DRAFT
2007 AQMP APPENDIX V

MODELING AND ATTAINMENT DEMONSTRATIONS

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CONTRIBUTORS

Elaine Chang, DrPH
Deputy Executive Officer
Planning, Rule Development and Area Sources

Laki Tisopulos, Ph.D., P.E.
Assistant Deputy Executive Officer
Planning, Rule Development and Area Sources

Joseph Cassmassi
Planning & Rules Manager
Planning, Rule Development and Area Sources

Kevin Durkee
Mark Bassett
Kathy Hsiao
Bong-Mann Kim
Satoru Mitsutomi

Chris Nelson
Zorik Pirveysian
Jill Whynot
Susan Yan
Zhang, Xinqiu

Production
Faye Thomas

CALIFORNIA AIR RESOURCES BOARD

Linda Murchison
Division Chief
Technical Support Division

John DaMassa
Branch Chief

Kurt Karperos
Branch Chief

Bruce Jackson
LucilleVan Ommering

Sylvia Oey

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MODELING OVERVIEW

INTRODUCTION

This appendix to the Draft 2007 AQMP provides the details of the modeling attainment demonstrations presented in Chapter V of the main document. The federal Clean Air Act (CAA) sets forth specific criteria to use air quality simulation modeling techniques to estimate future air quality in areas that do not meet the air quality standards. This Draft 2007 AQMP provides future year attainment demonstrations for two new pollutants: 8-hour average ozone and both annual and 24-hour average PM2.5.

The South Coast Air Basin (Basin) is currently designated nonattainment for PM2.5, ozone (8-hours), PM10 (24-hours) and carbon monoxide. On February 24, 2006, CARB forwarded the District's request to U.S. EPA to redesignate the Basin attainment for carbon monoxide. Air quality monitoring data measured from 2001 through 2005 indicated that the standard had been achieved and currently continues to be met. Future year projections of CO provided in the 2003 AQMP and projections from CARB's EMFAC2002 emissions model were used to support the redesignation request and provide the basis for a CO maintenance plan for the Basin. EPA's final approval of the redesignation request is currently pending.

Similarly, on October 17, 2006, the Federal Register codified EPA's decision revoking the annual PM10 standard. The action left the 24-hour average PM10 standard in place. Over the past decade, the Basin has experienced only a handful of days with 24-hour average PM10 concentrations exceeding the standard. The District has yet to seek redesignation to attainment for PM10 however it will open discussions with EPA on the applicability of the "Clean Data Policy" to the Basin situation. Regardless, the Draft 2007 AQMP will provide an updated attainment demonstration for 24-hour average PM10 to serve as the basis for a future maintenance plan.

The 2003 modeling attainment demonstrations served as an update of the 1997 AQMP ozone, PM10 and carbon monoxide plans for the South Coast Air Basin and other portions of the Southeast Desert Modified Nonattainment Area that are under the District's jurisdiction and were submitted as part of the California SIP. The Draft 2007 AQMP provides attainment demonstrations for 8-hour ozone and PM2.5 and provides similar linkage to the 2003 1-hour ozone and PM10 attainment demonstrations. This plan reflects the updated emissions baseline and future year estimates, new technical information and enhanced air quality modeling techniques and episodes.

Control Strategy

The Basin is currently designated nonattainment for PM2.5, and severe-17 nonattainment for ozone. These two pollutants, PM2.5 and ozone, are linked to common precursor emissions. The District's goal is to develop an integrated control strategy which: 1) ensures that ambient air quality standards for all criteria pollutants are met by the established deadlines in the federal Clean Air Act (CAA); and 2) achieves an expeditious rate of reduction towards the state air quality standards. The overall control strategy is designed so that efforts to achieve the standard for one criteria pollutant do not cause unnecessary deterioration of another. A two-step modeling process has been conducted for the 2007 AQMP. First, future year annual and 24-hour average PM2.5 is simulated to demonstrate attainment by 2015. The future year 8-hour average ozone emissions control strategy then builds upon the PM2.5 strategy to demonstrate attainment of the federal standard in 2021. This two-step approach is described in Chapter 4 of the main document and the control measures are extensively discussed in Appendices IVA, IVB and IVC. The two-step approach is also consistent with the approach used in the 2003 AQMP to first demonstrate attainment in 2006 of the PM10 standard and subsequent attainment of the 1-hour average ozone standard in 2010.

Model Selection

During the development of the 2003 Plan, the District convened a panel of seven experts to independently review the regional air quality modeling conducted for ozone and PM_{10}. The focus of the panel's review was to provide guidance in the selection of an appropriate meteorological-air quality dispersion platform for the attainment analysis. At that time, District and CARB modeling staff were evaluating three potential models for application using SAPRC99 chemistry: California Photochemical Grid Model (CALGRID) [Yamartino, et. Al, 1989], the Comprehensive Air Quality Model with Extensions (CAMx) [Environ, 2002], and the Urban Airshed Model (UAM) [EPA, 1990]. The performance of the three models varied with only UAM displaying the capacity to closely recreate the peak 1-hour average ozone concentrations observed for the August 5, 1997 meteorological episode. The performance of the CAMx and CALGRID simulations was similar and although they under-predicted peak concentrations, model output provided a better characterization of the spatial distribution of ozone in the Basin.

In general, the recommendations of the panel members supported the use of the UAM modeling platform for the 2003 attainment demonstrations, primarily based upon the District staff's familiarity with the model and that goal of recreating the regional peak ozone concentrations was critical. They also recommended that a relative reduction approach be applied to the performance of CAMx and CALGRID to see if future year emissions reductions would be consistent with the UAM projected rates of reduction. Most important, the consensus of the panel was for the District to move from UAM to the more current state-of-the-art dispersion platforms and chemistry modules. Among the recommended candidates were the Community Multiscale Air Quality Model (CMAQ) [USEPA, 1999] and CAMx both coupled with SAPRC99 chemistry and the prognostic Pennsylania State University / National Center for Atmospheric Research

Mesoscale Model Version 5 (MM5) [Grell,et. al., 1994]. Both CAMx and CMAQ can simulate ozone and PM2.5 concentrations together in a "one-atmosphere" approach and in response to the expert panel recommendations, District and CARB staff has selected CAMx as the primary regional dispersion modeling platform for the attainment demonstrations.

Table V-1-1 provides a summary comparison of the modeling technology used in the 2003 and Draft 2007 AQMP's.

TABLE V-1-1

Comparison of Modeling Methodologies used in the 2003 and Draft 2007 AQMP

Mechanism	Ozone		PM2.5	
	2003 AQMP	Draft 2007 AQMP	2003 AQMP	Draft 2007 AQMP
Dispersion Platform	UAM-IV	CAMx	UAM-IV	CAMx
Chemistry	SAPRC99	SAPRC99	AERO-LT/ CB-IV	PMCAMx "One Atmosphere"
Meteorology	CALMET/ Hybrid	MM5/FDDA	Diagnostic Wind Model	MM5
Mobile Emissions	EMFAC2002	EMFAC2007	EMFAC2002	EMFAC2007
Boundary	EPA "Clean"/ SCOS97	WRAP-CAMx-GEOCHEM	Modified EPA "Clean"	WRAP-CAMx-GEOCHEM

The following sections provide a brief overview of the PM2.5, PM10 and ozonemodeling methodologies. Wherever possible, the Draft Modeling Protocol will be used as a reference document to avoid duplicating presentation material. Draft Modeling Protocol is included in this Appendix as Attachment 1.

MODELING METHODOLOGY

Design Values and Relative Response Factors (RRF)

The Draft 2007 AQMP modeling approach to demonstrate attainment of the air quality standard relies heavily on the use of design values and relative response factors (RRF, previously referred as relative reduction factors) to translate regional modeling simulation output to the form of the air quality standard. Both ozone and PM2.5 have standards that require three consecutive years of monitored data, averaged by a designed form, to assess compliance. In the case of ozone, compliance to the standard is determined from a three year average of the 4^{th} highest daily ozone 8-hour average concentration. The PM2.5 annual design value is determined from quarterly average PM2.5 concentrations, averaged by year, for a three year period. For the 24-hour average PM2.5 design value, the 98^{th} percentile daily concentration sampled from a year is selected and then averaged for a three year period. The complexity of the design values does not lend itself to a direct attainment demonstration that relies on explicit air quality model simulation predictions of future air quality based on one or several meteorological episodes.

To bridge the gap between air quality model output evaluation and applicability to the health based air quality standards, EPA guidance (EPA, 2006) has proposed the use of relative response factors. The RRF is simply a ratio of future year predicted air quality with the control strategy fully implemented to the simulated air quality in the base year. The attainment demonstration consists of multiplying the non-dimensional RFF to the base year design value to predict the future year design value. Thus, the simulated improvement in air quality, based on one or more meteorological episodes, is translated as a metric that directly determines compliance in the form of the standard. Equations 5-1 and 5-2 summarize the calculation.

Eq. 5-1.

$$RRF_i = \text{Future-Year Model Prediction}_i / \text{Base-Year Model Prediction}_i$$

where i is the pollutant or species

Eq 5-2.

Attainment Demonstration

$$= \sum RRF_i \text{ X Design Value}_i \leq \text{Air Quality Standard}$$

The modeling analyses described above use the RRF and design value approach to demonstrate future year attainment of the standards.

PM2.5

The Draft 2007 AQMP employs CAMx using the "one atmosphere" approach comprised of the CB-IV gas phased chemistry and a static two-mode particle size aerosol module as the particulate modeling platform. The analysis follows EPA's recommended speciated modeling attainment test (SMAT), whereby model simulations for the base and future-year controlled emissions are used to generate RRFs at selected sites where monioting data is available for individual species. The site and species specific RRFs are calculated on a quarterly basis and then applied to quarterly desing values to determine attinament. The procedure is significant departure from the 2003 AQMP where a direct deterministic approach was used to directly calculate future year PM2.5 from model output.

In the 2003 AQMP the UAMAERO-LT model was used to simulate annual average Basin concentrations of PM2.5 and PM10. UAMAERO-LT model was a simplified version of the UAM-AERO model. The detailed thermodynamic routine (ISOROPIA) of the UAM-AERO model was replaced with the parameterized inorganic gas/aerosol partitioning module. The secondary organic aerosol formation scheme was replaced with a condensed version of the Carnegie Melon University (CMU) secondary organic aerosol module. The CMU module treats organic products as semi-volatile species and employs an equilibrium approach to the gas/aerosol partitioning of these species. In addition, the detailed particle-sizing scheme used in the UAM-AERO model was also replaced by an observation-based, two size (fine and coarse) particle-sizing scheme for secondary aerosols. UAMAERO-LT utilized a full Carbon Bond IV gas-phase chemical mechanism to simulate the formation of particulate nitrate, sulfate, ammonium, organic carbon, elemental carbon and other primary particles. By implementing the fine and coarse particle-sizing scheme for secondary aerosols, the 2003 AQMP was able to provide a first look at future year PM2.5 and the initial required emissions reductions that would be needed to attain the proposed federal standard.

The preliminary PM2.5 modeling approach crafted for the 2007 AQMP was to move the empirical AERO-LT chemistry from the UAM to CAMx to take advantage of the advanced dispersion platform. Parallel testing was conducted to evaluate the CAMx/AERO-LT performance against CAMx using the "one atmosphere" approach comprised of the the CB-IV chemistry and a static two-mode particle size aerosol module. The results of the analysis indicated that the two model/chemistry packages were performing similarly and that the speed of simulating an annual average using CAMx "one atmosphere" was approximately equal to that of the AERO-LT combination. As a consequence, the PM2.5 modeling approach shifted to the use of the CAMx "one atmosphere" as the primary tool.

Annual PM2.5 Modeling Approach

In the Draft 2007 AQMP, CAMx annual average PM2.5 modeling simulations were generated for 2005, 2014 and 2020 baseline emissions and 2014 and 2020 controlled emsissions scenarios. The 2005 CAMx simulation was conducted using baseline monthly temperature and humidity corrected emissions, for a weekday, Saturday and Sunday activity profile. Seasonal boundary conditions were extracted from the Western Regional Air Partnership (WRAP) regional modeling simulations (initialized from global air quality model output) in support of the Regional Haze Rule demonstrations. The simulations were driven by MM5 meteorological fields; five day-simulations with a one day "ramp-up" period using NCEP model inintialzation.

CAMx simulations used the same gridded region (5 km squared, 280 easting and 3650 northing, 65 by 40 grid cells) as that used for the 2003 UAMAERO-LT analyses. The vertical structure was increased to 11 layers (compared with the 5-layer analysis of UAMAERO-LT), but less than the 19 layers used for the MM5 simulations in effort to conserve computational resources. MM5 was used to generate the meteorological profile for each day in 2005. The MM5 simulations were generated for the larger SCOS97 modeling domain employing a 5 km square grid and fit to the smaller PM2.5 grid. The MM5 simulations were initialized from NCEP analyses and run for 5-day increments without the four dimensional data assimilation (FDDA) option.

Speciated PM2.5 data measured from the District's Multiple Air Toxic Evaluation Program (MATES-III) during 2005 provided the characterization for evaluation and validation of the CAMx annual and episodic demonstrations. A brief summary of the MATES-III field program and a detailed description of the data is provided in Chapter 2. Model performance was evaluated against monitored particulate PM2.5 air quality data for six species (ammonium, nitrates, sulfates, organic carbon, elemental carbon, and primary) and total particulate mass. Annual data from nine MATES-III monitoring sites, including Los Angeles, Anaheim, Wilmington, Long Beach, Compton, Burbank, Pico Rivera, Rubidoux, and Fontana, were used in the validation. The future year attainment demonstration was analyzed for 2014 controlled emissions, thus enabling an annual demonstration based on a control strategy that would be fully implemented by January 1, 2015.

Future year PM2.5 air quality (2014 and 2020) was determined using site and species specific RRF's applied to 2005 PM2.5 design values per EPA guidance documents. The quarterly RRF's were calculated from the controlled 2014 simulation and the 2005 baseline simulation. The design values were determined from the federal reference method Size Selective Inlet (SSI) High-Vol PM2.5 data measured at the District's air monitoring network from 2003-2005. The SSI PM2.5 design values were calculated by quarter then apportioned by species based on the distribution observed in the MATES-III data.

<u>Episodic 24-Hr Average PM2.5 Modeling Approach</u>

Per PM2.5 guidance, two options are provided to determine RRFs for the future year 24-hour average PM2.5 attainment demonstration. The first option uses episodic modeling with day-specific emissions for representative meteorological episodes to calculate RRFs and apply the RRF to the design value. The second approach proposed by EPA relies on an average response to implementation of emissions control for the top 25 percentile of days in each quarter of the annual model simulation.

The maximum 24-hour PM2.5 design value (based on 2003-2005 data) for the Basin (64.8 $\mu g/m^3$) meets the current federal standard. Of great interest is how will the 24-hour PM2.5 concentraios fair compared to the new standard of 35 $\mu g/m^3$ when that standard become effective in 2010. On the basis of our initial simulations and analysis, the District feels that the future design calculation based on the episodic modeling represents a higher threshold to demonstrate future attainment (either 2015 or 2020) than the method based on the top 25 percentile day, quarterly. Given the severity of the PM2.5 problen in the Basin and the health impacts, it is imperitive to provide the extra measure of protection to the impacted public.

Episodic Simulations

The first approach to determine future year 24-hour maximum or 98th percentile PM2.5 impacts relied on the simulation of one or more representative peak PM2.5 epsiodes where observed concentrations exceed 65 $\mu g/m^3$. The peak PM2.5 24-hour average concentration observed in the Basin during the 2005 MATES-III monitoring program (110 µg/m3 at Rubidoux) occurred on October 22, 2005. Episode specific emissions for the peak and preceding days were temperature and humidity corrected and MM5/FDDA simulations were generated to provide the meterorlogical imput.

Quarterly Top 25 Percentile

For this approach, the 2005 observational data are sorted by quarter of year and further into the top 25 percent of days in each quarter. PM2.5 RRFs are calculated on a quarterly basis from the future and base year annual simulations for only those days in the top 25 percentile per quarter. The quarterly RRFs are then applied to the quarterly 24-hour average PM2.5 design values to develop quarterly future year design values which are later aggregated into an annual 24-hour future year design value to assess attainment. (The measured quarterly 24-hour average PM2.5 design values were comprised of the 98th percentile data in each quarter for the years 2003, 2004 and 2005. The quarterly 24-hour average PM2.5 design values are presented in Chapter 2.

PM10

As previously discussed, on September 21, 2006 the U.S. EPA administrator signed the final documents that eliminated the existing annual PM10 standard. The action retained 24-hour PM10 standard at its existing concentration of 150 μg/m^3. The form of the 24-hour PM10 standard allows for one violation of the standard annually. The Basin currently meets the 24-hour average federal standard however, no petition to EPA to re-designate the Basin as attainment status has been submitted. (The only days that exceed the standard are associated with high wind natural events or exceptional events due to wildfires).

For this analysis, the annual second maximum concentration is used for the attainment demonstration (given the standard allows for one violation annually). Riverside-Rubidoux has been the PM10 24-hour design site in nine of the past ten years when high wind days have been excluded from the analysis. The 2005 design value at Rubidoux is 86 percent of the federal standard. The standard attainment demonstration is conducted to assure that the Basin will continue to be in compliance in future years.

As a conservative analysis, only emissions reductions associated with the PM2.5 portion of the 24-hour PM10 concentration are assumed to be impacted by future year emission controls. Future year predictions of maximum and second maximum 24-hour average PM10 are calculated using the site specific annual average PM2.5 RRFs applied to the PM2.5 portion of the PM10 design concentration. The average PM2.5 RRFs calculated from the nine sites, for 2005 to 2014, are applied to the fine portion of the 24-hour PM10 distribution for sites other than the MATES-III, which have the PM2.5 speciation. The coarse portion of the PM10 is assumed to be held constant in this analysis. The predicted reductions to the fine portion are then added to the coarse to estimate a 2015 second maximum PM10 24-hour average concentration.

OZONE

The CAA requires that ozone nonattainment areas designated as serious and above use a photochemical grid model to demonstrate attainment. CAMx was selected as the modeling tool used in the Draft 2007 AQMP ozone modeling attainment demonstration. CAMx is an urban scale, three-dimensional, grid-type, numerical simulation model. For the Draft 2007 AQMP, CAMx has been coupled with SAPRC99 gaseous chemistry for the ozone attainment demonstration. Althouugh not used as the primary modeling tool, CAMx simulations provided supporting documentation for the 2003 AQMP ozone attainment demonstration. In addition, as prevouly discussed, CAMx is one of the modeling platforms recommended by the peer review.

Modeling Approach

CAMx simulations were conducted using the 5 km squared grid over the SCOS97 modeling domain. Specifically, the UTM Zone 11 coordinates of the domain are 150-700 km UTM East and 3580-3950 km UTM North. The modeling analyses were run using 16 vertical layers up to 5000 m above ground level.

CAMx simulations were generated for six meteorological episodes including two periods in 2004, three periods in 2005 and one in 1997. Table V-1-2 provides a comparison for the meteorological episodes evaluated in the current and preceding attainment demonstrations. The August 1997 SCOS97 meteorological episode was retained for this analysis to provide a bridge from the 2003 AQMP attainment demonstration. The five episodes observed in 2004 and 2005 occurred during MATES-III, and the EPA Photochemical Assessment Monitoring Stations (PAMS) programs, a period of enhanced air quality monitoring in the Basin. Supporting MATES-III, the District operated three radar wind profilers in the Basin, with radio acoustic sounding systems. Additional profiler data was obtained from operating sites in Ventura and San Diego Counties.

TABLE V-1-2

Comparison of Ozone Meteorological Epsiodes used in the 2003 and Draft 2007 AQMP

2003 AQMP	Draft 2007 AQMP
August 4-7, 1997	August 4-7, 1997
	June 3-7, 2004
	August 4-8 , 2004
	May 17-24, 2005
	July 14-19, 2005
	August 25-29, 2005

Selection of episodes from 2004 and 2005 was also made to avoid the fuel commingling associated with the Phase III California Fuel Reformulation where the primary oxygenate was changed from MTBE to ethanol. Commingling of ethanol and non-ethanol based fuels leads to enhanced evaporative VOC emissions and thus more ozone. Quantification of the amount of commingling taking place on a daily or episodic basis was nearly impossible. Implementation of the fuel switch from MTBE to ethanol took place in California during 2003 and was assumed to be completed by December 31, 2003. Selecting meteorological episodes post 2003 reduced the uncertainty associated with the estimation of the VOC emissions inventory due to commingling.

The meteorological fields used for the CAMx ozone simulations were generated using MM5 with the FDDA option. The meteorological fields were developed using a Lambert Conformal grid adapted for the the SCOS97 modeling domain. MM5 was simulated using 34 vertical layers and simulations were initialized using the NCEP global weather forecast model analysis. The MM5 fields were post-processed to layer-averaged winds to the levels defined for the CAMx simulations and to adjust coordinates to the UTM system.

Day-specific point, mobile and area emissions inventories were generated for each meteorological episode. Mobile source emissions were temperature corrected by grid using a VMT weighted scheme. County-wide area source emissions were temperature corrected and gridded using the spatial emissions surrogate profiles developed for the 2003 AQMP. A more detailed description of the meteorological episode selection, meteorological modeling and validation and the episodic emissions inventory development is presented in Chapert 4.

<u>Application of RRF's</u>

Unlike the regional ozone modeling conducted for the 2003 AQMP that based the attainment demonstration on the direct results of a future year simulations, the procedure for determining future year attainment of the 8-hour ozone standard for the Draft 2007 AQMP relies on the use of site specific RRF's determined from a series of simulations for the 2002 and 2020 controlled emissions. The basic procedure is outlined earlier in this chapter. The ozone attainment demonstration is anchored by the 2002 base-year emissions. The meteorological episodes are first validated based on model performance using day-specific emissions for each base-case (e.g. 1997, 2004 or 2005). The suites of validated episodes are then simulated using the 2020 controlled and 2002 emissions to determine a site specific average set of RRFs. The site specific RRF is applied to the 2002 design value to determine whether attainment has been satisfied.

A minimum of 5-episode days is required to determine the site specific RRF. The evaluation requires that the model performance for the day is within guidelines and that a minimum observed concentration at each site used in the analysis exceeds 70 ppb or is simulated at 85 ppb or greater. Per EPA modeling guidance, since the CAMx regional modeling is based on a 5 km squared grid, the ozone performance evaluation and peak RRF calculation is based on a comparison of the observed concentration and the predicted concentration within a 15 km radius of the grid hosting the observation. (Data are evaluated for a 7 X 7 grid area).

UNCERTAINTIES ASSOCIATED WITH THE TECHNICAL ANALYSIS

As with any plan update there are uncertainties associated with the technical analysis. The following paragraphs describe the primary contributors to such uncertainties as well as some of the safeguards buildt in to the air quality planning process to manage and control such uncertainties.

Demographic and Growth Projections

Uncertainties exist in the demographic and growth projections for the future base years. As projections are made to longer periods (i.e., over ten or more years), the uncertainty of the projections become greater. Examples of activities that may contribute to these types of uncertainties include the rate and the type of new sources locating in the Basin and their geographic distribution, future year residential construction, military base reuse and their air quality impact, and economic prosperity.

Input Elements to Air Quality Models

In addition to the above, there are also uncertainties in the technical information gathered for the air quality analysis. There are three major input elements associated with any air quality modeling analysis: ambient air quality monitoring data; meteorological measurements; and emissions inventory. All three input elements have various levels of uncertainties impacting the technical analysis.

Ambient Air Quality Monitoring Data

Generally, ambient air quality measurements are within plus or minus half of a unit of measurement (e.g., for ozone usually reported in units of part-per-billion (ppb) would be accurate to within ± 5 ppb). Due to this uncertainty, the Basin's 8-hour attainment status based on ambient monitoring data would be achieved if all ozone monitors reported ozone concentration levels less than or equal to 84 ppb. Similar uncertainty is observed in particulate data measurements and labroratory analysis. For example, PM2.5 is comprised of six primary constituents ($NH4^+$, NO3, $SO4^-$, OC, EC and crustal), as well as bonded water and total mass. Each of the primary species has individual uncertainty associated with the laboratory analysis procedure used to analyze concentration, the type of filter media to collect the sample and the total mass can be affected by minor changes in the volumetric flow that fall within the approved instrument calibration range. As a consequence, the sum of the total species may not add up to or may exceed the filter measured mass.

Meteorological Measurements

Air Quality models have to rely on reliable meteorological input data to accurately simulate future ambient concentration levels. There are uncertainties associated with meteorological model input parameters, such as initializations from National Weather Service global and hemispheric simulations, or satellite estimates of ground level temperature and moisture. Direct measurements of instantaneous wind speeds and directions at varying levels above ground require averaging to hourly values before they can be assimilated into the numerical analyses. Layer averaging of model ouput reduces the sensitivity of the model to changing patterns in the vertical structure.

Emissions Inventory

As discussed in Chapter 3 of the main document, large uncertainties in the mobile source emissions inventory estimates have been observed as evident with the latest EMFAC2007 release. On-road mobile source emission estimates have increased with each new EMFAC release. On-road mobile source emissions have inherent uncertainties also with the current methodologies used to estimate vehicle activity such as vehicle miles traveled, the impacts of fuel additives such as ethanol and day-of-week diurnal profiles of traffic volume. Stationary (or point) source emission estimates have less associated uncertainties compared to area source emission estimates. Major stationary sources report emissions annually whereas area source emissions are, in general, estimated based on production or usage information. Area source emissions including paved road dust and fugitive dust have significant uncertainties in the estimation of particulate ($PM_{2.5}$) emissions due to the methodologies used for estimation, temporal loading and weather impacts.

Air Quality Models

The air quality models used for ozone and particulate air quality analysis are state-of-the-art, complex 3-dimensional models that utilize 3-dimensional meteorological models, complex chemical mechanisms that accurately simulate ambient reactions of pollutants and sophisticated numerical methods to solve complex mathematical equations that lead to the prediction of ambient air quality concentrations. While air quality models progressively became more sophisticated in employing improved chemical reaction modules that more accurately simulate the complex ambient chemical reaction mechanisms of the various pollutants, such improved modules are still based on limited experimental data which carry associated uncertainties. In order to predict ambient air quality concentrations, air quality models rely on the application of sophisticated numerical methods to solve complex mathematical equations that govern the highly complex physical and chemical processes that also have associated uncertainties.

Are There Any Safeguards Against Uncertainties?

Yes. While completely eliminating uncertainties is an impossible task, there are a number of features and practices build-into the air quality planning process that manage and control such uncertainties and preserve the integrity of an air quality management plan.

The concerns regarding uncertainties in the technical analysis are reduced with future AQMP revisions. Each AQMP revision employs the best available technical information available. Under state law, the AQMP revision process is a dynamic process with revisions occurring every three years. The AQMP revision represents a "snapshot in time" providing the progress achieved since the previous AQMP revision and efforts still needed in order to attain air quality standards.

Under the federal Clean Air Act, a state implementation plan (SIP) is prepared for each criteria pollutant. The SIP is not updated on a routine basis under the federal Clean Air Act. However, the federal Clean Air Act recognizes that uncertainties do exist and provides a safeguard if a nonattainment area does not meet an applicable milestone or attain federal air quality standards by their applicable dates. Contingency (or backstop) measures are required in the AQMP and must be developed into regulations such that they will take effect if a nonattainment area does not meet an applicable milestone or attainment date. In addition, federal sanctions may be imposed until an area meets applicable milestone targets.

In September 2006, U.S. EPA released an updated guidance document on the use of modeled results to demonstrate attainment of the federal ozone, PM2.5 and regional haze air quality standards. The guidance document recognized that there will be uncertainties with the modeling analysis and recommends supplemental analysis or weight of evidence discussion that corroborates the modeling attainment analysis where attainment is likely despite the modeled results which may be inconclusive. Table V-1-3, is taken directly from the modeling guidance document to illustrate the value of supplemental analyses. Where possible, the U.S. EPA recommends that at least one "mid-course" review of air quality, emissions and modeled data be conducted. A second review, shortly before the attainment date, should be conducted also. Statistical trend analyses can also provide support for assessing the likelihood for future year attainment. Such actions will occur in the South Coast Air Quality Management District.

TABLE V-1-3

Guidelines for Weight of Evidence Determinations (U.S. EPA, 2006)

Results of Modeled Attainment Test			Supplemental Analyses
Ozone	Annual PM2.5	24-Hour PM2.5	
Future Design Value < 82 ppb, all monitoring sites	Future Design Value < 14.5 $\mu g/m^3$, all monitoring sites	Future Design Value < 62 $\mu g/m^3$, all monitoring sites	Basic supplemental analyses should be completed to confirm the outcome of the modeled attainment test
Future Design Value 82 - 87 ppb, at one or more sites/grid cells	Future Design Value 14.5 – 15.5 $\mu g/m^3$, at one or more sites/grid cells	Future Design Value 62 – 67 $\mu g/m^3$, at one or more sites/grid cells	A weight of evidence demonstration should be conducted to determine if aggregate supplemental analyses support the modeled attainment test

DOCUMENT ORGANIZATION

This document provides the federal attainment demonstrations for PM2.5, PM10 and ozone. Chapter 2 provides the PM2.5 attainment demonstration to meet the 2015 attainment date. The discussion includes future year (2015 and 2021) particulate impacts for both PM2.5. Chapter 3 provides an update to the 24-hour average PM10 attainment demonstration and a brief discussion on the impacts of the control strategy to regional visibility. Chapter 4 presents the ozone attainment demonstration based on the CAMx modeling analyses. The ozone analysis includes a characterization of the episodic, base-year modeling performance, and future year attainment for the control strategy. As with the particulate analyses, a series of alternative emissions simulations are presented to test the sensitivity of the proposed control strategy. Weight of evidence discussions for ozone and PM2.5 will be incorporated in Chapters 2 and 4 respectively in the final document. Chapter 5 presents the summary comparing predicted air quality to the state and federal standards and the projected 2014 PM2.5 and 2020 8-hour ozone carrying capacities. Table V 1-4 lists the Attachments to this document.

TABLE V-1-4

Attachments

Number	Description
	References
Attachment-1	Model Performance Statistics and Graphical Evaluation
Attachment-2	Draft Modeling Protocol
Attachment-3	Critiques of the Expert Reviewers
Attachment-4	CEPA Source Level Emissions Reduction Summary for 2014: Annual Average Inventory
Attachment-5	CEPA Source Level Emissions Reduction Summary for 2020: Annual Average Inventory
Attachment-6	CEPA Source Level Emissions Reduction Summary for 2014: Planning Inventory
Attachment-7	CEPA Source Level Emissions Reduction Summary for 2020: Planning Inventory

CHAPTER 2

THE FEDERAL PM2.5 ATTAINMENT DEMONSTRATION PLAN

INTRODUCTION

As outlined in Chapter 1 of this document, the CAMx “one atmosphere” gas-aerosol modeling system was used to develop the regional PM2.5 attainment demonstration for the Draft 2007 AQMP. The departure from the Urban Airshed Model with Linear Chemistry (UAM/LC) [Kumar, et al, 1995] modeling system was made to take advantage of CAMx’s better-more mass consistent dispersion platform, integrated gas phase (CB-IV) and aerosol chemistry (two size partitioned) and readily incorporated numerical prognostic meteorological model data.

EPA guidance on PM modeling for attainment demonstrations requires the use of a regional dispersion model in combination with relative response factors. The speciated modeling attainment test (SMAT) relies on the use of modeled performance of individual particulate species in the base year and future year controlled scenarios to produce relative response factor to be applied to design year data. The CAMx output provides comprehensive characterization of the six key segments of the PM2.5 distribution (NH4+, NO3, SO4, organic carbon (OC), elemental carbon (EC), and crustal) as well as nitric acid and the standard chemical mix associated with ozone production (O3, NO, NO2, CO, aldehydes, and VOC).

Particulate data measured in 2005 as part of the Multiple Air Toxics III (MATES-III) program provided the speciation of the PM2.5 samples. The MATES-III monitoring program began in April 2004 and continued through March of 2006. The data used for the attainment demonstration was measured from January 1, 2005 through December 31, 2005, in the middle of the MATES-III program. Problems observed in data typically associated with the start-up of a field program and ensuing initial laboratory analysis were minimized over the 8-months of lead sampling prior to 2005. All MATES-III measured data was subjected to extensive quality assurance procedures following the protocol outlined by EPA criteria.

The speciated PM2.5 sampled by the MATES-III program were a unique data set, separate from the data acquired through the standard Federal Reference Method (FRM) PM2.5 sampling network. Total mass sampled in parallel (MATES-III and FRM) using side-by-side samplers are not expected to directly. As such, EPA’s “Sandwich” methodology was invoked in this demonstration to estimate the contribution of bonded water to the speciated data and include of estimate of filter contamination (“blank”). These variables are inferred in the FRM PM2.5 data samples and their inclusion in the analysis provided for a more direct comparison to the FRM determined regional design values.

Of particular importance for this Appendix is that the emissions data used in the Draft 2007 AQMP PM2.5 attainment demonstration were those estimated and in place on September 1, 2006. Subsequent modifications to the draft point source and mobile source inventories (on-road and off-road) will eventually modify this analysis. At the time of writing this document, it is estimated that these emissions inventory updates will not result in significant differences to the outcome of the analysis.

The PM2.5 attainment demonstration is twofold to address the annual and 24-hour portions of the standard. The following sections of this chapter first address the MATES- III program and data, the AQMD FRM PM2.5 sampling network, the SMAT and Sandwich data analyses, the CAMx modeling setup and briefly the modeling emissions inventory. The following sections of this chapter provide first the annual PM2.5 attainment demonstration and supporting weight of evidence analyses then lastly, the episodic PM2.5 24-hour standard attainment demonstration.

PM2.5 Data

MATES-III Monitoring

MATES-III is the second follow up to the original MATES toxics analysis that took place in the later 1980's. MATES-II was comprised of an extensive field monitoring campaign and laboratory analysis, emissions inventory development and regional toxics modeling. The MATES-II sampling generated speciated PM10 from the TEP-2000 monitoring network using the PTEP samplers (described in the 2003 AQMP, Appendix V).. A comprehensive discussion of the MATES-II program is provided in the MATES-II final report and appendicies.

MATES-III PM2.5 samples are collected upon a 47mm quartz and Teflon filters simultaneously within the same particulate sampler for a 24-hour duration using a size selective sampler (SSI) in accordance to the method based on EPA's Federal Reference Method 40CFR50 (Draft MATES-III Protocol, 2004). Samples were taken every third day basis. Teflon filters were used for the analysis of total particulate mass, ions and metals. The PM2.5 quartz filter was used for the analysis of organic and elemental carbon using the IMPROVE or NIOSH method. The District also operates co-located speciated air sampling system (SASS) monitors for the carbon measurement at two sites (Central Los Angeles and Riverside-Rubidoux) as part of EPA' STN sampling network. Only the IMPROVE carbon data are incorporated in the attainment demonstration.

The MATES-III sampling network was comprised of nine monitoring sites at locations used in the MATES-II study. At least one site is situated in each of the four counties in the Basin with the bulk of the monitoring in Los Angeles. The locations of the monitoring stations were chosen to bridge the MATES-II and MATES-III exposure analysis but also to address environmental justice issues associated with goods movement and exposure to mobile source emissions. The sites are listed in Table V-2-1.

TABLE V-2-1

MATES-III Monitoring Network

Site	Address	County
Anaheim	1010 S. Harbor Blvd.	Orange
Burbank	228 W. Palm Ave.	Los Angeles
Compton	720 N. Bullis Ave.	Los Angeles
Fontana	14360 Arrow Highway	San Bernardino
Long Beach	3648 N. Long Beach Blvd.	Los Angeles
Los Angeles	1630 N. Main St.	Los Angeles
Pico Rivera	3713-B San Gabriel River Parkway	Los Angeles
Rubidoux	5888 Mission Blvd	Riverside
Wilmington	900 E. Lomita Blvd	Los Angeles

MATES-III Speciated Data

Annual Data

Figure V-2-1 provides the PM2.5 mass distribution for the 2005 MATES-III data. The data reflects the direct measurements at each station with an adjustment applied to the organic carbon to account for total mass. (This adjustment is discussed as part of the "Sandwich Method" in a later section.) The highest PM2.5 mass is measured at Burbank and Rubidoux and the lowest at Anaheim. Figure V-2-2 provides the speciation of the adjusted 2005 MATES-III data including bonded water and a filter blank correction at each on the nine monitoring sites. The speciated data includes ammonium, nitrates, sulfates, organic carbon (OC), elemental carbon (EC), sodium, chloride, and metals including aluminum, iron, silicon, titanium, nickel, and lead among others. Table V-2-2 provides the concentrations of the PM2.5 species observed in the MATES-III data while Table V-2-3 provides the percentage of total mass for the major component species.

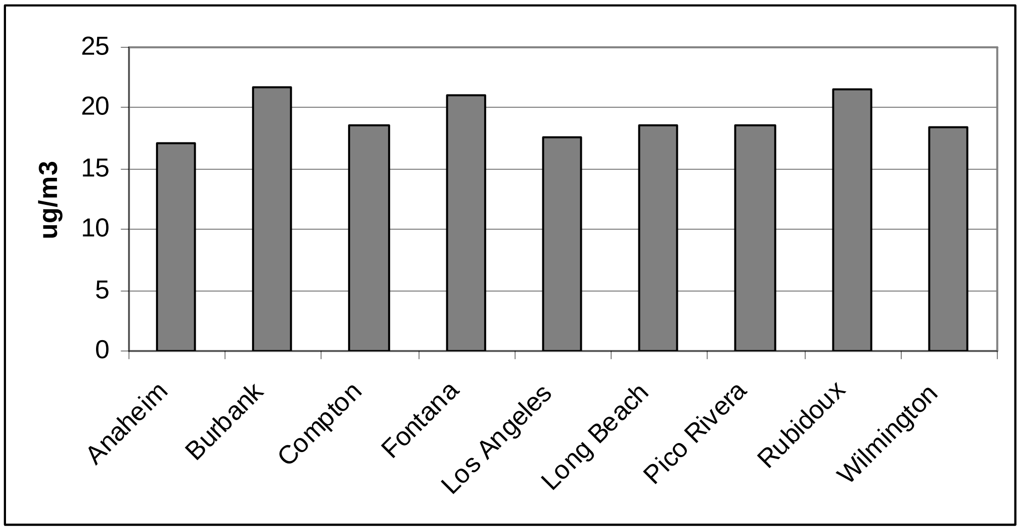

FIGURE V-2-1

MATES-III 2005 Annual PM2.5 Mass (µg/m3)

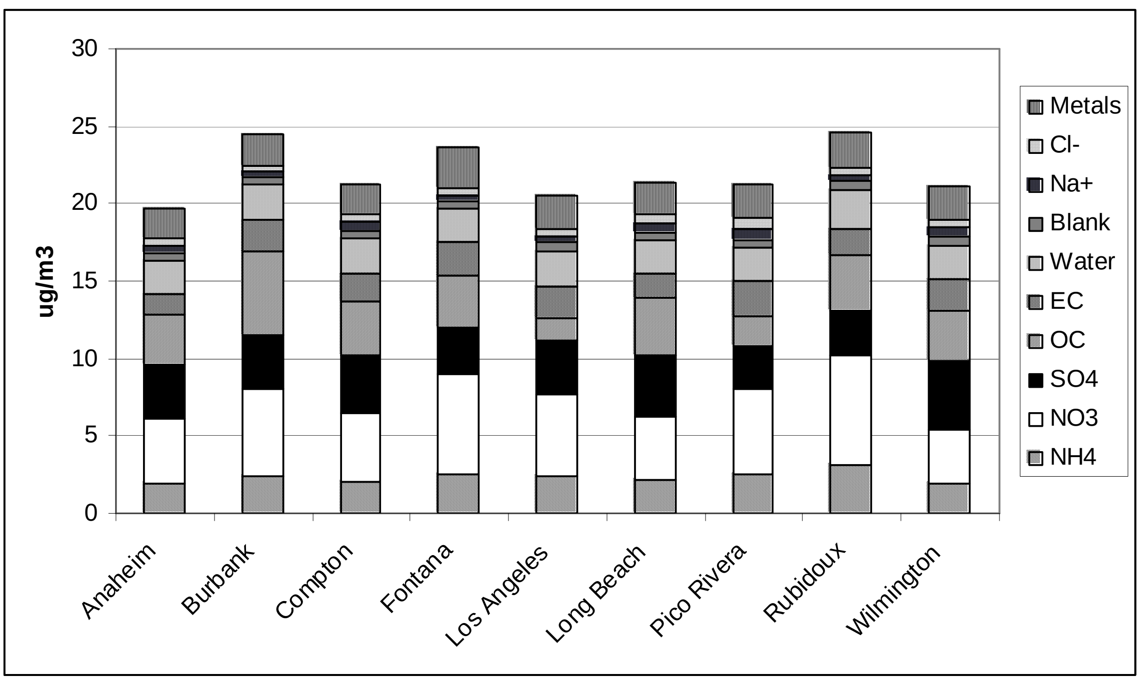

FIGURE V-2-2

MATES-III 2005 Annual Distribution of PM2.5 Species (µg/m3)
[Note: Data includes bonded water, the filter blank and filter mass adjustment for OC].

TABLE V-2-2

2005 Annual Percentage PM2.5 Species Contribution

Location	NH4	NO3	SO4	OC	EC	Na+	Cl-	Metals
Anaheim	10.9	24.9	20.5	18.5	8.4	3.3	2.8	10.8
Burbank	11.1	26.2	16.0	24.5	9.6	1.4	1.7	9.5
Compton	10.9	24.0	20.2	18.5	9.7	3.1	3.1	10.4
Fontana	11.9	30.5	14.4	16.2	10.3	1.9	1.8	12.9
Los Angeles	13.5	29.9	20.1	8.2	11.2	2.3	2.8	12.1
Long Beach	11.3	22.3	21.3	20.1	8.2	2.9	3.1	10.9
Pico Rivera	13.4	29.9	14.7	10.6	12.2	3.4	4.0	11.8
Rubidoux	14.3	33.1	13.1	16.8	7.9	1.9	2.4	10.6
Wilmington	10.3	19.3	23.8	17.5	11.5	3.4	2.7	11.5

TABLE V-2-3

MATES-III 2005 Annual PM2.5 Species Concentrations (µg/m3)

Location	NH4	NO3	SO4	OC	EC	Na+	Cl-	Metals	Mass
Anaheim	1.87	4.25	3.50	3.16	1.43	0.56	0.48	1.85	17.1
Burbank	2.41	5.68	3.47	5.32	2.08	0.31	0.37	2.06	21.7
Compton	2.03	4.47	3.76	3.45	1.81	0.58	0.57	1.93	18.6
Fontana	2.51	6.44	3.04	3.42	2.17	0.41	0.39	2.72	21.1
Los Angeles	2.37	5.26	3.53	1.45	1.97	0.40	0.49	2.13	17.6
Long Beach	2.10	4.14	3.96	3.74	1.52	0.54	0.57	2.03	18.6
Pico Rivera	2.50	5.57	2.73	1.97	2.27	0.63	0.74	2.19	18.6
Rubidoux	3.09	7.14	2.83	3.63	1.70	0.41	0.52	2.28	21.6
Wilmington	1.90	3.55	4.37	3.22	2.12	0.62	0.50	2.12	18.4

In general ammonium, sulfate and nitrates account for more than 50 percent of the total mass at each location. Rubidoux, Fontana and Pico Rivera are the most heavily impacted by nitrates. Sulfate is highest in the near coastal or port of Los Angeles/Long Beach areas, particularly Wilmington and Long Beach. OC measurements were highest at Burbank with EC ranging between 8-12 percent of the mass across the nine sites. All sites observed measurable concentrations of sodium and chloride ions reflecting the influence of the marine air as it is transported inland.

Quarterly Data

Figures V-2-3a –V-3-3i depict the adjusted 2005 MATES-III PM2.5 data by component species at each monitoring sites sorted by quarter. Table V-2-4 provides the quarterly design values for each site. PM2.5 concentrations are highest in either Quarter-3 or Quarter-4 at each site. The lowest concentrations are observed in the second quarter (with the exceptions of Rubidoux and Fontana). The contribution of the individual species varies by quarter as well. Sulfate is highest in Quarter-3 while nitrate are highest in Quarter-4 and to some extent Quarter-1. The species concentrations reflects the seasonal weather patterns where the higher values of sulfate typically occur under strong-elevated inversions and sea breeze transport inland, conditions that are prevalent in the Basin in late spring and summer. Nitrate chemistry is very dependent on the availability of water vapor and as a result Quarter-4, with the high humidity and frequent nocturnal inversions enhance regional formation. Organic carbon and elemental carbon values are also highest in Quarter-4 due to the poor dispersion from weak winds and low level inversions. Quarter-2 tends to have the lowest concentrations due to spring storms and favorable dispersion.

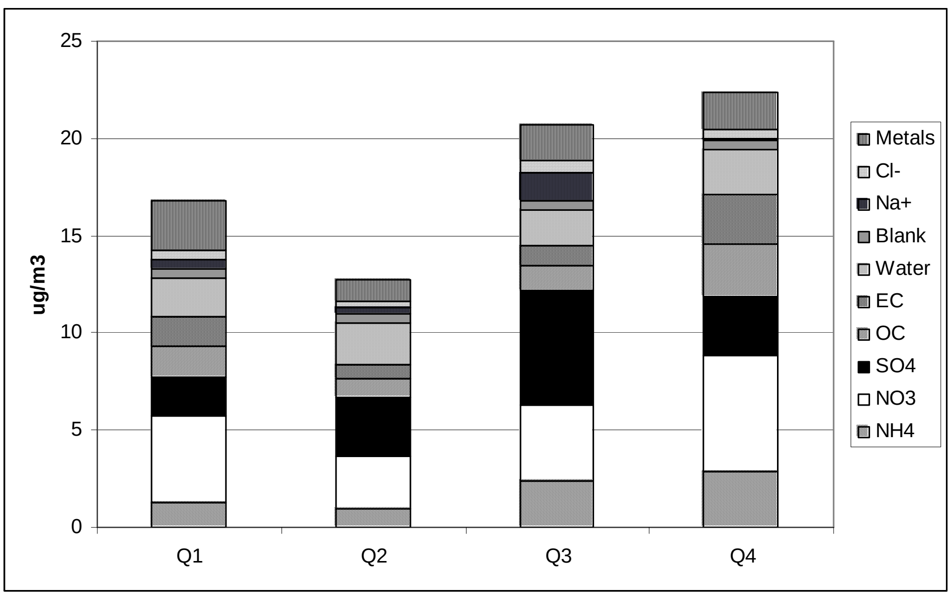

FIGURE V-2-3a

2005 Quarterly Distribution of PM2.5 Species at Anaheim (µg/m3)
[Note: Data includes bonded water, the filter blank and filter mass adjustment for OC].

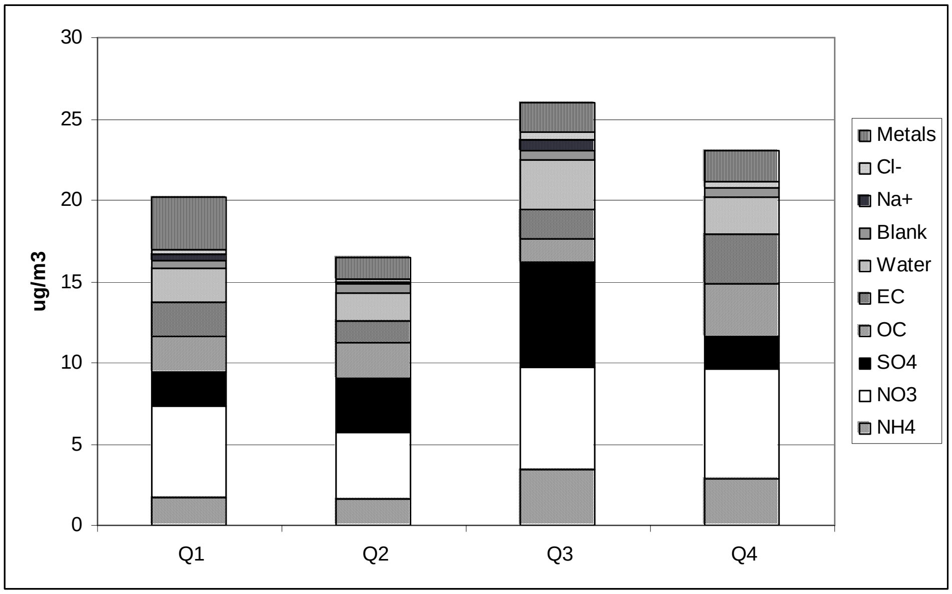

FIGURE V-2-3b

2005 Quarterly Distribution of PM2.5 Species at Burbank (µg/m3)
[Note: Data includes bonded water, the filter blank and filter mass adjustment for OC].

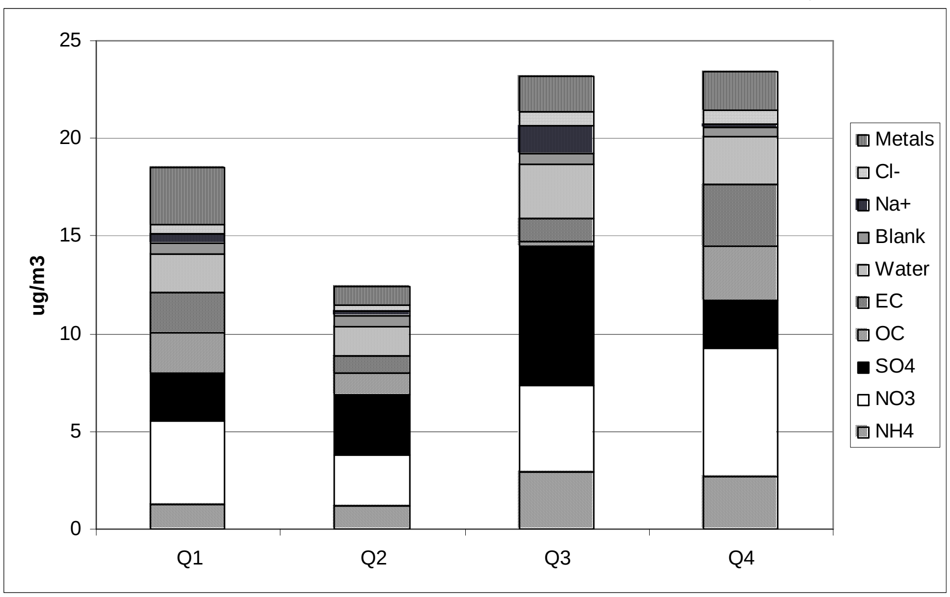

FIGURE V-2-3c

2005 Quarterly Distribution of PM2.5 Species at Compton (µg/m3)
[Note: Data includes bonded water, the filter blank and filter mass adjustment for OC].

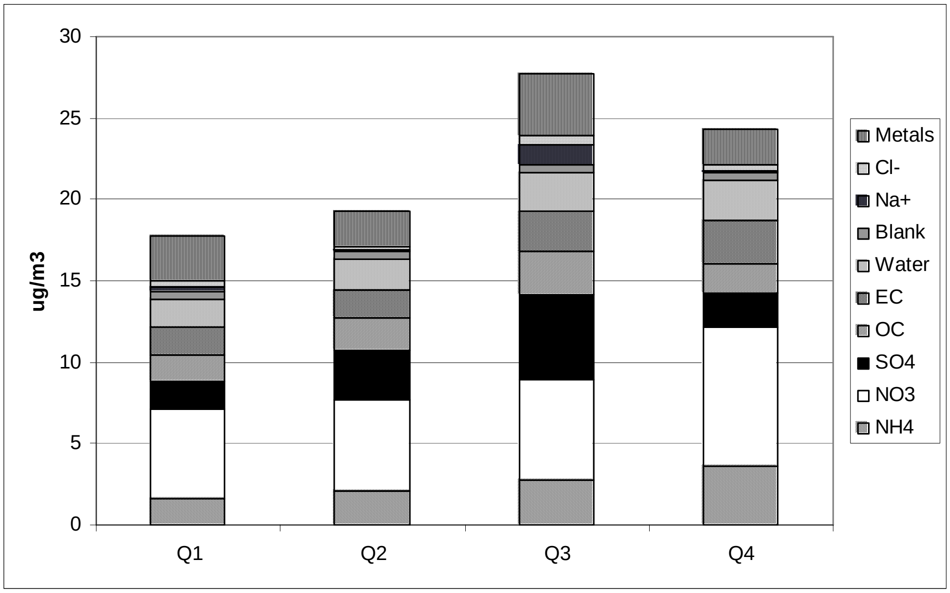

FIGURE V-2-3d

2005 Quarterly Distribution of PM2.5 Species at Fontana (µg/m3)
[Note: Data includes bonded water, the filter blank and filter mass adjustment for OC].

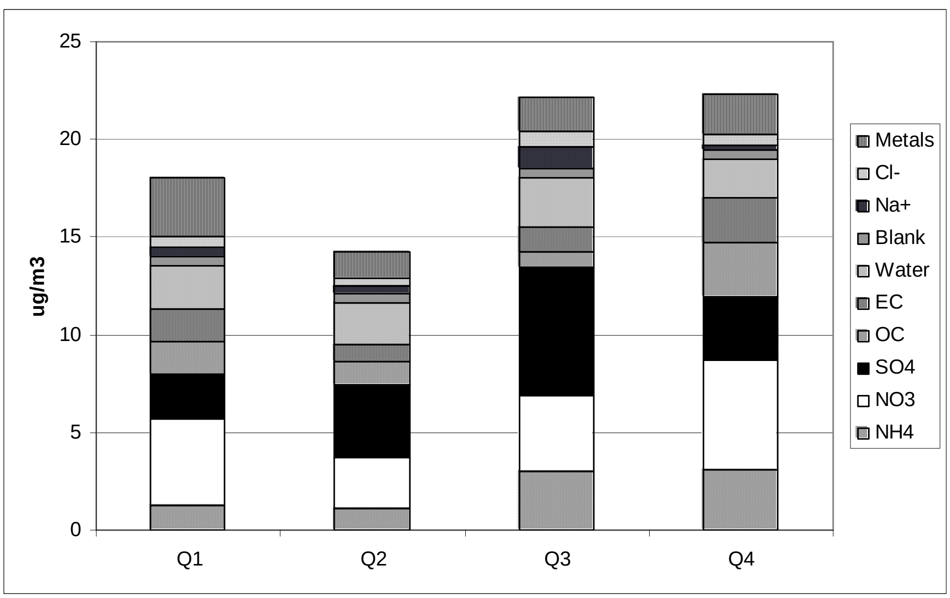

FIGURE V-2-3e

2005 Quarterly Distribution of PM2.5 Species at Long Beach (µg/m3)
[Note: Data includes bonded water, the filter blank and filter mass adjustment for OC].

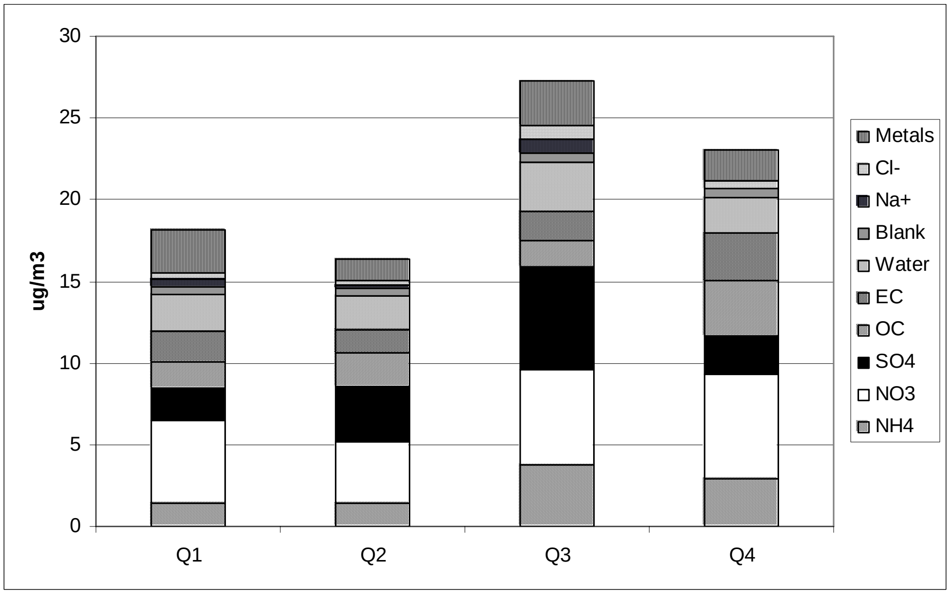

FIGURE V-2-3f

2005 Quarterly Distribution of PM2.5 Species at Los Angeles (µg/m3)
[Note: Data includes bonded water, the filter blank and filter mass adjustment for OC].

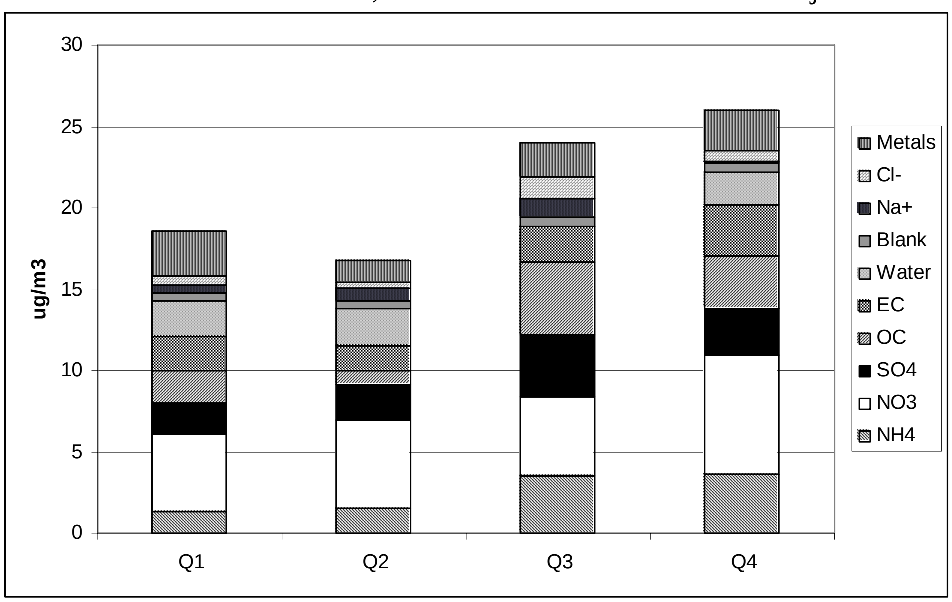

FIGURE V-2-3g

2005 Quarterly Distribution of PM2.5 Species at Pico Rivera (µg/m3)
[Note: Data includes bonded water, the filter blank and filter mass adjustment for OC].

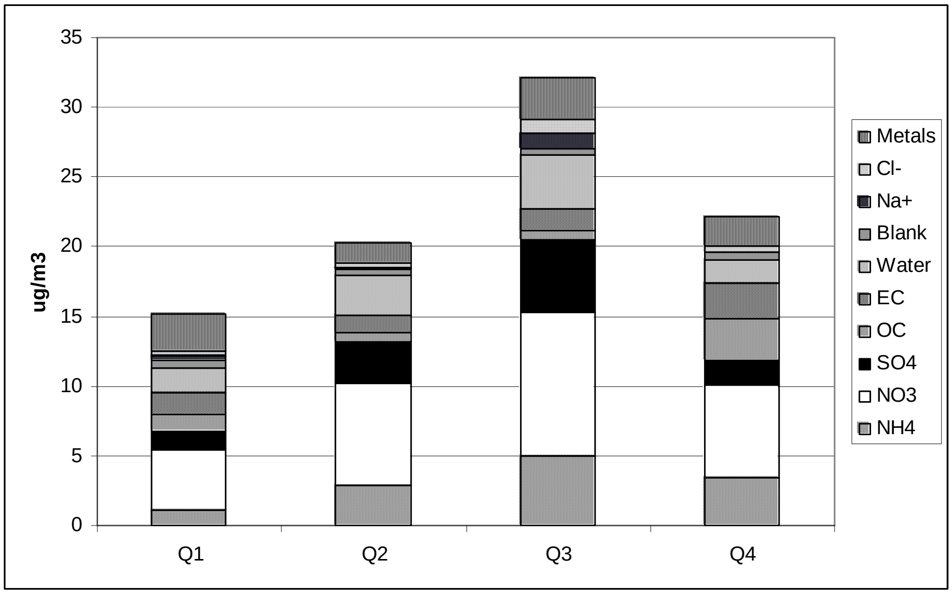

FIGURE V-2-3h

2005 Quarterly Distribution of PM2.5 Species at Rubidoux (µg/m3)
[Note: Data includes bonded water, the filter blank and filter mass adjustment for OC].

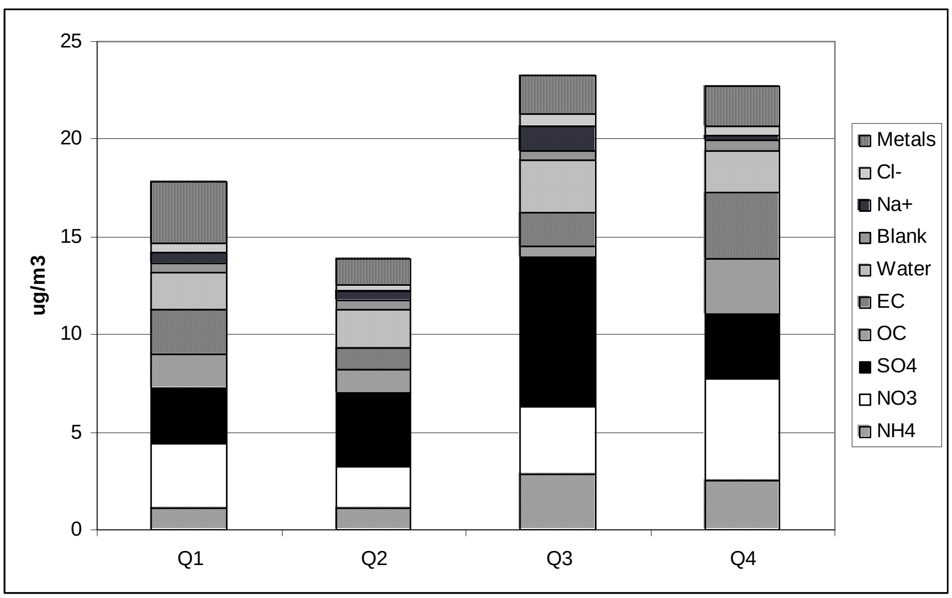

FIGURE V-2-3i

2005 Quarterly Distribution of PM2.5 Species at Wilmington (µg/m3)
[Note: Data includes bonded water, the filter blank and filter mass adjustment for OC].

TABLE V-2-4

FRM Annual and Quarterly PM2.5 Design Concentrations (2003-2005)
at MATES-III Monitoring Sites (µg/m3)

Location	Quarter-1	Quarter-2	Quarter-3	Quarter-4	Annual
Anaheim	17.6	12.4	15.4	20.0	16.4
Burbank	18.7	15.2	20.7	20.3	18.7
Compton	16.7	13.3	18.2	21.8	17.5
Fontana	18.7	19.2	20.2	23.2	20.3
Los Angeles	19.7	16.3	20.2	22.2	19.6
Long Beach	18.0	12.7	15.7	22.9	17.3
Pico Rivera	20.3	14.4	18.8	23.2	19.2
Rubidoux	21.2	21.9	22.6	24.9	22.7
Wilmington	12.7	10.9	15.7	19.6	14.7

On average, the annual MATES-III data are consistent with the annual design values. The quarterly data follows with the exceptions of Rubidoux and Fontana which exhibited higher Quarter-3 mass than usual.

FRM PM2.5

The AQMD measures PM2.5 using the federal reference method Size Selective Inlet (SSI) High-Vol method at 16 air monitoring sites in the Basin. The FRM PM2.5 data are used in this analysis to expand the future year predictions to the entire Basin and to corroborate the attainment demonstration at the grid level. Figure V-2-4 depicts the isopleths of 2005 annual PM2.5 from the FRM sites in the Basin. Table V-2-5 provides the quarterly and annual design values for the FRM sites. Note: design values for the sites used for the MATES-III networks are listed in Table V-2-4 above.

The FRM data depicted in Figure V-2-4 clear delineates the extent of the PM2.5 problem in the Basin. PM2.5 is essentially a combustion generated pollutant and with the volume of traffic flow, numbers of sources (both point and area) located in the region, concentrations exceed the annual federal standard (15 µg/m3) throughout the Basin. The area with the highest annual concentration includes southwest San Bernardino and Northwest Riverside Counties. These areas have design values exceeding 20 µg/m3 and incorporate both the Fontana and Rubidoux air monitoring stations. It is important to note that the areas with the highest concentrations are directly downwind of a major ammonia source area associated with dairies and poultry farming. These industries are rapidly moving from the Basin and are expected to contribute less to particulate formation in future years.

TABLE V-2-5

FRM Annual and Quarterly PM2.5 Design Concentrations (2003-2005)
at the Remaining Basin PM2.5 Monitoring Sites (µg/m3)

Location	Quarter-1	Quarter-2	Quarter-3	Quarter-4	Annual
Azusa	16.2	15.9	21.1	19.6	18.2
Big Bear	12.8	8.0	7.7	14.7	10.8
Lynwood	19.3	14.6	18.3	22.9	18.8
Mission Viejo	12.0	10.2	12.7	12.9	11.9
Ontario	21.0	17.9	20.5	25.3	21.2
Pasadena	15.5	14.6	18.6	18.5	16.8
Reseda	14.3	13.4	15.9	17.8	15.4
Riverside Magnolia	18.9	19.8	20.6	22.5	20.5
San Bernardino	18.2	20.3	21.6	21.8	20.5

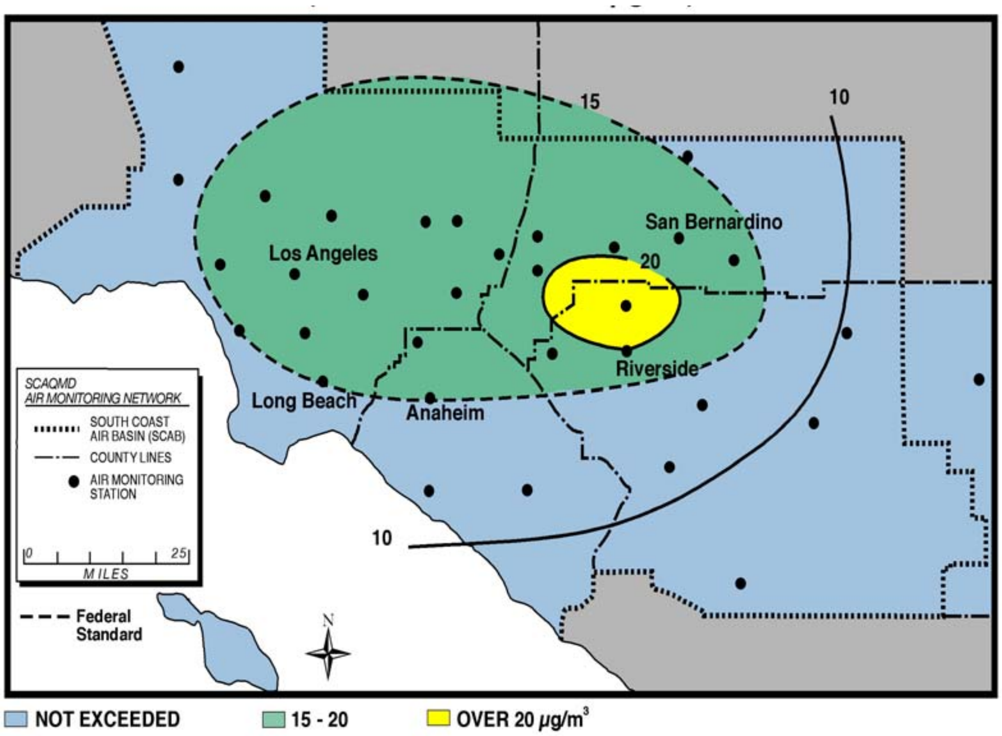

FIGURE V-2-4

2005 South Coast Air Basin Annual PM2.5 (µg/m3)

SANDWICH AND SPECIATED MONITORED ATTAINMENT (SMAT)

Sandwich

The “sandwich” method for data analysis (Frank, 2006) calculates the PM2.5 organic carbon mass from the difference between the total mass of the particulate sample and the other component species. As previously described, there is uncertainty associated with the monitoring and analytical methods used to develop the particulate profile. While nitrate filter mass loss is expected the analytical technique to determine the concentrations of the remaining sample is well established. Confidence is high in determining the concentrations of the other ions (sulfates, ammonium, sodium and chloride) and the measurements of directly emitted elemental and crustal components. Primary and secondary organic compounds express greater monitoring and analytical variability and the sandwich method proposes to minimize this uncertainty.

In the 2003 AQMP, the annual PM10 attainment demonstration the speciated particulate data used the measurements of ammonium, sulfate, nitrate, organic carbon and elemental carbon directly. The difference between the total filter mass and the sum of the five components was categorized as the “others.” The others included the crustal components, sea salts and accounted for any particle bonded water, filter blank contamination and uncertainties in the data monitoring or laboratory analysis. The sandwich method for PM2.5 (described by Equation V-2-1) substitutes organic carbon for the “others.”

Eq. V-2-1.

OC = PM2.5 – (NH4 + NO3 + SO4 + EC + bonded H2O + blank + crustal [metals]).

The sandwich method estimates ammonium (if not directly measured) and uses a either a linear or polynomial empirical equation to approximate the mass of bonded water in the sample. The polynomial equation is an empirically derived approximation of the thermodynamic Aerosol Inorganic Model (AIM) (Clegg, 1998) that uses the concentrations of NH4, NO3 and SO4 to estimate bonded water. The alternate linear equation also approximates bonded water assuming that the water content bonded to ammonium nitrate is equivalent to 12 percent of the mass and that the water bonded to ammonium sulfate is approximately equal to 26 percent of that mass. Comparisons of the calculated bonded water using the two algorithms were close and for the PM2.5 attainment demonstration, the primary method used to calculate water was the polynomial approach.

The sandwich also incorporates a filter blank contamination estimation of 0.5 µg/m3 into the calculation. AQMD procedures require the use of forceps to handle filter media to avoid mass contamination. However, some mass inevitably does impact the filter prior to exposure mostly due to the conditioned air mass in the sequential sampler as the filter is being queued for monitoring. The AQMD has discussed the filter bank issue with EPA and will determine if a alternate value for the banks is more appropriate for Basin sample. The PM2.5 attainment demonstration in the Draft 2007 AQMP however relies on the 0.5 µg/m3 value in its analysis.

The sandwich methodology does not exclude the use of directly measured ammonium or organic carbon. Estimates of ammonium calculated using a empirical relationships (0.29 X nitrate and 0.375 X sulfate) closely matched the measured ammonium. As a consequence, the directly measured ammonium is used in the Draft 2007 PM2.5 attainment demonstration analysis. Second, measurements of PM2.5 OC were analyzed using the same technique as for the previous 2003 AQMP PM10 analysis (although different filter media). The data were trend adjusted, based on emissions reductions observed over recent years and further adjusted to estimate the carbon fraction. The carbon fraction factor can range in the Basin from 1.2 to 1.8 depending upon the location of the station relative to source areas. For the Draft 2007 AQMP a carbon factor of 1.3 was applied to the OC data measured at the nine sites.

SMAT

The federal guidance for developing a PM2.5 attainment test differs from past in that the attainment demonstration does not directly rely on explicit model output. The attainment test in the new guidance requires the use of the RRFs determined from the modeling, applied to the current design values to create future design values. The speciated modeling attainment test outlined in the guidance document further requires the development of species dependent RRFs from the base and future year modeling simulations. The guidance tests the model response for the major species simulated. The analysis requires that the design value data and RRFs be assessed by the quarter of the year then recompiled into an annual future year demonstration.

Use of the measured OC data in the sandwich required that an adjustment be made to the total mass of the filter in the SMAT. The adjusted total mass (increase) was used to calculate the percentage contribution of OC relative to the other component species. After completing the quarterly SMAT, the ratios of the filter mass to the adjusted mass were used to proportionally readjust the future year estimated PM2.5.

Note: in the SMAT, the blank is constant and the future year bonded water is calculated as a function of the predicted ammonium, nitrate, and sulfate concentrations. The net amount of future year bonded water is expected to decrease as a function of the control strategy implementation.

CAMX AND MM5 OVERVIEW

As discussed in Chapter1, CAMx and MM5 were selected as the dispersion platform and meteorological model respectively for the PM2.5 attainment demonstration. The following sections briefly describe the modeling domain, meteorological interface and the boundary conditions applied in the analysis. The prescriptions for the MM5 domain initialization and coupling with the modeling domain are addressed in the Draft 2007 Modeling Protocol. Similar setup procedures for the CAMx simulations can be found in the Protocol document.

Modeling Domain

CAMx was simulated used the same region defined by 2600 5 km squared grid cells on a Universal Transverse Mercator (UTM) projection beginning at 275 easting through 3670 northing in a 65 by 40 grid cell structure. This is same grid specification that was used for the 2003 UAMAERO-LT analyses. Figure V-2-5depicts the modeling domain.

The PM2.5 domain extends approximately 80 km offshore to the west of the middle Basin. The domain captures the international shipping routes that extend parallel to the coast (northwest and southeast) and due west from the port areas. The northern boundary of the domain extends to Santa Barbara County and Kern County while the southern boundary resides primarily in Northern San Diego County. The desert portions of Riverside, San Bernardino and Imperial counties define the eastern boundary of the modeling domain. The modeling domain is smaller than both the ozone modeling and MM5 domain. As a consequence, the meteorological data are a subset of the larger analysis and a “clean” boundary is not assumed for the modeling analysis.

The vertical structure for the CAMx modeling was increased to 8 layers of height dependent varying depth (compared with the 5-layer analysis of UAMAERO-LT) but less than the 19 layers used for the MM5 simulations in effort to conserve computational resources. The top of the modeling domain was set at 5,000 m.

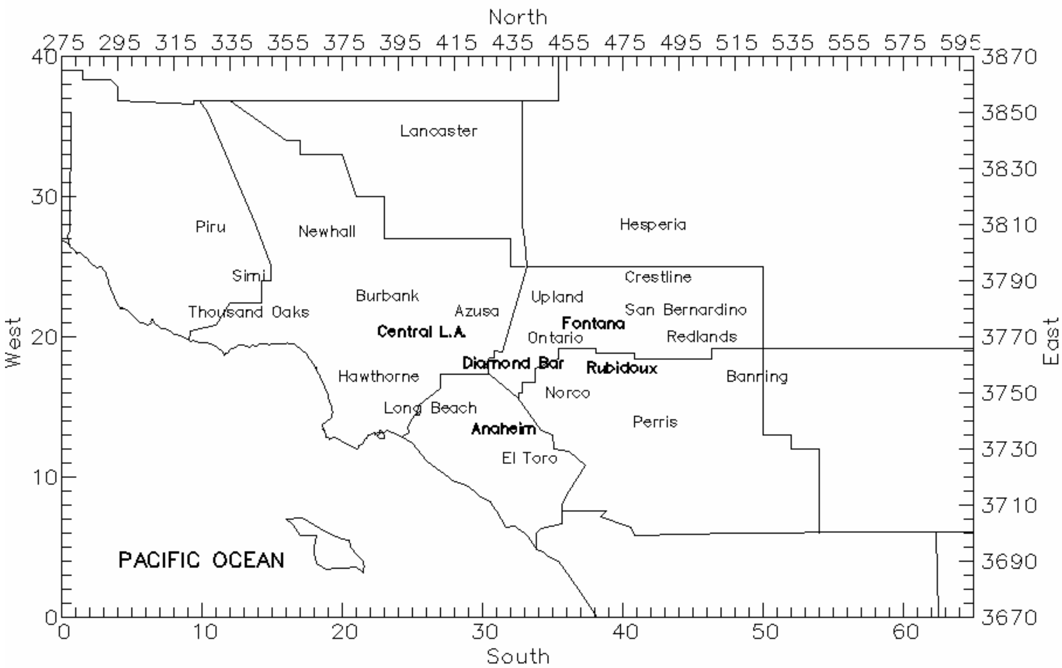

FIGURE V-2-5

PM2.5 Modeling Domain

Boundary, Top Conditions

One of the more difficult tasks of the modeling analysis was to determine a method to define the boundary and top conditions for the PM2.5 simulations. Three options were considered for the analysis: (1) assume clean conditions, (2) use the ozone modeling to generate concentration files at the PM2.5 grid boundary, or (3) use a hemispheric or global chemistry model output to specify the boundaries. Option-3 with minor adjustments was selected for the attainment demonstration.

The Western Regional Air Partnership (WRAP) has been simulating hemispheric particulates with a focus on the western U.S. as part of the Regional Haze Rule demonstration using CAMx on a coarse grid extending into the Pacific Ocean. Model ouput from the WRAP analysis for model year 2002 was extracted and converted to develop hourly boundary conditions for the PM2.5 (and ozone) modeling analyses. For this analysis it is assumed that little uncertainty is introduced into the modeling using the 2002 boundary data. The WRAP CAMx modeling used CB-IV gaseous chemistry as does the Draft 2007 AQMP PM2.5 CAMx modeling.

The WRAP modeling was conducted on a Lambert Conformal grid and therefore specification of the boundary conditions required remapping to the UTM coordinate system. Additional vertical layer averaging and remapping to the PM2.5 grid assumed that the concentration is uniform across each vertical layer.

The boundary and top concentration input files for the PM model were created on a month by month basis. The files were derived by averaging the WRAP simulation concentrations at each boundary point, vertical layer and each hour of the day over each day, monthly. To create the top concentration files, the values of the various concentrations were averaged over the entire top of the modeling domain for every hour in a month. For CAMx, the top concentration file only uses one concentration value for the top of the model for the entire simulation. Table V-2-6 provides the representative results for February and August.

Initial PM2.5 performance with the WRAP boundary conditions suggested that SOX concentrations along the western boundary in the shipping lanes were too low. A minimum concentration of 5 ppb SO_2 was set for the southern boundary extending westward from the San Diego coast approximately 20 km after which the concentration was phased to less than 1 ppb at the extreme southwest corner of the modeling domain. A similar adjustment was made along the north-south boundary with SO_2 being set at 5 ppb south from the coast of Santa Barbara approximately 15 km, again being lowered to less than 1 ppb at the southwest corner of the domain.

Future Boundary, Top and Initial Air Quality Conditions

For the future year scenarios, the boundary, region top and ambient air quality concentrations were adjusted to reflect projected emissions reductions from the 2005 base-year.

MM5 Simulations

MM5 was used to generate the meteorological profile for each day in 2005. The MM5 simulations were generated for the larger SCOS97 modeling domain employing a 5 km square grid and fit to the smaller PM2.5 grid. The MM5 simulations were initialized from NCEP analyses and run for 5-day increments without the option for four dimensional data assimilation (FDDA). For the annual PM2.5 modeling, the ramp-up period for the MM5 simulations was approximately one-half day. The total simulation time of 5 ½ days allowed for an overlap from run to run and provided consistency in the meteorological profile. The reader is directed to the Draft 2007 Modeling Protocol where the developments of the MM5 meteorological simulations are discussed at length.

TABLE V-2-6

Top Concentration Files for the PM Runs Derived from the WRAP simulation for February and August (ppb gaseous species, ng/m^3 aerosol species).
Only species with non-zero values are shown.

Species	February	August
NO	0	0.01
NO2	0.02	0.03
O3	64.03	49.51
OLE	0	0.01
PAR	2.55	5.26
TOL	0	0.01
FORM	0.2	0.53
ALD2	0.02	0.12
ETH	0	0.03
PAN	0.15	0.23
CO	95.36	92.85
H2O2	0.92	3.07
HNO3	0.22	0.28
SO2	0.02	0.04
NH4F	31.77	161.54
NO3F	15.75	234.54
SO4F	109.71	237.17
SOA1F	0.53	13.32
SOA2F	0.53	13.32
SOA3F	0.53	13.32
SOA4F	5.95	346.45
SOA5F	0.53	13.32
POMF	27.68	352.93
ECF	10.5	72.45
OTRF	4.58	175.45
NH4C	0.03	0.17
NO3C	0.02	0.25
SO4C	0.12	0.25
SOA1C	0	0.01
SOA2C	0	0.01
SOA3C	0	0.01
SOA4C	0.01	0.38
SOA5C	0	0.01
POMC	0.03	0.39
ECC	0.01	0.08
OTRC	154.08	346.99

MM5 produced wind speed and direction components (u,v,w), temperature, humidity, insolation, and cloud cover data that were input to CAMx. Output from the MM5 simulations were layer averaged to the CAMx vertical structure. Vertical stability was estimated using the CMAQ-dispersion scheme option and the vertical diffusivity minimum value was set at 1.0 m^2/sec. Figures V-2-6 through V-2-9 characterize the MM5 surface layer wind fields for morning (1000 PST) and afternoon (1400 PST) for January 15, 2005 and July 15, 2005.

EMISSIONS INVENTORY

Table V-2-7 provides the baseline 2005, 2014 and 2020 and controlled 2014 and 2020 modeling emissions inventories used in the attainment demonstration. CAMx model is based on the annual average inventory, with adjustments made for weekly and monthly variations. A brief characterization of the annual day emissions used for the modeling analysis follows. An extensive discussion of the overall emissions inventory is summarized in the Draft 2007 AQMP Appendix III.

TABLE V-2-7

Annual Average Day Emissions Inventory (tons/day)

Year	VOC	NO_x	SO_x	Diesel	Geol	PM2.5
(a) Baseline						
2005	825	1033	61	22	25	102
2014	594	668	70	12	27	98
2020	551	535	85	7	28	100
(b) Controlled						
2014	452	434	19	6	27	84
2020	351	291	20	3	28	84

PM2.5 modeling emissions were developed as monthly profiles corrected for temperature and humidity. For each month, where applicable, point, area and off-road mobile sources were adjusted to a day-of-week through-put profile consisting of a Monday-Friday, Saturday and Sunday schedule. On-road mobile sources were also adjusted by the same day-of-week schedule and overlaid with average diurnal profiles that represent weekday and weekend defined traffic patterns. The on-road mobile source emission data incorporate month specific ambient temperature and humidity input. Monthly biogenic emissions inventory (not listed in Table V-2-7) was developed by the California ARB.

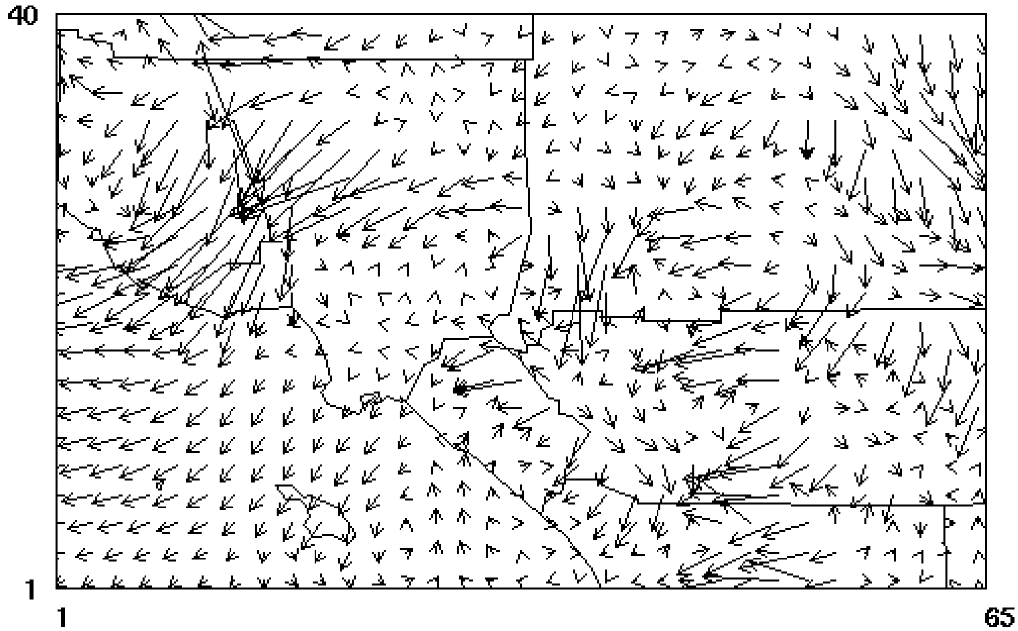

FIGURE V-2-6

MM5 Surface Layer Winds: January 15, 2005, 1000 PST

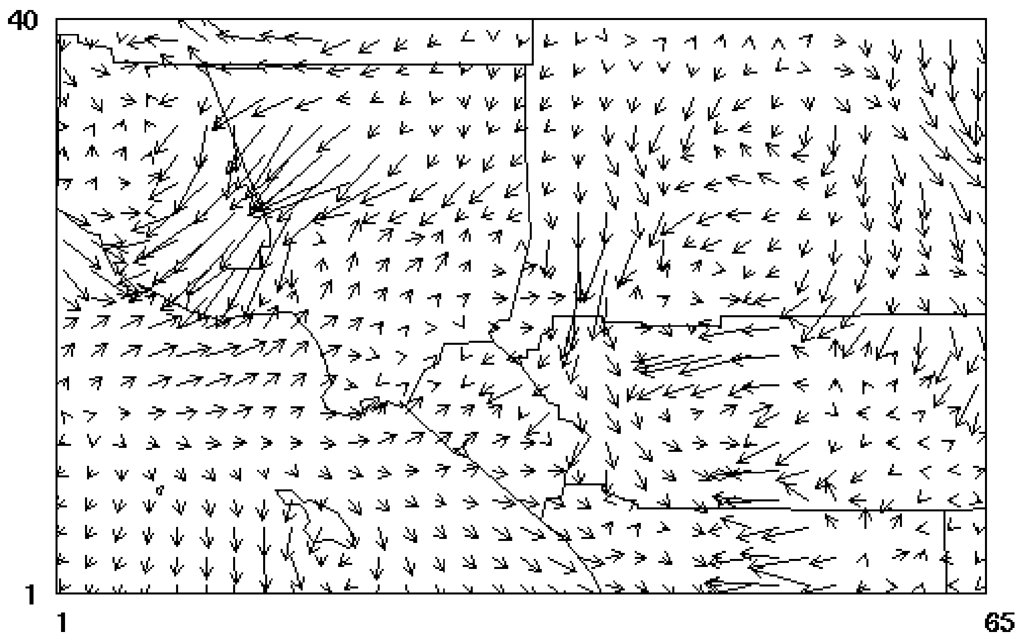

FIGURE V-2-7

MM5 Surface Layer Winds: January 15, 2005, 1400 PST

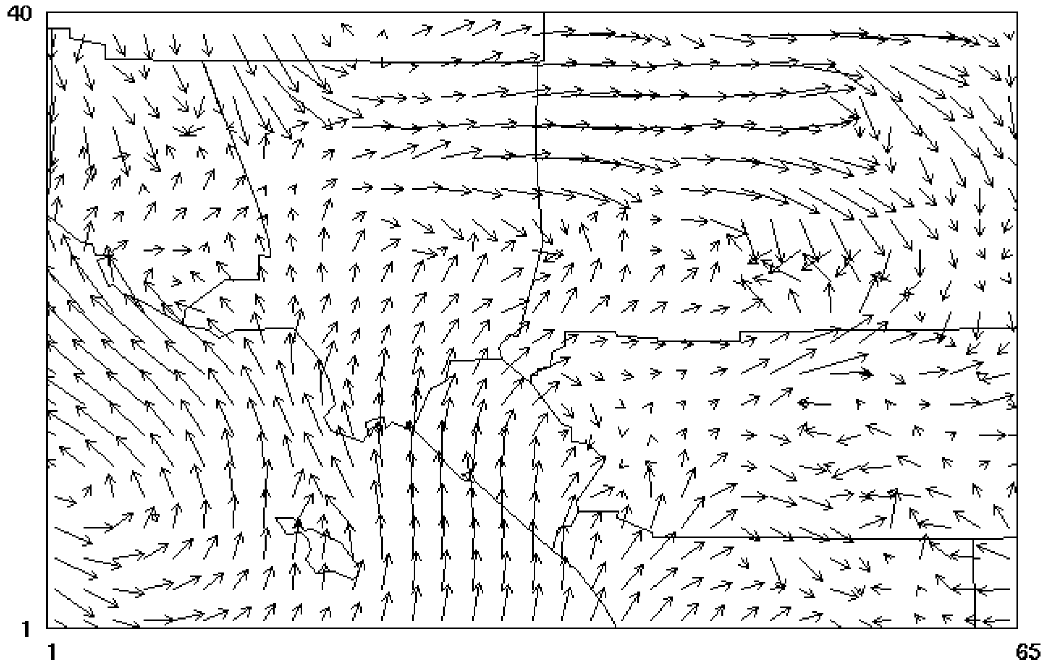

FIGURE V-2-8

MM5 Surface Layer Winds: January 15, 2005, 1400 PST

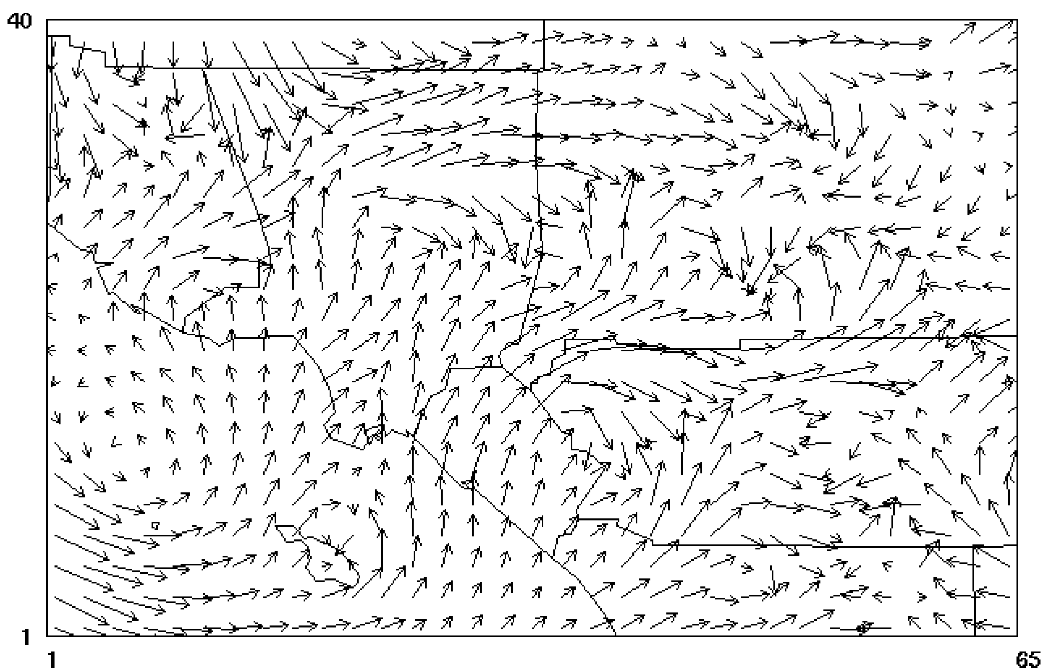

FIGURE V-2-9

MM5 Surface Layer Winds: January 15, 2005, 1400 PST

Paved Road Dust Emissions Uncertainties

Uncertainties can be estimated for all sources of emission: point, mobile, and area. With regard to PM2.5 and PM10 prediction, quantification, spatial allocation and apportionment of dust sources is magnified. Paved road dust accounted for the largest percentage of the primary emissions category. The paved road dust emissions are calculated based on the number of rain days in the year, VMT and silt loading. The 2005 paved road dust estimated emissions were impacted by each of these factors.

Rain Days

Precipitation summaries were reviewed to determine the dates on which measurable rainfall (0.01 inches or more in the South Coast Drainage Division) fell in the Basin during 2005. A total of 85 days met this criterion in the Basin for 2005. Table V-2-8 lists the dates meeting this criterion. This data was used adjust monthly entrained paved road dust emissions by the rain-factor prescribed in EPA AP-42 (Fifth Edition, Volume 1) 13.2.1--Paved Roads.

TABLE V-2-8

2005 Rain Days in the Basin:
Days Recording Measurable Precipitation of at least 0.01 Inches of Rain

Month	Dates
January	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 24, 26, 27, 28
February	6, 8, 10,11,12, 13, 17, 18, 19, 20, 21, 22, 23, 24, 25
March	2, 3, 4, 6, 8, 10, 11, 12, 18, 19, 20, 21, 22, 23, 24, 28
April	4, 22, 23, 24, 28
May	5, 6, 9
June	2, 3
August	15
September	3, 5, 19, 20, 21
October	11, 15, 16, 17, 18, 19, 24, 25, 27, 28, 29 30
November	9, 10, 11, 25
December	2, 3, 9, 14, 24, 26, 28, 31

VMT Capping

In addition, the paved road dust emissions are a function of VMT. In the 1997 and 2003 AQMP, paved road dust emissions were adjusted to reflect a cap on emissions growth for high VMT road types in future years. Base year emissions were not capped at a given VMT level. The future year adjustment assumed that the silt loading would be depleted by the entrainment from the traffic volume. Increasing the traffic volume beyond a set point would not increase dust entrainment because the silt would be essentially depleted. The Draft 2007 AQMP continued this adjustment of capping paved road dust on freeways in future years, allowing growth only associated with the construction of new lanes or additional miles of freeway.

Differential Silt Loading

A third adjustment was made to the paved road dust emissions to attempt to account for the differential silt loading content observed in the densely populated urban portions of Los Angeles and Orange Counties and the developing communities in the east Basin. Analysis of the preliminary modeling indicated the paved road dust may be overestimated by a factor of two in Los Angeles and Orange Counties where the traffic volume is greatest and the majority of streets have curbs, gutters and are regularly swept. A uniform silt loading factor is used in the CARB model for the entire Basin that doesn't account for differences in land use. Corresponding field studies conducted in Sacramento (2000) and Riverside (Fitz, 1998) indicated a wide range of silt loading exists to arterials, collectors and local streets that departs from the silt loading estimates provided in CARB's emissions model.

In addition, examination of the MATES-III data indicates that the crustal-metals portion of the PM2.5 distribution is essential constant across the basin. This infers that although the paved road dust emissions contribution should be uniform and that west Basin VMT contributions are offset by higher silt loading in the east Basin. The adjustment made to the paved road dust emissions normalized the total basin loading by county thus lowering Los Angeles by 55 percent, raising Orange County by 20 percent and doubling the emissions in Riverside and San Bernardino. No net change in the Basin total paved road dust occurred. The adjustment was made for base and future future years by growing the county totals and redistributing the emissions using the normalization.

PM2.5 Split Profiles and Ammonia Inventory Adjustments

Revisions to the particulate emissions split files were made to account for new processes and AQMD rule development and implementation. For the Draft 2007 AQMP, a cooking PM2.5 split profile was added and the profiles for residual oil burning and distillated oil burning were updated.

Revisions were made to the spatial distribution and emissions categories defining the ammonia inventory. In general, the total ammonia in the inventory did not change significantly from the 2003 AQMP inventory with emissions nominally exceeding 100 tons per day. The contributions of the soils, on-road mobile and livestock categories however did change significantly placing a higher contribution to mobile emissions at the expense of soils. Livestock emissions were halved as a result of the review and estimation methodology modifications. Table V-2-9 summarizes the changes made to the three main ammonia emissions categories.

Future year (2014) mobile source ammonia emissions are projected to be reduced by 45 percent from 2005 levels due to fleet turnover.

TABLE V-2-9

Comparison of Ammonia Soil, Mobile Source, and Lives Stock Emissions

Category	2003 AQMP (TPD)	Draft 2007 AQMP (TPD)
Soil	34.2	1.42
On-road Mobile	9.47	36.12
Live stock	60.37	25.67

BASE-YEAR ANNUAL SIMULATIONS

CAMx was run for the 2005 base simulation using the monthly adjusted annual average day emissions presented in the previous emission inventory discussion and the meteorological and air quality data inputs outlined in the preceding section. EPA guidance focuses model performance to the ability to predict the PM2.5 component species and the total mass. No specific criteria thresholds of performance are recommended in EPA's modeling guidance document. This is important since the model is used in a relative response fashion compared to the ozone and PM10 analyses in previous AQMPs.

Performance is evaluated by examining key statistics and graphical presentations of differences between model predicted concentrations and observations. Four statistics examine model bias and error while graphical presentations of error, model prediction as a time series and concentration scatter plots round out the prescribed methods of model performance evaluation.

A nearest cell average of predicted concentrations is typically used when comparing gridded concentrations to station measurements, because of possible spatial misalignments of the predicted concentration fields. The CAMx modeling results are presented based on a nearest nine-grid-cell average basis. Performance evaluations at each station are based on this average concentration.

Finally, model performance is assessed using every third day predications that line up with the observations. Statistics and graphical presentations are not included where observational data is missing.

PM2.5 Component Species Performance Evaluation for the MATES-III Sites

The CAMx 2005 base-year annual average predicted PM2.5 and observations for the six component species and total mass at the MATES-III sites are presented in Table V-2-10a through V-2-10g. Also presented in the tables are estimates of bias and error for each component at each monitoring site.

Figure V-2-10 provides a "soccer goal" graphical presentation of error for model performance. Figure V-2-11a through Figure V-2-11h presents the time series of model predicted vs. observations for each component at the MATES-III monitoring sites. Figure V-2-12a through Figure V-2-12h presents the scatter-plots of prediction accuracy for each component at the MATES-III monitoring sites. (Note: graphics for the Pico Rivera MATES-III site are not shown.) Figure V-2-13 provides the CAMx predicted 2005 spatial distribution of the component species and total mass.

In general, nitrate and ammonium tend to be over predicted by an average 2 $\mu g/m^3$ or less at most sites. Ammonium model performance at Rubidoux and Fontana are approximately within 35 percent of observations and within 20 percent or less for nitrate. On average, sulfate is nominally under-predicted however, OC and EC are well simulated at all stations. Model performance for the crustal-others category indicates an average over-prediction of about 1 $\mu g/m^3$ or 25 percent above observations. Overall, the prediction of total mass reflects the model performance for ammonium, nitrate and the others with a tendency for over-prediction at about an average level of 4 $\mu g/m^3$ or approximately 20 percent above observations.

TABLE V-2-10a

CAMx 2005 Base Year Ammonium Model Predictions ($\mu g/m^3$)

Locations	Mean Observed	Mean Predicted	Mean Bias	Mean Error	Normalized Mean Bias	Normalized Mean Error
All Stations	2.49	4.02	1.53	2.28	0.62	0.92
Anaheim	2.11	3.59	1.48	1.96	0.70	0.93
Burbank	2.62	3.28	0.65	1.75	0.25	0.67
Compton	2.18	4.46	2.28	2.60	1.04	1.19
Fontana	2.79	3.81	1.02	2.18	0.37	0.78
N Long Beach	2.20	4.03	1.83	2.37	0.83	1.08
Los Angeles	2.67	4.48	1.81	2.35	0.68	0.88
Pico River	2.49	4.81	2.32	2.80	0.93	1.13
Rubidoux	3.27	4.43	1.16	2.49	0.35	0.76
Wilmington	2.00	3.69	1.69	2.28	0.84	1.14

TABLE V-2-10b

CAMx 2005 Base Year Nitrate Model Predictions (µg/m^3)

Locations	Mean Observed	Mean Predicted	Mean Bias	Mean Error	Normalized Mean Bias	Normalized Mean Error
All Stations	5.79	7.57	1.78	3.76	0.31	0.65
Anaheim	5.01	7.01	2.00	3.28	0.40	0.65
Burbank	6.32	6.60	0.28	3.30	0.04	0.52
Compton	5.04	7.94	2.90	4.01	0.58	0.80
Fontana	7.11	7.52	0.41	4.15	0.06	0.58
N Long Beach	4.66	6.40	1.74	3.18	0.37	0.68
Los Angeles	6.22	8.84	2.62	3.95	0.42	0.63
Pico River	6.08	10.51	4.43	5.66	0.73	0.93
Rubidoux	7.76	9.30	1.53	4.58	0.20	0.59
Wilmington	3.94	5.42	1.47	2.69	0.37	0.68

TABLE V-2-10c

CAMx 2005 Base Year Sulfate Model Predictions (µg/m^3)

Locations	Mean Observed	Mean Predicted	Mean Bias	Mean Error	Normalized Mean Bias	Normalized Mean Error
All Stations	3.46	3.32	-0.14	2.09	-0.04	0.61
Anaheim	3.42	2.78	-0.64	1.94	-0.19	0.57
Burbank	3.43	2.29	-1.14	1.91	-0.33	0.56
Compton	3.66	4.13	0.46	2.58	0.13	0.71
Fontana	3.02	2.65	-0.37	1.62	-0.12	0.54
N Long Beach	3.97	4.51	0.53	2.42	0.13	0.61
Los Angeles	3.51	3.22	-0.29	1.99	-0.08	0.57
Pico River	2.51	2.78	0.27	1.71	0.11	0.68
Rubidoux	2.83	2.54	-0.29	1.52	-0.10	0.54
Wilmington	4.34	4.88	0.54	3.02	0.12	0.69

TABLE V-2-10d

CAMx 2005 Base Year Organic Carbon Model Predictions (µg/m^3)

Locations	Mean Observed	Mean Predicted	Mean Bias	Mean Error	Normalized Mean Bias	Normalized Mean Error
All Stations	4.53	4.61	0.09	1.60	0.02	0.35
Anaheim	4.22	4.67	0.45	1.52	0.11	0.36
Burbank	5.07	3.89	-1.18	1.85	-0.23	0.36
Compton	4.22	5.40	1.18	1.63	0.28	0.39
Fontana	4.59	3.80	-0.79	1.68	-0.17	0.37
N Long Beach	4.22	4.71	0.50	1.73	0.12	0.41
Los Angeles	5.07	5.73	0.66	1.64	0.13	0.32
Pico River	5.07	5.31	0.24	1.46	0.05	0.29
Rubidoux	4.29	4.25	-0.04	1.31	-0.01	0.30
Wilmington	4.22	4.10	-0.12	1.49	-0.03	0.35

TABLE V-2-10e

CAMx 2005 Base Year Elemental Carbon Model Predictions (µg/m^3)

Locations	Mean Observed	Mean Predicted	Mean Bias	Mean Error	Normalized Mean Bias	Normalized Mean Error
All Stations	1.87	1.60	-0.27	0.84	-0.14	0.45
Anaheim	1.44	1.32	-0.12	0.67	-0.08	0.47
Burbank	2.08	1.19	-0.89	1.03	-0.43	0.50
Compton	1.79	1.95	0.16	0.76	0.09	0.42
Fontana	2.18	1.29	-0.89	1.06	-0.41	0.49
N Long Beach	1.44	2.19	0.75	0.90	0.52	0.62
Los Angeles	1.97	1.84	-0.14	0.68	-0.07	0.34
Pico River	2.37	1.78	-0.59	0.83	-0.25	0.35
Rubidoux	1.71	1.11	-0.59	0.78	-0.35	0.46
Wilmington	2.07	1.91	-0.17	0.82	-0.08	0.40

TABLE V-2-10f

CAMx 2005 Base Year Crustal-Others Model Predictions (µg/m^3)

Locations	Mean Observed	Mean Predicted	Mean Bias	Mean Error	Normalized Mean Bias	Normalized Mean Error
All Stations	3.67	4.57	0.90	2.70	0.25	0.74
Anaheim	3.50	4.66	1.16	2.46	0.33	0.70
Burbank	4.76	3.03	-1.73	2.70	-0.36	0.57
Compton	3.78	5.10	1.32	3.00	0.35	0.79
Fontana	3.47	4.06	0.59	1.99	0.17	0.57
N Long Beach	3.34	5.65	2.32	3.14	0.69	0.94
Los Angeles	2.89	4.64	1.75	2.95	0.61	1.02
Pico River	3.21	4.23	1.02	2.26	0.32	0.70
Rubidoux	3.55	4.50	0.95	2.27	0.27	0.64
Wilmington	4.04	5.35	1.31	3.49	0.32	0.86

TABLE V-2-10g

CAMx 2005 Base Year Total Mass Model Predictions (µg/m^3)

Locations	Mean Observed	Mean Predicted	Mean Bias	Mean Error	Normalized Mean Bias	Normalized Mean Error
All Stations	20.07	25.90	5.83	10.16	0.29	0.51
Anaheim	18.05	24.19	6.14	8.42	0.34	0.47
Burbank	22.39	20.61	-1.78	8.78	-0.08	0.39
Compton	19.26	29.01	9.75	11.76	0.51	0.61
Fontana	21.82	23.23	1.42	9.05	0.07	0.41
N Long Beach	17.90	27.76	9.86	10.74	0.55	0.60
Los Angeles	19.66	29.04	9.38	11.89	0.48	0.60
Pico River	19.98	29.38	9.39	11.60	0.47	0.58
Rubidoux	22.47	26.60	4.14	10.28	0.18	0.46
Wilmington	18.80	25.17	6.37	9.67	0.34	0.51

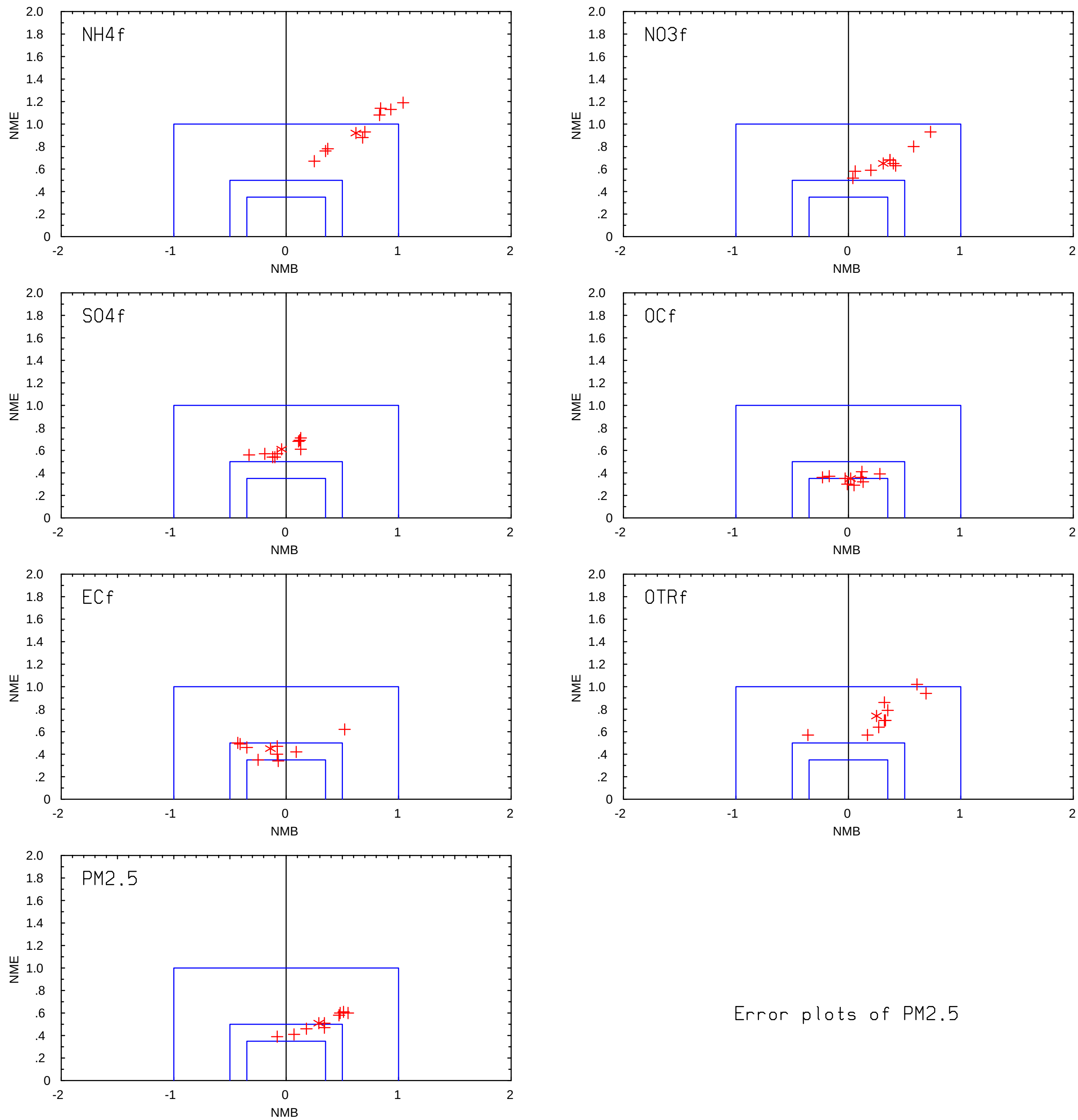

FIGURE V-2-10

CAMx 2005 Base Year Soccer Plots of Annual Average Error at the MATES-III Sites

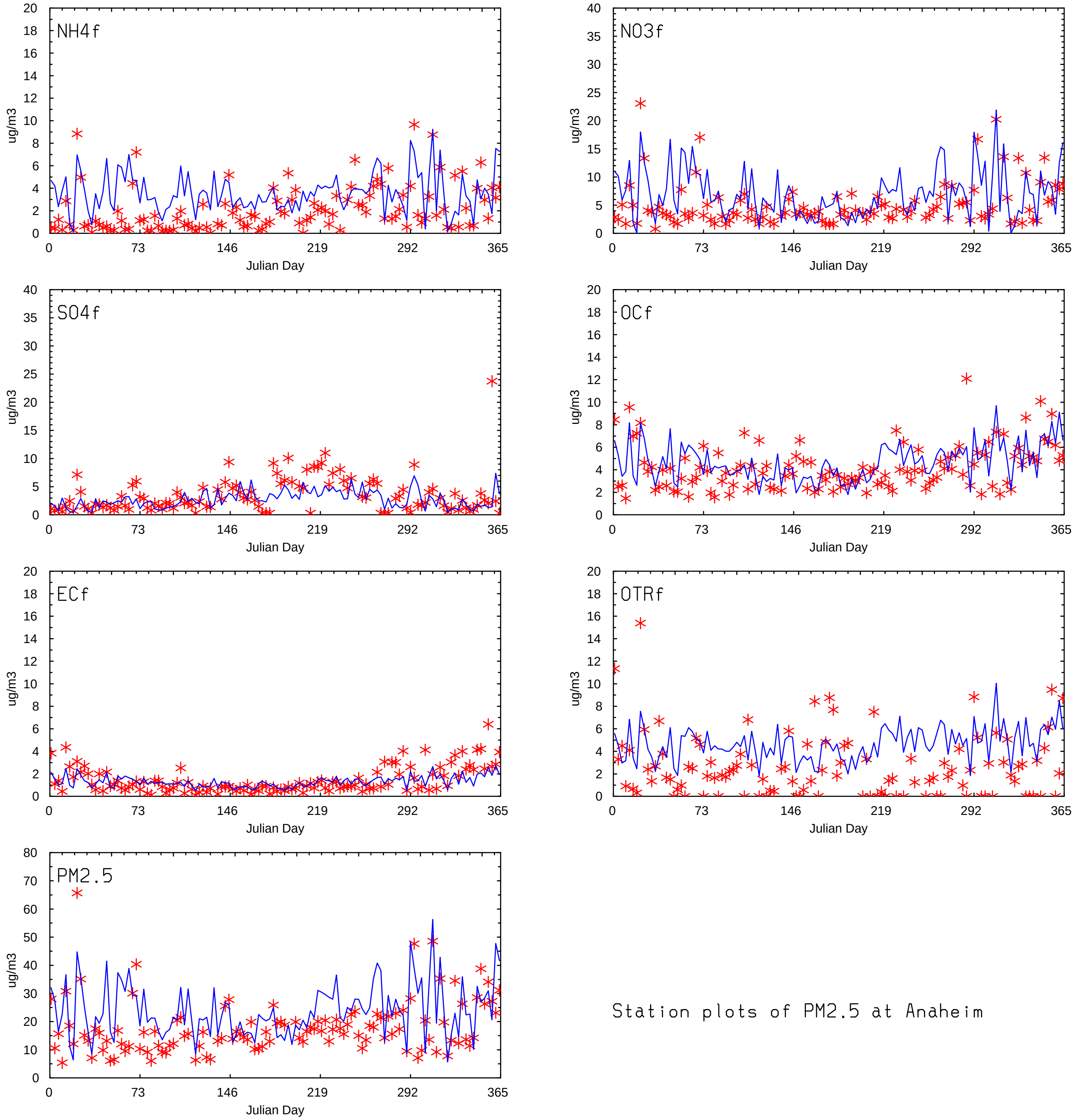

FIGURE V-2-11a

CAMx 2005 Base Year Time Series: Predicted vs. Observed at Anaheim

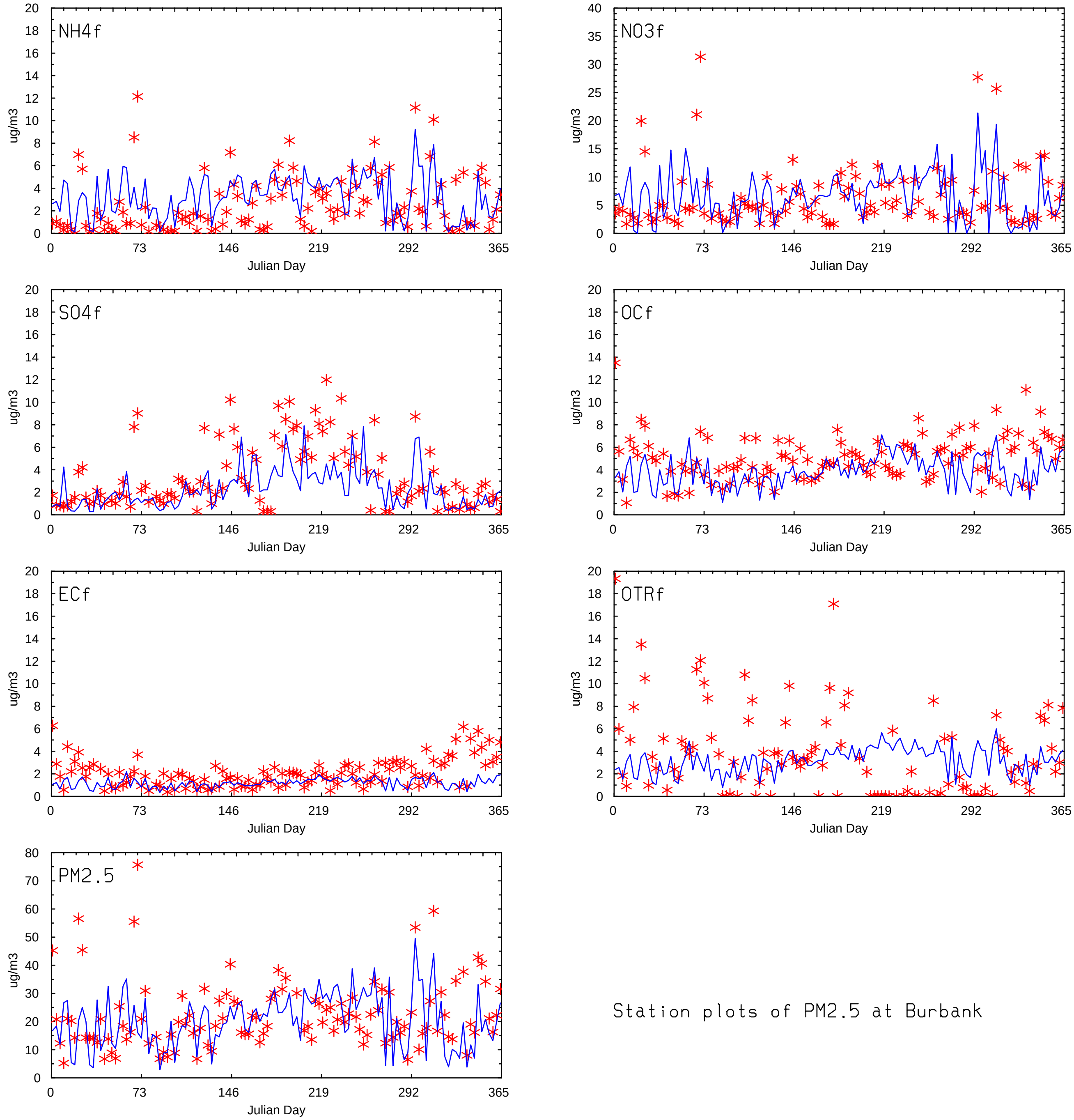

FIGURE V-2-11b

CAMx 2005 Base Year Time Series: Predicted vs. Observed at Burbank

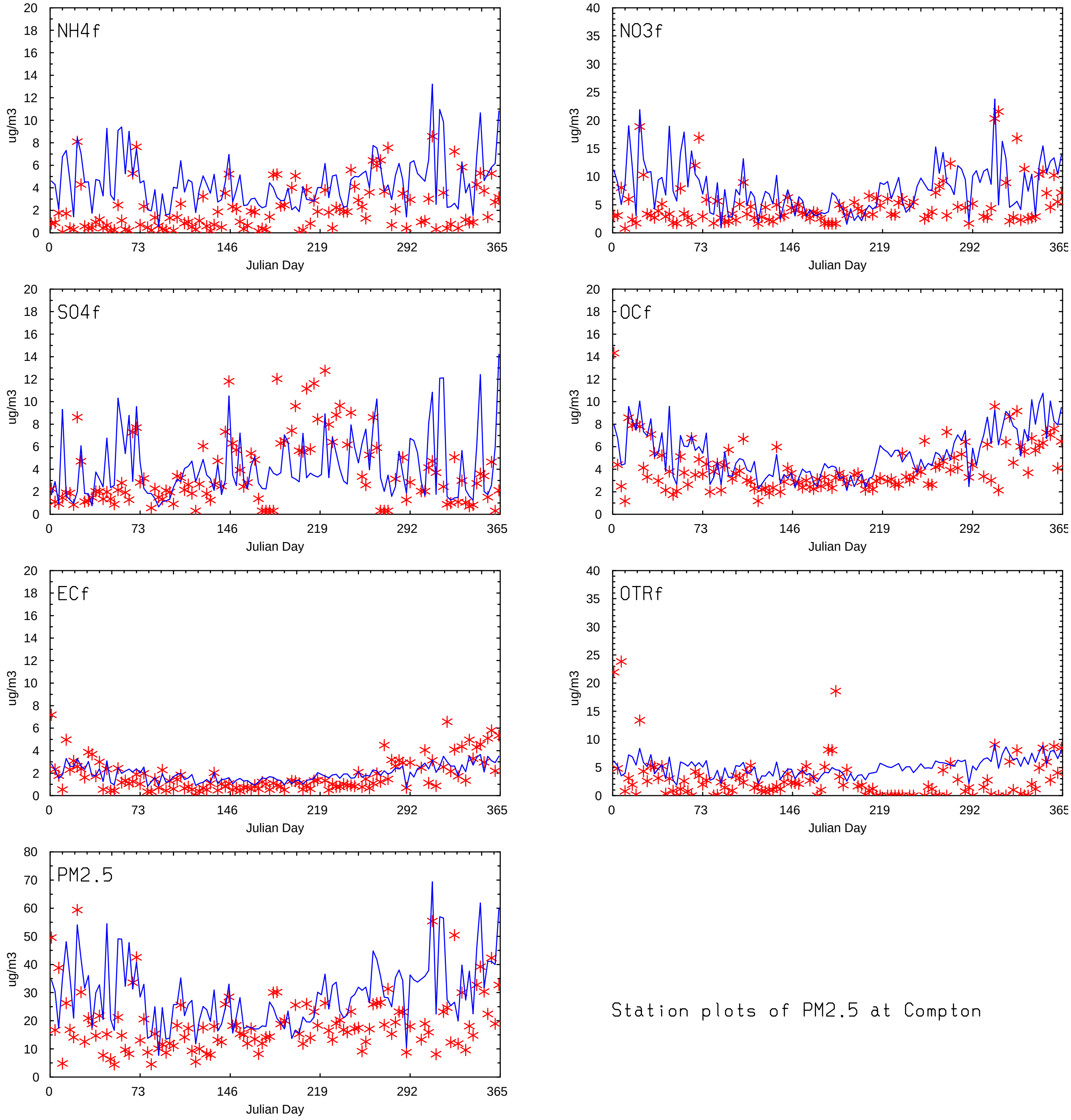

FIGURE V-2-11c

CAMx 2005 Base Year Time Series: Predicted vs. Observed at Compton

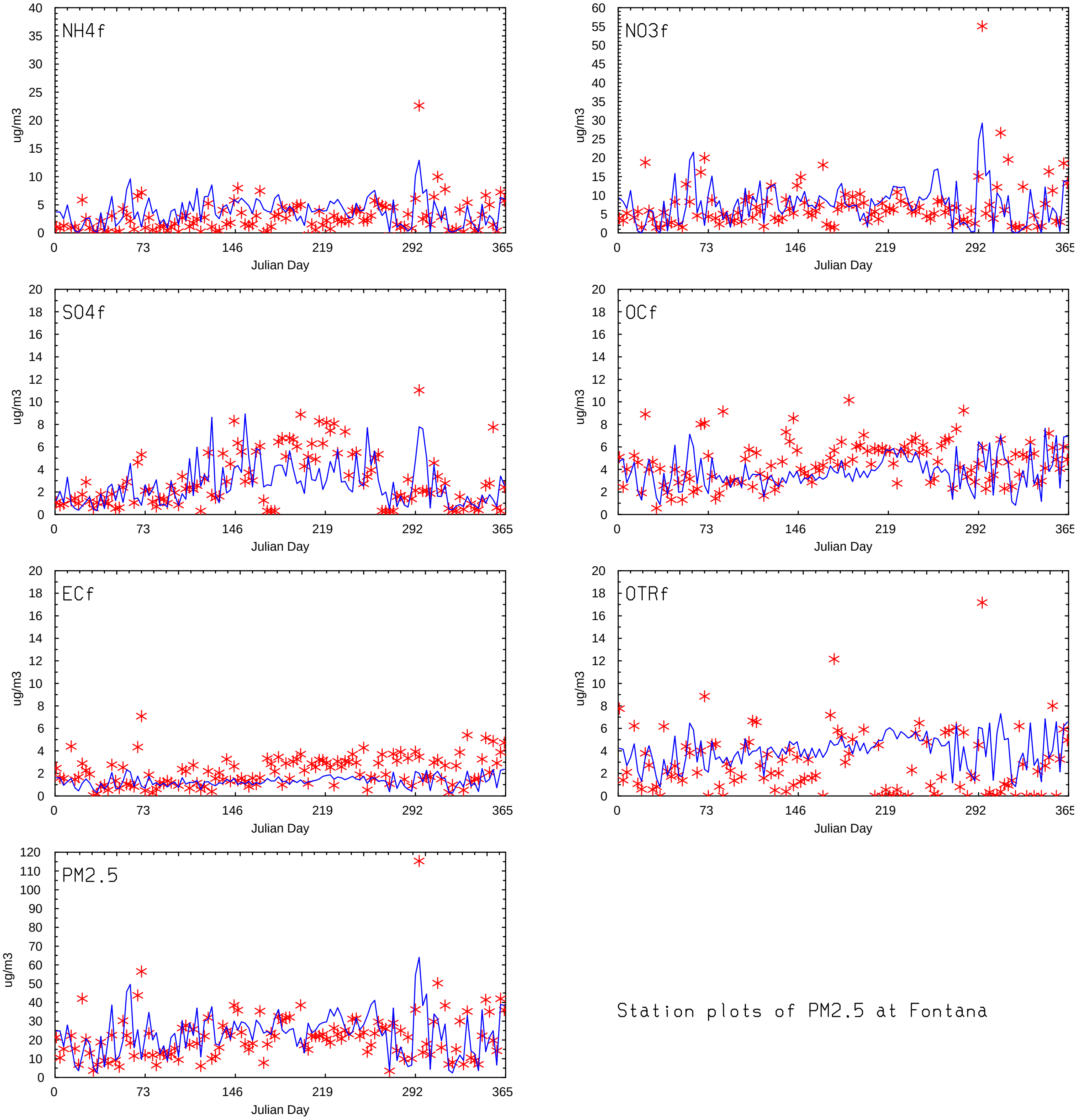

FIGURE V-2-11d

CAMx 2005 Base Year Time Series: Predicted vs. Observed at Fontana

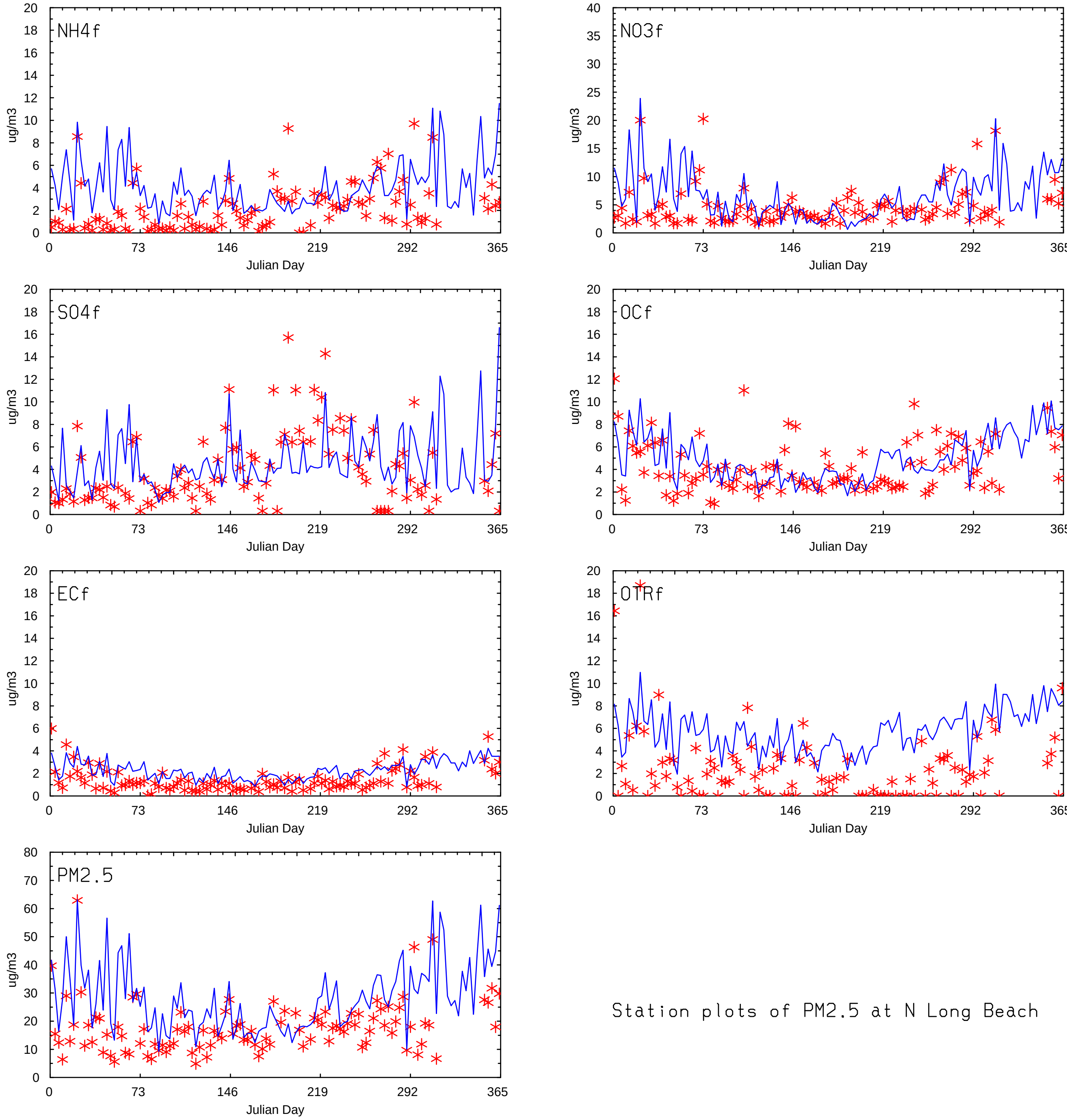

FIGURE V-2-11e

CAMx 2005 Base Year Time Series: Predicted vs. Observed at Long Beach

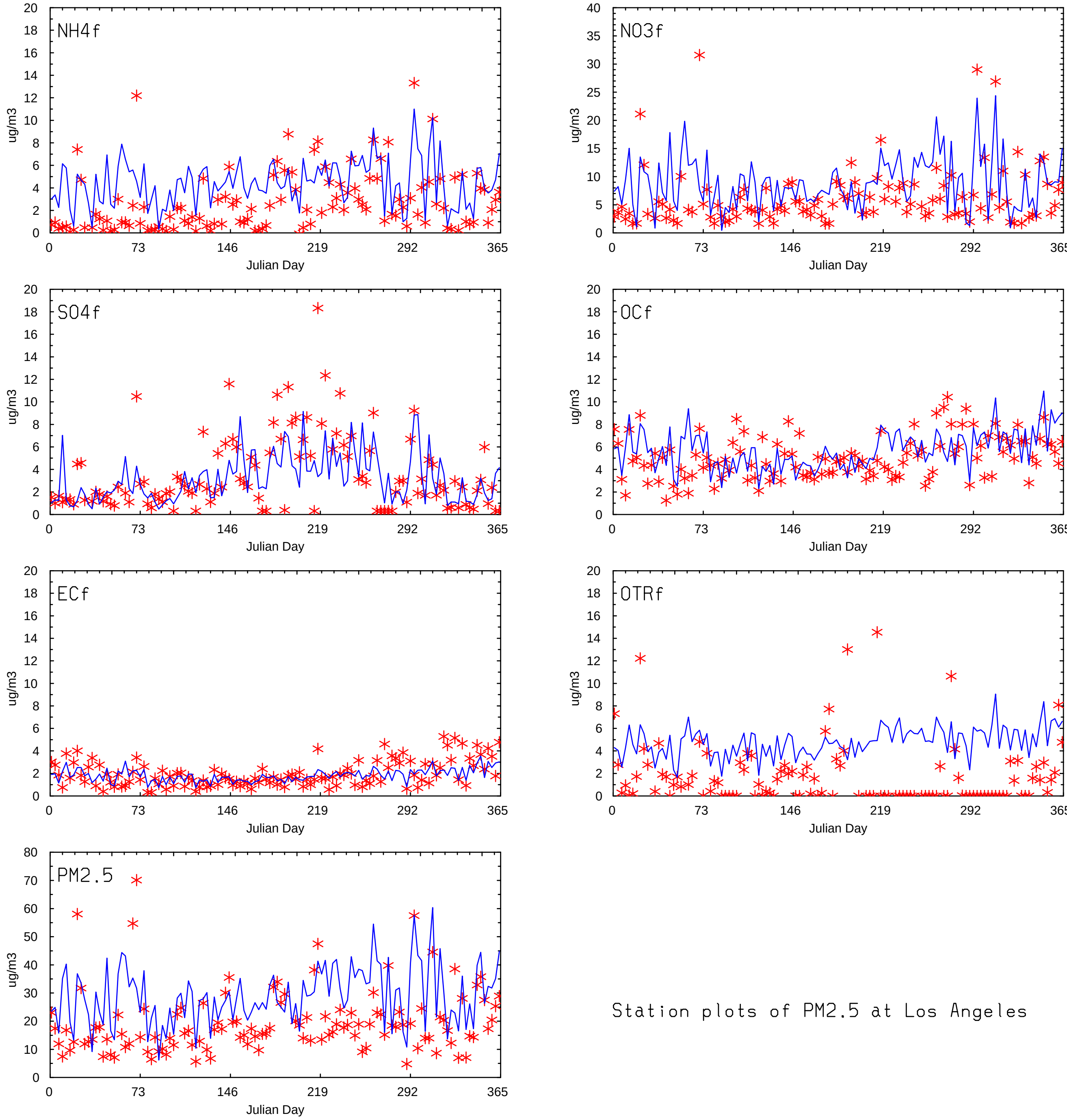

FIGURE V-2-11f

CAMx 2005 Base Year Time Series: Predicted vs. Observed at Los Angeles

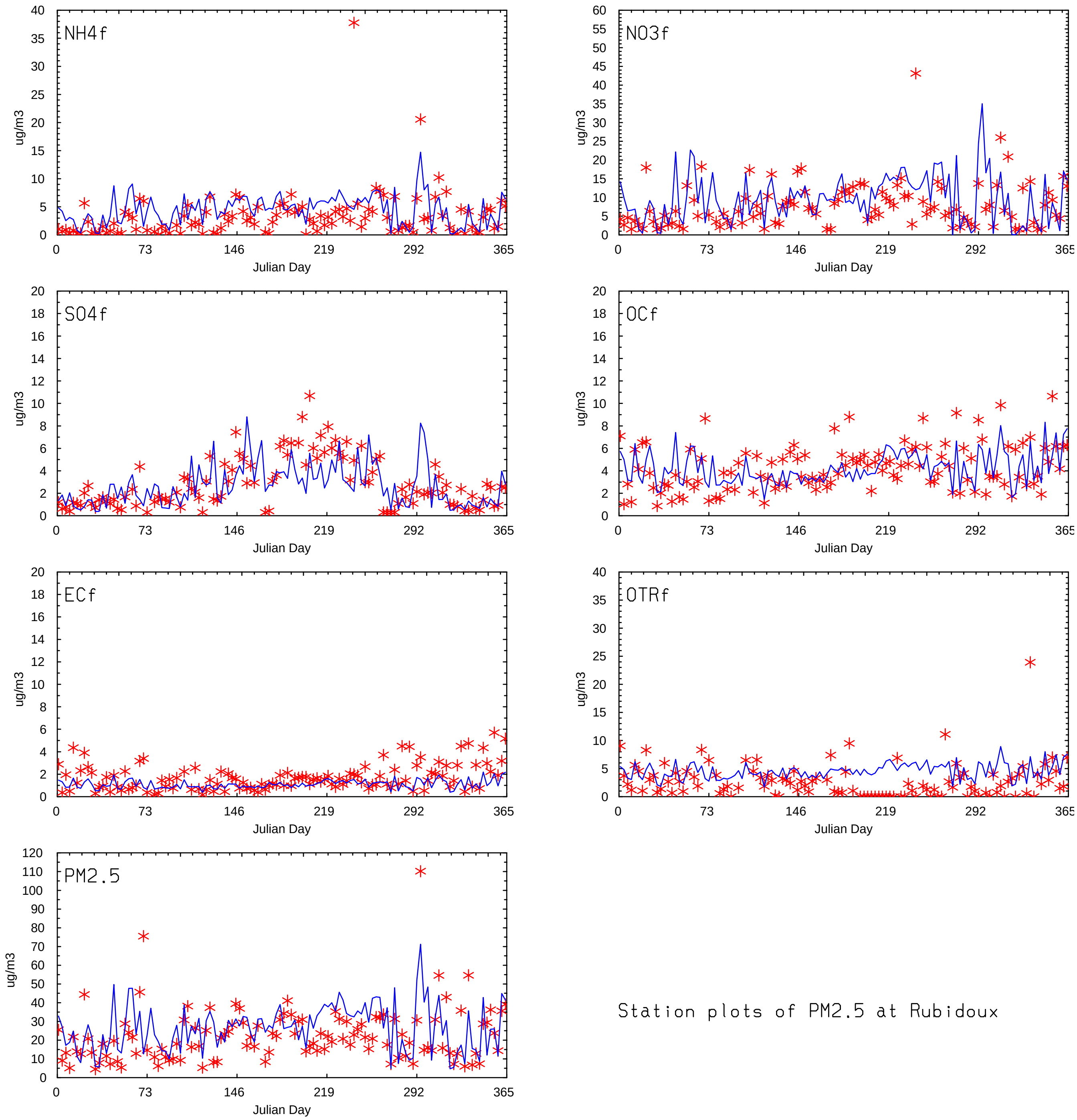

FIGURE V-2-11i

CAMx 2005 Base Year Time Series: Predicted vs. Observed at Rubidoux

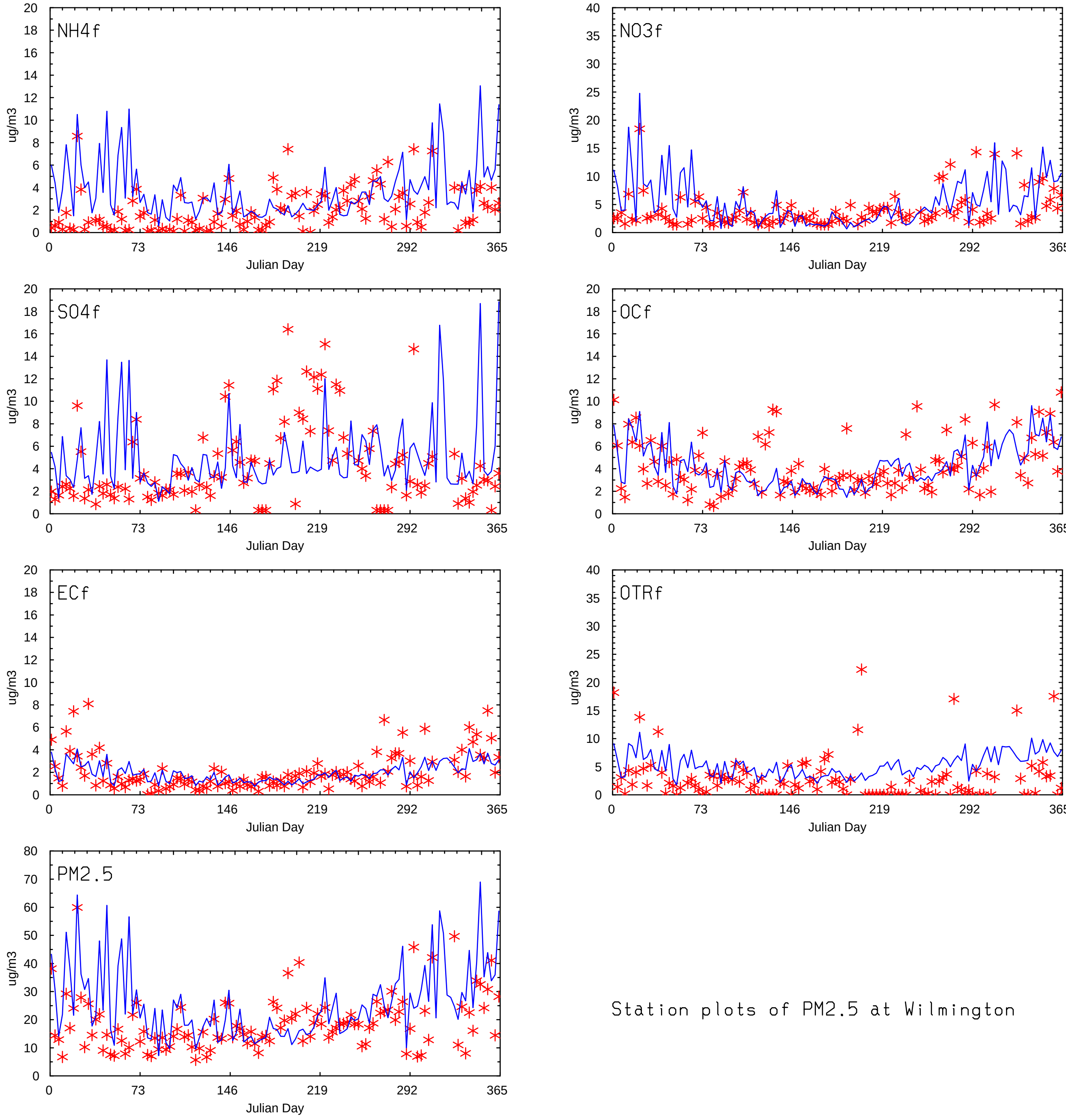

FIGURE V-2-11h

CAMx 2005 Base Year Time Series: Predicted vs. Observed at Wilmington

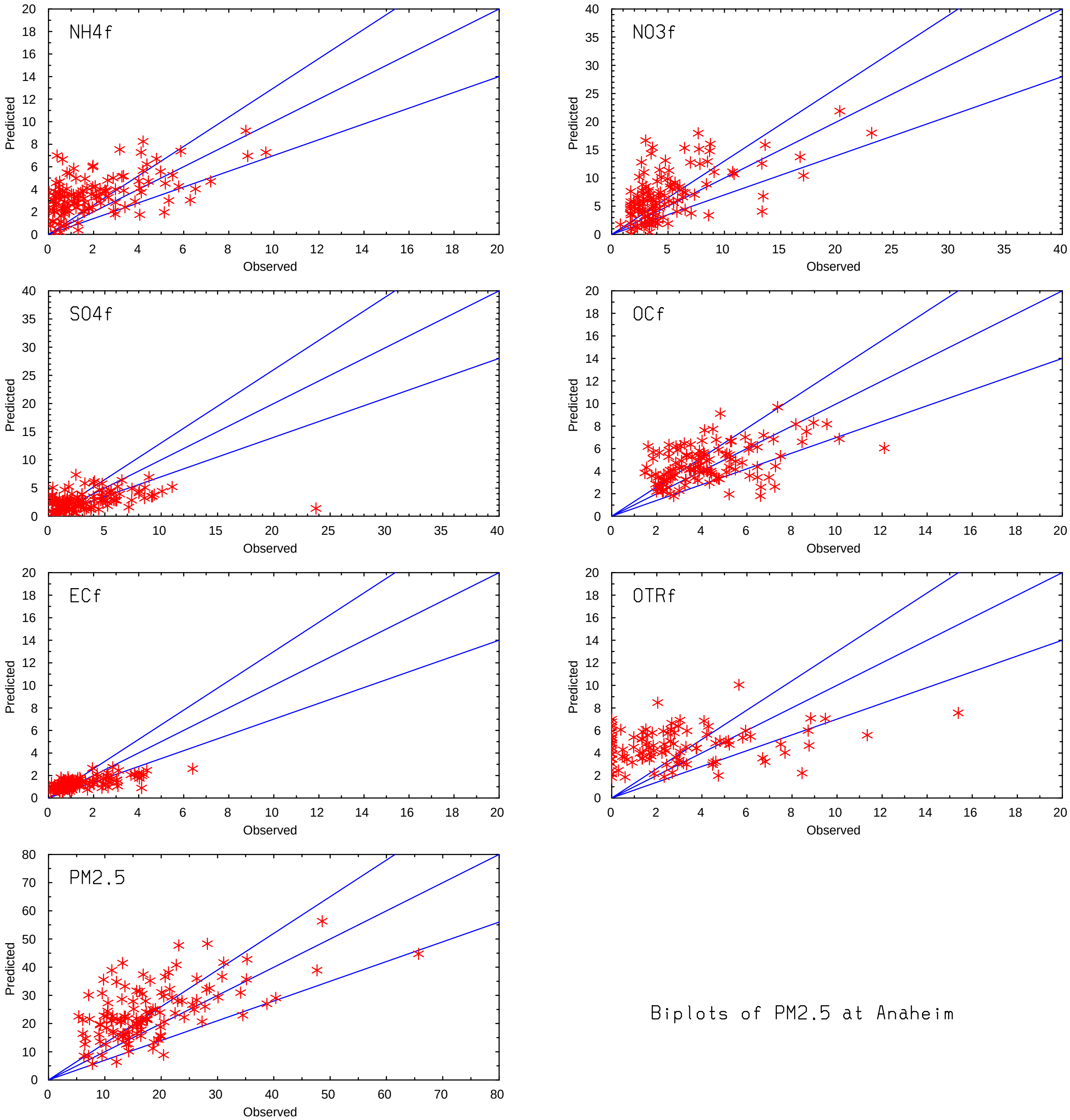

FIGURE V-2-12a

CAMx 2005 Base Year Bivariate Plots: Predicted vs. Observed at Anaheim

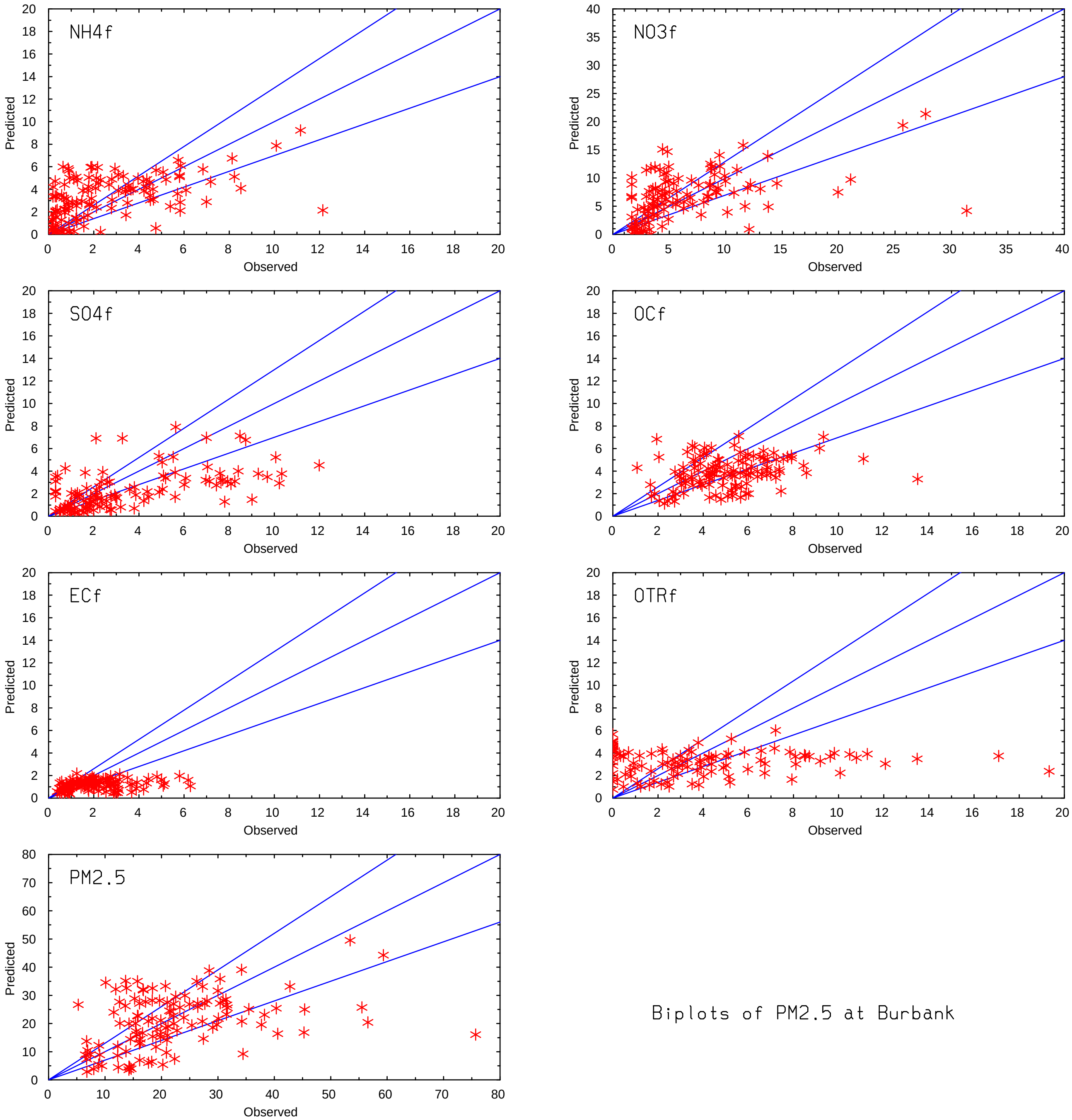

FIGURE V-2-12b

CAMx 2005 Base Year Bivariate Plots: Predicted vs. Observed at Burbank

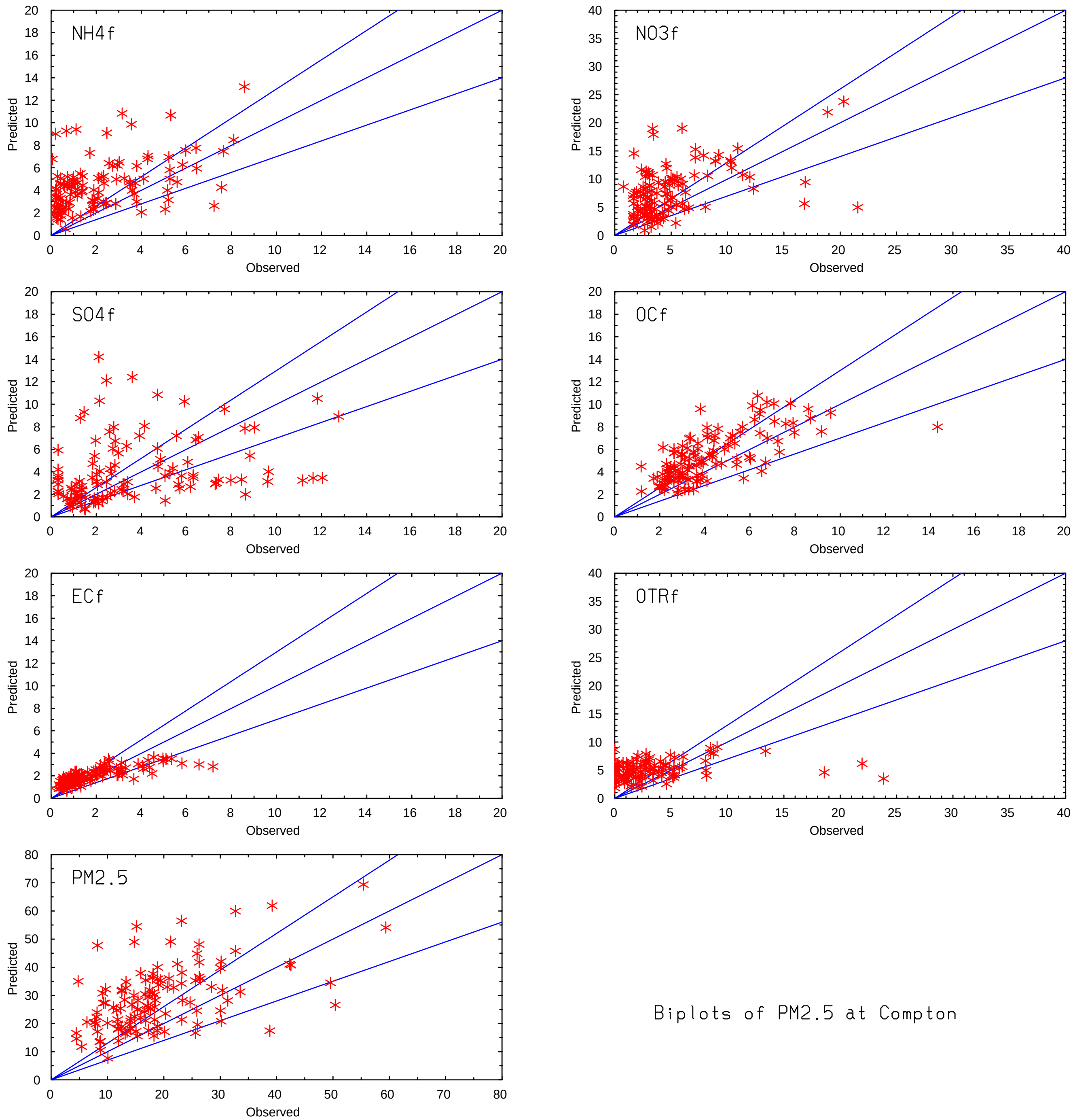

FIGURE V-2-12c

CAMx 2005 Base Year Bivariate Plots: Predicted vs. Observed at Compton

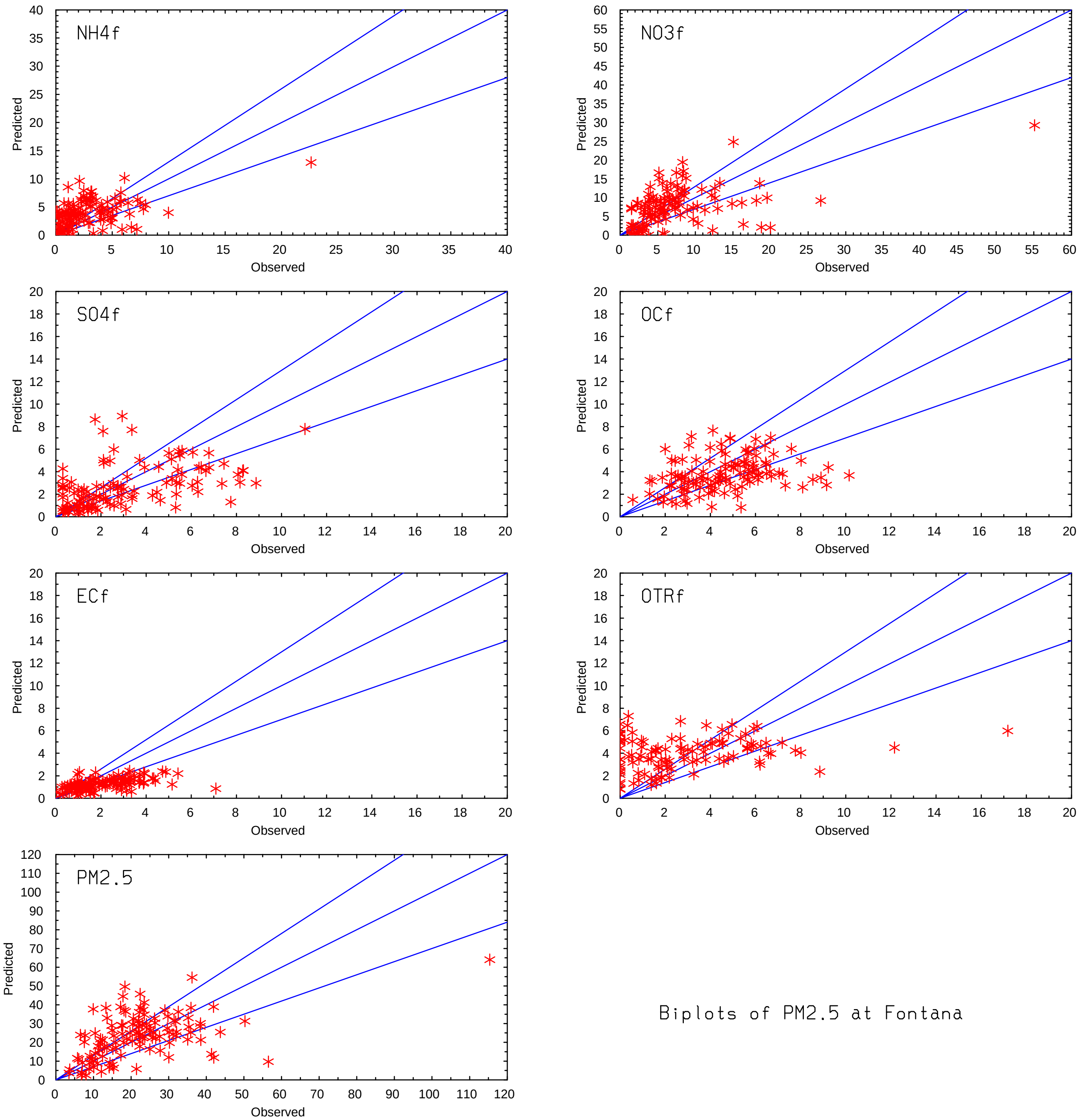

FIGURE V-2-12d

CAMx 2005 Base Year Bivariate Plots: Predicted vs. Observed at Fontana

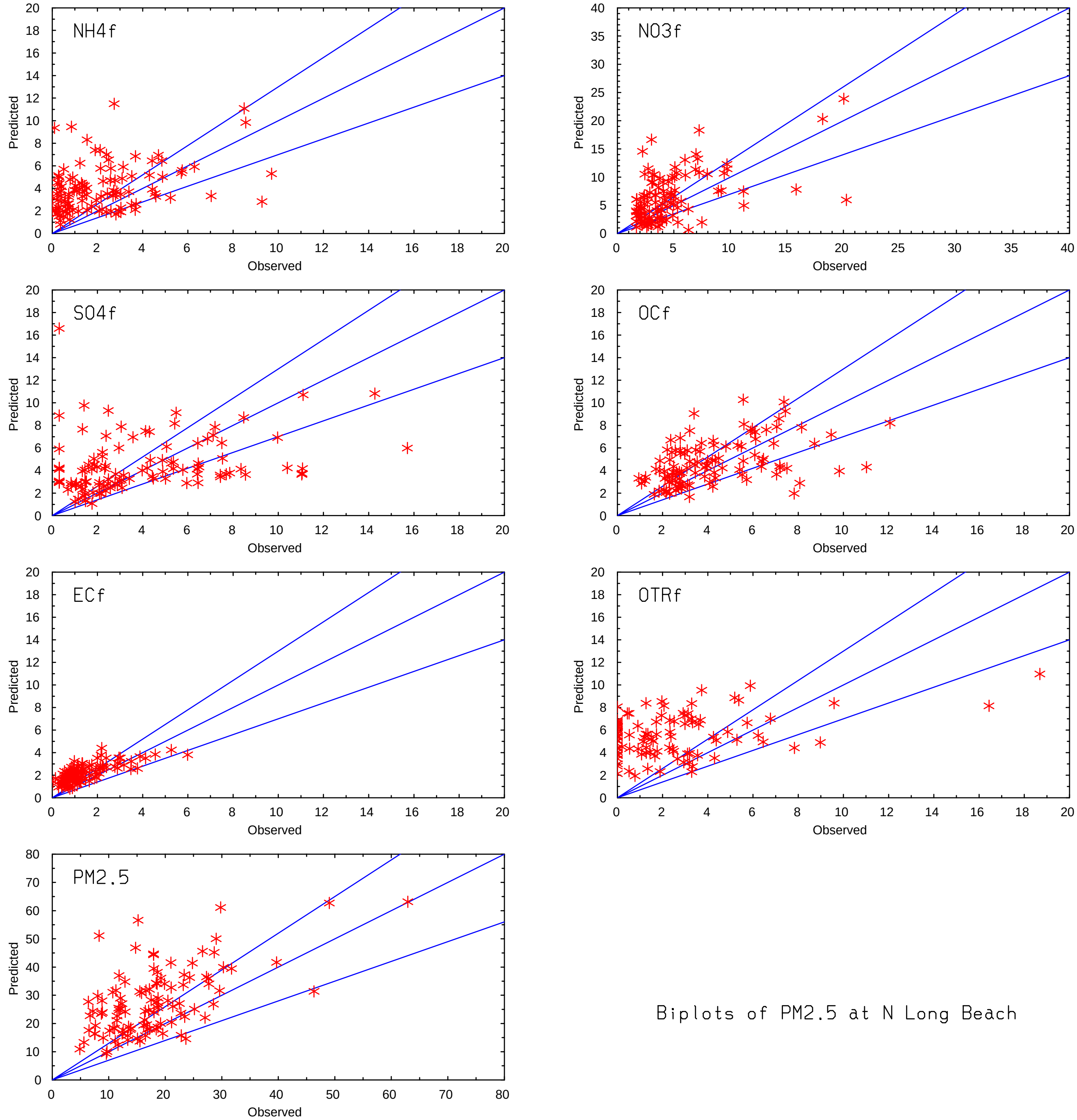

FIGURE V-2-12e

CAMx 2005 Base Year Bivariate Plots: Predicted vs. Observed at Long Beach

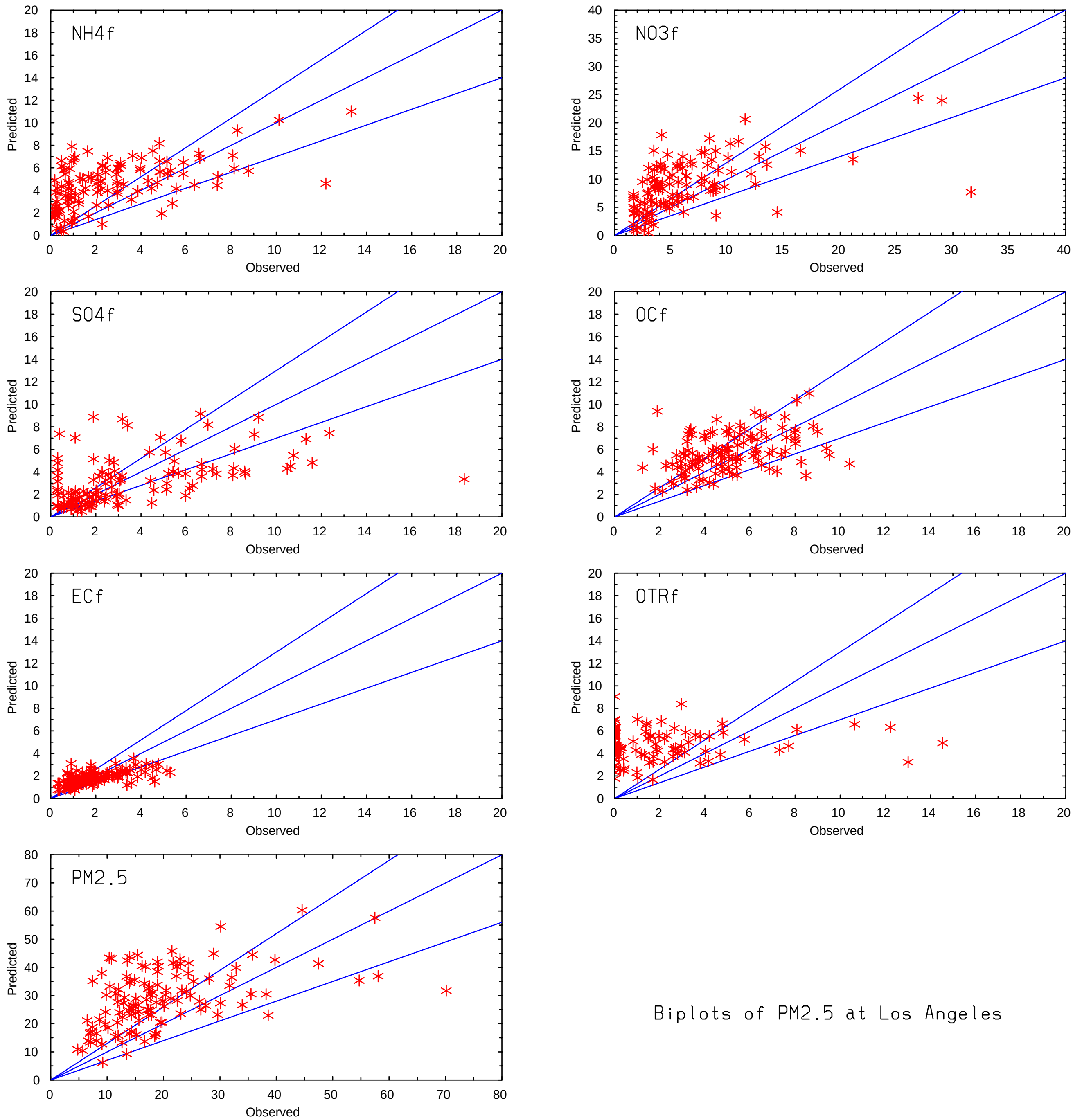

FIGURE V-2-12f

CAMx 2005 Base Year Bivariate Plots: Predicted vs. Observed at Los Angeles

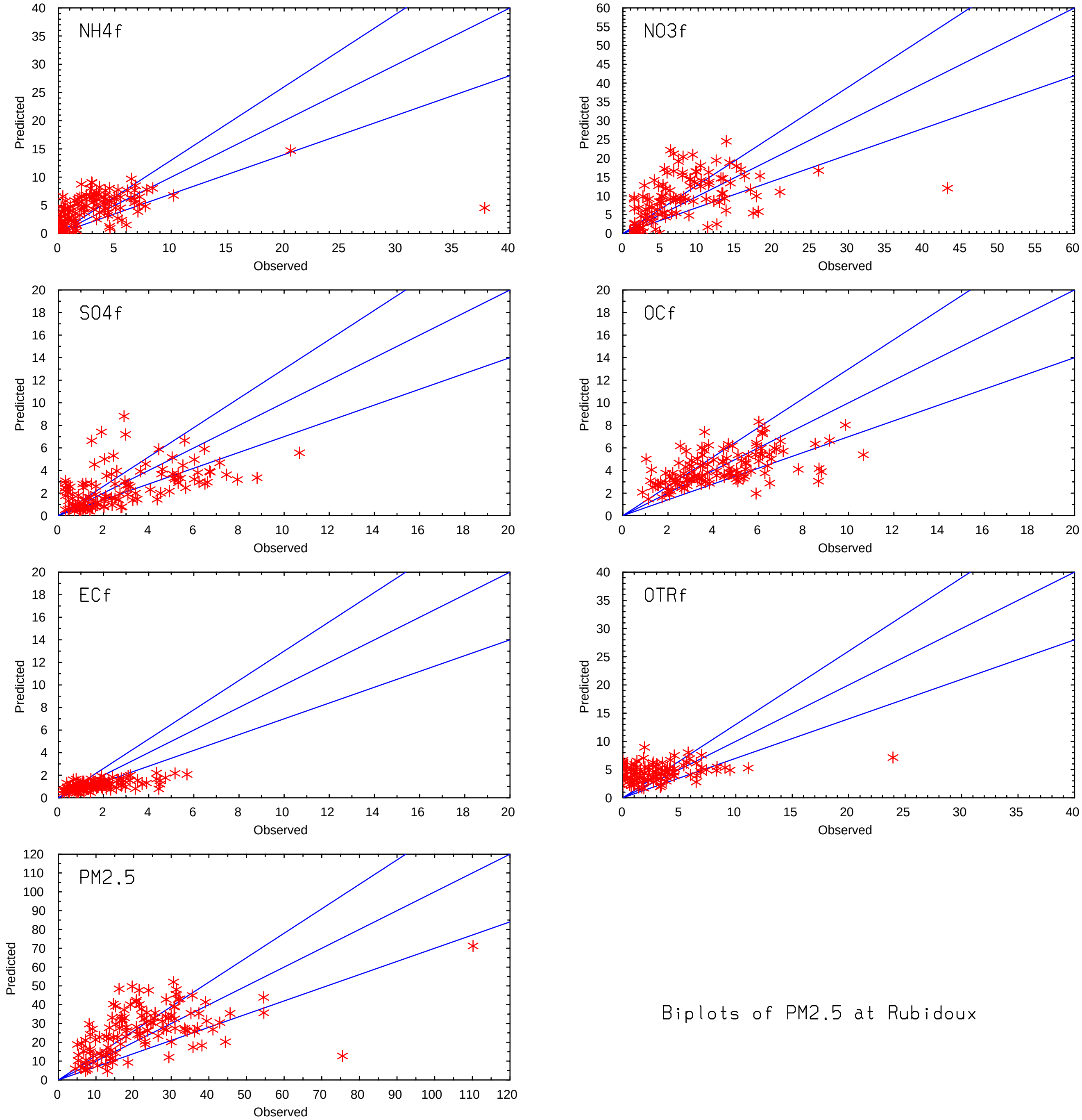

FIGURE V-2-12g

CAMx 2005 Base Year Bivariate Plots: Predicted vs. Observed at Rubidoux

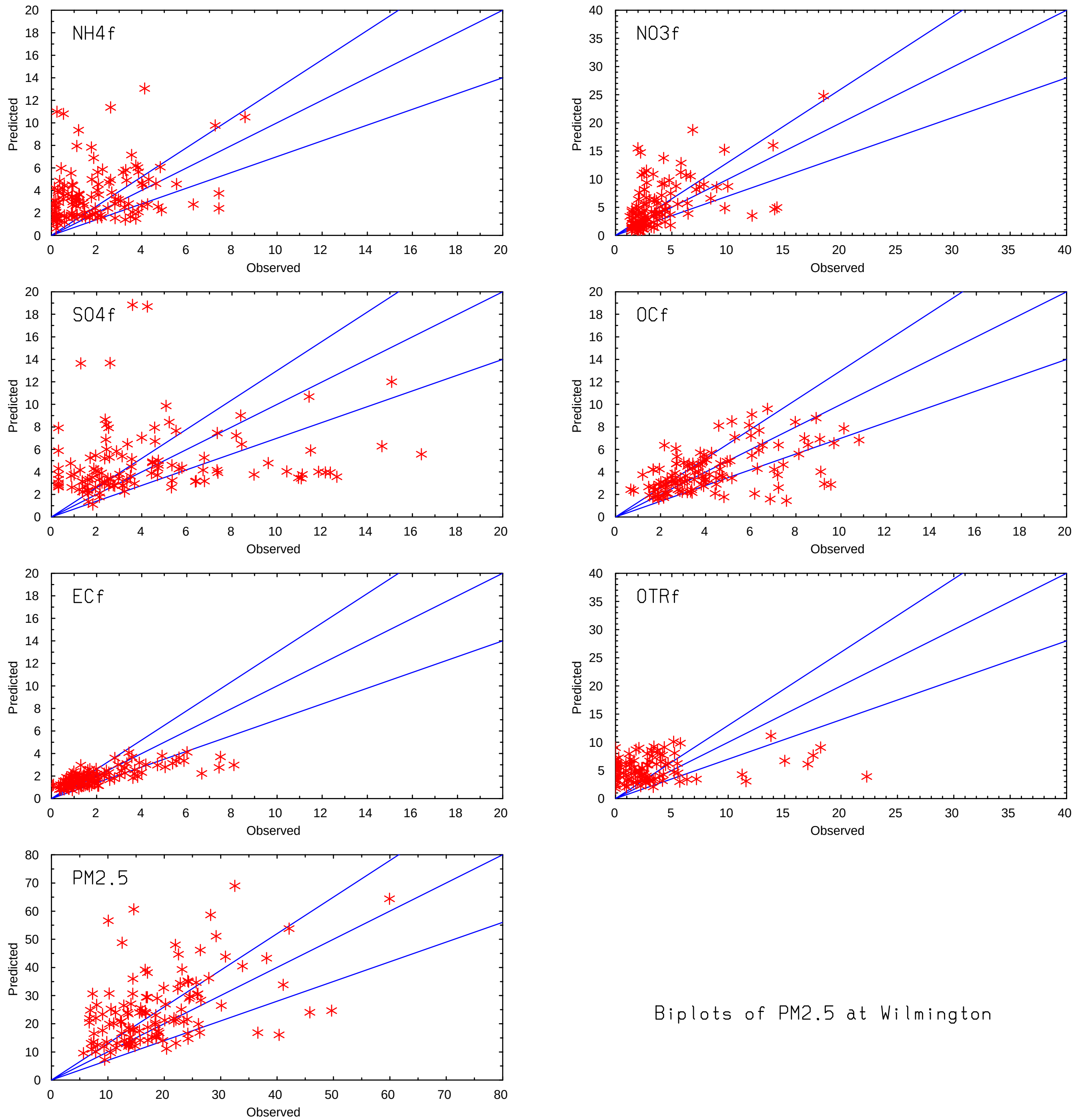

FIGURE V-2-12c

CAMx 2005 Base Year Bivariate Plots: Predicted vs. Observed at Wilmington

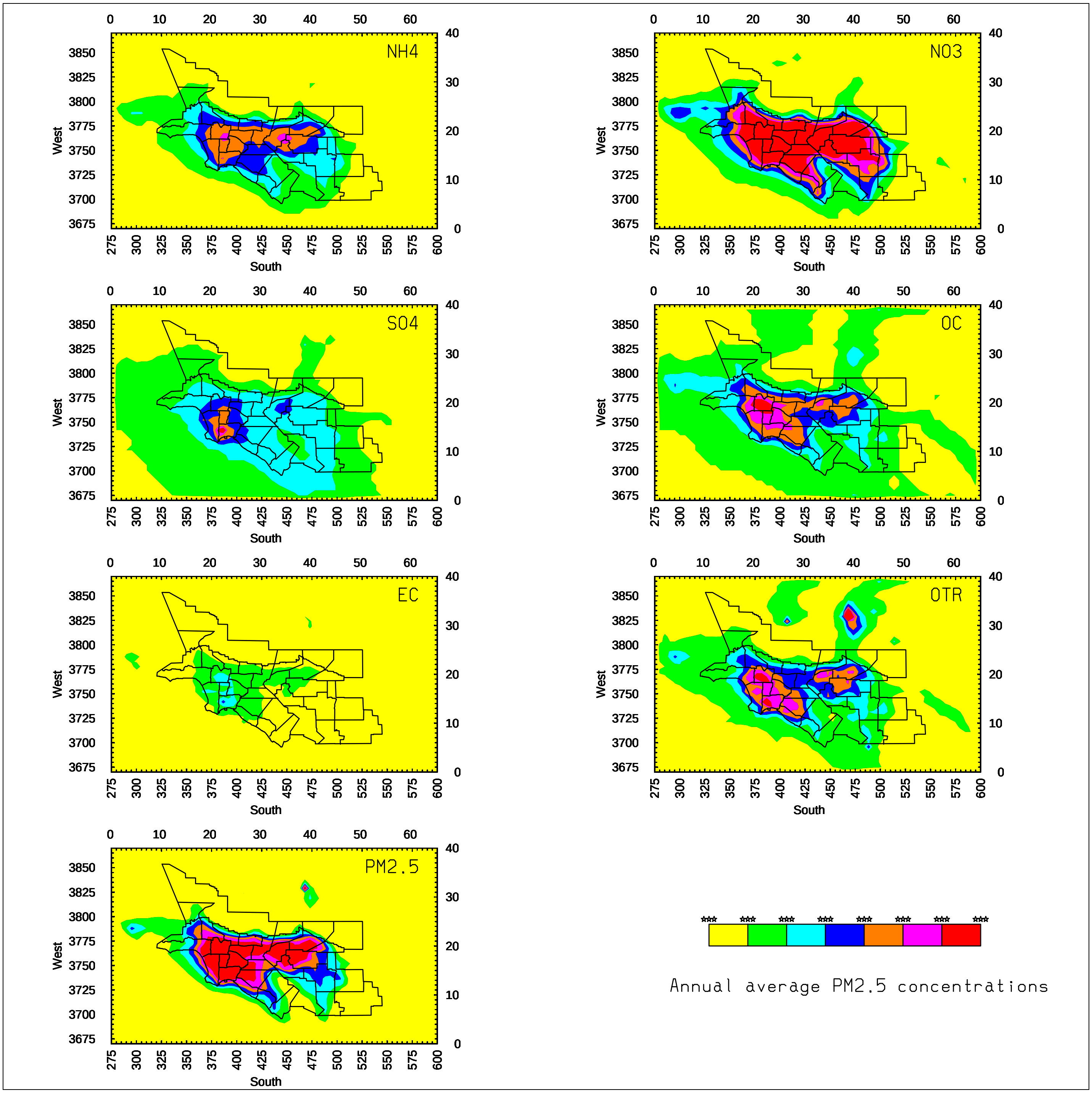

FIGURE V-2-13

CAMx 2005 Base Year Spatial Distribution of the Predicted PM2.5 Components and Total Mass

Annual Average SSI Mass Performance Evaluation

As part of the weight of evidence discussion, the base-year performance evaluation is presented in Table V-2-11 for the CAMx simulation comparing the predicted and observed annual average mass at the District's PM2.5 FRM monitoring network and at FRM sites in neighboring air basins included in the modeling domain. The goal of this analysis is to demonstrate that the model is consistent in the simulation of PM2.5 at the key sites and across the modeling domain.

In general, the 2005 base year simulations over-predict observed PM2.5 measures by the FRM methodology. The over prediction is greatest in the western Basin, in particular metropolitan Los Angeles County. Over prediction in the San Gabriel Valley and eastern Basin is within 50 percent of observations (with the exception of Big Bear Lake which is significantly under-predicted. Southern Orange County, Ventura County and the northern desert stations are reasonably well simulated. It is important to remember that the attainment demonstration is based on a relative response factor and not direct future year simulations.

TABLE V-2-11

CAMx Predicted and FRM Observed 2005 Base-Year Annual Average PM2.5

Location	Predicted Annual Average Concentration (μg/m^3)	Observed Annual Average Concentration (μg/m^3)	Percentage Prediction Error
Azusa	19.4	17.0	14.1
Big Bear	2.3	12.1	-81.7
Lynwood	29.1	17.5	66.3
Mission Viejo	14.7	10.7	37.4
Ontario	28.1	18.8	49.5
Pasadena	19.8	15.1	31.1
Reseda	16.5	13.9	18.7
Riverside Magnolia	26.7	18.0	48.3
San Bernardino	24.6	17.0	44.7
Lancaster-AV	5.5	8.9	-38.2
Victorville-MD	10.1	9.4	7.4
El Rio-SCCAB	11.7	10.6	10.4
Piru-SCCAB	7.3	9.3	-21.5
Simi Valley-SCCAB	9.1	11.2	-18.8
Thousand Oaks-SCCAB	10.4	10.5	-0.1

FUTURE AIR QUALITY

Under the federal Clean Air Act, the Basin must comply with the federal PM2.5 air quality standards by April, 2010 [Section 172(a)(2)(A)]. An extension of up-to five years could be granted if attainment cannot be demonstrated and several other conditions are satisfied. As indicated in Chapter 1 of the Draft 2007 AQMP, the District is formally requesting U.S. EPA to grant the five-year extension based upon the severity of the problem and the modeled attainment demonstration that clearly indicates that significant reductions in daily emissions of NOx and SOx are required to meet the 2015 attainment date.

Figure V-2-14 depicts future annual average PM2.5 air quality projections based on the SMAT at the nine PM2.5 monitoring sites having comprehensive particulate species characterization compared to federal and state annual PM2.5 standards, respectively. Shown in the figure are the estimated baseline conditions for 2005 along with projections for 2015, and 2021 with control measures in place. All sites will attain the federal annual standard by the year 2015. None of the sites will meet the state annual PM2.5 standard (12 $\mu g/m^3$) by 2015. Implementation of the 8-hour ozone control strategy will continue to lower annual PM2.5 concentrations.

The Basin currently meets the PM2.5 federal standard (65 $\mu g/m^3$) although a request for re-designation has not been forwarded to EPA. The SMAT applied to episodic PM2.5 with emission controls shows that the Basin will maintain its attainment of the 24-hour average federal PM2.5 standard in 2015. However, as shown in Figure V-2-15, the Draft 2007 AQMP does not achieve the revised 24-hour PM2.5 standard (35 $\mu g/m^3$) by 2015 or 2021. Additional controls are needed. California does not have a separate 24-hour PM2.5 standard.

Future-year PM2.5 air quality is projected using the procedures and assumptions previously described. Emissions for the 2005 and 2014 baseline and controlled scenarios are listed in Table V-2-7. Future year PM2.5 air quality was determined using site and species specific relative response factors applied to 2005 PM2.5 design values per EPA guidance documents.

The future year PM2.5 discussion follows the order of the previous analysis on base year model performance evaluation. Future year PM2.5 attainment is presented for: (1) the MATES-III sites, (2) the annual average for total mass at the FRM PM2.5 sites, and (3) a weight of evidence the 2015 gridded simulation "hot-spot" grid analysis.

For the purpose of the Basin attainment demonstration, analyses of predicted PM2.5 outside the District jurisdiction are not presented in this draft analysis.

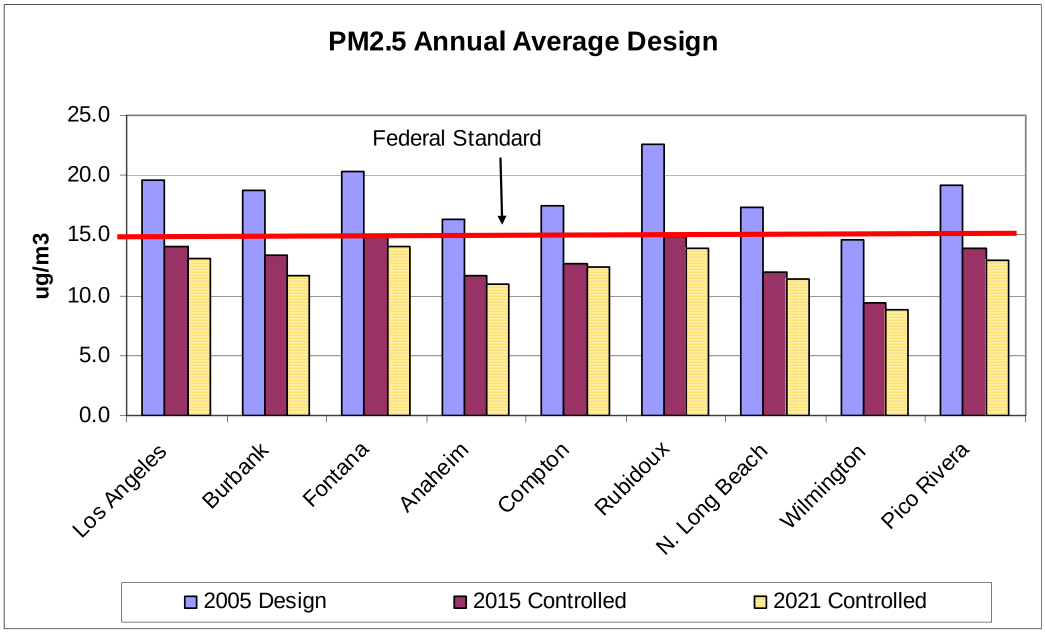

FIGURE V-2-14

Annual Average PM2.5 Design Concentrations:
2005, 2015 Controlled, and 2021 Controlled

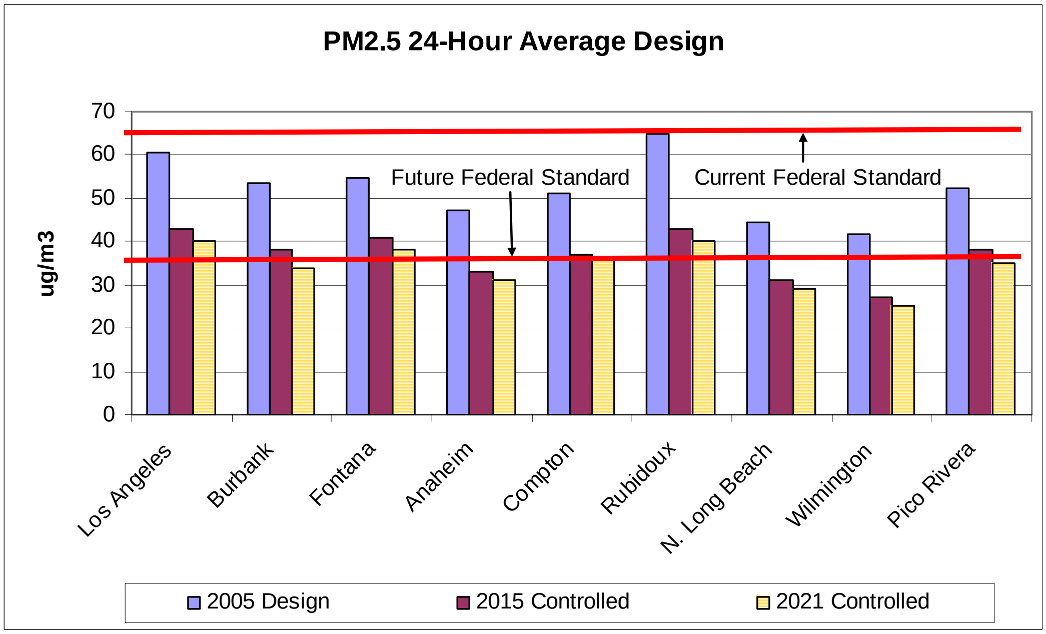

FIGURE V-2-15

Maximum 24-Hour Average PM2.5 Design Concentrations:
2005 Baseline, 2015 Controlled, and 2021 Controlled

Control Strategy Choices

PM2.5 has five major precursors that contribute to the development of the aerosol including ammonia, NOx, SOx, VOC, and directly emitted PM2.5. Various combinations of reductions in these pollutants could all provide a path to clean air. The attainment strategy presented in this Draft 2007 AQMP relies on the maximum extent possible reductions of SOx, direct PM2.5, followed by VOC and NOx. As discussed in Chapter 4 of the Draft 2007 AQMP, the proposed strategy focuses on the reductions of SOx and primary PM2.5 through cleaner marine fuels and extensive diesel trap retrofits respectively.

It is useful to weigh the value of the per ton precursor emissions to microgram reductions of PM2.5. The formation of PM2.5 is non-linear and as such individual precursors contribute differently to the overall mass. The CAMx simulations provide a relative rate of reduction per ton of emissions reduced based on complex aerosol chemistry. For PM2.5, the simulations determine that VOC emissions reductions have the lowest return in terms of micrograms reduced per ton reduction. NOx reductions are approximately three times more effective in lowering PM2.5 concentrations but not as effective as sulfate and direct PM2.5 emissions reductions. Table V-2-12 summarizes the relative importance of precursor emissions reductions to the analysis.

The District's proposed control strategy maximizes reductions of direct PM2.5 and SOx to the extent possible due to their effectiveness as well as the likelihood schedule of implementation within the next seven years. Substantial additional VOC and NOx emissions reductions are also required for attainment. However the strategy, nonetheless attempts to maximize the potential PM2.5 concentration reduction per identified ton precursor emissions reduction. The mix of the four primary precursor's emissions reductions targeted for the PM2.5 focused approach are listed in the Controlled Emissions Projection Algorithm (CEPA) output attaché at the end of this document.

SMAT Annual PM2.5 Attainment Demonstration

As outline in Chapter 1, the SMAT is conducted on a quarterly basis using the CAMx model output for the six species from the 2005 base-year and the 2014 controlled emissions. Quarterly RRFs determined from the modeling are applied to the measured quarterly MATES-III component species, distributed using the "sandwich" methodology, to estimate future year PM2.5. The predicted quarterly PM2.5 speciated data are scaled to the station quarterly design values, then averaged to estimate the future annual controlled PM2.5. For this analysis, ammonium concentrations measured as part of MATES-II are used directly. Bonded water is calculated from the concentrations of ammonium, nitrate and sulfate using EPA's polynomial regression equation (Frank, 2006) that simulates the thermodynamic balance between the four components. Bonded water is not directly reduced by an RRF but is recalculated after applying the RRFs to the ammonium, sulfate and nitrate.

TABLE V-2-12

Relative Contributions of Precursor Emissions Reductions to Simulated Controlled Future-Year PM2.5 Concentrations

Precursor (TPD)	PM2.5 Component ($\mu g/m^3$)	Standardized Contribution to Mass
VOC	Organic Carbon	Factor of 1
NOx	Nitrate	Factor of 3
PM2.5	Elemental Carbon & Others	Factor of 5
SOx	Sulfate	Factor of 10

Organic carbon concentrations measured by the field study are also used directly in the SMAT. The OC data is multiplied by a factor of 1.3 to adjust for the carbon mass. The procedure for including the OC data into the "sandwich" first required an estimation of the OC concentration by mass difference. The measured OC data is inserted into the distribution and the mass difference between the measured OC and the "sandwich" estimated OC is added to the total quarterly mass to maintain consistency with the FRM design value. The species specific RRF is applied to OC to estimate the future concentration and that future concentration is scaled by the percentage increase in mass added to the quarterly value before the reduction is calculated to readjust back to its original relative contribution to the future year PM2.5.

Tables V-2-13a through V-2-13i summarize the estimation of the 2015 controlled annual average PM2.5 using the SMAT and "sandwich" combined methodology.

TABLE V-2-13a

Predicted 2015 PM2.5 at Anaheim Using the Speciated Modeling Attainment Test

RRF (CAMx 2015/CAMx 2005)

	NH4	NO3	SO4	OC	EC	OTR	Mass
Q1	0.605	0.593	0.632	0.792	0.857	1.045	0.731
Q2	0.500	0.481	0.517	0.882	0.800	1.000	0.683
Q3	0.500	0.540	0.487	0.795	0.833	0.979	0.668
Q4	0.641	0.671	0.625	0.793	0.824	1.018	0.770

2005 MATES-III with Sandwich

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Filter Mass	Adjusted Mass	Design Value
Q1	1.28	4.43	2.05	4.05	1.49	3.52	1.98	0.50	16.14	19.31	17.6
Q2	0.95	2.70	3.00	3.66	0.71	1.68	2.15	0.50	13.53	15.35	12.4
Q3	2.42	3.86	5.88	3.66	0.99	3.89	1.84	0.50	17.38	23.03	15.4
Q4	2.83	6.01	3.06	5.46	2.54	2.44	2.32	0.50	21.21	25.16	20.0
Annual	1.87	4.25	3.50	4.21	1.43	2.88	2.07	0.50	17.07	20.71	16.4

2015 Controlled PM2.5

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Subtotal	Scaling Adjustment to FRM	2015 PM2.5 Adjusted to FRM
Q1	0.78	2.63	1.29	3.21	1.28	3.68	1.17	0.50	14.54	0.912	13.25
Q2	0.47	1.30	1.55	3.23	0.57	1.68	1.09	0.50	10.39	0.808	8.39
Q3	1.21	2.08	2.86	2.91	0.82	3.80	0.96	0.50	15.15	0.669	10.13
Q4	1.81	4.03	1.91	4.33	2.09	2.48	1.56	0.50	18.73	0.795	14.89
Annual	1.07	2.51	1.91	3.42	1.19	2.91	1.20	0.50	14.70		11.67

TABLE V-2-13b

Predicted 2015 PM2.5 at Burbank Using the Speciated Modeling Attainment Test

RRF (CAMx 2015/CAMx 2005)

	NH4	NO3	SO4	OC	EC	OTR	Mass
Q1	0.630	0.594	0.692	0.818	0.818	1.000	0.717
Q2	0.529	0.525	0.520	0.818	0.800	0.967	0.663
Q3	0.537	0.542	0.514	0.787	0.786	0.951	0.650
Q4	0.704	0.678	0.647	0.825	0.917	1.032	0.771

2005 MATES-III with Sandwich

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Filter Mass	Adjusted Mass	Design Value
Q1	1.68	5.61	2.12	4.77	2.09	3.89	2.06	0.50	21.38	22.73	18.7
Q2	1.64	4.12	3.26	4.47	1.33	1.70	1.74	0.50	18.75	18.77	15.2
Q3	3.47	6.21	6.54	5.02	1.77	2.99	3.11	0.50	22.94	29.60	20.7
Q4	2.84	6.77	1.99	5.99	3.13	2.34	2.28	0.50	23.58	25.84	20.3
Annual	2.41	5.68	3.47	5.06	2.08	2.73	2.30	0.50	21.66	24.23	18.73

2015 Controlled PM2.5

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Subtotal	Scaling Adjustment to FRM	2015 PM2.5 Adjusted to FRM
Q1	1.06	3.33	1.46	3.90	1.71	3.89	1.21	0.50	17.07	0.823	14.04891
Q2	0.87	2.16	1.69	3.66	1.07	1.65	0.89	0.50	12.49	0.810	10.11315
Q3	1.86	3.37	3.36	3.95	1.39	2.84	1.65	0.50	18.92	0.699	13.22991
Q4	2.00	4.59	1.29	4.94	2.87	2.42	1.36	0.50	19.97	0.786	15.68375
Annual	1.45	3.36	1.95	4.11	1.76	2.70	1.28	0.50	17.11		13.27

TABLE V-2-13c

Predicted 2015 PM2.5 at Compton Using the Speciated Modeling Attainment Test

RRF (CAMx 2015/CAMx 2005)

	NH4	NO3	SO4	OC	EC	OTR	Mass
Q1	0.660	0.694	0.622	0.780	0.810	0.940	0.741
Q2	0.568	0.593	0.571	0.806	0.800	0.902	0.689
Q3	0.600	0.642	0.551	0.750	0.765	0.872	0.686
Q4	0.709	0.740	0.625	0.757	0.808	0.938	0.762

2005 MATES-III with Sandwich

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Filter Mass	Adjusted Mass	Design Value
Q1	1.30	4.22	2.44	4.65	2.00	3.88	2.03	0.50	18.32	21.02	16.7
Q2	1.18	2.64	3.06	3.12	0.88	1.59	1.51	0.50	14.02	14.47	13.3
Q3	2.94	4.45	7.09	3.55	1.17	4.01	2.79	0.50	19.04	26.50	18.2
Q4	2.71	6.57	2.45	5.65	3.21	2.80	2.44	0.50	22.92	26.33	21.8
Annual	2.03	4.47	3.76	4.24	1.81	3.07	2.19	0.50	18.57	22.08	17.50

2015 Controlled PM2.5

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Subtotal	Scaling Adjustment to FRM	2015 PM2.5 Adjusted to FRM
Q1	0.86	2.93	1.52	3.63	1.62	3.65	1.39	0.50	16.09	0.794	12.78
Q2	0.67	1.57	1.75	2.51	0.70	1.43	0.92	0.50	10.05	0.919	9.24
Q3	1.77	2.86	3.91	2.66	0.89	3.50	1.63	0.50	17.71	0.687	12.16
Q4	1.92	4.86	1.53	4.28	2.60	2.63	1.77	0.50	20.09	0.828	16.63
Annual	1.30	3.05	2.17	3.27	1.45	2.80	1.43	0.50	15.98		12.70

TABLE V-2-13d

Predicted 2015 PM2.5 at Fontana Using the Speciated Modeling Attainment Test

RRF (CAMx 2015/CAMx 2005)

	NH4	NO3	SO4	OC	EC	OTR	Mass
Q1	0.581	0.557	0.813	0.882	1.000	1.091	0.759
Q2	0.500	0.458	0.588	0.818	0.917	1.050	0.643
Q3	0.476	0.437	0.600	0.791	0.929	1.042	0.657
Q4	0.656	0.643	0.714	0.878	0.929	1.073	0.795

2005 MATES-III with Sandwich

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Filter Mass	Adjusted Mass	Design Value
Q1	1.64	5.51	1.64	3.81	1.72	3.44	1.64	0.50	17.00	19.90	18.70
Q2	2.06	5.59	3.09	4.34	1.73	2.44	1.89	0.50	19.66	21.64	19.20
Q3	2.72	6.18	5.27	5.49	2.50	5.54	2.40	0.50	23.38	30.60	20.20
Q4	3.64	8.50	2.14	4.68	2.71	2.66	2.43	0.50	24.23	27.26	23.20
Annual	2.51	6.44	3.04	4.58	2.17	3.52	2.09	0.50	21.07	24.85	20.33

2015 Controlled PM2.5

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Subtotal	Scaling Adjustment to FRM	2015 PM2.5 Adjusted to FRM
Q1	0.95	3.07	1.33	3.36	1.72	3.75	1.16	0.50	15.85	0.940	14.89
Q2	1.03	2.56	1.82	3.55	1.58	2.56	0.95	0.50	14.55	0.887	12.91
Q3	1.29	2.70	3.16	4.34	2.32	5.77	1.38	0.50	21.48	0.660	14.18
Q4	2.39	5.46	1.53	4.11	2.52	2.85	1.59	0.50	20.95	0.851	17.83
Annual	1.42	3.45	1.96	3.84	2.04	3.73	1.27	0.50	18.21		14.95

TABLE V-2-13e

Predicted 2015 PM2.5 at Long Beach Using the Speciated Modeling Attainment Test

RRF (CAMx 2015/CAMx 2005)

	NH4	NO3	SO4	OC	EC	OTR	Mass
Q1	0.638	0.674	0.625	0.727	0.760	0.862	0.713
Q2	0.581	0.575	0.538	0.781	0.765	0.800	0.654
Q3	0.576	0.609	0.510	0.718	0.737	0.745	0.635
Q4	0.685	0.736	0.600	0.725	0.774	0.851	0.729

2005 MATES-III with Sandwich

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Filter Mass	Adjusted Mass	Design Value
Q1	1.25	4.46	2.29	4.39	1.63	3.99	2.24	0.50	17.87	20.74	18.00
Q2	1.14	2.61	3.70	3.78	0.90	2.10	2.11	0.50	15.71	16.85	12.70
Q3	2.97	3.90	6.61	3.85	1.22	3.63	2.56	0.50	20.08	25.22	15.70
Q4	3.06	5.61	3.25	5.2	2.33	2.84	1.91	0.50	20.43	24.70	22.90
Annual	2.10	4.14	3.96	4.31	1.52	3.14	2.21	0.50	18.52	21.88	17.33

2015 Controlled PM2.5

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Subtotal	Scaling Adjustment to FRM	2015 PM2.5 Adjusted to FRM
Q1	0.79	3.01	1.43	3.19	1.24	3.44	1.57	0.50	15.17	0.868	13.16
Q2	0.66	1.50	1.99	2.95	0.69	1.68	1.08	0.50	11.06	0.754	8.34
Q3	1.71	2.37	3.37	2.76	0.90	2.70	1.44	0.50	15.75	0.622	9.81
Q4	2.10	4.13	1.95	3.77	1.81	2.41	1.31	0.50	17.97	0.927	16.67
Annual	1.32	2.75	2.18	3.17	1.16	2.56	1.35	0.50	14.99		11.99

TABLE V-2-13f

Predicted 2015 PM2.5 at Los Angeles Using the Speciated Modeling Attainment Test

RRF (CAMx 2015/CAMx 2005)

	NH4	NO3	SO4	OC	EC	OTR	Mass
Q1	0.641	0.629	0.650	0.768	0.833	1.024	0.732
Q2	0.558	0.560	0.531	0.795	0.800	0.976	0.681
Q3	0.588	0.608	0.521	0.741	0.778	0.942	0.679
Q4	0.689	0.713	0.643	0.771	0.826	0.982	0.775

2005 MATES-III with Sandwich

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Filter Mass	Adjusted Mass	Design Value
Q1	1.39	5.07	2.03	4.34	1.85	3.46	2.23	0.50	16.54	20.87	19.70
Q2	1.40	3.74	3.41	4.72	1.35	1.70	2.11	0.50	13.71	18.93	16.30
Q3	3.80	5.80	6.34	5.13	1.74	4.50	3.07	0.50	18.23	30.88	20.20
Q4	2.88	6.45	2.33	6.07	2.94	2.39	2.19	0.50	21.71	25.75	22.20
Annual	2.37	5.26	3.53	5.07	1.97	3.01	2.40	0.50	17.55	24.11	19.60

2015 Controlled PM2.5

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Subtotal	Scaling Adjustment to FRM	2015 PM2.5 Adjusted to FRM
Q1	0.89	3.19	1.32	3.33	1.54	3.55	1.39	0.50	15.71	0.944	14.83
Q2	0.78	2.09	1.81	3.75	1.08	1.66	1.11	0.50	12.79	0.861	11.01
Q3	2.23	3.53	3.30	3.80	1.36	4.24	1.69	0.50	20.65	0.654	13.51
Q4	1.99	4.60	1.50	4.68	2.43	2.34	1.55	0.50	19.59	0.862	16.89
Annual	1.47	3.35	1.98	3.89	1.60	2.95	1.44	0.50	17.18		13.97

TABLE V-2-13f

Predicted 2015 PM2.5 at Pico Rivera Using the Speciated Modeling Attainment Test

RRF (CAMx 2015/CAMx 2005)

	NH4	NO3	SO4	OC	EC	OTR	Mass
Q1	0.622	0.637	0.591	0.745	0.824	0.947	0.709
Q2	0.525	0.544	0.516	0.800	0.833	0.941	0.646
Q3	0.558	0.610	0.500	0.733	0.733	0.900	0.654
Q4	0.692	0.730	0.581	0.742	0.783	0.961	0.752

2005 MATES-III with Sandwich

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Filter Mass	Adjusted Mass	Design Value
Q1	1.29	4.76	1.95	4.67	2.13	3.81	2.16	0.50	17.59	21.28	20.30
Q2	1.53	5.39	2.26	3.63	1.52	2.43	2.31	0.50	12.80	19.57	14.40
Q3	3.57	4.77	3.85	4.96	2.24	4.63	2.12	0.50	20.05	26.65	18.80
Q4	3.60	7.36	2.84	5.72	3.20	3.31	1.99	0.50	23.95	28.52	23.20
Annual	2.50	5.57	2.73	4.75	2.27	3.55	2.15	0.50	18.60	24.00	19.18

2015 Controlled PM2.5

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Subtotal	Scaling Adjustment to FRM	2015 PM2.5 Adjusted to FRM
Q1	0.80	3.03	1.15	3.48	1.76	3.61	1.36	0.50	15.70	0.954	14.97
Q2	0.80	2.93	1.17	2.90	1.26	2.29	1.29	0.50	13.15	0.736	9.67
Q3	1.99	2.91	1.93	3.64	1.64	4.17	1.14	0.50	17.92	0.706	12.64
Q4	2.49	5.37	1.65	4.24	2.51	3.18	1.33	0.50	21.27	0.814	17.31
Annual	1.52	3.56	1.47	3.57	1.79	3.31	1.28	0.50	17.01		13.65

TABLE V-2-13g

Predicted 2015 PM2.5 at Rubidoux Using the Speciated Modeling Attainment Test

RRF (CAMx 2015/CAMx 2005)

	NH4	NO3	SO4	OC	EC	OTR	Mass
Q1	0.571	0.536	0.688	0.854	0.909	0.951	0.702
Q2	0.431	0.419	0.471	0.824	0.889	0.905	0.576
Q3	0.436	0.405	0.514	0.761	0.833	0.882	0.564
Q4	0.622	0.619	0.650	0.854	0.917	0.960	0.746

2005 MATES-III with Sandwich

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Filter Mass	Adjusted Mass	Design Value
Q1	1.14	4.31	1.34	3.48	1.53	3.31	1.74	0.50	16.25	17.36	21.20
Q2	2.85	7.32	3.00	4.07	1.15	1.88	2.86	0.50	21.35	23.63	21.90
Q3	4.97	10.27	5.23	5.07	1.54	5.07	3.89	0.50	24.37	36.54	22.60
Q4	3.39	6.68	1.76	5.17	2.56	2.59	1.66	0.50	24.48	24.31	24.90
Annual	3.09	7.14	2.83	4.45	1.70	3.21	2.54	0.50	21.61	25.46	22.65

2015 Controlled PM2.5

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Subtotal	Scaling Adjustment to FRM	2015 PM2.5 Adjusted to FRM
Q1	0.65	2.31	0.92	2.97	1.39	3.15	0.97	0.50	12.87	1.221	15.72
Q2	1.23	3.07	1.41	3.35	1.02	1.70	1.22	0.50	13.50	0.927	12.52
Q3	2.17	4.16	2.69	3.86	1.28	4.47	1.71	0.50	20.84	0.618	12.89
Q4	2.11	4.13	1.15	4.42	2.35	2.49	1.05	0.50	18.19	1.024	18.63
Annual	1.54	3.42	1.54	3.65	1.51	2.95	1.24	0.50	16.35		14.94

TABLE V-2-13h

Predicted 2015 PM2.5 at Wilmington Using the Speciated Modeling Attainment Test

RRF (CAMx 2015/CAMx 2005)

	NH4	NO3	SO4	OC	EC	OTR	Mass
Q1	0.630	0.654	0.549	0.702	0.727	0.772	0.662
Q2	0.560	0.586	0.513	0.731	0.643	0.700	0.606
Q3	0.556	0.594	0.471	0.697	0.667	0.674	0.586
Q4	0.647	0.709	0.557	0.695	0.731	0.761	0.681

2005 MATES-III with Sandwich

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Filter Mass	Adjusted Mass	Design Value
Q1	1.14	3.30	2.78	4.18	2.27	4.19	1.93	0.50	16.79	20.29	12.70
Q2	1.08	2.15	3.81	3.67	1.07	2.11	1.98	0.50	13.87	16.38	10.90
Q3	2.81	3.53	7.59	3.7	1.77	3.87	2.64	0.50	19.99	26.43	15.70
Q4	2.55	5.21	3.28	5.52	3.38	2.78	2.17	0.50	23.01	25.39	19.60
Annual	1.90	3.55	4.37	4.27	2.12	3.24	2.18	0.50	18.42	22.12	14.73

2015 Controlled PM2.5

	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Subtotal	Scaling Adjustment to FRM	2015 PM2.5 Adjusted to FRM
Q1	0.72	2.16	1.52	2.93	1.65	3.23	1.10	0.50	13.82	0.626	8.65
Q2	0.61	1.26	1.96	2.68	0.69	1.48	0.99	0.50	10.16	0.666	6.76
Q3	1.56	2.10	3.58	2.58	1.18	2.61	1.36	0.50	15.47	0.594	9.19
Q4	1.65	3.69	1.83	3.84	2.47	2.11	1.44	0.50	17.53	0.772	13.53
Annual	1.13	2.30	2.22	3.01	1.50	2.36	1.22	0.50	14.25		9.54

2015 CAMx Grid-Cell Evaluation

Figure V-2-14 presents the grid cell extrapolated of 2005 PM2.5 annual design values. Extrapolation was based on Krieging using design values from sites inside and outside the Basin to enhance the spatial representation. The pattern depicted by the grid cell design display closely matches the pattern of annual average PM2.5 presented in Figure V-2-4. Using a similar interpolation scheme, the relative percentage contributions of the six component species was distributed to each cell in the basin. The grid cell speciated RRFs from the CAMx simulations were then multiplied by the relative percentage concentrations of the six components contributing to the grid cell mass and interpolated design value to estimate the grid cell future year concentration. Figure V-2-15 shows that only one cell in the Basin is expected to exceed the federal standard and when nine-cell averaging is incorporated all cells fall below an annual average threshold of 15 µg/m3.

SMAT 24-Hour PM2.5 Attainment Demonstration

As previously stated, the 2005 Basin maximum design value (64.8 µg/m3) meets the federal 24-hour average PM2.5 standard of 65 µg/m3. The SMAT for the 24-hour standard is presented to assure that the PM2.5 episodic levels continue to lower and that the Basin continues to meet the standard in 2015 and beyond. Five versions of the SMAT are applied to the MATES-III data to quantify future year PM2.5 reductioins. All of the tests demonstrate continued attainment of the 24-hour average PM2.5 standard in 2015.

The five version of the SMAT include: (1) CAMx derived RRFs (2005-2014) for the annual average PM2.5 attainment demonstration are applied to the 5-Year average PM2.5 design values; (2) the quarterly based speciated modeling attainment test prescribed in the EPA guidance document that uses the CAMx quarterly RRF's applied to the quarterly 24-hour design values for each year in the five year period 2001-2005; (3) a modified version of the second option that relies on the top three PM2.5 measurements average component percentages to the total mass substituted into the recommended quarterly PM2.5 design value attainment test; (4) the expected response of the peak episode PM2.5 [October 22, 2005, 110 µg/m3] to episodic specific RRFs is applied to the 5-year average Basin maximum design value, and (5) the expected response of the peak episode PM2.5 to the annual average RRFs is applied to the 5-year average Basin maximum design value. Table V-2-14 summarizes the different methods for calculating the 2015 24-hour PM2.5 design value.

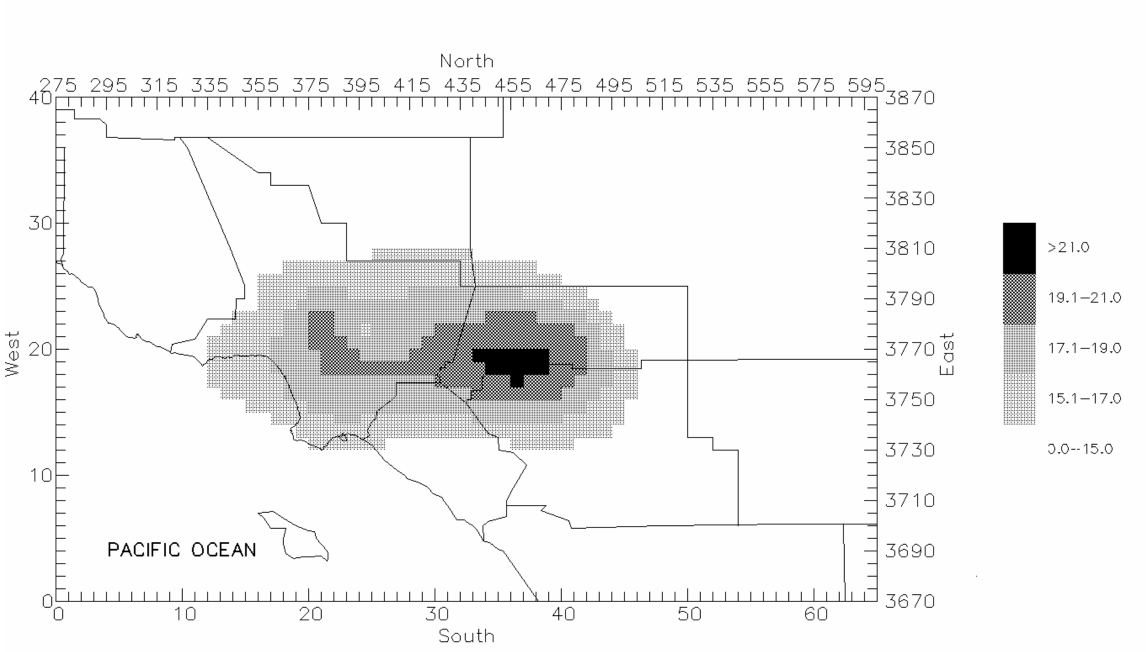

FIGURE V- 2-14

2005 Grid-Cell Extrapolated Design Values (µg/m^3)

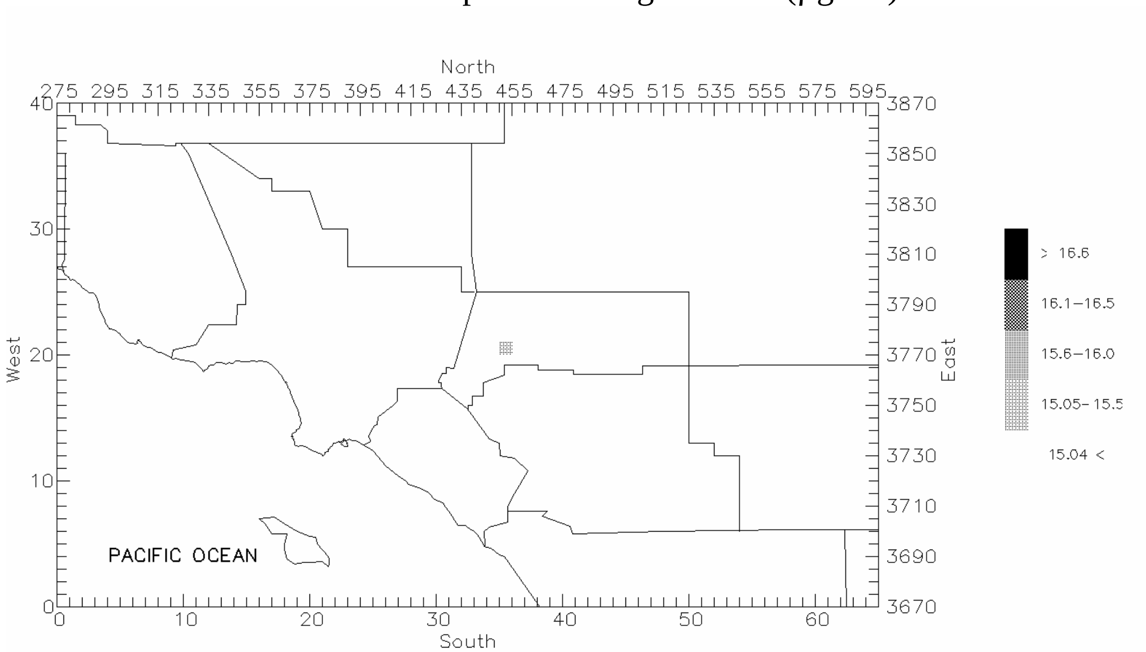

FIGURE V- 2-15

2005 Grid-Cell Performance Evaluation
(Grid Cell Predicted Concentrations in µg/m^3)

The first test simply assumes that the average of the quarterly RRFs calculated for the annual average attainment demonstration can be directly applied to the 24-hour PM2.5 design value to estimate the 2015 reduction in PM2.5 due to implementation of the control strategy. The results of this test are presented in Chapter 5 of the main document.

The second test is more conservative and follows the model specified in the EPA guidance document. The quarterly RRFs are applied to the component based design values for the period 2001 through 2005 are maximum quarterly design values to recreate a 2015 design value. The analysis requires the RRFs and the percentage contribution to the total mass of each component to make a future year estimation.

The third analysis focuses on the top three episodic days in each quarter of 2005 to establish both the percentage contributions for the components and the relative reduction for an episodic period. The quarterly RRFs are applied to the average quarterly composite episodes to determine a ratio of 2015 predicted concentration to 2005 observed. That ratio is then applied to the 2005 design to demonstrate 2015 attainment.

The fourth and fifth analyses apply the day specific and annual average RRFs to the components observed on October 22, 2005, the day having the highest measured PM2.5 at a majority of sites in the Basin. These two analyses, like the third, produce a ratio that is applied to the 2005 design to estimate 2015 attainment.

Tables V-2-15a through V-2-15h summarize the EPA recommended attainment test. Tables V-2-16a through V-2-16i provide the background for first, and thirird through fifth test. As previously stated, all analyses demonstrate 2015 attainment of the 24-hour average standard.

TABLE V-2-14

Summary of Methodologies to Calculate 2015 24-Hour Average Design Value (µg/m3)

	Method					
Location	A Annual RRF to Design	B EPA Guideline Quarterly	C Quarterly Top-3 Ratio to Design	D Peak Day RRF to Peak Day	E Annual RRF to Peak Day	F Maximum of Methods
Anaheim	33.4	39	34.4	36.2	30.1	39.0
Burbank	37.8	42.8	37.1	42.6	34.1	42.8
Compton	37.4	41.1	35.6	39.5	32.8	41.1
Fontana	40.6	45.3	41.7	40.0	33.4	45.3
Long Beach	30.8	47.4	32.4	34.3	28.5	47.4
Los Angeles	43.1	43.2	39.0	50.4	38.2	50.4
Pico Rivera	37.6	41.9	37.9	40.7	33.4	41.9
Rubidoux	42.8	53.6	46.4	41.5	39.5	53.6
Wilmington	26.6	39	N/A	30.0	25.8	39.0

TABLE V-2-15a

Anaheim 24-Hour 2015 Design Value Estimation

Split	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.07	0.24	0.11	0.22	0.08	0.19	0.11
Q2	0.06	0.18	0.20	0.25	0.05	0.11	0.14
Q3	0.11	0.17	0.26	0.16	0.04	0.17	0.08
Q4	0.11	0.24	0.12	0.22	0.10	0.10	0.09

Design	Q1	Q2	Q3	Q4
2001	55.1	23.1	28.4	40.9
2002	48.1	38.2	40.5	58.5
2003	51.8	46.3	27.6	47.3
2004	48.2	30.5	46.8	49.9
2005	41.8	27.6	42.9	43.8

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.605	0.593	0.632	0.792	0.857	1.045	0.591
Q2	0.500	0.481	0.517	0.882	0.800	1.000	0.507
Q3	0.500	0.540	0.487	0.795	0.833	0.979	0.523
Q4	0.641	0.671	0.625	0.793	0.824	1.018	0.672

Q1 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	3.8	13.1	6.0	12.0	4.4	10.4	6.0
2002	3.3	11.4	5.2	10.5	3.8	9.0	5.2
2003	3.6	12.3	5.6	11.3	4.1	9.7	5.6
2004	3.3	11.4	5.2	10.5	3.8	9.1	5.2
2005	2.9	9.9	4.5	9.1	3.3	7.8	4.5

Q1 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	2.3	7.8	3.8	9.5	3.7	10.8	3.5	0.5	42
2002	2	6.8	3.3	8.3	3.3	9.5	3.1	0.5	36.7
2003	2.2	7.3	3.6	8.9	3.5	10.2	3.3	0.5	39.5
2004	2	6.8	3.3	8.3	3.3	9.5	3.1	0.5	36.8
2005	1.7	5.9	2.9	7.2	2.8	8.2	2.7	0.5	31.9

Q2 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	1.4	4.1	4.5	5.7	1.1	2.5	3.2
2002	2.3	6.8	7.5	9.4	1.9	4.1	5.3
2003	2.7	8.2	9.2	11.5	2.3	5.0	6.4
2004	1.8	5.4	6.0	7.5	1.5	3.3	4.2
2005	1.6	4.9	5.4	6.8	1.4	3.0	3.8

Q2 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	0.7	2.0	2.3	5.0	0.9	2.5	1.6	0.5	15.4
2002	1.1	3.3	3.9	8.3	1.5	4.1	2.7	0.5	25.4
2003	1.4	4.0	4.7	10.1	1.8	5.0	3.3	0.5	30.8
2004	0.9	2.6	3.1	6.6	1.2	3.3	2.1	0.5	20.3
2005	0.8	2.3	2.8	6.0	1.1	3.0	1.9	0.5	18.4

Q3 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	3.1	4.7	7.3	4.5	1.1	4.7	2.2
2002	4.4	6.8	10.4	6.4	1.6	6.8	3.2
2003	3.0	4.6	7.0	4.3	1.1	4.6	2.2
2004	5.1	7.9	12.0	7.4	1.9	7.9	3.7
2005	4.7	7.2	11.0	6.8	1.7	7.2	3.4

Q3 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.5	2.6	3.5	3.5	0.9	4.6	1.2	0.5	18.4
2002	2.2	3.7	5.1	5.1	1.3	6.7	1.7	0.5	26.2
2003	1.5	2.5	3.4	3.4	0.9	4.5	1.1	0.5	17.9
2004	2.5	4.3	5.9	5.9	1.5	7.7	1.9	0.5	30.2
2005	2.3	3.9	5.4	5.4	1.4	7.1	1.8	0.5	27.7

Q4 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	4.4	9.7	4.8	8.9	4.0	4.0	3.6
2002	6.4	13.9	7.0	12.8	5.8	5.8	5.2
2003	5.1	11.2	5.6	10.3	4.7	4.7	4.2
2004	5.4	11.9	5.9	10.9	4.9	4.9	4.4
2005	4.8	10.4	5.2	9.5	4.3	4.3	3.9

Q4 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	2.8	6.5	3.0	7.0	3.3	4.1	2.4	0.5	29.8
2002	4.1	9.3	4.4	10.1	4.8	5.9	3.5	0.5	42.6
2003	3.3	7.5	3.5	8.2	3.9	4.8	2.8	0.5	34.5
2004	3.5	8.0	3.7	8.6	4.1	5.0	3.0	0.5	36.3
2005	3.1	7.0	3.2	7.6	3.6	4.4	2.6	0.5	31.9

Weighted 2015 Design Value

Year	Q1	Q2	Q3	Q4	Max	FDV	W2015DV
2001	42	15.4	18.4	29.8	42		
2002	36.7	25.4	26.2	42.6	42.6		
2003	39.5	30.8	17.9	34.5	39.5	41.4	
2004	36.8	20.3	30.2	36.3	36.8	39.6	
2005	31.9	18.4	27.7	31.9	31.9	36.1	39.0

TABLE V-2-15b

Compton/Lynwood 24-Hour 2015 Design Value Estimation

Split	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.06	0.21	0.12	0.23	0.10	0.19	0.10
Q2	0.08	0.19	0.22	0.22	0.06	0.11	0.11
Q3	0.11	0.17	0.27	0.14	0.04	0.15	0.11
Q4	0.10	0.25	0.09	0.22	0.12	0.11	0.09

Design	Q1	Q2	Q3	Q4
2001	45.8	30.8	35.0	48.4
2002	50.9	43.7	38.5	66.0
2003	45.3	44.7	45.5	52.5
2004	44.8	38.2	36.3	52.4
2005	41.0	31.8	51.7	53.0

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.660	0.694	0.622	0.780	0.810	0.940	0.684
Q2	0.568	0.593	0.571	0.806	0.800	0.902	0.609
Q3	0.600	0.642	0.551	0.750	0.765	0.872	0.584
Q4	0.709	0.740	0.625	0.757	0.808	0.938	0.725

Q1 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	2.7	9.5	5.4	10.4	4.5	8.6	4.5
2002	3.0	10.6	6.0	11.6	5.0	9.6	5.0
2003	2.7	9.4	5.4	10.3	4.5	8.5	4.5
2004	2.7	9.3	5.3	10.2	4.4	8.4	4.4
2005	2.4	8.5	4.9	9.3	4.1	7.7	4.1

Q1 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.8	6.6	3.4	8.1	3.7	8.1	3.1	0.5	35.3
2002	2.0	7.3	3.8	9.0	4.1	9.0	3.4	0.5	39.2
2003	1.8	6.5	3.3	8.0	3.6	8.0	3.1	0.5	34.9
2004	1.8	6.5	3.3	7.9	3.6	7.9	3.0	0.5	34.5
2005	1.6	5.9	3.0	7.3	3.3	7.2	2.8	0.5	31.6

Q2 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	2.4	5.8	6.7	6.7	1.8	3.3	3.3
2002	3.5	8.2	9.5	9.5	2.6	4.8	4.8
2003	3.5	8.4	9.7	9.7	2.7	4.9	4.9
2004	3.0	7.2	8.3	8.3	2.3	4.1	4.1
2005	2.5	5.9	6.9	6.9	1.9	3.4	3.4

Q2 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.4	3.4	3.8	5.4	1.5	3.0	2.0	0.5	21.0
2002	2.0	4.9	5.4	7.7	2.1	4.3	2.9	0.5	29.7
2003	2.0	5.0	5.6	7.8	2.1	4.4	3.0	0.5	30.3
2004	1.7	4.2	4.7	6.7	1.8	3.7	2.5	0.5	26.0
2005	1.4	3.5	3.9	5.6	1.5	3.1	2.1	0.5	21.6

Q3 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	3.8	5.9	9.3	4.8	1.4	5.2	3.8
2002	4.2	6.5	10.3	5.3	1.5	5.7	4.2
2003	5.0	7.7	12.2	6.3	1.8	6.8	5.0
2004	3.9	6.1	9.7	5.0	1.4	5.4	3.9
2005	5.6	8.7	13.8	7.2	2.0	7.7	5.6

Q3 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	2.3	3.8	5.1	3.6	1.1	4.5	2.2	0.5	23.1
2002	2.5	4.1	5.7	4.0	1.2	5.0	2.4	0.5	25.4
2003	3.0	4.9	6.7	4.7	1.4	5.9	2.9	0.5	30.0
2004	2.4	3.9	5.3	3.8	1.1	4.7	2.3	0.5	23.9
2005	3.4	5.6	7.6	5.4	1.6	6.7	3.3	0.5	34.0

Q4 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	4.8	12.0	4.3	10.5	5.7	5.3	4.3
2002	6.6	16.4	5.9	14.4	7.9	7.2	5.9
2003	5.2	13.0	4.7	11.4	6.2	5.7	4.7
2004	5.2	13.0	4.7	11.4	6.2	5.7	4.7
2005	5.3	13.1	4.7	11.6	6.3	5.8	4.7

Q4 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	3.4	8.9	2.7	8.0	4.6	4.9	3.1	0.5	36.1
2002	4.6	12.1	3.7	10.9	6.4	6.8	4.3	0.5	49.2
2003	3.7	9.6	2.9	8.7	5.0	5.4	3.4	0.5	39.2
2004	3.7	9.6	2.9	8.6	5.0	5.4	3.4	0.5	39.1
2005	3.7	9.7	3.0	8.7	5.1	5.4	3.4	0.5	39.6

Weighted 2015 Design Value

Year	Q1	Q2	Q3	Q4	Max	FDV	W2015DV
2001	35.3	21.0	23.1	36.1	36.1		
2002	39.2	29.7	25.4	49.2	49.2		
2003	34.9	30.3	30.0	39.2	39.2	41.5	
2004	34.5	26.0	23.9	39.1	39.1	42.5	
2005	31.6	21.6	34.0	39.6	39.6	39.3	41.1

TABLE V-2-15c

Burbank 24-Hour 2015 Design Value Estimation

Split	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.08	0.25	0.10	0.21	0.09	0.18	0.09
Q2	0.09	0.23	0.18	0.24	0.07	0.09	0.10
Q3	0.12	0.21	0.22	0.17	0.06	0.10	0.11
Q4	0.11	0.27	0.08	0.24	0.12	0.09	0.09

Design	Q1	Q2	Q3	Q4
2001	33.9	30.9	28.2	50.2
2002	52.6	54.4	39.0	61.4
2003	54.1	45.2	51.6	50.3
2004	37.8	41.6	51.5	60.1
2005	50.6	34.8	49.3	42.6

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.630	0.594	0.692	0.818	0.818	1.000	0.587
Q2	0.529	0.525	0.520	0.818	0.800	0.967	0.511
Q3	0.537	0.542	0.514	0.787	0.786	0.951	0.530
Q4	0.704	0.678	0.647	0.825	0.917	1.032	0.596

Q1 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	2.7	8.4	3.3	7.0	3.0	6.0	3.0
2002	4.2	13.0	5.2	10.9	4.7	9.4	4.7
2003	4.3	13.4	5.4	11.3	4.8	9.6	4.8
2004	3.0	9.3	3.7	7.8	3.4	6.7	3.4
2005	4.0	12.5	5.0	10.5	4.5	9.0	4.5

Q1 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.7	5.0	2.3	5.7	2.5	6.0	1.8	0.5	25.4
2002	2.6	7.7	3.6	8.9	3.8	9.4	2.8	0.5	39.4
2003	2.7	8.0	3.7	9.2	3.9	9.6	2.8	0.5	40.5
2004	1.9	5.5	2.6	6.4	2.7	6.7	2.0	0.5	28.3
2005	2.5	7.4	3.5	8.6	3.7	9.0	2.6	0.5	37.9

Q2 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	2.7	7.0	5.5	7.3	2.1	2.7	3.0
2002	4.9	12.4	9.7	12.9	3.8	4.9	5.4
2003	4.0	10.3	8.0	10.7	3.1	4.0	4.5
2004	3.7	9.5	7.4	9.9	2.9	3.7	4.1
2005	3.1	7.9	6.2	8.2	2.4	3.1	3.4

Q2 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.4	3.7	2.8	6.0	1.7	2.6	1.6	0.5	20.3
2002	2.6	6.5	5.0	10.6	3.0	4.7	2.8	0.5	35.7
2003	2.1	5.4	4.2	8.8	2.5	3.9	2.3	0.5	29.7
2004	2.0	5.0	3.8	8.1	2.3	3.6	2.1	0.5	27.3
2005	1.6	4.1	3.2	6.7	1.9	3.0	1.8	0.5	22.9

Q3 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	3.3	5.8	6.1	4.7	1.7	2.8	3.0
2002	4.6	8.1	8.5	6.5	2.3	3.9	4.2
2003	6.1	10.7	11.2	8.7	3.1	5.1	5.6
2004	6.1	10.7	11.2	8.7	3.1	5.1	5.6
2005	5.9	10.2	10.7	8.3	2.9	4.9	5.4

Q3 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.8	3.2	3.1	3.7	1.3	2.6	1.6	0.5	17.8
2002	2.5	4.4	4.4	5.2	1.8	3.7	2.2	0.5	24.6
2003	3.3	5.8	5.8	6.8	2.4	4.9	3.0	0.5	32.5
2004	3.3	5.8	5.8	6.8	2.4	4.9	3.0	0.5	32.4
2005	3.1	5.6	5.5	6.5	2.3	4.6	2.8	0.5	31.0

Q4 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	5.5	13.4	4.0	11.9	6.0	4.5	4.5
2002	6.7	16.4	4.9	14.6	7.3	5.5	5.5
2003	5.5	13.4	4.0	12.0	6.0	4.5	4.5
2004	6.6	16.1	4.8	14.3	7.2	5.4	5.4
2005	4.6	11.4	3.4	10.1	5.1	3.8	3.8

Q4 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	3.8	9.1	2.6	9.8	5.5	4.6	2.7	0.5	38.6
2002	4.7	11.1	3.2	12.1	6.7	5.7	3.3	0.5	47.2
2003	3.9	9.1	2.6	9.9	5.5	4.6	2.7	0.5	38.7
2004	4.6	10.9	3.1	11.8	6.6	5.5	3.2	0.5	46.2
2005	3.3	7.7	2.2	8.3	4.6	3.9	2.3	0.5	32.8

Weighted 2015 Design Value

Year	Q1	Q2	Q3	Q4	Max	FDV	W2015DV
2001	25.4	20.3	17.8	38.6	38.6		
2002	39.4	35.7	24.6	47.2	47.2		
2003	40.5	29.7	32.5	38.7	40.5	42.1	
2004	28.3	27.3	32.4	46.2	46.2	44.6	
2005	37.9	22.9	31.0	32.8	37.9	41.5	42.8

TABLE V-2-15c

Compton/Lynwood 24-Hour 2015 Design Value Estimation

Split	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.06	0.21	0.12	0.23	0.10	0.19	0.10
Q2	0.08	0.19	0.22	0.22	0.06	0.11	0.11
Q3	0.11	0.17	0.27	0.14	0.04	0.15	0.11
Q4	0.10	0.25	0.09	0.22	0.12	0.11	0.09

Design	Q1	Q2	Q3	Q4
2001	45.8	30.8	35.0	48.4
2002	50.9	43.7	38.5	66.0
2003	45.3	44.7	45.5	52.5
2004	44.8	38.2	36.3	52.4
2005	41.0	31.8	51.7	53.0

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.660	0.694	0.622	0.780	0.810	0.940	0.684
Q2	0.568	0.593	0.571	0.806	0.800	0.902	0.609
Q3	0.600	0.642	0.551	0.750	0.765	0.872	0.584
Q4	0.709	0.740	0.625	0.757	0.808	0.938	0.725

Q1 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	2.7	9.5	5.4	10.4	4.5	8.6	4.5
2002	3.0	10.6	6.0	11.6	5.0	9.6	5.0
2003	2.7	9.4	5.4	10.3	4.5	8.5	4.5
2004	2.7	9.3	5.3	10.2	4.4	8.4	4.4
2005	2.4	8.5	4.9	9.3	4.1	7.7	4.1

Q1 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.8	6.6	3.4	8.1	3.7	8.1	3.1	0.5	35.3
2002	2.0	7.3	3.8	9.0	4.1	9.0	3.4	0.5	39.2
2003	1.8	6.5	3.3	8.0	3.6	8.0	3.1	0.5	34.9
2004	1.8	6.5	3.3	7.9	3.6	7.9	3.0	0.5	34.5
2005	1.6	5.9	3.0	7.3	3.3	7.2	2.8	0.5	31.6

Q2 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	2.4	5.8	6.7	6.7	1.8	3.3	3.3
2002	3.5	8.2	9.5	9.5	2.6	4.8	4.8
2003	3.5	8.4	9.7	9.7	2.7	4.9	4.9
2004	3.0	7.2	8.3	8.3	2.3	4.1	4.1
2005	2.5	5.9	6.9	6.9	1.9	3.4	3.4

Q2 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.4	3.4	3.8	5.4	1.5	3.0	2.0	0.5	21.0
2002	2.0	4.9	5.4	7.7	2.1	4.3	2.9	0.5	29.7
2003	2.0	5.0	5.6	7.8	2.1	4.4	3.0	0.5	30.3
2004	1.7	4.2	4.7	6.7	1.8	3.7	2.5	0.5	26.0
2005	1.4	3.5	3.9	5.6	1.5	3.1	2.1	0.5	21.6

Q3 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	3.8	5.9	9.3	4.8	1.4	5.2	3.8
2002	4.2	6.5	10.3	5.3	1.5	5.7	4.2
2003	5.0	7.7	12.2	6.3	1.8	6.8	5.0
2004	3.9	6.1	9.7	5.0	1.4	5.4	3.9
2005	5.6	8.7	13.8	7.2	2.0	7.7	5.6

Q3 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	2.3	3.8	5.1	3.6	1.1	4.5	2.2	0.5	23.1
2002	2.5	4.1	5.7	4.0	1.2	5.0	2.4	0.5	25.4
2003	3.0	4.9	6.7	4.7	1.4	5.9	2.9	0.5	30.0
2004	2.4	3.9	5.3	3.8	1.1	4.7	2.3	0.5	23.9
2005	3.4	5.6	7.6	5.4	1.6	6.7	3.3	0.5	34.0

Q4 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	4.8	12.0	4.3	10.5	5.7	5.3	4.3
2002	6.6	16.4	5.9	14.4	7.9	7.2	5.9
2003	5.2	13.0	4.7	11.4	6.2	5.7	4.7
2004	5.2	13.0	4.7	11.4	6.2	5.7	4.7
2005	5.3	13.1	4.7	11.6	6.3	5.8	4.7

Q4 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	3.4	8.9	2.7	8.0	4.6	4.9	3.1	0.5	36.1
2002	4.6	12.1	3.7	10.9	6.4	6.8	4.3	0.5	49.2
2003	3.7	9.6	2.9	8.7	5.0	5.4	3.4	0.5	39.2
2004	3.7	9.6	2.9	8.6	5.0	5.4	3.4	0.5	39.1
2005	3.7	9.7	3.0	8.7	5.1	5.4	3.4	0.5	39.6

Weighted 2015 Design Value

Year	Q1	Q2	Q3	Q4	Max	FDV	W2015DV
2001	35.3	21.0	23.1	36.1	36.1		
2002	39.2	29.7	25.4	49.2	49.2		
2003	34.9	30.3	30.0	39.2	39.2	41.5	
2004	34.5	26.0	23.9	39.1	39.1	42.5	
2005	31.6	21.6	34.0	39.6	39.6	39.3	41.1

TABLE V-2-15d

Fontana 24-Hour 2015 Design Value Estimation

Split	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.08	0.28	0.08	0.20	0.09	0.18	0.08
Q2	0.10	0.26	0.15	0.21	0.08	0.12	0.09
Q3	0.09	0.21	0.18	0.18	0.08	0.18	0.08
Q4	0.14	0.32	0.08	0.17	0.10	0.10	0.09

Design	Q1	Q2	Q3	Q4
2001	46.8	30.1	28.0	39.3
2002	56.5	61.7	45.0	69.5
2003	53.6	48.8	46.6	55.7
2004	62.6	45.5	49.9	48.5
2005	48.2	43.7	38.4	43.0

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.581	0.557	0.813	0.882	1.000	1.091	0.707
Q2	0.500	0.458	0.588	0.818	0.917	1.050	0.503
Q3	0.476	0.437	0.600	0.791	0.929	1.042	0.575
Q4	0.656	0.643	0.714	0.878	0.929	1.073	0.654

Q1 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	3.7	13.0	3.7	9.3	4.2	8.3	3.7
2002	4.5	15.7	4.5	11.2	5.0	10.1	4.5
2003	4.2	14.9	4.2	10.6	4.8	9.6	4.2
2004	5.0	17.4	5.0	12.4	5.6	11.2	5.0
2005	3.8	13.4	3.8	9.5	4.3	8.6	3.8

Q1 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	2.2	7.2	3	8.2	4.2	9.1	2.6	0.5	36.9
2002	2.6	8.7	3.6	9.9	5	11	3.2	0.5	44.6
2003	2.5	8.3	3.5	9.4	4.8	10.4	3	0.5	42.3
2004	2.9	9.7	4	11	5.6	12.2	3.5	0.5	49.4
2005	2.2	7.4	3.1	8.4	4.3	9.4	2.7	0.5	38

Q2 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	3.0	7.7	4.4	6.2	2.4	3.6	2.7
2002	6.1	15.9	9.2	12.9	4.9	7.3	5.5
2003	4.8	12.6	7.2	10.1	3.9	5.8	4.3
2004	4.5	11.7	6.8	9.5	3.6	5.4	4.1
2005	4.3	11.2	6.5	9.1	3.5	5.2	3.9

Q2 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.5	3.5	2.6	5.1	2.2	3.7	1.3	0.5	20.4
2002	3.1	7.3	5.4	10.5	4.5	7.7	2.8	0.5	41.7
2003	2.4	5.8	4.3	8.3	3.5	6.1	2.2	0.5	33.0
2004	2.3	5.4	4.0	7.7	3.3	5.7	2.0	0.5	30.8
2005	2.2	5.1	3.8	7.4	3.2	5.4	2.0	0.5	29.6

Q3 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	2.5	5.8	5.0	5.0	2.2	5.0	2.2
2002	4.0	9.3	8.0	8.0	3.6	8.0	3.6
2003	4.1	9.7	8.3	8.3	3.7	8.3	3.7
2004	4.4	10.4	8.9	8.9	4.0	8.9	4.0
2005	3.4	8.0	6.8	6.8	3.0	6.8	3.0

Q3 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.2	2.5	3.0	3.9	2.0	5.2	1.3	0.5	19.6
2002	1.9	4.1	4.8	6.3	3.3	8.3	2.0	0.5	31.3
2003	2.0	4.2	5.0	6.6	3.4	8.6	2.1	0.5	32.4
2004	2.1	4.5	5.3	7.0	3.7	9.3	2.3	0.5	34.7
2005	1.6	3.5	4.1	5.4	2.8	7.1	1.7	0.5	26.8

Q4 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	5.4	12.4	3.1	6.6	3.9	3.9	3.5
2002	9.7	22.1	5.5	11.7	6.9	6.9	6.2
2003	7.7	17.7	4.4	9.4	5.5	5.5	5.0
2004	6.7	15.4	3.8	8.2	4.8	4.8	4.3
2005	6.0	13.6	3.4	7.2	4.3	4.3	3.8

Q4 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	5.4	12.4	3.1	6.6	3.9	3.9	3.5	0.5	30.1
2002	9.7	22.1	5.5	11.7	6.9	6.9	6.2	0.5	53.1
2003	7.7	17.7	4.4	9.4	5.5	5.5	5.0	0.5	42.6
2004	6.7	15.4	3.8	8.2	4.8	4.8	4.3	0.5	37.1
2005	6.0	13.6	3.4	7.2	4.3	4.3	3.8	0.5	32.9

Weighted 2015 Design Value

Year	Q1	Q2	Q3	Q4	Max	FDV	W2015DV
2001	36.9	20.4	19.6	30.1	36.9		
2002	44.6	41.7	31.3	53.1	53.1		
2003	42.3	33.0	32.4	42.6	42.6	44.2	
2004	49.4	30.8	34.7	37.1	49.4	48.4	
2005	38	29.6	26.8	32.9	38.0	43.3	45.3

TABLE V-2-15e

Long Beach 24-Hour 2015 Design Value Estimation

Split	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.06	0.22	0.11	0.22	0.08	0.20	0.11
Q2	0.07	0.16	0.23	0.23	0.06	0.13	0.13
Q3	0.12	0.16	0.27	0.16	0.05	0.15	0.10
Q4	0.13	0.23	0.13	0.21	0.10	0.12	0.08

Design	Q1	Q2	Q3	Q4
2001	48.4	27.1	31.0	41.4
2002	46.9	42.8	38.4	49.2
2003	46.5	42.9	36.9	47.4
2004	45.8	32.9	34.6	45.9
2005	37.3	27.7	46.1	43.2

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.638	0.674	0.625	0.727	0.760	0.862	0.701
Q2	0.581	0.575	0.538	0.781	0.765	0.800	0.502
Q3	0.576	0.609	0.510	0.718	0.737	0.745	0.563
Q4	0.685	0.736	0.600	0.725	0.774	0.851	0.686

Q1 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	2.9	10.5	5.3	10.5	3.8	9.6	5.3
2002	2.8	10.2	5.1	10.2	3.7	9.3	5.1
2003	2.8	10.1	5.1	10.1	3.7	9.2	5.1
2004	2.7	10.0	5.0	10.0	3.6	9.1	5.0
2005	2.2	8.1	4.0	8.1	2.9	7.4	4.0

Q1 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.8	7.1	3.3	7.7	2.9	8.3	3.7	0.5	35.3
2002	1.8	6.9	3.2	7.4	2.8	8	3.6	0.5	34.2
2003	1.8	6.8	3.2	7.4	2.8	7.9	3.5	0.5	33.9
2004	1.7	6.7	3.1	7.2	2.8	7.8	3.5	0.5	33.4
2005	1.4	5.5	2.5	5.9	2.2	6.3	2.8	0.5	27.2

Q2 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	1.9	4.3	6.1	6.1	1.6	3.5	3.5
2002	3.0	6.8	9.7	9.7	2.5	5.5	5.5
2003	3.0	6.8	9.8	9.8	2.5	5.5	5.5
2004	2.3	5.2	7.5	7.5	1.9	4.2	4.2
2005	1.9	4.4	6.3	6.3	1.6	3.5	3.5

Q2 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.1	2.4	3.3	4.8	1.2	2.8	1.7	0.5	17.8
2002	1.7	3.9	5.2	7.6	1.9	4.4	2.8	0.5	28.0
2003	1.7	3.9	5.2	7.6	1.9	4.4	2.8	0.5	28.1
2004	1.3	3.0	4.0	5.8	1.5	3.4	2.1	0.5	21.6
2005	1.1	2.5	3.4	4.9	1.2	2.8	1.8	0.5	18.2

Q3 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	3.7	4.9	8.2	4.9	1.5	4.6	3.1
2002	4.5	6.1	10.2	6.1	1.9	5.7	3.8
2003	4.4	5.8	9.8	5.8	1.8	5.5	3.6
2004	4.1	5.5	9.2	5.5	1.7	5.1	3.4
2005	5.5	7.3	12.3	7.3	2.3	6.8	4.6

Q3 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	2.1	3.0	4.2	3.5	1.1	3.4	1.7	0.5	19.5
2002	2.6	3.7	5.2	4.4	1.4	4.2	2.1	0.5	24.2
2003	2.5	3.5	5.0	4.2	1.3	4.1	2.0	0.5	23.2
2004	2.4	3.3	4.7	3.9	1.3	3.8	1.9	0.5	21.8
2005	3.2	4.4	6.3	5.2	1.7	5.1	2.6	0.5	29.0

Q4 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	5.3	9.4	5.3	8.6	4.1	4.9	3.3
2002	6.3	11.2	6.3	10.2	4.9	5.8	3.9
2003	6.1	10.8	6.1	9.8	4.7	5.6	3.8
2004	5.9	10.4	5.9	9.5	4.5	5.4	3.6
2005	5.6	9.8	5.6	9.0	4.3	5.1	3.4

Q4 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	3.6	6.9	3.2	6.2	3.2	4.2	2.2	0.5	30.1
2002	4.3	8.2	3.8	7.4	3.8	5.0	2.7	0.5	35.7
2003	4.2	7.9	3.7	7.1	3.6	4.8	2.6	0.5	34.4
2004	4.0	7.7	3.5	6.9	3.5	4.6	2.5	0.5	33.3
2005	3.8	7.2	3.3	6.5	3.3	4.4	2.3	0.5	31.4

Weighted 2015 Design Value

Year	Q1	Q2	Q3	Q4	Max	FDV	W2015DV
2001	48.4	27.1	31	41.4	48.4		
2002	46.9	42.8	38.4	49.2	49.2		
2003	46.5	42.9	36.9	47.4	47.4	48.3	
2004	45.8	32.9	34.6	45.9	45.9	47.5	
2005	37.3	27.7	46.1	43.2	46.1	46.5	47.4

TABLE V-2-15f

Los Angeles 24-Hour 2015 Design Value Estimation

Split	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.07	0.25	0.10	0.21	0.09	0.17	0.11
Q2	0.08	0.20	0.19	0.26	0.07	0.09	0.11
Q3	0.13	0.19	0.21	0.17	0.06	0.15	0.10
Q4	0.11	0.26	0.09	0.24	0.12	0.09	0.09

Design	Q1	Q2	Q3	Q4
2001	58.1	31.9	50.4	54.4
2002	48.9	57.2	41.2	57.1
2003	53.6	55.1	51.0	55.3
2004	49.7	44.0	55.9	61.3
2005	53.5	38.2	36.8	52.0

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.641	0.629	0.65	0.768	0.833	1.024	0.623
Q2	0.558	0.56	0.531	0.795	0.8	0.976	0.526
Q3	0.588	0.608	0.521	0.741	0.778	0.942	0.55
Q4	0.689	0.713	0.643	0.771	0.826	0.982	0.708

Q1 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	4.0	14.4	5.8	12.1	5.2	9.8	6.3
2002	3.4	12.1	4.8	10.2	4.4	8.2	5.3
2003	3.7	13.3	5.3	11.2	4.8	9.0	5.8
2004	3.4	12.3	4.9	10.3	4.4	8.4	5.4
2005	3.7	13.3	5.3	11.1	4.8	9.0	5.8

Q1 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	2.6	9.1	3.7	9.3	4.3	10.0	3.9	0.5	43.5
2002	2.2	7.6	3.1	7.8	3.6	8.4	3.3	0.5	36.6
2003	2.4	8.3	3.5	8.6	4.0	9.2	3.6	0.5	40.1
2004	2.2	7.7	3.2	7.9	3.7	8.6	3.4	0.5	37.2
2005	2.4	8.3	3.4	8.5	4.0	9.2	3.6	0.5	40.0

Q2 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	2.5	6.3	6.0	8.2	2.2	2.8	3.5
2002	4.5	11.3	10.8	14.7	4.0	5.1	6.2
2003	4.4	10.9	10.4	14.2	3.8	4.9	6.0
2004	3.5	8.7	8.3	11.3	3.0	3.9	4.8
2005	3.0	7.5	7.2	9.8	2.6	3.4	4.1

Q2 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.4	3.5	3.2	6.5	1.8	2.8	1.8	0.5	21.4
2002	2.5	6.4	5.7	11.7	3.2	5.0	3.3	0.5	38.3
2003	2.4	6.1	5.5	11.3	3.1	4.8	3.2	0.5	36.9
2004	1.9	4.9	4.4	9.0	2.4	3.8	2.5	0.5	29.5
2005	1.7	4.2	3.8	7.8	2.1	3.3	2.2	0.5	25.6

Q3 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	6.5	9.5	10.5	8.5	3.0	7.5	5.0
2002	5.3	7.7	8.5	6.9	2.4	6.1	4.1
2003	6.6	9.6	10.6	8.6	3.0	7.6	5.1
2004	7.2	10.5	11.6	9.4	3.3	8.3	5.5
2005	4.7	6.9	7.6	6.2	2.2	5.4	3.6

Q3 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	3.8	5.8	5.5	6.3	2.3	7.1	2.7	0.5	33.9
2002	3.1	4.7	4.5	5.1	1.9	5.8	2.2	0.5	27.8
2003	3.9	5.8	5.5	6.4	2.4	7.1	2.8	0.5	34.4
2004	4.2	6.4	6.1	7.0	2.6	7.8	3.0	0.5	37.6
2005	2.8	4.2	4.0	4.6	1.7	5.1	2.0	0.5	24.8

Q4 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	5.9	14.0	4.9	12.9	6.5	4.9	4.9
2002	6.2	14.7	5.1	13.6	6.8	5.1	5.1
2003	6.0	14.2	4.9	13.2	6.6	4.9	4.9
2004	6.7	15.8	5.5	14.6	7.3	5.5	5.5
2005	5.7	13.4	4.6	12.4	6.2	4.6	4.6

Q4 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	4.1	10.0	3.1	10.0	5.3	4.8	3.4	0.5	41.2
2002	4.3	10.5	3.3	10.5	5.6	5.0	3.6	0.5	43.2
2003	4.2	10.2	3.2	10.1	5.4	4.8	3.5	0.5	41.9
2004	4.6	11.3	3.5	11.3	6.0	5.4	3.9	0.5	46.4
2005	3.9	9.5	3.0	9.5	5.1	4.6	3.3	0.5	39.4

Weighted 2015 Design Value

Year	Q1	Q2	Q3	Q4	Max	FDV	W2015DV
2001	43.5	21.4	33.9	41.2	43.5		
2002	36.6	38.3	27.8	43.2	43.2		
2003	40.1	36.9	34.4	41.9	41.9	42.9	
2004	37.2	29.5	37.6	46.4	46.4	43.8	
2005	40.0	25.6	24.8	39.4	40.0	42.8	43.2

TABLE V-2-15g

Pico Rivera 24-Hour 2015 Design Value Estimation

Split	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.06	0.23	0.09	0.22	0.10	0.18	0.10
Q2	0.08	0.28	0.12	0.19	0.08	0.13	0.12
Q3	0.13	0.26	0.10	0.20	0.11	0.12	0.07
Q4	0.13	0.26	0.10	0.20	0.11	0.12	0.07

Design	Q1	Q2	Q3	Q4
2001	52.9	19.9	21.1	54.0
2002	57.9	39.8	42.6	66.0
2003	44.9	44.0	45.3	57.9
2004	52.1	29.2	48.2	50.4
2005	51.4	33.3	42.6	46.0

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.622	0.637	0.591	0.745	0.824	0.947	0.630
Q2	0.525	0.544	0.516	0.800	0.833	0.941	0.558
Q3	0.558	0.610	0.500	0.733	0.733	0.900	0.537
Q4	0.692	0.730	0.581	0.742	0.783	0.961	0.668

Q1 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	3.1	12.1	4.7	11.5	5.2	9.4	5.2
2002	3.4	13.2	5.2	12.6	5.7	10.3	5.7
2003	2.7	10.2	4.0	9.8	4.4	8.0	4.4
2004	3.1	11.9	4.6	11.4	5.2	9.3	5.2
2005	3.1	11.7	4.6	11.2	5.1	9.2	5.1

Q1 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	2.0	7.7	2.8	8.6	4.3	8.9	3.3	0.5	38.1
2002	2.1	8.4	3.1	9.4	4.7	9.8	3.6	0.5	41.6
2003	1.7	6.5	2.4	7.3	3.7	7.6	2.8	0.5	32.3
2004	1.9	7.6	2.7	8.5	4.3	8.8	3.3	0.5	37.5
2005	1.9	7.5	2.7	8.3	4.2	8.7	3.2	0.5	37.0

Q2 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	1.6	5.4	2.3	3.7	1.6	2.5	2.3
2002	3.1	11.0	4.7	7.5	3.1	5.1	4.7
2003	3.5	12.2	5.2	8.3	3.5	5.7	5.2
2004	2.3	8.0	3.4	5.5	2.3	3.7	3.4
2005	2.6	9.2	3.9	6.2	2.6	4.3	3.9

Q2 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	0.8	3.0	1.2	2.9	1.3	2.4	1.3	0.5	13.4
2002	1.7	6.0	2.4	6.0	2.6	4.8	2.6	0.5	26.6
2003	1.8	6.6	2.7	6.6	2.9	5.3	2.9	0.5	29.4
2004	1.2	4.4	1.8	4.4	1.9	3.5	1.9	0.5	19.6
2005	1.4	5.0	2.0	5.0	2.2	4.0	2.2	0.5	22.3

Q3 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	2.7	5.4	2.1	4.1	2.3	2.5	1.4
2002	5.5	10.9	4.2	8.4	4.6	5.1	2.9
2003	5.8	11.6	4.5	9.0	4.9	5.4	3.1
2004	6.2	12.4	4.8	9.5	5.2	5.7	3.3
2005	5.5	10.9	4.2	8.4	4.6	5.1	2.9

Q3 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	1.5	3.3	1.0	3.0	1.7	2.2	0.8	0.5	14.0
2002	3.1	6.7	2.1	6.2	3.4	4.5	1.6	0.5	28.0
2003	3.2	7.1	2.2	6.6	3.6	4.8	1.7	0.5	29.8
2004	3.5	7.6	2.4	7.0	3.8	5.2	1.8	0.5	31.7
2005	3.1	6.7	2.1	6.2	3.4	4.5	1.6	0.5	28.0

Q4 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	7.0	13.9	5.4	10.7	5.9	6.4	3.7
2002	8.5	17.0	6.6	13.1	7.2	7.9	4.6
2003	7.5	14.9	5.7	11.5	6.3	6.9	4.0
2004	6.5	13.0	5.0	10.0	5.5	6.0	3.5
2005	5.9	11.8	4.6	9.1	5.0	5.5	3.2

Q4 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	4.8	10.2	3.1	7.9	4.6	6.2	2.5	0.5	39.8
2002	5.9	12.4	3.8	9.7	5.6	7.6	3.1	0.5	48.6
2003	5.2	10.9	3.3	8.5	4.9	6.6	2.7	0.5	42.7
2004	4.5	9.5	2.9	7.4	4.3	5.8	2.3	0.5	37.2
2005	4.1	8.6	2.6	6.8	3.9	5.2	2.1	0.5	33.9

Weighted 2015 Design Value

Year	Q1	Q2	Q3	Q4	Max	FDV	W2015DV
2001	38.1	13.4	14.0	39.8	39.8		
2002	41.6	26.6	28.0	48.6	48.6		
2003	32.3	29.4	29.8	42.7	42.7	43.7	
2004	37.5	19.6	31.7	37.2	37.5	42.9	
2005	37.0	22.3	28.0	33.9	37.0	39.1	41.9

TABLE V-2-15h

Rubidoux 24-Hour 2015 Design Value Estimation

Split	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.07	0.26	0.08	0.21	0.09	0.20	0.10
Q2	0.12	0.32	0.13	0.18	0.05	0.08	0.12
Q3	0.14	0.28	0.15	0.14	0.04	0.14	0.11
Q4	0.14	0.28	0.07	0.22	0.11	0.11	0.07

Design	Q1	Q2	Q3	Q4
2001	70.3	40.5	42.7	58.4
2002	66.3	70.1	59.4	74.3
2003	72.9	61.6	60.5	66.0
2004	59.5	60.5	55.3	76.6
2005	56.6	55.8	47.0	49.5

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.571	0.536	0.688	0.854	0.909	0.951	0.557
Q2	0.431	0.419	0.471	0.824	0.889	0.905	0.427
Q3	0.436	0.405	0.514	0.761	0.833	0.882	0.440
Q4	0.622	0.619	0.650	0.854	0.917	0.960	0.632

Q1 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	4.9	18.1	5.6	14.7	6.3	14.0	7.0
2002	4.6	17.1	5.3	13.8	5.9	13.2	6.6
2003	5.1	18.8	5.8	15.2	6.5	14.5	7.2
2004	4.1	15.3	4.7	12.4	5.3	11.8	5.9
2005	3.9	14.6	4.5	11.8	5.0	11.2	5.6

Q1 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	2.8	9.7	3.8	12.5	5.7	13.3	3.9	0.5	52.3
2002	2.6	9.2	3.6	11.8	5.4	12.5	3.7	0.5	49.3
2003	2.9	10.1	4.0	13.0	5.9	13.8	4.0	0.5	54.2
2004	2.4	8.2	3.2	10.6	4.8	11.2	3.3	0.5	44.2
2005	2.2	7.8	3.1	10.1	4.6	10.7	3.1	0.5	42.1

Q2 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	4.8	12.8	5.2	7.2	2.0	3.2	4.8
2002	8.4	22.3	9.0	12.5	3.5	5.6	8.4
2003	7.3	19.6	7.9	11.0	3.1	4.9	7.3
2004	7.2	19.2	7.8	10.8	3.0	4.8	7.2
2005	6.6	17.7	7.2	10.0	2.8	4.4	6.6

Q2 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	2.1	5.4	2.4	5.9	1.8	2.9	2.0	0.5	23.0
2002	3.6	9.3	4.3	10.3	3.1	5.0	3.6	0.5	39.7
2003	3.2	8.2	3.7	9.1	2.7	4.4	3.1	0.5	34.9
2004	3.1	8.0	3.7	8.9	2.7	4.3	3.1	0.5	34.3
2005	2.9	7.4	3.4	8.2	2.5	4.0	2.8	0.5	31.7

Q3 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	5.9	11.8	6.3	5.9	1.7	5.9	4.6
2002	8.2	16.5	8.8	8.2	2.4	8.2	6.5
2003	8.4	16.8	9.0	8.4	2.4	8.4	6.6
2004	7.7	15.3	8.2	7.7	2.2	7.7	6.0
2005	6.5	13.0	7.0	6.5	1.9	6.5	5.1

Q3 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	2.6	4.8	3.3	4.5	1.4	5.2	2.0	0.5	24.3
2002	3.6	6.7	4.5	6.3	2.0	7.3	2.9	0.5	33.7
2003	3.7	6.8	4.6	6.4	2.0	7.4	2.9	0.5	34.3
2004	3.3	6.2	4.2	5.8	1.8	6.8	2.7	0.5	31.4
2005	2.8	5.3	3.6	5.0	1.5	5.7	2.3	0.5	26.7

Q4 Components

Year	NH4	NO3	SO4	OC	EC	OTR	Water
2001	8.1	16.2	4.1	12.7	6.4	6.4	4.1
2002	10.3	20.7	5.2	16.2	8.1	8.1	5.2
2003	9.2	18.3	4.6	14.4	7.2	7.2	4.6
2004	10.7	21.3	5.3	16.7	8.4	8.4	5.3
2005	6.9	13.7	3.4	10.8	5.4	5.4	3.4

Q4 2015 Estimates

Year	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass
2001	5.0	10.0	2.6	10.9	5.8	6.1	2.6	0.5	43.6
2002	6.4	12.8	3.4	13.9	7.4	7.8	3.3	0.5	55.4
2003	5.7	11.4	3.0	12.3	6.6	6.9	2.9	0.5	49.3
2004	6.6	13.2	3.5	14.3	7.7	8.0	3.4	0.5	57.2
2005	4.3	8.5	2.2	9.2	4.9	5.2	2.2	0.5	37.0

Weighted 2015 Design Value

Year	Q1	Q2	Q3	Q4	Max	FDV	W2015DV
2001	52.3	23.0	24.3	43.6	52.3		
2002	49.3	39.7	33.7	55.4	55.4		
2003	54.2	34.9	34.3	49.3	54.2	54.0	
2004	44.2	34.3	31.4	57.2	57.2	55.6	
2005	42.1	31.7	26.7	37.0	42.1	51.2	53.6

TABLE V-2-16a

2015 Estimated Reduction Ratios to be Applied Anaheim 24-Hour PM2.5 Design

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.605	0.593	0.632	0.792	0.857	1.045	0.591
Q2	0.500	0.481	0.517	0.882	0.800	1.000	0.507
Q3	0.500	0.540	0.487	0.795	0.833	0.979	0.523
Q4	0.641	0.671	0.625	0.793	0.824	1.018	0.672

Q1 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
22-Jan-05	8.5	21.8	7.1	12.0	3.1	3.9	5.9	0.5	62.3	
11-Mar-05	7.3	17.2	6.0	6.2	1.3	3.3	4.8	0.5	46.1	
25-Jan-05	4.5	11.8	4.1	6.8	2.2	3.0	3.3	0.5	35.7	
Average									48.0	
Q1 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
22-Jan-05	5.1	12.9	4.5	9.5	2.7	4.1	3.5	0.5	42.3	
11-Mar-05	4.4	10.2	3.8	4.9	1.1	3.5	2.8	0.5	30.7	
25-Jan-05	2.7	7.0	2.6	5.4	1.9	3.2	2.0	0.5	24.7	
Average									32.6	0.68

Q2 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
25-May-05	4.5	5.0	9.4	5.3	0.9	1.7	4.1	0.5	30.8	
30-Jun-05	3.7	5.2	9.2	5.2	0.8	1.3	4.1	0.5	29.4	
22-May-05	2.2	4.8	5.8	6.5	0.9	1.9	2.8	0.5	24.9	
Average									24.8	
Q2 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
25-May-05	2.2	2.4	4.9	4.7	0.7	1.7	2.1	0.5	18.6	
30-Jun-05	1.8	2.5	4.7	4.6	0.6	1.3	2.1	0.5	17.6	
22-May-05	1.1	2.3	3.0	5.7	0.7	1.9	1.4	0.5	16.2	
Average									17.5	0.62

Q3 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
4-Sep-05	6.5	6.0	2.9	8.5	1.0	2.5	2.0	0.5	29.3	
22-Sep-05	4.6	5.7	5.6	6.9	2.2	2.3	2.9	0.5	30.1	
1-Sep-05	3.8	4.8	6.5	5.8	0.9	3.4	3.1	0.5	28.3	
Average									29.2	
Q3 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
4-Sep-05	3.3	3.3	1.4	6.7	0.8	2.4	1.0	0.5	18.9	
22-Sep-05	2.3	3.1	2.7	5.5	1.8	2.3	1.5	0.5	19.1	
1-Sep-05	1.9	2.6	3.2	4.6	0.7	3.4	1.6	0.5	18.0	
Average									18.7	0.64

Q4 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
22-Oct-05	9.8	17.4	8.9	8.1	1.7	2.1	5.9	0.5	53.9	
6-Nov-05	8.6	19.9	4.6	10.8	2.0	2.5	4.7	0.5	53.1	
15-Dec-05	6.0	12.6	3.8	9.9	4.2	2.7	3.3	0.5	42.6	
Average									49.9	
Q4 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
22-Oct-05	6.3	11.7	5.6	6.4	1.4	2.2	4.0	0.5	37.4	
6-Nov-05	5.5	13.3	2.9	8.6	1.6	2.6	3.2	0.5	37.7	
15-Dec-05	3.9	8.5	2.4	7.8	3.5	2.8	2.2	0.5	31.0	
Average									35.4	0.71

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
RRF 22-Oct-05	0.75	0.81	0.63	0.85	0.92	0.93				
Observed										
22-Oct-05	9.8	17.4	8.9	8.1	1.7	2.1	5.9	0.5	53.9	
2015 Predicted										
22-Oct-05	7.4	14.1	5.6	6.9	1.5	2.0	4.2	0.5	41.6	0.77

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
Average 4-Q RRF	0.562	0.571	0.565	0.816	0.829	1.011	0.573			
Observed										
22-Oct-05	9.8	17.4	8.9	8.1	1.7	2.1	5.9	0.5	53.9	
2015 Predicted										
22-Oct-05	5.5	9.9	5.0	6.6	1.4	2.2	3.4	0.5	34.5	0.64

TABLE V-2-16b

2015 Estimated Reduction Ratios to be Applied Burbank 24-Hour PM2.5 Design

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.630	0.594	0.692	0.818	0.818	1.000	0.587
Q2	0.529	0.525	0.520	0.818	0.800	0.967	0.511
Q3	0.537	0.542	0.514	0.787	0.786	0.951	0.530
Q4	0.704	0.678	0.647	0.825	0.917	1.032	0.596

Q1 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
11-Mar-05	11.4	28.9	9.0	12.2	3.7	3.8	7.7	0.5	76.8	
22-Jan-05	6.9	19.7	3.8	14.0	3.9	3.8	4.4	0.5	56.4	
8-Mar-05	8.4	20.7	7.8	7.7	2.2	4.1	6.0	0.5	57.0	
Average									63.4	
Q1 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
11-Mar-05	7.2	17.2	6.2	10.0	3.0	3.8	4.5	0.5	51.9	
22-Jan-05	4.4	11.7	2.6	11.4	3.2	3.8	2.6	0.5	39.6	
8-Mar-05	5.3	12.3	5.4	6.3	1.8	4.1	3.5	0.5	38.8	
Average									43.4	0.69

Q2 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
25-May-05	6.5	10.8	10.2	7.9	1.7	1.7	5.3	0.5	44.2	
4-May-05	5.7	9.8	7.7	7.0	1.5	1.7	4.3	0.5	37.7	
16-Apr-05	1.2	5.3	3.0	11.3	1.9	1.6	1.9	0.5	26.3	
Average									36.1	
Q2 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
25-May-05	3.5	5.7	5.3	6.4	1.3	1.7	2.7	0.5	26.6	
4-May-05	3.0	5.1	4.0	5.8	1.2	1.6	2.2	0.5	22.9	
16-Apr-05	0.7	2.8	1.6	9.2	1.5	1.5	1.0	0.5	18.3	
Average									22.6	0.63

Q3 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
3-Jul-05	5.2	7.5	9.7	10.6	0.8	3.3	4.6	0.5	41.7	
9-Jul-05	3.9	6.1	8.5	7.1	1.0	2.1	4.0	0.5	32.7	
19-Sep-05	7.6	9.6	8.4	9.3	1.9	2.2	4.5	0.5	43.5	
Average									39.3	
Q3 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
3-Jul-05	2.8	4.1	5.0	8.3	0.6	3.2	2.5	0.5	26.4	
9-Jul-05	2.1	3.3	4.4	5.6	0.8	2.0	2.1	0.5	20.3	
19-Sep-05	4.1	5.2	4.3	7.3	1.5	2.0	2.4	0.5	26.9	
Average									24.5	0.62

Q4 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
6-Nov-05	10.0	25.2	3.9	15.4	3.1	2.1	5.3	0.5	65.0	
22-Oct-05	11.0	27.2	8.7	6.7	1.9	2.1	7.3	0.5	65.0	
12-Dec-05	4.9	13.2	1.9	15.2	5.8	2.4	2.7	0.5	46.0	
Average									58.7	
Q4 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
6-Nov-05	7.0	17.1	2.5	12.7	2.9	2.2	3.1	0.5	47.6	
22-Oct-05	7.8	18.5	5.6	5.5	1.7	2.2	4.4	0.5	45.7	
12-Dec-05	3.5	9.0	1.2	12.5	5.3	2.5	1.6	0.5	35.5	
Average									42.9	0.73

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
RRF 22-Oct-05	0.8	0.8	0.71	0.88	0.95	0.96				
Observed										
22-Oct-05	11.0	27.2	8.7	6.7	1.9	2.1	7.3	0.5	65.0	
2015 Predicted										
22-Oct-05	8.8	21.8	6.2	5.9	1.8	2.0	5.6	0.5	52.1	0.80

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
Average 4-Q RRF	0.6	0.58475	0.59325	0.812	0.83025	0.9875	0.556			
Observed										
22-Oct-05	11.0	27.2	8.7	6.7	1.9	2.1	7.3	0.5	65.0	
2015 Predicted										
22-Oct-05	6.6	15.9	5.2	5.4	1.6	2.1	4.1	0.5	41.4	0.64

TABLE V-2-16c

2015 Estimated Reduction Ratios to be Applied to Compton 24-Hour PM2.5 Design

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.605	0.593	0.632	0.792	0.857	1.045	0.591
Q2	0.500	0.481	0.517	0.882	0.800	1.000	0.507
Q3	0.500	0.540	0.487	0.795	0.833	0.979	0.523
Q4	0.641	0.671	0.625	0.793	0.824	1.018	0.672

Q1 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
22-Jan-05	8.5	21.8	7.1	12.0	3.1	3.9	5.9	0.5	62.3	
11-Mar-05	7.3	17.2	6.0	6.2	1.3	3.3	4.8	0.5	46.1	
25-Jan-05	4.5	11.8	4.1	6.8	2.2	3.0	3.3	0.5	35.7	
Average									48.0	
Q1 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
22-Jan-05	5.1	12.9	4.5	9.5	2.7	4.1	3.5	0.5	42.3	
11-Mar-05	4.4	10.2	3.8	4.9	1.1	3.5	2.8	0.5	30.7	
25-Jan-05	2.7	7.0	2.6	5.4	1.9	3.2	2.0	0.5	24.7	
Average									32.6	0.68

Q2 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
25-May-05	4.5	5.0	9.4	5.3	0.9	1.7	4.1	0.5	30.8	
30-Jun-05	3.7	5.2	9.2	5.2	0.8	1.3	4.1	0.5	29.4	
22-May-05	2.2	4.8	5.8	6.5	0.9	1.9	2.8	0.5	24.9	
Average									24.8	
Q2 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
25-May-05	2.2	2.4	4.9	4.7	0.7	1.7	2.1	0.5	18.6	
30-Jun-05	1.8	2.5	4.7	4.6	0.6	1.3	2.1	0.5	17.6	
22-May-05	1.1	2.3	3.0	5.7	0.7	1.9	1.4	0.5	16.2	
Average									17.5	0.62

Q3 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
4-Sep-05	6.5	6.0	2.9	8.5	1.0	2.5	2.0	0.5	29.3	
22-Sep-05	4.6	5.7	5.6	6.9	2.2	2.3	2.9	0.5	30.1	
1-Sep-05	3.8	4.8	6.5	5.8	0.9	3.4	3.1	0.5	28.3	
Average									29.2	
Q3 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
4-Sep-05	3.3	3.3	1.4	6.7	0.8	2.4	1.0	0.5	18.9	
22-Sep-05	2.3	3.1	2.7	5.5	1.8	2.3	1.5	0.5	19.1	
1-Sep-05	1.9	2.6	3.2	4.6	0.7	3.4	1.6	0.5	18.0	
Average									18.7	0.64

Q4 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
22-Oct-05	9.8	17.4	8.9	8.1	1.7	2.1	5.9	0.5	53.9	
6-Nov-05	8.6	19.9	4.6	10.8	2.0	2.5	4.7	0.5	53.1	
15-Dec-05	6.0	12.6	3.8	9.9	4.2	2.7	3.3	0.5	42.6	
Average									49.9	
Q4 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
22-Oct-05	6.3	11.7	5.6	6.4	1.4	2.2	4.0	0.5	37.4	
6-Nov-05	5.5	13.3	2.9	8.6	1.6	2.6	3.2	0.5	37.7	
15-Dec-05	3.9	8.5	2.4	7.8	3.5	2.8	2.2	0.5	31.0	
Average									35.4	0.71

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
RRF 22-Oct-05	0.75	0.81	0.63	0.85	0.92	0.93				
Observed										
22-Oct-05	9.8	17.4	8.9	8.1	1.7	2.1	5.9	0.5	53.9	
2015 Predicted										
22-Oct-05	7.4	14.1	5.6	6.9	1.5	2.0	4.2	0.5	41.6	0.77

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
Average 4-Q RRF	0.562	0.571	0.565	0.816	0.829	1.011	0.573			
Observed										
22-Oct-05	9.8	17.4	8.9	8.1	1.7	2.1	5.9	0.5	53.9	
2015 Predicted										
22-Oct-05	5.5	9.9	5.0	6.6	1.4	2.2	3.4	0.5	34.5	0.64

TABLE V-2-16d

2015 Estimated Reduction Ratios to be Applied Fontana 24-Hour PM2.5 Design

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.605	0.593	0.632	0.792	0.857	1.045	0.591
Q2	0.500	0.481	0.517	0.882	0.800	1.000	0.507
Q3	0.500	0.540	0.487	0.795	0.833	0.979	0.523
Q4	0.641	0.671	0.625	0.793	0.824	1.018	0.672

Q1 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
11-Mar-05	7.2	20.0	5.3	14.3	7.1	3.3	5.0	0.5	62.2	
8-Mar-05	6.5	16.1	4.6	14.2	4.3	3.6	4.1	0.5	53.6	
22-Jan-05	5.9	18.8	1.8	15.8	2.9	3.3	3.5	0.5	51.9	
Average									55.9	
Q1 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
11-Mar-05	4.3	11.8	3.4	11.4	6.1	3.4	2.9	0.5	43.8	
8-Mar-05	3.9	9.5	2.9	11.3	3.7	3.8	2.4	0.5	38.1	
22-Jan-05	3.6	11.1	1.1	12.5	2.5	3.4	2.1	0.5	36.8	
Average									39.6	0.71

Q2 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
25-May-05	5.2	10.7	8.3	10.1	2.6	2.4	4.6	0.5	44.0	
15-Jun-05	7.4	17.9	6.1	7.7	1.6	2.5	4.9	0.5	48.1	
28-May-05	7.7	13.9	6.3	7.2	1.4	2.6	4.4	0.5	43.5	
Average									45.2	
Q2 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
25-May-05	2.6	5.2	4.3	8.9	2.1	2.4	2.3	0.5	28.3	
15-Jun-05	3.7	8.6	3.1	6.8	1.3	2.5	2.5	0.5	29.0	
28-May-05	3.8	6.7	3.3	6.3	1.1	2.6	2.2	0.5	26.5	
Average									28.0	0.62

Q3 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
18-Jul-05	3.7	3.7	8.9	12.5	3.7	4.0	3.7	0.5	40.2	
1-Sep-05	3.6	5.5	5.5	9.7	3.0	5.3	2.8	0.5	35.3	
29-Aug-05	3.4	3.7	5.3	12.1	3.7	5.1	2.5	0.5	35.7	
Average									37.1	
Q3 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
18-Jul-05	1.9	2.0	4.3	9.9	3.1	3.9	2.0	0.5	27.6	
1-Sep-05	1.8	3.0	2.7	7.7	2.5	5.1	1.5	0.5	24.8	
29-Aug-05	1.7	2.0	2.6	9.6	3.1	5.0	1.3	0.5	25.7	
Average									26.0	0.70

Q4 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
22-Oct-05	22.0	52.8	11.0	10.5	3.5	3.3	12.1	0.5	115.2	
6-Nov-05	9.9	26.4	3.4	11.8	3.2	2.4	5.3	0.5	62.4	
27-Dec-05	7.1	18.0	0.3	10.6	3.9	2.9	2.9	0.5	45.7	
Average									74.4	
Q4 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
22-Oct-05	14.1	35.4	6.9	8.4	2.9	3.4	8.1	0.5	79.6	
6-Nov-05	6.3	17.7	2.1	9.4	2.6	2.4	3.6	0.5	44.7	
27-Dec-05	4.5	12.1	0.2	8.4	3.2	2.9	1.9	0.5	33.8	
Average									52.7	0.71

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
RRF 22-Oct-05	0.69	0.7	0.69	0.88	1.01	1.04				
Observed										
22-Oct-05	22.0	52.8	11.0	10.5	3.5	3.3	12.1	0.5	115.2	
2015 Predicted										
22-Oct-05	15.1	37.0	7.6	9.3	3.5	3.4	8.4	0.5	84.4	0.73

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
Average 4-Q RRF	0.562	0.571	0.565	0.816	0.829	1.011	0.573			
Observed										
22-Oct-05	22.0	52.8	11.0	10.5	3.5	3.3	12.1	0.5	115.2	
2015 Predicted										
22-Oct-05	12.3	30.2	6.2	8.6	2.9	3.3	6.9	0.5	70.5	0.61

TABLE V-2-16e

2015 Estimated Reduction Ratios to be Applied to Long Beach 24-Hour PM2.5 Design

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.605	0.593	0.632	0.792	0.857	1.045	0.591
Q2	0.500	0.481	0.517	0.882	0.800	1.000	0.507
Q3	0.500	0.540	0.487	0.795	0.833	0.979	0.523
Q4	0.641	0.671	0.625	0.793	0.824	1.018	0.672

Q1 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
22-Jan-05	8.2	18.6	7.9	8.7	2.2	4.3	5.7	0.5	55.5	
1-Jan-05	0.3	1.9	2.0	18.8	6.0	4.5	1.0	0.5	34.5	
11-Mar-05	5.8	11.6	6.9	11.2	1.2	3.8	4.3	0.5	44.8	
Average									44.9	
Q1 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
22-Jan-05	4.9	11.0	5.0	6.9	1.9	4.4	3.4	0.5	38.0	
1-Jan-05	0.2	1.2	1.2	14.9	5.1	4.7	0.6	0.5	28.3	
11-Mar-05	3.5	6.9	4.3	8.9	1.0	4.0	2.5	0.5	31.6	
Average									32.7	0.73

Q2 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
25-May-05	4.6	5.4	11.1	5.4	1.1	1.8	4.8	0.5	34.2	
30-Jun-05	5.0	4.4	11.0	4.4	1.0	1.5	4.6	0.5	32.0	
22-May-05	2.5	3.6	7.7	12.6	0.9	1.8	3.3	0.5	32.4	
Average									32.9	
Q2 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
25-May-05	2.3	2.6	5.7	4.7	0.9	1.8	2.4	0.5	21.0	
30-Jun-05	2.5	2.1	5.7	3.9	0.8	1.5	2.3	0.5	19.4	
22-May-05	1.2	1.7	4.0	11.1	0.7	1.8	1.7	0.5	22.8	
Average									21.1	0.64

Q3 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
22-Sep-05	6.2	8.5	0.3	8.7	2.9	6.0	1.4	0.5	34.0	
11-Aug-05	3.4	6.5	14.3	4.4	1.4	7.1	6.1	0.5	43.1	
25-Sep-05	5.6	9.1	0.3	6.2	1.3	6.0	1.5	0.5	30.0	
Average									35.7	
Q3 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
22-Sep-05	3.1	4.6	0.2	6.9	2.4	5.8	0.7	0.5	24.3	
11-Aug-05	1.7	3.5	7.0	3.5	1.2	7.0	3.2	0.5	27.4	
25-Sep-05	2.8	4.9	0.2	4.9	1.1	5.9	0.8	0.5	21.0	
Average									24.2	0.68

Q4 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
6-Nov-05	8.5	18.1	5.5	11.1	3.9	2.7	4.8	0.5	54.5	
22-Oct-05	9.7	15.6	10.0	6.1	1.7	2.3	6.0	0.5	51.3	
24-Dec-05	4.1	8.7	4.4	9.3	2.4	2.5	2.9	0.5	34.4	
Average									46.7	
Q4 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
6-Nov-05	5.4	12.1	3.4	8.8	3.2	2.8	3.2	0.5	39.4	
22-Oct-05	6.2	10.5	6.2	4.8	1.4	2.4	4.0	0.5	36.0	
24-Dec-05	2.6	5.9	2.8	7.4	2.0	2.6	2.0	0.5	25.6	
Average									33.7	0.72

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
RRF 22-Oct-05	0.76	0.82	0.67	0.78	0.90	0.7				
Observed										
22-Oct-05	9.7	15.6	10.0	6.1	1.7	2.3	6.0	0.5	51.3	
2015 Predicted										
22-Oct-05	7.3	12.8	6.7	4.7	1.5	1.6	4.4	0.5	39.5	0.77

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
Average 4-Q RRF	0.562	0.571	0.565	0.816	0.829	1.011	0.573			
Observed										
22-Oct-05	9.7	15.6	10.0	6.1	1.7	2.3	6.0	0.5	51.3	
2015 Predicted										
22-Oct-05	5.4	8.9	5.6	4.9	1.4	2.3	3.4	0.5	32.6	0.64

TABLE V-2-16f

2015 Estimated Reduction Ratios to be Applied to Los Angeles 24-Hour PM2.5 Design

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.605	0.593	0.632	0.792	0.857	1.045	0.591
Q2	0.500	0.481	0.517	0.882	0.800	1.000	0.507
Q3	0.500	0.540	0.487	0.795	0.833	0.979	0.523
Q4	0.641	0.671	0.625	0.793	0.824	1.018	0.672

Q1 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
11-Mar-05	11.8	30.3	10.5	11.5	3.4	3.7	8.4	0.5	79.6	
22-Jan-05	7.2	20.6	4.5	13.3	4.0	3.5	4.8	0.5	57.9	
8-Mar-05	2.4	19.6	4.3	8.0	2.1	2.8	4.6	0.5	43.9	
Average									60.5	
Q1 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
11-Mar-05	7.1	17.9	6.6	9.1	2.9	3.9	5.0	0.5	53.1	
22-Jan-05	4.4	12.2	2.8	10.5	3.4	3.7	2.8	0.5	40.4	
8-Mar-05	1.5	11.6	2.7	6.3	1.8	3.0	2.7	0.5	30.1	
Average									41.2	0.68

Q2 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
25-May-05	5.8	8.8	11.6	8.1	1.5	2.5	5.5	0.5	43.9	
30-Jun-05	5.0	8.8	8.2	7.1	1.7	2.4	4.3	0.5	37.4	
22-May-05	2.4	5.9	6.3	12.5	1.6	2.9	3.2	0.5	34.9	
Average									38.7	
Q2 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
25-May-05	2.9	4.2	6.0	7.2	1.2	2.5	2.8	0.5	27.3	
30-Jun-05	2.5	4.2	4.2	6.3	1.3	2.4	2.2	0.5	23.6	
22-May-05	1.2	2.9	3.2	11.0	1.3	2.9	1.6	0.5	24.7	
Average									25.2	0.65

Q3 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
5-Aug-05	7.9	15.8	18.3	11.2	4.2	5.7	9.0	0.5	72.2	
3-Jul-05	5.9	6.7	10.6	7.2	1.0	4.3	4.8	0.5	40.6	
19-Sep-05	8.0	10.5	9.0	13.6	1.8	4.2	4.9	0.5	51.9	
Average									54.9	
Q3 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
5-Aug-05	4.0	8.5	8.9	8.9	3.5	5.6	4.7	0.5	44.7	
3-Jul-05	2.9	3.6	5.2	5.8	0.8	4.2	2.5	0.5	25.6	
19-Sep-05	4.0	5.7	4.4	10.8	1.5	4.1	2.5	0.5	33.5	
Average									34.6	0.63

Q4 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
22-Oct-05	12.5	26.3	9.2	7.6	1.9	2.6	7.4	0.5	67.5	
6-Nov-05	9.8	25.8	4.4	12.2	2.9	2.5	5.6	0.5	63.1	
24-Nov-05	4.7	13.7	3.0	12.0	5.2	2.6	3.2	0.5	44.3	
Average									58.3	
Q4 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
22-Oct-05	8.0	17.7	5.8	6.0	1.5	2.7	4.9	0.5	47.1	
6-Nov-05	6.3	17.3	2.8	9.7	2.4	2.5	3.7	0.5	45.1	
24-Nov-05	3.0	9.2	1.8	9.6	4.2	2.7	2.1	0.5	33.1	
Average									41.8	0.72

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
RRF 22-Oct-05	0.82	0.87	0.67	0.84	0.93	0.93				
Observed										
22-Oct-05	12.5	26.3	9.2	7.6	1.9	2.6	7.4	0.5	67.5	
2015 Predicted										
22-Oct-05	10.3	22.9	6.2	6.4	1.7	2.4	5.7	0.5	56.1	0.83

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
Average 4-Q RRF	0.562	0.571	0.565	0.816	0.829	1.011	0.573			
Observed										
22-Oct-05	12.5	26.3	9.2	7.6	1.9	2.6	7.4	0.5	67.5	
2015 Predicted										
22-Oct-05	7.0	15.0	5.2	6.2	1.5	2.7	4.2	0.5	42.3	0.63

TABLE V-2-16g

2015 Estimated Reduction Ratios to be Applied to Pico Rivera 24-Hour PM2.5 Design

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.605	0.593	0.632	0.792	0.857	1.045	0.591
Q2	0.500	0.481	0.517	0.882	0.800	1.000	0.507
Q3	0.500	0.540	0.487	0.795	0.833	0.979	0.523
Q4	0.641	0.671	0.625	0.793	0.824	1.018	0.672

Q1 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
22-Jan-05	7.6	20.6	5.5	13.5	4.4	3.7	5.2	0.5	60.5	
8-Mar-05	7.6	18.7	7	5.9	2	4	5.4	0.5	50.6	
25-Jan-05	5.4	14.3	4.5	8.4	3.2	3.4	3.8	0.5	43	
Average									51.4	
Q1 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
22-Jan-05	5.1	12.9	4.5	9.5	2.7	4.1	3.5	0.5	42.3	
8-Mar-05	4.4	10.2	3.8	4.9	1.1	3.5	2.8	0.5	30.7	
25-Jan-05	2.7	7.0	2.6	5.4	1.9	3.2	2.0	0.5	24.7	
Average									35.6	0.69

Q2 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
1-Apr-05	0.1	1.5	1.3	6.1	1.8	1.7	0.7	0.5	13.2	
4-Apr-05	0	1.8	2.1	3	0.7	2.1	1	0.5	10.8	
7-Apr-05	6	16.3	3	6	1.9	3	3.6	0.5	39.6	
Average									21.2	
Q2 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
1-Apr-05	0.1	0.7	0.7	5.4	1.5	1.7	0.4	0.5	10.8	
4-Apr-05	0	0.9	1.1	2.7	0.6	2.1	0.5	0.5	8.3	
7-Apr-05	3	7.8	1.5	5.3	1.5	3	1.8	0.5	24.4	
Average									14.5	0.68

Q3 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
22-Sep-05	5.2	6	0.3	9.9	4.2	6.3	1	0.5	32.9	
19-Sep-05	5.6	5.4	8.3	7.7	2	2.7	3.8	0.5	35.5	
16-Sep-05	5	5.7	5.4	5.9	1.5	2.5	2.8	0.5	28.9	
Average									32.4	
Q3 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
22-Sep-05	2.6	3.2	0.2	7.9	3.5	6.2	0.5	0.5	24.5	
19-Sep-05	2.8	2.9	4.1	6.2	1.7	2.6	2	0.5	22.7	
16-Sep-05	2.5	3.1	2.6	4.7	1.2	2.5	1.5	0.5	18.6	
Average									21.9	0.68

Q4 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
22-Oct-05	12.7	28.4	10.6	14.1	2	3.2	8.2	0.5	79.3	
24-Dec-05	4.4	10.8	3.1	12	5.6	2.8	2.8	0.5	41.5	
30-Dec-05	4.1	9.2	0.3	10.7	5.4	3.8	1.5	0.5	35	
Average									51.9	
Q4 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
22-Oct-05	8.2	19.1	6.6	11.2	1.7	3.3	5.5	0.5	56	
24-Dec-05	2.8	7.3	1.9	9.6	4.6	2.9	1.9	0.5	31.4	
30-Dec-05	2.6	6.2	0.2	8.5	4.5	3.8	1	0.5	27.3	
Average									38.2	0.74

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
RRF 22-Oct-05	0.76	0.8	0.69	0.83	0.92	0.83				
Observed										
22-Oct-05	12.7	28.4	10.6	14.1	2	3.2	8.2	0.5	79.3	
2015 Predicted										
22-Oct-05	9.7	22.7	7.3	11.7	1.9	2.7	6.1	0.5	62.1	0.78

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
Average 4-Q RRF	0.562	0.571	0.565	0.816	0.829	1.011	0.573			
Observed										
22-Oct-05	12.7	28.4	10.6	14.1	2	3.2	8.2	0.5	79.3	
2015 Predicted										
22-Oct-05	7.1	16.2	6	11.5	1.7	3.3	4.7	0.5	50.5	0.64

TABLE V-2-16h

2015 Estimated Reduction Ratios to be Applied to Rubidoux 24-Hour PM2.5 Design

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.605	0.593	0.632	0.792	0.857	1.045	0.591
Q2	0.500	0.481	0.517	0.882	0.800	1.000	0.507
Q3	0.500	0.540	0.487	0.795	0.833	0.979	0.523
Q4	0.641	0.671	0.625	0.793	0.824	1.018	0.672

Q1 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
11-Mar-05	0.0	16.7	3.2	13.9	3.4	3.1	3.7	0.5	44.1	
22-Jan-05	5.4	17.3	2.0	10.6	3.9	2.9	3.4	0.5	45.5	
8-Mar-05	5.8	16.2	4.4	8.2	3.2	3.7	4.1	0.5	45.5	
Average									45.0	
Q1 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
11-Mar-05	0.0	9.9	2.0	11.0	2.9	3.2	2.2	0.5	31.9	
22-Jan-05	3.3	10.3	1.3	8.4	3.4	3.0	2.0	0.5	32.1	
8-Mar-05	3.5	9.6	2.8	6.5	2.7	3.8	2.4	0.5	31.8	
Average									31.9	0.71

Q2 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
15-Jun-05	9.4	17.1	5.4	5.9	1.1	1.5	4.6	0.5	44.8	
25-May-05	7.1	16.5	7.5	8.1	1.6	1.8	5.2	0.5	47.8	
16-Apr-05	5.4	17.6	3.3	7.1	1.3	1.7	3.9	0.5	40.1	
Average									44.2	
Q2 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
15-Jun-05	4.7	8.2	2.8	5.2	0.9	1.5	2.3	0.5	26.0	
25-May-05	3.5	8.0	3.9	7.2	1.3	1.8	2.6	0.5	28.7	
16-Apr-05	2.7	8.5	1.7	6.3	1.0	1.6	2.0	0.5	24.2	
Average									26.3	0.59

Q3 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
6-Jul-05	4.1	10.6	5.4	14.1	2.1	3.3	3.6	0.5	43.2	
14-Aug-05	4.0	13.0	6.7	5.3	0.9	3.6	4.4	0.5	37.9	
3-Jul-05	5.4	11.6	6.7	7.2	1.0	3.3	4.2	0.5	39.4	
Average									40.2	
Q3 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
6-Jul-05	2.0	5.7	2.6	11.2	1.8	3.2	1.9	0.5	29.0	
14-Aug-05	2.0	7.0	3.3	4.2	0.7	3.5	2.3	0.5	23.5	
3-Jul-05	2.7	6.3	3.3	5.7	0.8	3.2	2.2	0.5	24.7	
Average									25.7	0.64

Q4 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
22-Oct-05	20.6	55.6	21.1	10.9	3.5	2.7	16.1	0.5	130.5	
6-Nov-05	10.2	26.1	3.5	15.8	3.1	2.3	5.3	0.5	66.4	
12-Nov-05	7.6	20.5	2.7	9.9	2.8	2.4	4.1	0.5	50.1	
Average									82.3	
Q4 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
22-Oct-05	13.2	37.3	13.2	8.7	2.9	2.7	10.8	0.5	89.3	
6-Nov-05	6.6	17.5	2.2	12.6	2.5	2.3	3.6	0.5	47.8	
12-Nov-05	4.9	13.7	1.7	7.9	2.3	2.5	2.8	0.5	36.2	
									57.8	0.70

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
RRF 22-Oct-05	0.61	0.60	0.61	0.82	0.93	0.83				
Observed										
22-Oct-05	20.6	55.6	21.1	10.9	3.5	2.7	16.1	0.5	130.5	
2015 Predicted										
22-Oct-05	12.6	33.3	12.8	9.0	3.3	2.2	9.8	0.5	83.0	0.64

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
Average 4-Q RRF	0.562	0.571	0.565	0.816	0.829	1.011	0.573			
Observed										
22-Oct-05	20.6	55.6	21.1	10.9	3.5	2.7	16.1	0.5	130.5	
2015 Predicted										
22-Oct-05	11.6	31.7	11.9	8.9	2.9	2.7	9.2	0.5	79.0	0.61

TABLE V-2-16i

2015 Estimated Reduction Ratios to be Applied to Wilmington 24-Hour PM2.5 Design

RRF	NH4	NO3	SO4	OC	EC	OTR	Water
Q1	0.605	0.593	0.632	0.792	0.857	1.045	0.591
Q2	0.500	0.481	0.517	0.882	0.800	1.000	0.507
Q3	0.500	0.540	0.487	0.795	0.833	0.979	0.523
Q4	0.641	0.671	0.625	0.793	0.824	1.018	0.672

Q1 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
22-Jan-05	8.7	18.7	9.6	9.5	3.4	4.5	6.3	0.5	60.8	
1-Jan-05	0.2	1.9	2	15.8	4.9	4.6	1	0.5	30.4	
13-Jan-05	1.6	6.3	2.6	12.5	5.7	5.2	1.9	0.5	35.7	
Average									42.3	
Q1 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
22-Jan-05	5.2	11.1	6.1	7.5	2.9	4.7	3.7	0.5	41.8	
1-Jan-05	0.1	1.1	1.2	12.5	4.2	4.8	0.6	0.5	25.2	
13-Jan-05	1	3.7	1.7	9.9	4.8	5.4	1.1	0.5	28.1	
Average									31.7	0.75

Q2 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
30-Jun-05	4.6	2.6	11.1	4.3	1.2	1.5	4.4	0.5	29.6	
25-May-05	4.6	4	11.4	6	1.1	1.7	4.7	0.5	33.5	
22-May-05	2.5	2	10.4	4.3	1	1.8	4	0.5	26.1	
Average									29.7	
Q2 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
30-Jun-05	2.3	1.3	5.7	3.8	0.9	1.5	2.2	0.5	18.2	
25-May-05	2.3	1.9	5.9	5.3	0.9	1.7	2.4	0.5	20.9	
22-May-05	1.2	1	5.4	3.8	0.8	1.8	2	0.5	16.5	
Average									18.5	0.62

Q3 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
21-Jul-05	1.6	3.2	9	4.6	1.9	2.4	3.7	0.5	26.3	
12-Jul-05	7	3.4	16.4	5.3	1.8	2.2	6.4	0.5	42.5	
22-Sep-05	5.4	9.3	0.3	7.4	3.8	5.3	1.5	0.5	33	
Average									33.9	
Q3 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
21-Jul-05	0.8	1.7	4.4	3.7	1.6	2.3	1.9	0.5	16.9	
12-Jul-05	3.5	1.9	8	4.2	1.5	2.1	3.3	0.5	25	
22-Sep-05	2.7	5	0.2	5.9	3.2	5.2	0.8	0.5	23.4	
Average									21.8	0.64

Q4 Observed Components	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	Ratio
24-Nov-05	3.4	11.9	5.3	12.7	3.1	3	3.7	0.5	43.1	
22-Oct-05	7.3	14	14.7	5.5	1.7	2.3	7.4	0.5	52.8	
6-Nov-05	7.3	14.2	5.1	15.1	2.9	2.8	4	0.5	51.5	
Average									49.1	
Q4 2015 Estimates	NH4+	NO3-	SO4=	OC	EC	OTR	Water	Blank	Mass	
24-Nov-05	2.1	8	3.3	10.1	2.6	3	2.5	0.5	32.1	
22-Oct-05	4.7	9.4	9.2	4.3	1.4	2.4	5	0.5	36.8	
6-Nov-05	4.7	9.5	3.2	12	2.4	2.9	2.7	0.5	37.9	
Average									35.6	0.72

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
RRF 22-Oct-05	0.7	0.8	0.7	0.8	0.8	0.6				
Observed										
22-Oct-05	7.3	14	14.7	5.5	1.7	2.3	7.4	0.5	52.8	
2015 Predicted										
22-Oct-05	5.4	11.2	9.5	4.1	1.4	1.4	5.1	0.5	38.2	0.72

Episode Day Using	NH4	NO3	SO4	OC	EC	OTR	Water	Blank	Mass	Ratio
Average 4-Q RRF	0.6	0.6	0.6	0.8	0.8	1	0.6			
Observed										
22-Oct-05	7.3	14	14.7	5.5	1.7	2.3	7.4	0.5	52.8	
2015 Predicted										
22-Oct-05	4.1	8	8.3	4.5	1.4	2.4	4.2	0.5	32.8	0.62

CHAPTER 3

THE FEDERAL 24-HOUR PM10 ATTAINMENT DEMONSTRATION PLAN AND VISIBILITY ASSESSMENT

INTRODUCTION

As discussed, in the main document, on September 21, 2006 the U.S. EPA administrator signed the final documents that eliminated the existing annual PM10 standard. The action retained 24-hour PM10 standard at its existing concentration of 150 µg/m^3. The form of the 24-hour PM10 standard allows for one violation of the standard annually. The Basin currently meets the 24-hour average federal standard. (The only days that exceed the standard are associated with high wind natural events or exceptional events due to wildfires).

For this analysis, the annual second maximum concentration is used for the attainment demonstration (given the standard allows for one violation annually). Riverside Rubidoux has been the PM10 24-hour design site in nine of the past ten years when high wind days have been excluded from the analysis. The 2005 design value at Rubidoux is 86 percent of the federal standard. The standard attainment demonstration is conducted to assure that the Basin will continue to be in compliance in future years.

MODELING METHODOLOGY

As a conservative analysis, only emissions reductions associated with the PM2.5 portion of the 24-hour PM10 concentration are assumed to be impacted by future year emission controls. Future year predictions of maximum and second maximum 24-hour average PM10 are calculated using the site specific ratio between annual PM2.5 calculated for 2005 and 2015. The ratio encumbers total mass rather than individual component species. The site specific ratio is applied to the PM2.5 portion of the PM10 design concentration. Co-located PM2.5 values measured on the days having the maximum and second maximum concentrations were used to determine the site specific average ratio between the annual maximum and second maximum and their corresponding PM2.5 concentrations.

The average PM2.5 RRFs calculated from annual attainment demonstration, for 2005 to 2014, are applied to the fine portion of the 24-hour PM10 distribution. The average RRF determined from the MATES-III sites was substituted as the RRF at locations not used in the PM2.5 SMAT. The coarse portion of the PM10 is assumed to be held constant in this analysis. The predicted reductions to the fine portion are then added to the coarse to estimate a 2015 second maximum PM10 24-hour average concentration.

FUTURE YEAR AIR QUALITY

PM10 24-hour attainment Demonstration

Table V-3-1 summarizes the PM10 24-hour attainment demonstration. All sites meet the federal PM10 standard of 150 μg/m^3 in 2015. The predicted 2^{nd} highest maximum concentrations for 2015 is located at Rubidoux and values approximately 74 percent of the federal standard. Only five of the sixteen locations are expected to meet the more restive state standard of 50 μg/m^3 by 2015. Rubidoux is predicted to exceed the state standard by 122 percent in 2015.

Note: the predicted 2015 PM10 concentrations presented in Table V-3-1 reflect a minor modification in calculation methodology and now replace those concentrations presented in Table 5-6 in the main document.

PM10 Annual Analysis

The Draft 2007 AQMP does not provide an updated regional attainment demonstration to show compliance to the revoked annual PM10 standard (50 μg/m^3). At the writing of this document, it is expected that the 2006 design value for Rubidoux will continue to nominally exceed the revoked federal standard but will continue to exceed the California PM10 standard of 20 μg/m^3. Despite EPA's decision revoking the PM10 annual standard, the District will continue to work towards meeting its former attainment target in the effort to protect public health, demonstrate progress towards attaining the state PM10 annual standard and assist in compliance of the federal 24-hour PM10 standard.

As part of the 2003 AQMP, the District proposed a comprehensive program to examine the local emissions profile and potential for mitigation actions that could be taken to bring PM10 concentrations at Rubidoux within the annual standard by 2006. A survey of the local emissions was conducted and as a result two District rules (1186 and 1174) targeting emissions from aggregate operations and bag houses have been strengthened in the efforts to reduce impacts to the Rubidoux community. In addition, the District has increased compliance measures in the area and staff is working with the Riverside County Redevelopment agencies to expedite installation of paved curbs and gutters to eliminate sources of fugitive dust emissions. The Draft 2007 AQMP control measure BCM-02 PM Emissions Hot Spots continues this concept of addressing localized PM impacts.

TABLE V-3-1

24-Hour Average Maximum and Average 2nd Maximum Basin PM10: 2003-2005 Baseline Design and 2015 Controlled

	Average Maximum				Average 2nd Maximum						
Location	Mass (µg/m³)	PM2.5/PM10 Ratio	Est. 2.5 Mass (µg/m³)	Est. Crustal Mass (µg/m³)	Mass (µg/m³)	PM2.5/PM10 Ratio	Est. 2.5 Mass (µg/m³)	Est. Crustal Mass (µg/m³)	24-Hour Average PM2.5 RRF	2015 Estimated Average Maximum (µg/m³)	2015 Estimated Average 2nd Maximum (µg/m³)
Azusa	93	0.51	47.6	45.4	79	0.54	42.3	36.7	0.72	80	67
Burbank	82	0.51	42.0	40.0	73	0.69	50.2	22.8	0.71	70	58
Long Beach	96	0.73	69.8	26.2	63	0.78	48.9	14.1	0.70	75	48
Los Angeles	74	0.75	55.7	18.3	69	0.80	54.9	14.1	0.71	58	53
Santa Clarita	60	0.56	33.6	26.4	54	0.54	29.2	24.8	0.72	51	46
Hawthorne	53	0.56	29.7	23.3	61	0.54	32.9	28.1	0.72	45	52
Anaheim	78	0.50	38.8	39.2	67	0.49	33.1	33.9	0.70	66	57
Mission Viejo	51	0.69	35.4	15.6	44	0.33	14.7	29.3	0.72	41	40
Rubidoux	141	0.60	84.4	56.6	129	0.42	54.3	74.7	0.66	113	111
Perris	102	0.56	57.1	44.9	88	0.54	47.5	40.5	0.72	86	75
Banning Airport	79	0.56	44.2	34.8	55	0.54	29.7	25.3	0.72	67	47
Crestline	49	0.56	27.4	21.6	47	0.54	25.4	21.6	0.72	41	40
Fontana	105	0.29	30.6	74.4	96	0.36	34.2	61.8	0.75	97	87
San Bernardino	96	0.58	55.5	40.5	85	0.44	37.8	47.2	0.72	80	74
Redlands	80	0.56	44.8	35.2	70	0.54	37.8	32.2	0.72	67	59
Ontario	90	0.44	40.0	50.0	77	0.65	50.1	26.9	0.72	79	63

VISIBILITY

Background

In July 1999, U.S. EPA adopted the federal Regional Haze Regulations [40 CFR Part 51] to address Section 169A of the CAA which set forth a national goal for future visibility with specific focus to remedy any visibility impairments to Class I areas nationwide. States are required to provide to EPA emissions reduction strategies to improve visibility in all mandatory Class I national parks and wilderness areas. In response to the requirements of the regulations, California joined the Western Regional Air Partnership (WRAP), a multi-agency organization that is coordinating implementation of the regional haze rules. States with PM2.5 non-attainment areas are require to submit "haze plans" to EPA within 3-years following PM2.5 designation and develop future year (2018) inventories of emissions that lead to visibility reduction. The ARB has assumed the responsibility for the plan and inventory development requirements for the state.

The emissions reductions needed to attain the PM2.5 standard in the Basin will directly contribute to improved future year visibility. California continues to maintain a state standard for visibility structured to reduce aerosol particles (8-hour average) that contribute to an extinction coefficient value of 0.23 per kilometer (or 10 miles of visual range) when relative humidity is less than 70 percent. The previous form of the standard assessed the number of days when visual range was less than 10 miles for the same humidity consideration. Visibility is among the strongest indicators to air quality and its value is paramount. As such, future year visibility is used in the socioeconomic evaluation of the AQMP to estimate monetary benefits that arise from improved visual range through the implementation of the plan. Future-year visibility in the Basin is projected empirically using the results derived from a regression analysis of visibility with air quality measurements. The regression data set consisted of aerosol composition data collected during a special monitoring program conducted concurrently with visibility data collection (prevailing visibility observations from airports and visibility measurements from District monitoring stations). A full description of the visibility analysis is given in Technical Report V-C of the 1994 AQMP.

Visibility Modeling

To establish the most reasonable control strategy to meet the visibility standard in the future, a relationship between visibility and concentrations of visibility reducing particles must be established. This, in turn, requires visibility modeling techniques to identify sources of visibility reducing particles and to quantify their impacts.

The total atmospheric light extinction can be broken down into four basic components: scattering of light by particles, absorption of light by particles, absorption of light by gases, and scattering of light by gases (Rayleigh scattering). In general, total light extinction is dominated by scattering of light due to particles, with light absorption by particles being second in importance. The components other than scattering of light by particles have been well-characterized by theory or from previous studies. Therefore, light extinction by particle scattering is normally estimated either by visibility modeling or by direct measurement.

Multiple linear regression is a statistical tool commonly used for characterizing the relationship between visibility and ambient air quality of the visibility reducing particles. When atmospheric light extinction due to particle scattering is regressed on concentrations of visibility reducing particles, the regression coefficients represent the extinction efficiency due to particle scattering (extinction per unit concentration) for each air pollutant species.

Multiple linear regression was employed in the 1991 AQMP to develop empirical predictive equations. Empirical visibility model developed in the 1991 AQMP for Riverside were utilized in the current AQMP analysis to estimate future visibilities with new future-year (2015, and 2021) organic carbon concentrations, sulfate, and nitrate concentrations which were obtained from the CAMx simulations. Details of the statistical analysis used to develop the empirical predictive equations can be found in Technical Report V-G of the 1991 AQMP.

Prior Visibility Modeling Results

In the 1991 AQMP, the regression analysis resulted in several sets of extinction efficiencies for light scattering by particles for Riverside (Rubidoux station) and four additional measurement locations. (Since Rubidoux is the limiting PM2.5 station in the Basin it is considered to be the representative site for expected minimum Basin visual range estimation.) Combining extinction efficiencies for light scattering by particles with the empirical expressions for the other light extinction component produces a series of empirical predictive equations. Empirical predictive equations relate light extinction to concentrations of visibility reducing air pollutants and have the following form:

b_{ext} = Summation ($b_i \cdot C_i$)+ b_{RAY}

where b_i = extinction efficiency for ith species (10^{-4} $m^{-1}/\mu g/m^3$ or 10^{-4} m^{-1}/pphm)

C_i = mean concentration for ith species ($\mu g/m^3$ or pphm)

b_{RAY} = extinction due to Rayleigh scattering in the Basin (10^{-4} m^{-1})

Table V-3-2 is a summary of the 1991 AQMP results, showing the extinction efficiency, b_i, for Riverside. (The extinction efficiency, b_i, for the other locations analyzed in the 1994 AQMP can be found in 1994 AQMP, Technical Report V-C).

A baseline light extinction budget was determined for each empirical predictive equation using the mean measured values of the air quality components for the baseline year 2005. The light extinction budget for Riverside during the baseline emission year is summarized in Table V-3-3. These show the percent contribution to total extinction from each component for each equation. At Riverside light scattering by particles accounts for up to 86 percent of the total light extinction with secondary nitrate and carbon particles being dominant.

Predicted Future Air Quality

Future air quality levels are needed to estimate future visual air quality. The concentrations of sulfate, nitrate, organic carbon and elemental for future years 2015, and 2021 are taken from the results of the CAMx modeling analysis. Future concentrations of NO_2 are estimated from the mean annual concentrations measured using linear rollback of NO_X emissions. Natural background concentrations for each of these are assumed to be negligible for this analysis. Estimated future baseline and controlled levels for all pollutant species that affect visibility are shown in Table V-3-4.

Future Visibility Projections

Tables V-3-5 and V-3-6 compare the predicted future visibility with the current levels based on measurements. The results for the baseline emission scenario (no further emission controls) are shown in Table V-3-5 and the results for the controlled emission scenarios are shown in Table V-3-6. Each table shows the predicted annual average light extinction coefficients compared to the total light extinction coefficient derived from 1986 measurements and the mean visual range estimated from the measured and predicted extinction coefficients. Figure V-3-1 illustrates the improvement in visibility in terms of the annual visual range for both emission control scenarios.

The results of the visibility analysis for Rubidoux illustrated in Figure V-3-1 indicate that with future year reductions of PM2.5 from implementation of all proposed emission controls for 2015, the annual average visibility would improve from about 10 miles (calculated for 2005) to over 20 miles at Rubidoux. Visual range in 2021 is estimated Visibility at all other Basin sites is expected to equal or exceed the Rubidoux visual range. Visual range is expected to double from 2005 due to reductions of secondary PM2.5 (by more than one third), direct PM2.5 emissions including diesel soot and lower nitrogen dioxide concentrations as a result of 2007 AQMP controls.

TABLE V-3-2

Riverside Extinction Efficiencies, b_i, Defining Alternate Sets of Empirical Predictive Equations for Light Extinction

Visibility-Reducing Species	Units		Alternate Equations[1] 1	2	3	4
Riverside						
SULF	$(10^{-4}\ m^{-1}/\mu g/m^3)$	b_1				
NITR	$(10^{-4}\ m^{-1}/\mu g/m^3)$	b_2	0.070	0.075		
IONS	$(10^{-4}\ m^{-1}/\mu g/m^3)$	b_3			0.055	0.058
OC	$(10^{-4}\ m^{-1}/\mu g/m^3)$	b_4	0.104		0.089	
CRBN	$(10^{-4}\ m^{-1}/\mu g/m^3)$	b_5		0.062		0.053
EC	$(10^{-4}\ m^{-1}/\mu g/m^3)$	b_6	0.119	0.119	0.119	0.119
NO_2	$(10^{-4}\ m^{-1}/pphm)$	b_7	0.033	0.033	0.033	0.033
molecules	$(10^{-4}\ m^{-1})$	b_{RAY}	0.114	0.114	0.114	0.114

TABLE V-3-3

Current Light Extinction Budgets for Each Alternate Empirical Predictive Equation at Each Measurement Location[2]
(in percent of total light extinction)

Location	Alt Eq.	b_{sp} SULF	NITR	IONS	OC	CRBN	b_{ap}	b_{ag}	b_{RAY}
Riverside	1	0	0	74	11	0	7	3	6
	2	0	72	0	13	0	7	3	6
	3	0	0	75	0	11	6	3	5
	4	0	73	0	0	13	6	2	5

[1] Alternate equations in the set of empirical predictive equations defined for each measurement location.
[2] Based on mean annual average concentrations derived from 1986 measurements.

TABLE V-3-4

Riverside Air Quality Levels for the Years 2005 and 2015 Future Baseline and Controlled

Component	Units	Baseline	Controlled
2015			
SULF[1]	µg/m^3	7.25	2.49
NITR[1]	µg/m^3	19.22	5.53
IONS	µg/m^3	26.48	8.03
OC[2]	µg/m^3	5.08	1.65
EC[2]	µg/m^3	9.30	3.65
CRBN	µg/m^3	2.70	1.51
NO_2[2]	pphm	0.00	0.70
2021			
SULF[1]	µg/m^3	6.49	2.57
NITR[1]	µg/m^3	15.02	3.85
IONS	µg/m^3	21.51	6.42
OC[2]	µg/m^3	5.08	1.66
EC[2]	µg/m^3	9.10	3.64
CRBN	µg/m^3	2.50	1.48
NO_2[2]	pphm	0.06	0.47

The predicted future visibilities are consistent with the observed annual average visual range in areas influenced by marine air (with the attendant marine haze). Without significant air pollution sources, median mid-day visibilities along the California coast are generally less than 25 miles (Trijonis, 1980).

Future Light Extinction Budgets at Riverside

Table V-3-7 compares the baseline and future projected light extinction budgets determined from one of the alternate empirical equations for each location to illustrate changes in the importance of each pollutant component to overall light extinction. These changes result from alterations in the future pollutant mix and in the spatial distribution of sources.

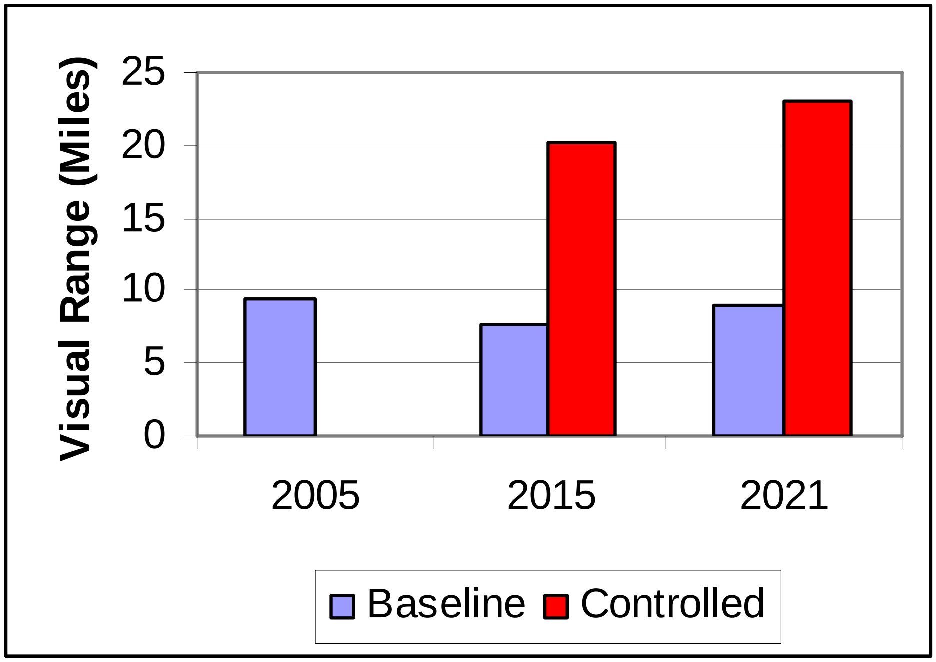

FIGURE V-3-1

Annual Average Daytime Visibility Projections at Rubidoux in Miles

TABLE V-3-5

Projected Future Visibility, Baseline without Future Controls

Year	Alt. Eq.[1]	Total Light Extinction Coefficient (10^{-4} m^{-1})	Calculated Visual Range (miles)
Baseline		2.0	9.5
2015	1	2.385	7.8
	2	2.351	7.9
	3	2.505	7.4
	4	2.495	7.5
2020	1	2.075	9.0
	2	2.019	9.2
	3	2.170	8.6
	4	2.131	8.7

[1] Alternate equations in the set of predictive empirical equations defined for each measurement location.

TABLE V-3-6

Projected Future Visibility, With Controls

Year	Alt. Eq.	Total Light Extinction Coefficient (10^{-4} m^{-1})	Calculated Visual Range (miles)
2015	1	0.905	20.6
	2	0.875	21.3
	3	0.976	19.1
	4	0.958	19.5
2020	1	0.807	23.1
	2	0.748	24.9
	3	0.871	21.4
	4	0.820	22.7

TABLE V-3-7

Comparison of Baseline and Future Projected Light Extinction Budgets for Riverside (% contribution)

Component	Baseline			Controlled	
	2005	2015	2021	2015	2021
NITR	62	59	55	46	39
OC	19	21	24	20	23
EC	10	13	15	19	22
NO_2	3	2	1	3	2
RAY.	6	5	5	12	14

The light extinction budget for Riverside changes nominally for the future baseline emission cases except for the following: (1) nitrate remains the major contributor but its contribution decreases; and (2) elemental carbon contributions increase from the base year then remain constant through 2021.

The projected light extinction budgets for the years 2015 and 2021 with the controlled emission scenarios continue to reduce the impacts of nitrates to reduced visibility but in the relative contribution due to elemental carbon.

CHAPTER 4

REVISION TO THE 2003 OZONE ATTAINMENT DEMONSTRATION PLAN

INTRODUCTION

The Draft 2007 AQMP Ozone Attainment Demonstration Plan to meet the federal 8-hour average standard (84 ppb) is presented in this chapter. The Basin is currently designated severe-17 nonattainment for ozone. As mentioned in Chapter 1 of the main document, the submittal of the 2003 California Ozone SIP served as the 1-hour ozone attainment demonstration for the South Coast Air Basin and those portions of the Southeast Desert Modified Nonattainment Area which are under the District's jurisdiction. The attainment demonstrations provided in this Draft Plan address the current 8-hour federal ozone standard and reflect the updated emissions baseline estimates, new technical information, enhanced air quality modeling techniques, and the control strategy provided in Chapter 4 of the main document and Appendices IVa through IVc.

The modeling Attainment Demonstration serves as a revision to the 1997 and 2003 ozone Attainment Demonstration Plans (Ozone Plan) submitted to EPA as part of the California State Implementation Plan (SIP). The ozone modeling attainment demonstration relies on the CAMx modeling system with the SAPRC99 chemical mechanism and seven modeling episodes. The structure of the standard and the use of RRFs differentiate this ozone modeling attainment demonstration from past endeavors. The standard is based on the 4^{th} highest annual 8-hour measured ozone concentration averaged over a three year period. The variability of meteorological episodes that can generate ozone concentrations equivalent to 4^{th} highest in a three year period does not lend to a direct deterministic simulated attainment demonstration. As such, EPA's modeling guidance recommends the use of RRFs determined from several simulated ozone episodes to assess future year standard attainment. This analysis uses seven meteorological episodes to draw a representative sample of days when the 8-hour ozone standard was exceeded at the set of Basin stations with design values requiring attainment demonstrations.

The meteorological episodes span three years: 2004 and 2005 when the MATES-III monitoring program was in effect and primary modeling episode used in the 2003 AQMP, August 5-6, 1997, which occurred during the 1997 Southern California Ozone Study (SCOS97). The 2004 and 2005 episodes occurring during the MATES-III sampling program integrate data from the network of radar wind and temperature profiles distributed throughout Southern California. In addition, advances in satellite data acquisition used in meteorological model initialization since SCOS97 and readily available global model output have shifted the focus of regional meteorological modeling from diagnostic/objective analysis towards 4-dimensional data assimilation in prognostic and hybrid modeling. Equally important, the 2004-2005 episodes occurred in the post California Phase III reformulation period and represent the current VOC emissions profile. The 1997 episode is one of several meteorological episodes that were intensively monitored through the SCOS97 field program and was included in the analysis to provide continuity between the Draft 2007 AQMP and 2003 Ozone Plans. The base year for the ozone modeling demonstration and emissions inventory characterization is 2002.

Note, as with the particulate analyses, the day specific emissions inventories used to validate the ozone modeling simulations and conduct the future year attainment demonstration are those in effect as of September 1, 2006.

This chapter draws heavily from the Draft Modeling Protocol and provides the background for the development of the components that contribute to the ozone modeling attainment demonstration. (Where necessary, the discussion will refer to the Draft Modeling Protocol to avoid duplication). Included are discussions of the modeling tool selected for the demonstration, federal and state air quality standard requirements, and base and future year emissions. The selection and characterization of meteorological episodes and preparation of the ozone simulation model input is provided in detail. The analysis also provides the base year model validation and supporting statistical and graphical documentation.

Ozone air quality is projected using CAMx for the following future years: 2010 (for downwind transport to the South Central Coast and Mojave Desert Air Basins), 2014 (for impacts to the Coachella Valley portion of the Salton Sea Air Basin), 2015 (the milestone year for PM2.5 attainment), and 2021 (to demonstrate attainment of the federal ozone standard in the South Coast Air Basin). Additional analyses provide characterization of future year air quality for alternative emissions control strategies.

Model Selection

The CAA requires that ozone nonattainment areas designated as serious and above use a photochemical grid model to demonstrate attainment. During the development of the 2003 Plan, the District convened a panel of seven experts to independently review the regional air quality modeling conducted for ozone and PM10. The consensus of the panel was for the District to move to the more current state-of-the-art dispersion platforms and chemistry modules. EPA (CRF 51, Appendix W) does not recommend a specific modeling dispersion platform or chemistry package to be used in an ozone attainment demonstration but provides guidance in the selection process. The comprehensive reviews of the peers are provided as attachments to the 2003 AQMP, Appendix V and a summary of the panel recommendations is presented in Chapter 1 of the 2003 AQMP.

The model selected for the Draft 2007 AQMP attainment demonstrations is the Comprehensive Air Quality Model with Extensions (CAMx), version 4.4 [Environ, 2006], using SAPRC99 chemistry (Carter, 2000). Moreover, this model and chemistry package is consistent with the previous advice of the outside peer reviewers. CAMx is a state-of-the-art air quality model that can simulate ozone and PM2.5 concentrations together in a "one-atmosphere" approach for the attainment demonstrations. CAMx is designed to integrate the output from both prognostic and diagnostic meteorological models.

The meteorological modeling platform selected for the modeling attainment demonstrations is the mesoscale meteorological model MM5. MM5 is a hydrostatic model system that can be run as a prognostic meteorological model or run in a historical mode with the option for 4-dimensional data assimilation. MM5 is widely used through the country by governmental agencies (the National Weather Service NWS), EPA, the military, and numerous state and local air quality agencies) as well as most if not all universities supporting a meteorology program. The MM5 layer structure, portability for including different mixing and cloud parameterization schemes and grid specification makes the model the ideal choice to couple with CAMx. One desirable aspect of the CAMx-MM5 system is mass is improved mass consitencey. The Draft Modeling Protocol provides and extended discussion on MM5 and the CAMx dispersion modeling platforms.

Modeling Approach

The Draft 2007 AQMP modeling approach for the 8-hour average federal standard attainment demonstration involves a series of steps which incorporate the simulations of multiple air quality episodes for three emissions scenarios to develop a set of site specific RRFs to be applied to the Basin design values. The sequence of the modeling approach first relies on determining the base-year episode simulation performance for the day specific base-year emissions inventories in 2004 or 2005. Sub regional and site specific performance statistics a for the Basin (and downwind receptor sites) having design values exceeding the federal standard are evaluated to determine (1) if the simulation is reasonably recreating the sub-regional observed ozone patterns and (2) if the simulation is able to produce concentrations of ozone within an acceptable concentration range. Station and day specific simulations that meet both criterions are used to develop the RFFs. (A more detailed discussion of the criterion is presented in the model performance evaluation section of this Appendix).

The second phase of the analysis involves simulating the meteorological episodes for two additional day-specific emissions scenarios: 2002, the base year for the RRF calculation and, 2020 with emissions control measures fully implemented. (Note: for the South Central Coast and Mojave Desert Air Basins (SCCAB and MDAB respectively) the future year simulation is based on the controlled 2009 day-specific inventory. For the Coachella Valley portion of the Salton Sea Air Basin (SSAB), the future year simulation is based on the controlled 2013 day-specific inventory.)

Simulated concentrations for the base year and future year controlled emissions scenario are generated to establish site specific RRFs.

The final phase is the attainment demonstration where the site specific RRFs are applied to the 2002 weighted station design values to determine the future year design concentrations.

Table V-4-1 provided the weighted 2002 design values for the Basin. Table V-4-2 provides the 2002 design values for the Coachella Valley-SSAB air monitoring stations and downwind transport stations in the SCCAB and MDAB. EPA guidance recommends the use of a 5-year weighted design values to minimize the impacts of y-ear to-year variations in weather and short term emissions trends. In Tables V-4-1 and V-4-2, the sites exceeding the 8-hour federal standard are delineated through bold lettering. These stations are the focus of the analysis.

Federal 8-Hour Ozone Standard Requirements

Air quality modeling is required by both the federal Clean Air Act (CAA) and the California Clean Air Act (CCAA). Section 182(b)(1)(A) of CAA requires that moderate and above ozone nonattainment areas must reduce volatile organic compounds (VOC) and oxides of nitrogen (NO_x) emissions sufficiently to attain the national ambient air quality standard for ozone and an attainment demonstration must be performed using photochemical grid modeling. According to Section 181(a)(1) of the CAA, ozone nonattainment areas are classified and given an attainment deadline based on their design values. Within the jurisdiction of the District are the South Coast Air Basin (Basin) and the Coachella Valley of the Salton Sea Air Basin (see Figure V-4-1). The Basin is classified as a “severe-17”[1] ozone nonattainment area and therefore has an attainment deadline of June 15, 2021. The attainment demonstration for the Basin is the primary subject of this chapter. The Coachella valley is classified as “serious” nonattainment for ozone and therefore has an attainment deadline of June 15, 2013.

The modeling domain used in the photochemical modeling analysis, also shown in Figure V-4-1, encompasses the entire Basin, Ventura County, Antelope Valley (AVAQMD), San Diego County, the Coachella Valley, and portions of the Mojave Desert Air Quality Management District (MDAQMD) and Imperial County. Ventura County, the Antelope Valley and Mojave Desert are classified as "moderate" (attainment year: 2010). These areas experience pollutant transport from the Basin, and at times are an upwind source of pollution. San Diego County is classified as “basic” with and attainment year of 2009 and Imperial County is classified as “marginal” with and attainment year of (2007).

TABLE V-4-1

8-Hour Average South Coast Air Basin Weighted Design Values

City	2002 Design	2003 Design	2004 Design	Weighted Design Value
Azusa	102	101	98	**100**
Burbank	92	91	92	**91**
Long Beach	62	61	64	62
Reseda	94	107	110	**103**
Pomona	89	96	101	**95**
Lynwood	51	53	57	54
Pico Rivera	80	79	78	79
Los Angeles	79	78	79	79
Pasadena	96	95	96	**96**
Santa Clarita	113	127	125	**124**
West Los Angeles	69	73	77	73
Hawthorne	68	70	63	67
Glendora	111	114	109	**111**
Anaheim	70	72	79	72
La Habra	76	75	75	75
Costa Mesa	67	71	73	70
Mission Viejo	79	83	87	84
Rubidioux	108	113	113	**111**
Perris	113	115	106	**111**
Lake Elsinore	104	109	106	**106**
Banning Airport	110	119	117	**115**
Upland	111	110	107	**111**
Crestline	129	131	128	**129**
Fontana	112	123	119	**118**
San Bernardino	115	119	113	**115**
Redlands	120	128	124	**124**

TABLE V-4-2

8-Hour Average Weighted Design Values: Salton Sea Air Basin (SSAB), Mojave Desert Air Basin (MDAB) and the South Central Coast Air Basin (SCCAB)

City	2002 Design	2003 Design	2004 Design	Weighted Design Value
SSAB				
Palm Springs	107	111	106	**106**
Indio	95	99	99	**95**
MDAB				
Lancaster	71	82	100	84
Phelan	103	106	105	**105**
Twenty-nine Palms	88	86	86	**87**
Hesperia	106	106	107	**106**
Joshua Tree	94	99	106	**100**
Barstow	87	88	87	**87**
Trona	80	83	86	83
Victorville	97	100	98	**98**
SCCAB				
Ojai	95	95	94	**95**
El Rio	66	66	66	66
Piru	73	90	88	84
Simi	97	95	92	**95**
Thousand Oaks	81	83	84	83
Emma Woods	69	71	69	70

California Requirements and Population Exposure

The CCAA requires the District to demonstrate reasonable progress towards achieving state ambient air quality standards in the Basin. To date, the Basin has not met the California 1-hour ozone standard (90 ppb) yet, ambient ozone air quality has greatly improved. The CCAA requires per-capita exposure reductions for the years 1994, 1997, and 2000, as compared to a 1986-88 base period. Overall per-capita exposure to ambient ozone must be reduced in accordance with the following schedule: 25 percent by 1994, 40 percent by 1997, and 50 percent by 2000.

Reductions are to be calculated based on per-capita exposure and the severity of exceedances. For the Basin, this provision is applicable to ozone [H&S Code 40920(c)]. The definition of exposure is the number of persons exposed to a specific pollutant concentration level above the state standard times the number of hours exposed. The per-capita exposure is the population exposure (units of pphm-persons-hours) divided by the total population. While this requirement has already been met in previous AQMPs (Appendix V, 2003 AQMP), the exposure demonstration is extended through 2005 in the Draft 2007 AQMP for consistency.

The Regional Human Exposure (REHEX) model is used to estimate per-capita exposure reduction. It considers population mobility; time spent indoors, outdoors and in transit; exposure by age classification; and activity pattern by season and weekday/weekend.

An analysis using the REHEX model indicates that the CCAA Amendments exposure reduction targets have been achieved for ozone with a margin of safety. Figure V-4-2 summarizes the results and compares exposure reductions to the targets.

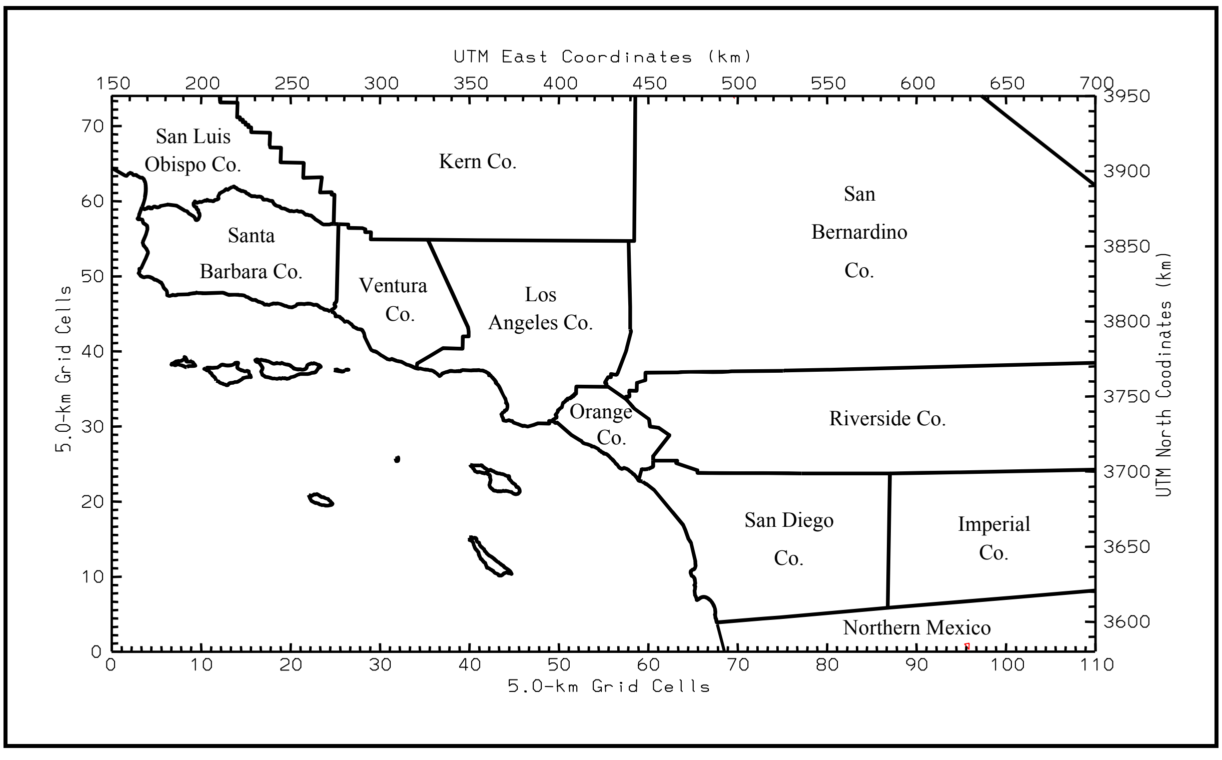

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FIGURE V-4-1

Southern California Modeling Domain Used in the Ozone Attainment Demonstration

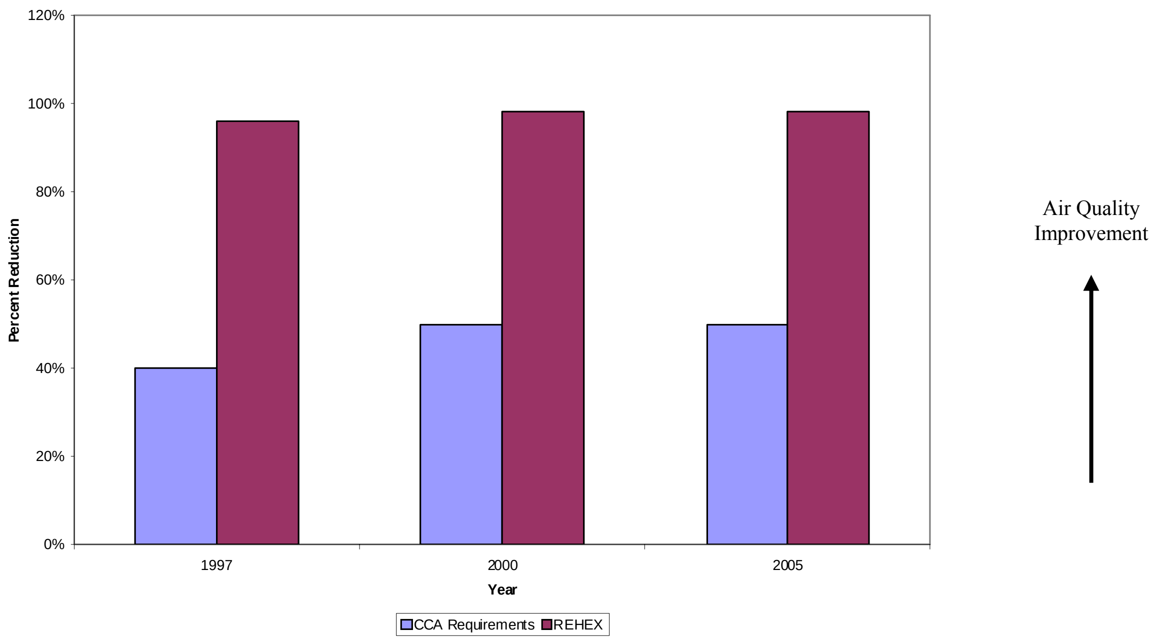

FIGURE V-4-2

CAAA Population Exposure Assessment: Percent Reductions in Annual Average Per-Capita Exposure to Ozone

EMISSIONS SUMMARY

Introduction

There are specific emission inventories developed for the photochemical modeling. The summer planning emission inventories developed for the historical years (1997, 2004 and 2005) and future planning years (baseline and controlled) are described in Appendix III. Baseline modeling inventories for the historical years (1997, 2004 and 2005) and the future years (2009, 2012, and 2020) are discussed next. Two emission projections are needed for each of the modeled future years. The first is the projected emissions assuming no further emission controls. These projections are commonly referred to as "baseline emissions" (e.g., 2020 baseline emissions), and reflect the emissions resulting from increases in population and vehicle miles traveled (VMT), as well as the implementation of all adopted rules and regulations up through 2005. The second emission projections reflect the implementation of the Draft 2007 AQMP control measures on the future baseline emissions. For a detailed description of the Draft 2007 AQMP control measures, the reader is referred to the main volume and Appendix IV.

The July 2005 historical year emissions are summarized as representative ozone episodes used for attainment demonstration. This is followed by a discussion of the the future-year (July 2005 episode) emission inventory, assuming implementation of proposed control measures, are presented. Appendix III contains emission summary reports by source category for the historical base year, future baseline, and future controlled scenarios used in this modeling analysis. Attachments 4, 5, and 6 of this appendix contain an emissions summary report by source category for the future (2009 2012 and 2020) controlled scenarios for the annual average inventory, and the 2020 controlled scenario for the planning inventory, respectively.

It should be noted that the inventories reported here may be slightly different than those reported in the Draft 2007 AQMP and Appendix III, since the inventories used for modeling reflect day-specific conditions. Day specific point, mobile and area emissions inventories were generated for each meteorological episode. Mobile source emissions were temperature corrected by grid using a VMT weighted scheme. County-wide area source emissions were temperature corrected and gridded using the spatial emissions surrogate profiles developed for the 2003 AQMP

Historical Baseline Emissions

Historical baseline emissions of oxides of nitrogen (NO_x) and volatile organic gases (VOC) and carbon monoxide (CO) are summarized in Table V-4-3 for the July 2005 meteorological episodes used for modeling. The day-specific July 2005 episode emissions inventory is representative of the remaining meteorological episodes. Variations in the temperature and humidity profiles among the episode days and between episodes reflect changes in the emissions totals of less than 50 tons/day or 5 percent. The summaries of biogenic, on-road mobile and total antropogenic emissions for the July 2005 are reported for the Basin and the modeling region.

Emissions for the July episode span the weekend where significant reductions in on-road NOx and increases in VOC from off road activities occur. Based on CALTRANS data, NOx emissions from heavy duty diesels are reduced by more than 60 percent on Saturdays with further reductions occurring on Sundays. Increases in off-road mobile source activities (e.g. pleasure craft and recreational vehicles) account for the bulk of the VOC increase on both Saturdays and Sundays.

Future Controlled Emissions

The control factors developed from the Controlled Emission Projection Algorithm (CEPA) program are applied to the future base year emissions to calculate the controlled emission inventories. The future-year baseline emission inventories estimation reflect the emissions resulting from increases in population and vehicle miles traveled (VMT), as well as the implementation of all rules and regulations adopted as of December 31, 2005. VOC and NO_x baseline emissions decrease from the historical base year through the year 2020. This decreasing trend in emissions reflects the implementation of current state and local air quality rules and regulations.

TABLE V-4-3

South Coast Air Basin July 2005 Historical Episode Emissions (tons/day)

Date	Emission Category	2005		
		CO	NOX	VOC
Thursday 14-Jul-05	Biogenic			233
	On-Road	2870	466	368
	Total Anthropogenic	3911	895	825
Friday 15-Jul-05	Biogenic			200
	On-Road	2823	451	350
	Total Anthropogenic	3864	880	807
Saturday 16-Jul-05	Biogenic			209
	On-Road	2286	314	314
	Total Anthropogenic	4397	706	925
Sunday 17-Jul-05	Biogenic			224
	On-Road	2177	280	309
	Total Anthropogenic	4286	670	895
Monday 18-Jul-05	Biogenic			245
	On-Road	2715	433	350
	Total Anthropogenic	3756	862	806
Tuesday 19-Jul-05	Biogenic			245
	On-Road	2905	445	372
	Total Anthropogenic	3946	873	829

Base year 2002, 2020 and future-year controlled emissions, estimated from the baseline emissions using the CEPA control factors for the simulations, are given in Table V-4-4. Baseline 2020 emissions and baseline and control emissions for 2009 and 2012 are provided as attachments to this Appendix.

TABLE V-4-4

2002, 2020 Base Year and 2020 Future Year Controlled Emissions Scenarios (TPD)

Year	Scenario	VOC	NOx	CO
2002	Baseline	1030	1090	5525
2020	Baseline	599	531	2475
2020	Controlled without Long- Term Measures	439	278	1915
2020	Controlled with Long-Term Measures	304	238	1661

EPISODE SELECTION

The 2003 AQMP benefited from the intensive monitoring conducted under the Southern California Ozone Study where the August 4-7, 1997 episode was the cornerstone of the modeling analysis. The requirements for multiple episode days at individual stations pose a different challenge for the Draft 2007 AQMP.

Five additional meteorological episodes with regionally observed higher ozone concentrations were added to the 2003 AQMP modeling episode. The five episodes observed in 2004 and 2005 occurred during MATES-III, a period of enhanced air quality monitoring in the Basin. Supporting MATES-III, the District operated three radar wind profilers in the Basin, with radio acoustic sounders. Additional profiler data was obtained from operating sites in Ventura and San Diego Counties. Table V-4-5 lists the complement of meteorological episodes used in the ozone attainment demonstration.

Selection of episodes from 2004 and 2005 was also made to avoid the commingling associated with the Phase III California Fuel Reformulation where the primary oxygenate was changed from MTBE to ethanol.   Commingling of ethanol and non-ethanol based fuels leads to enhanced evaporative VOC emissions and thus more ozone. Quantification of the amount of commingling taking place on a daily or episodic basis was nearly impossible. Implementation of the fuel switch from MTBE to ethanol took place in California during 2003 and was assumed to be completed by December 31, 2003. Selecting meteorological episodes for the post 2003 emissions reduced the uncertainty associated with the estimation of the VOC emissions inventory due to commingling.

Conceptual Model of an 8-Hour Ozone Episode

Several field studies (SCAQS, [1987], and SCOS97, [1998]) and previous AQMPS have described at length the development of an ozone episode in the Basin. The focus of many of these analyses was to simulate the observed 1-hour maximum concentration I the modeling domain. Cassmassi (1998) used Classification and Regression Tree analysis (CART) to determine whether the conceptual model for a 1-hour ozone episode differed from the meteorological profile characterizing an 8-hour average ozone episode in the Basin. The results of the analysis indicated that the peak 1-hour episodes were a subset of the 8-hour episodes and the meteorological profiles contributing to both scenarios were nearly identical. As such, the development of the 8-hour conceptual model for the Basin and the methodology to select and characterize episodes relies on the basic models constructed to describe the Basin 1-hour ozone episode.

The Draft Modeling Protocol provides an extended discussion of the meteorological and air quality profile of the five episodes, in addition to the August 1997 episode, that were selected for evaluation in the ozone attainment demonstration. In general, elevated concentrations of ozone (both 1- and 8-hour average) occur under a west coast or Four Corners ridge of high pressure aloft. Typically, the 500 mb pressure surface heights above mean sea level (msl) exceed 5880 m and generate a strong low level subsidence inversion (10^{o} C in strength or higher). The surface pressure gradient (i.e. wind forcing) typically is less than 5 mb between the coast and the desert (approximately 200 km in distance) and days often begin with a deck of morning coastal stratus that extends into the near valleys then burns off in the late morning hours. The more severe episodes tend to have neutral to slightly off shore pressure gradient forcing and clear skies.

Each of the 2004 and 2005 meteorological episodes selected for the ozone attainment demonstration fit this model. Figure V-4-3 illustrates the 500 mb upper air structure over the west coast during the July 2005 meteorological episode. Figure V-4-4 provides the 1200 UTC (4:00 am PST) temperature profile for July 16, 2005.

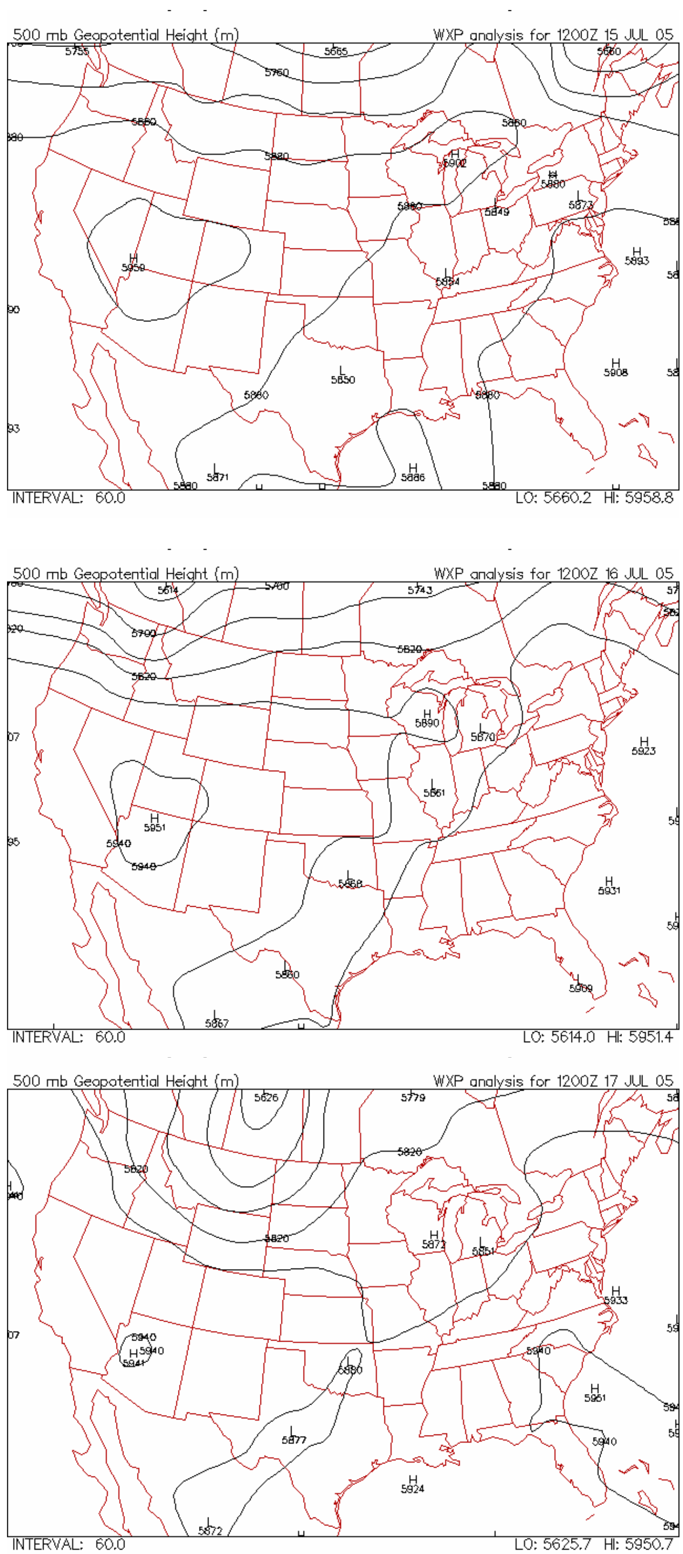

FIGURE V-4-3

500 mb Upper Air Structure: July 2005 Meteorological Episode

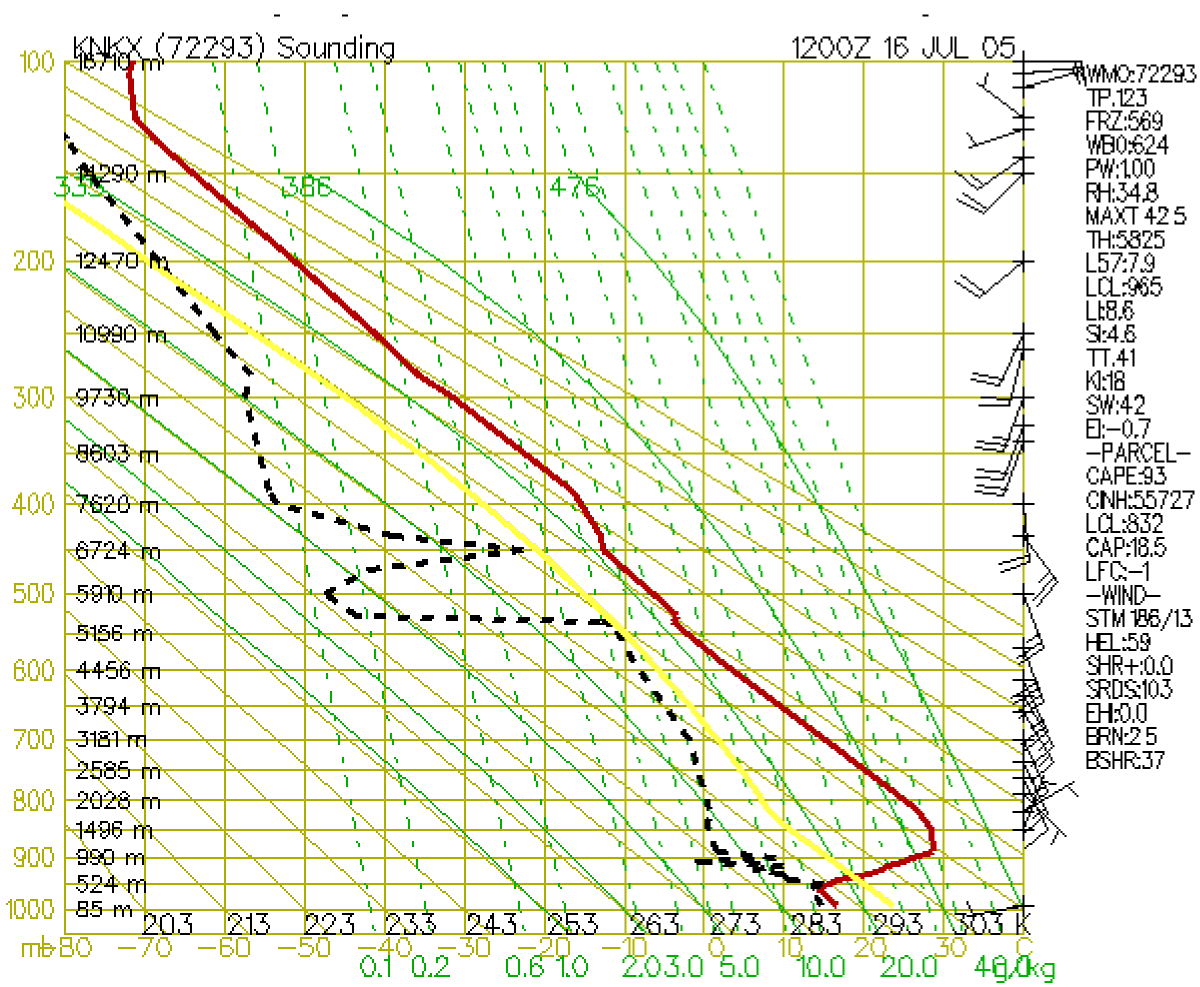

FIGURE V-4-4

1200 UTC Upper Air Sounding at Miramar MCAS (San Diego, CA) July 16, 2005

Statistical Episode Characterization and Ranking

CAMx simulations were generated for six meteorological episodes including two periods in 2004, three periods in 2005 and one in 1997. Table V-4-5 characterizes the selected episodes two ways: first by an assessment of the meteorological profile using a statistical model to rank the episodes based on meteorological stagnation potential and second by comparing observed maximum ozone concentrations to the annual design values.

The meteorological classification is based on an empirical analysis presented in the 2003 AQMP which provides both a stagnation severity rank (1 being the highest) and the percentile the meteorological episode had in a 22-year distribution. The observed maximum 8-hour average concentrations on each episode day, and the average of the 8-

hour maximum concentrations observed for each multi-day episode are also provided for comparison to the annual 4th highest 8-hour average ozone value observed in the year that the episode takes place.

Briefly, the selected episode days mostly rank in the 95th percentile or higher for meteorological stagnation potential. The episode average of the 8-hour maximum concentrations is within 5 ppb of the annual 4th highest 8-hour observed concentration for four of the six simulation periods. The episodes failing to meet this criterion were characterized by more severe stagnation and higher average concentrations.

Model Input Preparation

The procedures for CAMx input file preparation are presented in this section. Unlike previous AQMPs which relied on the use of UAM for the attainment demonstration, CAMX is designed to marry seamlessly with the MM5 model output. The meteorological modeling domain, NCEP initializations and vertical dispersion schemes are evaluated in the modeling are provided in the Modeling Protocol Document. Statistical meteorological model evaluation was conducted using METSTAT software package (Environ, Inc., 2005) and by Aerospace Corporation (McAtee, et al., 2006). Data evaluation compared MM5 predictions vs. observational data at selected meteorological monitoring sites from the SCAQMD, NWS, FAA, CIMIS and other air quality agencies networks. A summary of the meteorological model performance was presented at the 2006 National Air Quality Conference in San Antonio, Texas. The meteorological modeling was also presented to and critiqued by AQMP Scientific, Technical, Modeling and Peer Review (STMPR) Advisory group monthly meetings from December 2005 through September, 2006.

As previously stated, the CAMx ozone simulations were run on a 5 km squared grid the SCOS97 modeling domain depicted in Figure V-4-1. The coordinates of the domain are 150-700 km UTM East and 3580-3950 km UTM North. The modeling analyses were run using 16 vertical layers up to 5000 m above ground level. The eastern extent of the domain is approximately 100 miles offshore of the Basin. The large domain was chosen to minimize uncertainties in the upwind boundary conditions.

The meteorological fields used for the CAMx ozone simulations were generated using MM5 with the FDDA option. The meteorological fields were developed using a Lambert Conformal grid that roughly overlaid the SCOS97 modeling domain. MM5 was simulated using 34 vertical layers and simulations were initialized using NCEP global weather forecast model analysis. The MM5 fields were post processed to layer averaged winds to the levels defined for the CAMx simulations and to adjust coordinates to the UTM system.

TABLE V-4-5

Ozone Meteorological Episodes Used for the Ozone Attainment Demonstration
Ranking Applied to Historical 22-Year Period (1981-2002)

Episode	Stagnation Severity Rank	Percentile	8-Hour Maximum Ozone (ppb)	Episode Average 8-Hour Maximum Ozone (ppb)	Annual 4th Highest Observed 8-Hour Maximum Ozone / Station (ppb)
8/5/97	198	98	124	127	127 San Bernardino
8/6/97	203	97	130		
6/5/04	83	99	148	138	116 Crestline
6/6/04	524	93	127		
8/6/04	1009	87	94	114	
8/7/04	331	96	127		
8/8/04	144	98	122		
5/21/05	389	95	112	129	125 Crestline
5/22/05	50	99	145		
7/15/05	265	96	143	132	
7/16/05	22	99	141		
7/17/05	15	99	141		
7/18/05	73	99	127		
7/19/05	567	93	110		
8/27/05	160	98	130	126	
8/28/05	138	98	121		

Selected objective-hybrid MM5 wind fields were evaluated in the development of the modeling episodes to test transport to the northern portion of Los Angeles Country and Santa Clarita. The hybrid approach was not used in the ozone attainment demonstration.

Table V-4-6 summarizes some of the critical components of the air quality modeling system. Of the components listed, treatment of the boundary conditions is the subject of discussion in the following section.

TABLE V-4-6

Air Quality Modeling System Configuration

Component	Source
Initial Conditions/Boundary Conditions	Extracted from WRAP Regional Haze Modeling output
Meteorological Fields	MM5/FDDA with NCEP initialization
	Eta PBL – Mellor-Yamada scheme as used in the Eta model, Janjic (1990, MWR) and Janjic (1994, MWR). It predicts TKE and has local vertical mixing.
Horizontal Advection Solver	Piecewise Parabolic Method (PPM) of Colella and Woodward (1984), high order accuracy and little numerical diffusion
Vertical Mixing/Diffusivity	MM5 CAMx Option OB70 w/Kv Patch. Minimum vertical diffusivity set at 1 m^2/sec.
Chemistry (SAPRC99)	CAMx Version 4.4 Beta. Version modified to treat ETOH, MTBE and MBUT explicitly (Environ, 2006)
Chemistry Solver	Chemical Mechanism Compiler (CMC), fast highly efficient solver based on an “adaptive-hybrid” approach compared to the standard chemistry solver for the CB-IV mechanism
SAPRC99 Mechanism ID=5	The fixed parameter version of the SAPRC99 mechanism (Carter, 2000). 211 reactions and 74 species (56 state gasses and 18 radicals)
Dry Deposition of Gases	Resistance model developed by Wesely (1989)

Boundary and Top Air Quality Concentrations

The Draft 2007 AQMP boundary conditions for the ozone simulations were extracted from the annual WRAP Regional Haze modeling conducted for the model year 2002 (Tonnesson 2005). The output of the simulations was restructured using vertical layer averaging to conform to the SCOS97 horizontal and vertical grid alignment. Monthly averaged data from June, July and August were merged to form grid specific profiles. Twenty four hourly profiles were generated for each side of the domain to produce a "typical" summer day that was assumed appropriate for simulating any summer day.

For CAMx, the top concentration file only uses one concentration value for the top of the model for the entire simulation. These were obtained by averaging the top values from the WRAP simulation over the entire top of the ozone modeling domain for all hours in the June through August period.

Figures V-4-5a through V-4-5d show the values of the boundary concentrations of NO, NO_2, O_3 and RHC respectively for each boundary. The values represent each hour of the day at each grid point for the surface layer. Table V-4-7 shows the values in the top concentration files.

TABLE V-4-7

Top Concentrations Derived from the WRAP simulation.
(Only non-zero values are shown).

Species	Concentration (ppb)	Species	Concentration (ppb)
NO	0.0047	HO2H	2.9998
NO2	0.1	ACET	2
O3	53.2454	CO	86.4968
PAN	0.1954	ETHE	0.0235
CRES	0.0009	ALK3	1.1288
HONO	0.0001	ARO1	0.0101
HCHO	0.5293	ARO2	0.0003
ISOP	0.0033	OLE1	0.0093
ISPD	0.0193	OLE2	0.0553
MGLY	0.0047	SO2	0.0364
HNO3	1	SULF	0.0002

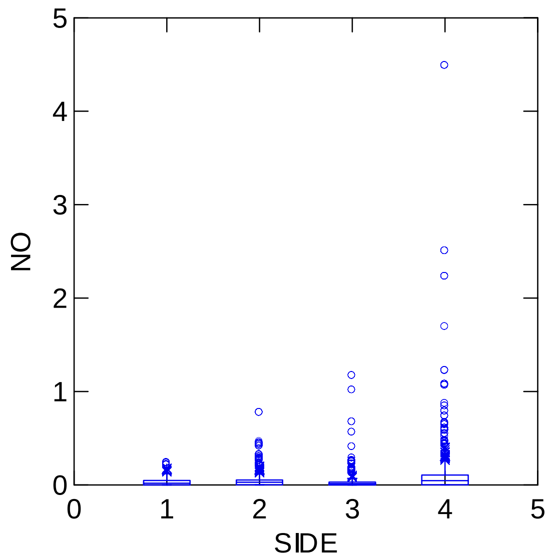

FIGURE V-4-5a
Boundary Concentrations for NO in the Ozone Simulation (ppb)
(1 West, 2 East, 3 South, 4 North)

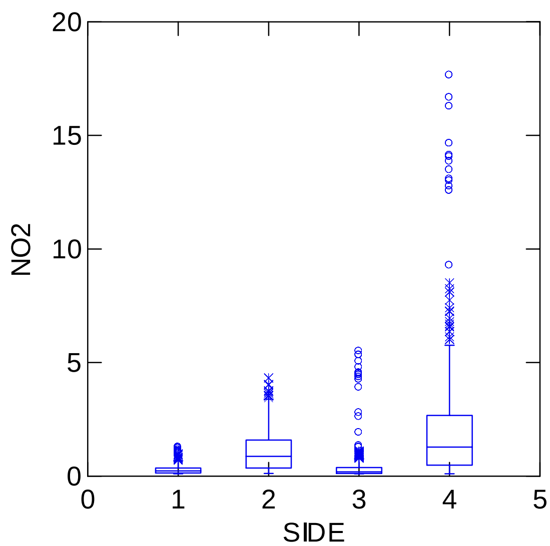

FIGURE V-4-5b
Boundary Concentrations for NO_2 in the Ozone Simulation (ppb)
(1 West, 2 East, 3 South, 4 North)

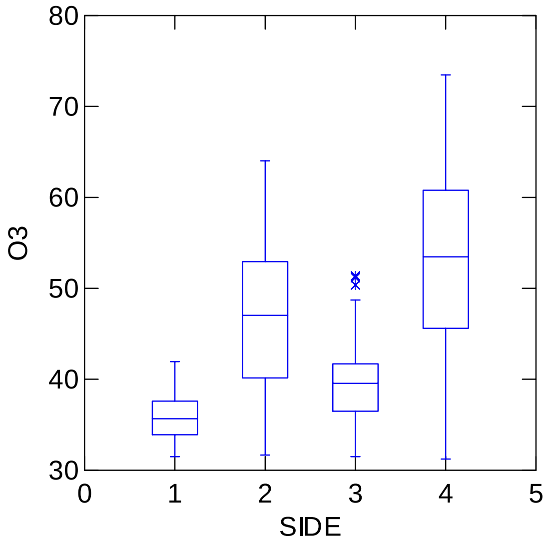

FIGURE V-4-5c

Boundary Concentrations for O_3 in the Ozone Simulation (ppb)
(1=west, 2=east, 3=south, 4=north)

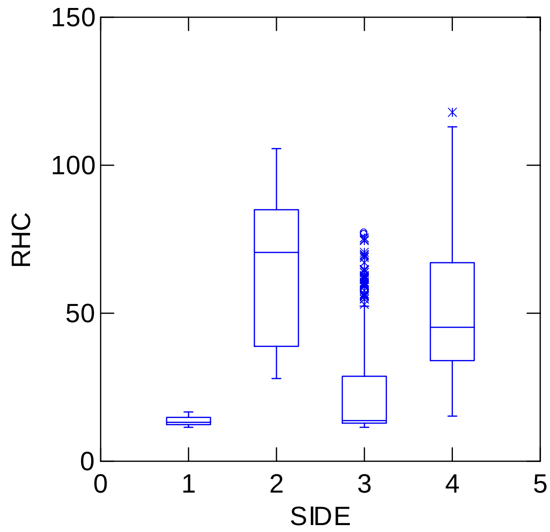

FIGURE V-4-5d
Boundary Concentrations for RHC in the Ozone Simulation (ppb)
(1=west, 2=east, 3=south, 4=north)

Future Boundary, Top and Initial Air Quality Conditions

For the future year scenarios, the boundary, region top and ambient air quality concentrations were rolled back based on the percentage reduction in emissions from 2002 base year to the projected emissions levels for future year of the simulation (2009, 2012, or 2020).

Meteorological Models

The MM5 meteorological model using 4-dimensional data assimilation (4DDA) was the primary tool used to develop the meteorological fields. The Modeling Protocol provides characterization of the nested MM5 modeling domains, the layer structure and initialization assumptions. Three-dimensional wind, temperature and mixing height fields were extracted from the MM5 simulations and postprocessed using CALMET to layer average variables to the CAMx structure. Vertical mixing was calculated using the Eta planetary boundary layer (PBL) scheme and a minimum value of vertical diffusivity was set at 1.0 m^2/sec.

The MM5 data fields were extensively analyzed using the METSAT software. Figure V-4-6 illustrates the extent of surface meteorological measurements in southern California, and the data used in the meteorological model evaluation were derived from a subset of the total archive. The summary performance statistics for the July 2005 episode are presented in Table V-4-8 and Figures V-5-7 through V-4-9. Summary meteorological field performance statistics for the remaining episodes are provided as attachments to this document.

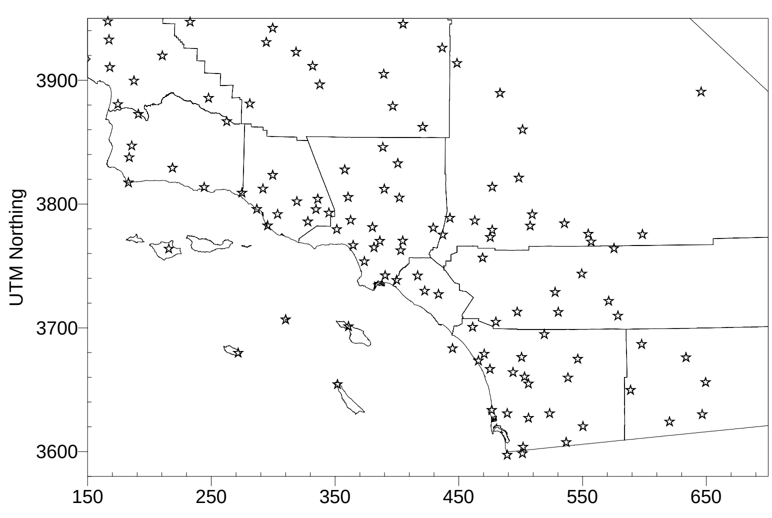

FIGURE V-4-6

Locations of Surface Monitoring Used in Preparation of Meteorological Fields

TABLE V-4-8

METSTAT Statistical Evaluation of MM5-4DDA for the July 2005 Episode:
AQMD Air Monitoring Stations

Variable	Statistic	Units	7/14	7/15	7/16	7/17	7/18	7/19
Wind Speed	Mean OBS	(m/s)	1.62	1.7	1.78	1.93	1.72	1.76
Wind Speed	Mean PRD	(m/s)	1.85	1.78	1.76	1.89	1.84	1.91
Wind Speed	Bias	(m/s)	0.23	0.04	-0.01	-0.03	0.13	0.15
Wind Speed	Gross Error	(m/s)	0.96	0.88	0.89	0.91	0.83	1
Wind Speed	RMSE	(m/s)	1.27	1.18	1.12	1.17	1.08	1.37
Wind Speed	Sys RMSE	(m/s)	0.82	0.75	0.78	0.75	0.69	0.96
Wind Speed	Unsys RMSE	(m/s)	0.96	0.91	0.81	0.9	0.83	0.97
Wind Speed	IOA		0.68	0.72	0.75	0.81	0.79	0.68
Wind Direction	Mean OBS	(deg)	227.83	220.61	235.33	252.18	237.75	209.55
Wind Direction	Mean PRD	(deg)	240.19	226.58	232.84	241.36	247.27	221.05
Wind Direction	Bias	(deg)	8.76	4.48	7.5	4.85	17.25	11.71
Wind Direction	Gross Error	(deg)	53.93	48.06	45.51	46.29	50.39	56.66
Temperature	Mean OBS	(K)	300.38	298.73	298.88	299.53	300.25	301.27
Temperature	Mean PRD	(K)	299.98	298.66	298.53	298.63	299.4	299.75
Temperature	Bias	(K)	-0.06	0.23	0.06	-0.58	-0.46	-1.21
Temperature	Gross Error	(K)	2.59	2.37	2.22	2.59	2.62	2.6
Temperature	RMSE	(K)	3.37	3.29	3.25	3.76	3.93	3.55
Temperature	Sys RMSE	(K)	2.37	1.84	2.21	2.63	2.58	2.5
Temperature	Unsys RMSE	(K)	2.4	2.73	2.39	2.68	2.96	2.51
Temperature	IOA		0.92	0.92	0.93	0.92	0.91	0.91
Humdity	Mean OBS	(g/kg)	11.5	12.2	12.31	12.19	12.92	13.91
Humdity	Mean PRD	(g/kg)	11.74	12.55	12.48	12.47	12.53	13.2
Humdity	Bias	(g/kg)	-0.17	0.39	0.19	0.34	-0.42	-0.74
Humdity	Gross Error	(g/kg)	2.69	2.14	1.91	1.97	1.87	1.96
Humdity	RMSE	(g/kg)	3.57	3.04	2.72	2.85	2.64	2.83
Humdity	Sys RMSE	(g/kg)	2.05	2.42	1.99	2.57	1.63	1.98
Humdity	Unsys RMSE	(g/kg)	2.93	1.83	1.85	1.24	2.07	2.03
Humdity	IOA		0.58	0.5	0.56	0.45	0.52	0.52

As previously stated, an assessment of the meteorological model performance was presented at EPA's 2006 National Air Quality Conference and periodically during the development of the ozone modeling episodes at the STMPR Advisory group. The data has also been provided to the independent Peer Reviewers, and their evaluation is pending.

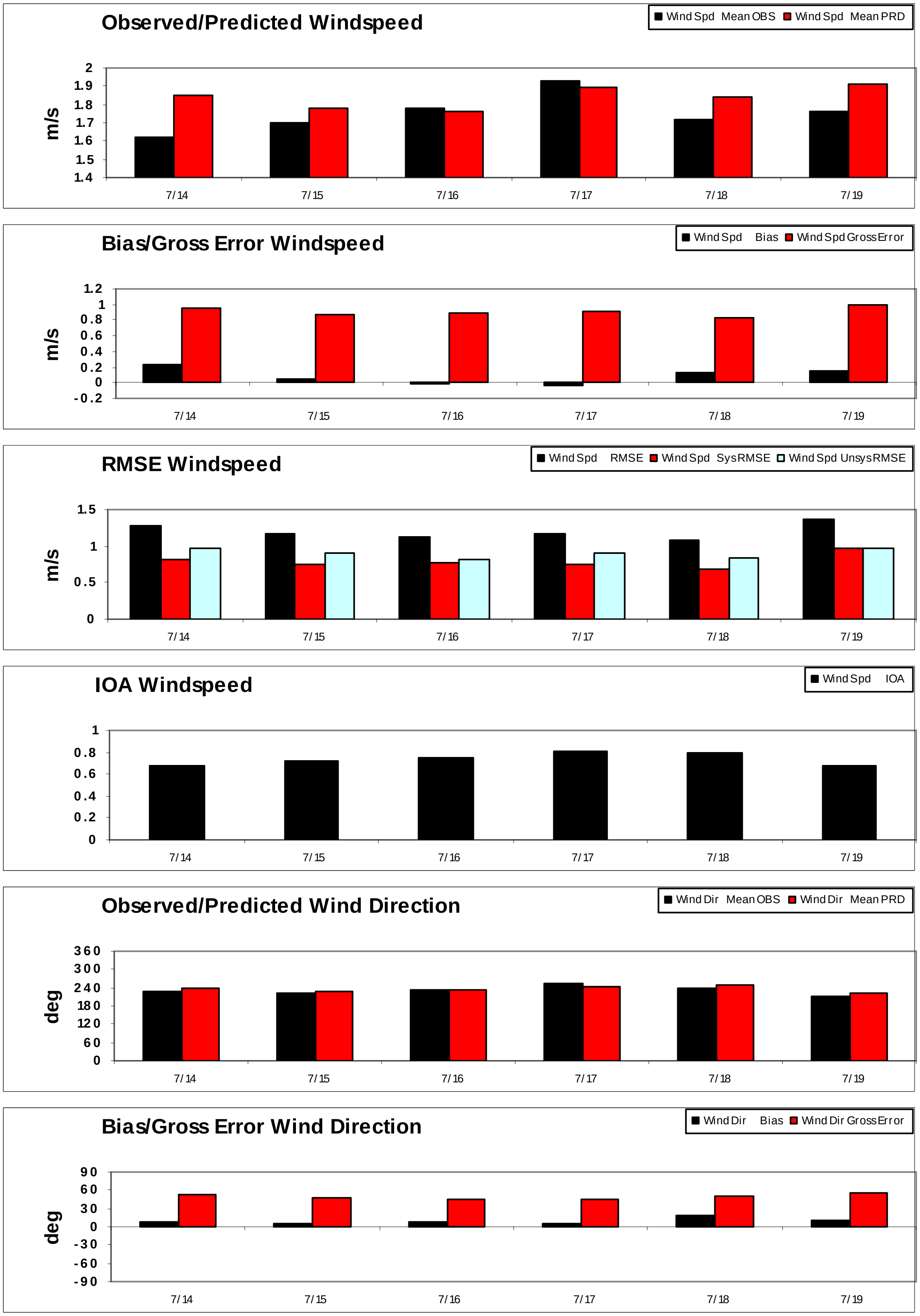

Figure V-4-7

METSAT Evaluation of MM5 Winds vs. AQMD Station Data: July 2005 Episode

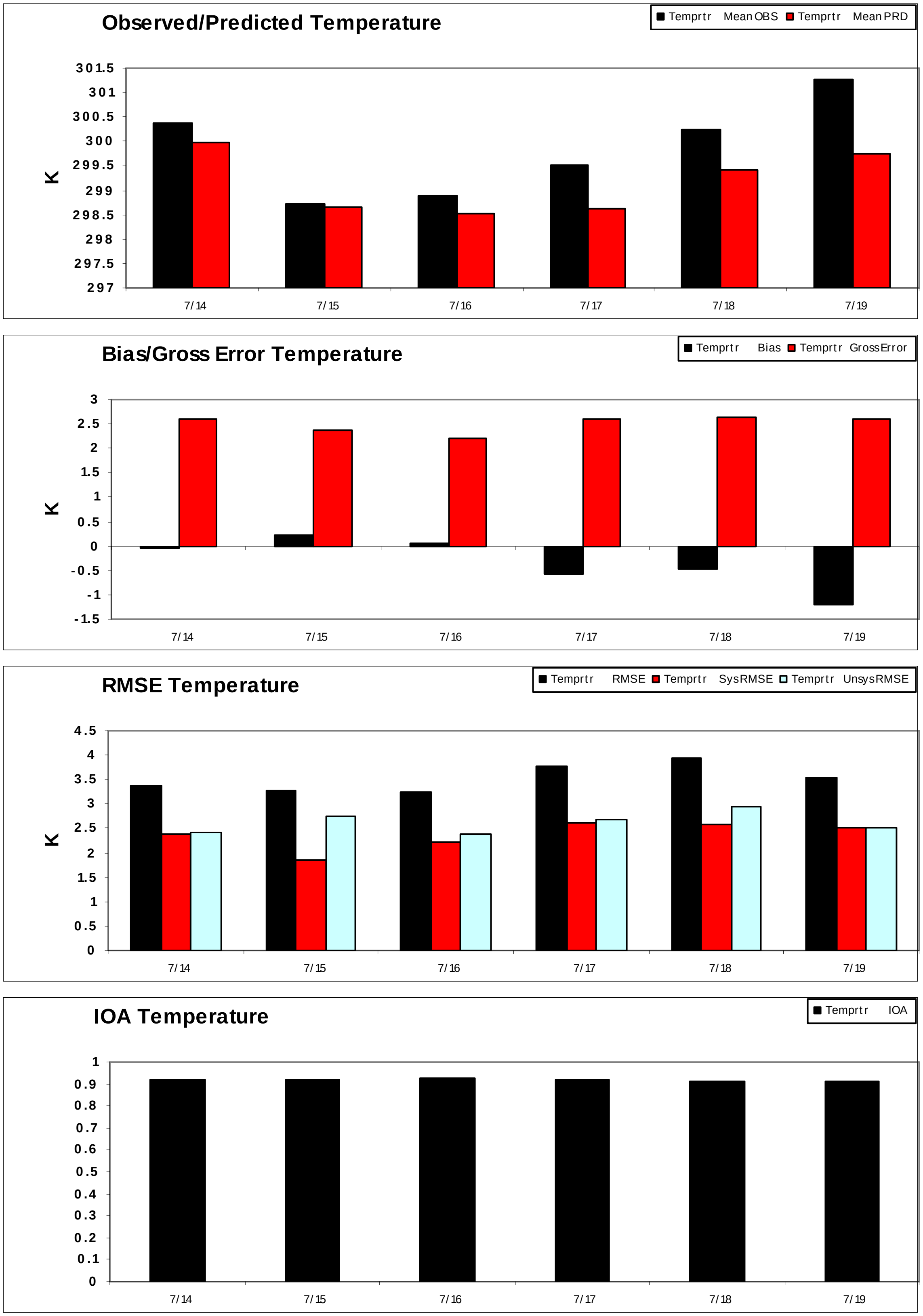

Figure V-4-8

METSAT Evaluation of MM5 Temperature vs. AQMD Station Data: July 2005 Episode

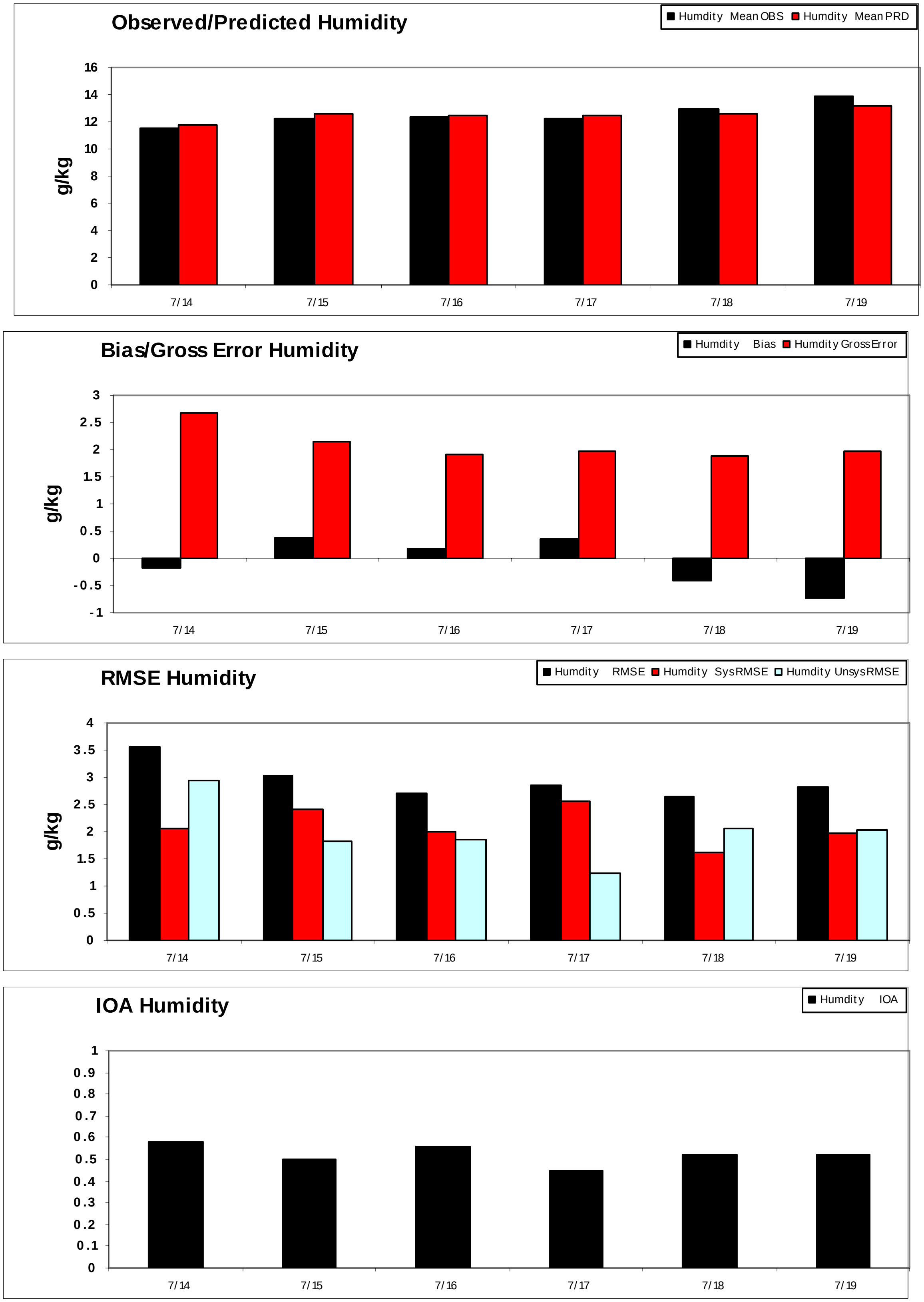

Figure V-4-9

METSAT Evaluation of MM5 Winds vs. AQMD Station Data: July 2005 Episode

BASE-YEAR PERFOMANCE EVALUATION

For the CAMx performance evaluation the modeling domain is separated into nine sub-regions or zones. Figure V-4-10 depicts the sub-regional zones used for base-year simulation performance. The different zones present unique air quality profiles. In previous ozone modeling attainment demonstrations using a smaller modeling domain, the number and size of the zones was different. Seven zones represented the Basin and portions of Ventura County, the Mojave Desert and the Coachella Valley.

For the current analysis the Basin is represented by three of the zones: Zone 3 – the San Fernando Valley, Zone 4 – the Eastern San Gabriel, Riverside and San Bernardino Valleys, and Zone 5 – the Los Angeles and Orange County emissions source areas. Of the four areas, Zone 4 represents the Basin maximum ozone concentrations and the primary downwind impact zone. As such, the priority in evaluating model performance is focus on Zone 4.

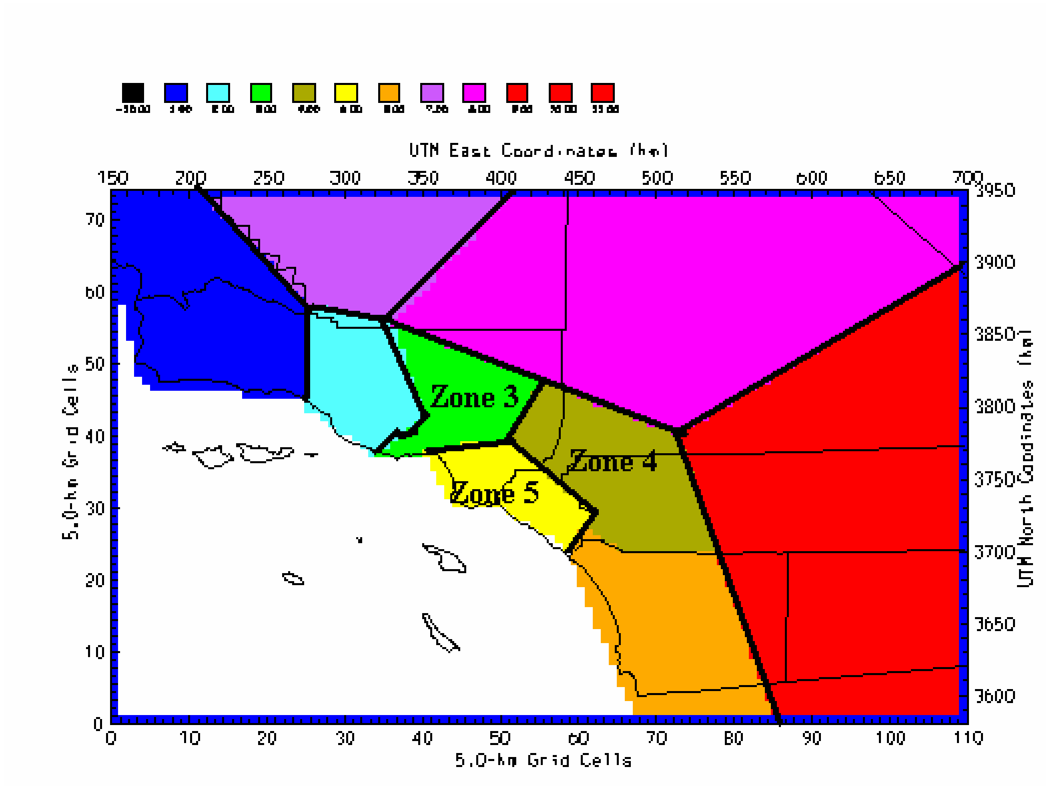

FIGURE V-4-10

Performance Evaluation Zones

Statistical Evaluation

The statistics used to evaluate 1-hour average CAMx ozone performance do not change from previous AQMPs and include the following:

Statistic for O_3	Criteria (%)	Comparison Basis
Normalized Gross Bias	≤ ±15	Paired in space and time
Normalized Gross Error	≤ 35	Paired in space (+2 grid cells) and time
Peak Prediction Accuracy	≤ ± 20	Unpaired in space and time

The same statistics are applied to the 8-hour average ozone.

The base-year 1- and 8-hour average regional model performance for the August 2004, May 2005, July 2005, August 2005 and August 1997 episodes for Zones 3, 4, and 5 are presented in Tables V-4-9 to V-4-14. Base-year performance statistics for Zones 2, 8 and 9 used for the 2010 and 2013 ozone attainment demonstrations for the downwind areas are provided in the attached performance summary evaluation tables. Performance statistics are presented for observed concentrations of 60 ppb or greater. Data for 1- and 8-hour average ozone concentrations for the sub regional peak concentrations are provide in the tables. Base-year station statistics for all of the episodes are presented as attachments to this document.

Performance statistics for the ozone precursors, nitrogen dioxide, nitric oxide and carbon monoxide will be provided separately. Daily statistic that meet the criterion stated above are listed in bold in the tables.

The CAMx ozone simulations generally met the 1-hour average unpaired peak model performance goal in all three zones on most days. Nearly all stations in zone 4 met the unpaired peak and normalized error goals with performance in zones 3 and 5 lagging, particularly for the May 2005 episode. In general, the bias tends to be negative indicating that model performance tended to under predict ozone concentrations. Overall, the 8-hour average evaluation was slightly better.

TABLE V-4-9

CAMx Sub-Region-3 1-Hour Average Ozone Performance Statistics

Ozone Threshold (60 PPB)	August 2004					May 2005							
Date	8/4	8/5	8/6	8/7	8/8	5/18	5/19	5/20	5/21	5/22	5/23	5/24	
Julian Date	218	219	220	221	222	139	140	141	142	143	144	139	
Ratio of Predicted Sub-Regional Peak to Peak Observed	- - -	**1.01**	**1.15**	1.22	**1.17**	**0.91**	**0.84**	**0.99**	**1.14**	0.78	**0.93**	**1.06**	
Ratio of Unpaired Station Peaks	- - -	**0.85**	**0.96**	**0.91**	**0.84**	0.78	0.66	0.70	0.73	0.59	**0.81**	**0.95**	
Normalized Systematic Bias (%)	- - -	-32	-28	-26	-20	-25	-29	-24	-25	-39	-30	-16	
Normalized Gross Error (%)	- - -	**32**	**29**	**30**	**25**	**25**	**29**	**24**	**26**	39	**30**	**16**	
Ozone Threshold (60 PPB)	July 2005					August 2005				August 1997			
Date	7/15	7/16	7/17	7/18	7/19	8/26	8/27	8/28	8/29	8/4	8/5	8/6	8/7
Julian Date	196	197	198	199	200	238	239	240	241	216	217	218	219
Ratio of Predicted Sub-Regional Peak to Peak Observed	1.28	**0.88**	**0.99**	0.74	**1.16**	**1.11**	**1.00**	**0.94**	0.64	**1.04**	**0.91**	**1.02**	**0.96**
Ratio of Unpaired Station Peaks	**1.16**	0.77	0.75	0.54	**0.99**	**0.83**	**0.81**	0.74	0.50	**0.86**	0.78	0.77	0.71
Normalized Systematic Bias (%)	**2**	**-12**	-21	-37	**-11**	**-12**	-24	-26	-29	**-11**	**-12**	**-12**	**-16**
Normalized Gross Error (%)	**17**	**18**	**24**	37	**18**	**14**	**31**	36	39	**17**	**30**	**25**	**21**

TABLE V-4-10

CAMx Sub-Region-4 1-Hour Average Ozone Performance Statistics

Ozone Threshold (60 PPB)	August 2004					May 2005							
Date	8/4	8/5	8/6	8/7	8/8	5/18	5/19	5/20	5/21	5/22	5/23	5/24	
Julian Date	218	219	220	221	222	139	140	141	142	143	144	139	
Ratio of Predicted Sub-Regional Peak to Peak Observed	- - -	**0.97**	**1.19**	**0.93**	**1.15**	**0.96**	**0.88**	**0.89**	**0.99**	**1.04**	**0.94**	**0.94**	
Ratio of Unpaired Station Peaks	- - -	**0.94**	**1.11**	**0.85**	**1.13**	**0.84**	**0.84**	**0.82**	**0.88**	**1.03**	**0.90**	**0.88**	
Normalized Systematic Bias (%)	- - -	-28	**-9**	**-17**	**6**	-24	-35	-26	**-8**	-20	-16	-22	
Normalized Gross Error (%)	- - -	**33**	**24**	**21**	**19**	**25**	**35**	**28**	**18**	**27**	**25**	**28**	
Ozone Threshold (60 PPB)	July 2005					August 2005				August 1997			
Date	7/15	7/16	7/17	7/18	7/19	8/26	8/27	8/28	8/29	8/4	8/5	8/6	8/7
Julian Date	196	197	198	199	200	238	239	240	241	216	217	218	219
Ratio of Predicted Sub-Regional Peak to Peak Observed	**0.96**	**0.92**	**1.00**	**1.17**	1.30	**1.20**	0.68	**0.84**	**1.18**	**1.04**	0.79	**0.98**	**0.88**
Ratio of Unpaired Station Peaks	**0.91**	**0.85**	**0.99**	**1.06**	1.26	**1.11**	0.68	**0.81**	**1.02**	**0.99**	0.74	**0.97**	**0.84**
Normalized Systematic Bias (%)	**5**	**-4**	**2**	**-8**	**13**	-18	-21	-20	-17	**-6**	**-4**	**13**	-17
Normalized Gross Error (%)	**24**	**21**	**19**	**20**	**22**	**27**	**30**	**28**	**31**	**19**	**17**	**23**	**23**

TABLE V-4-11

CAMx Sub-Region-5 1-Hour Average Ozone Performance Statistics

Ozone Threshold (60 PPB)	August 2004					May 2005							
Date	8/4	8/5	8/6	8/7	8/8	5/18	5/19	5/20	5/21	5/22	5/23	5/24	
Julian Date	218	219	220	221	222	139	140	141	142	143	144	139	
Ratio of Predicted Sub-Regional Peak to Peak Observed	**1.06**	**1.19**	**1.06**	1.25	1.32	**0.99**	0.75	**0.94**	**1.13**	**0.90**	1.26	- - -	
Ratio of Unpaired Station Peaks	**0.81**	**0.86**	**0.90**	**1.01**	**1.06**	0.76	0.70	0.74	**0.99**	0.75	0.73	- - -	
Normalized Systematic Bias (%)	-31	-45	-27	**-12**	**-2**	-28	-39	-27	-30	-30	-42	- - -	
Normalized Gross Error (%)	**31**	46	**29**	**19**	**15**	**28**	39	**27**	36	**33**	42	- - -	
Ozone Threshold (60 PPB)	July 2005					August 2005				August 1997			
Date	7/15	7/16	7/17	7/18	7/19	8/26	8/27	8/28	8/29	8/4	8/5	8/6	8/7
Julian Date	196	197	198	199	200	238	239	240	241	216	217	218	219
Ratio of Predicted Sub-Regional Peak to Peak Observed	**1.81**	1.60	1.24	1.72	1.92	**1.05**	**1.08**	**0.84**	1.23	**1.12**	**1.16**	1.58	1.46
Ratio of Unpaired Station Peaks	**0.86**	1.24	**0.96**	**0.83**	**0.88**	**0.84**	**0.85**	0.68	**1.05**	**0.81**	**0.84**	1.19	**0.84**
Normalized Systematic Bias (%)	-31	**10**	**12**	-21	**-9**	-38	-18	-23	-28	-20	-20	-43	-16
Normalized Gross Error (%)	**31**	**19**	**19**	**21**	**9**	38	**24**	**28**	**32**	**22**	**27**	63	**16**

TABLE V-4-12

CAMx Sub-Region-3 8-Hour Average Ozone Performance Statistics

Ozone Threshold (60 PPB)	August 2004					May 2005							
Date	8/4	8/5	8/6	8/7	8/8	5/18	5/19	5/20	5/21	5/22	5/23	5/24	
Julian Date	218	219	220	221	222	139	140	141	142	143	144	139	
Ratio of Predicted Sub-Regional Peak to Peak Observed	**0.94**	**0.99**	**1.16**	**1.13**	**0.94**	**0.96**	- - -	**1.12**	**0.84**	**1.01**	1.39	**0.96**	
Ratio of Unpaired Station Peaks	**0.82**	**0.84**	**0.83**	**0.81**	**0.82**	0.75	- - -	0.74	0.69	0.75	**0.90**	0.75	
Normalized Systematic Bias (%)	-25	-21	**-8**	**-3**	-25	-28	- - -	-21	-36	-23	**-14**	-28	
Normalized Gross Error (%)	**25**	**21**	**13**	**16**	**25**	**28**	- - -	**21**	36	**23**	**14**	**28**	
Ozone Threshold (60 PPB)	July 2005					August 2005				August 1997			
Date	7/15	7/16	7/17	7/18	7/19	8/26	8/27	8/28	8/29	8/4	8/5	8/6	8/7
Julian Date	196	197	198	199	200	238	239	240	241	216	217	218	219
Ratio of Predicted Sub-Regional Peak to Peak Observed	1.39	**0.92**	**0.92**	**0.84**	**1.02**	**1.06**	**1.15**	**0.84**	0.64	**1.07**	**1.15**	**1.05**	1.23
Ratio of Unpaired Station Peaks	1.23	**0.83**	0.73	0.64	**0.93**	0.79	**1.10**	0.79	0.58	**0.96**	**1.07**	**0.85**	**0.87**
Normalized Systematic Bias (%)	**14**	**-4**	**-10**	-27	**-10**	-21	**-6**	-27	-34	**2**	**11**	**5**	**-9**
Normalized Gross Error (%)	**14**	**7**	**16**	**27**	**10**	**21**	**17**	**27**	**34**	**5**	**21**	**20**	**9**

TABLE V-4-13
CAMx Sub-Region-4 8-Hour Average Ozone Performance Statistics

Ozone Threshold (60 PPB)	August 2004					May 2005							
Date	8/4	8/5	8/6	8/7	8/8	5/18	5/19	5/20	5/21	5/22	5/23	5/24	
Julian Date	218	219	220	221	222	139	140	141	142	143	144	139	
Ratio of Predicted Sub-Regional Peak to Peak Observed	0.64	**0.94**	**1.07**	**0.87**	**1.16**	- - -	**0.86**	**0.84**	**0.90**	**0.89**	**0.95**	**0.93**	
Ratio of Unpaired Station Peaks	0.59	**0.92**	**1.07**	0.78	**1.15**	- - -	0.78	0.74	**0.82**	**0.86**	**0.94**	**0.93**	
Normalized Systematic Bias (%)	-38	-24	**2**	**-15**	**12**	- - -	-29	-21	**-1**	**-11**	**-8**	**-13**	
Normalized Gross Error (%)	38	**28**	**14**	**15**	**12**	- - -	**29**	**22**	**13**	**16**	**16**	**20**	
Ozone Threshold (60 PPB)	July 2005					August 2005				August 1997			
Date	7/15	7/16	7/17	7/18	7/19	8/26	8/27	8/28	8/29	8/4	8/5	8/6	8/7
Julian Date	196	197	198	199	200	238	239	240	241	216	217	218	219
Ratio of Predicted Sub-Regional Peak to Peak Observed	**0.93**	**0.94**	**1.10**	1.22	1.25	1.29	0.74	**0.89**	**1.14**	**1.10**	**1.09**	**1.09**	**0.84**
Ratio of Unpaired Station Peaks	**0.86**	**0.91**	**1.06**	**1.03**	**1.21**	**1.15**	0.70	**0.89**	**1.03**	**1.03**	**1.00**	**1.07**	0.79
Normalized Systematic Bias (%)	**17**	**2**	**6**	**0**	26	**-14**	-18	24	**-14**	**4**	**2**	26	**-7**
Normalized Gross Error (%)	**24**	**15**	**11**	**7**	**26**	**6**	**21**	**22**	**27**	**11**	**6**	**28**	**22**

TABLE V-4-14

CAMx Sub-Region-5 8-Hour Average Ozone Performance Statistics

Ozone Threshold (60 PPB)	August 2004					May 2005							
Date	8/4	8/5	8/6	8/7	8/8	5/18	5/19	5/20	5/21	5/22	5/23	5/24	
Julian Date	218	219	220	221	222	139	140	141	142	143	144	139	
Ratio of Predicted Sub-Regional Peak to Peak Observed	**0.96**	**1.08**	**1.20**	1.25	1.51	- - -	**0.87**	- - -	1.29	**1.10**	1.25	- - -	
Ratio of Unpaired Station Peaks	0.52	0.63	**0.85**	**0.89**	**1.04**	- - -	0.69	- - -	**0.95**	0.74	0.61	- - -	
Normalized Systematic Bias (%)	-48	-37	-24	**-12**	**0**	- - -	-31	- - -	-16	-26	-39	- - -	
Normalized Gross Error (%)	48	37	**24**	**17**	**10**	- - -	31	- - -	**22**	**26**	39	- - -	
Ozone Threshold (60 PPB)	July 2005					August 2005				August 1997			
Date	7/15	7/16	7/17	7/18	7/19	8/26	8/27	8/28	8/29	8/4	8/5	8/6	8/7
Julian Date	196	197	198	199	200	238	239	240	241	216	217	218	219
Ratio of Predicted Sub-Regional Peak to Peak Observed	1.70	1.67	1.41	1.79	- - -	**1.19**	1.45	**1.16**	1.33	1.46	1.29	1.62	- - -
Ratio of Unpaired Station Peaks	**0.85**	**1.05**	**1.03**	0.72	- - -	**0.81**	0.79	**0.84**	**1.10**	**1.01**	**.86**	**1.01**	- - -
Normalized Systematic Bias (%)	**-15**	**5**	**14**	-28	- - -	-33	-22	-25	**1**	**-12**	**-2**	**1**	- - -
Normalized Gross Error (%)	**15**	**5**	**21**	**28**	- - -	**33**	**22**	**25**	**1**	**12**	**9**	**1**	- - -

Graphical Evaluation

Figures V-4-11 through V-4-15 show the tile plots of predicted maximum ozone for the each day of the July 15-19, 2005 ozone simulations. Figure V-4-16 provides the cumulative scatter plot of CAMx predicted vs. observed 1-hour average ozone for the July 14-18 subset of the 2005 episode. Figures V-4-17a through V-4-17h show the station diurnal plots of predicted and observed ozone. Similar tile plots of predicted maximum ozone, diurnal plots and scatter plots of performance for the remaining episodes are provided as attachments to this appendix.

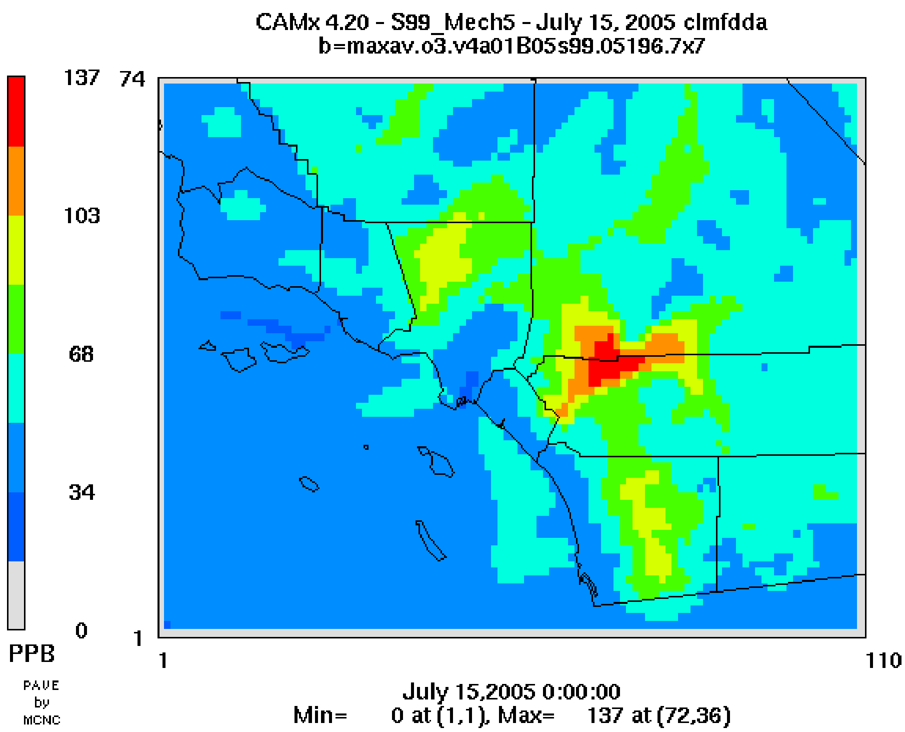

FIGURE V-4-11

CAMx Simulated Maximum 1-Hour Average Ozone, July 15, 2005

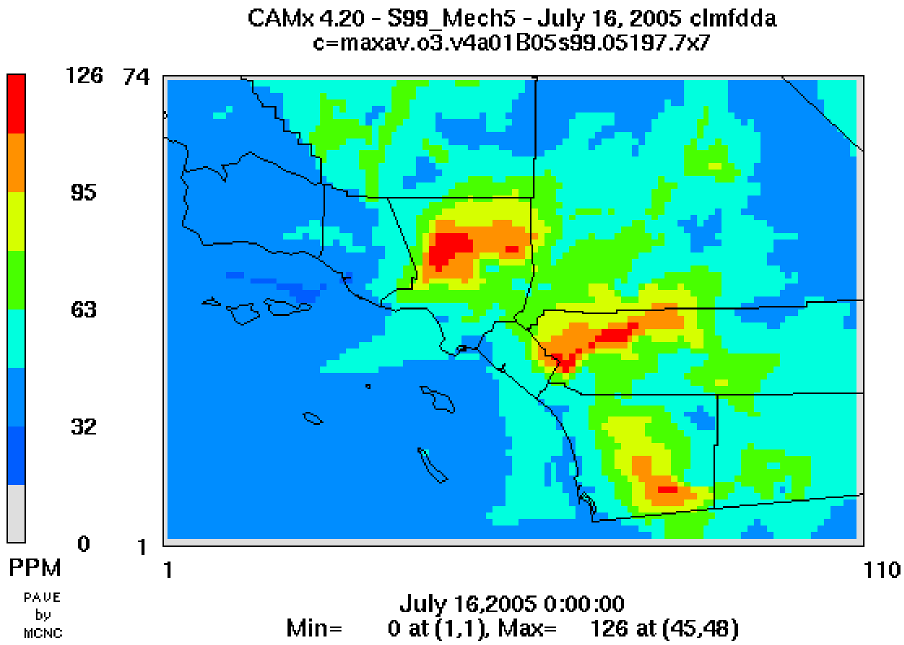

FIGURE V-4-12

CAMx Simulated Maximum 1-Hour Average Ozone, July 16, 2005

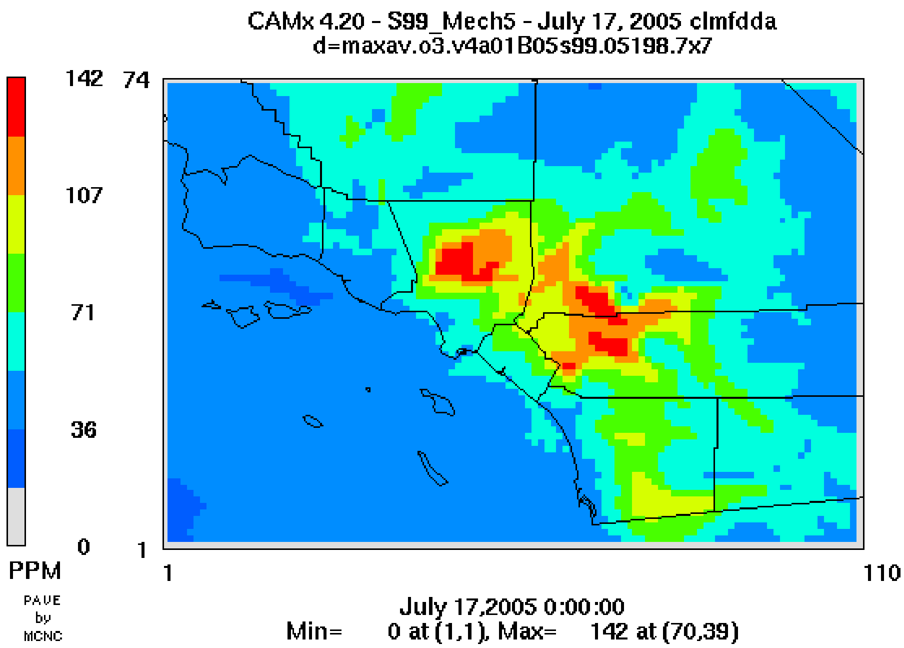

FIGURE V-4-13

CAMx Simulated Maximum 1-Hour Average Ozone, July 17, 2005

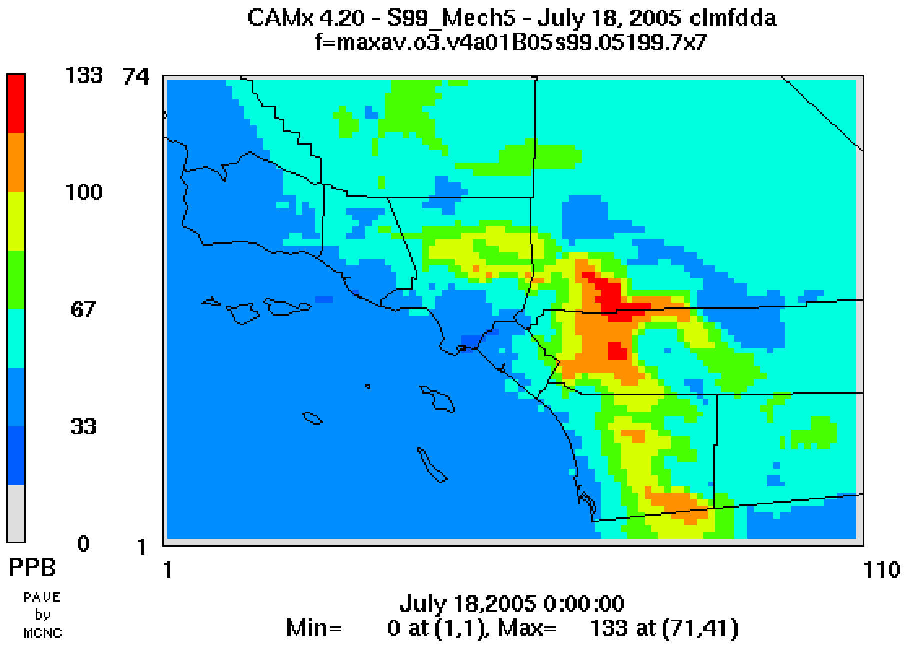

FIGURE V-4-14

CAMx Simulated Maximum 1-Hour Average Ozone, July 18, 2005

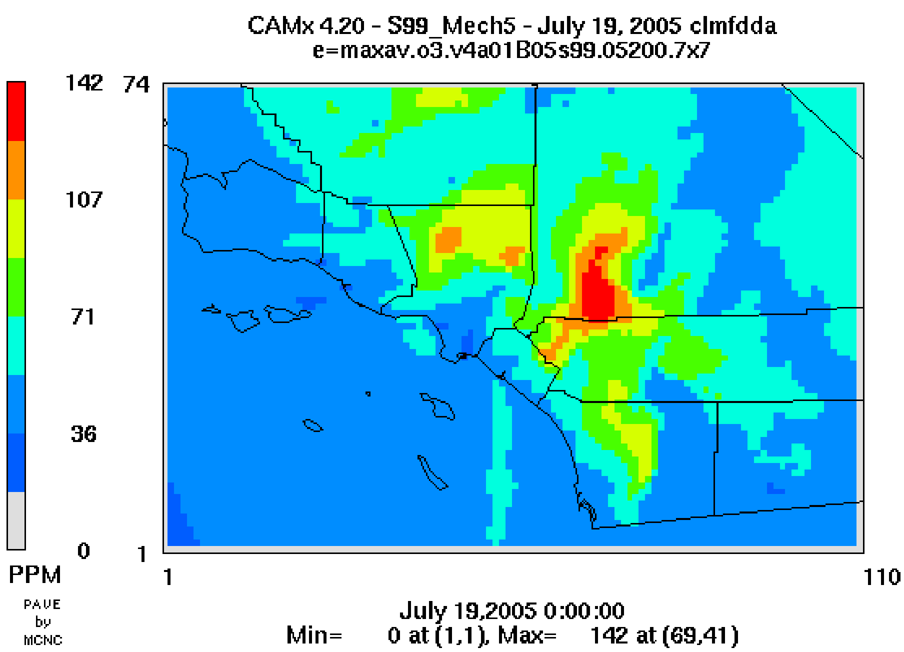

FIGURE V-4-15

CAMx Simulated Maximum 1-Hour Average Ozone, July 19, 2005

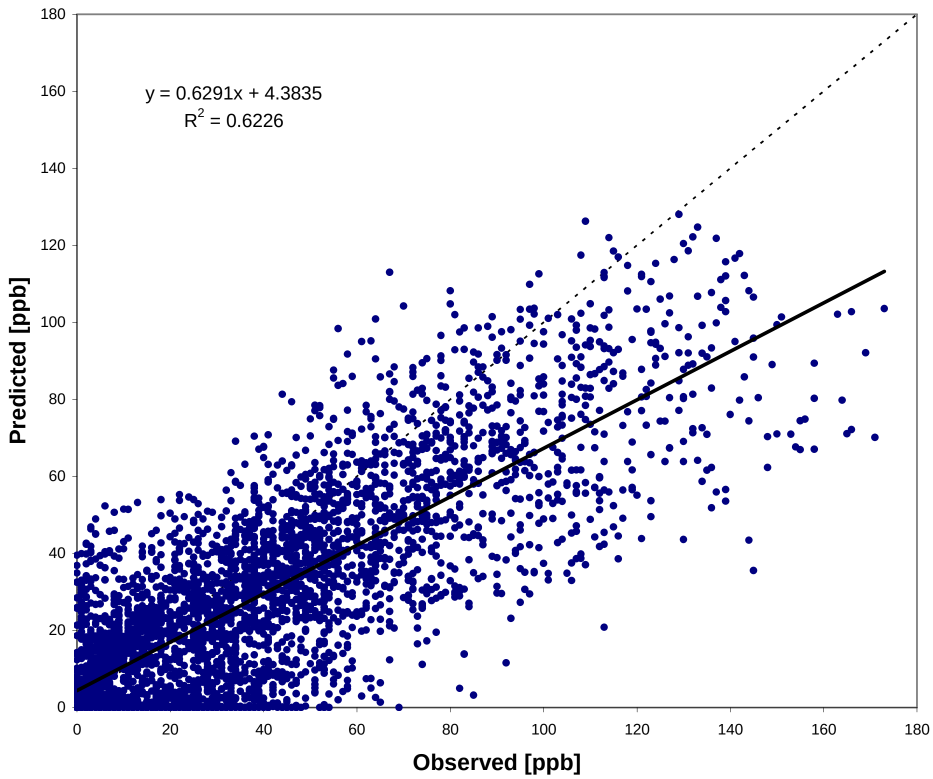

FIGURE V-4-16

CAMx Predicted vs. Observed 1-Hour Average Ozone Concentrations: July 14-18, 2005

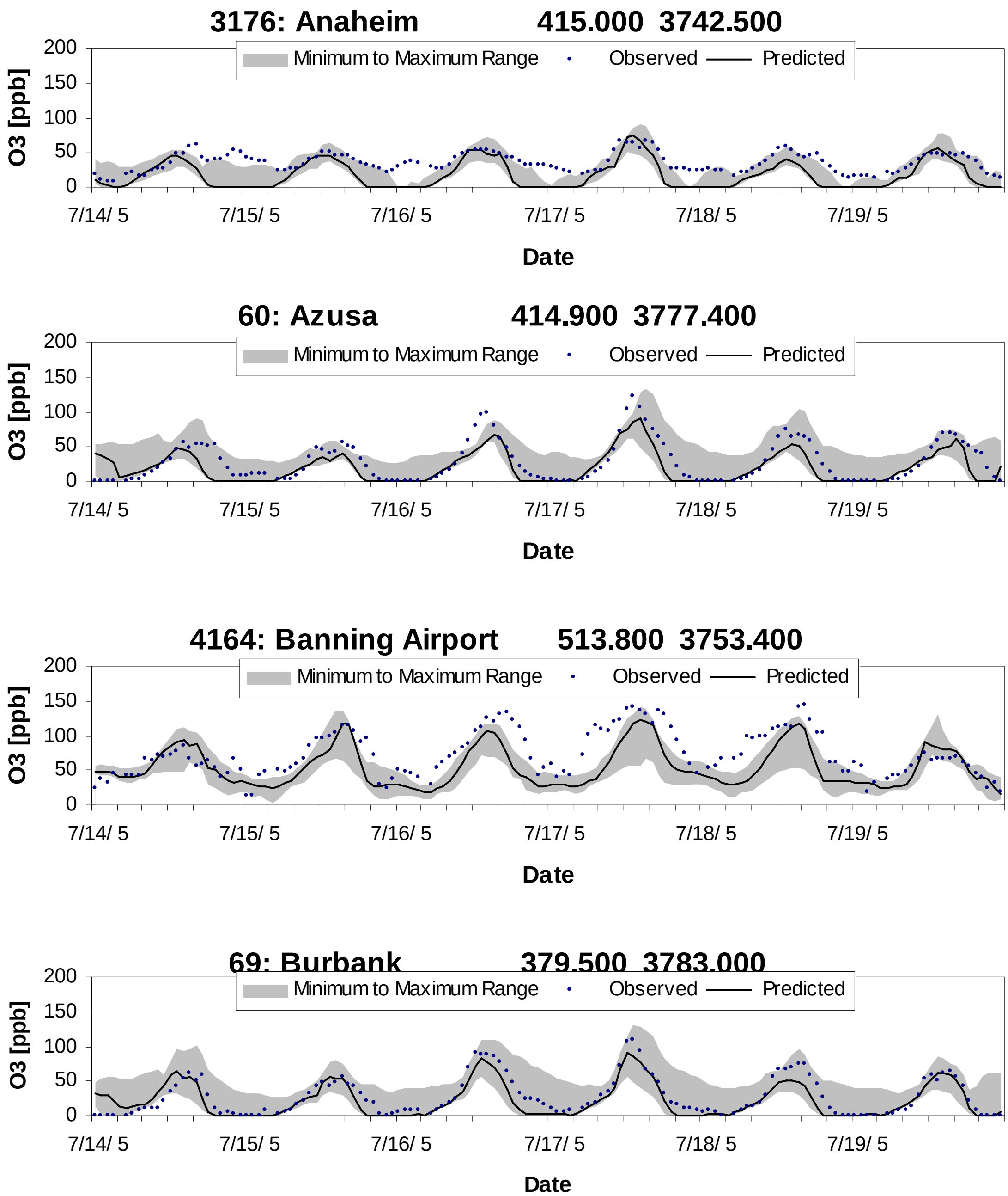

FIGURE V-4-17a

CAMx Simulated 1-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

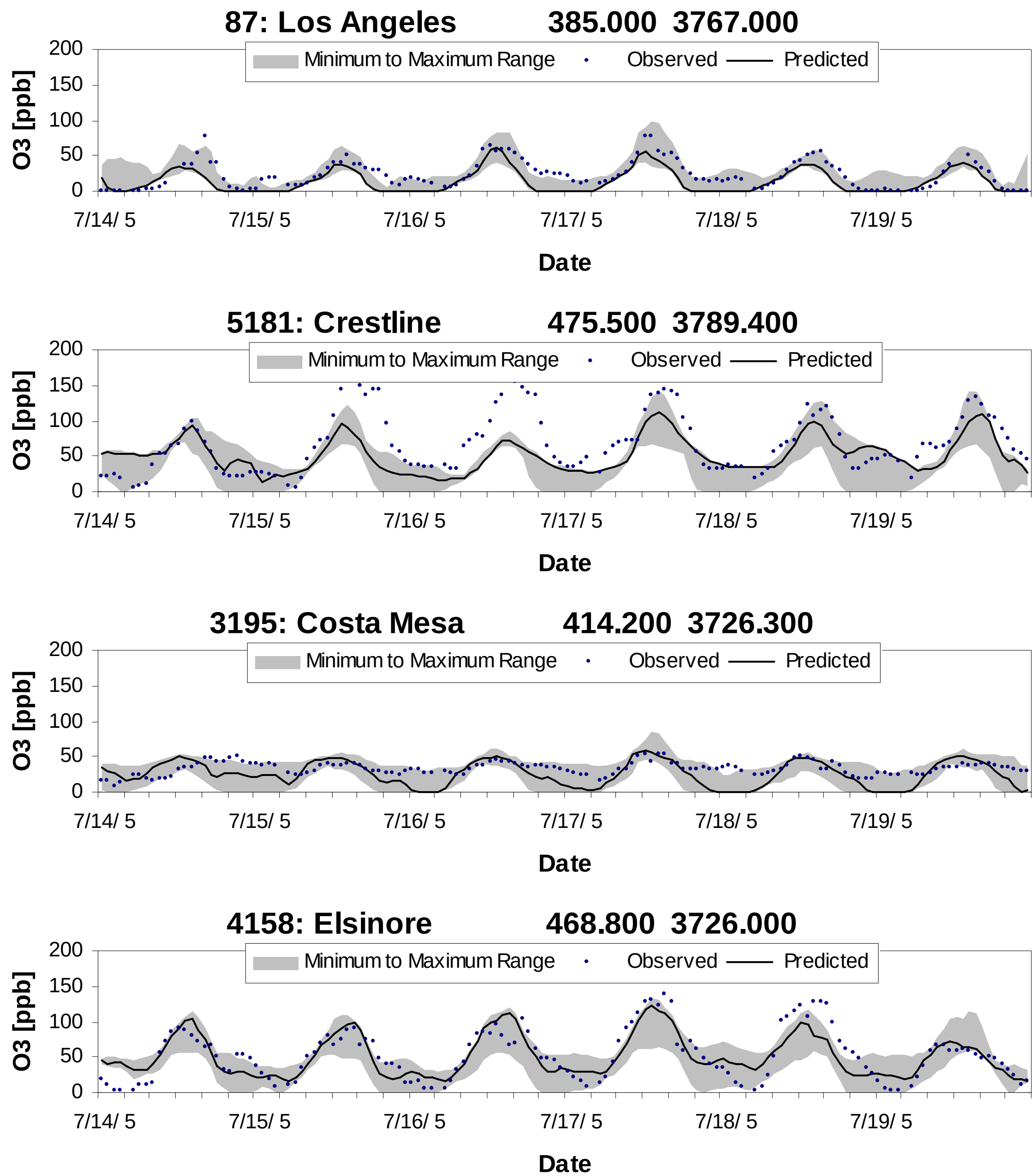

FIGURE V-4-17b

CAMx Simulated 1-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

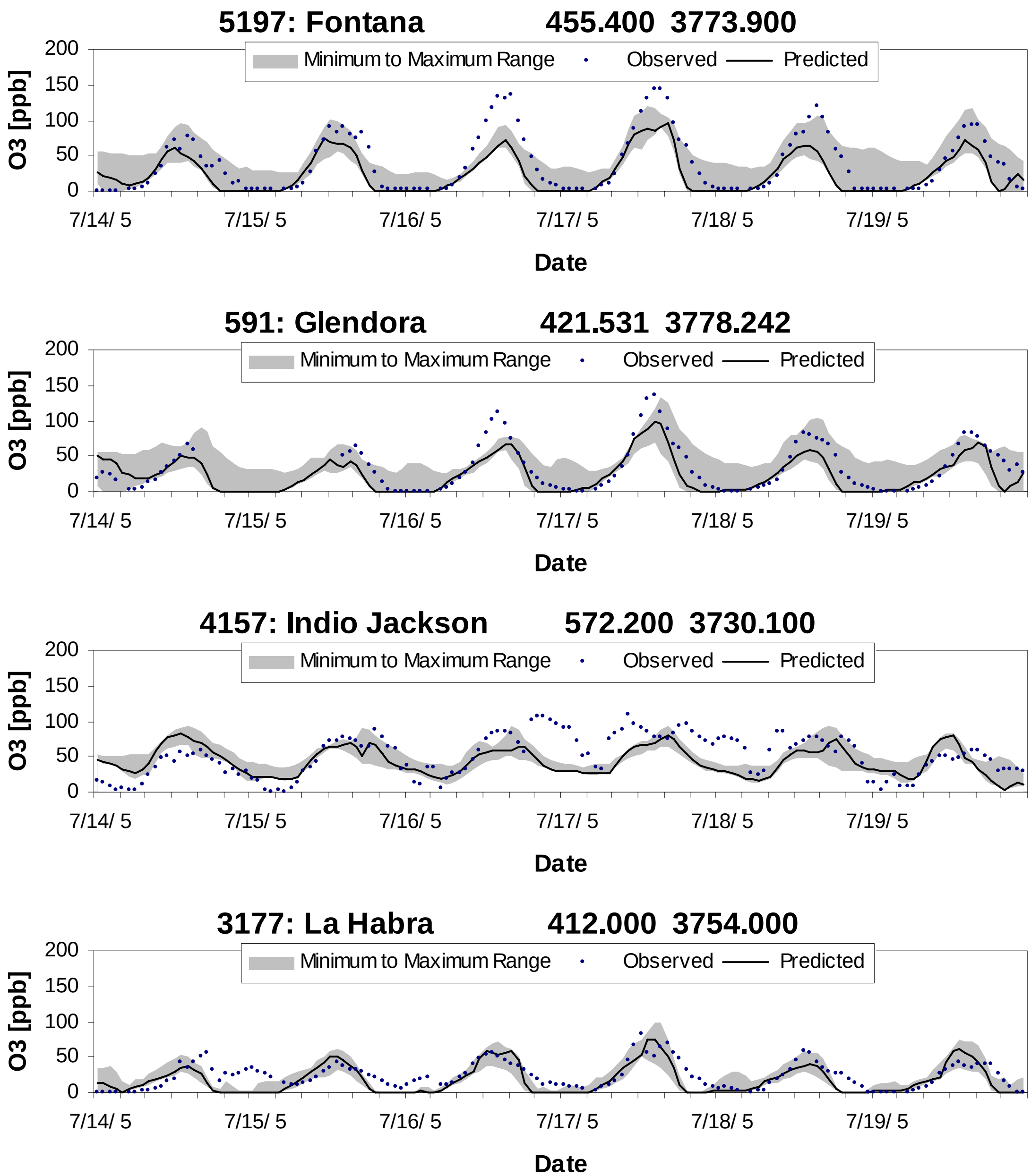

FIGURE V-4-17c

CAMx Simulated 1-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

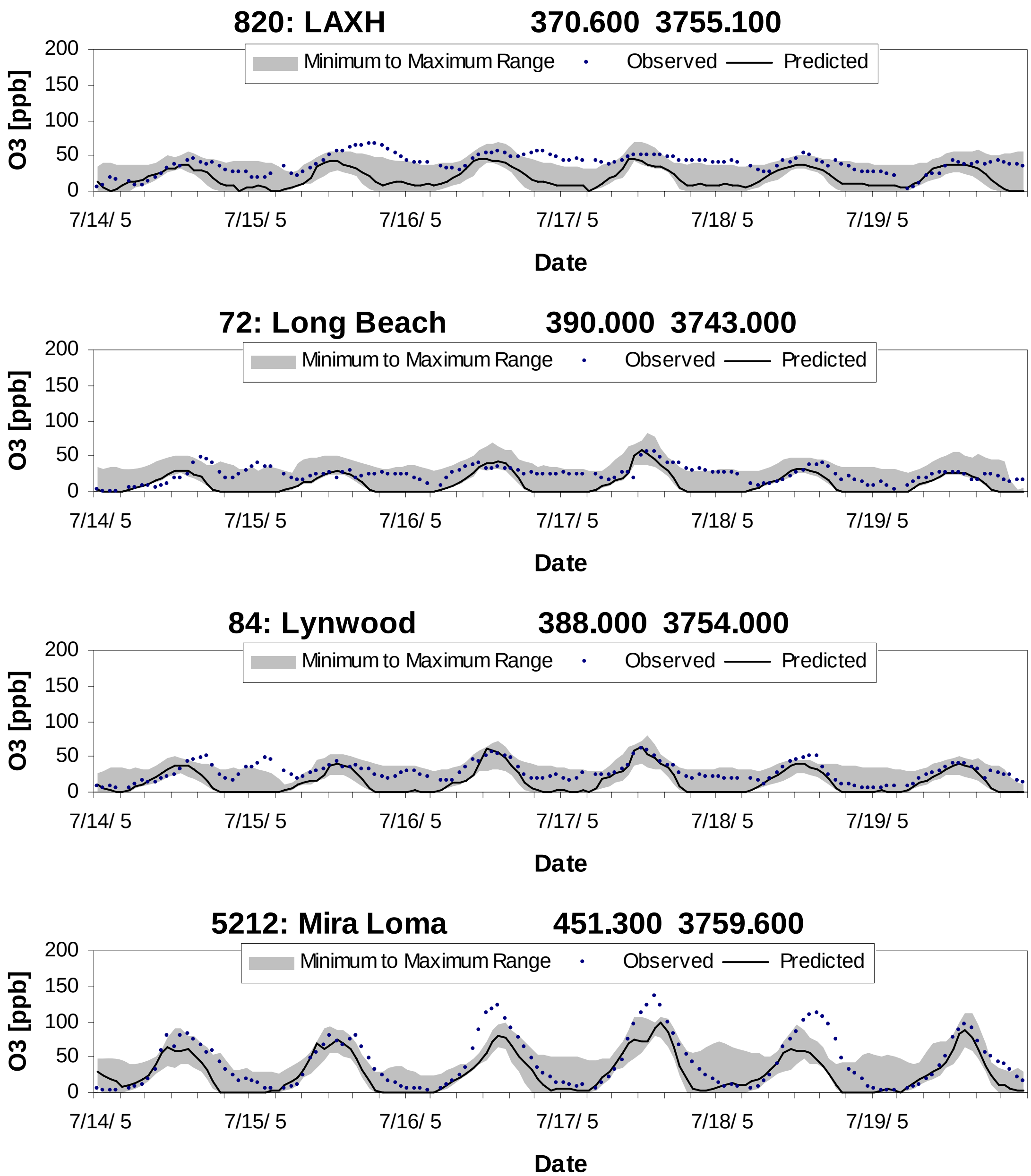

FIGURE V-4-17d

CAMx Simulated 1-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

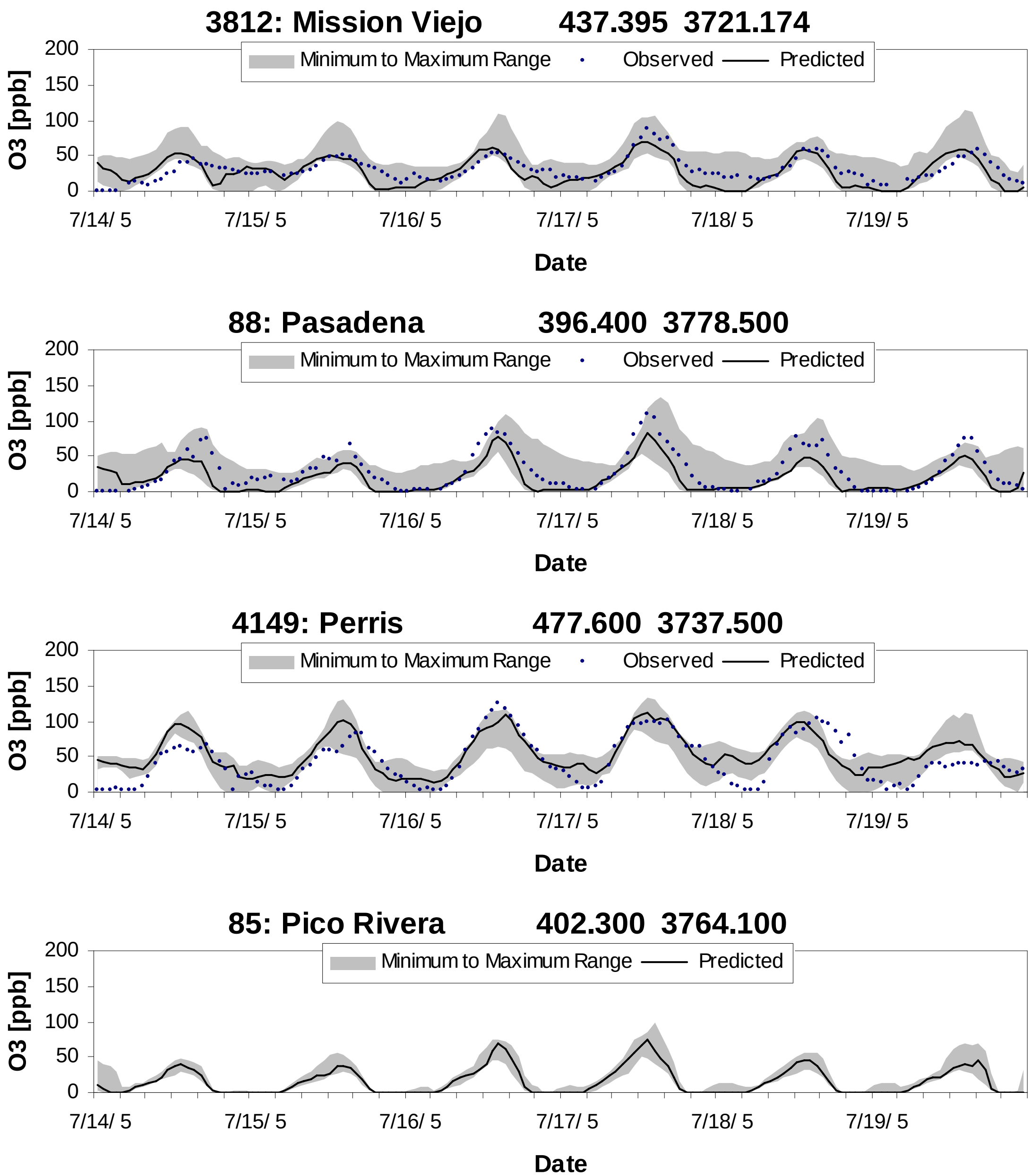

FIGURE V-4-17e

CAMx Simulated 1-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

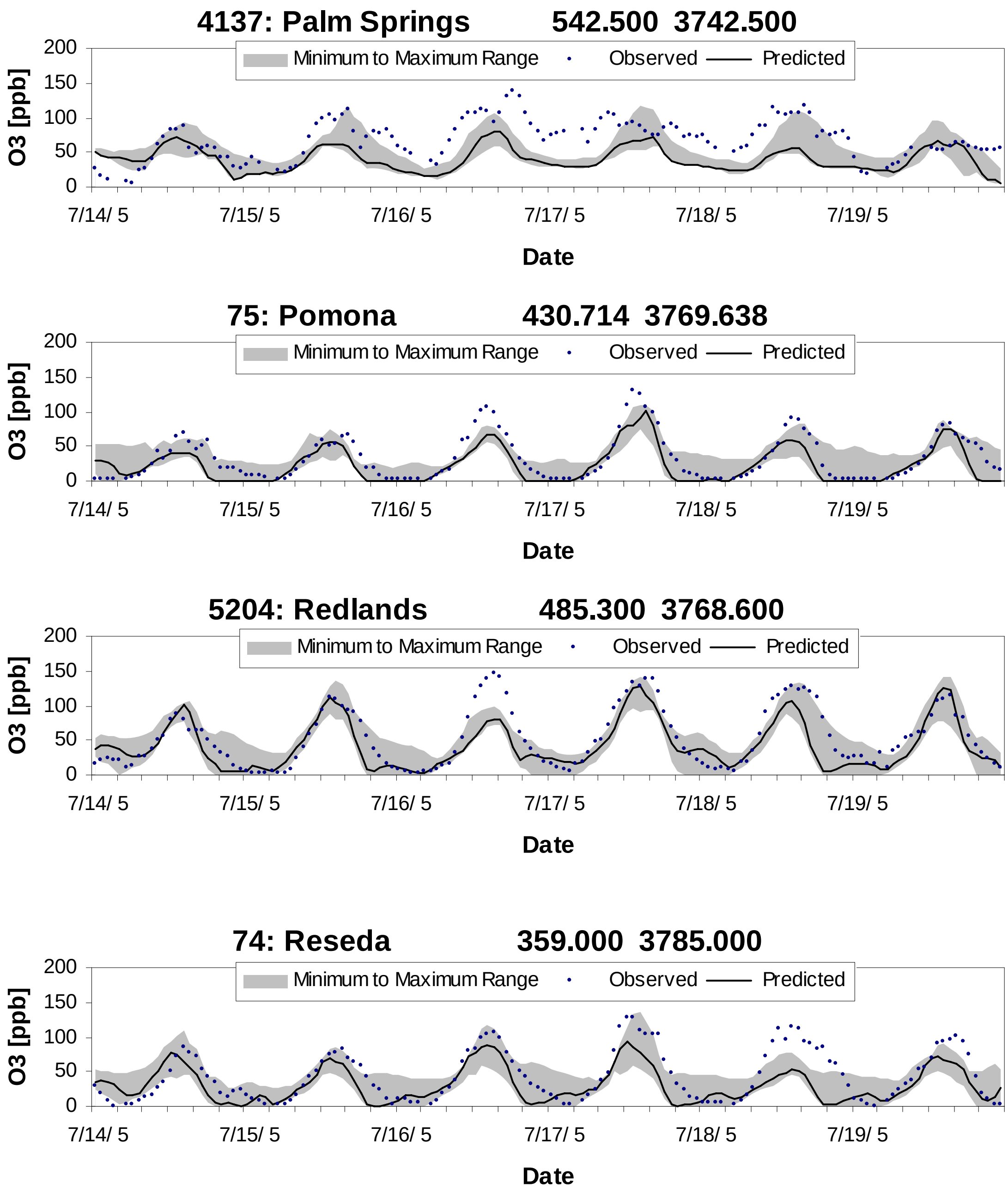

FIGURE V-4-17f

CAMx Simulated 1-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

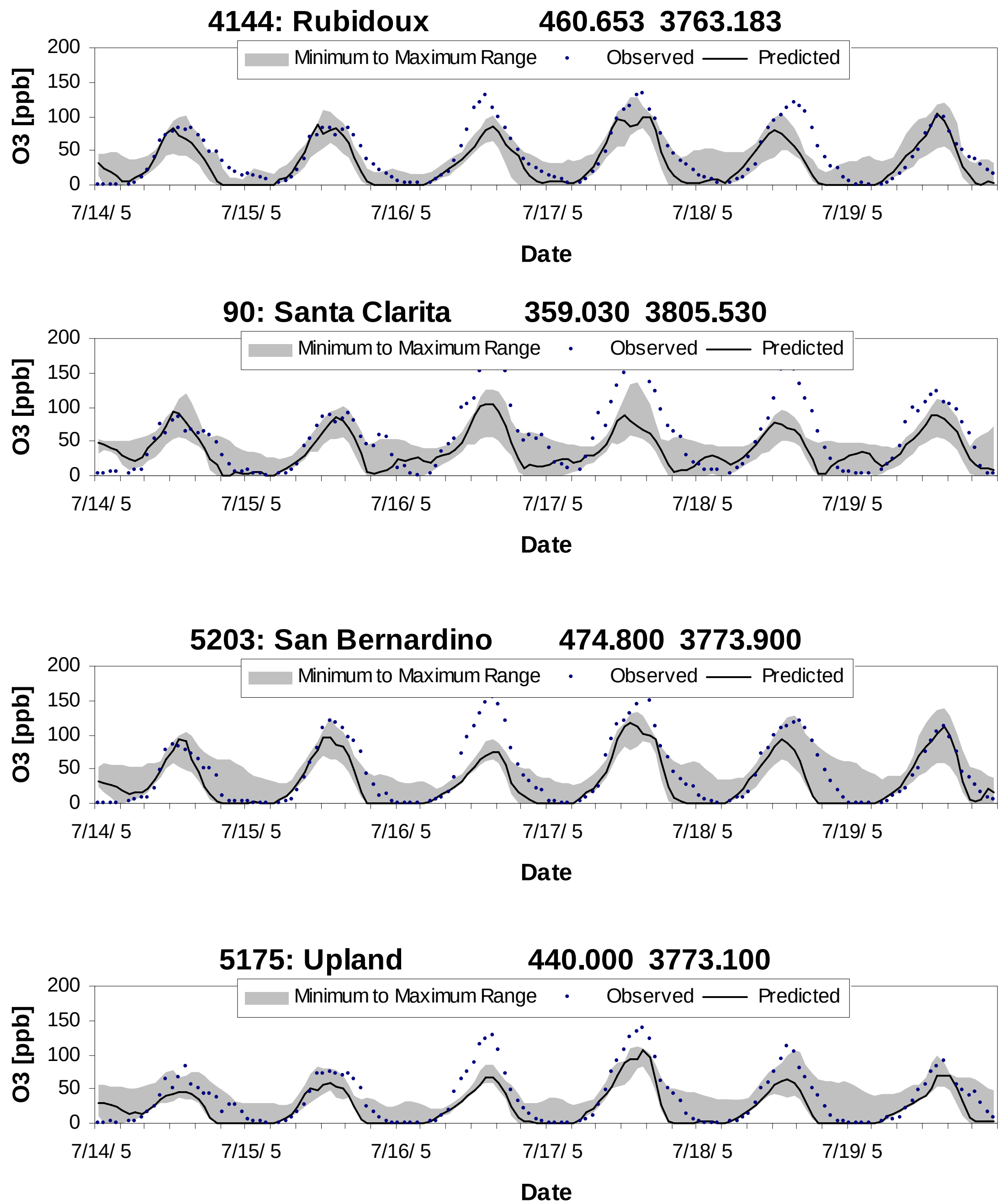

FIGURE V-4-17g

CAMx Simulated 1-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

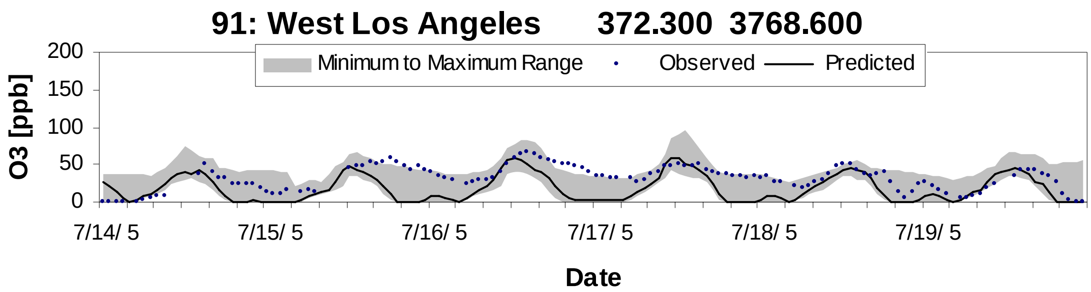

FIGURE V-4-17h

CAMx Simulated 1-Hour Average Ozone (Solid Line) Vs. Observed (Squares): July, 2005 Ozone Meteorological Episode

The diurnal plots illustrate a range of model predictions based on a 7 X 7 grid analysis. In the diagram, and in the later attainment demonstration, the peak prediction in the 49 grid cell array is compared to the station observation.

The July episode spans a weekend (July 16th and 17th) over the course of the 5 day meteorological episode. Weekend inventories have become increasingly more reliable but have not yet reached the level of certainty of the weekday emissions profiles. Overall, heavy duty truck traffic decreases by about 60 percent in the Basin on Saturday, compared to Friday, and an additional 10-15 percent on Sundays. NOx emissions are greatly reduced along the primary transportation corridors. Unfortunately, at this time, no weekend trip model is available to accurately simulate the reduced usage of trucks on weekends and the residual impact on the movement and speeds of passenger cars and light duty vehicles. Hence, the CAMx simulation uncertainty is most pronounced during the weekends. Weekday simulations provide a more accurate characterization of the observed ozone trends.

On July 16th and 17th, the peaks are nominally under predicted and tend to lag the observed concentrations in the San Bernardino Valley and mountain areas. Performance in the Riverside area is split, where Rubidoux is generally under predicted by Lake Elsinore and Perris are well simulated. The simulation tends to under predicted observations in the eastern San Gabriel Valley but is reasonable in the coastal-metropolitan areas. The San Fernando Valley sites of Burbank and Reseda are well simulated with a tendency for over prediction. Santa Clarita however is significantly under predicted on these days.

Effect of Emissions Uncertainties

The Draft 2007 AQMP emissions inventory built upon the effort undertaken in the 2003 AQMP to provide updates to the mobile and day specific point and biogenic inventories used in the modeling attainment demonstrations. Aircraft and airport operations were thoroughly reviewed and inventoried. Shipping transits into the Ports of Los Angeles and Long Beach were carefully logged and shipping lane transits up and down the coast were logged for the major vessels. The episode specific biogenic emissions inventory under went significant modification. The areas source emissions distribution continued to rely on the emissions surrogates used in the 2003 AQMP to distribute emissions.

Of the inventory upgrades, none had as much impact as the revisions to ARB's on-road emissions program EMFAC2007 and the update of the Off-Road companion model. The net impact of EMFAC2007 was to raise the absolute tonnage of NOx and VOC in the mobile source emissions inventory over the 2003 AQMP projected 2002 inventory. The Basin 2002 base-year mobile source inventory totals for VOC and NOx for the increased from 559 and 968 tons TPD in the 2003 AQMP to 710 and 1001 TPD for the current effort. While VOC emissions rose 27 percent NOx emissions only rose by a 3 percent margin. Many of the complaints of the episode development in simulating previous episodes was that there existed too much NOx relative to the amount of VOC in the domain. The upgrade to the inventories may have corrected several of the faults in the previous analyses but the ratio of VOC to NOx remaines in favor of ozone titration in the coastal emissions region.

Several additional factors resulting from the use of the EMFAC2007 and Direct Transportation Impact Model (DTIM4) to generate grid level mobile source emissions may have altered the VOC to NOx ratio in the Basin. First, there exist differences between the two models in the numbers of trips and lengths of trips inferred by the regional transportation model output. More numerous starts and stops lead to greater VOC emissions from vehicle use and standing evaporative loss. Similarly, speed impacts the NOx emissions, especially from heavy duty diesels. Differences between the emissions models in how the truck speed factors are assigned may have lead to an overestimation of NOx. Significant movement was made to resolve differences in the projections of truck travel, most notably the redistribution of a percentage of the fleet to both the eastern Basin and second, out of the Basin to the northern and eastern air Basins. The redistribution of truck travel is one of the contributing factor to the nominal increase in NOx as opposed to previous inventory updates.

The impact of ethanol as a additive in the fuel has lead to increase VOC emissions due to increase vapor permeation in the fuel and exhaust systems of passenger vehicles. While progress has been made to capture the impact of the enhanced VOC evaporative emissions, there continues to exist uncertainty to the total daily tonnage and in particular the response on exceedingly hot days when evaporation can become an exponential function of temperature. Form this reasoning, VOC emissions on hot days, which are synonymous with higher ozone days may be under represented and the net impact to model performance would be for under prediction of the total amount of ozone formed in the Basin.

Other areas of the inventory uncertainty may have impacted the CAMx (and other models) performance including the assignment of surrogates used to distribute emissions through the Basin, and the sub-county distribution of vehicles by age. Several sensitivity simulations were conducted using emissions factors generated by EMFAC2002 during the 2003 AQMP and were regenerated for this analysis using a grid level characterization of the passenger vehicle age with each county. The analysis was designed to attempt to place older, high emitting vehicles in the general areas where they operate. There are drawbacks to this assumption in that the average trip distance in the Basin exceeds one grid length and can easily transverse a county line. The sensitivity analyses were encouraging and preliminary results improved the ozone simulation model performance in some critical areas (most notably, Santa Clarita).

Similar types of sensitivity analyses were conducted to test the extent of reduced truck travel (lower NOx) in the Basin on weekends and the movement, storage and usage of pleasure craft on weekends and weekdays. The impacts of these prospective inventory modifications varied by hour of day and location in the Basin.

The biogenic inventory is also subject to uncertainties due to the critical roll daily temperature and humidity has in the estimation of the emissions. This is clearly evident in the day-to-day variation in total emissions over the five multi-day episodes, and in the difference in the estimated emissions between spring and mid summer. Added to the diurnal and seasonal variation is the rapid die off of the forests in the East Basin due to an infestation of the Bark Beetle. Estimates of tree death by acre continue to increase creating a moving target for emissions estimation. Finally, the several episodes take place in August and it is difficult to assess cumulative stress on the biomass over the season and what impact did the stress have on daily emissions.

OZONE AIR QUALITY PROJECTIONS

CAMx simulations were conducted for the year base emission scenarios (2002, 2009, 2012, 2015 and 2020), and future year controlled scenarios (2009, 2012, 2015, and 2020). As discussed earlier, the ozone attainment demonstration relies on the use of site specific RRFs being applied to the 2002 weighted design values. The RRFs are determined from the future year controlled and the 2002 base year simulations.

Future year 8-hour ozone attainment demonstrations are required for those sites with design values that exceed 84 ppb. As such, the current demonstrations are focused on 16 locations in the Basin. Station days are included in the attainment demonstration if they met the following criteria: having an observed concentration equaling or exceeding 85 ppb and a simulation predicted base year (2004 or 2005) concentration over 70 ppb. As a consequence, several modeling days are excluded from the analysis but every attempt is made to include at least five days into the demonstration. Since the CAMx simulations are run on a 5 km grid, the maximum 8-hour average concentration from the 49 grid cells representing the monitoring site are used to generate the simulated concentration at the monitor. (Note: the 2005 and 2002 simulations were generated using the Lambert Conformal grid format. The 2020 controlled simulation was generated using the UTM based simulation.)

The results of the attainment demonstration for 2020 are presented in Tables V-4-15. The analysis indicates that the federal 8-hour ozone standard would be attained in 2021 at the key stations with the controlled emissions implemented to the 2020 inventory. The controlled carrying capacity (304 TPD of VOC and 238 TPD of NOx) consists of both short term and long term control measures. The CEPA output summarizing the control strategy implementation and emissions reductions is provided as an attachment to this document.

With controls in place, it is expected that all stations in the Basin will meet the federal 8-hour ozone standard. The east Basin stations of Crestline and Fontana are projected to have the highest 8-hour controlled design values. Both sites are downwind receptors along the primary wind transport route that moves precursor emissions and developing ozone eastward during by the daily sea breeze. Future year projections of ozone along the northerly transport route through the San Fernando Valley indicate that the ozone design value in the Santa Clarita Valley will be approximately 13 percent below the standard.

It is important to reiterate that the form of the ozone standard allows for at least 3-days to have 8-hour average concentrations that exceed 80 ppb in any year. So, although the demonstration satisfies the criteria for attainment, areas of the Basin are likely to experience occasional higher ozone days (greater than 80 ppb) under severe meteorological conditions.

Equally important, is the rate of progress specified by the timing of the new standard. The 2003 AQMP 1-hour ozone demonstration set a 2010 attainment carrying capacity of 330 TPD of VOC and 540 TPD of NOx. Sensitivity simulations were conducted to assess progress towards attaining the revoked 1-hour ozone standard for a current 2010 baseline emissions estimate. The results indicated that the currently predicted 1-hour average ozone concentrations for 2010 are expected to be approximately 20 percent above the revoked 1-hour federal standard assuming full implementation of port-related measures.

Graphical Distribution

The spatial distribution of ozone design values for the 2002 base year is shown in Figure V-4-18. The distribution was generated using GIS mapping of the station based ozone design values overlaid onto the modeling grid while applying a Kreiging interpolation scheme to expand the prediction. Future year ozone air quality projections for 2020 with and without implementation of all control measures are presented in Figures V-4-19 and V-4-20. The predicted ozone concentration will be significantly reduced in the future years in all parts of the Basin with the implementation of proposed control measures in the South Coast Air Basin.

A grid level analysis using grid specific RRFs applied to the interpolated 2002 design values will be provided at the release of the final document.

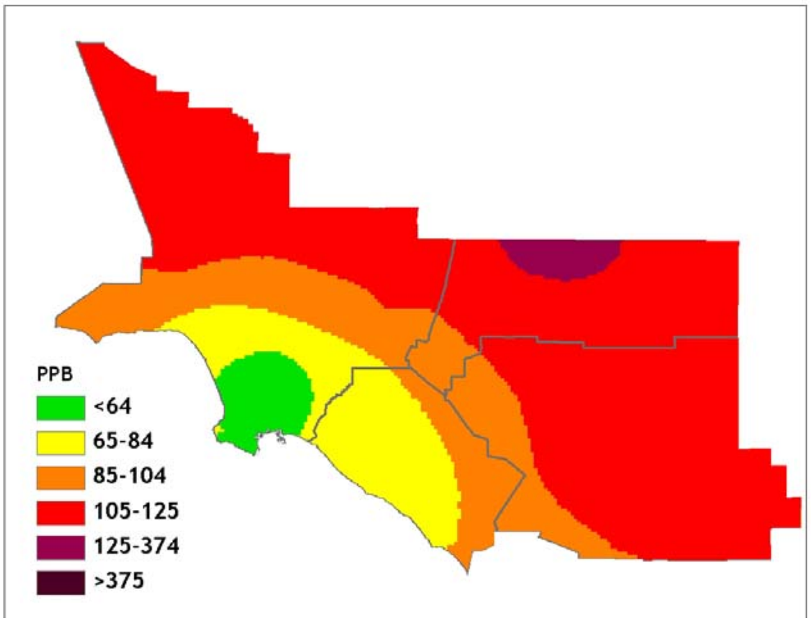

FIGURE V-4-20

2002 Baseline 8-Hour Ozone Design Concentrations (ppb)

TABLE V-4-15

2020 Projected Basin 8-Hour Ozone Design Values

Site	2002 Weighted Design (PPB)	2002 Baseline Simulation (PPB)	CAMx 2020 Controlled Simulation 4219	4221	5141	5196	5197	5198	5199	5200	2020 Controlled Average (PPB)	RRF	2020 Controlled Design (PPB)
AZUS	101	116		79.4	74.9		76.9	75.9			76.8	0.700	67.0
BURK	92	125		71.1			74.6	70			71.9	0.423	52.9
RESE	104	117		70.4			67.1	68.8		74.5	70.2	0.532	62.2
POMA	96	114		81.1			78.1	81.4			80.2	0.591	67.4
PASA	96	128		78.6			74.6	73.7			75.6	0.445	57.0
SCLR	122	124		70.4		75.1	68.6	66.2		76.8	71.4	0.565	70.1
GLEN	112	116		79.4	74.9		76.9	82.6			78.5	0.652	75.6
RIVR	112	120		88.5	82.8	81.6	77.2	85.7	92		84.6	0.659	79.1
PERI	112	112		77.5			71.2	72.6	72.6		73.5	0.658	73.7
ELSI	107	116		73.5		61.7	66.5	68.2	70.2		68.0	0.540	62.6
BNAP	115	129	68.7	82.6	70.8	79	77.3	81.5	84.8		77.8	0.540	69.6
UPLA	110	120		83.4			78.1	82.4	92.3		84.1	0.643	77.1
CRES	129	130		88.5	82.8	81.4	80.8	85.7	93.1		85.4	0.654	84.4
FONT	118	121		87	82.7	83.8	78.1	85	92.3		84.8	0.686	83.0
SNBO	116	128	76.5	88.5	82.8	80.5	79.1	85.7	93.1		83.7	0.591	75.7
RDLD	125	131	75.5	88.5	82.8	81.4	80.8	85.7	93.1		84.0	0.611	80.0

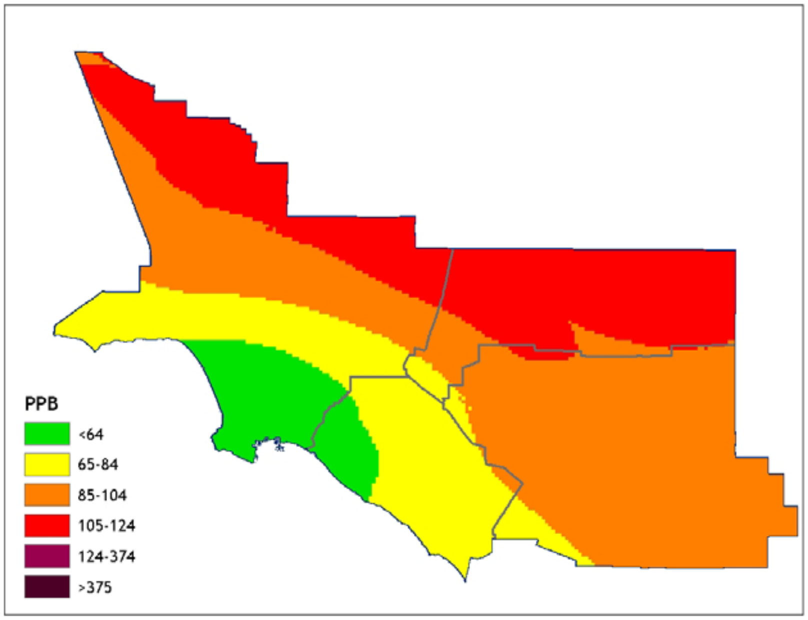

FIGURE V-4-19

Model-Predicted 2021 Baseline 8-Hour Ozone Design Concentrations (ppb)

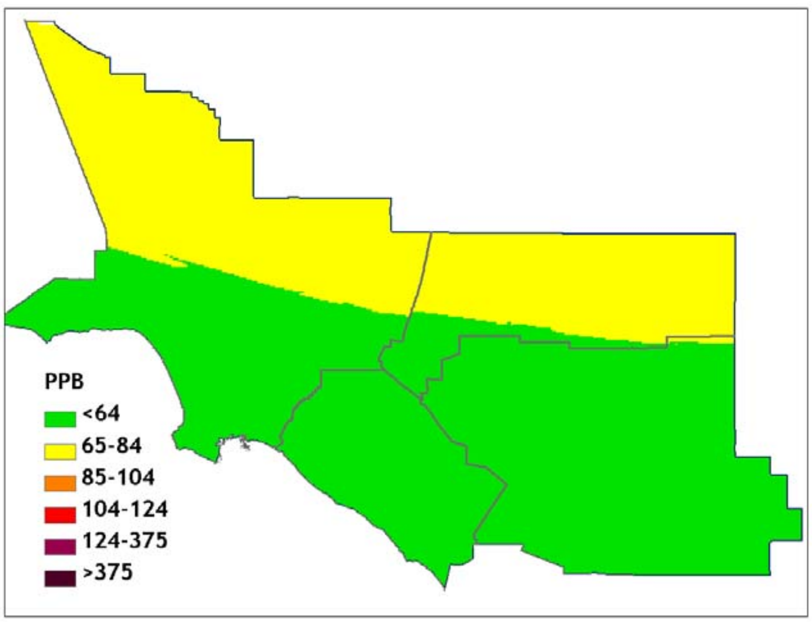

FIGURE V-4-20

Model-Predicted 2021 Controlled 8-Hour Ozone Design Concentrations (ppb)

Projection of 2010 and 2013 Air Quality

One major component of the Draft 2007 AQMP modeling attainment demonstration addresses the issue of transport of ozone and precursor pollutants into the Coachella Valley, Antelope Valley, South Central Coastal Air Basin and Mojave Desert. The attainment year for Antelope Valley, South Central Coastal Air Basin and Mojave Desert areas is 2010. The Coachella Valley has a 2013 attainment date.

CAMx simulations (based on the UTM grid system) were generated for the 2009 baseline inventory to demonstrate potential attainment in Ventura and the high desert areas. No additional controls were assumed to be implemented and emissions reductions were assumed to be the result of programs already in place and mobile source emissions reductions projected by EMFAC2007 and the OFFROAD model.

Additional CAMx simulations (based on the UTM grid system) were also generated for the 2012 baseline and controlled inventories. Emission reductions through 2012 are expected to take place through exiting established control measures and reductions in mobile source emissions as projected by EMFAC2007. Implementation of diesel engine modifications, cleaner fuels, fleet rules and the POLA/POLB Clean Air Plan is expected to impact emissions by the 2012 time frame.

Table V-4-16 lists the 2010 predicted air quality for the Antelope Valley, South Central Coastal Air Basin and Mojave Desert. The procedure for calculating the projected air quality follows the method used for the Basin where the RRFs are calculated from 2009 and 2002 model simulations. Only four stations met a modified criteria (base year observed ≥ 85 ppb and predicted ≥ 65 ppb) to be included in the analysis. None of the sites in Ventura County met the modified performance criteria.

The attainment demonstration indicated that all four sites in the Mojave Desert would not meet the federal standard without the implementation of additional emissions controls.

Table V-4-17 provides the 2013 ozone attainment demonstration for the Coachella Valley. Again, RRFs are determined from CAMx simulations using the 2002 baseline and 2012 controlled emissions. The attainment demonstration shows that Indio will meet the federal standard and that Palm Springs will be nominally above the standard, requiring additional emissions reductions.

SENSITIVITY STUDIES

A set of CAMx sensitivity simulations will be presented in final draft Appendix V. The sensitivity simulations will support both the CEQA analyses and the weight of evidence demonstration.

TABLE V-4-16

2010 Projected Mojave Desert Air Basin 8-Hour Ozone Design Values

Site	2002 Weighted Design (PPB)	2002 Baseline Simulatio n (PPB)	CAMx 2009 Controlled Simulation 4219	5142	5143	5196	5197	519 8	519 9	520 0	2009 Controlle d Average (PPB)	RRF	2009 Controlle d Design (PPB)
Hesperia	106	72.1		75.6	65			78		79.8	74.6	0.940	99.7
Phelan	105		73.2			69.3	65.5	74.4			70.6	0.962	101.0
Victorvill e	98	79.3						80.9		66.7	73.8	0.909	89.1
Yucca Valley	100				72.1	75.6		78	78.8		76.125	0.885	88.5

TABLE V-4-17

2013 Projected Coachella Valley 8-Hour Ozone Design Values

Site	2002 Weighted Design (PPB)	2002 Baseline Simulatio n (PPB)	CAMx 2012 Controlled Simulation 422 1	422 2	514 3	514 4	519 7	519 8	523 9	2012 Controlle d Average (PPB)	RRF	2012 Controlle d Design (PPB)
Indio	95	72.1	66.3		68.8	79.6		73.5		62.1	0.862	81.8
Palm Springs	106	79.3	67.3	79.9	76.9	80.1	75.6	69.7	67.9	59.5	0.805	85.3

CHAPTER 5

SUMMARY AND CONCLUSIONS

Comparison to State and Federal Standards

Basin Emissions Carrying Capacity (Emissions Budget)

COMPARISON TO STATE AND FEDERAL STANDARDS

Figure V-5-1 shows the 2002 observed and model-predicted regional peak concentrations for the three nonattainment criteria pollutants, as percentages of the most stringent federal standard, for the years 2010, 2015, and 2021 (with and without further emission controls). Figure V-5-2 shows similar information related to the most stringent California state standards. Note: the revoked federal 1-hour standard comparison has been included for reference. The 2010 baseline 1-hour average ozone concentrations are projected to exceed the revoked standard.

Table V-5-1 summarizes the expected year for attainment of the various federal and state standards for the four pollutants analyzed. As shown, the Basin will be in compliance with federal standards by the year 2021. The Basin will require additional time beyond 2021 to meet the state ozone, PM2.5 and PM10 standards.

BASIN EMISSIONS CARRYING CAPACITY (EMISSIONS BUDGET)

The District is required to separately identify the emission reductions and corresponding type and degree of implementation measures required to meet federal and state ambient air quality standards. Section 40463(b) of the California State Health and Safety Code specifies that, with the active participation of the Southern California Association of Governments, a South Coast Air Basin emission carrying capacity for each state and federal ambient air quality standard shall be established by the South Coast District Board for each formal review of the Plan and shall be updated to reflect new data and modeling results.

A carrying capacity is defined as the maximum level of emissions that enable the attainment and maintenance of an ambient air quality standard for a pollutant. Emission carrying capacity for state standards shall not be a part of the State Implementation Plan requirements of the Clean Air Act for the South Coast Air Basin. Emission carrying capacity as defined in the Health and Safety Code is an overly simplistic measure of the Basin-wide allowable emission levels for specific ambient air quality standards. It is highly dependent on the spatial and temporal pattern of the emissions. Because of the multi-component nature of PM2.5, the carrying capacity for the contributing emissions can vary significantly and like ozone it is a non-linear function among their precursors.

The federal Clean Air Act requires that plans contain an emissions budget that represents the remaining emissions levels that achieve the applicable attainment deadline. Based on the modeling results, a set of carrying capacities can be defined corresponding to federal and state ambient air quality standards for annual PM2.5 and 8-hour ozone. VOC and oxides of nitrogen are used for ozone. PM2.5 additionally requires reductions of sulfur oxides and directly emitted PM2.5. Table V-5-2 shows the emissions carrying capacities for the Basin to meet federal air quality standards. These estimates are based on emission patterns estimated for each of the federal attainment years: 2015 for PM2.5 and 2021 for ozone.

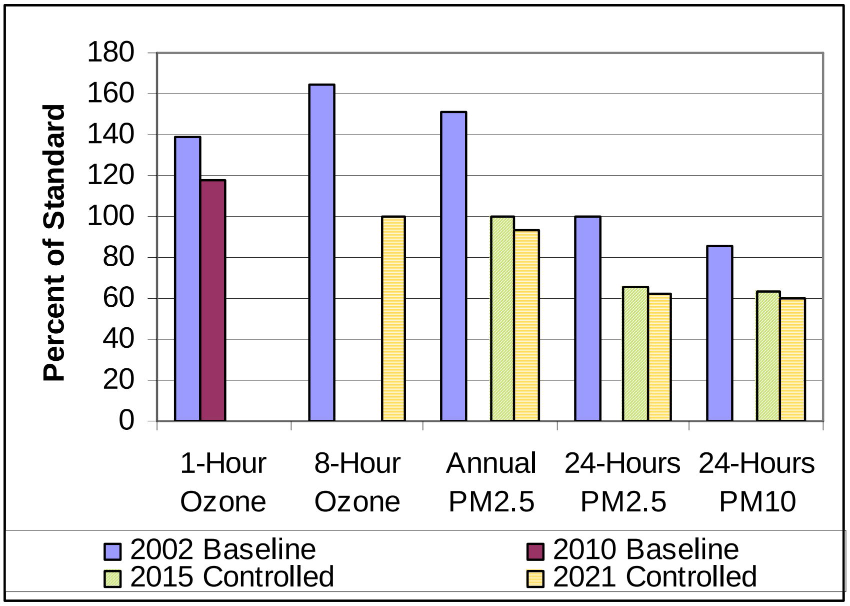

FIGURE V-5-1

Projection of Future Air Quality in the Basin in Comparison with the Most Stringent Federal Standards.

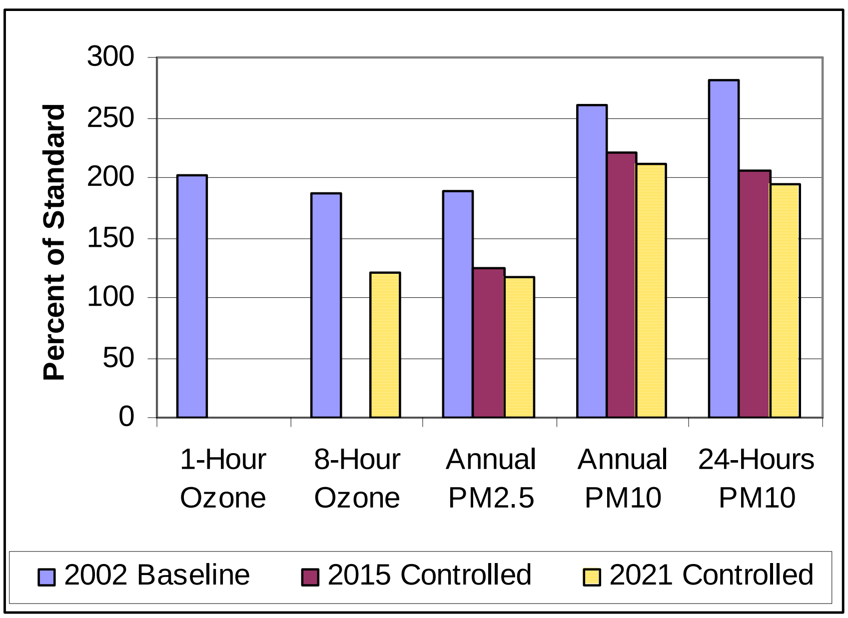

FIGURE V-5-2

Projection of Future Air Quality in the Basin in Comparison with Most Stringent California State Standards

TABLE V-5-1

Expected Year of Compliance with State and Federal Standards for the Four Criteria Pollutants

Pollutant	Standard	Concentration Level	Expected Compliance Year
Ozone	NAAQS 8-hours	84 ppb	2021
	CAAQS 1-hour	90 ppb	beyond 2021
	CAAQS 8-hours	70 ppb	beyond 2021
PM2.5	NAAQS Annual	15 ug/m^3	2015
	NAAQS 24-hours	65 ug/m^3	2005
	CAAQS Annual	12 ug/m^3	beyond 2021
PM10	NAAQS 24-hours	150 ug/m^3	2000
	CAAQS 24-hours	50 ug/m^3	beyond 2021
	CAAQS Annual	20 ug/m^3	beyond 2021
CO*	NAAQS 1-hour	35 ppm	1990
	NAAQS 8-hours	9 ppm	2002
	CAAQS 8-hours	9 ppm	2002
NO2	NAAQS Annual	0.0534 ppm	1995
	CAAQS 24-hours	0.25 ppm	2003

* The Basin has been achieving the federal 1-hour CO air quality standard since 1990. In 2002, the Basin achieved the 8-hour CO air quality standard. The Basin is still considered nonattainment until a petition for redesignation is submitted by the state and is approved by EPA.

TABLE V-5-2

Emissions Carrying Capacity Estimations for the South Coast Air Basin (tons/day) based on the Planning Inventory

a) PM2.5 Attainment Strategy to meet NAAQS (2015)

VOC	NOx	SOx	PM2.5
457	426	19	84

b) Ozone Attainment Strategy to meet NAAQS (2021)

VOC	NOx	CO
384	232	1661

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Attachment-1

Model Performance Statistics and Graphical Presentation

August 2004

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

SubRegional Descriptions

SubRegion 003 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
0069	Burbank	53	48	-27.848	461.308
0088	Pasadena	56	47	-11.205	457.021
0074	Reseda	49	48	-48.000	463.105
0090	Santa Clarita	49	52	-48.140	483.357

SubRegion 004 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
0060	Azusa	60	47	6.981	456.113
4164	Banning Airport	79	42	104.459	433.527
5181	Crestline	72	49	66.383	468.606
4158	Elsinore	71	37	60.525	405.907
5197	Fontana	68	46	46.811	453.081
0591	Glendora	61	47	13.487	457.010
5212	Mira Loma	67	43	42.938	438.915
4149	Perris	72	39	69.051	417.376
0075	Pomona	63	45	22.598	448.610
5204	Redlands	74	45	76.256	448.189
5213	Rim of the World HS	74	48	79.691	464.719
4144	Rubidoux	69	44	52.093	442.557
5203	San Bernardino	72	46	65.874	453.299
4162	UC Riverside	70	43	57.540	435.996
5175	Upland	65	46	31.687	452.125

SubRegion 005 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)

3176	Anaheim	60	40	7.422	421.645
0087	Los Angeles	54	45	-22.302	445.563
3195	Costa Mesa	60	37	6.793	405.626
3177	La Habra	59	42	4.359	432.978
0820	LAXH	51	42	-36.352	433.685
0072	Long Beach	55	40	-17.171	421.903
0084	Lynwood	55	42	-19.237	432.753
3812	Mission Viejo	64	36	29.671	400.791
0085	Pico Rivera	57	44	-5.273	442.860
0091	West Los Angeles	52	45	-34.796	447.031

SubRegion 009 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
4157	Indio Jackson	91	38	162.217	411.293
4137	Palm Springs	85	40	132.826	423.133

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 155 (06/03) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---					
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0003	SubRegion	3	10.1	11	6.3	11	0	0.62	-3.1	3.1	-0.35	0.35	-74.20

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
	Subregional Peak:				7.1	11	0	0.70	(at 61 x 58) NSte: 0069; NSPk: 5.1				
0069	Burbank	1	7.1	10	5.1	10	0	0.72	-2.0	2.0	-0.28	0.28	
0074	Reseda	1	8.7	11	5.2	10	-1	0.60	-3.4	3.4	-0.40	0.40	
0090	Santa Clarita	1	10.1	11	6.3	11	0	0.62	-3.8	3.8	-0.38	0.38	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 155 (06/03) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
			------- Peak Concentrations --------						--- Comparisons with Observations ---				
0004	SubRegion	14	10.8	11	7.3	11	0	0.67	-2.7	2.7	-0.32	0.32	-38.79
	Subregional Peak:				8.0	10	-1	0.74	(at 69 x 36) NSte: 4158; NSPk: 7.3				
0060	Azusa	1	6.2	11	4.2	10	-1	0.67	-2.0	2.0	-0.33	0.33	
4164	Banning Airport	1	10.8	11	6.8	11	0	0.63	-4.0	4.0	-0.37	0.37	
5181	Crestline	1	9.6	11	5.9	10	-1	0.61	-3.7	3.7	-0.39	0.39	
4158	Elsinore	1	9.1	9	7.3	11	2	0.81	-1.8	1.8	-0.19	0.19	
5197	Fontana	1	7.4	11	5.0	10	-1	0.68	-2.4	2.4	-0.32	0.32	
0591	Glendora	1	6.7	11	4.6	10	-1	0.68	-2.2	2.2	-0.32	0.32	
5212	Mira Loma	1	7.5	10	5.2	9	-1	0.69	-2.3	2.3	-0.31	0.31	
4149	Perris	1	8.9	11	6.9	11	0	0.78	-1.9	1.9	-0.22	0.22	
5204	Redlands	1	9.5	11	6.1	10	-1	0.64	-3.4	3.4	-0.36	0.36	
5213	Rim of the World HS	1	10.3	13	6.1	11	-2	0.59	-4.2	4.2	-0.41	0.41	
4144	Rubidoux	1	8.0	10	5.5	10	0	0.68	-2.5	2.5	-0.32	0.32	
5203	San Bernardino	1	8.0	11	5.6	10	-1	0.70	-2.4	2.4	-0.30	0.30	
4162	UC Riverside	1	9.2	11	5.9	10	-1	0.64	-3.3	3.3	-0.36	0.36	
5175	Upland	1	6.4	11	4.8	10	-1	0.74	-1.7	1.7	-0.26	0.26	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 155 (06/03) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	1	6.2	11	4.4	10	-1	0.71	-1.8	1.8	-0.29	0.29	-99.00
	Subregional Peak:				7.8	10	-1	1.26	(at 68 x 37) NSte: 3812; NSPk: 5.2				
0091	West Los Angeles	1	6.2	11	4.4	10	-1	0.71	-1.8	1.8	-0.29	0.29	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 155 (06/03) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	2	10.1	11	6.6	11	0	0.65	-2.5	2.5	-0.27	0.27	-99.00

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
	Subregional Peak:				10.1	10	-1	1.00	(at 106 x 12) NSte: 4157; NSPk: 6.5				
4157	Indio Jackson	1	8.0	8	6.5	11	3	0.80	-1.6	1.6	-0.20	0.20	
4137	Palm Springs	1	10.1	11	6.6	11	0	0.65	-3.5	3.5	-0.35	0.35	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 156 (06/04) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0003	SubRegion	4	11.4	11	7.1	10	-1	0.62	-3.8	3.8	-0.40	0.40	-39.02
	Subregional Peak:				7.9	11	0	0.69	(at 54 x 54) NSte: 0090; NSPk: 7.1				
0069	Burbank	1	8.0	11	5.5	10	-1	0.68	-2.6	2.6	-0.32	0.32	
0088	Pasadena	1	8.4	11	4.3	10	-1	0.51	-4.1	4.1	-0.49	0.49	
0074	Reseda	1	10.4	12	6.2	9	-3	0.60	-4.2	4.2	-0.40	0.40	
0090	Santa Clarita	1	11.4	11	7.1	10	-1	0.62	-4.3	4.3	-0.38	0.38	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 156 (06/04) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0004	SubRegion	15	12.3	13	10.1	11	-2	0.82	-2.3	2.5	-0.23	0.25	-33.05
	Subregional Peak:				10.5	10	-3	0.86	(at 76 x 41) NSte: 4164; NSPk: 10.1				
0060	Azusa	1	8.1	11	5.0	10	-1	0.62	-3.1	3.1	-0.38	0.38	
4164	Banning Airport	1	10.4	11	10.1	11	0	0.97	-0.3	0.3	-0.03	0.03	
5181	Crestline	1	12.0	12	7.8	11	-1	0.65	-4.2	4.2	-0.35	0.35	
4158	Elsinore	1	8.3	10	9.7	10	0	1.17	1.4	1.4	0.17	0.17	
5197	Fontana	1	8.9	11	6.4	10	-1	0.72	-2.5	2.5	-0.28	0.28	
0591	Glendora	1	8.7	11	5.6	10	-1	0.65	-3.0	3.0	-0.35	0.35	
5212	Mira Loma	1	9.6	10	5.9	10	0	0.61	-3.7	3.7	-0.39	0.39	
4149	Perris	1	10.0	11	9.2	10	-1	0.92	-0.8	0.8	-0.08	0.08	
0075	Pomona	1	7.5	11	6.0	10	-1	0.81	-1.5	1.5	-0.19	0.19	
5204	Redlands	1	11.6	10	8.7	10	0	0.75	-2.9	2.9	-0.25	0.25	
5213	Rim of the World HS	1	12.3	13	7.9	11	-2	0.65	-4.4	4.4	-0.35	0.35	
4144	Rubidoux	1	10.3	10	7.2	10	0	0.70	-3.1	3.1	-0.30	0.30	
5203	San Bernardino	1	10.2	10	7.8	10	0	0.77	-2.4	2.4	-0.23	0.23	
4162	UC Riverside	1	10.6	11	7.7	10	-1	0.73	-2.9	2.9	-0.27	0.27	
5175	Upland	1	7.8	10	6.3	10	0	0.80	-1.5	1.5	-0.20	0.20	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 156 (06/04) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

------- Peak Concentrations -------- --- Comparisons with Observations ---

Observed Predicted Time Peak Mean Mean Normalized

Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	6	7.6	10	5.5	10	0	0.72	-2.3	2.3	-0.33	0.33	-129.00
	Subregional Peak:				9.6	10	0	1.26	(at 68 x 37) NSte: 3812; NSPk: 5.9				
3176	Anaheim	1	7.6	10	4.1	10	0	0.53	-3.6	3.6	-0.47	0.47	
0087	Los Angeles	1	6.8	10	3.8	10	0	0.55	-3.0	3.0	-0.45	0.45	
3195	Costa Mesa	1	6.2	10	5.5	10	0	0.89	-0.7	0.7	-0.11	0.11	
0820	LAXH	1	6.8	11	4.4	9	-2	0.64	-2.4	2.4	-0.36	0.36	
0085	Pico Rivera	1	6.7	11	4.7	10	-1	0.71	-2.0	2.0	-0.29	0.29	
0091	West Los Angeles	1	6.5	11	4.4	10	-1	0.67	-2.1	2.1	-0.33	0.33	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 156 (06/04) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	2	10.0	11	9.1	11	0	0.92	-0.8	0.8	-0.08	0.08	-99.00
	Subregional Peak:				10.2	10	-1	1.03	(at 108 x 11) NSte: 4157; NSPk: 9.1				
4157	Indio Jackson	1	9.2	9	9.1	11	2	0.99	-0.1	0.1	-0.01	0.01	
4137	Palm Springs	1	10.0	11	8.4	11	0	0.85	-1.5	1.5	-0.15	0.15	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 157 (06/05) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0003	SubRegion	4	13.3	11	8.5	11	0	0.64	-4.3	4.3	-0.37	0.37	-82.52
	Subregional Peak:				8.7	11	0	0.65	(at 51 x 53) NSte: 0090; NSPk: 8.5				
0069	Burbank	1	10.9	11	7.0	11	0	0.64	-4.0	4.0	-0.36	0.36	
0088	Pasadena	1	10.3	10	6.0	10	0	0.59	-4.3	4.3	-0.41	0.41	
0074	Reseda	1	11.5	11	7.5	11	0	0.65	-4.0	4.0	-0.35	0.35	
0090	Santa Clarita	1	13.3	11	8.5	11	0	0.64	-4.8	4.8	-0.36	0.36	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 157 (06/05) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

------- Peak Concentrations -------- --- Comparisons with Observations ---

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0004	SubRegion	15	14.8	13	10.7	10	-3	0.72	-2.6	3.2	-0.20	0.28	-40.87
	Subregional Peak:				11.2	11	-2	0.76	(at 76 x 46) NSte: 5204; NSPk: 10.3				
0060	Azusa	1	10.5	10	6.6	10	0	0.63	-3.9	3.9	-0.37	0.37	
4164	Banning Airport	1	8.5	12	9.9	10	-2	1.17	1.4	1.4	0.17	0.17	
5181	Crestline	1	14.6	12	9.3	12	0	0.63	-5.3	5.3	-0.37	0.37	
4158	Elsinore	1	8.0	9	10.7	10	1	1.33	2.7	2.7	0.33	0.33	
5197	Fontana	1	12.4	11	8.3	10	-1	0.67	-4.1	4.1	-0.33	0.33	
0591	Glendora	1	10.8	11	7.2	10	-1	0.67	-3.5	3.5	-0.33	0.33	
5212	Mira Loma	1	11.1	10	7.8	10	0	0.71	-3.2	3.2	-0.29	0.29	
4149	Perris	1	10.0	10	10.6	10	0	1.06	0.6	0.6	0.06	0.06	
0075	Pomona	1	10.0	10	7.0	10	0	0.69	-3.1	3.1	-0.31	0.31	
5204	Redlands	1	13.6	11	10.3	11	0	0.76	-3.3	3.3	-0.24	0.24	
5213	Rim of the World HS	1	14.8	13	9.3	12	-1	0.63	-5.5	5.5	-0.37	0.37	
4144	Rubidoux	1	11.4	10	8.9	10	0	0.78	-2.5	2.5	-0.22	0.22	
5203	San Bernardino	1	12.9	10	9.4	11	1	0.73	-3.5	3.5	-0.27	0.27	
4162	UC Riverside	1	11.7	10	9.2	10	0	0.78	-2.5	2.5	-0.22	0.22	
5175	Upland	1	10.5	10	7.7	10	0	0.74	-2.8	2.8	-0.26	0.26	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 157 (06/05) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Peak Concentrations: Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Comparisons with Observations: Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0005	SubRegion	9	8.0	9	6.6	10	1	0.83	-1.9	1.9	-0.25	0.27	-86.66
	Subregional Peak:				10.0	10	1	1.25	(at 68 x 37) NSte: 3812; NSPk: 6.6				

3176	Anaheim	1	8.0	9	5.4	10	1	0.68	-2.6	2.6	-0.32	0.32	
0087	Los Angeles	1	7.8	10	5.1	10	0	0.65	-2.7	2.7	-0.35	0.35	
3195	Costa Mesa	1	6.2	9	5.1	10	1	0.83	-1.1	1.1	-0.17	0.17	
3177	La Habra	1	7.8	10	5.5	10	0	0.70	-2.4	2.4	-0.30	0.30	
0820	LAXH	1	6.4	10	4.5	10	0	0.69	-2.0	2.0	-0.31	0.31	
0084	Lynwood	1	6.7	10	4.5	9	-1	0.67	-2.2	2.2	-0.33	0.33	
3812	Mission Viejo	1	6.3	10	6.6	10	0	1.06	0.4	0.4	0.06	0.06	
0085	Pico Rivera	1	7.9	10	5.2	10	0	0.66	-2.7	2.7	-0.34	0.34	
0091	West Los Angeles	1	6.9	10	5.4	9	-1	0.78	-1.5	1.5	-0.22	0.22	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 157 (06/05) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	2	10.0	13	8.5	10	-3	0.85	-1.2	1.2	-0.13	0.13	-99.00
	Subregional Peak:				10.1	10	-3	1.01	(at 96 x 33) NSte: 4157; NSPk: 8.5				
4157	Indio Jackson	1	10.0	13	8.5	10	-3	0.85	-1.5	1.5	-0.15	0.15	
4137	Palm Springs	1	8.8	11	7.8	10	-1	0.89	-1.0	1.0	-0.11	0.11	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 158 (06/06) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0003	SubRegion	3	10.1	11	9.2	11	0	0.91	-0.8	0.8	-0.09	0.09	-53.20
	Subregional Peak:				9.6	11	0	0.96	(at 52 x 54) NSte: 0090; NSPk: 9.2				
0069	Burbank	1	7.1	10	6.8	10	0	0.95	-0.3	0.3	-0.05	0.05	
0074	Reseda	1	8.7	11	7.5	10	-1	0.87	-1.1	1.1	-0.13	0.13	
0090	Santa Clarita	1	10.1	11	9.2	11	0	0.91	-0.9	0.9	-0.09	0.09	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 158 (06/06) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0004	SubRegion	14	10.8	11	11.0	11	0	1.01	0.7	1.0	0.10	0.12	-45.89
	Subregional Peak:				12.3	11	0	1.13	(at 76 x 47) NSte: 5213; NSPk: 11.0				
0060	Azusa	1	6.2	11	6.8	10	-1	1.10	0.6	0.6	0.10	0.10	
4164	Banning Airport	1	10.8	11	8.9	11	0	0.82	-1.9	1.9	-0.18	0.18	
5181	Crestline	1	9.6	11	10.0	11	0	1.04	0.4	0.4	0.04	0.04	
4158	Elsinore	1	9.1	9	9.2	10	1	1.01	0.1	0.1	0.01	0.01	
5197	Fontana	1	7.4	11	8.5	10	-1	1.16	1.1	1.1	0.16	0.16	
0591	Glendora	1	6.7	11	7.3	10	-1	1.09	0.6	0.6	0.09	0.09	
5212	Mira Loma	1	7.5	10	8.6	9	-1	1.15	1.1	1.1	0.15	0.15	
4149	Perris	1	8.9	11	9.9	11	0	1.11	1.0	1.0	0.11	0.11	
5204	Redlands	1	9.5	11	10.9	10	-1	1.15	1.4	1.4	0.15	0.15	
5213	Rim of the World HS	1	10.3	13	11.0	11	-2	1.07	0.7	0.7	0.07	0.07	
4144	Rubidoux	1	8.0	10	9.2	10	0	1.15	1.2	1.2	0.15	0.15	
5203	San Bernardino	1	8.0	11	9.9	10	-1	1.24	1.9	1.9	0.24	0.24	
4162	UC Riverside	1	9.2	11	9.9	10	-1	1.08	0.8	0.8	0.08	0.08	
5175	Upland	1	6.4	11	7.7	10	-1	1.20	1.3	1.3	0.20	0.20	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 158 (06/06) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	------- Peak Concentrations -------- Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	--- Comparisons with Observations --- Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0005	SubRegion	1	6.2	11	5.5	11	0	0.88	-0.7	0.7	-0.12	0.12	-99.00
	Subregional Peak:				9.7	10	-1	1.56	(at 67 x 38) NSte: 3812; NSPk: 7.0				
0091	West Los Angeles	1	6.2	11	5.5	11	0	0.88	-0.7	0.7	-0.12	0.12	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 158 (06/06) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	2	10.1	11	8.7	10	-1	0.87	-0.8	1.5	-0.07	0.16	-99.00
	Subregional Peak:				9.7	12	1	0.96	(at 81 x 44) NSte: 4137; NSPk: 7.8				
4157	Indio Jackson	1	8.0	8	8.7	10	2	1.09	0.7	0.7	0.09	0.09	
4137	Palm Springs	1	10.1	11	7.8	10	-1	0.77	-2.3	2.3	-0.23	0.23	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 159 (06/07) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0003	SubRegion	1	6.5	11	5.2	10	-1	0.80	-1.3	1.3	-0.20	0.20	-99.00
	Subregional Peak:				6.1	11	0	0.94	(at 51 x 56) NSte: 0090; NSPk: 5.5				
0074	Reseda	1	6.5	11	5.2	10	-1	0.80	-1.3	1.3	-0.20	0.20	

------- Peak Concentrations -------- --- Comparisons with Observations ---

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 159 (06/07) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

------- Peak Concentrations -------- --- Comparisons with Observations ---

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0004	SubRegion	4	7.7	0	8.5	10	10	1.11	0.8	0.9	0.12	0.13	-190.67
	Subregional Peak:				9.0	10	10	1.17	(at 75 x 40) NSte: 4149; NSPk: 8.5				
4164	Banning Airport	1	7.6	10	8.3	10	0	1.10	0.8	0.8	0.10	0.10	
5181	Crestline	1	7.3	4	7.4	11	7	1.02	0.1	0.1	0.02	0.02	
4149	Perris	1	6.2	11	8.5	10	-1	1.38	2.4	2.4	0.38	0.38	
5213	Rim of the World HS	1	7.7	0	7.4	11	11	0.97	-0.2	0.2	-0.03	0.03	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 159 (06/07) 2004

Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			Peak Concentrations						Comparisons with Observations				
Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0005	SubRegion	1	6.1	12	4.7	9	-3	0.76	-1.4	1.4	-0.24	0.24	-99.00
	Subregional Peak:				6.9	9	-3	1.12	(at 68 x 37) NSte: 3812; NSPk: 5.6				
3176	Anaheim	1	6.1	12	4.7	9	-3	0.76	-1.4	1.4	-0.24	0.24	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 159 (06/07) 2004
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			Peak Concentrations						Comparisons with Observations				
Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0009	SubRegion	2	9.1	9	8.7	10	1	0.96	-0.3	0.3	-0.04	0.04	-99.00
	Subregional Peak:				10.9	9	0	1.20	(at 106 x 14) NSte: 4157; NSPk: 8.7				
4157	Indio Jackson	1	9.1	9	8.7	10	1	0.96	-0.4	0.4	-0.04	0.04	
4137	Palm Springs	1	7.5	11	7.2	10	-1	0.97	-0.3	0.3	-0.03	0.03	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0000 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 155 through 159
Unpaired Subregional Maximum of 8.9 at Cell 107 x 11 -- Nearest Site: 4157

Site ID	Site Description	Observed Site Avg.	Observed DOY 155	Observed DOY 156	Observed DOY 157	Observed DOY 158	Observed DOY 159	Simulated Site Avg.	Simulated DOY 155	Simulated DOY 156	Simulated DOY 157	Simulated DOY 158	Simulated DOY 159	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0001 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 155 through 159
Unpaired Subregional Maximum of -99.0 at Cell -9 x -9 -- Nearest Site: 0820

Site ID	Site Description	Observed Site Avg.	Observed DOY 155	Observed DOY 156	Observed DOY 157	Observed DOY 158	Observed DOY 159	Simulated Site Avg.	Simulated DOY 155	Simulated DOY 156	Simulated DOY 157	Simulated DOY 158	Simulated DOY 159	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0002 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 155 through 159
Unpaired Subregional Maximum of 7.9 at Cell 48 x 51 -- Nearest Site: 0090

Site ID	Site Description	Observed Site Avg.	Observed DOY 155	Observed DOY 156	Observed DOY 157	Observed DOY 158	Observed DOY 159	Simulated Site Avg.	Simulated DOY 155	Simulated DOY 156	Simulated DOY 157	Simulated DOY 158	Simulated DOY 159	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0003 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 155 through 159
Unpaired Subregional Maximum of 8.2 at Cell 51 x 53 -- Nearest Site: 0090

Site ID	Site Description	Observed Site Avg.	Observed DOY 155	Observed DOY 156	Observed DOY 157	Observed DOY 158	Observed DOY 159	Simulated Site Avg.	Simulated DOY 155	Simulated DOY 156	Simulated DOY 157	Simulated DOY 158	Simulated DOY 159	Max. Ratio	Max. Bias	Max. Error
0069	Burbank	8.3	7.1	8.0	10.9	7.1	5.4	7.3	6.4	7.5	8.5	8.7	5.5	0.80	-0.04	0.16
0088	Pasadena	9.3	0.6	8.4	10.3	3.2	4.1	7.1	6.0	7.2	8.2	8.8	5.1	0.86	-0.17	0.17
0074	Reseda	9.1	8.7	10.4	11.5	8.7	6.5	7.3	6.2	7.1	8.6	9.2	5.6	0.80	-0.18	0.21
0090	Santa Clarita	11.2	10.1	11.4	13.3	10.1	5.9	7.9	7.1	7.8	8.7	9.6	6.1	0.73	-0.25	0.25

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0004 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 155 through 159
Unpaired Subregional Maximum of 9.6 at Cell 75 x 41 -- Nearest Site: 4149

Site ID	Site Description	Observed Site Avg.	Observed DOY 155	Observed DOY 156	Observed DOY 157	Observed DOY 158	Observed DOY 159	Simulated Site Avg.	Simulated DOY 155	Simulated DOY 156	Simulated DOY 157	Simulated DOY 158	Simulated DOY 159	Max. Ratio	Max. Bias	Max. Error
0060	Azusa	7.7	6.2	8.1	10.5	6.2	3.1	7.1	6.0	7.2	8.2	8.8	5.2	0.84	0.02	0.19
4164	Banning Airport	9.6	10.8	10.4	8.5	10.8	7.6	9.8	7.3	10.5	10.9	11.2	9.0	1.04	0.04	0.17
5181	Crestline	10.6	9.6	12.0	14.6	9.6	7.3	9.1	6.7	8.6	10.6	11.6	8.0	0.80	-0.11	0.23
4158	Elsinore	8.6	9.1	8.3	8.0	9.1	5.5	9.8	8.0	10.5	11.1	10.7	8.9	1.23	0.18	0.23
5197	Fontana	9.0	7.4	8.9	12.4	7.4	3.8	8.3	6.1	8.6	9.5	10.1	7.3	0.81	-0.02	0.20
0591	Glendora	8.2	6.7	8.7	10.8	6.7	3.6	7.2	6.2	7.2	8.3	8.8	5.2	0.82	-0.04	0.19
5212	Mira Loma	8.9	7.5	9.6	11.1	7.5	4.9	8.4	6.6	8.1	9.8	10.1	7.6	0.91	-0.01	0.18
4149	Perris	8.8	8.9	10.0	10.0	8.9	6.2	9.9	8.0	10.5	11.2	11.0	9.0	1.12	0.15	0.19
0075	Pomona	8.8	5.6	7.5	10.0	5.6	3.7	7.1	5.6	7.2	8.4	8.4	5.9	0.84	-0.10	0.10
5204	Redlands	11.0	9.5	11.6	13.6	9.5	5.4	9.8	7.0	10.2	11.2	12.3	8.5	0.91	-0.07	0.21
5213	Rim of the World HS	11.1	10.3	12.3	14.8	10.3	7.7	9.7	7.3	9.3	11.2	12.3	8.2	0.83	-0.10	0.21
4144	Rubidoux	9.4	8.0	10.3	11.4	8.0	5.0	8.8	6.5	8.9	10.3	10.4	7.9	0.91	-0.03	0.18
5203	San Bernardino	9.8	8.0	10.2	12.9	8.0	4.4	9.4	6.7	9.6	11.0	11.6	8.1	0.90	0.02	0.21
4162	UC Riverside	10.2	9.2	10.6	11.7	9.2	5.3	9.3	6.9	9.5	10.8	10.8	8.7	0.92	-0.06	0.15
5175	Upland	7.8	6.4	7.8	10.5	6.4	3.4	7.7	6.1	8.6	8.7	9.0	6.3	0.86	0.07	0.18

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0005 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 155 through 159
Unpaired Subregional Maximum of 9.1 at Cell 69 x 37 -- Nearest Site: 4158

Site ID	Site Description	Observed Site Avg.	Observed DOY 155	Observed DOY 156	Observed DOY 157	Observed DOY 158	Observed DOY 159	Simulated Site Avg.	Simulated DOY 155	Simulated DOY 156	Simulated DOY 157	Simulated DOY 158	Simulated DOY 159	Max. Ratio	Max. Bias	Max. Error

3176	Anaheim	7.2	5.8	7.6	8.0	5.8	6.1	6.2	5.7	5.7	6.9	7.2	5.7	0.90	-0.15	0.15
0087	Los Angeles	7.3	5.7	6.8	7.8	5.7	4.5	6.1	5.4	6.0	7.4	7.0	4.8	0.94	-0.09	0.09
3195	Costa Mesa	6.2	4.8	6.2	6.2	4.9	5.8	6.2	5.7	6.1	6.2	7.2	5.7	1.15	-0.01	0.01
3177	La Habra	7.8	4.5	5.9	7.8	4.5	4.6	6.0	4.9	6.1	6.7	6.9	5.3	0.88	-0.15	0.15
0820	LAXH	6.6	5.7	6.8	6.4	5.7	5.5	6.0	5.6	5.7	6.6	6.7	5.6	0.98	-0.07	0.10
0084	Lynwood	6.7	5.2	5.9	6.7	5.2	4.4	5.5	5.1	5.2	5.7	6.1	5.2	0.92	-0.15	0.15
3812	Mission Viejo	6.3	4.9	5.8	6.3	4.9	4.8	8.5	7.3	8.8	9.9	10.2	6.4	1.62	0.59	0.59
0085	Pico Rivera	7.3	5.2	6.7	7.9	5.2	3.7	5.7	4.5	5.9	6.7	6.9	4.7	0.87	-0.14	0.14
0091	West Los Angeles	6.5	6.2	6.5	6.9	6.2	5.8	6.4	5.6	6.2	7.5	7.5	5.3	1.09	0.04	0.11

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0006 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 155 through 159
Unpaired Subregional Maximum of 8.6 at Cell 70 x 36 -- Nearest Site: 4158

		- - - - - Observed					- - - - -	- - - - - Simulated					- - - - -			
Site ID	Site Description	Site Avg.	DOY 155	DOY 156	DOY 157	DOY 158	DOY 159	Site Avg.	DOY 155	DOY 156	DOY 157	DOY 158	DOY 159	Max. Ratio	Max. Bias	Max. Error
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* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 200r4Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0007 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 155 through 159
Unpaired Subregional Maximum of -99.0 at Cell -9 x -9 -- Nearest Site: 0820

		- - - - - Observed					- - - - -	- - - - - Simulated					- - - - -			
Site	Site	Site	DOY	DOY	DOY	DOY	DOY	Site	DOY	DOY	DOY	DOY	DOY	Max.	Max.	Max.

ID	Description	Avg.	155	156	157	158	159	Avg.	155	156	157	158	159	Ratio	Bias	Error

* * * Model Performance Evaluation * * *

Pollutant: O3   (pphm)   Project: CAMx/SAPRC99f 200r4Base Case   Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0008   Spatially Paired Average 8-Hour Concentrations above   6.0 pphm for DOY 155 through 159
Unpaired Subregional Maximum of   7.5 at Cell 78 x 54 -- Nearest Site: 5213

Site ID	Site Description	- - - - - Observed - - - - - Site Avg.	DOY 155	DOY 156	DOY 157	DOY 158	DOY 159	- - - - - Simulated - - - - - Site Avg.	DOY 155	DOY 156	DOY 157	DOY 158	DOY 159	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3   (pphm)   Project: CAMx/SAPRC99f 200r4Base Case   Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0009   Spatially Paired Average 8-Hour Concentrations above   6.0 pphm for DOY 155 through 159
Unpaired Subregional Maximum of   9.0 at Cell 108 x 12 -- Nearest Site: 4157

Site ID	Site Description	- - - - - Observed - - - - - Site Avg.	DOY 155	DOY 156	DOY 157	DOY 158	DOY 159	- - - - - Simulated - - - - - Site Avg.	DOY 155	DOY 156	DOY 157	DOY 158	DOY 159	Max. Ratio	Max. Bias	Max. Error
4157	Indio Jackson	8.9	8.0	9.2	10.0	8.0	9.1	8.7	7.0	9.5	8.9	9.3	8.8	0.95	-0.02	0.09
4137	Palm Springs	9.3	10.1	10.0	8.8	10.1	7.5	8.7	6.9	10.0	9.5	8.9	8.4	0.99	-0.04	0.13

May 2005

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

SubRegional Descriptions

SubRegion 003 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
0069	Burbank	53	48	-27.848	461.308
0088	Pasadena	56	47	-11.205	457.021
0074	Reseda	49	48	-48.000	463.105
0090	Santa Clarita	49	52	-48.140	483.357

SubRegion 004 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
0060	Azusa	60	47	6.981	456.113
4164	Banning Airport	79	42	104.459	433.527
5181	Crestline	72	49	66.383	468.606
4158	Elsinore	71	37	60.525	405.907
5197	Fontana	68	46	46.811	453.081
0591	Glendora	61	47	13.487	457.010
5212	Mira Loma	67	43	42.938	438.915
4149	Perris	72	39	69.051	417.376
0075	Pomona	63	45	22.598	448.610
5204	Redlands	74	45	76.256	448.189
4144	Rubidoux	69	44	52.093	442.557
5203	San Bernardino	72	46	65.874	453.299
5175	Upland	65	46	31.687	452.125

SubRegion 005 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
3176	Anaheim	60	40	7.422	421.645

0087	Los Angeles	54	45	-22.302	445.563
3195	Costa Mesa	60	37	6.793	405.626
3177	La Habra	59	42	4.359	432.978
0820	LAXH	51	42	-36.352	433.685
0072	Long Beach	55	40	-17.171	421.903
0084	Lynwood	55	42	-19.237	432.753
3812	Mission Viejo	64	36	29.671	400.791
0085	Pico Rivera	57	44	-5.273	442.860
0091	West Los Angeles	52	45	-34.796	447.031

SubRegion 009 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
4157	Indio Jackson	91	38	162.217	411.293
4137	Palm Springs	85	40	132.826	423.133

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 139 (05/19) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0003	SubRegion	3	6.7	10	5.0	10	0	0.75	-1.8	1.8	-0.28	0.28	-704.69
	Subregional Peak:				6.4	12	2	0.96	(at 59 x 50) NSte: 0088; NSPk: 4.1				

0069	Burbank	1	6.4	9	4.8	10	1	0.75	-1.6	1.6	-0.25	0.25	
0088	Pasadena	1	6.5	10	4.1	10	0	0.64	-2.3	2.3	-0.36	0.36	
0074	Reseda	1	6.7	10	5.0	10	0	0.75	-1.6	1.6	-0.25	0.25	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 139 (05/19) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0004	SubRegion	13	9.5	11	7.4	10	-1	0.78	-2.3	2.3	-0.29	0.29	-52.53
	Subregional Peak:				8.2	10	-1	0.86	(at 79 x 38) NSte: 4164; NSPk: 7.4				
0060	Azusa	1	6.3	10	4.0	10	0	0.64	-2.3	2.3	-0.36	0.36	
4164	Banning Airport	1	9.0	12	7.4	10	-2	0.83	-1.5	1.5	-0.17	0.17	
5181	Crestline	1	7.9	11	6.1	12	1	0.77	-1.8	1.8	-0.23	0.23	
4158	Elsinore	1	7.1	12	6.6	10	-2	0.93	-0.5	0.5	-0.07	0.07	
5197	Fontana	1	8.5	11	5.1	10	-1	0.61	-3.3	3.3	-0.39	0.39	
0591	Glendora	1	7.4	10	4.4	10	0	0.60	-3.0	3.0	-0.40	0.40	
5212	Mira Loma	1	8.4	10	5.1	10	0	0.60	-3.4	3.4	-0.40	0.40	
4149	Perris	1	7.1	14	6.3	10	-4	0.90	-0.7	0.7	-0.10	0.10	
0075	Pomona	1	7.4	10	4.6	10	0	0.63	-2.8	2.8	-0.37	0.37	
5204	Redlands	1	7.5	11	6.3	10	-1	0.84	-1.2	1.2	-0.16	0.16	
4144	Rubidoux	1	9.5	11	5.8	10	-1	0.61	-3.8	3.8	-0.39	0.39	
5203	San Bernardino	1	8.3	11	5.9	10	-1	0.71	-2.4	2.4	-0.29	0.29	
5175	Upland	1	7.5	11	4.6	10	-1	0.61	-3.0	3.0	-0.39	0.39	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 139 (05/19) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0005	SubRegion	1	6.7	11	4.6	10	-1	0.69	-2.1	2.1	-0.31	0.31	-99.00
	Subregional Peak:				5.9	10	-1	0.87	(at 68 x 37) NSte: 3812; NSPk: 4.6				
3812	Mission Viejo	1	6.7	11	4.6	10	-1	0.69	-2.1	2.1	-0.31	0.31	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 139 (05/19) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0009	SubRegion	2	8.5	12	8.2	10	-2	0.97	-0.3	0.8	-0.03	0.10	-99.00
	Subregional Peak:				9.3	9	-3	1.10	(at 108 x 13) NSte: 4157; NSPk: 8.2				

4157	Indio Jackson	1	7.7	9	8.2	10	1	1.07	0.5	0.5	0.07	0.07	
4137	Palm Springs	1	8.5	12	7.4	10	-2	0.88	-1.1	1.1	-0.12	0.12	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 140 (05/20) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0004	SubRegion	10	9.6	11	7.1	9	-2	0.74	-1.7	1.7	-0.21	0.22	-40.91
	Subregional Peak:				8.0	10	-1	0.84	(at 78 x 38) NSte: 4164; NSPk: 7.1				
4164	Banning Airport	1	7.3	9	7.1	9	0	0.97	-0.2	0.2	-0.03	0.03	
5181	Crestline	1	9.6	11	6.6	10	-1	0.69	-3.0	3.0	-0.31	0.31	
4158	Elsinore	1	6.2	8	6.4	10	2	1.04	0.2	0.2	0.04	0.04	
5197	Fontana	1	7.3	10	5.4	10	0	0.74	-1.9	1.9	-0.26	0.26	
0591	Glendora	1	6.2	10	4.3	10	0	0.68	-2.0	2.0	-0.32	0.32	
5212	Mira Loma	1	7.6	9	4.8	9	0	0.64	-2.7	2.7	-0.36	0.36	
5204	Redlands	1	7.6	10	7.1	10	0	0.93	-0.6	0.6	-0.07	0.07	
4144	Rubidoux	1	8.8	10	5.8	9	-1	0.66	-3.0	3.0	-0.34	0.34	
5203	San Bernardino	1	8.5	10	6.6	10	0	0.78	-1.9	1.9	-0.22	0.22	
5175	Upland	1	6.3	11	4.6	10	-1	0.73	-1.7	1.7	-0.27	0.27	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 140 (05/20) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			Peak Concentrations						Comparisons with Observations				
Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0009	SubRegion	2	8.7	10	6.6	9	-1	0.76	-1.6	1.6	-0.20	0.20	-99.00
	Subregional Peak:				9.3	9	-1	1.07	(at 109 x 12) NSte: 4157; NSPk: 6.6				
4157	Indio Jackson	1	8.7	10	6.6	9	-1	0.76	-2.1	2.1	-0.24	0.24	
4137	Palm Springs	1	7.5	8	6.3	9	1	0.84	-1.2	1.2	-0.16	0.16	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 141 (05/21) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0003	SubRegion	4	8.7	11	6.5	10	-1	0.74	-1.7	1.7	-0.21	0.21	-207.82
	Subregional Peak:				9.7	13	2	1.12	(at 59 x 50) NSte: 0088; NSPk: 5.7				
0069	Burbank	1	7.1	11	6.5	10	-1	0.92	-0.6	0.6	-0.08	0.08	
0088	Pasadena	1	8.0	11	5.7	10	-1	0.71	-2.3	2.3	-0.29	0.29	
0074	Reseda	1	7.3	10	6.3	10	0	0.86	-1.0	1.0	-0.14	0.14	
0090	Santa Clarita	1	8.7	11	5.7	10	-1	0.66	-3.0	3.0	-0.34	0.34	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 141 (05/21) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0004	SubRegion	13	11.2	13	9.2	11	-2	0.82	-0.2	1.1	-0.01	0.13	-47.29
	Subregional Peak:				10.1	11	-2	0.90	(at 70 x 36) NSte: 4158; NSPk: 9.2				
0060	Azusa	1	7.2	11	5.6	10	-1	0.77	-1.7	1.7	-0.23	0.23	
4164	Banning Airport	1	7.2	12	7.7	11	-1	1.06	0.5	0.5	0.06	0.06	
5181	Crestline	1	11.2	13	8.4	13	0	0.75	-2.8	2.8	-0.25	0.25	
4158	Elsinore	1	7.3	11	9.2	11	0	1.26	1.9	1.9	0.26	0.26	
5197	Fontana	1	8.1	11	7.4	10	-1	0.91	-0.7	0.7	-0.09	0.09	
0591	Glendora	1	7.3	11	6.0	10	-1	0.83	-1.3	1.3	-0.17	0.17	

5212	Mira Loma	1	7.9	10	7.5	10	0	0.95	-0.4	0.4	-0.05	0.05	
4149	Perris	1	6.6	11	8.5	11	0	1.30	2.0	2.0	0.30	0.30	
0075	Pomona	1	6.5	10	6.7	10	0	1.03	0.2	0.2	0.03	0.03	
5204	Redlands	1	7.9	11	8.9	11	0	1.14	1.1	1.1	0.14	0.14	
4144	Rubidoux	1	8.9	10	8.4	10	0	0.94	-0.5	0.5	-0.06	0.06	
5203	San Bernardino	1	8.5	11	8.4	11	0	0.98	-0.1	0.1	-0.02	0.02	
5175	Upland	1	7.5	10	6.7	11	1	0.90	-0.7	0.7	-0.10	0.10	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 141 (05/21) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	4	7.4	11	7.0	10	-1	0.95	-1.1	1.5	-0.16	0.22	-63.14
	Subregional Peak:				9.6	10	-1	1.29	(at 68 x 37) NSte: 3812; NSPk: 7.0				
0087	Los Angeles	1	6.9	11	4.3	9	-2	0.63	-2.6	2.6	-0.37	0.37	
3195	Costa Mesa	1	6.0	11	6.1	10	-1	1.01	0.1	0.1	0.01	0.01	
3812	Mission Viejo	1	6.4	10	7.0	10	0	1.11	0.7	0.7	0.11	0.11	
0091	West Los Angeles	1	7.4	11	4.7	9	-2	0.63	-2.7	2.7	-0.37	0.37	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 141 (05/21) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---					
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	2	7.7	14	6.6	10	-4	0.86	-0.9	0.9	-0.12	0.12	-99.00
	Subregional Peak:				8.4	9	-5	1.09	(at 110 x 10) NSte: 4157; NSPk: 6.6				
4157	Indio Jackson	1	6.7	15	6.6	10	-5	0.98	-0.1	0.1	-0.02	0.02	
4137	Palm Springs	1	7.7	14	6.0	10	-4	0.79	-1.6	1.6	-0.21	0.21	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 142 (05/22) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---					
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0003	SubRegion	4	11.4	10	7.9	10	0	0.69	-3.8	3.8	-0.36	0.36	-118.09
	Subregional Peak:				9.6	11	1	0.84	(at 58 x 49) NSte: 0088; NSPk: 6.8				

0069	Burbank	1	10.4	10	7.9	10	0	0.75	-2.6	2.6	-0.25	0.25	
0088	Pasadena	1	11.4	10	6.8	10	0	0.60	-4.6	4.6	-0.40	0.40	
0074	Reseda	1	9.3	10	6.5	10	0	0.70	-2.8	2.8	-0.30	0.30	
0090	Santa Clarita	1	10.8	9	5.7	9	0	0.53	-5.1	5.1	-0.47	0.47	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 142 (05/22) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0004	SubRegion	13	14.5	12	12.5	10	-2	0.86	-1.4	1.9	-0.11	0.16	-46.44
	Subregional Peak:				13.0	10	-2	0.89	(at 75 x 46) NSte: 5204; NSPk: 12.5				
0060	Azusa	1	12.2	10	6.9	10	0	0.57	-5.3	5.3	-0.43	0.43	
4164	Banning Airport	1	10.6	12	10.0	11	-1	0.94	-0.6	0.6	-0.06	0.06	
5181	Crestline	1	14.5	12	12.4	11	-1	0.85	-2.2	2.2	-0.15	0.15	
4158	Elsinore	1	9.4	10	9.8	10	0	1.05	0.5	0.5	0.05	0.05	
5197	Fontana	1	12.9	11	11.4	10	-1	0.89	-1.5	1.5	-0.11	0.11	
0591	Glendora	1	13.0	11	7.8	10	-1	0.60	-5.2	5.2	-0.40	0.40	
5212	Mira Loma	1	11.7	11	10.5	9	-2	0.90	-1.2	1.2	-0.10	0.10	
4149	Perris	1	8.3	11	9.6	10	-1	1.16	1.3	1.3	0.16	0.16	
0075	Pomona	1	11.3	11	9.4	10	-1	0.84	-1.8	1.8	-0.16	0.16	
5204	Redlands	1	11.3	11	12.5	10	-1	1.10	1.1	1.1	0.10	0.10	
4144	Rubidoux	1	12.9	11	11.5	10	-1	0.89	-1.4	1.4	-0.11	0.11	
5203	San Bernardino	1	13.0	11	12.3	10	-1	0.94	-0.7	0.7	-0.06	0.06	
5175	Upland	1	11.4	10	10.0	10	0	0.87	-1.5	1.5	-0.13	0.13	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 142 (05/22) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
			------- Peak Concentrations --------						--- Comparisons with Observations ---				
0005	SubRegion	7	9.8	10	7.2	10	0	0.74	-2.2	2.2	-0.26	0.26	-51.93
	Subregional Peak:				10.9	9	-1	1.10	(at 68 x 37) NSte: 3812; NSPk: 7.2				
3176	Anaheim	1	7.5	10	5.5	9	-1	0.73	-2.1	2.1	-0.27	0.27	
0087	Los Angeles	1	9.8	10	4.8	10	0	0.49	-5.0	5.0	-0.51	0.51	
3195	Costa Mesa	1	6.4	10	6.0	11	1	0.94	-0.4	0.4	-0.06	0.06	
3177	La Habra	1	7.4	10	7.1	9	-1	0.96	-0.3	0.3	-0.04	0.04	
0084	Lynwood	1	8.2	10	5.2	10	0	0.64	-3.0	3.0	-0.36	0.36	
3812	Mission Viejo	1	8.6	10	7.2	10	0	0.85	-1.3	1.3	-0.15	0.15	
0091	West Los Angeles	1	9.0	10	5.3	9	-1	0.59	-3.7	3.7	-0.41	0.41	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 142 (05/22) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0009	SubRegion	2	10.9	15	8.3	9	-6	0.76	-2.3	2.3	-0.22	0.22	-99.00
	Subregional Peak:				9.5	12	-3	0.88	(at 82 x 42) NSte: 4137; NSPk: 6.9				
4157	Indio Jackson	1	9.0	19	8.3	9	-10	0.92	-0.7	0.7	-0.08	0.08	
4137	Palm Springs	1	10.9	15	6.9	10	-5	0.64	-3.9	3.9	-0.36	0.36	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm)   Project: CAMx/SAPRC99f 2005 Base Case   Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 143 (05/23) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0003	SubRegion	3	9.5	11	7.1	10	-1	0.75	-1.9	1.9	-0.23	0.23	-58.92
	Subregional Peak:				8.0	11	0	0.84	(at 53 x 54) NSte: 0090; NSPk: 7.1				
0069	Burbank	1	6.5	11	5.5	10	-1	0.84	-1.0	1.0	-0.16	0.16	
0074	Reseda	1	8.7	11	6.3	10	-1	0.72	-2.4	2.4	-0.28	0.28	
0090	Santa Clarita	1	9.5	11	7.1	10	-1	0.75	-2.4	2.4	-0.25	0.25	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 143 (05/23) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0004	SubRegion	12	10.9	10	10.3	8	-2	0.94	-0.8	1.6	-0.08	0.19	-34.48
	Subregional Peak:				10.3	9	-1	0.95	(at 75 x 41) NSte: 4149; NSPk: 9.7				
4164	Banning Airport	1	10.9	10	9.4	9	-1	0.86	-1.5	1.5	-0.14	0.14	
5181	Crestline	1	10.7	11	7.1	10	-1	0.66	-3.6	3.6	-0.34	0.34	
4158	Elsinore	1	7.6	10	10.3	8	-2	1.35	2.7	2.7	0.35	0.35	
5197	Fontana	1	8.8	10	7.0	9	-1	0.80	-1.8	1.8	-0.20	0.20	
0591	Glendora	1	6.7	10	5.2	9	-1	0.78	-1.5	1.5	-0.22	0.22	
5212	Mira Loma	1	8.1	10	7.1	9	-1	0.88	-0.9	0.9	-0.12	0.12	
4149	Perris	1	8.0	10	9.7	8	-2	1.20	1.6	1.6	0.20	0.20	
0075	Pomona	1	7.1	10	5.7	9	-1	0.80	-1.4	1.4	-0.20	0.20	
5204	Redlands	1	8.5	10	9.2	9	-1	1.07	0.6	0.6	0.07	0.07	
4144	Rubidoux	1	9.1	10	8.0	9	-1	0.88	-1.1	1.1	-0.12	0.12	
5203	San Bernardino	1	9.0	10	8.4	9	-1	0.94	-0.5	0.5	-0.06	0.06	
5175	Upland	1	8.0	10	6.1	10	0	0.77	-1.9	1.9	-0.23	0.23	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 143 (05/23) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

------- Peak Concentrations -------- --- Comparisons with Observations ---

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0005	SubRegion	1	7.1	12	4.3	10	-2	0.61	-2.8	2.8	-0.39	0.39	-99.00
	Subregional Peak:				8.5	7	-5	1.21	(at 68 x 37)		NSte: 3812;	NSPk:	6.0
0091	West Los Angeles	1	7.1	12	4.3	10	-2	0.61	-2.8	2.8	-0.39	0.39	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 143 (05/23) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	------- Peak Concentrations -------- Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	--- Comparisons with Observations --- Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0009	SubRegion	2	10.8	11	7.9	10	-1	0.72	-3.0	3.0	-0.28	0.28	-99.00
	Subregional Peak:				9.7	11	0	0.89	(at 106 x 12)		NSte: 4157;	NSPk:	7.9
4157	Indio Jackson	1	9.1	13	7.9	10	-3	0.87	-1.2	1.2	-0.13	0.13	
4137	Palm Springs	1	10.8	11	6.1	9	-2	0.57	-4.7	4.7	-0.43	0.43	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 144 (05/24) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0003	SubRegion	2	7.6	11	6.9	10	-1	0.90	-1.0	1.0	-0.14	0.14	-99.00
	Subregional Peak:				7.7	11	0	1.01	(at 52 x 54) NSte: 0090; NSPk: 6.9				
0074	Reseda	1	7.2	10	5.8	9	-1	0.82	-1.3	1.3	-0.18	0.18	
0090	Santa Clarita	1	7.6	11	6.9	10	-1	0.90	-0.7	0.7	-0.10	0.10	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 144 (05/24) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0004	SubRegion	10	9.2	11	8.6	10	-1	0.93	-1.0	1.5	-0.13	0.20	-41.87
	Subregional Peak:				8.6	10	-1	0.93	(at 71 x 37) NSte: 4158; NSPk: 8.6				

4164	Banning Airport	1	9.2	11	7.6	10	-1	0.83	-1.6	1.6	-0.17	0.17	
5181	Crestline	1	8.4	13	5.8	9	-4	0.69	-2.6	2.6	-0.31	0.31	
4158	Elsinore	1	7.2	10	8.6	10	0	1.19	1.4	1.4	0.19	0.19	
5197	Fontana	1	6.9	11	5.0	9	-2	0.73	-1.9	1.9	-0.27	0.27	
5212	Mira Loma	1	7.2	11	5.6	9	-2	0.78	-1.6	1.6	-0.22	0.22	
4149	Perris	1	6.8	11	7.9	10	-1	1.17	1.1	1.1	0.17	0.17	
0075	Pomona	1	6.2	11	4.1	10	-1	0.66	-2.1	2.1	-0.34	0.34	
5204	Redlands	1	7.0	11	7.0	9	-2	1.00	0.0	0.0	0.00	0.00	
4144	Rubidoux	1	7.9	11	6.1	9	-2	0.77	-1.8	1.8	-0.23	0.23	
5203	San Bernardino	1	6.8	11	6.3	9	-2	0.93	-0.5	0.5	-0.07	0.07	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 144 (05/24) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	2	8.9	12	7.0	9	-3	0.79	-2.0	2.0	-0.23	0.23	-99.00
	Subregional Peak:				8.9	9	-3	1.00	(at 105 x 13) NSte: 4157; NSPk: 7.0				
4157	Indio Jackson	1	7.4	13	7.0	9	-4	0.95	-0.4	0.4	-0.05	0.05	
4137	Palm Springs	1	8.9	12	5.3	9	-3	0.60	-3.6	3.6	-0.40	0.40	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0000 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 139 through 144
Unpaired Subregional Maximum of 7.9 at Cell 85 x 10 -- Nearest Site: 4157

		- - - - - Observed - - - - -						- - - - - Simulated - - - - -								
Site ID	Site Description	Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0001 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 139 through 144
Unpaired Subregional Maximum of -99.0 at Cell -9 x -9 -- Nearest Site: 0820

		- - - - - Observed - - - - -						- - - - - Simulated - - - - -								
Site ID	Site Description	Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0002 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 139 through 144
Unpaired Subregional Maximum of 7.0 at Cell 49 x 53 -- Nearest Site: 0090

		- - - - - Observed	- - - - -				- - - - - Simulated	- - - - -							
Site ID	Site Description	Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0003 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 139 through 144
Unpaired Subregional Maximum of 9.2 at Cell 60 x 50 -- Nearest Site: 0060

		- - - - - Observed	- - - - -				- - - - - Simulated	- - - - -							
Site ID	Site Description	Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Max. Ratio	Max. Bias	Max. Error
0069	Burbank	7.6	6.4	5.4	7.1	10.4	6.5	7.5	6.3	6.2	8.9	9.5	7.4	0.91	0.08	0.13
0088	Pasadena	8.6	6.5	5.3	8.0	11.4	5.9	7.4	6.4	6.3	9.7	9.6	6.4	0.85	0.01	0.13
0074	Reseda	7.8	6.7	5.1	7.3	9.3	8.7	7.1	5.8	6.0	8.0	8.7	7.4	0.93	-0.06	0.10
0090	Santa Clarita	9.2	5.7	4.0	8.7	10.8	9.5	7.4	6.1	6.2	8.0	8.7	8.0	0.80	-0.11	0.11

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0004 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 139 through 144
Unpaired Subregional Maximum of 9.3 at Cell 61 x 50 -- Nearest Site: 0591

Site ID	Site Description	Observed Site Avg.	Observed DOY 139	Observed DOY 140	Observed DOY 141	Observed DOY 142	Observed DOY 143	Simulated Site Avg.	Simulated DOY 139	Simulated DOY 140	Simulated DOY 141	Simulated DOY 142	Simulated DOY 143	Max. Ratio	Max. Bias	Max. Error
0060	Azusa	8.6	6.3	5.0	7.2	12.2	5.9	7.3	6.4	6.3	9.7	9.7	6.1	0.80	0.05	0.19
4164	Banning Airport	9.0	9.0	7.3	7.2	10.6	10.9	9.3	8.0	7.7	9.1	12.4	10.3	1.14	0.03	0.13
5181	Crestline	10.4	7.9	9.6	11.2	14.5	10.7	8.6	7.1	7.2	8.8	13.0	8.5	0.89	-0.18	0.18
4158	Elsinore	7.4	7.1	6.2	7.3	9.4	7.6	9.3	7.6	7.6	10.1	11.4	10.3	1.22	0.24	0.24
5197	Fontana	8.7	8.5	7.3	8.1	12.9	8.8	8.2	6.2	6.4	8.7	12.3	8.7	0.95	-0.07	0.09
0591	Glendora	8.1	7.4	6.2	7.3	13.0	6.7	7.5	6.4	6.3	9.7	10.4	6.1	0.80	-0.02	0.16
5212	Mira Loma	8.5	8.4	7.6	7.9	11.7	8.1	8.0	5.9	6.0	8.7	11.8	8.6	1.02	-0.06	0.12
4149	Perris	7.4	7.1	4.1	6.6	8.3	8.0	9.1	7.1	7.5	10.1	11.2	10.3	1.35	0.29	0.29
0075	Pomona	7.7	7.4	5.9	6.5	11.3	7.1	6.9	5.4	5.3	7.6	11.1	6.7	0.98	-0.06	0.13
5204	Redlands	8.3	7.5	7.6	7.9	11.3	8.5	9.2	7.3	7.3	9.3	13.0	10.2	1.15	0.10	0.12
4144	Rubidoux	9.5	9.5	8.8	8.9	12.9	9.1	8.5	6.2	6.8	8.8	12.6	9.3	0.98	-0.11	0.12
5203	San Bernardino	9.0	8.3	8.5	8.5	13.0	9.0	9.0	7.1	7.3	9.1	13.0	9.9	1.00	0.00	0.10
5175	Upland	8.1	7.5	6.3	7.5	11.4	8.0	7.4	6.2	5.5	8.1	11.4	7.6	1.00	-0.05	0.09

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0005 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 139 through 144
Unpaired Subregional Maximum of 9.5 at Cell 69 x 37 -- Nearest Site: 4158

Site ID	Site Description	Observed Site Avg.	Observed DOY 139	Observed DOY 140	Observed DOY 141	Observed DOY 142	Observed DOY 143	Simulated Site Avg.	Simulated DOY 139	Simulated DOY 140	Simulated DOY 141	Simulated DOY 142	Simulated DOY 143	Max. Ratio	Max. Bias	Max. Error
3176	Anaheim	7.5	5.7	4.7	5.8	7.5	5.4	6.4	5.2	5.3	6.8	9.6	5.9	1.27	0.27	0.27

Site ID	Site Description	Obs. Site Avg.	Obs. DOY 139	Obs. DOY 140	Obs. DOY 141	Obs. DOY 142	Obs. DOY 143	Sim. Site Avg.	Sim. DOY 139	Sim. DOY 140	Sim. DOY 141	Sim. DOY 142	Sim. DOY 143	Max. Ratio	Max. Bias	Max. Error
0087	Los Angeles	8.4	4.8	4.1	6.9	9.8	5.2	6.5	5.4	5.3	8.0	9.4	5.8	0.95	0.05	0.10
3195	Costa Mesa	6.2	4.7	3.8	6.0	6.4	4.9	6.2	5.5	5.5	7.1	7.6	5.9	1.18	0.18	0.18
3177	La Habra	7.4	3.7	3.1	4.7	7.4	4.8	6.0	4.7	4.5	6.6	9.3	5.6	1.25	0.25	0.25
0084	Lynwood	8.2	4.4	3.6	5.6	8.2	4.5	5.3	4.3	4.7	5.4	6.4	5.2	0.79	-0.21	0.21
3812	Mission Viejo	7.2	6.7	5.5	6.4	8.6	4.9	7.2	5.5	5.3	8.5	9.9	7.8	1.16	0.10	0.22
0091	West Los Angeles	7.8	4.9	4.8	7.4	9.0	7.1	6.4	5.1	5.5	7.2	8.6	6.3	0.95	-0.06	0.06

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0006 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 139 through 144
Unpaired Subregional Maximum of 9.2 at Cell 69 x 36 -- Nearest Site: 4158

Site ID	Site Description	Observed Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Simulated Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0007 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 139 through 144
Unpaired Subregional Maximum of -99.0 at Cell -9 x -9 -- Nearest Site: 0820

Site ID	Site Description	Observed Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Simulated Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0008 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 139 through 144
Unpaired Subregional Maximum of 7.6 at Cell 81 x 60 -- Nearest Site: 5181

		- - - - - Observed						- - - - - Simulated								
Site ID	Site Description	Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0009 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 139 through 144
Unpaired Subregional Maximum of 8.0 at Cell 105 x 13 -- Nearest Site: 4157

		- - - - - Observed						- - - - - Simulated								
Site ID	Site Description	Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Site Avg.	DOY 139	DOY 140	DOY 141	DOY 142	DOY 143	Max. Ratio	Max. Bias	Max. Error
4157	Indio Jackson	8.1	7.7	8.7	6.7	9.0	9.1	7.8	8.5	7.4	7.1	8.3	8.2	0.93	-0.03	0.08
4137	Palm Springs	9.0	8.5	7.5	7.7	10.9	10.8	8.1	7.9	7.0	7.4	9.5	9.2	0.88	-0.10	0.10

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* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

SubRegional Descriptions

SubRegion 003 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
0069	Burbank	53	47	-27.168	459.542
0074	Reseda	49	48	-46.776	461.466
0090	Santa Clarita	49	52	-48.187	483.843

SubRegion 004 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
0060	Azusa	60	47	7.551	455.846
4164	Banning Airport	79	42	103.017	432.847
5181	Crestline	72	49	66.342	467.091
4158	Elsinore	71	36	60.828	404.975
5197	Fontana	68	46	45.325	452.335
0591	Glendora	61	47	13.591	455.854
5212	Mira Loma	67	43	42.938	438.915
4149	Perris	72	39	69.830	417.843
0075	Pomona	63	45	22.674	448.580
5204	Redlands	74	45	77.109	447.127
4144	Rubidoux	69	44	52.958	441.437
5203	San Bernardino	71	46	64.965	452.483
5175	Upland	65	46	31.735	450.438

SubRegion 005 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
3176	Anaheim	60	40	9.104	421.167
0087	Los Angeles	54	45	-21.161	448.575
3195	Costa Mesa	60	36	7.604	404.725
3177	La Habra	59	42	4.545	432.118
0820	LAXH	51	42	-36.352	433.685
0072	Long Beach	55	40	-16.690	421.180
0084	Lynwood	55	42	-18.181	432.139
3812	Mission Viejo	64	36	29.671	400.791
0088	Pasadena	56	46	-10.573	454.025
0085	Pico Rivera	58	44	-4.538	441.245
0091	West Los Angeles	52	45	-34.774	446.801

SubRegion 009 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
4157	Indio Jackson	91	38	164.143	410.220
4137	Palm Springs	85	41	133.447	426.035

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 196 (07/15) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------					--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0003	SubRegion	2	7.9	11	9.8	11	0	1.23	1.1	1.1	0.14	0.14	-99.00
	Subregional Peak:				11.0	12	1	1.39	(at 51 x 55) NSte: 0090; NSPk: 9.8				
0074	Reseda	1	6.8	11	7.1	10	-1	1.05	0.4	0.4	0.05	0.05	
0090	Santa Clarita	1	7.9	11	9.8	11	0	1.23	1.8	1.8	0.23	0.23	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 196 (07/15) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Peak Concentrations: Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Comparisons with Observations: Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0004	SubRegion	10	14.3	12	12.3	10	-2	0.86	1.1	2.0	0.17	0.24	-34.61
	Subregional Peak:				13.2	11	-1	0.93	(at 76 x 46) NSte: 5204; NSPk: 12.3				
4164	Banning Airport	1	10.3	12	10.3	11	-1	1.00	0.0	0.0	0.00	0.00	
5181	Crestline	1	14.3	12	9.4	11	-1	0.66	-4.9	4.9	-0.34	0.34	
4158	Elsinore	1	7.7	11	9.1	11	0	1.19	1.4	1.4	0.19	0.19	
5197	Fontana	1	8.0	11	9.5	10	-1	1.20	1.6	1.6	0.20	0.20	
5212	Mira Loma	1	7.0	10	8.9	10	0	1.27	1.9	1.9	0.27	0.27	
4149	Perris	1	6.8	11	10.1	11	0	1.49	3.3	3.3	0.49	0.49	
5204	Redlands	1	9.4	11	12.3	10	-1	1.32	3.0	3.0	0.32	0.32	
4144	Rubidoux	1	7.6	10	10.4	10	0	1.36	2.7	2.7	0.36	0.36	
5203	San Bernardino	1	9.9	11	10.5	10	-1	1.05	0.5	0.5	0.05	0.05	
5175	Upland	1	6.8	11	7.9	10	-1	1.15	1.0	1.0	0.15	0.15	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 196 (07/15) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---					
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	1	6.3	14	5.3	11	-3	0.85	-0.9	0.9	-0.15	0.15	-99.00
	Subregional Peak:				10.7	10	-4	1.70	(at 68 x 37) NSte: 3812; NSPk: 6.5				
0820	LAXH	1	6.3	14	5.3	11	-3	0.85	-0.9	0.9	-0.15	0.15	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 196 (07/15) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---					
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	2	9.4	10	9.2	10	0	0.97	0.1	1.7	0.03	0.21	-99.00
	Subregional Peak:				12.4	10	0	1.31	(at 105 x 13) NSte: 4157; NSPk: 9.2				
4157	Indio Jackson	1	7.4	13	9.2	10	-3	1.24	1.8	1.8	0.24	0.24	

4137	Palm Springs	1	9.4	10	7.8	10	0	0.83	-1.6	1.6	-0.17	0.17	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 197 (07/16) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0003	SubRegion	3	14.1	11	11.8	11	0	0.83	-0.6	0.9	-0.04	0.07	-20.76
	Subregional Peak:				13.0	12	1	0.92	(at 51 x 54) NSte: 0090; NSPk: 11.8				
0069	Burbank	1	7.6	11	7.7	11	0	1.01	0.1	0.1	0.01	0.01	
0074	Reseda	1	8.9	11	9.3	10	-1	1.04	0.4	0.4	0.04	0.04	
0090	Santa Clarita	1	14.1	11	11.8	11	0	0.83	-2.3	2.3	-0.17	0.17	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 197 (07/16) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0004	SubRegion	13	13.8	12	12.5	11	-1	0.91	-0.1	1.5	0.02	0.15	-37.75
	Subregional Peak:				12.9	11	-1	0.94	(at 76 x 46) NSte: 5204; NSPk: 12.1				
0060	Azusa	1	7.0	10	8.4	11	1	1.19	1.3	1.3	0.19	0.19	
4164	Banning Airport	1	12.0	12	11.2	11	-1	0.93	-0.8	0.8	-0.07	0.07	
5181	Crestline	1	13.8	12	9.2	11	-1	0.66	-4.6	4.6	-0.34	0.34	
4158	Elsinore	1	8.4	11	12.5	11	0	1.49	4.1	4.1	0.49	0.49	
5197	Fontana	1	10.8	11	9.2	11	0	0.85	-1.6	1.6	-0.15	0.15	
0591	Glendora	1	7.8	10	8.9	11	1	1.14	1.1	1.1	0.14	0.14	
5212	Mira Loma	1	9.6	11	9.5	11	0	0.99	-0.1	0.1	-0.01	0.01	
4149	Perris	1	10.4	11	12.0	11	0	1.16	1.6	1.6	0.16	0.16	
0075	Pomona	1	8.2	10	8.5	11	1	1.03	0.3	0.3	0.03	0.03	
5204	Redlands	1	12.0	11	12.1	11	0	1.01	0.2	0.2	0.01	0.01	
4144	Rubidoux	1	10.0	11	10.7	11	0	1.07	0.7	0.7	0.07	0.07	
5203	San Bernardino	1	12.4	11	10.4	11	0	0.84	-2.0	2.0	-0.16	0.16	
5175	Upland	1	9.6	10	8.8	11	1	0.92	-0.8	0.8	-0.08	0.08	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 197 (07/16) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	1	7.1	10	7.5	10	0	1.05	0.4	0.4	0.05	0.05	-99.00
	Subregional Peak:				11.9	10	0	1.67	(at 68 x 37) NSte: 3812; NSPk: 7.3				
0088	Pasadena	1	7.1	10	7.5	10	0	1.05	0.4	0.4	0.05	0.05	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 197 (07/16) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0009	SubRegion	2	11.6	13	8.6	10	-3	0.74	-2.5	2.5	-0.22	0.22	-99.00
	Subregional Peak:				11.7	9	-4	1.01	(at 106 x 13) NSte: 4157; NSPk: 8.6				
4157	Indio Jackson	1	9.5	19	8.6	10	-9	0.90	-0.9	0.9	-0.10	0.10	
4137	Palm Springs	1	11.6	13	7.6	10	-3	0.66	-4.0	4.0	-0.34	0.34	

(Peak Concentrations: Observed/Predicted/Time Lag/Peak Ratio; Comparisons with Observations: Mean Bias through (r))

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 198 (07/17) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0003	SubRegion	3	14.2	10	10.3	10	0	0.73	-1.4	1.9	-0.10	0.16	-43.68
	Subregional Peak:				13.1	11	1	0.92	(at 53 x 53) NSte: 0090; NSPk: 10.3				
0069	Burbank	1	7.5	10	8.2	10	0	1.09	0.7	0.7	0.09	0.09	
0074	Reseda	1	10.9	10	9.8	10	0	0.90	-1.1	1.1	-0.10	0.10	
0090	Santa Clarita	1	14.2	10	10.3	10	0	0.73	-3.9	3.9	-0.27	0.27	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 198 (07/17) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0004	SubRegion	13	13.2	11	14.0	11	0	1.06	0.6	1.2	0.06	0.11	-87.58
	Subregional Peak:				14.5	11	0	1.10	(at 76 x 45) NSte: 5204; NSPk: 14.0				
0060	Azusa	1	8.6	11	9.6	10	-1	1.12	1.0	1.0	0.12	0.12	
4164	Banning Airport	1	13.2	11	11.5	11	0	0.87	-1.7	1.7	-0.13	0.13	
5181	Crestline	1	12.5	12	10.7	12	0	0.86	-1.8	1.8	-0.14	0.14	
4158	Elsinore	1	11.9	9	11.8	10	1	0.99	-0.1	0.1	-0.01	0.01	
5197	Fontana	1	11.4	11	12.6	11	0	1.10	1.1	1.1	0.10	0.10	
0591	Glendora	1	9.8	11	10.9	10	-1	1.11	1.1	1.1	0.11	0.11	
5212	Mira Loma	1	10.6	10	10.7	10	0	1.01	0.1	0.1	0.01	0.01	

4149	Perris	1	9.6	10	11.7	10	0	1.21	2.1	2.1	0.21	0.21		
0075	Pomona	1	9.9	11	11.5	10	-1	1.17	1.7	1.7	0.17	0.17		
5204	Redlands	1	12.3	10	14.0	11	1	1.13	1.6	1.6	0.13	0.13		
4144	Rubidoux	1	10.8	10	12.2	10	0	1.13	1.4	1.4	0.13	0.13		
5203	San Bernardino	1	12.9	10	13.0	11	1	1.01	0.1	0.1	0.01	0.01		
5175	Upland	1	11.2	10	12.5	11	1	1.12	1.3	1.3	0.12	0.12		

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 198 (07/17) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---					
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	4	8.1	10	8.4	10	0	1.03	0.8	1.4	0.14	0.21	-96.66
	Subregional Peak:				11.5	10	0	1.41	(at 68 x 37) NSte: 3812; NSPk: 8.2				
3176	Anaheim	1	6.1	10	7.1	10	0	1.17	1.0	1.0	0.17	0.17	
3177	La Habra	1	6.2	11	8.4	10	-1	1.37	2.3	2.3	0.37	0.37	
3812	Mission Viejo	1	7.1	10	8.2	10	0	1.15	1.1	1.1	0.15	0.15	
0088	Pasadena	1	8.1	10	7.0	10	0	0.85	-1.2	1.2	-0.15	0.15	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 198 (07/17) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	2	9.4	7	7.6	11	4	0.80	-2.3	2.3	-0.25	0.25	-99.00
	Subregional Peak:				10.4	11	4	1.11	(at 81 x 43) NSte: 4137; NSPk: 6.2				
4157	Indio Jackson	1	8.9	8	7.6	11	3	0.86	-1.3	1.3	-0.14	0.14	
4137	Palm Springs	1	9.4	7	6.2	11	4	0.65	-3.3	3.3	-0.35	0.35	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 199 (07/18) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0003	SubRegion	3	12.7	11	8.1	10	-1	0.64	-2.8	2.8	-0.27	0.27	-25.23
	Subregional Peak:				10.7	11	0	0.84	(at 58 x 49) NSte: 0069; NSPk: 5.6				

0069	Burbank	1	6.4	11	5.6	10	-1	0.87	-0.8	0.8	-0.13	0.13	
0074	Reseda	1	9.9	11	6.8	10	-1	0.69	-3.1	3.1	-0.31	0.31	
0090	Santa Clarita	1	12.7	11	8.1	10	-1	0.64	-4.6	4.6	-0.36	0.36	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 199 (07/18) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0004	SubRegion	13	12.0	11	12.4	10	-1	1.03	0.0	0.7	0.00	0.07	-21.84
	Subregional Peak:				14.6	12	1	1.22	(at 76 x 47) NSte: 5204; NSPk: 12.4				
0060	Azusa	1	6.0	11	5.6	10	-1	0.94	-0.4	0.4	-0.06	0.06	
4164	Banning Airport	1	12.0	11	12.1	11	0	1.01	0.1	0.1	0.01	0.01	
5181	Crestline	1	10.2	11	12.0	11	0	1.18	1.9	1.9	0.18	0.18	
4158	Elsinore	1	11.7	9	10.7	10	1	0.91	-1.0	1.0	-0.09	0.09	
5197	Fontana	1	8.7	11	8.7	10	-1	1.00	0.0	0.0	0.00	0.00	
0591	Glendora	1	6.9	11	6.5	10	-1	0.95	-0.3	0.3	-0.05	0.05	
5212	Mira Loma	1	9.5	11	7.8	9	-2	0.82	-1.7	1.7	-0.18	0.18	
4149	Perris	1	9.3	11	10.8	10	-1	1.16	1.5	1.5	0.16	0.16	
0075	Pomona	1	6.9	11	7.7	11	0	1.11	0.8	0.8	0.11	0.11	
5204	Redlands	1	11.9	11	12.4	10	-1	1.04	0.4	0.4	0.04	0.04	
4144	Rubidoux	1	10.2	11	9.8	9	-2	0.97	-0.3	0.3	-0.03	0.03	
5203	San Bernardino	1	10.5	11	10.4	10	-1	0.99	-0.1	0.1	-0.01	0.01	
5175	Upland	1	8.1	10	7.9	11	1	0.98	-0.2	0.2	-0.02	0.02	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 199 (07/18) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			Peak Concentrations							Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	1	6.2	10	4.5	10	0	0.72	-1.7	1.7	-0.28	0.28	-99.00
	Subregional Peak:				11.0	10	0	1.79	(at 68 x 37) NSte: 3812; NSPk: 6.3				
0088	Pasadena	1	6.2	10	4.5	10	0	0.72	-1.7	1.7	-0.28	0.28	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 199 (07/18) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			Peak Concentrations							Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	2	10.6	10	9.1	11	1	0.86	-1.0	2.6	-0.06	0.28	-99.00
	Subregional Peak:				12.9	10	0	1.21	(at 105 x 13) NSte: 4157; NSPk: 9.1				
4157	Indio Jackson	1	7.5	9	9.1	11	2	1.22	1.6	1.6	0.22	0.22	

4137	Palm Springs	1	10.6	10	7.0	10	0	0.66	-3.6	3.6	-0.34	0.34	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 200 (07/19) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0003	SubRegion	2	10.6	10	9.8	11	1	0.93	-0.9	0.9	-0.10	0.10	-99.00
	Subregional Peak:				10.8	12	2	1.02	(at 51 x 55) NSte: 0090; NSPk: 9.8				
0074	Reseda	1	8.4	11	7.3	11	0	0.87	-1.1	1.1	-0.13	0.13	
0090	Santa Clarita	1	10.6	10	9.8	11	1	0.93	-0.8	0.8	-0.07	0.07	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Statistics were calculated for the 24-hour period of DOY 200 (07/19) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

------- Peak Concentrations -------- --- Comparisons with Observations ---

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0004	SubRegion	11	11.0	12	13.3	11	-1	1.21	2.0	2.0	0.26	0.26	-26.21
	Subregional Peak:				13.7	11	-1	1.25	(at 74 x 46) NSte: 5204; NSPk: 13.3				
4164	Banning Airport	1	6.7	10	9.9	11	1	1.47	3.1	3.1	0.47	0.47	
5181	Crestline	1	11.0	12	12.0	12	0	1.10	1.0	1.0	0.10	0.10	
4158	Elsinore	1	6.1	8	7.6	9	1	1.25	1.5	1.5	0.25	0.25	
5197	Fontana	1	7.2	11	8.2	11	0	1.14	1.0	1.0	0.14	0.14	
0591	Glendora	1	6.7	12	7.0	11	-1	1.05	0.4	0.4	0.05	0.05	
5212	Mira Loma	1	7.3	11	8.3	11	0	1.14	1.0	1.0	0.14	0.14	
0075	Pomona	1	6.5	12	7.9	11	-1	1.21	1.4	1.4	0.21	0.21	
5204	Redlands	1	8.9	10	13.3	11	1	1.50	4.4	4.4	0.50	0.50	
4144	Rubidoux	1	7.5	11	10.7	10	-1	1.44	3.3	3.3	0.44	0.44	
5203	San Bernardino	1	8.1	11	11.4	11	0	1.40	3.2	3.2	0.40	0.40	
5175	Upland	1	6.5	11	7.8	12	1	1.20	1.3	1.3	0.20	0.20	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0000 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 196 through 200
Unpaired Subregional Maximum of 10.6 at Cell 86 x 6 -- Nearest Site: 4157

		- - - - - Observed - - - - -						- - - - - Simulated - - - - -							
Site ID	Site Description	Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0001 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 196 through 200
Unpaired Subregional Maximum of 6.4 at Cell 32 x 68 -- Nearest Site: 0090

		- - - - - Observed - - - - -						- - - - - Simulated - - - - -							
Site ID	Site Description	Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0002 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 196 through 200
Unpaired Subregional Maximum of 10.1 at Cell 49 x 53 -- Nearest Site: 0090

		- - - - - Observed - - - - -						- - - - - Simulated - - - - -							
Site ID	Site Description	Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Max. Ratio	Max. Bias	Max. Error

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* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0003 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 196 through 200
Unpaired Subregional Maximum of 10.9 at Cell 52 x 54 -- Nearest Site: 0090

Site ID	Site Description	Observed Site Avg.	Observed DOY 196	Observed DOY 197	Observed DOY 198	Observed DOY 199	Observed DOY 200	Simulated Site Avg.	Simulated DOY 196	Simulated DOY 197	Simulated DOY 198	Simulated DOY 199	Simulated DOY 200	Max. Ratio	Max. Bias	Max. Error
0069	Burbank	7.2	4.5	7.6	7.5	6.4	5.2	10.1	8.5	11.4	11.9	9.7	8.7	1.56	0.53	0.53
0074	Reseda	9.0	6.8	8.9	10.9	9.9	8.4	10.3	9.3	11.5	12.3	8.9	9.4	1.13	0.16	0.20
0090	Santa Clarita	11.9	7.9	14.1	14.2	12.7	10.6	11.4	11.0	13.0	12.9	9.5	10.8	0.92	0.00	0.17

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0004 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 196 through 200
Unpaired Subregional Maximum of 13.4 at Cell 76 x 46 -- Nearest Site: 5204

Site ID	Site Description	Observed Site Avg.	Observed DOY 196	Observed DOY 197	Observed DOY 198	Observed DOY 199	Observed DOY 200	Simulated Site Avg.	Simulated DOY 196	Simulated DOY 197	Simulated DOY 198	Simulated DOY 199	Simulated DOY 200	Max. Ratio	Max. Bias	Max. Error
0060	Azusa	7.2	4.6	7.0	8.6	6.0	5.8	9.8	7.6	9.1	12.6	10.7	8.6	1.47	0.52	0.52
4164	Banning Airport	10.9	10.3	12.0	13.2	12.0	6.7	13.2	13.2	12.8	14.5	13.7	11.7	1.10	0.27	0.27

5181	Crestline	12.3	14.3	13.8	12.5	10.2	11.0	13.2	12.5	12.2	13.9	13.8	13.7	0.97	0.09	0.19
4158	Elsinore	9.2	7.7	8.4	11.9	11.7	6.1	12.1	10.8	12.8	12.4	11.9	12.3	1.08	0.41	0.41
5197	Fontana	9.2	8.0	10.8	11.4	8.7	7.2	12.0	10.9	11.8	13.6	11.4	12.1	1.19	0.33	0.33
0591	Glendora	7.8	4.8	7.8	9.8	6.9	6.7	9.9	8.3	9.1	12.6	10.7	8.6	1.29	0.33	0.33
5212	Mira Loma	8.8	7.0	9.6	10.6	9.5	7.3	11.5	10.5	11.7	12.9	10.6	11.6	1.22	0.33	0.33
4149	Perris	9.0	6.8	10.4	9.6	9.3	4.0	12.3	11.7	12.9	13.1	12.2	11.8	1.26	0.41	0.41
0075	Pomona	7.9	5.5	8.2	9.9	6.9	6.5	9.9	9.0	9.2	12.5	10.1	8.8	1.27	0.31	0.31
5204	Redlands	10.9	9.4	12.0	12.3	11.9	8.9	13.8	13.2	12.9	14.5	14.6	13.7	1.19	0.29	0.29
4144	Rubidoux	9.2	7.6	10.0	10.8	10.2	7.5	12.3	11.5	12.3	13.9	11.2	12.9	1.29	0.37	0.37
5203	San Bernardino	10.8	9.9	12.4	12.9	10.5	8.1	13.1	12.3	12.1	14.0	13.4	13.7	1.08	0.25	0.26
5175	Upland	8.4	6.8	9.6	11.2	8.1	6.5	10.8	9.7	10.0	13.2	11.4	9.6	1.18	0.30	0.30

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0005 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 196 through 200
Unpaired Subregional Maximum of 11.5 at Cell 69 x 37 -- Nearest Site: 4158

		- - - - - Observed - - - - -						- - - - - Simulated - - - - -								
Site ID	Site Description	Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Max. Ratio	Max. Bias	Max. Error
3176	Anaheim	6.1	4.5	5.0	6.1	4.9	4.7	7.9	7.5	8.4	9.3	6.5	7.8	1.53	0.53	0.53
3177	La Habra	6.2	3.3	4.6	6.2	4.0	3.8	8.3	7.1	8.3	11.3	7.4	7.5	1.83	0.83	0.83
0820	LAXH	6.3	6.3	5.3	5.0	4.4	4.0	6.7	6.6	7.5	7.5	5.6	6.5	1.20	0.06	0.06
3812	Mission Viejo	7.1	4.5	4.6	7.1	4.9	4.6	11.0	10.3	10.7	10.9	10.2	12.9	1.81	0.53	0.53
0088	Pasadena	7.1	4.5	7.1	8.1	6.2	5.4	9.6	6.7	10.5	12.6	10.7	7.6	1.55	0.59	0.59

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0006   Spatially Paired Average 8-Hour Concentrations above   6.0 pphm for DOY 196 through 200
Unpaired Subregional Maximum of 11.0 at Cell 70 x 36 -- Nearest Site: 4158

Site ID	Site Description	Observed Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Simulated Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3   (pphm)   Project: CAMx/SAPRC99f 2005 Base Case   Simulation ID: mA04SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0007   Spatially Paired Average 8-Hour Concentrations above   6.0 pphm for DOY 196 through 200
Unpaired Subregional Maximum of   6.8 at Cell 48 x 77 -- Nearest Site: 0090

Site ID	Site Description	Observed Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Simulated Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3   (pphm)   Project: CAMx/SAPRC99f 2005 Base Case   Simulation ID: mA04SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0008   Spatially Paired Average 8-Hour Concentrations above   6.0 pphm for DOY 196 through 200
Unpaired Subregional Maximum of   9.3 at Cell 73 x 57 -- Nearest Site: 5181

- - - - - Observed - - - - -   - - - - - Simulated - - - - -

Site ID	Site Description	Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Max. Ratio	Max. Bias	Max. Error
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* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA04SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0009 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 196 through 200
Unpaired Subregional Maximum of 10.9 at Cell 105 x 13 -- Nearest Site: 4157

Site ID	Site Description	Observed: Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Simulated: Site Avg.	DOY 196	DOY 197	DOY 198	DOY 199	DOY 200	Max. Ratio	Max. Bias	Max. Error
----	------------------------	---	---	---	---	---	---	---	---	---	---	---	---	----	----	----
4157	Indio Jackson	8.3	7.4	9.5	8.9	7.5	5.2	9.0	9.5	9.0	8.1	9.5	8.7	1.00	0.11	0.17
4137	Palm Springs	10.3	9.4	11.6	9.4	10.6	5.9	10.3	9.9	10.6	10.3	11.2	9.5	0.97	0.03	0.07

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* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

SubRegional Descriptions

SubRegion 003 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
0069	Burbank	53	48	-27.848	461.308
0088	Pasadena	56	47	-11.205	457.021
0074	Reseda	49	48	-48.000	463.105
0090	Santa Clarita	49	52	-48.140	483.357

SubRegion 004 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
0060	Azusa	60	47	6.981	456.113
4164	Banning Airport	79	42	104.459	433.527
5181	Crestline	72	49	66.383	468.606
4158	Elsinore	71	37	60.525	405.907
5197	Fontana	68	46	46.811	453.081
0591	Glendora	61	47	13.487	457.010
5212	Mira Loma	67	43	42.938	438.915
4149	Perris	72	39	69.051	417.376
0075	Pomona	63	45	22.598	448.610
5204	Redlands	74	45	76.256	448.189
4144	Rubidoux	69	44	52.093	442.557
5203	San Bernardino	72	46	65.874	453.299
5175	Upland	65	46	31.687	452.125

SubRegion 005 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
3176	Anaheim	60	40	7.422	421.645
0087	Los Angeles	54	45	-22.302	445.563

3195	Costa Mesa	60	37	6.793	405.626
3177	La Habra	59	42	4.359	432.978
0820	LAXH	51	42	-36.352	433.685
0072	Long Beach	55	40	-17.171	421.903
0084	Lynwood	55	42	-19.237	432.753
3812	Mission Viejo	64	36	29.671	400.791
0085	Pico Rivera	57	44	-5.273	442.860
0091	West Los Angeles	52	45	-34.796	447.031

SubRegion 009 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
4157	Indio Jackson	91	38	162.217	411.293
4137	Palm Springs	85	40	132.826	423.133

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 237 (08/25) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0003	SubRegion	1	6.1	10	5.9	10	0	0.97	-0.2	0.2	-0.03	0.03	-99.00
	Subregional Peak:				7.1	12	2	1.15	(at 59 x 50) NSte: 0088; NSPk: 5.0				

0090	Santa Clarita	1	6.1	10	5.9	10	0	0.97	-0.2	0.2	-0.03	0.03

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 237 (08/25) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0004	SubRegion	2	6.3	13	6.4	9	-4	1.02	-0.2	0.4	-0.03	0.06	-99.00
	Subregional Peak:				7.1	13	0	1.12	(at 60 x 50) NSte: 0060; NSPk: 5.1				
4164	Banning Airport	1	6.3	13	5.8	10	-3	0.91	-0.5	0.5	-0.09	0.09	
5212	Mira Loma	1	6.3	12	6.4	9	-3	1.03	0.2	0.2	0.03	0.03	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 237 (08/25) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	4	8.3	10	5.1	10	0	0.62	-2.6	2.6	-0.37	0.37	-68.01
	Subregional Peak:				6.7	10	0	0.81	(at 68 x 36) NSte: 3812; NSPk: 4.0				

3195	Costa Mesa	1	6.5	11	4.6	11	0	0.70	-2.0	2.0	-0.30	0.30
0820	LAXH	1	7.1	10	5.1	10	0	0.72	-2.0	2.0	-0.28	0.28
0072	Long Beach	1	6.0	11	3.7	10	-1	0.61	-2.4	2.4	-0.39	0.39
0091	West Los Angeles	1	8.3	10	4.2	10	0	0.51	-4.1	4.1	-0.49	0.49

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 238 (08/26) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0003	SubRegion	2	6.9	11	5.4	10	-1	0.79	-1.4	1.4	-0.21	0.21	-99.00
	Subregional Peak:				7.2	11	0	1.06	(at 55 x 49) NSte: 0069; NSPk: 5.4				
0069	Burbank	1	6.4	11	5.4	10	-1	0.85	-0.9	0.9	-0.15	0.15	
0088	Pasadena	1	6.9	11	5.0	10	-1	0.74	-1.8	1.8	-0.26	0.26	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 238 (08/26) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0004	SubRegion	12	8.0	11	9.2	10	-1	1.15	-1.0	1.5	-0.14	0.21	-72.36
	Subregional Peak:				10.4	11	0	1.29	(at 78 x 38)	NSte: 4164;	NSPk:	9.2	
0060	Azusa	1	6.5	11	4.5	10	-1	0.70	-1.9	1.9	-0.30	0.30	
4164	Banning Airport	1	7.6	13	9.2	10	-3	1.21	1.6	1.6	0.21	0.21	
5181	Crestline	1	7.4	14	5.5	10	-4	0.74	-1.9	1.9	-0.26	0.26	
4158	Elsinore	1	7.4	12	7.5	10	-2	1.01	0.1	0.1	0.01	0.01	
5197	Fontana	1	6.8	11	5.4	10	-1	0.80	-1.4	1.4	-0.20	0.20	
0591	Glendora	1	7.3	11	5.0	10	-1	0.68	-2.3	2.3	-0.32	0.32	
5212	Mira Loma	1	8.0	11	5.6	10	-1	0.70	-2.4	2.4	-0.30	0.30	
0075	Pomona	1	7.0	11	5.4	10	-1	0.77	-1.6	1.6	-0.23	0.23	
5204	Redlands	1	6.8	12	8.2	10	-2	1.19	1.3	1.3	0.19	0.19	
4144	Rubidoux	1	8.0	11	6.3	10	-1	0.79	-1.6	1.6	-0.21	0.21	
5203	San Bernardino	1	6.9	12	6.8	10	-2	0.98	-0.1	0.1	-0.02	0.02	
5175	Upland	1	7.0	11	5.5	10	-1	0.77	-1.6	1.6	-0.23	0.23	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 238 (08/26) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours

Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0005	SubRegion	5	7.4	12	6.0	9	-3	0.81	-2.3	2.3	-0.33	0.33	-56.29
	Subregional Peak:				8.8	10	-2	1.19	(at 68 x 36) NSte: 3812; NSPk: 6.0				
3176	Anaheim	1	6.9	10	3.5	9	-1	0.51	-3.4	3.4	-0.49	0.49	
0087	Los Angeles	1	6.2	11	3.4	9	-2	0.55	-2.8	2.8	-0.45	0.45	
3195	Costa Mesa	1	6.1	10	5.5	9	-1	0.91	-0.6	0.6	-0.09	0.09	
3812	Mission Viejo	1	7.4	12	6.0	9	-3	0.81	-1.4	1.4	-0.19	0.19	
0091	West Los Angeles	1	7.1	11	3.9	9	-2	0.56	-3.1	3.1	-0.44	0.44	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 238 (08/26) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0009	SubRegion	1	8.0	12	5.9	11	-1	0.73	-2.1	2.1	-0.27	0.27	-99.00
	Subregional Peak:				9.0	10	-2	1.11	(at 81 x 43) NSte: 4137; NSPk: 5.9				
4137	Palm Springs	1	8.0	12	5.9	11	-1	0.73	-2.1	2.1	-0.27	0.27	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 239 (08/27) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0003	SubRegion	4	7.7	10	8.5	10	0	1.10	-0.4	1.2	-0.06	0.17	-80.25
	Subregional Peak:				8.9	10	0	1.15	(at 55 x 48) NSte: 0088; NSPk: 7.7				
0069	Burbank	1	7.3	10	8.5	10	0	1.16	1.2	1.2	0.16	0.16	
0088	Pasadena	1	7.3	9	7.7	10	1	1.05	0.4	0.4	0.05	0.05	
0074	Reseda	1	7.7	10	6.4	10	0	0.83	-1.3	1.3	-0.17	0.17	
0090	Santa Clarita	1	6.6	10	4.6	9	-1	0.71	-1.9	1.9	-0.29	0.29	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 239 (08/27) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0004	SubRegion	12	13.0	11	9.1	11	0	0.70	-2.0	2.2	-0.18	0.22	-47.15
	Subregional Peak:				9.6	10	-1	0.74	(at 69 x 35) NSte: 4158; NSPk: 8.3				
0060	Azusa	1	7.7	10	6.9	11	1	0.89	-0.8	0.8	-0.11	0.11	
4164	Banning Airport	1	10.6	13	8.7	11	-2	0.82	-1.9	1.9	-0.18	0.18	
5181	Crestline	1	13.0	11	5.1	12	1	0.39	-7.9	7.9	-0.61	0.61	
4158	Elsinore	1	6.7	9	8.3	11	2	1.25	1.6	1.6	0.25	0.25	
5197	Fontana	1	9.9	10	7.8	10	0	0.79	-2.1	2.1	-0.21	0.21	
0591	Glendora	1	8.4	10	7.3	11	1	0.87	-1.1	1.1	-0.13	0.13	
5212	Mira Loma	1	10.0	10	7.8	11	1	0.77	-2.3	2.3	-0.23	0.23	
0075	Pomona	1	8.8	10	7.3	11	1	0.83	-1.5	1.5	-0.17	0.17	
5204	Redlands	1	10.7	11	9.1	11	0	0.85	-1.6	1.6	-0.15	0.15	
4144	Rubidoux	1	9.6	10	8.4	11	1	0.87	-1.3	1.3	-0.13	0.13	
5203	San Bernardino	1	11.2	10	8.2	11	1	0.73	-3.0	3.0	-0.27	0.27	
5175	Upland	1	9.3	10	7.7	10	0	0.82	-1.6	1.6	-0.18	0.18	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 239 (08/27) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	3	6.6	10	5.2	9	-1	0.79	-1.5	1.5	-0.22	0.22	-5889.26
	Subregional Peak:				9.6	10	0	1.45	(at 68 x 36) NSte: 3812; NSPk: 7.2				
3176	Anaheim	1	6.5	10	5.2	10	0	0.79	-1.4	1.4	-0.21	0.21	
0087	Los Angeles	1	6.6	10	4.8	10	0	0.73	-1.8	1.8	-0.27	0.27	

0091	West Los Angeles	1	6.5	10	5.2	9	-1	0.80	-1.3	1.3	-0.20	0.20	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 239 (08/27) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	2	9.4	15	6.6	10	-5	0.70	-3.0	3.0	-0.32	0.32	-99.00
	Subregional Peak:				8.3	10	-5	0.88	(at 81 x 43) NSte: 4137; NSPk: 6.2				
4157	Indio Jackson	1	9.4	17	6.6	10	-7	0.70	-2.9	2.9	-0.30	0.30	
4137	Palm Springs	1	9.4	15	6.2	11	-4	0.66	-3.2	3.2	-0.34	0.34	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 240 (08/28) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0003	SubRegion	4	11.3	10	8.9	10	0	0.79	-2.7	2.7	-0.27	0.27	-42.72
	Subregional Peak:				9.4	10	0	0.84	(at 52 x 49)	NSte: 0069;	NSPk: 8.9		
0069	Burbank	1	10.8	10	8.9	10	0	0.82	-1.9	1.9	-0.18	0.18	
0088	Pasadena	1	10.2	10	8.1	10	0	0.79	-2.2	2.2	-0.21	0.21	
0074	Reseda	1	11.3	10	6.9	10	0	0.61	-4.4	4.4	-0.39	0.39	
0090	Santa Clarita	1	7.8	10	5.5	9	-1	0.70	-2.3	2.3	-0.30	0.30	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 240 (08/28) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0004	SubRegion	12	12.1	11	10.8	11	0	0.89	-1.6	2.4	-0.13	0.24	-36.20
	Subregional Peak:				10.8	11	0	0.89	(at 74 x 45)	NSte: 5204;	NSPk: 10.8		
0060	Azusa	1	10.6	10	7.2	10	0	0.68	-3.4	3.4	-0.32	0.32	
4164	Banning Airport	1	7.0	15	9.4	10	-5	1.34	2.4	2.4	0.34	0.34	
5181	Crestline	1	11.0	11	4.9	12	1	0.45	-6.1	6.1	-0.55	0.55	
4158	Elsinore	1	6.9	11	8.6	11	0	1.24	1.7	1.7	0.24	0.24	
5197	Fontana	1	11.9	11	9.7	10	-1	0.81	-2.2	2.2	-0.19	0.19	

0591	Glendora	1	11.8	10	7.9	10	0	0.67	-3.9	3.9	-0.33	0.33	
5212	Mira Loma	1	10.6	10	8.6	10	0	0.81	-2.0	2.0	-0.19	0.19	
0075	Pomona	1	10.6	10	8.5	10	0	0.80	-2.1	2.1	-0.20	0.20	
5204	Redlands	1	10.0	11	10.8	11	0	1.08	0.8	0.8	0.08	0.08	
4144	Rubidoux	1	10.6	10	9.9	10	0	0.93	-0.7	0.7	-0.07	0.07	
5203	San Bernardino	1	11.4	11	10.4	11	0	0.91	-1.0	1.0	-0.09	0.09	
5175	Upland	1	12.1	11	9.1	10	-1	0.75	-3.0	3.0	-0.25	0.25	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 240 (08/28) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	4	8.5	10	7.1	10	0	0.84	-1.9	1.9	-0.25	0.25	-55.74
	Subregional Peak:				9.8	11	1	1.16	(at 68 x 36) NSte: 3812; NSPk: 7.1				
3176	Anaheim	1	6.3	10	5.1	10	0	0.81	-1.2	1.2	-0.19	0.19	
0087	Los Angeles	1	8.5	10	4.7	10	0	0.56	-3.7	3.7	-0.44	0.44	
3812	Mission Viejo	1	7.6	10	7.1	10	0	0.94	-0.5	0.5	-0.06	0.06	
0091	West Los Angeles	1	7.5	9	5.2	9	0	0.70	-2.3	2.3	-0.30	0.30	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 240 (08/28) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	2	7.7	8	6.5	10	2	0.85	-1.2	1.2	-0.16	0.16	-99.00
	Subregional Peak:				8.8	10	2	1.15	(at 81 x 43) NSte: 4137; NSPk: 6.0				
4157	Indio Jackson	1	7.2	9	6.5	10	1	0.90	-0.7	0.7	-0.10	0.10	
4137	Palm Springs	1	7.7	8	6.0	11	3	0.78	-1.7	1.7	-0.22	0.22	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 241 (08/29) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0003	SubRegion	4	10.9	10	6.3	10	0	0.58	-3.0	3.0	-0.34	0.34	-32.69
	Subregional Peak:				6.9	10	0	0.64	(at 50 x 50) NSte: 0074; NSPk: 6.3				

0069	Burbank	1	7.1	11	5.5	10	-1	0.78	-1.6	1.6	-0.22	0.22	
0088	Pasadena	1	6.5	11	4.4	10	-1	0.67	-2.1	2.1	-0.33	0.33	
0074	Reseda	1	10.1	11	6.3	10	-1	0.62	-3.8	3.8	-0.38	0.38	
0090	Santa Clarita	1	10.9	10	6.3	10	0	0.58	-4.6	4.6	-0.42	0.42	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 241 (08/29) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0004	SubRegion	12	9.2	22	9.5	10	-12	1.03	-1.1	2.0	-0.14	0.27	-38.30
	Subregional Peak:				10.5	11	-11	1.14	(at 76 x 47) NSte: 5204; NSPk: 8.9				
0060	Azusa	1	6.4	10	4.4	10	0	0.69	-2.0	2.0	-0.31	0.31	
4164	Banning Airport	1	7.0	13	9.5	10	-3	1.36	2.5	2.5	0.36	0.36	
5181	Crestline	1	9.2	22	7.5	10	-12	0.81	-1.7	1.7	-0.19	0.19	
4158	Elsinore	1	7.4	9	9.1	10	1	1.24	1.7	1.7	0.24	0.24	
5197	Fontana	1	7.8	10	5.1	10	0	0.66	-2.7	2.7	-0.34	0.34	
0591	Glendora	1	7.6	10	5.1	10	0	0.67	-2.5	2.5	-0.33	0.33	
5212	Mira Loma	1	8.7	9	6.1	10	1	0.70	-2.6	2.6	-0.30	0.30	
0075	Pomona	1	7.0	11	4.9	10	-1	0.70	-2.1	2.1	-0.30	0.30	
5204	Redlands	1	7.6	11	8.9	10	-1	1.17	1.3	1.3	0.17	0.17	
4144	Rubidoux	1	8.7	10	6.8	10	0	0.78	-1.9	1.9	-0.22	0.22	
5203	San Bernardino	1	8.3	10	7.3	10	0	0.88	-1.0	1.0	-0.12	0.12	
5175	Upland	1	7.7	10	5.2	10	0	0.67	-2.5	2.5	-0.33	0.33	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 241 (08/29) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0005	SubRegion	1	6.2	10	6.3	9	-1	1.01	0.0	0.0	0.01	0.01	-99.00
	Subregional Peak:				8.2	10	0	1.33	(at 68 x 37) NSte: 3812; NSPk: 6.3				
3812	Mission Viejo	1	6.2	10	6.3	9	-1	1.01	0.0	0.0	0.01	0.01	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Statistics were calculated for the 24-hour period of DOY 241 (08/29) 2005
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0009	SubRegion	2	6.4	11	7.6	11	0	1.19	0.7	0.7	0.11	0.11	-99.00
	Subregional Peak:				9.3	11	0	1.44	(at 81 x 43) NSte: 4137; NSPk: 6.6				

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4157   Indio Jackson              1     6.4  10      7.6  11      1   1.20     1.3    1.3     0.20   0.20
4137   Palm Springs               1     6.4  11      6.6  11      0   1.03     0.2    0.2     0.03   0.03


                              *  *  * Model Performance Evaluation * * *


    Pollutant: O3     (pphm)          Project: CAMx/SAPRC99f 2005 Base Case              Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of  3 grid cells

Subregion  0000   Spatially Paired Average  8-Hour Concentrations above   6.0 pphm  for DOY 237 through 241
                  Unpaired Subregional Maximum of  10.0 at Cell  82 x  10  --  Nearest Site: 4158

                                        - - - - -  Observed  - - - - -      - - - - -  Simulated - - - - -

Site           Site                Site    DOY  DOY  DOY  DOY  DOY     Site    DOY  DOY  DOY  DOY  DOY   Max.  Max.  Max.
 ID         Description             Avg.   237  238  239  240  241      Avg.   237  238  239  240  241   Ratio Bias
Error
----   -----------------------   ---    ---  ---  ---  ---  ---      ---    ---  ---  ---  ---  ---   ----  ----  ----


                              *  *  * Model Performance Evaluation * * *


    Pollutant: O3     (pphm)          Project: CAMx/SAPRC99f 2005 Base Case              Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of  3 grid cells

Subregion  0001   Spatially Paired Average  8-Hour Concentrations above   6.0 pphm  for DOY 237 through 241
                  Unpaired Subregional Maximum of -99.0 at Cell  -9 x  -9  --  Nearest Site: 0820

                                        - - - - -  Observed  - - - - -      - - - - -  Simulated - - - - -

Site           Site                Site    DOY  DOY  DOY  DOY  DOY     Site    DOY  DOY  DOY  DOY  DOY   Max.  Max.  Max.
 ID         Description             Avg.   237  238  239  240  241      Avg.   237  238  239  240  241   Ratio Bias
Error
----   -----------------------   ---    ---  ---  ---  ---  ---      ---    ---  ---  ---  ---  ---   ----  ----  ----


                              *  *  * Model Performance Evaluation * * *
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Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0002 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 237 through 241
Unpaired Subregional Maximum of 6.5 at Cell 42 x 55 -- Nearest Site: 0090

Site ID	Site Description	Observed Site Avg.	Observed DOY 237	Observed DOY 238	Observed DOY 239	Observed DOY 240	Observed DOY 241	Simulated Site Avg.	Simulated DOY 237	Simulated DOY 238	Simulated DOY 239	Simulated DOY 240	Simulated DOY 241	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0003 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 237 through 241
Unpaired Subregional Maximum of 8.7 at Cell 53 x 48 -- Nearest Site: 0069

Site ID	Site Description	Observed Site Avg.	Observed DOY 237	Observed DOY 238	Observed DOY 239	Observed DOY 240	Observed DOY 241	Simulated Site Avg.	Simulated DOY 237	Simulated DOY 238	Simulated DOY 239	Simulated DOY 240	Simulated DOY 241	Max. Ratio	Max. Bias	Max. Error
0069	Burbank	7.9	4.3	6.4	7.3	10.8	7.1	7.8	6.7	7.2	8.9	9.4	6.9	0.87	0.05	0.13
0088	Pasadena	7.7	5.6	6.9	7.3	10.2	6.5	7.9	7.1	7.2	8.9	9.3	6.9	0.91	0.06	0.10
0074	Reseda	9.7	4.7	5.3	7.7	11.3	10.1	7.6	6.7	6.7	8.4	9.4	6.9	0.84	-0.13	0.19
0090	Santa Clarita	7.8	6.1	4.9	6.6	7.8	10.9	7.7	6.7	6.9	8.4	9.4	6.9	0.87	0.06	0.24

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0004 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 237 through 241
Unpaired Subregional Maximum of 10.0 at Cell 76 x 48 -- Nearest Site: 5204

Site ID	Site Description	Observed Site Avg.	Observed DOY 237	Observed DOY 238	Observed DOY 239	Observed DOY 240	Observed DOY 241	Simulated Site Avg.	Simulated DOY 237	Simulated DOY 238	Simulated DOY 239	Simulated DOY 240	Simulated DOY 241	Max. Ratio	Max. Bias	Max. Error
0060	Azusa	7.8	4.8	6.5	7.7	10.6	6.4	7.3	7.1	7.0	7.7	8.7	6.2	0.83	-0.04	0.07
4164	Banning Airport	7.7	6.3	7.6	10.6	7.0	7.0	9.3	6.7	10.3	9.3	10.4	9.9	0.99	0.24	0.29
5181	Crestline	10.2	5.3	7.4	13.0	11.0	9.2	8.7	6.6	8.6	8.3	10.4	9.4	0.80	-0.06	0.15
4158	Elsinore	7.1	5.2	7.4	6.7	6.9	7.4	9.2	6.8	9.3	9.6	10.1	10.0	1.36	0.37	0.37
5197	Fontana	9.1	4.8	6.8	9.9	11.9	7.8	8.3	6.7	7.4	9.0	10.2	8.1	0.86	-0.03	0.09
0591	Glendora	8.8	4.9	7.3	8.4	11.8	7.6	7.2	7.1	6.5	7.7	8.8	6.1	0.75	-0.16	0.16
5212	Mira Loma	8.7	6.3	8.0	10.0	10.6	8.7	8.5	6.7	8.1	9.2	10.2	8.2	0.96	-0.02	0.05
0075	Pomona	8.3	4.9	7.0	8.8	10.6	7.0	7.2	6.3	6.5	7.7	9.2	6.5	0.87	-0.10	0.10
5204	Redlands	8.8	5.3	6.8	10.7	10.0	7.6	9.3	6.5	9.3	9.2	10.8	10.5	1.01	0.17	0.24
4144	Rubidoux	9.2	5.9	8.0	9.6	10.6	8.7	8.6	6.7	8.1	9.1	10.5	8.8	0.99	-0.01	0.02
5203	San Bernardino	9.5	5.3	6.9	11.2	11.4	8.3	9.0	6.7	8.8	9.2	10.8	9.5	0.94	0.05	0.17
5175	Upland	9.0	4.8	7.0	9.3	12.1	7.7	7.7	6.6	6.5	8.0	9.7	7.5	0.80	-0.11	0.11

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0005 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 237 through 241
Unpaired Subregional Maximum of 8.9 at Cell 68 x 35 -- Nearest Site: 4158

Site	Site	Observed Site	Observed DOY	Observed DOY	Observed DOY	Observed DOY	Observed DOY	Simulated Site	Simulated DOY	Simulated DOY	Simulated DOY	Simulated DOY	Simulated DOY	Max.	Max.	Max.

ID	Description	Avg.	237	238	239	240	241	Avg.	237	238	239	240	241	Ratio	Bias	Error
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3176	Anaheim	6.6	5.9	6.9	6.5	6.3	5.8	6.4	5.7	5.6	7.3	7.4	5.8	1.08	0.04	0.16
0087	Los Angeles	7.1	5.8	6.2	6.6	8.5	5.4	7.6	6.6	7.0	8.9	9.3	6.3	1.10	0.19	0.19
3195	Costa Mesa	6.3	6.5	6.1	5.9	5.1	4.5	6.6	6.3	6.6	7.3	7.0	5.9	1.11	0.03	0.06
0820	LAXH	7.1	7.1	5.6	5.0	5.2	4.3	6.1	6.0	5.8	6.5	6.6	5.8	0.92	-0.15	0.15
0072	Long Beach	6.0	6.0	5.2	5.4	4.7	4.3	5.9	5.9	5.5	6.2	6.6	5.4	1.09	-0.01	0.01
3812	Mission Viejo	7.1	5.2	7.4	5.5	7.6	6.2	8.2	6.3	8.6	9.2	9.5	7.5	1.25	0.21	0.21
0091	West Los Angeles	7.3	8.3	7.1	6.5	7.5	5.4	7.5	6.6	6.5	8.9	9.3	6.3	1.13	0.08	0.22

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0006 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 237 through 241
Unpaired Subregional Maximum of 9.8 at Cell 82 x 11 -- Nearest Site: 4158

		- - - - - Observed - - - - -						- - - - - Simulated - - - - -								
Site ID	Site Description	Site Avg.	DOY 237	DOY 238	DOY 239	DOY 240	DOY 241	Site Avg.	DOY 237	DOY 238	DOY 239	DOY 240	DOY 241	Max. Ratio	Max. Bias	Max. Error
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* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0007 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 237 through 241
Unpaired Subregional Maximum of 6.4 at Cell 47 x 69 -- Nearest Site: 0090

- - - - - Observed - - - - - - - - - - Simulated - - - - -

Site ID	Site Description	Site Avg.	DOY 237	DOY 238	DOY 239	DOY 240	DOY 241	Site Avg.	DOY 237	DOY 238	DOY 239	DOY 240	DOY 241	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O_3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0008 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 237 through 241
Unpaired Subregional Maximum of 6.2 at Cell 61 x 63 -- Nearest Site: 0591

Site ID	Site Description	Observed Site Avg.	Observed DOY 237	Observed DOY 238	Observed DOY 239	Observed DOY 240	Observed DOY 241	Simulated Site Avg.	Simulated DOY 237	Simulated DOY 238	Simulated DOY 239	Simulated DOY 240	Simulated DOY 241	Max. Ratio	Max. Bias	Max. Error

* * * Model Performance Evaluation * * *

Pollutant: O_3 (pphm) Project: CAMx/SAPRC99f 2005 Base Case Simulation ID: mA01SL

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0009 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 237 through 241
Unpaired Subregional Maximum of 8.7 at Cell 87 x 45 -- Nearest Site: 4137

Site ID	Site Description	Observed Site Avg.	Observed DOY 237	Observed DOY 238	Observed DOY 239	Observed DOY 240	Observed DOY 241	Simulated Site Avg.	Simulated DOY 237	Simulated DOY 238	Simulated DOY 239	Simulated DOY 240	Simulated DOY 241	Max. Ratio	Max. Bias	Max. Error
4157	Indio Jackson	7.7	3.6	5.7	9.4	7.2	6.4	7.2	6.0	7.5	7.3	7.2	8.2	0.87	0.02	0.17
4137	Palm Springs	7.9	5.9	8.0	9.4	7.7	6.4	8.1	6.1	8.7	8.1	8.5	9.1	0.97	0.12	0.19

August 1997

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

SubRegional Descriptions

SubRegion 000 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
PSRB	CARB *PASO ROBLES-235 SANTA FE	11	80	-237.650	621.815
CATI	Catalina Isl (AV)	51	31	-38.091	376.089
CATA	Catalina AP (AV)	49	32	-45.520	380.187
CLEM	San ClemenSDCAPCD	49	20	-45.111	322.376
ROSA		18	44	-203.059	444.963
SNI		30	28	-144.321	361.523
TIRP	Tijuana CARB	76	8	87.840	260.907
TRON	MDAQMD*TRONA-83732 TRONA ROAD	70	82	55.972	634.396
LAGP	Point MuguUSN	39	46	-96.552	453.778
PMGU	Pt. Mugu	38	47	-101.692	455.217

SubRegion 001 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
LOMP	SBAPCD LOMPOC-4350 CONSTELLATION	14	60	-221.546	521.227
GLWF	SBAPCD*GOLETA-380 W FAIRVIEW AVE	26	54	-163.840	490.523
ATAS	SLOCO *ATASCADERO-6005 LEWIS AVE	11	77	-236.657	607.244
CPGB	CHVRON*CARPINTERIA-GOBERNADOR RD	32	53	-130.842	486.204
ECSP	SBAPCD*EL CAPITAN STATE PARK	22	54	-181.828	492.776
GAVE	CHVRON*GAVIOTA EAST-N OF CHEVRON	19	55	-198.303	495.033
GCTY	SLOCO *GROVER CITY-9 LE SAGE DR	12	69	-233.529	567.128
GTCB	TEXACO*NOJOQUI PASS-GTC B HWY 10	19	56	-196.652	500.458
LFC1	EXXON *CAPITAN-LFC #1 LAS FLORES	22	55	-183.237	496.458
LOSP	UNOCAL*LOS PADRES NF-PARADISE RD	26	56	-160.591	501.387
LPHS	UNOCAL*LOMPOC-HS&P FACILITY 500	15	60	-217.003	522.909
LPSH	SBAPCD*LOMPOC-128 S 'H' ST	14	58	-220.274	513.898
MOBY	SLOCO *MORRO BAY-MORRO BAY BL &	9	74	-247.450	594.883

NIPO	UNOCAL NIPOMO-1300 GUADALUPE RD	13	67	-229.418	556.075
PTCL	CHVRON*POINT CONCEPTION LIGHTHOU	14	54	-220.887	493.866
SBWC	CARB *SANTA BARBARA-3 W. CARRIL	28	53	-153.359	488.470
SLOM	CARB *SAN LUIS OBISPO-1160 MARS	11	73	-235.901	585.399
SMSB	CARB *SANTA MARIA-500 S BROADWA	15	65	-217.780	546.610
SYAP	SBAPCD*SANTA YNEZ-AIRPORT RD	21	57	-185.912	509.285
UCSB	EXXON *UCSB WEST CAMPUS-ARCO TAN	25	53	-168.433	486.982
VBPP	VBGAFB*VANDENBERG AFB-STS POWER	11	57	-235.433	508.910
GAVW	Gaviota West	19	55	-199.251	496.300
GTCC	TEXACO*GAVIOTA-GTC C 1 MI E OF P	19	54	-196.802	494.993

SubRegion 002 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
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ELRO	VCAPCD*EL RIO-RIO MESA SCHOOL	38	49	-102.502	469.335
EMMA	VCAPCD*EMMA WOOD STATE BEACH	35	50	-119.021	473.236
OJAI	VCAPCD OJAI-1768 MARICOPA HIWY	36	53	-114.242	489.568
PRTG	VCAPCD*PIRU-2SW, 2815 TELEGRAPH	44	52	-73.713	483.573
SVAL	VCAPCD*SIMI VALLEY-5400 COCHRAN	46	50	-61.789	470.697
THOS	CARB *OAK VIEW-5500 CASITAS PAS	33	52	-126.363	484.301
TOMP	VCAPCD*THOUSAND OAKS-9 2323 MOOR	43	48	-78.444	463.563

SubRegion 003 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
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BRBK	SCAQMD*BURBANK-228 W PALM AVE	53	47	-27.168	459.542
LANC	SCAQMD*LANCASTER-315 W. PONDERA	56	59	-10.483	516.001
RSDA	SCAQMD*RESEDA-18330 GAULT ST	49	48	-46.776	461.466
CALB	Calabasas (AV)	47	47	-55.433	457.635
CSUN	Van Nuys NOAA	50	49	-44.517	465.008
SCLR	Santa ClarSCAQMD	49	52	-48.187	483.843
WILS	Mount WilsCE-CERT	57	49	-5.430	466.029

SubRegion 004 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
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LKAR	MDAQMD LAKE ARROWHEAD-27400 HWY	73	49	72.392	465.324
AZSA	SCAQMD*AZUSA-803 N LOREN AVE	60	47	7.551	455.846
BANH	SCAQMD*BANNING-135 N ALLESANDRO	79	42	103.017	432.847
FONT	SCAQMD*FONTANA-14360 ARROW BLVD	68	46	45.325	452.335
GLDR	SCAQMD*GLENDORA-840 LAUREL	61	47	13.591	455.854
HESP	MDAQMD*HESPERIA-17288 OLIVE ST	71	53	64.656	487.131

LELS	SCAQMD*LAKE ELSINORE-506 W FLINT	71	36	60.828	404.975
LGRE	SCAQMD*CRESTLINE-LAKE GREGORY-LA	72	49	66.342	467.091
PERR	SCAQMD*PERRIS-237 .5 N "D" ST	72	39	69.830	417.843
PHEL	MDAQMD*PHELAN-BEEKLEY & PHELAN R	67	53	40.599	486.957
POMA	SCAQMD*POMONA-924 N. GAREY AVE	63	45	22.674	448.580
RDLD	SCAQMD*REDLANDS-500 N. DEARBORN	74	45	77.109	447.127
RUBI	SCAQMD*RUBIDOUX-5888 MISSION BLV	69	44	52.958	441.437
SANB	SCAQMD*SAN BERNARDINO-24302 4TH	72	46	66.476	452.498
SNBO	SCAQMD*SAN BERNARDINO-ARB	65	46	30.224	450.432
ULDS	SCAQMD UPLAND-155 "D" ST	65	46	31.735	450.438
CAJB	Cajon Pass (AV)	68	52	49.851	482.487
CAJC	Cajon MDAQMD	68	51	49.946	479.601
MBLD	Azusa CARB	65	49	34.299	467.505
TCCC	Temecula SCAQMD	74	33	76.727	389.831

SubRegion 005 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
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ANAH	SCAQMD*ANAHIEM-1610 S HARBOR BLV	60	40	9.104	421.167
CMMV	SCAQMD*COSTA MESA-2850 MESA VERD	60	36	7.604	404.725
ELTR	SCAQMD*EL TORO-23022 EL TORO RD	64	35	28.915	399.295
HAWH	SCAQMD*HAWTHORNE-5234 W. 120TH S	52	42	-33.330	432.194
LANM	SCAQMD*LOS ANGELES-1630 N MAIN S	54	45	-21.161	448.575
LHAB	SCAQMD*LA HABRA-621 W. LAMBERT	59	42	4.545	432.118
LYNW	SCAQMD*LYNWOOD-11220 LONG BEACH	55	42	-18.181	432.139
NLGB	SCAQMD*LONG BEACH-3648 N LONG BE	55	40	-16.690	421.180
PDSW	SCAQMD*PASADENA-752 S. WILSON AV	57	46	-9.067	450.374
VALA	SCAQMD*W LOS ANGELES-VA HOSPITAL	50	45	-40.824	446.834
PICO	SCAQMD*PICO RIVERA-3713 SAN GABR	58	44	-4.538	441.245
PVSP	Palos Verdes (AV)	52	38	-30.556	413.493

SubRegion 006 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
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ALPN	SDAQMD*ALPINE-2300 VICTORIA DR	82	18	115.506	312.299
CHVT	SDAQMD*CHULA VISTA-80 E "J" ST	76	13	88.047	289.920
DMMC	SDAQMD*DEL MAR-MIRACOSTA COLLEGE	72	21	69.168	326.379
ECAJ	SDAQMD*EL CAJON-1155 REDWOOD AVE	78	17	98.615	308.389
ESCO	SDAQMD*ESCONDIDO-600 E. VALLEY P	76	24	85.862	344.867
OCEA	SDAQMD*OCEANSIDE-1701 MISSION AV	70	26	58.192	353.749
OTAY	SDAQMD*OTAY-1100 PASEO INTERNATI	78	13	98.908	286.390
SDOV	SDAQMD*SAN DIEGO-5555 OVERLAND A	75	18	81.626	311.848

SD12	SDAQMD*SAN DIEGO-330A 12TH AVE	74	15	78.682	298.985
BLKM	Black MounSDCAPCD	75	21	81.528	329.985
PEND	Camp Del MSDCAPCD	70	27	55.472	355.619
REDM	Fallbrook SDCAPCD	73	31	74.125	375.908
SMPK	Deer SprinSDCAPCD	74	26	79.954	352.306
SOLM	La Jolla SDCAPCD	72	18	69.281	314.379
TILM	Tijuana CARB	77	11	94.980	276.911
TIPL	Tijuana CARB	75	11	82.102	278.547
TITT	Tijuana CARB	77	11	94.200	279.907
VCEN	Valley CenSDCAPCD	76	27	89.589	357.633
WSPR	Warner SprSDCAPCD	83	29	120.650	367.928

SubRegion 007 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
BKGS	SJVUCD*BAKERSFIELD-1138 GOLDEN S	41	74	-88.897	592.954
BLFC	CARB *BAKERSFIELD-5558 CALIFORN	40	73	-91.907	589.357
ARVN	CARB *ARVIN-20401 BEAR MTN BLVD	45	70	-69.832	572.746
EDSN	CARB *EDISON-JOHNSON FARM	43	73	-75.621	587.349
MRCP	SJVUCD*SCHOOL-755 STANISLAUS ST,	33	67	-125.088	557.129
OLDL	CARB *OILDALE-3311 MANOR ST	41	75	-88.829	598.407
SHFT	CARB *SHAFTER-548 WALKER ST	36	77	-112.400	606.008

SubRegion 008 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
MOJP	CARB *MOJAVE-923 POOLE ST	56	67	-11.914	556.044
VICT	MDAQMD*VICTORVILLE-14029 AMARGOS	71	55	61.417	496.317
TEHP	Monolith CE-CERT	52	68	-33.847	563.088

SubRegion 009 Contains the Following Sites:

Site	Site Description	Xcell	Ycell	XPos(km)	YPos(km)
CALE	CARB *CALEXICO-CALEXICO HS ETHE	105	15	234.585	298.610
CLXC	ICAPCD*CALEXICO-900 GRANT ST	105	15	231.499	298.514
EC9S	ICAPCD*EL CENTRO-150 9TH ST	104	18	226.478	311.199
INDO	SCAQMD*INDIO-46-990 JACKSON ST	91	38	164.143	410.220
JOSH	NPS JOSHUA TREE NATIONAL MONU	88	46	146.614	450.024
MEXI	Mexicali CARB	107	14	241.109	293.624
MEXT	Mexicali CARB	108	13	245.809	288.365
MEXU	Mexicali CARB	106	14	236.593	294.546
PALM	SCAQMD*PALM SPRINGS-FS 590 RACQU	85	41	133.447	426.035

TNPM	MDAQMD TWENTYNINE PALMS-6078 ADO	94	47	176.661	457.994
CLXE	Calexico CARB	107	15	241.550	299.721
MEXA	Mexicali CARB	106	15	238.292	297.854

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 215 (08/03) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0000	SubRegion	3	8.8	19	6.1	12	-7	0.69	-1.7	1.7	-0.21	0.21	-138.71
	Subregional Peak:				9.1	11	-8	1.04	(at 64 x 32) NSte: CATI; NSPk: 5.7				
CATA	Catalina AP (AV)	1	6.3	23	5.7	12	-11	0.91	-0.6	0.6	-0.09	0.09	
CLEM	San ClemenSDCAPCD	1	8.8	19	5.3	12	-7	0.61	-3.4	3.4	-0.39	0.39	
LAGP	Point MuguUSN	1	7.2	16	6.1	12	-4	0.84	-1.1	1.1	-0.16	0.16	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 215 (08/03) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0002	SubRegion	4	8.5	10	6.4	12	2	0.76	-0.8	0.8	-0.10	0.10	-316.13
	Subregional Peak:				6.6	12	2	0.78	(at 47 x 50) NSte: SVAL; NSPk: 6.4				
OJAI	VCAPCD OJAI-1768 MARICOP	1	6.8	10	6.1	12	2	0.90	-0.7	0.7	-0.10	0.10	
PRTG	VCAPCD*PIRU-2SW, 2815 TE	1	6.3	10	6.2	12	2	0.99	-0.1	0.1	-0.01	0.01	
SVAL	VCAPCD*SIMI VALLEY-5400	1	8.5	10	6.4	12	2	0.76	-2.1	2.1	-0.24	0.24	
TOMP	VCAPCD*THOUSAND OAKS-9 2	1	6.3	10	6.0	12	2	0.94	-0.3	0.3	-0.06	0.06	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 215 (08/03) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0003	SubRegion	6	10.3	8	7.4	12	4	0.71	-0.7	1.2	-0.06	0.14	-132.74
	Subregional Peak:				8.8	12	4	0.85	(at 53 x 50) NSte: BRBK; NSPk: 6.7				
BRBK	SCAQMD*BURBANK-228 W PAL	1	6.6	8	6.7	12	4	1.02	0.1	0.1	0.02	0.02	
RSDA	SCAQMD*RESEDA-18330 GAUL	1	7.8	10	7.1	12	2	0.91	-0.7	0.7	-0.09	0.09	
CALB	Calabasas (AV)	1	8.4	10	6.5	12	2	0.78	-1.8	1.8	-0.22	0.22	
CSUN	Van Nuys NOAA	1	10.3	8	7.3	12	4	0.71	-3.0	3.0	-0.29	0.29	
SCLR	Santa ClarSCAQMD	1	6.8	9	7.0	12	3	1.02	0.2	0.2	0.02	0.02	
WILS	Mount WilsCE-CERT	1	6.3	11	7.4	12	1	1.18	1.1	1.1	0.18	0.18	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 215 (08/03) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Peak Concentrations: Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Comparisons with Observations: Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0004	SubRegion	19	11.2	12	9.2	12	0	0.82	-1.4	1.5	-0.13	0.16	-56.75
	Subregional Peak:				9.5	13	1	0.84	(at 73 x 44)	NSte: RDLD;	NSPk: 9.2		
LKAR	MDAQMD LAKE ARROWHEAD-27	1	10.9	12	8.5	13	1	0.78	-2.3	2.3	-0.22	0.22	
AZSA	SCAQMD*AZUSA-803 N LOREN	1	8.9	10	7.4	12	2	0.83	-1.5	1.5	-0.17	0.17	
BANH	SCAQMD*BANNING-135 N ALL	1	8.6	13	6.8	13	0	0.79	-1.8	1.8	-0.21	0.21	
FONT	SCAQMD*FONTANA-14360 ARR	1	9.5	11	8.2	12	1	0.86	-1.3	1.3	-0.14	0.14	
GLDR	SCAQMD*GLENDORA-840 LAUR	1	9.7	10	7.5	12	2	0.78	-2.2	2.2	-0.22	0.22	
HESP	MDAQMD*HESPERIA-17288 OL	1	8.0	12	7.1	13	1	0.89	-0.9	0.9	-0.11	0.11	
LELS	SCAQMD*LAKE ELSINORE-506	1	6.9	11	7.6	13	2	1.10	0.7	0.7	0.10	0.10	
LGRE	SCAQMD*CRESTLINE-LAKE GR	1	10.0	11	8.2	13	2	0.82	-1.8	1.8	-0.18	0.18	
PHEL	MDAQMD*PHELAN-BEEKLEY &	1	7.6	16	7.5	13	-3	0.99	-0.1	0.1	-0.01	0.01	
POMA	SCAQMD*POMONA-924 N. GAR	1	8.7	10	7.0	12	2	0.81	-1.6	1.6	-0.19	0.19	
RDLD	SCAQMD*REDLANDS-500 N. D	1	11.2	12	9.2	12	0	0.82	-2.0	2.0	-0.18	0.18	
RUBI	SCAQMD*RUBIDOUX-5888 MIS	1	10.4	11	9.1	12	1	0.88	-1.3	1.3	-0.12	0.12	
SANB	SCAQMD*SAN BERNARDINO-24	1	11.2	11	8.8	12	1	0.79	-2.4	2.4	-0.21	0.21	
SNBO	SCAQMD*SAN BERNARDINO-AR	1	9.9	10	7.5	12	2	0.76	-2.3	2.3	-0.24	0.24	
ULDS	SCAQMD UPLAND-155 "D" ST	1	9.9	11	7.5	12	1	0.76	-2.3	2.3	-0.24	0.24	
CAJB	Cajon Pass (AV)	1	6.5	18	7.2	12	-6	1.11	0.7	0.7	0.11	0.11	
CAJC	Cajon MDAQMD	1	7.4	18	7.2	12	-6	0.96	-0.3	0.3	-0.04	0.04	
MBLD	Azusa CARB	1	10.3	12	7.4	13	1	0.72	-2.8	2.8	-0.28	0.28	
TCCC	Temecula SCAQMD	1	6.1	12	6.0	12	0	0.98	-0.1	0.1	-0.02	0.02	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 215 (08/03) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	6	8.4	10	6.6	11	1	0.78	-1.2	1.2	-0.16	0.16	-112.20
	Subregional Peak:				8.2	12	2	0.98	(at 68 x 36) NSte: ELTR; NSPk: 6.6				
ELTR	SCAQMD*EL TORO-23022 EL	1	8.3	10	6.6	11	1	0.79	-1.7	1.7	-0.21	0.21	
LANM	SCAQMD*LOS ANGELES-1630	1	6.5	10	5.3	12	2	0.82	-1.2	1.2	-0.18	0.18	
LHAB	SCAQMD*LA HABRA-621 W. L	1	6.1	9	6.0	12	3	0.99	-0.1	0.1	-0.01	0.01	
PDSW	SCAQMD*PASADENA-752 S. W	1	8.4	10	6.3	12	2	0.74	-2.2	2.2	-0.26	0.26	
PICO	SCAQMD*PICO RIVERA-3713	1	7.8	10	5.8	12	2	0.75	-2.0	2.0	-0.25	0.25	
PVSP	Palos Verdes (AV)	1	6.2	16	5.8	12	-4	0.94	-0.3	0.3	-0.06	0.06	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 215 (08/03) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	7	10.0	17	7.3	12	-5	0.73	-1.2	1.2	-0.13	0.14	-92.30
	Subregional Peak:				7.8	12	-5	0.78	(at 68 x 34) NSte: REDM; NSPk: 6.1				
ALPN	SDAQMD*ALPINE-2300 VICTO	1	8.2	9	7.3	12	3	0.90	-0.8	0.8	-0.10	0.10	
ESCO	SDAQMD*ESCONDIDO-600 E.	1	6.6	10	6.3	11	1	0.96	-0.3	0.3	-0.04	0.04	
BLKM	Black MounSDCAPCD	1	10.0	17	6.1	12	-5	0.61	-3.9	3.9	-0.39	0.39	

REDM	Fallbrook SDCAPCD	1	8.6	15	6.1	12	-3	0.70	-2.6	2.6	-0.30	0.30	
SMPK	Deer SprinSDCAPCD	1	6.9	8	6.2	12	4	0.90	-0.7	0.7	-0.10	0.10	
VCEN	Valley CenSDCAPCD	1	6.4	7	6.4	12	5	1.00	0.0	0.0	0.00	0.00	
WSPR	Warner SprSDCAPCD	1	6.4	7	6.6	13	6	1.04	0.2	0.2	0.04	0.04	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 215 (08/03) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0007	SubRegion	7	9.0	10	6.4	12	2	0.71	-2.3	2.3	-0.28	0.28	-118.38
	Subregional Peak:				7.4	13	3	0.82	(at 48 x 74) NSte: EDSN; NSPk: 6.3				
BKGS	SJVUCD*BAKERSFIELD-1138	1	8.4	11	5.6	12	1	0.67	-2.8	2.8	-0.33	0.33	
BLFC	CARB *BAKERSFIELD-5558	1	8.0	11	5.6	12	1	0.70	-2.4	2.4	-0.30	0.30	
ARVN	CARB *ARVIN-20401 BEAR	1	8.8	13	6.4	12	-1	0.73	-2.4	2.4	-0.27	0.27	
EDSN	CARB *EDISON-JOHNSON FA	1	9.0	10	6.3	12	2	0.70	-2.7	2.7	-0.30	0.30	
MRCP	SJVUCD*SCHOOL-755 STANIS	1	7.8	12	6.3	12	0	0.81	-1.5	1.5	-0.19	0.19	
OLDL	CARB *OILDALE-3311 MANO	1	7.7	11	5.7	12	1	0.74	-2.0	2.0	-0.26	0.26	
SHFT	CARB *SHAFTER-548 WALKE	1	6.9	12	4.6	12	0	0.66	-2.3	2.3	-0.34	0.34	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 215 (08/03) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations		--------			--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0008	SubRegion	3	7.1	15	7.2	12	-3	1.02	-0.5	0.5	-0.06	0.08	-1006.76
	Subregional Peak:				8.4	14	-1	1.19	(at 77 x 52) NSte: VICT; NSPk: 7.2				
MOJP	CARB *MOJAVE-923 POOLE	1	6.8	15	6.2	12	-3	0.91	-0.6	0.6	-0.09	0.09	
VICT	MDAQMD*VICTORVILLE-14029	1	7.0	12	7.2	12	0	1.02	0.1	0.1	0.02	0.02	
TEHP	Monolith CE-CERT	1	7.1	15	6.2	12	-3	0.88	-0.8	0.8	-0.12	0.12	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 215 (08/03) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations		--------			--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	2	7.5	12	6.6	12	0	0.88	-1.1	1.1	-0.15	0.15	-99.00
	Subregional Peak:				8.1	16	4	1.08	(at 80 x 48) NSte: JOSH; NSPk: 6.6				
CLXC	ICAPCD*CALEXICO-900 GRAN	1	7.5	12	5.3	10	-2	0.71	-2.2	2.2	-0.29	0.29	
JOSH	NPS JOSHUA TREE NATIO	1	6.7	0	6.6	12	12	0.99	-0.1	0.1	-0.01	0.01	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 216 (08/04) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0000	SubRegion	4	8.3	15	5.6	11	-4	0.68	-3.5	3.5	-0.49	0.49	-12.96
	Subregional Peak:				8.1	12	-3	0.99	(at 86 x 05) NSte: TIRP; NSPk: 5.7				
PSRB	CARB *PASO ROBLES-235 S	1	6.4	10	0.0	0	-10	0.00	-6.4	6.4	-1.00	1.00	
CATA	Catalina AP (AV)	1	6.1	0	4.8	12	12	0.78	-1.3	1.3	-0.22	0.22	
CLEM	San ClemenSDCAPCD	1	8.3	15	4.4	11	-4	0.53	-3.8	3.8	-0.47	0.47	
LAGP	Point MuguUSN	1	7.9	9	5.6	11	2	0.71	-2.3	2.3	-0.29	0.29	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 216 (08/04) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0001	SubRegion	2	6.4	10	5.2	9	-1	0.80	-1.6	1.6	-0.25	0.25	-99.00
	Subregional Peak:				6.5	11	1	1.01	(at 25 x 52) NSte: UCSB; NSPk: 6.3				
ATAS	SLOCO *ATASCADERO-6005 L	1	6.4	10	4.1	10	0	0.64	-2.3	2.3	-0.36	0.36	
LOSP	UNOCAL*LOS PADRES NF-PAR	1	6.0	14	5.2	9	-5	0.86	-0.8	0.8	-0.14	0.14	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 216 (08/04) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
			------- Peak Concentrations --------						--- Comparisons with Observations ---				
0002	SubRegion	3	7.7	10	6.4	11	1	0.84	-0.6	0.6	-0.09	0.09	-174.04
	Subregional Peak:				6.9	11	1	0.90	(at 47 x 51) NSte: SVAL; NSPk: 6.4				
OJAI	VCAPCD OJAI-1768 MARICOP	1	6.2	9	5.8	12	3	0.93	-0.4	0.4	-0.07	0.07	
SVAL	VCAPCD*SIMI VALLEY-5400	1	7.7	10	6.4	11	1	0.84	-1.2	1.2	-0.16	0.16	
TOMP	VCAPCD*THOUSAND OAKS-9 2	1	6.0	11	5.8	12	1	0.96	-0.2	0.2	-0.04	0.04	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 216 (08/04) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
			------- Peak Concentrations --------						--- Comparisons with Observations ---				
0003	SubRegion	4	7.8	12	7.4	12	0	0.96	0.2	0.3	0.02	0.05	-255.72
	Subregional Peak:				8.3	12	0	1.07	(at 53 x 50) NSte: BRBK; NSPk: 6.4				
CALB	Calabasas (AV)	1	6.3	10	6.5	12	2	1.03	0.2	0.2	0.03	0.03	
CSUN	Van Nuys NOAA	1	6.5	8	7.0	12	4	1.07	0.5	0.5	0.07	0.07	
SCLR	Santa ClarSCAQMD	1	6.9	9	7.3	12	3	1.05	0.3	0.3	0.05	0.05	

WILS	Mount WilsCE-CERT	1	7.8	12	7.4	12	0	0.96	-0.3	0.3	-0.04	0.04		

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 216 (08/04) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0004	SubRegion	18	11.0	11	11.3	13	2	1.03	0.2	0.9	0.04	0.11	-31.61
	Subregional Peak:				12.1	12	1	1.10	(at 77 x 44)	NSte: BANH; NSPk: 11.3			
LKAR	MDAQMD LAKE ARROWHEAD-27	1	11.0	11	9.4	12	1	0.86	-1.6	1.6	-0.14	0.14	
AZSA	SCAQMD*AZUSA-803 N LOREN	1	6.9	10	6.6	12	2	0.96	-0.3	0.3	-0.04	0.04	
BANH	SCAQMD*BANNING-135 N ALL	1	10.4	11	11.3	13	2	1.09	1.0	1.0	0.09	0.09	
FONT	SCAQMD*FONTANA-14360 ARR	1	7.0	10	8.3	12	2	1.19	1.3	1.3	0.19	0.19	
GLDR	SCAQMD*GLENDORA-840 LAUR	1	7.6	10	6.8	12	2	0.90	-0.8	0.8	-0.10	0.10	
HESP	MDAQMD*HESPERIA-17288 OL	1	6.9	9	6.9	11	2	1.00	0.0	0.0	0.00	0.00	
LELS	SCAQMD*LAKE ELSINORE-506	1	7.9	11	9.9	12	1	1.26	2.0	2.0	0.26	0.26	
LGRE	SCAQMD*CRESTLINE-LAKE GR	1	9.2	10	9.2	12	2	1.00	0.0	0.0	0.00	0.00	
PHEL	MDAQMD*PHELAN-BEEKLEY &	1	7.8	12	6.7	13	1	0.86	-1.1	1.1	-0.14	0.14	
RDLD	SCAQMD*REDLANDS-500 N. D	1	9.0	10	10.4	12	2	1.15	1.4	1.4	0.15	0.15	
RUBI	SCAQMD*RUBIDOUX-5888 MIS	1	9.2	10	9.2	11	1	1.00	0.0	0.0	0.00	0.00	
SANB	SCAQMD*SAN BERNARDINO-24	1	8.0	9	9.4	12	3	1.18	1.5	1.5	0.18	0.18	
SNBO	SCAQMD*SAN BERNARDINO-AR	1	6.5	10	7.5	12	2	1.16	1.0	1.0	0.16	0.16	
ULDS	SCAQMD UPLAND-155 "D" ST	1	6.5	11	7.5	12	1	1.16	1.0	1.0	0.16	0.16	
CAJB	Cajon Pass (AV)	1	6.3	11	6.9	13	2	1.10	0.6	0.6	0.10	0.10	
CAJC	Cajon MDAQMD	1	7.6	12	7.2	13	1	0.94	-0.4	0.4	-0.06	0.06	
MBLD	Azusa CARB	1	10.4	11	8.7	13	2	0.84	-1.7	1.7	-0.16	0.16	
TCCC	Temecula SCAQMD	1	6.5	12	6.8	8	-4	1.04	0.3	0.3	0.04	0.04	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 216 (08/04) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	3	6.9	10	6.9	10	0	1.01	-0.8	0.8	-0.12	0.12	-219.53
	Subregional Peak:				10.0	11	1	1.46	(at 68 x 36) NSte: ELTR; NSPk: 6.9				
ELTR	SCAQMD*EL TORO-23022 EL	1	6.9	10	6.9	10	0	1.01	0.1	0.1	0.01	0.01	
PDSW	SCAQMD*PASADENA-752 S. W	1	6.6	9	5.6	12	3	0.84	-1.0	1.0	-0.16	0.16	
PICO	SCAQMD*PICO RIVERA-3713	1	6.3	10	5.0	12	2	0.79	-1.3	1.3	-0.21	0.21	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 216 (08/04) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	7	8.3	9	7.9	10	1	0.96	-0.3	0.8	-0.04	0.10	-107.04
	Subregional Peak:				9.7	11	2	1.17	(at 68 x 34) NSte: REDM; NSPk: 6.7				
ALPN	SDAQMD*ALPINE-2300 VICTO	1	7.2	9	7.9	10	1	1.10	0.7	0.7	0.10	0.10	

ESCO	SDAQMD*ESCONDIDO-600 E.	1	6.6	10	6.7	10	0	1.02	0.1	0.1	0.02	0.02		
SDOV	SDAQMD*SAN DIEGO-5555 OV	1	6.1	10	5.9	10	0	0.98	-0.1	0.1	-0.02	0.02		
BLKM	Black MounSDCAPCD	1	8.1	0	6.3	10	10	0.78	-1.8	1.8	-0.22	0.22		
REDM	Fallbrook SDCAPCD	1	8.3	9	6.7	8	-1	0.82	-1.5	1.5	-0.18	0.18		
SMPK	Deer SprinSDCAPCD	1	7.1	9	6.7	9	0	0.94	-0.4	0.4	-0.06	0.06		
WSPR	Warner SprSDCAPCD	1	6.8	9	7.4	12	3	1.09	0.6	0.6	0.09	0.09		

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 216 (08/04) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0007	SubRegion	7	9.3	10	6.4	10	0	0.69	-2.7	2.7	-0.34	0.34	-73.96
	Subregional Peak:				7.6	12	2	0.81	(at 50 x 74)	NSte: EDSN;	NSPk: 5.4		
BKGS	SJVUCD*BAKERSFIELD-1138	1	7.4	11	4.7	12	1	0.63	-2.7	2.7	-0.37	0.37	
BLFC	CARB *BAKERSFIELD-5558	1	8.1	11	4.7	12	1	0.58	-3.4	3.4	-0.42	0.42	
ARVN	CARB *ARVIN-20401 BEAR	1	9.3	10	6.4	10	0	0.69	-2.8	2.8	-0.31	0.31	
EDSN	CARB *EDISON-JOHNSON FA	1	8.1	10	5.4	11	1	0.67	-2.7	2.7	-0.33	0.33	
MRCP	SJVUCD*SCHOOL-755 STANIS	1	8.0	11	5.9	10	-1	0.73	-2.1	2.1	-0.27	0.27	
OLDL	CARB *OILDALE-3311 MANO	1	7.5	11	4.9	12	1	0.65	-2.6	2.6	-0.35	0.35	
SHFT	CARB *SHAFTER-548 WALKE	1	6.6	11	4.2	10	-1	0.65	-2.3	2.3	-0.35	0.35	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 216 (08/04) 1997

Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0008	SubRegion	2	8.1	16	6.5	10	-6	0.81	-1.5	1.5	-0.19	0.19	-99.00
	Subregional Peak:				8.7	9	-7	1.08	(at 80 x 51) NSte: MOJP; NSPk: 6.5				
MOJP	CARB *MOJAVE-923 POOLE	1	8.1	16	6.5	10	-6	0.81	-1.5	1.5	-0.19	0.19	
TEHP	Monolith CE-CERT	1	8.0	13	6.5	10	-3	0.81	-1.5	1.5	-0.19	0.19	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 216 (08/04) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	8	10.4	17	10.2	13	-4	0.98	-0.2	1.4	0.00	0.17	-32.03
	Subregional Peak:				12.0	13	-4	1.16	(at 81 x 44) NSte: PALM; NSPk: 10.2				
CLXC	ICAPCD*CALEXICO-900 GRAN	1	9.3	11	6.6	10	-1	0.71	-2.7	2.7	-0.29	0.29	
EC9S	ICAPCD*EL CENTRO-150 9TH	1	7.0	10	6.0	11	1	0.86	-1.0	1.0	-0.14	0.14	
INDO	SCAQMD*INDIO-46-990 JACK	1	6.1	10	8.0	11	1	1.32	2.0	2.0	0.32	0.32	
JOSH	NPS JOSHUA TREE NATIO	1	10.4	17	8.4	12	-5	0.81	-2.0	2.0	-0.19	0.19	
MEXI	Mexicali CARB	1	6.9	8	6.9	10	2	1.00	0.0	0.0	0.00	0.00	
MEXT	Mexicali CARB	1	6.3	14	7.1	10	-4	1.13	0.8	0.8	0.13	0.13	
PALM	SCAQMD*PALM SPRINGS-FS 5	1	8.2	13	10.2	13	0	1.24	2.0	2.0	0.24	0.24	
MEXA	Mexicali CARB	1	7.0	10	6.6	10	0	0.94	-0.4	0.4	-0.06	0.06	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 217 (08/05) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0000	SubRegion	3	8.8	16	6.2	10	-6	0.71	-1.7	1.7	-0.22	0.22	-68.45
	Subregional Peak:				10.2	10	-6	1.17	(at 83 x 08) NSte: TIRP; NSPk: 6.7				
CATA	Catalina AP (AV)	1	6.4	17	6.0	11	-6	0.94	-0.4	0.4	-0.06	0.06	
CLEM	San ClemenSDCAPCD	1	7.0	17	4.8	10	-7	0.69	-2.2	2.2	-0.31	0.31	
LAGP	Point MuguUSN	1	8.8	16	6.2	10	-6	0.71	-2.6	2.6	-0.29	0.29	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 217 (08/05) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0001	SubRegion	6	8.1	10	6.2	12	2	0.77	-1.9	1.9	-0.28	0.28	-65.43
	Subregional Peak:				6.3	11	1	0.78	(at 32 x 52) NSte: CPGB; NSPk: 6.2				

ATAS	SLOCO *ATASCADERO-6005 L	1	6.1	9	4.0	10	1	0.66	-2.1	2.1	-0.34	0.34	
CPGB	CHVRON*CARPINTERIA-GOBER	1	7.1	9	6.2	12	3	0.88	-0.9	0.9	-0.12	0.12	
GTCB	TEXACO*NOJOQUI PASS-GTC	1	6.1	9	4.4	11	2	0.73	-1.7	1.7	-0.27	0.27	
LFC1	EXXON *CAPITAN-LFC #1 LA	1	6.5	13	4.8	11	-2	0.75	-1.6	1.6	-0.25	0.25	
LOSP	UNOCAL*LOS PADRES NF-PAR	1	8.1	10	5.0	12	2	0.61	-3.2	3.2	-0.39	0.39	
SYAP	SBAPCD*SANTA YNEZ-AIRPOR	1	6.4	9	4.7	11	2	0.74	-1.7	1.7	-0.26	0.26	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 217 (08/05) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0002	SubRegion	4	8.1	12	7.0	11	-1	0.86	-0.8	0.8	-0.11	0.11	-251.68
	Subregional Peak:				7.2	11	-1	0.90	(at 47 x 50)	NSte: SVAL;	NSPk: 7.0		
PRTG	VCAPCD*PIRU-2SW, 2815 TE	1	6.4	9	6.3	12	3	0.98	-0.2	0.2	-0.02	0.02	
SVAL	VCAPCD*SIMI VALLEY-5400	1	7.7	10	7.0	11	1	0.90	-0.7	0.7	-0.10	0.10	
THOS	CARB *OAK VIEW-5500 CAS	1	8.1	12	6.2	11	-1	0.77	-1.9	1.9	-0.23	0.23	
TOMP	VCAPCD*THOUSAND OAKS-9 2	1	6.9	11	6.3	11	0	0.91	-0.6	0.6	-0.09	0.09	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 217 (08/05) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0003	SubRegion	7	9.5	9	10.1	12	3	1.07	0.6	1.4	0.11	0.21	-44.99
	Subregional Peak:				10.9	13	4	1.15	(at 59 x 50) NSte: WILS; NSPk: 10.1				
BRBK	SCAQMD*BURBANK-228 W PAL	1	7.7	10	8.7	12	2	1.13	1.0	1.0	0.13	0.13	
LANC	SCAQMD*LANCASTER-315 W.	1	6.3	14	6.6	12	-2	1.05	0.3	0.3	0.05	0.05	
RSDA	SCAQMD*RESEDA-18330 GAUL	1	6.7	10	7.7	12	2	1.15	1.0	1.0	0.15	0.15	
CALB	Calabasas (AV)	1	8.5	9	7.2	11	2	0.85	-1.3	1.3	-0.15	0.15	
CSUN	Van Nuys NOAA	1	9.5	9	7.9	12	3	0.83	-1.6	1.6	-0.17	0.17	
SCLR	Santa ClarSCAQMD	1	6.4	10	7.3	12	2	1.14	0.9	0.9	0.14	0.14	
WILS	Mount WilsCE-CERT	1	6.2	12	10.1	12	0	1.65	4.0	4.0	0.65	0.65	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 217 (08/05) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0004	SubRegion	17	11.8	11	11.8	12	1	1.00	0.1	0.7	0.02	0.08	-29.23
	Subregional Peak:				12.9	12	1	1.09	(at 74 x 41) NSte: RDLD; NSPk: 11.8				
LKAR	MDAQMD LAKE ARROWHEAD-27	1	10.9	13	8.9	11	-2	0.81	-2.0	2.0	-0.19	0.19	
AZSA	SCAQMD*AZUSA-803 N LOREN	1	8.5	10	8.5	12	2	1.00	0.0	0.0	0.00	0.00	
BANH	SCAQMD*BANNING-135 N ALL	1	8.8	12	8.6	13	1	0.98	-0.2	0.2	-0.02	0.02	
FONT	SCAQMD*FONTANA-14360 ARR	1	9.9	11	10.5	12	1	1.06	0.6	0.6	0.06	0.06	
HESP	MDAQMD*HESPERIA-17288 OL	1	6.8	8	6.5	10	2	0.95	-0.3	0.3	-0.05	0.05	
LELS	SCAQMD*LAKE ELSINORE-506	1	9.2	12	11.5	12	0	1.25	2.3	2.3	0.25	0.25	
LGRE	SCAQMD*CRESTLINE-LAKE GR	1	8.6	11	8.7	11	0	1.01	0.1	0.1	0.01	0.01	

PHEL	MDAQMD*PHELAN-BEEKLEY &	1	6.4	9	5.9	15	6	0.92	-0.5	0.5	-0.08	0.08	
POMA	SCAQMD*POMONA-924 N. GAR	1	6.5	10	8.2	12	2	1.26	1.7	1.7	0.26	0.26	
RDLD	SCAQMD*REDLANDS-500 N. D	1	11.0	11	11.8	12	1	1.07	0.8	0.8	0.07	0.07	
RUBI	SCAQMD*RUBIDOUX-5888 MIS	1	11.8	11	10.9	12	1	0.93	-0.9	0.9	-0.07	0.07	
SANB	SCAQMD*SAN BERNARDINO-24	1	10.4	10	11.0	12	2	1.06	0.7	0.7	0.06	0.06	
SNBO	SCAQMD*SAN BERNARDINO-AR	1	9.2	10	9.5	12	2	1.04	0.4	0.4	0.04	0.04	
ULDS	SCAQMD UPLAND-155 "D" ST	1	9.2	11	9.5	12	1	1.04	0.4	0.4	0.04	0.04	
CAJC	Cajon MDAQMD	1	6.4	10	6.5	10	0	1.02	0.1	0.1	0.02	0.02	
MBLD	Azusa CARB	1	9.8	9	9.0	15	6	0.92	-0.8	0.8	-0.08	0.08	
TCCC	Temecula SCAQMD	1	8.1	13	7.9	9	-4	0.98	-0.2	0.2	-0.02	0.02	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 217 (08/05) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	5	8.8	9	7.5	12	3	0.86	-0.2	0.7	-0.02	0.09	-145.19
	Subregional Peak:				11.2	11	2	1.29	(at 68 x 36) NSte: ELTR; NSPk: 7.5				
ELTR	SCAQMD*EL TORO-23022 EL	1	7.7	10	7.5	12	2	0.97	-0.3	0.3	-0.03	0.03	
PDSW	SCAQMD*PASADENA-752 S. W	1	8.8	9	7.3	12	3	0.84	-1.4	1.4	-0.16	0.16	
VALA	SCAQMD*W LOS ANGELES-VA	1	6.1	10	7.2	12	2	1.19	1.2	1.2	0.19	0.19	
PICO	SCAQMD*PICO RIVERA-3713	1	6.9	10	6.5	12	2	0.94	-0.4	0.4	-0.06	0.06	
PVSP	Palos Verdes (AV)	1	6.8	14	6.7	12	-2	0.97	-0.2	0.2	-0.03	0.03	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 217 (08/05) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
			------- Peak Concentrations --------						--- Comparisons with Observations ---				
0006	SubRegion	14	9.8	9	9.8	9	0	1.00	-0.5	0.9	-0.07	0.13	-39.58
	Subregional Peak:				10.8	11	2	1.11	(at 68 x 34)	NSte: REDM;	NSPk: 7.7		
ALPN	SDAQMD*ALPINE-2300 VICTO	1	8.7	9	9.8	9	0	1.12	1.0	1.0	0.12	0.12	
CHVT	SDAQMD*CHULA VISTA-80 E	1	7.4	10	6.9	12	2	0.93	-0.5	0.5	-0.07	0.07	
ECAJ	SDAQMD*EL CAJON-1155 RED	1	6.7	9	7.8	11	2	1.17	1.1	1.1	0.17	0.17	
OTAY	SDAQMD*OTAY-1100 PASEO I	1	7.9	8	7.5	12	4	0.95	-0.4	0.4	-0.05	0.05	
SDOV	SDAQMD*SAN DIEGO-5555 OV	1	7.1	10	7.2	11	1	1.02	0.2	0.2	0.02	0.02	
SD12	SDAQMD*SAN DIEGO-330A 12	1	6.1	10	2.3	10	0	0.38	-3.8	3.8	-0.62	0.62	
BLKM	Black MounSDCAPCD	1	8.8	10	7.7	10	0	0.88	-1.1	1.1	-0.12	0.12	
REDM	Fallbrook SDCAPCD	1	9.8	9	7.7	9	0	0.79	-2.0	2.0	-0.21	0.21	
SMPK	Deer SprinSDCAPCD	1	7.9	11	7.9	9	-2	1.00	0.0	0.0	0.00	0.00	
SOLM	La Jolla SDCAPCD	1	7.8	13	6.6	11	-2	0.86	-1.1	1.1	-0.14	0.14	
TILM	Tijuana CARB	1	7.7	9	7.0	11	2	0.91	-0.7	0.7	-0.09	0.09	
TITT	Tijuana CARB	1	6.9	8	7.0	11	3	1.02	0.1	0.1	0.02	0.02	
VCEN	Valley CenSDCAPCD	1	7.8	9	8.4	8	-1	1.08	0.6	0.6	0.08	0.08	
WSPR	Warner SprSDCAPCD	1	8.4	11	7.8	5	-6	0.93	-0.6	0.6	-0.07	0.07	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 217 (08/05) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

------- Peak Concentrations -------- --- Comparisons with Observations ---

Observed Predicted Time Peak Mean Mean Normalized

Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0007	SubRegion	7	9.8	10	5.3	11	1	0.54	-4.2	4.2	-0.48	0.48	-172.16
	Subregional Peak:				6.7	12	2	0.69	(at 50 x 75) NSte: EDSN; NSPk: 4.9				
BKGS	SJVUCD*BAKERSFIELD-1138	1	8.3	11	4.2	12	1	0.51	-4.0	4.0	-0.49	0.49	
BLFC	CARB *BAKERSFIELD-5558	1	9.1	10	4.3	12	2	0.47	-4.8	4.8	-0.53	0.53	
ARVN	CARB *ARVIN-20401 BEAR	1	9.8	10	5.3	11	1	0.54	-4.5	4.5	-0.46	0.46	
EDSN	CARB *EDISON-JOHNSON FA	1	8.9	10	4.9	10	0	0.55	-4.0	4.0	-0.45	0.45	
MRCP	SJVUCD*SCHOOL-755 STANIS	1	8.9	10	5.2	12	2	0.58	-3.7	3.7	-0.42	0.42	
OLDL	CARB *OILDALE-3311 MANO	1	8.6	11	4.5	12	1	0.52	-4.1	4.1	-0.48	0.48	
SHFT	CARB *SHAFTER-548 WALKE	1	8.2	11	4.0	10	-1	0.49	-4.2	4.2	-0.51	0.51	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 217 (08/05) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0008	SubRegion	2	8.6	15	6.0	10	-5	0.70	-2.4	2.4	-0.29	0.29	-99.00
	Subregional Peak:				7.1	9	-6	0.82	(at 76 x 52) NSte: VICT; NSPk: 6.0				
MOJP	CARB *MOJAVE-923 POOLE	1	8.6	15	5.1	12	-3	0.59	-3.5	3.5	-0.41	0.41	
VICT	MDAQMD*VICTORVILLE-14029	1	7.3	10	6.0	10	0	0.83	-1.3	1.3	-0.17	0.17	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 217 (08/05) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0009	SubRegion	10	9.3	9	7.8	10	1	0.84	-0.5	0.9	-0.05	0.12	-103.47
	Subregional Peak:				10.4	13	4	1.13	(at 89 x 17) NSte: EC9S; NSPk: 6.2				
CLXC	ICAPCD*CALEXICO-900 GRAN	1	9.3	9	6.5	8	-1	0.70	-2.7	2.7	-0.30	0.30	
EC9S	ICAPCD*EL CENTRO-150 9TH	1	6.8	9	6.2	8	-1	0.91	-0.6	0.6	-0.09	0.09	
INDO	SCAQMD*INDIO-46-990 JACK	1	6.4	9	7.8	10	1	1.21	1.3	1.3	0.21	0.21	
JOSH	NPS JOSHUA TREE NATIO	1	6.8	0	6.5	3	3	0.96	-0.3	0.3	-0.04	0.04	
MEXI	Mexicali CARB	1	7.4	7	6.7	9	2	0.90	-0.7	0.7	-0.10	0.10	
MEXT	Mexicali CARB	1	9.0	9	6.7	9	0	0.75	-2.2	2.2	-0.25	0.25	
MEXU	Mexicali CARB	1	6.6	10	6.8	9	-1	1.03	0.2	0.2	0.03	0.03	
PALM	SCAQMD*PALM SPRINGS-FS 5	1	6.9	16	7.3	9	-7	1.06	0.4	0.4	0.06	0.06	
CLXE	Calexico CARB	1	6.1	10	6.3	8	-2	1.02	0.1	0.1	0.02	0.02	
MEXA	Mexicali CARB	1	6.9	9	6.4	9	0	0.92	-0.5	0.5	-0.08	0.08	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 218 (08/06) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0000	SubRegion	4	9.8	14	6.9	12	-2	0.70	-4.8	4.8	-0.66	0.66	-5.68
	Subregional Peak:				8.3	14	0	0.84	(at 45 x 44) NSte: LAGP; NSPk: 6.9				

PSRB	CARB *PASO ROBLES-235 S	1	7.1	10	0.0	0	-10	0.00	-7.1	7.1	-1.00	1.00	
CLEM	San ClemenSDCAPCD	1	6.9	1	4.4	9	8	0.64	-2.4	2.4	-0.36	0.36	
TRON	MDAQMD*TRONA-83732 TRONA	1	6.6	20	0.0	0	-20	0.00	-6.6	6.6	-1.00	1.00	
LAGP	Point MuguUSN	1	9.8	14	6.9	12	-2	0.70	-3.0	3.0	-0.30	0.30	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 218 (08/06) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0001	SubRegion	4	8.2	11	5.7	11	0	0.70	-2.0	2.0	-0.28	0.28	-69.03
	Subregional Peak:				7.6	13	2	0.93	(at 20 x 53) NSte: GTCC; NSPk: 6.7				
ATAS	SLOCO *ATASCADERO-6005 L	1	7.0	10	4.2	10	0	0.60	-2.8	2.8	-0.40	0.40	
GTCB	TEXACO*NOJOQUI PASS-GTC	1	6.6	10	4.4	10	0	0.67	-2.2	2.2	-0.33	0.33	
LFC1	EXXON *CAPITAN-LFC #1 LA	1	6.2	11	5.7	11	0	0.92	-0.5	0.5	-0.08	0.08	
LOSP	UNOCAL*LOS PADRES NF-PAR	1	8.2	11	5.6	11	0	0.68	-2.6	2.6	-0.32	0.32	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 218 (08/06) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

------- Peak Concentrations -------- --- Comparisons with Observations ---

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0002	SubRegion	5	11.5	10	10.3	12	2	0.90	-0.8	1.4	-0.07	0.16	-39.16
	Subregional Peak:				10.7	12	2	0.93	(at 46 x 54)	NSte: PRTG;	NSPk: 9.2		
OJAI	VCAPCD OJAI-1768 MARICOP	1	9.7	13	6.8	12	-1	0.71	-2.9	2.9	-0.29	0.29	
PRTG	VCAPCD*PIRU-2SW, 2815 TE	1	8.7	11	9.2	11	0	1.06	0.5	0.5	0.06	0.06	
SVAL	VCAPCD*SIMI VALLEY-5400	1	11.5	10	10.3	12	2	0.90	-1.2	1.2	-0.10	0.10	
THOS	CARB *OAK VIEW-5500 CAS	1	8.4	21	6.9	11	-10	0.83	-1.5	1.5	-0.17	0.17	
TOMP	VCAPCD*THOUSAND OAKS-9 2	1	7.1	9	8.2	11	2	1.15	1.1	1.1	0.15	0.15	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm)   Project: CAMx/CALMET/SAPRC99f 1997 Base C   Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 218 (08/06) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	------- Peak Concentrations -------- Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	--- Comparisons with Observations --- Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0003	SubRegion	7	10.9	10	9.3	12	2	0.85	0.1	1.5	0.05	0.20	-64.70
	Subregional Peak:				11.5	13	3	1.05	(at 48 x 60)	NSte: SCLR;	NSPk: 9.3		
BRBK	SCAQMD*BURBANK-228 W PAL	1	6.3	9	7.9	12	3	1.26	1.6	1.6	0.26	0.26	
LANC	SCAQMD*LANCASTER-315 W.	1	9.0	13	7.2	12	-1	0.80	-1.8	1.8	-0.20	0.20	
RSDA	SCAQMD*RESEDA-18330 GAUL	1	6.6	9	8.2	12	3	1.24	1.6	1.6	0.24	0.24	
CALB	Calabasas (AV)	1	9.1	10	8.1	12	2	0.88	-1.1	1.1	-0.12	0.12	
CSUN	Van Nuys NOAA	1	9.2	9	8.7	12	3	0.95	-0.4	0.4	-0.05	0.05	
SCLR	Santa ClarSCAQMD	1	10.9	10	9.3	12	2	0.85	-1.6	1.6	-0.15	0.15	
WILS	Mount WilsCE-CERT	1	6.4	13	8.8	10	-3	1.38	2.4	2.4	0.38	0.38	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 218 (08/06) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0004	SubRegion	17	13.0	14	13.9	11	-3	1.07	2.2	2.3	0.26	0.28	-34.03
	Subregional Peak:				14.1	12	-2	1.09	(at 72 x 44)	NSte: SANB; NSPk: 13.5			
LKAR	MDAQMD LAKE ARROWHEAD-27	1	13.0	14	12.9	12	-2	0.99	-0.1	0.1	-0.01	0.01	
AZSA	SCAQMD*AZUSA-803 N LOREN	1	6.0	10	9.3	11	1	1.55	3.3	3.3	0.55	0.55	
BANH	SCAQMD*BANNING-135 N ALL	1	8.0	10	7.0	13	3	0.87	-1.0	1.0	-0.13	0.13	
FONT	SCAQMD*FONTANA-14360 ARR	1	8.5	9	12.7	12	3	1.50	4.2	4.2	0.50	0.50	
HESP	MDAQMD*HESPERIA-17288 OL	1	10.7	13	10.4	14	1	0.98	-0.3	0.3	-0.02	0.02	
LELS	SCAQMD*LAKE ELSINORE-506	1	7.4	8	8.8	9	1	1.18	1.4	1.4	0.18	0.18	
LGRE	SCAQMD*CRESTLINE-LAKE GR	1	11.8	12	12.3	12	0	1.04	0.5	0.5	0.04	0.04	
PERR	SCAQMD*PERRIS-237 .5 N "	1	7.9	9	10.0	11	2	1.26	2.0	2.0	0.26	0.26	
PHEL	MDAQMD*PHELAN-BEEKLEY &	1	8.7	13	10.5	13	0	1.20	1.8	1.8	0.20	0.20	
RDLD	SCAQMD*REDLANDS-500 N. D	1	10.6	9	13.7	12	3	1.30	3.1	3.1	0.30	0.30	
RUBI	SCAQMD*RUBIDOUX-5888 MIS	1	9.2	10	13.9	11	1	1.51	4.7	4.7	0.51	0.51	
SANB	SCAQMD*SAN BERNARDINO-24	1	9.4	9	13.5	12	3	1.44	4.1	4.1	0.44	0.44	
SNBO	SCAQMD*SAN BERNARDINO-AR	1	8.5	9	11.4	11	2	1.33	2.8	2.8	0.33	0.33	
ULDS	SCAQMD UPLAND-155 "D" ST	1	8.5	10	11.4	11	1	1.33	2.8	2.8	0.33	0.33	
CAJB	Cajon Pass (AV)	1	7.6	13	10.7	13	0	1.42	3.2	3.2	0.42	0.42	
CAJC	Cajon MDAQMD	1	8.3	13	10.8	13	0	1.30	2.5	2.5	0.30	0.30	
MBLD	Azusa CARB	1	9.6	12	11.1	12	0	1.15	1.5	1.5	0.15	0.15	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 218 (08/06) 1997

Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0005	SubRegion	1	6.2	3	6.2	11	8	1.01	0.0	0.0	0.01	0.01	-99.00
	Subregional Peak:				10.0	9	6	1.62	(at 65 x 39) NSte: ELTR; NSPk: 7.4				
PVSP	Palos Verdes (AV)	1	6.2	3	6.2	11	8	1.01	0.0	0.0	0.01	0.01	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 218 (08/06) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			Peak Concentrations						Comparisons with Observations				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0006	SubRegion	5	8.4	8	8.7	9	1	1.04	1.2	1.2	0.17	0.17	-272.15
	Subregional Peak:				10.5	12	4	1.25	(at 81 x 27) NSte: WSPR; NSPk: 8.6				
ALPN	SDAQMD*ALPINE-2300 VICTO	1	8.4	8	8.7	9	1	1.04	0.4	0.4	0.04	0.04	
OTAY	SDAQMD*OTAY-1100 PASEO I	1	6.0	8	8.2	10	2	1.36	2.1	2.1	0.36	0.36	
REDM	Fallbrook SDCAPCD	1	7.1	4	8.1	9	5	1.14	1.0	1.0	0.14	0.14	
VCEN	Valley CenSDCAPCD	1	7.1	7	8.7	10	3	1.23	1.6	1.6	0.23	0.23	
WSPR	Warner SprSDCAPCD	1	7.9	11	8.6	13	2	1.09	0.7	0.7	0.09	0.09	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 218 (08/06) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
			------- Peak Concentrations --------						--- Comparisons with Observations ---				
0007	SubRegion	7	11.9	9	6.0	12	3	0.50	-4.4	4.4	-0.45	0.45	-97.95
	Subregional Peak:				7.3	13	4	0.62	(at 50 x 76)	NSte: EDSN;	NSPk: 5.7		
BKGS	SJVUCD*BAKERSFIELD-1138	1	9.2	10	4.9	12	2	0.53	-4.3	4.3	-0.47	0.47	
BLFC	CARB *BAKERSFIELD-5558	1	9.8	10	4.9	12	2	0.50	-4.8	4.8	-0.50	0.50	
ARVN	CARB *ARVIN-20401 BEAR	1	9.6	12	6.0	12	0	0.62	-3.6	3.6	-0.38	0.38	
EDSN	CARB *EDISON-JOHNSON FA	1	11.9	9	5.7	12	3	0.48	-6.2	6.2	-0.52	0.52	
MRCP	SJVUCD*SCHOOL-755 STANIS	1	9.2	9	5.7	12	3	0.62	-3.5	3.5	-0.38	0.38	
OLDL	CARB *OILDALE-3311 MANO	1	9.2	9	5.2	12	3	0.57	-3.9	3.9	-0.43	0.43	
SHFT	CARB *SHAFTER-548 WALKE	1	8.6	10	4.4	11	1	0.51	-4.2	4.2	-0.49	0.49	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 218 (08/06) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
			------- Peak Concentrations --------						--- Comparisons with Observations ---				
0008	SubRegion	2	9.7	13	10.2	14	1	1.05	0.0	0.5	0.00	0.06	-99.00
	Subregional Peak:				12.0	14	1	1.24	(at 76 x 52)	NSte: VICT;	NSPk: 10.2		

MOJP	CARB *MOJAVE-923 POOLE	1	9.4	16	8.9	15	-1	0.94	-0.5	0.5	-0.06	0.06	
VICT	MDAQMD*VICTORVILLE-14029	1	9.7	13	10.2	14	1	1.05	0.5	0.5	0.05	0.05	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 218 (08/06) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0009	SubRegion	3	8.0	10	6.4	12	2	0.80	-1.2	1.2	-0.15	0.15	-249.67
	Subregional Peak:				11.5	17	7	1.44	(at 80 x 49) NSte: JOSH; NSPk: 6.4				
CLXC	ICAPCD*CALEXICO-900 GRAN	1	8.0	10	6.0	9	-1	0.75	-2.0	2.0	-0.25	0.25	
JOSH	NPS JOSHUA TREE NATIO	1	8.0	22	6.4	12	-10	0.80	-1.6	1.6	-0.20	0.20	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 219 (08/07) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0000	SubRegion	2	7.6	7	0.0	0	-7	0.00	-7.3	7.3	-1.00	1.00	-99.00

	Subregional Peak:				8.2	11	4	1.08	(at 27 x 51) NSte: ROSA; NSPk: 4.7					
PSRB	CARB *PASO ROBLES-235 S	1	7.1	10	0.0	0	-10	0.00	-7.1	7.1	-1.00	1.00		
TRON	MDAQMD*TRONA-83732 TRONA	1	7.6	7	0.0	0	-7	0.00	-7.6	7.6	-1.00	1.00		

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 219 (08/07) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0001	SubRegion	3	8.7	10	6.4	10	0	0.74	-2.1	2.1	-0.29	0.29	-52.25
	Subregional Peak:				8.4	11	1	0.97	(at 27 x 52) NSte: SBWC; NSPk: 7.7				
ATAS	SLOCO *ATASCADERO-6005 L	1	6.7	9	4.1	10	1	0.62	-2.5	2.5	-0.38	0.38	
LOSP	UNOCAL*LOS PADRES NF-PAR	1	8.7	10	6.4	10	0	0.74	-2.3	2.3	-0.26	0.26	
SYAP	SBAPCD*SANTA YNEZ-AIRPOR	1	7.3	10	5.8	10	0	0.79	-1.6	1.6	-0.21	0.21	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 219 (08/07) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

------- Peak Concentrations --------				--- Comparisons with Observations ---		
Observed	Predicted	Time	Peak	Mean	Mean	Normalized

Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0002	SubRegion	3	8.8	10	8.1	12	2	0.92	-0.1	0.8	0.00	0.11	-263.55
	Subregional Peak:				9.0	11	1	1.02	(at 45 x 55) NSte: PRTG; NSPk: 8.4				
OJAI	VCAPCD OJAI-1768 MARICOP	1	8.8	10	7.5	9	-1	0.85	-1.4	1.4	-0.15	0.15	
SVAL	VCAPCD*SIMI VALLEY-5400	1	8.2	10	8.1	12	2	0.99	-0.1	0.1	-0.01	0.01	
THOS	CARB *OAK VIEW-5500 CAS	1	6.7	0	7.8	11	11	1.16	1.1	1.1	0.16	0.16	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 219 (08/07) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0003	SubRegion	4	8.3	10	7.2	12	2	0.87	-0.7	0.7	-0.09	0.09	-393.14
	Subregional Peak:				10.2	12	2	1.23	(at 48 x 60) NSte: SCLR; NSPk: 7.2				
LANC	SCAQMD*LANCASTER-315 W.	1	7.7	13	6.7	10	-3	0.87	-1.0	1.0	-0.13	0.13	
CALB	Calabasas (AV)	1	6.9	10	6.7	12	2	0.98	-0.2	0.2	-0.02	0.02	
CSUN	Van Nuys NOAA	1	7.3	9	6.5	12	3	0.90	-0.7	0.7	-0.10	0.10	
SCLR	Santa ClarSCAQMD	1	8.3	10	7.2	12	2	0.87	-1.0	1.0	-0.13	0.13	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 219 (08/07) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours

Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0004	SubRegion	14	12.9	13	10.1	11	-2	0.79	-1.1	2.2	-0.07	0.22	-60.39
	Subregional Peak:				10.9	11	-2	0.84	(at 74 x 42) NSte: RDLD; NSPk: 10.0				
LKAR	MDAQMD LAKE ARROWHEAD-27	1	12.9	13	9.0	12	-1	0.70	-3.9	3.9	-0.30	0.30	
BANH	SCAQMD*BANNING-135 N ALL	1	11.5	11	10.1	11	0	0.88	-1.4	1.4	-0.12	0.12	
FONT	SCAQMD*FONTANA-14360 ARR	1	6.0	11	8.7	12	1	1.45	2.7	2.7	0.45	0.45	
HESP	MDAQMD*HESPERIA-17288 OL	1	10.3	12	7.9	12	0	0.77	-2.4	2.4	-0.23	0.23	
LELS	SCAQMD*LAKE ELSINORE-506	1	10.3	9	7.3	9	0	0.71	-3.0	3.0	-0.29	0.29	
LGRE	SCAQMD*CRESTLINE-LAKE GR	1	11.4	12	9.0	12	0	0.79	-2.4	2.4	-0.21	0.21	
PERR	SCAQMD*PERRIS-237 .5 N "	1	9.0	9	9.1	10	1	1.01	0.1	0.1	0.01	0.01	
PHEL	MDAQMD*PHELAN-BEEKLEY &	1	11.2	12	8.0	12	0	0.71	-3.3	3.3	-0.29	0.29	
RDLD	SCAQMD*REDLANDS-500 N. D	1	8.7	10	10.0	12	2	1.16	1.4	1.4	0.16	0.16	
RUBI	SCAQMD*RUBIDOUX-5888 MIS	1	8.1	10	9.8	12	2	1.21	1.7	1.7	0.21	0.21	
SANB	SCAQMD*SAN BERNARDINO-24	1	7.8	10	9.6	12	2	1.24	1.8	1.8	0.24	0.24	
CAJB	Cajon Pass (AV)	1	9.7	11	8.2	12	1	0.84	-1.5	1.5	-0.16	0.16	
CAJC	Cajon MDAQMD	1	10.8	12	8.3	12	0	0.77	-2.5	2.5	-0.23	0.23	
MBLD	Azusa CARB	1	11.1	11	8.5	11	0	0.77	-2.6	2.6	-0.23	0.23	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 219 (08/07) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)

0006	SubRegion	1	8.3	9	7.5	13	4	0.91	-0.8	0.8	-0.09	0.09	-99.00
	Subregional Peak:				9.0	12	3	1.09	(at 83 x 24) NSte: WSPR; NSPk: 7.5				
WSPR	Warner SprSDCAPCD	1	8.3	9	7.5	13	4	0.91	-0.8	0.8	-0.09	0.09	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 219 (08/07) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

			------- Peak Concentrations --------						--- Comparisons with Observations ---				
			Observed		Predicted		Time	Peak	Mean	Mean	Normalized		
Site	Description	No	Value	Time	Value	Time	Lag	Ratio	Bias	Error	Bias	Error	(r)
0007	SubRegion	7	11.8	10	6.8	12	2	0.57	-4.7	4.7	-0.44	0.44	-193.63
	Subregional Peak:				8.3	12	2	0.70	(at 49 x 76) NSte: EDSN; NSPk: 6.7				
BKGS	SJVUCD*BAKERSFIELD-1138	1	10.3	10	5.7	12	2	0.55	-4.7	4.7	-0.45	0.45	
BLFC	CARB *BAKERSFIELD-5558	1	10.9	10	5.7	12	2	0.52	-5.2	5.2	-0.48	0.48	
ARVN	CARB *ARVIN-20401 BEAR	1	10.7	10	6.8	12	2	0.64	-3.9	3.9	-0.36	0.36	
EDSN	CARB *EDISON-JOHNSON FA	1	11.8	10	6.7	11	1	0.57	-5.1	5.1	-0.43	0.43	
MRCP	SJVUCD*SCHOOL-755 STANIS	1	10.4	10	6.2	12	2	0.60	-4.2	4.2	-0.40	0.40	
OLDL	CARB *OILDALE-3311 MANO	1	10.3	11	5.9	12	1	0.57	-4.4	4.4	-0.43	0.43	
SHFT	CARB *SHAFTER-548 WALKE	1	10.2	10	4.8	10	0	0.48	-5.3	5.3	-0.52	0.52	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 219 (08/07) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours

Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0008	SubRegion	2	9.2	12	8.1	13	1	0.88	-1.0	1.0	-0.11	0.11	-99.00
	Subregional Peak:				9.7	12	0	1.05	(at 49 x 63) NSte: MOJP; NSPk: 8.1				
MOJP	CARB *MOJAVE-923 POOLE	1	9.0	16	8.1	13	-3	0.90	-0.9	0.9	-0.10	0.10	
VICT	MDAQMD*VICTORVILLE-14029	1	9.2	12	8.0	12	0	0.87	-1.2	1.2	-0.13	0.13	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Statistics were calculated for the 24-hour period of DOY 219 (08/07) 1997
Included were data-pairs with observed concentrations above a threshold of 6.0 (pphm); Averaged over 8 hours
Concentrations determined as the MAXimum within a radius of 0 grid cells

Site	Description	No	Observed Value	Observed Time	Predicted Value	Predicted Time	Time Lag	Peak Ratio	Mean Bias	Mean Error	Normalized Bias	Normalized Error	(r)
0009	SubRegion	4	10.1	12	9.7	10	-2	0.96	-0.2	1.1	-0.03	0.14	-35.38
	Subregional Peak:				10.9	12	0	1.08	(at 84 x 44) NSte: PALM; NSPk: 9.1				
CLXC	ICAPCD*CALEXICO-900 GRAN	1	7.1	9	5.8	9	0	0.81	-1.4	1.4	-0.19	0.19	
JOSH	NPS JOSHUA TREE NATIO	1	10.1	12	9.7	10	-2	0.96	-0.4	0.4	-0.04	0.04	
PALM	SCAQMD*PALM SPRINGS-FS 5	1	7.4	10	9.1	12	2	1.23	1.7	1.7	0.23	0.23	
TNPM	MDAQMD TWENTYNINE PALMS-	1	8.0	12	7.2	9	-3	0.90	-0.8	0.8	-0.10	0.10	

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0000 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 215 through 219
Unpaired Subregional Maximum of 8.6 at Cell 91 x 2 -- Nearest Site: TIRP

		- - - - - Observed - - - - -						- - - - - Simulated - - - - -								
Site ID	Site Description	Site Avg.	DOY 215	DOY 216	DOY 217	DOY 218	DOY 219	Site Avg.	DOY 215	DOY 216	DOY 217	DOY 218	DOY 219	Max. Ratio	Max. Bias	Max. Error
PSRB	CARB *PASO ROBLES-235 S	6.8	5.7	6.4	5.7	7.1	7.1	4.3	4.4	4.1	4.0	4.4	4.4	0.62	-0.37	0.37
CATA	Catalina AP (AV)	6.2	6.3	6.1	6.4	5.3	3.4	6.8	6.9	5.6	6.9	7.2	7.4	1.16	0.03	0.08
CLEM	San ClemenSDCAPCD	7.7	8.8	8.3	7.0	6.9	4.3	5.5	6.0	4.8	5.5	6.0	5.3	0.69	-0.27	0.27
TRON	MDAQMD*TRONA-83732 TRONA	7.1	5.5	5.6	5.7	6.6	7.6	5.5	6.0	6.5	4.1	4.5	6.2	0.86	-0.25	0.25
LAGP	Point MuguUSN	8.4	7.2	7.9	8.8	9.8	5.5	6.9	6.3	5.9	6.7	7.8	7.6	0.80	-0.20	0.20

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0001 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 215 through 219
Unpaired Subregional Maximum of 7.2 at Cell 28 x 54 -- Nearest Site: SBWC

		- - - - - Observed - - - - -						- - - - - Simulated - - - - -								
Site ID	Site Description	Site Avg.	DOY 215	DOY 216	DOY 217	DOY 218	DOY 219	Site Avg.	DOY 215	DOY 216	DOY 217	DOY 218	DOY 219	Max. Ratio	Max. Bias	Max. Error
ATAS	SLOCO *ATASCADERO-6005 L	6.6	5.4	6.4	6.1	7.0	6.7	4.7	4.9	4.8	4.4	4.9	4.7	0.70	-0.29	0.29
CPGB	CHVRON*CARPINTERIA-GOBER	7.1	4.1	3.5	7.1	5.2	5.5	6.9	6.6	6.1	6.3	7.2	8.2	1.15	-0.11	0.11
GTCB	TEXACO*NOJOQUI PASS-GTC	6.3	4.1	5.0	6.1	6.6	3.6	6.6	5.8	5.9	6.0	7.6	7.7	1.16	0.07	0.08
LFC1	EXXON *CAPITAN-LFC #1 LA	6.3	5.1	5.2	6.5	6.2	4.3	6.9	6.2	6.5	6.2	7.6	8.3	1.28	0.09	0.13
LOSP	UNOCAL*LOS PADRES NF-PAR	7.8	5.7	6.0	8.1	8.2	8.7	6.9	6.1	6.3	6.0	7.6	8.3	0.96	-0.08	0.11
SYAP	SBAPCD*SANTA YNEZ-AIRPOR	6.9	3.7	5.1	6.4	5.3	7.3	6.4	5.6	5.7	5.6	7.3	7.8	1.07	-0.03	0.09

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0002 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 215 through 219
Unpaired Subregional Maximum of 9.6 at Cell 46 x 59 -- Nearest Site: PRTG

Site ID	Site Description	Observed Site Avg.	Observed DOY 215	Observed DOY 216	Observed DOY 217	Observed DOY 218	Observed DOY 219	Simulated Site Avg.	Simulated DOY 215	Simulated DOY 216	Simulated DOY 217	Simulated DOY 218	Simulated DOY 219	Max. Ratio	Max. Bias	Max. Error
OJAI	VCAPCD OJAI-1768 MARICOP	7.9	6.8	6.2	5.5	9.7	8.8	6.8	6.5	6.0	6.3	7.2	8.1	0.83	-0.11	0.11
PRTG	VCAPCD*PIRU-2SW, 2815 TE	7.1	6.3	5.8	6.4	8.7	5.9	8.1	6.6	6.9	7.3	10.7	9.1	1.24	0.14	0.14
SVAL	VCAPCD*SIMI VALLEY-5400	8.7	8.5	7.7	7.7	11.5	8.2	8.3	7.1	7.4	7.7	10.6	8.8	0.93	-0.04	0.07
THOS	CARB *OAK VIEW-5500 CAS	7.7	5.0	5.2	8.1	8.4	6.7	6.9	6.6	6.1	6.3	7.2	8.2	0.97	-0.05	0.19
TOMP	VCAPCD*THOUSAND OAKS-9 2	6.6	6.3	6.0	6.9	7.1	5.8	7.8	6.5	6.5	7.1	10.4	8.3	1.46	0.14	0.14

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0003 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 215 through 219
Unpaired Subregional Maximum of 8.9 at Cell 53 x 50 -- Nearest Site: BRBK

Site ID	Site Description	Observed Site Avg.	Observed DOY 215	Observed DOY 216	Observed DOY 217	Observed DOY 218	Observed DOY 219	Simulated Site Avg.	Simulated DOY 215	Simulated DOY 216	Simulated DOY 217	Simulated DOY 218	Simulated DOY 219	Max. Ratio	Max. Bias	Max. Error
BRBK	SCAQMD*BURBANK-228 W PAL	6.8	6.6	4.8	7.7	6.3	5.0	9.0	8.8	8.3	10.8	9.8	7.3	1.40	0.43	0.43

LANC	SCAQMD*LANCASTER-315 W.	7.7	5.9	5.9	6.3	9.0	7.7	8.0	7.2	7.8	7.7	9.2	8.2	1.02	0.10	0.10
RSDA	SCAQMD*RESEDA-18330 GAUL	7.0	7.8	5.9	6.7	6.6	4.9	8.9	8.5	7.8	9.5	10.4	8.3	1.35	0.36	0.36
CALB	Calabasas (AV)	7.8	8.4	6.3	8.5	9.1	6.9	8.2	7.4	7.2	8.1	10.3	8.1	1.13	0.05	0.12
CSUN	Van Nuys NOAA	8.5	10.3	6.5	9.5	9.2	7.3	9.2	8.8	8.3	10.4	10.3	8.2	1.01	0.09	0.15
SCLR	Santa ClarSCAQMD	7.9	6.8	6.9	6.4	10.9	8.3	9.2	8.5	8.1	9.5	10.7	9.1	0.99	0.20	0.20
WILS	Mount WilsCE-CERT	6.6	6.3	7.8	6.2	6.4	5.8	9.0	8.7	8.3	10.9	9.7	7.4	1.41	0.44	0.44

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0004 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 215 through 219
Unpaired Subregional Maximum of 11.5 at Cell 74 x 43 -- Nearest Site: RDLD

		- - - - - Observed	- - - - -				- - - - - Simulated	- - - - -								
Site ID	Site Description	Site Avg.	DOY 215	DOY 216	DOY 217	DOY 218	DOY 219	Site Avg.	DOY 215	DOY 216	DOY 217	DOY 218	DOY 219	Max. Ratio	Max. Bias	Max. Error
LKAR	MDAQMD LAKE ARROWHEAD-27	11.7	10.9	11.0	10.9	13.0	12.9	11.5	9.4	11.5	12.1	13.9	10.6	1.07	-0.02	0.11
AZSA	SCAQMD*AZUSA-803 N LOREN	7.6	8.9	6.9	8.5	6.0	4.7	9.3	8.0	8.5	10.9	10.6	8.2	1.23	0.29	0.35
BANH	SCAQMD*BANNING-135 N ALL	9.4	8.6	10.4	8.8	8.0	11.5	10.7	8.5	12.1	11.3	10.8	10.7	1.06	0.15	0.18
FONT	SCAQMD*FONTANA-14360 ARR	8.2	9.5	7.0	9.9	8.5	6.0	11.0	9.2	10.3	11.4	13.9	10.3	1.41	0.39	0.40
GLDR	SCAQMD*GLENDORA-840 LAUR	8.6	9.7	7.6	5.9	0.0	5.8	9.4	8.0	8.7	10.9	10.8	8.4	1.13	-0.01	0.16
HESP	MDAQMD*HESPERIA-17288 OL	8.5	8.0	6.9	6.8	10.7	10.3	9.3	8.6	8.5	7.8	12.9	8.5	1.21	0.10	0.17
LELS	SCAQMD*LAKE ELSINORE-506	8.3	6.9	7.9	9.2	7.4	10.3	10.2	8.5	10.7	12.6	10.0	9.4	1.23	0.24	0.28
LGRE	SCAQMD*CRESTLINE-LAKE GR	10.2	10.0	9.2	8.6	11.8	11.4	11.4	9.4	11.1	12.1	13.9	10.5	1.18	0.13	0.18
PERR	SCAQMD*PERRIS-237 .5 N "	8.5	-99.0	-99.0	1.2	7.9	9.0	11.4	9.1	11.8	12.9	12.6	10.9	1.43	0.40	0.40
PHEL	MDAQMD*PHELAN-BEEKLEY &	8.3	7.6	7.8	6.4	8.7	11.2	8.8	7.9	8.2	8.1	11.1	8.6	0.99	0.08	0.18
POMA	SCAQMD*POMONA-924 N. GAR	7.6	8.7	5.6	6.5	5.8	3.8	9.8	8.3	9.0	10.7	12.2	8.6	1.41	0.30	0.35
RDLD	SCAQMD*REDLANDS-500 N. D	10.1	11.2	9.0	11.0	10.6	8.7	11.9	9.5	12.1	12.8	14.1	10.9	1.26	0.19	0.25
RUBI	SCAQMD*RUBIDOUX-5888 MIS	9.7	10.4	9.2	11.8	9.2	8.1	11.4	9.4	10.8	12.1	14.1	10.5	1.20	0.19	0.23
SANB	SCAQMD*SAN BERNARDINO-24	9.3	11.2	8.0	10.4	9.4	7.8	11.8	9.5	11.9	12.6	14.1	10.9	1.26	0.29	0.35
SNBO	SCAQMD*SAN BERNARDINO-AR	8.5	9.9	6.5	9.2	8.5	5.9	10.4	8.9	9.5	11.0	13.4	9.5	1.36	0.29	0.33
ULDS	SCAQMD UPLAND-155 "D" ST	8.5	9.9	6.5	9.2	8.5	5.9	10.4	8.9	9.5	11.0	13.4	9.5	1.36	0.29	0.33
CAJB	Cajon Pass (AV)	7.5	6.5	6.3	5.3	7.6	9.7	9.3	8.0	9.0	9.0	11.8	8.9	1.22	0.29	0.33
CAJC	Cajon MDAQMD	8.1	7.4	7.6	6.4	8.3	10.8	10.0	8.2	9.9	10.3	12.3	9.4	1.14	0.27	0.32

MBLD	Azusa	CARB	10.2	10.3	10.4	9.8	9.6	11.1	10.1	8.2	9.5	11.0	12.7	9.0	1.14	-0.01	0.19
TCCC	Temecula	SCAQMD	6.9	6.1	6.5	8.1	5.4	4.1	9.2	7.6	9.9	11.5	8.8	8.1	1.41	0.39	0.39

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0005 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 215 through 219
Unpaired Subregional Maximum of 9.7 at Cell 70 x 38 -- Nearest Site: LELS

		- - - - - Observed - - - - -						- - - - - Simulated - - - - -								
Site ID	Site Description	Site Avg.	DOY 215	DOY 216	DOY 217	DOY 218	DOY 219	Site Avg.	DOY 215	DOY 216	DOY 217	DOY 218	DOY 219	Max. Ratio	Max. Bias	Max. Error
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ELTR	SCAQMD*EL TORO-23022 EL	7.6	8.3	6.9	7.7	4.4	3.7	9.3	9.1	9.3	10.2	9.7	8.4	1.22	0.25	0.25
LANM	SCAQMD*LOS ANGELES-1630	6.5	6.5	5.0	5.6	3.5	3.0	7.9	7.6	7.4	9.4	8.7	6.5	1.44	0.17	0.17
LHAB	SCAQMD*LA HABRA-621 W. L	6.1	6.1	5.1	5.3	3.1	2.6	7.7	6.9	6.8	8.2	9.5	7.2	1.57	0.14	0.14
PDSW	SCAQMD*PASADENA-752 S. W	7.9	8.4	6.6	8.8	5.9	4.1	8.7	8.0	8.1	10.6	9.7	7.2	1.21	0.13	0.16
VALA	SCAQMD*W LOS ANGELES-VA	6.1	4.8	4.5	6.1	3.8	3.0	8.2	7.6	7.4	9.4	8.9	7.5	1.55	0.55	0.55
PICO	SCAQMD*PICO RIVERA-3713	7.0	7.8	6.3	6.9	4.0	3.2	8.0	7.5	6.8	8.8	9.5	7.2	1.23	0.10	0.12
PVSP	Palos Verdes (AV)	6.4	6.2	5.0	6.8	6.2	3.8	6.7	6.4	5.6	7.3	7.1	7.3	1.07	0.08	0.08

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0006 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 215 through 219
Unpaired Subregional Maximum of 9.4 at Cell 69 x 36 -- Nearest Site: LELS

		- - - - - Observed - - - - -						- - - - - Simulated - - - - -								
Site	Site	Site	DOY	DOY	DOY	DOY	DOY	Site	DOY	DOY	DOY	DOY	DOY	Max.	Max.	Max.

ID	Description	Avg.	215	216	217	218	219	Avg.	215	216	217	218	219	Ratio	Bias	Error
ALPN	SDAQMD*ALPINE-2300 VICTO	8.1	8.2	7.2	8.7	8.4	5.2	8.8	7.7	8.4	10.1	9.4	8.2	1.16	0.10	0.13
CHVT	SDAQMD*CHULA VISTA-80 E	7.4	4.3	5.1	7.4	3.0	3.5	7.4	7.0	6.6	8.3	8.7	6.4	1.19	0.12	0.12
ECAJ	SDAQMD*EL CAJON-1155 RED	6.7	5.3	5.0	6.7	4.4	2.9	8.3	7.1	7.6	9.4	9.7	7.5	1.45	0.40	0.40
ESCO	SDAQMD*ESCONDIDO-600 E.	6.6	6.6	6.6	4.5	5.5	3.0	8.5	7.0	7.6	9.4	10.1	8.3	1.52	0.11	0.11
OTAY	SDAQMD*OTAY-1100 PASEO I	7.0	4.9	4.5	7.9	6.0	3.3	8.3	7.0	7.2	9.7	10.0	7.4	1.26	0.44	0.44
SDOV	SDAQMD*SAN DIEGO-5555 OV	6.6	5.2	6.1	7.1	2.7	2.5	7.2	6.6	6.7	8.4	7.8	6.6	1.19	0.15	0.15
SD12	SDAQMD*SAN DIEGO-330A 12	6.1	3.6	4.1	6.1	2.4	3.2	6.9	6.8	6.4	7.8	7.6	5.8	1.28	0.28	0.28
BLKM	Black MounSDCAPCD	9.0	10.0	8.1	8.8	4.9	3.0	7.8	6.7	7.2	8.9	8.8	7.2	0.89	-0.14	0.15
REDM	Fallbrook SDCAPCD	8.4	8.6	8.3	9.8	7.1	4.4	8.5	7.3	8.9	10.3	8.5	7.7	1.06	0.05	0.12
SMPK	Deer SprinSDCAPCD	7.3	6.9	7.1	7.9	5.5	3.9	7.9	6.6	7.2	8.8	9.3	7.8	1.18	0.03	0.05
SOLM	La Jolla SDCAPCD	7.8	4.5	5.4	7.8	3.1	3.4	6.9	6.6	6.3	7.7	7.7	6.0	0.99	-0.01	0.01
TILM	Tijuana CARB	7.7	3.9	4.7	7.7	0.3	2.9	7.9	7.0	7.0	9.3	9.3	6.8	1.22	0.22	0.22
TITT	Tijuana CARB	6.9	3.3	3.6	6.9	4.4	1.8	7.9	7.0	7.0	9.3	9.3	6.8	1.35	0.35	0.35
VCEN	Valley CenSDCAPCD	7.1	6.4	5.9	7.8	7.1	4.4	8.5	7.0	7.6	9.4	10.1	8.3	1.30	0.24	0.24
WSPR	Warner SprSDCAPCD	7.5	6.4	6.8	8.4	7.9	8.3	9.0	7.1	8.4	9.9	10.5	8.9	1.25	0.19	0.19

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0007 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 215 through 219
Unpaired Subregional Maximum of 7.3 at Cell 49 x 75 -- Nearest Site: EDSN

Site ID	Site Description	Observed Site Avg.	Observed DOY 215	Observed DOY 216	Observed DOY 217	Observed DOY 218	Observed DOY 219	Simulated Site Avg.	Simulated DOY 215	Simulated DOY 216	Simulated DOY 217	Simulated DOY 218	Simulated DOY 219	Max. Ratio	Max. Bias	Max. Error
BKGS	SJVUCD*BAKERSFIELD-1138	8.7	8.4	7.4	8.3	9.2	10.3	6.7	7.0	6.7	5.8	6.5	7.3	0.71	-0.23	0.23
BLFC	CARB *BAKERSFIELD-5558	9.2	8.0	8.1	9.1	9.8	10.9	6.5	6.8	6.5	5.7	6.3	7.1	0.65	-0.29	0.29
ARVN	CARB *ARVIN-20401 BEAR	9.6	8.8	9.3	9.8	9.6	10.7	7.2	7.3	7.4	6.4	7.1	7.9	0.74	-0.25	0.25
EDSN	CARB *EDISON-JOHNSON FA	9.9	9.0	8.1	8.9	11.9	11.8	7.0	7.3	7.0	6.2	6.8	7.8	0.66	-0.28	0.28
MRCP	SJVUCD*SCHOOL-755 STANIS	8.9	7.8	8.0	8.9	9.2	10.4	6.2	6.5	6.4	5.5	6.1	6.4	0.62	-0.29	0.29

OLDL	CARB *OILDALE-3311 MANO	8.6	7.7	7.5	8.6	9.2	10.3	6.6	7.0	6.5	5.8	6.5	7.3	0.71	-0.23	0.23
SHFT	CARB *SHAFTER-548 WALKE	8.1	6.9	6.6	8.2	8.6	10.2	5.3	5.7	5.0	4.5	5.4	5.8	0.57	-0.33	0.33

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

Concentrations determined as the MAXimum within a radius of 3 grid cells

Subregion 0008 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 215 through 219
Unpaired Subregional Maximum of 8.1 at Cell 49 x 63 -- Nearest Site: TEHP

Site ID	Site Description	- - - - - Observed - - - - - Site Avg.	DOY 215	DOY 216	DOY 217	DOY 218	DOY 219	- - - - - Simulated - - - - - Site Avg.	DOY 215	DOY 216	DOY 217	DOY 218	DOY 219	Max. Ratio	Max. Bias	Max. Error
MOJP	CARB *MOJAVE-923 POOLE	8.4	6.8	8.1	8.6	9.4	9.0	7.5	6.5	7.0	5.6	9.6	8.8	1.02	-0.11	0.11
VICT	MDAQMD*VICTORVILLE-14029	8.3	7.0	1.1	7.3	9.7	9.2	8.4	7.8	7.5	7.0	11.5	8.2	1.19	0.04	0.11
TEHP	Monolith CE-CERT	7.5	7.1	8.0	5.9	-99.0	-99.0	7.7	6.5	7.1	5.5	10.0	9.3	1.25	-0.10	0.10

* * * Model Performance Evaluation * * *

Pollutant: O3 (pphm) Project: CAMx/CALMET/SAPRC99f 1997 Base C Simulation ID: cA85

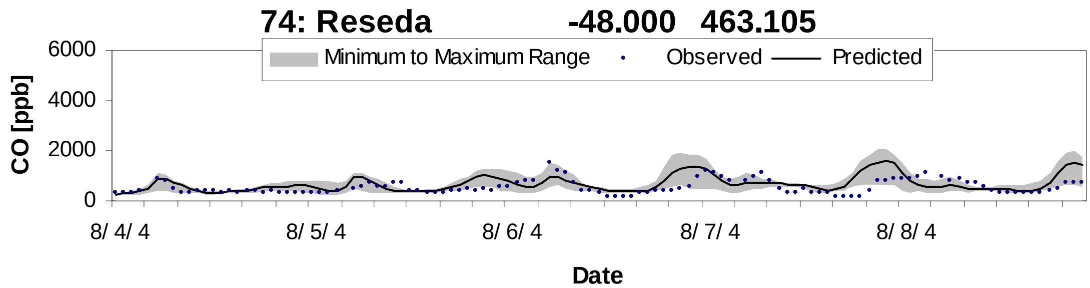
Concentrations determined as the MAXimum within a radius of 3 grid cells

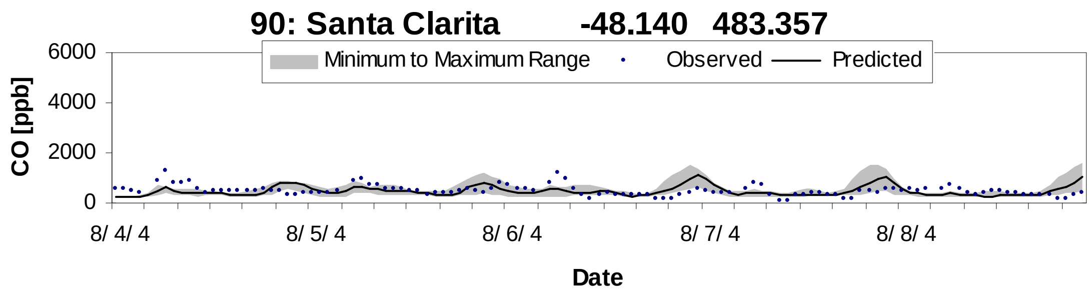
Subregion 0009 Spatially Paired Average 8-Hour Concentrations above 6.0 pphm for DOY 215 through 219
Unpaired Subregional Maximum of 9.4 at Cell 83 x 46 -- Nearest Site: JOSH

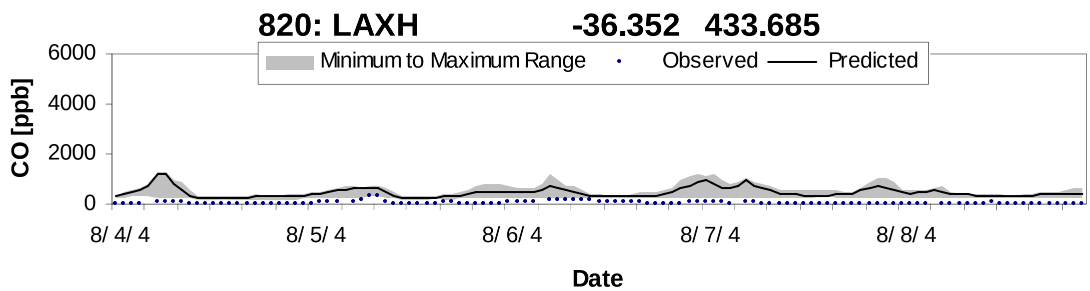
Site ID	Site Description	- - - - - Observed - - - - - Site Avg.	DOY 215	DOY 216	DOY 217	DOY 218	DOY 219	- - - - - Simulated - - - - - Site Avg.	DOY 215	DOY 216	DOY 217	DOY 218	DOY 219	Max. Ratio	Max. Bias	Max. Error
CLXC	ICAPCD*CALEXICO-900 GRAN	8.2	7.5	9.3	9.3	8.0	7.1	7.0	6.0	7.4	7.3	7.3	7.0	0.80	-0.14	0.14

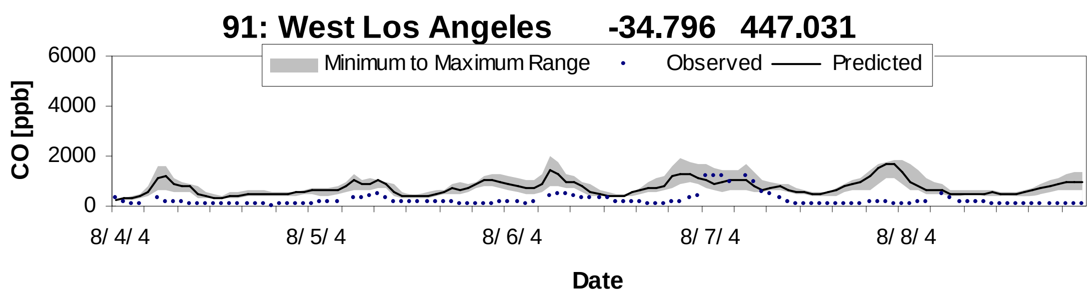
EC9S	ICAPCD*EL CENTRO-150 9TH	6.6	5.8	7.0	6.8	6.0	4.6	6.9	6.2	6.6	6.7	7.5	7.4	1.08	0.07	0.11
INDO	SCAQMD*INDIO-46-990 JACK	6.2	4.9	6.1	6.4	4.8	5.9	7.2	6.3	8.8	7.9	5.7	7.2	1.37	0.35	0.35
JOSH	NPS JOSHUA TREE NATIO	8.4	6.7	10.4	6.8	8.0	10.1	8.4	6.8	10.7	7.2	6.6	10.8	1.05	0.00	0.07
MEXI	Mexicali CARB	7.1	5.4	6.9	7.4	5.1	3.5	6.6	5.6	7.4	7.3	6.4	6.4	1.00	0.03	0.04
MEXT	Mexicali CARB	7.6	4.5	6.3	9.0	4.7	3.4	6.4	5.4	7.4	7.3	6.0	6.1	0.83	0.00	0.18
MEXU	Mexicali CARB	6.6	4.0	4.9	6.6	4.5	2.4	6.7	5.8	7.4	7.3	6.7	6.5	1.12	0.11	0.11
PALM	SCAQMD*PALM SPRINGS-FS 5	7.5	5.2	8.2	6.9	5.2	7.4	9.7	7.1	12.0	9.5	9.3	10.9	1.46	0.43	0.43
TNPM	MDAQMD TWENTYNINE PALMS-	8.0	-99.0	-99.0	4.2	5.9	8.0	7.1	6.2	7.6	6.9	6.0	8.7	1.09	0.09	0.09
CLXE	Calexico CARB	6.1	4.9	5.9	6.1	4.5	3.1	6.6	5.6	7.4	7.3	6.4	6.4	1.20	0.19	0.19
MEXA	Mexicali CARB	7.0	5.0	7.0	6.9	4.9	3.1	6.8	5.8	7.4	7.3	6.8	6.8	1.05	0.05	0.05

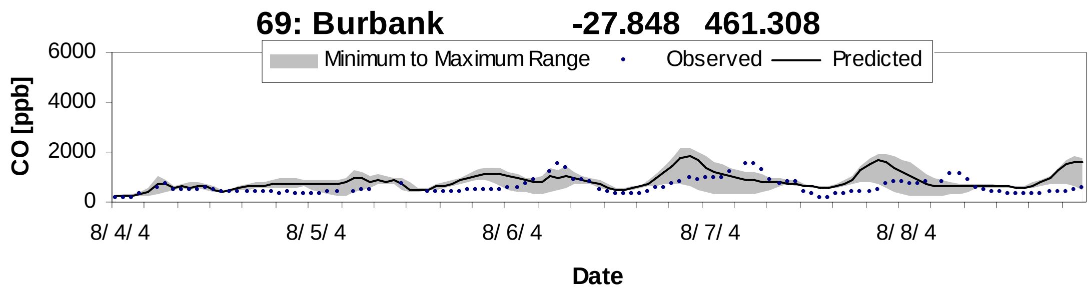
August 2004 SCAQMD CALMET mA01

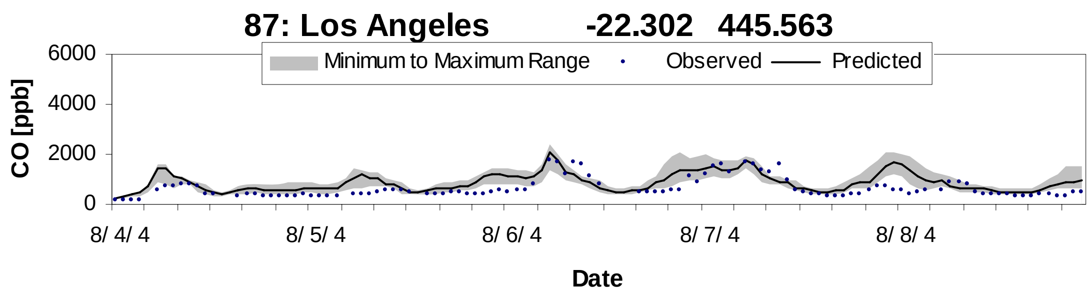


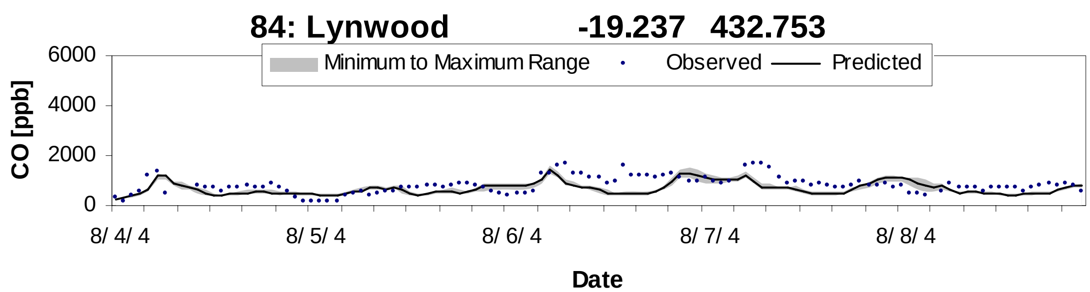


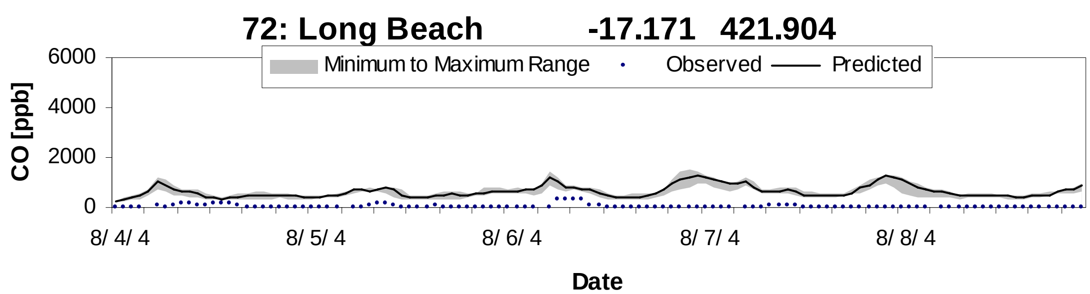


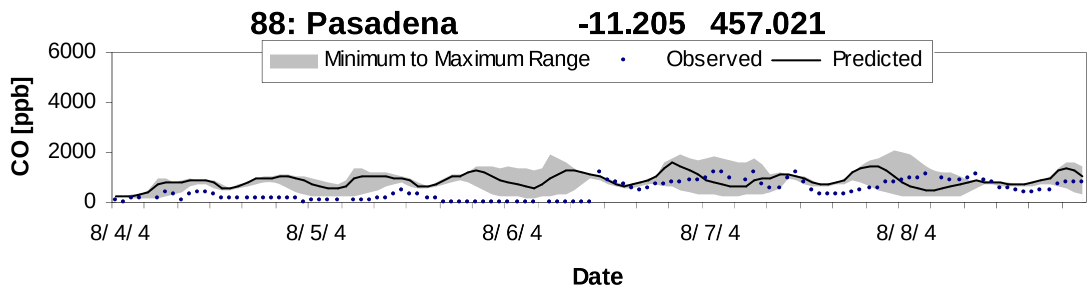


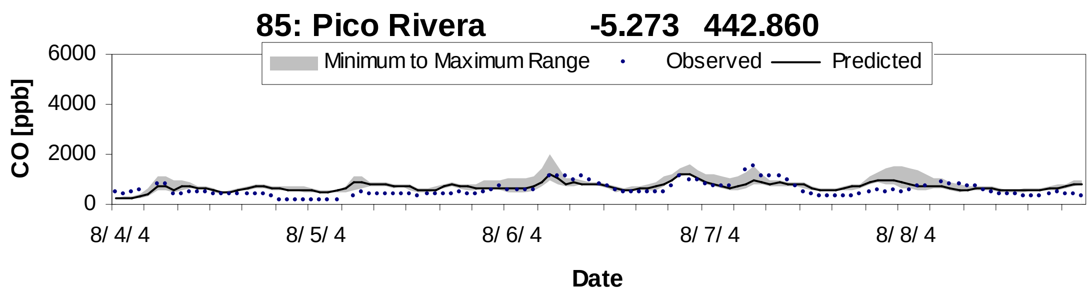

69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

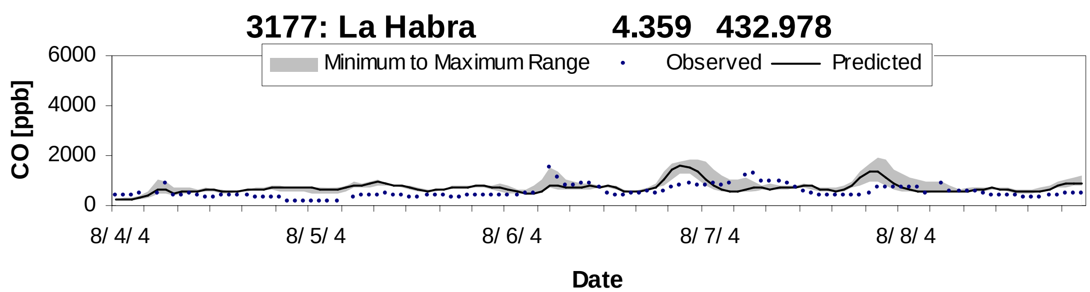

87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

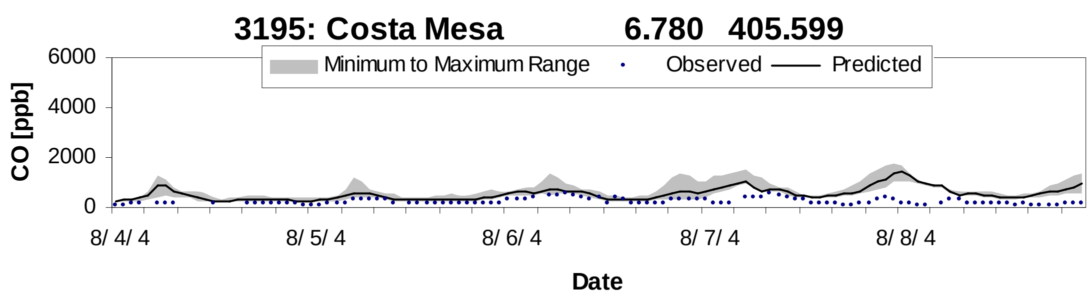

84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

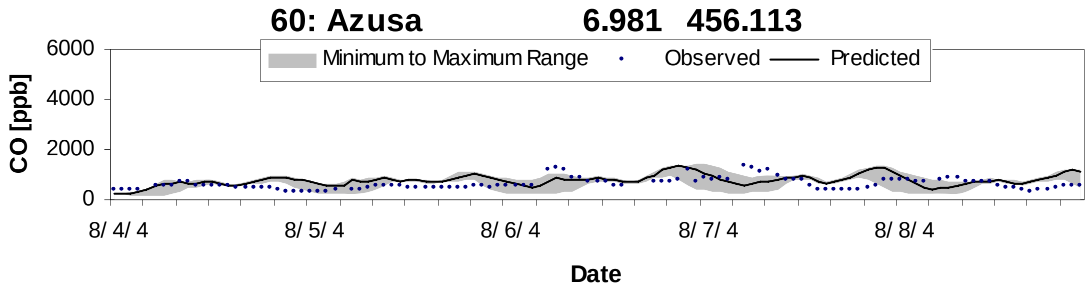

72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

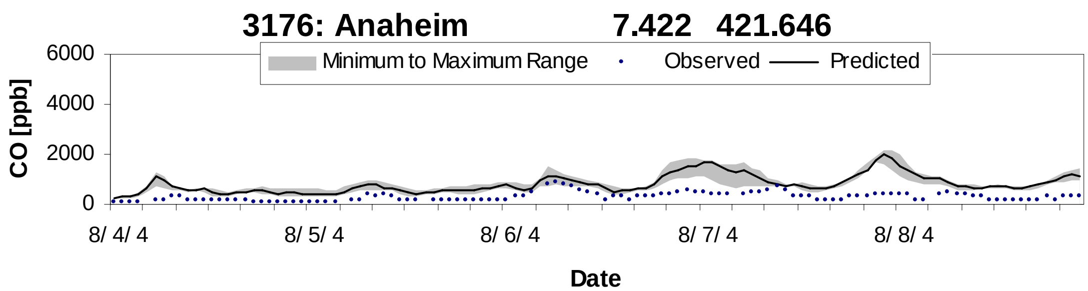

88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

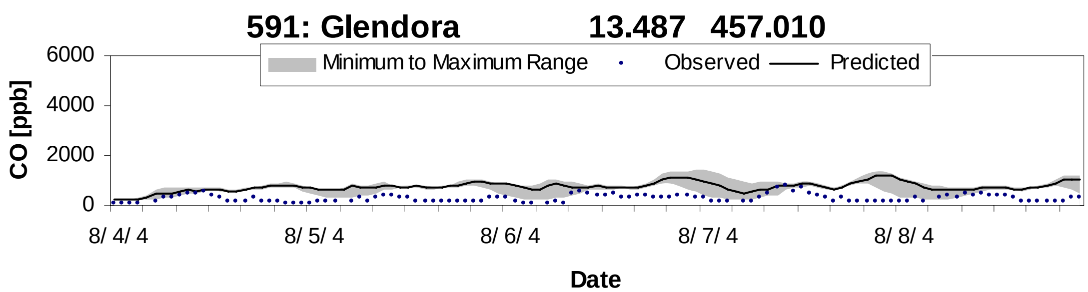

85: Pico Rivera -5.273 442.860
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

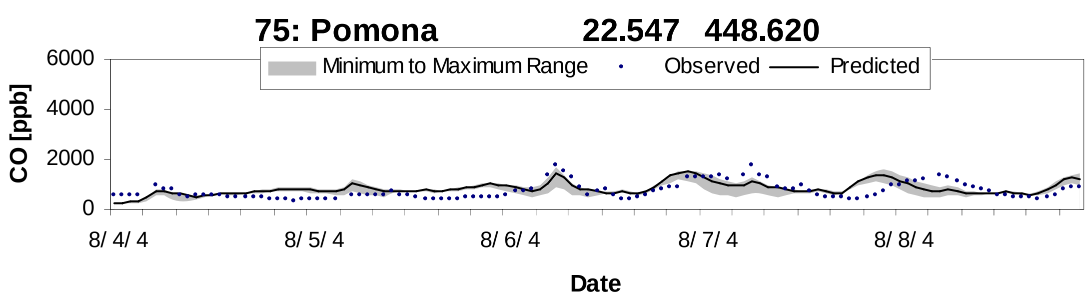

3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

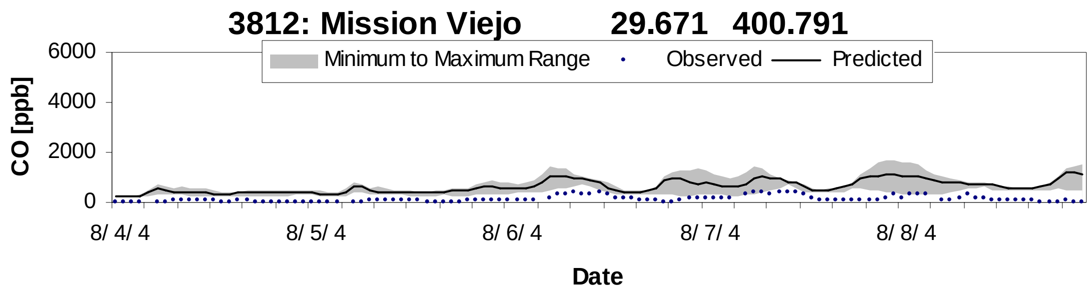

3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

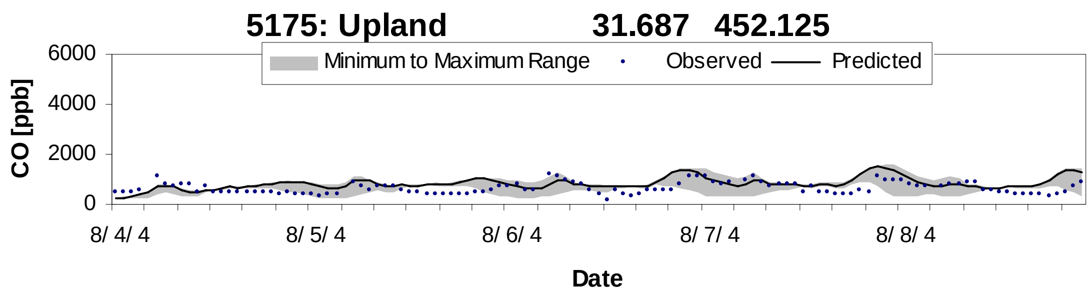

60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

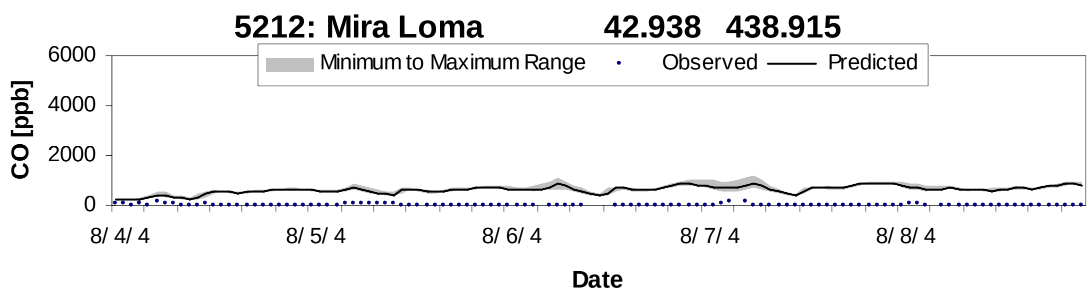

3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

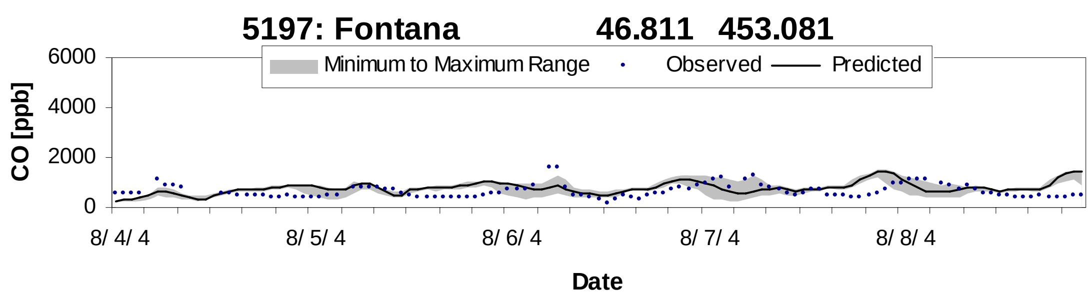

591: Glendora 13.487 457.010
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

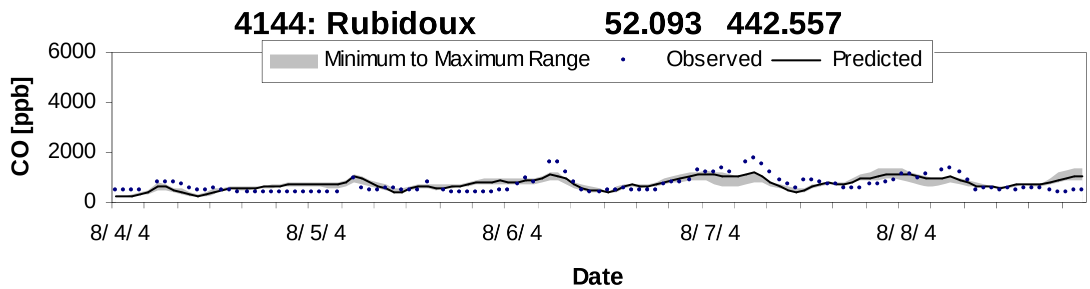

75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

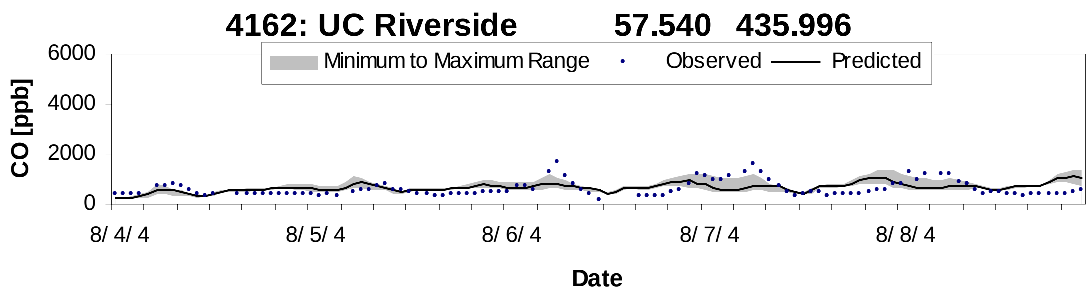

3812: Mission Viejo 29.671 400.791
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

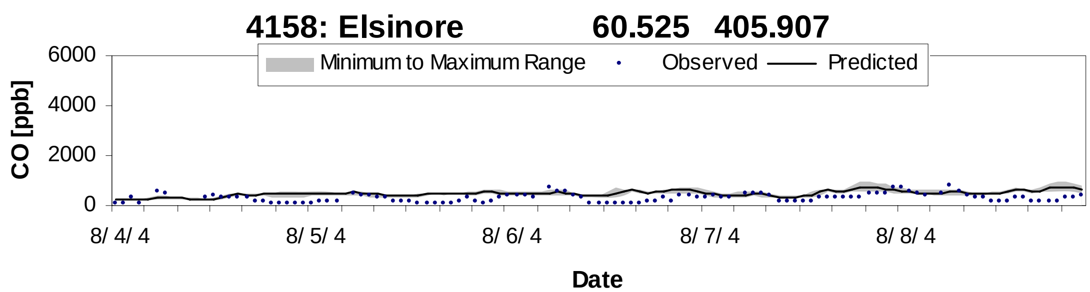

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

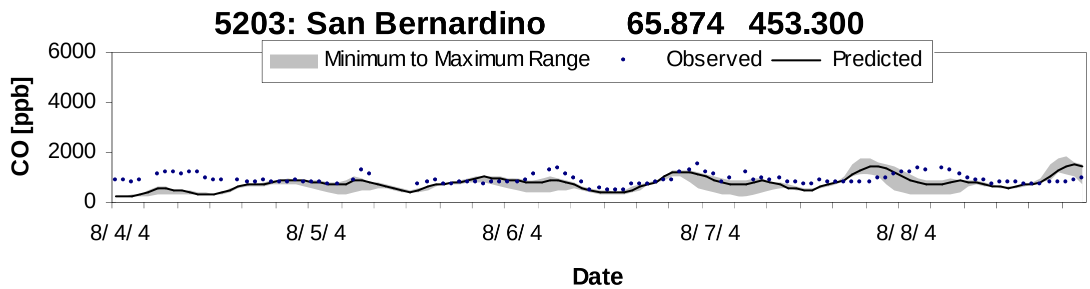

5212: Mira Loma 42.938 438.915
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

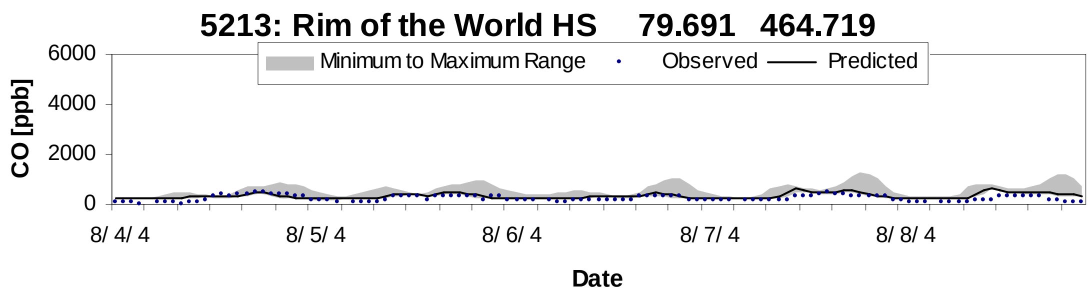

5197: Fontana 46.811 453.081
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date


4144: Rubidoux 52.093 442.557
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

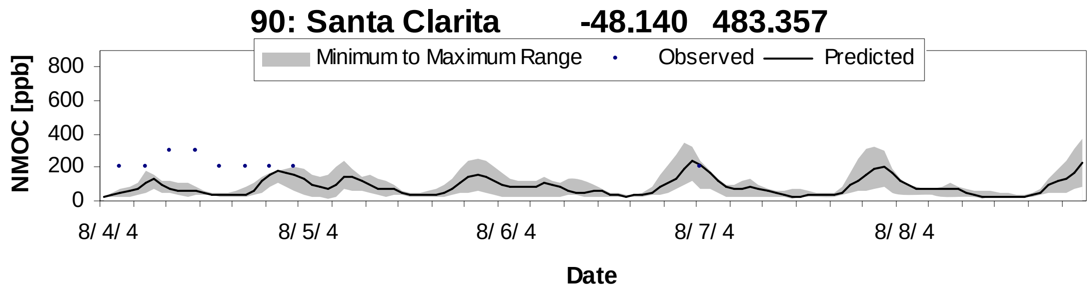

4162: UC Riverside 57.540 435.996
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

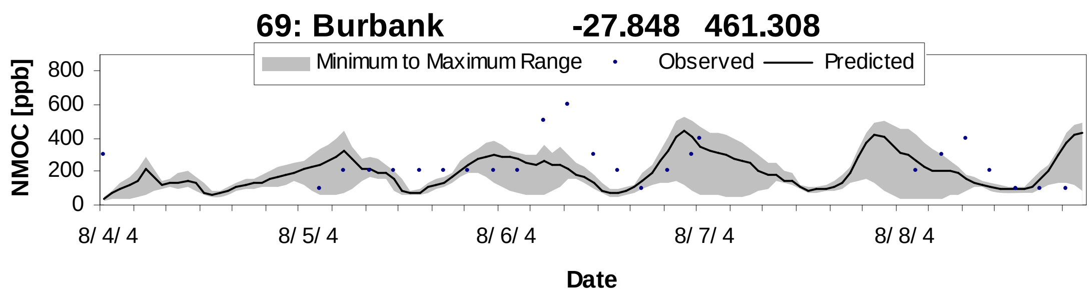

4158: Elsinore 60.525 405.907
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

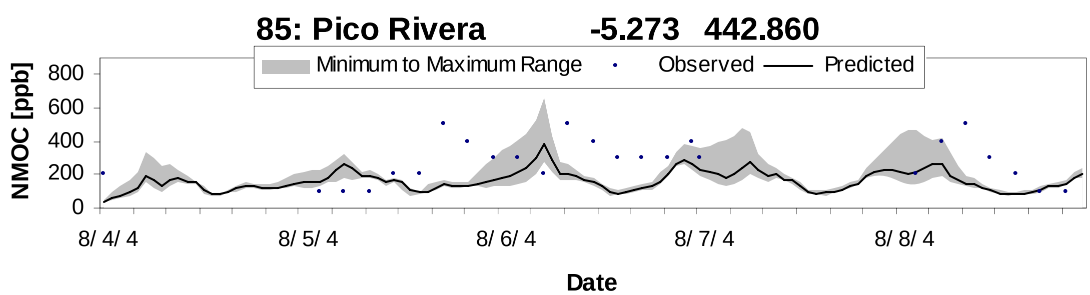

5203: San Bernardino 65.874 453.300
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

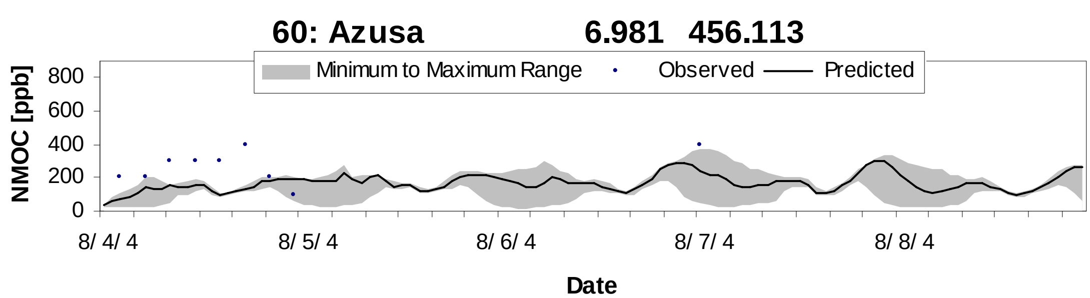

5213: Rim of the World HS 79.691 464.719
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

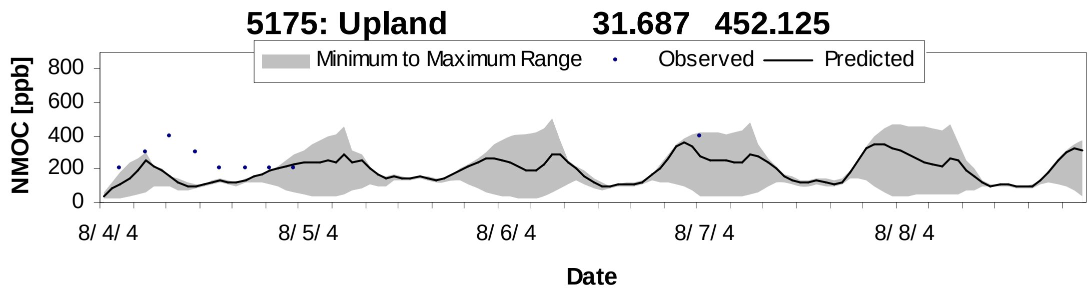
August 2004 SCAQMD CALMET mA01

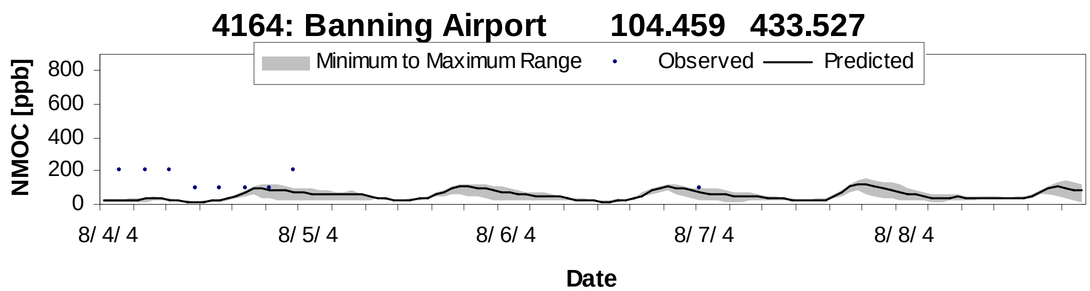




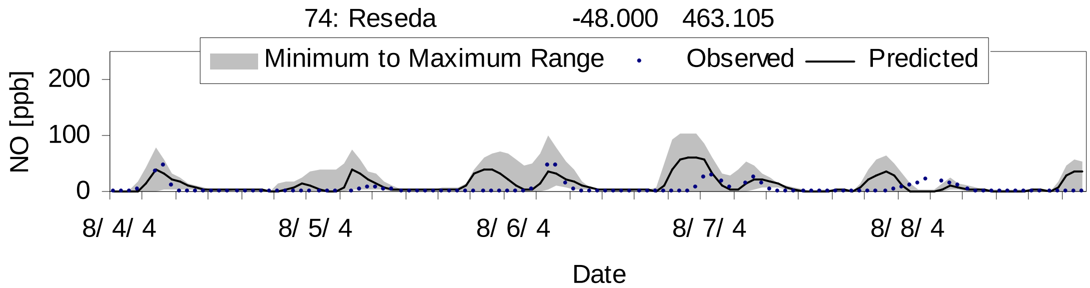


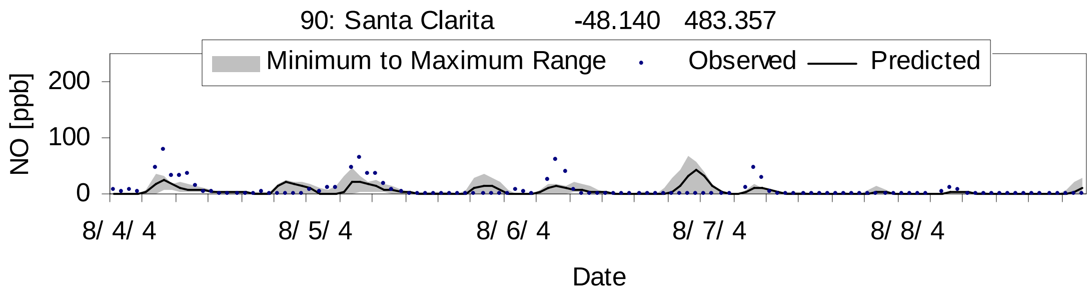


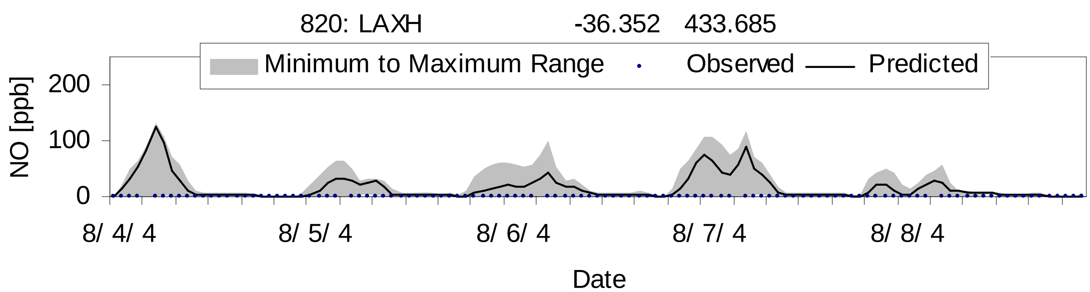

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
NMOC [ppb]
800
600
400
200
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

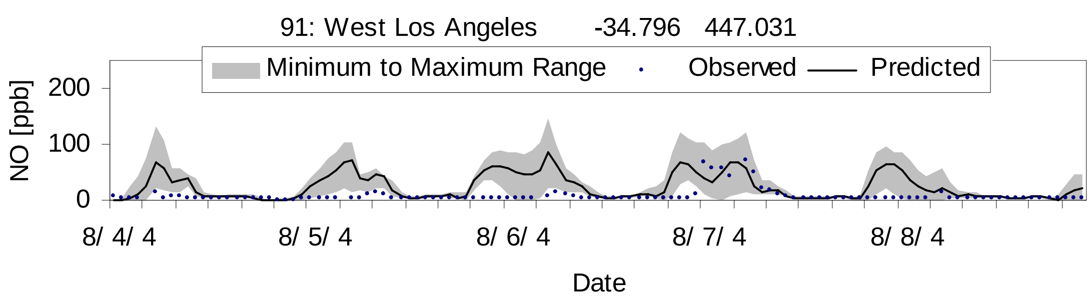

4164: Banning Airport 104.459 433.527
Minimum to Maximum Range
Observed
Predicted
NMOC [ppb]
800
600
400
200
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

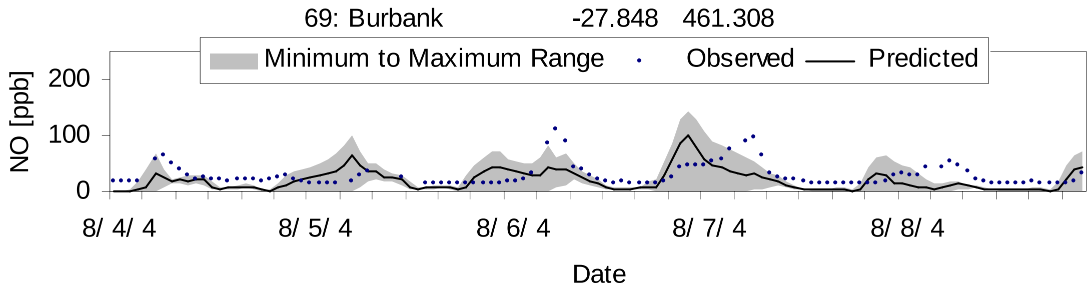
August 2004 SCAQMD CALMET mA01

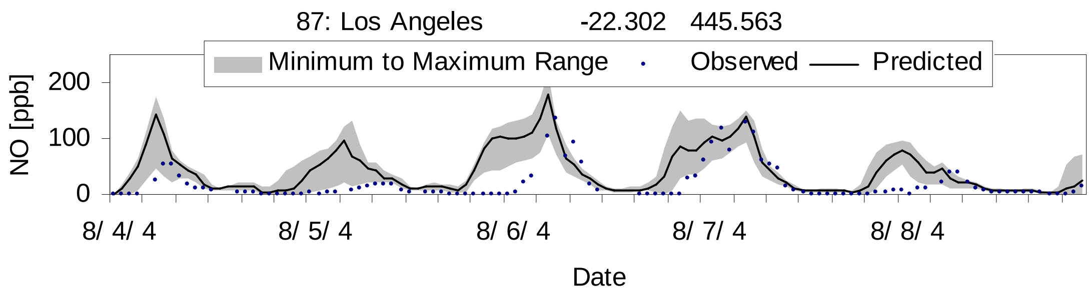


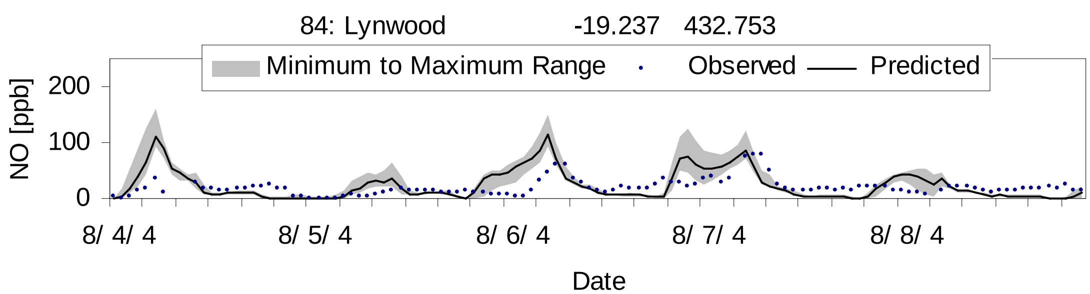


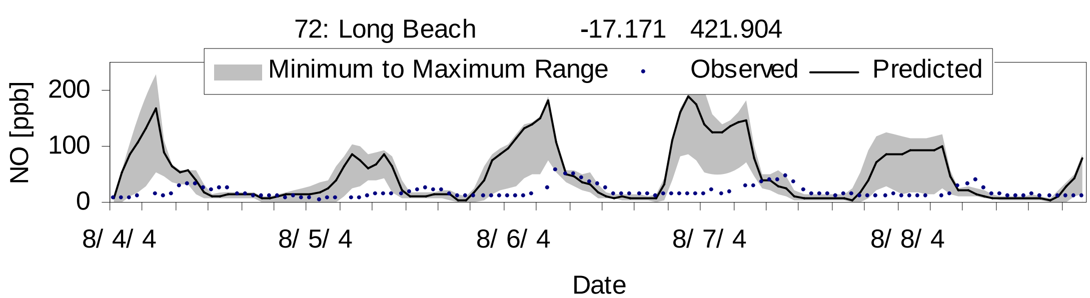


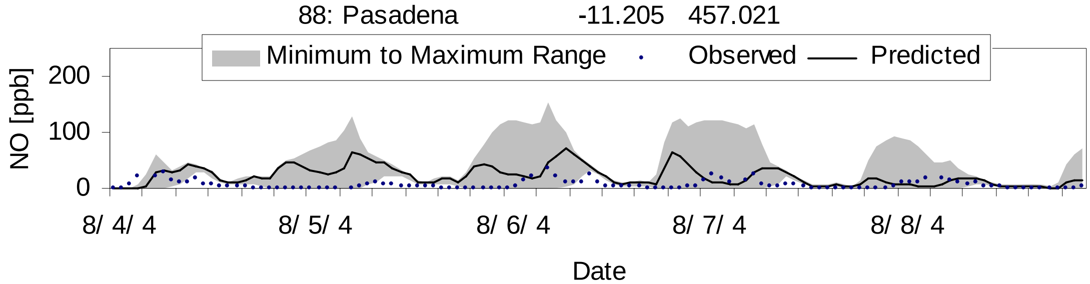


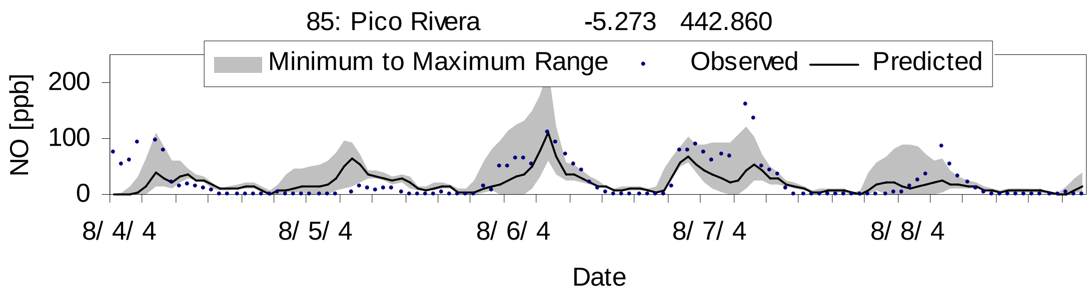

69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

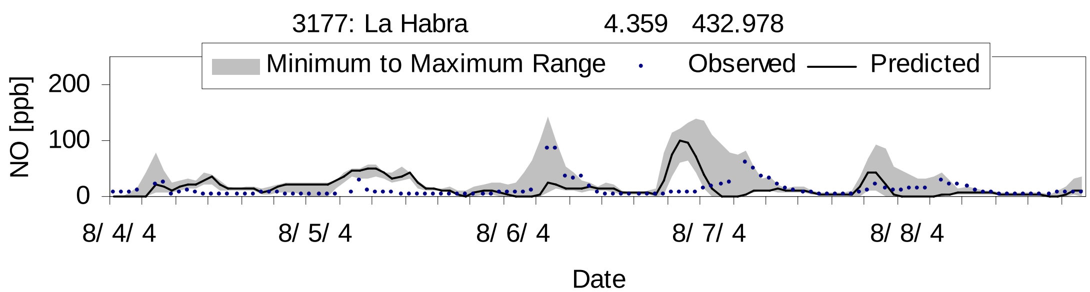

87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

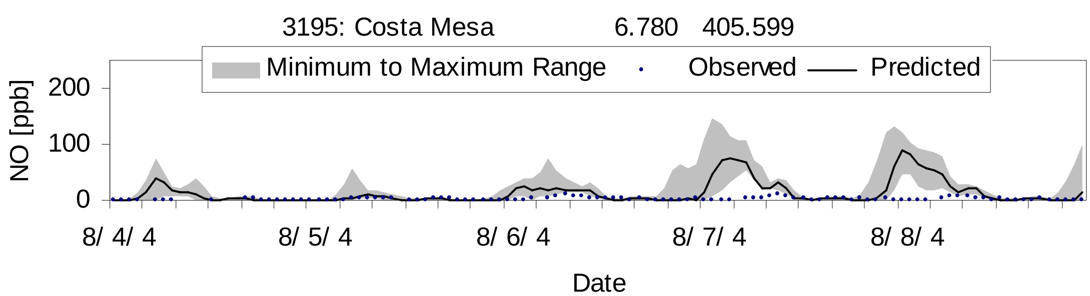

84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

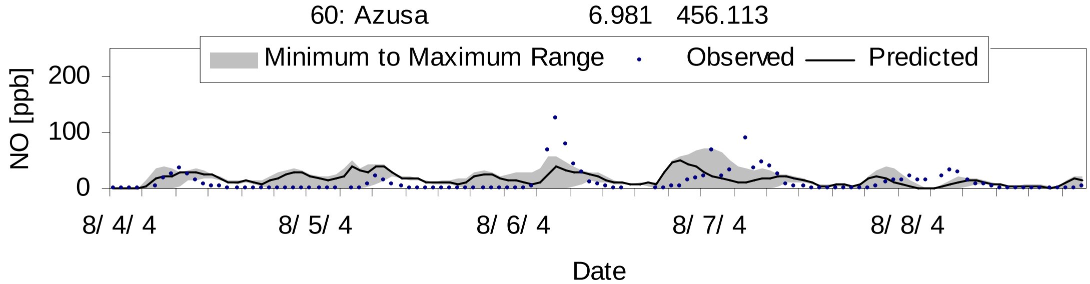

72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

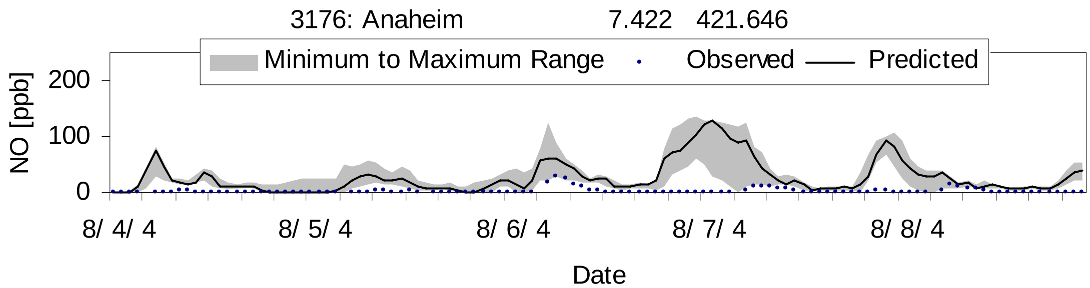

88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

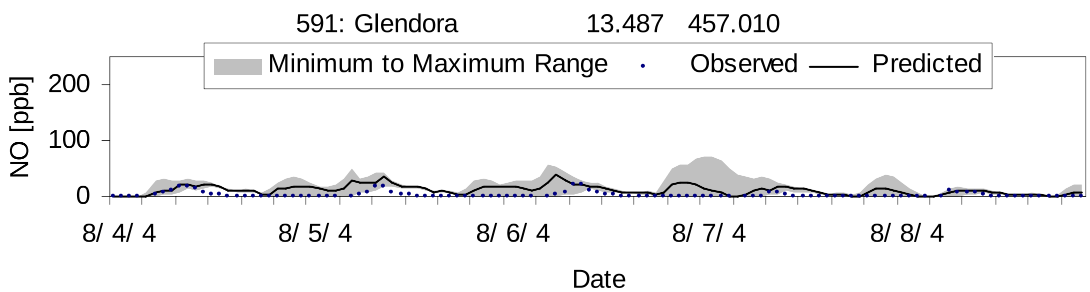

85: Pico Rivera -5.273 442.860
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

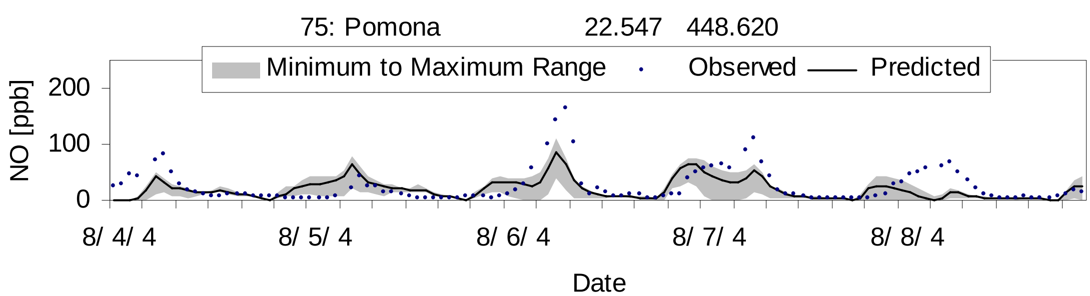

3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

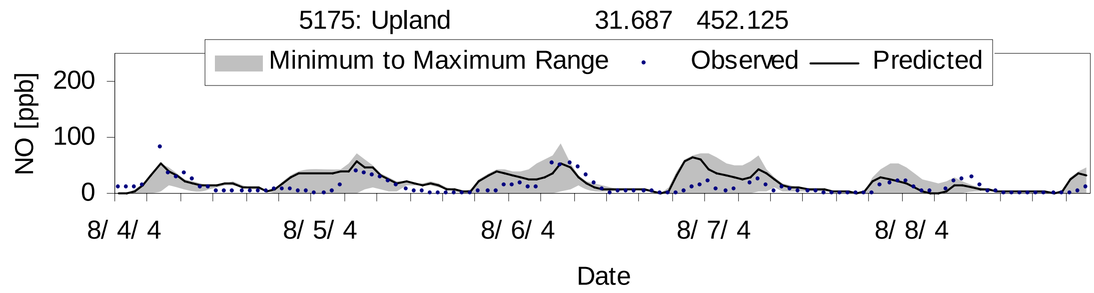

3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date


60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

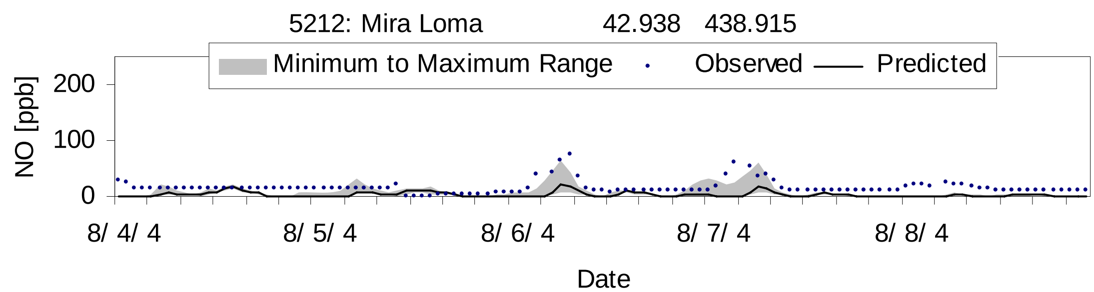

3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date


591: Glendora 13.487 457.010
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

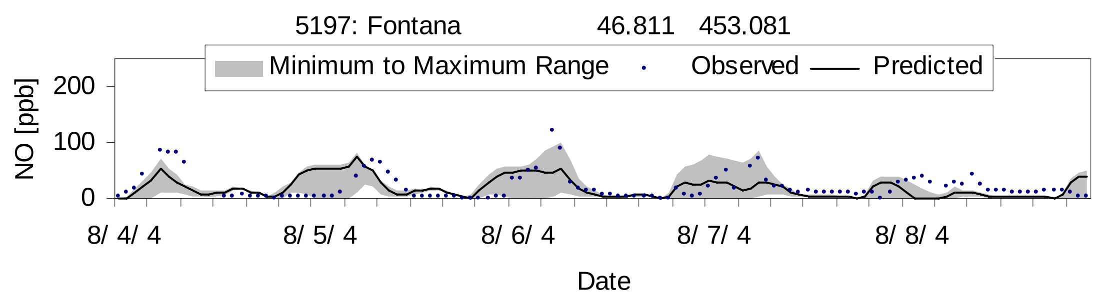

75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date



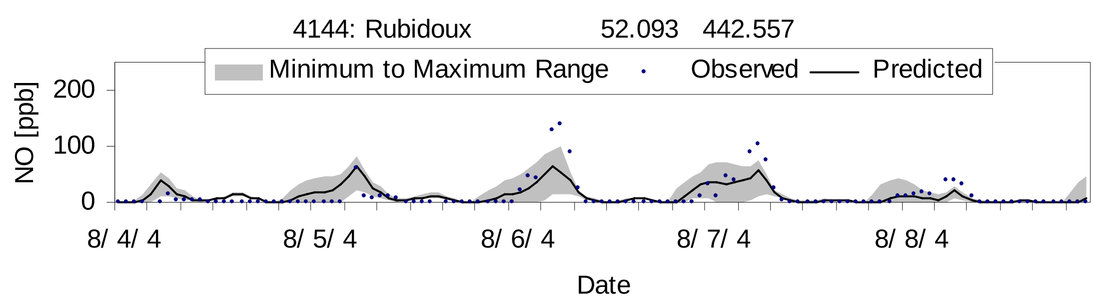
5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date



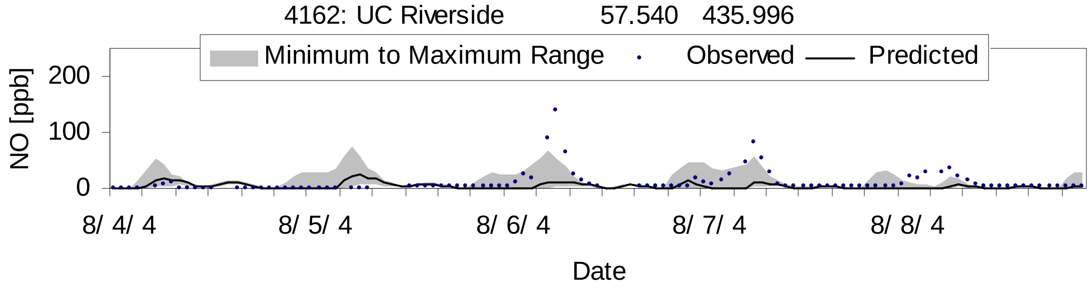
5212: Mira Loma 42.938 438.915
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

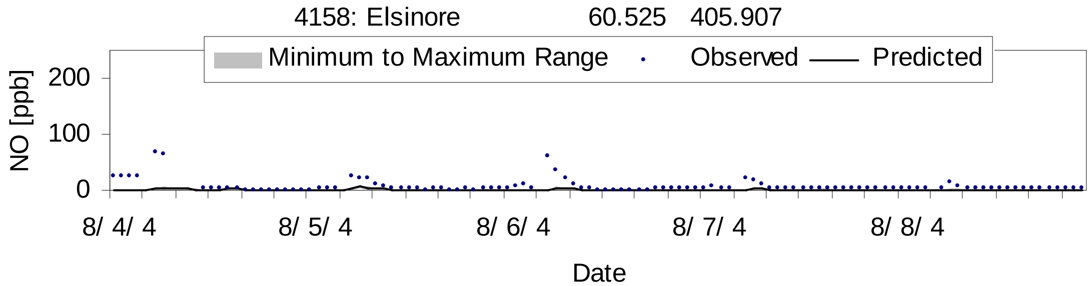


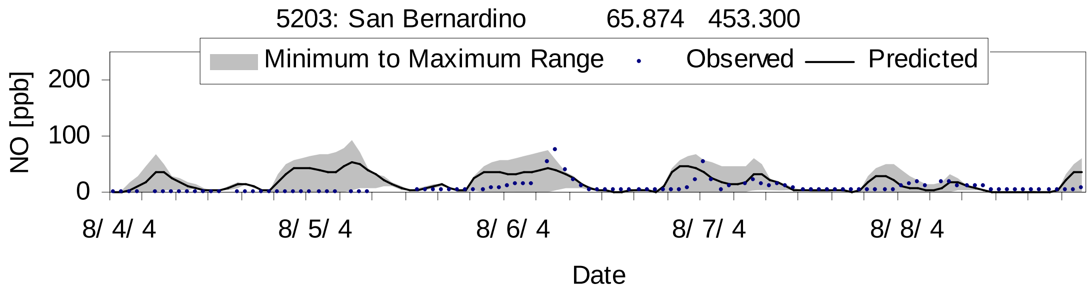
5197: Fontana 46.811 453.081
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

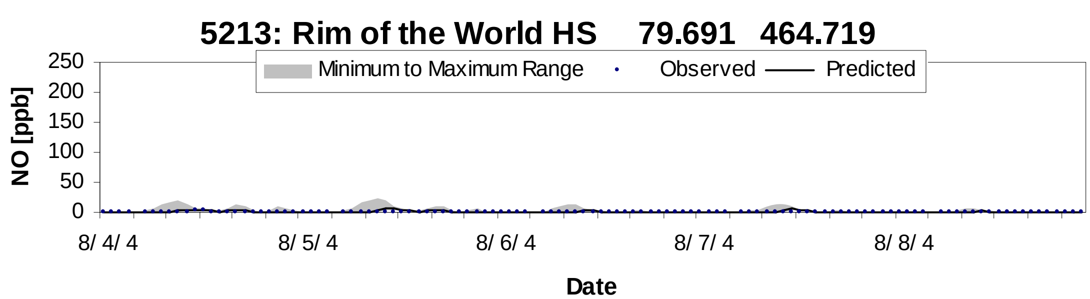


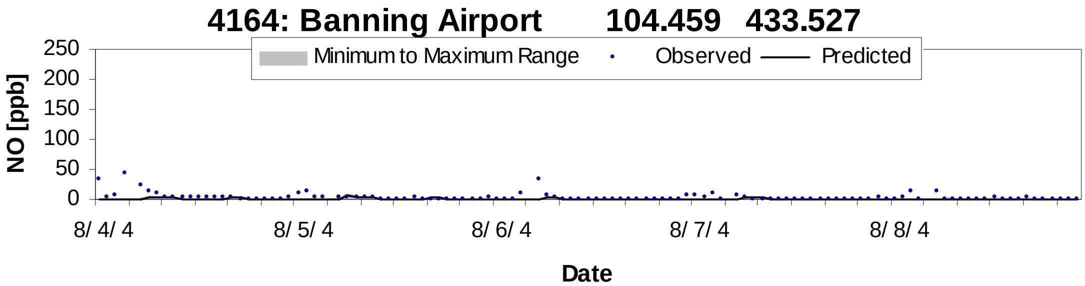
4144: Rubidoux 52.093 442.557
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

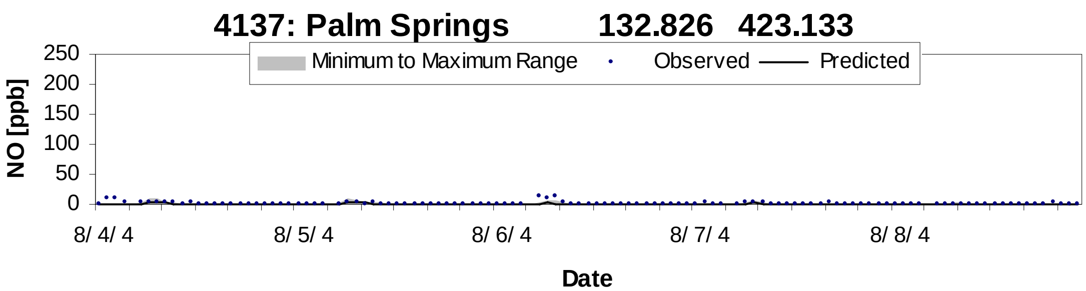

4162: UC Riverside 57.540 435.996
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date


4158: Elsinore 60.525 405.907
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

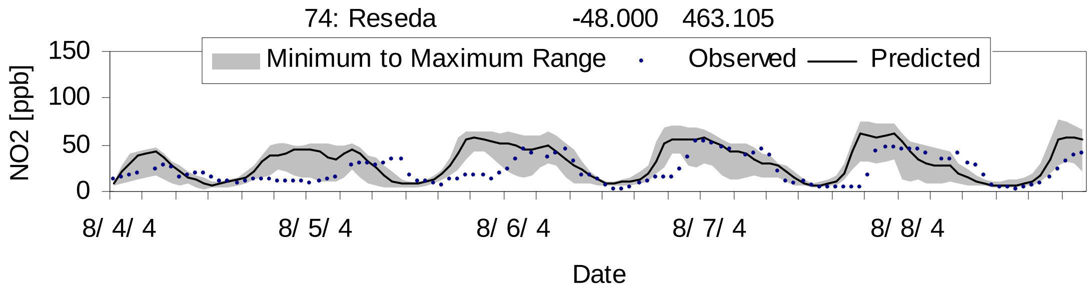

5203: San Bernardino 65.874 453.300
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

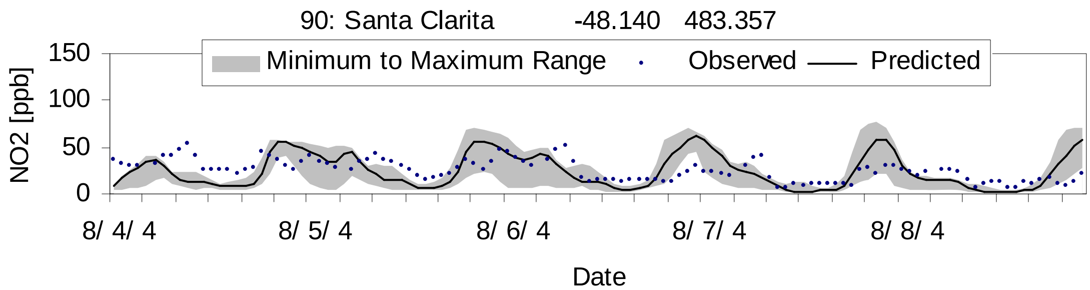

5213: Rim of the World HS 79.691 464.719
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
250
200
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

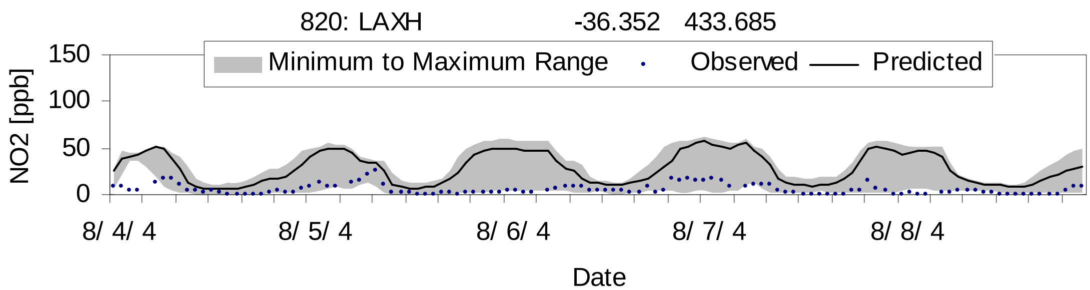

4164: Banning Airport 104.459 433.527
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
250
200
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

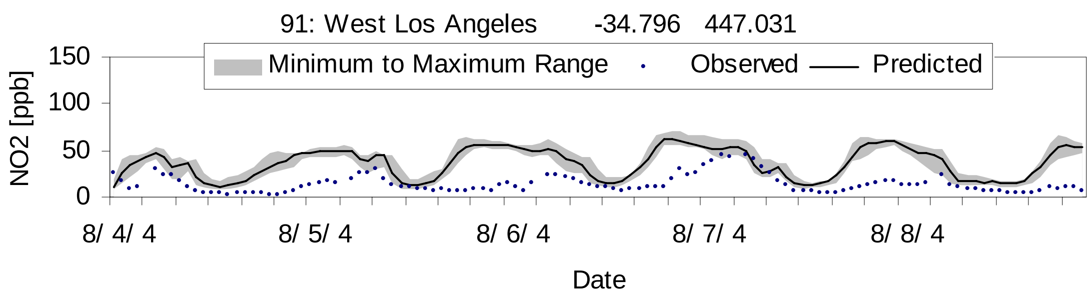

4137: Palm Springs 132.826 423.133
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
250
200
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

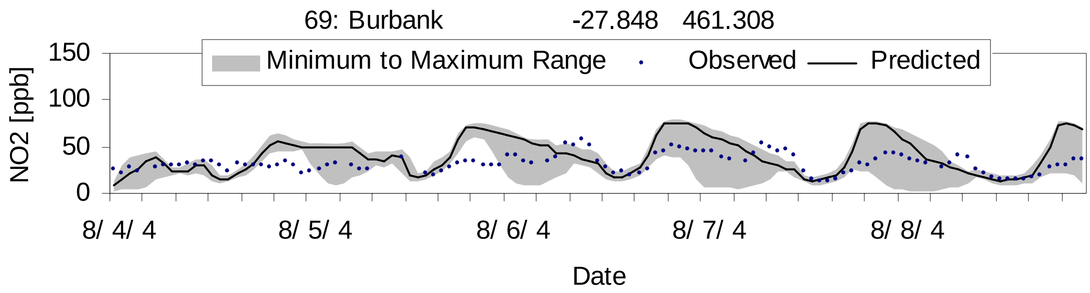
August 2004 SCAQMD CALMET mA01

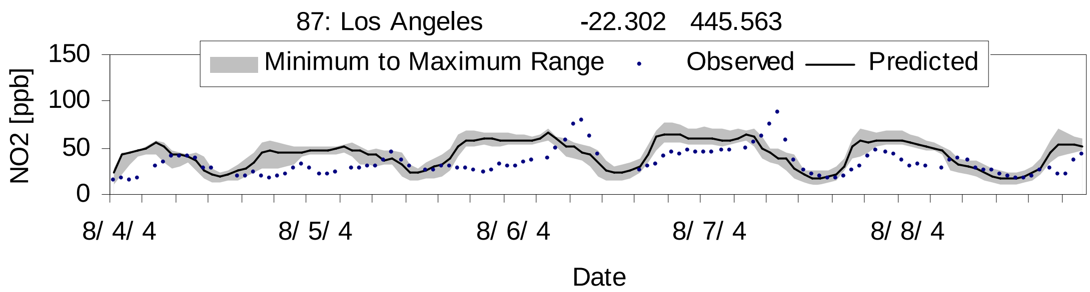


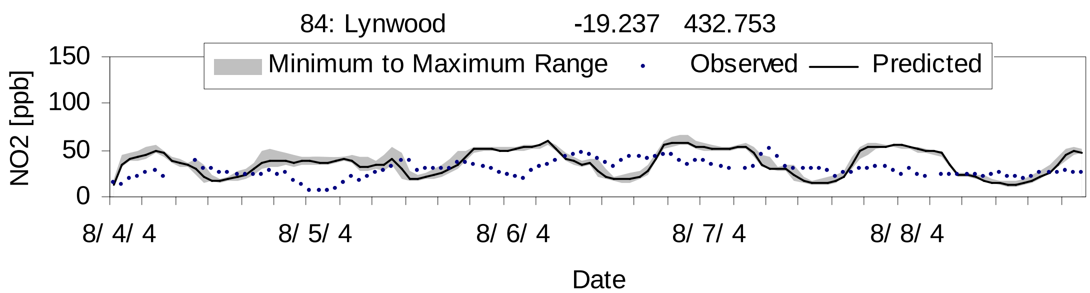


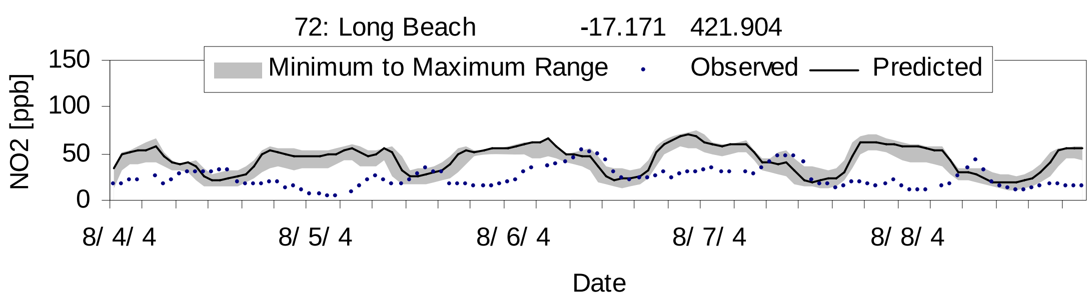


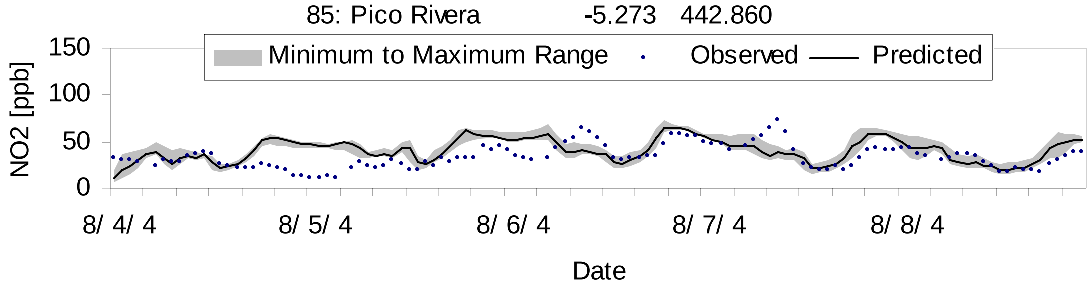


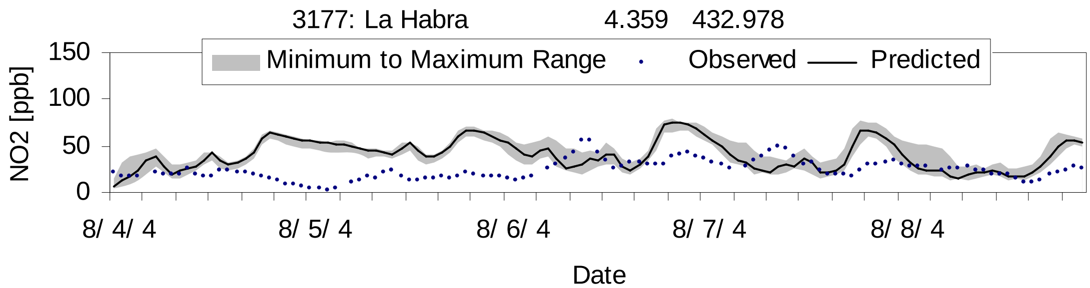

69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

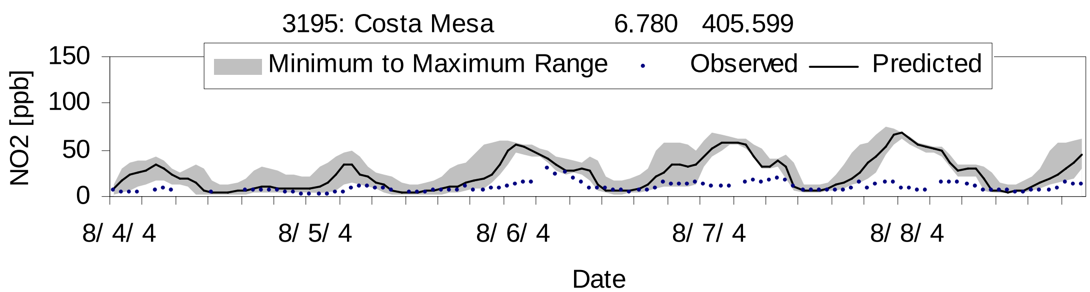

87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

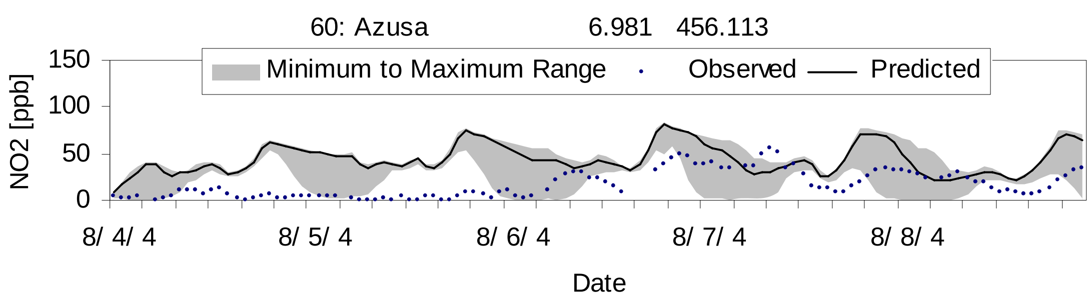

84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

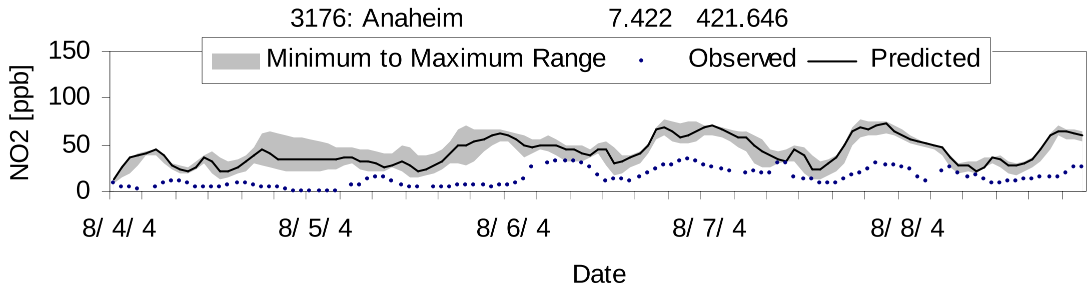

72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

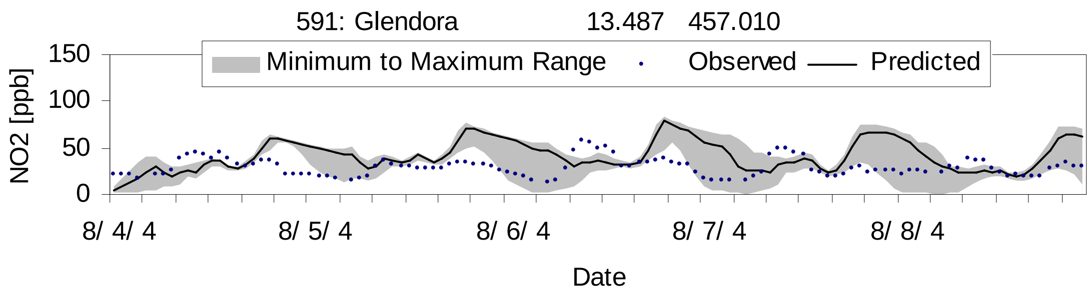

85: Pico Rivera -5.273 442.860
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

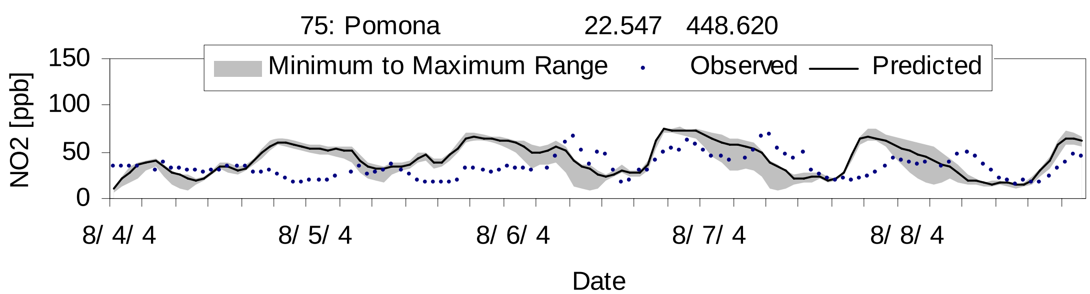

3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

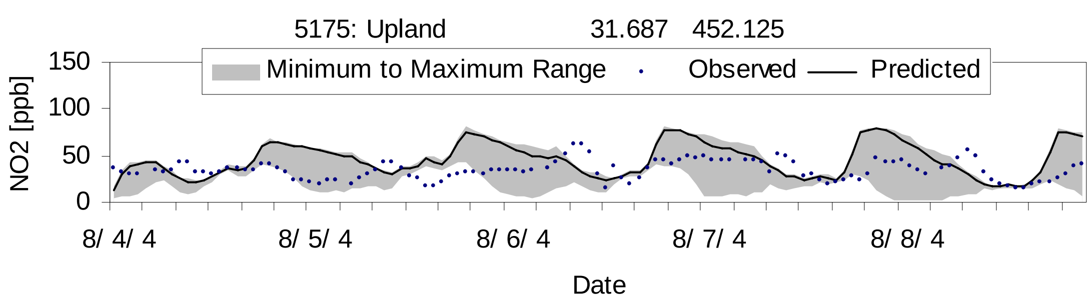

3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

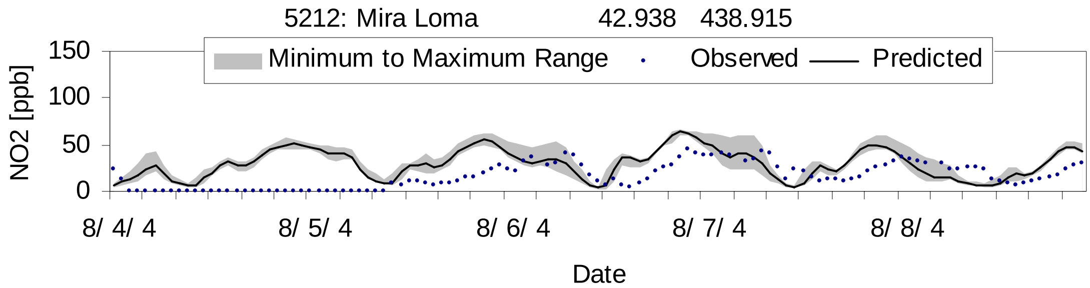

60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

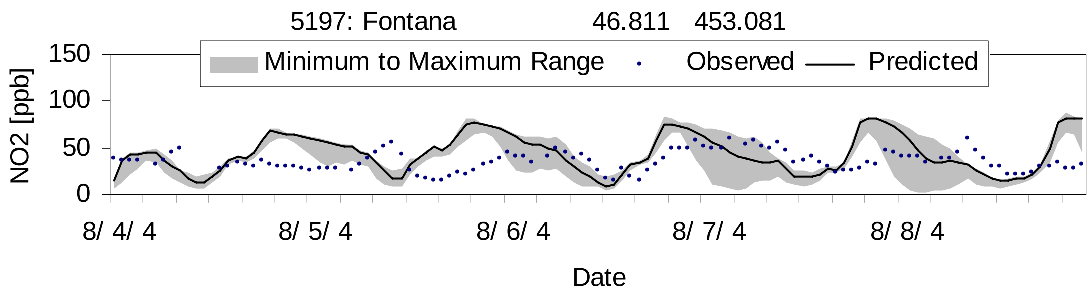

3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

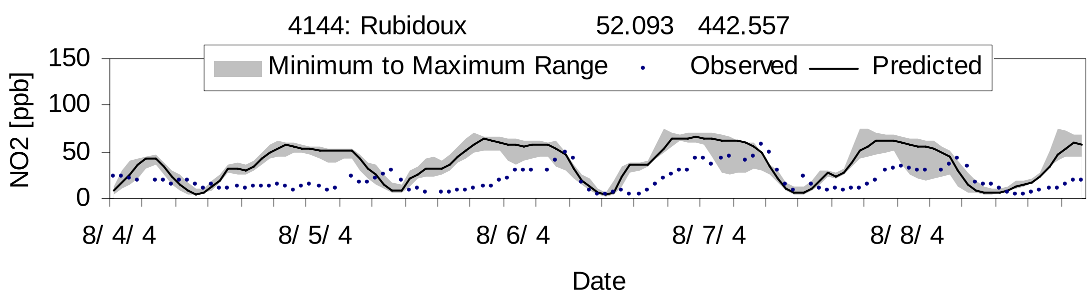

591: Glendora 13.487 457.010
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

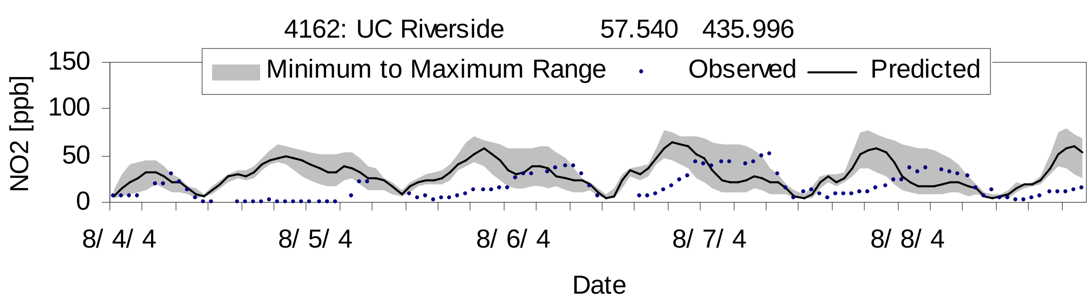

75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

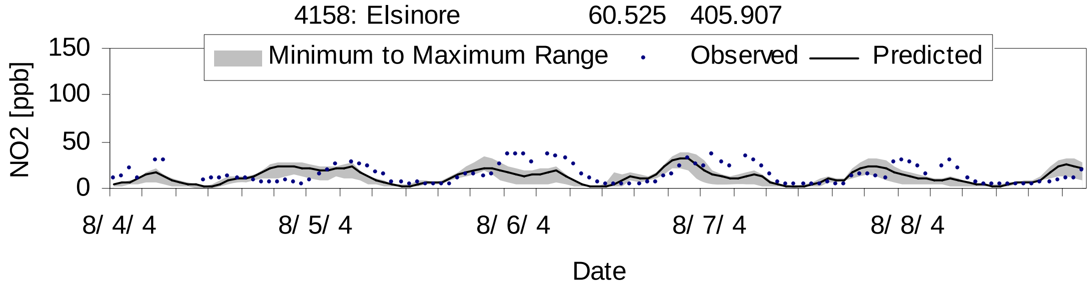

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

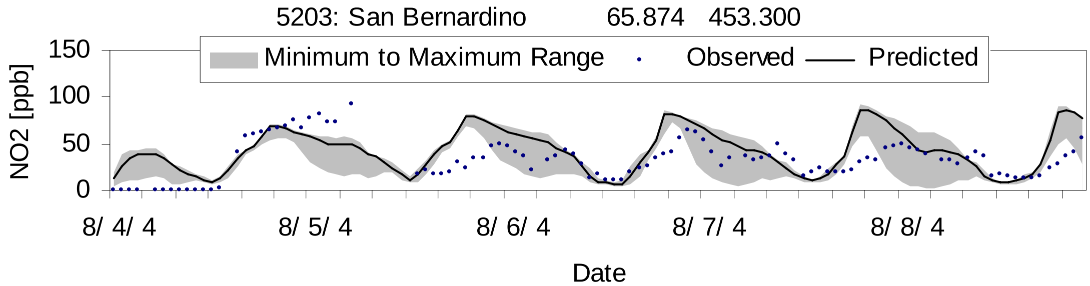

5212: Mira Loma 42.938 438.915
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

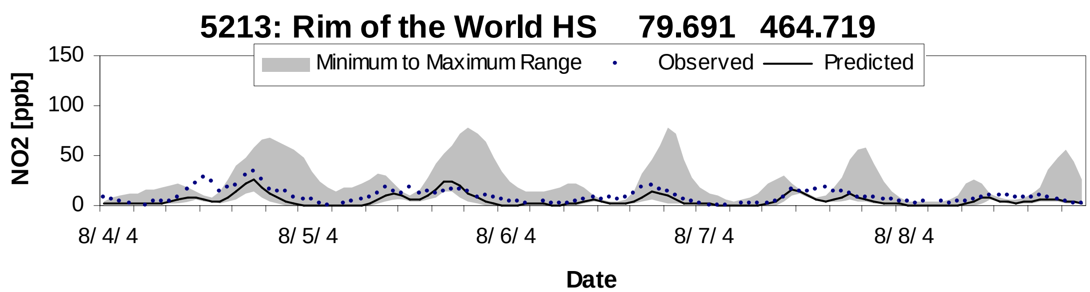

5197: Fontana 46.811 453.081
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

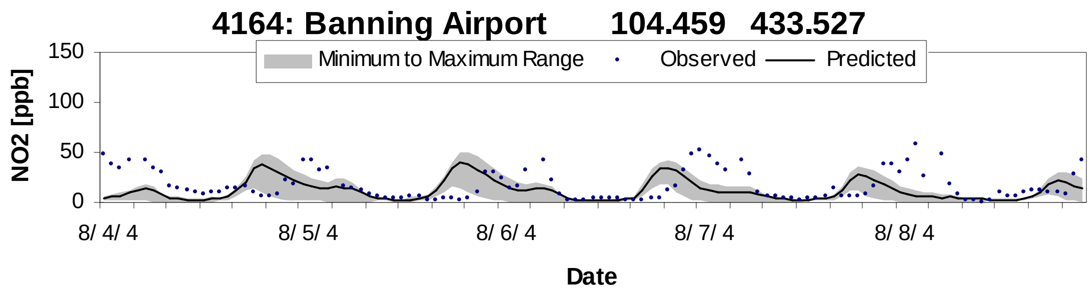

4144: Rubidoux 52.093 442.557
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

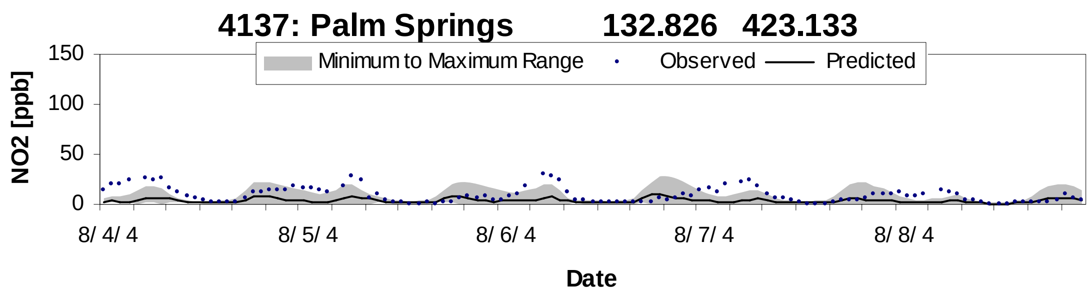

4162: UC Riverside 57.540 435.996
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date


4158: Elsinore 60.525 405.907
NO2 [ppb]
150
100
50
0
Minimum to Maximum Range
Observed
Predicted
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

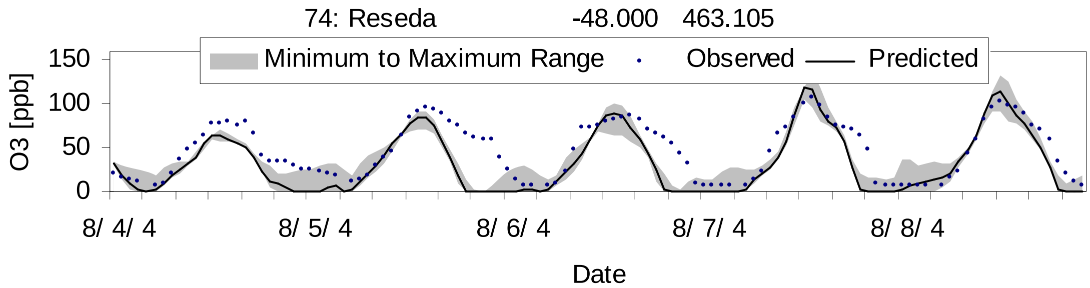

5203: San Bernardino 65.874 453.300
NO2 [ppb]
150
100
50
0
Minimum to Maximum Range
Observed
Predicted
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

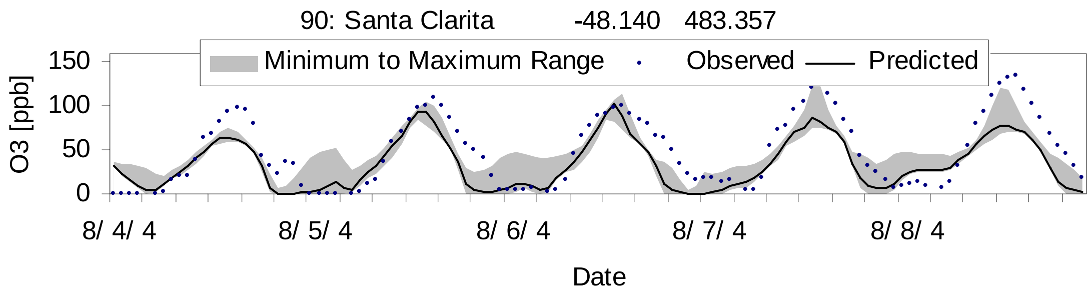

5213: Rim of the World HS 79.691 464.719
NO2 [ppb]
150
100
50
0
Minimum to Maximum Range
Observed
Predicted
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

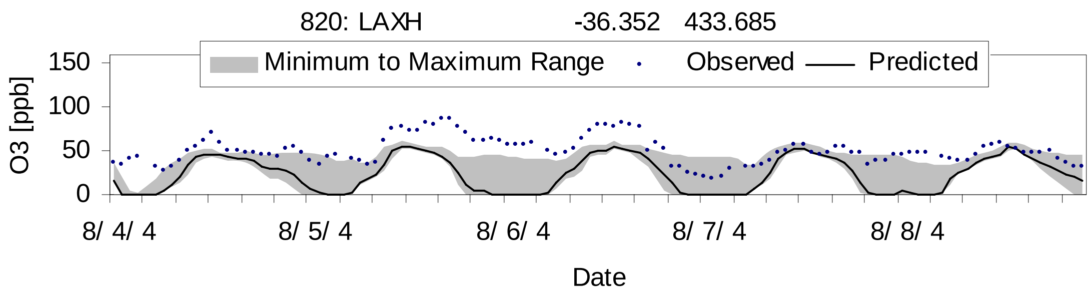

4164: Banning Airport 104.459 433.527
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

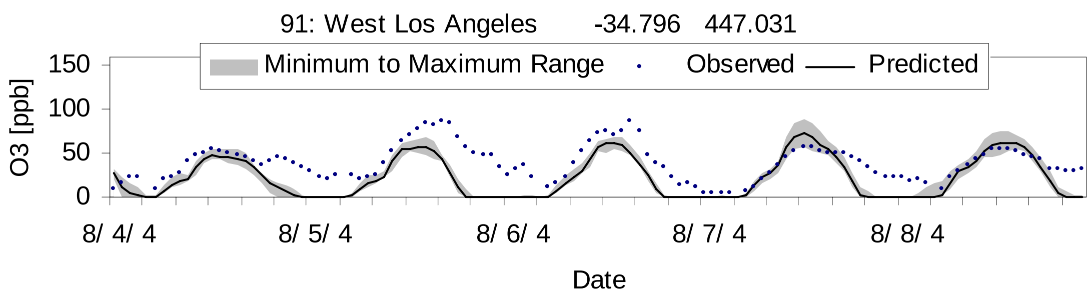

4137: Palm Springs 132.826 423.133
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

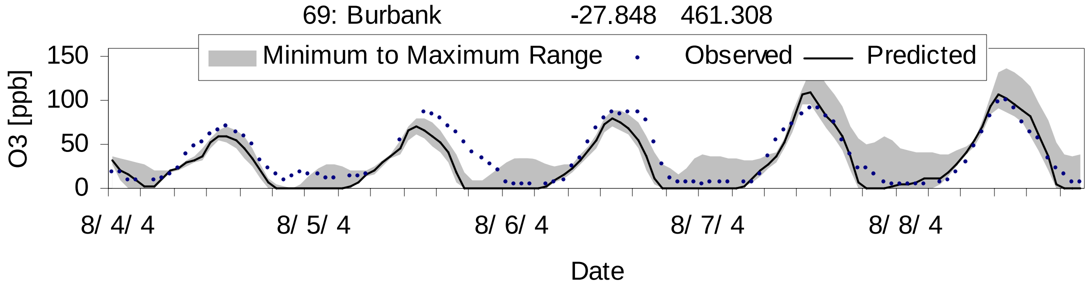
August 2004 SCAQMD CALMET mA01



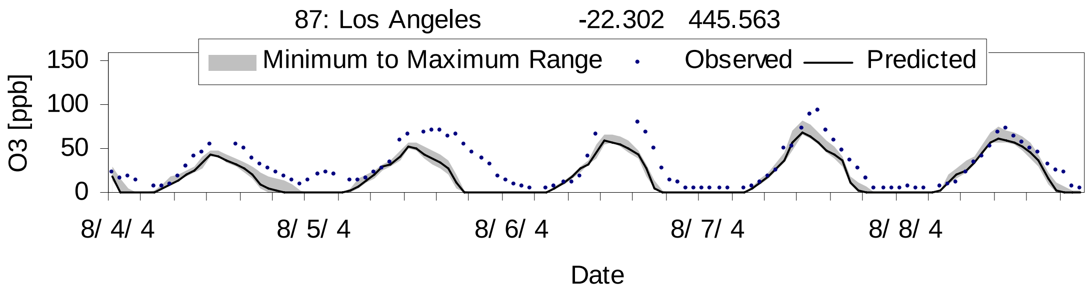




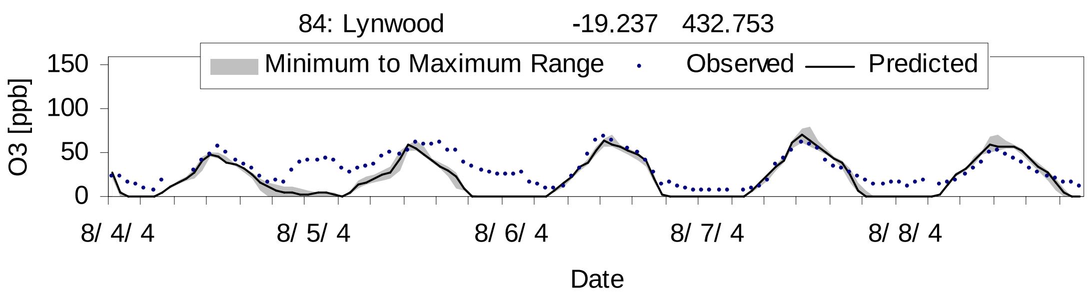




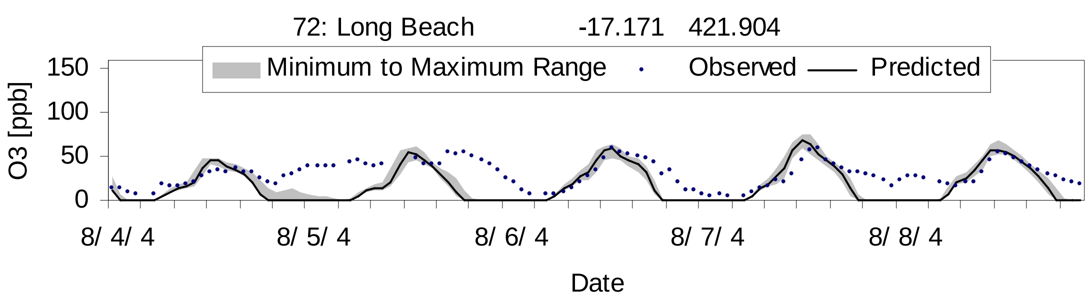
69: Burbank
-27.848 461.308
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date



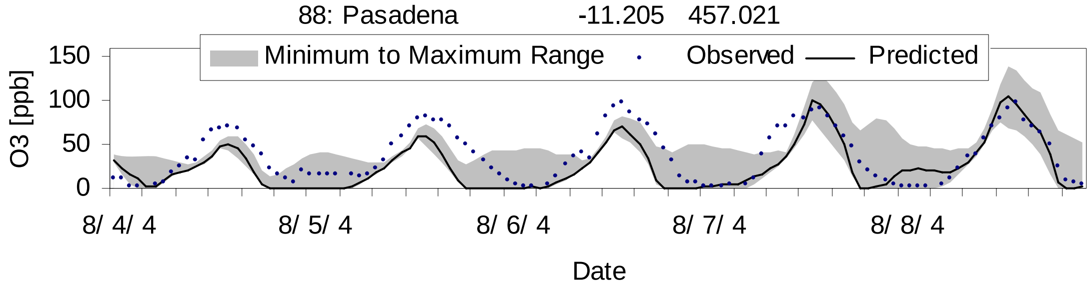
87: Los Angeles
-22.302 445.563
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

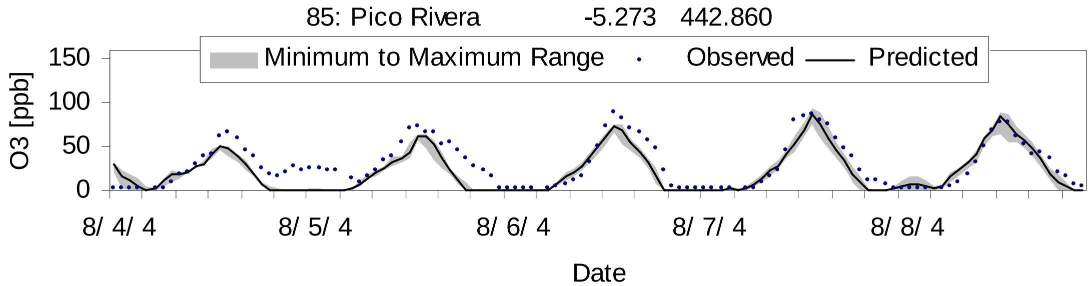


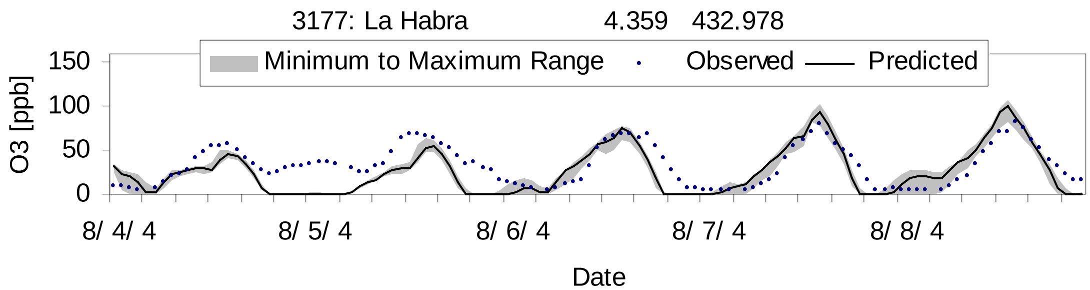
84: Lynwood
-19.237 432.753
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

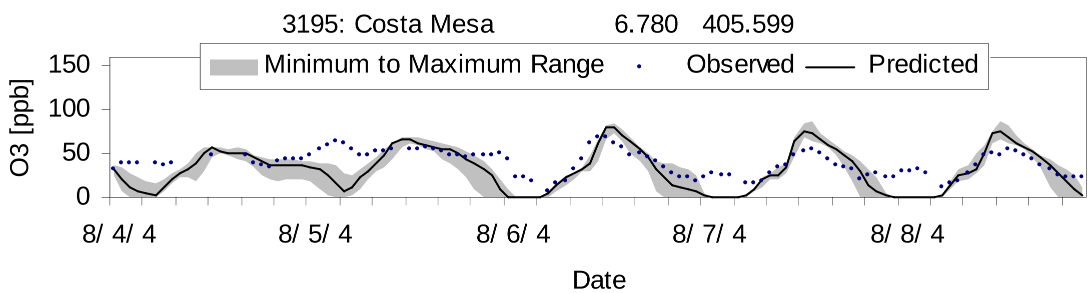


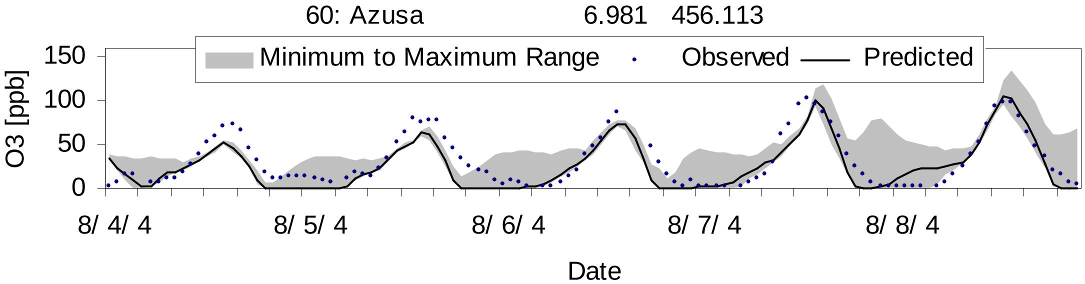
72: Long Beach
-17.171 421.904
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

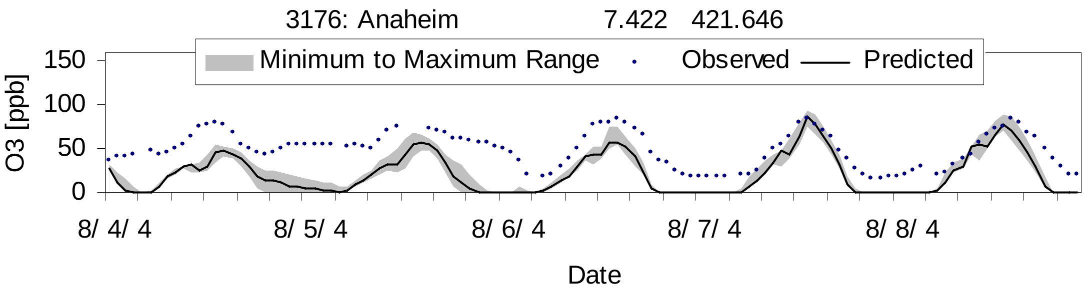

88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

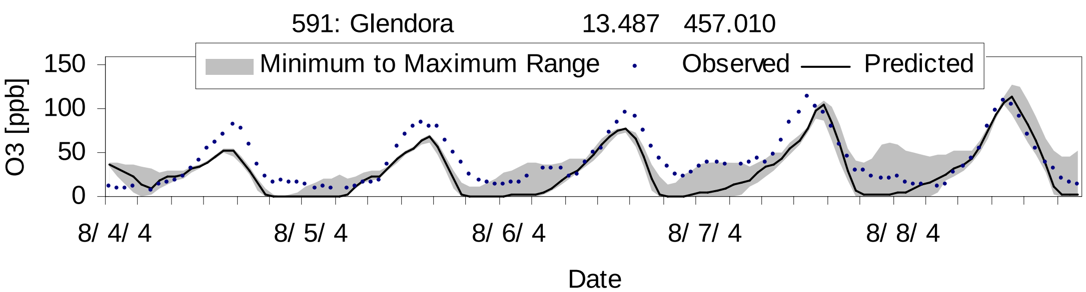

85: Pico Rivera -5.273 442.860
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

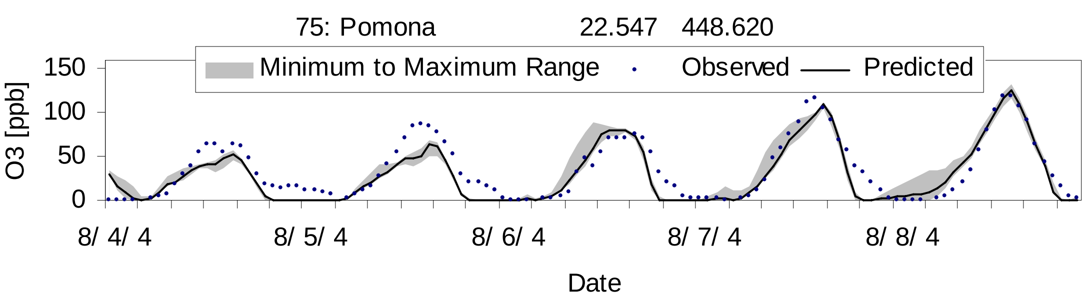

3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

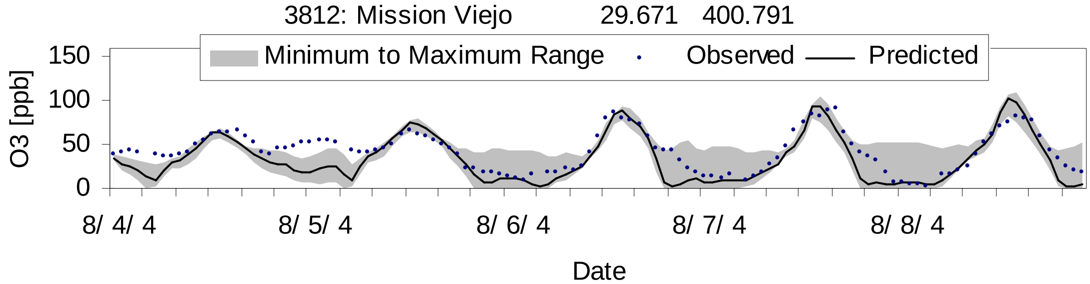

3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

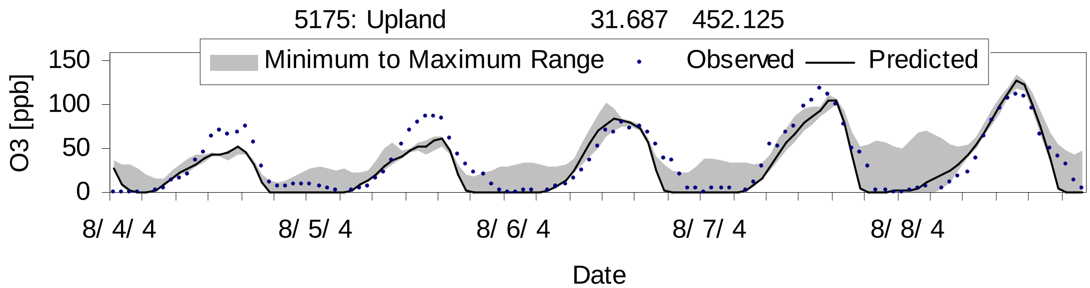

60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

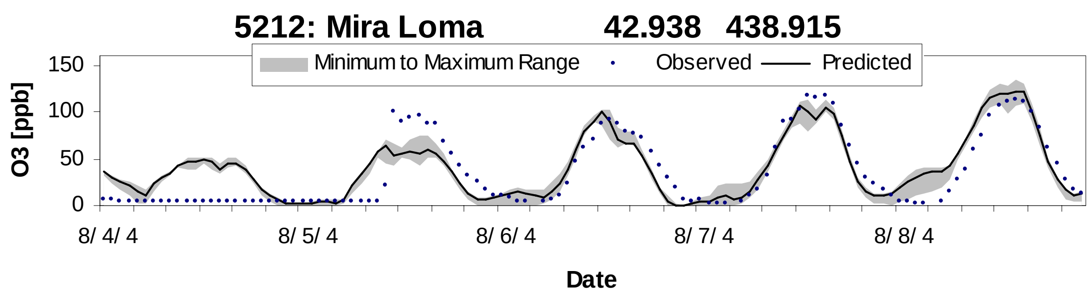

3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

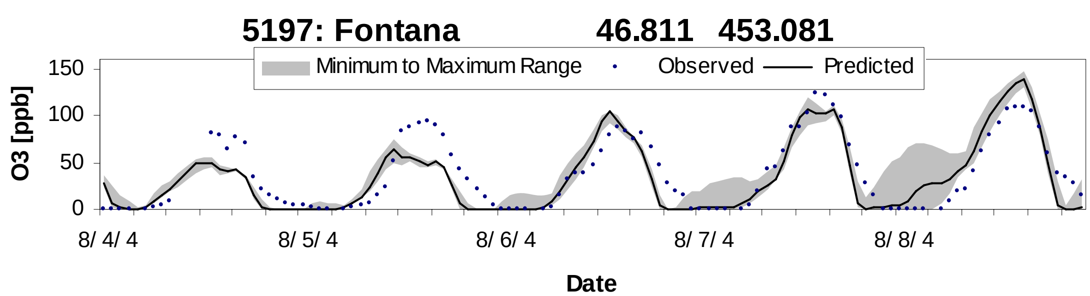

591: Glendora 13.487 457.010
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

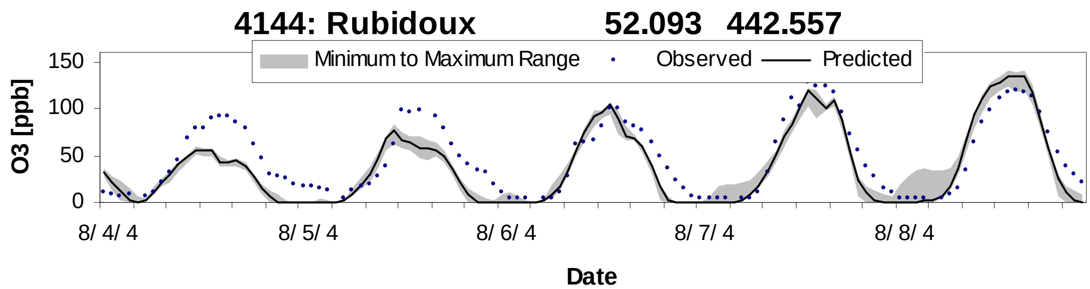

75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

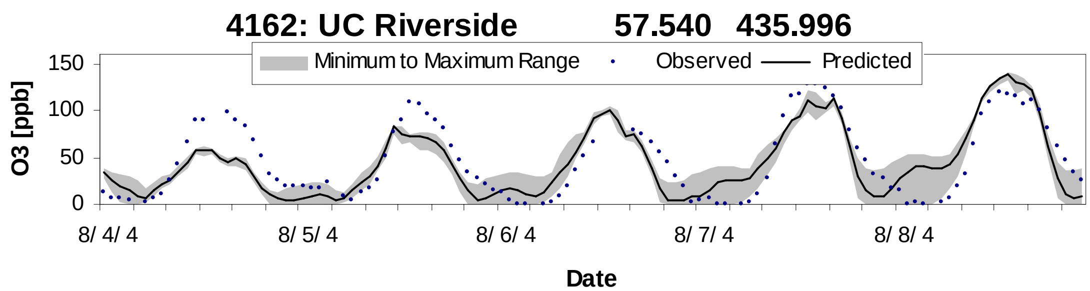

3812: Mission Viejo 29.671 400.791
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

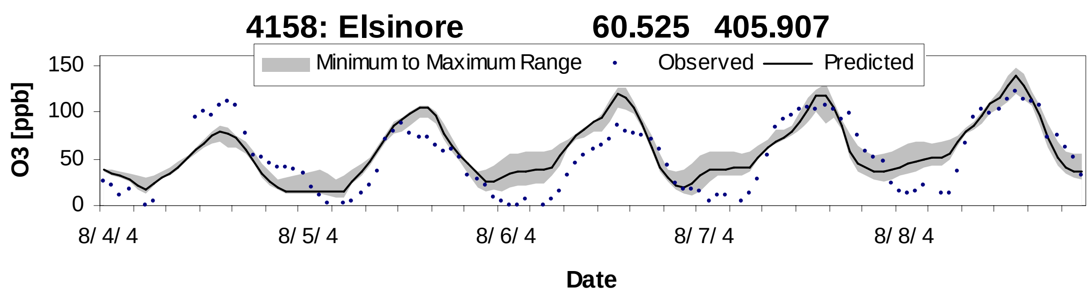

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

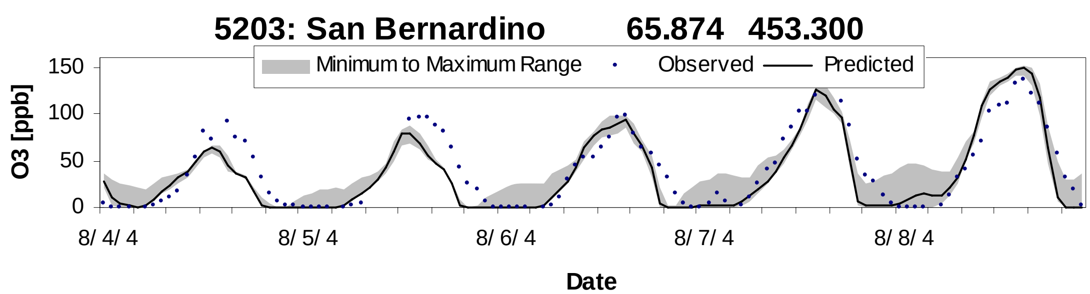

5212: Mira Loma 42.938 438.915
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

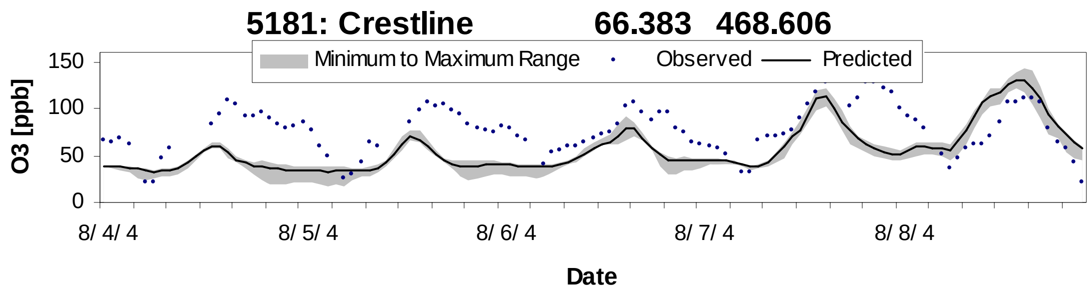

5197: Fontana 46.811 453.081
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

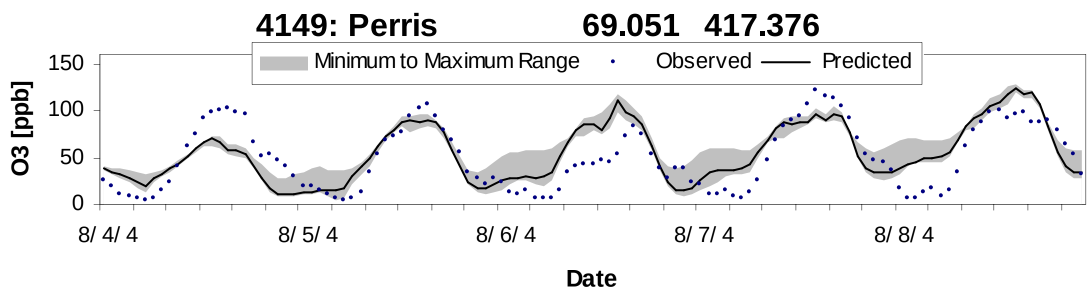

4144: Rubidoux 52.093 442.557
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

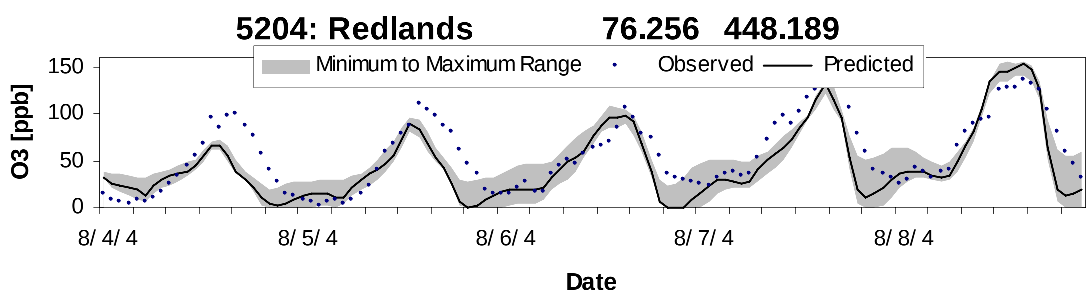

4162: UC Riverside 57.540 435.996
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

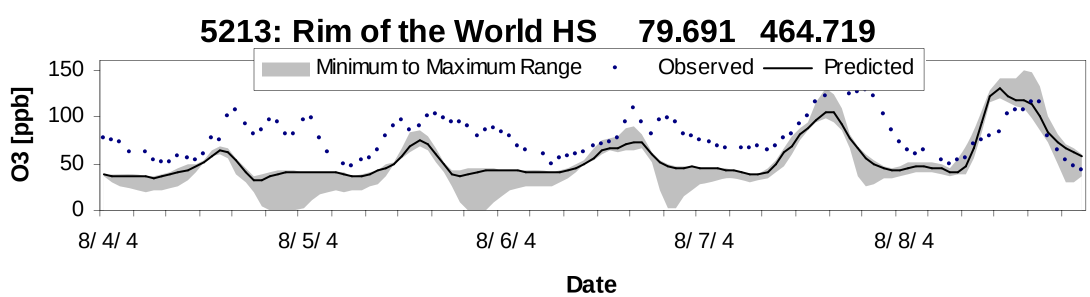

4158: Elsinore 60.525 405.907
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

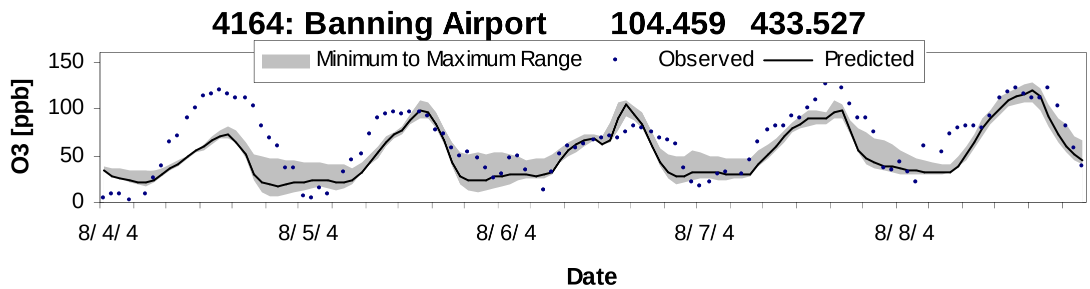

5203: San Bernardino 65.874 453.300
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

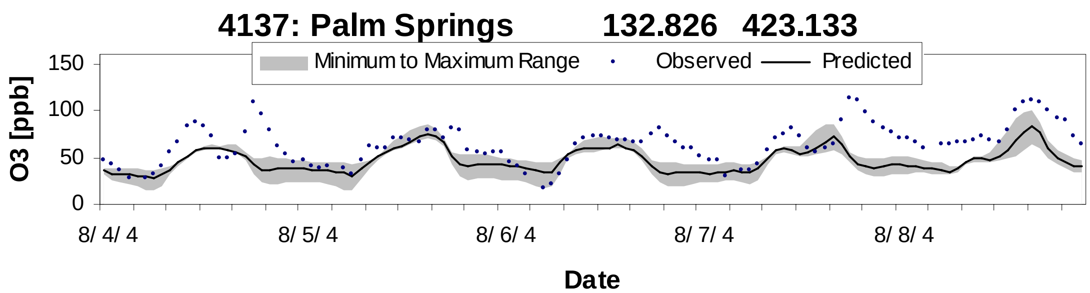

5181: Crestline 66.383 468.606
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

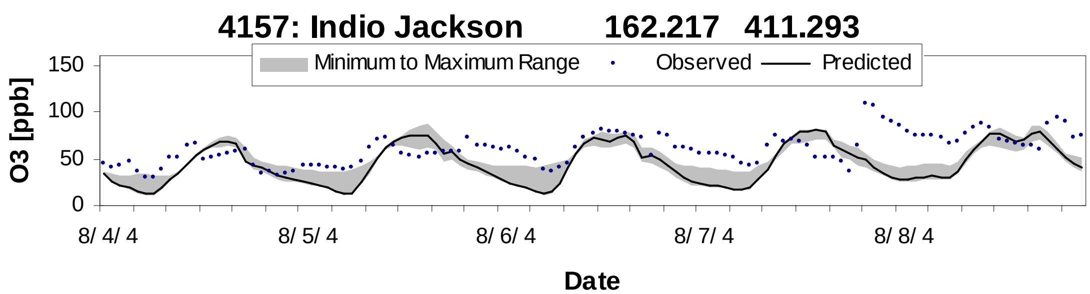

4149: Perris 69.051 417.376
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date


5204: Redlands 76.256 448.189
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

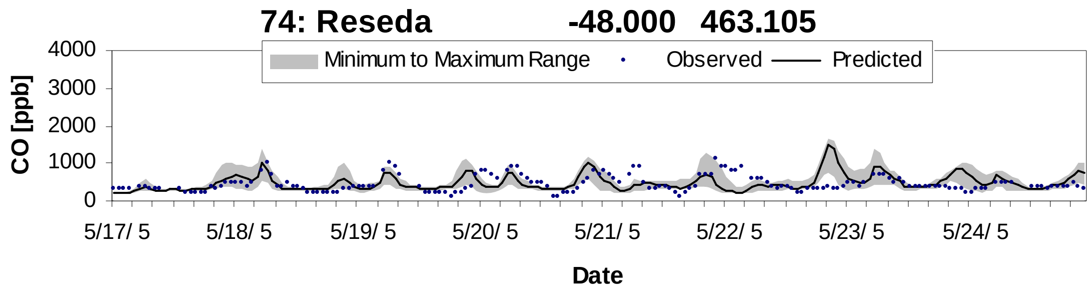

5213: Rim of the World HS 79.691 464.719
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

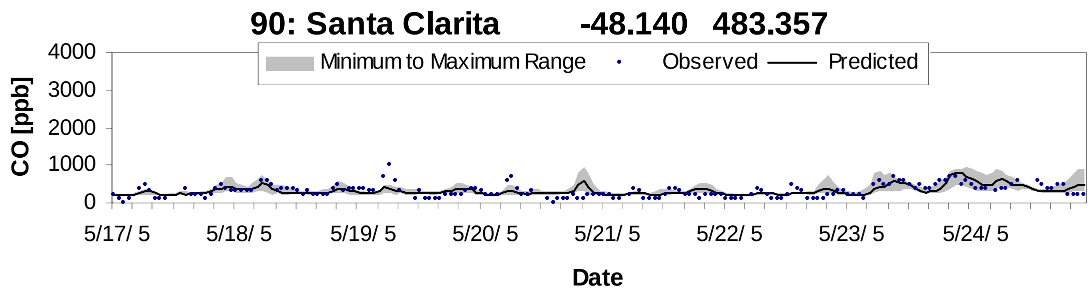

4164: Banning Airport 104.459 433.527
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

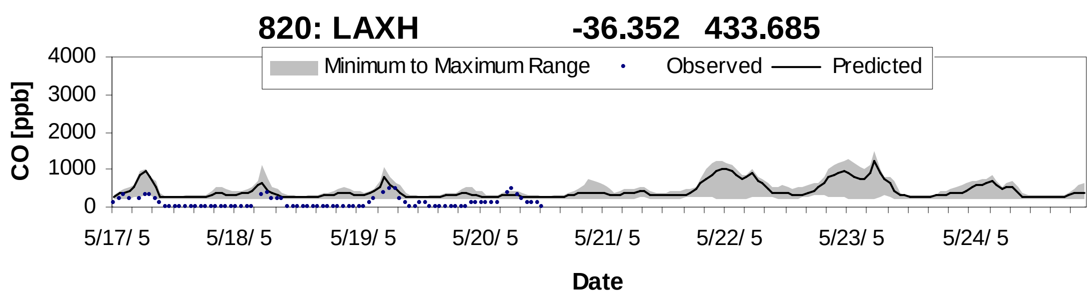

4137: Palm Springs 132.826 423.133
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

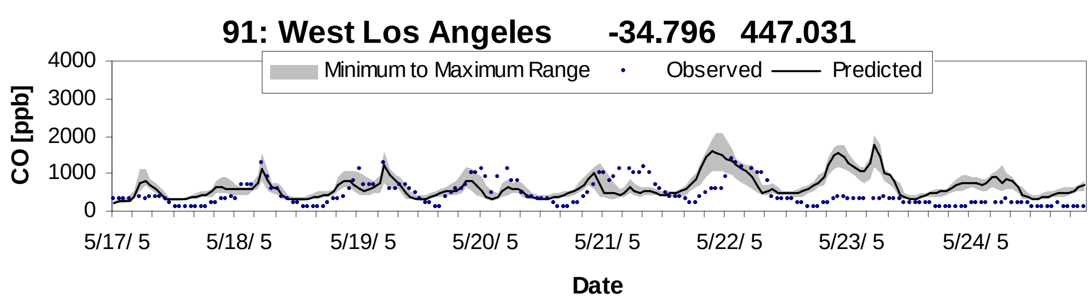

4157: Indio Jackson 162.217 411.293
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
150
100
50
0
8/ 4/ 4
8/ 5/ 4
8/ 6/ 4
8/ 7/ 4
8/ 8/ 4
Date

May 17-24, 2005 CALMET Winds mA01

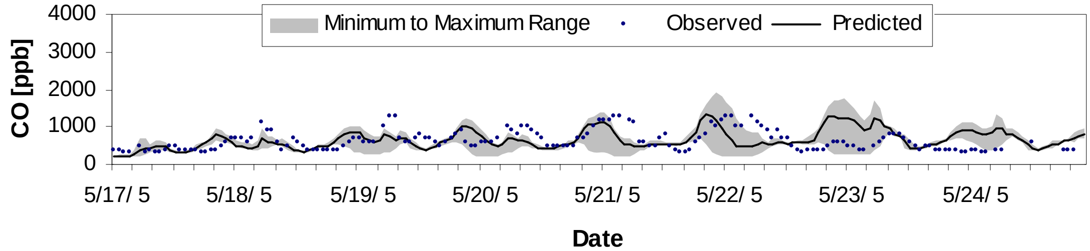




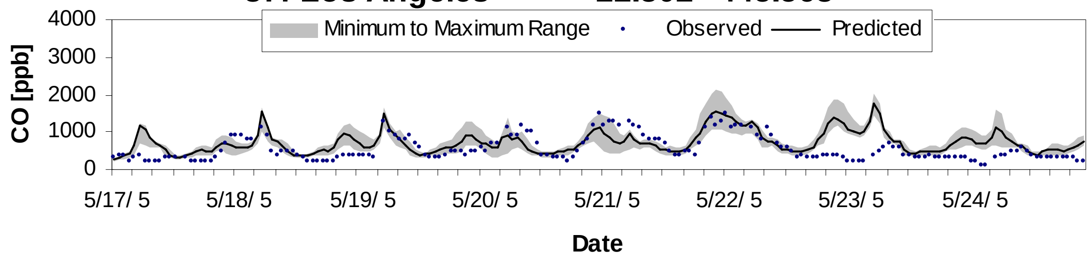




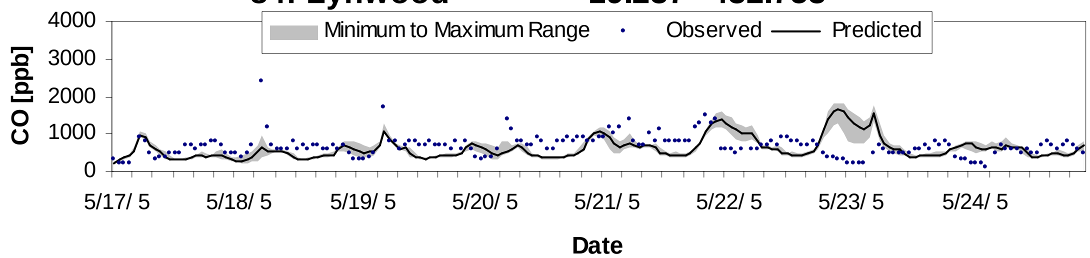
69: Burbank -27.848 461.308



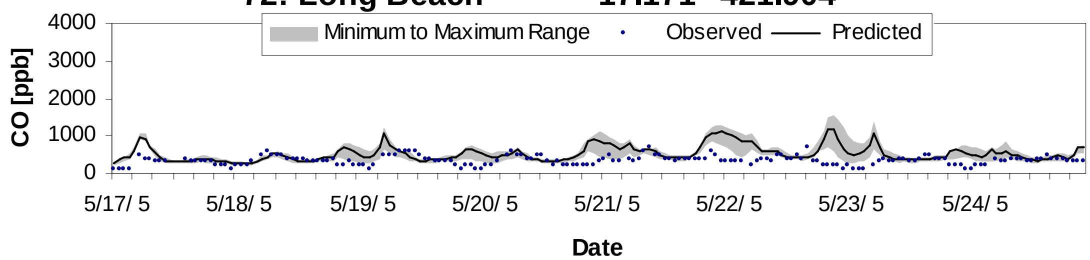
87: Los Angeles -22.302 445.563

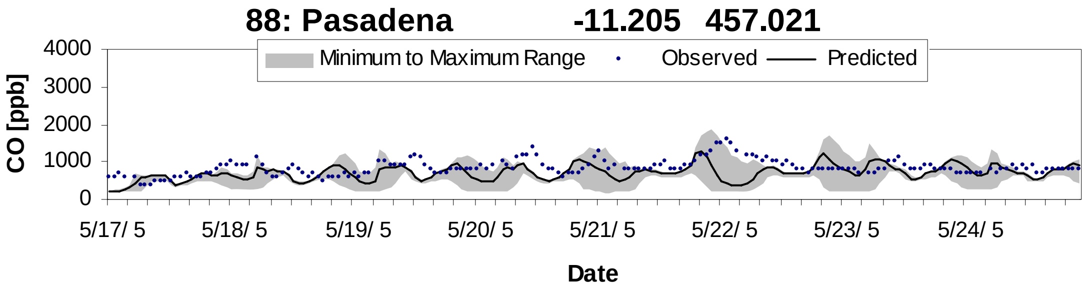


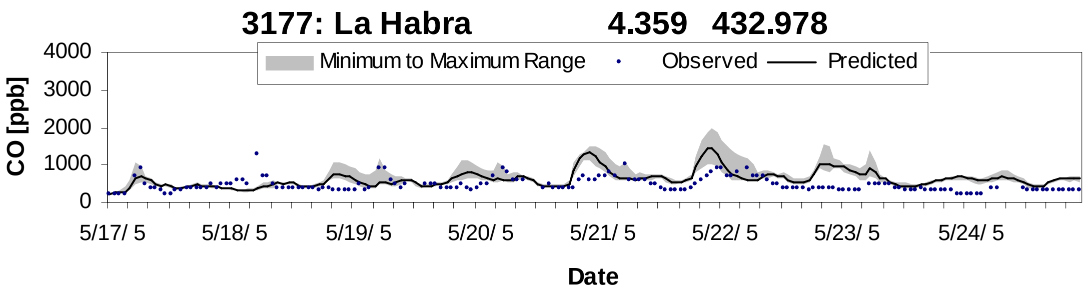
84: Lynwood -19.237 432.753

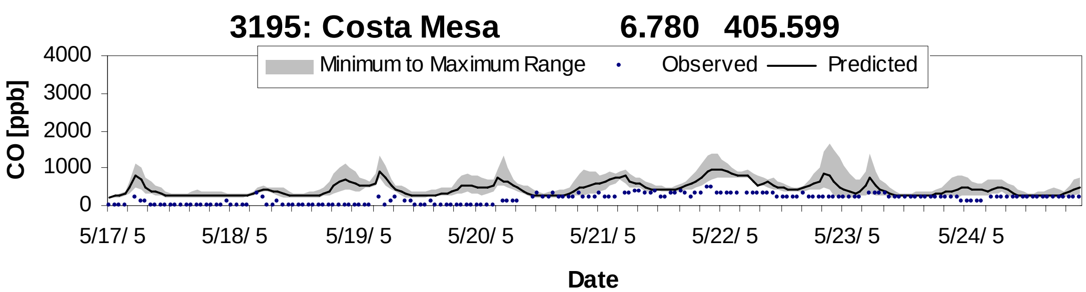


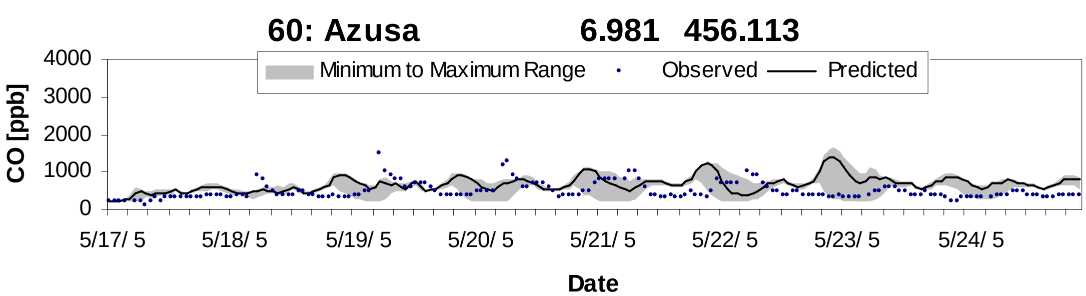
72: Long Beach -17.171 421.904




88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date


3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date


3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date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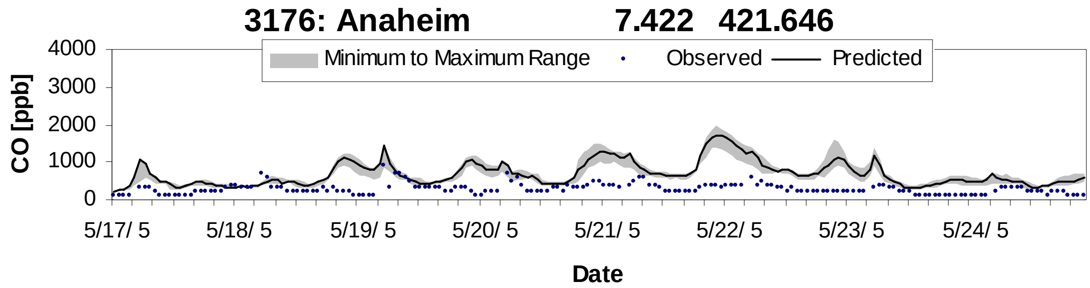
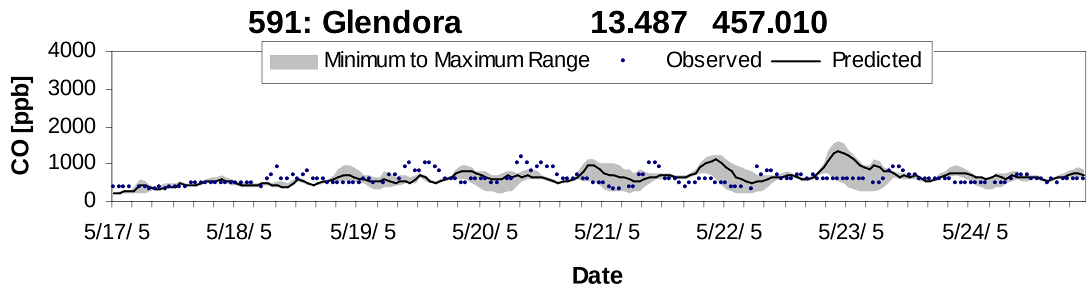
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date


3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date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Minimum to Maximum Range
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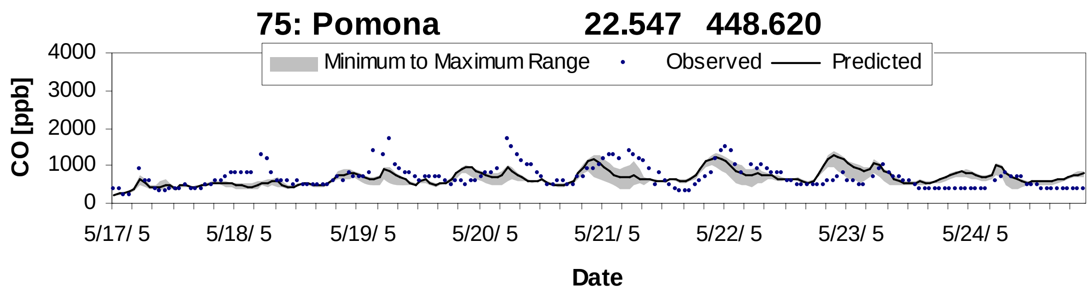
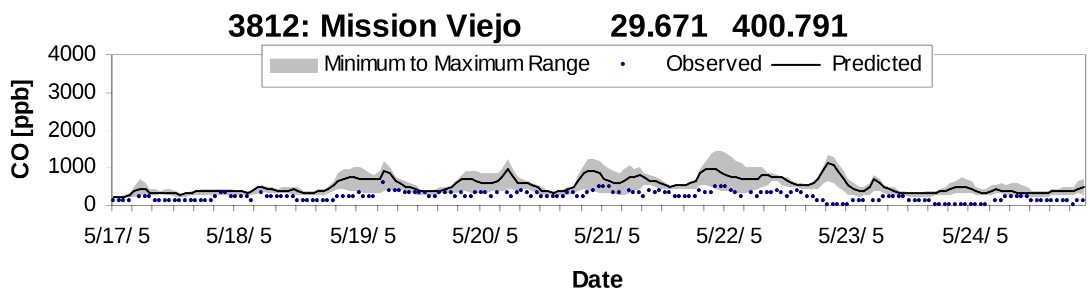
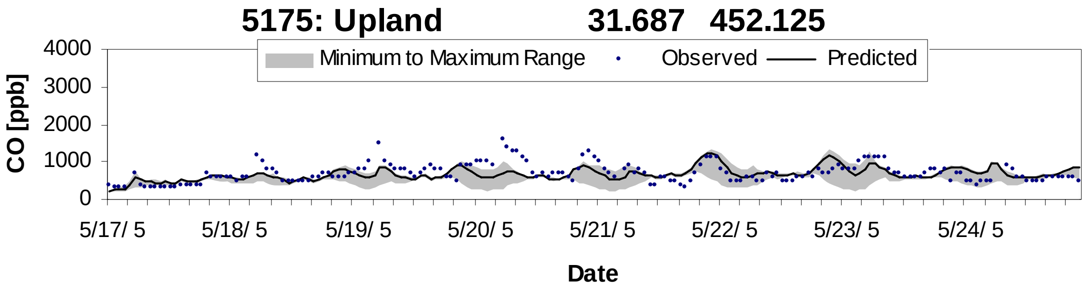
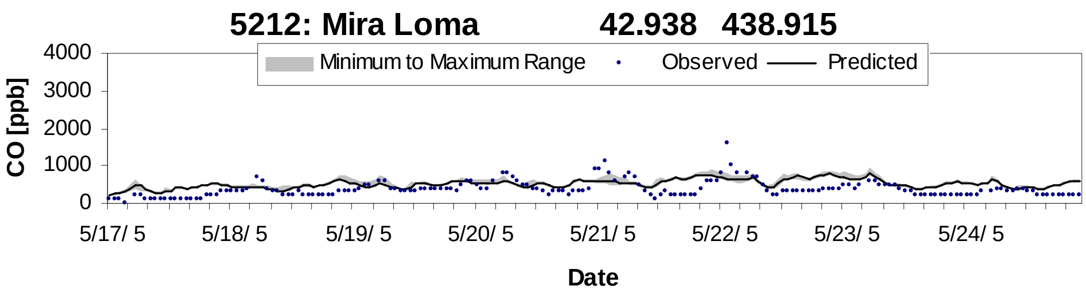
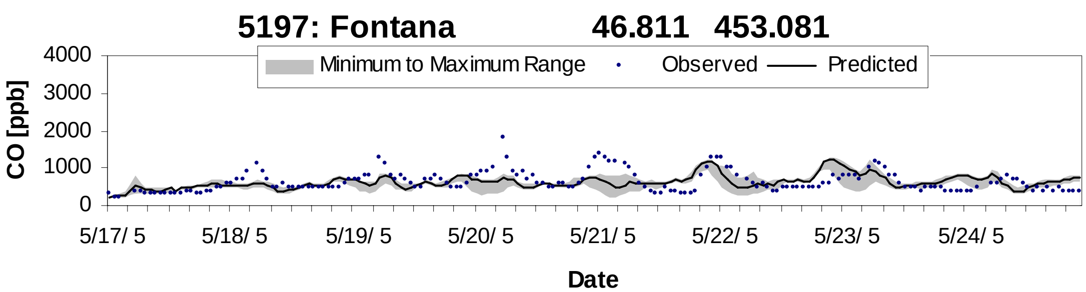
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

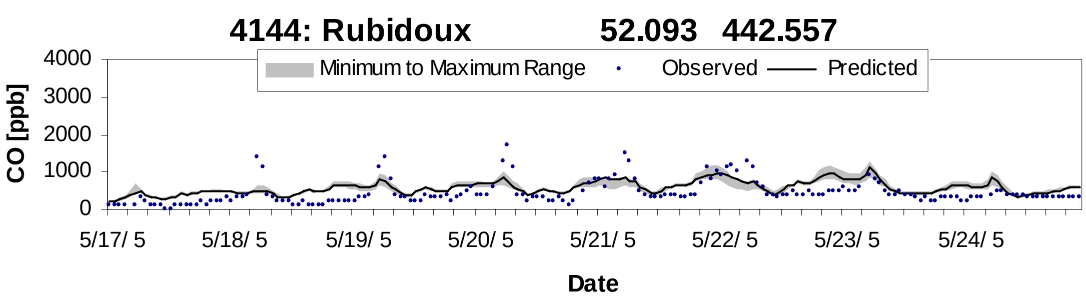

75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

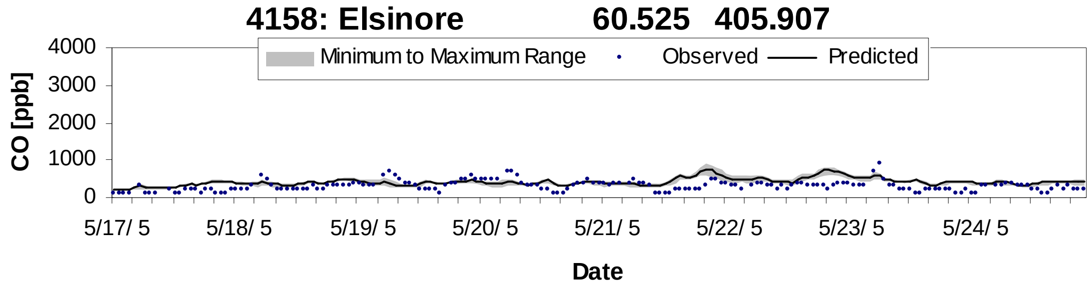

3812: Mission Viejo 29.671 400.791
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

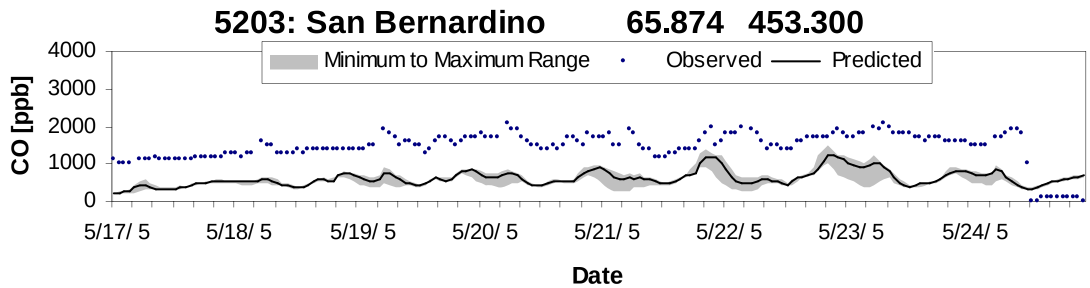

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

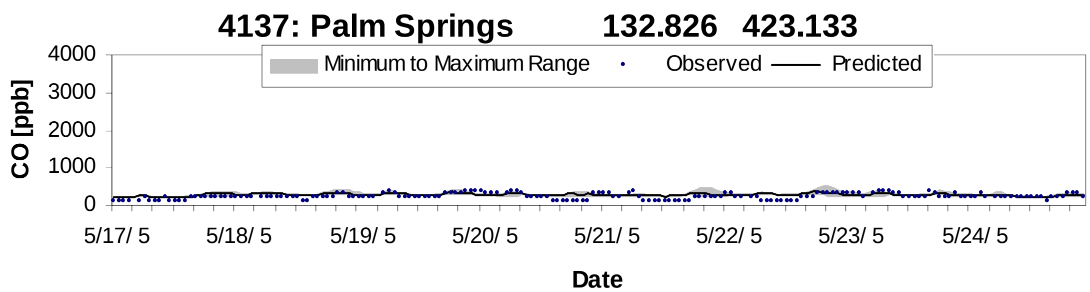

5212: Mira Loma 42.938 438.915
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date


5197: Fontana 46.811 453.081
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

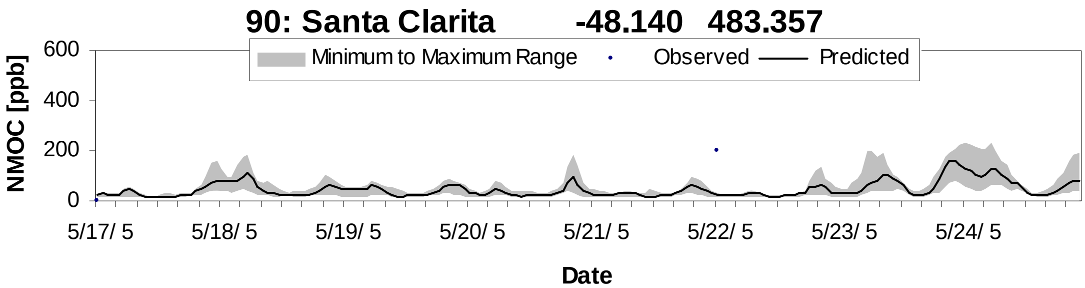

4144: Rubidoux 52.093 442.557
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

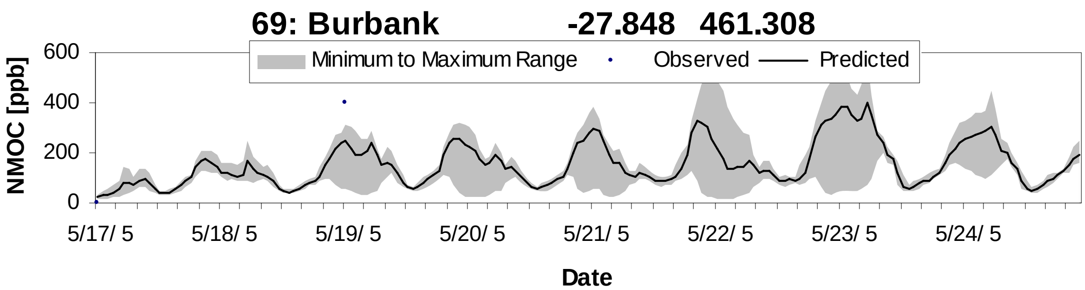

4158: Elsinore 60.525 405.907
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

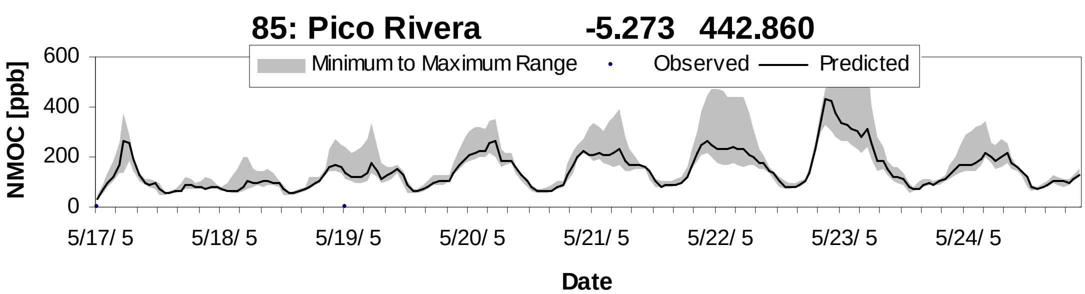

5203: San Bernardino 65.874 453.300
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

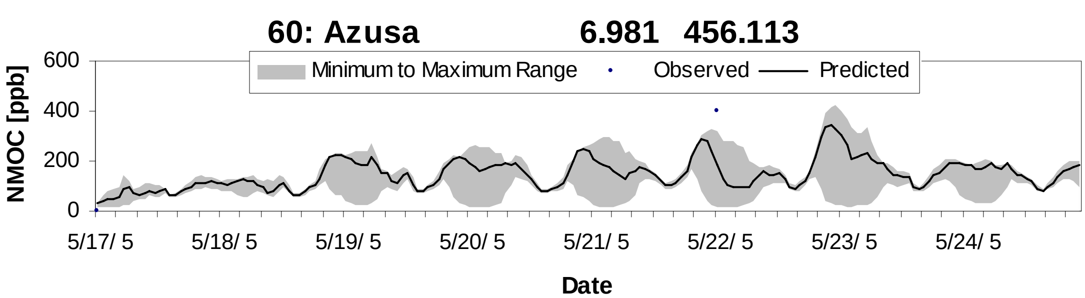

4137: Palm Springs 132.826 423.133
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
4000
3000
2000
1000
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

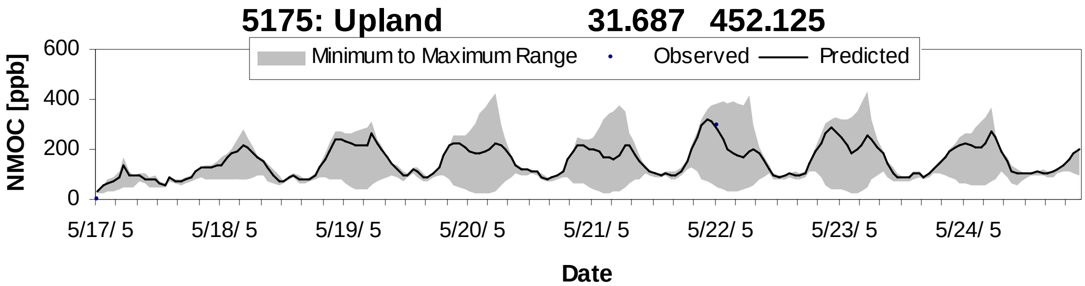
May 17-24, 2005 CALMET Winds mA01

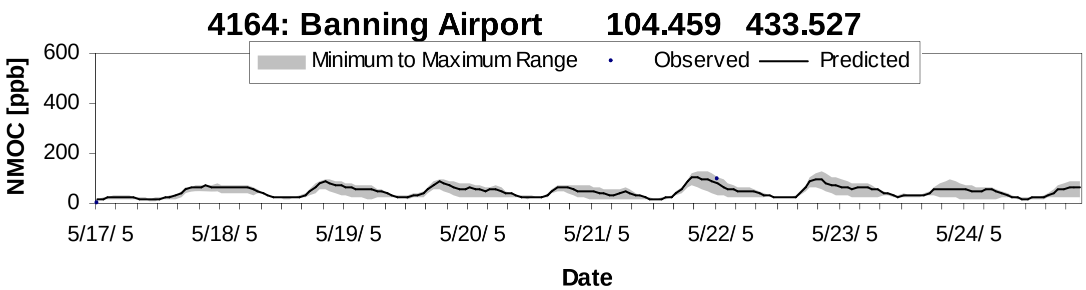




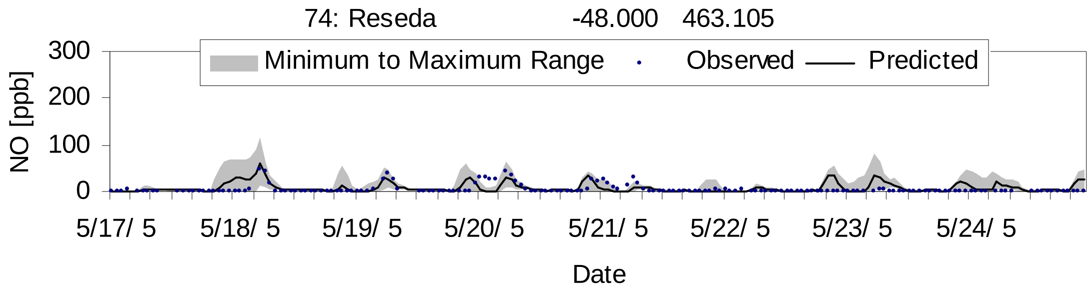


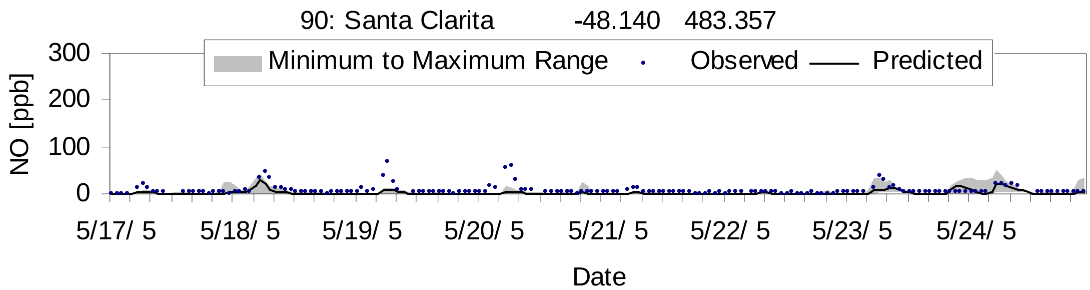


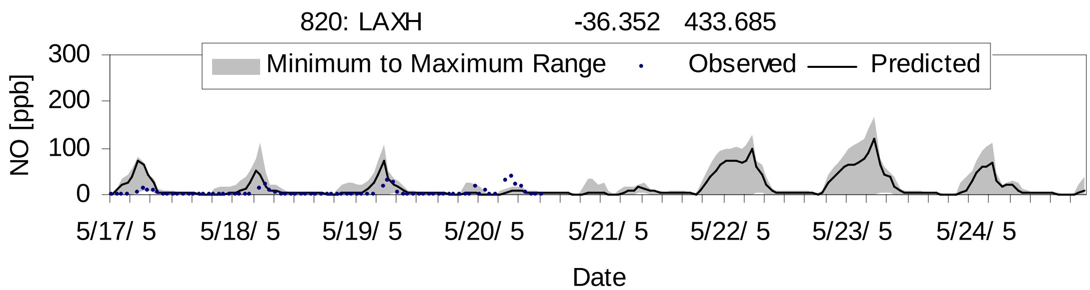

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
NMOC [ppb]
600
400
200
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

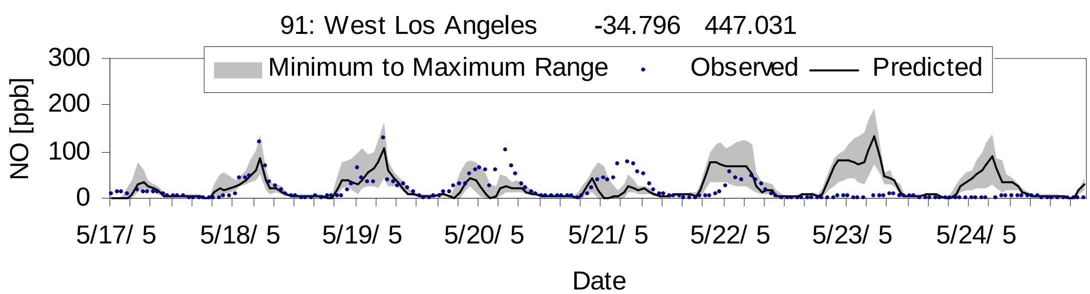

4164: Banning Airport 104.459 433.527
Minimum to Maximum Range
Observed
Predicted
NMOC [ppb]
600
400
200
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

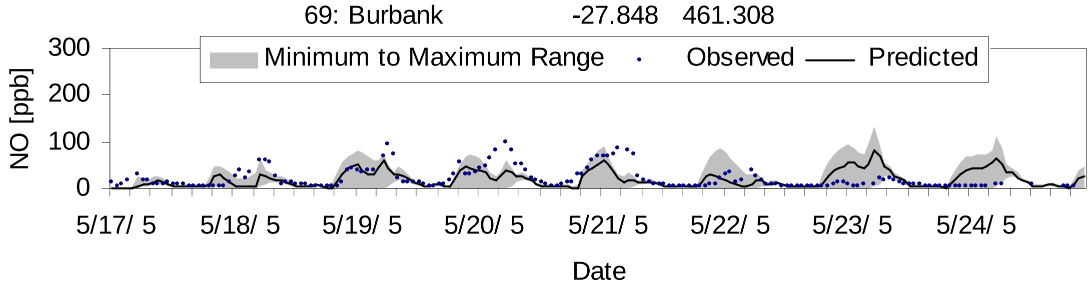
May 17-24, 2005 CALMET Winds mA01

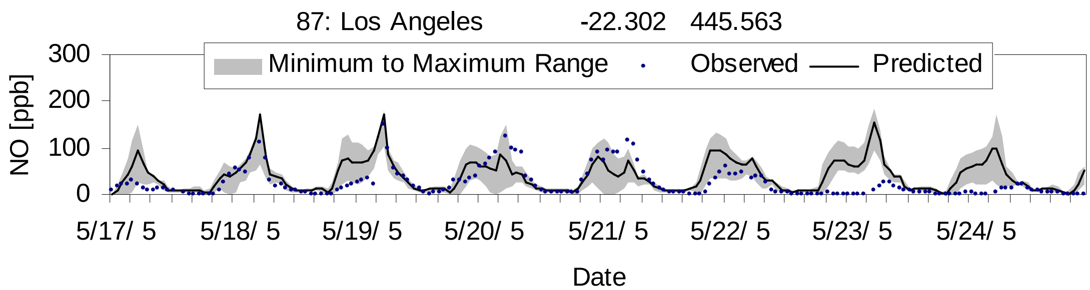


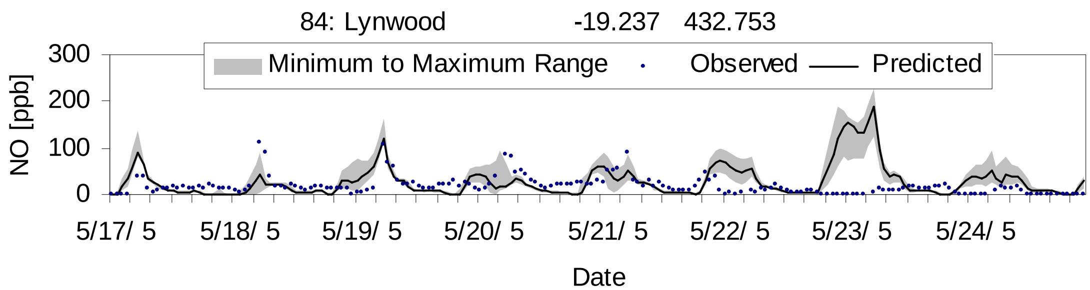


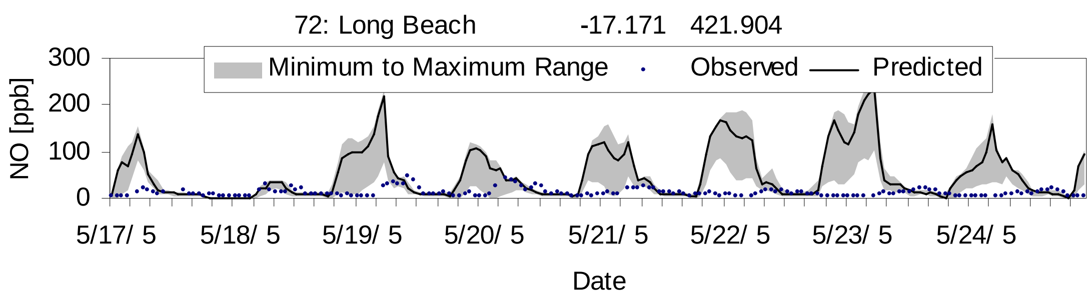


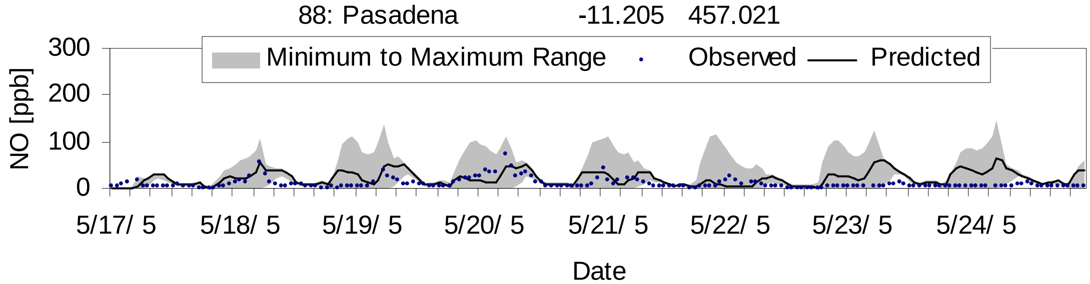


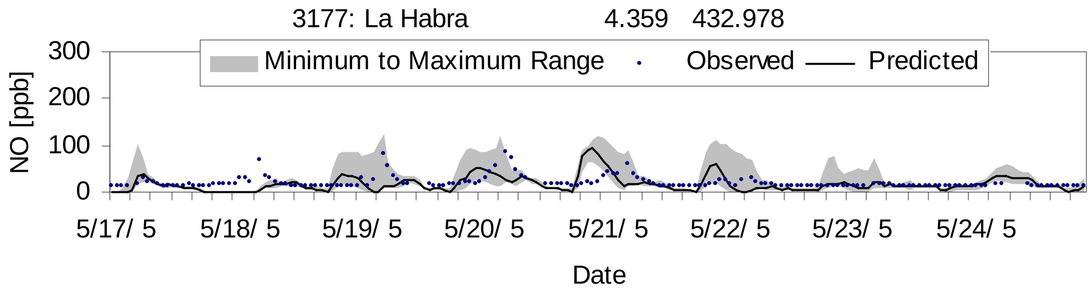

69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

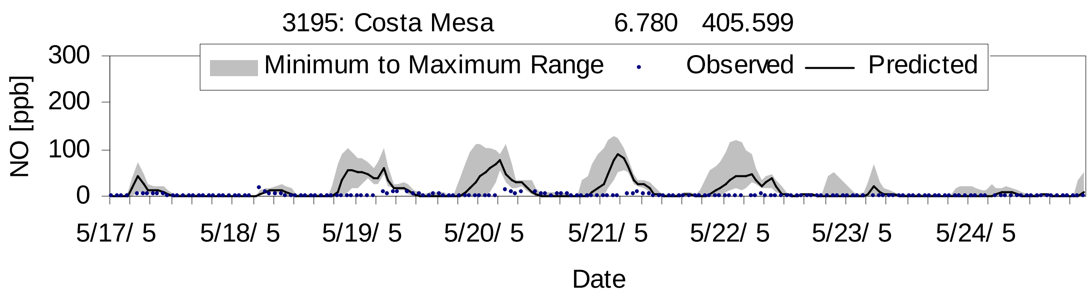

87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

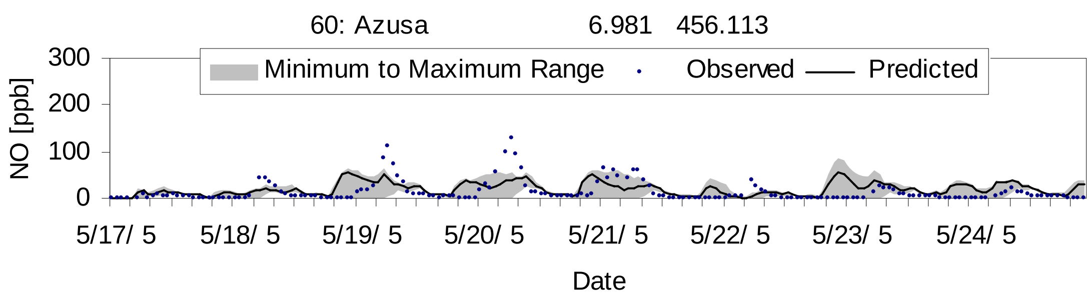

84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

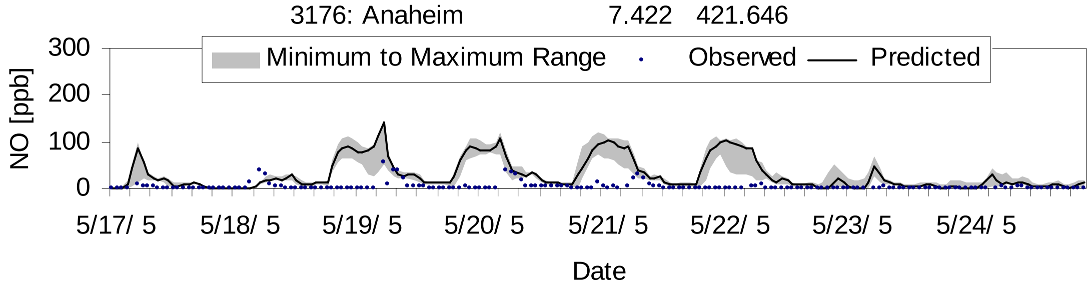

72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

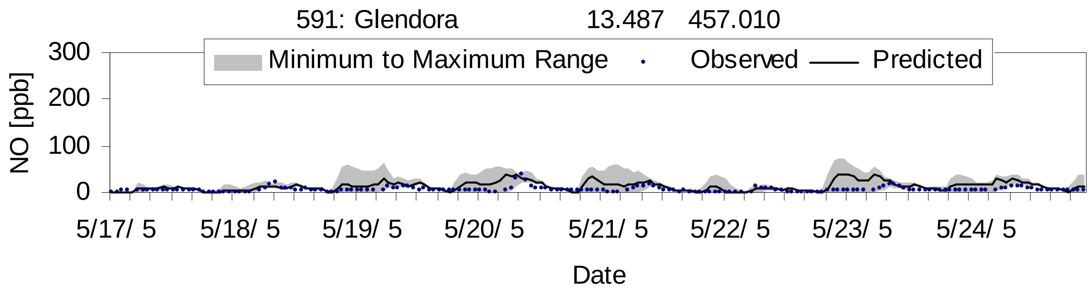

88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

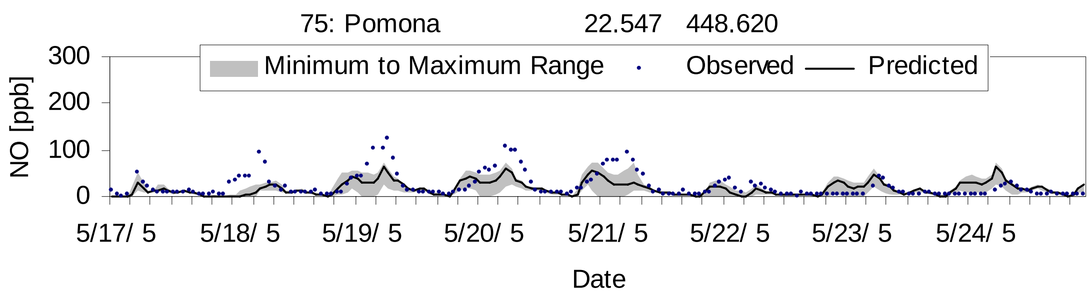

3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

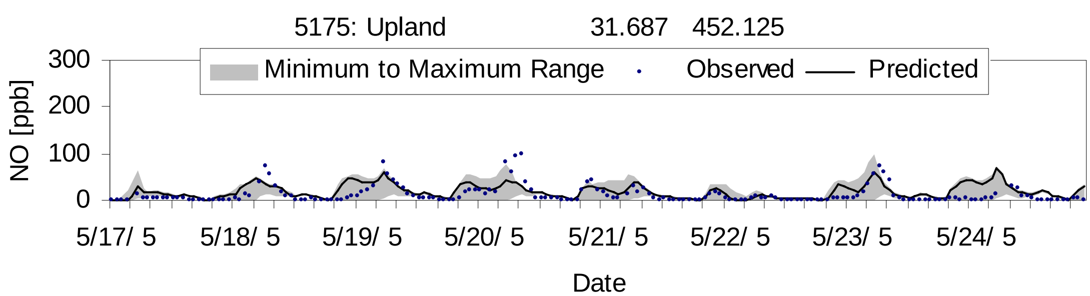

3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

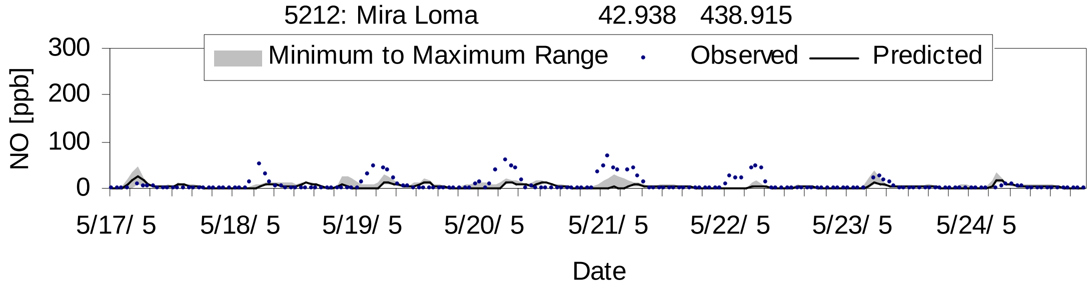

60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

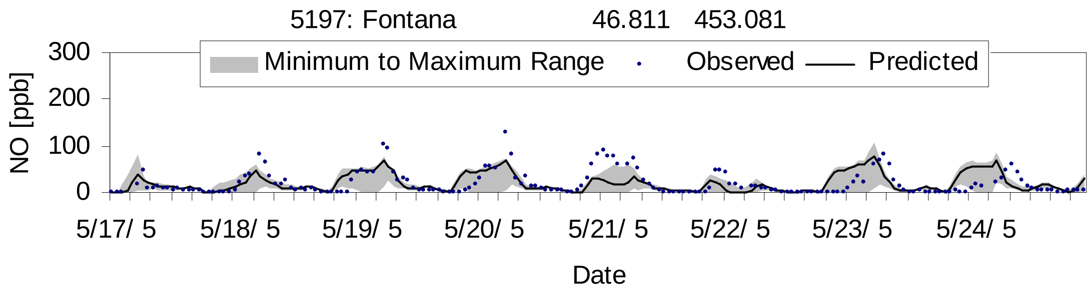

3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

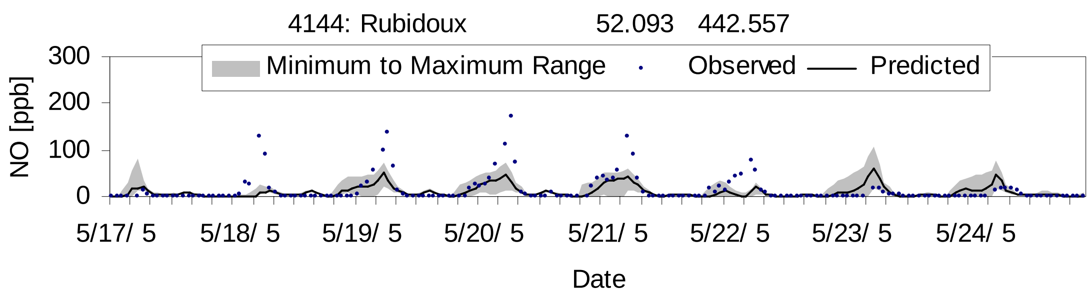

591: Glendora 13.487 457.010
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

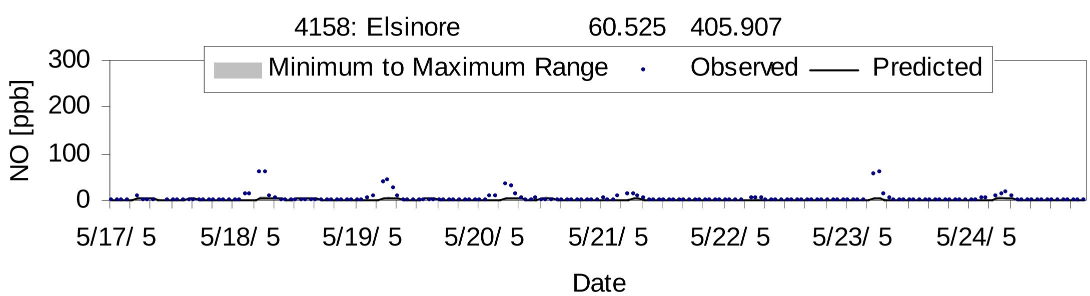

75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

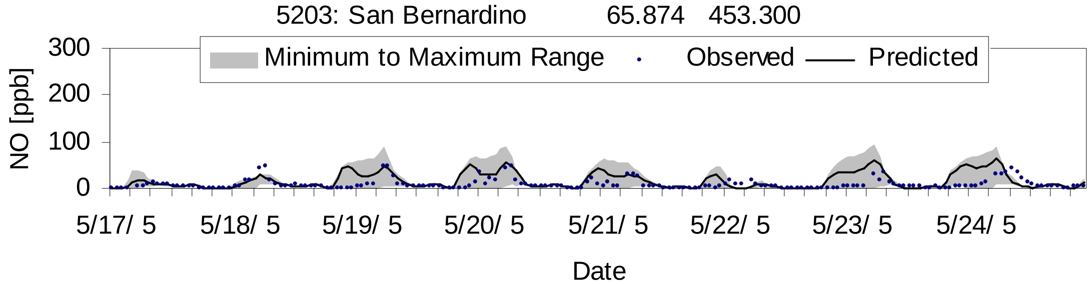

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date


5212: Mira Loma
42.938 438.915
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

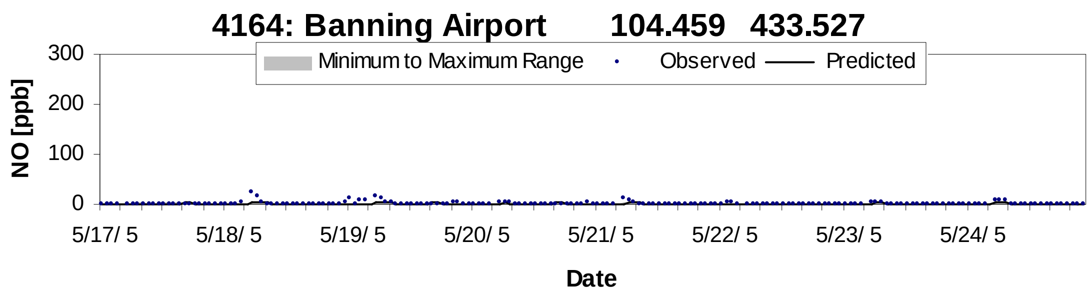

5197: Fontana
46.811 453.081
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date


4144: Rubidoux
52.093 442.557
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

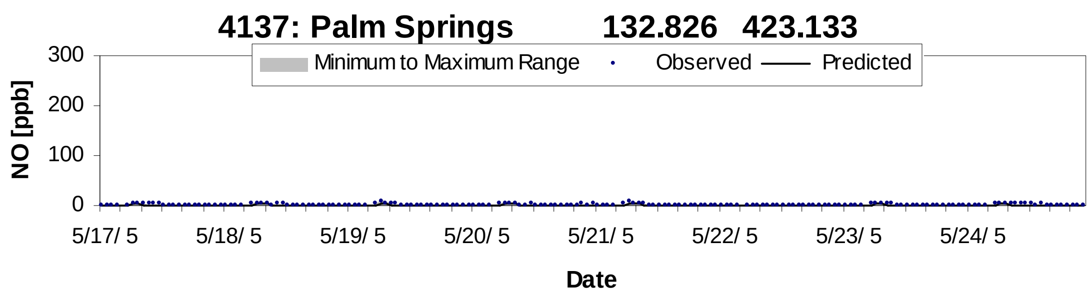

4158: Elsinore
60.525 405.907
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date



5203: San Bernardino 65.874 453.300
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date



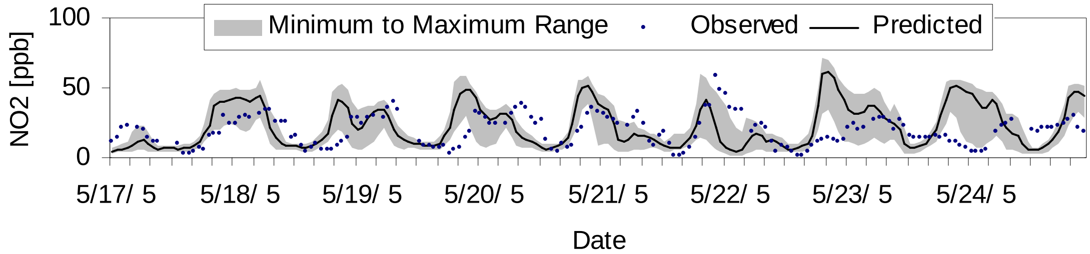
4164: Banning Airport 104.459 433.527
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date



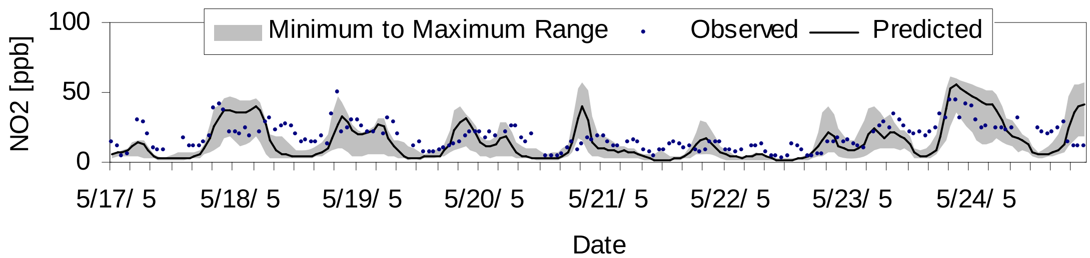
4137: Palm Springs 132.826 423.133
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
300
200
100
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

May 17-24, 2005 CALMET Winds mA01

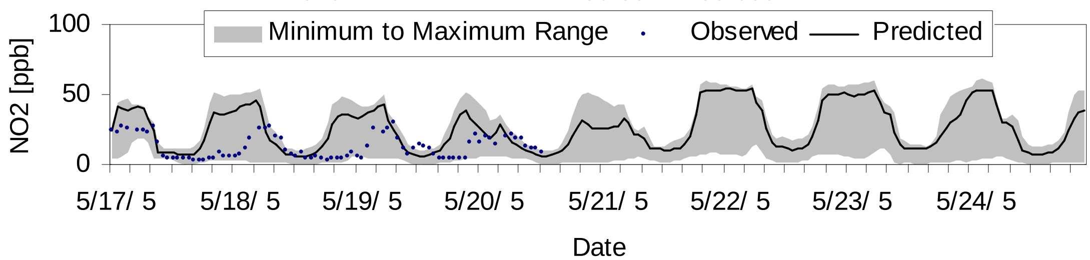
74: Reseda -48.000 463.105



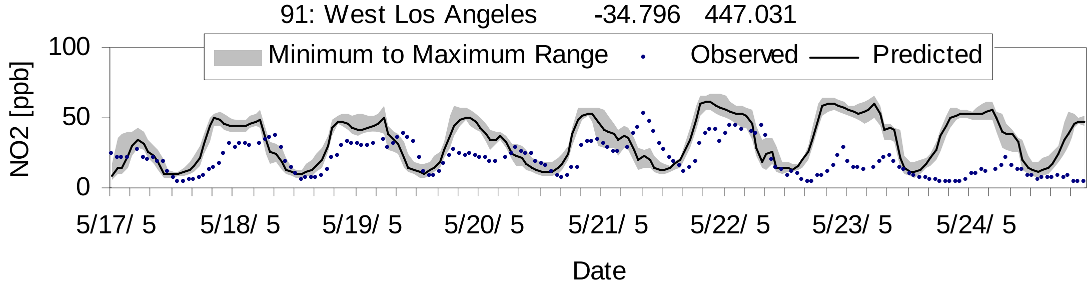
90: Santa Clarita -48.140 483.357

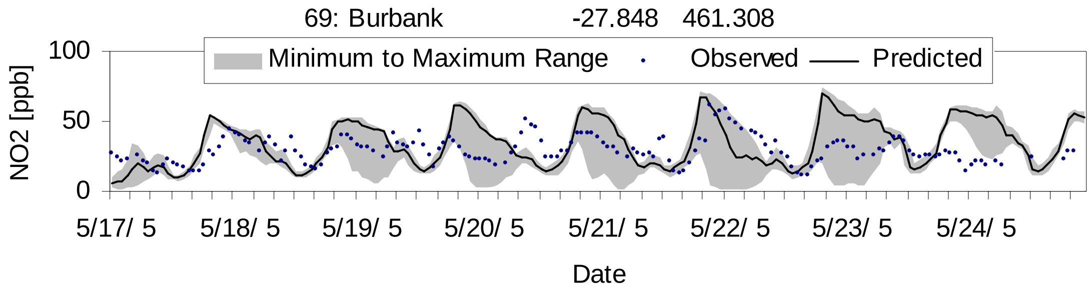


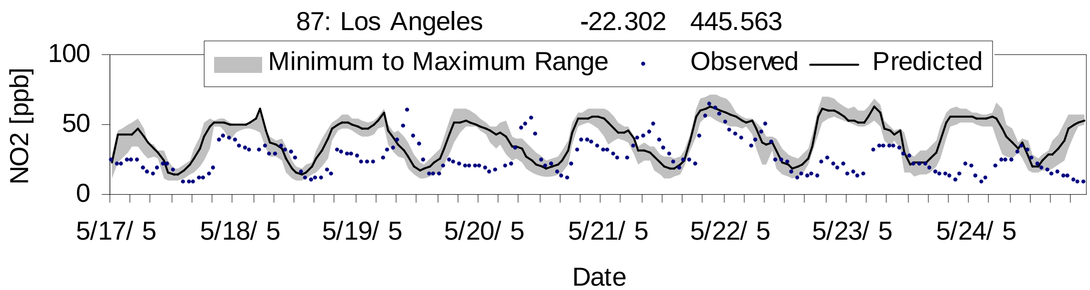
820: LAXH -36.352 433.685

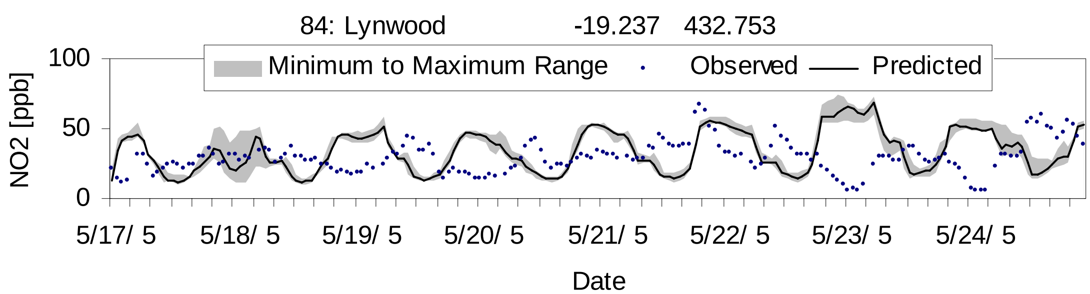


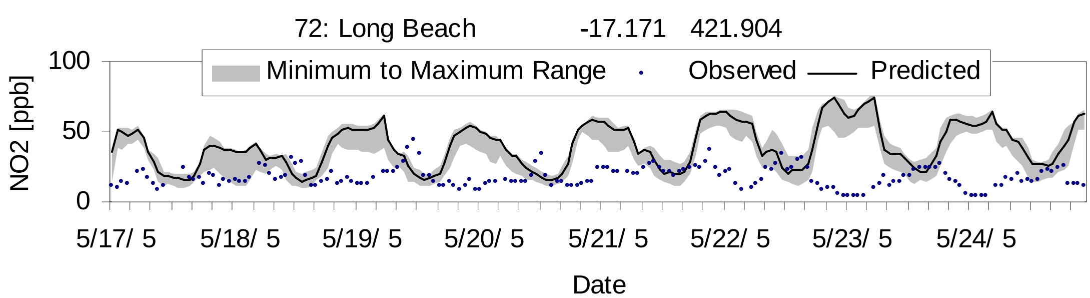
91: West Los Angeles -34.796 447.031

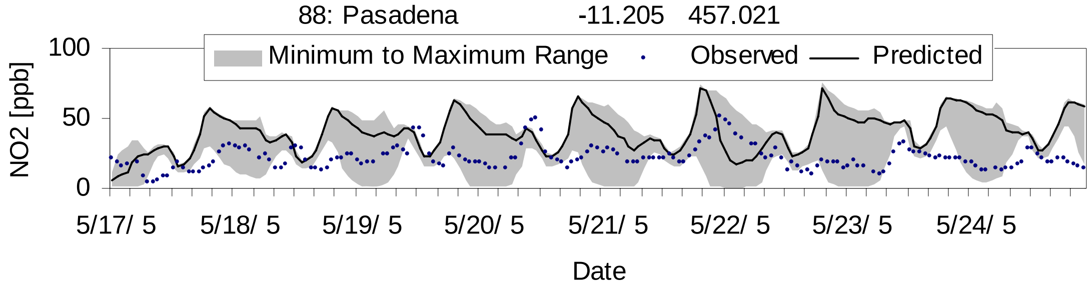


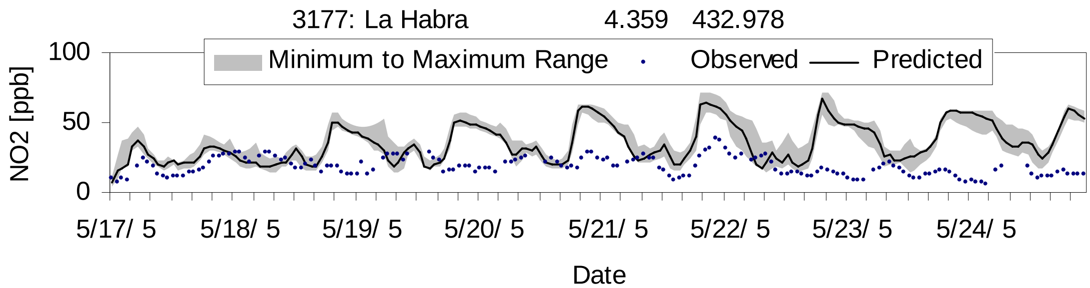

69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

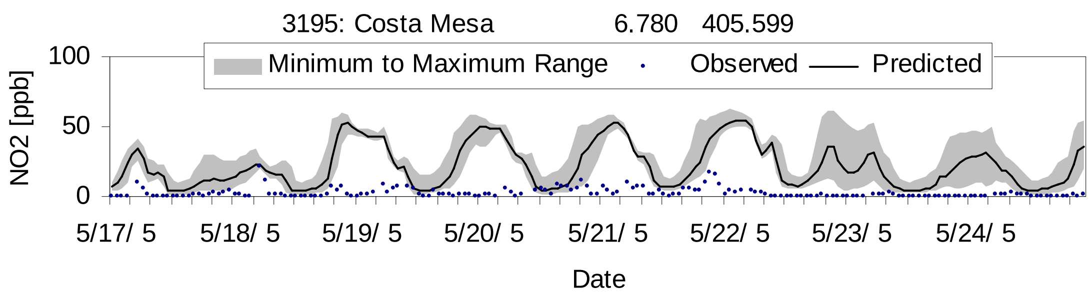

87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

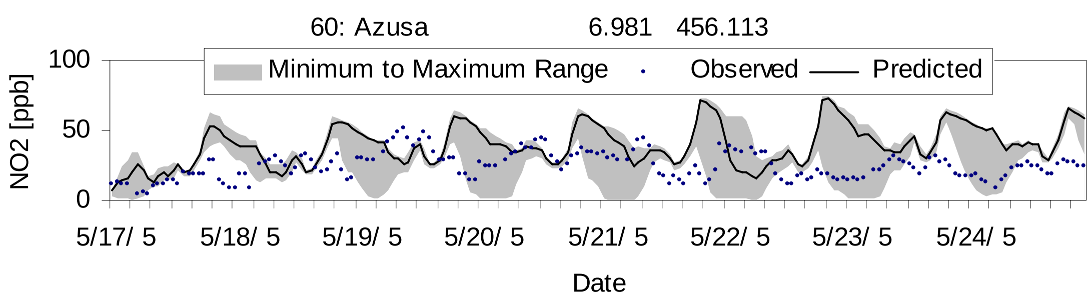

84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

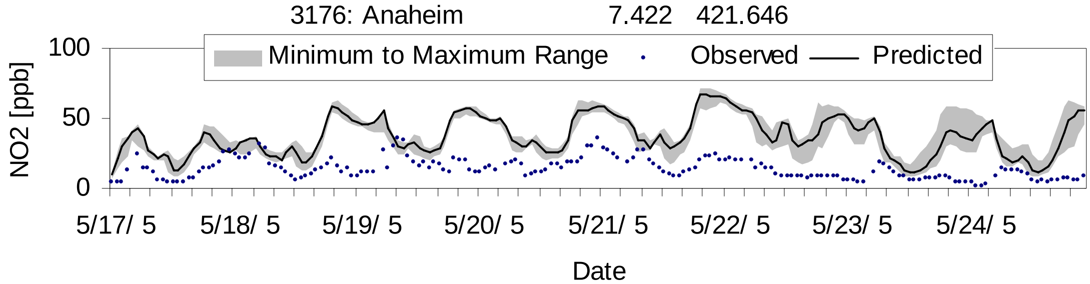

72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

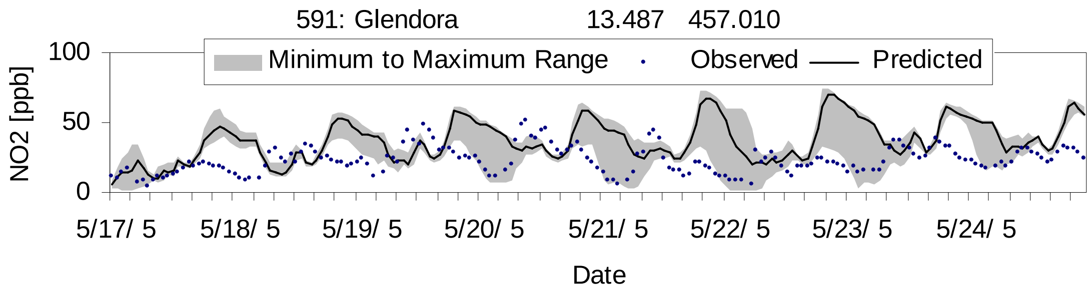

88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

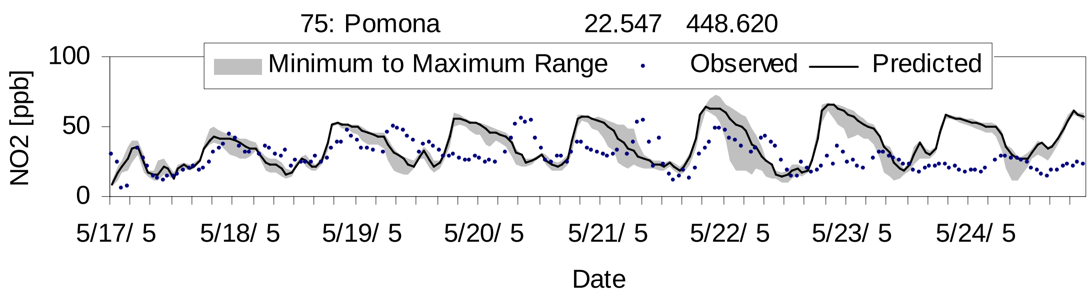

3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

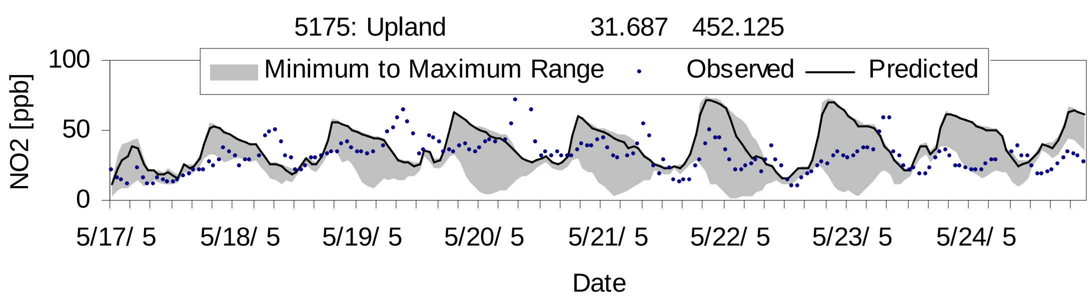

3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

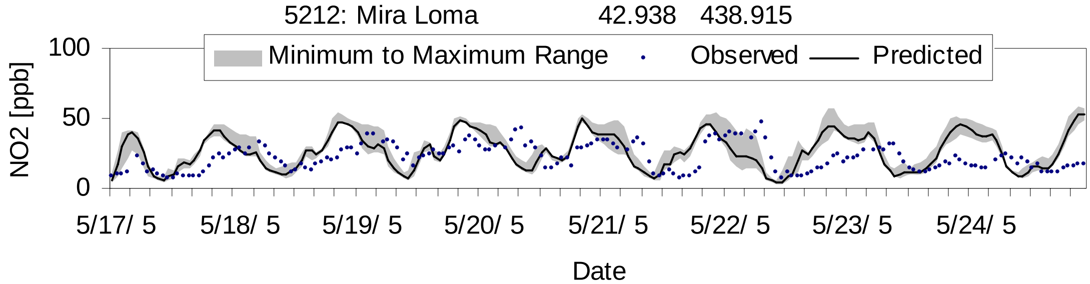

60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

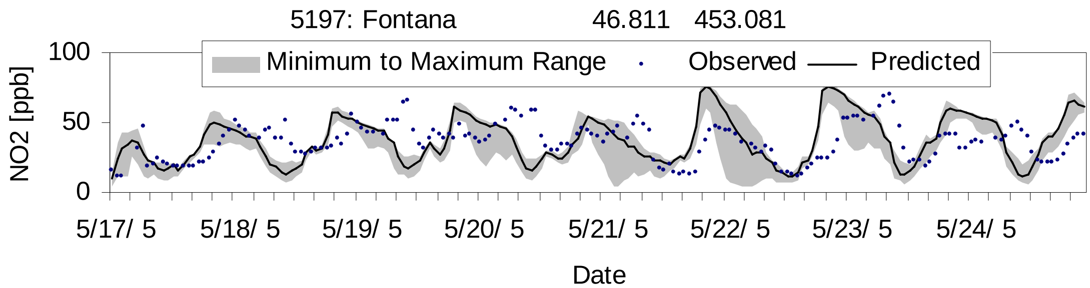

3176: Anaheim 7.422 421.646
100
50
0
NO2 [ppb]
Minimum to Maximum Range
Observed
Predicted
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

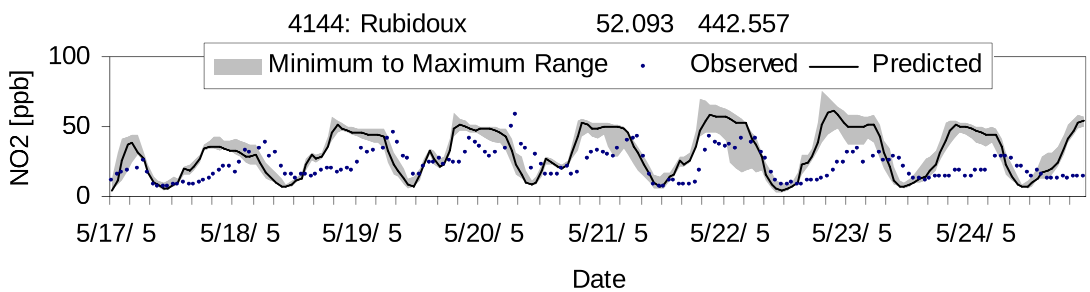

591: Glendora 13.487 457.010
100
50
0
NO2 [ppb]
Minimum to Maximum Range
Observed
Predicted
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

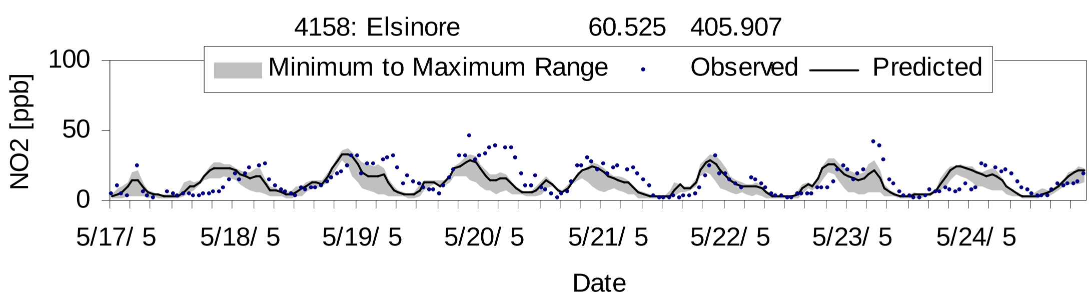

75: Pomona 22.547 448.620
100
50
0
NO2 [ppb]
Minimum to Maximum Range
Observed
Predicted
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

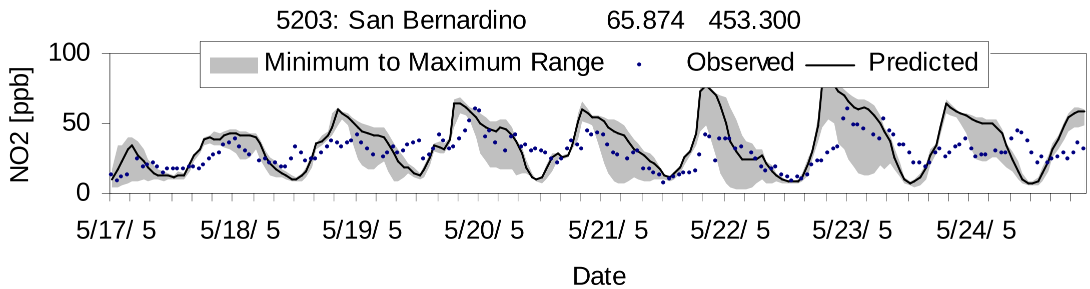

5175: Upland 31.687 452.125
100
50
0
NO2 [ppb]
Minimum to Maximum Range
Observed
Predicted
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

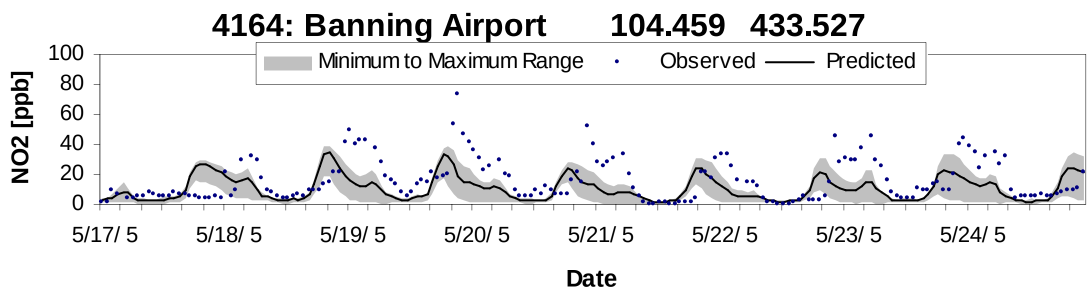

5212: Mira Loma 42.938 438.915
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

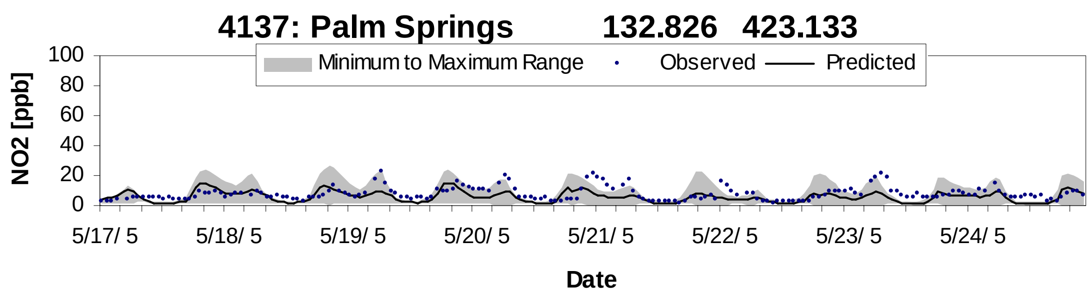

5197: Fontana 46.811 453.081
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date


4144: Rubidoux 52.093 442.557
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

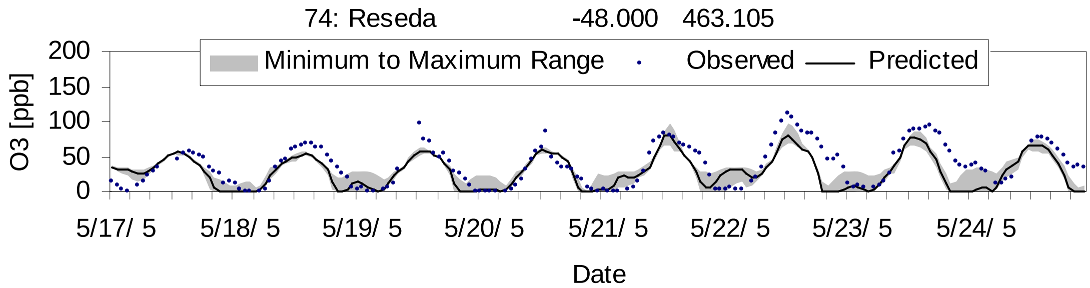

4158: Elsinore 60.525 405.907
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

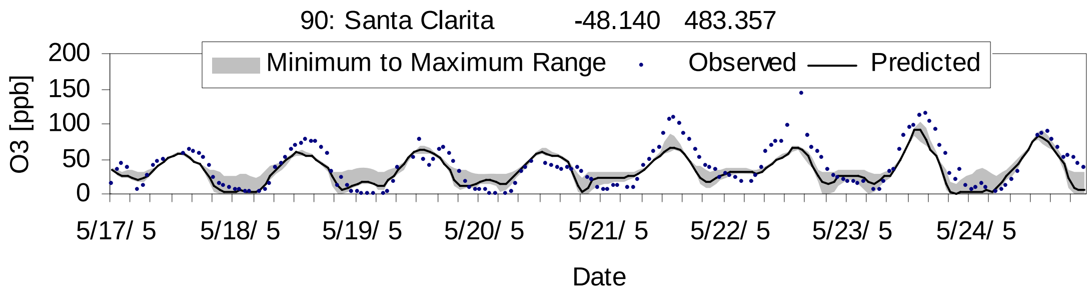

5203: San Bernardino 65.874 453.300
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

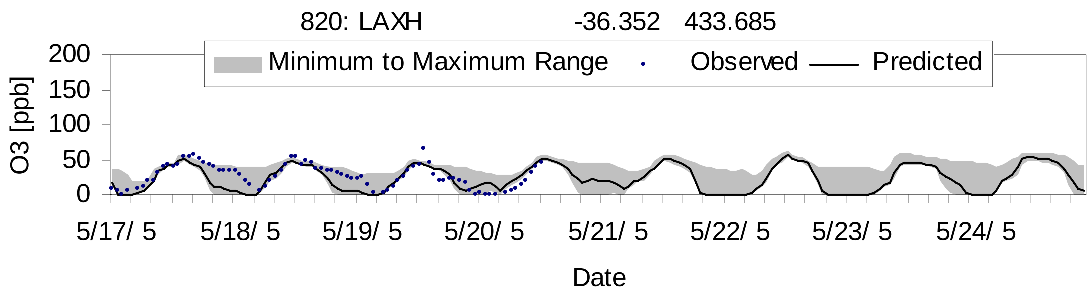

4164: Banning Airport 104.459 433.527
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
80
60
40
20
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

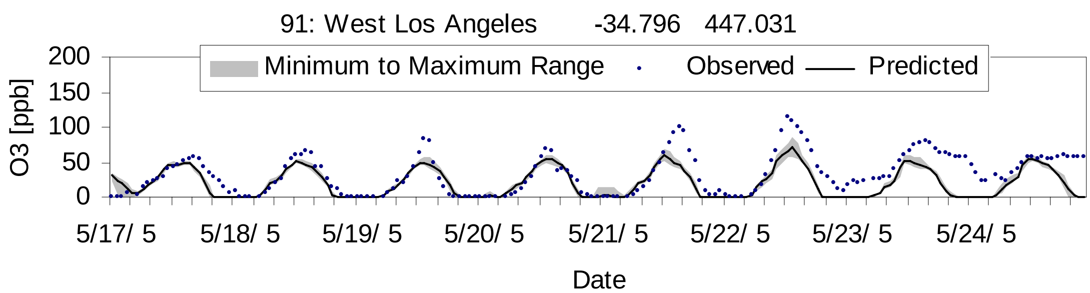

4137: Palm Springs 132.826 423.133
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
80
60
40
20
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

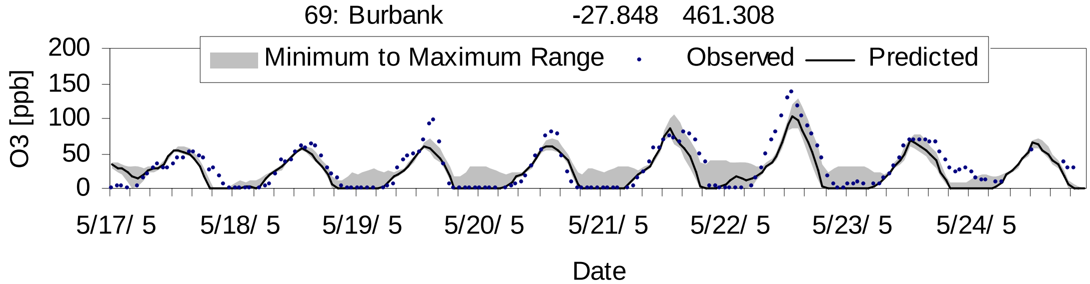
May 17-24, 2005 CALMET Winds mA01



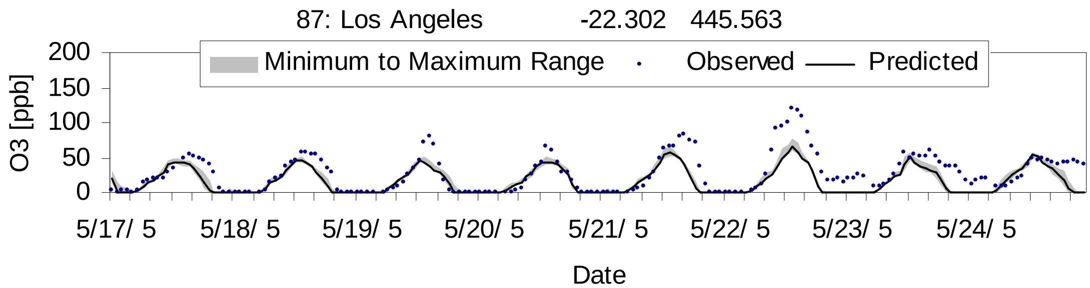




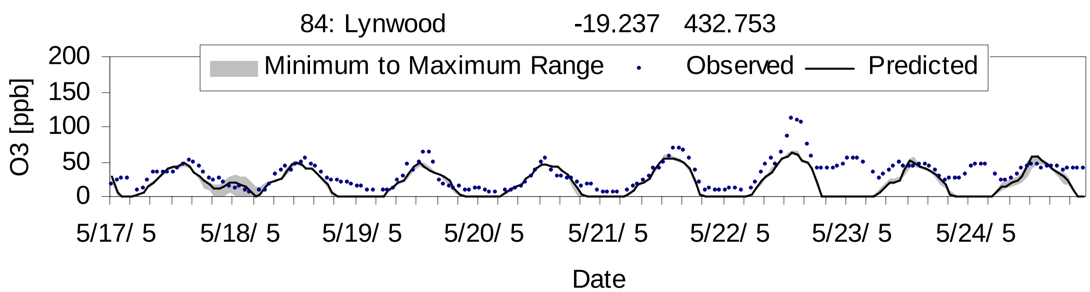




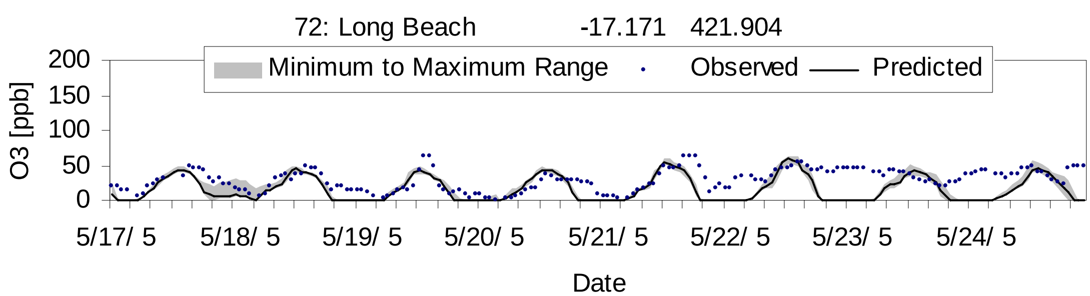
69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date



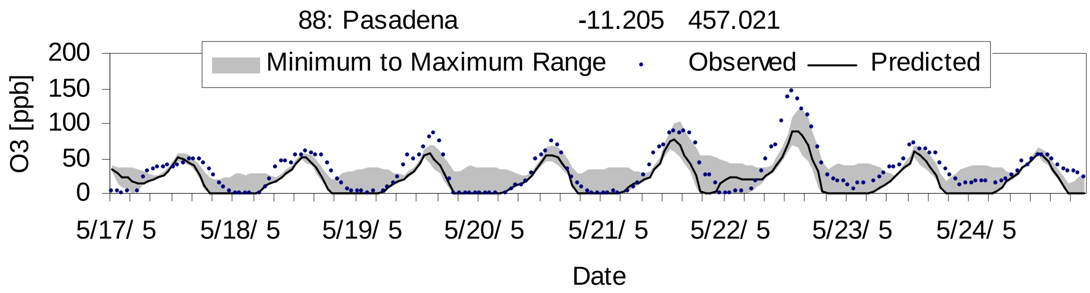
87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

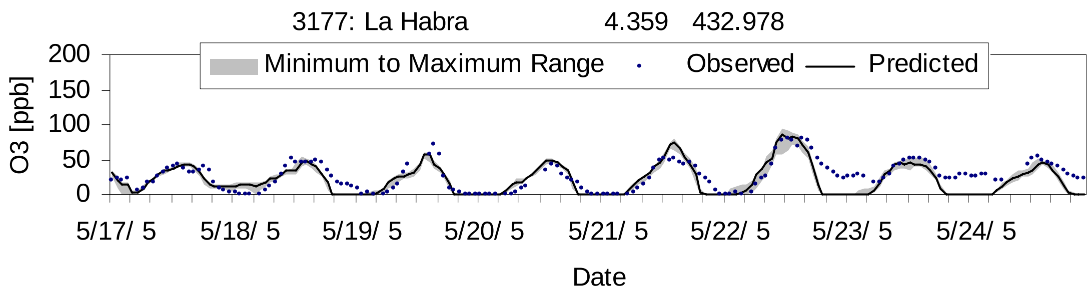


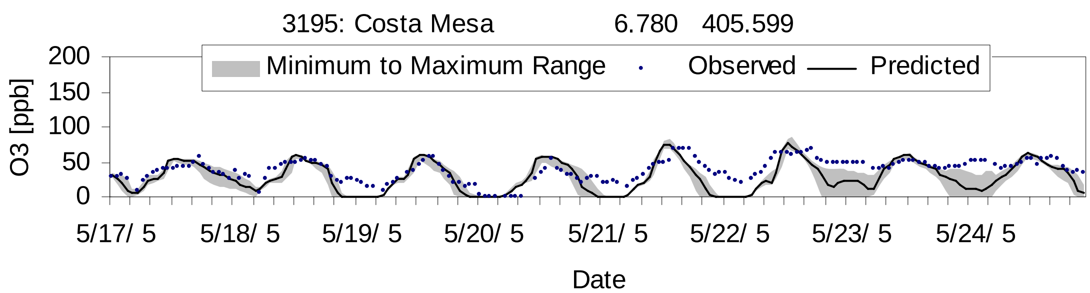
84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

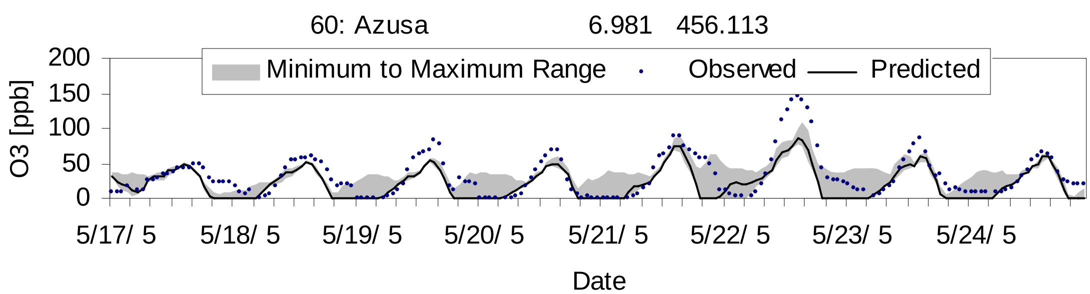


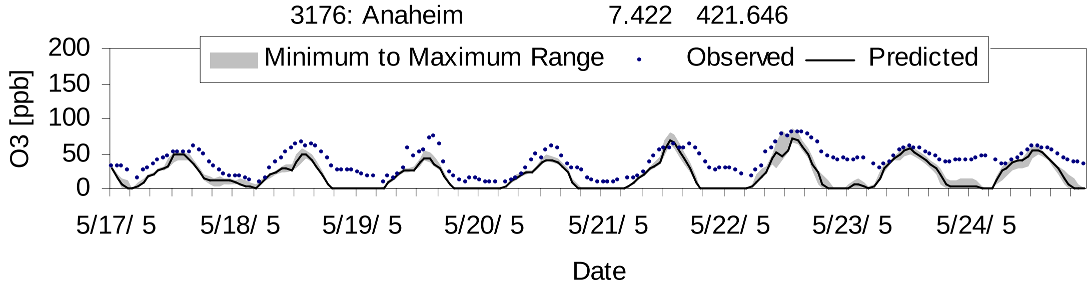
72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

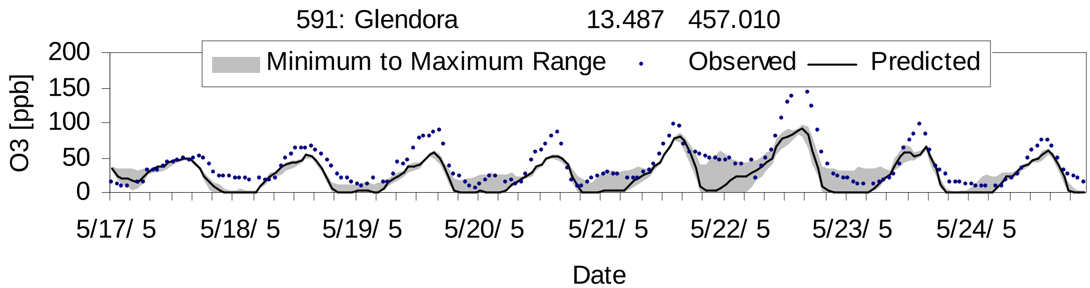

88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

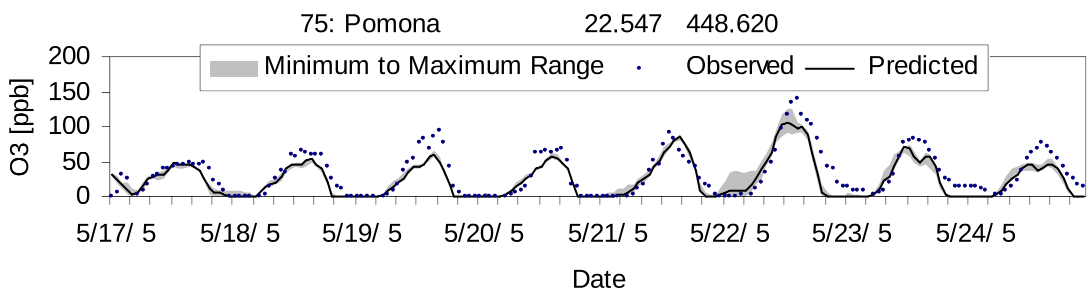

3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

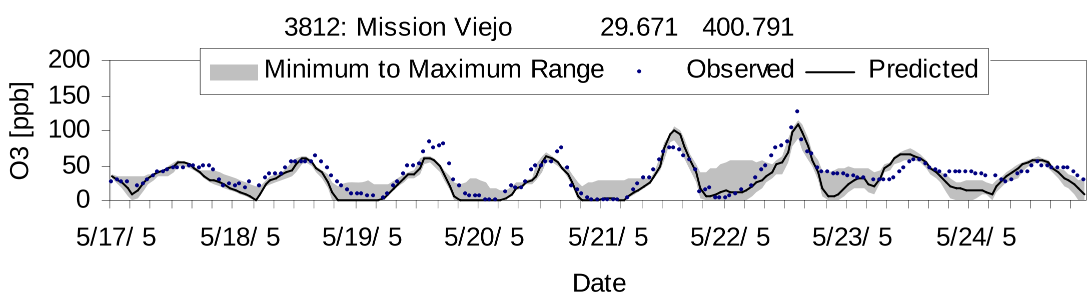

3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

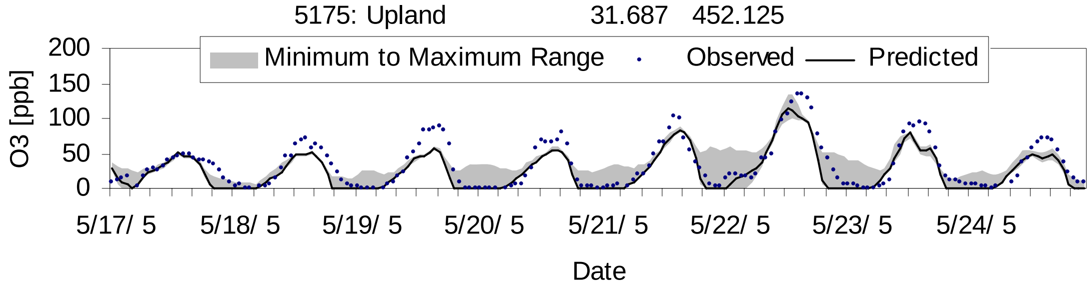

60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

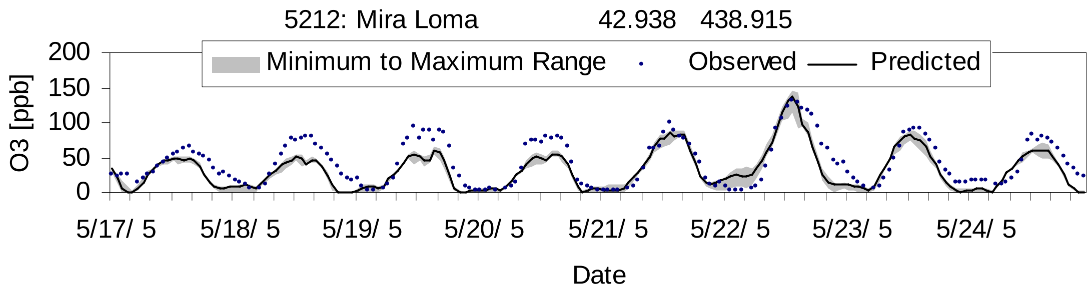

3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

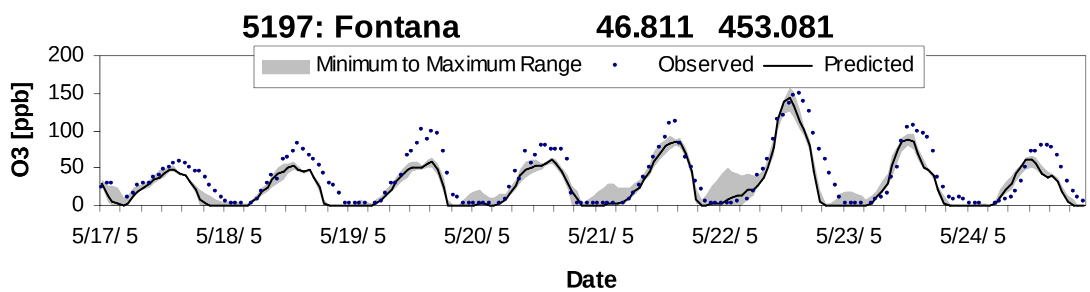

591: Glendora 13.487 457.010
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

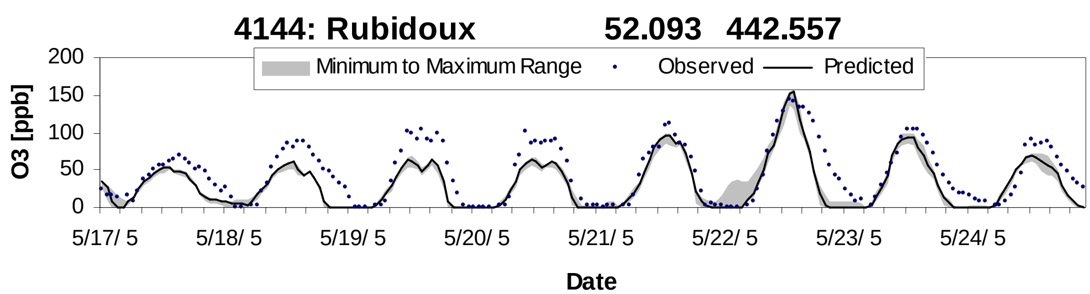

75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

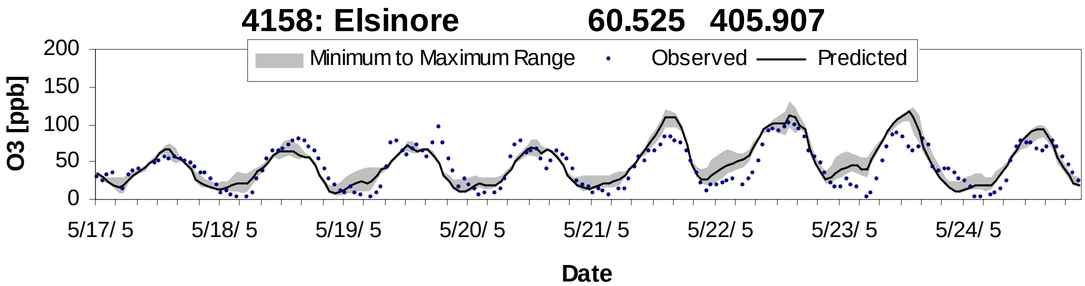

3812: Mission Viejo 29.671 400.791
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

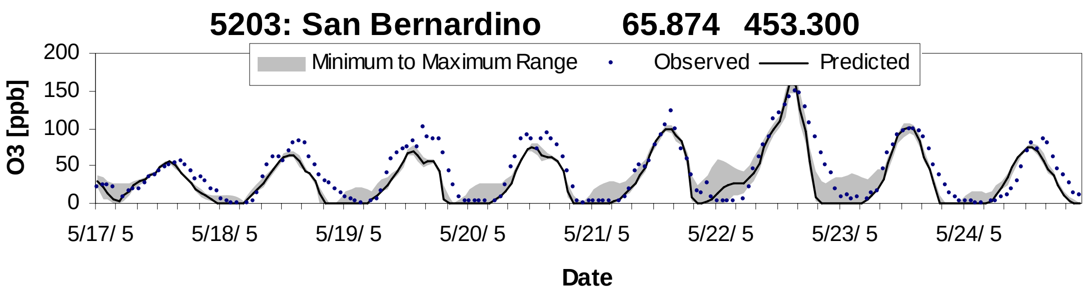

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

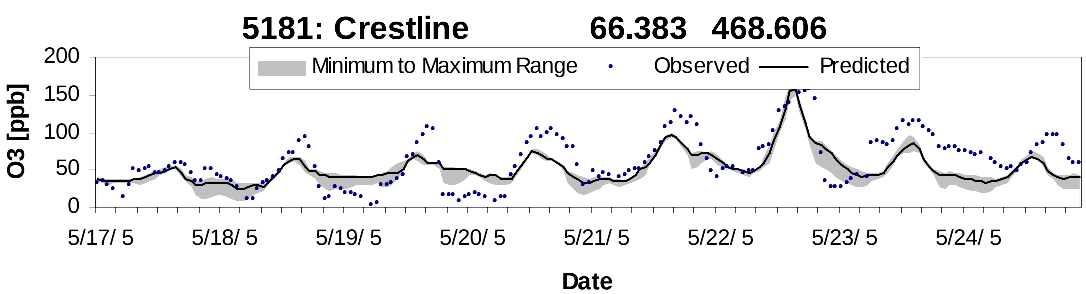

5212: Mira Loma 42.938 438.915
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

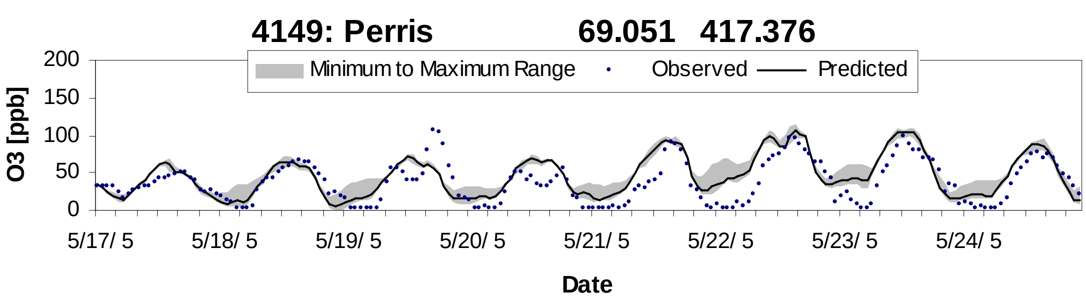

5197: Fontana 46.811 453.081
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

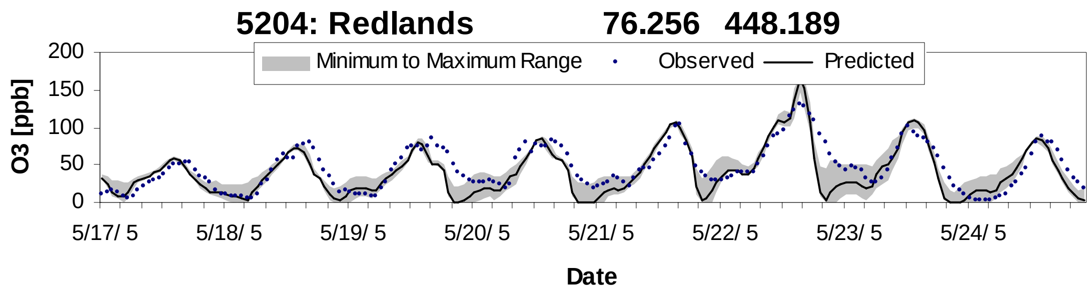

4144: Rubidoux 52.093 442.557
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

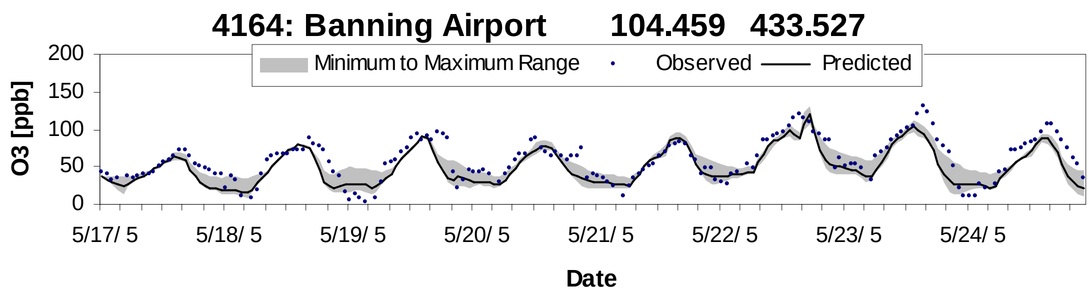

4158: Elsinore 60.525 405.907
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

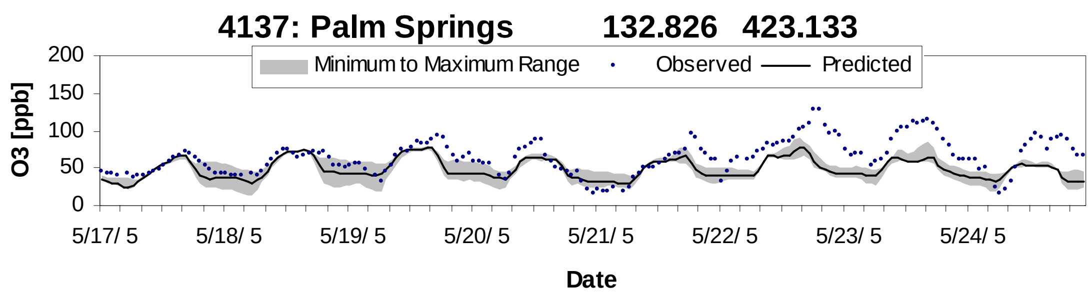

5203: San Bernardino 65.874 453.300
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

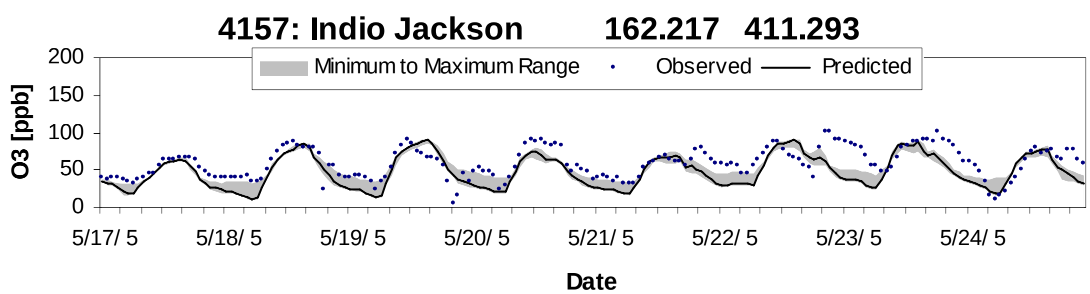

5181: Crestline 66.383 468.606
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date


4149: Perris 69.051 417.376
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

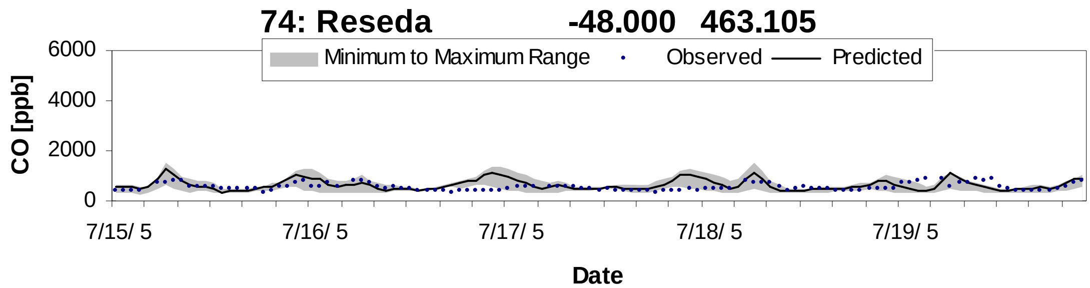

5204: Redlands 76.256 448.189
O3 [ppb]
Minimum to Maximum Range
Observed
Predicted
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

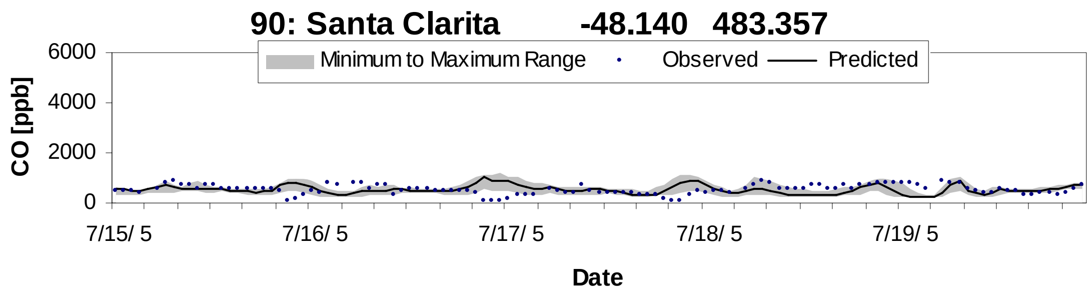

4164: Banning Airport 104.459 433.527
O3 [ppb]
Minimum to Maximum Range
Observed
Predicted
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

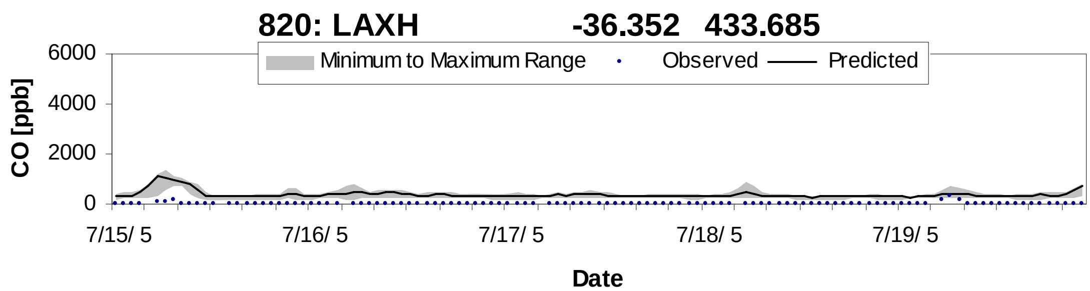

4137: Palm Springs 132.826 423.133
O3 [ppb]
Minimum to Maximum Range
Observed
Predicted
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

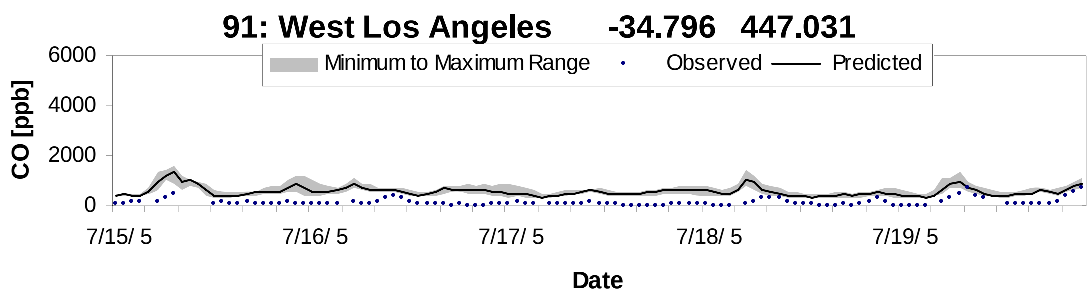

4157: Indio Jackson 162.217 411.293
O3 [ppb]
Minimum to Maximum Range
Observed
Predicted
5/17/ 5
5/18/ 5
5/19/ 5
5/20/ 5
5/21/ 5
5/22/ 5
5/23/ 5
5/24/ 5
Date

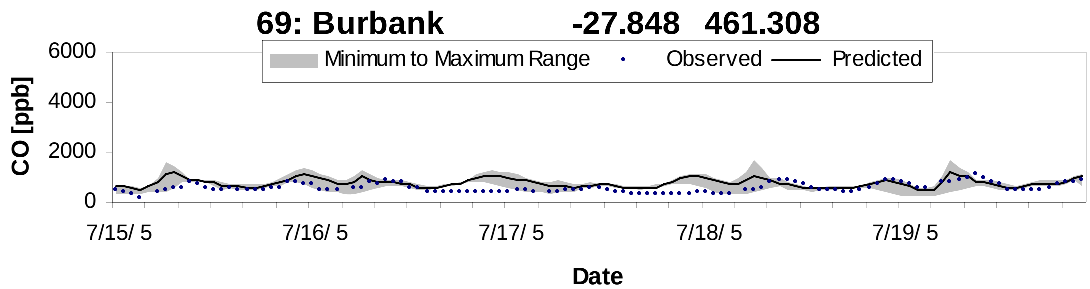
July 15-19, 2005 CALMET Winds 05base emission mA04

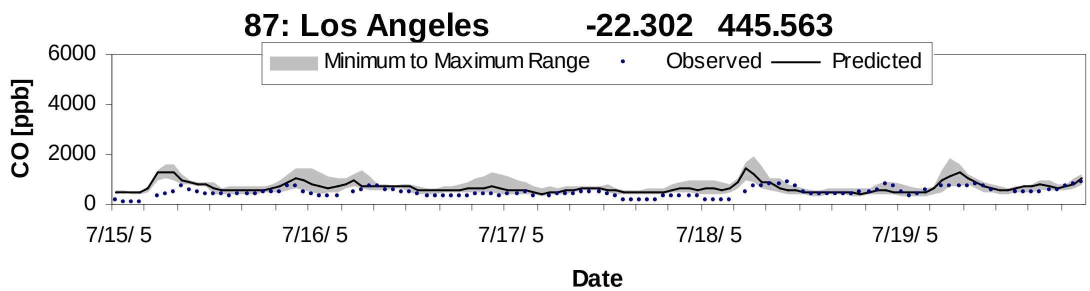


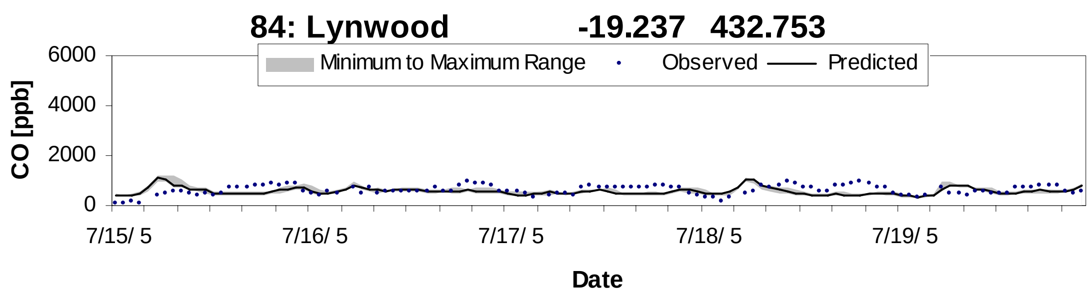


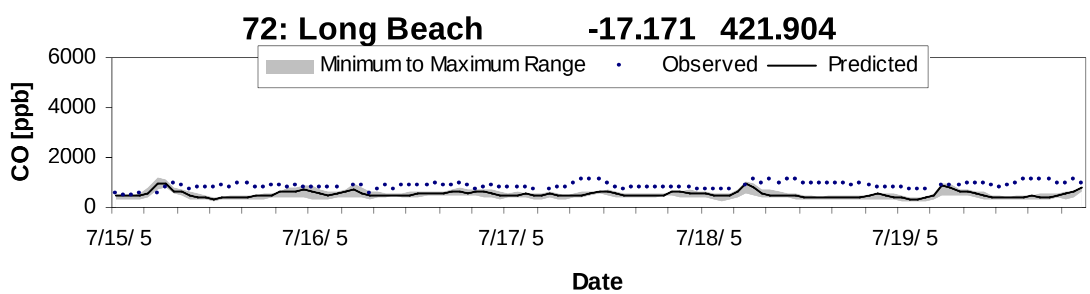


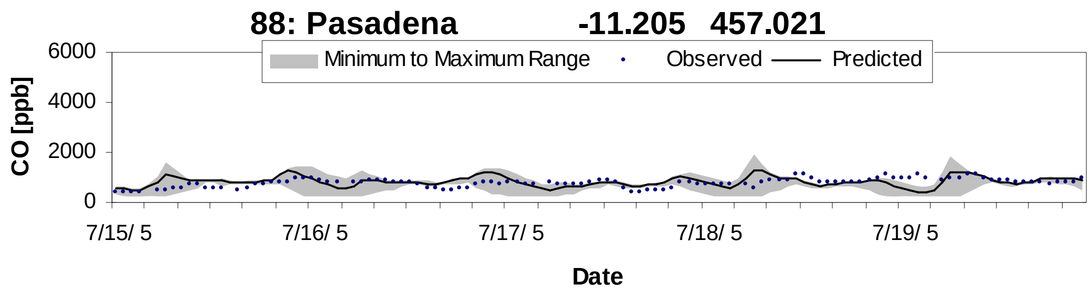


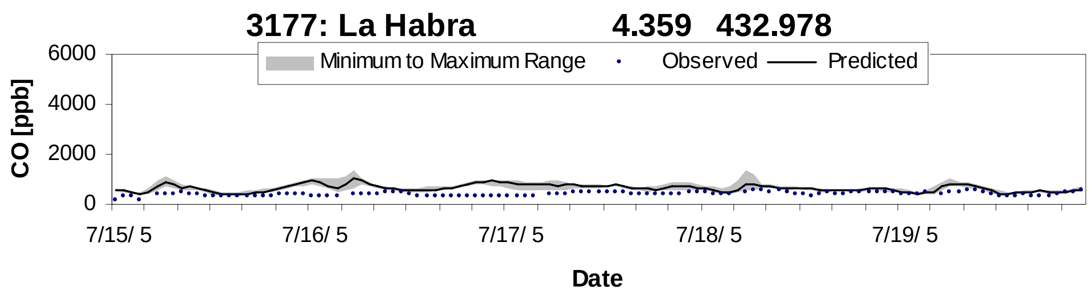

69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

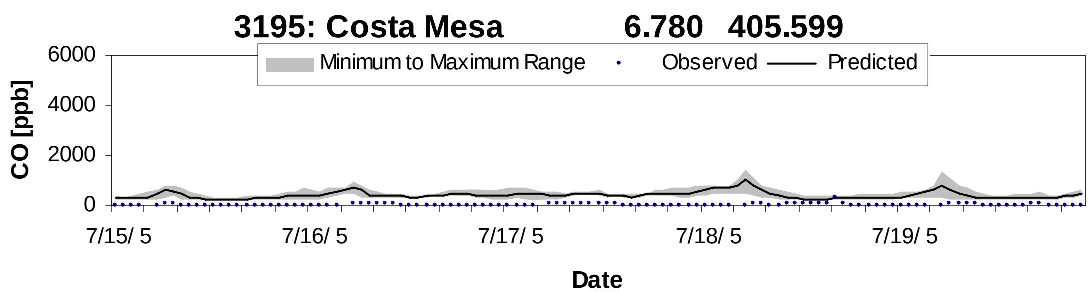

87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

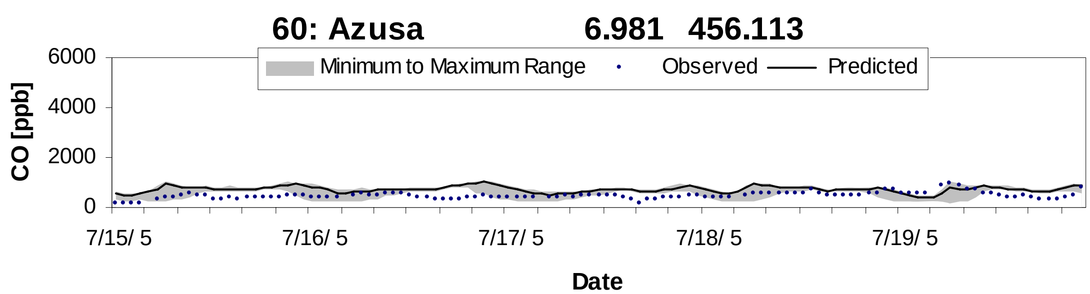

84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

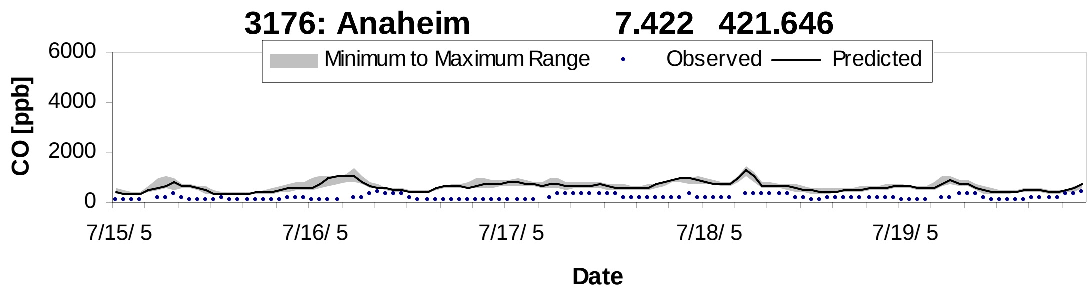

72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

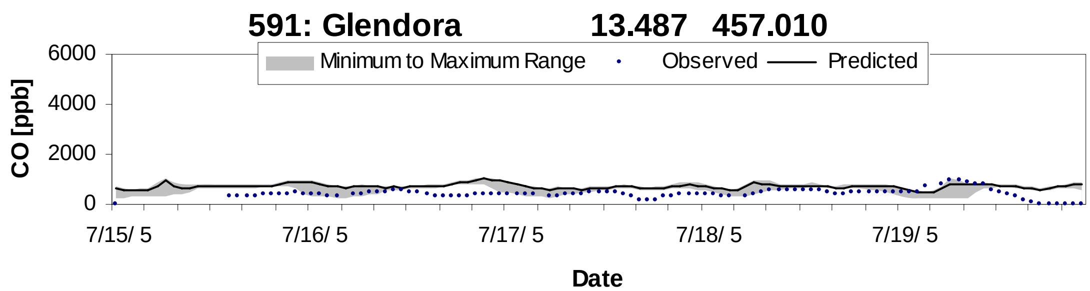

88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

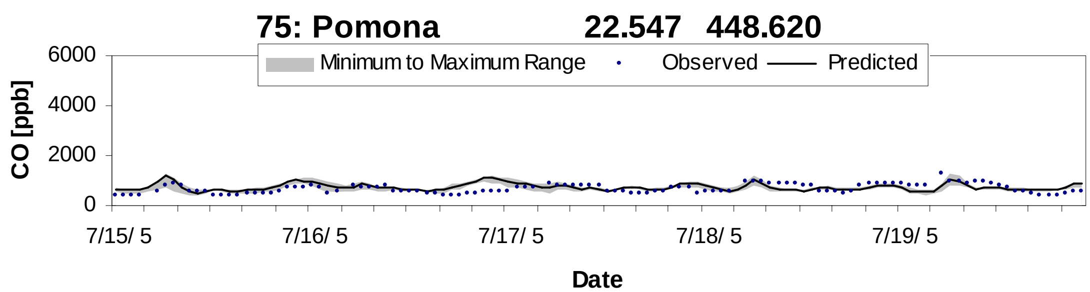

3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

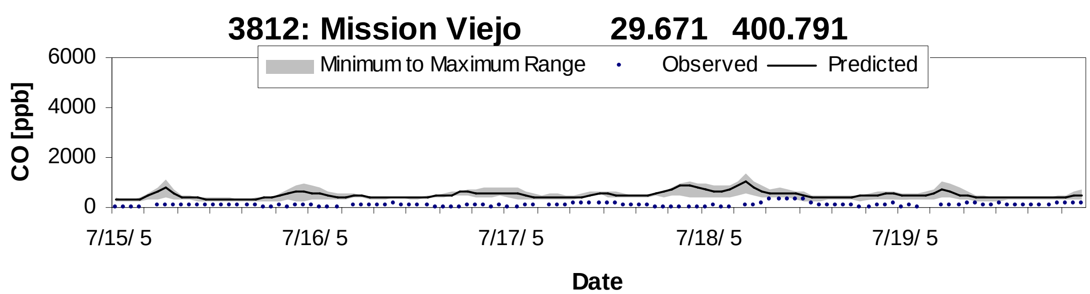

3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

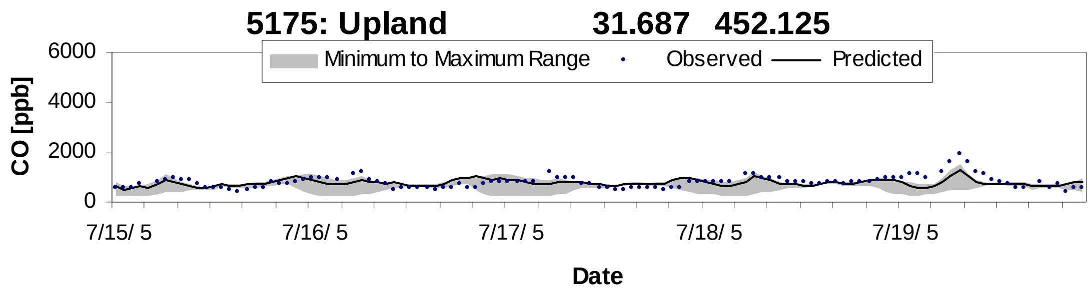

60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

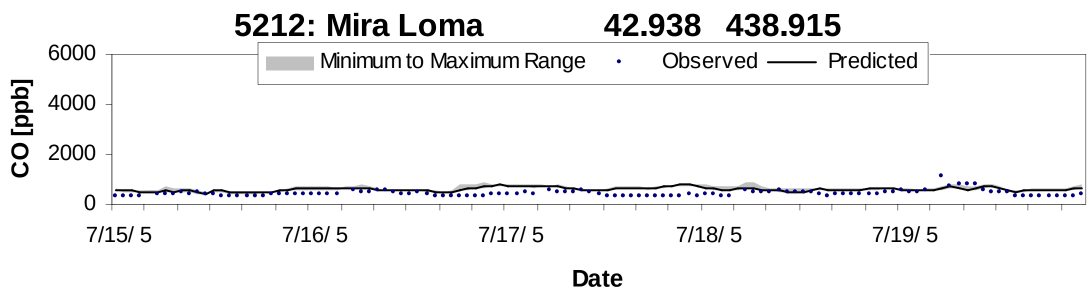

3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

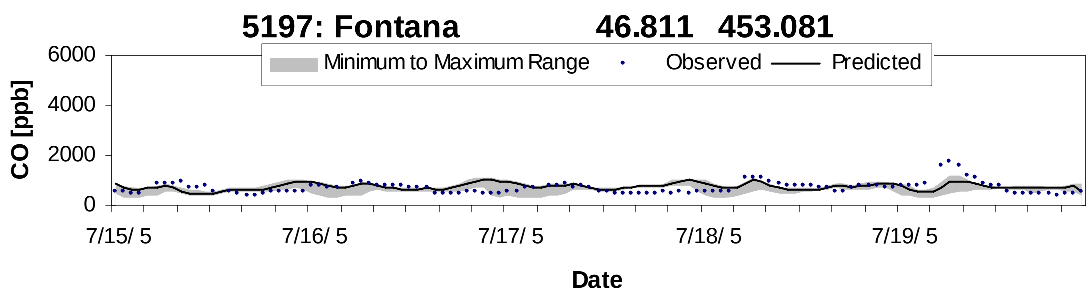

591: Glendora 13.487 457.010
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

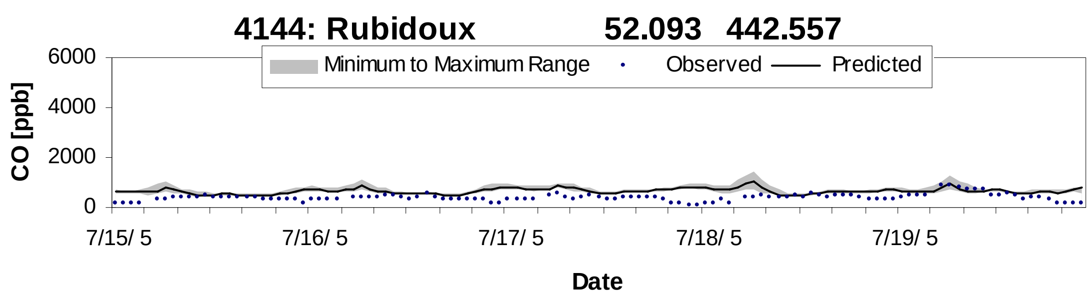

75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

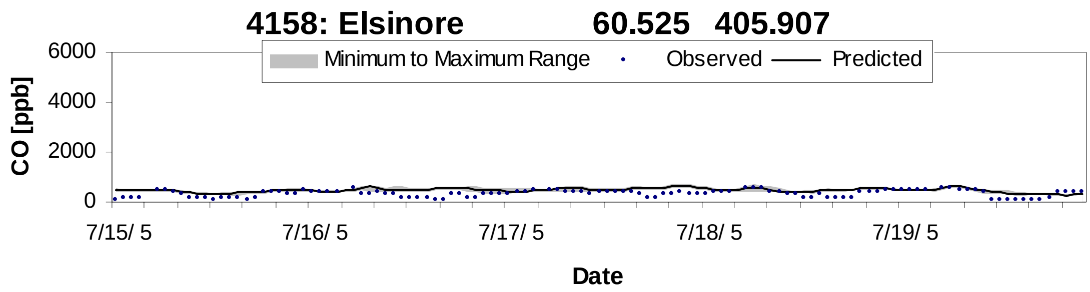

3812: Mission Viejo 29.671 400.791
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

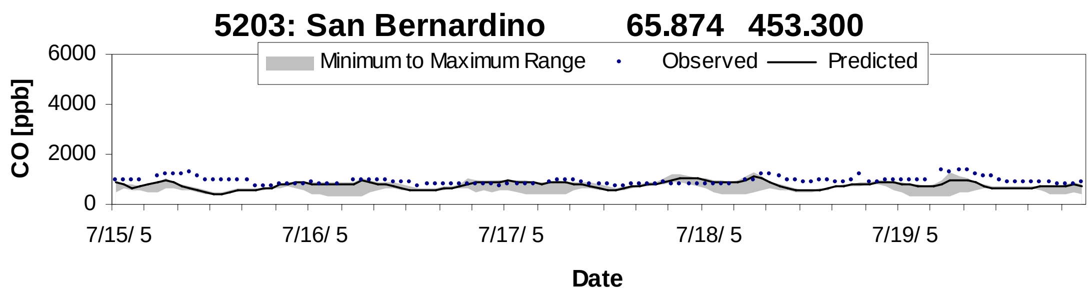

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

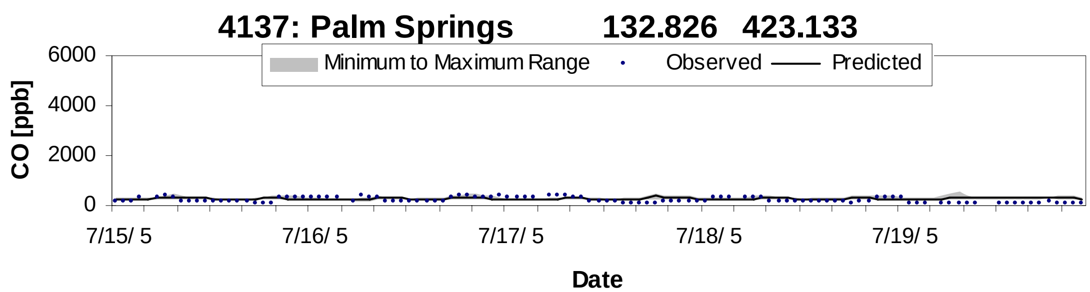

5212: Mira Loma 42.938 438.915
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date


5197: Fontana 46.811 453.081
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date


4144: Rubidoux 52.093 442.557
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date


4158: Elsinore 60.525 405.907
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date


5203: San Bernardino 65.874 453.300
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date


4137: Palm Springs 132.826 423.133
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
6000
4000
2000
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

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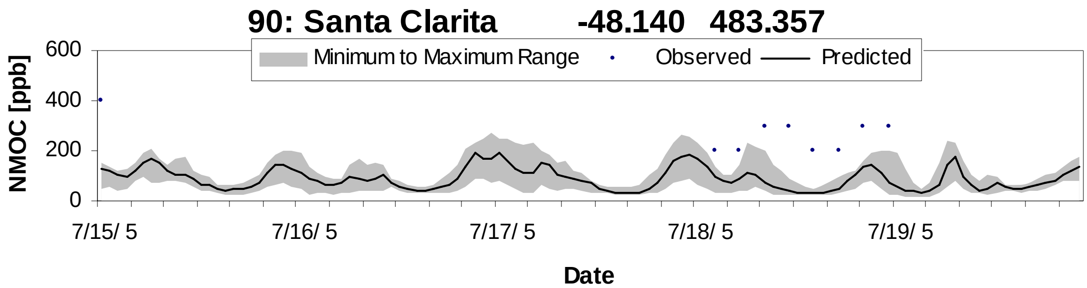
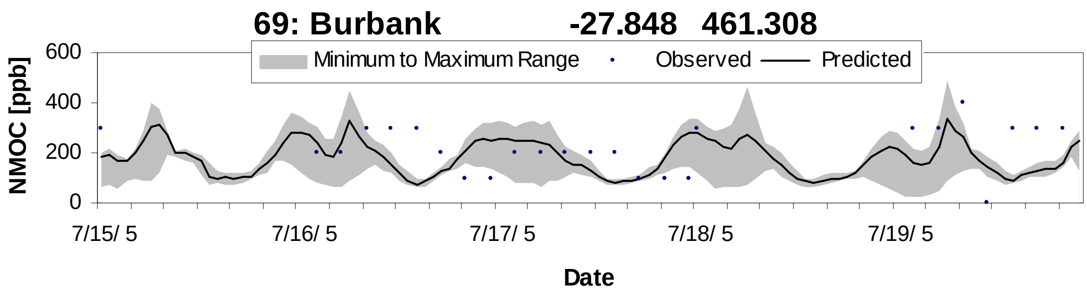
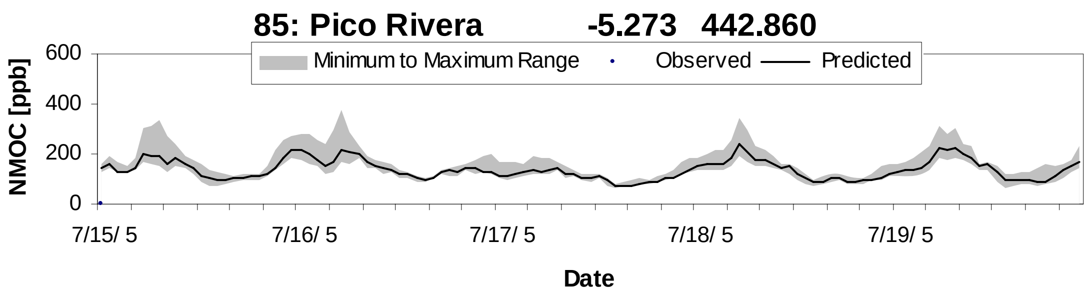
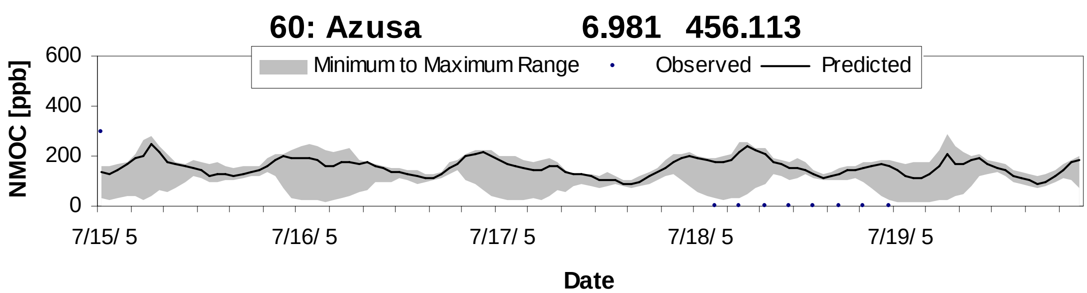
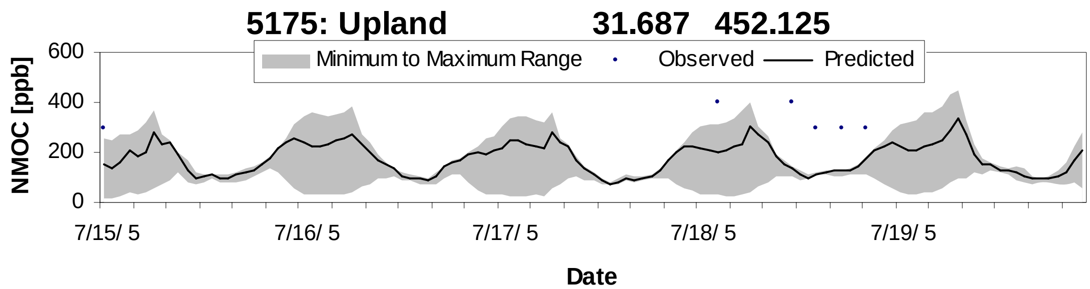
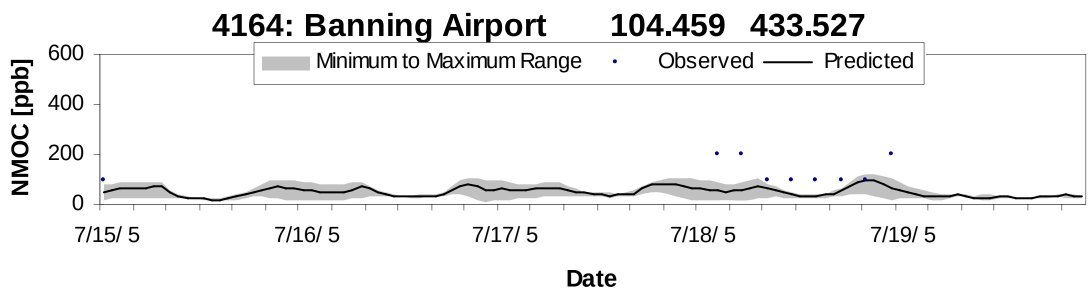




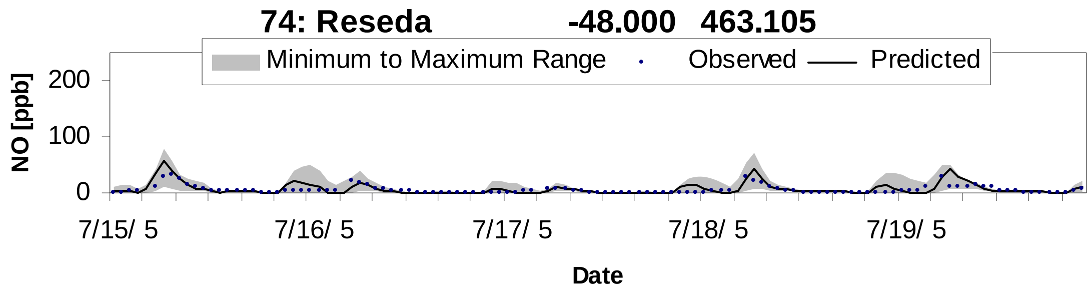


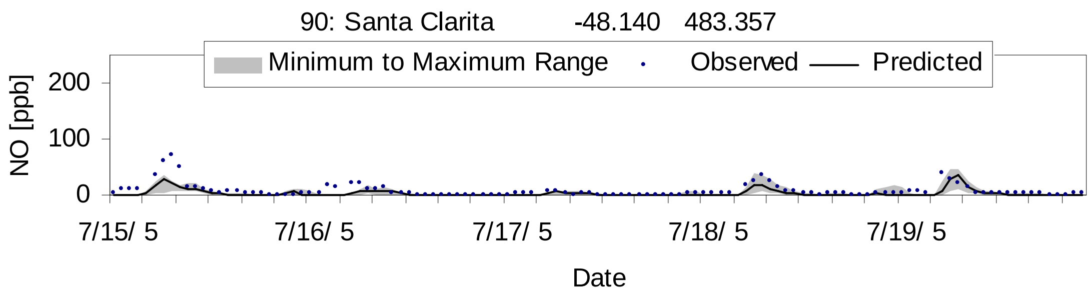


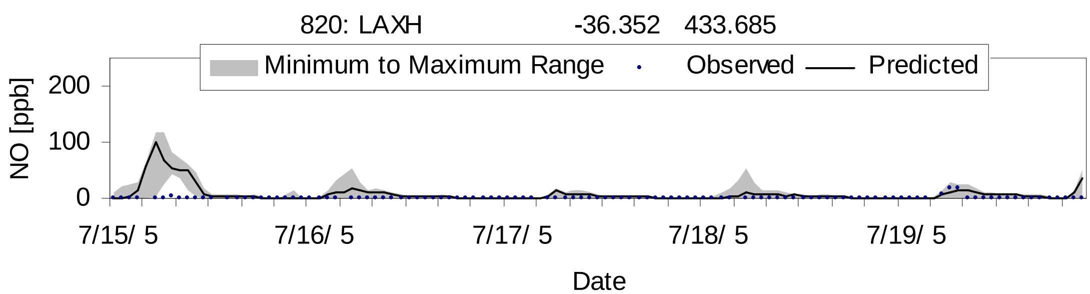

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
NMOC [ppb]
600
400
200
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

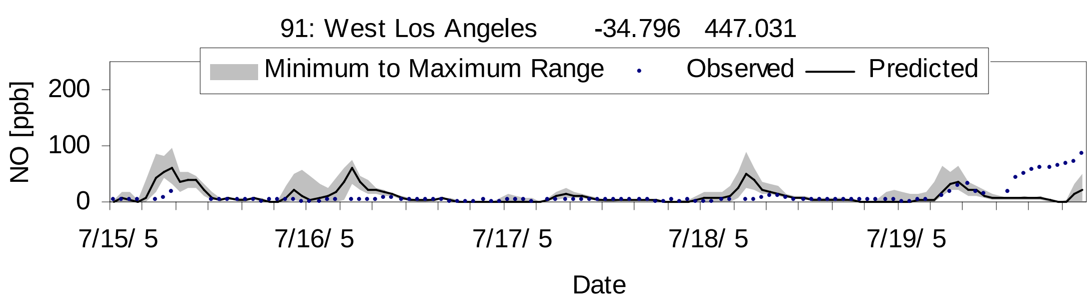

4164: Banning Airport 104.459 433.527
Minimum to Maximum Range
Observed
Predicted
NMOC [ppb]
600
400
200
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

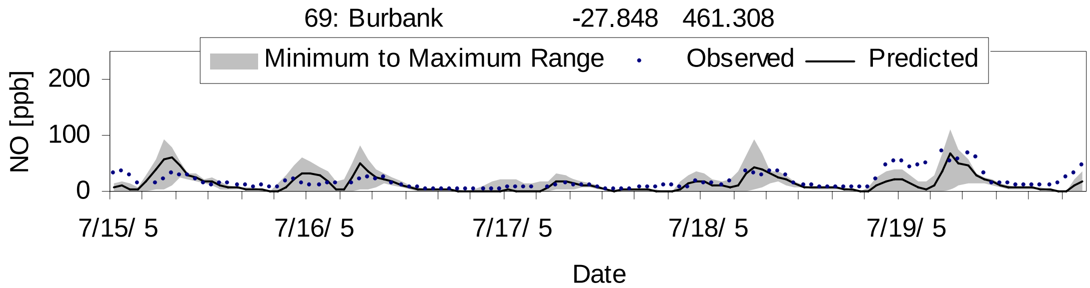
July 15-19, 2005 CALMET Winds 05base emission mA04

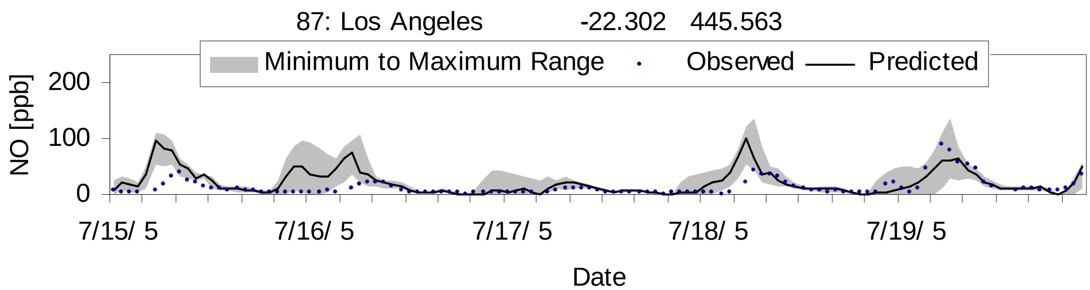


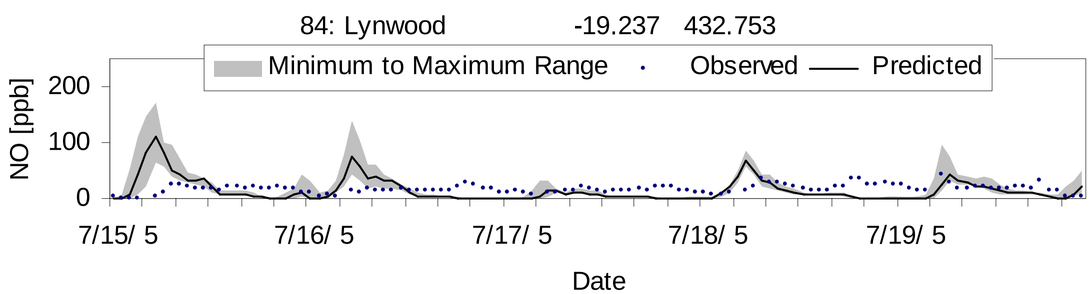


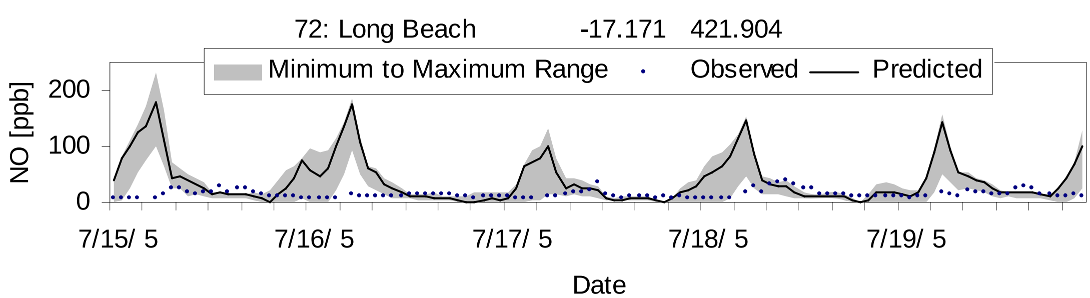


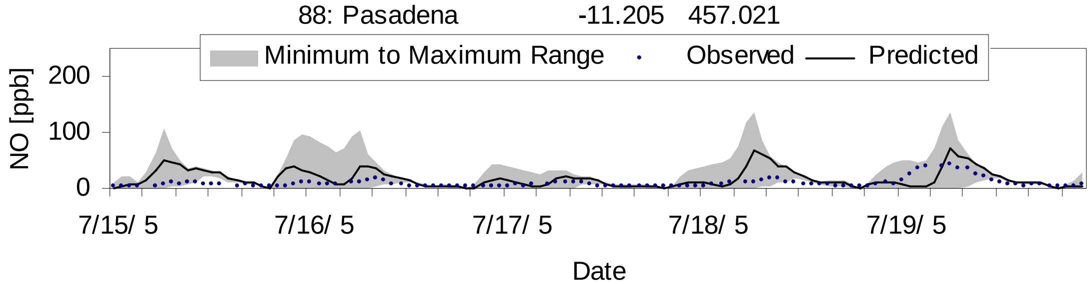


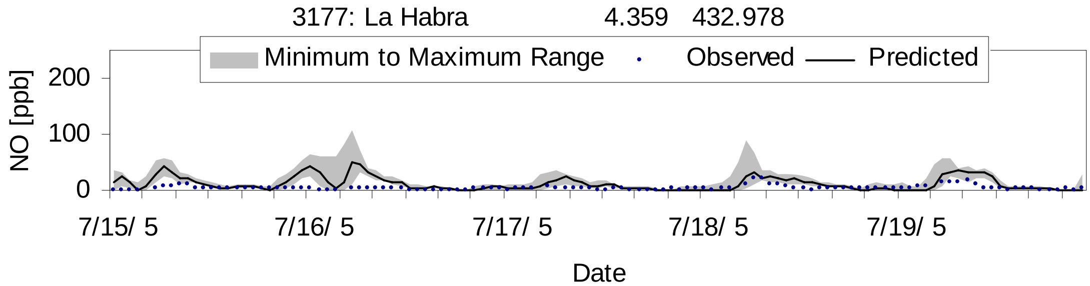

69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
0
100
200
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

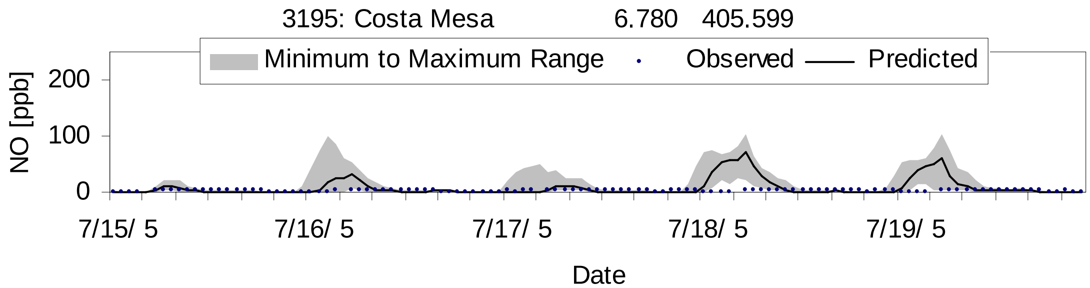

87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
0
100
200
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

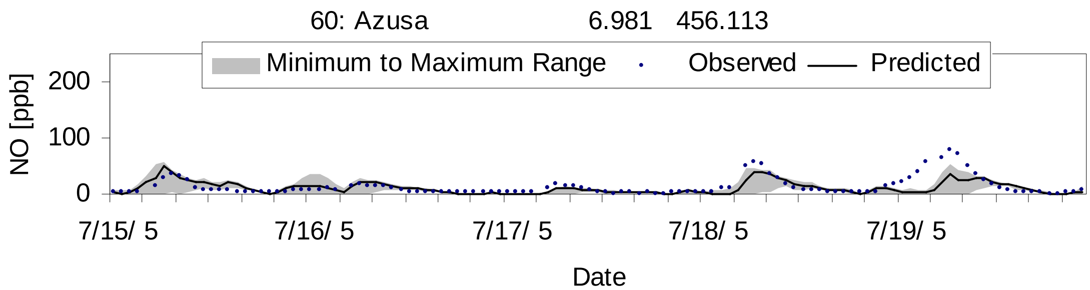

84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
0
100
200
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

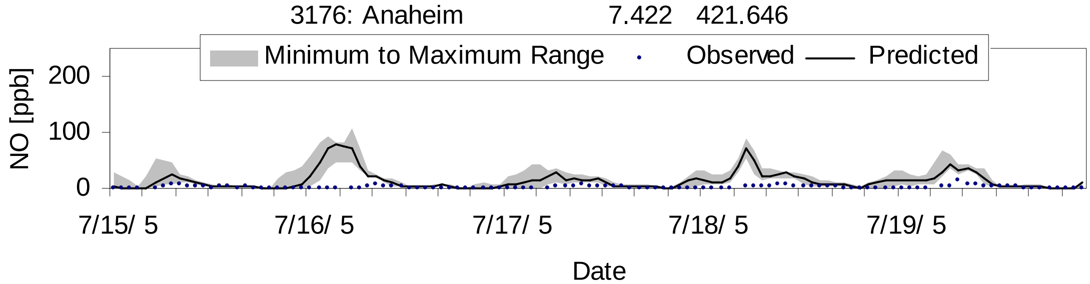

72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
0
100
200
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

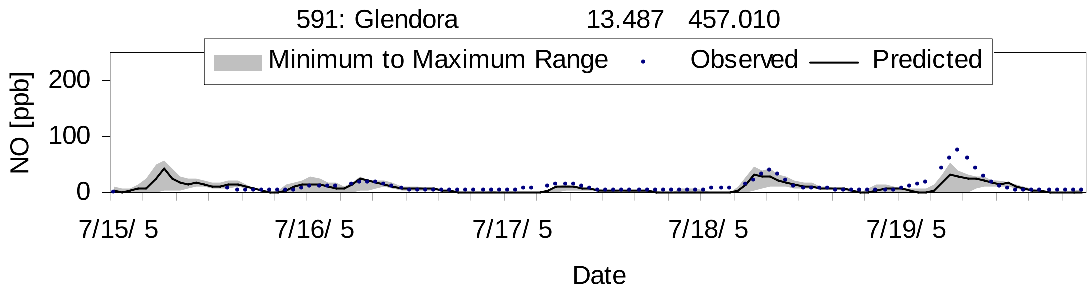

88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

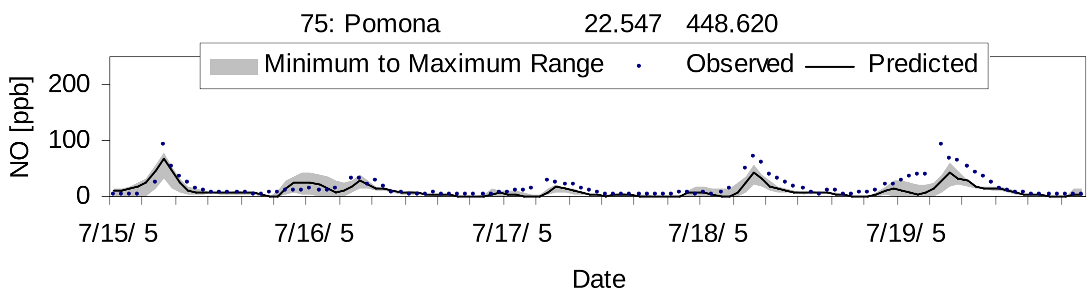

3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

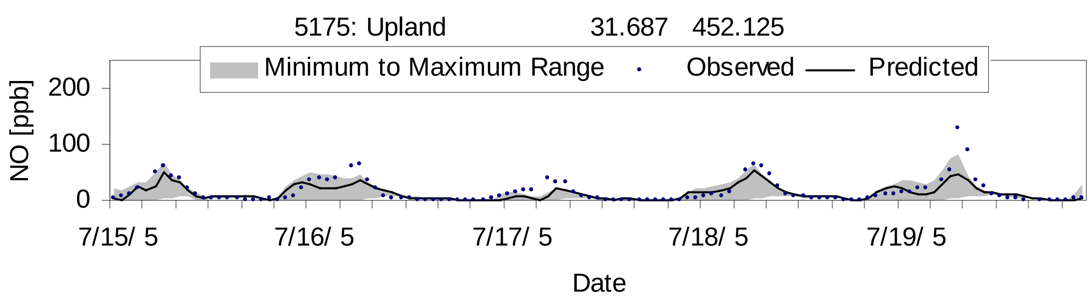

3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date


60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

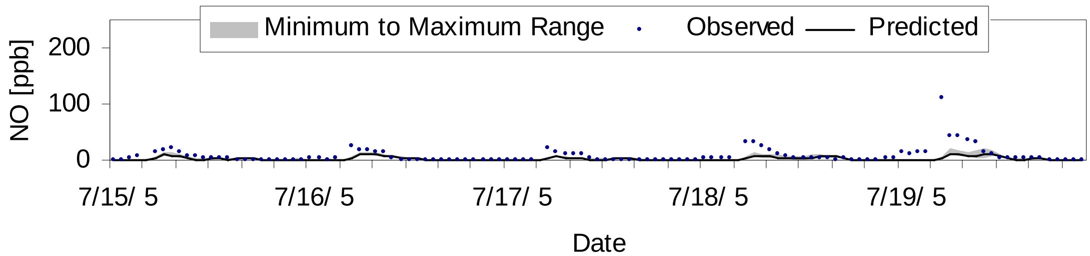

3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date


591: Glendora 13.487 457.010
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

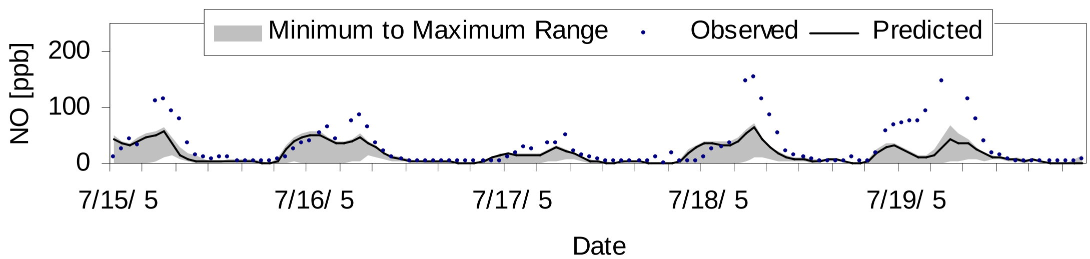

75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date


5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

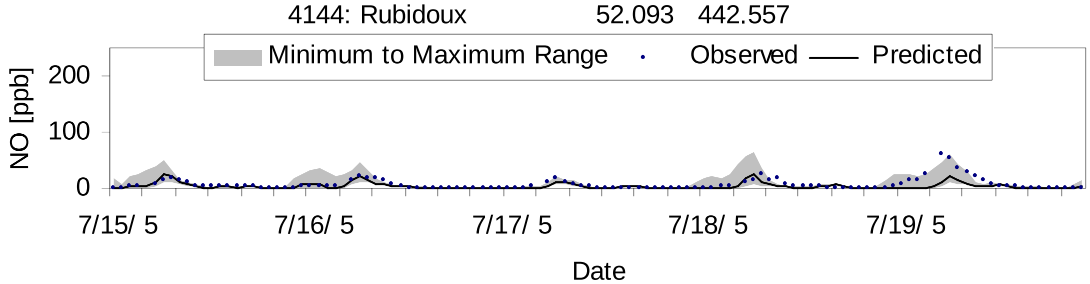
5212: Mira Loma 42.938 438.915



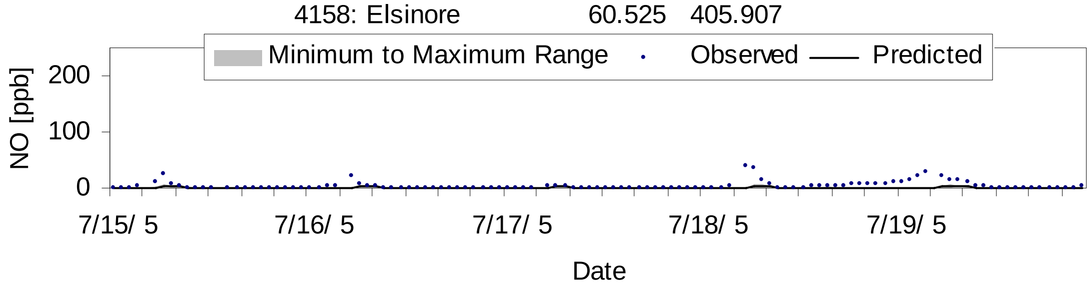
5197: Fontana 46.811 453.081

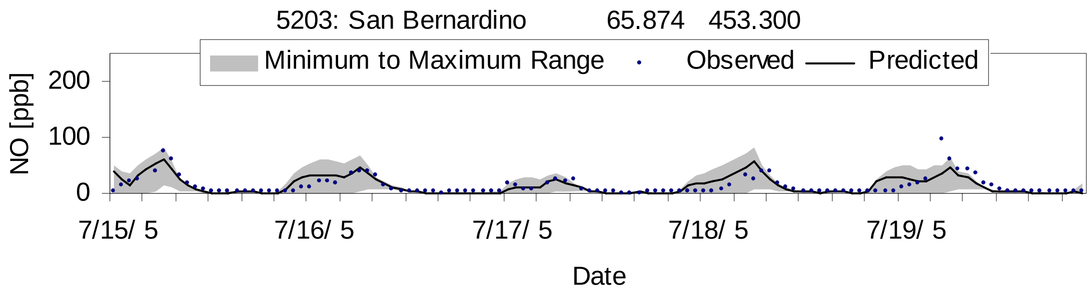


4144: Rubidoux 52.093 442.557

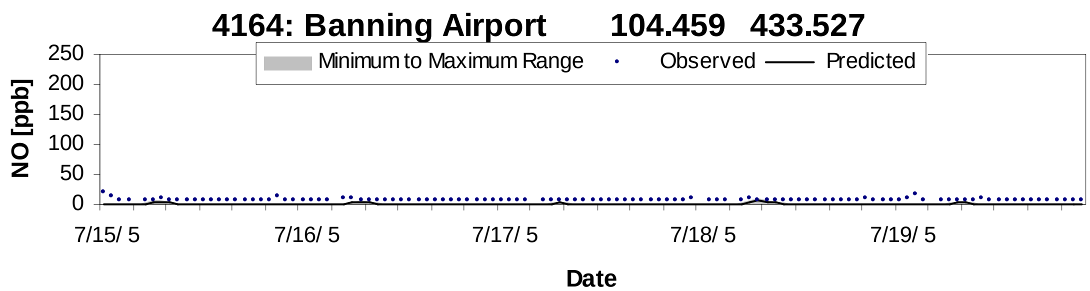


4158: Elsinore 60.525 405.907

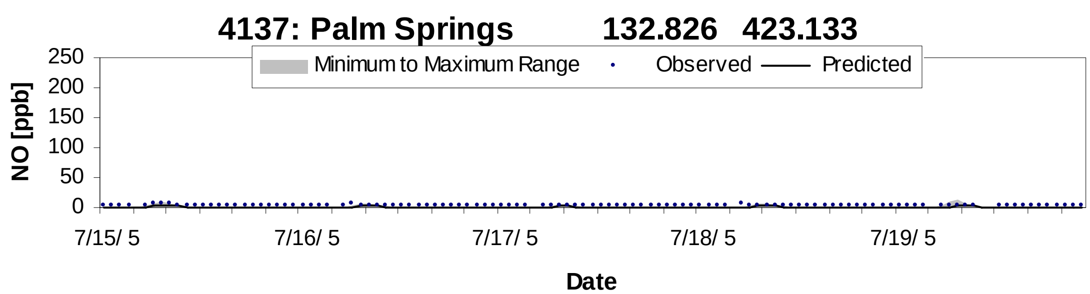




5203: San Bernardino 65.874 453.300
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

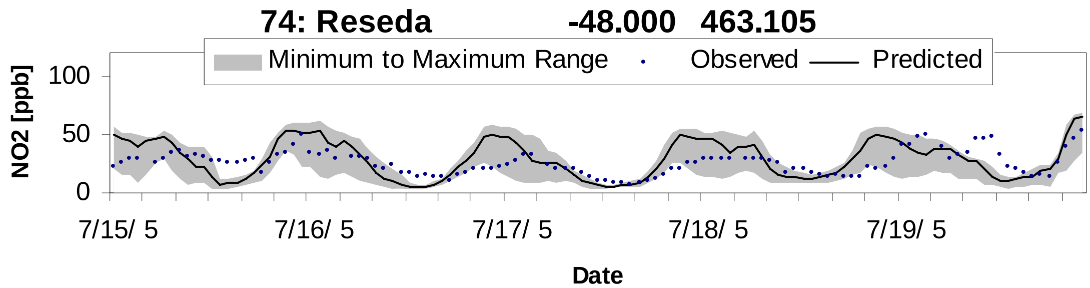


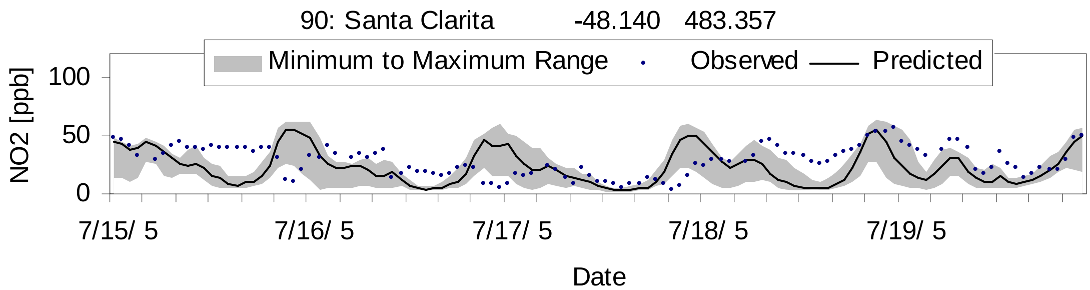
4164: Banning Airport 104.459 433.527
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
250
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

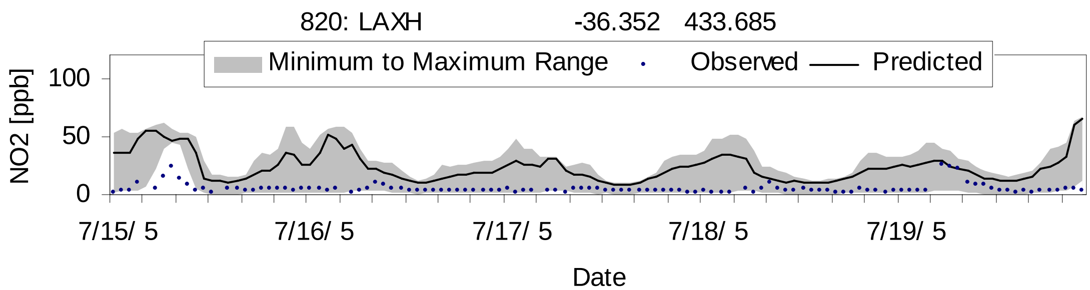


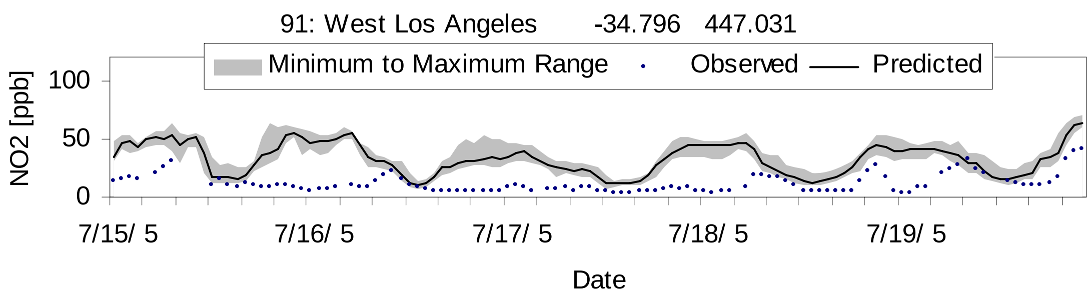
4137: Palm Springs 132.826 423.133
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
250
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

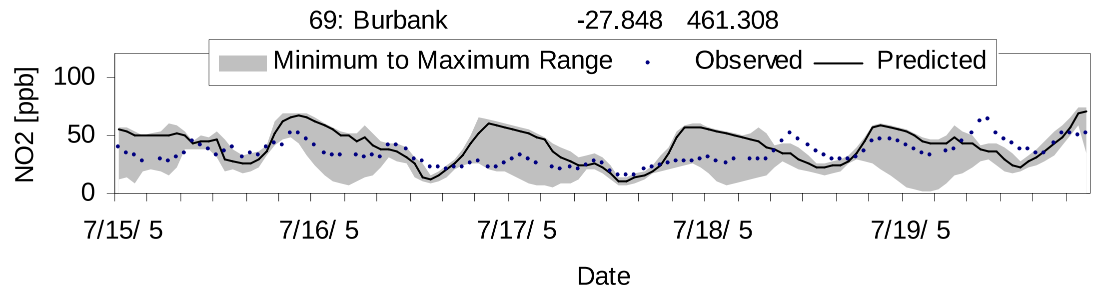
July 15-19, 2005 CALMET Winds 05base emission mA04

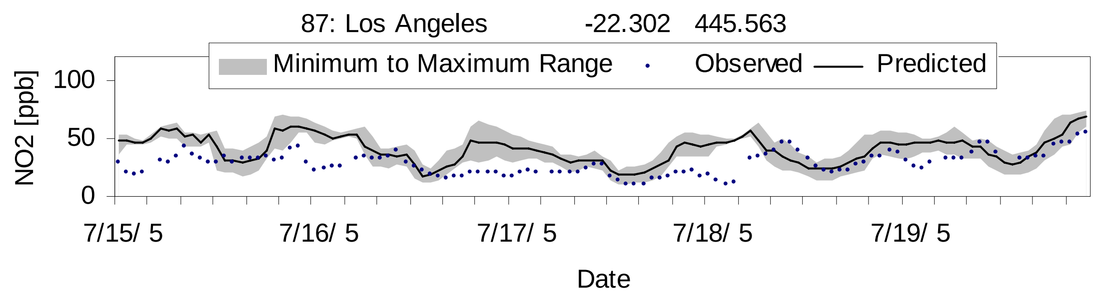


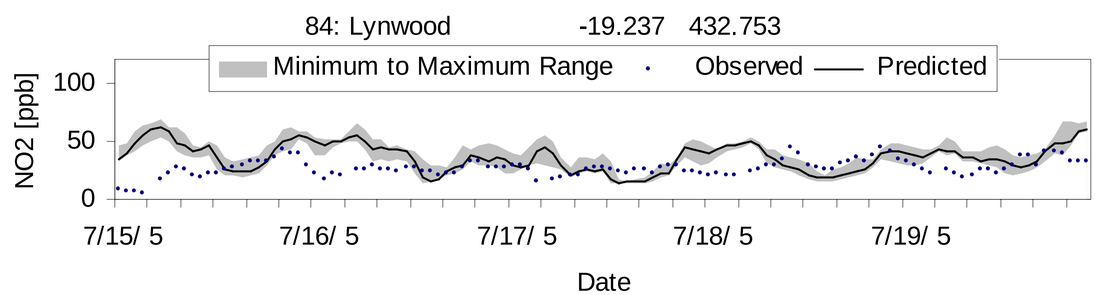


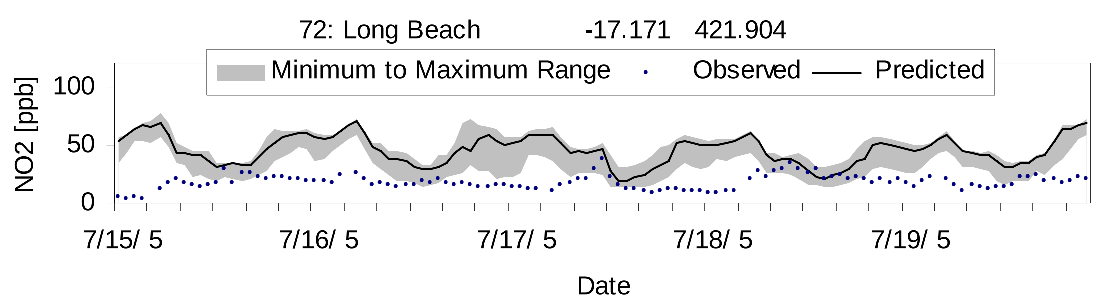


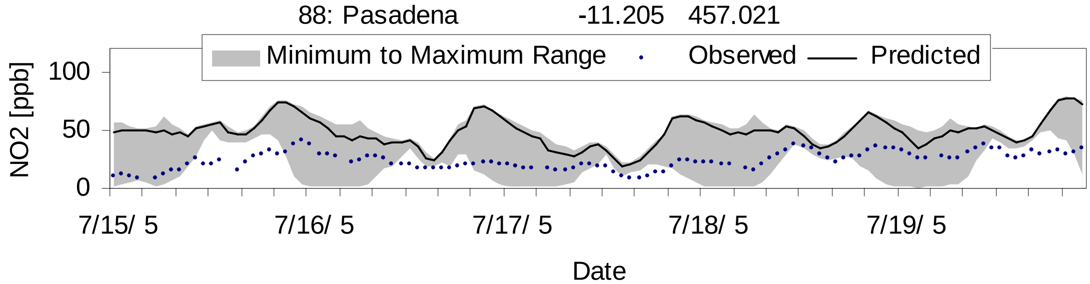



69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

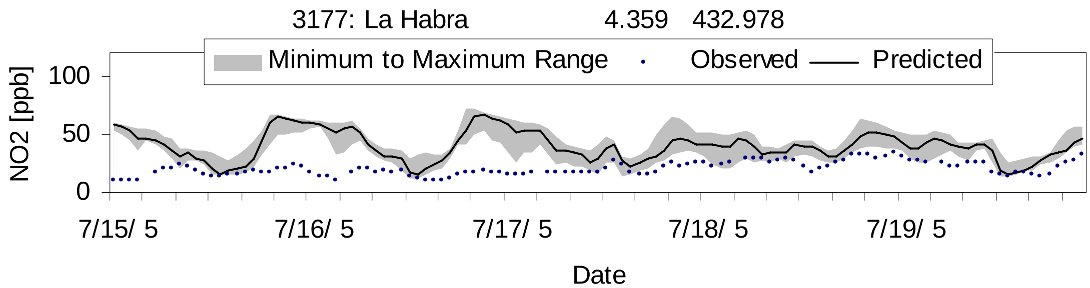

87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date


84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

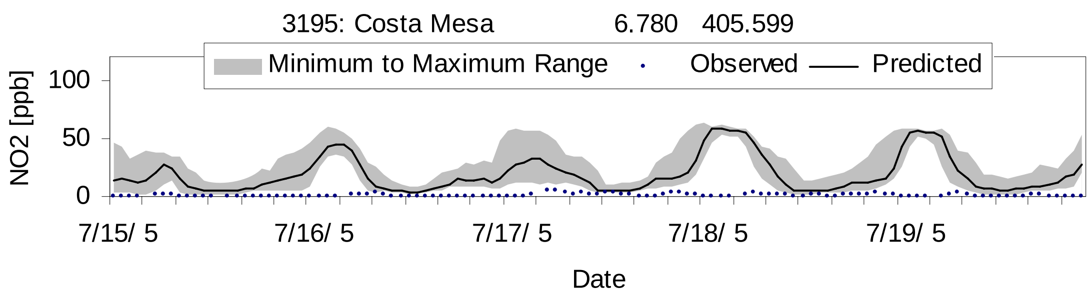

72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date



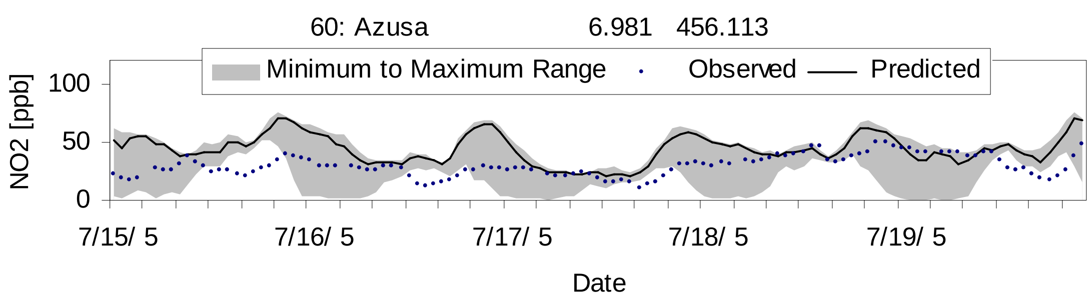
88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date



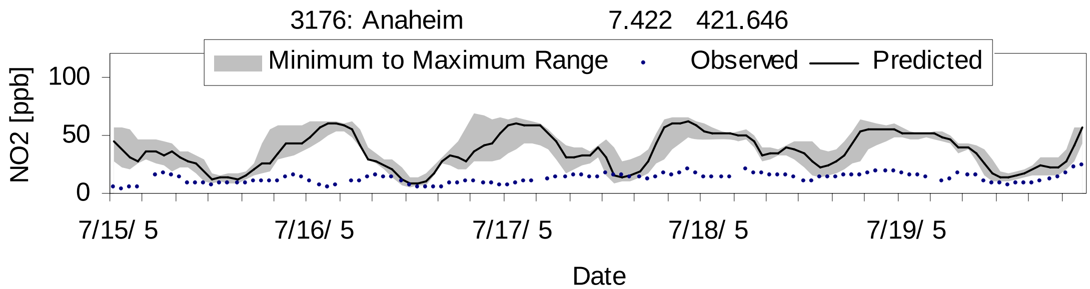
3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

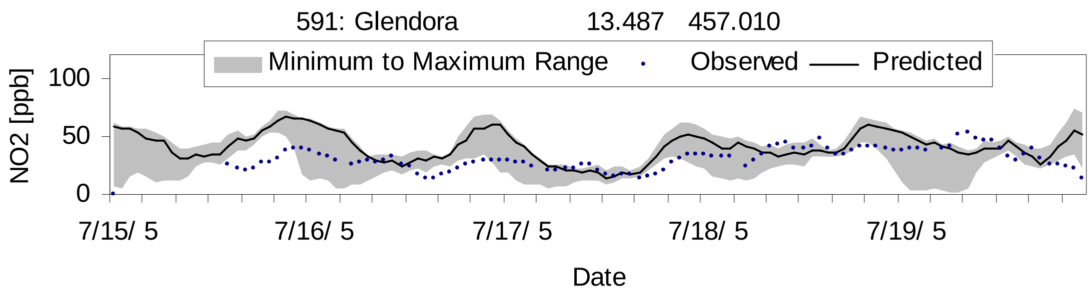


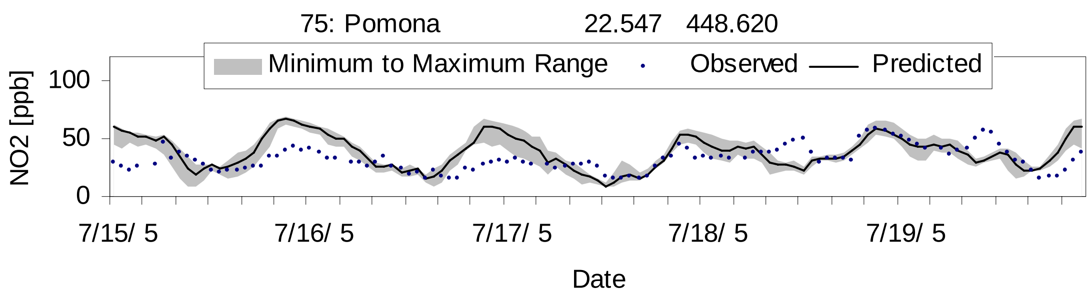
3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

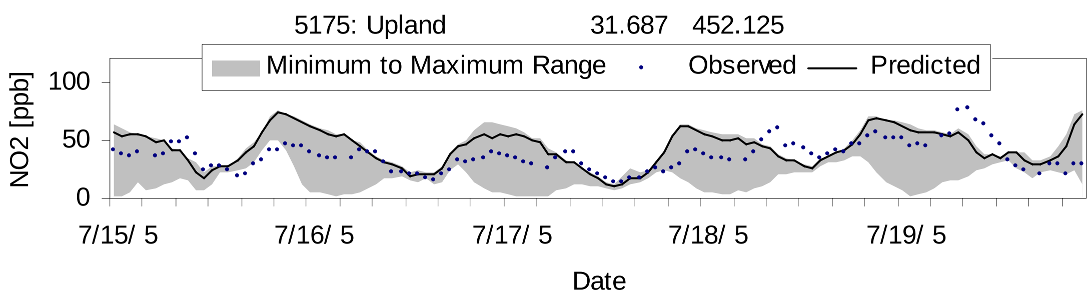


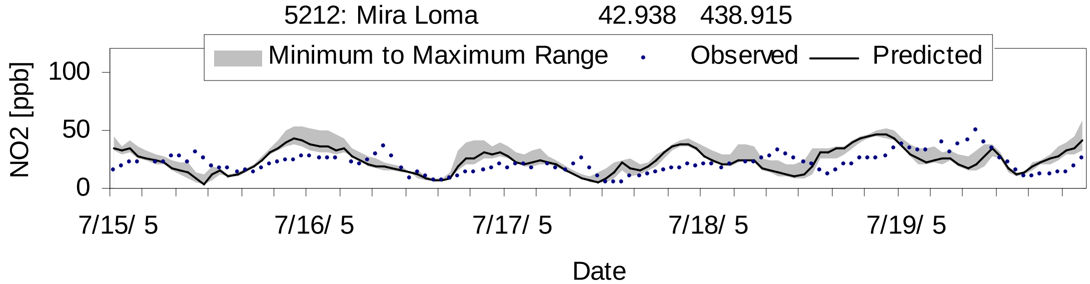
60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date


3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

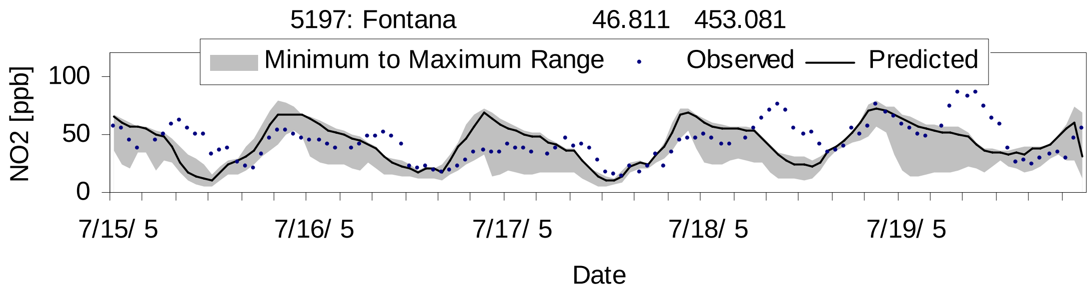

591: Glendora 13.487 457.010
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date


75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

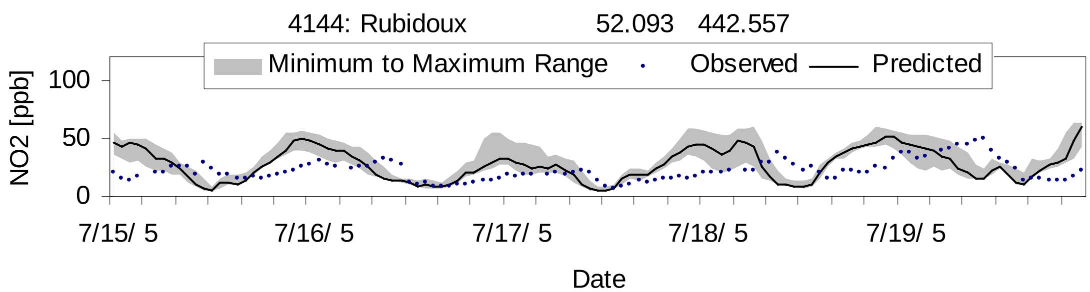

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date



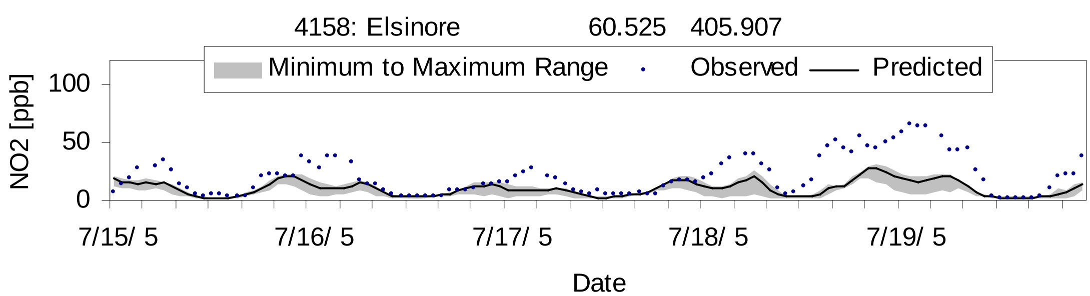
5212: Mira Loma 42.938 438.915
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date



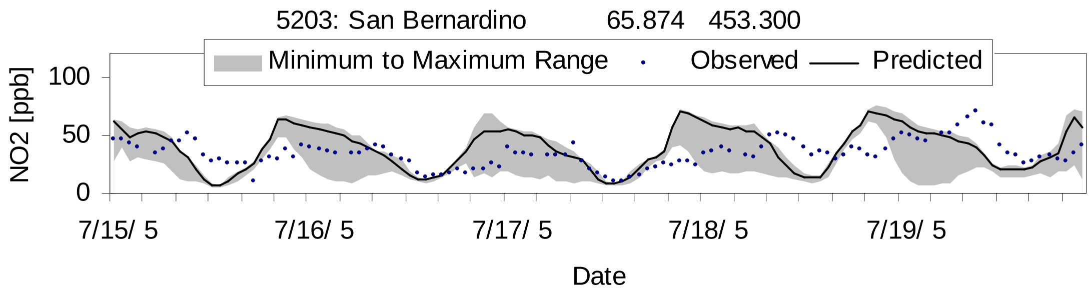
5197: Fontana 46.811 453.081
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date



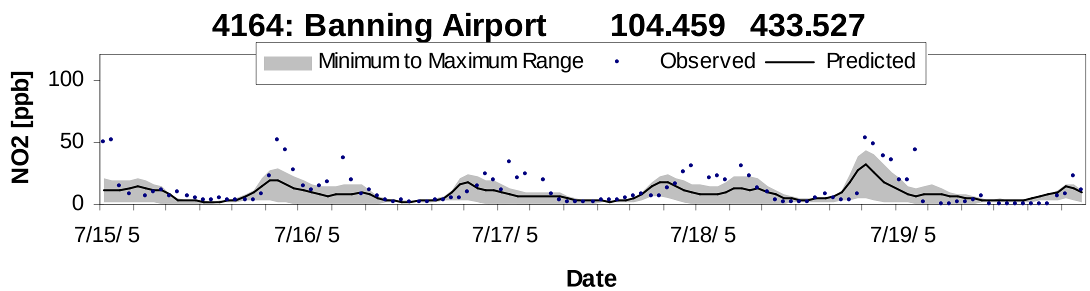
4144: Rubidoux 52.093 442.557
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date



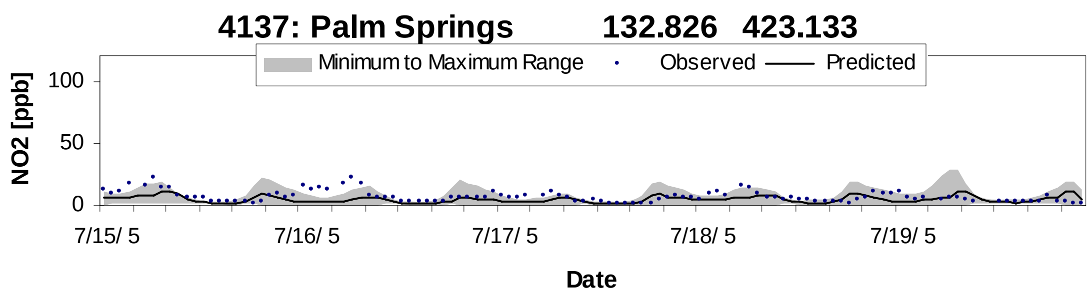
4158: Elsinore 60.525 405.907
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date



5203: San Bernardino 65.874 453.300
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

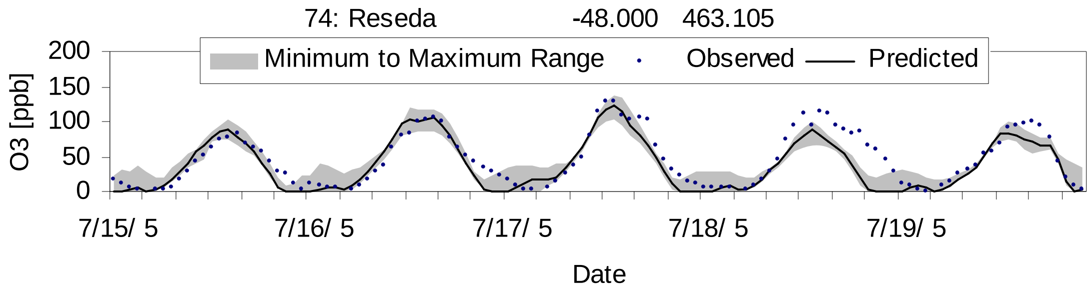


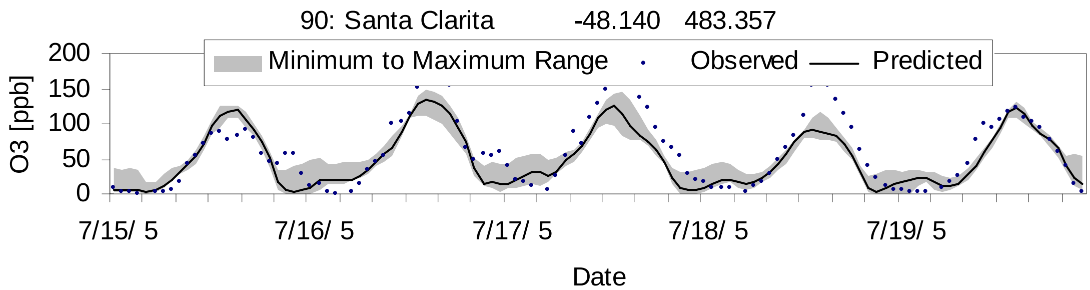
4164: Banning Airport 104.459 433.527
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

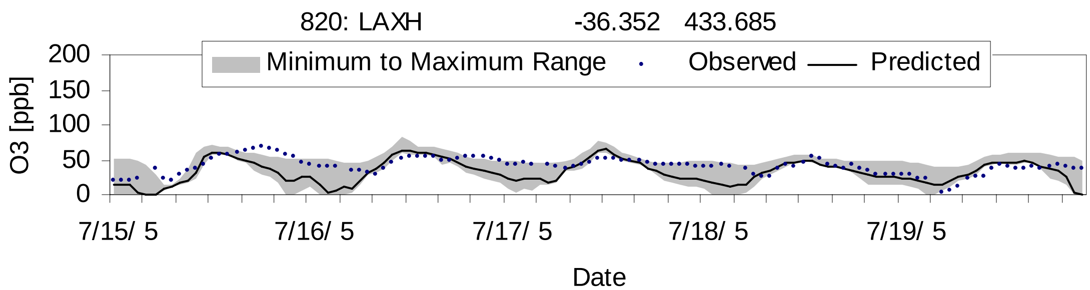


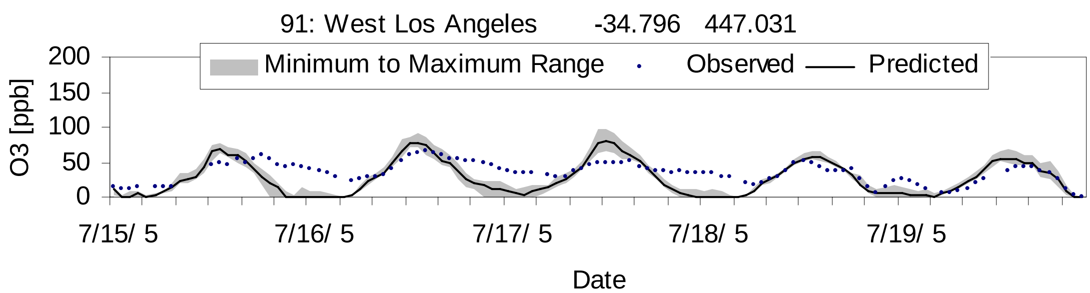
4137: Palm Springs 132.826 423.133
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

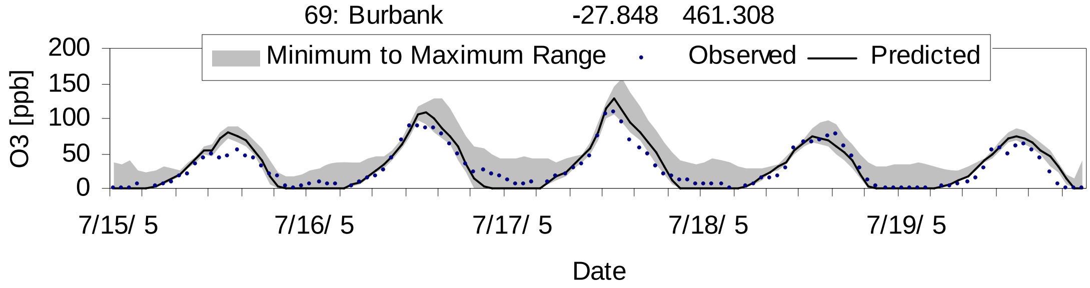
July 15-19, 2005 CALMET Winds 05base emission mA04

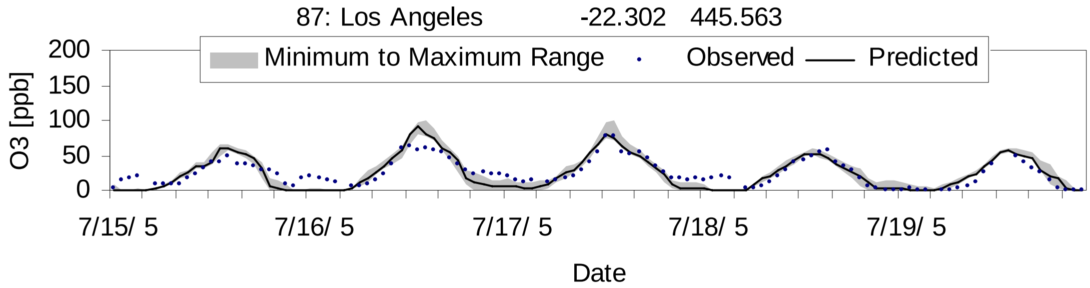


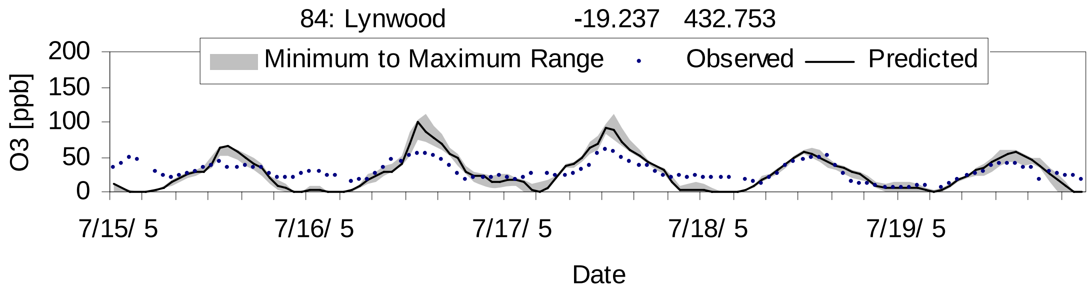


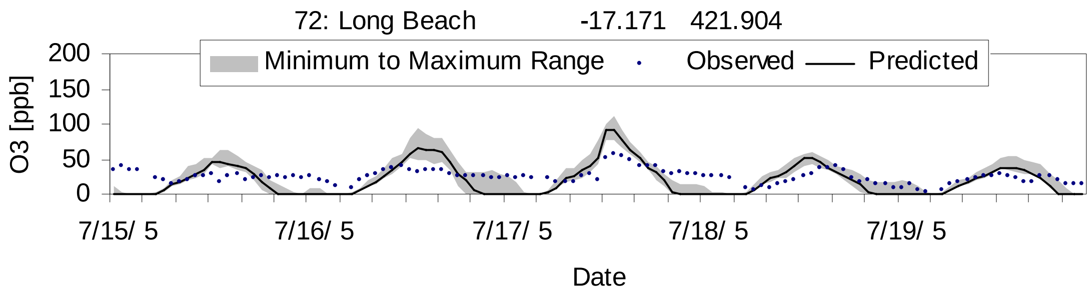


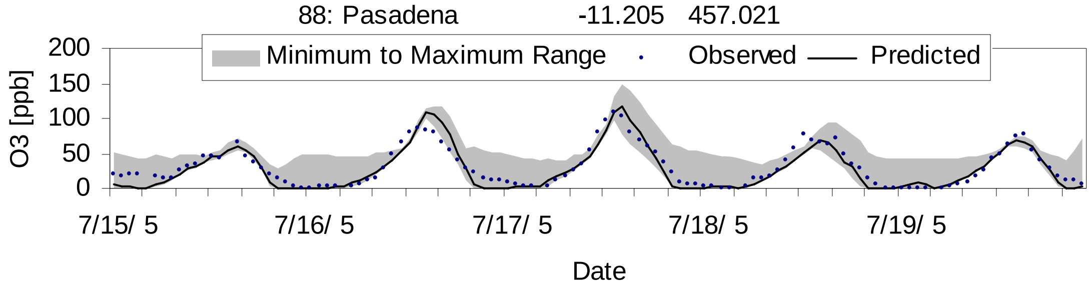


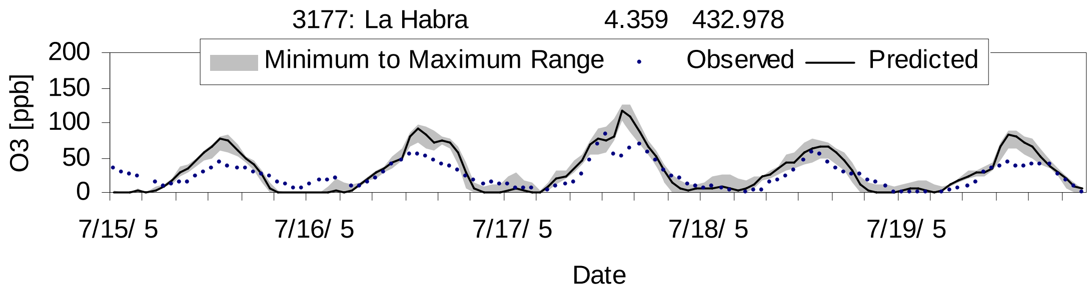

69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

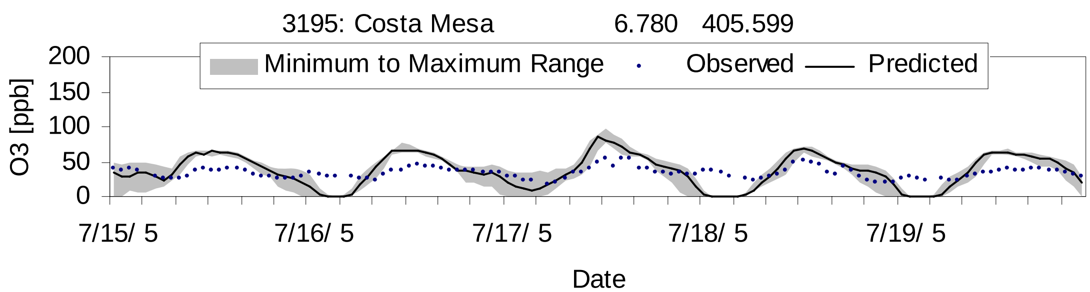

87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

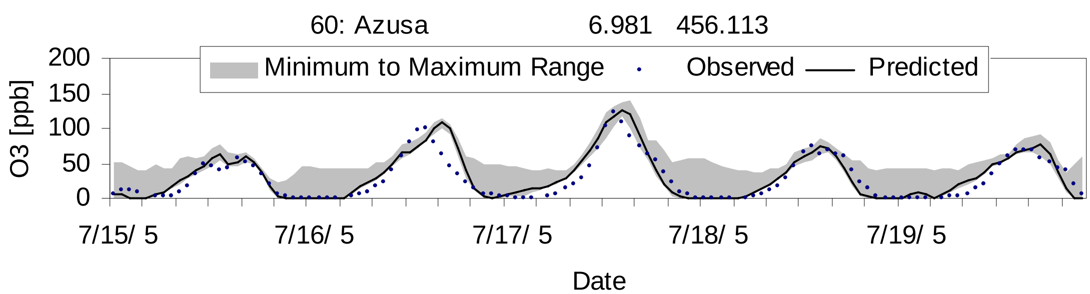

84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

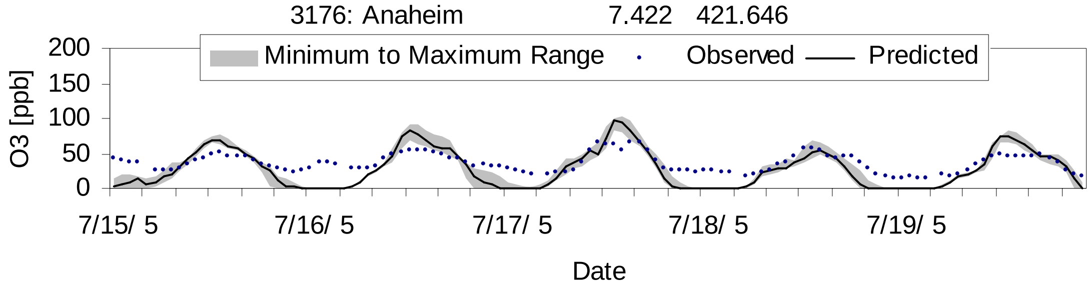

72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

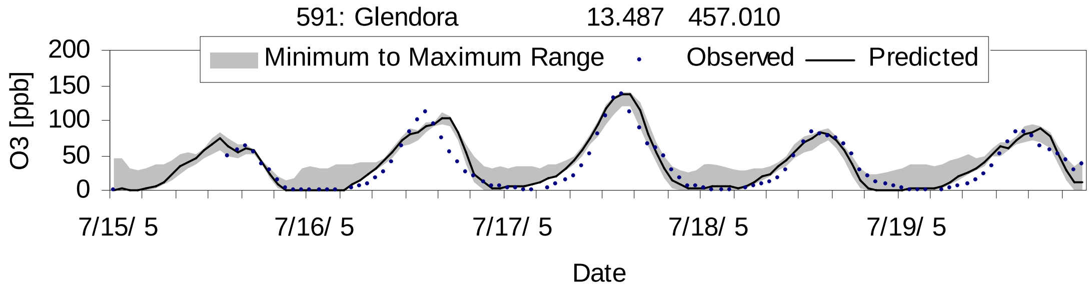

88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

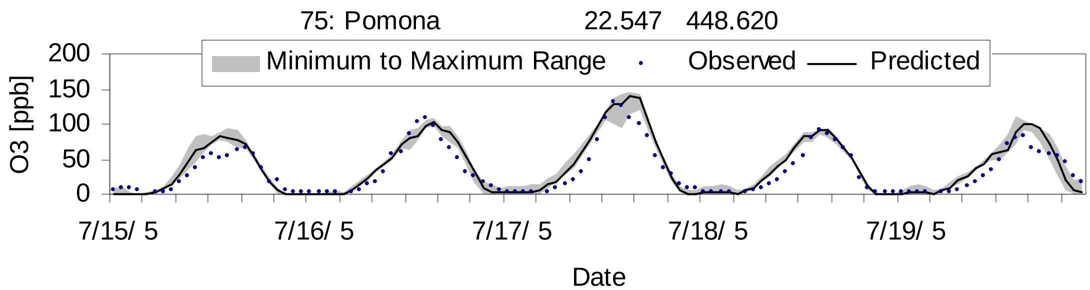

3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

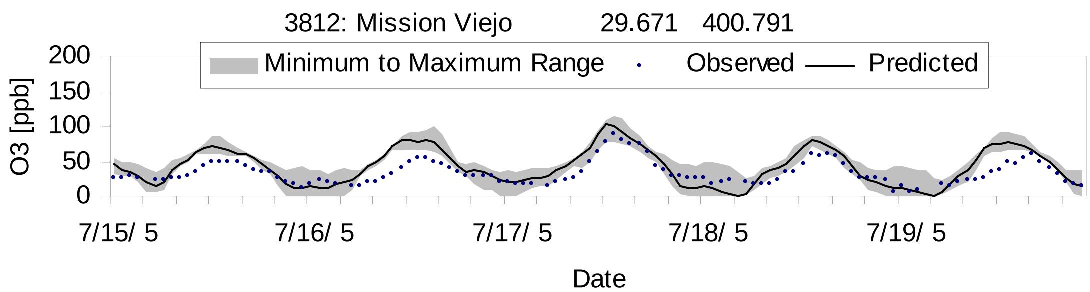

3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

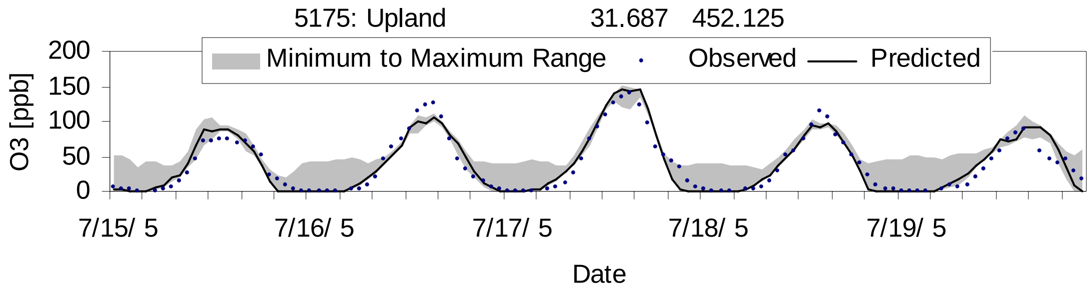

60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

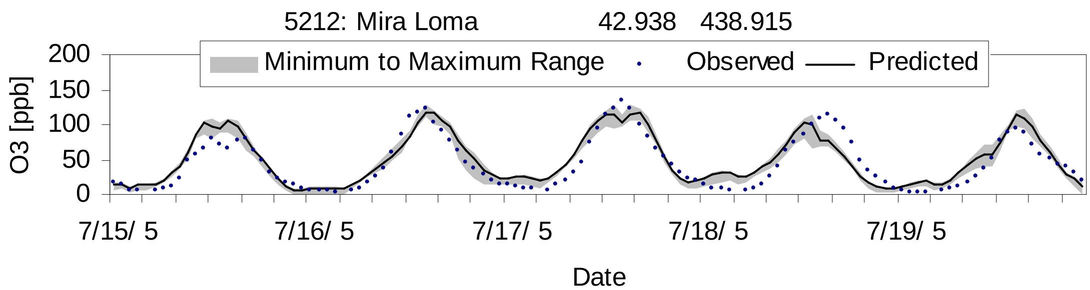

3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

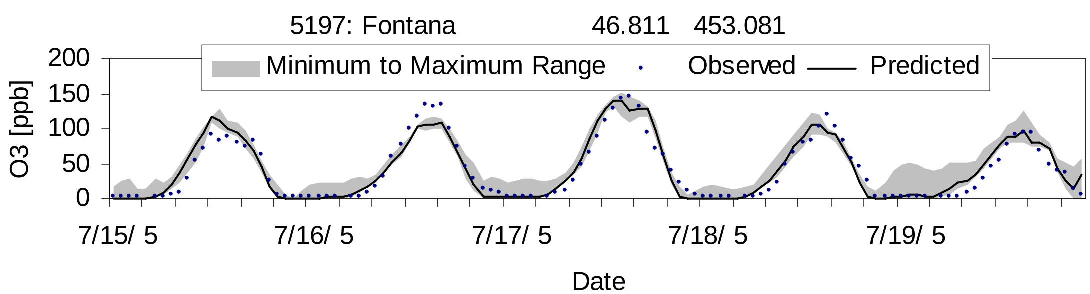

591: Glendora 13.487 457.010
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

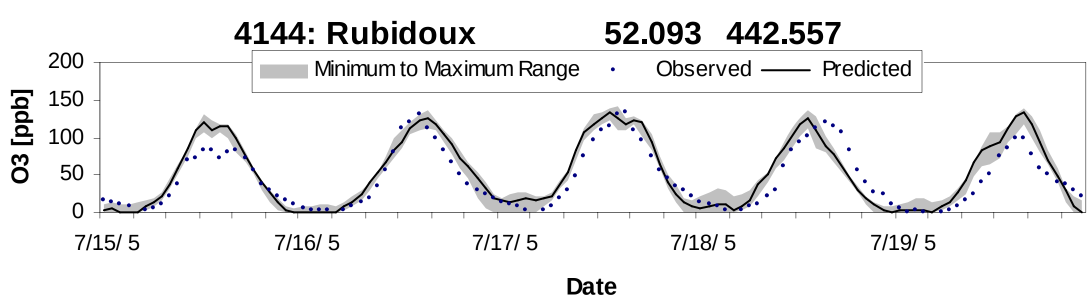

75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

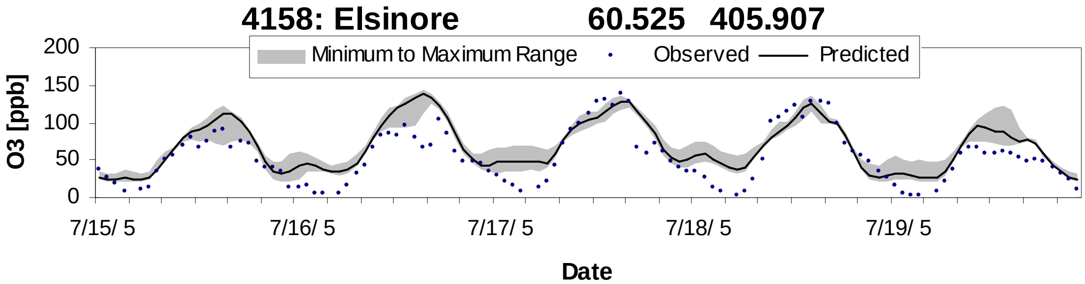

3812: Mission Viejo 29.671 400.791
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

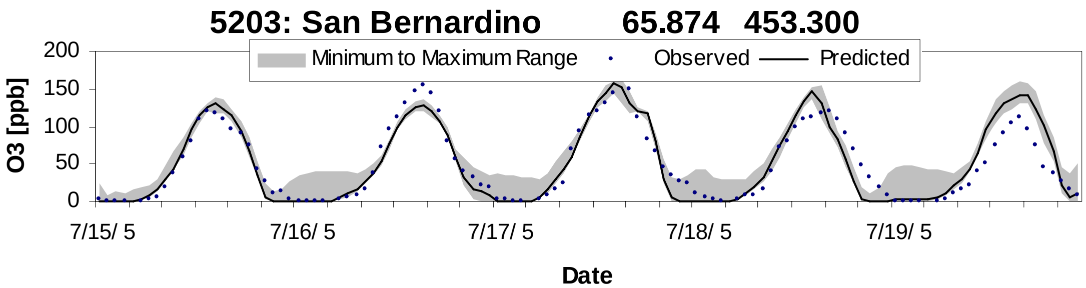

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

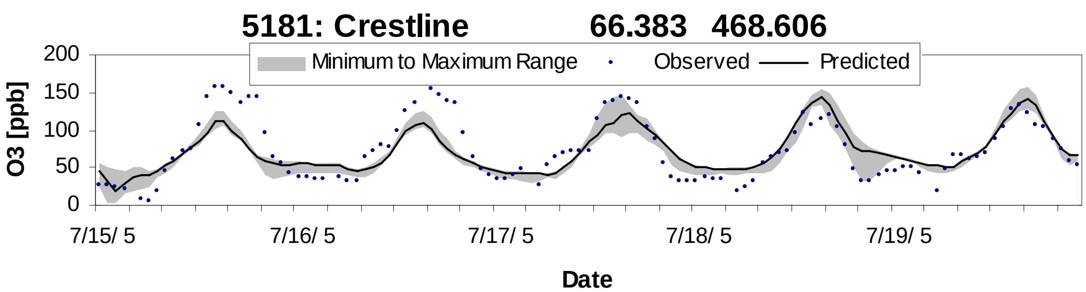

5212: Mira Loma 42.938 438.915
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

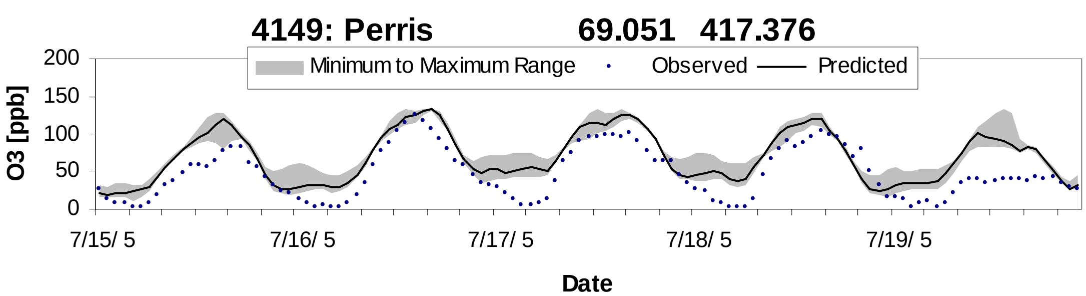

5197: Fontana 46.811 453.081
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

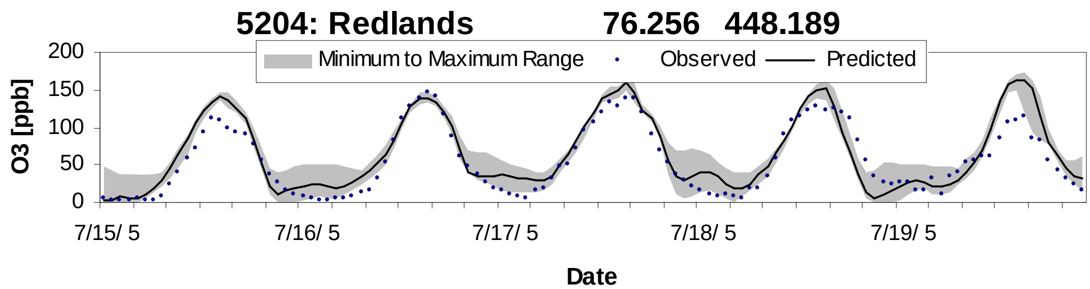

4144: Rubidoux 52.093 442.557
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date


4158: Elsinore 60.525 405.907
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

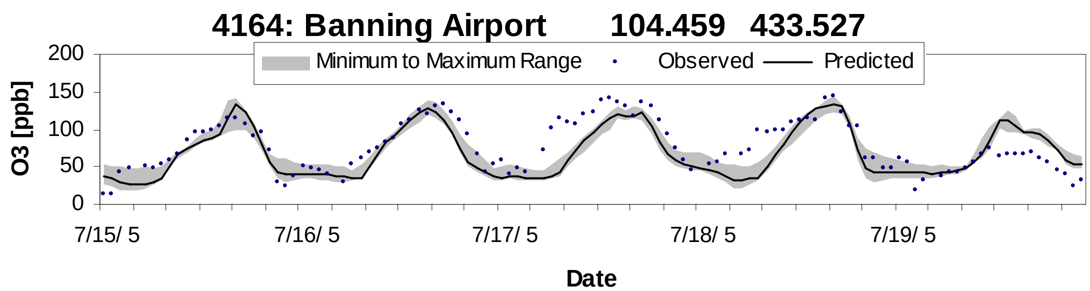

5203: San Bernardino 65.874 453.300
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date


5181: Crestline 66.383 468.606
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

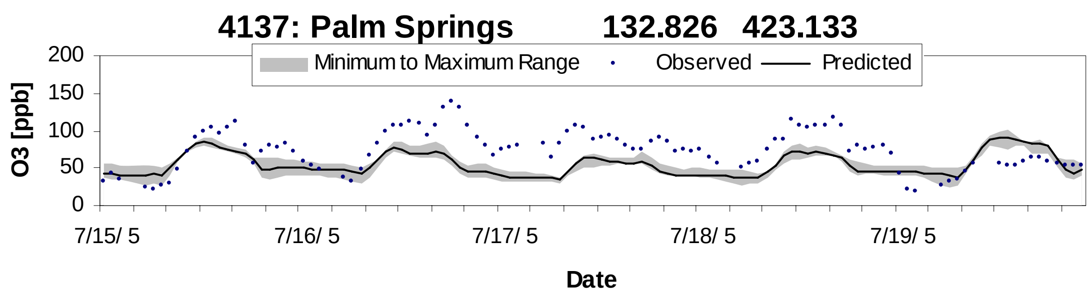

4149: Perris 69.051 417.376
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date



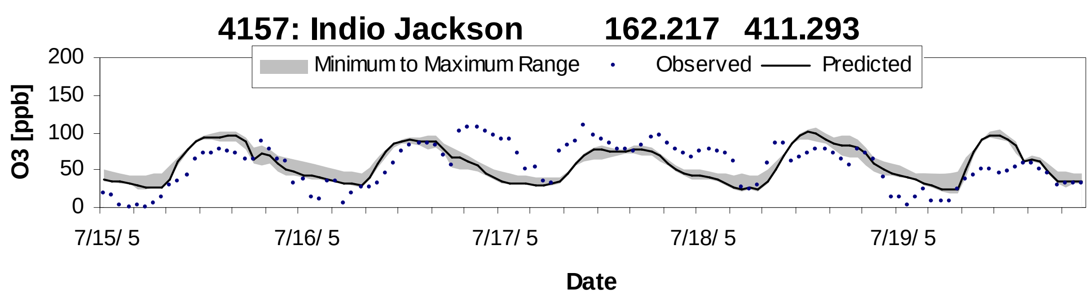
5204: Redlands 76.256 448.189
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date



4164: Banning Airport 104.459 433.527
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

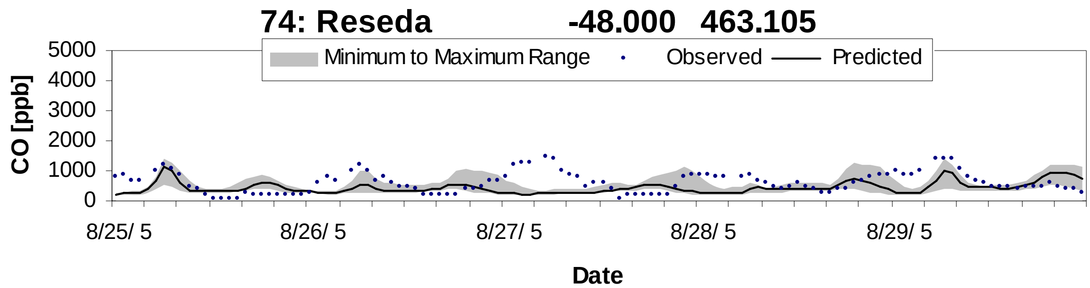


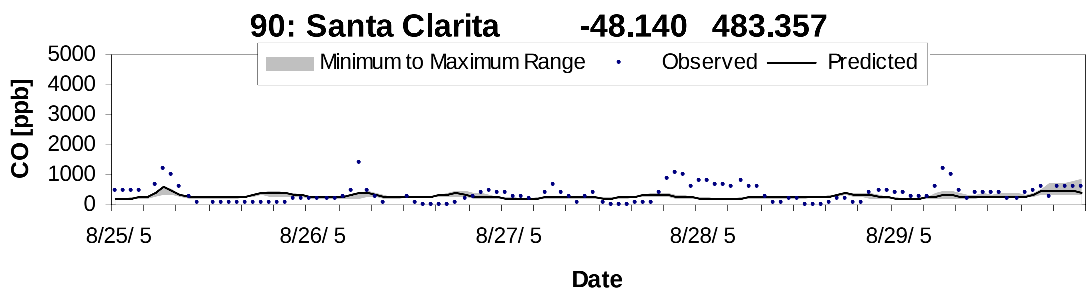
4137: Palm Springs 132.826 423.133
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

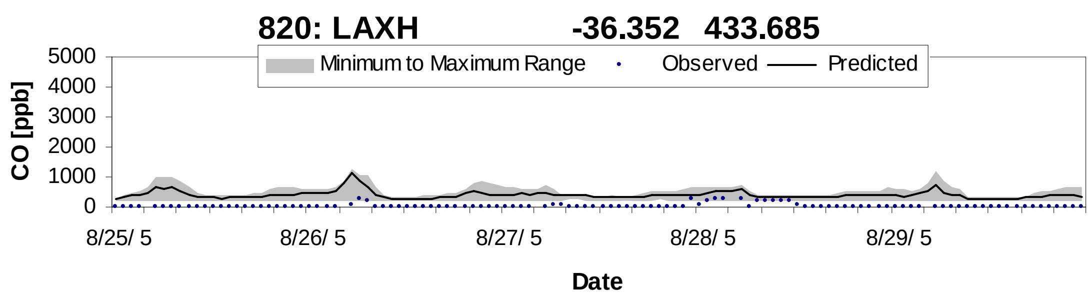


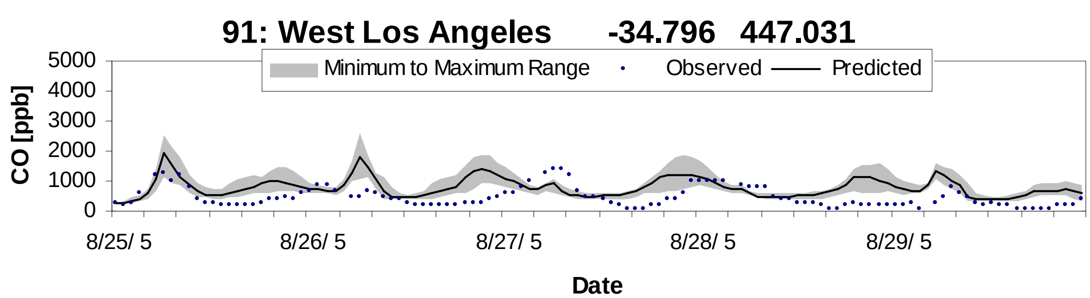
4157: Indio Jackson 162.217 411.293
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
7/15/ 5
7/16/ 5
7/17/ 5
7/18/ 5
7/19/ 5
Date

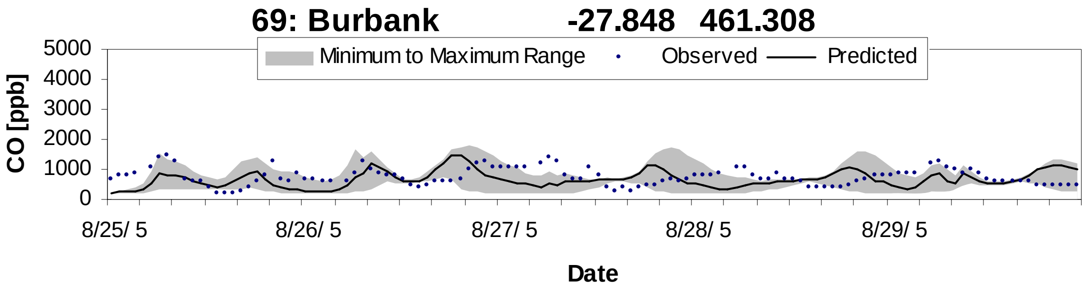
August 25-29, CALMET mA01

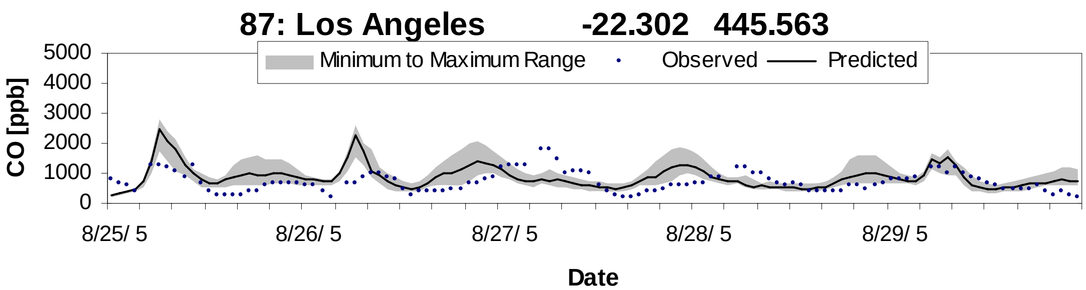


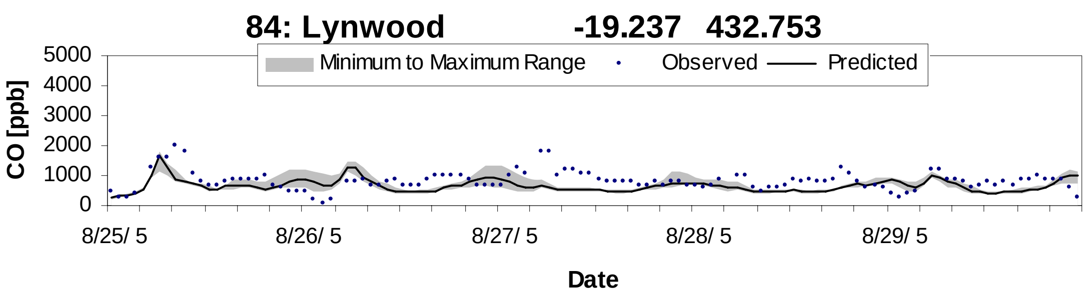


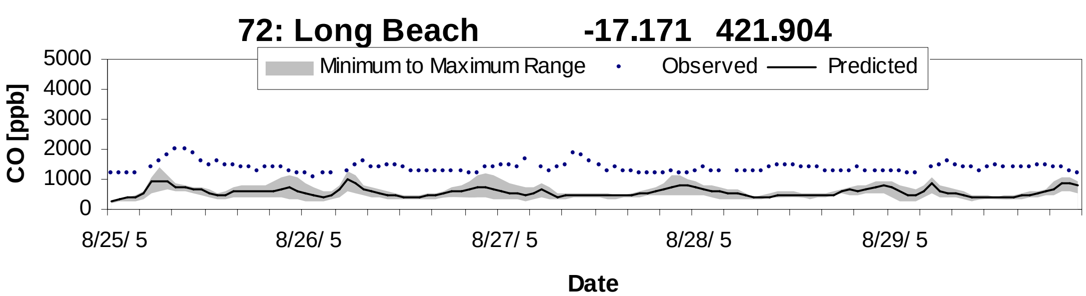


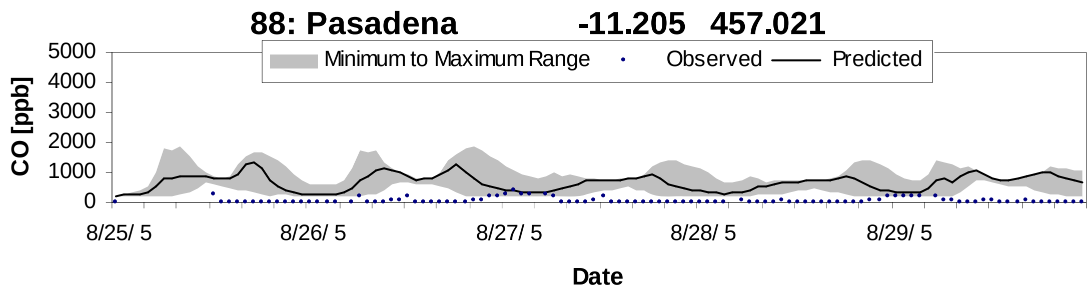


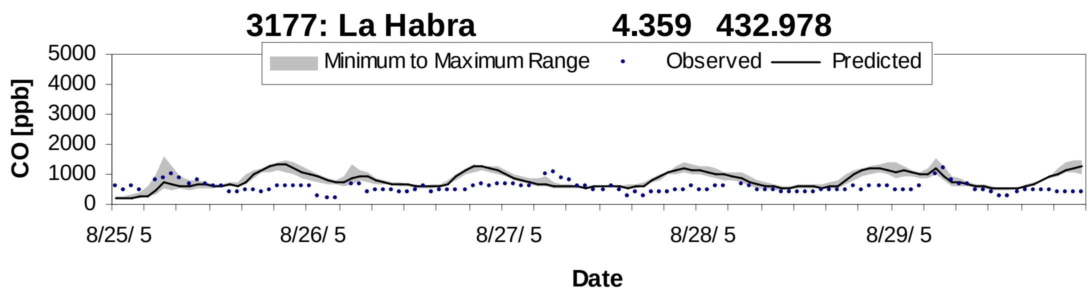

69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

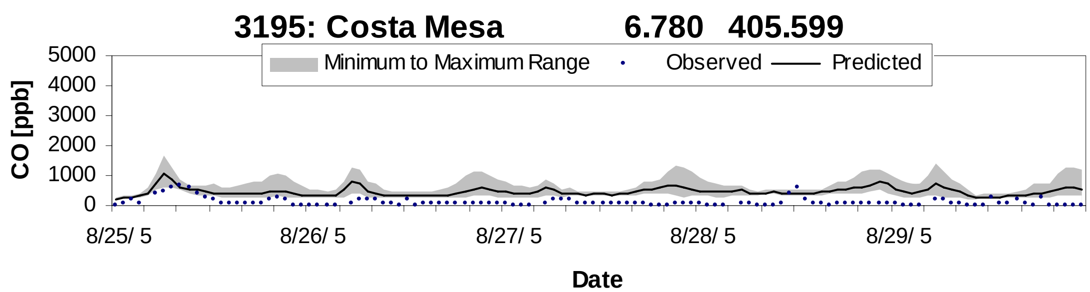

87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

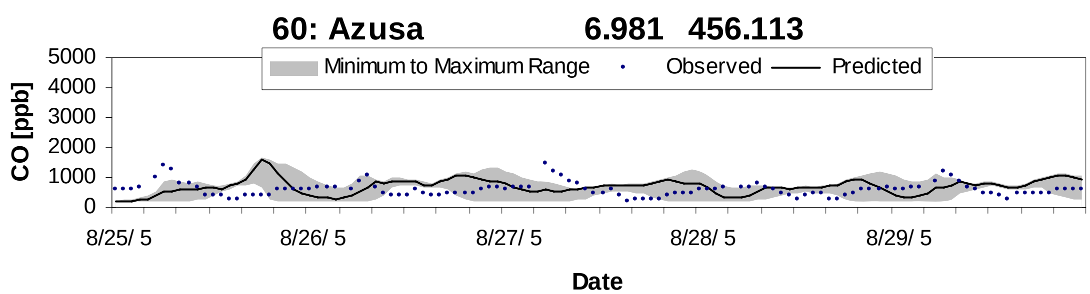

84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

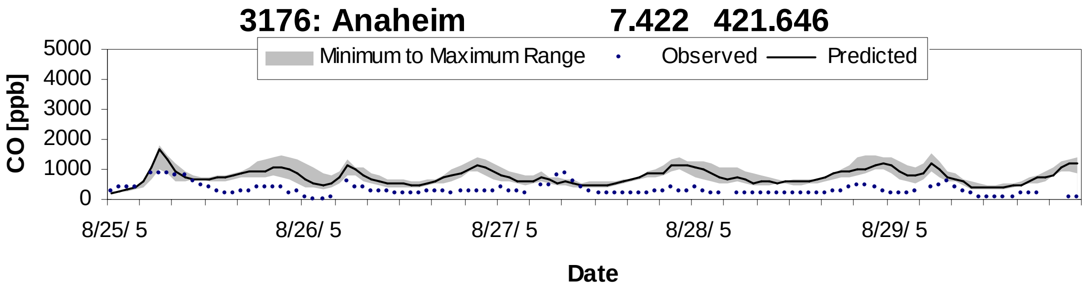

72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

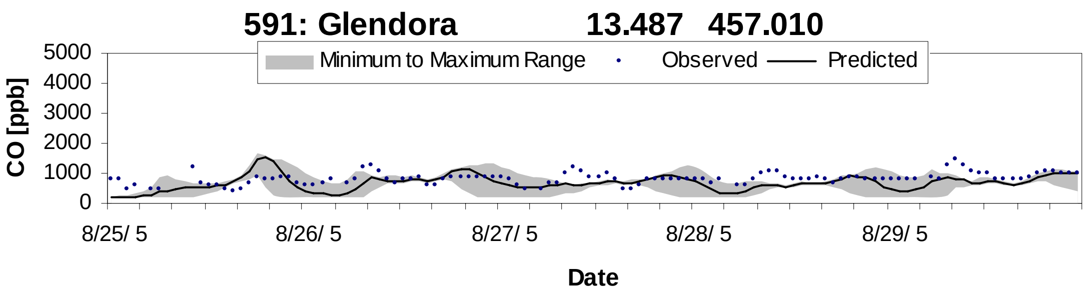

88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

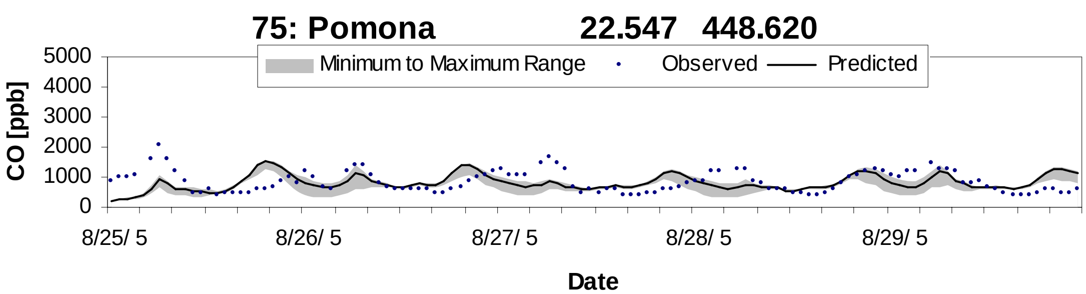

3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

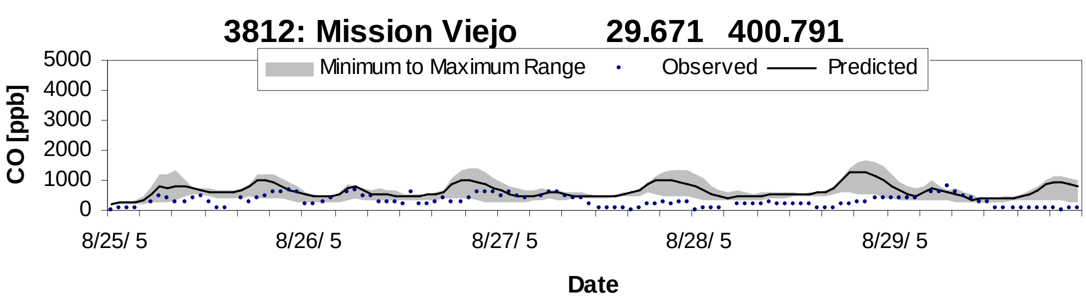

3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

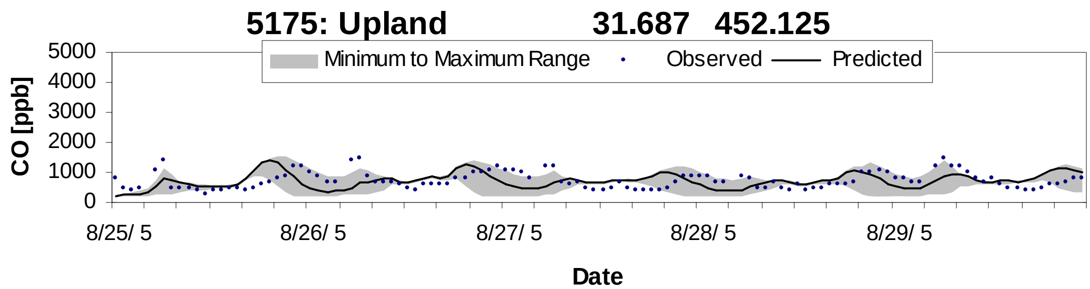

60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

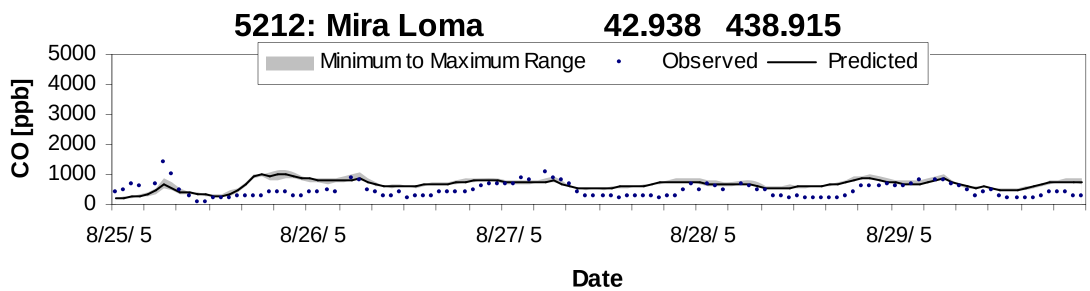

3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

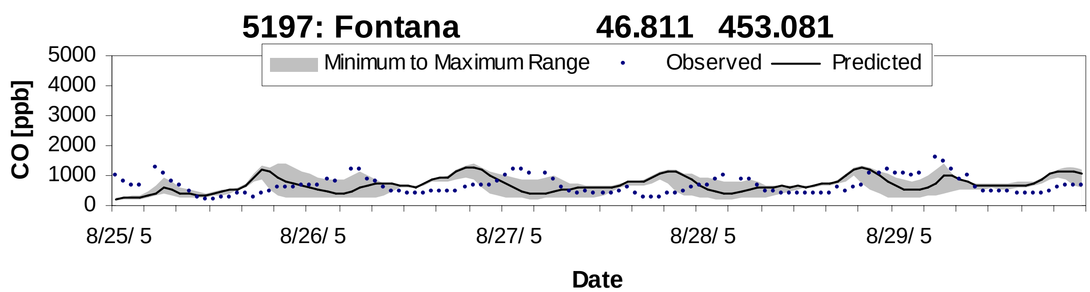

591: Glendora 13.487 457.010
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

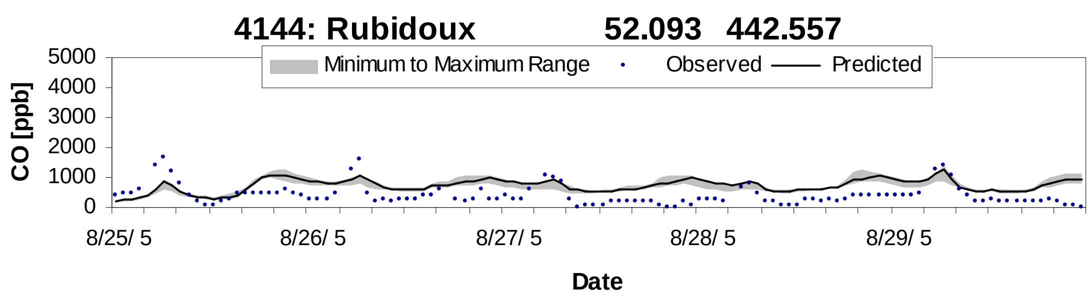

75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

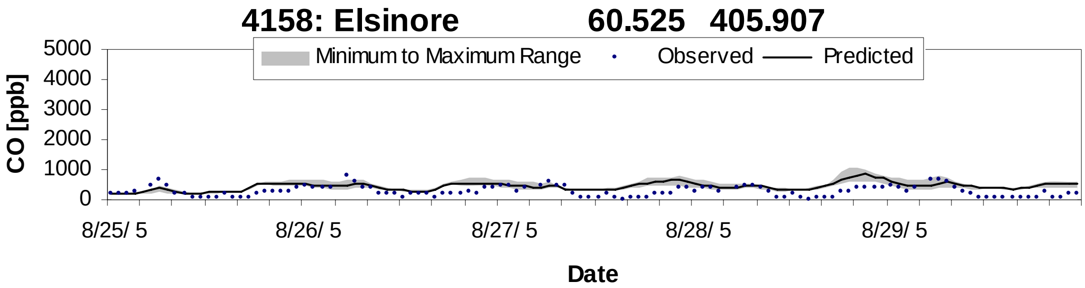

3812: Mission Viejo 29.671 400.791
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

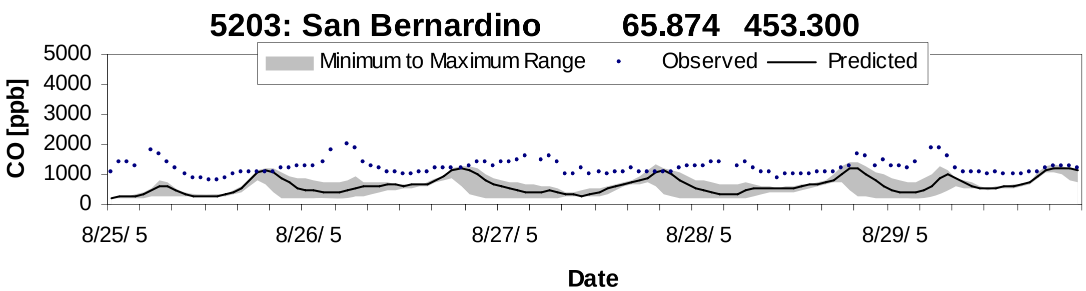

5175: Upland
31.687 452.125
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

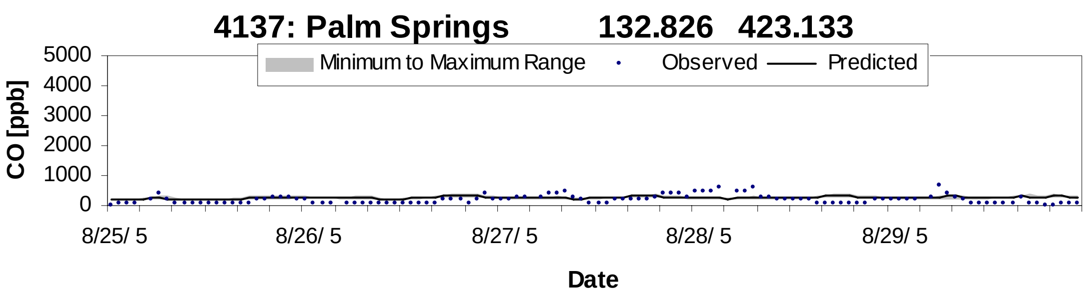

5212: Mira Loma
42.938 438.915
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date


5197: Fontana
46.811 453.081
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date


4144: Rubidoux
52.093 442.557
Minimum to Maximum Range
Observed
Predicted
CO [ppb]
5000
4000
3000
2000
1000
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date







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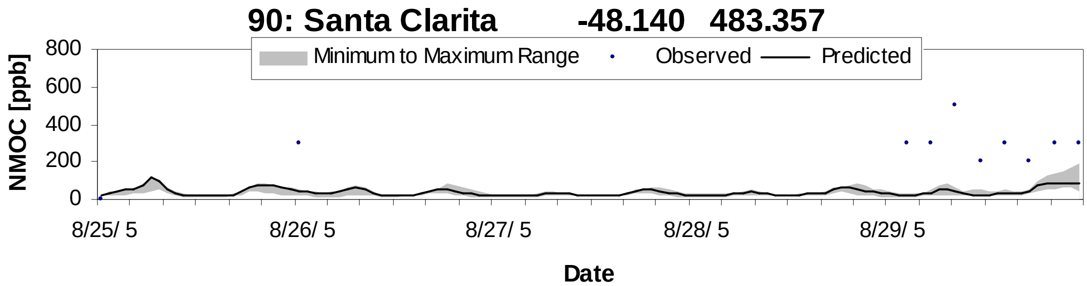
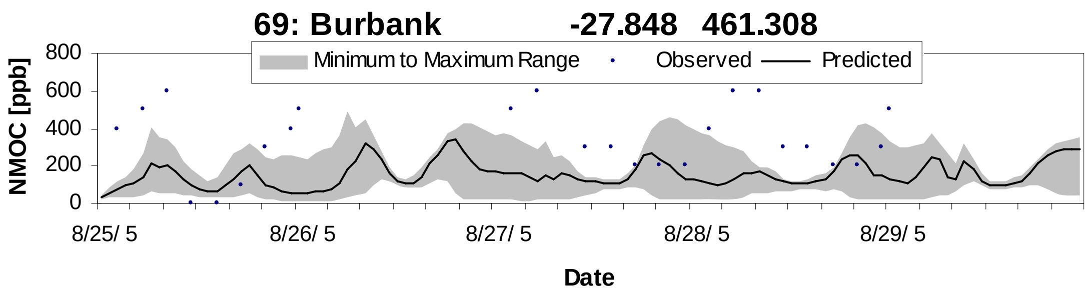
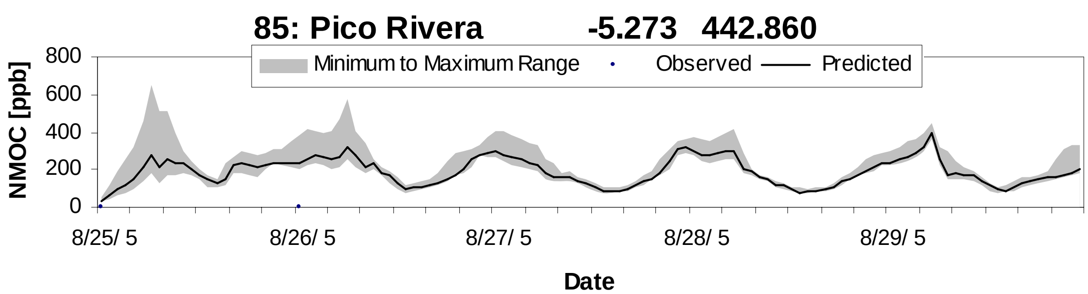
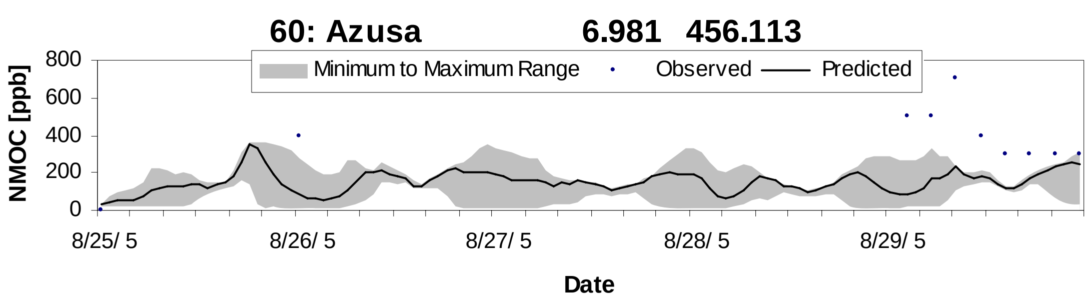
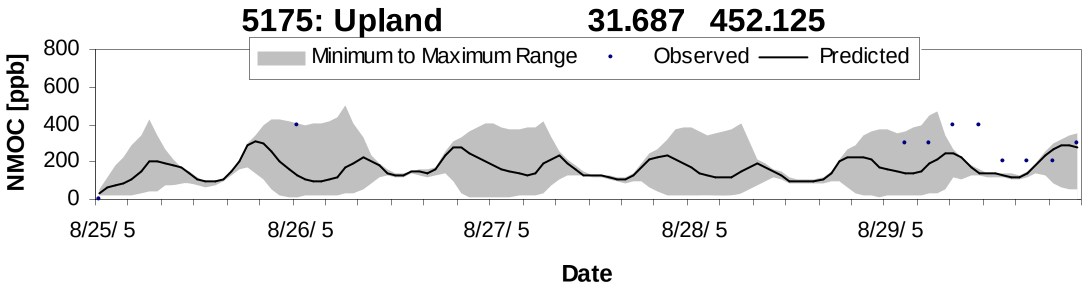
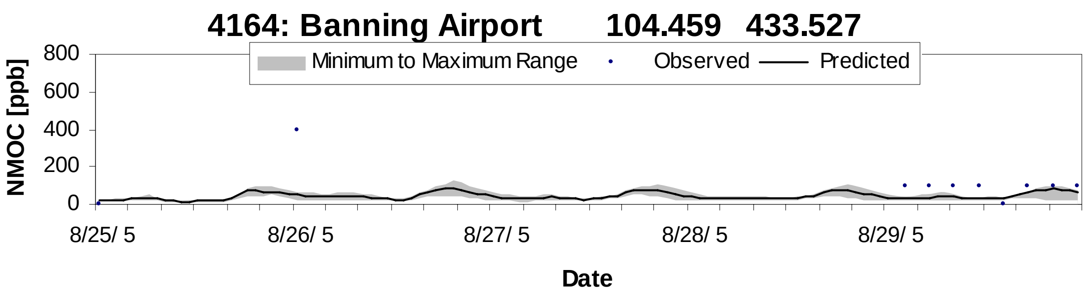

90: Santa Clarita -48.140 483.357
Minimum to Maximum Range
Observed
Predicted
NMOC [ppb]
800
600
400
200
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date


69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
NMOC [ppb]
800
600
400
200
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

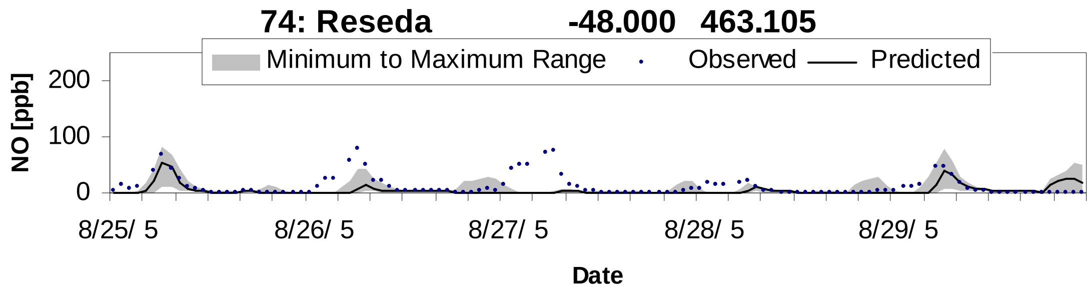

85: Pico Rivera -5.273 442.860
Minimum to Maximum Range
Observed
Predicted
NMOC [ppb]
800
600
400
200
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

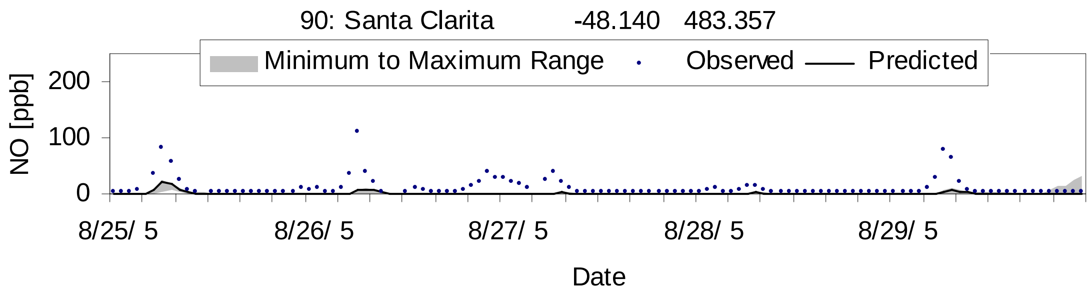

60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
NMOC [ppb]
800
600
400
200
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

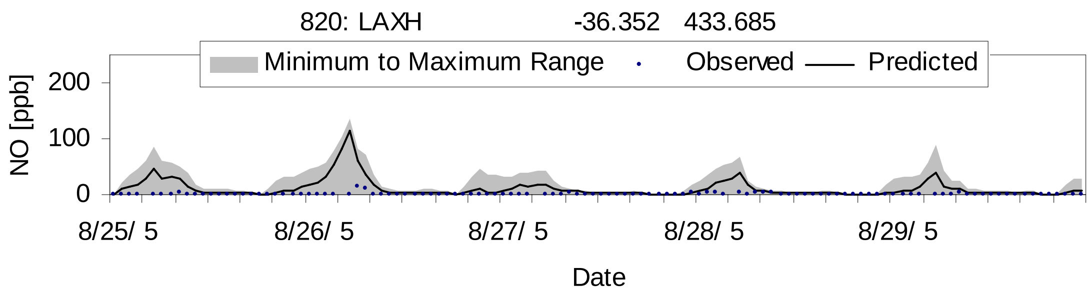

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
NMOC [ppb]
800
600
400
200
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

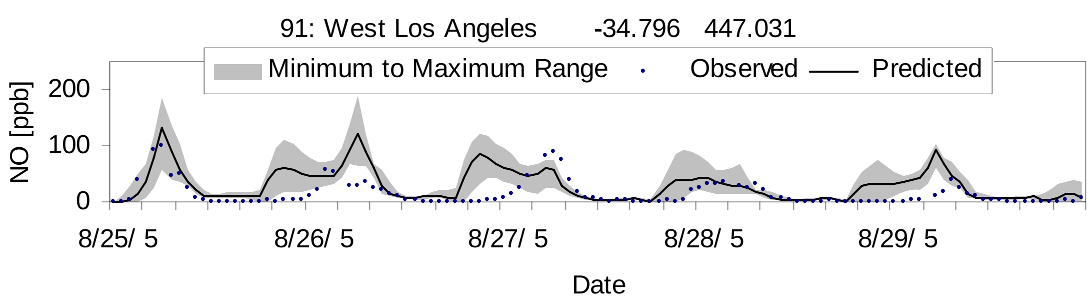

4164: Banning Airport 104.459 433.527
Minimum to Maximum Range
Observed
Predicted
NMOC [ppb]
800
600
400
200
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

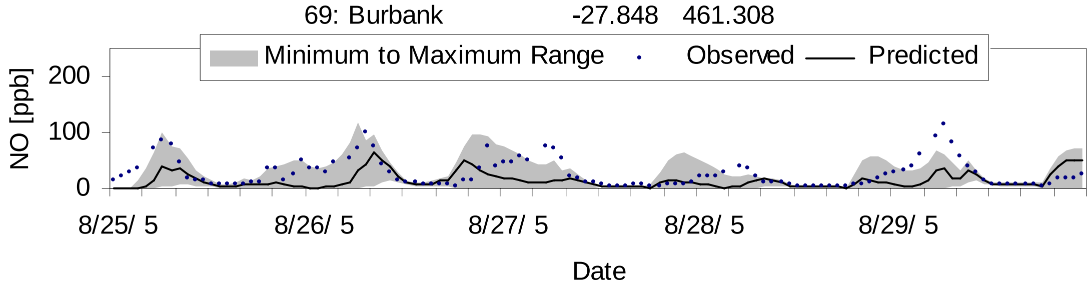
August 25-29, CALMET mA01

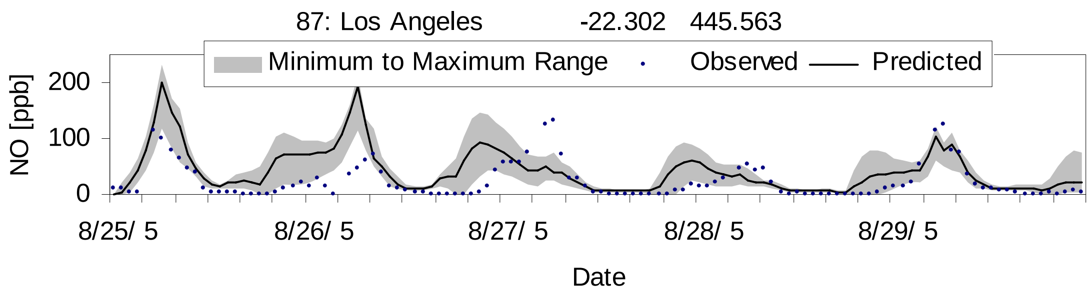


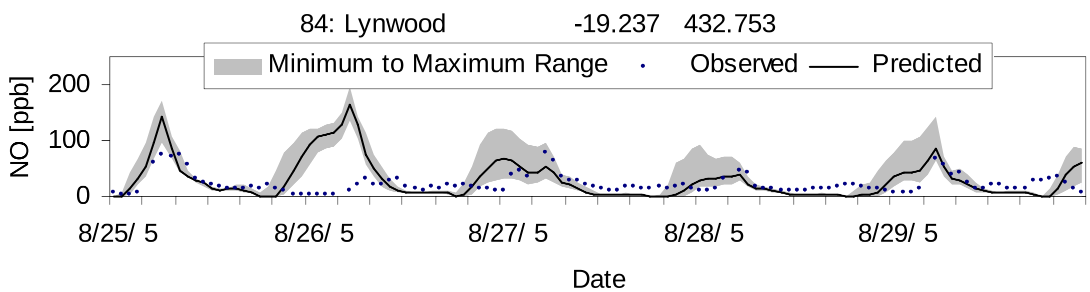


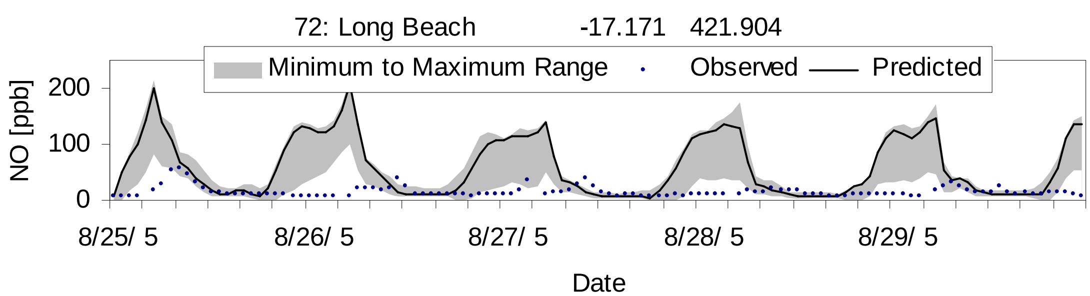


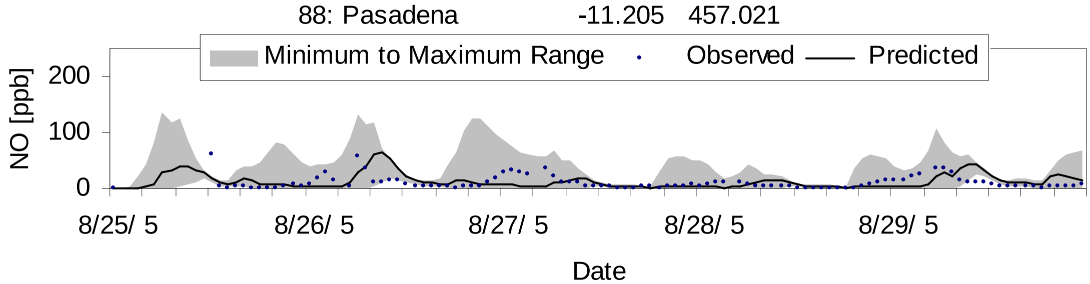


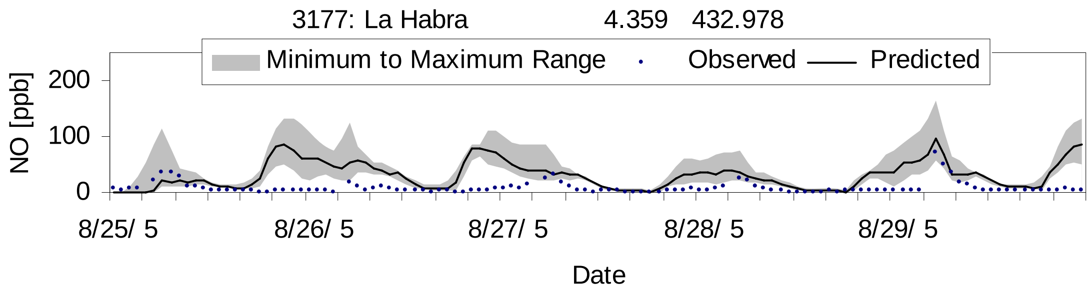

69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

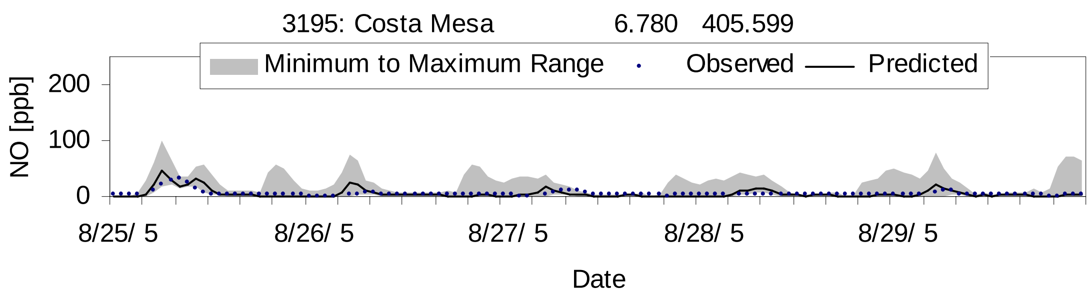

87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

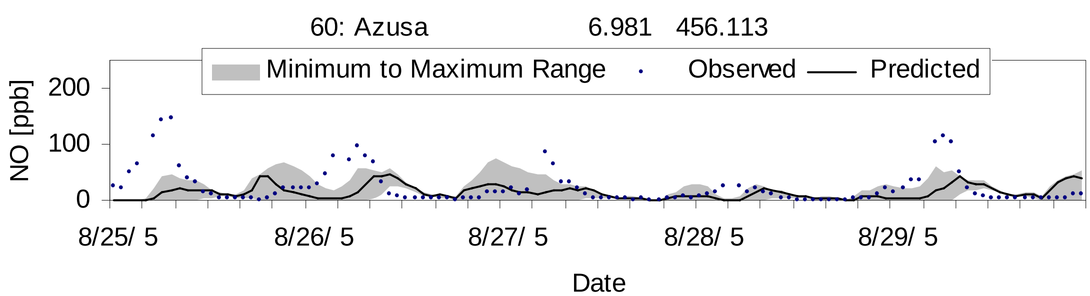

84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

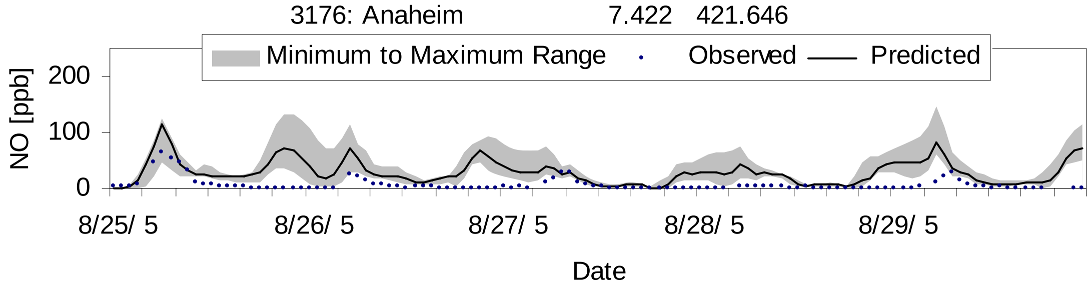

72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date


88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

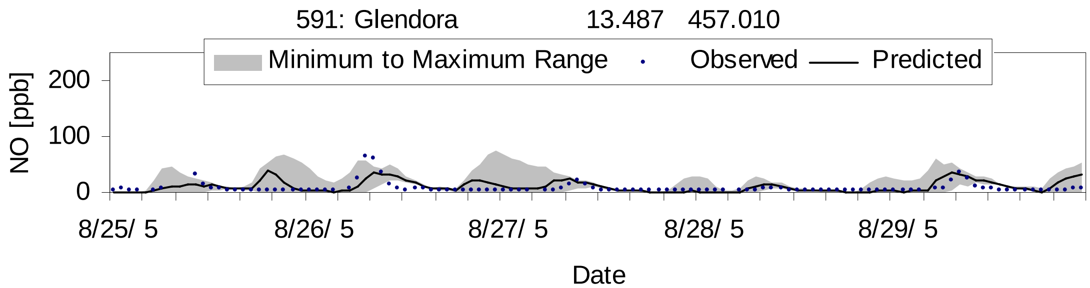

3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date


3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

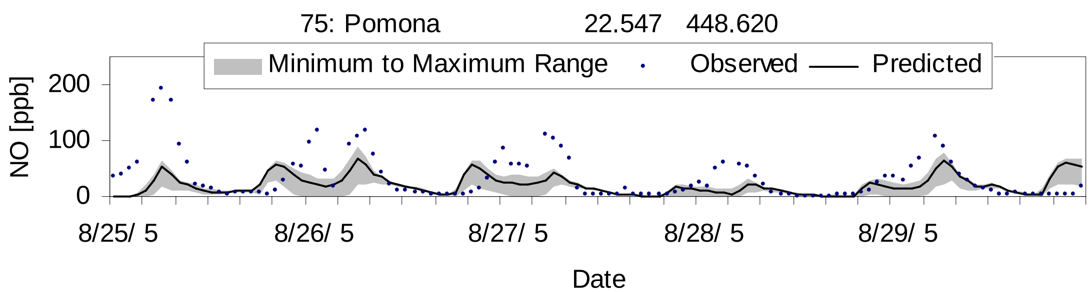

60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date



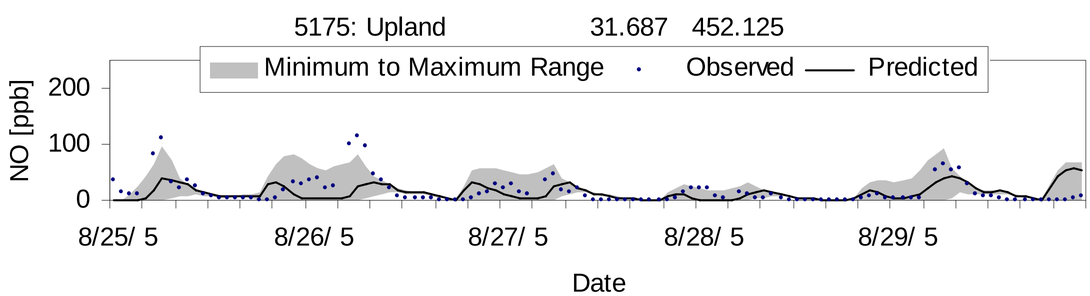
3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date



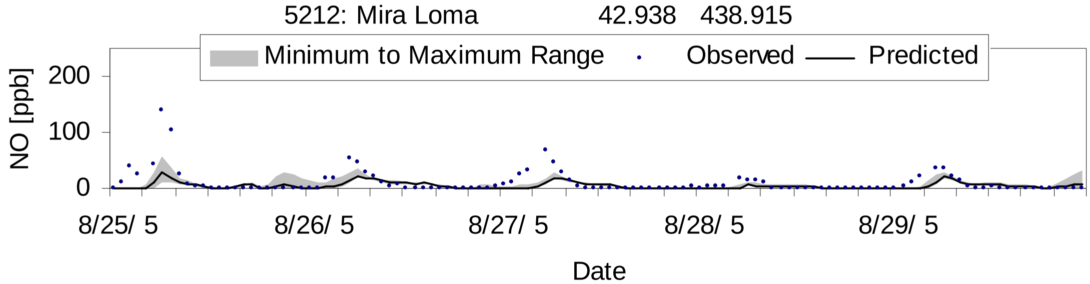
591: Glendora 13.487 457.010
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

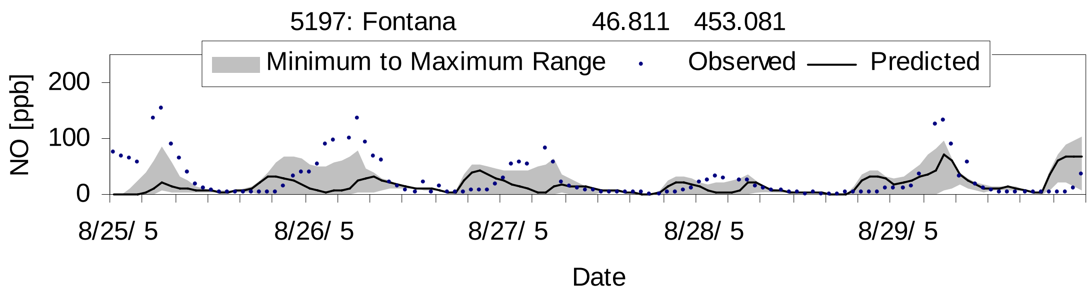


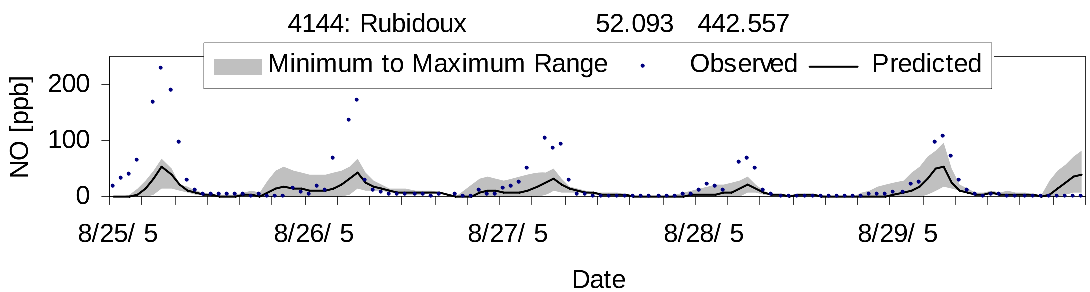
75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

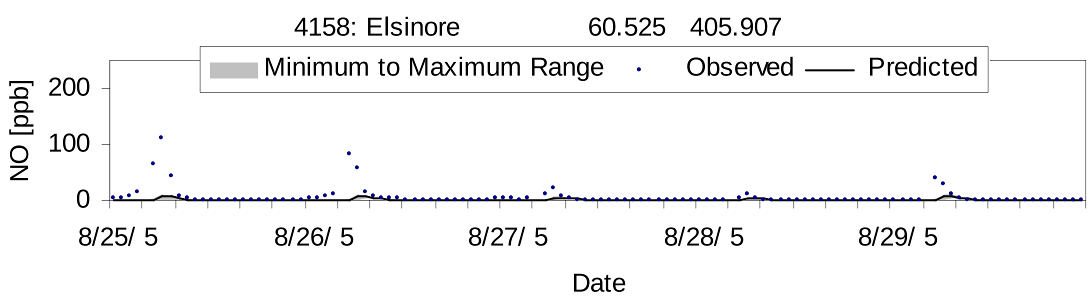


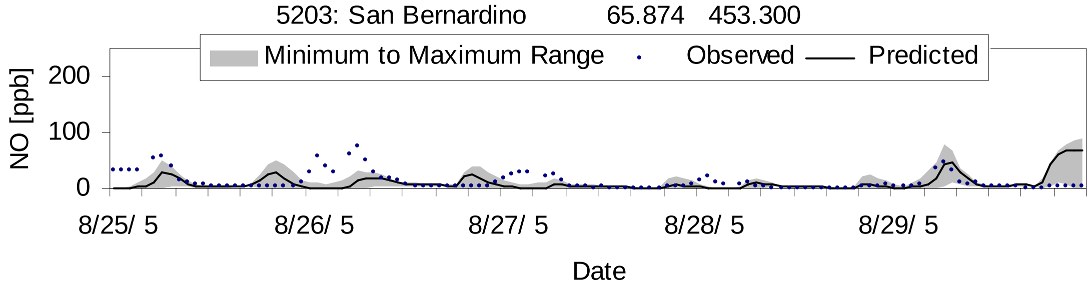
5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

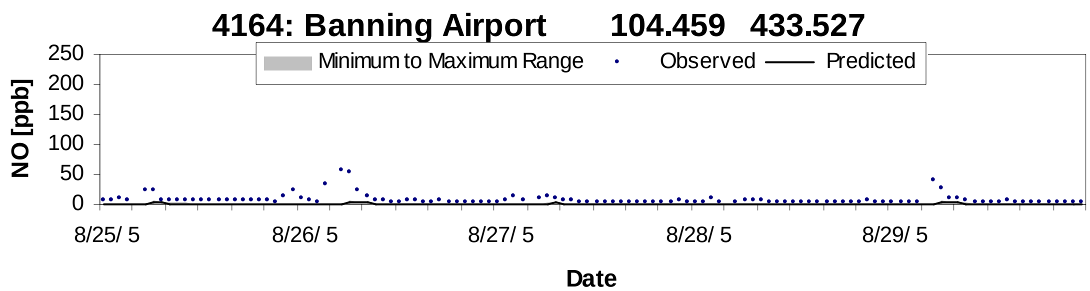

5212: Mira Loma 42.938 438.915
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

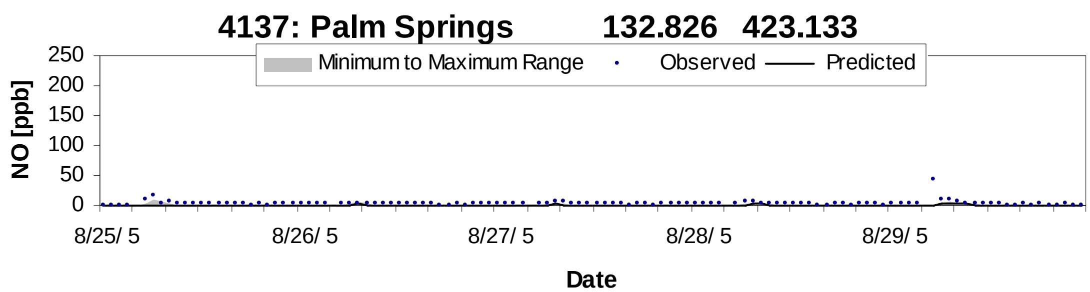

5197: Fontana 46.811 453.081
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date


4144: Rubidoux 52.093 442.557
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

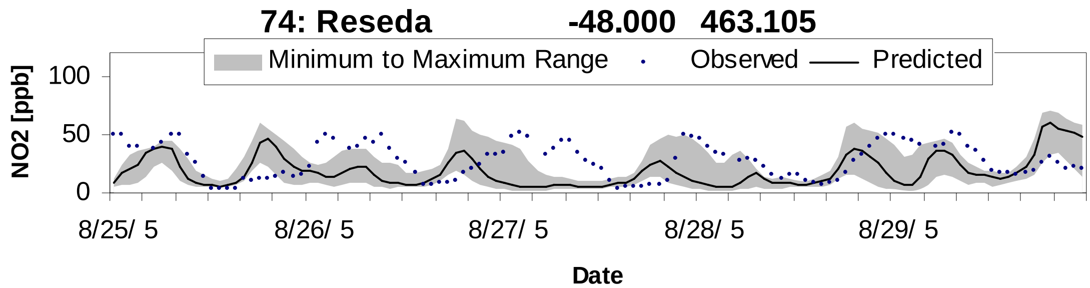

4158: Elsinore 60.525 405.907
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

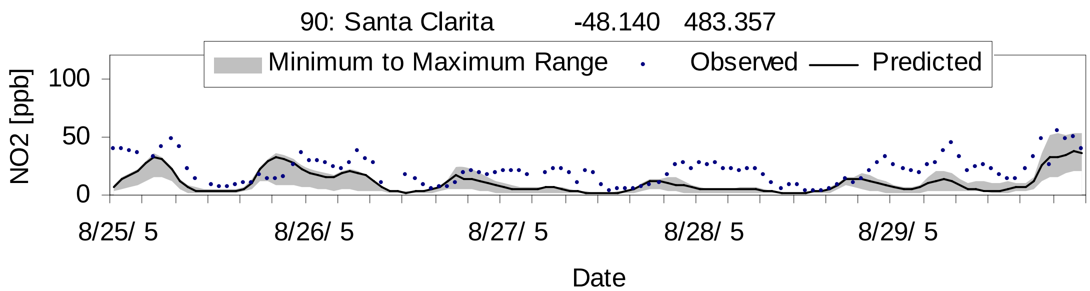

5203: San Bernardino 65.874 453.300
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
200
100
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

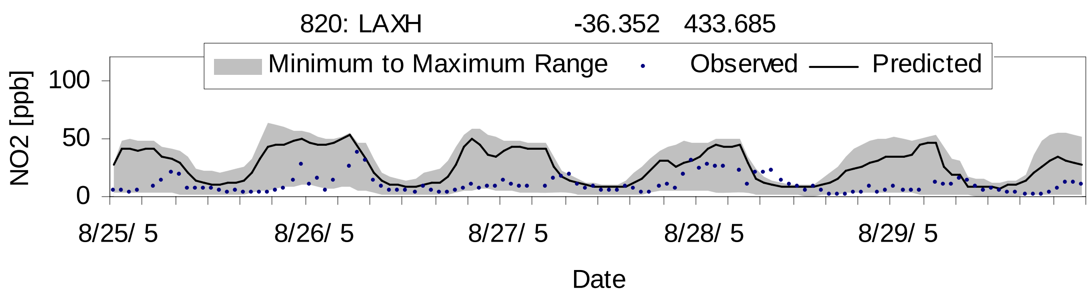

4164: Banning Airport 104.459 433.527
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
250
200
150
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

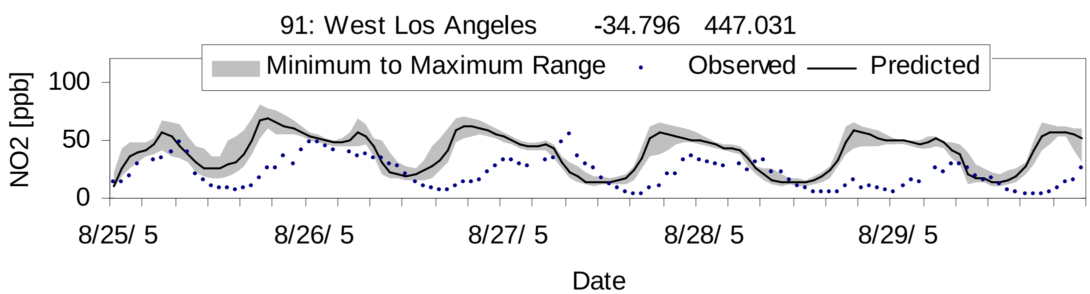

4137: Palm Springs 132.826 423.133
Minimum to Maximum Range
Observed
Predicted
NO [ppb]
250
200
150
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

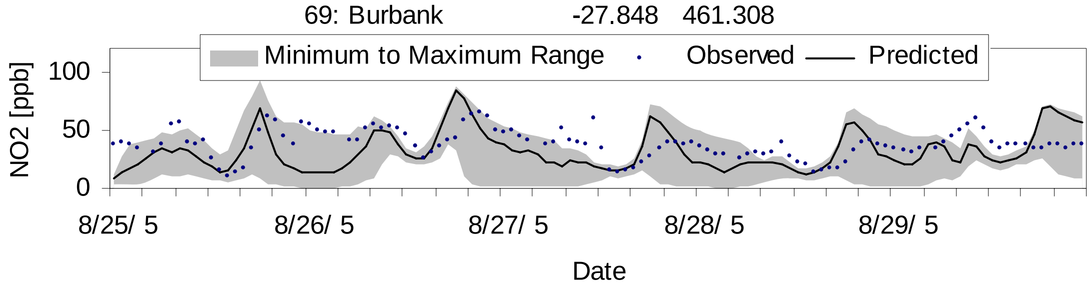
August 25-29, CALMET mA01

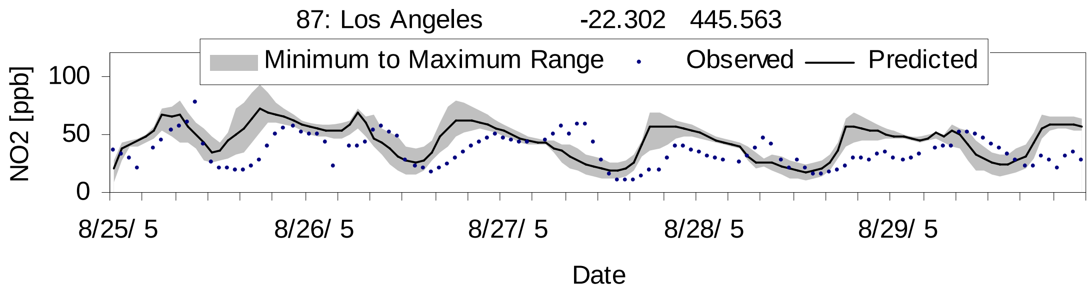


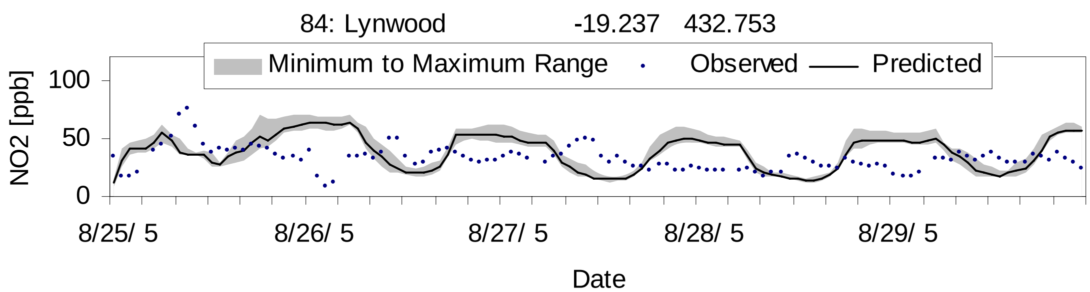


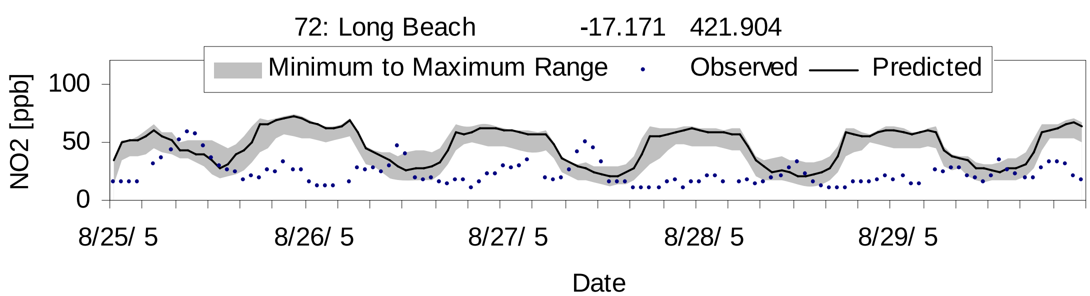


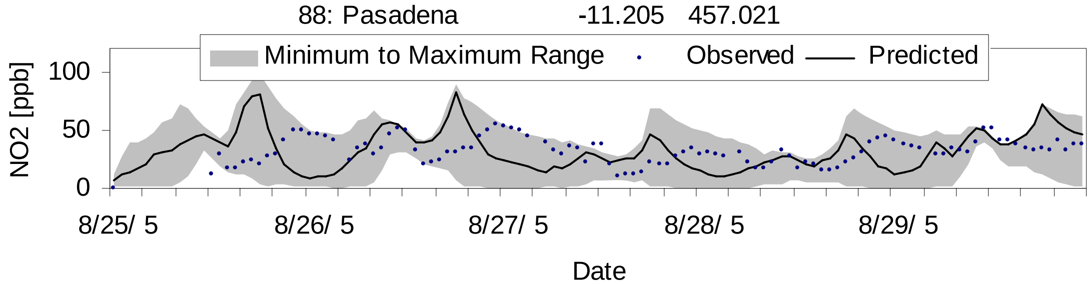


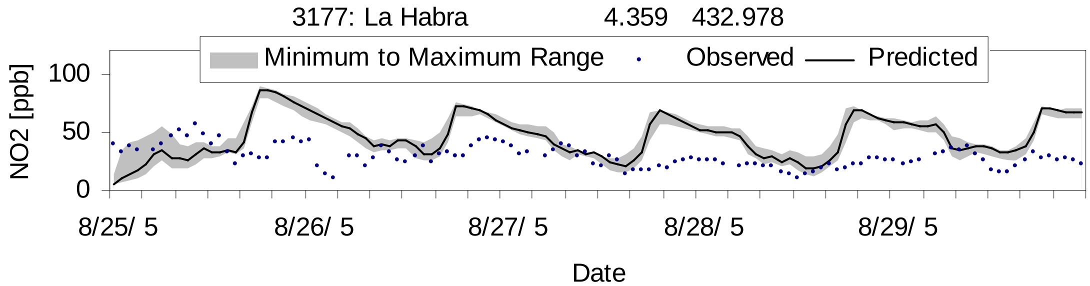

69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

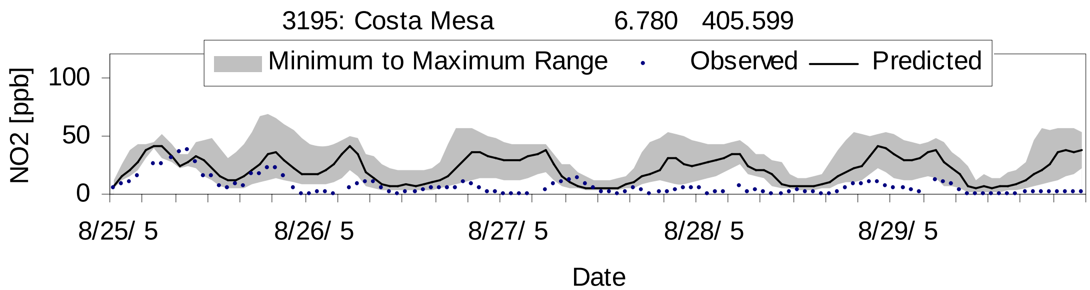

87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

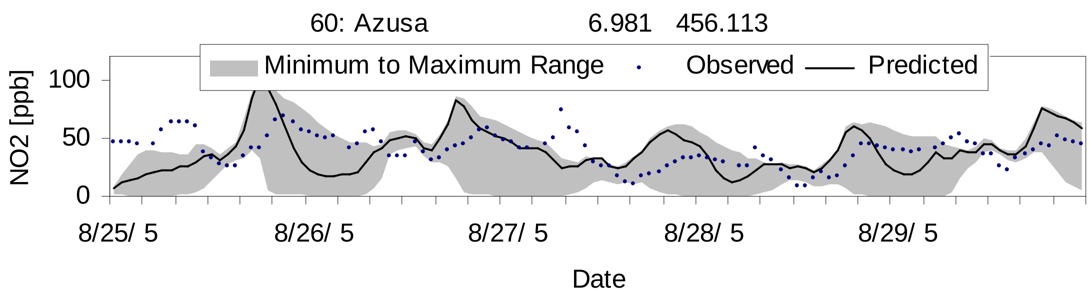

84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

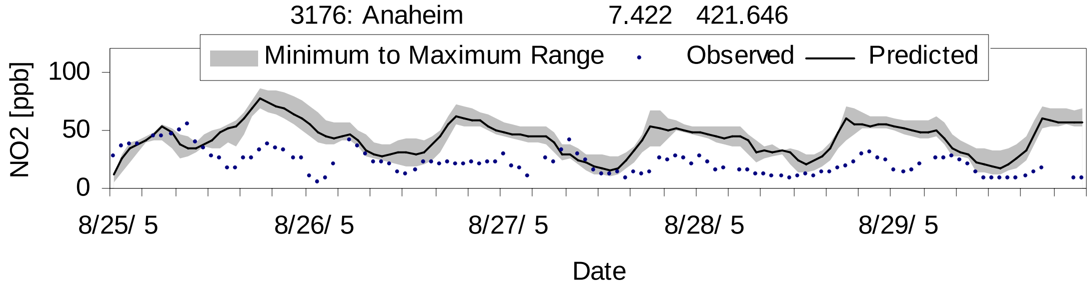

72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

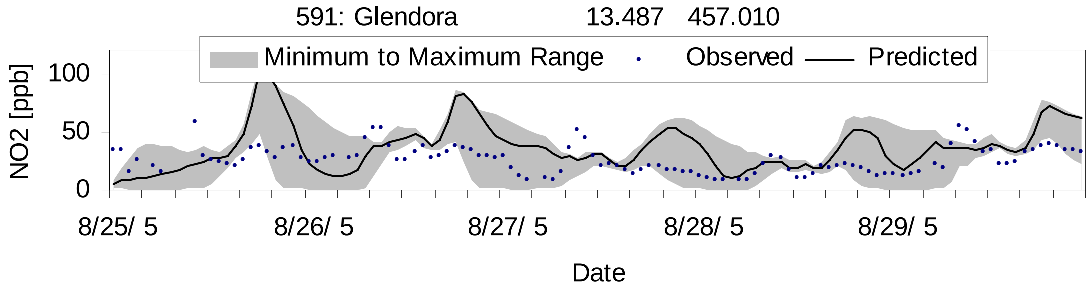

88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

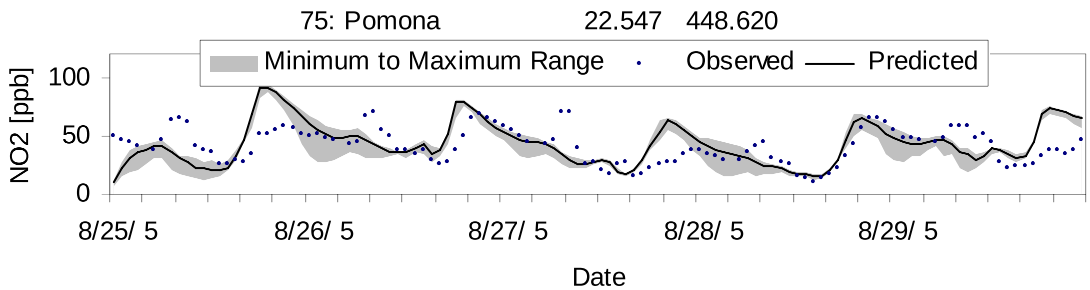

3177: La Habra 4.359 432.978
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

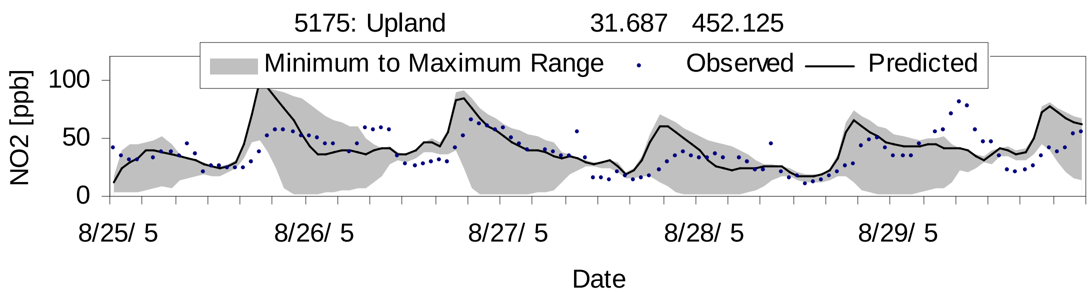

3195: Costa Mesa 6.780 405.599
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

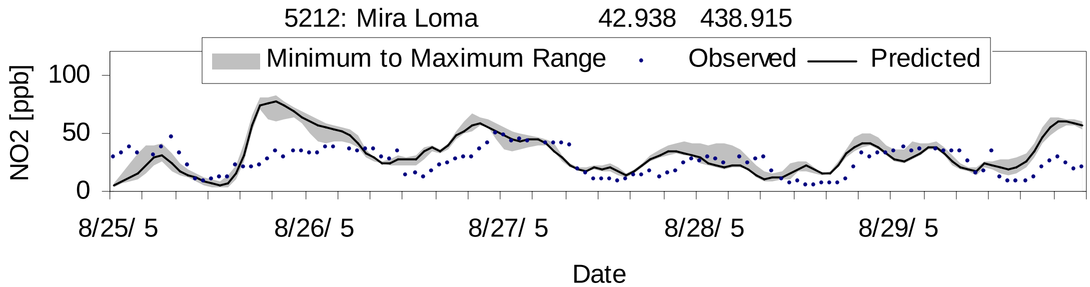

60: Azusa 6.981 456.113
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

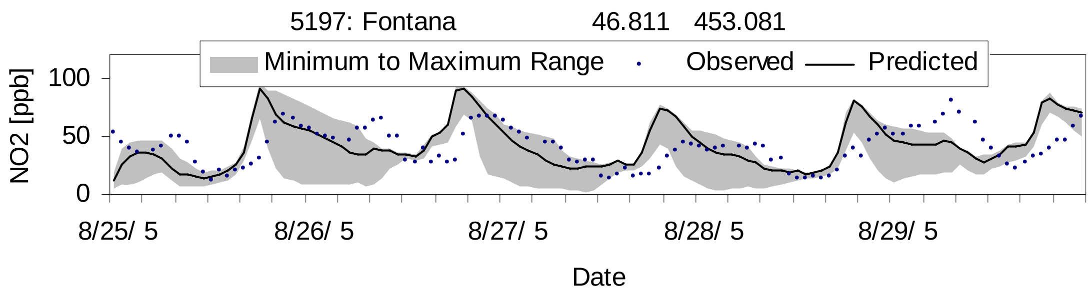

3176: Anaheim 7.422 421.646
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

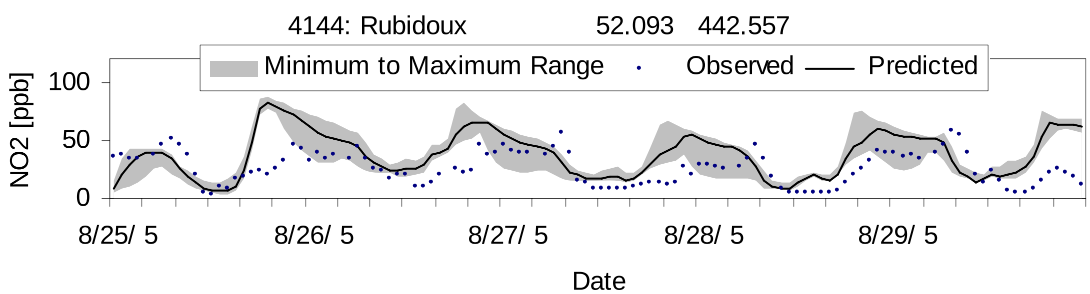

591: Glendora 13.487 457.010
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

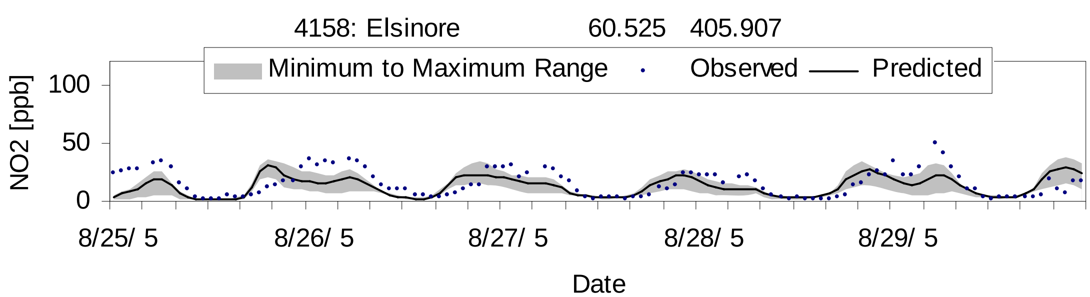

75: Pomona 22.547 448.620
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

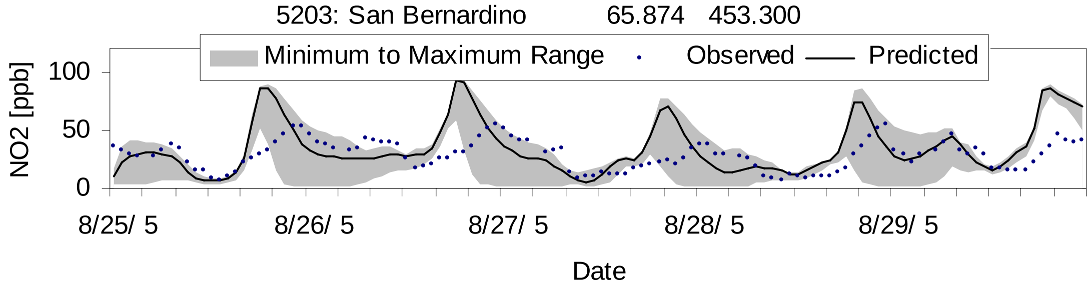

5175: Upland 31.687 452.125
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

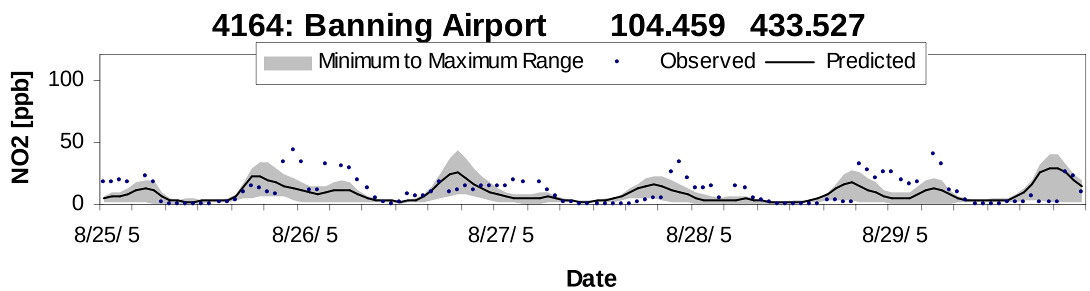

5212: Mira Loma 42.938 438.915
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

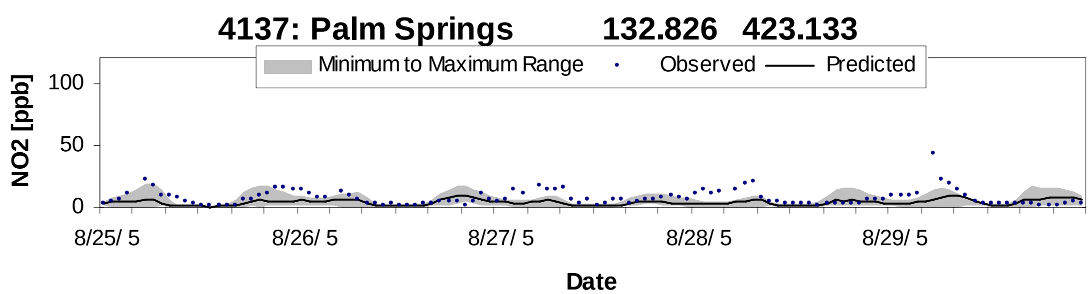

5197: Fontana 46.811 453.081
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date


4144: Rubidoux 52.093 442.557
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

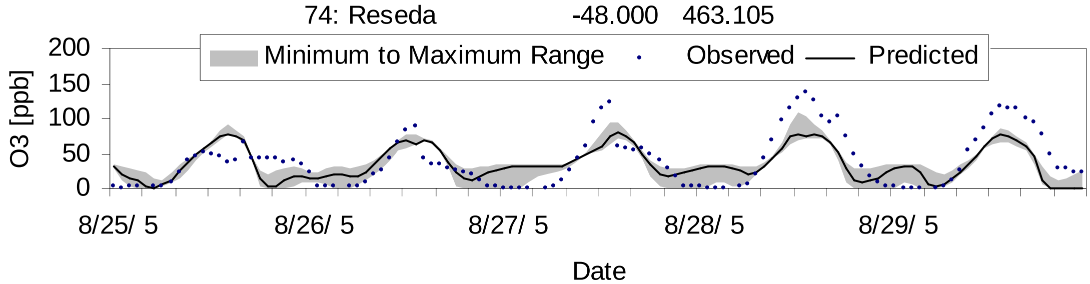

4158: Elsinore 60.525 405.907
Minimum to Maximum Range
Observed
Predicted
NO2 [ppb]
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

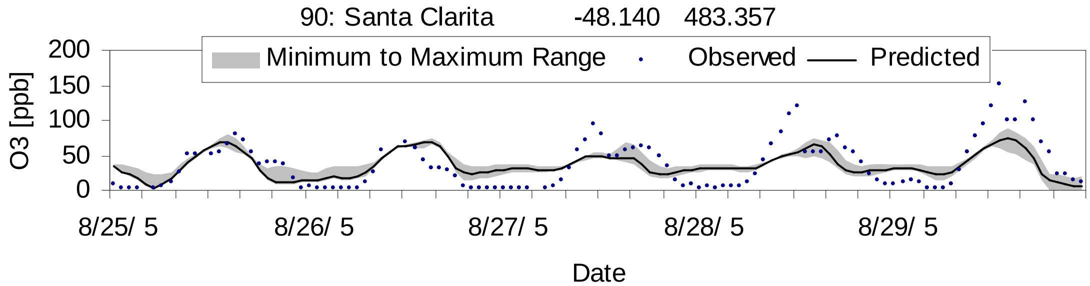


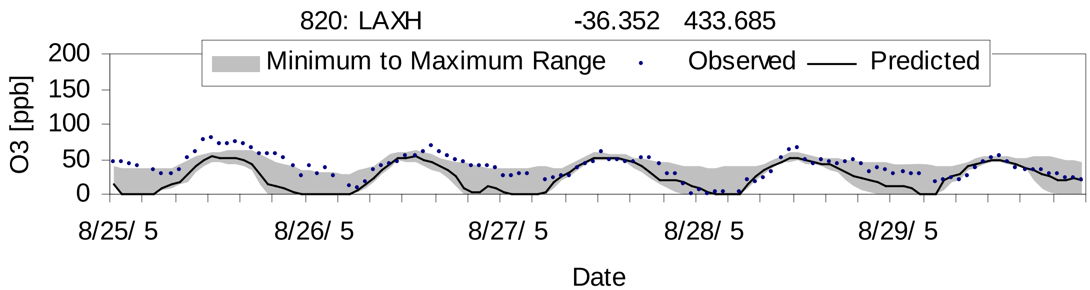


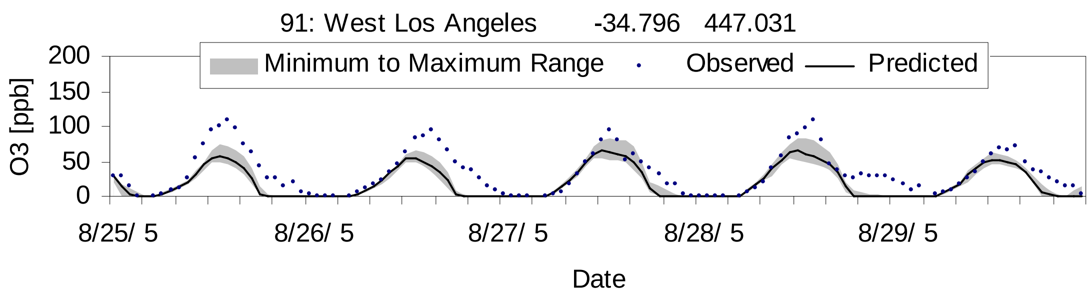


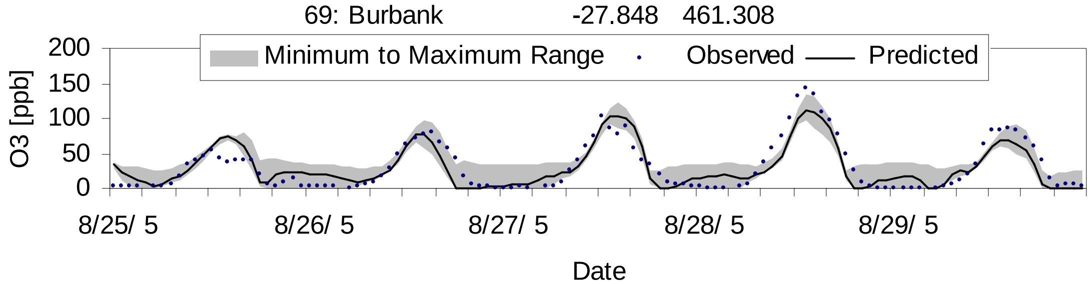
August 25-29, CALMET mA01

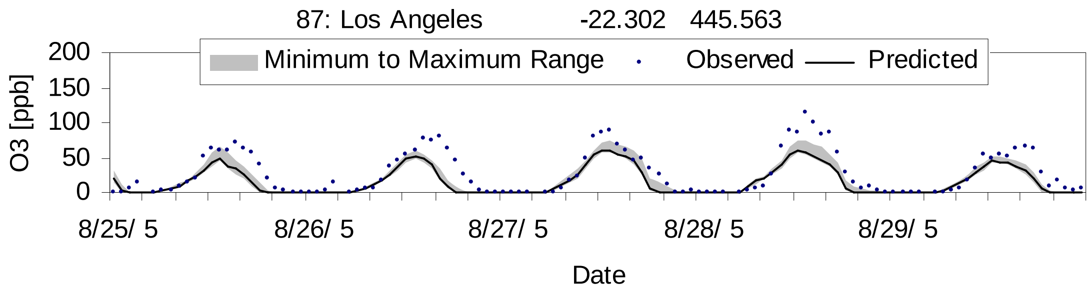

74: Reseda -48.000 463.105
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

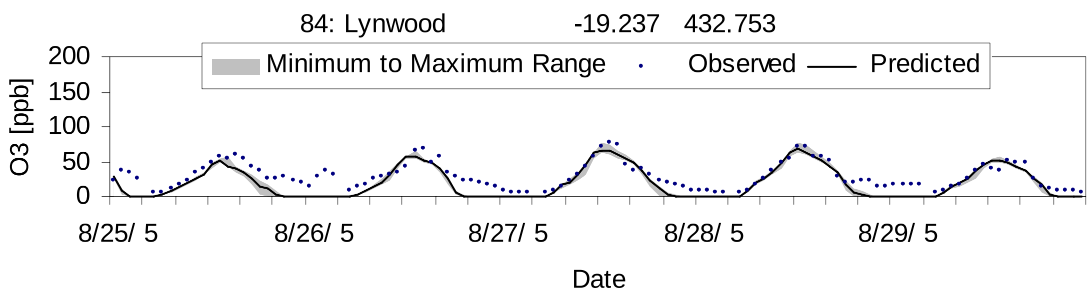

90: Santa Clarita -48.140 483.357
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

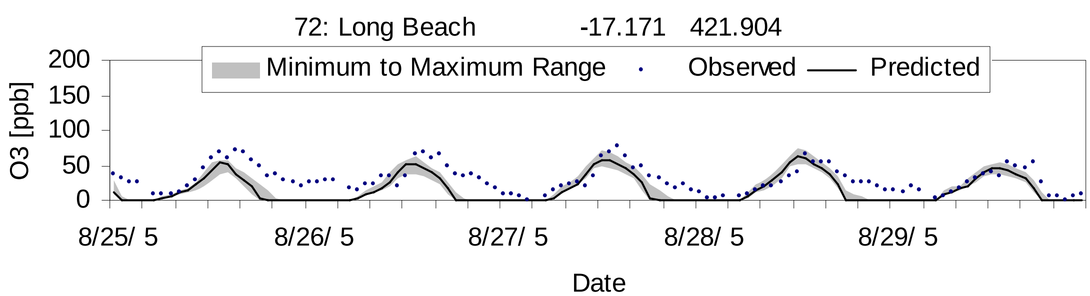

820: LAXH -36.352 433.685
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

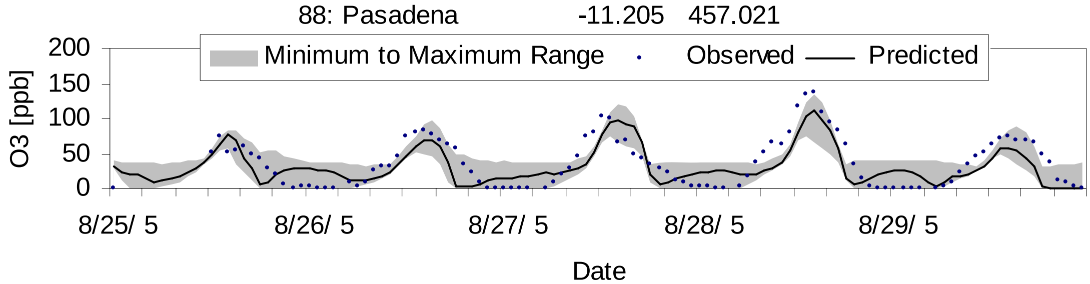

91: West Los Angeles -34.796 447.031
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

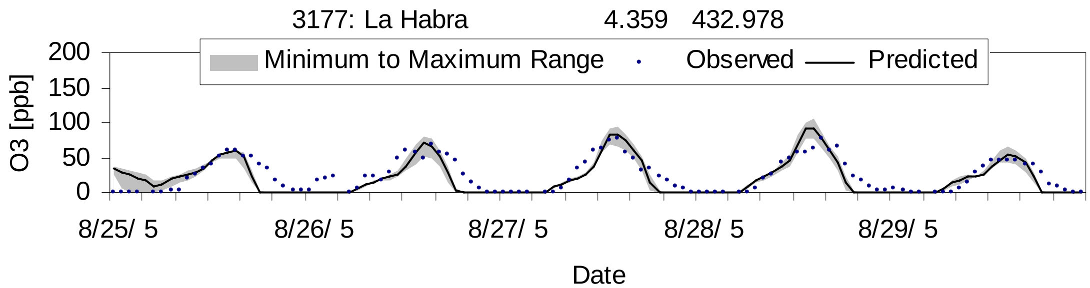

69: Burbank -27.848 461.308
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date


87: Los Angeles -22.302 445.563
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date


84: Lynwood -19.237 432.753
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date


72: Long Beach -17.171 421.904
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date


88: Pasadena -11.205 457.021
Minimum to Maximum Range
Observed
Predicted
O3 [ppb]
200
150
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date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Predicted
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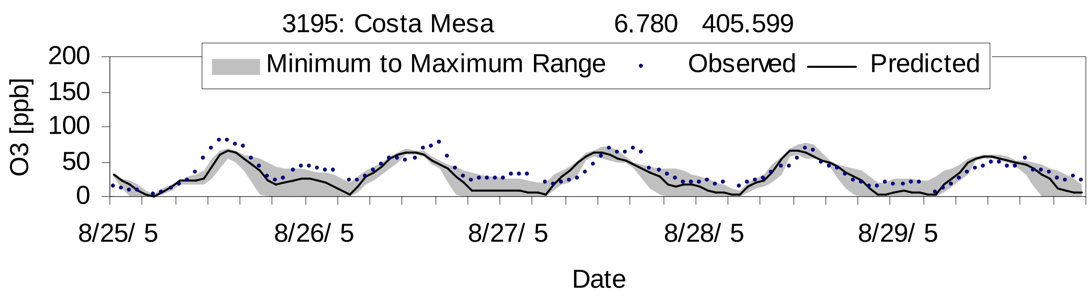
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date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Predicted
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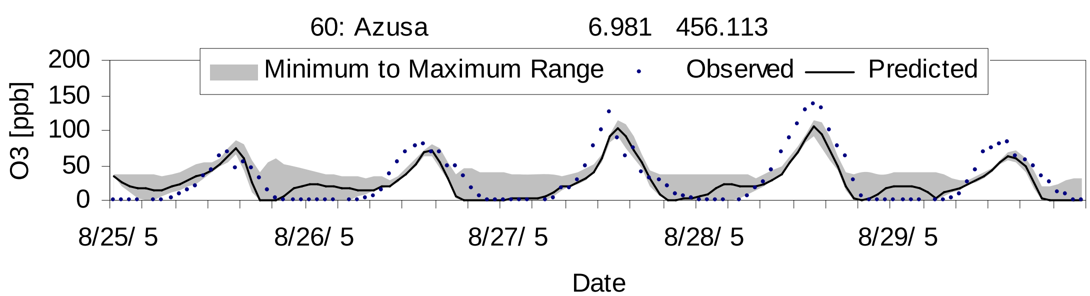
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date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Minimum to Maximum Range
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Predicted
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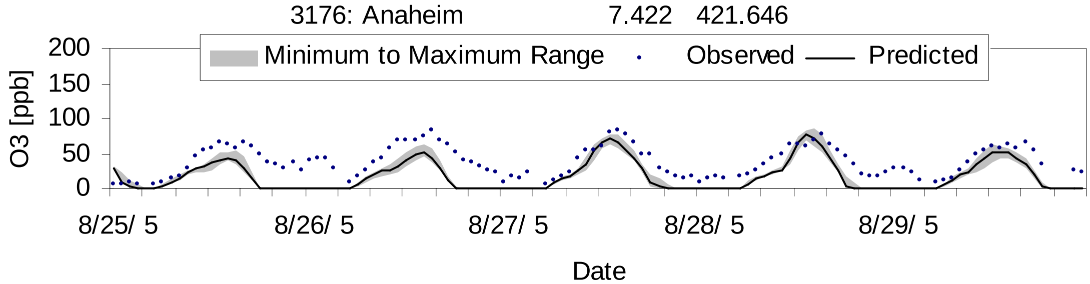
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date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Predicted
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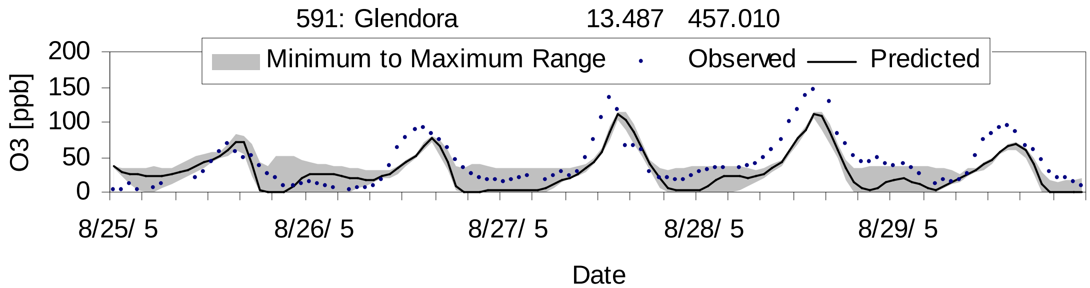
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date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Predicted
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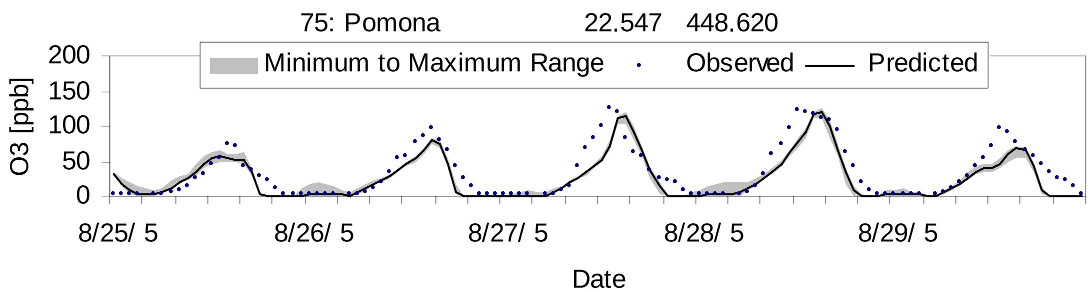
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date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Predicted
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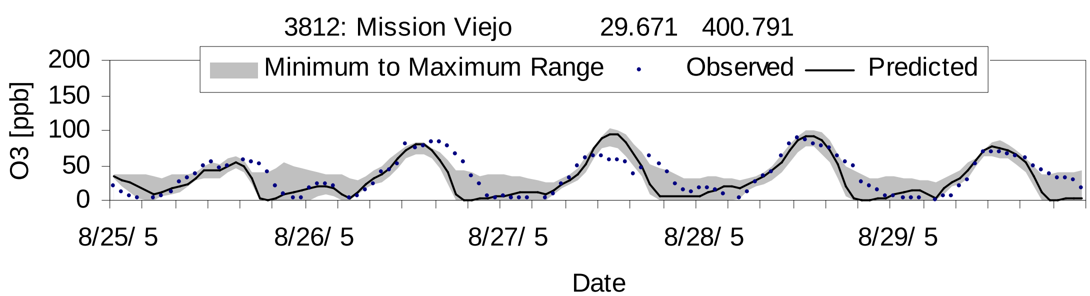
150
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date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Predicted
O3 [ppb]
200
150
100
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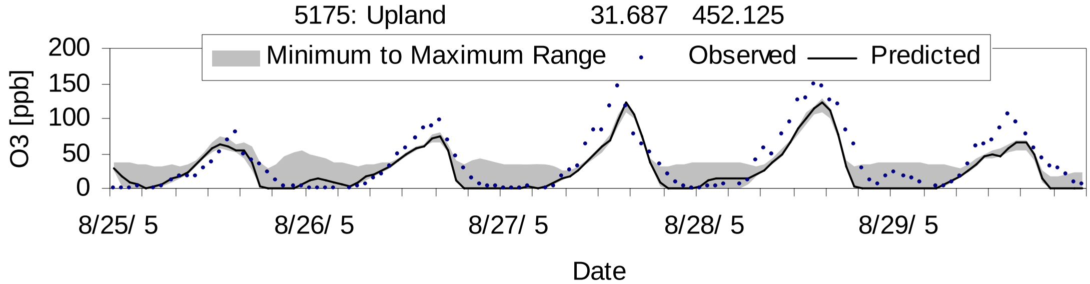
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date


5175: Upland 31.687 452.125
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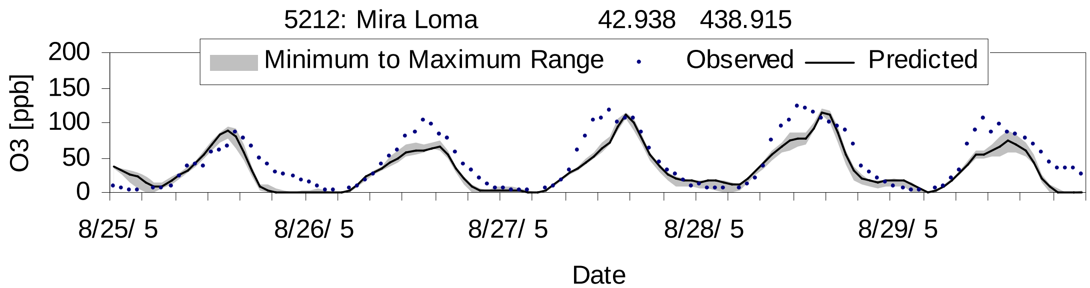
Predicted
O3 [ppb]
200
150
100
50
0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date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Predicted
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8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
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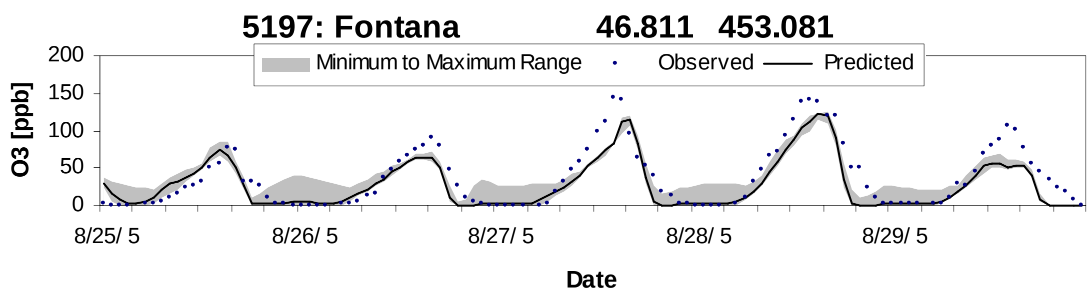
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Predicted
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150
100
50
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8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
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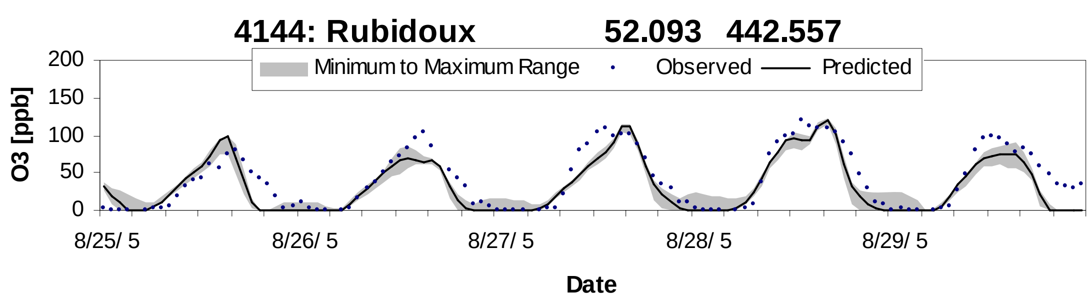
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Predicted
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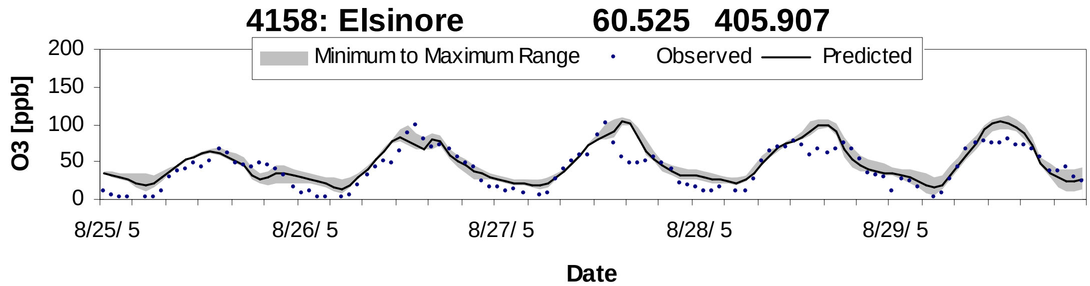
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date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Predicted
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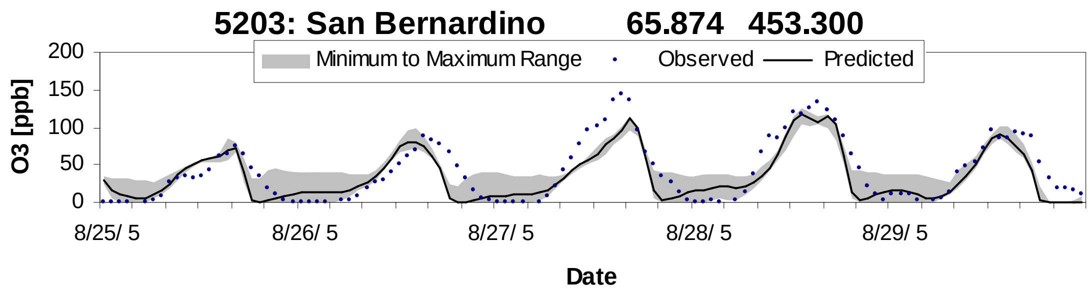
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date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Predicted
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8/26/ 5
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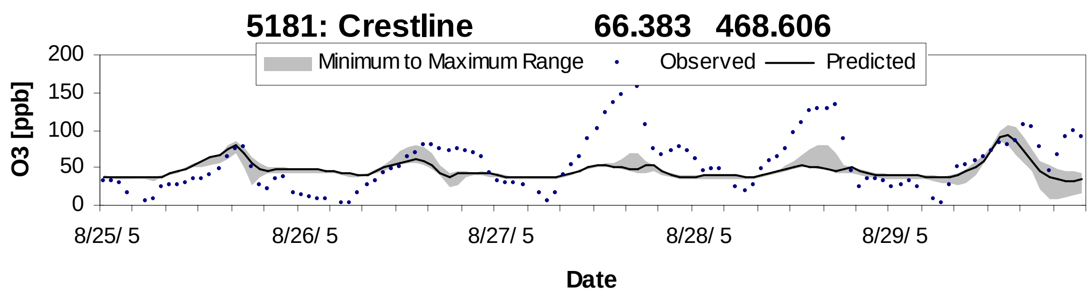
8/28/ 5
8/29/ 5
Date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Predicted
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8/29/ 5
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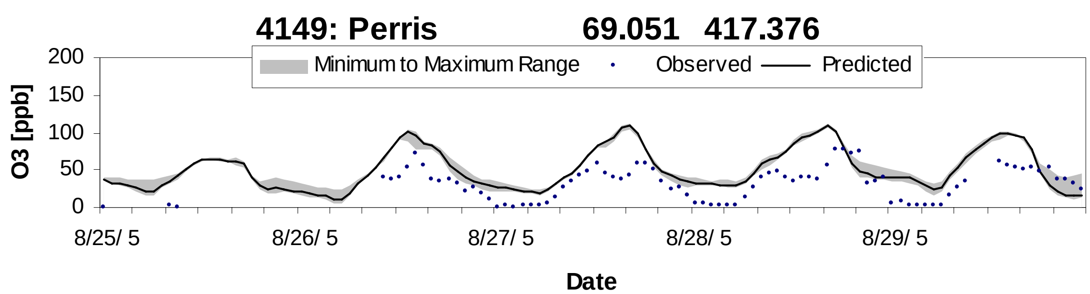
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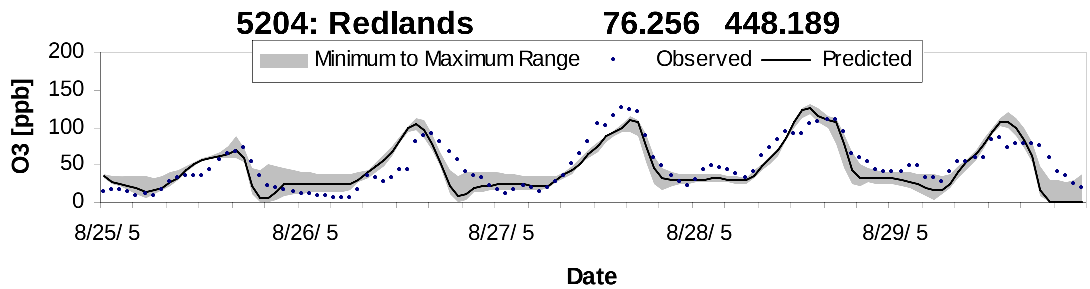
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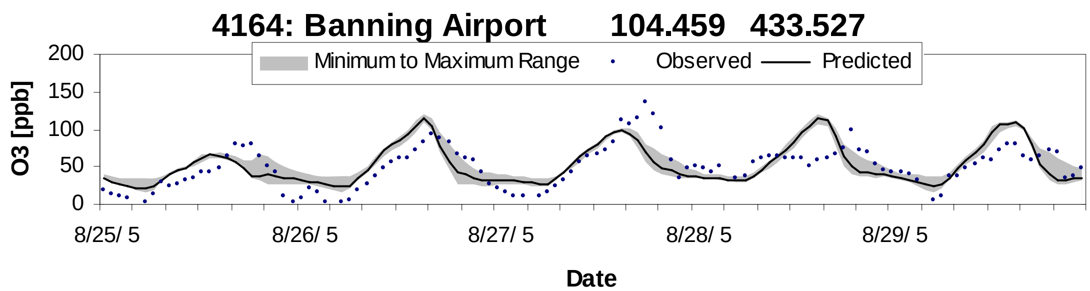
8/29/ 5
Date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Minimum to Maximum Range
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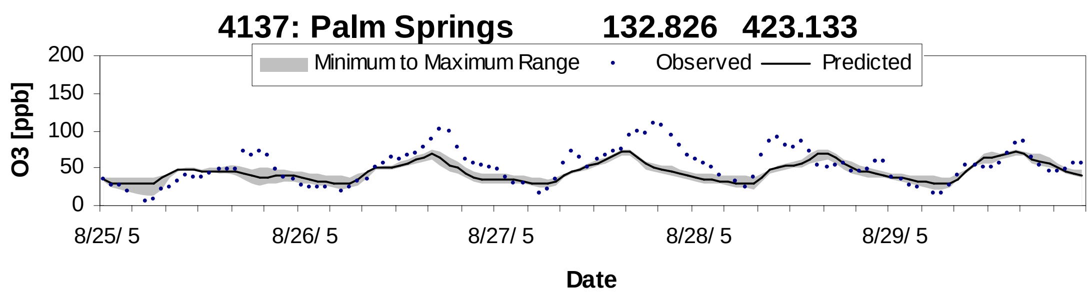
8/28/ 5
8/29/ 5
Date


4137: Palm Springs 132.826 423.133
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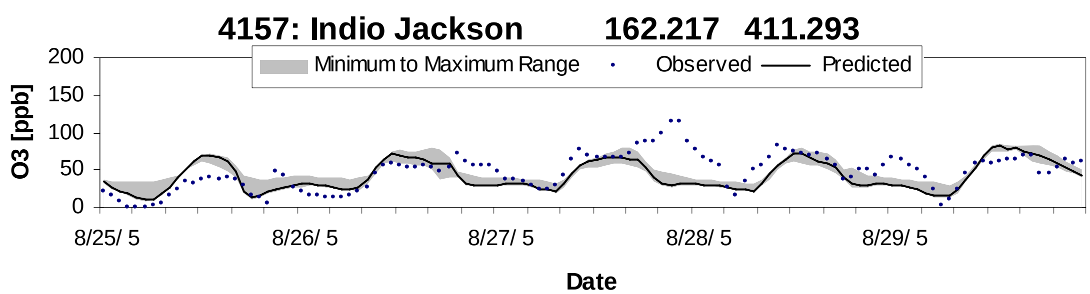
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Predicted
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0
8/25/ 5
8/26/ 5
8/27/ 5
8/28/ 5
8/29/ 5
Date

DRAFT

MODELING PROTOCOL FOR OZONE AND PARTICULATE MATTER MODELING IN SUPPORT OF THE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT 2007 AIR QUALITY MANAGEMENT PLAN UPDATE

Draft Report

May 9, 2006

Jointly Prepared by:

California Air Resources Board
Planning & Technical Support Division
P.O. Box 2815
Sacramento, CA 95812

and

South Coast Air Quality Management District
Planning, Rule Development and Area Sources
21865 Copley Drive
Diamond Bar, CA 91765

Send Comments to:

Kevin Durkee
South Coast Air Quality Management District
kdurkee@aqmd.gov

Contributors:

Mark Bassett
Joseph Cassmassi
John DaMassa
Kevin Durkee
Bruce Jackson
Bong-Mann Kim
Satoru Mitsutomi
Xinqiu Zhang

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LIST OF ACRONYMS

Several acronyms are used in the modeling protocol document. For convenience, the acronyms used are listed below to aid the reader.

AAMA – American Automobile Manufacturer's Association
AGL – Above Ground Level
AQMD – Air Quality Management District
AQMP – Air Quality Management Plan
AQMPAG Air Quality Management Plan Advisory Group
AUSPEX – Atmospheric Utility Signatures, Predictions, and Experiments
AVHRR – Advanced Very High Resolution Radiometer
BEIS – Biogenic Emission Inventory System
CAA – Clean Air Act Amendment of 1990
CAMx – Comprehensive Air-Quality Model with Extensions
CARB – California Air Resources Board
CBM – Carbon Bond Mechanism
CCAA – California Clean Air Act
CEFS – California Emission Forecasting System
CMAQ – Community Multi-scale Air Quality (model)
CO – Carbon Monoxide
COG – Council of Governments
DARS – Data Attribute Rating System
DWM – Diagnostic Wind Model
DTIM – Direct Travel Impact Model
EIWG – Emission Inventory Working Group
EKMA – Empirical Kinetics Modeling Approach
EMFAC – Emission Factor (model)
FCM – Flexible Chemical Mechanism
FDDA – Four-Dimensional Data Assimilation
GAP – Geographical Approach to Protection of Biological Diversity
GCM – Global Climate Model
ICAPCD – Imperial County Air Pollution Control District
IOP – Intensive Operation Period
LIDAR – Light Detection and Ranging
MDAQMD – Mojave Desert Air Quality Management District
MM5 – Mesoscale Meteorological Model (5th generation)
MWG – Modeling Working Group
NAAQS – National Ambient Air Quality Standard
NDVI – Normalized Difference Vegetative Index

NOx	–	Nitrogen Oxides
NO2	–	Nitrogen Dioxide
PDT	–	Pacific Daylight Time
PM	–	Particulate Matter
PM10	–	Particulate Matter less than 10 microns equivalent aerodynamic diameter
PM2.5	–	Particulate Matter less than 2.5 microns equivalent aerodynamic diameter
PMcourse	–	PM10 – PM2.5
PMfine	–	PM2.5
RADM	–	Regional Acid Deposition Model
RECLAIM	–	Regional Clean Air Incentives Market
ROG	–	Reactive Organic Gases
RRF	–	Relative Reduction Factor
SANDAG	–	San Diego Association of Governments
SAPRC	–	State Air Pollution Research Center
SAQM	–	SARMAP Air Quality Model
SARMAP	–	SJVAQS/AUSPEX Regional Model Adaptation Project
SBCAG	–	Santa Barbara County Association of Governments
SBCAPCD	–	Santa Barbara County Air Pollution Control District
SCAB	–	South Coast Air Basin
SCAG	–	Southern California Association of Governments
SCAQMD	–	South Coast Air Quality Management District
SCAQS	–	Southern California Air Quality Study
SCE	–	Southern California Edison
SCOS97	–	Southern California Ozone Study (1997)
SDCAPCD	–	San Diego County Air Pollution Control District
SIP	–	State Implementation Plan
SJVAQS	–	San Joaquin Valley Air Quality Study
SOx	–	Sulfur Oxides
STMPRAG	–	Scientific, Technical, Modeling and Peer Review Advisory Group
TOG	–	Total Organic Gases
UAM	–	Urban Airshed Model
USEPA	–	United States Environmental Protection Agency
UTM	–	Universal Transverse Mercator
VCAPCD	–	Ventura County Air Pollution Control District
VMT	–	Vehicle Miles Traveled
VOC	–	Volatile Organic Compound
WSPA	–	Western States Petroleum Association

INTRODUCTION

The federal Clean Air Act (CAA) requires areas with unhealthy levels of ozone , carbon monoxide, nitrogen dioxide, sulfur dioxide, and inhalable particulate matter to develop plans, known as State Implementation Plans (SIPs), describing how they will attain national ambient air quality standards (NAAQS). The 2007 Air Quality Management Plan (AQMP or Plan) for the South Coast Air Basin (Basin) will meet the SIP update requirements for this area, demonstrating NAAQS attainment. The federal Clean Air Act (CAA) requires the use of photochemical grid models that are approved by the Unites States Environmental Protection Agency (USEPA) to perform the attainment demonstration. This document addresses the air quality modeling protocol for the 2007 AQMP, as developed through a joint cooperative effort between the staff of the South Coast Air Quality Management District (AQMD or District) and the California Air Resources Board (CARB), with technical oversight from the Scientific, Technical, Modeling and Peer Review Advisory Group (STMPRAG).

The objective of this modeling protocol is to define the methodology to be used for simulating the formation and transport of ozone and particulate matter in the Basin, including:

- the model(s) to be used;
- the modeling domain;
- the horizontal and vertical grid resolution;
- the annual PM period and ozone and PM episodes to be simulated;
- the model input data, including meteorology, emissions, initial conditions; and lateral and top boundary conditions;
- the process for model performance evaluation.

In addition, the protocol outlines the attainment demonstration process, including a review of the California Clean Air Act (CCAA) requirements. This protocol document is intended to be dynamic and will be updated in response to reviewer comments and to reflect the results of new information that will emerge during the AQMP modeling process.

In order to devote the maximum resources practicable to the development of the District's 2007 AQMP, the Executive Officers of CARB and AQMD have agreed to jointly develop the emissions and air quality modeling needed to determine the carrying capacity and attainment demonstration for the ozone and PM standards. The technical staffs of both agencies are working closely together to plan and carry out the necessary work for the

AQMP and are committed to intensive and timely coordination to ensure that it is based on the soundest science possible. Both agencies agree that their staffs will collaborate on this work such that the product will be mutually acceptable modeling analyses for use in the 2007 Plan.

Background

Regulatory Modeling Requirements and Guidance

The 1990 amendments to the federal CAA set new deadlines for attainment based on the severity of the pollution problem and launched a comprehensive planning process for attaining the NAAQS. The promulgation of the new national eight-hour ozone standard and the fine particulate matter (PM2.5) NAAQS in 1997 required additional statewide air quality planning efforts. In response to new federal regulations, SIPs must also address ways to improve visibility in national parks and wilderness areas. SIPs demonstrating attainment of the federal ozone standard must be adopted by the local air districts and CARB, and submitted to the USEPA by June 15, 2007.

USEPA's guidelines on air quality modeling previously recommended the use of the Urban Airshed Model (UAM) for attainment demonstrations involving entire urban areas. However, USEPA revised its recommendation (USEPA, 2001a) to no longer include a recommended air quality model for ozone. Instead, USEPA recommends that air quality models proposed for an ozone attainment demonstration be subjected to model performance evaluations to demonstrate that they are appropriate for attainment demonstration purposes.

USEPA issued the *Guideline for Regulatory Applications of the Urban Airshed Model* (USEPA, 1991) and *Guidance on the Use of Modeled Results to Demonstrate Attainment of 1-hour Ozone NAAQS* (USEPA, 1996) to assist states in preparing the attainment demonstration required by the CAA. In addition, the CARB *Technical Guidance Document: Photochemical Modeling* (CARB, 1992) provides photochemical modeling guidance for use by the districts to ensure the technical validity of the modeling results. Most recently, USEPA has finalized attainment demonstration guidance for the 8-hour ozone NAAQS (USEPA, 2005). The ozone modeling protocol in this document is based on these guideline documents. Guidance for the PM portion of the modeling protocol utilizes the *Draft Guidance for Demonstrating Attainment of Air Quality Goals for PM2.5 and Regional Haze* (USEPA, 2001b).

Under the federal Clean Air Act of 1990 (CAA), the South Coast Air Basin (Basin) was classified as an "extreme" nonattainment area for 1-hour ozone. Section 182(c)(2)(A) of the CAA set November 15, 1994 as the deadline for submission of a SIP to demonstrate attainment of the NAAQS for ambient 1-hour ozone of 0.125 parts per million (ppm) by December 2010. AQMD satisfied that CAA requirement with the submittal of the 1994 AQMP in September 1994. A subsequent revision was submitted to USEPA in February 1997. This was amended in 1999 to revise the Basin ozone portion of the 1997 AQMP due to its partial approval/disapproval by USEPA. The 2003 AQMP took advantage of information obtained from the 1997 Southern California Ozone Study (SCOS97) and emissions inventory enhancements. It updated the attainment demonstration for the ozone and PM10 particulate matter NAAQS, replaced the 1997 attainment demonstration for the CO NAAQS, and updated the maintenance plan for the NO2 NAAQS that the Basin has met since 1992. In 2005, AQMD submitted a CO attainment request and maintenance plan to CARB and USEPA; approval of this is pending.

In July 1997, the USEPA established new ozone NAAQS of 0.085 ppm based on an 8-hour average measurement. Due to legal challenges, the final form of the ozone NAAQS has been implemented in two phases. The Phase 1 ozone implementation rule, finalized on June 15, 2004, defined the classification scheme for 8-hour ozone nonattainment areas and revoked the 1-hour ozone NAAQS, while requiring states to maintain control programs which were included in their state implementation plans (SIP) for the 1-hour standard. Fifteen areas in California were designated that violate the federal 8-hour ozone standard. Each nonattainment area's classification and attainment deadline is based on the severity of its ozone problem. Southern California's nonattainment areas and attainment deadlines are: South Coast Air Basin (2021); Coachella Valley (2013); Ventura County (2010); Western Mojave Desert (2010); Antelope Valley (2010); San Diego (2009-2014); and Imperial County (2007).

The Phase 2 ozone rule, adopted November 9, 2005, described the actions that states must take to reduce ground level ozone and set the deadline for ozone SIP submittal of June 2007. The AQMD began air quality modeling analyses related to the 8-hour ozone standard during the 1997 AQMP, prior to the final NAAQS implementation. This analysis effort was continued for the 2003 AQMP. The 2007 AQMP modeling will expand the 8-hour ozone analysis and include an attainment demonstration for the current form of the NAAQS. The 2007 AQMP will include an analysis of 1-hour ozone to provide additional milestones for progress of ongoing control programs and for continuity with previous efforts.

AQMP Ozone Modeling History in the South Coast Air Basin

The first Air Quality Management Plan (AQMP) for the Basin was produced in 1979 as part of a revision to California's SIP. The 1979 AQMP indicated that it would not be possible to achieve the federal 1-hour ozone air quality standard of 0.12 ppm by 1982. Because the emission controls discussed in the 1979 AQMP would not be fully effective until after 1982, CARB and USEPA granted an extension to 1987 for achievement of the standard. As part of that extension, a revision to the AQMP was performed by the AQMD in 1982 which included a new series of modeling analyses to address concerns regarding the original 1979 modeling analysis.

For both the 1979 and 1982 AQMP revisions, the city-specific Empirical Kinetics Modeling Approach (EKMA) was applied. The 1979 AQMP used the city-specific EKMA procedures then in existence. The 1982 AQMP revision used a more sophisticated version of the EKMA procedures and also contained sensitivity analyses (Appendix VI-A of the 1982 AQMP revision). The UAM was used in conjunction with the EKMA analyses to evaluate the effect of applying all feasible control measures by 1987 (Appendix VI-E of the 1982 AQMP revision). On the basis of those modeling studies, it was determined that hydrocarbon reductions on the order of 75 percent or greater would be required to attain the federal standard by 1987, given a forecasted 23 percent reduction in oxides of nitrogen. Forecasted emission data indicated that only a 33 percent hydrocarbon reduction could be expected by 1987. Issues raised during the 1979 and 1982 AQMP revisions highlighted the need to use a three-dimensional, photochemical model such as the UAM to better understand the complex interactions between precursor emissions, meteorology, and the formation of ozone in the Basin.

For the 1989 AQMP revision, the UAM was applied to a single, multiday, ozone episode to demonstrate attainment of the National Ambient Air Quality Standard (NAAQS) for ozone. It was determined from the modeling analysis that hydrocarbon and oxides of nitrogen emission reductions of more than 80 percent would be needed in order to attain the 1-hour ozoneNAAQS by the year 2007. The 1989 AQMP revision outlined three levels of controls (identified as Tiers I, II, and III) that separated the proposed control measures by known and proven technologies from those technologies anticipated to be available within the next 20 years.

For the 1991 AQMP, the AQMD used the UAM to further assess the effectiveness of the three tiers of control measures in reducing ambient ozone levels. To complement the single, multiday ozone episode used for the 1989 AQMP revision, two additional ozone episodes were modeled to investigate the effect of projected emission reductions on future ozone concentrations during a wider variety of meteorological conditions. Additional evaluations of model performance, including new graphical procedures and subregional performance statistics, were used to ensure adequate representation of the physical and chemical processes that influence ozone formation in the Basin.

A number of improvements were made to the modeling analysis for the 1994 AQMP. Growth factors for population and vehicle miles traveled (VMT) were revised to reflect the 1990 Census data and the economic climate of the early 1990s, and improved transportation modeling was considered. The modeling analysis benefited from a number of AQMD, CARB, and SCAG studies that improved the area source emission inventory (Appendix III-A). On-road, mobile emission estimates were improved with the use of the latest CARB emission factors program, EMFAC7F. Five ozone episodes were simulated to evaluate control strategy effectiveness. In addition to the June 5-7, 1985, episode used in the 1989 AQMP, and the two Southern California Air Quality Study (SCAQS) episodes (August 26-28, 1987, and June 23-25, 1987) added for the 1991 AQMP analysis, two additional episodes (July 13-15, 1987, a SCAQS episode, and September 7-9, 1987) were simulated for the 1994 AQMP. In this manner, control strategy decisions were based on a range of meteorological conditions, thereby reducing uncertainty in the control strategy's effectiveness. It was determined that hydrocarbon and oxides of nitrogen emission reductions on the order of 80 and 60 percent, respectively, would be needed in order to attain the NAAQS.

Based on the AQMD's experience with the five ozone episodes used in preparing the 1994 AQMP, it was decided to drop the June 1985 meteorological episode for the 1997 AQMP. The AQMD believed that the 1987 meteorological episodes were satisfactorily evaluated. Since the 1985 meteorological episode was based on routinely monitored data, it was believed that the 1987 SCAQS episodes provided improved performance. In October 1998, AQMD provided to the USEPA a "weight of evidence" analysis that indicated that even without the June 1985 episode, a viable ozone attainment demonstration could be made.

As a result of intense interest for aerometric databases to support *regional* ozone modeling, a large-scale field measurement program was carried out in southern California during the Summer of 1997 to collect sufficient aerometric data to allow data analysts and modelers to characterize and simulate ozone formation and fate in the region. Several agencies and others participated during the planning and operational phases of the field study, including CARB, USEPA, the local air districts, the US Navy, the US Marines, and the marine industry. The 1997 Southern California Ozone Study, or SCOS97, occurred over a four month period from June 15 through October 15, 1997 and captured several episodic ozone days.

The 2003 AQMP updated the attainment demonstration for the federal standards for ozone and PM10; replaced the 1997 attainment demonstration for the federal CO standard and provided a basis for a maintenance plan for CO for the future; and updated the maintenance plan for the federal NO2 standard that the Basin has met since 1992. New ozone episodes, including these from SCOS97, were included as complementary or replacement episodes in the 2003 AQMP. This revision to the AQMP also addressed several state and federal planning requirements and incorporated significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes and new air quality modeling tools. This revision pointed to the need for additional emission reductions (beyond those incorporated in the 1997/99 Plan) from all sources, specifically those under the jurisdiction of CARB and the USEPA which account for approximately 80 percent of the ozone precursor emissions in the Basin.

The 2007 AQMP modeling effort focuses primarily on recent ozone episodes in 2004 and 2005. These periods better reflect emissions conditions following the reformulation of gasoline in California. The August 1997 episode from SCOS97 will be retained for continuity with the previous AQMP analyses. The 2007 AQMP will be consistent with and will build upon the modeling approaches taken in the previous SIP efforts for the South Coast Air Basin, utilizing the latest tools and technical guidance.

AQMP PM Modeling History in the South Coast Air Basin

PM is a multicomponent pollutant including inorganic species such as sulfate, nitrate, ammonium, sodium, chloride, and organic compounds, elemental carbon, and a variety of trace metals. The PM10 modeling analysis shows that the annual average PM10 concentration is the controlling factor for attainment of the federal PM10 standards in the future. Although there were several PM10 modeling tools, there had been no single reliable annual PM10 model available to address the multicomponent nature of the PM10. Therefore, a multi-pronged modeling methodology was employed to assess regional PM10 and demonstrate future compliance with the federal PM standards.

For the 1989, l991, and 1994 AQMP, the Chemical Mass Balance (CMB) model for primary and secondary organic carbon and the Particle-In-Cell (PIC) model for sulfate and nitrate were used for annual PM10 analysis. And speciated linear rollback (SLR) was used for maximum 24-hour PM10 analysis.

For 1997 AQMP, a new annual PM10 modeling methodology, the UAM/LC model, was developed and applied. The Urban Airshed Model (UAM) (Ames, et al., 1985; and Morris, et al., 1990a, 1990b) was used as a host air quality model and the parameterized linear chemistry (LC) module was incorporated into the UAM. UAM was adapted to address the formation of particulate nitrate, sulfate, and ammonium and handling of primary particles by replacing the UAM standard chemical mechanism with the parameterized linear chemistry module. UAM/LC, unlike the PIC model, addresses the 3-dimensional aspects of transport and diffusion, varying mixing height, ammonia emissions change, and particulate nitrate concentrations. However, the UAM/LC model cannot handle secondary organic carbon because the current parameterized linear chemistry does not include organic chemistry. Secondary organic carbon is treated separately by the CMB model.

For the 2003 AQMP, UAM/LC model was further enhanced to include secondary organic carbon and PM2.5 partition. The resulting UAMAERO-LT model, for the first time, provided a more robust, stand-alone platform for primary and secondary annual PM2.5 and PM10 simulations.

2007 AQMP Modeling Analysis Goals

The 2007 AQMP modeling will focus primarily on the 8-hour ozone and the annual and 24-hour PM2.5 NAAQS attainment demonstration and reasonable further progress. The applicable NAAQS, along with the current attainment status of the South Coast Air Basin and recent design values, are presented in Table 1. Although the 1-hour federal standard was revoked in 2005, the analysis of 1-hour ozone will be retained as a benchmark of progress toward meeting the former 1-hour ozone NAAQS, as well as toward the State of California ozone standards. In addition to the PM2.5 NAAQS attainment demonstration, the particulate modeling analysis will include annual and 24-hour PM10 attainment demonstrations.

Further, the 2007 AQMP modeling will address maintenance plans for Carbon Monoxide (CO) and Nitrogen Dioxide (NO2).

The modeling effort may also include initial modeling strategy development toward demonstrating attainment of the inhalable coarse particle (PM10-2.5) NAAQS and a stricter PM2.5 NAAQS recently proposed by USEPA. The proposed standards are:

- PM10-2.5: 98^{th} percentile 24-hour PM10-2.5 in a year, averaged over 3 years not to exceed 70.4 $\mu g/m^3$; no annual standard;
- PM2.5: 98^{th} percentile 24-hour PM2.5 in a year, averaged over 3 years not to exceed 35.4 $\mu g/m^3$; no change to annual standard.

TABLE 1
National Ambient Air Quality Standards Compliance Status in the South Coast Air Basin

	8-Hour Ozone	**24-Hour PM2.5**	**Annual PM2.5**
Standard	3-year average of the 4^{th} highest concentration not to exceed 0.084 ppm	3-year average of the 98th percentile of 24-hour concentrations not to exceed 65.4 μg/m^3	3-year average of 4 quarterly averages not to exceed 15.04 μg/m^3
Classification	Severe-17 [may petition for Extreme]	Non-Attainment	Non-Attainment
Attainment Date	2021 [2024, if Extreme]	2015	2015
Design Value	0.127 ppm (2002-2004)	67 μg/m^3 (2002-2004)	24.8 μg/m^3 (2002-2004)
	24-Hour PM10	**Annual PM10**	
Standard	3-year average of the 99th percentile of 24-hour concentrations not to exceed 154 μg/m^3	3-year average of 4 quarterly averages not to exceed 50.4 μg/m^3	
Classification	Serious Non-Attainment	Serious Non-Attainment	
Attainment Date	2006	2006	
Design Value	159 μg/m^3 (2002-2004)	57 μg/m^3 (2002-2004)	

Ozone Design Value Determination

Since the base year emissions are for 2004, air quality data from the three overlapping 3-year periods from 2000 through 2004 were used for calculation of the 8-hour ozone design values for each AQMD air monitoring station. These are shown in Table 2, along with the Relative Reduction Factors (RRF) needed. Per USEPA guidance, the design value averages are truncated (not rounded).

TABLE 2

Ozone Design Value (ppb) for Each Station, 2000-2004

(Average of the 4th highest 8-hour station concentration in each 3-year period)

Station	2000-2002 Design Value	2001-2003 Design Value	2002-2004 Design Value	Current Design Value (DVC)	RRF Required
AZUS	102.3	101.0	101.0	101.43	0.8284
BURK	91.7	91.3	91.3	91.43	0.9190
LGBH	61.7	60.7	60.7	61.03	
RESE	93.3	106.3	106.3	101.97	0.8235
POMA	89.7	96.7	96.7	94.37	0.8898
LYNN	51.0	53.3	53.3	52.53	
PICO	80.3	79.0	79.0	79.43	
CELA	79.3	78.3	78.3	78.63	
PASA	96.3	95.3	95.3	95.63	0.8787
SCLR	113.3	126.7	126.7	122.23	0.6874
WSLA	69.3	73.3	73.3	71.97	
HAWT	69.3	71.0	71.0	70.43	
GLEN	110.7	114.3	114.3	113.10	0.7427
ANAH	69.7	71.7	71.7	71.03	
LAHB	75.7	74.7	74.7	75.03	
CSTA	67.3	71.3	71.3	69.97	
MSVJ	80.0	82.7	82.7	81.80	
PLSP	105.3	108.3	108.3	107.30	0.7829
RIVR	108.0	112.7	112.7	111.13	0.7561
PERI	114.0	115.7	115.7	115.13	0.7298
INDI	92.3	96.7	96.7	95.23	0.8824
ELSI	104.3	109.0	109.0	107.43	0.7821
UCRI	113.3	117.3	117.3	115.97	0.7241
BNAP	110.3	118.7	118.7	115.90	0.7248
UPLA	114.0	113.0	113.0	113.33	0.7414
CRES	129.0	131.7	131.7	130.80	0.6422
FONT	112.3	123.0	123.0	119.43	0.7035
SNBO	114.7	118.7	118.7	117.37	0.7155
RDLD	120.0	128.3	128.3	125.53	0.6693
MLOM	103.0	106.0	106.0	105.00	0.8000
RHIS	130.3	136.7	136.7	134.57	0.6241

Overview of the Modeling Analysis

The analysis techniques currently recommended for attainment demonstrations using air quality models have changed significantly from those used in past demonstrations. In *Guidance on the Use of Models and Other Analyses in Attainment Demonstration for the 8-hour Ozone NAAQS* (USEPA, 2005), USEPA recommends that the air quality models be used in a relative sense in concert with observed air quality data rather than applying the air quality model in a deterministic sense. The Relative Reduction Factor (RRF) which takes the ratio of future to present predicted air quality is multiplied to an "ambient design value" to demonstrate attainment. The proposed ozone modeling analysis is comprised of the following tasks:

- Identify potential, new ozone meteorological episodes to be used. These episodes should represent the different meteorological conditions that are conducive to ozone formation in the Basin.
- Among the widely accepted state-of-the-science ozone models, CAMx was selected for the attainment demonstration. CMAQ may be employed in the sensitivity analysis and weight-of-evidence section as a supportive modeling tool.
- Develop model inputs. This task includes evaluation of the raw data and of the model input files developed from them. The input files will be evaluated using graphical and other techniques.
- Simulate each episode with the proposed ozone models. This task includes a separate performance evaluation for each episode and each model. Documentation of the simulation results and performance evaluations will be provided.
- Project ozone air quality with proposed control measures in effect for the years 2007, 2010, 2014, and 2020. This task includes the required attainment demonstration using RRF. Model projections for the year 2007 are necessary since that is the year that the CAA requires attainment for severe-17 areas, such as the Coachella Valley and Mojave Desert Ozone Nonattainment Areas. Ozone air quality projections to 2020 will be used to demonstrate that the control strategy maintains the ozone NAAQS and to establish emission budgets needed for conformity purposes.

The work to do the foregoing tasks will be divided between the AQMD and CARB staffs and they will fully share all analyses, model inputs and outputs, findings, and conclusions. Consensus on each component of the analysis shall be reached before proceeding with subsequent components. In the event of technical disagreement on any of the work elements, the

AQMD and CARB staffs shall attempt to reach consensus on a mutually acceptable approach. In the event that consensus cannot be reached, the disagreement will be elevated to the Executive Officers for resolution. Table 3 summarizes the model selection and application elements for the 2007 AQMP and the changes from the 2003 AQMP modeling.

TABLE 3
Summary of Proposed 2007 AQMP Model Selection and Application

2007 AQMP Element	2003 AQMP Element	Selection Process/Issues/Comments
Ozone Dispersion Platform: CAMx Chemistry: SAPRC99	*Ozone* Dispersion Platform: UAM Chemistry: SAPRC99	• Peer Group Recommendation to move to state-of-art mass-consistent model/chemistry • Integrates with numerical weather model output • CAMx used by several agencies for SIP development and supported by Environ • Option for one atmosphere modeling • Alternates CMAQ: Emissions preprocessing more extensive CALGRID: performance similar to CAMx with no one-atmosphere modeling
PM10/PM2.5 Annual and Episodic Dispersion Platform: CAMx Chemistry: • AERO-LT with CB-IV • Enhanced CFI scheme with CB-IV • Optional One Atmosphere Aerosol chemistry	*PM10/PM2.5* Dispersion Platform: UAM Chemistry: AERO-LT with CB-IV	• CAMx PM dispersion consistent with ozone discussion above. • Installed SCAQMD version of AERO-LT into latest CAMx code (V4.20). • Enhanced CAMx two section CFI aerosol scheme. It will be compared with AERO-LT.
Meteorology • MM5/4DDA • Hybrid MM5/CALMET • MM5 initialized using NCEP data	*Meteorology* • CALMET Objective Analysis • Hybrid *MM5/CALMET*	• EPA has expressed concerns about using the hybrid approach • MM5/4DDA is more mass consistent but doesn't capture localize wind impacts (transport to San Fernando Valley) • Testing several land use assumptions with prognostic model to optimize wind fields and vertical mixing/diffusivity fields. • Using Environ's and Aerospace met-model performance evaluation software. • Where possible take advantage of enhanced observation field data (e.g. 3D-Var)
Domain/ Coordinates SCOS97 Meteorology: Lambert Conformal Emissions and Model application: UTM Ozone: 16 layers PM10/2.5: 8 layers	*Domain* SCOS97 Meteorology: UTM Emissions and Model application: UTM Ozone & PM10 5-layers	• Maintained the SCOS97 domain however emissions inventories require coordinate system offsets to adjust from statewide modeling domain. Impacts are to biogenic and CEDARS output.

TABLE 3 (Continued)

2007 AQMP Element	2003 AQMP Element	Selection Process/Issues/Comments

Emissions Inventories
• 2002 Base year
• Enhanced aircraft/airport and shipping inventories
• POLA/POLB updates
• EMFAC2007
  o gross adjustments
  o "focused" inventories
  o Final public model
• Adjustments to fugitive PM10/PM2.5 categories
	Emissions Inventories
	• 1997 Ozone base year & 1995 PM10 base year
	• Updated aircraft/airport and shipping inventories
	• EMFAC2002V2.01
	(major effort to develop surrogates for area sources)
		• 2002 Inventory will be used to back-cast 1997, 2000 and project inventories through 2030 for milestone years
		• Waiting on SCAGS' growth estimates based on 2004 RTP which is expected to differ only slightly from the 2007 RTP.
		• Episodic temperature and humidity fields submitted to CARB for biogenic emissions
		• CARB is adjusting temperature fields for planning inventory development
		• Gridded inventories awaiting focused on and off road model output and supplemental inventories
		• No weekend trip model output available from SCAG
		• CARB will develop a "weekend" overlay to mimic VMT based on Caltrans in-road counter data

Air Quality Model Performance Ozone • Assess model performance based on both 1-hour and 8-hour statistics • 60 ppb threshold (both indices) • Weight of Evidence Analysis • Mid-Course simulations PM10/PM2.5 (annual and episodic) • Base statistics at speciation sites • Weight of evidence analysis • Mid-Course simulations	*Air Quality Model Performance* Use EPA recommendations for 1-hour ozone and outline for PM10 and CO. Ozone • Mid-Course 2002 simulation • Comparative relative reduction for UAM/CAMx/CMAQ per Peer Advisory Group Recommendation PM10 Analyzed "hot spot" grid cell emissions	• Will review thresholds and geographical zones used for ozone performance evaluation. • Conduct sensitivity simulations to test emissions mass, VOC/NOx ratios, emissions timing (daily and weekend vs. weekday), ammonia mass
Relative Reduction Factors RRF: sites specific applied to 3-year average of the design value (PM2.5 and ozone)	*Relative Reduction Factors* Tested for ozone and PM10 but not applied	

TABLE 3 (Continued)

2007 AQMP Element	2003 AQMP Element	Selection Process/Issues/Comments
Episode Selection <u>Ozone</u> • 1997 August 3-7 • 1997 Seasonal: August • 2004 June 3-7 • 2004 August 4-8 • 2005 May 17-24 • 2005 July 14-19 • 2005 August 25-29 <u>PM10/2.5</u> • Annual 2005 (January – December) • 2005 October 19-25 • 2005 March 6-12	*Episode Selection* <u>Ozone</u> • 1997 August 4-7 <u>PM10/2.5</u> • January – December 1995 • Episodic: Rollback <u>CO</u> • 1997 October 31-November 1	• Meteorological episodes include SCOS97 and post California Fuel reformulation (2003) • MATES-III meteorological data base development concurrent with AQMP data base development • Contract with Aerospace to provide additional observations data and MM5 initialization fields using (satellite ingest and 3DVAR
Initial/Boundary Conditions <u>Ozone</u> • EPA recommended boundary conditions • 40 ppb ozone top profiled to lower layers <u>PM10/2.5</u> • Monthly varying emissions generated boundary conditions (simulate model with zero boundary conditions and let model generate boundary -- using 3-5 grid cells from model domain boundary as representative of boundary)	*Initial/Boundary Conditions* <u>Ozone</u> • Use EPA recommended boundary conditions • Per SCOS97 sampling tested 60 ppb ozone aloft <u>PM10</u> Monthly varying boundary conditions based on coastal monitoring site data	• Will test varying top boundary concentration • Review alternate approaches for quantifying boundary conditions

2007 AQMP Schedule

The schedule of 2007 AQMP modeling efforts is driven by the regulatory deadlines for SIP submittal to USEPA, which is June 15, 2007 for 8-Hour Ozone. Table 4 outlines the tentative schedule of events leading up to the SIP submittal.

TABLE 4
Tentative 2007 AQMP Schedule

Task	Due Date
Episode Selection	January 2006
Air Quality and Meteorological Data Preparation	January 2006
Emission Inventory Preparation	April 2006
Performance Evaluation	May 2006
Control Strategy Development	May 2006
Attainment Demonstration	June 2006
Draft SIP Documents	September 2006
District Board Approval of Final SIP	November 2006
CARB Board Approval of Final SIP	February 2007
SIP Submittal to USEPA	June 15, 2007

[Add EIR Schedule,
Alternative Modeling,
Public Workshops]

AQMP Modeling Technical Oversight

The AQMD Governing Board has established several advisory groups to assist with technical oversight and scientific community and business involvement in air quality programs. The mission of the Air Quality Management Plan Advisory Group (AQMPAG), whose membership is appointed by the Board, is to review the overall aspects of a draft air quality management plan and to make recommendations concerning emission inventories, modeling, control measures, and socioeconomic impacts. Tasks of the AQMPAG, include:

- Provide review and comments on (1) studies relevant to advancing scientific and technical knowledge in support of AQMP preparation; (2) emissions inventory development and modeling approaches; (3) the development of new and revised control measures, including on-and off-road mobile sources; (4) socioeconomic data and evaluations.

- Foster coordinated approaches toward overall attainment strategies.
- Assist in resolving key technical issues.

In addition, the AQMD Governing Board has established a more focused technical oversight committee to review the technical aspects of the ongoing modeling analyses. Since the late 1980's the AQMD has had socioeconomic and modeling working groups, when the Governing Board passed a resolution to form the Modeling Working Group (MWG) during the adoption of the 1989 AQMP revision. The MWG, comprised of individuals with photochemical and aerosol modeling expertise, provided oversight and technical consensus on AQMP modeling issues. In 1997, the MWG was reconstituted as the Scientific, Technical, and Modeling Peer Review Advisory Group (STMPRAG). The STMPRAG role expands upon that of the MWG and includes experts in socioeconomic assessment and human health, providing review of AQMD modeling, monitoring and related scientific issues.

The STMPRAG assists AQMD in resolving technical issues related to air quality and socio-economic modeling by providing ongoing technical review and consensus of procedures and analyses. The objectives of the STMPRAG are as follows:

- Suggest methods to gather and process meteorological, aerometric and emission data with a specific focus on air quality modeling.
- Provide technical guidance to the air quality modeling efforts, with an emphasis on ozone and particulate matter. Some specific areas of technical guidance include: (1) Formulation of modeling approaches; (2) Selection and development of appropriate modeling techniques; and (3) Identification of model performance evaluation methods.
- Review and provide comments on the AQMP modeling procedures and analyses.
- Make recommendations on future modeling resource requirements (i.e., staffing and computational needs).
- Recommend methods for interpretation of modeling results.
- Provide a linkage between the air quality and socio-economic modeling communities, emphasizing the importance of future growth and economic factors on future air quality attainment demonstrations.

The STMPRAG consists of approximately 20 members appointed by the Governing Board, with representatives from USEPA, CARB, Southern California Association of Governments (SCAG), the California Small Business Aliance (CSBA), Southern California Edison (SCE), Western

States Petroleum Association (WSPA), and technical experts from universities and consultant firms.

Finally, as progress is made and products are available, interim results will be shared with the interested public at appropriate times and locations.

MODEL SELECTION

Meteorological Model

Background

Air quality models require three-dimensional, meteorological inputs. The key parameters are winds, mixing heights, temperature, and insolation. The windfields describe the transport and dispersion of pollutants. Mixing heights define the vertical extent of pollutant mixing near the surface. Temperature and insolation fields influence emission rates and the rates of chemical transformation. Because meteorological measurements can be made only at discrete locations, meteorological models are required to develop the 3-dimensional fields required by air quality models.

The meteorological models used to generate these three-dimensional fields are generally of three types: objective, diagnostic or prognostic. ***Objective models*** are the least sophisticated meteorological models. These models rely on interpolation of observations. Obtaining a reasonable field requires sufficient observations to accurately represent the atmosphere. This is especially true for windfields. In areas with complex terrain and bodies of water, such as the proposed modeling domain, the meteorology can be quite complex, and a successful objective analysis would require an extremely large number of observations.

Diagnostic models rely both on observations and constraints based on physical concepts such as the conservation of mass. A diagnostic wind model can simulate thermally induced circulations and the effects of surface friction. One example of this type of model is the Diagnostic Wind Model (DWM) which is distributed by the USEPA. For the DWM, the user first defines an initial-guess mean wind field that can be representative of synoptic scale patterns. The domain mean wind is then adjusted for the effects of terrain. Available observations are then used to develop meteorological fields using objective analysis. The initial guess and the objective analysis are then combined using a weighting function based on distance from observations. A criticism of diagnostic models is that the fields produced are not consistent from one hour to the next. Since the processes which create the wind, temperature, and mixing height fields are relatively independent, these models are also criticized for not being thermodynamically consistent between the meteorological parameter fields.

Prognostic models are the most sophisticated of the meteorological models. They are based on principles of atmospheric physics, i.e., conservation of mass, momentum, energy and moisture. As a result, they are computationally intensive. The use of four dimensional data assimilation (FDDA) or observational nudging – where observations are introduced to the model as an additional forcing term – is typically used in areas of complex meteorology to improve the accuracy of the outputs. Another approach is objective combination, in which observations are introduced after the model has estimated a value. Prognostic models are capable of explicitly incorporating many of the physical flow processes important in the domain. However, prognostic models have historically had problems estimating fine-scale flow features due to the limited resolution of datasets used for describing geographic features.

Previous AQMP Applications

In the past, CARB and AQMD have utilized prognostic, diagnostic, and objective models to generate meteorological inputs for modeling. The National Center for Atmospheric Research's prognostic, non-hydrostatic Mesoscale Model (MM5) was applied for modeling in support of attainment planning in the San Joaquin Valley. The SCAQMD also has experience with the SAIMM prognostic model. Diagnostic models (WIND2D, WIND3D, DWM) have been applied in the Sacramento area and in southern California to prepare meteorological input fields for the application of photochemical models in those areas. CARB and AQMD conducted a review of CALMET, which may be viewed as an improved version of the DWM and which is being distributed through the USEPA for air quality modeling applications. The CALMET model has an added feature that allows a hybrid meteorological field to be developed by merging the results from a prognostic model, such as the National Center for Atmospheric Research Mesoscale Model Version 5 (MM5), with an objective or diagnostic analysis characteristic of the CALMET model. This hybrid approach has the potential to take advantage of the prognostic capabilities of MM5 in areas of the domain where meteorological measurements are few, and utilizing measurements in an objective analysis where there are many.

2007 AQMP Meteorological Modeling Approach

The SCOS97 field study generated a dataset with a relatively high spatial density of meteorological observations. While this dataset suggests that an objective/diagnostic model could be adequate to develop the meteorological parameter fields required for air quality modeling of the August SCOS97 episode, there are large portions of the modeling domain—such as over the ocean or the inland desert—where there are few observations. The approach for the 2007 AQMP modeling will be to use the MM5 prognostic model with a 5 km grid resolution. The meteorological boundary conditions for MM5 are generated using the output from a Global Climate Model (GCM) with a relatively coarse grid of 45 km. The MM5 prognostic model uses more accurate and complete physics than the diagnostic models used previously. The MM5 has relatively good replication of meteorological features of the Basin, such as the coastal eddies, Santa Ana winds, recirculation, & strong inversions.

The recent air quality models are designed to use inputs from the prognostic models, such as MM5, and the use of such a model is strongly encouraged by USEPA. In the past, the use of MM5 meteorological fields in air quality models has brought limited success in the prediction of peak ozone concentrations that result from extreme meteorological conditions and complex distribution of precursor emissions. However, the prediction of ozone with MM5 meteorological fields on most days is comparable to the results using other models. Since the air quality model will be employed in more of a relative sense for the 2007 AQMP, with the use off relative reduction factors instead of peak concentration comparisons, the MM5 is an appropriate choice for the AQMP modeling. The premise is that the magnitude of RRF will reflect the ozone concentration resulting from the various meteorological episode classifications. With the use of the MM5 meteorological model, the AQMP modeling effort will move closer to the "one atmosphere" air quality modeling perspective (i.e., ozone and fine particles simulated with the same model). The successful application of this prognostic model is critical for the development of multipollutant control strategies.

Several MM5 initialization fields and data ingest options are also being explored for the 2007 AQMP modeling effort:

- MM5 model initialized with the National Centers for Environmental Prediction (NCEP) 12 km ETA/North American Model (NAM);
- MM5 model with Aerospace Corp 3DVAR forecast fields;
- Weather Research and Forecasting (WRF) community model using Aerospace Corporation 3DVAR;
- MM5 model with NCEP database of upper air and surface observations and the 1degree by 1 degree Global Tropospheric Analysis
- Above method of MM5 with NCEP database and Global Tropospheric Analysis and four-dimensional data assimilation (4DDA) of AQMD station meteorological data (this method is more mass consistent, but may be difficult to capture localized wind impacts (e.g., transport to San Fernando Valley);

- Hybrid CALMET with MM5 as background field

To supplement the MM5 meteorological modeling, the CALMET/MM5 hybrid meteorological model will be used to bolster the sensitivity analyses and weight-of-evidence discussions. The RRF can be adjusted or supported by the air quality modeling results using this alternative hybrid meteorological field. In this approach, the parameter fields will be overlaid using a weighting scheme that is based on the proximity to meteorological observations. The resultant fields benefit from the capabilities of the prognostic model in those areas of the modeling domain with few observations (such as offshore, in complex terrain, and in the desert areas), and benefit from the objective analysis component of the diagnostic model to force the fields to agree with observations. To develop the hybrid fields, the fields developed using CALMET and MM5 will need to be mapped into common horizontal and vertical coordinate domains. The CALMET model code is structured to facilitate this mapping.

Air Quality Model

Background

The air quality model employed for previous AQMP efforts, the Urban Airshed Model (UAM-IV (USEPA 1990), is widely acknowledged to have characteristics which limit its utility when applied to large modeling domains or to domains that are not geographically uniform. In addition, much of the science in the model is outdated, and both the USEPA and CARB are no longer recommending that model for most analyses. Several photochemical models have been developed to improve upon the UAM-IV. Among those models, CAMx and CMAQ were widely accepted models as the state of the science models that include the most up-to-date chemical mechanisms, physics and the efficient numerical algorithms. The following summarizes the current models.

- ***CALGRID***
  The CALGRID model (Yamartino et. al, 1989) was developed for CARB in the late 1980's. The model has been applied by various air pollution agencies around the world. It is modular to allow the user to substitute various types of wind fields and chemical mechanisms. CALGRID incorporates refined treatments of numerical advection, vertical transport and dispersion, and dry deposition. The model can be exercised with either the Carbon Bond IV (CB-IV) or SAPRC chemical mechanisms, and contains highly efficient chemical integration routines. The vertical structure of the atmosphere can be optionally defined

relative to a mixing height field, similar to the UAM, or can be based on fixed layer heights and a derived mixing height.

- ***Models-3***
  Models-3 (USEPA, 1998a) is a flexible software system designed for applications ranging from regulatory and policy analysis to understanding the complex interactions of atmospheric chemistry and physics. The Models-3 system is a framework that allows the user to go from developing model inputs to visualizing results all in one package. At the heart of the current version of Models-3 is the ***Community Multi-scale Air Quality (CMAQ) Model***. The capabilities of CMAQ include urban to regional scale air quality simulation of ozone, acid deposition, visibility and fine particles. CMAQ is a modular system capable of using output from the MM5 prognostic meteorological model, along with the CB-IV, RADM-2, or SAPRC-99 chemical mechanisms. The CMAQ model also includes a plume-in-grid module, vertical and horizontal growth due to turbulence and shear, a choice of advection schemes and a cloud- module to simulate precipitating and non-precipitating clouds. Since the Models-3 system is relatively new, some implementation and application problems are likely.

- ***SARMAP Air Quality Model (SAQM)***
  SAQM (Chang, et. al, 1997) is a three-dimensional non-hydrostatic model based upon the Regional Acid Deposition Model (RADM) (Chang et. al 1987, 1990). However, SAQM includes a number of improvements over RADM, including: a fixed vertical coordinate system that is compatible with MM5; a horizontal coordinate system defined in a Lambert-Conformal projection that accounts for curvature of the Earth; a mass conservation module for compatibility with non-hydrostatic meteorological inputs; the Bott advection scheme (Bott 1989a, 1989b) to reduce numerical diffusion and increase numerical accuracy; two-way nesting, and the capability to use either the CB-IV or SAPRC chemical mechanisms. A version of SAQM with plume-in-grid treatment is also available.

- ***Urban Airshed Model-Flexible Chemical Mechanism (UAM-FCM)***
  The UAM-FCM (Kumar et. al, 1995) is an alternate version of the UAM-IV that has been enhanced to allow the flexibility to incorporate any Carbon Bond- or SAPRC-type chemical mechanism. The FCM allows incorporation of reaction-specific photolysis rates. In addition, the UAM-FCM has a generalized methodology to solve the set of differential equations that is mechanism independent. However, the meteorological dispersion algorithms are the same as in UAM-IV.

- ***Urban Airshed Model-Variable (UAM-V)***
  The UAM-V (Systems Applications International, 1996) is an updated version of the Urban Airshed Model (UAM-IV) which incorporates many state-of-the-art enhancements in chemical mechanisms, meteorological models and the representation of emissions. Perhaps the most significant additions are: an updated CB-IV mechanism to include aqueous phase chemistry; plume-in-grid capabilities; an improved dry deposition algorithm; and an improved plume rise algorithm. Other enhancements over UAM-IV include allowing the user a fixed vertical structure as opposed to one that is relative to the diffusion break, the ability to use three dimensional inputs from prognostic models and two-way grid nesting. However, the present non-public domain status of UAM-V may preclude regulatory usage. The model developers have indicated that the model could be made available for any party to review if the party agrees that the use of the model would be solely for the review of the AQMP.

- ***Comprehensive Air-Quality Model with Extensions (CAMx)***
  CAMx (Environ, 1997) contains a number of advanced features, including grid nesting, sub-grid scale plume-in-grid simulation, alternative numerical advection solvers and the ability to use alternative chemical mechanisms. In addition it has the ability to tag emissions so that at the end of the simulation one can determine the sources of emissions impacting a particular receptor. Since CAMx is a relatively new model, thus there is a relatively short history of experience applying the model.

2007 AQMP Air Quality Modeling Approach

CAMx will be the primary air quality model for the attainment demonstration. This dispersion platform integrates well with numerical meteorological model output and it will be run using both the prognostic (MM5) and hybrid (CALMET/MM5) meteorological fields. The application of the MM5 and CAMx modeling system for both ozone and particulate matter simulation will bring AQMD closer to the "one atmosphere" modeling concept, where ozone and particulates are simulated in the same model. CMAQ model may also be run as a supporting model in the sensitivity analysis discussion.

The ozone air quality models will be run using the SAPRC (Carter 1999, 2001) chemical mechanism, based on chemical reactivity scales. At its meeting on October 8, 1999, CARB's Reactivity Scientific Advisory

Committee (chaired by Dr. John Seinfeld, with participation by other members Dr. Roger Atkinson, Dr. Jack Calvert, Dr. Harvey Jeffries, Dr. Jana Milford, and Dr. Armistead Russell) discussed a peer review of the SAPRC-99 mechanism conducted by Dr. William Stockwell. Members of the committee agreed that the peer review was excellent, that SAPRC-99 was a state-of-the-art chemical mechanism, and they approved the peer review. The Committee then unanimously recommended that SAPRC-99, as the most up-to-date mechanism available, be used for SIP modeling.

The particulate matter air quality model will use CAMx with the AERO-LT/CB-IV chemical mechanism and the enhanced two-section CFI aerosol scheme with CV-IV. The AQMD version of the AERO-LT chemistry and the enhanced version of the CAMx CFI scheme have been installed in the latest CAMx code and comparative analyses will be presented. Advisory group recommendations have been to move toward a state-of-the-art, mass-consistent model and chemistry. This system will integrate well with numerical weather model output and with also use the MM5 model for meteorological fields.

MODELING DOMAIN

Meteorological Modeling Domain

Nested domains of 15 km and 5 km are defined within MM5 to simulate meteorological fields for the fine grid scale of the modeling domain. The modeling domain for MM5 is defined in a Lambert-Conformal projection with two parallels to account for curvature of the Earth within the modeling domain over such a large region. Figure 1 shows the nested MM5 domains. Figure 2 shows the finest scale (interior) MM5 domain, covering most of southern California. The vertical structure of MM5 is defined in a terrain-following, "sigma" coordinate system based upon a normalized pressure index. The 30 vertical layers defined for MM5 to approximately 15,000 m above ground level (AGL) can be transformed to fit the requirements of any air quality model. The MM5 meteorological fields are converted from Lambert-Conformal projection to UTM coordinates for input into the air quality models.

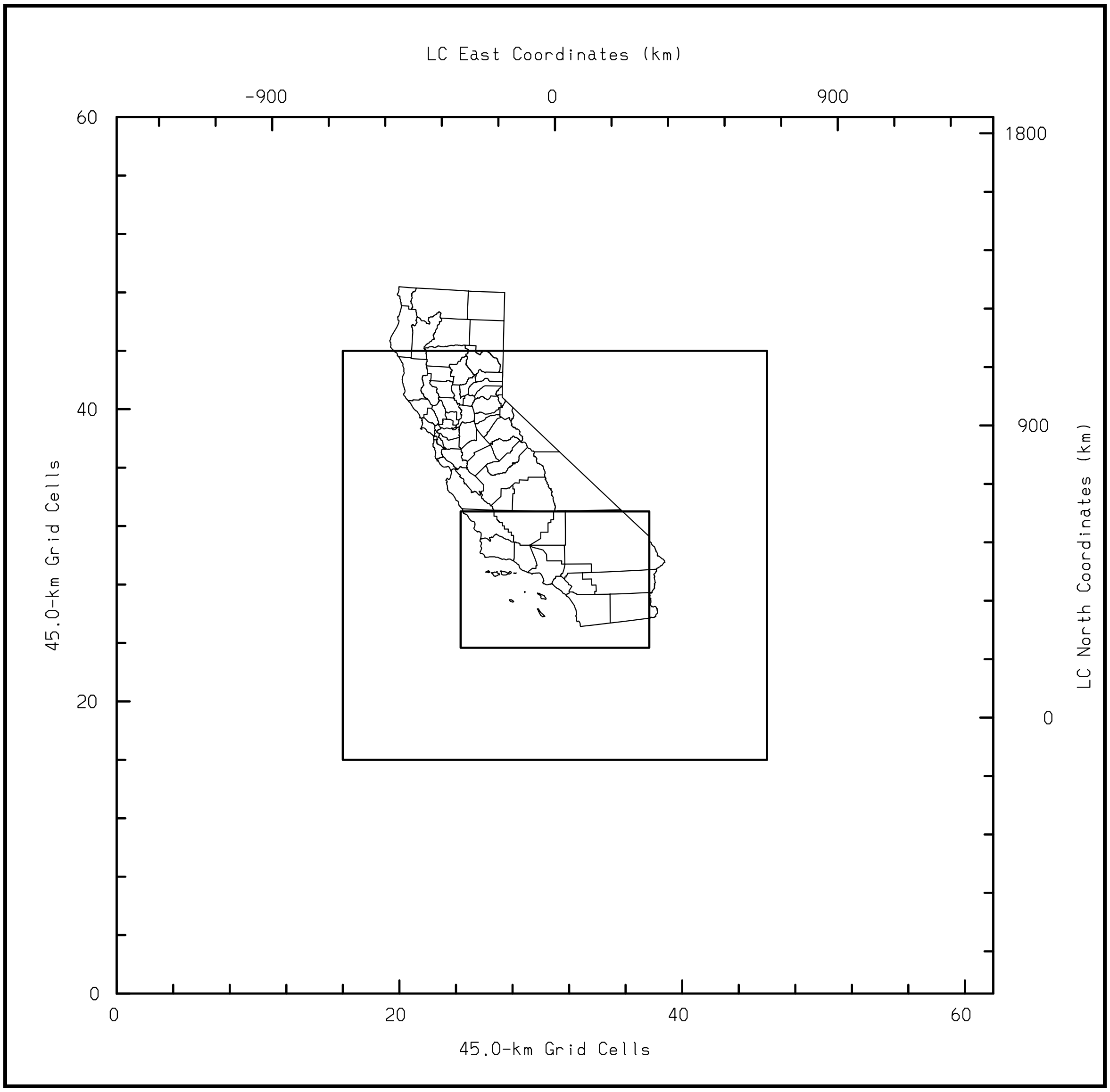

FIGURE 1
Nested MM5 Domains
The horizontal grid resolution of the outermost domain is 45 km, for the middle domain is 15 km, and for the fine scale domain is 5 km.

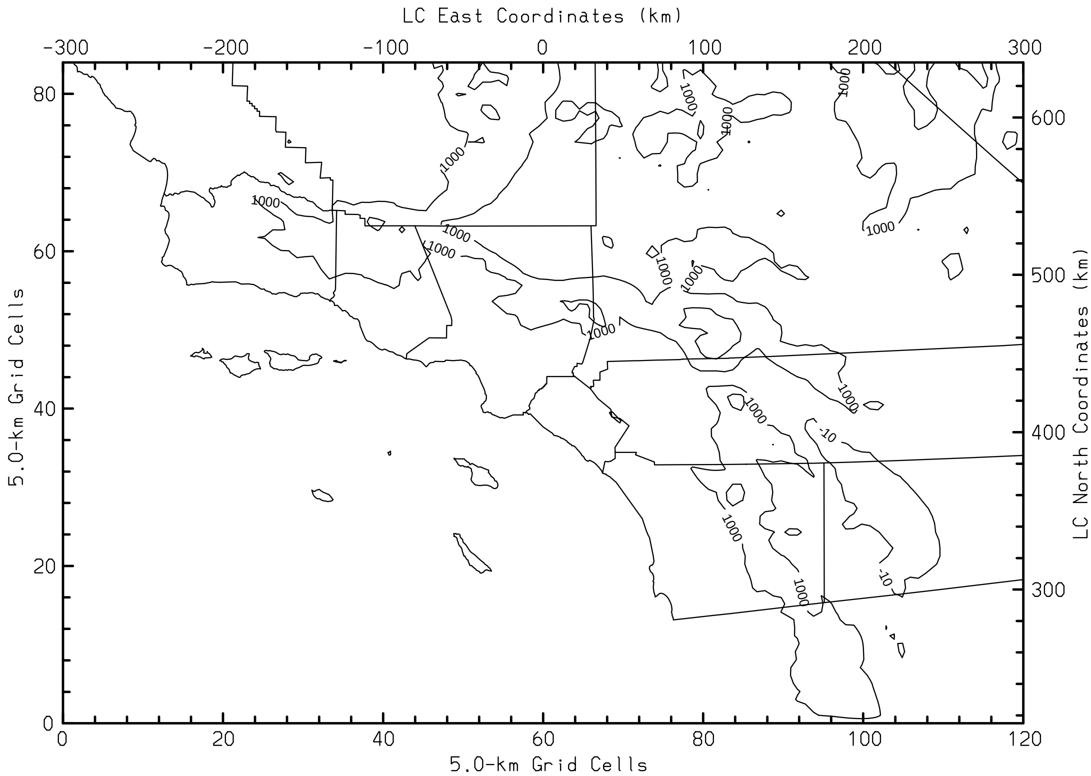

FIGURE 2
The Fine-Scale (5 km) MM5 Domain.

Ozone Modeling Domain

The proposed ozone regional modeling domain is that previously developed for the modeling of the SCOS97 field study episodes, encompassing a 600 km wide by 160 km area, as shown in Figure 3. Specifically, the UTM Zone 11 coordinates of the domain are 150-700 km UTM East and 3580-3950 km UTM North. This corresponds to 100 by 74 grid cells at 5 km grid spacing. The vertical modeling domain will extend to a height of approximately 5,000 m AGL for a more complete representation of atmospheric processes. This will contain observed high ozone concentrations aloft and allow three-dimensional wind flow patterns near elevated terrain features to be represented, providing accurate representation of pollutant transport and recirculation. This same domain will be used for all of the ozone episodes.

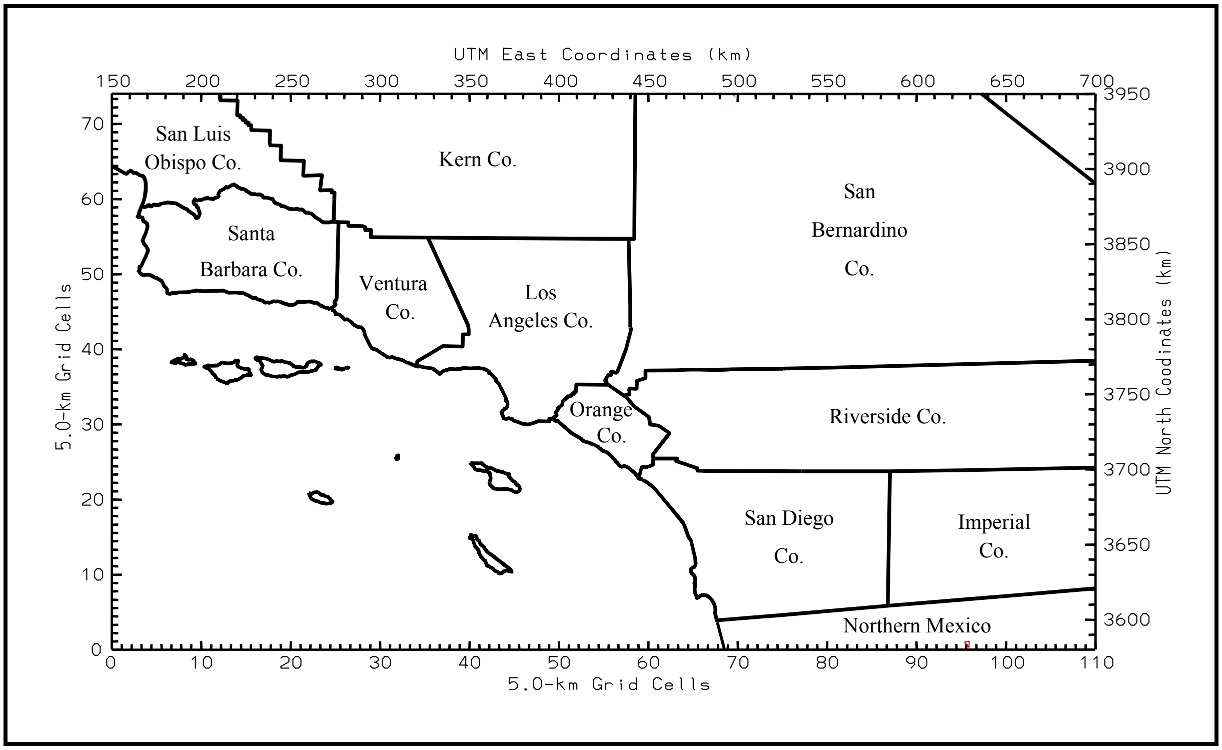

FIGURE 3
2007 AQMP Ozone Modeling Domain

The ozone modeling domain encompasses much of southern California, as follows: all of the South Coast Air Basin (including Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino Counties), the Coachella Valley and San Diego County; the California-Mexico border regions; most of Imperial County; most of the inland deserts; and almost all of the South Central Coast Air Basin (excepting a small piece of San Luis Obispo County). This large domain minimizes the influence of boundary conditions on simulation results and allows the effects of recirculation and interbasin transport to be better represented by the meteorological and photochemical model simulations. It also eliminates the need to define boundary concentrations between the air basins and it extends far enough offshore to contain wind flow patterns conducive to over-water recirculation.

PM Modeling Domain

The modeling domain for the particulate matter modeling will be smaller than the ozone domain, encompassing a 325 km wide by 200 km area, as shown in Figure 4. This corresponds to 65 by 40 grid cells at 5 km grid resolution. The reduced domain is due in part to the computational resource and time constraints of modeling the full 2005 year for annual PM. In addition, PM SIP modeling is not needed in the southernmost counties of California and adequate ammonia emissions inventories are not available from many areas surrounding the South Coast Air Basin.

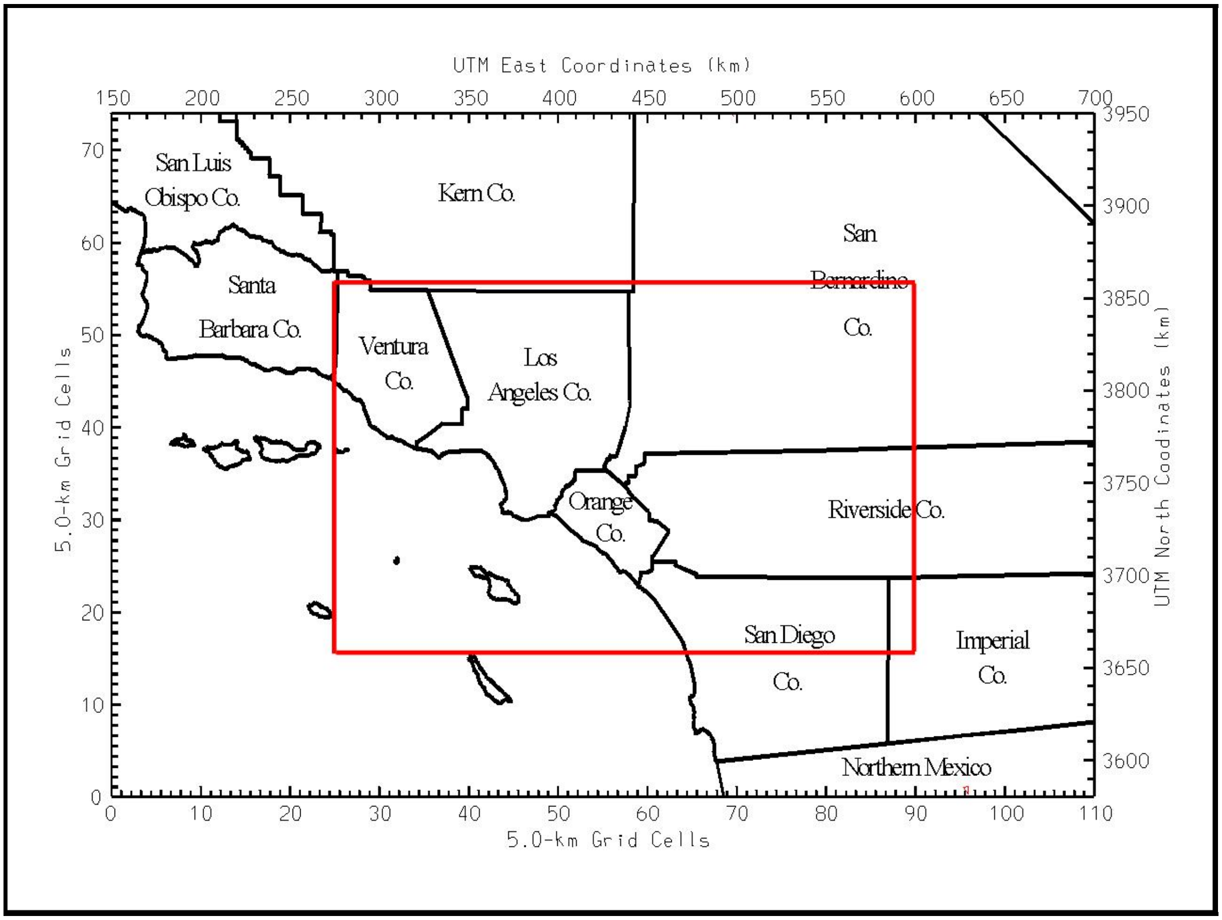

FIGURE 4
2007 AQMP PM Modeling Domain, inside the Ozone Modeling Domain

HORIZONTAL AND VERTICAL GRID RESOLUTION

Horizontal Grid Resolution

The horizontal grid resolution plays an important role in the modeling process. Large grid resolution tends to smooth emission gradients and meteorological inputs, which in turn leads to a smoothing of the resulting concentration fields. In general, the resolution should be sufficiently small to pick up emission gradients in urban areas and be consistent with the major terrain features which may affect the air flow. In the past, photochemical models have been applied in California with horizontal grid resolutions ranging from 2 x 2 km to 8 x 8 km. The specific grid resolution chosen was primarily dependent on the size of the modeling domain, computer resources available and the time and money available to carry out the simulations. In effect the final resolution was a compromise between the accuracy desired and the cost. However, the current generation of high-speed computers has minimized cost and resource constraints.

For the year 2007 AQMP ozone, particulate and meteorological modeling, a horizontal grid resolution of 5 km is proposed to be used for the air quality modeling. No grid nesting is anticipated. This resolution is consistent with the grid resolution used in earlier photochemical modeling studies for the South Coast Air Basin and for San Diego. In addition, this will reduce resources needed to create gridded emissions, which are based on 5 km grid cells. For the proposed ozone modeling domain, use of a 5 km resolution results in a modeling grid with 110 cells in the east-west direction and 74 cells in the north-south direction. The Universal Transverse Mercator (UTM) coordinate system is adopted as the primary coordinate system for the air quality modeling. There are variations in Lambert-Conformal map projection systems, such as the Normal Sphere (6471 km radius) used in MM5, the North American 1927 Clerk 1866 used in CARB's emissions development system, and the Arakawa-C or Arakawa-B variable configuration which assign meteorological parameters at grid points or the center of the grid. The selection of UTM simplifies translation from one grid system to another and the gridded emissions inventory is based on a UTM coordinate system.

Vertical Resolution

As with the selection of the horizontal grid resolution, the vertical resolution defined for air quality modeling domains has been limited by computational resources. In addition, available aloft meteorological and air quality databases were not sufficient to characterize conditions aloft. As a result, simulation results have been limited by a relatively small number of vertical layers within the atmospheric boundary layer, resulting in poor representation of the stratification of the atmosphere. The ability to better simulate the vertical structure of the atmosphere has improved significantly due to the increased availability of measurements aloft (including radar wind profilers and aircraft measurements), the emergence of higher-speed computers, and our increased experience with diagnostic and prognostic meteorological models.

Meteorological Modeling

For the terrain-following MM5 model, the proposed vertical layer consists of 34 layers to a height of over 15,000 meters AGL, as shown in Table 5. For input into the air quality model, the 34 layers are reduced to match the vertical resolution of the ozone or particulate matter air quality model.

TABLE 5
Vertical Structure for the MM5 Meteorological Model

Layer #	Sigma	P_0 (Pa)	Height (m)*	Depth (m)*
34	0.000	10000	15674	2004
33	0.050	14500	13670	1585
32	0.100	19000	12085	1321
31	0.150	23500	10764	1139
30	0.200	28000	9625	1004
29	0.250	32500	8621	900
28	0.300	37000	7720	817
27	0.400	41500	6903	750
26	0.300	46000	6163	693
25	0.450	50500	6461	645
24	0.500	55000	4816	604
23	0.550	59500	4212	568
22	0.600	64000	3644	536
21	0.650	68500	3108	508
20	0.700	73000	2600	388
19	0.740	76600	2212	282
18	0.770	79300	1930	274
17	0.800	82000	1657	178
16	0.820	83800	1478	175
15	0.840	85600	1303	172
14	0.860	87400	1130	169
13	0.880	89200	961	167
12	0.900	91000	794	82
11	0.910	91900	712	82
10	0.920	92800	631	81
9	0.930	93700	550	80
8	0.940	94600	469	80
7	0.950	95500	389	79
6	0.960	96400	310	78
5	0.970	97300	232	78
4	0.980	98200	154	39
3	0.985	98650	115	39
2	0.990	99100	77	38
1	0.995	99550	38	38
0	1.000	100000	0	0

** The vertical coordinate system for MM5 is based on a normalized pressure scale. The above layer heights were calculated from sea level using standard conditions. Layer heights are lower relative to ground level as terrain height increases.*

Air Quality Modeling

For sufficient vertical representation of the atmosphere, 16 vertical layers will be used for the CAMx ozone modeling, to a top height of nearly 5000 m AGL. Five of the layers will be below 500 m AGL (the nominal height of the summer afternoon mixing height within the Los Angeles coastal plain). The computational resources required for the annual particulate matter modeling necessitate a reduction in the number of layers used in the CAMx model for particulates. For this, eight vertical layers will used to a top height of approximately 5000 m AGL. The proposed vertical structure for the ozone and PM models are shown in Table 6, along side of the MM5 vertical structure.

TABLE 6
Vertical Structures for the CAMx Ozone and PM Simulations
with Corresponding MM5 Meteorological Model Layers

MM5 Vertical Layer Heights (34)				Ozone Model Layers (16)		PM Model Layers (8)	
No.	**Sigma**	**Height (m AGL)**	**Depth (m)**	**Height (m AGL)**	**Depth (m)**	**Height (m AGL)**	**Depth (m)**
…	…	…	…				
24	0.500	4816	604	4816	1172	4816	2216
23	0.550	4212	568				
22	0.600	3644	536	3644	1044		
21	0.650	3108	508				
20	0.700	2600	388	2600	670	2600	670
19	0.740	2212	282				
18	0.770	1930	274	1930	274	1930	627
17	0.800	1657	178	1657	178		
16	0.820	1478	175	1478	175		
15	0.840	1303	172	1303	172	1303	508
14	0.860	1130	169	1130	169		
13	0.880	961	167	961	167		
12	0.900	794	82	794	164	794	325
11	0.910	712	82				
10	0.920	631	81	631	161		
9	0.930	550	80				
8	0.940	469	80	469	159	469	315
7	0.950	389	79				
6	0.960	310	78	310	156		
5	0.970	232	78				
4	0.980	154	39	154	78	154	116
3	0.985	115	39				
2	0.990	77	38	77	38		
1	0.995	38	38	38	38	38	38
0	1.000	0	0				

EPISODE SELECTION

Ozone Episodes

Five ozone episodes were simulated for the 2003 AQMP: June 24-25, 1987; August 27-28, 1987; August 3-7, 1997; September 26-29, 1997; and July 13-18, 1998. To maintain continuity with the last plan submittal, the model performance for the August 1997 episode will be reevaluated using updated emission data and modeling protocols. Five new recent episode periods from 2004 and 2005 will evaluated to better represent current conditions, including those associated with the reformulation of gasoline in the past several years. The six episodes are outlined in Table 7 and briefly described below.

TABLE 7
Summary of Ozone Episodes to be Simulated for the 2007 AQMP

Episode	Peak 1-Hr. Ozone	Peak 8-Hr. Ozone	Notes
August 3-7, 1997 (Sunday – Thursday)	**0.187 ppm** Tuesday, August 5 at Rubidoux	**0.117 ppm** Tue.& Wed., August 5 & 6	SCOS97 intensive measurement episode. Primary modeling episode from 2003 AQMP. Before California fuel reformulation.
June 3-7, 2004 (Thursday – Monday)	**0.163 ppm** Saturday, June 5 at Crestline	**0.145 ppm** Saturday, June 5 at Crestline	2004 Basin maximum 1-hour and 8-hour ozone concentrations.
August 4-8, 2004 (Wednesday – Sunday)	**0.156 ppm** Saturday, August 7 at Banning	**0.124 ppm** Saturday, August 7 at Crestline	
May 17 -24, 2005 (Tuesday – Tuesday)	**0.164 ppm** Sunday, May 22 at Santa Clarita	**0.145 ppm** Sunday, May 22 at Crestline	2005 Basin maximum 8-hour ozone concentration.
July 14-19, 2005 (Thursday – Tuesday)	**0.173 ppm** Saturday, July 16 at Santa Clarita	**0.143ppm** Friday, July 15 at Crestline	
August 25-29, 2005 (Thursday – Monday)	**0.182 ppm** Saturday, Aug. 27 at Crestline	**0.130 ppm** Saturday, Aug. 27 at Crestline	2005 Basin maximum 1-hour ozone concentration.

August 3-7, 1997 (Sunday – Thursday)

The episode period of August 3-7, 1997 was selected to provide continuity with the previous AQMP modeling effort. This episode was the primary modeling episode for the 2003 AQMP and it is representative of the most extreme meteorological conditions conducive to the highest ozone concentrations in the Basin. Unlike the more recent ozone episodes, the peak concentrations during this period did not occur on a weekend. Model input data supporting the August 1997 simulations were derived from intensive field monitoring that occurred during the 1997 Southern California Ozone Study (SCOS97). The SCOS97 study benefited from state-of-the art upper air wind and temperature monitoring and recently developed advances in particulate and oxides of nitrogen sampling technology.

The August 1997 episode included the peak ozone concentrations measured in the South Coast Air Basin during SCOS97 that were not associated with an exceptional event. A peak 1-hour ozone concentration of 0.187 ppm was measured at the AQMD Metropolitan Riverside County (Rubidoux) air monitoring station on Tuesday, August 5 and peak 8-hour concentrations of 0.117 ppm were measured on Tuesday, August 5 and Wednesday, August 6. High ozone concentrations were also observed in the Mojave Desert Air Basin (1-hour peak of 0.140 ppm) and in Ventura County (1-hour peak of 0.130 ppm, 8-hour peak of 0.115 ppm).

The August 1997 meteorological episode began on Sunday, August 3 under a ridge of high pressure aloft with 500 mb heights measured in excess of 5900 m each day. Weak onshore flow gave way to stagnant winds through the middle of the episode. Winds observed on August 5th, illustrate a classic "south route" transport regime that has been identified as characteristic of past severe Basin ozone meteorological episodes. Beginning late on August 6 and continuing into August 7, a well-defined coastal eddy developed that contributed to southerly flow and transport northward toward Ventura County. Peak inland afternoon temperatures crested over 100 degrees Fahrenheit on each day during the episode and downtown Los Angeles consistently reached the mid to upper 90's. The excessive regional surface temperatures and stagnant flow also contributed to a massive wildfire in the mountainous portions of eastern Ventura and southeastern Santa Barbara counties during the later part of the episode.

Ozone air quality reached the California Ozone Health Advisory level (0.150 ppm or higher) on two day during the episode at Redlands, San Bernardino, Rubidoux and Mira Loma. The peak observed value of 0.187

ppm occurred on the August 5 at Rubidoux. Eleven locations exceeded the federal 1-hour ozone standard. Areas such as Azusa, Pasadena, Glendora and Santa Clarita that routinely experience higher values of ozone during episodic conditions were spared the brunt of the impact due to excessive daytime heating that deepened the mixed layer. Overall, The peak concentrations in the Basin reached 0.140 ppm on the August 4 in the Central San Bernardino Mountains, 0.187 ppm at Rubidoux on August 5, 0.170 ppm and 0.150 ppm on August 6 and 7, respectively, in the Central San Bernardino Mountains. On August 6, ozone transport was observed through the Newhall pass to the Santa Clarita area and concentrations rose in Reseda and Ventura County as the coastal eddy developed.

June 3-7, 2004 (Thursday – Monday)

- Peak 1-hour Ozone: 0.163 ppm on Saturday, June 5 at Crestline (2004 Basin max 1-hour ozone)
- Peak 8-hour Ozone: 0.145 ppm on Saturday, June 5 at Crestline (2004 Basin max 8-hour ozone)

August 4-8, 2004 (Wednesday – Sunday)

- Peak 1-hour Ozone: 0.156 ppm on Saturday, August 7 at Banning
- Peak 8-hour Ozone: 0.124 ppm on Saturday, August 7 at Crestline

May 17-24, 2005 (Tuesday – Tuesday)

- Peak 1-hour Ozone: 0.164 ppm on Sunday, May 22 at Santa Clarita
- Peak 8-hour Ozone: 0.145 ppm on Sunday, May 22 at Crestline (2005 Basin max 8-hour ozone)

July 14-19, 2005 (Thursday – Tuesday)

- Peak 1-hour Ozone: 0.173 ppm on Saturday, July 16 at Santa Clarita
- Peak 8-hour Ozone: 0.143 ppm on Friday, July 15 at Crestline

The morning of July 13, 2005 had a low, strong temperature inversion layer in the Basin, which continued for several days, and hot weather except at the immediate coast. Skies were mostly clear, except for low clouds and fog offshore an at the coastline for most of the day. Ozone levels were starting to increase in the inland valley areas. The inland valley areas remained hot on July 14 while the coast remained much cooler with coastal low clouds and fog. On July 15, high pressures aloft, centered over the western U.S. deserts, helped to keep inland temperatures hot. Excessive heat warnings were in effect for many desert areas. The marine layer deepened a little with increased onshore flow, bringing night and morning low clouds and fog into the coastal valleys and transporting ozone and ozone precursors towards the Inland Empire with a 8-hour ozone peaking at Crestline (0.143 ppm). Skies in the Basin were mostly sunny with haze.

On July 16, the hot inland temperatures continued while coastal low cloud and fog in the morning clearing in the afternoon. .On July 17, the strong inversion layer continued along with the hot temperatures in the inland valley areas. Only the immediate coastal strip will escaped the hot weather due to low clouds and fog along the coastline and offshore. With strong high pressure aloft over the west coast, temperature will remain hot on July 18 and through the week with an excessive heat advisory and record temperature possible in some areas on Monday, July 18. A lower temperature inversion confined morning low clouds and fog to the coast, with hazy sunshine elsewhere. Little change occurred on July 19 as inland heating likely caused the inversion to break in the afternoon inland.

August 25-29, 2005 (Thursday – Monday)

- Peak 1-hour Ozone: 0.182 ppm on Saturday, August 27 at Crestline (2005 Basin max 1-hour ozone)
- Peak 8-hour Ozone: 0.130 ppm on Friday, August 27 at Crestline

Possible Seasonal Ozone Episode: Summer 1997

Ozone Episode Statistical Ranking

For the 2003 AQMP ozone attainment demonstration a statistical model was developed to characterize the ozone meteorological episodes selected for regional modeling evaluation. The statistical model related degree of ozone meteorological episode severity relative to the long term trend (1981-2002). Multi-variate regression was conducted using the Basin 1-hour average maximum ozone concentration and surface and upper air meteorological data for 1996 to generate an ozone prediction equation. This equation was applied to the air quality and meteorological data for the 22-year period to predict Basin daily maximum ozone and establish a daily ranking. The multiple linear regression analysis is discussed in Appendix V of the 2003 AQMP.

The statistical evaluation used in the 2003 AQMP used the daily maximum 1-hour ozone as the dependent variable to characterize the meteorological episodes. The meteorological conditions that give rise to higher 8-hour average concentrations are essentially a subset of those giving rise to peak 1-hour concentration. CART pattern recognition analysis (Cassmassi, 1998) demonstrated that the meteorological conditions that lead to high 1-hour average concentrations were the same as those for peak 8-hour concentrations. In addition, station specific correlations between maximum 1- and 8-hour average ozone concentrations generally explain more than 95 percent of the variance in the data. Given the consistency between the meteorological profiles contributing to both maximum 1- and 8-hour average concentrations, it was assumed that the algorithm used to rank episodes in the 2003 AQMP would be applicable for ranking the 8-hour episodes.

The 1997 episode ranking was taken directly from the 2003 AQMP. The statistical characterization was then extended to the 2004 and 2005 candidate episodes and their predicted daily maximum concentrations were compared to the 22-year distribution to determine relative rank. Table 6 summarizes the analysis.

Eleven of the 13 days ranked above the 95th percentile in episode severity with only August 6, 2004 failing to rank in the 90th percentile. The daily maximum 8-hour ozone averages were averaged by episode and compared to the 4th highest ozone value in the Basin (99th percentile) for each of the modeling years. The 1997 episode was a match for the annual design value while the 2004 and 2005 episodes bracketed the annual design values, each depicting episodes that were more or less severe than the design. The overall distribution listed in Table 8 may be enhanced at a later date if a seasonal modeling application is determined to be viable.

TABLE 8
Ozone Episode Characterization

Ranking Applied to Historical 22-Year Period (1981-2002)

Episode	Rank	Percentile	8-Hour Max Ozone (PPB)	Episode Average (PPB)	Annual 4th Highest Station (PPB)
8/5/97	198	98	124	127	127 San Bernardino
8/6/97	203	97	130		
6/5/04	83	99	148	138	116 Crestline
6/6/04	524	93	127		
8/6/04	1009	87	94	111	
8/7/04	331	96	127		
5/21/05	389	95	112	129	125 Crestline
5/22/05	50	99	145		
7/16/05	22	99	141	136	
7/17/05	15	99	141		
7/18/05	73	99	127		
8/27/05	160	98	130	126	
8/28/05	138	98	121		

PM Episodes

Annual particulate matter modeling will cover the entire year of 2005, taking advantage of additional speciated particulate measurements and meteorological data archived in association with the Multiple Air Toxics Exposure Study III (MATES-III) in the South Coast Air Basin. In addition, two PM2.5 episodes in 2005 will be modeled for 24-hour NAAQS compliance: October 19-25 and March 6-12, 2005. These two days were chosen since they were the highest PM2.5 episodes in 2005 that were not influenced by exceptional events. Both episode periods exhibited multiple-day buildups in the Beta Attenuation Monitor (BAM) continuous PM2.5 monitoring and affected multiple stations. Only July 5 had a higher PM2.5 concentration, but it was associated with fireworks on the night of July 4. Table 9 shows the days in 2005 with the highest Size Selective Inlet (SSI) sampler PM2.5 concentrations and the associated 24-hour BAM PM2.5 and SSI PM10 concentrations.

TABLE 9
Highest 24-Hour Averaged SSI PM2.5 Concentration in 2005
with BAM PM2.5 and SSI PM10 Concentrations

Date	Station	SSI PM2.5 ($\mu g/m^3$)	BAM PM2.5 ($\mu g/m^3$)	SSI PM10 ($\mu g/m^3$)
July 5, 2005	Azusa	132.7		
October 22, 2005	San Bernardino	106.3		
October 22, 2005	Rubidoux	98.7	120.6	123/124
October 22, 2005	Fontana	96.8		
October 23, 2005	Rubidoux	95.9	117.9	
October 22, 2005	Riverside	95.0		
October 22, 2005	Ontario	87.8		
October 21, 2005	Rubidoux	82.1	98.5	
July 5, 2005	Rubidoux	79.9	102.0	
March 10, 2005	Downtown LA	73.7	88.2	
March 11, 2005	Downtown LA	67.6	84.7	70

Annual PM: January 1 – December 31, 2005

- AQMP database development concurrent with MATES-III
- Peak Annual Average PM2.5: 23.3 $\mu g/m^3$ at Rubidoux
- Peak Annual Average PM10: 52.2 $\mu g/m^3$ at Rubidoux

Episodic PM10/2.5: October 19-25, 2005 & March 6-12, 2005

- Peak 24-Hour PM2.5 was 132.7 $\mu g/m^3$ at Azusa on July 5, 2005 (due to Independence Day fireworks)
- Second Peak 24-Hour Average PM2.5: 106.3 $\mu g/m^3$ at San Bernardino on October 22, 2005
- Rubidoux exceeded the 24-hour PM2.5 standard on the most days in 2005 (8 days)
- Peak 24-Hour Average PM10: 131 $\mu g/m^3$ at South Long Beach on May 4, 2005
- Second Peak 24-Hour Average PM10: 123 $\mu g/m^3$ at Rubidoux on October 22, 2005
- No 24-Hour NAAQS violations were measured in the Basin in 2005

INITIAL AND BOUNDARY CONDITIONS

Previous ozone modeling results in southern California proved sensitive to initial and boundary concentrations of air pollutants. This reflected the physical processes of recirculation of pollutants within southern California and the transport of pollutants from one air basin to another. However, because of the three-dimensional nature of transport and recirculation, it is difficult to take field study measurements that are adequate to determine boundary conditions. Ozonesonde measurements made during SCOS97 have shown high concentrations of ozone at heights above 3,000 m AGL. The modeling domain developed for the SCOS97 episodes, which will be used for the 2007 AQMP, has been expanded both horizontally and vertically from that of earlier studies in an attempt to minimize the influence of boundary conditions. With the boundaries extending horizontally well into the desert areas an over the ocean and vertically to 5000 m, the effects of recirculation and interbasin transport will be better represented by the meteorological and photochemical model simulations.

The sensitivity of the model simulations to initial and boundary conditions will be extensively examined with sensitivity analyses. Chemical species concentration measurements, where available from the SCOS97 field study archive and the PAMS measurements, will be used to check the initial and boundary conditions for reasonableness. For the large areas of the study domain in which there are few such measurements, initial and boundary conditions are often assigned "background" values based on the minimum concentrations measured from monitoring sites where measurements are available. The use of larger-domain air quality models to provide the initial, top and lateral boundary concentrations will also be explored. Speciated gridded pollutant and precursor profiles from the 36 km grid CMAQ model used for the WRAP visibility modeling is currently being evaluated to provide the initial and boundary conditions. The boundary profiles will vary with time and height level, as well as location, while the top boundary concentration will vary by time and grid location.

Initial Conditions

Initial conditions in the air quality models define the spatial distribution of chemical species concentrations throughout the 3-dimensional modeling domain at the time at which the air quality model simulation begins. There are two limitations inherent in defining initial conditions. The first is that chemical species concentrations are only measured at discrete locations and, for some species, for discrete time periods. In particular, observed VOC data is sparse although some PAMS monitoring stations data are available. Therefore, observed concentrations must be extrapolated to estimate concentrations throughout the modeling domain. The second limitation is that observed chemical species concentrations may not represent chemical equilibrium, especially since not all important chemical species are measured explicitly.

To minimize the importance of initial conditions on air quality model simulation results, the simulation is frequently started at some time interval before the period of interest. Historically, this "spin-up" time interval has ranged between 8 and 72 hours. For the 2007 AQMP episodes, the modeling period starts early in the morning (typically 0000 PDT) of the day before the first day of interest for spin-up. This allows a full diurnal cycle of sunlight for air quality model to reach chemical equilibrium. Since most of the modeling episodes encompass several days, the day with the worst air quality is typically well into the simulation.

Boundary Conditions

The top and lateral boundary conditions in the air quality models are the chemical species concentrations on the study domain boundaries and represent the concentrations for the air mass moving into the modeling domain. Unlike initial conditions which need to be defined only for the beginning of the simulation, boundary conditions must be defined for each hour of an air quality model simulation on the 2-dimensional, vertical planes on each of the horizontal boundaries of the domain and at the top of the modeling domain.

Ideally, the modeling domain boundaries are placed so remotely that simulation results are insensitive to boundary conditions. Even for the large SCOS97 modeling domain, the influence of boundary conditions on the simulation results may be problematic. Beyond the northern boundary, emissions from central California could have an impact on the domain. To the south, emissions from Mexico could have an impact. The western boundary is over the Pacific Ocean, where recirculation may be an issue.

Also, the determination of vertical profiles of chemical species is problematic. During SCOS97, ozone concentrations aloft were measured by launching balloon-borne ozonesondes. The measurements indicated that there are layers of high ozone ranging 60 to 80 ppb at near 3000 m. Prescribing a 60 ppb ozone concentration aloft in the model would contribute to high ozone concentrations at the surface due to advection or vertical diffusion. Ideally boundary conditions would be determined from measured chemical species concentrations, but these are rarely available for the most of the episode days or in all locations needed.

For the 2007 AQMP, AQMD proposes to use relatively clean initial and boundary conditions, based on the results of a larger domain model, the WRAP CMAQ visibility simulations. The SAPRC species for the initial and boundary conditions are shown in Table 10 for the ozone modeling. The use of relatively clean boundary conditions could significantly impact the predicted peak ozone concentration which results in poor model performance for ozone peak prediction. However, the use of clean boundary condition minimizes the uncertainty in future-year model predictions. The calculated RRF should only reflect the impact of anthropogenic emissions reductions. Also, as the future year air quality becomes close to background concentrations, the treatment of boundary conditions may be problematic, particularly in 8-hour ozone attainment demonstration. A part of the air quality model evaluation process, sensitivity analysis and weight of evidence analysis will be to assess the influence of boundary and initial concentrations on simulation results and RRF.

TABLE 10
SAPRC-99 Chemical Mechanism Species

Species	Species
ACET	ISPD
ALK1	MEK
ALK2	MEOH
ALK3	METH
ALK4	MGLY
ALK5	MPAN
ARO1	MVK
ARO2	NO
BACL	NO2
BALD	NOXY
CCHO	NPHE
CO	O3
CO2H	OLE1
CO3H	OLE2
COOH	PAN
CRES	PAN2
DCB1	PBZN
DCB2	PHEN
DCB3	PROD
ETHE	RC2H
GLY	RC3H
HC2H	RCHO
HC2H	RNO3
HCHO	ROOH
HNO3	SO2
HNO4	SULF
HO2H	TERP
HONO	XN
ISOP	

METEOROLOGICAL INPUTS

Meteorological Input Evaluation and Technical Review

The quality of the meteorological inputs can have a profound influence on the accuracy of the simulations concentrations of ozone, PM and other pollutants by the air quality models. It is therefore essential that the products of the meteorological models undergo a rigorous evaluation. By evaluating the flow characteristics of the wind fields, as well as the representativeness of the temperature, relative humidity and mixing height fields, the uncertainty in the air quality simulations can be minimized. AQMD and CARB staff will consider both qualitative and quantitative analyses in judging the meteorological fields and in reaching consensus on the appropriateness of those fields for use in the 2007 AQMP. Graphical and statistical analysis software is available to facilitate the meteorological input field evaluation.

The use of routine and special study monitoring data and model analysis archives provides a robust data set for comparing and analyzing the simulated meteorological fields. Some of the available data sets include:

- Routine surface meteorological network data, including:
    - South Coast AQMD (~32 stations),
    - Ventura County APCD,
    - San Diego County APCD,
    - Mojave Desert/Antelope Valley APCD,
    - NOAA/FAA Stations (METAR obs),
    - California Remote Access Weather Stations (RAWS),
    - California Irrigation Management Information System (CIMIS) Stations;
- Special study meteorological station data, such that from the Multiple Air Toxics Exposure Study III (MATES-III) project during part of 2004 and all of 2005;
- Marine buoy data from National Data Buoy Center (NDBC);
- Routine National Weather Service and military radiosonde observation (RAOB) data, including the stations at Miramar MCAS, Point Mugu NAS, San Nicolas Island NAS, Vandenberg AFB, Edwards AFB, China Lake NAS, Oakland, Mercury/Desert Rock, and Tucson;
- Southern California radar wind and temperature profiling network, including stations operated by:
    - South Coast AQMD (Los Angeles International Airport, Ontario International Airport and Moreno Valley),

    - Ventura County APCD (Simi Valley)
    - San Diego County APCD (Pt. Loma, Valley Center or Miramar)
    - NOAA project and SCOS97 profilers, when available (e.g., Goleta, San Clemente Island, Santa Catalina Island during SCOS97).
- National Center for Environmental Prediction (NCEP) gridded observational databases and model analysis fields, including:
    - NCEP ds353.4 ADP Global Upper Air Observations database,
    - NCEP ds464.0 ADP Global Surface Observations database,
    - NCEP ds083.2 Global Tropospheric Analyses, 1 degree x 1 degree gridded database,
    - NCEP ETA-12 km model forecast fields,
    - NCEP ETA-40 km Model Forecast Fields,
    - NCEP EDAS-40 km Gridded Data;
- Aerospace Corporation MM5/3-Dimensional Variational Analysis System (3DVAR) archives (incorporating surface, upper-air, ships, buoys, aircraft and satellite observations)

Qualitative Analyses

The qualitative analysis of modeled wind fields includes an evaluation of the gross circulation features in the modeling region to determine if the model is replicating those essential features (Mulberg, 1995, Lolk and Douglas, 1996). Such features include areas of convergence and divergence, eddy circulations, land/sea breezes, slope flows, and transport corridors. Since the modeling domain includes large overwater areas it is also necessary to evaluate offshore flows as well. Key features of the windfield are areas of convergence and divergence. These features result in vertical velocities which can transport pollutants upward (in the case of convergence) or bring pollutants from aloft down to the surface (with divergence). The evaluation will include a review of the convergence and divergence zones in the simulated windfield, and their impact on realistic vertical velocities, to determine agreement with measurements or conceptual models in terms of location, timing, and extent.

Synoptic forcing and mesoscale flow characteristics can sometimes result in eddy circulations. In the SCOS97 domain two key eddy features are prevalent: the Catalina Eddy (named since its center is often near Santa Catalina Island), and the Gaviota Eddy in the Santa Barbara Channel (Smith, et. al., 1984). Both eddy circulations are important transport mechanisms; they are capable of transporting precursors and aged ozone concentrations onshore and northward to Santa Clarita and sometimes Ventura and Santa Barbara Counties. Exceedances of the ozone standards are often observed with the presence of an eddy circulation and the deep of the marine layer that accompanies a mature coastal eddy can end an ozone episode. The timing of the onset, persistence, and spatial extent of eddy circulations, are a critical part of the windfield validation.

Land/sea breeze circulations are another important flow feature. The sea breeze is one method whereby pollutants generated in the Los Angeles Basin are transported eastward. That is, the strength of the sea breeze will determine how far precursors and ozone generated near the coast will be transported inland. Errors in the timing of the sea breeze can cause precursor emissions to be transported to the wrong locations instead of inland where peak concentrations are observed. It is essential that the onset of the sea and land breezes simulated by the model be compared to observations for reasonableness.

The onshore portion of the 2007 AQMP modeling domains includes areas of complex terrain. Slope flows are important as a recirculation mechanism that may influence ozone concentrations. Slope flows are probably the most challenging feature for prognostic meteorological models, due to the sparse observational data in complex terrain and these models have a tendency to overdo the speed of the slope flows. A proposed qualitative approach is to determine if wind speeds estimated by the model appear to be reasonable in areas of complex terrain.

As a qualitative and quantitative evaluation of the windfields, wind speeds are proposed to be statistically summarized and plotted by site and globally throughout the domain (Seaman et. al., 1995, Bigler-Engler et. al., 1996). Temporal plots for key sites will be examined to determine agreement with observations. Quantitative techniques will make use of statistical measures such as the mean gross error and mean bias to compare modeled and measured wind speeds (Mulberg, 1995).

Some of the methods being explored for the meteorological modeling incorporate observations, thus reasonably good agreement should be expected near those observation sites where data was used as input to the model. In order to diagnose the impact that incorporation of the observations has on the meteorological models, it may be useful to consider withholding some observations when executing the models to have an independent set of observations for comparison. The sites withheld should have some relation to the sites used to provide some assurance in the results from the comparison. This diagnostic evaluation is proposed to be conducted once acceptable meteorological fields have been prepared.

Temperature fields will also be examined. At the surface, qualitative analyses will include an examination of the diurnal and spatial variation of estimated and observed temperatures, as well as consistency of the gridded data within regions.. The interface at the coastline will be examined for the expected gradients between the ocean and the land. Mean bias and mean gross error statistics will also be calculated to provide quantitative measures of performance. In addition, the vertical temperature profiles generated by the models will be compared to those observed at rawinsonde sites and boundary layer wind and temperature profiler locations. The vertical temperature profile influences the stability characteristics of the modeling domain which significantly affects vertical mixing. The evaluation will include temporal and spatial evaluations of simulated vertical temperatures and mixing as compared to those estimated from observed soundings and profiler data. The timing of the onset and breakup of the inversion will also be evaluated, as this phenomenon has a profound effect on estimated ozone concentrations.

Quantitative Analyses

ENVIRON Corporation International (Emery, et al., 2001) proposed performance benchmarks and developed a statistical analysis software package, called METSTAT, to statistically and graphically analyze the meteorological fields. METSTAT is publicly available and widely used by the modeling community. It can read the MM5 output files and the observational data, and then calculate the following statistics: mean observation, mean prediction, bias error, gross error, root mean square error (RMSE), systematic root mean square error (RMSEs), unsystematic root mean square error (RMSEu), and index of agreement (IOA). It should be noted that the statistical evaluations are influenced by the number of stations and the duration of sampling period. The benchmark statistics will be applied to all observational stations available and to specific geographic groupings (e.g., coastal, mid-Basin, inland areas). Both daily and hourly statistics will be compiled for each modeled period.

Meeting the METSTAT benchmarks provides assurance that the model performance is comparable with performance achieved in the past. METSTAT can be used as a screening tool to identify the periods when the performance is poor that require further analysis. These statistics can also be used to identify stations where performance is consistently poor. Table 11 shows the proposed performance benchmarks for the meteorological inputs for the 2007 AQMP air quality modeling. In addition, temporal plots will provide direct comparison of modeled meteorological parameters at grid points corresponding to observational stations.

TABLE 11

Proposed Meteorological Input Performance Benchmarks

Parameter	Benchmark
Wind Speed Total RMSE	≤ 2.0 m/s
Wind Speed Bias	≤ ±0.5 m/s
Wind Speed IOA	≥ 0.6
Wind Direction Gross Error	≤ 30 degrees
Wind Direction Bias	≤ ±10 deg
Temperature Gross Error	≤ 2.0 K
Temperature Bias	≤ ±0.5 K
Temperature IOA	≥ 0.8
Humidity Gross Error	≤ 2 g/Kg
Humidity Bias	≤ ±1.0 g/Kg
Humidity IOA	≥ 0.6

[These benchmarks may be too stringent for MM5, especially Temperature. These may need to be reevaluated after seeing more results.]

EMISSION INVENTORY INPUTS

Ozone episodes occurring in 1997, 2004, and 2005 will be simulated for the 2007 AQMP. Gridded, hourly base year emissions inventories, including CO, NOx, SOx, and TOG emsissions, for those years are needed for photochemical ozone modeling. The 2005 base year particulate matter emissions will also be needed to support inputs needed for aerosol modeling. The information needed to complete the emission inventory for the modeling region is obtained from the local air pollution control districts, transportation planning agencies and CARB. For the 2007 AQMP, the 2002 base year emissions will be used. The statewide emissions inventory will be gridded to the modeling domain. The 2002 emissions will be backcasted to the 1997 episode year and grown to the 2004 and 2005 episode years. Specific month and day-of-week emissions will be estimated from the annual average emissions, based on temperature corrections derived from ambient measurements. The emissions will also be grown to the attainment milestone and demonstration years of 2005, 2010, 2020 and, possibly 2015 and 2030.

Adjustments to the 2002 base year inventory for the 2007 AQMP will likely reflect the following changes from the 2003 AQMP inventory:

- Overall emissions inventory changes will likely include higher VOCs, lower NOx and lower CO emissions. New temperature and relative humidity profiles will be used for annual inventory adjustments.
- The stationary source inventory will reflect that the actual 2002 emissions were mostly lower than 2003 AQMP-projected emissions.
- The mobile source inventory will be projected with EMFAC Gross Adjustments (to be provided by Spring 2006). It will reflect increased VOC and NOx emissions from the 2003 AQMP inventory. Key areas of mobile source inventory adjustment include:
    - Truck Distribution/VMT/deterioration rate;
    - Ethanol & evaporatives and permeation issues;
    - Modified temperature distribution.
- For the particulate matter emissions categories, the new USEPA fugitive PM10/PM2.5 ratio will be evaluated and applied.
- Temperature and humidity corrections will be applied to the biogenic inventory.

Other potential emissions inventory changes will possibly result from improved inventories for ports, the Alameda Corridor, shipping, aircraft and airports. The 2007 AQMP on-road emissions will be based on technical-adjustments to the SCAG 2004 Regional Transportation Plan. No weekend trip model will be available from SCAG, so CARB will develop a "weekend" overlay to mimic VMT based on California Department of Transportation (Caltrans) in-road counter data. Air quality modeling analyses will stress emissions sensitivity runs, since the spatial distribution of emissions will be critical to model performance due to the use of Relative Reduction Factors (RRFs) instead of peak concentration performance metrics.

Emissions Characterization

Point Sources

Characterizing anthorpogenic point source emission is the responsibility of the local air districts. Emission inventories for point sources (including RECLAIM facilities) are compiled by local districts and reported to CARB. If annual emissions for a facility fall below 10 tons/year (this cutoff varies with district) the source is included in the area source inventory. Point sources are allocated to grid cells using the location that is stored as part of the point source emission database. Temporal codes which describe hours of operation are also included in the emission database. Factors are also stored to convert annual average emissions to a specific month and day of week. Point sources have been inventoried for 2002. SCAQMD's point source inventory for 2002 includes an update to locations (UTM coordinates) and stack parameters. Point source emissions will be estimated using the CARB California Emission Forecast System (Johnson, 1997) for the modeling episode base years and future years.

Area Sources

Area sources are comprised of emission source types that are difficult to inventory individually. Examples are architectural coatings, residential water heating, gasoline stations and off-road mobile sources not included in the CARB OFFROAD model. The area sources include point sources smaller than 10 tons per year and area surrogates are used for sources such as consumer products.

Districts and CARB share responsibility for estimating area source emissions according to a long-standing division of categories. CARB, 1997b describes methodologies used to estimate emissions from area sources. Factors are also included that allow estimates of specific month and day of week emissions from annual average emissions. Temporal codes which describe hours of operation are also included in the area source emission database. Area source categories have been inventoried for 2002. Emissions for the modeling episode base years and future years will be grown using CARB emission forecasting system.

On-Road Mobile Sources

On-road mobile source inventories are prepared using vehicle activity data from transportation planning agencies. The majority of travel is reflected in transportation plans developed by:

- Southern California Association of Governments (SCAG);
- San Diego Association of Governments (SANDAG);
- Santa Barbara County Association of Governments (SBCAG); and
- Kern Council of Governments (Kern COG).

Travel data for areas not covered by the transportation planning agencies are extracted from the California Statewide Planning Model maintained by the California Department of Transportation. Emission factors for on-road mobile sources will ultimately be estimated using the CARB EMFAC2007 emission factor model. However, the release of EMFAC2007 will likely be concurrent with the 2007 SIP submittal, so the modeling will proceed using the 2002 base year emissions inventory from the 2003 AQMP with gross EMFAC adjustments based on CARB technical documentation. DTIM4 will use both the emission factors and travel activity data to produce hourly gridded emission estimates for the SCOS97 region.

CARB is leading the effort to acquire all travel data needed for this modeling study. The network and travel activity data provided by transportation planning agencies is developed for peak and off-peak time periods, which will be processed into 24 hourly data sets. Day-specific traffic count data will be used to calibrate DTIM4 inputs for development of day-specific on-road mobile source emissions. CARB will use the network and travel activity data to produce gridded DTIM4 inventories for episode days.

Other Mobile Sources

Area source emissions from most categories of off-road mobile sources will be estimated using the CARB off-road mobile source emission model (OFFROAD). OFFROAD covers more than 12 off-road categories, including lawn and garden equipment, small utility and construction equipment, as well as farm equipment. Categories not estimated by OFFROAD will be covered under "area sources". However, specific emissions for aircraft, marine vessels, and locomotives will be provided through separate special studies. OFFROAD will produce gridded emission inventories for each calendar year desired. The OFFROAD model will have the capability to estimate exhaust, starting, and evaporative emissions for differing spatial and temporal conditions.

Biogenic Emissions

The derivation of a gridded natural biogenic emission inventory requires data sets describing the spatial distributions of plant species, biomass, and emission factors that define rates of hydrocarbon emissions for each plant species. The Biogenic Emission Inventory System (BEIS 2.3) (USEPA, 1995) model, distributed by the USEPA for this purpose, is one source of these data sets for areas throughout the United States. However, the BEIS model has been shown to have limited use in California because of poor spatial resolution within the referenced data sets and a simplified scheme for assigning emission factors (e.g., Jackson, et al., 1996). The development of a gridded biogenic emission inventory for the SCOS97 domain will benefit from research conducted within California that describes the needed data sets in more detail than is defined within the BEIS model (Benjamin et. al., 1998).

CARB, in consultation with researchers at UCLA, developed a methodology to complete a gridded biogenics inventory for the SCOS97 modeling domain. The methodology involves the use of: (1) gridded plant species maps using the GAP data base (Davis et. al., 1995), an inventory of biomass diversity for the United States; (2) biomass distribution, determined using published correlations between biomass and Normalized Difference Vegetative Index (NDVI), an index of relative "greenness" from Advanced Very High Resolution Radiometer (AVHRR) satellite remote sensing data sets; (3) emission factors of isoprene, monoterpenes, methyl butenol, and other VOCs for various plant species known to exist within the modeling domain using taxonomic relationships between the plant species (Benjamin et. al., 1996). The gridded biogenic inventory, including the gridded plant species, biomass distribution and emission factor databases, are combined with ambient temperature and radiation data to produce gridded hourly emissions of isoprene, monoterpenes, methyl butenol, and other VOCs.

Organic Gas Speciation

Organic gas speciation profiles are applied to all categories of TOG emissions to obtain estimates for each organic gas species emitted in the modeling region. CARB maintains a database of current profiles that are routinely updated to reflect recent information. The most recent updates were for gasoline exhaust and evaporation, diesel exhaust and jet engine exhaust. The CARB publication *Identification of VOC Species Profiles* (CARB, 1991) documents the organic gas profiles.

Day-Specific Emissions

Emissions from many sources vary from day to day. Evaporative emissions from vehicles and vegetation increase with ambient temperature. Exhaust emissions are also a function of ambient temperature. Increased air conditioning demands on hot days also lead to increased emissions from electrical generation. Hourly surface temperatures for episode days are interpolated to each grid cell and are used in estimating emissions from vegetation and on-road mobile sources.

Criteria pollutant emissions from approximately 80 major point sources will also be estimated hourly for each specific episode day. Each district has acquired data from major point sources for the episode days and is developing day-specific point source inventories for those years. The districts also collect information on variances, temporary breakdowns and shutdowns. DTIM4 will be run to develop mobile source inventories for several episode days, including weekend days.

Where feasible, wildfire emissions will be estimated. Emissions from large ships in the shipping lanes are also estimated, using ship activity data (for commercial vessels) from shipping ports, ship-specific engine characteristics data, and the latest emission factors. Emissions from aircraft will be estimated using aircraft activity data, including hourly landing, takeoff, approach, climbout and cruise emission. This type of information will allow development of temporally and spatially resolved emission estimates.

Emissions Quality Assurance

CARB has provided specific guidelines to assist state and local agencies in implementing uniform and systematic approaches for collecting, compiling, and reporting emission inventory data. A comprehensive quality control and quality assurance plan was prepared to ensure good quality practices during development of the 2002 and future year emission inventories. These procedures include: quality control checks for collecting non-emission data, updating activity data, and using appropriate emission factors for calculating emissions; emission calculation methodology;

quality assurance evaluation using the Data Attribute Rating System (DARS); and quality review of the entire inventory. The DARS program, originally developed by the USEPA, will be used as an additional quality assurance tool to quantify the relative accuracy of the annual emission inventories. CARB has also provided the districts with a variety of quality assurance reports to aid in the review of inventory data important for modeling. These reports were intended to provide checks on the accuracy of the emission calculations, stack data, facility location data, temporal data, devices data, process data, etc.

Emission Projections

Future year emissions form the basis for an air quality emission reduction target. Future year emissions for area and point sources are projected by accounting for growth and control, generally using growth and control factors applied to the base year (2002) emissions. Control factors are derived based on adopted measures. Growth factors are derived from socioeconomic and demographic data provided by districts and local agencies, and CARB-sponsored research factors elsewhere. Area source and offroad emissions are gridded using the appropriate surrogates as used for 2002. Gridded future year surrogates for the entire modeling domain region and also being prepared for milestone and attainment demonstration years. Surrogates for other years can be interpolated as needed.

Future year traffic activity and network data are also prepared by local planning agencies. EMFAC will give estimates of future year emission factors. DTIM4 uses future year emission factors and network travel data to obtain gridded future year on-road mobile emissions. DTIM4 inputs for future years are being compiled and prepared. Ambient temperatures that occurred during 2002 are also used in calculating future year emissions for each episode day.

Biogenic emissions will not change for future years. Even though there may be a shift in farm or landscaping plans and species, the capability does not exist to incorporate any potential changes into the inventory. Seep emissions will also remain constant in future year inventories.

AIR QUALITY MODEL PERFORMANCE EVALUATION

It is a well established tenet of the modeling community that for an air quality modeling simulation to give reliable results, it must be capable of giving the right answers for the right reasons. That is, not only must the model be capable of reproducing observed air pollution measurements with a reasonable level of accuracy, but it must also pass a series of prescribed tests designed to ensure that the apparently accurate results are not produced by a combination of compensating errors. Several tests on the modeling simulations, both at the surface and aloft are proposed to be conducted as part of the model performance evaluation. Both precursor and secondary species will be evaluated, in addition to 1-hour and 8-hour ozone, PM10 and PM2.5 for each episode and model variation. Statistical and graphical analyses will compare simulated concentration to measured values, throughout the domain and by geographic region. Diagnostic simulations will be used to analyze the sensitivity of the model to the input parameters and assumptions. This performance evaluation should allow a determination that the model is working properly. The following evaluation tools are based on previous modeling practices, the CARB photochemical modeling guidance (CARB 1992), and the USEPA attainment demonstration guidance for ozone (USEPA, 2005) and particulate matter (USEPA, 2001b).

Statistical and Graphical Analyses

The model performance evaluation effort will include both graphical and statistical analyses. These will compare simulated pollutant concentrations with measured values from the routine air monitoring stations and special study sites, including the PAMS stations. The statistical evaluations for the particulate matter modeling will focus primarily on comparisons to the speciated particulate data from the MATES-III study. The graphical analyses will include time series plots showing temporal variations, contour plots showing spatial variations, scatter plots showing tendencies for over- or under- estimation, and residual plots showing the distribution of the differences between observed and predicted concentrations.

The statistical analyses will examine the accuracy of peak estimates (both paired and unpaired in time and space), mean normalized bias, mean absolute gross error, and mean absolute normalized gross error. The statistical performance criteria outlined in the CARB guidance document for Class B or better ozone performance will be used to guide the determination of acceptable model performance. These statistical criteria will be used as a criterion for acceptable model performance. However, other analyses (graphical, multi-species, aloft comparisons and the diagnostic simulations) will also be used to determine acceptable model performance, and ultimately a conclusion that the model is working properly must be made considering the evidence from all of the analyses. Table 12 shows some of the statistical performance goals for the ozone simulations.

TABLE 12
Performance Goals for 1-Hour Ozone

Statistic for 1-Hour Ozone	Criteria (%)	Comparison Basis
Normalized Gross Bias	≤ ±15	Paired in space and time
Normalized Gross Error	≤ 35	Paired in space (+2 grid cells) and time
Peak Prediction Accuracy	≤ ±20	Unpaired in space and time

Subregional Performance

The performance tests will be evaluated for the entire domain, by district or air basin, and for several geographic subregional zones to ensure that the domain-wide statistics do not mask subregional issues with the simulation. Since the modeling domains are very large, six geographic zones are proposed to be evaluated for model performance: San Fernando Valley, west (or coastal) Basin, mid-Basin, San Gabriel Valley, east Basin, and Coachella Valley. The same statistical acceptance criteria will be used for the subregions as for the entire domain.

Multi-Species Evaluations

To be useful for planning or other purposes, an air quality model must be able to replicate measured concentrations with reasonable accuracy. However, it is also important to compare estimated and measured concentrations of precursors and secondary species, to establish confidence that the chemistry is being simulated properly. The important ozone precursors are NO, NOx, HONO, and organic gas species; important secondary species are HNO3 and PAN. Organic gas concentrations will be lumped according to the scheme employed by each model’s chemical mechanism. Comparisons will be made for each of the estimated precursor species and lumped organic gas species, for each monitoring location. In addition, comparisons will also be made for NOx, and total ROG.

The multi-species comparisons may reveal modeling issues that were not obvious from the direct ozone comparison. Many of the precursor species have a secondary component as well. Concentrations of primary pollutants tend to have higher gradients than do secondary species. This makes it more difficult to assume that a measured concentration of a primary pollutant represents a grid cell average. For these reasons it is probably unreasonable to expect the same accuracy in replicating precursor concentrations as for ozone concentrations. Thus, use of a specific statistical error or bias criterion is not recommended. These comparisons should be viewed as more qualitative, to uncover potential problems in precursor and secondary performance.

Aloft Comparisons

Aloft air quality measurement data for the 2004 and 2005 episodes is minimal. The vertical profile of the chemical species will be evaluated qualitatively and a more quantitative analysis will be conducted whenever observational data are available. For the SCOS97 August 1997 episode, more extensive the upper air measurements are available. The concentrations of selected air pollutants were measured above the ground using aircraft, balloons and LIDAR. The primary component of these measurements is the oxidant concentrations measured with ozonesondes to a height of 5,000 m AGL. Ozonesondes were flown at seven sites, at 6-hour intervals, for selected episode days. Also, four aircraft were flown up to three times per day and an ozone LIDAR was operated continuously on selected episode days.

When air quality data aloft is available, the performance of air quality model simulations above the ground will be determined by quantitatively comparing simulated oxidant and ozone concentrations with measurements, at reasonable close times and locations. Measured concentration profiles will be averaged for the vertical layer increments corresponding to those of the air quality model. Due to the vertical resolution of the air quality models, the vertical resolution of the aloft comparisons is likely to be somewhat inconclusive and the evaluation will be of a more qualitative nature.

In addition to measuring ozone, three of the SCOS97 aircraft measured oxides of nitrogen and collected samples for later hydrocarbon analysis. Comparisons between these precursor data and concentrations simulated using the air quality models will also be made. However, there are relatively few samples and because an aircraft is not in one grid cell for an hour, comparisons may not be consistent with modeled concentrations. Comparisons to see if any large discrepancies exist between modeled and measured concentrations aloft will be made.

Acceptable Model Performance

While it is expected that acceptable model performance can be achieved for the ozone and particulate episodes, this is not always feasible given the regulatory deadlines for plan submittals. While the modeling results of some episodes may not meet all the performance goals, the episode can still be used for carrying capacity and attainment demonstration purposes assuming the relative reduction factors reflect the change in emission reduction. The RRF will be extensively evaluated with sensitivity analyses and such issues will be described in the weight-of-evidence discussions.

Sensitivity Analyses

Diagnostic Simulations

Several diagnostic or investigative simulations will be employed to further determine the fidelity of the model results. These sensitivity analyses will help evaluate potential concerns regarding such factors as emissions mass, VOC/NOx ratios, ammonia mass, and emissions timing, including daily and weekend vs. weekday emissions. The diagnostic simulations that are anticipated help evaluate model sensitivity and performance will include the following:

- ***Zero emissions –*** all anthropogenic and biogenic emissions will be set to zero to test the model's sensitivity to emissions and to ensure that the base case results are influenced appropriately by the emission inputs.
- ***Double anthropogenic emissions –*** all anthropogenic emissions will be doubled to test the model's sensitivity to increased man-made emissions. In addition, as separate tests of anthropogenic emissions affects, only mobile source emissions will be doubled and only stationary source emissions will be doubled.
- ***Emissions adjusted based on uncertainty analysis results –*** The anthropogenic emissions estimate include various inherent uncertainties because of the nature of human activity, such as the possibility that some VOC sources could not be accounted and uncertainty in the spatial distribution of the emission sources. The adjustment factors will be developed based on the ambient VOC species adjusted within the

bounds of the uncertainty. Various emissions estimate scenarios will be tested to diagnose model sensitivity and performance.

- ***Zero biogenic emissions* –** biogenic emissions will be set to zero to test the model's sensitivity to biogenic emissions.
- ***Zero surface deposition* –** deposition will be turned off for all species to examine the effects of dry deposition on ozone estimations.
- ***Reduced wind speeds* –** reducing the wind speeds by 50% is proposed to test the model's sensitivity to that parameter. However, it is possible that the resulting wind fields will not be dynamically consistent, so these results will need to be approached with caution.
- ***Zero and estimated or measured boundary and initial conditions* –** A range of boundary and initial conditions will be analyzed to test the sensitivity of the models to these inputs. The modeling results using the following initial and boundary conditions will be analyzed: (1) the boundary conditions at the top and sides of the modeling domain and the three-dimensional initial conditions will be set to zero; (2) the observed air quality data is interpolated for the initializations hours, using data from PAMS and other measurements as available to prepare estimated speciated initial and boundary profiles; (3) a range of boundary and initial conditions will be evaluated, based on the larger scale WRAP modeling results.
- ***Grid cell averaging sensitivity* –** For the attainment demonstration, relative reduction factors (RRF) will be calculated using 9-cell (15 km by 15 km) averages. As a sensitivity run, 1-cell (5 km by 5 km), 4-cell (10 km by 10 km) and 16-cell (20 km by 20 km) averages will be examined.

USE OF THE MODEL RESULTS

Attainment Demonstration

The modeling results are anticipated to be used for estimating carrying capacities and demonstrating future attainment of the NAAQS. For the attainment demonstration, the years 2007, 2010, 2014 and 2021 will be simulated with the proposed control measures (the control strategy) for 8-hour ozone NAAQS attainment. Attainment of the revoked 1-hour ozone NAAQS will also be demonstrated for the future year 2010 as a milestone and to show reasonable further progress. The years 2006, 2010, 2015 and 2020 will be simulated to demonstrate the particulate matter NAAQS attainment. In the past the use of the model results for these goals has been contingent upon acceptable base case model performance for the episodes simulated. That is, only episodes for which the model is judged to be operating properly and which meet the model performance acceptance criteria will be used.

Weight-of-evidence discussions will also factor into the attainment demonstration by providing supportive analyses to confirm or compliment the modeling assessment. Examples of the weight-of-evidence considerations may include: trend analyses, sensitivity modeling analyses (e.g., altered emissions scenarios), hot spot grid evaluations, and statistical analyses. Special analyses may also be targeted to problem locations, for example, incorporating the Rubidoux study results.

Relative Reduction Factors

Historically, AQMD developed the carrying capacity and attainment demonstration for ozone based on a set of specific control measures that was projected to achieve the 1-hour ozone NAAQS for all modeled episodes. The USEPA 8-hour ozone guidance (USEPA, 2005) and draft particulate matter guidance (USEPA, 2001b) recommend the use of relative reduction factors (RRFs) as part of the attainment demonstration process, assuming that satisfactory base year model performance is established. The RRF is a non-dimensional factor that incorporates design period monitoring data, using the 3-year average of the design value, directly into the attainment test along with the ratio of future to current year model predictions. The RRF is defined as the ratio of the future daily maximum concentration predicted near a monitor (averaged over multiple days) to the baseline daily maximum concentration predicted near the monitor (averaged over the same days).

The RRF are site specific and will be based on the 9-cell average (15 km by 15 km) for multiple episodes. Areas with severe or higher nonattainment status require a minimum of 15 simulated days. It allows the model to be used in a relative, rather than absolute, sense to reduce uncertainty in the predictions. The use of RRFs also potentially address two problems in model applications that tend to result in underestimation of emission reductions needed to attain standards. The first problem is that modeled episodes usually have ozone concentrations lower than the design value. The second problem is that simulation results have historically exhibited a tendency towards underestimation of observed concentrations. By utilizing monitored data along with model estimations, RRFs address both problems.

However, there may be some limitations in using RRFs, especially for 1-hour ozone. Examples of such situations include:

- Measured ozone concentrations at some sites and for some episodes may differ substantially from design values for those sites. That is, each available ozone episode will not be representative of design value conditions at all sites. In such instances it may not be reasonable to include the non-representative sites in the RRF analysis.
- Model performance typically varies considerably between sites and episodes in a domain. The reported ozone performance measures (such as peak prediction accuracy, bias, and gross error) may not capture this variation. Thus it may not be reasonable to include sites which have poor model performance for a given episode.

Some characteristics of RRFs include the following:

- More robust analysis due to multiple episodes;
- Less reliant on peak concentration performance statistics;
- Allows for episodic, seasonal or annual composite application;
- Can be site specific;
- Directly applied to design values so unusually adverse years weigh heavily;
- Weekend/weekday differences may not be adequately characterized;
- More applicable to 8-hour than 1-hour ozone;
- Not applied for previous AQMPs

Carrying Capacity Estimation

A traditional use of models for planning has been the estimation of carrying capacities for ozone precursors. This is typically achieved by exercising the model with a series of across-the-board precursor emission reductions from the future year baseline, from which an ozone isopleth ("EKMA") diagram is constructed. The metric used for the isopleth diagram can be one of several, such as peak 1-hour or 8-hour ozone concentrations within the modeling domain or subregion, number of grid cells above the standard, or one of many population exposure metrics. Since the carrying capacity for each precursor is based on across-the-board emission changes, rather than source- and location-specific controls as would be specified in a plan, it should only be viewed as an initial estimate for determining the emissions reductions necessary for attainment.

For the 2007 AQMP, ozone isopleth diagrams for the following air quality metrics will be constructed by episode:

- Peak 1-hour ozone concentration for the domain.
- Population exposure for 1-hour ozone concentrations.
- Peak 8-hour ozone concentration for the domain. This information will serve as an indicator of the need for potential additional precursor emission reductions to meet the 8-hour ozone NAAQS.

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Attachment-3

Peer Reviews

Attachment-4

CEPA Source Level Emissions Reduction Summary for 2014: Annual Average Inventory

Attachment-5

CEPA Source Level Emissions Reduction Summary for 2020: Annual Average Inventory

Attachment-6

CEPA Source Level Emissions Reduction Summary for 2014: Planning Inventory

Attachment-7

CEPA Source Level Emissions Reduction Summary for 2020: Planning Inventory