Field Evaluation aeroQUAL S500 OZL

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South Coast AQMD

AQ-SPEC
Air Quality Sensor Performance Evaluation Center

Background

- From 02/10/2015 to 04/14/2015, three **aeroQUAL S500 (model OZL, 0-0.5 ppm)** ozone sensors were deployed at one of our monitoring stations in Rubidoux, CA, and run side-by-side with a Federal Reference Method (FRM) instrument measuring the same pollutant

- aeroQUAL S500 OZL (*3 units tested*):
  - Gaseous sensors (metal oxide; non-FRM)
  - Each unit measures: Ozone (pphm)
    Unit cost: ~$500
  - Time resolution: 1-min
  - Units IDs: AQ #1, AQ #2, AQ #3

- SCAQMD FRM instruments:
  - Ozone instrument; cost: ~$7,000
  - Time resolution: 1-min

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Data validation & recovery

- Basic QA/QC procedures were used to validate the collected data (i.e. obvious outliers, negative values and invalid data-points were eliminated from the data-set)
- Data recovery for ozone from all three units was close to 100%

aeroQUAL S500; intra-model variability

- Very low measurement variability was observed between the three aeroQUAL S500 units

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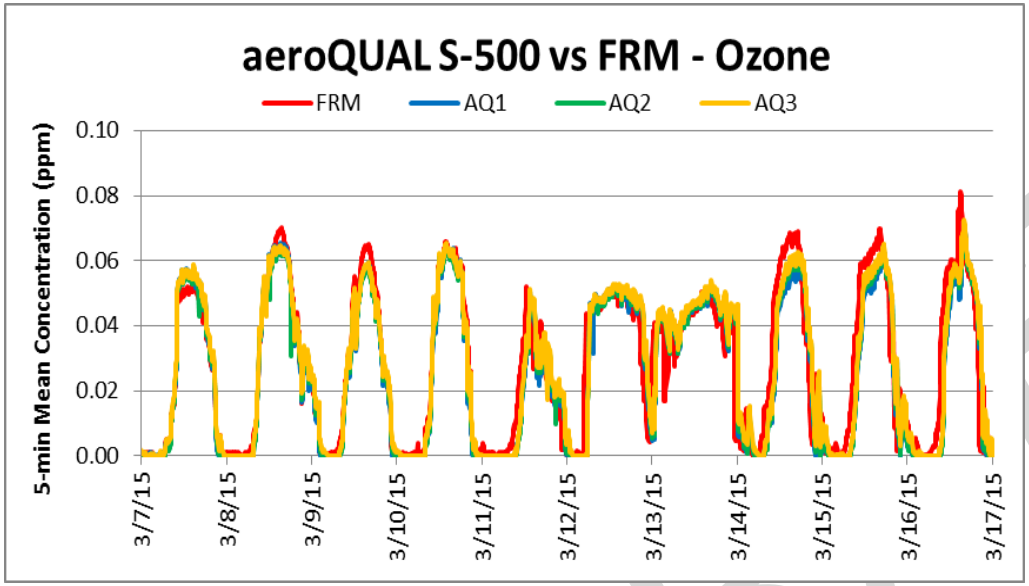
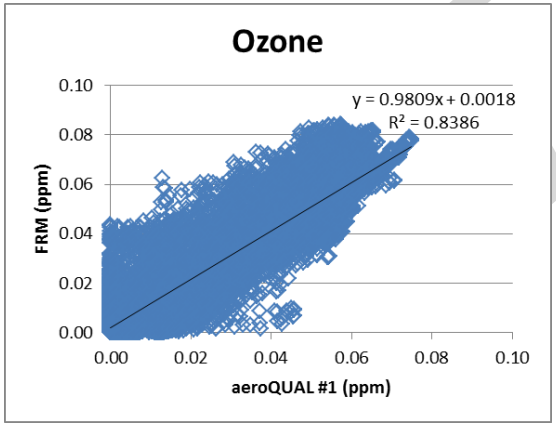
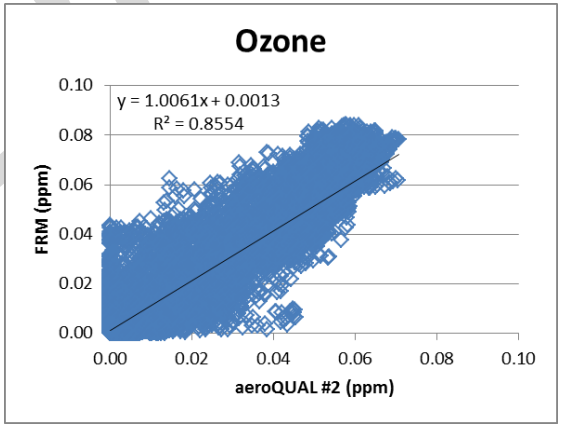
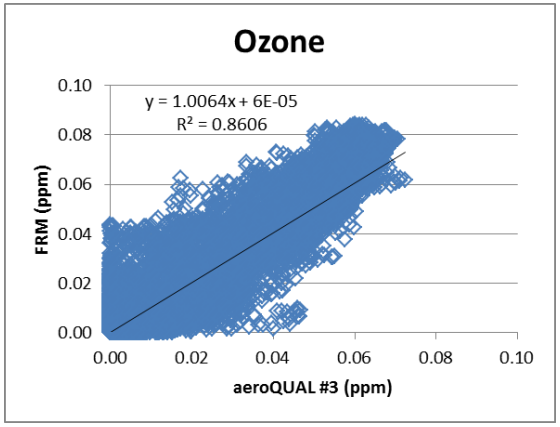
aeroQUAL S500 vs FRM (Ozone; 5-min mean)



All ozone measurements correlate very well with the corresponding FRM data (R^2>0.83)







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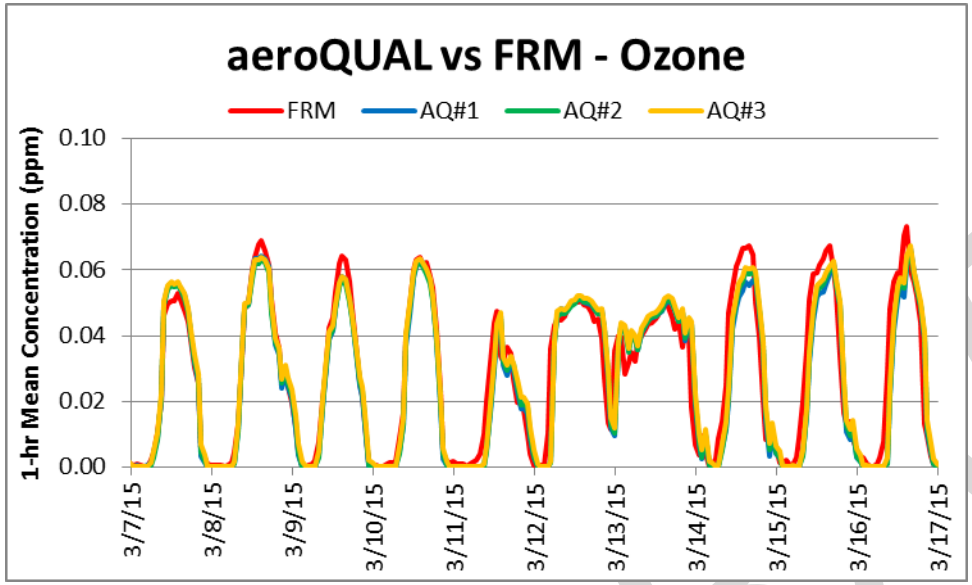
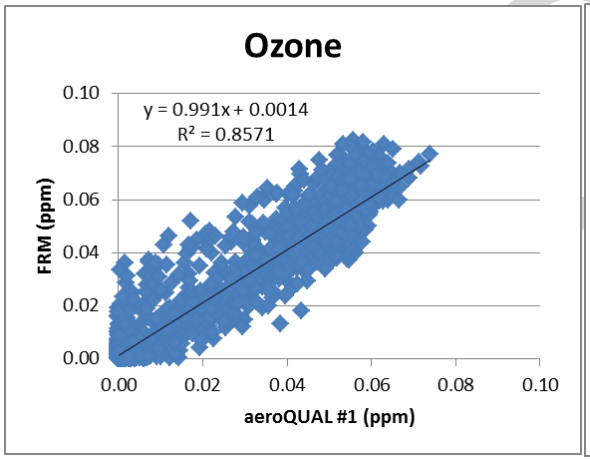
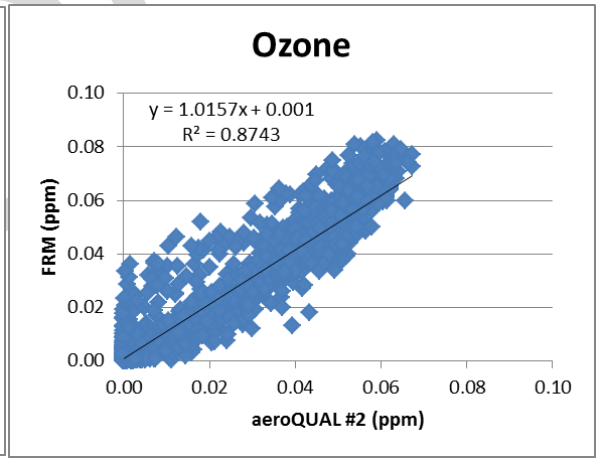
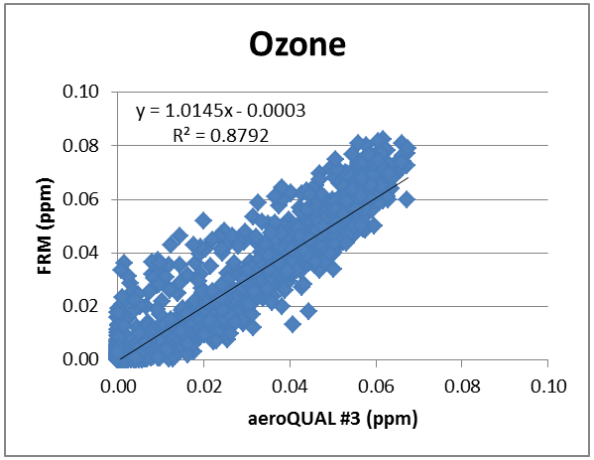
aeroQUAL S500 vs FRM (Ozone; 1-hr mean)



- All ozone measurements correlate very well with the corresponding FRM data (R^2>0.85)







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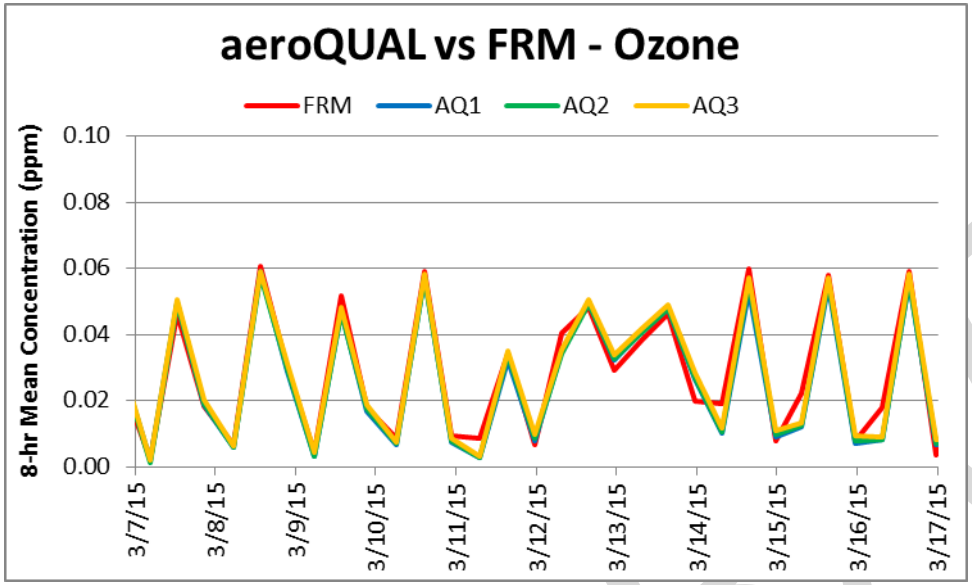
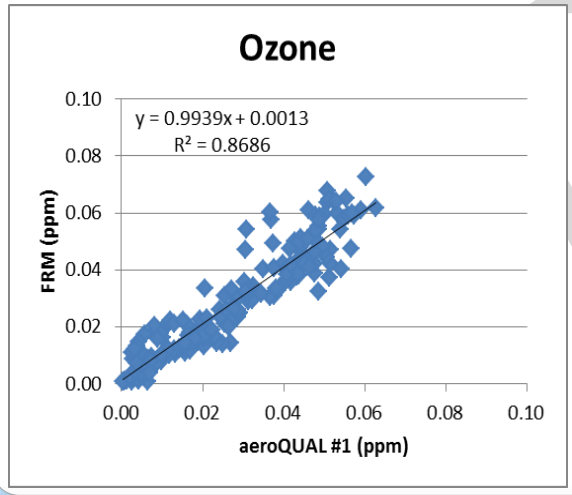
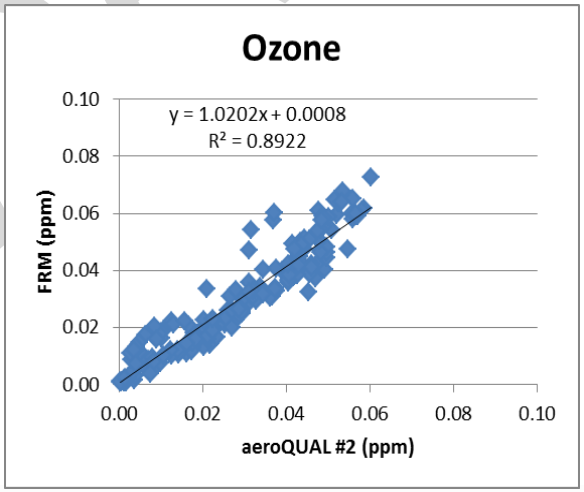
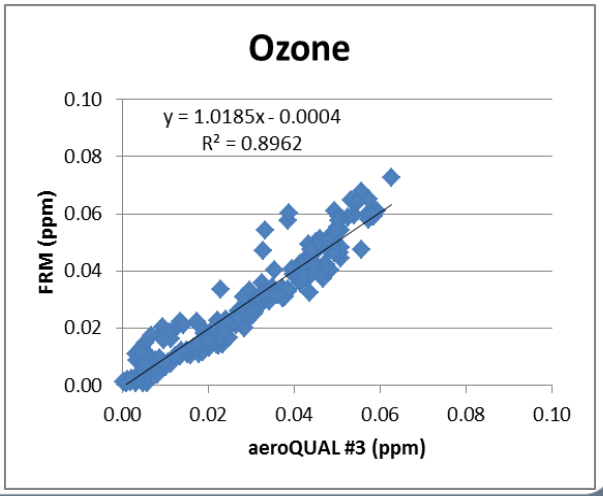
aeroQUAL S500 vs FRM (Ozone; 8-hr mean)



- All ozone measurements correlate very well with the corresponding FRM data (R^2>0.86)







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Discussion

- Overall, during the two month of field deployment, the three aeroQUAL Series 500 Ozone sensors performed very well and showed:
  - Minimal down-time over a period of about two months
  - Very low intra-model variability
  - Very good correlation to a substantially more expensive FRM instrument
- During the first month (2/10-3/10) of this field deployment, the aeroQUAL sensors slightly overestimated the ozone concentration. During the second month (3/11-4/14) the aeroQUAL sensors slightly underestimated the ozone concentration. This suggests that sensor performance may have decreased over time
- Laboratory Chamber testing is necessary to fully evaluate the performance of the aeroQUAL Series 500 sensors over different / more extreme environmental conditions

- <u>These are preliminary results</u>

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