



San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

Technical Evaluation of Sensor Technology (TEST) Program

*Aeroqual Sensor
2019 – 2nd Quarter*



Introduction and Sensor Profile

This analysis report is focused on assessing the performance of the Aeroqual sensor as a part of the District's Technical Evaluation of Sensor Technology (TEST) Program. Using interchangeable sensor heads, the Aeroqual sensor is capable of measuring particulates or 17 different gases. Only ozone (O₃) is measured for this analysis using the Series 500 0-500 ppb range sensor head. The ozone sensor head uses an active flow and sample control system using Gas Sensitive Semiconductor (GSS) technology. The Aeroqual sensor also measures temperature and relative humidity.

Background and Approach of Evaluation Test

In June 2019, the District installed one Aeroqual Series 500 sensor at the Clovis-Villa air monitoring site for the purpose of testing the Aeroqual Series 500 sensor in the San Joaquin Valley and comparing the performance of the collocated Aeroqual sensor to the Federal Equivalent Method (FEM) ozone analyzer. At the end of July, two additional Aeroqual Series 500 sensors began operating at the Clovis site. The data sets analyzed for this report compare ozone data collected from the first Aeroqual Series 500 sensor set up in June and the Teledyne T265 FEM analyzer collocated at the regulatory air monitoring site. The additional sensors will be compared starting in the 3rd quarter 2019 report. The scatter plots and time series graph below show how the hourly datasets compare for this period.

Overview of Analysis Findings from Current Period

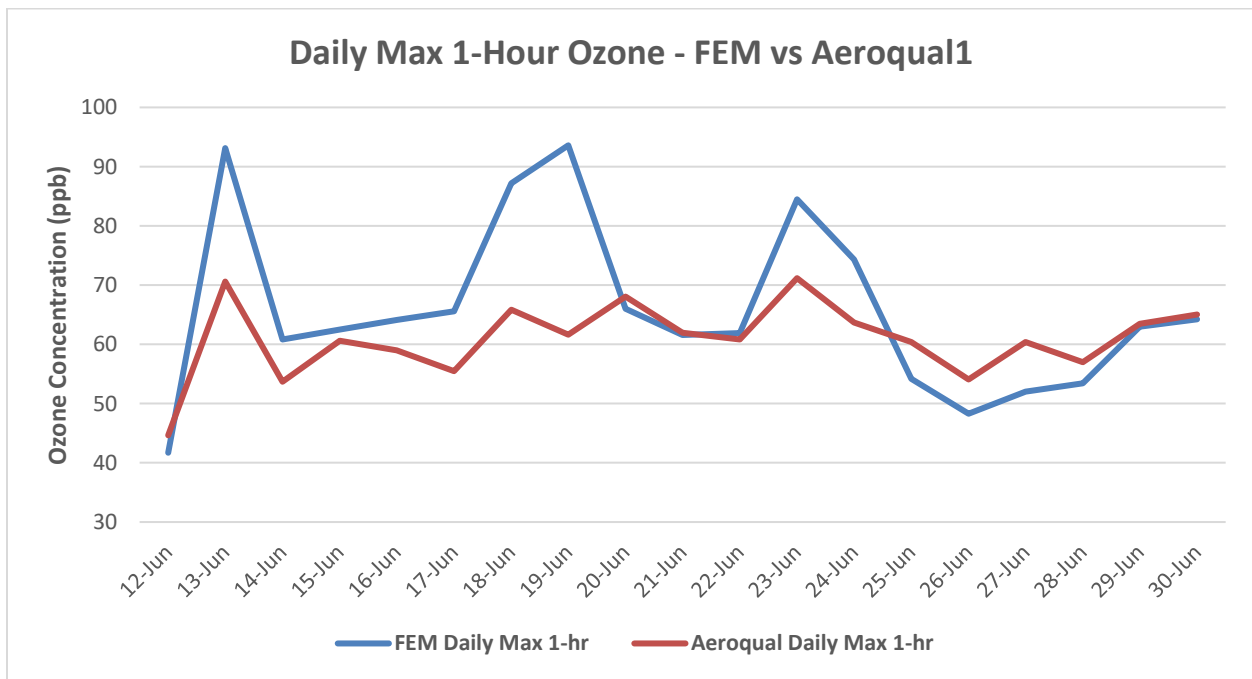
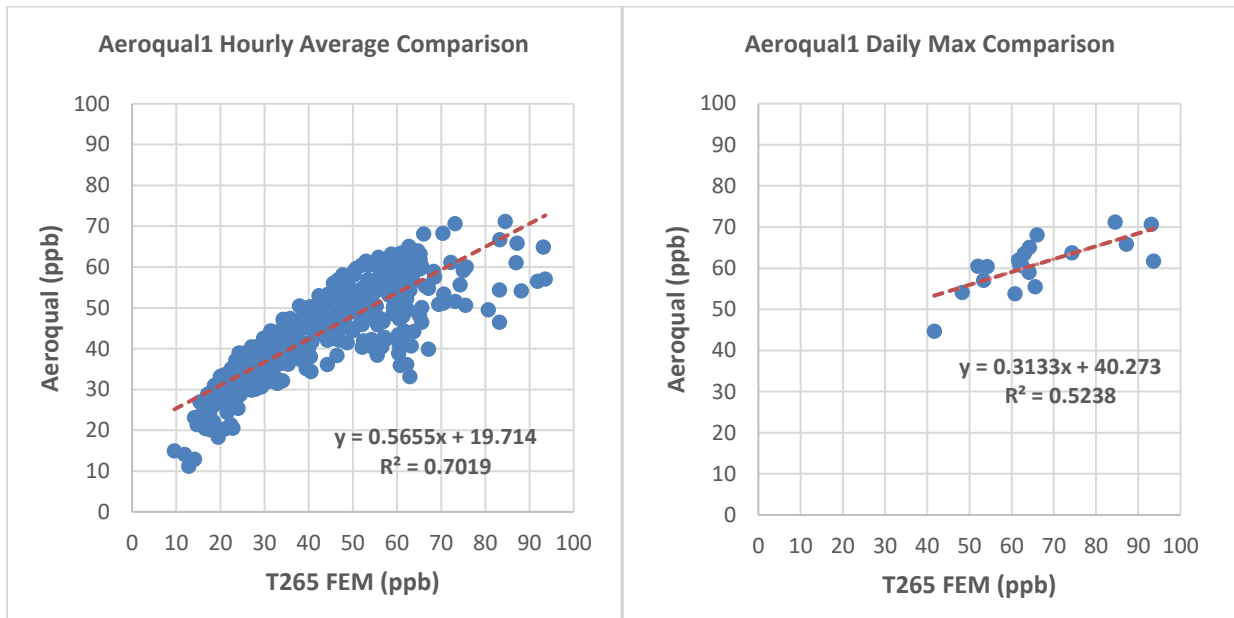
The analysis for this report covers the time period of June 12, 2019 through June 30, 2019 (2019 – 2nd quarter). During this this period, hourly data was removed from the calculation of bias when either the Aeroqual sensor or regulatory analyzer did not have a valid hourly sample. For the scatter plots and line graph, all available data are shown.

June 2019 began with several lows bringing rain showers across the valley. By the middle of the month, high pressure started building for longer periods of time and caused temperatures to climb above average. This caused dispersion to deteriorate and ozone concentrations to increase. The last week of the month, clouds covered the sky from a slow moving front and ozone concentrations decreased. As the plots below show, Aeroqual ozone data was biased lower than the District's regulatory data during this period.

Site Specific Analysis of Aeroqual Sensor Performance

Aeroqual 1

For the hourly ozone averages, the Aeroqual sensor had a 0.5 ppb high bias during the June 2019 period. For the daily 1-hour ozone max, Aeroqual had a 5.0 ppb low bias during the June 2019 period.



Statistical Summary

The following table provides a statistical summary of the data collected during the analysis period of this report.

Clovis-Villa	Average 1-hr	Max 1-hr	1-hr R2	1-hr Slope	1-hr Intercept	Max R2	Max Slope	Max Intercept
Aeroqual1	44.8	71.2	0.70	0.57	19.71	0.52	0.31	40.27
Aeroqual2	---	---	---	---	---	---	---	---
Aeroqual3	---	---	---	---	---	---	---	---
FEM	44.3	93.6						