

Case Study

Real-Time Ozone Sensor Network Helps California District Overcome Regulatory Problems

San Joaquin Valley Air Pollution Control District was required to carry out a study to quantify temporal and spatial distribution of summer time ozone.



Project

San Joaquin Valley Air Pollution Control District

Services

Series 500 Portable Ozone Monitors

Location

San Joaquin, Calif

Measurements

Ozone

Date

2013

Sector

Ozone



The customer



Sonoma Technology, Inc (STI) is an advanced air quality consultancy based in California, USA. STI was contracted by the San Joaquin Valley Air Pollution Control District (SJVAPCD) to carry out a study to quantify temporal and spatial distribution of summer time ozone in and around the city of Arvin in the San Joaquin Valley.

The problem

The SJVAPCB operates about 35 federal equivalence monitoring stations in the San Joaquin Valley, the largest in California. One station measuring the highest ozone concentration, at Bear Mountain near Arvin, had to be moved due to the expiration of the lease where the station was located.

The station was moved to a new site by Di Giorgio Elementary School but the ozone levels there were on average 10% lower than at Bear Mountain during a comparison summer. This raised concerns in the community, and the US EPA indicated that the differences may hinder the EPA's ability to determine whether the region had reached attainment.



“The Aeroqual sensors made this study possible relative to the cost of using traditional monitors.”

Clint MacDonald
STI

The solution



To better understand the spatial and temporal distribution of ozone around Arvin, STI chose Aeroqual's Series 500 portable ozone monitors equipped with water and dust proof enclosures and fitted with a solar power system and cellular modems for remote operation.

Twenty three monitors were co-located next to a federal reference method (FEM) monitoring stations to check their precision and accuracy before being distributed across an area of about 100 square miles. The monitors collected and transmitted ozone concentrations every minute for six weeks. Afterwards the monitors were co-located with reference monitoring stations to quantify drift. STI analysed the data and produced a report for the SJVAPCD.

Evaluation

Co-location of the Series 500 monitors established accuracy to within +/- 3 ppb of the federal reference monitors. See example in figure below.

The study demonstrated that there are strong spatial gradients in ozone over short distances even in rural areas. In addition, the new site at Di Giorgio actually measures higher concentrations than the old Bear Mountain site, and therefore is a good replacement site. In addition, it was determined that the new site was representative of concentrations experienced in the city of Arvin and is therefore useful for real-time warnings regarding poor air quality for citizens in Arvin.

The results of this study provide important supporting evidence for the District's formal attainment request to EPA. In addition the study provides a strong scientific foundation for future decision making about managing the air resources of the San Joaquin Valley.

The final report can be found at:

http://www.valleyair.org/Air_Quality_Plans/docs/2013Attainment/OzoneSaturationStudy.pdf

Data is courtesy of STI, 2013.

Final Corrected Data Compared to FEM

