aeroqual

Case Study

SC AQMD Leads successful Study of U.S. EPA-Funded Community Air Monitoring A leading California air quality agency, in collaboration with the U.S. EPA, deployed a dense real-time air monitoring network, producing credible data while increasing community engagement and trust.



Project Los Angeles Community Air Monitoring Network

Location Los Angeles, USA

Date 2017

Services

100x AQY Micro Air Quality Monitors (beta), Aeroqual Unify: MOMA network management

Measurements O₃, NO₂, PM_{2.5}

Sector Communities



Protecting communities using dense hyperlocal air monitoring

One of California's leading air quality agencies deployed several hundred affordable air quality monitoring systems to create a virtual real-time air monitoring network, producing credible air quality data and furthering community monitoring goals. By collaborating with local groups on the placement of installation sites, South Coast Air Monitoring District (SC AQMD) was able to increase engagement, build trust, and expand outreach and education initiatives in the region. The resulting sensor network demonstrated a commitment to community-level air quality monitoring while achieving regulatory compliance, thanks to Aeroqual Unify, a virtual network management service.

Aeroqual Limited

"Previously, the ongoing maintenance needed to get meaningful data from lower-cost networks was prohibitively expensive. In using Aeroqual Unify, we're able to save cities hundreds of thousands of dollars and provide them with the accurate, robust data that led them to invest in a sensor network in the first place."

Geoff Henshaw Aeroqual, Co-Founder & CTO

U.S. EPA Encourages Successful Study of Community Air Monitoring in California

South Coast Air Quality Management District (SC AQMD) is the air pollution agency responsible for regulating stationary sources of air pollution in the Los Angeles Basin. Tasked with protecting over 12 million people across Southern California from poor quality air, they wanted to expand their network of some 40 regulatory monitoring stations into something that could provide a more granular picture of air quality throughout region. SC AQMD has a STAR grant from the United States Environmental Protection Agency (U.S. EPA) to educate California Communities on the use and applications of low-cost monitors and to encourage research into community-level air monitoring.

As air quality varies spatially across a city, different communities are exposed to different levels of air pollution. Most regulatory monitoring networks in the US and around the world are not dense enough to address the variability of air quality and its relative impact on different communities. In addition, the California state government enacted Rule AB 617, which mandated community level air monitoring be put in place by mid-2019.

Since deploying a network of regulatory monitors at the community level would not be technically or economically feasible, SC AQMD chose to invest in a lower-cost air sensors. However, these show variable performance and data can be unreliable. With recent advancements, such as <u>Aeroqual Unify</u>, it's now possible to obtain credible and useful hyperlocal data from lower-cost sensors. Aeroqual Unify offers a complete software solution for air monitoring networks. Using the <u>MOMA technique</u>, a virtual network calibration method comparing monitoring data against "proxy" near-reference stations, Unify delivers accurate, credible data for lower-cost networks.



Aeroqual Limited

MRK-D-0085

An integrated solution produces trusted real-time data

Based on <u>AQ-SPEC's independent evaluation</u>, SC AQMD chose to use a combination of PurpleAir PA-II sensors for measuring particulate matter, and Aeroqual's AQY Micro Air Quality Monitor (beta) for measuring ozone, nitrogen dioxide and, and fine particulate matter (PM_{2.5}). SC AQMD deployed a pilot network of 500 combined sensors, providing detailed hyperlocal insights on air quality and pollution trends throughout the region. Over the next 10 years, SC AQMD plans to expand this network to include several thousand sensors. Aeroqual Unify makes it simple to use a combination of different sensor types within a single network. Unify is compatible with both Aeroqual air quality monitors and a range of third-party devices, such as PurpleAir, Clarity and Davis, producing useful hyperlocal insights in a highly flexible package.

SC AQMD engaged community groups to help find installation sites – a mix of schools, private homes, and recreational facilities. Several units are installed alongside government monitoring stations to check network data performance. The location of the Aeroqual AQY beta devices is shown in the accompanying image.



The AQY beta devices measure PM_{2.5}, ozone, nitrogen dioxide, temperature, relative humidity, and dew point. Real-time data is sent over a 4G cellular network to Aeroqual's cloud servers and from there SC AQMD accesses the data through an API. In this way, SC AQMD may view and analyze data in their preferred software package, and Aeroqual's technicians can monitor the performance of the network from the operations centre in Auckland, New Zealand. The successor to the AQY, the AQY R, features an upgrade to the control and communications system, bolstering reliability and ensuring maximum uptime even in challenging environmental conditions.

Increased knowledge drives community outreach and education

By working closely with community groups, SC AQMD has demonstrated a commitment to community-level air quality initiatives, while rapidly gaining expertise in deploying and managing a large network of affordable sensors. SC AQMD has shared some of this knowledge in a <u>recent article</u> they co-published with the U.S. EPA in Environmental Science and Technology. This new expertise is allowing them to undertake the complicated task of devising a plan to deliver on Rule AB 617 commitments in a way that is technically robust while meeting multiple stakeholder objectives.

From a technical viewpoint, network uptime has been 87.4% (considering these are beta prototypes, has been acceptable; we are working on improvements). Minimal drift has been observed (-0.33 ppb/month for ozone 1.9ppb/month for NO₂, and -1.7ppb/month for PM_{2.5}). The AQY beta devices co-located with government monitoring stations exhibit strong correlation (O₃: $r^2 = 0.97$, NO₂: $r^2 = 0.78$, PM_{2.5}: $r^2 = 0.76$).

Aeroqual Limited

About



South Coast Air Quality Monitoring District

South Coast AQMD is the regulatory agency responsible for improving air quality for large areas of Los Angeles, Orange County, Riverside and San Bernardino counties, including the Coachella Valley. The region is home to more than 17 million people–about half the

Aeroqual



Aeroqual develops integrated monitoring and software systems underpinned by industryleading sensor technology to support environmental, health, and safety professionals in protecting people and the planet from the impact of air pollution. That's why governments, industry, researchers, and consultants trust Aeroqual to deliver actionable data for their air quality monitoring projects.