Air Monitoring in Mexicali, Mexico. The Evolution of Air Pollution Monitoring in a Border City.

Advancements in technology have influenced not only the way air pollution is measured but also how air pollution data is received, shared, and acted upon by stakeholders. Using Mexicali, México as an example, this paper will review the evolution of the air pollution monitoring technologies used to measure and inform stakeholder actions. The air pollution problem in Mexicali begins with its geographic location. The city locates in the center of Imperial and Mexicali Valleys, surrounded by the Sierra de Juarez mountain range to the West and South and the aforementioned valleys to the North and Southeast. The average elevation of the city is 10 meters above mean sea level, but there are areas of the city below sea level. The city is partly split in the center by the New River, which runs from South to North and flows into the Salton Sea located in Imperial Valley, California. The terrain, climate, and land-use patterns contribute to air pollution formation and transport in the city and surrounding region. Non-compliance with the National Ambient Air Quality Standards (NAAQS) at the stations located in Imperial Valley led to several efforts aimed at characterizing air quality and air pollution transport at the California-Mexico border. A first study was carried out during 1992-1993 by performing measurements of Ambient Particulate Matter (PM10) using four different sampling methods, as well as wind speed, and wind direction. The Mexicali Air Pollution Network was established between 1996 and 1997 to measure PM10, Total Suspended Particles (TSP), Ozone (O3), Carbon Monoxide (CO), Sulfur Dioxide (SO2), and Nitrogen Dioxide (NO2), wind speed and wind direction at six different sites around the city. In 2016 three different samplers to measure fine particulate matter (PM2.5) and wind data were installed, a currently operating program. In 2018, as part of a social initiative, a network of 50 low-cost sensors that measure PM2.5 was installed in the city. Stakeholders now have the capability of accessing real-time air quality data from platforms that integrate information from low-cost sensors and regulatory sites. The evolution of technology for measuring and presenting data has been remarkable - from large, manual, analog equipment to small, automated, digital equipment with communication systems that allow for real-time data access.

José G. Landeros was born and raised in Mexicali, the capital of the state of Baja California, México. He holds a Master's degree in engineering and architecture. José's path to air monitoring began in 1997, when he was a student at the Universidad Autónoma de Baja California Architecture School. Like many students, he needed to work to pay for his studies. That summer, he got a job working on the installation of the equipment utilized in the monitoring network stations in Mexicali. From that moment on, he has been working on, learning about the operation, maintenance, and troubleshooting of environmental monitoring equipment. For over 20 years, he worked as a contractor for Tracer ES&T (Tracer ES&T merged with SCS Engineers in 2009), which was in charge of operating the stations in Mexicali as a contractor to CARB. Currently, he works as Project Professional at SCS Engineers. In the last 25 years, different studies have been conducted to measure the air pollution impacts in Mexicali. For half of his life, he has been part of those studies.