Air Quality Sensor Experts Convene: Current Quality Assurance Considerations for Credible Data

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Abstract

Air sensors can provide valuable nonregulatory and supplemental data as they can be affordably deployed in large numbers and stationed in remote areas far away from regulatory air monitoring stations. Air sensors have inherent limitations that are critical to understand before collecting and interpreting the data. Many of these limitations are mechanistic in nature, which will require technological advances. However, there are documented quality assurance (QA) methods to promote data quality. These include laboratory and field evaluation to quantitatively assess performance, the application of corrections to improve precision and accuracy, and active management of the condition or state of health of deployed air quality sensors. This paper summarizes perspectives presented at the U.S. Environmental Protection Agency's 2023 Air Sensors Quality Assurance Workshop (https://www.epa.gov/air-sensor-toolbox/quality-assurance-air-sensors#QAworkshop) by stakeholders (e.g., manufacturers, researchers, air agencies) and identifies the most pressing needs. These include QA protocols, streamlined data processing, improved total volatile organic compound (TVOC) data interpretation, development of speciated VOC sensors, and increased documentation of hardware and data handling. Community members using air sensors need training and resources, timely data, accessible QA approaches, and shared responsibility with other stakeholders. In addition to identifying the vital next steps, this work provides a set of common QA and QC actions aimed at improving and homogenizing air sensor QA that will allow stakeholders with varying fields and levels of expertise to effectively leverage air sensor data to protect human health.

Quality Assurance and Quality Control Improves Air Sensor Data

Raw data → QA steps & processing → Credible data

More defensible