

Introduction to This Special Edition: Findings from the 2013 Air Sensors Workshop

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The US Environmental Protection Agency (EPA), hosted a recent workshop entitled, Air Sensors 2013: Data Quality & Applications in March 2013 (Research Triangle Park, North Carolina). This was the third of a series of next generation air monitoring (NGAM) workshops involving EPA, academics, sensor developers, community environmental advocates, citizen citizens, and state and regional air quality officials. In person and web-accessed attendance involved over 400 registrants and reinforced the high degree of interest being witnessed for this emerging scientific area. A world-wide search for invited presenters was performed to underline the global emphasis on sensor technologies being exhibited across the globe. This most recent workshop focused on introducing the attendees to new technologies, sensor application opportunities, and emerging issues including how sensors might be evaluated for data quality and/or calibrated during their use. In addition, attendees were provided invited presentations on a number of critical needs involving sensor data consideration, including the practical and theoretical aspects of “big data” with respect to its value for environmental monitoring.

The workshop featured invited speakers devoted to four primary topics:

1. New Technologies, Hot Science, and Instruments on the Horizon
2. Data Quality, Evaluation, and Calibration
3. Big Data, Management and Analysis
4. Recent Applications of Sensors

A hands-on technology demonstration was held concurrent with the workshop and involving nearly 20 sensor prototypes involving the collection of environmental pollutants ranging from volatile organic compounds (VOCs) to particulate matter (PM). A diverse poster session was conducted during the workshop and provided sensor developer, citizen scientist, and regulatory officials alike the opportunity to learn more about emerging technologies and their potential use for a wide variety of environmental applications. To further leverage the value of such a concentration of scientists and interested parties associated with sensor research, a total of six breakout session were performed that provided attendees with an opportunity to respond to a variety of pre-workshop developed strawman discussion points developed by the workshop organizers. Breakout groups were led in discussions involving:

- 1) Citizen Science and Sensors
- 2) Reducing Measurement Uncertainty: Calibration Approaches
- 3) Sensor Performance and Application Guidelines
- 4) Designing A Sensor Information Clearing House
- 5) Big Data: Approaches for Managing, Analyzing, and Visualizing Large Data Sets
- 6) New Technologies: Challenges, Data Gaps, and Needs

In concert with *EM*, conference organizers will be sharing key findings from the workshop in a series of invited articles, the first four of those articles being published in the current edition. The second set of six articles is expected to be published in a summer 2014 edition. These articles will summarize in their entirety information gleaned from the invited presentations, breakout sessions, and technology demonstrations pertaining to the four primary topics of the workshop. We believe you as the reader will quickly see that not only has the age of sensor development reached a highly advanced stage, the threshold of their widespread use for a variety of environmental applications is on the horizon.