Air Sensors – An EPA Perspective

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Disclaimer: Material presented is for informational purposes only. EPA does not recommend nor endorse any particular sensor product or data management platform.





1. Data Generators



3. Air Quality Information Systems

Using machine learning and AI to combine:

- Observational data
 - Satellite data
 - Modeled outputs

Other data (traffic, weather, health etc)



4. Air Quality Information Outputs Web and mobile applications (often part of weather packages)

AQ Exchange (June 2019)





Communications summit with key conveyors of air quality data (state and local agencies, federal partners, private sector) to discuss the increasing amount of "conflicting" information being shared by various public and private entities.













AQ Exchange Common Themes



- Confusion exists because data is being generated for different purposes, needs, and users
- Strong desire to be more aligned in messaging air quality to the public
- Companies are developing global solutions
- Demand from consumers for trusted, real-time, localized, actionable information
 - Resulting in what look like "EPA AQIs"
- Standardized terminology desired (e.g. current conditions, real-time air quality, air quality alert, air quality action day)
- Need for transparency in the "source" of the data including uncertainty in the output
- Include more people in the conversation

Data Quality



Current Work

- EPA's First Workshop on Deliberating Non-Regulatory Performance Targets for PM_{2.5} & O₃
 - June 2018 workshop completed*
 - September 2018 literature review publication*
 - April 2019 journal publication of workshop discussions*
 - Developing ORD EPA interim report with performance targets, evaluation protocols, and best practices for sensors
- EPA's Second Workshop on Deliberating Performance Targets for Air Sensors
 - July 2019 workshop on additional pollutants NO₂, SO₂, CO, and PM₁₀
 - Developing ORD EPA interim report with performance targets, evaluation protocols, and best practices for sensors
- Coordinating public/private partnership in evaluation of sensors

*https://www.epa.gov/air-research/deliberating-performance-targets-air-quality-sensors-workshop



Emerging Evaluation Complexities



- "Learned environment" prior to evaluation
- Temperature and relative humidity assumptions
- Algorithm adjustments during and after testing
- Hacking online sensor networks
- Operation and maintenance of consumer devices
- Real-time data versus published health studies over longer time periods
- Ownership
- Who is verifying assertions or outputs?





- EPA developing outreach materials (e.g. short video clips, FAQs, and factsheets) to promote understanding of regulatory vs. sensor data – Late 2019 release
- Responding to requests from Local, State, or Tribal agencies to submit sensor data to EPA
- Facilitating responses to public inquiries on why AirNow conditions differ from weather applications on smartphones
- Examining data algorithm adjustments and assumptions, including published verification of claims
- Intensive study of air quality websites in late summer 2019



THANK You