Midwest Air Quality Planning Applications of Earth Science Data

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NASA Aerosol, Clouds, Convection and Precipitation Air Quality Workshop
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Current Regional Air Quality Planning Issues

• Regional Haze (light extinction from aerosols)
• Ozone
  • NAAQS attainment
  • Model improvements (lakeshore dynamics)
• Long-range smoke transport and impacts on regional/local surface air quality
• International transport (Canadian sources)
• Source-receptor relationships: which emissions to reduce and where

Multi-jurisdictional Organizations (MJOs)
(NASA) Satellite Data Products In-Use* @ LADCO

Meteorology
- Surface reflectance
- Soil moisture/temp (SPoRT LIS)
- Cloud thickness and fraction
- Temperature
- Precipitation
- Snow cover/depth

Air Quality and Emissions
- AOD and AOT
- Aerosol backscatter (CALIPSO)
- NO$_2$, HCHO, SO$_2$, CO
- Fire incidents and strength
- Green vegetation fraction
- Land cover/land use

* Or in the process of being integrated into our work
Satellite Data in Action

• Midwest planning satellite data applications
  • Tracking smoke from fires/exceptional events
  • Episode analysis
  • Lake breeze identification
  • Regional modeling boundary conditions
  • Surface trends analysis
  • Meteorology modeling FDDA

• What’s on the horizon
  • Improving emissions inventories
  • Chemical data assimilation in regional AQMs
  • Data fusion across observational assets

NOAA-20/VIIRS Corrected Reflectance
June 17, 2020
Satellite retrievals of AOD, smoke imagery, and vertical backscatter profiles are used heavily for smoke impact assessments/exceptional events.
Satellite Data Are Being Used for Air Quality Planning...

... yet there is still work to be done to expand the use of these data

- **Create saliency.** How to integrate remote sensing in the mission of the environmental management/health agency?
- **Create legitimacy.** How to solidify the use of these assets/analysis techniques in the planning process such that they become integral to future forms to the Clean Air Act?
- **Create demand.** How to create extensible, reproducible, planning-agency friendly processes for using remote sensing data?
- **Understand the paradigm.** Commit to and invest in the concept that applied science is a process as much as it a product.

Leverage past experience to educate researchers in emerging applied science programs on communicating with planners, understanding planning agency needs, and building sustained collaborations.