The Practical Use of Satellite Observations for Visibility and Air Quality Analysis

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This course is in collaboration with NASA's Applied Remote Sensing Training Program (ARSET), http://arset.gsfc.nasa.gov/airquality. The course will provide an overview of satellite data and its application in visibility and air quality data analysis. The focus will be on understanding what present satellite measurements can and can't provide and how to use them. In addition to an overview of satellite data and terminology, we will explore common and achievable uses for satellite data in air quality analysis (e.g., events, trends, long-range transport, spatial context) through a series of case studies. Recently, we have seen a proliferation of tools and platforms that make using satellite data easier than ever. This course will also cover current methods for discovering, acquiring, and processing satellite data.

The course will have tutorials and hands-on exercises

Course Outline

- **Overview of satellite remote sensing of air quality**
    - Satellite remote sensing basics (remote sensing methods, orbits, resolutions etc.)
    - Overview of satellite remote sensing of air quality: Past, present and future capabilities
    - Air quality data availability, parameters, strengths and weaknesses
- **Tools for browsing, acquiring, and analyzing satellite data**
    - Satellite data formats and levels
    - Near real time data and image browsing tools (Worldview, LANCE, Earth Observatory)
    - Data browsing and downloading (e.g., LAADS Web, and MIRADOR)
    - Online data visualization and analysis (IDEA and GIOVANNI)
    - Utilities and programming languages (e.g., HDFLook, Panoply, IDL, Python)
- **Uses for satellite data in air quality and visibility – Case Study Analysis**
    - Trends analysis (i.e aerosols and trace gases through Earth Engine, GIOVANNI etc.)
    - Wildfire event analysis (visible imagery, fire detects, aerosol optical depth, vertical profile with lidar)