Integration of Satellite Data, Surface Observations and Models during Exceptional Air Quality Events

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The air quality standards for PM2.5 and ozone in the U.S. and E.U. provide for the exclusion of data for a given day when it is strongly influenced by "exceptional events" (EE), such as smoke from wildfires or windblown dust. In order to apply for EE exclusion, organizations must provide appropriate documentation to demonstrate the dominance of uncontrollable sources on that day. Most of the EE days are due to regional or continental-scale smoke or dust events. The availability of near real-time monitoring data from satellite remote sensing data and surface air quality data now allows the early assessment of such events. Here we report the candidate methodologies that are being developed for the quantification and documentation of EEs over the US, including: (1) Observed/modeled pollutant transport based on trajectory and regional models; (2) Spatial pattern of pollutant derived from surface (AIRNOW, FRM, Visibility) and satellite data (OMI, GOES, AVHRR, SEAWiFS, MODIS); (3) Temporal pattern analysis; (4) Chemical fingerprinting and source apportionment. The characteristics and initial climatology of EEs over the US will also be presented along with approaches to iterative reconciliation of observations, emissions and forecast models.