

## **Observations of boundary layer circulations and their influence on local air chemistry**

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Anthropogenic emissions from urban sprawl, traffic, and industrialization along the northeast corridor of the United States are having an increasingly profound effect on urban and regional air quality. Surface air quality over populated areas is an important issue given persuasive data linking high levels of atmospheric oxidants and particulate matter to deleterious human health effects and higher morbidity in at-risk populations.

Predictions of air quality episodes along the Northeast corridor can be confounded by land-sea discontinuities, orography, urban environments, and a convoluted coastline. These can give rise to local and regional circulations that whose timing and intensity are difficult to predict.

During the summers of 1999, 2001, and 2002 investigators from several institutions and government laboratories conducted an intensive field campaign about 18 km ENE of Philadelphia (40.04° N, 75.00° W). The objectives of this project were to investigate the conditions within the urban polluted environment to find relationships between the meteorological conditions and high O<sub>3</sub> concentrations, increased levels of PM<sub>2.5</sub>, and contributions from local and distant sources. Data were gathered by a number of platforms including Raman Lidar, 915 MHz profiler, multiple tethered balloons, and a suite of surface based criteria and other trace gas analyzers. This presentation will focus on local and regional circulations such as low-level jets and sea breezes that had a profound effect on the air quality and meteorology at the site. Time permitting this presentation may also include a brief description of a winter particle study in January-February 2004 that focuses on the detailed structure of the stably-stratified boundary layer.

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