

Initial Results from the Northeast Aerosol Oxidant Study (NEAOS)

NEAOS Objectives

- Conduct a regional scale survey of aerosol precursors, and aerosol chemical and microphysical properties.
- Test and evaluate new instrumentation for measurement of aerosol properties

Aerodyne aerosol mass spectrometer

Particle into liquid sampler- Y-N Lee, BNL

DMA system for measurement of particle number concentrations and size distributions (3 nm - 3 μm)

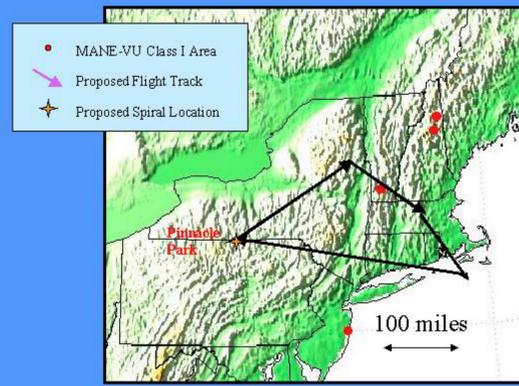
New aerosol inlet

New Instrumentation

New Aerosol Inlet

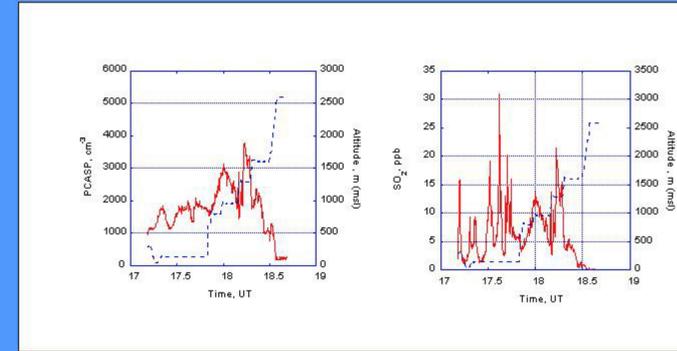
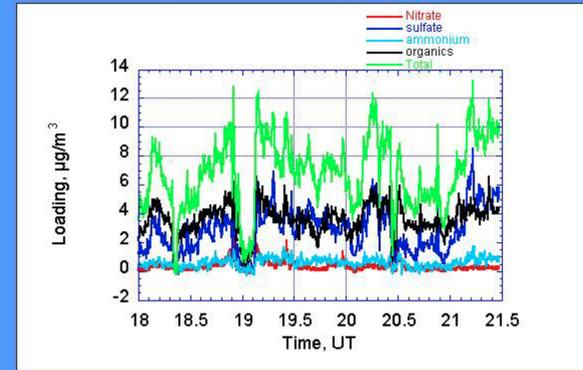


Aerodyne Aerosol Mass Spectrometer



Regional Flight Plan to Pinnacle Park

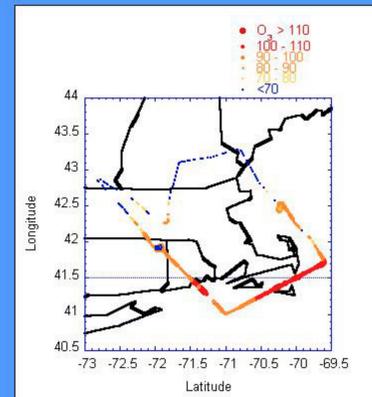
Aerosol Composition from Aerodyne Mass Spectrometer



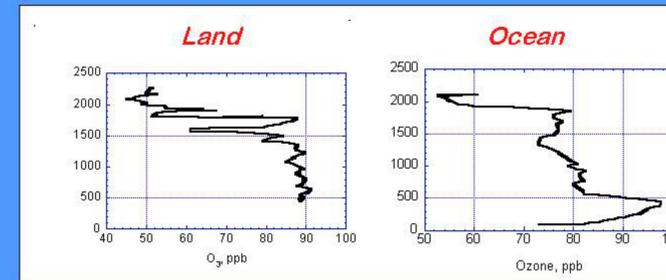
Preliminary Results

Flight of July 13, 2002

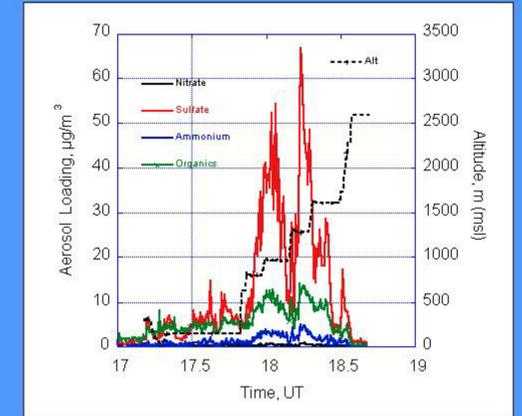
Winds from the SSW brought pollution up from the Baltimore-Washington area along the northeast coast.



Comparison of Vertical Profiles



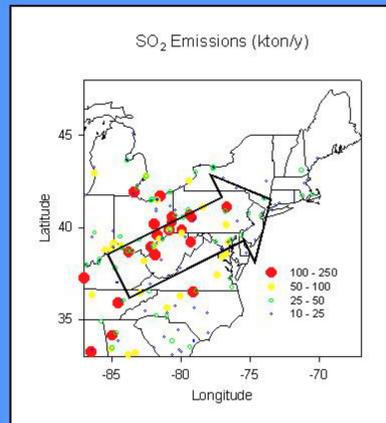
Comparison of vertical profiles over land and ocean suggest that ocean surface measurements may not be representative of conditions aloft.



Data indicate major episode of ozone/aerosol transport from regions to the southwest of Boston

Why Study the Northeast?

Prevailing winds bring aerosols and aerosol precursors (SO₂) from the source regions to the west. These aerosols have health consequences and cause significant reductions in visibility throughout much of the Northeast. They can also have significant climate effects both directly and indirectly through alteration of the cloud properties.

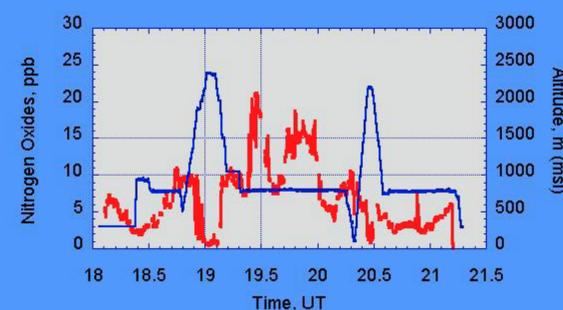
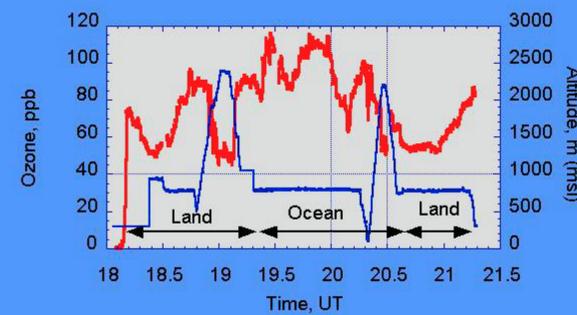
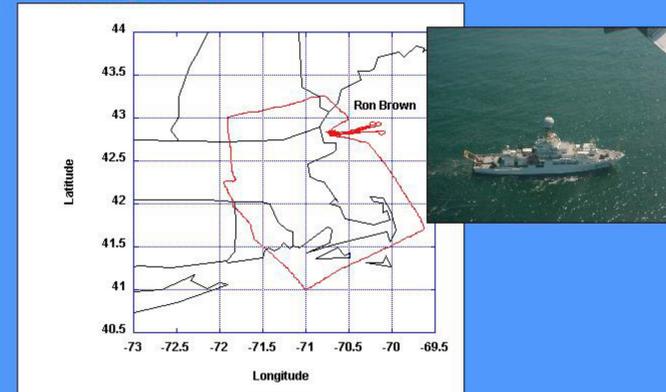


NEAOS Flights

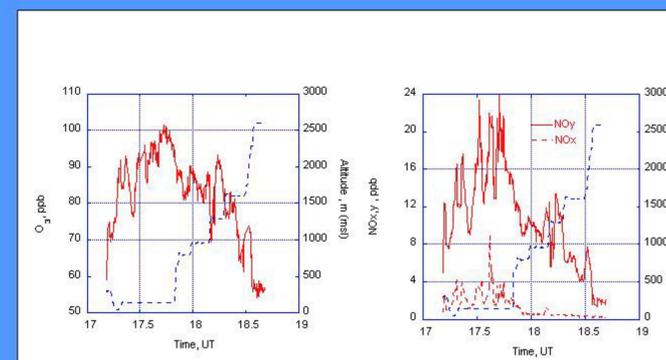
- 7/12 Pinnacle Park-Regional characterization
- 7/13 Boston-upwind/downwind
- 7/14 Pinnacle Park-Regional characterization
- 7/16 Eastern Pa/Ron Brown
- 7/17 Boston-upwind/downwind/Ron Brown
- 7/21 Pinnacle Park-Regional characterization
- 7/22 Boston-upwind/downwind/Ron brown

Flight of August 22 with RV Ron Brown

7/22 Flight Track



Vertical Profile over Ron Brown



Summary

- Measurements suggest significant long-range transport of aerosols, ozone and their precursors from sources to the west and southwest of Boston.
- Transport over ocean vertically structured suggesting that much of the transport occurs well above the surface. Ship based measurements may not adequately capture transport.
- New aerosol instrumentation provided aircraft measurements of aerosol properties of unprecedented quality and spatial resolution.

