

A New Wind Profiler Trajectory Tool for Air Quality Studies

Allen White^{1,2}, Christoph Senff^{1,2}, Ann Keane², Jessica Koury^{2,3}, Wayne Angevine^{1,4}

- ¹Cooperative Institute for Research in Environmental Sciences
University of Colorado, Boulder, CO
- ²NOAA Environmental Technology Laboratory, Boulder, CO
- ³Science and Technology Corporation, Boulder, CO
- ⁴NOAA Aeronomy Laboratory, Boulder, CO

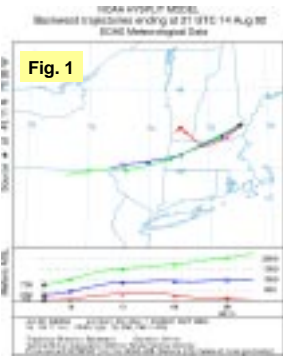


Fig. 1

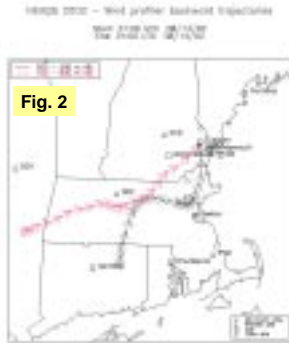
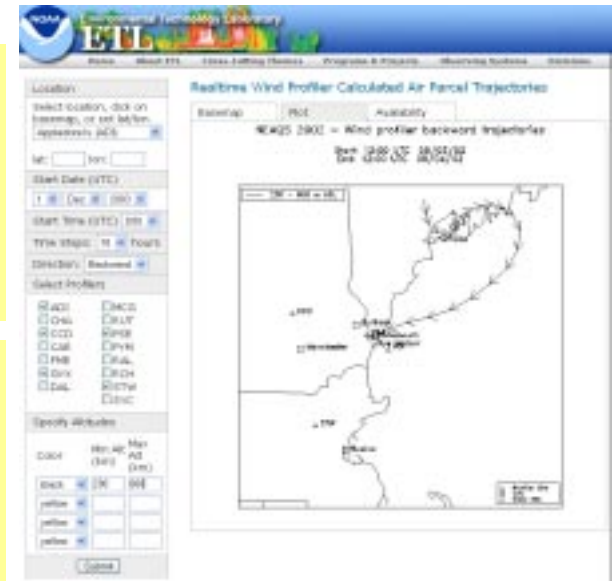


Fig. 2

Back trajectories were computed for a high-ozone episode that occurred in the Northeast U.S. in mid-August 2002 using NOAA/ARL's HYSPLIT trajectory model (<http://www.arl.noaa.gov/ready/hysplit4.html>). Results are plotted in Fig. 1. Back trajectories computed from hourly data collected by a network of boundary-layer wind profilers (Fig. 4) for the same period are plotted in Fig. 2. The coarse horizontal and temporal resolution sounding data used in the HYSPLIT trajectories do not resolve a low-level, coastal flow feature detected by the profilers.

Coming in 2004! An interactive, web-based profiler trajectory tool for NEAQS-ITCT!



Users will be able to specify ending location, start and end times, NOAA and cooperative agency profilers to use in the trajectory analyses, and altitude ranges for the trajectories. An example of how the web page for this tool will be configured is shown in Fig 5. A strawman plan for the NEAQS-ITCT profiler network is outlined in Fig. 6.

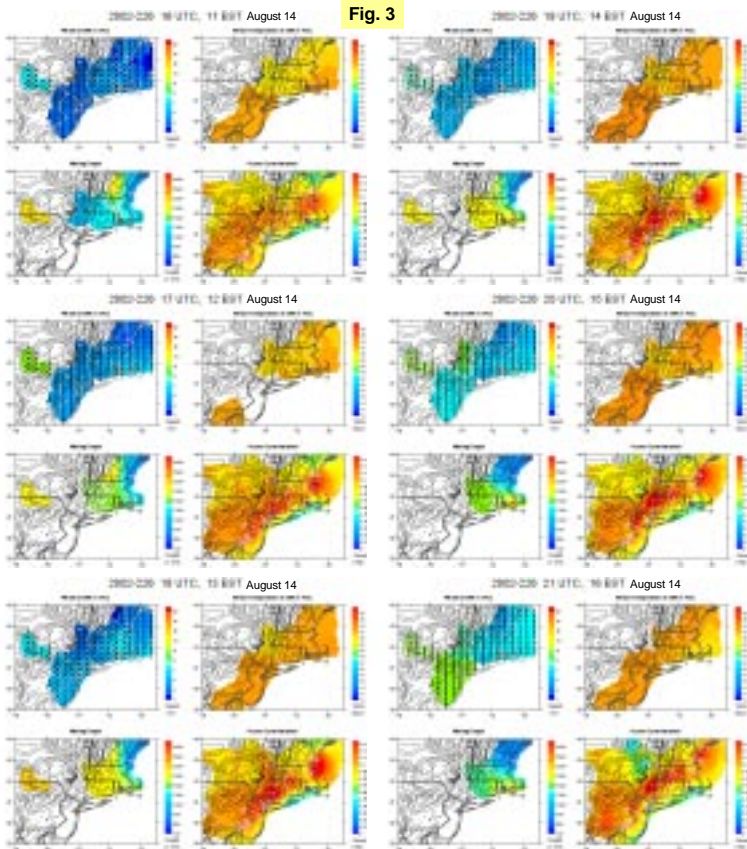


Fig. 3

The importance of this flow feature is illustrated in Fig. 3, which contains a time series of wind profiler data and surface ozone data provided by the EPA AIRS network. A plume of high ozone formed over the Boston metropolitan area by 1100 EST on this day. This plume was advected by south-southwesterly flow over the New Hampshire and southern Maine coastline and impacted the AIRMAP ozone monitor at Thompson Farm (TF) in Durham, NH, where a peak ozone concentration topping 150 ppb was measured near 1600 EST. Based on the HYSPLIT model, one might attribute incorrectly the pollution measured at TF to a region other than Boston.



Fig. 4

NEAQS/ITCT - 2004

Regional Air Quality
Intercontinental Transport
Aerosol Direct and Indirect Effects

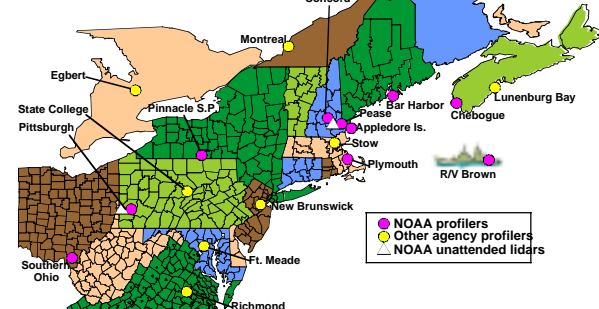


Fig. 6