



Department of the Environment

Visualization of Ozone Pollution Transport from the Ohio River Valley into Maryland

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- Background
- Motivation
- Measurements Platforms
- Visualization

Background (1 of 2)

- ❑ Forefront of **Supplemental Measurement Initiatives to Capture Interstate Pollutant Transport**; One of the Main Focuses is **Regional Control Strategies**; Results are utilized in State Implementations Plans.
- ❑ Performed by MDE
 - Upper-Air Radar Wind Profiler (RWP) / RASS (Piney Run & HU-Beltsville).
 - Comprehensive Surface Monitoring Network Including 2 Research Sites (same as above).
- ❑ Contract Work Through Local Universities
 - Aircraft (UMD, Dr. Russell Dickerson, since 1995): Aloft trace gas concentrations and aerosol characteristics.
 - Lidar (UMBC, Dr. Ray Hoff, since 2005): Aloft back-scattering of light for aerosols.
 - Ozonesonde (HU, Dr. Everette Joseph, since 2005): ozone concentrations, winds, temperatures, and RH.

What Are Known Regarding Pollution Transport?

- ❑ **Long Range Transport** (Westerly transport) is well understood and contributes 40-80% of pollutant concentrations on bad air quality episodes.
- ❑ **Short Range Transport** (e.g. Low Level Jet [LLJ]) is new area of focus. Aloft ozone maxima within Planetary Boundary Layer (PBL) coincides with LLJ events.
- ❑ List of References (see [Appendix A](#))

Motivation

□ How to Convey a Complex Scientific Problem (e.g. Pollution Transport) to the Policymakers and the Public?

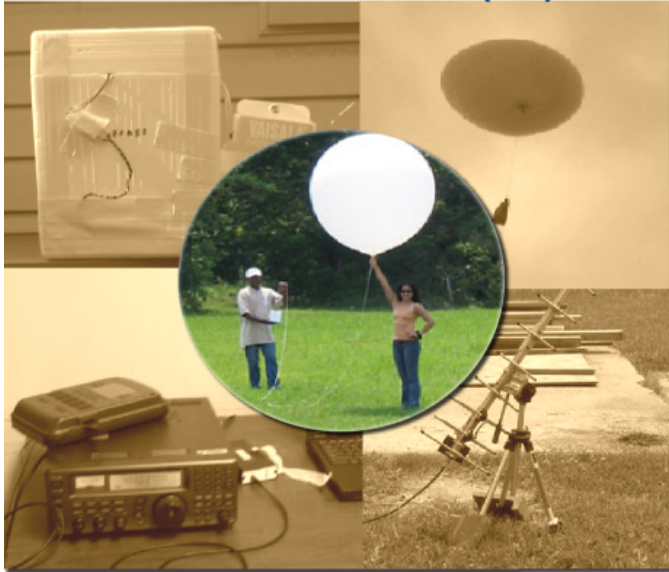
□ Approaches

- Historically: Modeling and “Complex” Visualization Software (Vis5D, Matlab, IDL, etc.)
- Recently: Application of Keyhole Markup Language (**KML**) and Virtual Globes.

**Easy INFUSION of Geospatial Data
from Multiple Sources!**

Supplemental Measurement Platforms

Ozonesonde Measurements (HU)



Aircraft Measurements (UMD)



Upper-Air Radar Wind Profiler & RASS (MDE)



LIDAR - Aerosol Measurements (UMBC)





[Animation](#)



Resources

- ❑ EPA AIR Explorer <http://www.epa.gov/airexplorer/>
- ❑ EPA National Emission Inventory (NEI) Database <http://www.epa.gov/air/data/neidb.html>
- ❑ GPSVisualizer <http://www.gpsvisualizer.com/>
- ❑ Howard University Ozone Profiling <http://meiyu.atmphys.howard.edu/~davis/>
- ❑ MDE Ambient Air Monitoring Program <http://www.mde.state.md.us/Programs/AirPrograms/Monitoring/index.asp>
- ❑ NOAA ESRL-GSD/MADIS Profiler Graphical Data Displays <http://www.madis-fsl.org/cap/profiler.jsp?options=full>
- ❑ NOAA HYSPLIT Model <http://www.arl.noaa.gov/ready/hysplit4.html>
- ❑ Regional Atmospheric Measurement Modeling and Prediction Program (RAMMPP) <http://www.atmos.umd.edu/~RAMMPP/>
- ❑ Tools for Google Earth <http://www.sgrillo.net/googleearth/>
- ❑ UMBC Atmospheric Lidar Group <http://alg.umbc.edu/>





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Appendix A:

Pollution Transport References

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- ❑ EPA (1988), “Air Quality Modeling Technical Support Document for the NOx SIP Call,” Appendix E: Table E-29 (Percent contribution from upwind states to 8-hour non-attainment in Maryland), EPA’s Office of Air and Radiation, E-29. Online access at: http://www.epa.gov/scram001/reports/nox_sip.pdf.