



# Air Resources Laboratory

Headquarters

Silver Spring, Maryland

## Who We Are

The Air Resources Laboratory (ARL) is one of seven research laboratories within NOAA's Office of Oceanic and Atmospheric Research. It is headquartered in Silver Spring, MD with Divisions in Idaho Falls, ID; Las Vegas, NV; and Oak Ridge, TN. ARL scientists are a talented group of meteorologists, chemists, engineers, and technicians working in the areas of atmospheric dispersion (the transport and dispersal of material through the air), air quality, and climate analyses. There are more than 25 permanent staff working for ARL Headquarters.

## What We Do

ARL Headquarters develops and improves atmospheric dispersion and air quality models, which track the movement of potentially harmful substances, collects air quality and deposition measurements of select air quality parameters, and provides climate-relevant datasets and assessments of climate variability and trends. Some products developed by ARL augment the operational products of NOAA's service-oriented offices, particularly the National Weather Service. ARL also produces state-of-the-art, web-based assessment tools that serve university researchers, federal research agencies, and international partners.

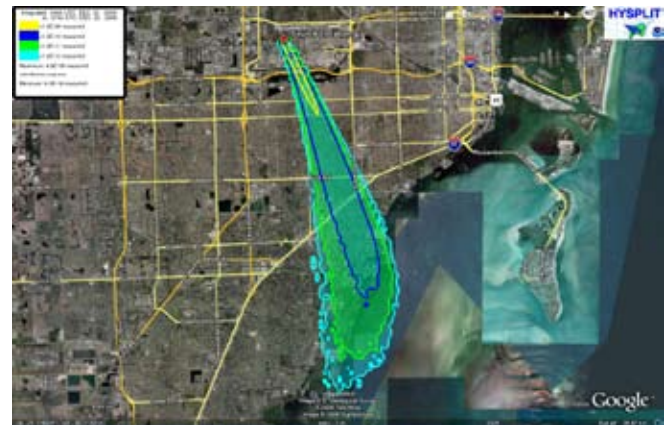
### Dispersion and Air Quality Modeling

Dispersion models are used for:

- Emergency response in the event of a volcanic eruption, homeland security incident, or nuclear accident; and
- Air quality applications, particularly to understand the transport and fate of mercury emitted from local and distant sources and to forecast the long-range transport of dust, volcanic ash, and wildfire smoke.

Air quality models, run operationally by the National Weather Service for ground-level ozone (and particulate matter in the future), support:

- State and local air quality forecasters issuing air quality forecasts and alerts; and
- People interested in more detailed air quality predictions.



*An example of ARL's dispersion model being adapted to simulate pollutant dispersion across an area. Colors represent different concentrations as the pollutant plume moves away from the source.*



*Total Mercury Research Monitoring Station at Beltsville, MD*

### Air Pollutant Measurement

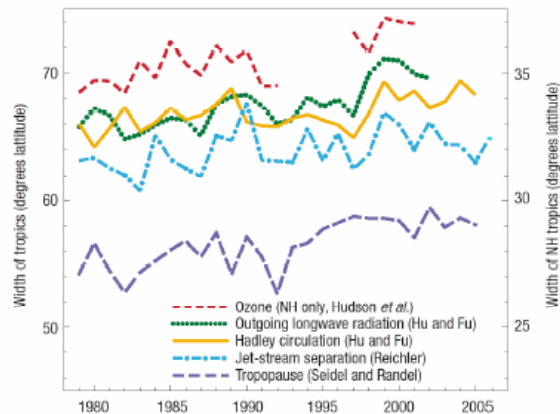
Research studies conducted by ARL focus on:

- Improved methods for measuring pollutant concentrations in the air, particularly toxic metals such as mercury, acidic gases (e.g., sulfur and nitrogen oxides), and ammonia; and
- Improved methods for measuring pollutants that deposit onto land and water surfaces and affect ecosystems, and
- Coordination and quality assurance for the World Meteorological Organization Global Atmosphere Watch precipitation chemistry program.

## Climate Analyses

ARL scientists contribute to improved understanding of climate change and variability through:

- Characterizations of daily to multi-decadal climate variations based on analysis of observations;
- Development of climate monitoring methods and data products to understand multi-decadal variations in the climate system, including temperature, water vapor, ozone, heat waves, and clouds, and their response to natural and man-made climate changes;
- Evaluation of the climate models to support more reliable projections and better informed public policy; and
- Participation in national and international climate assessments, such as those conducted by the U.S. Climate Change Science Program, the Intergovernmental Panel on Climate Change, and the international stratospheric ozone community.



*Climate analysis produced by ARL and collaborators demonstrating that over the past few decades the tropical belt has expanded. This expansion is occurring faster than has been predicted by climate models. Such changes could significantly affect weather patterns. (image: NOAA, Seidel et al., 2008)*

## Why It Is Important

Air pollution, airborne hazards, and some climate change impacts can lead to significant health, environmental, and economic consequences. Poor air quality contributes to tens of thousands of premature deaths annually; accidental or intentional release of a hazardous chemical or agent can cause serious health, safety, security, and ecological concerns; and changes in our climate can affect water availability, ecosystems, air quality and weather.

ARL's research and development capabilities serve a wide range of customers whose missions relate to atmospheric science, emergency response, air and water pollution, and climate change. ARL transitions its products and services to operations and applications in NOAA's National Weather Service and the National Climatic Data Center, the U.S. Department of Energy, the Department of Homeland Security, the U.S. Environmental Protection Agency, and many other groups.

## Our Partners

- NOAA service offices and other NOAA research groups
- U.S. Environmental Protection Agency, U.S. Department of Agriculture, and other Federal agencies
- National Center for Atmospheric Research
- NASA Jet Propulsion Lab
- Academic Institutions: Howard University, University of Maryland, Cornell University, University of Illinois, Pennsylvania State University, University of Delaware, University of Vermont, University of Washington, University of Utah, and University of Puerto Rico
- Canaan Valley Institute in Davis, West Virginia
- Scientists in the United Kingdom, Holland, China, and Spain

## How To Contact Us:

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ARL Headquarters location in Silver Spring, MD