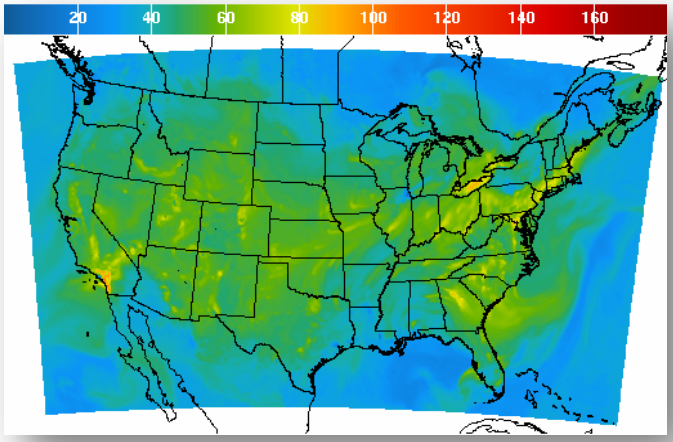
Air Resources Laboratory

Understanding air as part of the total environment

What Does the Air Resources Laboratory Do for the Nation?



A map of ground-level ozone concentrations predicted for the continental U.S. NOAA's National Weather Service generates such maps twice daily using an ARL-developed modeling system. (Image: *NOAA*)

NOAA's Air Resources Laboratory (ARL) provides research and development for air quality, atmospheric dispersion, climate, and other atmospheric issues. ARL's goal is to improve the Nation's ability to protect human and ecosystem health while also maintaining a vibrant economy. For example, ARL's research provides essential information for evaluating and revising air quality and environmental management approaches by the EPA and state and local governments. Key activities include developing, evaluating, and applying predictive models of ozone and particulate matter; improving approaches for predicting atmospheric dispersion of hazardous materials; generating new insights into air-land exchange and climate variability and trends; and advancing the understanding of and ability to predict the behavior of the planetary boundary layer (the layer of the atmosphere closest to the ground).

Recent Accomplishments

Air Chemistry Models: The public is better informed about the movement of pollutants and other potentially harmful substances so that actions can be taken to reduce health impacts.

ARL developed and delivered air chemistry and atmospheric dispersion models to the National Weather Service to support operational air quality prediction and emergency response.

Mercury Pollution Research: Decision-makers are equipped with the information necessary to effectively reduce mercury levels in food, improving public health, and supporting recreational and commercial fishing.

ARL developed observation protocols to measure mercury in the air and its deposition on land. The lab deployed advanced mercury monitoring instruments in Maryland, West Virginia, Mississippi, and Pennsylvania. ARL conducted intensive measurements to investigate sources of atmospheric mercury near the Gulf of Mexico.

The ARL atmospheric plume model, called HYSPLIT, has been updated to improve ease-of-use and capabilities. The National Weather Service uses HYSPLIT for incidents ranging from local chemical spills to forest fires to volcanic eruptions. The updated model is the result of a collaboration among ARL, the NWS, and the National Ocean Service.

Climate Data: Policy-makers are better informed of climate variability and trends.

ARL corrected inconsistencies in the historical record of observations from balloon-borne radiosondes and analyzed climate trends. ARL deployed soil temperature and moisture sensors in the U.S. Climate Reference Network. The Network provides highly accurate and reliable measurements of climate variability and change.

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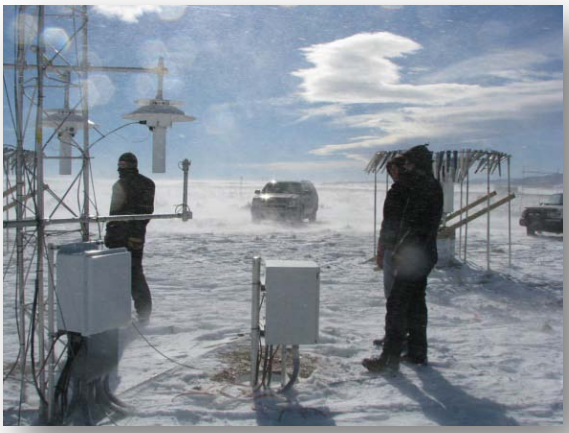
More Accomplishments

Traffic Pollution Research: Improved information that protects people who live, work, and attend school near busy highways.

ARL conducted a study of how the wind transports pollutants around roadway sound barriers.

Wind Research: Improved weather predictions to support more effective wind energy predictions.

In partnership with industry, ARL studied approaches to improving predictions of winds in the lowest part of the atmosphere.



Evaluating instrumentation at the Climate Reference Network site in Colorado. Photo: NOAA

ARL installed two meteorological monitoring systems to measure winds, temperature, and energy balance at the Duke Energy's Ocotillo Wind Farm in western TX. The data collected will be used to evaluate the different measurement techniques used by ARL and by Duke Energy. Photo: NOAA

What's Next for ARL?

Scientific challenges in the next 5 to 10 years:

- Improve numerical models of particulate matter and ozone concentrations to support better air quality forecasts.
- Better predict airborne dispersion of hazardous materials in urban areas to support a more effective response to their release.
- Develop and apply methods for measuring airborne substances, such as nitrogen and mercury, and their deposition on sensitive ecosystems , as well as methods for determining the sources of those substances.
- Continue to improve the measurement and assessment of climate variability and change to inform national and international policies.

Research Partnerships

ARL works in partnership with other NOAA labs, universities, non-governmental organizations, industry, and other federal agencies, including the U.S. Environmental Protection Agency and the Departments of Energy, Homeland Security, and Defense.

Budget and Staff

The fiscal year 2012 President's budget request estimated allowance for ARL is $4.6M. The fiscal year 2010 allowance for ARL was $5.0M. For fiscal year 2011 NOAA has been allocated a total of $4.6B, with an approximately 2% cut to OAR's ORF funding from fiscal year 2010 enacted levels, pending a final spend plan. ARL's direct appropriation supports 28 permanent full time employees. Additional funds from other NOAA offices and federal partners support an additional 17 permanent full time employees. Our employees are based in Silver Spring (MD), Idaho Falls (ID), Las Vegas (NV), and Oak Ridge (TN).

Did You Know?

ARL's Hybrid Single Particle Lagrangian Integrated Trajectory (HYSPLIT) model is used by multiple federal agencies, other nations' weather services, and thousands of people around the world to predict the transport and dispersion of a wide range of atmospheric materials. Applications include radioactive releases, volcanic ash, wildfire smoke, large chemical spills, and windborne dust. Photo: NOAA

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