



# Air Resources Laboratory

## Special Operations & Research Division

### Las Vegas, NV

## Who We Are

The Special Operations and Research Division (SORD) is a division of NOAA's Air Resources Laboratory (ARL) that conducts research and development in meteorology, atmospheric transport and dispersion, and air quality. SORD's research is used by decision-makers to protect our atmosphere and health, reduce weather related injuries and fatalities, and protect our safety during times of disaster. Located with the U.S. Department of Energy (DOE) in Southern Nevada, SORD is both on the Nevada Test Site (NTS) and at the DOE Complex in North Las Vegas. Staff are comprised of meteorologists, specialists, and technicians. SORD capabilities are used primarily to support the NTS with continuous meteorological and climatological measurements, air quality and atmospheric dispersion modeling and forecasting, weather related safety advisories, and hazardous material emergency response information. SORD has provided support to DOE and its predecessors since 1956.

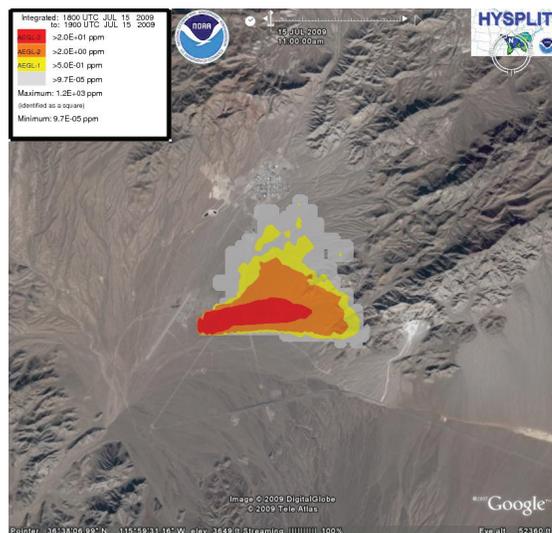
## What We Do

### Data Collection, Operations, Safety and Environmental Applications

SORD collects meteorological data, develops daily weather forecasts, provides weather surveillance for weather related safety advisories, conducts wind flow studies over complex terrain, and prepares climatology, compliance and environmental reports. SORD operates and maintains a network of weather towers located across the NTS that collect data remotely. SORD also operates and maintains a rain gauge network and a lightning strike detection network in southern Nevada. SORD is host to a NOAA Climate Reference Network station and a Surface Radiation monitoring station. In addition to these fixed weather stations, SORD deploys surface and upper air meteorological equipment on and off the NTS to collect data during emergencies and for scientific experiments. For example, at the request of DOE's Los Alamos National Laboratory in New Mexico, SORD technicians released weather balloons to collect upper-air weather data to support fire-fighting aircraft operations and national protective action assessment activities in Washington, DC.



*SORD technician releases a balloon to measure upper level winds. Photo: NOAA*



*Example of a HYbrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model air concentration plot for a hypothetical release using SORD WRF winds. Colors represent different concentrations as the pollutant plume moves away from the source.*

### Mesoscale Forecast and Atmospheric Dispersion Modeling

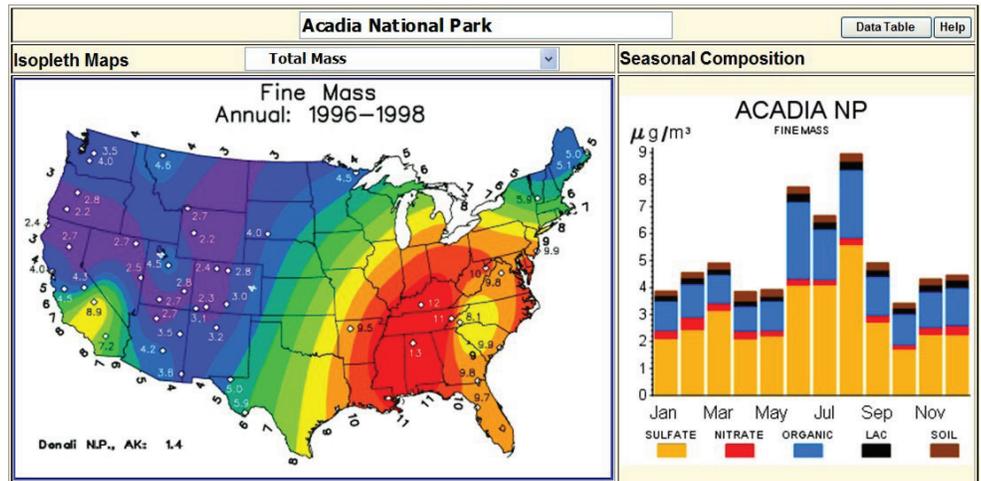
SORD conducts mesoscale weather forecast modeling for the southern Nevada region to provide local (NTS) predictive capabilities. Research studies focus on improvements to the local Weather Research Forecast (WRF) model and to develop an improved understanding of the WRF model representation of the desert environment. SORD applies atmospheric dispersion models to provide protective action assessments for real or simulated incidents of radiological and chemical atmospheric releases. This information is provided to emergency managers who use it to determine how best to safeguard people and property. SORD meteorologists also apply regulatory models using data from SORD weather stations to support the development of environmental reports and state air permit applications.



*One of the SORD meteorological towers located on the NTS. Photo: NOAA*

## Air Quality Research

SORD provides air quality monitoring and assessment expertise to other federal agencies, state air quality managers, and tribal air quality organizations. A primary air quality research focus for SORD is improved understanding of airborne particulate matter impacts on natural areas. SORD is actively involved with the Interagency Monitoring of Protected Visual Environments (IMPROVE) program, a network which routinely measures airborne particulate matter composition and mass at 150 locations nationwide. SORD also provides technical assessments to assist the U.S. Environmental Protection Agency in developing new National Ambient Air Quality Standards.



An example of a summary display of air quality data for fine particulate matter (small particles with a diameter of 2.5 microns or less) developed by SORD for the IMPROVE program. The colors on the map represent the spatial pattern of fine particulate matter, with red, orange, and yellow showing the largest accumulation of particles by mass observed during this period. The bar graph shows the seasonal composition by major aerosol type for Acadia National Park. See <http://vista.cira.colostate.edu/improve/> for more information on the IMPROVE program.

## Why It Is Important

SORD's science provides information to better understand air quality and visibility, climate change, severe/hazardous weather, and releases of hazardous material that can impact human health and the environment, often at great costs. With a better understanding of the atmosphere, policies can be developed that protect our atmosphere and health, reduce weather related injuries, and provide improved information that can protect our safety during times of disaster. For over 50 years, the work at SORD has been instrumental in the maintenance of U.S. national security. SORD's work continues to provide support to national security, local climate, and air quality issues of great importance to our nation.

## Our Partners

- U.S. Department of Energy
- National Park Service
- NOAA's National Ocean Service
- Yucca Mountain Project
- University of Utah
- Southern Methodist University
- National Nuclear Security Administration/Nevada Site Office
- U.S. Environmental Protection Agency
- U.S. Department of Homeland Security
- U.S. Department of Defense, Defense Threat Reduction Agency
- National Weather Service Forecast Office, Las Vegas, NV

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Desert Weather Observatory  
located on the NTS  
Photo: NOAA

Department of Energy Complex  
Photo source: NNSA/NSO