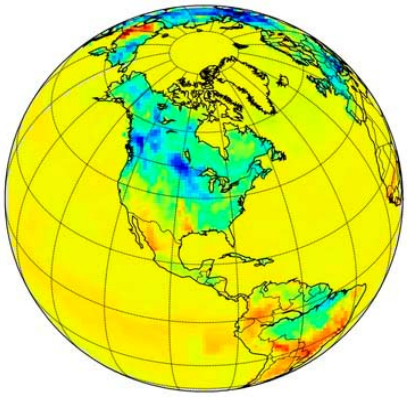
Outstanding Accomplishments in Research 2007

Research is at the center of all National Oceanic and Atmospheric Administration services. NOAA's Office of Oceanic & Atmospheric Research (OAR) conducts research, develops products, and provides scientific understanding and leadership to support NOAA's mission to meet our nation's economic, social and environmental needs.

NOAA Launches First Buoy to Measure Acidification

The first buoy to monitor ocean acidification, a result of carbon dioxide absorbed by the ocean, was launched in the Gulf of Alaska. This buoy is part of a National Science Foundation project awarded to NOAA's Pacific Marine Environmental Laboratory and the University of Washington in Seattle, in collaboration with Fisheries and Oceans Canada and the Institute of Ocean Sciences in British Columbia. The buoy measures the air-sea exchange of carbon dioxide, oxygen, and nitrogen gas, in addition to the pH -- a measure of ocean acidity -- of the surface waters. Rising acidity in the ocean could have a detrimental effect on ocean organisms, with resulting impacts on ocean life and the food chain.

Powerful New NOAA Tool Tracks Atmospheric Carbon Dioxide by Source



Scientists from NOAA's Earth System Research Laboratory launched a new tool called "CarbonTracker" to monitor changes in atmospheric carbon dioxide and other greenhouse gases by region and source. CarbonTracker will enable its users to evaluate the effectiveness of their efforts to reduce or store carbon emissions. The online data framework distinguishes between changes in the natural carbon cycle and those occurring in human-produced fossil fuel emissions. It also provides verification for scientists using computer models to project future climate change. Potential users include corporations, cities, states, and nations assessing their efforts to reduce fossil fuel emissions around the world.

NOAA is Major Contributor to IPCC Reports: Collective IPCC Effort Earns Nobel Peace Prize

NOAA individuals and technology made major contributions to the Intergovernmental Panel on Climate Change (IPCC) international climate science report. For their collective efforts, the nearly 2,000 scientists who comprised the IPCC (including more than 120 NOAA scientists) were awarded the 2007 Nobel Peace Prize. The depth of NOAA's contributions in this international effort, highlight the preeminent science conducted by NOAA, providing observations, data, model simulations, analysis, authors and review editors. A cadre of NOAA scientists from the laboratories and programs, including the joint and cooperative institutes, served as contributors and government reviewers of the final report, which is a state of the science analysis based on published peer-reviewed literature. Many of the IPCC efforts were supported by NOAA and the U.S. Climate Change Science Program.

In February 2007, the IPCC released the Summary for Policy Makers of the first chapter of the Fourth IPCC Assessment Report—The Physical Science Basis for Climate Change. NOAA's Earth System Research Laboratory Scientist Dr. Susan Solomon, co-chair of IPCC Working Group 1, was a leader in the production of the report. Nine lead and review authors were NOAA scientists, and NOAA observation networks, computer modeling labs, and research programs provided data and analysis.

NOAA's investment in enhanced computing power at the Geophysical Fluid Dynamics Laboratory (GFDL) made it possible for the lab to provide 20 model runs to the IPCC that enhanced the projections used in the report. GFDL contributed climate models, which couple the interactions of the atmosphere and the ocean to help understand climate phenomena on time scales of decades to centuries. The new models show improved resolution and can incorporate more sophisticated physical parameters.

NOAA Great Lakes Lab Recognized for 'Green' Research Vessels

NOAA's Great Lakes Environmental Research Laboratory (GLERL) earned a White House Closing-the-Circle Award in the green purchasing category for its fleet of research vessels operating on 100 percent bio-based fuel and lubricants. GLERL's innovative efforts to engineer, operate, and maintain these ships to support scientific missions also advances NOAA's larger mission as a steward of the marine environment. This initiative also reduced costs and has a positive impact on the work environment for the vessels' crews and researchers.

National Oceanic and Atmospheric Administration (NOAA) Office of Oceanic and Atmospheric Research (OAR)

OAR's mission is to conduct research, develop products, provide scientific understanding and leadership and to conduct outreach towards fostering NOAA's evolving environmental and economic mission.

www.research.noaa.gov

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Mid-Atlantic Array to Aid in Study of Atlantic Meridional Overturning Circulation

NOAA's Atlantic Oceanographic and Meteorological Laboratory scientists and their partners installed an array of moorings in the mid-Atlantic to help study the Atlantic Ocean Meridional Overturning Circulation (MOC) that brings warm waters northward, and to assess its relationship to observed climate fluctuations. New results from this array have identified much larger variability than previously thought, which can impact marine ecosystems and the climate of North America.

Lake Superior Warming Faster Than the Air Around It

A Minnesota Sea Grant scientist noted that Lake Superior's surface water temperature last summer reached a peak of 74 degrees (until recently, the lake rarely climbed above 60 degrees). Global warming could be a factor because the winters are shorter and less ice forms on the lake. The lake warms up sooner and earlier than in past years, and does so rapidly. Scientists are worried about the lake's vulnerability to exotic species since frigid waters act as a natural barrier.

Researchers Monitor Oceanic Methane Emissions for Climate Impact

NOAA scientists specializing in undersea research developed a new listening technique to monitor emissions of methane from the seabed. Methane, stored in and on the seafloor as hydrate (ice-like) deposits, is susceptible to atmospheric release from catastrophic events and could contribute to global warming. By listening to the sounds different-sized bubbles produce, scientists estimate the quantity of methane being released and how much reaches the sea surface and atmosphere. This technique will allow us to better understand the climate threat from seabed emissions of methane, a potent greenhouse gas.

Stormy Spring Weather Tests NOAA Research Radar

Storms across Oklahoma in the spring of 2007 provided NOAA's National Severe Storms Laboratory researchers an unprecedented opportunity to study rapidly evolving weather phenomena and the potential to extend warning lead-times for severe weather using the Phased Array Radar (PAR), part of the National Weather Radar Testbed (NWRT). For the first time, these data were made available for operational use to the NWS Weather Forecast Office in Norman, Oklahoma. This innovative technology, developed by the Department of Defense, has the potential to vastly improve upon the capabilities of the national NEXRAD radar network for all weather radar applications.

Tracer Dispersion Study Supports Efforts to Safeguard Pentagon

The NOAA Air Research Laboratory, Field Research Division (FRD) completed a study of meteorological conditions around the Pentagon, part of a multi-agency and multi-institutional program dubbed "Pentagon Shield." FRD released a harmless atmospheric tracer from various locations around the Pentagon during several intensive observation periods to mimic a potential attack. FRD placed sensors on, around, and in the Pentagon to measure the dispersion characteristics of the tracer into and around the building. The resultant dispersion patterns have been used to verify a series of nested meso- and building-scale meteorological models used in an automated operational building protection system. Results of the study will support development of a system to protect its more than 25,000 occupants from chemical, biological, and radiological attack.

Ring-of-Fire Undersea Explorations Conducted

NOAA Ocean Exploration continued a multi-year series of discovery missions to undersea volcanoes and hydrothermal vents associated with the Submarine Ring of Fire -- a large but virtually unexplored province in the Pacific where the Earth's tectonic plates are being forced below the Earth's crust. Accomplishments include discovery of abundant flows of both gaseous and liquid carbon dioxide (CO_2) from the seafloor, which will provide a natural deep-ocean laboratory for studying ocean sequestration of this greenhouse gas. Because the Mariana Arc hydrothermal fluids are very different than those associated with seafloor spreading centers, a large variety of apparently unique ecosystems have been discovered. The biotechnical and pharmaceutical value of these organisms is under study.

PREEMINENT RESEARCH

NOAA Research studies the Earth system from the depths of the oceans to the upper reaches of the atmosphere. Our world-class scientists conduct preeminent research that contributes to public health and safety, healthy ecosystems, and a robust economy. This requires transfer of research to operations, as well as continued exploration and discovery in new areas that will expand the boundaries of our understanding of the Earth system and lay the foundation for the NOAA services of the future.

NOAA Research is integrated across three central research themes: ocean, coastal, and Great Lakes resources; climate; and weather and air quality. The NOAA Research network consists of seven internal research laboratories; an Office of Ocean Exploration that conducts both internal and extramural research; 30 National Sea Grant university programs, six undersea research centers, a research grants program through the Climate Program Office, and 13 cooperative institutes with academia.

VALUE TO SOCIETY

NOAA research provides value to society through improved weather forecasts, and enhanced navigation and aviation safety, as well as improved ocean and coastal services. Ultimately, the information NOAA Research provides is used by decision makers to prevent the loss of human life and manage natural resources, while maintaining a strong economy. NOAA Research:

- Provides comprehensive knowledge to guide national environmental policy decisions;
- Improves environmental services to the Nation, including reliable predictions and assessments; and
- Promotes economic growth through science for decision-making, new technology, and partnerships.

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