February and March were busy months at AOML as the Laboratory prepared for a critical assessment of its science program. On March 18-20th, five reviewers and several invited guests including Drs. Richard Spinrad and Alexander MacDonald of NOAA’s Office of Oceanic and Atmospheric Research (OAR) visited AOML to participate in the Laboratory’s quadrennial science review.

AOML Director Dr. Robert Atlas began the proceedings by presenting an organizational overview of the Laboratory, followed by an overview of AOML’s three science divisions presented by Drs. Silvia Garzoli, Frank Marks, and John Proni.

Reviewers were tasked with evaluating AOML’s science program based upon three research themes derived from the mission goals of NOAA’s Strategic Plan: oceans and climate, coastal ecosystems, and hurricanes. Science presentations for each theme were tailored to address a series of key questions aimed at demonstrating the quality of the research performed, its relevance to NOAA and the nation, and its overall effectiveness in terms of advancing scientific understanding, leadership, planning, and transition into operational application. A poster session, as well as a question and answer period with the reviewers, followed the formal presentations for each research theme.

Scientific reviews are performed by NOAA to evaluate the quality, relevance, and effectiveness of research conducted at OAR laboratories to both internal and external interests, and to help strategically position the laboratories in planning their future science. The reviews are also intended to ensure that OAR laboratory research is linked to NOAA’s strategic plan, relevant to the NOAA Research mission and priorities, and consistent with NOAA planning, programming, and budgeting.

Preparations for the review were organized and coordinated by Judith Gray and Erica Rule of AOML’s Office of the Director. Additionally, AOML’s administrative, scientific, technical, and maintenance staff all contributed to the successful endeavor. The time, attention, and efforts of the review team—Drs. Douglas Luther (University of Hawaii), Steven Murawski (NOAA-National Marine Fisheries Service), James Miller (Rutgers University), Robert Houze (University of Washington), and Ramesh Kakar (National Aeronautics and Space Administration)—are gratefully acknowledged and appreciated.
Southern Ocean Cruise Probes Climate-Related Gases

More than 30 scientists, including a small group from AOML’s Ocean Chemistry Division, embarked on a research cruise aboard the NOAA Ship Ronald H. Brown in February to study how gases important to climate change move between the atmosphere and the ocean under high winds and seas. The Southern Ocean Gas Exchange Experiment was co-sponsored by the National Aeronautics and Space Administration, NOAA, and the National Science Foundation.

The Brown departed Punta Arenas, Chile near the southern tip of South America on February 29th to cruise the turbulent waters of the Southern Ocean, which surrounds Antarctica. Amidst roaring winds, rolling waves, and frigid temperatures, scientists measured turbulence, waves, bubbles, ocean temperature, and ocean color to determine how these factors relate to the exchange of carbon dioxide and other climate-relevant gases.

“The Southern Ocean is the largest ocean region where the surface waters directly connect to the ocean’s interior currents, providing a pathway into the deep sea for carbon dioxide released from human activities,” said Christopher Sabine, an oceanographer at NOAA’s Pacific Marine Environmental Laboratory in Seattle, Washington and co-chief scientist on the cruise. “Understanding how atmospheric carbon dioxide is absorbed into these cold surface waters under high wind speeds is important for determining how the ocean uptake of carbon dioxide will respond to future climate change.”

The world’s oceans are estimated to absorb about two billion metric tons of carbon dioxide from the atmosphere every year. NOAA’s leading research on ocean acidification resulting from carbon dioxide uptake indicates that many organisms that support marine biodiversity may be threatened by climate change in the future. Scientists know that higher wind speeds promote a faster exchange of gases, but there have been very few studies aimed at directly measuring these exchanges under real world conditions where other factors, like breaking waves, can influence the process.

In spite of the challenging conditions, an unprecedented number of measurements were gathered during the cruise which should help determine the processes that control air-sea gas exchange. “Our ongoing efforts to understand the global carbon cycle will benefit from the data this cruise produced about the mechanisms that govern gas transfer in this remote part of the world’s ocean,” said Paula Bontempi, manager of NASA’s ocean biology and biogeochemistry research program.

“We directly assessed the rate and mechanism by which the ocean takes up carbon and releases it,” said co-chief scientist David Ho of the Lamont-Doherty Earth Observatory of Columbia University in Palisades, New York. “This is the first U.S.-led effort to use all of the state-of-the-art tools that we have to quantify gas exchange in the Southern Ocean.” Data gathered during the six weeks at sea are expected to eventually improve the accuracy of climate models and predictions. The cruise ended in Montevideo, Uruguay on April 12th.

*Names of AOML authors are in blue capital letters.

Adapted from an online article appearing on the NOAA web site.
Nation’s Hurricane Hunter Fleet Equipped with Surface Wind Instruments

America’s entire fleet of hurricane hunter aircraft are now equipped with a state-of-the-art remote sensing instrument that reliably measures the surface winds in tropical cyclones. Data gathered by the instrument, a stepped frequency microwave radiometer (SFMR), will provide forecasters with a more accurate view of the strength and extent of the damaging winds that impact coastal communities during landfalling storms.

The current generation of the SFMR was first tested aboard NOAA’s two WP-3D Orion hurricane hunter aircraft in 2003. A validation study performed by AOML scientists that subsequently demonstrated its accuracy resulted in the SFMR being used operationally beginning with the 2005 Atlantic hurricane season. Efforts to install the SFMR aboard the Air Force Reserve’s WC-130J aircraft have been ongoing since 2006. In February 2008, all ten of the 53rd Weather Reconnaissance Squadron’s planes had been outfitted. The instrument attaches to the under portion of the aircraft’s wing.

In the past, flight crews estimated surface wind speeds by extrapolating the aircraft’s altitude or by deploying Global Positioning System dropsondes. By contrast, the SFMR provides continuous, real-time measurements of surface winds directly beneath the aircraft. The instrument detects radiation that is naturally emitted from foam created on the sea by winds at the surface. Computers onboard the aircraft then determine surface wind speeds based on the level of microwave radiation detected.

To assist with quality control of Miami-Dade County’s public transit system, please report your comments, concerns, suggestions, and problems to the Miami-Dade Transit Authority at www.miamidade.gov/transit/feedback_zone.asp or by calling 305-770-3131. Major or persistent transit problems should also be reported to Stanley Goldenberg, AOML’s transit liaison at: 305-361-4362 Stanleys.goldenberg@noaa.gov

Ocean Drifter Training Seeks to Remedy Data Void

In conjunction with the United States Navy, Shaun Dolk of AOML’s Drifter Operations Center visited Ghana in March to train regional researchers in the deployment and data acquisition procedures for Argo floats, global drifting buoys, and expendable bathythermographs (XBTs). The training was conducted onboard the U.S. Navy vessel HSV-2 Swift off the west coast of Africa in the Gulf of Guinea, a region historically undersampled.

While similar training sessions have been held in the past, this particular training was unique in that it was conducted at sea. The ability of the Navy to host the training aboard one of its vessels allowed for a novel “hands-on” experience which enabled participants to become familiar with the instruments. The endeavor was conducted as part of a U.S. Navy Africa Partnership Station initiative that supports NOAA’s climate research and ocean-observing efforts.

During the three-day session, one Argo float, three drifting buoys, and 12 XBTs were deployed from the HSV-2 Swift to gather temperature, salinity, and current measurements. Data from the instruments are transmitted via satellite to the Global Telecommunication System for use by the international oceanographic and meteorological communities in ocean and climate studies, weather modeling, and marine operations.

Representatives from all west African countries were invited to attend the training. Participants included oceanographers, academic professors, military personnel, graduate and post-graduate students, fisheries representatives, and geologists from Ghana, Cameroon, and Nigeria.

As the network of west African regional partners develops, it is anticipated that a greater number of ocean-observing instruments will be deployed in the area, leading to improved short and long-term climate forecasts.
Foundation Established for Cayman Islands Coral Monitoring Station

The foundation for a new Integrated Coral Observing Network (ICON) station was established off the northern coast of Little Cayman Island in the Cayman Islands during the week of April 6th. The site is located in 22 feet of water offshore of the Little Cayman Research Center, a facility of the Central Caribbean Marine Institute.

AOML oceanographer Jules Craynock and LCDR Nancy Ash of AOML performed the initial underwater layout of the two-foot square, stainless steel center base plate and eight peripheral pins. Drilling operations at the site were performed by the crew of the R/V Sea Keeper, a coastal service vessel operated by the Cayman Islands Department of Environment.

The bottom plate will support a coral monitoring platform equipped with an array of meteorological and oceanographic instruments positioned above and below the ocean surface along an upright pylon. The station will aid researchers in observing environmental conditions at the site when it is completed later in the year.

The Little Cayman ICON station will become part of a growing network of coral reef monitoring platforms installed in accordance with goals established by the U.S. Coral Reef Task Force and NOAA for monitoring and assessing the health of coral reefs. ICON stations are already operating in St. Croix, Puerto Rico, and Jamaica.

AOML Plays Host to Workshops and Meetings

AOML hosted the following workshops and meetings during the March-April time frame:

- **XBT Fall-Rate Workshop, March 10-12th:** Drs. Gustavo Goni and Molly Baringer of AOML’s Physical Oceanography Division organized the event. An international group of scientists met to discuss the recently observed contradiction between global sea level rise estimates and heat content changes. Recent work has shown a steady increase or a leveling off of sea-level trends globally, but heat content changes since 2000 have declined. A closer examination of the underlying data used for heat content estimates led to the discovery that several issues could impact the global heat content trend estimates based on the data sources themselves. Participants focused on the small but systematic discrepancies in ocean temperature profile observations between expendable bathythermographs (XBTs) and other observing platforms such as CTDs (conductivity-temperature-depth) and Argo floats. Recommendations included a routine systematic intercomparison of platform types and highlighted the particularly valuable nature of dual data sources to diagnose potential problems for constructing a climate quality time series. The workshop was supported by NOAA’s Climate Program Office and endorsed by the World Meteorological Organization’s Ship Observations Team.

- **11th Annual Meeting of the Variability of the American Monsoon Systems (VAMOS) Panel, March 25-28:** Dr. David Enfield of AOML’s Physical Oceanography Division organized the event. Participants met to discuss the coordination of several ongoing climate experiments being conducted in southwestern North America, the southeast Pacific, and the La Plata Basin which intersects Argentina, Uruguay, Brazil, and Paraguay. The centerpiece for the event was the presentation of a Science and Implementation Plan for a new climate program, the Intra-Americas Study of Climate Processes (IASCLIP), which is projected to begin in 2009 and extend to the middle of the next decade. IASCLIP is centered in the Caribbean and Gulf of Mexico, forming a geographical and phenomenological nexus between the North and South American monsoon systems. The program will investigate the physical processes that drive rainfall and tropical cyclone variability in the Intra-Americas Sea and surrounding regions and improve their prediction. Researchers from across the U.S., Caribbean, and Central-South America will be involved, including many from the Virginia Key science community (AOML and University of Miami). VAMOS is an international program of CLIVAR and the of World Climate Research Program.

- **Observing System Experiments (OSEs) and Observing System Simulation Experiments (OSSEs) Workshop, April 14-17:** AOML Director Dr. Robert Atlas convened the event; Drs. Silvia Garzoli of AOML and Christopher Mooers of the University of Miami’s Rosenstiel School served as co-convenors. Researchers from diverse communities met to focus efforts on creating a national capability for conducting observing system experiments (OSEs) and observing system simulation experiments (OSSEs). OSSEs consist of controlled, quantitative assessments of the value of a system of observations based on sophisticated numerical models of the circulation. It was proposed to develop an ocean OSSE capability to meet NOAA’s needs for OSE and OSSE results in designing ocean observing systems and, specifically, to quantify the value of existing and proposed ocean observing systems in the context of the Integrated Ocean Observing System and the Global Ocean Observing System. The proposed capability will be built in partnership with national laboratories and universities. Participants defined the topic area, strengthened partnerships, and outlined an action plan for implementing a true ocean model assessment system.

NOAA Miami Regional librarian Linda Pikula represented the Group of Experts in Marine Information Management (GEMIM) at a recent International Oceanographic Data and Information Exchange (IODE) Officers meeting in Oostende, Belgium. Pikula presented an update on GEMIM activities and provided a work plan and budget for 2008-2009 activities. The approved budget supports the continued information management programs for capacity building projects in Latin America, Africa, and eastern Europe. The continuation and expansion of the OceanDocs online repository was approved, as well as the OceanTeacher project. The complete IODE Officers report can be viewed at www.iode.org/index.php?option=com_oe&task=viewEventRecord&eventID=162.
Congratulations

Molly Baringer and Gustavo Goni, both oceanographers with AOML’s Physical Oceanography Division, have been selected to participate in NOAA’s Leadership Competencies Development Program (LCDP). The LCDP is a competitive, 18-month program that provides a series of training and learning experiences to prepare individuals to assume greater leadership responsibilities within NOAA.

Derek Manzello, a CIMAS research associate with AOML’s Ocean Chemistry Division, has been awarded a Ph.D. in marine biology from the Division of Marine Biology and Fisheries of the University of Miami’s Rosenstiel School of Marine and Atmospheric Science. In April, Manzello successfully defended his thesis entitled Short and Long-Term Ramifications of Climate Change upon Coral Reef Ecosystems: Case Studies Across Two Oceans.

Shirley Murillo, a meteorologist with AOML’s Hurricane Research Division, has been awarded a Master’s of Science degree in meteorology from the Department of Meteorology of the University of Hawaii at Manoa. In March, Murillo successfully defended her thesis entitled Determination of the Circulation Center and Inner Core Evolution of Hurricane Danny (1997) using the GBVT-D-Simplex Algorithm.

Eric Uhlhorn, a meteorologist with AOML’s Hurricane Research Division, has been awarded a Ph.D. in meteorology from the Division of Meteorology and Physical Oceanography of the University of Miami’s Rosenstiel School of Marine and Atmospheric Science. In April, Uhlhorn successfully defended his thesis entitled Gulf of Mexico Loop Current Mechanical Energy and Vorticity Response to a Tropical Cyclone.

AOML has been recognized as a Federal partner in a National Oceanographic Partnership Program (NOPP) Excellence in Partnering Award. The award acknowledges a broad consortium of academic, Federal, and commercial institutions who have collaborated on the NOPP-based U.S. GODAE: Global Ocean Prediction with the HYbrid Coordinate Ocean Model (HYCOM) project. AOML was one of several Federal partners participating in the consortium for assimilating observational data into the HYCOM model.

Welcome Aboard

Dr. Alexandre Fierro joined the staff of the Hurricane Research Division in February as a National Research Council post-doctoral research associate. Fierro recently received a Ph.D. from the University of Oklahoma where he studied microphysics and electrification in tropical squall lines using numerical models and observations. Fierro will work with Dr. Robert Rogers to evaluate microphysics fields in tropical cyclone simulations, compare them with observations, and test the sensitivity of simulated microphysics to various model configurations.

Christine Wiley joined the staff of the NOAA Miami Regional Library in March as a librarian. Wiley is originally from Augusta, Georgia. She is a recent graduate of Florida State University with a Master’s of Library Science degree in information architecture and a B.A. in business information systems.

Dr. Kao-San (Kevin) Yeh joined the modeling team of AOML’s Hurricane Research Division in February as a CIMAS scientist from NASA’s Goddard Earth and Science Technology Center. Yeh obtained a Ph.D. in meteorology from Purdue University in 1997 and has focused his research on weather and climate modeling, numerical weather prediction, and data assimilation. He is one of the developers of the Canadian GEM (Global Environmental Multiscale) model and NASA’s finite-volume general circulation model, both well known global atmospheric modeling systems.

Dr. Xuejin (Ken) Zhang joined the modeling team of AOML’s Hurricane Research Division in February as a CIMAS assistant scientist. Zhang earned a Ph.D. in atmospheric sciences from North Carolina State University in 2007. His research interests include numerical modeling and model development, land-air-sea interactions, and numerical method and parallel computing.

Earth Day

April 22nd

Earth Day

April 22nd

AOML celebrated Bring Your Sons and Daughters to Work Day on April 24th with a program of activities planned and hosted by outreach coordinator Erica Rule. About 15 children visited the Laboratory to participate in the fun and to learn about all the interesting things their parents do in support of NOAA’s mission. Activities included a tour of the engineering labs where global drifter buoys are constructed, a tour of the R/V Virginia Key, and a workshop to build their very own models of planet Earth. An outdoor lunchtime pizza party topped off the event.
Travel


Stanley Goldenberg made a presentation at the 2008 International Conference on Climate Change in New York City, New York on March 2-4, 2008.

A large component of scientists from AOML attended and made presentations at the American Geophysical Union’s Ocean Sciences Meeting in Orlando, Florida on March 2-7, 2008.

John Gamache, Sundararaman Gopalan-krishnan, Frank Marks, Shirley Murillo, Mark Powell, Robert Rogers, and Eric Uhlhorn attended the 62nd Interdepartmental Hurricane Conference in Charleston, South Carolina on March 3-7, 2008.


Pamela Fletcher attended the Global Coral Reef Environmental Observatory Network (CREON) Integration Meeting in Kenting, Taiwan on March 13-14, 2008.

Jules Craynock and Nancy Ash installed the bottom plate/foundation for an Integrated Coral Observing Network (ICON) station offshore of Little Cayman Island, Cayman Islands on April 7-11, 2008.

Gustavo Goni was an invited instructor for a CLIVAR-sponsored course at the Institut Universitaire Européen de la Mer in Brest, France on April 21-24, 2008.

A large component of scientists from AOML attended and made presentations at the American Meteorological Society’s 28th Conference on Hurricanes and Tropical Meteorology in Orlando, Florida on April 28-May 2, 2008.

Judith Gray attended the annual planning meeting of the Coastal Storms Program in Washington, D.C. on April 29-30, 2008.