

# AOML Keynotes

November-December 2009

Atlantic Oceanographic and Meteorological Laboratory

Volume 13, Number 6

## AOML Receives Green Grant for Light Switch Conversion

This past spring, AOML was awarded a grant through NOAA's Green Grant Program to convert its light switches from traditional manual switches to motion, sound, and dual technology sensors. The sensor technology prevents lights from staying on in unoccupied spaces, making for an overall reduction in lighting hours that is both environmentally and fiscally responsible.

In early November, contractors began installing wall and ceiling motion sensors in most offices, sound sensors in restrooms, and timers on hallway lighting breakers. Workshop and emergency lights remain unchanged, however, as their conversion could present safety issues. The project is proceeding on schedule and should be completed before the end of the year.

Expected benefits of the conversion include the following:

- Reduced energy consumption
- Reduced energy costs
- Reduced light bulb consumption
- Reduced cost for light bulbs
- Reduced cost for light bulb disposal
- Reduced spread of germs and viruses since switch surfaces no longer require touch activation

*Thank You!* AOML staff donated \$18,676.00 towards their favorite charities during the 2009 Combined Federal Campaign program.

## New Study Highlights CO<sub>2</sub> Variability in the North Atlantic

With an estimated 40% of the carbon dioxide (CO<sub>2</sub>) from fossil fuels having entered the oceans since the start of the Industrial Revolution, understanding how much CO<sub>2</sub> is absorbed by the oceans and how this amount changes from year to year is critical to piecing together Earth's total carbon budget. As fossil fuels continue to be burned, will the world's oceans continue to absorb the same percentage of CO<sub>2</sub> entering the atmosphere? NOAA has played an important role in developing an innovative and cost-effective approach for measuring CO<sub>2</sub> in the oceans. This approach, which uses ships of opportunity equipped with autonomous carbon monitoring instruments, was successfully used to assess CO<sub>2</sub> absorption in a recent study of the Atlantic Ocean. Dr. Rik Wanninkhof of AOML's Global Carbon Cycle program was part of the international team of researchers who participated in the effort. Results from the study are reported in Watson *et al.* in the December 4th edition of the journal *Science*.



Ships of opportunity that routinely traverse the Atlantic Ocean such as the cargo ship *Reykjafoss* pictured above were outfitted with autonomous carbon dioxide sampling equipment as a cost-effective method for gathering data over broad, often undersampled, expanses of the ocean.

The *Science* article shows for the first time how the exchange of CO<sub>2</sub> between the ocean and atmosphere can be calculated with significant accuracy in the North Atlantic Ocean based on measurements from ships of opportunity such as cargo vessels and even a cruise ship! NOAA scientists at AOML and the Pacific Marine Environmental Laboratory (PMEL) helped design and test the CO<sub>2</sub> monitoring instruments that sit in the engine room of the vessels and sample sea water. Using information collected from six ocean-going vessels in 2005, combined with high resolution sea surface temperature data from satellites and an ocean assimilation model to estimate mixed layer depths, the *Science* article describes how the North Atlantic Ocean carbon sink is more variable than most ocean models suggest.

The overall concept for using ships of opportunity to measure CO<sub>2</sub> absorption was first advocated in a study commissioned by NOAA in 2002, and NOAA played a critical role in facilitating international collaboration for the effort. PMEL investigators provided leadership in the International Ocean Carbon Coordination project sponsored by the International Oceanographic Commission, while AOML investigators led a technology transfer campaign to ensure participating ship of opportunity vessels used similar instrumentation, thereby obtaining comparable data.

The groundwork for the recent North Atlantic study was based on smaller scale studies in the Atlantic and equatorial Pacific performed by NOAA researchers and their affiliates. Carbon data gathered by ships such as the *Explorer of the Seas*, the *Ronald H. Brown*, and *Reykjafoss*, collected with the sustained support of NOAA's Climate Observation Program, were integral to the study.



AOML is an environmental research laboratory of NOAA's Office of Oceanic and Atmospheric Research located on Virginia Key in Miami, Florida



### AOML's Weather Station Returns!

After being struck by lightning and disabled two years ago, the weather station at AOML has been reestablished. In mid-November, a team of AOML staffers worked to install a suite of meteorological sensors on the station's tower and then hoisted and secured the tower to the roof of the AOML facility. The station is currently recording wind speed, wind direction, humidity, temperature, and rain accumulation data, as well as the heat index. It also provides a generic forecast and measures the temperature and humidity inside AOML.



After a two-year absence, the weather station at AOML is once again functioning and reporting local conditions due the efforts of a team of AOML staffers.

Local weather conditions can be viewed on a digital display located in the fifth floor conference room. However, plans are currently underway to enable everyone at AOML with a computer to view AOML's weather data from either inside or outside of the facility.

Hector Casanova, Mike Sam, Neville Cohen, Greg Banes, Tom Heeb, Neal Dorst, Manny Fraga, and Cameron Lambert worked together over a three-day period to resurrect the station. Due to their efforts, weather conditions at AOML are once again being monitored.

## FACE Cruise Samples Florida's Southeast Coastal Waters

Scientists with AOML's Ocean Chemistry Division (OCD), along with colleagues from the University of Miami and the U.S. Environmental Protection Agency, boarded the NOAA Ship *Nancy Foster* in early November to sample the coastal waters off southeastern Florida. The week-long cruise, undertaken in support of the Florida Area Coastal Environment (FACE) program, began out of Key West, Florida on November 1st. Lewis Gramer of OCD served as the chief scientist. Sampling operations were performed along much of Florida's coral reef tract, one of the largest reef systems in the world, from Key West northward to the Boca Raton Inlet offshore of Boca Raton, Florida.

Along the way, extensive data were gathered on ocean currents. Samples were collected to analyze the physical and chemical water properties present within several distinctive features of the coastal circulation, including a transient coastal current and several apparent sub-mesoscale vortices or eddies interacting with the offshore slope of the Florida reef tract.

Water and floating aquatic vegetation samples were also collected to test for the presence of human fecal indicator bacteria and other pathogens, as well as characterize the ocean surface concentrations of various nutrients, particularly ammonia, in the Florida Keys. These samples will enable researchers to study the fate and transport of microbial contaminants from land-based sources by eddy structures along the Florida Keys and southeast Florida coast. They will also enable researchers to study the transport of microbial contaminants by floating seagrass and other macrophyton and the discharge of microbial contaminants at wastewater-treated outfall sites. Additionally, ocean floor sediments were sampled in transects off the Florida Keys for stable isotope analysis to further examine anthropogenic impacts.

The cruise was part of a coordinated project that included the deployment of six moorings and two benthic lines this past fall off the southeast Florida coast. The moorings are presently recording sea temperature and ocean currents along the Florida shelf and outer reefs. Data from both the FACE cruise and the moorings should help FACE researchers better understand the impact of oceanic vortices and internal waves on the physical, chemical, and biological environment of the Florida reef tract.



Jakub Bartkowiak of AOML's Environmental Microbiology Laboratory (left) assists with the deployment of a conductivity-temperature-depth (CTD) cast from aboard the NOAA Ship *Nancy Foster*.

CAPT Michael Devany, Commanding Officer of NOAA's Atlantic Marine Operations Center, visited AOML on December 8th to meet with AOML users of the Atlantic fleet. While at AOML, he also met with Gustavo Goni and Molly Baringer, fellow classmates and recent graduates of NOAA's Leadership Competencies Development Program. Pictured at AOML from left to right are LT Hector Casanova (AOML), CAPT Michael Devany, LTJG Lecia Salerno (AOML), LTJG Madeleine Adler (AOML), and LTJG David Gothan (Southeast Fisheries Science Center).



## Recent Publications\*

**DI NEZIO, P.N.**, A.C. Clement, G.A. Vecchi, B.J. Soden, B.P. Kirtman, and **S.-K. LEE**, 2009: Climate response of the equatorial Pacific to global warming. *Journal of Climate*, 22(18):4873-4892.

Elmir, S.M., **T. SHIBATA**, H.M. Solo-Gabriele, **C.D. SINIGALLIANO, M.L. GIDLEY**, G. Miller, L.R.W. Plano, J. Kish, K. Withum, and L.E. Fleming, 2009: Quantitative evaluation of enterococci and bacteroidales released by adults and toddlers in marine water. *Water Research*, 43(18):4610-4616.

**FIERRO, A.O.**, J. Simpson, M.A. LeMone, J.M. Straka, and B.F. Smull, 2009: On how hot towers fuel the Hadley cell: An observational and modeling study of line-organized convection in the equatorial trough from TOGA COARE. *Journal of the Atmospheric Sciences*, 66(9):2730-2746.

**GONI, G.J.**, M. DeMaria, J. Knaff, C. Sampson, I. Ginis, **F. BRINGAS**, A. Mavume, C. Lauer, I.-I. Lin, M.M. Ali, P. Sandery, S. Ramos-Buarque, K. Kang, A. Mehra, E. Chassignet, and **G.R. HALLIWELL**, 2009: Applications of satellite-derived ocean measurements to tropical cyclone intensity forecasting. *Oceanography*, 22(3): 191-197.

Marshall, J., A. Andersson, N. Bates, W. Dewar, S. Doney, J. Edson, R. Ferrari, G. Forget, D. Fratantoni, M. Gregg, T. Joyce, K. Kelly, S. Lozier, **R. LUMPKIN**, G. Maze, J. Palter, R. Samelson, K. Silverthorne, E. Skyllingstad, F. Straneo, L. Talley, L. Thomas, J. Toole, and R. Weller, 2009: The CLIMODE field campaign: Observing the cycle of convection and restratification over the Gulf Stream. *Bulletin of the American Meteorological Society*, 90(9): 1337-1350.

Rodgers, K.B., R.M. Key, A. Gnanadesikan, J.L. Sarmiento, O. Aumont, L. Bopp, S.C. Doney, J.P. Dunne, D.M. Glover, A. Ishida, M. Ishii, A.R. Jacobson, C.L. Monaco, E. Maier-Reimer, H. Mercier, N. Metzl, F.F. Perez, A.F. Rios, **R. WANNINKHOF**, P. Wetzel, C.D. Winn, and Y. Yamanaka, 2009: Using altimetry to help to explain patchy changes in hydrographic carbon measurements. *Journal of Geophysical Research*, 114(C9):C09013, doi:10.1029/2008JC005183.

**WANG, C.**, F. Kucharski, R. Barimalala, and A. Bracco, 2009: Teleconnections of the tropical Atlantic to the tropical Indian and Pacific Oceans: A review of recent findings. *Meteorologische Zeitschrift*, 18(4):445-454.

Watson, et al., and **R. WANNINKHOF**, 2009: Tracking the variable North Atlantic sink for atmospheric CO<sub>2</sub>. *Science*, 326(5958):1391-1393.

\*AOML authors appear in bolded blue capital letters.

## NOAA Delegation Negotiates MOU with Indian Ministry

AOML Deputy Director Judith Gray was a member of a NOAA delegation that visited New Delhi, India this past October to negotiate an Implementation Agreement on Tropical Cyclone Research as part of a Memorandum of Understanding (MOU) with India's Ministry of Earth Sciences. The U.S. delegation was led by Dr. Richard Spinrad, NOAA's Assistant Administrator for Oceanic and Atmospheric Research.

In addition to two days of formal presentations on a wide range of NOAA-related topics, Gray met with Dr. Ajit Tyagi, Director General of the Indian Meteorological Department, Professor U.C. Mohanty of the Indian Institute of Technology, and staff and students to discuss opportunities for cooperative research and model development related to tropical cyclones.

NOAA's experimental Hurricane Weather Research Forecast (HWRFx) model is being adapted to the Bay of Bengal. Both NOAA and Indian scientists are developing data assimilation schemes and parameterization schemes for convection, as well as testing model domain sizes and resolution, for HWRFx.

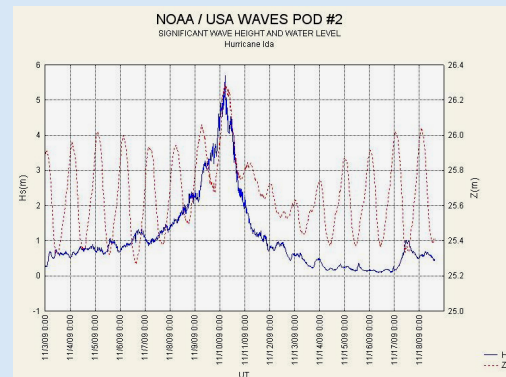
It was agreed in principle that these efforts should be coordinated and information shared through a bilateral exchange program. Future efforts are expected to include student exchanges and workshops in India and the U.S.



Dr. Richard Spinrad (right), Assistant Administrator for NOAA's Office of Oceanic and Atmospheric Research, and Dr. Shailesh Nayak, Secretary of India's Ministry of Earth Sciences, exchange tokens of appreciation during meetings and negotiations to establish a collaborative India-U.S. agreement on tropical cyclone research.

Researchers with AOML's Ocean Chemistry Division (OCD) retrieved three acoustic wave and current (AWAC) instruments from the Gulf of Mexico south of Mobile Bay, Alabama, during the week of November 16th. The instruments were deployed on the ocean floor in water depths of 85-110 meters this past June as part of a cooperative effort with researchers from the University of South Alabama's Center for Hurricane Intensity and Landfall Investigation. Their deployment marked the third consecutive year that OCD placed the instruments in the Gulf of Mexico at the start of the Atlantic hurricane season.

On November 9th, Tropical Storm Ida passed over the three AWACs before making landfall along the Alabama coast. The AWACs recorded the sea surface height, directional wave spectrum, subsurface ocean currents, and ocean bottom temperatures as Ida churned above them. Data recorded by instruments will help researchers better understand the physical processes that occur during tropical cyclone landfall events, as well as improve predictive models used by emergency managers and meteorologists in protecting lives and property.



Tropical Storm Ida generated waves more than 5 meters in height as indicated by data gathered from an AWAC instrument deployed in the Gulf of Mexico during the 2009 hurricane season.

## Common Access Cards

New identification badges known as Common Access Cards have become a requirement for all employees working onsite at Federal facilities, as specified by Homeland Security Presidential Directive 12 (HSPD-12) signed into law by former President George W. Bush in August 2004. Current NOAA identification badges do not satisfy HSPD-12 requirements and will become obsolete on December 31, 2009.

All AOML employees—Federal, CIMAS, and contractors—must obtain Common Access Cards at their earliest convenience. These new cards must be worn alongside existing NOAA identification badges until the NOAA badges are phased out.

Common Access Cards can be obtained at the following locations:

U.S. Coast Guard  
Integrated Support Command  
100 MacArthur Causeway  
Miami, FL 33139  
305-535-4598 (call for appointment)

U.S. Army Garrison  
8300 N.W. 33rd Street  
Miami, FL 33122  
(No appointments, walk-ins only)

Two forms of personal identification must be presented:

- Florida state-issued document, e.g., Florida driver's license.
- Social security card, passport, birth certificate, or voter registration card.

For purposes of time and attendance, travel involved in obtaining a Common Access Card is considered work time. Please inform Ruth Almonte (305-361-4367) of AOML's Administrative Group when you have obtained a Common Access Card so your name can be added to AOML's weekly compliance reports.

## Below-Average 2009 Atlantic Hurricane Season Ends

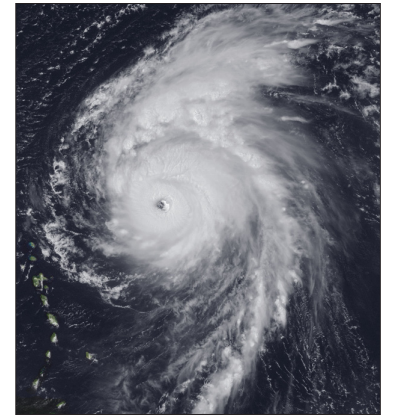
The 2009 Atlantic hurricane season, strongly impacted by an El Niño event in the Pacific Ocean, came to an end on November 30th. As forecasted by NOAA this past August, the six-month long season that began June 1st was marked by a below-average level of storm activity, making it the quietest season on record since 1997.

In total, nine named storms developed (see graphic below), with three storms strengthening into hurricanes (Bill, Fred, and Ida), and two becoming major hurricanes with winds above 110 mph (Bill and Fred). An average season churns out 11 named storms, three to six hurricanes, and one to two major hurricanes.

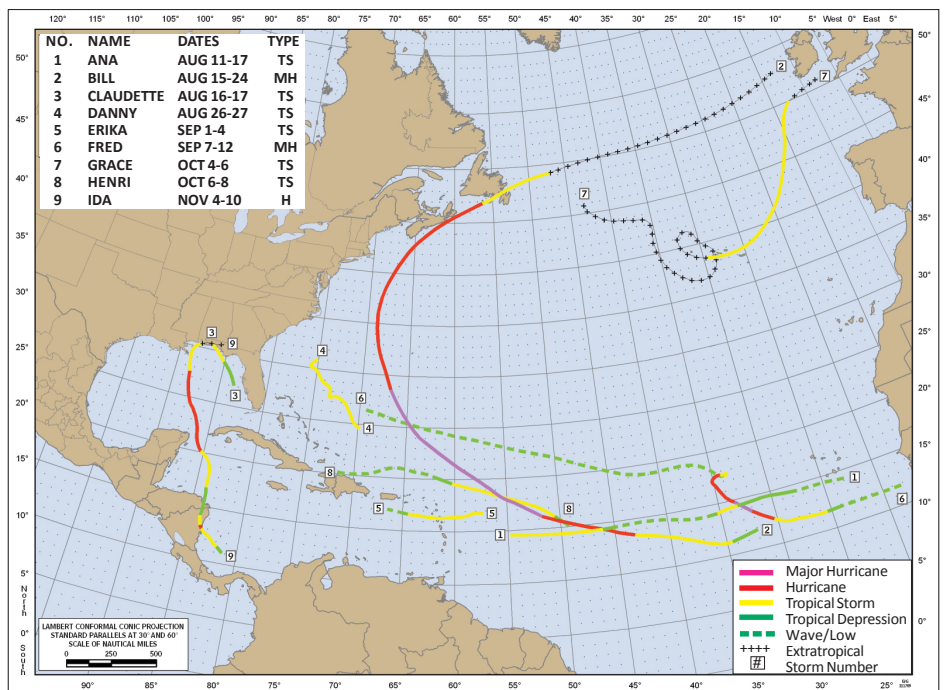
A combination of environmental conditions contributed to curbing storm formation and intensification during the 2009 season. In fact, the season's first named storm, Ana, didn't develop until halfway through the season on August 11th.

The El Niño in the Pacific Ocean caused greater wind shear in the Caribbean and tropical Atlantic Ocean which disrupted many of the storms before they could intensify. Steering currents over the U.S. east coast throughout the summer generated strong westerly winds that kept the majority of storms that did develop away from the U.S. mainland.

For the third consecutive year, no major hurricanes made landfall in the U.S., although two weak tropical storms did come ashore in 2009. Tropical Storm Claudette brought gusty winds and rain to the Florida panhandle in August while Tropical Storm Ida, initially a category 2 hurricane in the Gulf of Mexico, struck Alabama in early November. After making landfall in Alabama, the remnants of Ida spawned a powerful nor'easter that trekked northward up the eastern seaboard, causing widespread power outages and flooding. Torrential rains, blustery winds, and pounding waves impacted coastal communities from Georgia to New England. Other than this event, however, the 2009 Atlantic hurricane season's overall potential for destruction was mercifully curtailed.



GOES satellite image of Bill, the 2009 season's first hurricane and major hurricane, on August 19th. Strong westerly winds deflected Bill away from the U.S. mainland. The tenacious storm made landfall in Newfoundland, Canada on August 24th as a weak tropical system.



Tracks of the named storms that developed during the 2009 Atlantic hurricane season. As illustrated, the U.S. mainland and island nations throughout the Caribbean were largely spared from the devastation and destruction of powerful landfalling storms.

## Congratulations

Molly Baringer, an oceanographer with AOML's Physical Oceanography Division, and Gustavo Goni, Director of the Physical Oceanography Division, successfully completed NOAA's Leadership Competencies Development Program in October 2009. The 18-month program helps to train and prepare federal employees for leadership positions within the agency.

Eric Uhlhorn, a meteorologist with AOML's Hurricane Research Division (HRD), and Peter Black, a retired meteorologist with HRD and currently a consultant with SAIC in Berkeley, California, were among the recipients of the American Meteorological Society's 2010 Special Award. The award recognizes the long-term efforts of a group of 13 individuals, "Team SFMR," who have used stepped frequency microwave radiometer data over the past 30 years to sustain "an exceptional, interdisciplinary project that has resulted in continuous operational monitoring of hurricane surface winds and improved hurricane intensity advisories." The award will be presented at the January 2010 annual meeting of the American Meteorological Society in Atlanta, Georgia.

## Welcome Aboard

Lindsey Visser joined the staff of AOML's Ocean Chemistry Division in November as a CIMAS research associate. She will work with Dr. Jia-Zhong Zhang in the Nutrient Laboratory and participate in upcoming Florida coastal water quality monitoring research cruises in support of the Florida Area Coastal Environment Program. Lindsey recently received her M.Sc. in biological oceanography from Texas A&M University at College Station.



## It's a Boy!

Erik Valdes, a CIMAS research associate with AOML's Physical Oceanography Division, and his wife Jossette are the proud parents of their second child, a son. Ethan Valdes was born in Miami on November 12, 2009 and weighed in at 9 pounds, 2 ounces. Ethan, his Mom, Dad, and big sister are all fine and doing well.



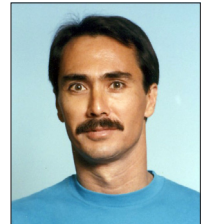
## Farewell

Two of AOML's long-term federal employees, both of whom were classmates at Florida Atlantic University and have worked at AOML their entire careers, retired in December. Congratulations to Paul Dammann and Robert Roddy for their valuable contributions to the Laboratory and their years of loyal, dedicated service.

Paul Dammann, an oceanographer with AOML's Ocean Chemistry Division, retired in December after 32 years of full-time federal employment. Paul began his federal career in 1977 as an electronics technician at AOML but was promoted to the position of oceanographer with the Ocean Acoustics Division in 1979. Over the years, Paul was responsible for developing and coordinating research programs, participating in sampling operations at sea, serving as a chief scientist during research cruises, processing and analyzing data, and presenting and publishing research findings. The acoustic backscatter techniques he helped develop were successfully used in a number of field research programs, particularly the Southeast Florida Outfall Experiments, to detect, measure, and monitor wastewater effluents and dredged materials in the coastal ocean environment.



Robert Roddy, a mechanical engineer with AOML's Physical Oceanography Division (PhOD), retired in December after 34 years of full-time federal employment. During Robert's years at AOML, he traveled extensively in support of PhOD's data-gathering field operations. From coastal ocean research cruises to transoceanic crossings, Robert sailed aboard a variety of NOAA ships and merchant vessels gathering data and ensuring oceanographic instruments remained functioning. Through the years, he participated in research cruises in the Gulf of Mexico, Caribbean Sea, and the Atlantic, Pacific, and Indian oceans. More recently, Robert has focused on high-density XBT cruises for the Ship of Opportunity program, along with Argo profiling float deployment logistics. After retirement, Robert will continue his duties with PhOD through the University of Miami's Cooperative Institute for Marine and Atmospheric Studies.



A delectable assortment of cookies, cakes, and other goodies were served up at AOML's annual holiday dessert contest on December 4th, as staff gathered in the lobby to play music, trim a tree, and decorate for the holidays. Chris Kelble, Sylvie Lorsolo, and Peter Dodge (upper left-hand photo) served as this year's capable dessert judges and had the formidable task of choosing the top three entries. After a thorough taste test, Shirley Murillo (center photo) was chosen as the grand prize winner for her yummy chocolate truffle torte. The festivities were enjoyed by all, and AOML emerged dressed for the holiday season.

## Travel

Pedro DiNezio attended the Fourth Global Synthesis and Observations Panel Meeting in Tokyo, Japan on November 11-13, 2009.

Rik Wanninkhof was an invited keynote speaker at the Surface Ocean Lower Atmosphere Study (SOLAS) Science Conference in Barcelona, Spain on November 16-19, 2009.

Rick Lumpkin attended the Southeast and Caribbean Regional Team (SECART) annual meeting in San Juan, Puerto Rico on November 17-20, 2009.

Robert Castle, Shenfu Dong, Esa Peltola, and Andrew Stefanick are participating in the CLIVAR P6 cruise from Brisbane, Australia to Papeete, Tahiti aboard the R/V *Melville* in support of the Repeat Hydrography Program from November 21 2009-February 2010.

Sim Aberson attended the International Workshop on the Advancement of Typhoon Track Forecast Technique in Tokyo, Japan on November 30-December 2, 2009.

Molly Baringer and Gustavo Goni attended a NASA Salinity Field Program planning meeting in Pasadena, California on December 1-3, 2009.

Lewis Gramer attended the Fifth International Conference on Intelligent Sensors, Sensor Networks, and Information Processing in Melbourne, Australia on December 7-10, 2009. Gramer was also an invited keynote speaker at the "Towards the Development of an Integrated Coral Reef Ecosystem Observing System" sponsored by the Australian Institute of Marine Science on December 10, 2009.

Frank Marks attended the Earth Observing Laboratory Advisory Committee Meeting in Boulder, Colorado on December 7-8, 2009.

Robert Atlas attended the American Geophysical Union's 2009 Fall Meeting in San Francisco, California on December 14-18, 2009.

Claudia Schmid was an invited participant at the U.S. Argo Science and Implementation Panel meeting in Honolulu, Hawaii on December 15-17, 2009.

## Happy Holidays — 2009!



AOML hosted its annual Holiday Party for staff and their families on Friday, December 11th. Friends and co-workers gathered in the lobby to mingle and feast from a banquet table filled with tasty dishes that included freshly cooked turkeys by Paul Dammann and Alejandra Lorenzo. Adding to the festivities was music performed by the Holiday Ensemble under the direction of Jack Stamates. Greg Banes and Judy Gray hosted a raffle drawing with lots of great prizes. Santa Claus also made a special guest cameo appearance, much to the delight of children young and old. Thanks to the Buoys and Gulls group at AOML, led by Madeleine Adler, for their efforts in organizing, coordinating, and staging the happy event.

*Keynotes* is published bi-monthly by the Atlantic Oceanographic and Meteorological Laboratory to promote the research activities and accomplishments of staff members. Contributions are welcome and may be submitted via email (Gail.Derr@noaa.gov), fax (305-361-4449), or mailing address (NOAA/AOML, *Keynotes*, 4301 Rickenbacker Causeway, Miami, FL 33149).

Editors – Robert Atlas/Judith Gray  
Publishing Editor/Writer – Gail Derr

View *Keynotes* online at <http://www.aoml.noaa.gov/keynotes>