

Keynotes

January-February 2009

Atlantic Oceanographic and Meteorological Laboratory

Volume 13, Number 1

2009 Federal Holidays

New Year's Day...

- Thursday, January 1st

Martin Luther King's Birthday...

- Monday, January 19th

Washington's Birthday...

- Monday, February 16th

Memorial Day...

- Monday, May 25th

Independence Day...

- Friday, July 3rd

Labor Day...

- Monday, September 7th

Columbus Day...

- Monday, October 12th

Veterans Day...

- Wednesday, November 11th

Thanksgiving Day...

- Thursday, November 26th

Christmas Day...

- Friday, December 25th

New Year's Day (2010)...

- Friday, January 1st

Buoy to Assess Ocean Acidification Impacts on Reefs

A moored autonomous pCO₂ (MAPCO₂) buoy was successfully deployed in the Cayo Enrique Reef near La Parguera, Puerto Rico this past January to monitor and assess the effects of ocean acidification on coral reefs. The effort involved the collaboration of a team of scientists from several NOAA line offices, including AOML and the Pacific Marine Environmental Laboratory (PMEL), NOAA's Coral Reef Watch Program, and the University of Puerto Rico's Department of Marine Science.

After months of logistical planning, the buoy was anchored to two 1800-pound railroad wheels precisely positioned in 38 feet of water by NOAA divers that included Jules Craynock, Jim Hendee, and LTJG Lecia Salerno of AOML, along with Dwight Gledhill of the National Environmental Satellite, Data, and Information Service and Noah Lawrence-Slavas of PMEL. The buoy was situated in close proximity to an Integrated Coral Observing Network (ICON) station maintained by AOML researchers with NOAA's Coral Health and Monitoring Program (CHAMP). ICON stations are part of a network of environmental monitoring platforms that provide near real-time data and information about coral health and climate conditions at coral reefs.

Ocean acidification poses a growing challenge to coral reefs worldwide. As greater amounts of atmospheric carbon dioxide are absorbed and dissolved in ocean surface waters, less calcium carbonate is available for marine organisms like corals to form the structures in which they live. While research has revealed extensive variability in the sea surface carbonate system of oceanic waters throughout the greater Caribbean region, impacts upon shallow water ecosystems such as reefs are poorly understood. Monitoring carbonate chemistry at reef sites thus holds the promise of advancing understanding of a marine environment in transition and its overall affect upon coral reefs.

Support for the MAPCO₂ project was provided by NOAA's Coral Reef Conservation Program, which seeks to achieve the following objectives:

- Establish a standardized approach and methodology for monitoring, assessing, and modeling the impacts of ocean acidification on coral reef ecosystems.
- Identify critical thresholds, impacts, and water chemistry trends necessary for developing ecological forecasts.

(continued on page 2)



Deployment of a PMEL-engineered pCO₂ buoy at Cayo Enrique Reef near La Parguera in Puerto Rico. Jules Craynock of AOML (in the water) helps to guide the buoy into position, while Milton Carlo of the University of Puerto Rico's Magueyes Laboratory looks on.

AOML at the AMS

AOML researchers participated in the 89th Annual Meeting of the American Meteorological Society (AMS) this past January in Phoenix, Arizona. The event brought together more than 2,500 scientists from across the globe to focus on a wide array of climate and weather-related topics. Here is a brief summary of AOML's contributions to the 89th Annual AMS Meeting:

13th Conference on Integrated Observing and Assimilation Systems for Atmosphere, Oceans, and Land Surface:

- AOML Director Bob Atlas served as the Program Chairperson, as well as organized and chaired the session on Observing System Simulation Experiments. He was also the lead author or co-author on six papers.
- Frank Marks organized and chaired the session on Advanced Methods for Data Assimilation.
- John Proni organized and chaired one of the sessions on Ocean Observations for Data Assimilation and Climate and made an oral presentation.
- Eric Uhlhorn organized and chaired the session on Mesoscale Data Assimilation and Impact Experiments.
- Researchers with AOML's Hurricane Research and Physical Oceanography Divisions were co-authors on several presented papers.

16th Conference on Air-Sea Interaction:

- Ernesto Muñoz organized and chaired one of the sessions on Ocean-Atmosphere Interactions and Influences on Tropical and Extratropical Storms and made an oral presentation.
- Chunzai Wang made two invited presentations.
- Jun Zhang made two oral presentations.

21st Conference on Climate Variability and Change:

- Robert Black made an oral presentation.

25th Conference on International Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology:

- Molly Baringer made an oral presentation on the contributions of the Global Ocean Observing System.

(continued from page 1)

- Characterize the spatial and temporal variability in carbonate chemistry in coral reef environments to better understand the threat posed by ocean acidification.

- Provide data and information necessary to facilitate an early alert system based on ecological forecasting for ocean acidification stress to coral reef ecosystems.

Observations obtained from the MAPCO₂ buoy will aid in meeting these objectives, as well as supplement existing monitoring efforts performed by AOML researchers with the CHAMP program, the University of Miami, and the University of Puerto Rico.

Additional information and photos about the MAPCO₂ deployment in the Cayo Enrique Reef can be found by visiting <http://atlantic-mcb.blogspot.com/>.



The MAPCO₂ team in La Parguera, Puerto Rico (from left to right): Dr. Francisco Pagan (University of Puerto Rico [UPR]), Dr. Rich Appeldorn (UPR), Dr. Dwight Gledhill (NOAA/National Environmental Satellite, Data, and Information Service), Milton Carlo (UPR), Dr. Jim Hendee (AOML), LTJG Lecia Salerno (AOML), Jules Craynock (AOML), and Noah Lawrence-Slavas (NOAA-PMEL).

Dr. Rik Wanninkhof Honored by AGU

Dr. Rik Wanninkhof, an oceanographer with AOML's Ocean Chemistry Division, has been elected a Fellow of the American Geophysical Union (AGU). Fellows are nominated by their AGU peers based on their outstanding contributions to the advancement of the geophysical sciences. The designation is conferred on only 0.1% of all AGU members in any given year and is chosen by a Committee of Fellows.

Wanninkhof was recognized for his contributions to understanding of the ocean carbon cycle with emphasis on improved understanding and quantification of the exchange of carbon dioxide (CO₂) between the surface ocean and atmosphere. This research has become particularly pertinent due to rapidly increasing CO₂ levels in the atmosphere, the leading cause of the greenhouse effect. A significant fraction of the excess CO₂ enters the ocean, offsetting atmospheric increases but leading to concerns about its effect on marine biota, the so-called ocean acidification phenomena. Wanninkhof and other 2009 inductees will be honored at the 2009 Joint Assembly, The Meeting of the Americas, in Toronto in May.



Kevin D. Skow, a meteorology major at the University of North Dakota, is the first recipient of the Dr. K. Vic Ooyama Scholarship. The scholarship was founded by Yoko Ooyama (Dr. Ooyama's widow) and the Ooyama family following the death of Dr. Ooyama in December 2006. The presentation was made during the American Meteorological Society's 89th annual meeting held in Phoenix, Arizona on January 11-15, 2009.

Dr. Ooyama joined AOML's Hurricane Research Division in 1980 as a senior research meteorologist. During his years with HRD, his pioneering studies advanced the application of numerical methods to three-dimensional modeling of tropical cyclones. He published three landmark papers on numerical modeling, all of which earned NOAA distinguished authorship awards and inspired a younger generation of tropical cyclone modelers. Dr. Ooyama retired from federal service in 2003 after a science career that spanned more than five decades. Pictured above from left to right are Clara Ooyama (Dr. Ooyama's daughter), Kevin Skow, and Yoko Ooyama.



Photo by Dr. Frank Marks

Recent AOML Publications

ABERSON, S.D., 2008: An alternative tropical cyclone intensity forecast verification technique. *Weather and Forecasting*, 23(6):1304-1310.

Lirman, D., and **D.P. MANZELLO**, 2009: Patterns of resistance and resilience of the stress-tolerant coral *Siderastrea radians* (Pallas) to sub-optimal salinity and sediment burial. *Journal of Experimental Marine Biology and Ecology*, 369(1):72-77.

MANZELLO, D.P., M. Warner, E. Stabenau, **J. HENDEE**, M. Lesser, and **M. JANKULAK**, 2009: Remote monitoring of chlorophyll fluorescence in two reef corals during the 2005 bleaching event at Lee Stocking Island, Bahamas. *Coral Reefs*, 28(1): 209-214.

MEINEN, C.S., 2008: Accuracy in mooring motion temperature corrections. *Journal of Atmospheric and Oceanic Technology*, 25(12):2293-2303.

MEINEN, C.S., D.S. Luther, and **M.O. BARINGER**, 2009: Structure, transport, and potential vorticity of the Gulf Stream at 68°W: Revisiting older data sets with new techniques. *Deep-Sea Research, Part I*, 56(1):41-60.

ROGERS, R.F., and **E.W. UHLHORN**, 2008: Observations of the structure and evolution of surface and flight-level wind asymmetries in Hurricane Rita (2005). *Geophysical Research Letters*, 35(21):L22811, doi:10.1029/2008GL034774.

Sallee, J.-B., K. Speer, R. Murrow, and **R. LUMPKIN**, 2008: An estimate of Lagrangian eddy statistics and diffusion in the mixed layer of the Southern Ocean. *Journal of Marine Research*, 66(4): 441-463.

SELLWOOD, K.J., S. Majumdar, I. Szunyogh, and B. Mapes, 2008: Predicting the influence of observations on medium-range forecasts of atmospheric flow. *Quarterly Journal of the Royal Meteorological Society*, 134(637):2011-2027.

Thomas, H., A.E.F. Prowe, I.D. Lima, S.C. Doney, **R. WANNINKHOF**, R.J. Greatbatch, U. Schuster, and A. Corbiere, 2008: Changes in the North Atlantic Oscillation influence CO₂ uptake in the North Atlantic over the past two decades. *Global Biogeochemical Cycles*, 22(4):GB4027, doi:10.1029/2007GB003167.

WANNINKHOF, R., W.E. Asher, D.T. Ho, C.S. Sweeney, and W.R. McGillis, 2009: Advances in quantifying air-sea gas exchange and environmental forcing. *Annual Reviews in Marine Science*, 1:213-244.

*Names of AOML authors are in blue capital letters.

AOML's Data Acquisition Activities Continue in the Atlantic

Researchers with the AOML/Physical Oceanography Division (PhOD) Ship of Opportunity Program (SOOP) successfully completed four high density AX10 XBT cruises during 2008, deploying almost 450 expendable bathythermograph (XBT) probes. This XBT transect runs from Newark, New Jersey, to San Juan, Puerto Rico and collects information about the thermal structure in the North Atlantic Ocean, of great importance in the study and monitoring of the Gulf Stream. During the October and December 2008 transects, Pedro DiNezio and Francis Bringas of PhOD tested a new system for real-time data transmission based on the Iridium satellite network. AOML's SOOP researchers are exploring a transition to Iridium from the Inmarsat transmission system currently in use, which could potentially translate into large savings for NOAA. The Iridium software was developed by Janet Roseli and Paul Chinn, and the hardware by Pedro Peña and Andrew Stefanick, all of AOML/PhOD.

In December 2008, Bringas tested a new XBT auto-launcher and a new version of the SEAS (Shipboard Environmental [data] Acquisition System) program designed to operate with different types of XBTs, with the goal of conducting additional tests during the upcoming 2009 transects. The new auto-launcher allows for the deployment of XBT probes capable of collecting temperature profiles to a depth of 1800 meters, and will ultimately be used in the zonal transects across the North and South Atlantic Ocean. This new auto-launcher was designed by Ulises Rivero and David Bitterman of PhOD.

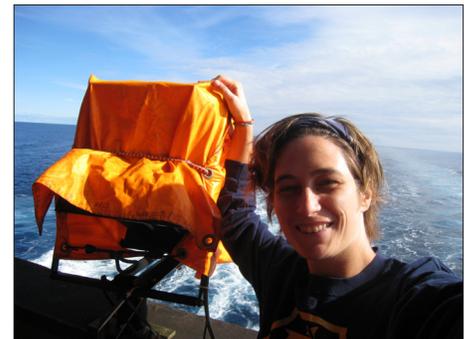
Sommyr Pochan of PhOD recently completed the AX07 transect from Barcelona, Spain, to Fort Lauderdale, Florida, deploying 195 XBTs, three sea surface drifters, and four Argo floats during her 15-day voyage aboard Hapag-Lloyd's *Veracruz Express*. The *Veracruz Express* is a long-standing SOOP partner that has welcomed high-density riders for trans-Atlantic observations since 2005. This was the 53rd realization of the AX07 transect. Sommyr is the first AOML female to perform a solo high density XBT Atlantic crossing and joins the ranks of solo female riders already performing high density transects in other ocean basins.

XBT data obtained during these cruises and other SOOP projects are transmitted in real-time and received by AOML staff in Silver Spring, Maryland, then transmitted to AOML to be quality controlled and disseminated through the Global Telecommunication System in Silver Spring. More than 3000 XBTs were deployed in the Atlantic during 2008, together with 30 drifters and 12 profiling floats.

SOOP is supported by both the World Meteorological Organization and the Intergovernmental Oceanographic Commission. NOAA/AOML is its main contributor and plays a role in the acquisition, deployment, and data transmission of 90% of the approximate 25,000 XBTs deployed annually to obtain temperature profiles from the sea surface down to various depths starting at 800 m. Additional information about SOOP can be found at www.aoml.noaa.gov/phod/goos/.



Francis Bringas with an Iridium antenna and modem package built by staff at AOML in support of improved data acquisition.



Sommyr Pochan with the high density auto-launcher aboard the *Veracruz Express* during the most recent AX07 transect from Barcelona, Spain to Fort Lauderdale, Florida.



NOAA's FY-2009 Information Technology Security Awareness Course must be completed by all Federal, joint institute, and contract employees by March 31st. Visitors on site for more than 30 days are also required to complete the course, which can be accessed at <http://noaa.learnsecuritywith.us>.

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 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 OR walk-ins)

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

A current NOAA identification badge (cannot be expired) must be presented to obtain a Common Access Card, plus two additional forms of personal identification:

- The first form of identification must be a Florida state-issued document (e.g., Florida driver's license).
- The second form of identification can be a social security card, passport, birth certificate, or voter registration.

For purposes of time and attendance, travel involved in obtaining a Common Access Card is considered work time. Please inform Angie Arias of AOML's Administrative Group (305-361-4442) when you have obtained a Common Access Card so your name can be added to AOML's weekly compliance reports.

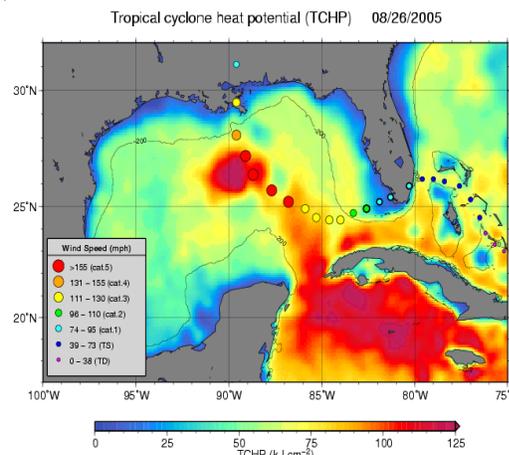
Heat Content Map Featured in New Ocean Atlas

A new book published by the National Geographic Society entitled *Ocean: An Illustrated Atlas* features an oceanic heat content map created by scientists with AOML's Physical Oceanography Division (PhOD). The 352-page volume by authors Sylvia A. Earle and Linda K. Glover provides a broad overview of the latest marine research studies and findings written in an easy-to-read format. Numerous high-resolution photographs, maps, satellite images, and diagrams accompany the text.

The map, which appears in the chapter focused on the Atlantic Ocean, highlights the critical role of the upper ocean thermal structure in tropical cyclone intensification. It depicts the tropical cyclone heat potential field that existed over the Gulf of Mexico during the passage of Hurricane Katrina in late August 2005.

The tropical cyclone heat potential field represents the oceanic heat content present at the sea surface to a depth of 26°C. Current research indicates that the warm oceanic waters beneath a tropical cyclone's track may be linked to rapid intensification, provided that the right atmospheric conditions are also present.

PhOD researchers Gustavo Goni, Joaquin Triñanes, and Pedro DiNezio developed the maps of tropical cyclone heat potential at AOML and compute them in real-time using satellite observations. The maps are updated daily and appear online at www.aoml.noaa.gov/phod/cyclone.



Gulf of Mexico heat content map created by AOML scientists that's featured in the new National Geographic Society book entitled *Ocean: An Illustrated Atlas*.

Dr. Joe Prospero, Director of the University of Miami's Cooperative Institute for Marine and Atmospheric Studies (CIMAS), was honored by a gathering of his friends and colleagues on January 9th as he officially retired from an illustrious science career spanning more than four decades. Prospero's pioneering research on the trans-Atlantic transport of mineral-laden dust from the Saharan desert is widely recognized as having laid the foundation for much of the current research related to its impacts upon climate, weather, and marine atmospheric chemistry.



AOML Director Bob Atlas acknowledged Prospero's many research accomplishments and how they've contributed to fulfilling NOAA's mission. Approximately 38% of AOML's research staff are employees of CIMAS, which serves as one of NOAA's joint and cooperative institutes. CIMAS enables AOML and university scientists to collaborate on research areas of mutual interest and facilitates the participation of graduate students and visiting scientists.

Although retired, Prospero will continue conducting research part-time through his affiliation with the University of Miami's Rosenstiel School as a Professor Emeritus. Pictured above from left to right are Drs. Bonnie Ponwith, Director of NOAA's Southeast Fisheries Science Center, Joe Prospero, and Bob Atlas.

Welcome Aboard

Cameron Lambert joined the staff of AOML's Facilities Management Group in December to assist the Facility Manager with tasks associated with maintaining, repairing, and improving the AOML facility and grounds.

Farewell

Dr. Alexandre Fierro, a National Research Council post-doctoral research associate with AOML's Hurricane Research Division, departed in January to begin another post-doctoral position at the Los Alamos National Laboratory in Los Alamos, New Mexico. He will, however, continue collaborating with Dr. Robert Rogers in the use of numerical models to evaluate the convective activity in tropical cyclones.

Janette Perez, a budget analyst with the Office of the Director's Administrative Group, resigned in January to accept a position with NOAA's National Hurricane Center in Miami as their new Administrative Officer. During her 11 years at AOML, Perez assisted with procurement and requisition items, bankcard reconciliation, and served as a personnel liaison for AOML.

Congratulations

LCDR Nancy Ash, AOML's Associate Director, is the recipient of a 2008 NOAA Bronze Medal awarded in recognition of her leadership, initiative, and dedication in creating and implementing high-quality aviation safety training across NOAA and subsequently avoiding costs of approximately \$1.25M.

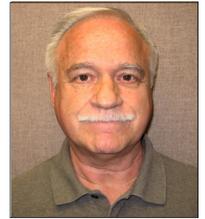
David Enfield, an oceanographer with AOML's Physical Oceanography Division, is the recipient of a 2008 NOAA Distinguished Career Award in recognition of his consistent excellence in seminal research on ocean-atmosphere climate variability with an emphasis on the tropical Atlantic Ocean.

Eric Uhlhorn, a meteorologist with AOML's Hurricane Research Division, along with Peter Black (retired meteorologist with AOML's Hurricane Research Division) are the recipients of a 2008 NOAA Bronze Medal awarded in recognition of the operational transition of Stepped Frequency Microwave Radiometer data which provide accurate, extensive measurements of hurricane surface winds in real time to forecasters at the National Hurricane Center.

Long-Time AOML Federal Employees Retire

After many years of dedicated service to the Laboratory, five of AOML's long-time Federal employees retired in December 2008. Congratulations to David Enfield, John Festa, John Proni, Reyna Sabina, and Carlisle Thacker on the successful completion of their Federal careers.

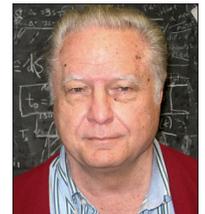
Dr. David Enfield retired after 23 years of Federal Service as a research oceanographer with AOML's Physical Oceanography Division (PhOD) where he investigated the El Niño-Southern Oscillation phenomenon, the Atlantic Ocean's variability, and their interactions with western hemisphere climate fluctuations. Enfield will continue his studies with PhOD through the University of Miami's Cooperative Institute for Marine and Atmospheric Studies.



John Festa retired after 37 years of Federal service with AOML's Physical Oceanography Division (PhOD). He joined PhOD in 1971 as a research oceanographer. Festa became PhOD's Deputy Director in 1980 and has since played an invaluable role overseeing budget activities for both PhOD and the Hurricane Research Division. He will continue his duties at AOML through the University of Miami's Cooperative Institute for Marine and Atmospheric Studies.



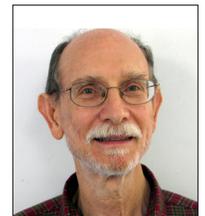
Dr. John Proni joined AOML in 1972 as an oceanographer with the Ocean Acoustics Division. During his 36 years at AOML, he investigated the effects of wastewater effluents and discharged dredged materials on the coastal ocean environment, as well as served as the Division Director for both the Ocean Acoustics and Ocean Chemistry Divisions. Proni has joined the staff of Florida International University's Applied Research Center as their new Executive Director.



Reyna Sabina retired after 32 years of Federal service as a computer specialist with AOML's Physical Oceanography Division (PhOD). She joined AOML in 1976 as a scientific computer programmer with the Sea-Air Interaction Division but transferred to PhOD in 1985 to oversee the Division's data management functions. Sabina will continue her duties with PhOD through the University of Miami's Cooperative Institute for Marine and Atmospheric Studies.



Dr. Carlisle Thacker retired after 34 years of Federal service as a research oceanographer with AOML's Physical Oceanography Division (PhOD). During his years at AOML, he conducted research on numerical modeling and data assimilation, as well as statistical analysis of data and statistical forecasting. Thacker will continue his studies with PhOD through the University of Miami's Cooperative Institute for Marine and Atmospheric Studies.



Paul Dammann, an oceanographer with AOML's Ocean Chemistry Division, has come forward as being the mystery chef responsible for preparing and cooking all of the delicious turkeys that have appeared on the table at AOML's annual holiday party for the past few years. Paul's culinary skills have been honed by nine years of roasting turkeys for his church group that have helped provide thousands of free Thanksgiving dinners to the needy.



Travel

Mark Powell attended a Digital Hurricane Conference in Baton Rouge, Louisiana on January 5-6, 2009.

Robert Atlas, Molly Baringer, Robert Black, Frank Marks, Ernesto Muñoz, John Proni, Eric Uhlhorn, Chunzai Wang, and Jun Zhang attended the 89th annual meeting of the American Meteorological Society in Phoenix, Arizona on January 11-15, 2009.

Jules Craynock, James Hendee, and Lecia Salerno installed a MAP/CO₂ buoy near the Integrated Coral Observing Network station in La Parguera, Puerto Rico on January 12-16, 2009.

Judith Gray was a panelist for the review of the National Ocean Service's Center for Coastal Fisheries and Habitat Research in Beaufort, North Carolina on January 14-15, 2009.

Molly Baringer attended the CLIVAR-sponsored Western Boundary Current Workshop in Phoenix, Arizona on January 15-17, 2009.

Robert Atlas attended an OAR Senior Research Council meeting and the NOAA Senior Executive Service (SES) Summit in Lansdowne, Virginia on January 26-30. He also attended a NOAA environmental modeling strategic planning meeting in Silver Spring, Maryland on February 23-24, 2009.

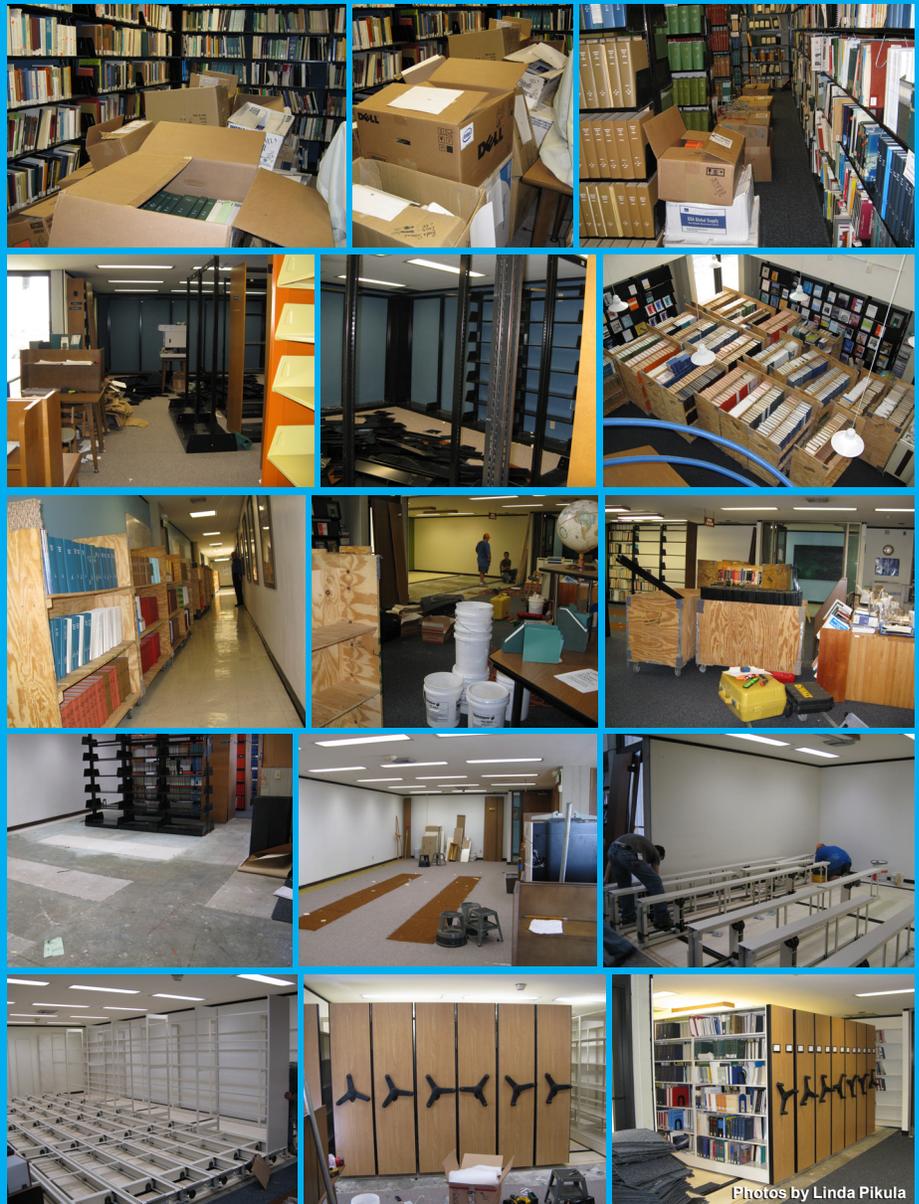
Rik Wanninkhof participated in a NOAA Carbon Program coordination meeting in Boulder, Colorado on February 1-4, 2009.

Rick Lumpkin and Chunzai Wang attended a Prediction and Research Moored Array in the Atlantic (PIRATA) meeting in Toulouse, France on February 2-6, 2009.

Kelly Goodwin attended a U.S. Environmental Protection Agency Gulf of Mexico Alliance principle investigators meeting in Tampa, Florida on February 11-13, 2009.

Shailer Cummings collaborated with colleagues at the University of South Alabama on a joint project in Mobile, Alabama on February 25-28, 2009.

NOAA MIAMI REGIONAL LIBRARY UNDERGOES RENOVATION



The NOAA Miami regional library at AOML was renovated in January to upgrade its shelving capacity. Before the new shelving could be installed, however, more than 21,000 books, 11,600 bound journals, 2,500 technical reports, and 110 CDs and databases had to be removed. To maximize floor space, the existing shelving was replaced with compact or movable-aisle shelving. The compact shelving rides on movable carriages over rails installed in the floor. As a result of the new shelving, the library's storage capacity has more than doubled, increasing from 2500 linear feet to more than 5100 linear feet.

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).

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