

# Keynotes

July-August 2008

Atlantic Oceanographic and Meteorological Laboratory

Volume 12, Number 4

## Hurricane Research Budget Request Quadrupled for 2009

The White House boosted funding for hurricane research and forecast improvements in August by \$13 million to accelerate NOAA scientists' ability to more accurately forecast tropical storms, hurricane intensity, the tracks of these dangerous storms, and their related storm surges.

The \$13 million increase to NOAA's Hurricane Forecast Improvement Project (HFIP), led by Dr. Frank Marks, Director of AOML's Hurricane Research Division, is added to the original \$4 million request for a total of \$17 million for fiscal year 2009. The HFIP is a 10-year effort begun in 2005 to accelerate improvements to hurricane track and intensity forecasts in the one to five-day time range and to extend the lead time of hurricane prediction with increased certainty.

NOAA will use the funding in four major areas to: increase hurricane observations; improve forecast models through research, development, and engineering; increase computing power; and enhance collaboration with hurricane scientists in the private sector, government, and universities to advance research and operations. Specific goals of the HFIP include:

- 20% improvement in track forecast accuracy for days 1-5 by 2013.
- 20% improvement in intensity forecast accuracy for days 1-5 by 2013.
- Extend the lead time for hurricane forecasts out to day 7.

## Likelihood Increased for Above-Average Hurricane Season

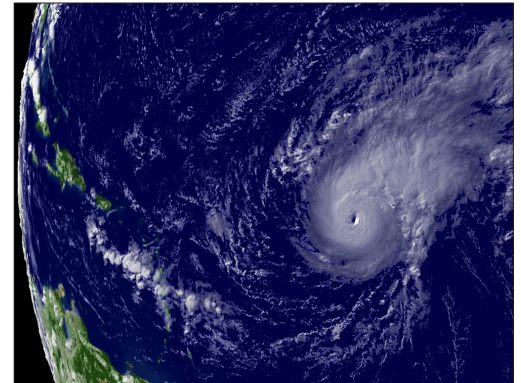
NOAA's team of seasonal hurricane forecasters revised their outlook for the Atlantic hurricane season on August 7th, increasing the likelihood from 65% to 85% that 2008 would be a year marked by above-normal levels of storm activity. Forecasters now predict that the 2008 season, which runs from June 1st through November 30th, will produce a total of 14-18 named storms, up from the 12-16 named storms predicted in their pre-season outlook released in late May.

Seven to 10 named storms are expected to strengthen into hurricanes, while three to six hurricanes are expected to intensify into major hurricanes with winds above 110 mph (category 3 and stronger on the Saffir-Simpson scale). During an average hurricane season, 11 named storms usually form, with six storms strengthening into hurricanes and only two becoming major hurricanes.

NOAA cautions that the outlook provides the public with only a general guide to the overall storm activity expected during hurricane season. It is not a seasonal hurricane landfall forecast, and it does not imply levels of activity for any particular region. Therefore, residents, businesses, and government agencies in coastal and near-coastal regions should prepare for every hurricane season regardless of the seasonal outlook by remaining vigilant and having hurricane preparedness plans in place to protect both life and property.

Environmental factors driving the updated forecast include several atmospheric and oceanic conditions that favor enhanced storm formation: the ongoing active phase of the multi-decadal signal, weaker trade winds, reduced wind shear, warmer than average sea surface temperatures in the tropical Atlantic Ocean, and the lingering impact of La Niña on atmospheric circulation patterns. An additional factor indicative of an above-normal season is the amount of storm activity observed between the June 1st start of hurricane season and the August 7th release of the update. Five named storms developed, including Bertha, both the season's first hurricane and major hurricane. Before fizzling out in the North Atlantic, Bertha earned the distinction of becoming the longest-lasting tropical cyclone on record for the month of July (17 days).

Since the outlook was released, three more storms have developed: Fay, Gustav, and Hanna. Tropical Storm Fay, the season's sixth named storm, is also destined for the record books. The tenacious system will be remembered for its *(continued on page 2)*



GOES-12 satellite image of Hurricane Bertha churning in the Atlantic on July 7th as the storm rapidly intensified into a major hurricane with top winds estimated at 120 mph.

## Know the Plan!

AOML's Hurricane Preparedness and Recovery Plan outlines a course of action to secure the AOML grounds and facility for severe weather. Should a tropical storm or hurricane threaten south Florida, the Plan is implemented. The Plan requires the cooperation and support of all staff and can be viewed online at [nuwave/intrapdf/hurrprep2008.pdf](http://nuwave/intrapdf/hurrprep2008.pdf).

The following Coordination Team members are tasked with leading the effort to carry out the Plan during both preparatory and recovery phases for their respective Division or group. Staff are tasked with assisting team members in fulfilling their duties, as well as preparing and securing their individual offices and work areas.

### Computer Networks and Services

- Robert Kohler
- Thomas Heeb

### Hurricane Research Division

- Neal Dorst
- Shirley Murillo
- Joseph Griffin (alternate)

### Ocean Chemistry Division

- Thomas Carsey
- Jules Craynock
- Michael Shoemaker
- Joseph Bishop (alternate)

### Office of the Director

- Nancy Ash
- Gregory Banes
- Judith Gray
- Manuel Fraga (alternate)

### Physical Oceanography Division

- Robert Roddy
- Pedro Pena
- Ulises Rivero (alternate)

## TROPICAL WEATHER DISCUSSIONS

FIRST FLOOR  
CONFERENCE ROOM  
WEEKDAYS - 12:30 P.M.

(continued from page 1)

unprecedented four landfalls and historic flooding in the state of Florida. After thrashing Hispaniola and Cuba with torrential rains, Fay came ashore in Key West, Florida during the afternoon of August 18th. A second landfall occurred the following morning along the southwest Florida coast near Naples with 60 mph winds. Communities throughout central Florida were pelted with heavy rain and gusty winds that reached 65 mph as Fay cut across the state.

Fay stalled out near Cape Canaveral and then re-entered the balmy waters of the Atlantic briefly before slowly drifting ashore once again at Flagler Beach for its third Florida landfall on August 21st. Much of Brevard and St. Lucie counties were inundated, with some communities receiving as much as 30 inches of rain. The system continued to soak communities as it lumbered westward and made its fourth landfall near the Florida panhandle town of Carrabelle on August 23rd.

Gustav and Hanna continue to be monitored by the National Hurricane Center for possible future impacts.

The 2008 seasonal outlook team consists of scientists with NOAA's Climate Prediction Center, National Hurricane Center, and Hurricane Research Division (HRD) of AOML. Stanley Goldenberg, a meteorologist with HRD, has been a part of the seasonal outlook team since its inception in 1998.



GOES-12 satellite image of Tropical Storm Fay on August 22nd. The storm criss-crossed Florida, making four landfalls and dumping as much as 30 inches of rain on some communities.

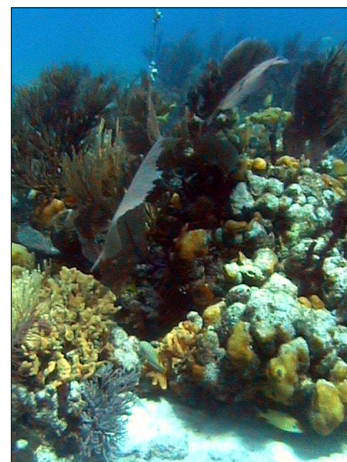
## AOML Contributes to International Coral Reef Symposium

AOML researchers representing the Florida Area Coastal Environment (FACE) and Integrated Coral Observing Network (ICON) programs attended and contributed to the 11th International Coral Reef Symposium held on July 7-11. The week-long event in Ft. Lauderdale, Florida attracted more than 3,000 coral reef scientists and marked the first time in 32 years that the quadrennial meeting has taken place in the United States.

Reefs worldwide are increasingly challenged by environmental factors and, in many areas, are in decline. Attendees from 150 countries shared the latest research and information on an array of topics including ocean acidification, climate change, coral ecosystem adaptation, sanctuary management, reef resilience, ecosystem monitoring, biogeochemical cycles, and reef connectivity.

Lewis Gramer, Michael Jankulak, Jules Craynock, Michael Shoemaker, Thomas Carsey, James Hendee, and Derek Manzello, all with AOML's Ocean Chemistry Division, along with Linda Pikula of NOAA's Regional Library located at AOML, presented papers and posters. Additionally, James Hendee and Derek Manzello jointly chaired a mini-symposium—*Ecosystem Assessment and Monitoring of Coral Reefs: New Technologies and Approaches*—which provided a forum for over 50 oral presentations and posters. Pamela Fletcher represented both AOML and the Florida Sea Grant program by hosting a meeting of the Coral Reef Environmental Observatory Network.

“Reef Rally,” a two-night Reef Fest concert benefiting coral reefs, featured local bands including AOML's very own Jack Stamates with his group *Celtic Mayhem*. The success of the concert lead to possible new Reef Fest events in Denmark, Belize, St. Croix, Texas, and the Florida Keys. Information about Reef Fest can be found at [www.reeffest.org](http://www.reeffest.org). Additional information about the 11th International Coral Reef Symposium can be found at [www.nova.edu/ncri/11icrs](http://www.nova.edu/ncri/11icrs).



## Glass and Plastic added to AOML's Recycling Efforts

AOML has expanded its recycling program to include glass and plastic. A large green bin is now positioned on the first floor near the T-shirt showcase to serve as a receptacle for glass and plastic containers. Bins are also located on floors 2 through 5 near the main elevator for glass and plastic. Staff are strongly encouraged to use the bins and should observe the following guidelines:



- All items deposited in the bins must be clean and free of food particles. Metal/plastic caps and rings must be removed from bottle necks.
- Deposit only plastic types 1, 2, and 3 in the bins (look for the number type within a triangular recycling symbol).
- Deposit only clear, brown, and green-colored glass in the bins.

An AOML Recycling Committee led by Madeleine Adler has been formed to ensure the contents from the bins on floors 2-5 are transferred into the bin on the first floor.

In addition to glass and plastic, AOML also recycles the following items:

- Paper and cardboard: Bins for paper and cardboard are located next to all public-domain printers. Staff are also encouraged to use recycle bins in their offices for paper and cardboard.
- Aluminum: Bins for aluminum cans are located on the first and fourth floors.
- Styrofoam: A bin for styrofoam packing material is located near the loading dock on the first floor. Please deposit styrofoam "peanuts" from incoming packages into this bin rather than trash receptacles. Staff are welcome to use the styrofoam peanuts for outgoing packages.
- Batteries: Plastic barrels are located in the basement for used dry cell household batteries, lithium batteries, and small wet cell batteries.

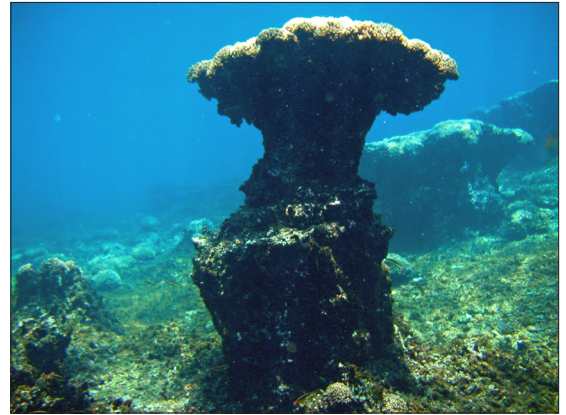
## High-CO<sub>2</sub> Ocean May Cause Reefs to Become "Unglued"

Cements that bind individual coral skeletons and larger coral reef structures are predominantly absent in waters with naturally high levels of carbon dioxide (CO<sub>2</sub>), making these reefs highly susceptible to physical erosion, say scientists with AOML's Ocean Chemistry Division and other institutions.

A study, released in the July 29th issue of the *Proceedings of the National Academy of Sciences*, found that the coral reefs of the eastern tropical Pacific provide a real-world example of the challenges all coral reefs will face under high-CO<sub>2</sub> conditions resulting in ocean acidification.

Manzello, D.P., J.A. Kleypas, D.A. Budd, C.M. Eakin, P.W. Glynn, and C. Langdon, 2008: Poorly cemented coral reefs of the eastern tropical Pacific: Possible insights into reef development in a high-CO<sub>2</sub> world. *Proceedings of the National Academy of Sciences*, 105(30):10,450-10,455.

This is the first attempt to characterize the impacts of ocean acidification on coral reef ecosystems by examining naturally-occurring, high-CO<sub>2</sub> reef environments. Lead author Derek Manzello, a coral reef ecologist



Heavily bioeroded reef framework structure from the eastern Pacific. Image taken by Dr. T.B. Smith (University of Virgin Islands) at Secas Island Reef, Gulf of Chiriqui, Pacific Panama.

at AOML, and his colleagues analyzed the abundance of cements within reef framework structures from the eastern tropical Pacific, which is an entire region exposed to naturally higher levels of carbon dioxide, and compared them to reefs from the Bahamas, an ecosystem exposed to comparatively lower levels of carbon dioxide.

The impact of ocean acidification seems to be a drastic reduction in the production of the cements that allow coral reefs to grow into large, structurally-strong formations that can withstand high wave action. "Reefs are constantly degraded by mechanical, biological, and chemical erosion," said Manzello. "This study indicates that poorly cemented reefs that develop in an acidic ocean will be much less likely to withstand this persistent erosion. These results imply that coral reefs of the future may be eroded faster than they can grow."

Ocean acidification occurs as much of the new carbon dioxide being placed into the atmosphere is dissolved into the ocean's surface waters. This increase in the amount of carbon dioxide in ocean waters leads to a decrease in the amount of carbonate available to organisms like corals that make calcium carbonate to build the stony structure they inhabit. Calcium carbonate is also the basis of the cement that binds one coral to another and to sand that fills the spaces between them.

Co-authors of the paper include Joan Kleypas of the National Center for Atmospheric Research; David Budd of the University of Colorado; C. Mark Eakin of NOAA's Coral Reef Watch program; and Peter Glynn and Christopher Langdon of the University of Miami's Rosenstiel School.

*Adapted from a July 28th online article appearing on the NOAA web site.*



As part of a cooperative effort with the University of South Alabama, researchers with AOML's Ocean Chemistry Division installed three acoustic wave and current measurement instruments southeast of Mobile, Alabama in June. The instruments were mounted on the ocean floor in water depths ranging from between 22-29 meters at several mile ranges from the entrance to Mobile Bay. Data gathered from the instruments will be used to study surface waves, storm surge, and current effects from landfalling hurricanes and other storm systems. Tropical Storm Fay passed over the array in August while making its fourth Florida landfall. The instruments and data will be recovered in November 2008.

PhOD's Ship of Opportunity Program (SOOP) completed three high density expendable bathythermograph (XBT) cruises aboard Atlantic container vessels in July. SOOP is a global network of commercial and research ships that aid NOAA in obtaining observations of the ocean's thermal structure, primarily through the deployment of XBTs and also through deployment of surface drifting buoys and Argo profiling floats.



Kyle Seaton of PhOD on the stern of the *Horizon Navigator*, next to a mounted XBT auto-launcher.

XBTs are typically released every 1 to 1½ hours, necessitating a ship rider who is provided with a cabin and meals during voyages. Grant Rawson (of PhOD) was aboard the *Rome Express* from Gibraltar to Fort Lauderdale on July 4-14; Gus McKay (University of Miami CIMAS contractor in Durban, South Africa) sailed on the *Safmarine Ngami* from Cape Town, South Africa to Philadelphia on July 4-19; and Sommyr Pochan and Kyle Seaton (both with PhOD) were aboard the *Horizon Navigator* from Newark to San Juan, Puerto Rico on July 4-8.

The SOOP rider program measures the upper ocean thermal structure in key regions of the Atlantic Ocean. XBT data is obtained on a quarterly basis from five sections in the Atlantic from the surface to about 850 m depth. Data gathered enables researchers to monitor and study the ocean's overturning circulation which redistributes heat and other water properties globally.

AOML principal investigators for the program include Drs. Molly Baringer, Gustavo Goni, and Silvia Garzoli. The program is also supported by more than 20 PhOD and CIMAS personnel.

## New Systems Tested to Monitor Crucial Current

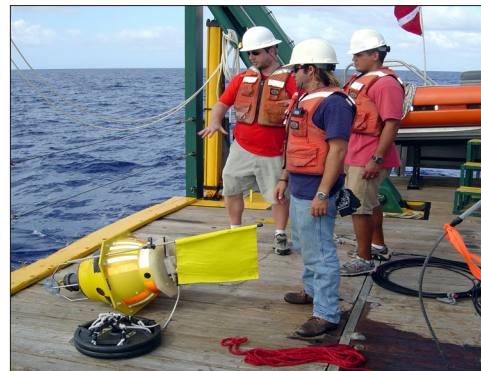
Members of AOML's Physical Oceanography Division (PhOD) recently deployed two tide gauges and three inverted echo sounders in a test of new systems for observing the transport of the Florida Current, a crucial ocean current that has been continuously monitored using voltage measurements from subsurface telephone cables since 1982. PhOD researchers, along with colleagues with NOAA's Southeast Fisheries Science Center and the University of Miami's Rosenstiel School, deployed the instruments during a cruise aboard the R/V *Walton Smith* on July 7-9.

The cable presently being used, which is out of service and is not owned or managed by NOAA, is expected to eventually break or corrode. Different technologies are, therefore, being tested to replace the cable before a loss of data occurs due to its failure.

NOAA has been monitoring the transport of the Gulf Stream, which is known as the Florida Current as it passes between south Florida and the Bahamas, for more than 25 years. The Florida Current/Gulf Stream represents both the western boundary current for the North Atlantic subtropical wind-driven gyre, as well as the primary return pathway for the warm upper limb of the Meridional Overturning Circulation (MOC).

The thermohaline flow of the MOC consists of a slow circulation that redistributes the waters of the world ocean based on sinking at the high latitudes and upwelling elsewhere. Numerical climate models suggest that variations in the MOC flow have strong impacts on global climate including air temperature and precipitation over large portions of the northern hemisphere. Continuous monitoring of changes in the Florida Current is critical if the scales of variability in the MOC are to be quantified.

The five test instruments will be recovered and redeployed during the summer of 2009. Data gathered from them will assist researchers in determining the type of moored observing system required to reproduce the measurements currently being obtained from the cable.



Chris Meinen, Andy Stefanick, and Pedro Pena (left to right) of PhOD prepare to deploy an inverted echo sounder (IES) from the fantail of the R/V *Walton Smith*. Photo courtesy of Nelson Melo (PhOD).



A diver deploys a tide gauge in the Straits of Florida. Photo courtesy of Nelson Melo (PhOD).



AOML scientists met recently with representatives from the International SeaKeepers Society to discuss opportunities for collaboration. The SeaKeepers program installs self-contained data sampling packages on private yachts and other vessels which provide near real-time meteorological and oceanographic data that are transmitted via satellite to the Global Telecommunication System (GTS). AOML offered assistance in tracking and evaluating SeaKeepers' oceanographic data, which is primarily obtained in the coastal oceans. Specifically, AOML will provide SeaKeepers with maps that denote which of their observations are reaching the GTS. A follow-on meeting was attended by Drs. Richard Spinrad (Assistant Administrator of NOAA's Office of Oceanic and Atmospheric Research [OAR]), Michael Johnson (NOAA's Climate Program Office) and Gustavo Goni (AOML) to explore a closer working relationship between SeaKeepers and NOAA. Dr. Alexander MacDonald and Craig McLean, both with OAR, as well as John Englander (CEO) and Geoff Morrison (technical director) of SeaKeepers, also attended the meeting.

## High Resolution Hurricane Predictability Research Begins

AOML's hurricane researchers, along with partners from NOAA, Texas A&M, Penn State University, and the Naval Postgraduate School, have begun an effort to use an ensemble modeling approach to address the ability to predict the processes responsible for rapid hurricane intensity changes. Ensemble research involves running many versions of the same model with each version or "run" starting with slightly different initial conditions or discrete changes in the model itself. The point at which the different ensembles display drastically different results indicates the extent to which researchers are able to reliably predict that phenomena.

The NCAR (National Center for Atmospheric Research) version of the Advanced Regional Weather Research and Forecasting model (or ARW) will be used to test the predictability hypothesis on the Texas Advanced Computing Center's Ranger Linux computer cluster. The project is supported by both NOAA and the National Science Foundation.

The test will entail high horizontal resolution (~1 km) over a large (up to 1000 x 1000 km) moving inner domain embedded in a coarser resolution outer domain run for up to five days with 30-50 ensemble members. At least one of the runs will use idealized initial hurricane conditions. The other runs will use real data initial conditions obtained from AOML's numerous hurricane flights taken from the 60 cases selected for the Hurricane Forecast Improvement Project high resolution model test. This real data will include Doppler radar data and will utilize a data assimilation system.

The goal is to review the capability of potential intensity forecasts for use in predictability research. NOAA expects that after the tests using ARW are completed and analyzed, the tests will be repeated using the Hurricane Weather Research and Forecasting (HWRF) model.

## Southeast and Caribbean Regional Team Meets in Miami

*Judy Gray, Office of the Director*

AOML and the Southeast Fisheries Science Center hosted the second annual meeting of NOAA's Southeast and Caribbean Regional Team (SECART) on June 18-20, 2008. Attendees included representatives from NOAA's five science Line Offices throughout the southeast U.S. and Caribbean region. SECART business included reviewing the FY-2008 activities of the team, planning for 2009, finalizing "terms of reference" for the team, improving team and project connections in the Caribbean, and learning more about NOAA's operations and research in the South Florida region.

Regional science presentations encompassed a broad array of topics, while several guest speakers focused on the concerns of the Caribbean. Priority issues discussed for the Caribbean included coastal development, building partner capacity, education and outreach, hazards resilience, and coral and fisheries management and reinforcement. The need to create a NOAA regional services document at the national and/or international level for the Caribbean and perhaps for the Pacific Islands was also discussed.

Improvement of NOAA outreach and communications is one of the main goals of NOAA's regional teams. SECART set internal-to-NOAA objectives to ensure NOAA employees in the region are aware of, understand, and know how to participate in regional collaborations including making sure NOAA employees are aware of regional issues and priorities. An additional objective established was to ensure NOAA employees had an enhanced understanding of, and access to, NOAA assets within the region.

The team agreed its priority objective for FY-2009 regarding the external community should be to foster partner and stakeholder engagement in NOAA regional planning, priority setting, and execution, particularly with extramural partners (e.g., Sea Grant, Cooperative Institutes, National Estuarine Research Reserve System, fishery management councils, and state coastal and emergency management agencies) and key regional coordination groups (e.g., emerging South Atlantic Alliance, Southeast Natural Resources Leadership Group, and NOAA in the Carolinas).

Attendees from AOML included Judy Gray (Deputy Director and OAR representative to SECART), Christopher Kelble (Ocean Chemistry Division), David Palmer (Ocean Chemistry Division and OAR representative to the Gulf of Mexico Regional Team), Gustavo Goni (Physical Oceanography Division), Jules Craynock (Ocean Chemistry Division), Nelson Melo (Physical Oceanography Division), and Pamela Fletcher (Florida Sea Grant).



**Dr. Theo Brainerd (left), Southeast Fisheries Science Center SECART representative, presents a plaque in recognition of the outstanding leadership provided by SECART Team Leader Dr. Jeff Payne of NOAA's Coastal Services Center.**



At the recent Greater Everglades Ecosystem Restoration Conference in Naples, Florida, AOML scientists presented an initial water quality assessment for south Florida coastal waters including the identification of chlorophyll as an indicator for water quality. The water quality indicator is one of AOML's contributions to the upcoming greater Everglades ecosystem assessment "report card" that describes the overall health of the ecosystem. This 24-page report card is expected to be released in the coming months and will be utilized by decision makers and the public to understand and convey the impacts of management decisions on the environment. AOML's contribution to the report card includes determining indicators for both water quality and salinity. Monitoring these indicators allows scientists and managers to streamline their analysis efforts, keying in supplemental resources when an indicator signals that the ecosystem may be negatively or positively impacted.

## Farewell

Mark Powell, a meteorologist with AOML's Hurricane Research Division (HRD), relocated to Tallahassee, Florida in July. Powell will work from an office at Florida State University's Center for Ocean-Atmosphere Prediction Studies (COAPS), which serves as one of NOAA's nine Applied Research Centers. He will continue his affiliation with AOML and support of HRD's ongoing tropical cyclone research.

Krystal Valde, a CIMAS research associate with AOML's Hurricane Research Division, relocated to Shreveport, Louisiana in July. Although departed from Miami, Valde will continue to work with the Division on analyzing precipitation structures in tropical cyclones from satellite and aircraft observations.

## Welcome Aboard

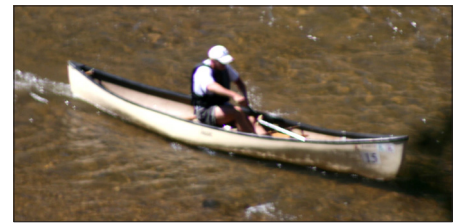
Dr. Altug Aksoy joined the staff of AOML's Hurricane Research Division in July as a CIMAS post-doctoral fellow after spending three years at the Mesoscale and Microscale Meteorology Division and the Institute for Mathematics Applied to Atmospheric Research. Aksoy received a B.S. degree in mechanical engineering from Bogazici University in Istanbul, Turkey, an M.B.A. from The George Washington University, and a Ph.D. in atmospheric sciences from Texas A&M University. He will work with HRD researchers on ensemble-based data assimilation of inner-core data into high-resolution regional hurricane models.

Chao Chen, a Ph.D. candidate with the University of Miami's Electrical and Computer Engineering Department, joined the staff of AOML's Physical Oceanography Division in July as a member of the U.S. Argo Team. Chen will provide software support for existing databases and other information technology related issues. He will also work on the implementation of a hydrographic database in support of the Argo project.

**2008 emergency information  
Cards are available at the  
receptionist's desk in the lobby**

## Congratulations

James Farrington of AOML's Physical Oceanography Division stationed in Norfolk, Virginia, won three medals at the Whitewater Open Canoe National Championships held on the French Broad River near Hot Springs, North Carolina on July 10-13. Farrington paired with Kirk Havens to win a gold medal in the 40-54 age group C2M16 two-person class. During the following day's Sprint races, he won a second gold medal for his age group in the singles competition, as well as a silver medal in the doubles competition with canoe partner Kirk Havens.



**Jim Farrington on the French Broad River.**

AOML scientist Evan Forde received a Congressional Commendation honoring his "life and works" from Congresswoman Corrine Brown, who represents Florida's Third Congressional District in the U.S. House of Representatives. The commendation recognizes Forde's many years of commitment and contributions to science education in the United States and acknowledges him as one of the nation's leading African American scientists and explorers.

AOML welcomed an exceptional group of summer interns to its ranks in June, including several NOAA Hollings Scholars. Guided by mentors with the Hurricane Research (HRD), Ocean Chemistry (OCD), Physical Oceanography (PhOD), and Computer Networks and Services (CNSD) Divisions, interns performed a variety of tasks in support of AOML's research programs while gaining valuable experience working in a science environment.

Diana Aranda, Nova Southeastern University .....	Chris Sinigalliano (OCD)
Rene Boiteau, Northwestern University ( <b>Hollings</b> ) .....	John Proni/Thomas Carsey (OCD)
Jonathan Davis, University of Miami .....	Thomas Carsey (OCD)
Alexandra Ferrell, University of Missouri ( <b>Hollings</b> ) .....	Derek Manzello (OCD)
Zachary Gruskin, Cypress Bay High School .....	Michael Black (HRD)
Tiffany Hall, MAST Academy .....	Joseph Bishop (OCD)
Michael Hernandez, Pennsylvania State Univ. ....	Sundararaman Gopalakrishnan (HRD)
Thomas Hinson, University of North Carolina .....	Robert Rogers (HRD)
Beth Kaplan, Pennsylvania State University .....	Mark Powell (HRD)
Marcos Mirabent, Edward Pace High School .....	John McKeever (CNSD)
Brittany Perrin, University of Missouri ( <b>Hollings</b> ) .....	David Enfield (PhOD)
Patricia Sanchez, University of Puerto Rico .....	Jason Dunion (HRD)
Myrna Santiago, University of Puerto Rico .....	Jason Dunion (HRD)
Ynhi Thai, University of Alabama ( <b>Hollings</b> ) .....	John Proni/Thomas Carsey (OCD)
Ryan Walter, Cornell University ( <b>Hollings</b> ) .....	Shailer Cummings (OCD)
Latricia White, Howard University .....	Sim Aberson (HRD)
Chris Williams, Georgia Institute of Technology .....	Frank Marks/John Gamache (HRD)



**Summer interns gather for a group photograph following a Welcome Aboard pizza party held in their honor at AOML on July 1st. Photo courtesy of Erica Rule.**

## Travel

John Proni attended and made a presentation at the Acoustics '08 Conference in Paris, France on June 28-July 4, 2008.

Molly Baringer, Silvia Garzoli, and Christopher Meinen attended the annual science meeting for the Rapid Climate Change program in Cambridge, United Kingdom on June 30-July 3, 2008.

Silvia Garzoli made an invited presentation at the Science Conference on Polar Research-Arctic and Antarctic Perspectives in the International Polar Year in St. Petersburg, Russia on July 8-11, 2008.

Christopher Meinen attended the U.S. CLIVAR Summit in Irvine, California on July 14-17, 2008.

Robert Kohler attended NOAA's High Performance Computing and Communications mid-term meeting in Boulder, Colorado on July 14-18, 2008.

Tsung-Hung Peng and Rik Wanninkhof attended the annual Ocean Carbon and Biogeochemistry Workshop in Woods Hole, Massachusetts on July 21-24, 2008.

Joseph Cione attended meetings to discuss the possible location for future UAS (unmanned aircraft systems) hurricane operations at Embry-Riddle Aeronautical University in Daytona Beach, Florida and Kennedy Space Center on July 28-31, 2008.

Jules Craynock, James Hendee, Michael Jankulak, and Derek Manzello were part of a team that performed a site survey to determine the location for a MAP-CO<sub>2</sub> buoy in the La Parguera Estuarine Preserve, Puerto Rico on July 28-August 1, 2008.

Pamela Fletcher and Christopher Kelble attended the Greater Everglades Ecosystem Restoration, Planning, Policy, and Science Meeting in Naples, Florida on July 28-August 1, 2008.

Stanley Goldenberg made a presentation via video-conference at the Weather In-Situ Deployment Optimization Method (WISDOM) Modeling Workshop in Boulder, Colorado on August 13, 2008.

Robert Atlas presented two papers at the SPIE annual meeting in San Diego, California on August 11-14, 2008. He also attended an Executive Committee meeting of the U.S. Weather Research Program in Silver Spring, Maryland on August 26, 2008.

## Recent Publications\*

**ATLAS, R.**, and G.D. Emmitt, 2008: Review of observing system simulation experiments to evaluate the potential impact of lidar winds on numerical weather prediction. *ILRC24*, Vol. 2 (ISBN 978-0-615-21489-4), 726-729.

Bell, M.M., and **M.T. MONTGOMERY**, 2008: Observed structure, evolution, and potential intensity of category 5 Hurricane Isabel (2003) from 12 to 14 September. *Monthly Weather Review*, 136(6):2023-2046.

Beron-Vera, F.J., M.J. Olascoaga, and **G.J. GONI**, 2008: Oceanic mesoscale eddies as revealed by Lagrangian coherent structures. *Geophysical Research Letters*, 35(8):L12603, doi:10.1029/2008GL033957.

**DONG, S.**, J. Sprintall, S.T. Gille, and L. Talley, 2008: Southern Ocean mixed-layer depth from Argo float profiles. *Journal of Geophysical Research*, 113(C6):C06013, doi:10.1029/2006JC004051.

Gentry, B., M. McGill, G. Schwemmer, M. Hardesty, A. Brewer, T. Wilkerson, **R. ATLAS**, M. Sirota, S. Lindemann, and F. Hovis, 2008: New technologies for direct detection of Doppler lidar: Status of the TWiLiTE airborne molecular Doppler lidar project. *ILRC24*, Vol. 1 (ISBN 978-0-615-21489-4), 239-243.

Halliwell, G.R., L.K. Shay, S.D. Jacob, O.M. Smedstad, and **E.W. UHLHORN**, 2008: Improving ocean model initialization for coupled tropical cyclone forecast models using GODAE nowcasts. *Monthly Weather Review*, 136(7):2576-2591.

**HUANG, X.-L.**, and **J.-Z. ZHANG**, 2008: Kinetic spectrophotometric determination of submicromolar orthophosphate by molybdate reduction. *Microchemical Journal*, 89(1):58-71.

Jiang, L.-Q., W.-J. Cai, **R. WANNINKHOF**, Y. Wang, and H. Lüger, 2008: Air-sea CO<sub>2</sub> fluxes on the U.S. South Atlantic Bight: Spatial and seasonal variability. *Journal of Geophysical Research*, 113(C7):C07019, doi:10.1029/2007JC004366.

**MANZELLO, D.P.**, J.A. Kleypas, D.A. Budd, C.M. Eakin, P.W. Glynn, and C. Langdon, 2008: Poorly cemented coral reefs of the eastern tropical Pacific: Possible insights into reef development in a high-CO<sub>2</sub> world. *Proceedings of the National Academy of Sciences*, 105(30):10,450-10,455.

Moore, R.W., **M.T. MONTGOMERY**, and H.C. Davies, 2008: The integral role of a diabatic Rossby vortex in a heavy snowfall event. *Monthly Weather Review*, 136(6):1878-1897.

**MUNOZ, E.**, and R. Czujko, 2008: AMS membership survey results: Profile of AMS membership residing outside the United States. *Bulletin of the American Meteorological Society*, 89(6):900-904.

Smith, R.K., **M.T. MONTGOMERY**, and S. Vogl, 2008: A critique of Emanuel's hurricane model and potential intensity theory. *Quarterly Journal of the Royal Meteorological Society*, 134(632):551-561.

Terwey, W.D., and **M.T. MONTGOMERY**, 2008: Secondary eyewall formation in two idealized, full-physics modeled hurricanes. *Journal of Geophysical Research*, 113(D12):D12112, doi:10.1029/2007JD0088979.

Van Sang, N., R.K. Smith, and **M.T. MONTGOMERY**, 2008: Tropical cyclone intensification and predictability in three dimensions. *Quarterly Journal of the Royal Meteorological Society*, 134(632):563-582.

**ZHANG, J.A.**, K.B. Katsaros, **P.G. BLACK**, S. Lehner, J.R. French, and W.M. Drennan, 2008: Effects of roll vortices on turbulent fluxes in the hurricane boundary layer. *Boundary-Layer Meteorology*, 128(2):173-189.

\*Names of AOML authors appear in blue capital letters.

*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: <http://www.aoml.noaa.gov/keynotes>