

Hurricane Preparedness and Recovery Coordination Team

AOML's Hurricane Preparedness and Recovery Plan for 2003 (available internally at <http://nuwave/intrapdf/hurrprep2003.pdf>) provides a course of action to prepare the facility for severe weather should a tropical storm or hurricane threaten south Florida. The Coordination Team is responsible for carrying out all operational elements of the Plan during preparatory and recovery phases for their group. Team members include:

Office of the Director

Gregory Banes
Judy Gray
Manuel Fraga (alternate)
Jeffery Kelley (alternate)

Computer Networks and Services

Robert Kohler
Thomas Heeb

Hurricane Research Division

Neal Dorst
Peter Dodge (alternate)
Joseph Griffin (alternate)

Ocean Chemistry Division

Michael Farmer
Michael Shoemaker

Acoustics Research Group

Jules Craynock
Joseph Bishop (alternate)

Physical Oceanography Division

Douglas Anderson
Craig Engler
Robert Roddy
David Bitterman (alternate)

Hurricane Database Undergoes Major Revision

Major revisions to HURDAT, the Atlantic basin hurricane database, have been completed for the second half of the 19th Century and early 20th Century by scientists with the National Hurricane Center and AOML's Hurricane Research Division. HURDAT is the official record of tropical storms and hurricanes for the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea, including those that have made landfall in the United States.

The National Hurricane Center, which maintains HURDAT, updates the database annually with information from the most recent hurricane season. HURDAT is used for a wide variety of purposes: risk assessment for emergency managers, intensity forecasting techniques, analysis of potential losses for insurance and business interests, verification of official and model predictions of track and intensity, seasonal forecasting, climate change studies, and establishment of appropriate building codes for coastal zones.

"There are many reasons why re-analysis of the HURDAT database was both needed and timely," said Chris Landsea, a research meteorologist with the Hurricane Research Division and lead scientist on the project. "HURDAT contained many systematic and random errors that needed correction. As our understanding of tropical cyclones has developed, analysis techniques at the National Hurricane Center have changed over the years, leading to biases in the historical database that had not been addressed." Another difficulty in applying HURDAT to studies concerned with landfalling events was the lack of exact time, location, and intensity information at landfall. Finally, recent efforts led by the late Jose Fernandez-Partagas, a research meteorologist in Miami, uncovered previously undocumented historical tropical cyclones in the mid-1800s to early 1900s that greatly increased the knowledge of these past events, which also had not been incorporated into the HURDAT database.

Due to the groundbreaking work of Fernandez-Partagas, and the analyses, digitization, and quality control of data by investigators with the Hurricane Research Division, more than 5000 additions and alterations to the database have been approved for the 1851 to 1910 era by the National Hurricane Center's Best Track Change Committee. Over the next two years, the re-analysis effort will continue to progress through the remainder of the 20th Century. The work is being funded by NOAA's Office of Global Programs.



Sampling Efforts in the Atlantic...Chronicles of the Repeat Hydrography (A16) Cruise

John Bullister, Pacific Marine Environmental Laboratory

Following are informal excerpts written by the Chief Scientist of the Repeat Hydrography cruise (A16) aboard the NOAA Ship Ronald H. Brown. The Brown departed Reykjavik, Iceland on June 19th for two months of atmospheric and water column sampling in the Atlantic between Iceland and northern Brazil. More than 40 researchers and technicians, including investigators with AOML's Ocean Chemistry and Physical Oceanography Divisions, participated in the sampling effort.

As of 29 July, we are at 10°N, 28°30'W, about 700 miles southwest of Senegal, West Africa. We have completed 41 stations since leaving Madeira (112 overall) and just passed the halfway point for this leg. The weather has been good for the past week. Both the CTD (conductivity-temperature-depth) and trace metal sampling programs continue to go well, despite the occasional repairs necessary caused by the wear and tear that is associated with lowering and raising the CTD packages several times a day by more than 5 km (~3 miles). The sampling programs go on 24 hours a day. At night when the ship stops for a station, squid and flying fish quickly gather close to the ship in the area where the CTD is deployed, feeding on small fish and other organisms attracted to the lights.

In addition to the water sampling program, air samples are being collected and analyzed for a variety of gases including carbon dioxide, chlorofluorocarbons, methyl halides, and hydrochlorofluorocarbons. Aerosol samples are being collected atop a 20-foot mast on the forward end of the ship. Since leaving Madeira, the aerosol samples have become more and more influenced by mineral aerosols from northern Africa, referred to as "Saharan dust." This dust is visible from satellite photos we are receiving on the ship and contributes to the hazy sunsets we have been experiencing. Small drifts of the dust can be found on the upper decks of the ship, and the intake filters for the ship's engines are coated with orange-brown dust. These high aerosol concentrations have resulted in elevated dissolved iron and aluminum concentrations in the surface waters, reaching values 3-5 times higher than were observed earlier on Leg 1 in the low dust regions of the North Atlantic between Iceland and Madeira. The primary goal of the aerosol sampling effort is to quantify the solubility of iron and aluminum in mineral aerosols collected over the open ocean. This information is critical to models of dust deposition and iron solubility and its impact on the global ocean carbon cycle.

A number of profiling floats and drifters have been released during the past week. The profiling floats sink to depths greater than 1000 meters and gather data on subsurface temperature, salinity, and currents. They rise to the surface every few weeks, transmitting the data to a satellite, which is then forwarded to laboratories on shore. The profiling floats then sink back to depth and repeat this cycle. The drifters are designed to remain at the surface where they transmit data on surface currents and temperature at regular intervals via satellite to laboratories on shore. Both the profiling floats and drifters are expected to continue sending data for several years. We continue to occupy stations at a rate of about three or more per day, and expect to reach the equator in about one week.



Doused with seawater, "pollywogs" await trial in the court of King Neptune and initiation to become "shellbacks."

guilty. The chief scientist will act as attorney for the pollywogs at the trial and is working feverishly on defense strategies. Many of the older shellbacks are not optimistic about the eventual outcome—to their knowledge no pollywog has ever been acquitted of their charges against King Neptune and escaped punishment. The third part of the ceremony consists of the pollywogs graduating to become shellbacks and is followed by a barbeque and celebration. (continued on next page)



Scientists collect water samples throughout the night using a conductivity-temperature-depth (CTD) instrument.

As of 8 August, we are at 4°S, 25°W. We have completed 74 stations since leaving Madeira and a total of 145 stations for the entire cruise. We anticipate completing the section work at about 6°S, 25°W on 9 August, followed by a 2+ day transit to Natal, Brazil. We crossed the equator on 5 August. In order to better resolve the fine-scale structure of the tropical circulation, we occupied stations at 20 mile intervals from 3°N to 3°S instead of the usual 30 mile interval. Because of the additional sampling in the equatorial region, most of the traditional equator crossing ceremonies have been postponed until we finish the section at the end of this week. Equator-crossing ceremonies involve the initiation of "pollywogs" (those who have never crossed the equator on a ship) by the "shellbacks" (those sailors who have). The first part of the initiation involves dousing the pollywogs with seawater, appearances by Davey Jones and King Neptune, and the requirement that the pollywogs provide entertainment for King Neptune and the shellbacks. In the second part of the initiation, the pollywogs are put through a mock trial where they must answer for various "offenses" against King Neptune, and undergo various forms of punishment if found

Active Hurricane Season Forecast Reaffirmed

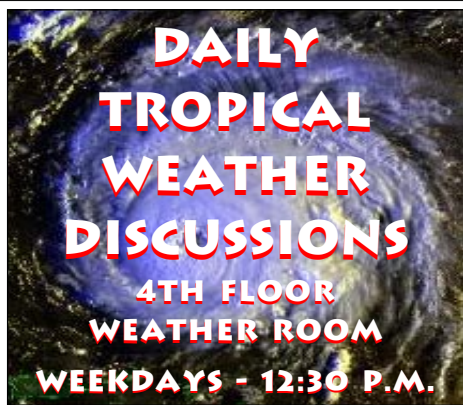
NOAA's team of hurricane experts issued their updated forecast for the Atlantic hurricane season on August 7th, reaffirming that 2003 should be an active year. As the peak of the hurricane season approaches, above-normal levels of storm activity are expected to prevail.

The updated forecast calls for the likelihood of between 12-15 tropical storms, with seven to nine becoming hurricanes. Three to four storms are expected to intensify into major hurricanes with sustained winds of at least 111 mph. These levels of activity are consistent with the pre-season forecast of May 19th, which called for 11-15 tropical storms, six to nine hurricanes, and two to four major hurricanes.

Development of the La Niña weather phenomenon during the summer was considered a significant factor in the pre-season forecast. La Niña reduces vertical wind shear in the tropical Atlantic Ocean, enabling tropical disturbances to strengthen. Surprisingly, La Niña's failure to manifest as anticipated bears little weight upon the updated forecast.

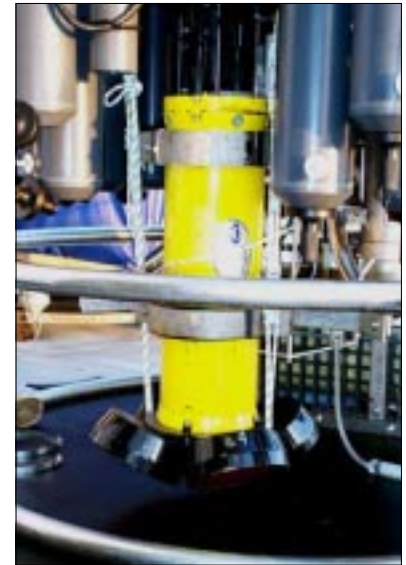
Above-normal levels of activity are still expected due to atmospheric wind and air pressure patterns in place for the past several years that are conducive to storm development. These favorable conditions, combined with the active phase of the Atlantic multi-decadal signal, indicate an above-normal Atlantic hurricane season is likely for 2003.

The NOAA seasonal forecast represents a consensus of scientists from NOAA's Climate Prediction Center, National Hurricane Center, and AOML's Hurricane Research Division (HRD). HRD participants include Christopher Landsea and Stanley Goldenberg.



(continued from previous page)

The research programs continue to go well. Of particular interest in the equatorial region is the complex pattern of surface and subsurface ocean currents. Ocean current measurements are being made on this cruise by two acoustic instruments (acoustic Doppler current profilers, ADCPs) which rely on a Doppler frequency shift to measure velocity. One instrument is mounted on the primary CTD (conductivity-temperature-depth) rosette package and collects full-depth velocity profiles every time that package is deployed ("lowered ADCP") (see yellow instrument in photo). The other instrument is mounted on the hull of the ship and provides 5-minute averages of ocean velocity beneath the ship to 250-350 m. With these instruments, a picture of rich current structure is emerging. The shipboard ADCP gives a clear cross-equatorial section of ocean velocities down to over 350 m. The Equatorial Undercurrent was quite strong, with core velocities over 1 m/s, centered at 80 m, and significantly colder surface temperatures just north of the equator.



An acoustic Doppler current profiler mounted to the CTD instrument collected ocean current velocity data.

The tropics are of great interest not only because of their complex near-surface circulation, but also because of their importance in controlling the exchange of water, heat, momentum, and many chemical constituents from one hemisphere to the other. The tropical Atlantic is especially fascinating, since its intermediate (200-1000 m) and deep (below 1000 m) circulation is characterized by an interplay between waters stemming from the high-latitude North Atlantic and those originating from around Antarctica. For example, at depths between about 500-800 m we find Antarctic Intermediate Water, the depth range from 1500-4000 m is mostly occupied by North Atlantic Deep Waters, while the depth range from 4000 m to the bottom (nearly 6000 m here in the Brazil Basin) is dominated by Antarctic Bottom Water. Each of these water masses is characterized by typical ranges in temperature and salinity, with the North Atlantic components generally being warmer and saltier than their Antarctic counterparts. The circulation of these intermediate and deep water masses is of great importance for the oceanic uptake and transport of anthropogenic carbon dioxide (CO₂), *i.e.*, that component of the global carbon cycle that is associated with the burning of fossil fuel and the release of CO₂ from the land as a consequence of land-use change.

The North Atlantic is known to have taken up a lot of anthropogenic CO₂ from the atmosphere, thereby having contributed substantially to the mitigation of the atmospheric CO₂ increase. One of the goals of our program is to better document and understand how this anthropogenic CO₂ signal is taken up by the ocean and then transported toward the interior of the ocean. Detecting this signal is not easy, because it is masked by a very active background natural cycle of carbon. However, we are greatly aided by the simultaneous measurements of many other constituents and, particularly, other man-made substances, such as chlorofluorocarbons (CFCs). Although these latter substances have been introduced into the atmosphere only about 50-60 years ago, we can see them already in easily measurable concentrations in the North Atlantic Deep Water at 1500-4000 m. This means that the water masses at these depths must have carried this signal from the high latitudes around Iceland (where we started our cruise) to the tropics in a few decades! By contrast, the transport of the signals from the southern hemisphere high latitudes appears less rapid, as the intermediate and deep waters of Antarctic origin tend to contain less CFCs. More details of these water masses and their circulation will emerge from the southward continuation of the A16 line that will likely take place around March to April of 2005 aboard the *Ronald H. Brown*.

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

"Biscayne Bubbles" Booklets Available

"Biscayne Bubbles," the educational series about Biscayne Bay that appeared weekly in *The Islander*, Key Biscayne's local newspaper, is now available in booklet format. The printed compilation of the "bubbles" is intended for outreach activities, including broad distribution to schools and those interested in Biscayne Bay.

The "bubbles" were co-authored by Erica Van Coverden, AOML's outreach coordinator, and Marella Crane, an extension agent with the University of Florida and Florida Sea Grant Program. Scientific insights, facts, and figures for the series were provided by the Virginia Key science community (AOML, the University of Miami's Rosenstiel School, and Southeast Fisheries Science Center) and environmental organizations in the Miami area.

Copies of the booklets can be obtained from Erica Van Coverden (erica.van.coverden@noaa.gov or 305-361-4541). The "bubbles" can also be found on the Internet in PDF format at www.aoml.noaa.gov/outreach/index.html.

"Biscayne Bubbles" was a collaborative effort between AOML and the Florida and Connecticut Sea Grant programs to inform south Floridians, especially young people, of the many aspects of the fragile Biscayne Bay ecosystem.



2003 Emergency Info Cards provide a list of designated AOML contact personnel (and their telephone numbers) to call should south Florida be impacted by either a tropical storm or hurricane. Contact Gladys Medina to obtain a card (gladys.medina@noaa.gov or 305-361-4300).

Web Site Monitors Oceanic Heat Content

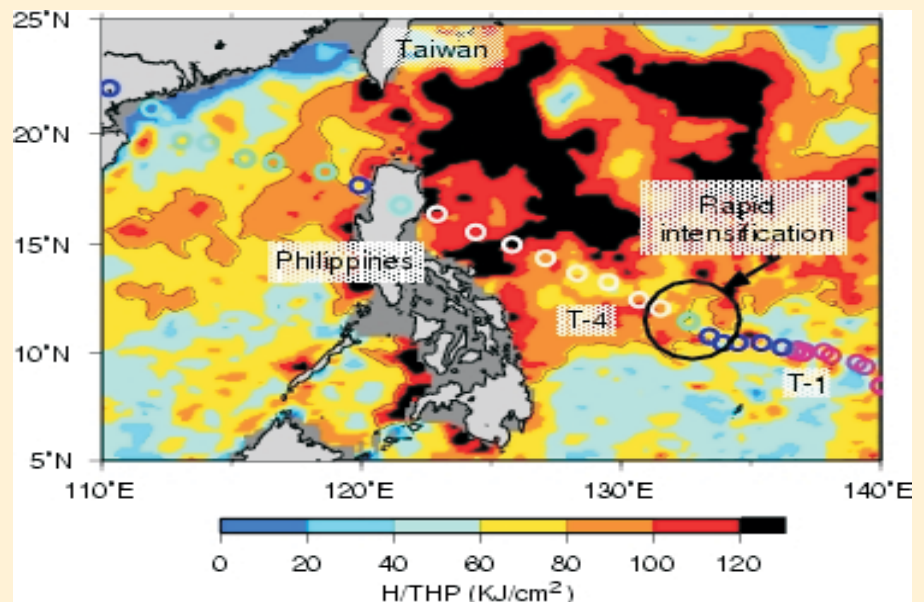
In June 2003, AOML premiered a new web site that provides global near-real time estimates of upper ocean heat content and hurricane/typhoon heat potential (H/THP) derived from remote sensing observations. The site was developed by Gustavo Goni, an oceanographer with AOML's Physical Oceanography Division, and Joaquin Trinanés, a University of Miami CIMAS assistant scientist. It can be viewed at www.aoml.noaa.gov/phod/cyclone/data.

Monitoring the upper ocean thermal structure has become an important component in the study of tropical cyclone-ocean interaction and the prediction of sudden intensification of hurricanes and typhoons. Daily maps of H/THP, sea height anomalies, sea surface temperatures, and altimeter estimates of the depth of the 26°C and 20°C isotherms are generated for the seven basins where tropical cyclones regularly occur and for the tropical Pacific. These maps can be used to identify and monitor the heat content of oceanic warm features, such as anticyclonic rings, which have very high values of H/THP, several times the values needed to sustain a tropical storm. Moreover, these features have been associated with the sudden intensification of hurricanes and typhoons.

Details on the methodology used to estimate the upper ocean heat content are presented on the web site. Examples of hurricane and typhoon intensification due to large variation of H/THP under the storm track are also presented. For example, during July 2003, Typhoon Imbudo suddenly intensified from a typhoon with estimated winds of 95 mph to a super typhoon with estimated winds of 150 mph in a 24-hour period as it passed over a region with increased H/THP of approximately 100 KJ/cm² east of the Philippines (see figure below).

Goni and Trinanés speculate that the H/THP may not necessarily be the dominant ocean parameter linked to intensification. Rather, it may be the gradient along the track of the storm above some threshold value of H/THP. There are numerous ways that the ocean has the potential to influence tropical cyclone intensity. Preliminary results indicate that the H/THP appears to be a better predictor than sea surface temperatures alone for intensification processes.

They hope that these oceanic H/THP fields will contribute to the understanding of the role these warm features play in rapid intensification of hurricanes and typhoons and that this knowledge will improve intensity forecasts. The work is being performed in collaboration with Peter Black, a meteorologist with the Hurricane Research Division, and is supported by NOAA, the Office of Naval Research's CBLAST (Coupled Boundary Layers/Air-Sea Transfer) program, and NOAA's ESDIM program.



Typhoon Imbudo intensified from a typhoon to a super typhoon in a 24-hour period when it passed over an area of high hurricane/typhoon heat potential in the western Pacific Ocean.

Panel Selects AOML's Best Scientific Papers

A review panel of AOML scientists met in July to select AOML's top scientific papers for 2001-2002. Based upon the many excellent papers submitted, the following three were chosen:

• Baringer, M.O., and J.C. Larsen: Sixteen years of Florida Current transport at 27°N. *Geophysical Research Letters*, 28 (16), 3179-3812 (2001).

• Goni, G.J., and W.E. Johns: A census of North Brazil Current rings observed from TOPEX/POSEIDON altimetry: 1992-1998. *Geophysical Research Letters*, 28 (1), 1-4 (2001).

• Powell, M.D., and S.D. Aberson: Accuracy of United States tropical cyclone landfall forecasts in the Atlantic basin (1976-2000). *Bulletin of the American Meteorological Society*, 82 (12), 2749-2767 (2001).

Congratulations to AOML's award-winning authors. Their papers have been forwarded to NOAA's Office of Oceanic and Atmospheric Research (OAR) as AOML's entries in the NOAA Research Outstanding Scientific Paper Awards competition for 2003.

RSMAS Fall Semester Shuttle Schedule

AUGUST 27-
DECEMBER 5, 2003
(MONDAY THROUGH FRIDAY)

Viscaya Station to RSMAS:

8:15 AM
8:45 AM
3:50 PM

RSMAS to Viscaya Station:

8:30 AM
3:30 PM
5:30 PM

Live on the Web: Coral Spawning

James Hendee, Ocean Chemistry Division

As part of NOAA's Coral Reef Watch Program, web accessible cameras are being installed at selected monitoring stations to allow researchers and the lay public to view the coral reefs. The St. Croix, U.S. Virgin Islands Coral Camera is currently positioned to point at a large colony of *Montastraea faveolata* in about 40 feet of water.

Hopefully, the camera will enable viewers to witness this coral colony spawning some time between August 18th and 20th, between 9:00 p.m. and 2:00 a.m., with a high probability of August 19th at 10:30 p.m. as the likely date and time. To access the footage, visit www.coral.noaa.gov, click on "Live Web Cams" in the left side-bar, and then on "UnderwaterCam." You must have Windows Media installed on your computer to access the images. The data stream can also be accessed directly in Windows Media (and thus increase the size of the viewing window) at <mms://192.111.123.141/uw-stx>.

The camera is broadcasting at night all this week and, of course, also during all daylight hours. The camera light will be on in 10-minute intervals every 30 minutes beginning at 7:02 p.m. (EST) and ending at 5:32 a.m. The light will not remain on all night to avoid disturbing the colony. If this colony spawns, the recording will be made available on the website for download sometime after spawning.

Coral-List E-mail List Server Upgraded

Louis Florit, Ocean Chemistry Division

AOML's extremely popular Coral-List has been a valuable resource for coral reef researchers and other interested individuals for the past eight years. Over this period, countless messages regarding research, environmental impacts, and human pressures on coral reefs have been exchanged through this successful medium. The Coral-List allows individuals with common interests, located at the far corners of the world, to interact where it would be otherwise impossible.

The software that allowed the Coral-List to be so successful had begun to show its age; vulnerabilities were discovered that would let rogue programs post viruses to all subscribers and make it difficult to manage the list messages and its membership. It was time to upgrade. In June 2003, a technical team led by the Ocean Chemistry Division's James Hendee, Monika Gurnee, Clarke Jeffris, and Louis Florit, with assistance from John McKeever of Computer Networks and Services, implemented the greatest changes to Coral-List and its underlying systems to date.

The upgrade involved the setup of a new dedicated computer running the Redhat Linux 9.0 operating system, the Apache web server, Postfix e-mail server, and the Mailman list server software. As part of the configuration, all messages posted and sent from the Coral-List are scanned for computer viruses and tagged for their possibility as unsolicited commercial e-mail, or spam. All of these software are available for free without licensing use restrictions through the Internet.

The new setup gives users a web-based interface to subscribe and change their personal settings for their subscription to the Coral-List, in addition to the e-mail based subscription system. The archival of messages occurs automatically. Subscribers are automatically protected by the virus scanners, and messages are filtered for dubious content. Overall, the Coral-List has become more stable and reliable.

Additional information about Coral-List and other coral health-related public mailing lists (Coral Disease and Health Consortium list, NOAA's Coral Reef Information System list, and Coral Beaching-Management Issues and Responses list) can be found at <http://coral.aoml.noaa.gov>. James Hendee (jim.hendee@noaa.gov) is the Coral-List administrator and moderator.

The Coral-List listserver provides a forum for Internet discussions and announcements among coral health researchers pertaining to coral reef health and monitoring throughout the world. Over 2,000 individuals currently subscribe.

AOML's Newest Additions

NOAA Corps Officer Jeffery Kelley and his wife Lisa are the proud parents of a daughter, Sydney Grace Kelley, born in Miami on July 11, 2003 at 1:51 p.m. Sydney and her parents are doing well.

Joseph Cione, a meteorologist with the Hurricane Research Division, and his wife Pam are the proud parents of a son, Jaxon Tyler Cione, born in Miami on August 11, 2003. Jaxon weighed in at 6 lbs., 13 oz. and is doing well. His parents are very happy (but sleepy).

Welcome Aboard

Jeffrey Absten joins the staff of the Ocean Chemistry Division to serve as the CREWS (Coral Reef Early Warning System) operations manager. He comes from the Keys Marine Laboratory of the Florida Institute of Oceanography, where he served as the operations manager for the SEAKEYS program.

NOAA Corps Officer LTJG Jeffery Kelley joins the staff of the Physical Oceanography Division to assist Drs. Molly Baringer and Elizabeth Johns with coastal Florida observational programs, including real-time monitoring of the Florida Current transport. Jeff will also be involved in diving operations at the National Undersea Research Program (NURP) laboratory in Key Largo, Florida.

Richard Rosen of Atmospheric and Environmental Research, Inc. has been confirmed as the new Assistant Administrator of NOAA's Office of Oceanic and Atmospheric Research (OAR). He assumes office in mid-October but has already involved himself in the Senior Research Council deliberations as a visitor. We look forward to his coming onboard.



Photograph by Tsung-Hung Peng,
Ocean Chemistry Division.

Congratulations

AOML has received a 2003 Federal Energy and Water Management Award from the Department of Energy. The award recognizes the collaborative efforts of AOML and Florida Power and Light in making infrastructure improvements to the 30+ year-old AOML facility that have reduced overall energy costs by nearly 40%. AOML has also been designated by the Department of Energy as being a "2003 Federal Energy Saver Showcase Facility."

Michael Black, a meteorologist with the Hurricane Research Division, and James Franklin of the National Hurricane Center have jointly won a Department of Commerce Gold Medal for their pioneering and innovative research using Global Positioning System (GPS) dropsonde data to measure the wind structure in the eyewall region of tropical cyclones.

James Haynes, a computer specialist working on contract with the Computer Networks and Services Division, served as a field coordinator during a three-hour long Adobe Acrobat 6.0 remote training session hosted by NOAA's Office of Oceanic and Atmospheric Research on May 30, 2003. More than 200 people from 12 NOAA field locations participated in the free training via the Internet, which was offered locally in Silver Spring, Maryland.

Christopher Landsea, a research meteorologist with the Hurricane Research Division, has been named the NOAA Employee of the Month for August 2003 for his re-analysis efforts to improve the accuracy of the Atlantic hurricane database (HURDAT).

David Palmer, a physicist with the Ocean Chemistry Division, has signed a publishing contract with Cambridge University Press to co-author an undergraduate textbook on acoustical oceanography to be entitled "Sounds in the Sea: Principles and Applications of Acoustical Oceanography."

Retirement Party For

Kristina Katsaros

September 18, 2003

6:30 p.m.

The Commons

*Rosenstiel School of Marine
and Atmospheric Science Campus*

Buffet Dinner

RSVP by September 12, 2003:

<http://www.aoml.noaa.gov/rsvp>

Travel

Richard Wanninkhof was a lecturer at the first International SOLAS (Surface Ocean Lower Atmosphere Study) Summer School in Corsica, France, on June 30-July 11, 2003. Seventy-two students and 12 lecturers representing 25 different nations attended.

Gustavo Goni attended the 2003 General Assembly of the International Union of Geodesy and Geophysics (IUGG) in Sapporo, Japan on July 1-9, 2003.

Joyce Berkeley attended the Federally Employed Women's 34th Annual National Training Program in Chicago, Illinois on July 7-11, 2003.

Kristina Katsaros and Peter Ortner attended a Senior Research Council meeting in Silver Spring, Maryland on July 21-25, 2003.

Jules Craynock and James Hendee surveyed a site for a new Coral Reef Early Warning System (CREWS) station in La Parguera, Puerto Rico on July 21-25, 2003.

Silvia Garzoli attended the Earth Observation Summit in Washington, D.C. on July 31, 2003.

David Enfield attended the Workshop for Scientific Drilling in Lake Peten-Itza in Flores, Guatemala on August 10-16, 2003.

Christopher Landsea visited the National Climate Data Center in Asheville, North Carolina on August 11-15, 2003 to obtain hourly observations for the hurricane database re-analysis project and to present a seminar.

Keynotes is published bi-monthly by the Atlantic Oceanographic and Meteorological Laboratory. Contributions and/or comments 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.

Editor – Kristina Katsaros
Publishing Editor/Writer – Gail Derr

AOML's 2003 summer interns and volunteers performed a variety of technical and computer-related tasks for the Hurricane Research (HRD), Ocean Chemistry (OCD), and Physical Oceanography Divisions (PhOD), as well as the Office of the Director and NOAA Miami Regional Library. Here is a roster of their names and their AOML mentors:

Cooperative Institute of Marine and Atmospheric Studies (CIMAS):

William Bredemeyer, Florida State University Christopher Landsea (HRD)
Andy Hagen, Gulliver Preparatory Jason Dunion (HRD)
Krystal Valde, University of Miami Michael Black (HRD)
Lenworth Woolcock, Florida International University Christopher Landsea (HRD)

AOML Interns:

Christelle Auguste, Institute of Engineering Sciences (France) Silvia Garzoli (PhOD)
Claire Channaliere, Institute of Engineering Sciences (France) Silvia Garzoli (PhOD)
Shuka Daneshzadeh, Cypress Bay High School Linda Pikula (Library)
William Dubel, Florida State University Joseph Bishop (OCD)
Robert Durning, City College of New York Kristina Katsaros (OD)
Damon Gomez, University of Miami, Rosenstiel School Linda Pikula (Library)/James Hendee (OCD)
Chris Marron, United States Air Force Academy Jason Dunion (HRD)
Adrian Santiago, North Miami Senior High School Frank Marks (HRD)
Rebecca Schneider, University of Hawaii Mark Powell/Shirley Murillo (HRD)
Sabato Visconci, MAST Academy Richard Wanninkhof (OCD)

Volunteers:

Philip Carrasco, New World School Shirley Murillo/Nick Carrasco (HRD)
Chris Chow, MAST Academy Carlisle Thacker (PhOD)
Meredith Chow, MAST Academy Joseph Bishop (OCD)
Jonathan Conant, Florida State University Michael Black (HRD)
Jessica DeLourdes Meijas, Warren Wilson College Thomas Carsey (OCD)
Chris Fossas, Florida State University Jason Dunion (HRD)
Martin Frank, Emory College Robert Molinari (PhOD)
Zach Gruskin, Falcon Cove Middle School David Enfield (PhOD)
Christine Hemphill, South Broward High School Joseph Bishop (OCD)
Alexander Lowang, University of Karlsruhe (Germany) Robert Black (HRD)
Dana Lowes, Florida State University Eric Uhlhorn/Jason Dunion (HRD)
Alex Mendoza, Miami-Dade Community College Mark Powell (HRD)
Vanessa Rohwedder, MAST Academy Neal Dorst (HRD)
Monica Simon, MAST Academy Frank Marks (HRD)



AOML held a pizza party on July 9th to welcome summer interns and volunteers to their new work environment. In attendance were (left to right, standing): Rebecca Schneider, Robert Durning, Lenworth Woolcock, Claire Channaliere, Christelle Auguste, Alex Mendoza, William Bredemeyer, Chris Chow, and Shuka Daneshzadeh. Seated: Krystal Valde, Vanessa Rohwedder, Jessica DeLourdes Meijas, Meredith Chow, and Zach Gruskin.