

Holiday Happenings

Here are a few holiday events happening at AOML:

Tree Trimming, Lobby Decorating, & Holiday Dessert Contest

December 3rd

Join coworkers in the lobby between 10:30 a.m. and noon to decorate AOML for the holidays and trim a tree

Bring your favorite holiday dessert for the judges to sample



Holiday Party

December 10th

Sing, dance, eat, and be merry at AOML's annual holiday party (more details on last page)

AOML's Holiday Ensemble will perform in the lobby at 11:30 a.m.

Hurricane Research Division's Efforts Vital to Success of NOAA's 2004 Hurricane Field Program

Erica Rule, Office of the Director

Scientists and staff with AOML's Hurricane Research Division (HRD) made a concerted effort this past hurricane season to support their operational partners within NOAA and other Federal agencies, in addition to supporting their ongoing hurricane intensity research projects. HRD had many notable successes this year due to the dedication of its employees and similar efforts from colleagues with NOAA's Aircraft Operations Center (AOC), National Hurricane Center (NHC), and the U.S. Air Force's 53rd Weather Reconnaissance Squadron.

Overall, HRD provided hundreds of hours of manpower support for NOAA's operational and research missions into Hurricanes Charley, Frances, Ivan, and Jeanne. A total of 54 flight missions were accomplished for operational NOAA aircraft missions, transfer of SFMR (Stepped Frequency Microwave Radiometer) technology to operations, and CBLAST (Coupled Boundary Layer Air-Sea Transfer) hurricane intensity and ocean winds research. HRD also provided support for 125 operational surface wind analyses to NHC, as well as wind swath and landfall post analyses of each hurricane for the Department of Homeland Security's HAZUS model for damage estimates.

Wind Speed Estimates: The ability of AOC to provide reliable, frequent surface wind data to NHC in an operational mode was a phenomenal success made possible by the outstanding efforts of HRD and the AOC electronic technicians and engineering staff. Data were collected with a SFMR, which uses remote sensing technology to collect and report wind speeds at the surface level on a continual basis. The SFMR instruments were used on both of NOAA's WP-3D Orion aircraft this season. HRD scientists also provided onboard data screening of the SFMR data. Further quality control efforts were completed at NHC using surface wind analyses made possible by HRD employees who invested countless hours as each storm approached landfall.

The collective ability to check the SFMR data against surface wind estimates from the Global Positioning System (GPS) dropsondes and to co-locate the instrument's location in storm relative coordinates was crucial in establishing its credibility. More than 150 real time GPS surface wind observations were gathered by HRD scientists and compared with SFMR surface wind observations to show a mean error of only 2.5 knots. This analysis further enhanced the credibility of the SFMR as an operational tool in hurricane wind observation. Wind speed data were invaluable to NHC in providing (*continued on page 2*)



NOAA's WP-3D Orion aircraft were equipped with Stepped Frequency Microwave Radiometers during the 2004 hurricane season to obtain observations of ocean surface winds.



Deadly 2004 Hurricane Season Finally Ends

The six-month long 2004 Atlantic hurricane season officially came to an end on November 30th, just as a new tropical storm, Otto, was emerging in the central Atlantic Ocean. While not a threat to land, Otto nevertheless served as an uneasy reminder of a stressful, hectic season that brought record amounts of destruction and flooding to the United States.

A region of strong high pressure stationed over the western Atlantic Ocean throughout the summer served as the primary steering current that propelled storms towards the U.S. rather than out to sea. As a result, instead of the average two to three hurricane landfalls experienced during an above-normal hurricane season, five landfalling hurricanes—Charley, Frances, Gaston, Ivan, and Jeanne—impacted the U.S. Hurricane Alex also impacted coastal North Carolina but never made landfall. Additionally, Tropical Storms Bonnie, Hermine, and Matthew brought soggy weather and flooding to coastal Florida, Massachusetts, and Louisiana, respectively.

Florida was particularly hard hit during the 2004 season with four hurricane strikes in the mere span of six weeks. Hurricanes Charley, Frances, Ivan, and Jeanne prompted massive evacuation efforts to remove millions of citizens from harm. The storms caused extensive property damage, beach erosion, flooding, and power outages. Close to 65,000 homes were either destroyed or suffered major damage, and tens of thousands of people were left homeless.

Deaths attributed to the four Florida hurricane strikes totaled 117. Throughout the Caribbean, however, the number of hurricane-related fatalities was estimated as being close to 3,000, with more than two-thirds of these deaths occurring in Haiti.



According to the Department of Commerce's Occupational Safety and Health Report, slips, trips, falls, and struck-by incidents made up 54% of all injuries and illnesses reported in FY-04. Almost all of these accidents were preventable. Please be careful and watch your step!

AOML Safety Committee

(continued from page 1)

better estimates than ever before of peak surface winds and wind radii. The SFMR data also directly affected the timing and extent of warnings issued by NHC.

Hurricane Surface Wind Analysis (H*Wind) Maps: The H*Wind project integrates wind data in and around a hurricane from a variety of platforms into a single wind analysis that represents surface wind speeds. This analysis provides guidance on the observed extent and strength of the wind field. Over 120 H*Wind analyses were generated this season, one for almost every mission that included SFMR observations, and all landfall periods. These H*Wind analyses generated objective estimates of surface wind radii that were included in advisories from NHC forecasters. H*Wind analyses and the HRD inland hurricane decay model were also used by the Federal Emergency Management Agency (FEMA) to estimate inland damage by generating wind swath products. Members of FEMA's Risk Assessment Branch found the H*Wind products critical as input to their HAZUS model for all four of the Florida hurricanes. The HAZUS model is used by FEMA to provide critical information to key decision makers both in FEMA and the White House.

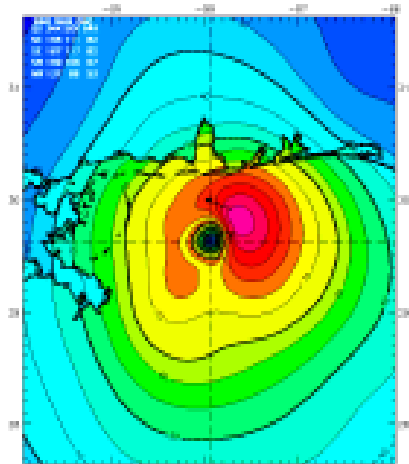
Intensity Research: Coupled Boundary Layer Air-Sea Transfer (CBLAST) Experiment and Ocean Winds Experiment: The season's priority intensity research project, CBLAST, required the deployment of multiple ocean buoys and floats ahead of Hurricane Frances by two aircraft from the U.S. Air Force's 53rd Weather Reconnaissance Squadron. The strategic placement of these probes allowed a subsequent bull's eye hit by Hurricane Frances directly over the instrument array and corresponding flights directly overhead by NOAA WP-3D aircraft. The success of such coordination and timing was made possible by the extraordinarily accurate 48-hour track forecast by NHC. The observational data set from these buoys and floats was more than doubled when Hurricane Jeanne passed over the array during her slow, looping turn towards the Bahamas and Florida just 10-15 days after the Frances deployment.

GPS dropsondes and the University of Massachusetts' Imaging Wind and Rain Airborne Profiler (IWRAP), the principal instrument used for NOAA's National Environmental Satellite, Data and Information Service (NESDIS) sponsored Ocean Winds experiment, provided vertical wind profiles below the aircraft that documented the atmospheric boundary layer near the ocean and surface observations, revealing fine scale boundary layer structure never before seen in such detail. IWRAP, GPS dropsondes, and the SFMR data are being used together to characterize the impacts of precipitation and high wind speeds on ocean surface wind estimates. This knowledge will help improve the understanding of satellite-based ocean surface wind estimates in limiting environmental conditions.

Additionally, HRD was able to make crucial ocean thermal profile observations in Hurricanes Ivan and Jeanne which, together with the CBLAST observations, provided an excellent picture of the upper ocean and surface conditions as the storms passed.

Gulfstream-IV Surveillance Missions: Continued support was given to the operational Gulfstream-IV flights. HRD employees drew flight tracks for optimal observations, participated in all 31 missions, and provided quality control and transmission of all dropsondes to the National Weather Service's Environmental Modeling Center (EMC). The often two flights per day tested the resolve of NOAA's hurricane hunters and could not have been accomplished without the combined efforts of AOC crew and HRD scientists.

HRD's 2004 field program director, Peter Black, summarized the successes of one of the most intense hurricane field programs conducted by NOAA: "I think each and every one of us has to know in his or her gut that we have done a fantastic job this season in support of NHC's forecasts and warnings, the National Weather Service EMC numerical model guidance, and for hurricane research. This has been an extraordinary year for our ability to support operations and for our research efforts."



Surface wind analysis map that depicts the extent of Hurricane Ivan's maximum-minimum winds on September 16, 2004.

In Memory Of . . .

AOML was recently saddened by the untimely death of Melvin Edward "Ed" Rahn, a computer specialist and long-time employee with the Hurricane Research



Division. Ed passed away on November 17th at Parkway Hospital from complications that developed after having undergone heart surgery a few months ago. Because Ed was a very private person, many at AOML were unaware of how serious his health problems had become. He is survived by his sister, Abby Rahn, of Kalamazoo, Michigan. Ed was 53 years old.

Ed was a military veteran and a graduate of the University of Miami. He joined the staff of the Hurricane Research Division in 1985. Over the years, he was a respected and dedicated employee. He carried out his duties quietly and efficiently with a "can-do" attitude. Among other tasks, he was responsible for processing HRD's flight-level data, an important component of the Division's data archival products.

Ed was extremely knowledgeable about politics and had very strong political opinions. He was active in several local political organizations including the Miami-Dade Republican Executive Committee, the North Dade Republican Club, and Biscayne Bay Young Republicans, Inc. He was also a co-founder of the South Florida Republican Liberty Caucus. Many at AOML will miss the back hallway debates and discussions with Ed, as well as his candor and honesty.

In addition to a passion for politics, Ed was also an avid supporter of the arts, a collector, and a philanthropist. He could always be counted on for a generous donation to AOML's annual Combined Federal Campaign program of volunteer employee contributions in support of non-profit organizations and groups. Ed always looked out for others and wanted the best for his family, his community, and his country.

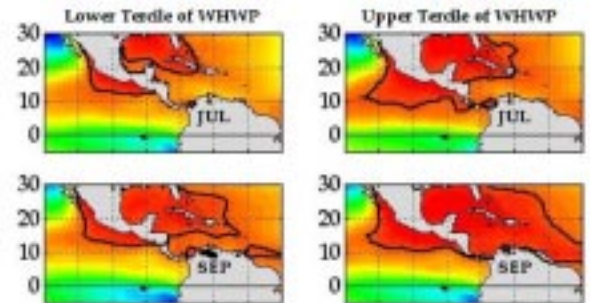
Ed will be missed not only as a valued employee but also as a unique individual. He was a good friend and long-time colleague for many at AOML.

Western Hemisphere Warm Pool Key to Improved Climate Predictions

Researchers with AOML's Physical Oceanography Division are studying the atmospheric and oceanic mechanisms involved in the annual growth and decay of a large area of warm ocean water that lies in the tropics between North and South America, the Western Hemisphere Warm Pool (WHWP). Drs. Sang-ki Lee, David Enfield, and Chunzai Wang are using the Miami hybrid ocean circulation model (HYCOM) to simulate warm pool behavior and its links to climate variables. They have found that two major global climate phenomena, the El Niño-Southern Oscillation and the North Atlantic Oscillation, account for virtually all of the extraordinarily large warm pools that have occurred in the last half century.

Scientists have become adept at detecting El Niño-Southern Oscillation events and changes in the North Atlantic Oscillation in their early stages. Lee, Enfield, and Wang hope to make use of the relationship between the Western Hemisphere Warm Pool and the El Niño-North Atlantic Oscillation to predict months in advance significant summer warm pool anomalies and their associated climate impacts. They are currently investigating the predictive power of their procedure.

The climate of North America is strongly influenced by the presence of the Western Hemisphere Warm Pool, which heats the overlying atmosphere and supplies moisture to it. Much of the moisture affecting summer rainfall in the central and eastern United States originates over the warm pool, whose size and intensity varies greatly from year to year. The frequency of Atlantic hurricanes is also related to changes in the warm pool. Increased accuracy in predicting warm pool anomalies should result in improved predictions of summer rainfall rates and hurricane occurrence.



Interannual variability in the size of the Western Hemisphere Warm Pool (WHWP). Shown are the distributions of sea surface temperatures in the western hemisphere tropics for July (upper panels) and September (lower panels). The dark contour outlines the WHWP as defined by water warmer than 28.5°C. The left-side panels show the average size of the one-third smallest warm pools of the last half-century. The right side panels show the average size of the one-third largest warm pools.

Recent AOML Publications*

Chenoweth, M., and C.W. LANDSEA, 2004: The San Diego hurricane of 2 October 1858. *Bulletin of the American Meteorological Society*, 85(11):1689-1697.

FONSECA, C.A., G.J. GONI, W. Johns, and E. Campos, 2004: Investigation of the North Brazil Current retroreflection and North Equatorial Countercurrent variability. *Geophysical Research Letters*, 31(21):L21304, doi:10.1029/2004GL020054.

Grigorieva, N.G., G.M. Fridman, and D.R. PALMER, 2004: Investigation of near-axial interference effects for propagation in a ducted waveguide. *Proceedings, 6th International Conference on Theoretical and Computational Acoustics*, Honolulu, HI, August 11-15, 2003. World Scientific Publishing, 129-134.

LANDSEA, C.W., J.L. Franklin, C.J. McAdie, J.L. Beven, J.M. Gross, B.R. Jarvinen, R.J. Pasch, E.N. Rappaport, J.P. DUNION, and P.P. DODGE, 2004: A reanalysis of Hurricane Andrew's intensity. *Bulletin of the American Meteorological Society*, 85(11):1699-1712.

STABENAU, E.R., R.G. Zepp, E. Bartels, and R.G. Zika, 2004: Role of seagrass *Thalassia testudinum* as a source of chromophoric dissolved organic matter in coastal south Florida. *Marine Ecology Progress Series*, 282:59-72.

Strong, A.E., G. Liu, J. Meyer, J.C. HENDEE, and D. Sasko, 2004: Coral Reef Watch 2002. *Bulletin of Marine Science*, 75(2):259-268.

WANG, C., 2004: ENSO, Atlantic climate variability, and the Walker and Hadley circulations. In *The Hadley Circulation: Present, Past, and Future*, H.F. Diaz and R.S. Bradley (eds.). Cambridge University Press, Volume 21 (ISBN 1-4020-2943-8).

*Names of AOML authors appear in capital letters.

A milestone in international cooperation and implementation of a global ocean observing system was reached this December as the 1,500th Argo float was deployed and began gathering data. The Argo project has a goal of placing 3,000 profiling floats throughout the world's oceans by 2006. Deployment of the floats has been ongoing since 2000.

NOAA (AOML and the Pacific Marine Environmental Laboratory) is one of the chief participants in implementing the ocean-sensing Argo array. The array is part of the Global Climate Observing System/Global Ocean Observing System (GCOS/GOOS) housed at AOML within the Physical Oceanography Division.

Argo floats are now operating in all parts of the world's ice-free oceans. They collect and distribute data on the temperature and salinity of the upper 2,000 meters of the ocean. The data are available without restriction to everyone and support scientific research on a wide range of oceanographic and climate issues.



Here are a few safety guidelines to remember when operating space heaters:

- Plug space heaters into wall receptacles only (do not plug space heaters into surge protectors).
- Keep all combustible materials (paper, clothing, wood) at least 12 inches away from all sides of the space heater.
- Never walk away or leave an operating space heater unattended.
- Turn off and unplug space heaters when not in use.

AOML Safety Committee

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www.aoml.noaa.gov/keynotes

Regional Center to Manage South Atlantic Argo Data

Scientists with AOML's Physical Oceanography Division (PhOD) helped to organize the first meeting of the South Atlantic Argo Regional Center (SAARC) in Buenos Aires, Argentina on November 15-16, 2004. The SAARC was established following the fourth Argo Science Team Meeting held in March 2002. At that time it was determined that regional data centers should be created to support Argo data requirements and to facilitate data access among regional Argo participants. The SAARC is responsible for Argo data collected primarily in the South Atlantic Ocean between 20°S and 50°S. Current SAARC members include scientists from institutions and Argo data centers in the United States, Brazil, South Africa, and Argentina.

The meeting in Buenos Aires outlined how SAARC participants will make available hydrographic and oceanographic data that they regularly collect, as well as methods for uniform quality control of the data to prevent inaccuracies and false climate signals. PhOD scientists, as managers of the current U.S. Argo Data Center, will assist this process by contributing training and quality control technology to SAARC partners.

During the meeting, it was proposed that the SAARC coordinate Argo float deployments in the region, as well as provide guidance on regional deployment needs. Once there is enough data coverage, the SAARC will develop climatologies that contribute to continental climate forecasts. These climatologies will also be made available to the global Argo community.

New Science Plan for Florida Bay Unveiled

A new strategic science plan for Florida Bay was presented in early December at the South Florida Ecosystem Restoration Task Force meeting. The plan was prepared by the Program Management Committee, co-chaired by John Hunt of the Florida Fish and Wildlife Conservation Commission and Peter Ortner, AOML's Chief Scientist. The Committee provides guidance for the Florida Bay and Adjacent Marine Systems (FBAMS) program in support of south Florida ecosystem restoration efforts and participating agency natural resource or environmental management mandates.

Since 1997, the FBAMS program has been organized around five central questions that have directed efforts at identifying the basic structure of the Florida Bay ecosystem and the underlying causes of specific changes. These changes occurred in response to stressors, some local, but others distant and outside of Florida Bay. One important external stressor was upstream water management.

The new strategic science plan builds on the results of these efforts by moving the existing science forward to a more predictive state to help guide restoration planning and implementation and satisfy individual agency responsibilities. To function in a predictive capacity, the FBAMS science program will emphasize those activities that yield information which refines understanding of critical linkages expressed in regional conceptual ecological models, improves definition of restoration targets, and assists in developing, calibrating, and validating the numerical or statistical model used to make system predictions.

Given the need to evolve with and respond to new demands from the implementation of restoration efforts, specific science priorities have been identified and organized by theme: physical processes, water quality, benthic habitats, higher trophic levels, and the mangrove-estuarine transition zone.

Winter Greetings...

I think of my happy time with you often and am very grateful for my years at the helm of that good ship AOML! I follow somewhat your advance across the ocean of research and you are obviously going as strong as ever. Congratulations! With love to you all and good wishes for a well deserved holiday of rest and fun and a wish for a Happy New Year!

Kristina Katsaros (with greetings from Mike too!)

Welcome Aboard

Lyle Hufstetler joined the staff of the Hurricane Research Division in October as a CIMAS associate to assist Dr. Chris Landsea with activities related to the hurricane reanalysis project. Lyle is a freshman at the University of Miami majoring in meteorology.

Congratulations

Christopher Kelble, a CIMAS associate with AOML's Ocean Chemistry Division, married Amy Gilbert on November 6th at a ceremony on Miami Beach. Best wishes to the newlyweds for a long and happy life together.

Hector Casanova, a NOAA Corps officer working with AOML's Ocean Chemistry Division, has been promoted to the rank of Lieutenant Junior Grade.

Jeffrey Judas, a NOAA Corps officer working with AOML's Ocean Chemistry Division, has been promoted to the rank of Lieutenant.

Toy Drive

AOML is hosting a toy drive to help brighten the lives of children during the holiday season.

Please donate toys in their original unopened packaging and place them in the drop box in the lobby.

Toys will benefit children living in the Melrose, Allapatah, Little Havana, Brownsville, and Liberty City areas of Miami.

**Toys must be placed
in the drop box by
December 11th**

For more info contact:
Jannette Perez — 305-361-4367

Joyce Berkeley Retires

Joyce Berkeley, a meteorological technician with AOML's Hurricane Research Division, is retiring on December 31st after 33 years of federal service. Joyce began her federal career with the Experimental Meteorology Laboratory in Miami, Florida where one of the main focal points of research was cloud seeding. It was believed that rainfall rates could be increased in drought stricken areas by seeding clouds with silver iodide.

In 1974, the Experimental Meteorology Laboratory became part of the National Hurricane Research Laboratory. In 1980, the organization was moved into AOML on Virginia Key and renamed the Hurricane Research Division.

During her years with the Hurricane Research Division, Joyce was involved with the ongoing Synoptic Flow Experiment which seeks to improve hurricane track prediction. Among her many duties, she helped analyze and plot Omega dropwindsonde data in real time that were used by forecasters in making crucial decisions during major hurricanes. She has witnessed many changes in the evolution of hurricane research due to technological innovations and improvements. Joyce was also active in the Federally Employed Women and Blacks in Government programs, as well as with the Miami Federal Executive Board in helping to coordinate AOML's equal employment opportunity and diversity programs.

Starting the new year as a retiree, she looks forward to having more time to travel and spend with family and friends. Congratulations to Joyce for her many years of dedicated service to NOAA. Best wishes for a well-deserved and leisurely retirement.



It's a Girl!

Erica Rule, AOML's popular outreach coordinator, and her husband Lance, are the proud parents of their first child, a daughter, born December 9th, 2004, at 5:49 p.m. Sabrina Claire Rule weighed in at a healthy 7 lbs. 1 oz. Mom, Dad, and baby Sabrina are all doing well.



AOML hosted Oktober'ween, its annual Okotoberfest-Halloween party, on October 29th during the lunchtime hour. A festive group assembled to feast on bratwurst, sauerkraut, potato salad, pumpkin pie, apple cider, and, of course, lots of goodies and treats. Dressed for the occasion (pictured above left to right) were Jack Stamates, Evy (the mystery witch), Charlotte Kijek (Southeast Fisheries), Jim Bohnsack (Southeast Fisheries), Neal Dorst, Erica Rule, and Molly Baringer.

Travel

Gustavo Goni made an invited presentation at the Ocean Surface Topography Science Team Meeting in St. Petersburg, Florida on November 4-6, 2004.

Christopher Landsea made an invited presentation at the Fifth Southern New England Weather Conference in Brookline, Massachusetts on November 6, 2004.

Carlisle Thacker attended the CLIVAR Ocean Reanalysis Workshop in Boulder, Colorado on November 8-10, 2004.

Silvia Garzoli attended a Scientific Advisory Board meeting of the Inter-American Institute for Global Change in Santiago, Chile, and the South Atlantic ARGO Regional Center meeting in Buenos Aires, Argentina on November 8-19, 2004.

Scott Stolz and Jeffrey Absten performed maintenance on the Coral Reef Early Warning System (CREWS) station located in Salt River Bay, St. Croix, U.S. Virgin Islands on November 15-19, 2004.

Jules Craynock attended a NOAA Contaminated Water Diving Workshop on November 17-18, 2004 and an Emergency Medical Technician training course on November 29-December 17, 2004 in Seattle, Washington.

Judith Gray attended a summit meeting of the Southeast Coastal Ocean Observations Regional Association (SECOORA) in Jacksonville, Florida on November 30-December 3, 2004.

Robert Molinari attended the annual U.S. Argo Review Team meeting in San Diego, California on December 9-10, 2004. He also attended the NOAA Senior Executive Service Summit in Washington, D.C. on December 15-17, 2004.

Tsung-Hung Peng and Rik Wanninkhof attended the American Geophysical Union's 2004 Fall Meeting in San Francisco, California on December 13-17, 2004.

Rick Lumpkin and Claudia Schmid attended the 10th International PIRATA (Pilot Research Moored Array in the Tropical Atlantic) meeting in Fortaleza, Brazil on December 14-16, 2004.



AOML Holiday Party and Awards Ceremony

December 10, 2004

Lobby — 12:00 Noon

*Bring a covered dish or dessert
to share with others*

Price: \$8.00

*(includes turkey, ham, chicken, fish,
mashed potatoes, gravy, dressing, and drinks)*

Raffle drawing with door prizes

To register or for more info contact:

Greg Banes—305-361-4456

Monica Rodriguez—305-361-4420

Lourdes Arteta—305-361-4442

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.

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