

AOML

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Keynotes

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Argo Ocean Observing Array Now Two-Thirds Complete

The international Argo program has celebrated another milestone in its efforts to establish a global ocean monitoring system. In October, the number of profiling floats deployed worldwide topped the 2,000 mark. The array for monitoring Earth's oceans is now two-thirds of the way complete. The Argo goal of deploying 3,000 free-drifting profiling floats globally by 2006 has been ongoing since 2000.

Argo profiling floats measure the upper 2 km of the ocean. Upon release, they sink to a depth of either 1,000 or 2,000 meters and drift submerged for 10-14 days. As they surface, the floats gather temperature and salinity data which are transmitted to satellites before they sink once again to repeat their data-collecting cycle.

Argo data are made publicly available within hours of their collection. Since the program's inception, researchers with AOML's Physical Oceanography Division have managed and provided real-time processing and quality control of the U.S. Argo profiling float data. AOML is also responsible for deploying Argo floats in the Atlantic Ocean.

The program is supported by 18 countries and the European Commission. Once completed, the Argo array will provide 100,000 temperature/salinity profiles and velocity measurements annually. Researchers, however, are already using Argo data to monitor and predict climate and weather events, as well as improve their understanding of how the oceans store and transport heat and fresh water.

It is a pleasure to be here at AOML and to be serving as your new director. In the course of my career, I have worked as an operational meteorologist performing both aviation and hurricane forecasting, a research scientist, an educator, and a manager dealing with a wide variety of atmospheric and oceanographic applications. Since arriving two months ago, I have met nearly all of the staff and have very much enjoyed the interactions that we have had at Lab and Division all-hands meetings. I also appreciate that many of you have taken me up on my open-door policy and have stopped by to either introduce yourself or to discuss research or other important issues.

My personal review of AOML's research has been equally positive. I have been very impressed with the quality of research being performed in each of the divisions, and with all of the AOML publications that I have read. I believe that AOML is making vital contributions to NOAA's mission as a result of all of your individual contributions.

There are several areas of research that I would like to see developed further at AOML. One of these relates to very high resolution modeling of the atmosphere and ocean, where the observations routinely taken by AOML can be applied very effectively. The development of models that are cloud-resolving for the atmosphere and eddy-resolving in the ocean would contribute to improved forecasts of hurricane track, landfall, and intensity, as well as to address important climate questions relating to the oceans, the ecosystem, and hurricanes. A second area is Observing System Simulation Experiments (OSSEs), which can be used to define the optimal observing system for Weather and Water, Climate, and Ecosystem applications. OSSE methodology is highly developed for large-scale numerical weather prediction, but much less so for hurricanes, oceans, climate, and ecosystems. I plan to work with each of the divisions to help bring up this important capability for NOAA.

The last two months have been very exciting and challenging for all of us. I was very pleased when I saw a waterspout my first day as a NOAA employee in Florida. What I didn't know then is that we would be hit by three hurricanes in the months that followed. I want to assure everyone that my coming to Florida is not the cause for the increased frequency or intensity of hurricanes.

Robert Atlas



Robert Atlas



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



Leadership Changes for NOAA Research

NOAA's Office of Oceanic and Atmospheric Research (OAR) welcomed a new Assistant Administrator and Deputy Assistant Administrator with the new fiscal year on October 1, 2005. Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator, retired Navy Vice Admiral Conrad C. Lautenbacher, Jr., announced the changes recently in a memorandum to all NOAA employees.

"To strengthen the connectivity of NOAA's vital research components to NOAA Oceans and Coasts, and to better leverage our capabilities-to-operations outlook and the U.S. Ocean Action Plan, I have asked Dr. Richard Spinrad to lead NOAA Research" VADM Lautenbacher said. Dr. Richard Rosen, who had been serving as the Assistant Administrator for NOAA Research, has been asked to work closely with Dr. James R. Mahoney, NOAA's Assistant Secretary for Oceans and Atmosphere.

VADM also announced that Dr. John Hayes will serve as the new Deputy Assistant Administrator for NOAA Research. The former Deputy Assistant Administrator of NOAA Research under Dr. Rosen, Louisa Koch, has been appointed as NOAA's Director of Education.

AOML Participates in Post Hurricane Katrina Response

In the midst of the national recovery and relief efforts to Hurricane Katrina stricken areas, AOML is participating in an ongoing interagency effort to determine whether the Gulf coast marine food supply is safe and the risks posed to Florida's coastal waters. Working with other federal and state agencies, AOML scientists have supported this objective by participating in oceanographic surveys of the Gulf of Mexico, initiating a satellite drifter program to track water movements in the area, and posting near real-time drifter and satellite data with analyses of the results on the Internet.

The first post Hurricane Katrina response cruise was conducted aboard the NOAA Ship *Nancy Foster* on September 12-16 as part of NOAA's overall response in the Mississippi Delta and Lake Pontchartrain discharge areas. NOAA's National Marine Fisheries Service (NMFS) was deployed to

detect potential chemical contamination in fish and shrimp and to test for the presence of pathogens harmful to human health. Recognizing the effort would also require oceanographic surveys, Dr. Peter Ortner, AOML's Chief Scientist, was asked to organize a response team to collect water column samples for total suspended sediment and dissolved oxygen and to obtain mea-

surements of temperature, salinity, chlorophyll-a, colorimetric dissolved organic material, and light transmission. Ortner quickly assembled an Ocean Survey team with Shailer Cummings of AOML's Ocean Chemistry Division as the Chief Scientist. Cummings was joined by AOML's Chris Kelble and LT Bill Mowitt of the Northwest Fisheries Science Center (NWFS).

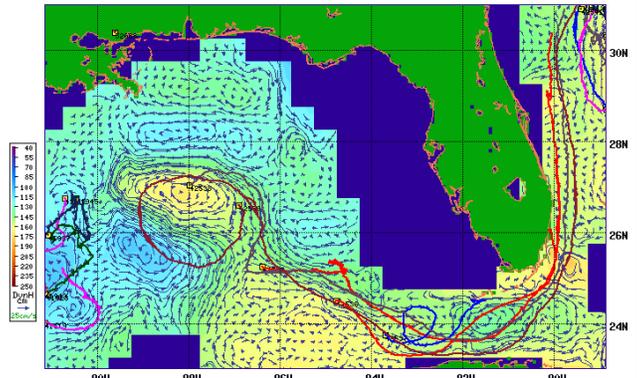
Initial cruise results indicate that salinity, colorimetric dissolved organic material, and nutrient (nitrate+nitrite, total phosphorus) levels were near normal throughout the cruise, although suspended sediments were somewhat elevated in the Mississippi Sound. The data will be compared with historical data to confirm these interpretations. Early reports from NWFS show fecal contamination indicators within normal EPA levels. The NWFS results can be viewed at www.st.nmfs.noaa.gov/hurricane_katrina.

The second post-Katrina cruise was conducted aboard the RV *Cape Hatteras* on September 22-24. Grant Rawson of AOML's Physical Oceanography Division and a volunteer collected water quality samples, acoustic Doppler current profiler data, and deployed five Surface Velocity Program (SVP) satellite drifters between the Florida Straits and the northern Gulf of Mexico (see graphic above). By tracking the Loop Current and major eddy features in the Gulf, researchers have been able to monitor how coastal pollution associated with the storm has been transported to more remote downstream regions such as south Florida.

A third cruise will be conducted on October 27-November 3rd aboard the RV *Walton Smith*, a vessel operated by the University of Miami. The first leg of that cruise will survey the southern section of the Loop Current and its associated front and the waters upstream of the Dry Tortugas.

AOML also initiated a coastal CODE drifter deployment in conjunction with the NMFS' Southeast Fisheries Science Center. To date, six drifters have been deployed along the northern Gulf coast from NMFS vessels or NMFS contract vessels under the direction of AOML scientists. The data from all three cruises, drifter trajectories, satellite data, and model analyses can be viewed at www.aoml.noaa.gov/ocd/hurricanerresponse/.

These efforts demonstrate the capability AOML has developed through its leadership in NOAA's South Florida Program to address environmental issues in the region. They also foreshadow AOML's anticipated role in development of the Gulf of Mexico Ecological Forecast Center.



Satellite trajectories of ocean drifters deployed between the Florida Straits and the northern Gulf of Mexico that monitor the transport of coastal pollution associated with Hurricane Katrina.

Blood Drive

Be a blood donor and give the precious gift of life!

October 7, 2003

9:00 a.m.-2:00 p.m.

Register at the receptionist's desk in the lobby

Sponsored by:
Community Blood Centers of South Florida

Combined Federal Campaign

A tradition of caring...



The annual CFC program enables federal employees to support thousands of non-profit charitable organizations and agencies through payroll deductions

CFC 2005:

November 1–November 30

Kickoff Event:

November 3, 2005
(at 12 noon)

Individuals returning pledge forms by November 8th are eligible to participate in a drawing for prizes that include:

- ◊ Assortment of homemade sweets including cookies, brownies, and pies
- ◊ Free car wash at AOML
- ◊ Custom ordered NOAA logo polo shirt

For more information contact:

Erica Rule
2005 CFC Coordinator

(305) 361-4541
Erica.Rule@noaa.gov

Archbishop Desmond Tutu Launches NOAA Drifter in the South Atlantic

Archbishop and Nobel Laureate Desmond Tutu and Captain Jeremy Kingston of the MV *Explorer* deployed a drifter off the coast of South Africa on September 25, 2005 as part of NOAA's continuing efforts to obtain global ocean observations. Archbishop Tutu was participating in the Semester At Sea (SAS) program aboard the *Explorer*, which serves as a floating university campus. Every semester more than 600 students sail aboard the *Explorer* for a learning experience that circumnavigates the globe. Two classes, one from the Congressional Schools of Virginia and the other from Elsie's River High School in South Africa, adopted the drifter and will be tracking its passage through the South Atlantic via the Internet.

The *Explorer* recently joined AOML's Volunteer Observing Ship network (see the January-February 2005 issue of *Keynotes*). Rick Lumpkin, an oceanographer with AOML's Physical Oceanography Division (PhOD), and John Kermond of NOAA's Office of Global Programs sailed aboard the *Explorer* during its Salvador, Brazil to Cape Town, South Africa transect on September 17-26. While aboard the *Explorer*, the two presented lectures on ocean observations and climate variability and led students in deploying ten drifters and six floats in the South Atlantic. They also left ten additional drifters for Professor William Brice's oceanography class to deploy in the Indian Ocean. At the transect's conclusion, Lumpkin presented a plaque to Dr. John Tymitz, the SAS Executive Dean, acknowledging the valuable partnership between NOAA, SAS, and the MV *Explorer*.

Lumpkin greatly enjoyed his interaction with the students, faculty, and staff of the ship. All were enthusiastic, and deployments (including a 1:00 a.m. Argo float launch) were always well attended. Kermond filmed several of the launches, Lumpkin's lectures, interactions with students, and various snippets of life aboard the *Explorer* including a Neptune Day ceremony. He is producing a video that will soon appear on the Office of Global Programs web site.

Gustavo Goni (AOML/PhOD) participated in the first South Atlantic transect deployment from aboard the *Explorer*, as reported in the May-June 2005 issue of *Keynotes*. Elizabeth Steffen of NOAA's Pacific Marine and Environmental Laboratory will join the *Explorer* in Japan in November 2005 to deploy six additional floats in the Pacific.



Archbishop Desmond Tutu (left) and Captain Jeremy Kingston deploy a surface drifter from the fantail of the MV *Explorer*.



Rick Lumpkin aboard the MV *Explorer* teaches Semester At Sea students about oceanographic instruments.



Rick Lumpkin leads Semester At Sea students in the deployment of a South Atlantic drifter.



The name of AOML's coral research program has been changed from the Coral Reef Early Warning System (CREWS) to the Integrated Coral Observing Network (ICON).

September-October 2005 Informal Research Reports

September 8

Estimating Salinity in the South Atlantic

Dr. Carlisle Thacker
Physical Oceanography Division

September 13

The Atlantic North Equatorial Countercurrent

Dr. Gustavo Goni
Physical Oceanography Division

September 22

Subsurface Temperature Variability in the North Atlantic

Dr. Molly Baringer
Physical Oceanography Division

September 22

Salinity Variability in South Florida Coastal Waters, 1995-2005

Dr. Elizabeth Johns
Physical Oceanography Division

September 27

Data Assimilation with a HYbrid Coordinate Ocean Model (HYCOM): Implementing the NRL Coupled Ocean Data Assimilation (NCODA) System

Dr. Hee-Sook Kang
Physical Oceanography Division

October 20

A Simple Atmosphere-Ocean Model of Tropical Atlantic Decadal Variability: Interaction between Zonal and Meridional Modes

Dr. Sang-Ki Lee
Physical Oceanography Division

October 22

Electrochemical Biosensors to Monitor Coastal Waters for Biological Threats

Dr. Michael LaGier
Ocean Chemistry Division

First Successful Unmanned Aircraft Observations Obtained in Tropical Storm Ophelia

Scientists with AOML's Hurricane Research Division (HRD) marked a new milestone in airborne observations of tropical cyclones as the first unmanned aircraft touched down after a successful 10-hour surveillance mission into Tropical Storm Ophelia on September 16th. The aircraft, known as an Aerosonde, provided the first-ever detailed observations of the turbulent, high-wind environment just above the ocean surface, an area considered too dangerous for NOAA and U.S. Air Force Reserve manned aircraft to observe directly.

NOAA's partners in this effort included Aerosonde North America, the company which designed and operates the aircraft, and NASA's Wallops Flight Facility, located on Virginia's eastern shore. Tropical Storm Ophelia provided the perfect test case for using Aerosondes, as it vacillated between being a minimal hurricane and strong tropical storm within flight range of the Wallops Flight Facility. Wallops houses the U.S. base that served as both the departure and landing location for this historic flight.

The environment where the atmosphere meets the ocean is critically important in tropical cyclones, as this is where the ocean's warm water energy is directly transferred to the atmosphere just above it. The tropical cyclone/ocean interface is also important because it's where the strongest winds are located. Observing and understanding this region of the storm is crucial for improving forecasts of tropical cyclone intensity and structure. Enhancing this predictive capability will not only save the U.S. economy billions of dollars but also save many lives.

"If we want to improve future forecasts of hurricane intensity change, we need to get continuous low-level observations near the air-sea interface on a regular basis, but manned flights near the surface of the ocean are risky," said Joe Cione, HRD lead scientist on this project. "Remote unmanned aircraft such as the Aerosonde are the only way. Today we saw what hopefully will become 'routine' in the very near future."

The Aerosonde that flew into Ophelia was specially outfitted with Global Positioning System (GPS) dropwindsondes and a satellite communications system that relayed temperature, pressure, humidity, and wind speed data every half second. It also carried a downward positioned infrared sensor to estimate the underlying sea surface temperature. All available data were transmitted in near-real time to the National Hurricane Center and to AOML. The Aerosonde project is funded by NASA and NOAA Research to test this promising new observational tool.

While satellites and the use of NOAA's WP-3D Orion and Gulfstream-IV aircraft, as well as the U.S. Air Force Reserve's WC-130H aircraft, have helped advance the understanding of tropical cyclones, detailed observations of the near-surface environment have been elusive due to the severe safety risks associated with low-level, manned-flight missions. The Aerosonde observing platform, with its long endurance capability and capacity to fly at altitudes as low as 500 feet, addresses this observational deficiency.

Accomplishments from this flight include the first detailed documentation of the ocean/atmosphere interface, heretofore an unsampled region of the tropical cyclone, while simultaneously providing the National Hurricane Center with near surface wind and thermodynamic data from within Tropical Storm Ophelia.

Reprinted from an official NOAA press release of September 16, 2005.



An aerosonde unmanned aircraft being released from its transport vehicle on the runway at the NASA Wallops Flight Facility, in Wallops Island, Virginia, on September 16, 2005.

Welcome Aboard

David Wanless joined the staff of the Ocean Chemistry Division in October as a CIMAS Research Associate. He will assist Dr. Kelly Goodwin with research activities related to the Environmental Microbiology Laboratory.

Congratulations

Howard Friedman, Deputy Director of AOML's Hurricane Research Division, has been elected to serve as the 2006 treasurer of the South Florida Federal Executive Board.

David Palmer, a physicist with AOML's Ocean Chemistry Division, and Dr. Oleg Godin of the University of Colorado's Cooperative Institute for Research in Environmental Sciences (CIRES), have signed a contract with World Scientific Publishing Company to serve as co-editors for the publication of a new book entitled *A History of Soviet and Russian Underwater Acoustics*. The book is expected to appear in print in 2006 and be approximately 800 pages in length.

Chunzai Wang, an oceanographer with AOML's Physical Oceanography Division, has been selected to serve a two-year term as a member of the American Geophysical Union's Books Board representing its Ocean Sciences section.



Photo courtesy of Paul Willis

Patrolling the grounds with measured efficiency, AOML's new 24-hour security guard keeps a watchful eye over the mangrove.

Farewell

Douglas Anderson, an electronics technician with AOML's Physical Oceanography Division, retired on September 30, 2005 after 28 years of federal service (all spent at AOML). During his years with the Laboratory, Anderson traveled the world in support of the Physical Oceanography Division's data-gathering field efforts. Sailing aboard an array of NOAA and commercial ships, he participated in research cruises in the Caribbean Sea, Atlantic, Pacific, and Indian Oceans. Anderson's technical expertise contributed to the success of many of PhOD's research programs including, among others, OTEC (Ocean Thermal Energy Conversion), STACS (Subtropical Atlantic Climate Studies), EPOCS (Equatorial Pacific Ocean Climate Studies), CLIVAR (Climate Variability Experiment), and WOCE (World Ocean Climate Experiment).



"It was definitely interesting," said Anderson. "There's probably no other job I would have stayed in for 28 years." Anderson and his wife Diane will make their home in the town of New Tazwell, Tennessee. AOML wishes Doug and Diane a long and happy retirement.

Christopher Landsea, a research meteorologist with AOML's Hurricane Research Division (HRD), accepted a position with the National Hurricane Center/Tropical Prediction Center in September as their new Science and Operations Officer. He leaves behind him a successful affiliation with HRD that spans more than 20 years.



Landsea was first introduced to HRD through the Miami-Dade County Public Schools' Community Laboratory Research Program. During his senior year of high school in 1982-1983, Landsea worked as a student intern with HRD scientists, earning credits towards graduation for analyzing radar data and studying the rainband structure of Hurricane Frederic. As a result of this learning experience, Landsea made meteorology, particularly hurricanes and tropical meteorology, the focus of his education. Landsea continued working with HRD scientists during the summers between undergraduate and graduate school years.

After completing a doctoral degree in atmospheric sciences at Colorado State University in 1994, Landsea returned to Miami and to HRD as a post-doctoral fellow supported by NOAA's Climate and Global Change Program. In 1995, he was hired by HRD as a member of their permanent staff.

Among Landsea's accomplishments while with HRD, he earned a Department of Commerce Bronze Medal, the American Meteorological Society's Editorship Award, and was named a NOAA Employee of the Month. In addition to these honors, he was recently the recipient of a 2005 NOAA Administrator's Award. AOML extends its best wishes to Chris for his continued success.

AOML's first line of defense against mosquitos is a device called a "mosquito magnet." The mosquito magnet emits carbon dioxide, heat, moisture, and a short-range attractant that female mosquitos (the ones that bite) find irresistible. Drawn by the scent, mosquitos are vacuumed into a net where they dehydrate and die. With two mosquito magnets located on the AOML grounds, the need to spray for the pesky critters has been eliminated. The ever-adaptable mosquito has been around for 170 million years, with more than 175 known species in the United States.



Travel

Claudia Schmid attended an International African Monsoon Multidisciplinary Analysis (AMMA) meeting in Biarritz, France on September 19-23, 2005.

Shailer Cummings and Charles Featherstone cleaned and refurbished the acoustic Doppler current profilers (ADCP) aboard the *Explorer of the Seas* while it was in dry dock at the Grand Bahamas Island Ship Yard during the week of September 25-October 2, 2005.

Steven Cook attended the Western Indian Ocean Expendable Bathythermograph (XBT) Workshop in Goa, India on October 5-7, 2005.

David Enfield attended the CLIVAR (Climate Variability) Workshop on the South Pacific in Concepcion, Chile on October 11-14, 2005.

Rick Lumpkin attended a PIRATA (Pilot Research Moored Array in the Tropical Atlantic) meeting in Toulouse, France on October 12-14, 2005.

Jeffrey Absten, Hector Casanova, Jules Craynock, James Hendee, Jeffrey Judas, and Scott Stolz traveled to La Parguera, Puerto Rico where they assembled and deployed a new ICON (Integrated Coral Observing Network) monitoring station on October 16-21, 2005.

Steven Cook, Craig Engler, and Mayra Pazos attended the 21st Session of the Data Buoy Cooperation Panel in Buenos Aires, Argentina on October 17-21, 2005.

Silvia Garzoli, Gustavo Goni, and Robert Molinari made presentations at the Fifth Tropical Atlantic Workshop in Venice, Italy on October 17-19, 2005.

Robert Atlas made a presentation entitled *Tropical Applications of Precipitation Measurements* at the National Academy of Science in Washington, D.C. on October 18, 2005.

Silvia Garzoli and Robert Molinari attended a KAPEX (Cape of Good Hope Experiment) Principal Investigators meeting in Paris, France on October 25-26, 2005.

Recent Publications*

Ansonge, I., S. Speich, J. Lutjeharms, G.J. GONI, C. Rautenback, P. Froneman, and S.L. GARZOLI, 2005: Monitoring the oceanic flow between Africa and Antarctica: Report of the first Good Hope cruise. *South African Journal of Science*, 101(3-4):29-35.

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Blake, E.S., E.N. Rappaport, J.D. Jarrell, and C.W. LANDSEA, 2005: The deadliest, costliest, and most intense United States tropical cyclones from 1851 to 2004 (and other frequently requested hurricane facts). NOAA Technical Memorandum, NWS TPC-4, 48 pp.

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POWELL, M.D., G.A. SOUKUP, S. Cocke, S. Gulati, N. MORISSEAU-LEROY, S. Hamid, N.M. DORST, and L. Axe, 2005: State of Florida hurricane loss projection model: Atmospheric science component. *Journal of Wind Engineering and Industrial Aerodynamics*, 93(8):651-674.

PRONI, J.R., V. Fox-Norse, S.J. STAMATES, and J.F. CRAYNOCK, 2005: Innovative applications of ocean acoustics and other technologies for marine monitoring and assessment-effluent plume studies of the MWRA Outfall. *Proceedings, Coastal Zone 2005 Conference: Balancing on the Edge*, New Orleans, LA, July 17-21, 2005. NOAA Coastal Services Center, CD-ROM, 7 pp.

Wang, D., C. WANG, X. Yang, and J. Lu, 2005: Winter northern hemisphere surface air temperature variability associated with the Arctic Oscillation and North Atlantic Oscillation. *Geophysical Research Letters*, 32(16):L16706, doi:10.1029/2005GL022952.

*Names of AOML authors appear in capital letters.

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