

AOML Keynotes

ATLANTIC OCEANOGRAPHIC AND METEOROLOGICAL LABORATORY



AOML is an environmental laboratory of NOAA's Office of Oceanic and Atmospheric Research on Virginia Key in Miami, Florida

UAV Dropsonde System Successfully Tested

A dropsonde system designed for use aboard NASA's Global Hawk unmanned aerial vehicle (UAV) was successfully tested in February and March 2011 during the Winter Storms and Pacific Atmospheric Rivers (WISPAR) experiment. WISPAR was conducted as a tri-agency effort of NOAA, NASA, and the National Center for Atmospheric Research (NCAR) to better understand how plumes of deep moisture known as "atmospheric rivers" evolve and to test the operational and research applications of the new dropsonde system. The WISPAR effort was also designed to deploy dropsondes in conjunction with NOAA's Winter Storms Reconnaissance (WSR) program.

NCAR developed the Global Hawk dropsonde system at NOAA's request for use in the Genesis and Rapid Intensification Processes (GRIP) field campaign that took place during the 2010 Atlantic hurricane season. However, the system had not become fully operational at the time of the GRIP project and the dropsondes were not used. While modifications were subsequently made to the UAV's dropsonde system, plans were also underway to flight-test the system and to set a schedule for the WISPAR campaign.



Photo courtesy of NASA

NASA's Global Hawk UAV will serve as the launch platform for an a new dropsonde system developed for NOAA.

Researchers developed the WISPAR experiment not only to improve their understanding of atmospheric rivers, but also as an opportunity to finally test the dropsonde system aboard the Global Hawk. AOML meteorologist Michael Black participated in the Global Hawk's test and science missions that were conducted from NASA's Dryden Flight Research Center at Edwards Air Force Base in California.

Dropsondes have proven to be an invaluable aid in understanding atmospheric processes in and around the environment of tropical cyclones and other weather systems. The instruments are launched from research and reconnaissance aircraft and gather pressure, temperature, humidity, and wind data as they descend through the atmosphere. Dropsondes are manually released from conventional aircraft, but the system must be fully autonomous and extremely reliable on unmanned aircraft.

UAVs are increasingly being considered as instrument platforms due to their ability to fly long distances, stay aloft for long durations, and gather data at both very high and very low altitudes, regions sometimes too dangerous for humans to venture. The Global Hawk has unique capabilities since it can

carry a large scientific payload, operates at altitudes ranging from 55,000 to 65,000 feet, and has a flight duration of up to 30 hours.

During its three WISPAR science missions, the Global Hawk logged a combined total of almost 70 flight hours and successfully deployed 177 dropsondes at altitudes as high as 60,000 feet. The first mission was flown into an atmospheric river encountered near Hawaii, while the second gathered atmospheric data in conjunction with a NOAA WSR flight of a winter storm that developed over the North Pacific. The third mission, conducted in the Arctic atmosphere as far north as 85° latitude, demonstrated the Global Hawk's ability to sample the extreme northern hemisphere where in situ measurements are scarce and environmental conditions are harsh for aircraft and scientific instruments.

The success of this flight indicates that dropsondes deployed within and near the "Polar Vortex" of the Arctic will enable researchers to gather valuable observations in a region whose weather can influence atmospheric conditions globally. Routine sampling with dropsondes in the Arctic or other data-sparse regions could thus provide a means to improve weather forecasts throughout North America. *(continued on page 2)*



Photo courtesy of NASA

The automated dropsonde launching assembly designed for installation on the NASA Global Hawk UAV.

(continued from page 1)

Although the Global Hawk will not be used for data-gathering missions during the 2011 Atlantic hurricane season, the dropsonde system and other scientific instruments will undergo further testing in the latter part of the summer. These tests are in preparation for NASA's Hurricane and Severe Storm Sentinel (HS3) effort, a five-year field campaign that begins in 2012.

Researchers with AOML's Hurricane Research Division and other NOAA field offices will be heavily involved in the HS3 effort to investigate the processes that underlie hurricane formation and intensity change in the Atlantic Ocean basin. It is anticipated that both the Global Hawk and its dropsonde system will provide unique observational capabilities throughout the HS3 campaign.



NASA's Operations Center for the Global Hawk UAV at the Dryden facility at Edwards Air Force Base in California. Kathryn Sellwood and Michael Black of AOML's Hurricane Research Division appear in the lower left corner of the photograph as co-mission scientist Gerald Heymsfield of the Goddard Space Flight Center stands alongside them.

AOML Experiences a Close Encounter of the F0 Kind

A severe thunderstorm warning was issued for south Florida during the late morning hours of March 10th as a cold front approached the region. Virginia Key, home to AOML on the Rickenbacker Causeway, was one of the areas included in the warning.

At approximately 12:19 p.m., AOML meteorologist Sim Aberson was near the entrance to the Rickenbacker Causeway in his car. Stopped at a traffic light, Sim observed a dark line of clouds moving quickly in a northeastwardly direction. A dramatic increase in the wind lifted leaves, palm fronds, and other debris skyward in a spinning pattern. In less than a minute the gale-force winds subsided, and Sim proceeded to drive over the Rickenbacker Causeway bridge.

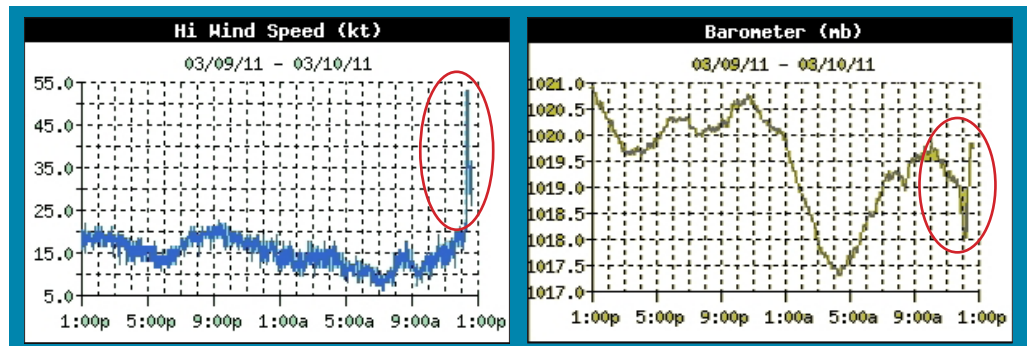
On his approach to AOML, a funnel cloud formed about a quarter mile in the distance from Sim. He watched as it briefly touched down in front of the MAST Academy, a Miami-Dade County public high school located near AOML. The funnel cloud then continued on its eastward trek, passing either very close to or directly over AOML before heading out to sea at about 12:23 p.m.

Weather observations gathered at AOML confirmed Sim's sighting of the funnel cloud. A Vantage Pro 2 weather station on the AOML roof recorded a sharp rise in wind speed, with a maximum wind gust of 53 knots (about 60 mph), along with a very quick 2 hPa drop in air pressure, followed by an even faster rise (see graphics at right).

A distinct wind shift from south to north was also observed at the time, although it appears the wind direction did not return



As viewed from AOML, heavy bands of cumulonimbus clouds loomed ominously in the sky above metropolitan Miami on March 10th in advance of an approaching cold front.



Weather data gathered at AOML showed that a sharp spike in wind speed and barometric pressure occurred on March 10th during the time frame when a funnel cloud was sighted on Virginia Key near AOML.

to its previous southern direction after the funnel cloud's passage. This may be due to the strong gust front that quickly followed.

Based upon Sim's observations and the weather statistics gathered at AOML, it

appears that a F0 tornado formed and briefly touched down on Virginia Key near AOML on March 10th before dissipating at sea. Virginia Key was subsequently pelted with gusty winds and heavy rain.

First Benchmark Met for MARES South Florida Coastal Ecosystem Project

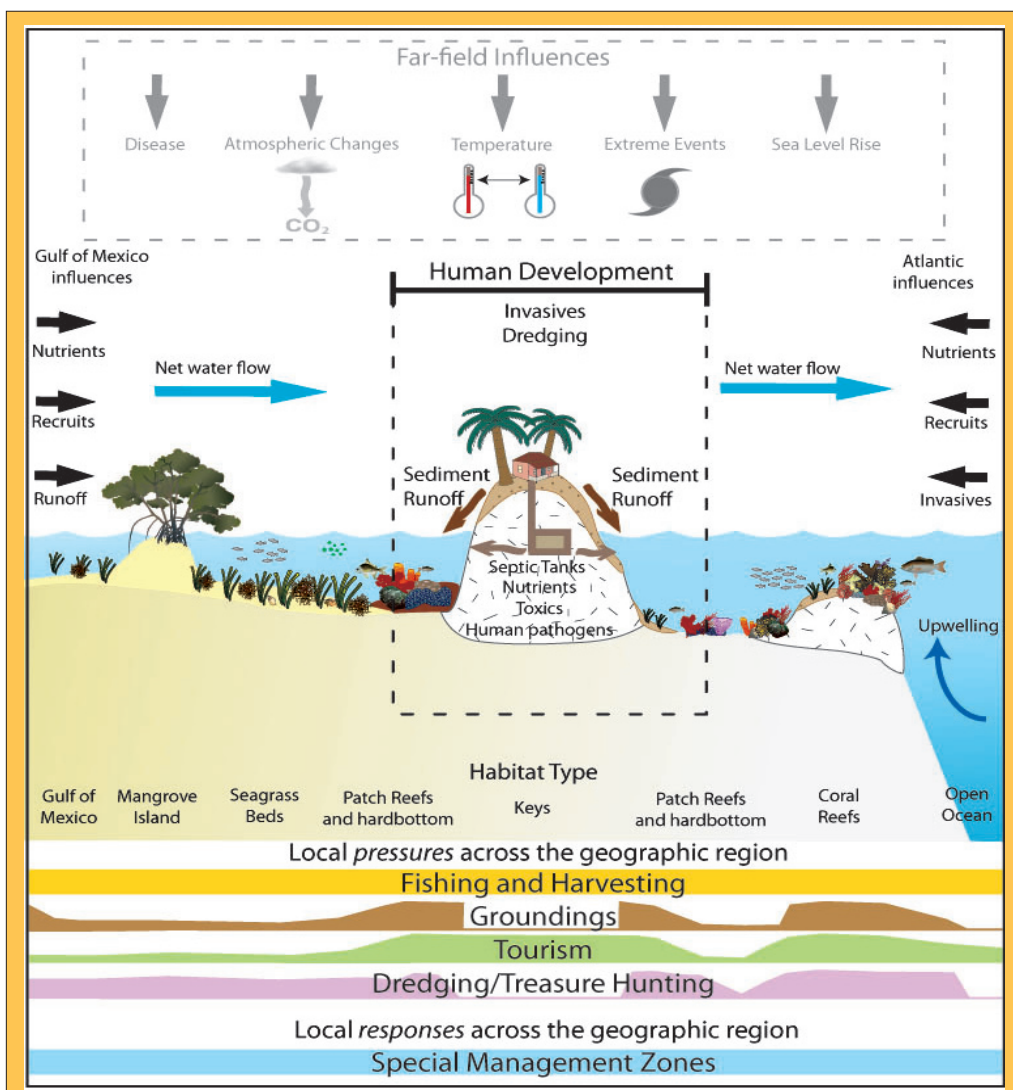
Beautiful beaches, vibrant coral reefs, mangrove forests, and the Everglades: coastal ecosystems are a vital component of life in south Florida, and their health is inextricably linked to the region's economic prosperity, development, and sustainability. Preservation of these sensitive environments is, however, increasingly challenged by the needs and impacts of south Florida's burgeoning human population.

The Marine and Estuarine Goal Setting for South Florida, or MARES, initiative began in December 2009 as a three-year effort to assess the collective south Florida coastal ecosystem. The goal of MARES is to reach a science-based consensus on the defining characteristics and fundamental regulating processes for the south Florida coastal marine ecosystem that is both sustainable and capable of providing the diverse ecological services upon which our society depends.

MARES researchers have been working to accomplish this goal by hosting a series of technical workshops aimed at developing two key benchmarks: (1) integrated conceptual ecosystem models (ICEMs) for the southwest Florida shelf, Florida Keys/Dry Tortugas, and southeast Florida shelf (see figure below); and (2) quantitative ecosystem indicators that can be monitored to assess changes and reflect the conditions occurring in south Florida's ecosystems.

The collaborative MARES effort is being lead by both natural and social scientists including Chris Kelble and Pamela Fletcher of AOML's Ocean Chemistry Division, with contributions from academic, federal, state, local, public, and private organizations. This larger, collective MARES team includes Tom Carsey, Jack Stamates, and Michelle Wood of AOML's Ocean Chemistry Division.

A MARES workshop held on March 29-30, 2011 for the southeast Florida shelf marked the completion of the first phase of



Example of a conceptual illustration depicting the principal drivers, including near-field and far-field influences, that impact coastal ecosystems in the Florida Keys and Dry Tortugas reef tract.

the MARES effort dedicated to the development of the ICEMs. The ICEMs synthesize our knowledge about the natural and human systems in a manner that is useful to decision making. They were developed through consensus-building meetings with the bridging concept of "ecosystem attributes that people care about" as a means to link the social and natural sciences.

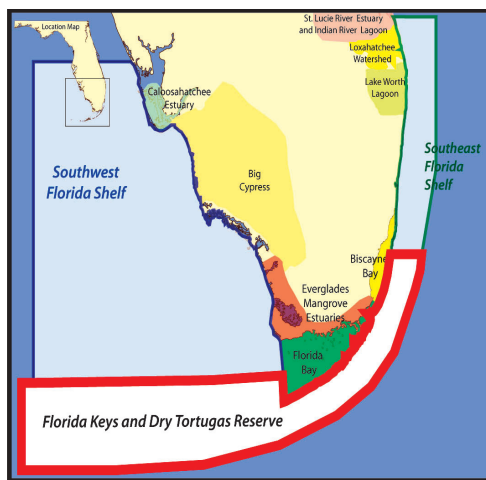
To better represent the spatial variability in south Florida's coastal ecosystems and define the bounds within which a decision will produce an effect, Pamela Fletcher, a Florida Sea Grant employee, has developed illustrated ICEMs that have proven to be effective communication tools (see diagram above). These illustrations clearly depict the spatial distribution of pressures and human activities in the various ecosystems, e.g., the depiction of far-field pressures such as elevated carbon dioxide levels that affect the ecosystem but which are outside the control of the local decision-making process.

By graphically depicting the spatial distribution of pressures and human activities,

managers can more clearly visualize the geographic realm over which their management decisions will have an impact. Moreover, depicting human activities in the illustrated ICEMs allows for the delineation and development of a separate state model for the "marine-dependent human population," thus, more fully integrating human dimensions into the MARES process.

The MARES effort will now turn its focus to the development of quantitative ecosystem indicators and their targets, as well as the effective communication of MARES products to decision makers and the general public. This will draw heavily upon the Ocean Chemistry Division's experience in scientific communication and indicator development.

Completion of these two benchmarks will ultimately provide the means for identifying ecosystems in need of immediate attention and those that are meeting science-based consensus goals. For more information on the MARES project, visit the project's website at www.sofl-mares.org or contact Pamela Fletcher (Pamela.Fletcher@noaa.gov).



Integrated conceptual ecosystem models have been developed for the three south Florida subregions, completing the initial phase of the MARES project.

Closed Ranks in Oceanography

A study published in the April 2011 issue of *Nature Geoscience* examines employment trends for men and women physical oceanographers at the PhD level. LuAnne Thompson, Renellys Perez, a CIMAS assistant scientist with AOML's Physical Oceanography Division, and Amelia Shevenell conducted a survey of career paths of men and women who obtained PhDs in physical oceanography from six main U.S. oceanographic institutions between 1980 and 2009. The survey was undertaken in support of the Mentoring Physical Oceanographic Women to Increase Retention (MPOWIR) effort (1). Career path was defined by the current (or terminal, if retired) position by searching university, laboratory, and corporate web pages.

Out of a 257 men and 92 women sample, all but ten men and one woman were located. Individuals were sorted into seven categories: tenured or tenure track faculty, academic research faculty, civil/contract employee at a government laboratory, private sector position, academic research staff/lecturer, post-doctoral positions, and finally those that could not be found or were not employed in science. However, graduates holding post-doctoral positions as of 2009 were excluded from the analysis.

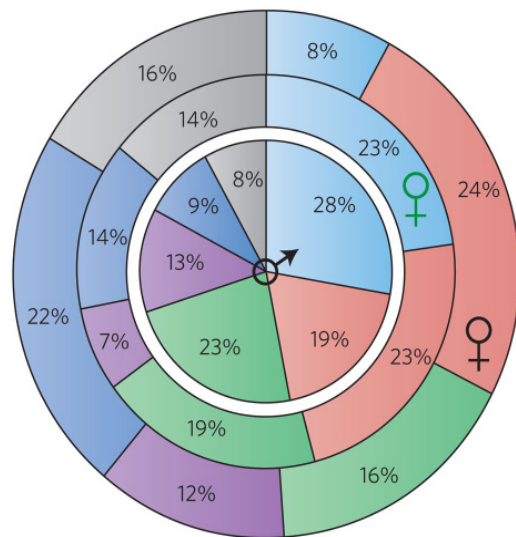
Substantial gender differences were found, particularly when data were disaggregated into two groups of individuals: those who earned PhDs from 1980 to 1995 and those

who earned PhDs from 1996 to 2009. For those who earned PhDs from 1980 to 1995, chances of attaining a tenure-track position were almost equal between men and women.

Since then, the situation has deteriorated, and for those who earned their PhD between 1996 and 2009, the fraction of women who were in tenure track positions was only about one-third of the fraction of men who passed that hurdle. Diversity studies suggest that critical mass for minorities to achieve adequate representation in employment groups is 15% (2). In our sample, women obtained 20% of the tenure track faculty positions before 1996, suggesting a critical mass of women were hired into faculty ranks during this time interval. Women awarded PhDs after 1996 obtained only 11% of the tenure track faculty positions.

Women in our sample were more likely to attain research faculty positions which are fixed-term and funded primarily from research grants. Although female PhDs are reaching parity with male PhDs in physical oceanography in the research track, women are not transitioning to tenure track faculty positions at the same rate as men.

- (1) Thompson, L., R.C. Perez, and A.E. Shevenell, 2011: *Nature Geoscience*, 4 (4), 211-212 (doi:10.1038/ngeo1113).
- (2) Etzkowitz, H., C., Kemelgor, M. Neuschatz, B. Uzzi, and J. Alonzo, 1994: *Science*, 266 (5182), 51-54 (doi:10.1126/science.7939644).



Graphic courtesy of *Nature Geoscience*

■ Tenure track	■ Private sector
■ Research faculty	■ Research staff and instructors
■ Government	■ Other

1980-2009 ♂ 1980-1995 ♀ 1996-2009 ♀

The gender gap in physical oceanography. Whereas 28% of the men in our sample who earned their PhD between 1980 and 2009 obtained tenured or tenure-track positions, the fraction of women holding these positions dropped sharply from 23% (middle circle) to 8% (outer circle). At the same time, more women left science or were employed as research staff or as lecturers. (Figure reproduced from Thompson *et al.*, 2011, *Nature Geoscience*.)

In March, members of AOML's Hurricane Research Division (HRD) attended Aviation Water Safety Training in preparation for the upcoming 2011 Atlantic hurricane season and the Division's hurricane field program conducted aboard NOAA aircraft. All participants on hurricane research flight missions are required to undergo water safety training every five years to comply with NOAA's Aviation Safety Policy. The two-day classroom and pool course, taught by Federal Aviation Administration safety-certified trainers, covered topics such as the physiological effects of flying on the human body, post-crash survival skills, personal survival kits, survival shelter, and survival signaling.

In the pool, HRD staff learned about the Winslow life raft, survival swimming techniques, and how to use a HEEDS bottle, a small device that enables underwater breathing for short periods of time. They also practiced aircraft evacuation skills using a Shallow Water Egress Trainer (SWET) chair. A cold weather safety immersion suit that facilitates floating and the retention of body heat was donned by every participant to experience its capabilities.

Left: HRD meteorologist Eric Uhlhorn floats effortlessly in the Coast Guard Base pool at Opa Locka Airport wearing a cold weather safety immersion suit.



Upper right: HRD staff huddle together to practice water survival skills.



Lower right: HRD meteorologist Jason Dunjon prepares to be dunked upside down in the SWET chair to practice his submersion evacuation skills.



AOML Hosts Annual Ship of Opportunity Meeting

Researchers with AOML's Physical Oceanography Division hosted the annual International Operations meeting for the NOAA-AOML Ship Of Opportunity Program (SOOP) on March 8-9th. More than 30 scientists, technical specialists, and project managers from AOML, the National Weather Service, and the National Marine Fisheries Service's Northeast Fisheries Science Center participated in the meeting.

Technical and logistical issues were addressed, with a focus on SOOP's high density expendable bathythermograph (XBT) transects and thermosalinograph (TSG) observations, as well as advances made to the Ship Environmental Data Acquisition System (SEAS) software. Discussions were geared towards the support of programs such as the Oleander Project. The *Oleander* is a merchant vessel that has gathered a variety of oceanographic parameters for almost 20 years during its weekly transits between Elizabeth, New Jersey and Hamilton, Bermuda. Presentations were made on the status of the recent installation of a TSG instrument on the *Reykjafoss*, a container ship that travels between Reykjavik, Iceland and Boston, Massachusetts. The TSG installation aboard the *Reykjafoss* was carried out in support of the pCO₂ project of AOML's Ocean Carbon Group.

AOML's SOOP program leads an international effort to implement a global XBT network, recommended by the international community, with the aim to provide oceanographic observations for scientific research.

During the workshop the implementation of new XBT transects was discussed. Some of these new transects started this year, with XBT sampling in the northern portion of the North Atlantic Ocean in collaboration with French scientists from the Institut de Recherche pour le Développement (IRD) and the University of Paris. SOOP currently maintains international collaborations with several institutions and universities in Argentina, Australia, Brazil, France, India, and South Africa. The critical need to maintain and enhance these collaborations was also discussed during the workshop.

This year the workshop was attended by three port meteorological officers from New Orleans, Louisiana, Fort Lauderdale, Florida, and Charleston, South Carolina, in support of the National Weather Service's Voluntary Observing Ship (VOS) program. The interaction between SOOP and VOS is important for creating greater synergy between these projects and for facilitating several logistical and ship recruitment tasks which are common to both groups. The relationship between VOS and SOOP is also linked to the SEAS software, which is the standard software used by VOS in the U.S. to collect meteorological observations from hundreds of ships, including the ships of the NOAA fleet.

SOOP is a global network of commercial vessels that aid NOAA in obtaining surface and subsurface oceanographic measurements through the deployment of equipment such as XBTs, TSGs, surface drifters, and Argo floats. The program is responsible for the transmis-



Attendees of the annual International Operations meeting for the Ship of Opportunity Program on the front steps at AOML.

sion and quality control of XBT and TSG data in real-time and its dissemination through the Global Telecommunication System (GTS).

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

Retirement Party for Judy Gray

June 10, 2011

4:00 p.m.

\$15.00 per person

Rickenbacker Fish Company
3301 Rickenbacker Causeway
(305) 361-0040

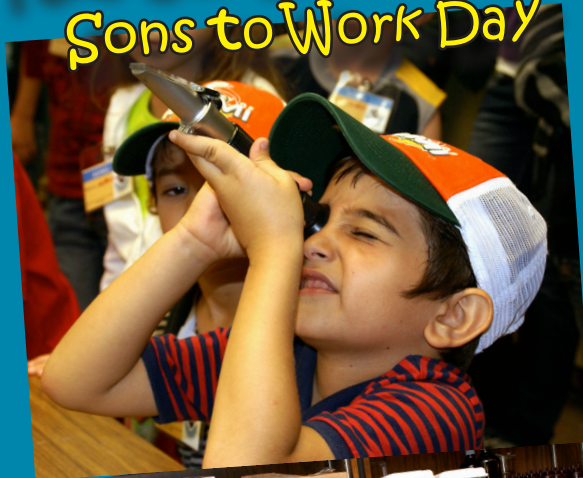
RSVP by June 3, 2011

Erica.Rule@noaa.gov
Gladys.Medina@noaa.gov



Dr. Jim Hendee, program manager of NOAA's Coral Health and Monitoring Program at AOML (standing on bench wearing white shirt), joined volunteers for a beach cleanup event at Lauderdale-By-The-Sea on Saturday, March 5th. The coastal community is located 30 miles north of Miami and has living coral reefs within 100 feet of its shores. Hendee presented an overview of NOAA's Marine Debris program, as well as NOAA's long-term efforts to globally assess environmental conditions at coral reefs through satellite data collection and monitoring stations that gather in situ observations. He also spoke of the fragility of coral reef ecosystems and how they provide a habitat for a rich diversity of marine organisms. Coral reefs worldwide are increasingly challenged by factors such as pollution, urban and agricultural runoff, climate change, and ocean acidification.

Take Our Daughters and Sons to Work Day



AOML celebrated *Take our Daughters and Sons to Work Day* on April 28th. For the 18 children who accompanied their parents to work, the morning was filled with learning and discovery activities, followed by a lunchtime cookout and then time with parents to learn about all the interesting things they do in support of NOAA. Thanks to Erica Rule, AOML's Communications and Outreach Coordinator, for organizing and coordinating the day's events and to the many volunteers who ensured the experience was memorable for AOML's next generation of budding scientists.

Farewell

Lourdes Arteta, a CIMAS administrative assistant with the Admin Group of AOML's Office of the Director, resigned in March. During Lourdes' seven years with the Admin Group, she was responsible for a variety of tasks related to government bills of lading, public transit benefits, bankcards, purchase orders, and the reconciliation of financial reports. Lourdes has accepted a position with the budget and administrative office of NOAA's Southeast Fisheries Science Center located across the street from AOML.



Congratulations

Cheryl Brown, a CIMAS research associate with AOML's Ocean Chemistry Division and an auxiliary member of the U.S. Coast Guard (USCG) District 7's Flotilla 6-7, recently earned her certification as a Commercial Fishing Vessel Examiner. The certification enables Cheryl to perform dockside inspections of vessels for required safety equipment and to ensure their compliance with federal safety regulations. The certification also provides Cheryl with the authority to issue compliance decals that are valid for two years for commercial fishing vessels that meet all safety requirements. The Coast Guard Auxiliary is a civilian, non-military component of trained volunteers that supports the Coast Guard by promoting boating safety and the safety and security of citizens, ports, waterways, and coastal regions.



Pedro Di Nezio, a CIMAS research associate with AOML's Physical Oceanography Division, earned a Ph.D. from the University of Miami's Rosenstiel School of Marine and Atmospheric Science on March 28th by successfully defending his thesis entitled *Mechanisms of tropical Pacific climate change: Beyond the Bjerknes feedback*. Dr. Amy Clement, an associate professor with the Rosenstiel School's Division of Meteorology and Physical Oceanography, served as his dissertation advisor. Pedro has subsequently been accepted into the Young Investigator Postdoctoral Program of the University of Hawaii's School of Ocean and Earth Science and Technology (SOEST). He will begin his post-doctoral fellowship with SOEST in September 2011 to perform research on the predictability of the El Niño/La Niña-Southern Oscillation, or ENSO, a climate pattern that periodically occurs across the tropical Pacific Ocean.



Maria Pelegrin, a MAST Academy student intern with AOML's Computer Networks and Services Division, was recognized by the South Florida Federal Executive Board (FEB) at its quarterly meeting on March 17th. The FEB acknowledged Maria for her outstanding work in organizing the content and developing the structure of its new web site. Due to Maria's diligent efforts, the site was completed in a timely manner, enabling the FEB to better serve and communicate with the south Florida federal community. Close 130 civilian, military, postal, and law enforcement federal agencies from West Palm Beach to the Florida Keys currently participate in the FEB program. A high school senior, Maria will graduate from the MAST Academy in May 2011 and has already been accepted at several top-tier universities to study computer engineering.



Linda Pikula, regional librarian of the NOAA/National Oceanographic Data Service's Miami Library located at AOML, is the recipient of an International Oceanographic Data and Information Exchange (IODE) Achievement Award. Linda received the award from Dr. Wendy Watson-Wright, head of the Intergovernmental Oceanographic Commission, on March 22nd during the IODE's 50th Anniversary International Conference in Liege, Belgium. The award honors Linda's championship of marine information and her role as an "Ocean Teacher" during numerous IODE information management courses, as well as her commitment to shaping a global community of marine information managers. In addition to Linda, Sydney Levitus of the National Oceanographic Data Service was also recognized by the IODE with an Achievement Award for his leadership of the Global Oceanographic Data Archaeology and Rescue (GODAR) and World Ocean Database projects.



Robert Rogers, a meteorologist with AOML's Hurricane Research Division, was selected as NOAA's April 2011 Employee of the Month. Rob received the honor in recognition of his leadership during NOAA's 2010 Hurricane Field Program (HFP). The annual HFP effort to gather data from the core and surrounding environment of tropical cyclones requires extensive coordination with researchers from numerous NOAA line offices and federal agencies such as NASA and the National Science Foundation, as well as with academic and international partners. As the HFP director, Rob compiled and published the Hurricane Field Program plan, coordinated research missions amongst the various operational and scientific teams, ensured aircraft were adequately staffed with scientists, and made certain data were available to researchers and forecasters both during and after the Atlantic hurricane season.



Professor Kishor Mehta presents Dr. Mark Powell with a plaque following his lecture at TTU.

AOML meteorologist Mark Powell was an invited guest lecturer at Texas Tech University (TTU) in Lubbock, Texas on April 5-7th. Mark participated in TTU's McDonald-Mehta Lecture Series, named after prominent wind engineers at TTU, by presenting a seminar entitled *Drag coefficient behavior in tropical cyclones*.

In addition to meeting with faculty and students, Mark also toured TTU's facilities, including their 200 m wind tower, wind energy testing facility, and hurricane field program facilities. Under the leadership of Wind Science and Engineering Center Director Dr. John Schroeder, TTU has developed an impressive portable mesonet for observing landfalling hurricanes with 24 tripod-mounted weather stations called "sticknets" and two X band portable radars.

AOML has benefited from TTU's portable tower data in past years, but 2011 marks the first year these data will be available in real time. It is hoped that the sticknet grid real-time data will be incorporated into AOML's H*Wind analysis system this summer during the Atlantic hurricane season. TTU's 200 m tower provides a unique ability to provide wind loading design data and validate wind turbine power versus wind speed curves.

Travel

Derek Manzello and Ruben van Hooidonk attended the Coral Bleaching Response Workshop for Papahānaumokuākea Marine National Monument in Honolulu, Hawaii on March 8-10, 2011.

Rick Lumpkin attended a PIRATA (Prediction and Research Moored Array in the Tropical Atlantic) Science Steering Group meeting in Fernando de Noronha, Brazil on March 14-18, 2011.

Jack Stamates attended the Institute of Electrical and Electronic Engineers' Tenth Current, Waves, and Turbulence Measurement Workshop in Monterey, California on March 20-23, 2011.

Dwight Gledhill, Derek Manzello, and Rik Wanninkhof attended an Ocean Acidification Principal Investigators meeting in Woods Hole, Massachusetts on March 22-24, 2011.

Kelly Goodwin was an invited participant at the Sampling the Aquatic Environment: Technologies for Sample Concentration, Remote Sampling, and Sample Return Workshop in Monterey, California on March 29-31, 2011.

Gustavo Goni and Rik Wanninkhof attended the Deep Ocean Observing Strategy Workshop in Paris, France on March 30-April 2, 2011.

Bob Atlas attended NOAA's Observing System Committee Workshop in Silver Spring, Maryland on April 5-6, 2011; he also attended an AIRS (Atmospheric Infrared Sounder) Science Team meeting in Pasadena, California on April 25-29, 2011.

Mark Powell was an invited speaker for the McDonald-Mehta Lecture Series at the Wind Science and Engineering Research Center of Texas Tech University in Lubbock, Texas on April 6, 2011.

Francis Bringas, Gustavo Goni, and Joaquin Trinanes attended the Sixth Session of the JCOMM (Joint Technical Commission for Oceanography and Marine Meteorology) Ship Observations Team in Hobart, Australia on April 11-15, 2011.

Frank Marks was an invited participant and presenter at the 2011 AIR Client Conference in Boston, Massachusetts on April 12-15, 2011.

David Lindo traveled aboard the MV *Maersk Vilnius* on April 18-May 10th from Charleston, South Carolina to Cape Town, South Africa to deploy Argo profiling floats in the western North and South Atlantic.

Robert Rogers and Xuejin Zhang participated in a WRF (Weather Research and Forecasting) Tutorial for Hurricanes Workshop in Boulder, Colorado on April 26-29, 2011.

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Recent Publications (AOML authors are denoted by capital letters)

Beron-Vera, F.J., M.J. Olascoaga, and G.J. GONI, 2010: Surface ocean mixing inferred from different multisatellite altimetry measurements. *Journal of Physical Oceanography*, 40(11):2466-2480 (doi:10.1175/2010JPO4458.1).

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Fleisher, J.M., L.E. Fleming, H.M. Solo-Gabriele, J.K. Kish, C.D. SINIGALLIANO, L. Plano, S.M. Elmir, J.D. Wang, K. Withum, T. SHIBATA, M.L. GIDLEY, A. Abdelzaher, G. He, C. Ortega, X. Zhu, M. Wright, J. Hollenbeck, and L.C. Backer, 2010: The BEACHES Study: Health effects and exposures from nonpoint source microbial contaminants in subtropical recreational marine waters. *International Journal of Epidemiology*, 39(5):1291-1298 (doi:10.1093/ije/dyq084).

GRUSKIN, Z., 2010: Reply. *Monthly Weather Review*, 138(12):4583-4584 (doi:10.1175/2010MWR3559.1).

Kanzow, T., S.A. Cunningham, W.E. Johns, J.J.-M. Hirschi, J. Marotzke, M.O. BARINGER, C.S. MEINEN, M.P. Chidichimo, C. Atkinson, L.M. Beal, H.L. Bryden, and J. Collins, 2010: Seasonal variability of the Atlantic meridional overturning circulation at 26.5°N. *Journal of Climate*, 23(21):5678-5698 (doi:10.1175/2010JCL13389.1).

LUMPKIN, R., and S. ELIPOT, 2010: Surface drifter pair spreading in the North Atlantic. *Journal of Geophysical Research*, 115:C12017, 20 pp. (doi:10.1029/2010JC006338).

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