November-December 2011
Vol. 15/No. 6

AOML Keynotes

ATLANTIC OCEANOGRAPHIC AND METEOROLOGICAL LABORATORY

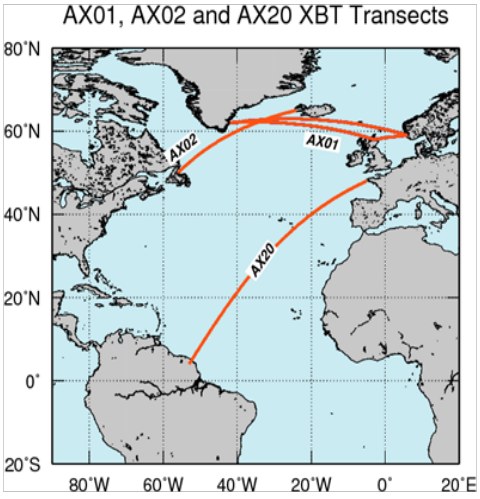
AOML is an environmental laboratory of NOAA's Office of Oceanic and Atmospheric Research on Virginia Key in Miami, Florida

AOML's Ship Of Opportunity Program Increases its International Collaborations

AOML's Ship Of Opportunity Program (SOOP) is expanding its international collaborations to implement the Global Expendable Bathythermograph (XBT) network recommended by the international community, with the aim of providing oceanographic observations for scientific research. XBTs measure the thermal structure of the upper ocean.

SOOP is a global network of commercial vessels that aid NOAA in obtaining surface and subsurface oceanographic data through the deployment of instruments such as XBTs, surface drifters, Argo floats, and thermosalinographs (TSG), among others. The program is responsible for the transmission and quality control of XBT and TSG data in real-time and their dissemination through the Global Telecommunication System.

During 2011, AOML implemented three new XBT transects in the Atlantic Ocean (see map below) in collaboration with colleagues at the French Institut de Recherche pour le Développement (IRD) and the University of Paris. These new transects include:



Three new Atlantic transects for gathering XBT data were added in 2011 in support of global oceanographic and climate studies.

AX01 – between Greenland, Iceland, Ireland, and Denmark

AX02 – from Iceland to Canada

AX20 – from France or Spain to French Guyana

AOML provides the equipment and XBT probes for these new transects, as well as manages, quality controls, and distributes the data, while French collaborators provide ship logistics and ship riders to deploy XBTs. These transects are occupied on a quarterly basis, with deployments performed in high density mode with spatial resolutions of between 25 and 50 km.

XBTs were deployed along the AX01 transect during three cruises in 2011 (March, June, and September), two cruises along the AX02 transect (March and October), and one cruise along the AX20 transect (October), for a combined total deployment of 463 XBTs.

The objectives of these transects are to investigate the variability of the ocean's upper thermal structure at high latitudes (AX01 and AX02 transects) and to complement existing observations of zonal currents in the tropical Atlantic (AX20).

The resulting XBT data are important for climate and other scientific studies. They help to document oceanic heat storage and the global transport of heat and fresh water, which are crucial for improving climate prediction models that are initialized with temperature profiles.

These data are also needed to help increase understanding of the dynamics of the ocean's variability on seasonal to interannual and decadal time scales and to provide data for model validation studies. In particular, the three new transects are all located in regions of the ocean with important dynamic characteristics.

The seasonal to interannual variability in upper ocean's heat content and transport are being monitored to understand how the ocean responds to changes in atmospheric and oceanic conditions and how the ocean's response may provide a feedback to important climate fluctuations such as the North Atlantic Oscillation.

The MV *Nuka Arctica* (top), MV *Reykjafoss* (middle), and MN *Colibri* (bottom) are aiding NOAA's climate research efforts by deploying XBTs along the AX01, AX02, and AX20 transects, respectively, in the Atlantic Ocean.

By providing XBT probes to its international partners, AOML saves the costs associated with ship greeting and logistical support for transects that would be difficult and expensive to maintain from the U.S., while also increasing the overall number of oceanographic observations as a component of SOOP's global data-gathering efforts.

AOML is SOOP's main global 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 of the sea surface to depths as great as 800 m. AOML now maintains nine high density XBT transects in the Atlantic Ocean. Additional information about SOOP can be found by visiting www.aoml.noaa.gov/phod/soop/.

Intensify Forecast Experiment Concludes

Scientists with AOML's Hurricane Research Division (HRD) concluded their 2011 hurricane field program in late October after gathering data from Hurricane Rina as the system weakened in the Yucatan Channel. For more than 30 years, HRD's annual field program has been dedicated to gathering observations of the inner core and surrounding environment of tropical cyclones from aboard NOAA's hurricane hunter aircraft.

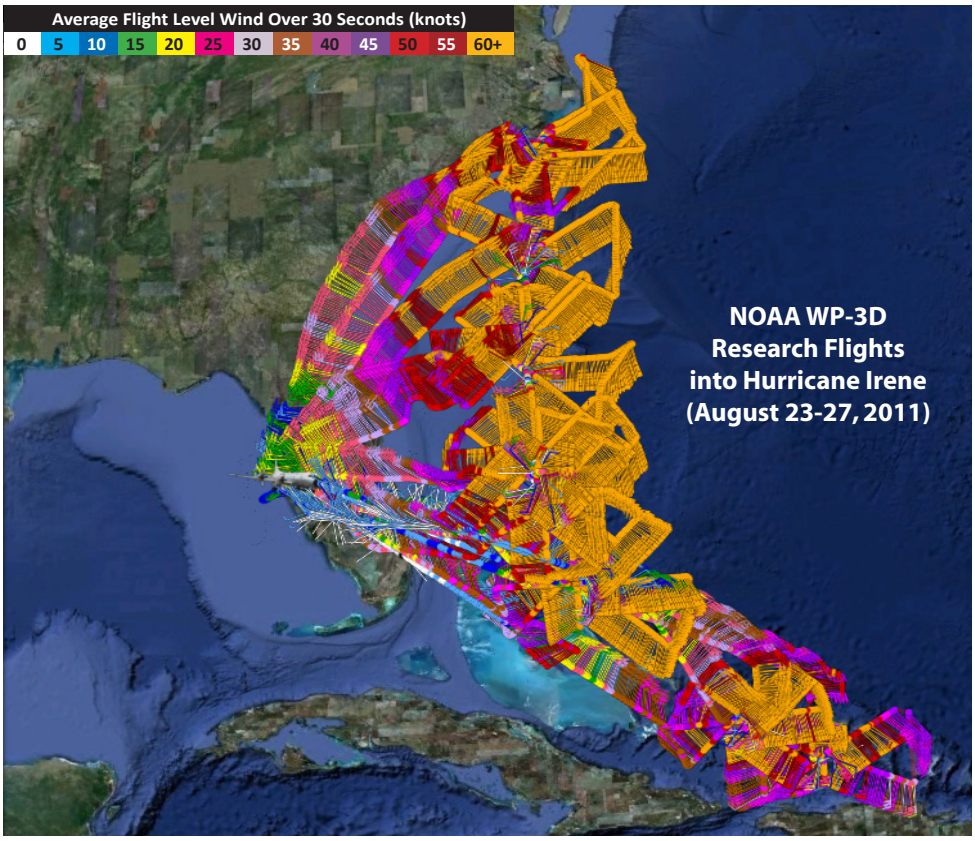
Since 2005, a major component of HRD's field program has focused on the Intensity Forecast Experiment, or IFEX, conducted in collaboration with NOAA's National Hurricane Center, Aircraft Operations Center, Environmental Modeling Center, and other partners. IFEX is a multi-year effort to improve operational forecasts of tropical cyclone intensity, structure, and rainfall by sampling storms at all stages of their life cycle, particularly their rapid intensification.

In support of IFEX, HRD researchers flew 31 missions aboard NOAA's WP-3D Orion turboprop aircraft and 18 missions aboard NOAA's Gulfstream-IV jet for a combined total of 342 in-flight hours. Observations were gathered from a number of Atlantic basin storms, including Don, Emily, Harvey, Irene, Katia, Lee, Ophelia, and Rina, as well as eastern Pacific hurricanes Dora and Hilary.

These data were used to evaluate and initialize computer forecast models and to help develop and refine measurement technologies. They will also be used to improve understanding of the physical processes that both support and impact tropical cyclone genesis, intensification, and decay.

2011 CFC Campaign a Success

AOML's 2011 Combined Federal Campaign (CFC) program concluded on November 28th, with federal employees donating a total of $28,450 to charitable organizations. This amount represents a new record for AOML and is a significant contribution to those in need. Whether through the CFC or through other avenues, thanks to all for their generosity and commitment to helping others. Together we all make a difference.



In support of their annual hurricane field program, scientists with AOML's Hurricane Research Division flew round-the-clock missions to gather observations in Irene as the system intensified into a powerful category 3 hurricane and trekked westward towards the United States. Depicted above are the average flight level winds encountered aboard NOAA's WP-3D hurricane hunter aircraft (denoted by various colors) on August 23rd-27th. Although Irene weakened to category 1 hurricane strength before making landfall along the outer banks of North Carolina on August 27th, the massive storm nevertheless flooded both coastal and inland communities, knocked out power to millions, and caused at least 50 deaths as it swept up U.S. eastern seaboard and crossed into Canada.

2011 Atlantic Hurricane Season Score Card

Named Storm	Strength	Dates of Activity	Peak Winds (mph)
Arlene	Tropical Storm	June 28-July 1	65
Bret	Tropical Storm	July 17-22	70
Cindy	Tropical Storm	July 20-22	70
Don	Tropical Storm	July 27-30	50
Emily	Tropical Storm	August 2-7	50
Franklin	Tropical Storm	August 12-13	45
Gert	Tropical Storm	August 13-16	65
Harvey	Tropical Storm	August 19-22	65
Irene	Major Hurricane	August 21-28	120
Jose	Tropical Storm	August 27-28	45
Katia	Major Hurricane	August 29-September 10	140
Unamed	Tropical Storm	September 1-2	45
Lee	Tropical Storm	September 2-5	60
Maria	Hurricane	September 6-16	80
Nate	Hurricane	September 7-11	75
Ophelia	Major Hurricane	September 21-October 3	140
Philippe	Hurricane	September 24-October 8	90
Rina	Major Hurricane	October 23-28	115
Sean	Tropical Storm	November 8-11	65

The 2011 Atlantic hurricane season generated 19 named storms, making it one of the busiest seasons on record. In spite of the large number of storms, however, only 7 intensified into hurricanes.

Busy 2011 Atlantic Hurricane Season Ends

The 2011 Atlantic hurricane season ended quietly on November 30th after having lived up to NOAA's expectations of being an active year. With 19 tropical storms, 7 hurricanes, and 4 major hurricanes (winds above 110 mph) to its credit, 2011 will be remembered as one of the busiest seasons on record. In fact, the year 2011 is tied with three other years (1887, 1995, and 2010) as having the third highest tally of named storms since records began in 1851.

In May, NOAA's pre-season outlook called for the formation of 12-18 named storms, 6-10 hurricanes, and 3-6 major hurricanes. In August, NOAA increased the number of expected storms to 14-19, the number of hurricanes to 7-10, and major hurricanes to 3-5. Its updated hurricane outlook predicted with 85% confidence that the season would be marked by an above normal level of storm activity. An average season typically generates 11 tropical storms, 6 hurricanes, and 3 major hurricanes.

While near record high sea surface temperatures across the Atlantic Ocean fueled the formation of storms during the 2011 season, dry, stable air that persisted over the region throughout much of the summer impeded their intensification. Of the 19 named storms that developed, only 7, or 37% of the total, strengthened into hurricanes. In an average year at least 50% of the named storms become hurricanes. Additionally, favorable wind currents steered the majority of 2011 storms away from the U.S. mainland.

The season began with a succession of eight weak tropical storms that caused only minimal damage. The ninth named storm, Irene, developed on August 21st and, by August 22nd, strengthened into the season's first hurricane. Irene continued to intensify and became the season's first major hurricane on August 24th with top winds of 120 mph.

After cutting a swath of destruction through the Bahamas as a powerful category 3 storm, Hurricane Irene took aim at the U.S. mainland. Irene's projected path along the eastern seaboard imperiled an estimated 65 million people, triggering massive emergency preparation efforts in at least 13 states and the District of Columbia. Before landfall along North Carolina's Outer Banks on August 27th, Irene was downgraded to a category 1 storm with 85 mph sustained winds.

2011 Atlantic Hurricane Season Forecasts

Activity Type	2011 Season	NOAA Outlook (August 2011)	NOAA Outlook (May 2011)	Average Season
Tropical Storms	19	14-19	12-18	11
Hurricanes	7	7-10	6-10	6
Major hurricanes	4	3-5	3-6	3

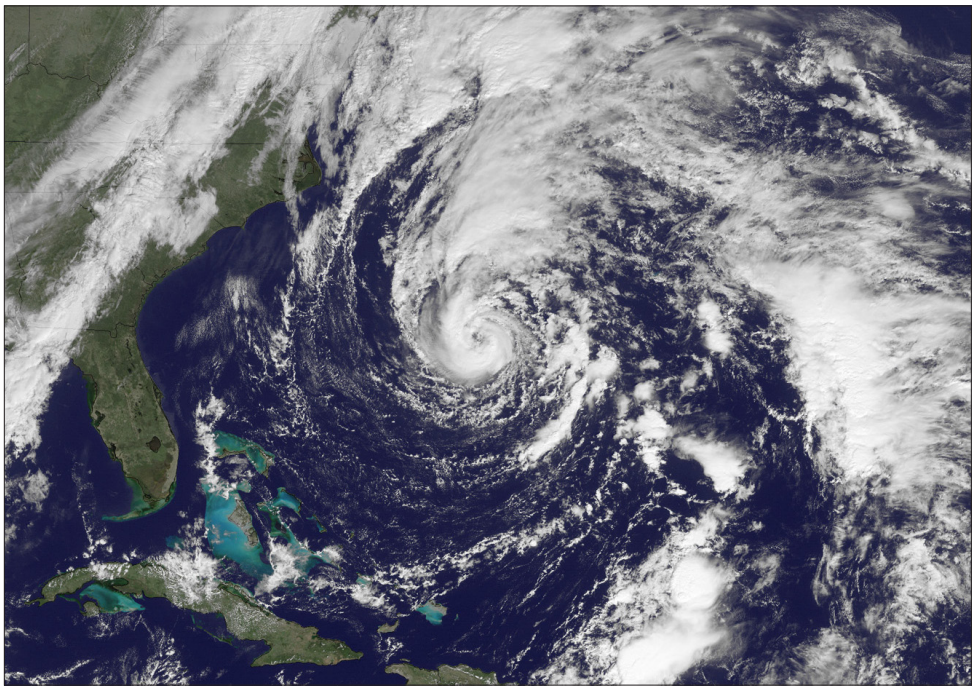
Coastal and inland communities from North Carolina to Maine to Canada were nevertheless impacted by Irene's blustery weather as the mammoth system trekked up the eastern seaboard, causing massive power outages, flooding, and damages into the billions, as well as an estimated 50 deaths. Irene became the first hurricane to strike the U.S. since 2008 when Hurricane Ike came ashore in Galveston, Texas.

Once again, however, the U.S. was spared from the devastating impacts of a major landfalling hurricane (categories 3 to 5 on the Saffir-Simpson scale), extending the U.S. record without a major strike to 6 years. Hurricane Ophelia, the 2011 season's strongest storm, briefly reached category 4 status as it churned in the Atlantic east of Bermuda before a combination of wind shear and cooler ocean temperatures weakened the storm to category 1 strength.

Tropical Storm Lee was the only other system to affect the U.S. during the 2011 season. Lee formed in the Gulf of Mexico in early September and drenched portions of Louisiana, Mississippi, Alabama, and the Florida Panhandle during its passage inland. As Lee slowly lumbered to the northeast, remnants of the system soaked some of the same regions previously inundated by Irene.

Only two other hurricane seasons have generated more named storms than 2011. The recordbreaking 2005 season still holds the number one position with 28 storms, followed by the 1933 season, which produced 21 named storms. The 2011 totals include a post-storm upgrade of Tropical Storm Nate to hurricane status, the addition of a short-lived unnamed tropical storm that formed in early September, and an upgrade for Hurricane Rina to major hurricane status.

NOAA will release its preliminary outlook for the 2012 Atlantic hurricane season in May, several weeks in advance of the June 1st hurricane season start date.

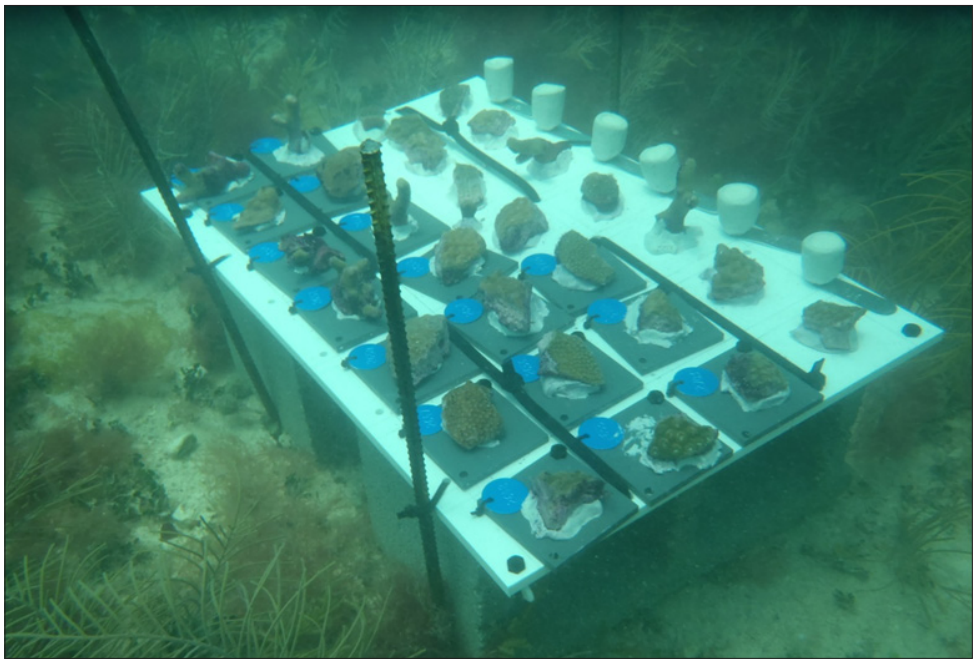


Tropical Storm Sean, the last named system of the 2011 Atlantic hurricane season, as viewed by NOAA's GOES-13 satellite on November 10th. Sean formed in the western Atlantic on November 8th and strengthened into a robust tropical storm with winds reaching 65 mph. The system brought gusty weather and rain to Bermuda as it passed to the northwest and then dissipated harmlessly at sea on November 12th after being absorbed into a cold front.

Atlantic Ocean Acidification Test Bed Moves to Florida Keys

Dwight Gledhill, Derek Manzello, and Ian Enochs of AOML traveled to La Parguera, Puerto Rico during the week of November 28-December 2nd. Gledhill, with the assistance of Sylvia Musielewicz of NOAA's Pacific Marine Environmental Laboratory, serviced and re-deployed a MAP-CO_2 buoy, which simultaneously measures the concentration of carbon dioxide in the atmosphere and ocean. Manzello and Enochs made coral calcification and growth measurements on four species of reef-building coral from two sites as part of the Atlantic Ocean Acidification Test Bed (AOAT) Project (see photo at right).

The AOAT project, funded by NOAA's Coral Reef Conservation Program, conducts repeated process studies to quantify coral community metabolism, obtain coral growth and bioerosion rates, and test advanced technologies for monitoring ocean acidification.



Corals and bioerosion blocks deployed in the Florida Keys. Live corals will be used to establish species-specific growth rates, whereas bioerosion blocks are used to determine rates of carbonate destruction by various eroding organisms.

The newly deployed MAP-CO_2 buoy at Cheeca Rocks in the Florida Keys measures carbon dioxide in the atmosphere and ocean.

This same team deployed a new MAP-CO_2 buoy at Cheeca Rocks in the Florida Keys on December 7th. Cheeca Rocks will serve as the new location of the Atlantic Ocean Acidification Test Bed in fiscal year 2012 and, like La Parguera, Puerto Rico, will ultimately serve double-duty beginning in fiscal year 2013 as a class III climate monitoring site under the planned National Coral Reef Monitoring Plan (NCRMP) of NOAA's Coral Reef Conservation Program.

The NCRMP is committed to gathering long-term observations to better understand the threat of ocean acidification on coral reefs. The third and final class III NCRMP climate site is planned to become operational at the Flower Garden Banks in 2013. These three class III NCRMP climate sites in the Atlantic will complement the three planned sites in the Pacific located in Hawaii, Midway Atoll in the northwest Hawaiian Islands, and Saipan in the Mariana Islands.

On December 16th, Adrian McDonald, a representative from Oceanscience, met with researchers and technical support staff from AOML's Physical Oceanography Division (PhOD) to evaluate the test results of an Oceanscience instrument. During the PIRATA Northeast Extension cruise this past summer, PhOD used Oceanscience's Underway Conductivity-Temperature-Depth (UCTD) instrument to gather upper ocean measurements. From its work with the UCTD, PhOD staff provided Oceanscience with several technical and scientific recommendations for improving future versions of the observing platform and for customizing the instrument according to AOML's ocean-observing needs.

PhOD recognizes the importance of pursuing updated technologies to improve the quality and coverage of the ocean data it gathers. The UCTD is capable of collecting high-resolution salinity and temperature profiles of the upper ocean. These measurements can be performed without the need of a stationary cast, thereby reducing the costs associated with time at sea. Measurements to depths of 500 meters can be performed while underway at 10 knots, the standard speed of a research vessel while on transit between stations.

Adrian McDonald of Oceanscience (center), along with Marlos Goes, Zachary Barton, and Pedro Pena of PhOD discuss the UCTD instrument.

The UCTD technology is quickly evolving. Updated versions of the instrument will include sensors to measure turbidity and chlorophyll and decrease the user/equipment interaction, moving closer to an autonomous system suitable for deployment on ships of opportunity.

Site Surveys Identify Possible Location for New Coral Monitoring Station

AOML oceanographer Jim Hendee, Jon Fajans of the Florida Institute of Oceanography, and John Halas of Environmental Moorings International visited Belize in early December to pinpoint the location for a new coral reef monitoring station. In Belize, they met with Dr. Leandra Cho-Ricketts, Director of the University of Belize's Calabash Cay Field Station, for a week-long series of site surveys along the Belizean Barrier Reef.

Two candidate sites were identified for the installation of a Coral Reef Early Warning System (CREWS) station in support of NOAA's Coral Health and Monitoring Program. The first site is near the Calabash Cay Field Station, while the second is near Carrie Bow Cay, site of the Smithsonian Institution's field station established in 1972.

CREWS stations gather data in near real-time to assess the health of coral reefs. The data are transmitted to AOML for processing by an expert system that uses artificial intelligence technology and then posted to the Coral Health and Monitoring Program web site. Early warning alerts are issued when parameters conducive to coral bleaching and other impact events for corals and coral reef ecosystems are met.

Jim Hendee aboard ship in Belize between dives.

The project is being funded by the Caribbean Community Climate Change Center (C5) and the European Global Climate Change Association as part of an effort to install coral monitoring stations in Belize, the Dominican Republic, St. Lucia, Trinidad and Tobago, Barbados, and Cuba by 2014. The stations will provide long-term meteorological and oceanographic data collection, together with biological monitoring, to help determine the effects of climate change on coral reef ecosystems. A Memorandum of Understanding between NOAA and C5 establishes protocols for the exchange of information and provides for guidance from NOAA on the interpretation and presentation of climate data.

Jim Hendee measures the distance between two proposed pin locations to anchor a moored autonomous pCO_2 buoy for gathering carbonate chemistry data to aid in the study of processes that control the air-sea exchange of carbon dioxide.

A site at the southern end of Half-Moon Caye in the Lighthouse Reef Atoll was determined to be especially attractive as a western Caribbean location for characterizing carbonate dynamics. The site was surveyed in advance of a possible NOAA-sponsored international project on ocean acidification.

Climate Summit Establishes Projections for Sea Level Rise in Southeast Florida

The Third Annual Southeast Florida Regional Climate Leadership Summit was held in Key Largo, Florida on December 8-9, 2011, representing the culmination of 3-4 years of meetings and consultations between administrators, scientists, and engineers from the four southeast Florida counties (Monroe, Miami-Dade, Broward, and Palm Beach).

The aim of the annual summit meetings has been to adopt a uniform set of scientific guidelines for future climate change and impacts on the South Florida region and to elaborate an action plan for the counties in the areas of transportation and water management, as well as man-made and natural environments.

Earlier in 2011, an inter-county task force completed a science report outlining a uniform projection for future sea level rise, which has since been incorporated into the four-county planning document that was debuted at the Key Largo summit meeting.

The scientific consultations have involved numerous meetings in Ft. Lauderdale with researchers from AOML, the University of Miami, Florida International University, and Florida Atlantic University, as well as engineers from organizations such as the South Florida Water Management District and the U.S. Army Corps of Engineers.

The Key Largo summit mainly focused on formally presenting the overall planning document, *The Southeast Florida Regional Climate Action Plan*, to the public. Drs. David Enfield and Sang-Ki Lee of AOML were in attendance, along with numerous others involved in preparing the uniform projection of future sea level rise, which is the basis for the regional action plan. A draft version of the document can be viewed at www.southeastfloridaclimatecompact.org/.

This is the first time a climate action plan has been crafted for a region that comprises a larger population than the individual populations of 25 states. The meeting ended with a commitment to the biggest task that lies ahead—implementation of the plan through partnerships between county and municipal governments, state and national government agencies (including NOAA), and the private sector.

The scientific basis for regional planning will be reassessed in 2014 following further research and the formal release of the next Intergovernmental Panel on Climate Change report. At that time, the consultation process of 2009-2010 will be resumed, with the participation of NOAA, and an amended projection (if necessary) will be released.

SAMOC 4 Workshop Convenes in South Africa

The fourth workshop devoted to the South Atlantic Meridional Overturning Circulation, SAMOC 4,* took place in Simons Town, South Africa, on September 26-28, 2011. Researchers met to highlight recent modeling results from observing the South Atlantic components of the Atlantic Meridional Overturning Circulation, provide an overview of results from ongoing pilot arrays and observational programs, discuss the status of proposals submitted for observations and modeling, and coordinate new proposals aimed at meeting SAMOC goals. Ship time availability to support proposed fieldwork campaigns in the region, as well as new agreements for sharing these resources, were also discussed.

Local South African researchers made presentations on the role of Agulhas eddies in the South Atlantic and highlighted the significance of recent changes in surface temperature, wind stress, and wind stress curl associated with a southward displacement of zonal winds. They also presented new modeling results and observations, followed by plenary discussions about current and upcoming efforts.

A review of results from ongoing modeling experiments showed that 30-35°S was the best latitude to monitor MOC variability, confirming previous results from numerical and theoretical modeling studies conducted in the U.S., United Kingdom, Brazil, and the Netherlands. Higher latitudes provide stronger density gradients and a larger Coriolis parameter, leading to improved signal-to-noise characteristics for geostrophic velocity calculations. The strongest signals are tightly confined to the boundaries at higher latitudes, particularly at the eastern boundary, indicating a smaller portion of the trans-basin array requires more intense horizontal resolution.

Additionally, an estimation of the stability of the MOC, a crucial factor in the attribution of observed signals, is more favorable at higher latitudes. Ocean model studies indicate that it is possible to use more economical mooring technologies at higher latitudes (i.e., pressure-equipped inverted echo sounders or PIES), reducing the cost of the overall system and its maintenance.

A crucial component of the SAMOC observing system, the proposed trans-basin array at 34.5°S, was thoroughly discussed, including a review of comments by anonymous reviewers of this U.S.-National Science Foundation proposal. The consensus of the workshop attendees was that the proposal be resubmitted with modifications. The array will be proposed with ~20 ocean moorings, with a combination of tall "dynamic height" moorings and PIES, coupled with several shorter direct velocity moorings on the shelf on either side of the basin.

SAMOC 4 workshop participants, including Silvia Garzoli, Christopher Meinen, and Renellys Perez of AOML, met in Simons Town, South Africa this past September.

Measurements at the boundaries were considered crucial to close the budgets. A group of North and South American countries working through the Inter-American Institute for Global Change Research has a program funded for the western boundary that would fit together nicely with the western end of the recommended trans-basin array. A Brazilian proposal has also been funded for augmenting the shallow array located near the current U.S.-funded PIES array at 34.5°S. At the eastern boundary, South African scientists with the Centre for Operational Oceanography have been funded to deploy an array of five moorings from the coast outward to the French array.

The group agreed that attribution of the observed signals at 30-34.5°S will require both a continuation and augmentation of the two concurrent interocean exchange observing systems: the GoodHope array and the Drake Passage programs. Observations along the GoodHope transect will, in conjunction with the German array of PIES/CPIES moorings and altimetry, help quantify the Agulhas rings shed at the retroflection, while the Drake Passage observations will aid in determining flow via the cold-water route.

The group also agreed on the importance of analyzing the products of different ocean general circulation models to study the various branches of the Deep Western Boundary Current in the South Atlantic.

Crucial to the success of the program is the availability of a robust research fleet. To this end, South Africa is building a new global class ship that will become operational in 2012. The University of Sao Paolo has purchased a regional class ship that will also be available in 2012. Brazilian scientists have obtained funds to purchase new oceanographic equipment and refurbish the Brazilian Navy vessel *Cruzeiro do Sul*. In Argentina, a 40-foot catamaran will be available for nearshore mooring services in addition to the R/V *Puerto Deseado*.

One action item from the workshop is the preparation of a SAMOC implementation plan for submission to the International CLIVAR office for endorsement. The SAMOC 5 workshop will be held in Miami, Florida in 2012; local organizers of the event include Renellys Perez and Christopher Meinen of AOML.

The SAMOC 4 workshop was hosted by Isabelle Ansorge and Chris Reason (University of Cape Town); chaired by Silvia Garzoli (AOML), Sabrina Speich (France), and Alberto Piola (Argentina); and attended by 43 scientists and students from eight countries (Argentina, Brazil, France, Germany, South Africa, Spain, United Kingdom, United States). Financial support was provided by the South African National Antarctic Programme Development Grant and the Johann Lutjeharms National Research Foundation rated Researchers Award.

***The meeting was dedicated to the memory of Johann Lutjeharms, one of Southern Africa's leading marine scientists and the foremost authority on the Agulhas Current, who died on June 8, 2011.**

"Deck the Halls" at AOML...

AOML staff welcomed in the holidays on December 2nd by gathering to trim a tree and decorate the lobby. Holiday tunes played by AOML musicians made for a festive atmosphere, while an array of goodies free for the sampling as entries in the annual dessert contest satisfied everyone's sweet tooth. A fun time was had by all.

Correction: The September-October 2011 issue of *Keynotes* stated that Judy Gray was AOML's first deputy director. In fact, Mr. Jack Kofoed served as AOML's first deputy director from 1967 to 1979 under Dr. Harris B. Stewart, AOML's founder and first director. Judy was AOML's second deputy director, serving in that position from 1998 to 2010.

Congratulations

Molly Baringer, a supervisory oceanographer with AOML's Physical Oceanography Division (PhOD), became PhOD's new deputy director in November. In addition to conducting research, Molly will provide scientific support for the Division, as well as tend to personnel actions on behalf of staff. She will also serve as the division's acting director during absences of Gustavo Goni, the PhOD Director. Molly began her career at AOML in 1994 after completing her Ph.D. at the Massachusetts Institute of Technology in 1993. Her current research focuses on monitoring and measuring the Atlantic component of the Meridional Overturning Circulation and evaluating the strength and variability of Atlantic meridional oceanic heat transport.

Howard Friedman, deputy director of AOML's Hurricane Research Division, was honored by the South Florida Federal Executive Board (FEB) in November. During the FEB's monthly Board of Directors meeting on November 17th, Friedman was presented with an award in recognition of his dedication and service as Treasurer of the organization during fiscal year 2011. The South Florida FEB serves the community of federal employees residing in Palm Beach, Broward, Miami-Dade, and Monroe counties. It supports and promotes the national initiatives of the President and Administration, and responds to the local needs of Federal departments/agencies through the program activities of its committees and councils. In addition to his position as treasurer, Friedman also serves as co-chairman of the Mediation Committee and a member of the FEB's Federal Employee of the Year Committee.

Farewell

David Wanless, a CIMAS Research Associate with AOML's Ocean Chemistry Division, departed AOML in December. During Dave's six years at AOML, he assisted Drs. Chris Sinigalliano and Maribeth Gidley in the Environmental Microbiology Laboratory as a molecular technician. Dave worked to develop and/or adapt molecular assays and sensors to better detect the presence of microbial contaminants in coastal waters. He has moved to Washington, D.C. with his wife and son.

Researchers with AOML's Hurricane Research Division participated in the annual review meeting for the Hurricane Forecast Improvement Project (HFIP) in held Miami on November 8-9th. HFIP is a NOAA project dedicated to improving the accuracy of hurricane forecasts and extending the lead times for hurricane forecasts with increased certainty (e.g., an increased accuracy of 20% for hurricane track and intensity forecasts within 5 years and 50% within 10 years with a forecast period extended outward to 7 days).

Happy Holidays 2011

On December 9th, AOML's annual holiday party brought friends, coworkers, and family members together for an afternoon of fun and merriment. Adding to the festivities was a delectable assortment of food and goodies, music by AOML's Holiday Ensemble, singing, dancing, and a raffle drawing with prizes. A special guest appearance by Santa Claus delighted children both young and old. The happy event was organized by AOML's Buoys and Gulls group. Photos are by Maribeth Gidley and Evan Forde.

Travel

Christopher Sinigalliano participated in the Gulf of Mexico Gulf Monitoring Forum in Pensacola, Florida on November 1-3, 2011.

Alan Leonardi attended an X Prize Visioneering meeting in Seattle, Washington on November 2-4, 2011 to explore the possible development of an ocean-based X Prize.

Gustavo Goni and Rick Lumpkin attended the Tsunami Debris Workhop via video teleconference hosted by the University of Hawaii's International Pacific Research Center on November 14, 2011.

Claudia Schmid attended the 12th Argo Data Management meeting, Executive meeting, and Trajectory Workshop in Seoul, Korea on November 14-18, 2011.

Denis Pierrot and Kevin Sullivan repaired the underway pCO_2 system aboard the tanker ship *Las Cuevas* in Trinidad on November 14-18, 2011.

James Hendee was part of a team that performed a site survey for a new Coral Reef Early Warning System (CREWS) station in Belize on November 28-December 2, 2011.

Michelle Wood and Rik Wanninkhof attended a meeting at the Hollings Marine Laboratory in Charleston, South Carolina on November 28-30, 2011.

Kelly Goodwin and Christopher Kelble attended NOAA's Ecosystem Research Challenge Workshop in Silver Spring, Maryland on November 29-December 1, 2011.

Christopher Meinen attended the OceanSITES meeting in La Jolla, California on December 1-2, 2011.

Chunzai Wang was an invited keynote speaker at the 6th International Workshop on Marine Environmental Change of the South China Sea in Guangzhou, China on December 4-7, 2011.

Ruben Van Hooidonk and Tomislava Vukicevic attended the annual Fall Meeting of the American Geophysical Union in San Francisco, California on December 5-9, 2011.

Silvia Garzoli and Claudia Schmid attended an Argo Panel meeting in San Diego, California on December 12-14, 2011.

Recent Publications *(AOML authors are denoted by capital letters)*

BARINGER, M.O., T.O. Kanzow, C.S. MEINEN, S.A. Cunningham, D. Rayner, W.E. Johns, H.L. Bryden, E. Faika-Williams, J.J.-M. Hirschi, M.P. Chidichimo, L.M. Beal, and J. Marotzke, 2011: Global oceans: Meridional overturning circulation observations in the subtropical North Atlantic. In *State of the Climate in 2010,* J. Blunden, D.S. Arndt, and M.O. Baringer (eds.). *Bulletin of the American Meteorological Society,* 92(6):S95-S98.

Bell, G.D., E.S. Blake, T.B. Kimberlain, C.W. Landsea, J. Schemm, R.J. Pasch, and S.B. GOLDENBERG, 2011: The tropics: Atlantic basin. In *State of the Climate in 2010,* J. Blunden, D.S. Arndt, and M.O. Baringer (eds.). *Bulletin of the American Meteorological Society,* 92(6):S115-S121.

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