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AOML Keynotes

ATLANTIC OCEANOGRAPHIC AND METEOROLOGICAL LABORATORY

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

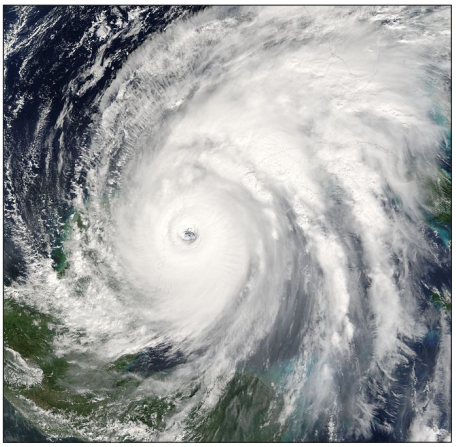
Research Reveals New Theory on Hurricane Formation and Intensification

How do hurricanes form, survive, and intensify? Hurricane scientists have long believed upper ocean temperatures were the key factor. In the March 2015 issue of *Monthly Weather Review,** AOML's Dr. Joseph Cione presents a new theory that suggests the atmosphere plays a greater role in their formation, survival, and intensification than previously realized.

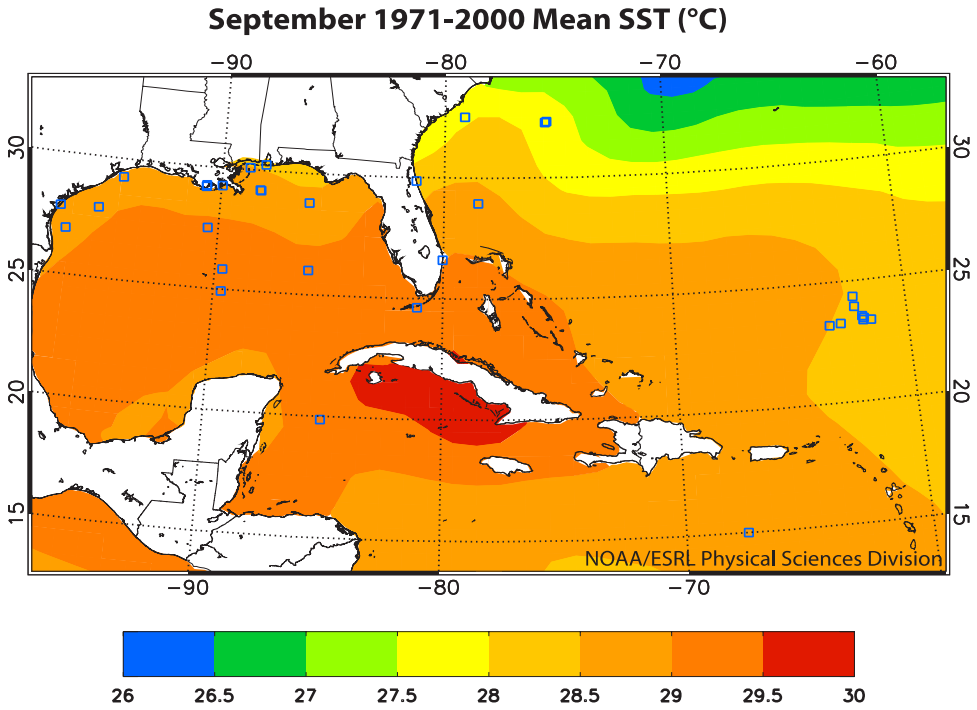
Cione analyzed observations from 62 Atlantic hurricanes over a span of 32 years (1975-2007). He found the commonly-held belief that links the robustness of a hurricane to sea surface temperatures at or above 26°C might not be entirely accurate. If his new theory holds, it has the potential to significantly improve hurricane intensity forecasts for the nation.

Besides the ocean, Cione found near-surface air temperatures and the moisture surrounding a hurricane were also essential energy requirements for their sustainment. These two variables often play a more critical, often dominant, role than ocean temperatures alone.

Cione assessed sea surface conditions in tropical systems by monitoring the difference between dew point temperature and the sea surface temperature within the hurricane environment. When the dew-point temperature was higher than the hurricane's inner core sea surface temperature, the storm's internal energy decreased and subsequently weakened the hurricane.



Hurricane Wilma (2005), one of 62 storms analyzed, rapidly intensified from category-1 to category-5 strength in 24 hours. With top winds of 185 mph, Wilma is the most intense tropical cyclone observed to date in the Atlantic basin.



Map of buoy platform sites in the Gulf of Mexico, Caribbean Sea, and Atlantic Ocean, denoted by blue open squares, where observations were obtained for hurricanes analyzed in the study, superimposed on an average sea surface temperature analysis (degrees Celsius) representative of the 30-year period, including 1971-2000. Figure provided courtesy of NOAA's Earth System Research Laboratory.

Contrary to long-held assumptions, results from the study showed hurricanes can, and occasionally do, maintain their intensity even when sea surface temperatures are at or below the threshold of 26°C. In six percent of the cases Cione studied, ocean surface temperatures of 26°C or higher were not required for a hurricane to survive.

For hurricanes within 29° latitude of the equator, near-surface atmospheric moisture was found to be the most important factor in maintaining a hurricane. In deep tropic storms between 10°N–20°N, the atmospheric environment within and around a storm was found to be the primary factor responsible for determining how much surface energy was drawn up from the ocean and into the hurricane environment.

Cione's research has the potential to greatly impact intensity hurricane forecast models, which have traditionally focused mainly on ocean surface temperatures. With this study showing the importance of moisture and atmospheric temperature for hurricane growth, scientists can now begin investigating how these factors impact hurricane intensity prediction.

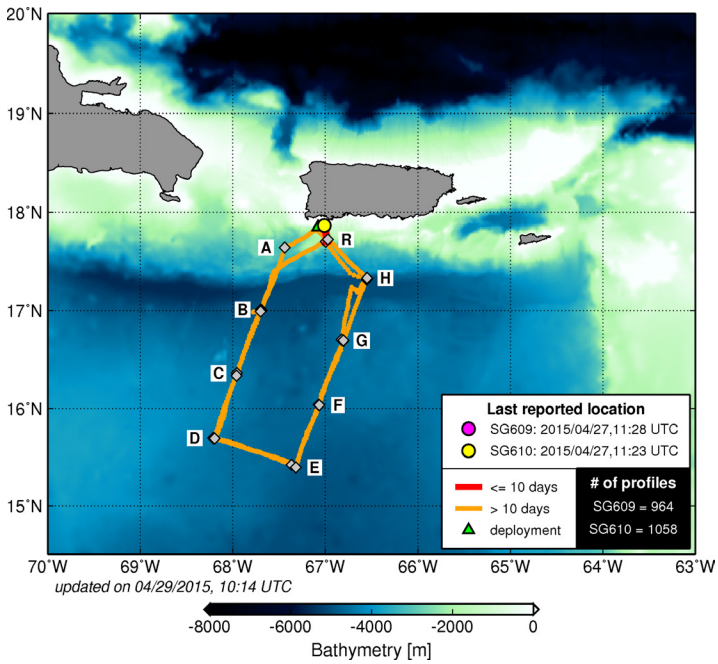
*Cione, J., 2015: The relative roles of the ocean and atmosphere as revealed by buoy air-sea observations in hurricanes. *Monthly Weather Review,* 143(3):904-913 (doi:10.1175/MWR-D-13-00380.1).

Underwater Gliders Successfully Complete Caribbean Mission

The recovery of AOML's two underwater gliders from the Caribbean Sea on April 27th marked the successful completion of their second mission with the collection of more than 2,000 temperature, salinity, and dissolved oxygen profiles. Both gliders were deployed in the Caribbean Sea south of Puerto Rico on February 6th and were piloted along pre-determined tracks, gathering observations to depths up to 1000 m during their 80-day deployment (see figure at right).

In this second mission, both gliders were equipped with new sensors to measure dissolved oxygen concentrations, providing a unique set of observations in the region. All data obtained during the mission were transmitted in real-time into the Global Telecommunications System and the Integrated Ocean Observing System (IOOS, http://data.ioos.us/providers/).

Recovery activities for the gliders were carried out from aboard the R/V *La Sultana,* a research vessel of the University of Puerto Rico-Mayaguez (UPRM). Ricardo Domingues, a University of Miami-Cooperative Institute researcher with AOML's Physical Oceanography Division, participated in the field activities led by Professor Julio Morel of UPRM, along with UPRM students Luis Pomales and Erick Garcia. The crew of the *La Sultana*—Captain Cesar Carrero, Ubaldo Lopez, Hugo Montalvo, and Wilson Ramos—also participated in the effort to recover the gliders. Remote piloting of the gliders was led by Walt McCall of NOAA's National Data Buoy Center.



Track denoting the region traversed by AOML's two underwater gliders during their second mission, conducted in the Caribbean Sea south of Puerto Rico from February 6-April 27, 2015.

Participants involved in the successful recovery of AOML's two underwater gliders included (from left to right) Erick Garcia, Professor Julio Morel, Hugo Montalvo, Ricardo Domingues (of AOML), Luis Pomales, Captain Cesar Carrero, and Wilson Ramos. Missing from the photograph is Ubaldo Lopez.

AOML's underwater glider project is a multi-institutional effort that brings together the research and operational components within NOAA and the university community. The work is geared towards obtaining sustained and targeted ocean observations in the Caribbean Sea and southwestern tropical North Atlantic Ocean in support of hurricane research and the Caribbean Coastal Ocean Observing System (CariCOOS, http://www.caricoos.org).

The effort is made possible through funding from the Disaster Relief Appropriations Act of 2013, also known as the Sandy Supplemental. Both gliders will now be prepared for their next mission during the 2015 Atlantic hurricane season. For additional information, please visit http://www.aoml.noaa.gov/phod/gliders.

AOML Director Dr. Bob Atlas and Acting AOML Deputy Director Dr. Molly Baringer visited Washington, DC on April 22nd to meet with South Florida Congressional representatives. Bob and Molly briefed the Congressional offices of Senators Bill Nelson and Marco Rubio, as well as Representatives Lois Frankel, Frederica Wilson, Mario Diaz-Balart, Ileana Ros-Lehtinen, and David Jolly, about AOML's research on ocean acidification, coral ecosystems, and the effects of the ocean on weather, climate, and fisheries. They also discussed several technological advances made by NOAA that will be used to safeguard the public during the 2015 Atlantic hurricane season. These advances include an updated version of the high-resolution Hurricane Weather Research and Forecasting model, unmanned aerial systems that will gather observations in the highest and lowest reaches of the tropical cyclone environment, and enhanced oceanographic observing capabilities to better assess the impact of the upper ocean on tropical cyclone intensification.

Dr. Molly Baringer, Florida Congresswoman Ileana Ros-Lehtinen, and Dr. Bob Atlas.

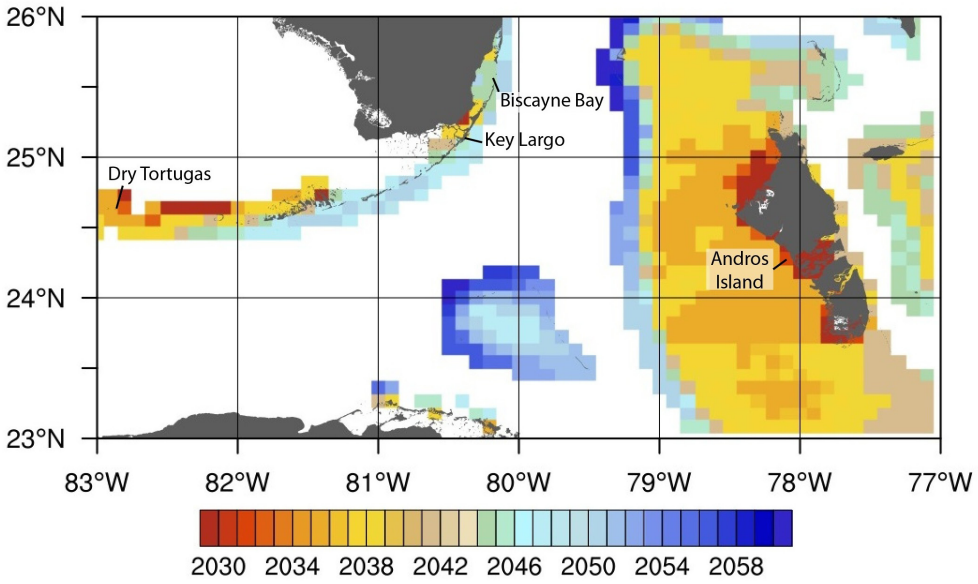
Study Projects Local-Scale Coral Bleaching in the Caribbean and Gulf of Mexico

A study by AOML researchers and colleagues published April 1st in *Global Change Biology** presents a new method for producing high-resolution projections of the range and onset of severe annual coral bleaching for reefs in the Gulf of Mexico and Caribbean.

Dr. Ruben van Hooidonk, a University of Miami Cooperative Institute researcher at AOML, and coauthors used a regional ocean model coupled with a method called statistical downscaling to improve upon previous annual coral bleaching projections generated at a coarse resolution of about 70 miles or 100 kilometers. The new, fine-scale projections, at a resolution of 6 miles or 10 kilometers, will enable managers to include climate change as a consideration in their planning and conservation decisions.

Coral bleaching poses a major threat to coral ecosystems worldwide; it primarily occurs when ocean temperatures rise above the expected norm. Heat stress disrupts the symbiotic bond between corals and the colorful algae that live within their tissue, causing the algae to be expelled. Extensive coral bleaching events, called "mass bleachings," have increased in frequency and severity over the past two decades, contributing to the overall loss of reefs globally.

The loss of coral reefs has significant ecological, social, and economic impacts. Reefs provide a rich habitat for valuable fisheries that people are dependent upon for food. They also serve as protective buffers to coastlines by absorbing wave energy from storms and boost local economies by attracting tourists who fish, dive, and explore these underwater treasures.



Projected timing in years for the onset of annual severe bleaching of the Florida Reef Tract and the Bahamas at ~11 km resolution. Regions in red and orange, such as the Dry Tortugas, are projected to bleach annually starting in the early 2030s, while the more northern stretch of the Florida Keys near Biscayne Bay is projected to bleach annually by the mid-2040s.

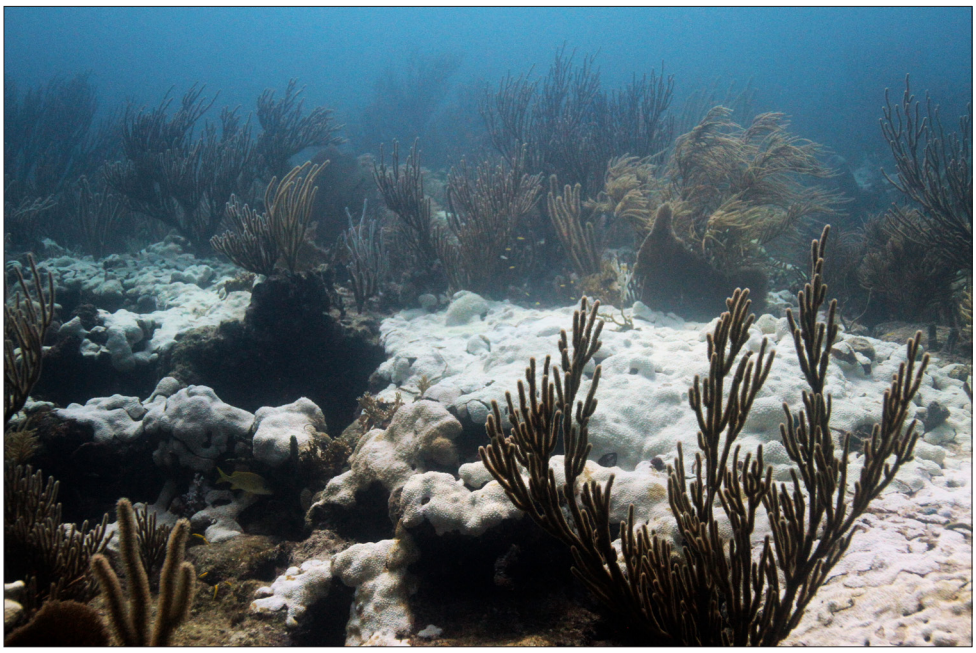
Although it is anticipated that almost all reef sites in the Gulf of Mexico and Caribbean Sea will encounter bleaching conditions annually by mid-century, the study indicates there is quite a bit of variability in the timing and location of these extreme conditions. For example, some coral reef sites are projected to experience annual bleaching 15 or more years later than others.

This observation applies to reefs in Florida, the Bahamas, Cuba, Puerto Rico, the Dominican Republic, Turks and Caicos, and Mexico. Such sites are considered conservation priorities, as they represent a type of refuge; they are among the locations most likely to persist as climate changes.

According to Dr. van Hooidonk, lead author of the study, "At these locations, referred to in the study as relative refugia,' lower rates of temperature increase and fewer extreme events mean reefs have more time to acclimate and adapt to climate change."

Coastal and environmental managers, as well as conservation staff throughout south Florida, the Gulf of Mexico, and Caribbean, can now use the projections to identify local conservation priorities. Managers may decide to preferentially protect these locations within marine protected area networks or may target a range of other actions to these relative refugia to reduce stress caused by human activities.

Over the coming year, the authors plan to use the new methodology to produce fine-scale annual severe coral bleaching projections for reef sites worldwide.



Warmer than average ocean temperatures triggered a massive coral bleaching event at reef sites throughout the Florida Keys in August-September 2014.

*van Hooidonk, R., J.A. Maynard, Y. Liu, and S.-K. Lee, 2015: Downscaled projections of Caribbean coral bleaching that can inform conservation planning. *Global Change Biology,* doi:10.1111/gcb.12901.

Drifter Program Catches a Lift to the Southern Ocean with the Volvo Ocean Race

If you've ever sailed aboard a ship or checked a weather report before heading to the beach, you're one of the millions of people who benefit daily from ocean observations. NOAA collects ocean observations and weather data to provide accurate forecasts of the seas, coastal weather, and regional climate predictions.

It takes a lot of effort to maintain observations gathered in all of the world's ocean basins to support these forecasts, and NOAA doesn't do it alone. Partnerships are essential to maintaining the global network of free-floating, data-gathering buoys known as drifters that measure surface pressure and ocean currents.

NOAA's latest partner is not your typical research vessel or cargo ship: it's the six yachts currently competing in the around the world Volvo Ocean Race. As one of the world's major global sailing events, accurate predictions of ocean currents and marine weather are critical to ensuring the safety of crew members during the eight-month long, 38,000+ nautical mile voyage from Alicante, Spain to Gothenburg, Sweden.

The fifth leg of the Volvo Ocean Race from Auckland, New Zealand to Itajaí, Brazil by way of the Southern Ocean began on March 17th. During the 6,775 nautical mile journey through the Southern Ocean, the longest and most challenging leg of the race, all six teams deployed a drifter in support of NOAA's ocean observation efforts. The Southern Ocean isn't regularly visited by oceanographers due to its remoteness, but is nevertheless an important region to observe.

Volvo Ocean Race competitors left Auckland, New Zealand, on March 17th for the start of leg 5 across the cold, turbulent waters of the Southern Ocean towards their next port stop in Itajaí, Brazil.

"The Southern Ocean is poorly sampled compared to other ocean basins because it's so remote from most shipping lanes where observations are collected," said Rick Lumpkin, director of the Global Drifter Program at AOML. "However, it plays a critical role in global ocean circulation and climate. It links the Atlantic, Pacific, and Indian oceans, so it's extremely important to observe currents and temperatures there."

Researchers with NOAA's Global Drifter Program at AOML continuously seek opportunities to deploy drifters in remote regions where ocean-observing platforms are needed. The unique partnership with the Volvo Ocean Race was negotiated by Martin Kramp, a ship coordinator for the Joint Technical Commission for Oceanography and Marine Meteorology of the World Meteorological Organization and Intergovernmental Oceanographic Commission of UNESCO.

"Organized ocean sailing events, such as races and rallies, are a new type of volunteer ocean observation," explained Kramp. "We have shown the feasibility and efficiency of such partnerships in the last months and are very happy the Volvo Ocean Race is collaborating with us as a part of the current race."

Each of the six race teams deployed their drifter at the same predetermined coordinates. As soon as the drifters entered the water, they began drifting with the surface currents and transmitting their data through a global network of satellites.

"The oceans are our race tracks, and we are delighted we can help build knowledge about them in this way," said Knut Frostad, chief executive officer of the Volvo Ocean Race. "I look forward to following the data from the drifters that our fleet dropped as they raced through the Southern Ocean, passing some of the most remote locations on the planet."

In spite of rough seas, crew members aboard each of the six yachts competing in leg 5 of the Volvo Ocean Race successfully deployed a drifter in the sparsely-sampled Southern Ocean between 40-43°S on March 23rd.

AOML Global Drifter Program:
www.aoml.noaa.gov/keynotes/keynotes_0814_oceanbouys.html

Drifter data online:
www.aoml.noaa.gov/phod/dac/index.php

Volvo Ocean Race:
www.volvooceanrace.com/en/home.html

Article adapted from NOAA's Office of Oceanic and Atmospheric web site (research.noaa.gov)

Longstanding Collaboration with Maersk Line Supports NOAA's Observational Efforts

NOAA-AOML plays a leadership role in the international effort to collect environmental data in the global ocean. As part of this effort, widely known as the Global Ocean Observing System (GOOS), scientists deploy oceanographic instruments such as Argo floats, expendable bathythermographs (XBTs), and surface drifters to collect information about the ocean's currents, temperature, and salinity. The data obtained are critical for weather forecasts and climate studies.

The success of the Global Ocean Observing System is partly possible thanks to a strong partnership between NOAA and the shipping industry. One of these partners is the Maersk Line, the world's largest container shipping company. For almost 15 years, approximately 30 Maersk vessels have supported AOML's global observational activities by providing platforms for scientific riders to deploy oceanographic instruments.

Since the early 2000s, more than 12,000 XBTs have been deployed from Maersk ships. These vessels have also provided deployment opportunities for hundreds of Argo floats and surface drifters.

The support of Maersk Line on XBT operations is an example of the impact this type of collaboration has on AOML's XBT network. In just the last 5 years, more than 8,000 XBTs have been deployed from the Maersk ships *Visby* and *Vilnius* which, combined, have completed 21 Atlantic XBT transects between Cape Town, South Africa, and Newark, New Jersey.

The Maersk ship *Vilnius* has completed 14 XBT transects across the Atlantic Ocean over the past 5 years in support of NOAA, deploying more than 5,500 XBTs between Cape Town, South Africa and Newark, New Jersey.

The data obtained from these transects are used to investigate the variability of zonal currents in the tropical Atlantic and the subtropical gyre in the South and North Atlantic oceans. The data have also been used to write numerous articles for scientific journals on these topics.

Maersk Line is, therefore, an excellent example of how private industry's voluntary contributions are improving our understanding of the ocean's currents and thermal structure, while also helping NOAA accomplish its goals.

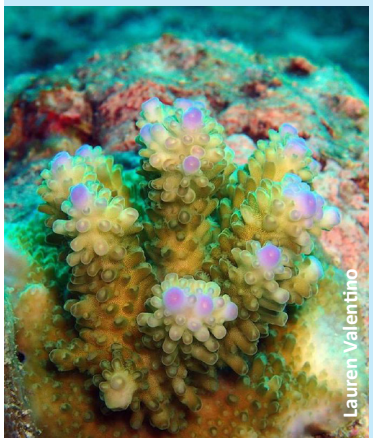
ACCRETE Researchers Explore Remote Coral Reefs in the Indian Ocean

In March, ACCRETE researcher Lauren Valentino participated in the first leg of the Khaled bin Sultan Living Oceans Foundation's Global Reef Expedition cruise to the Chagos archipelago. The small chain of islands in the Indian Ocean is home to the world's largest marine protected area, and 95% of its reefs are unexplored. The region's remoteness and lack of anthropogenic influence provide the ideal context for studying the impact of global stressors such as climate change and ocean acidification on the long-term health of coral reefs.

The R/V *Golden Shadow* explores the Chagos archipelago.

Working from aboard the R/V *Golden Shadow,* Valentino collected pH and carbon dioxide data and deployed a pH sensor to evaluate the carbonate chemistry dynamics of benthic reef environments. She also collected coral cores for analysis by computed tomography scanning (CT scans) to determine coral growth rates over time.

The Global Reef Expedition, operating under theme of "Science Without Borders," has been studying coral reef sites around the globe since 2011, documenting their health to better understand the factors that are crucial for reef resilience. ACCRETE (Acidification, Climate, and Coral Reef Ecosystems TEam), which is a subunit of the Coral Health and Monitoring Program (CHAMP) at AOML, has participated in 13 Global Reef Expedition cruises since June 2012. ACCRETE researchers Derek Manzello and Renee Carlton joined the cruise in April for its second leg to research coral reefs in the Maldives.



A vibrant colony of *Acropora* coral observed at a reef in the Chagos archipelago.

AOML-NOAA Fisheries Study Larval Fish and Ocean Currents in the Caribbean

Researchers with AOML's Physical Oceanography Division and NOAA's Southeast Fisheries Science Center (SEFSC) partnered for an interdisciplinary cruise aboard the NOAA Ship *Nancy Foster* to study larval fish and ocean currents in the Caribbean.

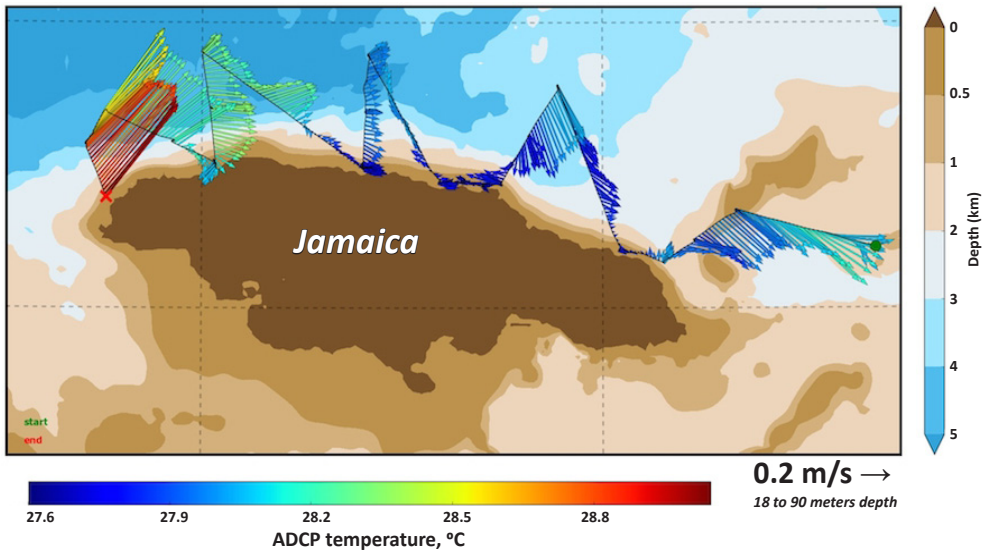
Leg 1 began on April 11th with a series of biological and physical oceanographic surveys of the Virgin Islands and surrounding region. These surveys were undertaken to study how larval reef fish distributions are affected by ocean currents and water properties.

In particular, research focused on the Virgin Islands coastal shelf ecosystem to better understand the processes that drive spawning aggregations of economically-important reef fish species in the region.

Researchers gathered fish larvae in nets and documented the contents in an onboard lab, with about 25,000 fish larvae classified per survey. These surveys built upon previous surveys conducted between 2007 and 2014 that serve as a baseline for comparing new results. The long-term sustainability of fisheries in these banks depends upon understanding the transport, spawning aggregations, and overall larval recruitment in the region.

Data gathered from the larval surveys should enhance scientists' understanding of the differences in larval reef fish distributions between managed and non-managed areas of the coastal shelf. By understanding where "hot spots" of species richness and diversity are likely to occur in the seascape, scientists will be in a unique position to inform resource managers about the effectiveness of various approaches to managing living resources along the coastal shelf.

Crew recover a CTD (conductivity-temperature-depth) instrument used for profiling the water column.



Plot of the upper ocean current velocities measured along the northern coast of Jamaica over a 2-day period. The vectors are an average of the flow in the upper 18-90 meters of the water column The strongest currents (almost 1 meter/second, ~2 knots) were observed around the western end of the island.

During leg 1, researchers aboard the *Nancy Foster* also reached out to the local community. Students from Charlotte Amalie High School on St. Thomas toured the ship and learned about the importance of larval reef fish. They were also given the chance to examine larval specimens under a stereo-microscope, as well as a lesson in how to identify and classify fish.

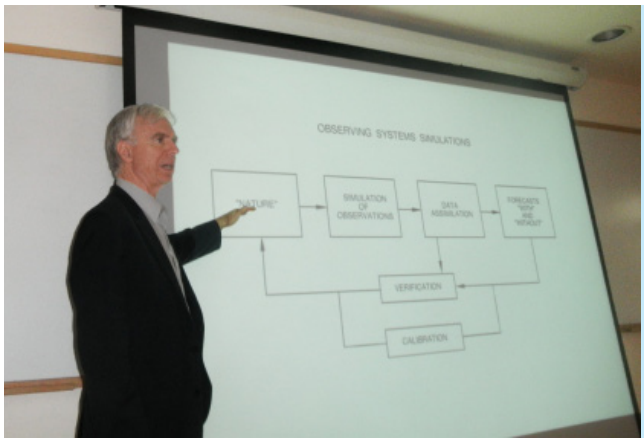
Leg 2 began on April 27th in Montego Bay, Jamaica, and took the team westward across the northern Caribbean into the waters of Cuba and Mexico. The biological focus of the research shifted from larval reef fish to pelagic Atlantic bluefin tuna (*Thunnus thynnus*) larvae, particularly the relationship between Atlantic bluefin tuna larvae and oceanographic conditions found in the coastal waters of southern Cuba.

Measurements and samples collected during leg 2 will provide species abundance and distribution data to improve tuna stock assessments for the western Caribbean Sea and Gulf of Mexico. The results will also be used to further develop a regional larval habitat model for Atlantic bluefin tuna.

Crew recover an S10 net used to collect larval fish.

In addition to AOML and SEFSC researchers, scientific participants also included researchers with the University of Miami, University of South Florida, University of the Virgin Islands, University of Oregon, University of Puerto Rico, University of the West Indies (Jamaica), the Department of Natural Resources (St. Thomas), the Colegio de la Frontera Sur (Mexico), the Instituto Nacional de Pesca (Mexico), and the Instituto Español de Oceanografia (Spain). The cruise ended in Cozumel, Mexico on May 5th.

Hurricane Pioneer: Memoirs of Bob Simpson documents Dr. Robert H. Simpson's life-long fascination with weather, his many trail-blazing accomplishments, and his critical contributions to the discipline of tropical meteorology. Edited by AOML research meteorologist Neal Dorst and published by the University of Chicago Press, the new book is available from the American Meteorological Society's web site (http://bookstore.ametsoc.org/catalog/book/hurricane-pioneer), as well as a number of commercial vendors. NOAA's Miami Regional Library at AOML also has several copies.

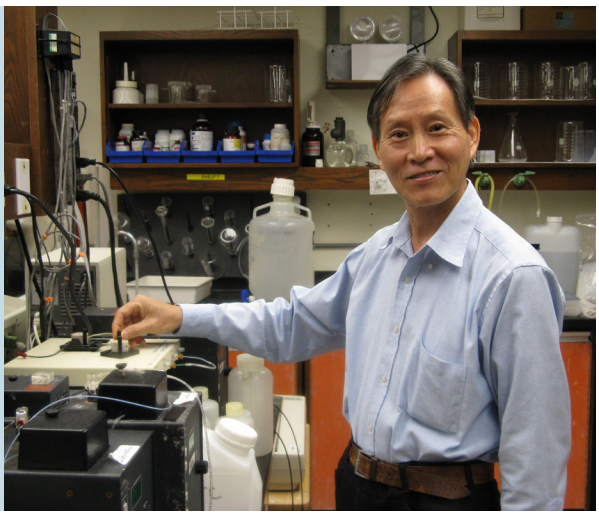


AOML Director Dr. Bob Atlas presented the keynote address at the Israeli Meteorological Society's annual meeting in Tel Aviv on March 23rd. Bob spoke about the value of observing system simulation experiments in assessing the potential forecast impacts of new observing systems for numerical weather prediction; he also spoke about numerical modeling and data assimilation of both the atmosphere and the ocean. The following day, Bob visited Tel Aviv University and presented a seminar about hurricane research and NOAA's Hurricane Forecast and Improvement Project.

AOML Director Dr. Bob Atlas delivered the keynote address at the Israeli Meteorological Society's annual meeting in Jerusalem on March 23rd.

In March, researchers with AOML's Nutrient Laboratory completed their analysis of nutrient reference seawater samples as part of the 4th International Inter-Comparison Exercise. More than 110 nutrient laboratories worldwide were invited to participate in the study sponsored by the International Ocean Carbon Coordination Project (IOCCP) and the Japan Agency for Marine-Earth Science and Technology (JAMSTEC). Nutrient reference samples of unknown concentration were prepared in Japan, Korea, and the Netherlands. These samples were supplied to participating laboratories for analysis, and the results were then reported back to the organizers. The exercise is part of an effort to develop a more uniform global consensus for how nutrient samples are analyzed. By establishing international standards for nutrient comparability, researchers will gain the ability to more accurately detect changes in ocean nutrient levels due to anthropogenic impacts and shifting physical processes.

Dr. Jia-Zhong Zhang in the Nutrient Laboratory at AOML.



Pedro Pena, Erik Valdes, and Robert Roddy, all with AOML's Physical Oceanography Division, and AOML communications intern Ed Pritchard conducted a hydrographic survey along 27ºN in the Florida Straits on April 9-10th. The cruise aboard the R/V *F.G. Walton Smith* was conducted in support of the ongoing Western Boundary Time Series program to quantify volume transport and water mass changes occurring in the Florida Current. During the cruise, researchers deployed a CTD (conductivity-temperature-depth) instrument to obtain full water column measurements of salinity, temperature, and oxygen. This survey and others like it are used to calibrate daily estimates of the Florida Current volume transport derived from a submarine telephone cable deployed across the Straits.

A CTD instrument used for water column profiling sits ready on the deck of the RV *F.G. Walton Smith* as the ship leaves the Port of Miami for the Straits of Florida.

Due to the efforts of researchers with AOML's Physical Oceanography Division, the first of 12 new dual salinity sensor drifters were deployed in the south equatorial Pacific Ocean in April as part of a jointly-funded NOAA-NASA project to investigate sea surface salinity variability in several ocean regions. The drifter, which has salinity sensors located at the surface and at a depth of 5 meters, was deployed by the commercial vessel *Maersk Batur* on April 9th while transiting from Philadelphia, Pennsylvania to Auckland, New Zealand. The *Maersk Batur* deployed two additional dual salinity sensor drifters during its return voyage to Philadelphia. This drifter deployment marks the first time dual salinity drifters have been deployed in the South Pacific Ocean. Data obtained from these drifters will help researchers better understand the link between the vertical salinity gradient in the upper ocean and ocean surface processes. The data will also support NASA's Aquarius satellite salinity mission.

Crew aboard the *Maersk Batur* deploy the first dual salinity sensor ever released in the South Pacific Ocean.

Hurricane Research Division Wears Purple for a Cause

A 21-member team from AOML's Hurricane Research Division (HRD) and the University of Miami's Cooperative Institute for Marine and Atmospheric Studies (CIMAS) participated in the annual Purple Stride walk to raise funds and increase awareness for pancreatic cancer research. The team had an early start on Sunday, April 12th, to walk 3 miles in support of colleague Paul Willis, who is currently battling the disease. Sponsored by the Pancreatic Cancer Action Network, the event was held at the Historic Virginia Key Beach Park and raised over $92,000 towards the goal to "know it, fight it, end it."

The event chairman, Anita Marks, helped organize the group from HRD, which was one of the top 10 fund-raising teams, with over $2000 in donations. The team consisted of HRDers Bachir Annane and son Aiden, Bob Black, Lisa Bucci, Hua Chen, Javier Delgado, Peter Dodge, John Gamache, John Kaplan, Chris Labbe, Paul Leighton, Frank Marks, Rob Rogers, his wife Jennifer and children Katie and Matthew, Team Captain Kathryn Sellwood, and CIMAS director Peter Ortner and daughter Katie. Rob Roger's son Jonathan and Bob Black's son Edward also supported the team as event volunteers.

It was a beautiful day on Virginia Key, and the walkers enjoyed the shady nature paths, ocean view, and the camaraderie of people coming together for a good cause.

Team Captain Kathryn Sellwood and Peter Dodge of HRD enjoy a picture-perfect morning at Historic Virginia Key Beach Park.

HRD staff supported colleague Paul Willis, wearing a blue polo shirt, by participating in the Purple Stride walk on April 12th.

Walking for pancreatic cancer research—Paul Leighton, Peter and Katie Ortner, Lisa Bucci, John Kaplan, Hua Chen, and Bachir Annane.

Bring Your Children To Work Day

In support of mentoring the next generation of scientists, AOML welcomed 18 children to the lab on Friday, April 10th, for National Bring Your Child to Work Day. Parents and students shared a fun day of science activities which included a tour of the new University of Miami-Rosenstiel School's Marine Technology Life Sciences Seawater Complex. There, they visited a coral nursery, watched the 28,000 gallon SUSTAIN (Surge-Structure-Atmosphere Interaction) wave tank in action, and interacted with the resident aplysia (sea hares). Thanks to all who helped make the event a success and to all the young scientists who participated.

Farewell

Gregory Banes, a maintenance mechanic with AOML's Facilities Management Group, retired in April after 40 years of federal service, 37 of which were spent at AOML. Greg worked for decades to keep the aging, 74,000 square foot AOML facility functioning and in good repair, a task that kept him perpetually busy.

AOML hosted a farewell party for Greg to thank him for his many years of loyal service and to wish him the best in his retirement. Congratulations to Greg on the successful conclusion of his federal career and to a well-earned bit of rest and relaxation. Greg looks forward to spending time with his grandchildren and to endless, leisurely fishing expeditions.

Welcome Aboard

Edward Pritchard joined the Office of the Director in April as a student research assistant with the University of Miami's Cooperative Institute for Marine and Atmospheric Studies. Ed will intern with Erica Rule, director of communications and outreach at AOML, for the next year to assist with science communications and with Twitter, Facebook, and other social media technology. He is currently a graduate student with the Marine Affairs and Policy Department at the University of Miami's Rosenstiel School. Ed holds a B.S. degree in environmental science awarded in 2011 from the University of Florida.

AOML recycles:

- Paper
- Cardboard
- Aluminum cans
- Clear/green/brown colored glass
- Plastic bottles and containers (nos. 1, 2, and 3)
- Batteries (lithium & dry/wet cell)

Congratulations

Gregory Foltz, an oceanographer with AOML's Physical Oceanography Division, accepted an invitation by the American Meteorological Society in February to become an editor for the *Journal of Physical Oceanography*. Greg will serve a three-year term as editor, during which he will be responsible for the peer-review and decision-making processes for manuscripts dealing with low-latitude oceanography.

Alejandra Lorenzo, an Information Technology specialist with AOML's Computer Networks and Services Division, was recognized by the South Florida Federal Executive Board (SFFEB) in March for her long-term support of its website and outreach initiatives. After the SFFEB website malfunctioned several years ago, Alejandra worked with Russell St. Fleur of AOML to transition the website to AOML. Since then, Alejandra has trained a number of student interns to update the SFFEB website and has assisted the SFFEB's efforts to revamp its web presence. Additionally, Alejandra was recognized for creating and successfully managing the SFFEB's Government Investment in Future Talent-English for Speakers of Other Languages program. Thanks to Alejandra, the program has grown to include more than 70 south Florida federal agency volunteers that speak with students at two partner high schools—Miami Senior High and Hialeah Senior High—about the personal and professional benefits of learning to speak English.

Xaymara Serrano, a National Research Council post-doctoral scientist with AOML's Ocean Chemistry and Ecosystems Division, is the recipient of one of 18 Ford Foundation Postdoctoral Fellowships awarded in 2015 nationwide. The postdoctoral fellowships are awarded in a national competition administered by the National Research Council to individuals who, in the judgment of the review panels, have demonstrated superior academic achievement, are committed to a career in teaching and research, show promise of future achievement as scholars and teachers, and are well prepared to use diversity as a resource for enriching the education of all students. Xaymara plans to use the funds to support another year of her postdoctoral research aimed at investigating coral reef responses to climate change and land-based sources of pollution.

Team NOAA-Miami competed in the 2015 Mercedes-Benz 5K Corporate Run on April 23rd. This year's 20-member group was represented by NOAA employees from the National Hurricane Center, South Florida Weather Forecast Office, Southeast Fisheries Science Center, and AOML. The weather was rainy but failed to dampen or deter anyone's enthusiasm: more than 27,500 competitors from 888 local businesses, government agencies, and non-profits flocked to downtown Miami's Bayfront Park for the event. Congratulations to Team NOAA-Miami, whose men's and women's teams won first and second places, respectively, in the State-Federal Government Employees category (Greg Foltz-Eric Blake-David Zelinsky-Marlos Goes/Lisa Bucci-Claudia Schmid-Kathryn Sellwood-Mandy Karnauskas).

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

BARINGER, M.O., W.E. Johns, **S. GARZOLI, S. DONG, D. VOLKOV,** and W.R. Hobbs, 2014: Global oceans: Meridional oceanic heat transport in the Atlantic Ocean. In *State of the Climate in 2013,* J. Blunden and D.S. Arndt (eds.). *Bulletin of the American Meteorological Society,* 95(7):S69-S71.

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