

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

Mississippi River Flood Waters Reach the Florida Keys during August 2011

As a result of the record flooding in the central U.S. during the spring of 2011, the Mississippi River stage and volume discharge to the Gulf of Mexico also reached record levels (as recorded by the U.S. Geological Survey). These values peaked in May 2011, resulting in a large pulse of fresh water, possibly laden with contaminants such as fertilizers, pesticides, and other materials due to its terrestrial origin, which entered and then spread across the northern Gulf.

By July 2011, satellite remote sensing images of ocean color indicated that the Mississippi River discharge was beginning to spread southward as a narrow, coherent plume along the eastern edge of the Loop Current. A rough estimate, based on the southward progression of the plume as observed by ocean color imagery, suggested that the Mississippi River plume would reach south Florida's coastal waters from the Tortugas to the Keys just in time for AOML's South Florida Program (SFP) bimonthly regional cruise.

This rough estimate proved to be correct. Scientists from the Ocean Chemistry and Physical Oceanography divisions recently completed an extended version of their regular interdisciplinary SFP sampling program on August 2-7, 2011 aboard the R/V *F.G. Walton Smith*, and were able to document the delivery of Mississippi River water to the Florida Keys using the onboard flow-through C6 seawater system. The instrument continuously recorded surface temperature, salinity, chlorophyll, chromophoric dissolved organic matter (CDOM), turbidity, crude oil, and other parameters, while a conductivity-temperature-depth (CTD) instrument provided vertical profiles of several of these parameters.

Visiting scientists from various institutions, who had been alerted of this opportunity to sample the Mississippi River plume, collected samples for microbial DNA analysis, stable isotopes, and other biogeochemical parameters. In addition, recently acquired optical instrumentation allowed for measurement of hyperspectral remote sensing reflectance to be used for calibration and validation of satellite ocean color observations. The

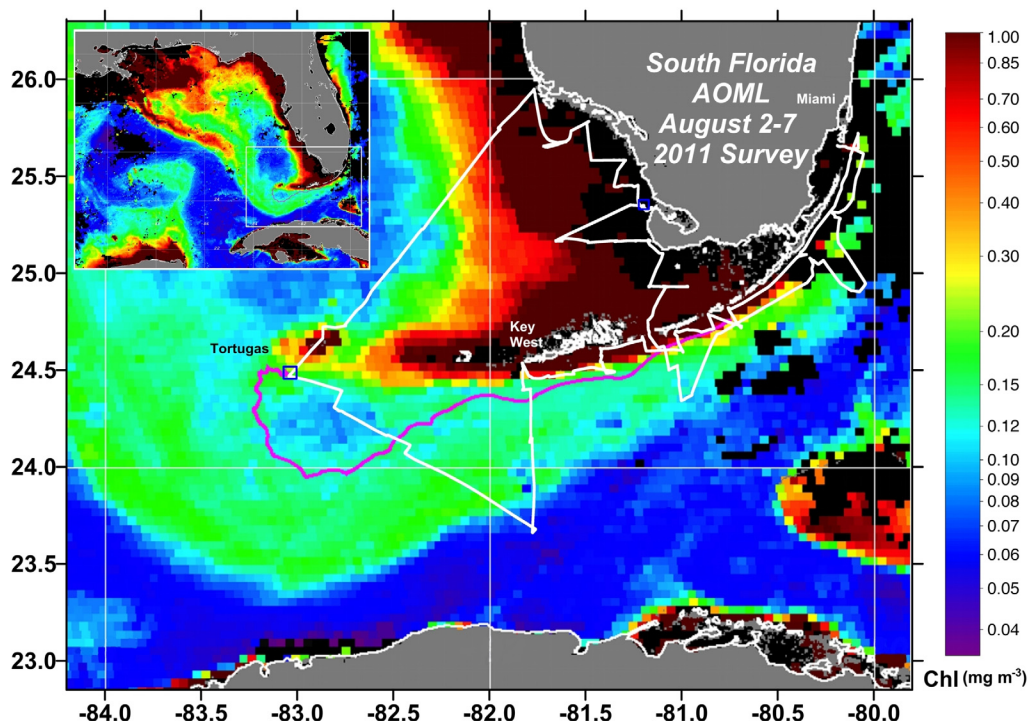


Figure 1. Ocean color image from NASA's MODIS Aqua satellite depicting surface chlorophyll levels in the Gulf of Mexico and coastal south Florida waters. Higher values are seen originating from the discharge region of the Mississippi River and spreading down to south Florida along the eastern front of the Loop Current, ultimately reaching the Tortugas Gyre and the Florida Current along the Florida Keys. Also shown are the cruise track (white line) and the trajectory of a satellite-tracked surface drifter (magenta line) that was deployed during the August South Florida Program cruise near the Dry Tortugas.

science team for the cruise also included a NOAA Teacher at Sea, graduate students from the University of South Florida and Florida Atlantic University, and an undergraduate student from the University of Chicago.

A satellite-derived, 3-day composite image of ocean color from NASA's MODIS Aqua satellite, recorded on August 5-7, 2011, shows a plume of relatively high chlorophyll from the Mississippi River extending from the northern Gulf of Mexico (inset) to the Tortugas Gyre (centered at 24.2°N, 82.8°W), which then spreads to the northeast towards Miami along the onshore front of the Florida Current (Figure 1). The cruise track (white line) is superimposed upon the ocean color image; the 8-day trajectory of a surface drifter (magenta line) deployed in the Tortugas during the cruise is also shown, graphically demonstrating the rapid connectivity along the Florida Keys from the Tortugas to Miami and beyond.

Surface water properties from the shipboard flow-through C6 system indicated that although a phytoplankton bloom was located along the southwest Florida shelf that dominated most of the signals, a lower magnitude but still very distinct signal from the Mississippi River plume was most evident in the Tortugas Gyre sections. Surface properties measured along the portion of the cruise track between the Dry Tortugas and the southernmost point below Key West (Figure 2) show that the water was relatively lower in salinity and higher in chlorophyll within the river plume as opposed to the surrounding waters of the Gulf of Mexico and Florida Current. The river water was also associated with relatively higher surface temperature, CDOM, turbidity, and crude oil (not shown). CTD profiles revealed that the Mississippi River plume thickness reached a depth of approximately 20-30 meters in the vertical.

(continued from page 1)

The ecological effects on south Florida's ecosystems caused by terrestrial origin river discharges are not yet fully understood. When the cruise data, including the extra biogeochemical sampling, are fully analyzed they will provide further insight into the downstream consequences of the 2011 Mississippi River flood. It should be noted that although specific contaminants such as pesticides and fertilizer were not sampled during this particular cruise, such data were collected farther north in the Gulf of Mexico near the Mississippi River mouth by other institutions, and it will be possible to estimate their relative dilutions as the river plume approached the Keys by using measured conservative tracers such as salinity.

Finally, the Mississippi River flood plume during 2011 provided a graphic and unmistakable demonstration of a direct transport mechanism capable of delivering materials from the northern Gulf to the Florida Keys, often quite rapidly with a time scale of days to weeks. In the summer of 2010, following the Deepwater Horizon oil spill in the northern Gulf, scientists from AOML documented that such a direct pathway was not present at the

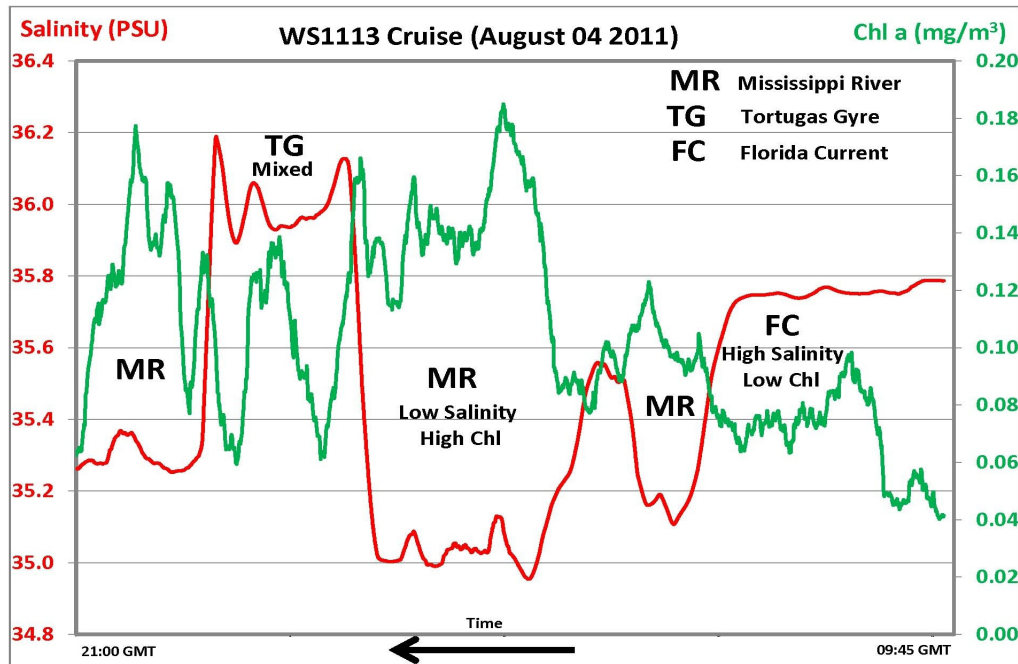


Figure 2. Surface salinity and chlorophyll measured along the transect from the Dry Tortugas to the southernmost point below Key West (shown in reverse for easier comparison with Figure 1) using the flow-through system. The Mississippi River water signal is associated with relatively lower salinity and higher chlorophyll, the Tortugas Gyre water is banded/mixed, and the Florida Current water signal is associated with higher salinity and lower chlorophyll.

time and found no sign of oil south of about 28°N. Had the oil spill occurred during 2011 rather than 2010, its consequences for the

sensitive coral reefs, sea grass beds, mangrove shorelines, and sandy beaches of south Florida could have been dramatically different.

NOAA Teacher at Sea Participates in South Florida Program Cruise

During the August South Florida Program (SFP) sampling cruise aboard the R/V *F.G. Walton Smith*, AOML researchers were aided by Caitlin Fine, a science teacher from Francis Scott Key Elementary School in Arlington, Virginia. Caitlin participated in the cruise through NOAA's 2011 Teacher at Sea program, which provides teachers at all academic levels—Kindergarten through college—the opportunity to work alongside scientists and crew members during sea-going missions. The program seeks to help teachers increase their understanding and appreciation of the marine and atmospheric sciences and to share the knowledge they've gained with their students.

Although it was her first time at sea, Caitlin quickly adjusted to the hectic pace of life aboard a research vessel. As a member of the science team, she supported all aspects of the cruise. During her 12-hour watches, Caitlin helped deploy and recover data-gathering instruments, worked in both the wet and dry labs, and assisted in the processing and analysis of samples for an array of physical, biological and chemical components.

She learned all about the CTD (conductivity-temperature-depth) Rosette system used for gathering water samples, as well as how to use Neuston and phytoplankton nets towed along the water's surface for biodiversity studies. Visit Caitlin's blog site to read about her experiences while aboard ship at <http://teacheratsea.wordpress.com/category/noaa-teacher-at-sea-2/caitlin-fine/>.

AOML's SFP has been conducting its bimonthly monitoring cruises of Florida Bay and south Florida's coastal waters since the early 1990s to assess changing patterns of circulation and water quality in the region. During its April cruise, the SFP had the pleasure of hosting another 2011 NOAA Teacher at Sea, Nathan Pierantoni, from Heights Middle School in Farmington, New Mexico.

In the wet lab, Caitlin Fine processes water samples for dissolved inorganic carbon.



Caitlin Fine, on the deck the R/V *F.G. Walton Smith*, fills a sample bottle with water from a CTD Rosette instrument for later laboratory analysis.

In reflecting upon the entire experience, I feel extremely fortunate to have been granted the opportunity of a lifetime to participate in Teacher at Sea. I was able to help with all aspects of the scientific research from optics, to chemistry, to marine biology, as well as help with equipment that is usually reserved for the ship's crew, such as lowering the CTD or tow nets into the water. I return to the classroom loaded with great memories, anecdotes, first-hand experiences and a more complete knowledge of oceanography and related marine science careers to help empower my students to consider becoming future scientists and engineers. Thank you Teacher at Sea!

Caitlin Fine, 2011 NOAA Teacher at Sea

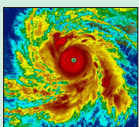
HRD Researchers Begin Hurricane Intensity Forecast Experiments

AOML's Hurricane Research Division (HRD) is continuing its efforts to improve hurricane intensity forecasts this summer during its annual Hurricane Field Program. Intensity Forecast Experiments (IFEX) are being conducted in collaboration with NOAA's National Hurricane Center, Environmental Modeling Center, Aircraft Operations Center, and other partners to sample an assortment of storms at various stages of their lifecycle using NOAA's P-3 and G-IV research aircraft as observational platforms.

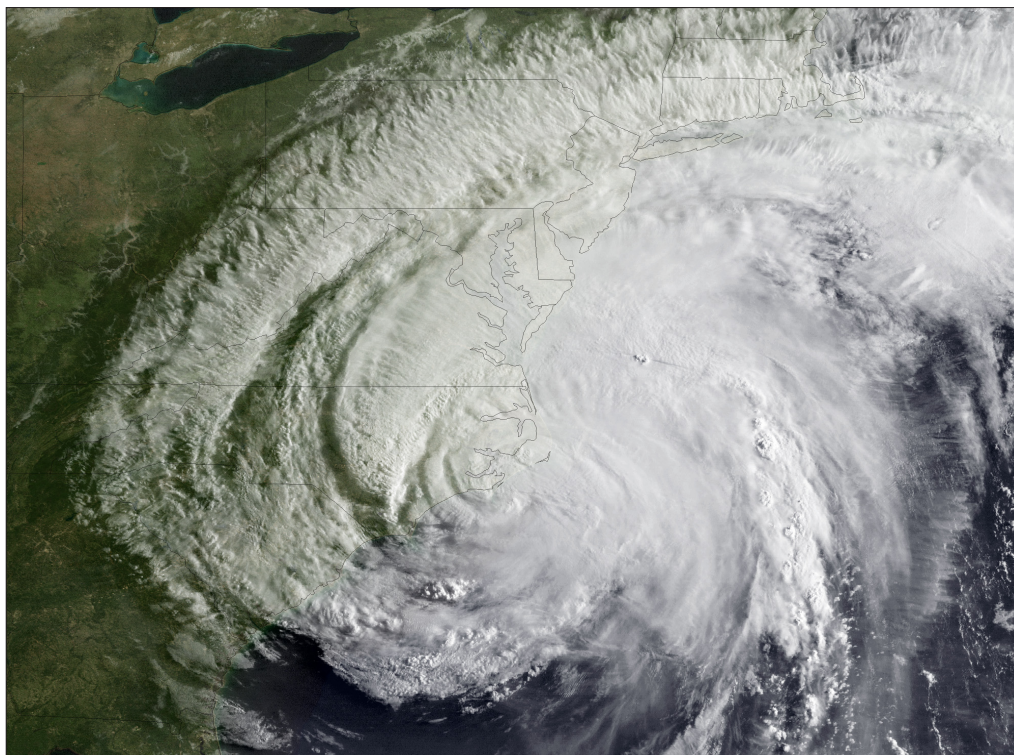
The data gathered from fledgling thunderstorms that are the precursors of hurricanes to hurricanes at landfall or their subsequent decay over open water will aid in initializing and evaluating computer models, improving sampling technologies, and advancing understanding of the physical processes involved in intensity change. Storms that rapidly gain strength as they approach landfall are of particular interest.

In July, HRD researchers gathered observations of the atmosphere, ocean surface, and subsurface of Hurricane Dora as the storm decayed above the Pacific Ocean in cold water. The data collected will help to better calibrate existing methods of estimating tropical cyclone intensity over cold water. HRD researchers continued their data-gathering efforts in August with research flights into Tropical Storms Emily and Harvey, as well as 15 missions into Hurricane Irene as the storm intensified from a tropical system into a major hurricane and approached the U.S. eastern seaboard.

As the Atlantic hurricane season edges closer to its peak period of activity from August through October, NOAA's hurricane hunters will continue sampling Atlantic basin storms to study the lifecycle of tropical systems to bring about more accurate forecasts of tropical cyclone intensity, structure, and rainfall.



The Hurricane Research Division hosts daily tropical weather discussions at 12 noon in the AOML first-floor conference room in support of its 2011 Hurricane Field Program. The discussions are between 20-30 minutes in length and are open to all interested individuals who wish to know more about tropical weather activity in the Atlantic basin. For audio access to the discussions, join the HRD conference call line at 1-866-700-1361, pass code 491147.



NOAA GOES-13 satellite image of Hurricane Irene making landfall near Cape Lookout, North Carolina on August 27th. Irene became the 2011 Atlantic hurricane season's first named storm to reach hurricane strength, as well as the first storm to intensify into a major hurricane (winds above 110 mph on the Saffir-Simpson scale). In support of their annual Hurricane Field Program, scientists with AOML's Hurricane Research Division flew round-the-clock missions into Irene aboard NOAA's hurricane hunter aircraft as the system developed and trekked westward towards the United States. The massive storm barreled up the U.S. east coast, flooding both coastal and inland communities and knocking out power to millions before crossing into Canada. Early estimates place the damage from Irene into the billions. Irene also became the first hurricane to make landfall in the U.S. since Hurricane Ike struck the Galveston, Texas coast on September 13, 2008.

NOAA Increases Number of Named Storms for 2011

NOAA released its updated outlook for the 2011 Atlantic hurricane season on August 4th, stating it anticipates a greater number of named storms to develop than previously indicated in its pre-season outlook. In May, NOAA predicted 12-18 named storms would form during the six-month long hurricane season, which began June 1st and ends November 30th.

As the Atlantic hurricane season enters its peak period for tropical cyclone activity, August through October, NOAA forecasters predict 14-19 named storms will form, with 7-10 named storms strengthening into hurricanes with winds above 74 mph. Three to 5 hurricanes are predicted to intensify into major hurricanes with winds above 110 mph (categories 3, 4, and 5 on the Saffir-Simpson scale). An average hurricane season typically produces 12 named storms, 6 hurricanes, and 3 major hurricanes.

A combination of climatic factors—the tropical multi-decadal signal, above-average sea surface temperatures, and the possible redevelopment of La Niña conditions in the equatorial Pacific Ocean—are all contributors to NOAA's confidence that 2011 will be an busy year for storm activity.

The active phase of the tropical multi-decadal signal is believed to have caused an

NOAA's Atlantic Hurricane Outlooks	May 2011	August 2011
Named Storms	12-18	14-19
Hurricanes	6-10	7-10
Major hurricanes	3-6	3-5

increase in Atlantic hurricane activity since it began in 1995, while above average sea surface temperatures across the tropical Atlantic Ocean and Caribbean Sea help fuel storm development. The possible redevelopment of La Niña conditions in the equatorial Pacific reduces wind shear in the Atlantic, creating a more favorable environment for tropical cyclogenesis to occur.

NOAA's seasonal hurricane outlooks are produced by the Climate Prediction Center through a collaboration of scientists with the National Hurricane Center and Hurricane Research Division (HRD) of AOML. HRD meteorologist Stanley Goldenberg has been a member of the seasonal hurricane forecast team since its inception in 1998.

Coastal communities are urged to remain vigilant in monitoring the tropics and to have hurricane preparedness plans in place and ready to activate if the need arises.

Saipan Coral Reef Monitoring Station Goes Live

A new Coral Reef Early Warning System (CREWS) station was installed in Lao Lao Bay, Saipan in July, becoming the first coral reef monitoring platform established in the Pacific by NOAA's Coral Health and Monitoring Program. AOML coral reef researcher Jim Hendee and John Halas of NOAA's Florida Keys National Marine Sanctuary served as on-site technical consultants that oversaw a team of divers from Seafix, Inc., of Garapan, Saipan as they secured and then righted the station's 38-foot pylon.



The new, fully instrumented Coral Reef Early Warning System (CREWS) station in Lao Lao Bay, Saipan.

In August, Ross Timmerman of the Pacific Islands Ocean Observing System, along with Mike Jankulak, Rachel Kotkowski, and Derek Manzello of AOML, visited Saipan to install a suite of atmospheric and oceanic sensing instruments on the station's pylon, both above and below the ocean surface. In spite of rough seas and stormy weather that persisted throughout much of their visit, the team succeeded in securing the instruments to the pylon, ensuring their functioning, and bringing the station online. As an added innovation, the



The beautiful fringing and barrier coral reefs of Saipan provide a habitat for a wide range of marine life but are increasingly impacted by the environmental effects of pollution and human activities.

station becomes the first to use a cellular modem as its main mode of communication. Rather than a 20-second window of satellite communications once per hour, researchers can access the Saipan station at any time and download as much data as they wish.

Located directly adjacent to Forbidden Island Marine Sanctuary, the Saipan CREWS station joins the network of NOAA's environmental monitoring platforms and satellite monitoring "virtual stations" that collectively form the Integrated Coral Observing Network (ICON). ICON 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 (www.coral.noaa.gov). Early warning alerts are issued when parameters conducive to coral bleaching and other impact events for corals and coral reef ecosystems are met.

The Saipan CREWS station was made possible through an initiative between the Coastal Resource Management Office of the Commonwealth of the Northern Mariana Islands and NOAA's Coral Health and Monitoring Program.

A cooperative agreement between NOAA and the European Union's Global Climate Change Alliance will greatly expand coral reef monitoring efforts in the Caribbean. The agreement calls for the installment of environmental monitoring stations (buoys) in the coastal waters of Belize, Barbados, Cuba, Saint Lucia, the Dominican Republic, and Trinidad and Tobago by 2014. AOML's Coral Health and Monitoring Program (CHAMP) researchers will aid this effort by providing advice on site surveys, collaborating with science partners throughout the Caribbean, and by quality controlling and incorporating the new data into a Google-based web interface on the CHAMP web site.

Representatives from the Indonesian Ministry of Marine Affairs and Fisheries (KKP) and the Agency for the Assessment and Application of Technology (BPPT) visited AOML on August 8-9th. The group met with staff from the Physical Oceanography Division's Global Drifter and Argo Float programs, as well as its Engineering group, to learn more about ocean-observing instruments and the data they produce.

The Republic of Indonesia is developing its capacity to obtain climate observations in the Indian Ocean, as well as its management, quality control, dissemination, and archival of data from ocean observing instruments. By collaborating with AOML staff, Indonesian researchers hope to emulate NOAA's ocean-observing strategies and to become a better partner to the international community of organizations that gather ocean observations.

Pictured from left to right are Vicki Halliwell (AOML), Pak M. Handoko (KKP-BPPT), Pak R. Alfi (KKP-BPPT), Elizabeth Forteza (AOML), Mayra Pazos (AOML), Erik Valdes (AOML), Ibu S. Yenburg (KKP-BPPT), and Pak C. Handy (KKP-BPPT).



Microbial Water Quality Assessed in Florida Keys

In July, researchers with AOML's Environmental Microbiology Group spent a week in the Florida Keys conducting an intensive microbial water quality and source tracking study. Drs. Chris Sinigalliano and Maribeth Gidley were aided in the effort by student intern Lisa Johns and NOAA Hollings scholars Olufunmilola Adebajo and Frank Johnson.

The microbiology team first focused its attention on testing the canals and nearshore coastal waters of Little Venice, a residential community located near Marathon, Florida. Water quality in and around Little Venice has been monitored for the past several years by Florida International University (FIU) to track the occurrence of enterococci bacteria, which are found in human fecal matter.

Over the last decade, Little Venice has transitioned from an outdated, failing system for coping with sewage to a new sewer network and centralized wastewater treatment plant. Before this upgrade, aging septic tanks and cesspits had been found to be leaking human waste into the canals and coastal waters, degrading water quality. The presence of enterococci bacteria is thus used to assess the health risks to marine and coastal waters posed by fecal contamination.

To follow-up on FIU's monitoring efforts, AOML's microbiology team collected water samples every 2 hours for 50 hours and processed the samples to measure the occurrence of enterococci fecal indicator bacteria markers. An analysis of the human-host source fecal markers was also performed to evaluate the progress of sanitary remediation efforts for residential homes along the canals that impact the region's coastal water quality.

After sampling operations were completed in the Little Venice region, a number of popular recreational beach sites in the Florida



A rescued pilot whale undergoing rehabilitation at a facility in the Florida Keys is supported by staff and volunteers while a collaborative team from the University of Miami's Oceans and Human Health Center, AOML, and NOAA's Southeast Fisheries Science Center test the whale, humans, and surrounding environment for the presence of pathogenic bacteria.

Keys were sampled to test for the presence of pathogenic *Staphylococcus aureus*, including the methicillin-resistant strain of the bacteria known as MRSA. Sand and water samples were collected from high-use public beaches in John Pennekamp State Park, Bahia Honda State Park, Annie's Beach Park, and several private beaches.

AOML's microbiology team also participated in a multi-organizational effort to investigate microbial water quality at a rehabilitation facility for marine mammals. The team collected samples from the holding pens and coastal environment of the facility, as well as tested several pilot whales and volunteer staff members for the bacteria. The cooperative venture was led by researchers from the University of Miami's Miller School of Medicine and Oceans and Human Health Center, along with researchers with NOAA's Southeast Fisheries Science Center, the Florida Department of Health, and AOML.

Back in Miami, NOAA Hollings Scholar Olufunmilola Adebajo, student intern Lisa Johns, and summer intern Lily Zhang assisted Dr. Maribeth Gidley and other researchers at the University of Miami's medical campus in the culture and genetic analysis of *Staphylococcus* isolates. NOAA Hollings Scholar Frank Johnson, along with AOML research associates David Wanless and Jakub Bartkowiak, worked with Dr. Chris Sinigalliano to genetically characterize the fecal indicators, source tracking markers, and pathogens sampled from the Little Venice residential canals.

Both Hollings scholars gave brief presentations of their work with the Microbiology Group at AOML's first sponsored student symposium on July 28th. They also presented

their research at NOAA's 2011 Science and Education Symposium in Silver Spring, Maryland, where Frank Johnson tied for first place in the student poster competition.



AOML undergraduate student intern Lisa Johns, high school summer intern Sharon Plano (daughter of collaborator Dr. Lisa Plano from the University of Miami), and NOAA Hollings Scholar Olufunmilola Adebajo identify presumptive *Staphylococcus aureus* colonies from Baird-Parker membrane filtration plates at the Keys Marine Laboratory.



AOML interns and a post-doctoral researcher with the University of Miami's Oceans and Human Health Center set up an autosampler to collect water samples from the 91st Street Canal in the Little Venice neighborhood of Marathon, Florida. Counterclockwise from the top are AOML student intern Lisa Johns, NOAA Hollings Scholar Frank Johnson, and University of Miami post-doc Susan Hower.



AOML undergraduate student intern Lisa Johns (shown wading out of water with a Whirpak sample bag) collects a water sample from a Florida Keys recreational beach site to test for microbial water quality parameters such as the potential presence of fecal indicator bacteria and pathogenic *Staphylococci*, including Methicillin-Resistant *Staphylococcus aureus* (MRSA).

AOML Hosts First Student Symposium

AOML hosted its first Student Symposium on July 28th, providing students enrolled in summer internship programs at AOML and other south Florida NOAA line offices the chance to share research results and discuss their summer experiences. The symposium enabled students to practice making a formal presentation before an audience and to field and answer questions. Mentors and other audience members provided constructive comments and feedback.

Student interns displayed an impressive array of presentation skills and demonstrated to those in attendance a great future resource for NOAA scientists and leadership.

Special thanks to Maribeth Gidley of AOML's Ocean Chemistry Division for her efforts to organize the event. Student intern presentations included the following:



AOML happily welcomed its student interns for the 2011 summer season in June, including four NOAA Hollings Scholars. Student interns assisted investigators with a wide range of research activities, field sampling efforts, and technical tasks in support of the Laboratory's three science divisions (Hurricane Research [HRD], Ocean Chemistry [OCD], and Physical Oceanography [PhOD]), Office of the Director (OD), and the Computer Networks and Services Division (CNSD). Pictured above from left to right are Hallee Meltzer, Diana Goeller, Olufunmilola Adebajo, Frank Johnson, and Aryeh Drager following their presentations at AOML's first student symposium on July 28th. The complete listing of AOML's 2011 student interns and their mentors appears below.

Anthropogenic *Staphylococcus Auerus* on South Florida Beaches

Olufunmilola Adebajo

NOAA Hollings Scholarship Program

AOML mentor—Maribeth Gidley

Diagnosing Vertical Wind Shear Impacts in the Hurricane Weather Research and Forecast Experimental System (HWRFX) Model

Aryeh Drager

NOAA Hollings Scholarship Program

AOML mentor—Paul Reasor

Operations at the National Hurricane Center

Diana Goeller

National Hurricane Center

Summer Internship

NHC mentor—Ed Rappaport

Molecular Microbial Source Tracking of Fecal Indicators in the Nearshore Water and Residential Canals in the Florida Keys

Frank Johnson

NOAA Hollings Scholarship Program

AOML mentor—Chris Sinigalliano

Processing Data from the Florida Bay

Hallee Meltzer

Summer Intern with the Juvenile Spotted

Seatrout Program and Comprehensive

Everglades Restoration Plan

AOML mentor—Chris Kelble

Managing the Federal Executive Board Website

Eric Wahl

MAST Academy Summer Internship

AOML mentor—Alejandra Lorenzo

Olufunmilola Adebajo, University of Maryland (Hollings Scholar)	Maribeth Gidley (OCD)
Gabriella Compana, Carrolton School of the Sacred Heart	Jia-Zhong Zhang (OCD)
Aryeh Drager, Dartmouth University (Hollings Scholar).....	Paul Reasor (HRD)
Michael Fischer, Florida International University	Eric Uhlhorn (HRD)
Diana Goeller, Washington University	Ed Rappaport (NHC)
Danielle Graham, University of Miami	Jim Hendee/Derek Manzello (OCD)
Zachary Gruskin, University of Wisconsin (Hollings Scholar).....	Paul Reasor (HRD)
Lisa Johns, University of Miami	Chris Sinigalliano/Maribeth Gidley (OCD)
Frank Johnson, Florida A&M University (Hollings Scholar).....	Chris Sinigalliano (OCD)
Tosca Lichtenheld, University of Chicago.....	Erica Rule (OD)
Hallee Meltzer, Palmetto Senior High School	Christopher Kelble (OCD)
Xavier Mendez, Academy of Arts and Minds High School.....	Silvia Garzoli/Ulises Rivero (PhOD)
Eric Wahl, MAST Academy.....	Alejandra Lorenzo (CNSD)
Lily Zhang, University of Miami	Chris Sinigalliano/Maribeth Gidley (OCD)

Student Intern Wins Top Honor

NOAA Hollings Scholar Frank Johnson, who served his internship with the AOML Microbiology Program this summer, tied for first place in the poster presentations portion of NOAA's 2011 Science and Education Symposium on August 2-4th. Hollings scholars from across the nation attended the symposium at NOAA Headquarters in Silver Spring, Maryland to make presentations about their summer research projects (the topic of Frank's research project appears in the single column to the left).

Frank is currently a student at Florida Agricultural and Mechanical University in Tallahassee, Florida where he is majoring in environmental science with a minor in mathematics.



Frank Johnson in the Microbiology Lab

Congratulations

Evan Forde, an AOML oceanographer, is the recipient of a 2011 NOAA Administrator's Award. Evan received the award for his outstanding communication of NOAA science, sharing the joy of science with students, and helping to foster a science-literate society.



Much of Forde's 36-year career with NOAA has been dedicated to exposing youth to the joy of science and promoting the value of NOAA's research to our nation. He has worked extensively in the area of science education to develop ways of translating complicated scientific principles and concepts into terms that can be understood and appreciated by all.

Over the years, Forde has spoken to more than 40,000 Florida students at career day events and other school presentations to spark and encourage an interest in science.

Jim Hendee, a research oceanographer with the Ocean Chemistry Division, has published his first novel, a bio-thriller available online through Lulu Press and Amazon.com. *Codon Zero* presents a tale of international intrigue that revolves around a genetically-engineered virus that has the power to bring lasting peace to the Middle East, as well as an unprecedented loss of life.



Rik Wanninkhof, a research oceanographer with the Ocean Chemistry Division, has been awarded the American Geophysical Union's (AGU) Editor's Citation for Excellence in Refereeing. Rik was recognized by AGU for his conscientious reviews of submitted papers to the *Journal of Geophysical Research (Oceans)* that have enabled AGU to maintain its high standards of quality.



It's a Girl!

Hector Casanova, AOML's Associate Director, and his wife Luisette, are the proud parents of their second child, a daughter. Mariana Elena was born on July 29th in Miami and weighed in at 9 pounds. Mom, Dad, and Mariana Elena are all well and doing fine.



Farewell

Pedro Di Nezio, a CIMAS research associate with AOML's Physical Oceanography Division, departed AOML in August. During Pedro's six years at AOML, he processed and analyzed hydrographic and satellite data for use in ocean dynamic studies. In 2008, he earned a Master's degree from the University of Miami's Rosenstiel School of Marine and Atmospheric Science. In 2011, Pedro earned a Ph.D. from the Rosenstiel School by successfully defending his thesis entitled *Mechanisms of tropical Pacific climate change: Beyond the Bjerknes feedback*. Pedro has been accepted into the Young Investigator Postdoctoral Program of the University of Hawaii's School of Ocean and Earth Science and Technology (SOEST) in Honolulu, Hawaii. At SOEST, he will conduct 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.



Welcome Aboard

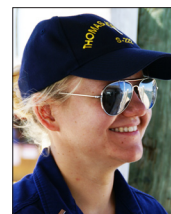
Ricardo Domingues joined the staff of AOML's Physical Oceanography Division (PhOD) in July as a CIMAS research associate. Ricardo will be working with PhOD researchers in support of NOAA's Ship-Of-Opportunity Program, with particular emphasis on the analysis of expendable bathythermograph (XBT) data. Before coming to AOML, Ricardo worked on a project to develop the Brazilian oceanic forecast system through the use of remote sensing, in situ, and ocean modeling data. He holds a B.S. degree in oceanography from the Universidade Federal da Bahia (Federal University of Bahia) in Brazil.



James (Jay) Hooper joined the staff of AOML's Physical Oceanography Division in August as a CIMAS research associate III. Jay will work with Dr. Molly Baringer on the Western Boundary Time Series and Rapid/MOCHA/WBTS 26°N instrument array. He holds a M.S. degree in physical oceanography from Florida State University, completing his thesis on turbulence and microstructure measurements from the Tongue of the Ocean, Bahamas, under Dr. Louis St. Laurent. One of his first tasks will be to learn about data collection and CTD (conductivity-temperature-depth) data processing by participating in the CLIVAR A10 30°S research cruise from Cape Town, South Africa to Rio de Janeiro, Brazil.



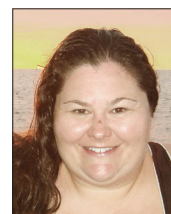
NOAA Corps officer LTJG Marina Kosenko joined the staff of AOML's Office of the Director in July. Marina will provide support for the Ocean Chemistry Division's coastal environmental research programs through the Small Boat Program, which include operations, field sampling, and monitoring activities. Prior to her arrival at AOML, she served aboard the NOAA hydrographic ship *Thomas Jefferson* based in Norfolk, Virginia. Marina holds a B.S. degree in astronomy and physics from the University of Washington.



Jaime Soto joined the staff of AOML's Physical Oceanography Division in July as a CIMAS research associate. Jaime will be working with PhOD researchers in support of NOAA's Ship-Of-Opportunity Program, with particular emphasis on expendable bathythermograph (XBT) data flow and real-time quality control of XBT data. Before coming to AOML, Jaime worked as a research assistant at Florida International University on a project to develop tools for monitoring CPU performance and trace memory behavior in real systems. He holds a B.S. degree in computer science from Florida International University.



AOML welcomed Dana Wusinich-Mendez to the Laboratory in June. Dana, an employee of NOAA's National Ocean Service, serves as the Atlantic and Caribbean Management Liaison for NOAA's Coral Reef Conservation Program (CRCP). The CRCP works in partnership with various NOAA line offices to support effective management and sound science to preserve, sustain, and restore valuable coral reef ecosystems for future generations. Dana will be collaborating with AOML staff associated with NOAA's Coral Health and Monitoring Program, as well as with staff at NOAA's Southeast Fisheries Science Center.



Travel

Molly Baringer and Gustavo Goni served as co-organizers for the First XBT (expendable bathythermograph) Science Workshop in Melbourne, Australia on July 7-8, 2011. Pedro Di Nezio and Marlos Goes also attended and made presentations.

Silvia Garzoli and Christopher Meinen attended the Past, Present, and Future Change in the Atlantic Meridional Overturning Circulation International Science Meeting in Bristol, England on July 12-15, 2011.

Michelle Wood attended the annual meeting of the Phycological Society of America in Seattle, Washington on July 13-16, 2011.

Jim Hendee oversaw the installation of a new Coral Reef Early Warning System (CREWS) station in Lao Lao Bay, Saipan on July 18-27, 2011. Mike Jankulak, Rachel Kotkowski, and Derek Manzello installed the station's instruments on August 15-26, 2011.

Maribeth Gidley, Alan Leonardi, and Christopher Sinigalliano attended the Gulf of Mexico Alliance All-Hands meeting in New Orleans, Louisiana on August 2-4, 2011.

Bob Atlas visited NOAA's Earth System Research Laboratory and attend the Working Group for Space-based Lidar Winds meeting and the American Meteorological Society's Summer Community meeting in Boulder, Colorado on August 1-12, 2011. He also attended an OAR Senior Research Council meeting in Princeton, New Jersey on August 23, 2011.

Frank Marks attended and chaired a session at the Hurricane Field Improvement Project Physics Workshop in Clinton, Maryland on August 9-11, 2011. Jun Zhang and Sundaraman Gopalakrishnan also participated by making telepresentations.

Kelly Goodwin and Christopher Kelble attended the Integrated Ecosystem Assessment National Face-to-Face meeting in Monterey, California on August 22-24, 2011.

Molly Baringer, George Berberian, Robert Castle, Charles Featherstone, Charles Fischer, James Hooper, Kyle Seaton, and Andrew Stefanick are participating in the CLIVAR/CO₂ Repeat Hydrography A10 cruise from Cape Town, South Africa to Rio de Janeiro, Brazil from August 28-October 2, 2011.

Alan Leonardi attended the James Cook X Prize Foundation Science Visioning meeting in Washington, DC on August 29, 2011.

Robert Kohler attended the NOAA Network Computer meeting in Fairmont, West Virginia on August 29-September 2, 2011.

Keynotes | 8

Recent Publications (AOML authors are denoted by capital letters)

ABERSON, S.D., S.J. Majumdar, C.A. Reynolds, and B.J. Etherton, 2011: An observing system experiment for tropical cyclone targeting techniques using the Global Forecast System. *Monthly Weather Review*, 139(3):895-907 (doi:10.1175/2010MWR33979.1).

FLETCHER, P.J., and S. Mulki, 2011: Training video for water quality sampling and analysis. In *Water Quality Concepts, Sampling, and Analysis*, Y. Li and K. Migliaccio (eds.). CRC Press, Boca Raton, 313-323 (doi:10.1201/b10157-16).

HALLIWELL, G.R., L.K. Shay, J.K. Brewster, and W.J. Teague, 2011: Evaluation and sensitivity analysis of an ocean model response to Hurricane Ivan. *Monthly Weather Review*, 139(3):921-945 (doi:10.1175/2010MWR3104.1).

Johns, W.E., M.O. BARINGER, L.M. Beal, S.A. Cunningham, T. Kanzow, H.L. Bryden, J.J.M. Hirschi, J. Marotzke, C.S. MEINEN, B. Shaw, and R. Curry, 2011: Continuous array-based estimates of Atlantic Ocean heat transport at 26.5°N. *Journal of Climate*, 24(10):2429-2449 (doi:10.1175/2010JCLI3997.1).

LEE, S.-K., D.B. ENFIELD, and C. WANG, 2011: Future impact of differential interbasin ocean warming on Atlantic hurricanes. *Journal of Climate*, 24(4):1264-1275 (doi:10.1175/2010-JCLI3883.1).

MOLINARI, R.L., 2011: Information from low-density expendable bathythermograph transects: North Atlantic mean temperature structure and quasi-decadal variability. *Progress in Oceanography*, 88(1-4):131-149 (doi:10.1016/j.pocean.2010.12.013).

MUNOZ, E., and D.B. ENFIELD, 2011: The boreal spring variability of the Intra-Americas low-level jet and its relation with precipitation and tornadoes in the eastern United States. *Climate Dynamics*, 36(1-2):247-259 (doi:10.1007/s00382-009-0688-3).

Polkinghorne, R., and T. VUKICEVIC, 2011: Data assimilation of cloud-affected radiances in cloud resolving model. *Monthly Weather Review*, 139(3):755-773 (doi:10.1175/MWR3360.1).

Rauscher, S.A., F. Kucharski, and D.B. ENFIELD, 2011: The role of regional SST warming variations in the drying of Meso-America in future climate projections. *Journal of Climate*, 24(7):2003-2016 (doi:10.1175/2010JCLI3536.1).

Speer, M.S., L.M. Leslie, and A.O. FIERRO, 2011: Australian east coast rainfall decline related to large scale climate drivers. *Climate Dynamics*, 36(7-8):1419-1429 (doi:10.1007/s00382-009-0726-1).

Srinivasan, A., E.P. Chassignet, L. Bertino, J.M. Brankart, P. Brasseur, T.M. Chin, F. Counillon, J.A. Cummings, A.J. Mariano, O.M. Smedstad, and W.C. THACKER, 2011: A comparison of sequential assimilation schemes for ocean prediction with the HYbrid Coordinate Ocean Model (HYCOM): Twin experiments with static forecast error covariances. *Ocean Modelling*, 37(3-4):85-111 (doi:10.1016/j.ocemod.2011.01.006).

Thompson, L., R.C. PEREZ, and A.M. Shevenell, 2011: Closed ranks in oceanography. *Nature Geoscience*, 4(4):211-212 (doi:10.1038/ngeo-1113).

Viau, E.J., K.D. GOODWIN, K.M. Yamahara, B.A. Layton, L.M. Sassoubre, S.L. Burns, H.-I. Tong, S.H.C. Wong, Y. Lu, and A.B. Boehm, 2011: Bacterial pathogens in Hawaiian coastal streams: Associations with fecal indicators, land cover, and water quality. *Water Research*, 45(11):3279-3290 (doi:10.1016/j.watres.2011.03.033).

Weissmann, M., F. Harnisch, C.-C. Wu, P.-H. Lin, Y. Ohta, K. Yamashita, Y.-H. Kim, E.-H. Jeon, T. Nakazawa, and S.D. ABERSON, 2011: The influence of assimilating dropsonde data on typhoon track and mid-latitude forecasts. *Monthly Weather Review*, 139(3):908-920 (doi:10.1175/2010MWR3377.1).

ZHANG, J.A., F.D. MARKS, M.T. MONTGOMERY, and S. LORSOLO, 2011: An estimation of turbulent characteristics in the low-level region of intense Hurricanes Allen (1980) and Hugo (1989). *Monthly Weather Review*, 139(5):1447-1462 (doi:10.1175/2010MWR3435.1).

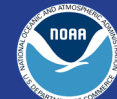
Atlantic Oceanographic and Meteorological Laboratory

4301 Rickenbacker Causeway
Miami, FL 33149
www.aoml.noaa.gov

Robert Atlas.....Director
Alan LeonardiDeputy Director
Hector Casanova.....Associate Director
Silvia GarzoliChief Scientist
Frank Marks.....Hurricane Research Division Director
Michelle WoodOcean Chemistry Division Director
Gustavo GoniPhysical Oceanography Division Director

Keynotes is published bimonthly to highlight AOML's recent research activities and staff accomplishments.

Keynotes publishing editor: Gail Derr
www.aoml.noaa.gov/keynotes



AOML conducts research to understand the physical, chemical, and biological characteristics and processes of the ocean and the atmosphere, both separately and as a coupled system. The principal focus of these investigations is to provide knowledge that leads to more accurate forecasting of severe storms, better utilization and management of marine resources, better understanding of the factors affecting both climate and environmental quality, and improved ocean and weather services for the nation.