

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

Key Biscayne Students Deploy NOAA Ocean Drifting Buoy

On April 27th, three Key Biscayne middle-school students deployed an ocean drifting buoy with the help of AOML staff, contributing to a global array that yields vital environmental data. The students, all from the K-8 Center on Key Biscayne, are Carmen Mollet, 15, Guillermina Pons, 14, and Sophia Ortega, 12.

"We're extremely proud of our students. Each won a prize in NOAA's Adopt a Drifter contest, which gives students across the country, many with international partners, the chance to learn about our environment right in their classrooms, and with the same near real-time data that ocean and climate scientists use," said Erica Cheva, lead science teacher at the Key Biscayne K-8 Center. "Students here are partnering with students from the International Preparatory School in Santiago, Chile to track the buoy."

NOAA hosted the Adopt a Drifter events at six U.S. locations in April in honor of Earth Day. Students in Boston, Maui, Miami, Mobile, Santa Barbara, and Seattle were invited to participate in the competitions by submitting ocean-themed essays and artwork.

The Miami-based event was sponsored by AOML. AOML's Ocean Chemistry Division (OCD) donated both ship time and personnel, with Joe Bishop and LTJG Marina Kosenko of OCD serving as



Carmen Mollet, Guillermina Pons, and Sophia Ortega prepare to deploy NOAA drifting buoy 37456 in Biscayne Bay from aboard the RV *Hildebrand* with the assistance of AOML's Shaun Dolk.

Captain and crew of the RV *Hildebrand* to ensure a smooth and safe cruise. Erica Rule, AOML's Communications and Outreach Coordinator, along with Shaun Dolk, a CIMAS research associate with AOML's Physical Oceanography Division, reviewed 148 student artwork and essay entries from the Key Biscayne K-8 Center for the Earth Day competition.

At the Rickenbacker Marina on Virginia Key, AOML staff spoke to the students about the importance of NOAA's ocean-observing efforts and congratulated them on winning the chance to deploy their school's drifter at sea (see page 2 for the winning entries). The students and AOML staff then boarded the RV *Hildebrand* to deploy buoy 37456 in Biscayne Bay. The 44-pound drifter will collect sea surface temperature data as it is carried along by ocean currents. These currents carry heat from place to place, which affects climate.

While satellite technology makes it possible to obtain sea surface temperature measurements from space, drifters are

needed to ensure the measurements are accurate. Without drifter observations to correct satellite measurements, dust and other elements in the atmosphere can cause errors. Each drifter is part of a global ocean array that students can follow online, along with the particular drifter they adopted.

Although NOAA's Global Drifter Program deploys, monitors, and collects data from buoys globally, the program is locally managed by AOML researchers. "The goal of NOAA's Global Drifter Program is to maintain a global array of satellite-tracked drifters and to provide valuable climate and weather data to the forecasting and research community," said Dr. Rick Lumpkin, scientific director of the Global Drifter Program at AOML. "This drifter provides an excellent opportunity for children to learn more about the ocean as it tracks currents and eddies."

Additional information about NOAA's Adopt a Drifter Earth Day events can be found at www.adp.noaa.gov/earthday.



Three Key Biscayne students—Guillermina Pons, Sophia Ortega, and Carmen Mollet—won the chance to deploy a NOAA drifting buoy as part of NOAA's 2012 Earth Day celebrations.



First image: NOAA drifting buoy 37456 bearing NOAA stickers with the name of students from the Key Biscayne K-8 Center.

Second image: Dr. Rick Lumpkin, Director of the Global Drifter Program at AOML, provides a brief overview of NOAA's ocean-observing efforts and how drifting buoys gather data as they flow with the currents.

Third image: Key Biscayne K-8 Center students, chaperones, and science teacher with AOML staff at the Rickenbacker Marina on Virginia Key.

Fourth image: Recording coordinates aboard the RV Hildebrand after deployment of buoy 37456.



Sophia Ortega, Carmen Mollet, and Guillermina Pons, all students at the K-8 Center Community School on Key Biscayne, with their winning entries in NOAA's Adopt a Drifter competition hosted in celebration of Earth Day.

The Ocean

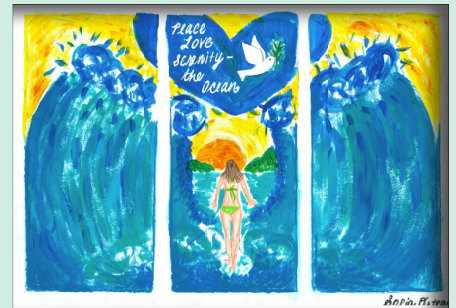
Carmen Mollet, 8th Grade

I could list out a million reasons why the ocean is important to science. Why we need to learn about acidic levels and jellyfish venom. Why it's important to know an area's temperature or the kind of organisms that inhabit it. But in the end, it doesn't matter to me.

The ocean has always been my savior. It held me in its swaying arms, cradling me in its sweet gentle motion, and reminding me that everything will be okay. It's a source of inspiration, hope and faith. It's proof that in the deepest abysses, there will always be a source of light and it's a gate into the wildest imagination journeys a teen poet can set off on.

The great waters represent wisdom, just by existing. They can be used to portray life. I remember that as a small girl I spent my time wondering why some people were so terrified of the ocean, and it wasn't until recently that I understood: they were afraid of what's beneath it. I came to the conclusion that people are scared of the unknown. They are horrified by anything that isn't within their comfort zone and this is something that doesn't only happen when it comes to going for a swim. I've seen so many people let their dreams slip away because they were afraid to take a chance, to live in the moment. Instead of taking a fresh, clear plunge into the unknown waters, they have stood at the shore wondering whether it was safe to do so.

The high seas have taught me to trust my instincts and appreciate the kind of awareness that has been granted to me. Never did I think that from gazing at the horizon for a few hours while writing poetry and listening to music, I would come to such a conclusion, to such a state of enlightenment and personal evolution.



It may sound dreamy (cheesy, even) how the ocean speaks to me although it doesn't converse in our phonetic universe. It whispers words of encouragement, confidence, and hope. It brings warmth to my heart and wings to my pen when it comes to writing.

I have always looked at the ocean as a place of mystery and unknown tales. Who knows all the wrecked ships that lie on the ocean floor? Who knows how the mermaids chant? How many lovers tell their story through their sunken bones? So much left to my imagination. I being the writer, I fell in love with the sea for its untold stories, and enigmatic depths, for its meaning and what it represents as a whole.

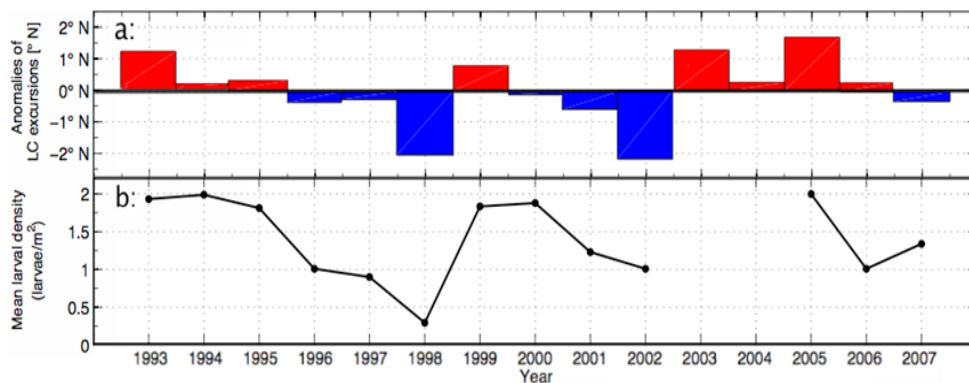
Hence I ended up writing this essay. It doesn't feel like an assignment. It feels like me writing about home.

Study Identifies Relationship between Ocean Mesoscale Structures and Larval Fish Distribution in the Gulf of Mexico

A recently-accepted manuscript for publication in the journal *Marine Ecology Progress Series** explores the links between surface ocean conditions and fish larval abundance. Researchers from AOML, NOAA's Southeast Fisheries Science Center, the University of Miami, and the University of South Florida collaborated to identify and assess how ocean currents, temperature, and sea height affected the spatial distribution of larval fish in the Gulf of Mexico.

Specifically, the study reveals that for several species of fish, e.g., *Auxis spp.*, *Euthynnus alleteratus*, *Thunnus thynnus*, other *Thunnus spp.*, and *Coryphaena spp.*, larger total larval abundances occurred during years of high northward penetration of the Loop Current (see figure above right). The study also revealed that the interannual variability of the Loop Current was not mirrored by a general increase/decrease of larval-fish densities in the water masses out of the Loop Current front.

In general, the Gulf of Mexico is a favorable spawning habitat for numerous fish species, and knowledge of the temporal and spatial variability of mesoscale structures is fundamental for understanding the spawning habitat of fish, food availability, and the distribution of larvae.



(a) Anomalies of the mean northernmost location of the Loop Current in spring. (b) Spring mean larval density of *T. thynnus*, *E. alleteratus*, *Auxis spp.*, *Thunnus spp.*, and *Coryphaena spp.* (total of all taxa) captured in a 2° box centered at 87°W and 26°N (the mean northernmost latitude and westernmost longitude of the Loop Current during spring months). Oscillations of the Loop Current about its mean latitude were significantly correlated with larval densities ($R^2 = 0.71$, $p < 0.001$).

In this particular study, researchers used satellite altimeter data and surveys conducted by NOAA's National Marine Fisheries Service each spring between 1993 and 2007 to study the variability of mesoscale circulation structures in the region and better understand the role they play on the distribution of larvae of five different taxa.

The findings suggest that the position and strength of anticyclone mesoscale features define favorable spawning habitat for the species examined. Studies of this type will provide further valuable infor-

mation on the influence of oceanographic features on larval distribution and survival. It is expected that future work will help initiate research to investigate the link between ocean conditions and the abundance of other larval species in other ocean regions of commercial and scientific interest.

*Lindo-Atichati, D., F. Bringas, G. Goni, B. Muhling, F.E. Muller-Karger, and S. Habtes, 2012: Variability of mesoscale structures with effects on larval fish distribution in the northern Gulf of Mexico during spring months. *Marine Ecology Progress Series*, in press.

AOML Researchers Attend Hurricane Conference

A large cadre of AOML researchers attended the American Meteorological Society's 30th Conference on Hurricanes and Tropical Meteorology in Ponte Vedra Beach, Florida, on April 15-20, 2012. More than 600 abstracts were submitted to the conference, of which 593 were presented (427 oral in 65 sessions and 166 posters in three poster sessions). Of the 593 presentations, roughly 85% were related to tropical cyclones. AOML researchers were authors or coauthors on 39 presentations (32 presentations and seven posters) and chaired six sessions.

Of the 500 tropical cyclone-related presentations, roughly 24% (119) mentioned or used data sets developed by AOML's Hurricane Research Division. Three sessions were dedicated to NOAA's Hurricane Forecast Improvement Project (HFIP) and Intensity Forecast Experiment (IFEX) with 24 presentations, with another 30-35 presentations that reported on HFIP-

and IFEX-related work. Additionally, it was also clear that HFIP research had influenced a number of other presentations through recognition of the importance of evaluating numerical developments and simulations over numerous cases.

A highlight of the conference was the presentation of a tropical meteorology family tree, created by everyone at the meeting having submitted a list of both their major professors and the students they had mentored. The detailed genealogy took up about 30 feet of wall space and clearly documented the impact that some professors have had on the field.

A second highlight of the conference was the presence of Dr. Robert Simpson, one of the National Hurricane Center's earliest directors and, along with Herbert Saffir, a co-developer of the Saffir-Simpson Hurricane Scale. Now 99 years old, Simpson was welcomed with a standing ovation and made an invited presentation



Session chair Dr. Greg Holland (standing) introduces Dr. Robert Simpson (seated) at the American Meteorological Society's 30th Conference on Hurricanes and Tropical Meteorology.

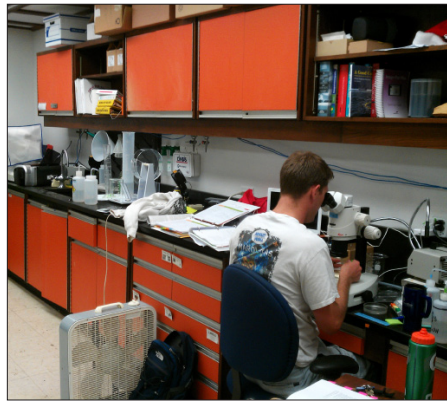
on the history behind the creation of the Saffir-Simpson Hurricane Scale.

Early Life History Group Sets up Shop at AOML

The Early Life History (ELH) group of NOAA's Southeast Fisheries Science Center in Miami has temporarily relocated its laboratory to AOML. The lab space at AOML, provided by Michelle Wood of the Ocean Chemistry Division, will serve as a work area for the ELH group while construction is underway at the SEFSC facility. The ELH group will occupy room 221 until the end of June, when the ELH lab at SEFSC is expected to re-open.

At AOML, the ELH group will be processing plankton samples collected in response to the Deepwater Horizon oil spill as part of the Natural Resource Damage Assessment protocol. The SEFSC Miami Laboratory is responsible for close to 1,000 samples collected in 2010 and 2011 throughout the Gulf of Mexico with neuston, MOCNESS, manta, and bongo nets. The samples are being processed to remove ichthyoplankton, zooplankton, and fish eggs, with subsequent analysis performed to identify ichthyoplankton and zooplankton species to their taxonomic family level.

In addition to these duties, the ELH group will also be processing plankton samples gathered from cruises conducted in partnership AOML's South Florida Program. The ELH group has participated with AOML researchers on their quarterly cruises to the Florida Current along 27°N since 2009. Plankton samples collected from the top 5 meters of surface water are sorted for ichthyoplankton, larval lobster, and cephalopods. Of the ichthyoplankton



Matthew Straney with the Early Life History group of NOAA's Southeast Fisheries Science Center in Miami analyzes a plankton sample in the temporary laboratory space provided by AOML.

samples gathered, pelagic larvae for species such as marlin, sailfish, and tuna are of particular interest, and the resulting data are compared among seasons and years.

The ELH team is also currently collaborating with the Department of Planning and Natural Resources in the U.S. Virgin Islands to study the otoliths of commercially and ecologically valuable parrotfish. Adult stoplight and redbtail parrotfish are dissected for their otoliths (earbones of teleost fish), which maintain the chemical signature of the water masses encountered by these fish. Otoliths are cut, polished, and drilled along a transect using a precision micromill. Residue collected from the drilling is analyzed for stable isotopes of carbon and oxygen to potentially evaluate migratory patterns.

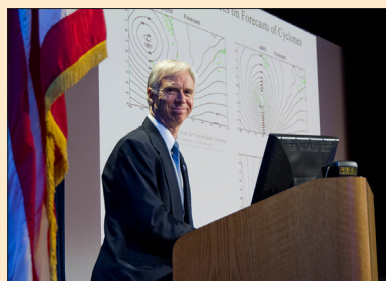
NOAA Corps officers LTJG Rachel Kotkowski and LCDR Hector Casanova of AOML, along with LTJG Aaron Maggied and Jack Javech of NOAA's Southeast Fisheries Science Center, serviced the Coral Reef Early Warning System (CREWS) station in La Parguera, Puerto Rico in March. The week-long maintenance included replacement of the spectra lines and lashings attached to the eight chains that hold the 38-foot tall station upright. CREWS stations support a suite of atmospheric and oceanic sensing instruments attached to the station's pylon, both above and below the ocean surface, that gather data in near real-time. These data are transmitted to AOML for processing by an expert system that uses artificial intelligence to assess coral reef health. The system issues early warning alerts when parameters conducive to coral bleaching and other impact events to corals and coral reef ecosystems are met.



LTJG Rachel Kotkowski and LCDR Hector Casanova of AOML work to replace the spectra lines at the CREWS station in La Parguera, Puerto Rico.

AOML Director Dr. Bob Atlas participated in the AIRS (Atmospheric Infrared Sounder) Science Team meeting at NASA's Jet Propulsion Laboratory and Caltech on April 23-26th in Pasadena, California. The first day of the meeting included a 10-year celebration of AIRS data from space. Launched in May 2002 aboard NASA's Aqua satellite, the AIRS instrument gathers highly accurate measurements of atmospheric temperature, clouds, water vapor, and other greenhouse gases that have led to improvements in weather forecasting and a greater understanding of climate processes. As the sole NOAA senior leader at this event, Bob talked about the value of AIRS data to NOAA and also talked about his own research, which was the first to demonstrate the application of AIRS temperature soundings to the numerical prediction of both tropical and extratropical cyclones.

Participants of the AIRS Science Team meeting held at NASA's Jet Propulsion Laboratory and Caltech campus in Pasadena, California.



AOML director Dr. Bob Atlas' presentation at the AIRS Science Team meeting focused on NOAA's Hurricane Forecast Improvement Project and the value of AIRS data to hurricane and general weather prediction. The slide behind Bob shows the first significant impact of AIRS data on a tropical cyclone in the South Pacific.



Intrinsic Art: The Beauty of a Coral Reef

AOML coral researcher Dr. Jim Hendee wrote a series of three articles to promote greater awareness of the beauty and fragility of coral reef ecosystems. Part 2 of the series was published in the March 2012 issue of DEON, a local south Florida magazine, and is presented below in its entirety.

The gorgeous colors, magnificent shapes, and dramatic diversity of coral reef ecosystems around the world are imperiled by numerous threats; however, the three most prevalent are climate change, effects of over-fishing, and land-based sources of pollution. Last month in DEON magazine I outlined how climate change and ocean acidification affect coral reefs. (You can see previous issues at deonmagazine.com.) This month I'd like to briefly discuss the effects of over-fishing in coral reef areas.

Sustainability is the key word here, and for ecosystems (like coral reefs) it can be defined as a system that maintains its own viability by using techniques that allow for continual reuse. An example of a sustainable practice is the enforcement of fishing regulations designed to allow fish to reach maturity, spawn, and produce viable eggs which, in turn, develop into juvenile fish.

These juveniles then need a favorable environment for developing to maturity, whereupon the cycle repeats. In this particular case, a favorable environment would be all the nooks and crannies and other shelter provided by the coral reef, as well as the other plants and animals that co-exist and serve as prey for the fish.

Commercial, recreational, and subsistence fisheries are provided by coral reef



ecosystems. At many island communities throughout the world fishing plays a central social and cultural role, and also provides a critical source of protein. Coral reef fisheries are relatively small, compared to open ocean fisheries, but small changes in them can result in big changes to the ecosystem.

A rising human population, demands for fishing resources, use of more efficient fishery techniques, and inadequate management and enforcement have led to the depletion of critical reef species and habitat damage in many locations. Specific impacts of fishing on reefs generally include one or more of the following: (1) exploitation of fish, invertebrates, and algae for food and the aquarium trade; (2) removal of a species or group of species impacting multiple trophic levels; (3) by-catch and mortality of non-target species; and (4) physical impacts to reef environments associated with fishing techniques, fishing gear, and anchoring of fishing vessels. Such threats are exacerbated when coupled with other coral reef stress-

ors such as climate change and land-based sources of pollution.

Coral reef researchers and managers have documented declines in reef fish abundance and described correlations between reduced fish biomass and proximity to human population centers. Socioeconomic studies conducted with local fishers have also shown that their perceptions are that there are now less fish and that coral reef health has declined.

However, some work within the U.S. has shown that appropriate management actions can reverse these trends, for example “no-take” areas in the Florida Keys National Marine Sanctuary and marine preserves in Guam, where the results include increased numbers and size of economically and ecologically important reef fish.

The most commonly regulated fish in and around coral reefs are a variety of groupers and snappers, which are generally protected through the time of their spawning season. However, other key species included under fishery regulations are invertebrates like conch and spiny lobster.

Regulation of these important species can be complex, for instance, when you take into account that the larval life of a spiny lobster can be up to 180 days at sea before settling. If you live in Florida, you are probably aware of the two-day lobster “mini-season” in July, a period during which only diving is permitted for catching spiny lobsters. It is quite a big event for south Florida and especially the Keys, and many activities occur around that time, for instance a special festival coming up in Lauderdale-By-The-Sea.



The coastal community of Lauderdale-By-The-Sea has a new sign to promote its snorkeling trail, funded partially from the proceeds of Reef Fest, the inspiration of AOML coral researcher Jim Hendee. Reef Fest is a non-profit venture that has raised funds to promote coral reef conservation worldwide from concerts and music festivals since 2007.

Farewell

AOML bid a fond farewell to LCDR Hector Casanova in April as he departed the Laboratory for his next tour of duty with the NOAA Corps. During Hector's two and a half years as AOML's Associate Director, he oversaw the day-to-day operation and maintenance of the AOML facility, championed safety issues, coordinated ship time aboard NOAA research vessels, and assisted with diving missions in support of the Ocean Chemistry Division's coastal ecosystem programs. Hector will temporarily serve for two to three months aboard the NOAA Ship *Ka'imimoana* based on Honolulu, Hawaii before transferring to the NOAA Ship *Fairweather* in Newport, Oregon.



Congratulations

Maribeth Gidley, a CIMAS assistant scientist with the Ocean Chemistry Division's Environmental Microbiology Program (EMP), was selected as NOAA's March 2012 Team Member of the Month. Maribeth received the award for her outstanding public outreach efforts and mentoring of graduate and summer student interns at AOML. Along with EMP director Christopher Sinigalliano, Maribeth has been conducting research on a number of microbial water quality assessment projects, as well as the impacts of land-based sources of pollution on ecosystems and public health in the coastal environment. The enthusiastic inclusion of young scientists and local students in all aspects of this research has fostered professional formation and guidance of the first order and has increased public awareness of NOAA's mission and activities.



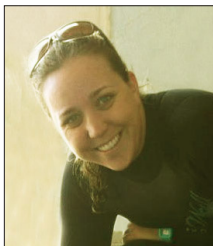
Dr. Michelle Wood, Maribeth Gidley, and AOML Director Dr. Bob Atlas.

John Kaplan, a meteorologist with AOML's Hurricane Research Division, received a Department of Commerce Bronze Medal in March in conjunction with colleagues Mark DeMaria and John Knaff of NOAA's National Environmental Satellite, Data, and Information Service. The group was recognized for their work in "providing skillful operational hurricane intensity models as demonstrated by the National Hurricane Center forecast verifications for the 2009 and 2010 seasons."



Welcome Aboard

Renee Carlton joined the staff of AOML's Ocean Chemistry Division in April as a research associate of the University of Miami's Cooperative Institute of Marine and Atmospheric Studies (CIMAS). Renee will be working with Ian Enochs, Jim Hendee, and Derek Manzello to implement the Ocean Acidification Program's coral reef monitoring network in the Atlantic, as well as conduct research on related projects to understand the impact of ocean acidification on coral reef ecosystems. Renee is originally from southern California and recently received a Masters of Professional Science degree from the University of Miami's Rosenstiel School.



David Lindo-Atichati, a CIMAS research associate with AOML's Physical Oceanography Division, earned a Ph.D. with highest honors from the University of Las Palmas de Gran Canaria on March 27th by successfully defending his thesis entitled *Long-term Variability and Effects on Larval Fish Distribution of the Gulf of Mexico Loop Current and Rings*. Dr. Gustavo Goni of AOML served as his dissertation co-advisor, together with Dr. Pablo Sangrà from the University of Las Palmas de Gran Canaria and Dr. Barbara Muhling from NOAA's Southeast Fisheries Science Center. David has been accepted into the University of Miami's Physical-Biological Interactions Laboratory at the Rosenstiel School's Division of Applied Marine Physics (AMP). He will begin his post-doctoral fellowship with AMP in June 2012 to perform research on transport processes and their influence on larval dispersion, marine population connectivity, recruitment variability, and on other phenomena driving marine ecosystems across the tropical Atlantic.



Thiago Quirino, an information technology specialist with AOML's Hurricane Research Division, earned a Ph.D. in April from the University of Miami's Department of Electrical and Computer Engineering. Thiago's research thesis, *Improving Search in Genetic Algorithms Through Instinct-Based Mating Strategies*, explored ways to enhance a popular approach to search and optimization known as the Genetic Algorithm (GA), a programming technique that mimics the process of biological evolution which is used in hundreds of real world engineering applications. Inspired by the concept of "opposites attract," Thiago was able improve upon one of the components of the GA known as the "mating strategy." He developed new "mating strategies" and found experimentally that these strategies led the GA to search faster and discover better solutions while requiring only minimal additional computational overhead.



Kevin Sullivan of the Ocean Chemistry Division's Ocean Carbon Group was awarded the Antarctica Service Medal in April from the National Science Foundation. Kevin received the honor for his participation in the CLIVAR CO₂ Repeat Hydrography Program cruise to the Southern Ocean on the ice breaker *Nathaniel B. Palmer*. The cruise was conducted in February-April 2011 as part of an ongoing international effort to track decadal changes in the storage and transport of heat, fresh water, carbon dioxide, and other parameters. The Antarctica Service Medal was established by Congress in 1960 to commemorate military service in Antarctica, but is also awarded to civilians deployed to an Antarctic research station or vessel that remain south of 60°S latitude for at least 10 days.



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)

Travel

Jason Dunion, John Kaplan, Bradley Klotz, Frank Marks, Michael Montgomery, Shirley Murillo, Kathryn Sellwood, and Tomislava Vukicevic attended the 66th Interdepartmental Hurricane Conference in Charleston, South Carolina on March 5-8, 2012.

Rick Lumpkin attended the 2012 GlobCurrent Workshop in Brest, France on March 7-9, 2012.

Gustavo Goni attended the Third U.S.-Brazil Joint Commission Meeting on Science and Technology Cooperation in Brasilia, Brazil on March 12-13, 2012. He also attended a NASA-Aquarius/SAC Satellite D Science Team meeting and met with representatives of the Argentine Coast Guard and Argentine Fisheries Service in Buenos Aires, Argentina on April 11-21, 2012.

Robert Atlas attended a meeting of the Senior Research Council in Silver Spring, Maryland and participated in budget briefings with Congressional members in Washington, DC on March 19-23, 2012. He also attended the Atmospheric Infrared Sounder Science Team meeting in Pasadena, California on April 24-26, 2012.

Maribeth Gidley and Christopher Sinigalliano attended the Gulf of Mexico Alliance's Microbial Source Tracking Workshop in Saint Petersburg, Florida on April 9-11, 2012.

Sim Aberson, Altug Aksoy, Bachir Annane, Jason Dunion, Sundararaman Gopalakrishnan, John Kaplan, Bradley Klotz, Sylvie Lorsolo, Frank Marks, Michael Montgomery, Shirley Murillo, Mark Powell, Paul Reasor, Robert Rogers, Eric Uhlhorn, Tomislava Vukicevic, Chunzai Wang, Jun Zhang, and Xuejin Zhang attended the 30th Conference on Hurricanes and Tropical Meteorology in Ponte Verda Beach, Florida on April 15-20, 2012.

Francis Bringas and Joaquin Triñanes attended the annual meeting of the Global Temperature and Salinity Profile Program in Oostende, Belgium on April 16-18, 2012.

Christie Wiley attended the Florida Library Association's 2012 Conference in Orlando, Florida on April 18-20, 2012.

Christopher Meinen attended the 2012 General Assembly of the European Geosciences Union in Vienna, Austria on April 22-27, 2012.

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

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