

# Keynotes

## Science Team Presents Results of Coastal Pollution Study

An AOML-led science team reported its findings about the pollutant levels in the Brevard County coastal zone to County officials and the general public at a press conference on Monday, March 28th. The event was well attended and extensively covered by local media.

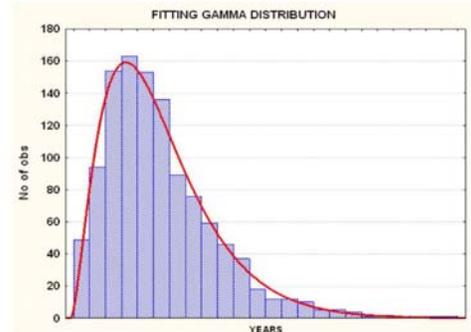
The Brevard County Near Shore Nutrification Analysis study was undertaken in 2004 to address community concerns that nutrient levels in the Brevard County surf zone were abnormally elevated and possibly linked to septic systems or wastewater disposal processes. Brevard County and the Canaveral Port Authority contracted with NOAA/AOML to assemble an expert team to determine if nutrient levels were elevated, whether they posed a risk to human health and near shore ecology, and whether the source(s) were local or remote.

The seven-member panel, comprised of five AOML scientists and scientists from the University of Miami's Rosenstiel School and the Environmental Protection Agency, found that existing data did not support the claim that nutrient levels in the Brevard County surf zone were elevated and concluded that nutrient concentrations did not pose a direct risk to human health or near shore ecology. No evidence of elevated levels of sewage-indicating bacteria were found within the sampling area.

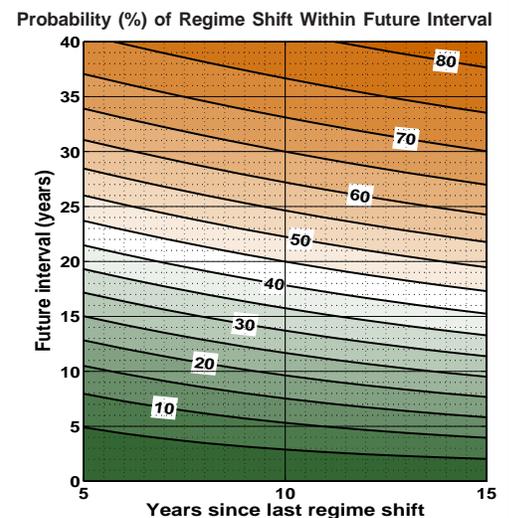
## Development of Probability Forecasts to Help Predict U.S. Climate Shifts

AOML oceanographer Dr. David Enfield is currently collaborating with Dr. Luis Cid of the University of Concepcion in Chile and engineers with two south Florida water management districts to develop applied probabilistic forecasts of future decadal-to-multidecadal climate shifts. Climate modes in the Pacific (PDO; Pacific decadal oscillation) and Atlantic (AMO; Atlantic multidecadal oscillation) are prime examples of climate indices that can be predicted in a probabilistic manner through advanced statistical techniques applied to standard historical indices presently in use.

Various studies by Enfield and others have shown that such indices have a robust relationship to precipitation and drought cycles in the United States. Armed with a probability forecast for a future regime shift in an index such as the AMO, water managers can adopt certain management directives designed to minimize (or maximize) the negative (or positive) impacts of the next change. As a regime shift is predicted to be more imminent, more or less excess surface water can be shunted to underground storage to ameliorate future shortfalls. More or fewer long-term water leases can also be issued in anticipation of future scarcity or surplus. Applications are many and vary from one region to another. The top right figure shows how the climate regime intervals can be fitted to a Gamma distribution. The bottom right figure show a typical probabilistic forecast product for the support of water management decisions.



A theoretical Gamma probability density function can be adjusted to the Monte-Carlo augmented observed distribution of intervals (years) between historical Atlantic Multi-decadal Oscillation regime shifts.



A graph derived from the Gamma curve: Given that X years have elapsed since the last regime shift of the AMO, what is the probability that a new, reverse shift will occur within Y future years? The last, positive shift occurred approximately in 1995 (X=10). The risk of a negative shift (more frequent Florida droughts) within the next five years is only 10%. For the next 30 years, however, the risk increases to about 65%.



Administrative Professionals Day  
April 27, 2005



### Recent AOML Publications\*

Arnold, W.S., G.L. Hitchcock, M.E. Frischer, R. WANNINKHOF, and Y.P. Sheng, 2005: Dispersal of an introduced larval cohort in a coastal lagoon. *Limnology and Oceanography*, 50(2):587-597.

EASTIN, M.D., W.M. Gray, and P.G. BLACK, 2005: Buoyancy of convective vertical motions in the inner core of intense hurricanes, Part I: General statistics. *Monthly Weather Review*, 133(1):188-208.

EASTIN, M.D., W.M. Gray, and P.G. BLACK, 2005: Buoyancy of convective vertical motions in the inner core of intense hurricanes, Part II: Case studies. *Monthly Weather Review*, 133(1):209-227.

Goes, M., R.L. MOLINARI, I. da Silveira, and I. Wainer, 2005: Retroreflections of the North Brazil Current during February 2002. *Deep-Sea Research, Part I*, 52(4):647-667.

LUMPKIN, R., and S.L. GARZOLI, 2005: Near-surface circulation in the tropical Atlantic Ocean. *Deep-Sea Research, Part I*, 52(3):495-518.

MEINEN, C.S., 2005: Meridional extent and interannual variability of the Pacific Ocean tropical-subtropical warm water exchange. *Journal of Physical Oceanography*, 35(3):323-335.

Olsen, A., R. WANNINKHOF, J.A. Trinanes, and T. Johannessen, 2005: The effect of wind speed products and wind speed-gas exchange relationships on interannual variability of the air-sea CO<sub>2</sub> gas transfer velocity. *Tellus B*, 57(2):95-106.

PALMER, D.R., 2005: Acoustic scattering from constituents of an ocean plume located near a boundary surface. *IEEE Transactions on Geoscience and Remote Sensing*, 43(4):770-777.

SCHMID, C., B. Bourles, and Y. Gouriou, 2005: Impact of the equatorial deep jets on estimates of zonal transport in the Atlantic. *Deep-Sea Research, Part II*, 52(3-4): 409-428.

Velden, C., J. Daniels, D. Stettner, D. Santek, J. Key, J.P. DUNION, K. Holmlund, G. Dengel, W. Bresky, and P. Menzel, 2005: Recent innovations in deriving tropospheric winds from meteorological satellites. *Bulletin of the American Meteorological Society*, 86(2):205-223.

\*Names of AOML authors appear in capital letters.

## CBLAST Researchers Review Observational and Modeling Efforts from 2003-2004 Hurricane Seasons

The fourth Principal Investigators Meeting of the Coupled Boundary Layer Air-Sea Transfer (CBLAST) program was held at the University of Miami's Rosenstiel School on April 4-6, 2005. Dr. Peter Black, CBLAST Chief Scientist with AOML's Hurricane Research Division, and Professor Shuyi Chen with the Rosenstiel School's Meteorology and Physical Oceanography Division, co-hosted the event.

Approximately 40 researchers, as well as NOAA and Office of Naval Research program managers, met to review initial observational results obtained from the field phase of CBLAST during the 2003 and 2004 hurricane seasons. The group agreed that the data sets obtained provided an unprecedented view of hurricane boundary layer fluxes and eyewall structure, surface wave fields, and the four-dimensional ocean response. These data sets are already leading to a new parameterization of hurricane fluxes, surface wave fields, and hurricane ocean response that will be available for use by the emerging suites of operational-coupled hurricane prediction models. The prospects for improved validation and initialization of coupled models in the atmosphere, ocean, and air-sea interface was viewed as extremely encouraging.

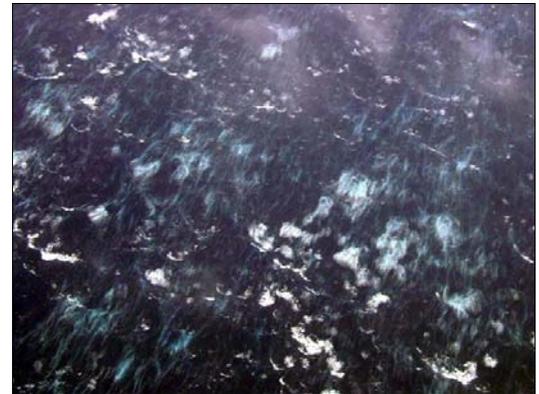
Twelve NOAA WP-3D flights were conducted into Hurricanes Fabian and Isabel on six days in 2003, which included 14 stepped-descent patterns involving over 24 momentum and enthalpy flux runs, as well as deployment of over 300 dropsondes. Eighteen hours of directional wave data and 12 radius-height wind velocity profiles from three Doppler radars were obtained, as well as Stepped Frequency Microwave Radiometer (SFMR) and airborne scatterometer surface winds.

CBLAST data sets were more than doubled, with the exception of the stepped-descent turbulence data, during flights into three of four landfalling hurricanes in 2004: Frances, Ivan, and Jeanne. Sixteen drifting buoys and four ocean profiling float deployments at eight grid locations ahead of Fabian in 2003 were obtained from an Air Force Reserve 53rd Weather Reconnaissance Squadron WC-130J aircraft. In 2004, 38 drifting buoys and 16 profiling floats were deployed at 25 locations ahead of Hurricane Frances from two Air Force Reserve Command WC-130 aircraft, providing the most complete four-dimensional observations ever obtained on the ocean's response to hurricanes.

Coordination of observational analyses with CBLAST hurricane modeling studies was discussed at length. New understanding of the physics of ocean surface wave breaking, sea spray generation and its impact on air-sea fluxes, and the responses in both the atmospheric and oceanic boundary layers were reported from the observations, as well as from wave tank studies and numerical models.

Ongoing partnerships among principal investigators were solidified and new ones established during the meeting as well as after it ended, as several principal investigators stayed on in Miami for just this purpose. Plans were formulated for publishing a description of the CBLAST field experiment and preliminary modeling results and for defining deliverables to NOAA and Navy operational modeling centers.

CBLAST is funded by NOAA and the Office of Naval Research. The program seeks to provide improved parameterizations of air-sea fluxes for use in numerical models, ultimately leading to more skillful forecasts of hurricane intensity change.



September 2003 aerial sea surface photograph of Hurricane Isabel. CBLAST investigators are gaining greater understanding of air-sea interactions that occur in high winds, specifically the complex hurricane environment, to advance hurricane intensity forecasting skill.

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## Welcome Aboard

Pedro DiNezio joined the staff of the Physical Oceanography Division in March as a CIMAS Research Associate. He will assist Drs. Gustavo Goni and Silvia Garzoli with the processing and analysis of hydrographic and satellite data for ocean dynamic studies. Pedro earned a degree in mechanical engineering from the Buenos Aires Institute of Technology in 2000.

## It's a Boy!

Congratulations to Robert Molinari, senior scientist at AOML, on the birth of his first grandchild, a boy, Everett James Little, who weighed in at 7.2 lbs. on February 18, 2005.



## Visitors

Kristina Katsaros, former director of AOML, visited the Laboratory on March 1-15, 2005 to complete a final report for NASA entitled *Interpretation of Synthetic Aperture Radar-Observed Boundary Layer Flow Structures in Hurricanes*. She was delighted to be back in Miami and glad to see the Laboratory doing well. Since her retirement from federal service in 2003, she has been elected President of the 2006 Scientific Organizing Committee for the Pan Ocean Remote Sensing Conference (PORSEC) and Secretary for the Atmospheric and Hydrospheric Sciences section of the American Association for the Advancement of Science.

Sophie Stalhberg, an undergraduate biology student at Stockholm University in Stockholm, Sweden, will be visiting AOML as a volunteer from March through June 2005 to gain field work experience. She will assist Dr. John Proni and other senior scientists with the Ocean Chemistry Division in assessing the potential environmental impacts of major water and sewer installations in the coastal environment, particularly the discharge of wastes into the coastal ocean and the biological impacts upon local, migratory, and endangered species.



## Congratulations

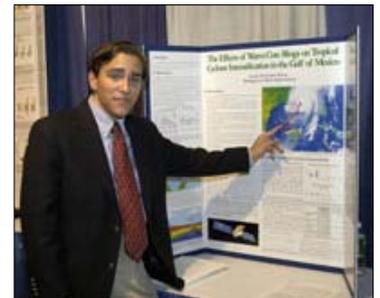
Frank Marks, Director of AOML's Hurricane Research Division, is the 2005 recipient of the National Weather Service's Richard H. Hagemeyer Award, presented at the 59th Interdepartmental Hurricane Conference in Jacksonville, Florida (March 7-11, 2005). The award is presented annually in honor of Richard Hagemeyer, a former long-time Director of the National Weather Service's Pacific region and an internationally-recognized leader in developing the United States' Tsunami Warning Program. Marks received the award for his outstanding contributions to the Nation's Hurricane Warning Program. Marks also received the U.S. Weather Research Program's Joint Hurricane Testbed Outstanding Contributor Award in recognition of his outstanding contributions to the Nation's Hurricane Warning Program as a member of the Joint Hurricane Testbed Steering Committee from 2002-2005.

Joseph Prospero, Director of the University of Miami's Cooperative Institute for Marine and Atmospheric Studies (CIMAS), is the recipient of the University of Miami's 2005 Distinguished Faculty Scholar Award. Dr. Prospero received the award for his lifetime of distinguished accomplishments in identifying the role of terrigenous aerosols in atmospheric chemistry, air-sea interactions, and climate; for his firmly establishing the global impacts of continental dust on climatically important processes occurring in the atmosphere and the ocean; for his continuing service to, and leadership of, the national and international community of atmospheric chemists; for his foresight and leadership in developing the highly successful atmospheric chemistry program at the Rosenstiel School; and for the prestige he has brought to the University of Miami.

## Congratulations to AOML's Student Interns

Zachary Gruskin, a student at Falcon Grove Middle School in Weston, Florida, and a summer intern at AOML during 2003, was awarded the American Meteorological Society's first place special category award at the 2005 Broward County Regional Science and Engineering Fair. His project entitled *Does Sahelian Rainfall Affect the Number of Named Cape Verde Cyclones Produced During the North Atlantic Hurricane Season from 1958 to 1990?* was also awarded (overall) third place at the Broward County Science Fair in the Earth Science category.

Justin Kovac, a former student intern at AOML, is the seventh-place winner in the 2005 Intel Science Talent Search, the nation's most prestigious and respected pre-college science competition. During the summer of 2004, Justin worked with AOML oceanographer Dr. Gustavo Goni on a project to identify and track warm core rings in the Gulf of Mexico using altimetry data and to study intensity fluctuations in the tropical cyclones that travelled over them. Justin was one of 300 semifinalists chosen from a field of 1,600 entrants before being selected as a top-ten winner for his research project entitled *The Effects of Warm Core Rings on Hurricane Intensification in the Gulf of Mexico*. For his seventh-place finish, he received a \$25,000 college scholarship, a lap-top computer, and a visit to the White House to meet President George W. Bush. Justin is a recent graduate of Montgomery Blair High School in Silver Spring, Maryland.



Justin Kovac at the 2005 Intel Science Talent Search in Washington, D.C.

Alexander Robel, a MAST Academy student intern working at AOML, is the first-place winner of an award presented by the Greater Miami Chapter of the American Meteorological Society at the 51st annual Miami-Dade Science and Engineering Fair. As first-place winner for his research project entitled *Evaluation of Four Sea Surface Temperature Indices as Indicators of Atlantic Tropical Cyclone Activity*, Alexander received a NOAA weather radio and a Certificate of Outstanding Achievement from the American Meteorological Society. Alexander has been working with Dr. David Enfield, an oceanographer with AOML's Physical Oceanography Division, on an after-school project to study the correlation between sea surface temperature indices and Atlantic tropical cyclone activity.

## Travel

Michael Black, Peter Black, Joseph Cione, John Gamache, John Kaplan, Christopher Landsea, Frank Marks, Mark Powell, Robert Rogers, and Eric Uhlhorn attended the 59th Interdepartmental Hurricane Conference in Jacksonville, Florida on March 7-11, 2005.

Peter Black attended the Tropical Cyclone Landfall Processes Workshop in Macao, China on March 21-25, 2005.

Chunzai Wang was an invited guest at the NASA-sponsored Ocean Vector Wind Science Team meeting in Seattle, Washington on March 22-24, 2005.

Mayra Pazos attended the Argos International Users Conference and Manufacturers Meeting in Annapolis, Maryland on April 5-7, 2005.

Jules Craynock, Jeffrey Judas, and Scott Stolz performed maintenance and updated components on the Coral Reef Early Warning System (CREWS) station at Lee Stocking Island, Bahamas on April 11-15, 2005.

Christopher Landsea made a presentation about hurricane climate variability and change at both the Cosmo Caixa Science Museum and the University of Madrid in Madrid, Spain on April 12-13, 2005.

Molly Baringer, Silvia Garzoli, Gustavo Goni, Christopher Meinen, Rick Lumpkin, Robert Molinari, Claudia Schmid, and Rik Wanninkhof participated in the Third Annual System Review Workshop hosted by NOAA's Office of Climate Observations in Silver Spring, Maryland on April 25-27, 2005.

Judith Gray attended a meeting to create an alumni program for NOAA's Leadership Competency Development Program in Charlottesville, Virginia on April 17-19, 2005. She also attended a meeting of the Coastal Storms Program in Washington, D.C. on April 25-28, 2005.

Jia-Zhong Zhang attended the 13th International Conference of Flow Injection Analysis in Las Vegas, Nevada on April 24-29, 2005.

## To the Rescue – Training Improves Medical Emergency Skills

Twenty-six staff members participated in an American Red Cross-sponsored training session at AOML on March 1st to learn basic first aid skills, cardiopulmonary resuscitation (CPR) techniques, and how to safely use an automated external defibrillator (AED) to provide care for victims of sudden cardiac arrest.

Participants learned first aid essentials such as how to control bleeding, care for burns, bandage wounds, treat head, neck, and back injuries, apply a sling, and immobilize injured bones and joints. Cardiopulmonary training provided practical hands-on experience in how to assist conscious and unconscious choking victims and how to perform rescue breathing and chest compressions.

CPR/AED certification cards good for one year were issued to participants at the end of the day-long training, along with first-aid certification cards good for three years. AOML is fortunate to have so many employees prepared to recognize and skillfully respond to life-threatening medical emergency situations.



Yeun-Ho Daneshzadeh (left) and Pedro Pena (right) practice their bandaging skills on Shirley Murillo (center).



Participants practice cardiopulmonary resuscitative (CPR) breathing techniques during the Red Cross-sponsored medical emergency training class held at AOML on March 1st.

## Miami Corporate Run

Walkers, Joggers, and Runners Welcome...

Join Team AOML

May 5, 2005  
Bayfront Park  
6:45 p.m.



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