

# AOML

Miami, Florida

# Keynotes

October 2000

Atlantic Oceanographic and Meteorological Laboratory

Volume 4, Number 10

## Project Eagle Offers Unique Research Environment

An alliance between Royal Caribbean Cruise Lines (RCCL), the Rosenstiel School of Marine and Atmospheric Science (RSMAS), and the Atlantic Oceanographic and Meteorological Laboratory (NOAA), with additional funding from the National Science Foundation, has resulted in Project Eagle, an innovative ship-of-opportunity research opportunity. Since 1998, scientists from RSMAS and AOML's Ocean Chemistry and Physical Oceanography Divisions have collaborated with Royal Caribbean Cruise Lines to design and equip oceanographic and atmospheric research facilities aboard one of the RCCL's new "eagle" class cruise ships, the *Explorer of the Seas*. This past September, AOML and RSMAS personnel traveled to Turku, Finland, to complete installation of the shipboard instrumentation and to outfit the laboratory spaces. AOML's technical representative is Mr. Shailer Cummings. During the *Explorer of the Seas*' maiden voyage from Finland to Miami, Florida, he and several RSMAS colleagues will conduct a series of tests of the instrumentation and data acquisition systems. The ship is expected to arrive in Miami near the end of October.

Beginning November 4, 2000, *Explorer of the Seas* will transport more than 3,800 passengers weekly to several ports in the Caribbean (see diagram). Its cruise track (Miami, Florida to Labadee, Hispaniola; San Juan, Puerto *(continued on page 3)*)

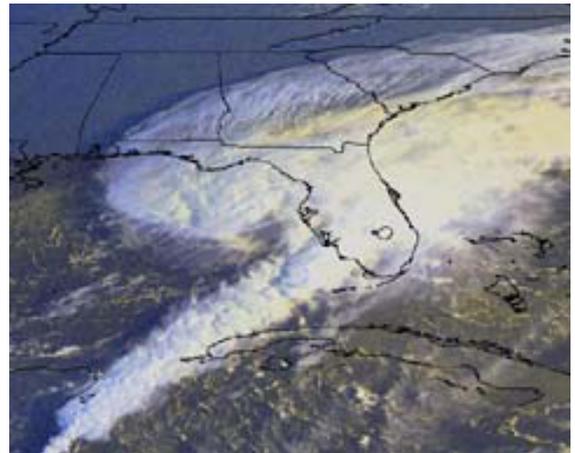
Columbus Day  
October, 9, 2000



## Storms Intensify Over Deep Warm Pools of Gulf Water

As the 2000 Atlantic hurricane season enters its second half, NOAA's hurricane hunters are taking another look at the Gulf of Mexico's hidden hurricane fuel tanks, two eddies of deep warm water spanning 15-20% of the Gulf, and their parent Loop Current. There is good reason to do so because the peak season for hurricane development in the Gulf of Mexico falls in the last weeks of September and the first weeks of October.

Since 1998, Peter Black of AOML's Hurricane Research Division and Lynn Shay of the University of Miami have researched these eddies and their potential for turbo-charging any hurricane that may cross their path. Black and Shay are studying how such deep pockets of warm water provide enough heat energy for a hurricane to rapidly intensify from a minimal hurricane to a monster in a matter of hours. Rapid intensification of hurricanes is still a crucial challenge in hurricane forecasting.



Hurricane Gordon makes landfall on September 17, 2000.

The Loop Current is a stream of warm Caribbean water that enters the Yucatan Straits, meanders northward, sometimes extending to the Gulf coast, and exits into the Florida Straits after a sharp turn around the Florida Keys where it becomes the Florida Current. Deep, warm-water eddies in the Gulf are spun off from the Loop Current as it goes through its 10-14 month cycle.

Warm eddies, such as the two present in the Gulf this summer, are a tremendous source of energy to a storm that crosses their path, say Shay and Black. The hurricane winds draw heat from the water to fuel the storm, mixing the warm waters with the cooler waters below as the storm passes by. Because the layer of warm water is so thick within the Loop Current and eddy, the ocean surface experiences less storm-induced cooling than it would outside these features, allowing for further intensification of the storm. Black and Shay believe that last year's Hurricane Bret, which jumped from a Category 2 to a Category 4 storm in just a few hours, may have drawn its energy from another eddy remnant off the coast of Texas. Any warm ocean feature close to shore could allow for rapid intensification of storms just before landfall.

In preparation for Hurricane Gordon and, later, Tropical Storm Helene moving into the Gulf, Black and Shay considered two major features that the storms would likely pass over: a large eddy currently in the central Gulf, just south of the *(continued on page 2)*



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



## NOAA Celebrates Hispanic Heritage Month

NOAA's Office of Civil Rights will celebrate National Hispanic Heritage Month (September 15-October 15) by lending support to an idea proposed by Alejandra Lorenzo, computer programmer with AOML's Remote Sensing Division, to promote science awareness among Hispanic students in Miami, Florida.

Due to Ms. Lorenzo's efforts, NOAA will "adopt" Eneida Massas Hartner Elementary, a predominantly Hispanic grade school. Once a month, volunteers from various NOAA line offices in the Miami area will visit the school and speak with the students on a wide range of marine and atmospheric science topics. If interested in participating, contact Alejandra Lorenzo (305-361-4404) or Erica Van Coverden, AOML's outreach coordinator (305-361-4541), for more information.

(continued from page 1)

Mississippi delta, and the Loop Current itself. These features were selected for study based on satellite and in-situ measurements.

On September 13, the scientists observed the pre-storm structure of the Loop Current and adjacent eddies during a nine-hour flight aboard one of NOAA's WP-3D reconnaissance aircraft. Data gathered aboard the aircraft analyzed heat content before and after Gordon and Helene tracked over the Loop Current. Data obtained from ocean profiling instruments dropped from the WP-3D showed that the eddy south of Louisiana was significantly weaker than previous data indicated. Therefore, the focus for the 2000 season was on the Loop Current itself, and Black and Shay are fortunate that both Gordon and Helene passed over the Current. Each acted as expected: strengthening while over the warmer water and then weakening over the cooler waters of the continental shelf. Even after the two storms passed, heat content in the Loop Current was well above the threshold needed to sustain a storm. This is vitally important to know for intensity change in storms approaching landfall.

NOAA hurricane researchers also considered environmental data gathered around the storm by NOAA's Gulfstream-IV (G-IV) jet, a surveillance aircraft operated by NOAA's Aircraft Operations Center. Although the G-IV missions are designed to improved track forecasts for landfalling hurricanes, an added benefit is measurement of the wind shear and environmental moisture and stability that can affect storm intensity. Wind shear is the difference in wind velocity at upper and low levels in the atmosphere. High wind shear, dry air, and low stability are associated with the weakening of tropical storms. Direct measurements of these variables is unavailable over the Gulf of Mexico without use of the Gulfstream-IV jet.

"We hope to discover the relative importance of the Loop Current and environmental wind shear in determining hurricane intensity change," Black says. The data gathered suggest that much like major hurricanes Opal and Bret, the ocean represents a fuel-injector to the atmosphere for all types of tropical cyclones, even tropical storms and minimal hurricanes.

Black and Shay hope that data gathered during this study will enhance knowledge and predictability of major hurricanes, which translates into improved intensity forecasts, increased warning times, and better preparedness in coastal regions.

Official NOAA press release of September 28, 2000. Contact: Erica Van Coverden (coverden@aoml.noaa.gov or 305-361-4541).

## Combined Federal Campaign

**A tradition of caring...**



The annual CFC program enables federal employees to support thousands of non-profit charitable organizations and agencies through payroll deductions

**CFC 2000:**  
October 16-November 3

**Kickoff Event:**  
October 16, 2000

Individuals returning pledge cards by October 20th are eligible to participate in a drawing for prizes

Contact Joseph Pica  
(2000 CFC Coordinator)  
for more information

(305) 361-4544  
pica@aoml.noaa.gov

**COSTUME CONTEST**



## Oktoberween Party

October 27, 2000

4:00 P.M., AOML Picnic Shack

\$5.00 per person

Bratwurst, Knackwurst,  
Sauerkraut, Potato Salad,  
Fixings, Pumpkin Pie, Soft Drinks

Family Members and the Virginia Key Science Community are Welcome to Attend

Contact Neal Dorst for more info  
(305-361-4311—dorst@aoml.noaa.gov)



## Commitment to Cooperative Research Reaffirmed

A delegation from the Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER) met with NOAA Administrator Dr. D. James Baker on September 27, 2000 in Washington, D.C. to reaffirm their commitment and interest in advancing



IFREMER delegation

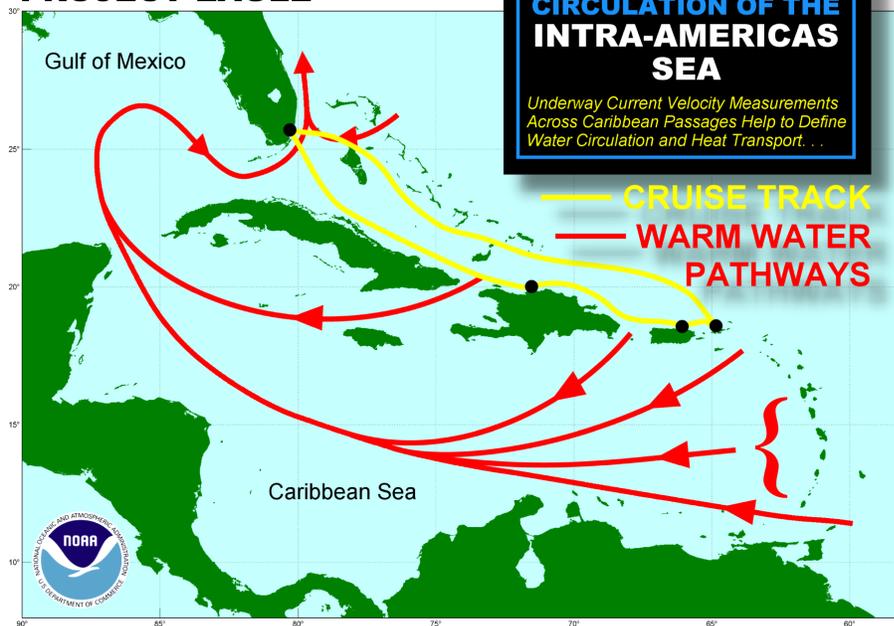
cooperative research in oceanography between France and the United States. This cooperative research, now known as the U.S.-France Cooperation in Oceanography, originated with the Marine Science Cooperation agreement signed in 1970 between the National Center for the Exploration of the Oceans (CNEXO) and the National Council on Marine Resources and Engineering Development.

Dr. Baker and Dr. Jean-François Minster, IFREMER President and Executive Director, expressed their desire to identify topics of mutual interest and work to reinvent the U.S.-France Cooperation in Oceanography. Both agreed that NOAA and IFREMER would encourage broad participation by the greater marine science community, including universities, government agencies, and non-governmental organizations.

After their Washington tour, the delegation visited the Miami/Virginia Key science community on September 29th, touring the facilities of AOML, the Southeast Fisheries Science Center, and the Rosenstiel School of Marine and Atmospheric Science.

(continued from page 1)

## PROJECT EAGLE



The cruise path of the *Explorer of the Seas* will enable scientists to collect environmental data from the Caribbean on a continuing basis. These long-term data sets will be invaluable to local and global oceanic and climatic studies.

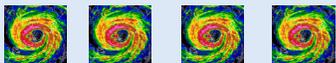
Rico; St. Thomas, U.S. Virgin Islands; and back through the Bahamas) has enormous importance because it crosses the Florida Straits, principle pipeline into the North Atlantic, as well as a number of other major passages that connect the Caribbean Sea with the Atlantic Ocean. This will permit sampling processes on time and space scales unattainable using a dedicated research regime.

Physical oceanographers at AOML have been studying the exchange between the Caribbean Sea and Atlantic Ocean for the last decade or more. This important transport pathway includes the upper ocean portion of the Meridional Overturning Cell (MOC) of the North Atlantic Ocean. In the MOC, cold deep water exits the North Atlantic southward across the equator and is balanced by northward-flowing, warmer upper ocean waters from the South Atlantic. The resulting heat flux into the northern hemisphere is thought to be a key factor influencing long term atmospheric climate variability in the North Atlantic and adjacent regions. Project Eagle will sample this transport continuously using two phased array acoustic Doppler current profiling (ADCP) systems. The data will eventually yield a much improved understanding of the mechanisms and pathways of upper ocean, warm water interhemispheric transport.

Ancillary acoustic data collected by the ADCP systems will be used to continuously assess plankton and mesopelagic fish biomass distribution. The salinity, temperature, oxygen concentration, transmittance, carbon dioxide chemistry, and plankton composition of near surface waters will be monitored by a series of sensors connected with a flow through seawater system. AOML scientists will use these data to improve estimates of atmospheric-ocean carbon flux, hurricane intensification processes, and biological variability within the Gulf Stream ecosystem. Atmospheric measurements will provide RSMAS scientists with estimates of trade wind transport of materials from North Africa.

Besides providing a highly cost-effective means of conducting critical scientific studies in support of the NOAA research mission, the *Explorer of the Seas* will also provide a venue for science education and public outreach. RSMAS and AOML have worked with RCCL to establish interactive exploration centers, plan guided tours of the laboratory spaces, and develop feature films and exhibits about both the ocean/atmosphere system and the participating scientific institutions. Three scientific berths will be made available at no cost to visiting scientists who will, in turn, be asked to present one or more scientific lectures to the *Explorer's* passengers. From an AOML perspective, Project Eagle represents a unique opportunity to educate the public about NOAA's research mission.

## DAILY TROPICAL WEATHER DISCUSSION



12:30 P.M. (WEEKDAYS)  
4TH FLOOR MAP ROOM

In support of the Hurricane Research Division's annual Hurricane Field Program, join us for daily map discussions about tropical cyclones around the world, with a focus on Atlantic hurricanes. Each week a new volunteer will lead the discussions, which last about 20 minutes. Contact Chris Landsea (305-361-4357 or [landsea@aoml.noaa.gov](mailto:landsea@aoml.noaa.gov)) for more information.

## It's a Girl!



Congratulations to Armando Cuervo, accounting technician with the Office of the Director, and his wife, Lordes, on the birth of their second child, a daughter, born October 17, 2000. Melanie Elizabeth weighed in at 7 lbs., 10 oz. at 10:33 a.m. Mom, Dad, baby, and sister Michelle are all doing well.

*October is National  
Disability Awareness Month*

## Congratulations

Christopher Landsea and Stanley Goldenberg, meteorologists with the Hurricane Research Division, are recipients of FY-2000 Department of Commerce Bronze Medals, awarded in recognition of their significant contributions to the fulfillment of NOAA's mission. The HRD scientists were members of a group nominated for the award by the National Weather Service for "issuing the accurate and first official physically based Atlantic seasonal hurricane outlooks for the 1998/1999 seasons, based upon new research." The medals will be awarded on October 19, 2000 at a ceremony held at the University of Maryland.

James Hendee, research oceanographer with the Ocean Chemistry Division, is the recipient of a FY-2000 NOAA Research Employee of the Year Award. The award recognizes employees who have made outstanding contributions to the promotion of excellence in the operations or programs of NOAA research as demonstrated by their initiative, commitment, effort, and competence. Dr. Hendee received the award for his ongoing contributions to the National Coral Reef Initiative and the coral reef scientific community.



## Farewell

Samuel Houston, meteorologist with the Hurricane Research Division for the past 10 years, resigned from AOML on October 6, 2000. Sam joins the ranks of NOAA's Central Pacific Hurricane Center in Honolulu, Hawaii, as a forecast meteorologist. Best of luck to Sam for his continued success.

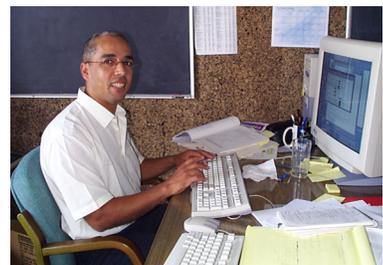


Helen Williams, a 26-year veteran of AOML, retired from federal service on September 30, 2000. Helen began working with the Hurricane Research Division in August 1974. Over the years, she tended to the smooth and efficient operation of AOML's Computer Room, witnessing computer technology evolve from keypunch cards, to magnetic cards, to tape drives, to hard drives, to floppy disks, to CD ROMs. Best wishes to Helen for a leisurely retirement. AOML is thankful for all your years of dedicated service.



## Visitors

Dr. Abderrahim Bentamy of the Institut Francais de Recherche pour l'Exploitation de la Mer (IFREMER), Brest, France, has been a guest scientist at AOML since August. He has worked with Dr. Kristina Katsaros and other members of AOML's Remote Sensing Division (Satellite Remote Sensing Group) to complete a joint study of satellite-derived latent heat fluxes over the oceans. In addition to Dr. Katsaros, his other collaborators have included Alberto Mestas-Nuñez and Evan Forde of AOML and Will Drennan of the Rosenstiel School. A preliminary manuscript entitled "Characteristics of Remotely Sensed Momentum and Latent Heat Fluxes" is a result of the group's collaborative research. Dr. Bentamy will make a guest presentation to discuss the manuscript on Friday, October 20th; he returns to France shortly thereafter.



## October 2000 Guest Presentations\*

- October 6**     ***The Sensitivity of the Tropical Hydrological Cycle to ENSO***  
**Dr. Brian J. Soden**  
**NOAA/Geophysical Fluid Dynamics Laboratory**
- October 12**     ***NOAA Coast Watch: Plans for Operational Coastal Ocean Color***  
**LT Michael Hopkins**  
**NOAA/NESDIS Coast Watch Operations Officer**
- October 20**     ***Characteristics of Remotely Sensed Momentum and Latent Heat Fluxes***  
**Dr. Abderrahim Bentamy**  
**Institut Francais de Recherche pour l'Exploitation de la Mer (IFREMER)**
- October 23**     ***Extratropical Cyclone Variability in the Northern Hemisphere Winter from the NCEP/NCAR Reanalysis Data***  
**Ms. Olga Zolina**  
**Shirshov Institute of Oceanology, Moscow, Russia**

\*Presentations begin at 3:00 p.m. in the first-floor conference room. Coffee and tea are served at 2:45 p.m.

## Travel

Kristina Katsaros attended the International Society for Optical Engineering's Symposium on Remote Sensing in Barcelona, Spain on September 25-29, 2000.

Michael Farmer and Michael Shoemaker will install a tower on the bow of the NOAA ship *Ronald H. Brown* in San Diego, California on October 8-16, 2000.

Silvia Garzoli and Robert Molinari will attend a CLIVAR (Climate Variability and Predictability) program workshop entitled "Shallow Tropical/Subtropical Overturning Cells and their Interaction with the Atmosphere" in Venice, Italy on October 9-13, 2000.

Rik Wanninkhof will attend a Scientific Steering Committee meeting of the Carbon Cycle Science Program in Washington, D.C. on October 10-12, 2000.

James Hendee will attend the 9th International Coral Reef Symposium in Bali, Indonesia on October 18-30, 2000 and make a presentation entitled "Expert system generated coral bleaching alerts for Myrmidon Reef, Great Barrier Reef, Australia." He will also meet with members of the Great Barrier Reef Marine Park Authority and the Australia Institute of Marine Science to discuss 2001 collaborative activities with NOAA and NESDIS.

Kelly Goodwin will be a Visiting Fellow at the University of Warwick, England from October 24-November 28, 2000. She will be working to isolate the methyl-bromide degrading gene(s) from a newly-isolated marine bacterium.

Christopher Landsea will attend the NOAA Climate Diagnostics and Prediction Workshop in Palisades, New York on October 23-27, 2000.

**Daylight Savings Time  
ends at 12:00 a.m. on  
October 29, 2000**

## AOML CRANDON PARK WORK DAY



November 4, 2000  
9:00 a.m. - 11:00 a.m.



Meet at Crandon Park Bear Cut Preserve

Contact Chris Landsea for more information  
(305-361-4537 or [landsea@aoml.noaa.gov](mailto:landsea@aoml.noaa.gov))

## AOML PICNIC

November 4, 2000  
11:00 a.m. to 4:00 p.m.  
Crandon Park, Key Biscayne  
(Shelter #5)

\$6.00 for adults/kids under 12 free  
(must be paid by November 1st)

*Bring a dish to share with others!*

hot dogs, hamburgers, bratworst,  
baked beans, potato salad, soft drinks

Roller blading, swimming, beach volleyball,  
playground nearby for children

Contact Nina Liebig for more information  
(305-361-4308 or [liebig@aoml.noaa.gov](mailto:liebig@aoml.noaa.gov))

Sponsored by the AOML Morale, Welfare, and Recreation Committee

Keynotes can be viewed online in PDF format at the following  
World-Wide Web Internet address:  
<http://www.aoml.noaa.gov/keynotes>

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Editor – Kristina Katsaros  
Writer/Publishing Editor – Gail Derr

The deadline for submitting material for the November issue of *Keynotes* is October 23, 2000.