

Web Site Features Atlantic Ocean Benchmarks

AOML's newest web site (www.aoml.noaa.gov/benchmarks/index.html) features 50 years of studies in the Atlantic Ocean and serves as a source of information for modelers, observers, and decision makers. It provides benchmarks of Atlantic Ocean characteristics that are indices of the historical as well as present state of many important components of the basin's circulation.

The benchmarks have been developed from satellite, volunteer observing ship/expendable bathythermograph data, submarine cable, and hydrographic survey sources. The length of some of the records thus varies from 10 to 50 years. The following time series are currently included:

- Agulhas Current rings and transport
- North Brazil Current rings
- Tropical Atlantic current structure along a cross-equatorial volunteer observing ship section
- Florida Current transport
- Two temperature sections through the subtropical gyre of the North Atlantic
- Gulf Stream transport
- Deep Western Boundary Current water mass properties at 26.5°W
- Total water column variability along 24°N

The time series will be updated as new data becomes available, on some occasions in real-time and other occasions after cruises have been completed.

Secretaries Day
April 24, 2002



SOFeX Studies Biological Effects of Iron Fertilization

Kevin Sullivan, a CIMAS associate with AOML's Ocean Chemistry Division, and Craig Neill, a contract employee with AOML's CO₂ group, sailed aboard the R/V *Roger Revelle* this past January-February 2002 to participate in a research cruise to study the biological effects of adding iron to the ocean ecosystem. The Southern Ocean Iron Fertilization Experiment (SOFeX) brought together 76 scientists and three research vessels to explore whether "fertilizing" the ocean surface with iron could affect the rate at which carbon dioxide (CO₂), a "greenhouse" gas, is drawn out of the atmosphere into the ocean depths, counteracting global warming.

The R/V *Revelle* scientific team distributed several tons of iron sulfate and the inert trace gas sulfur hexafluoride (SF₆) over two 200-square mile patches of ocean, one north (52°S, 167°W) and one south (67°S, 170°W) of the Antarctic Polar Front Zone. Sullivan and Neill were responsible for injecting and subsequently monitoring and mapping the SF₆ used as a tracer for the iron. For a month period the patches were continuously monitored and sampled, first by the R/V *Revelle*, followed by the R/V *Melville*, and the U.S. Coast Guard Cutter *Polar Star*. Water samples taken outside of the patch areas were used as controls to distinguish between naturally-occurring seasonal changes and those occurring due to iron fertilization.

The effect of natural (iron-laden dust) or man-made iron additions on phytoplankton growth rates was first expressed by the late Dr. John Martin of Moss Landing Marine Laboratories. His iron hypothesis theorized that biological productivity and, therefore, atmospheric CO₂ sequestration by the ocean, is controlled in large parts of the ocean by trace levels of iron. His famous quote "give me half a tanker of iron and I'll give you the next ice age" illustrates the potential of iron to regulate atmospheric CO₂ and its "greenhouse" warming effect.

As anticipated, the addition of iron in both patches caused dramatic biological responses. After three weeks, enhanced chlorophyll levels due to photosynthesis turned the deep blue surface waters "pea soup" green, an effect visible by satellite. A detailed time series was derived of the drawdown of CO₂, biological production, changing species composition, and other biological and chemical changes by combining the extensive measurements gathered by the three research vessels.

(continued on page 2)



Kevin Sullivan aboard the R/V *Roger Revelle*.

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Tropical Atlantic Cruise Successful

Scientists from AOML's Physical Oceanography Division (PhOD) and the University of Kiel completed a successful research cruise to the tropical western Atlantic Ocean this past February. U.S. investigators have been collaborating with researchers from Germany, France, and Brazil since the mid-1980s as part of an ongoing cooperative study of the region's role in global thermohaline circulation and its shallow subtropical cells (STC). Both of these oceanic features have been linked to atmospheric climate change.

During the NOAA R/V *Ronald H. Brown* cruise, five current meter moorings were successfully recovered and four re-deployed to continue data collection efforts of a time-series along 11°S in the Southern Hemisphere STC. Three inverted echo sounders were also recovered along the same line. Hull-mounted acoustic Doppler current profiler (ADCP) and conductivity-temperature-depth (CTD) data were collected to temporally and spatially map the complicated current and water mass properties of the region and to define the pathways of waters that are subducted in the subtropics and advected to the tropics. Data gathered from the cruise will help to further quantify the transport of boundary flow to the Equatorial Undercurrent (EUC) and North and South Equatorial Currents, the former a main component of the Southern Hemisphere STC.

(continued from page 1)

SOFeX was undertaken to address two large-scale questions: (1) can changing dust (containing iron) deposition patterns cause climate change by stimulating biological growth in the ocean and thereby enhance the amount of CO₂ absorbed; and (2) what are the consequences of possible CO₂ mitigation strategies that involve increasing biological growth in the surface ocean if such iron additions were performed at large scale.

The results from this study should enhance understanding of how biological processes impact the global carbon cycle and atmospheric CO₂ concentrations, as well as how they regulate climate. AOML's tracer effort was funded by the National Science Foundation in a joint proposal between OCD scientist Rik Wanninkhof and Professor Frank Millero of the University of Miami's Rosenstiel School of Marine and Atmospheric Science. Additional information about the SOFeX study, as well as daily cruise reports from the three research vessels, can be found by visiting the Monterey Bay Aquarium Research Institute web site (<http://www.mbari.org/education/cruises/SoFex2002/>).

AOML Meteorologists Participate in National Conference

Meteorologists with AOML's Hurricane Research Division (HRD) were speakers at the 24th National Hurricane Conference in Orlando, Florida during the first week of April. The conference serves as an annual pre-season meeting for emergency managers, law enforcement personnel, and those who deal with hurricane preparedness at the local level. It provides a forum for information exchange and briefings on recent advancements in storm prediction, warnings, and research. HRD scientists presented information about a few of their current research projects, including the:

- Atlantic hurricane database re-analysis project: The re-analysis project is one of the first efforts to update the National Hurricane Center's (NHC) North Atlantic hurricane database (HURDAT), originally created in the 1960s for statistical track forecast guidance of tropical storms and hurricanes. Inclusion of undocumented historical hurricanes from the late 1800s and early 1900s, plus a greater understanding of tropical cyclones that has developed over the years, will assist in fine tuning the HURDAT database and eliminating many systematic and random errors.

- Increase in Atlantic hurricane activity: AOML meteorologists and oceanographers recently discovered a link between ocean cycles in the Atlantic Ocean and the frequency of intense Atlantic hurricanes (see July 2001 issue of *Science*). The 25-40 year cycle appears to have entered a period of increased hurricane activity that began in the late 1990s.

- Wind-analysis system in transition to operations at NHC: HRD's wind analysis project produces color-coded maps that denote the location of tropical storm and hurricane-force winds in and around storms. Wind analysis maps will aid NHC forecasters in their understanding of the extent and strength of the wind field, leading to more accurate forecasts.

Diversity Seminar

"Compromise, Consensus Building, and Consideration of Others: A Copout or a Recipe for Progress and Peace"

March 19, 2002

12 Noon

Dr. Kristina Katsaros
Discussion Leader

First-Floor Conference Room



In honor of
Women's History Month
AOML presents
**The Life and Times
of Rosie the Riveter**
March 26, 2002
12 Noon
First-Floor Conference Room

Bring Your Children To Work Day: April 25, 2002

March-April 2002 Informal Research Reports

March 26

*New Production Estimates
from the Diurnal Cycle of
Nitrate in Oligotrophic Waters*

Dr. Jia-Zhong Zhang
Ocean Chemistry Division

March 27

*Satellite Oceanography and
New AOML Products on
the Web*

Dr. Joaquin Trinañes
Physical Oceanography Division

April 16

*Kinematic Evidence for
Tropical Cells in
the Atlantic Ocean*

Dr. Robert Molinari
Physical Oceanography Division

April 23

*A Further Investigation of
the Western Hemisphere
Warm Pool*

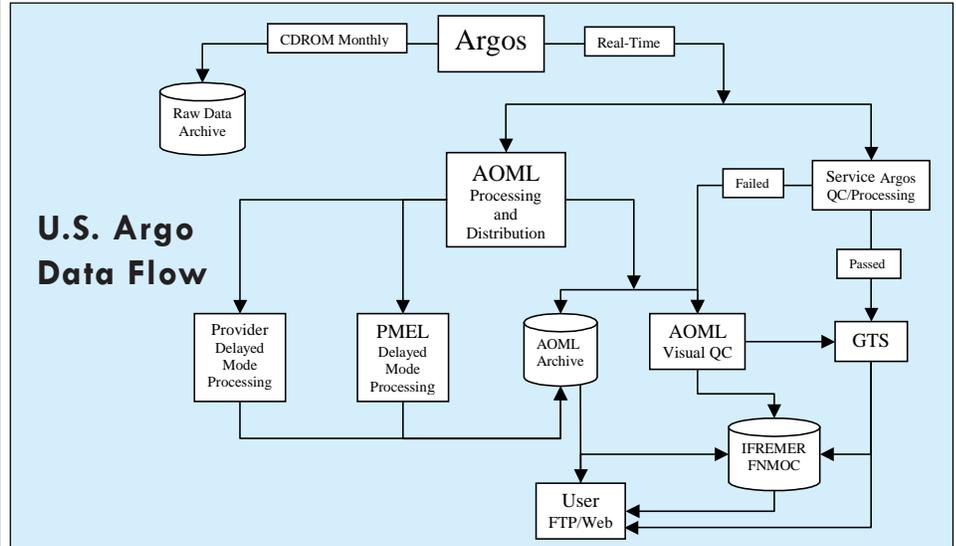
Dr. David Enfield
Physical Oceanography Division

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

Service Argos Plays Key Role in Processing Float Data

William Woodward and Robert Vence, Service Argos; Claudia Schmid and Reyna Sabina, AOML/Physical Oceanography Division

Service Argos, Inc. (SAI) of Largo, Maryland and AOML have joined forces to strengthen the real-time operational processing of the U.S. Argo float data (see data flow schematic below). The primary objective of the U.S. Argo project is to make real-time, quality-controlled data from the profiling floats available to the operational community.



Argo profiling floats are part of an international effort that began in 1999 to build a real-time, high-resolution climate monitoring system for the upper and middle layers of the global ocean. Argo floats drift with ocean currents at a typical depth of about 2000 m and rise to the surface every 10-14 days. As they ascend through the water column, they measure temperature and salinity. Upon reaching the sea surface, the data are relayed via satellite to land-based receiving stations where they are processed and made available to the scientific community in a matter of hours.

The U.S. Argo Data Center located at AOML is responsible for processing and distributing the data within 24 hours of collection. AOML scientists have successfully developed software modules capable of real-time quality control and processing of float profiles relayed via Service Argos in, currently, 11 different data formats. This software has been implemented by AOML at Service Argos and will augment the existing continuous Argos float data processing pipeline. By taking advantage of the on-line operational systems at Service Argos, this AOML-SAI partnership maximizes the real-time processing and dissemination capabilities for the U.S. Argo Program.

The Argo data processing system at SAI will become fully operational in the spring of 2002. At that time, in addition to the real-time quality control and processing at SAI, AOML will continue to: (1) collect, process, and store all Argo data in parallel, as well as provide a backup for the real-time Argo data processing; (2) provide the visual quality control and redistribution to the GTS of data that fails to pass the quality control software module at the SAI Processing Center; and (3) distribute the data to the general public via the Internet (<http://www.aoml.noaa.gov/phod/ARGO/HomePage/>).

FIRE DRILL

APRIL 23, 2002



10:15 A.M.



View AOML's
Occupant Emergency Plan at:

<http://queue/aomloep.html>

BROWN-BAG LUNCH

A Photographic Journey to Antarctica

Kelly Goodwin and Shari Yvon-Lewis

April 29, 2002

12 Noon; First-Floor Conference Room



AOML-SEFSC POT LUCK LUNCHEON

AOML hosted an outdoor pot luck luncheon on March 1st to become better acquainted with its Virginia Key neighbors at the Southeast Fisheries Science Center. Fair weather prevailed, in spite of gusty winds. The luncheon was well attended and featured a delectable assortment of entrees and desserts. An enjoyable time was had by all.



Visitors

Dr. Silvia Blanc from the Underwater Sound Division of the Naval Service of Research and Development (SENID), Buenos Aires, Argentina, visited AOML for training purposes during March 2002. Dr. Blanc worked with scientists from the Ocean Chemistry Division's Acoustics Research Group to explore experimental methodologies based on acoustic scattering theory. Her visit was sponsored by the Partnership for Observations of the Global Oceans (POGO) and facilitated by Dr. John Proni, Director of the Acoustics Research Group.



Dr. Arnold Gordon of the Lamont-Doherty Earth Observatory of Columbia University visited AOML on April 1-5, 2002 and presented a seminar entitled "For the global thermohaline circulation, little things may mean a lot."

Dr. Abderrahim Bentamy from the Institut Français pour la Recherche et l'Exploitation de la MER (IFREMER), Plouzane, France, visited AOML on April 4-11, 2002 to work with AOML Director Kristina Katsaros, Alberto Mestas-Nuñez, and Evan Forde on an analysis of evaporation rates in the tropical and subtropical Atlantic Ocean derived from satellite measurements.

Corporate Run

May 2, 2002

Bayfront Park

6:45 p.m.

Walkers and Runners...

Join Team AOML

Contact Chuck Featherstone for info
(305-361-4401)



April 26, 2002 is the last day of service for the RSMAS shuttle bus. Shuttle service resumes on August 28, 2002.

Congratulations

Michael Black, a meteorologist with AOML's Hurricane Research Division, and James Franklin of the National Hurricane Center (formerly with HRD) were recipients of the Outstanding Achievement Award in Meteorology at the 24th National Hurricane Conference in Orlando, Florida. The award was presented on April 4, 2002 in recognition of their pioneering the use of global positioning satellite (GPS) dropsondes to study the inner core region of tropical cyclones. The unparalleled degree of detail provided by the GPS dropsondes of the wind, temperature, and moisture structure of tropical cyclones has resulted in more accurate hurricane analyses and track forecasts by the National Weather Service.



Michael Black and James Franklin

Rik Wanninkhof, an oceanographer with AOML's Ocean Chemistry Division, and Richard Feely of the Pacific Marine Environmental Laboratory are the recipients of a joint 2002 NOAA Administrator's Award for their outstanding leadership in studying the oceanic carbon cycle and its role in sequestering carbon dioxide as part of NOAA's Ocean Atmosphere Carbon Exchange Study.

Close Up Students Reminse about Memorable Trip

Students from Hialeah High School visited AOML on March 22nd to share their impressions from a trip to Washington, D.C. this past February as participants in Close Up, a civics education program. Accompanied by history teacher Catherine Palmore, the group (Vanessa Ochoa, Melissa Perez, Jaqueline Lopez, and Frances Perez) fondly recalled the week-long adventure that took them behind the scenes to witness government in action. Activities included visits to national landmarks and monuments, interaction with students from across the country, and meetings with Florida politicians Senator Bill Nelson and Representative Lincoln Diaz-Balart.



Close Up students from Hialeah High School, Alejandra Lorenzo, and Catherine Palmore.

Alejandra Lorenzo, a computer specialist with AOML's Computer Networks and Services Division and an alumni of Hialeah High, helped make the long anticipated trip possible by securing funds from NOAA's office of Equal Employment Opportunity. NOAA has subsidized student participation in the Close Up program for the past four years. Catherine Palmore had this to say about the current trip: "I am always impressed with the growth in perception that happens to young people who attend this trip. This year's Close Up Program was the most important one that I personally have attended. In light of the events of 9-11, many school systems denied their students the opportunity to take part in any out of state field trip. We were very lucky that Miami-Dade County did not take this step. Consequently, the attendance at this year's program was half of what it was last year. Despite the obvious, the Close Up staff were there to see that each of our students was given the same quality experiences that preceding groups have had. We were continually thanked for our courage in coming to Washington, D.C."

Travel

Silvia Garzoli attended the Ocean.US Workshop in Warrenton, Virginia on March 10-15, 2002.

Robert Molinari attended the fourth meeting of the International Argo Science Team in Hobart, Australia on March 12-14, 2002.

Evan Forde served as a member of the Ocean Exploration Science Review Panel in Silver Spring, Maryland on March 17-19, 2002.

Stanley Goldenberg attended the Global Climate Observing System Regional Workshop for Central America and the Caribbean in San Jose, Costa Rica on March 19-21, 2002.

Peter Ortner attended a South Florida Restoration Task Force Meeting in Washington, D.C. on March 20-21, 2002.

Kristina Katsaros attended the National Weather Service/Office of Oceanic and Atmospheric Research Weather Workshop in Silver Spring, Maryland on March 26-27, 2002.

Michael Black, Jason Dunion, Stanley Goldenberg, Christopher Landsea, Mark Powell, and Hugh Willoughby attended the 24th National Hurricane Conference in Orlando, Florida on April 2-5, 2002.

James Hendee, Michael Shoemaker, and Jules Craynock were members of a team that completed installations on a new CREWS (coral reef early warning system) station in St. Croix, Virgin Islands in April.

Alejandra Lorenzo will assist with preparations for the Office of Oceanic and Atmospheric Research's (OAR) Webshop 2002 seminar and development of the OAR intranet in Silver Spring, Maryland on April 4-June 4, 2002.

Rik Wanninkhof attended a U.S. Joint Global Ocean Flux Study meeting in Vancouver, Canada on April 8-12, 2002.

Several staff members from the Hurricane Research Division will attend the American Meteorological Society's 25th Conference on Hurricanes and Tropical Meteorology in San Diego, California on April 29-May 3, 2002.

*Commemorative Evening Hosted by the Miami Chapter
of the American Meteorological Society:*

"The 1926 Hurricanes and Hurricane Andrew: A Look at the Region's Most Devastating Tropical Cyclones"

May 20, 2002

Hors d'Oeuvres/Cocktails: 6:00-7:30 p.m.
(Rosenstiel School - Commons)

Presentations: 7:30 p.m.
(Rosenstiel School - Auditorium)

Guest Speakers:

Dr. Paul George
Impact of the 1926 Miami Hurricane

Dr. Lixion Avila
The 1926 Cuba Hurricane

Dr. Christopher Landsea
*Comparing the 1926 Hurricane and Hurricane Andrew
in the Context of Today's South Florida*

To purchase tickets or for additional information:
Neal Dorst (305-361-4311)
Erica Van Coverden (305-361-4541)
Krissy Williams (305-229-4439)

View Keynotes online: <http://www.aoml.noaa.gov/keynotes>

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