Center for Ocean-Atmospheric Prediction Studies

Newsletter

Spring 2009

About COAPS

The Florida State University Center for Ocean-Atmospheric Prediction Studies promotes interdisciplinary research in air-sea interaction, the coupled ocean-atmosphere-land-ice earth system, and climate prediction to increase our understanding of the physical, social, and economical consequences of coupled ocean-atmospheric variations.

COAPS is located in Tallahassee's Innovation Park, and has a staff of approximately 50, including teaching faculty, research scientists, and students from the fields of meteorology, oceanography, and the computer and information sciences. It is home to the NOAA Applied Research Center, the Florida Climate Center, and the Research Vessel Data Center. Sponsors include NASA, NOAA, NRL, NSF, ONR, the State of Florida, USDA, and the U.S. DOE.

During La Niña events, stronger than normal trade winds bring cold water up to the surface of the Pacific Ocean. Image credit: NASA.

La Niña's Abrupt Return Could Mean Drought in Florida

by David Zierden, State Climatologist, & James O'Brien, Professor Emeritus

The Southeast Climate Consortium is predicting a warm and dry spring until May 2009 for Florida with the return of La Niña in the Pacific Ocean.

La Niña refers to a state of the tropical Pacific Ocean where surface temperatures along the equator from South America to the central Pacific turn colder than normal. La Niña can be thought of as the opposite of El Niño, where the same area of the Pacific is much warmer than normal. It is unusual for La Nina to raise its signal so late in the winter.

La Niña affected Florida's climate patterns last winter as well before dissipating in April 2008. From that time until mid-December, surface temperatures in the Pacific Ocean had been near normal, or the neutral phase. Driven by stronger than normal trade winds in the central Pacific since October, colder water has recently broken through to the surface over a large area and has taken on La Niña characteristics. This La Niña is expected to last through the remainder of the winter and into spring.

La Niña is known to bring winter weather patterns to the state of Florida that are usually warmer and drier than normal. Historically, the peninsula of Florida averages rainfall 40 to 60 percent below normal in the months of January through March during La Niña events. Temperatures over the entire state average 3-4 degrees warmer than normal.

The expected dry pattern could hasten the return of drought to the state. West central Florida is already in moderate drought according to the U.S. Drought Monitor, while the rest of the peninsula is considered abnormally dry. Spring and early summer is a critical time for drought impacts across the state, as rising temperatures and the extended winter dry season combine to stress vegetation and water resources. Water stored in Lake Okeechobee from plentiful summer rains and tropical storm Faye will help buffer South Florida against the impacts of La Niña.

La Niña also brings the potential for a very active wildfire season. Acreage burned is often more than doubled over the average in La Niña years, as was seen in 1998 and 2001.

Warmer temperatures may slow the chill accumulation in flowering fruits such as blueberries, peaches and strawberries, but enhance development of other crops. While mild freezes can be expected every year in north and central Florida, La Niña reduces the risk of severe freezes in the citrus and vegetable belts.

La Niña brings some benefits to Florida. Tourism and outdoor activities can expect more days of sunshine and mild temperatures this spring. For more detailed information on La Niña and climate forecasts, visit www.agroclimate.org and www.coaps.fsu.edu/climate_center/.

Hurricane Evacuation Study

A recent study led by COAPS economist Daniel Solís examines how socioeconomic factors influence hurricane evacuation decisions.

For the study, Solís and colleagues surveyed over 1,300 households in NW and SE Florida who experienced a hurricane during the 2005 season.

The results suggest that households living in risky environments (mobile home and flooding areas) are more likely to evacuate, as are households with children and those who have previously experienced the threat of a hurricane. In contrast, homeowners and households with pets are less likely to evacuate. Households in SE Florida are also less likely to evacuate in comparison with those in NW Florida. The data also suggests that the more people spend on storm preparation the less likely they are to evacuate.

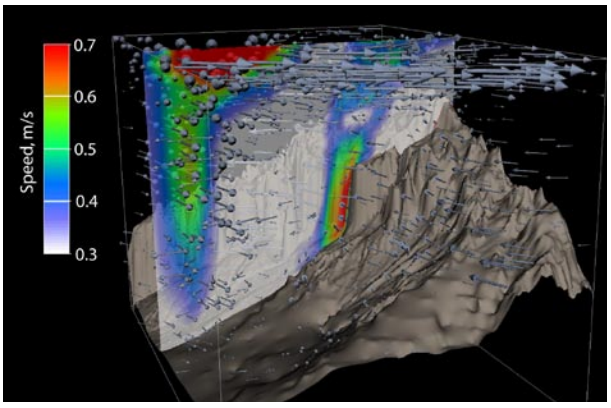
The results stemming from this study may help emergency managers target resources more efficiently by focusing not only on households in risky environments but also on those with lower evacuation probabilities.

Full report: http://purl.umn.edu/45338.

Ocean Modeling:

Computer Simulations of Strong Currents in the Deep Gulf of Mexico

by Dmitry Dukhovskoy, Assistant Scholar Scientist, & Steve Morey, Associate Scholar Scientist



The simulated velocity of currents over the Sigsbee Escarpment. The red color in the lower region shows the very strong deep currents.

Recent measurements of currents near the ocean bottom along a steep topographic feature in the northern Gulf of Mexico called the Sigsbee Escarpment have recorded very strong speeds (over 1 meter per second).

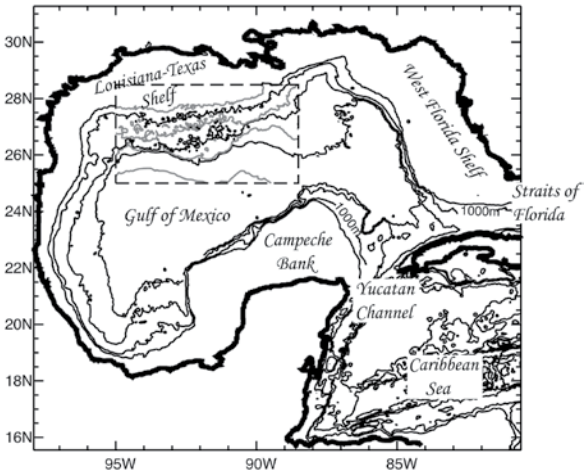
The ocean has typically been thought to be relatively quiet at these depths, but these currents are so strong that they could cause damage to offshore pipelines and drilling rigs, as well as cause difficulties in navigating Remotely Operated Vehicles (ROVs).

The discovery of these episodic strong currents has led to intense observational studies in the area and has sparked interest within the oceanographic community. Both scientific interest and engineering needs require an understanding of what causes these extreme currents and how frequently they occur.

These currents are so strong they could cause damage to offshore pipelines and difficulties in navigating Remotely Operated Vehicles.

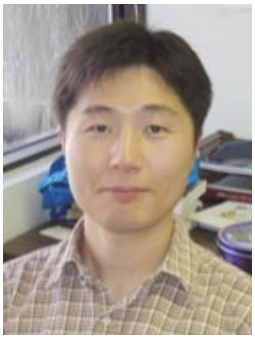
A numerical model can be used to help explain the physical processes in the region and aid in interpreting the observations. However, the very steep slope of the Sigsbee Escarpment (5-20%) poses problems for many ocean models in use today. Our ocean modeling group, in cooperation with modelers from the Navy Research Laboratory, has developed a new numerical modeling technique for simulating the currents in this region.

Numerical simulations are performed with the new ocean model run on FSU's high performance supercomputing cluster. They are able to simulate the strong currents near the bottom of the deep Sigsbee Escarpment. The deep ocean currents in the simulations replicate the prominent dynamic features of the observed intense currents in the region. These simulations are being used to study the intensification of the currents near the bottom, the probability of the currents occurring at different places along the escarpment, and the link between the currents and circulation of the upper ocean.



The Sigsbee Escarpment model domain is located within the rectangle.

Meet A Scientist: *Young-Kwon Lim* (Assistant Scholar Scientist)



When I learned the elementary level of meteorology in my early teens, I was impressed by the basic rules of atmospheric motion (including wind, pressure, and circulation). The desire to know more about this topic drew me to meteorology.

My major duty at COAPS is regional climate simulation and prediction through the improvement of statistical and dynamical climate models. I do this work focusing on the southeast U.S.

In recent years, the natural and human impacts on regional climate are getting significant. For this reason, I enjoy this work very much and am happy with the fact that my work helps the people living in the Southeast to better prepare for normal and abnormal climates.

Alumni Spotlight: *Dawn Petraitis* (M.S. Meteorology, 2006)

I am a Senior Environmental Data Analyst for Science Applications International Corporation (SAIC) working in support of a contract at NOAA's National Data Buoy Center at the Stennis Space Center in Mississippi.

I have a specific focus on the Tropical Atmosphere Ocean (TAO) project, which uses buoys to monitor El Niño/Southern Oscillation (ENSO) conditions. I look at meteorological and oceanographic data which are recorded by each of the 55 buoys in the TAO array and make determinations on whether the data are good or bad. I use outside data sources, such as satellite and model data, to verify the buoy data.

As part of my continuing work in the TAO program, I participated in a buoy service cruise in 2008. This allowed me to understand the buoy hardware and relate it back to shore-side data processing. My trip wasn't just educational, it was also quite enjoyable. I took advantage of life at sea, which included some fishing as well as quiet time for reflection. Being at sea showed me how large the world really is.

If you are an alumnus interested in sharing your experiences, please contact Meredith Field (mfield@coaps.fsu.edu).

Alumni Survey Results

In the summer of 2008, we surveyed former students and staff to find out where they are now and what they're doing. We received responses from across the United States, as well as Brazil, Canada, France, Japan, Mexico, and Norway!

Our alumni list includes professors, directors, oceanographers, meteorologists, research scientists, forecasters, software engineers, and many others.

The organizations which employ the largest numbers of our graduates are NOAA, NASA, the National Weather Service, the U.S. Navy, and the National Center for Atmospheric Research (NCAR).

If you are an alumnus and did not receive a survey, or if your contact information has changed, the survey is posted at www.coaps.fsu.edu/alumni.php.

Stay In Touch

We encourage community members and alumni to stay in touch through the following options:

RSS

Subscribe to the COAPS RSS feed to find out when news items are added to our homepage: www.coaps.fsu.edu/rss.xml.

Email List

Join our email list to be notified about future events and newsletters. Contact: Meredith Field (mfield@coaps.fsu.edu).

Facebook

Our Facebook group is open to anyone with an interest in our research efforts. News items and upcoming events are posted to this group: www.facebook.com/group.php?gid=26925638340.

LinkedIn

Our LinkedIn group is open to current and former COAPS personnel, and is aimed at helping colleagues get in touch with one another: www.linkedin.com/e/gis/822617.

Assistant State Climatologist Melissa Griffin measures rainfall using a rain gauge.

Call for Backyard Meteorologists

If you're a weather enthusiast and would like to collect valuable meteorological data from your backyard, school, or office, please consider joining CoCoRaHS!

CoCoRaHS is the national Community Collaborative Rain, Hail, & Snow network of volunteers who take daily precipitation measurements for a wide variety of natural resource, education, and research applications.

For more information, please contact Melissa Griffin, Co-Coordinator of Florida CoCoRaHS and assistant State Climatologist at COAPS (mgriffin@coaps.fsu.edu, 850.644.0719), or visit www.cocorahs.org.

Hurricane Forecasting

by Henry Winterbottom, PhD Student

A visible satellite image of Hurricane Ivan as it intensifies in the Gulf of Mexico on September 14, 2004. Image credit: NOAA.

During the summer and fall months, hurricanes can be a concern for residents of Florida. In recent years, storms such as Charley (2004), Ivan (2004), and Katrina (2005) have either threatened or impacted Florida directly. When hurricanes make land-fall, they nearly always result in loss of property and, in worst-case scenarios, loss of life.

The National Hurricane Center (NHC) and the Hurricane Research Division (HRD), both in Miami, are actively working on ways to improve forecasts for the track and intensity of hurricanes by furthering the scientific understanding of how hurricanes interact with the environment. This, however, is an exceptionally challenging task, and the research community often relies on the academic community to contribute to the overall knowledge of hurricane science.

At COAPS, scientists collect satellite, ship, and aircraft observations of important hurricane-related variables (such as wind, pressure, and rainfall). We then use these observations within state-of-the-art computer models to study the interactions between the atmosphere and the ocean during hurricanes. These simulations show how ocean feedbacks related to conditions such as sea surface temperature can dramatically impact the strength and path of hurricanes. Warm surface temperatures, for example, provide energy for hurricanes, however, strong winds cool sea surface temperatures by churning up cooler sub-surface waters.

COAPS scientists share their findings during weekly teleconference meetings with NHC, HRD, and other NOAA labs such as the Earth System Research Laboratory (ESRL). These collaborations between the academic (COAPS) and the operational/research (NHC/HRD/ESRL) communities will ultimately improve forecasts of hurricane track and intensity, and will result in a better ability to save lives in the wake of these devastating storms.

Family Activity

How far away is that storm?

Equipment: (1) A thunderstorm, (2) A watch

Steps: (1) After you see a flash of lightning, count the number of seconds until you hear thunder. (2) For every 5 seconds, the storm is one mile away. Divide the number of seconds you count by 5 to get the number of miles.

What's Happening: The lightning and thunder are happening at the same time, but because light travels faster than sound, you may see the lightening before you hear the thunder. If you see the lightning and hear the thunder at the same time, look out!

Do you ever see lightning without hearing thunder? Some call that "heat lightning," but it is really lightning that is over 15 miles away and too far away for you to hear the thunder! *Source: www.eo.ucar.edu/webweather.*

Events

Visit our COAPS booth at these upcoming events:

Saturday, April 18, 10am-3pm: FSU Coastal & Marine Lab Open House

Saturday, May 2: Kidsfest @ The North Florida Fairgrounds

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