

## **Periodic Report: Activities of CIOSS Fellows at the College of Oceanic and Atmospheric Sciences, Oregon State University**

### **November 4, 2005**

**September 18-21:** CIOSS Fellow Pete Strutton attended the University of Washington's Program on Climate Change Summer Institute, held in Leavenworth, WA. Strutton gave a presentation entitled, "What are the impacts of El Nino on the carbon cycle?". This meeting was part of a program focused on the relationship between El Nino and climate change.

**September 28-30:** A number of CIOSS Fellows and their students attended the annual Eastern Pacific Ocean Conference (EPOC), held at Fallen Leaf Lake, California, during September 28-30. Renato Castelao, student of CIOSS Fellow Jack Barth, gave a presentation entitled, "Sea-surface temperature fronts in the California Current System: Observations from geostationary satellite." Timothy Mavor (NESDIS) was a co-author. Fellows Michael Freilich, Dudley Chelton and Curtiss Davis also gave presentations in a session on "Satellite Remote Sensing Primer for the New Millennium" which was co-chaired by CIOSS Director Ted Strub. Their presentations were titled, "Microwave remote sensing of ocean surface wind speed and directions: accomplishments, challenges and predictions" (Freilich), "Summertime influence of sea-surface temperature on the wind stress field over the California Current" (Chelton) and "Monitoring the coastal ocean from geostationary orbit" (Davis). Posters were also presented by CIOSS Fellows and their students: "A high resolution scatterometer-based climatology of wind-stress and wind-stress curl over the California Current, 1999-2005" (Craig Risien, student working with Dudley Chelton); "Satellite-derived climatology and interannual variability in surface ocean fields along the Pacific Northwest" (Roberto Venegas, student working with Ted Strub); "Integration of oceanographic information off the Oregon and Washington coasts in fisheries management: Can we define 'ocean fish habitats'?" (Maria Jose Juan Jorda, student working with Jack Barth).

**October:** CIOSS fellows Pete Strutton (COAS) and Michelle Wood (UO) have received some publicity for their work on Harmful Algal Blooms (HABs). A press release by Mark Floyd at OSU received coverage on Eugene TV and radio, and in several Oregon newspapers. The goal of their project, funded by NOAA's Oceans and Human Health Initiative (OHHI), is to identify and track blooms of toxic phytoplankton species using primarily satellite data. This would serve as an early warning system for coastal managers and have applications for Oregon's commercial and recreational shellfish harvests.

**October:** A collaborative effort between Renato Castelao, CIOSS Fellow Dudley Chelton and Tim Mavor at NESDIS is currently in progress, which is to use high resolution sea-surface temperature gradient fields from the GOES satellite to redo the analysis Chelton did on the

influence of sea surface temperature on the wind stress field over the California Current using data from AMSR-E.

**October:** David Foley, Director of the West Coast CoastWatch node, is working with CIOSS Fellow Dudley Chelton and his student, Craig Risien, to transition to CoastWatch an interactive web site that allows users to access a global, 1 degree wind climatology based on QuikSCAT data. This product was developed by Craig Risien for his MS thesis in the Marine Resource Management program at COAS. This is the first of several projects that CIOSS hopes to contribute to the CoastWatch site.

**October 2-7:** CIOSS Fellows Pete Strutton and Michelle Wood, and Michelle's student, Brittany Scott, attended the 3rd Symposium on Harmful Algae in Pacific Grove, California.

**October 10-15:** CIOSS Director Ted Strub attended the CLIVAR workshop on the South Pacific, held in Concepcion, Chile during October 10-15. The purpose of the workshop was to develop plans for research intended to examine climate variability in the South Pacific. Ted presented a summary of past, present and future satellite capabilities that can be used in these studies. Ted and several other CIOSS/COAS oceanographers are involved in plans for a project called VOCALS, which is a coupled atmosphere and ocean study that will focus on the marine stratus cloud deck off southern Peru and Northern Chile, with field-work in October 2007. After the workshop, Ted met with several of the Chilean and Peruvian scientists to design a coastal component to VOCALS, to look at the influence of the coastal region (both ocean and atmosphere) in influencing the atmospheric and oceanographic characteristics farther offshore under the stratus deck. The role in the coastal ocean and land in producing aerosols and in changing the ocean farther offshore in ways that may affect aerosol production is the primary link between the coast and the region farther offshore.

As part of the South Pacific CLIVAR meeting, a separate working group was created to advance a program called "GRASP" (GOOS Regional Alliance for the Southeast Pacific). The working group was led by Rodney Martinez (Ecuador) and is intended to unite Colombia, Ecuador, Peru and Chile in a GOOS Regional Alliance. Plans for this alliance were developed and these will be presented at the next International GOOS meeting by Rodney Martinez. Ted Strub attended this working group and showed the SST fields and frontal positions from the geostationary satellite that Dave Foley is making available (experimentally) on his CoastWatch/OceanWatch web site. Dave is also making other products available for the region off western South America. The four South American countries have a well developed collaborative structure on other oceanographic projects, including annual coordinated hydrographic cruises and a system of tide gauges (some with automated reporting) that has been recently upgraded to form an extensive system stretching from Colombia to southern Chile. This established, international alliance represents a good opportunity for development of a pilot observation system off western South America, in collaboration with CoastWatch/OceanWatch and CIOSS.

**October 26-27:** CIOSS Administrative Specialist and Grants Accountant, Amy Vandehey and Carol Wallace respectively, attended a Cooperative Institute (CI) Administrator's Meeting held at CREST in New York on October 26-27. This meeting provided an opportunity for the CI Administrative personnel to meet and become more familiar with the structure of other institutes. In addition, common issues, such as CIOSS' upcoming 5-year formal review, were discussed. Action items that came out of the meeting discussions included improved communications on both the CI and NOAA sides, ways to make proposals move more quickly through the Grants Management Division, and the sharing of an example of the new annual report format. Mark DeMaria will be posting presentations and action items from the meeting on the web.

**October 31:** Renellys Perez, a student working with CIOSS Fellow Bob Miller, successfully defended her doctoral dissertation: Numerical and Assimilative Studies of the Equatorial Pacific Cold Tongue. CIOSS Fellows Dudley Chelton and John Allen were on her committee. The following is a short summary of her dissertation:

A four-dimensional multivariate data assimilation scheme was developed with the goal of obtaining a better understanding of surface mixed layer temperature balance in the cold tongue on interannual to intraseasonal timescales during August 1999 to July 2004. Using a reduced state space Kalman filter, the assimilation scheme combines a nonlinear general circulation model driven by QuikSCAT satellite winds with Tropical Atmosphere Ocean dynamic height anomalies. Assimilation improved the interannual and intraseasonal variability of sea surface height and the seasonality, zonal structure, spectral properties, and phase propagation of TIWs. Flaws in the model mean state and seasonal cycle limited the ability of the anomaly-for-anomaly assimilation scheme to improve the surface mixed layer temperature balance in the eastern equatorial Pacific. Future assimilation experiments will need to resolve these issues by using better numerical models, applying bias-correction algorithms, improving the heat flux specification, or constructing forecast error models that incorporate heat flux errors.

**November:** A proposal is in the process of being submitted to the GOES-R Risk Reduction Effort (Paul Menzel) for research by the COAST (Coastal Ocean Applications and Science Team), led by Curt Davis at CIOSS. This multi-institutional team is planning to collect hyperspectral optical data (in situ and aircraft) over a three year period at three locations, characteristic of different sites along the U.S. coast: off Monterey, California (2006); New Jersey and New York (2007); and the Gulf Coast (2008). These data sets will allow the team to simulate data that will be collected by the HES-CW (Coastal Waters imager) on GOES-R, in order to develop algorithms for various applications for HES-CW. The team is also providing guidance in the design specifications for HES-CW.

**Peer-Reviewed Papers (in press and in progress):**

Flow-topography interactions in the northern California Current System observed from geostationary satellite data, by Renato M. Castelao, John A. Barth and Timothy P. Mavor. Geophysical Research Letters, in press.

Sea-surface temperature fronts in the California Current System from geostationary satellite observations, by Timothy Mavor, Renato Castelao, John Barth and Laurence Breaker. To be submitted to Journal of Geophysical Research.

Upwelling around Cabo Frio, Brazil: The importance of the wind stress curl, by Renato Castelao and John Barth. To be submitted to Geophysical Research Letters.

Additional activities of CIOSS Fellows working at NESDIS/STAR are reported separately in the STAR weekly reports.