

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

### **January 24, 2006**

**Nov 1-3:** CIOSS Fellow Pete Strutton and Hemantha Wijesekara attended the 2nd workshop on Autonomous Lagrangian platforms and Sensors (ALPS-II) in Skamania Lodge, WA. See <http://optics.dmc.maine.edu/ALPS/>

**January 9-13:** CIOSS Director Ted Strub and many other researchers and students from OSU attended a NE Pacific (NEP) GLOBEC meeting in Seattle, WA this week. The meeting's first main objective was to provide project progress (status) reports to the scientific investigators involved in GLOBEC NEP synthesis, and to provide status reports on the online availability of data. The second major objective was to discuss future synthesis, including what kind of coordinated multi-project steps need to be undertaken in the next year to further NEP synthesis. During the meeting, Ted Strub stepped down as Chair of the NEP Executive Committee and Nick Bond was chosen as new Chair.

**January 13:** CIOSS Fellow Jack Barth's student, Anthony Kirincich, a Ph.D. Candidate Physical Oceanography, presented a seminar entitled, "Spatial and temporal variability of inner-shelf circulation along the central Oregon coast during summer".

#### **Abstract:**

The nature and variability of inner-shelf circulation along the central Oregon coast is examined using measurements obtained in water depths of 15 m during the summer of 2004. Although wind forcing and inner-shelf bathymetry are spatially uniform in the region, a comparison of velocity and pressure anomaly from 4 along-shelf locations reveal distinct differences in circulation. Upwelling circulation at the northernmost station, north of an offshore submarine bank, is similar to classic two-dimensional (2D) upwelling with bottom stress and acceleration balancing the along-shelf wind stress. Along-shelf velocities here are strong with large variations in magnitude and direction. In contrast, circulation at the southern 3 stations, all in-shore of the bank, is weaker and prone to large reversals under downwelling conditions. At these sites, the 2D balance is poor during upwelling winds and inclusion of the pressure gradient and nonlinear terms aids the along-shelf momentum balance. During downwelling conditions the 2D balance holds well at the southern sites, but poorly at the northern site. Pressure anomalies are similar early in the season, but differences between the on-bank and off-bank stations grow over time, despite similar hydrographic conditions. An empirical orthogonal function analysis of pressure and along-shelf velocity finds two important modes. The first, explaining some off-bank but all on-bank variability, is associated with the local wind forcing. The second, matching density variations in the region, explains the bulk of the

off-bank variability, and is similar to a weighted function of the local winds. Much of the temporal and spatial differences observed results from the large-scale upwelling circulation's encounter with the offshore bank. Due to flow-topography interactions, the on-bank stations are sheltered from the larger upwelling circulation offshore and to the north. A new, weak upwelling jet develops at the on-bank inner-shelf locations and strengthens to the south. These results agree favorably with previous outer- and mid-shelf studies conducted in the region, while offering new insight into interactions in the inner-shelf. The variability shown here has large ecological implications and begins to explain known along-shelf differences in onshore production in the region.

**January 17:** Natalie Perlin, who is partially funded by CIOSS and advised by CIOSS Fellows Roger Samelson and Eric Skillingstad, presented the following seminar: "Numerical study of idealized upwelling conditions off the Oregon coast using a coupled ocean-atmosphere model".

**January 23:** The proposal to fund FY06 GOES-R Risk Reduction activities for the HES-Coastal Water imager was submitted to NESDIS by Curt Davis. Activities of the multi-institutional COAST (Coastal Ocean Applications and Science Team) members will focus on a field experiment in Monterey Bay in Fall, 2006. Data from this field experiment will provide the first of three data sets designed for algorithm development and evaluation for the HES-CW sensor.

**January 24:** CIOSS Fellow Jim Coakley's student Guang Guo gave a presentation entitled, "Surface measurements and satellite-derived estimates of surface radiative fluxes in the northeastern Pacific".

**January 26:** Craig Risien, a Master's degree student of CIOSS Fellows Jim Good and Dudley Chelton, is defending his thesis in Marine Resource Management entitled, "A Satellite-Derived Climatology of Global Ocean Winds". Craig's electronic climatological wind atlas is being transitioned to the west coast CoastWatch site in Monterey.

**January 27:** Maria Jose Juan Jorda and Angel White gave presentations as part of the COAS Student Seminar Series. Maria is a M.S. Candidate in Marine Resource Management, advised by CIOSS Fellows Jack Barth and Jim Good. The title of her presentation was, "Integration of Oceanographic Information off the Oregon and Washington Coasts into West Coast Groundfish Ecology and Fisheries Management" (see Abstract below). Angel is a Ph.D. Candidate in Biological Oceanography, advised by CIOSS Fellows Ricardo Letelier and Yvette Spitz. The talk she gave was entitled, "Nitrogen Fixation in Summertime Surface Waters of the Gulf of California".

**Abstract:**

"Integration of Oceanographic Information off the Oregon and Washington Coasts into West Coast Groundfish Ecology and Fisheries Management"

Maria Jose Juan Jorda and John A. Barth

This work is an attempt to incorporate oceanographic information into fisheries management. To date, the use of oceanographic data in fisheries management has been minimal due to scarcity and the difficulty of accessing complete oceanographic datasets. Consequently, fish stocks are managed with limited knowledge about the habitat where fish live and incomplete understanding of what oceanographic conditions affect their populations.

This inadequate scientific knowledge among other factors has led to the management failure of the West Coast groundfish fishery. With the long term goal to improve the management of the groundfish fishery, this study assembles and merges oceanographic information off the Oregon and Washington coasts to investigate if there are particular ocean habitats associated with four different groundfish species with different life history. The fish data consist of NOAA NWFSC's West Coast Groundfish 2004 Survey and the oceanographic data are comprised of temperature, salinity, chlorophyll concentration, and ocean current velocity from a variety of sources (satellite sensors, conductivity-temperature-depth instruments, acoustic Doppler current profilers and high frequency radars located on the coast) from the earliest time possible to the year 2004. Climatological monthly means and standard deviations for each of the oceanographic variables have been computed at various depths for the cold regimes (1946-1977, 2000-2004).

The oceanographic and fish data are being organized in a GIS system, so that it may be combined with benthic habitat information. Work is in progress to carry out a statistical analysis between the oceanographic and fish data.

**Jan 29 – Feb 2:** CIOSS Fellow Eric Maloney and graduate student Larry O'Neill (student of CIOSS Fellow Dudley Chelton) will present papers at the AMS meeting in Atlanta. Eric Maloney's presentation is entitled, "10.10 Ocean-atmosphere interactions over the east Pacific warm pool associated with the boreal summer intraseasonal oscillation". Larry O'Neill's presentation is entitled, "Upper-ocean response to small-scale wind forcing in the Agulhas Return Current"

**Peer-Reviewed Papers by CIOSS Fellows and their students (published, accepted and submitted):**

Waliser, Duane E.; Murtugudde, Ragu; **Strutton, Peter**; Li, Jui-Lin.

Subseasonal organization of ocean chlorophyll: Prospects for prediction based on the Madden-Julian Oscillation. *Geophys. Res. Lett.*, Vol. 32, No. 23, L23602

<http://dx.doi.org/10.1029/2005GL024300> 03 December 2005

## CIOSS/COAS Students and their area of interest/title of projects

**Renato Castelao:** Research topic - Sea surface temperature fronts in the California Current System from geostationary satellite observations. Partially funded by CIOSS and advised by Jack Barth.

<http://www.coas.oregonstate.edu/index.cfm?fuseaction=faculty.detail&id=233>

**Wiley Evans:** Thesis title - "Ecological and Chemical Responses to Tropical Instability Waves in the Equatorial Pacific". Advised by Peter Strutton. More information can be found at

[http://bioloc.oce.orst.edu/strutton/people\\_wiley.htm](http://bioloc.oce.orst.edu/strutton/people_wiley.htm)

**Maria Jose Juan Jorda:** M.S. Candidate in Marine Resource Management. Thesis title - "Integration of Oceanographic Information off the Oregon and Washington Coasts into West Coast Groundfish Ecology and Fisheries Management". Advised by Jack Barth and Jim Good.

<http://www.coas.oregonstate.edu/index.cfm?fuseaction=faculty.detail&id=262>

**Julie Keister:** Ph.D. candidate in Biological Oceanography. Thesis title is not set, but may be something like: "Effects of mesoscale circulation on zooplankton distributions in the northern California Current". Advised by Tim Cowles and Ted Strub.

<http://www.coas.oregonstate.edu/index.cfm?fuseaction=faculty.detail&id=263>

**Anthony Kirincich:** Research topic - Inner-shelf circulation along the central Oregon Coast. Paper - Wind-driven inner-shelf circulation off central Oregon during summer. (JGR v110 c10s03 doi: 10.1029/2004JC002611). Advised by Jack Barth.

<http://www.coas.oregonstate.edu/index.cfm?fuseaction=faculty.detail&id=266>

**Sam Laney:** Research topic - optical methods of assessing phytoplankton ecology. Please see his website ( <http://oregonstate.edu/~laney/>) for more information about his research and publications. Advised by Ricardo Letelier.

**Larry O'Neill:** Thesis title - "Small-Scale Ocean-Atmosphere Interactions: Observations and Modeling of Atmospheric and Oceanic Responses ". Papers and presentations can be found in his CV, located on his web page, <http://numbat.coas.oregonstate.edu/~loneill> . Advised by Dudley Chelton.

**Craig Risien:** Thesis title - "A Satellite-Derived Climatology of Global Ocean Winds" and it can be accessed online at <http://numbat.coas.oregonstate.edu/cogow/>. Advised by Dudley Chelton.

**Andrea Schuetz:** Research deals with the assessment of cloud properties retrieved for partly cloudy imager pixels. She will be comparing the properties retrieved using a partly cloudy

retrieval scheme to cloud properties derived from 250-m resolution MODIS observations.  
Advised by Jim Coakley.

<http://www.coas.oregonstate.edu/index.cfm?fuseaction=faculty.detail&id=704>

**Emily Shroyer:** Currently, she does not have a thesis topic. She is working with Jim Moum, studying bottom propagating bores off the Oregon Coast and is interested in the energetics associated with these events.

<http://www.coas.oregonstate.edu/index.cfm?fuseaction=faculty.detail&id=636>

**Angel White:** Ph.D. Candidate in Biological Oceanography. Thesis title - "Nitrogen Fixation in Summertime Surface Waters of the Gulf of California". Advised by Ricardo Letelier and Yvette Spitz.

<http://www.coas.oregonstate.edu/index.cfm?fuseaction=faculty.detail&id=322>

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