2012

Internal Chronology: Activities of CIOSS Fellows at the College of Oceanic and Atmospheric Sciences, Oregon State University

updated January 26, 2013

*CIOSS Fellows are in bold.

January-December: Milestones for projects funded in FY12 and FY13 are submitted to NOAA program managers throughout the year, and can be found on the CIOSS website at: http://cioss.coas.oregonstate.edu/CIOSS/milestones.html

January 3: An annual CIOSS "Hot Item" was submitted to NOAA for publication on their website. The article (copied below) can be viewed at: http://www.nrc.noaa.gov/ci/hotitems/2012/cioss-01.html

CIOSS Installs New Direct Broadcast Satellite Dish on the West Coast

A new 3-meter satellite dish was installed in September 2011 on the Oregon State University campus in Corvallis, Oregon. This dish tracks earth-observing satellites as they pass overhead, receiving data of the western United States in real time. The reception, processing, and distribution of data in near real time from the sensors onboard is essential for guiding fieldwork and monitoring events such as wildfires, oil spills, and harmful algal blooms.

Background: Oregon State University has operated a direct broadcast station since November 2000. Until very recently, it was the only non-commercial direct broadcast station on the U.S. West Coast. After eight wet winters, the original satellite dish succumbed to corrosion and became inoperable. Recent funding from the National Oceanic and Atmospheric Administration (NOAA) granted to the Cooperative Institute for Oceanographic Satellite Studies (CIOSS) aided in the purchase of a new weatherproof state-of-the-art satellite dish.

Significance: The timing of this installation was critical for two reasons. (1) Exactly one month after the installation, a satellite was launched carrying the prototype for the new earth-observing sensor called VIIRS (Visible Infrared Imaging Radiometer Suite), which will provide future data for ocean surface temperature and bio-optics. The Oregon station will collect data for the entire U.S. West Coast and contribute to the evaluation and testing of direct broadcast downlinks from this new sensor. Collaboration on cal/val efforts with the National Aeronautics and Space Administration (NASA) in this endeavor is currently underway. (2) NOAA has substantial interest in obtaining real-time ocean color data from as many sensors as possible. An agreement between the Indian Space Research Organization and NOAA/NASA is being finalized. This agreement will allow access to direct broadcast data from an ocean color sensor aboard the satellite OCEANSAT 2. The Oregon State University satellite dish is routinely tracking this satellite and is prepared to receive the data when available. These activities support the NOAA Mission Goals: Healthy Oceans and Climate Adaptation and Mitigation.

Contact Information: Ricardo Letelier and Jasmine Nahorniak, Oregon State University, http://sugar.coas.oregonstate.edu/MODIS/IPOPP/.

January 17: Angel White gave a seminar entitled, ""Ecology of Harmful Algal Blooms in the California Current System" as part of the Ecological & Evolutionary Biology Seminar Series.

2012

January 17: Mark Abbott gave a seminar entitled, ""Knowledge Ecosystems: Data-Intensive Science is More than Speeds and Feeds" as part of the GEM Geospatial Intelligence and Planning Seminar Series.

January 30: The CIOSS Year 9 Annual Progress Report was completed and turned in through NOAA Grants Online.

February 3: The Winter SMILE Highschool Teacher Workshop was held at LaSells Stewart Center on the OSU campus.

February 6: **Ted Strub** and Amy Vandehey met with Mark McCulloch (a local fisherman) to discuss having a continued dialogue between ocean modelers and local fishers. This was part of an ongoing effort to improve existing ocean models (some hosted on the NANOOS website) by comparing them with in situ observations, and incorporating feedback. It also serves to foster a scientific collaboration with local fishers.

February: Angel White was named an Alfred P. Sloan Research Fellow in Ocean Sciences for 2012.

February 20-24: Many representatives from CIOSS attended the biannual Ocean Sciences meeting in Salt Lake City, UT. Amy Vandehey, along with co-authors **Ted Strub, Alexander Kurapov,** Peng Yu, Sarah Mikulak, and Craig Risien prepared a poster on fishermen and ocean modeling interactions. The title was, "Science Spilled in the Grass Roots: Bottom Up & Top Down Discovery, A Community Builds Itself Around Common Needs & Common Tools." Ted Strub gave a related talk, focusing on the organic relationship between oceanographic products that are posted on the internet, and the fishermen that find and use them for their purposes.

March 19-21: Ted Strub and Amy Vandehey attended the annual All NOAA CI Meeting was held in Silver Spring, MD. The Directors were able to meet with the NOAA Research Council, receive updates from the OAR Assistant Administrator, and discuss Task I and other budget issues. The Administrators were able to attend the Directors meeting this year, but then separated and focused on the specifics of managing a consortia, and topics regarding Grants Management Division.

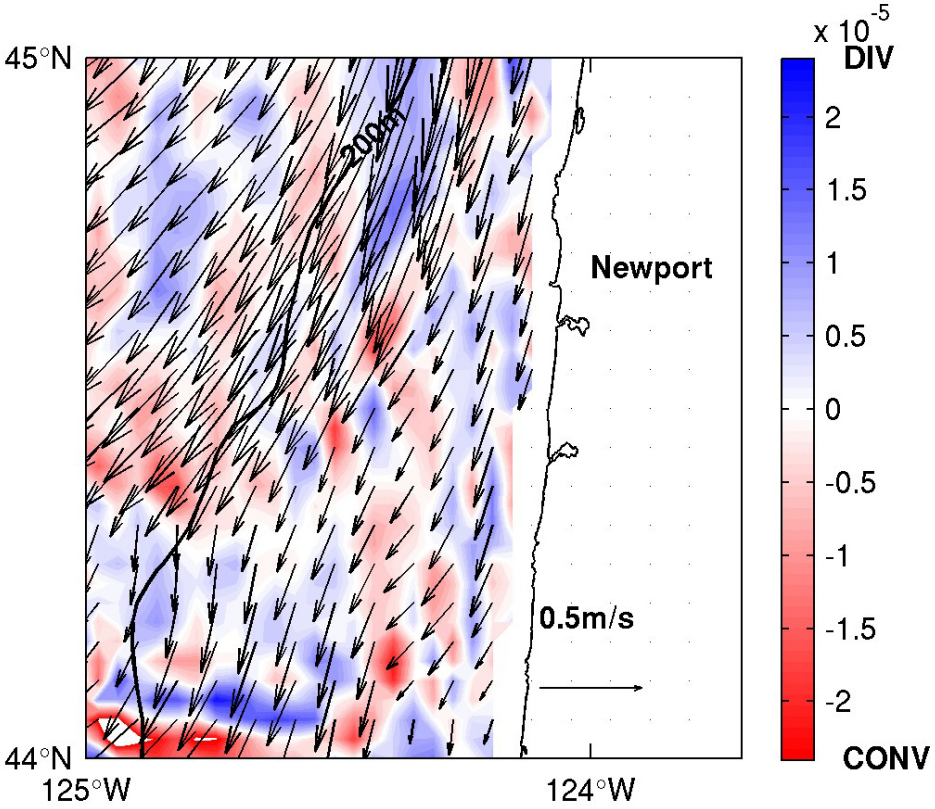
March 31: Ted Strub and Amy Vandehey joined Sarah Mikulak (NANOOS Informal Education Specialist) at the annual Saltwater Sportsman Show in Salem – a tradeshow event for local fishers in Oregon. Sarah organized a booth to showcase NANOOS oceanographic products, which are hosted on their website. One particular page on the site packages their oceanographic products for tuna fishermen, showing modeled, forecasted ocean conditions for chlorophyll, waves and temperature within a certain range (http://www.nanoos.org/data/products/tuna_fishers/tuna_fishers.php). **Alexander Kurapov** and his group produce the nowcast, and 1 and 2 day forecast models which are then incorporated into the information presented on the site. The goals of attending the show were to introduce a wider audience of fishers to these products, receive feedback to improve the products from those that had already accessed this website, and ask about the utility of a potential new product, such as divergence and convergence fields. Excerpts from the show handout can be seen below.

Get Involved!

1) We're interested in working with the fishing community to make new model/forecast products that would help you. Would you like to help with the research for new model data products to make them more useful, such as the convergence fields you see below?

2) We're also interested in providing a workshop so that the fishing community can directly interact with the scientists involved in creating these models. Would you be interested in attending a workshop in the Spring to learn more about current and possible future model data products?

RED = CONVERGENCE **BLUE = DIVERGENCE**



Close-up of model forecast for area of convergence and divergence on September 8, 2011 off the Oregon coast, centering on Newport.

April 12-13: The annual SMILE High School Challenge event was held at Western Oregon University and Oregon State University. Assistance in various capacities was provided by **Ted Strub**, Amy Vandehey, Morgaine McKibben, **Angel White** and Katie Watkins-Brandt from CIOSS. The theme this year was Harmful Algal Blooms, and the event itself mainly focused on how to communicate science and risk to the public. Students experimented with social media (such as podcasts) and other more typical media to share their message.

2012

June 5-6: Ted Strub attended the NESDIS CI Director's Meeting in the Washington DC area. He took advantage of the trip to strengthen OSU's scientific collaborations with CIC-MD, meeting with their directors and fellows, and giving an informal seminar highlighting a number of exciting projects underway at CEOAS.

June-September: During 2012, CIOSS requested that the CREST program identify a student to participate in the OSU summer REU (Research Experience for Undergraduates) program. Shakila Merchant identified one of the applicants to the CREST REU program, Coleen Brown. Ms. Brown spent 3 months in Corvallis working with **Ted Strub** and Corinne James on a project analyzing satellite surface wind fields along the Oregon coast.

July 26: A meeting of the local CIOSS Council of Fellows was convened. Meeting attendees: **Jack Barth, Hal Batchelder, Dudley Chelton, Curt Davis, Ricardo Letelier, Ted Strub** and Amy Vandehey. Ted summarized NOAA's decision to not continue using a Cooperative Institute for Ocean Remote Sensing. The reasons given to us were: (1) Research funding in NESDIS is decreasing; and (2) Operational demands on NESDIS/STAR are increasing. NOAA program managers have stated their interest in continuing the ongoing projects at CIOSS that benefit NOAA and OSU, with funding channeled through CICS-M since OSU is a named partner in that consortia.

August 7-9: The SMILE Summer Teacher Workshop was held at LaSells Stewart Center. Alicia Christensen led the high school teachers (aided by Amy Vandehey) in demonstrating the club activities, with a focus on marine debris (what is it?, where does it come from?, what effects does it have on wildlife and the environment (especially with regards to invasive species)?). Physical factors, such as the effects of wind and currents on marine debris movement, will also be considered, as well as, how satellite oceanography and modeling can be used to help us better understand the trajectory of marine debris.

September 20-29: With funds from the STAR Laboratory of Satellite Altimetry, CIOSS administered the selection of logistics of sending young researchers to attend various altimetry meetings held in Italy (see Project 13 for more details). The main Symposium was held over 6 days from September 24-29, in Venice-Lido, Italy, while the annual meeting of the Ocean Surface Topography Science Team (OSTST) overlapped during September 27-29 at the same venue. In addition, the sixth Coastal Altimetry Workshop (CAW-6) was held during Thursday and Friday of the previous week (September 20-21) in Riva del Garda, Italy.
Those sponsored by CIOSS and NESDIS/STAR/LSA [with their guiding professor(s) in parentheses if applicable] are:

- Carolyn Roesler (W. Emery, University of Colorado)
- Ganesh Gopalakrishnan (B. Cornuelle, Scripps Institute of Oceanography)
- Jinting Zhang (K. Kelly, L. Thompson, University of Washington)
- Kuo-Hsin (Steven) Tseng (C.K. Shum, Ohio State University)
- Junkun Wan (C.K. Shum, Ohio State University)
- Richard Yablonsky (University of Rhode Island)
- Uriel Zajaczkovski (S. Gille, Scripps Institute of Oceanography)
- YK Somayajulu (National Institute of Oceanography, India)

Posters presented at this workshop will be available in early 2013 at www.coastalt.eu. A summary of the CAW-6 Workshop Recommendations can be found at http://www.coastalt.eu/news/recommendations-6th-coastal-altimetry-workshop. The results of the workshop were presented at the Symposium Plenary and the presentations can be found at http://multimedia.esa.int/Videos/2012/09/20-Years-of-Progress-in-Radar-Altimetry-Symposium-part-2. Posters and presentations by these attendees of the OSTST meeting can be found at http://www.aviso.oceanobs.com/en/courses/sci-teams/ostst-2012/.

September 24-25: Phil Arkin (Director of CICS) visited Corvallis and CIOSS and met with **Mark Abbott**, Rick Spinrad, **Ted Strub** and several other CIOSS Fellows. The purpose of the visit was for Phil to meet with CIOSS Fellows and talk about possible ongoing future projects and collaborations with NOAA and colleagues at the University of Maryland and the University of North Carolina (NOAA National Climate Data Center).

October 4-5: The NESDIS CI Administrator's Meeting, which typically rotates around to all of the Institutes, was combined with the OAR and NMFS CI Administrators. This year it was hosted by Tracy Reinke at CIMMS in Norman, OK. Several NOAA representatives were in attendance. Discussion topics included: Uniformity of Budgets, Proposal Processing Time, GMD, Progress Reports, the FY13 Budget Outlook, Transition to Renewal Award, Closeout Awards, Consortia – Managing Information Required for Reports, and Information Requests.

October 10: Amy Vandehey relocated to Honolulu, HI, but continues to work remotely part time as CIOSS' Administrative Specialist.

October 30: Roger Samelson gave a seminar entitled, "'"Stochastic models of eddy lifecycles" as part of the Physics of Oceans and Atmospheres Seminar Series.

November 13: On October 15, SMILE was one of 24 organizations honored by the U.S. Department of Education and the Corporation for National and Community Service as Together for Tomorrow Challenge winners for the 2012-2013 school year. The award recognizes community-led partnerships whose goal is assisting struggling schools. SMILE was the only statewide rural program focused on STEM (Science, Technology, Engineering and Math) honored at the event. A news article was published on the OSU website to highlight the SMILE program, and their receipt of this prestigious reward: http://oregonstate.edu/dept/ncs/lifeatosu/2012/smile-gives-students-confidence-boosts-stem-skills/.

November 29: The SMILE office convened a planning meeting for the High School Marine Debris Challenge in April 2013. Meeting participants included: **Ryan Collay**, Susan O'Brien, Jenny de la Hoz, Craig Risien, **Dave Foley**, Shawn Rowe, Bob Lillie, **Ted Strub**, and Amy Vandehey. Susan and Jenny are Science and Math Education doctoral students that are in charge of the curriculum development for the teacher workshops and challenge event. Susan brought everyone up to speed on what had been accomplished thus far in terms of curriculum and preparation. The bulk of the meeting was focused on ideas, design and decision-making for the student product at the challenge event.

December 5: Alex Kurapov has been running 2-day forecasts of ocean currents, temperatures, and salinities for a few years. Those forecast fields are made available by NANOOS, the Pacific NW Regional Association of IOOS. Recreational tuna fishers have been using those forecasts for a couple of years, even producing a tutorial to show others how to use the fields. There are other fields on the NANOOS site, such as **Mike Kosro**'s surface currents from the radars and satellite images. We have a new Marine Resource Management student, Colin Duncan, who is working with Flaxen Conway to try to interact with a wider range of fishers to make them aware of the information that is available on the NANOOS site and also to get their input as to what further information they would like to have available. Craig Risien is the local Faculty Research Assistant who has been the one to place the model fields on the NANOOS site. On December 5, Flaxen, Craig and Colin met with local fishers in Newport to demonstrate the NANOOS information site and get more feedback from the fishers. This type of activity will continue and increase in the future. This is an example of how University research is affecting, and being affected by, a set of Oregon citizens and "small business owners" (the fishers).

December 10-12: Jay (Julian P.) McCreary from the IPRC at University of Hawaii visited Ted Durland, **Ted Strub** and others at CEOAS. Over the past 35 years, Jay has repeatedly produced seminal work advancing our understanding of equatorial, subtropical and coastal dynamics. As part of his visit, Jay gave one of the Physics of Oceans and Atmospheres seminars entitled, "Dynamics of the oxygen minimum zones in the North Indian Ocean."

Abstract:
In the Indian Ocean, mid-depth oxygen minimum zones (OMZs) occur in the Arabian Sea and the Bay of Bengal. The lower part of the Arabian Sea OMZ (ASOMZ; below 400 m) intensifies northward across the basin; in contrast, its upper part (above 400 m) is located in the central/eastern basin, well east of the most productive regions along the western boundary. The Bay of Bengal OMZ (BBOMZ), although strong, is weaker than the ASOMZ. To investigate the processes that maintain the Indian-Ocean OMZs, we obtain a suite of solutions to a coupled biological/physical model. Its physical component is a variable-density, 6.5-layer model, in which each layer corresponds to a distinct dynamical regime or water-mass type. Its biological component has six compartments: nutrients, phytoplankton, zooplankton, two size classes of detritus, and oxygen. Because the model grid is non-eddy resolving (0.5°), the biological model also includes a parameterization of enhanced mixing based on the eddy kinetic energy derived from satellite observations. To explore further the impact of local processes on OMZs, we also obtain analytic solutions to a one-dimensional, simplified version of the biological model. Our control run is able to simulate basic features of the oxygen, nutrient, and phytoplankton fields throughout the Indian Ocean. The OMZs result from a balance, or lack thereof, between a sink of oxygen by remineralization and subsurface oxygen sources due primarily to northward spreading of oxygenated water from the Southern Hemisphere; other sources from marginal seas (Red Sea, Persian Gulf, and the Indonesian Throughflow) have little impact. The northward intensification of the lower ASOMZ results mostly from horizontal mixing since advection is weak in its depth range. The eastward shift of the upper ASOMZ results primarily from enhanced advection and vertical eddy mixing in the western Arabian Sea, which spread oxygenated waters from the Southern Hemisphere northward and from the ocean surface downward, respectively. The model BBOMZ is weaker than the ASOMZ because the wind forcing is weaker and the near-surface

stratification is greater in the Bay, both of which weaken nutrient entrainment and, hence, surface production there. Although the source of detritus varies significantly throughout the year, the ASOMZ exhibits a weak (almost no) seasonal cycle because it lies in a region where oxygen sources are weak.