

Periodic Report: Activities of CIOSS Fellows at the College of Oceanic and Atmospheric Sciences, Oregon State University
August 10, 2006

Recent Recognitions, Nominations and Honors of CIOSS Fellows and students

Mark Abbott was nominated by the President to serve on the National Science Board.

Curt Davis received the 2005 Presidential Rank of Meritorious Senior Professional Award. Annually, the President recognizes a small group of career senior executives with the President's Rank Award for exceptional long-term accomplishments. This award recognized Curt as a pioneer in the development and use of hyperspectral imagers.

Jim Good received the top career award given by the national Sea Grant Extension organization. He was presented the William Q. Wick Visionary Career Leadership through Programming Award at the biennial national meeting of Sea Grant Extension program leaders.

Renato Castelao, a recently defended graduate student of CIOSS Fellow **Jack Barth**, received the 2006 Distinguished Dissertation Award, which recognizes scholarly achievement by a doctoral degree recipient whose dissertation makes an unusually significant contribution to a discipline in mathematics, physical sciences and engineering. His dissertation, "Coastal Ocean Response to Alongshore Variations in Topography and Wind Forcing," has been advanced as OSU's nominee for consideration in the national Distinguished Dissertation Award competition sponsored by the Council of Graduate Schools and Univ. Microfilms International.

May 19: Chris Wolfe, a PhD candidate in Physical Oceanography under CIOSS Fellow **Roger Samelson**, presented "Quantifying Linear Predictability" as part of the COAS Student Seminar Series.

ABSTRACT

One compelling explanation for the apparent randomness of atmospheric and oceanic motions is that small changes in the initial, boundary, and forcing conditions are amplified by instabilities of the fluid motion. This is the so-called sensitive dependence on external conditions often associated with nonlinear dynamical systems. Several techniques have been developed to quantify the linear predictability

of systems subject to sensitive dependence on external conditions. In this presentation, we will briefly describe two ways of describing linear disturbance growth based on these techniques: singular vectors and Lyapunov vectors. In addition, we will very briefly outline recent work on an efficient algorithm for recovering Lyapunov vectors from singular vectors.

June 2: Two students under CIOSS Fellows gave presentations as part of the COAS Student Seminar Series. **Angkana Rawichutiwan**, a Marine Resource Management MS student under CIOSS Fellow **Jim Good**, presented "School Group Use of Oregon's Rocky Intertidal Areas: Use, Impacts and Management" (abstract 1). **Chris Hayes**, an Atmospheric Sciences MS student under CIOSS Fellow **Jim Coakley**, presented "Characterizing near cloud aerosol retrievals using CALIPSO and MODIS data" (abstract 2).

ABSTRACT (1)

School groups from all over Oregon use rocky intertidal field trips as a highlight of their biology curricula. However, there are no comprehensive studies of how many school groups take such field trips each year; where they tend to go and why; and how students are prepared for the trips, particularly with respect to protection of sensitive resources. This study is designed to address these data gaps. It is part of Oregon's ongoing effort to provide appropriate recreational and educational opportunities for its citizens and other visitors, while protecting and conserving its rocky shore resources. This project is done with the assistance and advice of the Oregon Parks and Recreation Department and will contribute to its Rocky Shores Management Strategy.

This study is composed of three parts. The first part is the literature review on the vulnerability of rocky shores to intensive visitor use. One or more rocky shore scientists will be interviewed as part of this process. The second part is the interview of managers of coastal rocky shore and intertidal areas to estimate rocky shore use by school groups. The third part is the interview of school teachers who arrange the field trips on rocky intertidal areas. Finally, data from the three sources above will be integrated to estimate rocky shore use pressures by school groups along the Oregon coast and potential management measures that could be implemented to minimize adverse impacts of this use.

ABSTRACT (2)

A major problem in climate prediction is modeling how aerosols affect clouds. The effect is known as the aerosol indirect radiative forcing.

Several studies have attempted to use satellite imagery to infer the magnitude of this forcing. These studies show that as aerosol optical depth increases, cloud droplet

radius decreases and cloud optical depth increases, consistent with the aerosol indirect effect. The observed correlations between aerosol burdens and cloud properties, however, fail to account for a number of physical processes that could also give rise to the observed behavior. One of these processes is the illumination of aerosols by sunlight scattered by clouds, enhancing aerosol reflectivity and thus their apparent optical depth. The recently launched CALIPSO satellite carries a space based lidar for probing the near cloud aerosol without being influenced by light scattered from nearby clouds. Retrieved cloud and aerosol backscatter profiles will give a vertical profile of the atmosphere and when combined with MODIS observations will give a much more accurate characterization of aerosols near the clouds. Lidar inversion schemes are being studied to learn how aerosol returns and optical depths retrieved from MODIS can be used to better characterize aerosols near clouds.

June 14: Matt Segrin, a Master's degree student of CIOSS Fellow **Jim Coakley**, defended his thesis in Atmospheric Sciences entitled, "Using Ship Tracks to Characterize the Effects of Haze on Cloud Properties".

June 23: Guido Corno, a PhD student of CIOSS Fellows **Mark Abbott** and **Ricardo Letelier**, defended his thesis in Biological Oceanography entitled, "Primary Production dynamics in the North Pacific subtropical gyre". Also, **Wiley Evans**, a Master's degree student of CIOSS Fellow **Pete Strutton**, defended his thesis in Biological Oceanography entitled, "Impacts of Tropical Instability Waves on Chlorophyll and Nutrient Distributions in the Equatorial Pacific".

June 28-29: The fourth COAST workshop, organized by CIOSS Fellow **Curt Davis**, was held in Monterey, CA to plan the first field program, which will take place there in September, 2006. This is part of the planning for a series of field experiments in different types of U.S. coastal waters to collect hyperspectral remote and in situ data sets that can be used to develop and test algorithms for use with the HES-CW sensor. The agenda for this meeting is available on the CIOSS website (http://cioss.coas.oregonstate.edu/CIOSS/workshops/COAST_meeting4/Final_Agenda_COAST.html).

July 18-19: A Review of MOBY Replacement Advanced Hyper-spectral Autonomous Buoy (AHAB) Design and Plans for Implementation was held at NIST in Gaithersburg, MD. The meeting objectives were to review the MOBY background, review the Research and Operations progress, and to describe a future vision and design for a new instrument. CIOSS Fellow **Curt Davis** is chairman of the Review Team. The agenda for this meeting is available on the CIOSS website

http://cioss.coas.oregonstate.edu/CIOSS/workshops/MOBY_review_meeting_06/Final_Agenda_MOBY-AHAB.html).

August 9: The Summer SMILE Highschool Teacher Workshop was held in Corvallis, OR. This workshop prepares teachers involved in the SMILE after-school program to present activities during the coming school year. These activities cumulate in the SMILE Highschool Challenge in April of each year.

August 9: Jurgen Theiss from Theiss Research in La Jolla, CA visited CIOSS Fellow **Dudley Chelton**, sponsored by CIOSS. While here, Jurgen presented, "New Features in Geostrophic Turbulence" as part of the COAS Physical Oceanography Seminar series.

August 11: **Sam Laney**, a PhD student of CIOSS Fellows **Mark Abbott** and **Ricardo Letelier**, will defend his thesis in Biological Oceanography entitled, "Seconds to Hour Scale Photosynthetic Responses in Marine Microalgae".

August 15-16: The Cooperative Research Program Symposium will be held in Fort Collins, CO. The theme this year is "NPOESS, GOES-R and Beyond: New Observations and Applications to Benefit Society". Participants from COAS include **BJ Choi**, **Antonio Fetter** and **Maria Kavanaugh** who are presenting posters, and **Larry O'Neill** who is giving an oral presentation.

Poster Titles:

BJ Choi: Circulation modeling and data assimilation along the Oregon Coast

Antonio Fetter: A Numerical Study of the Annual Cycle of the Western Boundary Currents of the South Atlantic Ocean

Maria Kavanaugh: Scales of variability in coastal oceans: lessons from EO-1

Oral Presentation Title:

Larry O'Neill: Coupled interactions between surface winds and sea surface temperature

August 22-24: CIOSS will be co-hosting a "short course" on satellite data for NOAA Fisheries (NMFS), along with Cara Wilson (NOAA/NMFS), Dave Foley (CoastWatch) and their colleagues. CIOSS Director Ted Strub, and CIOSS Fellows Dudley Chelton and Pete Strutton will give presentations ranging from a general overview of remote sensing, to altimeter and scatterometer details and applications, to ocean color details and applications. The 30 participants are mostly from NOAA Fisheries, with half a dozen from different NOAA sanctuaries. According to Cara, this class has generated quite a bit of enthusiasm within the wet side of NOAA (i.e. NMFS and NOS).

August 26-September 2: Lei Zhou from University of Maryland will be visiting COAS/CIOSS (Dudley Chelton) as part of the NESDIS CI Summer Exchange program.

August 29: Tentative date for the Climate Data Stewardship Workshop to be held in the Washington DC area.

September 4-15: The field experiment at the Monterey Bay, CA site will take place during the first two weeks of September. The Monterey Bay region includes many of the characteristic oceanographic features found on the West Coast in a very local area making it an ideal location for remote sensing product development and calibration/validation research.

September 24-27: Kristopher Karnauskas from University of Maryland will be visiting COAS/CIOSS as part of the NESDIS CI Summer Exchange program. On September 25, Kris will present a seminar entitled, "Interannual Variability of SST and Chlorophyll in the Eastern Pacific Warm Pool: High-Resolution Satellite Observations". He will then go on to attend the EPOC meeting (see below) at Timberline Lodge and present a poster with the same title.

September 27-30: The 53rd annual Eastern Pacific Ocean Conference (EPOC) will be held at the Timberline Lodge in Oregon. Many CIOSS Fellows and students will attend and give oral or poster presentations.

September 30-October 3: Stephanie Henson, a post doc for Andrew Thomas at the University of Maine, will be visiting COAS and giving a seminar, co-hosted by CIOSS. Her seminar will be based on the theme of satellite observations of the California Current. Stephanie works on GLOBEC issues, and her focus is mainly on SeaWiFS in the California Current.

October 17-19: The dates have been finalized for the CIOSS Formal Review to be held in Corvallis, OR. The review consists of 2 days of science review, followed by 1 day of administrative review. The participation of Review Panel Members and the agenda are being finalized at this time.