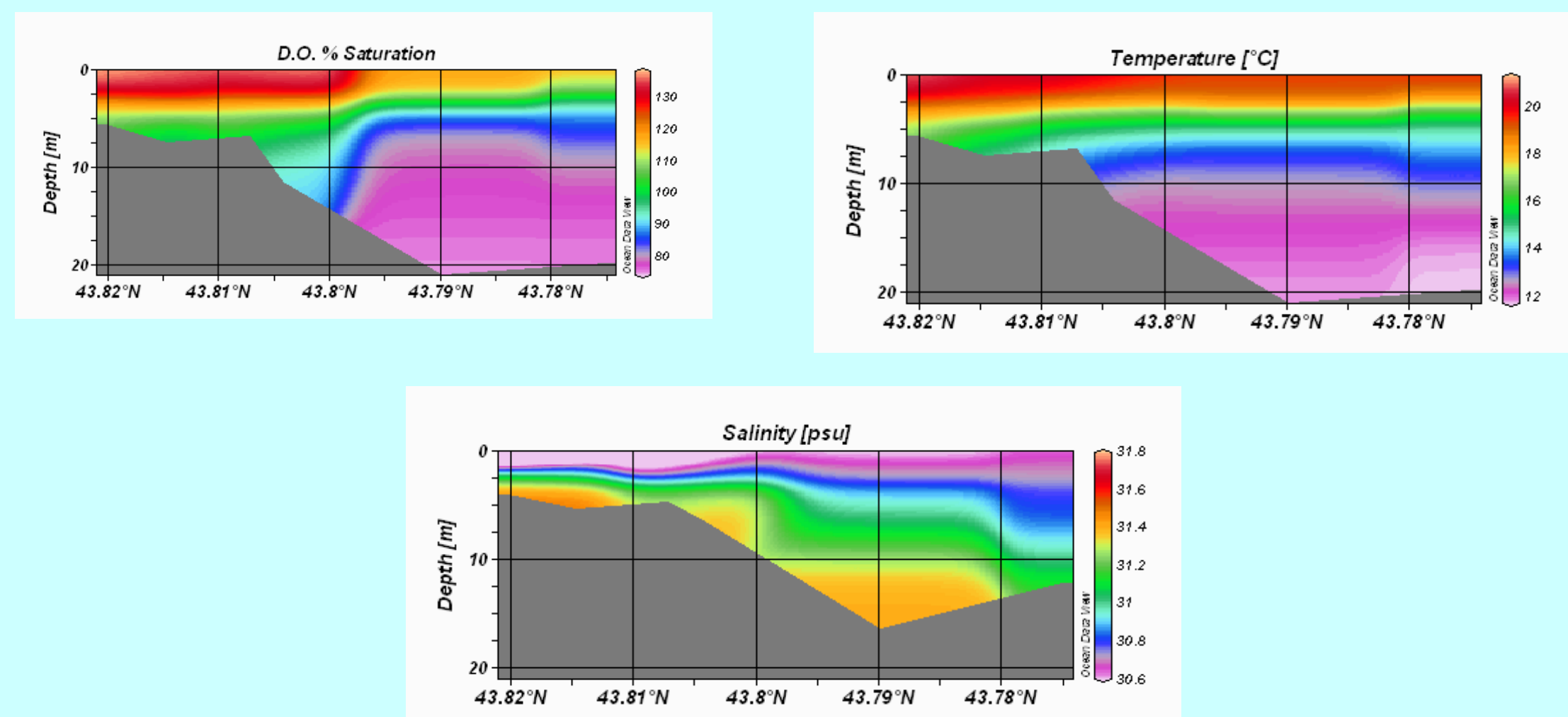


Inquiry-Based Instruction in Oceanography Using Service Learning, Ocean Data View, and an Oceanographic Buoy

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Student Inquiry Fostered by Service Learning



September

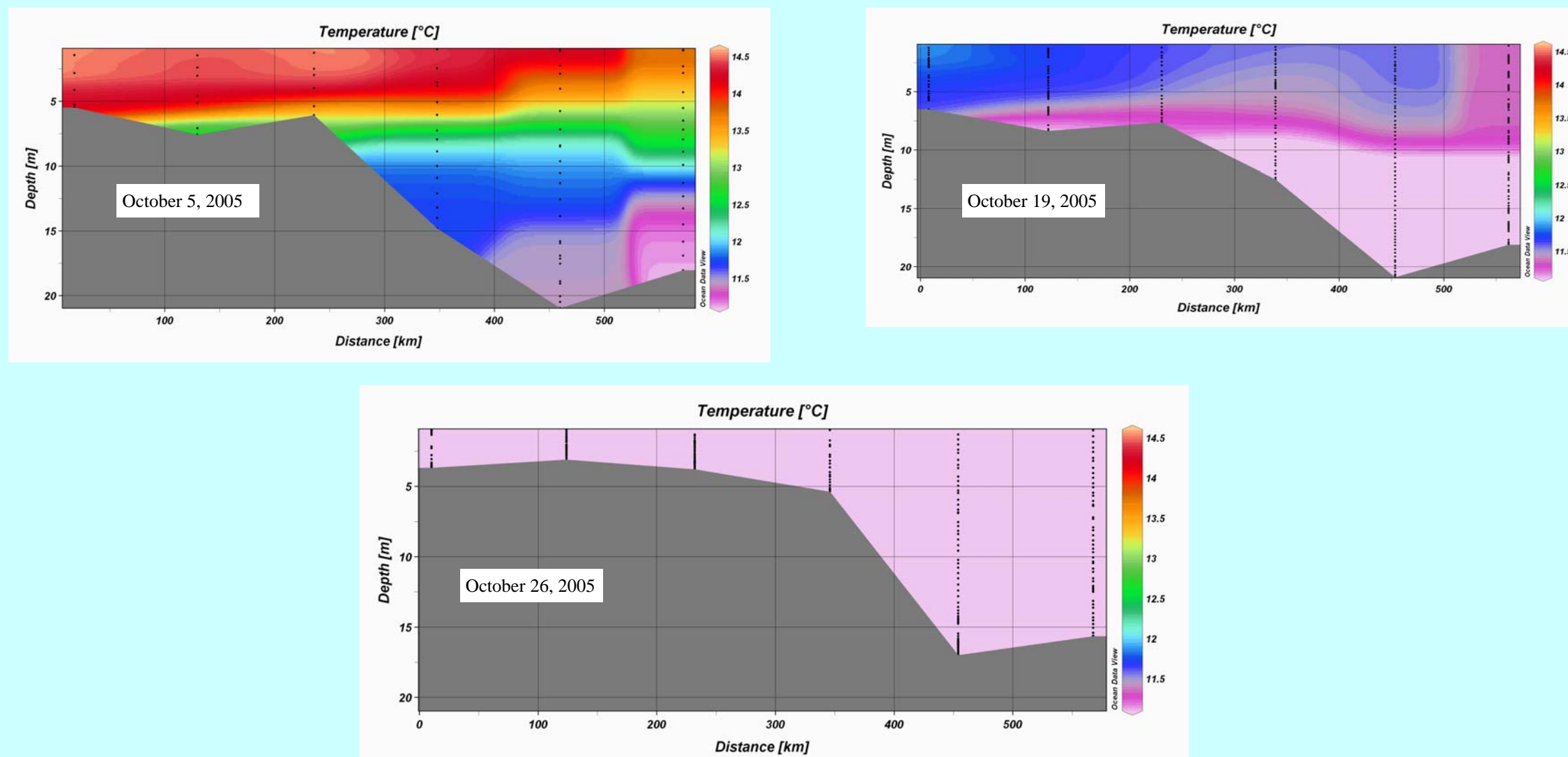
Intro students analyze T/S/DO data provided by their community partner, Friends of Casco Bay and identify new problems.

Laboratory and field exercises build the capacity of students to under-



October

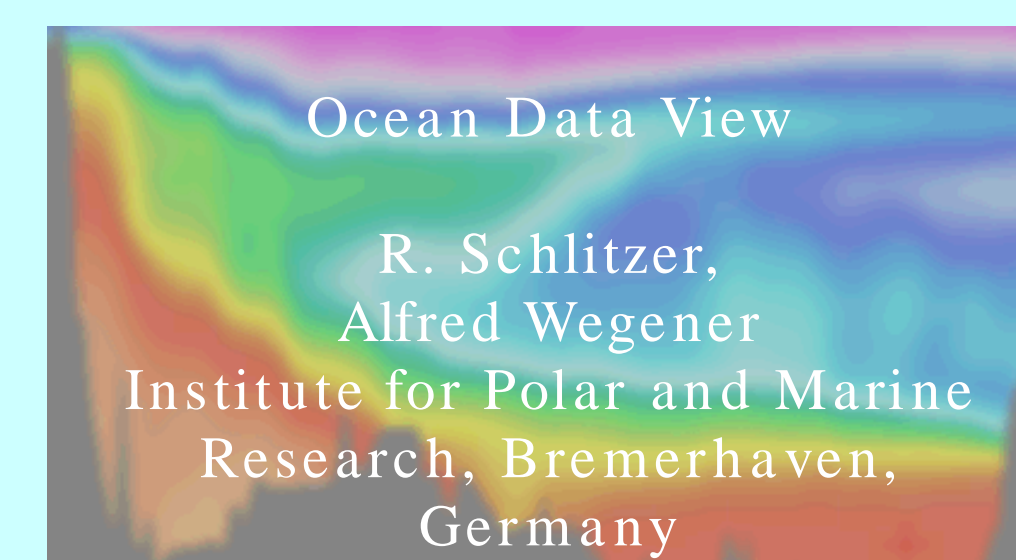
Students plan and carry out a field program to address their specific problems. There is never enough shiptime.



November – December

Students analyze their data, draw conclusions, and write and report upon what they have learned. FOCB and the Writing Project edit reports. Final poster presentation.

Ocean Data View Used to Visualize Student Data



ODV allows students to quickly plot

- property/property plots of selected stations
- scatter plots for sets of stations
- color sections along arbitrary cruise tracks
- color distributions on general iso-surfaces
- temporal evolution plots of tracer fields
- differences of tracer fields between repeats

Advantages

GUI
Derived variables
Rapid plotting
Format readily controlled

Disadvantage

Building database
Non-intuitive menu

What Students Said About The SL/ODV Approach

Jesse, junior, Physics major: *My favorite aspect of this project was that we got to do real, potentially useful research. This is the only course I've taken at Bowdoin where I have done anything that had a larger purpose than merely educating or evaluating me. I took a lot of satisfaction in doing something useful for once. I also really enjoyed reading the academic papers and articles that pertained to my project. It was very interesting to see what real oceanographers do and discuss.... I really liked being a part of a service learning project, and I think there should be more of them.*

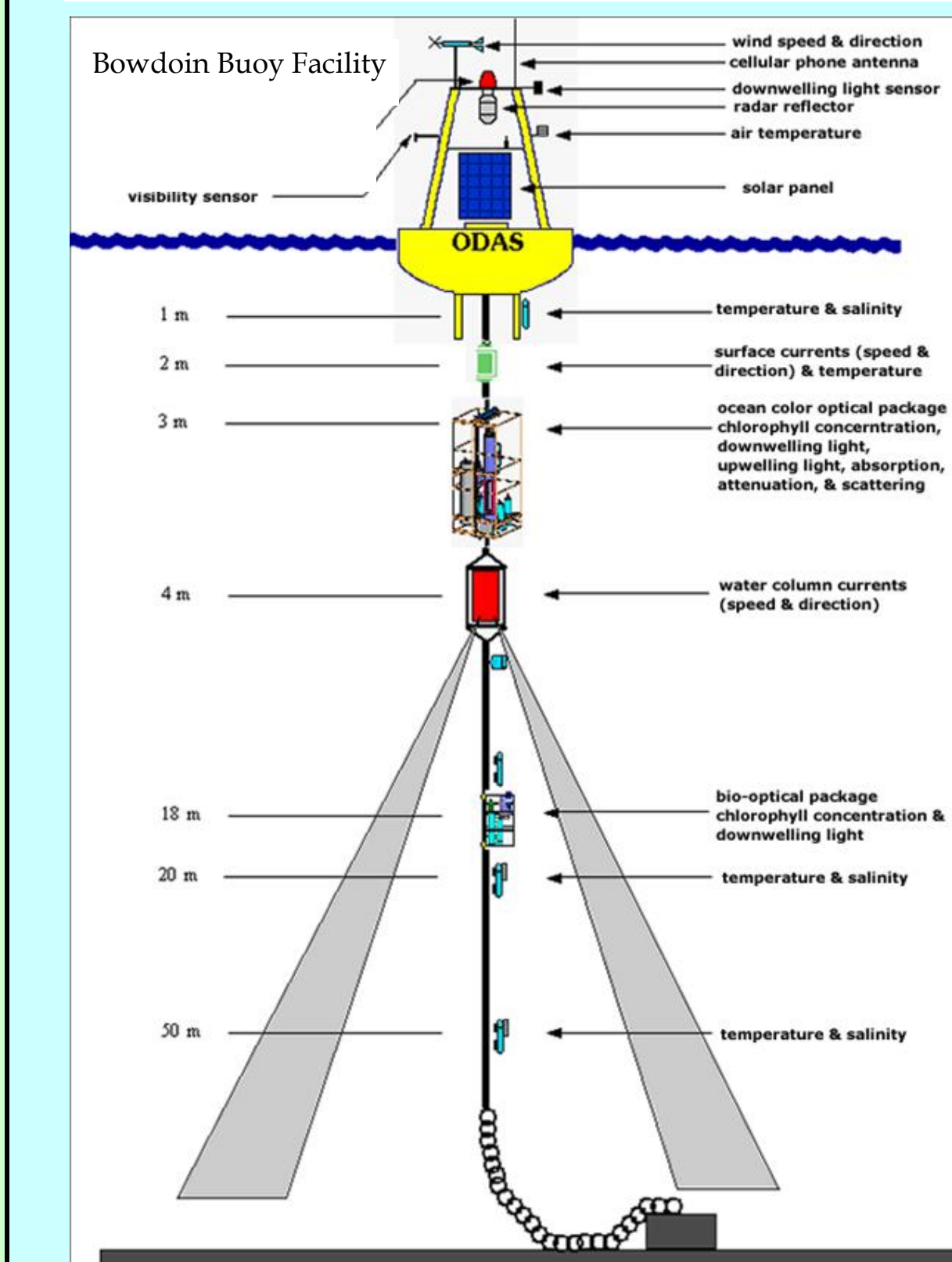
Paul, first year, undeclared major: *My favorite aspect of the project was knowing that our work can possibly benefit the Quahog Bay area. Usually in college we are given assignments that already have answers. The only goal of those assignments is to obtain a good mark, nothing more. Our service-learning project, however, will hopefully contribute some new and significant knowledge to the community. I am intrigued by the simple fact that the low dissolved oxygen in Quahog Bay is a yet unsolved mystery. I learned two main lessons from our service learning project. One, not everything is as cut and dry as I once thought. Our problem was very open ended and we ventured into uncharted territory. In high school and college we, as students, very rarely get an opportunity to try to figure out a problem that is yet unsolved.*

Nicole, sophomore, Environmental Studies major: *I enjoyed knowing that the work we were doing was going to aid Friends of Casco Bay.... I have learned to appreciate the work that scientists, lab assistants and science majors do, as it can be laborious, fascinating, and rewarding all at the same time.*

Patrick Keneally, senior Econ major: *My favorite aspect of the project was actually going out to Card Cove to collect the data. Not only is this area beautiful, but I was experiencing something that I have not done since coming to Bowdoin. I am an economics major & government minor and this was my first science class that I have taken. I learned that collecting data is not always easy. The first time out on the boat with Jay to collect our data, the YSI broke and our trip to Card Cove was 'unsuccessful'. While this was frustrating, it made me realize & appreciate the work that geologists and other scientists must do: data collection does not always go as smoothly as one hopes.*

Sam Downing, senior gov & Latin American Studies major: *My favorite aspect of the project was actually the analysis - taking the data we had collected and reviewing trends in comparison to the existing literature. It was satisfying to have gone through the whole process of designing, researching, and executing a new project and it made for a great way to get into a variety of sources on sediment analysis because they become personally relevant to the goals I was hoping to meet, particularly to explain spatial concentrations of organic carbon and grain size and the relationship between the two. I particularly liked being able to compare our Maine estuary to bays in Chile, China, and Australia, as well as to other marine areas in Maine, through scholarly and secondary literature.*

New Oceanographic Buoy Accessible from Coastal Studies Center



Above the water Basic Meteorology

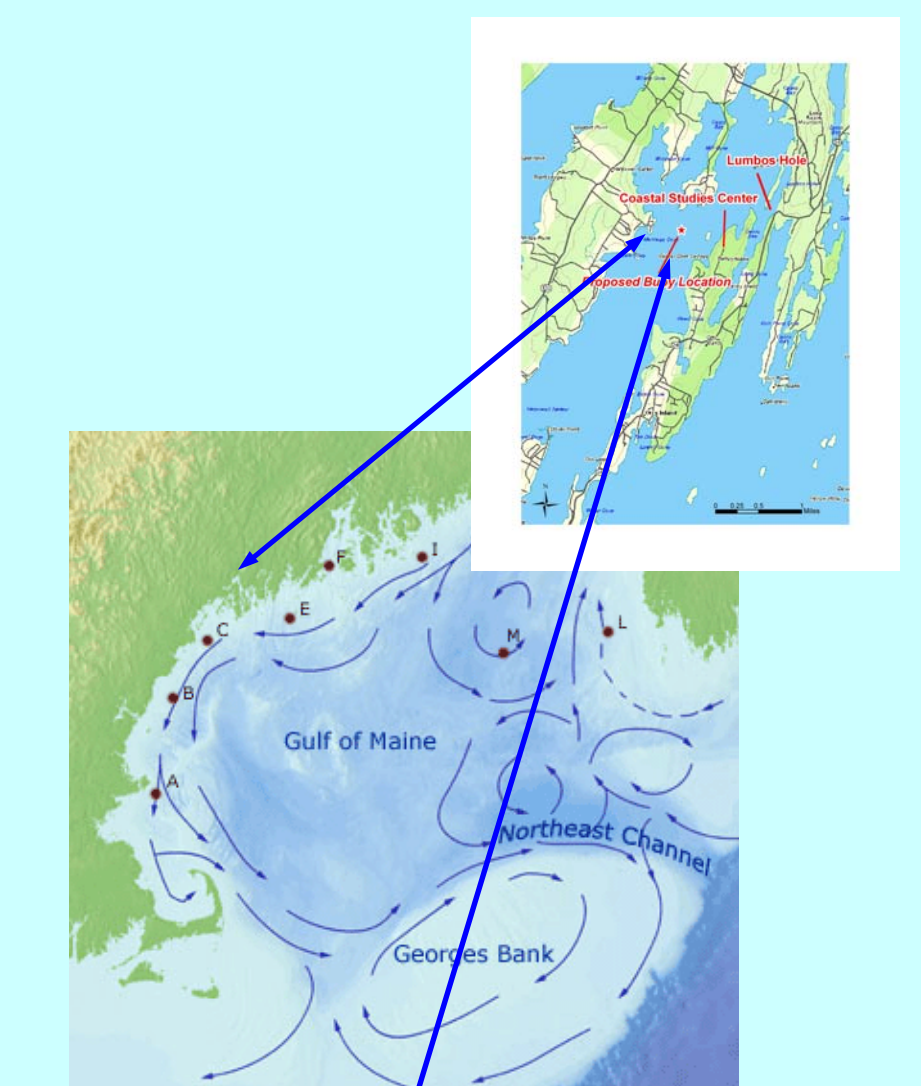
- Wind speed and direction
- Wind gust
- Air temperature
- Incident solar radiation
- Visibility
- Dominant wave period
- Wave height

Beneath the surface oceanographic sensors monitor

- Water temperature, salinity, and density at two depths
- Surface (2mbs) current speed and direction via standard current meter
- Dissolved Oxygen (DO) at two depths
- A depth profile of current speed and direction via an Acoustic

An optical oceanography sensor group will produce data products pertaining to:

- Seawater composition (dissolved and particulate constituents, with particulates separated into phytoplankton, other organic particles and inorganic sediments)
- Particle size distribution (as described by the Junge or hyperbolic slope of the size distribution)
- spectral solar radiation (incident photosynthetically available radiation, PAR, and at two depths within the euphotic zone)
- dissolved nitrate concentrations at two depths
- Phytoplankton biomass, composition and production, detection of *Alexandrium*



Five minute motor from the College's Coastal Studies Center (CSC) on Harpswell Sound. Seawater from Harpswell Sound is drawn into a marine laboratory at the CSC CSC.



This buoy has just been funded by a successful NSF/MRI proposal "An Oceanographic Buoy for Multidisciplinary Research in a Coastal Embayment Prone to Harmful Algal Blooms (2005)" from Bowdoin College(Ed Laine), Bigelow Laboratory for Ocean Science (Collin Roesler) and St Joseph's College (Greg Teegarden)