3-9-2012

Improvements to Sampling from the Research Vessel Ira C

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Final Report for Period: 09/2011 - 01/2012
Submitted on: 03/09/2012
Principal Investigator: Perry, Mary J.
Award ID: 0934314
Organization: University of Maine
Submitted By:
Perry, Mary - Principal Investigator

Title:
Improvements to Sampling from the Research Vessel Ira C

Project Participants

Senior Personnel

Name: Perry, Mary
Worked for more than 160 Hours: No
Contribution to Project:
Mary Jane Perry is the PI on the grant and was responsible for selection and purchasing of the instrumentation.

Post-doc

Graduate Student

Undergraduate Student

Technician, Programmer

Name: Miller, Timothy
Worked for more than 160 Hours: No
Contribution to Project:
Mr. Miller provided support for installing the crane on the dock; although this was funded by the University of Maine, it was essential for on and off loading the CTD and winch to the research vessel, and hence directly contributed to the success of this project.

Other Participant

Research Experience for Undergraduates

Organizational Partners

Other Collaborators or Contacts

This is an instrument acquisition project and there have been no partners, only vendors.

Activities and Findings

Research and Education Activities:
The major goal of this work was to improve the ability of researchers and students at all levels (K-graduate school) to sample the waters of the Damariscotta River Estuary and near-by Gulf of Maine, using modern oceanographic sensors and remotely-controlled water sampling bottles. Since 2000, the Darling Marine Center had a capable research vessel,

the42-foot R/V Ira C., which was built specifically for the Center, based on a traditional Maine lobster boat. What the Center lacked was a modern capability for sensing and sampling local waters. The major accomplishment of this project, for both research and educational purposes, was the acquisition of a state-of-the-art water sensing?sampling system that allows real time display of in situ data and physical sampling of water at specified depths. A by-product of the NSF supported work, the PI was able to convince the university to install a crane on the dock, to allow efficient and safe transfer of the CTD and other equipment to the vessel.

The water sensing system includes a Sea-Bird Electronics CTD (conductivity, temperature, depth) for temperature, salinity and depth; a Sea-Bird Electronics dissolved oxygen sensor; a Biospherical scalar PAR (photosynthetically active radiation) sensor; WET Labs C-Star transmissometer and ECO-FLNTU sensors (for light attenuation, optical backscattering, and chlorophyll fluorescence) with data logger. A large display screen enables researchers, trainees, and students on educational trips to easily see the real time data. The water sampling system is a Sea-Bird Electronics ECO water sampler with three four-liter Niskin bottles that are automatically closed at depth via electronic control from the vessel with the carousel deck unit. The conducting cable required to power the CTD and carousel water sampler is deployed with a Sound Ocean Systems ECO winch.

As a facilities up-grade proposal, the major activity has been procurement of the equipment and upgrading of university infrastructure to use the equipment. Little work has been carried out during the inclement Maine autumn and winter. The currently planned research that will use this system in 2012 include work involving cross calibration of optical sensors, time series sampling at an offshore station for phytoplankton and zooplankton, and productivity studies in three local estuaries. Additionally, the system will be used in an undergraduate plankton course in the Center?s autumn Semester-by-the-Sea program, Bowdoin College field trips, and other day trips for K-12 educational programs.

Findings:

To date, no scientific findings can be reported. As an outcome of this infrastsructure improvement project, the capabilities of the marine laboratory to support the research of visitors and University of Maine researchers and to train undergraduate and graduate students has been significantly enhanced. Researchers can now propose research that previously would have been impossible. The ability to ?see? data in real time will enhance the field trip experience of the many K-12 groups that come through the Center.

Training and Development:

No students or postdocs were supported on this project. As yet, no specific training has occurred, however, many new plans for education are being crystalized and developed, one of which will be implemented this May. The new May course, Problems in Marine Science -   Estuarine Oceanography <http://www.dmc.maine.edu/coursesUM.html#estuarineoce>, is open to both University of Maine and non-UMaine students. The fieldwork will include hydrographic surveys coupled to various sampling, field sensor, and laboratory approaches to provide views of physical, biological, chemical, and sedimentary responses to mixing patterns. The course will include various forms of data analysis and will be structured by team-oriented student projects. One goal of this course is to create a long-term data base of estuarine hydrography, with successions of students contributing over time.

Outreach Activities:

Although no outreach has been directly supported to date, in the past K-12 groups have taken field trips on the R/V Ira C. The large display screen with real-time display of data apeals to the young computer generation. A general description of the Center's outreach activities can be found at <http://www.dmc.maine.edu/k12.html>. This summer, the system will be used in Sustainable Ocean Studies <www.waynflete.org/podium/default.aspx?

t=125548>, a high school program offered by two local educational organizations who entrain high school studies into studying the environment (Wayneflete and Chewonki).

Journal Publications

Books or Other One-time Publications

Web/Internet Site

Other Specific Products

Contributions

Contributions within Discipline:

While there are no results to date, the ability to meaningfully sample local estuaries and near-by Gulf of Maine waters will contribute to the discipline of oceanography. The combination of easy access to the water from the Center and the now-well equipped research vessel will allow resident researchers and visitors to collect time series data in these waters as well as instantaneous measurements of the environmental to provide a context for biological/geological specimen collections, process studies, and experiments.

Contributions to Other Disciplines:

While there are no results to date, the increasing interest in tidal energy and offshore wind harvesting in Maine will require a better understanding of hydrography and potential impacts on local circulation, as well as the effect of the ocean on energy extraction. A number of researchers in the State of Maine are involved in various aspects of research on this topic; it is likely that the new sampling capabilities on the R/V Ira C will be used as the research on energy harvesting accelerates.

Contributions to Human Resource Development:

As part of the university, one of the most important goals of the Center is to provide opportunities for research and training. The trust established by the late Professor John Dearborn at the Center will provide more internship opportunities to undergraduate students, some of whom will be involved in oceanographic sampling on the R/V Ira C. Students who have both hands-on experience with modern tools, in addition to class room learning, are better prepared for the job market. The new infrastructure will significantly contribute to improved training and preparation of new scientists and technicians.

Contributions to Resources for Research and Education:

The primary outcome of this project is the significant upgrade of physical resources of the Darling Marine Center?s facilities for research and education in local estuaries and the near-by Gulf of Maine. These capabilities for water sensing and sampling are described in detail under the section: Project Activities and Findings/major research and education activities. Because the Center serves not only resident and other UMaine faculty and students, the impact of this upgrade extents to a broader user group including visiting investigators, outside faculty supervising visiting classes from other colleges, and K-12 students who visit the Center.

Contributions Beyond Science and Engineering:

One of the hotly discussed topics on mid-coast Maine estuaries is the detrimental effect of aquaculture, with discussions rarely based on evidence. The optical sensors on the CTD will allow time series and process study investigation of some of these issues, specifically

generation of suspended sediment from aquaculture oyster dredging operations. One combined research and education project envisioned is tidal cycle studies of suspended sediment over various strengths of the annual spring/neap cycles, during periods with and without active dredging for oysters. This proposed project has the potential for engaging both Lincoln Academy (a private institution that serves the public) high school students and the community in evidence-based decision making.

Conference Proceedings

Categories for which nothing is reported:

Organizational Partners

Any Journal

Any Book

Any Web/Internet Site

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Any Conference