

Regional Ocean Observing Systems Provide an Opportunity for All Citizens to Be Explorers

B. W. Meeson
Ocean.US
2300 Clarendon Blvd, Suite 1350
Arlington, VA 22201-3667 USA
b.meeson@ocean.us

E. J. Lindstrom
Ocean.US
2300 Clarendon Blvd, Suite 1350
Arlington, VA 22201-3667 USA
e.lindstrom@ocean.us

The U.S. is engaged in an international effort to instrument our oceans and coasts through a coordinated national and international network of observations, and dissemination of this information on states of the oceans and the nation's Exclusive Economic Zone (EEZ). This effort, The Integrated Ocean Observing System (IOOS), is being developed in two closely related components:

- The global ocean component is an international collaboration to develop a global observing system (the Global Ocean Observing System, GOOS) designed to improve weather and climate forecasts and assessments.
- The coastal component is required to assess and predict the effects of weather, climate and human activities on the state of the coastal ocean, on its ecosystems and living resources, and on the nation's economy. It encompasses the nation's Exclusive Economic Zone (EEZ), the Great Lakes, and estuaries.

Together, the global ocean and coastal components of the IOOS constitute a hierarchy of observations required to detect, predict, and mitigate the effects of large scale changes in the oceans, atmosphere, and land-based inputs on coastal ecosystems, resources and human populations.

The IOOS will improve significantly the nation's ability to achieve seven national goals related to climate change, marine services, natural hazards, national security, public health, ecosystem health, and living marine resources. The integrated system as it addresses these seven goals is also charged to improve public understanding of the oceans and

changes occurring in them through sustained programs of education and communications.

To address these seven national goals, the ocean and coastal observing systems will have sensors to detect the biological, chemical and physical features of the coastal and ocean environment. These observing systems and the information they will collect provide exciting opportunities for millions of Americans of all ages to experience and interact with the undersea realm. The dynamic nature of this realm can for the first time be observed by grandparents and preschoolers without concern for their personal safety and in ways that allows them to observe and interact with it briefly or to delve deeply into the interdependence of the living organisms on each other, and on their physical and chemical environment. Learning about this environment through hands-on, authentic experiences that the observing system will provide allows for richer and deeper experiences for millions of Americans. One can live hundreds of miles from an ocean or coast and still experience or interact with the ocean. The use of both scientific instruments to detect and measure the physical, biological and chemical realm coupled with digital cameras and other devices to observe changes over short or long time periods opens up a wide range of learning experiences not possible using ships or satellites alone.

Because the regional/global observing systems can take many forms, simple buoys with two or three measurement devices that relay their data to shore, to complex grid systems with multiple devices some mounted in fixed locations, some moving vertically and others roving or point able, there are a tremendous diversity of learning experiences

which can be constructed. These experiences range from uses in informal learning venues where a pointable camera provides audiences exposure to the undersea realm, to independent study projects by high school students in an AP biology or Earth system science course utilizing a full suite of data.

The regional/global observing systems will also provide Americans full access to the diversity of coastal and ocean environments, from coral reefs to open ocean to the sea floor. Children will be able to do comparative studies of these environments in their classroom or even at home. For instance, a middle school classroom in the heartland of America, equipped with Internet access and some simple analysis tools could compare and contrast life in different ecosystems (the sea floor, coral reefs, surface waters of a major estuary, etc.) and use the observing system measurements to examine differences between their physical and chemical environments.

The observing systems will also provide the opportunity to engage and excite many more educators with the ocean and coastal sciences than in the past. Educators will not need to be near a coast to have access to marine organisms and their ocean environment, and those that are, will now have access to many environments some very different from the one outside their door.

Yes, technology is required to bring these environments into the classroom and to bring them to life there. This hurdle is becoming smaller every day as more schools purchase computers equipped for science instruction and set-up learning laboratories with these new computers. Internet access is also becoming more reliable and faster so that collecting data and videos from sites is becoming practical for many classrooms. As the observing system matures and provides information resources prepared for classroom educators, and the technology hurdles fade away, more educators from all parts of the country will be excited by the ocean and coastal sciences and will transmit that excitement to their students and to other educators.

In a similar way, educators in informal and non-formal learning venues will have ever increasing opportunities to incorporate the ocean and coastal sciences in their programs in new and dynamic ways. Aquaria and science-and-technology centers, for example, may take very different approaches to these materials. Aquaria may choose to focus on biology and ecology using cameras and visual sensors, while the science-and-technology centers may focus on the technologies used in the observing systems themselves. Marine sanctuaries and reserves may take yet another course. The options for innovative programming on the Internet and via radio and television are also wide open.