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2008 Annual Report: Coastal Ocean Institute

The Coastal Ocean Institute (COI) promotes scientific inquiry into phenomena that shape our coastal waters and ecosystems. Through research grants, scientific gatherings, and the development of state-of-the-art facilities, COI encourages interdisciplinary research and innovative technology development. COI strives to translate the results of this basic research for citizens and policymakers, providing a solid information base for better resource management.

Enlarge Image

Biogeochemist Karen Casciotti, a COI fellow, is working to understand how microorganisms affect the exchange of excess nutrients (principally nitrate) between groundwater and the coastal ocean. Casciotti and colleagues are using microbiological, molecular, and chemical techniques to understand which nitrogen-metabolizing microbes are present in the Waquoit Bay (Falmouth, Mass.) subterranean estuary and at what rate they are removing nitrogen from the system. (Photo by Tom Kleindinst, Woods Hole Oceanographic Institution)

COI's research themes focus on examining threats to and abuses of coastal waters; observing and analyzing the biological, physical, geological, and chemical processes at work where air, sea, and land meet; and developing instruments to better measure, monitor, and analyze the fundamental processes shaping the coastal region.

To support these themes, COI funded six research projects and one new initiative in 2008. We also initiated support for one new COI Fellow: Karen Casciotti (MC&G) whose research focuses on how nitrogen and nitrogen-containing compounds cycle in coastal waters, including the greenhouse gas nitrous oxide (N_2O). The COI fellowship will allow her to explore emerging areas of research, such as the mechanisms of N_2O production and nitrogen inputs to the coastal ocean from human activity.

COI continues its support of four other Fellows. Rob Evans (G&G) is using marine electromagnetics to study groundwater discharge and to characterize the sedimentary environment on the continental shelf. Becky Gast (BIO) is studying the epidemiology of infectious diseases in coastal areas. Andone Lavery (AOP&E) is using high-frequency sonar to learn more about how turbulence and mixing affect the biology of coastal waters. Claudia Cenedese (PO) is using laboratory experiments and analytical models to simulate the dynamics of eddies and buoyant coastal currents.

The Institute supported several postdoctoral scholars and Joint Program graduate students in various ways in 2008. Postdoc Anthony Kirincich is using the Martha's Vineyard Coastal Observatory to examine the vertical structure of the water column and the effects of waves on sub-tidal circulation, while postdoc Juliette Smith is studying the ecophysiology of a recently cultivated marine dinoflagellate, *Dinophysis* spp., focusing on its production of Diarrhetic Shellfish Poisoning (DSP) toxins.

COI-sponsored graduate student Dan Rogers is using molecular biology and stable isotopic techniques to examine the distribution, abundance, and activity of nitrogen-cycling microbes in the subterranean estuary in Waquoit Bay, Mass. Graduate student Erin Banning is also using Waquoit Bay as a research base where he is exploring the potential importance of bacterial predation on biogeochemical processes.

–*Christopher Reddy, Institute Director*

Last updated: July 16, 2009

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