The river discharge during the northeast monsoon (October–December) is almost one fifth of that during the southwest monsoon (June–September). Both the northeast and southwest monsoon currents do not favor the growth and elongation of the plume toward deep waters, as the sediment disperses vertically down due to strong turbulent mixing of bottom and surface waters at the source itself. The river discharge is minimal during the nonmonsoon season (February–May) when the turbulent and vertical mixing is less. However, the presence of strong coastal and geostrophic currents causes the formation of these plumes even if the river discharge is less. When the current flows from south to north, the plume deflects offshore toward the east due to the coastal topography near the study area.

From this preliminary analysis, we conclude that the unique plumes observed in the Bay of Bengal are due primarily to the presence of water jets flowing away from the Kakinada coast. The characteristics of the jet control the presence, extent, intensity, and direction of the plume. Because of the lack of sufficient observations, we could not analyze the chemical composition and particulate matter concentrations to understand how these plumes evolve as they propagate. This information could help to establish the conditions that are likely to change due to changes in agricultural practices, an increase in human population, and climatic change. The studies on the composition and origin of the plumes require the collection of in situ observations on the chemical composition of seawater in the study area through detailed experimental planning that also could help in understanding the origin of the sediments, characteristics of the SSC, and features of the plume.

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Author Information

PATTAM N. SRIDHAR and MEER M. ALI, National Remote Sensing Agency (NRSA), Balanagar, Hyderabad, India; E-mail: mmali73@yahoo.com; PONNUMONY VETHAMONY and MADAVANA T. BABU, National Institute of Oceanography (NIO), Dona Pola, Goa, India; INDRAKANDI V. RAMANA, NRSA; and SEELAM JAYAKUMAR, NIO.

MEETINGS

Modern Perspectives on Measuring and Interpreting Seafloor Heat Flux

The Future of Marine Heat Flow: Defining Scientific Goals and Experimental Needs for the 21st Century; Salt Lake City, Utah, 6–7 September 2007

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There has been a resurgence of interest in marine heat flow in the past 10–15 years, coinciding with fundamental achievements in understanding the Earth's thermal state and quantifying the dynamics and impacts of material and energy fluxes within and between the lithosphere and hydrosphere. At the same time, technical capabilities have dwindled to the point that no U.S. academic institution currently operates a seagoing heat flow capacity.

In September 2007, a workshop was convened in Salt Lake City with sponsorship from the U.S. National Science Foundation (NSF) and participation by scientists and engineers from North America, Europe, and Asia. The primary goals of the workshop were to (1) assess high-priority scientific and technical needs and (2) to evaluate options for developing and maintaining essential capabilities in marine heat flow for the U.S. scientific community.

Workshop participants emphasized how marine heat flow data are proving especially important for interdisciplinary initiatives that link physical, chemical, and biological processes in the deep marine environment, and are contributing in new and sometimes unforeseen ways to plate boundary, geodynamics, subseafloor hydrology, and deep biosphere studies. Such studies are important on their own and to the scientific goals of the Integrated Ocean Drilling Program, MARGINS and InterMargins, RIDGE2000 and InterRIDGE, and now the NSF's Ocean Observing Initiative. Specific discussions included (1) combining conductive marine heat flow data with new technologies for measuring the advective components of heat transfer as a means to assess the role of seeps and vents in regional and global thermal budgets; (2) the role of heat flow measurements in understanding the evolution of hydrothermal circulation; and (3) geodynamic insights from the thermal state of the lithosphere, transform faults, subduction zones, and hot spots.

Modern marine heat flow studies commonly include coincident seafloor and subseafloor mapping and imaging surveys and sediment coring programs that provide material for physical, chemical, and microbiological analyses. Navigational technologies that precisely locate marine heat flow probes on the seafloor, and new perspectives on survey design and nesting of widely and closely spaced heat flow measurements, have improved the quality, interpretability, and utility of the data for many scientific problems. These approaches have turned intermeasurement variability that was once considered to be experimental noise into signals that respond to shallow subseafloor processes related to fluid flow, gas hydrates, and sedimentary and/or oceanographic phenomena.

Although the scientific need for continued acquisition of seafloor heat flow data cuts across disciplines and programs, the future of U.S. capabilities remains uncertain. The U.S. community needs to move quickly to establish basic capabilities in the acquisition, processing, and interpretation of marine heat flow data before critical expertise is lost. The workshop considered several relatively low cost (e.g., pay-as-you-go) models to provide the U.S. community with access to modern marine heat flow capabilities during surveys on University National Oceanographic Laboratory System (UNOLS) and other research vessels.

The full workshop report is available at http://www.coas.oregonstate.edu/Workshop/FutureofMarineHeatFlow.html. We thank

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—Robert N. Harris, College of Oceanic and Atmospheric Sciences, Oregon State University, Corvallis; E-mail: rharris@coas.oregonstate.edu; Andrew Fisher, Earth and Planetary Sciences Department, University of California, Santa Cruz; Carolyn Ruppel, U.S. Geological Survey, Woods Hole Mass.; and Fernando Martinez, Hawai'i Institute of Geophysics and Planetology, University of Hawai'i at Manoa, Honolulu.

About AGU

AGU Position Statements: Evolution and Nuclear-Test-Ban Treaty

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At its 14 December meeting, the AGU Council adopted four position statements, after months of work by panels of experts that also included input from the AGU membership. AGU formulates and maintains a number of position statements that reflect the concerns of the Union, and none of these position statements extends beyond the range of available geophysical data or the norms of legitimate scientific debate. Two of the four adopted statements—"Biological Evolution and the History of the Earth Are Foundations of Science" and "Capability to Monitor the Comprehensive Nuclear-Test-Ban Treaty"—have been released.

The Comprehensive Nuclear-Test-Ban Treaty statement was a joint statement with the Seismological Society of America, and was originally adopted in 1999. The evolution statement—originally developed in 1981 and revised many times since—was the first position statement adopted by AGU. The evolution statement revision emphasizes the importance of teaching evolution in the classroom and comes at a time when some school boards are trying to eliminate evolution from their curriculums.

The other two position statements, "The Importance of Natural Hazards" and "Human Impacts on Climate," will be released in the near future.

All AGU position statements can be found at http://www.agu.org/sci_soc/policy/sci_pol.html.

—Kate Von Holle, AGU Public Affairs Administrator

Biological Evolution and the History of the Earth Are Foundations of Science

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AGU affirms the central importance of including scientific theories of Earth history and biological evolution in science education. Within the scientific community, the theory of biological evolution is not controversial, nor have "alternative explanations" been found. This is why no competing theories are required by the U.S. National Science Education Standards. Explanations of natural phenomena that appeal to the supernatural or are based on religious doctrine—and therefore cannot be tested through scientific inquiry—are not scientific, and have no place in the science classroom.

Evolution through natural selection is one of the great unifying theories of biology. It explains the myriad forms of life—including human—that have originated from simple beginnings early in Earth's four and a half billion year history, and it emphasizes the interrelatedness of all living things. It is a theory in the scientific sense—a body of knowledge that has accumulated through testing of hypotheses, by observation and by experiment over a long period, so as to become accepted by the scientific community as an explanation of natural phenomena. Although there is broad agreement within the scientific community, the theory of evolution, like any scientific theory, is subject to revision as our understanding improves. Indeed, science seeks to unravel innumerable unsolved problems in the natural world, including the evolution of the universe itself.

An increasingly complex and competitive international economy calls for a scientifically literate public. The theory of biological evolution is one of the most important foundations of the science enterprise, and therefore education of the future workforce in evolution and other pillars of science is essential.

In addition to the practical benefits of understanding evolution, there is an aesthetic one: the gaining of a sense of awe and wonder at the beautiful complexity of our dynamic planet and the integral role of its evolving biological component throughout much of its history. To deny students a full understanding of the theory of evolution in the context of Earth history is to deprive them of an important part of their intellectual heritage.

AGU urges its members to help the public better understand the scientific process including biological evolution and the history of the Earth as foundations of science.