

Advancing priority ocean science topics

Working groups of the Scientific Committee on Oceanic Research (SCOR)

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The Scientific Committee on Oceanic Research (SCOR) is one of IGBP's major partners, in terms of co-sponsoring large-scale ocean research projects and other marine activities. As the oldest of the interdisciplinary committees of the International Council for Science (ICSU), SCOR recently celebrated its 50th anniversary with a symposium that highlighted its contributions to ocean science over the past five decades, as well as discussing ideas for priority research in the future.

An important part of SCOR activities is the establishment and support of working groups intended to advance specific areas of science identified as priority topics. SCOR working groups can be proposed by anyone in the global ocean science community and, before working groups are established, SCOR invites comments on the proposals from the entire community. Some groups are supported solely by SCOR, whereas others are co-sponsored with other organizations, including IGBP projects.

Currently, SCOR has 14 working groups in various stages, from three newly formed ones to some that have held their final meetings and are working on peer-reviewed journal issues or books. Some highlights from SCOR working groups are outlined in this article.

Global Comparisons of Zooplankton Time-Series

This group has compiled a global database of representative zooplankton time-series observations in order to examine what factors control zooplankton populations, including testing for the kind of climate-dependent teleconnections that are seen in fish populations. A better understanding of the effects of climate and oceanographic conditions on zooplankton is very important for improved management of marine fisheries. Scientists from the Global Ocean Ecosystem Dynamics science community have been very involved in this group.

Thermodynamics and Equation of State of Seawater

The equation of state of seawater describes the dependence of seawater density on its temperature, salinity, and pressure. It has been several decades since the equation of state was last revised and this group is working to provide new definitions and algorithms for salinity, density, entropy, enthalpy, and many other properties. These more accurate quantities will help improve global models of circulation and climate. The International Association for the Physical Sciences of the Oceans (IAPSO) is a co-sponsor of this group.

The Legacy of *in situ* Iron Enrichment: Data Compilation and Modelling

A major debate is raging on whether scientists should be allowed to conduct *in situ* meso-scale iron enrichment experiments. A meeting sponsored by the National Science Foundation (USA) and the Surface Ocean - Lower Atmosphere Study that synthesized the results from past iron-enrichment experiments, concluded that the data and metadata from past experiments would be more useful if they were gathered into a single database. This working group is in the midst of this task, with the ultimate aim of using the relational database to conduct modeling studies of the oceanographic factors that influence the outcomes of iron enrichment experiments. The better understanding from these activities will help policymakers as they continue to debate whether to allow future iron-enrichment experiments.

Land-based Nutrient Pollution and the Relationship to Harmful Algal Blooms in Coastal Marine Systems

There is good evidence that coastal areas in many parts of the world are experiencing both increased nutrient levels and increased harmful algal blooms, but the causal link between the two is uncertain. This group, co-sponsored by IGBP's Land-Ocean Interactions in the Coastal Zone project and the Chinese Academy of Science's Institute of Oceanology, is integrating nutrient and harmful algal bloom data in a geographic information system format to study this

important question. The results of this group will help coastal policymakers in decisions to prevent or mitigate harmful algal blooms. Sybil Seitzinger, Executive Director of the IGBP, is a member of this working group.

OceanScope

Some aspects of the ocean environment can be monitored from commercial ships, including ocean-going vessels and ferries plying coastal waters. Although ocean scientists have more than 50 years' experience using commercial vessels to monitor composition of the plankton community, temperature, salinity, dissolved carbon dioxide, and other parameters, arrangements are typically between individual scientists and individual shipping companies. This group seeks to develop a new paradigm for partnering with the merchant marine fleet. It will identify new measurements, sampling techniques and technologies optimized for commercial vessels, and develop new broad-scale interactions between the scientific and shipping communities in order to establish and maintain high-resolution studies of the ocean over time. IAPSO is co-sponsoring this group.

Hydrothermal Energy Transfer and its Impact on the Ocean Carbon Cycle

Deep-sea hydrothermal vents in mid-ocean ridge-crest areas are known to have profound influences on the surrounding ecosystems in fueling communities of chemosynthetic organisms. Circulation through vent areas and relatively young crust also controls the oceanic concentrations of many elements. Yet, the potential contribution of

hydrothermal energy transfer and materials to the ocean carbon cycle is unknown. This working group, co-sponsored by the InterRidge project, will bring together the information necessary to provide quantitative estimates of such contributions

The Microbial Carbon Pump in the Ocean

Microorganisms can shape the chemical composition of organic matter and consequently influence the residence time of carbon in the ocean. This process is analogous to the known "biological pump" (the biological processes that draw down carbon from the atmosphere into the deep ocean) in consequence, but different in mechanisms, and can be called "microbial carbon pump". This group will address the state-of-the-art techniques for studying

microbial processing of organic matter to acquire new insights in mechanisms controlling carbon cycling in the ocean.

As we see, SCOR working groups cover the entire range of ocean science topics. SCOR welcomes IGBP co-sponsorship of new working groups and is interested in participating in new IGBP Fast-Track Initiatives related to ocean science. SCOR has co-funded three Fast Track Initiatives, on the global iron and nitrogen cycles, and on ocean acidification over time.

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Scientists collect sea water samples which have been brought to the surface from different depths by a rosette sampler.