

**CANADIAN OCEAN SCIENCE NEWSLETTER
LE BULLETIN CANADIEN DES SCIENCES DE L'OCÉAN**

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Report by: Paul Myers, email: pmyers@ualberta.ca

The 40th CMOS Congress, with a overall theme of Weather, Oceans and Climate, Exploring the Connections, will be held 29th May to 1st June, 2006 in Toronto. Additional details on the

Congress can be seen at the web site <http://www.cmos2006.ca/>. A number of oceanographic, climate and GFD themed sessions are planned (as well as a large suite of atmospheric sessions not listed here). The process of confirming plenary speakers is still on going, but among those confirmed in the oceanography area, CMOS is pleased to have Fiamma Straneo from the Woods Hole Oceanography Institute confirmed - She will speak on the potential role of deep convection regions (the Labrador Sea in particular) in our current climate and climate variability.

Those sessions that may be of interest to oceanographers include:

Operational Oceanography and ARGO, Convenor: Howard Freeland

This session will examine progress being made in the development of routine assessments of the state of the deep and coastal oceans and progress towards forecasting evolving ocean states. Thus, papers should focus on the use and interpretation of near real-time data systems such as Argo, altimetry, upper-ocean T, sea level gauges and shelf/slope monitoring programs. Session 1 (morning) will focus on the observational data streams themselves, especially new results and novel methods of interpretation from those streams. Session 2 (afternoon) will focus on data assimilation methodologies and results, preferably those using the data streams discussed in the morning session.

Ocean Evolution and Change, Convenor: Paul Myers

This session examines the state of the oceans over the last century, including the underlying hydrography and circulation of the global ocean. Although an emphasis will be on how/whether the oceans have changed or are changing, papers looking at present day conditions are also welcome. Both modelling and observational papers are of interest. Papers examining all of the world's oceans will be considered.

Coastal Oceanography and Inland Waters session, Conveners: Jinyu Sheng & Ram Yerubandi

This session will focus on aspects of physical processes and modeling of coastal oceans, estuaries and inland waters. Topics could include for example: coastal physical oceanography, storm surges, tsunamis, estuarine dynamics, hydrology and hydrodynamics of large lakes, air-lake interactions, mixing and dispersion of material in the coastal waters.

Atmosphere and Ocean Dynamics, Convenor: David Straub

Papers are solicited on aspects of fluid mechanics relating to atmospheric and/or oceanic dynamics. Topics could include geophysical turbulence, small scale mixing, waves, balance and general circulation theory/modelling. Contributions dealing with theoretical aspects of climate modelling (e.g., statistical models of climate) as they relate to atmospheric and oceanic dynamics would also be welcome.

Atmospheric and oceanic seasonal predictions, Convenor: Jacques Derome

This session will be devoted to studies dealing with both the potential predictability and actual predictions of the atmosphere and oceans on the seasonal to interannual time scale. Statistical, dynamical and mixed statistical/dynamical approaches are of interest, as are studies on the

economic value of seasonal forecasts. Presentations that identify the source of the predictive skill in the forecasting system are particularly welcome.

Climate Change: Attribution and Detection, Convenor: Andrew Weaver

This session is designed to highlight recent advances in understanding both the detection of climate change above the background of natural, unforced variability as well as its attribution to changes in either anthropogenic or natural external forcing. Particular emphasis will be on regional and end-to-end climate change detection as well as new detection and attribution techniques. Papers that aim to prove an increased understanding of natural climate variability are also welcome.

Arctic Weather and Climate Studies : a challenge for IPY, Convenor: Ron Stewart

The Arctic is characterized by many severe weather events and an extreme and changing climate with significant regional variations. Some research has been conducted on these features but much more is needed before we can reliably anticipate weather events and long-term climate trends, and respond in a responsible, sustainable manner. One of the major stumbling blocks for research on these topics has been the paucity of observational information and the lack of coordination between individual studies. The 2007-08 International Polar Year (IPY) serves as an excellent means of advancing Arctic weather and climate studies because it will act as a unique facilitating and coordinating activity. In this CMOS session, submissions are requested from all branches of atmospheric, oceanic, cryospheric and land surface science that focus on Arctic weather and climate and that will benefit from and contribute to IPY.

Tidal Prediction for the Arctic Archipelago

Report by Charles Hannah, HannahC@mar.dfo-mpo.gc.ca

An assimilation system for coastal tidal observations into a finite element model has been applied to the Canadian Arctic Archipelago. The system included a user-specified static ice field to partly account for the frictional effects of the ice coverage. The rms error of the tidal constituents, when averaged across all the observations, is about 14 cm for M2 and (5, 7, 8, 3) cm for (N2, S2, K1, O1) respectively. The normalized rms error for M2 is about 13% and between 20-30% for the other four constituents. The regional tidal prediction errors range from 8-25 cm. These errors vary substantially from region to region, reflecting the regional tidal amplitudes, and from station to station. Maps of the M2 and K1 constituents are shown in Figures 1 and 2. As example application we map the parameter h/u^3 which can be used to identify potential areas of tidal mixing fronts and polynyas (Figure 3). The fields are available online as part of the WebTide tidal prediction package (www.mar.dfo-mpo.gc.ca/science/ocean/home.html).

Dunphy, M., F. Dupont, C. G. Hannah, D. Greenberg. 2005. Validation of a Modelling System for Tides in the Canadian Arctic Archipelago. Can. Tech. Rep. Hydrogr. Ocean Sci. 243: vi + 70 pp. Available online from the BIO library at www.dfo-mpo.gc.ca/Library/316074.pdf.

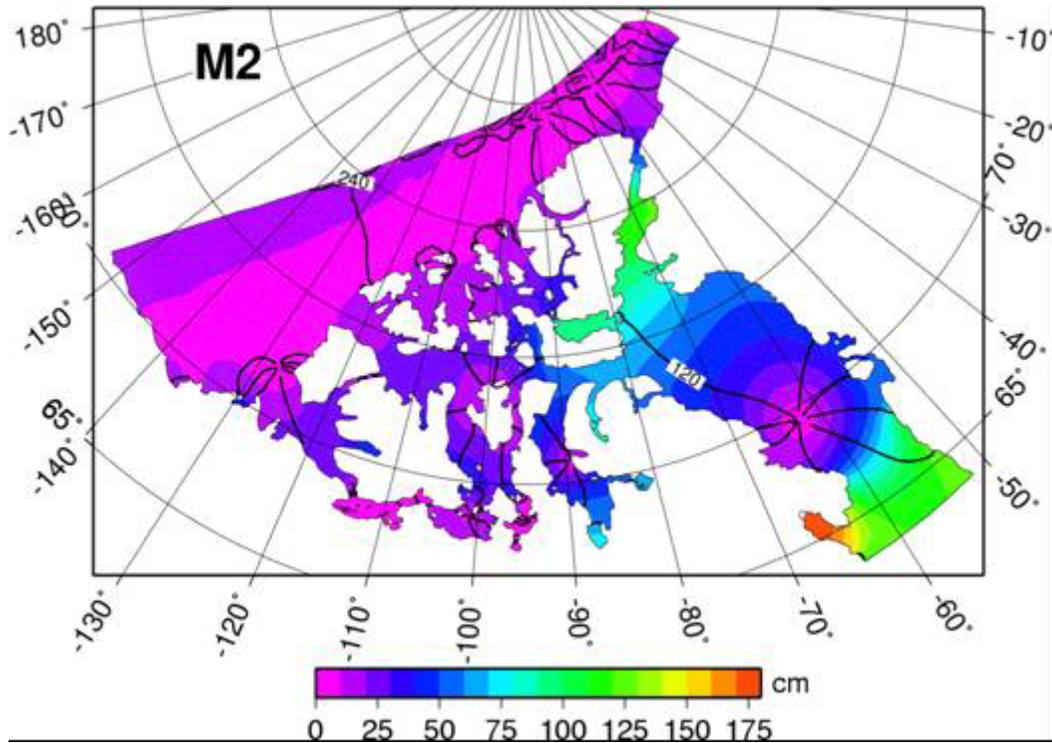


Figure 1: Co-tidal chart for the M2 tidal constituent for the Arctic Archipelago. Note the amphidrome in Baffin Bay and the very small tidal amplitudes in the western half of the domain.

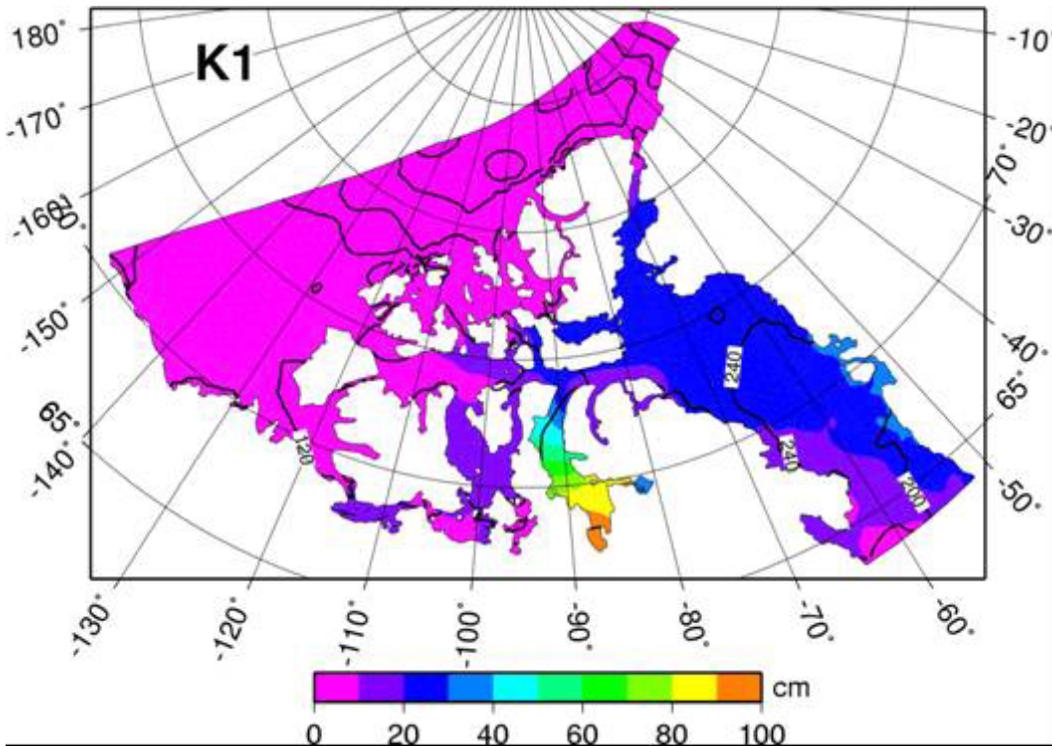


Figure 2: Co-tidal chart for the K1 tidal constituent for the Arctic Archipelago. The K1 tide is relatively small except for the amplification in Boothia Bay.

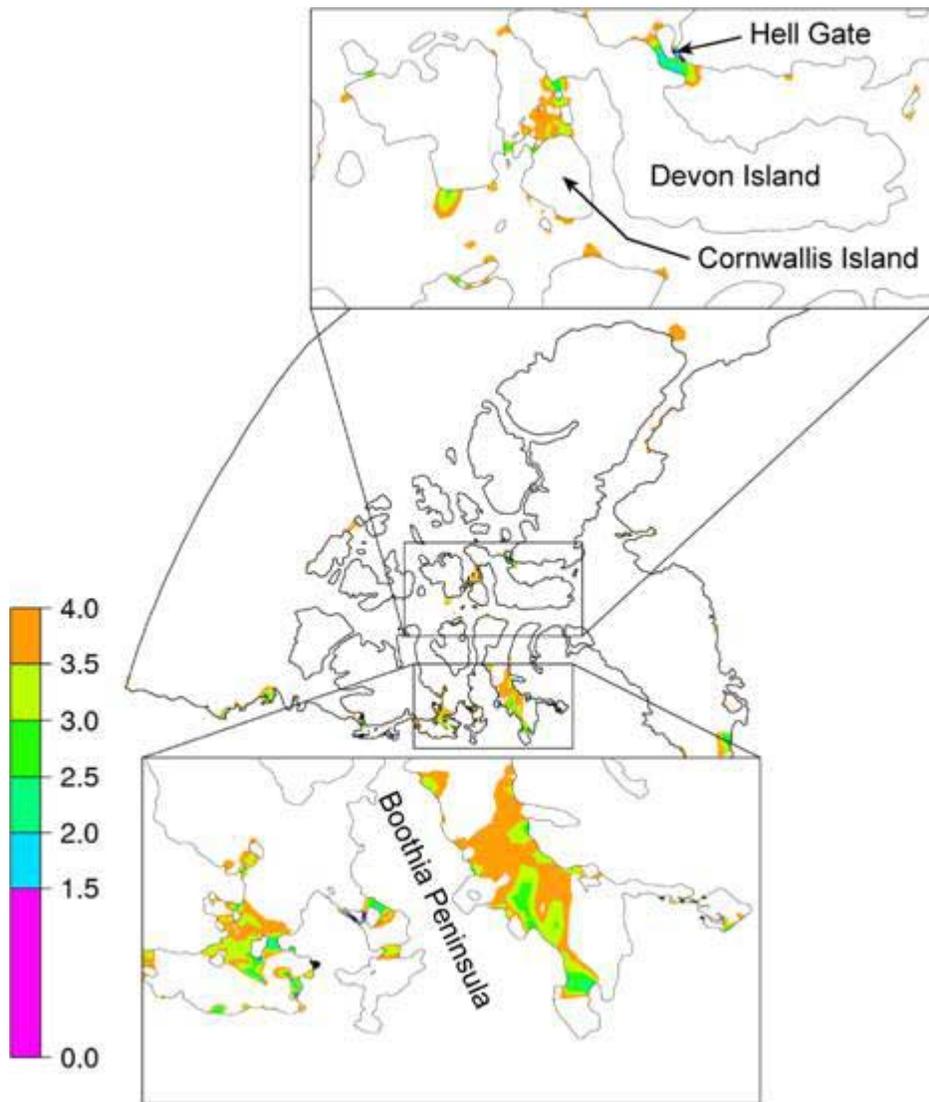


Figure 3: The tidal mixing factor h/u^3 (contours of $\log h/u^3$ are shown). Two regions with the smallest values (strongest mixing) are expanded for detail. The upper inset shows the region around Devon Island and includes Hell Gate, Cardigan Channel, Penny Strait and Queens Channel. The lower inset shows the region around the Boothia Peninsula. In mid-latitude waters, values of $\log h/u^3$ below 2 generally indicate well mixed water, values higher than 4 indicate stratification, and values between 2 and 4 represent transitional zones. Most of the region has values greater than 4 suggesting a stratified water column. The only location with values close to 2 is Hell Gate (upper inset), a narrow channel with very large tidal currents. Several areas with narrow channels or shallow sills have values in the 2 to 4 range and many of these high mixing rate regions coincide with locations of recurring polynyas.

Earth System Science Partnership Open Science Conference

The Earth System Science Partnership Open Science Conference entitled: Global Environmental Change: Regional Challenges will be held 9-12 November 2006 in Beijing, China. For further information about the themes of the meeting, the call for proposals, the venue etc, please see the conference website <http://www.essp.org/essp/ESSP2006>.

Océan Innovation 2005

http://www.oceaninnovation.ca/Programme_fr.pdf

La Conférence et exposition internationale « Océan Innovation », se tiendra au Centre des congrès de l'Hôtel Rimouski, à Rimouski (Québec), du 23 au 25 octobre, ainsi qu'à un quatrième jour d'ateliers le 26 octobre. Le thème de l'événement est, cette année, « *Les eaux nordiques : des défis sur le plan opérationnel* ».

Comme les années précédentes, la conférence, qui se déroule sur deux jours, comportera quatre sessions. Le premier jour mettra l'accent sur une variété de questions liées à l'Arctique et abordées par le biais de la recherche sur le passage du nord-ouest. Le second jour traitera de la cartographie et de la surveillance. Le thème de la première session sera le « Passage du nord-ouest - perspective ». La deuxième session sera organisée autour d'une analyse d'étude de cas plus détaillée du « *Passage du nord-ouest* », qui abordera un certain nombre de questions pertinentes auxquels le Nord fait face aujourd'hui. La troisième session traitera de la « *Cartographie des océans - un contexte nordique* ». La dernière session, « *Observatoires des océans au Canada* », fournira, quant à elle des mises à jour relatives aux projets d'observatoires en Colombie-Britannique, Terre-Neuve-et-Labrador et sur le Saint-Laurent.

Ocean Innovation 2005

http://www.oceaninnovation.ca/Programme_en.pdf

The Ocean Innovation 2005 Conference & Exhibition is being held at the Hotel Rimouski Congress Centre, in Rimouski, Québec on October 23-25, with a fourth day of WaterWorks workshops scheduled offsite on October 26. The theme for this year's event is **Operational Challenges in Northern Waters**. As in previous years, the two-day conference will consist of four sessions, with Day 1 focussing on a variety of issues related to the Arctic and explored through an investigation of The Northwest Passage and Day 2 on Mapping and Monitoring. The theme for Session 1 is *The Northwest Passage - The Opportunity*, while Session 2 will be structured as a more detailed case study analysis of *The Northwest Passage* that will explore a number of relevant issues facing the North today. Session 3 is *Ocean Mapping - a Northern Context*, with the final Session *Ocean Observatories in Canada* providing updates on the observatory projects off British Columbia, Newfoundland & Labrador and in the St. Lawrence.

Role of Viruses in Marine Ecosystems

Contact: Curtis Suttle, csuttle@eos.ubc.ca

There will be a meeting of the SCOR working group on the Role of Viruses in Marine Ecosystems (<http://www.jhu.edu/scor/wg126.htm>) on 2-4 June 2006, at the University of British Columbia. The meeting will be hosted by Curtis Suttle and immediately precedes the ASLO meeting in Victoria. The meeting will focus on Methods in Aquatic Virology and contributions by SCOR and non-SCOR members are welcome. The venue will accommodate 100 participants. If you wish to be on the mailing list for this meeting please contact Curtis Suttle (csuttle@eos.ubc.ca).

Argo Science Workshop #2

Canadian Contact: Howard Freeland, FreelandHj@pac.dfo-mpo.gc.ca



The second Argo Science Workshop will take place 13th to 18th of March, 2006, in Venice in conjunction with the Ocean Surface Topography Steering Team meeting celebrating 15 years of satellite altimetry. For further information:- Email: esa.conference.bureau@esa.int Web: http://www.argo.ucsd.edu/FrSecond_Science_Work.html The web page for the altimetry workshop is: <http://www.esa.int/venice06/>

Highlights of the 2005 SCOR Executive Committee Meeting, Cairns, Queensland, Australia

Canada was represented by Dr. Bjorn Sundby, SCOR President, bjorn_sundby@uqar.qc.ca

SCOR held its 2005 Executive Committee Meeting in Cairns, Queensland, Australia on 29 August to Sept. 1 2005. Approximately 40 individuals attended the meeting, which included a special session on the science and management aspects of coral reefs, in the context of a world in which atmospheric carbon dioxide levels and temperature are increasing. The meeting also included discussions of all ongoing SCOR activities and review of proposals for new activities. (The full report will as usual be produced by the SCOR secretariat and distributed to national SCOR committees when ready.) <http://www.jhu.edu/~scor/>

New Working Groups

From the group of six proposals that had been submitted to SCOR, two were approved for a start in 2006:

1. Thermodynamics and Equation of State of Seawater (chair: Trevor McDougall, Australia)—This group will examine the results of recent research in ocean thermodynamics to recommend a change to the internationally recommended algorithms for evaluating density and related quantities (including enthalpy, entropy and potential temperature). Such recommendations would take into account the reformulation of the International Temperature Scale (ITS-90). The group will examine the most accurate recent knowledge of the freezing temperature of seawater, the calculation of dissolved oxygen, and the behavior of seawater at high salinity. The group also will examine the feasibility of using simple functions of three-dimensional space to account for the effects of the spatially varying concentrations of alkalinity, total carbon dioxide, calcium and silica on the determination of density in the ocean. **From Canada, Dan Wright is a proposed member.**
2. Natural and Human-Induced Hypoxia and Consequences for Coastal Areas (**co-chairs: Jing Zhang, China-Beijing, and Denis Gilbert, Canada**)—This group will synthesize the state of the science and make recommendations for future research related to the following topics:
 - prevalence and variability (i.e., temporal and spatial) of human-induced coastal hypoxia;

- effects of hypoxia on the biogeochemistry and ecology of coastal marine systems, particularly the role of daily to intra-decadal variability, and
- non-linearity (e.g., asymmetric influence) in effects of the formation of, and recovery of coastal ecosystems from, hypoxic events.

The group also will determine the requirements for observing hypoxic events and their impacts in coastal systems and identify requirements for modeling coastal hypoxia and its impacts. **From Canada, Howard Freeland is a proposed Associate Member.**

The full memberships and terms of reference of these working groups will be available on the SCOR Web site after final adjustments are made. It is likely that each group will meet for the first time in 2006.

New Research Project: GEOTRACES

GEOTRACES is a new international ocean research project designed to study the concentrations and distributions of trace elements and isotopes (TEIs) in the ocean, in order to study how the global cycles of TEIs operate and what controls the cycles. SCOR approved the *Science Plan* of the GEOTRACES project and requested that the co-chairs of the GEOTRACES Planning Committee (Robert Anderson, USA, and Gideon Henderson, UK) propose a Scientific Steering Committee for the project. The *GEOTRACES Science Plan* will be published following final revisions made to it based on comments from nine external reviewers. GEOTRACES has formed a subcommittee on data management and one on standards and intercalibrations, each of which will meet in the next few months to begin their work. **(Comment: A group of Canadian scientists have initiated a Canadian GEOTRACES project. See the Canadian Ocean Science Newsletter #14, March 31, 2005, or contact Roger François, UBC, (rfrancoi@eos.ubc.ca)).**

SCOR/IOC Symposium Series on *The Ocean in a High-CO₂ World*

SCOR approved follow-up activities to the successful first symposium on The Ocean in a High-CO₂ World, a meeting convened by SCOR and the Intergovernmental Oceanographic Commission (IOC). SCOR and IOC have begun seeking funding for a second symposium, tentatively planned for 2008, to allow sufficient time since the 2004 symposium for research progress to be made. Results of the first symposium were used in an Intergovernmental Panel on Climate Change (IPCC) Special Report on Carbon Dioxide Capture and Storage, and the continuing series of symposia will be designed to contribute to future IPCC assessments. The papers from the first symposium will be published as a special section of the September issue of the *Journal of Geophysical Research—Oceans*. Some of the papers are already available on-line (see <http://www.agu.org/journals/ss/HIGHCO2/>).

Review of Anthropogenic Nitrogen Impacts on the Open Ocean

SCOR has agreed to contribute funding and scientific advice to a joint Surface Ocean – Lower Atmosphere Study (SOLAS)/International Nitrogen Initiative (INI) Review of Anthropogenic Nitrogen Impacts on the Open Ocean. This review will contribute to the larger INI effort “dedicated to optimizing the use of nitrogen in food production, while minimizing the negative effects of nitrogen on human health and the environment as a result of food and energy production. Among the many facets of the INI are scientific assessment, development of solutions to solve a wide variety of nitrogen-related problems, and interactions with policymakers to implement these solutions.”(see <http://initrogen.org/>). Part of the SOLAS research activity is related to the air-sea flux of gases important in climate change, including

nitrogenous gases. The review will be conducted by a workshop group in 2006 and the products will be 2-4 papers for submission to journals such as *Deep-Sea Research* or *Global Biogeochemical Cycles*, and a review paper submitted to *Science* or *Nature*.

Budget Approved

Meeting participants approved a 2006 budget for SCOR with about a US\$70,000 deficit. This will allow SCOR to finance several one-time meetings and start two new working groups, while maintaining sufficient funds in surplus for future activities. It is anticipated that this deficit will be decreased over the year as outside funds are identified to replace SCOR funds. The surplus was generated over the past several years because of conservative budgeting and payment of past dues by several SCOR national committees.

In addition to decisions at the SCOR Executive Committee meeting, other progress on SCOR activities has been made since the previous newsletter.

News About Major Projects Sponsored by SCOR

SCOR/IOC Global Ecology and Oceanography of Harmful Algal Blooms (GEOHAB) program—GEOHAB continues its implementation, with continued work on research plans for the Core Research Projects on HABs in Eutrophied Systems, and HABs in Fjords and Coastal Embayments. The final focused GEOHAB Open Science Meeting, on HABs and Stratification, will be held at the UNESCO Headquarters in Paris in December 2005 (see <http://www.scor.confmanager.com>). **(Comment: Efforts to establish a Canadian GEOHAB program have so far not been successful.)**

SCOR/IGBP Integrated Marine Biogeochemistry and Ecosystem Research (IMBER) project—The IMBER Science Plan and Implementation Strategy was published in August 2005 and is available through the IMBER International Project Office (Sylvie.Roy@univ-brest.fr). IMBER and the Global Ocean Ecosystem Dynamics (GLOBEC) project are beginning to plan joint work on end-to-end food webs and other topics relevant to both projects. IMBER and GLOBEC also are developing a process to identify which GLOBEC-related research should be continued by IMBER after GLOBEC is completed at the end of 2009. **(Comment: Sylvie Roy is a Canadian scientist.)**

Project Coordination

SCOR continues to work in the area of stimulating coordination among large-scale ocean research projects and implementing recommendations from the 2004 project coordination meeting (see <http://www.jhu.edu/scor/PCReport.pdf>). A new page on the SCOR Web site provides a link to the major ocean research projects that are associated with SCOR (see <http://www.jhu.edu/scor/ProjCoord-front.htm>). SCOR will request funds for another project coordination meeting, to precede the 2006 SCOR General Meeting in Concepción, Chile. SCOR is participating with the Partnership for Observations of the Global Ocean (POGO) and others on developing an international database of research cruises.

2006 SCOR General Meeting

The 2006 SCOR General Meeting will be held in Concepción, Chile on 23-26 October 2006 (waiting for confirmation of dates). The Chilean SCOR Committee is arranging a symposium on “Oxygen minimum systems in the ocean: distribution, diversity and dynamics” to coincide with the SCOR meeting. Nominations for 2006 elections for SCOR officers (Secretary and Vice-Presidents) will be opened in mid-April and election results will be finalized at the meeting.

Request for Proposals: International Polar Year Projects in the Natural Sciences and Engineering

A one-time funding opportunity is available through NSERC's Special Research Opportunity (SRO) Program for participation in projects that are part of International Polar Year (IPY) 2007-08. The deadline for application submission is November 7, 2005.

The International Council for Science (ICSU) and the World Meteorological Organization (WMO) have declared 2007-08 as the International Polar Year (IPY) starting March 1, 2007, and ending March 1, 2009. The International Polar Year will focus researchers around the world on the North and South polar regions. In the context of NSERC's emphasis on supporting northern research, NSERC is launching this one-time Request for Proposals (RFP) through the SRO Program to support the participation of Canadian researchers in International Polar Year projects. NSERC is soliciting applications for research proposals linked to IPY from NSERC-eligible researchers in the fields of the natural sciences and engineering. Proposals must be for projects that have been officially endorsed at the national (<http://www.ipy-api.ca/>) or international (<http://www.ipy.org/>) level as being IPY projects.

NSERC expects to support a limited number of high-quality research projects of up to three years' duration that cover the 2007 and 2008 IPY years. Projects can start before the official March 1, 2007 start date of IPY and end after the official end date of March 1, 2009, but should cover the two IPY years. NSERC will make available up to \$2 million per year for three years for the IPY competition. Although a maximum of \$500,000 per year for three years can be requested for a specific proposal, we expect the majority of funded projects to be in the \$100,000 to \$200,000 per year range. Thus, NSERC expects to support 10 to 15 projects.

Details on eligible project themes, application procedures, selection processes, evaluation criteria, reporting requirements, etc. may be found on the NSERC site at: http://www.nserc.gc.ca/professors_e.asp?nav=profnave&lbi=a4_polar For additional information, please contact Paul Potvin by telephone at (613) 995 5821, or by e-mail at paul.potvin@nserc.ca.

CANADIAN OCEAN SCIENCE NEWSLETTER LE BULLETIN CANADIEN DES SCIENCES DE L'OcéAN

Previous newsletters may be found on the CNC/SCOR web site.
Les bulletins antérieurs se retrouvent sur le site web du CNC/SCOR.

Newsletter #19 will be distributed on November 23, 2005. Please send contributions to dick.stoddart@sympatico.ca
Bulletin #19 sera distribué le 23 novembre 2005. Veuillez faire parvenir vos contributions à dick.stoddart@sympatico.ca

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