



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

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NSERC Scholarship Supplement in Ocean Sciences

The Canadian National Committee (CNC) for the Scientific Committee on Oceanic Research (SCOR) is pleased to announce, in partnership with DFO and CMOS, the establishment of a new NSERC Scholarship Supplement for Ocean Sciences in the amount of \$5,000/year to a deserving student for a period of two years. Only those students who have succeeded in winning an NSERC Postgraduate Scholarship or a Canada Graduate Scholarship are eligible. The initial award of \$5,000 is renewable for the second year provided that the student continues to hold the NSERC postgraduate scholarship. The application deadline for the inaugural award is **April 15, 2006**. Further information on the Supplement and how to apply may be found on the NSERC web site: http://www.nserc.ca/sf_e.asp?nav=sfnave&lbi=2b_4.

In establishing the Scholarship Supplement, CNC/SCOR intends to use already established mechanisms to solicit applications through NSERC and use adjudication procedures established through CMOS. The winning student will be selected by representatives of the CMOS Scientific Committee. The Supplement will be awarded at the annual banquet of the CMOS Congress. By using the well established NSERC and CMOS solicitation and adjudication procedures, CNC/SCOR will ensure that administrative overhead will on the one hand remain within the overall comfort level of the academic community, and on the other, will be fair, rigorous and transparent.

Supplément à une bourse CRSNG pour les sciences de la mer

Le Comité national canadien (CNC) pour le Comité scientifique pour les recherches océaniques (SCOR) est heureux d'annoncer, en partenariat avec le MPO et la SCMO, l'établissement d'un nouveau Supplément à la bourse du CRSNG pour les sciences de la mer, d'un montant de 5 000 \$ par année, à un étudiant méritant pour une période de deux ans. Seuls sont éligibles les étudiants ayant remporté une bourse d'études supérieures du CRSNG ou une bourse d'études supérieures du Canada. Le Supplément initial de 5 000 \$ est renouvelable pour la seconde année à condition que l'étudiant continue de détenir la bourse d'études supérieures du CRSNG. La date limite de présentation des candidatures pour le Supplément inaugural est le **15 avril 2006**. On pourra trouver plus de précisions sur le Supplément et sur la façon de présenter une demande en visitant le site Web du CRSNG à l'adresse http://www.nserc.ca/sf_f.asp?nav=sfnave&lbi=2b_4.

Pour décerner le Supplément à une bourse, le CNC/SCOR a l'intention d'utiliser les mécanismes déjà en place pour solliciter des candidatures par l'entremise du CRSNG et d'utiliser les modalités d'adjudication établies à la SCMO. L'étudiant gagnant sera choisi par des représentants du Comité scientifique de la SCMO. Le Supplément sera accordé lors du banquet annuel du Congrès de la SCMO. En utilisant les modalités de sollicitation et d'adjudication bien établies du CRSNG et de la SCMO, le CNC/SCOR s'assurera que l'administration générale, d'une part, restera dans la zone de confort du milieu de l'enseignement et, d'autre part, sera juste, rigoureuse et transparente.

Graduate Student Position; Optical Properties of a Large Interior Sea: Hudson Bay Université du Québec à Rimouski

Closing Date: Monday, 20 March 2006

Applications are invited for a two-year M.S. student position focusing on the analysis of apparent and inherent optical properties of the Hudson Bay (Canada). This water body is a large interior sea with an area close to 1 million square kilometers. The water optical properties are strongly affected by the freshwater runoff of multiple rivers located around the periphery of the bay. The project consists of analyzing a set of data to understand the spatial and temporal influence of river waters on the optical properties. This analysis will lead to the validation of actual remote sensing algorithms used to process ocean color images and possibly to the development of regional algorithms. The candidate is expected to participate in a research cruise in spring-summer 2007 to acquire new optical properties data in the Hudson Bay. The position will work collaboratively within a Network of Centres of Excellence known as ArcticNet. For more information about ArcticNet, please go to: <http://www.arcticnet.ulaval.ca>

The Université du Québec à Rimouski is a french university. All courses will be in french but the thesis can be written in English. The expected starting date is September 2006.

The applicant should have:

- B.Sc. in environmental science, biology, physics
- Enthusiasm for field work

To apply, please send a cover letter and resume to:

Pierre Larouche
Institut Maurice-Lamontagne
PO Box 1000
Mont-Joli, QC G5H 3Z4
Canada
E-mail: LaroucheP@dfo-mpo.gc.ca

Past Global Changes (PAGES) Job Database

PAGES provides a free listing of paleoscience jobs as a service to the PAGES community. Jobs are divided into 5 categories. As of March 7, 2006 the categories had the following number of entries, several of which were in the Canadian community: student jobs (8), post-doc jobs (8), faculty jobs (10), other jobs (5), and IPO jobs (0). The job listing may be found at <http://www.pages-igbp.org/services/jobs/>

Beringia 2005 Expedition in the Arctic Ocean

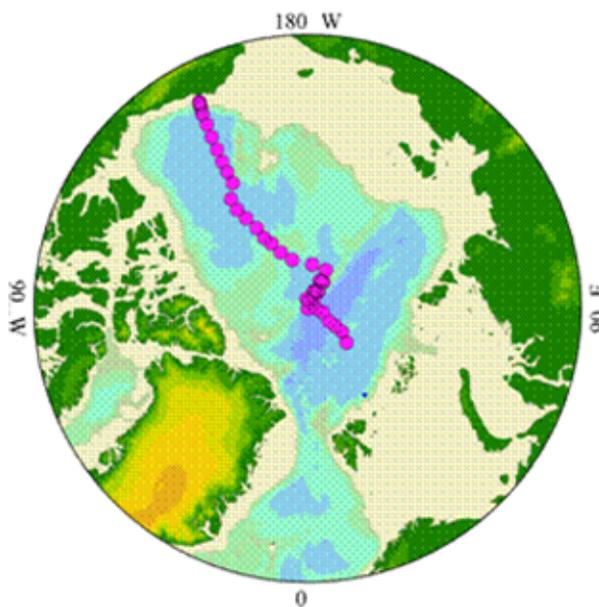
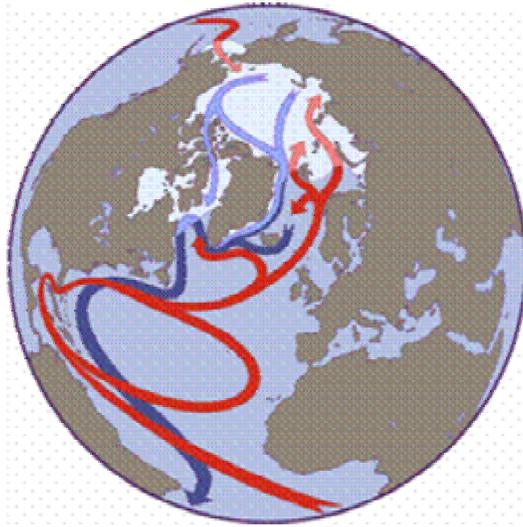
Report by Peter Jones, JonesP@mar.dfo-mpo.gc.ca

From August 19 to September 25, 2005, Peter Jones and Frank Zemlyak (Ocean Sciences Division, Bedford Institute of Oceanography) took part in the Beringia 2005 Expedition in the Arctic Ocean on board the Swedish icebreaker, Oden. Oden was the first icebreaker to cross the central Canadian Basin, dubbed the “Canadian Hole”, previously considered to be an inaccessible region. One goal of the expedition was to obtain more information on the fresh water sources and their distributions within the Arctic Ocean in this relatively unexplored region. A motivation for this work is that changes in the fresh water budget of the Arctic Ocean could have a significant effect on climate in the northern hemisphere. This is because the Atlantic Ocean experiences more evaporation than precipitation, with much of this excess evaporated water falling as rain into the Pacific and Arctic oceans and into river drainage basins, all of which feed back into the Atlantic Ocean via the Arctic Ocean. The climate change concern is that, in returning to its evaporation sites, the fresh water passes through regions of deep convection in the Nordic and Labrador seas, the “headwaters” of thermohaline circulation or the “Global Conveyor Belt.” Climate and climate change is a primary motive for determining fresh water sources, their distributions and their pathways. Identifying the fresh water sources and tracing their flow within the Arctic Ocean is a step towards this end.

The fresh water sources in the Arctic Ocean are water from rivers, Pacific water (fresher than Atlantic water and thus a source of fresh water for the Atlantic Ocean), and sea ice meltwater. In addition to determining concentrations of the waters in the previously unsurveyed areas, we were able to note changes at the North Pole based on comparisons with our data collected on previous expeditions in 1991 and 1994. One such change was Pacific water re-establishing a presence there after more than a decade.

This and other similar work make clear that climate change scenarios dealing with fresh water budgets of the Arctic Ocean should not use just a single parameter to represent fresh water in the Arctic Ocean since fresh water has different sources and distributions, all subject to different forcing. Of the three components that affect thermohaline circulation, river water would seem to be the most open to change. At present the export of sea ice meltwater seems to be the least likely to influence thermohaline circulation, though this could play a large role with changing ice conditions.

The Global Conveyor Belt in the Atlantic Ocean (After Greg Holloway)



Expedition Track

Coastal Zone Canada 2006 Conference and Climate Change

Dr. Jennifer V. Lukovich, Research Scientist, Centre for Earth Observation Science, University of Manitoba, Winnipeg, MB, lukovich@cc.umanitoba.ca

Climate change is no longer an issue to be debated, but an urgent reality to be addressed. Research over the last decade has shown the impacts of climate change in the Arctic, with record

reductions in minimum sea ice extent, and weakened thermohaline circulation in the North Atlantic. Extreme weather events attest to the Earth's response to globalization fostered by a continued reliance on fossil fuels and loading of greenhouse gases to the atmosphere. Ozone depletion as a consequence of disturbances to the polar vortex and again, increased greenhouse gas loading to the atmosphere, is a signature of climate change. Moreover the impacts of climate change on the Earth's ecosystem are none the more apparent than in the circumpolar regions of our planet.

The Coastal Zone Canada 2006 Conference, to be held in Tuktoyaktuk, Northwest Territories from August 14 – 16, 2006, addresses issues associated with the most susceptible of the Northern regions – its coastal zones. The first of this series to be hosted in the Canadian Arctic, the Coastal Zone Canada 2006 Conference examines three key themes that draw on the knowledge of Northern Communities, Arctic research scientists, politicians and stakeholders. The first, "Drivers of Change – Implications for the Arctic", explores the role climate change will play in the economic development of Northern Communities. "Community Well Being" underlines existing factors that define northern communities and means by which livelihoods and communities may be protected and preserved when addressing responses to climate change. Finally, issues of ocean governance in the context of the Ocean Action Plan, established by the federal government in March, 2005, and designed to provide an integrated national/territorial framework for ocean and coastal management and marine ecosystem protection, in addition to the Arctic Marine Strategic Plan, a collaborative program of eight circumpolar nations, adopted by the Arctic Council in 2004, and intended to create a comprehensive international framework to investigate pollution, coastal areas, and health in Northern communities, are examined in "Ocean Management and Governance."

Modelling studies have shown that most sea level rise will occur in the Arctic Ocean (IPCC, 2001), as a consequence of increased river runoff, due to increased storm frequency and intensity, in addition to melting glaciers and changes in permafrost, due to a global temperature increase. Organized by Dr. David Barber, Canada Research Chair in Arctic System Science at the University of Manitoba, the climate change session of the conference is designed to integrate the scientific, social and political elements of climate change in the context of the three specific conference themes. The first component of the climate change session will provide scientific evidence for climate change based on research in sea ice, snow, glaciers, carbon flux exchange and permafrost, in addition to atmospheric and oceanic processes studied in the Canadian Arctic and internationally, with a brief overview of Arctic research networks and international collaboration and emphasis on coastal communities.

The second component of the climate change session will focus on the repercussions of a changing northern climate for the well-being of Northern communities, with perspectives from northern community representatives on livelihood changes as a consequence of reductions in multi-year ice, longer ice-free seasons, melting permafrost and glaciers, and contaminant transport as a consequences of variability in atmospheric and oceanic dynamics. Predictions based on forecasting models that incorporate temperature increases and sea level rise will outline the implications of climate change for traditional ways of life, socio-economic development and international collaboration in the form of ecosystem management plans, in northern coastal communities over the next several decades.

Climate change provides northern coastal communities with the opportunity for renewed economic development. The last session will focus on governance and adaptation strategies designed to address climate change. Northern coastal communities as pilot projects for alternative energy technologies in a decentralized grid structure will be explored within the framework of the national Arctic Ocean Action Plan. Training in the form of community-based monitoring established in both the CASES and ArcticNet research networks will also be examined. Coastal protection management is key to developing a strategy for increased flooding and potential erosion in coastal communities. Canada's leadership role in establishing an economy built on environmental sustainability and stewardship can be defined within the context of the Arctic Marine Strategic Plan, through such initiatives as permanent land-based meteorological stations and oceanographic stations to monitor sea level rise, pollution and contaminant transport, while simultaneously securing Canadian sovereignty in the Arctic.

The importance of this conference to Arctic Ocean Science resides in the shared knowledge of Northern Communities and their inhabitants, stakeholders, scientists and politicians to establish an action plan for Canada's Northern coastal communities. From the perspective that links science with policy and the public, the Coastal Zone Canada 2006 conference serves as an affirmation of Canada's commitment not only to understanding polar coastal regions in the context of climate change, but to legislation and incentives that will encourage growth and development within northern communities through international collaboration.

CASES Workshop in Winnipeg

Jennifer Lukovich, Research Scientist, Centre for Earth Observation Science CEOS, University of Manitoba, lukovich@cc.umanitoba.ca

The Canadian Arctic Shelf Exchange Study (CASES) program is an international collaboration that includes principal investigators from 10 Canadian universities, four federal departments and 9 different foreign countries. Funded by NSERC in 2001, CASES examines the Mackenzie Shelf ecosystem through studies of connections between atmospheric, oceanographic and hydrologic forcing of the marine ecosystem in the Southern Beaufort Sea (SBS). Overall, the CASES field program logged 543 days at sea on 6 different vessels, 377 of these days being directly chartered by CASES and 166 being contributed by national and international partners. This corresponded to a total of 14 544 day-scientists at sea, which makes the CASES field program the largest and most comprehensive international effort ever to decipher the functioning of the Arctic Ocean shelf ecosystem (Figure 1). The CASES workshop held in Winnipeg, Manitoba, from February 14th -- 17th, 2006 provided a synthesis of analyses resulting from the field studies, while underlining the significant impact this program has had in advancing existing knowledge in the area of Arctic System Science.

The CASES 2006 workshop was launched by a Climate Change Youth Forum on February 13th, 2006, hosted by the CASES Schools on Board Program, led by Lucette Barber, and coordinated by Grant Park High School students, Tatjana Trebic, Duncan Farthing-Nichol, and Runjun Kumar and teachers. CASES Principal Investigators Dr. David Barber and Dr. Louis Fortier provided an overview of scientific evidence for climate change, in addition to Canada's

upcoming potential role in the International Polar Year (IPY). Other Principal Investigators and graduate students in the CASES study program relayed their experiences on board the Amundsen in the Beaufort Sea, and engaged high school students in their research programmes through a series of parallel sessions focused on discipline specific presentations.

Science meetings from February 14th – 17th, 2006, and organized by Dr. Josee Michaud (Universite de Laval) and David Moss crop (University of Manitoba) provided researchers with the opportunity to become acquainted with colleagues' analyses and to ascertain connections between programmes from each of the nine CASES subgroups. The interdisciplinary nature of CASES – a key component in understanding Arctic marine ecosystems – was also highlighted. Professor Grant Ingram, Principal investigator for atmospheric and sea ice forcing of coastal circulation, presented results from Acoustic Doppler Profiler, moorings and turbidity measurements conveying the nature of shelf-canyon exchange. Presentations from this subproject also included studies of tides and mixing events (Y. Gratton), freshwater plume formation by compression ridges over the Mackenzie Delta using video/laser sensors (S. Prinsenberg), in addition to the role of baroclinicity and inertial oscillations in shelf-break processes in the Southern Beaufort Sea (W. Williams).

Professor David Barber, Principal investigator for ice-atmosphere interactions and biological linkages, presented results from optical and passive microwave dataset measurements and their confirmation of both rapid reduction in sea ice extent, in addition to a shift from multi-year ice to first-year ice in the Beaufort Sea region. Discussed also were improved cloud retrievals from satellite data based on improved radiative transfer models developed within CEOS. An overview was also provided of drifting and blowing snow studies based on heat flux measurements (P. Taylor), optical and structural analyses of lower-level sea ice (J. Ehn), and carbon sequestration in the context of air-surface CO₂ exchange over sea ice, based on eddy correlation flux experiments (T. Papakyriakou).

Seven additional subgroups related to biological productivity, contaminant transport, and carbon cycles presented results related to their theme. In particular, photo-oxidation of dissolved organic matter was discussed according to satellite remote sensing observations (S. Belanger), relative contributions of ice melt and runoff to system stratification based on ¹⁶O/¹⁸O and salinity measurements (R. Macdonald), and concentrations of archaea along the Mackenzie slope (J. Deming). Further information on conference presentations and abstracts may also be found on the CASES schedule website at http://www.cases.quebec-ocean.ulaval.ca/CASES06_detailed_agenda_Final.pdf. With thanks as well to Dr. Josee Michaud and David Moss crop for having organized the science session on February 14th – 16th.

Much progress has been made in the CASES network, measured in terms of improved scientific understanding of the region, the establishment of training programs for graduate students and future Arctic scientists, and outreach programs to educate the public as to the significance of climate change and implications for the Arctic. It is this work that will provide the foundation for its extension, ArcticNet, and additional Canadian involvement in the IPY programme.

The science session was followed on February 17th by a discussion on Canada's role in the International Polar Year (IPY), cluster projects and collaborations with IPY projects developed in other countries. Plans and similarities between programmes were examined. The science meeting concluded with a planning session for ArcticNet, a Network of Centres of Excellence of Canada, which builds and expands on the initiatives established by CASES, through its multidisciplinary approach to research and learning. ArcticNet incorporates knowledge from the natural and social sciences, human health and governmental agencies, and entails collaboration between 23 Canadian universities, and with research teams from over 10 countries. ArcticNet seeks to improve understanding of climate change in the Arctic through examination of four themes including the impact of climate change on east-west physical processes, north-south physical processes, the Hudson Bay watershed, and policy development to address these changes. These are indeed exciting times for Arctic marine research, its scientists, and northern communities.

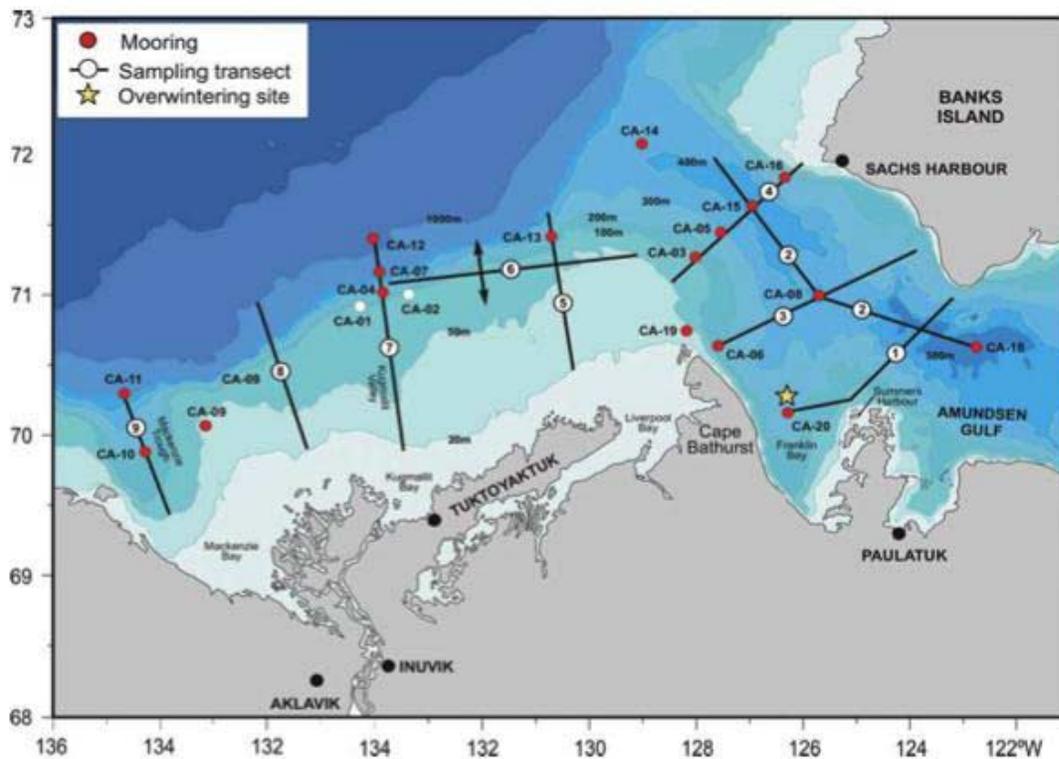


Figure 1. Map of the study area with position of moorings and sampling transects covered by the Amundsen in the fall of 2003 and the spring/summer of 2004. The over-wintering position of the ship in Franklin Bay is indicated by a yellow star.

9th International Workshop on Wave Hincasting and Forecasting

Victoria, B.C., September 24-29, 2006

An international workshop on wave prediction in coastal areas sponsored by Environment Canada, the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory, and the WMO/IOC Joint Technical Commission for Oceanography and Marine

Meteorology (JCOMM), will be held in Victoria, British Columbia, Canada at the Ocean Pointe Resort and Spa on September 24-29, 2006. The objectives of the workshop are:

- to provide a forum for the exchange of ideas and information related to wave hindcasting and forecasting,
- to coordinate ongoing R&D initiatives,
- to discuss priorities for future research and development.

The theme session for this workshop is “Extreme Storm Seas”. Papers dealing with research related to this theme will be given particular consideration. Topics may include theoretical aspects, numerical modelling, operational forecasting and hindcasting, measurements and case studies of extreme wave phenomena; the interpretation of climatic characteristics of extreme waves, and the impact of these phenomena on offshore operations and design considerations.

Papers are also welcomed on other research and operational aspects of wave hindcasting and forecasting; including operational forecasting; regional hindcasts; data collection and instrumentation; data assimilation into numerical models; wave-current interaction; wave-ice interaction; shallow water and nearshore effects; wind fields for wave hindcasting or forecasting; extremal analysis; case studies.

Those wishing to present a paper or poster should submit a title and abstract (100-300 words) to either address shown below. Each abstract should contain the author’s name, mailing address and telephone number. The deadline for receipt of abstracts is April 6, 2006. Full papers will be required by September 1, 2006. To receive further notices, please contact:

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See www.oceanweather.com/waveworkshop for further information as it becomes available.

Arctic Council Working Group on the Protection of the Marine Environment (PAME)

Report by Geoff Holland; hollandg@shaw.ca

The Arctic Council Working Group on the Protection of the Marine Environment (PAME) met in Oslo, Norway in early March. Canada was represented by Chris Cuddy (INAC) and Maureen Copley (EC). On the agenda was an item on the *Regional Programme of Action for the Protection of the Arctic Marine Environment from Land-based Activities (RPA)*. This regional agreement, part of the Global Programme of Action (GPA), is being considered for possible revision in the light of recent information and developments and ahead of the Intergovernmental

GPA Meeting taking place later in the year. Canada was requested to act as lead country in the preparation of a draft document for discussion and presented an initial review of the RPA to the PAME WG, with a recommendation that a formal review of the RPA be included in the 2004-2006 work plans for PAME.

Call for SCOR Working Group Proposals for 2006

The 28th SCOR General Meeting will take place in Concepcion, Chile on October 23-26, 2006. For consideration at that meeting, the SCOR Secretariat will accept proposals for new SCOR working groups from now until May 31, 2006. Model proposals and other information about working groups can be found at www.jhu.edu/scor/wkgrpinfo.htm Comments from the 2005 evaluation stated that there is still no activity on benthic biology or about hard rock geology in Earth Sciences....Where can SCOR improve its disciplinary balance? Potential areas, in addition to those listed above, are shelf-break processes and models, physics/sedimentology/geochemistry, and instabilities related to clathrate dissolution. Particularly useful would be interdisciplinary work focused on the shelf break. SCOR has sufficient funding for two new working groups to start in 2007. National SCOR committees are an important aspect of SCOR's operation and can play a key role in reviewing working group proposals. Proponents should consider submitting their proposals through their national SCOR committees, although SCOR will also accept proposals from individuals and other organizations. Details on the call for proposals may be found at: <http://www.jhu.edu/~scor/2006GM.htm> (the second entry).

International SCOR February 2006 Electronic Newsletter

The SCOR Electronic Newsletter #5 may be downloaded from the SCOR Publications page (second entry from the bottom) at <http://www.jhu.edu/scor/SCORpubs.htm>.

CANADIAN OCEAN SCIENCE NEWSLETTER
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Previous newsletters may be found on the CNC/SCOR web site.

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Newsletter #22 will be distributed on May 4, 2006. Please send contributions to dick.stoddart@sympatico.ca

Bulletin #22 sera distribué le 4 mai 2006. Veuillez faire parvenir vos contributions à dick.stoddart@sympatico.ca

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