Canadian National Committee for SCOR
Comité national canadien pour SCOR

Scientific Committee on Oceanic Research

CANADIAN OCEAN SCIENCE NEWSLETTER

LE BULLETIN CANADIEN DES SCIENCES DE L'OCÉAN

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OCEAN SCIENCE PROGRAMS

The Arctic - A CMOS Special Interest Group

submitted by Marty Taillefer, Maritime Way Scientific Ltd.

After two years of ideas, discussions and preparations, the Arctic Special Interest Group officially launched its existence on May 26 2013 at this year's 2013 Joint Scientific Congress of the CMOS, CGU and CWRA, in Saskatoon, Saskatchewan. This special CMOS group was created to serve as a focus for interests in the North and an opportunity for both CMOS members and non-members to participate in a forum on Northern and Arctic issues seeking to publicly promote and create advantages for its cause: the Arctic. The scope of the Arctic SIG covers the interest of Canada's north as an emerging and important area for applications of meteorological, oceanographically and related science knowledge and data.

The idea to have a vehicle by which scientists can engage around Arctic issues started in 2011 when Marty Taillefer (Maritime Way Scientific), David Fissel (ASL Environmental Sciences) and Ann McMillan (Storm Consulting) created a working group to explore the creation of an Arctic association. A year later at the 2012 CMOS Congress in Montreal, Marty Taillefer proposed an engagement during its Annual General Meeting (AGM) to stand up the association within the auspices of CMOS. The idea received enthusiastic support from the AGM which lead to a proposal, in September 2012, to the National Council to form an Arctic Special Interest Group. The proposal, already supported by over 65 members, along with a draft Terms of Reference was approved. It was decided to formally launch the Arctic SIG in Saskatoon at the 2013 Congress.

At the start of the Congress - a special session was held on Sunday 26 May, 2013. Marty Taillefer laid out the objectives of focusing the role of the SIG and arriving at a manageable number of projects to be accomplished over the coming months. In addition, interested attendees were invited to step forward to lead or participate in the SIG activities. A series of notable speakers provided brief presentations:

- Jim Drummond, of Dalhousie University, briefed the group about the Polar Environment Atmospheric Research Laboratory (PEARL), which has received needed CCAR support, and the new Consortium for Arctic Infrastructure.

CNC-SCOR

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The Canadian National Committee of the Scientific Committee for Oceanic Research (CNC-SCOR) fosters and facilitates international cooperation. It is a non-governmental body that reflects the multi-disciplinary nature of ocean science and marine technology.

Le Comité national canadien du Comite scientifique de la recherche océanographique (SCOR) favorise et facilite la coopération internationale. Il reflète la nature multidisciplinaire de la science océanique et de la technologie marine.

- Drew Peterson, of the U.K. Met Office, gave some insights into the interest of the U.K. Met Office in the Arctic and the status of their work.
- Susan Woodbury presented a summary, on behalf of Fraser Davidson (DFO), of the work being done by Environment Canada, Fisheries and Oceans and National Defense under the CONCEPTS MOU, with a focus on linked ocean/air models for the Beaufort Sea.
- David Fissel, President of ASL Environmental Sciences, talked about the potential of cabled observations for Arctic work and specifically about the Cambridge Bay observatory.
- Andy Monahan, Science Adviser to CMOS, spoke about the role of the SIG in relation to the Science Advisory Group within CMOS and suggested that if CMOS moves to update their Statement on Climate Change, for example, it would be fitting if the Arctic SIG could be called upon to prepare a statement on Climate Change in the Arctic for inclusion.
- Brian Horton, of the University of Manitoba, talked about ArcticNet and the work ongoing at the University of Manitoba in the Arctic.

Following these speakers a discussion panel was convened that included the SIG speakers along with Al Pietroniro, Director of the Canada Water Survey, and Jim Abraham, retired Director General from Environment Canada. Questions and discussion were wide ranging from concern expressed about outreach efforts with Northerners that are seen as too quick and without a plan, to resounding support for the Arctic SIG becoming a "go to" group for ensuring Arctic Science has a voice.

To complement the creation of the SIG, a "stream" of Polar sessions was organized by David Fissel and Paul Myers (CNC-SCOR) with 21 papers on Arctic topics having a range of content. These polar sessions and the plenary by Robie Macdonald (DFO) attracted considerable interest as the number of members of the Arctic SIG continued to swell during the Congress. The landing of the SIG at CMOS was culminated with Pierre Gauthier's (CMOS National President) banquet speech that recognized the importance of the SIG and the contribution that it can have on future CMOS functions and delivery of Arctic science within the society and beyond.

If you would like to join the Arctic-SIG please e-mail: Marty Taillefer at mtaillefer@maritimeway.ca.

Canada Contributes to the Arctic Ocean Acidification Assessment

submitted by Paul Lyon, DFO, Ottawa

The Arctic Monitoring and Assessment Programme (AMAP) governing body agreed based on the Arctic Council's Tromsø Declaration of 2009, to conduct a scientific assessment dealing with observations and potential impacts of Arctic Ocean Acidification (AOA) for delivery to Arctic Council Ministers in May 2013.

The AMAP is an international organization established in 1991 to implement components of the Arctic Environmental Protection Strategy to which Canada is a signatory. AMAP is an entity of the Arctic Council of which Canada is a member state.

Facilitated by Fisheries and Oceans Canada (DFO), two workshops were held to bring together government (DFO) scientists and Canadian academic experts in ocean acidification from both the ocean and social sciences to

compile and summarize data, produce an outline and relevant Canadian text, and develop figures and tables for submission to the AOA assessment.

The first workshop scoped out the key components of Canada's contribution to the process and was held in Sidney British Columbia at the Institute of Ocean Sciences on August 24-25 2011. The second workshop, which was hosted by the University of British Columbia in Vancouver on August 15-16, 2012, involved a detailed review of a working draft of the Arctic Ocean Acidification Assessment.

DFO scientists participated in a series of international face-to-face meetings of the AMAP Ocean Acidification Expert Group and other relevant meetings on the subject of ocean acidification throughout the assessment process. Canada's contribution, drawing from the discussions from the two workshops, helped to define the scope of the AMAP assessment and in the provision of specific content in the final document, notably in the first two chapters which were co-authored by DFO scientists.

DFO undertook a project to generate new data for the assessment. Historical Canadian carbonate system data housed at the Institute of Ocean Sciences were digitized, collated, and used to calculate pH and calcium carbonate saturation states in the Beaufort Sea over the last four decades. This project was completed in the first year of the AOA assessment and resulted in two peer reviewed publications.

Canada was a significant contributor to the work of the AMAP assessment with significant influence on a number of the final document's chapters.

The Arctic Ocean Acidification Summary for Policy-Makers was released by the Arctic Council on May 15th, 2013 at the Kiruna Ministerial Meeting and is available online (click here).

Highlights from the 14th Argo Steering Team (AST-14) meeting

The 14th Argo Steering Team (AST-14) meeting took place 19-21 March 2013 in Wellington, New Zealand. Below are some news items from the numerous issues discussed:

- On the technology side of things, several manufacturers started exploring new float prototypes capable of profiling to depths greater than 2000m. These prototypes of APEX, NINJA, ARVOR and SOLO floats can profile from depths between 3500 and 6000 m. A subset of the Argo array will consist of such deep-Argo floats in the future, allowing better monitoring of heat storage in the ocean.
- India has received major new funding to support the Indian Argo program over the next 5 years.
- Two new nations plan to begin deploying Argo floats: Brazil and South Africa. Among the world's great economic powers, only Russia is still missing from the Argo family portrait: this is an issue the newly nominated international Argo Director hopes to address.
- At the request of the Argo Steering Team, Dr. Howard Freeland has accepted to become the new international Argo Director, starting in August 2013. This position was previously held by John Gould (National Oceanography Centre, Southampton), but has been vacant in the past few years. Substantial travel funds will be required for Dr. Freeland to fulfill these duties and several countries agreed to provide some of these travel funds.

- Canada will host the 15th AST meeting in Halifax, Nova Scotia, likely during the week of 17 March 2014. Blair Greenan (Bedford Institute of Oceanography, DFO) took initial steps in organising that event, in collaboration with Jim Hanlon (Halifax Marine Research Institute), Doug Wallace (Dalhousie University, HMRI) and Denis Gilbert (Maurice Lamontagne Institute, DFO). The AST-15 meeting will last a full 3 days and float manufacturers and related companies will be invited to attend and make presentations during one of the three days. A half-day meeting of the Argo Executive will precede AST-15.

The AST-14 meeting agenda, presentations and national reports for year 2012 can be retrieved here (click) and the Argo Canada's 2012 report is available here (click).

Faits saillants de la 14ème réunion de l'équipe de direction du programme Argo (AST-14)

La 14ème réunion de l'équipe de direction du programme Argo (AST-14) a eu lieu les 19-21 mars 2013 à Wellington, en Nouvelle-Zélande. Ci-dessous vous trouverez quelques nouvelles surgies de cette réunion.

- Sur le plan de la technologie, les fabricants ont commencé à explorer de nouveaux prototypes de flotteurs capables de profilage à des profondeurs supérieures à 2000 m. Ces prototypes de flotteurs-profileurs APEX, NINJA, Arvor et SOLO peuvent effectuer des profils à des profondeurs comprises entre 3500 et 6000 m. Un sous-ensemble du réseau Argo sera composé de flotteurs-profileurs Argo profonds à l'avenir, ce qui nous permettra de mieux surveiller le contenu en chaleur des océans.
- L'Inde a reçu de nouveaux fonds pour son programme Argo pour les 5 prochaines années.
- Deux nouvelles nations envisagent commencer le déploiement de flotteurs Argo: le Brésil et l'Afrique du Sud. Parmi les grandes puissances économiques du monde, seule la Russie demeure absente du portrait de famille Argo. Voici un défi auquel le directeur international d'Argo nouvellement nommé aimerait s'attaquer.
- À la demande de l'équipe de direction Argo, le Dr. Howard Freeland (MPO) a accepté de devenir le nouveau directeur international du programme Argo, à compter d'août 2013. Cette position fut précédemment détenue par John Gould (National Oceanography Centre, Southampton), mais est restée vacante au cours des dernières années. Des fonds importants pour les voyages seront nécessaires pour que le Dr. Freeland puisse remplir adéquatement ses fonctions de directeur international d'Argo. Plusieurs pays ont convenu de lui fournir une partie de ces fonds.
- Le Canada accueillera la 15ème réunion AST à Halifax, probablement pendant la semaine du 17 mars 2014. Blair Greenan (Institut Océanographique de Bedford, MPO) en a débuté la préparation en collaboration avec Jim Hanlon (Halifax Marine Research Institute), Doug Wallace (Université Dalhousie, HMRI) et Denis Gilbert (Institut Maurice Lamontagne, MPO). La réunion AST-15 durera 3 jours complets, et les fabricants de flotteurs et compagnies connexes seront invités à y assister et faire quelques présentations durant une des trois journées. Une réunion d'une demi-journée du comité exécutif d'Argo précédera AST-15.

L'ordre du jour de la réunion AST-14, les présentations et les rapports nationaux pour l'année 2012 peuvent être téléchargés d'ici (click) et le rapport d'Argo Canada pour l'année 2012 (disponible en anglais seulement) peut être téléchargé d'ici (click).

New SCOR Working Group Proposals

SCOR working groups are the mainstay of SCOR's program. These are small international groups, each proposed by scientists from the community, with specific terms of reference and a finite period of operation. They are established in response to proposals supported from national committees for SCOR and other scientific organizations. In general they are designed to address fairly narrowly-defined topics which can benefit from coordinated international attention.

This year there are 11 proposals for consideration:

1. Zooplankton Production Measurement Methodologies and Their Application
2. Response of marine biota to complex global environmental change: co-ordination and harmonization of experimental approaches
3. Dissolved N_2O and CH_4 measurements: Working towards a global network of ocean time series measurements of N_2O and CH_4
4. Climate and tsunami science with green repeaters on submarine cable systems
5. Towards harmonization of global oceanic nutrient data
6. Development of new methodologies for chemical and other branches of oceanography
7. Microbial Community Responses to Ocean Deoxygenation
8. Surface Waves in Ocean Circulation and Climate System
9. Standard protocols for the development of an atlas of marine plankton biogeography
10. Studying Ocean Acidification Effects on Continental Margin Ecosystems
11. Science and Technology Imperatives Created by Deep-Ocean Industrialization

One or two of these proposal will likely be funded at the SCOR Annual Meeting in November 2013. Any interested scientist is invited to provide comments directly to Dr. Paul Myers by 31 August 2013.

The full proposals as well as the detailed procedure for comments are available on the SCOR website (click)

Comments would be particularly useful in relation to the following questions:

- Is the proposal timely?
- Is the topic a priority for ocean science and for SCOR?
- Is a SCOR Working Group a good mechanism to advance this topic?
- Are the terms of reference appropriate?
- Are the membership suggestions appropriate? (Please note that individuals listed as potential members may not have been contacted yet and that membership is not final until approval by the SCOR Executive Committee.)
- Do you have any other comments to improve the proposal?
- How would you rank the priority of SCOR funding for these proposals?

MEETINGS

Ocean Innovation 2013: Ocean Smart, 20-23 October 2013, Rimouski, Québec

Monitoring, Data Management and Decision-Making

Technopole maritime du Québec (TMQ) and the Marine Institute of Memorial University of Newfoundland are pleased to invite you to Ocean Innovation 2013, to be held in Rimouski on 20-23 October. Ocean Innovation is one of the most important events in Canada in the ocean sector. This edition named Ocean Smart will combine scientific and technical conferences with an exhibitor room under the theme Monitoring, Data Management and Decision-Making, in the context of ocean observation opportunities and challenges.

You can visit the website www.oceaninnovation.ca to register and take advantage of the early registration fee until July 31th. The preliminary program will be available online soon.

Ocean Innovation 2013: Ocean Smart, 20-23 octobre 2013, Rimouski, Québec

Surveillance, gestion des données et prise de décision

Technopole maritime du Québec et le Marine Institute of Memorial University of Newfoundland ont le plaisir de vous inviter Ocean Innovation 2013 qui se tiendra à Rimouski du 20 au 23 octobre prochain. Cet évènement est un des plus importants au Canada dans le secteur des océans et l'édition 2013, intitulée *Ocean Smart*, combinera conférences scientifiques et techniques et salon d'exposants sous le thème surveillance, gestion des données et prise de décision dans un contexte d'observation des océans.

Visitez le site Internet www.oceaninnovation.ca pour vous inscrire et profiter du tarif d'inscription hâtive en vigueur jusqu'au 31 juillet 2013. Le programme préliminaire sera disponible en ligne très bientôt.

When Genetics Meets Oceanography Workshop, 14-16 October 2013, Banyuls sur Mer, France

Biogeochemical fluxes in the ocean are tightly linked to the activity of the microbial community. The diversity and the functions of microbes have been largely revealed by Omic's approaches applied both in field and experimental studies. Comparative genomics is also a powerful tool to identify genes and biological processes that are responsible for the adaptation and acclimation of microbes to specific ecological niches. However, there are still gaps in our knowledge and methodologies that need to be filled in order to understand the molecular basis for the biological activities and ecological fitness of microbes in the ocean.

In this context, genetic tools are a promising approach that merits further investigation. Microbial model organisms such as the yeast *Sacharomyces cerevisiae* or the bacterium *Escherichia Coli* have been used for a long time by cell biologists and physiologists to study biological processes such as the cell division cycle and the underlying gene regulatory networks. Genetic tools and genetic resources are already available for a few marine model microorganisms such as diatoms (Phaeodactylum, Thalassosira), Prasinophytes (Ostreococcus) and cyanobacteria (Synechococcus). The objective of this workshop is to bring together oceanographers, ecologists and cell biologists/geneticists to promote the development and use of genetic tools for marine prokaryotic and eukaryotic microbes. The development of genetic tools is a huge investment, it is therefore important to optimize the use of existing resources as well as to coordinate and mutualize the development of new model species that are suitable to address environmental questions. The type of resources and techniques will also be discussed, with an overview of methods that can be used to target a gene (gene silencing, knock out by

homologous recombination) in marine microbes. Reporter genes such as luciferase or the Green Fluorescent Protein have also a great potential to monitor gene expression, physiological processes or redox stress under multiple environmental conditions.

For logistic reasons, participation to this workshop will be limited. Participants will be chosen on a first come first serve basis. If you are interested in participating, please send an e-mail to fy.bouget@obs-banyuls.fr until June 30th 2013 providing the following information: education, level, oral or poster presentation and a tentative title and co-authors.

Scientific Committee:
Kathy Barbeau Scripps Institution of Oceanography/UC San Diego, USA. Stéphane Blain, Laboratoire d'Océanographie Microbienne, CNRS-Univ Paris06, Banyuls-sur-Mer France, Francois-Yves Bouget Laboratoire d'Océanographie Microbienne, CNRS-Univ Paris06, Banyuls-sur-Mer, France. Chris Bowler Département de Biologie, Ecole Normal Supérieure, Paris, France. Christel Hassler, Institut F.-A. Forel, Université de Genéve, Switzerland. Julie Laroche, Department of Biology, Dalhousie University Halifax, Canada, Thomas Mock, School of Environmental Sciences, University of East Anglia, Norwich, UK. Rafael Simo, Institu de Ciencies de Mar-CSIC, Barcelona, Spain. Assaf Vardi Department of Plant Sciences, Weizmann Institut of Science, Rehovot, Israel.

Biogeochemical cycles in highly productive marine ecosystems, 2-14 December 2013, Buenos Aires

This SCOR-sponsored training opportunity will review the basis of the biogeochemical process in the ocean and will show examples of highly productive regions. More details are available at eco-marinos.at.fcen.uba.ar. The application deadline is 1 August 2013. Note that grants are available.

PERSONNEL

Chi-Shing Wong, FRSC

Dr. Chi-Shing Wong, known by most of his associates as CS, and widely recognized as one of Canada's leading ocean geochemists, passed away on 6 June 2013.

He came to Canada's west coast in the early 1970s and set up an atmosphere-ocean CO_2 facility, initially within *Environment Canada* but soon transferred to *Fisheries and Oceans* where he remained until he retired in 2009. CS had an exceptional capability to recognize an important science problem, to engage with the international community working on it, and to find the funding to support a meaningful contribution to that problem by Canada. In those early years, when few of us worried about time series, CS recognized the opportunity afforded by the west-coast weather-ships to initiate the first atmospheric CO_2 time series at an oceanic station (Station Papa). Perhaps this would be

no surprise to those who knew him well, given that two of his heroes were Roger Revelle and Charles Keeling. This atmospheric time series was accompanied by an ocean chemistry time series, the value of which has grown exponentially with time.

While maintaining the carbon-cycle work in the NE Pacific Ocean, CS recognized the emerging revolution in ocean trace-metal geochemistry toward the end of the 1970s. With impeccable foresight, he included a cutting-edge clean room as part of design of the chemistry wing in the new *Institute of Ocean Science* at Patricia Bay, and immediately initiated elemental research using mesocosm enclosures moored in Saanich Inlet – bag work, as it was frequently termed. This enclosure work, led by Tim Parsons, presented the opportunity of researching metal cycles as they affected – or were affected by – biological cycles. CS recognized clearly the extraordinary opportunity presented by this setting, not only to research the cycles of metals in constrained ocean systems, but also to attract a community of leading international scientists from, for example, Japan, Germany, Britain, and the USA. From this basis, CS brought about a NATO Advanced Research Institute in 1981 out of which came a turning-point book – "Trace Metals in Sea Water." His chosen co-editors formed a cadre of who's who in ocean geochemistry, including Ed Goldberg, Ed Boyle, Ken Bruland and JD Burton. If one pages through the papers included in that NATO book, one will find virtually the entire community who produced the first real understanding of elemental cycling in world oceans.

In the early 1980s another quiet revolution was occurring consequent to the development of sequential sediment trap technology, which presented some of the first glimpses of rapid connectivity between upper ocean and abyss mediated by particle flux. Again, CS recognized the value of collecting a time series at Station Papa and, against all fiscal odds, managed to maintain that observatory from 1982 to 2006. Establishing this observatory was prescient, given the changes now occurring in the ocean's CO_2 system, and it well illustrates CS's astute geochemical eye and remarkable tenacity. CS authored or co-authored well over 100 papers spanning several oceans and far more topics than highlighted here. He received numerous awards including *Fellowship of the Royal Society of Canada* (*FRSC*, 1999), but perhaps his favourite would have been the *AAAS Newcomb Cleveland Prize* for the most outstanding paper in *Science* (Quay, Tilbrook and Wong, 1991). This particular paper could not have been written without the time series on carbon isotopes collected by CS at Station P. Looking back on all these accomplishments, I think it fair to say that CS has firmly established himself as an icon in Canadian ocean science.

A memorial award endowment has been initiated at the University of Victoria for deserving undergraduate students in the field of Earth and Ocean Sciences where donations may be made to The Dr. C.S. Wong Memorial Award in Earth and Ocean Sciences (https://extrweb.uvic.ca/page.aspx?pid=468)

CANADIAN JOBS

Opportunity for Two Postdoctoral Fellows at Dalhousie University

Canada requires rapidly deployable environmental prediction systems to help guide its response to marine emergencies along its coastline and offshore areas. To help meet this need, a Network of Centres of Excellence called Marine Environmental Observation Prediction and Response (MEOPAR, www.meopar.ca) has recently been established. MEOPAR will fund two postdoctoral fellows to help develop a relocatable ocean prediction

system. The successful applicants will have a recent Ph.D. in Physical Oceanography, Atmospheric Science or related discipline, and a demonstrated ability to communicate results in the form of scholarly articles. Further details on the two positions are available here (click).

Both appointments will begin as soon as possible and will initially be for one year. Extensions may be granted for two more years subject to performance.

Review of applications will start immediately and continue until suitable candidates are found.

Executive Director, CMOS/SCMO

The Canadian Meteorological and Oceanographic Society (CMOS) is seeking applicants for the position of executive director. This is a part-time position requiring about two days per week of work on average and a physical presence in the CMOS office in Ottawa at least once every two weeks.
For further details please see the position notice (click here).

Directeur général, SCMO/CMOS

La Société canadienne de météorologie et d'océanographie (SCMO) est à la recherche de candidats au poste de directeur général. Ce poste à temps partiel nécessite en moyenne environ deux jours de travail par semaine et la présence du directeur au bureau de la SCMO, à Ottawa, au moins une fois toutes les deux semaines.
Pour plus de détails, lisez s'il vous plaît l'avis (ici).

Looking for work? Try the CMOS site (click)
Vous recherchez un emploi? Visitez le site SCMO (click)

GENERAL

A View beyond the Horizon: Future Directions in Antarctic Science

The Scientific Committee on Antarctic Research (SCAR) is embarking on a unique and exciting project to identify the most important and compelling questions in Antarctic and Southern Ocean science over the next two decades. A collective, community-based vision of the 100 highest priority scientific questions will be developed to assist in strategic planning; influence future directions in Antarctic research; highlight opportunities for collaborations and synergies; identify future critical infrastructure, logistical, and technological needs; and inform international decisions about investments in the Antarctic scientific enterprise. The first round solicitation closed on 15 June 2013. A key element of the project will be a physical gathering of experts (the "Retreat"). Pre-Retreat planning includes formation of a diverse and representative International Steering Committee, assembling foundational documents in a database, community-wide solicitations for nominees for Retreat participation and scientific questions, preliminary sorting of questions and recruitment of discussion leaders. At the Retreat the list of 100 most important questions will be embellished within an integrated, substantive narrative.

For further details go directly to www.scar.org/horizonscanning.

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

Newsletter #72 will be distributed on 17 September, 2013. Please send contributions to Michel Mitchell, michel.mitchell@dfo-mpo.gc.ca
Bulletin #72 sera distribué le 17 septembre 2013. Veuillez faire parvenir vos contributions à michel.mitchell@dfo-mpo.gc.ca

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