

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

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A Message from the Chair of CNC/SCOR

Dear Ocean Scientist;

As you will know from previous newsletters, I've now become the chair of the Canadian National Committee for SCOR (Scientific Committee on Ocean Research), having taken the torch from Gordon McBean at Halifax. The Canadian Committee traditionally does a number of tasks including interfacing with the International SCOR, reviewing Working Group proposals with the intent of getting Canadian scientists involved where appropriate, administering a top-up scholarship for deserving graduate students holding NSERC scholarships and, of course, putting out this Newsletter. We want to *inform* the Canadian ocean science community and we want to *be informed* by this community. My first request to you is to make this *your* Newsletter; contribute your ideas and your news in short articles. My background, interest and passion is ocean science, not bureaucracy. So, my second request is for advice from you. How can we in this CNC-SCOR committee better promote Canadian Ocean Science. Your ideas are welcome. I believe the time has never been more crucial for ocean advocacy based on sound science; we face the challenges of climate change and contaminants, as we all know, but perhaps most of all we face the challenge of communicating these risks coherently and professionally to decision makers. The SCOR committee (National and International) provides an opportunity to communicate and I depend on you, Canada's ocean scientists, to help with that task.

Rob Macdonald

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State of the Pacific Ocean 2008

This report summarizes highlights from the tenth in an annual report series updating the state of physical, biological, and selected fishery resources of Canadian Pacific marine ecosystems. Canadian Pacific marine waters lie in a transition zone between coastal upwelling (California Current) and downwelling (Alaskan Coastal Current) regions, and experience strong seasonality and considerable freshwater influence. Variability is closely coupled with events and conditions throughout the tropical and North Pacific Ocean, experiencing frequent El Niño and La Niña events particularly over the past decade. The region supports important resident and migratory populations of invertebrates, groundfish and pelagic fishes, marine mammals and seabirds. Monitoring the physical and biological oceanographic conditions and fishery resources of the Pacific Region is done semi-regularly by a number of government departments, to understand the natural variability of these ecosystems and how they respond to both natural and anthropogenic stresses. Support for these programs is provided by Fisheries and Oceans Canada, Environment Canada, and various other agencies.

Despite continuing increases in overall global water temperatures, the waters off the Pacific coast of Canada were the coldest in 50 years, and the cooling extended far into the Pacific Ocean and south along the American coast. Near-shore temperatures dropped as well, as did temperature in deep waters of the Strait of Georgia. Only the surface temperatures in the Strait of Georgia remained at or above normal. This cooling is associated with weather patterns typical of La Niña and of the local cold phase of the Pacific Decadal Oscillation (PDO).

Surface phytoplankton and zooplankton concentrations were the highest in a decade of observations across the Gulf of Alaska in August and September 2008. The cause is as-yet uncertain, but injection of iron by winds or currents is suspected (Iron is a limiting nutrient in this region), along with higher levels of nitrate and silicate in spring. Ship-based sampling for phytoplankton in Juan de Fuca Strait revealed high near-surface concentrations in early September. Deep-sea and coastal zooplankton populations continued their recent shift to cold-water species and delayed spring blooms.

In the Gulf of Alaska, the ocean mixed-layer depth was relatively deep in early 2008, and surface oxygen concentrations were relatively high in early 2009. However, oxygen concentrations have generally declined in deep waters along the continental slope over the past several decades. A sudden decline in bottom-water oxygen concentration in 2008 on the continental shelf was likely due to denser water with naturally low oxygen levels moving up onto the shelf in this year due to anomalous winds and currents. This oxygen drop may have been a factor in the movement of some groundfish species to shallower depths in 2008.

Cool marine conditions generally improve marine survival for salmon. However, despite relatively cool ocean conditions in 2007 and 2008, many BC populations remain depressed due to low numbers of brood-year spawners, partially attributed to warm oceans in 2003 to 2005. Sockeye returns remain generally low coast-wide, with one notable exception being Okanagan sockeye that returned in record numbers in 2008. High pre-spawn mortality was observed for many Fraser River watershed sockeye populations in 2008, and river entry of returning adults was generally early. Coho populations in southern BC remain extremely depressed, while northern coho populations have improved. For chinook, the situation is somewhat reversed – northern populations continue to decline while the status of southern chinook is highly variable.

Classification of salmon marine survival expectations based on a “weight of indicators” approach continues to show promise. In general, survivals of coho and sockeye that went to sea in 2008 are predicted to be at average to above-average levels, meaning improved coho returns in 2009, and sockeye in 2010, relative to brood year strengths. One possible exception is Strait of Georgia coho.

Herring biomass has declined recently for all five major BC stocks. In the Georgia Basin where herring biomass was at record high levels earlier this century, the biomass declined almost to the fishery-closure limit in 2008. Three other Canadian herring stocks were at or below the fishing limit. Eulachon populations remain depressed. Although there was no wide-scale hake survey in 2008, their numbers on the BC continental shelf, particularly on the traditional fishing grounds around La Pérouse bank, appear to have been very low, continuing a trend that began developing around 2003-04. Smooth pink shrimp and English sole along the west coast of Vancouver Island increased in numbers in 2008.

For many of our fish species including salmon, Pacific Ocean conditions have been improving since the extremely poor year of 2005. Cool water generated bottom-up changes to the food web that have contributed to improving marine survival for many juvenile fish. Linkages between ocean conditions and fish survival are not completely understood and additional exploration of existing data is warranted.

The full 21-page report may be found at http://www.pac.dfo-mpo.gc.ca/sci/psarc/OSRs/Ocean_SSR_e.htm and a French version at http://www.pac.dfo-mpo.gc.ca/sci/psarc/OSRs/Ocean_SSR_f.htm The supporting 129-page report (State of physical, biological, and selected fishery resources of Pacific Canadian marine ecosystems by W.R. Crawford and J.R. Irvine) may be found at http://www.dfo-mpo.gc.ca/CSAS/Csas/Publications/ResDocs-DocRech/2009/2009_022_e.htm

The CMOS President's Prize



The CMOS President's Prize is awarded each year to a member or members of the Society for a recent paper or book of special merit in the fields of meteorology or oceanography. The paper must have been accepted for publication in *ATMOSPHERE-OCEAN*, the *CMOS Bulletin SCMO* or another refereed journal. This year the award was presented by CMOS President Andy Bush (right) to John C. Fyfe for his substantive contributions to our understanding of climate variability and change, especially as expressed in the

polar regions. His milestone paper "The Arctic and Antarctic oscillations and their projected changes under global warming", published in *Geophysical Research Letters* in 1999, was the first to demonstrate that these modes can be accurately represented in global climate models, and that their behaviour is expected to change somewhat as the climate warms. It has been cited some 250 times and has been highly influential, leading the way for numerous other studies on the topic of annular modes and polar climate variability.

The CMOS Tully Medal in Oceanography



The CMOS Tully Medal in Oceanography is awarded each year to a person whose scientific contributions have had a significant impact on Canadian oceanography. The award was presented by Andy Bush to Chris Garrett in recognition of his illuminating and productive insights into a broad range of fundamental oceanography problems. His ability to view complex phenomena through a simplifying lens built of physical concepts has proved to be highly effective, not just for theories but also for a wide range of practical issues.

His unflinching scientific integrity has inspired generations of young oceanographers, as has his uncanny ability to identify the core issue at hand, while others wrestle with details.

The CMOS Prize in Applied Oceanography



The CMOS Prize in Applied Oceanography is awarded each year to a member or members of the Society for an outstanding contribution to the application of oceanography in Canada. This year the award was presented to Rolf Lueck by Andy Bush for a history of innovative development and exceptional technical support for unique and valuable instrumentation, particularly for the measurement of ocean microstructure. His work has recently resulted in the

development and worldwide marketing of a series of systems for measuring ocean turbulence, leading to a rapid expansion in the measurement of important mixing processes around the globe.

CMOS Fellows



CMOS Fellows are awarded to individuals for exceptional long term service and support to the Society and/or for outstanding contributions to the scientific, professional, educational, forecasting or broadcasting fields in atmospheric or ocean sciences in Canada. This year there was one Fellow elected. Dr. Richard Marsden was congratulated by CMOS President Andy Bush for his exceptional contributions to the Society, ocean research, and training of the next generation of applied Canadian oceanographers.

Neil J. Campbell Medal for Exceptional Volunteer Service



The Neil J. Campbell Medal for Exceptional Volunteer Service award is made for an exceptional contribution in a single year or for contributions over an extended period. The contribution has resulted in an important advancement for CMOS and/or its aims, nationally or locally. This year the award was made by Neil Campbell to Susan Woodbury for her exceptional service and dedication to CMOS at both the local and national level over a period of more than two decades. She has served on numerous

CMOS committees, often in a leadership role, always with a focus on strengthening both CMOS and meteorology in Canada. Her contributions have had an impact in many areas and her efforts as a volunteer are widely appreciated.

Tertia M.C. Hughes Memorial Graduate Student



One of the Tertia M.C. Hughes Memorial Graduate Student Prizes was awarded by Andy Bush to Li Zhai for her Ph.D. dissertation at Dalhousie University, which describes an impressive body of work encompassing the application of data assimilative ocean models to the Lunenburg Bay region, including analysis of dynamical processes, validation against observations and examination of ecologically important exchange processes within the bay and with adjacent regions.

CNC/SCOR Scholarship Supplement in Ocean Sciences



This year's CNC/SCOR scholarship supplement is awarded to Kristina Brown of the University of British Columbia. Using stable carbon isotopes to shed light on carbon cycling in sea-ice associated biological communities, she will undertake research for her PhD on the application of various chemical tracer measurements to quantify dissolved CO₂ export within brines formed during sea ice growth. Her project will tackle the difficult question of carbon cycling in sea ice and brines, and how these affect carbon transport in convecting sea water. This work will require a melding of thermodynamic processes in ice and seawater, and carbon transfers and fractionations in ice-associated biota.

CMOS Weather Research House NSERC Scholarship Supplement



This year's CMOS Weather Research House NSERC Scholarship Supplement is awarded to Andrew Hamilton of the University of British Columbia. Focusing on his previous work in the area of the Ward Hunt Ice Shelf, his research will undertake a spatial-temporal study of the ice shelf integrity alongside an examination of the variability and succession of the sub-ice shelf microbial community.

Richard Thomson Awarded the Timothy R. Parsons Medal



On behalf of Wendy Watson-Wright, Assistant Deputy Minister for Science of the Department of Fisheries and Oceans (DFO), Faith Scattolon, DFO Regional Director General, Maritimes Region presented the Timothy R. Parsons Award to Dr. Richard Thomson. The award was made at the Canadian Meteorological and Oceanographic Society 2009 Congress in Halifax, NS. Dr. Thomson received the award for his extensive contributions to multidisciplinary ocean research over more than 35 years of service

with Fisheries and Oceans.

Dr. Thomson is a prolific writer with more than 170 publications in primary peer-reviewed journals, two books - the best-selling "Oceanography of the British Columbia Coast" published in 1981 and the internationally acclaimed "Data Analysis Methods in Physical Oceanography" coauthored with Bill Emery in 1998 (revised in 2001), and countless reports. Throughout his eclectic career, there are several recurring themes:

- a desire to communicate the results of his research through highly respected national and international journals;
- the need to understand the bio-physical processes of hydrothermal venting regions of the world ocean, including Endeavour Ridge in the northeast Pacific - Canada's first Marine Protected Area;

- a long-term interest in the generation and propagation of tsunamis generated by both earthquakes and submarine slides, including the devastating Indian Ocean tsunami in 2004;
- a career-long effort to understand the ecosystem dynamics of the west coast of North America, including the paleoclimate of the region based on sediment cores from anoxic basins; and
- the championing of Operational Oceanography for the prediction of storm surges and climate-induced sea level rise.

Dr. Thomson has also found time to motivate and mentor other scientists, students, and support staff to contribute synergistically to multidisciplinary research activities in Canada's ocean science community. Rick's contributions, ideas, publications, and leadership are evident through his body of research, activities and regulatory contributions in Canada.

Richard Thomson, récipiendaire de la médaille Timothy R. Parsons



Au nom de Wendy Watson-Wright, sous-ministre adjointe du secteur des Sciences de Pêches et Océans, Faith Scattolon, directrice générale régionale du ministère des Pêches et des Océans, région des Maritimes, a présenté à Richard Thomson, Ph. D., la médaille Timothy R. Parsons pour l'année 2009. Cette distinction honorifique lui a été remise en reconnaissance de son importante contribution à la recherche océanique multidisciplinaire durant ses 35 années de carrière au ministère des Pêches et

des Océans. M. Thomson a reçu son prix au congrès 2009 de la Société canadienne de météorologie et d'océanographie, à Halifax, en Nouvelle-Écosse.

Auteur prolifique, M. Thomson a rédigé plus de 170 articles dans de grandes revues scientifiques ainsi que deux ouvrages, le succès de vente « Oceanography of the British Columbia Coast » publié en 1981 et l'ouvrage acclamé internationalement « Data Analysis Methods in Physical Oceanography », corédigé avec Bill Emery en 1998 (revu en 2001). Il est aussi l'auteur de nombreux rapports. Tout au long de sa carrière éclectique, il a maintes fois démontré :

- un désir de partager les résultats de ses recherches dans des revues nationales et internationales de grand renom;
- le besoin de comprendre les processus biophysiques des régions de champs hydrothermaux des océans du monde, dont la dorsale Endeavour dans le Pacifique Nord-Est – première aire marine protégée du Canada;
- un intérêt de longue date pour l'étude de la formation et de la propagation des tsunamis engendrés à la fois par des séismes et par des glissements sous-marins, dont le tsunami dévastateur dans l'océan Indien en 2004;

- une persévérance inébranlable dans les efforts qu'il a déployés pour comprendre la dynamique des écosystèmes de la côte Ouest de l'Amérique du Nord, dont le paléoclimat de la région à partir de carottes de sédiments prélevées dans des bassins anoxiques;
- un dynamisme étonnant dans la promotion de l'océanographie opérationnelle pour la prévision de marées de tempête et d'élévations du niveau de la mer d'origine climatique.

M. Thomson a aussi trouvé le temps d'encourager d'autres scientifiques, des étudiants et le personnel de soutien à contribuer de façon synergique aux recherches multidisciplinaires de la communauté océanographique du Canada et de les encadrer dans leurs efforts. L'ensemble de ses recherches, de ses activités, de ses publications et de son concours à la réglementation révèle l'ampleur de la contribution de Richard, sans compter la richesse de ses idées et de son leadership.

New CMOS President



Outgoing CMOS President Andy Bush (left) congratulates Bill Crawford on his election as CMOS President for 2009-2010.

Passing of Don Vachon



On June 2nd, 2009 DFO lost a great asset with the passing of Don Vachon, Director of the Integrated Science Data Management. Don, an electrical engineer by trade, spent his career advancing the technology used by CHS to develop, produce, maintain and distribute CHS data holdings and products to the world.

Don was a firm believer in the use of commercially available tools, the use of Standards and in supporting Canadian industry and thereby providing CHS with state of the art technology to maintain their position as a world leader. At first Don was involved in Chart production hardware and software then moved into system development for Electronic Chart production, Oracle Spatial development and implementations, and more recently SDI technology for Web mapping and exchange of data. Don was active in the development of IHO S-57 and the development of supporting production systems. He led the charge for and has been actively involved in the development of an enhanced standard for

hydrographic exchange based on ISO TC211 which is now known as IHO S-100. Don's personal stamp sits on endeavors like the Hydrographic Production Database (HPD), a unified charting production line which reduced the duplication of effort tremendously in the CHS offices. The GeoPortal, a project devoted to making geospatial data holdings available interdepartmentally and to all Canadians, is also his creation.

In 2005 Don moved from his CHS role to become Director of the newly created Integrated Science Data Management Branch in Science. This was formed by merging his group at CHS, who managed digital chart production and distribution, with the Marine Environmental Data Service, the oceanographic data archive centre for DFO. Although there were strong similarities between the activities of the two groups, as in any merger, there were rough spots to iron out. Don handled this challenge very ably with his usual straightforward manner and strong leadership.

Ocean Science Theses

Using 2000 as a starting point, the CNC/SCOR has compiled and posted listings of Canadian university PhD and MSc theses in ocean sciences. Results from the canvass for 2008 have been posted at <http://www.cmos.ca/scor/thesesdirectory.html>. Listings include those for University of Victoria, University of British Columbia, University of Alberta, University of Manitoba, McGill University, Québec-Océan (which includes theses listings from Université Laval, Université du Québec à Rimouski (UQAR), Université du Québec à Chicoutimi (UQAC), Institut national de la recherche scientifique (INRS), McGill University) and Dalhousie University.

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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 #45 will be distributed on August 25, 2009. Please send contributions to dick.stoddart@sympatico.ca
Bulletin #45 sera distribué le 25 août 2009. Veuillez faire parvenir vos contributions à dick.stoddart@sympatico.ca

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