

**CANADIAN OCEAN SCIENCE NEWSLETTER  
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## **Research Scientists**

Closing date is July 19, 2006.

The Department of Fisheries and Oceans is hiring research scientists at various laboratories across the country. The classification is SE - RES – 01 with a salary range of \$46,025 to \$105,480 (per annum). Reference Number: DFO06J-006661-000083. Selection Process Number: 2006-DFO-PACSID-EA-917624. The positions are permanent full time, with the number of vacancies to be determined.

Scientific Research at DFO ranges from molecular level to the ecosystem scale with participation internationally on global issues. Examples include: assessing the status of fisheries resources and the impact of human activities on aquatic ecosystems; assessing aquatic ecosystems and supporting integrated management of resources; support to sustainable aquaculture resources and the assessment and recovery of species-at-risk; understanding aquatic animal health in support of assessing ecosystems and facilitating international trade; support to marine safety and security and Canadian sovereignty.

Additional information may be found at (under research scientist):

<https://psjobs-emploisfp.psc-cfp.gc.ca/psr/applicant/applicant.helpcareerchoices>;

## **Civilian Graduate Student Opportunity in Physical Oceanography**

The Royal Military College (RMC) in Kingston, Ontario is seeking an MSc or PhD graduate student to work on one of a number of numerical oceanography projects in the Physics Department. These projects use numerical models (both finite difference and finite volume) to gain a better understanding of fundamental oceanic processes in regions such as the Northeast Pacific Ocean and the Canadian Arctic. One project is specifically focused on using the Parallel Ocean Program model with a state-of-the-art data assimilation scheme to investigate the impacts of eddies on local biological communities in the Northeast Pacific. We are also interested in optimizing the advective and diffusive schemes in this model. Students may also have the opportunity to gain field experience assisting on a ship with researchers from DND Canada in the Underwater Force Protection group.

Anyone with a BSc in physics, engineering, math, computer science or a BMath may apply. Interested persons should send a CV and letters of recommendation to Dr. J. A. Shore ([jennifer.shore@rmc.ca](mailto:jennifer.shore@rmc.ca)). For information on admission to RMC's graduate program visit [http://www.rmc.ca/academic/grad/calendar/scieng/physics\\_e.html](http://www.rmc.ca/academic/grad/calendar/scieng/physics_e.html). This position is funded for at least two years at the MSc level and three years at the PhD level and teaching assistantships may also be available. The successful candidate is expected to take up the position between July and September 2006. In conformity with Canadian immigration policies, preference will be given to Canadian citizens. The Royal Military College of Canada is a coeducational and bilingual university, and this position is offered equally to women and men. For more information about Dr. Shore's research visit: [http://www.rmc.ca/academic/physics/shore/index\\_e.html](http://www.rmc.ca/academic/physics/shore/index_e.html).

## **GLOBEC moves into Integration and Synthesis phase**

Report by Ian Perry, Pacific Biological Station, [perryi@pac.dfo-mpo.gc.ca](mailto:perryi@pac.dfo-mpo.gc.ca)

The international GLOBEC (Global Ocean Ecosystem Dynamics) program continues to be extremely active. The focus of the four “mature” Regional Programs and Working Group activities is now on Integration and Synthesis, which will take the program to its formal completion in 2009. In addition, two new Regional Programs have been developed and are expected to out-last the parent program. GLOBEC is co-sponsored by the International Geosphere-Biosphere Program (IGBP), SCOR, and the Intergovernmental Oceanographic Commission (IOC) of the United Nations. The goal of GLOBEC is to understand how global change will affect the abundance, diversity and productivity of marine populations. Canada had a national GLOBEC program from 1996-2000, which was co-chaired by Brad deYoung of Memorial University and David Mackas of DFO, Sidney, B.C., and was co-sponsored by NSERC and Fisheries & Oceans Canada. Canadian scientists remain very active in the international GLOBEC program, playing important roles as chairs and participants in each of the four core working groups (Focus 1 on retrospective studies; Focus 2 on process studies; Focus 3 on modelling, and Focus 4 on the human dimensions of marine ecosystem changes). This brief report provides an overview of recent and forthcoming GLOBEC activities (as discussed at the Scientific Steering Committee meeting held in Hawaii in April 2006), with a focus on those activities of particular interest to Canadian scientists. Much more information (including recent science findings) is available in the GLOBEC Newsletter (April 2006) and at the GLOBEC web site [www.globec.org](http://www.globec.org).

### *Recent Activities*

#### **GLOBEC Symposium on ‘Climate variability and sub-Arctic marine ecosystems’,** (Victoria, B.C., 16-20 May 2005)

This symposium was designed to integrate GLOBEC research in sub-Arctic marine ecosystems, and to launch the new GLOBEC Regional program ESSAS (Ecosystem Studies of Sub-Arctic Seas). This symposium and Canadian participation was described in an earlier CNC-SCOR newsletter. The proceedings are in preparation in *Progress in Oceanography*.

#### **GLOBEC/ICES Workshop on ‘Impact of zooplankton on cod abundance and production’** (Copenhagen, Denmark, June 2005)

This workshop was a synthesis activity of the GLOBEC Cod and Climate Change (CCC) program, and was co-sponsored with the ICES Working Group on Zooplankton Ecology. The workshop goals were to 1) determine zooplankton species in cod diets; b) determine the variability of zooplankton populations and their relationships to cod; c) examine the vital rates of zooplankton that are relevant to cod; d) compare zooplankton production dynamics in space and time with the dynamics of early stages of cod; e) establish the links between zooplankton and later stages of cod; and f) examine consequences to cod of long-term changes in zooplankton. The workshop findings are expected to be published in an ICES Cooperative Research Report.

#### **PICES/GLOBEC Symposium on ‘Climate variability and ecosystem impacts on the North Pacific: a basin-scale synthesis’** (Honolulu, HI, 19-21 April, 2006)

This symposium was designed to begin the synthesis of the PICES/GLOBEC Climate Change and Carrying Capacity (CCCC) Program. Its themes were: 1) Regime shifts; 2) Ecosystem productivity and structural responses to physical forcing; and 3) Pan-Pacific comparisons. The proceedings from the symposium will be published in a future issue of *Progress in Oceanography*.

**GLOBEC Workshop on ‘Mathematical modelling of zooplankton dynamics’** (Marseille, France, 2-5 May 2006).

This is a joint workshop between GLOBEC Working Groups 2 (Process Studies) and 3 (Modelling). The theme is ‘key issues in the parameterisation of zooplankton models’. Brad de Young and Dave Mackas participated from Canada.

**GLOBEC CCC Workshop on ‘Decline and recovery of cod stocks throughout the North Atlantic including tropho-dynamic effects’** (St. John’s, Nfld, 8-11 May 2006)

The workshop theme was to compare the changes that have occurred in the cod stocks around the North Atlantic and to assess the relative importance of climate-induced ecosystem changes and fishing as causes of the observed changes.

**GLOBEC ESSAS/PICES Workshop to ‘Compare four sub-Arctic marine ecosystems’** (St. Petersburg, Russia, 12-14 June 2006)

This workshop is an activity of the ESSAS program, designed to build upon the scientific bases for comparisons of sub-Arctic marine ecosystems. Its theme is to compare the ecosystems of the Okhotsk Sea/Oyashio region, the Bering Sea, the Newfoundland/Labrador Shelf, and the Barents Sea.

#### *Forthcoming and New Activities*

**GLOBEC Focus 1 Workshop on ‘Impact of climate variability on marine ecosystems; a comparative approach’** (Berlin, Germany, 4-8 September 2006)

This is a major Integration and Synthesis workshop for GLOBEC’s Focus 1 Working group on Retrospective Analyses and Long-time Series. It is structured into four working groups: 1) climate variability and teleconnection patterns; 2) impacts of past climate variability on marine ecosystems; 3) mechanisms linking climate variability to marine ecosystems; and 4) sensitivity of marine ecosystems to climate and human exploitation. Proceedings will be published in a future issue of *Journal of Marine Systems*.

#### **ESSAS (Ecosystem Studies of Sub-Arctic Seas)**

As noted above, ESSAS began with a successful symposium in Victoria, BC in May, 2005. A smaller workshop will be held in Russia in June, 2006. The Science Plan and background material for ESSAS have been published and are available at the GLOBEC web page. Co-Chairs are Ken Drinkwater (Norway) and George Hunt (USA); Erica Head of BIO, Dartmouth, is a member of the ESSAS Scientific Steering Committee. ESSAS has been invited as one of the research nodes to integrate proposals for work under the International Polar Year 2007.

#### **CLIOTOP (CLimate Impacts on Oceanic TOP Predators)**

The general objective of CLIOTOP is to organize a worldwide comparative effort to identify the impact of climate variability and fishing on the structure and function of open ocean pelagic

ecosystems and their top predator species. The ultimate objective is the development of a reliable predictive capability for the dynamics of top predator populations and oceanic ecosystems that combines both fishing and climate (i.e. environmental) effects. The CLIOTOP Science Plan is available at the GLOBEC web site. CLIOTOP has developed into a very active program, structured around four working groups: WG1 Early life history; WG2 Physiology, behaviour and distribution; WG3 Trophic pathways in open ocean ecosystems; WG4 Synthesis and modeling; and WG5 Socio-economic aspects and management strategies. Meetings of several of these working groups are planned, and funding is underway for many of their activities.

### **GLOBEC – IMBER End-to-End Food Web Task Team**

This joint Task Team between GLOBEC and IMBER (Integrated Marine Biogeochemistry and Ecosystem Research, a new core program of IGBP) is deigned to scope the issues and develop research concepts for investigating foods webs from ‘microbes to marine megafauna’. It is co-chaired by Mike St. John (Germany) and Coleen Moloney (South Africa); Ken Denman is a member from Canada. They met in Germany in December 2005 to prepare a scoping document, which is planned to be published in the high-profile scientific literature. A proposal has been submitted to GLOBEC and IMBER for the Terms of Reference for a multi-year Working Group on this topic.

### **Connecting Communities & Ecosystem Impact Research (CCCEIR)**

This is a new initiative between GLOBEC and the U.S. National Center for Atmospheric Research. At its grandest, this initiative is intended to understand and be able to project the potential effects of global climate variability and change on ecosystems, ecosystem services, human responses, and ecosystem links to the climate system. It will be used by GLOBEC to develop a “scenario” approach to projecting impacts to marine systems of future climate change. A web site describing the initial project development and first meeting (in November, 2005 in Boulder, Colorado) is at <http://www.cgd.ucar.edu/div/ccceir/>

### **GLOBEC Integration & Synthesis activities**

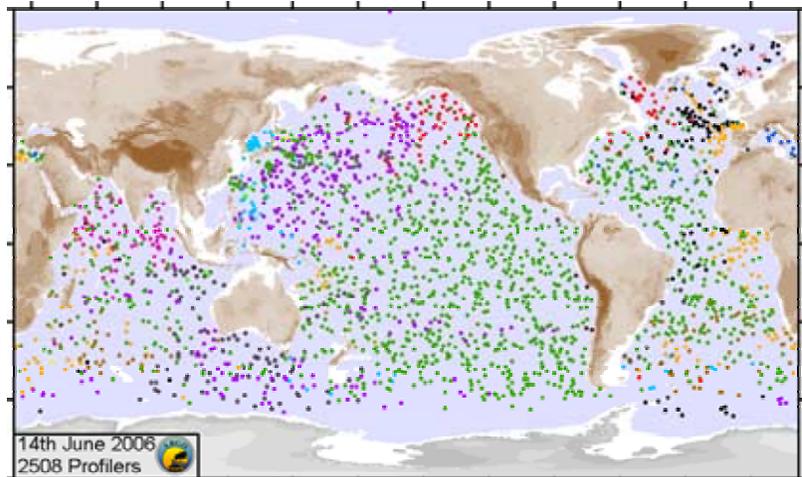
Over the next 3 years GLOBEC, as a program, will focus on integrating and synthesising the findings from its 10 years of global activities. Several workshops, major symposia, and publications, including a book, are planned to bring this phase of marine ecosystem research to a close. A web page on GLOBEC’s I&S plans and activities is available at the GLOBEC web site, with opportunities for individual scientists to contribute ideas and express interests. Also between now and 2009, GLOBEC is expected to develop closer links with emerging IMBER research activities; many of these activities are likely to continue post-2009 as part of IMBER and integrated ocean research programs.

### **The current state of Argo, June 2006**

Howard Freeland, Institute of Ocean Sciences, Ross Hendry, Bedford Institute of Oceanography, and Denis Gilbert, Inst. Maurice-Lamontagne, Fisheries and Oceans Canada

[FreelandHj@pac.dfo-mpo.gc.ca](mailto:FreelandHj@pac.dfo-mpo.gc.ca)

Argo, a pilot project of the Global Ocean Observing System (GOOS), is an international venture that aims to deploy 3000 profiling floats scattered around the world. The resulting global upper-ocean observing system will serve a broad community of scientific and operational users. The original target was to have 3000 floats operating by the end of 2006.



|                |                     |                     |                        |
|----------------|---------------------|---------------------|------------------------|
| Argentina (6)  | Costa Rica (1)      | Japan (365)         | Norway (10)            |
| Australia (96) | European Union (22) | Korea, Rep. of (85) | Russian Federation (3) |
| Brazil (3)     | France (185)        | Mauritius (2)       | Spain (6)              |
| Canada (83)    | Germany (123)       | Mexico (1)          | United Kingdom (101)   |
| Chile (4)      | India (72)          | Netherlands (11)    | United States (1311)   |
| China (12)     | Ireland (1)         | New Zealand (5)     |                        |

The number of floats reporting data through the Argo project and the number of countries deploying floats in support of

Argo continue to increase. As shown in Fig. 1, more than 2500 floats were operational on June 14<sup>th</sup> 2006. At the time of writing 23 contributing countries are listed. These are national groups with Argo projects funded to supply floats. Italy and Denmark also have deployed floats in support of an independent European Union program. All of these floats report in near real-time. Over 90% of the profiles are available on the Global Telecommunications System and the World Wide Web within 24 hours of the profile being observed.

Argo Canada, supported by the Canadian Department of Fisheries and Oceans (DFO), is a significant contributor to this effort. In Canada, the observing elements are managed through the Bedford Institute of Oceanography, Institut Maurice-Lamontagne, and Institute of Ocean Sciences. Data management is handled by DFO's Marine Environmental Marine Environmental Data Service (MEDS). Canadian Argo data are featured on the MEDS web site at [http://www.meds-sdmm.dfo-mpo.gc.ca/meds/Prog\\_Int/Argo/ArgoHome\\_e.html](http://www.meds-sdmm.dfo-mpo.gc.ca/meds/Prog_Int/Argo/ArgoHome_e.html).

One remarkable new development concerns a dot on the map above that some might imagine to be a plotting error, the float at top centre. We do indeed have a float operating at the time of writing very close to the North Pole. This is a Japanese deployment based on a system developed by the Metocean Corporation in Dartmouth, Nova Scotia. Essentially a surface float was frozen into the surface ice pack with a weighted Kevlar cable hanging beneath it. A float rides up and down the line with the Kevlar line inserted into two titanium rings that are attached to the float. When the float reaches a top stopper that restricts further ascent the rings match inductive couplings in the cable allowing the float to communicate the data to the surface buoy and thence to a satellite. The data from this float meet all of the requirements of the Argo data policy and are accessible in real time. More Arctic deployments are being planned and rival methods for acquiring Argo data from ice-infested waters have been developed at the Woods Hole Oceanographic Institution and at the University of Kiel.

Argo is now very large and we would like to share a few points of comparison with other projects. Over 8 years the WOCE Hydrographic Program gathered data from 20,000 CTD stations and used 25 ship-years at a total cost of about \$260M (Canadian funds). Though the

observations were of the very highest quality some areas were left weakly sampled, and the survey was a one-time effort anyway. Another mainstay of the ocean climate monitoring network is the XBT program; in 2004 30,000 XBT stations were reported. However, very large areas were left unsampled, primarily in the southern hemisphere, and temperature is measured to  $\pm 0.1^{\circ}\text{C}$  with no salinity being observed. In contrast, in January 2006 Argo floats reported 7045 good-quality profiles that included salinity and were available in real time. This is equivalent to 84,300 profiles/year. Unsampled areas are small and plans exist for eliminating them.

Uniquely in the history of ocean sampling, Argo is putting equal emphasis on the northern and southern hemispheres. It has been estimated that Argo is now gathering more data each and every year from the southern ocean than has been gathered by the sum of all previous research expeditions to the southern ocean.

Canada recently lost its oldest float due to battery failure. A float known by the name of 4900072 was launched off the coast of the Aleutian Islands in 2001. It was quickly absorbed into the Aleutian Stream and moved towards Asia at very high speed. Despite the fact that the Bering Sea is the source of the Oyashio Current the float approached the coast of Kamchatka and then turned right and entered the Bering Sea to the great dismay of some of my Russian colleagues who hoped it would offer valuable information on the Oyashio/Kuroshio mixing region. It then headed back along the Aleutian Island chain, but this time on the Bering Sea side, looped around the Aleutian Basin and returned to Kamchatka. It was right in the Kamchatka Pass heading into the Oyashio Current, at last, when it delivered its 169<sup>th</sup> and last profile. Total lifetime was 4.6 years.

The float technology is changing slowly and we will soon have floats that offer much higher efficiencies and potentially substantially longer lifetimes with profiling down to 2000 decibars. Various new sensors are being explored. Some are measuring velocity, sensors for fluorescence are being added but the great excitement has been with the development of new and stable sensors for dissolved oxygen. Many floats are now being launched carrying the Aanderaa Instruments Optode Oxygen sensor. This will be discussed at greater length in the following article.

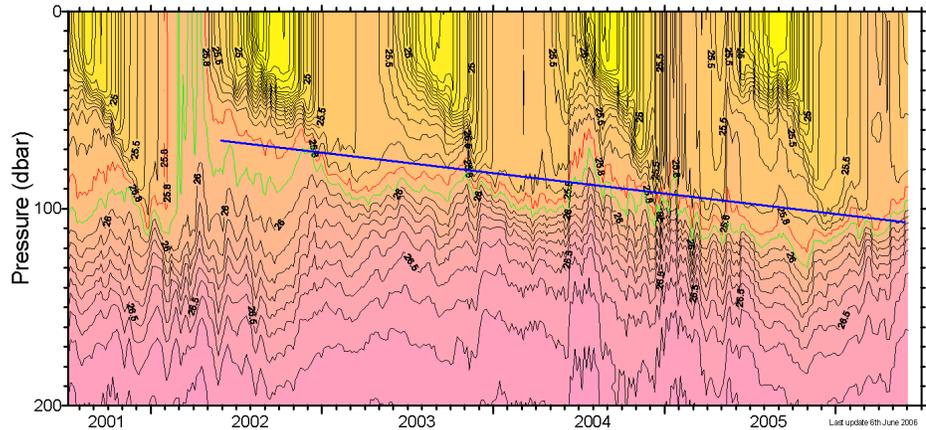
Argo data are readily accessible. The standard method is to use one of the web sites at the GDACS (Global Data Centres). Information about access to GDACS is available at the “Links” page at [http://www.pac.dfo-mpo.gc.ca/sci/osap/projects/argo/default\\_e.htm](http://www.pac.dfo-mpo.gc.ca/sci/osap/projects/argo/default_e.htm).

Many countries are using a routine developed at the Institute of Ocean Sciences for creating an ASCII Mirror of the global database on your own computer. This only works on a PC, but is an efficient way of maintaining a permanent local archive of all data. This routine can be found by going to the link above and choosing “Tools to help...”.

Use of Argo data is accelerating as this is now the dominant source of oceanographic data in the world. We recently hosted in Venice the Second Argo Science Workshop showcasing the use of Argo to explore the oceans. Papers ranged from global surveys of the steric contribution to the rising sea-level globally (which as a side effect allows a computation of the eustatic rise in sea-level, i.e. the new mass added each year to the oceans through global ice melt) to local studies of the behaviour of individual current systems and on to the development of coupled atmosphere-ocean data assimilation models.

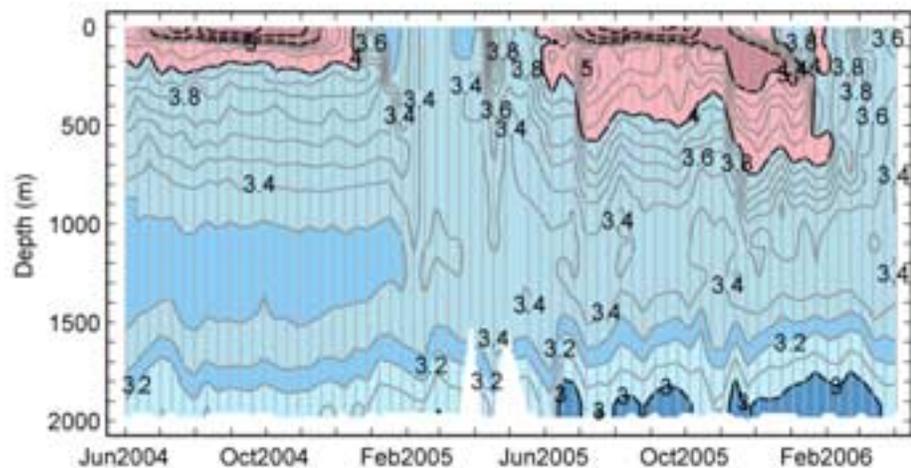
Funding continues to be a major issue in some nations. In the USA it has recently been announced that Argo is funded for another 5 years starting in October 2006. Since the USA is presently supplying just over 50% of the global array, this does ensure that the global coverage is fairly secure for the next 5 years. It also appears likely that the E.U. nations will be increasing their contribution to the global program.

On the west coast of Canada Argo is being used to monitor changing conditions in the Gulf of Alaska. These data are being used successfully as major input to the annual PSARC (Pacific Scientific Advice Review Committee) Status



report on the state of the Gulf of Alaska. Methods have been developed to monitor the changing circulation of the Gulf of Alaska and the changing structure of the upper ocean. Fig. 2 shows the density of the upper 200 decibars interpolated to the position of Ocean Station Papa. Howard Freeland wants to know why the surface  $\sigma_t = 25.8$  has been getting steadily deeper over the last 4 years. This surface is marked by the red line and an eyeball regression line is shown in blue.

On the east coast of Canada, Argo data offer the potential for monitoring winter convection in the Labrador Sea. The depth-time plot of potential temperature in Fig. 3 comes from Canadian Argo float 4900526 launched in the central Labrador Sea in May 2004. A mixed layer more than 1000 m deep developed in February-March 2005 in response to cooling during the winter of 2004-2005.



## Oxygen measurements on Argo floats

Denis Gilbert, Institut Maurice-Lamontagne, Howard Freeland and Frank Whitney, Institute of Ocean Sciences, Ross Hendry, Bedford Institute of Oceanography, Anh Tran, Marine Environmental Data Service, Department of Fisheries and Oceans (DFO), Canada  
[GilbertD@dfo-mpo.gc.ca](mailto:GilbertD@dfo-mpo.gc.ca)

As part of the Canadian Argo program, the Department of Fisheries and Oceans (DFO) deployed five Webb Research Corporation APEX profiling floats equipped with Aanderaa Instruments oxygen optode sensors in 2004 and 2005: two in the northwest Atlantic Slope Water (4900497 and 4900627), one in the Labrador Sea (4900494), and two in the northeast Pacific (4900523 and 4900637). In Fig. 1A, we have indicated the launch positions of the floats with triangles, and their most recent positions in June 2006 with squares. Floats 4900494 and 4900497 have travelled 530 km and 1150 km respectively, but the other three floats are still within 200 km of their initial positions. The latest oxygen profiles from June 2006 for each float are shown in Fig. 1B. Here we report on the first two years of oxygen data from these floats, and we briefly discuss the scientific motivations behind this Argo-oxygen pilot study.

A rare opportunity to compare Argo-optode oxygen measurements with Winkler titrations occurred in early September 2004 for float 4900523. The results were very encouraging, with an average absolute difference as small as  $6.2 \mu\text{mol kg}^{-1}$ . This is within the manufacturer's specified accuracy of  $8 \mu\text{mol kg}^{-1}$ . In absence of nearby Winkler titrations to check for sensor drift over time, an alternative is to look for oxygen trends at great depths, where we expect fairly stable values in oceanic regions with weak horizontal gradients of T-S-O<sub>2</sub> properties. Fig. 1C shows that for float 4900494, in the Labrador Sea, there is no evidence of oxygen sensor drift (to within  $\pm 1 \mu\text{mol kg}^{-1}$ ) at 1900 m depth over the first two years. In the surface layer, where physical and biological processes may cause departures from gas equilibrium with the atmosphere (100% oxygen saturation), we see a seemingly repeatable annual cycle of undersaturation from December to March and supersaturation from April to October (Fig. 1D).

There are many reasons that make oxygen an interesting parameter to measure in the ocean. Float 4900494 is in a region of active deepwater formation, where homogeneous, elevated oxygen values over several hundreds of meters can provide useful evidence of recent surface ventilation. We deployed floats 4900497 and 4900627 near the Laurentian Channel mouth, where changing oxygen concentrations can either improve or worsen the hypoxic conditions that have prevailed in the bottom waters of the Lower St. Lawrence Estuary since the mid-1980s. Finally, floats 4900523 and 4900637 are monitoring the northeast Pacific oxygen minimum zone (OMZ).

Time-depth contours of temperature, salinity, density and oxygen from float 4900637 are shown in Fig. 2. There is a 500 m thick layer of oxygen saturations below 5% centred at about 1000 m depth. Interestingly, in early May 2006, this float entered a region with very different T-S-O<sub>2</sub> properties as it moved east of the 129°W meridian, near 47°N. The 30% oxygen saturation level then underwent a spectacular 240 m upward excursion. We believe the low oxygen waters encountered since May 2006 by float 4900637 are of continental slope origin. These waters, often considered to be the California Undercurrent with a warm and salty nature, can have

oxygen lower than offshore waters by as much as  $100 \mu\text{mol kg}^{-1}$  on the 26.5 or 26.7 isopycnal surface.

Out of the 2500 Argo floats that presently compose the global Argo array, 55 floats are reporting oxygen data in real-time. A small group of people (Friends of Oxygen on Argo, FOA, <http://ioc.unesco.org/ioccp/FOA.htm>) is developing plans and proposals for a large-scale extension of the current small-scale deployments of Argo floats instrumented with O<sub>2</sub> sensors. Oxygen values in the ocean interior reflect the balance between ventilation rates and organic matter supply, and can therefore provide powerful constraints in our understanding of the global carbon cycle and climate change. Moreover, global climate models predict that in the next decades, the ocean inventory of O<sub>2</sub> will decrease much faster than one might think from the effects of higher water temperature on oxygen solubility alone. Rapidly lowering oceanic O<sub>2</sub> levels could thus be the miner's canary bird of climate change, but the present sources of oxygen data are too sparse and too intermittent to draw large-scale conclusions from them.

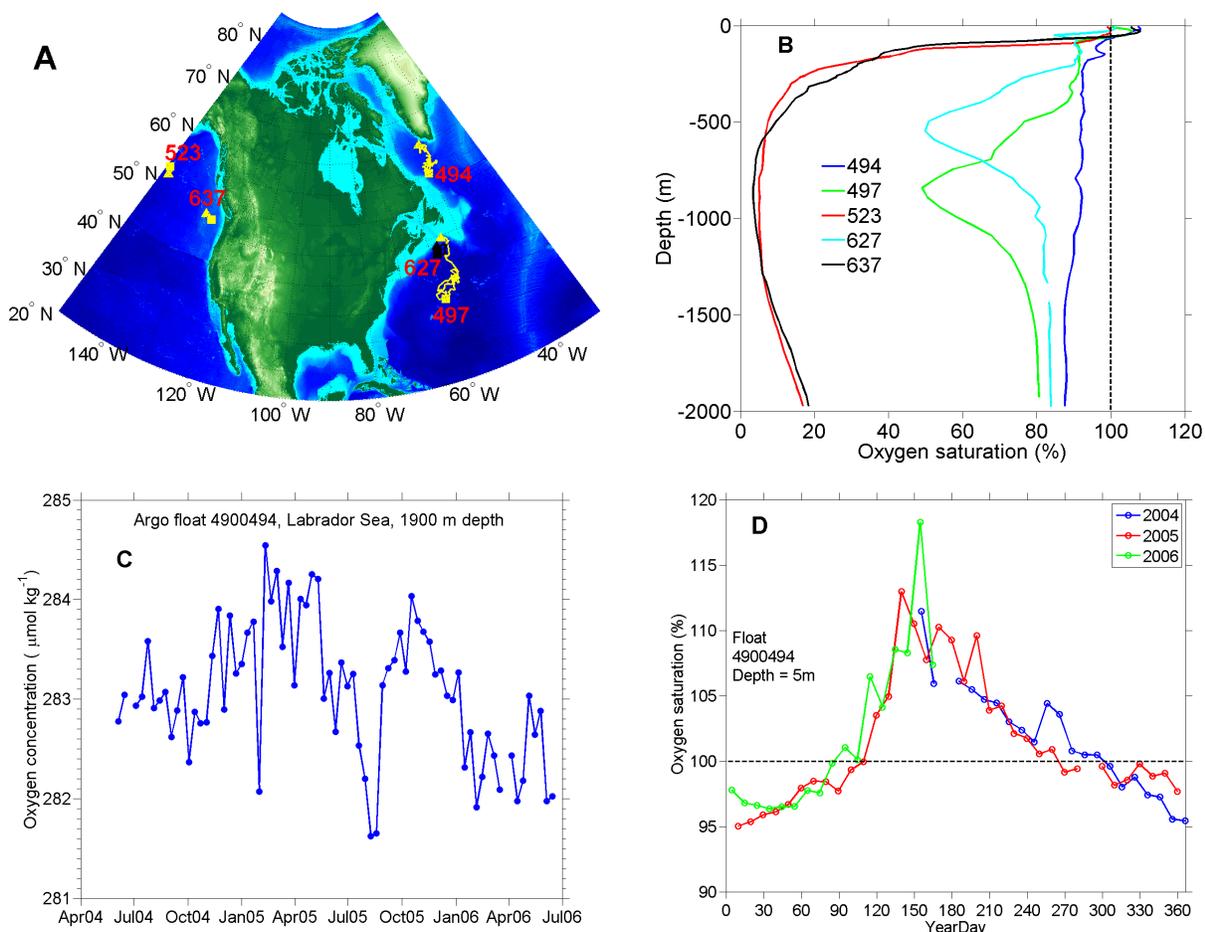


Figure 1. A) Map showing the locations of the five DFO Argo-oxygen floats deployed during 2004 and 2005. B) Vertical profiles of oxygen saturation measured between June 8 and June 14,

2006. Float 4900494 time series of C) oxygen concentration at 1900 m depth, and D) oxygen saturation at 5 m depth.

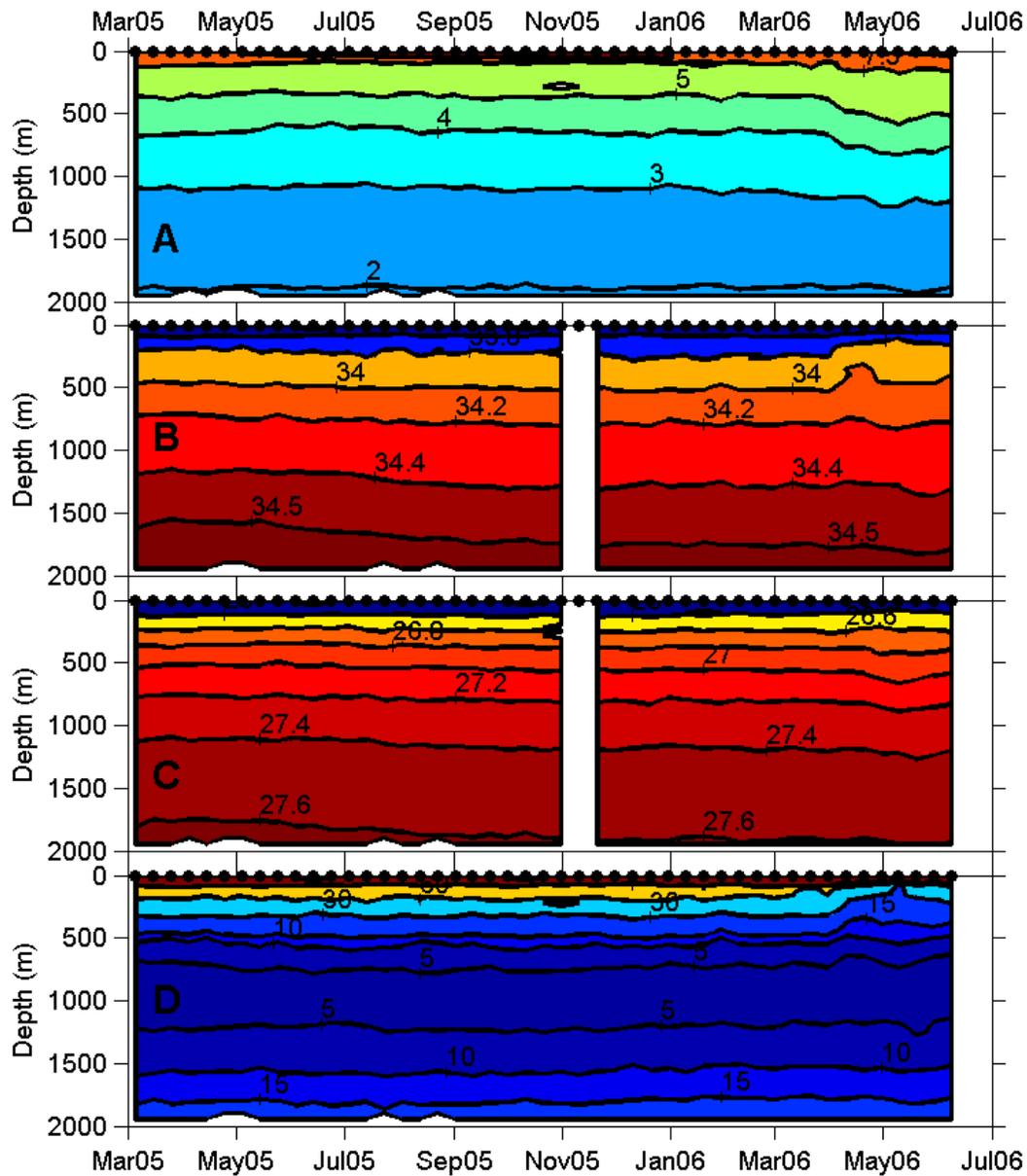


Figure 2. Float 4900637 measurements of A) temperature ( $^{\circ}\text{C}$ ), B) salinity, C) potential density ( $\text{kg m}^{-3}$ ), and D) oxygen saturation (%). The black dots at the top indicate the times of sampling.

## **Dominion Hydrographer & Director General Ocean Sciences – Canadian Hydrographic Service, Science Sector**



Dr. Savithri (Savi) Narayanan, who has been the Dominion Hydrographer and the Director General of the Canadian Hydrographic Service (CHS) since August 2, 2005, will now have the responsibility for the ocean sciences as well in DFO. She joined DFO in 1988 as an Oceanographer and later as the section head of oceanography in St. John's NL. In 1996, she became the director of the Marine Environmental Data Service (MEDS) in Ottawa until she was appointed in 2004 as the Dominion Hydrographer and the Director General of the CHS.

Savi brings considerable international experience to this position of the Director General, Ocean Sciences - CHS, having played a leadership role in the activities of International Council for the Exploration of the Seas (ICES), North Atlantic Fisheries Organization (NAFO), Intergovernmental Oceanographic Commission (IOC) and World Meteorological Organization (WMO), and from 2001-2005, as the co-president of the WMO/IOC Joint Technical Commission for Oceanography and Marine Meteorology. In addition, as the national representative in the Arctic Ocean Sciences Board, she will play a lead role in the implementation of national and international IPY programs.

**Dr. Ken Denman and Dr. Trevor Platt Honoured at Timothy R. Parsons Award Ceremony, May 30, 2006**

Dr. Wendy Watson-Wright, Assistant Deputy Minister for Science of the Department of Fisheries and Oceans (DFO) presented two awards named for Canadian ocean sciences pioneer Dr. Timothy R. Parsons to Dr. Ken Denman and Dr. Trevor Platt, on May 30th 2006, during the 40<sup>th</sup> Canadian Meteorological and Oceanographic Society (CMOS) Congress in Toronto.



Dr. Ken Denman received the award in honour of his career-long contributions on the influence of physical processes on ocean productivity, and for pioneering integrated physical-chemical-biological oceanographic research. Dr. Denman is employed at both the Canadian Centre for Climate Modelling and Analysis at the University of Victoria, and at the DFO Institute of Ocean Sciences in Sidney, B.C.



Dr. Trevor Platt received the award in honour of his outstanding contributions to the fields of biological oceanography and marine ecology, the thermodynamics of the open ocean ecosystem and an ecosystem approach to fisheries management. Dr. Platt is employed at the DFO Bedford Institute of Oceanography in Dartmouth, Nova Scotia and is an adjunct faculty member at Dalhousie University, Halifax, NS.

For more information on the Parsons medal, visit the website, at [http://www.dfo-mpo.gc.ca/science/Awards/Parsons\\_e.htm](http://www.dfo-mpo.gc.ca/science/Awards/Parsons_e.htm)

## Remise de la médaille Timothy R. Parsons à MM. Ken Denman et Trevor Platt le 30 mai 2006

Le 30 mai 2006, lors du 40<sup>e</sup> Congrès de la Société canadienne de météorologie et d'océanographie (SCMO) tenu à Toronto, Mme Wendy Watson-Wright, sous-ministre adjointe, Sciences, a décerné à MM. Ken Denman et Trevor Platt une médaille nommée en l'honneur de M. Timothy R. Parsons, qui a fait œuvre de pionnier dans le domaine des sciences de la mer au Canada.



Cette médaille a été décernée à Ken Denman pour sa contribution, tout au long de sa carrière, à l'étude de l'influence des processus physiques sur la productivité océanique et pour avoir été l'un des premiers à faire des recherches océanographiques physiques, biologiques et chimiques intégrées. Ken travaille au Centre canadien de la modélisation et de l'analyse climatique d'EC, situé à l'Université de Victoria, et à l'Institut des sciences océaniques du MPO, situé à Sidney, en C.-B.



Cette médaille a également été décernée à Trevor Platt pour sa contribution exceptionnelle aux domaines de l'océanographie biologique et de l'écologie marine, de la thermodynamique de l'écosystème de la haute mer et à l'approche écosystémique de gestion des pêches. Trevor travaille à l'Institut océanographique de Bedford du MPO, situé à Dartmouth, en Nouvelle-Écosse et est professeur adjoint à l'Université Dalhousie, située de l'autre côté du bassin de Bedford.

Pour un complément d'information sur la médaille Parsons, aller à [http://www.dfo-mpo.gc.ca/science/Awards/Parsons\\_f.htm](http://www.dfo-mpo.gc.ca/science/Awards/Parsons_f.htm)

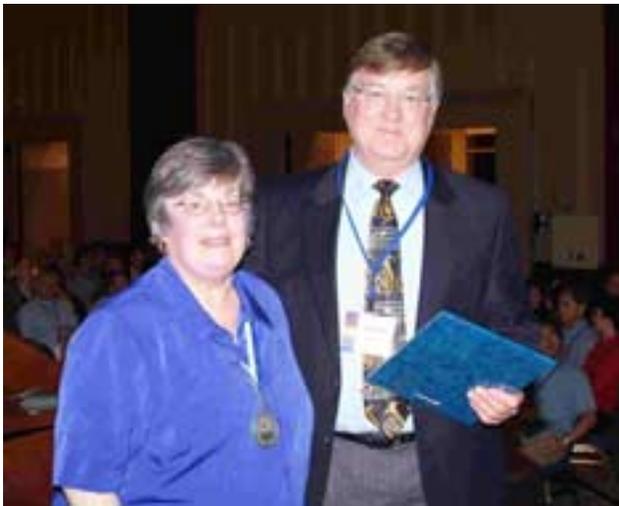
## The Tully Medal in Oceanography



The CMOS Tully Medal in Oceanography in 2005, awarded each year to a person whose scientific contributions have had a significant impact on Canadian oceanography, was presented by CMOS President Susan Woodbury to Jean-Claude Therriault, Institut Maurice Lamontagne, for his outstanding career as a Canadian marine biologist and his continuing leadership of oceanographic research in Quebec. His wide-ranging contributions to the understanding of marine ecosystems, particularly in the Gulf of St. Lawrence, Hudson Bay and the Canadian North, have had significant impact on the conservation and sustainment of living marine

resources. He has also played an important operational oceanographic role in Atlantic coastal waters through the Monitoring Program (AZMP) and in the establishment of the Gulf of St. Lawrence Observatory.

## The Prize in Applied Oceanography



The 2005 CMOS Prize in Applied Oceanography, awarded each year to a member or members of the Society for an outstanding contribution to the application of oceanography in Canada, was awarded by CMOS President Susan Woodbury to James Stronach, Hay and Company Consultants, Vancouver, for his outstanding contributions to applied oceanography in Canada through his development of numerical models of coastal waters, and through application of these models to a wide variety of fields, from Search and Rescue software for the Canadian Coast Guard, to complete sewage outflow

modelling for coastal communities, to tsunami and storm surge simulations, river plume and sediment transport, oils spill software and coastal erosion. His models of the Strait of Georgia and the St. Lawrence River and estuary have enabled others to extend these applications to ice forecasting, tidal height prediction and tidal current charts and software.

### **Tertia M.C. Hughes Memorial Graduate Student Prize**



The CMOS Tertia M.C. Hughes Memorial Graduate Student Prize for 2005 was awarded by CMOS President Susan Woodbury to Natacha Bernier, Dalhousie University, for her outstanding PhD thesis work at Dalhousie University entitled "Annual and Seasonal Extreme Sea Levels in the Northwest Atlantic: Hindcasts Over the Last 40 Years and Projections for the Next Century". This timely research, centered on the frequency of extreme sea levels along the eastern seaboard of Canada, is not only innovative, but has important practical applications in terms of flood-risk assessment.

### **CMOS Graduate Student Prize**

Daniel Deacu was awarded the CMOS Graduate Prize for his research at the University of Alberta. His thesis covered several different aspects of ocean modeling, including developing and testing of several eddy parameterizations in ocean models, and developing a new sea-ice model suitable for representation of the features of the marginal ice zone along the Labrador coast. Daniel is presently working as a post-doctoral fellow at Memorial University.

### **SCOR/DFO NSERC Scholarship Supplement in Ocean Sciences**



The CMOS SCOR/DFO NSERC Scholarship Supplement for 2005 was awarded to James Munroe of the University of Alberta. Mr. Munroe is pursuing a PhD where he studies the generation of internal gravity waves by turbulence using both laboratory experiments and numerical models. This work will lead to better parameterizations of mixing in numerical climate models.

## Oil Spill Response Workshop; October 12-13th, 2006

Submission by Andrew Cogswell; CogswellA@mar.dfo-pmo.gc.ca



A Workshop on Oil Spill Response will be held at the Bedford Institute of Oceanography, Dartmouth, Nova Scotia, Canada from Oct 12-13<sup>th</sup>, 2006 under the auspices of NATO/CCMS. This is the third Workshop in a series which started in Horten, Norway in April 2004, and Moscow, Russian Federation, in October 2005 (<http://www.nato.int/ccms/>).

Delegates from 55 NATO, partner and dialogue countries, in addition to previously identified experts in the field, have been invited to participate. This Workshop will be hosted by the Centre for Offshore Oil and Gas Environmental Research of Canada's Department of Fisheries and Oceans and will cover the most recent strategies for responding to marine oil spills. Presentations will focus on applied research and development, technology transfer, and will provide a forum to review results from field trials and case studies. Session topics will include, but are not limited to: **Risk Prevention** (Legislation and Policy, Response Preparedness/Contingency Planning, Eco-terrorism); **Oil Spill Fate and Transport** (Environmental Persistence, Remote Sensing, Modeling, Biodegradation); **Biological Effects** (Environmental Effects Monitoring and Environmental Risk Assessment); and **Operational Response** (Containment/Recovery Treating Agents, Shoreline Cleanup, In-situ Burning, Emerging Response Strategies).

Prior to the NATO/CCMS Oil Spill Response Workshop (Oct 12-13, 2006) a one day session (Oct 11, 2006) will focus on the application of oil spill response technologies under Arctic

conditions. It is anticipated that participants will discuss ongoing research programs and new opportunities such as that presented by the International Polar Year (IPY) 2007-2008 initiative ([www.ipy.org](http://www.ipy.org)) and other joint partnerships.

It is hoped that this continued international dialogue will generate new ideas and partnerships that will lead towards a thorough understanding of the current scientific, technological, and regulatory hurdles that remain for maximizing the effectiveness of oil spill response worldwide.

### **Conference on Offshore Energy**

OCEAN Industries BC will be holding a conference on offshore energy in Vancouver, British Columbia, Canada on October 12 and 13, 2006, at the Sheraton Vancouver. Conference and registration details will be provided on their website at: [www.oceanindustriesbc.ca](http://www.oceanindustriesbc.ca)

### **Call for Science Proposals; Science Exhibition 2009**

Musée de la Civilisation, Quebec City

The Musée de la Civilisation in Quebec City, jointly with MITACS Inc. and Université Laval, is proposing Science Exhibition 2009, to showcase cutting edge science. The focus will be on Science and the Future with the intention that patrons will have an interactive, hands-on experience. Topics will range across a broad spectrum of disciplines, including (but not limited to) the life sciences, physical sciences, mathematical and computational sciences, engineering, the health sciences, and the social sciences. While the target audience is high school students and teachers, proposals that reach out to general public are also desirable. The goal is to show connections between science and its applications, to stimulate young explorers to discover the beauty of science, and to inspire students to pursue scientific education and careers. The Museum is proposing to host the Exhibition for approximately 12 months after which it may move to other venues.

We are currently soliciting ideas for specific aspects of cutting edge science to be presented at the exhibition. The main criteria for selection will be the novelty of science, relevance of its possible applications, interactive character of the proposal, and the potential to reach out to and excite young people. If your proposal is selected, you may be invited to contribute to the development of the exhibit (although this is not a selection criterion and you are not obliged to help). We will ensure that proposers of selected projects are acknowledged.

We welcome you to share your ideas with us on-line at [www.mitacs.ca/goto/scientificexhibition2009](http://www.mitacs.ca/goto/scientificexhibition2009). Enquires and proposed ideas can be directed to: Olga Stachova, Science Exhibition 2009 Coordinator, MITACS, East Academic Annex, Room 120, Simon Fraser University, Burnaby, BC, V5A 1S6, 604-291-5477, [ostachova@mitacs.ca](mailto:ostachova@mitacs.ca)

## **Appel de propositions scientifiques; Exposition scientifique 2009**

Musée de la Civilisation Québec

Le Musée de la Civilisation de Québec, en collaboration avec MITACS Inc. et l'Université Laval, propose la tenue de l'Exposition scientifique 2009, un événement qui mettra en valeur la fine pointe de la science. L'accent sera mis sur la science et le futur avec l'intention que les visiteurs puissent vivre sur place une expérience interactive. Les thèmes couvriront un large éventail de disciplines, incluant (sans y être limité) les sciences de la vie, les sciences physiques, mathématiques et informatiques, le génie, les sciences de la santé, et les sciences sociales. Alors que la clientèle visée sont les étudiants et les enseignants du niveau secondaire, les propositions susceptibles d'intéresser le grand public sont également souhaitées. L'objectif est de mettre en évidence les liens entre la science et ses applications, de stimuler les jeunes explorateurs à découvrir la beauté de la science, et d'inciter les étudiants à poursuivre des études en science et à envisager des carrières scientifiques. Le Musée propose de tenir cette Exposition sur une période de 12 mois, après laquelle elle pourrait se déplacer à d'autres endroits au pays ou même à l'extérieur.

Nous sollicitons donc des idées sur des aspects spécifiques de la fine pointe de la science qui pourraient se concrétiser en une exposition. Le critère principal de sélection des propositions sera l'aspect novateur de la science, sa pertinence à d'éventuelles applications, son caractère interactif, de même que son potentiel de rejoindre et d'exciter la jeune clientèle. Si votre proposition est retenue, vous pourriez être invité(e) à contribuer au développement du thème exposé (bien que cela ne soit pas un critère de sélection et que l'on ne vous obligera pas à participer à sa réalisation). Il va de soi que la contribution des proposeurs des projets retenus sera reconnue.

Nous vous invitons à partager vos idées en ligne à [www.mitacs.ca/goto/scientificexhibition2009](http://www.mitacs.ca/goto/scientificexhibition2009). Toute interrogation au sujet de ce processus de même que les idées proposées peuvent être soumises à: Olga Stachova, Coordonnatrice de l'Exposition scientifique 2009, MITACS, East Academic Annex, Bureau 120, Université Simon Fraser, Burnaby, BC, V5A 1S6, 604-291-5477, [ostachova@mitacs.ca](mailto:ostachova@mitacs.ca)

## **SCOR Electronic Newsletter #6**

SCOR Newsletter #6 is now available at is now available at: <http://www.jhu.edu/scor/SCOR-NL-6.pdf>. It contains information on ongoing SCOR Working Groups, new Working Group proposals, SCOR sponsored research projects, the Second Symposium on The Ocean in a High CO<sub>2</sub>-World, the Second Volume of *Phytoplankton Pigments in Oceanography*, and the Past Marine Global Changes (IMAGES) project.

**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 #24 will be distributed on August 24, 2006. Please send contributions to [dick.stoddart@sympatico.ca](mailto:dick.stoddart@sympatico.ca)  
Bulletin #24 sera distribué le 24 août 2006. Veuillez faire parvenir vos contributions à [dick.stoddart@sympatico.ca](mailto:dick.stoddart@sympatico.ca)

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