



Canadian Meteorological
and Oceanographic Society

La Société canadienne
de météorologie et
d'océanographie

CMOS BULLETIN SCMO

December / décembre 2013

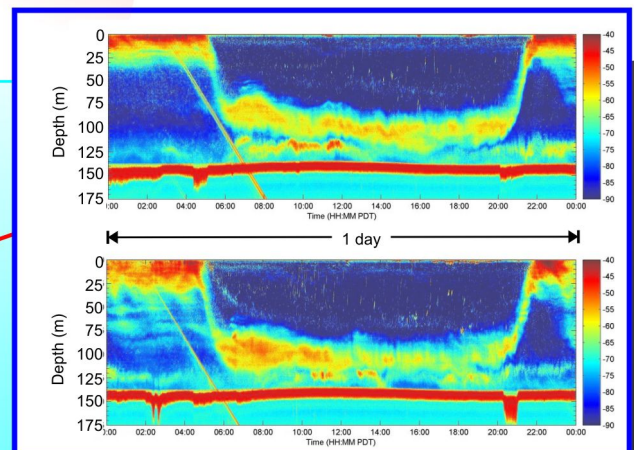
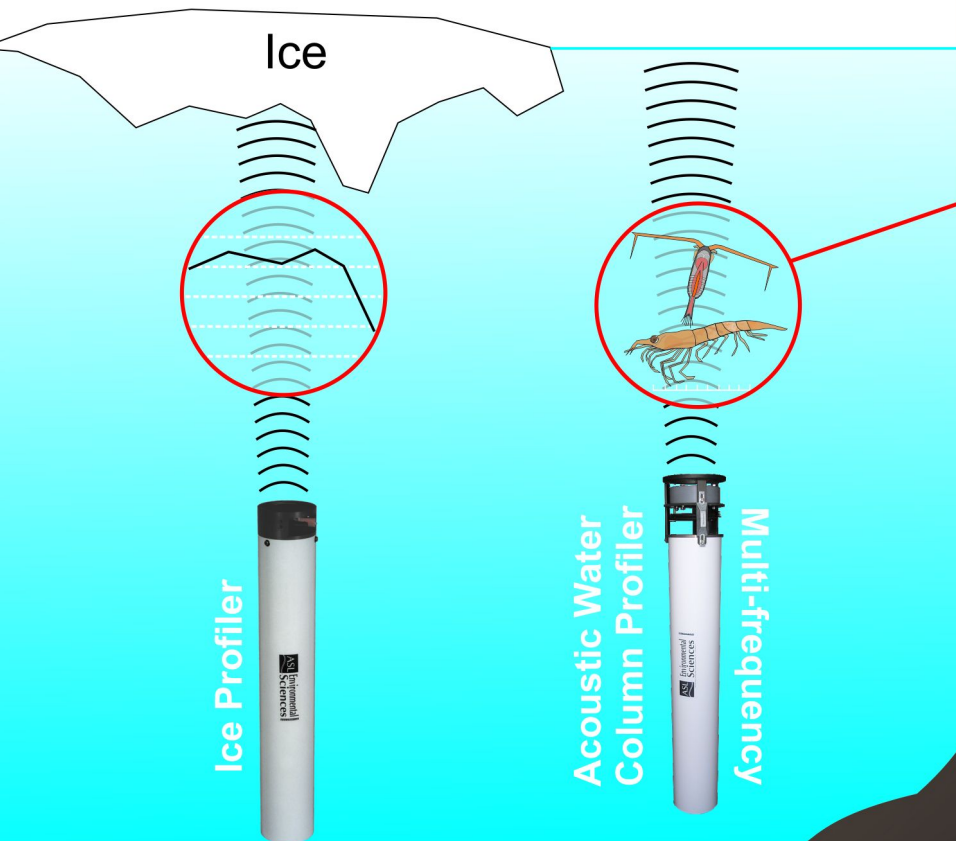
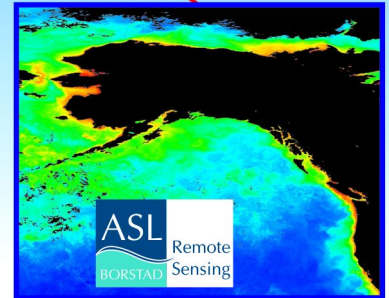
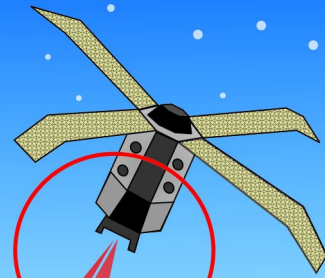
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... **Allocution du président**Chers amis et collègues:

Pierre Gauthier
Président de la SCMO
CMOS President

(English version follows on page 187)

À chaque année, à peu près à la même période, on vous rappelle que vous devriez renouveler votre statut de membre. Étant membre de la SCMO, vous connaissez l'importance de parler d'une voix unie pour exprimer les besoins de notre communauté. La météorologie, l'océanographie et les sciences de l'environnement sont à l'avant-plan de l'actualité,

particulièrement cette année avec la publication du cinquième rapport du GIEC (Groupe d'experts intergouvernemental sur l'évolution du climat) sur l'état des changements climatiques. D'ores et déjà, les médias accordent beaucoup d'intérêt à ce sujet ainsi qu'à plusieurs événements météorologiques extrêmes qui affectent la vie de plusieurs et pour lesquels il est important d'avoir des prévisions météorologiques précises à la plus longue échéance possible pour pouvoir se préparer à les affronter.

D'autre part, on observe un déclin de l'investissement en science. Celui-ci diminue non seulement en termes de fonds de recherche mais également dans la visibilité d'une partie importante de notre communauté, en l'occurrence les chercheurs, techniciens et professionnels du gouvernement fédéral. Ceux-ci jouent un rôle important pour maintenir et améliorer les services à la population comme les prévisions météorologiques, la surveillance de la qualité de l'air, et l'évaluation des changements climatiques. La recherche dans les universités et le secteur privé s'appuie sur eux et leurs problèmes deviennent les nôtres également. On se doit de parler d'une seule voix sur ces enjeux et de trouver le moyen de maintenir cette expertise de haut niveau que le Canada a pu bâtir au fil des ans. La SCMO a le sentiment qu'elle a un rôle à jouer pour changer le cours des choses. A chaque année, la SCMO tient son congrès annuel qui est l'occasion de se rencontrer. C'est souvent à cette occasion que nous renforçons nos liens et nos collaborations entre les universités, le gouvernement et le secteur privé. C'est un plaisir sans cesse renouvelé de rencontrer en personne ceux avec qui nos contacts sont le plus souvent par courriel ou par téléphone.

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CMOS Bulletin SCMO

"at the service of its members / au service de ses membres"

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Cover page: The 7th CMOS photo contest is now underway since six months. If you wish to participate, do so quickly. Winter months offer nice opportunities. Grab your camera. For more information on the contest, please go to <http://www.cmos.ca/photocontest.html>. Shown on the cover page are the last four years' winning (1st prize) photos (left to right, top to bottom): 2013, *Lightning at Sunset, Kelowna, BC*, from Gabor Friscka; 2011, *Storm over Canola* from Patrick McCarthy; 2010, *Umbrella Graveyard* from Frédéric Fabry; 2008, *Supercell Panorama* from Dave Sills. The editorial team takes this opportunity to wish all CMOS Members a joyous holiday season and a Happy New Year 2014.

Page couverture: Le 7^e concours photographique de la SCMO est en marche depuis maintenant six mois. Si vous voulez participer, faites vite. Les mois d'hiver offrent des opportunités intéressantes. Alors à vos appareils! Pour plus d'information sur le concours allez à <http://www.cmos.ca/photocontest.htm>. Illustrées sur la page couverture sont les photos gagnantes (1^{er} prix) des quatre dernières années (de gauche à droite, puis de haut en bas): 2013, *Lightning at Sunset, Kelowna, BC*, de Gabor Friscka; 2011, *Storm over Canola* de Patrick McCarthy; 2010, *Umbrella Graveyard* de Frédéric Fabry; 2008, *Supercell Panorama* de Dave Sills. L'équipe de rédaction profite de l'occasion pour vous souhaiter de très joyeuses fêtes et une Bonne et Heureuse Année 2014.

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... Allocution du président [Suite de la page 185]

Malheureusement, nous notons que le nombre de participants venant du gouvernement diminue à cause de restrictions dans les plans de voyage des ministères. Nous avons écrit pour exprimer notre inquiétude aux ministères concernés et espérons vivement que des correctifs pourront être apportés pour ramener nos collègues aux congrès de la SCMO.

Cette année, la SCMO s'affaire à rafraîchir son site web pour en faire un endroit où vous les membres, pourrez non seulement y trouver de l'information sur ce qui se passe partout au Canada mais également échanger et débattre de sujets d'intérêt en météorologie et océanographie. Nous voulons également être proactifs dans nos relations avec les médias et le public en général pour qu'on sache que la SCMO est le lieu par excellence où trouver l'expertise reliée à la météorologie, le climat et l'océanographie. Nous pensons que c'est le type de services que la SCMO peut vous rendre.

Je vous invite donc à renouveler votre carte de membre et à encourager vos collègues à le faire. Il est important que nous ayons une organisation qui parle en notre nom et établisse des liens avec d'autres sociétés comme la nôtre. De tels liens existent déjà entre la SCMO, l'UGC (Union Géophysique Canadienne), l'ACRH (Association Canadienne en Recherches Hydriques), l'AMS (American Meteorological Society), avec lesquelles nous avons organisé récemment des congrès conjoints qui ont eu beaucoup de succès et furent très stimulants. D'autres sont en préparation dans les prochaines années. Cette année, nous nous rencontrerons à Rimouski du 1^{er} au 5 juin 2014. J'espère vous y retrouver et entendre les présentations sur le travail que vous faites. Il est toujours agréable de voir l'excellent travail réalisé par notre communauté que ce soit autant par nos chercheurs chevronnés que nos étudiants gradués qui font souvent leurs premières présentations scientifiques dans le cadre d'un événement d'envergure. Ceci est définitivement à ne pas manquer.

Finalement, depuis le 1^{er} octobre, Andrew Bell est devenu notre nouveau directeur général en remplacement de Ian Rutherford qui a occupé ce poste durant plus de dix ans (voir articles dans ce numéro du Bulletin en pages 205-207). Nous souhaitons la bienvenue à Andrew et remercions Ian pour son dévouement et son engagement envers la SCMO durant toutes ces années.

Pierre Gauthier, Président de la SCMO

(la version française précède en page 185)

... Words from the PresidentFriends and colleagues:

Every year at about the same time, you are reminded that you should renew your membership. Being a member of CMOS you know the importance that we stand together to express the needs of our community. Meteorology, oceanography and environmental sciences are at the forefront of the actuality. This year in particular, the IPCC is releasing its fifth assessment report on the status of climate change and already the public and the media are devoting a lot of attention to our science. There are also a number of extreme meteorological events that impact the lives of many people and for which it is important to have accurate weather forecasts with as much lead time as possible to prepare for such things.

At the same time, we see a declining investment in science. The investment declines not only in terms of research funds but also in the visibility of a good part of our community - the government scientists. They play an important role in maintaining and improving the services to the population such as weather forecasts, air quality monitoring, and climate change assessment. Research in universities and the private sector relies on them, and the problems they face become our problems also. We need to speak with one voice on such issues and try to find ways to maintain the high level of expertise Canada has built over decades. CMOS feels it has to play a role to change this course of events.

Every year, CMOS holds its annual congress which is the occasion for all of us to meet. It is often there that we strengthen our linkages and develop new ones among government, universities and the private sector. It is also always a pleasure to meet face-to-face with many who are our contacts most of the time by emails or on the phone. Unfortunately, we have sadly noticed that the number of participants from the government is declining due to travel restrictions. We did express our concern to the federal departments and expect changes will occur to bring back our colleagues to CMOS congresses.

This year CMOS is working to freshen up its website to make it a place where you, the members, can not only pick up information on what is going on all across the country but also exchange and debate topics of interest. We also want to be more proactive in our relations with the media and the general public to make it known that CMOS is the one place to go to find the best expertise on weather, climate and oceanic issues. We feel this is the kind of services CMOS has to do for you.

I would like then to invite you to renew your membership to CMOS and encourage your colleagues to do so. It is

important that we have an organization that speaks for us and engage with other similar societies. There is a close link among CMOS, CGU (Canadian Geophysical Union), CWRA (Canadian Water Resources Association), AMS (American Meteorological Society), with whom we organize joint congresses which have been very successful and stimulating. More is on the way. Next year, we will meet in Rimouski on June 1-5, 2014. I hope to see you there and hear about the work you are doing. It is always amazing to see all the good work our community does from our most seasoned scientists to young graduate students who often make their first scientific presentation at a such big event. Certainly, this is not to be missed.

Finally, since October 1st, Andrew Bell became our new executive director replacing Ian Rutherford who served for over ten years (see articles in this issue of the Bulletin on pages 205-207). We welcome Andrew amongst us and thank Ian for his dedication and commitment to CMOS over all those years.

Pierre Gauthier, President of CMOS

CMOS exists for the advancement of meteorology and oceanography in Canada.

Le but de la SCMO est de stimuler l'intérêt pour la météorologie et l'océanographie au Canada.

This publication is produced under the authority of the Canadian Meteorological and Oceanographic Society. Except where explicitly stated, opinions expressed in this publication are those of the authors and are not necessarily endorsed by the Society.

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ARTICLES

Forecasts: helping us follow currents, water temperature and water levels

by Denis Lefaivre¹

The object of operational oceanography in the St. Lawrence River and the Gulf of St. Lawrence is to calculate and make available the anticipated changes in the physical conditions of this vast area using numerical forecast models.

Two models to inform mariners on future navigation conditions were developed by Fisheries and Oceans Canada: The first one in the St. Lawrence Estuary for surface currents (Saucier et al. 1999) and the second one in the Gulf of St. Lawrence for surface currents, surface water temperature and sea ice. The latter is coupled to the atmospheric forecast model of Environment Canada (Saucier et al. 2000, 2003; Pellerin et al. 2004; Smith et al. 2013). This article describes the elements used in these models and a few of their applications.

These models, similar to the ones used for weather forecasts, grasp the entire Gulf of St. Lawrence and River, from Trois-Rivières to the Cabot Strait and the Strait of Belle-Isle, and allow us to forecast the water temperature and the surface currents. A surface current refers to the speed and direction of the upper water layer in a river, stream or ocean. It is influenced by the atmosphere and by water level variations or tides. Thus, to forecast surface currents in the ocean, tides must be known first. Observations along the St. Lawrence coast, from tidal measurement stations equipped with water pressure devices, are analyzed at the Canadian Hydrographic Service to predict tidal heights one year in advance, independent of weather conditions. These tidal predictions are available in the form of tide tables at www.tides.gc.ca

In addition, water level forecasts that incorporate weather and the St. Lawrence River flow forecasts are produced for the next 48 hours, followed by a 30-day forecast without atmospheric forcing (Lefaivre et al. 2009). This is done by combining tidal predictions with atmospheric forecasts, which are produced by Environment Canada, and incorporating them into a model.

These forecasts, the result of daily teamwork, are particularly useful to the Canadian Coast Guard during search and rescue operations. The forecasts allow them to

guide seaborne searches for disabled ships towards the forecasted drift zones. Data from the model and drift forecasts are used in the same way to plan environmental interventions when oil spills occur. Current forecasts are also used to help plan instrument moorings for marine scientific measurement programs, as well as in analysing marine biology and fish habitat data. The water level forecasts are used daily by mariners for navigation safety and to optimize ship loading.

Observations from Environment Canada's Canadian Ice Service are also used in the model in the winter, to issue a sea ice forecast, in thickness and in concentration, influenced by surface currents and winds. These forecasts help to identify areas where ice tends to accumulate and could hinder navigation. The Coast Guard also uses this information to plan, recommend and maintain safe navigation routes in winter conditions.

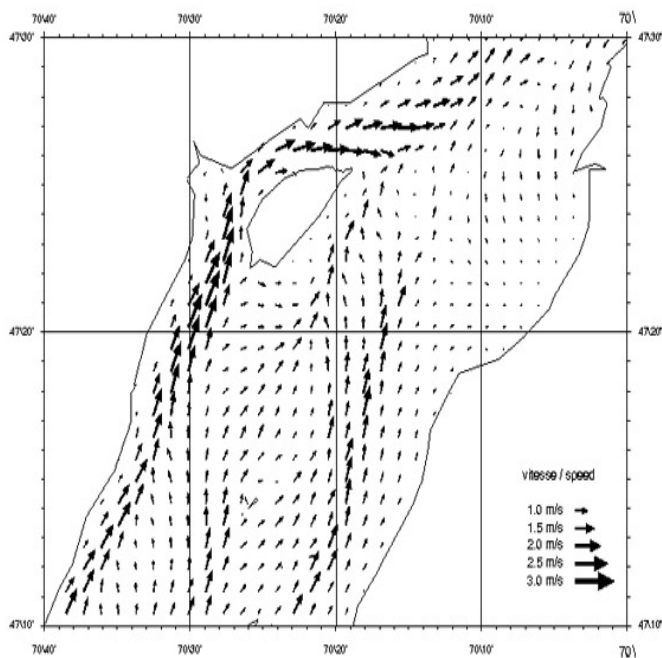


Figure 1: Surface current, surface water temperature, sea ice and water level forecasts are published on the St. Lawrence Global Observatory website at www.ogsl.ca

They are found under Ocean Forecasts and are provided by region on 48-hour charts (Figure 1).

References

Lefaivre, D., S. Hamdi and B. Morse, 2009. Statistical analysis of the 30-day water level forecasts in the St. Lawrence River. *Marine Geodesy*, 32:1, 30-41.

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Pellerin, P., H. Ritchie, F.J. Saucier, F. Roy, S. Desjardins, M. Valin and V. Lee, 2004: Impact of a two-way coupling between an atmospheric and ocean-ice model over the Gulf of St. Lawrence. *Monthly Weather Review*, 132(6): 1379-1398.

Saucier, F.J., and J. Chassé, 2000. Tidal circulation and buoyancy effects in the St. Lawrence Estuary. *Atmosphere-Ocean*, 38(4): 505-556.

Saucier, F.J., F. Roy, D. Gilbert, P. Pellerin and H. Ritchie, 2003. Modeling the formation and circulation processes of water masses and sea ice in the Gulf of St. Lawrence, Canada. *Journal of Geophysical Research*, 108 (C8): 3269.

Saucier, F. J., J. Chassé, M. Couture, R. Dorais, A. D'Astous, D. Lefavre, and A. Gosselin, 1999. The making of a surface current atlas of the St. Lawrence Estuary, Canada. Fourth international conference on computer modelling of seas and coastal regions (C. A. Brebbia & P. Anagnostopoulos, Eds.), *Journal of Computational Mechanics*, Wessex Institute of Technology Press, 87-97.

Smith, G.C., F. Roy, and B. Brasnett, 2013. Evaluation of an operational ice-ocean analysis and forecasting system for the Gulf of St Lawrence. *Quarterly Journal of the Royal Meteorological Society*, 139(671) Part B: 419-433.

Des prévisions pour mieux suivre les courants, la température de l'eau et les niveaux d'eau

par Denis Lefavre²

Le but de l'océanographie opérationnelle dans le fleuve et le golfe du Saint-Laurent est de calculer et de rendre disponible l'évolution anticipée des conditions physiques de ce grand territoire en utilisant des modèles numériques de prévision.

Deux modèles pour informer les navigateurs des conditions de navigation à venir ont été développés par Pêches et Océans Canada. Un premier dans l'estuaire du Saint-Laurent traite des courants de surface (Saucier et al. 1999) et un deuxième dans le golfe du Saint-Laurent traite des courants de surface, de la température de l'eau en surface et de la glace de mer. Ce dernier est couplé au modèle de prévision atmosphérique d'Environnement Canada (Saucier et al. 2000, 2003; Pellerin et al. 2004; Smith et al. 2013). Le présent article décrit les éléments pris en compte par les

modèles et quelques-unes de leurs applications.

Ces modèles numériques, semblables à ceux utilisés pour les prévisions atmosphériques, couvrent le fleuve et le golfe du Saint-Laurent, de Trois-Rivières aux détroits de Cabot et de Belle-Isle, et permettent de calculer la prévision de la température de l'eau et des courants de surface. Un courant de surface, c'est la vitesse et la direction de la couche supérieure d'un cours d'eau ou de l'océan. Cette couche subit l'influence atmosphérique et celle des variations du niveau d'eau : les marées. Ainsi, pour produire des prévisions de courants de surface, il faut d'abord connaître les marées. Le Service hydrographique du Canada a installé le long des côtes du Saint-Laurent des stations de marémètres équipées d'appareils qui mesurent la pression de l'eau. Les observations enregistrées sont analysées pour calculer les hauteurs de marée, un an à l'avance, sans l'influence des conditions atmosphériques. Ces prédictions sont disponibles sous forme de tables des marées à l'adresse www.marees.gc.ca

Par ailleurs, des prévisions de hauteurs de niveau d'eau qui intègrent les prévisions atmosphériques et du débit du Saint-Laurent sont produites pour les 48 prochaines heures, suivies des prévisions sans effet atmosphérique pour 30 jours (Lefavre et al. 2009). Pour ce faire, les prédictions de marées ajoutées aux prévisions atmosphériques produites par Environnement Canada sont importées dans un modèle numérique.

Ces prévisions, fruit d'un travail d'équipe au quotidien, sont notamment utilisées par la Garde côtière canadienne lors d'opération de recherche et de sauvetage puisqu'elles permettent d'orienter la recherche de naufragés en mer vers les zones de dérive prévues. De la même façon, les données du modèle et la prévision de la dérive aident à planifier l'intervention environnementale lors d'incidents de déversement d'hydrocarbures. Les prévisions de courants servent aussi à mieux planifier les programmes de mesures scientifiques en mer pour les mouillages d'instruments et pour l'analyse de données biologiques et de l'habitat du poisson. Les prévisions de niveau d'eau sont utilisées quotidiennement par les navigateurs pour leur sécurité et pour optimiser le chargement des navires.

Les observations faites par le Service canadien des glaces d'Environnement Canada sont également utilisées pour alimenter le modèle pendant l'hiver et produire une prévision de glace, en épaisseur et en concentration, sous l'influence des courants de surface et des vents. Cette prévision permet de déterminer les endroits où la glace aura tendance à s'accumuler et risquerait d'entraver la navigation. La Garde côtière utilise d'ailleurs ces renseignements pour planifier, recommander et entretenir les routes sécuritaires de navigation en hiver.

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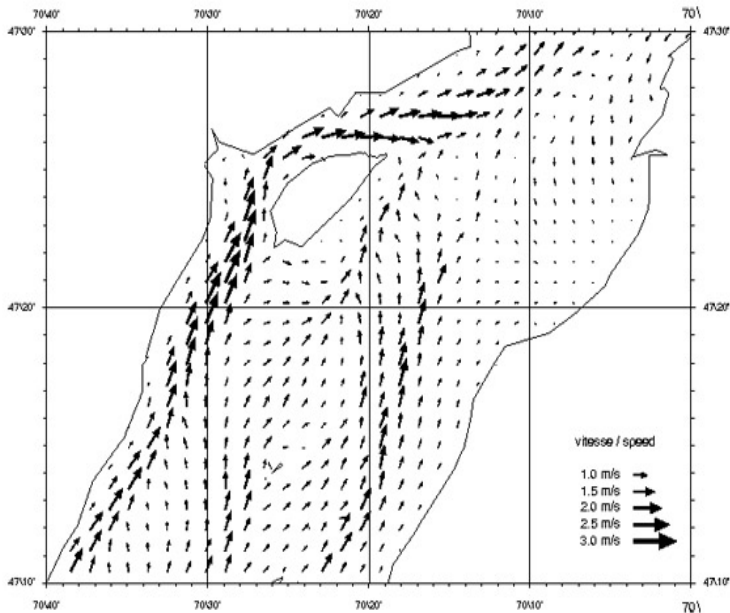


Figure 1: Les prévisions de courants de surface, de température de l'eau en surface, de glace et de niveau d'eau sont diffusées au site de l'Observatoire global du Saint-Laurent à l'adresse www.ogsl.ca

Elles sont affichées sous la rubrique Prévisions océaniques et sont présentées par région sous forme de cartes pour chacune des 48 prochaines heures (Figure 1).

Références:

Les références sont présentées à la page 189 du présent numéro.

Antarctic Ozone Hole

The area of the annually recurring Antarctic ozone hole reached its peak at 24.0 million square kilometres on 16 September according to data from NASA. This is more than in 2012 and 2010, but less than in 2011.

The World Meteorological Organization's newest Antarctic Ozone Bulletin said the ozone hole area averaged over the ten last days of September was 20.9 million km² (data from the Royal Netherlands Meteorological Institute, KNMI). The ozone mass deficit averaged over the same period was 19.59 megatonnes. This is more than in 2010 and 2012 but less than in 2011.

As the temperatures rise after the southern hemisphere winter, the ozone depletion rate will slow down. It is still too early to give a definitive statement about the degree of ozone loss that will occur in 2013. Existing data indicates that this year's ozone hole is larger than in 2012 and possibly also 2010, but smaller than the one of 2011.

The ozone bulletin is based on observations from the ground, weather balloons and satellites from WMO's Global Atmosphere Watch Program and its network of scientific stations in some of the world's most inhospitable terrain. Most stations reported clear signs of ozone depletion.

Ozone mixing ratio (ppm) at approx. 22 km on 17 Sept. 2013

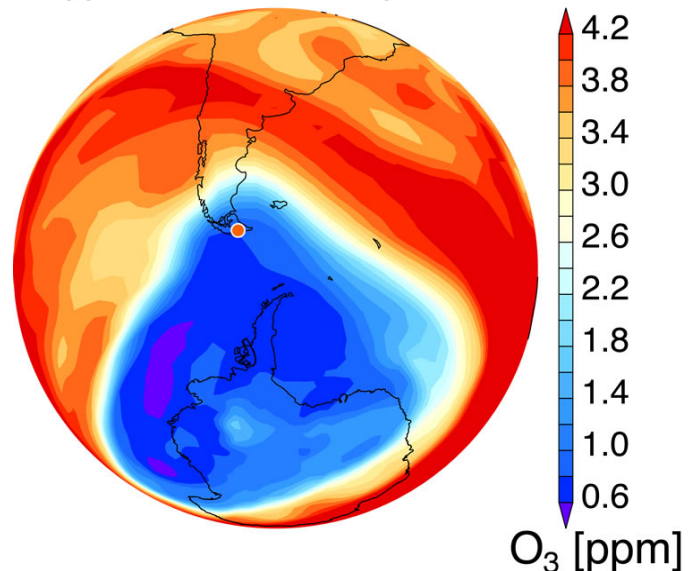


Figure caption: Ozone hole on 17 Sept extended to southern tip of South American continent. The dot on the map is the GAW station at Ushuaia operated by the national meteorological service of Argentina. Blue colours indicate ozone depleted air masses. The map is calculated by a so-called data assimilation model run at the Belgian Institute for Space Aeronomy. It uses meteorological data from ECMWF and satellite data from the MLS instrument on board the NASA-operated AURA satellite in combination with our best knowledge of the chemical reactions that cause ozone depletion.

For example, on 17 September, the ozone hole extended all the way to the southern tip of the South American continent and affected inhabited places such as Ushuaia and Río Gallegos, where Argentinian scientists carry out observations of the stratospheric ozone layer. Such episodes typically occur a handful of times each September-November. Especially in November, when the sun is high in the sky, they can lead to a significant increase in the intensity of solar ultraviolet radiation that hits the earth's surface.

The meteorological conditions in the Antarctic stratosphere found during the austral winter (June-August) set the stage for the annually recurring ozone hole. The last ten days of September is typically the time period when the ozone hole reaches its maximum extent.

By most criteria, the largest ozone hole was observed in 2006. An international agreement banning the worst ozone-depleting substances has stemmed the destruction of the ozone layer. However, severe Antarctic ozone holes are expected to continue during the next couple of decades.

Source: WMO Website visited on October 31, 2013.

Trou d'ozone au-dessus de l'Antarctique

D'après les données de la NASA, le trou d'ozone qui se reforme tous les ans au-dessus de l'Antarctique a atteint son pic de superficie le 16 septembre avec 24 millions de kilomètres carrés. Ce chiffre est supérieur à celui de 2012 et de 2010, mais inférieur à celui de 2011.

Le dernier Bulletin sur la couche d'ozone au-dessus de l'Antarctique de l'Organisation météorologique mondiale révèle que la surface moyenne du trou d'ozone au-dessus de l'Antarctique sur les dix derniers jours de septembre était de 20,9 millions de km² (données de l'Institut météorologique royal des Pays-Bas, KMNI).

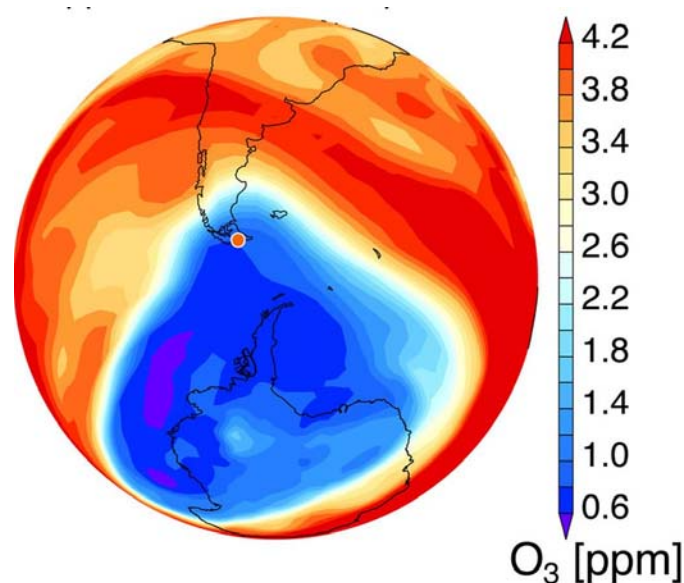
C'est plus qu'en 2012, mais moins qu'en 2010 et 2011. La déperdition de gaz moyenne pour la même période était de 19,59 mégatonnes, ce qui est plus qu'en 2010 et 2012, mais moins qu'en 2011.

Avec la hausse des températures faisant suite à l'hiver austral, le taux de destruction d'ozone va reculer. Il est encore trop tôt pour pouvoir donner un chiffre définitif du degré de déperdition pour 2013. Les données dont on dispose indiquent que, cette année, le trou d'ozone est de plus grande taille qu'en 2012, voire qu'en 2010, mais plus petit que celui observé 2011.

Le bulletin sur la couche d'ozone se fonde sur des observations au sol, à partir de ballons et de satellites météorologiques relevant du Programme de Veille de l'atmosphère globale de l'OMM et de son réseau de stations scientifiques situées dans certaines des régions les plus inhospitalières du globe. La plupart des stations ont fait état de signes manifestes de déperdition d'ozone.

Par exemple, le 17 septembre le trou d'ozone s'étendait jusqu'à la pointe du continent sud-américain et affectait des zones habitées comme Ushuaïa et Río Gallegos, où les scientifiques argentins réalisent des observations de la couche d'ozone stratosphérique. De tels épisodes se produisent généralement quelques rares fois entre septembre et novembre. En novembre, notamment, lorsque le soleil est haut dans le ciel, ils peuvent conduire à une hausse sensible de l'intensité de rayonnement solaire ultraviolet qui touche la surface de la terre.

Rapport de mélange d'ozone en PPM le 17 septembre 2013 à approximativement 22 km



Légende: Le 17 septembre, le trou d'ozone s'étendait jusqu'à la pointe du continent sud-américain. La couleur bleue indique les masses d'air pauvres en ozone. La carte est établie d'après un modèle d'assimilation des données géré par l'Institut d'aéronomie spatiale de Belgique. Il utilise des données météorologiques du CEPMMT et des données satellitaires produites par l'instrument MLS embarqué sur le satellite AURA exploité par la NASA, associées à nos meilleures connaissances des réactions chimiques appauvrissant l'ozone.

Les conditions météorologiques observées dans la stratosphère antarctique pendant l'hiver austral (de juin à août) déterminent l'évolution du trou d'ozone se reformant tous les ans. Les dix derniers jours de septembre sont traditionnellement la période où le trou d'ozone atteint sa superficie maximale.

Le trou d'ozone le plus important, à presque tous les égards, a été observé en 2006. Un accord international interdisant les principales substances qui appauvrissent l'ozone a stoppé la poursuite de la destruction de la couche d'ozone. Néanmoins, d'importants trous d'ozone devraient encore perdurer au cours des prochaines décennies.

Source: Site web de l'OMM visité le 31 octobre 2013.

REPORTS / RAPPORTS**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:

1) 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.

2) India has received major new funding to support the Indian Argo program over the next 5 years.

3) 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.

4) 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.

5) 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.

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

La 14^e 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.

1) 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.

2) L'Inde a reçu de nouveaux fonds pour son programme Argo pour les 5 prochaines années.

3) 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.

4) 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.

5) Le Canada accueillera la 15^{ème} 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.

World Weather Open Science Conference (WWOSC 2014)
Montréal, Canada, 16-21 August 2014

The overarching theme of WWOSC 2014 is "Seamless Prediction of the Earth System: from minutes to months". The Conference is structured around two programs:

- The science program will cover basic weather research that extends our knowledge of processes and systems as well as the applied research needed to put prediction systems together and assess the impacts of weather and climate events.
- The user, application & social science program will consider the goods and services economy and the role of government in disaster risk reduction and management and the communication of weather information.



For more information visit
wwosc2014.org

WWOSC 2014
 MONTREAL, CANADA

Conférence scientifique publique mondiale sur la météorologie (WWOSC 2014)
Montréal, Canada, 16 au 21 août 2014

La Conférence scientifique publique mondiale sur la météorologie (WWOSC 2014) a pour thème général *Prévision continue des éléments du système terrestre : de quelques minutes à plusieurs mois*. La conférence s'articulera autour de deux programmes :

- Le programme scientifique présentera des connaissances scientifiques allant de la recherche de base qui étend notre connaissance des processus et des méthodes à la recherche appliquée pour rassembler toutes les parties du système de prévision et évaluer les répercussions des phénomènes météorologiques et climatiques.
- Le programme des utilisateurs, des applications et des sciences sociales se penchera sur l'économie de biens et services, le rôle des gouvernements dans la réduction et gestion des risques de catastrophe et la communication des renseignements météorologiques.



Pour plus d'information visiter
wwosc2014.org

WWOSC 2014
 MONTREAL, CANADA

Report on the IAHS-IAPSO-IASPEI Scientific Assembly

Three of IUGG's constituent Associations, IAHS, IAPSO and IASPEI, met for a Joint Scientific Assembly in Gothenburg, Sweden, from 22 to 26 July 2013. The theme of the Assembly, "**Knowledge for the Future**", was chosen in order to highlight the importance of improved knowledge in hydrology, oceanography and seismology in addressing the challenges posed by climate change and the risks of natural extreme events. The Assembly attracted 1087 participants from 66 countries with 24 participants from Canada. The two national IAPSO correspondents for Canada, Blair Greenan and Jody Klymak, attended the IAPSO Business Meeting on July 23rd.

Kathryn Kelly (USA), the plenary lecturer for IAPSO, focused on meridional heat transport in the Atlantic Ocean, a key component of the global climate system. She combined different data sources to review the heat budget and anomalies in the heat transport, indicating a southern source for the anomalies.

Each Association offered a broad program of lectures and posters, with up to 11 parallel sessions at any one time. The lecture program was organized into 48 Association symposia, together with nine joint symposia focusing on areas such as land-ocean interactions, advanced applied statistics, and tsunamis. This program was complemented

by two afternoon poster sessions. A highlight of the IAPSO program was the presentation of the 2013 Albert I Gold Medal, commemorating the Prince of Monaco, Vice President of IUGG (1919-1922). The medal was presented to Albert Gordon (USA), who then delivered the Albert I Memorial Lecture describing his research on the Indonesian Throughflow, the link between the Pacific and Indian Oceans.

IUGG	International Union of Geodesy and Geophysics
IAHS	International Association of Hydrological Sciences
IAPSO	International Association for Physical Sciences of the Ocean
IASPEI	International Association of Seismology and Physics of the Earth's Interior

Maury Project 2013

Report by the Canadian Representative
Leslie A. Hussmann
Langley, British Columbia

Submitted to the
Canadian Meteorological and Oceanographic Society
August 12, 2013

The Maury Project completed its 20th season this year, from July 8th to 19th, 2013. Teachers from all over the continent studied physical oceanography in Annapolis, Maryland. Workshops were conducted at the historic and august United States Naval Academy.



Leslie Hussmann in Annapolis, Maryland, USA

Among the 24 participants of Maury 2013, was the Canadian representative Leslie Hussmann. The Canadian Meteorological and Oceanographic Society generously cooperated with the American Meteorological Society to send a Canadian to the Maury Project. Leslie is from Langley, British Columbia, and teaches Late French Immersion, grade 6, at Sunrise Ridge Elementary in the Surrey School District of British Columbia. Other Maury participants included secondary school math and science teachers and elementary school teachers. They came from all over continental United States, including one Department of Defense teacher, who teaches children on a military base in Okinawa, Japan.

Dr. David Smith who has been the Chair of the Maury Project for 20 years has recently retired. The new Chair of the Maury Project is Captain Bill Schultz. Other professors of the oceanography department contributed their expertise to the project including Professor Don McManus, Dr. Andrew McManus and Commander Emil Petruncio.

During the Maury Project, Rear Admiral Brian Brown also addressed the participants about the future of the U. S. Navy and its need for oceanographic data.

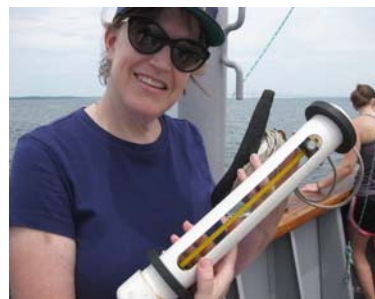
The 24 elementary and high school teachers involved in the Maury Project were housed at Saint John's College in Annapolis, founded in the 1600s. Many of the colonial-style buildings at Saint John's College were built in the 1800s.

The Maury Project included a number of excellent hands-on field studies. Two afternoons were spent on the Naval Craft YP 686. Teachers conducted a variety of water tests, from the boat, on the Chesapeake Bay. The aquatic environment of the Chesapeake is greatly impacted by the six states, with significant human population, which border the bay and supply its tributaries. The U. S. Naval Academy is located between two tributaries of the Bay, the Severn River and the South River.



Leslie Hussmann, Kevin Weatherbee, Jen White and Jennifer Wiggins prepare to lower the C.T.D. into the water.

Conductivity, temperature and depth are measured by the sensors on the C.T.D., which are connected to computers in the ship's cabin. Many of the traditional instruments have been made redundant by modern technology.



Water temperature manual measurement

Leslie measures the temperature of the water of Chesapeake Bay. Sensors on the C.T.D., pictured previously, confirmed this manual method of data collection.

A second afternoon of field study was conducted at a beach on the Chesapeake Bay. Joe Zuniga, Commander Emil Petruncio and the team, measure the slope of the beach on the Chesapeake Bay, on this very blustery day.

This field study also included a visit to an estuary, where an invasive plant was observed. Phragmites is a perennial plant that is invasive to wetlands.



A white perch caught in the net

Angie McKay and Bill Licopoli net white perch, which were blown close to shore by the strong winds at the beach off Chesapeake Bay. Observation of the fish indicated that they were free of external growths that plague some fish in the Bay.

On Saturday, July 13, the Maury teachers undertook a field trip to Baltimore. The National

Aquarium in Baltimore, with marine and non-marine life exhibits, was outstanding. Among the exhibits was a display of live jelly fish, which revealed their beauty and their detrimental aspects.

Animators bring nature and the environment to life at the Aquarium, including a sloth exhibit.

A final field trip took the Maury participants to two facilities of NOAA, the National Oceanic and Atmospheric Administration, in Washington D.C. The scientists at NOAA indicated that there were 3 large forest fires burning in Canada on July 17, and that almost half of the country was affected by light smoke from those fires.



NOAA facility

During the two-week workshop, each Maury participant did a demonstration of an oceanographic effect or phenomenon. Leslie Hussmann and Tania Coffin demonstrated the effects of water pressure.

Throughout the Maury Project, the participants enjoyed many excellent power point presentations and lectures. Several of the modules that were explored, were of particular interest to Leslie Hussmann as an elementary school teacher and a resident of the Pacific Coast. These included:

- El Niño, la Niña;
- Ocean tides;
- Ocean sound and the Deep Sound Channel;
- Deep and shallow ocean waves;
- Pacific Ocean currents;
- Estuaries and deltas;
- Deep-ocean Assessment and Reporting of Tsunamis (D.A.R.T.);
- Arctic and Antarctic conditions.

Leslie looks forward to presenting this material in workshops and conferences.

During the two-week workshop there was ample time for conferring with colleagues from other jurisdictions. Leslie Hussmann appreciated the opportunity to learn about differences between the American and Canadian educational systems. Having a provincially regulated system appears to offer more autonomy and more variability than a nationally administered system. Also, there seems to be more focus on standardized tests, which are conducted annually in each grade, south of the border. Undoubtedly, further comparison of the various school systems would provide opportunities for collaboration.

Maury 2013 was a "most excellent" two weeks of workshops and field studies. Leslie Hussmann thoroughly enjoyed and benefitted from her experience in Annapolis at the United States Naval Academy. Her understanding of oceanography has increased dramatically. She looks forward to sharing with other teachers in Western Canada. Leslie greatly appreciates the sponsorship of the Canadian Meteorological and Oceanographic Society. She encourages future participation with the American Meteorological Society in the Maury Project. *"Every physical fact, every expression of nature, every feature of the earth, the work of any and all of those agents which make the face of the world what it is, and as we see it, is interesting and instructive."* (Matthew Fontaine Maury in *The Physical Geography of the Sea*, 1855). The Maury Project is an 'interesting and instructive' instrument through which teachers, can spread the science of physical oceanography to fellow teachers and to students of all ages.

Note from the Editor: Leslie Hussman's original report was modified slightly to fit the format of the *CMOS Bulletin SCMO*.

Ocean Science in Canada: Meeting the Challenge, Seizing the Opportunity



OCEAN SCIENCE IN CANADA: MEETING THE CHALLENGE, SEIZING THE OPPORTUNITY

The Expert Panel on Canadian Ocean Science

The universal challenges facing the ocean today demand the integration of multidisciplinary knowledge and coordination across traditional boundaries. While Canada is recognized for its excellence in ocean research and leading role in international research collaboration,¹ a comprehensive understanding of national capacity to address future questions of ocean science is essential.

Recognizing the importance of ocean science, the Canadian Consortium of Ocean Research Universities (CCORU) asked the Council of Canadian Academies to undertake an expert assessment of the state of ocean science in Canada, focusing on future opportunities and challenges for Canada and its coasts. This evidence-based assessment follows on the Council's priority setting exercise and expert workshop report, **40 Priority Research Questions for Ocean Science in Canada**.

The major findings from *Ocean Science in Canada: Meeting the Challenge, Seizing the Opportunity*:

- Canada ranks among the top countries in output and impact of ocean science papers but this position is at risk.

The Panel used bibliometric analysis as a proxy indicator for an international comparison of the performance of ocean science in Canada. According to this analysis, Canada ranks 7th in the number of peer-reviewed papers, and 11th in scientific impact, by average relative citations. Ocean science in Canada is growing at a slower pace than other fields of science in Canada. Canada also has the lowest domestic growth index of the 25 leading countries in ocean science. This implies that ocean science is losing ground relative to other fields faster in Canada than in other countries, which in the long run could lead to a decline of

Canada's position in research output and impact.

- Canada has several world-class systems for ocean observation and monitoring; however, challenges exist in achieving geographical coverage and integration of data management.

Canada has recently invested in innovative observation platforms, such as the NEPTUNE cabled observatory and the Ocean Tracking Network, which build on existing strengths in observation technology development. While these systems are ground-breaking and attractive to leading ocean scientists from around the world, challenges exist with regard to the geographic coverage of observation and monitoring, in particular in the Arctic. Other challenges remain with regard to data integration and accessibility through the use of modern data portals. Addressing these challenges is especially important for research on global changes to the ocean.

- Canada has a substantial but aging research fleet.

Coast Guard operates the Canadian research fleet, which includes several large oceanographic vessels and a dedicated research icebreaker that provides access to the Arctic. Half of these vessels were built over 25 years ago, and older vessels lead to more breakdowns, higher costs, and operational days lost to maintenance. Furthermore, the Panel observed that other countries have established more transparent systems of ship time allocation, which allow for more efficient use of ship time, and provide data to inform the planning of infrastructure investments. The ongoing renewal of the Canadian research fleet provides an opportunity not only to update aging infrastructure but also to improve the alignment of vessel specifications with science needs.

- Although funding for ocean science in Canadian universities is increasing, trends in total funding are unclear.

Total spending by funding agencies in Canada increased from 2002 to 2011, but direct funding for individual research projects has declined since 2008. While more funding is available for large research networks and investments in major infrastructure, changes in the policies and programs of funding organizations require higher levels of coordination among researchers, and alignment of funding from multiple sources. Overall, data on ocean science expenditures of government organizations and the private sector were insufficient to estimate national trends in funding for ocean science.

- The state of human capacity in ocean science cannot be determined because of data limitations.

Despite a steady increase in undergraduate and graduate students in many fields related to ocean science in Canada from 2001 to 2009, it is unclear whether overall trends in

human capacity are positive on balance or whether the skills needed to address the 40 research questions, described in *40 Priority Research Questions for Ocean Science in Canada*, are available. Due to its interdisciplinary character, ocean science draws on highly qualified personnel from many programs and departments, which makes human capacity one of the most challenging categories to assess. This is a particular concern, since human capacity determines the use and productivity of all other elements of ocean science capacity.

For more information, please visit www.scienceadvice.ca.

References

1: Coward *et al.*, 2000; Charles, 2001; for other examples of Canadian leadership and contributions, see: de Wit & Muir, 2010; AMAP, 2011; Greenan & Klymak, 2011; Picard-Aitken *et al.*, 2011.

Ocean Technology Clusters: Governments, Universities, and Private Sector Firms

Across Canada, regional partnerships among governments, universities, and private sector firms are contributing to the development of innovative ocean technologies and services. These regional groups, or clusters, share facilities and expertise to help businesses innovate and grow while developing new tools for scientific research. For example, firms in Halifax, NS have developed a particular strength in marine-derived food additives and other products, as well as marine defence and security. Newfoundland and Labrador is home to a number of firms specializing in cold-water engineering and oil and gas extraction. Similarly, a Pacific cluster has emerged in Victoria and Vancouver, BC around a range of government-funded research programs, including the NEPTUNE and VENUS cabled observatories, and offshore oil and gas exploration (Doloreux & Shearmur, 2009). In Quebec, the provincial government is investing in innovation-support organizations to stimulate technology and economic development along the St. Lawrence coast. These examples demonstrate the types of economic and scientific opportunities that can be realized when government, academic, and private sector organizations pool their collective knowledge and resources

“Si ce n'est pas nous, alors qui? Si ce n'est pas maintenant, alors quand? Et si ce n'est pas ici, alors où?”

Naderev Sano, Commissaire aux changements climatiques des Philippines à la 19^e Conférence des Nations Unies sur le climat tenue à Varsovie. Ces propos font référence au passage du typhon *Haiyan* qui a dévasté une partie des Philippines, vendredi, le 8 novembre 2013.

Highlights in Ocean Observation in Canada

Argo is a global array of more than 3,500 automated floats that transmit data via satellites. The system covers almost the entire ocean, with the notable exception of the Arctic. Canada is contributing about one-tenth of the active Argo floats and was one of the early developers of the Argo Software System (Argo, n.d.).

Reference: Argo. (n.d.). About Argo. Retrieved March 2013, from http://www.argo.ucsd.edu/About_Argo.html.

The Ocean Tracking Network, based at Dalhousie University, collects data on sea animal movements in relation to the physical characteristics of the surrounding ocean. It uses a global network of acoustic receivers to track individual tags attached to a variety of aquatic species (OTN, n.d.).

Reference: OTN (Ocean Tracking Network). Home page. Retrieved March 2013, from <http://oceantrackingnetwork.org/>.

The Census of Marine Life used human-operated vehicles (HOVs), remotely-operated vehicles (ROVs), Autonomous Underwater Vehicles (AUVs), and towed platforms in a concerted international effort to establish a baseline of marine biodiversity (Snelgrove, 2010).

Reference: Snelgrove, P.V.R. (2010). *Discoveries of the Census of Marine Life: Making Ocean Life Count*. Cambridge, United Kingdom: Cambridge University Press.

The Ocean Networks Canada observatory combines the North-East Pacific Undersea Networked Experiments (NEPTUNE) and the Victoria Experimental Network Under the Sea (VENUS) into one of the world's most potent cabled networks (Taylor, 2009).

Reference: Taylor, S.M. (2009). Transformative ocean science through the VENUS and NEPTUNE Canada observing systems. *Nuclear Instruments and Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors and Associated Equipment*, 602 (1), 63-67. Doi: 10.1016/j.nima.2008.12.019.

“If not us, then who? If hot now, when? And if not here, where?”

From Naderev Sano, Commissioner for Climate Change in the Philippines at the 19th United Nations Conference on Climate Change held in Warsaw. His words refer to Typhoon *Haiyan* which devastated part of the Philippines on Friday, November 8, 2013.

Les sciences de la mer au Canada : Relever le défi, saisir l'opportunité



LES SCIENCES DE LA MER AU CANADA : RELEVER LE DÉFI, SAISIR L'OPPORTUNITÉ

Le comité d'experts sur les sciences
de la mer au Canada

Les défis universels que soulève l'océan aujourd'hui exigent l'intégration des connaissances de multiples disciplines et une coordination allant au-delà des frontières traditionnelles. Même si le Canada est reconnu pour son excellence en recherche sur l'océan et son rôle de chef de file dans la collaboration internationale en recherche², il est essentiel d'acquérir une solide compréhension des capacités nationales nécessaires pour répondre aux problématiques futures des sciences de la mer.

Reconnaissant l'importance des sciences de la mer, le Consortium canadien des universités de la recherche océanographique (CCURO) a demandé au Conseil des académies canadiennes (CAC) de réaliser une évaluation sur l'état des sciences de la mer au Canada, en mettant l'accent sur les possibilités et les défis futurs pour le Canada et ses régions côtières. Cette évaluation fondée sur des données probantes donne suite à l'exercice d'établissement des priorités du CAC et au rapport du groupe cadre d'experts, intitulé **Les 40 questions prioritaires pour la recherche canadienne en sciences de la mer**.

Voici les principales constatations qui ressortent de *Les sciences de la mer au Canada : Relever le défi, saisir l'opportunité*.

- Le Canada se classe dans le groupe de tête des pays pour le nombre et l'impact des articles publiés en sciences de la mer, mais cette position est à risque.
- Le Canada possède plusieurs systèmes d'observation et de surveillance océaniques de calibre mondial; cependant, l'extension de la couverture géographique et l'intégration de la gestion des données posent des défis.
- Le Canada dispose d'une flotte de navires de recherche importante mais vieillissante.
- Même si le financement alloué aux sciences de la mer dans les universités canadiennes va en augmentant, les tendances du financement total demeurent imprécises.
- L'état de la capacité humaine en sciences de la mer ne peut être déterminé en raison des contraintes de données.

Pour en savoir plus, visitez <http://sciencepourlepublic.ca>.

Références:

2: Coward *et al.*, 2000; Charles, 2001; pour d'autres exemples de leadership et de contributions du Canada, voir de Wit et Muir, 2010; AMAP, 2011; Greenan et Klymak, 2011; Picard-Aitken *et al.*, 2011.

Position open

Proof reader for *CMOS Bulletin SCMO* (English, French or both). This is a labour of love, but you get to read the Bulletin before everyone else! If interested, please contact Paul-André Bolduc at bulletin@cmos.ca

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CLIMATE CHANGE / CHANGEMENTS CLIMATIQUES

IPCC confirms that human activity will further warm the Earth, with dramatic effects on weather, sea-levels and the Arctic

Stockholm, 27 September 2013 – A major international assessment of climate change adopted here by 110 governments provides conclusive new scientific evidence that human activities are causing unprecedented changes in the Earth's climate.

Produced by the Intergovernmental Panel on Climate Change (IPCC), which was established by the World Meteorological Organization and the United Nations Environment Programme in 1988, the report confirms that it is extremely likely (95-100% probability) that most of the warming since 1950 has been due to human influence.

The IPCC's previous assessment, released in 2007, described the evidence for human-caused global warming as "unequivocal," with at least a 9 out of 10 chance of being correct.

The new report further states that greenhouse gas emissions at or above current rates would induce changes in the oceans, ice caps, glaciers, the biosphere, and other components of the climate system. Some of these changes would very likely be unprecedented over decades to thousands of years. Limiting climate change would require substantial and sustained reductions in emissions of carbon dioxide (CO₂) and other greenhouse gases.

"Multiple lines of evidence confirm that the extra heat being trapped by greenhouse gases is warming the Earth's surface to record levels, heating the oceans, raising sea levels, melting ice caps and glaciers, and changing weather patterns and extremes," said WMO Secretary-General Michel Jarraud.

"The IPCC report demonstrates that we must greatly reduce global emissions in order to avoid the worst effects of climate change. It also contains important new scientific knowledge that can be used to produce actionable climate information and services for assisting society to adapt to the impacts of climate change," he said.

"Climate change is a long term challenge but one that requires urgent action, not tomorrow but today and right now, given the pace and the scale by which greenhouse gases are accumulating in the atmosphere and the rising risks of a more than 2°C temperature rise," said UN Under Secretary General and UNEP Executive Director Achim Steiner.

"A universal new UN climate agreement by 2015 is critical, backed by supportive voluntary initiatives such as those managing down short-lived climate pollutants like black carbon. As work under the inclusive Green Economy shows, the benefits of a transition to a low carbon future are multiple from improved public health, food security and job generation to combating climate change now and for future generations," he added.

"For those who want to focus on the scientific question marks, that is their right do so. But today we need to focus on the fundamentals and on the actions. Otherwise the risks we run will get higher with every year".



The role of the IPCC is to supply policy-relevant information about climate change to the world's governments. Its Fifth Assessment Report (AR5) will be considered by negotiators responsible for concluding a new agreement under the United Nations Framework Convention on Climate Change (UNFCCC) in 2015.

Some of the report's key findings include:

- The global mean average surface temperature rose by 0.89 °C from 1901 to 2012. Each of the last three decades has been warmer than all preceding decades since 1850. In the Northern Hemisphere, 1983–2012 was likely the warmest 30-year period of the last 1400 years. The first decade of the 21st century has been the warmest of all (WMO's The Global Climate 2001-2010 estimates the global average surface temperature for that decade at 14.47°C). Global average temperatures will likely rise by another 0.3°C to 0.7°C in the period 2016-2035. Averaged over the period 2081-2100, the global surface temperature is likely to exceed pre-industrial levels by 1.5°C or even (depending on future greenhouse gas emissions) 2°C.
- Changes in many extreme weather and climate events have been observed since about 1950. It is very likely that the number of cold days and nights has decreased and the number of warm days and nights has increased on the global scale. In large parts of Europe, Asia and Australia, it is likely that the frequency of heat waves has increased.

- It is virtually certain that the upper ocean (down to 700m) has warmed from 1971 to 2010. The deep ocean below 3000 m has also likely warmed since the 1990s, when sufficient observations became available. Ocean warming accounts for most of the change in the amount of incoming solar energy stored by the Earth, accounting for about 93% of it between 1971 and 2010. The global ocean will continue to warm during the 21st century. Heat will penetrate from the surface to the deep ocean and affect ocean circulation.

- The rate of sea level rise since the mid-19th century has been larger than the mean rate during the previous two millennia. The global mean sea level rose by around 19 cm from 1901 to 2010 due to increased ocean warming and melting glaciers and ice sheets. The rate of rise accelerated between 1993 and 2010, and it is very likely to increase further during the 21st century and beyond. The report notes that, during the last interglacial, when the climate was 2 °C warmer than pre-industrial levels, maximum global sea levels were 5 to 10 metres higher than they are today.

- Seawater has become more acidic (its pH has decreased by 0.1) since the beginning of the industrial era due to humanity's carbon dioxide emissions; it will continue to acidify during the 21st century.

- It is very likely that the Arctic sea ice cover will continue to shrink and thin and that Northern Hemisphere spring snow cover will decrease during the 21st century as global mean surface temperature rises. Some scenarios foresee a nearly ice-free Arctic Ocean in September before mid-century.

- There is very high confidence that glaciers have continued to shrink and lose mass world-wide, with very few exceptions. By 2100, glacial volume could, under one scenario, decline further by as much as 35-85%. Meanwhile, the extent of Northern Hemisphere snow cover has decreased since the mid-20th century, especially in spring, and this decline, too, will continue.

- It is likely that human influences have affected the global water cycle and its patterns since 1960. For example, in recent decades precipitation has increased in the mid-latitude land areas of the Northern Hemisphere.

IPCC's Fifth Assessment Report (AR5)

- Working Group I: Physical Science Basis (Sept 2013)
- Working Group II: Impacts, Adaptation and Vulnerability (March 2014)
- Working Group III: Mitigation of Climate Change (April 2014)
- Synthesis Report: October 2014

Three years in the making, the "**Physical Science Basis**" volume of the Fifth Assessment Report was produced by over 250 scientists. Additional volumes on impacts,

mitigation and a synthesis will be released over the coming year. The IPCC does not conduct new research. Instead, its mandate is to make policy-relevant assessments of the existing worldwide literature on the scientific, technical and socio-economic aspects of climate change. Its reports have played a major role in inspiring governments to adopt and implement the United Nations Framework Convention on Climate Change.

Reference: Joint Press Release WMO/UNEP.

Le GIEC confirme que la Terre continuera de se réchauffer sous l'effet des activités humaines, ce qui aura des répercussions spectaculaires sur le temps, le niveau de la mer et l'Arctique

Stockholm, le 27 septembre 2013 – Une évaluation internationale majeure consacrée au changement climatique et adoptée à Stockholm par 110 gouvernements apporte de nouvelles preuves scientifiques concluantes d'un bouleversement sans précédent de notre climat du fait des activités humaines.

Produit par le Groupe d'experts intergouvernemental sur l'évolution du climat (GIEC), lequel a vu le jour en 1988 sous les auspices de l'Organisation météorologique mondiale (OMM) et du Programme des Nations Unies pour l'environnement (PNUE), ce rapport confirme qu'il est extrêmement probable (à 95-100%) que le réchauffement observé depuis 1950 soit en grande partie attribuable aux activités humaines.

Le précédent rapport d'évaluation du GIEC, qui date de 2007, avait qualifié de «sans équivoque» les preuves d'un changement climatique anthropique, qui ont au moins 9 chances sur 10 d'être correctes.

Le nouveau rapport affirme en outre que si les émissions de gaz à effet de serre se poursuivent au rythme actuel ou à un rythme supérieur, les océans, les glaciers et les calottes glaciaires, la biosphère et d'autres composantes du système climatique connaîtront des changements, dont certains seront très probablement sans précédent depuis des dizaines, des centaines voire des milliers d'années. Pour limiter l'ampleur du changement climatique, il faudrait réduire considérablement et de façon prolongée les émissions de dioxyde de carbone (CO₂) et autres gaz à effet de serre.

«Un faisceau de preuves confirme que la chaleur piégée par les gaz à effet de serre entraîne une hausse record des températures à la surface du globe», a déclaré le Secrétaire général de l'OMM, Michel Jarraud. «Les océans se réchauffent, le niveau de la mer s'élève, les glaciers et les calottes glaciaires fondent et les régimes météorologiques

sont perturbés, sans parler des phénomènes extrêmes”.

“Le rapport du GIEC démontre que nous devons abaisser considérablement le niveau des émissions dans le monde pour contrer les conséquences les plus catastrophiques du changement climatique”, a poursuivi M. Jarraud. “Il contient aussi de nouveaux éléments scientifiques qui pourront servir à élaborer des informations et des services susceptibles d'aider la société à s'adapter aux effets du changement climatique”.

“Le changement climatique est un défi permanent mais qui n'en appelle pas moins une action immédiate”, a déclaré le Secrétaire général adjoint de l'ONU et Directeur exécutif du PNUE, Achim Steiner. “Nous ne pouvons nous permettre de remettre à demain les mesures nécessaires étant donné le rythme et l'ampleur de l'accumulation des gaz à effet de serre dans l'atmosphère et la menace grandissante d'une hausse de plus de 2°C de la température”.

“Il est absolument essentiel que les Nations Unies concluent d'ici à 2015 un nouvel accord universel sur le climat qui s'appuie sur des initiatives volontaristes visant par exemple à limiter les émissions de polluants climatiques de courte durée de vie comme le carbone noir”, a-t-il ajouté. “Comme le montrent les études menées au titre de l'Initiative pour une économie verte, les perspectives offertes par un avenir économe en carbone sont prometteuses à de multiples égards: amélioration de la santé publique et de la sécurité alimentaire, création d'emplois, lutte contre le changement climatique dans l'intérêt des générations actuelles et futures, etc.”.

“Ceux qui insistent sur les incertitudes scientifiques ont le droit de le faire, mais nous devons nous concentrer aujourd'hui sur l'essentiel et sur la politique à mener, faute de quoi les risques que nous courons s'aggraveront d'année en année”.

Le rôle du GIEC consiste à fournir aux gouvernements du monde des informations sur le changement climatique dont ils pourront se servir pour définir leurs politiques. Le cinquième Rapport d'évaluation du Groupe d'experts sera examiné par les négociateurs chargés de conclure en 2015 un nouvel accord au titre de la Convention-cadre des Nations Unies sur les changements climatiques.



Voici quelques conclusions de ce rapport:

- La température moyenne à la surface du globe a augmenté de 0,89°C entre 1901 et 2012. Chacune des trois dernières décennies a été plus chaude que toutes celles qui se sont écoulées depuis 1850. Les années 1983 à 2012 constituent probablement la période de 30 ans la plus chaude qu'ait connue l'hémisphère Nord depuis 1400 ans, et à l'échelle du globe, la première décennie du XXI^e siècle a été la plus chaude de toutes (la publication de l'OMM intitulée “The Global Climate 2001-2010: A Decade of Climate Extremes” (Le climat dans le monde entre 2001 et 2010: une décennie d'extrêmes climatiques) fait état d'une température moyenne à la surface du globe estimée à 14,47°C pour cette décennie). La moyenne mondiale des températures devrait encore augmenter dans une fourchette comprise entre 0,3 et 0,7°C sur la période 2016-2035, et la température à la surface du globe, moyennée sur la période 2081-2100, devrait dépasser de 1,5°C voire 2°C (cela dépendra des futures émissions de gaz à effet de serre) les valeurs préindustrielles.

- Des changements ont été constatés depuis 1950 environ en ce qui concerne bon nombre de phénomènes météorologiques et climatiques extrêmes. Il est très probable que le nombre de journées et de nuits froides a diminué et que le nombre de journées et de nuits chaudes a augmenté à l'échelle de la planète, et la fréquence des vagues de chaleur s'est sans doute accrue dans une grande partie de l'Europe, de l'Asie et de l'Australie.

- Il est quasiment certain que les couches supérieures de l'océan (jusqu'à 700 m de profondeur) se sont réchauffées entre 1971 et 2010. Quant à l'océan profond – en-dessous de 3000 m –, il s'est probablement réchauffé lui aussi depuis les années 1990, lorsqu'on a commencé à disposer de données d'observation suffisantes. L'évolution de la quantité de rayonnement solaire incident stocké par la planète se traduit pour une très grande part – environ 93% entre 1971 et 2010 – par un réchauffement des océans. Ce réchauffement se poursuivra durant le XXI^e siècle: la chaleur passera de la surface aux profondeurs marines, perturbant la circulation océanique.

- Le rythme d'élévation du niveau de la mer s'est accéléré depuis le milieu du XIX^e siècle, par rapport à la moyenne calculée pour les deux millénaires précédents. Le niveau moyen de la mer s'est élevé de quelque 19cm entre 1901 et 2010 en raison du réchauffement des océans et de la fonte des glaciers et des inlandsis. La hausse s'est accélérée entre 1993 et 2010, et le rythme devrait très probablement s'accroître encore durant le XXI^e siècle et au-delà. Le rapport signale que pendant la dernière période interglaciaire, lorsque les températures dépassaient de 2°C celles de l'ère préindustrielle, le niveau moyen de la mer était 5 à 10 m plus haut qu'aujourd'hui.

● L'eau de mer s'est acidifiée (son pH a diminué de 0,1) depuis le début de l'ère industrielle à cause des émissions anthropiques de dioxyde de carbone, et le processus se poursuivra au XXI^e siècle.

● Dans l'hémisphère Nord, il est très probable que l'étendue et l'épaisseur de la banquise de l'Arctique continueront de diminuer et que l'étendue du manteau neigeux au printemps se réduira durant le XXI^e siècle au fur et à mesure de l'augmentation de la température moyenne à la surface du globe. Selon certains scénarios, l'océan Arctique sera quasiment libre de glaces en septembre avant le milieu du siècle.

● Il est très probable que les glaciers ont continué de reculer et de perdre de leur masse dans le monde entier, à quelques très rares exceptions près. Le volume des glaces pourrait diminuer encore de 35 à 85% d'ici à 2100, selon un scénario. Par ailleurs, l'étendue du manteau neigeux dans l'hémisphère Nord a diminué depuis le milieu du XX^e siècle, surtout au printemps, et cette tendance se poursuivra elle aussi.

● Il est probable que les activités humaines ont eu une incidence sur le cycle mondial de l'eau et ses manifestations depuis 1960. Ces dernières décennies par exemple, les précipitations ont augmenté aux latitudes moyennes de l'hémisphère Nord.

Le volume du cinquième Rapport d'évaluation consacré aux bases scientifiques physiques, dont la gestation a duré trois ans, est le fruit du travail de plus de 250 experts. D'autres volumes sur les conséquences et l'atténuation du changement climatique ainsi qu'un rapport de synthèse paraîtront dans l'année à venir. Le GIEC ne procède pas à de nouveaux travaux de recherche: son mandat consiste à fournir des évaluations susceptibles d'orienter les politiques et portant sur la littérature mondiale consacrée aux aspects scientifiques, techniques et socio-économiques du changement climatique. Ses rapports ont largement contribué à inciter les gouvernements à adopter et mettre en œuvre la Convention-cadre des Nations Unies sur les changements climatiques.

Cinquième rapport d'évaluation du GIEC (AR5)

- Groupe de travail I: Bases scientifiques physiques (Sept 2013)
- Groupe de travail II: Impacts, Adaptation et Vulnérabilité (Mars 2014)
- Groupe de travail III: Adaptation aux changements climatiques (Avril 2014)
- Rapport de synthèse: Octobre 2014

Référence: Communiqué de presse conjoint OMM/PNUÉ.

(Mét.P)

Définissez-vous comme un météorologiste professionnel

La désignation de météorologiste professionnel (**Mét. P**) reconnaît vos titres et qualités sur les plans de l'éducation, de l'expérience, des compétences et de l'éthique professionnelle en tant que météorologiste au Canada. La désignation démontre votre engagement à l'égard la reddition de comptes, du perfectionnement professionnel et de l'apprentissage continu.

ECO Canada, SCMO et **Environnement Canada** ont mis sur pied un partenariat pour offrir cet agrément de calibre mondial aux météorologistes du Canada. Vous trouverez ci-bas la liste des **Mét. P** présentement certifiés:.

Barry Lough (Calvin Consulting Group Ltd.)

Carolyn Evans (AMEC)

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Atmosphere-Ocean
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Call for Papers in a Special Issue of *Atmosphere-Ocean*

Summary

Atmosphere-Ocean plans to publish a special issue entitled "Dynamics of the Gulf St. Lawrence System and its Influence on the Ecosystem: Past, Present and Future" in 2014. The Gulf of St. Lawrence is a semi-enclosed sea connected to the Grand Banks and the Scotian Shelf through Cabot Strait, and to the Labrador and northeastern Newfoundland Shelves through the Strait of Belle Isle. The Gulf of St. Lawrence is a unique marine ecosystem characterized by large freshwater runoff from rivers; landward flow of the North Atlantic waters in the deep layer along the Laurentian Channel, large seasonal changes in hydrography, high biological productivity and diversity of marine life. This special issue will focus on the latest advances in understanding of the physical, chemical, biological and geological processes in the Gulf of St. Lawrence and adjacent waters based on observational, numerical, and climate studies. Please submit your papers online at <http://mc.manuscriptcentral.com/a-o>, indicating the special issue "Gulf of St. Lawrence and Adjacent Waters".

Tentative Schedule

- Submission of the full manuscript: February 2014.
- Completion of Review: August 2014.
- Publication: January 2015 or earlier.

Guest Editors

1) Dr. Jinyu Sheng, Professor and LRF Chair, Department of Oceanography, Dalhousie University, 1355 Oxford Street, PO Box 1500, Halifax, Nova Scotia, CANADA, B3H 4R2. Tel: (902) 494-2718; E-mail: Jinyu.Sheng@Dal.Ca

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Proposed Title and Abstract of your Paper

If you are interested in publishing your paper in this special issue, please contact the guest editors (Jinyu.Sheng@Dal.Ca or denis.lefavre@dfo-mpo.gc.ca) with a proposed title and abstract and an indication whether you can meet the suggested deadline.

Appel de communications pour un numéro spécial d'*Atmosphere-Ocean*

Aperçu

Nous envisageons de publier en 2014 un numéro d'*Atmosphere-Ocean* intitulé "Dynamics of the Gulf of St. Lawrence System and its Influence on the Ecosystem: Past, Present and Future" (*Dynamique du système du golfe du Saint-Laurent et son incidence passée, présente et future sur l'écosystème*). Le golfe du fleuve Saint-Laurent est une mer semiferme, reliée aux Grands bancs et à la plateforme Scotian via le détroit de Cabot, ainsi qu'au Labrador et à la plateforme du nord-est de Terre-Neuve via le détroit de Belle Isle. Le golfe du Saint-Laurent constitue un écosystème unique, caractérisé par un important ruissellement d'eau douce, provenant de divers cours d'eau; par un écoulement vers le continent des eaux de l'Atlantique Nord via le courant profond du chenal Laurentien; par de grandes variations hydrographiques saisonnières; par une production biologique abondante, et une grande diversité de la faune et de la flore marines. Ce numéro spécial portera sur les dernières avancées de la compréhension des processus physiques, chimiques, biologiques et géologiques du golfe du Saint-Laurent et des eaux adjacentes, étayées par des observations, des simulations numériques et des études climatologiques. Veuillez soumettre vos articles en ligne à l'adresse <http://mc.manuscriptcentral.com/a-o>, en mentionnant le numéro spécial : "Gulf of St. Lawrence and Adjacent Waters".

Dates préliminaires

- Soumission du manuscrit complet : février 2014.
- Fin de la révision : août 2014.
- Publication : janvier 2015 ou plus tôt.

Rédacteurs en chef invités

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Titre proposé et résumé de votre communication

Si vous êtes intéressés à publier votre communication dans ce numéro spécial, prière de contacter les rédacteurs en chef invités (Jinyu.Sheng@Dal.Ca ou denis.lefavre@dfo-mpo.gc.ca) en mentionnant le titre proposé et le résumé de votre communication. Prière d'indiquer également si vous pouvez rencontrer la date butoir.



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Atmosphere-Ocean 51-5 Paper Order

Applied Research / Recherche appliquée

AO-2012-0069

Use of the National Drought Model (NDM) in Monitoring Selected Agroclimatic Risks Across the Agricultural Landscape of Canada, by A.C. Chipanshi, R.T. Warren, J. L'Heureux, D. Waldner and H. McLean

AO-2013-0033

All-Sky Surface Radiation and Clear-Sky Surface Energy Budgets: Summer to Freeze-Up in the Western Maritime Arctic, by R. L. Raddatz, T. Papakyriakou, R. J. Galley, M. G. Asplin, L. M. Candlish, B. Else and D. G. Barber

AO-2012-0063

Changes in Snow Mass Balance in the Canadian Rocky Mountains Caused by CO₂ Rise: Regional Atmosphere Model Results, by Edward W. Pollock and Andrew B.G. Bush

Fundamental Research / Recherche fondamentale

AO-2013-0003

Measurements of CO, HCN and C₂H₆ Total Columns in Smoke Plumes Transported from the 2010 Russian Boreal Forest Fires to the Canadian High Arctic, by C. Viatte, K. Strong, C. Paton-Walsh, J. Mendonca, N. T. O'Neill and J. R. Drummond

AO-2012-0035

A 7-Year Lidar Temperature Climatology of the Mid-Latitude Upper Troposphere and Stratosphere, by B. Iserhienrhien, R. J. Sica and P. S. Argall

AO-2013-0020

Simulation of the 2001–02 Anomalous Intrusion in the Northeast Pacific, by Shawn M. Donohue and Michael W. Stacey

AO-2013-0036

Testing and Modelling the Volatility Change in ENSO, by R. Modarres and T. B. M. J. Ouarda

Ian Rutherford is leaving us

After serving three years at the head of Council from 1998 to 2000 Ian Rutherford completed his administrative training as CMOS Business Manager when the Society was still administered by CAP (Canadian Association of Physicists). In June 2004, he was appointed Executive Director, succeeding Neil Campbell. Many things have changed in the administration of the Society under his leadership, notably the initiation of a modern financial management system and the development of a centralised database that have allowed the safeguarding and exploitation of numerous data and statistics about our membership, committees, finances and congresses. For the first time in its modern history the Society finally acquired an autonomous and efficient administration that fulfils its requirements.



Dr. Ian Rutherford

Ian developed close contacts between CMOS and external organisations such as PAGSE (Partnership Group for Science and Engineering) which aims to inform politicians about science, CCR (Canadian Consortium for Research) which submits budgetary proposals about science to the

Government, SMCC (Science Media Centre of Canada) which informs the media about scientific developments, as well as NSERC (Natural Science and Engineering Research Council) and other scientific societies, in particular CAP and CGU (Canadian Geophysical Union). Ian was also at the centre of the CMOS initiative to create CFCAS (Canadian Foundation for Climate and Atmospheric Sciences) which succeeded in distributing more than \$75 million to our scientists.

Organisation of congresses was a major achievement under Ian's leadership. Since congresses now require several years of planning, negotiation of expensive agreements with hotels and development of large budgets, the expertise and management tools of the Executive Director have become essential. Ian's expertise has even allowed CMOS to offer conference management services to other societies or friendly organisations. Thanks to him, congresses have become a significant source of revenue for the Society.

All those who have had the occasion to work with Ian have been able to appreciate his talents in all domains, his reasoned commentaries and advice, his deep commitment to the Society and to everything that concerns atmospheric and oceanographic sciences, all rounded up in a friendly personality. Everything is not lost with his departure: he will remain available to assist his successor in understanding and resolving the challenges that the Society will continue to face.

Richard Asselin, Director, CMOS Publications

Ian Rutherford nous quitte

Après avoir servi trois ans à la tête du Conseil de 1998 à 2000 Ian Rutherford a complété son apprentissage administratif comme chef de bureau de la SCMO alors que l'ACP (Association canadienne des physiciens et physiciennes) administrait encore la SCMO. En juin 2004 il était nommé Directeur général en remplacement de Neil Campbell. Beaucoup de choses ont changé dans l'administration de la Société sous sa direction, notamment l'implantation d'un système de gestion financière moderne et le développement d'une banque de données centralisée qui ont permis d'accumuler et d'exploiter de nombreux renseignements et statistiques sur nos membres, comités, finances et congrès. Pour la première fois de son histoire, la Société fut enfin dotée d'une administration efficace autonome qui répond à ses besoins particuliers.

Ian a développé des contacts étroits entre la SCMO et des organismes externes tels que PFST (Partenariat en faveur des sciences et de la technologie) qui vise à informer les politiciens sur les sciences, CCR (Consortium canadien pour la recherche) qui fait des propositions budgétaires au Gouvernement en faveur de la recherche, CCSM (Centre canadien sciences et média) qui informe les médias des progrès scientifiques, de même que le CSNRG (Conseil de recherches en sciences naturelles et en génie), et d'autres sociétés scientifiques, en particulier l'ACP et l'UGC (Union géophysique canadienne). Ian fut aussi au centre de l'initiative de la SCMO pour la création de la FCSCA (Fondation canadienne pour les sciences du climat et de l'atmosphère,) qui a contribué à distribuer plus de 75\$ millions à nos chercheurs.

L'organisation des congrès a particulièrement bénéficié du leadership de Ian. Comme il faut maintenant planifier les congrès plusieurs années d'avance, négocier des ententes très coûteuses avec les hôtels et établir des budgets importants, l'expertise et les outils de gestion du directeur général sont devenus indispensables. Les systèmes établis par Ian ont même permis à la SCMO d'offrir des services d'administration de conférences à d'autres sociétés ou organisations amies. Grâce à lui, les congrès sont devenus une source importante de revenus pour la Société.

Tous ceux qui ont eu l'occasion de travailler avec Ian ont pu apprécier ses talents dans tous les domaines, ses réflexions et conseils réfléchis, son engagement auprès de la Société et tout ce qui touche les sciences atmosphériques et océanographiques, sans oublier son contact amical. Mais tout n'est pas perdu avec son départ; il demeurera disponible pour aider son successeur à comprendre et à résoudre les défis qui ne cessent de se présenter à la Société.

Richard Asselin, Directeur des Publications de la SCMO

Andrew Bell becomes the new Executive Director for CMOS



Dr. Andrew Bell

After nearly 10 years as executive director of CMOS, Ian Rutherford is stepping down to a well deserved break from his duties. He expressed his intention well in advance to give us the time needed for CMOS to find someone who could take up this position. An announcement was sent to our members and published in the *CMOS Bulletin* and four candidates responded, all with valuable credentials. After informal discussions with the candidates, two of them withdrew their candidacies. The two remaining candidates were interviewed and myself, the past-

and vice-president went to Ottawa for the occasion. It is now my great pleasure to announce that Dr. Andrew Bell has been selected as the new executive director of CMOS.

Dr. Bell obtained a PhD in atmospheric physics from the University of Manchester (UK) and has worked as project manager, technical leader, systems engineer, and principal scientist on several significant electro-optical instrument projects and many advanced studies within the civil space industry in Europe and North America. He championed the design and development of scientific instruments for atmospheric sounding and Earth/Ocean surface sensing. At the interview, we were all impressed by his grasp of what

CMOS is but maybe more importantly what it could become. This is very timely as the executive has expressed its interest in revamping the organization.

Andrew took up the position on October 1, 2013 and since then has been working with Ian Rutherford on the transition. Presidents of CMOS come and go but the executive director remains and keeps our organization on track. We have been privileged to have had Ian Rutherford for all those years and we cannot think him enough for his dedication and hard work. This being said, I think that Andrew Bell will live up to the expectations and imprint his own personal touch to the future of CMOS. I warmly welcome him amongst us and look forward to working with him.

Pierre Gauthier, President CMOS

Andrew Bell devient le nouveau directeur général de la SCMO

Après presque dix ans au poste de directeur général de la SCMO, Ian Rutherford laisse son poste pour un répit bien mérité de ses responsabilités. Il avait exprimé son intention il y a longtemps pour nous donner le temps nécessaire pour lui trouver un remplaçant. Une annonce a été envoyée à nos membres et publiée ensuite dans le *Bulletin de la SCMO* et quatre candidats ont répondu, tous avec des références intéressantes. Après des discussions informelles avec les candidats, deux d'entre eux ont retiré leur candidature. Les deux autres candidats furent interviewés et moi-même, le président sortant et le vice-présidents nous sommes rendus à Ottawa pour l'occasion. C'est maintenant avec grand plaisir que je vous annonce que le Dr. Andrew Bell a été choisi comme nouveau directeur général de la SCMO.

Le Dr. Bell a obtenu son PhD en physique de l'atmosphère de l'Université de Manchester (UK) et a travaillé comme gestionnaire de projet, chef technique, ingénieur de systèmes et scientifique principal sur plusieurs projets concernant le développement d'instruments électro-optiques ainsi que sur des études avancées dans l'industrie spatiale civile en Europe et en Amérique du Nord. Il a promu la conception et le développement d'instruments scientifiques pour sonder l'atmosphère et la télédétection de la surface terrestre et des océans. Lors de l'entrevue, nous avons tous été impressionnés par sa compréhension de ce qu'est la SCMO mais, encore plus important, de ce qu'elle pourrait devenir. Ceci tombe bien car l'exécutif s'intéresse actuellement à remanier l'organisation.

Andrew est devenu directeur général le 1^{er} octobre 2013 et depuis, a travaillé sur la passation des pouvoirs avec Ian Rutherford. Les présidents de la SCMO ne font que passer mais le directeur général reste et maintient le cap. Nous avons été privilégiés d'avoir eu Ian Rutherford durant toutes ces années et nous ne le remercierons jamais assez pour

son dévouement et son travail ardu. Ceci étant dit, je pense qu'Andrew Bell saura être à la hauteur de nos attentes et qu'il donnera sa touche toute personnelle à l'avenir de la SCMO. Je lui souhaite donc la bienvenue parmi nous et j'ai bien hâte de travailler avec lui.

Pierre Gauthier, Président de la SCMO

A few words from our new Executive Director

I am very happy to have been selected for the role of Executive Director. I thank the committee and Ian in particular for trusting someone who is from neither a traditional meteorological nor oceanographic background. I have however worked with both groups in the process of my career designing and building remote sensing instruments to support both fields. I hope to be able to utilise some of my skills in working with groups of many different backgrounds to strengthen and broaden the CMOS community.

We find ourselves in an interesting time where the major government departments in our field, Environment Canada and the Department of Fisheries and Oceans are contracting and refocusing, and many aspects of their past work are being picked up by academia and industry. As the community becomes more dispersed and diverse it will be increasingly important to have an umbrella organisation where the different constituent groups can discuss the issues that face them and find a combined voice. I hope that we can build CMOS in to that organisation.



Dr. Andrew Bell

For those of you who use linkedin I have created a group area there called "Canadian MeteOcean Group" it is open to all who have an interest and can be used to publicise work, items of interest for discussion about science, measurement equipment & techniques, campaigns, questions for the community, studentships, jobs etc. From the CMOS side I will use it to provide group members with the push email on CMOS "What's New" items, the "Congress" and "Jobs" so that communication does not solely rely on remembering to visit the CMOS web site from time to time. Please join in and make use of this more interactive new media to strengthen and hopefully grow the community. (Note: you do not have to be a CMOS member to join the linkedin group).

Andrew Bell, CMOS Executive Director

Un mot de notre nouveau directeur général



Dr. Andrew Bell

Je suis très heureux qu'on m'ait choisi pour le poste de directeur général. Je remercie le comité, et lui en particulier, de faire confiance à un candidat qui ne provient pas des secteurs traditionnels de la météorologie ou de l'océanographie. J'ai toutefois travaillé avec ces deux groupes au cours de ma carrière, en concevant et en construisant des instruments de télédétection en soutien à ces domaines. J'espère être en mesure d'utiliser certaines compétences acquises au contact de groupes de diverses spécialités, afin de renforcer et d'élargir la

communauté de la SCMO.

Il s'agit là d'une période intéressante, pour laquelle les ministères fortement liés à notre domaine, Environnement Canada et Pêches et Océans Canada, se restructurent et se repositionnent, de manière que plusieurs aspects de leurs activités passées sont repris par les universités et l'industrie. Tandis que la communauté se disperse et se diversifie, il importera de plus en plus d'avoir un organisme qui chapeaute les discussions entre les divers groupes en ce qui a trait aux questions qui les concernent, tout en trouvant une voix commune. J'espère que nous pourrons faire de la SCMO cet organisme rassembleur.

Pour ceux qui utilisent LinkedIn, j'ai créé un groupe appelé « Canadian MeteOcean Group ». Celui-ci est ouvert à tous ceux qui s'intéressent aux domaines visés. Il peut servir à diffuser des travaux et des discussions autour de questions scientifiques, ou portant sur l'équipement et les techniques de mesure, ainsi qu'à faire campagne, à répondre aux questions adressées à la communauté et sur les bourses d'études, les emplois, etc. En ce qui concerne la SCMO, je vais utiliser LinkedIn pour transmettre aux membres du groupe de l'information sur les nouveautés, le Congrès et les emplois, afin que la communication ne se limite pas à se souvenir de visiter le site Web de la Société de temps à autre. N'hésitez pas à vous inscrire et à tirer profit de ce nouveau média interactif, visant à renforcer et, je l'espère, à faire croître notre communauté (notez que vous n'avez pas à faire partie de la SCMO pour vous joindre au groupe LinkedIn).

Andrew Bell, Directeur général de la SCMO

Dorothy Neale is leaving us

After thoughtful consideration, Dorothy Neale, our Associate editor, has decided to retire.

Dorothy joined CMOS in 1994 as Executive Secretary to Dr. Neil Campbell, then the newly appointed Executive Director. With her vast experience in public administration, she was of tremendous help in the organization of the Society.



Dorothy Neale receiving the Neil J. Campbell medal for exceptional volunteer service from Neil Campbell himself in 2007

Since her arrival in Canada in the mid-fifties, Dorothy Neale worked with Mr. R.F. Shaw in his varied career as President, The Foundation Company of Canada, Deputy Commissioner General of EXPO '67 and Vice-Principal (Administration) McGill University. On his appointment as Deputy Minister of the newly created Department of the Environment in 1971,

Dorothy joined the Public Service in Ottawa and provided administrative support until his retirement at the end of 1974. At that time, she joined the office of Dr. A.E. Collin in his capacity as Assistant Deputy Minister, Ocean and Aquatic Sciences, Department of Fisheries and Oceans. In 1977, Dr. A.E. Collin was appointed Assistant Deputy Minister, Atmospheric Environment Service. Dorothy followed him and provided administrative support and served in this capacity a succession of Assistant Deputy Ministers: Mr. J. Bruce, Mr. H. Ferguson and Ms. E. Dowdeswell. Prior to retirement in 1992, Dorothy worked as Assistant Liaison Officer in the preparation of ministerial correspondence in AES.

Since her beginning with CMOS, by methodically revising our published material, Dorothy contributed tremendously to improve the various CMOS publications, specially the *CMOS Bulletin SCMO*. Well known for her merciless red pen, she corrected the proofs often in short delays because of the publication deadlines. With the departure of Neil Campbell as Executive Director, Dorothy became our Associate Editor, tireless, always looking for the grammatical or spelling error. She was awarded the Neil J. Campbell Medal for Exceptional Volunteer Service in 2007. For all this, for unconditional assistance during all those years, for her proverbial good mood, we only can say "Thank you"! [Note: Version française en page 213].

Paul-André Bolduc, CMOS Bulletin SCMO Editor

BOOK REVIEW / REVUE de LITTÉRATURE**Chemistry and the Environment**

by Sven E. Harnung and Matthew S. Johnson

Cambridge University Press, ISBN 978-1-107-68257-3
2012, Paperback, xiii + 427 pages, \$75

and

**An Introduction to Chemistry of the Sea,
Second edition**

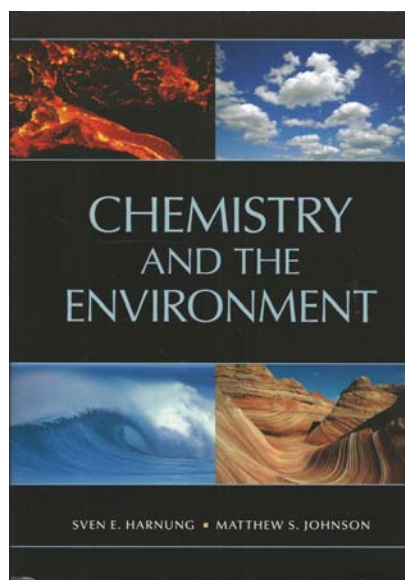
by Michael E.Q. Pilson

Cambridge University Press, ISBN 978-0-521-88707-6
2013, Hardcover, xi + 524 pages, \$80Books reviewed by J.J.P. Smith¹

The true art in the work of an academic scientist is the writing of a textbook. For it is in the creation of a text, with its goal of efficiently transferring knowledge, that current advances in science come to be synthesized and enter into the canon of received learning. And, from such a source, science advances. Well-written texts in the natural sciences define epochs of understanding. In disciplines where knowledge is increasingly acquired through electronic media, textbooks can have an enduring quality that gives them authority in the classroom and as references in the laboratory. So it is with both these recent works.

Harnung and Johnson's *Chemistry and the Environment* has the ambitious goal of surveying complex chemical processes across the natural environment, a daunting task in a single volume. The authors define their subject matter with clarity and frame introductory (*i.e.* review) topics which ground the following comprehensive presentations of particular subjects. The book begins with a breezy (but concise and interesting) consideration of the earth's origins featuring basic chemical formulae and compact explanations of the Wilson geochemical cycle and Curie temperature. Fearlessly the authors (both well regarded senior academics at the University of Copenhagen) move into the challenging area of

earth dynamics, presenting the empirical schema of global scale thermodynamics and fluid mechanics. Some aspects of the two subjects could have been more fully explained, but space had to be left for the central introductory topic of chemical thermodynamics, itself well presented. From these beginnings *Chemistry and the Environment* returns to a descriptive section (Chapter 3) that defines the earth's constituent parts for chemical analysis: the atmosphere, the lithosphere, and the hydrosphere, followed by a description of what constitutes biota in all three parts. From there, the subsequent three chapters address empirical chemistry in detail for each of the spheres. The book is at its best here, ably presenting narrative descriptions of chemical processes (and established rules) with formulae and well developed charts and drawings. For example, the "Chemistry of Soils" section (at Chapter 6.3) is superb and one could see how it would be taught in the classroom straight from the book.



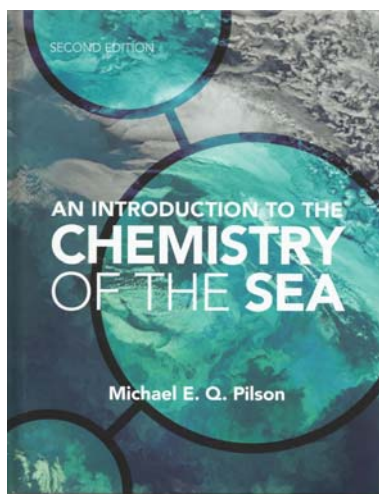
What transforms *Chemistry and the Environment* from a good work to an excellent one are the final four chapters (7 – 10) and supporting materials in several appendices. Although these chapters – about global cycles of the elements, the chemicals industry, environmental impact of selected chemicals and the chemistry of climate

change – are somewhat general, they present complex phenomena unusually well. Because the subject of climate change (Chapter 10) has particular interest (if not urgency) this section could have been more detailed. I anticipated a comparison of high latitude climate change causation at the north and south poles as the mechanisms differ in each region and because there is a useful heuristic in the example of the cooling effect around the South Pole from the reduction of its stratospheric ozone in recent decades. The concern is minor, however. The book's

¹ McGill and Carleton Universities, and the government of the Saharawi Arab Democratic Republic.

concluding materials also have a useful selection of current reference works that includes several classics, such as Henderson's 1982 *Inorganic Chemistry*. A final mark of a well-written text, as here, is an accessible, organized index.

Pilson's *An Introduction to the Chemistry of the Sea*, similarly empirical and so accessible to many, can easily be called one-stop shopping in the field of chemical oceanography. The (yet further) tests of a textbook are whether it is an interesting read and if one would teach from it. *An Introduction to Chemistry of the Sea* succeeds at both.



The 15 chapters of the book begin with the basics of what seawater is comprised of and the physical properties by which we analyze it, before turning to gases in seawater (Chapter 5) and salts (Chapter 6). Particular explanations about salinity, density, solubility and atmospheric exchange are among the best in the wider literature. *An*

Introduction to Chemistry of the Sea then moves to address specifics in neatly integrated chapters, from carbon dioxide (Chapter 7) and nutrients (Chapter 8) through the chemical extraction of substances from seawater (Chapter 14). On first impression, the final chapter (geochemical history of the oceans) seems misplaced. After all, "earth origins" in natural science texts almost invariably feature as introductory material. But this is a deftly prepared culmination of significant ocean chemical phenomena, one that rewards the reader for persevering through the foundations of earlier chapters. Chapter 10, radioactive clocks, merits particular mention. It is likely as much the development in radionuclide research for ocean chemistry as it is the author's (an *emeritus* professor of oceanography at the University of Rhode Island) confidence in presenting the subject that makes this section especially useful. There is here a seemingly complete reference to methodologically approaching research of radioactivity in seawater. Together with some useful reference appendices (for example carbon dioxide in seawater, and sound absorption) the book concludes with question sets for

each chapter and an impressive list of bibliographic references. Rare is the text which balances the teaching of science with the role of being a reference manual for research. Michael Pilson's *An Introduction to the Chemistry of the Sea* achieves that.

The test of a book is whether one would buy it. Another is whether it can be recommended to others. A third, applicable here, is whether the book has use in the classroom. Both *Chemistry and the Environment* and *An Introduction to Chemistry of the Sea* succeed at these. Taken together, the two would make suitable core selections for senior undergraduate environmental chemistry and chemical oceanography courses. That is because they definitively encompass their subjects in a way that is accessible to students and they have a ready pedagogical engagement for the lecturer. For others, each book will be a timely and credible research reference, useful in climate change, general oceanographic and marine pollution research (among others), as well as the planning of research. They deserve a place on the bookshelves of many.

Books in search of a Reviewer (Partial list) Livres en quête d'un critique (Liste partielle)

Latest Books received / Derniers livres reçus



2013-02) *Mesoscale-Convective Processes in the Atmosphere*, by Robert J. Trapp, Cambridge University Press, ISBN 978-0-521-88942-1, Hardback, 346 pages, CDN\$86.95.

2013-04) *Non-Linear Climate Dynamics*, by Henk A. Dijkstra, Cambridge University Press, ISBN 978-0-521-87917-0, Hardback, CDN\$76.95, 357 pages.

2013-05) *The Weather and Climate, Emergent Laws and Multifractal Cascades*, by Shaun Lovejoy and Daniel Schertzer, Cambridge University Press, ISBN 978-1-107-01898-3, Hardback, CDN\$132.95, 475 pages.

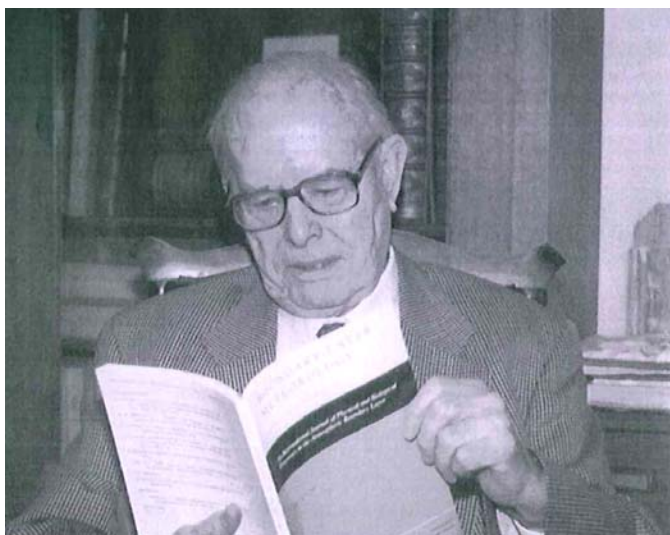
2013-06) *The Self-Potential Method, Theory and Applications in Environmental Geosciences*, by André Revil and Abderrahim Jardani, Cambridge University Press, ISBN 978-1-107-01927-0, Hardback, CDN\$121.95, 369 pages.

IN MEMORIAM

Robert Edward (Ted) Munn**(26 July 1919 – 7 September 2013)**

BA (McMaster), MSC (Toronto), PhD (Michigan), FRSC

Ted Munn, a well known figure in Canadian meteorology and environmental science, passed away in early September at the age of 94. Ted enjoyed a long and distinguished career in the federal public service and at the University of Toronto. Despite his numerous projects and commitments he always had time for students and colleagues, for visits to his favourite art galleries and concerts halls, and for cross-country ski outings on sunny winter afternoons. Ted never stopped working away at his beloved science – he completed his final book in the last few weeks of his life.



Dr. Robert Edward Munn

Ref: Peter Taylor et al., *Boundary-Layer Meteorology* 78: 3-8, 1996

Ted joined the Meteorological Division of the Canadian Department of Transport in 1941. He served as a wartime forecaster in Gander from 1943 to 1948 and meteorologist at the Public Weather Office in Halifax from 1948-1956, including a short stint as a TV weatherman. In 1956 he was seconded to the Canada-US International Joint Commission in Windsor as an air pollution research meteorologist to investigate pollution in the Detroit-Windsor area. In 1959 Ted moved to Meteorological Branch Headquarters in Toronto to become Head of the new Micrometeorology Section. He continued his research in meteorology and air pollution, with publications on micro- and meso-scale meteorology, turbulence, air pollutant dispersion, and lake-breeze and heat-island effects. His first book, *"Descriptive Micrometeorology"*, was published in 1966 and used extensively as a textbook; his second, *"Biometeorological*

Methods" followed in 1970.

Shortly after the creation of the federal Department of the Environment in the early 1970s Ted became Chief Scientist of the Air Quality Research Branch, a position which he held until his retirement from the public service in 1977. During this period Ted played a very important role in bringing a multidisciplinary approach to the study of environmental issues in Canada and abroad. Initially he brought together meteorologists, physicists and chemists to work on air pollution problems. One of his proud moments was the day he announced to his staff of physical scientists that he had just hired a biologist into the group – unheard of at the time! Ted worked with aquatic, forestry, plant and health communities, with social and political scientists, and economists. He strove to ensure that decision-makers who would eventually have to deal with the impacts of and adaptations to environmental problems were well informed and fully engaged. In 1971 Ted founded *"The International Journal of Boundary-layer Meteorology"* and served as its Editor in Chief for more than 25 years.

In 1977 Ted began a new career at the Institute for Environmental Studies (IES) at the University of Toronto. He became increasingly interested in broader environmental issues – environmental policy, risk assessment, sustainable development and global environmental change. He was very active internationally, notably with the United Nations Environment Program (UNEP) and the Scientific Committee on the Environment (SCOPE) of the International Council of Scientific Unions (ICSU), where he was Editor in Chief for the SCOPE Publication Program from 1979-1998.

In 1985 Ted became Leader of the Environment Program and Deputy Director at the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria. This move was somewhat of a surprise given Ted's penchant for avoiding management positions. Could his decision have been influenced by the lure of Vienna's galaxy of opera, concerts, galleries and museums? On his return to IES in 1989 Ted continued to work on long term global change and global environmental issues. He served as a senior advisor to UNEP, the United Nations Conference on Environment and Development, the World Meteorological Organization, the World Health Organization and ICSU. He was one of the principal editors of the 1992 UNEP book, *"The World Environment 1972-1992"* and Editor in Chief of the comprehensive reference work, the five-volume *Encyclopedia of Global Environmental Change*, published by Wiley & Sons in 1992. In addition to Ted's legendary editorial skills, he published more than 200 scientific papers and some 20 books and monographs. Although Ted retired again in 2005, he continued to be part of the IES community and pursue his scientific interests.

Ted was recognized in Canada and abroad for his many outstanding accomplishments. He received the President's Prize from the Canadian Meteorological Society; the Patterson Medal for Meteorology in Canada; awards for Applied Meteorology, Outstanding Achievement in Biometeorology and the Walter Orr Roberts Lectureship from the American Meteorological Society; the Frank Chambers Research Award from the US Air Pollution Control Association; and a Commonwealth Fellowship from the Government of Australia. He was a Fellow of the Royal Society of Canada, the Canadian Meteorological and Oceanographic Society, the American Meteorological Society, and the American Association for the Advancement of Science. In 1991 he received the Arbor Award from the University of Toronto for Service to the University.

One of Ted's most important contributions was the pioneering and sustained role he played in the evolution of environmental science in Canada and abroad. He always seemed to be a step ahead of the state of the science. When air pollution was primarily thought of in terms of stack emissions, Ted was thinking about where the pollution eventually ended up, how it got there and what damage it was doing. He promoted the new tools and techniques that would be required to advance understanding of environmental issues: more effective monitoring systems, comprehensive modelling approaches, risk assessments and environmental impact assessments. Throughout his career he was a strong advocate for a multi-disciplinary approach to environmental studies and for informed societal engagement. Ted's editorial and written communication skills contributed immensely to the dissemination of information about current and impending environmental issues. His audience included layperson, politician, decision-maker, and scientist.

Ted was a wonderful teacher and mentor. His thirst for knowledge and his enthusiasm touched many bright young students. During the 1990s Ted, Ron Williams and I had the good fortune to co-teach a course at IES on "*Current Issues of Global Environmental Change*". Ted had a knack of reaching out to students in other disciplines, both to encourage them in matters environmental and to benefit from their diverse insights and talents. He was particularly delighted to have attracted students of law, journalism, history and medicine to the course. During his later years he established a tradition of having lunch on a regular basis with an assortment of his former colleagues and students from over the years, "the Lads", as he called them. He would often begin the lunch-time conversation with a challenging question or a proposal for the next project to be tackled. Perhaps not many startling developments emerged from these sessions, but as always, Ted was delighted to have provoked a good discussion.

Doug Whelpdale

Dr. John Vandermeulen

1933-2013



Dr. John Vandermeulen

John Vandermeulen died on 20 July 2013 in Truro, NS after a lengthy illness. Born in The Netherlands, he immigrated to Canada with his family in 1948. He earned B.Sc., B.Ed. and M. Sc. Degrees from the University of Alberta and later a Ph.D. in marine biology at UCLA. Following a postdoctoral fellowship at Duke

University, he returned to Canada to take up a research scientist position at the Marine Ecology Laboratory at the Bedford Institute of Oceanography in Dartmouth, NS where he remained for the rest of his scientific career. He became an international expert on the impacts of oil spills on marine ecosystems, beginning with work on the 1970 *Arrow* oil spill in Chedabucto Bay, NS followed by work on other major oil spills around the world. Over his lengthy career, he published a wide variety of scientific papers and reports and organized numerous international symposia and workshops. Other major scientific contributions included leading the founding of the A.G. Huntsman Award (given annually to an outstanding scientist in international oceanography) and serving as an adjunct professor at Dalhousie University. A person with insatiable curiosity and diverse interests, John was also an avid orchid grower, a talented enamellist and visual artist, and a member of the Royal Astronomical Society. He is survived by his wife Gail, four children, nine grandchildren and a wide network of friends and colleagues.

Prochain numéro du *CMOS Bulletin SCMO*

Le prochain numéro du *CMOS Bulletin SCMO* paraîtra en **février 2014**. Prière de nous faire parvenir avant le **3 janvier 2014** vos articles, notes, rapports d'atelier ou nouvelles à l'adresse indiquée au haut de la page 186. Nous avons un besoin **URGENT** de vos contributions écrites.

Klaus Hochheim

Dr. Klaus Hochheim, a respected climatologist and research associate with the Centre for Earth Observation Science (CEOS) at the University of Manitoba, has died tragically in a helicopter accident in the Canadian Arctic (See *CMOS Bulletin SCMO*, Vol.41, No.5, page 184). He was 55 years of age.

Dr. Hochheim was aboard a Coast Guard helicopter over the Northwest Passage when it crashed on Monday 9 September. Two Coast Guard officers were also killed in the accident.



Dr. Klaus Hochheim

Dr. Klaus was an ardent researcher dedicated to the understanding of the nature of climate change and its effects on sea ice. He worked at the University of Manitoba Centre for Earth Observation Science in the Clayton H. Riddell Faculty of Environment, Earth, and Resources (CEOS) for over 12 years, and has

collaborated with researcher at CEOS for more than 25 years. He was a veteran of high Arctic field campaigns and an outstanding research scientist.

Hochheim received his BA (hons) from the University of Winnipeg, followed by his MA/95 and PhD/03 from the University of Manitoba. He studied sea ice climatology and microwave and optical remote sensing in extreme conditions, having been part of projects and expeditions in both the Arctic and Antarctic. He worked extensively with ArcticNet, a Network of Centres of Excellence of Canada that brings together scientists and managers in the natural, human health and social sciences with their partners from Inuit organizations, northern communities, federal and provincial agencies and the private sector.

Dr. Hochheim leaves behind a wife and three children.

Next Issue *CMOS Bulletin SCMO*

Next issue of the *CMOS Bulletin SCMO* will be published in **February 2014**. Please send your articles, notes, workshop reports or news items before **January 3, 2014** to the address given at the top of page 186. We have an **URGENT** need for your written contributions.

Dorothy Neale nous quitte

Après mûre réflexion, Dorothy Neale, notre rédactrice associée, a décidé de prendre sa retraite définitive.

Dorothy s'est jointe à la SCMO en 1994 comme Secrétaire exécutive du Dr. Neil Campbell, alors nouvellement nommé Directeur général. Elle a alors largement contribué à l'organisation de la Société étant donné sa vaste expérience en administration des affaires publiques.



Dorothy Neale s'occupant du kiosque de la SCMO au congrès de 2004

Après avoir émigré de l'Écosse dans le milieu des années cinquante, Madame Dorothy Neale a travaillé avec monsieur R. F. Shaw pendant que celui-ci occupait divers postes : président de la Foundation Company of Canada, sous-commissaire général d'Expo 67 et vice-recteur (administration) de l'Université McGill.

Dorothy s'est jointe à la fonction publique à Ottawa et a fourni, à partir de 1971, un soutien administratif à M. Shaw, quand celui-ci était sous-ministre du nouveau ministère de l'Environnement, et ce, jusqu'à la retraite de celui-ci à la fin de 1974. À ce moment, elle a été affectée au bureau de monsieur A. E. Collin, sous-ministre adjoint des Océans et des Sciences aquatiques au sein du ministère des Pêches et des Océans. En 1977, M. Collin a été nommé sous-ministre adjoint, au Service de l'environnement atmosphérique. Dorothy l'a suivi en tant que soutien administratif, puis elle est restée auprès des sous-ministres adjoints suivants : J. Bruce, H. Ferguson et E. Dowdeswell. Avant sa retraite en 1992, Dorothy a travaillé comme agente de liaison adjointe à la préparation de la correspondance ministérielle au sein du SEA.

Depuis le tout début de son association avec la SCMO, Dorothy a contribué largement à perfectionner les publications de la Société, en particulier le *CMOS Bulletin SCMO*, en révisant méthodiquement les textes publiés. Bien connue pour sa plume rouge impitoyable, elle corrigeait les épreuves souvent dans des délais très courts, étant donné la date de tombée de la publication. Après le départ de Neil Campbell comme directeur général, Dorothy a été notre rédactrice associée, infatigable, toujours à l'affût de la moindre faute grammaticale ou d'orthographe. Elle s'est d'ailleurs méritée la Médaille Neil J. Campbell pour service bénévole exceptionnel en 2007. Pour tout cela, pour son soutien sans faille durant plusieurs années, pour sa bonne humeur proverbiale, nous lui disons "**Merci!**"

Paul-André Bolduc, Rédacteur *CMOS Bulletin SCMO*

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BRIEF NEWS / NOUVELLES BRÈVES

Dalhousie University Industrial Research Chair

According to Halifax Chronicle Herald and reported by Joann Alberstat, Dalhousie University is getting a \$2.5-million industrial research chair to study ways of improving data transmission underwater. The position is co-sponsored by the Natural Sciences and Engineering Research Council of Canada and Ultra Electronics Maritime Systems Inc.

Christian Schlegel, an engineering professor at the Halifax University, will hold the research chair and lead the five-year project. He said that the program's goals include developing technology to carry high-speed data using underwater sound equipment. "*Squeezing ever-more data through that wireless channel is the name of the game,*" Schlegel said in an interview. He also reported that the research may also lead to improvements in other types of communications networks that operate in challenging environments, such as below ground, through rock or in outer space. "*The underwater channel is, in a sense, a new and very challenging environment for industry*", Schlegel said.

An official with Ultra Electronics said the development of better wireless technology will benefit the sound equipment company, which specializes in undersea surveillance and antisubmarine warfare. "*We're looking at ways to improve the bandwidth capability so you can go from, basically, the telegraph to sending video images,*" said Ken Walker, Ultra's president. "*We're very much in kindergarten when it comes to these sorts of transmission mechanisms*".

The research will be useful not only to defence industry but also to other sectors, including offshore resources management, search and rescue, satellite Internet and mobile wireless services. Besides the underwater applications, Woodside-based Ultra is also interested in advancing its magneto-inductive systems, which allow for underground communication, claimed Ken Walker. The company, a subsidiary of English defence multinational Ultra Electronics plc, does have ties to Dalhousie now, but this is the first time it has helped fund a research chair position.

It is interesting to note that a sister company, Ultra Electronics Tactical Communications Systems, sponsors similar research at the University of Quebec. The Montreal-based company supports a research chair related to conventional radio systems, Walker said. "That was a large part of the impetus for us getting into it. Although we have a relationship with Dalhousie, we saw the added value that they were getting from their industrial chair."

El Niño / La Niña Update



Neutral conditions (neither El Niño nor La Niña) continue in the tropical Pacific. Model forecasts and expert opinion suggest that neutral conditions are likely to be maintained through the boreal autumn of 2013 and winter 2013-14. Two or more consecutive years of neutral conditions have been observed in the past and the situation is not unusual.

National Meteorological and Hydrological Services and other agencies will continue to monitor the conditions over the Pacific and provide outlooks to assess the most likely state of the climate through the remainder of 2013 and into early 2014.

Since the boreal spring of 2012, El Niño-Southern Oscillation (ENSO) indicators in the tropical Pacific (e.g., tropical Pacific sea surface temperatures, sea level pressure, cloudiness and trade winds) have generally been at neutral levels, indicating that neither El Niño nor La Niña conditions have been present. Since May 2013, sea surface temperatures have been well below average in the far eastern tropical Pacific, only recently returning toward normal. However, these cold sea surface temperatures have been positioned too far to the east to be considered indicative of a basin-wide La Niña episode, even though they caused some minor impacts over local climate conditions in western parts of South America.

The latest outlooks from international climate models and expert opinion suggest that sea surface temperatures and atmospheric anomalies associated with El Niño or La Niña are most likely to remain neutral through the end of 2013 and into early 2014. Less than one-fifth of the models surveyed predict weak La Niña conditions to develop during the October to December period, and likewise less than one-fifth predict weak El Niño development during that period and into the first quarter of 2014. Therefore, while there is a very slight chance for La Niña or El Niño development during the next one or two seasons, neutral ENSO conditions are considered by far the most likely scenario.

It is important to note that El Niño and La Niña are not the only factors that drive global climate patterns. At the regional level, seasonal outlooks need to assess the relative impacts of both the El Niño/La Niña state and other locally relevant climate drivers. For example, the negative Indian Ocean Dipole conditions, established in May, dissipated during August and neutral conditions are currently prevailing. Locally applicable information is available via regional/national seasonal climate outlooks, such as those

produced by WMO Regional Climate Centres (RCCs), Regional Climate Outlook Forums (RCOFs) and National Meteorological and Hydrological Services (NMHSs).

In summary:

- Over the last 12 months, conditions have mainly remained neutral (neither El Niño nor La Niña);
- As of mid-September 2013, outlooks indicate that these neutral conditions are most likely to continue into early 2014.

Forecasting and Monitoring the El Niño / La Niña Phenomenon

The forecasting of Pacific Ocean developments is undertaken in a number of ways. Complex dynamical models project the evolution of the tropical Pacific Ocean from its currently observed state. Statistical forecast models can also capture some of the precursors of such developments. Expert analysis of the current situation adds further value, especially in interpreting the implications of the evolving situation below the ocean surface. All forecast methods try to incorporate the effects of ocean-atmosphere interactions within the climate system.

The meteorological and oceanographic data that allow El Niño and La Niña episodes to be monitored and forecast are drawn from national and international observing systems. The exchange and processing of the data are carried out under programmes coordinated by the World Meteorological Organization (WMO).

Date of the Update: October 7, 2013.

Source: WMO Website visited October 31, 2013.

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Personnel

Election of a new RSC Fellow



Dr. Kenneth Frank

On 6 September 2013, the Royal Society of Canada announced its list of newly elected fellows. The newly elected fellows have been elected by their peers in recognition of outstanding scholarly, scientific and artistic achievement. Election to the academies of the Royal Society of Canada is the highest honour a scholar can achieve in the Arts, Humanities and Sciences.

Dr. Kenneth Frank from the Bedford Institute of Oceanography (Department of Fisheries and Oceans) was elected to the Fellowship of the Royal Society of Canada as a Fellow in the Earth, Ocean and Atmospheric Sciences Division of the Academy of Science.

Ken Frank's research into the dynamics of marine fish populations and the ecosystems they inhabit has yielded important and revolutionary insights into their ecology and functioning. Consistently anchored within the framework of ecological theory his research has broad application in the ecological sciences, has stimulated re-examination of long-held concepts, and has advanced the management of large marine ecosystems and the communities/species that inhabit them.

The Induction and Awards Ceremony is scheduled for November 16, 2013, at the Fairmont Banff Springs in Banff, Alberta, and is open to the public.

Congratulations to Dr. Kenneth Frank from all the CMOS community.

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