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CMOS BULLETIN SCMO

Canadian Meteorological and Oceanographic Society

La Société canadienne de météorologie et d'océanographie

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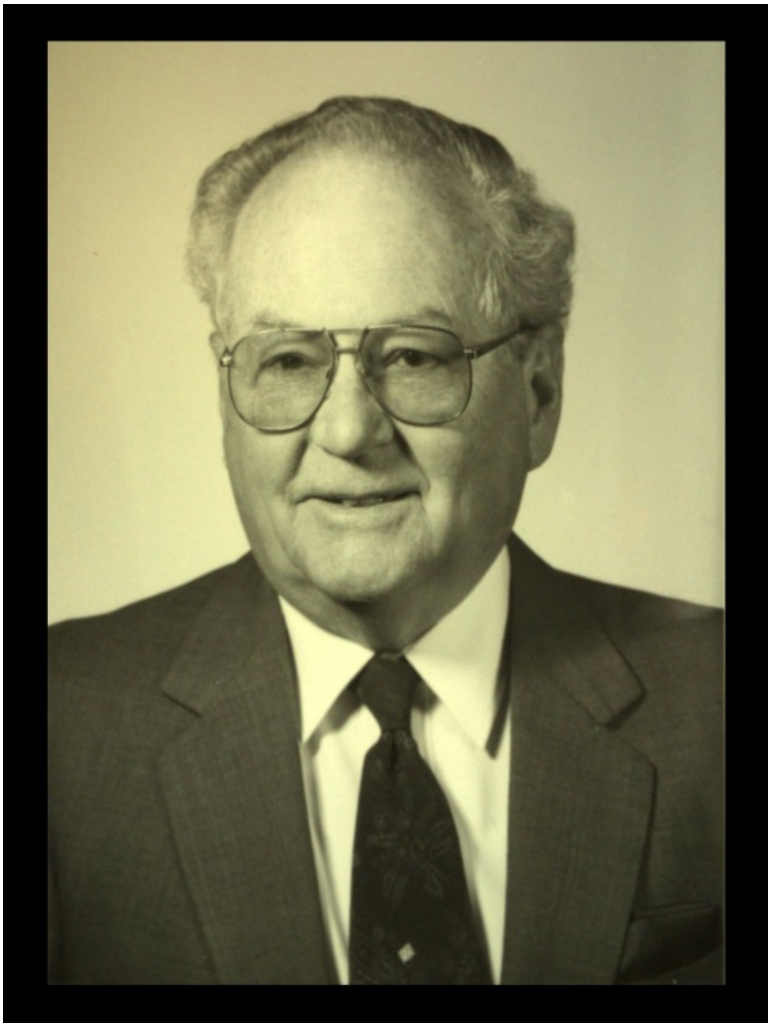
Vol.42 No.5

Neil John Campbell



1925 - 2014

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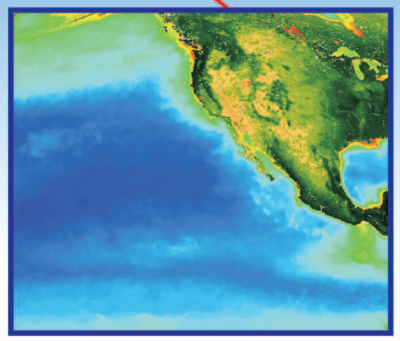
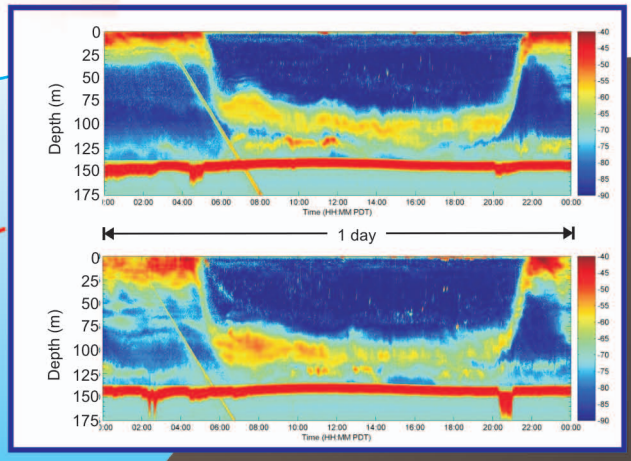
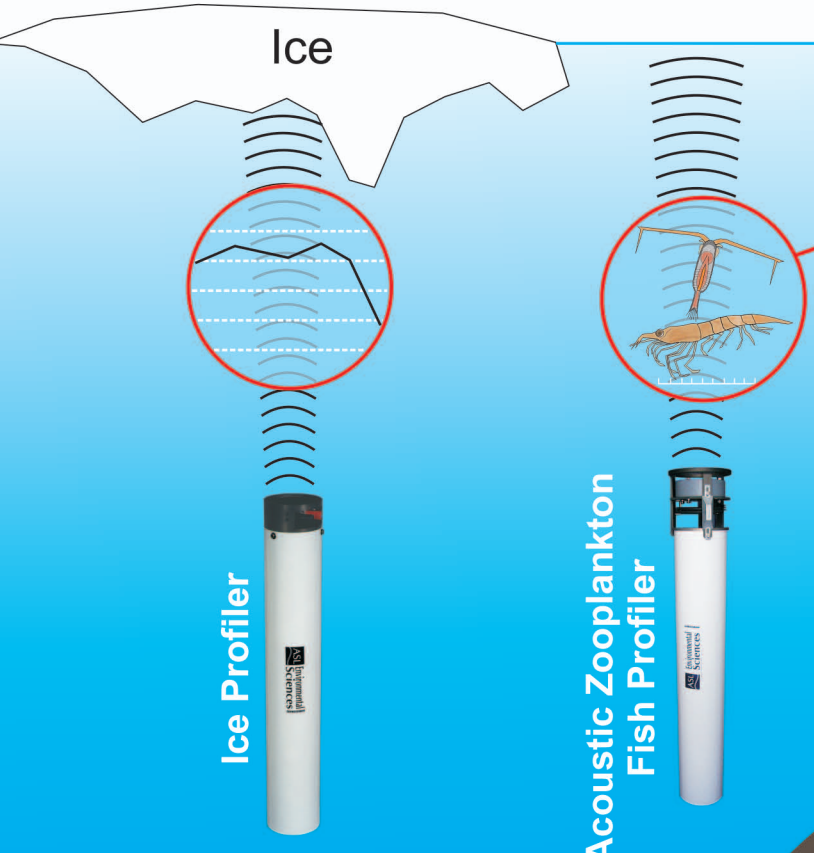


Ocean colours are chlorophyll concentrations and land colours are NDVI





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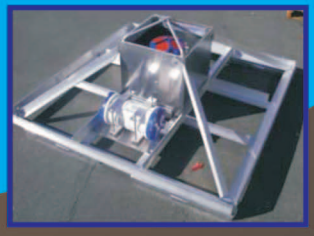

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.... Words from the President

Friends and colleagues:

Harinder Ahluwalia
CMOS President
Président de la SCMO

Scientific and professional societies are meant to promote science and the profession they are associated with. They are supposed to be the voice of the profession as far as dealing with Government, Media, and Public is concerned. They must assist professionals to express their creativity through publications and congresses and they must provide networking opportunities. For younger professionals and students they must provide career development opportunities through job prospects and mentoring.

These societies must meet these needs of the profession if they wish to be relevant and strong. They must provide benefits to its members in order to make them seek and retain memberships. Since last year we have been endeavouring to do just that. Through a "**Road Map**" and a couple of surveys, we have defined what a scientific and professional society should provide. We are now in the process of implementing major recommendations.

We have already started serious work on strengthening our association with American Meteorological Society (AMS) which was an overwhelming wish of the respondents in our survey. We have had a meeting of some of the Council Members with the President of AMS in Montreal on August 19, 2014 during the WWOSC-2014 Conference. Action items have been created and we plan to do the follow-up diligently to be able to reach some important agreements by the first week of January 2015 when the 95th AMS Conference is to take place in Phoenix, Arizona.

To begin with, we would like to immediately start the Webinars, Mentoring Program, as well as stronger Media, Public, and Government Relations. We are looking for volunteers whether unpaid or honorarium-paid to move on these very important CMOS activities. I would strongly request our members and would-be members to offer their services and contribute to CMOS and the society at large. With summer having gone by, we wish to achieve our objectives by working hard on them during winter to keep us warm. By contributing to their implementation you will be helping us in taking your Society to the next level.

Have a warm winter.

Harinder Ahluwalia, CMOS President

CMOS Bulletin SCMO
Volume 42 No.5
October 2014 — octobre 2014

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Climate Change / Changement Climatique

In Memoriam

Our regular sections / Nos chroniques régulières

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

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Cover page: It is with great sadness that we have learnt of the passing of Neil Campbell this past August. As Executive Director of the Canadian Meteorological and Oceanographic Society from 1994 to 2004, there is no doubt that Neil has brought the Society into the 21st century with his numerous initiatives. To convince you, please refer to Neil's eulogy on **page 158**, to the numerous testimonies on **pages 159 and 160** from those who came into contact with him during that time, to the souvenir photos on **pages 161 to 163**. Cover page photo courtesy of Neil Campbell's family.

Page couverture:C'est avec grande tristesse que nous avons appris la mort de Neil Campbell au milieu du mois d'août. Comme Directeur général de la Société canadienne de météorologie et d'océanographie de 1994 à 2004, il ne fait aucun doute que Neil a fait entrer la Société dans le 21e siècle par ses nombreuses initiatives. Pour vous en convaincre, prière le lire l'oraison funèbre de Neil en **page 158**, les nombreux témoignages de ceux qui l'ont côtoyé durant toutes ces années en **pages 159 et 160** et les photos souvenirs en **pages 161 à 163.** Photo de la page couverture gracieuseté de la famille de Neil Campbell.

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Canadian Meteorological and Oceanographic Society (CMOS)
Société canadienne de météorologie et d'océanographie (SCMO)

Council / Conseil d'administration

.... Allocution du Président

Chers amis et collègues:

Les sociétés scientifiques et professionnelles visent à promouvoir les sciences et les professions qui leur sont associées. Elles sont censées être la voix d'une profession auprès des gouvernements, des médias et du public. Ces organisations doivent aider les professionnels à exprimer leur créativité par le biais de publications et de congrès, et doivent fournir des occasions de réseautage. En outre, elles doivent offrir aux jeunes professionnels et aux étudiants la possibilité de développer leur carrière grâce à des occasions d'emploi et du mentorat.

Ces sociétés n'ont d'autre choix que de satisfaire les besoins de la profession, si elles souhaitent demeurer fortes et pertinentes. Elles doivent procurer des avantages à leurs membres, et ainsi les retenir et en attirer de nouveaux. Depuis l'an passé, nous nous efforçons d'atteindre cet objectif. Grâce à une **feuille de route** et quelques sondages, nous avons défini ce que devrait offrir une société scientifique et professionnelle. Nous implantons actuellement les recommandations majeures proposées.

Nous travaillons sérieusement à renforcer notre association avec l'American Meteorological Society (AMS), ce que les participants au sondage souhaitaient largement. Quelques membres de notre conseil d'administration ont rencontré le président de l'AMS à Montréal, le 19 août 2014, lors de la Conférence scientifique publique mondiale sur la météorologie (WWOSC 2014). Nous avons dressé la liste des mesures à prendre et comptons en faire assidûment le suivi, de façon à conclure des ententes importantes, d'ici la première semaine de janvier 2015, pendant la tenue du 95^{e} Congrès de l'AMS, à Phoenix, Arizona.

Nous souhaitons d'abord démarrer immédiatement les webinaires et le programme de mentorat, ainsi que renforcer les relations avec les médias, le public et les gouvernements. Nous cherchons des volontaires, rémunérés ou non, pour faire avancer ces importantes activités de la société. Je prie instamment nos membres et futurs membres de proposer leurs services, et de contribuer à la SCMO et à la société en générale.

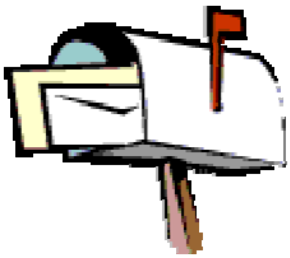
L'été étant derrière nous, nous souhaitons maintenant travailler ardemment à l'atteinte de nos objectifs et ainsi nous « tenir au chaud » tout l'hiver. En contribuant à la mise en œuvre de ces mesures, vous permettrez à la SCMO de progresser à grands pas.

Je vous souhaite un chaleureux hiver.

Harinder Ahluwalia,
Président de la SCMO

Letter to the Editor / Lettre au rédacteur

From: Peter Calamai
CMOS Public Awareness Award 2001
Ottawa, ON
Date: August 24, 2014
Subject: Sander Schimmelpenninck's article



The article in the June *CMOS Bulletin SCMO* (Vol.42, No3, page 77) by Sander Schimmelpenninck gave a favourable evaluation of the Vantage VUE weather station from Davis Instruments purchased through Scientific Sales Inc. Partly based on that positive review, I ordered the same unit, also from Scientific Sales. Although it has been operating at my cottage on Georgian Bay for less than two weeks, I too am favourably impressed.

However, Mr. Schimmelpenninck did not mention three further aspects which might interest *CMOS Bulletin SCMO* readers. First, the cost he quotes does not include duty imposed by Canadian customs which was $45.40 in my case. Maybe his unit slipped in under the customs radar.

Second, Mr. Schimmelpenninck did not mention that the unit must be mounted atop a pole at least six feet above the ground to function properly. The Davis mounting pole is not included in the system as shipped to him (and me) but must be purchased separately ($35 US) or a suitable substitute rigged up.

Third, the sensor package will not operate in parts of Canada that receive any appreciable snow and below-freezing temperatures without an additional shelter system ($295 US) and possibly an AC connection.

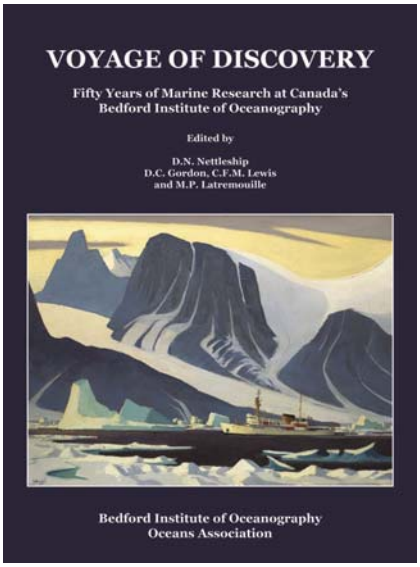
None of these aspects, in my view, constitute reasons to not buy the unit but they should be borne in mind.

BIO-Oceans Association announces the publication of a major treatise reviewing the history and marine research accomplishments at Canada's Bedford Institute of Oceanography over five decades primarily in the Atlantic and Arctic Oceans

VOYAGE OF DISCOVERY

Fifty Years of Marine Research at Canada's Bedford Institute of Oceanography

Edited by
D.N. Nettleship, D.C. Gordon, C.F.M. Lewis and M.P. Latremouille



Voyage of Discovery summarizes BIO research results on the oceanography of Arctic and Eastern Canada. In a series of 48 papers by past and present research staff from all oceanographic disciplines at BIO, the history of Canadian oceanography before BIO and a broad cross section of the Institute's work spanning five decades are featured with particular emphasis on contributions to Canadian and global understanding/management of the marine environment.

Divided into 12 sections with a Preface and Epilogue, ***Voyage of Discovery*** is the most extensive overview of the history and scientific accomplishments of the Bedford Institute of Oceanography under one cover: Historical Roots, Arctic Studies, Ocean Life, Ocean Circulation and Chemistry, Hydrography and Seabed Mapping, Geological Oceanography, Fisheries-Ecosystems-Aquaculture, Marine Contamination, Technology and Instrument Development, Energy Developments, BIO and the Law of the Sea, and The BIO Experience. This book's well-written and illustrated accounts will appeal to a broad readership from professional oceanographers and environmental/resource managers and decision-makers to marine science students and lay persons interested in the Arctic and Atlantic oceans, and their present status and future welfare.

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Reports / Rapports

Summary of the Presentation of Dr. Harinder Ahluwalia[1] at WWOSC[2] - 2014

For the future of Weather Enterprise, it is important to ensure that the three sectors – public, private, and university collaborate with each other in the three important areas – Infrastructure, Service, and Research & Development (R&D). Since all three sectors are members of National Meteorological Societies (NMS), these societies can greatly facilitate this collaboration.

The National Meteorological Services are expected to provide overall Forecasts and Nowcasts. The venue specific and business specific Forecasts and Nowcasts can be best handled by Private Weather Service companies.

Since currently infrastructure belongs to the public sector, it is important that all data be made available to all sectors free of charge. This is the case in some advanced countries but not in developing and least developed nations. Since meteorological data is a very important resource both for researchers as well as service providers, its open availability in all countries is essential for the advancement of the Weather Enterprise.

Although in the U.S. there are some examples of private infrastructure (e.g. three Lightning Detection Networks), the infrastructure currently belongs to the public sector in almost all countries. In Least Developed Countries (LDCs) there is a dire lack of infrastructure. Since many advanced countries run global models, the lack of quality data from LDCs and many developing countries affects the accuracy of Global Models. There are two ways for providing infrastructure for the LDCs. One way is to provide the required funds through World Bank (WB) and various aid programs implemented by advanced countries (e.g. United States Agency for International Development [USAID] by the U.S. Government, Canadian International Development Agency [CIDA] by the Canadian Government, etc.) and through World Meteorological Organization [WMO]. Another way is to let Private Sector Companies from developed countries install the infrastructure in LDCs but some reliable entity such as WMO, WB, etc. provides a guarantee of the investment and return. An example of such a project is the Earth Networks Early Warning System implemented in Guinea.

Due to the limited availability of funds, even advanced countries have limitations to enhance their infrastructure. Here again private sector could install networks, provided that the National Weather Service (NWS) guarantees purchase of data. This relieves the NWS from implementing and maintaining complex systems, the costs are reduced (because data can be sold to other large users) and it is easier for departments to get Operations & Maintenance (O&M) money as compared to capital money.

In many cases the problem in developing infrastructure in developing countries is due to contracting out procedures which are very cumbersome and that delay projects by multiple years hence depriving them the opportunity to enhance their infrastructure. These countries need to greatly improve their contracting procedures.

As far as R&D collaboration between the three sectors is concerned, there are many great examples of successful collaboration. In the U.S., these examples include UCAR (University Corporation for Atmospheric Research) and NOAA (National Oceanic and Atmospheric Administration). UCAR is a collaboration of 102 universities and some international entities too. Through its NCAR (National Center for Atmospheric Research) component, it provides numerous opportunities for collaboration with universities and the private sector. UCAR also acts as an incubator for new companies; some examples include Advanced Radar Corporation and Global Weather Corporation. In addition, NOAA provides free data and also provides opportunities to universities and the private sector to collaborate. In fact one of its mission statements states: "*To unite NOAA inventors and U.S. companies in mutually productive business relationships, maximizing the benefit of public money invested in research and development*."

We believe that other countries will gain tremendously by implementing a similar model. Capacity building through investment in infrastructure and training in LDCs is crucial for "**The Future of the Weather Enterprise**".

One of the best examples of collaboration between the public and private sectors is the WAFS (World Area Forecast Service) system of ICAO (International Civil Aviation Organization), developed and operated in collaboration with WMO. Under this project, the two WAFCs (World Area Forecast Centers), one in Exeter, UK and the other in Silver Spring, Maryland, U.S., run Global Models and also produce weather charts for usage by aviation. They also receive significant weather charts from various countries and distribute them through two systems, SADIS (Satellite Distribution of Aviation Weather) and ISCS (International Satellite Communication System) implemented by the UK Met Office and NWS, U.S. respectively. Over the last couple of years, the weather products have been increasingly distributed through the internet. All countries have access to this data through these networks and processing system available from private vendors.

[1] CMOS President

[2] World Weather Open Science Conference

Summary of Special Panel Sessions on advance dialogue on the collaboration of private, public, and academic elements of the weather enterprise

by Dr. Harinder Ahluwalia[2]

A World Weather Open Science Conference was held at the Palais des Congrès in Montreal during the period August 15-21, 2014. In addition to plenary sessions and presentation of papers, three special panels consisting of representatives from four sectors – Public (7), Private (7), University (3) and Met Societies (4) for a total of 21 – acted as panelists (18) and moderators (3). Please see the Table for the list of moderators and panelists.

As per the Conference Program, the series of three panels were designed to advance dialogue on the collaboration of private, public, and academic elements of the weather enterprise. The first two explored important issues and problems while the final panel was oriented towards finding solutions. Infrastructure can be defined as everything necessary to design, develop, and deliver products and services. It includes weather and climate observations, models and numerical weather prediction, and applications to specific customer decision making needs. It also includes the underlying information technologies (data processing, visualization, communications) as well as the education, training, and management of people — weather service providers, R&D scientists, and especially clients and users. The panel discussion considered the gaps and weaknesses in the present infrastructure that limit achieving the full potential of weather services. It also tried to answer the question: "***What infrastructure improvements are needed to increase the value of weather services to society?"***

In addition to short presentations by each of the panelists, each session culminated in questions by the audience and responses by panelists. **A summary of the sessions is under preparation and will be published in a future issue of the *CMOS Bulletin SCMO.***

Four meteorological societies (Canadian Meteorological and Oceanographic Society, American Meteorological Society, Hydro-Meteorological and Environmental Instrumentation Society, and India Meteorological Society) participated – the first three were represented by their Presidents and the last one by their Vice-President.

The brief summary of the presentation of the CMOS President is presented below.

For the future of Weather Enterprise, it is important to ensure that the three sectors – public, private, and university collaborate with each other in the three important areas – infrastructure, service, and R&D. Since all three sectors are members of National Meteorological Societies (NMS), these societies can greatly facilitate this collaboration.

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"What infrastructure improvements are needed to increase the value of weather services to society?"

Although in the US there are some examples of private infrastructure (e.g. three Lightning Detection Networks), the Infrastructure currently belongs to the Public Sector in almost all countries. In LDCs there is a dire lack of infrastructure. Since many advanced countries run global models, the lack of quality data from LDCs and many developing countries affects the accuracy of Global Models. There are two ways for providing infrastructure for the LDCs. One way is to provide the required funds through World Bank and various aid programs implemented by advanced countries (e.g. USAID by the U.S. Government, CIDA by the Canadian Government, etc.) and through WMO. Another way is to let Private Sector Companies from developed countries install the infrastructure in LDCs but some reliable entity such as WMO, WB, etc. provides a guarantee of the investment and return. An example of such a project is the Earth Networks Early Warning System implemented in Guinea.

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[2] CMOS President

capital money.

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List of moderators and panelists WWOSC-2014

Panel 1	Affiliation	Region
David Parsons Moderator	Director University of Oklahoma School of Meteorology	N. America US
Julia Lingo	Chief Scientist UK Met Office	Europe
Krystin Lyng	Legal Counsel Norwegian Met Office	Europe
Bob Marshall	CEO Earth Networks	N. America US
Anne Migliarese	President Planet IQ	N. America US
Ajit Tyagi	Retd. DGM IMD, India VP IMS	Asia
Eric Webster	VP & Director Environmental Services ITT Exelis Geospatial System	N. America US

Panel 2	Affiliation	Region
Jim Abraham	EX-DG Monitoring EC-MSC	N. America Canada
Mike Eilts	CEO WDT	N. America US
David Grimes	President WMO & ADM EC-MSC	N. America Canada
David Kenny	CEO The Weather Channel	N. America US
Hans-Joachim Koppert	Head Business Area - Weather Forecasting Deutscher Wetterdienst (DWD)	Europe
Barry Myers	CEO Accuweather	N. America US
Roland Stull	Professor UBC	N. America Canada

Panel 3	Affiliation	Region
Jack Hayes Moderator	Senior VP	N. America US
Harinder Ahluwalia	CMOS President CEO-Info-Electronics Systems Inc.	N. America Canada
Tom Bogdan	President UCAR	N. America US
Brian Day	President HMEI CEO Campbell Scientific	N. America Canada
Bill Gail	AMS - President Chief Tech. Officer GWC	N. America US
Jerry Lengoasa	Deputy Secretary General WMO	International
Louis Uccellini	NWS Director	N. America US

Representations from Four Sectors WWOSC-2014

	Pub	Priv	Univ	Soc	Total
USA	2	7	1	1	11
Canada	2	0	1	2	5
Europe	3	0	0	0	3
Asia	0	0	0	1	1
WMO	1	0	0	0	1
Total	**8**	**7**	**2**	**4**	**21**

Pub = Public; Priv = Private; Univ = University; Soc = Societies

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.

STOP PRESS!

Version française en page 176

Discovery of one of the ill-fated Franklin Expedition Ships lost in 1846

The 2014 Victoria Strait Expedition has been successful in discovering one of the ships belonging to the ill-fated Franklin Expedition which was lost in 1846.

At time of printing, it was still unknown whether the wreck found was from ***Her Majesty's Ship (HMS) Erebus*** or ***HMS Terror***. The finding was done using a remotely operated underwater vehicle recently acquired by Parks Canada.

Photo courtesy of Parks Canada

Congratulations are due to all partners involved in this year's significant Victoria Strait Expedition, including Parks Canada, the Royal Canadian Geographical Society (RCGS), the Arctic Research Foundation (ARF), the Canadian Coast Guard (CCG), the Royal Canadian Navy, and the Government of Nunavut. This discovery would not have been possible without their tireless efforts over the years, as well as their commitment, dedication, and the perseverance of the many partners and explorers involved.

The Canadian government has been deeply committed to finding ***HMS Erebus*** and ***HMS Terror***, which were Canada's only undiscovered national historical site. Since 2008, there have been six major Parks Canada-led searches for the lost Franklin Expedition ships, pain-stakingly covering many hundreds of square kilometres of the Arctic seabed. It is gratifying that the ship's remains were found during the last government-supported 2014 Victoria Strait Expedition.

Reference: Parks Canada Press Release Ottawa, Ontario, 9 September 2014 and Parks Canada website.

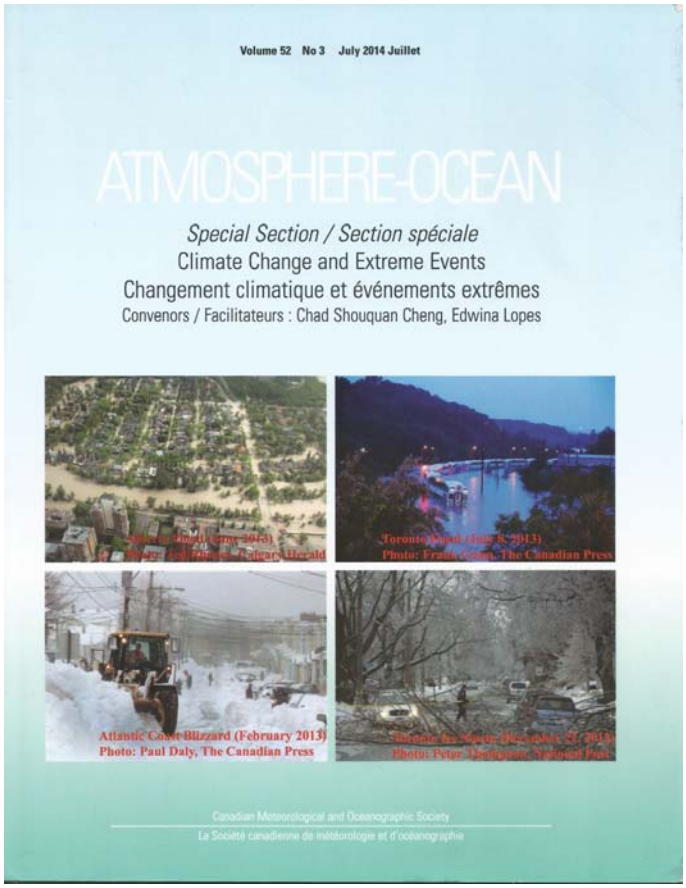
CLIMATE CHANGE / CHANGEMENT CLIMATIQUE

Atmosphere-Ocean Special Section Climate Change and Extreme Events

Volume 52, No.3, July 2014

A Brief Overview and Preface to the *A-O* Special Issue on Climate Change and Extreme Events

by Chad Shouquan Cheng[1] and Edwina Lopes[1]



It has become widely recognized that under a changing climate the frequency and intensity of meteorological and hydrological extreme events and the associated damage costs are likely to increase in the twenty-first century. These meteorological and hydrological extreme events include heat waves, heavy rainfall, flooding, drought, freezing rain, blizzards, snow on the ground, wind gusts, hurricanes, and tornadoes. Similar to changes reported in the FourthAssessment Report of the Intergovernmental Panel on Climate Change (IPCC AR4; IPCC, 2007), the Fifth Assessment Report (AR5) continues to indicate that the frequency and intensity of some of these extreme weather events are projected to very likely increase globally in the twenty-first century (IPCC, 2013). Many studies have specifically focused on projecting changes in the frequency and intensity of future extreme weather events, such as hot spells and heat waves, heavy precipitation, severe winter and summer storm events, wind gusts, and freezing rain. The results indicate that the frequency and intensity of future extreme weather events are projected to increase over most land areas of the globe as the result of a changing climate (Cheng et al., 2007, 2008; Cheng, Auld, Li, & Li, 2012; Cheng, Li, Li, & Auld 2011a, 2011b; Cheng, Li, Li, Auld, & Fu, 2012; Cheng, Lopes, Fu, & Huang, 2014; Cubasch, Waszkewitz, Hegerl, & Perlwitz, 1995; Kharin & Zwiers, 2005; Last & Chiotti, 2001; Medina-Ramón & Schwartz, 2007; Meehl & Tebaldi, 2004; Riedel, 2004; Zwiers & Kharin, 1998).

Although global climate models (GCMs) are an important tool in the assessment of climate change, most of their simulations are relevant for much larger spatial and temporal scales than those faced by most decision-makers. In general, decision-makers require guidance on future climate extremes at a local scale, which requires "downscaling" of the future climate change scenarios from GCMs to a finer-scale spatial resolution, even to the city or station scale. Two fundamental approaches exist for downscaling large-scale GCM simulations to a finer spatial resolution (Fowler, Blenkinsopa, & Tebaldi, 2007; Wilby, Dawson, & Barrow, 2002; Wilby & Wigley, 1997). The first of these is a dynamical approach in which a higher resolution climate model is embedded within a GCM. The second approach is to use statistical methods to establish empirical relationships between GCM-resolution climate variables and local observed station-scale climate variables of interest to decision-makers.

Although there has been a huge increase in the downscaling literature, only about one-third of all downscaling studies consider impacts (Fowler et al., 2007). Even within studies considering the various impacts from a changing climate there is often little consideration given to adaptation research models designed for decision-making. In their assessment of climate change downscaling techniques, Fowler et al. (2007) concluded that there is a need for applied research capable of producing downscaled results that can be used to help decision-makers, stakeholders, and the public make informed, robust decisions on adaptation and mitigation strategies in the face of many uncertainties about the future.

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To expand adaptive capacity to minimize future hazard risks, solid scientific information on future projections and historical trend analysis of extreme meteorological and hydrological events is essential for decision-makers to develop adaptation strategies and policies. This information includes quantitative assessments or projections on changes in frequency and intensity of the meteorological and hydrological extreme events under a changing climate. In light of these concerns, the organizers of the annual congress of the Canadian Meteorological and Oceanographic Society (CMOS) have held a special session on Climate Change and Extreme Events each year since 2010 to provide a platform for researchers and scientists to share and present advances in the field and exchange information on the latest developments and applications of climate change impact analyses on meteorological and hydrological extreme events. These sessions have successfully accommodated a considerable number of papers and presentations concerning historical trend analysis of and climate change impacts on meteorological and hydrological extreme events using GCM and regional climate model (RCM) outputs and/or statistical downscaled climate change scenarios.

The CMOS continues to provide a forum for scientists to share recent developments and results of climate change impact studies conducted in Canada, including publishing this special section on Climate Change and Extreme Events. Diverse topics relevant to climate change and extreme events with a variety of techniques are addressed in this special section.

Paquin and co-authors from Consortium Ouranos and the Université du Québec à Montréal applied an ensemble of projections performed using the Canadian Regional Climate Model (CRCM) driven by different GCMs (IPCC SRES A2) and reanalysis datasets to investigate changes in North American atmospheric conditions associated with deep convection and severe weather events. They found that the number of deep convection-related extreme weather events is expected to increase during the twenty-first century. Casati and de Elía from Consortium Ouranos employed a non-stationary model for Generalized Extreme Value distributions to perform trend analysis of annual extremes in daily minimum and maximum temperatures over North America during the twenty-first century using the CRCM simulations under an IPCC SRES A2 greenhouse gas emissions scenario. Gaitan and co-authors from the University of British Columbia, University of Victoria, and Environment Canada applied linear regression and Bayesian neural network ensembles to downscale daily maximum and minimum temperatures to ten weather stations in southern Quebec and Ontario, Canada, using 25 potential predictors from the National Centers for Environmental Prediction/National Center for Atmospheric Research reanalysis data over the current climate period 1961–2000. These downscaling transfer functions have the potential to be used to generate future station-scale climate change scenarios for the study area in their research. In addition to future projections and downscaling, observed changes in extreme weather events are also addressed in this special issue. Wang and co-workers from Environment Canada homogenized the time series of daily minimum and maximum surface air temperatures recorded for up to 100 years (1911–2010) at 146 stations over Canada to better assess changes in one-in-20 year extremes in annual maxima and minima of both daily minimum and maximum temperatures. They found that the strongest warming was detected for the extreme low minimum temperature and the weakest warming for the extreme high maximum temperature, and the strongest warming of the study area was identified in the Canadian Arctic. Cheng from Environment Canada analyzed historical wind gust observations for up to 57 years (1953–2009) at 104 stations over Canada to identify any evidence from historical records to support projection of future wind regimes conducted in a recent study (Cheng et al., 2014).

As the conveners for this special issue, it is our pleasure and honour to convene the papers with our sincere appreciation for the great contributions of all the authors. We also would like to thank the editorial and technical staff for their hard work and valuable input to make this special issue successful: William Hsieh and Douw Steyn, editors-in-chief; Sean Fleming, guest editor; Sheila Bourque, technical editor; Claude Paré, translator; and Richard Asselin, publications director.

Atmosphere-Ocean 52-3 Paper Order

Special Section / Section spéciale

Climate Change and Extreme Events

Changement climatique et événements extrêmes

Convenors / Facilitateurs

Chad Shouquan Cheng, Edwina Lopes

A Brief Overview and Preface to the Special Section on Climate Change and Extreme Events / Bref aperçu et préface de la section spéciale sur le changement climatique et les événements extrêmes Chad Shouquan Cheng, Edwina Lopes

AO-2013-0028
Change in North American Atmospheric Conditions Associated with Deep Convection and Severe Weather using CRCM4 Climate Projections
Dominique Paquin, Ramón de Elía and Anne Frigon

Section spéciale *Atmosphere-Ocean* Changement climatique et événements extrêmes

Volume 52, No.3, Juillet 2014

Bref aperçu et préface du numéro spécial de *A-O* sur le changement climatique et les événements extrêmes

par Chad Shouquan Cheng[2] et Edwina Lopes[2]

Il est maintenant largement admis qu'en raison d'un climat changeant, la fréquence et l'intensité des événements météorologiques et hydrologiques extrêmes ainsi que le coût des dommages qui en résultent devraient augmenter au cours du XXI[e] siècle. Ces événements météorologiques et hydrologiques extrêmes comprennent les vagues de chaleur, les fortes pluies, les inondations, les sécheresses, la pluie verglaçante, les blizzards, la neige au sol, les rafales de vent, les ouragans et les tornades. Comme c'était le cas pour les changements mentionnés dans le Quatrième Rapport d'évaluation du Groupe d'experts intergouvernemental sur l'évolution du climat (GIEC 4RE; GIEC, 2007) le Cinquième Rapport (5RE) continue d'indiquer que la fréquence et l'intensité de certains de ces événements météorologiques extrêmes vont très probablement augmenter à l'échelle mondiale au cours du XXI[e] siècle (GIEC, 2013). De nombreuses études ont expressément porté sur les changements projetés dans la fréquence et l'intensité des événements météorologiques extrêmes futurs, comme les périodes chaudes et les vagues de chaleur, les fortes précipitations, les événements de fortes tempêtes hivernales ou estivales, les rafales de vent et la pluie verglaçante. Les résultats indiquent que la fréquence et l'intensité des événements météorologiques extrêmes futurs devraient augmenter sur la majeure partie des terres émergées du globe en raison d'un climat changeant (Cheng et al., 2007, 2008; Cheng, Auld, Li, et Li, 2012; Cheng, Li, Li, et Auld, 2011a, 2011b; Cheng, Li, Li, Auld, et Fu, 2012; Cheng, Lopes, Fu, et Huang, 2014; Cubasch, Waszkewitz, Hegerl, et Perlwitz, 1995; Kharin et Zwiers, 2005; Last et Chiotti, 2001; Medina-Ramón et Schwartz, 2007; Meehl et Tebaldi, 2004; Riedel, 2004; Zwiers et Kharin, 1998).

Même si les modèles climatiques planétaires (GCM) sont un outil important dans l'évaluation du changement climatique, la grande majorité de leurs simulations s'appliquent à des échelles spatiales et temporelles beaucoup plus grandes que celles auxquelles s'intéressent la plupart des décideurs. En général, les décideurs ont besoin d'indications sur les extrêmes climatiques futurs à une échelle locale, ce qui demande de "réduire l'échelle" des scénarios de changement climatique futur fournis par les GCM à une résolution spatiale d'échelle plus fine, même jusqu'à l'échelle d'une ville ou d'une station. Il existe deux approches fondamentales pour réduire à une résolution spatiale plus fine les simulations à grande échelle des GCM (Fowler, Blenkinsopa, et Tebaldi, 2007; Wilby, Dawson, et Barrow, 2002; Wilby et Wigley, 1997). La première, dite dynamique, incorpore un modèle climatique de plus forte résolution à l'intérieur d'un GCM. La seconde, dite statistique, utilise les méthodes statistiques pour établir des relations empiriques entre les variables climatiques à la résolution des GCM et les variables climatiques observées localement à l'échelle de la station qui sont d'intérêt pour les décideurs.

Quoique les études portant sur la réduction d'échelle se soient multipliées, seulement le tiers d'entre elles environ ont traité des répercussions (Fowler et al., 2007). Et même les études qui s'intéressent aux diverses répercussions d'un climat changeant n'accordent souvent que peu d'attention aux modèles de recherche adaptative conçus pour la prise de décisions. Dans leur évaluation des techniques de réduction d'échelle des changements climatiques, Fowler et al. (2007) ont conclu qu'il existe un besoin de recherche appliquée capable de produire des résultats à une échelle réduite pouvant être utilisés pour aider les décideurs, les intervenants et le public à prendre en toute connaissance de cause des décisions éclairées à propos des stratégies d'adaptation et d'atténuation à adopter pour composer avec les nombreuses incertitudes du futur.

[2] Service météorologique du Canada, Environnement Canada, Toronto, Ontario, Canada

Pour accroître la capacité adaptative de réduire au minimum les risques de problèmes futurs, les décideurs doivent disposer d'une information scientifique rigoureuse sur les projections dans le futur et les analyses de tendance historique des événements météorologiques et hydrologiques extrêmes afin de mettre en oeuvre des stratégies et des politiques d'adaptation. Cette information comprend des estimations ou des projections quantitatives concernant les changements dans la fréquence et l'intensité des événements météorologiques et hydrologiques extrêmes sous un climat changeant. Au regard de ces enjeux, les organisateurs du congrès annuel de la Société canadienne de météorologie et d'océanographie (SCMO) ont tenu, chaque année depuis 2010, une session spéciale sur "le changement climatique et les événements extrêmes" pour fournir aux chercheurs et aux scientifiques une plate-forme leur permettant de présenter les progrès dans ce domaine et d'échanger des informations sur les derniers développements et les plus récentes applications des analyses de répercussions du changement climatique sur les événements météorologiques et hydrologiques extrêmes. Ces sessions ont constitué une vitrine sur un nombre considérable d'articles et de présentations portant sur l'analyse de la tendance historique des événements météorologiques et hydrologiques extrêmes sur les répercussions que le changement climatique pourrait avoir sur ceux-ci d'après des sorties de GCM et de modèles climatiques régionaux (RCM) et/ou des scénarios de changement climatique obtenus par réduction d'échelle statistique.

La SCMO continue d'offrir aux scientifiques un forum leur permettant de faire connaître les développements récents et les résultats des dernières études sur les répercussions du changement climatique menées au Canada, notamment en publiant ce numéro spécial sur Le changement climatique et les événements extrêmes. Divers sujets se rapportant au changement climatique et aux événements extrêmes ainsi qu'une variété de techniques sont abordés dans ce numéro spécial.

Paquin et coauteurs, du Consortium Ouranos et de l'Université du Québec à Montréal, ont appliqué un ensemble de projections exécutées au moyen du modèle climatique canadien du climat (CRCM) dirigé par différents GCM (SRES A2 du GIEC) et d'ensembles de données de réanalyse pour étudier les changements dans les conditions atmosphériques nord-américaines liées à la convection profonde et aux événements météorologiques violents. Ils ont trouvé que le nombre d'événements météorologiques violents liés à la convection profonde devrait s'accroître au cours du XXI^{e} siècle. Casati et de Elía, du Consortium Ouranos, ont employé un modèle non stationnaire pour les distributions de valeurs extrêmes généralisées pour effectuer l'analyse de la tendance des extrêmes annuels dans les températures journalières minimales et maximales en Amérique du Nord au cours du XXI^{e} siècle en se servant de simulations du CRCM selon le scénario d'émissions de gaz à effet de serre SRES A2 du GIEC. Gaitan et coauteurs, de l'Université de la Colombie-Britannique, de l'Université de Victoria et d'Environnement Canada, ont appliqué la régression linéaire ainsi que des ensembles issus de réseaux neuronaux bayésiens pour réduire l'échelle des températures journalières maximales et minimales à dix stations météorologiques du sud du Québec et de l'Ontario, au Canada, en se servant de 25 prédicteurs potentiels à partir des données du *National Centers for Environmental Prediction/National Center for Atmospheric Research* pour la période du climat actuel 1961–2000. Il est possible d'utiliser ces fonctions de transfert de réduction d'échelle pour produire des scénarios de changement climatique futur à l'échelle de la station pour la région à l'étude dans leur recherche. En plus des projections dans le futur et des réductions d'échelle, ce numéro spécial accorde une attention particulière aux changements observés dans les événements météorologiques extrêmes. Wang et coauteurs, d'Environnement Canada, ont homogénisé les séries temporelles de températures journalières maximales et minimales homogénéisées de l'air en surface enregistrées depuis jusqu'à 100 ans (1911–2010) à 146 stations au Canada pour mieux évaluer les changements dans les extrêmes de type "une fois en 20 ans" pour les minimums et maximums annuels des températures journalières minimales et maximales. Ils ont trouvé que le réchauffement le plus fort se produisait avec la basse température minimale extrême et le réchauffement le plus faible avec la haute température maximale extrême et que le réchauffement le plus fort dans la région à l'étude s'observait dans l'Arctique canadien. Cheng, d'Environnement Canada, a analysé les observations passées de rafales de vent sur des périodes allant jusqu'à 57 ans (1953–2009) à 104 stations au Canada afin de trouver dans les données historiques des indices à l'appui des projections de régimes de vent futurs faites dans une étude récente (Cheng et al., 2014).

En tant que responsables de ce numéro spécial, c'est un plaisir et un honneur pour nous de recevoir les articles et nous apprécions sincèrement les importantes contributions de tous les auteurs. Nous aimerions également remercier le personnel rédactionnel et technique pour leur excellent travail et leurs commentaires utiles qui ont contribué à faire de ce numéro spécial un succès : William Hsieh et Douw Steyn, rédacteurs en chef; Sean Fleming, directeur scientifique; Sheila Bourque, rédactrice technique; Claude Paré, traducteur; et Richard Asselin, directeur des publications.

Human Cause of Climate Change

Trent University geography professor, Graham Cogley, worked with international scientists to demonstrate increasing losses from glaciers due to human activity.

Thursday, August 14, 2014, Peterborough, ON - Dr. Graham Cogley, professor of geography at Trent University, and an international team of scientists led by Dr. Ben Marzeion, of the University of Innsbruck, have found unambiguous evidence for an increase in the loss of glacier mass in recent decades due to human activities. In a paper published today in the prestigious academic journal Science, the team reports that about one-quarter of the global glacier mass loss from 1851 to 2010 is anthropogenic, or caused by humans. But the fraction attributable to human activity has increased steadily, reaching almost two-thirds of the overall loss between 1991 and 2010.

"*Everybody knows that if the temperature goes up, ice will melt. But we don't use thermometers when we measure glacier mass balances, and the glaciers would give us reliable information about climatic change even if the thermometer had never been invented*," said Professor Cogley. "*So our finding is an independent nail in the coffin of the belief that climatic change is not mostly our fault. People who still believe that are running out of places to hide*."

Glaciers have been shrinking since about the middle of the 19th century, when the Little Ice Age came to an end. Glaciers respond both to natural climatic influences, such as the changing output of radiation from the sun, and to human alteration of the climate. But the extent of the human contribution has been unclear until now.

Glacier mass loss causes sea levels to rise, changes the seasonal availability of water resources, and increases hazards such as landslides and floods. Melting glaciers have become emblems of anthropogenic climate change, but glacier extent responds only slowly to climatic influences. "*It takes glaciers decades or centuries to adjust to climate changes*," said Dr. Marzeion.

Anthropogenic glacier change

The team of scientists simulated glacier changes in Dr. Marzeion's computer model of glacier evolution. *"We [found] unambiguous evidence of a growing human impact on glacier mass loss*," Dr. Marzeion said. "*The results are consistent with measured glacier mass balances*."

All glaciers in the world outside Antarctica were included in the study. The recently released Randolph Glacier Inventory, a complete worldwide inventory of all glaciers, enabled the team to run the model. *"The inventory provides data for nearly all glaciers on the earth in machine-readable format*," said Dr. Cogley, one of the coordinators of the Randolph Inventory.

Climate models can include different factors driving climate change. By switching the different factors on or off, climate modellers can distinguish between natural and human influences on climatic change, and glacier modellers can use the climate-model outputs to simulate glacier mass changes. "*We keep factors such as solar variability and volcanic eruptions unchanged, but then we re-run our models driven also by land use changes and greenhouse gas emissions*," Dr. Marzeion said.

Significant increase in recent decades

The scientists show that only about one-quarter (25+/-35%) of the global glacier mass loss between 1851 and 2010 is attributable to human activities. However, between 1991 and 2010, the human fraction is about two-thirds (69+/-24%). "*Up to about 1950, glacier mass loss attributable to human activity is hardly noticeable, but the attributable percentage has increased steadily since then*," Dr. Marzeion said. "We are very confident that it is now dominant, regardless of the fact that the glaciers would have lost some mass anyway."

The authors of the study also looked at model results on regional scales, but found that, in many regions, measurements are too few to allow natural and human factors to be distinguished clearly. However, in some well-observed regions, such as western North America and the Canadian Arctic, there is indeed a clear human contribution to glacier mass loss.

Publication details

Ben Marzeion, J. Graham Cogley, Kristin Richter and David Parkes, 2014, *Attribution of global glacier mass loss to anthropogenic and natural causes*, Science. Published online 14 August 2014. DOI: 10.1126/science.1254702

In Memoriam

Canadian International Marine Science Pioneer Passes On

Dr. Neil John Campbell

August 1925 - August 2014

Dr. Neil John Campbell

Died peacefully on Thursday, August 14, 2014 in his 89th year, Neil Campbell will fondly be remembered by his family, friends, and colleagues all over the world. Neil received a Ph. D. in Physics from the University of British Columbia in 1955. He joined the Fisheries Research Board of Canada where he headed its Arctic Oceanographic Program and later the Atlantic Oceanographic Group in New Brunswick and Nova Scotia. In 1963 he was appointed to Ottawa to organize and develop the entry of the Department of Energy Mines and Resources into the field of marine sciences. From 1976 to 1986 he was Director General, Marine Sciences and Information Directorate with Canada's Department of Fisheries and Oceans (DFO). Neil worked in Canada's Maritimes, the Eastern Arctic, and the Northwest Atlantic. He was a member and head of the Canadian Delegation to the Intergovernmental Oceanographic Commission of UNESCO, and represented that organization at the Third Law of the Sea Conference. He organized and reported on the government study of pollution in Lakes Erie and Ontario, and became a special adviser to the Department of External Affairs on marine scientific matters. In retirement, Neil acted as consultant on training, education, and assistance for Third World countries. Neil was fond of curling. He served on the Royal Canadian Navy Curling Club for many years, being one of their board members and going as far as rewriting their constitution. Neil and Eleanor sponsored many Ottawa friends in becoming members of the club.

In Neil's memory, the family asked to consider making a donation to the CMOS Scholarship Fund, the University of Ottawa Heart Institute Foundation, the Alzheimer Society Canada or a charity of your choice.

Neil has served as Vice-President (1983), President (1984) and Past-President (1985) of the Canadian Meteorological and Oceanographic Society (CMOS). In 1987, he was made a life member of CMOS, in 1992 was awarded that organization's *John P. Tully Medal*, and in 1994 became Executive Director of CMOS (1994-2004) after the retirement of Uri Schwarz.

As Executive Director of CMOS, Neil will be remembered for having:

- fostered the Professional Affairs Committee and certification of consultants;
- negotiated the provision of office space by DFO for housing the CMOS national office;
- created the position of Publications Director in the national office;
- fostered the Private Sector Committee;
- established the Weathercaster Endorsement Program;
- created the Tully Medal in Oceanography and the Rube Hornstein Medal in Operational Meteorology;
- established the Tertia Hughes Memorial Prize and Roger Daley Postdoctoral Publication Award;
- negotiated for CMOS to host the Canadian National Committees for SCOR and ECOR;
- written and maintained guidelines for CMOS centres to host the annual congresses;
- been one of the leaders in establishing the CFCAS Fund in 2000;
- written the first CMOS strategic plan in 2004.

In 2004, Neil was the first recipient of the *Neil J. Campbell Medal for Exceptional Volunteer Service*. Neil will forever be remembered for

"***the development of Canadian international marine science***."

Testimonies in memory of Neil Campbell / Témoignages en mémoire de Neil Campbell

Tribute to Neil Campbell

Neil, in his long life and extensive career in oceanography, has touched many nationally and internationally, encouraging them to do their best and more, supporting in their efforts and work. Here are a few reflections from people on how Neil was as a friend, as a mentor, as a scientist, as a colleague.

"Neil Campbell was a great believer in the importance of collaboration and cooperation in the study of the world's oceans and his leadership won the respect and friendship of many colleagues at home and abroad. Neil knew the importance of a strong ocean voice in Ottawa and was influential in Canadian ocean policy development during the important negotiations on the Law of the Sea and the 1972 Stockholm Conference on the Environment. Neil was especially involved with the function and growth of the Intergovernmental Oceanographic Commission (IOC), which had been established within UNESCO in 1960. In particular, when international ocean data collection and exchange was in its infancy, Neil was Chairman of an IOC intergovernmental working committee that was laying the foundations of global efforts in this area and developing relationships between the joint requirements of meteorology and oceanography".

"At home, Neil was a great manager. He knew how to gain the trust and respect of his staff and would encourage their development by delegating meaningful assignments and responsibilities. He was open about his own opinions and always ready to listen to other views. I shall always be grateful to Neil Campbell who was my mentor and friend for two decades".

- Geoff Holland

"Neil, thank you for all you've done for CMOS and its associated sciences. We shall not forget you. Rest in peace old friend".

- Geoff Strong

"My first experience working with Neil came when I was president of CMOS in 1999, one of many who served as president during his tenure as executive director and who were trained and mentored by him. Neil was very much the glue that held the society together and who made sure that everyone on the executive knew their roles and responsibilities. But he was also very open to new activities that would advance the aims of CMOS. Hence when the proposal came from Meteorological Service of Canada for CMOS to set up a new research granting fund, Neil was very supportive of this opportunity as it promised to include funding for research on marine environmental prediction and on the role of the oceans in the climate system, and of course the purposes of the proposed foundation were totally aligned with those of CMOS. Setting up this new foundation, Canadian Foundation for Climate and Atmospheric Sciences (CFCAS) as a child of CMOS required both of us to work closely for many months for discussions with officials from Environment Canada and the Department of Finance in order to define precisely the mandate of the foundation, its governance, its constitution and by-laws, and its modus operandi. Neil's organizational and managerial experience was vital to getting legal advice for CMOS and for setting up the nitty-gritty details of leasing an office and hiring staff to get the new foundation up and running. This new child of CMOS was announced to the Council and Membership at the Congress and AGM of 2000 held in Victoria. Neil worked with subsequent Presidents and Councils to refine and then oversee its operations".

"Neil knew that recognizing the accomplishments of CMOS members and indeed of anyone working in meteorology and oceanography was a vital role for the Society. He worked tirelessly to improve the program of prizes and awards and scholarships. He started new awards where there were gaps and made sure that there were appropriate medals and plaques for the most important ones".

"Neil was always visible at the annual Congresses and he knew most of the members by name. He was so good with people that he managed to persuade many that it was their duty to volunteer their services for the good of the Society. He was the ultimate volunteer himself and it is entirely fitting that the Society named its medal for volunteer service after him".

- Ian Rutherford

"My close interactions with Neil Campbell only started when I moved to Ottawa as the Director of Marine Environmental Data Service (MEDS). Coming from Newfoundland, following a career of a consultant, scientist, and academic, navigating safely and effectively through the bureaucracy of Ottawa was an extremely challenging task. Neil was one of the individuals who provided me great support and guidance to ensure that I established a wide network of contacts nationally and internationally. I ramped up quickly in my role as the head of a national data centre and I became a strong member of the management team in Department of Fisheries and Oceans (DFO). Having him located within the MEDS area, I could always walk into his office and just have a heart-to-heart conversation with him, no matter what my concerns and questions were. He was a good listener, and was always able to steer me in the right direction because of his vast experience as a scientist and senior manager, and having led the Canadian Delegation to many international meetings. On top of that, he always had a welcoming smile for me. Being the Director of MEDS was one of the best jobs I had in my career and I was fortunate

to have Neil Campbell next to my office as a friend and a mentor. The friendship remained strong even after I moved to Booth Street as the Dominion Hydrographer, and over the years, Neil and his wife Eleanor became part of my extended family. Thank you Neil".

- Savithri Narayanan

"I was very sad to see the news of the passing of Neil Campbell. I first met Neil in the 1980s and we worked together on many international and national issues related to our oceans. He was a recognized leader at international meetings and was an excellent representative of Canada. He became Executive Director of CMOS about the same time as I became Assistant Deputy Minister of the Atmospheric Environment Service (AES) and we continued to work towards the same goals of enhancing meteorology and oceanography in Canada. In 2000, when the possibility of setting up the Canadian Foundation for Climate and Atmospheric Sciences (CFCAS) became a possibility, Neil led from the CMOS side to make it a reality. His experience in government, his energy and insights and his team approach were very important for establishing CFCAS and getting it moving to provide support for academic research. Neil was very appropriately awarded the Tully Medal and made a CMOS life-member – both very well deserved for his outstanding contributions to Canadian and international oceanography and science in general".

- Gordon McBean

"When I arrived at CMOS in October 1996, the office had three old computers, one of which was connected to a printer. To print a document, one had to save it to a floppy diskette and print the content from the printer-enabled machine! All office documents were archived on floppies. Neil and his good friend Dorothy Neale had introduced the computer to the CMOS executive office. It was rudimentary, but a major step nevertheless".

"In 1994 when considering whether to accept the jobs of Executive Director and Executive Secretary from their predecessor Uri Schwarz, the latter had informed Neil and Dorothy that the work required one half-day per week. But, by 1996, work already required two days per week (although we sometimes had time to end the work day early and go to the nearby Dancing Mermaid for a drink!)".

"Needless to say, Neil and Dorothy were not just twisting their thumbs! Neil had created work on behalf of CMOS by exercising close relations with senior managers in DFO and AES as well as the elected officers of the Society, by developing all sorts of guidelines to assist local Centres, committee chairs, and congress organizing committees, by taking care of CMOS archives, and by formalizing the budgeting system. There was need for more contact with members, so the first CMOS website was created. One of his major achievements at that time was the creation of the Canadian Foundation for Climate and Atmospheric Sciences, with Gordon McBean and Ian Rutherford".

"I had come to fill the need for a Director of Publications, but there was no job description and the only documentation that I can recall was a policy on the number of copies of our publications that we were to keep in our basement archives. As with the Society in general, there was lots of work to do but it needed to be identified and prioritized. Neil was a great mentor: he willingly discussed the problems that he or I was finding and basically let me resolve them as I felt best. Never a criticism, always positive feedback".

"At that time, the administration of the Society (memberships, subscriptions, finances) was performed under contract by the Canadian Association of Physicists. The Society was evolving and taking more and more initiatives, making it difficult to work without real-time access to the files, lists, reports from the CAP office. Neil identified the need for our own database system, which was finally implemented in 2003. By that time, Neil was starting to feel that he should retire, but I had to push him a bit to initiate a search to find a replacement, which occurred in 2004. In retirement, Neil never lost contact and frequently asked about various initiatives and continued to give advice when appropriate".

"Neil was a good friend who will not be forgotten. He did a lot for the Society".

- Richard Asselin

"There is a special place in my heart for Neil Campbell. I had the honour of working with him on a number of CMOS projects including the Private Sector Committee and Task Force. I was very honoured to have been awarded the Neil J. Campbell Medal and to have received it from him personally. It will always remind me of what a wonderfully dedicated volunteer he was to CMOS and what a true friend he was to me".

- Susan Woodbury

"Neil était un homme qui avait à coeur le bien-être de tous et tout particulièrement celui de sa famille. Famille immédiate, bien sûr, mais également sa famille élargie, celle de la SCMO. Il s'informait toujours non seulement de notre condition mais également celle de nos êtres chers. Lui avec Eleanor étaient très généreux, nous faisant goûter à plusieurs de leurs trouvailles culinaires comme, par exemple, la marmelade d'oranges de Séville. Non seulement Neil nous avait donné la recette mais nous informait également du temps où il fallait acheter ces fameuses oranges qui nous parviennent que quelques semaines durant l'hiver. Il ne fallait surtout pas manquer cette occasion unique. Merci Neil pour ces marques d'attention qui nous faisaient chaud au coeur".

- Paul-André Bolduc

Souvenir Photos in Memory of Neil Campbell
Photos souvenirs en mémoire de Neil Campbell

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Photos description on page 163 / Vous trouverez la description des photos à la page 163

Souvenir Photos in Memory of Neil Campbell
Photos souvenirs en mémoire de Neil Campbell

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Photos description on next page / Vous trouverez la description des photos à la page suivante

Photos captions / Légendes des photos (from left to right / de gauche à droite)

1. Peter Taylor, Gordon McBean, Ian Rutherford with Neil presenting the cheque for the establishment of CFCAS [2000]	2. Neil with Paul-André Bolduc and Allyn Clarke [2004]	3. Neil receiving the Neil J. Campbell (NJC) Medal for Exceptional Volunteer Service from Allyn Clarke [2004]
4. Neil with his beloved wife Eleanor [2004]	5. Ian Rutherford and Eleanor with Neil at the head table at CMOS Congress Banquet in Halifax [2004]	6. Standing back row: George Pickard, Neil, and Allyn Clarke; seated: Tim Parsons and CS Wong [2005]
7. Susan Woodbury with Neil [2006]	8. Uri Schwarz receiving the NJC Medal from Neil [2006]	9. Several Ottawa CMOS Members seated with Neil and Eleanor at CMOS Banquet Congress in Toronto [2006]
10. Neil and Eleanor [2006]	11. Neil with Geoff Strong [2007]	12. Dorothy Neale receiving the NJC Medal from Neil [2007]
13. Neil with Geoff Strong and Sus Tabata [2008]	14. Susan Woodbury receiving the NJC Medal from Neil [2009]	15. Group photo of former CMOS Presidents [2009]
16. Dick Stoddart receiving the NJC Medal from Neil [2010]	17. Louise Bolduc seated with Neil at the Ottawa Congress Ice Breaker [2010]	18. Christmas Ottawa Centre CMOS Dinner [2010]

Note: Many other photos from Neil Campbell are available on CMOS website.

Notez: Plusieurs autres photos de Neil Campbell sont disponibles sur le site web de la SCMO.

CMOS Accredited Consultants
Experts-Conseils accrédités de la SCMO

Next Issue *CMOS Bulletin SCMO*

Next *CMOS Bulletin SCMO* issue will be published in **December 2014.** Please send your articles, notes, workshop reports or news items before **October 31, 2014** to the electronic address given at the top of page 146. We have an URGENT need for your written contributions.

Prochain numéro du *CMOS Bulletin SCMO*

Le prochain numéro du *CMOS Bulletin SCMO* paraîtra en **décembre 2014.** Prière de nous faire parvenir avant le **31 octobre 2014** vos articles, notes, rapports d'atelier ou nouvelles à l'adresse électronique indiquée au haut de la page 146. Nous avons un besoin URGENT de vos contributions écrites.

CMOS BUSINESS / AFFAIRES de la SCMO

Recent changes in the *Atmosphere-Ocean* Editorial team

by Douw Steyn[1]

Dr. Douw Steyn

In recent months, the *A-O* Editorial team of Director of Publications and Editors-in-Chief has undergone substantial changes that CMOS members might like to know about. The Editorial team now consists of Drs. Stephen Déry, Guoqi Han, and Hai Lin as Editors-in-Chief. Dr. Stephen Déry handles submissions on meteorological and hydrological sciences, Dr. Guoqi Han handles submissions on oceanographic sciences, and Dr. Hai Lin handles submissions on climate science. I now serve as Director of Publications. While the three Editors-in-Chief are all experienced and active publishing scientists, and excellent editors, I am new to the tasks of Director of Publications. I have had to take over these complex and varied tasks in a post ably created and built by Dr. Richard Asselin. Over the coming year I will be exploring the many components of CMOS publications, and building my portfolio of tasks. During that time I will be working with the three *Atmosphere-Ocean* Editors-in-Chief, the *Atmosphere-Ocean* Technical Editor (Sheila Bourque), the Advisory Committee for *Atmosphere-Ocean* (Paul Myers, René Laprise, Theodore Shepherd, Richard Thomson, and Andrew Weaver), the Editor of the *CMOS Bulletin SCMO* (Paul-André Bolduc) as well as CMOS Council to develop Publication as an essential and possibly defining component of CMOS as a professional organization. I expect that within the coming year I will be returning to the pages of *CMOS Bulletin SCMO* to let CMOS members know of my plans for CMOS publications.

The scientific quality of *Atmosphere-Ocean* rests on the expertise and dedication of the three Editors-in-Chief, whose careers are among the finest examples of Canadian science. I would therefore like to introduce them to the CMOS community.

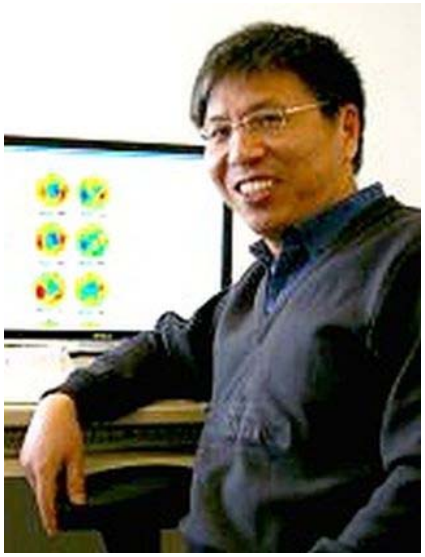
Dr. Guoqi Han

Dr. Guoqi Han is a Research Scientist of Fisheries and Oceans Canada, at the Northwest Atlantic Fisheries Centre. His main research area is physical oceanography and applications to ecosystem and climate change adaptation issues. In particular, he has made significant achievements in advancing coastal and shelf applications of satellite altimetry and in applying unstructured grid ocean models for oceanographic and ecosystem-science issues in the past two decades. He has published over 60 refereed papers in scientific journals and written chapters in books, encyclopaedia and science bulletins, covering fields of oceanography, climate, ecosystem science, hydrodynamics, and hydraulic engineering.

Dr. Han currently serves as the Editor-in-Chief (Ocean Sciences) for *Atmosphere-Ocean*. He is the Oceanography Lead in the Surface Water and Ocean Topography – Canada (SWOT-C) Program. He is the Vice Chair for Scientific Commission A (Space Studies on the Earth's Surface, Meteorology, and Climate) of Committee on Space Research. He is an Adjunct Professor at Memorial University of Newfoundland. Dr. Han co-chaired the Science Program Committee for the CMOS (Canadian Meteorological and Oceanographic Society) - CGU (Canadian Geophysical Union) - AMS (American Meteorological Society) 2007 Congress. He served on advisory/organizing committees of international symposiums and conferences.

Dr. Han, together with a team of his colleagues, was awarded the Prize in Applied Oceanography for the year 1998 by CMOS. He, together with the Local Organizing Committee of the 2007 CMOS-CGU-AMS Congress, received the Admiral Award from the City of St. John's in 2008.

[1] Professor, University of British Columbia
Director of Publications, CMOS



Dr. Hai Lin

Dr. Hai Lin is a Research Scientist at the Recherche en Prévision Numérique (RPN, Dorval, QC) of Environment Canada. He is also an adjunct professor at McGill University. He received his PhD degree in Atmospheric and Oceanic Sciences from McGill University in 1995. His research interests include climate dynamics, atmospheric low-frequency variability, monthly and seasonal forecasting. He was the recipient of the 2010 President's Prize of the Canadian Meteorological and Oceanographic Society. He is a member of the Steering Committee for Sub-seasonal to Seasonal Prediction of the World Weather Research Programme (WWRP) and World Climate Research Programme (WCRP) of the World Meteorological Organization (WMO), and a member of the Committee for Climate Variability and Change of the American Meteorological Society.

Dr. Stephen Déry

Dr. Stephen Déry holds a Canada Research Chair in Northern Hydrometeorology and has appointments as associate professor in the Environmental Science and Engineering undergraduate program and the Natural Resources and Environmental Studies graduate program at University of Northern British Columbia (UNBC). His background is in atmospheric science and he has degrees from York and McGill Universities. Stephen also did post-doctoral positions at the Lamont-Doherty Earth Observatory of Columbia University, New York and held a Visiting Research Scientist position at Princeton University in New Jersey. Stephen is investigating the consequences of climate change on the water cycle of northern and alpine regions, including on snow and ice. A major aspect of this research is to develop a better understanding of the water balance in the Fraser River basin based on field studies, remote sensing data, and numerical simulations.

Changements récents au sein de l'équipe éditoriale d'*Atmosphere-Ocean*

par Douw Steyn[2]

Douw Steyn, Ph.D.

Au cours des derniers mois, l'équipe éditoriale d'*Atmosphere-Ocean*, comprenant le directeur des publications et les rédacteurs en chef, a connu des changements considérables, que les membres de la SCMO voudront connaître. L'équipe éditoriale se compose maintenant des rédacteurs en chef Stephen Déry (Ph.D.), Guoqi Han (Ph.D.) et Hai Lin (Ph.D.). Stephen Déry s'occupe des soumissions relatives à la météorologie et à l'hydrologie; Guoqi Han, des soumissions portant sur l'océanographie et Hai Lin, des soumissions sur la climatologie. Je suis maintenant directeur des publications. Bien que les trois rédacteurs en chef soient tous des auteurs scientifiques actifs et expérimentés, j'assume le poste de directeur des publications pour la première fois. Je succède dans ces fonctions complexes et variées à l'instigateur de ce poste, Richard Asselin, qui l'a développé avec expertise. Au cours de l'année, j'explorerai les divers aspects des publications de la SCMO et dresserai ma liste de tâches. Je travaillerai donc avec les trois rédacteurs en chef, la rédactrice technique (Sheila Bourque) et le comité consultatif (Paul Myers, René Laprise, Theodore Shepherd, Richard Thomson et Andrew Weaver) d'*Atmosphere-Ocean*, ainsi qu'avec le rédacteur en chef du *CMOS Bulletin SCMO* (Paul-André Bolduc) et le conseil d'administration de la SCMO, afin de faire de ces publications une composante essentielle, et peut-être distinctive, de la SCMO en tant qu'organisme professionnel. Je compte, au cours de l'année, m'adresser aux membres dans les pages du *CMOS Bulletin SCMO*, afin de vous informer de mes plans concernant les publications de la SCMO.

La qualité scientifique d'*Atmosphere-Ocean* repose sur l'expertise et le dévouement des trois rédacteurs en chef, dont la carrière représente ce que la science canadienne offre de mieux. Je les présente donc aux membres de la

[2] Professeur, Université de la Colombie-Britannique; Directeur des publications de la SCMO

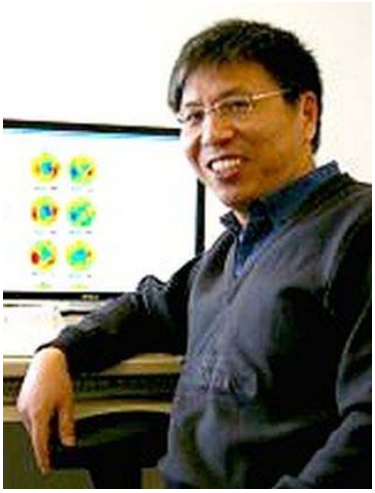
SCMO.


Guoqi Han, Ph. D.

Guoqi Han (Ph.D.) est chercheur au Centre des pêches de l'Atlantique nord-ouest, relevant du ministère des Pêches et des Océans. Son domaine principal de recherche porte sur l'océanographie physique relativement aux écosystèmes et à l'adaptation aux changements climatiques. Il a notamment fait considérablement progresser l'application de l'altimétrie satellitaire aux littoraux et aux plateaux, et utilisé des modèles océaniques à maillage non structuré pour étudier les sciences océanographiques et écosystémiques, durant les vingt dernières années. Il a publié, dans des revues scientifiques, plus de 60 articles évalués par des pairs, et rédigé des chapitres de livres, des articles d'encyclopédies et des bulletins scientifiques portant sur l'océanographie, le climat, la science des écosystèmes, l'hydrodynamique et le génie hydraulique.

Monsieur Han occupe actuellement l'un des postes de rédacteur en chef (océanographie) d'*Atmosphère-Ocean*. Il est responsable du volet océanographique du programme canadien Surface Water and Ocean Topography (SWOT-C). Il est vice-président de la Commission d'étude spatiale de la surface, de la météorologie et du climat de la Terre du Comité pour la recherche spatiale. Il est professeur auxiliaire à l'Université Memorial de Terre-Neuve. Monsieur Han a coprésidé le comité du programme scientifique du Congrès 2007, tenu conjointement par la SCMO (Société canadienne de météorologie et d'océanographie), l'UGC (Union géophysique canadienne) et l'AMS (American Meteorological Society). Il a siégé au sein de comités consultatifs et de comités d'organisation de colloques et de congrès internationaux.

Une équipe formée de monsieur Han et de quelques collègues a gagné le prix d'océanographie appliquée, que la Société canadienne de météorologie et d'océanographie a décerné en 1998. Il a reçu, avec le comité local d'organisation du Congrès conjoint SCMO-UGC-AMS de 2007, le prix Admiral de la cité de St. John's en 2008.


Hai Lin, Ph.D.

Hai Lin (Ph.D.) est chercheur à la division de Recherche en prévision numérique (RPN) d'Environnement Canada, à Dorval (Québec). Il occupe aussi un poste de professeur auxiliaire à l'Université McGill. Il a reçu son diplôme de doctorat en Sciences atmosphériques et océaniques de l'Université McGill en 1995. Ses domaines de recherche comprennent la dynamique du climat, la variabilité basse fréquence atmosphérique, ainsi que les prévisions mensuelles et saisonnières. En 2010, la Société canadienne de météorologie et d'océanographie lui a octroyé le Prix du président. Il est membre du Comité directeur pour les prévisions sous-saisonnières et saisonnières relevant du Programme mondial de recherche sur la prévision du temps (PMRPT) et du Programme mondial de recherche sur le climat (PMRC) de l'Organisation météorologique mondiale, et membre du Committee for Climate Variability and Change de l'American Meteorological Society.

Stephen Déry, Ph.D.

Stephen Déry (Ph.D.) est titulaire de la Chaire de recherche du Canada en hydrométéorologie du Nord. Il est professeur agrégé au programme de premier cycle en science et génie environnemental et au programme d'études supérieures sur les ressources naturelles et l'environnement, à l'Université de Northern British Columbia. Il détient une formation en sciences atmosphériques et possède des diplômes des universités York et McGill. Monsieur Déry a occupé un poste postdoctoral au Lamont-Doherty Earth Observatory de l'Université Columbia (New York) et a été chercheur invité à l'Université Princeton (New Jersey). Il étudie les conséquences des changements climatiques sur le cycle de l'eau, y compris la neige et la glace, des régions alpines et boréales. Il compte principalement développer une bonne compréhension du bilan hydrique du bassin du fleuve Fraser, s'étayant sur des études sur le terrain, des données de télédétection et des simulations numériques.

À lire absolument!

Peut-on connaître le climat sans connaître la météo?

par Corentin Herbert

National Center for Atmospheric Research, Boulder, Colorado, États-Unis

La Météorologie - n° 85 - mai 2014, page 17.

Résumé: On conçoit intuitivement le climat comme la moyenne (ou plus généralement la statistique) spatiale et temporelle des variables météorologiques. En pratique, pour étudier le climat on utilise généralement un modèle numérique pour intégrer un système d'équations, relativement proches de celles de la météorologie, avant d'éventuellement calculer la statistique de ce signal temporel. Il pourrait être intéressant, numériquement et conceptuellement, de disposer d'outils permettant d'avoir accès directement aux grandeurs statistiques, sans passer par la résolution des équations de la dynamique. On présente ici deux tentatives dans ce sens.

Note du rédacteur: Corentin Herbert a reçu le prix André Prud'homme 2013 pour sa thèse soutenue en 2012 à l'université Pierre-et-Marie-Curie et intitulée "*Applications de la mécanique statistique à la modélisation du climat - Thermodynamique et dynamique de l'atmosphère*".

Interesting article

Can we know the climate without knowing the weather?

by Corentin Herbert

National Center for Atmospheric Research, Boulder, Colorado, United States

La Météorologie - n° 85 - mai 2014, page 17.

Abstract: The climate is usually thought of as the statistics of the meteorological fields, both in time and space. In practice, to study the climate, one generally uses a numerical model to integrate a set of equations, which are relatively close to those of meteorology, and eventually computes the statistics of the time series thus obtained. For both numerical performance and theoretical reasons, it would be highly beneficial to design tools which treat directly the statistical quantities, without going through the numerical integration of the dynamical equations. In this paper, we introduce two attempts in this direction.

Note of the Editor: Corentin Herbert received the 2013 André Prud'homme prize for his thesis defended in 2012 at the Pierre-et-Marie-Curie University and entitled "*Applications de la mécanique statistique à la modélisation du climat - Thermodynamique et dynamique de l'atmosphère*".

Note: This article is available on the web in French only.

Nouveau site Web de la SCMO

Tel qu'annoncé lors du congrès à Rimouski, le nouveau site Web de la SCMO est en développement. La structure de base est en place et l'équipe de réalisation travaille à migrer, trier et redéfinir le contenu du nouveau site. Un défi de taille est de mettre en place un site simple d'utilisation qui garde néanmoins la trace des riches archives de la SCMO.

Il semble clair que cette migration ne sera pas complétée avant la mise en ligne officielle du nouveau site. Des sections du site seront donc complétées au cours des semaines et mois suivant le lancement. Vos commentaires et suggestions seront évidemment les bienvenus, encore plus si ils sont accompagnés d'une offre pour contribuer au nouveau site. On cherche en particulier un responsable du fil twitter de la SCMO et de contributeurs au blog. Si vous avez une expérience de terrain à partager ou des réflexions sur l'état de la science, contactez webmaster@cmos.ca pour soumettre vos articles. Ce sont vos contributions qui rendront le site vivant et intéressant et en feront une vitrine inspirante de l'océanographie et de la météorologie au Canada.

David Huard, Ph.D., Conseiller scientifique, Ouranos

New CMOS Website

As announced at the last congress, the new CMOS website is in development. The framework is in place and the work team is busy migrating, sorting, and redefining the scope and content of the new site. A considerable challenge is to keep the site simple to navigate while preserving the rich archives CMOS has gathered over the years.

It's now clear that this migration won't be complete before the official launch. What this means is that sections of the site will be completed over the next weeks and months. Your comments and suggestions to improve the content and appearance of the site are of course welcome, even more so if accompanied by help offers. In particular, we are looking for an editor in charge of keeping our twitter feed alive with news from the metocean field. Also, please send us short blog posts about your field experiments or thoughts about the state of the science. It is your contributions that will keep this site lively and interesting.

Dr. David Huard, Scientific Advisor, Ouranos

Next Joint Congress

American Meteorological Society (AMS) and Canadian Meteorological and Oceanographic Society (CMOS)

The 49th CMOS Congress and 13th AMS Conference on Polar Meteorology and Oceanography will be held at the Whistler Conference Centre, in Whistler, British Columbia, May 31 – June 4, 2015. The theme of this congress is "**TROPICS TO POLES: Advancing Science in High Latitudes**". More detailed information will be posted as it becomes available on the Congress website at

http://www.cmos.ca/congress2015/index.html

At this time, we are inviting interested CMOS and AMS members to propose and to take the lead on organizing any special session or workshop of interest to you, particularly on topics related to: the Atmosphere, Climate, the Cryosphere, the Oceans, Biogeochemistry and Interdisciplinary Studies. Session organizers are expected to recruit participants and to chair the session. Sessions will be organized into 1½-hour blocks of six 15-minute presentations. Organizers may choose to allocate 30 minutes for a lead speaker and four 15-minute presentations. Multiple 1½-hour sessions are welcome if the number of submitted abstracts warrants it.

To plan a special session for the 2015 Congress, please submit your proposal through the CMOS website:

http://www.cmos.ca

The proposal should include the session title (up to 40 characters), information about the session convener or co-conveners, and a short paragraph of up to 300 words describing the scientific content of the session. All session proposals should be received by November 1st, 2014. On-line abstract submissions will then be accepted between December 15th, 2014 and February 15th, 2015.

Scientific and plenary sessions of the Congress will take place from Monday, June 1st through Thursday, June 4th, 2015. In addition, time and venue space have been set aside on Sunday, May 31th for related workshops, business meetings, courses, and other Congress-related events, as well as an icebreaker reception to be held that evening. Parties interested in making such arrangements should contact Scientific Program Committee Chair Bruce Ainslie (Bruce.Ainslie@ec.gc.ca).

We look forward to receiving your submissions as we plan an exciting 2015 Congress.

Prochain congrès conjoint

American Meteorological Society (AMS) et Société canadienne de météorologie et d'océanographie (SCMO)

Le 49e congrès de la SCMO et la 13e conférence AMS sur la météorologie polaire et l'océanographie aura lieu du 31 mai au 4 juin 2015 au Centre de Conférence Whistler, à Whistler, en Colombie-Britannique. De plus amples renseignements seront publiés à mesure de leur disponibilité sur le site Web du congrès à

http://www.cmos.ca/congress2015/index_FR.html

Le thème du 49e Congrès SCMO et de la 13e conférence AMS sur la météorologie polaire et l'océanographie est **"DES TROPIQUES AUX PÔLES: Avancement de la science des hautes latitudes**". Vous êtes invités à proposer des sessions scientifiques portant sur les thèmes : l'Atmosphère, le Climat, le Cryosphere, les Océans, la Biogéochimie , les études interdisciplinaires et également sur tous les domaines d'intérêt de la SCMO et l'AMS.

En ce moment, nous invitons les membres intéressés de la SCMO et de l'AMS à proposer et à organiser une session spéciale ou un atelier d'intérêt pour vous, en particulier sur des sujets liés au thème du Congrès qui met l'accent sur les changements naturels et anthropiques dans les environnements froids. Les organisateurs de session seront responsables du recrutement des participants à leur session et agiront comme président. Les sessions seront organisées en blocs d'une heure et demie comprenant six présentations de 15 minutes. Les organisateurs pourront choisir d'allouer 30 minutes pour un conférencier thématique, et quatre présentations de 15 minutes. Plusieurs sessions d'une heure et demie sont possibles si le nombre de résumés soumis le justifie.

Pour proposer une session lors du congrès de 2015, veuillez soumettre votre proposition via notre page Web :

http://www.cmos.ca

La proposition doit inclure le titre de la session (jusqu'à 40 caractères), des renseignements sur le président et co-président, ainsi qu'un court paragraphe (jusqu'à 300 mots) décrivant le contenu scientifique de la session. Toutes les propositions de session doivent être reçues au plus tard le 1er novembre 2014. La soumission en ligne des résumés se fera ensuite entre le 15 décembre 2014 et le 15 février 2015.

Les sessions scientifiques et plénières du congrès auront lieu du lundi 1er au jeudi 4 juin 2015. En outre, des créneaux horaires et des locaux ont été réservés le dimanche 31 mai pour les ateliers associés, les réunions d'affaires, les cours de formation et autres événements reliés au congrès, de même que la tenue d'un cocktail de bienvenue en soirée. Les personnes voulant profiter de cette journée afin de tenir une réunion sont invitées à communiquer avec le président du comité du programme scientifique, Bruce Ainslie (Bruce.Ainslie@ec.gc.ca).

Nous attendons avec grand intérêt vos propositions afin de planifier un excitant congrès en 2015.

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

Latest Books received / Derniers livres reçus

2014-1) *Biogeochemical Dynamics at Major River-Coastal Interfaces, Linkages with Global Change*, 2014, Edited by Thomas S. Bianchi, Mead A. Allison, Wei-Jun Cai, Cambridge University Press, 978-1-107-02257-7, Hardback, 658 pages, $146,95.

2014-2) *Double-Diffusive Convection*, by Timour Radko, 2014, Cambridge University Press, ISBN 978-0-521-88074-9, Hardback, 342 pages, $125,95.

2014-4) *Transport in the Atmosphere-Vegetation-Soil Continuum*, by Arnold F. Moene, Jos C. van Dam, 2014, Cambridge University Press, ISBN 978-0-521-19568-3, Hardback, 436 pages, $78,95.

2014-5) *An Introduction to Ocean Remote Sensing*, by Seelye Martin, 2nd Edition, 2014, Cambridge University Press, 978-1-107-01938-6, Hardback, 496 pages, $88,95.

2014-6) *Electromagnetic Scattering by Particles and Particle Groups, An Introduction*, by Michael I. Mishchenko, 2014, Cambridge University Press, 978-0-521-51992-2, Hardback, 435 pages, $73,95.

2014-7) *Terrestrial Biosphere-Atmosphere Fluxes*, by Russell Monson and Dennis Baldocchi, 2014, Cambridge University Press, 978-1-107-04065-6, Hardback, 487 pages, $86,95.

2014-9) *Father Benito Viñes The 19th-Century Life and Contributions of a Cuban Hurricane Observer and Scientist*, by Luis E. Ramos Guadalupe, 2014, Published by American Meteorological Society and distributed by the University of Chicago Press, ISBN 978-1-935704-62-1, Paperback, 171 pages, US$20,00.

2014-10) *The Thinking Person's Guide to Climate Change*, by Robert Henson, 2014, Published by American Meteorological Society and distributed by the University of Chicago Press, ISBN 978-1-935-70473-7, 171 pages, Paperback, US$30,00.

2014-11) *The Arctic Climate System*, (2nd edition), by Mark C. Serreze and Roger G. Barry, 2014, Cambridge University Press (Cambridge Atmospheric and Space Science Series), 978-1-107-03717-5, Hardback, 404 pages, $130,95.

Erratum

On page 133 of the printed version of *CMOS Bulletin SCMO* August 2014, Vol. 42 No. 4 issue, under photo description 'François Roy…', the name Pierre Pauthier is incorrectly spelled. It should be Pierre Gauthier.

À la page 133 de la version imprimée du *CMOS Bulletin SCMO*, août 2014, Vol. 42 No. 4, l'épellation du nom Pierre Pauthier doit être corrigée à Pierre Gauthier (voir description de la photo 'François Roy...').

BRIEF NEWS / NOUVELLES BRÈVES

Yves Gratton intronisé au Cercle d'excellence de l'Université du Québec

Le 28 août 2014 – Le professeur Yves Gratton du Centre Eau Terre Environnement de l'Institut national de la recherche scientifique (INRS) a été nommé au Cercle d'excellence de l'Université du Québec lors de l'évènement de la rentrée des chefs d'établissements du réseau de l'Université du Québec tenu le 27 août au Musée national des beaux-arts du Québec. Par ce geste, l'Université du Québec reconnaît sa contribution remarquable en océanographie physique tant en recherche qu'en formation.

"L'INRS est fier de pouvoir compter sur des chercheurs de grande qualité comme le professeur Gratton qui contribue à l'avancement des connaissances sur les impacts des changements climatiques, un domaine prioritaire pour l'avenir de notre société", se réjouit le recteur de l'INRS, monsieur Daniel Coderre.

Possédant une vaste expertise dans les études d'impact de l'environnement physique sur la qualité du milieu, la production biologique et les pêcheries, le professeur Gratton s'intéresse notamment aux processus qui contrôlent la circulation et le mélange des masses d'eau et à ceux qui affectent la production biologique océanique.

Au cours de sa carrière, il a démontré sa capacité à œuvrer dans un environnement où se côtoient des chercheurs en sciences naturelles, médicales et sociales. Se qualifiant de "*physicien de service*", le professeur Gratton a participé à la réalisation de plusieurs grands programmes multidisciplinaires nationaux et internationaux dans le but d'étudier la réponse des écosystèmes arctiques aux changements climatiques. Chef de mission à plusieurs reprises, le professeur Gratton a été responsable de l'échantillonnage physique à bord de navires comme l'Amundsen et a dirigé l'équipe Modélisation de la réponse des écosystèmes des mers glacées aux changements climatiques du Centre Québec-Océan.

Professeur Yves Gratton

Le professeur Gratton a collaboré au développement d'un modèle physique-biologique unique pour l'archipel Arctique canadien et pris part aux projets Canadian Arctic Shelf Exchange Study (CASES) et ARCTIC SOLAS (Surface Ocean Lower Atmosphere Study). Il a aussi dirigé l'équipe d'océanographie physique dans le cadre d'un projet de l'Année polaire internationale intitulé Circumpolar Flaw Lead Study. Membre du réseau de centres d'excellence ArticNet, le professeur Gratton a été responsable du thème portant sur les impacts des changements climatiques dans le Haut-Arctique canadien. Il a été à la tête d'une équipe multidisciplinaire chargée de produire une étude comparative des conditions physiques et sociétales, incluant des analyses stratégiques et médicales dans cette région. De plus, il a dirigé le projet Long-Term Observatories in Canadian Arctic Waters qui a permis d'étudier les changements de propriétés physiques, biologiques et géochimiques de l'océan.

En plus de contribuer au projet européen MALINA et au projet HYPOXIA, le professeur Gratton a contribué au développement d'un modèle du comportement de l'oxygène dans les eaux de fond et étudié l'impact des changements climatiques sur les habitats de la truite grise. Il collabore présentement à un projet visant à quantifier l'acidification des eaux de l'estuaire et du golfe du St-Laurent et à en déterminer les causes. Il est également impliqué dans le projet NETCARE qui étudie les aérosols d'origine biologique dans l'Arctique.

Président du Centre de Québec de la Société canadienne de météorologie et d'océanographie, il est membre du comité de rédaction de la revue *Atmosphere-Ocean*. Il a été membre du comité scientifique de cette société et membre du conseil d'administration du regroupement stratégique Québec-Océan pendant plusieurs années.

Canadian climate scientist is new President of the International Council for Science

Professor Gordon McBean, an internationally recognized meteorologist and climate change expert, today became the new President of the International Council for Science (ICSU).

Auckland, New Zealand (Sept 3) – At the conclusion of the organization's 31st General Assembly in Auckland, McBean today assumed the presidency, to which he had been elected by representatives from ICSU's 120 National Members and 31 International Scientific Union Members at the previous General Assembly in Rome, Italy in 2011. An established member of the ICSU community, McBean succeeds the previous ICSU President, Yuan Tseh Lee, and is the second Canadian to take up this office.

Professor Gordon McBean delivering his Presidential address

Professor McBean was born and educated in Canada, and obtained a PhD in physics from the University of British Columbia (UBC), Vancouver. After an academic and research career that included serving as Professor of Atmospheric and Oceanographic Sciences at UBC, he was appointed Assistant Deputy Minister in Environment Canada, and was, from 1994 to 2000, responsible for climate, weather, and air quality sciences and services in the federal government. He currently holds professorships in the Departments of Geography, Political Science, and Physics at the University of Western Ontario, London, Canada, and is Director of Policy Studies at the Institute for Catastrophic Loss Reduction and Co-Director of the Centre for Environment and Sustainability there.
For many years McBean has been involved in ICSU and ICSU-related affairs, including the World Climate Research Programme (WCRP) and the planning of a new decade-long interdisciplinary research programme Integrated Research on Disaster Risk (IRDR), whose Scientific Committee he chaired until 1 November 2011.

As a member of the Future Earth Transition Team, he played a key role in defining the research initiative's organizational design and objectives. He is also President of Global Change START International, an organization which supports regional networks and capacity enhancement in Africa and Asia, and notably in the context of ICSU's international global change programmes. He is chair of the International Advisory Board, IRDR International Centre of Excellence, China: Taipei; the Ontario Climate Consortium and member of several other international and national committees.

His service and achievements in the fields of climate change and natural hazards research have been recognized with the Orders of Canada (2008) and Ontario (2010). He is a Fellow of the Royal Society of Canada. As a lead author and review editor for the Intergovernmental Panel on Climate Change (IPCC), he was a member of the team that was awarded the 2007 Nobel Peace Prize.

In his inaugural address, McBean said that he was "*very proud of the role the Council has played, and will continue to play, in planning, coordinating, and 'making happen' global scale research for the benefits for all societies*."

He emphasized that the Council "*will continue to provide societies and governments with policy relevant science that can and should form the basis for policy making*."

"*I am very proud to be your new President and look forward to working with you now and in the future*," he concluded.

About the International Council for Science

The International Council for Science (ICSU) is a non-governmental organization with a global membership of national scientific bodies (121 Members, representing 141 countries) and International Scientific Unions (31 Members). It mobilizes the knowledge and resources of the international scientific community to strengthen international science for the benefit of society. Ref: www.icsu.org

New Record for 48-Hour Rainfall

A World Meteorological Organization (WMO) panel has concluded that Cherrapunji in India now holds the world record for two-day (48-hour) rainfall, with 2 493 millimeters recorded on 15–16 June 1995.

This rainfall total exceeds the previous world 48-hour rainfall record of 2 467mm associated with the passage of a tropical cyclone over the Indian Ocean island of La Réunion (France) in April 1958. La Réunion, which is frequently hit by tropic cyclones and receives large amounts of rainfall over its mountains, continues to hold the record for the most rainfall over periods of 12-hours and 24-hours (in 1966), as well as 72-hours and 96-hours (in 2007).

The WMO Commission of Climatology international panel of experts reached its decision following an in-depth investigation of the Cherrapunji rainfall event for it to be included in the WMO World Archive of Weather and Climate Extremes, the official international listing of weather and climate extremes.

The new 48-hour record is particularly noteworthy as it reaffirms Cherrapunji (also known as Sohra) as one of the wettest places on Earth. It complements Cherrapunji's long-held record rainfall for a 12-month (one-year) period, with 26 470 mm of rain from August 1860 to July 1861. It also supplants a two-day rainfall record associated with a tropical cyclone. In contrast to other short-term rainfall records, Cherrapunji's extensive rains are the result of summer monsoon depressions interacting with its mountainous topography. Cherrapunji is situated on a plateau in the state of Meghalaya at an average elevation of 1 484 metres, facing the plains of Bangladesh.

The investigation was conducted at the request, and with the support, of the India Meteorological Department, and was based on post-event data analysis. The investigating committee was composed of climate experts from Argentina, Columbia, France, Germany, India, Morocco, Spain, and the United States of America.

Reference: WMO Press Release No. 988, *Cherrapunji, India, Holds New Record for 48-Hour Rainfall*, Geneva, 4 April 2014.

Nouveau record de pluie en 48 heures

Un groupe d'experts de l'Organisation météorologique mondiale (OMM) a conclu que Cherrapunji (Inde) détenait à présent le record mondial de pluie sur deux jours (48 heures), soit une hauteur de 2 493 millimètres enregistrée les 15 et 16 juin 1995.

La hauteur totale de pluie enregistrée dépasse le record mondial précédent sur 48 heures, soit 2 467 mm, associé au passage d'un cyclone tropical sur l'île de la Réunion (France), dans l'océan Indien, en avril 1958. La Réunion, fréquemment frappée par des cyclones tropicaux et dont les régions montagneuses reçoivent de grosses quantités de pluie, continue de détenir les records de pluviométrie sur des périodes de 12 heures et 24 heures (1966), ainsi que de 72 heures et 96 heures (2007).

Le groupe international d'experts relevant de la Commission de climatologie de l'OMM est parvenu à cette décision après une enquête approfondie au sujet de l'épisode de pluie en question survenu à Cherrapunji. L'enquête a été menée pour le compte des Archives mondiales de données concernant les extrêmes météorologiques et climatiques, lesquelles constituent les relevés mondiaux officiels de l'OMM pour ce qui concerne ces extrêmes.

Ce nouveau record sur 48 heures revêt un intérêt particulier, puisqu'il confirme que Cherrapunji (également appelée Sohra) compte parmi les lieux les plus arrosés de la planète. Il vient compléter un record que Cherrapunji possède depuis longtemps, à savoir 26 470 mm de pluie sur douze mois (un an), d'août 1860 à juillet 1861. Il supplante aussi un record de pluviométrie qui était associé à un cyclone tropical. Par opposition à d'autres records pluviométriques concernant de courtes périodes, les pluies abondantes que connaît Cherrapunji sont causées par l'influence du relief montagneux sur les dépressions associées à la mousson d'été. Cherrapunji se situe dans l'État du Meghalaya, sur un plateau dont l'altitude moyenne atteint 1 484 mètres et qui fait face aux plaines du Bangladesh.

Fondée sur l'analyse de données sur des phénomènes passés, l'enquête a été menée à la demande et avec le concours du Service météorologique indien. Le comité d'enquête était constitué de spécialistes du climat de divers pays: Allemagne, Argentine, Colombie, Espagne, États-Unis d'Amérique, France, Inde, et Maroc.

Référence: Communiqué de presse No. 988 de l'OMM, *Un nouveau record de pluie en 48 heures pour Cherrapunji en Inde*, Genève, 4 avril 2014.

Atlas of Mortality and Economic Losses from Weather, Climate, and Water Extremes

Better disaster data enables better decisions

Geneva, 11 July 2014 (WMO) - Weather, climate, and water-related disasters are on the rise worldwide, causing loss of life and setting back economic and social development by years, if not decades. From 1970 to 2012, 8 835 disasters, 1.94 million deaths, and US$ 2.4 trillion of economic losses were reported globally as a result of hazards such as droughts, extreme temperatures, floods, tropical cyclones, and related health epidemics, according to a new report.

The Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes 1970-2012 describes the distribution and impacts of weather, climate, and water-related disasters and highlights measures to increase resilience. It is a joint publication of the World Meteorological Organization (WMO) and the Centre for Research on the Epidemiology of Disasters (CRED) of the Catholic University of Louvain (UCL) in Belgium.

The Atlas aims to provide decision-makers with actionable information for protecting life and property.

It also highlights the need for stronger efforts to report, standardize, and analyze data on weather, climate, and water-related hazards to improve understanding of disasters and reinforce the platform for prevention.

The report was published ahead of the First Session of the Preparatory Committee Meeting (Geneva 14-15 July) for the Third United Nations World Conference on Disaster Risk Reduction. It seeks to inform debate on the post-2015 framework both for disaster risk reduction and sustainable development.

Storms and floods accounted for 79 per cent of the total number of disasters due to weather, climate, and water extremes and caused 55 per cent of lives lost and 86 per cent of economic losses between 1970 and 2012, according to the Atlas. Droughts caused 35 per cent of lives lost, mainly due to the severe African droughts of 1975 and 1983–1984.

The 1983 drought in Ethiopia ranked top of the list of human casualties, claiming 300 000 lives, as did Cyclone *Bhola* in Bangladesh in 1970. Drought in Sudan in 1984 killed 150,000 people, whilst the Cyclone locally known as *Gorky* killed 138 866 people in Bangladesh in 1991.

Hurricane *Katrina* in the United States of America in 2005 caused the worst economic losses, at US$ 146.89 billion, followed by *Sandy* in 2012 with a cost of $ 50 billion.

The worst ten reported disasters in terms of lives lost occurred primarily in least developed and developing countries, whereas the economic losses were mainly in more developed countries.

"*Disasters caused by weather, climate, and water-related hazards are on the rise worldwide. Both industrialized and non-industrialized countries are bearing the burden of repeated floods, droughts, temperature extremes, and storms*," said WMO Secretary-General Michel Jarraud.

"*Improved early warning systems and disaster management are helping to prevent loss of life. But the socio-economic impact of disasters is escalating because of their increasing frequency and severity and the growing vulnerability of human societies*."

The report highlighted the importance of historical, geo-referenced information about deaths and damages to estimate risks before the next disaster occurs. This information can support practical decisions on reducing potential impacts by, for example, improved early warning systems, retrofitting critical infrastructure, or enforcing new building codes.

"*Collecting global loss data that are comparable and complete is a major challenge. Climate and weather services are working with disaster-impact researchers and data centers to meet this challenge. This partnership is producing analyses that support practical decisions on reducing the human consequences of disasters, for example by investing in early warning systems or targeting the most vulnerable communities*," said CRED Director, Prof. Debarati Sapir.

The United Nation's Global Assessment Report on Disaster Risk Reduction 2013 concluded that direct and indirect losses from natural hazards of all kinds have been underestimated by at least 50 per cent because of the data collection challenges. Because better reporting of disaster impacts is vital for strengthening disaster risk reduction, the international community should help vulnerable countries improve their capacity for developing and maintaining high-quality damage and loss databases.

Another challenge for users of risk information is the changing characteristics (frequency, location, severity) of weather-, climate- and water-related hazards. Natural

climate variability is now exacerbated by long-term, human-induced climate change, so that yesterday's norms will not be the same as tomorrow's.

The WMO-CRED-Louvain report seeks to raise awareness of these and other challenges to collecting and analyzing disaster risk information. It presents a worldwide analysis of extreme weather, climate, and water events drawing on the Emergency Events Database (EM-DAT), compiled by CRED. The Atlas compares the reported impacts of meteorological, climatic, and hydrological extremes (as categorized by CRED) on people and economies at both the global and regional levels.

In addition to global statistics and maps, the Atlas also provides details on disasters which are summarized in the following table.

Area Period	Number of reported disasters	Number of lives lost	Economic damages in US$ billion
Africa 1970-2012	1,319	698,380	26.6
Asia 1970-2012	2,681	915,389	789.8
South America 1970-2012	696	54,995	71.8
North America 1970-2012	1,631	71,246	1,008.5
South-West Pacific 1970-2012	1,156	54,684	118.4
Europe 1970-2012	1,352	149,959	375.7

Reference: WMO Press Release No. 998, *Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes*, Geneva,11 July 2014.

Atlas de la mortalité et des pertes économiques dues aux phénomènes météorologiques, climatiques et hydrologiques extrêmes

Des décisions plus rationnelles grâce à des données sur les catastrophes de meilleure qualité

Genève, le 11 juillet 2014 (OMM) – Les catastrophes liées au temps, au climat et à l'eau, qui font des victimes et retardent le développement économique et social de plusieurs années, voire de plusieurs décennies, sont en hausse dans le monde entier. Selon un rapport qui vient de paraître, de 1970 à 2012, 8 835 catastrophes, 1,94 million de victimes et 2,4 billions de dollars É.-U. de pertes économiques ont été attribuées, à l'échelle mondiale, à des phénomènes tels que la sécheresse, les températures extrêmes, les crues, les cyclones tropicaux et leur cortège d'épidémies.

Dans l'Atlas de la mortalité et des pertes économiques dues aux phénomènes météorologiques, climatiques et hydrologiques extrêmes (1970–2012) publié conjointement par l'Organisation météorologique mondiale (OMM) et le Centre de recherche sur l'épidémiologie des désastres (CRED) de l'Université catholique de Louvain (UCL), en Belgique, les auteurs décrivent la répartition géographique et les conséquences des catastrophes liées au temps, au climat et à l'eau, en soulignant les mesures susceptibles d'être prises pour renforcer notre résilience.

L'objectif de cet Atlas est de fournir aux décideurs des informations qui peuvent être mises en pratique afin de protéger les personnes et les biens. L'accent est notamment mis sur la nécessité d'accorder une attention particulière à la diffusion, à la normalisation et à l'analyse des données relatives aux catastrophes météorologiques, climatiques et hydrologiques, afin de mieux comprendre les différents types de catastrophes et d'améliorer l'efficacité des mécanismes de prévention.

Publié à la veille de la première session (Genève, 14-15 juillet) du Comité préparatoire de la Troisième Conférence mondiale des Nations Unies sur la réduction des risques de catastrophe, l'Atlas vise à étayer les débats sur les priorités de développement pour l'après–2015 dans les domaines de la réduction des risques de catastrophe et du développement durable.

Selon l'Atlas, de 1970 à 2012, 79% des catastrophes liées aux phénomènes météorologiques, climatiques et hydrologiques extrêmes étaient des tempêtes et des crues, qui ont été à l'origine de 55% du nombre total de victimes et de 86% des pertes économiques. Principalement en raison des graves sécheresses qui ont frappé l'Afrique en 1975 et en 1983–1984, 35% des victimes ont perdu la vie des suites de sécheresses.

Avec ses 300 000 victimes, la sécheresse qui a sévi en Éthiopie en 1983 a été la plus meurtrière, à l'instar du cyclone *Bhola*, qui a frappé le Bangladesh en 1970. En 1984, 150 000 personnes ont péri au Soudan en raison de la sécheresse, alors qu'un cyclone, localement baptisé *Gorky*, a fait 138 866 victimes au Bangladesh en 1991.

Les pertes économiques les plus importantes (146,89 milliards de dollars) ont été enregistrées aux États-Unis après le passage de l'ouragan *Katrina*, en 2005, puis de *Sandy*, en 2012, dont le coût s'est chiffré à 50 milliards de dollars.

Les dix catastrophes signalées les plus meurtrières ont principalement touché des pays moins avancés et des pays en développement, alors que les pertes économiques ont surtout pesé sur des pays plus développés.

Selon le Secrétaire général de l'OMM, Michel Jarraud, «*les catastrophes liées à des phénomènes météorologiques, climatiques et hydrologiques sont en hausse dans le monde entier. Qu'ils soient industrialisés ou non, tous les pays doivent supporter le fardeau que représente la fréquence accrue des inondations, des sécheresses, des températures extrêmes et des tempêtes*».

Les systèmes améliorés d'alerte précoce et la gestion des catastrophes aident à sauver des vies. Mais les conséquences socio-économiques des catastrophes s'aggravent en raison de l'augmentation de leur fréquence et de leur gravité et du fait que les communautés sont de plus en plus vulnérables, a-t-il ajouté.

Les auteurs de l'Atlas soulignent qu'il importe de disposer d'informations historiques géo-référencées sur les victimes et les dégâts pour évaluer les risques avant que la catastrophe suivante n'ait lieu. Ces informations peuvent étayer des décisions d'ordre pratique visant à réduire au maximum les conséquences possibles, par exemple en utilisant des systèmes améliorés d'alerte précoce, en mettant à niveau les infrastructures essentielles ou en ne tolérant aucun manquement aux nouveaux règlements de construction.

Pour la directrice du CRED, Mme Debarati Sapir, *"la collecte de données exhaustives, pouvant être comparées, est un défi de taille. Les services climatologiques et météorologiques collaborent avec les chercheurs et les centres de données spécialistes des catastrophes et de leurs conséquences afin de relever ce défi. Ce partenariat produit des analyses sur lesquelles des décisions pratiques sont fondées en vue d'atténuer les conséquences des catastrophes sur les êtres humains, notamment en investissant dans des systèmes d'alerte précoce ou en ciblant les communautés les plus vulnérables*".

Dans le Bilan mondial 2013 sur la réduction du risque de catastrophe publié par l'ONU, les experts concluent que les pertes directes et indirectes dues aux catastrophes naturelles, quelles qu'elles soient, ont été sous-estimées d'au moins 50% en raison des problèmes posés par la collecte de données. Puisqu'il est essentiel d'améliorer la diffusion d'informations relatives aux conséquences des catastrophes pour renforcer la prévention, la communauté internationale devrait aider les pays vulnérables à améliorer leurs capacités afin qu'ils soient en mesure d'établir et de tenir à jour des bases de données, de qualité supérieure, sur les dégâts et les pertes.

Les personnes qui utilisent les informations sur les risques doivent également composer avec l'évolution des caractéristiques des phénomènes météorologiques, climatiques et hydrologiques dangereux (fréquence, lieu d'occurrence, gravité). Comme la variabilité naturelle du climat est aujourd'hui exacerbée par des changements climatiques à long terme d'origine anthropique, ce qui était la norme hier risque de ne plus l'être demain.

L'objectif de la publication conjointe de l'OMM et du CRED-Louvain est de mettre en lumière l'ensemble des problèmes liés à la collecte et à l'analyse des informations sur les risques de catastrophes. Une analyse des phénomènes météorologiques, climatiques et hydrologiques extrêmes à l'échelle mondiale, effectuée à partir des informations regroupées dans la base de données sur les catastrophes (EM-DAT) du CRED, y est présentée. L'Atlas compare les conséquences mondiales et régionales des phénomènes météorologiques, climatiques et hydrologiques extrêmes (tels qu'ils sont catégorisés par le CRED) sur les populations et l'économie.

Outre des statistiques mondiales et des cartes, des informations détaillées sur les catastrophes à l'échelle régionale sont également présentées et dont un sommaire apparaît dans le tableau ci-dessous.

Région Période	Nombre de catastrophes rapportées	Nombre de victimes	Perte économique en milliard US$
Afrique 1970-2012	1 319	698 380	26,6
Asie 1970-2012	2 681	915 389	789,8
Amérique du Sud 1970-2012	696	54 995	71,8
Amérique du Nord 1970-2012	1 631	71 246	1 008,5
Pacifique Sud-Ouest 1970-2012	1 156	54 684	118,4
Europe 1970-2012	1 352	149 959	375,7

Référence: Communiqué de presse No. 998 de l'OMM *Atlas de la mortalité et des pertes économiques dues aux phénomènes météorologiques, climatiques et hydrologiques extrêmes*, Genève,11 Juillet 2014.

DERNIÈRE HEURE

English version on page 152

Découverte de l'un des infortunés navires de l'expédition de Franklin perdus en 1846

L'expédition 2014 dans le détroit de Victoria a permis la découverte de l'un des deux navires ayant pris part à l'expédition Franklin et ayant disparu en 1846.

Au moment d'aller sous presse, l'authenticité du navire n'avait pas encore été faite à savoir s'il s'agissait du ***Navire de sa Majesté (NSM) Erebus*** ou du ***NSM Terror.*** La découverte a été faite à l'aide d'un véhicule sous-marin autonome acheté récemment par Parcs Canada.

Des félicitations sont de mise pour tous les partenaires impliqués dans cette expédition historique de 2014 dans le détroit de Victoria, incluant Parcs Canada, la Société géographique royale du Canada, l'Arctic Research Foundation, la Garde côtière canadienne, la Marine royale canadienne et le gouvernement du Nunavut. Cette découverte aurait été impossible sans les efforts acharnés qu'ils ont déployés au cours des années, leur engagement et leur dévouement ainsi que la persévérance des nombreux partenaires et explorateurs qui ont pris part à ces activités.

Photo gracieuseté de Parcs Canada

Le gouvernement canadien a fait preuve d'efforts soutenus dans le cadre de la recherche des ***NSM Erebus*** et ***Terror***. Ces navires constituaient les seuls lieux historiques nationaux du Canada non découverts. Depuis 2008, six importants efforts de recherche menés par Parcs Canada ont été réalisés afin de trouver les navires disparus de l'expédition Franklin. Les participants ont minutieusement couvert des centaines de kilomètres carrés du lit océanique de l'Arctique. C'est une fierté de voir que les restes du navire ont été découverts lors de l'expédition dans le détroit de Victoria de 2014, expédition financée par le gouvernement.

Référence: Communiqué de presse de Parcs Canada, Ottawa, Ontario, 9 septembre 2014 et le site Web de Parcs Canada.

Elizabeth Dowdeswell honoured

Elizabeth Dowdeswell, former ADM of the Meteorological Service of Canada, was named Ontario's new Lieutenant-Governor. She succeeds David Onley who served a seven-year term.

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