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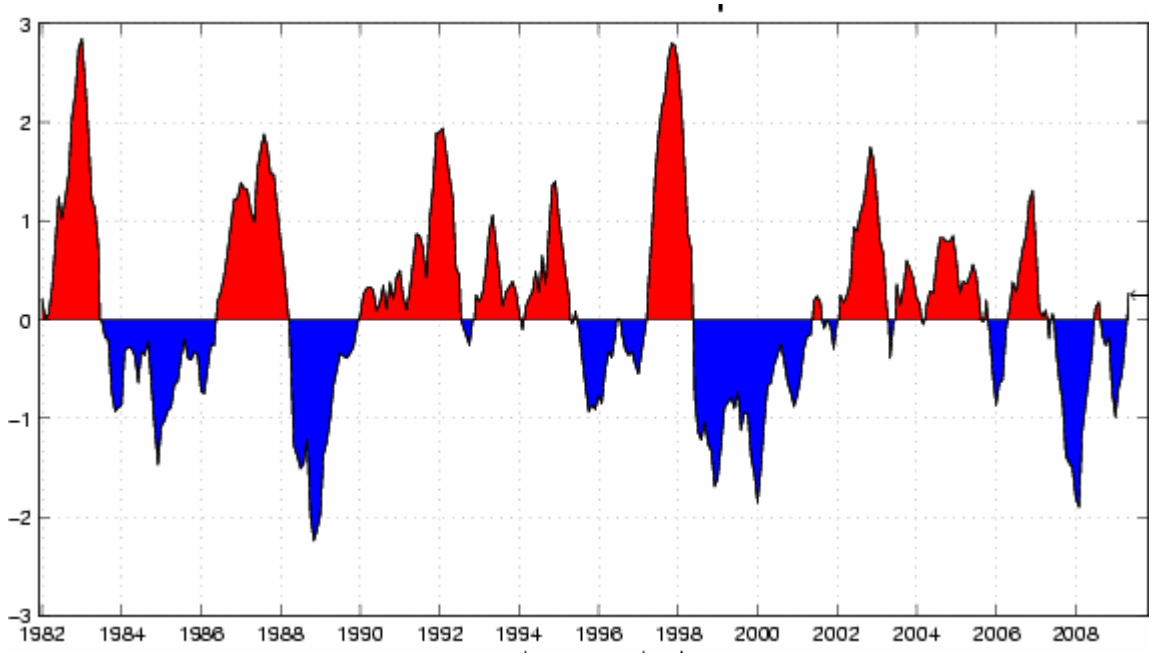
SCMO

Canadian Meteorological and Oceanographic Society

La Société canadienne de météorologie et d'océanographie

August / août 2009 Vol.37 No.4

Niño 3.4



Sea Surface Temperature Index in °C
Indice de la température de surface de l'océan en °C

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

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Cover page : The economic and social impacts of El Niño being large, Canada has recently become a player in the worldwide enterprise to predict its arrival up to twelve months in advance. Recently, it has been noted that a new El Niño event is developing. Shown on the cover page is the historical departure of sea surface temperature from its long-term average in the "Niño 3.4" region (120°W-170°W and 5°S-5°N). This graph represents its evolution since 1982 with El Niños appearing as red peaks and La Niñas as blue. To learn more, please read the report on **page 105**. Reproduced here with permission from http://iri.columbia.edu/climate/ENSO/currentinfo/Quicklook.htm

Page couverture : Étant donné que les impacts de El Niño sont majeurs, le Canada est devenu un joueur dans la prédiction jusqu'à douze mois en avance de son arrivée. Dernièrement, on a observé le développement d'un nouvel événement. On montre sur la page couverture l'historique de l'écart de la température de surface de l'océan de la moyenne à long terme dans la région "Niño 3.4" (120°W-170°W and 5°S-5°N). Ce graphique illustre son évolution depuis 1982 alors que les El Niños apparaissent comme des pics en rouge et les La Niñas en bleu. Pour en apprendre plus, prière de lire l'article en **page 105**. Reproduit ici avec la permission de http://iri.columbia.edu/climate/ENSO/currentinfo/Quicklook.htm

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Canadian Meteorological and Oceanographic Society (CMOS)

Société canadienne de météorologie et d'océanographie (SCMO)

Executive / Exécutif

....from the President's Desk

Bill Crawford
CMOS President Président de la SCMO

Friends and colleagues:

1) Carbon offset funding

While flying into Halifax for our 2009 Congress in late May, I reflected on the CO_2 emissions I was sending into the atmosphere. I have tried over the past year to cut my greenhouse gas imprint, but my increasing air travel undid this effort. For example, my travel to Halifax sent another ton or two of CO_2 into the atmosphere. I shared my concerns with John Falkingham and Dick Stoddart, hosts of our 2010 Ottawa Congress. They want to encourage carbon offsets but suspect that most of us need to know more of how to offset these emissions before we voluntarily put our money into a specific program. It is a new market with genuine gold standard buyers and also fakes who make easy money.

Few conferences ask us to set aside money to offset greenhouse gas emissions for travel. One exception is MOCA 09 that met in Montreal in July. This international meeting hosted meteorologists, oceanographers and cryosphere scientists. Organizers asked for a voluntary contribution of $20 to offset travel emissions. Is its plan simple? Yes. Effective? I scanned the MOCA 09 web site to find out details. It assured me the money was well spent, but why the same rate for all? Some registrants walked to the meeting and others flew in from Montreal's near-antipode in Perth Australia. Should CMOS ask its members to contribute such to such a fixed-price solution? At the other end of the complexity scale is the province of British Columbia, which offsets all travel by its civil servants. Distance travelled, car-pooling, taxi distance, ferry routes and other details are all fed into a database and the province purchases offsets annually for the total emissions.

I was surprised at the variety of rating standards for offset programs. The international "Gold Standard", generally considered the most stringent, recommends specific programs in developing countries and does not include tree-planting. British Columbia mostly keeps projects within the province and does support effective tree-planting ventures. Even the cost per tonne of CO_2 varies among programs, and for air travel the greenhouse impact per tonne of fuel burnt can be a factor of two or more higher, due to jet contrails that trap heat in the atmosphere.

(Continued on next page / Suite à la page suivante)

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August 2009 — août 2009

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....from the President's Desk (Continued)

Both Dick Stoddart and John Falkingham suggested that we publish information in the *CMOS Bulletin SCMO* to explain why these programs work and how we could contribute. So watch for this topic in future issues of this *Bulletin.* Many of you already offset your own emissions, so why not let us know how you do it? You can write to me at:

president@cmos.ca

2) Membership 2009

CMOS members are almost a thousand in number and hold great clout in providing insight, forecasts and advice on meteorology and oceanography. Our credibility derives from the insight of members, and from our numbers too. Many have belonged for more than 25 years and many are student members. However, some meteorologists and oceanographers are missing from this list and we need their input and presence. The executive believe we can grow and need to grow so we can bring the community together and carry more weight with our national decision-makers. Through the summer and autumn we will approach you through your Local Centres to sign up these missing members, but in the meantime you can do this yourself. We offer strong value for your members' dues, and even reduced rates for students and retired members. Why not ask your colleagues if they really are members, and if not, sign them up. CMOS offers a cash bonus of $100 to the local centre that increases its membership the greatest percentage by the end of December. This funding sponsors members' meetings, luncheons and also local student awards.

Membership forms are available on our CMOS Web page:

http://www.cmos.ca/membershipform.html

Although I wrote this in early July, it will be August before this issue of the Bulletin reaches you. I hope your summer is relaxing and safe. What better time could there be to recruit your colleagues to join CMOS?

Bill Crawford
President / Président

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.

Highlights of Recent CMOS Meetings

- The Halifax CMOS Congress, "*Sea and Sky Come to Life*", was a great success. Thanks to John Parker, Blair Greenan and their teams for the over-the-top congress. There were 417 full congress registrations, 27 1-day registrations for a total of 444 paid registrations, plus plenary speakers, exhibitors and volunteers.

- Next year's congress will be in Ottawa, co-hosted with the Canadian Geophysical Union, with the theme "*Our Earth, Our Air, Our Water -- Our Future*"; "*La terre, l'air, et l'eau -- notre avenir*". Many of the plenary speakers are already on board. Check out the Congress web site for more news. http://www.cmos.ca/Congress2010/index.htm Dates are May 31 to June 4, 2010.

- In 2011, we will move west for our congress in the Victoria Conference Centre right next to the Empress Hotel and the Victoria Harbour. Dates are June 6 to 9, 2011.

- For 2012, CMOS has been approached by the American Meteorological Society to co-sponsor their annual Weather Analysis and Forecasting and Numerical Weather Prediction Conference in Canada. The Montréal CMOS Centre is contemplating hosting this conference jointly with our CMOS Congress. Watch for more news in the next *CMOS Bulletin SCMO*.

- The publication of *ATMOSPHERE-OCEAN* has successfully moved to a new printing method. Presently all operations, except the actual printing are done in-house. The CMOS Publications Committee is considering moving more of the operation to NRC, who already publishes several academic journals.

Bill Crawford, CMOS President
Président de la SCMO

Next Issue *CMOS Bulletin SCMO*

Next issue of the *CMOS Bulletin SCMO* will be published in **October 2009.** Please send your articles, notes, workshop reports or news items before **September 11, 2009** to the address given on page ii. We have an URGENT need for your written contributions.

Prochain numéro du *CMOS Bulletin SCMO*

Le prochain numéro du *CMOS Bulletin SCMO* paraîtra en **octobre 2009.** Prière de nous faire parvenir avant le **11 septembre 2009** vos articles, notes, rapports d'atelier ou nouvelles à l'adresse indiquée à la page ii. Nous avons un besoin URGENT de vos contributions écrites.

Rainfall Intensity Corrections with the MSC Tipping Bucket

by Kenneth A. Devine ①

The tipping bucket rain gauge has existed since the 17th century when it was invented by the astronomer Christopher Wren (Strangeways, 2007). Samuel Crosley's two-bucket gauge of 1839 with its clockwork mechanism for totalling rainfall (Middleton, 1969) has evolved to include a magnetic switch which allows for electronic counting. Along with low friction bearings, the modern tipping bucket rain gauges (TBRG) are quite sensitive but are still affected by rate errors. As a meteorological sensor, it is simple, containing one switch and one moving part. Compared to other sensors they are inexpensive ranging from plastic hobby gauges at $40 to professional gauges costing $2000 with gold plated buckets. The tipping bucket gauge has become the standard sensor for rainfall measurements at automated meteorological stations.

Professional gauges are adjusted so that each tip is equivalent to a fixed depth of rainfall. MSC uses 0.2 mm per tip gauges but others are available for 0.1 mm, 0.01", 0.5 mm etc. Interestingly the error in the total rainfall increases for finer tip values (i.e. 0.1 mm). For TBRGs finer resolution does not mean increased accuracy. The reason is that during the time the bucket assembly tips, some water is lost since the rain will flow into the wrong bucket (the one already full) until the bucket assembly has tipped half way. The half-tip times vary from 0.3 to 0.7 seconds and are often simply referred to as the tip time. A higher resolution gauge has more tips with more water loss and hence a higher error for the same rainfall amount. In general, the loss of water is usually called the rate error since the loss increases with rainfall intensity. For a calibrated MSC gauge that error is –4% at 100 mm/hr. The MSC gauge (AES, 1981) is calibrated to have zero error at a rainfall rate of 50 mm/hr (100 tips for 1013 ml of water). Higher settings such as often used in Ontario (~104 tips for 1013 ml.), can produce a better comparison with the standard manual measurements (Devine and Mekis, 2008) but this may just be counterbalancing wind and wetting errors which are both negative.

The rate error can be minimized by installing a siphon at the bottom of the funnel like the TB3 (Hydrological Services, 2000). The siphon dumps water at a fixed rate for which the bucket assembly can be precisely calibrated. These dump rates are equivalent to 300 to 400 mm/hr which covers almost all of the rainfall intensities experienced. The rate error for intensities up to the dump rate is very low. For the rare events with rainfall rates higher than the dump rate, the siphon gauges will encounter rate errors since the water flows continuously through the siphon rather than dumping. Also, gauges with siphons have poor response in very low rainfall rates (Devine and Mekis, 2008) since there is 2.5 times the storage of a standard TBRG. The siphon holds the rainfall equivalent of up to 0.3 mm and the bucket 0.2 mm. Since this total storage could evaporate in as little as eight hours for gauges, one solution would be to add a small incremental amount of 0.05 mm to the first tip of the TB3, if there had not been any rainfall in the last twelve hours. This amount is due to the TB3 siphon not completely flushing out the last 1/6th of the rain (~1 ml) when it dumps.

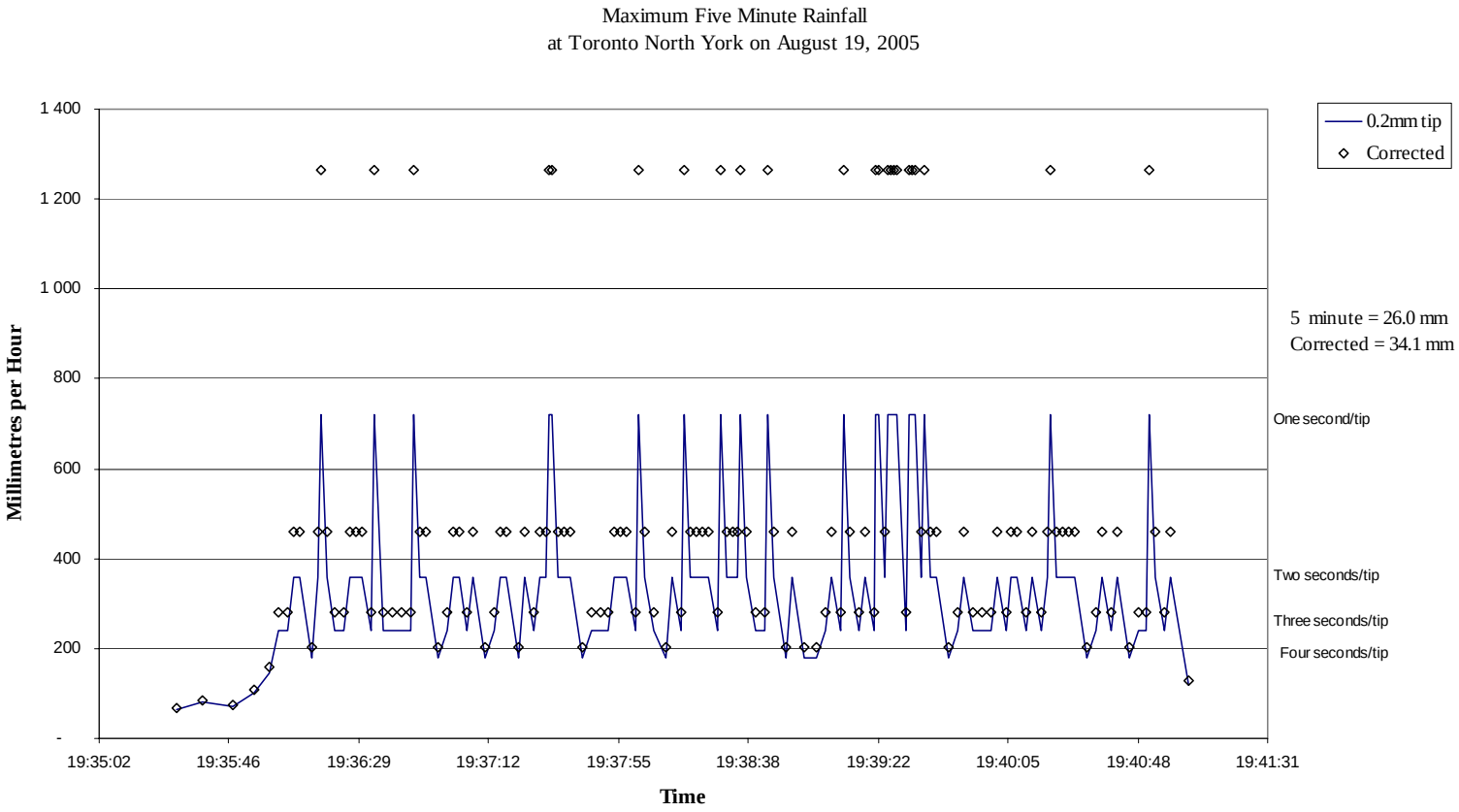
Simple rate corrections cannot be applied to gauges with siphons but for basic tipping bucket gauges like the MSC, it is possible. This correction requires that the exact tip time be determined in the lab. For complex loggers which monitor many parameters, the normal technique is to total the number of tips for each minute so that maximum rates for five, ten, fifteen etc. minutes can be determined. The single function event loggers, like the Lakewood or the Hobo, record the time each tip occurs to the nearest second. This actually requires less memory storage than recording the number of tips in a minute since most minutes have zero rainfall. These event loggers go one step further and only record the number of seconds since the logger started to record. The full date/time at the start is entered into the file header in the logger so that the software in the computer which is used for downloading the data, can compute the complete date/time for each tip. The resolution of this time is usually one second but some loggers record down to ½ a second.

For the basic tipping buckets like the MSC gauge, a rate correction can be applied at the logger for each tip for rates greater than 90 mm/hr. This would be of the form:

Corrected tip (mm) = 0.2 T/(T-t)

where T is the time between tips in seconds determined by the logger;
t is the half-tip time of 0.43 seconds;
0.2 is the nominal rainfall depth in mm for one tip by the MSC gauge.

The half-tip time was determined in the lab by the author using a camcorder. While T is the measured time between tips, (T-t) is the time during which 0.2 mm accumulated in the bucket. This correction would be applied to each tip during extreme rainfalls and can only be applied at the logger where T can be determined for each tip. At Inland Waters Burlington, Marsalek measured a similar half-tip time for the MSC gauge using a 16mm movie camera (Marsalek, 1980). His half-tip times were the same for low intensities but decreased to 0.33 seconds at 340 mm/hr. This type of rate correction could be applied to any tipping bucket once the parameters of the gauge have been determined.



When this correction using t = 0.43 seconds was applied to the Toronto North York downpour of August 19, 2005, the result was an increase of 13% in the rainfall. The apparent rainfall would increase from 128.2 mm to 148.0 mm (or +19.8 mm) during that four-hour period from 18:00 to 21:00. The maximum five-minute rainfall which starting at 19:35 would increase from 26.0 mm to 34.1 mm. On the 18th of August the manual Type B gauge reported 10.0 mm vs. 10.6 mm for the MSC TBRG which shows that these two gauges were in good agreement for moderate rainfalls. On the 19th the Type B reported 140.6 mm vs. 132.8 mm for the TBRG. When the 19.8 mm correction is added to the TBRG value then it is slightly greater than the manual gauge and the manual/TBRG ratio (0.92) would be similar to the previous day (0.94). Hence, once corrected, the MSC TBRG will maintain its relationship to the standard gauge. This correction can only be applied for intensities greater than 90 mm/hr or less than 7.5 seconds between tips.

For both of the manual and tipping bucket gauges under extremely intense rainfalls, splash (both in and out) is also a factor but this cannot be measured. Routine maintenance is necessary to remove debris from the funnel and buckets which seriously affects the reliability of rainfall data from unattended tipping bucket gauges. Like any other gauge, the TBRG is still affected by wind and funnel wetting errors. The latter is significant for light rainfalls. All TBRGs operate differently for less than extreme rainfalls since the water does not flow out of the funnel continuously but instead forms drops. In the case of the MSC TBRG these drops are over 7 mm in diameter. Essentially this quantizes the water entering the bucket assembly causing the error curve below 90 mm/hr to be a stepped function where this rate correction does not apply.

While the rate correction can be shown in the lab to correct for intensities up to 250 mm/hr, at very high intensities as in the previous downpour, the bucket assembly may not be able to react fast enough. During lab tests with a small 6" gauge, the assembly responded predictably (i.e. the error curve was continuous) until the time between tips dropped to one second or about 1300 mm/hr. One researcher (Hsu, 1989) stated that it generally required 1.5 second for the water to clear the bucket in a large 12" diameter gauge. He also stated that on occasion the last drop took over 30 seconds to clear the bucket. Adding the half-tip time, one could state that up to two seconds are required between tips for an accurate measurement. For the 10" MSC tipping bucket this is equivalent to a rainfall intensity of 360 mm/hr. Beyond that intensity the bucket may not properly clear of water before the next tip. Thus the corrected intensities (1263 mm/hr) for the highest measured value of 720 mm/hr are probably underestimates and the slightly reduced tip times at these high rates (Marsalek, 1980) will also add to that underestimate. Hence while these corrected amounts during the downpour of August 19th are probably close to the actual rainfall, the amounts could be even higher.

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Calibration of the Tipping Bucket Raingauge, J. Marsalek, J. Hydrol., 53, 343-354, 1981.

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Instruction Manual for the Tipping Bucket Raingauge Model TB3, Issue 6, Hydrological Services, Liverpool Australia, ~2000.

Precipitation: Theory, Measurement and Distribution, Ian Strangeways, Cambridge University Press, New York, 2007

Field Accuracy of Canadian Rain Measurements, Kenneth A. Devine and Eva Mekis, ATMOSPHERE-OCEAN, June 2008.

① CMOS Member, Toronto Centre.

Is a strong El Niño on the way?

by William Merryfield[1]

Because the economic and societal impacts of El Niño/Southern Oscillation (ENSO) are large, it is not surprising that forecasting ENSO evolution twelve months or more in advance has become a worldwide enterprise, with many centres issuing forecasts based on statistical and, increasingly, coupled ocean-atmosphere models. Indeed, an effort to develop a "made-in-Canada" model-based forecasting system is nearing fruition, as described briefly below.

During the 1980s and 1990s a succession of powerful El Niño events spurred the rapid development of ENSO observing systems, theory and prediction. However, during the past decade or so ENSO activity has remained comparatively mild at a time when coupled climate models and their application to ENSO prediction have matured considerably. Although skill in predicting ENSO can and has been demonstrated through retrospective forecasts, perhaps the most persuasive test of a prediction system rests in its ability to foresee the future. ENSO forecasters are thus understandably alert to predicting the next "big one".

Since the beginning of this year, conditions in the equatorial Pacific have shifted from a moderate-to-weak La Niña, which persisted through much of 2007-2008, to a mild but growing El Niño. (The switchover from negative to positive SST anomalies or SSTA occurred in April and May). From a forecasting perspective, a key question is whether the positive anomalies will continue to grow, resulting in a strong event reminiscent of the El Niños of the 1980s and 1990s, or level off, leading to a relatively mild El Niño as in 2002-2003, 2004-2005 and 2006-2007. A compendium of current ENSO forecasts is displayed on the website of the International Research Institute for Climate and Society (IRI) at Columbia University. The version released in July 2009, reproduced in Figure 1, shows mean SSTA in the Niño 3.4 region of the equatorial Pacific, observed in the previous season and month (diamonds), and forecast by various dynamical models (filled symbols) and statistical models (open symbols). Of the thirteen dynamical models whose forecasts extend through the end of 2009, six predict that Niño 3.4 SSTA will exceed 1.5 ^{o}C. This would mark the strongest El Niño since at least late 2002, although if not exceeded such values would fall rather short of the “monster” event of 1997-98 (Figure2). The remaining seven dynamical models (and all the statistical ones) forecast either a milder El Niño or near-neutral conditions throughout 2009.

Where does Canada stand in the ENSO forecasting business? Currently seasonal (three-month) forecasts are issued every month by Environment Canada, and posted at the web locations listed below. Forecasts valid 1-3 and 2-4 months from issuance are obtained from a suite of four atmospheric dynamical models which throughout the forecast “see” the SSTA field observed just prior to the forecast start. Longer-lead forecasts are obtained from a statistical model. Although having skill in predicting climate anomalies within Canada and elsewhere (e.g. Kharin et al. 2009), neither procedure attempts to forecast future SSTA and hence ENSO activity. (Forecasts of Niño 3.4 are issued by William Hsieh's group at the University of British Columbia. These are based on two nonlinear statistical techniques; see links below).

[1] Canadian Centre for Climate Modelling and Analysis
Environment Canada, Victoria, BC, Canada

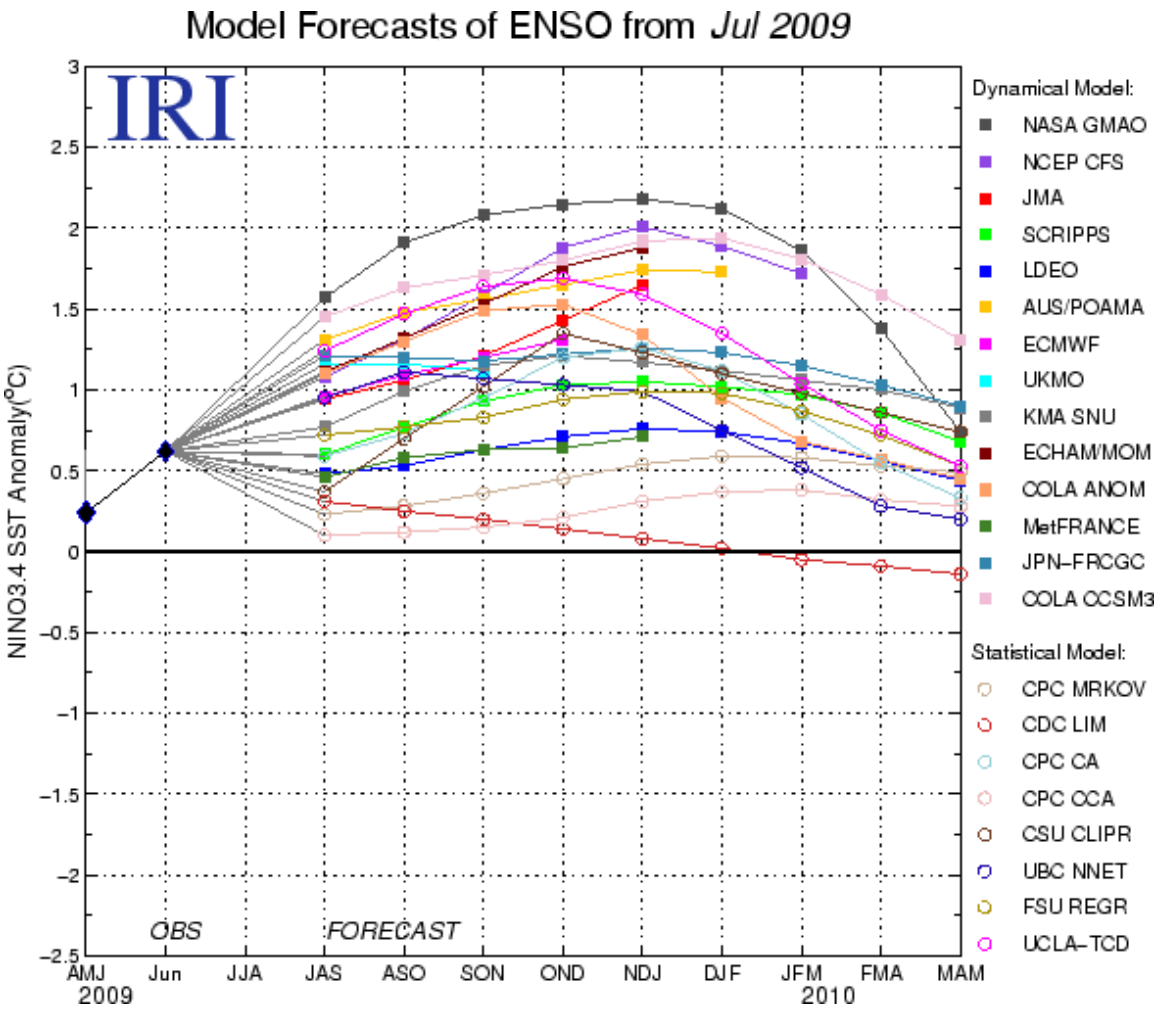

Figure 1: Observed values (diamonds) and forecasts (coloured symbols) of the Niño3.4 index of equatorial Pacific SSTA. (Reproduced *with permission from* *http://iri.columbia.edu/climate/ENSO/currentinfo/SST_table.html*)

An effort to develop a Canadian dynamical forecast system that predicts future SSTA and associated global climate perturbations is well under way. This effort, based at Environment Canada's Canadian Centre for Climate Modelling and Analysis (CCCma) at the University of Victoria in association with university partners, is a major component of the Global Ocean-Atmosphere Prediction and Predictability (GOAPP) research network, funded through 2010 by the Canadian Foundation for Climate and Atmospheric Sciences. An initial step has been a modest pilot project, the first Coupled Historical Forecasting Project (CHFP1), which consists of a suite of retrospective forecasts produced using the CGCM3.1(T63) climate model employed for IPCC Fourth Assessment, together with very simple initialization and ensemble generation procedures (Merryfield et al. 2009). The utility of CHFP1 is both as a development platform and as a baseline against which impacts of model, initialization, and post-processing improvements on forecast skill can be assessed.

Ensuing development leading to a successor dynamical forecasting system CHFP2 is near fruition. Lines of development have included:

1) Climate model: Improvements to the oceanic and atmospheric components of CCCma's climate model have led both to a more vigorous modelled ENSO and improved skill in retrospective ENSO forecasts.

2) Forecast initialization: In CHFP1, only SST evolution prior to the forecasts was constrained to be close to observations. CHFP2 will additionally employ more realistic initializations of the 3D ocean and atmosphere, sea ice, and land state. Contributions from S. Polavarapu (Environment Canada) and university partners Y. Tang (U. of Northern British Columbia) and A. Berg and G. Drewitt (U. of Guelph) have been instrumental.

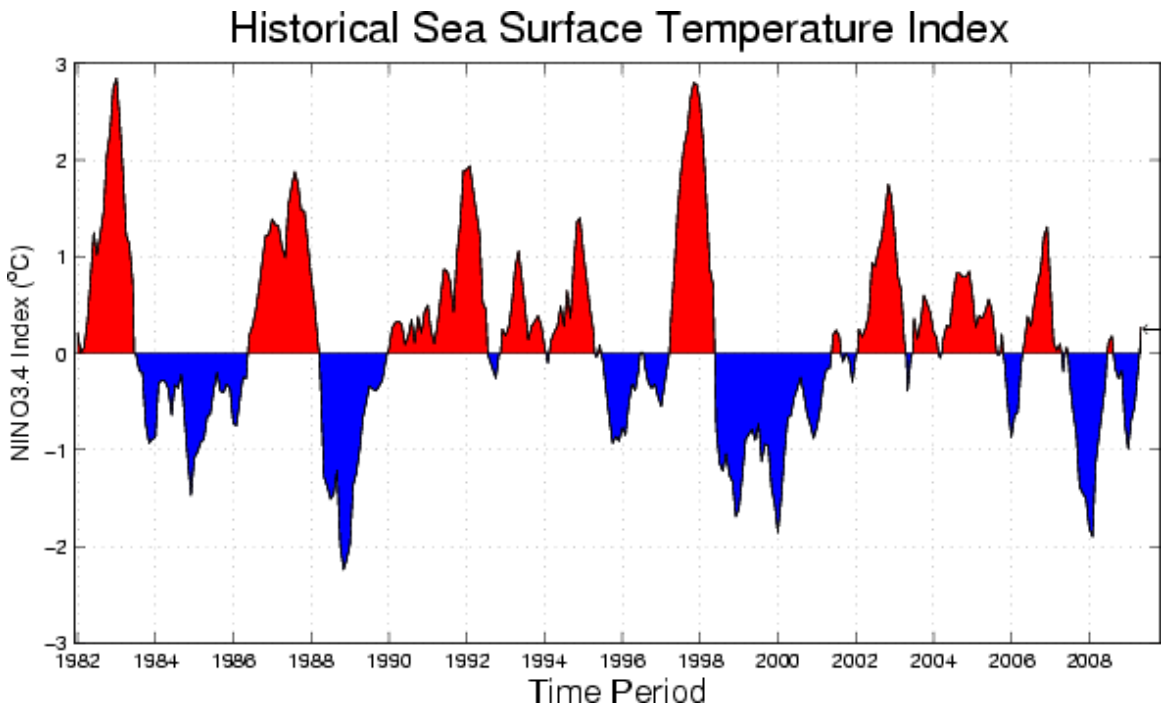

Figure 2: Evolution since 1982 of the Niño3.4 index. El Niños appear as red and La Niñas as blue peaks exceeding some threshold. *(Reproduced with permission from http://iri.columbia.edu/climate/ENSO/currentinfo/QuickLook.html)*

3) Forecast post-processing: Potential has been demonstrated for improving forecast skill through optimal weighting and combination of ensemble forecasts (Kharin et al. 2009), accounting for climate trends (Boer 2009), spatial and temporal filtering of forecasts (V. Kharin, in preparation) and application of machine learning methods (Finnis et al. 2009).

Procedures developed under GOAPP also will provide a means for initializing the decadal-to-30 year retrospective and predictive forecasts called for under phase five of the Coupled Model Intercomparison Project (CMIP5), whose coordinated experiments will inform the Intergovernmental Panel on Climate Change 5th Assessment.

Resources

Environment Canada seasonal forecasts (in English and French):

http://www.weatheroffice.gc.ca/saisons/index_e.html

http://www.weatheroffice.gc.ca/saisons/index_f.html

ENSO forecasts from UBC:

http://www.ocgy.ubc.ca/projects/clim.pred/NN/index.html

http://www.ocgy.ubc.ca/projects/clim.pred/NLCCA/index.html

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Finnis, J., W. Hsieh, W. Merryfield and H. Lin, 2009: Nonlinear post-processing of numerical seasonal climate forecasts. Presentation at the 2009 CMOS Congress (available at:

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http://www.cccma.ec.gc.ca/papers/bmerryfield/PDF/Merryfield_et_al_AO_submitted.pdf)

Goldschmidt Conference

June 22 to 26, 2009 / Davos, Switzerland

Reported by Frank Whitney[1]

The Goldschmidt Conferences attract geochemists from all disciplines of Earth sciences to discuss advances in their fields. This year, twenty themes covered topics such as planet formation, exploitation of resources, evolution of life on Earth and impacts of human activities on the environment and landscape. One of the topics under the theme on Global Geochemical Challenges was the **Expansion of Oceanic Oxygen Minimum Zones**, chaired by Lothar Stramma and Denis Gilbert (DFO). I contributed to this session to present work Alan Sinclair (DFO) and I have been carrying out on the impacts of expanding oxygen minimum zones (hypoxia) on groundfish stocks of the British Columbia coast.

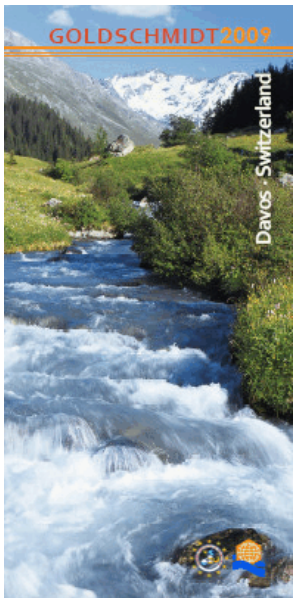
The conference drew over 2900 delegates, the largest attendance at these meetings to date. This resulted in 18 parallel sessions scheduled over 5 days, along with morning and afternoon poster sessions in a nearby ice rink. Plenary talks were given each morning and most afternoons.

I was keen to hear talks and visit posters on hypoxia, ocean acidification and instability of gas hydrates since these all pose threats to oceanic habitat. In addition, there were many presentations on past ocean anoxia (typically recorded in sedimentary black shales) that coincided with major extinction events. These have been linked to changes in Earth's climate brought on by a variety of causes (volcanism, oxidation of Earth's early atmosphere, release of gas hydrates during ocean warming, meteorite impacts, etc.).

The session on ocean hypoxia covered both direct impacts of human activities on habitat resulting from increasing discharges of fertilizers and sewage into the coastal ocean, and indirect impacts resulting from the increased stratification of the surface ocean which leads to reduced oxygen exchanges between atmosphere and ocean. Diaz is well known for his publications on dead zones along continental margins, especially in the Gulf of Mexico where nitrogen fertilizers have led to eutrophication of a broad area along the edge of the Mississippi River plume. He explained that shelf communities were feeling the pinch as oxygen demands from eutrophication and decreased ventilation were converging on vulnerable coastal habitats. Naqvi presented evidence of eutrophication along the West coast of India where anoxic waters have been seen only in recent years, likely due to the increasing use of fertilizers in agriculture.

My work has shown that the ventilation of the subarctic Pacific has decreased by perhaps 15% over the past few decades, resulting in "deoxygenation" of waters at a rate of 1.3% per year at depths between about 150 and 500 metres. Al Sinclair and I show that this oxygen loss is resulting in the shoaling and decline in catch of many groundfish. Ventilation in the North Atlantic is also weakening (Gruber), suggesting that warming or freshening of surface oceans is a broad threat to oxygen supply to the interior ocean. Large equatorial regions are also losing oxygen at subsurface depths (Stramma). In a casual conversation with Toggweiler, he suggested brisker winds around Antarctica may be counteracting this problem in the Southern Ocean.

Oschiles presented model results suggesting that the carbon-to-nitrogen ratio in phytoplankton will change as CO_2 levels increase, resulting in an increased flux of carbon into the ocean and an enhanced oxygen demand. He suggests oxygen minimum zones could increase by 50% by the year 2100 because of this.



Ocean acidification is an emerging field of study, as was evident by the preliminary nature of studies presented. One poster found that increasing the acidity of marine waters by 0.3 pH units did not seem to hinder mussel growth (*Mytilus edulis*), but may have decreased shell density. These were preliminary results and were being repeated. Modelling in a variety of forms confirmed that a more acid ocean was going to greatly reduce the areas in the ocean where calcium carbonate was supersaturated (and therefore would not readily dissolve). Frolicher noted the Arctic is particularly vulnerable

[1] Department of Fisheries and Oceans, Emeritus Scientist
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and suggested atmospheric CO_2 levels need to be kept below 450 ppm to avoid the risk of large-scale ecosystem disruptions. Kump discussed the Paleocene-Eocene Thermal Maximum as a model for the impacts of our present CO_2 increases. His model results suggest that during this time, the surface ocean likely did not dissolve carbonates. However, his caution was that the present high rate of CO_2 increase is unlike anything in the geologic record and will have more severe consequences for surface dwelling organisms. Because this was a geochemical conference, presentations did not deal with many of the potential biological impacts of ocean acidification and increased pCO_2.

Methane sources and sinks have been re-evaluated since the 2007 IPCC report. Geological sources were not previously estimated, however work over the past several years shows that various seeps (land and ocean) are the second largest source of methane after wet lands. Etiope suggests one of the largest uncertainties in this source is marine seepage from sediments and hydrates. Moridis modeled the release of frozen methane sources, showing that with a 3°C warming, small Arctic deposits would be lost within a couple of decades, large, shallow-ocean (<600 m) cold deposits would be largely mobilized within a century and deep-ocean (1000 m) deposits would not be released. It is not well understood how much of this methane might reach the atmosphere (none from deposits deeper than ~300 m). Bacteria can oxidize methane within one to several days in the ocean, so it is probable that mobilized methane hydrates will have a substantial impact on oceanic oxygen levels, and therefore the acidity of seawater (a triple whammy). Estimates of methane in hydrates vary widely in the 10 to 100 Gt range.

Other talks that interested me included:

■ Robie Macdonald's (DFO) keynote talk on what we don't know about mercury pathways in the Arctic;

■ Morel's plenary on how cadmium was used by diatoms to make CO_2 more available (also an aside that silica might buffer reactions within a cell);

■ Goldhaber's plenary on how ammonium fertilizer use in the Central Valley of California has mobilized chromium VI (a toxic form of Cr);

■ Trumbore's plenary on terrestrial feedbacks to climate change (with the comment that deforestation will far outpace any enhanced sinks that might arise on land);

■ an acceptance speech which outlined how CO_2 levels have been monitored for 20 years in two lakes in the Cameroons following the death of 1800 locals by asphyxiation. Monitoring showed the lakes were accumulating a dangerous level of gas again, so deep waters are being sprayed into the atmosphere to degas CO_2 in a controlled manner.

Abstracts from the conference are in print in Geochimica et Cosmochimica Acta 73 (13S), June 2009 and can be found at http://www.goldschmidt2009.org. My summary of this meeting is taken from my notes and published abstracts. I suggest facts be confirmed with authors.

Regional Weather 2008 Highlights

by David Phillips

Atlantic: St. Patrick's Storm and Sheilagh's Brush
Two storms in four days, between March 13 and 16, left residents of Newfoundland and Labrador digging out from under piles of blowing and drifting snow. But the worst was yet to come. A stormy St. Patrick's Day followed with another wallop (known as a Sheilagh's Brush Storm) that dumped between 30 and 50 cm of snow. The storms shut down Newfoundland, closing schools, courts, banks, businesses and transportation. In central Newfoundland, plows were taken off the road as the blizzard raged and caused blinding whiteouts for more than 24 hours. In the eastern portion of the province, freezing rain added to the ugly precipitation mix. Driving was treacherous on the Trans-Canada Highway. Ferries in the east remained tied up and all flights into and out of St. John's were cancelled. "Sheilagh's Brush" refers to a storm that occurs in the period around St. Patrick's Day (March 17) and the spring equinox (March 20 or 21). Sheilagh's storm had the biggest blast. St. John's received 38 cm of snow before the precipitation changed to ice pellets and rain. The Bonavista Peninsula and Clarenville areas bore the brunt of the storm, receiving up to 50 cm of snow in some areas. Winds in coastal areas exceeded 120 km/h, with wind gusts at Cape Race peaking above 140 km/h.

Ontario: Province-wide Power Outages
At the end of January, the combination of wicked winter chill, strong winds, and whiteout conditions left about 90,000 Hydro One customers in southern and central Ontario without electricity. The strongest winds were recorded in Niagara's Port Colborne at 126 km/h. Snow and violent winds shut down most of Sault Ste. Marie, including schools, community centres, malls, transit and restaurants. North of London, strong winds took out trees and power lines and caused numerous whiteouts and road closures. Waves in the open waters of Lake Erie's eastern basin were as high as 6 m. At Crystal Beach, wind-whipped waves drove water and chunks of shore ice, some as much as a metre in diameter, through living room windows.

Canadian Science Advisory Secretariat
Science Advisory Report 2009/030

Presented by Bill Crawford[2] and Jim Irvine[3]

Context

Pacific Canadian waters lie in a transition zone between coastal upwelling (California Current) and downwelling (Alaskan Coastal Current) regions, and experience strong seasonality and considerable freshwater influence. Variability is closely coupled with events and conditions throughout the tropical and North Pacific Ocean, experiencing frequent El Niño and La Niña events particularly over the past decade. The region supports important resident and migratory populations of invertebrates, groundfish and pelagic fishes, marine mammals and seabirds. Monitoring the physical and biological oceanographic conditions and fishery resources of this region is done semi-regularly by a number of government departments, to understand the natural variability of these ecosystems and how they respond to both natural and anthropogenic stresses. Support for these programs is provided by Fisheries and Oceans Canada, and Environment Canada. Contributors to this report are members of the Fisheries and Oceanography Working Group of the DFO Pacific Centre for Science Advice, with additional contributions from U.S. fisheries and climate scientists.

State of the Pacific Ocean 2008

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

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

Surface phytoplankton and zooplankton concentrations were the highest in a decade of observations across the Gulf of Alaska in August and September 2008. The cause is as-yet uncertain, but injection of iron by winds or currents is suspected (Iron is a limiting nutrient in this region), along with higher levels of nitrate and silicate in spring.

Ship-based sampling for phytoplankton in Juan de Fuca Strait revealed high near-surface concentrations in early September. Deep-sea and coastal zooplankton populations continued their recent shift to coldwater species and delayed spring blooms.

[2] DFO/Institute of Ocean Sciences, Sidney, BC, Canada

[3] DFO/Pacific Biological Station, Nanaimo, BC, Canada

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

Cool marine conditions generally improve marine survival for salmon. However, despite relatively cool ocean conditions in 2007 and 2008, many BC populations remain depressed due to low numbers of brood-year spawners, partially attributed to warm oceans in 2003 to 2005.

Sockeye returns remain generally low coast-wide, with one notable exception being Okanagan sockeye that returned in record numbers in 2008. High pre-spawn mortality was observed for many Fraser River watershed sockeye populations in 2008, and river entry of returning adults was generally early. Coho populations in southern BC remain extremely depressed, while northern coho populations have improved. For chinook, the situation is somewhat reversed – northern populations continue to decline while the status of southern chinook is highly variable.

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

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

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

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

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Secrétariat canadien de consultation scientifique / Avis scientifique 2009/030

Présenté par Bill Crawford[1] et Jim Irvine[2]

Contexte

Les eaux canadiennes de l'océan Pacifique, situées dans une zone de transition entre les régions de montée d'eau côtière (courant de la Californie) et les régions de plongée d'eau (courant côtier de l'Alaska), subissent un effet saisonnier important et une forte incidence des eaux douces. La variabilité est étroitement liée aux événements et aux conditions qui règnent dans tout le Pacifique, des tropiques jusqu'aux régions du nord, qui subit de fréquents événements El Niño et La Niña, notamment au cours de la dernière décennie. La région soutient d'importantes populations résidentes et migratrices d'invertébrés, de poissons de fond et pélagiques, de mammifères marins et d'oiseaux marins. La surveillance des conditions physiques et biologiques de l'océan ainsi que des ressources halieutiques de cette région est effectuée de façon semi-régulière par certains ministères afin que nous puissions comprendre la variabilité naturelle de ces écosystèmes et leur réaction aux facteurs de perturbation d'origine naturelle et anthropique. Ces programmes de surveillance sont soutenus par Pêches et Océans Canada et Environnement Canada. Les personnes qui ont contribué au présent rapport sont membres du groupe de travail sur les pêches et l'océanographie du Centre des avis scientifiques du Pacifique du MPO ainsi que des scientifiques américains qui s'intéressent aux pêches et au climat.

1: MPO/Institut des Sciences de la Mer, Sidney, BC

2: MPO/Station Biologique du Pacifique, Nanaimo, BC

État de l'océan Pacifique 2008

Les eaux au large de la côte canadienne du Pacifique étaient les plus froides en 50 ans, et ce refroidissement s'étendait loin dans l'océan Pacifique et au sud le long de la côte américaine. Les températures près des côtes ont aussi baissées, de même que la température des eaux profondes du détroit de Géorgie. Seules les températures de surface dans le détroit de Géorgie sont restées près ou au-dessus de la normale. Ce refroidissement est associé aux conditions météorologiques typiques de La Niña et de la phase froide locale de l'oscillation décennale du Pacifique (ODP).

Les concentrations de phytoplancton et de zooplancton dans les eaux de surface du golfe de l'Alaska étaient, selon une décennie d'observation, plus élevées que jamais en août et en septembre 2008. On n'en connaît pas encore la cause, mais on pense que ce pourrait être dû à une injection de fer par les vents ou par les courants (le fer est un élément nutritif limitant dans cette région), ainsi qu'à des niveaux plus élevés de nitrate et de silicate au printemps. Un échantillonnage à bord de navire du phytoplancton dans le détroit de Juan de Fuca a indiqué de fortes concentrations dans les eaux de surface au début de septembre. Les populations de zooplancton côtières et du large tendent de plus en plus vers les espèces d'eau froide et vers une prolifération printanière retardée. Dans le golfe de l'Alaska, la couche mélangée océanique était relativement profonde au début de 2008 et les concentrations d'oxygène de surface étaient relativement élevées au début de 2009. Cependant, au cours des dernières décennies, les concentrations d'oxygène ont en général diminué dans les eaux profondes, le long de la pente continentale. Il est probable que le déclin soudain en 2008 de la concentration d'oxygène dans les eaux de fond du plateau continental était dû à une remontée d'eau plus dense ayant une faible teneur en oxygène plutôt qu'à une baisse d'oxygène d'une masse d'eau particulière. Cette baisse d'oxygène a pu jouer un rôle dans le mouvement de certaines espèces de poisson de fond vers les eaux moins profondes en 2008.

En règle générale, des conditions marines froides améliorent le taux de survie marine du saumon. Cependant, en dépit des conditions océaniques plutôt froides en 2007 et en 2008, plusieurs populations de la C.-B. demeurent faibles en raison du faible nombre de géniteurs de l'année, en partie à cause des eaux océaniques chaudes de 2003 à 2005. Le retour des saumons rouges demeure généralement faible sur l'ensemble de la côte, sauf pour le saumon rouge de l'Okanagan qui retourna en nombre record en 2008. Les populations de saumon rouge du bassin hydrologique du fleuve Fraser ont subi en 2008 un fort taux de mortalité pendant la période précédant le frai et les adultes sont entrés dans le fleuve généralement tôt. Les populations de saumon coho du sud de la C.-B. restent très faibles, alors que les populations du nord se sont améliorées. La situation est d'une certaine façon renversée pour le saumon quinnat - les populations du nord continuent leur déclin alors que l'état du saumon quinnat du sud est

fortement variable.

La classification des prédictions du taux de survie marin du saumon selon l'approche du «poids des indices» se montre prometteuse. En général, on prédit que le taux de survie du saumon coho et du saumon rouge qui sont allés en mer en 2008 sera moyen ou supérieur à la moyenne, ce qui suggère des retours améliorés du saumon coho en 2009 et du saumon rouge en 2010, par rapport à l'effectif de l'année d'éclosion. Une exception pourrait être le saumon coho du détroit de Géorgie. La biomasse des cinq stocks importants de hareng de la C.-B. a récemment diminué. Dans le bassin de Géorgie où la biomasse de hareng était à un niveau record au début du siècle, la biomasse a diminué en 2008 à un niveau près de celui de la limite de fermeture de pêche. Trois autres stocks canadiens de hareng se situaient à la limite de pêche ou au-dessous. Les populations d'eulakane demeurent faibles. Bien qu'il n'y ait eu aucun relevé de merlu à grande échelle en 2008, leur nombre sur le plateau continental de la C.-B. semble avoir été très bas, surtout sur les lieux traditionnels de pêche près du banc La Perouse; cette tendance se maintient depuis environ 2003-2004. Le nombre de crevettes roses et de soles anglaises le long de la côte ouest de l'île de Vancouver a augmenté en 2008.

Pour nombre de nos espèces de poissons, dont le saumon, les conditions de l'océan Pacifique se sont améliorées depuis l'année extrêmement mauvaise de 2005. L'eau froide a entraîné un contrôle ascendant du réseau trophique, ce qui a mené à l'amélioration du taux de survie marine pour plusieurs poissons juvéniles. On ne comprend pas pleinement les liens entre les conditions océaniques et le taux de survie des poissons et une étude plus approfondie des données existantes s'avère nécessaire.

Note du Rédacteur: La version française (21 pages) peut être trouvée sur la toile à http://www.pac.dfo-mpo.gc.ca/sci/psarc/OSRs/Ocean_SSR_f.htm. Le document scientifique de base (State of physical, biological, and selected fishery resources of Pacific Canadian marine ecosystems by W.R. Crawford and J.R. Irvine, 129 pages) se trouve sur la toile à http://www.dfo-mpo.gc.ca/CSAS/Csas/Publications/ResDocs-DocRech/2009/2009_022_e.htm

2008 Patterson Medal Award Presentation

Halifax, Nova Scotia, June 2, 2009 – The Patterson Distinguished Service Medal, first presented in 1954, is considered the pre-eminent award recognizing outstanding work in meteorology by residents of Canada. This award is named in honour of Dr. John Patterson, a meteorologist who was Director and Controller of the Meteorological Service of Canada from 1929 to 1946, a crucial period in the development of Canada's weather service.

David Grimes presenting the 2008 Patterson Award to Dr. George A. Isaac

David Grimes, Assistant Deputy Minister, Meteorological Service of Canada, presented the medal to **Dr. George A. Isaac** with the following words:

"For over 35 years, George Isaac has been a leading member in Canadian and International meteorological research. George began his career when he joined the Meteorological Service of Canada in 1972 and since that time he has become a Senior Scientist in Environment Canada and has been described by his colleagues as "one of the most productive and influential scientists in the Atmospheric Environment Service".

"George has made significant contributions to Canadian and International meteorology science through his research in the fields of cloud physics and microphysics, aircraft icing, cloud chemistry and acid rain, weather modification and nowcasting."

"Throughout his career, George has demonstrated very strong leadership skills as he has built and led Canadian scientific teams that have been recognized as both ground-breaking and world-class in their accomplishments."

"I'd like to take a few minutes to highlight a couple of George's biggest contributions to meteorology. The first is his work in the field of cloud physics where he has co-authored more than 50 peer-reviewed articles covering the importance of the roles of aerosols and clouds in the energy budget of the Earth and the role that changes in these might have on climate change. George currently works with a group of internationally recognized scientists on aerosol physics, cloud property parameterizations, cloud physics theory and microphysics and cloud-climate links."

"George's second notable contribution was in the field of aircraft icing where George was responsible for assembling a team of researchers which is now recognized as world leaders in icing modeling, icing model verification and icing microphysics and characterization. In 2002, he was recognized for this work when he received a Departmental Citation of Excellence for outstanding scientific research and leadership in the field of aircraft icing."

"George has also contributed internationally to further meteorological research initiatives and served as both a member and chair on numerous committees and working groups in organizations such as the WMO and the International Commission on Clouds and Precipitation (ICCP) to further our understanding of the physics and chemistry of clouds and weather modification research."

"You are highly respected for your research, recognized as a world leader in your field and both your leadership and excellence in meteorological research are recognized by all who have had the opportunity to work with you."

"What stands out about Dr. Isaac above the many significant scientific contributions is his ability to enable and lead the development of world-class research teams in several different subject areas and his ability to influence research efforts in the field of meteorology through the advancement and application of science and knowledge. This is what makes Dr. Isaac a great leader, one that is respected by his peers and colleagues."

Congratulations George!

On behalf of the Meteorological Service of Canada, it gives me great pleasure to present today the Patterson Distinguished Service Medal to George Isaac.

Remise de la médaille Patterson de 2008

Halifax (Nouvelle-Écosse) le 2 juin 2009 – La médaille Patterson pour service méritoire, qui a été remise pour la première fois en 1954, est considérée comme un prestigieux prix visant à souligner le travail remarquable des Canadiens en météorologie. Ce prix a été nommé en l'honneur de M. John Patterson, Ph.D., météorologue qui a été directeur et contrôleur du Service météorologique du Canada de 1929 à 1946. Il s'agit d'une période cruciale dans le développement du service météorologique du Canada.

David Grimes, sous-ministre adjoint, Service météorologique du Canada, a remis la médaille à **M. George A. Isaac, Ph.D.,** et voici l'hommage qu'il lui a rendu :

"Depuis plus de 35 ans, George Isaac est membre émérite de la recherche en météorologie sur la scène canadienne et internationale. George a amorcé sa carrière lorsqu'il s'est joint au Service météorologique du Canada en 1972 et, depuis ce moment-là, il est devenu un éminent scientifique à Environnement Canada et ses collègues le dépeignent comme « l'un des scientifiques les plus productifs et influents au service de l'environnement atmosphérique ».

George s'est imposé dans le monde de la science de la météorologie ici comme à l'étranger grâce à ses recherches dans les domaines de la physique des nuages et la microphysique, le givrage d'aéronef, la chimie des nuages et les pluies acides, la modification des conditions météorologiques et les prévisions immédiates.

Au cours de sa carrière, George a démontré de solides aptitudes de chef de file ayant mis sur pied et dirigé des équipes scientifiques canadiennes qui ont été reconnues comme pionnières et de calibre mondial dans le cadre de leurs diverses réalisations.

J'aimerais prendre quelques minutes pour souligner quelques-unes des plus grandes réalisations de George au domaine de la météorologie. Tout d'abord, son travail lié au domaine de la physique des nuages est digne de mention, ayant corédigé plus de 50 articles revus par des pairs portant sur l'importance du rôle des aérosols et des nuages dans le bilan d'énergie de la terre et du rôle que ces changements peuvent avoir sur les changements climatiques. George travaille actuellement avec un groupe de scientifiques reconnu internationalement sur la physique des aérosols, le paramétrage de la propriété des nuages, la théorie de la physique des nuages, la microphysique et les liens entre les nuages et le climat.

Deuxièmement, son autre grande contribution porte sur le domaine du givrage d'aéronef où George était responsable de mettre sur pied une équipe de chercheurs qui jouit maintenant d'une renommée mondiale en matière de modélisation relative au glaçage, de vérification du modèle de glaçage ainsi que de la caractérisation et de la microphysique du glaçage. En 2002, ses efforts ont été récompensés lorsqu'il a reçu une marque d'excellence du Ministère pour ses remarquables travaux de recherche scientifique et son rôle de chef de file dans le domaine du glaçage d'aéronef.

George s'est également illustré sur la scène internationale pour avoir approfondi les initiatives de recherche météorologique et il a été membre et président de plusieurs comités et groupes de travail dans des organismes dont l'OMM et l'International Commission on Clouds and Precipitation (ICCP) pour avoir enrichi nos connaissances de la physique et de chimie des nuages et de la recherche sur la modification météorologique.

Vos travaux de recherche imposent le respect; vous êtes reconnu comme chef de file mondial dans votre domaine et tant votre leadership que l'excellence en recherche météorologique sont reconnus de tous ceux qui ont eu la chance de travailler avec vous.

Outre ses nombreuses contributions importantes au domaine de la science, la capacité du D^{r} Isaac d'assurer et de diriger le développement d'équipes de recherche de calibre mondial dans plusieurs différents domaines et sa capacité d'influencer les efforts de recherche dans l'univers de la météorologie grâce à l'avancement et à l'application de la science et du savoir constituent ses qualités qui se démarquent. Voilà pourquoi D^{r} Isaac est un grand leader qui impose le respect de ses pairs et de ses collègues."

Félicitations George!

Au nom du Service météorologique du Canada, j'ai le grand plaisir de remettre aujourd'hui la médaille Patterson pour service méritoire à George Isaac.

Parsons 2009 Medal Award Presentation

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

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

- a desire to communicate the results of his research through highly respected national and international journals;

- the need to understand the bio-physical processes of hydrothermal venting regions of the world oceans, including Endeavour Ridge in the northeast Pacific - Canada's first Marine Protected Area;

- a long-term interest in the generation and propagation of tsunamis generated by both earthquakes and submarine slides, including the devastating Indian Ocean tsunami in 2004;

- a career-long effort to understand the ecosystem dynamics of the west coast of North America, including the paleoclimate

of the region based on sediment cores from anoxic basins; and

■ the championing of Operational Oceanography for the prediction of storm surges and climate-induced sea level rise.

Dr. Richard Thomson receiving the 2009 Parsons Award from Faith Scattolon

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

Congratulations to Dr. Rick Thomson!

Présentation de la médaille Parsons 2009

Au nom de Wendy Watson-Wright, sous-ministre adjointe du secteur des Sciences du Ministère et Océans, Faith Scattolon, directrice générale régionale du ministère des Pêches et des Océans, région des Maritimes, a présenté à **Richard Thomson, Ph. D.**, la médaille Timothy R. Parsons. Cette distinction honorifique lui a été remise en reconnaissance de son importante contribution à la recherche océanique multidisciplinaire durant ses 35 années de carrière au ministère des Pêches et des Océans. M. Thomson a reçu son prix au congrès 2009 de la Société canadienne de météorologie et d'océanographie, à Halifax, en Nouvelle-Écosse.

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

■ un désir de partager les résultats de ses recherches dans des revues nationales et internationales de grand renom;

■ le besoin de comprendre les processus biophysiques des régions de champs hydrothermaux des océans du monde, dont la dorsale Endeavour dans le Pacifique Nord-Est – première aire marine protégée du Canada;

■ un intérêt de longue date pour l'étude de la formation et de la propagation des tsunamis engendrés à la fois par des séismes et par des glissements sous-marins, dont le tsunami dévastateur dans l'océan Indien en 2004;

■ une persévérance inébranlable dans les efforts qu'il a déployés pour comprendre la dynamique des écosystèmes de la côte Ouest de l'Amérique du Nord, dont le paléoclimat de la région à partir de carottes de sédiments prélevées dans des bassins anoxiques;

■ un dynamisme étonnant dans la promotion de l'océanographie opérationnelle pour la prévision de marées de tempête et d'élévations du niveau de la mer d'origine climatique.

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

Félicitations au Dr Rick Thomson!

REMINDER - REMINDER - REMINDER

CMOS has negotiated great membership deals for its members. CMOS members are eligible for a 25% discount off membership fees for the Royal Meteorological Society (RMetS) and the Canadian Geophysical Union (CGU) as associate members. Members of both these societies are also eligible for associate membership in CMOS; so please encourage your colleagues in those societies to join CMOS too.

RAPPEL - RAPPEL - RAPPEL

La SCMO a négocié des tarifs intéressants pour ses membres qui désirent devenir membre de la Société royale de météorologie (RMetS) et de l'Union géophysique canadienne (CGU). Un rabais de 25% est appliqué lorsque vous devenez membre associé de ces deux sociétés savantes. Les membres de ces deux sociétés ont également le privilège de devenir membre associé de la SCMO; dites-le à vos collègues et encouragez-les à joindre la SCMO.

JOB - JOB - JOB

Tenure-Track Faculty Position in Mesoscale Data Assimilation

McGill

The Department of Atmospheric and Oceanic Sciences at McGill University is seeking outstanding applicants for a tenure-track Assistant Professor position in the area of Data Assimilation. This opening is to enhance our strength in data assimilation and modelling at the mesoscale. The successful applicant will be expected to develop an active research program, supervise graduate students, and teach a variety of undergraduate and graduate courses.

Preference will be given to candidates whose area of expertise is the application of data assimilation to mesoscale numerical weather prediction, particularly in improving forecasts of high impact weather and precipitation.

A Ph. D. in atmospheric or oceanic sciences or a closely-related field is required.

McGill University is an English-speaking university located in Montreal, one of North America's most cosmopolitan cities. For more information about McGill University and the Department of Atmospheric and Oceanic Sciences please see http://www.mcgill.ca/meteo

Qualified candidates are invited to submit an application, including a curriculum vitae, a research proposal, and a teaching statement to: Dr. John R. Gyakum, Chair, Department of Atmospheric and Oceanic Sciences, McGill University, 805 Sherbrooke Street West, Montreal, QC H3A 2K6, Canada (Telephone: 514-398-3760; fax: 514-398-6115), or by e-mail with pdf format application to: mesoscale@meteo.mcgill.ca.

Candidates should also provide three names, with contact information of referees, with their application. After preliminary screening, the search committee will request reference letters from the list of names that candidates have provided.

The preferred starting date for this position is September 1, 2010.

Review of the applications will begin on October 15, 2009, and continue until the position is filled.

McGill University is committed to equity in employment and diversity. It welcomes applications from indigenous peoples, visible minorities, ethnic minorities, persons with disabilities, women, persons of minority sexual orientations and gender identities and others who may contribute to further diversification. All qualified applicants are encouraged to apply; however, in accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada.

Événements météorologiques marquants par région pour 2008

par David Phillips

Québec: Des trombes! C'est Montréal, pas Miami!
De rares trombes ayant la forme d'un cyclone, habituelles dans les tropiques, se sont formées dans le fleuve Saint Laurent, près de Montréal, le 23 juillet. Des témoins oculaires ont aperçu de nombreux nuages en forme d'entonnoir et, à 70 km au nord est de Montréal, une deuxième trombe. Les trombes marines se forment à partir de cumulus de convection. Ces vents dépassent rarement 90 km/h, mais ils sont connus pour faire chavirer les embarcations et endommager les propriétés situées au bord de l'eau. Bien que les trombes étaient le sujet sur toutes les lèvres, c'est le temps qui les accompagnait qui a fait des ravages. Des vents atteignant 90 km/h ont soufflé, de la grêle et une forte pluie se sont abattues et on a signalé une tornade de force F0 à Lanoraie. La région de la Haute Mauricie a connu de fortes pluies ce jour là. Soixante treize millimètres de pluies diluviennes en 13 heures sont tombés à La Tuque, inondant de nombreux sous sols d'eau et de boue et endommageant plusieurs routes. Les pluies d'été avaient déjà préparé la région à subir une inondation qui lui coûterait cher. Au 23 juillet, les pluies de juin et de juillet dépassaient la normale de presque 65 p. 100. L'ajout de 167 mm de pluie au cours des deux semaines suivantes a rendu la situation critique.

Trombes d'eau entre Montréal et Longueuil sur le Saint-Laurent. Photo modifiée de Cyberpresse.ca. Un court vidéo est également disponible sur YouTube.

CMOS Prizes and Awards announced at the 43nd Annual Banquet

World Trade and Convention Centre, Halifax, Nova Scotia
June 3rd, 2009

President's Prize
may be awarded each year to a member or members of the Society for a recent paper or book of special merit in the fields of meteorology or oceanography. The paper must have been accepted for publication in ATMOSPHERE-OCEAN, the *CMOS Bulletin SCMO* or another refereed journal.


John Fyle receiving his award from Andrew Bush

Awarded in 2008 to **John C. Fyle** for his substantive contributions to our understanding of climate variability and change, especially as expressed in the polar regions. His milestone paper "*The Arctic and Antarctic oscillations and their projected changes under global warming*", published in Geophysical Research Letters in 1999, was the first to demonstrate that these modes can be accurately represented in global climate models, and that their behaviour is expected to change somewhat as the climate warms. It has been cited some 250 times and has been highly influential, leading the way for numerous other studies on the topic of annular modes and polar climate variability.

Tully Medal in Oceanography
may be awarded each year to a person whose scientific contributions have had a significant impact on Canadian oceanography.


Chris Garrett receiving his prize from Andrew Bush

Awarded in 2008 to **Chris Garrett** in recognition of his illuminating and productive insights into a broad range of fundamental oceanography problems. His ability to view complex phenomena through a simplifying lens built of physical concepts has proved to be highly effective, not just for theories but also for a wide range of practical issues. His unflagging scientific integrity has inspired generations of young oceanographers, as has his uncanny ability to identify the core issue at hand, while others wrestle with details.

Andrew Thompson Prize in Applied Meteorology
may be awarded to a member of members of the Society for an outstanding contribution to the application of meteorology in Canada.


Andrew Bush, Ian Rutherford and William Burrows

Awarded in 2008 to **William Burrows** for his long and dedicated service in developing many key meteorological forecasting techniques for a variety of atmospheric phenomenon. Dr Burrows' unique specialty of statistical applications has proved instrumental in the improved forecasting of hazardous meteorological phenomenon such as blizzards, fog/stratus, convection, and most notably, lightning probability. This body of work has bridged many gaps between meteorological science and atmospheric forecasting and is well deserving of this award.

The Prize in Applied Oceanography
may be awarded each year to a member or members of the Society for an outstanding contribution to the application of oceanography in Canada.


Rolf Lueck receiving his prize from Andrew Bush

Awarded for 2008 to **Rolf Lueck** for a history of innovative development and exceptional technical support for unique and valuable instrumentation, particularly for the measurement of ocean microstructure. His work has recently resulted in the development and worldwide marketing of a series of systems for measuring ocean turbulence, leading to a rapid expansion in the measurement of important mixing processes around the

globe.

The Rube Hornstein Medal in Operational Meteorology to an individual for providing outstanding operational meteorological service in its broadest sense, but excluding the publication of research papers as a factor, unless that research has already been incorporated into the day-to-day performance of operational duties. The work for which the medal is granted may be cumulative over a period of years or may be a single notable achievement.


Jack Dunnigan receiving his prize from Andrew Bush

Awarded in 2008 to **Jack Dunnigan,** for his passion and excellent contributions to operational meteorology, as a forecaster and as a software designer. Jack's boundless energy, operational insight and computer language skills have been combined to create a prodigious number of key operational software tools over the course of the last 12 years, particularly in the aviation sector; quite notably, MultiAlert which has become a fundamental situational awareness software tool combining various information sources onto a well-designed display. Jack continues to move operational software design forward and always places operations and operational forecasters at the top of his priority list.

Neil J. Campbell Medal for Exceptional Volunteer Service
may be awarded each year to a member who has provided exceptional service to CMOS as a volunteer. The award may be made for an exceptional contribution in a single year or for contributions over an extended period. The contribution should have resulted in an important advancement for CMOS and/or its aims, nationally or locally.


Susan Woodbury receiving his prize from Neil Campbell

Awarded for 2008 to **Susan Woodbury** for her exceptional service and dedication to CMOS at both the local and national level over a period of more than two decades. She has served on numerous CMOS committees often in a leadership role, always with a focus on strengthening both CMOS and meteorology in Canada. Her contributions have had an impact in many areas and her efforts as a volunteer are widely appreciated.

CMOS Fellow
may be awarded for exceptional long term service and support to the Society and/or for outstanding contributions to the scientific, professional, educational, forecasting or broadcasting fields in atmospheric or ocean sciences in Canada.


Richard Marsden

In 2009, the title of CMOS Fellow is conferred on **Dr. Richard Marsden** for his exceptional contributions to the Society, ocean research and training of the next generation of applied Canadian oceanographers.

The Tertia MC Hughes Memorial Prize
may be awarded for contributions of special merit by graduate students registered at a Canadian university or by Canadian graduate students registered at a foreign university. There are two prizes for 2008.


William Hsieh receiving Alex Cannon's prize from Andrew Bush

1) Awarded to **Alex J. Cannon** for his outstanding and innovative Ph.D. dissertation at the University of British Columbia, consisting of five refereed journal publications. Each paper consists of a distinct new statistical model tackling the challenging problems of seasonal climate prediction and/or climate downscaling.


Li Zhai receiving her prize from Andrew Bush

2) Awarded to **Li Zhai** for her Ph.D. dissertation at

Dalhousie University, which describes an impressive body of work encompassing the application of data assimilative ocean models to the Lunenberg Bay region, including analysis of dynamical processes, validation against observations and examination of ecologically important exchanges processes within the bay and with adjacent regions.

The CMOS CNC/SCOR NSERC Scholarship Supplement provides a supplement of $5000 to a holder of an NSERC Postgraduate Scholarship or Canada Graduate Scholarship. It is renewable for a second year provided the Scholarship continues to be held.

Awarded for 2008 to **Kristina Brown** who is a Ph.D. student at University of British Columbia working on the application of various chemical tracer measurements in the Arctic Ocean to quantify dissolved CO_2 export within brines during sea ice formation.

The CMOS Weather Research House NSERC Scholarship Supplement
provides a supplement of $5000 to a holder of an NSERC Postgraduate Scholarship or Canada Graduate Scholarship. It is renewable for a second year provided the Scholarship continues to be held.

Awarded in 2008 to **Andrew Hamilton** of the University of British Columbia. Focussing on his previous work in the area of the Ward Hunt Ice Shelf, his research will undertake a spatial-temporal study of the ice shelf integrity alongside an examination of the variability and succession of the sub-ice shelf microbial community.

The previous year's winner, **Gabrielle Gascon,** continues to hold her NSERC scholarship and hence she will also receive a $5000 cheque.

The CMOS Weather Network / Météomédia Scholarship offered to a Canadian female student enrolled in the 3rd or 4th year of an atmospheric science degree program at a Canadian university and with career aspirations as a forecast meteorologist, on-air meteorologist or meteorological briefer. It consists of a cheque for $1500. The scholarship is funded by an annual donation from Pelmorex Inc., the parent company of The Weather Network and Météomédia.

Awarded for 2008 to **Alexandra Anderson-Frey**, a third year undergrad student, University of Alberta.

CMOS Undergraduate Scholarships
Provides $500 for students in their penultimate year of studies to support their final year.

In 2008, the scholarship is awarded to **Lindsay Sutton** for academic excellence.

Campbell Scientific Best Student Poster Prize was presented by Brian Day to **Karen Smith**, University of Toronto, for her poster entitled "*Influence of stationary wave field on stratosphere-troposphere coupling response to idealized Eurasian snow forcing*".

CMOS 43nd Congress - Halifax, NS

Halifax, NS, June 4, 2009. The 43rd annual Congress of the Canadian Meteorological and Oceanographic Society wrapped up a successful week of presentations and meetings here today. About 600 delegates attended the Congress, including 100 teachers who attended a very successful special day on June 3. Some of the main messages left by a series of impressive plenary speakers included:

■ Fertilization of the oceans with iron is an unlikely strategy to capture atmospheric carbon dioxide created by human activity;

■ Confirmation and monitoring of continued loss of global sea and glacial ice by the "Grace" satellite was described;

■ Present and future geostationary satellite systems remain the single best tool available for accurate hurricane forecasting;

■ For the first time, results from experiments on the impact of vast African duststorms on oceanic weather were described, based on observations from the Cape Verde Islands which lie off Africa near the genesis area of many tropical storms;

■ The role of the Grand Banks and Flemish Cap in the Atlantic deep water currents was explained; and

■ Results from new satellites which measure greenhouse gas emissions were shown. They graphically illustrated the

global extent of large plumes of carbon dioxide from China and from burning forests in the Amazon area (these results indicated a visible lessening of Chinese emissions in the past two years with the current financial recession suspected as the cause).

On Tuesday evening, a public talk by Peter Boyer of the Canadian Hurricane Centre was held at the Atlantic Museum on the Halifax waterfront. About 200 people attended, over half from the general public. Peter's talk included a history of recent hurricanes and remnants which have hit Atlantic Canada. His many graphic photos, diagrams and illustrations enthralled the crowd.

Several awards were announced and presented during the Congress. These included the Society's prizes and awards as well as the Environment Canada Patterson Medal for a major achievement in meteorology, and the Fisheries and Oceans Parsons Medal for oceanography. The names, and photos (where available) of all the winners will be posted here very shortly.

Phil “The Forecaster” Chadwick

At the Awards Banquet on Wednesday evening, Phil "The Forecaster" Chadwick entertained the attendees with one of his trademarked "*Weather, Life, Art & Tom Thomson*" talks.

Bob Jones, CMOS Webmaster

Next CMOS Congress

The next CMOS Congress will be held in Ottawa, Ontario, May 31- June 4, 2010. The selected theme is “Our Earth, Our Air, Our Water, Our Future”. It will be a joint meeting with the Canadian Geophysical Union and held at the Crowne Plaza Hotel. Please book these important dates on your 2010 agenda.

Prochain Congrès de la SCMO

Le prochain congrès de la SCMO se tiendra à Ottawa, Ontario, du 31 mai au 4 juin 2010. Le thème choisi est “La Terre, l’air et l’eau: notre avenir”. Ce sera une conférence conjointe avec l’Union géophysique canadienne et se tiendra à l’hôtel Crowne Plaza. Prière d’inscrire ces dates importantes à votre agenda pour 2010.

2009 Student Bursary Recipients

Récipiendaires 2009 des bourses de voyage pour étudiants

Student / Étudiant (e)	University / Université
Albarran-Melzer, Marna	Centre for Research in Earth and Space Science, York University
Bédard, Joël	École de Technologie Supérieure
Bianucci, Laura	School of Earth and Ocean Sciences, University of Victoria
Biswas, Sumita	Centre for Research in Earth and Space Science, York University
Collier, Emily	Earth and Atmospheric Sciences, University of Alberta
Corkum, Matthew	Centre for Research in Earth and Space Science, York University
Erven, Lisa	Earth and Ocean Sciences, University of British Columbia
Iserhienrhien, Blessing	Dept. of Physics and Astronomy, University of Western Ontario
Jahn, Alexandra	Dept. of Atmospheric and Oceanic Sciences, McGill University
Lapoussière, Amandine	Institut des Sciences de la Mer, Université du Québec à Rimouski
Lindenmaier, Rodica	Dept. of Physics, University of Toronto
Malik, Khalid	Centre for Research in Earth and Space Science, York University
McCormack, Trudy	Dept. of Atmospheric and Oceanic Sciences, McGill University
McCullough, Emily	Dept. of Physics and Astronomy, University of Western Ontario
McLarty, Jennifer	Centre for Research in Earth and Space Science, York University
Pogson, Lynn	Dept. of Atmospheric and Oceanic Sciences, McGill University

Steinmoeller, Derek	Dept. of Applied Mathematics, University of Waterloo
White, Eric	Dept. of Geography, University of Calgary
Wolfe, Megan	Earth and Ocean Sciences, University of British Columbia

President's speech at CMOS Banquet

Je voudrais tout d'abord saluer les congressistes d'origine francophone qui assistent à ce congrès et les remercier pour leur participation en anglais. Je ne peux pas parler couramment le français, et je ne peux pas parler sans notes en français, mais je peux au moins vous parler d'abord dans ma propre version de votre langue. Les anglophones comme moi reconnaissons rarement l'effort supplémentaire exigé de la part des scientifiques de langue française pour participer à la SCMO, mais votre présence en tant que partie intégrale de ce congrès et de cette société nous enrichit tous. Merci.

Bill Crawford, CMOS President addressing the audience at banquet

In my token and broken French, I acknowledged that native French-speaking members of CMOS spend almost all of their time here communicating in English. Although I speak French poorly, at least I could speak to them first in French. We English seldom acknowledge the extra effort required by French members of our Society to contribute. This Society is much richer due to their full-hearted participation.

I was not at all nervous tonight until I met 12 past presidents of CMOS at a photo session prior to this banquet. They are an impressive collection of men and women, and I can only hope to measure up to their standards in this job.

This congress is the best CMOS Congress ever, thanks to the Halifax Centre of CMOS, chairs John Parker and Blair Greenan, and their 29 committee members and many volunteers. We have almost 500* registrants. They had the advantage of Halifax hospitality and their location in the city in Canada with the greatest concentration of meteorological and oceanographic businesses, academics and government agencies. This year the CMOS organizers awarded 19 travel bursaries to students to participate in this congress.

CMOS is a small society that does big things. The biggest is our congress. We also publish ATMOSPHERE-OCEAN and the *CMOS Bulletin SCMO*, and direct International and Canadian agencies. All by a few underpaid and volunteer staff. We are guided, of course, by Ian Rutherford, our Executive Director who is also a past president.

Just before I came up here to accept this position and to address you, Paul-André Bolduc asked me for my speaking notes to publish in the Bulletin. I hope you are writing this down, Paul-André, because I am about to go off my notes here. [Paul-André did not record my speech; these following paragraphs are written from memory].

In the past century the stature of scientists rose to great heights. They earned respect when they found cures for disease. They were regarded with awe for building atomic bombs. They were sought after for weather and hurricane forecasts. We have acquired another role in the 21st century, which is that of the prophet. Meteorologists and oceanographers are now able to predict climate far into the future, and are telling this message through IPCC reports and climate papers and presentations. I personally believe that these IPCC reports are the greatest collective scientific achievements ever. However, there are only a few thousand climate scientists telling 6,000,000,000 people on this planet something they do not want to hear, and this places the climate scientist into the role of prophet. If you read the Old Testament of the Bible you will appreciate the difficult and often unrewarding lives that prophets lead. However, this role is necessary and the many scientists at this banquet who contribute to these predictions will courageously lead society as prophets of climate change.

The new CMOS Executive: Andy Bush, Sophia Johannessen, Bill Crawfod, Rich Pawlowicz, Jane Eert and David Fissel

My final note is to welcome your new national executive. These officers look forward to three years of voluntary service and this might be their only chance for public recognition. Each three years the executives are selected from one of Canada's many regions; your next executive will mostly be from the West Coast. We are a balance of business, academia and government. Your new vice-president is David Fissel, the founder and CEO of ASL Environmental Sciences in Sidney, BC. David's company

has a booth at this congress and he also delivered a scientific paper, so he wears many hats. Our next corresponding secretary will be Jane Eert, who is an oceanographic consultant. Jane's most visible experience has been to serve as senior scientist on four ocean research cruises to the Arctic on Canada's biggest ice-breaker. From academia we have Professor Rich Pawlowicz from UBC serving as treasurer, and Professor Andy Bush from University of Alberta as past president. Our recording secretary will be Sophia Johannessen, a chemical oceanographer from DFO's Institute of Ocean Sciences in Sidney, BC. I will serve as president, and I am also from the Institute of Ocean Sciences. Please welcome your new executive.

*The final count, including 1-day passes, was almost 600 registrants.

Photos credit: All photographs shown in the above section (except for Kristina Brown and Andrew Hamilton) are courtesy of Jennifer Patridge, the CMOS Halifax Congress official photographer.

Teachers' Day

by Sheila Bourque[1] and Emily Bourque[2]

On 3 June 2009, 35 teachers participated in what has become the annual Teachers' Day event at the CMOS Congress. This year's event was held at the Congress venue, the Halifax World Trade and Convention Centre and organized by Claude Coté of Environment Canada and Frederic Dupont of Dalhousie University who are to be congratulated on the excellent job they did in bringing together science teachers and speakers from a variety of backgrounds – some were academics, some from local environmental organizations and some were Environment Canada employees.

Table 1: Teachers' Day Program

Speaker	Affiliation	Title of talk
Alan Warner	Acadia University	Environmental Behaviour Changes
Thera Ip	Environment Canada	Indi: The AQHI Caterpillar
Ingrid Peterson	Bedford Institute of Oceanography	Sea Ice, Icebergs and Glaciers
René Brunet	La biosphere	Educational Activities at the Biosphere

Table 1: Teachers' Day Program (Continued)

Speaker	Affiliation	Title of talk
Maggie McIntyre	Nova Scotia Museum of Natural History	Cool Climate, Cool Creatures
Victoria Hudec	Environment Canada	Sky Watchers
Bill Batycky	SEEDS, Alberta	Cloud Watch
Karen Matheson	Science East	Improving the Long Term Forecast
Rebecca McQuaid	Clean Nova Scotia	Cool Classrooms
Peter Bowyer	Environment Canada	Canadian Hurricane Centre
Richard Karsten	Acadia University	Tidal Power in the Bay of Fundy
Sheila Bourque	Environment Canada	Project Atmosphere
Caroline Channing	Environment Canada	Teaching Resources
Krista Hilchey	Nova Scotia Dept. of Environment	Water Resources Education

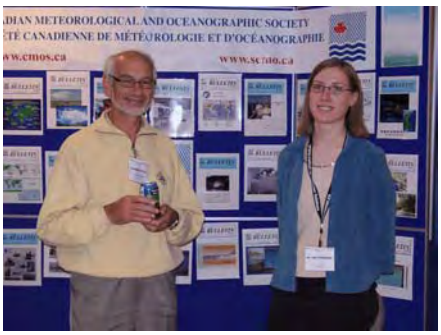
Hands-on activities included a balloon launch!

These presenters provided updates on current scientific research, insight into educational programs geared specifically to schools and classroom activities. Registration was free and the Local Arrangements Committee provided a lovely sit-down lunch for the teachers and speakers which gave the teachers an opportunity to interact with the speakers and to build their contacts with other teachers in the board. Teachers were invited to take their coffee breaks in the exhibit area, view the posters and tour the exhibits. The overall feedback from teachers was very positive.

[1] Environment Canada, Ottawa, ON

[2] CMOS Headquarters, Ottawa, ON

43nd CMOS Congress Photo Memories
Souvenirs photographiques du 43e Congrès de la SCMO



Photos legend (from left to right, top to bottom). 1. When oceanography meets meteorology, **Des O'Neill**, **Bob Jones** and **Dick Stoddart**. 2. **Richard Asselin** and **Emily Bourque** minding the CMOS booth. 3. Well attended posters session. 4. Job well done, **John Parker**, Chair, Local Arrangements Committee (LAC) and **Blair Greenan**, Chair Scientific Program Committee (SPC). 5. I like icebergs, **Jennifer Patridge**, Congress official photographer. 6. Team Lagrange, **Allyn Clarke, Denis Gilbert, Howard Freeland, Amy Bower**, WHOI, (plenary speaker) and **John Loder**. 7. **Bourque** family at banquet. 8. Passing the buck, **Andrew Bush** (Past President) and **William Crawford** (Incoming President). 9. From Halifax to Ottawa, **John Parker** (Chair, LAC Halifax Congress) and **John Falkingham** (Chair, LAC Ottawa Congress).

Above photos are courtesy of the Editor, *CMOS Bulletin SCMO*, June 2009.

Joint CMOS/CGU Congress
Call for Sessions Proposals

The joint CMOS/CGU Congress will be held on June 1-4, 2010 in Ottawa, Ontario at the Crowne Plaza. This will be the 44th Annual Congress of the Canadian Meteorological and Oceanographic Society (CMOS) and the 36th Annual Scientific Meeting of the Canadian Geophysical Union (CGU). This will be the third occasion for a joint Congress between the two societies. The Congress theme for this year will be "Our Earth, Our Air, Our Water: Our Future". See: http://cmos.ca/Congress2010/index.htm

The theme for the Congress provides an opportunity to do a bit more than is often the case at a scientific meeting. That is to have the presenters think and talk about "our future" as a result of their work, as well as having the Congress itself contribute to a forward-looking stance on the part of the community, CMOS and CGU. The opportunity to link science to policy, or other action-oriented outcomes, should be seized by participants.

In addition to traditional CMOS and CGU theme sessions, the Scientific Program Committee solicits proposals for special sessions on topics of particular interest. Joint sessions of interest to both the CMOS and CGU participants would be most welcome.

This year marks the first year for the new Solid Earth and Biogeoscience sections of the CGU, so we particularly encourage proposals to highlight these new sections.

In addition to science sessions during the June 1-4, 2010 time frame there is also an opportunity to have related workshops, short courses, business meetings, etc. on either the day before or the day after. There may be associated incremental costs to such activities; therefore proponents should contact one of the Co-Chairs of the Scientific Program Committee to ensure a full exchange of information.

To propose a session, please submit your session proposal (up to 40 characters for the title) through: https://www1.cmos.ca/abstracts/proposal_default.asp The proposal should include information on the designated convener/co-conveners of the session and a short paragraph (up to 300 words) describing the session. The deadline for proposing a theme or special session is September 15, 2009.

Dick Stoddart (dick.stoddart@sympatico.ca)
Rod Blais (blais@ucalgary.ca)
Co-Chairs of the Scientific Program Committee for the Ottawa 2010 Congress

Congrès conjoint SCMO/UGC
Demande de propositions de sessions

Le Congrès conjoint SCMO/UGC au lieu du 1er au 4 juin 2010 à Ottawa, en Ontario, au Crowne Plaza. Il s'agira du 44e Congrès annuel de la Société canadienne de météorologie et d'océanographie (SCMO) et de la 36e Rencontre scientifique annuelle de l'Union géophysique canadienne (UGC). Il s'agira de la troisième participation des deux sociétés à un Congrès conjoint. Cette année, le thème du Congrès sera: "La Terre, l'air et l'eau: Notre avenir". Visitez : http://cmos.ca/Congress2010/indexf.html

Le thème du Congrès offre l'occasion d'en faire davantage qu'à l'accoutumée lors d'une rencontre scientifique. Qui est d'amener les présentateurs à penser et à parler de « notre avenir » comme résultat de leur travail, ainsi que de faire participer le Congrès lui-même à une position tournée vers l'avenir sur le rôle de la communauté, de la SCMO et de l'UGC. L'occasion de lier la science à la politique, ou autres résultats orientés sur l'action, devrait être saisie par les participants.

En plus des sessions sur les thèmes traditionnels de la SCMO et de l'UGC, le Comité du programme scientifique sollicite des propositions pour des sessions spéciales sur des sujets d'un intérêt particulier. Des sessions conjointes intéressant à la fois des participants de la SCMO et de l'UGC seraient particulièrement les bienvenues.

Cette année marque la première année des nouvelles sections de Terre solide et de Biogéosciences de l'UGC, alors nous encourageons particulièrement les propositions qui souligneront ces nouvelles sections.

En plus des sessions scientifiques qui auront lieu du 1er au 4 juin 2010, il sera également possible de profiter d'ateliers, de formations courtes, de réunions d'affaires, etc., soit la veille ou le lendemain. Des coûts incrémentaux peuvent être associés à ces activités; ainsi, les requérants devront contacter l'un des coprésidents du Comité du programme scientifique afin d'assurer un échange complet des renseignements.

Pour proposer une session, veuillez soumettre votre proposition de session (jusqu'à 40 caractères pour le titre) par le biais de : https://www1.cmos.ca/abstracts/proposal_default.asp. La proposition devra inclure des renseignements sur l'organisateur/les coorganisateurs de la session, ainsi qu'un court paragraphe (jusqu'à 300 mots) décrivant la session. La date d'échéance pour la soumission d'un thème ou d'une session spéciale est le 15 septembre 2009.

Dick Stoddart (dick.stoddart@sympatico.ca) et *Rod Blais* (blais@ucalgary.ca), Coprésidents du Comité du programme scientifique pour le Congrès de 2010 à Ottawa

Already at work for you

The Local Arrangements Committee (LAC) and the Scientific Program Committee (SPC) are already at work, planning the 2010 CMOS/CGU Joint Congress in Ottawa, Ontario. The Crowne Plaza hotel has been reserved for the venue and the poster was presented and distributed at the 2009 Halifax Congress. Tasks to various members of the LAC have already been assigned. The 2009 Halifax Congress was not over yet that the chairmen of the SPC were busy preparing their membership. Most plenary speakers have already been selected and the Call for Sessions Proposals (see previous page in this issue) is already available. Members of the LAC and the SPC include:

John Falkingham

Local Arrangements Committee
Comité local d'organisation

John Falkingham	Chair (CMOS)
Wayne Richardson	Treasurer
Sean Carey	Secretary
Erica Wilson	Facilities
Bruce Ramsay	Facilities
Brian Beamish	IT / AV
Paul Pestieau	Communications
Mario Ouellet	Program Book
John Anderson	Program Book
Bob Jones	Webmaster
Oscar Koren	Exhibits
Guy Stogaitis	Exhibits
Sheila Bourque	Teachers' Day
Spiros Pagiatakis	CGU Representative
Kathy Young	CGU Representative
Denis Bourque	CMOS Ottawa Centre Chair
Anne O'Toole	Sponsorships
Wesley Van Wychen	At large

Scientific Program Committee
Comité du programme Scientifique

Dick Stoddart	SPC Co-Chair (CMOS)
Rod Blais	SPC Co-Chair (CGU)
Doug Whelpdale	EC/MSC (retired)
Gail Atkinson	University of Western Ontario
Howard Freeland	DFO/IOS
Ian D Rutherford	CMOS Executive Director
Joe Henton	NRCan
John Falkingham	Chair, 2010 Congress LAC
John Stone	EC/MSC (retired)
Leah Braithwaite	EC/Can Ice Service
Peter Taylor	York University
Sam Butler	University of Saskatchewan
Sean Carey	Carleton University
Spiros Pagiatakis	York University
Tim Aston	CFCAS
CGU Biogeoscience Section	(name to be decided shortly)

Déjà au travail pour vous


Dick Stoddart

Le Comité local d'organisation (CLO) et le Comité du programme scientifique (CPS) sont déjà au travail, planifiant le congrès conjoint 2010 de la SCMO et de l'UGC qui se tiendra à Ottawa, Ontario. L'hôtel Crowne Plaza a été réservé pour cet événement et l'affiche du congrès a été présentée et distribuée au congrès 2009 d'Halifax. Les tâches ont déjà été assignées aux membres du CLO. Le congrès 2009 d'Halifax était toujours en cours que les présidents du CPS dressaient la liste des membres de leur comité. La plupart des conférenciers pléniers ont été choisis et la demande de propositions de sessions est déjà disponible (voir page précédente). Les membres du CLO et CPS sont indiqués ci-haut.


Rod Blais

A-O Abstracts Preview

Avant Première des résumés de A-O

The following abstracts will soon be published in your next ATMOSPHERE-OCEAN publication.

Les résumés suivants paraîtront sous peu dans votre prochaine revue ATMOSPHERE-OCEAN.

Matching of Coastal and Open Ocean Wave Models in a Mesoscale Application over Lake Erie

by ROOP LALBEHARRY, ARNO BEHRENS, HEINZ GUENTHER AND LAURENCE WILSON

Abstract

Three widely used wave models, namely, the open ocean wave model (Cycle-4.5, hereinafter referred as WAM4.5) and the coastal models, Simulation of Waves Nearshore (Cycle III version 40.31, hereinafter referred as SWAN) and the K-model, are applied to Lake Erie to simulate waves at a spatial resolution of about 4 km. The results of a three-week hindcast study are compared with buoy observations in terms of integrated parameters, one-dimensional (1-D) and two-dimensional (2-D) energy spectra, scatter plots and statistical analyses of the wave fields. The time development of the 1-D spectra by the models matches the buoy measurements well. All the wave models tend to overpredict the wave heights and underpredict (particularly the K-model) the peak period. SWAN performs best for the wave heights and WAM4.5 for the peak periods and is computationally less demanding, whereas the spatial resolution applied to Lake Erie seems to be too coarse for an adequate use of the K-model. In general, WAM4.5 has advantages over coastal wave models in operational intermediate-scale applications.

Résumé

Nous appliquons au lac Érié trois modèles de vagues couramment utilisés, nommément le modèle de vagues en haute mer (cycle 4.5, ci-après appelé WAM4.5) et les modèles côtiers Simulation des vagues près des côtes (cycle III version 40.31, ci-après appelé SWAN) et le *K-Model*, pour simuler les vagues à une résolution spatiale d'environ 4 km. Nous comparons les résultats d'une étude *a posteriori* de trois semaines avec les observations par bouées en nous basant sur des paramètres intégrés, des spectres d'énergie à une dimension (1-D) et à deux dimensions (2-D), des diagrammes de dispersion et des analyses statistiques des champs de vagues. L'évolution dans le temps des spectres 1-D dans les modèles correspond également aux mesures des bouées. Tous les modèles de vagues ont tendance à prévoir des valeurs de vagues trop élevées et à prévoir des valeurs de période de pointe (surtout le *K-Model*) trop basses. Le SWAN fournit les meilleurs résultats de hauteurs de vagues et le WAM4.5 prévoit mieux les périodes de pointe tout en nécessitant moins de temps de calcul. La résolution spatiale appliquée au lac Érié semble trop grossière pour que le *K-Model* puisse être appliqué convenablement. De manière générale, le WAM4.5 offre des avantages par rapport aux modèles de vagues côtières dans les applications opérationnelles d'échelle intermédiaire.

Ice Band Characteristics of Antarctic Seasonal Ice Zone Observed using MOS MESSR Images

by KUNIMITSU ISHIDA AND KAY I. OHSHIMA

Abstract

Ice band characteristics for the region off East Queen Maud Land in Antarctica were examined and their relationship with the wind conditions was assessed using a large number of Marine Observation Satellite (MOS)-1/1b Multispectral Electronic Self Scanning Radiometer (MESSR) images received at Syowa Station during the period 1989 - 93. Analyses from 43 examples of bands captured from August to December suggest that ice-band formation and band scale are affected by both wind speed and direction over approximately the preceding four days (defined as the effective wind). Ice-band width and spacing are significantly correlated with the effective wind speed and the maximum wind speed during that period. The long axis of ice bands tends to be oriented at 70° - 90° (mean of 75°) to the right of the effective wind direction. The band scales decrease from winter (August) to summer (December) with typical band spacing of 4 - 6 km in winter and 1 - 2 km in summer. This seems to be primarily due to a decrease in ice floe size and partly due to a decrease in the effective wind speed from winter to summer. Band scale decreases from the ice interior to the ice edge under conditions of off-ice winds.

Résumé

Nous avons examiné les caractéristiques des bandes de glace dans la région située au large de la partie est de la Terre de la Reine-Maud, en Antarctique, et nous avons estimé leur relation avec les conditions de vent à l'aide d'un grand nombre d'images du radiomètre multispectral à balayage électronique automatique (MESSR) du satellite d'observation marine (MOS)-1/1b reçues à la station Syowa au cours de la période 1989-1993. Des analyses faites sur 43 exemples de bandes capturés entre août et décembre suggèrent que la formation des bandes de glace et la taille des bandes dépendent à la fois de la vitesse et de la direction du vent durant la période précédente d'environ quatre jours (définie comme le vent effectif). La largeur et l'espacement des bandes de glace exhibent une corrélation significative avec la vitesse du vent effectif et la vitesse maximale du vent durant cette période. Le grand axe des bandes de glace a tendance à s'orienter de 70 à 90° (moyenne de 75°) à droite de la direction du vent effectif. La taille des bandes diminue de l'hiver (août) à l'été (décembre) et leur espacement est habituellement de 4 à 6 km en hiver et de 1 à 2 km en été. Cela semble principalement dû à une diminution de la taille des floes de glace et dû aussi à une diminution de la vitesse du vent effectif de l'hiver à l'été. La taille des bandes diminue de l'intérieur des glaces vers la lisière des glaces dans des conditions de vent soufflant de la glace vers l'eau libre.

Skill Assessment of Seasonal Hindcasts from the Canadian Historical Forecast Project

by Viatcheslav V. Kharin, Qiaobin Teng, Francis W. Zwiers, Xuebin Zhang

Abstract
The performance of seasonal hindcasts produced with four global atmospheric models in the second phase of the Canadian Historical Forecasting Project is evaluated. Deterministic and probabilistic forecast skill assessments are carried out using common verification measures. Several methods of combining multi-model output to produce deterministic and probabilistic forecasts of near-surface air temperature, 500 hPa geopotential height, and 700 hPa temperature for zero-month and one-month leads are considered. A variance-based weighting modestly improves the skill of deterministic and probabilistic hindcasts in some cases. A parametric Gaussian probability estimator is superior to a non-parametric count-method estimator for producing multi-model probability forecasts. Statistical adjustment is beneficial for deterministic and probabilistic hindcasts of near-surface temperature over the ocean but not always over land. Skill improves with the number of different models used for a given total ensemble size. The four-model ensemble is shown to be a reasonable multi-model configuration.

Résumé
Nous évaluons la performance des prévisions saisonnières a posteriori produites à l'aide de quatre modèles de circulation atmosphérique générale dans la deuxième phase du projet de prévision historique. Les évaluations d'habileté des prévisions déterministes et probabilistes sont basées sur des mesures de vérification courantes. Nous examinons plusieurs méthodes de combinaison de sortie multimodèle pour produire des prévisions déterministes et probabilistes de la température de l'air près de la surface, de la hauteur géopotentielle de 500 hPa et de la température à 700 hPa à échéance de zéro mois et d'un mois. Une pondération fonction de la variance améliore légèrement l'habileté des prévisions déterministes et probabilistes a posteriori dans certains cas. Un estimateur de probabilité gaussien paramétrique est supérieur à un estimateur non paramétrique utilisant une méthode de comptage pour produire des prévisions de probabilités multimodèles. Un ajustement statistique est bénéfique pour les prévisions déterministes et probabilistes a posteriori de la température près de la surface au-dessus de l'océan mais pas toujours au-dessus de la terre. L'habileté augmente avec le nombre de modèles différents utilisés pour une taille d'ensemble totale donnée. L'ensemble de quatre modèles s'avère une configuration multimodèle raisonnable.

Books in search of a Reviewer
Livres en quête d'un critique

The Dynamics of Coastal Models, by Clifford J. Hearn, Cambridge University Press, ISBN 978-0-521-80740-1, 2008, pp.488, Hardback, US$100.

Basics of the Solar Wind, by Nicole Meyer-Vernet, Cambridge University Press, ISBN 978-0-521-81420-1, 2008, pp.463, Hardback, US$132.

Mesoscale Dynamics, by Yuh-Lang Lin, Cambridge University Press, ISBN 978-0-521-80875-0, 2008, pp.630, Hardback, US$165.

Chemical Oceanography and the Marine Carbon Cycle, by Steven Emerson and John I. Hedges, Cambridge University Press, ISBN 978-0-521-83313-4, 2008, pp.366, Paperback, US$90.

An Introduction to Ocean Turbulence, by S. A. Thorpe, Cambridge University Press, ISBN 978-0-521-67680-9, 2007, pp.240, Paperback, US$60.

Aquatic Ecosystems: Trends and Global Perspective, Edited by Nicholas V.C. Polunin, Cambridge University Press, ISBN 978-0-521-83327-1, pp. 482, Hardback, US$160.

Physics of the Earth, by Frank D. Stacey and Paul M. Davis, Cambridge University Press, ISBN 978-0-521-87362-8, 4th Edition, pp. 532, Hardback, US$80.

Drinking Water Quality: Problems and Solutions, by N.F. Gray, Cambridge University Press, ISBN 978-0-521-70253-9, 2nd Edition, pp. 520, Paperback, US$70.

Ecological Climatology: Concepts and Applications, by Gordon B. Bonan, Cambridge University Press, ISBN 978-0-521-69319-6, 2nd Edition, pp. 550, Paperback, US$80.

Beach and Dune Restoration, by Karl F. Nordstrom, Cambridge University Press, ISBN 978-0-521-85346-0, pp. 187, Hardback, US$140.

Applied Geophysics in Periglacial Environments, Edited by C. Hauck and C. Kneisel, Cambridge University Press, ISBN 978-0-521-88966-7, pp. 240, Hardback, US$140.

Hydroclimatology, Perspective and Applications, by Marlyn L. Shelton, Cambridge University Press, Hardback, 2009, ISBN 978-521-84888-6, pp.426, US$90.00.

Managing and Transforming Water Conflicts, by Jerome Delli Priscoli and Aaron T. Wolf, International Hydrology Series, Cambridge University Press, Hardback, 2009, ISBN 978-0-521-63216-4, pp.354, US$140.00.

Estuaries, Dynamics, Mixing, Sedimentation and Morphology, by David Prandle, Cambridge University Press, Hardback, 2009, ISBN 978-0-521-88886-8, pp.236, US$130.00.

Principles of Snow Hydrology, by David R. DeWalle and Albert Rango, Cambridge University Press, Hardback, 2009, ISBN 978-0-521-82362-3, pp.410, US$150.00.

THE ART AND SCIENCE OF LIGHTNING PROTECTION

by Martin A. Uman

New York: Cambridge University Press, 2008. ISBN 970-0-521-87811-1. xiii + 240p. Hardbound US$110

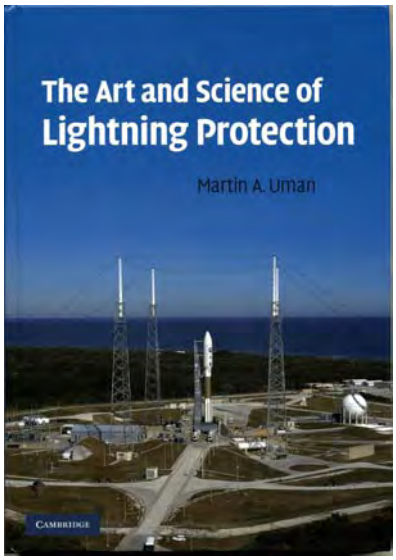
Book Reviewed by Bob Kochtubajda[1]

When lightning strikes the ground, it can cause serious property and infrastructure damage, death, injury and disrupt daily activities and lives. In Canada, for example, it is estimated that about 10 people are killed and between 92 and 164 people are seriously injured annually. Lightning-related damage and disruption costs to the Canadian economy are estimated at between $600 million and $1 billion each year. Thus, knowledge of the phenomenon of lightning, its impacts and effects on humans and objects, and an improved understanding of lightning protection are important.

These topics are the subject of professor Uman's latest book ***"The Art and Science of Lightning Protection".*** He has written 4 previous books primarily on the physics of lightning including the comprehensive volume "***Lightning: Physics and Effects*"** which he co-authored with Professor Vladimir Rakov. Dr. Uman is generally recognized as one of the leading experts on lightning and has received numerous awards and holds four patents in the area of lightning detection and location. This book introduces the reader to all aspects of lightning protection.

The book, comprised of fourteen chapters, begins with a brief introductory chapter describing the physical behaviour of lightning and the general principles of lightning protection. Chapter 2 introduces the reader to the types of lightning damage and the properties of lightning that produce the damage. The damage to an object struck by lightning depends on the characteristics of the lightning and on the ability of the object to conduct electricity and to dissipate heat. General methods for lightning protection are discussed in Chapter 3, while the various elements of the protection of structures including air terminals, down conductors, and grounding systems are discussed in Chapters 4 and 5, respectively. Chapter 6 considers the protection of electrical and electronic systems within structures. A variety of surge protective devices are described including voltage clamping devices, electrical circuit filters and isolation devices.

The protection of humans and animals, aircraft and launch vehicles, boats, trees, and above-ground and underground power and communication lines, are discussed in chapters 7, 9, 10, 11, and 12, respectively. The examples of the common types of lightning burns in Chapter 7 were sobering and helped to dispel the myth that a direct lightning strike victim is seriously burned, both internally and externally. The short duration of the lightning current in the body, generally saves all but a few victims from serious burns.



Ground-based and satellite-based lightning detection systems, discussed in Chapter 8, are effective tools in lightning warning and ultimately in lightning protection. The section explaining the two techniques for ground-based lightning location (magnetic direction finding and pulse time-of-arrival) was well described and illustrated. However, figure 8.8 depicting the satellite-derived global flash density would have been more effective in colour. Chapter 13 explores the issue of lightning elimination or suppression. The book concludes with a summary of the status of our current understanding of lightning protection. The author indicates that lightning protection systems when designed according to existing standards offer a means of preventing damage by providing a way for the safe discharge of the lightning energy. However, many research questions about how well lightning protection works still remain to be answered.

Overall, I found this book to be very well written, well edited and quite enjoyable to read. The author makes excellent use of high quality drawings and black and white photographs to illustrate his explanations throughout the book. A list of references is provided at the end of each chapter. Contact information for additional bibliographies compiled on lightning safety and in the medical aspects of lightning injury is found in Chapter 7. Although several websites are identified throughout the book, an appendix listing the websites would be more effective. This book will serve as a useful reference for anyone involved or interested in lightning protection including meteorologists, engineers and fire safety officials, and will be of interest to physicians dealing with lightning-related injuries.

[1] Environment Canada, Edmonton, AB

Quantitative Modeling of Earth Surface Processes

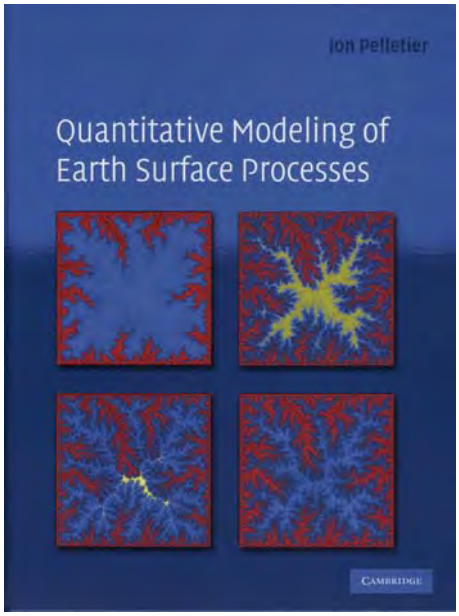
by Jon D. Pelletier

Cambridge University Press, ISBN 978-0-521-85597-6
2008, 295 p., Hardback, US$80

Book reviewed by Sean Fleming[2]

This book describes mathematical-computational modelling of geomorphic processes, broadly defined. The text is organized as follows. Chapter 1 is an introduction to the subject, providing "tours" of archetypal fluvial, eolian, and glacial systems. The second chapter explores the diffusion equation, its solutions, and its applications to earth surface processes, such as hillslope evolution. Chapter 3 looks at "flow routing," which is taken broadly by the author to mean the modelling of mass and energy pathways through the landscape. Note, however, that the emphasis lies on algorithms for predicting stream drainage network patterns from digital elevation maps; conversely, minimal attention is devoted to the flood or channel routing issues often considered by civil engineers and river hydrologists. Chapter 4 is generally similar to Chapter 2, but considers the advection equation instead. The fifth chapter takes a view of the larger-scale problems of flexural isostacy. Chapter 6 reviews non-Newtonian flow equations, with applications to glacier dynamics, for example. The seventh chapter provides an overview of geophysical instabilities, such as those associated with feedbacks. The final chapter broaches the problems of stochastic processes, with an emphasis on 1/*f* and related scaling problems. This is followed by no less than eight appendices, totalling about 50 pages in length, providing C++ codes (which make use of the venerable Numerical Recipes subroutine library) to solve many of the problems discussed in the text.

The book is in many respects a stunning virtuoso performance. The range of problems tackled is fantastic, ranging from the geomorphic evolution of volcanoes to the formation of spiral patterns on the Martian polar ice caps, why rivers meander, the frequency-size distribution of landslides, glacier dynamics, the land surface expressions of plate tectonics, the timing of ice ages, dust deposition from desert windstorms, and the movement of anthropogenic radionuclides in the environment – to name just a few. The range of analysis and modelling techniques described and applied is equally impressive, including (for example) a tour of both analytical and numerical solution methods for differential equations, linear stability analysis, and various forms of stochastic modelling. The chapters on the diffusion and advection equations take an interesting tack, in so far as the author does not dictate per se the governing equations a priori, but instead describes what these equations mean intuitively, what makes them useful for certain problems, and how they might be altered for other circumstances. This approach is refreshing, and likely appropriate for the issues tackled by geomorphologists and others who study complex earth systems. Overall, the quality of the presentation, both text and figures, is very good.



No book is perfect, of course. Although there are some errors and omissions that one might quibble over, I think the main issue lies with the notion, stated in the book's supporting material, that one of its two main roles is to serve as a textbook (the other being to serve as a reference). It has potential to be a course text, but there may be some kinks to iron out first. A variety of examples is considered in the book, but overall, the emphasis in the applications lies very strongly with examples from the US desert southwest. This is indeed a fascinating region well-deserving of the attention, but I suspect the book would be far more likely to connect with a much broader range of students if a wider geographic focus was considered in the case studies. Another issue may be the back cover's suggestion that the book requires only "some knowledge of calculus," which might be true but seems a bit optimistic. To be sure, many passages involve a deeper familiarity with mathematical analysis than most students would have acquired through first-year calculus. Additionally, the book seems to show a weakness for very long case studies. These involve much detail that may indeed be important to addressing the research issue raised in the study but does not contribute much to, and indeed might distract substantially from, the core concepts and techniques that the text should focus on conveying. The 11-page discussion of a contaminant transport model (developed by the author and his graduate students) for bed sediments at the Fortymile Wash drainage basin in Nevada is a case in point. Such examples may have their place, but seem better-suited to an edited volume rather than a course textbook, for which briefer and simpler applications would seem more appropriate. Finally, although the quoted price for the book is reasonable as far as these things go, I am of the opinion that books written specifically with students in mind ought to

[2] BC Hydro, Vancouver, BC
Geography Department, and
University of British Columbia
Vancouver, BC

be made available as lower-cost soft-cover editions.

Overall, I am impressed with this book, and feel reasonably comfortable recommending it as a reference text for researchers, practitioners, and graduate students working directly with problems of quantitative geomorphology; or for experienced scientists and engineers in other, allied fields wishing to branch into the subject. It should be taken in context as a research-oriented text, however, and does not appear to provide stock "cook-book" solutions to established problems. It also seems well-suited as a supplemental text in upper-level courses for those students in subjects like geomorphology and Quaternary geology who have a fairly solid mathematical background.

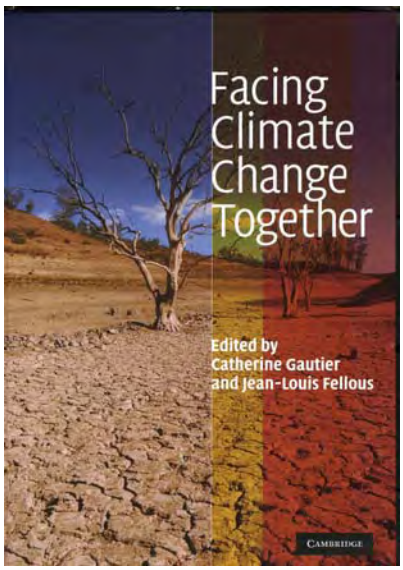
Facing Climate Change Together

Ed: Catherine Gauthier and Jean-Louis Fellous

Cambridge University Press, 2008
ISBN 978-0-521-89682-5, pp. 257, Hardback, US$80.

Book Reviewed by John Stone[3]

* This book is also available in French as *"Comprendre le changement climatique"*, published by Editions Odile Jacob Sciences (2007)



I began to read this book with considerable anticipation. The book is a collection of essays on various aspects of climate change - a subject of not unimportant scientific and policy relevance – and its title suggested that it would begin to discuss solutions rather than be limited to defining the threat. It is the product of an interesting American and French collaboration; most chapters are co-authored by a pair of French and American scientists - many of whom will be well known to *CMOS Bulletin SCMO* readers. One of the Editors, Catherine Gauthier, was the author of a book I recently reviewed for the *CMOS Bulletin SCMO* - Oil, Water and Climate: An Introduction (Vol.37, No.1, pp 28-29) - which I considered to be an excellent volume. Catherine Gauthier, by the way, was a Professor at Université du Québec à Rimouski in the mid-1980s. Each chapter starts amusingly with French and American quotations including Voltaire's reference to Canada as "quelques arpents de neige". However, in the end I was rather disappointed by the book.

At the rate at which the science of climate change is advancing almost any new book risks being out of date by the time it is published. This book is an unfortunate example. Most of the essays were clearly written at the same time as the Fourth Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC) was being completed. Thus, many of the IPCC's conclusions are more authoritative than the science discussed in this book. What makes the situation worse is that recent results give the impression that the AR4 itself is somewhat conservative. In other words, the book's call for the "urgent and immediate need for wise responses [mitigation and adaptation] to potential climate change" can be made even more imperative.

The title of this English version of this book is misleading. The fact is the book does not provide the reader, and particularly the concerned lay-reader, with much information on how we might actually face climate change together. The Conclusions chapter contains some suggestions in what the authors call their "Genesis Strategy" derived from their notion of "let there be light". There is nothing new or deep in this strategy. It includes five elements: research, observations, energy demand and supply and adaptation. However, this chapter is further spoilt by an inaccurate assessment of the science. For example, the authors do not seem to recognize that projections of future climate depend on unknown future emission scenarios and not just uncertainties in the representation of climate processes.

The language in this book is often inconsistent and lacking in rigour. Scientists and policy-makers need to have a commonly understood and precise language for defining and communicating uncertainty. This would seem to be essential if we are to face climate change together. We are given to expect from the Introduction as well as the Forward, written by Jim Baker who was a previous Administrator of the National Oceanic and Atmospheric Administration, that the book will deal with uncertainties. Unfortunately, it pays no attention to their quantification. What the book does do is discuss the uncertainties in our understanding of many processes in the climate system such as the hydrological and carbon cycles because, in the view of the lead authors, this is where the exciting science is being done. To its credit the book treats these uncertainties without giving the impression that the science is still inconclusive.

The book has twelve scientific chapters that focus mostly on research although there is a dedicated chapter on climate observations. The chapters cover, somewhat unevenly,

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[3] Retired Meteorologist and adjunct Research Professor in the Department of Geography and Environmental Studies at Carleton University, Ottawa, ON, Canada

such topics as aerosols, the hydrological cycle, the carbon cycle, oceans, ice and atmospheric chemistry. There is, not surprisingly for a collection of essays, some duplication in the chapters. The first chapter presents the overall scientific consensus on the state of climate science as derived by the IPCC. This chapter is written by two scientists, Richard Somerville and Jean Jouzel, who have been deeply involved in the IPCC and are able to not only discuss the substance of the Assessments but also the process involved in their preparation and the evolution of the IPCC. I would have hoped, however, that at least these two authors would have treated uncertainties more rigorously since the IPCC has spent much effort wrestling with this challenge. Indeed the authors are somewhat guilty of a lack of critical assessment of the science.

In contrast is the chapter on the global water cycle written by Moustafe Chanine and Pierre Morel which is a model of critical writing and a real pleasure to read especially for those who know the latter and his style in running the World Climate Research Programme for over a decade. The authors argue strongly that no serious long-term projections of global climate can be conducted without a quantitatively correct prediction of changes in the hydrological cycle. They recall some of the essential features of clouds, for example noting that: lacking clouds, earthlight on the moon would be dimmer by a factor of two. They discuss some of the short-comings in the representation of moist atmospheric processes in climate models such as cloud microphysics and cloud cell dynamics and suggest that parameterizations based on current climate may not be appropriate in a changed climate. The chapter finishes with a statement which, in its boldness, is characteristic of the authors: “it is time for climate science to reconnect with meteorological science”.

Uncertainties in climate processes are also brought out in the chapters on ocean circulation and the carbon cycle. I found the chapter on ocean circulation by Carl Wunsch and Jean-Francois Minster, to be an excellent introduction with a realistic assessment of our current state of knowledge. The authors point out that the ocean is best regarded as fundamentally turbulent and varying on all time and spatial scales and suggest that, although models have improved and have many practical uses, some of the success may only be artefacts of oversimplified physics, reduced dimensions or accumulated errors. Berrien Moore and Philippe Ciais, both of whom have been prominent global change scientists, have done an excellent job of describing the chemical disequilibrium which is a signature of the planet Earth. They discuss our state of knowledge of the carbon cycle, where we are constantly surprised and still are unable to separate human and natural contributions to carbon stock changes. What I find unsatisfactory in this chapter and similarly in the chapter on atmospheric chemistry by Guy Brasseur and Marie-Lise Chanin, is a complete lack of any chemical equations. Perhaps that is the chemist in me for there are similarly no physics equations either in the book.

A short, almost token, chapter entitled: Climate and Society: what is the human dimension? addresses the socio-economic aspects of climate change. It begins by wasting space discussing the perception of climate change in the US and France which is a rather limited perspective for a book aimed, I presume, at an international and now clearly out-dated with a new Administration in Washington. The chapter touches on the fact that humans have always influenced their environment and notes that recent technological progress has not been the unalloyed benefit that was expected but has actually inflicted damage on society and our environment. But the chapter says very little about how technologies may help us address climate change. The chapter also gives little encouragement that social scientists might yet make more of a contribution to addressing climate change. With the exception of a handful of economists, recently joined by Sir Nicholas Stern, the economics community has shied away from tackling this issue. And where are the behavioural scientists that could help us overcome such detrimental human traits as denial and short-termism or the historians who could explain how previous societies lived without such consumerism that we don’t seem to be able to escape today? The chapter also fails to address the threats to security (geopolitical, energy, health etc…) that climate change poses. But perhaps this chapter’s gravest omission is to not discuss the inescapable nexus between climate change and sustainable development. Anyone looking for a seminal examination of this nexus should read chapter 20 of the Working Group II contribution to the AR4.

In general, this book is well produced as one has come to expect from Cambridge University Press. Despite the lack of consistency and rigour in discussing uncertainties, the English is generally excellent and I only found one instance of a mistranslation. However, the illustrations are not well referenced or presented. For example, all the colour plates are collected together in the centre of the book with no indication of where they belong in the text, and the black and white versions in the text, in addition to being difficult to interpret, make no reference to the colour plates. In conclusion, there are many similar books, at least in English if not in French, that present information on climate change in as accessible a manner as this book and some, including John Houghton’s recently revised “Global Warming: The Complete Briefing”, are more up to date.

JOB - JOB - JOB

Tenure-Track Faculty Position in Satellite Remote Sensing

The Department of Atmospheric and Oceanic Sciences at McGill University is seeking outstanding applicants for a tenure-track Assistant Professor position in the area of Satellite Remote Sensing. The successful applicant will be expected to develop an active research program, supervise graduate students, and teach a variety of undergraduate and graduate courses.

Candidates whose research interests are in the global or regional scales will be considered. They should also have a strong disciplinary expertise in physical meteorology and/or dynamics.

A Ph. D. in atmospheric or oceanic sciences or a closely-related field is required.

McGill University is an English-speaking university located in Montreal, one of North America's most cosmopolitan cities. For more information about McGill University and the Department of Atmospheric and Oceanic Sciences please see http://www.mcgill.ca/meteo

Qualified candidates are invited to submit an application, including a curriculum vitae, a research proposal, and a teaching statement to: Dr. John R. Gyakum, Chair, Department of Atmospheric and Oceanic Sciences, McGill University, 805 Sherbrooke Street West, Montreal, QC H3A 2K6, Canada (Telephone: 514-398-3719; fax: 514-398-6115), or by e-mail with pdf format application to: satellite@meteo.mcgill.ca.

Candidates should also provide three names, with contact information of referees, with their applications. After preliminary screening, the search committee will request reference letters from the list of names that candidates have provided.

The preferred starting date for this position is September 1, 2010.

Review of the applications will begin on October 15, 2009, and continue until the position is filled.

McGill University is committed to equity in employment and diversity. It welcomes applications from indigenous peoples, visible minorities, ethnic minorities, persons with disabilities, women, persons of minority sexual orientations and gender identities and others who may contribute to further diversification. All qualified applicants are encouraged to apply; however, in accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada.

Regional Weather 2008 Highlights

by David Phillips

British Columbia: What Follows May? January

At the beginning of June, when British Columbia residents expect warmth and bountiful sunshine, many along the Pacific coast shivered instead in record-breaking cold and wet weather. Numerous daily record-low temperatures were newly established. Victoria and Vancouver set records for the lowest highs on June 6 and 9. Emerging plants struggled in the inclement weather. Crops such as tomatoes, squash and peppers were at least ten days to two weeks behind. Marijuana growers were also concerned about crop delays. Finally, towards the end of June, seasonably warm weather arrived along the coast when temperatures almost broke 30°C for the first time in the year. In the Interior, temperatures soared to a record high of 40°C at Lytton and 39°C at Kelowna and Lillooet. Add some haze from California wildfires and it finally began to feel like summer.

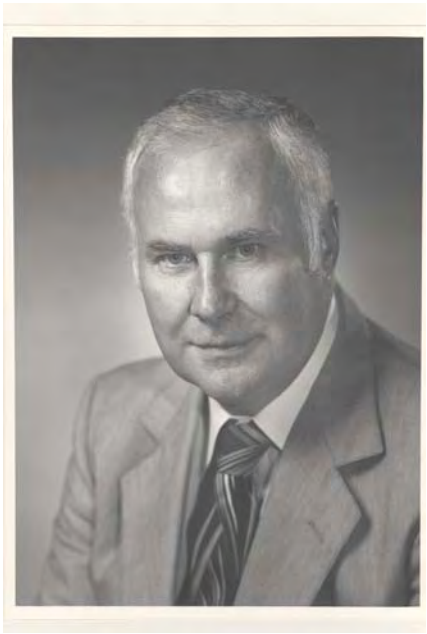
The North: Record Arctic Heat Wave

From July 19 to July 24, maximum temperatures in Iqaluit, Nunavut, ranged between 21° and 27°C, some 15 degrees warmer than normal. The previous all-time high temperature in the territorial capital was 26.1°C on July 29, 2003 with records covering 62 years. On July 21, the temperature soared to 26.8°C, again, some 15 degrees warmer than normal. That would be equivalent to 40°C in Toronto. At night the minimum temperature dipped to 12.6°C, which was the highest minimum temperature on record. Even more unusual was a record humidex value of 27°C.

Gerald Neil Ewing

1932 — 2008

"He was the kindest and most generous of men I have known" said Ross Douglas, Canada's 11th Dominion Hydrographer, on hearing the news of Gerry's passing. Gerry's kindness and consideration for others was a constant theme in comments of many of his friends and colleagues.



Gerry Ewing (Photo courtesy of Canadian Hydrographic Service)

Born in Hampton, New Brunswick, to a large family, Gerry quickly expressed his ambition and competitive spirit through excellence in sports, particularly hockey and soccer. When Gerry was only nine, his elder brother Kenny (then aged 16) was captured in Hong Kong and spent three and a half years in various Japanese POW camps. This made a strong impression on young Gerry. The wartime experiences of his father and brothers, coupled with economic pressure to become self-sufficient, helped him decide on a military career which eventually involved him in combat service in Korea. After graduating from high school in 1950, he served with the Canadian Army (Militia), then with B Squadron Lord Strathcona Horse (R.C.) in Canada and Korea from 1950-1953. Later, he served with the Canadian Officer Training Corps from 1953-1956, then the Canadian Army (militia) 1956 - 1968. He won the Sam Brown Belt and Major General Worthington Sword as the outstanding Royal Canadian Armoured Corps Officer Cadet in 1955 (top of the class).

In spite of these successes, he felt that his talents could be put to better use by acquiring more education. With the military's student support, he completed a B.Sc. in Geology and graduated from St. Frances Xavier University in 1957. Seismic exploration in western Canada was then expanding and he was quickly swept up by Mobil Oil of Canada. He was assigned to one of their field parties.

In the early 1960s, rumours of the establishment of a new Oceanographic Institute in Dartmouth reached the backwoods of Alberta and Gerry and Al Grant decided to head East. Gerry was hired by the legendary Bill Cameron and first assigned to work with the Atlantic Oceanographic Group (AOG) under Neil Campbell. He joined the newly established Marine Geophysics group at BIO in the summer of 1963 but left after a few months to do graduate work, becoming student number three in Mike Keen's group at Dalhousie University (Donny Barrett and Keith Manchester were numbers one and two). He graduated with his M.Sc. in 1965: his thesis described seismic work in the Gulf of St. Lawrence, proving that the Gulf was underlain by thick continental-type crust.

Returning to BIO in 1965, he assumed responsibilities for multidisciplinary surveys, a joint project of the Geophysics Group and the Canadian Hydrographic Service (CHS). Many months at sea brought him in close contact with hydrographers and their work. "He was the nicest fellow to work with" says Burt Smith, then Chief of Hydrographic Parties. "He never lost his cool and never had a harsh word for anybody. But he could not take Baffin's rolling, and spent long hours in his bunk, suffering from seasickness." A new opportunity opened up in 1969 when the position of Assistant Regional Hydrographer was established at BIO. The intention was to strengthen the progress of CHS modernization and Gerry seemed well suited for that task. He won the competition, but the appointment was not without resentment. Promotion in the traditional service was earned by many months of work in small boats and many years of surveys in hydrographic ships. Gerry was an outsider. Nevertheless, Burt Smith, who was one of the unsuccessful candidates in that competition, says without any bitterness: "Gerry was a delightful person to work with because of his calm and methodical approach. He was never afraid to ask for an explanation if unfamiliar with a particular hydrographic practice."

His next promotion in 1972 as the Ninth Dominion Hydrographer (DH) was even more controversial and the appointment was appealed. Again, he soldiered on soon winning the loyalty and devotion of Headquarters and regional staff. His six years as the DH were marked by at least three significant accomplishments. He was instrumental in negotiating an MOU between CHS and GSC establishing a series of "Natural Resource Charts" which brought the results of multidisciplinary surveys to the hydrographic mapping standards. Wide dissemination of these charts (both in paper and digital format) stimulated industry exploration for hydrocarbons, especially on the Grand Banks.

The second part of Gerry's legacy is the publication of the 5th edition of GEBCO (General Bathymetric Chart of the Oceans). While fostering the development of Canadian

marine science, Gerry became increasingly involved in international cooperation, especially working with the International Hydrographic Organization and the International Hydrographic Bureau. As a Canadian Delegate to these organizations, he rescued them from a serious crisis by offering to produce the fifth edition of the General Bathymetric Chart of the Oceans using Canadian resources and expertise. Through his efforts, Canada became one of the leading nations in the art of ocean charting. With David Monahan as Scientific Coordinator (and overall manager of the project), the first two bathymetric sheets were rushed through production in 1975 and 200 copies were ready for distribution to all the delegates at the UN Conference on the Law of the Sea. This was another step in enhancing Canada's international reputation as a leading maritime nation.

"The other legacy that can in part be attributed to Gerry is the success of CHS in computer-assisted chart production" says Gerry's successor, Steve MacPhee, the tenth DH. "Gerry strongly supported a team that worked on a project entitled GOMADS (Graphical On-line Manipulation and Data System). This system was initially intended to manipulate digital chart files. GOMADS evolved over the years and in 1981 CHS was instrumental in having Dr. Salem Masry, a photogrammetry professor at University of NB, establish Universal Systems Ltd. in Fredericton, NB. This company took over the programme and after some years and much further development, the system emerged as CARIS (Computer Assisted Resource Information System). CARIS is now in use in more than 60 countries as a survey and chart production tool and in different forms is used in many other applications. This is not only a tribute to CHS in this period but is also a fine testament to Canadian research and development."

As an ADM, Gerry had a significant impact on the Huntsman Award. He was able to persuade Fisheries Minister Roméo LeBlanc to make a substantial grant to the newly formed Huntsman Foundation. He also persuaded the Organizing Committee of the International Association for Physical Oceanography (IAPSO) to donate to Huntsman Foundation a portion of the surplus funds from their successful conference in Halifax. With a subsequent large grant from the Offshore Petroleum Operators Association, the endowment was well established and provides to this day funds for the Huntsman Award.

The period of Gerry's appointment as the ADM, Ocean Science and Surveys (OSS), was not a very happy time. After the death of his first wife Peggy (from leukemia, in March 1979) some of the "joie de vivre" evaporated and new challenges became difficult to cope with. "He took a hard hit and may have found himself in deep water" says Art Collin who was a close friend and preceded Gerry as the Dominion Hydrographer. The merger of Fisheries and Marine Science changed the Government priorities, and Gerry had to preside over painful budget cuts. It was heart-rending to watch the 'white fleet' deteriorate and the ship replacement program disappear. His major task at this point was the need to allocate resources and personnel to the newly established Maurice-Lamontagne Institute (MLI) at Mont-Joli, Québec. It was a politically driven move as exemplified by the name, location away from the University in Rimouski, and no direct access to ships. Geoff Holland, his close associate in those days, says: "As I recall, one of his biggest decisions was the establishment of the new ocean science centre in Québec at MLI, which meant a reapportioning of scarce resources to that region. It was a difficult time, but he was driven [to do it] by what he thought was right." The result was establishment of an architecturally outstanding Institute with a stunning view of the mouth of the great St. Lawrence River."

It came almost as a relief, when his ADM appointment was terminated through reorganization within the Department in 1985. He was briefly on an Executive Interchange as the first Director of the Centre for Frontier Engineering Research at the Technical University of Nova Scotia (TUNS,now DalTech) and completed his public service as the Chairman (1986-1989) of the Fisheries and Oceans Research Advisory Council (FORAC). On completion of his time as ADM Science, he did not waste any time in returning to Nova Scotia and building, with his second wife Marie, a beautiful retirement residence in Lakelands, near Mount Uniacke.

Back in Nova Scotia, Gerry started rebuilding the old friendships. He joined the Legion and again became involved in sports taking up lawn bowling with enthusiasm, a sport more suitable for his age. This idyllic life did not last. In 1998 he suffered a debilitating stroke which severely limited his participation in community activities. He suffered the final blow in October 2002 when his second wife died, also from cancer. The last official function he attended was at BIO in 2003, celebrating the award of the Order of Canada to Mike Eaton, a long-time CHS champion of the Electronic Chart Project. Soon, the medical problems started piling up with increasing severity leading to much suffering in his final days.

Gerry had an outstanding career. One gets the impression, and Art Collin agrees, that he was not driven by "blind ambition" but instead that his loyalty and sense of duty compelled him to accept larger and larger challenges as they were presented to him. Throughout that career he remained a quiet, generous and kind person, which is how his many friends will remember him. He was a consummate team player and a great friend.

Written by *Bosko D. Loncarevic* with the assistance of Gerry's family, many friends and colleagues.

Note from the Editor: It was during the 2009 CMOS Congress held in Halifax that I became aware of this obituary written by Bosko Loncarevic and published in the *BIO-Oceans Association Newsletter*, issue # 39, July 2008. It is reproduced here in a slightly modified form with the written authorization of the original author.

Don Vachon

1957 — 2009

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

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

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

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

SHORT NEWS / NOUVELLES BRÈVES

Environmental scientist of the year

by Billy Comeau

Dalhousie University, May 25, 2009. The oceans make up 70 per cent of the Earth's surface, 90 per cent of the biosphere and are the most important parts of the global environment. Through overfishing, air pollution and pumping waste directly into them, humans have neglected and taken for granted the oceans, and the life dependent on them, for too long.

Ron O'Dor has spent his life researching the oceans, working to understand marine life, and reversing this downward spiral draining our planet of its lifeblood. His dedication has earned him Canadian Geographic's Environmental Scientist of the Year award.

"It's a pleasure to be recognized for my scientific contributions," says Dr. O'Dor. "I don't consider myself an environmentalist, just a scientist interested in the environment".

Dalhousie professor Ron O'Dor has been named Canadian Geographic's Environmental Scientist of the Year. (Danny Abriel Photo)

A Professor of Biology at Dalhousie, Dr. O'Dor is the scientific director for the Dalhousie-headquartered Ocean Tracking Network (OTN), a $168-million global conservation project uniting leading ocean scientists around the globe. Acoustic tags and receivers track and record the migration and feeding habits of marine life around the world and measure information such as salinity and temperature. OTN will put an end to the knowledge void of the ocean and lead to a global standard in ocean management. Additionally, Dr. O'Dor is the chief science officer of the Census of Marine Life (CoML), a Washington D.C.-based 10-year, 82-nation project to gauge and record the diversity, distribution and abundance of life in the world's oceans.

Dr. O'Dor is pleased that OTN and the CoML are both unbiased sources of factual information. Both attempt to focus on good information as opposed to opinions, much like the man leading them. “OTN and the Census are like *CSI*,” he says, comparing them to the popular TV series. “We don't write the laws and we don't catch the bad guys, but we collect the evidence and give it to those with the power to do so”.

While his work can take him around the globe in weeks, he has a passion for what he does. “I've never taken a job I didn't enjoy and I never plan on doing so,” he says. He manages to stay on top of his work by not getting bogged down with minute details. “Someone has to keep their eye on the pie in the sky,” explains Dr. O'Dor.

He admits the constant travel has an interesting side effect. “My brain has turned into a PowerPoint presentation,” he laughs. “I am constantly giving and listening to presentations and now I process information as if it's on the background of a PowerPoint slide.”

Environmentally and regarding the oceans, he thinks society is moving toward better practices. Pointing to coral beds being closed to fishing in the Bahamas, places in the Northeast Atlantic banning trawling and increased funding from OTN partners such as Australia for ocean observing, he thinks humans are beginning to understand the urgency facing the environment. “If you have the power to destroy something, you have to take responsibility for it,” he says.

Dr. O'Dor is the fourth recipient of Canadian Geographic's Environmental Scientist of the Year Award. He is profiled in the latest issue of *Canadian Geographic*.

Source: Dalhousie University News website visited June 19, 2009.

Notes from the Editor:
1) Reproduced here with the written authorization of the author.
2) It is also planned to publish a report on **Ocean Tracking Network** in a future issue of the *CMOS Bulletin SCMO.*

2009 National Conference of the Ocean Management Research Network

October 21-24, 2009

University of Ottawa, Ottawa, Ontario, Canada

Announcement and Call for Submissions

The 2009 National Conference of the Ocean Management Research Network (OMRN) will be held in the National Capital Region, October 21-24, 2009. The University of Ottawa will host the conference, for the second consecutive time, at the site of the new Désmarais Multidisciplinary Building.

Researchers, managers, policy-makers, students, industries and communities are all invited to participate in this gathering to join in discussions, share ideas and synthesize research results on the management of Canada’s three oceans - Atlantic, Pacific and Arctic.

The 2009 National Conference will feature sessions on contributed papers and posters on original work. As well, the conference will present panel discussions and workshops on thematic topics focussed on assessing the state of knowledge, research gaps and priorities of the human use of Canada’s oceans and coasts. The deadline for electronic submission of paper and poster abstracts is **September 9th, 2009.**

For further information and registration to the Conference, interested parties are invited to consult the OMRN 2009 National Conference website at: www.omrn-rrgo.ca

The OMNR gratefully acknowledges the funding support of the Social Sciences & Humanities Research Council of Canada and Fisheries and Oceans Canada.

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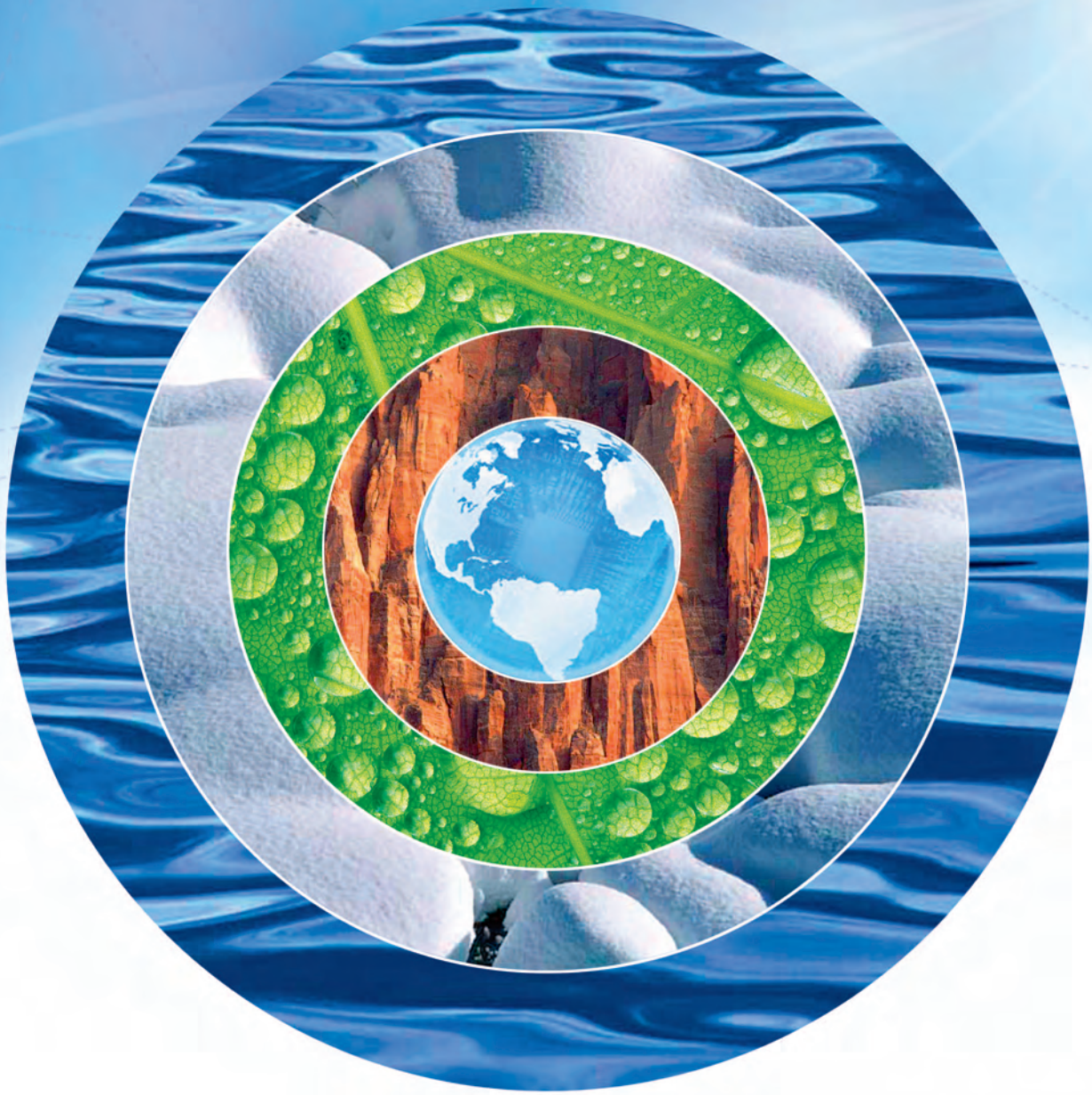

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