



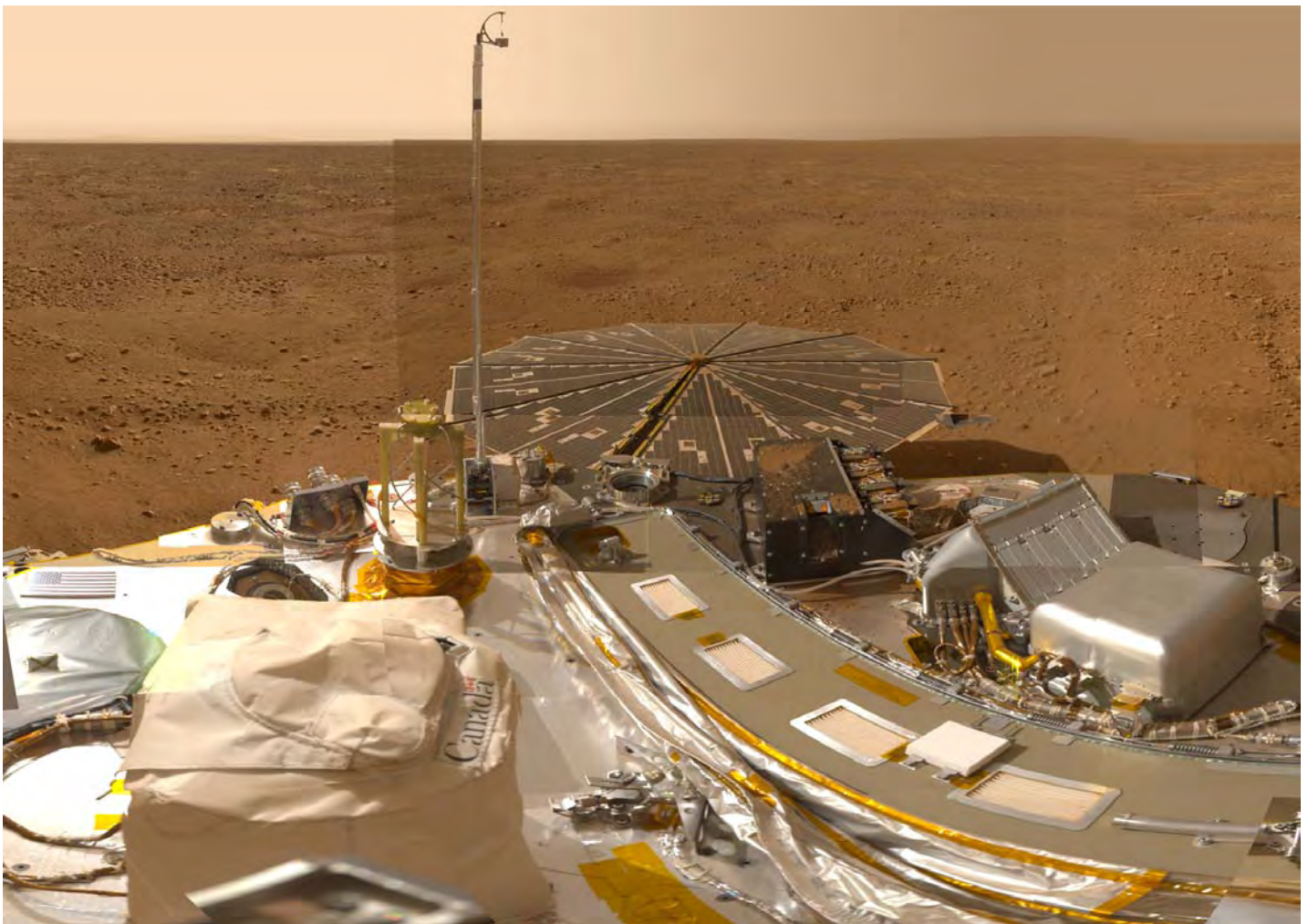
Canadian Meteorological  
and Oceanographic Society

La Société canadienne  
de météorologie et  
d'océanographie

# CMOS **BULLETIN** SCMO

April / avril 2009

Vol.37 No.2



**“A Maple Leaf on Mars”  
“Une feuille d’érable sur Mars”**

## CMOS Bulletin SCMO

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

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**Cover page :** "A Maple Leaf on Mars"! Shown on cover page is a SSI non-calibrated image of MET on Mars, soon after landing. The lidar is under the protective cover with the Canada logo and the MET mast and telltale are behind. The thermocouples are on the far side of the mast. Image credit: NASA/JPL-Caltech/University of Arizona/Texas A&M, provided by Mark Lemmon. To learn more on this Canadian MET station on planet Mars, please read the article on **page 43**.

**Page couverture :** "Une feuille d'érable sur Mars"! En couverture, on voit une image non calibrée SSI du MET, peu après l'amarissage. Le LIDAR est sous une bâche portant le logo Canada; et le mat du MET ainsi que l'indicateur de vent sont derrière. Les thermocouples sont situés du côté éloigné du mat. L'image est de NASA/JPL-Caltech/Université de l'Arizona/Texas A&M, fournie par Mark Lemmon. Pour en apprendre plus sur cette station canadienne MET sur la planète Mars, veuillez lire l'article en **page 43**.

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## ....from the President's Desk

Friends and colleagues:



Andy Bush  
President of CMOS / Président de la SCMO

With the back of winter broken (at least in the west) I'm sure many of us are looking forward to putting away the shovel and breaking out the lawnmower.

The American Geophysical Union is actively pursuing the idea of creating an international umbrella for all geophysical science unions and societies. At their fall meeting in San Francisco, CMOS was represented by myself and Patrick Cummins. The AGU is proposing a second such meeting in Vienna, coincident with the EGU congress. If that does occur and if some of you are going to the EGU meeting and are interested in participating, please let me know. I will continue to liaise with this international group through the next year along with John Pomeroy, president of the Canadian Geophysical Union, with whom we have formed the Canadian Societies for the Geophysical Sciences (CSGS). We are still trying to find the best method to make CSGS the first point of contact for both CMOS and CGU. What sounds so simple is actually not.

The announcement of the federal budget was disconcerting, to say the least. The dire news surrounding funding for the geosciences sparked a flurry of post-budget letters to the government from a variety of organizations across the country. CMOS did not send a letter after the budget was announced, but we did send one beforehand. There was no reply. With CFCAS scheduled to end in March 2011, and with what effectively amount to cuts to NSERC, we expect to see a funding crisis looming for our community. This will negatively impact not only research but also our training of highly qualified personnel. It is difficult to take on new students when the funding situation is so unclear. John Pomeroy and I feel we should meet with NSERC under our CSGS umbrella sometime before our respective congresses in May.

One could view the situation from a different angle, however, and simply say that these are exciting times to be doing climate research! I know we are all doing our part to improve the situation and hopefully our work will pay off in the end (but sooner rather than later).

**Andy Bush**, *President / Président*

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Cette publication est produite sous la responsabilité de la Société canadienne de météorologie et d'océanographie. À moins d'avis contraire, les opinions exprimées sont celles des auteurs et ne reflètent pas nécessairement celles de la Société.

## ADM Distinction Award for Dr. Arthur Collin

At the recent DFO Science Managers meeting, Wendy Watson-Wright presented the ADM Distinction Award to Dr. Arthur E. Collin.

Dr. Collin began his distinguished career in the service of Canada in 1955 as a research scientist with the Fisheries Research Board of Canada. Over the years, he held a number of senior positions in the Public Service, including: Assistant Deputy Minister, Fisheries Research; Assistant Deputy Minister, Atmospheric Environment Service; Associate Deputy Minister, Department of Energy, Mines and Resources; and Science Advisor to the Government of Canada and Secretary of the Ministry of State for Science and Technology.

As the Dominion Hydrographer of Canada (1967-1972), he established a university-accredited Canadian training program for hydrographic science and rebuilt the Canadian Hydrographic Service into a world-class institution that has served as a model for many other Maritime nations.



As Science Advisor to the Government of Canada and Secretary of the Ministry of State for Science and Technology (1984), he was instrumental in the creation of University Research Chairs and the federal Network of Centres of Excellence which

continue to exist and flourish today. Later, Dr. Collin became the founding Director of the Institute for Robotics and Intelligence Systems (IRIS), a Network Centre of Excellence. He also left his mark at the Privy Council Office where he was instrumental in developing and moving forward legislation to establish the Canadian Space Agency.

Up until 2006, Dr. Collin served as a member of the Science and Technology Advisory Council to the Government of Canada and the Council of Science and Technology Advisors. During this time, Dr. Collin also made major contributions to the development and growth of the Royal Canadian Geographical Society as President of the Society.

In keeping with his long-time interest in advancing the understanding of climate change and Canada's North, Dr. Collin currently sits as the Chair of the Board of Directors for the Polar Climate Stability Network, funded by the Canadian Foundation for Climate and Atmospheric Sciences (CFCAS).

Over the last eight years, Dr. Collin has been instrumental in providing advice that has helped shape the DFO Science

Program through his work as Chairman of the Science Advisory Council, and more recently, representing the Science Advisory Council as a member on the Department's Science Management Board. Wendy expressed her gratefulness to him for this contribution and said "Throughout his public service career and retirement he has exemplified leadership excellence in developing, contributing to, and implementing initiatives that have strengthened the Government of Canada's science and technology capacity in support of public policy and the management of federal science".

## Highlights of Recent CMOS Meetings

- Abstracts submitted to our 2009 Halifax congress, "Sea and Sky Come to Life", number over 440 now, which is excellent.
- Organization of the 2009 Halifax congress, "**Sea and Sky Come to Life**" is proceeding well, thanks to the efforts of the members of the Local Arrangements and Scientific Committees.
- The theme for the joint CMOS-CGU 2010 Ottawa congress has been finalized: "**Our Earth, Our Air, Our Water -- Our Future**", "**La Terre, l'air, et l'eau: notre avenir.**"
- The CMOS president chairs the Nominating Committee for the CFCAS Board of Trustees. I'm happy to report that all current Board members have agreed to remain in place.
- The CMOS executive approved en masse a number of Centre requests for Science Fair matching funds.
- Work continues on the Flight Service Specialist accreditation procedure.
- Our CMOS tour speaker, Ken Denman, has given an excellent set of 13 very well received presentations in all. Thank you Ken!
- The final cheque was cut for room rentals for the 2009 Halifax congress.

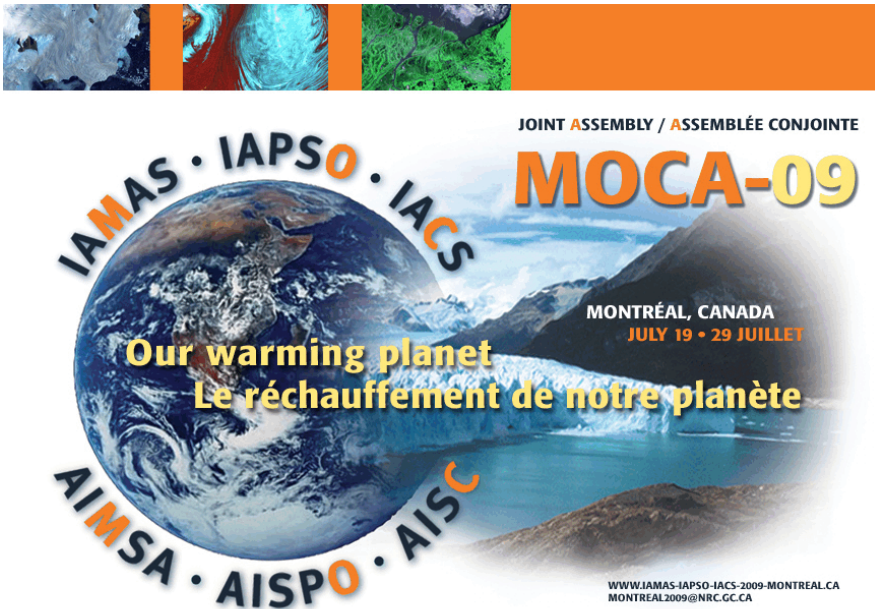
Andy Bush, CMOS President, Président de la SCMO

### Next Issue CMOS Bulletin SCMO

Next issue of the *CMOS Bulletin SCMO* will be published in **June 2009**. Please send your articles, notes, workshop reports or news items before **May 8, 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 **juin 2009**. Prière de nous faire parvenir avant le **8 mai 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.



A Meteorological – Oceanographic – Cryospheric Assembly of researchers from around the world

*Venant des quatre coins du monde, des spécialistes de la Météorologie, de l'Océanographie et de la Cryosphère se réunissent en Assemblée conjointe de leurs trois associations internationales*

...how are changes in atmospheric circulation, land and sea ice cover, and ocean currents linked to one another?

*...comment les changements de circulation atmosphérique, l'étendue de glace marine et terrestre et les courants océaniques interagissent-ils?*

See [WWW.MOCA-09.ORG](http://WWW.MOCA-09.ORG) to register online. Full details on MOCA-09 Partnership and Exhibitor opportunities are also now available online. For more information, please contact [MONTREAL2009@NRC.GC.CA](mailto:MONTREAL2009@NRC.GC.CA)

Visitez le site [WWW.MOCA-09.ORG](http://WWW.MOCA-09.ORG) pour vous inscrire en ligne. Les détails sur les possibilités de parrainage et le prospectus pour exposants sont également disponibles en ligne. Pour de plus amples renseignements contacter [MONTREAL2009@NRC.GC.CA](mailto:MONTREAL2009@NRC.GC.CA)

## Recent Addition to the Canadian Oceanographic Historical Photos Archive

Contribution by Howard Freeland

There was an important oceanographic event in Canada on July 2008. DFO/IOS hosted scientists from around the world at a Festschrift in celebration of the 65<sup>th</sup> birthday of Chris Garrett. A group picture was taken at the event along with identification keys. This contribution, along with other archived photos, may be found on the CNC/SCOR web site at: <http://www.cmos.ca/Oceanphotos/photoindex.html>



The next CMOS Congress will be held in Halifax, Nova Scotia, 31 May – 4 June, 2009. The selected theme is **“Sea and Sky Come to Life”**. It will be held at the World Trade and Convention Centre (WTCC). The web site for the Congress is:

<http://www.cmos.ca/Congress2009/index.htm>

The Congress will begin with committee meetings during the day on Sunday May 31<sup>st</sup> which will be followed by an icebreaker reception at the historic Brewery Market on Lower Water Street; this is just a short walk from the WTCC. Beginning on Monday June 1<sup>st</sup>, there will be more than 440 presentations (oral and poster) during the Congress. Plenary addresses will be given by Drs. John Cullen, Dick Peltier, Jack Beven, Doug Wallace, Amy Bower, Anne de Vernal and Jim Drummond.

The CMOS Annual General Meeting will be held during the evening of Monday June 1<sup>st</sup> and all CMOS members are encouraged to attend. This will be preceded by a Town Hall hosted by the Natural Sciences and Engineering Research Council of Canada (NSERC).

On Tuesday June 2<sup>nd</sup>, the Parsons - Patterson Luncheon will be held in the Grand Ballroom of the WTCC. During the late afternoon on this day, the Assistant Deputy Minister of the Meteorological Service of Canada will also host a Town Hall entitled *“A renewed vision and strategic direction for Environment Canada’s weather and environmental services”*. A public lecture entitled *“Canadian Hurricane Centre Reflections: Two Decades of Lessons Learned”* will be given by Peter Bowyer that evening at the Maritime Museum of the Atlantic on the Halifax waterfront.

On Wednesday June 3<sup>rd</sup>, the CMOS Banquet and Awards Presentations will take place in the Grand Ballroom at the WTCC.

The Local Arrangements Committee and Scientific Program Committee look forward to greeting everyone here in Halifax where the **“Sea and Sky Come to Life”**.

*John Parker*  
Chair of the CMOS 2009 Local Arrangements Committee  
([john.k.parker@ec.gc.ca](mailto:john.k.parker@ec.gc.ca))

*Blair Greenan*  
Chair of the CMOS 2009 Scientific Program Committee  
([greenanb@mar.dfo-mpo.gc.ca](mailto:greenanb@mar.dfo-mpo.gc.ca))

Le prochain congrès de la SCMO aura lieu à Halifax, en Nouvelle-Écosse, du 31 mai au 4 juin 2009. Le thème choisi du congrès est **“Mer et ciel s'animent”**. Le congrès se tiendra au World Trade and Convention Centre (WTCC). Le lien du site web pour le congrès est:

<http://www.cmos.ca/Congress2009/index.htm>

Le congrès débutera avec les assemblées des comités durant la journée de dimanche le 31 mai qui sera suivi par la réception brise-glace au site historique Brewery Market sur la rue Lower Water, à seulement une courte distance du WTCC. Débutant le lundi le 1<sup>er</sup> juin, il y aura plus de 440 présentations (orales et affiches) durant le congrès. Les conférences plénières seront données par les Drs John Cullen, Dick Peltier, Jack Beven, Doug Wallace, Amy Bower, Anne de Vernal et Jim Drummond.

L'assemblée générale annuelle de la SCMO se tiendra le lundi le 1<sup>er</sup> juin durant la soirée et tous les membres de la SCMO sont encouragés à y assister. Cet événement sera précédé par une rencontre générale informelle organisée par le Conseil de recherche des Sciences naturelles et d'ingénierie du Canada (CRSNG).

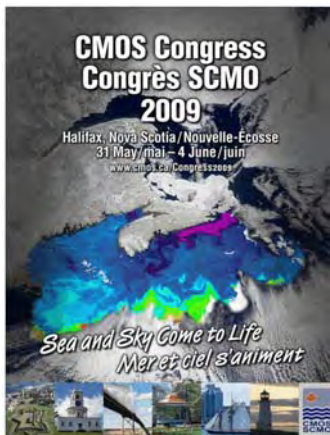
Mardi le 2 juin, le déjeuner de Parsons-Patterson aura lieu dans la Grand Ballroom du WTCC. Tard dans l'après-midi, le sous-ministre adjoint du Service météorologique du Canada sera aussi l'hôte d'une rencontre publique intitulée *“Une nouvelle vision et une direction stratégique pour les Services météorologiques et environnementaux d'Environnement Canada”*. Une conférence publique intitulée *“Les réflexions du Centre canadien de prévision des ouragans: deux décennies de leçons acquises”* sera présentée par Peter Bowyer le même soir au Musée Maritime de l'Atlantique sur le bord de mer d'Halifax.

Mercredi le 3 juin, le banquet de la SCMO et les présentations des récompenses prendront place dans le Grand Ballroom du WTCC.

Le Comité local d'organisation et le Comité du programme scientifique se réjouissent à l'avance de rencontrer tout le monde ici à Halifax où **“Ciel et terre s'animent”**.

Note from the Editor: The program for the Congress and all abstracts are available on the web at:  
[https://www1.cmos.ca/abstracts/congress\\_schedule.asp](https://www1.cmos.ca/abstracts/congress_schedule.asp)

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Note du Rédacteur: Le programme du congrès et tous les résumés sont disponibles sur la toile à:  
[https://www1.cmos.ca/abstracts/congress\\_schedule.asp](https://www1.cmos.ca/abstracts/congress_schedule.asp)



## The First Forecasters

by Morley Thomas<sup>1</sup>

Canada's first weather forecasters had no training in meteorology but learned to forecast on the job. This method of training forecasters existed for sixty years when weather forecasting was more of an art than a science. Then from 1933 to 1940 the Meteorological Service, in conjunction with the University of Toronto, offered a one-year post-graduate course that led to an MA in Physics (Meteorology) at the university. This article deals mostly with this period prior to World War II.

### Public Weather Forecasting

With funds from the federal government, Professor George T. Kingston of the Toronto Observatory established the Meteorological Service of Canada in 1871. Immediately the government asked him to prepare and issue storm warnings for the Atlantic Coast and the Great Lakes. Kingston then obtained half a dozen or so observers to report to him by telegraph and he began exchanging weather observations with the Americans who had established their national service a year earlier.

Weather maps were always the basic tool in forecasting although at first the extent of the daily maps was limited to southeast Canada and the eastern part of the United States. Kingston and Charles Carpmael, his assistant, both University of Cambridge mathematics graduates, developed empirical forecasting methods and procedures taking advantage of those developed in the United States and Britain. In 1871 the Observatory library held at least a dozen British, American and German textbooks and many papers and pamphlets on meteorology. As the weather maps accumulated, much dependence in forecasting was put on "history," that is in the study of previous weather maps seeking analogous situations. The first Canadian-prepared storm warnings and forecasts were issued in 1876.

Kingston hired young men to assist in the Map Room; one of them, Frederic Stupart, was hired in 1871 as a "map drawer" at the age of 15 years. Kingston thought that three or four years experience was required before an assistant could become a forecaster. Usually, four men rotated on the forecast desk in the Map Room with the director regularly taking a turn. The forecasters also went on inspection trips periodically to the reporting stations to check on observing methods and the location of the instruments. Stupart followed Kingston and Carpmael as director in 1894, became Sir Frederic in 1917 and retired in 1929. A notable non-professional in the Map Room for decades was Frank O'Donnell who was hired in 1900, became chief forecaster in 1923 and did not retire until 1946 when the Map Room

was closed.

The first Canadian university graduate to forecast in the Map Room was A.J. Connor, an MA in Classics, who was hired in 1907 as a part-time forecaster. In 1919 Jonathon Sharpe, a Toronto physics graduate was hired, trained and began forecasting. When he resigned in 1922 another graduate, A.C. Steadman, was hired but he resigned in two years. Then, graduates Ernie Chilcott and Bill Thorne were hired in 1925 and began their training. Hugh Grayson-Smith, a Toronto physics Ph.D, was hired in 1927 to develop forecasting methods to assist forestry and aviation but he returned to the university in two years. No more graduates were hired for public forecasting and when the Map Room closed in 1946 the forecasters were O'Donnell, Chilcott, Thorne and Karl Fox, a Great War veteran who was hired in 1917 and began forecasting in the 1930s.

A second public weather forecast office was set up at Victoria in 1898 to prepare forecasts for southern British Columbia, and Napier Denison was sent from the Toronto Head Office to do the forecasting. Denison expanded the work of the Victoria Gonzales Heights Observatory, experimented with long-range and aviation forecasting and became a local seismology authority. He retired in 1936 and in a year the Vancouver District Aviation Forecast Office took over public weather forecasting for British Columbia.

### Aviation Weather Forecasting

In 1930 several science graduates were hired and began their training to provide forecasts for air mail flying. Don Archibald, a Manitoba graduate with an MA in Physics from Yale, was hired as the supervisor of the Western Air Mail Weather Service and was located in Winnipeg. To assist him science graduates Alan McCauley and Harold Troop were hired and began their training in atmospheric physics at Head Office in Toronto. An Eastern Air Mail Weather Service was located at Head Office in Toronto. Graduates Bill (Knowles) Middleton and Alex Chisholm were hired and began their training with McCauley and Troop. However, with the economic Depression deepening, the Post Office began cancelling the air mail contracts and funding for aviation meteorology ceased in April 1932. A dozen or so observers who had been hired and trained on airports across the country were discharged. Training for the forecasters ceased but Patterson assigned them to other duties and was able to find funds to keep them on staff.

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<sup>1</sup> Retired meteorologist, CMOS Member, Toronto Centre

The needs of civil aviation for weather information continued to grow but the Meteorological Service's budget did not. The three graduates of the first MA course were hired but not for weather forecasting - Graham Millar for research, Clarence Boughner for climatology and Murray Monsinger for Toronto observing. When four more graduated in 1935 there were still no funds and they could not be hired. But by the summer of 1936, however, when the government began to move quickly to support commercial aviation, additional funds did become available. Reg Noble, Hugh Bindon, and Carl Muskat, graduates of the 1935 course, returned to meteorology and were hired along with Dean Smith from the 1936 course. Most graduates from the 1937 and succeeding courses were hired and posted to the new District Aviation Forecast Offices (DAFOs) established to serve Trans-Canada Airlines. By the summer of 1939 there were 25 graduates of the Toronto MA course working at the DAFOs.

Some scientists who had not taken the MA course at Toronto were hired for forecasting in the pre- and early war years. Pat McTaggart-Cowan was hired in 1936 to study in Britain and develop forecasting methods for the flying boat experimental transatlantic flights. He was joined in Newfoundland by two from the MA courses and Gib Henry, a physics Ph.D student, in 1937. Two Canadians with American degrees in physics and meteorology also joined the staff - in 1936 Fred Turnbull, who became a pioneer at the Toronto Malton DAFO and in 1938 Tom Howe who opened an Edmonton office to service aviation.

In 1940 it became apparent that more meteorologists were needed to provide forecasts and instruction in meteorology at dozens of new airfields opened by the Royal Canadian Air Force in the British Commonwealth Air Training Plan. A short Intensive Course in Meteorology was set up late that year to train "dependent" forecasters. By the end of the war 12 such courses had been held and 373 recruits graduated. In 1942 more "independent" forecasters were needed at the DAFOs and at the RCAF operational bases so over the next three years 103 short course graduates were brought back for additional training. Most wartime meteorologists departed at the end but, by mid-1946, 55 dependent forecasters and 79 independent forecasters who were trained in wartime remained in the MSC.

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## World Oceans Day – June 8

**World Oceans Day**, June 8, is a time to remember the life-giving role of oceans. This international celebration, declared in 1992 at the United Nations Earth Summit in Rio de Janeiro, Brazil, has grown from a ripple into a tidal wave of awareness about the importance of our oceans.

## Other Early Meteorologists

John Patterson, a Toronto graduate in mathematics and physics with a Cambridge graduate degree and meteorological experience in India, was hired in 1910 as a physicist. When he succeeded Stupart as head of MSC, Andrew Thomson, a Toronto graduate with geophysical experience in the United States, the Pacific and New Zealand, replaced him as physicist. However, with the advent of World War II, both men became fully occupied with administration as they guided the service through the development and provision of aviation services for Trans-Canada airlines (Air Canada) and the Armed Services.

Prior to the 19<sup>th</sup> century, experienced technicians were in charge of the other activities carried out by the Meteorological Service – climatology, magnetic observations, time keeping, and solar observations. In 1911 Connor became responsible for climatology and in 1920 Walter Jackson for magnetism. Jackson had joined the service in 1904 and subsequently obtained two degrees in science from Toronto. In the 1930s more science graduates were recruited – in 1936 Gerry Gill and Ratje Jacobson to develop an upper air sounding system and Jim McPherson to assist in surface observing, and in 1938 Wendell Hewson, a graduate of the 1935 MA course, came to the service with a Ph.D in meteorology from the University of London. In 1940 Larry Sobiski was hired to assist in upper air development and Wendell Smith in meteorological instruments.

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## 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 rejoindre la SCMO.

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## Journée mondiale des océans – le 8 juin

Le 8 juin, **Journée mondiale des océans**, est l'occasion de souligner le rôle vital joué par les océans. Cette journée a été proclamée lors du Sommet de la Terre des Nations Unies qui s'est déroulé à Rio de Janeiro, au Brésil, en 1992. Après des débuts timides, elle est devenue un moyen extraordinaire de sensibilisation à l'importance de nos océans.



## Phoenix MET – a Weather Station on Mars

by Peter Taylor<sup>1</sup>, James Whiteway<sup>1</sup>, Allan Carswell<sup>1,6</sup>, Cameron Dickinson<sup>1</sup>,  
Mike Daly<sup>2</sup>, Vicky Hipkin<sup>3</sup>, David Fisher<sup>4</sup> and Carlos Lange<sup>5</sup>

For the 2008 CMOS congress in Kelowna, one of us (Peter Taylor) was honoured to have been asked to give one of the plenary talks on the final morning, May 29, 2008. The topic was “*The NASA Phoenix Mars mission*”. Phoenix had launched August 4, 2007 from the Kennedy Space Centre at Cape Canaveral (Figure 1a) and was to land on Mars on May 25, 2008. Landing on Mars is a risky proposition, so Peter’s talk had two endings prepared. Fortunately, the landing was picture perfect, our instruments started to work and, by the morning of May 29, we even had some preliminary data to talk about [though not yet *Canadian scientists discover snow falling from Martian clouds (Il neige sur Mars!)*, *CMOS Bulletin SCMO*, Vol.36, No.6, pages 223-224]. Figure 1b shows the lander on the surface of Mars.



Figure 1a: The launch, at 5:26 a.m. EDT on Aug. 4, 2007 at Cape Canaveral

Phoenix was the first successful landing in the northern polar regions of Mars. Although the Mars rovers have been spectacularly successful from a geological and imaging sense, the last in situ meteorological data are from Pathfinder in 1997-1998 or Viking back in 1976-1982.

While Peter was fretting in Kelowna, other members of the Canadian MET team were experiencing the stress and excitement of the landing at the Science Operations Centre

(SOC) at the University of Arizona in Tucson. Spacecraft operations were coordinated from NASA’s Jet Propulsion Laboratory (JPL) in Pasadena and Lockheed-Martin’s operation centre in Denver while the Science aspects of the mission were dealt with at the University of Arizona in Tucson where Peter Smith is the Principal Investigator for Phoenix. Members of the science team come from various centres in the US, from Germany, Denmark, Finland and the UK, plus a strong team from Canada, including members from York University, University of Alberta and Dalhousie University, MDA, Optech Incorporated, the Geological Survey and the Canadian Space Agency. Professor James Whiteway from York University is the leader of the Canadian Science Team. Jim took over from our colleague Diane Michelangeli who, very sadly, lost her battle with cancer in August 2007, just a few weeks after the launch. Professor Allan Carswell of Optech Inc. and York University initiated the Canadian involvement with funding and strong support from the Canadian Space Agency.

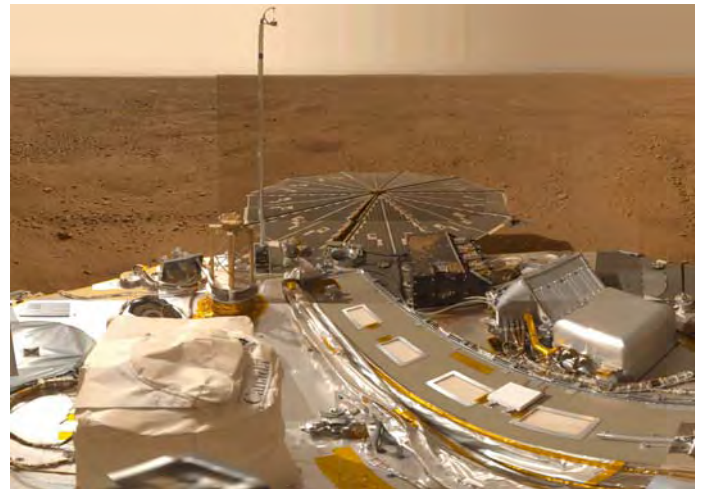


Figure 1b: Surface Stereo Imager (SSI) non-calibrated image of MET on Mars, soon after landing. The lidar is under the protective cover with the Canada logo and the MET mast and telltale are behind. The thermocouples are on the far side of the mast. Image credit: NASA/JPL-Caltech/University of Arizona/Texas A&M, provided by Mark Lemmon. This figure is also shown in colour on the cover page.

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Not all members of the Canadian Science team spent the whole duration of the mission in Tucson, but remote access to the data and other communication was possible so it was an exciting summer for all of us. For those of us present at the Operations Centre, life was complicated by a work schedule based on Mars time. We basically worked Mars nights and since a Mars sol is about 24.6 Earth hours the shift moved forward about 0.6 hours each day, resulting in the "loss" of one Earth day each month. Instructions and data were passed to and from Phoenix via the Mars orbiting satellites (mostly Odyssey and the Mars Reconnaissance Orbiter or MRO). This saved power on the lander since direct communication to Earth would need a stronger transmitter and larger antennae but limited the communication opportunities. The basic plan for the science operations involved a late afternoon data transmission from Phoenix, an evaluation of the data by the Science Team, making plans for the next sol's activities on Mars, negotiating how the next sol's power and data transmission resources should be utilised by the various teams and setting up a series of instructions to be relayed to the lander for the next sol's activities. Our MET team was relatively well placed in the resource negotiations since the MET package had its own separate data storage. We were able to operate the temperature and pressure sensors at a 2-Hz sampling rate throughout the mission apart from short daily interruptions for data transfer. We were also successful in getting sufficient resources to run the lidar for 15 min to 1 hr on most sols and our Danish colleagues obtained a series of telltale images to estimate winds several times per sol.

The landing site, at 68.21°N, 125.76°W, was chosen based on the anticipated presence of ice just beneath the surface and, for a safe landing, a lack of large boulders. The site selection team used high resolution images from the Mars Reconnaissance Orbiter to assist in site selection, and the anticipated presence of ice was based on remote Gamma ray spectroscopy from Mars Odyssey. The Martian Arctic circle is at about 66°N, very similar to Earth's, so with a landing site North of the Arctic circle and power coming from batteries charged by solar panels, the Phoenix lander would only operate during the Martian northern hemisphere summer. The Primary Mission was 90 sols (Martian days) long and we managed to keep things going until sol 151 (measured from the start of the mission). Battery power dropped below a critical point at that stage and the lander went into "safe" mode from which it has not recovered. In principle, it is now in "Lazarus" mode. Over the Martian winter, temperatures at the site will drop to below 150°K (-123°C) and there will be significant amounts of CO<sub>2</sub> frost deposited on the lander. We anticipate damage to the electronic components due to cold temperatures causing contraction and brittleness and frost loading may damage the structure, for example of the solar panels. There will, however, be attempts to communicate with the lander in the Spring and a very small possibility of getting parts of the MET station activated. Note that the Martian year is about 1.93 Earth years so the spring of 2010 is when we might hope for a response from Phoenix.

The overall mission included a suite of soil-chemistry and microscopy experiments to study the regolith (Martian soil) and any ice that could be obtained with the robotic arm from beneath the surface. The robotic arm carried one camera system while a sophisticated Surface Stereo Imager (SSI) camera was critical for many aspects of the mission. The Canadian Space Agency provided funding and support for the MET package including three thermocouples on a 1m mast above the deck of the lander, a pressure sensor provided by the Finnish Meteorological Institute and a telltale wind sensor provided by a Danish university group. The most innovative component of the MET package is a dual wavelength lidar system which has successfully studied dust and cloud in the Martian boundary layer. Additional details of the MET instrumentation are given by Taylor et al, (2008) and Whiteway et al, (2008).

The Phoenix lander successfully made near continuous 0.5 Hz measurements of air temperature at three levels above the deck of the lander and of deck level air pressure. Wind speed and direction estimates were frequently obtained 1m above the deck (2m above ground) by the telltale and the SSI camera system. A number of humidity measurements are available from the TECP instrument when used in air. The SSI camera provided clear evidence of occasional dust devils and, later in the mission, confirmed the presence of clouds and precipitating ice particles - the snow on Mars that was reported in the last issue. Data on the clouds, near surface fog and snow, were one of the major contributions from the vertically pointing lidar system carried by the lander.

Data are available via the NASA Planetary Data System (<http://pds.nasa.gov/>) and a series of journal papers detailing the full set of results are in preparation for Science and the Journal of Geophysical Research. Several papers were presented November 2008 at the Third International Workshop on the Mars Atmosphere in Williamsburg (<http://www.lpi.usra.edu/meetings/modeling2008/>) and at the December 2008 AGU Fall Meeting in San Francisco (<http://www.agu.org/meetings/fm08/>) in Union Sessions U11B and U14A. The section below provides a few sample plots of our results.

### Sample Results

Temperatures measured by the fast response thermocouples 0.25m and maybe even 0.5m above the deck appear to be affected by heat sources on the deck, or the solar panels, for some wind conditions, but modelling suggests that the data from the top of the mast, 2m above the ground, should be unaffected under most conditions. These data showed a relatively regular diurnal cycle with temperature maxima in the range -30°C to -20°C occurring in early afternoon through the early part of the mission (Figure 2a). Temperature minima of about -80°C occurred, generally between 0100-0200 local solar time. Later in the mission, SOLs 110+, temperatures had fallen with minima around -90°C (Figure 2b).

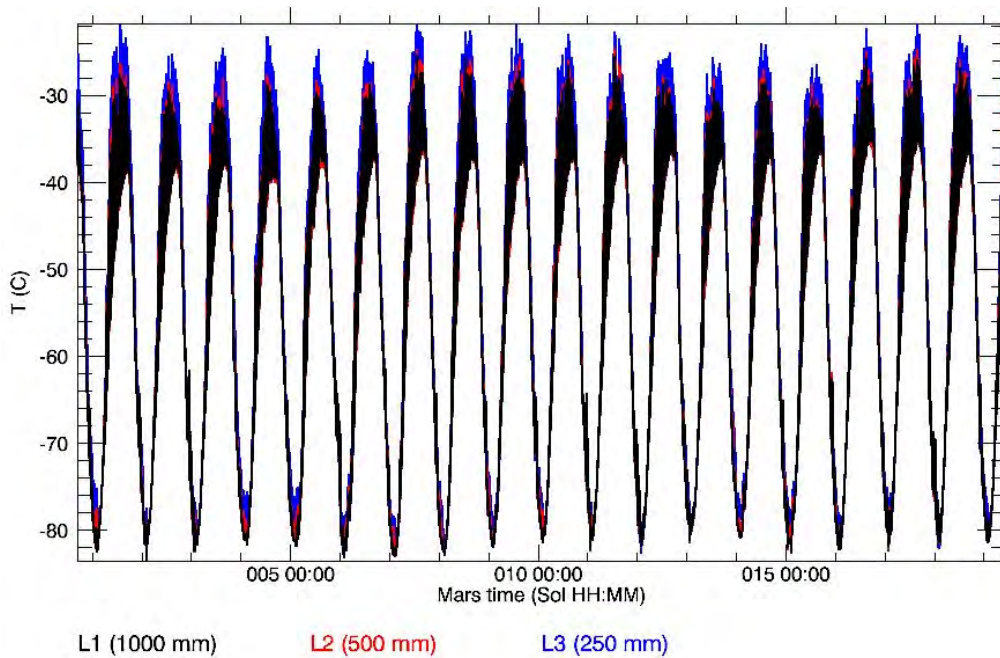
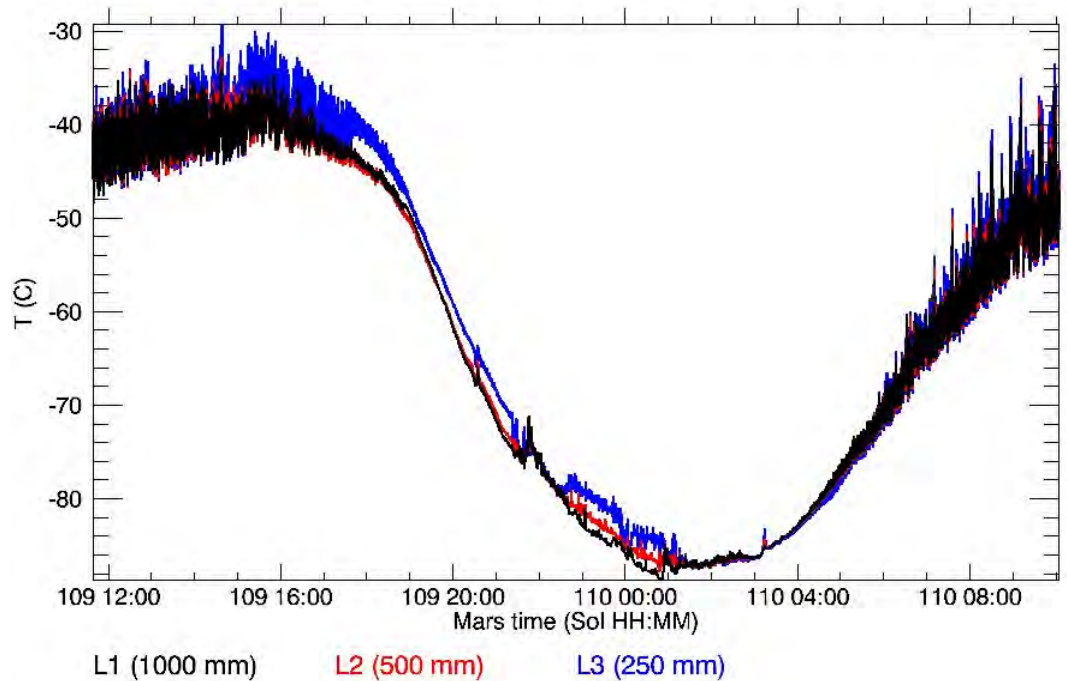


Figure 2a: Temperature data from the first 20 sols

Figure 2b: Temperature data from sols 109-110, late in the mission. Heights given are distances above the lander deck



As expected the pressure has a regular diurnal tide cycle with a peak-to-trough range of about 7 Pa. Peaks occurred around mid sol. We could also see a relatively steady decline, with some departures due to weather events, in the daily mean pressure from about 855 Pa on Sol 5 (Ls 78) to a seasonal minimum of about 725 Pa on Sol 140 (Ls 142). We lost communication shortly after that point but at least saw the occurrence of the annual minimum, caused by CO<sub>2</sub> frosting out on the Southern polar cap. The 0.5 Hz pressure data are especially interesting in that they can detect the passage of dust devils, or more often invisible, dustless devils – coherent vertically oriented vortices without

sufficient strength to raise dust from the surface, over or close to the lander. These are characterized by sharp drops in pressure of order 1 Pa occurring over a time interval of order 30 s as in Figure 3a. They generally occurred in the early afternoon and several events with pressure drops > 0.2Pa were seen on most sols. Numbers rose to about 12 per sol towards the end of the mission and an isolated peak of 90 events occurred on Sol 95 during the passage of a meteorological low pressure centre. The SSI camera was also able to capture a number of dust devil images (Figure 3b).

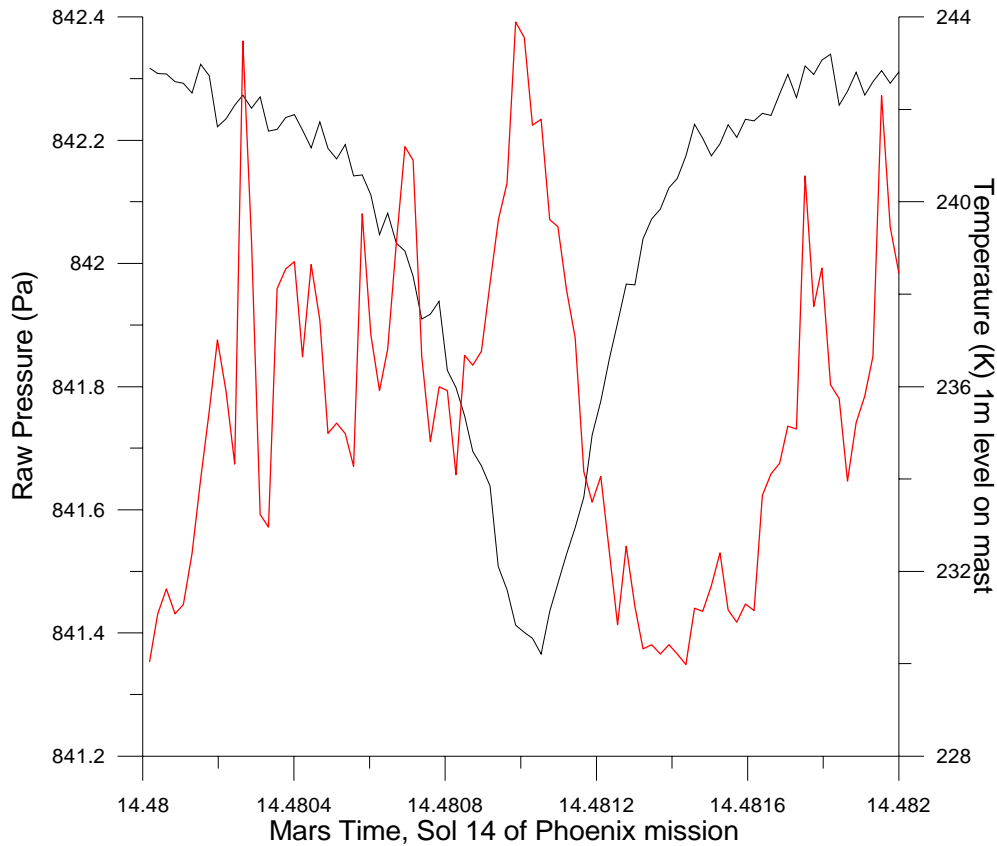
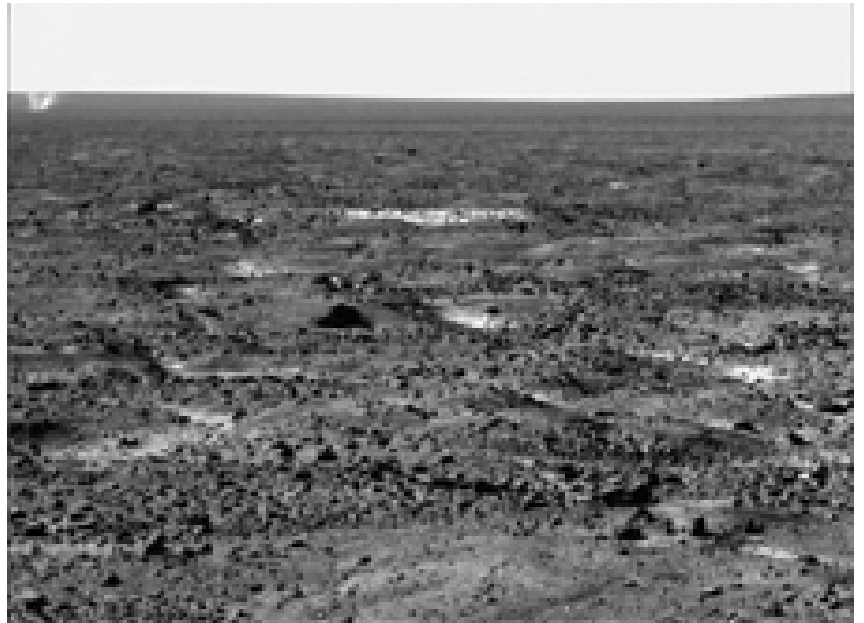


Figure 3a: A short section of pressure and temperature data during the passage of a vortex feature on Sol 14

Figure 3b: A dust devil picture captured by the SSI camera on Sol 104. Video Credit: Image NASA/JPL-Caltech/University of Arizona/Texas A&M University. Picture extracted from: [http://phoenix.lpl.arizona.edu/videos\\_sol106.php](http://phoenix.lpl.arizona.edu/videos_sol106.php)



Due to cost and mass budget constraints, and timely availability of appropriate instrumentation, there was no hot wire or sonic anemometer on board, and Phoenix was unable to monitor winds on a continuous basis. However Danish and some Canadian ingenuity produced a small, carefully calibrated lightweight telltale (Gunnlaugsson et al, 2008) which was deflected by the wind and could be imaged by the SSI camera. This provided a significant amount of wind data, and for the first 90 sols of the mission the winds seemed to follow a fairly regular diurnal cycle.

Basically winds came from the East and South-East at night, veering through South and West to become Northerly by late afternoon. Wind speeds were relatively light, typically around  $4 \text{ ms}^{-1}$ . Vertically pointed movies of dust and cloud patches passing over the lander suggest even lower wind speeds aloft and one conjecture is that the winds we are observing are primarily slope winds associated with the southern edge of the valley in which Phoenix landed. The local slopes are gentle (1.4 degrees upwards to the SE) but with the large diurnal temperature

cycles our modelling suggests that it is steep enough to generate the wind patterns that were observed. Solar tides are the other possible explanation and Mars GCM models show similar veering of the winds at the Phoenix location.

From a moisture perspective the large diurnal temperature cycle means that air containing, for example, 0.5 mg/m<sup>3</sup> of water vapour (a typical value) has a very low relative humidity at -30°C but is saturated at -82°C. This does not appear to have occurred during the early part of the mission and it is only towards the end that we saw low level cloud and precipitation. In the final few weeks of the mission, during the night or early morning, frost formed on the ground, fog occurred in the lower atmosphere and clouds formed at a level corresponding to the top of the previous afternoon's boundary-layer. These features can occur if the mixing ratio is relatively uniform throughout the boundary layer after convective mixing the previous day. Both modelling studies (Davy et al, 2009) and Phoenix lidar studies of dust indicate boundary layer depths of order 4 km and it is at that height that the lidar sees clouds. During the night low level ice fog also develops (Figure 4 shown next page). The clouds often produce snow, seen in other lidar images, which falls to the surface, adding to any moisture deposited there as frost.

### Conclusions

We have focussed on the MET component of Phoenix in this article. The papers to appear in Science and JGR will include all aspects of the mission but the Nature news article by Eric Hand (2008) provides some rather irreverent and critical but amusing background. Hand chose to ignore MET and given the tone of his article, with a sub-heading "...the short life and times of the little Mars lander that sort-of-could", we can take pride in the fact that MET, and the lidar in particular really could!

The MET instrumentation was not without a few problems, mostly associated with heat sources on the deck affecting the lower level thermocouples and a heat source close to the pressure sensor necessitating some pressure corrections but we are extremely pleased with the performance of MET and the data sets it has produced. The lidar observations of dust, clouds and precipitation are new and unique and the determination of boundary-layer depth nicely matches our model predictions. The long time series of temperature and pressure data will tell us more about dust devil and vortex occurrences in the highly convective Martian boundary layer, as well as providing good tidal and other signals for comparison with Mars GCM models. In collaboration with our Danish colleagues we have wind speed and direction data and by coupling the data with our models we can build realistic pictures of the local weather in the northern plains on Mars.

### Acknowledgements;

Funding for our involvement in Phoenix came from the Canadian Space Agency (CSA) through contracts and an SSEP grant. A large team of engineers, at CSA, MDA and Optech Inc. as well as university researchers and students at York, Dalhousie and Alberta have played critical roles in the Canadian contribution to Phoenix. Their contributions are gratefully acknowledged. The mission as a whole is led by Dr Peter Smith from University of Arizona, and we truly appreciate his creating the opportunity for our involvement in this mission.

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# Lidar Measurements of Martian Clouds

SOL 98

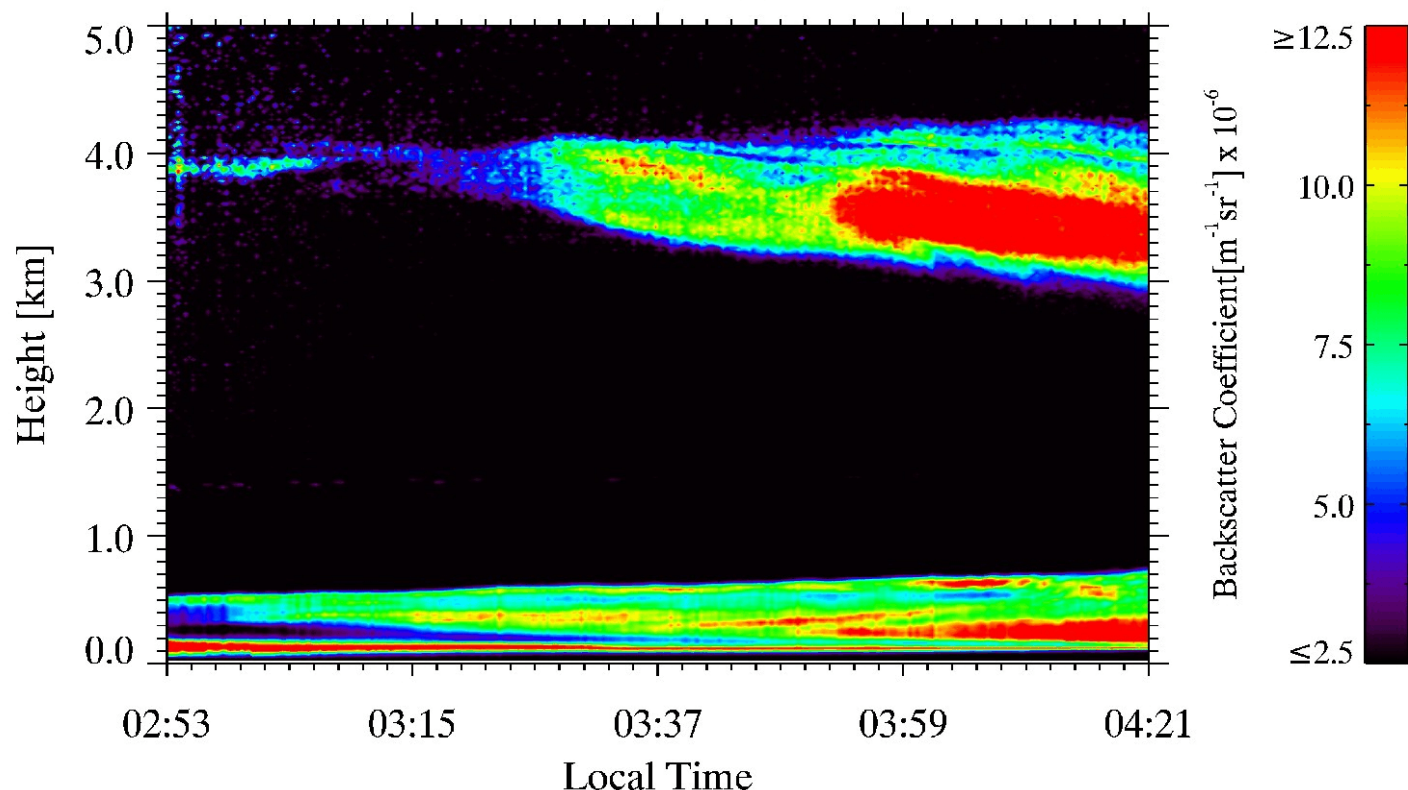


Figure 4: Lidar backscatter coefficient results - early morning on Sol 98. Scattering layers are from low level ice fog and, near 4 km, from water ice clouds at the top of the boundary layer. Produced by Leonce Komguem.

## GLOBEC international 3<sup>rd</sup> and final Open Science Meeting

GLOBEC international will be holding its 3<sup>rd</sup> and final Open Science Meeting (OSM) in Victoria, Canada, in June 2009. This conference will culminate in the integration and synthesis activities of the international GLOBEC programme, ten years after its launch as an IGBP-SCOR-IOC activity. The 3<sup>rd</sup> OSM is entitled "Marine ecosystems: from function to prediction" to focus the meeting on the overall objective of GLOBEC of "providing a new mechanistic understanding of the functioning of the marine ecosystem, in order to develop predictive capabilities and propose a framework for the management of marine ecosystems in the era of global change".

The programme of the meeting has been designed with the dual purpose of celebrating the programme's achievements at global, regional and national level, while providing a unique forum for scientists to shape the new decade of international collaboration in GLOBEC area of science.

Confirmed invited speakers include:

- Roger Harris/ Liz Gross: A history of GLOBEC
- Eileen Hofmann: Physical/Biological coupling in marine ecosystems
- Coleen Moloney: Food web processes in marine ecosystems
- Yasuhiro Yamanaka: Forecasting and predicting marine ecosystem responses to climate change
- Ian Perry: The human dimensions of global environmental change
- John Steele: Beyond GLOBEC: Challenges and opportunities
- Ken Denman: An outsider's view of GLOBEC.

For further details of the programme, workshops and registration, please visit the GLOBEC website at: <http://www.globec.org>



<http://www.scor-int.org/>

## Highlights of the 29<sup>th</sup> General Meeting

Woods Hole Oceanographic Institution  
Woods Hole, Massachusetts, USA  
22-24 October 2008

(The full report will as usual be produced by the SCOR secretariat and distributed to national SCOR committees when ready.)

The Canadian National Committee for SCOR was represented at the meeting by Professor Bjørn Sundby, President of SCOR International. Also present from Canada were Professor Lawrence Mysak, President of IAPSO and member of the SCOR executive, and Dr. Ian Perry, Chair of GLOBEC.

### 1. Large-Scale Scientific Programs

#### 1.1 SCOR/IGBP/IOC Global Ocean Ecosystems Dynamics (GLOBEC).

The activities of GLOBEC will end in 2009. An IMBER/GLOBEC Transition Task Team has been established to identify GLOBEC activities that may be continued by IMBER. Presently, GLOBEC and IMBER are working together on an end-to-end food web project. GLOBEC will hold its final open science meeting in Victoria, BC, in June 2009.

#### 1.2 SCOR/IGBP Integrated Marine Biogeochemistry and Ecosystem Research (IMBER)

IMBER held a joint open science meeting with LOICZ on coastal margin science in Shanghai, China in September 2007, and is producing an implementation plan for cooperative science in coastal areas. IMBER has received commitments for funding its international project office through 2011. IMBER held an open science meeting (Imbizo) in Miami in December 2008.

#### 1.3 SCOR/IOC Global Ecology and Oceanography of Harmful Algal Blooms (GEOHAB)

GEOHAB continues to develop its Core Research Projects (CRPs). The research plan for harmful algal blooms in stratified systems is in press, and a new Asian GEOHAB

activity is under development, and a second meeting was held in Vietnam in January 2008. A modelling workshop is planned for June 2009 in Galway, Ireland. The workshop will be open, and some funding is available for students. GEOHAB still needs to establish an International Program Office.

#### 1.4 SCOR International study of Marine Biogeochemical Cycles of Trace Elements and their Isotopes (GEOTRACES)

GEOTRACES has conducted cruises in the Arctic and the Southern Ocean as part of IPY. An international GEOTRACES Data Management Office has been set up at the British Oceanographic Data Centre (BODC) in Liverpool, UK, and a full-time data liaison officer has been hired. The U.S. National Science Foundation, BODC, and the UK Natural Environment Research Council are co-funding the position. NSF and several European sources are also co-funding the first full-time position for a GEOTRACES International Project Office in Toulouse, France.

#### 1.5 SCOR/IGBP/WCRP/CACGP Surface Ocean-Lower Atmosphere Study (SOLAS)

SOLAS will hold its third open science meeting in Barcelona, Spain, in 2009, and a fourth summer school, also in 2009. SOLAS and IMBER have created a cooperative research activity on ocean carbon and have a joint working group to guide the activity and to interact with IOCCP. Professor Doug Wallace (Germany) is the new chair of SOLAS.

### 2. Working Groups

#### 2.1 Getting More Value From SCOR Working Groups

John Compton (South Africa) introduced the question how SCOR could reach a greater audience and develop a broader interest in science and its societal relevance. Professor Compton proposed that SCOR ask each working group to produce a brief document about their work that could be used to convey the excitement of science to educated non-scientists. Such documents could also become valuable teaching tools. The suggestion stimulated a discussion during which numerous ideas were put forward. An ad hoc group of interested members discussed the ideas and delivered a report to the meeting the following day that will be used to move the subject forward. A copy of the report will be made available to interested parties on the SCOR web site.

## 2.2 Disbanded Working Groups

### 2.2.1 **WG 78** Determination of Photosynthetic Pigments in Seawater

Chapters of the book are still being completed and a suitable non-profit publisher is still being sought. So far, Cambridge University Press and Island Press have declined to publish the book. Other non-profit publishers are being considered.

2.2.2 SCOR/IOC **WG 119** Quantitative Ecosystems Indicators for Fisheries Management Registration fees from a WG 119 symposium were used for a workshop on "Coping with global change in marine social-ecological systems" that was held in Rome in June 2008. The workshop brought together natural and social scientists and the participants found the workshop valuable enough that other such events should be planned in the future.

## 2.3 Current Working Groups

### 2.3.1 **WG 111** Coupling Winds, Waves and Currents in Coastal Models

This group has been around for a while, but it seems now to be on track to complete its book early in 2009. The book is entitled *Coupled Coastal Wind-Wave-Current Dynamics* and will be published by Cambridge University Press.

### 2.3.2 **WG 115** Standards for the Survey and Analysis of Plankton

The group planned a series of papers for a special issue of the *Journal of the Marine Biological Association of the U.K.*, but only one of the papers was completed as planned and the timeline has slipped. The meeting decided that the group be disbanded without insisting on a product.

### 2.3.3 SCOR/LOICZ/IAPSO **WG 122** Estuarine Sediment Dynamics

The group has held its final meeting and expects to publish

its findings in a special issue to *Coastal and Estuarine Science* in 2009.

### 2.3.4 SCOR/IMAGES **WG 124** Analyzing the Links Between Present Oceanic Processes and Paleo-records (LINKS)

The group held its final meeting in 2006 and is preparing a series of manuscripts that target understanding how changes in ocean productivity are connected with the signal recorded at the seafloor. The group was given one more year but no new funding to finish their terms of reference.

### 2.3.5 **WG 125** Global Comparisons of Zooplankton Time Series

The group held its final meeting in 2008 and will publish a series of papers in a special issue of *Progress in Oceanography* to appear in 2009. The NOAA National Marine Fisheries Service has committed funds to bring more participants (and data) into the process.

### 2.3.6 **WG 126** Role of Viruses in Marine Ecosystems

This group had a very productive meeting in 2007 that led to a multi-lab comparison of techniques, including counting, virus production, and molecular tools. The group's forthcoming book, tentatively entitled *Methods in Aquatic Viral Ecology*, is expected to be ready for publication in 2009. The group and a related group from EurOCEANS published a perspective for *Nature Reviews Microbiology*. A final meeting will be held in 2009.

### 2.3.7 SCOR/IAPSO **WG 127** on Thermodynamics and Equation of State of Seawater

The group has met with the International Association of the properties of water and seawater, the "Saline Gibbs Function", has the blessing of the International Association of the Properties of Water and Steam, and 12 papers have been published. The group is seeking endorsement of their work by asking IOC to recommend the adoption of the new international equation of state of seawater. IOC is interested since they were involved in endorsing the first equation of state. The work still to be done requires another two years, although no additional meetings will be needed.

### 2.3.8 **WG 128** on Natural and Human-Induced Hypoxia and Consequences for Coastal Areas

This group, which started in 2005, has been very active and successful and is now preparing for their special issue, potentially for *Biogeosciences*. The group has not spent all of its budget and the meeting agreed to allow them to use some or all of their remaining funds towards publication costs.

### 2.3.9 SCOR/IAPSO **WG 129** on Deep Ocean Exchanges with the Shelf



The initiative to form this group stems from the IUGG meeting in Perugia in 2006. The group convened a workshop in Cape Town, South Africa on 6-8 October supported by the U.S. Office of Naval Research, IUGG, SCOR, and IAPSO. Papers from the workshop will be published in *Ocean Science*. The group's next meeting will be held in conjunction with the IAPSO meeting in Montréal, mid-2009.

#### 2.3.10 SCOR **WG 130** on Automatic Plankton Visual Identification

This group is using open source software for automatic plankton identification. The group met for the second time on 6-9 May in São Paulo, Brazil, with most of the meeting expenses funded by Petrobras.

#### 2.3.11 SCOR **WG 131** on The Legacy of in situ Iron Enrichment: Data Compilation and Modelling

The working group has made good progress in compiling data from past iron-enrichment experiments, but the work of bringing the data into an open access database is not yet completed. The group has requested additional funding for a post-doctoral fellow to work with the data center, as well as funding for a workshop on modelling the enrichment experiments. SCOR decided to continue to support the development of the database for one more year, but not to provide support for a meeting until this has been accomplished.

#### 2.3.12 SCOR/LOICZ **WG 132** on Land-based Nutrient Pollution and the Relationship to Harmful Algal Blooms in Coastal Marine Systems

This working group, which started its work in mid-2008, is co-funded by the Institute of Oceanology of the Chinese Academy of Sciences and by the Land-Ocean Interactions in the Coastal Zone project with a small contribution from SCOR. A second meeting will be held in October 2009 in Beijing, China to coincide with the SCOR Executive Committee meeting and a GEOHAB open science meeting.

### 3. New Working Group Proposals

Seven new working group proposals were received by the SCOR Secretariat:

1. Evaluating the Ecological Status of the World's Fished Marine Ecosystems.
2. OceanScope.
3. Coral Triangle: The centre of maximum marine biodiversity.
4. Global Patterns of Phytoplankton Dynamics in Coastal Ecosystems: Comparative Analysis of Time-Series

Observations.

5. Hydrothermal energy transfer and its impact on the ocean carbon cycle.
6. Coupled climate-to-fish models for understanding mechanisms underlying low-frequency fluctuations in small pelagic fish.
7. The Microbial Carbon Pump in the Ocean.

The following three new working groups were approved:

1. OceanScope Working Group (Thomas Rossby, USA, chair).

This group will (1) address and prioritize the scientific challenges that can be best addressed by an integrated Volunteer Observing Ship (VOS) program, (2) outline and promote appropriate and necessary sensor, instrument and software development; (3) develop an institutional framework that enhances the links between the merchant marine and ocean observation communities including ongoing VOS programs, and (4) identify and develop an integrated framework for data management and distribution. The group will be co-funded by the International Association for the Physical Sciences of the Oceans.

2. Working Group on Hydrothermal Energy Transfer and its Impact on the Ocean Carbon Cycle (Chris German, USA and Nadine Le Bris, France, co-chairs).

This group will synthesize existing knowledge of chemical substrates, mechanisms and rates of chemosynthetic carbon fixation at hydrothermal systems as well as the transfer of phytoplankton-limiting micronutrients from these systems to the open ocean. The group will integrate these findings into conceptual models of energy transfer and carbon cycling through hydrothermal systems, which would lead to an estimation of the contribution of primary production from these systems to the global ocean carbon cycle. Finally, the group will identify critical gaps in knowledge and propose a strategy for future field, laboratory, experimental and theoretical studies to bridge these gaps and better constrain the impact of deep-sea hydrothermal systems on ocean carbon cycles. The group will be co-sponsored by the InterRidge project.

3. Working Group on The Microbial Carbon Pump in the Ocean (Nianzhi Jiao, China, and Farooq Azam, USA, co-chairs).

This group will summarize representative microbial data on biomass, production and diversity, as well as dissolved ocean carbon (DOC) data, along environmental gradients; establish the current state of knowledge; and identify essential scientific questions regarding the role of microbial processing in carbon cycling in the ocean. The group will

also assess the available techniques for quantifying functional groups of prokaryotes and different types of DOC, document state-of-the-art techniques and parameters addressing microbial processing of organic carbon, and establish/standardize key protocols for the essential observation/measurements. The group plans to convene one or more international workshops and publish a special volume in an internationally recognized peer-reviewed journal or a protocol book (practical handbook) by a major publisher on measurements of the key parameters related to microbial processing of carbon in the ocean. The group's work will result in recommendations for future research related to the microbial carbon pump in the ocean, toward development of a large-scale interdisciplinary research project. The Chinese National Science Foundation and State Key Laboratory for Marine Environmental Science will provide partial support for the group.

#### **4. The Ocean in a High CO<sub>2</sub> World**

The Scientific Committee on Oceanic Research (SCOR) and the Intergovernmental Oceanographic Commission (IOC) of UNESCO convened an open symposium on *The Ocean in a High-CO<sub>2</sub> World* on 10-12 May 2004 in Paris, France. The symposium addressed the biological and biogeochemical consequences of increasing atmospheric and oceanic CO<sub>2</sub> levels, and possible strategies for mitigating atmospheric increases. Topics ranged from ocean physics, to chemistry and biology, including the impacts of elevated CO<sub>2</sub> levels on marine life, the dissolution of calcium carbonate, and the impacts on coral reefs. Speakers also evaluated the possible benefits and impacts of surface fertilization and deep-ocean CO<sub>2</sub> injection strategies. Symposium participants did not address whether it would be a good policy choice to sequester carbon dioxide in the ocean, but did identify what scientific information is available, and what is still needed, to make informed policy decisions.

The symposium included plenary presentations, discussion sessions on research priorities, and a poster session. To highlight some of the significant results from the symposium, a subset of results will be published in a special section of the *Journal of Geophysical Research-Oceans*. The papers in this special section will contribute to the work of the Intergovernmental Panel on Climate Change (IPCC) and to its Special Report on Carbon Dioxide Capture and Storage. Research priorities identified at the symposium are published in a separate document for the benefit of ocean scientists and research program managers worldwide. IOC and SCOR are considering follow-up actions to the symposium, including recommendations to develop a Web-based information and communications service for scientists and the general public. For more information: <http://ioc.unesco.org/iocweb/co2panel/HighOceanCO2.htm>

#### **5. SCOR's 50<sup>th</sup> Anniversary Symposium**

The 50<sup>th</sup> anniversary, which preceded the General Meeting, was held in Woods Hole, Massachusetts, USA — the site of the first SCOR meeting — on 19-21 October 2008. This open meeting was attended by about 125 scientists from around the world, including 27 young scientists selected by SCOR member nations. CNC/SCOR sponsored one young Canadian scientist (Rob Campbell) to attend the meeting. The young scientists presented posters to symposium participants and were hosted by the Woods Hole Oceanographic Institution (WHOI) to a special reception with WHOI post-docs. The directors of the Marine Biological Laboratory (Gary Borisy) and WHOI (Susan Avery), opened the symposium. Peter Liss then provided remarks from SCOR's parent, the International Council for Science, and Prof. Bjørn Sundby welcomed participants on behalf of SCOR. George Hemmen and Elizabeth Gross, the former SCOR Executive Secretary and Executive Director, respectively, reviewed the history of SCOR, to set the stage for the remainder of the symposium, which focussed on future ocean science. Excellent keynote presentations were given by Andy Ridgwell, Chris Scholin, and Martin Visbeck. Bjørn Sundby gave the closing address on the future of SCOR.

Six SCOR Presidents participated in the symposium as did all three of the SCOR Executive Secretaries/Executive Directors. Sadly, one of the former SCOR Presidents, Warren Wooster, was not able to attend and died shortly after the symposium after a long illness.

#### **6. SCOR Finances**

A 5% dues increase for 2009 was approved by the Executive Committee meeting in Bergen in 2007. On the recommendation of the Ad Hoc Finance Committee, the 2008 General Meeting approved a 5% dues increase for 2010.

The financial situation of SCOR is healthy. SCOR is well supported by the U.S. National Science Foundation (NSF) and other sources, but there is always a need to diversify the sources of funding. The SCOR administration is very "lean" compared to other ICSU organizations. Thus, SCOR has only one full-time and two part-time staff members: Ed Urban, Elizabeth Gross, and SCOR's new financial assistant, Lora Carter.

#### **7. Composition of the SCOR Executive Committee**

Professor Bjørn Sundby (Canada) stepped down as President of SCOR. As Past President, he remains a member of the Executive Committee. Professor Wolfgang Fennel (Germany) was elected the new SCOR President, and Mary (Missy) Feeley (Vice-President, USA), and John Compton (Co-opted Member, South Africa) joined the executive committee. Three members rotated off at the end

of the meeting: Victor Akulichev (Vice-President, Russia), Robert Duce (Past President, USA), and Laurent Labeyrie (Co-opted Member, France).

## 8. Future meetings

**2009** — The 2009 SCOR Executive Committee Meeting will be held in Beijing, China, on 20-22 October, in conjunction with an open science meeting of the GEOHAB Core Research Project on HABs in Eutrophied Systems and SCOR/LOICZ WG 132 on Land-based Nutrient Pollution and the Relationship to Harmful Algal Blooms in Coastal Marine Systems.

**2010** — SCOR has accepted an offer from the French SCOR Committee to hold the 2010 SCOR General Meeting in Toulouse, France.

**2011** — The Finnish SCOR Committee has invited SCOR to hold its 2011 Executive Committee meeting in Finland.

*Reported by Bjørn Sundby  
Université du Québec à Rimouski*



## Partnership Group for Science and Engineering (PAGSE)

### PAGSE: The Past Six Months (July - December 2008)

The Partnership Group for Science and Engineering (PAGSE) [www.pagse.org](http://www.pagse.org) is a cooperative association of more than 25 national organizations in Science and Engineering. It was formed in June 1995 at the invitation of the Academy of Science of the Royal Society of Canada. The national organizations that comprise PAGSE represent approximately 50,000 individual members from industry, academia, and government sectors. They work collectively to represent the Canadian science and engineering community to the Government of Canada, and to advance research and innovation for the benefit of Canadians. PAGSE is *not* a lobby group. It does not seek an audience in order to advance the cause of specific science and engineering initiatives: rather, its intent is to address the broader issues of science and engineering policy at the national level.

If PAGSE is to be truly representative of the science and engineering community in Canada, we must ensure that you, individual members of member societies and associations, are aware of the activities that we undertake in your name. While details may be found on the PAGSE website ([www.pagse.org](http://www.pagse.org)), we also provide you with a periodic summary of activities.

## Bacon & Eggheads:

PAGSE, in partnership with the Natural Sciences and Engineering Research of Canada (NSERC), sponsors a monthly breakfast meeting involving an invited speaker. The meeting is held on Parliament Hill and known as “*Bacon and Eggheads*”. The meeting informs parliamentarians about recent advances in science and engineering. Due to the federal election call in September, the election in October and prorogation of the new Parliament in November, the Bacon & Eggheads schedule for the fall session of parliament was suspended. Bacon & Eggheads will resume when Parliament returns in January 2009.

## PAGSE Monthly Meetings

Guests representative of science and engineering in the government and industry sectors are invited to monthly PAGSE meetings held at the University of Ottawa to discuss their views on the status of science and engineering in Canada in general and in the organizations they represent, and the issues and challenges that they would like to see PAGSE address. The August 25<sup>th</sup> meeting was a business session only; the December 9 meeting was deferred due to a severe winter storm; however in October we welcomed the following guest, who presented his perspective on S&T in Canada and the strategic directions of his agency.

October 7<sup>th</sup>, 2008: **Dr. Chad Gaffield**, President, Social Sciences & Humanities Research Council of Canada.

PAGSE members also consider federal activities and reports and how best to promote and sustain Canada's scientific base.

## Submission to the House of Commons Finance Committee

The Partnership Group submitted a brief to the House of Commons Finance Committee in mid-August, as input to the Government's pre-budget consultations. The focus of the brief was international and big science. A summary follows:

### Summary

Canada is one of the largest countries in the world, yet historically it has been a minor player in international science projects, including those of strategic importance to the country. Collaboration on international science not only exposes Canadian scientists to breaking discoveries, it provides the critical mass required for certain major research initiatives, as well as access to scientific talent and intellectual property, representing huge leverage of the country's investment. It also allows Canadians to benchmark against other countries and to influence international programming while enhancing Canada's reputation as a serious international partner, which can influence leading international scientists to consider working here. Greater involvement and investment in selected major international initiatives will help change the perception of

Canada from that of a small player who must join with other small players for access to a scientific programme, to that of a key partner.

International science is defined as initiatives and Secretariats requiring the coordinated financial, logistical or intellectual resources of several countries and sectors. Big science is defined as initiatives of a significant magnitude that require resources beyond the capacity of any single institution, funding agency or country to operate, and which are expected to yield very significant results. Big science includes all levels of initiatives from consortia at facilities such as CERN (European Organization for Nuclear Research); the world acclaimed Sudbury Neutrino Observatory Laboratory; or the Ocean Drilling Programme, to major research networks such as the *Polar Environment Research Laboratory* on Ellesmere Island; and NEPTUNE<sup>1</sup>, which will be the world's largest cable-linked seafloor observatory.

Canada subscribes to a number of international science programmes and hosts the international secretariats for a few. It can ratchet up its reputation, contributions and most importantly, its benefits, by coordinating funding sources, supporting infrastructure and operational costs; hosting international science secretariats, and removing strictures affecting the environment for innovation and economic development. These measures will enhance the reputation of Canadian science and scientists in the international sphere, increase awareness by industry of the roles played by Canadians, and will encourage the retention of research and innovation in Canada.

The Partnership Group recommends:

- ***That the federal government adopt a strategic approach to investments in big science initiatives and international science partnerships. The approach must incorporate financial support to ensure full benefits to Canadians and their economy.***



## **Partenariat en faveur des sciences et de la technologie (PFST)**

### **PFST : Les six derniers mois (juillet-décembre 2008)**

Le Partenariat en faveur des sciences et de la technologie (PFST; [www.pagse.org](http://www.pagse.org)) est une association coopérative de plus de 25 organisations nationales en sciences et en génie, constituée en juin 1995 à l'invitation de l'Académie des sciences de la Société royale du Canada. Les organisations nationales membres du PFST regroupent plus de 50 000 membres provenant de l'industrie, du milieu universitaire et des gouvernements. Elles œuvrent ensemble pour représenter le milieu canadien des sciences et du génie auprès du gouvernement du Canada et faire progresser la recherche et l'innovation, à l'avantage des Canadiens et des Canadiennes. Le PFST n'est pas un groupe de pression; il ne cherche pas à mobiliser un public pour défendre des initiatives particulières en sciences ou en génie, mais il s'intéresse plutôt aux grandes politiques nationales dans ces domaines.

Pour que le PFST soit vraiment représentatif de la communauté canadienne des sciences et du génie, nous devons nous assurer que les personnes composant les diverses sociétés et associations membres soient renseignées sur les activités entreprises en leur nom. On peut en trouver les détails sur le site Web du PFST ([www.pagse.org](http://www.pagse.org)), mais nous présentons également ces résumés périodiques aux organisations membres.

### **Petits-déjeuners avec des têtes à Papineau**

Le PFST, en collaboration avec le Conseil de recherches en sciences et en génie du Canada (CRSNG), propose chaque mois un petit-déjeuner-causerie présenté sur la colline du Parlement, et intitulé "Petit-déjeuner avec des têtes à Papineau". Les conférenciers invités y renseignent les parlementaires sur les derniers progrès scientifiques et technologiques. En raison du déclenchement des élections de septembre, de la tenue de ces élections en octobre et de la prorogation du nouveau Parlement en novembre, les Petits-déjeuners de l'automne ont été annulés. L'activité se poursuivra cependant au retour du Parlement, en janvier 2009.

### **Les réunions mensuelles du PFST**

Nous invitons des représentants d'organismes publics et privés œuvrant dans le domaine des sciences et du génie à participer aux réunions mensuelles du PFST ayant lieu à l'Université d'Ottawa pour y présenter leurs points de vue sur l'état des sciences et du génie au Canada, sur les organisations qu'ils représentent et sur les enjeux et défis auxquels ils voudraient que le PFST s'intéresse. La réunion du 25 août n'a consisté qu'en une séance administrative, tandis que la réunion du 9 décembre a dû être reportée en raison des mauvaises conditions météorologiques; nous

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<sup>1</sup> North-East Pacific Time-series Undersea Network Experiments

avons toutefois accueilli l'invité suivant en octobre, qui nous a entretenus de sa vision des sciences et de la technologie au Canada et de l'orientation stratégique de son organisme.

Le 7 octobre : **Chad Gaffield**, Président, Conseil de recherches en sciences humaines du Canada

Les membres se penchent également sur les activités et les rapports fédéraux, et sur la meilleure façon de promouvoir et d'étayer les assises scientifiques du Canada.

### **Mémoire au Comité permanent des finances de la Chambre des communes dans le cadre de ses consultations prébudgétaires de 2008**

Le PFST a présenté à la mi-août un mémoire au Comité permanent des finances de la Chambre des communes dans le cadre de ses consultations prébudgétaires. Ce mémoire traitait principalement de la mégascience et des projets scientifiques internationaux; en voici le sommaire :

#### **Sommaire**

Le Canada est l'un des plus grands pays et pourtant il a toujours été un joueur de peu d'importance dans les projets scientifiques internationaux, y compris les projets qui revêtent une importance stratégique pour le pays. La collaboration à des projets scientifiques internationaux expose les scientifiques canadiens à d'éventuelles découvertes et elle fournit la masse critique nécessaire à la réalisation de grands travaux de recherche et donne accès à des talents scientifiques et à la propriété intellectuelle, qui décuplent le pouvoir des ressources investies par le pays. La collaboration internationale permet également aux Canadiens de se comparer à d'autres pays et à peser sur la programmation internationale tout en rehaussant la réputation du Canada en tant que partenaire international sérieux, facteur qui peut amener certains scientifiques de pointe à envisager de travailler au Canada. En participant et en investissant davantage dans certaines grandes initiatives internationales, on aidera à changer la perception du Canada; de petit joueur forcé de s'associer à d'autres petits joueurs pour accéder à un programme scientifique, il deviendra un partenaire incontournable.

Les travaux scientifiques internationaux sont des initiatives et des secrétariats qui nécessitent les ressources financières, logistiques ou intellectuelles coordonnées de plusieurs pays et secteurs. Les grands travaux scientifiques sont des initiatives de grande ampleur qui nécessitent des ressources débordant de la capacité d'un établissement, d'un organisme de financement ou d'un pays et qui sont censées produire des résultats considérables. Les grands travaux scientifiques englobent des initiatives de tous les niveaux, des consortiums travaillant dans des installations comme le CERN (l'Organisation européenne pour la recherche nucléaire), l'Observatoire de neutrinos de Sudbury, salué mondialement, le Programme de sondage des fonds marins ou encore de grands réseaux de

recherche comme le *Polar Environment Research Laboratory* sur l'île Ellesmere et le projet NEPTUNE<sup>2</sup>, le plus grand observatoire câblé des fonds marins.

Le Canada souscrit à un certain nombre de programmes internationaux et héberge quelques secrétariats internationaux. Il a la possibilité d'améliorer sa réputation, ses contributions et surtout ses avantages en coordonnant des sources de financement, en soutenant l'infrastructure et les coûts opérationnels, en hébergeant des secrétariats scientifiques internationaux et en éliminant les restrictions environnementales qui entravent l'innovation et le développement économique. De telles mesures permettront d'améliorer la réputation des milieux scientifiques canadiens et des scientifiques canadiens à l'échelon international, sensibiliseront l'industrie aux rôles joués par les Canadiens et favoriseront le maintien de la recherche et de l'innovation au Canada.

Le Partenariat recommande :

**•que le gouvernement fédéral adopte une démarche stratégique à l'égard des investissements dans les grandes initiatives scientifiques et dans les partenariats internationaux en sciences; cette démarche doit comporter un soutien financier pour maximiser les avantages pour les Canadiens et leur économie.**

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**Earth Day**

**Our Planet – Our Future**

**Wednesday, April 22, 2009**

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**Jour de la Terre**

**Faites un vœu pour la planète**

**Mercredi, le 22 avril 2009**

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<sup>2</sup> North-East Pacific Time-series Undersea Network Experiments

# Integrated Research on Disaster Risk

## The challenge of natural and human-induced environmental hazards A new international research program

Reported by Gordon A. McBean<sup>1</sup>

In December 2004, the great Indian Ocean tsunami spread across the ocean and killed many thousands of people and caused untold hardships across the globe. World Conference on Disaster Reduction, already planned, was held in Kobe, Hyogo, Japan in January 2005, and called on nations to take actions and agreed on the Hyogo Framework for Action. Environmental and geophysical hazards create many disasters around the world and the impacts have been devastating on many communities and countries. Over the decades there has been significant international scientific response, much of it organized by the International Council for Science (ICSU) and its partners in the United Nations system, especially the World Meteorological Organization and UNESCO. Through the deliberations of an ICSU-sponsored process, a new international research program Integrated Research on Disaster Risk – the challenge of natural and human-induced environmental hazards - has now been initiated, with the support of ICSU, the International Social Sciences Council and the UN International Strategy for Disaster Reduction.

The title **Integrated Research on Disaster Risk – the challenge of natural and human-induced environmental hazards** (acronym: IRDR) was chosen on basis of the rationale of integration, risk and disasters. IRDR is to be a Research Programme of ten or more years' duration. ICSU and the International Social Sciences Council (ISSC) are the IRDR co-sponsors. The United Nations International Strategy for Disaster Reduction (ISDR) has endorsed the Programme. The Science Plan of IRDR focuses on natural and human-induced environmental hazards where a hazard is defined as a potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Note that a hazard "may" cause impacts. The other factor is the vulnerability of the system where the vulnerability is determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. Disasters result when there is the intersection of a hazard and vulnerabilities. Hence to understand the factors involved in disasters it is important to understand both the hazards with their occurrence and characteristics and the factors that make communities vulnerable.

The scoping exercise identified the most significant research gaps to be interdisciplinary cohesion, i.e. the intersections of the natural, socio-economic, health and engineering sciences; and the issue of how knowledge about hazards is, or can be, put to use. Public perception–decision making in the context of natural hazards, risks and uncertainty would be an important research area, as would the study of human behaviour and cultural contexts for vulnerability analysis.

The first IRDR Scientific Objective is Characterization of hazards, vulnerability and risk, with three sub-objectives: identifying hazards and vulnerabilities leading to risks; forecasting hazards and assessing risks; and dynamic modelling of risk. The second IRDR Scientific Objective is Understanding decision-making in complex and changing risk contexts, with three sub-objectives: identifying relevant decision-making systems and their interactions; understanding decision-making in the context of environmental hazards; and improving the quality of decision-making practice. The third IRDR Scientific Objective is: Reducing risk and curbing losses through knowledge-based actions through Vulnerability assessments and Effective approaches to risk reduction. There will be Cross-cutting themes and approaches through: Capacity building; Case studies and demonstration projects; and Assessment, data management and monitoring.

The IRDR Programme will be guided by a Scientific Committee selected by mutual agreement between the joint sponsoring organizations of the Programme (see Figure 1). There are many international initiatives and activities already existing in the field of natural hazards and disasters. Stakeholder groups include: the international and national scientific programmes either already ongoing or potentially to be initiated, on hazards research and their sponsors; international and national organizations who are involved in development, humanitarian assistance and similar issues; and, in general, governments, private sector and civil society. An ongoing consultative process will be established, using other forums where appropriate. IRDR will draw upon the expertise and scientific outputs of many *Partners in research*. The Intergovernmental Oceanographic Commission (IOC) of UNESCO promotes the concept of 'end-to-end' tsunami warning systems, in cooperation with ISDR and WMO. The International Geosphere-Biosphere Programme (IGBP) Projects, such

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<sup>1</sup> Chair, ICSU  
Planning Group on Natural and Human-induced Environmental Hazards and Disasters

as Land-Ocean Interactions in the Coastal Zone, are clearly relevant. The WMO World Weather Research Programme is a ten-year international study aiming to reduce and mitigate natural disasters by transforming timely and accurate weather forecasts into specific and definite information in support of decisions; storm surges are one important example. The World Climate Research Programme (WCRP) has identified a focus on climate extremes including floods and droughts. In the social sciences realms of science, there are programs such as the International Human Dimensions Programme on Global Environmental Change's (IHDP) new Integrated Risk Governance Project. The Global Change System for Analysis Research and Training (START) has ongoing projects to build capacity and regional networks in Africa, Asia and Oceania.

The Hyogo Framework for Action calls for all-hazards approaches, people-centred systems and overall risk assessment. The assessment of the Planning Group was that, despite all the present activities ongoing on natural hazards, there is an imperative for a research programme, sustained for a decade or more, that is integrated across the hazards, the disciplines and the geographical regions, wherein would lie its value-added nature. The coupling of the natural sciences' examination of hazards with the socio-economic analysis of vulnerability and mechanisms for engaging policy decision-making processes will be a major value added.

The legacy of IRDR will be an enhanced capacity around the world to address hazards and make informed decisions on actions to reduce their impacts. The legacy will also be the development of science and development of broadly-based capacity and the repository of information and data that have been acquired and that will be of continuing availability and value to the global community. The sponsors are now establishing an international IRDR Science Committee and an international project office. IRDR will move ahead over the coming months and work with partners for the benefit of global humanity. Members of the ICSU Planning Group on Natural and Human-induced Environmental Hazards and Disasters are G. McBean (Canada, Chair); T. Beer (Australia); I. Burton (Canada); C.-J. Chen (Taiwan); O.P. Dube (Botswana); J. R. Eiser (UK); F. Lúcio (Mozambique); H. Gupta (India); W. Hooke (USA); R. Keller (USA); A. Lavell (Costa Rica); D. Murdiyarto (Indonesia); V. Osipov (Russia); S. Sparks (UK); H. Moore (ICSU).

Source: Canadian Ocean Science Newsletter, No.41, January 2009. Reproduced here with the written authorization of the author and the Editor.

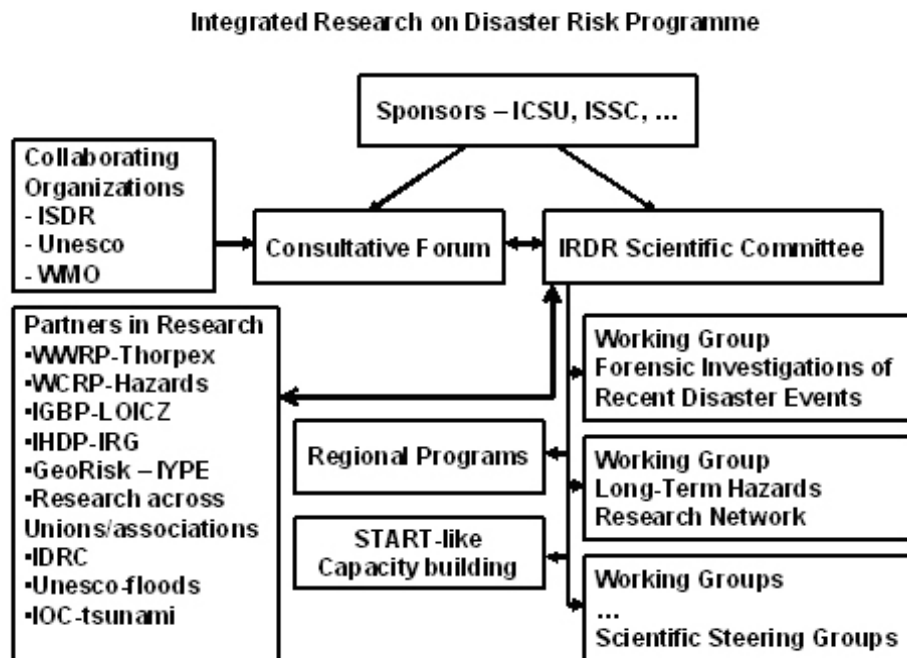


Figure 1. Proposed schematic structure for the IRDR Programme

# Report on the 89<sup>th</sup> Annual Meeting of the AMS

11-15 January 2009, Phoenix AZ

by Ian Rutherford<sup>2</sup>



I attended this American Meteorological Society (AMS) Annual Meeting at CMOS expense, as part of representing CMOS at the AMS-organised planning meeting for an International Forum of Meteorological Societies.

The AMS Annual conference is an enormous affair with more than 1700 abstracts received, between 2000 and 3000 registrants and over 100 commercial exhibitors. It included 31 conferences and symposia, somewhat analogous to our "special sessions" but many of them have been running for years and are numbered themselves, like the 23<sup>rd</sup> Conference on Hydrology. There were two special lectures, 12 Town Hall meetings, three short courses, one workshop on Professional Communication and numerous special sessions or programs of general interest.

Clearly it is impossible to take all of this in, so difficult choices between usually a dozen alternatives had to be made several times each day. I chose to attend two special symposia, one celebrating the contributions of Timothy Oke, Professor of Geography at UBC, to urban meteorology. Tim was there to be celebrated at several sessions and a luncheon. The other was in honour of Anthony (Tony) Hollingsworth, long-time head of research at ECMWF, major contributor to the development of NWP and data assimilation, who died suddenly during the summer of 2007. For the remaining time I concentrated on sessions on data assimilation, the field in which I worked many years ago. It was a "blast from the past" to talk to colleagues from years ago who are still making contributions to the field, long after I was sent out to pasture. People like Eugenia Kalnay, Michael Ghil and Adrian Simmons are still very active in the field, as are many others.

The poster sessions were held in a room the size of a football field, where coffee and snacks were usually available. Certain times were reserved for poster viewing without competition from concurrent oral sessions.

The exhibits hall was also huge and evening snacks and cash bars provided an incentive for delegates to spend some time there. However some exhibitors complained that

their business was slow because the coffee at coffee breaks was available only in the poster area and not in the exhibits area.

I went around armed with a supply of posters for the Halifax Congress and applications for exhibit space. I did not see any other meetings being advertised in this way so I held off sticking up posters because it did not seem appropriate. I did give a supply of both to Brian Day of Campbell Scientific to distribute to suppliers and neighbour exhibit companies as he saw fit.

I also managed to talk to the technical AMS staff running the very efficient system for distributing presentation files from the presentation uploading room to the various lecture halls. It turns out that AMS hires the same contractor to supply the computers and networking and file handling software each year. They would be worth investigating although cost would likely be an issue for CMOS.

There were many other Canadians attending this meeting, many of them well known CMOS members, some of whom received awards or special recognition from the AMS. Tim Oke has already been mentioned.

There were five pages required to list all the winners of AMS awards. These included Ron McTaggart-Cowan who won the *Monthly Weather Review* Editor's award for excellent reviews. Two Honorary Members were elected, Guri Marchuk and John Zillman, and 27 Fellows, including Jim Hansen and Andrew Weaver. All of these awards were announced by the President, who made presentations throughout the annual banquet, all of which were televised on monitors throughout the banquet hall and noted in a printed program so that everyone could follow.

All in all this was a very impressive meeting, very well-run, excellent scientific content and many very good interesting sessions on policy and public affairs, a career fair and comprehensive exhibits. I am very grateful to the CMOS Council for agreeing to send me as their representative.

## 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.

<sup>2</sup> Executive Director, CMOS



Foreword: The following Editorial Policy for the *CMOS Bulletin SCMO* will be presented for approval at the next Publications Committee Meeting to be held in Halifax during the next CMOS Annual Congress in May 2009. If you have any comments and/or suggestions, please submit them at the earliest to the author of this policy or to Richard Asselin, Director, CMOS Publications.

### **CMOS Bulletin SCMO Editorial Policy (Draft)**

#### **Purpose of the Bulletin**

Published under the auspices of the Canadian Meteorological and Oceanographic Society (CMOS), the *CMOS Bulletin SCMO* is a bi-monthly publication with the primary purpose of informing its readers about meteorological and oceanographic development in Canada while fostering their current knowledge in these two scientific fields. Typical readers come from the government circle (meteorologists, oceanographers and researchers in environmental sciences), education field (teachers and students), and the private sector (meteorologists and oceanographers practitioners). The *CMOS Bulletin SCMO* is published in two forms: a paper version sent to members by regular mail and an electronic version available on CMOS web site to members only.

#### **Published articles**

The *CMOS Bulletin SCMO* seeks to publish:

- synthesis articles in the domain of meteorology and oceanography and climate research;
- articles reporting meteorological and oceanographic phenomena, recent or past;
- articles on instrumentation, data collection and distribution, quality control and archival systems;
- articles on forecasts, models and their limitations; and on distribution systems of forecasts;
- reports on field surveys in these two scientific domains including regional, national and international surveys;
- studies highlighting economic, environmental, educational and social implications;
- historical studies on the two scientific domains and related areas.

It should be noted that the *CMOS Bulletin SCMO* is not a scientific publication and that articles, although reviewed by the Review Board, are not reviewed by peers.

#### **Length of articles**

Except for special cases, articles must not be longer than 8 pages, including the text, figures, tables and pictures. For a

typical article with some pictures, the text may thus be of the order of 6,000 words.

All articles submitted will be reviewed by an editorial board and, if necessary, corrected. The Oxford English dictionary is used by the board. There is no page charge. All articles and reports will be published in the standard two-column format.

#### **Title**

The title must be concise and state clearly the subject of the article. Sub-titles may also be used where appropriate. Titles and sub-titles may not contain abbreviations, acronyms, or technical expressions. The given name and surname of each author along with his or her affiliation should follow the title.

#### **Languages**

Articles may be submitted in English or French. A short abstract must be included to define the purpose of the article, its limits and its major conclusions. The Editor reserves the right to have the abstract translated and to publish it along with the original article.

#### **Tables, figures and pictures**

Tables and figures must be numbered in the same sequence as used in the main text. They must include a legend. Different components should be clearly defined and the units used (International System) must be indicated. Each table and figure should be explained in the main text or, at the very least, referred to in the text.

Tables and figures may be placed in the main text at the location chosen by the author. At the same time, figures must be provided in electronic format as JPEG or TIFF files. Pictures provided in electronic format (in JPEG or TIFF) must have a high enough resolution to allow a good quality reproduction. The origin of the pictures must also be stated. A full list of tables, figures and pictures must be included with the text at the end of the electronic file. The Editor reserves the right to arrange the tables, figures and pictures to facilitate the layout while maintaining the logic as the author.

#### **References**

Bibliographic references appearing in the main text must include the names of authors and the year of publication; for example, it should be noted as "*Bolduc, 2008*" or as "*Bolduc 2008 has demonstrated*". If a reference has more than two authors, it must be noted with the expression *et al.*

The bibliography appearing at the end of the article or report should refer to the works quoted in the main text and must be compiled in alphabetical order. Each reference must include the surname and initials of the authors, the year of publication, the title of the article, the name of the publication, the volume number and the first and last page numbers of the article. Within the bibliography, the use of *et*

a/ should be avoided.

### Offprints

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Paul-André Bolduc

Editor, *CMOS Bulletin SCMO*

[Bulletin@cmos.ca](mailto:Bulletin@cmos.ca) or [Publications@cmos.ca](mailto:Publications@cmos.ca)

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Avant-propos: La politique éditorial du *CMOS Bulletin SCMO* qui suit sera présentée au comité des publications lors du prochain congrès qui se tiendra à Halifax en mai 2009 pour approbation. Si vous avez des commentaires et/ou suggestions, prière de les faire parvenir au plus tôt à l'auteur de cette politique ou à Richard Asselin, Directeur des Publications pour la SCMO.

### **CMOS Bulletin SCMO** **Politique éditorial (Ébauche)**

#### But du Bulletin

Publié sous la responsabilité de la Société canadienne de météorologie et d'océanographie (SCMO), le *CMOS Bulletin SCMO* est une revue bi-mensuelle dont le but premier est de renseigner ses lecteurs sur les développements en météorologie et en océanographie au Canada tout en enrichissant leurs connaissances pour ces deux disciplines scientifiques. Les lecteurs typiques du Bulletin viennent du milieu gouvernemental (météorologistes, océanographes, chercheurs en sciences de l'environnement), du milieu de l'enseignement (professeurs, étudiants), du secteur privé (praticiens en météorologie ou en océanographie). Le *CMOS Bulletin SCMO* est publié sous deux formes: une version papier distribuée par la poste aux membres de la SCMO et une version électronique sur le site web de la SCMO et disponible aux membres seulement.

#### Sujets publiés

Le *CMOS Bulletin SCMO* souhaite publier:

- des articles de synthèse faisant le point sur un domaine de la météorologie et l'océanographie, de la recherche sur l'étude du climat;

- des articles sur les phénomènes météorologiques ou océanographiques récents ou passés;

- des articles sur l'instrumentation, de la collecte des données, de la distribution de ces, données, du contrôle de leur qualité et des systèmes d'archivage;

- des articles sur les prévisions, sur les modèles utilisés, sur leurs limites et sur les systèmes de distribution des prévisions;

- des rapports sur les campagnes de mesure dans ces deux domaines scientifiques, autant les campagnes régionales que les campagnes nationales et internationales;

- des études dégagant les implications économiques, environnementales, éducatives ou sociales;

- des études à caractère historique sur ces deux domaines scientifiques et sciences connexes.

Il faut noter que le *CMOS Bulletin SCMO* n'est pas une revue scientifique et que les articles, bien que révisés par le Comité éditorial pour leur contenu et leur compréhension, ne font pas l'objet d'une évaluation scientifique par les pairs.

#### Longueur des articles

À moins d'exception, les articles ne doivent pas dépasser 8 pages incluant le texte, les figures, les photos et les tableaux. Pour un article moyennement illustré, le nombre de mots est donc d'environ 6 000 mots ou 33 000 caractères.

Tous les articles soumis seront revus par un comité de rédaction et, si nécessaire, corrigés. Le dictionnaire anglais utilisé est le Oxford. Il n'y a pas de frais de publication. Tous les articles et rapports seront publiés sous le format standard de deux colonnes.

#### Titre

Autant que possible, le titre doit être concis et refléter le sujet traité. Les sous-titres sont également indiqués dans certains cas. Par contre, le titre et les sous-titres ne doivent pas comporter d'abréviations, de sigles ou d'expressions trop techniques. Le titre sera suivi par le prénom et le nom de l'auteur ou des auteurs et leur organisme d'appartenance.

#### Langues

Les articles peuvent être soumis en anglais ou en français. Un court résumé devra être inclus pour préciser l'étendue de l'article, ses limites et ses principales conclusions. Le rédacteur se réserve le droit de faire traduire le résumé et de le publier avec l'article original.

#### Textes

Les textes peuvent être présentés dans la langue de choix de l'auteur, anglais ou français, sous forme électronique à l'aide des logiciels MS Word ou WordPerfect en évitant

toute forme compliquée de présentation.

### Tableaux, figures et photographies

Les tableaux et figures seront numérotés suivant le même système de numérotation utilisé dans le texte principal. Ils seront accompagnés d'une légende. Leurs éléments doivent être clairement définis et les unités employées (Système international) doivent être précisées. Chaque tableau et chaque figure devra être commenté dans le texte principal ou, tout au moins, être mentionné dans le texte.

Les tableaux et figures peuvent être intégrés dans le texte principal à l'endroit choisi par l'auteur. Par contre, les figures doivent être fournies sous forme séparées en format électronique JPEG ou TIFF. Les photographies fournies sous forme électronique (également sous forme JPEG ou TIFF) devront avoir une résolution suffisante pour permettre une bonne reproduction. L'origine des photos devra être également mentionnée. Une liste complète des tableaux, figures et photographies devra accompagner le texte et être intégrée à la fin du fichier électronique. La rédaction se réserve le droit de disposer les tableaux, figures et photographies aux endroits appropriés pour faciliter la mise-en-page tout en respectant l'ordre logique de présentation.

### Références

Les références bibliographiques indiquées dans le texte principal devront inclure le nom des auteurs ainsi que l'année de publication; par exemple on dira *Bolduc, 2008* ou bien comme l'a démontré *Bolduc (2008)*. Si la référence comporte plus de deux auteurs, on utilisera la mention *et al.*

La bibliographie à la fin des articles ou rapports indiquera les travaux cités dans le texte principal et sera classée par ordre alphabétique. Chaque référence devra inclure le nom et initiales du prénom des auteurs, année de publication, titre de l'article, nom du périodique, numéro du volume, et le numéro de la première et dernière pages de l'article. Dans la bibliographie on évitera l'usage du *et al.*

### Tirés à part

Le *CMOS Bulletin SCMO* ne donne pas de tirés à part aux auteurs. Le premier auteur d'un article recevra gratuitement sur demande un exemplaire papier du numéro dans lequel son article est publié. Également sur demande, il pourra recevoir un fichier PDF de son article.

### Responsabilité

À moins d'avis contraire, les opinions exprimées dans les articles et rapports sont celles des auteurs et ne reflètent pas nécessairement celles de la SCMO. En soumettant un article pour publication dans le *CMOS Bulletin SCMO*, l'auteur s'engage à permettre à la Société de publier son article sous forme papier et sous forme électronique. Les articles et rapports publiés dans le *CMOS Bulletin SCMO* deviennent la propriété de la Société.

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## 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.

#### Mesoscale Wind Climate Modelling in Steep Mountains

by JEAN-PAUL PINARD, ROBERT BENOIT and JOHN D. WILSON

#### Abstract

Although the Mesoscale Community Compressible (MC2) model successfully reproduces the wind climate (for wind energy development purposes) of the Gaspé region, equivalent simulations for the steep mountainous southern Yukon have been unsatisfactory. An important part of the problem lies in the provision of suitable boundary conditions in the lower troposphere. This paper will describe an alternative provision of boundary conditions to the MC2 model based partly on standard National Centers for Environmental Prediction/National Center for Atmospheric Research (NCEP/NCAR) Reanalysis statistics, however, with modified lower tropospheric conditions based on local radiosonde measurements.

The MC2 model is part of the AnemoScope wind energy simulation toolkit which applies statistical-dynamical downscaling of basic large-scale weather situations (i.e., the NCEP/NCAR Reanalysis) to simulate the steady-state wind climate of a complex region. A case study summarized here imposes a typical mean winter temperature inversion on the boundary conditions to reduce downward momentum transfer in the MC2 model over the Whitehorse region. In conjunction with this step, the geostrophic wind at the boundaries is held constant (with height) in speed and direction, based on the (observed) dominant southwesterly winds *above* the mountaintops. The resulting simulation produces wind directions within the modelled domain that are in much better agreement with the available measurements. However, despite the imposed atmospheric stability, downward transfer of horizontal momentum from aloft still appears to exceed that occurring in nature.

It is recommended that (in future studies of this type regarding mountain wind climate) the input statistics processed from the NCEP/NCAR Reanalysis be modified by referencing the geostrophic winds to a level above the mountaintops. It is also suggested that converting to a height (z) coordinate system may reduce the erroneous downward momentum transfer found in the present terrain-following grid.

## Résumé [traduit par la rédaction]

Même si le modèle de mésoéchelle compressible communautaire (MC2) reproduit adéquatement la climatologie du vent (pour les besoins du développement éolien) dans la région de Gaspé, il n'y est pas parvenu de façon satisfaisante lors de simulations équivalentes dans les régions de montagnes escarpées du sud du Yukon. Une partie importante du problème réside dans la fourniture de conditions aux limites appropriées dans la basse troposphère. Cet article décrira une autre façon de fournir des conditions aux limites au modèle MC2 fondée en partie sur les statistiques normalisées des réanalyses des NCEP/NCAR (National Centers for Environmental Prediction/National Center for Atmospheric Research) avec, cependant, des conditions modifiées dans la basse troposphère en fonction des mesures locales obtenues par radiosondes.

Le modèle MC2 fait partie de la trousse de simulation de l'énergie éolienne AnemoScope qui applique une réduction d'échelle statistique-dynamique à des situations météorologiques à grande échelle (c.-à-d. les réanalyses des NCEP/NCAR) pour simuler la climatologie du vent en régime permanent dans une région au relief accidenté. Une étude de cas que l'on résume ici impose une inversion thermique moyenne caractéristique de l'hiver comme conditions aux limites pour réduire le transfert de quantité de mouvement vers le bas dans le modèle MC2 au-dessus de la région de Whitehorse. En même temps, le vent géostrophique aux limites est maintenu constant (avec la hauteur) en vitesse et en direction et basé sur les vents dominants du sud-ouest (observés) *au-dessus* du sommet des montagnes. La simulation résultante produit des directions du vent dans le domaine modélisé qui s'accordent beaucoup mieux avec les mesures que nous avons. Cependant, malgré la stabilité atmosphérique imposée, le transfert de quantité de mouvement vers le bas à partir des couches en altitude semble encore plus important que dans la réalité.

Nous recommandons que (dans les futures études de ce genre sur la climatologie du vent en régions montagneuses) les statistiques dérivées des réanalyses des NCEP/NCAR fournies en entrée soient modifiées en définissant les vents géostrophiques par rapport à un niveau situé au-dessus du sommet des montagnes. Nous pensons aussi que l'emploi d'un système de coordonnées de hauteur ( $z$ ) pourrait réduire le transfert erroné de quantité de mouvement vers le bas observé avec la grille actuelle, qui épouse le relief.

**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.**

## Tracing Freshwater Anomalies Through the Air-Land-Ocean System: A Case Study from the Mackenzie River Basin and the Beaufort Gyre

by MICHAEL A. RAWLINS, MICHAEL STEELE, MARK C. SERREZE, CHARLES J. VÖRÖSMARTY, WENDY ERMOLD, RICHARD B. LAMMERS, TAMLIN M. PAVELSKY, ALEXANDER SHIKLOMANOV and JINLUN ZHANG

### Abstract

Mackenzie River discharge was at a record low in water year (WY) 1995 (October 1994 to September 1995), was near average in WY 1996, and was at a record high in WY 1997. The record high discharge in WY 1997, with above average flow each month, was followed by a record high flow in May 1998, then a sharp decline. Through diagnosing these changing flows and their expression in the Beaufort Sea via synthesis of observations and model output, this study provides insight into the nature of the Arctic's freshwater system. The low discharge in WY 1995 manifests negative anomalies in P-E and precipitation, recycled summer precipitation, and dry surface conditions immediately prior to the water year. The complex hydrograph for WY 1996 reflects a combination of spring soil moisture recharge, buffering by rising lake levels, positive P-E anomalies in summer, and a massive release of water held in storage by Bennet Dam. The record high discharge in WY 1997 manifests the dual effects of reduced buffering by lakes and positive P-E anomalies for most of the year. With reduced buffering, only modest P-E the following spring led to record discharge in May 1998. As simulated with a coupled ice-ocean model, the record low discharge in WY 1995 contributed to a negative freshwater anomaly on the Mackenzie shelf lasting throughout the winter of 1995/96. High discharge from July-October 1996 contributed approximately 20% to a positive freshwater anomaly forming in the Beaufort Sea in the autumn of that year. The remainder was associated with reduced autumn/winter ice growth, strong ice melt the previous summer, and positive P-E anomalies over the ocean itself. Starting in autumn 1997 and throughout 1998, the upper ocean became more saline owing to sea ice growth.

### Résumé

Le débit du fleuve Mackenzie a connu un minimum record durant l'année hydrologique (AH) 1995 (octobre 1994 à septembre 1995), il était près de la moyenne durant l'AH 1996 et il a connu un maximum record durant l'AH 1997. Le débit maximum record de l'AH 1997, avec des débits au-dessus de la moyenne à tous les mois, a été suivi d'un débit maximum record en mai 1998, puis d'une diminution prononcée. En diagnostiquant ces débits changeants et leurs effets dans la mer de Beaufort par le biais d'une synthèse d'observations et de sorties de modèle, cette étude donne un aperçu des caractéristiques du réseau d'eau douce de l'Arctique. Le faible débit de l'AH 1995 est le résultat d'anomalies négatives dans l'indice P-E et dans les précipitations de même que des précipitations estivales

recyclées et des conditions de surface sèches immédiatement avant l'année hydrologique. L'hydrogramme complexe pour l'AH 1996 est dû à une combinaison de la reconstitution printanière de l'humidité du sol, du stockage d'eau par la hausse du niveau des lacs, d'anomalies positives de l'indice P-E en été et du relâchement d'une importante quantité d'eau qui était retenue par le barrage Bennet. Le débit maximum record de l'AH 1997 reflète le double effet d'un stockage moindre par les lacs et d'anomalies positives de l'indice P-E durant la majeure partie de l'année. En raison du stockage réduit, le faible indice P-E le printemps suivant a donné lieu à un débit record en mai 1998. Comme cela a été simulé à l'aide d'un modèle couplé glace-océan, le débit minimum record de l'AH 1995 a contribué à une anomalie négative d'eau douce sur le plateau du Mackenzie qui a perduré durant tout l'hiver 1995/1996. Un débit élevé de juillet à octobre 1996 a contribué dans une mesure d'environ 20 % à une anomalie positive d'eau douce qui est apparue dans la mer de Beaufort à l'automne de cette année. Le reste a été attribué à une croissance réduite de la glace en automne et en hiver, à une fonte intense l'été précédent et à des anomalies positives de l'indice P-E au-dessus de l'océan même. À partir de l'automne 1997 et durant tout 1998, la salinité de la couche supérieure de l'océan a augmenté à cause de la croissance de la glace de mer.

## Atmosphere-Ocean 47-1 Paper Order

### Fundamental Research / Recherche fondamentale

Sensitivity of the Statistical DownScaling Model (SDSM) to Reanalysis Products by E.N. KOUKIDIS and A.A. BERG

Comparing Two Climatologies of the Labrador Sea: Geopotential and Isopycnal by Nilgun Kulan and Paul G. Myers

Extreme Wind Regime Responses to Climate Variability and Change in the Inner-South-Coast of British Columbia, Canada by DILUMIE S. ABEYSIRIGUNAWARDENA, ERIC GILLELAND, DAVID BRONAUGH and PAT WONG

Mesoscale Wind Climate Modelling in Steep Mountains by Jean-Paul Pinard, Robert Benoit and John D. Wilson

Tracing Freshwater Anomalies Through the Air-Land-Ocean System: A Case Study from the Mackenzie River Basin and the Beaufort Gyre by MICHAEL A. RAWLINS, MICHAEL STEELE, MARK C. SERREZE, CHARLES J. VÖRÖSMARTY, WENDY ERMOLD, RICHARD B. LAMMERS, TAMLIN M. PAVELSKY, ALEXANDER SHIKLOMANOV and JINLUN ZHANG

### Applied Research / Recherche appliquée

Numerical Simulation of Extreme Waves During the Storm of 20-22 January 2000 Using CMC Weather Prediction Model Generated Winds by Roop Lalbeharry, Ralph Bigio, Bridget R. Thomas and Laurence Wilson

## 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. 2 copies available.

*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. 2 copies available.

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

*The Asian Monsoon, Causes, History and Effects*, by Peter D. Clift and R. Alan Plumb, Cambridge University Press, ISBN 978-0-521-84799-5, pp.270, Hardback, US\$150. 2 copies available.

*Large-Scale Disasters, Prediction, Control and Mitigation*, Edited by Mohamed Gad-el-Hak, Cambridge University Press, ISBN 978-0-521-87293-5, pp.576, Hardback, US\$200. 2 copies available.

*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, 4<sup>th</sup> 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, 2<sup>nd</sup> Edition, pp. 520, Paperback, US\$70.

*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.

**New Book on Meteo-Philately**

The WMO has just published a beautiful new book: From Weather Gods to Modern Meteorology - a Philatelic Journey.



In 111 pages this book treats the history of weather and meteorology in six chapters:

1. From heaven to science
2. Beyond borders and divisions
3. Taking the pulse of the Earth
4. Be informed, be prepared
5. Hazards and disasters
6. Taking care of our climate .

The material in this book was compiled by Dr. Raino Heino of the Finnish Meteorological Institute who has years of experience in meteo-philately and in philatelic expositions at the highest international level. It is lavishly illustrated with hundreds of high-quality images of stamps and postal stationery from Dr. Haino's collection. Virtually any meteorological topic that one can think of is illustrated somewhere in this book.

Anyone interested in meteo-philately or simply in beautiful stamps will appreciate this book.

The book is WMO No. 1023, 2008, 112-pages, ISBN 978-92-63-11023-7. Additional information can be found in the WMO Publications Catalogue.

Note from the Editor: The CMOS Bulletin SCMO has published an article on Meteorological Philately in its December 2006 issue: *What is Meteorological Philately?*, by Garry Toth, Don Hillger and Bob Kochtubajda, Vol.34, No.6, pages 197-200.

**Census of Marine Life (CoML) data and the****Intergovernmental Oceanographic Commission (IOC)**

Report by Geoffrey Holland

The Ocean Biogeographic Information System (OBIS) makes available, online, primary data on marine species. A primary mission element is to support the CoML synthesis in 2010. OBIS integrates data from all data providers across species and marine themes. In 2010 the funding from the Sloan Foundation for the Census of Marine Life, and therefore also for OBIS, will end and the future of OBIS beyond 2010 has to be addressed. Canada hosts one of the fourteen regional OBIS nodes at the Centre of Marine Biodiversity in BIO and managed by Tana Worcester. OBIS and the IOC are exploring the possibility for an institutional framework within the IOC to ensure the continuation of OBIS. The IOC requested the IOC Data and Information Management Advisory Group (IODE) to work together with the OBIS Secretariat to develop a document for submission to the 25<sup>th</sup> Session of the IOC Assembly in 2009.

The first step in the process was an IODE/OBIS Workshop held in Ostende, Belgium, November 24-26, 2008, attended by invited experts, including several Canadians; Bob Branton and Mary Kennedy, from BIO, and Geoff Holland, who acted as Rapporteur for the meeting. The participants discussed several potential scenarios for a future arrangement and arrived at a final recommendation that would see OBIS become an IOC programme. The recommendation from the Workshop included the need for a joint IOC Group of Experts between OBIS and the IODE to ensure close coordination and compatibility between the two data groups. The next step will be to investigate the proposed arrangement in depth and to prepare documentation for the approval of the OBIS Governing Body and the IOC Assembly in 2009.

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**Fifth Prince Albert I Medal of IAPSO**

Prince Albert I

Lawrence Mysak, President of IAPSO, is pleased to announce that the fifth Prince Albert I Medal of IAPSO will be presented to Professor Harry L. Bryden, FRS of the University of Southampton, UK, in recognition of his fundamental contributions to understanding the ocean's role in the global climate system. The Medal will be presented at the upcoming IAMAS-IAPSOIACS Joint Assembly (MOCA-09) in Montréal at 10.30 on Wednesday, July 22, 2009. After the Medal presentation, Professor Bryden will

deliver the Prince Albert I Memorial Lecture. At MOCA-09 (<http://www.moca-09.org>), there will be 21 joint symposia involving the IUGG sister associations IAMAS and IACS, as well as 10 IAPSO-only symposia on a variety of topics on physical, chemical and biogeochemical oceanography.

*Lawrence Mysak  
President, IAPSO  
and Canada Steamship Lines Professor,  
McGill University  
Montréal, Québec, Canada*

Note from the Editor: In partnership with the International Association for the Physical Sciences of the Oceans (IAPSO), Prince Rainier of Monaco has established the Prince Albert I Medal in the physical and chemical sciences of the oceans. This medal is named in honour of the late Prince Albert I of Monaco who, in 1919, organized the Oceanography Section of the International Union of Geodesy and Geophysics. He also served as first president of that section. This medal is awarded biannually by IAPSO at its Assemblies. Previous recipients of the medal are:

- 2001 Dr. Walter Munk
- 2003 Dr. Klaus Wyrtki
- 2005 Prof. Dr. Friedrich Schott
- 2007 Dr. Russ Davis

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#### First Notice and Call for Papers

### **11<sup>th</sup> International Workshop on Wave Hindcasting and Forecasting & 2<sup>nd</sup> Coastal Hazards Symposium**

Halifax, Nova Scotia, Canada  
October 18-23, 2009

An international workshop on wave prediction and a symposium on hazard assessment in coastal areas, co-sponsored by Environment Canada, the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory and the WMO/IOC Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM) will be held at the Prince George Hotel in Halifax, Nova Scotia, Canada, from October 18-23, 2009. Please visit the Prince George Hotel website: <http://www.princegeorgehotel.com> A limited block of rooms has been reserved at the Prince George Hotel at the special rate of \$149 CDN per night plus taxes.

The objectives of the workshop are:

- to provide a forum for the exchange of ideas and information related to wind, wave, and surge hindcasting and forecasting, including some special topics related to the evaluation of coastal hazards
- to coordinate ongoing R&D initiatives,

- to discuss priorities for future research and development.

Within the general context of the workshop objectives two specific themes have been identified for this particular meeting. Papers dealing with research related to these themes will be given particular consideration. These two themes are:

(1) prediction of coastal hazards on all time scales up to centennial, including historical and projected wave climate trends as a contribution to total sea level and associated coastal vulnerability, theoretical, numerical, laboratory and field studies of wind, wave and surge phenomena in coastal areas, and the assessment of wind, wave and surge hazards in coastal areas;

(2) validity and reliability of wave measurements from the various wave measurement systems, including intercomparison of wave measurements from different platforms, the development of new wave measurement sensors and measurement techniques and their evaluation, and new methodologies for the inter-comparisons for both directional and non-directional data.

Papers are also welcomed on other research and operational aspects of wave hindcasting and forecasting; including operational forecasting; regional hindcasts; data collection and instrumentation; data assimilation into numerical models; wave-current interaction; wave-ice interaction; shallow water and nearshore effects; wind fields for wave hindcasting or forecasting; extremal analysis; case studies.

The program will consist of both presentation and poster sessions; authors should indicate their preference, but the final decision rests with the workshop organizers.

Those wishing to present a paper should submit a title and abstract (100-300 words) to the addresses shown below. Each abstract should contain the author's name, mailing address and telephone number. The deadline for receipt of abstracts is May 22, 2009. Full papers will be required by September 18, 2009. To receive further notices, please contact either:

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or

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### Ouranos reçoit du gouvernement du Québec une subvention importante de 10 millions de dollars

Montréal, 23 février 2009. Ouranos, un consortium d'experts en recherche sur la climatologie régionale et l'adaptation aux changements climatiques, a reçu une importante subvention complémentaire de 10 M\$ du ministère du Développement durable, de l'Environnement et des Parcs (MDDEP) pour le développement de projets de recherche en impacts et adaptation aux changements climatiques. Cette subvention a été accordée à Ouranos dans le cadre du Plan 2006-2012 sur les changements climatiques du gouvernement du Québec et s'ajoute à son financement de base.

Ouranos est un consortium qui intègre quelque 250 scientifiques et professionnels issus de différentes disciplines. Son organisation se concentre sur deux grands thèmes :

**Science du climat**, dont les objectifs sont de développer les connaissances en climatologie régionale, fournir les données de simulations et de scénarios climatiques requises par les projets en impacts et adaptation et traiter et valider les résultats acquis par des analyses hydro-climatiques pertinentes et adéquates; et

**Impacts et adaptation**, dont les objectifs sont d'évaluer les impacts des changements climatiques sur l'environnement, les populations et les activités socioéconomiques, d'apprécier les vulnérabilités des systèmes et d'identifier et recommander aux décideurs les meilleures approches pour s'adapter aux changements climatiques.

Dans le cadre de la subvention complémentaire, l'accent sera porté sur les enjeux suivants :

**Biodiversité et écosystèmes québécois:** Acquisition de connaissances sur l'état et la vulnérabilité des espèces aux changements climatiques et développement d'outils d'aide à la décision pour les gestionnaires de ces ressources.

**Enjeux municipaux:** Vulnérabilités des infrastructures et des équipements municipaux, aménagement et développement du territoire, développement d'outils d'aide à la décision.

**Eau:** Quantités et qualité de l'eau, étude du système Grands Lacs/Saint-Laurent, acquisition de connaissances additionnelles sur les eaux de surface et souterraine.

**Agriculture:** Évaluation et identification de pratiques de gestion durable.



Signature de l'entente le 23 février 2009 entre Mme Line Beauchamp, ministre du Développement durable, de l'Environnement et des Parcs et M. André Musy, directeur général d'Ouranos

Plusieurs projets sont actuellement en cours de réalisation ou en préparation dans ces différents secteurs. D'autres ont déjà fourni une information circonstanciée aux décideurs, notamment en matière d'hydrologie nordique, d'érosion côtière et de sécurité des populations. La subvention complémentaire viendra renforcer l'action d'Ouranos et permettra d'offrir une information solide aux décideurs.

Le soutien financier du gouvernement du Québec, qui sera conforté par d'autres appuis provenant de ses membres, permettra d'atteindre les objectifs fixés.

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### MediClim.com - Weather Health Link Goes Online

Toronto, ON, February 12, 2009 /EIN News/ -- The launch of a new website brings excitement to the medical community and a form of relief to people who suffer from chronic health problems such as migraine, asthma, arthritis, diabetes and heart condition. MediClim.com tracks weather patterns, identifies when weather conditions are more likely to affect health and alerts subscribers when there is potential risk.



Founded by physician Dr. John Bart and senior career meteorologist Denis Bourque, this free subscriber-based web service is available in the U.S., Canada and the U.K. Users will be able to subscribe to MediClim through [www.mediclim.com](http://www.mediclim.com) and receive advance warning via email alert when their health matter is more likely to be aggravated as a result of pending weather conditions.

Over the past 25 years Dr. Bart and Mr. Bourque have collaborated on what is the most robust form of online weather health link in the world. "Our goal is to improve the lives of people with chronic or re-occurring illnesses by warning them when their health matter may flare-up. It is



our hope that, armed with this knowledge, people may heed their doctor's advice more carefully during an alert to minimize any impact," says Dr. Bart.

"The launch of a new website brings excitement to the medical community and a form of relief to people who suffer from chronic health problems such as **migraine, asthma, arthritis, diabetes and heart condition**".

Backed by European research that supports the weather health theory such as studies completed by the International Society of Biometeorology, Bart and Bourque have developed an index that maps specific weather conditions known to trigger adverse health effects. The results of their research have culminated in 14 distinct categories of weather known to affect health.

"We're just at the tip of the iceberg in terms of the weather health relationship," says Mr. Bourque. There are already plans under way to expand the range of health matters MediClim will warn against.

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### L'indice météo-santé

Le temps vous affaïsse-t-il? Est-ce que vous ou quelqu'un que vous connaissez souffre de la MIGRAINE, de l'ASTHME, de l'ARTHRITE, des MALADIES CARDIAQUES, ou du DIABÈTE? MediClim® peut vous aider.



Inscrivez-vous chez MediClim® gratuitement et vous recevrez des avertissements par courriel lorsque le lendemain pourrait aggraver votre malaise suite aux

changements prévus par la météo. De plus, vous aurez accès à nos pages de discussions où vous pourrez rencontrer d'autres personnes qui souffrent de problèmes de santé similaires aux vôtres. MediClim® est un service GRATUIT disponible au Canada, aux Etats-Unis (sauf Alaska et Hawaii), et au Royaume Uni.

Nous ajouterons d'autres pays européens dans un futur proche.

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### Coastal Zone Canada 2010

Mark your calendars! The international conference Coastal Zone Canada 2010 is scheduled for 24-29 July 2010 in Charlottetown, Prince Edward Island. The theme is **'Healthy Oceans - Strong Coastal Communities'**. The first call for papers will be issued in May 2009

### Polar Research Reveals New Evidence of Global Environmental Change



Geneva, 25 February 2009

(WMO/ICSU) – Multidisciplinary research from the International Polar Year (IPY) 2007-2008 provides new evidence of the widespread effects of global warming in the polar regions. Snow and ice are declining in both polar regions, affecting human livelihoods as well as local plant and animal life in the Arctic, as well as global ocean and atmospheric circulation and sea level. These are but a few

findings reported in **"State of Polar Research"**, released today by the World Meteorological Organization (WMO) and the International Council for Science (ICSU). In addition to lending insight into climate change, IPY has aided our understanding of pollutant transport, species' evolution, and storm formation, among many other areas.

The wide-ranging IPY findings result from more than 160 endorsed science projects assembled from researchers in more than 60 countries. Launched in March 2007, the IPY covers a two-year period to March 2009 to allow for observations during the alternate seasons in both polar regions. A joint project of WMO and ICSU, IPY spearheaded efforts to better monitor and understand the Arctic and Antarctic regions, with international funding support of about US\$ 1.2 billion over the two-year period.

"The International Polar Year 2007 – 2008 came at a crossroads for the planet's future" said Michel Jarraud, Secretary-General of WMO. "The new evidence resulting from polar research will strengthen the scientific basis on which we build future actions".

Catherine Bréchnac, President of ICSU, adds *"the planning for IPY set ambitious goals that have been achieved, and even exceeded, thanks to the tireless efforts, enthusiasm, and imagination of thousands of scientists, working with teachers, artists, and many other collaborators"*.

IPY has provided a critical boost to polar research during a time in which the global environment is changing faster than ever in human history. It now appears clear that the Greenland and Antarctic ice sheets are losing mass contributing to sea level rise. Warming in the Antarctic is much more widespread than it was thought prior to the IPY, and it now appears that the rate of ice loss from Greenland is increasing.

Researchers also found that in the Arctic, during the summers of 2007 and 2008, the minimum extent of year-round sea ice decreased to its lowest level since satellite records began 30 years ago. IPY expeditions recorded an

unprecedented rate of sea-ice drift in the Arctic as well. Due to global warming, the types and extent of vegetation in the Arctic shifted, affecting grazing animals and hunting.

Other evidence for global warming comes from IPY research vessels that have confirmed above-global-average warming in the Southern Ocean. A freshening of the bottom water near Antarctica is consistent with increased ice melt from Antarctica and could affect ocean circulation. Global warming is thus affecting Antarctica in ways not previously identified.



Photo credit: WMO Art Gallery: Our Polar Heritage

IPY research has also identified large pools of carbon stored as methane in permafrost. Thawing permafrost threatens to destabilize the stored methane - a greenhouse gas- and send it into the atmosphere. Indeed, IPY researchers along the Siberian coast observed substantial emissions of methane from ocean sediments.

In the area of biodiversity, surveys of the Southern Ocean have uncovered a remarkably rich, colourful and complex range of life. Some species appear to be migrating poleward in response to global warming. Other IPY studies reveal interesting evolutionary trends such as many present-day deep-sea octopuses having originated from common ancestor species that still survive in the Southern Ocean.

IPY has also given atmospheric research new insight. Researchers have discovered that North Atlantic storms are major sources of heat and moisture for the polar regions. Understanding these mechanisms will improve forecasts of the path and intensity of storms. Studies of the ozone hole have benefited from IPY research as well, with new connections identified between the ozone concentrations above Antarctica and wind and storm conditions over the Southern Ocean. This information will improve predictions of climate and ozone depletion.

Many Arctic residents, including indigenous communities, participated in IPY's projects. Over 30 of these projects addressed Arctic social and human science issues, including food security, pollution, and other health issues, and will bring new understanding to addressing these pressing challenges. *"IPY has been the catalyst for the development and strengthening of community monitoring networks across the North"* said David Carlson, Director of the IPY International Programme Office. *"These networks stimulate the information flow among communities and back and forth from science to communities"*.

IPY leaves as its legacy enhanced observational capacity, stronger links across disciplines and communities, and an energized new generation of polar researchers. *"The work begun by IPY must continue"*, said Mr. Jarraud. *"Internationally coordinated action related to the polar regions will still be needed in the next decades,"* he said. Ms Bréchnignac concurs: *"This IPY has further strengthened the ICSU-WMO relationship on polar research coordination, and we must continue to assist the scientific community in its quest to understand and predict polar change and its global manifestations at this critical time"*.

The increased threats posed by climate change make polar research a special priority. The **"State of Polar Research"** document not only describes some of the striking discoveries during IPY, it also recommends priorities for future action to ensure that society is best informed about ongoing polar change and its likely future evolution and global impacts. A major IPY science conference will take place in Oslo in June 2010.

Source: WMO Website <http://www.wmo.ch> on March 5, 2009. WMO Press Release # 839.

*The World Meteorological Organization is the United Nations' authoritative voice on weather, climate and water.*

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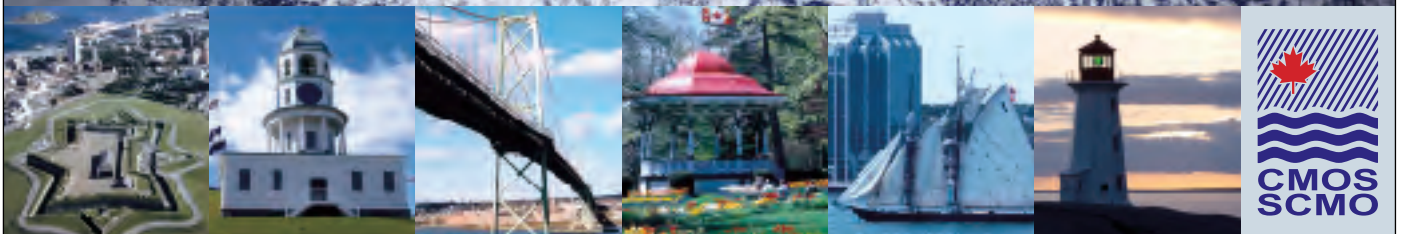
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