ISSN 1929-7726 (Online / En ligne)

CMOS BULLETIN SCMO

Canadian Meteorological and Oceanographic Society

La Société canadienne de météorologie et d'océanographie

April / avril 2018

Vol. 46 No. 2

Eureka Weather Station, August 1997. © Ansgar Walk/Wikipedia Commons/CC-BY-SA-2.5

Inside:

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CMOS Bulletin SCMO
Volume 46 No. 2
April 2018 - avril 2018

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

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

Le but de la SCMO est de promouvoir l'avancement de la météorologie et l'océanographie au Canada.

Words from the President / Mot du président

My year as President of CMOS seems to be flying by. It is already, once again, time to register for our upcoming CMOS Congress. As you know, our CMOS Local Arrangements Committee in Halifax has been hard at work putting together a fantastic scientific and social programme. Our 52nd Congress will be held from June 10th to 14th at the new Halifax Convention Centre in Halifax, Nova Scotia. This year's congress theme is "marine and environmental risks and impacts". I have already registered for the Congress, and I've made my hotel reservations at one of the two Congress hotels.

Every year at Congress we have our Annual General Meeting. This meeting is where members meet to review, discuss and vote on such things as any bylaw changes, budget and financial matters and important policy issues that may arise from time to time. Over the last couple of years your Executive and Council have been actively discussing and analysing our finances with an eye to improving our service offerings to members, controlling costs and improving our membership numbers over the longer-term. We appear to be getting some good results from the transformation of our CMOS Bulletin from print to web and we are looking forward seeing our free student membership ultimately serving to increase our full memberships. My biggest disappointment this year has been our inability to increase our budget for our Special Interest Groups (currently Arctic and Aviation) as well as our salary budget to increase the current two-day-a-week retainer for our Executive Director. As well, I did not allocate resources to visit some of our Centres as I had hoped. We just don't have the money. In addition, (compared to the Royal Society, CGU and AMS), we have continually undervalued our service offerings (such as our private sector directory). We are also taking a close look at our various honoraria, contracts and our membership fees. At the Annual General Meeting we will be proposing some changes to our fee structure for services and will be making some modest proposals to increase membership fees. We will continue with our free membership for students.

I look forward to seeing you at the Congress and at our Annual General Meeting!

Wayne Richardson, P.Eng.
CMOS President

Mon année au poste de président de la SCMO semble passer à toute allure. Il est déjà temps de s'inscrire au prochain congrès de la SCMO. Comme vous le savez, notre comité local d'organisation à Halifax a travaillé d'arrache-pied pour monter de fantastiques programmes scientifique et social. Notre 52e congrès se tiendra du 10 au 14 juin, au nouveau Centre des congrès d'Halifax, en Nouvelle-Écosse. Le thème du congrès à venir est « Risques et impacts marins et environnementaux ». Je suis déjà inscrit au congrès et j'ai réservé une chambre dans l'un des deux hôtels affiliés à l'événement.

Chaque année, parallèlement au congrès, nous tenons notre assemblée générale annuelle. Cette réunion permet aux membres de se réunir afin de voter, après avoir examiné et remis en cause des sujets comme les changements au règlement, le budget, les questions financières et les enjeux stratégiques importants qui surgissent de temps à autre. Au cours des dernières années, le comité exécutif et le conseil d'administration ont activement discuté de nos finances et les ont analysées en vue d'améliorer l'offre de services aux membres, de gérer les coûts et d'augmenter, à long terme, le nombre de membres. La migration du Bulletin de la SCMO, de la version papier à une version Web, semble donner de bons résultats. Nous attendons avec impatience de voir si l'adhésion gratuite des étudiants se traduira par une augmentation du nombre de membres ordinaires.

Ma plus grande déception cette année a été notre incapacité à augmenter le budget pour financer nos groupes d'intérêts spéciaux (ceux pour l'Arctique et l'aviation) et à dégager la hausse salariale qui nous permettrait de retenir les services du directeur général plus de deux jours par semaine. En outre, contrairement à ce que j'espérais, je n'ai pu allouer les ressources nécessaires à la visite de certains de nos centres. L'argent manque, tout simplement. De plus, en comparaison avec la Royal Society, l'UGC et l'AMS, nous avons toujours sous-évalué notre offre de services (comme notre répertoire du secteur privé). Nous examinons également de près nos divers honoraires, nos contrats et nos frais d'adhésion. À l'assemblée générale annuelle, nous vous soumettrons une modification de la structure tarifaire pour les services et nous vous exposerons des propositions modestes pour augmenter les frais d'adhésion. Nous continuerons d'offrir l'adhésion gratuite aux étudiants.

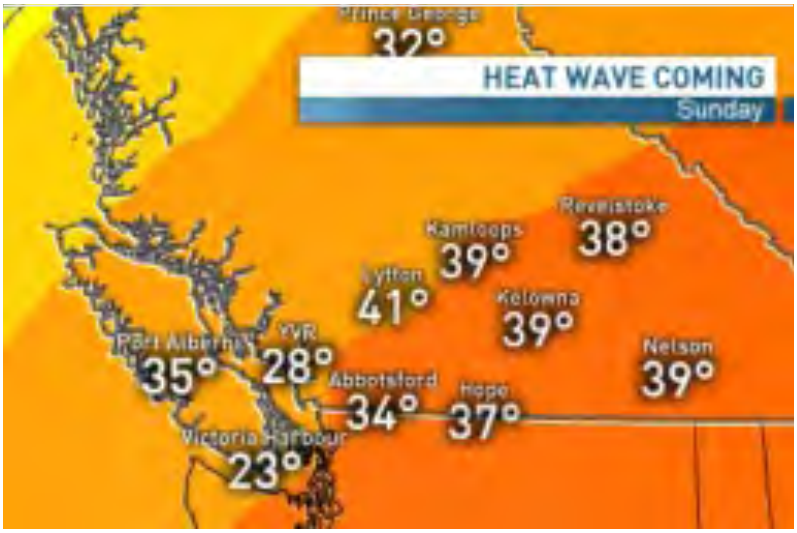
Je vous attends en grand nombre, au congrès et à l'assemblée générale annuelle.

Wayne Richardson, ing.
Président de la SCMO

Climate and Weather Information for Healthy, Resilient Canadians and Communities

By Katie Hayes, PhD Candidate, University of Toronto, and Research Affiliate, Health Canada; Peter Berry, Climate Change and Innovation Bureau, Health Canada

Climate change is affecting health and well-being of people around the globe and the risks to human health and well-being are increasing. The possible increase in the frequency and severity of a number of climate-related hazards (e.g., heatwaves, droughts, floods, ice storms, hurricanes) threatens the health of Canadians in all regions of the country and requires effective responses to protect populations of most concern. Multidisciplinary partnerships among meteorologists, climatologists, public health officials and emergency managers demonstrate that effective actions can be taken to use weather in climate data in innovative ways and with sophisticated tools to help build healthy climate resilient communities. The article uses the issue of climate change impacts on mental health to explore the possible opportunities and challenges attendant with addressing emerging climate change risks to the health of Canadians through new collaborations.



The World Health Organization (WHO) estimates that 12.6 million people die every year from diseases and injuries due to unhealthy environments associated with air, water and soil pollution, chemical exposures, ultraviolet radiation and climate change.[1] Climate change and variability are affecting health and well-being of people around the globe and risks are increasing. Risks to health can be direct (e.g., health impacts from heat waves) or indirect and arise from ecosystem-mediated pathways (e.g., vector-borne infectious diseases) or from the influence of societal institutions and actors (e.g., impacts on occupational health).[2] In Canada, among other effects of weather and climate, the health of Canadians is being impacted by extreme heat events. In 2009, for example, a heat wave struck Vancouver and Fraser, British Columbia resulting in 134 deaths.[3] Populations in Canada of greatest concern in planning for the health impacts of climate change include children and infants, some older adults, people with chronic diseases, the socially and economically disadvantaged, Indigenous populations and those with compromised immune systems.[4]

A growing concern within and outside of Canada[5] are the impacts of climate change on mental health. Such impacts have the potential to incur significant costs to the health system and disrupt the lives of many Canadians over the long-term as impacts can last for years. In a study of the impacts of heat on human health in nine low-socioeconomic neighbourhoods in Quebec, authors found a 44% prevalence of physical health impacts and a 17.8% prevalence of mental health impacts.[6] In addition, the mental health outcomes associated with the devastating 2016 wildfire in Fort McMurray, Alberta include post-traumatic stress disorder, depression (PTSD), and insomnia among many people affected by the fire.[7]

Other climate risks such as drought can pose major socioeconomic challenges, particularly amongst land-labourers, which can affect economic and food security and ultimately impact psychosocial wellbeing.[8] Drought often occurs gradually, building up over time, and is harder to observe; mental health effects of living through this type of disaster are more subtle and last longer than with other natural disasters. Emergency and disaster management planning, resources deployment, and support activities to respond to the impacts of weather extremes are generally more typically engaged for short term events, with a more defined beginning and end.

Multidisciplinary Partnerships to Protect Health

Public health officials have had longstanding collaboration with meteorologists and climatologists in efforts to reduce risks to health from a range of weather and natural hazards such as extreme heat events, violent storms, floods, droughts, and air pollution episodes.

The World Meteorological Organization through its Global Framework for Climate Services is facilitating new partnerships and alliances among these officials to aid in the development of weather and climate services, such as severe weather forecasts, hazard maps, heat-health warnings and long-term climate projections that are tailored to the needs of the health sector.[9] Table 1 presents climate and weather information relevant for public health decision making in the context of a changing climate.

In Canada, weather and climate information is currently employed at all temporal scales to protect people – from the use of real-time data for public alerts of hazardous weather to projections of climate change impacts on health at the end of the century. For example, in Canada over 50 public health authorities at local and regional levels use short-term temperature forecasts from Environment and Climate Change Canada to issue heat warnings to the public and community organizations to reduce heat illness and deaths.[10]

In response to the increased risk of wildland fires as a result of climate change, Manitoba Health, Seniors and Active Living, with assistance from Environment and Climate Change Canada, developed a smoke monitoring system that uses a suite of tools, including a GIS-based smoke "common operating picture," to provide emergency managers and public health officials with real-time and forecasted information on wildland fire smoke conditions in Manitoba communities. Emergency managers and public health officials use this information to communicate action-based health messages to communities and populations at risk, so that interventions can be taken to protect health.[11]

Given that climate change is a recognized driver of the northward expansion of some infectious diseases into Canada[12], application of climatological data has significant utility in helping prepare for impacts on health. For example, long range projections of the expansion of the vector that causes Lyme disease, which are based upon climate modeling, have been used by public health authorities in Canada to raise awareness of climate change impacts on health and plan for emerging health risks.[13]

Opportunities for Increasing the Resilience of Canadians to Climate Extremes

Increasing impacts from climate change and growing risks to health will require an integrated approach that brings together health and emergency decision makers, meteorologists and climatologists to address emerging climate hazards threatening Canadians, especially considering the complexity of certain risks (e.g., impacts on mental health, impacts from cascading or cumulative events) as well as the recognised complexity of risk communication. For example, with respect to mental health, some studies have shown that early warning communications about extreme weather may actually trigger mental health problems like anxiety or feelings of impending doom, particularly for people with pre-existing mental health conditions.[14] Other studies demonstrated the protective nature of early warning communication for mental health and wellbeing. Munro et al. (2017) found that people who received a 12-hour minimum notice of flooding were less likely to report anxiety, depression, or PTSD than those with little to no advanced warning.[15]

Key questions to consider to enhance transdisciplinary collaboration between meteorologists, climatologists, and public health officials in this regard are:

- How can effective weather warnings be provided to the public when some people may experience undue stress and anxiety from them?
- What climate products – and at what temporal scale – would be most useful to health authorities in preparing for possible mental health impacts?
- Is it possible to project longer term impacts on mental health from climate change using climate models and scenarios?

Table 1: Climate and weather information relevant for health decision-making		
Timescale	**Example of climate information products**	**Example of health-decision applications**
Historic record of climate observations	Historic time series data, summary statistics and other information products	Epidemiological trend and statistical analysis to understand associations of climate and health (e.g. temperature-mortality curves); develop predictive disease modeling based on current and recent observation data, particularly for infectious diseases with time lags between observed ambient conditions and disease onset
Weather information and forecasts (hourly, daily, weekly)	Real-time monitoring of daily weather: temperature, precipitation, humidity, etc. 0-14 day probabilistic outlooks Extreme weather forecasts (e.g. severe winter and summer weather conditions)	Short-term operational decisions such as real-time syndromic surveillance systems, public weather advisories, and application of thresholds that trigger action plans for staff deployment, delivery of supplies, and public protection
Short-term climate information (Month to season)	Risk indices of hurricanes, floods, dust storms, wind storms, extreme temperature, fire Long-range forecasts of average, maximum and minimum temperature and precipitation conditions 1 - 2 months ahead (e.g. sub-seasonal forecasts and trends) Status of El Niño Southern Oscillation (ENSO) conditions Monthly and seasonal forecasts of temperature and precipitation based on deterministic and probabilistic approaches	Short-term operational investment in preparedness, outbreak prevention, identification of resource needs
Mid-term climate information (annual to multi-year)	Annual to interannual projections (several years ahead) describing large scale state of the climate for regional applications	1-5 year policy decisions for disease control, research, health systems planning
Long-range climate information (decades)	10-30 year decadal projections of surface temperature, precipitation, and sea surface temperature etc. Climate change scenarios, dynamic climate models, global circulation models, downscaled and regional climate models	Long-term health infrastructure investments, research investment, demographic and population models, health system planning Increase understanding of disease trends (e.g., heatwave deaths)on a regional scale and future health risks

New and innovative measures requiring the expertise of climatologists and meteorologists are needed to address key challenges facing Canadians from climate change. Such challenges include, for example:

- How to provide information to decision-makers who are responsible for protecting public health from cascading or cumulative extreme weather events through predictions and warnings;
- Development of new or improved services through interdisciplinary collaboration (e.g., health, emergency management, meteorology, climatology communities) to reduce risks from indirect and long lasting health impacts such as impacts on occupational health or mental health;
- How to deliver information and services to Canadians that is effective in changing personal behaviours including among populations of highest vulnerability to climate change (e.g., children and infants, seniors, people with chronic diseases, the socially and economically disadvantaged, Indigenous Populations and those with compromised immune systems).

Meteorologists and climatologists are well positioned to supply valuable information and services to address these three challenges and increase awareness of the health risks posed by climate change; they are a trusted voice in their scientific field and they have the medium (TV and radio) through which they can share information broadly and frequently. According to a recent study by Zhou et al. (2016), meteorologists and climatologists are essential agents of knowledge transfer because they are recognized by the public as a reliable source of information, thus they can play a key role in supporting climate change education.[16] These authors suggest that meteorological broadcasters have significant reach and knowledge about local climate and weather patterns; therefore, they are well-positioned to communicate to broad audiences with information that can be tailored at the local level.

Recent investments under the Pan Canadian Framework for Climate Change and Clean Growth have resulted in the funding of the Canadian Centre for Climate Services (CCCS). The CCCS has responsibility to provide national leadership coordination and nurture regional capacity. It will assemble national foundational climate products (databases, etc.) and climate information and tools to support adaptation decision-making. These value-added climate information products will support understanding and preparation for the health impacts of climate change on Canadians. It is through transdisciplinary collaboration – such as between climatologists and meteorologists, and health and emergency management professionals that new risk analyses and practices to address climate related risks may well emerge.

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Excerpts from the Journal of the Eureka Weather Station, 1947-48

By John Gilbert

The Eureka Weather Station, situated in Canada's far North, recently celebrated its 70th birthday. Supporting operational meteorology and atmospheric research on topics that are essential for the understanding of weather and climate, including hourly synoptic and aerological weather monitoring and the detection of atmospheric change, this remote weather station is of global significance. The Station came in to being in February of 1947, when an agreement between Canada and the United States to establish five Joint Arctic Weather Stations (JAWS) staffed by Canadian and American personnel was reached. Under JAWS, Eureka and Resolute were the first weather stations established in 1947, followed by Isachsen and Mould Bay in 1948 and Alert in 1950. The Joint project was led by Dr. Andrew Thomson, head of MSC and Charles Hubbard, US Weather Bureau.

That same year, in April, the first station, Eureka on Ellesmere Island (near 80 degrees N., 86 degrees W.) was established by airlift from Thule, Greenland. It was then the farthest north station and post office in the world. Perhaps reflecting the international character of the Eureka station, the Officer-in-Charge (OIC), Jud Courtney, was a Newfoundlander and the US Executive Officer, Per Stoen, was a Norwegian-born American.

A lot can be learned about life at Eureka in those early years from the station journals, in which entries were made from the first day of its establishment in April 1947 until very recently. Past and present inhabitants and visitors have endured extreme weather events, accidents and disasters as part of their dedicated service to the advancement of the scientific understanding of the Arctic environment. A sampling of entries shared here, from the station journals of 1947 and 1948, gives us a glimpse into just some of the (mis)adventures of Eureka's first year.

An Accident with Caustic Soda

December 3 [1947] Wednesday: [Journal entry by Murray Dean, Met Tech]. First serious accident on the station today. While making hydrogen, Courtney received a shower of caustic soda flakes in the face, and some went into the right eye. The eye was flooded with water and treated with boric acid ointment, but during the time before he could reach the operations building for this treatment, the eyeball was severely blistered and vision impaired. Will possibly be blind in this eye for some time.

December 4 [Journal entry by Courtney]: Cannot see well enough myself to take ascents or do any work that requires use of eyes. I find the left eye has been affected too; some of the soda dust must have gotten in there. Treatment with boric acid continuing…..I can operate a typewriter by touch, and write the reports mainly from memory and from the station journal notes which are read to me. I hope the eyes have suffered no permanent injury; they seem to be OK and I can see very dimly in bright light.

December 6: The right eye does not seem to be any better, although the left one is clearing up now. This is causing some worry here on the station and we are afraid some permanent damage may have been done. However, only time will tell in the absence of competent medical diagnosis.

December 12: Eye is improving slowly, but [I] cannot tell yet if any permanent damage has been done.

December 17: The eye appears to be going to heal of its own accord, but is still badly inflamed and brings on headaches when used. [In 2012 Jud, then in his 90s, viewed and commented on Eureka photos – without the need for glasses].

December 28: Now, just when my eye was coming along fine, developed an infection of the eyelid. The eyeball is still inflamed but sight is almost normal in this eye now and we have stopped worrying about it.

Article: Journal of the Eureka Weather Station 1947-48




From left: Low Pressure Hydrogen Generator (Source: Environment Canada Collection); Per Stoen (Source: George Rabbitt holdings); Jud Courtney at radiosonde equipment (Source: George Rabbitt holdings); the late Jud Courtney, Kelowna, BC. 2012 (Source: J. Gilbert).

The Lost Aircraft

December 19: Temperature minimum last night -51° F and still getting colder.

December 20: Personnel are being given a few days off in order to get Xmas mail written and make photographic Xmas cards, since the non-arrival of the plane in October did not give them a chance to get them any other way.

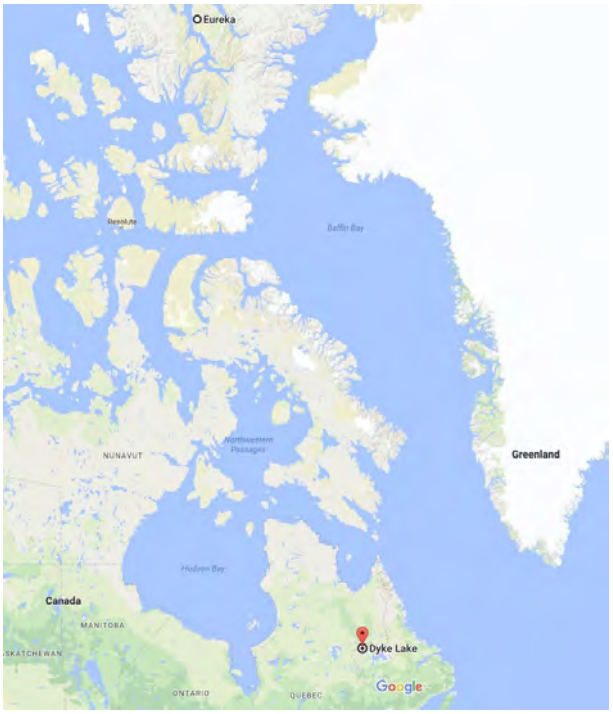
December 23: Aircraft arrived here tonight unexpectedly. No flight plan from Thule and aircraft did not call this station until ten minutes out from here…..homemade flare pots [toilet paper in coffee cans soaked in fuel oil] were used for the strip this time. Change of one man on staff on this aircraft. [Robert] Tyrer was relieved by Walker of DOT. ….The moonlight was weak and deceptive….With the moon up we shall have to take advantage of the light to get in a supply of ice sufficient to last until next moon. [Robert Tyrer left on the plane which flew to Resolute where J.D. Cleghorn, OIC Resolute, joined the flight enroute to Goose Bay.


WEATHERMEN flew to Thule from ... make reconnaissance flights near Eureka ... station site. Vessel anchored in Arctic waters with iceberg in foreground

RADIO OPERATOR with the party is R. H. Tyrer, Barrie. Transport of supplies will take most of April and May

CANADIANS ... be in the north 18 ... before being relieved. They is G. ... M. Dean of Montreal, radio technician

J. L. COURTENAY of Toronto and St. John's, Nfld., is party head. First reports from Eureka expected this month.



Top: Tyrer, Dean, Courtney (Toronto Star, Apr 5, 1947); Bottom: Path of aircraft flying from Eureka, Resolute enroute to Goose Bay December 24, 1947.

December 24, Wednesday: Christmas Eve, and we had planned to celebrate the season as best we can under the odd shift hours we work. BASOPS reported today that the aircraft with [Robert] Tyrer aboard has gone down between Resolute Bay and Goose Bay, and has not been located. Nobody feels much like celebrating anything now. However, they are in good country to go down if they were on course, and there is every hope they have made a safe forced landing.

December 25, Thursday: Still waiting for news of the aircraft. The Xmas dinner went well, but without much heart. The tree was not even set up.

December 26. Friday: Good news today. The aircraft has been located and all personnel are safe and well. Aircraft made a forced landing close to Goose Bay, probably on one of the many lakes in that region [Dyke Lake, Labrador]. Personnel will be flown out to Goose Bay tomorrow. [The plane was abandoned and sunk to the bottom of Dyke Lake for 51 years].

December 27: According to commercial news, the crew and passengers of the aircraft are safe in Goose Bay tonight.

A sequel: The story of the 1998 recovery of the wrecked plane is told in Nicholas A. Veronico's book: Hidden Warbirds II: More Epic Stories of Finding, Recovering, and Rebuilding WWII's Lost Aircraft (2014).

A Disastrous Fire

Fire and appendicitis were the two big fears at these remote weather stations.

December 16 [1948]: (Murray Dean, OIC writing.): We have not been heating the RAWIN (Radar Wind Sounding) shelter due to danger of fire for several weeks now.

December 24 [1948]: Lowest temperature of the season, minus 51.8º F.

December 25 [1948]: This was the date of the worst disaster that could befall us. Fire wiped out our complete power supply, much other equipment and stocks, and much hard work. …..That until today everything was running so smoothly and was so pleasant should have been a warning to us that our good luck could not continue. This was also Christmas. We could not rejoice.

December 26 [1948]: Communications with Resolute continue unbroken. The small SCR 694 performs admirably with its hand-cranked generator. We learn from Resolute tonight that only because of a fortunate incident were they saved from experiencing our plight this evening. They were fortunate in discovering a fire in their power-shed and were able to stop it before any damage was done. This is small consolation to us, however.



Left and centre: The Eureka station fire: December 25, 1948; Right: Murray Dean at the theodolite. (All sourced from George Rabbitt holdings)

The Canada/US Agreement was initially limited to five years. A “Five Year Report” was written in 1952 and the arrangement was extended to span a total of 25 years, after which Eureka became a solely Canadian weather station when the stations were re-named “High Arctic Weather Stations”.

The legacy of the pioneering meteorological and atmospheric research at Eureka, started over 70 years ago, continues through the present and into the future. In addition to the Meteorological Service of Canada (MSC) weather station, a world-class atmospheric research facility was established near Eureka in 1993 initially as the Arctic Stratospheric Ozone Laboratory (ASTRO). In 2005, the facility became a continuously operating research station, under the name Polar Environment Atmospheric Research Laboratory (PEARL) which relies on the facilities at Eureka for life support and other infrastructure needs. The work of so many people who have done so much to conduct the important atmospheric work at Eureka is an inspiration to make sure this station celebrates its 100th birthday and beyond.

About the Author

John served from 1956 to 1958 as a Radio Operator and meteorological observer at Resolute Bay and Eureka, Nunavut. He followed a career in telecommunications and information technology and was the Executive Secretary of the 1984 Worldwide Commission on Telecommunications under the auspices of the International Telecommunication Union, like WMO, a UN specialized agency. He retired from the Government of Canada as Director General, Government Telecommunications Agency. He has been associated for many years with UNESCO. He has maintained a life-long interest in telecommunications and meteorology the High Arctic and has compiled a collection of photographs, documents and stories about the Joint Arctic Weather Stations: 1947-72. John is a CMOS member.

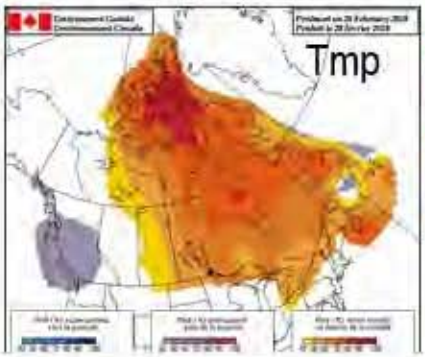
Environment and Climate Change Canada | Environnement et Changement climatique Canada
Canada

Seasonal Outlook for the spring 2018 (MAM) based on the official CanSIPS forecast issued on the 28th Feb. 2018

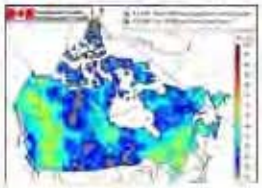
By Marko Markovic, Bill Merryfield and Kevin Gauthier

Above normal spring temperatures are most likely in eastern Canada and eastern Canadian Prairies. The highest probabilities (>60%) for a warm spring are in the Maritimes, ON, QC and in the northern Canada, whereas in southern QC and ON this probability is 50-60%. Chances are ~equal for a cool, normal or warm spring over the AB, YK and western NT, and near normal values are most likely in central and coastal BC.

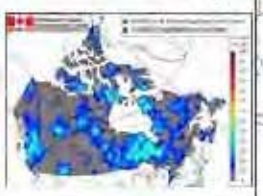
Equal chances for below/near/above normal precipitation across most of Canada. There is a probability of >40% for above normal precip over scattered regions of AB and northern Canada, and >40% for below normal precip over northeastern Canada. Otherwise, equal probability chances are expected across Canada for the spring.

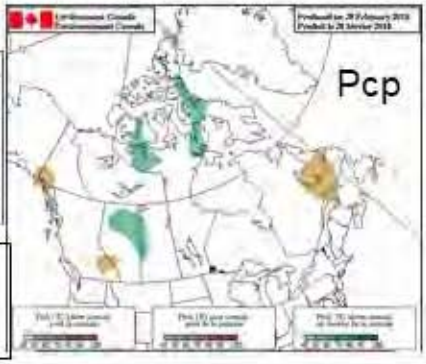


Historical Skill, Tmp



Historical Skill, Pcp



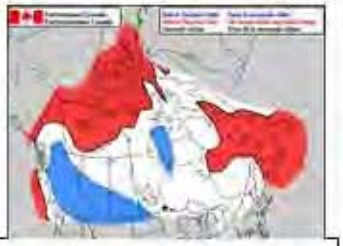


CanSIPS MAM18 forecasted Indices:
Nino3.4 = -0.4 (neutral conditions)
PDO = - 0.75 (moderate negative phase)

What will influence the next season? There are currently weak La Nina conditions in the central equatorial Pacific that are forecast to dissipate and have little impact over Canada in spring. ECCC predicts neutral ENSO conditions (-0.5 to +0.5 °C) to persist throughout this spring and summer. According to the ENSO forecast issued by International Research Institute (IRI), there is a probability of ~70% that neutral conditions will remain this spring. **PDO** index is expected to remain negative in MAM18, moderately influencing coastal BC regions. Negative **NAO** index (according to the NOAA/CPC prediction) is forecasted at least until mid-March after which the forecasting skill is low. Negative NAO is historically linked with above average temperatures across eastern Canada. ***PNA*** index will likely stay negative (until mid March, according to the CPC). Negative PNA index is historically linked to below normal spring temperatures particularly for western Canada.

DJF17/18 Obs. Categories

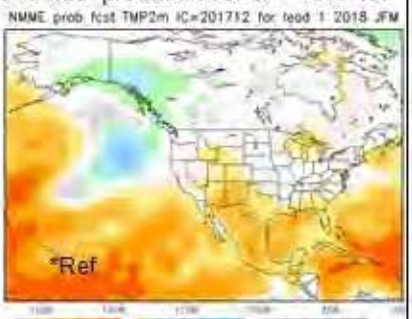
DJF17/18 CanSIPS Catgs.

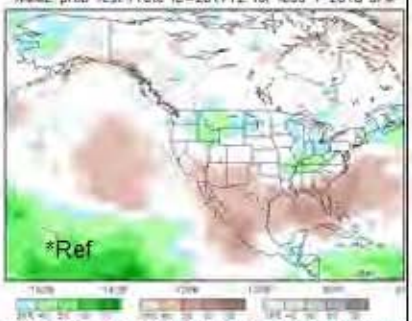


Verification DJF: Temperature: aside from the Vancouver island, western ON and Manitoba, all southern regions of Canada are missed by the last winter's forecast.

Seasonal forecast by other centers: Temperature: There is a significant difference between CanSIPS and the longer lead forecast from NMME (upper figure) in all Canadian regions. NMME is forecasting equal chances for temperature probability in the northern, central and eastern Canada. According to the NMME there is slightly elevated probability for below normal temperatures over the west coast. Over the Great Lakes region both systems agree on forecasted probabilities of >40% for above normal.

Precipitation: Like CanSIPS, the longer lead forecast from NMME (lower figure) predicts equal chances for below/near/above normal across most Canadian regions. However differences are seen in the locations where these probabilities are elevated to >40%.





*Ref: http://www.cpc.ncep.noaa.gov/products/NMME/

Environment and Climate Change Canada | Environnement et Changement climatique Canada

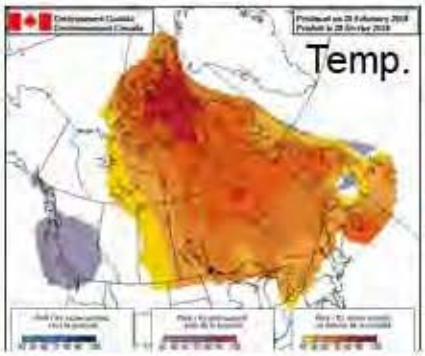
Canada

Prévision saisonnière pour le printemps 2018 (MAM) par le système SPISCan, produite le 28 février 2018

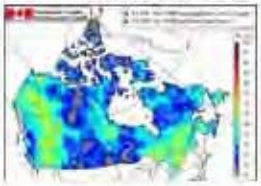
Par Marko Markovic, Bill Merryfield et Kevin Gauthier

Un printemps plus chaud que la normale est anticipé pour l'est du Canada et les prairies canadiennes.
Les probabilités les plus élevées (60% et +) sont anticipées, pour les prévisions au-dessus de la normale, dans les Maritimes, l'ON, le QC et le nord du Canada, tandis que dans le sud du QC et en ON cette probabilité est de 50-60%. Les chances sont égales pour un printemps frais, normal ou chaud pour l'AB, YK et l'ouest de NT. Des probabilités près de la normale sont plus probable dans le centre et la cote de CB.

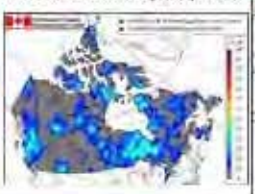
Égalité des chances pour des précipitations sous/près/au dessus de la normale pour tout le Canada. Il y a une probabilité >40% pour des précipitations au-dessus de la normale autour de l'AB et du nord du Canada, et une probabilité sous la normale de >40% pour le nord-est du Canada. Autrement, des chances égales de probabilités sont attendues pour tout le Canada.

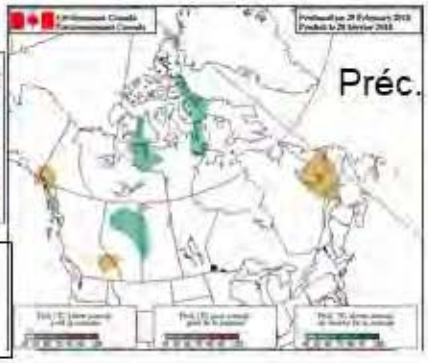


Habileté historique, temp



Habileté historique, préc.

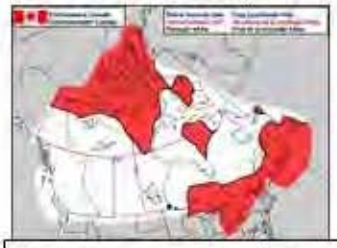




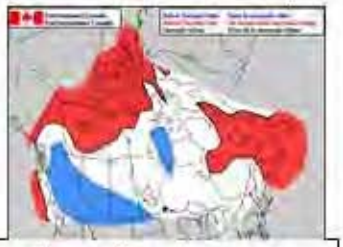
Les indices climatiques prévus par le SPISCan pour MAM18:
Nino3.4 = -0.4 (conditions neutres)
PDO = - 0.75 (phase modérément négative)

Qu'est-ce qui influencera le climat la saison prochaine?
Il y a actuellement un faible LaNina dans le pacifique équatorial central. On prévoit qu'il se dissipera et aura un faible impact sur le Canada ce printemps. ECCC prévoit que des conditions neutres de ENSO (-0.5 à +0.5 °C) persisteront ce printemps et cet été. Selon la prévision à plus longue échéance du International Research Institute (IRI), il y a une probabilité ~70% que la condition neutre se prolonge ce printemps.
L'indice **PDO** devrait rester négatif ce printemps, modérément influencé par les régions côtières de la CB.
Un indice **NAO** négatif (selon la prédiction de NOAA/CPC) est prévu au moins jusqu'en mi-mars, après quoi l'habileté à prévoir est faible. Un NAO négatif est historiquement lié à des températures au dessus de la normale pour l'est du Canada.
L'indice PNA restera probablement négatif (jusqu'à la mi-mars, selon le CPC).
Un **PNA** négatif est historiquement lié à des températures printanières sous la normale particulièrement pour l'ouest du Canada.

DJF17/18 Obs. Categories

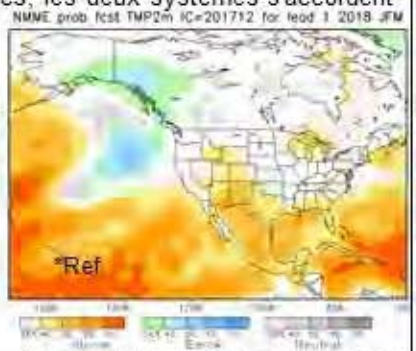


DJF17/18 SPISCan Catgs.

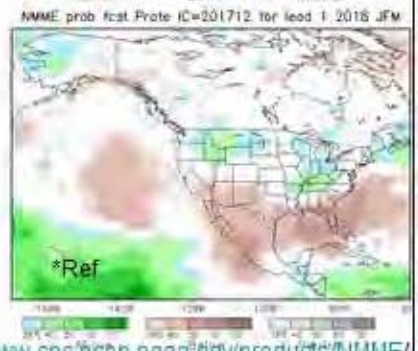


Verification DJF: Température: mis à part l'île de Vancouver, l'ouest de l'ON et le Manitoba, toutes les régions du sud du Canada ont été manquées par la prévision d'hiver.

Prévisions saisonnières d'autre centre: Température:
Il y a une différence significative entre SPISCan et la prévision à longue échéance du NMME (figure du haut) dans toutes les réegions du Canada. Le NMME prévoit des chances égales de probabilité de température dans le nord, le centre et l'est du Canada. Selon le NMME, il existe une probabilité légèrement plus élevées de températures sous la normale sur la côte ouest. Dans la région des Grands Lacs, les deux systèmes s'accordent sur des probabilités supérieur à 40% au dessus de la normale.



Précipitation:
SPISCan et la prévision à longue échéance du NMME (figure du bas) prévoient des chances égales sous/près/au dessus de la normale pour la plupart des régions du Canada. Par contre, on peut observer des différences où ces probabilités sont supérieur à 40%.



*Ref: http://www.cpc.ncep.noaa.gov/products/NMME/

Philip E. Merilees, 1940-2018

On 7 March 2018 Dr. Philip E. Merilees passed away peacefully, surrounded by loving family in the hospital near his home in Bonita Springs, Florida, following a short battle with cancer and its complications. Phil and Micheline have a home in Newmarket Ontario as well, where a memorial service will be held in June.

Dr. Merilees was an exceptional scientist and scientific leader in both Canada and the USA. He was a brilliant theoretician who made many contributions to our understanding of atmospheric and oceanic fluid dynamics. He was a gifted teacher, supervisor and mentor of students who became an exceptional manager of research and of researchers. He will be sorely missed by a wide circle of colleagues, students and researchers whom he supervised and by all those whose lives he touched.

Phil, as he was known to nearly everyone, was born in Chatham Ontario and grew up and received his early education there and in Montreal. He obtained a BSc in Physics in 1960 from Sir George Williams, now a part of Concordia University, and an MSc in Physics 1962 from Carleton University in Ottawa. He joined the Meteorological Service of Canada (MSC) and studied Meteorology at McGill University, receiving a PhD in 1966. His thesis supervisor was Prof. Byron Boville. He then did post-doctoral research at the University of Michigan and at Florida State University, returning to the MSC in 1967 and then back to McGill as Assistant Professor in 1968, and Associate Professor in 1970. From '72 until '74 he was a Visiting Scientist at the National Centre for Atmospheric Research (NCAR) in Boulder Colorado, returning again to McGill as Associate Professor and Chairman of the Department of Meteorology. In 1977 he joined the Atmospheric Environment Service (AES) as Chief Scientist of the Canadian Climate Centre. In 1984 he became Director General of Atmospheric Research. In 1987 he went to NCAR as Director of the Mesoscale and Microscale Research Division until 1991, returning again to AES as Director General of Atmospheric and Climate Research. Following retirement from AES in 1997, he became Superintendent of the Marine Meteorology Division of the Naval Research Laboratory (NRL) in Monterey, California, becoming in the process a citizen of the USA as well as of Canada. From 2002 until 2006 he was back at NCAR and then finally retired to his new home in Bonita Springs, Florida.

Phil was a true mathematical physicist who combined physical insight with the mathematical skill to describe atmospheric and oceanic fluid dynamical and thermodynamic processes mathematically and to manipulate the equations in order to provide new physical insights. He was also able to develop forms useful for making accurate and efficient numerical calculations, so necessary in the real world of operational meteorology and oceanography. He was a pioneer of spectral methods for describing the energetics of the global general circulation and of spectral and pseudo-spectral (transform) methods for numerical weather and climate prediction.

He could have become a leading contributor to more fashionable fields like particle physics, which he eschewed because of the runaway proliferation (in his view) of particle types. Instead he became fascinated by geophysical fluid dynamics and the many problems of understanding the development of structured flow patterns that arise from the chaotic patterns of random turbulence, as exemplified by the so-called dishpan experiments. He collaborated with George Platzman, the leading expert at the time and set his students at McGill at work to clarify the transition from axial-symmetric flow to wavelike flow. He became interested in the theoretical limits of meteorological predictability imposed by the uncertainty of initial conditions and is credited by Edward Lorentz for suggesting, during discussions with him, the description "butterfly effect" which made the latter's work famous. He encouraged the work of Roger Daley on the data analysis and initialisation problem which resulted in the ultimate textbook on the subject, even while they both were working on climate simulation models at the Canadian Climate Centre. This may have raised some eyebrows at the time because climate was regarded as strictly a boundary-value problem, but years later the role of initial conditions was recognized as very important for climate prediction on monthly to annual time-scales.

Phil Merilees announced as CMOS Fellow, 1999. Presentation took place in 2000 at the CMOS Congress in Victoria.

As a working researcher and academic he published more than fifty papers in these and other fields. Many of these papers attracted international attention. His work led to his appointment to numerous international bodies and to recognition of his personal contributions to research and research management. He represented Canada on the Intergovernmental Panel for the Global Atmospheric Research Program, the Medium- and Large-scale Dynamics Working Group of the International Association of Meteorology and Atmospheric Physics and the Commission for Atmospheric Science of WMO. He chaired Grant Review Committees for the National Science and Engineering Research Council of Canada and for the National Science Foundation in the USA.

He won a WMO Research Award in 1970 and the President's Prize of CMOS in 1978. He was made a Fellow of the AMS in 1981 and a Life Member of CMOS in 1987. He was awarded the Patterson Medal of the Atmospheric Environment Service in 1994 for his many contributions to meteorology in Canada.

Phil, on right, as the 1994 Patterson Medal Winner with presenter Jim Bruce.

As a professor or adjunct professor at several universities in both Canada and the USA, he supervised tens of master's and doctoral theses and influenced many more. He was a superb mentor of students and junior colleagues alike and helped them to achieve their best. As a leader of researchers and research teams his management style was open, supportive and generous. To illustrate that, I can do no better than quote the wonderful words of a tribute, written upon news of his death, by Pat Phoebus, his Associate Superintendent at NRL: "Phil was a wonderful mentor and outstanding leader who trusted and empowered the people in his organisation. I think the first thing he said to us in our management team meeting was 'I don't believe in upward delegation'. Phil was a visionary, a 'big picture' executive who succeeded in greatly raising the visibility of our small laboratory within the national and international atmospheric science community. He always gave credit for our successes to the people that worked for him, but I noticed how he subtly planted the seeds for those successes and waited for the ideas to blossom. Phil was an insightful, level-headed, even-tempered leader and genuinely nice man who treated all his people with respect." These words ring so very true to all who knew him.

Phil Merilees with other CMOS Past Presidents photographed together during the 2004 Congress at Edmonton.

From left to right: Hal Ritchie, Allyn Clarke, Ron Stewart, Peter Taylor, Ian Rutherford, Gordon McBean, Ed Lozowski, David Krauel, Phil Merilees.

Phil made many, many contributions to the Canadian Meteorological Society (CMS before 1977) and the Canadian Meteorological and Oceanographic Society (CMOS after 1977): Chair Montreal Centre 1986-1989; Executive Committee 1974-1979; President 1975-1976; Scientific Committee 2000-2018; Co-editor Atmosphere-Ocean 1983-1986; Awards Committee 1983-1986; Publications Committee 1983-1986; Fellow 1999. It was indeed largely due to Phil's urging that physical oceanographers were invited to join the CMS and the name of the Society was changed in 1977 during his tenure as Past-President. The journal Atmosphere became Atmosphere-Ocean at the same time.

Well after retirement Phil continued to serve the community as a member of the NSERC grant selection committee and the CMOS Scientific Committee.

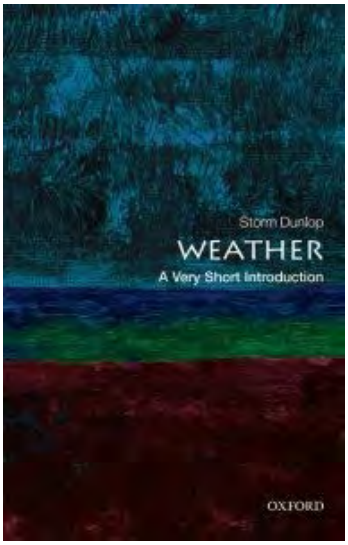
In summary, Phil was a warm and wonderful, supremely ethical and honest, person who was dedicated to science, family and friends. My life was enriched to have known him as a friend and colleague.

Ian D Rutherford FCMOS, PhD

Book Review

Weather: A Very Short Introduction

Review by Richard Leduc Ph.D., AirMet Science Inc



By Storm Dunlop
Oxford University Press
Hardcover, 144 pages, $11.95
ISBN 978-0-19-957132-4

This book is part of the “Very short introduction” series published by Oxford University Press and is intended for the general public. The series includes a wide range of titles on a wide variety of topics of interest to inquiring minds. It covers many themes related to science, history, plants, medicine, people such as historians, scientists, philosophers, etc.

The chapters in this book include the following subject matter: the atmosphere, atmospheric circulation, global meteorological systems, water in the atmosphere, weather systems, tropical weather, extreme systems, local meteorology, global effects and predictions. Appendices cover the Beaufort scale, cloud types, and intensity scales for tornadoes and hurricanes. The References section is divided into seven groups (based on reading levels and interest) and includes web links.

Cet ouvrage fait partie de la collection “Very short introduction” publié par Oxford University Press et s’adresse au grand public. Cette collection comprend une foule de titres sur une grande variété de sujets susceptibles d’intéresser tous les lecteurs curieux. La gamme de titres est des plus variée, sur les sciences, l’histoire, les plantes, la médecine, personnage tels historiens, savants, philosophes, etc.

Ce volume compte 158 pages et fait 11 cm par 17.4 cm. Il est donc très facile de le mettre en poche et de lire à la moindre occasion et c’est là un attrait de cette collection.

Le volume comprend une préface, une liste des figures, au nombre de 46, neuf chapitres, trois annexes, des références et un index. La structure est ainsi complète et l’index rend facile le repérage des sujets.

Les chapitres sont les suivants: l’atmosphère, la circulation atmosphérique, les systèmes météorologiques globaux, l’eau dans l’atmosphère, les systèmes météorologiques, le temps dans les tropiques, les systèmes extrêmes, la météorologie locale, les effets globaux et les prévisions. Les annexes portent sur l’échelle de Beaufort, les genres de nuages et les échelles d’intensité pour les tornades et les ouragans. La section sur les références est divisée en sept groupes (selon le niveau de lecture et l’intérêt) et comprend des liens internet.

Le chapitre 1 présente la structure verticale de l’atmosphère et discute du bilan d’énergie global. Au chapitre 2, on retrouve les grands systèmes de la circulation générale moyenne et, fait intéressant, on y trouve la carte de Halley de 1686. Le chapitre 3 présente les masses d’air et le courant-jet. Dans le chapitre 4 sur l’eau dans l’atmosphère, on discute de l’humidité, des nuages, des cristaux de glace et de la formation des nuages. Le chapitre 5 présente les fronts et le temps associé et le développement des tempêtes; à mon avis il aurait été intéressant d’y inclure une carte avec un cas réel. Le chapitre 6 aborde succinctement le temps dans les tropiques et décrit la mousson et le temps associée à la ZCIT. Le chapitre 7 aborde la question des orages, tornades et ouragans. Les effets locaux tels vent anabatique et catabatique, brise de mer et de terre et effet de lac sont discutés au chapitre 8. Finalement au chapitre 9 on aborde la question des téléconnections et la prévision numérique avec un encart sur l’effet papillon bien présenté.

À mon avis, ce livre est très bien écrit. On y retrouve tous les principaux concepts et notions nécessaires à mieux comprendre la météorologie et à s’y intéresser davantage. Le langage est clair, les phrases sont bien structurées et les explications sont aussi claires et factuelles; il y a cinq encadrés pour des explications supplémentaires. L’organisation globale des sujets est aussi bien faite et le tout demeure une question de choix de la part de l’auteur. Les illustrations sont simples et claires, la plupart sont des croquis épurés; on compte 17 photos ou images satellitaires et j’ai bien apprécié celle sur l’effet de lac.

J’ai aussi bien apprécié la liste des ouvrages dans la section des références, ce qui est un aspect important pour le lecteur désireux d’approfondir le sujet.

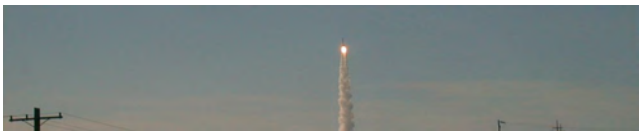
Finalement, à mon avis ce livre rencontre son objectif d’introduire la météorologie au grand public de manière simple et exacte.

In case you missed it...

From CMOS Bulletin Volume 46, Number 1:

[Isachsen - An Artist's Exploration of Isolation Through the Eyes of his Father at a Remote Arctic Weather Station](#)
An Interview with Doug Munson and aAron munson
by Sarah Knight

[MOPITT, Atmospheric Pollution and Me: A Personal Story](#)
by Jim Drummond



[Climate Clock: Running Out of Time?](#)
by Samantha Mailhot

[Canada's Top Ten Weather Stories of 2017](#)
by David Phillips

[CMOS Helping Scientists to be Heard](#)
by Paul Kushner

[Seeking Nominations for CMOS Annual Awards](#)

[Message from the CMOS President: Advocating for Science](#)

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La Société Canadienne de Météorologie et d'Océanographie

Weather - Climate - Ocean - Atmosphere
Météo - Climat - Océan - Atmosphère

After 45 years in print, the Bulletin of the Canadian Meteorological and Oceanographic Society (CMOS) has gone virtual. See bulletin.cmos.ca for articles, news, events and updates from Canada's top meteorologists, climatologists and oceanographers.

Après 45 années de publication papier, le Bulletin de la Société canadienne de météorologie et d'océanographie (SCMO) passe en mode virtuel. Consultez le site bulletin.scmo.ca pour lire des articles, des nouvelles, des annonces d'événements et des faits nouveaux que partagent les éminents météorologues, climatologues et océanographes du Canada.

http://bulletin.cmos.ca
http://bulletin.scmo.ca

Proposed Membership Dues Increase

The following table represents the proposed increase in CMOS membership dues to take effect Jan. 1, 2019:

Type	2017			2019		
	Canada	US	International	Canada	US	International
Regular	85	100	125	95	110	135
Student	0	0	0	0	0	0
Corporate	170	185	210	190	205	230
Sustaining	235	250	270	245	260	280
Associate	56	72	100	66	82	110
Retired	56	72	100	66	82	110

[1] All values are in Canadian dollars

In compliance with Section 3 a) of the Canadian Meteorological and Oceanographic Society By-laws and Appendices the proposed increase will be tabled at the Annual General Meeting in Halifax.

Les frais d'adhésion proposés

Le tableau suivant représente l'augmentation proposée des cotisations d'adhésion à la SCMO qui entreront en vigueur le 1er janvier 2019 :

Type	2017			2019		
	Canada	E-U	International	Canada	E-U	International
Régulier	85	100	125	95	110	135
Étudiant	0	0	0	0	0	0
Corporatif	170	185	210	190	205	230
De soutien	235	250	270	245	260	280
Associeé	56	72	100	66	82	110
Retraité	56	72	100	66	82	110

[1] Toutes les valeurs sont en dollars canadiens

Conformément à la section 3 a) des Réglements et des annexes de la Société canadienne de météorologie et d'océanographie, l'augmentation proposée sera déposée à l'assemblée générale annuelle à Halifax.

Gordon Griffith, ing., P.Eng., FEC
Executive Director – Directeur général
CMOS - SCMO

CMOS News: Proposed Fees Increase

Proposed Fees Increase – Services

CMOS provides the following services to its members: Accredited Consultant, Private Sector Listing and Endorsed Weathercaster.

	2017 Fees			2019 Fees	
Service	**Application**	**Annual**		**Application**	**Annual**
Accredited Consultant	$150	$50		$250	$100
Private Sector Listing					
Corporate		$140			$220
Individuals		$50			$100
Endorsed Weathercaster	$200	$20		$300	$100

Augmentation des frais proposés – Services

La SCMO fournit les services suivants à ses membres: un consultant accrédité, une inscription dans le secteur privé et un météorologue agréé.

	Frais 2017			Frais 2019	
Service	**Demande**	**Renouvellement**		**Demande**	**Renouvellement**
Consultant accrédité	$150	$50		$250	$100
Répertoire du secteur privé					
Corporatif		$140			$220
Individus		$50			$100
Agrément des présentateurs météo	$200	$20		$300	$100

Gordon Griffith, ing., P.Eng., FEC
Executive Director – Directeur général
CMOS - SCMO

CMOS News: Proposed Edits to the By-Laws

Canadian Meteorological and Oceanographic Society

APPENDIX I TO BY-LAW

PRIZES, AWARDS AND SCHOLARSHIPS

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

** recent is defined as within the last five years*

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

c) The Andrew Thomson Prize in Applied Meteorology
The Dr. Andrew Thomson Prize in Applied Meteorology may be awarded each year to a member or members of the Society for an outstanding contribution to the application of meteorology in Canada.

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

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

f) **The Tertia MC Hughes Memorial Graduate Student Prizes**
One or more prizes may be awarded each year for contributions of special merit by individuals who are or were (within 16 months preceding the nomination deadline) either graduate students ~~registered~~ at a Canadian university or ~~by~~ Canadian graduate students registered at a foreign university.

g) The Roger Daley Postdoctoral Publication Award
The Roger Daley Postdoctoral Publication Award, valued at $2000, is to be made annually to a candidate who, at the time of nomination, is working in Canada in a non-permanent position as a postdoctoral fellow or research associate, and is within 5 years of having received a doctoral degree. The award is to be based on the excellence of a publication in the fields of meteorology or oceanography that has appeared, or is in press, at the time of nomination. The first award is to be made in 2005, and the awards will continue as long as the fund established by Mrs. Daley, together with other contributions solicited through CMOS, will permit.

Société canadienne de météorologie et d'océanographie

ANNEXE I AU RÈGLEMENT

PRIX, DISTINCTIONS ET BOURSES

a) Le Prix du président
Le Prix du président peut être décerné chaque année à un ou plusieurs membres de la Société, afin de souligner la valeur particulière d'un article ou d'un livre récent*, portant sur la météorologie ou l'océanographie. L'article doit être accepté pour publication dans *ATMOSPHERE-OCEAN*, le *CMOS Bulletin SCMO* ou dans toute autre revue avec comité de lecture.

** récent est défini comme au cours des cinq dernières années*

b) La médaille J.-P.-Tully en océanographie
La médaille J.-P.-Tully en océanographie peut être décernée à une personne dont l'apport en matière de sciences océanographiques a exercé un impact considérable.

c) **Le prix Andrew-Thomson en météorologie appliquée**
Le prix Andrew-Thomson en météorologie appliquée peut être décerné chaque année à un ou plusieurs membres de la Société pour un travail exceptionnel dans le domaine de la météorologie appliquée au Canada.

d) **Le prix François-J.-Saucier en océanographie appliquée**
Le prix François-J.-Saucier en océanographie appliquée peut être décerné chaque année à un ou plusieurs membres de la Société pour un travail exceptionnel dans le domaine de l'océanographie appliquée au Canada.

e) La médaille Rube-Hornstein en météorologie opérationnelle
La médaille Rube-Hornstein en météorologie opérationnelle peut être décernée chaque année à une personne ayant fourni des services météorologiques opérationnels remarquables. Ceci exclut les publications scientifiques, à moins que leurs résultats ne s'utilisent déjà pour améliorer la prestation quotidienne de services opérationnels. La médaille est octroyée pour un travail réalisé sur plusieurs années précédant l'année en cours ou pour une réalisation ponctuelle exceptionnelle.

f) Les prix commémoratifs Tertia-M.-C.-Hughes pour études de 2e ou 3e cycle.
Un prix peut être décerné annuellement ~~à tout étudiant diplômé ayant accompli un travail exceptionnel, pourvu qu'il soit inscrit à une université canadienne ou qu'il soit un~~ pour des contributions de mérite spécial par des personnes qui sont ou étaient (dans les 16 mois précédant la date limite) soit des étudiants diplômés d'une université canadienne, soit des étudiants diplômés ~~C~~canadiens inscrits à une université étrangère.

g) Le prix Roger-Daley de publication postdoctorale
Le prix Roger-Daley de publication postdoctorale, d'une valeur de 2000 $, est remis annuellement à un candidat qui, au moment de la mise en candidature, occupe au Canada un poste non permanent à titre de boursier de recherche postdoctorale ou d'assistant de recherche, et a obtenu son doctorat dans les cinq dernières années. Le prix est remis en fonction de l'excellence d'une publication déjà parue ou en voie de l'être au moment de la mise en candidature, et ce, dans les domaines de la météorologie ou de l'océanographie. Le premier prix, fondé en 2005, continuera d'exister tant que le permettra le fonds créé par madame Daley et financé par des subventions versées par l'entremise de la SCMO.

Books in search of a Reviewer*:

(2017-3) *Eustasy, High-Frequency Sea-Level Cycles and Habitat Heterogeneity*, 2017. By Mu Ramkumar and David Menier, Elsevier Inc, ISBN 978-0-12-812720-9, Paperback, 102 pages, $60 US

(2017-4) *Minding the Weather: How Expert Forecasters Think*, 2017. By Robert R. Hoffman, Daphne S. LaDue, H. Michael Mogil, Paul J. Roebber, and Gregory Trafton, The MIT Press, ISBN 978-0-262-03606-1, Hardcover, 469 pages, $66.69

(2017-5) *Risk Modelling for Hazards and Disasters*, 2017. By Gero Michel, Elsevier, ISBN 9780128040713, paperback, 338 pages, US$100.00

(2017-6) *Introduction to Satellite Remote Sensing; Atmosphere, Ocean and Land Applications*, 2017. By William Emery and Adriano Camps, Elsevier, ISBN 9780128092545, 860 pages, US$130.00

(2017-7) *Remote Sensing of Aerosols, Clouds and Precipitation*, 2017. By Tanvir Islam, Yongxiang Hu, Alexander Kokhanovsky and Jun Wang, Elsevier, ISBN 9780128104378, 364 pages, US$120.00

(2017-8) *Mixed-Phase Clouds: Observations and Modeling*, 2017. By Constantin Andronache, Elsevier, ISBN 9780128105498, 300 pages, US$89.95

(2018-1) *Synoptic Analysis and Forecasting, An Introductory Toolkit*, 2017. By Shawn Milrad, Elsevier, ISBN 9780128092477, 246 pages, US$125.00

(2018-2) *Ice Caves*, 2017. Edited by Aurel Persoiu, Elsevier, ISBN 9780128117392, 752 pages, $225.00

(2018-3) *Sea Ice Analysis and Forecasting*: *Towards an Increased Reliance on Automated Prediction Systems*, 2017. Edited by Tom Carrieres, Mark Buehner, Jean-François Lemieux and Leif Toudal Pedersen, Cambridge University Press, ISBN 9781108417426, 236 pages, $143.95

You review it, yours to keep!

Atmosphere-Ocean 56-2
Special Issue / Numéro spécial

Proceedings of the Twenty-Second Quadrennial Ozone Symposium / Comptes-rendus du vingt-deuxième Symposium quadriennal sur l'ozone

Fundamental Research / Recherche fondamentale

An Overview of Surface-Based Precipitation Observations at Environment and Climate Change Canada **;** Eva Mekis, Norman Donaldson, Janti Reid, Alex Zucconi, Jeffery Hoover, Qian Li, Rodica Nitu, and Stella Melo

Island Wakes in Shallow Water; Changming Dong, Yuhan Cao, and James C. McWilliams

Stochastic Post-Processing of CFSR Daily Precipitation across Canada; Dikra Khedhaouiria, Alain Mailhot, and Anne-Catherine Favre

Seasonal Prediction of the Yangtze River Runoff Using a Partial Least Squares Regression Model; Xiaochen Ye, Zhiwei Wu, Zhaomin Wang, Huying Shen, and Jianming Xu


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Other News

CSPC 2018 Call for Panel Proposals: Building Bridges Between Science, Policy, and Society

The 10th Canadian Science Policy Conference (CSPC 2018) will be held in Ottawa, Ontario, on November 7-9th, 2018, at the Delta Hotel. Proposals can be in a variety of presentation formats that revolve around any of the conference themes. Here are the CSPC 2018 Themes:

- Science and Policy
- Science and Society
- Science, Innovation, and Economic Development
- Science and International Affairs
- Science and The Next Generation

The deadline for submitting your proposal is April 13, 2018. Learn more and submit today: http://sciencepolicy.ca/panel-proposals-cspc-2018

Every year CSPC brings together scientists, entrepreneurs, policy-makers, politicians, journalists, students and many others from across the country to discuss, exchange ideas, and mobilize knowledge regarding the present and future of Canadian science, technology, and innovation policy.

CPSC 2018: L'appel de propositions pour des groupes de discussion: Créer des rapprochements entre les sciences, les politiques et la société

La 10e Conférence sur les politiques scientifiques canadiennes aura lieu à Ottawa, Ontario, du 7 au 9 novembre 2018 à l'Hôtel Delta. Nous souhaitons recevoir des propositions pour divers formats de présentations qui sont articulés autour de l'un ou l'autre des thèmes de la conférence.

Les thèmes de la CPSC 2018 sont :

- Sciences et politiques
- Sciences et société
- Sciences, innovation et développement économique
- Sciences et affaires internationales
- Sciences et générations futures

La date limite pour présenter les propositions est le 13 avril 2018. Apprendre encore plus et présenter vote proposition: http://sciencepolicy.ca/fr/lappel-de-propositions-pour-des-groupes-de-discussion

Chaque année, CPSC ensemble les scientifiques, entrepreneurs, décideurs politiques, journalistes, étudiants et plusieurs autres individus des quatre coins du pays sont invités pour explorer, discuter, échanger et mobiliser les connaissances concernant le présent et l'avenir des politiques canadiennes relatives à la science, à la technologie et à d'innovation.

DATA, MODELS AND ANALYSIS

The Highest Impact Articles in *Atmosphere-Ocean*

CMOS SCMO

Edited by
GUOQI HAN, HAI LIN and DOUW STEYN

ROUTLEDGE

Council / Conseil d'administration

CMOS Bulletin SCMO @ bulletin.cmos.ca

The CMOS Bulletin has moved on-line to http://bulletin.cmos.ca. Please continue to send articles, notes, workshop reports and news items to bulletin@cmos.ca. We will be accepting, reviewing, and publishing content on an on-going basis.

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

CMOS Bulletin SCMO @ bulletin.scmo.ca

Le *Bulletin de la SCMO* se trouve maintenant en ligne à http://bulletin.scmo.ca/. N'hésitez pas à soumettre notes, rapports d'atelier et nouvelles à l'adresse bulletin@scmo.ca. Nous accepterons, réviserons et publierons vos contenus sur une base continue.

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.

Thank you to Bob Jones and Paul-André Bolduc, for their continued editorial assistance and guidance.

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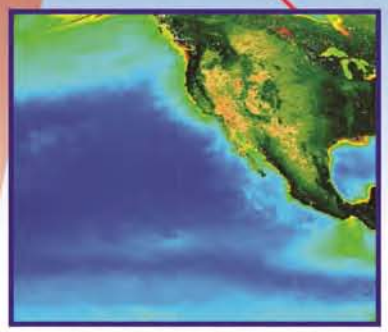

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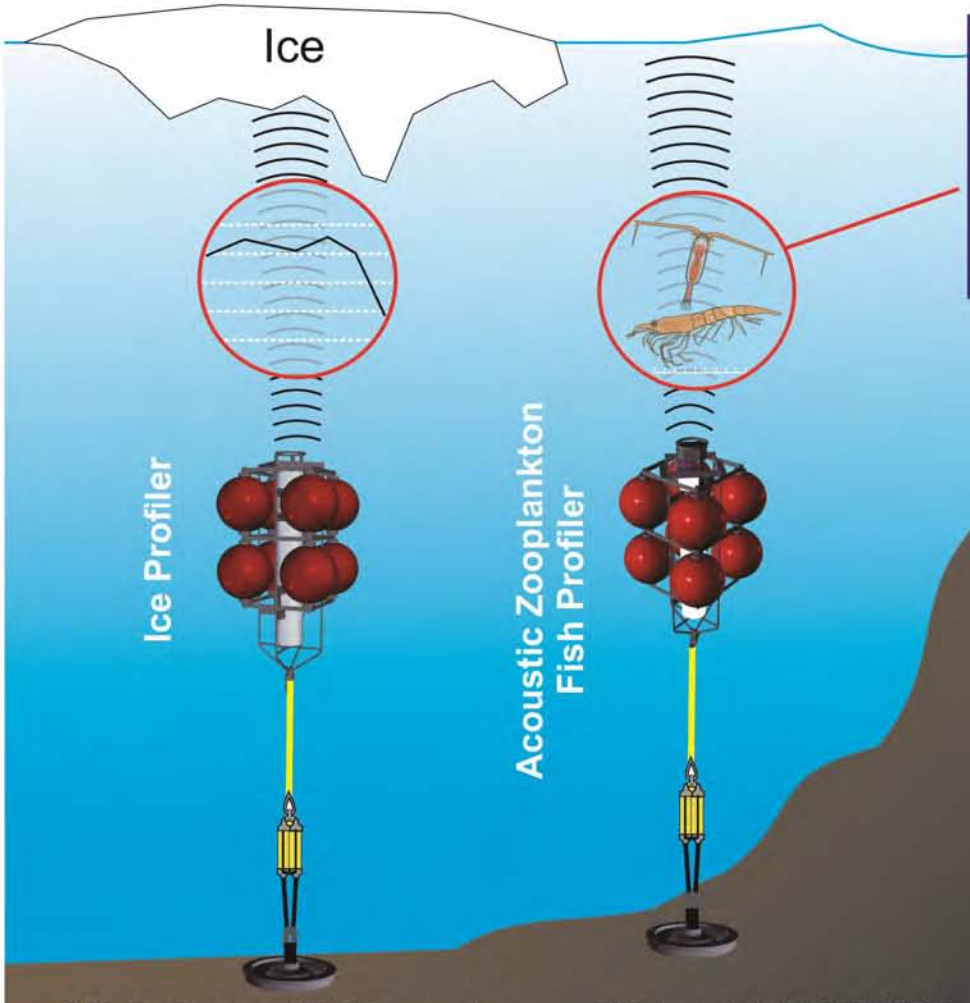

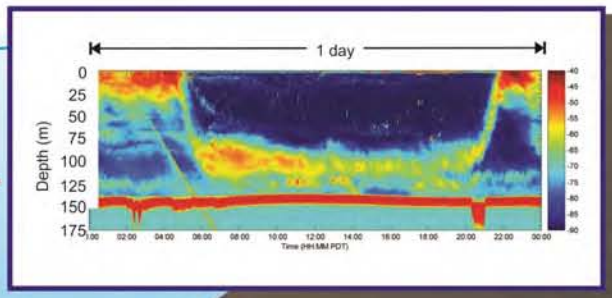

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