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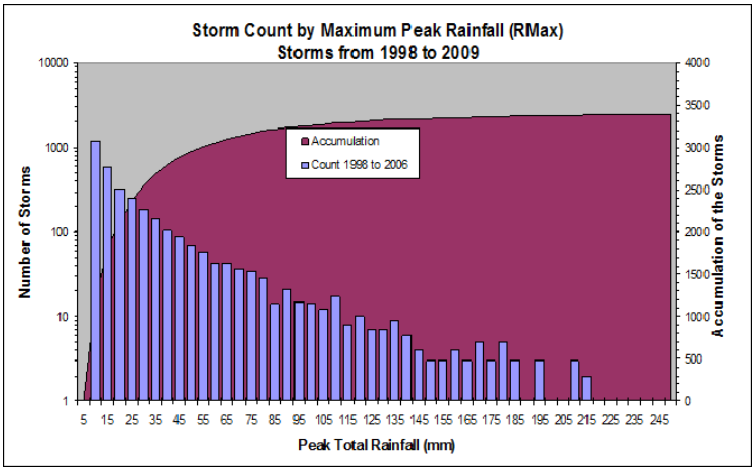
CMOS
BULLETIN
SCMO

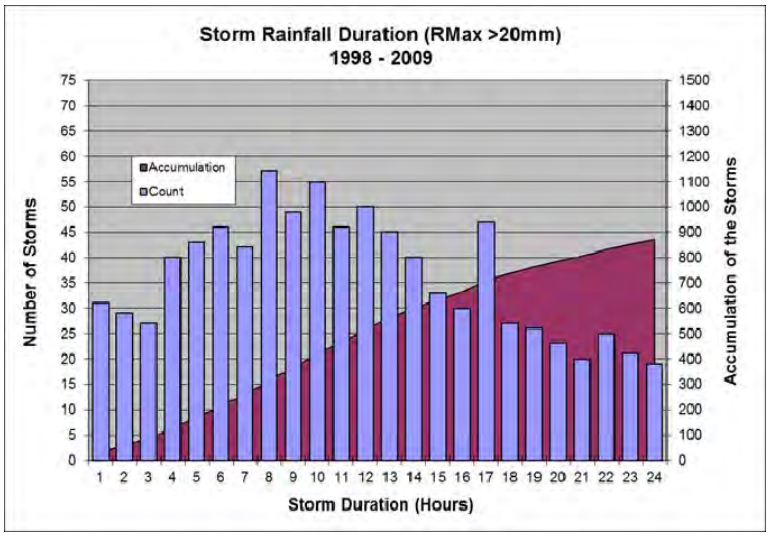
Canadian Meteorological and Oceanographic Society

La Société canadienne de météorologie et d'océanographie

June / juin 2013 Vol.41 No.3

Creation of a Large Rainfall Storm Database
General Storm Characteristics





Création d'une grande base de données d'averses de pluie
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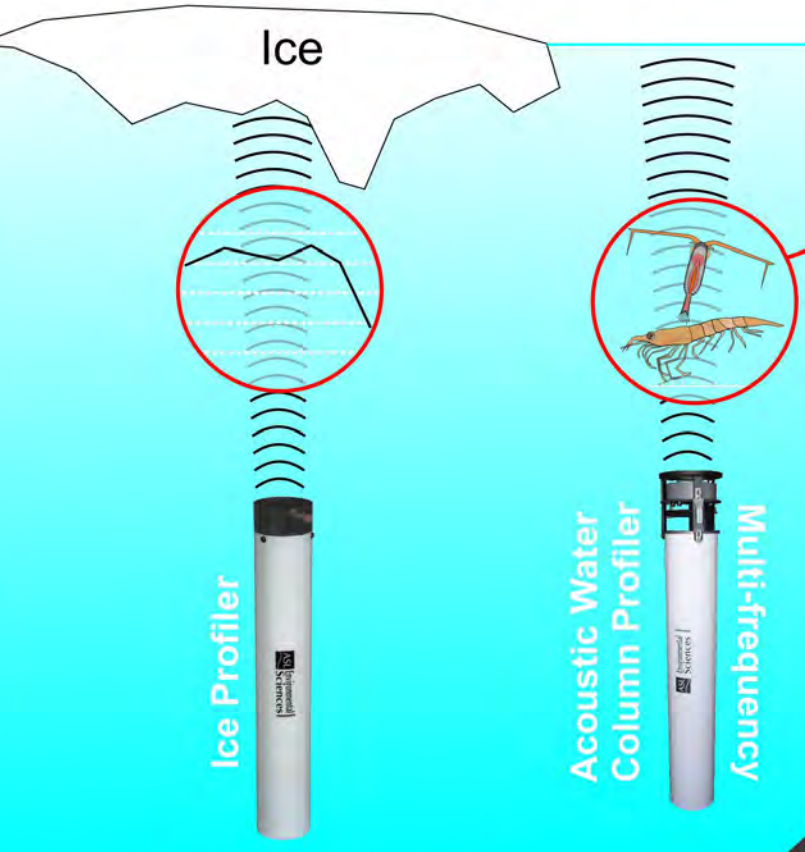

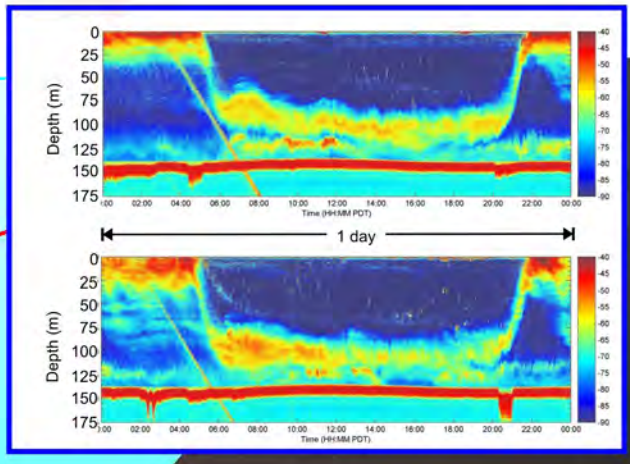

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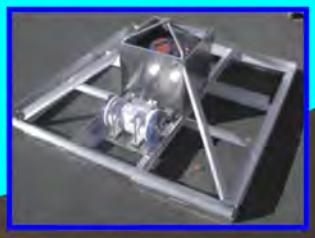

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from the Presidents' Desk / Allocution des présidents

Friends and colleagues:

Peter Bartello
Outgoing CMOS President
Président sortant de la SCMO

This issue of the Bulletin goes to press shortly before the Saskatoon Congress. This year's edition will once again be a joint Congress with the Canadian Geophysical Union and the Canadian Water Resources Association. Many thanks to Craig Smith, Chair of the Local Arrangements Committee, and Geoff Strong of the Scientific Program Committee and to their team of volunteers. It promises to be very stimulating and we will also be holding our first meeting of the newly-minted Canadian Societies for the Geophysical Sciences. In addition, at the Annual General Meeting of the CMOS Congress we hope to get important feedback from all the members on the proposed changes to CMOS governance. I hope to meet with as many of you as possible. The AGM will also formalise changes to CMOS Council and Executive Committees. In this, my last column as President, I wish to express the Society's deepest thanks to two Councillors-at-Large who will be stepping down. They are Denis Gilbert and Kim Strong. During my own time on the executive I have seen that the Society has benefited a great deal from their wise advice and their committment to the goals of CMOS and they have certainly made my job as President much easier. Also stepping down from the Society's Executive will be Norm McFarlane, after serving as Vice-President, President and Past-President. I first met Norm at the CMOS Congress in St. John's in 1987 while I was still a graduate student. He has been a role model for me as a researcher for decades and I think it is fair to say that, more recently, he led the way for me as CMOS President too. It has been a privilege to work with these people and I hope we can do so again. It is also a pleasure to welcome in Pierre Gauthier as our new President. I have known Pierre for 30 years and I can assure readers that we are in good hands for the next year.

Peter Bartello
Outgoing CMOS President
Président sortant de la SCMO

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CMOS Bulletin SCMO
Volume 41 No.3 June 2013 — juin 2013

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CMOS Bulletin SCMO
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Cover Page: The histograms of two rainfall storm characteristics are presented - the top graph shows the frequency distribution of the peak total rainfall while the bottom chart shows data on the duration of large storm events. These two important rainfall storm attributes were extracted out the large of Rainfall Storm Database that was discussed in the previous *CMOS Bulletin SCMO* issue (Vol.41, No.2, April 2013, pp.45-53). This database contains data on over 25,000 rainfall storms that were observed in an area of approximately 22,570 km^2 near the City of Edmonton using weather radar data that currently spans 11 years and is compiled at a 5-minute interval with a 1 km^2 grid size resolution. To learn more, please read Jobin's *et al* second article out of four on **page 82**.

Page couverture: Les hyétogrammes de deux caractéristiques d'averses de pluie sont présentés en page couverture, notamment, la fréquence du montant maximum des cellules pluvieuses ainsi que la durée des événements plus importants. Ces deux exemples d'attributs d'averses ont été extraits de la grande banque de données d'averses qui a été discutée dans le numéro précédent du *CMOS Bulletin SCMO* (Vol.41, No.2, April 2013, pages.45-53). Celle-ci contient au-delà de 25,000 cellules orageuses observées sur un territoire d'environ 22,570 km^2 aux alentours de la ville d'Edmonton et calculées à partir de 11 ans de données radar qui ont été compilées à intervalle de 5 minutes et une résolution spatiale de 1 km^2. Pour plus d'information sur le projet veuillez lire le second de quatre articles de Jobin *et al* en **page 82**.

from the Presidents' Desk / Allocution des présidents
(Continued / Suite)

Pierre Gauthier
Incoming CMOS President
Nouveau président de la SCMO

I would first like to also express my thanks to all the people mentioned by Peter for their contributions. This is a time for changes for CMOS with a new governance being put in place. I became vice-president last year and this past year, I got introduced to the affairs of CMOS. This brought us to realize that CMOS is changing as there is a growing and broader interest in issues related to climate and weather. I would like to thank Norman McFarlane who is now stepping down as past president. His enthusiasm and advice were inspiring to all of us. The new executive based in Montréal has now completed its first year and I would like to thank David Huard, corresponding secretary, André Giguère, recording secretary, Nacéra Chergui, treasurer for their involvement and dedication. Last year, I had the privilege to chair the scientific committee of the Congress in Montréal and this gave me the opportunity to be in touch with many of you who organized sessions on a wide range of themes, a reflection of the breadth of topics of interest to us. I am equally impressed by what is in preparation for the upcoming Congress in Saskatoon and I hope to see many of you on this occasion. This year, it is organized jointly with the Canadian Geophysical Union and the Canadian Water Resources Association. I echo Peter's words to thank the organizers of this annual event which is so important and stimulating for all of us.

The new governance of our Society will be pursued and completed next year. I would hope that we seize this opportunity to revitalize our ways of reaching out to society which is very concerned and affected by climate and weather events. Our channels of communications need to be able to express strongly our views on these issues. Although the interest of the population is more on impact and adaptation issues, it is equally important to make people realize that such studies rely on the reliability and accuracy of our science to be able to adequately respond to a changing climate with changing weather patterns. Funding of research is also a concern to both government scientists and the academic community. The consequence of inadequate funding is that we may lose valuable Canadian expertise that may not be there when society will need it. The CMOS community is in a position to express these concerns and to speak as an authoritative voice on climate and weather issues. This year will see the release of the fifth assessment report (AR-5) of the International Panel on Climate Change (IPCC) and this will certainly bring the spotlight on us. Quite a year to become president of CMOS!

Pierre Gauthier
Incoming CMOS President
Nouveau président de la SCMO

Next Issue *CMOS Bulletin SCMO*

Next issue of the *CMOS Bulletin SCMO* will be published in **August 2013.** Please send your articles, notes, workshop reports or news items before **July 5, 2013** to the address given at the top of page 74. We have an URGENT need for your written contributions.

Prochain numéro du *CMOS Bulletin SCMO*

Le prochain numéro du *CMOS Bulletin SCMO* paraîtra en **août 2013.** Prière de nous faire parvenir avant le **5 juillet 2013** vos articles, notes, rapports d'atelier ou nouvelles à l'adresse indiquée au haut de la page 74. Nous avons un besoin URGENT de vos contributions écrites.

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.

Proposed changes to CMOS governance

In response to changes in federal legislation governing not-for-profit corporations, CMOS is required to file "Articles of Continuance" along with new bylaws. While the former is straightforward, in the latter we must specify how the members of the Society choose their Board of Directors (using the language of the legislation, or CMOS Council using our language). To keep this document short, the proposed changes will be outlined and their rationale (in terms of changes to the legislation) only briefly summarised. More information on these can be found at: http://www.ic.gc.ca/eic/site/cd-dgc.nsf/eng/h_cs04953.html

Since we must review our bylaws, it seems like an opportunity to make CMOS work more efficiently. The total number of members of CMOS Council is now in the mid-thirties. There are simply too many people to hold an effective teleconference and we wish to reduce the size to between 6 and 15, as stated in our new Articles of Continuance. The changes below describe one possible way to accomplish this and we are now seeking feedback from all members of the Society.

We expect there will still be a need for a smaller Executive Committee that will meet more often, but the new legislation does not require us to be very specific about that at the moment. Our new bylaws need only state that the Council will choose its Executive Committee from among its members.

Changes to CMOS Council

1. Change: Centre Chairs will no longer be members of Council.

Rationale: In the new legislation all members of Council must be elected by all members of CMOS at the AGM. This violates the principle that local chapters ought to select their own representatives to CMOS. It is proposed to set up a committee of centre chairs, chaired by the national Vice-President. The latter will be a member of Council and will report on behalf of centre chairs.

2. Change: The Executive Director and Director of Publications will stand for election as individual members of the Society in order to become voting members of the new Council and Executive. However, their nomination should not be automatic, but rather a function of their individual suitability to serve on Council.

Rationale: Until now these two people have been *ex-officio* members of Council and Executive. The new legislation does not allow *ex-officio* members. On the other hand, they may be the most knowledgeable of CMOS business and would normally be expected to be key participants in any meeting. However, it is important to underline that their legal roles as members of Council and Executive must be clearly distinguished from their roles as Officers of the Society.

3. Change: Some, but not all, committee chairs will be members of Council.

Rationale: Committee Chairs were added to Council at the time of the creation of CFCAS to enlarge the expertise pool drawn upon in the selection of the CFCAS Board of Trustees. This is no longer necessary.

Committee chairs will report as follows:

Chairs of A-O Advisory Committee and Publications Committee will not be on Council as they will report through a member of Council responsible for publications.

Chairs of the External Relations Committee, the Membership Committee and the Nominating Committee are the President, Vice-President and Past President. As such they remain on Council.

Chairs of the Audit Committee and Finance and Investment Committee will not be on Council as they will report through the Treasurer, who remains on Council.

The Accreditation Committee, Fellows Committee, Prizes and Awards Committee and Weathercaster Endorsement Committee chairs will not be on Council as they will report through a member of Council responsible for accreditation and awards.

The chair of the Scientific Committee should be on the Council. In other words, one of the councillors should be nominated with his or her suitability to chair the Scientific Committee in mind.

The School and Public Education Committee, University and Professional Education Committee and Student Committee chairs will not be on Council as they will report through a member of Council responsible for education, public outreach and media communications.

The Private Sector committee chair will report through the Chief Operations Officer (normally the Executive Director).

The new CMOS Council would therefore consist of

1. President
2. Vice-President
3. Past President
4. Treasurer and Chief Financial Officer (CFO)
5. Recording Secretary
6. Corresponding Secretary,

as before. In addition, proposed new council members will

have the following responsibilities:

7. Chief Operations Officer (COO) (normally the Executive Director)
8. Publications (normally the Director of Publications)
9. Accreditation and awards
10. Chair of the Scientific Committee
11. Education, public outreach and media communications

We suggest that no change be made to the current three Councillors-at-Large, who do not have specific responsibilities other than to provide advice. This enables us to attract some rather busy wise people. The Council will therefore be composed of 14 members.

It has also been suggested that leaders of other like-minded societies (e.g. member organisations of the Canadian Societies for the Geophysical Sciences) may make valuable contributions on our Council. Adding one of these would give us a Council of 15 people.

This is a more two-tiered structure in which many new Council members are themselves chairs of groups of what would be members of the current Council. It is hoped this will keep the lines of communication open while still reducing the size of Council.

Changes to the CMOS Executive Committee

A smaller Council is expected to be able to handle more issues more effectively, but there still may be the need for an even smaller group that meets more often. It seems best not to describe its membership in too much detail in the new bylaws to provide flexibility in adapting to the new Council. It is proposed the Executive Committee be initially composed of

1. President
2. Vice-President
3. Past President
4. Recording Secretary
5. Corresponding Secretary
6. Treasurer and Chief Financial Officer (CFO),

as before. Plus one new voting member:

7. Chief Operations Officer (COO) (normally the Executive Director),

plus any members of Council relevant to the discussion for any particular meeting, including congress LAC chairs, etc., in keeping with CMOS tradition.

CMOS Bylaws Committee
Peter Bartello, Pierre Gauthier, Norman McFarlane and Ian Rutherford

Proposition de modifications à la gouvernance de la SCMO

En réaction aux modifications de la loi fédérale régissant les organismes sans but lucratif, la SCMO doit produire des « clauses de prorogation » parallèlement à ses nouveaux règlements. La situation est simple pour ces clauses, mais nous devons préciser dans les règlements de quelle façon les membres de la Société choisissent leur "conseil d'administration" (terme utilisé dans la loi, nous utilisons plutôt "Conseil de la SCMO"). Pour rester brefs, nous ne présenterons que sommairement les changements proposés et leur justification (relative aux modifications de la loi). De plus amples détails se trouvent à l'adresse : http://www.ic.gc.ca/eic/site/cd-dgc.nsf/fra/h_cs04953.html

Étant donné que nous devons revoir nos règlements, nous pourrions en profiter pour améliorer l'efficacité de la Société. Le Conseil de la SCMO se compose au total d'environ 35 personnes. Il est donc difficile de tenir une téléconférence efficace avec un tel nombre d'individus et nous souhaitons plutôt ne conserver que 6 à 15 personnes, comme indiqué dans nos nouvelles clauses de prorogation. Les modifications décrites ci-dessous ne représentent qu'une façon d'atteindre notre objectif et nous sollicitons des commentaires de tous les membres de la Société à ce sujet.

Nous nécessiterons probablement toujours un comité exécutif réduit, qui se réunira plus souvent, mais la nouvelle loi ne nous oblige pas à préciser cet aspect de notre structure administrative pour le moment. Nos nouveaux règlements n'auront qu'à indiquer que le Conseil choisira son comité exécutif parmi ses membres.

Modification du Conseil de la SCMO

1. Modification : le président d'un centre ne sera plus membre du Conseil.

Justification : en vertu de la nouvelle loi, tous les membres du Conseil doivent être élus par les membres de la SCMO, pendant l'Assemblée générale annuelle. Ce qui contrevient au principe qu'un centre doit sélectionner son propre représentant auprès de la SCMO. Nous proposons de créer un comité composé des présidents des centres et dirigé par le vice-président national. Ce dernier serait membre du Conseil et ferait rapport des activités des centres en leur nom.

2. Modification : le directeur général et le directeur des publications se présenteront à l'élection en tant que membre individuel de la Société, afin de devenir des membres votants du Conseil et de l'Exécutif. Toutefois, leur nomination ne serait pas automatique, mais plutôt la conséquence de leur aptitude à siéger au Conseil.

Justification : jusqu'à maintenant, ces deux directeurs étaient membres d'office du Conseil et de l'Exécutif. La nouvelle loi ne permet pas l'ajout de membres d'office. En revanche, ceux-ci pourraient bien posséder des connaissances considérables sur les affaires de la SCMO et s'avérer des participants clés au sein de toute réunion. Toutefois, il est important de souligner que leur fonction légale au sein du Conseil et de l'Exécutif doit être nettement distincte de leur fonction d'officiel de la Société.

3. Modification : seuls les présidents de certains comités seront membres du Conseil.

Justification : les présidents des divers comités se sont joints au Conseil, lors de la création de la Fondation canadienne pour les sciences du climat et de l'atmosphère (FCSCA), afin d'élargir le nombre d'experts admissibles au Conseil d'administration de la FCSCA. Ce contexte n'est plus valable.

Les présidents des comités rendraient compte comme suit :

Les présidents du comité conseil pour *Atmosphere-Ocean* et du comité des publications ne feraient plus partie du Conseil, et rendraient compte à un membre du Conseil responsable des publications.

Les présidents du comité des relations extérieures, du comité d'adhésion et du comité des nominations seraient le président, le vice-président et le président sortant du Conseil. Ainsi, ils demeureraient membres de cette instance.

Les présidents du comité de vérification et du comité des finances et investissements ne feraient plus partie du Conseil, et rendraient compte au trésorier, qui demeurerait membre de cette instance.

Les présidents du comité d'accréditation, du comité des membres émérites, du comité des prix et honneurs, et du comité d'agrément des présentateurs météo ne feraient plus partie du Conseil, et rendraient compte à un membre du Conseil responsable de l'accréditation et des prix.

Le président du comité scientifique devrait demeurer membre du Conseil. C'est-à-dire qu'un des conseillers serait nommé en tenant compte de ses aptitudes à présider le comité scientifique.

Les présidents du comité d'éducation publique et scolaire, du comité d'éducation professionnelle et universitaire et du comité étudiant ne feraient plus partie du Conseil et rendraient compte au membre du Conseil responsable de l'éducation, de la sensibilisation du public et des communications avec les médias.

Le président du comité du secteur privé se rapportera au directeur de l'exploitation (normalement le directeur général).

Le nouveau Conseil de la SCMO se composerait donc ainsi :

1. un président,
2. un vice-président,
3. un président sortant,
4. un trésorier et directeur financier,
5. un secrétaire d'assemblée,
6. un secrétaire correspondant,

comme actuellement; de plus, les membres proposés du nouveau Conseil assumeraient les responsabilités suivantes :

7. directeur de l'exploitation (normalement le directeur général),
8. les publications (normalement le directeur des publications),
9. les accréditations et les prix,
10. président du comité scientifique,
11. l'éducation, la sensibilisation du public et les communications avec les médias.

Nous recommandons de ne pas modifier la fonction des trois conseillers actuels, qui n'exercent pas de responsabilités précises, autres que de fournir leur avis. Ce qui nous permet d'attirer des gens brillants, bien qu'occupés. Le Conseil se composerait donc de 14 membres.

Il a aussi été suggéré que des dirigeants d'autres sociétés similaires (p. ex. provenant des organisations membres des Canadian Societies for the Geophysical Sciences) puissent apporter une contribution inestimable à notre Conseil. Cet ajout porterait la composition de cette instance à 15 membres.

Nous instaurerions donc une structure à deux échelons, par laquelle plusieurs des membres du nouveau Conseil seraient aussi présidents de groupes formés de membres du Conseil actuel. Nous espérons ainsi maintenir une bonne communication, malgré la réduction du nombre de sièges formant le Conseil.

Modification du Comité exécutif de la SCMO

Nous souhaitons qu'un Conseil de taille réduite puisse aborder plus de questions, plus efficacement qu'avant, mais il existe peut-être un besoin de former un groupe encore plus restreint, qui se réunirait plus souvent. Il est préférable de ne pas décrire en détail la composition de ce groupe dans les nouveaux règlements, afin d'être en mesure d'adapter celui-ci au nouveau Conseil. Le Comité exécutif se composerait initialement comme suit :

1. un président,
2. un vice-président,
3. un président sortant,
4. un secrétaire d'assemblée,
5. un secrétaire correspondant,
6. un trésorier et directeur financier,

comme actuellement; plus un membre votant supplémentaire :

7. un directeur de l'exploitation (normalement le directeur général),

ainsi qu'un membre du Conseil concerné par la discussion, pour toute réunion particulière, incluant les présidents des comités locaux d'organisation, etc., pour poursuivre la tradition de la SCMO.

Comité sur les règlements de la SCMO
Peter Bartello, Pierre Gauthier, Norman McFarlane et Ian Rutherford

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Letter to the Editor / Lettre au rédacteur

From: Ted Munn, Kaz Higuchi, Peter Summers, Bernard West and Ron Williams

Date: April 28, 2013

Subject: Public Acceptance of Climate Change Affected by Word Usage

This is a comment on an article in the latest issue of the *CMOS BulletinSCMO* (Vol.41, No.2, April 2013, pp 70-71) entitled *Public Acceptance of Climate Change Affected by Word Usage*. We are a small group of environmental scientists who meet for lunch and small talk once a month.

Here are the points that we raise.

1. Have the changes in word usage been the same in Canada as in the United States?

2. One of us wonders where the expression, "a pop-up shower" came from. Since 2011, we hear it regularly on Canadian radio and TV.

3. But our major query is about the word "environment". Dictionaries in the 1940s defined it as "that which surrounds" but by 1970 it took on several other meanings, one of which referred to organizations that specialized in environmental matters. For example, where did the following words come from: Environment Canada, Institute for Environmental Studies, SCOPE (Scientific Committee on Problems of the Environment), etc. Ted Munn was at a meeting in Stockholm when the name SCOPE was chosen but nobody ever questioned the use of the word "environment". One member of the Committee objected on the grounds that SCOPE was a mouthwash but his objection was quickly overruled. Everyone on the Committee felt that the word SCOPE had a pleasant ring to it.

Can anybody enlighten us on where this use of the word originated?

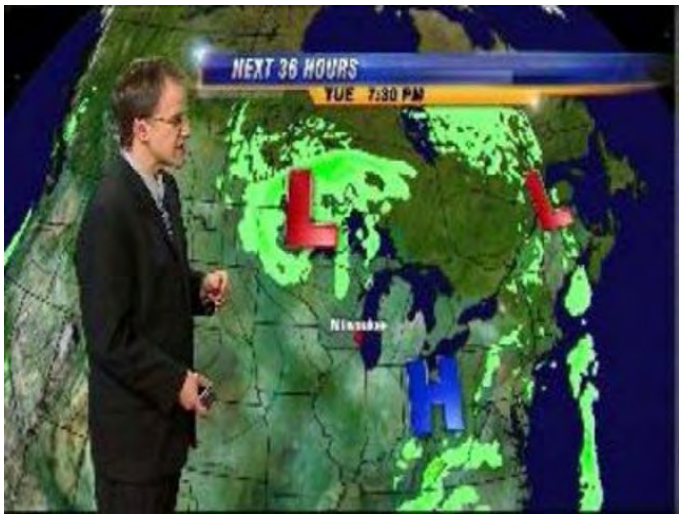
ARTICLES

The Other Science of Broadcast Meteorology – Psychology!

by Rob Haswell[1]

Let me start by saying I love being on TV. I love what I do and everything that comes along with it even the bad stuff. Sure, I'd like to make more money, I wish I didn't work at crazy hours and sometimes I'd like to be able to shop for groceries without dealing with that guy who has to grab my arm and pronounce, "Hey, you're that guy on TV!" but otherwise I love broadcast meteorology.

With that on the record, I have to say, there are times when I wish I could just forecast and not worry about how it was received or how it was heard by the viewing and listening public. How a forecast is received has numerous variables that are outside of the realm of atmospheric science. Viewers have a form of selective listening that causes them to hear what they want or not hear you at all. They want specifics but demand we generalize everything and they suffer from severe long-term memory loss that causes them to only relate to what is happening in the present or very near past and future.



Rob Haswell working the green wall at WITI-TV in Milwaukee, Wisconsin, USA

Perhaps the biggest challenge to any broadcast meteorologist is that of selective listening on the part of viewers or radio listeners. It's similar to the selective hearing that children have where they can't hear their own name shouted from the front porch but can make out the bells of an ice cream truck from miles away. Let's take, for example, a viewer who has weekend plans to play golf or attend a wedding. When a forecaster tells them there is a chance of rain on Saturday the viewer will hear it the way they want to hear it. If they are a pessimist, they will hear *"your golf game will be rained out"* but if they are an optimist or perhaps just in denial, they hear *"your wedding will be beautiful and dry"*. None of that changes what the actual chance of rain is for that area.

Another example of the selective hearing challenge comes when forecasting rain or snow totals. The human ear is capable of taking in everything we're saying but the human brain has a tendency to lean toward the dramatic. So, when a forecaster calls for a 7-15 centimetres of snow in an area, the viewer will typically only pick up on the higher number and forget the lower number. When the storm passes with an average of 7-9 centimetres the viewer accuses us of exaggerating for ratings. This becomes an even bigger challenge when a broadcaster covers a large area that will have a variety of micro climates or be affected by systems and fronts differently. In my area I try to be clear by using major roadways to indicate where I think the differences will occur. For example, if I feel the storm will leave up to 10-15 centimetres in our northern coverage area I will use a major east to west route just south of snowfall forecast area and inform the viewers north of that line to expect up to 15 centimetres. The problem comes when selective listening causes a viewer well south of that area to once again hear 15 centimetres and when their area does not get that, they cry foul! To compound the problem when we explain to that viewer that he or she was not in the area forecast to get that much snow they will typically accuse you of *"massaging your numbers*" or simply deny you ever said such a thing. Are they delusional? No. They heard what they heard and that is their own reality.

Of course a method of combatting this would be to provide a more detail-intense forecast. In some ways with the advent of the internet we have been able to do that. We can put more detailed information online than we are able to present to our audiences during our allotted time on the air. However, despite the viewers' demand for accuracy they will also demand brevity and generalities. Yes, there is a growing group of weather junkies that love it when I break out the water vapour imagery or go into depth on vorticity but the much larger group simply want to know if it is going

[1] FOX 6 – Milwaukee, Wisconsin, USA.
Note: Rob Haswell is Chair of the CMOS Weathercaster Endorsement Committee.

to rain or if it is going to snow. They want to know if it is sweater weather or t-shirt weather and so the broadcast meteorologist must cater to that crowd. We must remember that we are only part of a program whose main goal is to attract a large audience not necessarily to teach the viewer about the intricacies of the atmosphere. As such, we can't expect a television or radio station to devote the time necessary for a complete, in-depth forecast discussion in each and every quarter hour.

So, the viewer is demanding that I tell them the amount of snow in their driveway to the cm or the exact high temperature to within a degree for their backyard but at the same time they want me to tell them in a brief generalized manner that doesn't overly tax their brains. In a sense, they are their own worst enemies if they truly want to get a more accurate forecast.

Lastly, the broadcast meteorologist of today is up against the very memory of the viewer. Today's viewer lives in the now. Our Father's or Grandfather's generation was more connected to the world around them and how it affected their daily lives. They seemed to better hold a memory of what last Winter brought and what the average Spring is like in their area. Part of that was due to the simple fact that families weren't as mobile as they are today. It's not out of the ordinary now for someone to move across the country or across the world. As a result they don't have the same generational knowledge of their local climate. However, a large part can be attributed to the short attention span of the average person and in particular those of the post GenX generations. That lack of attention to what has come before leads to confusion among viewers when it comes to climate and it's in sharp focus when discussing climate change.

Take, for example, the colder and snowier than average February and March that occurred in much of the Great Lakes. Due to some late season snowfalls and cold snaps, viewers are convinced that this was the harshest winter on record. They are incapable of remembering the well above average December or the nearly snowless January. The viewer suffers from a climate amnesia and, in a sense is focussed on "*what have you done for me lately*?".

This problem of memory and being so very "now" focussed hits fever pitch on the issue of Global Climate Change. Sadly, it's an issue that is so contentious that very few on-air meteorologists will even touch it publicly. If a few days in a row are unseasonably cold it won't be very long before the broadcast meteorologist has to contend with emails or Facebook posts snarking "*where's Global Warming now?*"! Or if we manage, as we did here in Wisconsin, to have a couple of below-average months back-to-back, you'll hear calls of Global Warming Fraud because they've forgotten the numerous consecutive months of above average temperatures not to mention the deadly heat or extensive drought of the previous summer.

So there you have it. The broadcast meteorologist is up against not only the scientific challenges of forecasting but also the challenge of psychology. We're speaking to an audience of selective listeners that hear what they what to hear. A group of folks who want spot-on accuracy delivered in broad strokes and witty banter. And an audience who seem to only relate to what is happening in the world around them at this very moment.

So do we give up and just assume we'll never get through to them? No. These are just challenges not insurmountable obstacles. Broadcast meteorologists need to use all the tools at their disposal to provide specifics and focus their audience on what they need to know. Use Twitter and Facebook to engage the viewer and keep the forecast up to the minute. Take advantage of the internet to post more detailed data for those that crave it and use the on-air portion of our job to create more weather junkies that will consume that data. We need to keep it simple while at the same time not falling for the traps of over simplification to the point of being uninteresting. We need to use climate as a history lesson for the viewer to remind them over and over about what the world outside has been like so as to put today's weather in context.

Lastly, we need to grow a thick skin. For no matter how much we work at educating, informing and entertaining there will always be a portion of the viewing audience that revels in what they see as our short-comings. There will always be those that are convinced that "Chem-Trails" exist and that Global Warming is a myth. Remember the old saying,

"*weep for the weather forecaster.*
When he's wrong, no-one forgets.
***When he's right, no-one remembers*".**

Weather Forecaster:

Someone with whom the weather doesn't always agree.

Reference: *CMOS Newsletter*, Vol.6, No.6, December 1978, page 16.

Spatial-Temporal Rainfall Storm Characteristics

Part II: General Storm Characteristics

by Daniel Jobin[1], Peter Jolly[1] and Steven Chan[2]

Abstract: A series of four papers summarize the key findings of over ten years of research in hydrometeorology using weather radar-derived rainfall data at and near the City of Edmonton, Canada. Although the initial study objective was to determine spatial characteristics of rainfall storms, subsequent analyses provided much more complex storm attributes such as areal reduction functions, "Spatial Design Storms", storm-cell spacing statistics and, "Depth-Duration-Area-Frequency" curves. These advanced spatial characteristics are of great interest to water resources professionals that are tasked with designing water-related infrastructures and currently use overly simplistic approaches in estimating rainfall inputs. The breadth of the research eventually enabled the development of promising alternative methodologies for creating spatiotemporal "Design Storms"; results that could significantly impact how costly drainage structures are designed.

Résumé: Une série de quatre articles présente une synthèse des dix ans et plus de recherche en hydrométéorologie utilisant des données de précipitation radar aux alentours de la ville d'Edmonton, Canada. Bien que le but initial du projet de recherche était de seulement calculer des caractéristiques spatiales des événements pluvieux, les analyses ultérieures éventuellement abordèrent des attributs complexes notamment; des fonctions de décroissance spatiale des intensités, des 'Averses de projets', des statistiques de distances intercellulaires d'orage et, des fonctions 'Profondeur-Durée-Surface-Fréquence. Ces dernières caractéristiques d'averses sont particulièrement importantes en génie de ressources hydriques ou les professionnels utilisent maintenant que des méthodes simplistes pour évaluer l'apport pluvieux dans leurs calculs de dimensionnement d'ouvrage de drainage. L'envergure des travaux de recherche a permis éventuellement d'élaborer des méthodologies spatio-temporelles innovatrices de calculer les 'Averses de projet - des résultats qui pourraient changer de façon importante l'approche courante de concevoir l'infrastructure de drainage.

Preamble

This article is the result of over ten years of applied research and development in hydrometeorology; specifically, spatiotemporal characteristics of rainfall storms that occur at and near the City of Edmonton, Canada. Although the initial project's objective was to focus on the development of spatial characteristics of rainfall storms based on using weather radar data, the second follow-up study pushed the endeavors well beyond their intended purposes and resulted in important findings for water resources applications.

The large amount of research findings was organized into a series of four technical papers that progressively guide a reader toward more complex analysis results and, ultimately, proposed alternatives to the current simplistic "Design Storm" methodology.

The topics of the four papers are:

1. Building a Storm Database
2. **General Storm Characteristics**
3. Areal Reductions Factors
4. Alternative Design Storm Method

Introduction

The impetus and objectives of this project, as well as the methodology that was developed in creating a spatial-temporal database of rainfall storm attributes, was outlined in the first paper. This second paper provides an outline of some of the data contained in the **Rainfall Storm Database**. It will also present several derived rainfall storm characteristics and statistics such as the average distance between convective storm cells. Unfortunately, only a subset of all available spatial and temporal storm characteristics will be presented in this paper due to restrictions in available space. For more information, the reader is referred to the 2012 research report by *Kije Sipi Ltd*, entitled "*Study Report III - Spatial Analysis of Rainfall Over & Near Edmonton.*"

The focus of all analyses targets toward water resources applications; hence, a ground-level and watershed perspective is used in analyzing rainfall storm data. The methodologies and findings are an initial attempt at developing improved use of weather radar-based rainfall characteristics by water resources engineers and managers. The results are generally appropriate for small to medium-sized watersheds – less than 1,000 km^2, which is the approximate sewershed size of the City of Edmonton. However, there is no reason to believe the methodologies cannot be applied to larger areas and probably other locations that have similar hydrometeorological regimes.

Within the study area, the highest storm rainfall totals and

[1] Kije Sipi Ltd - RadHyPS Inc [2] City of Edmonton

intensities occur during the summer months and as convective rainfall cells that are usually embedded in frontal systems. Accordingly, the analyses were limited to determining hydrometeorological attributes of summer rainfall storms that occur during the months of May to September for the period of 1998 to 2009 (inclusive), over and near the City of Edmonton, Alberta. Data for the year 2001 were not available when the analyses were undertaken.

Finally, the radar-derived rainfall data was processed into 15-minute intervals at a spatial resolution of 1 km^2. The general entire study area is approximately 23,000 km^2 in size and encompasses the City of Edmonton. It is assumed to have a homogeneous hydrometeorological regime; hence all rainfall characteristics within this area are deemed part of the same data population.

Type of Storms

The distribution of rainfall – both spatial and temporal - falling over a given surface area is dependent on the type of storm event. For example, frontal convective systems as opposed to quasi-stationary convective storms have radically different temporal and spatial precipitation distributions that also result in quite different hydrological impacts. In order to analyze the ground-level impacts between different types of storms, major storm events were classified by visually examining the spatial distribution patterns of the total rainfall using color-coded thematic maps.

Four hydrologically significant storm patterns were identified as occurring during the period of analysis over and near Edmonton. The storm cell classification terminology that was used in this study do not adhere to any meteorological nomenclature system; however, they are expressed in terms more familiar to hydrologists and civil engineers – the target application group. The four types of storms are:

1) Single convective cells;
2) Cluster of convective cells
3) Single convective cell in frontal systems
4) Cluster of convective cells in frontal systems

The following two figures present examples of two of the four types of storms in the study area. Figure 1 shows the total rainfall of a single convective storm cell. The total storm rainfall varies spatially from less than 5 mm to more than 35 mm over a 25-km^2 area.

Figure 2 shows a typical cluster of convective cells in a frontal storm system. Rainfall totals vary between 10 and 60 mm over an area of approximately 1,500 km^2. The thematic map shows several convective cells, each with a maximum total rainfall greater than 50 mm.

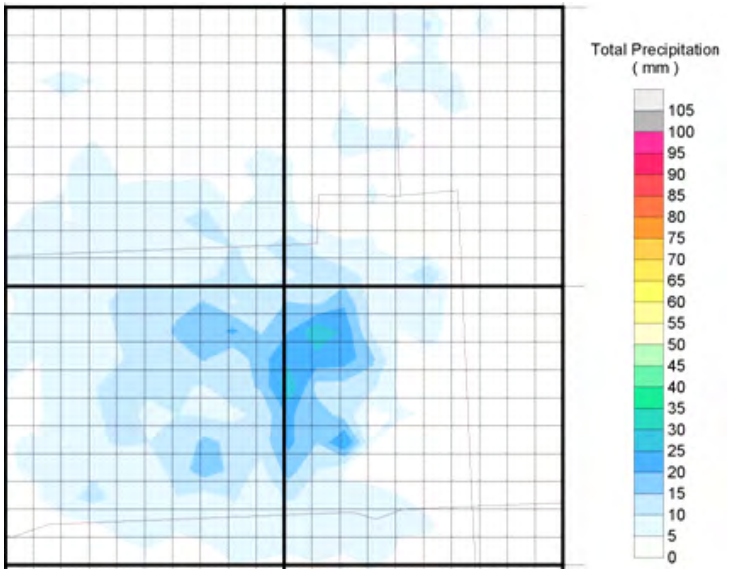


Figure 1: Single Convective Cell

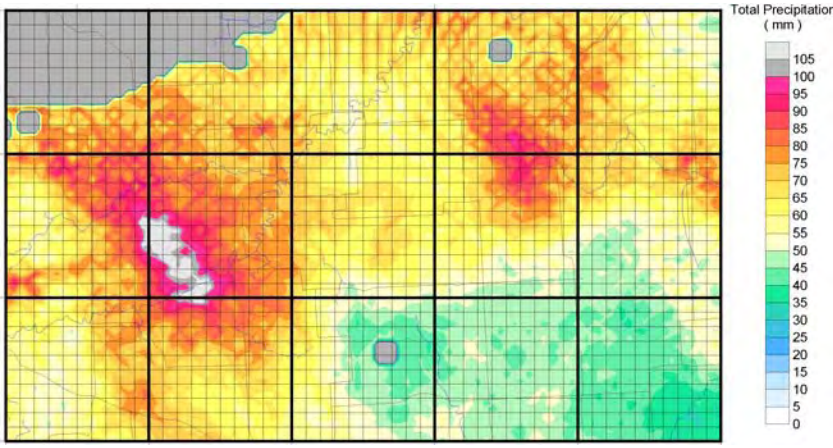


Figure 2: Convective Cells in Frontal System

Storm Rainfall Data Statistics

The digital **Rainfall Storm Database**, discussed in the first paper currently contains characteristics on approximately 25,500 storms of various sizes that occurred over a period of 11 years within an average area of 22,570 km^2. A large proportion of storms have a small total peak rainfall accumulation; whereas, larger and more significant rain storms are of interest to the water resources engineers. Figure 3 shows a histogram of the total annual number of storms with a maximum 1 km^2 grid-cell total accumulation (RMax) of greater than 5 mm (taller bars) and 20 mm (shorter bars).

There are a total of 3,414 storms with an RMax of at least 5 mm while only 1,300 have an RMax of at least 20 mm. Considering the entire period of analysis, there is an average of 310 storms per year with RMax >5 mm while only 118 with an RMax >20 mm. However, a general increase in the total annual number of storms is visible from

1998 to 2006 while a slight downward trend occurs thereafter.

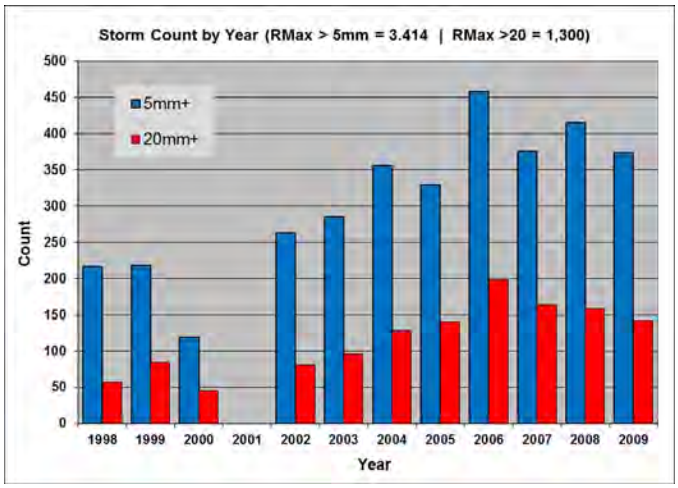


Figure 3: Number of Storms per Year (1998-2009)

Figure 4 shows the monthly distributions of storms with RMax >5 mm and >20 mm using the same colour scheme as Figure 3. The months of June, July and August have clearly the greatest number of storms while the month of July has marginally the greatest number of larger storms (RMax >20 mm). Nevertheless, percentage distributions over the five months are 11, 22, 25, 26 and 17% for storms with an RMax >5 mm and, 8, 22, 29, 27 and 14% for those with an RMax >20 mm.

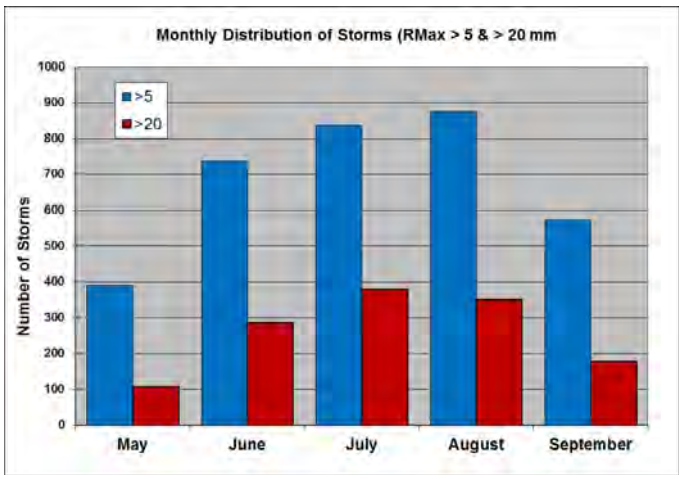


Figure 4: Number of Storm per Month (1998-2009)

Figure 5 presents a histogram of the eleven years of storm RMax within the average 22,570 km^2 study area. As stated earlier, RMax is defined as the total storm rainfall amount from the storm's 1 km^2 grid cell with the largest total rainfall. This is equivalent in hydrology to a quantity referred as the "*peak rainfall*". However, unlike the "*peak rainfall*" value observed by rain gauges which is hardly ever the storm's maximum total rainfall, the radar-derived RMax values in the **Rainfall Storm Database** are true "*peak rainfall*" storm totals.

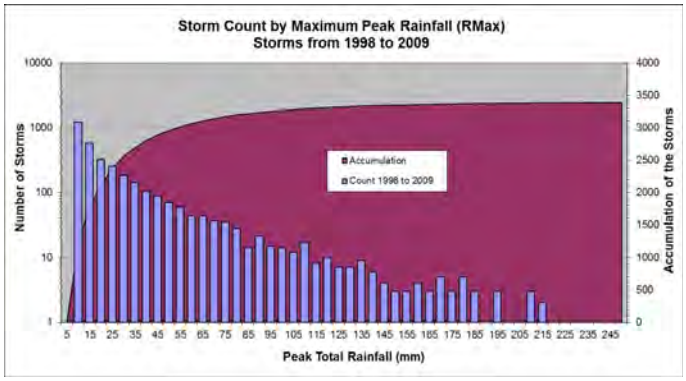


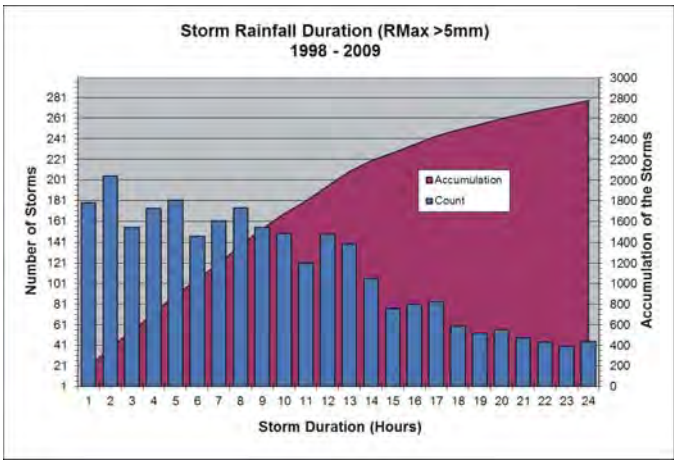
Figure 5: Storm RMax (1998-2009

Figure 5 shows a remarkably smooth decay in the total number the RMax using a semi-log scale plot. As indicated by the background accumulation chart, the figure presents the distribution of all 3,414 storms with an RMax greater than 5 mm. Also, there are 686 storms with maximum rainfalls greater than 40 mm, 161 with maximum rainfalls greater than 100 mm and, 5 with maximum rainfall larger than 200 mm. The largest observed storms had an RMax of 215 mm.

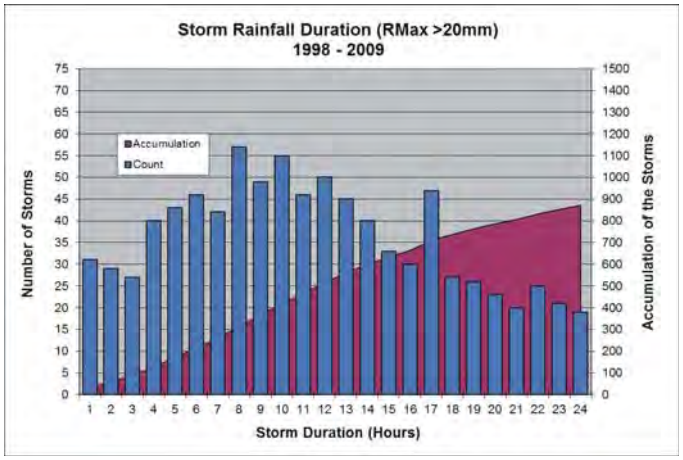
The figure is quite interesting. – consider that the largest daily rainfall recorded by rain gauges in the Edmonton area is only 120 mm. This was observed at the Edmonton Municipal Airport station that has a period of record of 70 years. The 200-year return period rainfall for this relatively long dataset is 130 mm; however, Figure 5 shows many storms with a significantly greater RMax. There are actually, 63 storms or, 1.9% of all storms with RMax >5 mm. Hydrologists and water resources engineers often believe that point source rain gauge statistics represent extreme values and, when applied homogeneously across watersheds, generates conservative design flow estimates. However, the observed RMax data in Figure 5 shows that using data from a single rain gauge hardly ever gives a region's maximum rainfall!

Figures 6a & 6b show two histograms of the storm duration in hourly intervals - up to 24 hours. The first graph presents the data for all storms with an RMax > 5mm while the second chart shows the data for larger storms that have an RMax >20 mm. This first figure shows again a relatively smooth decay pattern. There are proportionately fewer storms with longer durations. However, when considering only larger rain storms, as shown in Figure 6b, the distribution shows a noticeable concentration of storms with durations varying from 4 to 14 hours. The most frequent duration among large events is 8 hours.

6a)



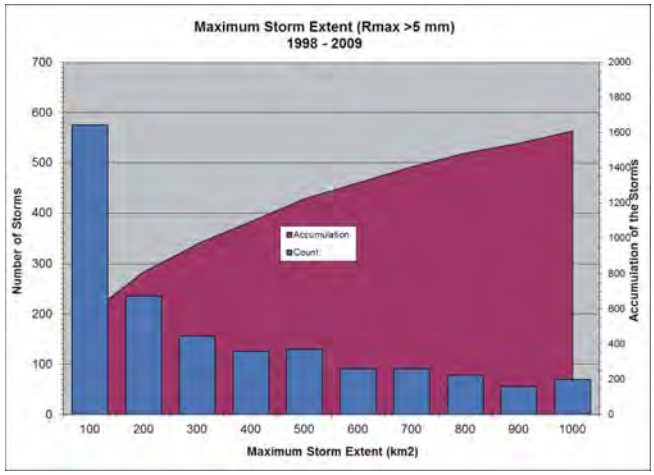
6b)



Figures 6a & b: Storm Duration (1998-2009)

Figures 7a & 7b show two histograms of the maximum areal extent of rainfall for all storms with an RMax >5mm. The difference between the two graphs is the interval on the x-axis; the first graph shows the total number of storm extents in increments 100 km^2, up to 1,000 km^2 while the second, in increments of 1,000 km^2, up to 18,000 km^2. The range of maximum storm extents in the **Rainfall Storm Database** is 6 to 18,000 km^2.

An analysis of the data that is presented in these two figures reveals that 86% of all storms with an RMax >5 mm have a maximum extent of less than 5,000 km^2 while 47% of the storms have a maximum extent of <1,000 km^2 and, 17% of the events have maximum extents <100 km^2. Both graphs show a relatively smooth decreasing trend in the number of events with increasing surface area. The statistics of this particular storm characteristic provides an appreciation of the maximum expected rainfall coverage on watersheds.



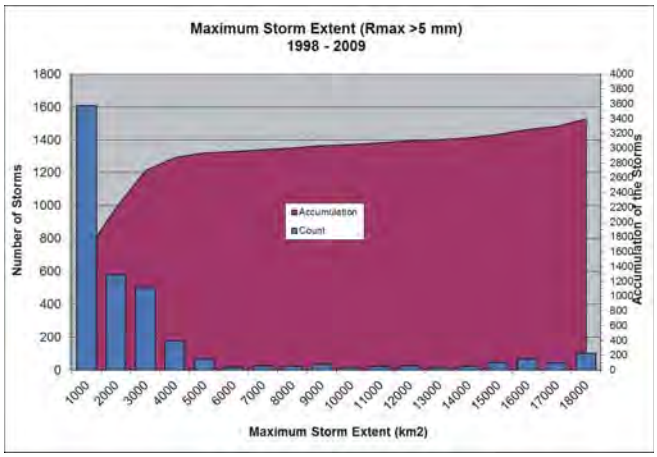


Figure 7: Storm Extent (1998-2009)

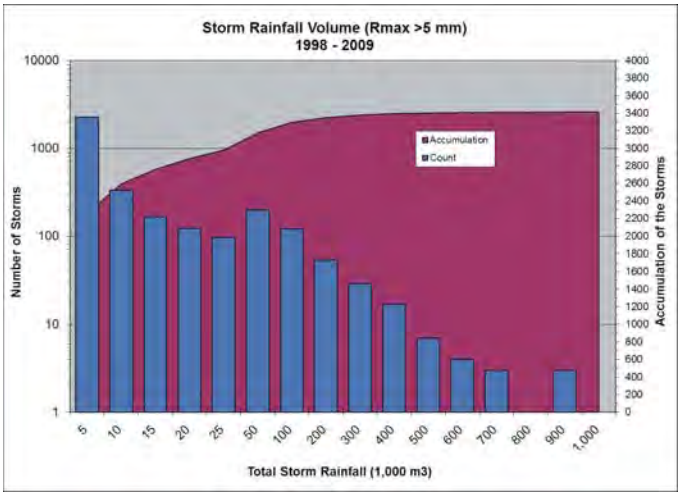


Figure 8: Storm Rainfall Volume (1998-2009)

Figure 8 presents a semi-log histogram of the volume of water precipitated by each storm with an RMax >5 mm.

Note that the x-axis as variable intervals in order to provide a better visualization of the attribute data.

An analysis of the underlying data indicates that approximately 66% of all storms have a total rainfall volume of less than 5,000 m^3 while a few storms precipitated nearly 900,000 m^3 of water. This particular storm characteristic also provides the water resources managers with maximum rainfall inputs to drainage basins.

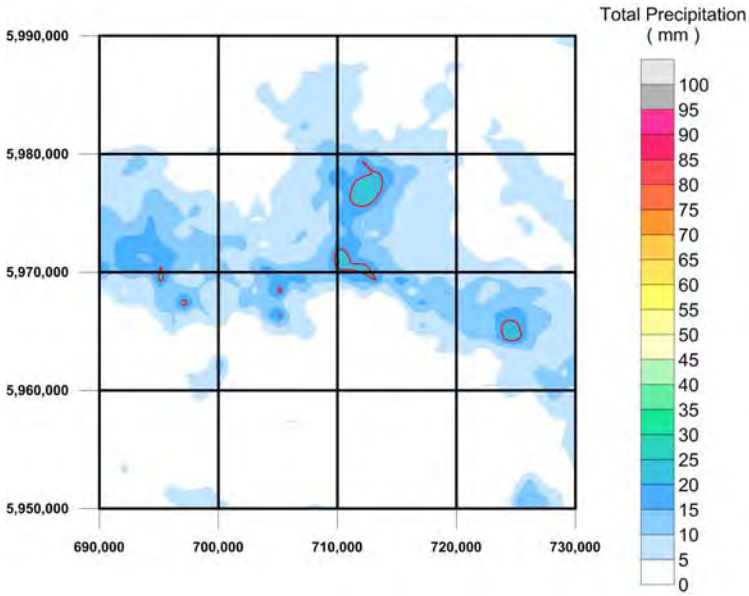


Figure 9: Areal Cluster of Storm Cells

Distance among Storm Cells

Mid-sized and larger watersheds often experience multiple storm cells during the same rainfall event, especially when frontal systems sweep across the basins. However, water resources infrastructures are typically sized using only a single design storm. This departure from reality is in part due to the design methodology currently being used by water resources engineers; however, the lack of data characterizing the distance between storm cells is more likely the underlying cause. In an effort to provide some initial guidance on this subject, data from the **Rainfall Storm Database** was analyzed to characterize the distance between storm cells.

Clusters of convective storm cells that are embedded in frontal systems have been shown to generally produce higher storm rainfalls than any of the other hydrometeorological regimes studied; hence, this type of storm pattern is the governing case for watershed infrastructure designs. However, clusters of storm cells occur in various spatial patterns in terms of: 1) the number of individual convective cells within a cluster, 2) the areal extent of the cluster and, 3) the distances between individual convective cells. The relative importance of these characteristics depends on the size of the cluster and the watershed, (and to lesser extent on the shapes and orientations of both the watershed and storm) for which design flows are sought. A review of a significant group of storms in the vicinity of the City of Edmonton reveals that clusters of convective cells can occur in areal or lineal patterns. An example of the former is shown in Figure 9 in which seven convective cells (circles) occur within an area of 660 km^2 while Figure 10 shows a linear pattern.

The line of convective cells is 66 km long and contains eight convective cells, each having a storm total maximum rainfall larger than 45 mm.

Considering the urban portion of the City of Edmonton is approximately 30 km by 40 km or 1,200 km^2 in surface area, a set of storm cells within circular areas of 50 km in diameter and, on lines of 50 km in length was analyzed. This included sixty-nine circular clusters and twenty-four line clusters. The distances from the principal convective cell were used to determine the number of convective cells and the distances between individual cells and the principal one. The principal cell was taken as the convective cell with the largest RMax or, the cell that provides the highest concentration of total storm rainfall near the centre.

Considering areal clusters of convective cells, the average number of cells in the cluster is five and the average distance from the principal cell to the other cells is 16 km. In the case of linear clusters, the mean number of cells is five and the average distance from the principal cell to the other cells is 13 km.

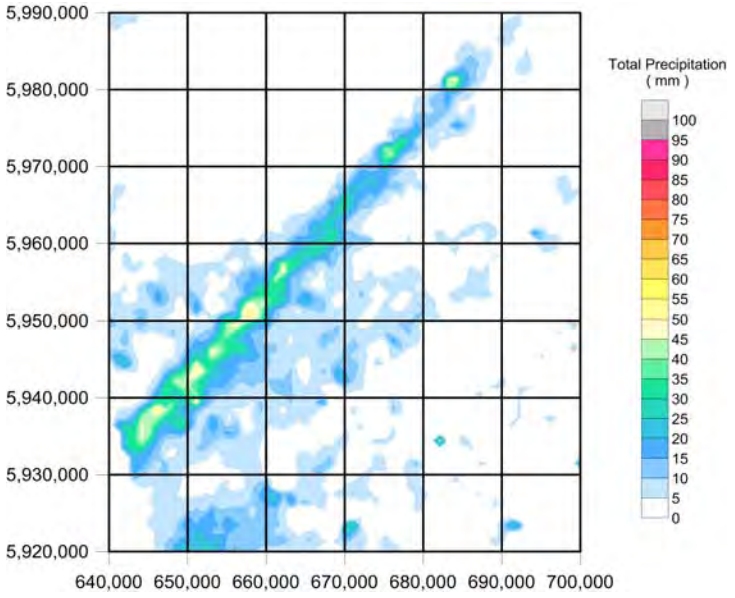


Figure 10: Linear Cluster of Cells

A histogram of average cell distance from the principal cell for both the circular and line cluster is provided in Figure 11. The analysis identified an average distance between storm

cells of 16 km with a standard deviation of 5 km. Furthermore, the minimum distance appears to be approximately 9 km.

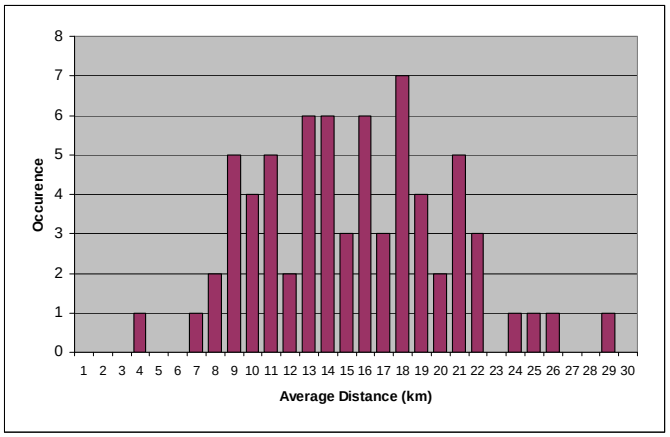


Figure 11: Average storm Cell Distance (Circular and Line Clusters)

Temporal Trends

An analysis was completed in order to determine if the magnitude of the maximum total storm rainfalls (RMax) and the number of rainstorms that occur annually in the summer months have increased or decreased in the period of record – 12 years.

Figure 12 shows the annual average and the annual maximum RMax as well as the number of storms (with RMax >20 mm) that occurred each year and have durations of 4 hours or less.

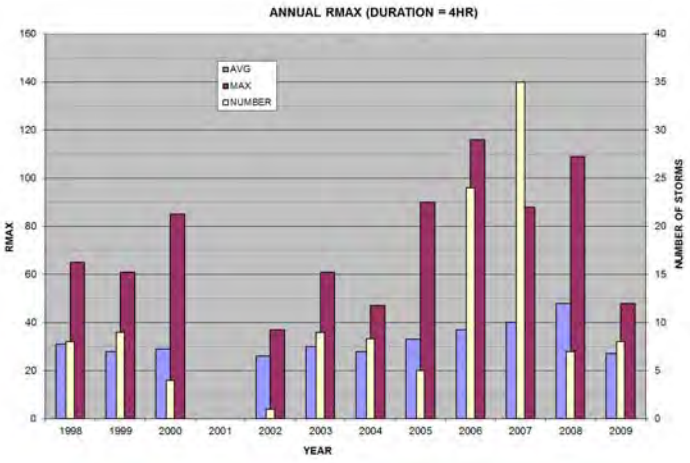


Figure 12: Temporal Trends(4-Hour Storms)

As may be observed from Figure 12, there is a general upward trend with the passage of years with each parameter (until the end of 2008). Both moving average and regression analyses were carried out with the annual maximum and the annual average storm maximum total rainfall. Both analyses indicate that the values are increasing with time. Additional analyses were carried out with the rainfall occurring within periods of 2-, 4-, 6-, 12- and 24-hrs and for durations of 2- and 4-hours. Note that the term "period" here does not refer to the interval between beginning and end of the storm rainfall but rather the duration of rainfall at the RMax location. The analysis results are presented in terms of the slope of the regression line and given in Table 1.

Trend Analysis - Regression Statistics

	Slope		
	Annual Average	Annual Maximum	Number of Points
Period (Hr)			
2	-0.32	-0.06	76
4	0.26	0.04	139
6	0.28	0.04	400
12	0.26	0.04	704
24	0.57	0.07	1374
Duration			
2	-0.45	-0.32	50
4	0.11	0.10	74

Table 1: Temporal Trends-Regression Analysis

For all periods except zero to 2 hr, the slopes are positive, indicating that the maximum rainfalls are increasing with the years. Furthermore, storms with longer durations show higher increasing trends.

The trend in the ratio of annual maximum storm total rainfall to average annual storm rainfall is indicated in Table 2.

Trend Analysis Regression Statistics

	Ratio
Period (Hr)	
2	1.71
4	1.91
6	2.13
12	2.23
24	2.44
All	2.96
Duration	
2	1.42
4	1.91

Table 2: Temporal Trends-Regression Analysis Average Ratio of Annual Maximum Rmax to Annual Average Rmax

As before, the results also show an increase in ratio with all rainfall durations and periods considered. Furthermore, the increase is greater for long periods as compared to short duration rainfalls. It may be concluded that not only are the number of storms increasing with time, but also the storm maximum rainfalls (RMax) are increasing and the annual maximum rainfall is becoming larger compared to the average annual maximum point rainfall.

Although the number of storms and the magnitude of RMax are increasing, a trend analysis of storm duration showed that there is no apparent annual trend in this storm characteristic.

Depth-Duration-Area-Frequency Curves

Rainfall design storms that are used for sizing water resources infrastructures typically require the rainfall frequency statistics from a single point source rain gauge station located within or near the watershed. These statistics are commonly available as Intensity-Duration-Frequency (IDF) data. The available frequency statistics are either used directly, or, for larger basins modified by an appropriate areal reduction factor. In other words, in the former case the statistics that are collected at one point are assumed to apply everywhere nearby; while in the latter case it is assumed that the rain gauge records the highest rainfall in the basin. A more meaningful design statistic would be based on the largest maximum rainfall storm values (RMax) that could occur anywhere in the region for various durations and surface areas. This type of data is known as Intensity-Duration-Area-Frequency (IDAF) statistics. However, IDAF curves are typically generated from networks of point source rain gauge data that rarely, if ever, include values of the storm's peak rainfall (RMax). Using the **Rainfall Storm Database**, the study team was able to calculate IDAF curves using only the storm peak total rainfall values (RMax); hence, provide a more accurate dataset of the maximum amounts of potential rainfall.

An area of 3,100-km^2, that includes the City of Edmonton was used for the IDAF analyses. Statistics were actually compiled in terms of "Depth" of rainfall (DDAF) instead of "Intensity". Also the entire area of analysis was divided into 6 sets of non-overlapping grid squares - the grid square sizes were 9, 25, 49, 81, 121 and 169 km^2. For each of the 6 datasets and each year in the 11-year dataset, the maximum annual point rainfall (1 km^2 RMax) within each grid square was retained for all storm cells with duration equal to, or less than 24 hours. An extreme value probability analysis was completed with the data using three probability distributions for the 1 km^2 RMax values on each of the selected series of square grids. Table 3 presents the resulting statistics for the Generalized Extreme Value (GEV) distribution. The total number of grid squares for analysis decreases as a function of the grid square resolution (Computational Unit Size). Also only the cases that have a positive skewness were included in the analysis. The table provides rainfall values for 2-, 10- and 20-year average return periods for all rainfalls of durations of 24-hrs and less. Figure13 presents the same data in a graphical form.

Summary - <=24 Hr - Spatial GEV Frequency Analysis

Computational Unit Size (km^2)	Total Number of Units	Total Number of Units w/+Skew	Rmax (mm)		
			2-Year	10-Year	20-Year
9	344	324	11	30	41
25	110	101	27	53	62
49	48	45	33	63	77
81	27	26	40	72	86
121	17	15	44	76	90
169	12	10	48	88	112

Table 3: DDAF GEV Frequency Analysis (Duration =<24Hrs)

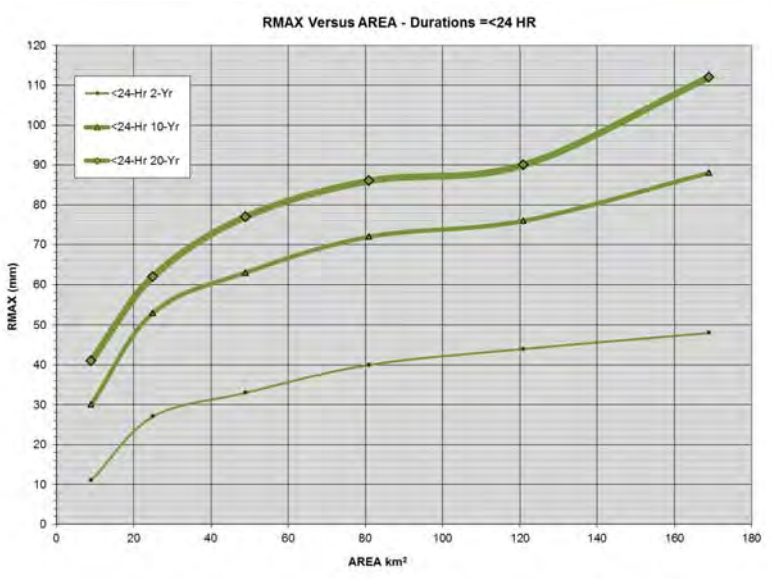


Figure 13: DDAF GEV - Average Annual Maximum (Duration =<24 Hours, 1km^2)

This graph shows the expected trend; whereas, for any given return period, RMax increases with the surface area. Larger areas would invariably be subjected, on average, to larger convective storm cells.

The areal frequency values (DDAF) were also calculated for rainfalls with a nominal duration of 2 and 6 hours – "Nominal is defined as +/- 30 minutes". In this case, the results are shown in Figure 14 that again presents a similar increasing trend with surface area. Furthermore, for any given area and return period, the two sets of DDAF curves have proportionately lower RMax values as compared to the =<24-hour DDAF curves.

Frequencies of occurrence or, exceedence, that are determined for any and all the locations within in a specified geographic area are more meaningful than those obtained

from one and the same point (rain gauge) every year in an analysis period.

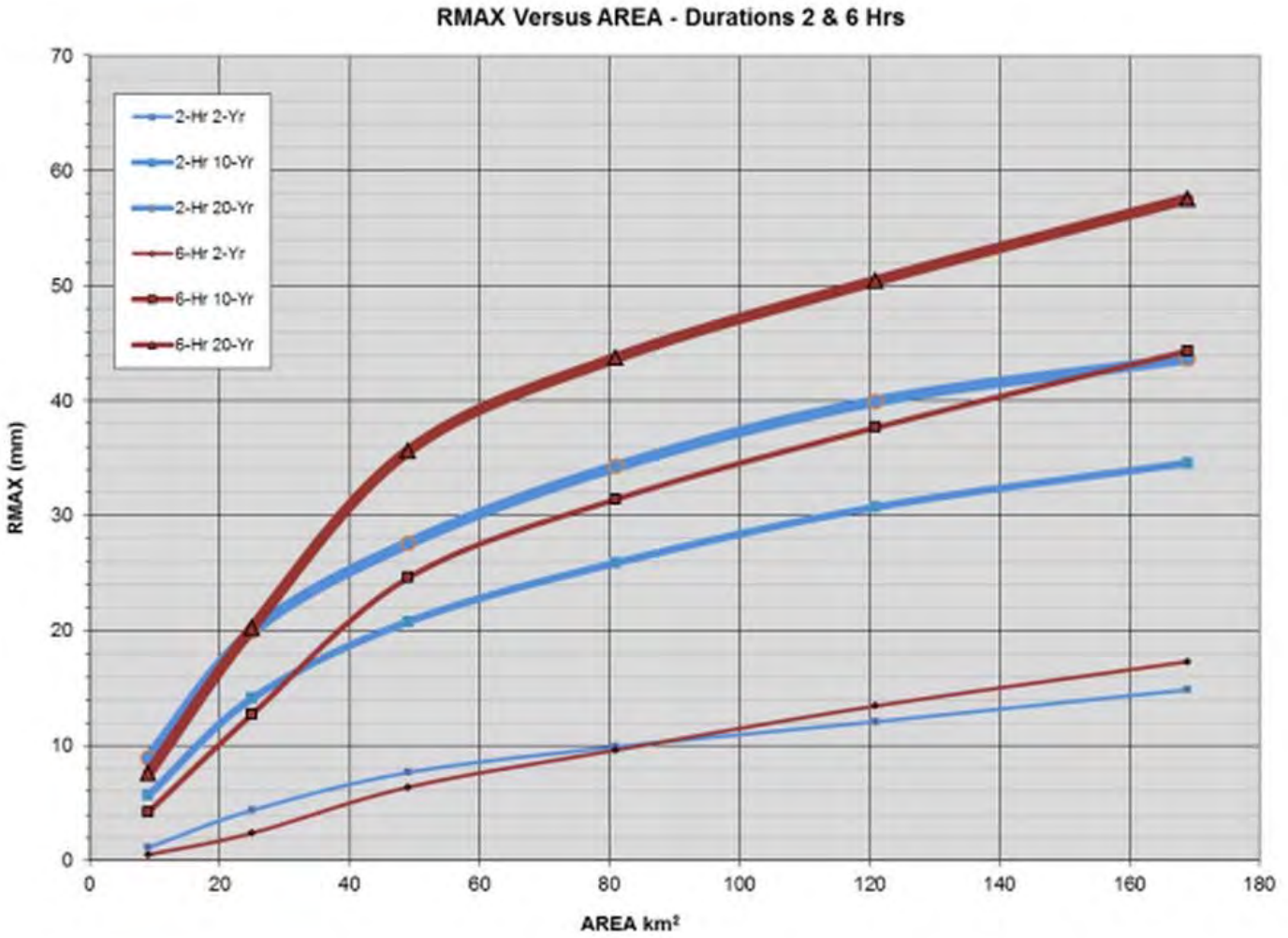


Figure 14: DDAF GEV - Average Annual Maximum (Duration: 2 and 6 hours, 1 km^2

Conclusions

This second of four papers has presented several storm data statistics resulting from analyzing the 11 years of radar-derived precipitation data currently contained in the digital **Rainfall Storm Database**. The information was derived from the storm and storm cell database that was compiled at an interval of 15 minutes and a spatial resolution of 1 km^2 over the entire study area of 22,570 km^2 that encompasses the City of Edmonton. These analyses were completed using a "watershed" perspective.

General statistics were presented on type of storms, the number of storms per year and per month, the range and distribution of: 1) the maximum storm cell rainfall, 2) storm duration, 3) maximum storm extent and, 4) total storm rainfall volume.The findings indicate:

- There is a general increase in the annual number of storms from 1998 to 2006 with a slight downward trend thereafter.

- The months of June, July and August have the greatest number of storms while the month of July has marginally the greatest number of larger storms (RMax >20 mm).

- The frequency distribution in the storm peak rainfall amount (RMax) shows a remarkably well behaved decay pattern with increasing values of RMax. The largest observed storms had an RMax of 215 mm; whereas, there are 686 storms with maximum rainfalls greater than 40 mm, 161 with maximum rainfalls greater than 100 mm and, 5 with maximum rainfall larger than 200 mm.

● The most frequent duration among large events is 8 hours.

Second-order storm characteristics were also presented including findings on the average distance between storm cells, temporal storm trends and, the development of Depth-Duration-Area-Frequency curves. The findings indicate:

● The distance between areal and linear clusters of the storms cells were analyzed and revealed an average distance between storm cells of 16 km with a standard deviation of 5 km. Furthermore, the minimum distance appears to be approximately 9 km.

● The storm data was analyzed for temporal trends using both moving average and regression techniques on the annual maximum and the annual average storm maximum total rainfall. Both analyses indicate that the values are increasing with time.

● A Depth-Duration-Area-Frequency (DDAF) analysis was successfully completed using grid square sizes of 9-, 25-, 49-, 81-, 121- and 169-km^2. For each of the six computational grid sizes and for each year in the 11-year dataset, the maximum annual point rainfall (1 km^2 RMax) within each grid square was retained for all storm cells with duration equal to, or less than 24 hours as well as nominal durations of 2 and 6 hours. An extreme value probability analysis was then completed with the data using three probability distributions for the 1 km^2 RMax values on each of the selected series of square grids. DDAF curves for return period values of 2, 10 and 20-year were developed and presented.

Two subsequent papers will present the results from analyzing the spatial decay of the maximum rainfall as well as an alternative Design Storm Method to the currently used IDF approach.

References

Jobin, D., Jolly, P., 2012, Study Report III - Spatial Analysis of Rainfall Over & Near Edmonton, *Kije Sipi Ltd*, 256.

Jobin, D., Jolly, P., 2007, Study Report II - Spatial Analysis of Rainfall Over & Near Edmonton, *Kije Sipi Ltd*, 133.

Jobin, D., Jolly, P., 2004, Study Report I - Spatial Distribution of Design Storm Rainfall, *Kije Sipi Ltd*, 80.

Technical Guide: Development, Interpretation and use of rainfall intensity-duration-frequency (IDF) information; Guideline for Canadian water resources practitioners, *CSA PLUS 4013 (2nd edition pub 2012)*, 214.

Vernon-H-TZ, 2000: (Advances in the Application of radar to Urban Hydrology), IAH Publication #351 Weather Radar and Hydrology Application, 595-600.

Lessons Learned from Hurricane *Sandy*

The World Meteorological Organization's Hurricane Committee has agreed to changes in its hurricane and tropical storm watch and warning system to take into account lessons learned from *Sandy* – which has now been retired from the official rotating list of names because of the devastation caused in October 2012. *Sandy* will be replaced by *Sara*.

The Hurricane Committee adopted a proposal from its Regional Specialized Meteorological Centre (RSMC) in Miami to broaden hurricane and tropical storm watch and warning definitions to allow these watches and warnings to remain in effect after a tropical cyclone becomes post-tropical, when such a storm poses a significant threat to life and property.

In future, the RSMC Miami will ensure a continuity of service by continuing to issue advisories during the post-tropical stage, when a storm poses a significant threat to life and property.

These changes were motivated by the special challenges posed by Hurricane *Sandy*, which evolved from a hurricane to a post-tropical cyclone prior to reaching the coast of the United States of America. They will be incorporated into the Operational Plan of the Hurricane Committee of WMO Regional Association IV (North and Central America and the Caribbean). [Source: WMO Website visited on April 17, 2013]

Enseignements tirés de l'ouragan *Sandy*

Le Comité des ouragans de l'Organisation météorologique mondiale a approuvé des changements dans son système d'alerte et de veille des ouragans et des tempêtes tropicales afin de prendre en compte les enseignements tirés de *Sandy* – dont le nom a maintenant été retiré de la liste tournante des noms en raison des dégâts qu'il a causé en octobre 2012. Sandy sera remplacé par *Sara*.

Le Comité des ouragans a adopté une proposition de son Centre météorologique régional spécialisé (CMRS) de Miami d'étendre le système de veille des ouragans et des tempêtes tropicales ainsi que les définitions des alertes, afin de permettre à ces veilles et alertes de demeurer actives une fois qu'un cyclone tropical passe au stade de post-tropical, lorsque celui-ci représente une menace importante pour les vies et les biens.

A l'avenir, le CMRS de Miami assurera une continuité de service en poursuivant la diffusion des avis pendant la phase post-tropicale lorsqu'une tempête représente une menace sérieuse pour les vies et les biens.

Ces changements ont été motivés par les défis particuliers posés par l'ouragan *Sandy*, qui est passé du stade d'ouragan à celui de cyclone post-tropical avant d'avoir touché les côtes des États-Unis. Ils seront incorporés dans le Plan opérationnel du comité des ouragans du conseil régional IV de l'OMM (Amérique du Nord, Amérique centrale et Caraïbes).

Source: Site web de l'OMM visité le 17 avril 2013.

REPORTS / RAPPORTS

Colloque sur les services climatologiques

Le premier colloque canadien sur les services climatologiques s'est tenu dans le cadre du 46e congrès annuel de la Société canadienne de météorologie et d'océanographie (SCMO). Ce congrès s'est tenu à Montréal (Québec, Canada) du 29 mai au 1er juin 2012 conjointement avec la 21e Conférence de l'American Meteorological Society (AMS) sur la Prévision numérique du temps (21st Conference on Numerical Weather Prediction) et la 25e Conférence de l'AMS sur la Prévision et l'analyse météorologique (25th Conference on Weather Analysis and Forecasting).

Ce colloque, intitulé *services climatologiques destinés aux sociétés vulnérables*, s'inscrit dans un contexte international de renouveau des services climatologiques avec l'adoption par l'Organisation météorologique mondiale (OMM)) du Cadre mondial sur les services climatologiques (OMM, 2011). Il se voulait un dialogue interdisciplinaire entre les différents acteurs en matière de services climatologiques. La rencontre fût l'occasion d'échanges pour les grands centres météorologiques, les usagers des services climatologiques, les fournisseurs de services et les professionnels en sciences du climat et de l'atmosphère.


David Grimes, Président OMM

Le colloque a été précédé par une session plénière animée par le Président de l'OMM Monsieur David Grimes également sous-ministre adjoint du Service météorologique du Canada (SMC), une direction au sein du Ministère de l'environnement du Canada (EC). M. Grimes a présenté les perspectives des services météorologique et hydrologique dans le contexte canadien. Il a également souligné les engagements internationaux du Canada notamment le soutien à l'OMM et son Cadre mondial sur les services climatologiques (GFCS). Selon M. Grimes, la science et la technologie constituent les éléments clés pour une réponse éclairée aux défis engendrés par un climat en évolution dont les sociétés vulnérables subissent les conséquences.

Le colloque sur les services climatologiques a suivi après cette session plénière avec l'animation de quatre sessions ci-dessous :

- session I : Services *climatologiques: pourquoi, par qui et pour qui?*
- session II : *Besoins des usagers*
- session III : *Fournisseurs de services*
- session IV : *Affiches*

Les modérateurs étaient respectivement Dr Pierre Baril, Directeur général du Consortium Ouranos sur la climatologie régionale et l'adaptation aux changements climatiques (session I), Madame Jacinthe Lacroix, gestionnaire exécutif aux opérations météorologiques et environnementales du SMC à Dorval (Québec) (session II et IV) et Dr Philippe Gachon chercheur scientifique à la Direction des sciences et de la technologie (S&T) d'Environnement Canada (session III).

Les différentes présentations dans les sessions couvraient plusieurs domaines allant de la R&D à l'identification des besoins des usagers qui évoluent en passant par la communication de l'information et du risque climatique, les impacts et stratégies d'adaptation ainsi que des liens entre celles-ci et la politique.

En terme de participation, outre les divers représentants des institutions du Canada (gouvernement fédéral, provincial, centres de services climatologiques, organisations sectorielles), celle ci comprenait des représentants des services météorologiques africains et britanniques.

Le rapport, disponible sur le site web de la SCMO (http://www.cmos.ca/ClimateColloquium2012.pdf), établit un bilan du colloque. Il récapitule les principaux enjeux soulevés relativement aux rôles des services climatologiques comme éléments de réponse pour faire face aux besoins de développement durable de la société actuelle. Le *CMOS Bulletin SCMO* est heureux de reproduire ci-après le résumé exécutif du rapport dont les auteurs sont:

- ***Amadou Bokoye***
- ***Louise Buissières***
- ***André Cotnoir***
- ***Jacinthe Lacroix***
- ***Luc Vescovi.***

Résumé Exécutif (English version follows)

Une représentation synthétique du colloque [qui s'est tenu à Montréal] peut s'articuler autour des points suivants :

Contextes global et régionaux des services climatologiques: on assiste à une croissance de la demande d'information climatologique un peu partout dans le monde. La mé téorologie, le climat et l'hydrologie sont intimement liés au bien être de l'homme et à son développement. Les changements de perception en termes d'échelle de temps et d'espace induits par les développements scientifique et technologique ont donné lieu à un monde de plus en plus basé sur l'information et où

l'état de notre environnement et de son système "météoclimatique"[1] occupe une place de choix au regard des impacts associés sur la vie socio-économique. En effet près de 90 % des catastrophes naturelles survenues au cours des dix dernières années étaient liées à des phénomènes dangereux d'origine hydro météorologique et climatique (inondations, cyclones tropicaux, vagues de chaleur et tempêtes violentes); et on peut noter une tendance à l'augmentation de l'intensité et de la fréquence de ces phénomènes liés à la météorologie et au climat. L'importance des impacts socio-économiques inhérents à ces phénomènes ont entraîné une prise de conscience mondiale qui a conduit l'Organisation Mondiale de Météorologie à adopter en 2009 un cadre mondial sur les services climatologiques. Cet événement a fait tache d'huile dans plusieurs institutions dédiées aux services climatologiques qui ont alors entrepris des réformes pour un renouveau des services climatologiques. C'est le cas notamment en Afrique, au Canada, aux États-Unis ou en Grande Bretagne pour ne citer que celles-là.

> *"Vous, les météorologues, serez appelés à jouer, dans les affaires humaines, un rôle bien plus important que celui que vous avez tenu jusqu'ici".*
>
> John Strachey, Ministre britannique, s'adressant aux directeurs des Services météorologiques nationaux à Londres en 1946.

Le Cadre mondial sur les services climatologiques (CMSC) - (Global Framework for Climate Services (GFCS)) résulte de la conférence mondiale sur le climat organisée par l'OMM en juin 2009 et vise à mieux connaître le climat pour agir notamment en termes de réduction de vulnérabilité des sociétés humaines. Le plan de mise en œuvre du CMSC a été adopté lors de l'assemblée extraordinaire de l'OMM en octobre 2012. Le CMSC est structuré de façon à fournir de l'information aux usagers sectoriels (via une interface appropriée), à partir des systèmes d'observation et de modélisation ainsi que de systèmes de gestion de l'information. Ces différentes composantes sont liées par des fonctions transversales. Un renforcement des capacités est attendu au sein de chaque composante et sur l'ensemble de la structure organisationnelle, par fonctionnalité horizontale et transversale entre les composantes. La mise en œuvre du CMSC inclut la prise en compte des échelles nationale, régionale et mondiale.

Sessions du colloque: afin d'optimiser les extrants du colloque et de mieux saisir les enjeux et les perspectives associés aux services climatologiques, trois grandes sessions de présentations ont été réalisées, soit: *Les services climatologiques: pourquoi, par qui et pour qui?*, *Besoins des usagers* et *Fournisseurs de services*. À cela s'est ajoutée une session d'affiches. Dans le présent rapport, l'équipe de rédaction fait ressortir les points marquants pour chaque session. Il s'agit notamment des enjeux abordés dans les présentations de la session, des progrès accomplis et des leçons apprises quant à l'expérience des services climatologiques. À cela s'ajoutent les besoins exprimés et les recommandations formulées en vue d'une amélioration des services climatologiques. La nécessaire collaboration entre les acteurs des services climatologiques, le dialogue permanent entre fournisseurs de services et usagers afin d'adapter les produits aux besoins de ceux-ci, le développement des connaissances, l'amélioration des réseaux d'observation ainsi que la nécessaire évaluation des incertitudes associées aux produits délivrés étaient à l'ordre du jour des échanges. La rubrique suivante fera ressortir les principales conclusions du colloque.

Messages clés du colloque:
Les principales conclusions et recommandations du colloque pour le développement et l'efficacité des services climatologiques sont présentées comme suit sous forme de message clés.

- La nature de l'information doit correspondre aux besoins des utilisateurs, c'est-à-dire qu'elle se doit d'être pertinente, utile et disponible en temps opportun.
- Pour être efficaces, les services offerts doivent respecter "l'interdisciplinarité" qui constitue la base des échanges entre les acteurs et être optimisés en tant qu'outils d'alerte précoce et de connaissance de l'évolution du climat.
- Le développement des services climatologiques doit se faire selon une vision guidée par le souci de répondre aux besoins de la société qui sont en constante évolution. Cette vision doit reposer sur les avancées de la science et de la technologie, ainsi que sur une solide stratégie de communication entre les acteurs des services climatologiques et ceci de l'échelle nationale à l'international en passant par la région.
- Le développement des outils pour le traitement de l'information et l'aide à la décision ainsi que la communication doivent se faire en lien avec les risques "météoclimatiques" et en tenant compte de sociétés qui sont en évolution. Ainsi, une meilleure connaissance de la dynamique des extrêmes météorologiques et climatiques avec des outils adéquats pour les applications, l'évaluation systématique des incertitudes sur les produits de la part des fournisseurs de services, et la nécessité de large partenariats entres les acteurs des services climatologiques et les décideurs (notamment politiques) permettent de créer des conditions optimums pour l'essor des services climatologiques. D'un point de vue opérationnel, l'efficacité des services climatologiques au regard des attentes des usagers nécessite la mise en place de partenariats entre fournisseurs et usagers, qui mettent de l'avant une

[1] Néologisme introduit pour traduire le continuum entre la météorologie et le climat pour lequel il n'existe pas un terme approprié.

communication permettant d'avoir un impact mesurable et imputable sur la diminution des risques liés aux intempéries. À cette fin, la forme de communication doit intégrer l'analyse et la gestion des risques dans une communication bidirectionnelle avec les partenaires et usagers.

Au bilan, ce colloque a aussi mis en lumière la nécessité de décloisonner les domaines de la climatologie et de la météorologie afin d'en faire un continuum des événements du climat passé, présent et futur et selon les échelles de temps en termes de jours, de mois et d'années. Et ceci afin de mettre en place un véritable système de vigilance météorologique et d'alertes précoces.

La version française précède

Colloquium on Climate Services[2]

"You, who are all meteorologists, be called upon to play a far more important role than you have ever played before in human affairs".

British Minister John Strachey addressing senior meteorologists, London, 1946.

The Colloquium on Climate Services for Vulnerable Societies, which was held on May 29, 2012, in Montreal, Quebec, Canada, as part of the 46th Annual Congress of the Canadian Meteorological and Oceanographic Society (CMOS), provided an opportunity for discussion and knowledge sharing among development players and climate service users and providers. The Colloquium can be summarized in the following points:

Global and regional contexts of climate services – Demand for climate information is on the rise worldwide. Weather, climate and hydrology are closely linked with human welfare and development. Scientific and technological developments have changed perceptions in terms of temporal and spatial scales, resulting in an increasingly information-based world that emphasizes the state of our environment and its "meteoclimatic"[3] system with regard to the associated impacts on socioeconomic life. Close to 90% of the natural disasters that have occurred in the past decade were related to dangerous phenomena of hydro-meteorological and climatic origin (floods, tropical cyclones, heat waves and severe storms), and a trend of increasing intensity and frequency of these weather- and climate-related phenomena can be observed. The significance of the inherent socioeconomic impacts of these phenomena has raised global awareness, leading the World Meteorological Organization (WMO) to adopt a Global Framework for Climate Services in 2009. This move had a ripple effect on a number of climate service institutions in Africa, Canada, the United States and Great Britain, to name only a few examples, which launched reforms to revitalize climate services.

The Global Framework for Climate Services (GFCS) – The purpose of the GFCS, which arose out of the WMO World Climate Conference in June 2009, is to improve climate knowledge in order to support action, particularly to reduce the vulnerability of human societies. The GFCS Implementation Plan was adopted by the WMO Extraordinary Congress in October 2012. The GFCS is structured so as to provide information to sector users (through an appropriate interface) using observation, modelling and information management systems. The various components are linked by cross-cutting functions. Capacity building is expected to occur within each component and throughout the organizational structure by means of horizontal, cross-component functionality. The implementation of the GFCS includes a consideration of the national, regional and global scales.

Colloquium sessions – To optimize the outputs of the Colloquium and provide a better grasp of the issues and perspectives associated with climate services, three major presentation sessions were held*: Climate Services: Why, By Whom and For Whom?*; *User Needs*; and *Service Providers*. There was also a poster session. This report will focus on the highlights of each session: the issues addressed in the session presentations, the progress achieved, and the lessons learned with regard to the experience of climate services, as well as the needs expressed and recommendations made concerning climate service improvement. The discussions dealt with the necessary collaboration between climate service players, the ongoing dialogue between service providers and users to tailor products to user needs, the development of knowledge, the improvement of observation networks, and the necessary assessment of uncertainties associated with the delivered products.

The main conclusions of the Colloquium are outlined below.

Key messages of the Colloquium

The main conclusions and recommendations of the Colloquium regarding the development and effectiveness of climate services can be summarized in the following key messages:

- The nature of the information must reflect user needs, which means it must be relevant, useful and available on a timely manner.

[2] The full report (in French only) is available on CMOS website: http://www.cmos.ca/ClimateColloquium2012.pdf

[3] Neologism coined to describe the continuum between meteorology and climate, for which no appropriate term exists.

● In order to be effective, the services offered must respect the "interdisciplinarity" on which exchanges between the players depend, and must be optimized as early warning tools and climate change knowledge tools.
● Climate services should be developed from a vision shaped by a desire to meet the needs of society, which are constantly changing. That vision should be based on scientific and technological advances and on a solid strategy for communication among climate service players at the regional, national and international levels.
● Information processing tools and decision and communications support tools should be developed in relation to "meteoclimatic" risks, taking into account changing societies. Increased knowledge of the dynamics of extreme weather and climate events with tools appropriate for the applications, systematic assessment of uncertainties associated with products by the service providers, and the need for broad partnerships between climate service players and decision makers (particularly policy makers) can be used to create optimal conditions for the expansion of climate services. From an operational perspective, if climate services are to be effective in meeting user expectations, partnerships must be forged between providers and users to promote communication that will allow for a measurable, causal impact on reducing the risks of adverse weather events. To that end, the mode of communication must integrate risk analysis and management in two-way communication with partners and users.

The winds of change are blowing for climate services, and the professional community in this field needs to be open and innovative in order to support:

● *sustainable economic growth and social development by assisting various sectors in adapting to climate risks through sound choices based on reliable information; and*

● *synergy among the various players (governments at all levels; regional and local stakeholders; and the public, parapublic and private sectors) in climate services in order to develop climate products and services that respond effectively to needs, thereby filling the gap observed between the true nature of these products and services and people's expectations.*

David Grimes
President WMO

The Colloquium also highlighted the need to break down the barriers between the fields of climatology and meteorology to provide a continuum of past, present and future climate events at daily, monthly and annual scales, in order to create a genuine weather alert and early warning system.

Canadian Climate Forum

2012 Annual Report to CMOS

The Canadian Climate Forum is the successor to the Canadian Foundation for Climate and Atmospheric Sciences (CFCAS), which was established in 2000 to support the enhancement of weather and climate research in Canada. During its existence, CFCAS invested almost $120 million of public funds in university-led research: partner support increased that amount to $274 million. The funds helped support the activities of more than 462 scientists and 2,200 students or other research personnel. Over 140 federal scientists were involved as partners.

2012 was a year of transition. CFCAS's federal mandate ended in March 2012 and this has reduced its activities in support of policy-relevant research. There was also a major reduction in staff and a move to smaller offices. The Forum is now focused on knowledge translation, analysis and outreach. In particular, it will accelerate the uptake and use of policy-relevant knowledge on Canada's weather and climate, through syntheses of results and provision of the scientific basis for development of policy options. It will also help organize and support special workshops and symposia, studies, issues papers and outreach activities related to the climate system and atmospheric sciences, and on impacts of, and adaptation to changing climate conditions.

During 2012....
The Forum completed its mandatory registration under the federal Not for Profit Corporations Act, and through that process has changed its name and expanded its mission statement to reflect the new focus.

Its partnership with the Toronto and Region Conservation Authority culminated in November in the publication of a report on water security and adaptation: *Mainstreaming Climate Change Adaptation in Canadian Water Resources Management.* The report explores how policies, projects and community actions have supported adaptation in water resource management across the country. The report is accompanied by a *National Compendium of Water Adaptation Knowledge.*

In 2012-13 the Forum received donations and transferred over $3,000 to Dalhousie University for activities at the Polar Environment Atmospheric Research Laboratory (PEARL). PEARL's research leader holds a Canada Research Chair at Dalhousie.

Government relations
CFCAS submitted a Brief on the importance of sustained weather and climate research, to the Federal Government's pre-budget consultations. The President of the Board presented it in person to the House of Commons Finance Committee, on November 19, 2012.

Communications
CFCAS participated at the CMOS Congress in Montréal, in May/June 2012. The Chair organized an information session at the Congress on Future Earth, a major ten-year research initiative of ICSU and partners, which will deliver knowledge to enable societies to meet their sustainable development goals in coming decades. The Forum is currently collaborating with NSERC, NSF, the U.S. Global Change Research Program and the National Academy of Sciences, to coordinate North American involvement in Future Earth.

The Forum published a final CFCAS newsletter and annual report, both of which are available on the Web. The 2011-2012 Annual Report outlined recent activities of the Foundation and its planned transition.

The new Forum was featured in a January 2013 edition of *Re$earch Money*. An article on it also appeared in the February 2013 edition of *International Innovation*: Disseminating science research and technology. (Publisher: Research Media Ltd., Bristol, United Kingdom)

CFCAS maintained a Twitter account, which presents an aggregate of weather and climate science research news. (Follow CFCAS on Twitter at @CFCAS_FCSCA). The Twitter newsfeed is featured on the Foundation's website.

International activity
The Board of the Canadian Climate Forum continues to serve as the Canadian National Committee (CNC) for the World Climate Research Programme. In January 2013, CCF reported to the National Research Council Canada (NRC) on Canadian activities in WCRP and their influence on the international programme. The report allowed an NRC decision on Canada's 2013 payment to WCRP.

In October 2012 the Executive Director contributed to discussions in Sweden at a meeting of the International Group of Funding Agencies for Global Change Research.

Granting activities
Granting activities are on hold; however, the Forum continues to receive final reports on several outreach and research initiatives funded in 2011-12.

Administration
New CMOS president Peter Bartello joined the Board of Directors as an ex-officio member, in July 2012. Marlon Lewis (Dalhousie) withdrew from the Board.

The Future
The Forum's transition is ongoing. The Forum remains uniquely placed to help fill growing gaps in weather and climate information that is critical to Canada. Its comprehensive and pragmatic approach applies research to social needs, in order to develop options that will inform decision-making at all levels. The Forum will also reinforce Canada's intellectual capacity by stimulating collaborative work in strategic areas. CCF continues to seek stable long-term support for research on weather and climate, on related innovation, for training — and to enable it to carry out these activities. It will partner with appropriate agencies to implement activities and will increase fundraising, to support the achievement of common, important goals. The Forum's ultimate goal is a stronger, healthier and more resilient society.

Dawn Conway
Executive Director

Forum canadien du climat

Rapport annuel 2012 présenté à la SCMO

Le Forum canadien du climat a pris la succession de la Fondation canadienne pour les sciences du climat et de l'atmosphère (FCSCA) qui avait été créée en 2000 pour appuyer l'accroissement de la recherche dans les domaines de la météorologie et de la climatologie au Canada. Au cours de son existence, la FCSCA a investi près de 120 millions de dollars de fonds publics dans la recherche universitaire; si l'on ajoute les contributions des partenaires, le financement associé à la Fondation atteint 274 millions de dollars. Ces fonds ont contribué à soutenir les activités de plus de 462 scientifiques et 2 200 étudiants et autres membres du personnel de recherche. Plus de 140 scientifiques du gouvernement fédéral ont collaboré aux travaux à titre de partenaires.

L'année 2012 a été une année de transition. Le mandat donné à la FCSCA par le gouvernement fédéral a pris fin en mars 2012. Il s'en est suivi une diminution du soutien à la recherche servant à éclairer les politiques. La Fondation a réduit considérablement son personnel et elle a déménagé dans de plus petits locaux. Le Forum canadien du climat (son nouveau nom) concentrera désormais ses activités sur le transfert des connaissances, l'analyse et la sensibilisation. En particulier, il s'appliquera à accélérer la mise à profit des connaissances relatives à la météo et au climat du Canada qui sont d'intérêt pour les politiques en offrant des synthèses des résultats de la recherche et en

fournissant une base scientifique pour l'élaboration d'options stratégiques. Le Forum aidera également à organiser et à soutenir des symposiums et ateliers spéciaux, des études, des synthèses thématiques et des activités de sensibilisation portant sur le système climatique et les sciences de l'atmosphère ainsi que sur les impacts du changement climatique et l'adaptation aux conditions climatiques changeantes.

2012 en détails
Au cours de 2012, le Forum a procédé à sa prorogation obligatoire sous le régime de la *Loi canadienne sur les organisations à but non lucratif* et, dans le cadre du processus, a changé son nom et a élargi son énoncé de mission pour refléter sa nouvelle orientation.

Un partenariat avec l'Office de protection de la nature de Toronto et de la région a abouti à la publication, en novembre, d'un rapport sur la sécurité de l'eau et l'adaptation, intitulé *Mainstreaming Climate Change Adaptation in Canadian Water Resources Management*, accompagné d'un sommaire en français intitulé *Intégration de l'adaptation aux changements climatiques dans la gestion des ressources en eau au Canada*. Le rapport examine la contribution des politiques, des projets et de l'action communautaire à l'adaptation de la gestion des ressources hydriques au pays. Un répertoire national des connaissances sur l'adaptation relative à l'eau, appelé *National Compendium of Water Adaptation Knowledge*, accompagne également le rapport.

En 2012-13, le Forum canadien du climat a reçu des dons et transféré plus de 3 000 $ à l'Université Dalhousie pour des activités au Laboratoire de recherche atmosphérique dans l'environnement polaire (PEARL). Le directeur de la recherche du Laboratoire est titulaire d'une chaire de recherche du Canada à cette université.

Relations avec les gouvernements
La FCSCA a déposé un mémoire sur l'importance d'un effort de recherche soutenu en météorologie et en climatologie, lors des consultations prébudgétaires du gouvernement fédéral. Le président du conseil d'administration l'a présenté en personne au Comité des finances de la Chambre des communes le 19 novembre 2012.

Communications
La FCSCA a participé au congrès de la Société canadienne de météorologie et d'océanographie (SCMO) tenu à Montréal en mai-juin 2012. Le président a organisé une séance d'information dans le cadre du congrès sur Terre d'avenir (*Future Earth*), une importante initiative de recherche du Conseil international pour la science (CIUS) et de ses partenaires. D'une durée de dix ans, cette initiative vise à fournir des connaissances qui permettront aux sociétés d'atteindre leurs objectifs de développement durable au cours des prochaines décennies. Le Forum collabore actuellement avec le Conseil de recherches en sciences naturelles et en génie du Canada (CRSNG), la National Science Foundation (NSF), l'US Global Change Research Program et la National Academy of Sciences afin de coordonner la participation nord-américaine à cette initiative.

Le Forum a publié le dernier bulletin et le dernier rapport annuel de la FCSCA, qui sont tous deux disponibles sur le Web. Le rapport annuel 2011-2012 décrit les activités récentes de la Fondation et la transition prévue.

Le nouveau forum a fait l'objet d'un article dans l'édition de janvier 2013 de *Re$earch Money*. Un article à son sujet a également été publié dans l'édition de février 2013 de la revue *International Innovation: Disseminating science, research and technology* (éditeur : Research Media Ltd., Bristol, Royaume-Uni).

La FCSCA a utilisé son compte Twitter (@CFCAS_FCSCA) pour communiquer diverses nouvelles sur la recherche dans les domaines de la météorologie et de la climatologie. Son fil de nouvelles Twitter peut également être consulté à partir du site Web de la Fondation.

Activités internationales
Le conseil du Forum canadien du climat continue d'agir à titre de comité national canadien pour le Programme mondial de recherche sur le climat (PMRC). En janvier 2013, le Forum a présenté au Conseil national de recherches du Canada (CNRC) son rapport sur les activités canadiennes rattachées au PMRC et leur influence sur ce programme international. Le rapport a permis au CNRC de prendre sa décision sur la contribution financière canadienne au Programme en 2013.

En octobre 2012, la directrice exécutive a participé aux discussions tenues lors de la réunion, en Suède, de l'International Group of Funding Agencies for Global Change Research (IGFA), un groupe international d'organismes de financement pour la recherche sur le changement planétaire.

Octroi de subventions
Les activités à ce chapitre sont suspendues; toutefois, le Forum continue de recevoir les rapports finaux de plusieurs initiatives de sensibilisation et de recherche financées en 2011-2012.

Administration
Le nouveau président de la SCMO, Peter Bartello, s'est joint au conseil d'administration à titre de membre d'office en juillet 2012. Marlon Lewis (Dalhousie) s'est retiré du conseil d'administration.

L'avenir
La transition se poursuit. Le Forum est exceptionnellement bien placé pour aider à combler les lacunes grandissantes

de l'information météorologique et climatologique d'importance cruciale pour le Canada. De par l'approche globale et pragmatique du Forum, la recherche est mise au service des besoins de la société et sert à l'élaboration d'options pour la prise de décision à tous les niveaux. Le Forum renforcera la capacité intellectuelle du Canada en stimulant la collaboration dans des domaines stratégiques. Il poursuit ses efforts afin d'obtenir un appui stable à long terme pour la recherche en météorologie et en climatologie, l'innovation connexe et la formation, ainsi que pour lui permettre de mener ces activités. Il établira des partenariats avec des organismes appropriés pour la réalisation d'activités et il augmentera sa quête de financement pour soutenir l'atteinte d'importants objectifs communs. Le but ultime du Forum est la construction d'une société plus forte, plus saine et plus résiliente.

Dawn Conway
Directrice générale

UPDATE: New Special Interest Group on the Arctic (Arctic SIG)

Under the leadership of **David Fissel**, ASL Environmental Sciences Inc and **Martin Taillefer**, Maritime Way Scientific Inc, a new Special Interest Group (SIG) was proposed and approved by CMOS Council last September 2012. **Ann McMillan**, Storm Consulting Services will be the Arctic SIG Manager, along with the recent participation of **Tess Lepore-Maheux**, as the Administrative Manager for the SIG operations. Since the approval of the Arctic-SIG, the membership has grown to over 65 members who have submitted their interests in participating in this special group.

First SIG Business Meeting – Sunday 26 May 2013
On Sunday 26 May 2013, The Arctic SIG will convene its first business meeting at the CMOS Congress in Saskatoon. The goal of this meeting will be to agree to the SIG's terms of reference, to vote on its governance and to define the scope, mandate and vision of the SIG.

1. Terms of Reference
In accordance with CMOS Bylaw #5 dealing with Special Interest Groups and recognizing that Canada's North is emerging as an important area for applications of meteorological, oceanographic and related knowledge and data, a special interest group on the Arctic (Arctic SIG) will serve as a focus for CMOS interests in the North.

2. Objectives of the group include

i) Handling of CMOS interests related to the Arctic in a consistent and transparent manner;

ii) Acting as an advisory group to the National Executive Council and membership in discussions between CMOS and others on matters related to Canada's Arctic and Northern Regions;

iii) Developing awareness of the importance of meteorology, oceanography and related science to Northern development and Arctic environmental changes and issues;

iv) The engagement and communication with Northern groups and communities about Arctic meteorological, oceanographic and environmental issues, data and scientific studies;

v) Create a neutral forum by which parties from public, private, academic and local communities both Canadian and foreign entities can work in support of Arctic meteorological, oceanographic, environmental issues, data and scientific studies;

vi) Provide a networking environment in order to bring together all interested groups both public and private in order to further the study of Arctic meteorological, oceanographic and environmental issues, data and scientific studies addressing issues such as climate change;

vii) Facilitate the publishing of specialized material in *Atmosphere-Ocean* and elsewhere tied to Arctic and Northern focused research and publications.

This topic will be discussed in Saskatoon; about 10 years ago CMOS published one on the North Water polynya study that was convened by Dave Barber: http://www.tandfonline.com/toc/tato20/39/3. A special issue needs a convener, to define the topic, invite contributors, set a deadline, recommend guest editors, organise the issue once the papers have been accepted, write a preface, and, in some cases, provide or facilitate a source of funding for page charges. CMOS now has three editors-in-chief for A-O: atmosphere and hydrology; ocean; climate. Depending on the focus of the special issue, one of them will be appointed to oversee the review process and assist the guest editors.

3. Mode of Operation
The group will normally work and meet by e-mail but will explore the use of technologies to facilitate national scope meetings and discussions. It may appoint ad hoc working and study groups as required. The need for a face-to-face workshop will be assessed.

i) Monthly or quarterly working meeting;
ii) Reporting of activities on a quarterly basis to the CMOS National Executive;

iii) Sponsoring of a special track at the annual CMOS conference related to Arctic meteorological, oceanographic, environmental issues, data and scientific studies. (Note: there are 22 papers in the four Polar Applications at the 2013 Congress that is convened by

David Fissel with assistance from others on the Arctic SIG group).

4. Core Activities

i) To represent the interests of CMOS, to develop positions related to Arctic issues and present these to other groups or bodies;

ii) To act as an advisory group on discussion with the CMOS membership and on matters related to Canadian Arctic meteorology, oceanography and related matters;

iii) To engage Northerners in discussion related to meteorology, oceanography and related matters in the Arctic;

iv) Reporting, Budget and fees: A business plan outlining a targeted set of activities will be created that includes any potential fees and expenditures. This will be reported to the CMOS executive as per other committees reporting on an annual basis at the annual general meeting.

5. Arctic SIG Mandate & TOR review
On an annual basis, the SIG Executives will convene a meeting to review and assess the SIG's mandate and terms of reference to ensure that they meet the intent and mandate of the group and CMOS.

6. Why is an Arctic SIG needed?
Canada's North is truly the last frontier, it is distant, relatively undeveloped, sparsely populated and rich in resources and culture. The North is deeply dependent on Meteorological and Oceanographic Services for success today and tomorrow. Northerners are increasingly taking an active role in their own government, their own monitoring and science and their own education. Existing collaborative mechanisms are scarce and sometimes ineffective. A lot of northern science has been done through, for example, International Polar Year (IPY) involving southern scientists as well as northerners.

In spite of the importance of the North, key activities such as IPY have wound down leaving a gap in coordination mechanisms for northern science and interaction with local communities.

7. Why Now?
Arctic SIG should be initiated now to take advantage of other related events:

i) Special issue of Atmosphere-Ocean already planned on the Arctic;

ii) Scientific interest raised by International Polar Year etc. has produced results that still require implementation. Some of this could be accommodated through a special session at the next CMOS Congress.

8. How it will work?
Although national in scope, the first executive is likely to be Ottawa-based. Meetings will need to utilize new web-based technologies in order to gather constituents. The "agenda" will be formed by the members and it is anticipated that activities could include meteorological, climatological, air quality or oceanographic issues and research support.

9. Examples where CMOS professionals could have a voice in the Arctic through SIG
As Arctic sea ice melts and resources are discovered, ships are navigating the Arctic with rapidly increasing frequency. However, less than 10% of Arctic waters are charted to modern standards. In addition, the melting sea ice leads to safety issues for those leading a traditional Northern life and hunting on the ice. Canada has one of the most automated weather forecasting systems in the world; however, the observations and science necessary to expand this system to the far North are not yet in place.

In the south, increased frequency of storm surges is causing damage to small craft harbours and other coastal infrastructure. In the North such infrastructure will need to be designed and built to withstand such change.

Northern air is thought of as pristine, but pollutants from the far distant sources in Northern Europe and Asia are increasingly finding their way into the Northern air and from there into biota used for food. Along the southern border between Canada and the US, the International Joint Commission oversees fresh water systems shared by the two countries. In the North the huge Yukon river system, which originates in Northern British Columbia, crosses the border from the Yukon Territory to Alaska and does not have such oversight.

While Canada has been a leading participant in IPY, since that time Northern science, especially done by the federal government, has been severely cut back and world leading facilities such as PEARL are closing.

MISE À JOUR : nouveau groupe d'intérêt spécial pour l'Arctique (Arctic SIG)

En septembre 2012, sous la direction de **David Fissel**, d'ASL Environmental Sciences Inc, et de **Martin Taillefer**, de Maritime Way Scientific Inc, le Conseil de la SCMO a approuvé un nouveau groupe d'intérêt spécial. **Ann McMillan**, de Storm Consulting Services, en sera la directrice, avec la participation de **Tess Lepore-Maheux**, comme directrice administrative, responsable du fonctionnement du groupe. Depuis l'approbation du groupe d'intérêt pour l'Arctique, le nombre de membres qui désirent y participer est passé à plus de 65.

Première réunion de travail du groupe – dimanche 26 mai 2013
Le dimanche 26 mai 2013, le groupe d'intérêt spécial pour l'Arctique se réunira pour la première fois au Congrès de la SCMO de Saskatoon. La réunion visera à convenir d'un mandat pour le groupe, à voter pour sa gouvernance et à définir la portée de sa mission et de sa vision.

1. Mandat
Conformément au règlement 5 sur les groupes d'intérêt spécial et reconnaissant que le Nord canadien est en voie de nécessiter l'utilisation accrue de connaissances et de données météorologiques et océanographiques, un groupe d'intérêt spécial pour l'Arctique servira d'assise à l'intérêt de la SCMO pour le Nord.

2. Les objectifs du groupe comprennent :

i) Traiter l'intérêt de la SCMO pour l'Arctique de manière cohérente et transparente;

ii) Servir de groupe consultatif pour l'exécutif national et les membres, dans le cadre de discussions entre la SCMO et d'autres organismes, sur des sujets liés au Nord canadien et aux régions nordiques;

iii) Renforcer la reconnaissance de l'importance que revêtent la météorologie, l'océanographie et les sciences connexes à l'aménagement du Nord, ainsi qu'aux changements et enjeux environnementaux touchant l'Arctique;

iv) Collaborer et communiquer avec les groupes et les communautés nordiques en ce qui concerne les données, les études scientifiques et les enjeux météorologiques, océanographiques et environnementaux dans l'Arctique;

v) Créer un forum neutre au sein duquel les intervenants des secteurs public, privé et universitaire, ainsi que les communautés locales, canadiennes ou étrangères, peuvent travailler à améliorer les données, les études scientifiques et les enjeux météorologiques, océanographiques et environnementaux touchant l'Arctique;

vi) Former un réseau rassemblant toutes les parties intéressées, publiques et privées, de façon à faire progresser les données, les études scientifiques et les enjeux météorologiques, océanographiques et environnementaux touchant l'Arctique, en ce qui concerne notamment les changements climatiques;

vii) Faciliter la publication, dans *Atmosphere-Ocean* et ailleurs, de textes spécialisés traitant d'études sur l'Arctique et le Nord (ce sujet sera débattu à Saskatoon.

Il y a environ 10 ans, la SCMO a publié un numéro traitant d'une étude sur la polynie North Water, sous la direction de Dave Barber : http://www.tandfonline.com/toc/tato20/39/3. Un numéro spécial exige un responsable qui déterminera le sujet; invitera les contributeurs; fixera une échéance; recommandera des rédacteurs invités; organisera la revue, une fois les articles acceptés; rédigera la préface et, parfois, trouvera une source de financement pour les frais de publication. La SCMO a maintenant trois rédacteurs en chef pour *A-O* : atmosphère et hydrologie; océan; climat. Selon le thème du numéro spécial, l'un des rédacteurs sera désigné pour diriger le processus de révision et aider les rédacteurs invités).

3. Fonctionnement
Le groupe travaillera normalement par l'entremise de courriels, mais explorera l'utilisation d'autres technologies, afin de faciliter les discussions et les réunions à l'échelle nationale. Il pourra créer des groupes de travail ou d'étude spéciaux, s'il y a lieu. Les besoins de rencontres face à face seront évalués.

i) Des réunions de travail auront lieu mensuellement ou trimestriellement;

ii) Le groupe rédigera trimestriellement des rapports d'activités pour la gouverne de l'exécutif national;

iii) Du financement sera réservé pour un volet spécial sur les données, les études scientifiques et les enjeux météorologiques, océanographiques et environnementaux touchant l'Arctique, au Congrès annuel de la SCMO (remarque : David Fissel, avec l'aide d'autres membres du groupe d'intérêt spécial pour l'Arctique, a rassemblé 22 présentations réparties sur quatre thèmes liés aux applications polaires, au Congrès de 2013).

4. Activités principales

i) Représenter les intérêts de la SCMO, rédiger des prises de position liées aux enjeux arctiques et présenter celles-ci à d'autres groupes ou organismes;
ii) Servir de groupe consultatif dans le cadre de discussions avec les membres de la SCMO et sur des sujets relatifs à la météorologie et à l'océanographie de l'Arctique canadien, et autres sujets connexes;

iii) Mobiliser les habitants du Nord pour débattre de questions liées à la météorologie et à l'océanographie de l'Arctique, et autres sujets connexes;

iv) Rapports, budget et dépenses : le plan d'affaires énumèrera une série d'activités ciblées et inclura toutes les dépenses prévues. Ces activités feront l'objet d'un rapport annuel, présenté à l'exécutif de la SCMO, dans le cadre de l'assemblée générale annuelle, comme pour les autres comités.

5. Examen du mandat du groupe d'intérêt pour l'Arctique
Chaque année, les dirigeants du groupe d'intérêt spécial se réuniront pour examiner et évaluer leur mandat, afin de garantir que leurs activités se conforment à ce mandat et à celui de la SCMO.

6. Raison d'être du groupe d'intérêt spécial pour l'Arctique
Le nord du Canada est véritablement la dernière frontière. Il est éloigné, relativement peu aménagé, peu habité et riche en ressources et en culture. Le Nord est fortement tributaire des services météorologiques et océanographiques pour toute réalisation, actuelle et future. Les habitants du Nord participent de plus en plus activement à leur gouvernement, à leur éducation, et à la surveillance et à la science de leur région. Les mécanismes de collaboration sont peu présents et parfois inefficaces. Une bonne part du développement des sciences nordiques s'est effectuée, par exemple, dans le cadre de l'Année polaire internationale, par des scientifiques des régions sud et des habitants du Nord.

Malgré l'importance du Nord, les activités majeures comme l'Année polaire internationale se sont terminées et ont laissé des lacunes dans les mécanismes de coordination des sciences nordiques et des interactions avec les communautés locales.

7. Conjoncture favorable
Le groupe d'intérêt spécial devrait être instauré maintenant pour profiter d'évènements connexes :

i) La planification d'un numéro spécial d'*Atmosphere-Ocean* sur l'Arctique suit déjà son cours;

ii) L'intérêt scientifique qu'a suscité l'Année polaire internationale, etc. a produit des résultats qui doivent encore être mis en œuvre. Certains de ces sujets pourraient être abordés dans le cadre d'une séance spéciale au prochain Congrès de la SCMO.

8. Modalités
Bien que de portée nationale, le groupe verra vraisemblablement son exécutif s'établir à Ottawa. Les réunions devront passer par les nouvelles technologies Web pour rassembler les membres. Les membres proposeront des questions à débattre et les activités pourraient aborder des enjeux météorologiques, climatologiques et océanographiques, ainsi que la qualité de l'air et le soutien à la recherche.

9. Situations pour lesquelles les professionnels de la SCMO pourraient s'exprimer sur l'Arctique au sein du groupe d'intérêt spécial.
Tandis que la glace de l'Arctique fond et qu'on y découvre des ressources, des navires sillonnent cette région de plus en plus fréquemment. Toutefois, moins de 10 % des eaux arctiques sont cartographiées selon les normes modernes. De plus, la fonte des glaces soulève des questions de sûreté pour les habitants du Nord vivant de façon traditionnelle et chassant sur la glace. Le Canada possède l'un des systèmes de prévisions météorologiques les plus automatisés au monde; toutefois, les observations et la science nécessaires pour étendre ce système vers l'extrême nord ne sont pas encore en place.

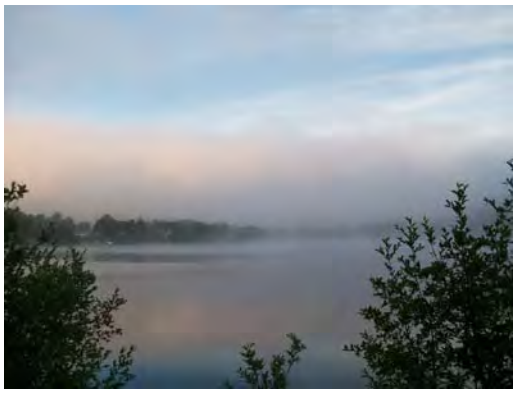
Au sud, l'augmentation de la fréquence des ondes de tempête endommage les ports pour petits bateaux et autres structures côtières. Au nord, ces infrastructures devront être conçues et construites pour résister à de tels changements.

L'air du Nord est considéré comme étant pur, mais les polluants provenant de sources éloignées situées en Europe du Nord et en Asie s'insinuent graduellement dans l'air nordique, puis de là dans le biote servant de nourriture. Le long de la frontière sud séparant le Canada et les États-Unis, la Commission mixte internationale gère le réseau hydrographique d'eau douce que se partagent les deux pays. Au nord, le vaste réseau du fleuve Yukon, qui prend sa source dans le nord de la Colombie-Britannique, traverse la frontière du Yukon vers l'Alaska et ne bénéficie pas d'une telle gestion.

Bien que le Canada ait été un chef de file dans le cadre de l'Année polaire internationale, depuis lors, la recherche nordique, notamment celle entreprise par le gouvernement fédéral, a connu des coupes draconiennes et des installations de premier plan comme le Laboratoire de recherche atmosphérique dans l'environnement polaire (PEARL) sont sur le point de fermer.

I tried to catch some fog, but I mist!

Richard Asselin, April 2012



"*Morning mist in Val-des-Bois, QC*"; extract from 2011 CMOS Photo Contest; photo credit: Paul-André Bolduc.

CMOS BUSINESS / AFFAIRES DE LA SCMO

Prochain congrès annuel de la SCMO

Rimouski, Québec

Le 48e congrès annuel de la Société canadienne de météorologie et d'océanographie (SCMO) se tiendra du 1ier au 5 Juin 2014 à l'Hôtel Rimouski sur le thème : ***Nord vulnérable : implications des changements dans les environnements froids***, afin de donner suite au succès du 36ième congrès SCMO tenu à Rimouski en 2002 sur l'*Environnement nordique*.

Le comité scientifique, composé d'océanographes et de météorologues canadiens, s'affaire à mettre en place un programme scientifique des plus attrayants pour les **scientifiques, professionnels et étudiants** qui partageront les résultats de leurs plus récentes découvertes en lien avec le Nord. Au programme : changements et variabilités climatiques, prévisions météorologiques dans le nord, modélisation climatique, systèmes d'observations in situ et satellitaire, pollution environnementale en milieu froid, interactions océan-glace-atmosphère-continent, impacts sur les communautés nordiques et sur les écosystèmes, et bien plus. Les scientifiques, en particulier les étudiants, seront fortement encourager à participer à un atelier de travail, organisé le dimanche 1ier Juin par les membres d'ARCTIConnexion (www.arcticonnexion.ca), afin de mieux comprendre la réalité des communautés nordiques les plus affectées par le réchauffement et le changement climatique.

Afin de permettre aux **citoyennes et citoyens du grand Rimouski** de bénéficier des retombées de ce congrès, une soirée de vulgarisation scientifique avec un débat sur les questions de l'heure quant aux défis que posent les changements climatiques pour la société canadienne dans son ensemble sera organisée le mardi 3 Juin à la salle Ernest-Simard de l'Université du Québec à Rimouski en lien avec le thème du congrès. Les noms des conférenciers qui animeront la soirée seront dévoilés sous peu. Une journée sera également organisée à l'intention des **enseignants** du primaire, du secondaire et du CÉGEP le 6 juin à l'Hôtel Rimouski.

Située sur la rive sud de l'estuaire du Saint-Laurent, Rimouski est une destination à caractère maritime où la nature occupe une place privilégiée. On y trouve dans un rayon de 30 kilomètres, le Parc national du Bic, le Canyon des Portes de l'Enfer, les jardins de Métis, le site historique maritime de la Pointe-au-Père où l'on peut visiter le sous-marin Onondaga ainsi que le musée *Empress of Ireland*. C'est avec grand plaisir que le Comité organisateur local et le Comité du programme scientifique vous accueilleront à Rimouski, ville du bonheur

(http://www.indicedebonheur.com/) !

Le comité organisateur local

Next CMOS Annual Congress

Rimouski, Quebec

The 48th Congress of the Canadian Meteorological and Oceanographic Society (CMOS) will take place at the Hotel Rimouski, 1-5 June, 2014. The theme of the congress, ***Northern Exposure: Implications of changes in cold environments***, follows from the successful 36th CMOS Congress, ***The Northern Environment,*** which was held in Rimouski in 2002.

The scientific program committee composed of Canadian oceanographers and atmospheric scientists is putting together an exciting schedule which will permit **scientists, professionals and students** to share the results of their recent work in the north. Among the subjects to be discussed: climate change and variation, meteorological prediction in the north, climate modelling, *in situ* and remote observing systems, pollution in cold environments, ocean-ice-atmosphere-continent interactions, impacts on northern communities and ecosystems, and much more.

To allow the citizens of Rimouski to benefit directly from the congress, a **popular science evening**, including a debate on current issues and the challenges posed to Canadian society by climate change will be organised on Tuesday, 3 June, at the Ernest Simard Auditorium of the University of Quebec at Rimouski, with presentations in keeping with the theme of the congress. The invited speakers will be announced shortly. A **Teacher's Day** will also be organised on Friday, 6 June at the Hotel Rimouski for teachers from primary, secondary and CEGEP level.

Located on the south shore of the St. Lawrence Estuary, Rimouski is a coastal destination where nature has a special place. Within a 30 km radius, one can find the beautiful *Bic Provincial Park*, the *Portes de l'Enfer (Hell's Gate)* canyon, the *Reford Gardens*, and the *Pointe-au-Père maritime historic site*, featuring the submarine *Onondaga* and the *Empress of Ireland* museum. The Local Organising Committee and the Scientific Program Committee welcome you to Rimouski, the happiest city in Quebec (http://www.indicedebonheur.com/) !

The Local Arrangements Committee

Citations of articles published in *Atmosphere-Ocean*

Last fall (CMOS Bulletin SCMO, Vol 40-6), we indicated that the *Atmosphere-Ocean* web site (informaworld.com/tato) now indicates the number of citations received by each article. We are pleased to report that some of the numbers are surprisingly high. However, explanations are required.

Citation data is collected in databases maintained by certain services like Google Scholar, Scopus, ISI and some hosting providers. Each organisation has its own criteria for accepting citation data, resulting in different counts. Therefore, it is necessary to indicate the source when referring to citation counts. The citation data provided by Taylor & Francis on the A-O journal site is based on citations recorded in the DOI (Digital Object Identifier) database maintained by CrossRef. The list of all citing articles is provided. The CrossRef citations database is built upon the submission of the reference list for each article submitted to CrossRef by participating publishers. Thus, the database contains exactly and only the references from the published articles, without other criteria. Submission of reference lists is voluntary and not all publishers affiliated with CrossRef have started to include this information with their metadata submission. Also, not all sources cited in reference lists have a DOI, and the metadata for many old citing articles has not been deposited with CrossRef. Therefore, citation information provided by T&F (CrossRef) is an underestimate. The discrepancies are clearly seen in the following table (shown on next page), which is based on the ten most cited articles listed on the A-O site. On the other hand, citations from any kind of journal are included. For more details on the CrossRef citations, see http://www.crossref.org/citedby/.

As implemented in the A-O site, articles that have not been cited in the last three years are not shown, even if they might have received a very large number of citations in the past. This is to avoid stagnation at the top of the list to the detriment of more recent articles. Nevertheless, if an old article has received recent citations (still has current relevance), it will be shown. Citations based on CrossRef provide a complement to the traditional citation sources, but cannot be considered as fully informative at this moment. One advantage is that the citation list is updated weekly.

Taylor & Francis are continuing to work with Web of Science and Scopus to be able to show the citations according to those reputed sources also by 2014.

Article usage statistics combine cumulative total PDF downloads and full-text HTML views from publication date (but no earlier than 25 Jun 2011, launch date of this website) to 21 Apr 2013. Article views are only counted from this site. Although these data are updated every 24 hours, there may be a 48-hour delay before the most recent numbers are available.

Richard Asselin
Director of CMOS Publications

Citations d'articles publiés dans *Atmosphere-Ocean*

L'automne dernier (*CMOS Bulletin SCMO*, vol. 40-6), nous mentionnions que le site Web d'*Atmosphere-Ocean* (informaworld.com/tato) indiquait maintenant le nombre de citations tirées de chaque article. Nous sommes heureux de rapporter que certains de ces nombres s'avèrent étonnamment élevés. Toutefois, des explications s'imposent.

Les données de citations sont colligées dans des bases de données que possèdent certains services tels Google Scholar, Scopus, ISI et certains fournisseurs d'hébergement. Chaque organisation possède ses propres critères d'acceptation de données de citation. Ces différences entraînent des écarts dans les statistiques. En conséquence, il est nécessaire d'indiquer la source associée à chaque décompte. Les données de citation que fournit Taylor & Francis sur le site de la revue *A-O* se fondent sur les citations relevées dans la base de données DOI (identificateur d'objet numérique) que tient CrossRef. La liste de tous les articles qui contiennent des citations est fournie. La base de données de citations de CrossRef s'accroît grâce à la soumission d'une liste de références provenant de chaque article que soumettent à CrossRef les éditeurs participants. Ainsi, la base de données ne contient que les références provenant d'articles publiés, sans tenir compte d'autres critères. La soumission de listes de références demeure volontaire. Tous les éditeurs affiliés à CrossRef n'ont pas nécessairement commencé à inclure

TITLE / TITRE	AUTHORS / AUTEURS	A-O	T&F	CITATIONS		
			Views since June 2011	CrossRef	Web of Science	Google Scholar
Sensitivity of climate simulations to the parameterization of cumulus convection in the Canadian climate centre general circulation model	*G.I. Zhang & Norman A. McFarlane*	33-3 1995	145	77	546	723
Temperature and precipitation trends in Canada during the 20th century	*Xuebin Zhang, Lucie A. Vincent, W.D. Hogg & Ain Niitsoo*	38-3 2000	683	73	211	520
The UVic earth system climate model: Model description, climatology, and applications to past, present and future climates	*Andrew J. Weaver, Michael Eby, Edward C. Wiebe, Cecilia M. Bitz, Phil B. Duffy, Tracy L. Ewen, Augustus F. Fanning, Marika M. Holland, Amy MacFadyen, H. Damon Matthews, Katrin J. Meissner, Oleg Saenko, Andreas Schmittner, Huaxiao Wang & Masakazu Yoshimori*	39-4 2001	196	41	224	322
Changes in Daily and Extreme Temperature and Precipitation Indices for Canada over the Twentieth Century	*Lucie A. Vincent & Éva Mekis*	44-2 2006	457	34	62	116
Rehabilitation and analysis of Canadian daily precipitation time series	*Eva Mekis & William D. Hogg*	37-1 1999	97	33	191	289
Gridded North American monthly snow depth and snow water equivalent for GCM evaluation	*Ross D. Brown, Bruce Brasnett & David Robinson*	41-1 2003	221	26	98	142
Documentation of a highly ENSO-related SST region in the equatorial pacific: Research note	*Anthony G. Bamston, Muthuvel Chelliah, Stanley B. Goldenberg*	35-3 1997	44	22	77	110
The 15-km version of the Canadian regional forecast system:	*Jocelyn Mailhot, Stephane Bélair, Louis Lefaivre, Bernard Bilodeau, Michel Desgagné, Claude Girard, Anna Glazer, Anne-Marie Leduc, André Méthot, Alain Patoine, André Plante, Alan Rahill, Tom Robinson, Donald Talbot, André Tremblay, Paul Vaillancourt, Ayrton Zadra & Abdessamad Qaddouri*	44-2 2006	46	22	42	59
Internal wave observations in the South China Sea: The role of rotation and non-linearity	*David Farmer, Qiang Li & Jae-Hun Park*	47-4 2009	96	21	33	47
A coupled atmosphere-ocean model for transient climate change studies:	*Gary L. Russell, James R. Miller & David Rind*	33-4 1995	122	18	176	274

Table 1: Comparison of citation statistics for the 10 most cited *A-O* articles according to Taylor & Francis (as of 23 April 2013)

Tableau 1: Statistiques comparatives de citations pour les 10 articles les plus cités d'*A-O*, selon Taylor & Francis (jusqu'au 23 avril 2013)

cette information dans leurs soumissions de métadonnées. De plus, toutes les sources citées dans les listes de références ne possèdent pas nécessairement un DOI et les métadonnées de plusieurs articles anciens qui les citent n'ont pas été incluses dans CrossRef. Les décomptes de citations que fournit T & F (CrossRef) sont donc sous-estimés. Le tableau ci-dessous met nettement en évidence ces écarts, en montrant les données des dix articles les plus cités, tirés du site d'*A-O*. En revanche, les décomptes comprennent les citations incluses dans toutes sortes de revues. Pour de plus amples détails sur les données de citation de CrossRef, consultez le site http://www.crossref.org/citedby/.

Tout comme sur le site d'*A-O*, les articles qui n'ont pas été cités au cours des trois dernières années ne sont pas affichés, même s'ils ont été cités un très grand nombre de fois auparavant. Ainsi, ces articles anciens majeurs ne demeurent pas en haut de la liste au détriment d'articles récents. Toutefois, si un article ancien a été cité récemment (c'est-à-dire qu'il demeure pertinent), il apparaîtra dans la liste. Les données de citation fournies par CrossRef offrent un complément aux sources traditionnelles de décompte, mais ne peuvent être considérées comme des données totalement révélatrices pour le moment. Avantage considérable, cependant, la liste est actualisée de façon hebdomadaire.

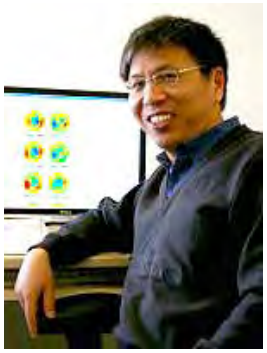
Taylor & Francis collabore toujours avec Web of Science et Scopus afin d'inclure, d'ici 2014, le nombre de citations provenant de ces sources réputées.

Les statistiques cumulatives d'utilisation d'articles combinent les téléchargements de documents PDF et les affichages de documents intégraux en HTML, et ce, à partir de la date de publication (mais après le 25 juin 2011, date de lancement de ce site Web) jusqu'au 21 avril 2013. Les affichages d'articles sont comptés uniquement pour ce site. Bien que ces données soient mises à jour toutes les 24 heures, il peut y avoir un délai de 48 heures avant la publication des données les plus récentes.

Richard Asselin
Directeur des publications de la SCMO

Change of Editor for Atmosphere-Ocean

After many years as Editor (meteorology and lately climate science) William Hsieh has decided to retire. He will be replaced by Dr. Hai Lin.



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

New Search Engine for CMOS Web Site

For many years a search engine from a small private company has been used to do a custom search of the CMOS web site. Our site now has too many pages for this engine to index; as a result, many documents especially pdfs are not searched.

So, beginning immediately, I have switched the main page search engine to Google's Custom Search. Web site sub areas such as Private sector, SCOR and the Historical Photos are still using the old search engine, but will be changed shortly.

Older web sites often list links to other related source of information. Our main tabs "Other Links / Autres Liens" tried to do that for the past 15 years. We have just removed those two pages because:

• the links were constantly changing, generating a large number of bad links
• Google is now so effective that any existing web site can easily be found

We hope these changes are helpful and do not cause any inconvenience.

Bob Jones, CMOS Webmaster

EXECUTIVE DIRECTOR, CMOS /SCMO

The Canadian Meteorological and Oceanographic Society (CMOS/SCMO) is seeking applicants for:

The Position of: Executive Director
Accountable to: The CMOS Council

For the following Responsibilities:
Provision of strategic advice and recommendations to the CMOS Council on the achievement of the goals of the Society, on its governance, its programs and its operations

Fostering good relationships with related scientific societies within Canada and with other national meteorological and oceanographic societies.

Representing CMOS as a member of umbrella organisations such as the Partnership Group for Science and Engineering (PAGSE) and the Canadian Consortium for Research (CCR).

Fostering public visibility of CMOS and its programs through the issuance of position statements, open letters to public officials, news releases, publicity brochures, appearing before committees of Parliament, participation in meetings with public officials, etc.

Supervising the CMOS national office and support staff for national programs including membership, committees, publications, the annual congresses, education and outreach, prizes awards and scholarships, certification, maintenance of records of the society's operations and all general business and financial affairs.

Acting as ex-officio member of Council-appointed Committees and the Local Organising Committees and Scientific Program Committees for Annual Congresses.

Preparing reports, proposals and contracts and acting promptly on decisions of the Executive or Council of the Society.

Acting as the signing authority on behalf of the Society for contracts, grants and agreements and be responsible for reporting on the same.

Ensuring the safe-keeping and proper use of the Corporate Seal.

Required Competencies:
Reliability, accountability, responsibility, integrity.

Dedication to the goals of CMOS and its success as an association.

Leadership qualities and communication skills.

General knowledge of science and scientific societies.

Ability to formulate objectives, strategies and action plans and to motivate others to achieve them.

Ability to self-motivate and work independently.

Fluency in English, oral and written.

Understanding of financial analysis, planning, budgeting and reporting.

Assets:
Conversational ability in French plus ability to do short translations, revisions, etc. of written material and original short reports.

Understanding of non-profit and charitable organisation governance and the rules and regulations under which they operate.

Familiarity with standard office software tools such as word processing, spreadsheet and presentation software.
Familiarity with databases and their uses, websites and their management

Remuneration:
This is a part-time position requiring about two days per week of work on average and a physical presence in the CMOS office in Ottawa at least once every two weeks. It is a one-year renewable contract position without benefits. The Executive Director is expected to function as an independent consultant, not as an employee. Compensation is to be negotiated.

Application procedure:
Interested individuals should send a letter indicating their interest and general qualifications and attach a CV outlining educational qualifications and relevant skills and experience to: president@cmos.ca.

If you have a colleague or know a person whom you think would make a good candidate for this position please make a nomination by sending a letter to president@cmos.ca explaining why your nominee is qualified.

Timing:
Applications and nominations will be accepted from 15 May until 15 June 2013 or until a suitable candidate is found. The incumbent would be expected to start no later than 1 September 2013.

DIRECTEUR GÉNÉRAL – SCMO / CMOS

La Société canadienne de météorologie et d'océanographie (SCMO/CMOS) est à la recherche de candidats.

Poste : Directeur général/directrice générale
Rend des comptes au : Conseil de la SCMO

Pour les responsabilités suivantes :
Fournir des conseils stratégiques et des recommandations au Conseil de la SCMO sur la façon d'atteindre les objectifs de la Société, sur sa gouvernance, ses programmes et son fonctionnement.

Entretenir de bonnes relations avec des sociétés scientifiques canadiennes semblables et d'autres organismes nationaux des secteurs de la météorologie et de l'océanographie.

Représenter la SCMO au sein d'organismes-cadres comme le Partenariat en faveur des sciences et de la technologie (PFST) et le Consortium canadien pour la recherche (CCR).

Renforcer la notoriété publique de la SCMO et de ses programmes grâce à la diffusion de déclarations de position, de lettres ouvertes aux hauts fonctionnaires, de communiqués de presse, de brochures publicitaires, de présentations auprès de comités parlementaires et de participations à des réunions avec des fonctionnaires, etc.

Administrer le bureau national de la SCMO, y compris la supervision des adhésions, des comités, des publications, des congrès annuels, de l'éducation et de la sensibilisation, des prix et des bourses, de la certification, de la gestion des documents, et des affaires générales et financières liés au fonctionnement de la Société.

Faire partie d'office de comités instaurés par le Conseil, ainsi que de comités locaux d'organisation et de comités du programme scientifique des congrès annuels.

Préparer des rapports, des propositions et des contrats et agir promptement à la suite de décisions prises par l'Exécutif ou le Conseil de la Société.

Agir comme signataire autorisé de la Société, en ce qui concerne les contrats, les subventions et les ententes, et en faire rapport.

Veiller à la garde et au bon usage du sceau de la Société.

Compétences nécessaires :
Fiabilité, responsabilité et intégrité.

Dévouement aux objectifs de la SCMO et à son succès en tant qu'association.

Aptitudes à diriger et à communiquer.

Connaissances générales en sciences et en matière de sociétés scientifiques.

Aptitude à formuler des objectifs, des stratégies et des plans d'action, et à motiver les autres afin de tout mener à bien.

Capacité de se motiver et de travailler de façon autonome.

Bonne connaissance de l'anglais parlé et écrit.

Compréhension des analyses et de la planification financières, ainsi que des budgets et des rapports financiers.

Atouts :
Capacité de converser en français et de faire de courtes traductions, révisions, etc. de textes ou de courts rapports originaux.

Compréhension de la gouvernance d'organisations sans but lucratif et à vocation caritative, et des lois et règlements en vertu desquels elles fonctionnent.

Bonnes connaissances des logiciels de bureautique : traitement de texte, tableur, concepteur de présentations, etc.

Bonnes connaissances du fonctionnement des bases de données et de leur usage, des sites Web et de leur gestion.

Rémunération :
Ce poste à temps partiel nécessite en moyenne environ deux jours de travail par semaine et la présence du directeur au bureau de la SCMO, à Ottawa, au moins une fois toutes les deux semaines. Il s'agit d'un contrat annuel renouvelable, sans avantages sociaux. Le directeur général est un consultant et non pas un employé. Ses honoraires sont négociables.

Modalités de mise en candidature :
Les personnes désirant poser leur candidature doivent envoyer une lettre démontrant leur intérêt et leurs compétences générales, en plus d'un curriculum vitae indiquant leur domaine d'études, et leurs compétences et expérience pertinentes à : president@cmos.ca.

Si vous connaissez un collègue ou une personne susceptible d'être un bon candidat pour ce poste, veuillez soumettre son nom en envoyant une lettre à l'adresse president@cmos.ca, afin d'expliquer les atouts de cette personne.

Dates limites :
Les mises en candidatures doivent parvenir à la SCMO entre le 15 mai et le 15 juin 2013, ou jusqu'à ce qu'un candidat adéquat soit choisi. Le titulaire du poste devrait entrer en fonction au plus tard le 1er septembre 2013.

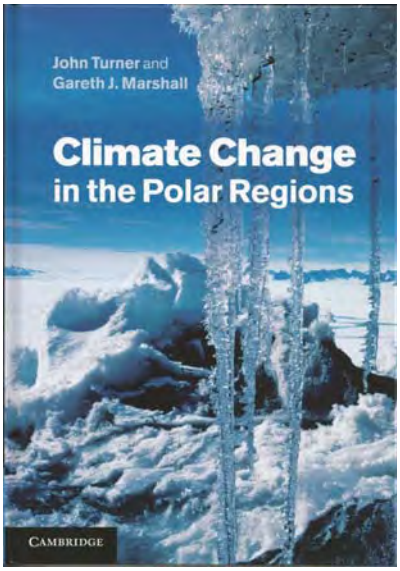
BOOK REVIEWS / REVUES de LITTÉRATURE

Climate Change in the Polar Regions

by John Turner and Gareth J Marshall

Cambridge University Press, 2011
ISBN 978-0-521-85010-0, Hardback, US$115, 434 pages

Book reviewed by John Stone[1]



It is often remarked that the Arctic is the canary in the coal mine when it comes to evidence of climate change. Temperatures in the Arctic have risen twice as fast as the global average; the sea-ice has declined at a much faster rate than the models predicted and the snow cover extent seems to have receded at an even faster rate. Indeed, the rate of change is non-linear as we would expect from the positive feedback associated with the change in albedo as we replace a bright reflecting surface of ice with a dark absorbing surface of sea-water and bare terrain. These changes are having significant impacts on the Arctic environment and on the livelihoods of those who call it their home. However, the Arctic is far from climatologically homogeneous and any climate change impacts occur in the context of several other stresses such as poverty, health and pollution. Thus, despite the media-capturing drama, the threat of climate change in the Arctic, and equally in the Antarctic, is far from simple.

The several assessment reports of the Intergovernmental Panel on Climate Change (IPCC) have dealt in some detail with the cryosphere and the impacts (but less so adaptation) of a changing climate in the Polar Regions. However, the treatment has not been pedagogical and thus not easily accessible to students. Even the more recent report from the Arctic Council: *Snow, Water, Ice, Permafrost in the Arctic* has similar shortcomings. It is therefore welcome that John Turner and Gareth Marshall have filled this lacuna with their excellent book: *Climate Change in the Polar Regions*. The authors, who are both with the British Antarctic Survey, provide an almost encyclopaedic treatment of the science, exhaustive references and helpful diagrams. Of course, with the pace of change in these regions and the remarkable advances in our understanding, such a book is likely to need up-dating from time to time.

After dealing with observations, both proxy and instrumental, and high latitude meteorological processes, the main chapters of the book are then arranged chronologically beginning with the last million years, through the Holocene to the present instrumental period and concluding with a discussion of predictions for the next 100 years. The authors deal almost entirely with geophysical changes and there is regrettably very little on changes in Arctic ecosystems or the impacts on humans and their settlements.

The book will be especially welcomed by those with a meteorological background for the authors devote considerable attention to atmospheric and ocean circulation. Part of their purpose for dealing with these topics seems to be to allow the authors to make the point that the changes we have seen in the Arctic can be attributed in part to natural climate variability. It is not surprising that with the benefit of more paleoclimate reconstructions and given the spatial and temporal heterogeneity of the Polar Regions, examples of changes of a similar magnitude to those we see today can always be found.

The first chapter provides an introduction to the Polar Regions and their interactions with the global climate system; pointing out, for example, that melting of the Greenland and Antarctic Ice Sheets could raise global sea-levels by 60 m and 6 m respectively. It is in this chapter that the authors provide a limited discussion of the socio-economic consequences of climate change, admitting that there could be radical impacts on the way of life of Arctic residents.

Data and models are dealt with in the second chapter. In both Polar Regions spatially comprehensive data have only been available since the beginning of the satellite era and short data records are often inadequate to identify trends, with significant certainty, especially given the large natural variability of the climate in these regions. What has been enormously valuable in providing estimates of long-term natural variability have been the retrieved ice-core records such as the 3 km EPICA core in Antarctica that goes back some 850 thousand years. Models rely on our understanding of the physical processes involved and one area of continuing active debate is the evolution of the Greenland and Antarctic Ice Sheets. Their projected

[1] Adjunct Research Professor in the Department of Geography and Environmental Studies at Carleton University, Ottawa, ON, Canada.
Lead author of the 4th Report (Polar Regions) for the IPCC Fifth Assessment Report.

contribution to sea-level rise led to considerable argument in the IPCC's Fourth Assessment Report and a conclusion that is now regarded as being overly conservative.

Chapter 3 provides an extraordinarily exhaustive treatment of high latitude meteorology covering discussion of the role of the oceans at each pole, the all-important feedbacks as well as the radiation regimes including orbital and solar variability. This chapter also deals with the climate modes of variability observed in the Polar Regions including such tele-connections as the North Atlantic Oscillation and the Pacific North America pattern.

Until we began to significantly modify the composition of the atmosphere, and hence the climate, humans had experienced a fairly stable climate for the past 11,000 years allowing agriculture to develop, civilizations to grow and cultures to deepen. In comparison, the changes in the deeper geological past were striking. The best known changes have been the cycle of ice-ages that now occur roughly every 120 thousand years (although they occurred about twice as often before about one million years ago). It is estimated that during the last interglacial period sea-levels were 4-6 m higher and the Arctic as a whole some 2.4^{o} C warmer than today, although carbon dioxide levels were much lower than at present which may be an indication of the slow response times of the climate system.

In their fascinating treatment of the Holocene period the authors discuss the apparent existence of several climate cycles. This includes the 1,500-year Bond cycle whose cause is still not known with certainty but is suggested by some to be related to variations in the solar output. This and other periodicities have been linked to well-known climate events such as the Medieval Warm Period and the Little Ice Age. I have the sense that the authors have introduced this discussion of "natural" climate cycles again to raise doubts about the extent of anthropogenic causes for the warming we have seen over the recent past.

When they come to the instrumental period the authors seem to put their doubts aside and state that while there is a complexity in the temperature changes that take place at a range of time-scales, "*there is powerful evidence that the recent warming across the Arctic has a strong anthropogenic component*". This being said, and as illustrated in the 2012 Canadian SCOR lecture by Eddy Carmack, there is still much that we don't understand; for example, the amplification of small changes in solar output and the millennial-scale variations in ocean circulation.

The final substantive chapter deals with climate projections for the next 100 years (although the authors incorrectly use the word prediction). It relies on models and results in the IPCC's 4th Assessment Report which will soon be out of date. Most of this material, particularly that pertaining to the Arctic though perhaps less the Antarctic, will be well known to CMOS members. The fact that some changes over the next few decades are now inevitable, regardless of what we do to reduce greenhouse gas emissions, and that adaptation becomes a policy imperative, is regrettably not discussed in this chapter.

This is one of the best books I have had the pleasure of reviewing over the last few years. I predict that it, or subsequent editions, will be on the desks of polar scientists for a long time.

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

Latest Books received / Derniers livres reçus

2011-34) *Modeling Methods for Marine Science*, David M. Glover, William J. Jenkins and Scott C. Doney, Cambridge University Press, Hardback, 571pages, US$85.

2012-03) *Ocean Dynamics and the Carbon Cycle, Principles and Mechanisms*, by Richard G. Williams and Michael J. Follows, Cambridge University Press, ISBN 978-0-521-84369-0, Hardback, 404 pages, US$ 73.

2012-08) *Dryland Climatology*, by Sharon E. Nicholson, Cambridge University Press, ISBN 978-0-521-51649-5, Hardback, 516 pages, US$150.

2012-10) *Phytoplankton Pigments, Characterization, Chemotaxonomy and Applications in Oceanography,* Edited by Suzanne Roy, Carole A. Llewellyn, Einar Skarstad Egeland and Geir Johnsen, 2011, Cambridge University Press, ISBN 978-1-107-00066-7, Hardback, 845 pages, US$140.

2012-12 *Buoyancy-Driven Flows*, Edited by Eric P. Chassignet, Claudia Cenedese and Jacques Verron, 2012, Cambridge University Press, ISBN 978-1-107-00887-8, Hardback, 436 pages, US$120.

2012-18) *Chemistry and the Environment*, by Sven E. Harnung and Matthew S. Johnson, Cambridge University Press, ISBN 978-110-768257-3, Paperback, 427 pages. CDN$76.95.

2012-19) *Understanding the Earth System, Global Change Science for Application*, Edited by Sarah E. Cornell, I. Colin Prentice, Joanna I. House and Catherine J. Downy, Cambridge University Press, ISBN 978-1-107-00936-3, Hardback, 267 pages, CDN$81.95.

2013-01) *Introduction to Chemistry of the Sea*, by Michael, E.Q. Pilson, Cambridge University Press, ISBN 978-0-521-88707-6, Hardback, 524 pages, CDN$81.95.

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

BRIEF NEWS / NOUVELLES BRÈVES

COMET Program

The COMET Program is pleased to announce the publication of the following two new modules:

1) "*Forecasters' Overview of the Gulf of Mexico and Caribbean Sea*". This module provides a brief introduction to the Gulf of Mexico and the Caribbean Sea for weather forecasters. It describes major aspects of the geography, oceanography and climatology. Geography looks at topography, rivers, countries and cities. Oceanography examines major bathymetric features, mean sea surface temperature, salinity, currents and tides. Climatology briefly covers jet streams, large-scale pressure systems, seasonal and monthly climatology of tropical and extratropical cyclones, as well as fronts and other synoptic weather systems.

The intended audience for this module is any operational forecaster who is unfamiliar with Gulf of Mexico and the Caribbean. The module should also appeal to students and members of the general public with an interest in this region. Please follow this link to the MetEd description page that provides additional information and a link to begin the module:

https://www.meted.ucar.edu/training_module.php?id=1030

2) "*Climatology for the Operational Forecaster*". This module introduces the Climate Analysis Process in the context of preparing a climatological brief for a naval ship deployment. Though the focus is on Department of Defense data sources, including the Advanced Climate Analysis and Forecasting (ACAF) system, information on other sources is provided. Recommendations for assembling a climatological brief tailored to your customer's needs are also included.

The intended audience for Climatology for the Operational Forecaster includes forecasters tasked with providing climate information for operational applications. The module contains sources of both DoD and non-DoD products for anyone needing to respond to a climatological data request. Please follow this link to the MetEd description page that provides additional information and a link to begin the module: Climatology for the Operational Forecaster,

https://www.meted.ucar.edu/training_module.php?id=1028

All COMET modules and the MetEd website rely on JavaScript, and some modules rely on Adobe® Flash® for navigation, animation, and/or presentation of multimedia elements. Ensure that you have a browser updated to its latest version with JavaScript enabled and the latest version of the Adobe FlashPlayer installed (http://get.adobe.com/flashplayer/). For technical support for this module please visit our Registration and Support FAQs at:

https://www.meted.ucar.edu/resources_faq.php

Comments or questions are welcome. Please e-mail your comments or questions to Arlene Laing (laing@ucar.edu).

Attachez vos ceintures, turbulences en vue

Les voyageurs habitués à des trajets au-dessus de l'Atlantique Nord devront s'adapter à de nouvelles conditions de vol dans les 40 prochaines années.

Le Dr Paul Williams et ses collègues de l'Université de Reading (U.K.) affirment que les avions affronteront de plus intenses turbulences atmosphériques durant les mois d'hiver.

Ces turbulences se traduisent par des secousses plus ou moins fortes et plus ou moins inconfortables qui peuvent même entraîner des blessures aux passagers et des dégâts aux avions.

Selon ces chercheurs, cette instabilité atmosphérique pourrait doubler d'ici 2050 et leur force moyenne va augmenter de 10 % à 40 %. La raison : l'impact des changements climatiques sur les courants-jets (jet-stream).

Les zones “à risque” de turbulences dangereuses pour les avions pourraient même doubler de taille pendant la même période. Déjà, depuis quelques décennies, les avions affrontent des vents plus forts.

La sécurité des vols ne sera pas affectée pour autant, mais un ciel plus perturbé pourrait avoir des effets sur le portefeuille des passagers. Selon les auteurs de ces travaux publiés dans la revue Nature Climate Change, le prix des billets augmentera en raison de la quantité de carburant supplémentaire que nécessitera le parcours.

Le saviez-vous?

Les turbulences atmosphériques au-dessus de l'Atlantique Nord frappent particulièrement à environ 10 kilomètres d'altitude, une zone dans laquelle volent 600 avions de ligne quotidiennement.

Pelmorex Media Appoints New President and CEO

Pelmorex Media, parent company of The Weather Network, MétéoMédia, Travelers Network, Beat The Traffic and eltiempo.es, announced the appointment of Ron Close to President and CEO. He replaces Pierre L Morrissette, the company's founder and controlling shareholder, who has been Chairman and CEO since the company was created in 1989. Morrissette will continue as the company's Executive Chairman of the Board.

"*Pelmorex Media Inc. is a family business*," said Morrissette. "*I have been planning a transition to a new CEO for over five years. This is one of the most important decisions faced by a Founder. Over two years ago I invited Ron to work closely with Management and the Board as a strategic advisor. So we have had a great chance to get to know each other well. When I learned last year that Ron was available, we both quickly concluded this was a great fit*."

The Board of Directors enthusiastically agreed and the management change was announced internally six months ago. This provided ample time for Close and Morrissette to wrap up existing commitments and to plan a seamless transition.

"*I am thrilled to have Ron Close as our new CEO*," said Morrissette. "*He is an excellent leader who shares our values, culture and our results-oriented mindset. We are an entrepreneurial organization which thrives on innovation as a path towards market leadership and Ron's dynamic management style exemplifies these traits. He is a super people-person and a demanding coach who motivates, inspires and challenges individuals and teams to perform at their best."*

Close brings a wealth of experience to the role along with a deep understanding of the industry and of the company's vision and strategy for the future. Close has held many executive roles in his career, including President of Bell New Ventures and Co-Founder/CEO of Netcom Canada. In the past five years, he has been the Executive Entrepreneur-In-Residence at The Richard Ivey School of Business as well as Entrepreneur-In-Residence at MaRS Discovery District. Close has been a Director on several boards, including CTVglobemedia, The Globe and Mail and MaRS Innovation.

"*I am proud of our accomplishments,*" said Morrissette. "*Our original vision was to create a national media company operating in both languages. Today, we are the undisputed leader in our market category. We connect with more than 20 million Canadians every month across all screens. Ipsos-Reid recently named us the 16th most influential brand in Canada (sixth among Canadian companies). We have been selected one of Canada's top 50 best managed companies seven years in a row. We have assembled an excellent team over the years and we are now exceptionally positioned for future growth*."

The company launched its international strategy last year by acquiring eltiempo.es, Spain's leading multi-platform weather-related information service, as well as Beat The Traffic, an advanced navigation and traffic-routing service, based in Santa Clara, California. Pelmorex employs close to 500 people in Canada, the US and Spain.

"*We have come a long way but I feel confident that we are only getting started," concluded Morrissette. "As we enter our 25th year with a history of consistent growth our future has never looked brighter*."

Source: (2013-05-01)
http://www.broadcastermagazine.com/news/pelmorex-media-appoints-new-president-and-ceo/1002268543/

WMO Annual Climate Statement Confirms 2012 as Among Top Ten Warmest Years

GENEVA, 2 May 2013 (WMO) The World Meteorological Organization's Statement on the Status of the Global Climate says that 2012 joined the ten previous years as one of the warmest — at ninth place — on record despite the cooling influence of a La Niña episode early in the year.

The 2012 global land and ocean surface temperature during January–December 2012 is estimated to be 0.45°C (±0.11°C) above the 1961–1990 average of 14.0°C. This is the ninth warmest year since records began in 1850 and the 27th consecutive year that the global land and ocean temperatures were above the 1961–1990 average, according to the statement. The years 2001–2012 were all among the top 13 warmest years on record.

"*Although the rate of warming varies from year to year due to natural variability caused by the El Niño cycle, volcanic eruptions and other phenomena, the sustained warming of the lower atmosphere is a worrisome sign*," said WMO Secretary-General Michel Jarraud. "*The continued upward trend in atmospheric concentrations of greenhouse gases and the consequent increased radiative forcing of the Earth's atmosphere confirm that the warming will continue*," he said.

"*The record loss of Arctic sea ice in August-September — 18% less than the previous record low of 2007 of 4.17 million km2 — was also a disturbing sign of climate change*," said Mr Jarraud. "*The year 2012 saw many other extremes as well, such as droughts and tropical cyclones. Natural climate variability has always resulted in such extremes, but the physical characteristics of extreme weather and climate events are being increasingly shaped*

by climate change," he said.

"*For example, because global sea levels are now about 20 cm higher than they were in 1880, storms such as Hurricane Sandy are bringing more coastal flooding than they would have otherwise*," said Mr Jarraud.

Above-average temperatures were observed during 2012 across most of the globe's land surface areas, most notably North America, southern Europe, western Russia, parts of northern Africa and southern South America. Nonetheless, cooler-than-average conditions were observed across Alaska, parts of northern and eastern Australia, and central Asia.

Precipitation across the globe was slightly above the 1961-1990 long-term average. There were drier-than-average conditions across much of the central United States, northern Mexico, northeastern Brazil, central Russia, and south-central Australia. Wetter-than-average conditions were present across northern Europe, western Africa, north-central Argentina, western Alaska, and most of northern China.

Snow cover extent in North America during the 2011/2012 winter was below average, resulting in the fourth smallest winter snow cover extent on record, according to data from the Global Snow Laboratory. This was in marked contrast to the previous two winters (2009/2010 and 2010/2011), which had the largest and third largest snow cover extent, respectively, since records began in 1966.

Meanwhile, the Eurasian continent snow cover extent during the winter was above average, resulting in the fourth largest snow cover extent on record. Overall, the northern hemisphere snow cover extent was above average – 590000 km^2 above the average of 45.2 million km^2 – and was the fourteenth largest snow cover extent on record.

Greenland ice sheet: In early July, Greenland's surface ice cover melted dramatically, with an estimated 97 per cent of the ice sheet surface having thawed in mid-July. This was the largest melt extent since satellite records began 34 years ago. During the summer it is typical to observe nearly half of the surface of Greenland's ice sheet melt naturally, particularly across the lower elevations. However, in 2012 a high-pressure system brought warmer-than-average conditions to Greenland, which are associated with the rapid melting.

Arctic sea ice extent reached its record lowest level in its annual cycle on 16 September at 3.41 million km2. This value broke the previous record low set on 18 September 2007 by 18 per cent. It was 49 per cent or nearly 3.3 million km^2 below the 1979–2000 average minimum. The difference between the maximum Arctic sea-ice extent on 20 March and the lowest minimum extent on 16 September was 11.83 million km^2 – the largest seasonal sea-ice extent loss in the 34-year satellite record.

Antarctic sea-ice extent in March was the fourth largest on record at 5.0 million km2 or 16.0 per cent above the 1979–2000 average. During its growth season, the Antarctic sea-ice extent reached its maximum extent since records began in 1979 on 26 September, at 19.4 million km2. This value surpassed the previous maximum sea-ice extent record of 19.36 million km2 set on 21 September 2006.

Extreme Events: Hurricane Sandy killed close to 100 people and caused major destruction in the Caribbean and tens of billions of US dollars in damage and around 130 deaths in the eastern United States of America. Typhoon Bopha, the deadliest tropical cyclone of the year, hit the Philippines – twice – in December. During the year, the United States and south-eastern Europe experienced extreme drought conditions, while West Africa was severely hit by extreme flooding. The populations of Europe, northern Africa and Asia were acutely affected by extreme cold and snow conditions. Severe flooding occurred in Pakistan for a third consecutive year.

Climate change is aggravating naturally occurring climate variability and has become a source of uncertainty for climate-sensitive economic sectors like agriculture and energy.

"*It is vital that we continue to invest in the observations and research that will improve our knowledge about climate variability and climate change*," said Mr Jarraud.

"*We need to understand how much of the extra heat captured by greenhouse gases is being stored in the oceans and the consequences this brings in terms of ocean acidification and other impacts. We need to know more about the temporary cooling effects of pollution and other aerosols emitted into the atmosphere. We also need a better understanding of the changing behaviour of extreme weather and climate events as a consequence of global warming, as well as the need to assist countries in the most affected areas to better manage climate-related risks with improved climate early warning and climate watch systems*," said Mr Jarraud.

The Global Framework for Climate Services (GFCS), adopted by the Extraordinary World Meteorological Congress in 2012, now provides the necessary global platform to inform decision-making for climate adaptation through enhanced climate information.

Source:

WMO Website visited on May 6, 2013.

In Memoriam

Ted Fathauer (1946-2013)

Ted Fathauer, of Fairbanks, died at home on Jan. 20, 2013. He was born June 5, 1946. He had recently retired from a 44-year career as a weather forecaster with the National Weather Service. He worked briefly in Suitland, Md., but for the past 42 years, he lived and worked in Alaska. For the past 35 years he worked in the Fairbanks office. He truly loved Alaska, and never wanted to leave. He lived in Juneau and Anchorage, but his heart was always in Fairbanks.

He had a long attachment to the University of Alaska Fairbanks, where he earned his master's degree in atmospheric sciences in 2012. He had previously earned his bachelor's degree from the University of Chicago in 1968. He had been admitted to begin work on his doctorate degree at the University of Alaska this coming fall, and he was greatly looking forward to it.

He contributed to the university, was in the University of Alaska College of Fellows and on the board of Friends of the University of Alaska Museum of the North. He also was on the boards of the Salvation Army, Fairbanks Concert Association and Fairbanks Symphony Orchestra. He was a supporter of the arts in Fairbanks and of Opera Fairbanks. For 19 years, he participated in the Equinox Marathon. He is survived by his wife of 31 years, Mary Ann, of Fairbanks; and his twin-sister, Gretchen Fathauer, of Blue Rock, Ohio.

Ted Fathauer was a sustaining member of CMOS. Memorial contributions may be made online to a student scholarship at the University of Alaska Fairbanks. (www.uaf.edu/giving/gift; please note on form "in memory of Ted Fathauer/gift).

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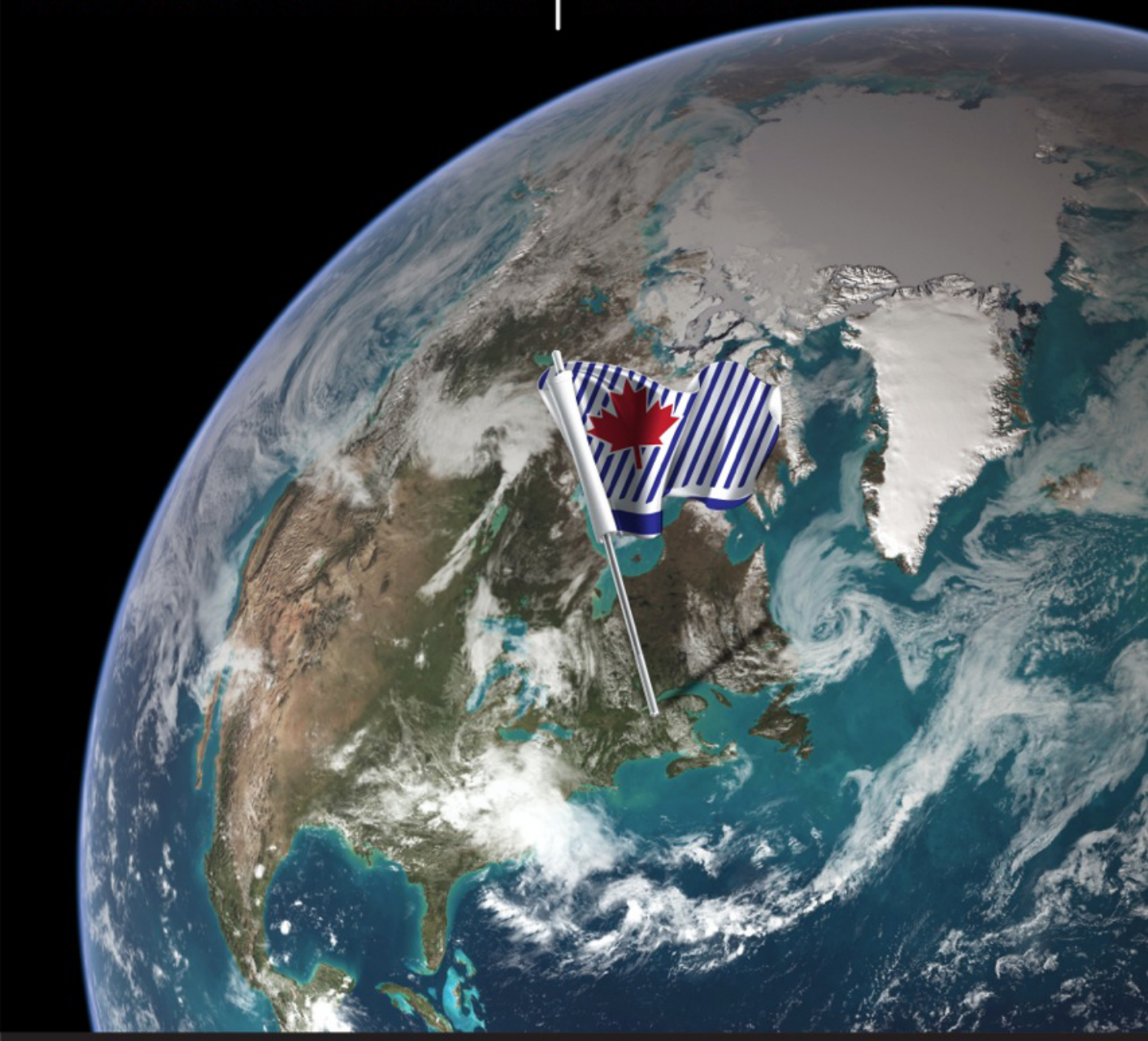

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