ISSN 1929-7726 (Online / En ligne)

ISSN 1195-8898 (Print / Imprimé)

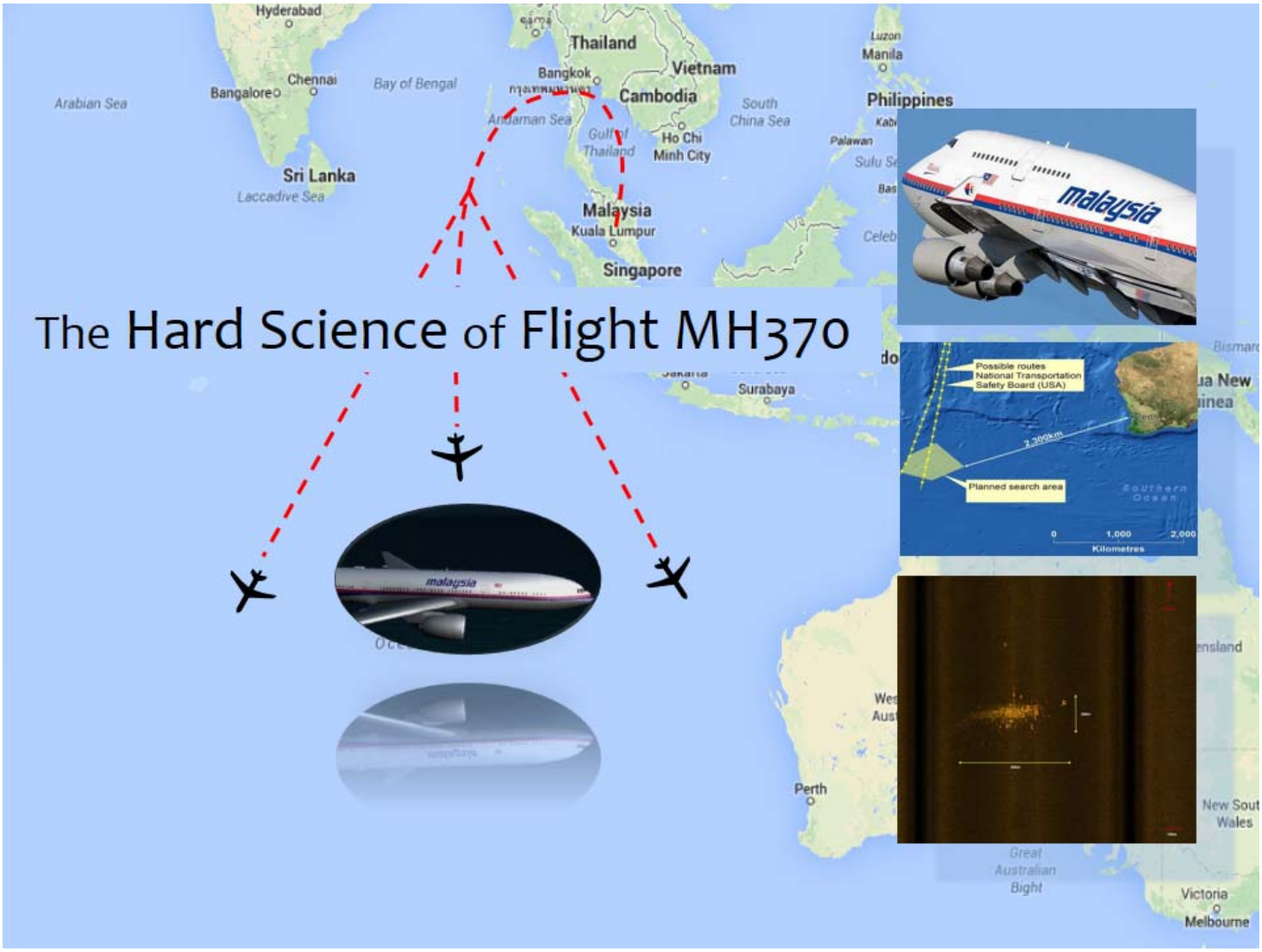
CMOS BULLETIN SCMO

Canadian Meteorological and Oceanographic Society

La Société canadienne de météorologie et d'océanographie

August / août 2014

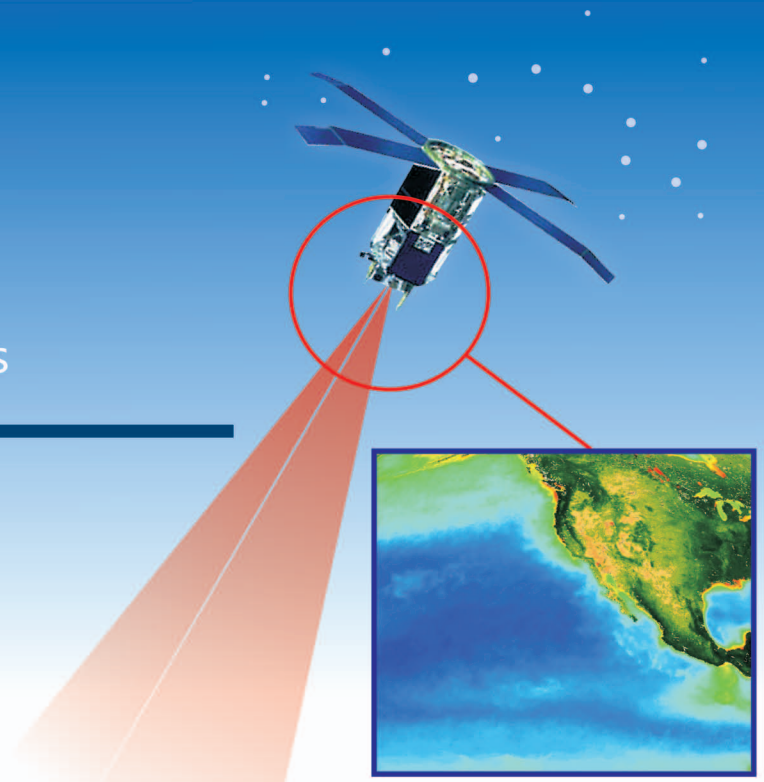
Vol.42 No.4



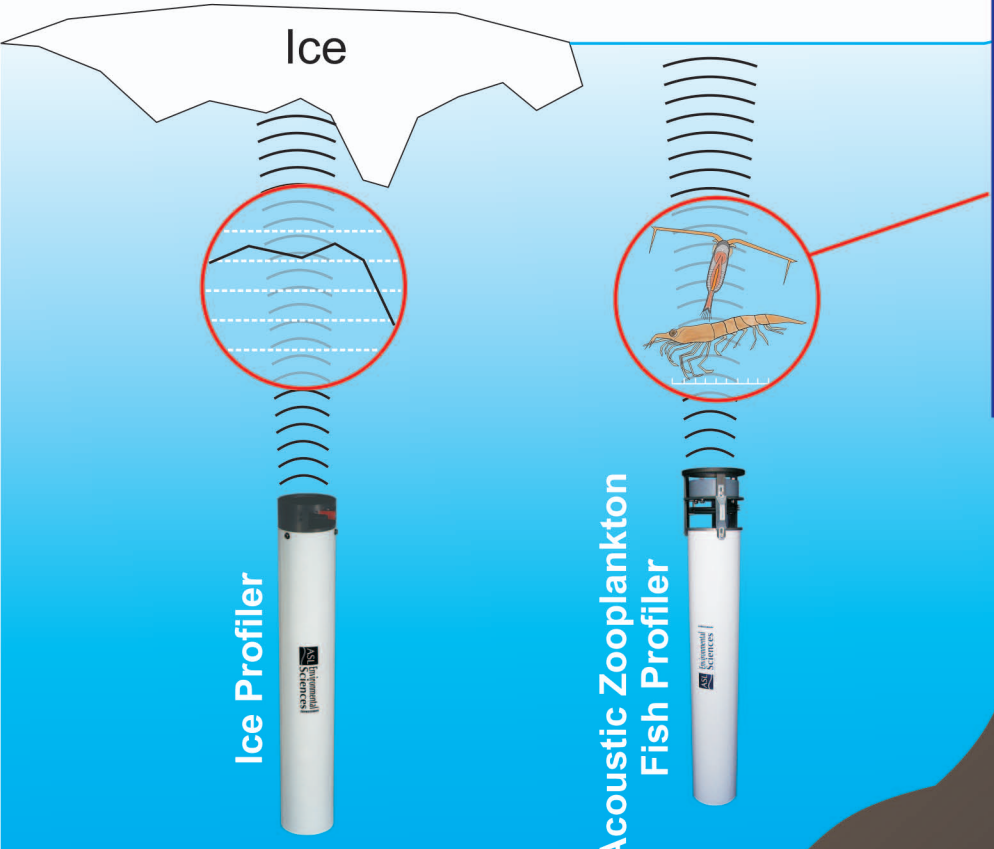
Examen scientifique rigoureux du vol MH370

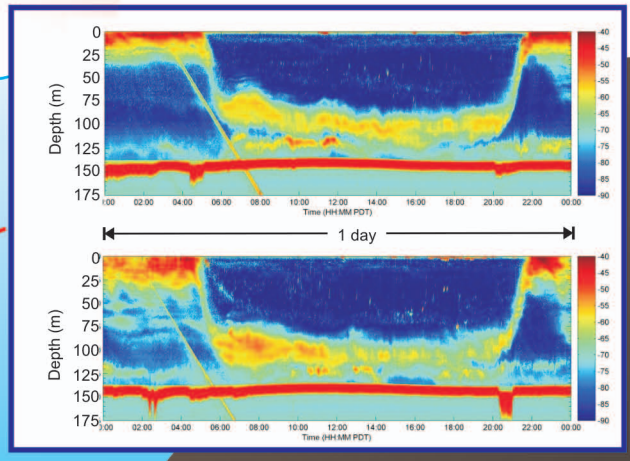
ASL Environmental Sciences

Oceanographic specialists/
Spécialistes océanographiques



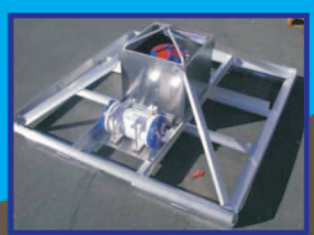
Ocean colours are chlorophyll concentrations and land colours are NDVI





ASL products include:

Ice Profiler and SWIP
Wave Profiler
Acoustic Zooplankton Fish Profiler
IRIS Datalogger for Imagenex SONAR
WERA NorthernRadar
Airborne/Spaceborne Remote Sensing



Mooring Designs

ASL offers an extensive equipment lease pool

ASL Environmental Sciences Inc.
#1-6703 Rajpur Place
Victoria, British Columbia
V8M 1Z5 Canada

Toll-free: 1-877-656-0177
Fax: +1 250 656-2162
email: aslenv@aslenv.com
website: www.aslenv.com

.... Words from the President

Incoming President's Acceptance Speech after CMOS Congress Annual Banquet, Rimouski, June 4, 2014

Bonsoir Mesdames et Messieurs,

Harinder Ahluwalia
CMOS President
Président de la SCMO

Avant toute chose, j'aimerais féliciter Pierre Gauthier, notre Président sortant, pour le travail fantastique accompli durant cette dernière année. J'ai eu la chance de travailler avec lui pour mettre en place les fondements du futur de notre Société, la SCMO, et j'espère pouvoir encore compter sur le même niveau de coopération durant mon mandat de Président de notre organisation.

I would also like to welcome Martha Anderson, who will be our next Vice-President and has experience both in meteorology and oceanography as the Director of Met-ocean in the Department of National Defence. We will be enriched by her experience. As a consequence of that, we will be able to do a better job also on the oceanography side because that is one area in which I need help. Together, we will try to bring CMOS to a higher level.

When I was asked by the Chairman of the Montreal Centre, Louis Lefaivre, to accept the nomination as Vice-President of CMOS for the year 2013 to 2014, I wondered what I could add to this esteemed organization. Then he told me that they would like to have somebody known from industry who has been with CMOS for a number of years to provide a different perspective. I told him that I would check with my wife and get back to him. When I talked to my wife Manjit who is also present here and got her permission, I accepted the nomination. Later on, I told her that when I take up a job I try to do the best possible job I can and that means spending a lot of time in managing and planning and she agreed. Later on when I was sitting in my bed with my laptop and preparing documents, she asked me what I was working on. I told her, you agreed. I have a small company to run during office hours and must do these things in the evenings (and weekends) and she understood and I thank her for that.

[Suite à la page 107]

CMOS Bulletin SCMO
Volume 42 No.4
August 2014 — août 2014

Inside / En Bref

Articles

Reports / Rapports

Our regular sections / Nos chroniques régulières

Printed in Ottawa, Ontario, by St. Joseph Print Group Inc.
Imprimé par St. Joseph Print Group Inc., Ottawa, Ontario.

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

Editor / Rédacteur: Paul-André Bolduc
Associate Editor / Rédactrice associée: Lise Harvey
Canadian Meteorological and Oceanographic Society
Société canadienne de météorologie et d'océanographie
E-mail: bulletin@cmos.ca; Courriel: bulletin@scmo.ca

Cover page: The tragedy of the missing Malaysian Boeing 777 in March 2014 forced an integration of oceanography, underwater acoustics, hydrography, and space-based remote sensing to merge into a complex and global scientific problem that resulted in frustration and mistrust of the science and those who applied it. Maritime Way Scientific Ltd. provides insight into the Hard Science of Flight MH370. To learn more, please read Martin Taillefer's article on **page 113.** Image credit: Maritime Way Scientific Ltd.

Page couverture: La disparition tragique du Boeing 777 de la Malaysia Airlines en mars 2014 a forcé l'intégration de l'océanographie, de l'acoustique sous-marine, de l'hydrographie et de la télédétection spatiale en un problème scientifique complexe et planétaire, générant frustration et méfiance à l'égard de la science et de ceux qui l'avaient appliquée. Maritime Way Scientific Ltd. jette un éclairage scientifique rigoureux sur le vol MH370. Pour en savoir plus, prière de lire l'article de Martin Taillefer en **page 113.** Image courtoisie: Maritime Way Scientific Ltd.

CMOS Office / Bureau de la SCMO

P.O. Box 3211, Station D
Ottawa, Ontario, Canada, K1P 6H7
Fax / Fascimilé: 613-990-1617
Homepage: http://www.cmos.ca
Page d'accueil: http://www.scmo.ca

Dr. Andrew Bell
Executive Director - Directeur général
Tel/Tél.: 613-990-0300
E-mail/Courriel: cmos@cmos.ca

Dr. Douw G. Steyn
Director of / Directeur des Publications
Tel/Tél.: 604-827-5517
E-mail/Courriel: publications@cmos.ca

Ms. Qing Liao
Office Manager - Chef de bureau
Tel/Tél.: 613-991-4494
E-mail/Courriel: accounts@cmos.ca

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

Council / Conseil d'administration

.... Words from the President [Suite de la page 105]

Dr. Harinder Ahluwalia accepting the CMOS Presidency Medal from Dr. Pierre Gauthier on June 4th, 2014. Photo credit: Rimouski Congress LAC.

My involvement with CMOS as Vice-President in the last year has shown to me that CMOS is a very good and prestigious organization serving our community in scientific areas of Met-ocean and this must be retained as such at all costs – this is our main objective – science for Met-ocean – and that will be done; there is no question. However, I also believe that we are losing members – in the last two years we have lost 15% of our membership. I want to work with you and interest many other people from universities, government departments, and especially students because they are our future. I would also like to attract members from the larger user industry so that we could solicit sponsorships for important events and serve our science community even more.

In addition, I have seen that certain government programs are changing and they are encouraging collaboration between industry, universities, and government departments. In order to make the best use of these changes, we must be informed what these programs are and how they affect us and for that I want to make sure that we have some mechanism for providing that information to all our members and those types of things will be done through Webinars. Ian [Rutherford; see note of page 136] who was our wonderful Executive Director and for whom I have a lot of respect, emphasized the need to be good volunteers because this is an organization run by volunteers. He also repeated President Kennedy's slogan "*ask not what your Society can do for you, ask what you can do for your Society*". We would like to encourage everybody to be a part of this mission and volunteer your services and help us. Our organization consists of the National Management and Regional Centres. If our Regional Centres are strong, only then will our overall organization be strong. How can we encourage more members to join and have more events? Those are the kinds of things I intend to achieve during the next year.

I did write a document which was the basis of the "*Future of CMOS*" Session – the meeting we had yesterday (Tuesday afternoon) – and for which we got an excellent response from attendees [See summary report in English on page 125 ou voir le rapport sommaire en français en page 129]. There were a lot of people and a lot of ideas were generated. We plan to analyse the ideas generated in the meeting and incorporate many of them in our strategy for the future. We also have a questionnaire based on the document "Discussion Paper – Roadmap for Future of CMOS" which we would like to see - as many people as possible - complete. We will make it available on our website. This will give us an idea of what you would like to see CMOS become and that will help define our direction. Please do fill the Questionnaire and also volunteer yourself at the Regional and National levels so that we could have a much stronger organization and as a whole could do a much better overall job. That is all I have to say to you this evening and I hope that you will all work hard to make this great organization even greater.

Harinder Ahluwalia,
CMOS President

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.

Position open

Editor of *CMOS Bulletin SCMO* (knowledge of written English, French or both). This is a labour of passion! A small honorarium can be negotiated with the Executive Office. If interested, please contact Andrew Bell at exec.dir@cmos.ca

Poste disponible

Rédacteur du *CMOS Bulletin SCMO* (connaissance du français ou de l'anglais écrit ou les deux). C'est un travail passionnant! Un léger dédommagement peut être négocié avec la direction. Si vous êtes intéressé, prière de contacter Andrew Bell à exec.dir@scmo.ca

Next Issue *CMOS Bulletin SCMO*

Next *CMOS Bulletin SCMO* issue will be published in **October 2014.** Please send your articles, notes, workshop reports or news items before **September 5, 2014** to the electronic address given at the top of page 106. We have an URGENT need for your written contributions.

Prochain numéro du *CMOS Bulletin SCMO*

Le prochain numéro du *CMOS Bulletin SCMO* paraîtra en **octobre 2014.** Prière de nous faire parvenir avant le **5 septembre 2014** vos articles, notes, rapports d'atelier ou nouvelles à l'adresse électronique indiquée au haut de la page 106. Nous avons un besoin URGENT de vos contributions écrites.

ARTICLES

We are listening … help us strengthen CMOS

by Dr. Harinder Ahluwalia, CMOS President

It is generally believed that CMOS is a very important and prestigious organization in support of met-ocean sciences. In fact, it is the major voice of met-ocean sciences, a crucial part of any economy. However, it has been observed that we are losing membership and importance and, as a result, some strong action is required. In order to keep up with the times and support met-ocean sciences as well as make CMOS a unified and strong voice for met-ocean, it needs to be strengthened considerably. It needs more members, more funds, and a strong benefits package.

While taking the challenge seriously during the last year, the management of CMOS planned a course of action which is being executed. We went through the following steps.

1) Recently, a Survey (we will call it Survey #1) was conducted to determine what members and potential members think about CMOS and what improvements they would like to see implemented.

2) This was followed by a "*Discussion Paper on a Roadmap for the Future of CMOS*" which is available on the CMOS website.

3) During the CMOS Congress in Rimouski, a Special Workshop entitled *"Evolution of the role of CMOS*" was held in which a Survey (we will call it Survey #2) based on the above discussion paper was also distributed. The same Survey is also available on the CMOS website for members and potential members to fill.

4) Survey #1 was completed by 260 respondents and Survey #2 which was distributed at the Rimouski workshop was completed by 18 respondents during the meeting itself, while others are expected to fill the one available on the CMOS website.

5) The responses of Survey #1 and #2 received up to now were analysed and the results were documented in a document titled "Survey Analysis" of Survey #1 and Partial Survey #2. After Survey #2 closes, its results will be analysed further.

What did we learn from the Surveys and the Special Session in Rimouski?

Analysis of the two Surveys shows that:

1) CMOS is an important organization for met-ocean sciences. However, to make it sustainable, the value package for all members needs to be strengthened.

2) Many people gave up membership because the Government stopped paying their dues.

3) We need to have a closer relationship with AMS (American Meteorological Society) and some other foreign societies.

4) We should be more visible with the general public and the media.

5) The CMOS website needs to be improved, which we are already in the process of implementing.

6) Congresses and publications are very important components of CMOS and we plan to strengthen them.

7) Networking opportunities need to be enhanced.

The two tables shown on the next pages provide the quantitative response to the two Surveys.

What do we Plan to do?

A ***major Membership Drive*** is being conducted to recruit all types of members including individual members (professionals – active and retired as well as students), Government Departments (Federal, Provincial, and Municipal), universities, Aviation weather users, service providers, and user corporations of all sizes. Meetings will be held in various cities to discuss CMOS' Future and recruit members. There has been a suggestion to start another category of membership for hobbyists and other interested parties. This will be discussed by CMOS Council and a decision will be taken on that.

Table 1: Quantitative Responses of Survey #1

Importance Ranking	Average Score	Benefits and Privileges
1	8.00	Publications
2	7.97	Website appearance and content
3	7.74	Person to Person Knowledge Sharing
4	7.68	Public Relations
5	7.65	Education
6	7.61	Job Postings
7	7.55	Government Relations
8	7.44	*CMOS Bulletin SCMO*
9	7.13	Forum for Collaborative Research
10	7.10	Membership Directories & Website
11	7.09	Free access to *Atmosphere-Ocean*
12	6.98	CMOS Prizes and/or Awards
13	6.96	Conference Sessions of practical issues for specific Industries such as Aviation, Power Generation, Agriculture, etc.
14	6.81	Professional Development & Certification
15	6.69	Discounted rate for CMOS Congresses
16	6.03	Discounts on Education
17	5.98	Voting at the CMOS Annual General Meeting
18	5.85	Beneficial Rates for Congresses of Related Organizations (including the Royal Meteorological Society and the Canadian Geophysical Union)
19	5.23	Help Desks & Libraries
20	4.46	Sales tax exemption for all services from CMOS
21	3.50	Discounted Insurances (In the future)
22	3.26	Credit Card Programs (In the future)

Plans are being made to increase the ***interaction of CMOS with media and public***. We plan to assign ***Spokespersons*** for various met-ocean issues.

Our ***congresses, publications, and tour speaker*** events are already quite successful. Additional ideas are being sought to make them even better.

Activities at the ***Regional Centres*** are a factor of interest and enthusiasm of the Centre's Chair and Committee. Also a factor is the image of CMOS and the nature of its activities at National and Regional levels. We need to strengthen activities at our Regional Centres which are the lifeline of CMOS. More activities are required in these ***Centres*** to provide ***networking opportunities and presentations*** on current topics of interest, etc.

Table 2: Summary of Responses to Survey # 2

CMOS Structure	Yes	No
Should CMOS stay as a Scientific Organization Only	6	10
OR		
Should it become a Scientific and Professional Organization	10	5
Membership		
Should Large Users be involved in CMOS	16	1
Should Prov. Govt./Municipalities be asked to join CMOS	16	2
Role & Benefits of a Professional Organization	**Average Score**	**Rank**
Annual Congress	9.33	1
Network Enhancement Opportunities	9.00	2
Level of importance to cooperation with AMS	8.33	3
Publications	8.11	4
Information and Advice	8.11	4
Professional Development	8.03	5
Bilateral Cooperation (Other Societies e.g. Royal Meteorological Society, India Meteorology Society, etc.)	8.03	5
Cooperation with like-minded Societies and Organizations	7.94	6
Mentoring by Senior Members	7.83	7
Public Policy influence in support of Science &Technology in Met-Ocean	7.75	8
Awards, Prizes, and Recognitions	7.56	9
Scholarships	7.53	10
Regional Centres & Meetings	7.50	10
Leadership Development	7.41	11
Private Sector Committee (PSC)	7.31	12
Cooperation with Canadian Complementary Societies	7.22	13
Support Professional Discussion Group – Special Interest Group (SIG)	7.08	14
Multilateral Cooperation (International Forum of Meteorological Societies)	7.00	15
Professional Recognition – Certification and Accreditation	6.39	16
Assistance in Finding Jobs	6.28	17
Sponsorship of Events organized by Other Organizations	6.12	18

Note: This table will be updated once Survey #2, which is currently on CMOS website, closes.

Most people give high priority to the ***relationship with AMS*** for which we have already initiated contact with our U.S. counterpart to achieve this. This will be followed by establishing relationships with other international societies.

We will organize ***Webinars*** by experts on important issues. This can attract a lot of people and can be an effective way of engaging our members and public depending on webinars topics. We are looking for ideas for Webinar topics and presenters for the year 2014-2015.

To many people, ***SIG***s are very important. We need to define them and have them led by motivated individuals because the success of such groups is dependent upon the leaders. We already have an active SIG - ARCTIC SIG. Some suggested topics for additional SIGs are AVIATION SIG to attract Aviation Companies and POWER SIG to attract Power Companies.

These SIGs can be sponsored by the Aviation Industry and the Power Industry. We are already planning to ask them to be members.

Professional Development has been identified as an important issue. We are planning to start a ***mentoring program*** as well as determine what professional development information can be made available on our website. In addition, stronger effort will be made in advertising jobs.

We are already giving ***scholarships and awards*** to students. It would be worthwhile looking for available scholarships and refering to those scholarships on our site.

We could also start an ***internship program***. This might be a good combination where we reach students and companies through a mentoring program. We give employers access to a large pool of students across the country and we provide access to students to a large pool of employers.

Certification and Accreditation needs to be given higher priority if we wish to keep this going. We need to ensure that those claiming to be professionals in meteorology have the requisite training to perform their job properly.

We already have a ***Professional Recognition*** program covered under the Awards programs at our Annual Congresses. We need to also recognize outstanding presenters and volunteers through other means of recognition such as special membership status, CMOS t-shirts and badges, etc. This will encourage volunteers who spend considerable time without any compensation.

Social Media is in vogue – especially with the younger generations. We need to find ways to leverage it to connect our members on various topics. We plan to introduce the usage of LinkedIn, Facebook, Twitter, etc. to connect our members and would-be members.

There have been suggestions ***to include some additional oceanography areas*** such as marine biology, ocean eco-system, etc. in the CMOS mandate. This question will be discussed at the CMOS Council Meeting in the near future.

Manpower Requirement for Executing the Plan

We will be able to achieve the above plan only if we have sufficient volunteers to support the required actions. Our first activity will be to look for volunteers. At Centres' meetings where we plan to have special sessions, we will search for volunteers and will also ask Centre Chairs to recruit volunteers.

In addition to unpaid volunteers, we need to recruit retired people who would be ready to help CMOS with a reasonable honorarium.

Conclusions

It is a strong desire of all met-ocean professionals that CMOS become a well-built organization with many members and services and a strong brand recognition with the public, media, and Government.

The plan outlined above can achieve these objectives. However, we recognize that it is a very ambitious plan and has never been tried by CMOS to this extent. The success of this plan is totally dependent upon the support of our volunteers and knowledgeable professionals. Please participate in this effort by becoming members and volunteers.

You are requested to contact the CMOS Central Office (exec-dir@cmos.ca) if you feel that you can help in implementing the CMOS Plan. It is only through your assistance that we can achieve success. In addition, we need a number of students to help us link with other like-minded students.

The Hard Science of Flight MH370

Maritime Way Scientific Ltd. Provides MH370 Analysis for CTV News

by Martin L. Taillefer [1]

With contributions from Capt(N) Ret'd Kurt Salchert (Domain Awareness Advisor & Consultant), Dr. Ron Kessel (Maritime Science & Technology specialist); Mr. Craig Hamm (Oceanographer & MH370 acoustic modelling analyst); Dr. Gary Brooke (Acoustic Modeller advisor); and Mr. Doug Bancroft, former Director General of the Canadian Centre for Remote Sensing.

Five months have passed since the mysterious disappearance of flight MH370 and the 239 souls onboard and to critics it may appear that we are no closer to solving this mystery and preventing future incidents of this kind. While true that the aircraft remains missing without a clue, a great deal has been learned about the challenges of conducting wide area searches in vast open ocean conditions of the Indian Ocean.

Figure 1: *On Friday March 8th, 2014 Malaysia Airlines Flight MH370, carrying 239 people, including two Canadians, vanished after taking off from Kuala Lumpur enroute to Beijing, China.*

On March 21st, almost two weeks after the disappearance, I began providing CTV News oceanographic, acoustic, and sonar analysis of the conditions and the difficulties of the search of the potential crash region west of Australia.

The purpose of this paper is to describe how diverse surveillance technologies and theoretical models were applied to this search, some of the key lessons learned along the way, and to share how a small oceanography company can draw from this experience and apply the lessons learned to this enigmatic science problem.

Figure 2: "*Oceanographer Martin Taillefer says the site of where the plane is must be pinned down otherwise finding the black box may be impossible" (21 March 2014).*

Most importantly, Maritime Way needed to draw from multidisciplinary expertise with government, interagency, academic and multinational experiences to support the news analysis.

The search and the oceanographic conditions

For the first two weeks, a visual surface search was conducted by numerous military aircraft and ships, scouring thousands of square miles for floating debris evidence of the crash. The search then moved underwater after detections were made of the aircraft's black box pinger-like signals despite the fact that these transmissions seemingly occurred beyond the 30-day lifecycle.

[1] President and Managing Director of Maritime Way Scientific Ltd. A graduate of the Royal Roads Physics and Oceanography program, Martin served 20 years in the Royal Canadian Navy specializing in Underwater Warfare. He assumed the role of the Pacific Fleet Oceanographer in 1997 until retirement in 2001. Worked at General Dynamics Canada on Swedish and Canadian underwater acoustic systems, and in 2006, he joined Fisheries and Oceans Canada as a Senior Oceanography Adviser. In 2010, he formed a small Oceanography and Acoustics company, Maritime Way Scientific Ltd., specializing in underwater acoustic propagation modelling and operational oceanographic analysis.

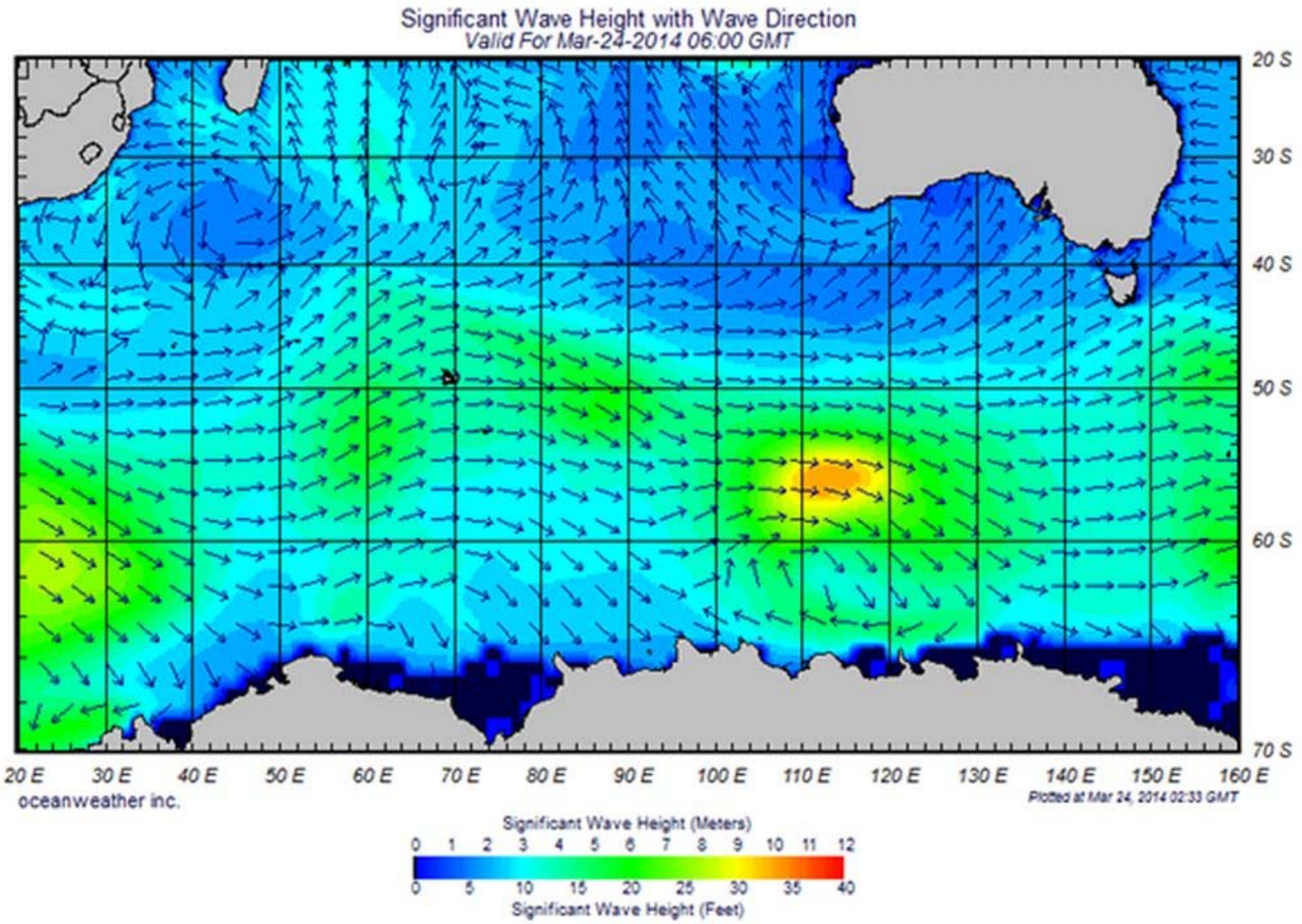


Figure 3: March 24 Significant Wave Height with Wave Direction. Courtesy of Oceanweather Inc. (http://www.oceanweather.com/data/Indian-Southern/index.html)

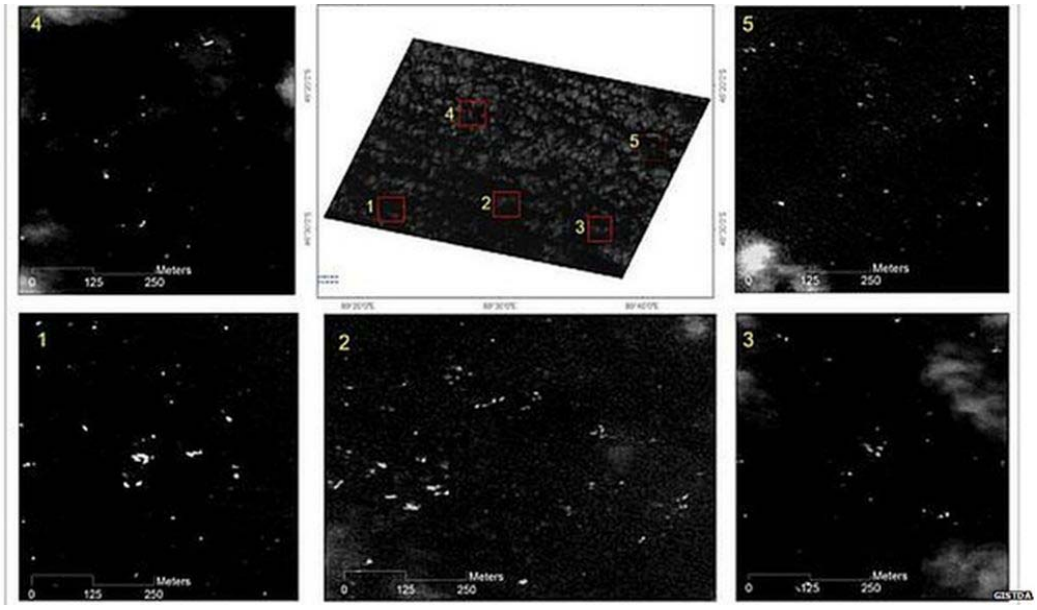


Figure 4: *March 28 – Images of Ocean Debris. A number of satellites and plane crews detected possible debris off the coast of Australia over the first two weeks of the search, scouring more than 1,000 km (600 miles) further north from the previous search zone. Courtesy of BBC News Asia (http://www.bbc.com/news/world-asia-26662641)*

The search then expanded with the deployment of the large torpedo-shaped autonomous underwater vehicle called a Bluefin-21 . Yet again – no clues, no sightings, no detection. Just a vast unforgiving ocean with a deep secret.

The Southern Indian Ocean is the world's most isolated ocean with a long history of making things disappear. Not only is the region remote, it also hosts worse weather than just about any other place on Earth. Take the harsh conditions that Canadians know of the North Atlantic in mid-winter and make them the rule rather than the exception in this part of the world, plagued by the "Roaring Forties", never-ending winds that howl around 40 degrees latitude south. The search areas are also the deepest parts of the Indian Ocean, with a rugged and volcanic ocean floor, leaving 90% of this area as uncharted. Submerged MH370 flight plane wreckage is likely to be in a region of seafloor that looks like an underwater Appalachian mountain range that significantly complicates the search for a plane's black box and wreckage site.

Floating debris and bottom wreckage fields

So where do you decide to look for crash debris on the surface? If the aircraft flew for an additional six to seven hours after its last known position, it's reasonable to assume that the plane may have crashed after running out of fuel … or maybe not. Could it have taken a direct western route instead of south? As an analogy, the North American continent fits within the boundaries of the Indian Ocean, hence it's like looking for a crash site in the state of Kentucky, when really it could have flown to Nunavut. The search needs a clue – a floating debris field!

The harsh conditions of the Southern Indian Ocean will disperse and submerge much of any debris floating on the surface. Intense wave action can submerge even the most buoyant of debris and very quickly it loses its buoyancy and sinks to the bottom. Or float south, just north of Antarctica to a zone where currents can carry debris around the globe without hitting land. The Antarctic Circumpolar Current (ACC) flows clockwise from west to east around Antarctica and is the dominant circulation feature of the Southern Ocean. It's among the largest current patterns in the world. The fetch and the size of this ocean create the highest waves in the world, further complicating the ocean surface search.

Floating debris can be carried by wind and currents as fast as one two nautical miles (nm) per hour. In a 24 hour period this equates to a travel distance of 24-50nm. After one week (or seven days) debris will have travelled 150-350nm. The floating debris "clue" would have been the most important component of the initial search. Any floating debris would allow searchers/scientists to use the current location of the plane flotsam and conduct reverse analysis of the weather, currents, wind speeds and direction by using particle-drift-models or statistical models (Bayesian statistics) that can calculate the probability distribution of the original position of the found debris. This clue would have significantly reduced the search area – or realize that you need to look in Kentucky and not Nunavut. Yet a lack of evidence or found debris should be of no surprise. It's a big ocean.

Satellite clues

Imagery satellite systems (such as Synthetic Aperture Radar Systems; Earth Observations; Hyper-spectral) are those that are not directly tied to aviation such as automatic engine reports, Doppler or GPS constellations. Often, the public would ask why are we not using these satellites to find the missing aircraft? The answer is that area coverage by satellite imagery is sparse and images are not routinely collected in the Southern Indian Ocean because there is nothing to monitor in that area. It is low in shipping and commercial air traffic. In essence, no commercial interest – so why monitor? It is pure science fiction to imagine that governments are sucking up vast amounts of high-resolution photos of the vacant sea surface every few seconds. Imagery and optical satellites can indeed see with high resolution, however, it is akin to taking a photo through a straw - it takes a great shot if you know where to aim it. If you don't know "precisely" where to aim it, you will just be taking photos of wide open space. One should also keep in mind that imagery satellites have the same issues of processing, downloading, and recharging. The spacecraft needs time in a sleep mode to recharge.

In 2008, Canada launched a highly capable satellite system called RadarSat2 (R2). This spacecraft contains wide area sensors that are very valuable. The sun synchronous orbit allows the satellite to be constantly recharged by the sun. Yet, even with this constant source of energy, the satellite can only image for about 15 minutes in a 100 minute orbit to allow for image processing, cooling, image transmission etc. -- this is important, because the satellite has to be programmed to be transmitting at the right time of each orbit in order to detect targets. R2 can also detect anomalies in the ocean surface texture over huge swaths of ocean. It can detect aircraft fuel/oil floating on the surface as little as 5-10 litres. If R2 was "tuned" to the southern oceans during the initial search periods – there is a possibility that R2 could have detected small fuel/oil spills in the area providing a clue of an impact site. The same particle drift models could then be used to calculate the likely original position of the plane crash area. But the time for R2 anomaly detection has long past for MH370.

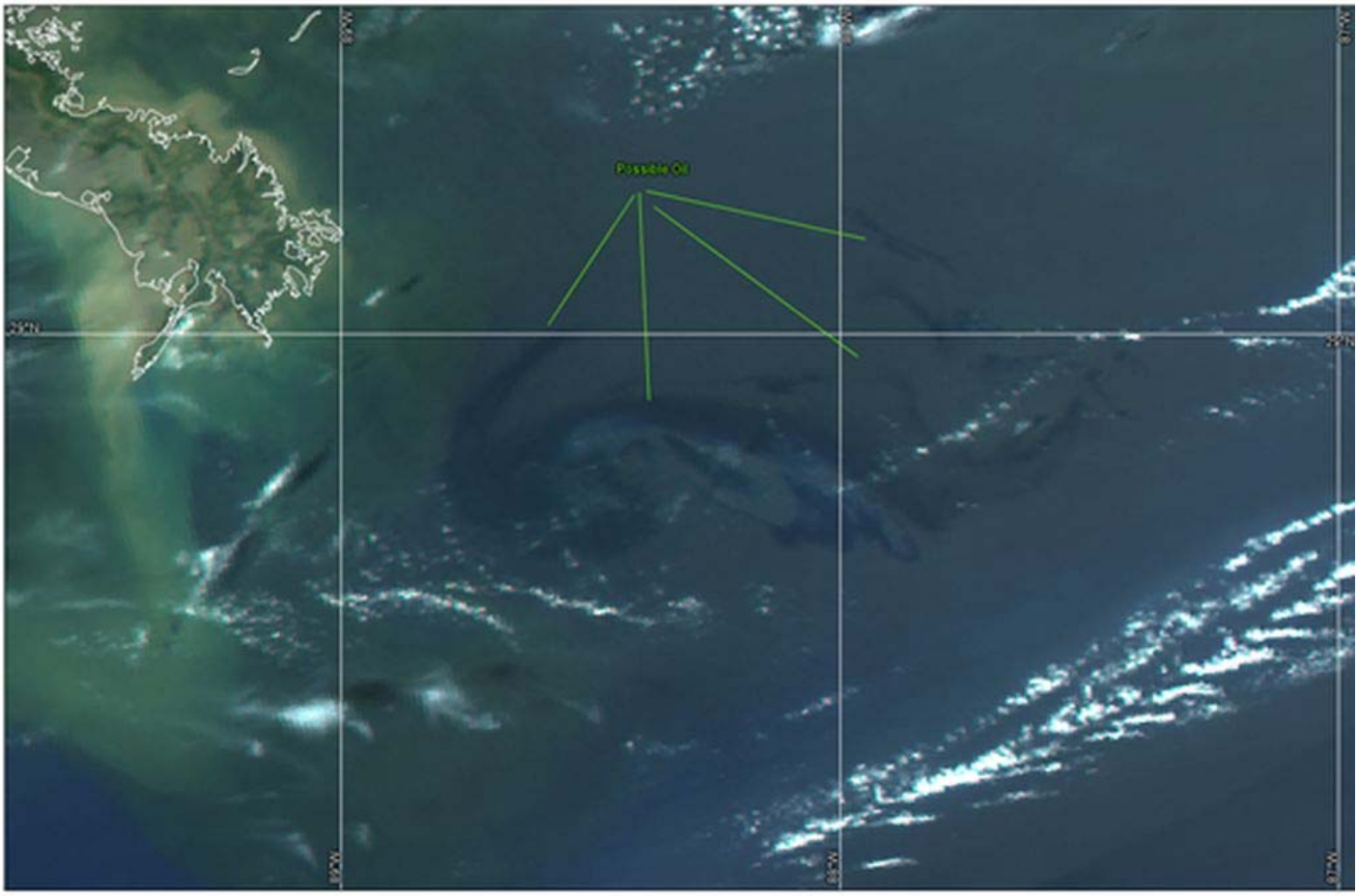


Figure 5: *NESDIS Satellite Analysis Branch uses MODIS and SAR imagery in support of response and mitigation efforts for oil spills. Canada's RadarSat 2 can detect aircraft fuel/oil floating on the surface as little as 5-10 litres. (http://www.nesdis.noaa.gov/news_archives/gulf_spill.html)*

What about the pingers?

The specifications of the aircraft pinger-transmitter were found (online) [2] to emit sound pings of 9 ms duration each second, at a source level of 157-160 dB (with respect to 1 micropascal at 1 m) and frequency 37.5 kHz. We assume that being a beacon, the pinger is largely omnidirectional in its sound radiation pattern. We presume that the frequency was chosen to avoid that part of the ocean ambient noise spectrum associated with global shipping.

A variety of factors can inhibit the performance of the pinger in extreme environments, such as being covered by debris or wrecked fuselage, and the immense hydrostatic pressure of the water column can lower the transmitter efficiency.

Figure 6: Flight Recorder and Pinger assembly.

2 http://traktoria.org/files/sonar/emergency_pinger/elp362d.pdf

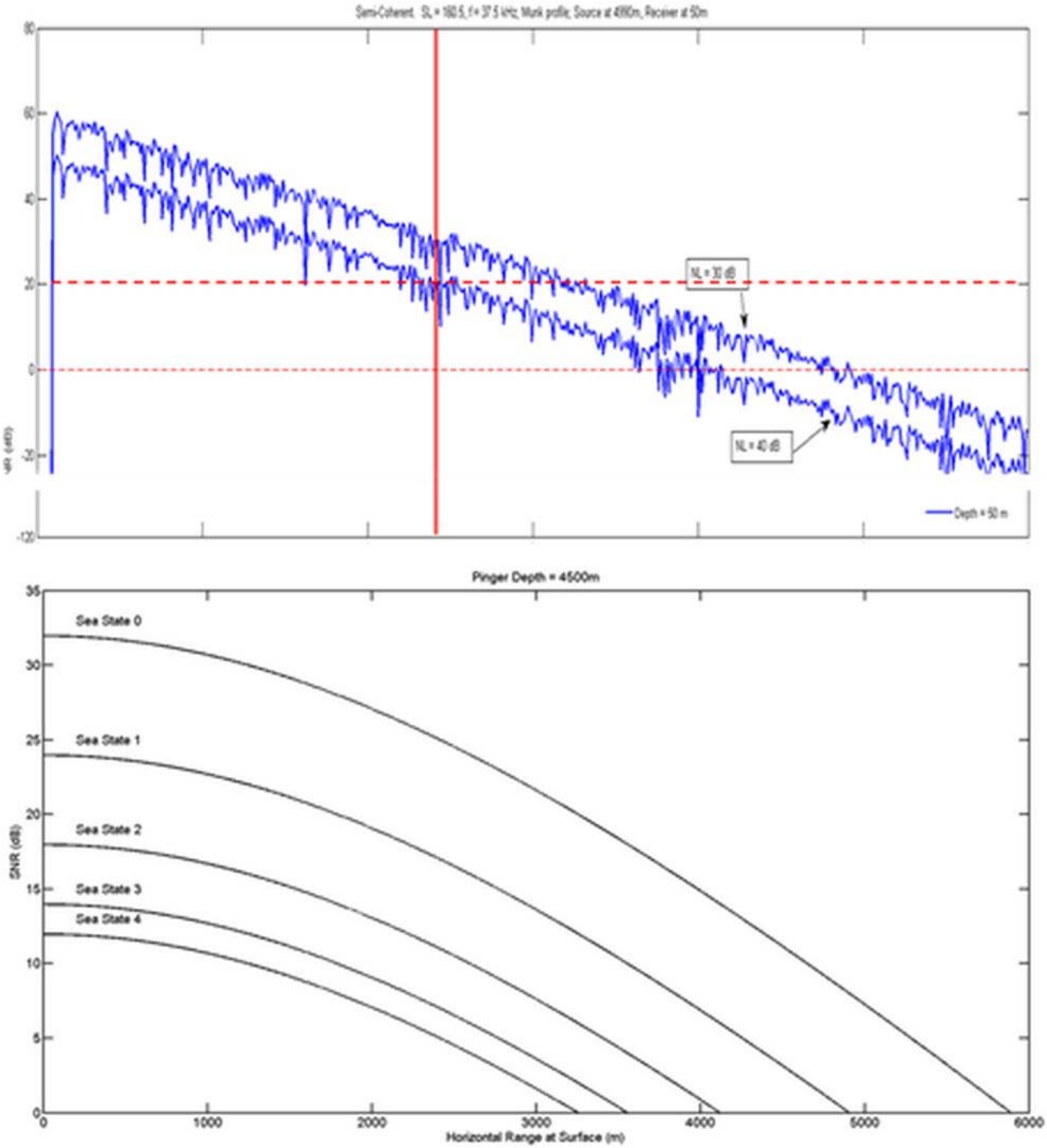


Figure 7: Detection range for various sea states (i.e. ambient noise) for a 5-ping average.

On the hardware, the batteries of a typical black-box pinger are lithium batteries that have a maximum "shelf life" of approximately six years. Often times, any battery sitting in a non-use period may have a shelf life of anywhere from three to six years. We assumed the aircraft preventive maintenance schedule (or regular maintenance on the blackbox) would have batteries exchanged for fresh ones on a regular basis. However, unless the batteries were replaced on the same day of the crash, they would not have the same voltage output as the stated specifications. There would have been a shelf life degradation, which means a reduced transmitted signal (not 160dBs) and a shorter transmission duration (not 30 days).

The 30-day lifetime of the acoustic beacon is in any case long past, making it almost certain that the black box is no longer broadcasting for location by triangulation.

Underwater acoustic analysis

In 2009, Air France Flight 447 departed Rio de Janeiro enroute to Paris and crashed into the Atlantic Ocean. It took two years to find the wreckage field at the bottom of the Atlantic, and only within 10km of the flight's last known position – or about one to two minutes of flight time. The location of the Titanic was known accurately for 70 years before it was found. Whereas MH370's last known position is estimated to be over seven hours! The wreckage could be anywhere in the Indian Ocean.

During the news coverage that Maritime Way Scientific Ltd. provided analysis for CTV News, we ran a large number of acoustic performance predictions for detection of the lost pinger. Because of the great ocean depth, and close proximity to the ocean bottom of the high frequency, omnidirectional source, it was appropriate to employ a simple spherical spreading model, using ray theory, instead of our usual suite of more sophisticated acoustic models.

For a most simple propagation case such as this one, the power generated by the pinger was radiated equally in all directions so as to be equally distributed over the surface of a sphere surrounding the source, as it propagated upwards from the bottom. With a pinger located at 4,500m to depths as deep as 7,500m, we assessed that the near vertical propagation was not going to suffer much diffraction and the acoustic paths were essentially straight lines. Loss of acoustic energy due to interaction with the bottom is expected to be high, so sound rays interacting with the sea bottom are lost, and were therefore ignored.

The pinger frequency is such that losses along the ray path are in the order of eleven dB per 1000 m (loss of acoustic energy due to absorption processes within the fluid medium increase with the square of the propagation frequency). As the ocean depth is so great, only steep propagation angles of acoustic energy are expected to be significant near the ocean surface. This translates to relatively short horizontal search radii at the ocean surface.

We ran several modelling runs, often shifting our input data with the different scenarios that were presented on the news (such as CTV News and CNN), as we attempted to re-create the environment that was reported. We only concentrated on the transmission of the pinger source in the ocean and its mixing with ambient background noise due to sea state (shipping noise is negligible at the pinger frequency), reflected by the following expression of the SNR (Signal-to-Noise Ratio):

Estimating Transmission Loss – Modeling of the transmission loss at 37.5kHz using the following simple sonar equation:

$$\mathbf{RL} = \mathbf{SL} - \mathbf{TL} \quad (1)$$

$$\mathbf{SNR} = \mathbf{RL} - \mathbf{NL} \quad (2)$$

where,

RL *is the received level of sound in dB re 1µPa (peak)*

SL *is the source level (@ 37.5 kHz) in dB re 1µPa @ 1m (peak)*

TL *is the transmission loss in dB*

SNR *is the signal to noise ratio of the signal excess over noise at the receiver*

NL *is the noise level at the receiver in dB re 1µPa (SPL Band, but could be spectrum as well).*

For noise level in the region, we assessed values that would accommodate the various sea states and wind speeds. Ambient noise levels of near 40 kHz on the Wenz curves [3] fall within 30 dB and 40 dB for Sea State 3. We used these two values to bound the Signal-to-Noise Ratio (SNR).

[3] Wenz Curves are plots of the average ambient noisespectra for different levels of shipping traffic, and sea state conditions (or wind speeds).

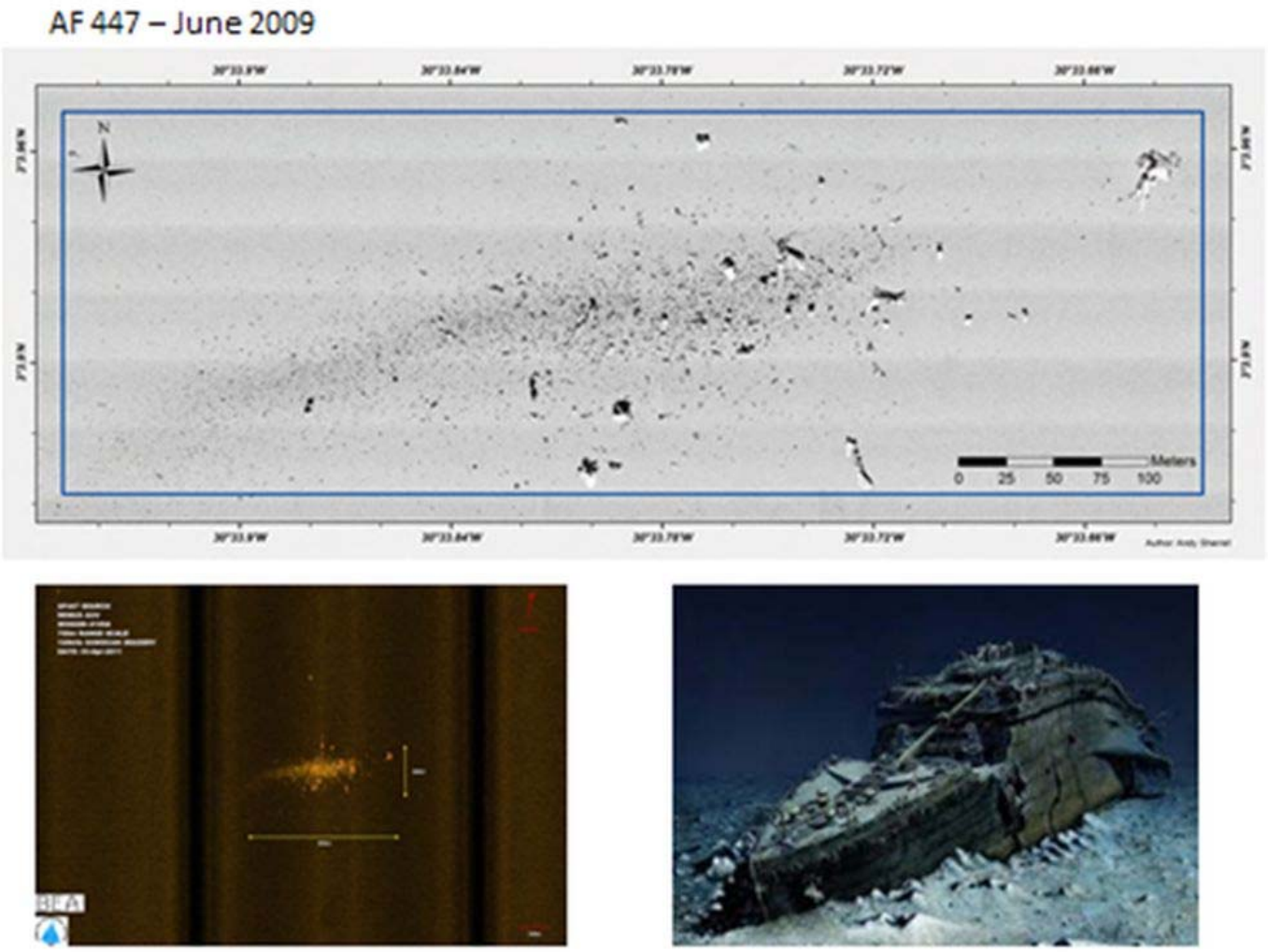


Figure 8: *Top and left hand figures showing sonar images of the debris field of AF 447 (June 2009) – compared with the massive hulk of steel left at the bottom of the Titanic.*

We then estimated the minimal detectable signal (SNR ≥ 0) and assessed our best estimates of the Probability of Detection (Pd) versus Probability of False Alarms (Pfa) as the basis for the detectability of the signal in normal conditions and the prevalent sea-state. With these assumptions, we estimated that a pinger in water depths of four to five km would be difficult to detect at the surface. As media updated reports of stated water depths we updated our assessments of the ranges and found they were in agreement with the media relayed search radii. That said, we clearly assessed that the pinger would not be detectable in water depths of 6km unless ocean noise levels are 20 dB or less – which is unlikely in the southern ocean. [4]

Our final conclusion: a very deep pinger with the stated conditions and assumptions could be detectable at ranges from the pinger of 3600m to 5000m max. As a hedge against our assumption the pinger being completely omnidirectional, we added 10 dB to the source level for increased directionality, without much range improvement.

Perhaps a main point of our analysis may be that the deep water is likely (in this case) to limit the transmit coverage-

[4] The added information of the narrow frequency band and 1-sec pulse rate does improve detectability considerably. It may seem that we have only a single ping to detect, when in reality the pinger transmits multiple independent opportunities (one every few seconds) to detect when transiting in its vicinity, hence driving up Pd. However, we did make calculations for N-pings as well and determined that the gain in SNR was only 10 log10 (N). So, you need 10 pings to get 10 dB. Now, 10 dB is a lot, but from media reports (which is all we had) they kept referring to 'detected a single ping'. Our analysis was focused on what we heard in the news and we assessed single ping detections or 10 $\log_{10}$(N) for ping averaging.

range of the pinger - which made detection conditional on passing very nearly directly above the pinger. However, a rugged bottom with canyons and gullys or high sea states would result in a near impossible detection of the pinger.

Domain awareness of the worst place to crash

Despite enormous advances in computing power and technology, the mystery surrounding Flight MH370 continues to highlight shortcomings in our knowledge of many areas of aviation technology ocean sciences, engineering, and human nature.

Officials know that MH370 left Kuala Lumpur airport with no signs of distress and its final data transmissions ceased somewhere over the South China Sea or Southern Indian Ocean. What happened next remains unclear since the flight data recorders (black boxes), which can only send out emergency signals for about a month after an incident, have not been located. Furthermore, despite significant advancements in ground-based and satellite surveillance capabilities as well as voice and data communications, the disappearance of MH370 highlights the inability or unwillingness of the international aviation regulatory community to address the shortcomings with the black box as a means to locate missing aircraft, particularly under water.

The disappearance of MH370 also highlights shortcomings in our knowledge of the deep ocean sea bed, oceanography, and ocean dynamics. While much attention was given to Bluefin 21, the autonomous underwater vehicle exceeded its maximum operating depth limit of 4,575m and its built-in mission abort features caused it to return to the surface prematurely.

Today, much of the world's ocean floors remain unmapped and our knowledge of ocean depths and bottom features to aid with anomaly detection (such as locating a missing aircraft or ship) remains a huge challenge. A testament to mankind's continuing ignorance and disregard for the environment, we learned that the Southern Ocean is a sea of trash which caused authorities to respond repeatedly to false sightings of aircraft debris.

But the shortcomings in our ability to understand and hopefully prevent a future MH370-like event are not confined to science, engineering, and innovation. Early speculation around terrorism, the demand for answers from the public, misinformation, as well as false expectations communicated by the authorities, and a frenzied media looking for fresh angles to the story all fueled false reporting and misplaced theories which undermined the search efforts.

In an age where information is just a few clicks away or the flick of a TV channel, the inclination to jump to conclusion is hard to fight. The MH370 event highlighted my efforts to build Maritime Way Scientific Ltd. as a company growing its reputation on hard data, solid science, and a global multidisciplinary network of experts.

Will we ever find MH370? – doubtful. In this case, the hard science begat hard truths.

The hard science of MH370

The following are Maritime Way Scientific Ltd.'s lessons learned from the science of MH370:

- The best available information indicates that MH370 went down in the vast, remote, deep, and hostile waters of the Southern Indian Ocean;

- Analysis showed how many oceanographic factors make the search very challenging – and the vastness of the Indian Ocean basin near impossible to find a speck of evidence;

- Prevailing sea conditions are among the roughest on earth, dispersing, masking, and submerging a surface debris field or oil slick;

- Prevailing current patterns are strong and consistent, possibly carrying surface debris long distances without hitting land;

- Satellite imagery of the air-space and sea surface in the region at the time of the crash was sparse and not routinely collected because the region is of little commercial or other interest;

- The seafloor is mountainous and rugged, possibly obscuring or masking a submerged debris field from the view of imaging sonar;

- The great water depth, acoustic absorption at the pinger frequency and ambient noise made detection of the plane's black-box acoustic pinger conditional on passing nearly above the black box. As a result, pinger detection was conditional on having solid information about the likely position of the black-box, which continues to be a matter of rough inference and conjecture;

- The black-box pinger has certainly stopped because its designed lifetime is in the order of 30 days, and surface debris have certainly been dispersed and carried far from the crash site, leaving seafloor debris as the last remaining detection cue. The search for seafloor debris is complicated by the extreme water depth, rugged seafloor, and very uncertain information (thus far) about where to focus the search in a vast hostile ocean.

Martin L. Taillefer, CD, M.Sc.
Maritime Way Scientific Ltd.,
Operational Oceanography & Scientific Solutions
mtaillefer@maritimeway.ca; www.maritimeway.ca

"Building a Window to a Transparent Ocean"

Réussites récentes et orientations futures du Service météorologique du Canada (SMC)

présenté par David Grimes[1] et rapporté par Marie-Élaine Boivin (SMC)

Certaines des réussites récentes et des orientations futures du Service météorologique du Canada (SMC) ont été soulignées au cours d'une séance présentée par son sous-ministre adjoint, David Grimes, dans le cadre du 48e Congrès de la Société canadienne de météorologie et d'océanographie (SCMO), qui s'est tenu du 1er au 5 juin 2014.

M. Grimes a fourni un aperçu de la façon dont les investissements réalisés par le gouvernement du Canada au cours des dernières années sont maintenant utilisés pour améliorer pratiquement tous les aspects du système de surveillance et de prévision météorologiques et environnementales du SMC, y compris son système d'avertissements des intempéries.

L'évolution des caractéristiques démographiques, les changements environnementaux, l'urbanisation et les politiques gouvernementales (notamment la politique sur les données ouvertes présentée plus tôt au cours de l'année et l'accent permanent sur l'amélioration de l'efficacité) ne sont que quelques-uns des nombreux facteurs qui exercent une influence sur la voie à suivre pour le SMC. La création d'un service réceptif et adaptable permettant de répondre aux besoins croissants et émergents des clients est essentielle dans un contexte national et mondial qui évolue rapidement.

Un des principaux objectifs des services essentiels à la mission du SMC consiste à fournir en temps opportun des renseignements, des prévisions et des avertissements météorologiques de plus en plus précis et exacts afin d'assurer aux personnes concernées, dont les gestionnaires de situations d'urgence et les intervenants en cas d'urgence, un préavis aussi long que possible pour leur permettre d'atténuer les effets des phénomènes météorologiques violents, tels que les inondations survenues à Calgary, la tempête de verglas qui a frappé Toronto et la série de tempêtes hivernales et de tornades qui ont mis des vies en danger et endommagé des biens au cours de la dernière année.

En phase avec le thème du Congrès de cette année, M. Grimes a non seulement souligné que les changements marqués qui surviennent dans le Nord canadien ont une incidence sur la sécurité et les moyens de subsistance des habitants du Nord du Canada, mais qu'ils offrent également des occasions de développement responsable des ressources à grande échelle. Cependant, certaines lacunes devront être comblées pour soutenir ces efforts et renforcer la résilience et la durabilité des collectivités. L'expansion du réseau de surveillance de l'Arctique et de ses services a été reconnue à la fois comme une priorité et comme un défi, compte tenu du fait que les coûts représentent presque le double de ceux observés dans les régions au sud du pays.

Pour relever ces défis et les autres auxquels l'organisation doit faire face, le SMC a élaboré un programme de transformation visant à concrétiser sa vision d'une organisation performante capable de comprendre et de prévoir les changements touchant les conditions météorologiques, l'eau, le climat, la glace et la qualité de l'air selon différentes échelles de temps variant de minutes à des saisons complètes, en cherchant plus particulièrement à fournir un éclairage sur les répercussions de ces changements.

Ce programme de transformation, fondé sur un plan sur dix ans, vise à améliorer et à mettre à niveau le réseau de surveillance du SMC, à maintenir sa capacité informatique de haute performance, à s'appuyer sur les progrès en sciences et technologie, à améliorer ses services, à tirer profit de partenariats à tous les niveaux et à assurer la durabilité de l'organisation et de ses employés à long terme.

Afin de moderniser l'infrastructure de surveillance météorologique et climatique du SMC, des investissements ciblés sont actuellement consacrés au réseau d'observation de surface, au réseau d'observations aérologiques et au réseau canadien de détection de la foudre.

Le SMC a mis au point une stratégie visant à stabiliser le réseau de radars météorologiques en remplaçant et en mettant à niveau de l'équipement selon les besoins. Il a collaboré avec des experts météorologiques de la France et de l'Australie où des efforts semblables ont produit des résultats favorables. De plus, pour déterminer les besoins, le SMC a créé un index fondé sur l'emplacement et la fréquence des phénomènes météorologiques menaçants et sur la taille de la population. Cet index a ensuite été appliqué à l'échelle du pays afin non seulement de garantir qu'une couverture adéquate soit assurée dans les zones à risque élevé, mais également que le type de radar installé à chaque site fournisse des renseignements de la meilleure qualité possible selon les conditions météorologiques généralement observées à cet endroit.

Le Canada dispose de l'un des services météorologiques les plus automatisés au monde et le super-ordinateur est une composante essentielle à ses capacités analytiques et

[1] Sous-ministre adjoint du Service météorologique du Canada

de prévision. Alors que la version actuelle sera bientôt désuète, un processus a déjà été lancé afin de connaître les solutions proposées par l'industrie pour la prochaine génération de super-ordinateurs.

Puisqu'il faudra environ un an pour passer à un nouveau système et en valider le rendement, une stratégie a déjà été élaborée pour se préparer à la migration à venir. Une collaboration efficace avec d'autres pays, dont les États-Unis, l'Australie et certains pays d'Europe, qui travaillent également à mettre à niveau leurs propres systèmes, permet de soutenir le processus de migration entrepris par le SMC.

Le SMC travaille également en étroite collaboration avec les experts scientifiques d'Environnement Canada, des universités et la communauté internationale pour mettre en pratique les avancées de pointe de la science et de la technologie, y compris des modèles de prévision numérique du temps et du climat et des projections de modèles climatiques permettant des prévisions dans un intervalle variant de quelques minutes à plusieurs années, tout en offrant des résolutions de plus en plus élevées et des préavis de plus en plus longs. Par exemple, alors que le système de prévision d'ensemble global actuel est capable de prévoir les conditions météorologiques n'importe où sur la planète à une résolution de 66 km, 16 jours à l'avance, la prochaine version offrira une résolution de 50 km et un préavis deux fois plus long.

Puisque les capacités en matière de superinformatique du SMC rendent également possible l'intégration des modèles atmosphériques, océaniques et hydrologiques, un projet pilote est actuellement en cours, en collaboration avec l'Organisation météorologique mondiale et les États-Unis, afin de produire des données plus précises et exactes pour la gestion des niveaux d'eau et des urgences dans les Grands Lacs.

Des efforts constants sont déployés afin d'améliorer la qualité et l'utilité des services du SMC et des projets majeurs ont été mis en place pour améliorer la façon dont les prévisions sont produites et les alertes transmises. Grâce à l'outil de prévisions météorologiques NinJo, par exemple, les prévisionnistes peuvent maintenant faire le suivi d'une tempête au moyen d'une image «en direct» qui montre les déplacements et l'évolution.

Twitter a récemment été ajouté à l'arsenal d'outils utilisés par le SMC pour obtenir des observations météorologiques. En effet, la population canadienne peut maintenant envoyer des « gazouillis » directement aux prévisionnistes contenant de l'information sur les tempêtes qui se rapprochent et sur d'autres conditions météorologiques potentiellement dangereuses, ce qui leur permet de concentrer leurs efforts sur ces zones à risque plus élevé. Le SMC travaille également avec Twitter afin de déterminer comment cet outil pourrait également être utilisé pour distribuer des gazouillis d'«avertissement» à tous les Canadiens intéressés par ce service. Restez à l'affût!

Les alertes et les avertissements ont été perfectionnés grâce à l'ajout de renseignements supplémentaires sur les répercussions possibles des prévisions météorologiques, ce qui permet aux gens de prendre les mesures nécessaires pour se protéger et protéger leurs biens avant qu'un événement dangereux se produise. Par exemple, les alertes en cas de pluies abondantes comportent maintenant des renseignements sur les secteurs où des crues éclair pourraient se produire. En outre, le site Web des services météorologiques offre quelques nouveautés, comme des prévisions horaires pour les 24 prochaines heures ainsi que des données géoréférencées brutes destinées aux utilisateurs spécialisés et disponibles à partir d'un entrepôt de données accessibles au public.

Le Canada est également devenu l'un des premiers pays au monde à offrir des avertissements météorologiques par l'entremise de Google; un système novateur qui affiche des alertes sur la page Web de tout utilisateur qui effectue une recherche en ligne afin d'obtenir des renseignements sur une zone géographique où des épisodes de temps violent sont en cours ou sont prévus.

Compte tenu des ressources limitées, l'importance de tirer profit de partenariats à tous les niveaux est un autre objectif majeur de la transformation du SMC, qui collabore à l'échelle provinciale, nationale et internationale avec l'industrie, la communauté scientifique et d'autres intervenants. Au chapitre de l'hydrométéorologie, par exemple, la Division des relevés hydrologiques du Canada entretient une relation de longue date avec son homologue américain et collabore avec la plupart des provinces pour recueillir des données sur les niveaux et les débits d'eau.

Reconnaissant l'importance du travail des autres intervenants dans le cadre de son mandat, le SMC soutient également l'expansion des organismes bénévoles, comme le Réseau de collaboration sur la pluie, la grêle et la neige (CoCoRaHS). De plus, le SMC travaille en étroite collaboration avec d'autres ministères pour étendre ses capacités opérationnelles, par exemple, avec Pêches et Océans Canada et le ministère de la Défense nationale en matière de prévisions couplées relatives à l'atmosphère, aux océans et aux glaces.

Enfin, le SMC a procédé à une réorganisation interne pour être en mesure de relever ces défis au cours de la prochaine décennie, mais également pour s'assurer que ses ressources les plus importantes, les membres de son personnel, reçoivent la formation nécessaire à l'évolution de leurs rôles et qu'ils savent tirer parti des nouveaux outils et des nouvelles technologies mises en place. En conclusion, M. Grimes a souligné qu'en ayant une vision globale de tous les aspects de ses opérations, le SMC peut ainsi s'assurer de demeurer une organisation adaptable, pertinente et durable, aujourd'hui et à l'avenir.

Meteorological Service of Canada - Recent Accomplishments and Future Directions

presented by David Grimes[2] and reported by Marie-Élaine Boivin (MSC)

Some of the recent accomplishments and future directions of the Meteorological Service of Canada (MSC) were highlighted during a session presented by its assistant deputy minister, David Grimes, at the 48th CMOS Congress on June 1-5, 2014.

David Grimes, ADM, Meteorological Service of Canada; photo credit: LAC Rimouski Congress

Grimes provided an overview of how investments made by the Government of Canada in the past few years are being used to enhance virtually every aspect of the MSC's weather and environmental monitoring and prediction system, including its warning system for high-impact weather.

Changing demographics, changes in the environment, urbanization, and government policies—including the open-data policy introduced earlier this year and the ongoing emphasis on improving efficiency—are just a few of the many drivers influencing the MSC's path forward. Creating a nimble and responsive service that can meet the increasing and emerging needs of its clients is critical in a national and global context that is evolving so rapidly.

A major focus of the MSC's mission-critical services is to provide increasingly precise, accurate, and timely information, forecasts, and warnings. A primary goal is to give those affected, including emergency managers and responders, as much lead time as possible to mitigate the impacts of severe weather, such as the Calgary flood, the Toronto ice storm, and the series of winter storms and tornadoes that threatened lives and property over the past year.

In keeping with the theme of this year's congress, Grimes noted that the marked changes occurring in Canada's North are not only affecting the safety and livelihoods of Northern Canadians but also offering opportunities for responsible, large-scale resource development. There are, however, gaps that need to be filled to support these efforts and strengthen community resilience and sustainability. Recognized as both a priority and a challenge is expanding Canada's arctic monitoring network and services, as costs are roughly double those in the south areas of the country.

To respond to these and other challenges, the MSC has developed a transformative agenda aimed at moving it toward its vision of a well-performing organization that understands and predicts changes in weather, water, climate, ice, and air-quality over varying time scales ranging from minutes to seasons, with an increased emphasis on informing on the impacts of these changes.

The agenda is based on a ten-year plan to improve and upgrade the MSC's monitoring network, sustain its high-performance computing capacity, build on its science and technology, enhance its services, leverage partnerships at all levels, and ensure that both the organization and its workforce are sustainable over the long term.

To modernize the MSC's weather and climate monitoring infrastructure, targeted investments are being made in the Surface Observing Network, Upper Air Network, and Canadian Lightning Detection Network.

Working collaboratively with meteorological experts from France and Australia, where similar efforts have been successful, the Service has developed a strategy to stabilize the Weather Radar Network by replacing and upgrading equipment, as needed. To determine needs, the MSC created an index based on the location and frequency of high-impact weather events and population size and applied it across the country. This approach was taken to ensure not only that there was adequate coverage in high-risk areas but also that the type of radar at each site provided the best possible quality of information for the weather typically encountered there.

Canada has one of the most automated weather services in the world, and a critical component of its analytical and predictive capabilities is the supercomputer. With the current version nearing retirement, a process has already been launched to seek industry's solutions for the next generation of supercomputer.

[2] Assistant Deputy Minister of the Meteorological Service of Canada

Given that it will take about a year to switch systems and validate performance, a strategy has already been developed to prepare for the upcoming migration. Fortuitously, other countries, including the United States, Australia and some European nations, are also upgrading their systems, allowing for some effective collaboration to support this process.

The MSC is also collaborating closely with Environment Canada's own science experts, universities, and the international community to implement state-of-the-art advances in science and technology—including numerical weather and climate forecasting models and climate model projections capable of predictions on a range from minutes to years, with increasingly higher resolutions and longer lead times. For example, while the current global ensemble is capable of forecasting weather anywhere on Earth at a resolution of 66 kilometres, 16 days ahead, the next iteration will operate at 50 km and double the lead time.

Since the MSC's supercomputing capabilities also make it possible to integrate atmospheric, oceanic, and hydrologic models, a pilot project is underway with the World Meteorological Organization and the United States to produce more precise and accurate information for managing water levels and emergencies in the Great Lakes.

Efforts to improve the quality and usefulness of the MSC's services are ongoing, with major projects in place to improve the way in which forecasts are produced and alerts issued. Thanks to the NinJo forecast-production tool, for example, forecasters can now track a storm through a "living" image that shows how it is moving and evolving.

Twitter has also recently been added to the arsenal of tools the MSC uses to obtain weather observations, with people across Canada now able to "tweet" information on approaching storms and other potentially hazardous weather conditions directly to forecasters, so they can target their efforts on these higher-risk areas. The MSC is also working with Twitter to investigate how it can use this tool to also distribute "warning" tweets to all interested Canadians.

Alerts and warnings have been honed by adding more information on the possible impact of weather forecasts, so people can take steps to protect themselves and their property before a hazardous event occurs. For instance, if a heavy rain alert is issued, it now includes information on areas where flash floods are possible. Also newly available on the Weather website are hourly forecasts for the next 24 hours, and raw, geo-referenced data for specialized users that is available in a publicly accessible data warehouse.

Canada has also become one of the first countries in the world to have its weather warnings issued through Google; an innovative system by which alerts appear on the web page when anyone searches the Internet for location information in an area where severe weather is occurring or expected.

With resources tight, the importance of leveraging partnerships at all levels is another major focus of the MSC's transformation, with collaborations occurring at the provincial, national, and international levels with industry, the scientific community, and others. On the hydro-meteorology front, for example, the Water Survey of Canada has a longstanding relationship with its American counterpart and works with most provinces to collect data on water levels and flows.

Recognizing the importance of the work of others to its own mandate, the MSC is also supporting the expansion of volunteer organizations, such as the Community Collaborative Rain, Hail and Snow network (CoCoRaHS). And it is working closely with other government departments to expand its operational capabilities — as it is with Fisheries and Oceans Canada and National Defence in the area of coupled atmosphere, ocean, and ice prediction.

Last, but not least, the MSC has reorganized itself internally to deliver on all of these challenges over the coming decade. Equally important is ensuring that its most important resource—its people—are properly trained for their evolving roles and to take advantage of the new tools and technologies being introduced. In closing, Grimes noted that, by taking a holistic perspective of every aspect of its operations, the MSC is ensuring that it will remain adaptable, relevant, and sustainable—now and into the future.

CMOS Accredited Consultants
Experts-Conseils accrédités de la SCMO

Reports / Rapports

Report on the Workshop on the Future of CMOS [1]

Rimouski, June 3, 2014

by Pierre Gauthier [2] and David Huard [3]
CMOS Executive Committee

1. Objectives

The membership of the society comprises scientists from the public, academic, and private sectors, the three sectors mutually benefiting from collaborating with each other. Over the years, CMOS has played a central role in bringing together this community through its congresses, publications, and advisory committees on science, education, public outreach, and private sector. But is it enough? CMOS should be the place to go to find expertise on meteorology, oceanography, and climate. The fact is, however, that outside from our community, CMOS is not well known. The result is that journalists end up contacting experts outside of Canada to comment on scientific issues associated with Canadian weather events or the Canadian Arctic. CMOS's *raison d'être* being the advancement of science, it should be proactive in addressing such issues.

Early audience at the workshop on the Future of CMOS held on June 3rd. In the front row (left to right), David Grimes, ADM, Meteorological Service of Canada and Denis Hains, DG, Canadian Hydrographic Service and Oceanographic Services. Photo credit: CMOS Bulletin SCMO Editor.

The workshop took place on June 3, 2014 at the end of the day during the CMOS Congress in Rimouski. More than thirty (30) people took part to an open discussion that followed three short presentations. One was made by Mr. David Grimes, assistant deputy minister of the Meteorological Service of Canada, who presented the Environment Canada (EC) perspective on the role of CMOS. Denis Hains, director general in the Department of Fisheries and Ocean, did the same for DFO. This reflected the long-standing interest and support of EC and DFO towards CMOS. The then vice-president, and now president of CMOS, Harinder Ahluwalia, presented a thorough review of services that CMOS could offer. A discussion followed with the audience to discuss the priorities on which the CMOS executive should focus.

From the government point of view, the question is "Do we need CMOS?" Yes we do, why? In today's world, it is very difficult to get everyone in one place. The challenge is how do you focus? How do you get visibility? Without CMOS we would lose touch of each other. I think it's worth investing in.

- David Grimes

2. The perspective from Environment Canada (David Grimes)

CMOS brings communities together and initiates new ideas. During the congress, I've seen examples of projects in which three departments were working closely together. Until not long ago, congresses were the only effective way to share information at that scale. But the world is different now and we need to adapt to the new means of communication to see how they can be leveraged to share ideas more efficiently. The congress is not the only way to bring together and strengthen our community.

From the government point of view, the question is "Do we need CMOS?" Yes we do, why? In today's world, it is very difficult to get everyone in one place. The challenge is how do you focus? How do you get visibility? Without CMOS we would lose touch of each other. I think it's worth investing in. However, it is hard to justify sending 100 people to a single event. It is a tough sell to justify to the minister sending so many people at the same place to gather and exchange. The minister responded to CMOS' request for the early acceptance of travel to CMOS. It is important for

[1] La version française suit.

[2] CMOS Past-President

[3] CMOS Recording Secretary

CMOS to give feedback to the minister and explain why it's appreciated and important. Maybe smaller more topical meetings that do not bring everybody together could be a way to spread the participation of government's professionals, and this would be easier to justify. There are only a few congresses where more than two people from EC go.

CMOS brings students in, and from an employer's point of view, this is major. Indeed, you see how they behave and present, and see facets that you don't see in an interview. It makes a big contribution for succession planning. This is something that CMOS does that makes a big difference.

3. The perspective from the Department of Fisheries and Oceans (Denis Hains)

The CONCEPTS program was mentioned previously as a good example involving scientists from three departments as well as universities. This is a good example of collaboration in meteorology, oceanography, hydrology, stakeholders, etc. across all sectors (industry, academia, government, citizens, international).

- Denis Hains

The problem raised for travel authorizations at EC is also true for DFO. It is very difficult to send more than two or three to a congress. Participation of students at CMOS congresses is refreshing to see and important to us. With new technologies and ways to access people, this is very powerful.

The CONCEPTS program was mentioned previously as a good example involving scientists from three departments as well as universities. This is a good example of collaboration in meteorology, oceanography, hydrology, stakeholders, etc. across all sectors (industry, academia, government, citizens, international).

CMOS is certainly helpful in professional development, and nurturing relationships between different disciplines and organizations; this is central to innovative research. The linkage also makes it possible to present and explain the strategic direction of the government altogether as its policies. This is also important to engage a broader spectrum of people in international programs.

4. What CMOS could offer (Harinder Ahluwalia)

Harinder Ahluwalia went over the points raised in the document *A Roadmap to the Future of CMOS* [4] presenting several services CMOS could offer. What can be done to make more progress in the organization and improve upon those points that it is doing well. First, it was noted that the members of the organization are individuals, either students, professionals, retired and academics researchers, but there could also be large corporations who use meteorology and ocean sciences for their own operations: Hydro-Québec, BC Hydro, NavCan, etc. They could be supporting CMOS too. Provincial departments, municipalities are big users of meteorological information and could support us just as EC and DFO support CMOS.

Should CMOS remain a scientific organization or become a scientific *and* professional organization? A certification program is already in place with ECO Canada to give credentials to individuals to act as professionals in meteorology and oceanography. At the moment, people can become forecasters with minimal training and this is a problem. The importance of having such credentials should be emphasized to work in our field. CMOS could act to make this known and demand that this be the case. This could help to significantly increase CMOS membership and the resources. This could be a convincing argument for private corporations to become corporate members.

What will attract people to CMOS is the value they see in it. Another essential part of what CMOS does relates to training through support of students. The congresses are valuable as an opportunity to see and discuss with future promising scientists, the students. CMOS could also help by having a mentoring program to match students and professionals providing excellent training on the field.

This could help to make CMOS more relevant which in turn could result in increasing our membership. Membership is decreasing and this is not a very good trend. How do we reverse that trend? In the document, a lot of options have been summarized and a questionnaire sent to all of you in a survey[5]. We invite you to fill in this questionnaire and give your thoughts. This will be carefully looked at to establish our strategic plan for the future.

[4] *see* http://www.cmos.ca/FutureCMOS/DiscussionPaper_May2014.pdf

[5] See the survey questionnaire at http://www.cmos.ca/FutureCMOS/survey_19Jun14_e.pdf .

5. Summary of the points raised in the discussion

5.1. *A CMOS strategic plan*

A point that came back was the need for CMOS to better define its objectives, the means it wants to implement actions to achieve those and monitor its progresses. This is the very definition of a strategic plan. Examples were given where a scientific society holds meetings to discuss the fundamental challenges that need to be addressed. Once this is established they work on implementing programs to achieve this objective. Industry, government, and universities are part of the discussion. Space agencies such as NASA (National Aeronautics and Space Administration) or ESA (European Space Agency) proceed in this manner and come up with research programs that eventually lead to the satellite observation program for the next ten years. This is quite the opposite of launching a satellite and asking what to do with it afterwards. A successful program is one which has clear objectives with an implementation that identifies the research needed to address the challenges it raises.

Interactions between the oceans, land cover, ice, and the atmosphere, including its chemistry, is one area for which there is a lot of interest and that presents several challenges. As was pointed out during presentations at the congress, there is a need for the community to come up for a plan to identify the direction its development will take. CMOS could hold meetings to hammer out what the big questions are so everyone can align and work together. At the moment, when a research program is launched nobody is really prepared for it and the response is not as focussed as one should expect. Aside from the innovative aspects, there are also some programmatic considerations that should come in play.

Examples were given of the institute of physics in the UK, or astronomy in Canada who manage to have a large impact on governments' science policy. CMOS is concerned with atmospheric and oceanic sciences but could also broaden its interest to biogeochemistry and water sciences. The research issues that are the object of current research do involve to a great extent these disciplines.

There is a need for CMOS to come up with a strategic plan to better define scientific challenges that need to be addressed and propose a way that properly tackles these. The aim of the society is the advancement of meteorology and oceanography, and it should be reaffirmed. It was also pointed out that, in the past, AMS (American Meteorological Society) has organized meetings on the weather enterprise, something that the U.S. government could not do. This had a significant impact on weather services government programs in the U.S. The Jenkins report[6] discussed how the industry, government, and universities can work together. It also states how innovation is central to economic growth. What CMOS could and should do is to particularize these general objectives to the management of atmospheric and oceanic sciences.

5.2 *Communication with the media and the public*

Communication with the media is a necessity for the visibility of CMOS and it requires professional services to engage the media during its congresses and all year long to respond to media requests for expert advice associated with weather events that are in the news. This is something that CMOS could develop and become the place to go when seeking expert advice on meteorology, oceanography, and climate. Several journalists are at a loss at the moment to find Canadian expertise to speak with authority on such scientific issues. This is also complicated with the federal government's communication policy that makes it more difficult to gain access to their scientists. CMOS could easily develop tools that would be of great help to quickly find relevant expertise. Recent examples have shown that we did not respond in a timely manner to such requests. CMOS national office should offer some guidance regarding the organization of media relations for its annual congresses and the dissemination of information related to congresses (e.g., recorded presentations by plenary speakers).

It was also pointed out that although it is difficult to get a column in the hard copy version of a newspaper, it could be easier to get one in the electronic one. There is certainly someone within CMOS who could be interested to embark in such an endeavor, presenting it as a CMOS endorsed contribution. These columns need to be timely, and they have to appear right after an event. It also has to be regular. CMOS can mobilize to put something like this together. No other organization is equipped to do that. This could be a way to give more visibility to what we do.

5.3 *Membership*

Weather and the climate is a topic of much interest to the general public. Weather hobbyists could adhere to CMOS, but at the moment no service targets those potential members. There was a general consensus at the meeting that reaching this public was an excellent idea. Having public conferences should be supported and recorded for easy access. Other needs may develop and ways to meet them will have to be found. To influence policy, you need a ground swell of support. Having members from the general public would add a new voice to CMOS.

---

[6]The report can be found at the following address: http://www.pwc.com/en_CA/ca/sred/developments/publications/narrowing-canada-innovation-gap-2011-11-en.pdf

Teachers could be of great hep and should be more involved. Teacher's Day is well attended. CMOS sends a teacher to Maury naval academy and is a partner with the Canadian Geophysical Society and the Canadian National Committee for SCOR. One of the sad things is teachers don't know where to get Canadian information about the climate. If teachers know, kids get to know and bring it back home. Ontario has taken weather out of the curriculum but cover climate change. Weather and climate are indissociable and teachers have to convey this to students.

The presence of young students at every congress is an indication that there is a potential to get new members. University graduates should be encouraged to become members. It was mentioned that regional centres have difficulty to attract participation from government professionals. Participation to CMOS should be championed from the highest level of government. Aside from EC and DFO, there are other federal departments, such as the Department of Defence, who have an interest in oceanography.

5.4 *Involvement in policy*

One of the things that has surprised many in the past, is how silent CMOS was about issues that relate to scientific issues about meteorology and oceanography. There are a number of issues where our members would like to hear CMOS to comment on. It would be very good for visibility if CMOS could be seen as a representative of this community.

CMOS should contribute to different policy forums on the development of research programs that concern meteorology and oceanography. Private sector issues require that a good strategy for innovation would "make business innovation one of the core objectives of procurement" (Jenkins report).

Conclusions

A survey was issued to CMOS members and 260 people responded to express what were the items they think should be prioritized. From the workshop itself, there was a strong support to consider opening CMOS to the general public and create a particular category to that effect. The idea of creating a mentoring program also gathered a lot of interest. Finally, there is clearly a need for CMOS to develop a strategic plan to guide its efforts to increase its visibility and its membership. These are not goals in itself, the objective being more to have an impact on policies to support research and development in meteorology and oceanography to address issues that the Canadian society will be facing. Weather and climate are central to a significant part of our economy and our lives and the research and professional services done by our community. It has to be better understood why the research we do is needed and so important to address important socio-economic issues.

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

Latest Books received / Derniers livres reçus

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

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

2014-3) Essentials of the Earth's Climate System, Cambridge University Press, ISBN 978-1-107-62049-0, Paperback, 259 pages, $67,95.

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

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

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

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

2014-8) Sea-Level Science, Understanding Tides, Surges, Tsunamis and Mean Sea-Level Changes, by David Pugh and Philip Woodworth, Cambridge University Press, 978-1-107-02819-7, Hardback, 395 pages, $103,95.

Rapport de l'atelier sur le futur de la SCMO [1]

Rimouski, 3 juin 2014

par Pierre Gauthier [2] et David Huard [3]
Comité exécutif de la SCMO

1. Objectifs

La composition de la Société canadienne de météorologie et d'océanographie (SCMO) comprend des scientifiques issus des secteurs public, universitaire et privé. Ces trois secteurs profitent mutuellement de la collaboration qui existe entre eux. Au fil des ans, la SCMO a joué un rôle central quant au regroupement de cette communauté, et ce, grâce à ses congrès, à ses publications et à ses comités consultatifs sur la science, l'éducation, la sensibilisation du public et sur le secteur privé. Mais est-ce suffisant? La SCMO devrait tenir lieu de guichet où trouver de l'expertise sur la météorologie, l'océanographie et le climat. Toutefois, en dehors de notre cercle, la Société est peu connue. Conséquemment, les journalistes finissent par communiquer avec des experts étrangers pour connaître leur opinion sur des questions scientifiques liées aux événements météorologiques touchant le Canada ou l'Arctique canadien. Sa fonction étant l'avancement des sciences, la SCMO devrait être proactive en ce qui concerne ces questions.

L'atelier s'est tenu le 3 juin 2014, en fin de journée, pendant le Congrès de la Société, à Rimouski. Plus de trente (30) personnes ont participé à la discussion libre suivant trois courtes présentations. Monsieur David Grimes, sous-ministre adjoint du Service météorologique du Canada, a présenté la perspective d'Environnement Canada sur le rôle de la SCMO. Monsieur Denis Hains, directeur général au ministère des Pêches et Océans, a aussi émis le point de vue de son ministère. Leurs présentations ont reflété l'intérêt de longue date et le soutien d'Environnement Canada, et de Pêches et Océans Canada envers la SCMO. Le vice-président sortant de la SCMO (maintenant président), Harinder Ahluwalia, a présenté une revue complète des services que la Société pourrait offrir. Ensuite, la discussion avec les participants a porté sur les priorités sur lesquelles devrait se concentrer l'exécutif de la SCMO.

Premiers participants à l'atelier de travail sur le futur de la SCMO tenu le 3 juin. Dans la première rangée, (de gauche à droite) David Grimes, SMA, Service météorologique du Canada et Denis Hains, DG, Service hydrographique du Canada et services océanographiques. Photo gracieuseté du rédacteur CMOS Bulletin SCMO.

Du point de vue du gouvernement, la question demeure : avons-nous besoin de la SCMO? La réponse est « oui ». Pourquoi? De nos jours, il reste très difficile de réunir un bon nombre de personnes à un seul endroit. Le défi en est un de concentration. Comment obtient-on une certaine visibilité? Sans la SCMO, nous nous perdrions de vue. Je pense qu'il vaut la peine d'y investir.

- David Grimes

2. La perspective d'Environnement Canada (David Grimes)

La SCMO réunit les communautés et lance de nouvelles idées. Au cours du Congrès, j'ai vu des exemples de projets sur lesquels trois ministères travaillaient en étroite collaboration. Récemment encore, les congrès s'avéraient le seul moyen efficace de partager de l'information à cette échelle. Mais le monde a changé. Nous devons nous adapter aux nouveaux moyens de communication et voir de quelle façon les exploiter pour partager efficacement nos idées. Le Congrès ne constitue pas l'unique moyen servant à rassembler et à renforcer notre communauté.

[1] The English version precedes.

[2] Président sortant de la SCMO

[3] Secrétaire d'assemblée de la SCMO

Du point de vue du gouvernement, la question demeure : avons-nous besoin de la SCMO? La réponse est « oui ». Pourquoi? De nos jours, il reste très difficile de réunir un bon nombre de personnes à un seul endroit. Le défi en est un de concentration. Comment obtient-on une certaine visibilité? Sans la SCMO, nous nous perdrions de vue. Je pense qu'il vaut la peine d'y investir. Toutefois, nous pouvons difficilement justifier l'envoi d'une centaine de personnes à un seul événement. Il est difficile de convaincre le ministre d'envoyer tant de gens à la même place, dans le but de se réunir et d'échanger des idées, et de le justifier auprès de celui-ci. Le ministre s'est rendu à la demande de la SCMO pour l'acceptation hâtive des plans de déplacement pour le Congrès de la SCMO. Il est essentiel que la Société s'adresse au ministre pour exprimer l'importance du geste et sa reconnaissance. Peut-être des réunions de moindre envergure, sur des thèmes précis, qui ne rassemblent pas un si grand contingent, constitueraient-elles un moyen de répartir la participation des professionnels du gouvernement et seraient-elles ainsi justifiables. Il n'y a que quelques congrès où plus de deux employés d'Environnement Canada se rendent à la fois.

La SCMO attire des étudiants et, du point de vue d'un employeur, il s'agit d'un avantage majeur. En effet, nous pouvons voir de quelle façon ils se comportent, ce qu'ils présentent et d'autres aspects qui ne ressortiraient pas en entrevue. Il s'agit là d'une contribution considérable pour la planification de nouvelles ressources. Une contribution qui fait toute la différence.

3. La perspective du ministère des Pêches et des Océans (Denis Hains)

Le problème soulevé par Environnement Canada concernant les autorisations de voyage s'applique aussi à Pêches et Océans. Il est très difficile d'envoyer plus de deux ou trois participants à un congrès. La participation d'étudiants aux congrès de la SCMO nous réconforte et s'avère importante pour nous. Avec les nouvelles technologies et les nouvelles façons de joindre les gens, ce moyen reste très efficace.

On a mentionné auparavant le programme CONCEPTS comme un bon exemple de mobilisation de scientifiques provenant de trois ministères et d'universités. Il illustre bien la collaboration en météorologie, en océanographie et en hydrologie, ainsi qu'entre divers intervenants, au sein de tous les secteurs (industriel, universitaire, gouvernemental, citoyen, international).

La SCMO demeure certainement profitable sur le plan du développement professionnel et pour renforcer les liens entre les différentes disciplines et les organisations, stimulant ainsi l'innovation dans le domaine de la recherche. Ces liens permettent aussi de présenter et d'expliquer l'orientation stratégique du gouvernement, tout comme ses politiques. Ce qui est aussi important pour mobiliser un éventail de gens dans des programmes internationaux.

On a mentionné auparavant le programme CONCEPTS comme un bon exemple de mobilisation de scientifiques provenant de trois ministères et d'universités. Il illustre bien la collaboration en météorologie, en océanographie et en hydrologie, ainsi qu'entre divers intervenants, au sein de tous les secteurs (industriel, universitaire, gouvernemental, citoyen, international).

- Denis Hains

4. Ce que la SCMO est en mesure d'offrir (Harinder Ahluwalia)

Harinder Ahluwalia a mentionné les points contenus dans le document *A Roadmap to the Future of CMOS* [4] et a présenté plusieurs services que la SCMO serait en mesure d'offrir. Que pouvons-nous faire pour que l'organisation progresse et pour améliorer les points qu'elle maîtrise déjà? Premièrement, il a été noté que nos membres sont des particuliers : des étudiants, des professionnels, des retraités ou des universitaires. Toutefois, les grandes entreprises qui utilisent les informations météorologiques et océanographiques pour la bonne marche de leur exploitation, Hydro-Québec, BC Hydro, Nav Canada, etc., pourraient participer et apporter leur soutien à la SCMO. Les ministères provinciaux et les municipalités sont de grands utilisateurs d'informations météorologiques et ils pourraient nous financer, tout comme le font Environnement Canada, et Pêches et Océans.

La SCMO devrait-elle demeurer un organisme scientifique ou devenir un organisme scientifique *et* professionnel? Un programme d'agrément est déjà en place en collaboration avec ECO Canada, afin d'octroyer des titres de compétence aux personnes désirant devenir des professionnels de la météorologie et de l'océanographie. Pour le moment, un particulier peut se présenter comme prévisionniste avec une formation minimale, ce qui pose problème. L'importance de détenir un titre de compétence pour travailler dans nos domaines devrait être soulignée. La SCMO pourrait publiciser ce fait et en exiger l'application. Cet aspect pourrait permettre d'augmenter de manière considérable le nombre de membres et les ressources de la Société. Cela pourrait aussi convaincre les entreprises privées de devenir membre collectif.

La valeur perçue de la SCMO incitera les gens à joindre ses rangs. La Société joue aussi un rôle essentiel en matière de formation grâce au soutien destiné aux étudiants. Les congrès sont utiles, puisqu'ils donnent l'occasion de rencontrer de futurs scientifiques prometteurs, les étudiants, et de discuter avec eux. Notre organisation pourrait aussi offrir son aide en créant un programme de mentorat pour réunir étudiants et

[4] *(voir http://www.cmos.ca/FutureCMOS/DiscussionPaper_May2014.pdf).*

professionnels, afin de fournir une excellente formation sur le terrain.

Ce programme renforcerait la pertinence de la SCMO et par le fait même pourrait augmenter l'adhésion. Le nombre de membres diminue et cette situation est peu réjouissante. Comment renverser la tendance? Le document contient le résumé de beaucoup d'options, ainsi qu'un questionnaire envoyé à tous aux fins de sondage[5]. Nous vous prions de remplir le questionnaire et de nous transmettre vos commentaires. Nous vous lirons avec attention, afin d'établir notre plan stratégique futur.

5. Résumé des questions soulevées durant la discussion

5.1 *Plan stratégique de la SCMO*

Le besoin d'une définition claire des objectifs de la SCMO, de moyens nécessaires pour les réaliser et de suivi des progrès accomplis a été soulevé. C'est la base même d'un plan stratégique. Des exemples portaient sur les réunions que tient une société scientifique pour discuter des enjeux fondamentaux à aborder. Une fois ces enjeux déterminés, on travaille à mettre en œuvre des programmes visant à atteindre ces objectifs. L'industrie, les gouvernements et les universités sont conviés aux débats. Des organismes comme la NASA (National Aeronautics and Space Administration) ou l'ESA (European Space Agency) procèdent de cette manière et créent des programmes de recherche qui finissent par mener à un programme d'observation par satellites pour les dix prochaines années. Ce qui est tout le contraire de lancer un satellite et de se demander comment l'utiliser par la suite. Un programme efficace vise des objectifs précis et met en place la recherche nécessaire pour régler les questions qu'il soulève.

Les interactions entre les océans, la couverture terrestre, la glace et l'atmosphère, incluant les processus chimiques, s'avèrent un domaine pour lequel il existe un fort intérêt et qui soulève bien des questions. Comme noté au cours des présentations faites au congrès, il existe un besoin pour la communauté d'établir un plan qui détermine la direction de son évolution. La SCMO pourrait organiser des rencontres pour cerner les grandes questions, de façon que tous puissent s'aligner et travailler ensemble. Pour le moment, quand on lance un programme de recherche, personne n'est vraiment préparé pour s'y intégrer. Conséquemment, les réactions ne sont pas aussi unifiées que prévu. Mis à part l'aspect innovation, il entre aussi en ligne de compte des préoccupations liées aux programmes.

Des exemples issus de l'institut de physique du Royaume-Uni ou de l'astronomie au Canada, qui exercent une grande influence sur les politiques scientifiques des gouvernements, ont été mentionnés. La SCMO se concentre sur les sciences atmosphériques et océaniques, mais pourrait élargir ses horizons pour inclure la biogéochimie et les sciences de l'eau. Les enjeux qui font actuellement l'objet de recherches comprennent en grande partie ces disciplines.

La SCMO doit dresser un plan stratégique, afin de mieux définir les questions scientifiques qui doivent être abordées, et doit proposer une façon adéquate d'y parvenir. La Société vise l'avancement de la météorologie et de l'océanographie. Cet objectif devrait être réaffirmé. Il a aussi été noté que, par le passé, l'AMS avait organisé des rencontres portant sur l'entreprise météorologique. Ce que le gouvernement américain ne pouvait pas entreprendre. Ces rencontres ont influé sur les programmes gouvernementaux visant les services météorologiques aux États-Unis. Le rapport Jenkins[6] porte sur la façon dont l'industrie, le gouvernement et les universités peuvent travailler ensemble. Il mentionne aussi que l'innovation est essentielle à la croissance économique. La SCMO pourrait donc, et devrait, particulariser ces objectifs généraux, relativement à la gestion des sciences atmosphériques et océaniques.

5.2 *Communication avec les médias et le public*

La communication avec les médias est essentielle à la visibilité de la SCMO. Elle nécessite la présence de professionnels pour mobiliser les médias durant les congrès et tout au long de l'année, afin de répondre aux demandes des médias voulant obtenir des avis d'experts en matière d'événements météorologiques médiatisés. La SCMO pourrait développer cette facette et devenir le guichet unique fournissant des avis d'experts sur la météorologie, l'océanographie et le climat. Pour le moment, plusieurs journalistes canadiens sont incapables de trouver au pays des experts pour discuter avec autorité de questions scientifiques. La politique de communication du gouvernement fédéral complique le tout et rend difficile l'accès à ses scientifiques. La SCMO pourrait facilement développer des outils permettant de trouver l'expertise pertinente en temps voulu. De récents exemples montrent que nous n'avons pas réagi rapidement à ce genre de demandes. Le bureau national de la Société devrait offrir une aide en matière d'organisation des relations avec les médias pour ses congrès annuels et pour la diffusion de l'information relative aux congrès (p. ex. l'enregistrement des présentations plénières que donnent les conférenciers).

[5] Consultez le questionnaire à l'adresse : http://www.cmos.ca/FutureCMOS/survey_19Jun14_f.pdf

[6] Le rapport peut être consulté à l'adresse: http://www.pwc.com/en_CA/ca/sred/developments/publications/narrowing-canada-innovation-gap-2011-11-en.pdf

Il est aussi à noter que, même s'il est difficile de faire l'objet d'un article dans un journal papier, il pourrait s'avérer relativement facile d'apparaître dans une version électronique. Il existe certainement quelqu'un au sein de la SCMO qui souhaiterait prendre cette responsabilité et s'en acquitter au nom de la Société. Ces articles doivent être émis en temps utile et être publiés juste après un événement. Une certaine régularité demeure aussi essentielle. La SCMO peut se mobiliser et réaliser quelque chose en ce sens. Aucune autre organisation n'est à même de s'en charger. Nous gagnerions ainsi une certaine visibilité quant à nos travaux.

5.3 *Adhésion*

Les conditions météorologiques et le climat intéressent vivement le grand public. Les météorologistes amateurs pourraient adhérer à la SCMO. Toutefois, aucun service ne vise ces membres potentiels pour le moment. Les participants à la réunion ont trouvé excellente l'idée d'ouvrir la Société à ce type de public. Nous devrions encourager la tenue de conférences publiques et les enregistrer pour les rendre accessibles. D'autres besoins pourraient se développer. Il s'agirait de trouver des façons de les satisfaire. Pour influer sur les politiques, il faut produire une vague de soutien. Des membres issus du grand public ajouteraient une nouvelle voix à la SCMO.

Les enseignants pourraient fournir un aide inestimable et devraient être mobilisés. La Journée des enseignants fonctionne bien. De plus, la SCMO envoie périodiquement un enseignant à l'académie navale américaine (Maury) et est un partenaire des bourses d'études supérieures du Canada et du Comité canadien national (CCN) pour le SCOR. Nous constatons malheureusement que les enseignants ne savent pas où se procurer de l'information sur le climat pour le Canada. Si les enseignants le savent, alors les jeunes le savent aussi et rapportent cette information à la maison. L'Ontario n'inclut plus la météorologie dans son programme scolaire, mais couvre les changements climatiques. La météorologie et le climat restent indissociables et les enseignants doivent passer ce message à leurs élèves.

La présence de jeunes à tous les congrès indique qu'il existe un potentiel pour recruter de nouveaux membres. Les finissants universitaires devraient être encouragés à devenir membre. Il a été mentionné que les centres régionaux éprouvent de la difficulté à attirer les professionnels du gouvernement. Les plus hauts niveaux de gouvernement devraient encourager la participation à la SCMO. À part Environnement Canada et Pêches et Océans, d'autres ministères fédéraux, comme la Défense nationale, possèdent un intérêt pour l'océanographie.

5.4 *Participation aux politiques*

Un aspect qui en a étonné plus d'un dans le passé est le silence de la SCMO en matière d'enjeux liés à des questions scientifiques météorologiques et océanographiques. Il existe des enjeux pour lesquels nos membres souhaiteraient entendre l'opinion de la SCMO. Si la Société pouvait s'afficher comme représentant cette communauté, sa visibilité en profiterait.

La SCMO devrait contribuer aux divers forums sur les politiques liées à la création de programmes de recherche qui concernent la météorologie et l'océanographie. Les enjeux du secteur privé demandent qu'une bonne stratégie concernant l'innovation « fasse de l'innovation en entreprise un des objectifs de base de l'approvisionnement » (rapport Jenkins).

Conclusions

Un sondage a été distribué aux membres de la SCMO et 260 personnes ont exprimé leurs préférences en ce qui a trait aux priorités. Lors de l'atelier, il s'est montré un fort soutien pour considérer l'ouverture de la SCMO au grand public et créer une catégorie particulière de membre en ce sens. L'idée de mettre sur pied un programme de mentorat a aussi suscité de l'intérêt. Finalement, il existe un besoin évident d'établir un plan stratégique, visant à guider les efforts de la SCMO pour augmenter sa visibilité et son nombre de membres. Il ne s'agit pas ici d'un but en soi, l'objectif restant ultimement d'influer sur les politiques pour soutenir la recherche et le développement en météorologie et en océanographie, afin d'aborder les questions touchant la société canadienne. Les conditions météorologiques et le climat se trouvent au cœur de notre économie et de nos vies, ainsi que de la recherche et des services professionnels que fournit notre communauté. La nécessité et l'importance des recherches que nous effectuons relativement aux questions socioéconomiques majeures doivent être bien comprises.

CMOS Prizes and Awards announced at the 48th Annual Banquet
Remise des prix et récompenses de la SCMO au 48e banquet annuel

Hôtel Rimouski, Rimouski, Québec
Wednesday, June 4, 2014 / Mercredi, le 4 juin 2014

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

Unfortunately, the President's Prize was not awarded this year.

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

Peter Smith accepting the Tully Medal from Pierre Gauthier

Awarded in 2013 to **Dr. Peter Smith**, Bedford Institute of Oceanography, for his project leadership and management, and his outstanding research of fundamental processes on the Scotian Shelf and in the Georges Bank, Gulf of Maine region.

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

Susan Allen accepting the Andrew Thomson Prize on behalf of Douw Steyn from Pierre Gauthier

Awarded in 2013 to **Dr. Douw Steyn**, University of British Columbia, for his outstanding career-long contributions to the understanding and mitigation of ozone pollution in the Lower Fraser Valley.

Le prix **François J. Saucier en océanographie appliquée** décerné pour un travail exceptionnel dans le domaine de l'océanographie appliquée au Canada. Ce prix est décerné en 2013 à **M. François Roy**, Environnement Canada, Recherche Prévision Numérique, pour sa contribution remarquable au développement et à l'implantation d'un système opérationnel de prévision numérique de l'océan.

François Roy receiving the François J. Saucier Prize from Pierre Gauthier

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

Unfortunately, the Rube Hornstein Medal in Operational Meteorology was not awarded this year.

Roger Daley Postdoctoral Publication Award to be made annually to a candidate who, at the time of nomination, is working in Canada in a non-permanent position as a postdoctoral fellow or research associate, and is within five years of having received a doctoral degree. The award is to be based on the excellence of a publication in the fields of meteorology or oceanography that has appeared, or is in press, at the time of nomination.

Unfortunately, the Roger Daley Postdoctoral Publication Award was not awarded this year.

Tertia M.C. Hughes Memorial Prize may be awarded for contributions of special merit by graduate students registered at a Canadian university or by Canadian graduate students registered at a foreign university. Two prizes were awarded in 2013.

Nancy Soontiens accepting the Tertia M.C. Hughes Memorial Prize from Pierre Gauthier

1) Awarded to **Dr. Nancy Soontiens**, Post-doctoral Researcher, University of British Columbia, for her excellent thesis entitled *Stratified Flow over Topography: Steady Nonlinear Waves, Boundary Layer Instabilities and Crater Topography*.

2) Awarded to **Dr. Neil Swart**, University of Victoria, for his excellent thesis entitled *Southern Hemisphere Westerlies and the Ocean Carbon Cycle: The Influence of Climate Model Wind Biases and Human Induced Change*.

Nathan Gillett accepting the Tertia M.C. Hughes Memorial Prize for Neil Swart from Pierre Gauthier

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

Awarded in 2013 to **Dr. Ian D. Rutherford** for his multi-year contributions to CMOS as a volunteer. He served terms as Vice-President, President, Past-President in crucial years for CMOS; he initiated and supported liaisons with the private sector; he defined the role of CMOS in governing the Canadian Foundation for Climate and Atmospheric Sciences; he often represented CMOS within the broader Canadian academic and scientific community, and in many ways he was the "**heart**" of CMOS.

Ian D. Rutherford receiving the Neil J. Campbell Medal from Pierre Gauthier

Citations

One or more Citations may be awarded each year to an individual, group or organization which has, in the previous year, made some outstanding contribution towards promoting public awareness of meteorology or oceanography in Canada.

Unfortunately, no citations were awarded in 2013.

Bourse d'étude de premier cycle SCMO offert à des étudiants prévoyant une carrière en météorologie, océanographie, limnologie, hydrologie ou climatologie.

Jeanne Blanchette acceptant la bourse de premier cycle de Pierre Gauthier

Une bourse de 500$ est décernée **à Jeanne Blanchette**, Université McGill, Sciences atmosphériques, pour excellence académique.

La bourse SCMO-MétéoMédia décernée à une étudiante dans son avant-dernière année d'études en sciences atmosphériques dans une université canadienne. Pelmorex, la compagnie mère de MétéoMédia/The Weather Network, fait un don annuel de 1 500$ à la SCMO qui coordonne le processus de sélection.

La bourse de 1 500$ est décernée à **Jeanne Blanchette** Université McGill, Sciences atmosphériques, 4^{e} année, pour excellence académique.

Majoud Fékri (The Weather Network) presenting the scholarship to Jeanne Blanchette

CMOS Daniel G. Wright Undergraduate Scholarship awarded to a Canadian undergraduate student entering his/her final year of a B.Sc. Honours program in Mathematics and/or Physics, or a related discipline, at a Canadian university who intends to pursue graduate studies in physical oceanography or a related field.

Unfortunately, the Daniel G. Wright Undergraduate Scholarship was not awarded for 2013.

CMOS CNC/SCOR NSERC Scholarship Supplement provides a supplement of $5000 to a holder of an NSERC Postgraduate Scholarship or Canada Graduate Scholarship. It is renewable for a second year provided the Scholarship continues to be held. This prize is no longer awarded.

The second year Scholarship Supplement ($5000) is awarded to **Jesse McNichol**, MIT-Woods Hole Institute, for his PhD studies: *Quantifying Energy Metabolism and Associating Function with Taxonomy for Chemolithoautotrophic Communities at Deep-Sea Hydrothermal Vents.*

CMOS Weather Research House / NSERC Scholarship Supplement in Atmospheric or Ocean Sciences provides a supplement of $5000 to a holder of an NSERC Postgraduate Scholarship or Canada Graduate Scholarship. It is renewable for a second year provided the Scholarship continues to be held. Note that this scholarship supplement is awarded by this private firm for the 17th year.

Cette année, le supplément est octroyé à **Mathilde Jutras**, Université McGill, pour sa thèse au niveau de la maîtrise intitulée *The impact of inertial oscillations on the sea ice mass balance: data and model analysis*.

Three Poster Prizes

Claude Labine presenting the Meteorological Poster Prize to Ying Sun

1) **Campbell Scientific Best Student Poster Prize in Meteorology** is awarded to **Ying Sun**, McGill University, for her poster entitled: *A comparative study of the UTLS water vapour in two monsoon regions.*

2) **ASL Environmental Sciences Best Student Poster Prize in Oceanography** is awarded to **Yann Follin**, Université du Québec à Rimouski for his poster entitled: *Pelagic respiration in the twilight zone of the Gulf of St.Lawrence: A meta-analysis and critical review*. [co-authors: Marcel Babin, Peter Franks, Michel Gosselin, Jean-Éric Tremblay]

David Fissel presenting the Oceanography Poster prize to Yann Follin

Mathieu Ardyna accepting the Best Poster prize from Pierre Gauthier

3) **CMOS Best Poster Prize** is awarded to **Mathieu Ardyna**, Université Laval, for his poster entitled: *Physical control of subsurface chlorophyll maximum in the Arctic Ocean*. [co-authors: Marcel Babin, Peter Franks, Michel Gosselin, Jean-Éric Tremblay]

Remarks on accepting the Neil J. Campbell Medal

I would like to start by thanking Richard [Asselin] for his kind introduction and to acknowledge our longstanding friendship and our shared love for CMOS.

Dr. Ian D. Rutherford accepting the Neil J. Campbell Medal.
Photo credit: Rimouski Congress LAC

I would like to thank the Society for the honour of awarding me the Neil J. Campbell Medal for volunteer service. Although it is true that I was involved in the establishment of the award, I never thought that I would be eligible for it, because unlike Neil I insisted upon being paid, at least a little bit, if only to establish the principle of CMOS having a paid Executive Director. I always tried to do what I was paid for, to the best of my ability, and then to provide a little bit more in case that wasn't enough.

CMOS is an organization that depends critically, in fact almost entirely, on volunteers. Neil Campbell, after whom the prize is named, was the epitome of volunteerism himself and he is the one who made sure during his ten-year tenure that the society had multiple ways to reward those who contributed. So too was Uri Schwarz who served ten years as Executive Director and another ten as Executive Director Emeritus. Neither Neil nor Uri were ever paid a cent for their services.

The Executive Director is probably in the best position to appreciate how important it is that we are a society of volunteers. We really do depend on them and I think that we should not see that as a negative thing but rather a great strength of the society; volunteerism is something that we should foster.

Why do people volunteer? They volunteer to give back to their colleagues and to their profession. They volunteer to make a difference, to try out their ideas and to try to affect the direction the Society takes. As Richard mentioned, I had the privilege of working with ten different Presidents of CMOS, all of whom stepped forward for at least three years to make a contribution and to lead the Society forward. Sometimes this involves a clash of ideas between the Executive Director and the elected leaders but this is by and large a good thing for it engenders discussion and leads to better policies and decisions, as anyone who has worked in government knows. It was a pleasure to work with these leaders and their colleagues on Council.

It was a pleasure as well to work with ten different Annual Congress Local Arrangement Committees, their chairpersons and their crew of volunteers. They are well exemplified by our hosts at this Congress in Rimouski, Simon Bélanger, Michael Scarratt and the numerous volunteers young and old who have worked so hard to put together this great event. It always strikes me that for the most part the LACs have a lot of fun too, working together as part of a team to make their congress a success and always just a little bit different from and better than the previous one. When it succeeds they have a great sense of accomplishment and they know that their efforts are appreciated. I think that this way of depending on local volunteers to run our congresses imparts a local flavour to each and produces a constantly shifting theme or program emphasis that is a great strength of our congresses.

"Ask not what your Society can do for you, but rather ask what you can do for your Society". ***- Ian D. Rutherford***

I would like to express my thanks to another great team of volunteers, those in the national office, especially Richard Asselin, Paul-André Bolduc, Bob Jones, the Bourques, both Sheila and Denis as well as their daughter Emily, and in my earlier years in office Neil Campbell, Uri Schwarz, and Dorothy Neale, all of whom contributed long after their time in office, and most recently Qing Liao, our only employee but one who also contributes above and beyond the call of duty.

I would just like to make a few comments arising from yesterday's meeting on the Future of CMOS and I hope that you will indulge me in that. It struck me yesterday that the attendance at that meeting was much greater than the attendance at the AGM. That tells me that perhaps the AGM has become too formulaic and boring, although this year we passed some very important business, including a complete revamping of the Constitution and By-Laws. The fact that so many people came out for the special meeting on the Future of CMOS tells me that there are still many people who care, who want their ideas to be heard and who

want to make a difference. In addition I'd like to remark that CMOS should be a society that serves Canadian society at large rather than merely serving its members. The stated goal of the Society is to promote the sciences of meteorology and oceanography and I think we should stick to that. That has long been our emphasis but still we could probably do more for our members including perhaps establishing a professional category of membership. I think that if we can appeal to the passion that people have to contribute and to make a difference and if we can demonstrate that to do so is satisfying and indeed a lot of fun, then we will get the leaders that we want and need. In particular I think that we should pick up on the idea expressed yesterday that the Society should be more involved in setting the direction for our sciences, perhaps through a meeting or series of meetings devoted to that task.

Finally I would like to finish with a quote from the late John Kennedy, one that we all would do well to remember, but paraphrased as: "Ask not what your Society can do for you, but rather ask what you can do for your Society".

Ian D. Rutherford
Retired CMOS Executive Director

Scientific Program Committee
Comité du programme scientifique

Michael Scarratt, MPO, Président
Marcel Babin, Université Laval
Fraser Davidson, DFO
Louis Garand, Environment Canada
Zou Zou Kuzyk, University of Manitoba
Maurice Levasseur, Université Laval
Connie Lovejoy, Laval University
Robie Macdonald, DFO
Bruce Ainslie, Environment Canada
Christine Michel, MPO
C.J. Mundy, University of Manitoba
Ann-Lise Norman, University of Calgary
Nadja Steiner, DFO

Local Arrangements Committee
Comité local organisateur

Simon Bélanger - Président
Robin Accot - Site internet
Geneviève Allard - Administration, logistique et audiovisuel
Mélany Belzile - Activités sociales
Daniel Bourgault - Activités sociales
Gwénaelle Chaillou - Communications
Cédric Chavanne - Inscription
Dany Dumont - Commanditaires
Julien Laliberté - Logistique des ateliers
Pierre Larouche - Trésorier
Daniel Lavoie - Prix et bourses
Urs Neumeier - Livre du programme
Paul Nicot - Commanditaires
Christian Nozais - Logistique
Rachel Picard - Journée des enseignants et activités sociales
Alexandra Rao - Livre du programme
Irène Schloss - Bénévoles

A happy volunteer group after banquet!
Un groupe de volontaires heureux après le banquet! Photo credit: Rimouski Congress LAC.

Report on CMOS Congress 2014

Rimouski, QC, June 6, 2014. The 48th CMOS Congress wrapped up a successful week of meetings and scientific presentations (oral and poster) at the Centre de Congrès, Hotel Rimouski. About 400 delegates attended.

On Monday June 1, the Congress was officially opened by Denis Hains, Director General of the Canadian Hydrographic and Oceanographic Services (DFO), and David Grimes, Assistant Deputy Minister of the Meteorological Service of Canada (EC).

Plenary presentations included plans to improve modelling of the air-ice-ocean interface in polar regions. Monitoring of melting permafrost detected by changing heights in terrain is a new input to these models. Other presentations again highlighted the fact that lack of monitoring in key areas such as the NW Atlantic and Arctic was preventing full utilization of the improved models. Ways are also being investigated to input Inuit traditional knowledge into the models to determine climate changes and impacts.

A re-analysis of the Christmas Ice Storm in Southern Ontario was presented. The difficulty of pinning down precise boundaries of the freezing rain was described but, with the exception of the Ottawa area where only snow fell, the forecasts and warnings for the affected areas were both timely and accurate.

David Grimes, ADM of Meteorological Service of Canada participated in several Congress sessions. He announced that accelerated hiring of about 250 new meteorologists will be undertaken in the next few years.

Several speakers discussed aspects of the recently released IPCC Fifth Assessment Report (AR5). They concluded, once again, that measured climate change with greater certainty than ever before was apparent in their findings.

Many prizes and awards were announced during the Congress (see page 133). Paul J. Harrison won the Parsons Medal (DFO) and William W. Hsieh won the Patterson Medal (MSC). They were announced at a luncheon on June 3. More details of these two awards will be published in the next issue of the *CMOS Bulletin SCMO* (October).

On the evening of June 1, during the annual Ice Breaker, Mylène Paquette, first North American woman to row solo across the Atlantic, recounted her adventure and presented highlights of her trip with many amazing photos.

Mylène Paquette during her presentation at the Ice Breaker.
Photo credit: Rimouski Congress LAC

On the evening of June 3, an interesting and well-attended public panel session was held at the Université du Québec à Rimouski. Moderated by a Radio-Canada newscaster (Catherine Mercier), the four panellists revealed many serious issues related to energy exploration and use in the St. Lawrence Estuary and Gulf region and described some possibilities to address the problems. Use, transport, and exploration of petroleum were the main focus of four presentations.

At the business meetings and a special workshop on the Evolution of the Role of CMOS, spirited discussions took place on changing the way CMOS will function in the future. More on this appears in this Bulletin and on the website, and members will likely be surveyed again on this important matter. As well, important changes to the Society's Constitution and By-Laws were passed at the Annual General Meeting. The essence of these was to shift to the new governance model approved last year at Saskatoon. This reduces the size of the Council among other things.

On Thursday afternoon, the congress attendees had the opportunity to participate in cultural and outdoor activities. A field trip to Bic National Park was presented where it was possible to discover the richness of Bic National Park with majestic views of the St. Lawrence estuary, bays, coves, mountains, and islands. A visit to the Maritime Museum at Pointe-au-Père to explore the history of the Empress of Ireland from its construction in 1906 to its dramatic sinking in 1914 was also made possible. The 100th anniversary of this maritime tragedy was in May of this year.

Bob Jones, CMOS Webmaster
and
Paul-André Bolduc, CMOS Bulletin SCMO Editor

2014 Student Bursary Recipients at Rimouski Congress

Récipiendaires 2014 des bourses de voyage pour étudiants au congrès de Rimouski

Christian Saad - INRS-ETE
David Collins - University of Victoria
Di Wan - University of Victoria
Hongyang Lin - Dalhousie University
Housseyni Sankare - Université du Québec à Montréal
Jean-Sébastien Côté - Université Laval
Joël Bédard - Université du Québec à Montréal
Kinson Leung - University of Toronto
Kristina Brown - University of British Columbia
Laura Castro de la Guardia - University of Alberta
Laura Gillard - University of Alberta
Manoj K Kizhzkkeniyil - University of Northern British Columbia
Marien Jelassi - Université du Québec à Montréal
Marilys Clément - Université du Québec à Montréal
Médéric St-Pierre - Université du Québec à Montréal
Meher Chelbi - Université de Moncton
Nicholas Soulard - McGill University
Nonna Belalov - Memorial University of Newfoundland
Opeyemi Richard Alonge - Memorial University of Newfoundland
Robert Fajber - University of Victoria
Shiliang Shan- Dalhousie University
Siraj Ul Islam - University of Northern British Columbia
Ying Sun - McGill University

Note from the Editor: The official Rimouski Congress photographer was Iften Redjah from Folio Photo studio, www.foliophoto.net

Next CMOS Congress in 2015

The 49th CMOS Congress will be held in beautiful Whistler, British Columbia, from May 31 to June 4, 2015. This congress will be held jointly with the 13th American Meteorological Society's Conference on Polar Meteorology and Oceanography. The theme of this joint conference is: ***Tropics to Poles - Advancing Science in High Latitudes.*** The organising committee is putting together an exciting program both inside and outside of the conference. We hope to see you all at the Whistler Conference Centre next year!

From Rimouski to Whistler; Ken Kwok and Simon Bélanger. Photo credit: Rimouski Congress LAC

Prochain Congrès de la SCMO en 2015

Le 49e congrès de la SCMO se tiendra du 31 mai au 4 juin 2015 dans la magnifique ville de Whistler, Colombie Britannique. Ce congrès se tiendra en même temps que la 13e conférence de l'AMS sur la météorologie polaire et l'océanographie. Le thème de cette conférence conjointe est ***Des Tropiques aux Pôles: Avancement de la science des hautes latitudes***. Le comité organisateur local met présentement en place un programme tant scientifique que social. Nous espérons vous voir tous au centre de conférences de Whistler l'an prochain.

Note du Rédacteur: Le photographe officiel du congrès de Rimouski était Iften Redjah du studio Folio Photo, www.foliophoto.net

48th CMOS Rimouski Congress Photo Memories

Souvenirs photographiques du 48e Congrès de la SCMO à Rimouski

1

2

3

4

5

6

7

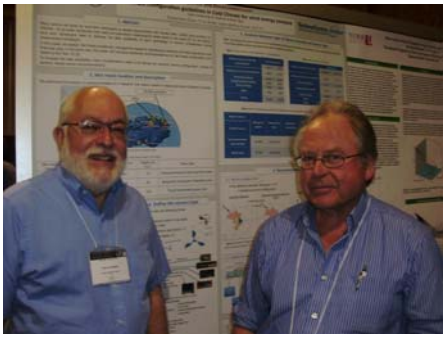
8

9

Photos description on next page with more photos!
Vous trouverez la description des photos à la page suivante avec encore plus de photos!

The first four photos are courtesy of the Rimouski Congress LAC.
The next eleven photos are courtesy of the Editor, *CMOS Bulletin SCMO*.

Les quatre premières photos sont la gracieuseté du Comité organisateur local du congrès de Rimouski. Les onze suivantes sont la gracieuseté du rédacteur, *CMOS Bulletin SCMO*.

		
10	11	12
		
13.	14	15

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

1. **Mylène Paquette**, première Nord-Américaine à traverser l'Atlantique à la rame en solitaire présentant un court exposé de son expérience durant la soirée d'ouverture le dimanche soir.	2. **Tom McElroy,** Toronto Centre Chair and **Oscar Koren**, retired meteorologist on Sunday night at the Ice Breaker in the lobby of UQAR.	3. **Lydia Webb** minding the Taylor & Francis booth. Taylor & Francis is the CMOS *A-O* Publisher.
4. **Catherine Mercier,** modératrice lors du débat public tenu à l'Université du Québec à Rimouski. **Catherine Mercier** est animatrice et journaliste à l'émission *La Semaine Verte* de Radio-Canada.	5. **Pierre Gauthier**, Président de la SCMO, donnant une conférence de presse le premier jour du congrès. **Pierre Gauthier**, CMOS President, giving a press conference on the first day of Congress.	6. Les panélistes du débat public tenu à l'Université du Québec à Rimouski, **Daniel Bourgault**, chercheur à ISMER, **Mario Heppell**, jusqu'à dernièrement directeur d'évaluation environnementale stratégique, **Jean-Thomas Bernard**, professeur visiteur à l'Université d'Ottawa, et **Steven Guilbeault**, fondateur et directeur d'Équiterre.
7. A well-attended poster session; des affiches bien populaires.	8. A well-attended and lively poster session; des affiches bien populaires et animées.	9. A well-attended poster session; des affiches bien populaires.
10. **Paul Lyon**, DFO, and **Marty Taillefer**, Maritime SafeWay, two well-known oceanographers based in Ottawa.	11. When oceanography meets meteorology: **David Greenberg**, retired oceanographer at BIO and **Peter Taylor**, meteorologist at York University.	12. **Sheila Bourque**, A-O Technical Editor and **Lydia Webb**, Taylor & Francis.
13. **Michael Scarratt**, Président, Comité du programme scientifique et **Simon Bélanger**, Président, Comité organisateur local donnant une entrevue.	14. **Harinder P.S. Ahluwalia**, CMOS President and **Ian D. Rutherford**, Retired CMOS Executive Director.	15. **Andrew Bell**, CMOS Executive Director, **Qing Liao**, CMOS Office Manager and **Ken Kwok**, Local Arrangement Committee, Whistler 2015 Congress.

CMOS BUSINESS / AFFAIRES de la SCMO

Change of leadership for CMOS Publications

As of July 1st, Council has transferred the important portfolio of CMOS publications from Dr. Richard Asselin to Dr. Douw Steyn.

When he was a member of Council in 1981-1983, Richard had been instrumental in creating the position of Director of Publications. In 1996, after retiring from Agriculture and Agri-food Canada, he himself accepted the position. Now, after nearly 18 years in the job, he called for a replacement.

Dr. Douw G. Steyn

New blood has arrived in the name of Douw Steyn (http://www.eos.ubc.ca/about/faculty/D.Steyn.html). Douw has been a professor of meteorology at UBC since 1980 and is well known for his contribution to urban and regional pollution research and for his excellence and generosity as a teacher and mentor. Having reduced his academic load, he is now eager to contribute to science in a new way. Douw has been an associate editor and the editor in chief for atmospheric and hydrological sciences for *Atmosphere-Ocean* since 2012. He has contributed to the Society in several ways and accepted a number of responsibilities. Douw has received the Andrew Thomson Prize in Applied Meteorology (2013) and is a Fellow of the Society (2012). He is now tackling the challenge of leading the Society's publications and adapting them to the changing environment.

Dr. Andrew Bell, CMOS Executive Director

Richard Asselin Retires

Dr. Richard Asselin, who has been CMOS Director of Publications since 1996, is finally seeking retirement after 18 years in that role. He has asked to be replaced following the 48th Congress in Rimouski in early June 2014. Council has reluctantly accepted his request, noting that the Society owes Richard an enormous debt of gratitude for having directed the Society's most important program so effectively and for so many years. Council has asked Prof. Douw Steyn of UBC, long-time member of the editorial board of *Atmosphere-Ocean* and currently co-editor for meteorology, to take on the role following Richard's retirement.

It is impossible to overstate the importance of Richard's leadership of the publications program. Never one to simply administer, Richard constantly sought out, argued for, and implemented new ways to make CMOS publications more effective, more attractive, and with constantly improving content. At the same time he always found ways to save the Society money by managing the business side to make it more efficient. The list of significant changes he brought about is very long and includes:

- bringing the printing and distribution operations for *Atmosphere-Ocean* from University of Toronto Press to a local printer in Ottawa and a local distribution agency in Gatineau. This made these processes faster, cheaper, and more responsive to requests for changes and improvements.

- changing the formats of both *A-O* and *CMOS Bulletin SCMO* to make them more attractive and easier to read as well as cheaper to produce. Both publications went through several transformations as printing technology rapidly advanced with introduction of digital printing to replace old-fashioned offset printing. As soon as the technology and the economics allowed it, he introduced colour in both publications and just recently switched the *CMOS Bulletin SCMO* to full-colour digital production, much improving its appearance and its ability to accurately reproduce graphs, etc.

- arranging for the binding of all publications by volume and year to produce an invaluable hard-copy archive of all the Society's publications, going back even to those issued by the Canadian Branch of the Royal Meteorological Society and those like the *Climatological Bulletin* and *Chinook* which the Society was unable to continue.

- implementing digital versions of *A-O* and the *CMOS Bulletin SCMO* and making them available on line. Many of the older volumes had to be scanned and Richard found inexpensive ways to accomplish this enormous task.

● recognizing that changes in the academic publishing world and their relations with academic libraries required a level of marketing and packaging expertise that CMOS simply could not compete with on its own, he made the case for engaging a third party publisher to take over these aspects, ran a competition amongst publishing houses and held a survey of members to help in the selection, resulting in the recent transfer of *A-O* publishing, marketing, and distribution to Taylor & Francis. This resulted in much better tools for authors to make submissions, reviewers to review and rank them, and editors to communicate with submitters.

● keeping a close watch on impact factors and other measures of effectiveness and informing members and subscribers of progress in this regard. Richard recognized the chicken and egg nature of the problem of persuading authors to publish their best work in our publications and implemented incentives for first authors and returning authors alike.

● publishing several special issues of *A-O* devoted to a single subject, papers from a single conference or some other special event.

● implementing a path for reviewers to become editors and ultimately chief editors for a major subject area.

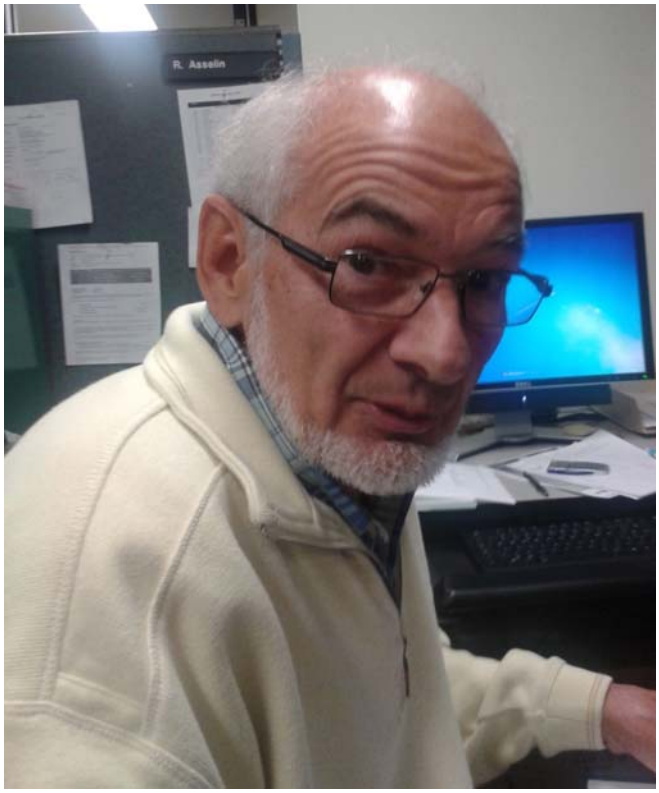
● implementing publication exchanges with sister societies such as the AMS, RMetSoc, Météo-France, AMOS (Australian Meteorological and Oceanographic Society), NZMS (New Zealand Meteorological Society) and the WMO (World Meteorological Organization).

● taking advantage of every opportunity to publicize CMOS publications at meetings of sister societies and at other non-CMOS meetings attended by CMOS members.

● acting as Secretary and occasional chair of the CMOS Publications Committee.

Thanks to Richard, CMOS publications enjoy an excellent and growing reputation. The impact factor for *Atmosphere-Ocean* is very respectable, especially on the oceanographic side. The number of submissions is growing, especially from international authors.

Important as his accomplishments re the publications program are, they are only a part of a much broader pattern of volunteer contributions to CMOS. Richard served as President for 1983-84 and for the years before and after. He established the position of Executive Director and recruited Uri Schwarz to take it on. He advised every Executive Director since then including the author of this piece. I can attest to the fact that throughout his tenure as Director of Publications, it was Richard who did much of the work of the office and who pushed for initiatives to improve its operations.



Dr. Richard Asselin

It was Richard who organized the CMOS exhibit at congresses and other meetings, who produced publicity brochures for the Society and for *A-O*, Richard who looked after the archives and who hired summer student help to get them organized, especially after a huge batch of material was received from the Downsview archives started by Morley Thomas.

It was Richard and his aptitude for business who recommended that CMOS should purchase a database system and software to manage membership and subscription records on its own, after CAP (Canadian Association of Physicists) encountered difficulty carrying out these functions for CMOS. It was Richard who then recognized that CMOS could do so much more with such a system. He managed the subscription side as well as the abstracts submission and management functions. He completely re-designed the latter, and with the help of a programmer that he hired, modified the system to go far beyond the rudimentary functions received from the software provider.

Although it will be relatively easy for CMOS to change to a new Director of Publications, a job that can be carried out from almost anywhere in the country, I suspect that his absence from daily life at the CMOS office will create an even bigger hole that will be even harder to fill!

Ian D. Rutherford, Retired CMOS Executive Director

In Memoriam

Renowned Canadian Sea Ice Pioneer Passes On

W.E. (Bill) Markham – 1920 - 2014


William (Bill) Markham

As the Cold War deepened in the 1950's, the United States, increasingly fearful of a Soviet attack from the Arctic, embarked on the construction of the Distant Early Warning (DEW) line. Canada was not about to let its ally trample unimpeded across its sovereignty and assigned two RCN ships, the icebreaker *HMCS Labrador* and the aircraft carrier *HMCS Magnificent* to support the U.S. ships carrying construction materials into the Arctic. On her maiden voyage in 1954, the *Labrador* had completed a transit of the Northwest Passage. A year later, the ship was back in the Arctic on escort duty with LCDR Bill Markham as meteorologist and ice advisor.

Bill had joined the Meteorological Division, Air Services Branch of the Department of Transport in 1942 and served as a weather forecaster for the RCAF Western Air Command during the war. He was later stationed in Edmonton where he co-founded the Arctic Weather Forecast Team and created the first Arctic Weather Centre in Resolute Bay. With the Navy looking for expertise to support its new Arctic operations, Bill was commissioned with the rank of Lieutenant Commander (Special Branch) and sent to Washington for a comprehensive course in oceanography and sea ice. On his return to Canada, he was assigned to *HMCS Labrador*.

DEW line construction was largely completed by 1958 but on-going re-supply, together with new and increasing commercial shipping in the Gulf of St. Lawrence, Newfoundland waters and Hudson Bay, demanded a continuing ice monitoring and forecasting service. LCDR Markham assembled a small nucleus of meteorologists and technicians at HMCS Shearwater to form the first Canadian ice forecast office – Sea Ice Central – in the spring of 1958. The next year, Ice Central was returned to the Department of Transport and relocated to Halifax with (now) Mr. Markham as Officer-in-Charge. He continued in that role for the next 21 years, keeping the unit and its unique expertise together through numerous organizational changes and a relocation to Ottawa. In 1977, he moved to Toronto and spent the last five years of his career as Director of the Ice Branch of the Atmospheric Environment Service (as the MSC was then known).

Over his career, Bill brought many innovations into the Canadian Ice Service, to use its current name. As early as 1970, Bill recognized the value of satellites in ice surveillance and implemented a complex process to get satellite images from receiving stations to the Ice Service by photo-facsimile in near-real-time. He borrowed a Side-Looking Airborne Radar (SLAR), surplus from the Vietnam War, from the U.S. Coast Guard and had it installed on an ice reconnaissance aircraft, the first application of radar mapping in an operational ice service. When the SeaSAT Synthetic Aperture Radar (SAR) satellite mission ended prematurely in 1978, he recruited Dr. René Ramseier, a SeaSAT Principal Investigator, into the Ice Service, solidifying the relationship between ice monitoring and radar satellites, an association that has flourished through Canadian and European SAR satellites to this day and will continue into the future.

Bill was highly regarded internationally and was Canada's delegate to the World Meteorological Organization's "Panel on Sea Ice", forerunner to the Expert Team on Sea Ice. Prior to 1982, there were many different national codes and symbols to describe ice conditions on charts – an obvious impediment to getting clear ice information to international shipping. Under Bill's leadership, the Panel negotiated a standard symbology and encoding that was adopted by all of the national ice services. While initially ridiculed as a "horse by committee", it has stood the test of time and remains in international use today. It stands as a testament to Bill's knowledge of ice as well as his personal affability and negotiating skills that he was able to bring a host of countries with national interests together in the service of ice navigation.

Over 40 years, Bill authored many publications on ice forecasting and climatology but his most memorable are the three Ice Atlases for the *"Eastern Canadian Seaboard*", "*Canadian Arctic Waterways*", and "*Hudson Bay and Approaches*". In an era before Geographic Information Systems, Bill laboured for years with gridpoint overlays to produce these first authoritative works on sea ice distribution in Canadian waters. Bill was awarded the Patterson Medal for *"distinguished service to meteorology in Canada*" in 1983.

In retirement, Bill turned his attentions to family and golf while continuing to consult on sea ice reconnaissance and ice climatology studies. He is survived by his loving wife of 72 years, Esther, sons Barry and Craig, daughter Jill, five grandchildren and three great-grandchildren.

John Falkingham and Alex Beaton

TROPICS TO POLES
DES TROPIQUES AUX POLES

ADVANCING SCIENCE IN HIGH LATITUDES
AVANCEMENT DE LA SCIENCE DES HAUTES LATITUDES

49th CMOS CONGRESS **49ème CONGRÈS SCMO**

13th AMS CONFERENCE ON POLAR METEOROLOGY AND OCEANOGRAPHY

2015 WHISTLER

May 31 - June 4 **31 mai - 4 juin** **British Columbia, Canada**

Canadian Meteorological and Oceanographic Society
La Société canadienne de météorologie et d'océanographie

American Meteorological Society

www.cmos.ca/congress2015 twitter:@CMOS2015

Graphic designed by / Le graphique a été créé par : Helen Sun Vancouver, BC

We're *passionate* about what we do

We just work with different instruments

What do you need to measure? Why do you need to measure? When do you need to measure? How do you need to measure? When you call Campbell Scientific, these are the questions you can expect our Measurement Consultant to ask, as they learn about your project. We are eager and curious to understand your work and we care for the science behind the data you are collecting.

Ensuring you have the right instruments to make the best possible measurements is our passion.

CAMPBELL® SCIENTIFIC

WHEN MEASUREMENTS MATTER

campbellsci.ca | 780.454.2505