



Canadian Meteorological  
and Oceanographic Society

La Société canadienne  
de météorologie et  
d'océanographie

# CMOS BULLETIN SCMO

April/avril 1994 Vol. 22 No. 2

SCIENCE: ADDRESSING THE ISSUES  
LES SCIENCES: DES SOLUTIONS AUX PROBLÈMES

Aviation  
Meteorology

Middle Atmosphere  
Meteorology

Climate

Agriculture and  
Forestry Meteorology

Fisheries  
Oceanography

Operational  
Oceanography

Météorologie de  
l'aviation

Atmosphère moyen  
Météorologie

Climat

Météorologie agricole  
et forestière

Océanographie  
des pêches

Océanographie  
opérationnelle

MAY 30 TO JUNE 3 1994 • 30 MAI AU 3 JUIN 1994

GLOBAL CHANGE FORUM

MAY 30 1994

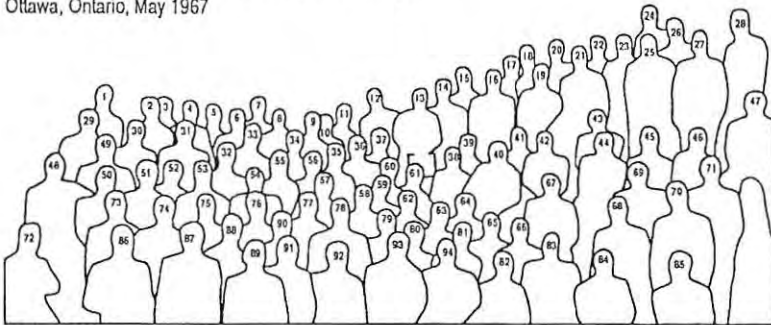
CHANGEMENT À L'ÉCHELLE PLANÉTAIRE

30 MAI 1994



Canadian Meteorological Society – First Annual Congress  
Ottawa Ontario – May 1967

Canadian Meteorological Society - First Annual Congress  
Ottawa, Ontario, May 1967



As most members are doubtless aware the 1994 CMOS Congress will take place in Ottawa from the 30th May to the 3rd June. This is not the first time that our Society has held the annual Congress in Ottawa, indeed the very first annual congress of the Canadian Meteorological Society was held in Ottawa in May 1967. Times have changed, the attendance at the 1994 Congress will probably be around 350. The 1967 Ottawa Congress attracted a total of 93 members, few enough that a group photograph was possible. I have tried to discover the identities of all 93, and failed. A list and key are on this page, if anyone can add some of the missing names, then please contact the editor of the Bulletin.

- |                   |                  |                  |                   |                   |                    |                 |
|-------------------|------------------|------------------|-------------------|-------------------|--------------------|-----------------|
| 1. B. Sagar       | 15. P. Schuepp   | 29. A. Thomson   | 43. G. McPherson  | 57. W. Hitchfield | 71. P. Litwin      | 85. W. Creswick |
| 2. R.E. Munn      | 16.              | 30. P. Carlson   | 44. D. Bauer      | 58. C. Taggart    | 72. A. Robert      | 86. A. Missio   |
| 3. P. Janecak     | 17. M. Webb      | 31. H. Kruger    | 45. G. McBean     | 59. E. Truhlar    | 73. R. Asselm      | 87. A. Brewer   |
| 4. J. Ring        | 18. W. Pugsley   | 32. G. Mather    | 46. I. Ashwell    | 60.               | 74. R. Latimer     | 88. C. East     |
| 5.                | 19. S. Derco     | 33. G. Morrissey | 47. A. Christie   | 61. M. Hirt       | 75. P. Johns       | 89. J. Clodman  |
| 6. E. Burford     | 20. D. Wardle    | 34. R. Armstrong | 48. J. Dimintryff | 62. D. Mckay      | 76. C. Penner      | 90. J. Maybank  |
| 7. W. Chisholm    | 21. K. Clark     | 35. D. Leahey    | 49. B. Boville    | 63. D. Smith      | 77. A. Shabbar     | 91.             |
| 8. G. Henry       | 22. L. McHattie  | 36.              | 50. S. Buckler    | 64. R. List       | 78. J. Mathieson   | 92. A. Miceli   |
| 9.                | 23. G. Legg      | 37.              | 51. M. Thomas     | 65. R. Anderson   | 79. R. Fichaud     | 93. R. Triedl   |
| 10.               | 24. B. O'Reilly  | 38. G. Gee       | 52. M. Kwizak     | 66. G. Pincock    | 80. G. Shimizu     | 94. D. Davies   |
| 11. I. Rutherford | 25. G. Robertson | 39. G. Gilbert   | 53. H.J. Wilson   | 67. R. Longley    | 81. A. Parry       |                 |
| 12. J. Gregory    | 26. P. Buttals   | 40. H. Cameron   | 54. R. Noble      | 68. B. Cudbird    | 82. G. Bristow     |                 |
| 13. D. Layton     | 27. J. McBride   | 41. R. Lee       | 55. B. Muller     | 69. G. Kennedy    | 83. B. Stoutjesdyk |                 |
| 14. J. Maunder    | 28. N. Yacowar   | 42. D. Hay       | 56. J. Van Tissot | 70. F. Burbridge  | 84. C. Mushkat     |                 |

# CMOS Bulletin SCMO

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## EDITOR'S COLUMN

As you may be aware, the editorial office of the Bulletin will be moved from Victoria to Montréal, with the new CMOS executive committee. Let me introduce myself, my name is Jean-Pierre Blanchet and I am professor at the Department of Physics of the Université du Québec à Montréal. Starting with the issue 22(3) of June 1994, I will take editorial responsibility for the Bulletin. In this function, some important people will assist me to maintain the quality of the Bulletin. Nathan Yakowar (Montréal), David Straub (McGill) and Richard Leduc (MEMVIQ, Québec) have graciously accepted the editorial section on operational meteorology, oceanography and climatology, respectively. Our first objective is to make the transition as smooth as possible. Considering the excellence of Howard Freeland and his colleagues in upgrading the Bulletin to its current status, this will be a challenge.

The next issue should go to press on May 20, 1994. We would appreciate receiving your contributions as soon as possible, preferably before May 6, to give us enough time to revise and prepare layout of that first issue. Following, Howard's procedure, I prefer to receive contributions submitted on floppy disk in any DOS format (i.e., Word Perfect, standard ASCII, MS Word). Files in Macintosh (Word and text) can be converted. Plain English text may be sent by E-Mail to: "bulletin@osiris.phy.uqam.ca". To start, I prefer to receive black and white graphics on paper or floppy disc. We are also looking for suggestions for front page pictures. Your suggestions on editorial matters will be welcome.

Jean-Pierre

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## Notes from the Retiring Editor

After three years I am handing over the instruments of office (a set of floppy discs) to a new Editor of the CMOS Bulletin SCMO, Jean-Pierre Blanchet. I have no doubt that the Bulletin will continue in very capable hands. Jean-Pierre will have one problem to face, where does he get the material he needs to fill the next 36 issues of the Bulletin? Certainly it is well known that over the last 3 years I have created a modest amount of material, but there is a limit to the creativity of the editor. The Bulletin will flourish if, and only if, it is supported by the members of CMOS. Please be prepared to submit items that are newsworthy. I have frequently found it a struggle to get reports on items that I know should be reported.

It has been a great pleasure working with a wide variety of CMOS members. Particularly, I would like to thank Uri Schwarz, Ed Truhlar and Nick Manou\* for their suggestions, contributions and encouragement. I would also like to thank all members who have contributed material, especially those who have contributed columns of material, such as Barry Ruddick, Paul LeBlond, Terry Krauss, Bruce Johnson, Ross Brown, Ced Mann and Morley Thomas. Finally, I would like to thank Savonius Rotor and his assistants for helping us take life a little less seriously.

Howard Freeland

\* Toronto University Press

## WHAT'S GOING AROUND?

by Savonius Rotor

As I am sure you all know, once every 5 years or so the west coast of N. America comes under the influence of the dreaded El Niño. This causes dramatic changes in the weather patterns, strange species of fish to appear, etc. Sometimes it is tempting to attribute all odd things that happen on the West Coast to El Niño. In response to this feeling a local Victoria DJ (CFAX-1070) composed and sang this song which he has kindly allowed me to print.

El Nino by Barry Bowman

### *Section 1, sung to the tune of "The Streets of El Paso"*

Out on the west coast  
This thing called El Niño  
Is constantly causing the weather to change.  
What is this thing and what does it mean?  
Everything's backwards the forecast's so strange.

We froze all last summer  
Right through 'til September  
I couldn't find enough long underwear.  
My tulips were bloomin' as late as November  
Now my goldfish has begun to grow hair.

### *Section 2, sung to the tune of "La Bamba"*

Oh what the hell is El Niño  
Just what the hell does it mean?  
This crazy thing  
That all so drives me crazy.  
Who knows what is El Niño  
(One day we froze) Yeh  
We freeze and we freeze, yeh.

Yeh, we're freezing and sneezing  
Because they say ( 3 times)  
Yes, because of El Niño  
It's because of El Niño  
the weather man (3 times)  
Blames El Niño (2 times)  
He blames El Niño

So what the hell is El Niño  
Just what the hell does this mean?  
This crazy thing  
That all so drives me crazy.  
What the hell is the El Niño  
Just what the hell does El Niño all mean?

### *Guitar solo - improvisation*

So what the hell is El Niño  
Just what the hell does this mean?  
This crazy thing  
That all so drives me crazy.  
And when I read the forecast-uh  
It spells disast-uh  
For you and me-uh

The El Niño (4 times - with background yelling of lines such as, "Sing along!", "I can't hear you!", etc. This can be improvised.)

## Greetings from the Ottawa Office

On behalf of the Canadian Association of Physicists I am very pleased to extend a warm welcome to the Canadian Meteorological and Oceanographic Society to your new business office in Ottawa. Some members may recall that the CMOS Business Office was affiliated with the CAP National Office several years ago. We are pleased to have you back and promise you the highest level of service and support that our resources can offer.

Activities are underway towards effecting a smooth transfer of the office operations. A new telephone line has been acquired for CMOS, access to CAP's shared fax machine and CAP's e-mail have been established, and we have begun a complete upgrading of the current CMOS database system to provide fast, efficient service to the CMOS membership. As part of the system upgrading we have undertaken a re-defining of the membership codes. This has resulted in a re-assigning of membership numbers, so please take note of your new membership number when you receive your 1994 receipt and membership card.

Ginette Allard and I (Francine Ford) are here to assist you whenever possible. Our normal hours of operation are: Monday to Friday, 8:30 to 17:00 (Ottawa time). Various methods of reaching the office are listed below:-

Mailing address: CMOS Business Office  
Suite 903  
151 Slater Street  
Ottawa, Ontario, K1P 5H3

Telephone: (613)-237-3393  
Fax: (613)-238-1677\*  
EMail address: cap@physics.carleton.ca

Please feel free to call us at any time. We will do our best to answer any questions you have as expeditiously as possible. However, please bear with us during this initial stage of transition while the 1993 records are still in Newmarket and we are establishing the systems necessary to provide the best service possible for CMOS in the long term.

Your new office manager,  
Francine Ford

\* Please note that the fax machine is shared by 4 organisations under the responsibility of the Youth Science Foundation. It is, therefore, essential that any fax be clearly directed to 'Francine Ford' at the CMOS Office.

### Editor's Note:

I have been sent a copy of the Sept. 1993 issue of *Physics in Canada*, published by CAP. This is a special theme issue on the subject of *Physics and the Environment*. The articles are of substantial interest to CMOS members and should be considered recommended reading. The issue is available from CAP at a special reduced price of \$7.49, including shipping and taxes. The following subjects are included:-

The "Slow" Physics of climate system evolution,  
by W.R. Peltier.

Isotopes and the environment, by A.E. Litherland.

From millimetres to megametres: The interacting scales of

## Salutations du bureau d'Ottawa.

Au nom de l'Association Canadienne des Physiciens, il me fait plaisir de souhaiter la bienvenue à la Société Canadienne de Météorologie et d'Océanographie dans votre nouveau bureau d'affaires à Ottawa. Certains membres peuvent se rappeler que le bureau d'affaires de la SCMO était affilié au bureau national de l'ACP il y a plusieurs années. Nous sommes heureux que vous soyez de retour et nous vous promettons les meilleurs service et support que nos ressources peuvent offrir.

Des activités sont en cours dans le but d'effectuer un transfert des opérations du bureau sans difficultés. Une nouvelle ligne téléphonique a été installée pour la SCMO, l'accès partagé au télécopieur de l'ACP ainsi qu'au courrier électronique de l'ACP a été établi, et nous avons commencé une mise à jour du système actuel de la base de données de la SCMO afin de fournir un service rapide et efficace aux membres de la SCMO. Une part de la mise à jour du système consistait en une redéfinition des codes d'adhésion. Cela a eu comme résultat un réassignement des numéros de membre. Veuillez donc noter votre nouveau numéro de membre lorsque vous recevrez votre reçu et votre carte de membre pour 1994.

Ginette Allard et moi-même (Francine Ford) sommes ici pour vous aider dans la mesure du possible. Nos heures normales de disponibilité sont: du lundi au vendredi, de 8h30 à 17h00 (heure d'Ottawa). Plusieurs manières de rejoindre le bureau sont indiquées ci-dessous :

Adresse postale : Bureau d'affaires de la SCMO  
Suite 903, 151 rue Slater  
Ottawa, Ontario, K1P 5H3  
Téléphone: (613)-237-3393  
Télécopieur: (613)-238-1677\*  
Adresse électronique: cap@physics.carleton.ca

N'hésitez pas à nous contacter à tout moment. Nous ferons de notre mieux pour répondre à toutes vos questions aussi promptement que possible. Cependant, veuillez nous accorder votre patience durant cette période initiale de transfert durant laquelle les dossiers de 1993 sont encore à Newmarket et que nous mettons en place le système adéquat pour procurer, à l'avenir, le meilleur service possible.

Votre nouvelle administratrice de bureau,  
Francine Ford.

\* Veuillez noter que l'utilisation du télécopieur est partagée par 4 organismes sous la responsabilité de la Fondation des Jeunes Scientifiques. Il est donc essentiel que toute transmission par télécopieur soit clairement adressée à "Francine Ford" au bureau de la SCMO.

ocean dynamics, by C.J.R. Garrett.

Acoustical studies of air-sea interaction and ocean climate,  
by D.M. Farmer

Upper ocean processes and the global carbon cycle,  
by K.L. Denman.

Modelling climate and climate change, by G.J. Boer.

The view from space - studying the surface and atmosphere  
from satellites, by J.R. Drummond.

Observation of middle atmosphere behaviour, by R.P. Lowe.

Could the Chernobyl exclusion zone be recovered?  
by J.V. Jovanovich.

## News from CMOS Headquarters

The move of the Society's Business Office from Newmarket to Ottawa has progressed smoothly, although there could be one or two mislaid membership renewals, subscriptions or receipts. In that event, please contact the Business Office at the address given on the back page, or by phone (613/237-3393) or fax (613/238-1677). They will do their best to help. As this is the time for membership renewals, if you have not already taken action, please send in your renewal to the Business Office as soon as possible; if you can help in recruiting new members, all the better.

We, that is Dorothy Neale, our new Executive secretary, and myself are also getting into the swing of things and looking forward to being contacted by chairs or members with any problems (few, I hope) or suggestions (many, I hope). The same address as for the Business Office should be used for that purpose, but the telephone number is 613/990-0300, and the fax number is 613/990-5510. I hope to be connected to E-mail in the near future.

Dorothy has been kept busy lately answering increasing numbers of enquiries from students in Canada, and even abroad, seeking information on studies leading towards careers in meteorology or oceanography, or from younger folk seeking material for school projects.

Some of the affairs of CMOS Council have been transacted by conference calls and E-mail in order to minimise the travel of council members.

Decisions recently taken by Council included the co-sponsorship of:-

- the Pacific Basin Meeting of The Oceanography Society (U.S.A.), Honolulu, 19-22 July, 1994, and
- the international Conference on Ozone Depletion and Ultraviolet Radiation, Victoria, B.C., 27-29 April, 1994.

Dorothy and I are looking forward to meeting many members at the Ottawa Congress, preparations for which are going ahead smoothly.

Neil J. Campbell  
Executive Director

## Nouvelles du bureau central de la SCMO.

Le déménagement du bureau d'affaires de la Société de Newmarket à Ottawa s'est bien déroulé, quoiqu'il se peut qu'un ou deux réabonnements, cotisations ou reçus aient été égarés. Dans ce cas, veuillez contacter le bureau d'affaires à l'adresse inscrite à l'endos, ou par téléphone (613-237-3393) ou télécopieur (613-238-1677). Le personnel fera tout en son pouvoir pour vous aider. Puisque c'est le temps des réabonnements, si vous ne l'avez pas encore fait, veuillez envoyer votre réabonnement au bureau d'affaires le plus tôt possible; si vous pouvez recruter de nouveaux membres, tant mieux.

Nous, c'est-à-dire Dorothy Neale, notre nouvelle secrétaire exécutive, ainsi que moi-même, nous mettons dans le bain et sommes impatients d'être contactés par les présidents ou les membres pour des problèmes de toute nature (peu, j'espère) ou des suggestions (plusieurs, j'espère). L'adresse du bureau d'affaires peut être utilisée à cette fin, mais le numéro de téléphone est 613-990-0300, et le numéro de télécopieur est 613-990-5510. J'espère être relié à un réseau de courrier électronique dans un proche avenir.

Dorothy a été occupée ces derniers temps à répondre à un nombre croissant de demandes de renseignements provenant d'étudiants du Canada, et même de l'étranger, cherchant de l'information sur des études conduisant à des carrières en météorologie ou en océanographie, ou provenant d'étudiants plus jeunes en quête de matériel pour des projets scolaires.

Certaines affaires du conseil de la SCMO ont été réglées par conférence téléphonique et courrier électronique dans le but de minimiser le déplacement des membres du conseil.

Les décisions prises récemment par le conseil comprennent le co-parrainage de :

- L'Assemblée du Bassin du Pacifique de la Société d'Océanographie (E.-U.), Honolulu, 19 au 22 juillet 1994, et
- La Conférence internationale sur la réduction de l'ozone et les radiations ultraviolettes, Victoria, C.-B., 27 au 29 avril 1994.

Dorothy et moi-même sommes impatients de rencontrer un grand nombre de membres au congrès d'Ottawa, pour lequel les préparatifs vont de l'avant.

Neil J. Campbell  
Directeur exécutif.

## New CMOS Members

The following new members were approved at the CMOS Executive meeting 14th Jan., 1994:

E.R. Garnett	Winnipeg, MB	regular
Colin Taylor	Kamloops, BC	student
Sherman Waddell	Victoria, BC	regular

The following new members were approved at the CMOS Executive meeting 7th Mar., 1994:

Ginet Armelle	Rimouski, QC	étudiante
Jim Bowers	Chilliwack, BC	student
Augustus Fanning	Victoria, BC	student
John Fyfe	Victoria, BC	regular
Kathleen Hedley	Osgoode, Ont	regular
Kent Johnson	Kelowna, BC	regular
Richard Laurence	St Laurent, QC	régulier
Diane Lavoie	Rimouski, QC	étudiante

Chris McLinden	N. York, Ont	student
Domenico Mignacci	Nelson, BC	regular
Lazaros Oreopoulos	Montréal, QC	régulier
Maurice Robinson	Victoria, BC	regular
Julien Roy	Hull, QC	régulier
Sophie Valke	Grenoble, France	étudiante
Al Wallace	Kelowna, BC	regular
Xiahong Wang	Victoria, BC	student
César Yaco	Rimouski, QC	étudiant
John Zupan	Manuels, NF	regular

Note to Centres and Chapters:

It is important that you make contact as soon as possible with any new members in your area to verify their mailing address and to begin distribution of local Society material. National mailings and publications begin once approved new members are entered in the office computer. This follows the date of the Executive or Council meeting shown in this notice.

## CMOS Member wins the Steacie Prize

### *Editor's Note:*

*It was with great pleasure that I heard recently that Verena Tunnicliffe had won the prestigious Steacie Prize. Verena is on the faculty of the University of Victoria, cross-appointed to the dept. of Biology and the School of Earth and Ocean Studies and is a valued colleague of mine. The following is a copy of a press release that was issued by the University of Victoria.*

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### Expert on exotic ocean hot-vent organisms wins prestigious Steacie Prize

A University of Victoria marine biologist who has spent more than 700 hours in small research submarines studying the strange animal communities living around ocean-floor hot springs is this year's winner of Canada's top award for young scientists and engineers.

Dr. Verena J. Tunnicliffe of the University of Victoria's School of Earth and Ocean Sciences and Department of Biology has been awarded the Steacie Prize for 1993. The 40-year-old marine biologist is one of the world's leading specialists in the ecology and evolution of the unusual organisms found living around hydrothermal vents--deep-sea hot springs that occur on mid-ocean ridges. Tunnicliffe's research involves not only exploration of the ocean floor in submersible vessels but also laboratory experiments in molecular genetics, biogeographical modelling and the analysis of fossils. Working together with scientists in other disciplines, such as geologists and geophysicists, she has developed a widely accepted framework for the description of hot-vent fauna and the interpretation of their evolution. She organized expeditions that discovered hydrothermal vents on the Juan de Fuca and Explorer ridges off British Columbia and has had a hand in much biological and geological research in this region and elsewhere. In the course of more than 130 descents in submersible research vessels, she has discovered more than 50 new species, three of which bear her name. She has also made important contributions to the development of these vessels and their equipment, to most of the tools and sampling methods used in the PISCES IV submersible as well as to the design of Canada's new Remote Operation Platform for Ocean Science (ROPOS). These studies of hot-vent fauna have major implications for our understanding of biological communities and their evolution in response to changes in the environment. Tunnicliffe is currently testing the hypothesis that most hot-vent animals are relics from before the major Cretaceous extinctions. This work should shed light on the mechanisms that maintain genetic diversity and protect species from extinction.

The Steacie Prize is administered by the E.W.R. Steacie Memorial Fund, a private foundation. It has been awarded each year since 1964 and carries a cash award of \$7500. Scientists and engineers considered for the Steacie Prize are nominated by their colleagues and evaluated by several independent referees and their recommendations are submitted to a selection panel of distinguished Canadian scientists and engineers. Tunnicliffe is the first female recipient of the Steacie Prize.

For further information, contact the Steacie Fund Secretary at (613) 990-0968 or Robie Liscomb, Public Relations, University of Victoria, at (604) 721-7640.

## CMOS Member Wins INHS Award

Madhav L. Khandekar, a research scientist with Environment Canada was presented with the Scientific Contribution Award of the International Natural Hazards Society at its 5th biennial symposium held in Qingdao, China, from 29 Aug. to 3rd Sept. 1993. Khandekar was cited for his long-term work on the Indian Monsoon and its connection to El Niño/Southern Oscillation. At the symposium Khandekar presented a keynote paper entitled "El Niño/Southern Oscillation, Indian Monsoon and World Grain Yield - A Synthesis".



Khandekar received his M.S. and Ph.D. in meteorology from the Florida State University in 1964 and 1968, respectively. At Environment Canada he has been working on ocean wave modelling for the past several years. Recently, Khandekar wrote a monograph entitled, "Operational Analysis and Prediction of Ocean Wind Waves", which was published by Springer-Verlag in 1989 under the series, Coastal and Estuarine Studies.

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### Conference Announcement The Economic Benefits of Meteorological and Hydrological Services

The World Meteorological Organization, in collaboration with other intergovernmental and non-governmental organizations will convene a conference on the above topic in Geneva from 19 to 23 Sept. 1994. The conference is expected to provide a forum for reviewing available knowledge on the subject and on the methodologies of assessment. It will also formulate strategies that will assist National Meteorological and Hydrometeorological Services (NMHS) in their efforts to ensure continued government funding of their core activities and, in many cases, to help demonstrate the benefits of their services to end users.

The principal topics to be discussed, and on which paper and poster presentations are being invited include: (a) proven methodologies for economic benefit analysis; (b) results of case-studies of benefits; (c) examples of the benefits of private sector/NMHS collaboration to end users; and (d) economic aspects of climate change and of seasonal forecasts. The working languages of the Conference will be: English, French, Russian and Spanish.

Further information is available from the Permanent Representative (or Director) of the Meteorological or Hydrometeorological Service) of the WMO Member country concerned, or directly from the WMO Secretariat in Geneva.

Some limited funds may be available to support the attendance of selected participants from developing countries.

## CMOS PRIZES AND AWARDS REVIEW

The Prizes and Awards Committee is reviewing various aspects of the Society's prizes and awards. A list of the present categories and criteria may be found in the October 1993 issue of the CMOS Newsletter (Vol. 21, No. 5), or can be obtained from the Committee Chair. CMOS members are invited to provide comments to the Committee on any aspect of the prizes and awards. In particular, feedback on the following questions would be welcomed:

- (i) Are there too many categories presently? If so, which ones are lower priority?
- (ii) Should there be a CMOS membership requirement for nominators?
- (iii) Should the criterion for the Applied Oceanography Prize be changed from "significant" to "outstanding" contribution, to be consistent with that for the Applied Meteorology Prize?

In addition, the Committee has received a proposal that the President's Prize be re-named in honour of the late André Robert, the Prize's first winner and only two-time winner. Dr. Robert's outstanding scientific contributions, particularly in the area of numerical methods for fluid dynamics, have impacted both meteorology and oceanography, and exemplify the intent of the Society's pre-eminent prize. Comments on this proposal would be welcomed.

Upon completion of this review, the Committee is planning to submit recommendations to CMOS Council for their consideration. Changes to the prizes and awards will require amendment of the Society By-Laws and hence formal membership approval later.

Comments should be forwarded to the Committee Chair: Dr. John Loder, Bedford Institute of Oceanography, P.O. Box 1006, Dartmouth, N.S. B2Y 4A2; fax: 902/426-7827; e-mail: jloder@sable.bio.dfo.ca. Informal comments may be passed to Committee members: Drs. Jean-Pierre Blanchet, William Hsieh and Hal Ritchie, and Mr. Neil Meadows.

## Révision des Prix et Bourses de la SCMO.

Le comité des prix et bourses révisé présentement divers aspects des prix et bourses attribués par la Société. Une liste des catégories et des critères actuels est disponible dans la parution des Nouvelles SCMO d'octobre 1993 (Vol. 21, No.5), ou peut être obtenue du président du comité. Les membres de la SCMO sont invités à faire parvenir leurs commentaires au comité sur tout aspect des prix et bourses. En particulier, des réponses aux questions suivantes seraient appréciées:

- (i) Y a-t-il présentement trop de catégories ? Dans ce cas, lesquelles sont de moindre importance ?
- (ii) Serait-il nécessaire d'être membre de la SCMO pour être présentateur ?
- (iii) Le critère "contribution significative", pour le prix en océanographie appliquée, devrait-il être changé pour "contribution remarquable", pour qu'il y ait cohérence avec le critère du prix en météorologie appliquée?

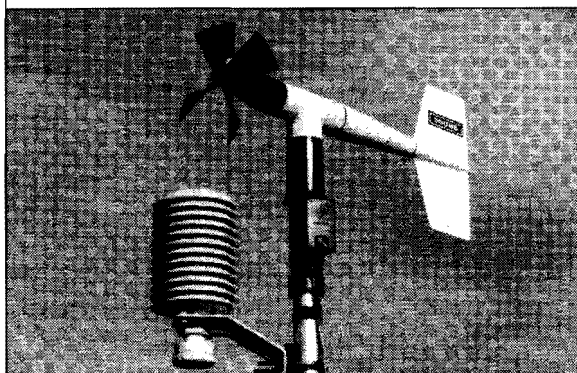
De plus, le comité a reçu la proposition que le prix du président soit rebaptisé en l'honneur du regretté André Robert, le premier titulaire de ce prix et deux fois récipiendaire. La contribution scientifique remarquable du Dr Robert, spécialement dans le domaine des méthodes numériques pour la dynamique des fluides, a eu des impacts autant en météorologie qu'en océanographie, et illustre le but de ce prix prééminent de la Société. Des commentaires se rapportant à cette suggestion seraient appréciés.

Suite à cette révision, le comité projette de soumettre les recommandations au Conseil de la SCMO pour qu'il les considère. Les changements aux prix et bourses nécessiteront des modifications aux règlements de la Société et donc l'approbation formelle ultérieure des membres.

Les commentaires peuvent être adressés au président du comité: Dr John Loder, Institut d'Océanographie de Bedford, C.P. 1006, Dartmouth, N.-E., B2Y 4A2; télécopieur: 902/426-7827; adresse électronique: jloder@sable.bio.dfo.ca. Les commentaires officiels peuvent être envoyés aux membres du comité: les Dr Jean-Pierre Blanchet, William Hsieh et Hal Ritchie, ainsi qu'à M. Neil Meadows.



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# Climate Research News

## Canadian Climate Research Network (CCRN) Process of Project Selection

### BACKGROUND

The Canadian Climate Research Network is being established as a series of Collaborative Research Groups (CRG) that bring together government, industry and university scientists from across the country to focus their talents, energy and collective resources on reducing the uncertainties in global warming. This is a new approach which should help to promote a vibrant and effective climate research community in Canada.

The main goals of the network are:

- to improve our ability to understand climate and to predict the rate, magnitude and regional characteristics of climate change associated with global warming;
- to engage and develop Canadian expertise related to understanding better climate processes and the simulation of future climates;
- to increase long-term collaboration between scientists in universities, government and the private sector; and
- to enhance the participation of Canadian scientists in international climate research programmes.

Equitable, systematic and fair treatment in the selection and management of the network Collaborative Research Groups (CRG) is essential for success. The evaluation of the process that is being followed by AES management is described below.

At the outset, in addition to reviewing scientific documents such as the assessments of the Intergovernmental Panel on Climate Change of WMO and UNEP, the scientific research community was consulted and involved in a process to define and identify a set of priorities which would address the goals of the Network. Discussion and review was accomplished through a series of five workshops held across the country.

### Names of Workshops and Location:

Ocean Circulation Modelling ....Victoria  
Land Surface Processes.....Saskatoon  
Clouds, Chemistry and Climate...Toronto  
Air-Sea Interactions.....Halifax  
Climate and the Arctic.....Ottawa

The outputs permitted AES management to devise a climate research agenda and a process to develop the Network which was feasible and achievable.

### PROCEDURES

#### Step 1.

AES management issued a request for letters of intent from researchers who wished to participate in the Network and contribute to the goals of the climate research agenda.

#### Step 2.

After receipt of an initial response of 59 letters of intent the National Climate Research Committee, which acts as the Advisory Panel for the Network, recommended the formation of 10 Collaborative Research Groups and suggested "main proponents" to coordinate them.

The main proponents were invited to prepare a fully documented proposal suitable for peer review or to develop their concepts further using a workshop or other means. They were encouraged to take into account the interests expressed in relevant letters of intent.

#### Step 3.

The National Climate Research Committee reviewed the detailed proposals and budgets from Collaborative Research Groups and provided advice and comments to AES management. The main proponents were provided with comments for possible fine tuning of the proposal before being forwarded to international referees for external review.

#### Step 4.

AES management will send out proposals to external referees for review of their scientific content. Referees will be selected on the basis of objectivity and scientific reputation and based on advice from proposers, the National Climate Research Committee and AES management. They will be paid an honorarium. Reviews will be confidential to AES management. Reviewers will be asked to ascertain the quality of the science as it pertains to network objectives and international scientific activity.

#### Step 5.

AES management will make decisions on funding and communicate the results to the main proponent of the collaborative research group. A research agreement, consistent with the submitted proposal, will be negotiated by AES management with the main proponent.

Current plans call for the management of the Network to be eventually handled by a new Canadian Institute of Climate Studies. In that case, some of the functions listed above which are now undertaken by AES, may be devolved upon the new Institute. The National Climate Research Committee would nevertheless be expected to continue providing input to Network operations.

# Climate Research News (cont.)

## Long Term Variability in Canadian Snow Cover

by Ross Brown

Climate Research Branch, Atmospheric Environment Service

Recently, a lot of attention has been focused on the snow covered area of the Northern Hemisphere which has declined ~10% since reliable satellite observations began in the early 1970s. The decrease has occurred over all continents, and is mostly confined to the spring period (Robinson et al., 1991). Groisman et al. (1994) provided evidence that this response was related to a stronger positive feedback between snow cover and the radiative balance in the spring period. This finding prompted Dr. Tom Karl of the National Climatic Data Center in Asheville to state in the *Globe and Mail* on January 14, 1994, that "for the first time we are implicating snow as a major factor in global warming". This may indeed be the case for the short period of data investigated (1972-1992). However, 21 years of data is plainly inadequate to assess the role of snow cover in the climate system in light of the significant natural variability found at decadal and longer time-scales related to ocean circulation (Stocker, 1994).

Research on long-term variability in Canadian snow cover is being carried out by the author as part of the **CRYSYS** program (Use of the Cryospheric System to Monitor Global Change in Canada). **CRYSYS** is a Canadian interdisciplinary research program within **NASA's** Earth Observing System (EOS) Program to monitor Earth systems from space. It is also a recognized research project within the federal government's Green Plan Global Warming Science Program. Two basic scientific goals of **CRYSYS** are: (1) to improve understanding of the role of the cryosphere in the climate system, and in global change; and (2) to develop capabilities for monitoring and understanding regional and hemispheric variations in cryospheric variables.

Figure 1 shows interannual variability in reconstructed annual snow cover duration over the western Prairies for the last ~100 years. Snow cover in this area was noted by Karl et al. (1993) as being particularly sensitive to temperature change. Snow cover changes in this area are also highly correlated with changes at the continental scale (Fig. 2). The reconstructed data were developed using daily snowfall and maximum temperature in a calibrated melting degree-day model (Brown and Goodison, 1993). The method was able to account for over 70% of the observed interannual variability in snow cover for the Prairies region in the calibration period (1955-91). Similar results were obtained in an independent calibration and verification using historical daily snow depth data from several sites in North Dakota obtained from Dr. David Robinson at Rutgers University.

Reconstruction of snow cover is necessary because observed daily snow depth data are only available in digital format from 1955 on. Figure 1 exhibits a trend toward increasing snow cover over much of this century, followed by a rapid decline in snow cover during the 70s and 80s (the period of available satellite coverage). The recent decrease is mainly due to

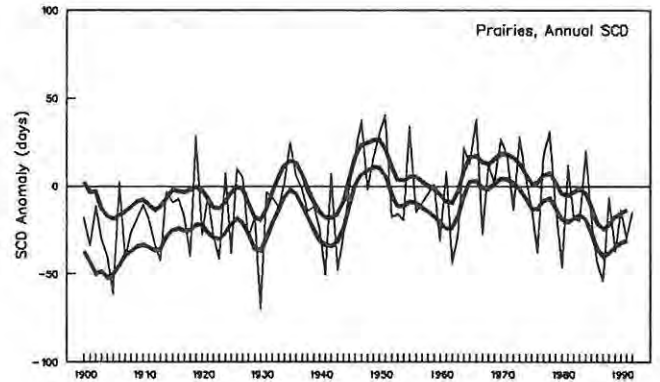


Figure 1: Annual variability in reconstructed snow cover duration (snow depth  $\geq 2$  cm) over the western Prairies (49-54°N, 105-115°W). Heavy lines are 9-term binomial filtered 95% confidence limits for the regional average. Wider limits in the early period of record reflect the lower number of stations used to derive the regional average.

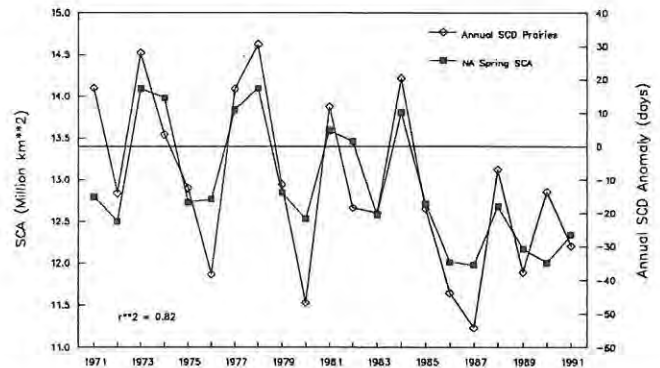


Figure 2: Annual variability in snow cover duration (SCD) over the western Prairies and spring (March-May) snow covered area (SCA) for North America. SCA data supplied by D. Robinson, Rutgers U.

significant reductions in spring snow cover. The U.S. Great Plains exhibits a similar long-term response (Hughes and Robinson, 1993). It can be readily seen in Figure 1 that snow cover in the Prairies is characterized by large interannual variability, and there is some evidence of cyclical variations in the 15-25 year interval. Seen in this longer-term context, it is apparent that recent changes in snow cover resulting from earlier snow disappearance in the spring are still well within the range of natural variability observed this century.

The research results presented above are in the process of being submitted for publication to *Journal of Climate* by Brown and Goodison (1994). I would like to end with a personal plea for historical snow data prior to 1955 for additional verification of the reconstruction method in different regions of Canada. I am particularly interested in

# Climate Research News (cont.)

learning the whereabouts of any digitized data on daily or weekly snow depths, and/or first and last dates of permanent snow cover. If you are aware of such data, please drop me a note at [brownr@ncr.dots.doe.ca](mailto:brownr@ncr.dots.doe.ca) or call me at (514) 421-4772.

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## CALL FOR PAPERS 1994 CSAM TECHNICAL SESSION

The 1994 CSAM Technical Session will be held Tuesday, July 12, 1994 at the Agricultural Institute of Canada (AIC'94) annual conference in Regina, Saskatchewan. Papers or posters on agricultural or forest meteorology, climatology, crop ecology/physiology or related topics are welcome. A \$200 prize will be awarded by Campbell Scientific for the best student paper or poster.

The title and author(s) must be submitted by April 1, 1994. A short abstract (200 words or less) will be required by June 1, 1994. Please send this material in electronic form if possible (diskettes or Email in ascii format).

Please send to:

Dr. Raymond Berard  
CSAM'94 Program Chair  
Agriculture Canada Research Station  
Summerland, B.C. V0H 1Z0  
Phone: (604) 494-7711  
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## Interdecadal Climate Variations over the High-Latitude North Atlantic as Seen in 235 Years of Surface Air Temperature Data

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Geophysical Fluid Dynamics Laboratory/NOAA  
Princeton University  
P.O. Box 308 Princeton, NJ U.S.A. 08542

### 1. Introduction

The interannual variation of climate in the North Atlantic is currently a subject of great interest. Various studies have shown that ocean general circulation models can undergo significant decadal and longer timescale variations in the strength of the thermohaline circulation (e.g., Manabe and Stouffer, 1988; Mikolajewicz and Maier-Reimer, 1990; Weaver and Sarachik, 1991; Weaver et al., 1993). Since in the real ocean most of the sinking of surface water into the deep ocean occurs north of Iceland, attention has been focused particularly on the North Atlantic region. Of interest for present purposes is the recent study of Delworth et al. (1993; hereafter DMS), who employed a global ocean model with realistic geography coupled to a sophisticated atmospheric model. DMS found that the meridional overturning in the North Atlantic in their model has a rather well-defined ~50-year oscillation. This oscillation has a clear effect on winter surface air temperature, particularly in the very high latitudes. Strong oceanic overturning in their model is correlated with warm temperatures in the eastern Atlantic, the North Sea and Scandinavia, and cold temperatures in the western Atlantic, the Labrador Sea and eastern Greenland (DMS Fig. 7). As coupled models become more realistic there is need for correspondingly detailed studies of the temporal and geographic dependence of observed low-frequency variability. A number of recent papers have addressed aspects of this issue in the North Atlantic using both oceanographic and meteorological data (e.g., Lazier, 1988; Levitus, 1989; Mysak et al., 1990; Greatbatch et al., 1991; Deser and Blackmon, 1993). The analysis of observations is complicated by the broad range of frequencies which are present as well as the limited period of data available. Not surprisingly, most earlier observational studies have used the relatively high volume of data from the 20th century. Given the rather long timescales of interest, it is also worthwhile to study the climate variability in the more limited instrumental data available in earlier times. This note supplements previous work by presenting a brief examination of systematic North Atlantic interdecadal air temperature fluctuations that can be seen in very long single station meteorological records. Attention is restricted to high latitude sites (principally Greenland, Iceland, Scandinavia) and to the winter season.

### 2. Data

The data for the present study are monthly mean surface air temperatures through 1987 taken from the widely distributed "World Weather Disk", supplemented by monthly data at Trondheim, Norway for the period 1762-1945 (with some gaps) given in Birkeland (1949). The sites used are: 1 Jakobshavn (69.4°W), 2 Godthaab (64.2°W), 3 Ivigtut (61.2°W), 4 Angmagssalik (65.6°W), 5 Stykkisholmur

# Climate Research News (cont.)

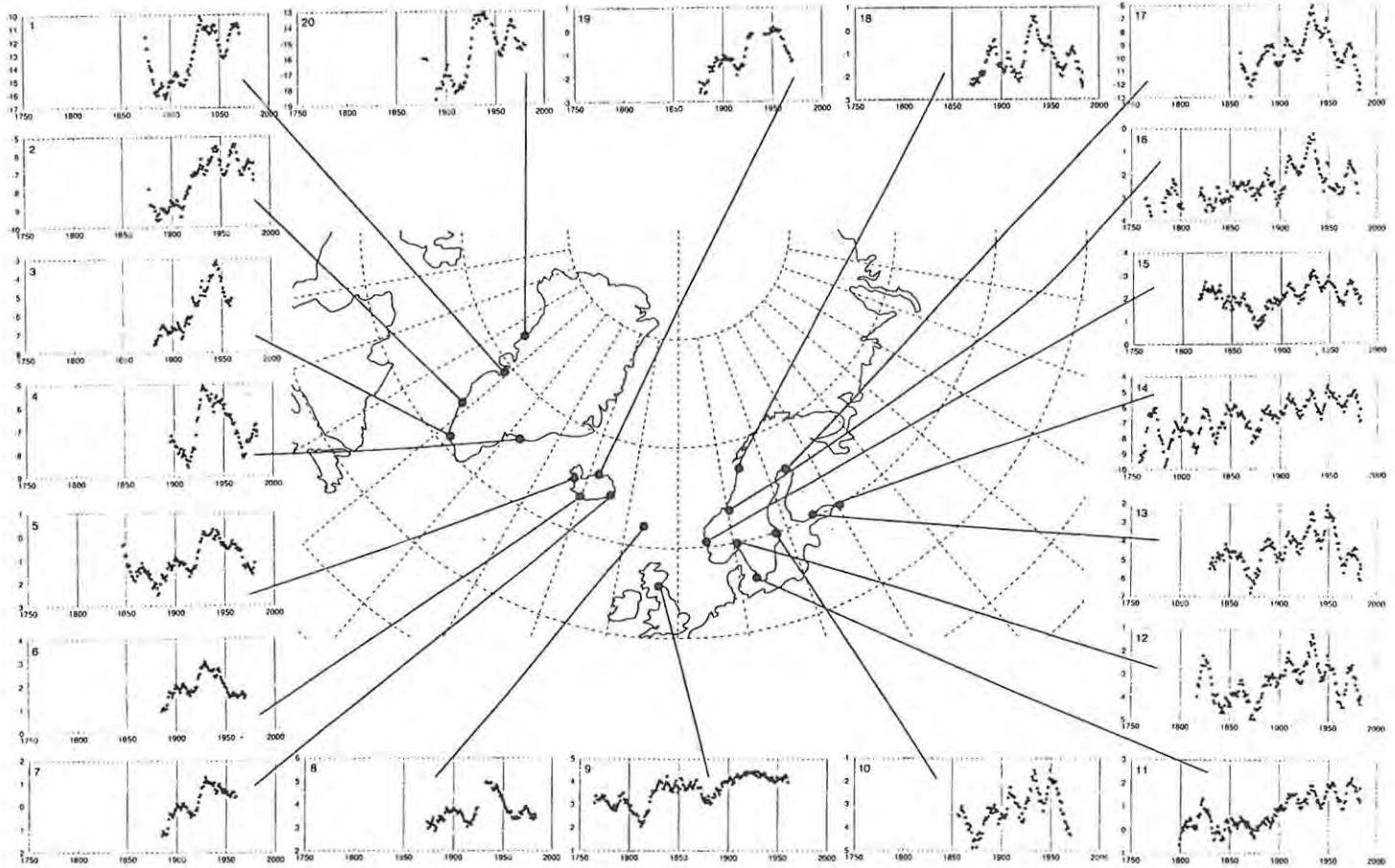


Fig. 1. Each graph displays the time series of the 11-year running mean of the December-February surface air temperature at one of the 20 stations shown on the map. The numbers in the upper left corner refer to the station list given in the text. The temperature scale in each case is in °C.

(65.1°W), 6 Vestmannaeyjar (63.4°W), 7 Teigarhorn (64.7°W), 8 Thorshavn (62.0°W), 9 Edinburgh (56.0°W), 10 Uppsala (59.9°E), 11 Copenhagen (55.7°E), 12 Oslo (59.9°E), 13 Helsinki (60.2°E), 14 St. Petersburg (59.9°E), 15 Bergen (60.4°E), 16 Trondheim (63.4°E), 17 Haparanda (65.8°E), 18 Bodo (67.3°E), 19 Grimsey (66.6°W), and 20 Uppernivak (72.8°W), where the numbers refer to the panels in Fig. 1. This represents the available stations in Greenland, Iceland, Færø Islands and Scandinavia with data for at least a significant part of the 19th century, along with Edinburgh and St. Petersburg (where very long records are available). The period of data at each location is apparent in Fig. 1, which shows the 11-year running mean values of the December-February (DJF) temperature at each of the 20 stations. (To be precise, each value plotted represents the mean of the temperature in that winter and in the five preceding and five succeeding winters, where missing data is ignored in this average. Only values for winters where data are available for at least 6 of the 11 years are plotted). The record at St. Petersburg begins in 1752, allowing 235 individual winter means to be made.

One naturally assumes that the temperature data employed

here are of lower quality in the very early periods of the long records. The detailed discussion of the Trondheim data by Birkeland (1949) is interesting in this regard. He shows that observations of temperature quite close to the center of town were taken by a succession of amateur observers in the periods 1762-87 (with gaps), 1788-1802, 1818-1834, 1835-1851, 1852-57, 1855-84, 1870-1886, and 1885-1944. There are also records from several other observers for briefer periods (that in some cases overlap parts of two of the principal series). Birkeland goes to some length to adjust the various series to account for the different observing times and possible inhomogeneities in thermometer calibration and location. The corrections he ends up applying to the data after 1818 are reasonably small (less than 0.5°C), but the uncertainty in the 18th century data is considerably larger. It is not readily ascertainable if this is typical of the other very long series used here, or if these other series have been examined and corrected as thoroughly as the Trondheim data. Certainly there is no guarantee that the long term trends during the 18th and early 19th centuries in any of the present data are meaningful.

# Climate Research News (cont.)

### 3. Results

There is a great deal of high frequency winter-to-winter variability apparent in the individual station records. The 11-year running mean applied in Fig. 1 is arbitrary, but represents essentially the minimum smoothing required to allow the systematic variability to stand out clearly. The 11-year mean very strongly suppresses the near-decadal period oscillation of air temperature found by Deser and Blackmon (1993) which may account for a significant portion of the actual variance in the unfiltered time series. The overall results in Fig. 1 do not appear to be too sensitive to the shape of the moving average filter employed. So, for example, the timing of the minima and maxima in the time series is not much affected if the 11 year boxcar running mean is replaced by a 17 point Gaussian filter with e-folding half-width of 7 years.

The feature most immediately apparent in Fig. 1 is the long term trend that leads to an overall temperature maximum sometime between about 1930 and 1950 at nearly every station, with generally decreasing temperatures after that point. Chapman and Walsh (1993) show that this cooling trend in recent decades is largely confined to the North Atlantic sector of the high latitude region. Their data also show some strong warming for the very recent period not included in the present study.

Superimposed on this very long period variability are other high frequency oscillations that often appear impressively regular. In particular, at almost all the Scandinavian stations (and St. Petersburg) there are maxima around 1885, 1910, 1930, 1950 and just after 1970. The Scandinavian records suggest that a similar oscillation was present earlier as well. In particular, there seem to be temperature maxima near 1770, 1790, 1805 (at least at St. Petersburg) and 1825. This ~20-year oscillation is less apparent in the middle part of the 19th century. The air temperature records at the four stations on the west coast of Greenland also show a ~20-year variation (although this is somewhat complicated by the very rapid rise of temperature during the first half of the 20th century). This is clearest in the three most northerly of these stations where maxima occur near 1900, 1945 and sometime between 1960 and 1965. There is also a suggestion of a maximum at the beginning of the record (i.e. near 1875). The peak one might expect between 1900 and 1945 may be obscured by the rapid warming during that time. The ~20-year variations of temperature in the west Greenland stations appear to be essentially out of phase with those seen in the Scandinavian stations. The temperature record at the one station on the east coast of Greenland shows an interdecadal variation rather different from that on the west coast (although it does have an abrupt warming in the first half of the century). The difference in interannual temperature oscillations on the east and west coasts of Greenland has been noted earlier by Dansgaard et al. (1975). The temperature series at this west Greenland station, the four Icelandic stations, the Færøe Island station and at Edinburgh all seem less affected by the ~20-year oscillation than those at either the east Greenland or Scandinavian station. This would be consistent with the notion of an oscillation out of phase between east Greenland and

Scandinavia, with a nodal line in between. This is similar to the geographical structure of the winter air temperature oscillation seen in the model of DMS.

### 4. Conclusion

When higher frequency variations are filtered out from time series of air temperature in the high latitude North Atlantic, a roughly 20-year oscillation appears prominently at many stations during at least during some periods. This oscillation is clearly out of phase between the eastern and western high latitude North Atlantic (in contrast to the very long term trends which appear to be in phase over the whole region). Some evidence for the existence of such a phenomenon can be found in Scandinavian temperature records even in the 18th century. There is a suggestion that the oscillation may have been particularly weak during the period ~1830-1880. It is striking that the ~20-year oscillation is often very regular, particularly in the Scandinavian temperature records. In terms of its geographical variation and regularity, the ~20-year variation of winter air temperature documented here resembles the ~50-year oscillation produced by the coupled atmosphere-ocean model of DMS. More work will have to be done to determine the relation of this interdecadal climate fluctuation and the prominent near-decadal variation seen over the entire North Atlantic by Deser and Blackmon (1993). Deser and Blackmon used ship data for the Atlantic north of 15°N, but due to poor data coverage they excluded the area roughly northwest of a line connecting Newfoundland and Iceland, and most of the area northeast of Iceland. It is interesting to note that the analysis of oxygen isotope ratios in Greenland ice cores by Hibler and Johnsen (1979) revealed a very prominent 20-year oscillation, particularly in the top part of the cores (representing the period 1699-1971). It may be that the ~20 year timescale is more prominent in the higher latitudes considered here than in the North Atlantic as a whole. The present results make a strong case for the use of land station data to supplement the available ship data in studies of North Atlantic climate variability.

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### AAAS ENSO Symposium

San Francisco State University will be hosting the Western Regional Meeting of the American Association for the Advancement of Science (AAAS) in June 1994. As part of this meeting we are planning to hold a two-day symposium on El Niño-Southern Oscillation (ENSO) June 20-21. The focus of the ENSO symposium will be on the oceanographic, atmospheric (including climatological), geological (palaeoclimate) and biological aspects of ENSO. We are particularly interested in contributions that focus on ENSO influences on the western part of the Americas, and on studies of the most recent ENSO event. If you think that you (or a colleague) might want to make a presentation at this symposium, please let us know your proposed topic as soon as possible.

Send your name, affiliation and a brief description of your topic to:

Oswaldo Garcia  
Dept. of Geosciences  
San Francisco State University  
1600 Holloway Avenue  
San Francisco, CA, U.S.A. 94132  
InterNet oz@tropic.sfsu.edu

### Call for Papers Sixth International Meeting on Statistical Climatology, June 19-23, 1995, Galway, Ireland.

The Sixth International Meeting on Statistical Climatology (6IMSC) will be held 19-23 June, 1995 in Galway, Ireland. The IMSC series of meetings is organized under the aegis of the Steering Committee for International Meetings on Statistical Climatology, currently chaired by Dr. Francis W. Zwiers of the Atmospheric Environment Service (Canada). It is anticipated that 6IMSC will be co-sponsored by several organizations, including the American Meteorological Society, the Bernoulli Society (of the International Statistical Institute), the World Meteorological Organization and the Irish Meteorological Service. The Program and Local Arrangements Committees for the meeting will both be chaired by Professor Iognaid O'Muircheartaigh of University College, Galway, Ireland.

The principal themes of the meeting will be climate variability on all time scales, and climate prediction on time scales of one week to one year. It is intended to hold special sessions at the meeting on ENSO forecasting, climate change detection, ensemble forecasting, extreme value analysis and spatial statistics.

Papers are solicited on all aspects of statistical climatology and on all aspects of statistical methodology which pertain to climatology. Special emphasis will be placed on papers which address topics related to either the principal themes or the special sessions of the meeting as outlined above.

The acceptance of papers will be based on a 400-600 word reviewer's abstract. Authors or groups desiring to present more than one paper are urged to assign a priority to the abstracts submitted in case the volume of papers forces the program committee to limit the number of presentations.

Titles and reviewer's abstracts should be received by the Program Chairperson, Professor Iognaid O'Muircheartaigh, Department of Mathematics, University College, Galway, Ireland (tel.: +353-91-750389; fax: +353-91-25700; e-mail: 0001607s@bodkin.ucg.ie) no later than 16 December 1994. Authors will be notified in February 1995 regarding acceptance of their papers.

It is hoped that a modest amount of support will be available for participants from developing countries who require assistance with travel and local expenses. Requests for support should be included with the abstracts.

Instructions for the preparation of camera-ready manuscripts will be furnished to authors of accepted papers. Complete manuscripts of not more than four pages (letter or A4 size), including diagrams and photographs, must be received by the Program Chairperson no later than April 3, 1995. Attendees will receive a preprint volume at the time of registration.

For further information, contact Professor O'Muircheartaigh at the above address.

The Secretariat of the Canadian Global Energy and Water Cycle Experiment (GEWEX) wishes to report on the following recent developments.

1. NSERC GEWEX CSPP Application: In December, a sub-committee of the Environmental Earth Sciences Committee of NSERC reviewed the Canadian GEWEX Collaborative Special Project and Program (CSPP) application. NSERC would not fund the proposal in its present form, but indicated that they would welcome a revised proposal if it addressed their concerns about changes needed to strengthen and maximize the university contribution to GEWEX. Concern was expressed regarding the integration of measurements and the modelling effort, and lack of sufficient integration between individual projects and with the overall objectives of the Mackenzie GEWEX Study (MAGS) and other projects such as the Boreal Ecosystem-Atmosphere Study (BOREAS) and the Beaufort and Arctic Storms Experiment (BASE).

2. Prof. Han-Ru Cho, University of Toronto, has agreed to become the new Principal Investigator for the revised GEWEX NSERC CSPP application. Prof. Cho has also been appointed Chairman of the Science Committee, in recognition of his strong scientific leadership and his commitment to the Canadian GEWEX program. The former PI, Dr. Gordon McBean has indicated that he will continue to follow GEWEX with interest in his new position as Assistant Deputy Minister of the Atmospheric Environment Service of Environment Canada.

3. A workshop was held February 14-16, 1994 at AES Headquarters in Toronto among 23 researchers within government and university to revise the GEWEX Science Plan to reflect the top-down scientific structure of the Canadian GEWEX program and to develop further the integration between the individual government and university projects within the overall objectives of MAGS, BASE, and BOREAS. It was decided to adopt a phased approach to the implementation of the Canadian GEWEX program. The first phase will focus on the land surface-atmosphere interactions within the Mackenzie Basin, and in particular, the process studies and development of coupled models. Key scientific questions and their corresponding essential studies have been identified. A revised NSERC CSPP proposal is in the process of being prepared for submission during April, 1994.

4. Government Green Plan proposals. A call for proposals was conducted during December for government GEWEX proposals to be funded from Green Plan funds. Twenty-five collaborative proposals aimed at GEWEX scientific issues have been received from government researchers in Toronto, Montreal, Ottawa, Saskatoon, and Yellowknife. The GEWEX Science Committee will meet during March to review the proposals and make recommendations to the Management Committee regarding the allocation of Green Plan funds for fiscal year 1994-95.

For further information about the Canadian GEWEX proposal, contact Dr. Terry Krauss, National Hydrology Research Centre, 11 Innovation Boulevard, Saskatoon, SK S7N 3H5. Tel: (306) 975-4215, Fax: (306) 975-5143, e-mail [krausst@nhri.v.nhrc.sk.doe.ca](mailto:krausst@nhri.v.nhrc.sk.doe.ca)

Editor's Note: JGOFS is the Joint Global Ocean Flux Study.

## Turning the Ocean Green: IRONEX 93

Why isn't the Equatorial Ocean greener? The divergence of surface waters in the Equatorial Pacific brings large quantities of nitrate-rich water to the well-lit surface. If similar quantities were to be introduced in the coastal waters, intense blooms of phytoplankton would be predicted to occur; the Equatorial waters remain poor.

One of the hypotheses put forward by John Martin and others to explain this unusual condition is that while large quantities of nitrate - usually thought to limit the production of phytoplankton - are present, there is insufficient elemental iron to permit rapid growth and accumulation of these primary producers. Past experiments using bottle incubations, and evidence from the geological record, have been equivocal, and subject to multiple interpretations. To test this hypothesis, the International Joint Global Ocean Flux Study under Dr. Martin's leadership, proposed a more direct test: to attempt the first large scale fertilization of the open ocean.

In October and November of 1993, the Columbus Iselin fertilized a 100 km<sup>2</sup> area of the ocean south of the Galapagos islands with an iron sulfate solution, and monitored the area over several weeks. Dalhousie University scientists participated in this international collaborative experiment in several ways under the auspices of the Canadian JGOFS program.

On the "wet" side, three of Dalhousie's optical drifting buoys were deployed during the experiment by members of the ship's scientific staff. These buoys freely drift with the ocean's currents; they measure the upwelling radiance at 7 visible frequencies ("ocean color") that correspond exactly to those wavebands which will be on the upcoming SeaWiFS ocean color satellite. The buoys also measure the downwelling solar irradiance (at 490 nm), and sea-surface temperature. All data is transmitted via satellite and Internet to Dalhousie computers on a daily basis. As of this writing (January 11), the buoys were still transmitting and approaching three months of continuous, uninterrupted observation. Data will be used to evaluate variations in pigment concentration and penetration of visible light in the sea.

Marlon Lewis and Dalhousie engineer Scott McLean also participated from above. The Airborne SeaWiFS Simulator, an instrument built in conjunction with Dalhousie, was mounted in the NASA P-3B experimental aircraft and flown repeatedly over the study site to provide synoptic coverage. The instrument, like those on the buoys, measures the water-leaving spectral radiances over the ocean which can be used to derive pigment concentrations over large spatial scales. The aircraft (and Lewis and McLean) was based in Guayaquil, Ecuador, and flew missions over the site at 150 m altitude. Data from the aircraft sensors and ship data were exchanged via radio as the aircraft orbited over the ship on station.

## JGOFS News (cont.)

Finally, the Dalhousie group has built a portable tracking ground station capable of receiving data directly from NOAA polar-orbiting operational satellites which observe the ocean from space. With the permission of the base commandant, this station was set up on the runway belonging to the Ecuadorian Air Force; the computer and ground station equipment was set up in the control tower. Time between satellite overflights was spent playing checkers with the guards manning the machine guns (Dalhousie's losing record was unbeaten...). The ground station performed well although prop wash from the helicopters was difficult to deal with.

The bottom line? Iron turns the ocean greener. Almost immediately after iron addition, physiological indicators of phytoplankton photosynthesis responded positively. After two days, phytoplankton concentrations had tripled to  $0.7 \text{ mg m}^{-3}$  (seen in both ship and aircraft data) and hopes were high that nitrate would be taken to depletion. Unfortunately, a meteorological system, accompanied by low salinity water from the east, caused the artificial bloom to subduct below and disperse, although concentrations remained high at depth. Following the iron addition segment of the study, the ship then moved to the east of the Galapagos for a "positive control" and where another Dalhousie buoy was released.

The results of the study were unequivocal: addition of iron in the absence of any "bottle effects" stimulates the growth and accumulation of phytoplankton. Whether limitation of iron is the proximate cause of why the Equator is not greener is still open to some question, but any explanation now must account for the influence of iron on the growth and new production in this large and potentially productive region of the ocean. There are significant implications, both scientific and ethical, with respect to altering the net exchange of carbon dioxide between the ocean and atmosphere by means of fertilization of "high nutrient, low chlorophyll" waters which include not only the Equatorial Pacific, but much of the Southern Ocean as well.

We would like to acknowledge the cheerful assistance and participation of members of the ship's scientific staff, particularly Steve Fitzwater of Moss Landing and Richard Barber of Duke University, and NASA scientists (Frank Hoge and Bob Swift) and crew of NASA 276. Dalhousie participants not mentioned above include John Cullen, Jeffrey Scrutton, Peter Bugden, Norman Countway, Rick Dittman, Chelluri Parvati and Mary-Angelica Peña. This study was jointly funded by NSERC, NASA and the U.S. Navy.

Marlon R. Lewis  
Department of Oceanography  
Dalhousie University

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## ATMOSPHERE-OCEAN

A diagnostic study of an apparent *instant occlusion* cyclogenesis event during ERICA.

G.M. Pearson and R.E. Stewart

MET0Z: Total ozone from meteorological parameters.

L. Poulin and W.F.J. Evans

Dawn-to-dusk evolution of air turbulence, temperature, sensible heat and latent heat fluxes above a forest canopy: Concepts, model and field comparisons.

C.P.-A. Bourque and P.A. Arp

The thermodynamic speed limit and its violation in axisymmetric numerical simulations of tornado-like vortices. Brian H. Fiedler

Northern Hudson Bay and Foxe Basin: Water masses, circulation and productivity.

E. Peter Jones and Leif G. Anderson

Residual currents in Juan de Fuca Strait. A.J.M. Lebreque, R.E. Thomson, M.W. Stacey and J.R. Buckley.

Stochastic interpolation as a means to estimate oceanic fields.

L.E. Borgman, C.D. Miller, S.G. Signorini and R.C. Faucette

Interannual variability of sea-ice cover in Hudson bay, Baffin Bay and the Labrador Sea.

J. Wang, L.A. Mysak and R.G. Ingram.

Sea-ice dynamics and CO<sub>2</sub> sensitivity on a global climate model. D. Pollard and S.L. Thompson

On the deterioration of icebergs in the marginal ice zone.

S. Venkatesh, D.L. Murphy and G.F. Wright

### Research Notes:

A note on the effects of virtual temperature. M. Danard

Five years' central Pacific sea-level from *in situ* array, satellite altimeter and numerical model. K.A. Donohue, M. Wimbush, X. Zhu, S.M. Chiswell, R. Lukas, L. Miller and H.E. Hurlburt



# CMS becomes CMOS

## *Editor's Note:*

*This is the second in a series of articles being written by Morley Thomas and Ced Mann on the history of CMS and CMOS. This article is by Ced Mann.*

In 1977, at the annual meeting of the Canadian Meteorological Society (CMS) the membership voted to change the constitution of the Society to include oceanography. The CMS became the CMOS, the Canadian Meteorological and Oceanographic Society. The changes were not extensive. The character of the organisation remained the same and had as its aim 'the advancement of Meteorology and Oceanography in Canada'. The policy of the journal, *ATMOSPHERE*, was also changed to accept publication of papers in oceanography as well as in meteorology. Of the various factors that led to these changes probably the two most persuasive were that the number of oceanographers in Canada had increased to the point that they needed some sort of organisation, and the realisation that meteorologists and oceanographers would have to work very closely together if any aspirations to predict the climate were to be realised.

Oceanography began in Canada in support of the fisheries, and as an aid to navigation. The fisheries oceanography was carried out by oceanographers on east and west coasts who were employed by the Fisheries Research Board of Canada (FRB), and who were attached to the Atlantic, Newfoundland and Pacific Biological Stations. The early work, which started before World War 2, consisted of studies of temperature and salinity distributions in the waters around Canada. These investigations eventually led to a description of the major coastal current systems. Descriptions of tides and tidal currents were carried out by the Canadian Hydrographic Service of the Department of Mines and Technical Surveys (DMTS). The Royal Canadian Navy and the Defence Research Board were also interested in oceanographic research as the water temperatures around Canada affected the performance of systems in use to detect submarines. In the 1950s, these interests led to the establishment of graduate programs in oceanography at the Universities of British Columbia, Dalhousie, McGill, and later at other universities. Initially, those doing research in oceanography at the universities were organized into Institutes of Oceanography, some of which became fully fledged departments.

In the late 1950s the federal government, through the Canadian Committee on Oceanography (CCO), undertook a major expansion in physical oceanography. DMTS assumed responsibility for the expanded program. FRB continued with oceanographic research in support of the fisheries, gradually focusing on biological programs and ultimately pollution studies. Within DMTS oceanography and hydrographic surveys were grouped in a Marine Sciences Branch. A major oceanographic institute was built in Dartmouth, Nova Scotia; followed by one at Burlington, Ontario, devoted to limnology; and subsequently one on the west coast at Patricia Bay, British Columbia. New vessels designed for oceanographic research were also built. The program in physical oceanography was followed by programs in chemical oceanography, and marine geology and geophysics.

By the late 1960s a thriving oceanographic community had

grown in Canada. A great deal of the research carried out was in Canadian coastal waters and was mainly of interest to other Canadian oceanographers. Some of the research was reported in international journals, or presented at international congresses, and some reported in the *Journal of the Fisheries Research Board*. However, this did not seem adequate. What was needed was a Canadian forum at which the research could be presented, and it was suggested to CCO that a national scientific meeting be held bi-annually. The CCO decided to rotate its annual meetings between Ottawa and the two coasts, and that the meetings on each coast be preceded by a symposium devoted to scientific reviews and presentations. The organization of these symposia were to be undertaken by sub-committees of CCO which already existed on the East and West coasts. Subsequently, symposia were held in Halifax in April, 1967, and in Halifax in November, 1969. There is no record of any later symposia.

Canadian oceanographers were still without an affiliation in 1974 when two opportunities presented themselves: one was to approach the newly formed Canadian Geophysical Union (CGU) with a view to becoming part of it; the second was to respond to an interest, expressed by members of the Canadian Meteorological Society, in expanding the interest of the society to include oceanography. Oceanography was already included in the activities of the American Geophysical Union, and many Canadians attended the annual meetings of the AGU. For those interested in climate change, integration with the meteorologists in CMS appeared very attractive as a major international research program was developing and would include oceanographic research.

Oceanographers and meteorologists had been collaborating for several years on research into the physics of the atmospheric and oceanic boundary layers adjacent to the sea surface and the exchanges between them. There was sufficient interest in the research to engender the creation of air-sea interaction groups at the University of British Columbia and at the Bedford Institute of Oceanography. By the end of 1974 the Global Atmospheric Research Program (GARP) was well under way, and Canadian meteorologists and oceanographers had participated in the GARP Atlantic Tropical Experiment on board the weather ship 'Quadra', from July to September, 1974. It was evident, by this time, that from GARP would come an international research program on climate change and the need for it was being discussed by interested international agencies. (In fact the World Climate Research Program was established in 1979 by the International Council of Scientific Unions and the World Meteorological Organization as part of the World Climate Program of WMO). At the outset a research program in oceanography was envisioned that would provide improved information about the world oceans that could be used in climate models. There were thus some compelling reasons for meteorologists and oceanographers to belong to a common society. In fact, some oceanographers with an interest in air-sea interactions were already members of CMS.

The initial move to include oceanography in CMS came in the spring of 1974 when oceanographers attended the May meeting of the Scientific Committee of CMS to explore the possibility of a union. An ad-hoc oceanographic sub committee was struck which sent 120 questionnaires to physical and chemical oceanographers asking whether they

## CMS becomes CMOS (cont.)

would join either CMS or CGU if some form of affiliation could be arranged. There were 92 replies with a slight majority favouring CMS. The matter was further discussed at the fall meeting of the Executive of CMS when it was resolved that the President would send a letter to all oceanographers inviting them to become members of CMS, and also that the ad-hoc oceanographic sub committee should go ahead with a call for papers and organize an oceanographic program for the 9th Congress of CMS, to be held in Vancouver in the spring of 1975. Significantly, the theme of the Congress was 'The role of the Pacific Ocean in the Climate of North America.'

Subsequently, the sub committee on oceanography proposed that CMS form an oceanography division. The Executive of CMS met immediately prior to the Vancouver Congress, endorsed the idea, and recommended to the Annual Meeting that an oceanography division be established. They also recommended that the arrangement be reviewed in 1966/67 with a view to its becoming permanent or discontinued, and that any constitutional amendments that might become necessary be considered at the 1977 Annual Meeting. Following the Executive meeting a dinner for oceanographers was held at the faculty club of UBC at which those present resolved to go with CMS, and elected a chairman and secretary for the proposed division and an associate editor for the journal *Atmosphere*. These arrangements were ratified at the Annual Meeting.

The seriousness of this decision caused both the meteorologists and the oceanographers to evaluate the consequences of a union. For the oceanographers the advantages were immediately apparent, since they would become part of an existing organization which held scientific meetings annually and would have access to a Canadian journal, both of which they sought. There was, however, a difficulty which simply was - what was oceanography? In its most restrictive usage oceanography meant only physical oceanography but in its broadest usage, as in some of the popular books, marine chemistry, biology, geology and geophysics were included as well. Also, where would limnology fit? This led some to express the opinion that CMS could become an umbrella society which was not all that attractive. To some extent the problem was resolved as the biologists, geologists, and geophysicists had not shown any desire to join CMS, and the Vancouver meeting was attended mainly by physical and chemical oceanographers. There were, though, some biologists and chemists who were interested in the linkages of the ocean's chemistry, biology and the ocean's physics. If membership in the new division was restricted to physical oceanographers they would be excluded, which was felt to be undesirable. Following discussion on who could join the division those at the meeting of oceanographers in Vancouver concluded that, while all oceanographers would be welcome to join the oceanography division of CMS it would be of greater appeal to the physical and chemical oceanographers. The range of interests of the oceanography division would be dictated in the long run by the interests of those who joined.

A second consideration was whether the addition of oceanography would cause CMS to focus its attention on research topics at the expense of operational meteorology. There was a large forecasting component in meteorology but no counterpart in oceanography. Most of the oceanographers

were researchers in universities or in federal institutes. It was fairly natural for the operational meteorologists to view the addition of oceanography to CMS with some degree of apprehension. The matter was discussed at some length during 1975. A letter was sent, by the President, to all the Centres seeking their opinions, and at the council meeting in February, 1976, the President reported that the responses ranged generally from strong to neutral support for integrating physical and chemical oceanographers into the society. The strong supporters of such a change based their recommendation on scientific considerations.

The most important consideration at this point was whether a sufficient number of oceanographers would join CMS to warrant CMS changing its constitution to include oceanography. This led to a drive to recruit oceanographers during 1975, with the result that by the time of the 10th Congress, held in Quebec in May, 1976, 70 oceanographers had joined CMS. There was also a concerted effort to solicit papers on oceanography for the Quebec Congress, and 50 papers were presented at oceanographic sessions. The oceanographers attending the Quebec Congress met and voted to formalise their relationship with CMS, and elected a new slate of officers.

Discussions between the newly elected officers of the oceanography division and the Executive of CMS proceeded throughout the summer and fall of 1976, since a formal proposal had to be presented at the annual meeting of CMS in May, 1977. As a result of these discussions, and consultation with its membership the Executive of the oceanography division recommended that the oceanographers be fully integrated into CMS instead of remaining a separate division. To accomplish this it was proposed that the name of CMS be changed to the Canadian Meteorological and Oceanographic Society, that the journal *Atmosphere* be renamed *Atmosphere - Ocean*, and that oceanographers be eligible for the President's Prize and a graduate student prize, with the Rube Hornstein Prize and the Dr. Andrew Thomson Prize remaining exclusively meteorological.

The proposals were fully endorsed by both the CMS Executive and Council. Acting on this endorsement the President prepared a letter for the Newsletter informing the membership of CMS of the proposed changes. The letter was published early enough for individuals, or the Centres, to consider the proposals and to make their thoughts known to the council before the annual meeting in May 1977. The next task was to rewrite the by-laws of CMS to encompass oceanography. This was reasonably easy as the aims and nature of the organization were not to change. For the most part it was accomplished simply by writing 'meteorology and oceanography' where only meteorology had appeared in the by-laws.

The proposed changes were presented to the membership of CMS at the Annual Meeting held during the 11th Congress at Winnipeg in May, 1977. By now 100 oceanographers had joined CMS, and during 1976 ten oceanographic papers had been published in *ATMOSPHERE*. The members present voted in favour of the change and the Canadian Meteorological Society became the Canadian Meteorological and Oceanographic Society. The last edition of *ATMOSPHERE*, Vol 15, No. 4, was published at the end of 1977, and the first edition of the new journal, *ATMOSPHERE-OCEAN*, was published in February, 1978.

## Richard (Dick) H. Douglas 1919-1993

Richard H. Douglas, passed away last summer in Edmonton, where he had moved in the fall of 1992, and where he was born in 1919. He is survived by his wife Alison and his daughter Alison.

Dick's career spanned more than 40 years, in University and government, both as an operational meteorologist, and as a researcher studying precipitation physics and agrometeorology.

During his career, he was the first director of the Alberta Hail Project, an influential member of the McGill Stormy Weather Group, a founding member of the Department of Meteorology at McGill, and a Chairman of the McGill Department of Agricultural Physics. In 1961-62, he was the President of the Canadian Branch of the Royal Meteorological Society, that later became the Canadian Meteorological and Oceanographic Society.

After obtaining his B.Sc. in physics at the University of Alberta in Edmonton in 1941, he joined the Meteorological Service of Canada (now the Atmospheric Environment Service). After training in Toronto, where he was posted to Gander, Newfoundland, where he did transatlantic forecasting for the RAF Bomber Ferry Command, the RCAF and later commercial flights, during and after the Second World War. From 1947 to 1951 he was stationed at the Main Meteorological Office in Dorval, which concentrated on transatlantic flight and public weather forecasting.

From 1952 to 1954 Dick was assigned to the Low Temperature Laboratory of the Research Division of NRC in Ottawa, that was heavily involved in aircraft and carburettor icing at the time, and participated in airborne cloud-seeding experiments and evaluated commercial cloud seeding operations in the Lac St. Jean region. In 1954 he was seconded to the Stormy Weather Group of the Physics Department at McGill, where he pursued studies of snow processes, making good use of what was then the new technology of weather radar, and of

general precipitation processes in supercooled clouds, including hail. In 1956, he was instrumental in initiating the Alberta Hail Project and subsequently directed it for nearly a decade. He conducted pioneering work on hail storms and their properties, and on snow generating cells, some of which is unique and still being referenced today.

Dick's inquisitive nature and bent for research were very evident in his work as a forecaster, and this naturally led to his obtaining a Ph.D. in Meteorology at McGill in 1957. Shortly after in 1960, he became a founding member of the Department of Meteorology. He taught undergraduate and graduate courses in physical meteorology and continued his research on hail problems. In 1965 he was appointed as Chairman of the small Department of Agricultural Physics on the Macdonald Campus, with a specific mandate to steer the group towards research in agrometeorology. He also introduced meteorology and biometeorology courses into the undergraduate curriculum and into the Diploma program and conducted research into the microclimate in corn canopies and on the spatial coherence of temperature and precipitation fields. Since 1968 he was a member of the Canada Committee of Agrometeorology (later the Expert Committee on Agrometeorology), on which he served until his retirement in 1985, the last two years as its chairman. In 1991, he was made a Fellow of the Society of Agrometeorology, in recognition of his services to the field.

Dick helped shape a good part of the meteorological infrastructure in Canada. He was one of the few meteorologists of his time to recognize the potential and importance of meteorology for agriculture, acted on this recognition and encouraged others to do the same. But more than that, he was a human being of outstanding dignity, constant in adversity, generous in his loyalty, and an excellent example to those around him.

George Isaac  
Cloud Physics Research Division  
Atmospheric Environment Service  
Downsview, Ontario, M3H 5T4

# 1994 CMOS CONGRESS/CONGRÈS 1994 DE LA SCMO

Ottawa, Ontario

May 30 - June 3, 1994/30 mai au 3 juin 1994

Don't miss the next CMOS congress in Ottawa next spring. Be part of the Tulip festival and come to meet your colleagues in the Nation's capital.

Part of the thematic sessions are:

- Global Change Forum
- Aviation Meteorology
- Middle Atmosphere
- Meteorology
- Agriculture and Forestry Meteorology
- Fisheries Oceanography
- Operational Oceanography

For more information, please refer to the last issue of the CMOS Bulletin (February). Look for the application form in this issue of the CMOS Bulletin. Don't be disappointed, register now.

Ne manquez pas le prochain congrès de la SCMO le printemps prochain. Joignez-vous au Festival des tulipes et venez rencontrer vos collègues dans la capitale canadienne.

Les sessions thématiques sont:

- Changement à l'échelle planétaire
- Météorologie de l'aviation
- Atmosphère moyen
- Météorologie
- Météorologie agricole et forestière
- Océanographie des pêches
- Océanographie opérationnelle

Pour plus de renseignements, prière de consulter la dernière parution du Bulletin (mois de février). Vous trouverez un formulaire d'inscription dans ce numéro. Ne soyez pas désappointé. Inscrivez-vous dès maintenant.



## CMOS 1994 Congress in Ottawa

### Global Change Forum

The theme for the Congress, "Science: Addressing the Issues", begs the question, what are the issues? The Scientific Program Committee have chosen to address it, appropriately enough, from an Ottawa policy perspective.

The new federal government is in its first year, and science, technology and environment are on the federal agenda. Canada also faces economic difficulties that limit what the federal government can afford to do. But there are pressing environmental and social issues of national and international scale, substantially encompassed by the topic of Global Change, for which meteorology and oceanography must supply part of the answer.

Scientists and engineers must take up the challenge. It would be foolish to ask someone else to do it for us ... or to claim that our work is irrelevant.

But being part of the debate means being informed on the issues. Join us on Monday, 30 May, for the Global Change Forum and hear from some of Canada's leading thinkers. The agenda is as follows:

09:00	Gordon McBean: <i>Introduction</i>
09:05	Sheila Copps (or alternate): <i>Welcome</i>
09:20	Maurice Strong: <i>Sustainable Development: Global Change's Intelligent Solution ... or Enchanting Mirage</i>
09:50	William Rees: <i>A New Global Economics</i>
10:20	Health Break
11:00	Brian Morrissey: <i>The Future of Renewable Natural Resources</i>
11:30	Jon Grant: <i>Business on a Greener Planet</i>
12:00	Jim Bruce: <i>Climate Change - Implication for Canadians</i>
12:30	Lunch
13:30	Anne McLellan (or alternate): <i>Energy at the Crossroads</i>
14:00	Stephen Lewis: <i>The Population - Consumption Time Bomb</i>
14:40	Health Break
15:10	Panel discussion
16:40	End of Forum

The panel discussion will be based on written questions from the floor, so come prepared to give your input. Simultaneous translation will be available.

CMOS acknowledges the help of Environment Canada, the Department of Fisheries and Oceans and the Royal Society of Canada : Canadian Global Change Program in organizing this event.

**Congrès de la SCMO 1994**  
**Colloque sur le Changement à l'échelle planétaire**

Le thème du Congrès, "Les sciences : des solutions aux problèmes", pose la question : de quels problèmes s'agit-il? En toute logique, le Comité du programme scientifique a choisi d'en discuter du point de vue des politiques d'Ottawa.

L'actuel gouvernement fédéral en est à sa première année de mandat, et la science, la technologie et l'environnement sont à l'ordre du jour. Le Canada est confronté à des difficultés économiques qui limitent la marge de manoeuvre du gouvernement fédéral. Nous faisons face néanmoins à d'urgentes questions nationales et internationales de portée écologique et sociale qui sont grandement liées aux changements planétaires, et pour lesquelles la météorologie et l'océanographie doivent apporter un élément de réponse.

Les scientifiques et les ingénieurs doivent relever le défi. Il serait ainsi insensé de demander à d'autres de le faire à notre place, que de prétendre que notre travail est sans rapport à ces questions.

Pour prendre part au débat, il faut être informé sur les problèmes. Joignez-vous à nous le lundi 30 mai, au Colloque sur le changement à l'échelle planétaire et venez entendre l'avis de penseurs de premier plan au Canada. L'ordre du jour de la journée est le suivant :

09:00	Gordon McBean: <i>Introduction</i>
09:05	Sheila Copps (ou remplaçant): <i>Bienvenue</i>
09:20	Maurice Strong: <i>Développement durable - changement à l'échelle planétaire: solution intelligente ou mirage enchanteur</i>
09:50	William Rees: <i>Une nouvelle économie mondiale</i>
10:20	Pause-Café
11:00	Brian Morrissey: <i>Le futur des ressources naturelles renouvelables</i>
11:30	Jon Grant: <i>Les affaires sur une planète plus verte</i>
12:00	Jim Bruce: <i>Changement climatique - implications pour les canadiens</i>
12:30	Dîner
13:30	Anne McLellan (ou remplaçant): <i>L'énergie à la croisée des chemins</i>
14:00	Stephen Lewis: <i>Population - consommation: bombe à retardement</i>
14:40	Pause-Café
15:10	Discussion du panel
16:40	Fin du colloque

La discussion du panel se fera à partir de questions écrites : veuillez donc préparer vos questions d'avance. La traduction simultanée sera disponible.

La SCMO remercie Environnement Canada, Pêches et Océans et le programme canadien sur le changement climatique de la Société royale du Canada de leur précieuse collaboration à l'organisation de cet événement.

28<sup>th</sup> CMOS ANNUAL CONGRESS

OTTAWA, ONTARIO

May 30th - June 3rd, 1994

REGISTRATION FORM

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FULL REGISTRATION (includes Global Change Forum, Icebreaker, Wine and Cheese and Banquet, except when noted)

Enter amounts

- Early registration\* - Members (CMOS or CSAM) \$ 200 \_\_\_\_\_
- Non-Members \$ 250 \_\_\_\_\_
- On-site registration - Members \$ 240 \_\_\_\_\_
- Non-Members \$ 290 \_\_\_\_\_
- Retired and Life Members (excludes banquet) \$ 70 \_\_\_\_\_
- Single day registration (excludes banquet) @ \$ 60 \_\_\_\_\_
- Students - single day (excludes banquet) @ \$ 20 \_\_\_\_\_
- entire Congress (excludes banquet) \$ 70 \_\_\_\_\_
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- (also available on site at the Congress)

AMOUNT DUE \$ \_\_\_\_\_

Note that all prices quoted include GST and PST when applicable.

For all types of applications: to aid Committee planning, please circle the days you will attend sessions at the Congress:

Mon - Tue - Wed - Thu - Fri

-----  
 \* Submit completed form before April 15, 1994 with a cheque or money order (no cash) for the amount due, payable to "CMOS Congress 1994", to:

Ken Yuen  
 Registrar, CMOS 1994 Congress  
 Fisheries and Oceans  
 200 Kent St., Room 1209  
 Ottawa, Ontario  
 K1A 0E6

# 28<sup>e</sup> CONGRÈS ANNUEL de la SCMO

OTTAWA, ONTARIO

30 Mai - 3 juin 1994

## FORMULAIRE D'INSCRIPTION

Nom: \_\_\_\_\_ Tél: \_\_\_\_\_  
Titre: \_\_\_\_\_ Fac-similé: \_\_\_\_\_  
Organisme: \_\_\_\_\_  
Adresse: \_\_\_\_\_ Date: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

INSCRIPTION COMPLÈTE (inclut le Colloque changement planétaire, réception, vin et fromage et le banquet sauf lorsqu'indiqué)

	<u>Inscrire les montants</u>	
- Inscription anticipée* - Membres (SCMO ou CSAM)	200	\$ _____
- Non-Membres	250	\$ _____
- Inscription sur place - Membres	240	\$ _____
- Non-Membres	290	\$ _____
- Membres à la retraite et à vie (exclut le banquet)	70	\$ _____
- Inscription d'un seul jour (exclut le banquet) _____ @	60	\$ _____
- Étudiants - un seul jour (exclut le banquet) _____ @	20	\$ _____
- Congrès au complet (exclut le banquet)	70	\$ _____
- Billets en sus pour le banquet, nombre: _____ @	50	\$ _____
(aussi disponible sur place au congrès)		
	<b>MONTANT dû</b>	\$ _____

Tous les prix incluent les taxes provinciale et fédérale lorsqu'elles s'appliquent.

Pour tous les types d'inscription: pour aider à la planification, prière d'encercler les jours où vous serez présent au Congrès:

Lun - Mar - Mer - Jeu - Ven

-----  
\* Faire parvenir votre formulaire complété avant le 15 avril 1994 en incluant votre chèque ou mandat de poste (pas de comptant) pour le **montant dû**, payable à l'ordre de "SCMO Congrès 1994",

à: Ken Yuen  
Préposé aux inscriptions, SCMO Congrès 1994  
Pêches et Océans  
200 rue Kent, Chambre 1209  
Ottawa, Ontario  
K1A 0E6



**Application for Student Travel Grant**  
**Complete and forward by April 15, 1994 to CMOS Business Office**  
**903 - 151 Slater Street, Ottawa, Ontario, Canada, K1P 5H3**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ Province: \_\_\_\_\_ Postal Code: \_\_\_\_\_

<u>Allowable Expenses</u>	<u>Expenses Claimed</u>
Registration fee      100 %	\$ _____
Transportation      50 % of cheapest fare	\$ _____
Per diem (accom. & meals) \$25 per day	\$ _____
Total                    maximum of \$500	\$ _____

*Note: Receipts will be required with claim.*

Paper to be presented at: \_\_\_\_\_ Date: \_\_\_\_\_

Title: \_\_\_\_\_

Co-author(s): \_\_\_\_\_

*Abstract should be attached on separate sheet of paper.*

\_\_\_\_\_  
Signature of Applicant

CMOS Student Member since 19\_\_

.....  
Section to be completed by student's supervisor

Referee's comments: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name: \_\_\_\_\_ Signature: \_\_\_\_\_

University: \_\_\_\_\_

**Demande de subvention de voyage pour étudiants**  
**Remplir et faire parvenir avant le 15 avril 1994 au bureau**  
**d'affaires de la SCMO**  
**903 - 151 rue Slater, Ottawa, Ontario, Canada, K1P 5H3**

Nom: \_\_\_\_\_

Adresse: \_\_\_\_\_

Ville: \_\_\_\_\_ Province: \_\_\_\_\_ Code postal: \_\_\_\_\_

<u>Dépenses admissibles</u>	<u>Dépenses réclamées</u>
Frais d'inscription 100 %	\$ _____
Transport 50 % du tarif le plus bas	\$ _____
Per diem (logement + repas) 25 \$ par jour	\$ _____
Total maximum de 500 \$	\$ _____

*Note: les reçus seront exigés avec la réclamation.*

Session de la présentation: \_\_\_\_\_ Date: \_\_\_\_\_

Titre: \_\_\_\_\_

Co-auteur(s): \_\_\_\_\_

*Prière de joindre le résumé sur une feuille à part.*

\_\_\_\_\_  
Signature du demandeur Membre étudiant de la SCMO depuis 19\_\_

.....  
Section à être complétée par le superviseur de l'étudiant

Commentaires: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Nom: \_\_\_\_\_ Signature: \_\_\_\_\_

Université: \_\_\_\_\_

# 28th ANNUAL CMOS CONGRESS (30 May - 3 June 1994)

	SUNDAY 29-May	MONDAY 30-May	TUESDAY 31-May	WEDNESDAY 1-Jun	THURSDAY 2-Jun	FRIDAY 3-Jun
07:30		07:30	07:30	07:30	07:30	07:30
08:00		REGISTRATION	REGISTRATION	REGISTRATION	REGISTRATION	REGISTRATION
08:30		08:30-08:45	08:20-09:25	08:20-08:55	08:20-08:55	08:20-08:55
09:00		OPENING	PLENARY - MID ATMOS WKSP	PLENARY - AV.MET	PLENARY - CSAM	PLENARY -
09:30		GLOBAL CHANGE FORUM*	09:30 SESSION TUE 1	09:00 SESSION WED 1	09:00 SESSION THUR 1	09:00 FRI 1 & Panel- RESPONDING TO CHALLENGES
10:00						
10:30			10:30-10:50 BREAK	10:25-10:50 BREAK	10:20-10:50 BREAK	10:20-10:50 BREAK
11:00		BREAK				
11:30		GLOBAL CHANGE FORUM*	SESSION TUE 2	SESSION WED 2	SESSION THUR 2	SESSION FRI 2
12:00			12:10	12:10	12:10	12:20
12:30	COMMITTEE MEETINGS	12:30 LUNCH	LUNCH	PATTERSON LUNCHEON	LUNCH	END of Congress
13:00			13:20			
13:30		13:30	PLENARY -	13:40	Operational Oceanography	
14:00	POSTER AND EXHIBITORS SET-UP TIME	GLOBAL CHANGE FORUM*	14:00 FISHERIES OCEANOGRAPHY SESSION TUE 3	SESSION WED 3	SESSION THUR 3	
14:30						
15:00						
15:30		15:00-15:20 BREAK	15:00-15:20 BREAK	15:00-16:00 POSTER BREAK	15:00-15:20 BREAK	
16:00		GLOBAL CHANGE FORUM*	SESSION TUE 4	SESSION WED 4	SESSION THUR 4	
16:30						
17:00	REGISTRATION	16:40	17:00	17:40	17:30	
17:30			EXHIBITORS			
18:00	No-host Bar at NOVOTEL		18:00 RECEPTION		18:30	
19:00		ICE BREAKER RECEPTION at U of Ott		19:00	BANQUET Château Laurier	
20:00			20:00 COUNCIL MTG	ANNUAL GEN. MEETING		

\* Government  
Conference Centre

University of Ottawa

# 28e CONGRÈS ANNUEL de la SCMO (30 mai au 3 juin 1994)

	DIMANCHE 29 Mai	LUNDI 30 Mai	MARDI 31 Mai	MERCREDI 1-Juin	JEUDI 2-Juin	VENDREDI 3-Juin
07:30		07:30	07:30	07:30	07:30	07:30
08:00		08:00 INSCRIPTION	08:00 INSCRIPTION	08:00 INSCRIPTION	08:00 INSCRIPTION	08:00 INSCRIPTION
08:30		08:30-08:45	08:20-09:25	08:20-08:55	08:20-08:55	08:20-08:55
09:00		09:00 <i>OUVERTURE</i>	PLÉNIÈRE - ATMOS MOYEN	09:00 MÉTÉO-AVIATION	09:00 CSAM	09:00 VEN 1 & Panel -
09:30		* COLLOQUE		SESSION MER 1	SESSION JEU 1	RÉPONSES
10:00		CHANGEMENT	09:30 SESSION MAR 1			aux DÉFIS
10:30		PLANÉTAIRE	10:30-10:50	10:20-10:50	10:20-10:50	10:20-10:50
11:00		PAUSE	PAUSE	PAUSE	PAUSE	PAUSE
11:30		* COLLOQUE	SESSION MAR 2	SESSION MER 2	SESSION JEU 2	SESSION VEN 2
12:00	RÉUNIONS	CHANGEMENT	12:10	12:10	12:10	12:20
12:30	des	PLANÉTAIRE	DÎNER	DÎNER		FIN du congrès
13:00	COMITÉS	DÎNER	13:20	PATTERSON	13:20	
13:30		13:30	PLÉNIÈRE	13:40	Océanographie	
14:00	INSTALLATION	* COLLOQUE	14:00 OCÉANOGRAPHIE des PÊCHES		opérationnelle	
14:30	des	CHANGEMENT	SESSION MAR 3	SESSION MER 3	SESSION JEU 3	
15:00	EXHIBITS	PLANÉTAIRE				
15:30	et des	15:00-15:20	15:00-15:20	15:00-16:00	15:00-15:20	
16:00	AFFICHES	PAUSE	PAUSE	AFFICHES	PAUSE	
16:30		* COLLOQUE	SESSION MAR 4	PAUSE	SESSION JEU 4	
17:00	INSCRIPTION	CHANGEMENT	17:00	SESSION MER 4		
17:30		PLANÉTAIRE	RÉCEPTION	17:40		
18:00	Bar payant		EXPOSANTS			
19:00	au	16:40		19:00		
20:00	NOVOTEL	RÉCEPTION	20:00	RÉUNION GÉN	BANQUET	
		à	RÉUNION CONSEIL	ANNUELLE	Château	
		U. d'Ottawa			Laurier	

Centre des conférences  
du gouvernement fédéral

U. d'Ottawa

ÉBAUCHE - APERÇU de la SEMAINE



**Canadian Meteorological and Oceanographic Society  
La Société Canadienne de Météorologie et d'Océanographie**

## **CALL FOR PAPERS**

### **Fifth Workshop on Operational Meteorology February 28 - 3 March, 1995 Edmonton, Alberta, Canada**

The Fifth Workshop on Operational Meteorology, sponsored by the Atmospheric Environment Service, Western and Northern Region of Environment Canada and the Canadian Meteorological and Oceanographic Society, will be held February 28 to March 3, 1995 in Edmonton. The principal theme of the workshop will be "Operational Meteorology in a Multi-disciplinary Environment".

The Program Committee wishes to solicit papers on the following topics:

- 1) The use of new observing systems such as Automated Surface Weather Observing Systems, DCP's, Lightning detectors, Satellite systems, radar systems, and others.
- 2) Applications of operational meteorology to agriculture, aviation, forestry, hydrology.
- 3) Relation of operational forecasting to air quality, ecosystem management and sustainable development.
- 4) The impact of commercialization on the provision of weather services.
- 5) The use of numerical models in the forecast office including post NWP processing and interpretation.
- 6) Cold Climate Meteorology and its applications.
- 7) Mesoscale Forecasting in Complex Terrain (orography, land/sea interface...)

The workshop format will consist of laboratory sessions, submitted papers, invited papers, panel discussions, poster sessions and demonstrations. A brief introduction of each poster session will be made during an appropriate oral session.

Titles and abstracts of 400 to 800 words should be sent to Glenn Vickers, Chairman Program Committee, Atmospheric Environment Service, Twin Atria Building, Room 240, 4999 - 98 Ave, Edmonton, Alberta, Canada T6B 2X3. Authors should indicate their preference for presenting their paper orally, in a laboratory or poster session, or as a demonstration. Preferences will be considered to the extent possible. Abstracts will be evaluated on their relevance to the theme as well as on quality. The deadline for laboratory and paper submissions is September 1, 1994.

Authors will be notified regarding the acceptance of their abstracts and instructions on the format of their papers by October 1, 1994. Trial runs of Laboratories will be required in the first two weeks of December, 1994. Complete camera-ready papers of not more than 8 pages, including diagrams, must be received by the Program Chairman no later than January 1, 1995. A pre-print volume will be prepared and distributed to all registered workshop attendees.

For further information contact either Glenn Vickers (Phone: 403-495-3143 Fax: 403-468-7916) or Brian Paruk (403-495-3143).



**La Société Canadienne de Météorologie et d'Océanographie  
Canadian Meteorological and Oceanographic Society**

**APPEL POUR COMMUNICATIONS ÉCRITES**

**5<sup>ème</sup> Atelier de Travail de Météorologie Opérationnelle.  
Du 28 février au 3 mars, 1995  
Edmonton, Alberta, Canada**

Le Cinquième Atelier de Travail de Météorologie Opérationnelle, commandité par le Service de l'Environnement Atmosphérique, les Régions de l'Ouest et du Nord d'Environnement Canada, et par La Société Canadienne de Météorologie et d'Océanographie, sera tenu du 28 février au 3 Mars 1995 à Edmonton. Le thème principal de l'atelier de travail sera "La Météorologie Opérationnelle dans un Environnement Multidisciplinaire".

Le comité du programme désire l'obtention de communications écrites sur les sujets suivants:

- 1) L'usage de nouveaux systèmes et réseaux d'observations tels que les Systèmes Automatisés d'Observations Météorologiques de Surface, les Plates-Formes Collectrices de Données, les réseaux de Détection de Foudre, les systèmes Satellitaires, les systèmes de Radar, et autres.
- 2) Des programmes de météorologie opérationnelle appliqués à l'agriculture, l'aviation, le domaine forestier, et l'hydrologie.
- 3) Les liens entre la météorologie opérationnelle et la qualité de l'air, la gestion d'écosystèmes et le développement soutenu à l'aide de pratiques viables.
- 4) L'impact de la mise en marché du service météorologique sur la production et la distribution des services météo.
- 5) L'utilisation des modèles numériques au bureau de prévision, incluant le post-traitement des données des modèles numériques et la façon d'interpréter les modèles localement et à plus grande échelle.
- 6) La météorologie des régions climatiques très froides et sa mise en application pratique.
- 7) La prévision à la Méso-échelle en topographie à relief variable (influence orographique, l'interface des brises de mer/terre...)

La conduite de l'atelier se fera sous forme de sessions de laboratoire, de communications écrites préalablement soumises, de communications personnelles des invités, de discussions de groupe, de sessions d'explication et d'échange d'affiches, et de démonstrations pratiques, soit par ordinateur ou autre. Une brève introduction, au sujet de chaque session d'explication et d'échange d'affiches, sera faite au préalable lors d'une présentation orale formelle.

Les titres et sommaires composés de 400 à 800 mots devraient être envoyés à Glenn Vickers, Président du Comité de Programme, Atmospheric Environment Service, Twin Atria Building, Room 240, 4999 - 98 Ave, Edmonton, Alberta, Canada T6B 2X3. Les auteurs devraient indiquer leur préférence quant au mode de présentation, soit oralement, lors d'un laboratoire ou d'une session d'affiches, ou lors d'une démonstration. Ces préférences seront prises en considération en fonction des moyens disponibles. Les sommaires seront évalués par rapport à leur pertinence au thème de l'atelier ainsi que selon leur mérite intrinsèque. La date limite pour la soumission des communications est le 1er septembre 1994.

Les auteurs seront avisés de l'acceptation de leurs sommaires et recevront des instructions au sujet de la méthode de présentation de leur communication au plus tard le 1er octobre 1994. Des simulations des sessions de laboratoire seront requises au cours des deux premières semaines de décembre 1994. Un jeu complet du matériel constituant la communication, et ne dépassant pas plus de 8 pages, devra être prêt pour la mise en page, incluant les diagrammes, et devra être reçu par le Président du Programme, pas plus tard que le 1er janvier 1995. Un volume constitué de l'ensemble des communications, telles que reçues, sera distribué à tous les participants enregistrés à l'atelier.

Pour plus de renseignements veuillez contacter Glenn Vickers (Téléphone: 403-495-3143 Fax: 403-468-7916) ou Brian Paruk (403-495-3143).

## CMOS EMail Addresses

In the *CMOS Newsletter* 21(6) I invited members to send their EMail addresses to me if they wished to be in a general CMOS listing. The following are the addresses received so far, the response has not been overwhelming. If you wish to have your name added, then please send your address to Howard Freeland at the Internet address listed below, and using the format of the entries listed. Place name, affiliation and EMail address on a single line and write "EMail address" in the subject field of the message. An updated list will be printed as seems necessary.

Amiro, Brian AECL Research amirob@wl.aecl.ca  
Bowman, Malcolm J. MSRC, SUNY at Stony Brook  
mbowman@ccmail.sunysb.edu  
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Buckley, Joseph R., Royal Roads Military College,  
jbuckley@post.royalroads.ca  
Castonguay, Martin Maurice-Lamont. Inst.  
m\_castonguay@iml3.iml.dfo.ca  
Cho, Han-Ru Univ. of Toronto cho@rainbow.physics.utoronto.ca  
CMOS Bulletin SCMO bulletin@osiris.phy.uqam.ca  
CMOS Business Office cap@physics.carleton.ca  
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Tuller, Stanton Weibull@uvvm.uvic.ca  
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Wannamaker, Brian Sea Scan brian.wannamaker@canrem.com  
Welsh, Leslie CARD/AES welshl@hydra.nhrc.sk.doe.ca

## "HOW DEEP WILL THE BURNING GO?"

### AN INTERNATIONAL CONFERENCE ON OZONE DEPLETION AND ULTRAVIOLET RADIATION: PREPARING FOR THE IMPACTS

April 27 - 29, 1994  
UNIVERSITY OF VICTORIA

#### SPONSORED BY:

**The Skies Above Foundation;** The B.C. Ministry of Env. Lands and Parks; Canadian Meteorological and Oceanog. Soc.; The Global Change Program of the Royal Society of Canada; Western Canada Wilderness Committee; The Canadian Dermatology Assoc.; The Sierra Club; The Atmosphere Alliance; Ozone Action; The Whistler Foundation for a Sustainable Environment; Atmospheric Caucus, B.C. Environmental Network; Atmospheric Caucus, Canadian Environmental Network; Canadian Earthcare Society; Friends of the Earth Canada; Greenpeace Canada; Greenpeace International; Reach for the Unbleached

#### COSPONSOR AND HOST:

Univ. of Victoria, Environmental Studies Program

**For further information:** The Skies above Foundation  
c/o 2701 Seaview Road, Victoria, B.C. V8N 1K7  
Tel. (604) 477-0555 fax: (604) 472-0700  
email: ub451@freenet.victoria.bc.ca

#### Conference Coordinators:

Mr. Bruce Torrie, LLB (604) 477-0555  
Keith C. Heidorn, Ph.D., ACM (604) 652-8436

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## ATMOSPHERE-OCEAN

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The Grand Banks ERS-1 SAR Wave Spectra Validation Experiment: Program Overview and Data Summary.  
Fred Dobson and Paris W. Vachon

The Performance of the Canadian Spectral Ocean Wave Model (CSOWM) During the Grand Banks ERS-1 SAR Wave Spectra Validation Experiment.  
M.L. Khandekar, R. Lalbeharry and V. Cardone.

Generalizations of the Non-Linear Ocean-SAR Transforms and a Simplified SAR Inversion Algorithm.  
Harald Krogstad, Oddgeir Samset and Paris Vachon.

Airborne and Spaceborne Synthetic Aperture Radar Observations of Ocean Waves.  
Paris Vachon, Harald Krogstad and J. Scott Paterson.

ERS-1 and Almaz Estimates of Directional Ocean Wave Spectra Conditioned by Simultaneous Aircraft SAR and Buoy Measurements. D.G. Tilley and R.C. Beal.

Airborne Radar Measurements of Ocean Wave Spectra and Wind Speed During the Grand Banks ERS-1 SAR Wave Experiment.  
D. Vandemark, F.C. Jackson, B.J. Walsh and B. Chapron

Airborne Measurements of the Ocean's K<sub>u</sub>-Band Radar Cross-Section at Low Incidence Angles.  
B. Chapron, D. Vandemark and F.C. Jackson.

On the Use of Marine Radar Imagery for Estimation of Properties of the Directional Spectrum of the Sea Surface.  
J.R. Buckley, M. Allingham and R. Michaud.

Analysis of Marine Radar Image Spectra Collected During the Grand Banks ERS-1 SAR Wave Experiment.  
J. Trask, M. Henschel and B. Eid.

Measuring the Relationship Between Wind Stress and Sea State in the Open Ocean in the Presence of Swell.  
J. Trask, M. Henschel and B. Eid.

Dedication/Dédicace  
Dr. Nelson G. Freeman 1944-1992

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### North American Regional Advisory Committee of the AGU Ann Gargett, IOS

The AGU has set up regional advisory committees to enhance participation of scientists outside the USA and Canada, and to determine the needs of scientists within the USA and Canada for more extensive international cooperation. As a member of the North American regional advisory committee through June 1994, I am available to pass on any concerns or comments you may have regarding the present level of service provided by the AGU, or any suggestions as to how the AGU could be of more use to you in the future.

In addition, I'd like to draw your attention to the Lend-a-Hand program recently set up by the AGU, specifically to aid colleagues in eastern European countries during the present period of reorganization, but open to anyone in countries with currency restrictions or low exchange rates. There are several ways to participate:

- 1) sponsor a colleague's dues for 2 years (\$40 US)
- 2) sponsor a member's subscription(s)
- 3) make a donation to the Lend-a-Hand fund
- 4) suggest colleagues' names for sponsorship by the fund

Please consider participating in some way: we all know people struggling to stay alive scientifically in the former eastern bloc.

- this is something you can do (besides, we may need it ourselves before long!).

How to participate? Various avenues are

- I can mail you a sponsorship form if requested (InterNet address is [anng@ios.bc.ca](mailto:anng@ios.bc.ca)).
- You can add the contribution at the time of renewal of your AGU membership.
- By contacting the AGU directly (have your membership # handy)  
phone: 1-800-966-2481 (toll-free in North America)  
FAX : 202-328-0566  
EMail: [cust\\_ser@kosmos.agu.org](mailto:cust_ser@kosmos.agu.org)

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### ACID REIGN '95?

The 5th International Conference on acidic deposition is to be held 26-30th June 1995 in Gothenburg, Sweden, under the patronage of His Majesty Carl XVI Gustaf.

The conference will focus on the acidification problem, but will cover the regional air pollution problems in the broadest sense. It will give opportunities for presentations of scientific results and their implications for national and international policies.

For further information contact the secretariat Acid Reign'95:-

Peringe Grennfelt  
Swedish Environmental Research Institute  
P. O. Box 47086  
S-402 58 Gothenburg  
Tel. +46(0)31 46 00 80  
Fax. +46(0)31 48 21 80



# ACCREDITED CONSULTANTS/EXPERTS-CONSEIL ACCREDITES

Entries on the following pages are restricted to CMOS Accredited Consultants. The accreditation process started in December, 1986. A complete list of CMOS accredited consultants can be obtained from the CMOS Business Office. Individuals interested in applying for accreditation may contact the CMOS Business Office at the Society's Ottawa address for a copy of the guidelines, and an application form.

As set out in the document, "CMOS Guidelines for Accreditation", the criteria are:

- (1) The applicant must possess an appropriate undergraduate degree from a recognized university.
- (2) The applicant must possess at least one of the following types of specialised training:
  - (i) post-graduate degree from a recognised university in meteorology or oceanography.
  - (ii) post-graduate degree from a recognised university in the natural or applied sciences or mathematics specializing in one or more branches of meteorology or oceanography; or
  - (iii) three years of on-the-job meteorological or oceanographic experience.
- (3) Upon completion of the above educational and training requirements, the applicant must have spent at least two years of satisfactory performance at the working level in the field of specialisation included in this document. This should include at least some consulting experience.

Les entrées sur les pages suivantes sont réservées aux experts-conseil accrédités de la SCMO. Le processus d'accréditation a débuté en décembre 1986. Une liste complète des experts-conseil accrédités de la SCMO peut être obtenue du bureau d'affaires. Les personnes désirant l'accréditation doivent entrer en contact avec la Société à Ottawa afin de recevoir une copie de règlements et un formulaire d'application.

Le document "Règlements de la SCMO pour l'accréditation" liste les critères suivants:

- (1) L'applicant doit posséder un degré universitaire de premier cycle approprié d'une institution reconnue.
- (2) L'applicant doit posséder au moins un des types suivants de formation spécialisée.
  - (i) degré de deuxième ou troisième cycle d'une universitaire reconnue en météorologie ou océanographie;
  - (ii) degré de deuxième ou troisième cycle d'une universitaire reconnue en sciences naturelles ou appliquées ou en mathématiques avec spécialisation dans une des branches de la météorologie ou de l'océanographie; ou
  - (iii) trois années d'expérience de travail en météorologie ou en océanographie.
- (3) Une fois les exigences d'éducation et formation complétées, l'applicant doit avoir au moins deux années de travail, avec performance satisfaisante, dans un champ de spécialisation mentionné dans ce document. Une certaine expérience d'expert-conseil est nécessaire.

**Susan K. Lally**  
CMOS Accredited Consultant  
General Meteorology, Marine Meteorology

SEIMAC LIMITED, Weather Source  
271 Brownlow Avenue  
Dartmouth, Nova Scotia, B3B 1W6 Canada  
Tel: (902) 468-3007 Fax: (902) 468-3008

**Bill Thompson, CCM**  
CMOS Accredited Consultant  
Impact assessments, Hydrometeorology, Aviation Meteorology  
Forest Fire Suppression, Marine Meteorology

Wm. C. Thompson & Associates Ltd.  
112 Varsity Green Bay N.W.  
Calgary, Alberta T3B 3A7, Canada  
Tel: (403)-286-6215

## ACCREDITED CONSULTANTS/EXPERTS-CONSEILS ACCRÉDITÉS

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*You could have your business card here*

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Tel: (604) 822-6407 Home: (604) 222-1266*

### **Brian Wannamaker**

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*Sea Scan  
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Fredericton, New Brunswick E3A 2K4 Canada  
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### **Mike Lepage, M.S.**

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Air Pollution Meteorology, Climate Research*

*Rowan Williams Davies & Irwin Inc.  
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Guelph, Ontario N1K 1B8 Canada  
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# 1994 MEMBERSHIP APPLICATION FORM-DEMANDE D'ADHESION 1994

(Please print in block letters - Ecrire en lettres moulées s.v.p.)

Title: Dr \_\_\_ Mr \_\_\_ Mrs \_\_\_ Miss \_\_\_ Ms \_\_\_  
 Titre: M \_\_\_ Mme \_\_\_ Mlle \_\_\_

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Regular  \$45.00/45,00\$  
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Student  \$20.00/20,00\$  
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\_\_\_\_\_

Retired  \$30.00/30,00\$  
 Retraité

\_\_\_\_\_

Sustaining  \$170.00/170,00\$  
 De soutien (minimum)

\_\_\_\_\_

Corporate  \$225.00/225,00\$  
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Telephone/Téléphone res./maison \_\_\_\_\_ bus./travail \_\_\_\_\_

Occupation/Emploi \_\_\_\_\_

For records only: if student, please indicate institution and year studies will be completed.

Pour dossiers seulement: l'étudiant(e) doit inscrire le nom de son institution et l'année où il (elle) finira ses études.

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Hydrology  Air pollution  Agriculture and Forest   
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Operational Meteorology  Floating Ice  Mesoscale Meteorology   
 Météorologie d'exploitation Glace flottant Météorologie à la mésoéchelle

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 Océanographie des pêches Autre (spécifiez) \_\_\_\_\_

April/avril 1994	Vol. 22 No. 2
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See over/voir au verso

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**Ottawa, Ontario**  
**K1P 5H3**



000001  
 Mr. M.F. Thomas  
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Please enroll me as a member of the Society. I attach a cheque for \$\_\_\_\_\_ payable to the Canadian Meteorological and Oceanographic Society for membership fee and/or publication subscriptions. I also include a tax-deductible donation of \$\_\_\_\_\_ for (indicate):

- The Society's Development Fund
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 (Signature) (Date)

If applying for student membership, please obtain signature of one of your professors.

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Mail completed form to CMOS at the address above.

Je désire devenir membre de la Société. J'inclus un chèque au montant de \$ \_\_\_\_\_ payable à la Société canadienne de météorologie et d'océanographie pour la cotisation de membre et/ou les frais d'abonnement aux périodiques. J'inclus aussi un don déductible d'impôts de \$ \_\_\_\_\_ pour (indiquez):

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Faire parvenir la demande d'adhésion complétée à la SCMO à l'adresse ci-dessus.