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Canadian Meteorological and Oceanographic Society

La Société canadienne de météorologie et d'océanographie

October/octobre 1993 VOL. 21 NO. 5

For information on the Canadian Atlantic Storms Program II see page 4.

EDITOR'S COLUMN

The next issue of the CMOS Newsletter 21(6), December 1993, will go to press on November 20th, 1993. Contributions are welcome and should be sent to me at:-

Institute of Ocean Sciences
P. O. Box 6000
Sidney, B.C. V8L 4B2
Tel. (604)-363-6590
FAX (604)-363-6746

I prefer receiving contributions submitted on floppy disk in any DOS format (i.e. Word Perfect, flat ASCII, MS Word etc), however, I can now convert Macintosh files to DOS files. DFO contributors can send ASCII files to me over DFOnet to IOSCCS::HJFREE. Anyone with access to Omnet can send ASCII files to me at IOS.BC, attention Howard Freeland. ASCII files can also be sent to me via Internet to HJFREE@IOS.BC.CA. If you want to send graphics, then HPGL files can be sent as ASCII files over the networks, any other format will have to be sent on paper or on a floppy disc. It is recommended that whatever software prepares an HPGL file be configured for the HP7550 printer. If you have the option of selecting pen colours, please don't. If you send a file over the network, send a copy to yourself and examine the transmitted copy to check that it is all there.

Do you have an interesting photograph, say, an interesting meteorological or oceanographic phenomenon? If so, write a caption and send me a high contrast black and white version for publication in the CMOS Newsletter. Savonius Rotor is also looking for assistance from anyone who has an unusual point to make.

Howard J. Freeland, CMOS Newsletter Editor

WHAT'S GOING AROUND?
by Savonius Rotor

The attached material first appeared in *The Times* of London, July 23rd, 1993. The comments are directed at the British Meteorological community, but I expect that they will be deemed to be equally applicable in Canada, with minor modifications.

AND HERE IS THE FORECAST
Meteorological prophecy must remain tribal property

Weather men and women are solemn students of the atmosphere, condemned to be treated as clowns by the public. The Meteorological Office, which yesterday published its annual review, with a cringing 16-point consumers' charter promising to improve its accuracy, is part of the Ministry of Defence. Its officers dislike being called forecasters, because, they declare, their job is to study the weather, not predict it or change it. Its annual report boasts of greatly increased revenue from customers and reduced charges to taxpayers, plus an increase in the accuracy of its prophecy to 85% over 24 hours.

But nobody is going to believe all that. As Cassandra was cursed to prophecy the truth, but to be believed by no one, by their subject weather men are stuck with being celebrity Aunt Sallies in silly pullovers and accents. Weather and the English Language are the only two topics on which everybody in the United Kingdom deems himself (less often herself) an expert. From the oldest proverbs in the language to the searchers at the Met enquiries office for what the weather is going to do, increased to 1,000 calls last month, for the British their weather is the subject of most immediate daily concern, prophesy-it-yourself pig-headedness, and healthy mistrust of experts.

The television weather forecasts, with their slickly designed but unintelligible graphics, are the most popular but least understood national rituals. One survey has shown that of all television programmes, the weather forecast is the one that viewers have the most difficulty in recapitulating accurately immediately afterwards. Another demonstrates that if the forecaster were to say that the weather would be the same tomorrow as it was today, he or she would be only 10 per cent more inaccurate than the supposedly scientific methods.

Twenty years ago, in the long eye of satellite photography, the Met Office introduced long-range weather forecasts a month ahead. Observation by indignant sufferers of the weather soon demonstrated that these were wrong almost all the time. Consequently, the long-range forecasts were dropped, and the Met Office admitted that it could get weather right only about a day ahead, at the most, with luck.

If the weather men and women were ever to start getting their prophecies right regularly, they would have to become the serious broadcasters. The overpaid and over-exposed news readers, who have become sillier than the British weather, could then replace them as the buffoons in funny pullovers and regional accents.

In most trades, increased cost efficiency and accuracy are considered desirable. Weather forecasting is the exception. Those who want to foresee their weather infallibly should emigrate to the Sahara or the North Pole. One attraction of Britain's offshore island on the wet and windy edge of the Atlantic is that there is at least one irregular natural event that is inscrutable to know-all scientists, but of daily interest to the amateurs. With the weather we are all experts. The Met Office should recognise that its business is folk poetry and provocation, not accuracy. Everybody else does.

CALL FOR PAPERS

1994 CSAM TECHNICAL SESSION

The 1994 Canadian Society of Agrometeorology (CSAM) Technical Session will be held at AIC'94 in Regina, Sask. The session is planned for Tues., July 12, 1994. Titles of papers should be submitted, or at least your intentions made known, prior to November 30, 1993. Please submit to:

Dr. Raymond Berard
CSAM'94 Program Chair
Agriculture Canada Research Station
Summerland, B.C., V0H 1Z0

phone (604) 494-4410
fax (604) 494-0755
Internet BERARD@BCRSSU.AGR.CA

CMOS Business Office Address Change

Please note that effective October 3rd 1993 the P.O.Box number has changed from 334 to 359 and that the telephone area codes will also change to:-

Tel. (905)-898-1040
Fax. (905)-898-7937

Gordon McBean

The New President of CMOS

Gordon McBean was elected President of the CMOS at the 27th Annual Congress. Gordon is a Professor of Atmospheric Science and Oceanography and Head of the Department of Oceanography at the University of British Columbia, Vancouver, B.C., Canada. He is a native of Vancouver, Canada and is a graduate of the University of British Columbia, with a B.Sc. with First Class Honours in Physics (1964) and a Ph.D. in Physics and Oceanography (1970), and McGill University with a M.Sc. in Meteorology (1966). During 1966-67, he was a forecaster at the Toronto Weather Office. The period of the 1970's was spent with AES, located in Downsview, where he was Chief of the Boundary Layer Research Division (1972-80) and Acting Director, Air Quality and Inter-Environmental Research Branch (1980). The call of the west coast proved too strong and Gordon moved to the Institute of Ocean Sciences in 1980, as a Senior Scientist with the Canadian Climate Centre, AES. With the establishment of the Atmospheric Science Program at UBC, he moved there in 1988 as Chair of the Atmospheric Science Program of the Departments of Geography and Oceanography. He assumed his present position on July 1, 1992. With a background in both meteorology and oceanography, Gordon is well-suited to be President-CMOS. In addition to these positions, Gordon has been very active in national and international scientific committees. He is presently: Chairman of the Joint Scientific Committee for the World Climate Research Programme, which is sponsored by the WMO, ICSU and IOC; a Councillor of the American Meteorological Society; a member of the Canadian Climate Program Board, Climate Research Committee, and Global Change Program Research Committee; Chairman of the Canadian GEWEX Scientific Committee and a Member of the Bureau of the International Union of Geodesy and Geophysics. In his Toronto days, he was Canadian Co-Chairman of the Canada-US Research Group on Long Range Transport of Air Pollutants (Acid Rain). Gordon has been an active CMOS member since its foundation (he attended the first Congress in Ottawa in 1967 and most of ones since). He has been Chair of both the Toronto and Vancouver Island Centres, Co-Editor of Atmosphere-Ocean, a Councillor, Chair of the Scientific Program Committees for Toronto and Regina Congresses and member of the several other committees. He was awarded the CMOS' President's Prize in 1975 for his research on the atmospheric boundary layer and the 1989 Patterson Medal and, in 1993, elected a Fellow of the Royal Society of Canada. Also a Fellow of the American and Royal Meteorological Societies, he conducts research on atmosphere-land/ocean interactions, marine storms, heat transfer in the ocean and the atmosphere and has published in various international journals. At UBC, he lectures in both undergraduate and graduate courses and supervises several graduate students.

Brief Statement

I am very honoured to be elected the President of the Canadian Meteorological and Oceanographic Society. I have been an active CMOS member because I think it is an important organization for Canadian science and because I enjoy the friends and colleagues that also participate. The CMOS Congresses are more than good scientific meetings; they are the place where meteorologists and oceanographers and others gather to discuss projects, common problems and have good times over a beer. One role of the Executive is to ensure that the Congresses continue to meet the needs of the members. In my case, I am particularly pleased to have an experienced and strong Council to work with, including David Krauel, as Past-President and Uri Schwarz as Executive Director.

During the coming year, I intend to continue the practices of my predecessors in developing the role of CMOS as an active national society. In these times of environmental-economic conflict, I think it is important that CMOS science be put forward in a way that strengthens our input and increases governmental and public understanding of and support for our work. The theme and public forum planned for the Ottawa Congress offer excellent opportunities in this regard. I also hope, with the approval of the membership, to work towards building the CMOS Bulletin SCMO into an enhanced publication of general interest to all CMOS members, while maintaining Atmosphere-Ocean as our scientific journal.

I look forward to a busy and exciting year and hope to meet and work with many of you, for the common good of meteorology and oceanography in Canada.

Canadian Atlantic Storms Program II - News

Background: The second Canadian Atlantic Storms Program (CASP II) is a collaborative investigation by scientists from the Bedford Institute of Oceanography (Dept. of Fisheries and Oceans), the Atmospheric Environment Service (Environment Canada), the National Research Council, and numerous universities, private companies and other government agencies. The primary sponsor for this work was EMR's Panel on Energy Research and Development (PERD). The main goals of the program were 1) to study the structure and evolution of east coast winter storms, and 2) to investigate their influence on the circulation and sea ice properties on the Newfoundland continental shelf and Grand Banks. The oceanographic emphasis on sea ice distinguishes CASP II from its forerunner, CASP, which was conducted on the Scotian Shelf during the winter of 1985-86. The CASP II field experiment was conducted in and around Newfoundland during the winter of 1991-92 and consisted of a two-month meteorological measurement program (15 Jan. to 15 March, 1992) and a suite of oceanographic and sea ice observations gathered between December, 1991 and May, 1992.

The atmospheric component of the CASP II field program consisted of

a) the examination of the storms with a wide variety of specialized instruments, and
b) the establishment of a special weather office at the St. John's Airport.

Instrumentation utilized in the experiment included the NRC Convair 580 research aircraft with dropsondes, Doppler radar from the University of Toronto, enhanced soundings over Atlantic Canada, an array of portable weather stations, a multi-channel radiometer, as well as specialized measurements of visibility, precipitation and accretion. A total of 16 storms was sampled and almost 200 h of research flights were made. In general, the instrumentation worked quite well, given the extremely harsh conditions that were experienced during the experiment. A large amount of truly unique information on the nature of winter storms was obtained and is the focus of analysis currently underway. Examples of studies being pursued include: explosive deepening over cold surfaces, detailed nature of surface fronts, effects of precipitation on fronts aloft, interaction between fronts and sea ice, description of all weather conditions associated with frontal passages, polar lows, aircraft and surface icing, sea ice effects on Newfoundland weather, freezing precipitation, and radiational effects of clouds.

The oceanographic component of the CASP II field program consisted of

a) moored current meter and surface drifter measurements on the northern Grand Bank between December, 1991 and May, 1992;
b) an oceanographic cruise to the marginal ice zone (MIZ) on the Newfoundland Shelf during March-April, 1992; and
c) a series of airborne surveys of the planetary boundary layer (PBL) above the MIZ in February-March, 1992.

These activities were coordinated with other concurrent investigations on the Newfoundland Shelf, including circulation studies as part of the Northern Cod Science Program and PERD-sponsored sea-ice drift and thickness measurements. Despite significant data losses due to extreme wave conditions, all the CASP II current meters but one were recovered in May, 1992, and uncontaminated records are presently being processed. Successful surface drift studies were also carried out in the Hibernia area of the Grand Bank on the May cruise. In addition, five airborne surveys of the planetary boundary layer above the MIZ were conducted between February 7 and March 15, 1992. These flights were to be coordinated with the sea-ice cruise of the CSS Hudson to the same region, but unfortunately the ship was delayed until after the flights had ended. Nevertheless, the oceanographic cruise to the MIZ completed its study of sea-ice properties and drift in conjunction with the Russian research vessel, the Akademik Shouleykin.

CMOS Congress A sampling of the preliminary results of the CASP II field experiment and modelling studies was presented at the 27th Annual CMOS Congress held during the second week of June at the University of New Brunswick in Fredericton. Three CASP II sessions covered a full day of the meeting. A total of ten meteorological research papers covered topics ranging from development theory and numerical models for explosive deepening to precipitation studies and fronts to aircraft icing. Two oceanographic contributions described sea ice properties observed on the cruise to the Newfoundland MIZ and flux measurements made during airborne surveys of the PBL over the MIZ. For historical interest, several other papers based on the rich CASP I data set were also presented.

An informal meeting of the attending CASP II investigators was also held at the Congress. The main topics of of discussion were future plans for the Program, which are summarized below.

Future Plans

1) BIO Workshop, 25-26 November, 1993

A workshop for all CASP II investigators is planned for 25-26 November 1993 at the Bedford Institute of Oceanography in Dartmouth, N.S. Aside from research updates, the primary purpose of the meeting is to present the results of analysis and modelling studies for critique in preparation for publishing in Atmosphere-Ocean. Notices will be sent to all investigators in September.

2) Dedicated Issue of Atmosphere-Ocean

A dedicated CASP-II issue of Atmosphere-Ocean is planned to highlight the results of CASP II collaborative research. It is hoped that interested contributors will attend the November workshop to present their work and fine tune their analyses so that manuscripts may be submitted to "guest editors" Ron Stewart and Peter Smith by February 1, 1994. Following internal review and coordination and the A-O review process itself, publication is anticipated in March 1995. Stewart and Smith are presently compiling a list of tentative titles for the issue and welcome further contributions.

3) Collaborative Paper on IOP 14

It was also suggested at the CMOS Congress that a special paper describing the observations and measurements made during the exceptional IOP 14 storm be prepared as a collaborative effort and presented in some other journal (e.g. Q. J. Royal Met. Soc.). We envision an article demonstrating the complex linkages between atmosphere, ocean, and sea ice. Contents would include synoptic observations, cloud characteristics, stratospheric alterations, precipitation distributions, surface fluxes, sea ice response, and model simulations of the event. Interested potential collaborators should contact Ron Stewart.

World Ocean Circulation Experiment (WOCE) News

WOCE Line P1W Started

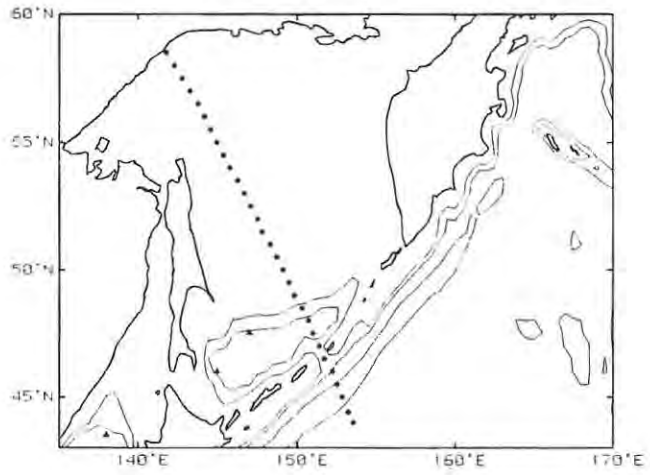


Figure 1: Map of the Sea of Okhotsk showing the 2000m, 3000m and 6000m depth contours. These highlight the location of the Kuril-Kamchatka Trench and the deep Kuril Basin inside the Sea. The sampling line passes through the busy Bussol Strait.

In mid-August 1993 a small group of Canadian scientists from the Institute of Ocean Sciences and from the Dept. of Oceanography, University of British Columbia, flew to Vladivostok to begin a joint Canada/Russia survey through the Sea of Okhotsk. The research vessel Akademik Nesmeyanov left Vladivostok on Sept. 1st and the survey was underway as this note was being written. This will be the first detailed survey in the Sea of Okhotsk in the 20th century and should cast some light on the problem of the frequency of dense water formation episodes in the sub-arctic Pacific. The job of Chief Scientist is being shared between Alexander Bychkov (Pacific Oceanological Inst., Vladivostok) and Frank Whitney (I.O.S., Climate Chemistry).

The P1W survey is just the western leg of WOCE line P1, which will not be completed as originally planned by the WOCE Hydrographic Program. The figure above shows a map of the Sea of Okhotsk and the planned sampling. The triangles denote shake-down stations, the dots indicate stations specific to P1W. Sampling includes temperature and salinity, dissolved oxygen, nutrients, tracers and carbonate chemistry. All samples will occupy the complete water column.

Three satellite tracked drifters were taken on the cruise and are planned for deployment between stations 1-2, 3-4 and 5-6 outside the Bussol Strait in the Oyashio Current.

Global Energy and Water Experiment (GEWEX) News

GEWEX UPDATE NSERC Collaborative Special Project and Program (CSPP) proposal submitted.

Canada's contribution to the Global Energy and Water Cycle Experiment (GEWEX) is planned as an integration of scientific activities in atmospheric science and hydrology, of university and government researchers, and of funding support from several sources (including Green Plan, government A-base, and NSERC). The program is focussing on the Mackenzie River Basin and the results will be an improved understanding of cold region, high latitude hydrological and meteorological processes and the role that they play in the global climate system.

On July 30, a Collaborative Special Project and Program (CSPP) proposal was submitted to the Natural Sciences and Engineering Research Council (NSERC) requesting funding of the University portion of the Canadian GEWEX program. The CSPP proposal requests approximately $4 million over a three year period for thirteen projects (involving 28 investigators representing ten universities in five provinces), as well as infrastructure and data management functions. The collaborative project leader is Prof. Gordon McBean from the Univ. of British Columbia. The proposal development began at a planning meeting and university workshop held in October 1992 and the submission of the CSPP proposal culminated approximately 10 months of work by the GEWEX Secretariat, Science Committee, and Management Committee in collaboration with members of the hydrological and meteorological academic communities across Canada.

The Beaufort and Arctic Storms Experiment (BASE), planned for the Inuvik area during the fall of 1994, will have core funding provided by the Canadian Panel on Energy Research and Development (PERD). The Canadian GEWEX Program will add complementary scientific activities to better understand the role of storm-related physical processes in the climate system. By coordinating with BASE, there will be major benefits to both programs and their joint project will constitute the first major intensive field project under the collaborative grant application submitted to NSERC.

The Canadian GEWEX Programme Progress Report for Fiscal Year 1992/93 has recently been published. The report summarizes the progress and preliminary findings for the Green Plan funded projects within the government during 1992/93. A copy of the report can be obtained by writing Terry Krauss, GEWEX Secretariat, 11 Innovation Boulevard, Saskatoon, SK, S7N 3H5. For more information about GEWEX, contact Terry Krauss at Tel. (306) 975-4215 or Fax. (306) 975-5143, or by EMail at KRAUSS@NHRISV.NHRC.SK.DOE.CA.

SEA ICE MONITORING AND MODELLING SITE (SIMMS)-1993

Introduction

In the high Arctic, the spring transition season is marked by a sharp increase in cloud cover at a time when incoming solar radiation is increasing and snow-covered sea ice is beginning to melt. This begins a complicated feedback process between surface albedo, cloud cover, and radiative and conductive fluxes near the snow/ice surface which lead into the summer season. The timing of this transition is controlled by changes in solar radiation and the larger scale atmospheric circulation. For the past four spring seasons, the SIMMS field program has been carried out on the sea ice off Resolute Bay, NWT (74x 45'N, 94x 50'W) to monitor this critical transition period. The principal investigators for the SIMMS program are Dr. E. LeDrew at the Earth Observations Laboratory of the Institute for Space and Terrestrial Sciences and Dr. D. Barber, Centre for Earth Observation Systems of the University of Manitoba. On average there are over 20 collaborating investigators from the following agencies: the Atmospheric Environment Service; the Canada Centre for Remote Sensing; the Canadian National Research Council; the Department of Fisheries and Oceans; the Cooperative Institute for Research in Environmental Sciences, University of Colorado; and the Graduate School of Ecology at the University of Tennessee. The main objectives of SIMMS are: to collect baseline geophysical data on the snow-covered sea ice surface; relate these to climatic and biological processes which operate through the ocean/ice/atmosphere interface; and develop algorithms by which remote sensing data can be used to estimate geophysical parameters. Over the past four year, the SIMMS program attempts to make detailed measurements over a variety of young ice, first-year ice and multiyear ice surfaces. The spring program concentrates on first year and multi-year ice forms while the fall program concentrates on young ice forms. Both 1990 and 1991 had only a spring program while 1992 and 1993 had a spring and fall program. The program is expected to continue until 1998.

Spring 1993 Field Setup

The accompanying figure is a satellite image taken by the European Research Satellite's (ERS-1) Synthetic Aperture Radar (SAR) during February, 1993. The image shows an area off southern Cornwallis Island and the location of the main sites of the SIMMS field experiment. The amount of back scattered microwave radiation in the image shows up as varying grey shades and is caused by different sea ice types and surface sea ice roughnesses. The image shows two approximately circular multiyear ice floes each about 2 to 3 km in diameter. One is next to the ice camp and the other is further west into Resolute Passage. These floes became conveniently frozen into the surrounding first year ice in the passage. This allowed detailed measurements over the multiyear ice during the 1993 spring season. The linear feature running from the tip of Griffith Island to the tip of Cornwallis Island is a complicated shear zone which forms annually in this location between the consolidated landfast ice of Resolute Passage and the still mobile ice in Barrow Strait. Other earlier consolidation lines (ridges) can be seen in Allen Bay between Cape Martyr and Sheringham Point as land fast ice moved out into Allen Bay during early winter.

The SIMMS ice camp was the 1993 headquarters for operations of the spring field program. Instrumented 10-metre towers were set up on the multi-year ice floe (MYI site) and on a typical smooth first-year ice location (FYI site) one km northeast of the ice camp. Table 1 shows the parameters measured at each 10-metre tower.

The main science activities carried out during SIMMS'93 were:

1) Energy and momentum balance measurements carried out at each of the 10-metre towers.
2) Snow/sea ice microscale physical and electrical properties and sea ice microstructure measurements program
3) Snow microstructure coupled with solar wavelength spectral radiance, reflectance and albedo.
4) Multi-frequency polarmetric Convair 580 SAR research.
5) Surface albedo and skin temperature measurements carried out along a one kilometre transect during various satellite overpasses.
6) Characterization of MYI floe (such as melt ponds and hummocks) using physical measurement and aerial photography.
7) Low level temperature, wind, humidity profiles using a tethersonde balloon.

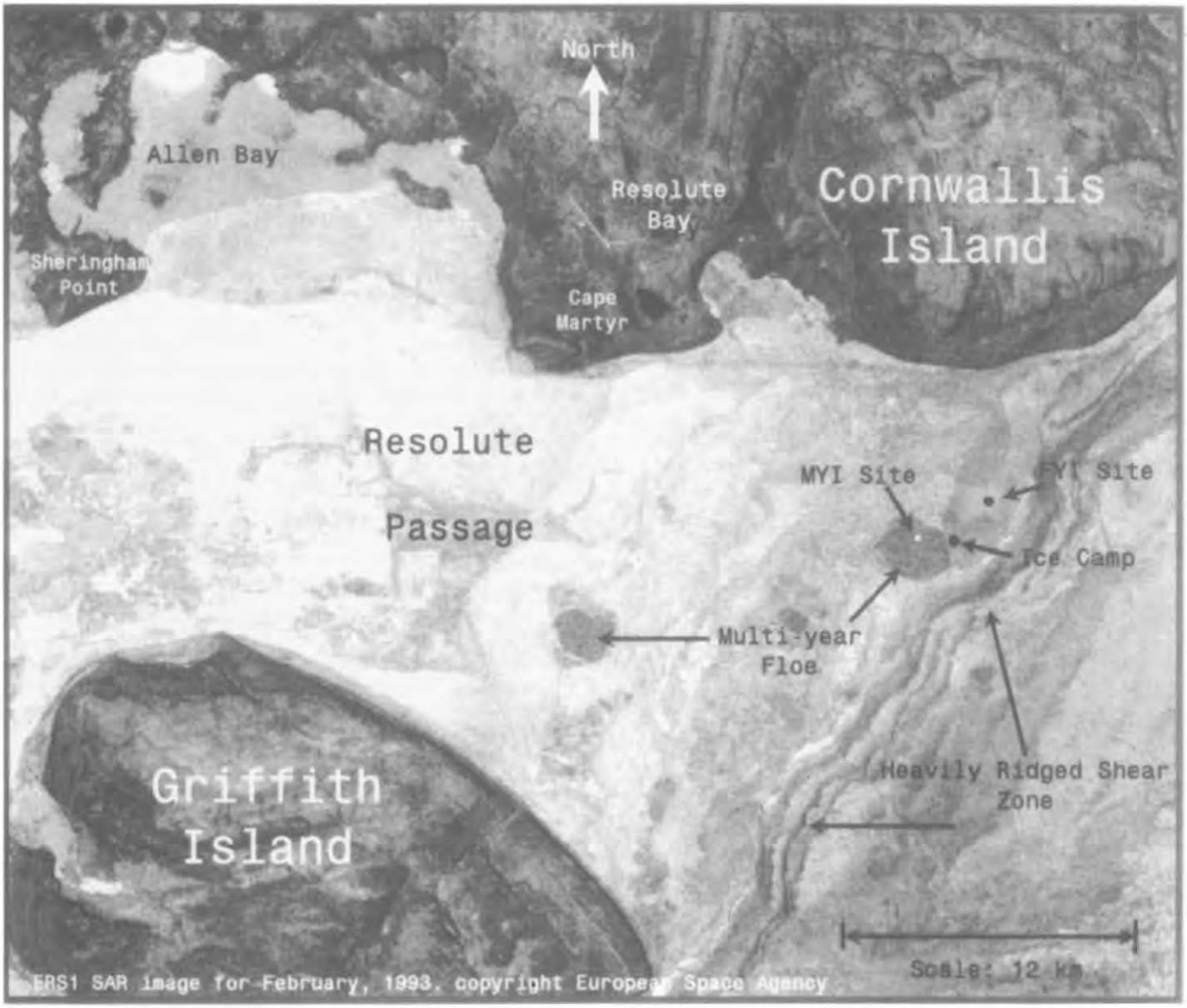
In addition to field work, modelling efforts related to SIMMS include modelling of electromagnetic radiation interaction with snow and sea ice surfaces. This will help provide the link between physical properties and remotely-sensed imagery as well as improve existing sea ice and snow cover algorithms.

The consolidation of a large multiyear floe in Resolute Passage in the spring of 1993 was particularly fortuitous and allowed detailed measurements of the differences in physical properties and conductive and radiative fluxes between first-year and multiyear ice. Since as much as 50% of the sea ice cover over the Arctic Basin is old multi-year ice, SIMMS 1993 spring results will be valuable in improving Global Circulation Modelling of the arctic through improved parameterization of arctic sea ice processes.

Variable	MYI Site	FYI Site
Net Radiation	1	1
Incident Solar Radiation	1	1
Reflected Solar Radiation	2	2
Down-welling Infrared	1	0
Up-welling Infrared	1	1
PAR Transmitted through snow	1	1
Snow temperature	27	22
Ice temperature	18	8
Air temperature	5	4
Dew Point temperature		2
Ocean Temperature		1
Relative Humidity	2	1
Wind Velocity	5	4
Wind Direction	1	1
Turbulence (sonic anemometer)	1	1

Table 1 Variables and number of levels monitored at the FYI and MYI 10-metre tower sites.

SEA ICE MONITORING AND MODELLING SITE (SIMMS)-1993



Summary

Over the last 4 years, SIMMS has collected a unique data set of surface geophysical parameters of the snow and ice surface during the spring transition period. Correspondingremotely sensed imagery from airborne and satellite based systems is an important component of this database and will be valuable in calibrating existing as well as upcoming satellite systems such as RADARSAT. The field experiment will also contribute to use of the cryosphere in monitoring climate variability and change. In this capacity SIMMS is an important component of a broader Canadian effort called CRYSYS (Cryospheric system to monitor global change in Canada) which in turn is a component of the Earth Observing System (EOS)/Mission to Planet Earth Program of NASA.

The following are overview papers on SIMMS:

Barber, D., D.G. Flett, R.A. DeAbreu, and E.F. LeDrew, 1992. Spatial and Temporal Variation of Sea Ice Geophysical Properties and Microwave Remote Sensing Observations: The SIMS'90 Experiment, Arctic, 45, 3,233-251.

Barber, D. G., D. Johnson, and E. F. LeDrew, 1991. Measuring Climatic State Variabiles from SAR Images of Sea Ice: The SIMS SAR Validation in Lancaster Sound, Arctic, 44, supp 1,108-121.

In addition, there will be a collection of SIMMS papers in the fall 1994 issue of the journal Arctic. For further information contact Tom Agnew (416-739-4385 (ph); 416-739-4297 (fax); internet tagnew@dow.on.doe.ca.

by Tom A. Agnew, co-investigator Atmospheric Environment Service, Environment Canada

Please send climate research-related material to Ross Brown, Atmospheric Environment Service, Phone: (514) 421-4772, Fax: (514) 421-4768, e-mail: brownr@ncr.dots.doe.ca

Canadian Climate Research Network

A total of 56 Letters of Intent were received in response to the "Call" to participate in the Climate Research Network announced in June. This greatly exceeded expectations. The Letters of Intent were reviewed by the Network Scientific Advisory Panel. Based on their recommendations, a limited number of research themes and proponents were chosen to lead the development of each theme. The themes and lead proponents identified (not in any particular order) were:

- . Global ocean general circulation modelling (lead proponent to be determined)
- Regional-scale ocean processes and variability (A. Clarke)
- Land surface processes (D. Verseghy)
- Clouds, aerosols and radiation (G. Isaac)
- Modelling the middle atmosphere (T. Shepherd)
- Climate variability (J. Derome)
- Arctic climate system (E. LeDrew)
- Paleoclimate modelling (R. Peltier)
- Regional climate modelling (R. Laprise)
- Climate observation and modelling (G. McBean)

The lead proponents have been invited to consult with their colleagues and proceed with developing detailed collaborative research proposals. These will be subject to external peer review before any decisions are made. In some cases this process will require holding focused workshops, supported by DOE/AES.

Replies to all 56 Letters of Intent have been prepared, and should have been received by the time this Newsletter is published. A further Call for Letters of Intent will probably be issued in the summer of 1994. Opportunities to participate in the Network are expected to grow over the next few years as its research activities begin to expand.

Dr. John M.R. Stone
Director, Climate Research Branch, AES.

CRYSYS

The EOS/CRYSYS program on the use of the Cryospheric System to Monitor Global Change in Canada has a new Principal Investigator. Dr. Barry Goodison of AES was asked to take over this role from Dr. Rejean Simard of CCRS who guided CRYSYS over the last two years. Barry is currently in the process of updating the active participants within CRYSYS and the science plan in preparation for a NASA review. Mr. Ross Brown, currently located at CMC Dorval, will be assisting Barry with running the CRYSYS Secretariat. The two basic scientific goals for EOS/CRYSYS are (1) to develop capabilities for monitoring and understanding regional and hemispheric variation in cryospheric variables, and (2) to better understand the role of the cryosphere in the climate system. There are currently 15-20 participants in CRYSYS actively involved in research related to the remote measurement and modelling of the entire range of cryospheric variables (glaciers, ice sheets, lake- ice, permafrost, sea-ice, snow).

Ross Brown, CRYSYS Secretariat, AES

Workshop on Calving Rate of West Greenland Glaciers in Response to Climate Change

Danish Polar Centre, September 13-15, 1993

As part of a PERD-sponsored project to examine the possible implications of global climate change on sea-ice and iceberg conditions off the east coast of Canada, a workshop was held with invited members of the glaciological community to focus on the question of how calving rates of west Greenland glaciers may respond to a changing climate. These glaciers are the dominant source for the icebergs drifting down the east coast of Canada. The scientific program was organized by Dr. Niels Reeh, while superb facilities and local arrangements were provided by the Danish Polar Centre. The format consisted of a series of invited presentations followed by extensive discussion to identify areas of uncertainty and priorities for further research.

Povl Frich (Danish Meteorological Institute) opened the workshop with some revealing insights into the historical climate record of Greenland. He highlighted the presence of major inhomogeneities related to the use of non-standard measuring devices, changes in instrumentation, and use of different formulae for computing mean daily temperatures. Povl warned that without a concerted effort to clean up the data, it was not clear how climate had changed in Greenland over the last 100 years, and consequently how this might relate to observed changes in glacier calving. He also noted that averaging of data over Greenland could be highly misleading since the eastern and western regions tended to be out of phase with each other. In spite of these difficulties, he noted there was some evidence for a 20th Century warming trend in Greenland which was accompanied by widespread retreat of west Greenland glaciers.

Sven Funder (Danish Geological Museum) provided a synthesis of a variety of paleo data which indicated that the present pattern of ocean circulation around Greenland was established about 10 ka, and that the ice sheet underwent a rapid degradation around this time. Estimates of glacier calving during the period of rapid ice retreat suggest that calving losses were not much greater than those observed today (~ 10% higher). The data indicate that summer temperatures reached a peak about 4-6 ka which was followed by a period of cooling in coastal regions. Intercomparison of terrestrial and oceanic paleo data suggest that changes in ocean circulation are the driving force behind changes in climate, and that the coastal climate is to a large extent de-coupled from the interior climate.

Anker Weidick (Geological Survey of Greenland) provided an overview of historical data on calving rates inferred from the frontal positions of calving glaciers. Scattered data are available in the 1700s but it is not until the middle of the 1800s that more regular data can be found. These data suggest an overall trend toward recession in the southwest, and advance in the southeast. The Jakobshavn Isbrae glacier

(one of the most active producers of icebergs) had advanced during the period 1600-1850, but had experienced rapid retreat since. The data also revealed that Greenland glaciers can experience short periods of rapid advance (surge) unrelated to climatic conditions. It was pointed out that data on glacier termini only provide part of the picture since calving rates are also dependent on glacier dynamics.

Niels Reeh (Danish Polar Centre) provided an overview of more recent attempts to estimate Greenland calving fluxes from aerial photography and mass balance computations. The observed data are very limited in terms of temporal and spatial coverage. Mass balance estimates were observed to be in general agreement with the relative magnitude of observed calving fluxes in all regions of Greenland, except the northern area where the mass balance overpredicted the observed calving flux by about a factor of 4. This discrepancy was considered to be due to northern glaciers having a positive mass balance, a result which highlighted the weakness of the equilibrium assumption employed in the mass balance approach. Analysis of observed calving speed data revealed a positive linear relationship with calving front thickness and water depth which seemed to be equally valid for floating and grounded glaciers. It was not clear what the physical basis for these relationships was.

Charles Warren (University of Edinburgh) pointed out that calving glaciers were energetic, dynamic systems which exhibited the pulsing behaviour typical of all dynamic systems. Calving glaciers did not appear to be sensitive to climatic variables, but non- climatic factors, such as topography, exerted strong controls. This explained why there were few consistent relationships to characterize calving glaciers e.g. no observed relationships with latitude, elevation, or with width. However, some intriguing differences were noted between lake and tidewater glaciers (lake glaciers produce fewer, larger icebergs) and between land and tidewater glaciers (most land glaciers had retreated this century while many tidewater glaciers had advanced). Further data were presented on the calving rate versus water depth relationship which suggested this could be sub-divided into three groupings of decreasing sensitivity to changes in water depth: temperate- tidewater, polar-tidewater and lake glaciers. The physical basis for this subdivision was not obvious. It was concluded that it was highly unlikely that a single empirical calving relationship could be used to characterize west Greenland calving glaciers.

Martin Funk (Versuchsansalt für Wasserbau, Switzerland) provided preliminary results of a 3-D dynamic model for Jakobshavn Isbrae. The model was able to correctly replicate the warming that took place within the ice stream from "strain heating" as the ice channel narrowed and deepened toward the calving front. The warming was associated with increased ice flow which has a direct impact on calving rates. The ability to correctly model such processes was considered essential for determining the future behaviour of calving glaciers.

Terry Hughes (University of Maine) examined the theoretical basis for developing a model of ice calving dynamics. He noted that the calving process was a study in material dynamics, and that the ice streams responsible for calving have relatively short time-scales which are relevant to the time-frame of greenhouse gas-induced climate change. It was shown that variable stresses within an ice stream provide increasing potential for unbalanced blocks of ice as they move toward the glacier snout. However, this process is sensitive to the upstream crevasse formation process which is not well understood.

Trond Laumann (Norwegian Water resources and Energy Administration) reported on the changed calving rates observed at Austdalsbreen glacier when the terminus lake was raised ~ 50 m for hydroelectric power generation. The surface velocity near the front of the glacier almost doubled from 25 to 47 m/a, and the observed increase in calving rate over the first three years was found to be in reasonable agreement with empirical relationships for lake-calving glaciers. The increase in velocity was considered to be due to increased sliding. It was noted that climate warming could produce a similar response through increased meltwater.

Mark Meier (Institute of Arctic and Alpine Research) presented an overview of the increase in ice velocity and calving accompanying the recent rapid retreat of the Columbia Glacier off its terminal sill. The calving rate was observed to increase with increasing water depth but the sensitivity was higher than polar tidewater glaciers. A number of calving parameterizations were evaluated. These were found to be of limited use as they had been developed for specific data sets and lacked universality. A crude relationship observed between strain rate and calving rate was considered promising because unlike water depth relationships, it had a physical basis. The implications of what had been observed at the Columbia Glacier for global warming suggested that increased melt would lead to increased sliding and iceberg production. However, Mark pointed out that this was not the whole picture as there were a number of possible feedback mechanisms involved. Mark has a DOE-funded project to examine some of these feedback mechanisms for Greenland Glaciers. This project will help address a critical issue of whether grounded and floating glaciers respond differently to warming. Another important point was that increased calving rates do not necessarily translate to increased numbers of floating icebergs. In the case of the Columbia Glacier, the calved ice remained trapped between the glacier terminus and the sill.

The workshop concluded with discussions regarding the feasibility of developing future scenarios of iceberg production from Greenland. Niels Reeh showed that scenarios based on steady state assumptions indicate a reduction in calf ice production over time, but that the rate of reduction was directly related to glacier response time e.g. for a response time ~10 years, the reduction would not be that significant over a time-scale of 50-100 years. However, the workshop participants felt that while such estimates were probably reasonable over the long term ("melting will win the war in the long run"), calving is a local mechanism and as such, is highly dependent on local factors. There was a consensus that thinning of calving glaciers (from increased ablation) would lead to increased velocity and greater discharge of icebergs. However, the total volume of ice discharged may not change unless an effect from increased accumulation kicks in. Without this, it was considered likely that increased calving rates would result in rapid retreat of a glacier, and an eventual reduction in calving. It was noted on numerous occasions that there were really too many significant

CLIMATE RESEARCH NEWS (cont.)

knowledge gaps at present to be able to say with any confidence how calving rates would respond. These included:

- insufficient under-ice topographic data to know how topographic forcing may affect glacier response in the future;
- insufficient knowledge of the sensitivity of the mass balance of Greenland glaciers to climate changes;
- lack of ice velocity data to help understand the mechanisms responsible for seasonal and interannual variability;
- lack of data (ice temperature, strain, velocity, surface elevations) for running and verifying dynamic models;
- lack of knowledge of possible feedback mechanisms between ice stream dynamics and calving;
- a lack of physical understanding of the calving process.

The consensus of the workshop was that further research into glacier calving was timely, and of a high priority considering the importance of this process in climate change issues such as sea- level rise. The glaciological community was urged to get more involved in glacier calving studies, and in particularly, to undertake detailed case studies to help address the above-noted knowledge and data gaps. A detailed workshop report containing the presentations of all participant, an overview of the current state of understanding of glacier calving, and recommendations for future research, is being produced by the Danish Polar Centre and will be available within the next 6 months.

In addition to the invited speakers, Ute Hersfeld (Institute of Arctic and Alpine Research), David Fisher (Geological Survey of Canada), and Antony Higgins (Geological Survey of Greenland) also provided valuable contributions to the workshop discussions.

Ross Brown, Climate Adaptation Branch, AES

CMOS TOUR SPEAKER

As in past years, CMOS is arranging a tour speaker to the 12 centres. This year we are most fortunate to have Dr. Andrew Staniforth or Recherche en Prévision Numérique (DOE/AES) who will be speaking on Numerical Modelling of the Atmosphere.

The content of the presentation is not yet finalised but will likely encompass past, present and future modelling at the Canadian Meteorology Centre (CMC); including models implemented on the new NEC Supercomputer.

Dr. Staniforth was the principle architect of CMC's operational short range weather model; one of the best models of its type in the world. Andrew's work as an operational forecaster, research scientist and supercomputer manager puts him in an authoritative position to make this tour. He is a dynamic speaker in both English and French and will have effective presentation graphics.

Timing details of the tour are being arranged at this time, but as in previous years will span January to April.

Volume 31 No 3 September 1993 Septembre

ATMOSPHERE-OCEAN

Intercomparsison of an acoustic Doppler current profiler with cyclesondes in Knight Inlet, British Columbia.
K.C. Greenwood, R.F. Marsden and J.R. Buckley

Coupled ice-ocean variability in the Greenland Sea.
A.T. Roach, K. Aagaard and F. Carsey

A particle-in-cell sea-ice model.
Gregory M. Flato

A comparison of conventional and passive microwave sea-ice data sets for Hudson Bay.
D.A. Etkin and Rene O. Ramseier.

A slantwise Showalter Index based on moist symmetric instability: Results for central Alberta.
Gerhard W. Reuter and Nacim Aktary

Newsletter Advertising Rates

Rates are based on black and white camera-ready copy. Sizes (inches) are full page (7.5 x 9.5), half-page single column (3.5 x 9.5), half-page two-column (7.5 x 4.5) and quarter page (3.5 x 4.5). Other charges will apply when typesetting, artwork or photography are required. **Material for inclusion in the CMOS Newsletter should be sent directly to the editor.** Distribution is to CMOS members, and therefore is approximately 1000 for each issue. There are six issues per year and appear in February, April, June, August, October and December.

Advertisement type	Full Page	1/2 Page	1/4 Page
Commercial **	$300.00	$160.00	$100.00
Position vacancy	$200.00	$120.00	$80.00
Employment wanted	----- Free to members only -----		

** Corporate and sustaining members are charged at the position vacancy rate.

Volume 27 No 1 April 1993 avril

Climatological Bulletin
Bulletin Climatologique

The biologically important thermal character of the eastern prairie climate.
G.H.B. Ash, C.F. Shaykewich and R.L. Raddatz

Weather and climate impacts in 1992 in Canada.
Malcolm East and Andrej Saulesleja

METEOROLOGY POSITION
IN THE DEPARTMENT OF FOREST RESOURCES
FACULTY OF FORESTRY
UNIVERSITY OF NEW BRUNSWICK

UNB
FACULTY OF FORESTRY

UNB
FACULTY OF FORESTRY

The Department of Forest Resources invites applications for a full-time, tenure-track position in Meteorology at the Assistant or Associate Professor level. A PhD or equivalent qualification in meteorology with application to the environmental issues associated with natural resource management is desirable.

The Faculty of Forestry offers degrees at the bachelor's, master's and PhD levels. The appointee will develop and teach undergraduate and graduate courses for both the Forest Resources and Forest Engineering programs, supervise graduate students, become involved with a unversity-wide environmental studies program, and conduct a strong research program in meteorology as it applies to natural resource management. This can range from the effect of synoptic weather patterns on forest fire behaviour to ecophysiology and crop production. The language of instruction is English, and the University of New Brunswick is committed to the principle of employment equity.

Applications, including a curriculum vitae and the names of three referees, should be submitted to:

Dr. I.R. Methven
Dean, Faculty of Forestry
University of New Brunswick
Bag #44555, Fredericton, NB
Canada E3B 6C2
Phone (506) 453-4501 or FAX (506) 453-3538

In accordance with Canadian Immigration requirements, this advertisement is directed in the first instance to Canadian citizens and permanent residents.

CMOS CONGRESS 1994 in Ottawa
SPECIAL SESSION: METEOROLOGICAL RESEARCH TO MEET CANADA'S AVIATION NEEDS IN THE 21st CENTURY

A special session on aviation meteorological research will be held June 1st. The session will be for the presentation and discussion of meteorological research activities for future aviation weather data acquisition, analysis, processing and dissemination concepts, with particular emphasis on the unique needs of the aviation system user in Canada.

OPERATIONAL GOALS

The aviation weather service safety goal is to systematically reduce the number of aircraft accidents and incidents that have a weather related cause factor. The efficiency goal is to minimize weather related diversions and to facilitate maximum air traffic flow by providing clear, accurate and timely weather information to aviation users.

RESEARCH & DEVELOPMENT CHALLENGE

A fundamental aviation weather product change is on the planning horizon. This next generation of information products could, for the first time, facilitate a complete, intuitive user understanding of the prevailing and forecast state of the atmosphere by depicting it in time-based cubic ("four dimensional") and cross-sectional formats in combination with air traffic management information. In particular, specific cross-sectional forecast products that address such aviation forecast requirements as thunderstorm initiation, areas of convective hazard, icing and in-flight turbulence are candidates for development. These sophisticated products will be derived from an aviation gridded forecast system model.

This gridded atmospheric model will be fed from a sophisticated, high density network of data acquisition devices, including airborne and satellite sensors, systematically distributed to service the forecast requirements of high aircraft traffic areas. It follows that the interdependent data acquisition, forecast production and dissemination processes will have to undergo some fundamental changes to enable them to deliver such intuitively clear weather information to the aviation user community. These changes will be driven by a major research and development effort.

The challenge in this research and development effort will be to provide a consolidation of the increased amounts of data into a cohesive product that is immediately understandable by air traffic controllers and pilots.

FRAMEWORK FOR RESEARCH AND DEVELOPMENT

A significant R&D effort will be required to advance from the current discrete text-based, coarse resolution products to intelligently integrated, graphically-based high resolution products. To accomplish this, meteorological research activities will be focussed in four main areas:

- new detection, data acquisition and data transmission technologies, to service unique aviation user requirements in a timely manner;
- integration of data through the use of intelligent processing techniques;
- improved numerical model products tailored to the needs of the aviation user; and
- improved forecasting methodologies using integrated information from sensors and numerical models.

For further information on the special session, contact John Carr, Transport Canada Aviation, (613) 991-9974, FAX: (613) 998-7416.

CONGRÈS SCMO 1994 à Ottawa
SÉANCE SPÉCIALE: RECHERCHE MÉTÉOROLOGIQUE POUR RÉPONDRE AUX BESOINS DE L'AVIATION DU CANADA AU VINGT-ET-UNIÈME SIÈCLE

Une séance spéciale sur la recherche météorologique aura lieu le 1 juin 1994. La séance spéciale aura pour but de présenter des activités de recherche météorologique ayant trait aux concepts futurs dans les domaines de l'acquisition, l'analyse, le traitement et la dissémination de données, avec emphase mise sur les besoins uniques des utilisateurs du système aéronautique au Canada.

LES BUTS OPÉRATIONNELS

Sur le plan de la sécurité, le but du service météorologique à l'aéronautique est de systématiquement réduire le nombre d'accidents et d'incidents d'aéronefs ayant une contribution provenant des conditions météorologiques. Quant à l'efficacité, le but est de minimiser les déroutements associés aux conditions météorologiques et de faciliter un débit maximum de la circulation aérienne en fournissant de l'information météorologique claire, précise et ponctuelle aux usagers de l'aviation.

LE DÉFI DE LA RECHERCHE ET DU DÉVELOPPEMENT

Les produits météorologiques pour l'aviation sont en voie de subir des changements fondamentaux. En effet, la prochaine génération de produits d'information météorologique pourrait, pour la première fois, permettre à l'usager d'avoir une compréhension complète et intuitive des états actuel et prévu de l'atmosphère en les dépeignant dans des espaces quadridimensionnels (volume et temps) ou par coupes transversales. Ces représentations des états actuel et prévus de l'atmosphère seraient combinées à l'information de gestion du débit de la circulation aérienne. Certaines candidates au développement seraient par exemple les coupes transversales prévues du déclenchement du temps orageux, des dangers associés à la convection, du givrage ainsi que de la turbulence; toutes ces coupes étant bien associées aux besoins de l'aéronautique. Ces produits sophistiqués proviendront d'un modèle de prévision aéronautique aux points de grille.

Ce modèle atmosphérique aux points de grille sera alimenté par un réseau dense et sophistiqué de dispositifs d'acquisition de données, incluant des systèmes de détection à bord d'aéronefs et de satellites, distribués de façon à remplir les besoins en prévision des zones de circulation aérienne de haute densité. Il s'en suit que les processus interdépendants que sont l'acquisition de données, la production de prévisions et la dissémination de produits, devront subir des changements fondamentaux si l'on veut un jour être en mesure de fournir de l'information météorologique intuitivement claire à la communauté des usagers de l'aéronautique. De pareils changements proviendront nécessairement d'un vaste ensemble d'activités de recherche et de développement.

Le défi d'un tel ensemble d'activités de recherche et de développement sera de permettre la consolidation de grandes quantités continuellement croissantes de données en un produit cohésif pouvant être directement compris par les contrôleurs aériens et les pilotes d'aéronefs.

LE CADRE DE LA RECHERCHE ET DU DÉVELOPPEMENT

Un vaste ensemble d'activités de recherche et développement sera requis pour passer des produits littéraux discrets à faible résolution produits de nos jours, à des produits graphiques intégrés de haute résolution. Afin d'accomplir ce passage, les activités de recherche météorologique devront s'effectuer sur quatre fronts principaux:

- les nouvelles technologies de détection ainsi que d'acquisition et de transmission de données, afin de répondre de façon ponctuelle aux exigences uniques des usagers de l'aéronautique;
- l'intégration de données à l'aide de techniques "intelligentes" de traitement de données;
- l'amélioration des produits de modèles numériques qui seront façonnés aux besoins des usagers de l'aéronautique; et
- l'amélioration des méthodologies de prévision qui utiliseront l'information intégrée provenant de détecteurs et de modèles numériques.

Pour obtenir plus d'information concernant la séance spéciale, prière de contacter John Carr, à Transports Canada Aviation, au (613) 991-9974, faxsimilé: (613) 998-7416.

28th Annual CMOS Congress
Ottawa, Ontario
May 30 to June 3, 1994

Theme -- "Science: addressing the issues"

Scientific Program Committee		Local Arrangements Committee
Geoff Holland	Chair	Mike Hawkes
(613)-990-0298	Telephone	(613)-996-3661
(613)-990-5510	Fax.	(613)-995-4197

Please contact the Local Arrangements Committee regarding general enquiries and the Scientific Program Committee for special workshops etc. Exhibitors, please contact John Falkingham at (613)-996-4552 to reserve your prime floor space.

Enter the Ottawa Congress on your agenda, now. Abstracts must be submitted before January 31st, 1994.

28ième Congrès annuel de la SCMO
Ottawa, Ontario
Mai 30 à Juin 3, 1994

Thème -- "Les sciences: des solutions aux problèmes"

Comité du Programme scientifique		Comité local d'organisation
Geoff Holland	Président	Mike Hawkes
(613)-990-0298	Téléphone	(613)-996-3661
(613)-990-5510	Télécopieur	(613)-995-4197

Prière de contacter le Comité local d'organisation pour les renseignements d'ordre général et le Comité scientifique pour les sessions spéciales et les ateliers de travail, etc. Pour les exhibits, contactez John Falkingham à (613)-996-4552 pour réserver votre place de choix d'exposition.
Inscrivez dès aujourd'hui le congrès d'Ottawa à votre agenda. Les résumés doivent être soumis avant le 31 Janvier, 1994.

1994 CMOS PRIZES AND AWARDS

The Canadian Meteorological and Oceanographic Society's annual call for nominations for their Prizes and Awards Program is now under way.

All members are encouraged to consider nominating individuals of the meteorological or oceanographic community who have made significant contributions to one of both of these fields.

This awards program provides an important opportunity for scientists to recognize their peers. It also provides an opportunity for media recognition to be given to the sciences of oceanography and meteorology as well as to the Canadian scientists who are actively in the forefront of their fields.

Each category has different and specific nomination criteria which must be met before any nomination can be considered. There is a deadline of **Wednesday December 22, 1993** for nominations to be received by the Secretary of the Prizes and Awards Committee.

The award categories are: (see attachment for further details)

President's Prize
Tully Medal for Oceanography
Applied Meteorology
Applied Oceanography
Operational Meteorology
Graduate Student
Environment Citation
Media Weather Presentation

Nominations can be made to:

Neil Meadows
Atmospheric Environment Service
4999 - 98 Avenue, 2nd Floor
Edmonton, Alberta
T6B 2X3

Telephone (403) 468-7902
Fax (403) 468-7950

BOURSES DE LA SCMO 1994

Les nominations pour le programme de Prix et Bourses de la Société canadienne de météorologie et d'océanographie sont maintenant acceptées.

Tous les membres sont invités à proposer la candidature d'individus de la communauté météorologique ou océanographique ayant apporté une contribution significative dans l'un ou les deux de ces domaines.

Le programme de prix procure une excellente opportunitée aux scientistes de reconnaître leurs pairs. Cela permet également aux sciences de l'océanographie et de la météorologie, ainsi qu'aux scientistes canadiens au premier rang de leur domaine d'expertise, d'être reconnus par les média.

Chaque catégorie a des critères spécifiques et différents, lesquels doivent être respectés, avant qu'une nomination soit considérée. La date limite pour la réception des nominations par le secrétaire du Comité des prix et bourses, est **mercredi le 22 décembre, 1993.**

Les catégories de prix sont (pour de plus amples informations consultez les pages ci-jointes):

Prix du Président
Médaille Tully en océanographie
Météorologie appliquée
Océanographie appliquée
Météorologie opérationnelle
Etudiant gradué
Citation environnementale
Présentation météorologique par les média.

Les nominations peuvent être adressées à:

Neil Meadows
Service de
l'environnment atmosphérique
4999 - 98 Avenue, 2 ième étage
Edmonton, Alberta
T6B 2X3

Téléphone (403) 468-7902
Fax (403) 468-7950

CANADIAN METEOROLOGICAL AND OCEANOGRAPHIC SOCIETY
Prizes and Awards Criteria

The criteria listed below are extracted from the bylaws of the Society. Note the conditions for submitting nominations on the following pages.

a) **PRESIDENT'S PRIZE**
May be awarded each year to a member or members of CMOS for a recent paper, book or contribution of special merit in the field of either meteorology or oceanography. The paper or work;

1. MUST have been accepted for publication in Atmosphere-Ocean, Climate Bulletin or another referred journal, or;

2. MUST have been presented to the Society membership at a national or local meeting.

b) **THE DR. ANDREW THOMSON PRIZE IN APPLIED METEOROLOGY**
May be awarded for an outstanding contribution in the field of applied meteorology. The nominee MUST be a member of the Society.

c) **GRADUATE STUDENT PRIZES**
May be awarded for contributions of special merit in meteorology and/or oceanography by graduate students.

d) **THE RUBE HORSTEIN PRIZE IN OPERATIONAL METEOROLOGY**
May be awarded to an individual for providing outstanding operational meteorological service in its broadest sense, but excluding the publication of research papers as a factor, unless that research is already incorporated as an aid in the day-by-day performance of operational duties. The work for which the prize is granted may be cumulative over a period of years or may be a single notable achievement.

e) **PRIZE IN APPLIED OCEANOGRAPHY**
May be awarded for a significant contribution to the application of oceanography in Canada. The nominee MUST be a member of the Society.

f) **THE J. P. TULLY MEDAL IN OCEANOGRAPHY**

May be awarded to a person whose scientific contributions have had a significant impact on Canadian Oceanography.

g) **ENVIRONMENTAL CITATIONS**
May be awarded to individuals or groups who have in the previous year, made some outstanding contribution in helping to alleviate pollution problems, in promoting environmental improvements, or in developing environmental ethics.

h) **CITATION FOR OUTSTANDING RADIO AND TELEVISION WEATHER PRESENTATION**
Only Canadian weather products will be considered. Any regular on-going weather program series may be submitted for consideration in the Citation review process. Nominations can be made for high standard of performance over a period of time or the media outlets response for a particular event.

SOCIETE CANADIENNE DE METEOROLOGIE ET D'OCEANOGRAPHIE
Critères d'éligibilité des prix et bourses

Les critères d'éligibilité énumérés ci-dessous originent des règles établies par la société. Veuillez prendre note des conditions de mise en candidature dans les pages qui suivent.

a) **PRIX DU PRESIDENT**
Peut être décerné chaque année à un ou plusieurs membres de la SCMO pour une publication récente, un livre ou une contribution importante dans les domaines de la météorologie et de l'océanographie. L'article ou le travail;

1. doit avoir été accepté pour publication dans Atmosphère-Océan, Bulletin de Climatologie ou un autre journal arbitré, ou;

2. doit avoir été présenté aux membres de la société lors d'une assemblée nationale ou locale.

b) **PRIX DR ANDREW THOMSON EN METEOROLOGIE APPLIQUE**
Peut être décerné pour une contribution remarquable en météorologie appliqué. La personne nommée doit être membre de la société.

c) **PRIX ETUDIANT GRADUE**
Peut être décerné à un étudiant gradué ayant apporté une contribution notable en météorologie et/ou en océanographie.

d) **PRIX RUBE HORNSTEIN EN METEOROLOGIE OPERATIONNELLE**
Peut être décerné à une personne ayant procuré un service exceptionnel dans son sens le plus large. Par contre la publication des papiers de recherche sera exclue, à moins que cette recherche soit déjà incorporée comme aide quotidienne dans le travail opérationnel. Le travail pour lequel le prix est accordé peut être cummulatif sur une période de plusieurs années, ou peut être un seul accomplissement remarquable.

e) **PRIX EN OCEANOGRAPHIE APPLIQUE**
Peut être décerné pour une contribution significative en océanographie appliquée au Canada. La personne nommée doit être membre de la Société.

f) **MEDAILLE J. P. TULLY EN OCEANOGRAPHIE**
Peut être décerné à une personne dont les contributions scientifiques ont eu un impact significatif en océanographie au Canada.

g) **CITATIONS ENVIRONNEMENTALES**
Peuvent être décernées à des individus ou groupes ayant, dans l'année précédente, apporté une contribution importante aux problèmes de la pollution, en promouvant une meilleure qualité environnementale ou en développant un code d'éthique environnemental.

h) **CITATION POUR L'EXCELLENCE EN PRESENTATION DES PREVISIONS METEOROLOGIQUES A LA RADIO OU A LA TELEVISION**
Seules les productions canadiennes sont éligibles. Toutes séries régulières de diffusion météorologique sont admissibles. Une bande audio de trois émissions radiophoniques consécutives ou un enregistrement VHS de trois émissions télévisées consécutives est requis. La date, le temps des émissions, le nom du présentateur, la station, la ville, etc,

CMOS Prizes (cont.)

Normally submissions include audio tapes of three consecutive radio broadcasts or **VHS recordings** of three consecutive telecasts along with the date and time of the programs, the name of the presenter, station, city, etc. However written justification will also be accepted and reviewed as submitted. Nominations must be made by either Centres or individual members. Nominations will be judged on the quality of informative, educational value, appeal to the audiences, a high level of technical and professional presentation, etc. Written submissions must address these same points.

i) Reviewers of the Year; Meteorology and Oceanography

Nominations for each of these categories will normally be made by the editors of Atmosphere-Ocean.

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PLEASE NOTE

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1. The deadline for submission is rigidly observed due to other Committee deadlines and the high volume of copying required. Complete submissions must be in the hands of the Secretary by that date.

Allow sufficient time for mail or courier. If desired, the Secretary of the Prizes and Awards Committee has access to fax (403) 468-7950.

2. Some prizes categories specify that a nominee must be a member of CMOS. Nominees in these categories who are not members of CMOS on the date which nomi- nations close will be disqualified and their nomination submissions will not be considered. Membership status will be confirmed by phone through the office of the Executive Director of CMOS.

3. Receipt of submissions by the Secretary will not be acknowledged unless requested. Acknowledgement when requested, will be by telephone.

4. The current title, full address and phone number of the nominee must accompany the submission.

5. Nominees from previous years, who have not received awards may be renominated. All criteria provided above apply to re-nominations. All renominations must be complete with justification since nomination material is not retained from year to year.

Bourses de la SCMO (cont.)

doivent être indiqués. Une justification écrite de la candidature n'est pas obligatoire. Toutefois, si désirée, une telle justification peut accompagner la bande afin d'aider le comité de sélection. Les extraits soumis seront jugés pour leur valeur informative et/ou éducative, attrait pour le public, et auront un niveau de présentation technique et professionnel élevé, etc. Les soumissions écrites devront adresser ces critères.

i) CRITIQUES DE L'ANNEE; METEOROLOGIE ET OCEANOGRAPHIE

La mise en candidature pour chacune de ces catégories sera normalement faite par les éditeurs de Atmosphère-Océan.

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VEUILLEZ PRENDRE NOTE

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1. La date limite doit être respectée étant donné les autres échéances du comité et la grande quantité de reproduction requise. Les candidatures doivent être entre les mains du secrétaire à la date limite.

Il faut allouer suffisamment de temps pour le transport du courrier. Si vous le désirez, le secrétaire du comité des prix et bourses peut recevoir des facsimilés au (403)468-7950.

2. Certaines catégories de prix sont réservées aux membres de la SCMO. Les candidats dans ces catégories qui ne ce seront pas enrolés dans la SCMO d'ici la date limite des2 nominations, seront disqualifiés et leurs nominations ne seront pas considérées. Le statut de membre des candidats sera confirmé avec le bureau de la direction de la SCMO par téléphone.

3. Un accusé de réception pour les candidatures ne sera pas envoyé par le secrétaire, à moins d'une demande formelle. Si désiré, un tel accusé se fera par téléphone.

4. Le titre actuel de chaque candidat, ainsi que son adresse complète et numéro de téléphone doivent être envoyés avec la mise en candidature.

5. Les candidats des années précédentes, qui n'ont pas reçu de prix, peuvent être reconsidérés. Les critères énoncés ci-dessus s'appliquent aux "ré-nominations". Les informations relatives aux candidats doivent être complètes, justifications incluses puisque les documents ne sont pas retenus à chaque année.

Canada-Wide Science Fair

The CMOS Special Award at the Canada-Wide Science Fair (Ottawa, Ont., May 1993) was awarded to Edward Weatherly and Leah Livingston of Provost Public School, Provost, Alberta, for their innovative project entitled *Up, Up and Away!* For their efforts they received a cheque in the amount of $250. The following is abstracted from their project highlight sheet:

The purpose of this project was to construct an inexpensive ground-based, remote-sensing instrument that will measure total atmospheric ozone and ultra-violet radiation at the same time. We believe that there should be a direct relationship between the values of total atmospheric ozone and UV-B radiation. Since the ozone layer is the Earth's "skin block", it should have an impact on the amount of radiation that reaches the Earth's surface.

Our instrumentation consists of several stations: computer terminal (IBM PC), spectrophotometer, radiometer and data processing network. An aluminum tripod was developed to support the weatherproof PVC housing of our instrumentation that reads combined values. This tripod is controlled by a computer program that is integrated to a tracking device that moves the instrument to trace the movement of the sun. An optical filter system is contained in a tube that obtains light from the sun which is massaged by several interference filters and optical devices. It is reflected through a diffraction grating that breaks up the filtered electromagnetic energy into its respective wavelengths. The light then passes through a shutter that systematically opens a slit that allows one of our five control wavelengths to be measured by the photo-detector that is carried by a stepping motor across the optical plane. The electrical output by the photo-detector is read by a voltmeter that relays this current to a data input port in the computer. A radiometer is also carried on the stepping motor; reading UV-B radiation throughout the day from the sun. Data from the spectrophotometer and radiometer are relayed to the computer to be read and analyzed with a home-made computer program.

We found that there is a direct relationship between readings of combined and indirect radiation. When comparing our ozone and radiation measurements to values read by manufactured instruments in our area, trends are apparent. The manufactured instrumentation used in our research and preliminary experimentation has a much higher accuracy in measuring total ozone than does our device, but our readings are comparable. In both cases, the more ozone present in the atmospheric column, the less radiation reaches the Earth. Our research is but a small step in understanding our upper atmosphere; determining how ozone and other variables affect life on Earth.

New CMOS Members

The following new members were approved at the CMOS Executive meeting 7th June, 1993:

Alard Ages	Sidney, BC	retired
Sheila Bourque	Markham, ON	regular
Colleen Farrell	Chezzetcook NS	regular
Anthony Isenor	Dartmouth, NS	regular
Mark Krawetz	Winnipeg, MB	regular
Ewa Milewska	Brampton, ON	regular
George Needler	Dartmouth, NS	regular
Patrick Ouellet	Mont-Joli, QC	régulier
Stuart Porter	St. Johns, NF	regular
Dapeng Xu	North York, ON	regular

The following new members were approved at the CMOS Executive meeting 12th July, 1993:

Stephen Hatt	Chester, NS	regular
John Parker	Winnipeg, MB	regular
Yvonne Bilan-Wallace	Edmonton, AB	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.

Royal Meteorological Society 1994 Calendar

The 1994 Royal Meteorological Society Calendar is now ready for distribution. It is beautifully produced with photos of high meteorological and artistic merit. The cost is £4.40 each, or £18.50 for five, including postage and packing and can be ordered from:

Royal Meteorological Society
104 Oxford Road
Reading, Berkshire, England RG1 7LJ

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CMOS - List of Officers - 1993/94 (cont.)

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28th Congress 1994 - Ottawa Ontario

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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 Newmarket 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 Newmarket 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 possèder 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) dégré 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.

ACCREDITED CONSULTANTS/EXPERTS-CONSEILS ACCRÉDITÉS

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___

Name/Nom _____

Address/Adresse _____

_____

_____

_____

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.

MEMBERSHIP CATEGORY-CATEGORIE DE MEMBRE
ANNUAL FEES - COTISATION ANNUELLE
(Please check one - cochez une case s.v.p.)

Regular Régulier	☐	$45.00/45,00$
Student Étudiant	☐	$20.00/20,00$
Retired Retraité	☐	$30.00/30,00$
Sustaining De soutien	☐	$170.00/170,00$ (minimum)
Corporate Moral	☐	$225.00/225,00$ (minimum)

PUBLICATION SUBSCRIPTIONS - ABONNEMENT AUX PERIODIQUES

ANNUAL RATES - FRAIS D'ABONNEMENT ANNUEL

		Members Membres	Non-members Non-membres	Institutions Institutions
ATMOSPHERE-OCEAN ATMOSPHERE-OCEAN	☐	$30.00 30,00$	$40.00 40,00$	$85.00 85,00$
Climatological Bulletin Bulletin-Climatologique	☐	$15.00 15,00$	$20.00 20,00$	$25.00 25,00$
Annual Congress Program and Abstracts Programme et résumés du congrès annuel	☐	$ 0.00 0,00$	$20.00 20,00$	$25.00 25,00$

NOTE: Students receive one society publication in their annual fee and must indicate free publication desired. All regular Society publications are sent to Corporate and Sustaining Members. Members resident in Canada please add 7% GST to annual rates

NOTE: Les membres étudiants reçoivent une publication gratuite de la SCMO et doivent indiquer celle désirée. Tous les périodiques réguliers de la Société sont envoyés aux membres moraux et de soutiens. Les membres résidant au Canada, veuillez SVP ajouter 7% (TPS) aux frais d'abonnement annuel.

PRIMARY FIELD OF INTEREST - SPHERE D'INTERET PRINCIPALE

Meteorology / Météorologie ☐ Oceanography / Océanographie ☐

SPECIAL INTEREST GROUP - GROUPE D'INTERET SPECIAL

(Indicate group if interested - Indiquez si vous avez des intérêts dans un des groupes.)

Hydrology Hydrologie	☐	Air pollution Pollution de l'air	☐	Agriculture and Forest Agriculture et forestrie	☐
Operational Meteorology Météorologie d'exploitation	☐	Floating Ice Glace flottant	☐	Mesoscale Meteorology Météorologie à la mésoéchelle	☐
Fisheries Oceanography Océanographie des pêches	☐			Other (specify) Autre (spécifiez)_____	☐

See over/voir au verso

CMOS-SCMO
P.O.Box/C.P. 359
Newmarket, Ontario
L3Y 4X7
Canada

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

☐ Other (specify) _____

_____ _____
(Signature) (Date)

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

_____ _____
(Signature) (Date)

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):

☐ Le fonds de développement de la Société

☐ Autre (spécifiez) _____

_____ _____
(Signature) (Date)

Si vous désirez devenir membre étudiant, veuillez SVP obtenir la signature d'un de vos professeurs.

_____ _____
(Signature) (Date)

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