



Canadian Meteorological  
and Oceanographic  
Society

La Société Canadienne  
de Météorologie et  
d'Océanographie

C.M.O.S.

# NEWSLETTER / NOUVELLES

S.C.M.O.

OCTOBER/OCTOBRE 1984 VOL. 12 NOS. 4-5

## THE FIRST RECIPIENT OF THE J.P. TULLY MEDAL

The man known as "the Father of West Coast Oceanography" in Canada was honoured last August with the first recipient of the medal bearing his name. John Patrick Tully of Nanaimo received the newly created J.P. Tully medal from members of the Canadian Meteorological and Oceanographic Society (CMOS) at his Pandell Avenue home. In accepting the medal, Dr. Tully said: "I am greatly honoured and most grateful that the Society has cast this medal in my name, to be awarded for significant contributions to Canadian oceanography." He described the science as "the description of the properties and behaviour of the waters and their consequences in various circumstances." He considered the medal to be a tribute to the Pacific Oceanographic Group, "that gallant band of pioneers who made oceanography practical in Canada."

Dr. Tully joined the staff of the Biological Station, Fisheries Research Board of Canada, in Nanaimo, in 1931 as an Assistant Scientist. While with the Station, he was involved in research on oyster quality and nutrition, sea water analyses, and coastal and physical oceanography. He was seconded to the Royal Canadian Navy in 1942 until the end of World War II. During this period he conducted extensive research studies on underwater acoustics and sound ranging. On his return to Nanaimo, he was appointed Oceanographer-in-Charge of the Pacific Oceanographic Group. Under Dr. Tully's guidance, this Group developed an international reputation on North Pacific oceanography and its impact on the salmon fishery. Dr. Tully's personal research spanned many fields of endeavour and included estuarine and pollution research on pulp mill effluents, hydraulic modelling, tidal mixing, long-term temperature and salinity changes, mass transport, etc. His unique contributions dealing with pulp mill effluents in Alberni Inlet, estuarine circulation and flushing, and the structure and circulation of the Northwest Pacific Ocean are considered classic by students and professional oceanographers worldwide.

Dr. Tully has more than 100 publications to his name. He is a Fellow of the Royal Society of Canada, a member of the American Geophysical Union, the Canadian Institute of Chemistry, the American Society of Limnology and Oceanography - Sigma XI, and the American Association for the Advancement of Science, on which he served as President of the Western Division in 1963. He was an Honorary Lecturer at the University of British Columbia from 1950 to 1953, where he contributed significantly in the formative years of the Institute of Oceanography through his lectures and training of students.

In 1966, Dr. Tully came to Ottawa to assume the position of Secretary of the Canadian Committee on Oceanography and acted as the senior oceanographic consultant to the Fisheries Research Board of Canada. He retired in 1969 but remained as an active consultant until 1975. Dr. Tully's many interests embraced international oceanography and included joint programs in the Arctic with the United States; and in the Pacific with Japan, the USSR and the USA. He served the Intergovernmental Oceanographic Commission and the World Meteorological Organization in the development of joint ocean and meteorological services. He was the first Chairman of the Integrated Global Ocean Station System (IGOSS). He pioneered many studies in Canada, particularly those related to estuarine research and the application of oceanography to fisheries and defence. His publications are a testimony to his energy, expertise and

contributions to oceanography, both nationally and internationally.

Dr. Tully now lives quietly at his home in Nanaimo, where he was visited last August by Dr. P.H. LeBlond, professor of oceanography at U.B.C., and by Drs. R.E. Thomson and S. Tabata, who are research scientists at the Institute of Ocean Sciences in Sidney, B.C. They presented him with the inaugural J.P. Tully medal, which had been officially attributed to Dr. Tully at the annual CMOS congress in Halifax in May, earlier this year.

## ACTIVITIES IN THE INTERNATIONAL FIELD

### AGROCLIMATIC INFORMATION FOR AGRICULTURAL DEVELOPMENT

Canada is contributing to dryland agricultural development in several developing countries (Indian Sub-Continent and East Africa). One reason for this involvement is the expertise of Canadian agricultural scientists with dryland agriculture, particularly in Western Canada. Recently, I was involved in the Canada Agriculture/CIDA Barani (rain-fed or dryland) Project in Pakistan.

In spite of the similarities of the low rainfall conditions in the Barani areas of Pakistan and in the Canadian Prairies, there are several subtle differences which do not become apparent until one has worked in Pakistan.

One difference is the soil water status at sowing time. Spring soil water reserves in Prairies Regions are usually ample for early crop growth, a condition which is a great boon for crops in a semi-arid regime with variable rainfall. In many cases, farmers must wait for the soil to dry sufficiently in order to prepare the land and sow seeds.

In the Barani areas in Pakistan, conditions are much different. Sowing time for "Kharif" (summer) crops comes after several weeks of hot, dry weather when crop-available soil water is almost depleted. Farmers must wait for ample rainfall for land preparation and sowing, and for assured seed germination and early seedling growth. Successful crop production depends entirely on the time of the first rains and on the amount and distribution of rainfall between sowing and harvest, during which period reserves may or may not increase depending on rainfall.

In many parts of Pakistan, temperatures are warm enough for crops to grow at any time of the year. Crop selection and date of sowing must be carefully planned to take advantage of the ensuing expected climatic conditions: not only the amount of rainfall and soil water and their distribution, but also temperature and photoperiod trends and available global energy for photosynthesis.

Subtropical countries such as Pakistan are usually considered as having an abundance of sunshine. In truth, however, the amount of global energy accumulated per day during any part of the year is less than the daily average during the growing season in many parts of Canada. This fact comes as a surprise to many foreign experts working in Pakistan and, furthermore, is not fully realized by many agricultural people.

Another subtle, but related, difference between the agroclimate of Canada and that of Pakistan is the difference in photoperiod or daylength. During the growing season in Canada, the daylength is at a maximum, ranging from 15 to 20 hours depending on latitude. In Pakistan, even during the longest days in the northern part of the country, the photoperiod is less than 14.5 hours and decreases to less than 10 hours during the period of low solar elevation. In the southern part of the country, the range is from 10.6 to 13.7 hours. These subtle differences in photoperiod can produce anomalies in the growth and development of crops, particularly those introduced from temperate climates (e.g., early and uneven flowering in soybeans and delayed floral primordia initiation in certain varieties of mustard and canola).

My role in this regard as part of the Barani Project was to analyze long-term records of various weather factors, particularly rainfall and derived soil water, and to characterize their averages, variability and persistence so that Canadian and local agronomists and others would have a better appreciation of local agroclimates and their effects on new farming techniques and crop production. Such information provided during the early stages of the project are expected to help agricultural workers avoid pitfalls which they might otherwise encounter in an unfamiliar agroclimatic regime.

The other part of my assignment was to assist the Pakistan Agricultural Research Council with the organization of an agrometeorological capability for monitoring the weather, particularly in Barani areas, interpreting the information in terms of agronomic operations and crop production, and conducting supporting agrometeorological research.

George W. Robertson, P. Ag.  
September 1984

#### NOTICE TO MEMBERSHIP

Any new committees formed within the auspices of CMOS are asked to contact the Corresponding Secretary (Mr. R. Jones, c/o Atmospheric Environment Service, Department of the Environment, 27th Floor, Terrasses de la Chaudière, Hull, Quebec, K1A 0E6) for a list of guidelines and CMOS policy.

#### NEWS FROM CMOS HEADQUARTERS

##### CMOS Constitution and By-Laws

An up-to-date version of the CMOS Constitution and By-Laws is reproduced in this issue of the Newsletter. Members are invited to keep this issue, as the next version of the Constitution and By-Laws is expected to be published only after the 1985 Annual General Meeting.

##### International Happenings

During September 1984, an ICSU (International Council of Scientific Unions) Symposium will be held in Ottawa. One day of this symposium will be devoted to "Global Change," which a CMOS representative will attend and prepare a report for the Newsletter.

The WMO Day in 1985 will be celebrated on March 23. Its theme will be "Meteorology and Public Safety." Chairmen of Centres and Chapters have been invited to arrange for corresponding activities on this day.

1985 has been declared as the International Youth Year. As CMOS is an active contributor to the work of the Canadian Youth Science Foundation (see article on CMOS Award winner at 1984 Youth Science Fair - June 1984 issue of the Newsletter), the plans of the C.Y.S.F. for the events will be published in a forthcoming Newsletter.

#### EDITORIAL POLICY

The CMOS NEWSLETTER is the principal medium by which Society members may exchange items of CMOS news and interest. It is a bi-monthly publication mailed to all members and, except for advertising revenue, is funded through Society membership fees. Articles are accepted in either official language, and responsibility for content rests with their respective authors. Although views expressed are not necessarily those of CMOS, the editorial staff shall endeavour to maintain a level of integrity deserving of the Society.

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Dave Mudry  
Micheline Gilbert

#### LA POLITIQUE EDITORIALE

Le BULLETIN DE NOUVELLES de la SCMO est la voie principale par laquelle ses membres peuvent échanger des articles d'information et d'intérêt. C'est une publication bimestrielle qui est expédiée à tous les membres et qui, sauf pour les revenus de la publicité, est financée par les frais d'adhésion. Les articles sont acceptés dans l'une ou l'autre des langues officielles et le contenu demeure la responsabilité de l'auteur. Même si les idées exprimées ne sont pas nécessairement celles de la SCMO, la rédaction tentera de maintenir un niveau d'intégrité digne de la société.

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#### NOTE FROM THE EDITORS

We apologize for the delay in publishing this issue of the CMOS Newsletter. The delay was caused by the acquisition of a new word processing system (and the subsequent loss of our old one), the move of the Department of Fisheries and Oceans to a new location, and the time lost due to staff travel and vacations. We regret any inconvenience caused by the tardiness of this issue.

#### CMOS NEWS FEE STRUCTURE

In one of the most historically significant moves by the Society, the Annual General Meeting of CMOS has approved the splitting of membership fees from all subscription fees, except for the Newsletter, at its May 3, 1983, meeting in Banff.

This means that beginning in 1984 the regular member will have complete freedom of choice as to which publications he receives. It was seen as a positive situation that Atmosphere-Ocean need not remain as a compulsory subscription for all members, and a statement that it had matured into a world class journal in high

demand by individuals and institutions around the world. The resultant decrease in straight membership fee is hoped to attract more CMOS members.

This means that from now on, each member has to decide which publication(s) (A-O, Chinook, Climatological Bulletin) he wishes to order. Members are urged to support the Society by ordering as many publications as possible. In addition, CMOS will accept voluntary contributions from its members to assist it in its important work in promoting meteorology and oceanography in Canada. These donations are tax deductible.

#### a) 1984 Fees

The fees were left substantially unchanged from 1983, except as required by the previous decision.

Membership Regular Membership - \$20.00 - receive Newsletter  
Student Membership - \$12.00 - receive A-O and Newsletter  
Corporate/Sustaining Membership - \$75.00 - receive A-O and Newsletter

Subscriptions  
(CMOS Members) Atmosphere-Ocean \$20.00  
Climatological Bulletin 10.00  
Chinook 7.50

Subscriptions  
(Institution) Atmosphere-Ocean \$50.00

#### b) Associate Membership

Since Regular Membership without A-O is now available at \$20.00/year, the AGM has approved dropping this membership class.

#### c) A-O Subscription to Non-CMOS Members

The AGM has approved the subscription to A-O by individual, non-CMOS members at the rate of \$25.00/year.

#### CMOS NEW MEMBERS

Ian Webster St. John's, Newfoundland	Daniel M. Hanes Halifax, Nova Scotia
A.J.W. Catchpole Winnipeg, Manitoba	Jason T. Edworthy Calgary, Alberta
Richard D. Hudson Sidney, British Columbia	Robert Perron St. Leonard, Quebec
David Etkin Downsview, Ontario	N. McFarlane Richmond Hill, Ontario
Jean-Pierre Savard Halifax, Nova Scotia	Georges Drapeau Rimouski, Quebec
Ann E. Gargett Sidney, British Columbia	Pierre Tourigny Edmonton, Alberta

#### CONTRIBUTION TO THE CMOS NEWSLETTER

In 1984, the Society published proceedings (extended abstracts) for the 1983 Banff Congress. The cost of production was \$3,391, but revenues based on post-Congress sales totalled less than \$100. For the 1984 Halifax Congress, the Scientific Program Committee decided strongly against the publication of proceedings. The Executive does not believe it is in the Society's best interests to leave the matter of proceedings in the hands of Local Arrangements Committees. Rather, a clear cut policy must be developed, for inclusion in the Congress guidelines.

The Executive is aware of the diverse range of factors and opinions both for and against the publication of proceedings. Based upon a recent survey of committee and Centre chairpersons, there continues to be a lack of clearcut consensus on the issue, although on balance, viewpoints are perhaps slanted slightly against proceedings.

In view of the net deficit that has been projected for the Society's operations over the next two years, and in concert with steps being taken generally to control our expenditures, the Executive decided on August 24 that proceedings for the 1985 Congress will not be published. However, further analysis and discussion will be undertaken to determine a consistent policy for the future, based upon a firm assessment of the benefits to the Society and Congress participants.

K.B. Yuen  
Treasurer

#### FROM THE PRESIDENT

Mr. Don Smith  
Director General  
Field Services Directorate  
Atmospheric Environment Service  
Department of the Environment  
4905 Dufferin Street  
Downsview, Ontario  
M3H 5T4

Dear Mr. Smith:

During the past year the Executive of the Canadian Meteorological and Oceanographic Society has recognized that the Society could be more supportive of operational meteorologists. In 1981, Council approved the formation of a Significant Interest Group, known as SIGMET, in order to provide a forum within the Society for operational meteorologists to meet and discuss their scientific problems. However, during the past year, with the exception of some activity in the Winnipeg chapter of SIGMET, this Group has been inactive. Because nearly all of the members of SIGMET are AES employees and this Group is dedicated to advancing the scientific and technical knowledge base related to operational meteorology, I feel it would be in our mutual interest to meet with you and your Regional Directors to discuss ways whereby the Society can revitalize SIGMET. In addition, I would also like to discuss the broader issue of the Society's potential to meet the needs of operational meteorologists through its Newsletter, Congress, Centre meetings, workshops and other publications.

If it is appropriate, I would be pleased to attend one of the Field Services Directorate Management Committee meetings to discuss the matter with you and your regional managers.

Yours sincerely,

Neil Campbell  
President  
Canadian Meteorological and  
Oceanographic Society

(Editor: Dr. Campbell was subsequently invited to attend the October 1984 Field Services Directorate Management Committee Meeting.)

#### FINANCIAL STATUS

At the Halifax AGM, a budget was approved which would result in a deficit of \$15,900 in 1984 and \$11,600 in 1985.



In the last few months, the Executive has searched for ways to increase our revenues and to control expenditures.

To date in 1984, a number of items are actually over budget but have been offset by an unexpected large surplus from the Halifax Congress. Moreover, the Executive has adopted a policy of fiscal restraint, which will create savings respecting administration and the Executive. There is also in effect a general restraint on committee travel, except for the Editorial Boards of the Climatological Bulletin and Chinook. It is now intended to bring Chinook back onto a regular basis. Due to delays, there will be savings in printing costs in 1984 but these become liabilities in 1985 for the catchup issues. Overall, it is not projected that the 1984 deficit could be as low as \$3,000.

For 1985, the Society will continue its general financial restraint and as well, it is intended to apply for an NSERC Scientific Publications grant for the Climatological Bulletin. Discussions are still underway to develop a higher voluntary page charge for Atmosphere-Oceans and mechanisms to encourage all authors to donate voluntary page charges. While not likely to be needed, the option of reducing the subvention to centres is also under consideration. Overall, these steps could reduce the 1985 deficit to \$2,000-\$3,000.

For the future, the Executive is now considering new strategies for increasing our membership and subscriptions. It is also likely that increased membership dues and subscription rates will be necessary. Proposals will be put forward for consideration at the 1985 AGM, for implementation in 1986. In conclusion, the financial deficits for 1984 and 1985 have been brought under control, and the outlook for 1986 will likely be a healthy surplus.

K.B. Yuen  
Treasurer

MINUTES OF THE 48TH MEETING OF THE SCIENTIFIC COMMITTEE  
OF THE CANADIAN METEOROLOGICAL AND OCEANOGRAPHIC SOCIETY

Arts and Administration Building, Dalhousie University

Halifax, Nova Scotia

28 May, 1984

Minutes

The Meeting was opened at 1330 by Chairman Paul LeBlond. Present were members M. Bédard, J. Elliott, C.A. Lin, G. Isaac, H.J. Thiébaux, F.E. Bunn, F. Boyce, P. LeBlond, J. Derome, and new member H. Leighton. Also in attendance were P.E. Merilees, D.G. Steyn, G.S. Strong, W.F. Hirschfeld, S. Cohen, G.A. McBean, E. Lozowski, H.-R. Cho, G. Boer, R. Asselin, and M. El-Sabbh.

1. Minutes of the 47th Meeting were approved.

2. Matters arising from the Minutes.

2a. Update on satellite data archiving.

A rotating data archive has been approved and implemented in Toronto, and a similar facility is to be established for GOES data in Vancouver.

With regard to the disposition of equipment formerly at Shoe Cove, the Bedford Institute of Oceanography expects to receive both the hardware and the software package for infrared imagery for the NOAA satellite data retrieving system. However, BIO will not be in a position to provide

training in the interpretation of the data, although they will provide assistance in accessing data from the archives, according to Jim Elliot's report.

Frank Bunn reported on the development optical discs, which store the equivalent of about 1,000 tapes each. For example, one whole year of LANDSAT data will fit on a single disc. These are now becoming available commercially.

2b. Mechanisms for realizing AES long-term research objectives.

Phil Merilees reported that the Canadian Climate Program was funded to about half the amount requested. The principal research objectives of this Program are prediction on monthly and seasonal time scales, and studies of changes in composition of the atmosphere. On April 1, 1985, funding will become available for application to staff support in universities. At the forthcoming meeting of the World Climate Research Program in Toronto, 12 June 1984, mechanisms for focusing these resources will be discussed.

Phil Merilees also reported that AES Science "Subvention" funds have been increased and can provide longer-term university research support, although this is not a mechanism for funding faculty positions.

Walter Hirschfeld said that some form of centre has been proposed for the Montreal area, to create a research environment which can receive and coordinate research funding from outside. However, it is too early to be more descriptive.

It was noted that there is no clear separation between climate and more general atmospheric research funds when Science Subvention funds are allocated; although, clearly, identification can be made post facto. The Chairman offered to act as a filter for communications with the appropriate AES committee, concerning Science Subvention. In particular, he invited recipients of these funds to relay to him any complaints about their management, the system and timetable for notification of awards, etc.

2c. Attendance of Canadian Government scientists at CMOS Meetings.

The matter was reviewed and it was noted that the case was well stated by a letter circulated by the President of CMOS to ADM's of AES, Fisheries and Oceans, and Inland Waters.

2d. AES Cray-IS computer access to the academic community via NSERC.

It was reported that progress has been made with earlier problems of access and that NSERC will be providing additional machine storage.

Richard Asselin noted that, if there is research which is of direct interest to AES, then scientists may be able to access the Cray on the AES allocation, i.e. in excess of the 10% dedicated to NSERC.

Phil Merilees reported that the Cray is already very heavily used and added that it is scheduled to be replaced in 1986 with a larger model which will probably be an XMP.

3. Report of the Subcommittee on Mesoscale Meteorology Research.

A 17-page report was presented to the Scientific Committee and reviewed by P.E. Merilees. The Chairman thanked the Subcommittee for their work; discussion of the report and its recommendations followed.

George Isaac asked where we should go from here with this matter; and Phil Merilees replied that he would like to have the reactions of the Scientific Committee to the recommendations of the Report. Specifically, he wished to hear reactions to the recommendation that a Canadian Mesoscale Meteorology Program Development Office be established immediately. This Office would develop detailed costs and operational plans for a Program: a substantial, planning and development task which will require a director and full-time office staff.

George Boer asked for clarification of the responsibilities of the proposed Office; specifically: Is it to take over from this Committee, and to whom will it be responsible? Phil Merilees replied that not all these things have been thought through, although there have been some suggestions. However, the Subcommittee felt strongly that the Office should be independent of both the AES and NSERC.

Further comments concerned whether it is practical to request funds for this type of program in view of the recent allocation of funds to the Canadian Climate Program. The consensus seemed to be that it should be a job of the Society and of this Committee to encourage and promote the dedication of funds to such an effort. Han-Ru Cho noted that one of the problems is the problem of human resources; and Phil Merilees agreed, saying that: If the Government decides that this is an important area to develop, then it will have to devote part of its effort to developing those resources. Specifically, he noted that there are many people now involved with forecasting who can be redirected to mesoscale forecasting. And this is a significant reason for calling the proposed program a "Mesoscale Meteorology Program" and not (just) a "Mesoscale Meteorology (Research) Program."

Jim Elliott added some oceanographic perspective, saying that: If there is a meteorology program which will generate a mesoscale data base for the continental shelf, this will enhance an oceanographic observation and modelling program - for which a funding proposal has already gone into DFO. In particular, he sees it as enabling oceanographers to look in more detail at the energy scales which are important to the generation of surface waves on the continental shelf.

The following motion was passed unanimously:

"The Scientific Committee receive the report of the Subcommittee on Mesoscale Meteorology Research and take it as its further task to organize a meeting of concerned CMOS members, at this Congress, to consider the report in greater detail and formulate specific responses and recommendations."

W. Hitschfeld proposed that the Scientific Committee approve the report and that the Subcommittee take it as their further responsibility to formulate policy, establish a steering committee to "grease the wheels" and see that the Office indeed is established. Further discussion and action were deferred to the special meeting, to be scheduled for later in the week.

#### 4. Scientific input into Chinook publication policy.

It is anticipated that a professional editor will be engaged, in which case, there probably should be a scientific advisory board to provide scientific guidance and content review. The Chairman suggested that it might be desirable for the Scientific Committee to have a representative on the Editorial Board of Chinook.

#### 5. Membership of the Scientific Committee of CMOS.

With this meeting, J. Derome and H.J. Thiébeaux retire from the Committee. New members are F.W. Zwiers and H. Leighton.

#### 6. Other business.

##### 6a. The 1987 meeting of the IUGG in Vancouver.

George McBean requests suggestions for topics and invited speakers, specifically, for interdisciplinary symposia.

##### 6b. The recent meeting of the World Climate Program in Liege.

George Boer reported very briefly on this meeting. He noted that an AES/OSS Working Group has been set up to discuss the topic of ocean/atmosphere modelling.

The meeting was adjourned at 1715 hours.

#### MINUTES OF THE 48TH MEETING (PART 2) OF THE SCIENTIFIC COMMITTEE OF THE CANADIAN METEOROLOGICAL AND OCEANOGRAPHIC SOCIETY

Dalhousie University

Halifax, Nova Scotia

31 May 1984

#### Minutes

The meeting was opened at 1830 by Chairman P.H. LeBlond. Present were members M. Bêland, J. Derome, F. Bunn, G. Isaac, J. Thiébeaux, J. Elliott, M.I. El-Sabh, F. Boyce (secretary), C. Lin, G. McBean, and F. Zwiers. Also present were P. Merilees and H.R. Cho.

The purpose of this meeting was to approve a course of action arising from the report to the Scientific Committee of CMOS from the Subcommittee on Canadian Mesoscale Meteorology Research.

Moved from the Chair, seconded by M.I. El-Sabh

"that the CMOS Scientific Committee endorse the recommendations of the Subcommittee of Canadian Mesoscale Meteorology Research."

Discussion ranged over many practical aspects of the recommendations of the Subcommittee on Mesoscale Meteorology Research, including costs of observational equipment necessary, direction of the program, and the duration of tenure of the proposed Development office. The original motion was withdrawn and an amended motion was moved by M. Bêland and seconded by J. Derome as follows:

"that the CMOS Scientific Committee extend the terms of reference of the Subcommittee on Mesoscale Meteorology Research and instruct the Subcommittee to do everything possible to initiate the Program Office and to report to the Scientific Committee at the next meeting."

The motion carried unanimously, and the meeting was adjourned at 0910.

#### THE SCIENTIFIC COMMITTEE

The Scientific Committee (henceforth barbarically abbreviated as SCICO) is one of CMOS's standing committees. Its role is to consider and debate issues of scientific interest to the Canadian meteorological and oceanographic community and to recommend action on these issues, as

appropriate, to the Society's Council. Matters discussed by SCICO may arise at the initiative of its members or be brought up by the Society's executive or general membership. Examples of SCICO's recent activities will be given below.

A "Scientific" committee in a society whose very interests are themselves of a scientific nature might be perceived by some as a redundant and superfluous institution. Why couldn't the Executive of the Society handle all such matters? Perusal of the minutes of recent Council and Executive Committee meetings reveals that the President and other officers of the Society have their hands full with the myriad preoccupations of coordinating all the activities of the Society. There is no time to discuss and examine at leisure a variety of purely scientific issues, when faced with the avalanche of day-to-day decisions required to run the Society. SCICO thus arises from the principle of division of labour; it functions, in a sense, as the conscience of the Society, musing at length over topics of fundamental, if not always immediate, interest.

One of the major concerns of SCICO in the past couple of years has been the future of mesoscale meteorology research in Canada. A subcommittee of SCICO which included many of those Canadian scientists most competent on this topic, prepared, over a period of a year, an extensive report on the subject, discussing current U.S. projects and their interfacing with Canadian interests. The subcommittee presented a series of suggestions on short-time forecasting in the prairies, storm development in the Great Lakes - St. Lawrence axis, and cyclogenesis and storm evolution on the Atlantic Coast. Because of its general interest, the report has been submitted to the Newsletter for wider circulation.

Another topic on which SCICO has repeatedly turned its attention has been the need for archiving of satellite imagery. Concerns of east coast oceanographers, following the closure of the Shoe Cove (Newfoundland) receiving station, as well as requests of west coast climatologists for GOES-West data have been aired in SCICO meetings and transmitted to agencies, such as AES, likely to provide archiving facilities. These representatives have generally met with positive responses, with rotating archives being set up at AES headquarters and at the Bedford Institute.

SCICO regularly serves as a clearing house for dissemination of information, such as on the accessibility of the AES Cray-1 at CMC-Dorval to Canadian academics, or for requests for interdisciplinary symposia to be presented at the 1987 IUGG Symposium in Vancouver.

SCICO's advice has been sought on many topics, such as how to increase government scientists' participation at Canadian meetings (the CMOS Congress, in particular); on long-term concerns at AES on how to maintain a solid core of fundamental research in an environment where new funding too often goes towards the solution of problems of immediate and practical interest; on the need for SCICO representation on Chinook's editorial board.

SCICO participates in the selection of four CMOS representatives to the Canadian National Committee for the IUGG (CNC/IUGG), a body of Geophysicists from all disciplines who advise NRC on Canadian participation in international geophysical organizations. The four CNC/IUGG members are also ex-officio members of SCICO. At the present, they are G.T. Needler of the Bedford Institute, who is also the Chairman of CNC/IUGG; G. McBean, an AES scientist working at the Institute of Ocean Sciences, Sidney, B.C.; J. Derome of McGill University; and M. El-Sabbh of the Université du Québec à Rimouski. CNC/IUGG also supervises the publication of an annual Canadian Geophysical Bulletin; SCICO nominates deputy editors for the oceanography and meteorology sub-sections. Presently, they are F. Boyce of the National Water Research Institute (Burlington, Ontario) and E.J. Truhlar of AES, Downsview. At present, SCICO meets twice a year; once at the annual congress, and once again in the fall, traditionally in the Toronto area. Meetings usually last about half a day.

Members of SCICO are appointed by Council, upon recommendation of the Scientific Committee itself, as well as of any other groups or individuals of the Society. Membership is for a period of three years and is arranged so as to provide representation for oceanographers and

meteorologists, as well as to respect geographic and linguistic groupings and to ensure a blend of government, university and private sector scientists. Renewal and continuity of membership are ensured by scattered terms of tenure, with short one-third turnover each year. A list of present members and of their affiliations follows:

Dr. M. Bêland Recherche en Prévision Numerique Dorval, Quebec	Dr. F.M. Boyce Canada Centre for Inland Waters Burlington, Ontario
Dr. F.E. Bunn Ph.D. Associates Inc. Downsview, Ontario	Dr. J.A. Elliott Bedford Institute of Oceanography Dartmouth, Nova Scotia
Mr. I.B. Findleton Pointe-Claire, Quebec	Dr. G.A. Isaac AES - Headquarters Downsview, Ontario
Dr. P.H. LeBlond (Chairman) University of British Columbia Vancouver, British Columbia	Dr. H. Leighton McGill University Montreal, Quebec
Dr. C. Lin University of Toronto Toronto, Ontario	Dr. H.S. Sandhu Alberta Environment Edmonton, Alberta
Dr. F.W. Zwiers Canadian Climate Centre Downsview, Ontario	

#### SPECIAL INTEREST GROUP IN OPERATIONAL METEOROLOGY

This group has been in a relative state of dormancy over the past year since the Banff Congress. On a national level, very little, if any, activity was carried out since the first Newsletter by G. Neault. The Winnipeg Centre, SIGMET and other concerned meteorologists made a presentation to the Officer-in-Charge of the Prairie Weather Centre with respect to automation of forecasts of Day-2 and beyond, which is being planned in the near future.

If any Centres have carried out any activities, please send a note to the CMOS Newsletter and also to representatives from the various Centres.

At the last meeting of the Winnipeg Centre, a proposal was made to begin some listing of material on operational meteorology at Universities. A proposal was made to have (1) a meeting scheduled at the Montreal Congress in 1985, and (2) an issue of Atmosphere-Ocean devoted to Operational Meteorology in the next couple of years. Also, the Congress in 1986 could have a significant section on Operational Meteorology.

Louis Legal has taken over as the Representative for SIGMET for Winnipeg.

Mr. Neault will remain as Chairman of SIGMET until a replacement can be found. Since moving to Whitehorse, he has found it difficult to remain in contact with other members of the group. Mr. Neault recommends that the nucleus of SIGMET activity should probably reside in one location and suggests that interested operational meteorologists contact him in this regard. Gerard may be reached at the AES Whitehorse Weather Office, c/o Room 205 - Operations Building, Whitehorse, Yukon, Y1A 3E4.

#### CMOS DELEGATION TO VISIT PEOPLES REPUBLIC OF CHINA

The President of the Meteorological Society and the President of the Oceanographic Society of the Peoples



Republic of China have invited the Canadian Meteorological and Oceanographic Society (CMOS) to send a delegation (up to 10) to China for a two-week visit in April or May 1985. The CMOS Council has accepted the invitation and, although the topics for discussion have not been finalized, looks forward to fruitful exchanges of ideas on questions of current importance, in particular climate, CO2 and meteorological and ocean services related to marine transportation and offshore resource development.

The Atmospheric Environment Service of DOE, the Natural Sciences and Engineering Research Council, and the Ocean Science Surveys of DFO have tentatively agreed to fund up to two delegation members each. All are expected to select suitable candidates. This would leave room for three to four additional participants. CMOS members interested in joining the delegation under the latter category should inform the CMOS Executive Director (151 Slater, Suite 805, Ottawa, Ontario, K1P 5H3) by December 31, 1984. Applicants should be prepared to pay their airfare to and from Beijing (about \$2,500) and incidental expenses. Travel and living expenses in China will be covered by the Chinese Societies.

The National Executive will subsequently make a selection from the applicants on the basis of their scientific background in relation to the subjects expected to be discussed, and with a view to a balanced representation in meteorology and oceanography.

#### NOUVEAU PRODUIT DE DONNEES SMISO DISPONIBLE AU SDMM

Le comité de travail conjoint COI/OMM pour le Systeme mondial intégré des services océaniques (SMISO) a établi un projet-pilote pour l'échange opérationnel des données sur le niveau moyen de la mer. Ce projet mettra à jour la banque actuelle des données sur le niveau moyen de la mer pour le bassin de l'océan Pacifique afin d'obtenir un ensemble synoptique mensuel des données. De cet ensemble, des cartes mensuelles des anomalies du niveau d'eau moyen seront produites et distribuées. Même si l'objectif final consiste en un réseau d'accès direct, le projet-pilote se limite à recueillir l'information du réseau en moins de 30 jours et à publier les cartes mensuelles des anomalies du niveau moyen dans les 30 jours qui suivent. Les diagrammes produits montrent les courbes des anomalies du niveau moyen de la mer ainsi qu'une interprétation initiale.

Le projet-pilote a comme objectif :

1. l'identification de marégraphes et leur recrutement dans un réseau opérationnel du niveau moyen de la mer;
2. l'amélioration des marégraphes et des installations afin d'obtenir des données du niveau moyen de la mer de qualité;
3. l'amélioration du réseau de communications des données des marées et du niveau de la mer;
4. l'évaluation de l'utilité et de la faisabilité des cartes synoptiques du niveau moyen de la mer pour la prévision des tendances climatiques, des conditions météorologiques à long-terme et des processus océaniques et l'information pour les pêches;
5. l'amélioration du temps d'arrivée, de la quantité et de la qualité des données qui parviennent au Service permanent du niveau moyen de la mer au Royaume-Uni.

Les cartes mensuelles des anomalies du niveau moyen de la mer peuvent être obtenues au Canada auprès du Service des données sur le milieu marin. La première carte disponible est celle de juillet 1984. Si vous êtes intéressé à obtenir les cartes mensuelles ou si vous avez des questions sur le projet-pilote, vous pouvez contacter M. Paul-André Bolduc à l'adresse mentionnée ci-dessous.

Paul-André Bolduc  
Service des données  
sur le milieu marin  
Poste 1202, 200 rue Kent  
Ottawa (Ont) K1A 0E6  
(613)990-0231

#### NEW IGOSS PRODUCT AVAILABLE FROM MEDS

The Joint IOC/WMO Working Committee for the Integrated Global Ocean Services (IGOSS) has undertaken a Pilot Project for the operational exchange of mean sea level data. The Pilot Project will upgrade the present mean sea level data collection in the Pacific Basin in order to obtain a monthly synoptic data set of mean sea levels from which monthly mean sea level anomaly charts will be produced and disseminated. Although the ultimate objective would be an on-line data network with a variety of products, the Pilot Project will concentrate on assembling data from existing sources within a 30-day time frame and publishing monthly charts of mean sea level anomalies within the subsequent 30-day period. The charts produced will show contours of mean sea level anomalies and will include some preliminary interpretations.

The Pilot Project has the following goals:

1. the identification and recruitment of tide gauges into a operational mean sea level network;
2. the upgrading of tide gauges and installations in terms of mean sea level data quality;
3. the improvement of the data communication network for tidal and sea level data;
4. the evaluation of the usefulness and the feasibility of synoptic mean sea level charts for the prediction of climatic trends, long-range weather, ocean processes and fisheries information;
5. to improve the timeliness, quantity and quality of data flowing into the Permanent Service Mean Sea Level archive in the United Kingdom.

The monthly sea level anomaly chart can be obtained in Canada from the Marine Environmental Data Service. The first chart available is for the month of July 1984. If you are interested to receive the monthly sea level anomaly chart for the Pacific Basin, or have any other questions regarding the Pilot Project, please contact the undersigned.

Paul-André Bolduc  
Marine Environmental Data Service  
Station 1202, 200 Kent St.  
Ottawa, Ont. K1A 0E6  
613-990-0231

UNIVERSITY OF BRITISH COLUMBIA  
DEPARTMENT OF OCEANOGRAPHY

#### OCEANOGRAPHY

Two research positions beginning 1 November 1984, subject to availability of funds. Two recent Ph.D. graduates sought to participate in a study of interannual variability in the northeast Pacific and its influence on sockeye salmon migration routes. One candidate should possess a degree in physical oceanography and have experience in data analysis and numerical modelling. The other should be trained in fisheries biology and have experience in experimental and field studies of fish migration mechanisms. The positions could be available for up to three years, and will be filled at the postdoctoral (ca \$21,000) or research associates (ca \$28,000) level according to the candidates' experience. In accordance with Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada. Resumes and three letters of reference should be sent to:

Dr. L.A. Mysak  
Department of Oceanography  
University of British Columbia  
6270 University Boulevard  
Vancouver, British Columbia  
Canada V6T 1W5

DEPARTMENT OF OCEANOGRAPHY

PHYSICAL OCEANOGRAPHY

Applications are invited for a tenure-track position at the beginning Assistant Professor level (subject to budgetary approval) in the Department of Oceanography with effect from 1 July, 1985. Of primary interest is a person having training and experience in an area of physical oceanography that enhances the research and teaching activities of the department, especially in numerical modelling of oceanographic processes. Applications submitted by qualified persons in other areas of physical oceanography will also be considered.

Candidates should have a Ph.D. qualification and relevant post-doctoral experience and will be required to teach in Combined Honours B.Sc., M.Sc., and Ph.D. programs.

In accordance with Canadian immigration regulations, this advertisement is directed to Canadian citizens and permanent residents of Canada. Closing date for applications is November 30, 1984. Send curriculum vitae and names and addresses of three referees to:

Dr. S.E. Calvert, Head  
Department of Oceanography  
University of British Columbia  
6270 University Boulevard  
Vancouver, British Columbia  
Canada V6T 1W5

NORDCO LIMITED

METEOROLOGISTS

WANTED: Meteorologists to work at remote locations starting late in 1984 or early 1985. English essential. Extensive marine operational forecasting background preferred. Part time or full time. Salary \$275/day all found. Apply to:

P.O. Box 8833  
St. John's, Newfoundland  
A1B 3T2

ATTENTION: Manager, Environmental Forecasting

M E P

METEOROLOGISTS

MEP (Meteorological and Environmental Planning Limited) is a progressive privately-owned consulting company specializing in the application of Meteorology and Oceanography for industrial use.

THE FORECAST OPERATIONS DIVISION of MEP has two positions available for meteorologists interested in specialized forecasting for agricultural, air pollution, aviation and marine activities.

1. DIRECTOR OPERATIONAL SERVICES -

To organize and supervise all forecast operations, client liaison, forecast applications development and business development. Salary Range 35K to 45K depending on experience and qualifications.

2. FORECASTERS -

To carry out forecasting duties in support of Operational requirements. Salary Range 25K to 35K depending on experience and qualifications.

Successful candidates should have comprehensive knowledge of synoptic meteorology and operational procedures as would normally be obtained from a government-sponsored forecasting course. Additional in-house training in specialized areas will be available to successful candidates. An understanding of computer techniques would be an asset.

MEP offers excellent compensation and a comprehensive benefit package, as well as the opportunity to become personally involved with a rapidly growing meteorological consulting company.

ALL APPLICATIONS WILL BE HELD IN STRICT CONFIDENCE.

Interested persons are invited to submit a letter of application or phone (416) 661-5960 for additional information.

FORECAST OPERATIONS DIVISION  
MEP COMPANY  
850 MAGNETIC DRIVE  
DOWNSVIEW, ONTARIO  
M3J 2C4

E X H I B I T I O N

Ottawa planned 10-16 July 1985

in conjunction with:

Ninth session WMO Commission for  
Instruments and Observation (CIMO-IX)

and third Technical Conference on

Instruments and Methods of Observations (TECIMO-III)

Potential exhibitors (commercial and non-commercial)  
are to direct enquiries to:

CMOS Ottawa  
c/o Ice Centre Environment Canada  
365 Laurier ave West  
Journal Tower South, third floor  
Ottawa, Ontario  
K1A 0H3

EXHIBIT/DISPLAY SPACE

NATIONAL SYMPOSIUM 1985

The Rawson Academy of Aquatic Science is a non-profit, Canadian organization chartered in 1979 and made up of aquatic resource-oriented scientists, educators and managers from across Canada. The Academy's major project for 1985 is the sponsoring of a National Symposium on "Canadian Waters: The State of the Resource," to be held in Toronto, May 1985.

It is anticipated that registration for the conference will exceed 400 scientists, senior government officials,



consultants and industry representatives from Canada and the United States. Twenty theme papers will be presented on diverse aquatic-related topics. These papers will be complimented by numerous submitted papers and workshop sessions. Although the final program has not yet been finalized, internationally-recognized guest speakers are being invited to attend, along with senior Federal and Provincial government representatives.

Space has been set aside to allow for a limited number of commercial/government exhibits and the Academy is actively seeking participant exhibitors. The symposium will run from May 26 to 29 at the Royal York Hotel, with exhibits operating from May 26 to 28. The room accommodating the exhibits is on the main convention floor adjacent to rooms used for the plenary sessions.

The basic exhibition unit will be an 8' x 10' draped booth at a cost of \$250. Charges for larger, multiple-booth displays will be based on a multiplier of \$200 per unit. Those interested in renting space should make confirmation to that effect before September 15 by contacting:

Mrs. Angela Lynch  
Symposium Coordinator  
The Rawson Academy of Aquatic Science  
#200, 601 - 17 Avenue S.W.  
Calgary, Alberta T2S 0B3  
(403) 228-0407

#### CANADIAN WATERS: THE STATE OF THE RESOURCE

TORONTO, MAY 1985

A symposium on this timely topic will be held 26-29 May 1985 at the Royal York Hotel, Toronto. The Rawson Academy of Aquatic Science, a non-profit, Canadian organization made up of aquatic Canada, is hosting this national review of aquatic resources, their quantity, quality and distribution in relation to present and projected demand.

Twenty theme papers will be presented on diverse aquatic-related topics and contributed scientific papers will be presented at concurrent sessions at the symposium. Invited papers reviewing significant scientific, technical and policy information will be edited and published by the Academy.

Authors wishing to contribute papers for presentation should submit a title and short abstract before October 31, 1984, to Dr. Henry Regier, Chairman, Symposium Program Committee, Institute for Environmental Studies, University of Toronto, Toronto, Ontario, M5S 1A5; telephone (416) 978-7338.

Enquiries regarding registration, exhibit and display space, student assistance and spouse's program should be directed to the Symposium Coordinator, The Rawson Academy of Aquatic Science, #200, 601 - 17 Avenue S.W., Calgary, Alberta, T2S 0B3; telephone (403) 228-0407.

#### FIRST INTERNATIONAL CONFERENCE ON SCHOOL AND AND POPULAR METEOROLOGICAL EDUCATION

The Conference was held in Oxford, England, 2-4 July, and co-sponsored by the RMS, AMS, and the WMO, and was intended for all those involved in general (non-specialist) meteorological education at the school and adult levels. The more than eighty attendees included representatives from all the continents and at least twenty-five countries.

During the opening session, the Conference heard from Professor H. Charnock and Dr. Eugene Bierly, the respective

Presidents of the RMS and AMS. Dr. Bierly, in particular, pointed out the current low quality of science education, not only in the US, but also in many other countries. He emphasized the role that meteorological education can play in reversing this trend.

The Conference was organized into three main sessions, each concentrating on different topics and concerns. The first session heard how meteorology and climatology could be used to improve science education in general and saw several interesting methods of teaching meteorology in and out of schools. Speakers stressed the importance of getting children and the general public interested and involved. During the second session, speakers described in some detail the courses and programs that are currently offered at a variety of schools and institutes. The conference also heard from TV meteorologists. Some interesting and lively discussions took place around the importance and the role of the media in general meteorological education. Some innovative demonstrations of educational technology were provided, as well.

The third and final session not only looked at the use of computers in the educational process, but also addressed the future in this area. The session further provided third-world representatives an opportunity to outline their concerns and needs.

Important outcomes of the Conference were a shared enthusiasm for activities and initiatives in the field of popular and school meteorological education and an increased awareness of the overall importance of the role that meteorological education can play in the amelioration of science education in general.

The major result of the gathering was a resolution calling for global action and the formation of an International Education Committee, acting as a clearing house and focus for the promotion and support of school and popular education. Ten members/correspondents representing different regions and the WMO will concern themselves with this new and important challenge and the preparation for a second conference in 1986.

Hans VanLeeuwen  
Member/Correspondent for Canada  
International Education Committee

#### HEAVY GAS (LNG/LPG) WORKSHOP

Toronto, Ontario

January 29 and 30, 1985

A two-day Heavy Gas Workshop will be held at the Sutton Place Hotel, Toronto, Ontario. The focus of this workshop will be on accidental discharges of heavy gases, particularly LNG/LPG, and their dispersion in the atmosphere. The aim of the workshop is to bring together agencies and individuals involved in research and applied safety work on heavy gases to provide a forum for information exchange and to identify user requirements, knowledge gaps, and priorities for future research and development. Experimental and modelling research will be covered on the first day, and the second day will deal with applied safety aspects - primarily risk assessment with some emergency response considerations. The workshop format will consist of lectures by key speakers, paper presentations, plus roundtable discussions. A proceedings of the workshop will be prepared.

Key Speakers: Dr. J. McQuaid  
Health & Safety Executive  
Sheffield, England  
Dr. D.H. Napier  
University of Toronto  
Toronto, Ontario  
Dr. J.S. Puttock  
Shell Research Ltd.  
Chester, England

Dr. P.K. Raj  
Technology Management Systems Inc.  
Burlington, Massachusetts

Co-Chairmen: Dr. J.D. Reid  
Atmospheric Environment Service  
Downsview, Ontario

Mr. R.V. Portelli  
Concord Scientific Corporation  
Downsview, Ontario

Sponsor: Environment Canada -  
Federal Energy R & D Program

For further information, please contact:

Mr. Steve Guerin  
Workshop Coordinator  
Concord Scientific Corporation  
2 Tippett Road  
Downsview, Ontario  
M3H 2V2 (416) 630-6331

#### FIRST ANNOUNCEMENT AND CALL FOR PAPERS

#### ASSOCIATE COMMITTEE FOR RESEARCH ON SHORELINE EROSION AND SEDIMENTATION (ACROSES)

in cooperation with

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

presents

#### CANADIAN COASTAL CONFERENCE 1985

13-16 August 1985

Hotel Newfoundland, St. John's, Newfoundland Canada

#### THEME WAVES AND THE COAST - SCIENCE AND ENGINEERING

The conference is being organized as a forum for interdisciplinary discussion of Canadian scientific research and engineering practice in the coastal zone. Proposed session topics include:

- (1) nearshore wave dynamics;
- (2) erosion and sedimentation;
- (3) ice interaction with the coast and coastal structures;
- (4) interaction of structures and shorezone development with coastal processes;
- (5) Canadian Coastal Sediment Study.

Consideration will be given to papers dealing with physical processes, data acquisition and analysis, engineering experience, scientific models for coastal engineering design, or other investigations relevant to the session topics. Poster presentations will be considered an integral part of the technical program and participants are encouraged to use this mode of communication where appropriate. Two field trips and a one-day short course will be offered in conjunction with the conference.

TENTATIVE PROGRAM	13 August 1985	registration and short course
	14 August 1985	technical sessions
	15 August 1985	technical sessions
	16 August 1985	field trips

An Accompanying Persons' program will also be available.

For further information contact:

Mr. D.H. Willis, Secretary  
Associate Committee for Research on  
Shoreline Erosion and Sedimentation  
National Research Council Canada  
Building M-32  
Montreal Road  
Ottawa, Ontario  
K1A 0R6

#### ABSTRACTS

Prospective authors are invited to submit abstracts on subjects related to the conference theme. Abstracts must be typed single spaced, using a standard type face and black carbon ribbon, within a box measuring 128 mm horizontal by 205 mm vertical, with the title in capitals and not indented, author(s) and affiliation(s) in lower case indented three spaces, and one blank line before start of abstract. Abstracts may be in French or in English; authors who are able to submit versions in both official languages are encouraged to do so. The original plus three copies must be received by the Selection Committee no later than 15 November 1984. Notification of acceptance will be mailed by 31 January 1985. Completed papers must reach the committee by 30 April 1985 for inclusion in the proceedings.

Submit abstracts to: Dr. D.L. Forbes, Chairman  
ACROSES Technical Program Committee  
c/o Atlantic Geoscience Centre  
Bedford Institute of Oceanography  
P.O. Box 1006  
Dartmouth, Nova Scotia  
B2Y 4A2

#### PREMIER AVIS ET DEMANDE DE COMMUNICATIONS

#### LE COMITÉ ASSOCIÉ DE RECHERCHE SUR L'ÉROSION ET LA SÉDIMENTATION LITTORALES (CARÉSL)

en collaboration avec

L'UNIVERSITÉ MEMORIAL DE TERRE-NEUVE

présentent

#### LA CONFÉRENCE CANADIENNE SUR LE LITTORAL 1985

du 13 au 16 août 1985

Hôtel Terre-Neuve, St. Jean, Terre-Neuve, Canada

#### THÈME LES VAGUES ET LE LITTORAL - SCIENCE ET GÉNIE

La conférence consistera en un forum permettant une discussion pluridisciplinaire de la recherche scientifique au Canada et de la pratique du génie civil dans la zone côtière. Il est proposé que les séances techniques portent sur les sujets suivants:

- (1) la dynamique des vagues dans la zone littorale;
- (2) l'érosion et la sédimentation;
- (3) les interactions entre la glace et le littoral et les ouvrages en milieu littoral;
- (4) l'interaction des structures et des ouvrages dans la zone côtière et des processus littoraux;
- (5) l'étude canadienne des sédiments littoraux.

Seront pris en considération les mémoires traitant des processus physiques, de la collecte et de l'analyse des données, des études de génie, des modèles scientifiques pour la conception des ouvrages en milieu littoral ou d'autres études

ayant trait aux sujets faisant l'objet des séances techniques. On encourage les participants à utiliser ce moyen de communication aussi souvent que possible. Deux excursions et un cours abrégé d'une journée seront offerts parallèlement à la conférence.

<b>PROGRAMME SUGGÉRÉ</b>	<b>le 13 août 1985</b>	Inscription et cours abrégé
	<b>le 14 août 1985</b>	Séances techniques
	<b>le 15 août 1985</b>	Séances techniques
	<b>le 16 août 1985</b>	Excursions

Un programme sera à la disposition des personnes qui accompagnent.

Pour de plus amples renseignements, communiquer avec:

M. D.H. Willis, secrétaire  
Comité associé de recherche sur l'érosion  
et la sédimentation littorales  
Conseil national de recherches Canada  
Immeuble M-32  
Chemin de Montréal  
Ottawa (Ontario)  
K1A 0R6

**RÉSUMÉS** Les éventuels auteurs sont invités à présenter des résumés sur des sujets reliés au thème de la conférence. Les résumés doivent être dactylographiés à simple interligne à l'intérieur d'un cadre mesurant 128 mm horizontalement sur 205 mm verticalement. On doit utiliser des caractères standards et du ruban au carbone noir. Le titre doit être dactylographié en lettres majuscules à partir de la marge gauche et les noms des auteurs et leur(s) affiliation(s) doivent être composés en lettres minuscules renforcées de trois espaces. On doit laisser une ligne en blanc avant de dactylographier le texte du résumé. Les résumés peuvent être présentés en français ou en anglais; on encourage cependant les auteurs à présenter une version bilingue de leur résumé lorsqu'ils sont capables de le faire. Le comité de sélection doit recevoir l'original, accompagné de trois copies, au plus tard le 15 novembre 1984. Les avis d'acceptation seront expédiés par la poste avant le 31 janvier 1985. Les rapports complets doivent parvenir au comité avant le 30 avril 1985 afin d'être incorporés au compte rendu.

Prière de présenter les résumés à:

Dr. D.L. Forbes, Ph.D., président  
Comité du programme technique du CARÉSL  
a/s Centre géoscientifique de  
l'Atlantique  
Institut océanographique Bedford  
B.P. 1006  
Dartmouth (Nouvelle-Écosse)  
B2Y 4A2

#### CALL FOR PAPERS - NINETEENTH ANNUAL CONGRESS

The Montreal Centre of the Canadian Meteorological and Oceanographic Society (CMOS) and l'Université du Québec à Montréal (UQAM) will host the Nineteenth Annual CMOS Congress and Annual General Meeting at UQAM from June 12 to 14, 1985. The theme is "Modelling in Meteorology and Oceanography." Contributions are particularly sought on the theoretical and practical aspects of modelling in the following areas: atmosphere-ocean interactions, waves in the atmosphere or oceans, atmospheric and oceanographic circulations, limnology, climatology, operational meteorology, cloud dynamics, transport and diffusion of

pollutants. In addition to invited and contributed papers relating to the general theme, sessions will be held on other aspects of meteorology and oceanography, depending on contributions.

Back to back with the CMOS Congress, the American Meteorological Society will hold two conferences at UQAM the following week: June 17 to 20 - the Seventh Conference on Numerical Weather Prediction, and June 19 to 21 - the Second International Conference on the Aviation Weather System.

For the CMOS Congress, abstract on any topic in meteorology and oceanography will be received until February 1, 1985, and should be sent to Dr. Harold Ritchie, Recherche en prévision numérique, 2121 Trans-Canada Highway, suite 508, Dorval, Québec, H9P 1J3; telephone: (514) 683-7768. Each abstract, not to exceed 300 words, is to be typed single spaced on a sheet of 216 mm by 279 mm (8.5 in. by 11 in.) paper with 25 mm (1 in.) margins. Clean, camera-ready copy with black type is required. Elite type (12 pitch) is preferred. The heading block should consist of the following items on successive lines:

(a) the title in capital letters, and

(b) the name(s) of the author(s) in upper and lower case letters.

There should be a one-line space between the heading block and text. All lines, including the title, names, and text, are to be typed left justified. Poster sessions may be held, depending on distributions. Speakers who prefer to give a poster presentation should so indicate.

Commercial exhibits will be on display during the Congress. For further information, contact Mr. Jean-Guy Cantin (local arrangements committee) or Mr. Richard Moffet (exhibits) at 100 Alexis-Nihon Boulevard, 3rd Floor, Montréal, Québec, H4M 2N8; telephone: (514) 333-4551.

#### INVITATION À PRÉSENTER DES COMMUNICATIONS

##### DIX-NEUVIÈME CONGRÈS ANNUEL

Le Centre de Montréal de la Société canadienne de météorologie et d'océanographie (SCMO) et l'Université du Québec à Montréal (UQAM) seront les hôtes du dix-neuvième Congrès annuel et de la réunion générale annuelle de la SCMO, événements qui se tiendront à l'UQAM du 12 au 14 juin 1985. Le Congrès a pour thème "La modélisation en météorologie et en océanographie." On recherche particulièrement des communications sur les aspects théoriques et pratiques de la modélisation dans les domaines suivants: interactions atmosphère-océan, ondes dans l'atmosphère ou l'océan, circulations atmosphériques et océanographiques, limnologie, climatologie, exploitation météorologique, dynamique des nuages, transport et diffusion des polluants. Outre les communications présentées par les conférenciers invités et les autres participants sur le thème général, il se tiendra des séances sur d'autres aspects de la météorologie et de l'océanographie, ceci en fonction de la participation.

À la suite du Congrès de la SCMO, l'American Meteorological Society tiendra deux congrès à l'UQAM: du 17 au 20 juin - le septième Congrès sur la prévision numérique, et du 19 au 21 juin - le deuxième Congrès international sur le service météorologique à l'aviation.

Pour le Congrès de la SCMO, des résumés sur des sujets reliés à la météorologie ou à l'océanographie peuvent être envoyés jusqu'au 1er février 1985. Ceux-ci doivent être adressés au Dr. Harold Ritchie, Recherche en prévision numérique, 2121 route Trans-Canadienne, suite 508, Dorval, Québec, H9P 1J3; téléphone: (514) 683-7768. Chaque résumé ne doit pas excéder 300 mots et doit être dactylographié à l'encre noire à interligne simple sur une feuille de 216 mm sur 279 mm (8.5 po. sur 11 po.) ayant une marge de 25 mm (1 po.). La copie doit être propre et prête à être



photocopiée. L'utilisation du caractère élite (12 frappes au pouce) est préférable. L'en-tête doit contenir les renseignements suivants sur des lignes successives:

- (a) le titre en lettres majuscules, et
- (b) le nom de l'auteur en lettres majuscules et minuscules.

On doit laisser un espace d'un interligne simple entre l'en-tête et le texte. Toutes les lignes, incluant le titre, le nom, et le texte, doivent commencer à la marge. Des séances faites par affichage pourront avoir lieu en fonction de la participation: les personnes intéressées doivent en faire mention.

Une exposition commerciale aura lieu pendant le Congrès. On peut obtenir plus de renseignements auprès de M. Jean-Guy Cantin (comité local d'organisation) ou M. Richard Moffet (exposition commerciale) au 100 boulevard Alexis-Nihon, 3e étage, Montréal, Québec, H4M 2N8; téléphone: (514) 333-4551.

#### CMOS PRIZES AND AWARDS WINNERS FOR 1983

Seven people received CMOS Awards for 1983.

**Professor Jacques Derome** - Professor of Meteorology,  
McGill University

Awarded the President's Prize. The specific contribution cited was a paper entitled "On the Average Errors of an Ensemble of Forecasts" which appeared in *Atmosphere-Ocean* 19 (2) 103-127; but the award also recognized Professor Derome's outstanding and continuing work in the field of numerical simulation of the atmospheric motion.

**Mr. Marvin Olson** - Air Quality and Inter-Environmental  
Research Branch, Downsview

Awarded the Andrew Thompson Prize in Applied Meteorology. In a joint paper with Eva Voldner and Ken Oikawa, published in *Atmosphere-Ocean* (vol. 21 (3) 344-361), Mr. Olson described a model for the long range transport of pollutants by the atmosphere, a model of some importance to the continuing work on acid precipitation.

**Mr. M.R. Morgan** - Halifax

Received the Applied Oceanography Prize for his pioneering work in setting up the wave analysis and prediction scheme used by METOC for the Western North Atlantic. The citation also referred to the importance of the resulting data for subsequent research on wave climate in the region.

**Mr. Jack Mathieson** - Pacific Region, AES

Awarded the Rube Hornstein Prize in Operational Meteorology for his long and distinguished service with the Pacific Region, AES, and particularly for his leading role with the Automated Shipboard Aerological Program (ASAP). ASAP has attracted worldwide interest and has applications not only for ocean-based measurements but also for many land locations.

**Mr. J. David Neelin**

Awarded the Graduate Student Prize for M.Sc. work at the University of Toronto on the instability of forced stationary waves. David is currently pursuing a Ph.D. degree at Princeton University.

**Mr. Reid V. Dexter** - Halifax

Awarded a Citation for his contributions as a weather man on CBC Halifax radio over 12 years. His knowledge and wit over the years enhanced the stature of operational meteorology in the eyes of the public.

**Mr. Michael Keating** - Globe and Mail, Toronto

Awarded a Citation for numerous excellent articles on environmental issues. These have contributed to informed public awareness of issues such as air pollution, climate perspectives, and forest and water managements.

#### 1984 SOCIETY AWARDS

##### Call for Nominations

Nominations are requested from members and Centres for the 1984 Awards, to be presented at the XVIII Annual Congress. Six awards are open for nomination:

##### **1. President's Prize**

To an individual or individuals for a recent paper of special merit in the fields of oceanography or meteorology. The paper must have been published in *Atmosphere-Ocean* or have been presented to the Society membership at a national or local meeting and has been accepted for publication in a referred journal.

##### **2. Tully Medal**

A new prize this year, awarded to a senior scientist in recognition of major contributions to oceanographic science in Canada. (The details can be found in the December 1983 Newsletter, Vol. 11, No. 6).

##### **3. Dr. Andrew Thomson Prize in Applied Meteorology**

To a member of the Society for an outstanding contribution in the field of applied meteorology.

##### **4. Prize in Applied Oceanography**

To a member or members of the Society for a significant contribution to the application of oceanography in Canada.

##### **5. Rube Hornstein Prize in Operational Meteorology**

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 awarded may be cumulative over a period of years or may be a single notable achievement.

##### **6. Graduate Student Prizes**

To graduate student for contributions of special merit in meteorology and/or oceanography.

With the exception of the Rube Hornstein Prize, all awards will be based on contributions during the 1983 calendar year.

Nominations are also requested for the award of citations to individuals or groups who have made some outstanding contribution in helping to alleviate pollution problems, in promoting environmental improvements, or in developing environmental ethics.

All nominations should reach the secretary of the

Awards Committee at the following address no later than January 15, 1985.

Dr. Paul Leblond  
Department of Oceanography  
University of British Columbia  
6270 University Boulevard  
Vancouver, British Columbia  
V6T 1W5

#### THE FRANK A. CHAMBERS AWARD

ROBERT EDWARD MUNN

The Frank A. Chambers Award is presented by APCA for outstanding achievement in the science and art of air pollution control. It requires accomplishment of a technical nature on the part of the recipient which is considered to be a major contribution to the science and art of air pollution control, the merit of which has been widely recognized by persons in the field.

The coverage is intentionally broad, since it is expected to recognize achievement in any line of technical endeavour in air pollution, from pure research to applied science.

The 1984 Frank A. Chambers Award is presented to Dr. Robert Edward Munn.

Interest in global air pollution has only emerged, to any appreciable extent, in the past few years. Most air pollution concern was, and continues to be, confined to urban problems. However, a few people have devoted their attention to global aspects, mainly working in international organizations. Ted Munn is one of these and for many years has been one of the world's leading authorities in global air pollution.

His career started as a weather forecaster with the Canadian Meteorological Service, but he soon became involved in air pollution. The first connection he had was with the transboundary Detroit-Windsor air pollution investigation by the International Joint Commission from 1957 to 1960. Following that, he headed a research group in the Meteorological Service which later became the Air Quality Research Branch of the Canadian Department of the Environment. During his career, Dr. Munn published prodigiously and, in addition to his numerous papers, he wrote six books and edited four others.

During the 1960's Dr. Munn began to turn his attention to global air pollution and became an active participant in international work. In 1970, he was a visiting professor at the University of Stockholm, where he was involved in acid rain research. Soon after, he became a consultant to the United Nations and took part in the design of global monitoring systems. In 1981, he was a senior consultant in the United Nations Environmental Program and provided the major input for the report "The Environment in 1982: Retrospect and Prospect." He also wrote the atmospheric chapter of a Ten-Year Environmental Review, 1972-1982.

Dr. Munn was born in Winnipeg, Manitoba, in 1919. He obtained a B.Sc. in Mathematics at McMaster University, Hamilton, in 1941 and began serving as a weather forecaster in Gander, Newfoundland, in the same year. In 1945, he obtained his master's degree in meteorology and then received a Ph.D. in meteorological air pollution engineering in 1962 from the University of Michigan.

Ted Munn is currently a Professor of Physics and an Associate of the Institute of Environmental Studies at the University of Toronto. He has been a member and active participant of the Ontario Section of APCA since its inception and was formerly the chairman of the TT-3 Meteorological Committee of APCA.

In recognition of his numerous contributions to the knowledge of the meteorology of air pollution and, in

particular, for his significant work on global aspects, the Air Pollution Control Association is pleased to present Dr. R.E. Munn with the Frank A. Chambers Award.

#### REPORT TO THE SCIENTIFIC COMMITTEE OF CMOS FROM THE SUBCOMMITTEE ON CANADIAN MESOSCALE METEOROLOGY RESEARCH

##### 1. Terms of Reference

- (1) Identify scientific problem areas; select a scientific focus; develop a scientific rationale; identify an organizational focus for mesoscale meteorology research and development.
- (2) Establish contact with relevant programs in other countries; prepare an inventory of observational capabilities, data sets and scientific personnel; take advantage of the CMOS Congress activities to obtain further input and feedback; make a preliminary report to the Fall 1983 meeting of the Scientific Committee and report to the Spring 1984 meeting with specific recommendations regarding a Canadian mesoscale meteorology research program.

##### 2. Accomplishments of Specific Tasks

- (a) The chairman made a presentation at the CMOS Conference at Banff based on previous workshop results and there ensued a lively discussion of ideas and importance of program.
- (b) The chairman reported to the CMOS Scientific Committee in December 1983 on the activities of the Subcommittee.
- (c) Dr. Walter Hitschfeld, Dr. H.R. Cho, and Dr. G. Isaac have contacted both the organizers of the U.S. Storm Program and the GALE Program as to the mutual interest of Canadian involvement or cooperation with the proposed U.S. STORM Program. The question of AES-NOAA cooperation and joint interest in the mesoscale and partially STORM is on the agenda of the annual AES-NOAA meetings. The above committee members have substantial involvement on an individual basis with the U.S. initiatives and have represented Canadian interests in this regard.
- (d) The committee has prepared reports on observational capabilities, Canadian numerical modelling capabilities, and data sets for verification, data sets, on-going projects and scientific personnel. These reports, while not exhaustive, paint a picture of the state of readiness of the meteorological community to embrace an organized mesoscale program.
- (e) The other charges to the committee are reported on in the document called "Mesoscale Meteorology, A Challenge for Canadians."

R. Benoit, Atmospheric Environment Service  
H.R. Cho, University of Toronto  
J. Elliot, Bedford Institute of Oceanography  
W. Hitschfeld, McGill University  
R. Humphries, Alberta Research Council  
G. Isaac, Atmospheric Environment Service  
G. McBean, Atmospheric Environment Service  
P. Merilees, Atmospheric Environment Service, Chairman  
R. Nelis, Atmospheric Environment Service

#### MESOSCALE METEOROLOGY, A CHALLENGE FOR CANADIANS

##### 1. Overview

The progress of meteorology as an applied science in the years since World War II is undeniable. Weather

forecasts, so useful to so many people, have been improving steadily as the science of meteorology and the technology of computers and satellites lift each other, hand over hand, to new levels. The progress has been tempered by the inherent complexity of the atmosphere, the available technology, and by pressure on resources. Observations, forecasts and their distribution to the public are very demanding of human resources.

The first stage of a new era in this regard was the use of radar to observe precipitation, whereby a small number of people with a sophisticated tool could observe the small-scale processes of precipitation over areas which just could not be sampled by other means. In the early days of radar meteorology, the human brain was about the only available manipulator of data. The second stage was the development and use of satellites to observe the atmosphere. The fundamental attraction is that the vast ocean areas of our planet were now indistinguishable from the land areas (where people lived) from the point of view of observations.

This led to the conception of a Global Weather Experiment which formulated as its central goal a year-long series of measurements which would define the large-scale patterns of atmospheric motions over the globe. This experiment was successfully carried out during 1979-80 and the results form the scientific basis for the development of an international, operational observing system and the provision of useful forecast services on the large-scale for up to ten days.

In the meantime, forecast services in the short time range and small scales continued to be based on classical models and techniques and in most cases outmoded methods of data manipulation. Significant progress has been made in other aspects of small-scale, or mesoscale meteorology, particularly as regards boundary layer flow in the context of pollution concerns. Nevertheless, as compared to the network of data exchange, scientific knowledge exchange, and cooperation for service delivery, the mesoscale is very much behind the large scale.

Advances in technology in recent years are surely changing the equation. Doppler radar, wind profiling systems, smaller-scale satellite footprints, satellite communications (all equipped with superior and flexible means of data manipulation) and the computer revolution are now available to be applied to the mesoscale problem. The meteorologists who are on the front lines as regards "real weather" prediction (i.e. mesoscale) for all sorts of applications might be forgiven for saying "it's about time" something was done to help us in our jobs. Nevertheless, requirements for forecast products have almost never been based on what is scientifically feasible at the time the service was required. This fact has been the major stimulus for research and development to investigate the scientific feasibility and adjustment of the methods of service delivery based on the scientific developments. In many ways, this is what the Global Atmospheric Research Program was all about. One must remember, however, that GARP took place during an era of world economic optimism.

The bottom line is that major advances have been made in the prediction of large scale flow on time scales of the order of 2-10 days.

The longer time scales of prediction have received increasing attention lately, with questions of the effects of pollutants on the course of climate and the economic impacts of monthly and seasonal climate fluctuations. This is reflected in the World Climate Research Program and the Canadian Climate Program. The very shortest time and space scales of meteorological phenomena have also been a priority under the concept of "nowcasting." The mesoscale problem (which is intermediate) has only recently received the attention that it deserves. To most atmospheric scientists, the fundamental unity of all scales of atmospheric processes is apparent. Indeed the most difficult and important scientific questions have to do with determining those interactions between scales of flow which can or cannot be ignored in order to get a first approximation to the environmental question being asked.

When one thinks about the question of large scale forecasting or about climate questions, it is clear that

international cooperative ventures are imperative, simply because such problems are global. In that context, Canada has contributed to and benefitted from international programs mainly through WMO. When one thinks about the mesoscale problem, the situation is different - especially in a country occupying a large area, where major and immediate benefits of mesoscale research will flow chiefly to people in that country. In that sense, a mesoscale emphasis is an entirely new situation of Canada.

Of course, there are mesoscale problems to which Canadians have paid attention. The problem of hail in Alberta is a long-standing question. In more recent years, questions about pollution have demanded efforts on the mesoscale. A long tradition of surface climate observing systems has been established and an expertise in interpretation of these data for site-specific design criteria has been developed. Nevertheless, there has not been a concerted, organized effort to tackle the mesoscale meteorology problems of the country. For example, Canadian ventures into offshore resource development were inadequately prepared as regards atmospheric information simply because the mesoscale information was almost totally inadequate.

It is in this context that the Scientific Committee of CMOS held a workshop on Mesoscale Meteorology Research, which has ultimately led to this report.

## 2. Rationale for the Development of the Canadian Mesoscale Meteorology Program

The development of a detailed plan and justification for the Canadian Mesoscale Meteorology Program is a very large task that must involve in-depth consideration of experimental design, including modelling studies, resource requirements and Canadian needs. These activities must be carried out in the next while by dedicated, interested people who are able to develop a concept into a more concrete Program Plan with the input of a broad scientific community. It is possible, however, at this time to establish the principles or rationale which should be used to develop the Program Plan.

Since the principle objective of the CMMP must be to improve Canada's ability to observe and predict the occurrence and nature of mesoscale weather phenomena of interest to Canadians, it is essential that an operational forecast system development component be an integral part of the program and that the research and operational aspects be closely linked.

It is our belief that through this linkage between research and operations advances in understanding of mesoscale weather phenomena will be accomplished, and will directly and quickly translate into benefits to Canadian society.

There are many scientific questions about the nature of mesoscale phenomena and their interactions with the larger-scale aspects of weather systems. There must be recognition that no scale of phenomena in the atmosphere is totally independent of other scale phenomena and a fundamental problem of atmospheric science is to describe and understand the exchange of energy, mass, momentum and varying manifestations of water substance between different scales. At present, forecast ability is generally limited to larger (synoptic) scales and our existing observational networks and forecast models are generally established to consider these scales. In view of this, we must attempt to approach the mesoscale problem from the large scale end.

In developing the Program Plan, it is estimated that some 15 years (at least) will be needed for its completion. The immense problems to be addressed cannot be overcome in less, and it is believed that continuity of effort over the whole period will be necessary. Within this time span, there will be periods of intensive observations interspersed with periods of scientific analysis and interpretation. The development of forecast procedures will continue in parallel, again with likely fluctuations in the level of activity. However, it is essential that the CMMP not be allowed to lapse before completion because only then will the real benefits of the Program be available. There will



also be a need for a continuing Program review and evaluation.

A very major consideration in Program Plan development is the opportunity provided by the sequence of U.S. projects: GALE, STORM-CENTRAL, STORM-EAST, STORM-WEST. This is an opportunity that must not be missed. Canadian coordination with and Canadian participation in U.S. projects will be mutually beneficial, with undoubtedly the greatest gain to Canada. The geographical coverage planned for STORM-CENTRAL provides a domain large enough for mesoscale model development, initialization and verification. It is doubtful that a Canadian program could muster sufficient resources independently to observe (on the mesoscale or smaller scale) a large enough domain to be adequate for these purposes. The U.S. programs will also provide opportunities for Canadian scientists to participate directly in field experiments and to use the data for scientific study.

However, it must be stated that neither the U.S. programs nor minor extensions of them, will address important and specific problems of Canadian mesoscale weather.

We propose that for immediate planning purposes, three Canadian mesoscale phenomena should be identified. These are: (1) the mesoscale convective systems of the Canadian prairie; (2) the modifications of weather systems induced by the Great Lakes and the topography of the St. Lawrence Valley (the region of the heavily populated "Canadian Corridor" from Windsor to Quebec City); and (3) the intense cyclones affecting the Maritimes and Newfoundland. Each of these phenomena has characteristics significantly different from those to be studied in the U.S. programs, and a special Canadian effort is warranted.

For example, enough is already known from Studies of Alberta hail storms to realize the critical differences from their Colorado/Kansas counterparts. STORM-CENTRAL is dealing only with the U.S. central plains; the western Great Lakes are only in the northeastern corner of the study area. Thus, the modification of the weather systems by passage over the Great Lakes or as modified by the topography of the Laurentian Shield will not be studied at all. The U.S. GALE will be studying the genesis (as the name implies) of Atlantic cyclones and principally examining the case of storms passing from over land to over water at latitudes about 1500 km south of the Canadian areas of interest. The situation for the Maritimes and Newfoundland is the opposite; the worst storms are already intense and approach from over the ocean to the land areas.

In the consideration of these three phenomena, it is also important to note the following. Because of their importance to the Canadian economy and national well being, scientific programs and/or facilities already exist that form a valuable basis for an enhanced effort as part of the CMMP. The Alberta hail studies have been underway for 30 years and radar systems and other observing capabilities exist for part of the region. Similarly, there now exists continuous radar coverage between Windsor and Quebec City, with special facilities near Toronto, Ottawa and Montreal. On the east coast, the recent impetus on resource development and the ongoing fishery have led to increased observational activity.

To summarize, the development of a Plan for the CMMP, as a coordinated research and forecast system development activity, with recognition of the interaction between scales of motion should rest on these three main components:

- a balanced, ongoing program of about 15 years duration, including several intensive observational phases, is envisaged;
- the opportunities provided the U.S. programs must not be missed; and
- recognition, however, that three specific Canadian mesoscale problem areas (mesoscale convective systems on the Prairies, modification of weather systems by the Great Lakes and St. Lawrence valley topography, and east coast cyclones) must be addressed by a specific Canadian effort.

### 3. Constraints to be Addressed

Before outlining some of the scientific planning that needs to be done, it is useful to outline the inevitable constraints which will limit the tasks that can be undertaken.

One constraint will be on the availability of capital resources to acquire the hardware necessary to make the essential observations. Enhancement of radar capability will be needed, upper air sounding systems will be required, new surface-based remote sensing techniques are becoming available and these should form an integral part of the CMMP, data acquisition and archiving systems need to be expanded - to name only the main requirements. All of these facilities will require significant financial commitments over many years.

Another constraint that may actually be more limiting is the short supply of scientific and technical people to conduct the experiment, analyze the data, and interpret the results. The U.S. programs include 4 intensive field experiments of a few months each. Three Canadian foci have been identified. Experience has shown that major field experiments require extensive planning and preparation for a few years before and a period of 4 to 5 years after for the scientific analysis of the results. Obviously, individual scientists cannot profitably contribute to more than about 2 or 3 of the proposed experiments. It is thus essential, in view of the limited numbers of scientific personnel in Canada who can contribute to the CMMP, that the Plan be limited to what can be practically accomplished.

A final but overriding constraint is provided by the distribution of the Canadian population. From a scientific point of view, the area for which improved forecasts are desired must be enclosed by a domain of concern which is sufficiently large to detect meteorological disturbances which will affect the target area within the time validity of the forecast. It is apparent that for most Canadian population centres this would require a substantial effort in areas of the U.S. simply because of the close proximity to the U.S. border. For this reason, it is thought that a national program which hopes to make substantial progress must be strongly coordinated with a U.S. program. To the extent that the U.S. has similar constraints, there are obvious benefits in their direction as well.

### 4. Some Proposals for a Canadian Mesoscale Meteorology Program

In view of the constraints discussed above and the rather well-advanced plans for a mesoscale meteorology program in the U.S., it is useful to discuss our proposals within that overall framework and in terms of present timing.

The U.S. STORM program envisages a large national effort which will focus, in order, on the problems of severe weather in mid-continent, the east-coast cyclone and, finally, storms hitting the Pacific Coast. These go under the names STORM-CENTRAL, STORM-EAST and STORM-WEST. Scientific program plans are well developed for STORM-CENTRAL, but not much has been done for STORM-EAST or STORM-WEST. In the context of STORM-EAST there is, however, a very well-developed plan to study the incipient stages of east coast cyclones. This program goes under the acronym GALE (Genesis of Atlantic Lows Experiment). The proposed timing of these efforts are given in the figure.

#### (a) GALE

GALE is presently scheduled so that its field phase will take place in January - March, 1986. It will focus its efforts on the initial stages of the development of the east coast storm which very often occurs in the Cape Hatteras area. As such, it will be an interesting and very useful forerunner for a major effort to tackle the question of the entire life cycle of these important storms. However, it will not directly address the problems which are of most crucial importance to the Canadian maritimes; namely, the much more mature phases of such storms. Therefore, while we do not discourage participation of

Canadian scientists in the GALE program, we believe it to be more important that we begin immediately some activities in the Canadian maritimes which will begin to address some of the immediate needs and prepare for a maximum effort at a later time.

(b) STORM-CENTRAL

This program focuses on the severe storm of mid-continent in spring and summer and has its maximum field effort scheduled for 1988. The scientific strategy is to enclose the phenomena in a series of observing systems of increasing resolution and decreasing domain size.

It is sound strategy, since it will provide the data sets necessary to test the skill of numerical models on the  $\alpha$ -scale (200-2000 km) and provide the meteorological context in which severe storms on the  $\beta$ -scale (20-200 km) develop, as well as data on the  $\gamma$ -scale (2-20 km) which are vital to understanding the interaction between scales.

The experimental program will not provide data sets which are suitable to investigate the use of mesoscale-forecast models in Canadian areas. There will be some information spill-over into Canadian areas which are downstream from the main experimental area, but this is generally confined to regions east of the Manitoba/Saskatchewan border and in parts of the Great Lakes area. In effect, the Canadian areas of interest are on the edges of the network.

Our committee considered at some length the question of possible extension of the meso- network into southern Canada in order to place Canadian population centres and the meso- observing systems which do exist (e.g. the Canadian radar network) firmly within a well-observed domain. It is our conclusion that, in general, minor extensions would be of minor value. It is our judgement that to take full advantage of the meso- network planned for STORM-CENTRAL, Canada would have to extend the network essentially northward by half again. This is a really major effort but probably less than half of the effort required were Canada to try to do it alone.

In the absence of such an effort, there would still be a good data set provided by STORM-CENTRAL which could be used to help develop the Canadian regional modelling capability, but of course it would not give us any answers about storms in Canada nor how useful such a meso- network would be if implemented on an operational basis.

It is really beyond the committee's capability at this time to provide any detailed scientific plan or costing for such a proposal, but we can provide a very rough idea of the cost based on the premise that the major incremental costs would be associated with the operation of a meso- network.

If one imagined that the Canadian prairies were covered with a network of sites providing upper air data on the same resolution as that proposed for STORM-CENTRAL, there would be a requirement for about 50 such sites to cover the additional 1000 km x 2000 km domain. At the present time, there are 8 U/A sites operated by the Atmospheric Environment Service in or very near the domain and a couple of sites operated by Alberta Research Council during the summer time.

If one assumes that the additional sites would be operated in a manner similar to that proposed in the U.S. (a combination of wind profilers and thermodynamic sondes) and the U.S. cost estimates apply, then the cost per site is about \$400K including capital, operational and expendable costs. Thus, for 40 additional sites the total cost is \$16M. Such costs would include capital expenditures and would be spread over many years. Further, the equipment could be made available for

subsequent stages of a mesoscale meteorology program.

We must emphasize, however, that these cost estimates are very rough and there are most likely many ways to accomplish the essential purpose which would be less costly.

It is our opinion, however, that this level of effort will be required if Canada is to tackle the mesoscale problem directly. If it were to be done independently of the U.S. effort, the costs would be far more. It must also be recognized that a program to tackle the east coast storm problem will also require efforts of this magnitude. For the sake of comparison, note that the Atmospheric Environment Service had a 1983-84 budget of \$125M for weather services, the bulk of which was directed toward data acquisition.

Viewed in this light the level of effort, while major, does not appear to be an excessively large investment to determine the value of an operational network of this density. One cannot imagine determining the real value and potential without doing it. In addition, by tackling this problem head on, we will be able to determine the value of new technologies to meet the observing requirements in an economic manner, whatever the ultimate result.

One final point about a major effort in conjunction with STORM-CENTRAL. There are now proposed programs to augment the surface observing capabilities in the Canadian Prairies, especially for precipitation in connection with application to agriculture. These initiatives will result in a much better definition of surface weather conditions on the mesoscale. As such, it would seem a pity that there would not be a complimentary description of the upper air for at least some period.

The committee believes, however, that the proximity of the north-eastern corner of the proposed STORM-CENTRAL network and the existence of a complete radar coverage of the Windsor-Quebec corridor does provide a circumstance where a relatively minor extension of a meso- network would be of value, especially during the period of the year when severe storms hit the corridor. While such an extension would not help regional model development for Canada very much, it would provide an opportunity to study some aspects of the interaction of meso- $\alpha$  to meso- $\beta$  scales and a chance to test out the usefulness of additional upper air data in that particular forecast problem. Such an effort may also help to understand the downstream effects of mesoscale convection on the synoptic scales, a matter of some interest to the STORM-CENTRAL program.

There is some question of whether or not additional mesoscale data would be required in the area south-east of Lakes Erie and Ontario to make such a program viable. This is a question which would have to be investigated further.

(c) STORM-EAST

Considerable progress has been made in prediction of east-coast storms over the years. Because of these advances, the occurrence of such storms is rarely missed completely. However, the intense small-scale phenomena associated with storms can make a crucial difference with respect to their effect on people and operations. Further, it is important to realize that the interaction of the development of coastal lows with the synoptic scale driving disturbance is of crucial importance to the occurrence and severity of the majority of the severe winter storms which affect not only the Atlantic provinces and offshore regions, but also the Windsor-Montreal corridor and the lower St. Lawrence Valley. As such, a program to improve our



ability to predict east coast storms has a much larger potential benefits than might be thought at first.

It is our belief that study of the east coast cyclone, with its accompanying mesoscale features and its interaction with major winter storms which impinge on southern Ontario and southwestern Quebec has the potential to provide very large benefits to many Canadians as a whole and that Canada should take a very active role in close coordination with the U.S. to mount a program to tackle this question.

#### 4. Specific Actions Recommended

- (a) A Canadian Mesoscale Meteorology Program Development Office should be established immediately. This office should be a multiagency creation involving a number of full-time staff. The immediate job of this office will be to develop detailed, costed scientific plans for a national effort in mesoscale meteorology, based on the report of our committee. Such work requires substantial effort and cannot continue to be done effectively on a limited part-time basis. The office should consist of a Director and 3 additional full-time staff.
- (b) Immediate steps should be taken to gain experience in the operation and use of radar wind profiling equipment. A useful plan would be to acquire 4 such systems, and locate one in Alberta in conjunction with the ongoing hail program, one in Toronto in association with the King Doppler radar, one in Montreal in association with the McGill Weather Radar, and one on the east coast to supplement the observing network for offshore exploration, as well as a contribution to the preparation for STORM-EAST. Agreement should be sought between the AES, the Alberta Research Council, McGill University and other interested groups as to the proper mix of capital funding, operating costs and manpower provision.
- (c) Immediate steps should be taken to increase the AES effort in mesoscale modelling for forecast purposes. Such models are vital to the improvement of forecast skill in the 6-24 hr. range and may well have additional important roles to play in the assimilation and analysis of data of many different types for "nowcasting" functions. The effort should be concentrated at RPN in Montreal, which should be designated as a mesoscale meteorology modelling centre. The Canadian effort in this regard is somewhat behind both the U.S. and European countries, due to a previous lack of computer resources. While this work has been recently given a higher priority and the computing resources have been acquired, there are still insufficient human resources put into it to catch up.
- (d) Immediate steps should be taken to activate a mesoscale meteorology project in the Maritimes. This project should seek to meet some immediate meteorological information needs for the offshore development and begin to accumulate experience on the mesoscale for a major effort in the early 1990's. This project should be coordinated with the GALE program as much as possible. A proposal for a Canadian Atlantic Storms Project is given in the Appendix.
- (e) Attention must be paid to the developing plans in the U.S. to organize a massive effort to track the path of airborne pollutants. While this Committee had no specific information on the proposal, it is clear that there may exist conflicting requirements.

#### A PROPOSAL FOR A CANADIAN

##### ATLANTIC STORMS PROJECT (CASP)

Winter storms commonly lash the Canadian East Coast Region, but many of their characteristics are not predicted accurately. Uncertainties in predicting their motion and development lead to errors in the timing, intensity and distribution of wind and temperature fields, precipitation including type, as well as oceanographic parameters, such as wave structure. Poorly-measured mesoscale features embedded within the storms, such as precipitation bands and wind structures, cause variations on smaller (100 km) scales.

A long-term program is being established to improve our ability to forecast these storms and their features. The program will rely upon a series of field experiments which will systematically address the crucial aspects of the forecasting problem. Coordination with the U.S. STORM-EAST project in the early 1990's will, for example, allow us to address predictability on somewhat longer time scales.

The first proposed field project to study Canadian east coast storms is scheduled for January 15 through March 15, 1986. The objectives of this project are (i) to study the motion, characteristics and development of east coast storms; (ii) to study the organization, dynamics and physics of mesoscale features embedded in the storms so as to (iii) begin the process of improving forecasts in the 1-48 h range, and (iv) to study the oceanographic response to mesoscale forcing as seen in the wave field and currents on the continental shelves.

The first field project will be greatly enhanced by association with the Genesis of Atlantic Lows Experiment (GALE) occurring simultaneously in the United States. GALE is centred near Cape Hatteras but extends northward, perhaps as far as New England. It will utilize several Doppler radars, a number of aircraft, as well as special satellite observations which should also cover the Canadian East Coast region. Many of the storms that influence Canada originate in the GALE project area. Such storms will be tracked over their life cycles to address questions concerning storm evolution and the degree to which results can be transferred between the American and Canadian projects.

The proposed Canadian meteorological field program includes a number of instruments designed to examine complementary aspects of the storms. Rawinsondes in the region will be released more frequently (every 3 hours) during storm episodes and additional rawinsondes are proposed for Cape Breton Island and the Hibernia region. Special satellite observations, as in the GALE, should be available throughout the project period. The two existing radars near Halifax and Trepassy, Newfoundland, will both have digital recording of information and will operate in volume scan modes. The measurement of the vertical variation of winds in all weather conditions is also proposed for Sable Island. The existing surface measurements of winds, pressure and precipitation will be augmented by additional sites, including locations on offshore platforms. Special observations of precipitation type will be made for deducing their mesoscale variability. Since many of the basic characteristics of the storms must be made by immersion sensing, the National Research Council cloud physics instrumented aircraft is proposed for conducting kinematic and microphysical studies within the storms.

The information obtained from these platforms will be utilized in different manners. It will be used for constructing conceptual models of the storms and their mesoscale features, as the basis for developing new models and enhancing existing models of the storms, and for developing short-term (a few hours) forecasting techniques of hazardous weather using radar and satellite observations.

The estimated costs of this proposed meteorological field project are approximately \$900K operating and \$100K capital.

The proposed oceanographic field program is projected to take place in conjunction with the meteorological



observational studies.

The Scotian Shelf is preferred as the most desirable site for the oceanographic field program because (i) this region offers a long, relatively straight coastline which can lead to economies in observational requirements and modelling; (ii) there has been a significant amount of wind-driven modelling expertise developed for this area; (iii) there is a significant data base to serve as the foundation for detailed experimental design; (iv) the prospect of offshore development which could use the results of this program is high; and (v) the proximity to Bedford Institute of Oceanography (BIO) offers logistical advantages to Department of Fisheries and Oceans (DFO) participation and to their support to other groups.

The proposed observation and modelling program by DFO (BIO) consists of three mooring lines perpendicular to the Nova Scotia coast. The main mooring line will be located approximately at Halifax and shall consist of five moorings equipped with current meters, bottom pressure gauges and a temperature salinity chain. The moorings will be located nearshore, bracket the winter density front which intersects the surface about 170 km from the coast, and end about 1150 km offshore with a lone bottom pressure gauge. Two auxiliary mooring lines located to the northeast and southwest consisting of three moorings are also intended. These will allow the examination of alongshore differences and propagation to be examined. Coastal sea level gauges are proposed for sites between the mooring lines. Two directional wave buoys are to be located near Sable Island and another on the inner shelf in the vicinity of the auxiliary mooring line northeast of Halifax.

Existing oceanographic numerical models of shelf response to winds will have to be upgraded to accommodate temporally and spatially varying wind fields. Thorough testing of these models would follow the observational program.

Estimated costs for the DFO program are approximately \$600K operating expenses and requires mobilization of more than \$1.5M for equipment.

It is expected that these proposals will be adjusted and expanded during the present planning phase.

R. Stewart

J. Elliott

#### CHINOOK EDITORIAL BOARD

The first meeting of the newly appointed Editorial Board took place at AES Downsview on October 30, 1984. Hans VanLeeuwen was elected as chairman of the Board and Editor of Chinook. The Board drew up the final Terms of Reference and decided upon the general content, format and timeline for the remaining three issues for 1984 (Volume 6) and the four for 1985 (Volume 7). The next meeting will be held at the CMOS Congress in Montréal.

Hans VanLeeuwen

#### MCGILL UNIVERSITY

#### INFORMATION FOR CONTRIBUTORS

The editorial board of the Climatological Bulletin seeks to publish research notes, overviews, survey articles, reviews, comments, opinions, and news of interest to climatologists, professionals in related disciplines, students, and users of climatic information. Contributions

of an interdisciplinary nature are welcome. The board gives special encouragement to the submission of articles and notes on applied climatology, e.g. agriculture, climatic change and variability, climate impact assessment, data bases, energy, environment, forestry, health, measurement, recreation, and transportation. Contributions in English or French should be on topics that are relevant to the Canadian scene, but these need not be on research done in Canada.

Contributors should submit manuscripts to Stewart J. Cohen, Editor, Climatological Bulletin, Atmospheric Environment Service, Department of the Environment, 4905 Dufferin Street, Downsview, Ontario, Canada M3H 5T4. All manuscripts should be typed double spaced on one side of good quality white paper, 28 cm x 21.5 cm or its nearest equivalent. The abstract, list of references, tables, and a list of figure captions should be typed double spaced on separate sheets. The total length of research manuscripts should not exceed 5,000 words, exclusive of illustrative material. Comments, reviews, opinions, and news items should not exceed 1,500 words. Furnish an original and three copies, if possible, in the order listed below.

Title page should include the full names of authors, and professional affiliations.

The abstract should be less than 250 words, and typed on a separate page.

The text of longer contributions should be typed double spaced on numbered pages, and divided into sections, each with a separate heading and numbered consecutively. The section heading should be typed on a separate line.

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References should be arranged alphabetically by senior author's last name. The text citation should consist of name(s) of the author(s) and the year of publication; for example, Jones (1975) or (Jones, 1975). When there are two or more cited publications by the same author in the same year, distinguishing letters a, b, etc., should be added to the year. A reference to "in press" implies that the paper has been accepted for publication. Titles of periodicals should be given in full.

Figure legends must be provided for each figure, and should be typed together, double spaced, on a separate sheet.

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Authors should use the International System of units, but may show other units in parentheses. Authors should provide instructions in the margin for any special type required (Greek letters, capitals, bold face, etc.).

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## CHINOOK ADVERTISING INFORMATION

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