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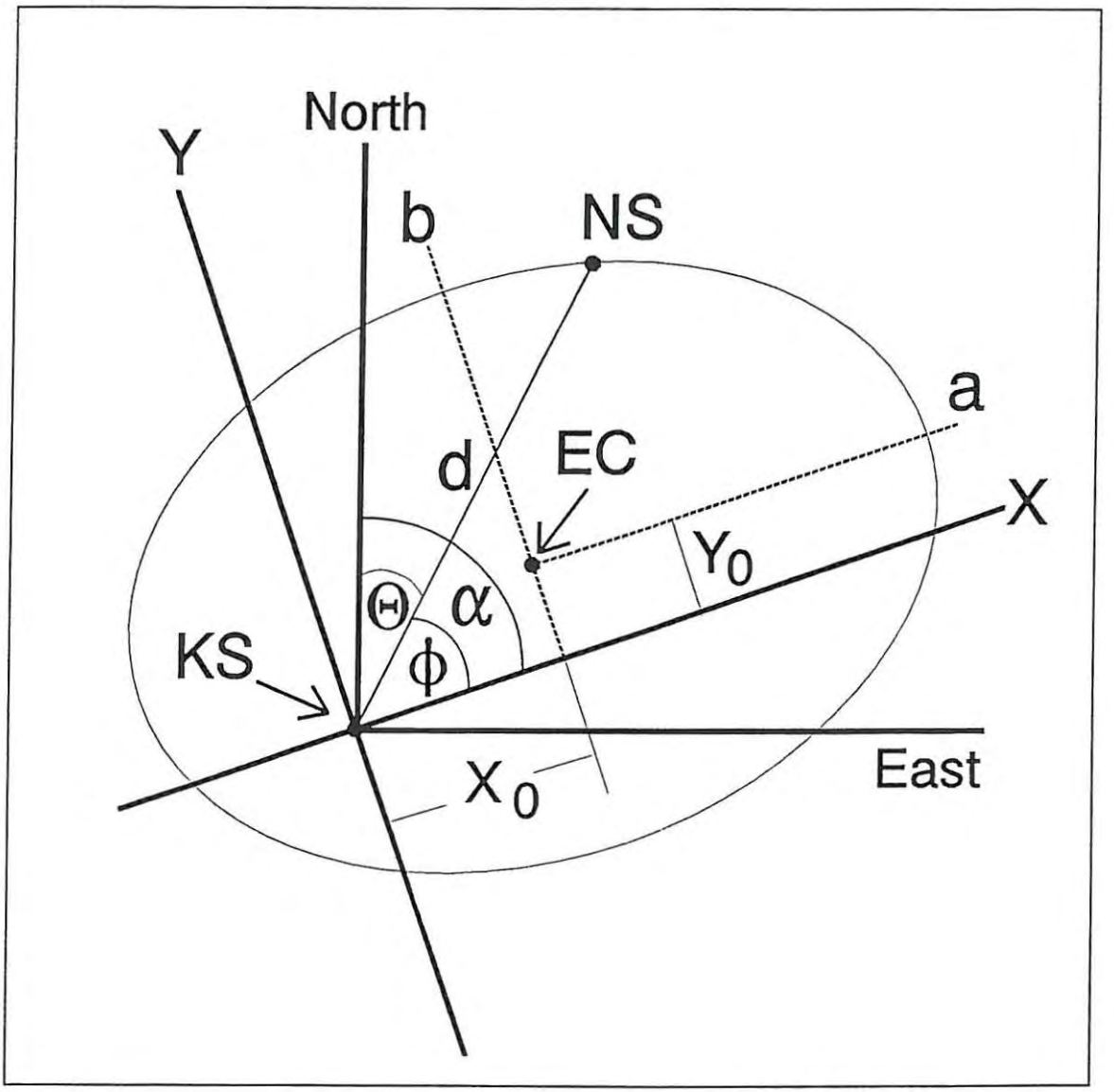
Radar Geometry / Géométrie radar



CMOS Bulletin SCMO

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Inside / En bref

EDITOR'S COLUMN

The next issue of the ***BULLETIN*** **22**(6), December 1994, will go to press on November 20th, 1994. Contributions are welcome and should be sent before November 8. We do not have a person for typing nor translating so I need your contribution in a form that can be readily inserted into the Bulletin. The most convenient way is via E-mail to the above address.

I accept contributions submitted on floppy disk in standard DOS formats (i.e. WordPerfect (version 4.1 to 5.1), plain ASCII text files, MS Word - at the moment I use Word 6.0 for Windows), however, I can convert Macintosh files to DOS files. If you want to send graphics, then HPGL files can be sent as ASCII files over the networks, any other format will have to be sent on paper or on a floppy disc. It is recommended that whatever software prepares an HPGL file be configured for the HP7550 printer. If you have the option of selecting pen colours, please don't. If you send a file over the network, send a copy to yourself and examine the transmitted copy to check that it is all there.

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

Jean-Pierre Blanchet,
CMOS Bulletin Editor

SECTION DU RÉDACTEUR

Le prochain numéro du ***BULLETIN*** **22** (6), décembre 1994 sera mis sous presse le 20 novembre '94. Vos contributions sont les bienvenues. Me les faire parvenir d'ici le 8 novembre.

Nous ne disposons pas de personnel pour dactylographier ou traduire les textes soumis et je demande votre collaboration en m'envoyant vos textes sous forme électronique (poste internet ou disquette). Les fichiers sur disquettes doivent être dans un format standard DOS (WordPerfect 4.1 ou 5.1, MS Word, texte ASCII). J'emploie actuellement MS Word 6.0 pour Windows. Je peux convertir les fichiers Macintosh équivalents vers DOS.

Si vous avez de bonnes photographies pour notre page couverture, s'il vous plaît m'en faire parvenir une copie en noir et blanc bien contrastée avec une légende appropriée.

Jean-Pierre Blanchet,
éditeur du Bulletin de la SCMO

Daily Rainfall Variability as a Basis for Fire Weather Network Design[1]

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ABSTRACT

A procedure for designing fire weather networks is presented which uses simple correlation statistics and elliptical geometry to describe rainfall distribution. Spatial patterns of daily rainfall correlation (r) in southern New Brunswick, Canada, were examined and a model was developed which allows for anisotropic and nonhomogeneous rainfall distribution. A non-linear least-squares algorithm was used to fit a geometric function to the spatial distribution of rainfall interstation correlation coefficients in the study area. Using the function, isocorrelation contours were constructed around individual stations for the arbitrarily selected value of $r = 0.90$ ($r^2 = 0.81$). All stations showed elliptical patterns of varying sizes, with eccentricities between 0.3 and 0.6. Correlation field orientations were generally southwest-northeast, approximately parallel to the coastline of the Bay of Fundy, located to the south of the Province. There was also evidence of differential gradients in the correlation patterns, with tighter gradients toward the Bay. The procedure was applied to the local forestry weather network and areas of data paucity and redundancy were identified.
KEY WORDS: fire weather; weather networks; interstation correlation

1. Introduction

In the past, weather network design and especially forestry weather network design was based as much on logistics as on meteorological considerations. The servicing and data collection procedures of manual stations requires the instrumentation to be sited with human accessibility as a major consideration. With the advent of automatic, remotely interrogated weather stations, networks can now be developed with greater emphasis on meteorology.

Forest fire danger is directly related to weather. The operational assessment of daily regional fire danger, as expressed by various danger rating systems, is therefore, primarily an exercise in the assessment of daily regional weather conditions. It follows that the regional weather network upon which fire danger assessment is based must be configured such that its data are representative of daily conditions. Furthermore, in that rainfall is considered to be one of the most important and most spatially variable of these weather elements (Williams 1963; Turner and Lawson 1978; Pouliot 1988), a network optimized for daily rainfall will be adequate for other weather inputs (Raddatz 1985). This rationale does not limit the need for representative data of high quality for the remaining weather variables. However, the greatest resolution in daily fire hazard assessment can be achieved by designing a network to the more demanding spatial requirements imposed by rainfall distribution.

Many network assessment techniques require the assumptions of an isotropic and homogeneous correlation field. However, it is often conceded that these requirements do not fit observed rainfall distributions very well (Johnstone 1985). The assumptions are considered valid in areas of low relief and for relatively long intervals such as monthly and yearly statistics. However, fire weather networks must reflect daily precipitation patterns which strain the assumptions of isotropy and homogeneity.

2. Methods

Caffey (1965), Hershfield (1965), Huff and Shipp (1969), Sneva and Calvin (1978), and Raddatz (1987), among others, have demonstrated the utility of interstation correlations of rainfall for network analysis. Based on this and given the suggestions of Dickison (1969), this basic approach was applied to daily rainfall data for stations in southern New Brunswick.

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[1] A paper presented at the 11th Conference on Fire and Forest Meteorology, April 16-19, 1991, at Missoula, MT.

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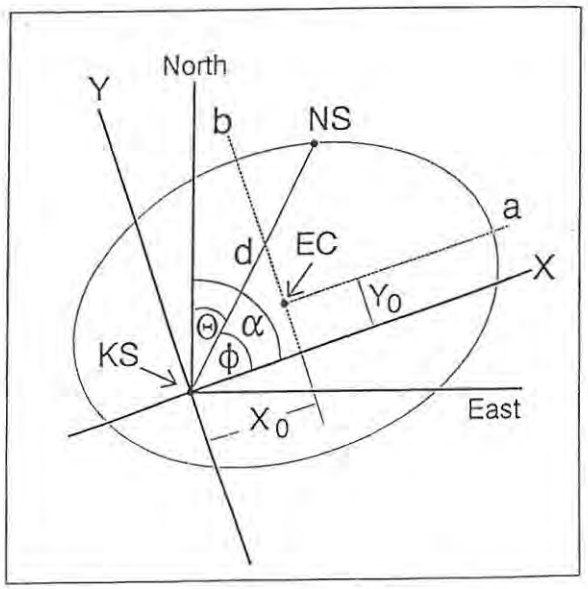

*FIG. 1. Describing a point (**NS**) on a correlation ellipse in terms of its distance (**d**) and direction (Θ) from the network station (**KS**). Angle ϕ is the difference between ellipse orientation (α) and Θ. Ellipse semimajor and semiminor axes are represented by **a** and **b**. Location of ellipse center (**EC**) relative to **KS** is indicated by $\mathbf{x_0}$ and $\mathbf{y_0}$.*

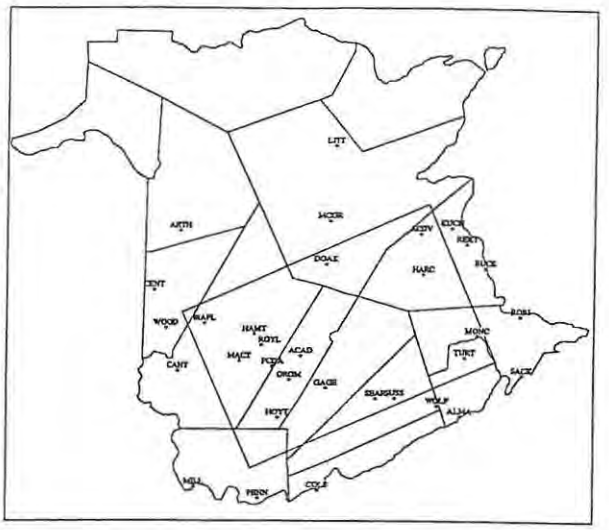

FIG. 2. The study area and developmental network of AES climatological stations (station names have been abbreviated). Stations within the box were used to estimate function parameters and were assigned key station status (a station to which all other stations are correlated). External stations were used to avoid fitting problems encountered at the network boundaries.

Elliptical geometry was used to model the correlation contour field (r), based on the findings of Caffey (1965), Hershfield (1965), and Dickison (1969), and on references by others to anisotropic tendencies in their data. Unlike correlation functions based on circular geometry, where correlation is related only to distance from a station, elliptical geometry permits the potential dependence of r on direction as well. The ellipse does not force the isotropic assumption at the outset but will permit it (eccentricity = 1) if appropriate.

In developing the model geometry, the eccentricity, e, and orientation, α (angle of ellipse semimajor axis with respect to true north), of the correlation field were considered necessary model outputs. It was also considered important to represent the effects of possible field deformation and variation (nonhomogeneity) due to climatic and geographical influences. These effects would be exhibited by a lack of symmetry among ellipses for different values of r, resulting in steeper correlation gradients in some parts of the field. Usually, studies which have dealt with elliptical isocorrelation contour analysis have fixed the ellipse centers at the network stations thereby forcing a measure of homogeneity on the model. To permit representation of differential gradients in the correlation field, the model allowed the centers of each ellipse to vary, independently of each other, from the locations of the network stations. The equation of an ellipse is

$$x^2/a^2 + y^2/b^2 = 1, \qquad (1)$$

where a is the semimajor axis aligned along the x axis and b is the semiminor axis aligned along the y axis. For a particular station the ellipse center location will vary with ellipse size (model correlation contour). This ellipse offset from the station can be represented by x_0 and y_0, (Fig. 1)

$$(x - x_0)^2/a^2 + (y - y_0)^2/b^2 = 1. \qquad (2)$$

The ratio of the semiminor axis to the semimajor axis is termed the eccentricity (e = b/a). Thus it is possible to describe the ellipse in terms of e and either of b or a. Equation (2) becomes

$$e^2(x - x_0)^2 + (y - y_0)^2 = b^2. \qquad (3)$$

By definition, a station must lie within its own field contours of r values, resulting in

$$-a < x_0 < a \quad \text{and} \quad -b < y_0 < b.$$

This is achievable by letting x_0 and y_0 be constrained to some fraction of b:

$$x_0 = \delta b, \quad \text{and} \quad y_0 = \varepsilon b$$

where

$$-1/e < \delta < +1/e \quad \text{and} \quad -1 < \varepsilon < +1.$$

A point on the ellipse can be described, in Cartesian coordinates, in terms of its distance, d, and direction, Θ, from the station in question by

$$x = d\cos\phi, \quad \text{and} \quad y = d\sin\phi$$

where

$$\phi = \alpha - \Theta.$$

Equation(3) then becomes

$$b^2 = e^2(d\cos\phi - \delta b)^2 + (d\sin\phi - \varepsilon b)^2, \qquad (4)$$

and solving for b gives

$$b = d(-(e^2\delta\cos\phi + \varepsilon\sin\phi)/k + (((e^2\delta\cos\phi + \varepsilon\sin\phi)/k)^2 + ((e^2\cos^2\phi + \sin^2\phi)/k))^{1/2}), \quad (5)$$

where

$$k = 1 - e^2\delta^2 - \varepsilon^2.$$

In Equation(5) four parameters characterize the set of ellipses associated with a particular station. The ellipse shape is determined by e, while δ and ε give the ellipse center location with respect to the station. The fourth parameter, α, describes the ellipse orientation. These four parameters, together with others which relate rainfall correlation to ellipse size (determined by b and discussed below), can be estimated using an N-dimensional, nonlinear, least-squares data fit to a chi^2 surface. In the fitting process, chi^2 is considered a continuous function of the N parameters and describes a hypersurface in N-dimensional space (Bevington 1969). This surface is iteratively searched for the appropriate minimum, using a gradient expansion algorithm described by Bevington, and estimates of the N parameters are then produced. The search process requires an initialization value for each parameter. However, more than one minimum may be possible on the chi^2 surface and care must be taken in supplying a reasonable starting value to reduce the chance of finding the wrong minimum.

Stations in the Atmospheric Environment Service (AES) climatological network within the box shown in Fig. 2 were considered part of the developmental network and were assigned key station status. A key station in this context is simply one to which all other stations are correlated and which is used in the estimation of the correlation field parameters. Additional stations surrounding the network of key stations were included in the overall study network to assist in the analysis but were not used as key stations. These additional stations were required to avoid problems of unrealistic parameter estimates, associated with the fitting algorithm, experienced at the network boundary.

Summer season daily rainfall data (May to September) were compiled for each network station for the period 1977 to 1986. The period of record was considered acceptable since climatological normals are not being sought here but rather an indication of relative precipitation climate between member stations of a network. At least one station in the network was required to have received a minimum of 0.5 mm of rainfall for a given day to be included in the data base. This constraint produced a maximum number of 1171 event-days for a station with a complete record. The smallest station-pair sample was 228 event-days. The above constraint ensured that rain had fallen somewhere within the network on each event-day and limited the potential for unrealistically high correlation coefficients which would result from all stations correlating perfectly on rainless days.

The decrease of interstation correlation (r) with distance can be modelled by expressing it as a suitable function of ellipse size. We have chosen to characterize it in terms of the semi-minor axis b (the directional dependence of r is reflected in the eccentricity and orientation of the ellipse). Any station will correlate perfectly with itself leading to the condition $r(b=0)=1$ and it is expected that r will decrease exponentially with increasing distance (Stol, 1982). Natural choices for functions which satisfy this behaviour are simple exponentials, $e^{-\mu r}$, or multiple exponentials,

$$f_1e^{-\mu r} + f_2e^{-\mu r} + f_3e^{-\mu r} + ..., (f_1 + f_2 + f_3 + ... = 1).$$

Multiple exponentials are notoriously difficult to work with in least squares fitting so, for purposes of this study, we adopted as the functional dependence of r on b the expression

$$r = \exp(-\mu b^n) \quad (6)$$

with μ and n being additional parameters to be determined in the fitting process, and increasing the total number of parameters to six. Values of n less than one give a dependence roughly similar to that of a multiple exponential. No attempt was made in this study to find the definitive interstation correlation function. The above function fit the data well (Kierstead, 1991) and was effective in illustrating the network design technique presented here.

The length of the semiminor axis of each ellipse, as determined from Equation (6) is

$$b = (-\ln(r)/\mu)^{(1/n)}. \quad (7)$$

From this equation the value of the semimajor axis can be determined using the model estimate of eccentricity.

The coordinates of each ellipse center were calculated (in degrees) by

$$Lat_e = Lat_s - ((b(\delta\cos\alpha + \varepsilon\sin\alpha))/60) \quad (8)$$

and

$$Lng_e = Lng_s + ((b(\delta\sin\alpha - \varepsilon\cos\alpha))/(60\sin(90 - Lat_s)) \quad (9)$$

where Lat_e and Lng_e are the latitude and longitude of the ellipse center, and Lat_s and Lng_s are the latitude and longitude of the key station.

Given estimates of the six parameters for each key station, as supplied by the fitting algorithm, it was then possible to construct correlation ellipses around the station using Equations (7)-(9). The result was a representation of the interstation correlation field of daily rainfall surrounding the station (Fig. 3). More important was the ability to enter ellipse data, corresponding to a single value of r, for all key stations. This produced a correlation contour field, for the selected value of r (0.9), over the entire key station network (Fig. 4). It was then possible to visualize variability in the size, shape, and orientation of station ellipses over the network and to identify network holes and areas of oversampling. Individual station effectiveness could then be assessed in relation to its contribution to the overall network representation of daily rainfall distribution.

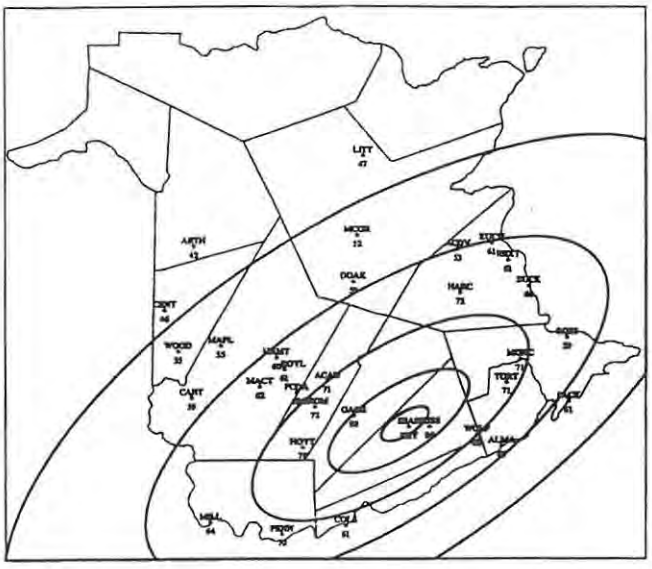

FIG. 3. The model interstation correlation field of daily rainfall for Searsville (SEAR - station names have been abbreviated). The contours represent **r** *values of 0.50 (outermost), to 0.90 (innermost). The numbers plotted at each network station indicate the observed* **r** *values with respect to SEAR. A steeper gradient of correlation is evident to the south.*

Finally, the model-estimated parameters at each key station were individually plotted on study-area maps, and a contour analysis was conducted for each. The purpose of this was to provide a means with which to interpolate model-parameter values at non-key station sites.

3. Results

In concert with the variability of the model parameters, the correlation ellipses varied over the network (Fig. 4). The variable sizes of the ellipses closely mirrored the variability in the parameter fields of n and μ and, to a lesser extent, the variability in e. The smallest ellipses were located in areas where both n and μ showed a maximum, while the largest ellipses were displayed in areas where both parameters were at a minimum. The gradient of eccentricity away from the Bay of Fundy was also evident. The effect of the model δ and ε fields was to display a slight but definitely steeper gradient on the Bay of Fundy side of the correlation ellipses for many of the study area stations (e.g. Searsville (SEAR) Fig. 3).

To illustrate the applicability of the procedure a part of the New Brunswick forestry weather network existing within the bounds of the study area was investigated. There were 17 forestry stations of interest. The stations were plotted on the parameter contour analyses and parameter values were interpolated for each. The interpolated values were then input to the model in the same manner as for the key station network. A composite correlation field was produced (Fig. 5) for the network at $r = 0.90$ ($r^2 = 0.81$ means 81% of the variance of an associated regression is accounted for).

The composite chart was examined to determine the degree of network coverage. Substantial areas of data

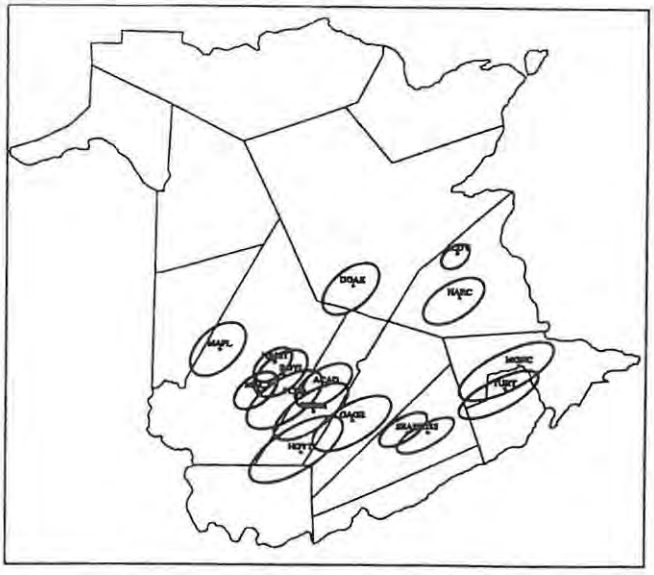

*FIG. 4. Composite model correlation contour field for the network of key stations (***r** *= 0.90). Station names have been abbreviated.*

paucity were evident over the network. Also, an area of oversampling stood out: Station 4017 appeared to be sampling an area already sampled by stations 4004, 4007, and 4010. Little additional information would result by retaining this station in its current location, thus affording an opportunity for resource saving or station relocation. It was then possible to investigate potential new sites in the same fashion as described for the forestry stations.

When designing a network, it may also be appropriate to consider different levels of confidence, and hence different

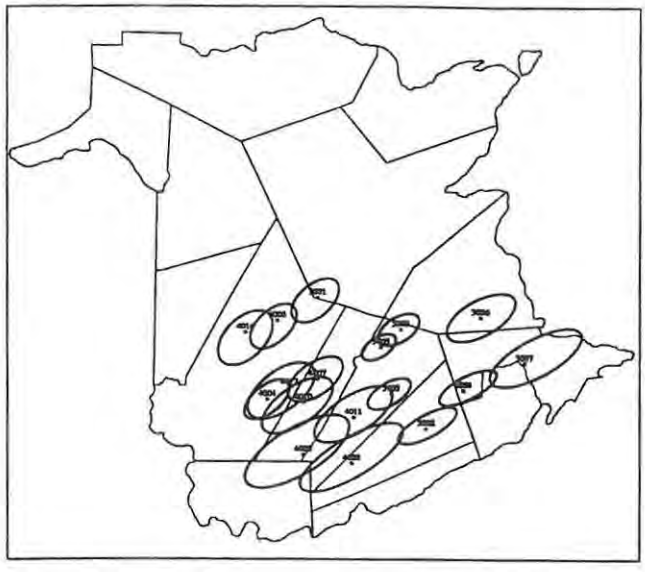

*FIG. 5. Composite model correlation contour field for the network of forestry stations (***r** *= 0.90).*

levels of correlation, for various parts of the network. A careful combination of additional resources and r value adjustment would result in the most cost-effective improvements to a network. Regardless of the r value selected, however, the network manager will always have a measure of the degree of association and hence a known level of confidence in the network.

Although interest in this study stemmed from a need to better design forest fire weather networks, the procedure should be of use in the assessment of other meteorological networks, as well as for other meteorological variables of interest.

4. Conclusion

Many studies involving interstation correlation of rainfall have assumed isotropic and homogeneous distributions. In this study, a model was developed which provides for the influence on r, of direction from the key station, as well as distance. The ability of the model to represent anisotropic and nonhomogeneous rainfall correlation patterns while still permitting the existence of isotropic and homogeneous distributions, allows more realistic determinations of the spatial distribution of rainfall and hence improvements to network design.

Acknowledgments

This paper is based on Mr. Kierstead's thesis research which was carried out as part of a M.Sc. Forestry degree (1991) at the University of New Brunswick. The Department of National Defense Director General Meteorology and Oceanography provided administrative support during the research and a grant was provided by the New Brunswick Forest Research Advisory Committee.

Jonas Busauskas spent long hours compiling the data base. Many thanks to U. Feunekes of REMSoft Inc. who developed graphics software used in the presentation of results.

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The Canadian Branch during the 1950's

(part 2)

by
Morley Thomas

9. The Distribution of Publications

Canadian members often complained that they did not begin to receive their RMS publications for several months after they had applied and sometimes had their subscriptions for Weather and the Quarterly Journal discontinued for alleged non-payment of fees. This resulted from changes in address as members were posted to different locations and the difficulty in keeping the parent Society up to date on these changes and from clerical errors on both sides of the Atlantic Ocean.

So, in 1951, the Executive committee developed some simplified procedures for handling membership applications. Those who applied to be a Canadian Associate were accepted as members as soon as the Branch approved the applications. The parent Society agreed to this although formal election had to be made later by RMS Council. It was recognized that application for Fellowship could be given only tentative approval by the Branch and was subject to consideration and approval by Council in London.

To solve the non-receipt of publications by members it was proposed to have all publications sent in bulk to Toronto where these would be dispatched to members often with issues of the Canadian Branch Publications. Early in 1951 the parent Society sanctioned this way of handling the publications and distribution from Toronto began in March 1951.[4] This was accomplished using Meteorological Division help but the Branch paid the postage. The Branch secretary was charged to keep the London office regularly informed of the number of issues required of the periodicals Weather and the Quarterly Journal. In this way it no longer became necessary to provide the parent Society with a list of members and addresses every few months. The bulk distribution became reasonably successful and no change was made during the remaining years of the 1950s.

10. Membership

Each year the Executive committee created a Membership committee for the purpose of recruiting new members. Don Black (Trenton), the convenor in 1950, recruited more than 80 new members. He reported that the Branch membership had doubled in two years and that "78% of the professional meteorologists of all grades, in the field, are members."[5] The 1951 and 1952 committees, led by Frank Thompson (Malton), reported 48 new members the first year and 38 the next, largely meteorologists who had not previously joined. However, it was not possible to retain the interest of many recruits who were not meteorologists and they dropped out after a year or two.

The 1955 convenor, B.V. Benedictson (Winnipeg), reported 45 new members that year but lamented that 65 members had been dropped from the list that year for non-payment of fees (half of this number eventually paid their arrears and continued as members). Expressing the hope that many of these people would again become members in good standing, he advocated the launching of "a newsy publication concerning the Canadian Branch [which] would do much to make the organization more interesting" and thus hold members.[6]

Recruiting efforts in 1958 continued to concentrate on the meteorologists, especially new recruits on the initial training course, and the convenor, E.H.V. Dexter (Winnipeg), reported 27 new members. In 1959, Svenn Orvig (Montreal) was convenor and he reported seven new members which was counter-balanced by five resignations and 13 suspensions for non-payment of 1958 fees.

In their Annual Reports the Executive committees did not used standard method of reporting the number of members in the Branch. Accordingly, any list of the number of members each year must be used with caution. There was usually a number given for the end of each year but the number of delinquent and suspended members might or might not be included. Often, a total given one year would be corrected the next. For some years the parent Society published a Canadian Branch total in the Annual Report of Council but these totals were also regularly amended the following year. Names on the available address lists have been counted but these lists were usually all-inclusive and give inflated values.

The best possible estimates of membership numbers show an increase from about 160 in October 1949 to 300 in 1950 and to 357 in 1953 and then a slight decrease over the rest of the decade. Despite the heavy recruitment early in the decade many (especially those who were not meteorologists) resigned after a year or so or were suspended for non-payment of fees. In short, after 1953, gains in membership during the 1950s barely balanced the losses.

11. The 1953 Toronto RMS/AMS Meetings

Throughout 1952 the Canadian Branch participated in planning and organizing the Toronto Meteorological Conference which brought together members of the Royal Meteorological Society and the American Meteorological

[4] CMOS Archives, File 2-5, Watson-Watt to McTaggart-Cowan, January 18, 1951.

[5] CMOS Archives, File 2-1, Black to Benum, December 30, 1950.

[6] CMOS Archives, File 2-8, Membership Committee Report - 1955, Convenor B.V. Benedictson.

Society at the University of Toronto from September 9 to 15, 1953. In August that year, the Meteorological Branch had been host, in Toronto, to three World Meteorological Organization meetings - a meeting of Region IV (North and Central America) representatives and meetings of the technical commissions for Aerology and Instruments and Methods of Observation. Many Toronto-based Canadian Branch members were co-opted for assistance in planning and ensuring that these WMO meetings ran smoothly. Several overseas meteorologists who were in Canada for these meetings were able to remain for the conference.

Some financial support ($7,500) for the Toronto Meteorological Conference was provided by the Munitalp Foundation. Most of this grant was required for the travel and accommodation expenses of the British delegates, who, because of financial restrictions then in place, were unable to obtain dollar currency. A local committee in Toronto, composed of senior Branch and Division people and chaired by Andrew Thomson, did most of the planning and arranging guided by decisions taken at a U.S.A. - Canada joint planning meeting held in December 1952. The City of Toronto, the university and the Toronto Convention and Tourist Association supported the conference by arranging accommodation, receptions and outings for the attendees.[7]

Labeled "one of the outstanding events in the history of the Canadian Branch," the conference attracted 231 registered members and guests. There were nine symposia which covered most sectors of meteorology from cloud physics and ozone to Arctic meteorology and climate change. All speakers were invited by the organizing committee and included many of the then "greats" in meteorology -British scientists Sir Charles Norman, R.C. Sutcliffe, G.D. Robinson, P.A. Sheppard and G. Manley; Scandinavians H.U. Sverdrup and J. Bjerknes; and several Americans including J. London, J.G. Charney, C.F. Brooks, H.E. Landsberg, H.R. Byers and C.W. Thornthwaite. Canadians on the program were W.L. Godson who spoke on spectral models, R.W. Rae on Arctic weather stations, D.P. McIntyre and R. Lee on jet streams and R.W. Longley on temperature trends in Canada. At the conference banquet, several honorary memberships in the AMS were announced including one for John Patterson, who was referred to as the "grand old man of Canadian meteorology." Papers given at the conference were subsequently published in Proceedings of the Toronto Meteorological Conference 1953.

12. A Montreal Centre

Another important step in the development of the Canadian Branch took place in late 1953 with the formation of a Centre at Montreal. Following an "informal meeting of those interested in meteorology" at McGill University in September 1953, three Montreal meteorologists wrote to the president of the Branch, D.P. McIntyre, advising that they wished to set up a "Local Centre" according to the RMS Charter and By-Laws. In November, the Canadian Branch Executive committee advised the leaders of the Montreal group that they were unanimously in support of the creation of a Montreal Branch.[8]

Previously, practically all Branch meetings had been held in Toronto so the formation of a Montreal Centre allowed a major increase in the number of Society meetings. Thirty members were present at the initial meeting of the Montreal Centre at the McGill Faculty Club and the potential membership was at least twice that number. As the secretary advised the parent Society, "Montreal has long been a flourishing centre of meteorological activity in Canada" with four large Meteorological Branch operational offices in or near that city and many scientists at McGill University actively interested in meteorology. The charter officers of the centre were: chairman, B.A. Power; secretary, W.S. Harley and Treasurer, W. Hitschfeld.[9] From 1954 to 1959 the Montreal Centre was led by presidents B.A. Power, R.H. Douglas, P. Johns, T.W.R. East, J.L. Galloway and S. Orvig.

From the beginning the Montreal Centre was very active. Seven meetings were held in 1954 and six in 1955, including a Symposium on Meteorology (later called the First National Meeting of the Royal Meteorological Society, Canadian Branch). This was held during a visit to Montreal of meteorologists from across the country who were attending a Meteorological Branch conference. One of the largest meetings took place late in 1954, when George Jacobsen, speaking on Arctic construction, drew an attendance of 100 people. In 1956 there were seven meetings and, in June of that year, the Montreal members participated in meteorology and atmospheric physics sessions organized by the Royal Society and the Canadian Association of Physicists. There were five meetings in 1957, seven in 1958 and seven in 1959.

During the late 1950s, meteorologists of the Montreal Centre pumped new life into the Canadian Branch. They were eager to take on the responsibilities of the national Executive committee and the first step in moving it from Toronto to Montreal was the election of R.H. Douglas (McGill University) as vice-president in 1957. When the move took place in May 1959, Professor Stewart Marshall of McGill University became Canadian Branch president. At about the same time, some members at Montreal (and in other parts of Canada) were beginning to discuss the advantages of having an independent Canadian Meteorological Society since they felt the Canadian Branch had become too "Toronto-bound." But, after consideration, the new Montreal Executive committee came to the conclusion that it was not yet time. This was to occur within a few years and as did the launching of two other Montreal-sparked activities, an annual Congress and a Branch publication. The events leading to these innovations are described later.

13. A Winnipeg Centre

A second local Centre of the Branch was formed at Winnipeg in 1955. In the spring of that year the idea was discussed at a regional Meteorological Branch meeting. In

[7] CMOS Archives, File 2-2.

[8] CMOS Archives, File 100, Montreal Centre, 1953.

[9] CMOS Archives, File 2-11, Harley et al to McIntyre, October 23, 1953; Graham to Harley, November 17, 1953. .

addition to the Winnipeg District Forecast Centre there were at that time at least half a dozen other civil and military meteorological offices within commuting distance from the city and 29 individuals volunteered to assist actively in the formation and functioning of a Canadian Branch centre. Application was made to the Executive committee for approval to form such a centre and this was granted in August. The first meeting took place on December 1, 1955, with Bob Graham, the Canadian Branch president, speaking on international aviation meteorology.

The charter Winnipeg executive consisted of S.V.A. Gordon aschairman, D.S. McGeary as secretary and R.K. Holbrook as treasurer. From the beginning, the Winnipeg Centre benefitted from the total support given by their Honorary Chairman, D.M. Robertson, then District Meteorologist responsible for the Central District (later Region) of the Meteorological Branch.

Located at the "gateway to the west" the Centre frequently asked meteorologists and other scientists who were passing through the city to speak at their meetings. Because of this, their meetings were often not planned far in advance. In its early days the centre frequently combined social occasions such as dinners and dances with their ordinary meetings. There were usually four or five meetings each year. Besides holding meetings, members of the Centre were quite active in bringing meteorology to the public through donating books and periodicals to libraries and speaking to various groups in the city. After Van Gordon, the chairmen of the centre during the late 1950s were A.B. Lowe and A.H. Lamont.[10]

14. A Toronto Centre

During the 1950s, members of the Montreal and Winnipeg Centres suggested that there should be a Toronto Centre so that the Canadian Branch Executive committee, located in that city, could take a more national outlook. However, it was not until the transfer of the national Executive committee to Montreal, in May 1959, the Toronto members decided to form a Centre to plan and conduct meetings in Toronto. Accordingly, a meeting of Toronto meteorologists was held in Toronto on May 14, 1959, immediately preceding the annual business meeting of the Branch. It was decided to form a centre and the following agreed to act as the charter officers: M.K. Thomas (chairman), A.G. McVicar (secretary) and H.E. Chadburn (treasurer). (Previously, the annual meetings had always been held in January but the term of the 1958 Executive committee was extended by four months to May 1959 in order to better fit the programs of ordinary meetings.)

That fall, the first Toronto Centre meeting was held at the Upper Air Training School in Scarborough when Vaughn Rockney (United States) spoke on recent developments in meteorology in his country. In November, the chairman organized "An evening with applied meteorology" at which several members of the Climatology Division described activities in their sectors and exhibited the punched card facilities of the Division at 260 Richmond Street West.

15. Canadian Branch By-Laws

As noted earlier, the first set of Canadian Branch by-laws was adopted and published in 1942. It appears that no need was felt to amend these for several years. However, by 1950, when careful study was being given to changing the administrative and financial ties between the parent Society and the Branch, a By-Laws committee was formed. But, in January 1951, the chairman of the committee reported that neither the revised text of new parent Society by-laws nor London's reaction to Canadian organizational proposals were yet available so the committee had been inactive. Although the parent Society brought out a 1951 edition of the RMS Charter and By-Laws and there were Branch By-Laws committees appointed from 1951 to 1954, little action was taken to revise the original 1942 Canadian Branch edition.[11]

By 1955, however, a new committee undertook a complete revision of the Branch by-laws and submitted the proposed version to the Executive committee in September of that year. Further, the committee recommended that manuals be promulgated outlining the working agreements between the Branch and the Society and between the Branch and its centres. In 1956, the committee chairman met several times with the Executive committee to examine the amended and new by-laws and then a new draft was distributed to all members for comments and suggestions. The new by-laws, containing sections on definitions, membership, election of members, entrance fees and annual subscriptions, the Executive committee, duties and powers of the Executive committee, duties of the officers, meetings, local centres and amendments, were adopted at the 18th Annual General meeting early in 1958.[12]

In April 1959, the members approved amendments to the new by-laws abolishing Associate membership which meant that all Canadian Branch members became Fellows effective January 1, 1960. Also, an amendment was approved which would allow the Executive committee to nominate a vice-president for Canada each year.

17. Other Committees

Besides the Executive and By-Laws committees the Branch named four other committees each year during the 1950s.

Nominating Committee..

In the early days the members of the Canadian Branch elected a Nominating committee by mail each autumn but later this committee was appointed annually by the Executive committee. The committee brought in a slate of officers and this list was presented to the members by mail with an invitation to make further nominations if they so desired.

[10] CMOS Archives, File 3-2, Winnipeg Centre.

[11] CMOS Archives, File 23-8, Annual Report of the By-Laws committee, January 11, 1951, Chairman P.D. McTaggart-Cowan.

[12] CMOS Archives, File 2-8, Annual Report of the By-Laws Committee, January 6, 1956, Chairman M.K. Thomas.

When none were received the nominees were declared elected at the Annual Meeting. Had more nominations been received (there is no record of this ever happening) ballots would have been sent to all members in time for these to be returned and counted prior to the Annual Meeting.

Scientific Papers Committee..

In 1950, under the convenorship of T.G. How (Edmonton), the committee continued in their attempt to develop a research project dealing with the synoptic situation accompanying abnormal precipitation events in some cities of Canada. But progress was slow and, in 1951, the new convenor, H.H. Bindon (Toronto), and his committee decided that this project would demand more coordination that appeared available. They suggested that the best chance for progress would be to encourage forecasters to expand the work they had already completed in local forecast studies. The 1952 and 1953 committees, convened by W.L. Godson (Toronto), recommended that no new large-scale projects be attempted but the members should be encouraged to submit "shorter contributions" and letters to the editors of the RMS publications on meteorological subjects of their choice. B.W. Boville (Montreal) was the convenor in 1954 and it appears this was the last Scientific papers committee appointed by the Society.

Prize Committee..

Originally called the President's Prize committee, this committee was named each year by the Executive committee to select a winner from the papers considered eligible for the President's Prize. Beginning in 1951, the committee was asked to also recommend a winner for the Darton Prize(s). A complete review of the first Society awards has recently been published.[13]

Referees Committee..

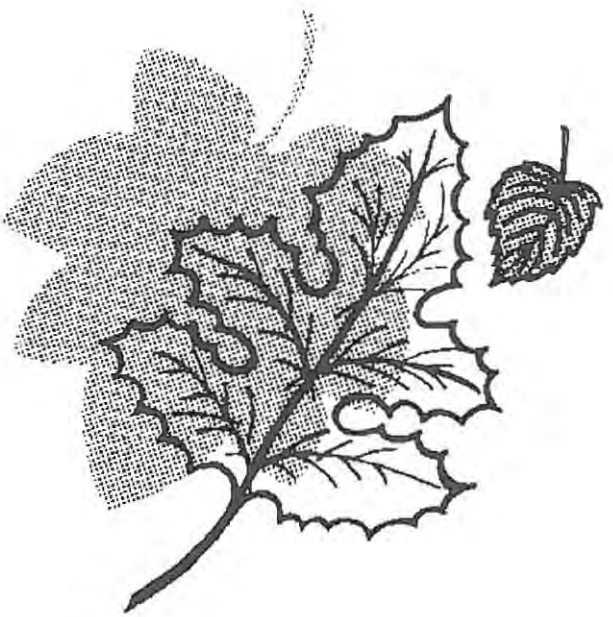
Another small group named each year in the early 1950s was the Referees committee. Originally, the committee was responsible for reviewing each paper submitted for reading before the Canadian Branch with the power to accept, reject or return a paper for modification. Some papers were considered of superior quality and were submitted to the Quarterly Journal or Weather. With more invited papers being presented to the Branch, often from visitors, the role of the Referees committee became debatable and the committee vanished by the mid-1950s.

18. A Second Reawakening of the Canadian Branch

The growth of meteorology at Montreal in both government and university during the late 1940s and early 1950s has already been noted. This led to the formation of a Montreal Centre of the Branch in 1953. Numbers and interest continued to grow and in 1957 the first steps were taken to move the Executive committee to that city.

The time was ripe for this fortunate decision. A decade earlier, new Executive committee members at Toronto had brought enthusiasm, ability and commitment to Branch affairs. But, as years passed, the Branch officers seemed to lose some of their enthusiasm and many members outside Toronto began to urge that a change be made in the location of the Executive. The decision to move was by no means unanimous - some members from points other than Toronto realized that the support the Branch received from the Meteorological Branch would otherwise have to be paid for by the Society. Others commented that they had the opportunity to visit Toronto Meteorological headquarters from time to time and this allowed them to participate in meetings of the Branch and with a move from Toronto this would not be possible.

But the time had come; a Montreal-based Executive committee was elected in May 1959 and by the summer that city became the hub of the Canadian Branch. Another reawakening was taking place and two specific activities were soon launched - the annual meteorological Congress and Atmosphere - both of which have proved to be invaluable Society activities over the years.



[13] Morley Thomas, "The First Society Awards," CMOS Newsletter, vol. 21, no. 6, December 1993. pp. 8-10.

The Federal Science and Technology Review

CMOS Scientific Committee

The federal government is now in the process of a major review of its $7 billion annual science and technology spending. This is the most far-reaching examination of federally-funded science in more than a decade, and could well significantly reshape the Government of Canada approach to the science it conducts and funds.

The review is being conducted in three parts: a public consultation process, an internal-to-the-federal-government exercise, and studies by a reconstituted National Advisory Board on Science and Technology. CMOS Council, on advice from its Scientific Committee meeting in Ottawa during the last Annual Congress, decided that the Society should be interveners in the public consultation process.

On June 28 the Secretary of State (Science, Research and Technology), Dr. Jon Gerrard, started the public process by releasing a consultation paper "Building a Federal Science and Technology Strategy" and the first volume of a "Resource Book for Science and Technology Consultations". The consultation paper looks at federal science spending under three categories, wealth and jobs in the context of sustainable development, quality of life, and advancement of knowledge. It poses questions for the science in each of these, and ends with a section on managing our investments in science and technology.

The first phase of the public consultation process, more than twenty local workshops, started at Trent University in Peterborough on July 12, and continued across the country until late August. Although it was possible to contact some CMOS members individually about the opportunity to participate, the publication schedule for the CMOS Bulletin was not convenient for publicizing the workshops to all members.

An initial draft of the CMOS brief reminds readers of the problems Canada and the world have encountered because of ignorance about the atmosphere and oceans, such as ozone holes and disappearing fish stocks, and states that these can only be ameliorated through improved knowledge through science. It makes specific comments and recommendations in three areas.

First, the need for domestic partnerships for science founded on strong partners. One point that will be stressed is the necessity of good scientific infrastructure of systematic observations, research ships, aircraft, computer and telecommunications facilities. You can help by providing other specific suggestions. We believe the case will be better made if it is expressed generically without pleading special cases. Second, the need for Canada to adopt a more concerted strategy for taking advantage of opportunities in international science. CMOS is in a natural position to advocate this as no science is more international than that of the atmosphere and oceans.

Third, the need to ensure a supply of highly qualified personnel - scientists, technicians and scientifically educated managers. We have decided making a general recommendation regarding the need for an Academy of Science. This would be an independent advisory body with membership, appointed at arms length from government, comprising a Board of noted scientists, and a permanent staff of science policy researchers, analysts and writers. The Academy would be properly funded by the federal government and have the obligation to report on the state of science in Canada, to conduct peer reviews of government and university research organizations, to act as Canada's adhering agency for non-governmental international scientific organizations, and to conduct studies and prepare special reports on topics in which science plays a key role.

In September, the review process moved into a phase of five regional workshops, in Vancouver, Saskatoon, Toronto, Montreal, and St. John's. On October 14 the consultation process end with a National Workshop in Ottawa. CMOS is also looking to be involved in one or more of these workshops.

Your input to any aspect of the CMOS brief is welcome. Please send your comments via internet to reidj@ncrsv2.am.doe.ca with a copy to cmos@ottmeds.meds.dfo.ca, or by fax to (819) 994- 8854.

S & T Review on the Internet.

If you read USENET NEWS on the Internet, check out and contribute to the discussion on the S&T Review on can.ai. You can download copies of review documents, such as the consultation paper and resource volumes, from Industry Canada via anonymous ftp at debra.dgbt.doc.ca in the directory pub/isc/science.and.technology.review/english/doc. For correspondence with the review Secretariat, email to s&t.review@istc.ca.

Brief to the Federal Science and Technology Review

At the request of Council, the Scientific Committee drafted a brief explaining the Society's position on a number of issues of interest to the S&T Review Board. The first version of the brief was written by John D. Reid, Chair of the committee, after extensive consultation with many Society members across Canada including, of course, the other members of the Scientific Committee. I took the liberty of adding some material and of editing, sometimes beyond recognition, some sections to reflect not only my own views but also, at least in part, that of colleagues, including those on Council, who had provided comments on the first draft. Unfortunately, mainly because the time available was so short, I was unable to take all comments into account. My sincere thanks to John Reid and all those who, on very short notice, contributed to the brief.

The text that follows was sent to the Secretariat to the Federal Science and Technology Review on August 17. On invitation of the S&T Review Board I then represented the Society at the regional consultation meeting held in Montreal on 22 and 23 September, the fourth of a series of five regional meetings held across Canada. The meeting participants, who numbered about 100, were divided in nine work-groups, each addressing a specific topic of interest to the Review Board, and each of which reported on two occasions on their deliberations in plenary sessions. As a member of the work-group on "the new frontiers of science" (which included atmospheric and oceanographic sciences) I had the opportunity to promote the ideas included in our Society's brief within the workgroup, and as the work-group's rapporteur, to further promote some of the ideas in the plenary sessions.

Jacques F. Derome
President

The Canadian Meteorological and Oceanographic Society (CMOS) very much welcomes the initiative of the federal government to develop a federal, and later national, science and technology strategy. While Canada has had some notable science successes in recent years, there is no cause for complacency and many reasons to be concerned for the future.

CMOS has a general concern growing from the statements of national interest and goals for S&T in the consultation paper. That paper sees our S&T strategy as dominated by industrial needs. Canada could benefit from a comprehensive national industrial strategy, but a science and technology strategy should have additional dimensions. The two components of S&T have equally important roles to play in ensuring our social development, environmental security and contributing to the quest for knowledge.

The consultation paper stresses the idea of wealth and job creation in the context of sustainable development. CMOS is concerned that the idea of sustainable development is often not well understood. CMOS members report that in the early local consultation sessions of this review, a good segment of the participants saw sustainable development as nothing more than continued industrial and economic development, with no particular consideration for social or environmental factors. In this brief, sustainable development is interpreted as the improvement of living conditions in a manner that is socially and environmentally sustainable for the present and future generations.

Unfortunately, past industrial and development practices have often been socially, environmentally and economically unsustainable, as evidenced by phenomena of global change - holes in the ozone layer, deforestation, depletion of fish stocks leading to massive unemployment, and extermination of species at unprecedented rates.

The causes are complex and it would be naive to single out a predominant underlying cause, but one major contributing factor is society's ignorance about the consequences of its actions. Mankind and its environment are currently paying the price of that ignorance. Many people believe that an environmental deficit situation now exists as real and pressing as the national debt. Thus the sustainable development context for the wealth and job creation objectives needs to be properly understood and taken seriously. Sustainable development must be practiced as well as preached. With limited government budgets, Canada cannot afford to support science and technology for unsustainable industrial development, no matter how immediately appealing the regional development argument, and at the same time fund remedial actions to compensate for the economic, social and environmental predicaments which result. To recover from the environmental deficit, society must become more cognizant of the consequences of its actions and more determined to limit the likelihood of future problems. Recognition of such consequences requires expanded scientific knowledge about the environment, an improved ability to use that knowledge to foresee likely environmental outcomes of development decisions, and the will to apply that knowledge in decision-making.

To this end, and this opinion appears to be widely shared in the scientific community, CMOS is not at all inclined to agree with those who assume that the financial situation in which the federal government finds itself can be solved by reducing expenditures on science. On the contrary, it is failure to invest wisely in science that is part of the reason the country is now facing economic problems. Science is needed to make Canadian industries more competitive, and to tell Canadians how the industrial development is affecting or likely to affect their environment.

It is gratifying to note in "Creating Opportunity" that the government supports the objective of doubling the national investment in R&D, with the sensible proviso that "Canada demonstrates its ability to absorb and manage such an increase." The challenge of sustainable development will indeed require Canadians to do more science, not less.

RECOMMENDATION 1: CMOS RECOMMENDS THAT CANADA PLAN AND IMPLEMENT AN INCREASE IN SPENDING ON SCIENCE, WITH A SUBSTANTIAL INCREASE TARGETED FOR NEW SCIENCE PROGRAMS WITH A FOCUS ON SUSTAINABLE DEVELOPMENT.

STRATEGIES

To maximize the effectiveness of available funds, Canadian meteorological and oceanographic science, and very likely Canadian science in general, should follow three strategies.

I. DOMESTIC PARTNERSHIPS

Often scientists achieve more when working together. The government is to be congratulated for renewing and extending the Networks of Centres of Excellence program. Some of the centres which were not renewed still contain elements that can benefit Canada; for example, the much-needed research on the relationship between the physical and chemical properties of the ocean and biological productivity in the Ocean Production Enhancement Network (OPEN). Less well known, but also effective, have been ecosystem research partnerships and climate research initiatives under the Green Plan, which despite severe cutbacks have remained effective, albeit limited programs. Other shorter-term partnerships have proven to be beneficial, such as the two Canadian Atlantic Storms Projects (CASP) within the context of the highly successful program of the Federal Panel on Energy Research and Development.

RECOMMENDATION 2: CMOS RECOMMENDS THAT THE GOVERNMENT EXPAND ON EXISTING TYPES OF RESEARCH PARTNERSHIP INITIATIVES, PARTICULARLY FOR SCIENCE FOR SUSTAINABLE DEVELOPMENT.

Effective partnerships are founded on strong partners - excellence in universities, solid public mission-oriented science in government, and targeted business research for product and service development in the private sector. How can the partners' strength be maintained and developed?

University

Science looks to universities to create, preserve and transmit knowledge, and so ensure a robust national science capability. Some CMOS members are concerned that the ability to follow promising scientific lines of investigation, even when the payoff may be obscure, is being eroded by the pressure to become ever more "strategic" in research funded by the granting councils. Others welcome the availability of increased resources for "strategic" research, and see it as tangible recognition of the importance of their work. CMOS believes that it is in the best national interest to retain a university support system in Canada which allows us to draw on the talents of all scientists. The question is one of balance between mission-oriented or "strategic" research and curiosity-driven research. Over the last several years the bulk of the new funds made available to the Natural Sciences and Engineering Research Council was channeled to mission-oriented group projects, and not to the curiosity-driven proposals of individual researchers. Curiosity- driven research is a fundamental component of a complete scientific strategy, a component that has been too often neglected in recent years. Our scientific community will only be strong if we put more emphasis on high-quality, curiosity-driven research.

RECOMMENDATION 3: CMOS RECOMMENDS THAT IN ALLOCATING THE INCREASED RESEARCH FUNDING, GOVERNMENT DELIBERATELY DEVOTE A LARGER PERCENTAGE OF FUNDS TO PROPOSALS BASED PRIMARILY ON EXCELLENCE, THAT WOULD NOT LIKELY BE IDENTIFIED AS A HIGH "STRATEGIC" PRIORITY.

Government

Contemporary scientific study of the major problems of the atmosphere and oceans requires a heavy investment in supercomputers for mathematical modelling and prediction, weather radar facilities, satellites and sensors, databases, research platforms - ships, aircraft, submersibles, buoys and a high-speed electronic network. Canada's infrastructure in the areas of high-speed communications, remote sensing of its territory and research supercomputers is lagging far behind that of the other major industrialized countries. For example, scientists in Canada exchange data on a network at speeds 25 times lower than their colleagues in the USA and Europe; Canada has one supercomputer dedicated to scientific calculations, whereas there are more than 200 in the other G7 countries, and Canada does not have a single earth-looking satellite and must currently rely on its G7 partners for images of its own vast territory - RADARSAT will be its first such satellite. As is common in other industrialized countries, national facilities, for use by all science sectors, can be maintained only with the continuing involvement of government. In some cases the infrastructure is best operated and maintained directly by federal agencies as part of their "public good" mission.

RECOMMENDATION 4: CMOS RECOMMENDS THAT THE FEDERAL GOVERNMENT LEAD AN EXERCISE TO DEVELOP A NATIONAL STRATEGY FOR DEVELOPING AND MAINTAINING KEY SCIENTIFIC INFRASTRUCTURES.

Canadians look to their federal government to provide essential science-based services for safety, security and general economic advantage, such as weather and hydrographic services. This "related scientific activity" is the way society extracts the benefit from scientific understanding of the global commons that has been developed over the years. For example, it has been found that on a daily basis over eighty-five percent of Canadians receive a weather forecast based on Environment Canada products, although often delivered by a value-added commercial supplier. The societal benefit has been estimated at more than ten times the cost to government.

RECOMMENDATION 5: CMOS RECOMMENDS THAT THE S&T REVIEW EMPHASIZE THE NECESSITY OF MAINTAINING ESSENTIAL HIGH-QUALITY, SCIENCE-BASED PUBLIC METEOROLOGICAL AND OCEANOGRAPHIC SERVICES FOR SAFETY AND SECURITY.

All science-based services provided by the government must be evaluated using criteria appropriate to science activity so that Canadians can be assured they are being well served. International comparisons are recommended. Similarly, for the important role of government in conducting research within its public good" mission, all government research activities should be subject to review by internationally-recognized science peers. The Society stresses that it does not wish to draw special attention to the meteorological and oceanographic work done within the government. The need for an arm's-length periodic evaluation of government activities applies to all government scientific activities in all disciplines. It is also worth stressing that, to

be credible and effective, evaluations of research must be performed by science peers with international reputations.

RECOMMENDATION 6: CMOS RECOMMENDS THAT ALL SCIENCE-BASED SERVICES PROVIDED BY GOVERNMENT BE EVALUATED BY COMPARISON WITH LIKE SERVICES INTERNATIONALLY, AND ALL IN-HOUSE SCIENTIFIC RESEARCH ACTIVITIES BE SUBJECT TO PERIODIC EVALUATION BY SCIENTIFIC PEERS WITH INTERNATIONAL REPUTATIONS.

Business

The meteorological and oceanographic private sector is fairly small in Canada. Government has, from time-to-time, made efforts to encourage that sector. There are some good examples of cooperation where government developments have been successfully marketed internationally by Canadian companies. The efforts to build a strong private sector have not been as successful as they might because of government policies regarding cost recovery and the provision of services. There would be more opportunity for private sector activity, particularly in exporting advanced-level meteorological and oceanographic services, if government departments provided data and services at lower cost to the private sector, and encouraged the early development and marketing of these services through consultation and technology transfer. Determining the fair cost of government products to the private sector is a complex matter, but the question must be addressed to the satisfaction of both the tax-payers and the private sector.

RECOMMENDATION 7: CMOS RECOMMENDS THAT THE FEDERAL GOVERNMENT ADOPT A POLICY THAT ENCOURAGES THE DEVELOPMENT OF A VALUE-ADDED PRIVATE SECTOR IN METEOROLOGICAL AND OCEANOGRAPHIC SERVICES.

II. INTERNATIONAL COOPERATION

Canada needs a more concerted strategy for taking advantage of opportunities in international science, particularly regarding global change. Canada must participate in these international activities to maximize benefits and to influence multilateral as well as national policy development for global environmental change issues that transcend national boundaries and organizations.

Canada has been recognized for the contributions of many individual scientists, but CMOS members report that increasingly the international community sees Canada as failing to pull its weight in international science in general, and on global change issues in particular. The National Research Council, which used to provide effective coordination for Canada's non-governmental international scientific activities, is increasingly withdrawing from the field as costs increase and policy demands that budgets be targeted to industrial development objectives.

There is no effective mechanism, nor federal central agency science policy capability, to recognize the need for increasing funding for national commitments to essential international programs and organizations.

RECOMMENDATION 8: CMOS RECOMMENDS THAT, WITHIN THE CONTEXT OF A SCIENCE-FOR-SUSTAINABLE-DEVELOPMENT INITIATIVE, FEDERAL MECHANISMS BE ESTABLISHED TO COORDINATE AND FUND CANADIAN PARTICIPATION IN INTERNATIONAL GLOBAL CHANGE SCIENCE.

III. HUMAN RESOURCES

Canada's supply of highly qualified scientific personnel is in jeopardy. CMOS is concerned that science enrollments in Canadian universities are declining, at least proportionately to other areas of study. Canada's laboratories are today notable for an increasing population of aging scientists. One can easily predict that as this generation retires in the next five to fifteen years, Canada will experience a deficiency of scientists. Presumably market mechanisms will restart the flow of science students into universities. However, it would be in the long-term interests of the country to stimulate the flow of science students, and particularly women, into the universities in anticipation of the need. Otherwise the government may have to consider ways to bridge the gap, i.e., by bringing scientists out of retirement or with preferential immigration policies.

With 7 billion federal dollars being invested in science and technology, it is notable how few of those managing the investment of these funds have any first-hand experience of science, and particularly research. This is especially true at the most senior levels of the Federal Public Service.

RECOMMENDATION 9: CMOS RECOMMENDS THAT THE GOVERNMENT DEVELOP AND PUBLISH A NATIONAL PERSPECTIVE ON CANADA'S SCIENTIFIC HUMAN RESOURCE NEEDS AS A BASIS FOR FACILITATING THE WORKFORCE ENTRY AND EXIT OF SCIENTISTS, TECHNICIANS AND SCIENCE MANAGERS.

GENERAL RECOMMENDATION

Canada needs a stronger voice for science. The National Advisory Board on Science and Technology", with its politically- appointed membership, has enjoyed little profile or credibility with the science community. For whatever reason, the Royal Society of Canada has rarely been able to fill the role. Industry Canada has just dismantled the Office of the Chief Scientist. And since the abolition of the Science Council, Canadian science has had no effective policy forum examining science in our national life.

Canada should have a body of internationally recognized scientists to which the federal government can turn for independent advice. It should have a permanent support staff including researchers and writers. Amongst the duties of this body would be to report periodically to Parliament on the state of science in Canada, to conduct peer reviews of government research organizations, to act as Canada's adhering agency for non-governmental international scientific organizations, and to conduct studies and prepare special reports on topics in which science plays a key role.

RECOMMENDATION 10: CMOS RECOMMENDS THAT THE GOVERNMENT CONSIDER ESTABLISHING A NEW SCIENCE COUNCIL OR TAKE STEPS TO GIVE CANADA A STRONGER NATIONAL ACADEMY OF SCIENCES.

Mémoire présenté au Comité sur la politique fédérale des sciences et de la technologie

À la demande du Conseil, le Comité scientifique a rédigé un mémoire expliquant la position de la Société sur un certain nombre de sujets d'intérêt pour Comité d'examen de la politique fédérale en matière de science et technologie. La première version du mémoire fut écrite par John D. Reid, le président du Comité scientifique de la Société, après de nombreuses consultations auprès de plusieurs membres de la Société de par le Canada incluant, évidemment, les autres membres du Comité scientifique. Je me suis permis d'ajouter des sections au mémoire et d'en modifier d'autres, parfois substantiellement, non seulement pour que le mémoire reflète mes propres opinions, mais aussi celles de collègues, y inclus des membres du Conseil, qui m'avait fait parvenir des commentaires sur le premier texte. Malheureusement, surtout par manque de temps, il ne m'a pas été possible de prendre en comptes tous les commentaires reçus. Mes sincères remerciements à John Reid et tous les autres membres de la Société qui, à l'intérieur de très courts délais, ont contribué au mémoire.

Le texte qui suit fut soumis au Comité d'examen de la politique fédérale en matière de S&T le 17 août. Répondant à une invitation de ce comité, j'ai représenté la Société à la rencontre de consultation régionale de Montréal les 22 et 23 septembre, la quatrième d'une série de cinq rencontres régionales de consultation tenues au pays. La centaine de participants à la réunion, fut divisée en neuf groupes de travail, chacun devant discuter d'un thème spécifique, et faire rapport en plénière à deux occasions. Comme membre du groupe traitant des "nouvelles frontières de la science et de la technologie" (qui incluaient la météorologie et l'océanographie) j'ai eu l'occasion de promouvoir les idées mises de l'avant dans notre mémoire, et comme rapporteur pour notre groupe, j'ai pu en promouvoir quelques unes au cours des deux séances plénières.

Jacques F. Derome
Président

La Société canadienne de météorologie et d'océanographie (SCMO) applaudit la décision du gouvernement fédéral de développer une stratégie des sciences et de la technologie. Même si le Canada a connu des succès notables dans le domaine des sciences, il n'y a pas lieu de se complaire; nous devrions même nous inquiéter pour le futur.

La SCMO s'inquiète des énoncés d'intérêt nationaux et des finalités de la science et la technologie publiés dans le document de consultation. Ce mémoire présente une vision de la science et la technologie dominées par les besoins industriels. Le Canada pourrait bénéficier d'une stratégie industrielle nationale, mais une stratégie de la science et de la technologie devrait inclure des dimensions additionnelles. Les deux composantes de la science et de la technologie ont des rôles également importants à jouer pour assurer notre développement social, notre sécurité environnementale et la création du savoir.

Le document de consultation met l'accent sur la création de la richesse et des emplois dans un contexte de développement durable. La SCMO constate avec inquiétude que le concept de développement durable est souvent mal compris. Des membres de la SCMO qui ont participé aux premières sessions locales de consultation de l'examen des politiques en matière de science et technologie rapporte qu'une bonne proportion des participants voyaient le développement durable comme rien de plus que la continuité du développement industriel et économique, sans considération particulière pour les facteurs sociaux et environnementaux. Ce mémoire définit le développement durable comme l'amélioration des conditions de vie de façon durable, tant au plan social qu'environnemental, pour les générations présentes et à venir.

Malheureusement, les pratiques de développement et d'industrialisation des années passées n'ont pas été durables du point de vue social, environnemental et économique. Ces pratiques nous valent maintenant des phénomènes de changements à l'échelle du globe tels le trou dans la couche d'ozone, le déboisement, l'épuisement des stocks de poissons qui ont mené au chômage massif et à l'extermination d'espèces animales et végétales à un rythme effréné.

Les causes sont complexes et il serait naïf d'en identifier une comme étant prédominante, mais l'ignorance de la société quant aux conséquences de ses actions constitue certainement l'une des causes majeures. L'humanité et son environnement payent en ce moment le prix de cette ignorance. Plusieurs personnes croient qu'il existe une situation de déficit environnemental aussi réelle et pressante que la dette nationale.

Ainsi le contexte de développement durable pour les objectifs de création de richesses et d'emplois doit être compris correctement et pris au sérieux. Le développement durable doit être non seulement prêché mais aussi pratiqué. Avec des budgets gouvernementaux limités le Canada ne peut se permettre, d'une part, d'appuyer financièrement un développement industriel non durable et, d'autre part, de payer pour réparer les avatars économiques, sociaux et environnementaux qui en résultent, même si les arguments en faveur du développement régional s'avèrent alléchants.

Afin de se sortir du déficit écologique, la société doit devenir plus consciente des conséquences de ses actions et plus déterminée à limiter les probabilités des problèmes futurs. La reconnaissance de telles conséquences exige des connaissances scientifiques approfondies sur l'environnement, une habilité accrue à utiliser ce savoir afin de prédire les conséquences environnementales du développement et la volonté d'appliquer ce savoir dans la prise de décision.

À cette fin, et cette opinion semble grandement partagée dans la communauté scientifique, la SCMO n'est pas d'accord avec ceux qui présument que la situation financière dans laquelle se retrouve le gouvernement fédéral peut être réglée en réduisant les dépenses de recherches scientifiques. Au contraire, c'est le manque d'investissement judicieux en sciences qui est partiellement à blâmer pour les problèmes économiques auxquels nous faisons face. La science est nécessaire pour rendre l'industrie canadienne plus compétitive et pour dire aux Canadiens comment le développement industriel affecte ou est susceptible d'affecter leur environnement.

La SCMO est heureuse de noter dans le document «Creating Opportunity» que le gouvernement appuie l'objectif de doubler l'investissement en recherche et développement avec la prudente stipulation que «le Canada démontre sa capacité d'absorber et de gérer une telle augmentation». Le défi du développement durable va en effet exiger que les Canadiens fassent plus de recherches scientifiques et non moins.

RECOMMANDATION 1: LA SCMO RECOMMANDE QUE LE CANADA PLANIFIE ET METTE EN OEUVRE UNE AUGMENTATION DES BUDGETS POUR LES SCIENCES, AVEC UNE AUGMENTATION SUBSTANTIELLE POUR LES NOUVEAUX PROGRAMMES SCIENTIFIQUES AXÉS SUR LE CONCEPT DE DÉVELOPPEMENT DURABLE.

STRATÉGIES

Afin de maximiser l'efficacité des fonds disponibles, les sciences canadiennes de météorologie et d'océanographie, et vraisemblablement les sciences canadiennes en général, devraient suivre trois stratégies.

I. PARTENARIATS DOMESTIQUES

Très souvent les scientifiques accomplissent plus lorsqu'ils unissent leurs efforts. Le gouvernement mérite d'être félicité pour le renouvellement et l'expansion du programme des Réseaux des centres d'excellence. Parmi les centres qui n'ont pas été renouvelés on retrouve des éléments dont le Canada pourrait bénéficier: par exemple la recherche tellement nécessaire sur la relation entre les propriétés physiques et chimiques de l'océan et la productivité biologique, au sein du «Réseau pour l'augmentation de la production océanique». Moins bien connus, mais tout aussi efficaces, les partenariats de recherche sur les écosystèmes, et les initiatives de recherches climatiques sous le Plan vert du gouvernement fédéral, sont demeurés des programmes efficaces, en dépit de leur taille limitée et de coupures sévères. Certains autres partenariats de courte durée ont aussi été bénéfiques, tels les deux projets canadiens sur les tempêtes de l'Atlantique dans le contexte du programme très réussi du Panel fédéral de la recherche sur l'énergie et le développement.

RECOMMANDATION 2: LA SCMO RECOMMANDE QUE LE GOUVERNEMENT DÉVELOPPE LES PROGRAMMES EXISTANTS DE PARTENARIAT EN RECHERCHE, PARTICULIÈREMENT LA RECHERCHE SCIENTIFIQUE SUR LE DÉVELOPPEMENT DURABLE.

Les partenariats efficaces sont fondés sur des participants forts: l'excellence dans les universités, de solides programmes scientifiques au sein du gouvernement axés sur les besoins de la population et la recherche en entreprises privées axée sur le développement de produits et de services. Comment peut-on maintenir et développer la force des partenaires?

Universités

La science compte sur l'université pour créer, préserver et transmettre le savoir afin d'assurer de solides capacités scientifiques nationales. Certains membres de la SCMO s'inquiètent de ce que la possibilité de pouvoir poursuivre un filon scientifique prometteur, même quand les résultats peuvent être obscurs, est de plus en plus érodée sous la pression grandissante de faire de la recherche «stratégique». D'autres sont heureux d'avoir accès à de plus grandes ressources pour la recherche stratégique considérant qu'il s'agit là d'une reconnaissance tangible de la valeur de leur travail. La SCMO croit qu'il y va de l'intérêt national de préserver un système de financement de la recherche universitaire qui fait appel aux talents de tous les scientifiques. Le défi est de réaliser un équilibre entre la recherche dite stratégique et la recherche libre, c'est-à-dire, motivée principalement par la curiosité. Au cours des dernières années la majeure partie des nouveaux fonds accordés par le Conseil de recherche en sciences naturelles et en génie a été accordée à des projets de groupe ayant une mission spécifique, et non aux projets motivés principalement par la curiosité des chercheurs individuels. La recherche motivée par la curiosité naturelle est une composante fondamentale d'une stratégie scientifique complète, une composante qui a été trop souvent négligée ces dernières années. Notre communauté scientifique sera forte si nous mettons plus d'accent sur une recherche de haut calibre nourrie par la curiosité.

RECOMMANDATION 3: LA SCMO RECOMMANDE QU'EN ALLOUANT LES FONDS DE RECHERCHES ADDITIONNELS, LE GOUVERNEMENT ACCORDE DÉLIBÉRÉMENT UN POURCENTAGE PLUS ÉLEVÉ AUX PROPOSITIONS QUI SONT BASÉES PRINCIPALEMENT SUR L'EXCELLENCE ET QUI NE SERAIENT PAS NÉCESSAIREMENT IDENTIFIÉES COMME AYANT UNE FORTE PRIORITÉ «STRATÉGIQUE».

Gouvernement

L'étude scientifique des principaux problèmes atmosphériques et océanographiques contemporains requiert un investissement important dans les superordinateurs pour la prévision et la modélisation mathématique, des radars météorologiques, des satellites et des sondes, des banques de données, des plate-formes de recherches, des bateaux, des submersibles, des bouées et un réseau électronique à haute vitesse. Les infrastructures canadiennes dans les domaines de communications ultra rapides, de la télédétection de son territoire et des superordinateurs de recherches traînent loin derrière celles des autres pays industrialisés. Par exemple les scientifiques canadiens échangent leurs informations à des vitesses vingt-cinq fois moindre que celles de leurs collègues américains et européens; le Canada possède un seul superordinateur dédié au calculs scientifiques, alors qu'il y en a plus de deux cents dans les autres pays du G7. De plus le Canada ne possède aucun satellite tourné vers la terre et doit présentement se fier à ses partenaires du G7 pour la surveillance de son propre territoire. RADARSAT sera le premier satellite canadien à remplir cette tâche.

Comme dans les autres pays industrialisés, l'entretien des équipements nationaux accessibles tous les secteurs scientifiques exige une implication continue de la part du gouvernement. Dans certains cas les infrastructures gagnent à être directement sous la gouverne des organismes ou laboratoires gouvernementaux dans le cadre de leur mission de service public.

RECOMMANDATION 4: LA SCMO RECOMMANDE QUE LE GOUVERNEMENT FÉDÉRAL PRENNE L'INITIATIVE D'ÉLABORER UNE STRATÉGIE NATIONALE POUR LE DÉVELOPPEMENT ET LE MAINTIEN D'INFRASTRUCTURES SCIENTIFIQUES CLÉS.

Les Canadiens s'attendent à ce que le gouvernement fédéral leur fournisse des services basés sur la science et la technologie leur garantissant sûreté, sécurité et avantages économiques, tels que ceux découlant de la météorologie et de l'hydrographie. Ces services représente une façon importante pour la société de bénéficier de la compréhension scientifique globale qui a été développée au fil des ans. Par exemple, il a été

démontré que quotidiennement plus de quatre-vingt-cinq pour-cent des Canadiens reçoivent des prévisions météorologiques basées sur des produits fournis par Environnement Canada, même si ces produits sont souvent livrés par un fournisseur commercial. Les bénéfices pour la société sont estimés à plus de dix fois les coûts payés par le gouvernement.

RECOMMANDATION 5: LA SCMO RECOMMANDE QUE LE COMITÉ SUR LA POLITIQUE FÉDÉRALE DE S&T SOULIGNE LA NÉCESSITÉ DE MAINTENIR DES SERVICES DE HAUTE QUALITÉ EN OCÉANOGRAPHIE ET EN MÉTÉOROLOGIE BASÉS SUR LA SCIENCE, SERVICES ESSENTIELS POUR LA SÉCURITÉ ET LA SÛRETÉ DU PUBLIC.

Tous les services fondés sur la recherche scientifique fournis par le gouvernement doivent être évalués selon des critères appropriés à l'activité scientifique pour que les Canadiens soient bien servis. Des comparaisons internationales sont recommandées. De la même façon, en regard du rôle important que joue le gouvernement en effectuant des recherches scientifiques pour le bien commun, toutes les activités de recherches gouvernementales devraient être évaluées par des pairs scientifiques de réputation internationale. La SCMO insiste qu'elle ne désire pas attirer une attention particulière sur les activités météorologiques et océanographiques exécutées au sein du gouvernement. Le besoin d'une évaluation périodique des activités gouvernementales s'applique à toutes les activités gouvernementales, dans toutes les disciplines. Il faut également souligner que pour être crédibles et efficaces, les évaluations de recherches doivent être exécutées par des pairs scientifiques de réputation internationale.

RECOMMANDATION 6: LA SCMO RECOMMANDE QUE TOUS LES SERVICES REPOSANT SUR LA SCIENCE FOURNIS PAR LE GOUVERNEMENT SOIENT ÉVALUÉS EN LES COMPARANT À DES SERVICES SEMBLABLES DANS D'AUTRES PAYS ET QUE TOUTES LES ACTIVITÉS DE RECHERCHE INTERNES SOIENT ÉGALEMENT SUJETTES A UNE ÉVALUATION PÉRIODIQUE PAR DES PAIRS SCIENTIFIQUES DE RÉPUTATION INTERNATIONALE.

Le monde des affaires

Le secteur privé en météorologie et d'océanographie est plutôt restreint au Canada. Le gouvernement a, à quelques reprises, fait des efforts pour encourager ce secteur. On retrouve quelques bons exemples de coopération où des développements gouvernementaux ont été mis en marché au plan international avec succès par des compagnies canadiennes. Les efforts pour construire un secteur privé fort n'ont pas connu autant de succès qu'ils auraient dû à cause de politiques gouvernementales concernant le recouvrement des coûts et la prestation de services. Il y aurait plus d'occasions pour une activité du secteur privé, particulièrement dans l'exportation de services météorologiques et océanographiques de haut calibre, si les ministères fournissaient au secteur privé des données et des services à un prix moins élevé et s'ils encourageaient très tôt le développement et la mise en marché de ces services par la consultation et le transfert technologique. Déterminer le coût approprié des produits gouvernementaux pour le secteur privé est chose complexe, mais la question doit être résolue à la satisfaction des contribuables et du secteur privé.

RECOMMANDATION 7: LA SCMO RECOMMANDE QUE LE GOUVERNEMENT FÉDÉRAL ADOPTE UNE POLITIQUE QUI ENCOURAGE LE DÉVELOPPEMENT DE COMPAGNIES PRIVÉES AXÉES SUR LA TRANSFORMATION ET L'AMÉLIORATION DES PRODUITS MÉTÉOROLOGIQUES ET OCÉANOGRAPHIQUES.

II. LA COOPÉRATION INTERNATIONALE

Le Canada a besoin d'une stratégie plus concertée afin de tirer profit des occasions de recherche scientifique au plan international, en particulier, en matière de changements globaux. Le Canada doit participer à ces activités internationales afin de maximiser ses bénéfices, et pour influencer les politiques multilatérales et nationales portant sur les questions de changement environnemental global qui transcendent les frontières et les organisations nationales.

Le Canada a été reconnu pour les contributions individuelles de plusieurs scientifiques, mais les membres de la SCMO rapportent que, de plus en plus, la communauté internationale voit le Canada faillir à la tâche en matière de science internationale en général, et sur la question du changement global en particulier. Le Conseil national de recherches, qui coordonnait les activités scientifiques internationales non-gouvernementales, se retire de ce champ d'activité au fur et à mesure que les coûts augmentent et que les politiques exigent que les budgets visent des objectifs de développements industriels.

Il n'y a pas de mécanisme efficace, ni d'agence fédérale de coordination des politiques scientifiques, pour reconnaître les besoins d'accroître le financement des engagements nationaux envers des organisations ou des programmes essentiels internationaux.

RECOMMANDATION 8: LA SCMO RECOMMANDE QUE, DANS LE CONTEXTE D'UN PROGRAMME DE SCIENCE-POUR-UN-DÉVELOPPEMENT-DURABLE, DES MÉCANISMES FÉDÉRAUX SOIENT ÉTABLIS POUR COORDONNER ET FINANCER LA PARTICIPATION CANADIENNE À LA RECHERCHE SCIENTIFIQUE INTERNATIONALE SUR LE CHANGEMENT GLOBAL.

III. LES RESSOURCES HUMAINES

Les ressources humaines canadiennes en sciences et technologie sont menacées. La SCMO s'inquiète de ce que les inscriptions de jeunes canadiens en science dans les universités diminuent, du moins par rapport aux autres domaines d'études. Les laboratoires canadiens sont aujourd'hui notoires pour le vieillissement de ses scientifiques. On peut facilement prédire que le Canada va connaître une pénurie de scientifiques au fur et à mesure que cette population va se retirer dans les cinq à quinze ans prochains. On peut présumer que des mécanismes de marché vont faire repartir le flot d'étudiants universitaires vers les domaines scientifiques. Toutefois, il serait dans l'intérêt à long terme du pays de stimuler le flot d'étudiants en sciences dans les universités, et particulièrement les femmes, afin d'anticiper le besoin. Sinon le gouvernement devra peut-être envisager d'autres façons de combler le vide, par exemple, en rappelant au travail les scientifiques retraités ou en établissant des politiques d'immigration préférentielles.

Avec sept milliards de dollars fédéraux investis en science et technologie, il est étonnant de voir combien peu parmi ceux qui administrent l'investissement de ces fonds ont une expérience scientifique de première main et particulièrement en recherche. Ceci est particulièrement vrai aux postes les plus élevés de la fonction publique fédérale.

RECOMMANDATION 9: LA SCMO RECOMMANDE QUE LE GOUVERNEMENT DÉVELOPPE ET PUBLIE UNE PERSPECTIVE NATIONALE EN MATIÈRE DE RESSOURCES HUMAINES EN SCIENCE AFIN DE FACILITER L'ARRIVÉE ET LE DÉPART DE SCIENTIFIQUES, DE TECHNICIENS ET D'ADMINISTRATEURS SCIENTIFIQUES SUR LE MARCHÉ DU TRAVAIL.

RECOMMANDATION GÉNÉRALE

Le Canada a besoin d'une voix plus forte en faveur de la science. Le Conseil consultatif national en matière de science et de technologie, dont les membres bénéficiaient de nominations politiques, n'a jouit que de peu de visibilité et de crédibilité auprès de la communauté scientifique. Pour quelque raison que ce soit, la Société royale du Canada n'a que rarement pu jouer ce rôle. Industrie Canada vient de fermer le bureau du Chef scientifique. Depuis l'abolition du Conseil des sciences, la science canadienne n'a plus de forum politique efficace pour examiner la rôle de la science au niveau national.

Le Canada devrait se doter d'un organisme composé de scientifiques de réputation internationale vers qui le gouvernement fédéral pourrait se tourner pour des avis indépendants en matière de science et technologie. Cet organisme devrait compter un personnel de soutien de même que des chercheurs et des écrivains. Parmi les tâches à exécuter pourraient se trouver celles de faire rapport périodiquement au parlement fédéral sur l'état de la science au Canada, de voir à l'évaluation des organismes de recherches gouvernementaux par des pairs, d'agir en tant qu'organisme canadien membre des organisations scientifiques internationales, de faire des études, et de préparer des rapports spéciaux sur des sujets où la science joue un rôle clé.

RECOMMANDATION 10: LA SCMO RECOMMANDE QUE LE GOUVERNEMENT CONSIDÈRE L'ÉTABLISSEMENT D'UN NOUVEAU CONSEIL DES SCIENCES OU PRENNE DES MESURES POUR DOTER LE CANADA D'UNE ACADÉMIE DES SCIENCES PLUS FORTE.

ICA Archival Survey for Climate History

Because of the uncertainty among meteorological experts as to the consequences of climate change, and even as to whether the climate is changing, it has become obvious that it is necessary to make a careful and detailed study of meteorological data from the past.

Unfortunately for most areas of the world, meteorological records are only kept from about 1850 onwards. A considerably longer period than the last 150 years for which we have detailed meteorological data needs to be studied to account for the normal fluctuations and periodicity in the climate. In February 1990, therefore, representatives of Unesco, the World Meteorological Association, the International Council of Scientific unions and the International Council on Archives met in Paris to plan a European Test Project for an Archival Survey for Climate History. The pilot project was the first systematic attempt to use the services and expertise of professional archivists in the realm of exact sciences. Archivists are the only professionals familiar with and able to locate rapidly all recorded information pertaining to climate which is contained in historic archives and to treat these sources objectively and critically, identifying and eliminating all suspect information and able to develop a methodology for more extensive research. Archivists can be seen to have no thesis to defend in the debate on climate change and this adds an impartiality to their research. Some work had already been done with climatologists noting annotations in private journals, descriptive weather reports and notes of para-meteorological phenomena, such as frozen rivers, in carrying out surveys. Such studies, however, had not been exhaustive or systematic.

The test project was designed to determine the feasibility of obtaining data contained in public and private archives; to evaluate the benefit of that data for the climatological community and, if beneficial, to consider expanding the project to include a study of archives throughout the world. The events to research were defined by the WMO. At the beginning many were of the opinion that the information obtained would be sketchy and of little value. It was decided to carry out research at various European points to compare the results of different sources, control the accuracy of the sources on the one hand and, on the other, provide information to fill gaps in knowledge. The project involved archivists, or others acting for them, in six European archives in Arras, Lancashire, Lubeck, Lucca, Milano and Ulm, systematically studying documents to identify all in the period 1725 to 1775 which contained both direct and indirect climatological data. They also identified records containing serial data for the period 1680 to 1880.

Two report forms were developed to facilitate the work. One was for point and occasional data for the period 1725 to 1775 and the other for data series. A form was completed for each document studied. It noted the document reference, its type and date, meteorological and hydrological events recorded, the date of events and the latitude, longitude and altitude of the place where the event occurred.

The inter-disciplinary working group set up to control the project had representatives from Unesco, ICSU, WMO and the ICA. It met again in April 1991 in Paris to review the pilot project. Data had been obtained from a wide variety of documents including family papers, municipal, legal and ecclesiastical records and newspapers. The results from Arras, Lancashire and Ulm showed clearly that family and estate papers, including correspondence and diaries, were a particularly rich source of climatological data. After examining the records of the six centres, it was decided to undertake a restricted test on two years i.e. 1740 and 1784. The year 1740 was, in principle, a year rich in information because of the severe winter climate throughout all of Europe, whilst 1784 was considered a moderate and uneventful year. It was considered that precise accounts for those years would allow the test evaluations to be based on a coherent group of data. For the serial data, photocopies of examples of documents were supplied with the report forms. In principle all data could be of scientific interest. Therefore in the search for point data the casual mention of, for example, dates of harvesting, rises in water levels, dates of fruit picking and sowing and human or animal mortality were not neglected. WMO, Unesco and ICSU organised the scientific evaluation of the data collected.

Evaluations were prepared for Unesco by M. Petit-Renauld of the Climatology and Hydrology Laboratory at Villeneuve d'Ascq and by W. Witte of the Federal Office of Water Sciences at Koblenz. Professor Pfister of the University of Bern prepared an evaluation for WMO and Ken Davidson of the National Climatic Data Center in the USA prepared an evaluation for ICSU.

All of the scientific evaluations emphasised the worth of the Project and its potential for completing data sets. They underlined the value of a global approach to serial measurements and the need for a sufficiently large grid to enable observations from different neighboring locations to be used. Obviously it was stressed that high density serial data were of most value. Ideally the data should be measured and consist of a time series of one year or longer to be valuable for global change studies. The most important variables for these studies and base-line data sets are temperature and precipitation. All agreed that the value of the Project for developing climatic base-line data sets was enormous.

The evaluators distinguished between two types of research for which the project would be useful, i.e. global change studies and climate reconstruction. Great benefit could be derived from it if it could provide data particularly for South and Central America, Central Asia and Africa, where known data were sparse. At this stage they also noted that the forms used in presenting retrieved archival data needed some improvement and that digitisation of data was important. They also observed that subjective data were not valuable for scientific purposes. For their part the archivists concerned observed how labour-intensive the exercise had been and stressed that if the project were to be widened, the methodology needed to be developed to ensure that original historical documents should be consulted only once. Similarly they stressed that training in data retrieval would be an important element for participants.

During 1992 more work was undertaken to refine the report forms and in March 1993 work began on a Project Document for a global program on a phased basis.

In the past many efforts have been made to extend the historical time series of data, but these have mainly centred on that being held within the meteorological services of various countries. The global project will co-ordinate through agencies and various local, regional and national archives the retrieval and digitisation of climate data sufficient to enhance the current global record of climate. At present ICSU World Data Centres and the World Meteorological Organisation are defining a global grid, a time frame and various parameters required for the project. The ICA and Unesco will co-ordinate within the various countries to acquire the data and provide each country with copies of the global and regional data sets being established. Phase I will be concentrated on Latin America where there are severe gaps both in temporal and spatial coverage. Work is scheduled to begin in Mexico, Brazil, Cuba and Ecuador during the latter part of 1994. Four members of the European Test Project will each visit one of those countries to share their experience with their Latin American colleagues about methodology and training and to agree a budget and timetable. It is intended that in each case the data collected after 6 months operation of the project will be evaluated by climatological colleagues.

During the pilot phase of the project it was determined that significant amounts of data exist in the national and local archives for many of these areas and that if retrieved would greatly benefit the scientific global change research community by assisting in filling in both the temporal and spatial time series. This Latin American phase will provide concrete benefits to meteorologists and climatologists.

At the conclusion of the project, the global baseline database will be nearly serially complete. It is not anticipated that all gaps will be filled, but the Pilot Project determined that enormous amounts of data are held in standard archives of various countries of which the meteorological services are unaware. It is intended that the data set that results will be provided to all research scientists and to the countries participating in the project. This will enable scientists world-wide to utilise a consistent high quality controlled data set for their studies. Much of the uncertainty surrounding the current climate change situation may then be eliminated from the various research studies.

For specified countries as each phase is implemented the project will identify archives in public repositories which contain data for the study of climate relating to specific places chosen in the grid plan. ICA will identify from the grid supplied by ICSU World Data Centres those repositories likely to have relevant documents. Prioritised initial target lists of repositories will then be chosen by the Project Committee. For each place selected and for each document or series of documents which contain data, a completed standard report form will be produced by the participating archival repository. Each form will note the nature of the data contained, the dates covered, the area to which it relates, the location and reference number of the document concerned. Copies of completed pro-formas will then be supplied to WDCs and WMO for evaluation by WDC meteorologists and climate historians. The latter will list by repository those documents or series identified in the pro-formas, of which they require copies to be supplied. Copies of the selected original documents will then be forwarded either as photocopies or microfilm, to WDCs and WMO for the data contained in them to be digitised and incorporated into existing climate data sets. In other cases, where appropriate, the data will be digitised at source directly by local labour without the need for copies. It will be for the Project Committee to determine the order of priorities and the setting of targets.

It would be possible to extend the study in order to gather other data. So far it has been determined that data will be collected on temperature, snow depth, wind regime, precipitation, water volume, ice thickness, first and last killing frosts and atmospheric pressure and depression. It would be possible either to extend this list or to develop other reporting forms which could be completed by archivists at the same time to gather data for oceanographers with whom initial contacts have been made.

Co-operation between the scientific and archival communities in this project is a new phenomenon. It brings together very different skills and experiences in an exciting partnership. The Test Project has already demonstrated how productive that co-operation can be and Phase I of the global project will bring solid benefit to the scientific community.

Ken Hall, Project Director

Are Canadians prepared when storms hit?

Peter Calamai
published in The Ottawa Citizen (June 18, 1994)

The warning was unequivocal: "There is no question there is a resource crisis within AES, and particularly within the Weather Services Program. Translated from bureaucratese, those words mean that you and your property aren't being protected from severe weather as much as Canada's weather experts believe desirable.

The warning is contained in an internal audit of the Atmospheric Environment Service (AES), the biggest component of the federal Environment Department and what used to be called the Canadian Meteorological Service. The audit was published in January 1993, but only recently made available to The Canadian Press under the Access to Information Act. Because the audit was based, in part, on information from 1991, some Environment Department officials have deprecated its bleak view as dated. In fact, in the most critical area, the status today is even bleaker than the 1992 audit.

That issue is the provision of a network of radar stations that can spot developing storms earlier, known as Doppler radar. Doppler radar is considered essential by meteorologists for timely warning of severe weather, like tornadoes and blizzards, and for the most accurate aviation forecasting. The continental United States will be covered by a network of Doppler radars by the end of this decade. Once, the Atmospheric Environment Service had similar plans for Canada, with a proposed network of 20 stations costing more than $33 million. By the 1993 audit, AES still planned a first phase of eight new Doppler radars and five conversions of existing radars by 1999.

Today, the plans have been scaled back to three new Doppler radars and two upgrades, already completed. The "savings from the original plan are, according to the official department estimates, $14.5 million. But consider. The biggest category of insurance claim from the tornado that hit Edmonton in 1987, killing 25 and causing more than $300 million in damage, was for vehicles battered by hailstones and debris. How much would have been saved by a warning broadcast 10 minutes sooner, enough time to move vehicles under shelter? Maybe $14.5 million?

The root problem is that weather observation over such a huge country as Canada costs a bundle because it's still labor-intensive and a large number of collection points are necessary. But the Environment Department raised public expectations with the Green Plan. To finance sexy new environmental protection projects within a shrinking budget, the Environment Department's brass keeps nibbling away at the biggest budget, the modernization program to improve meteorological warnings.

The weather services have been struggling to maintain the costly observation and forecasting network pushing ahead with automation to cut labor costs, squeezing more information from existing radar observations to compensate for the cuts to the Doppler network, plugging a Prairie gap in the upper-air sounding network. They've also taken on new jobs, such as the twice-daily production of a UV index, with a spin-off for a Saskatoon firm that developed the key piece of instrumentation. And they're looking for partnerships with private forecasters or specialized forecasting that would generate revenues, like predicting when the SkyDome will have to be closed. But few are satisfied. "There's no question that weather warnings are an important issue that we need to address more than we are at the present time, says Gordon McBean, the assistant deputy minister who heads AES.

To end on an encouraging note: AES has long had some of the world's most outstanding scientists and administrators. One of McBean's predecessors, Jim Bruce, is being given the highest honor of the World Meteorological Organization for his contributions to international work on climate change. And two AES scientists in Toronto are being honored for their work on ozone

(Peter Calamai is editorial page editor of the Citizen)

Handy radio can supply latest weather forecast

Peter Calamai
published in The Ottawa Citizen (June 18, 1994)

Once again, everyone is talking about the weather. For a change, however, someone is doing something about it. It's not enough, of course, and problems inevitably loom elsewhere but there is actually a weather success story featuring innovative Canadian science and technology that might well save your life and protect your property.

The success is the country's weather radio network which transmits comprehensive forecasts, bulletins and advisories 24 hours a day, seven days a week year round. More than 90 per cent of Canadians already can tune into this information for free anytime, if they have a special receiver which now costs $30 at Radio Shack. It could be even cheaper. Adding weather receiving capability to a radio during manufacture requires a 50-cent circuit board.

How many travellers would have avoided the "Storm of the Century" in March 1993 if their car radios had received the weather advisories? Specially equipped radio weather receivers for $40, in fact, turn themselves on only for severe weather warnings, altered by a tone.

Yet surveys indicate only a quarter of Canadians even know the service exists and far fewer make use of it, perhaps no more than one in 12. This ignorance is hardly the fault of

Canada's weather experts, the Atmospheric Environment Service, which has significantly expanded coverage by the weather radio network despite recession constraints. The federal service has also introduced world-leading technology capable of transmitting text through a special receiver to individual computers or printers, about the weather or other hazards if necessary. These Weathercopy receivers, designed and built in Montreal by Dataradio, are bought by public utilities, fire and police services, sports facilities and transportation companies. Canada's weather radio technology and coverage are the envy of the United States, where Vice-President Al Gore this March announced a crash program to match our status.

One goal of the U.S.A. program is developing an automatic weather warning system transmitted via cable television. The system would send a severe weather warning that "crawled" across the bottom of the screen on all cable channels, not just the weather channel. In Canada, we've already developed that TV technology but broadcasters, cable operators and a pussy-footing CRTC have been stalling introduction of this potential life-saving service.

An audit of the severe weather preparedness of Environment Canada, completed in January 1993 but only made public this month after an access-to-information request, reports that CRTC officials rebuffed approaches about cable TV weather warnings a decade ago, fearful of industry opposition to "any further conditions of licensing." The further condition being opposed by the industry is an obligation to carry automated warnings about dangers like the 1985 tornadoes, which killed 12 in Barrie and did $100 million damage, or the tornado that hit Edmonton in 1987, killing 25 and causing more than $300 million in damage. "While the industry acknowledges privately that there is a moral obligation to help disseminate warnings, it is unwilling to have that codified," reports the January 1993 audit. The stalling over cable TV is only one area where Canada has been slow to capitalize on its life-saving technological lead. In the United States, for example, a push is on to install weather radios in public gathering places like schools, community halls, shopping malls and highway service centres. In Canada, according to the internal audit and weather officials, such comprehensive coverage isn't being discussed, even though our print-out weather broadcasts are ideally suited to large-scale electronic displays.

At best, the Atmosphere Environment Service is hoping to mount a single demonstration of such public warning systems this year in Les Terraces de Chaudire, a federal government office complex in Hull. What's most irksome about the slow introduction of weather radio is that it's all so cheap. An automated transmitter costs roughly $40,000 to install and next-to-nothing to operate and Sony now markets an AM-FM radio for $60 that also includes the weather frequencies. The content (the warnings, advisories and bulletins) is what the weather service already exists to provide.

(Peter Calamai is editorial page editor of the Citizen)

The Atmosphere-Ocean System

In response to our correspondence with Gordon and Breach (*c.f.* ***Bulletin***, 22, 3, p.9) on the duplication of titles with their new journal "The Atmosphere-Ocean System", the publisher has responded advising that they will change their title to one which is not similar to our Journal. They have indicated they will keep us advised.

The Business Office and this office have prepared a draft of a new Renewal Notice for approval by the CMOS Executive. The new notice will feature the new Business Office address, E-mail addresses and a number of other items. One of the most important changes will be the option of payment of membership fees and subscriptions by Visa and Mastercharge. Application for these services is being made now.

The office is still receiving many requests for information on meteorology and oceanography from schools, libraries and students. Unfortunately, CMOS has to rely on outside sources for this information and all of it is very sketchy and outdated. Can anyone help us out?

Neil J. Campbell, Executive Director

ATMOSPHERE-OCEAN

Volume 32 No. 3, Sept. 1994

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Call for Papers
CMOS Twenty-Ninth Annual Congress

The 29th Annual Congress of the Canadian Meteorological and Oceanographic Society, will be held at Okanagan University College, Kelowna, British Columbia, Canada from May 29 to June 2, 1995. The Canadian Society of Agrometeorology (CSAM) and the Panel on Energy Research and Development (PERD) Currents Committee are planning to hold their meetings/workshops concurrently with this CMOS Congress.

Oral and poster papers, and commercial exhibits on the theme are invited, as well as in all areas of meteorology, oceanography and limnology. The Congress theme is: Environmental Services: Clients, Innovation and Commercialization. Other topics of special interest include: Air Quality Atmospheric and Oceanic Processes in the Arctic Climate and Climate Change Physical and Chemical Processes in Lakes

Abstracts of papers must be received by Dr. W. Hsieh, Chairman of the Scientific Program Committee by 31 January, 1995. Authors are strongly urged to submit abstracts electronically by email. Guidelines for sending an electronic abstract can be obtained automatically by sending a (blank) email message to cmos_form@ocgy.ubc.ca or by anonymous ftp to ogopogo.ocgy.ubc.ca, directory /cmos/abstracts, file "form". If email is not available, please contact W. Hsieh for information on submitting abstracts by other means.

List of sessions:

1. Air quality
2. Atm. Chemistry
3. Atm. Data Assimilation
4. Atm. modelling
5. Middle Atm.
6. Atm. Dynamics
7. Atm. waves
8. Cloud & precipitation physics
9. Boundary layer meteorology
10. Radar meteorology
11. Aviation meteorology
12. Weather forecasting
13. Client and commercial services
14. CSAM/ agricultural & forest met.
15. Hydrology
16. Climate & paleoclimate
17. Interannual variability
18. Geophysical fluid dynamics
19. Remote Sensing
20. Fisheries & biological oceanogr.
21. Chemical oceanogr. & limnology
22. Ocean waves
23. Ocean circulation
24. Coastal ocean & inland waters
25. Seamounts & hydrothermal vents
26. Sea ice & Arctic Studies
27. WOCE
28. JGOFS
29. OPEN
30. PERD
31. Other

For further information on the scientific program, contact: Dr. William Hsieh Chairman, Scientific Program Committee Dept. of Oceanography, Univ. of British Columbia, 6270 University Boulevard, Vancouver, B.C., Canada V6T 1Z4 Tel (604) 822-2821; fax: (604) 822-6091; internet: cmos@ocgy.ubc.ca

For further information on registration, accommodation and commercial exhibits, contact: Mr. Al Wallace Chairman, Local Arrangements Committee Atmospheric Environment Service 3140 College Way, Kelowna, B.C., Canada V1V 1V9 Tel: (604) 491-1510; fax: (604) 491-1506; internet: wallacea@aesvan.dots.doe.ca

Invitation à présenter des communications vingt-neuvième congrès annuel de la SCMO

Le 29 Congrès de la Société canadienne de météorologie et d'océanographie se tiendra au Okanagan University Collège, Kelowna, Colombie Britannique, du 29 mai au 2 juin 1995. La Société canadienne d'agrométéorologie (CSAM) et le Comité sur les courants du Groupe interministériel de recherche et d'exploitations énergétiques (GRDE) se proposent de tenir leurs réunions ateliers de travail en même temps que le Congrès de la SCMO.

Les présentations orales et écrites ainsi que les expositions commerciales sur les thèmes proposés sont les bienvenues tout autant que dans tous les domaines de la météorologie, de l'océanographie et de la limnologie. Le thème du Congrès: Les services environnementaux: Clients, Innovation et Commercialisation. Parmi les domaines d'intérêts spéciaux il y a aussi : la qualité de l'air, les processus atmosphériques et océanographiques de l'Arctique, le climat et le changement climatique, et les processus physiques et chimiques dans les lacs. Les résumés des présentations doivent parvenir au président du Comité du programme scientifique, W.Hsieh, avant le 31 janvier 1995. On prie les auteurs de soumettre leur résumé par courrier électronique. Les directives pour transmettre un résumé électronique peuvent être obtenues automatiquement en envoyant un message (blanc) électronique à cmos_form@ocgy.ubc.ca ou par protocole de transfert de fichier anonyme à ogopogo.ocgy.ubc.ca, répertoire cmos abstracts, fichier "form". Si vous ne pouvez utiliser le courrier électronique, W.Hsieh vous donnera les renseignements nécessaires à soumettre votre présentation d'une autre façon.

Liste des sessions:

1. Air quality

1 Qualité de l'air
2 Chimie de l'atmosphère
3 Assimilation des données atmosphériques
4 Modélisation de l'atmosphère
3 Atmosphère moyenne
6 Dynamique de l'atmosphère
7 Ondes atmosphériques
8 Physique des nuages et des précipitations
9 Météorologie de la couche limite
10 Météorologie radar
11 Météorologie aéronautique
12 Prévision météorologique
13 Services aux clients et commerciaux
14 CSAM Météorologie agricole et forestière
15 Hydrologie
16. Climat et paléoclimat
17 Variabilité interannuelle
18 Dynamique géophysique des fluides
19 Télédétection
20 Océanographie biologique et des pêches
21 Océanographie chimique et limnologie
22 Vagues océaniques
23 Circulation océanique
24 Océan côtier et eaux intérieures
25 Monts sous-marins et cheminées hydrothermales
26 Glaces de mer et Études de l'Arctique
27 WOCE
28 JGOFS
29 OPEN
30 GRDE
31 Autres

Pour plus de renseignements sur le programme scientifique, veuillez contacter : Dr William Hsieh, Président, Comité du programme scientifique, Department of Oceanography, University of British Columbia, 6270 University Boulevard, Vancouver, B.C. Canada V6T 1Z4. Tel.: (604) 822-2821 Fax: (604) 822-6091 internet:cmos@ocgy, ubc,ca

Pour d'autres informations sur l'inscription, les aménagements et les expositions commerciales, veuillez contacter: M. Al Wallace, Président du Comité Des arrangements locaux Service de l'environnement atmosphérique, 3140 College Way, Kelowna, B.C. Canada V1V 1V9. Tel.: (604) 491-1510 Fax: (604) 491-1506. Internet: wallacea @acsvan.dots.doe.ca

Annual Meeting of CMOS Hydrology Special Interest Group (HYSIG)

HYSIG held its annual general meeting at 8:00 p.m., Tuesday May 31 in Rm. 232, Morisset Building, Ottawa University Centre as part of the Annual CMOS Congress activities. The meeting was chaired by Terry Krauss, Vice-Chair of HYSIG. Due partly to at least two other conflicting meetings and a busy conference schedule, the meeting was attended by only three people (Jim Bruce, Gary Schaefer, and Terry Krauss).

In spite of the small attendance, several HYSIG issues were discussed.

a. Re-engineering of the water monitoring program within Environment Canada: The new regional structure within Environment Canada has incorporated the water quantity measurement program and atmospheric monitoring program in order to provide more interpretative science to the public. New challenges will be faced by the regions to maintain the monitoring programs in the face of shrinking federal and provincial budgets. The concerns to HYSIG are that most engineers and scientists of hydrology do not associate with CMOS, and that tight budgets could result in further losses of climatic and hydrometric observing stations.

b. Environment Canada in Ottawa has transferred the old Associate Committee on Hydrology (ACH) Secretariat to the National Hydrology Research Institute (NHRI) in Saskatoon. Notices have been sent out indicating that: i. The Canadian National Committee responsibilities and Secretariat for the UNESCO International Hydrological Program (IHP) have been transferred to the NHRI and; ii. The Canadian Geophysical Union (CGU) Section on Hydrology will take over responsibilities for the Canadian National Committee (CNC) for IAHS and Secretariat services for the Committee will also be provided by the NHRI in Saskatoon.

c. It was noted that CMOS members have been invited to become affiliated members of the CGU. The CGU Hydrology Section will co-host a Global Energy and Water Cycle Experiment (GEWEX) International Workshop on Cold-Season/Region Hydrometeorology at next year's CGU Annual General Meeting, May 22-26, 1995 at the Banff Centre, in Banff, Alberta. The new CMOS executive will be asked if they wish to be a co-sponsor of the workshop.

d. It was decided to continue using the CMOS Bulletin to communicate the activities and issues of HYSIG to the general membership, therefore, the HYSIG NEWSLETTER would be abandoned.

e. The officers of the HYSIG would remain as follows: Rick Lawford Chairperson Terry Krauss Vice-Chairperson Ron Hopkinson Communicating Secretary Jim Bruce Councillor-at-large (Ottawa)

Action: HYSIG should try one more time to interest hydrologists in CMOS/HYSIG. The organizing committee for next year's Annual Congress in Kelowna will be asked to organize a special session on Hydrological and Climate Data and Information Services. It is hoped that the new organization within Environment Canada can foster new interest in applied services within HYSIG.

The meeting was adjourned shortly after 9:00 p.m.

For further information regarding this meeting, contact Dr. Terry Krauss, National Hydrology Research Centre, Saskatoon, SK, S7N 3H5 Tel: (306) 975-4215, Fax: (306) 975-5143, e-mail: krausst@nhrisv.nhrc.sk.doe.ca

Positions in Atmospheric Chemical Modelling

Applicants are invited to apply for Postdoctoral and research positions in 3-D chemical modelling at York University in the Department of Earth and Atmospheric Science and the Centre for Atmospheric Chemistry. The positions will involve development and use of 3-D chemical transport models for studying the interaction between chemistry and dynamics in the troposphere and stratosphere. A Ph.D., experience with computer models and a working knowledge of FORTRAN and UNIX are required.

The group at York is part of a Canadian University/ Atmospheric Environment Service collaboration to build a Middle Atmosphere General Circulation Model with interactive chemistry (P.I. Prof. Ted Shepherd, University of Toronto). Part of the York group is responsible for the development of efficient chemical codes capable of use with both short term investigations of polar heterogeneous chemistry and climate runs. A Postdoctoral position is currently funded with salary in the range of $30-32K Can.

Tropospheric projects include studies of the impact of halogen chemistry in the troposphere, the effects of subsonic aviation on tropospheric and lower stratospheric ozone, calculation of the distribution of CO and ozone in the troposphere and the data assimilation of satellite CO data in 3-D Chemical Transport Models. The latter 2 projects are in support of the MOPITT experiment (P.I. Prof. Jim Drummond, University of Toronto) to be flown on the AM-1 platform of EOS. These projects are under funding review with start dates nominally in November, 1994.

Candidates should send their application with curriculum vitae and the names of 2 referees to Prof. John C. McConnell, Department of Earth and Atmospheric Science, 4700 Keele St., North York, Ontario, M3J 1P3, Canada (Tel: 416-736-2100 ex 77709: FAX 416-736-5817: internet: jack@nimbus.yorku.ca). In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents.

1995 CMOS PRIZES AND AWARDS

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

All members are encouraged to consider nominating individuals of the meteorological or oceanographic community who have made significant contributions to one or both of these fields. The awards program provides an important opportunity for scientists to recognize their peers. It also provides an opportunity for media recognition to be given to the sciences of oceanography and meteorology as well as to the Canadian scientists who are actively in the forefront of their fields.

Each category has different and specific nomination criteria which must be met before any nomination can be considered. There is a deadline of Friday, January 27, 1995 for nominations to be received by the Secretary of the Prizes and Awards Committee. The award categories are (see attachment for further details):

President's Prize
Tully Medal in Oceanography
Applied Meteorology
Applied Oceanography
Operational Meteorology
Graduate Student
Environmental Citation
Media Weather Presentation.

Nominations can be made to:

Mr. David Phillips, Secretary
CMOS Prizes and Awards Committee
Atmospheric Environment Service
700 - 1200 West 73rd Avenue
Vancouver, B.C. V6P 6H9

Telephone (604) 664-9050
Fax (604) 664-9195

PRIX ET BOURSES DE LA SCMO POUR 1995

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

Tous les membres sont invités à proposer la candidature d'individus de la communauté météorologique ou océanographique ayant appoté une contribution significative dans l'un ou les deux de ces domaines. Le programme de prix procure une excellente occasion aux scientifiques de reconnaître le mérite de leurs pairs. Cela permet également aux sciences de l'océanographie et de la météorologie, ansi qu'aux scientifiques canadiens au premier rang de leur domaine d'expertise, d'être cité par les média.

Chaque catégorie a des critères spécifiques et différents, lesquels doivent être respectés, avant qu'une nomination soit considérée. La date limite pour la réception des nominations par le secrétaire du Comité des prix et bourses, est vendredi le 27 janvier, 1995. Les catégories de prix sont (pour de plus amples informations consultez les pages ci-jointes):

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

Les nominations peuvent être adressées à:

M. David Phillips
Secrétaire du Comité SCMO pour les prix et bourses
Service de l'environnment atmosphérique
700 - 1200, ave 73 ouest
Vancouver, B.C. V6P 6H9

Téléphone (604) 664-9050
Fax (604) 664-9195

Prizes and Awards Criteria

a) PRESIDENT'S PRIZE

May be awarded each year to a member or members of CMOS for a recent paper, book or contribution of special merit in the field of either meteorology or oceanography. The paper or work:

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

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

b) THE DR. ANDREW THOMSON PRIZE IN APPLIED METEOROLOGY

May be awarded for an outstanding contribution in the field of applied meteorology. The nominee MUST be a member of the Society.

c) GRADUATE STUDENT PRIZES

May be awarded for contributions of special merit in meteorology and/or oceanography by graduate students.

d) THE RUBE HORSTEIN PRIZE IN OPERATIONAL METEOROLOGY

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

e) PRIZE IN APPLIED OCEANOGRAPHY

May be awarded for a significant contribution to the application of oceanography in Canada. The nominee MUST be a member of the Society.

f) THE J. P. TULLY MEDAL IN OCEANOGRAPHY

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

g) ENVIRONMENTAL CITATIONS

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

Critères d'Éligibilité des Prix et Bourses

a) PRIX DU PRÉSIDENT

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

1. DOIT avoir été accepté pour publication dans Atmosphère-Océan ou une autre revue avec comité de lecture, ou;

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

b) PRIX DR ANDREW THOMSON EN MÉTÉOROLOGIE APPLIQUÉE

Peut être décerné pour une contribution remarquable en météorologie appliquée. La personne nommée DOIT être membre de la Société.

c) PRIX ÉTUDIANT(E) GRADUÉ(E)

Peut être décerné à un(e) étudiant(e) gradué(e) ayant apporté une contribution notable en météorologie et/ou en océanographie.

d) PRIX RUBE HORNSTEIN EN METEOROLOGIE OPERATIONNELLE

Peut être décerné à une personne ayant procuré un service exceptionnel dans son sens le plus large. Par contre la publication des articles de recherche sera exclue, à moins que cette recherche soit déjà incorporée comme aide quotidienne dans le travail opérationnel. Le travail pour lequel le prix est accordé peut être cummulatif sur une période de plusieurs années, ou peut être une seule contribution remarquable.

e) PRIX EN OCÉANOGRAPHIE APPLIQUÉE

Peut être décerné pour une contribution significative en océanographie appliquée au Canada. La personne nommée DOIT être membre de la Société.

f) MÉDAILLE J. P. TULLY EN OCÉANOGRAPHIE

Peut être décerné à une personne dont les contributions scientifiques ont eu un impact significatif en océanographie au Canada.

g) CITATIONS ENVIRONNEMENTALES

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

h) CITATION FOR OUTSTANDING RADIO AND TELEVISION WEATHER PRESENTATION

Only Canadian weather products will be considered. Any regular on-going weather program series may be submitted for consideration. Nominations can be made for high standard of performance over a period of time or the media outlet's response for a particular event. Normally submissions include audio tapes of three consecutive radio broadcasts or VHS recordings of three consecutive telecasts along with the date and time of the programs, the name of the presenter, station, city, etc. However written justification will also be accepted and reviewed as submitted. Nominations must be made by either Centres or individual members. Nominations will be judged on the quality of informative, educational value, appeal to the audiences, a high level of technical and professional presentation, etc.

PLEASE NOTE

1. The deadline for submission is rigidly observed due to other Committee deadlines and the high volume of copying required. Complete submissions must be in the hands of the Secretary by January 27, 1995.

Allow sufficient time for mail or courier. If desired, the Secretary of the Prizes and Awards Committee has access to fax (604) 664-9195.

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

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

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

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

h) CITATION POUR L'EXCELLENCE EN PRÉSENTATION DES PRÉVISIONS MÉTÉOROLOGIQUES À LA RADIO OU À LA TÉLÉVISION

Seules les productions canadiennes sont éligibles. Toutes séries régulières de diffusion météorologique sont admissibles. La nomination peut être basée sur un standard élevé et soutenu de communications ou sur la reconnaissance des médias sur événement particulier. Une bande audio de trois émissions radiophoniques consécutives ou un enregistrement VHS de trois émissions télévisées consécutives est requis. La date, le temps des émissions, le nom du présentateur, la station, la ville, etc, doivent être indiqués. Une justification écrite de la candidature n'est pas obligatoire. Toutefois, si désirée, une telle justification peut accompagner la bande afin d'aider le comité de sélection. Les extraits soumis seront jugés pour leur valeur informative et/ou éducative, attrait pour le public, et auront un niveau de présentation technique et professionnel élevé, etc.

VEUILLEZ PRENDRE NOTE

1. La date limite doit être respectée étant donné les autres échéances du comité et la grande quantité de reproduction requise. Les candidatures doivent être entre les mains du secrétaire à le 27 janvier, 1995.

Il faut allouer suffisamment de temps pour le transport du courrier. Si vous le désirez, le secrétaire du comité des prix et bourses peut recevoir des transmissions par fac-similé au (604) 664-9195.

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

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

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

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

ACCREDITED CONSULTANTS/EXPERTS-CONSEIL ACCREDITES

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

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

(1) The applicant must possess an appropriate undergraduate ... degree from a recognized university.

(2) The applicant must possess at least one of the following types of specialised training:

   (i) post-graduate degree from a recognised university in meteorology or oceanography.

   (ii) post-graduate degree from a recognised university in the natural or applied sciences or mathematics specializing in one or more branches of meteorology or oceanography; or

   (iii) three years of on-the-job meteorological or oceanographic experience.

3) Upon completion of the above educational and training requirements, the applicant must have spent at least two years of satisfactory performance at the working level in the field of specialisation included in this document. This should include at least some consulting experience.

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

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

(1) L'applicant doit possèder un degré universitaire de premier cycle approprié d'une institution reconnue.

(2) L'applicant doit posséder au moins un des types suivants de formation spécialisée.

   (i) degré de deuxième ou troisième cycle d'une universitaire reconnue en météorologie ou océanographie;

   (ii) dégré de deuxième ou troisième cycle d'une universitaire reconnue en sciences naturelles ou appliquées ou en mathématiques avec spécialisation dans une des branches de la météorologie ou de l'océanographie; ou

   (iii) trois années d'expérience de travail en météorologie ou en océanographie.

(3) Une fois les exigences d'éducation et formation complétées, l'applicant doit avoir au moins deux années de travail, avec performance satisfaisante, dans un champ de spécialisation mentionné dans ce document. Une certaine expérience d'expert-conseil est nécessaire.

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