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SCMO

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La Société canadienne de météorologie et d'océanographie

June/juin 1994 Vol. 22 No. 3

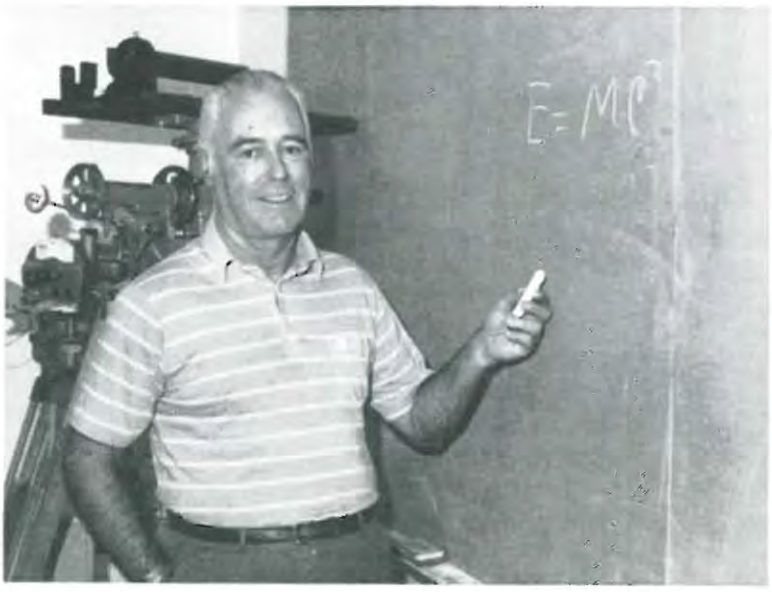
SYMPOSIUM

À la mémoire d'André J. Robert

Les méthodes numériques en sciences atmosphériques et océanographiques

André J. Robert Memorial

Numerical Methods in Atmospheric and Oceanic Sciences



Montréal 1994

October 5-7
5 - 7 octobre

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Atelier de travail
COMPARE
workshop

October 3 - 5
3 - 5 octobre

CMOS Bulletin SCMO

Editor/Rédacteur Prof. Jean-Pierre Blanchet
Département de physique, Université du Québec à Montréal
Case Postale 8888, succursale « Centre-Ville », Montréal, Qc., H3C 3P8, Canada

Inside / En Bref

EDITOR'S COLUMN

The next issue of the ***BULLETIN*** **22**(4), August 1994, will go to press on July 20th, 1994. Contributions are welcome and should be sent before July 8 to:

Prof. Jean-Pierre Blanchet
Physics Department
University of Quebec at Montreal
P.O. Box 8888, Station « Centre Ville »
Montréal, Qué., H3X 3P8, Canada
Tel. : (514) 987-3316
Fax:: (514) 987-6621
E-mail: bulletin@osiris.phy.uqam.ca

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.

French does not transmit completely on internet. The problem is with accents that are maped above the standard ASCII set. It is still possible to send your text in French if you convert all accent characters into a specific code. This can be done by global change in your word processor. We only have to agree on a notation. I suggest the following codes:

é	/e/	è	\e\	ê	^e^	ë	:e:
ï	:i:	à	\a\	â	^a^	ö	:o:
ç	?c?	ù	\u\	É	/E/	È	\E\

When I find the time I will write a utility to convert this in both directions from plain text to ASCII Standard and vice versa.

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 DE L'ÉDITEUR

Le prochain numéro du ***BULLETIN*** **22**(4), août 1994 sera mis sous presse le 20 juillet '94. Vos contributions sont les bienvenues. Me les faire parvenir d'ici le 8 juillet à l'adresse suivante:

Prof. Jean-Pierre Blanchet
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Université du Québec à Montréal
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Montréal, Qué., H3C 3P8, Canada
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Internet: bulletin@osiris.phy.uqam.ca

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.

Les fichier graphiques peuvent être envoyés dans le format HPGL comme des fichiers normalisés ASCII ou sur papier de bonne qualité avec des caractères de dimension convenable pour une réduction à l'échelle de cette colonne.

Les textes en français peuvent être transmis par courrier électronique (internet) mais ceci nécessite une traduction des caractères ayant des accents. Je vous propose les codes montrés dans la colonne voisine, en utilisant votre éditeur pour faire le changement sur l'ensemble du texte avant la transmission.

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

Note:

In the previous issue we presented a picture of the First Annual Congress of CMOS (May 1967). About 8 persons in that picture were not identified. I have received the information from Reuben A. Hornstein that the individual labeled 9 is most likely L.B. Foster, known as Manty Foster, formerly O.I.C. of Greenwood Meteorological office at the Atlantic Weather Central.

A Non-Tornadic Severe Storm Climatology of Southern Ontario Adjusted for Population Bias: Some Surprising Results

David Etkin and Michael Leduc

Environment Canada, 4905 Dufferin St., Downsview, Ontario, M3H 5T4

ABSTRACT

Newark (1983) developed a climatology of tornado density for Southern Ontario. No similar climatology exists for severe non-tornadic storms. Even a casual glance at the thirteen years of data used reveals a strong population bias; correction factors can be as large as an order of magnitude. This paper proposes adjusted statistics to correct for this bias, with some surprising results. As expected, the highest incidence of severe thunderstorms lies between Lake Erie and Southern Lake Huron, with an adjusted frequency of 22 events a^{-1} $(1{,}000\ km^2)^{-1}$ for Essex county. However, Simcoe county (the site of two devastating F4 tornadoes in 1985) lying just east of Georgian Bay, though considerably below Essex in tornado frequency, is found to have an adjusted frequency of 24 events a^{-1} $(1{,}000\ km^2)^{-1}$ of non-tornadic severe storm frequency. As sample sizes are not large and there are difficulties in estimating correction factors, the statistics generated in this paper must be interpreted with caution.

RÉSUMÉ

Newark (1983) a développé une climatologie de densité de tornades pour le Sud de l'Ontario. Il n'existe pas de climatologie similaire pour les orages violents sans tornades. Même un examen sommaire de treize années de données utilisées révèle un fort biais de population. Les facteurs de corrections peuvent être aussi importants qu'un ordre de grandeur. Cet article propose un ajustement statistique des données pour corriger ce biais. Les résultats sont étonnants. Comme prévue, la plus forte incidence d'orages violents se retrouve dans la région située entre le lac Érié et le sud du lac Huron avec une fréquence ajustée de 22 événements par milliers de km^2 pour le comté d'Essex. Cependant, le comté Simcoe (lieux de 2 tornades importantes en 1985) tout juste au sud de la Baie Georgienne, bien que considérablement moindre que la fréquence des tornades dans le comté d'Essex, obtient une fréquence ajustée de 24 événements par millier de km^2 pour l'incidence de orages sévères sans tornades. Puisque les échantillonnages sont faibles il est difficile d'estimer les facteurs de corrections et les statistiques présentées ici doivent être interprétées avec circonspection.

1. Introduction

The Ontario Weather Centre is responsible for providing warnings of possible severe weather events for the province of Ontario, except for the extreme northwestern portion of the province adjacent to Manitoba and, until recently, the counties in eastern Ontario south and east of Ottawa. Since 1980 a log of all reported severe weather events has been maintained. The source of information for these events includes the normal weather station network, newspaper reports, public phone calls and reports from the volunteer severe weather watcher network. With 13 years of data, this log offers the opportunity for quantitative analysis. The purpose of this paper is to develop a climatology of non-tornadic severe weather events for southern Ontario.

2. Description of Study Area

Southern Ontario (Figure 1), the most southern portion of Canada, lies nestled between three of the Great Lakes, Lake Erie and Lake Ontario to the south and Lake Huron and Georgian Bay to the west. The provincial boundary to the northeast is the Ottawa River, beyond which lies the Province of Quebec.

Although their location is continental, the Great Lakes have a profound influence on the local climate. Summer temperatures tend to be cooler near the lakeshore due to the presence of relatively cool water, and seabreeze cells are common. The southern location also means that hot weather is not uncommon; in July mean daytime maximum temperatures exceed 27°C in some locations and extremes have exceeded 40°C (AES, 1982). When a maritime tropical airmass engulfs the region, dewpoints can reach the low to

Figure 1: Counties and regional municipalities of southern Ontario.

mid twenties. As a result, convective weather is common in the summertime. The mean number of days with thunderstorms exceeds 5 per month, except near the lakes where the cooling effect of the water reduce that number to between 3 and 5.

3. Description of the Database

The severe weather log from the Ontario Weather Centre forms the basis of the database. Over time, the amount of detail and the type of information recorded varies. In order to standardize the database, events were typed as wind, rain or hail. Tornadoes, as a special case, were excluded from this analysis. Although many events are located by city, it was common for only the county or regional municipality to be noted with respect an event's location, therefore any spatial analysis can only be done at a county level. Several counties in extreme eastern Ontario are not included in this study since until recently they were the responsibility of the Québec Weather Office.

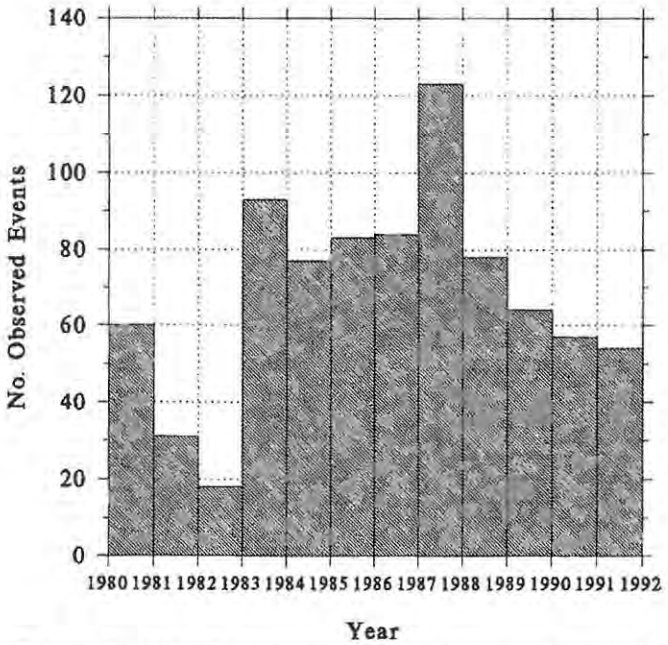

Figure 2: Annual observed non-tornadic severe weather events in southern Ontario.

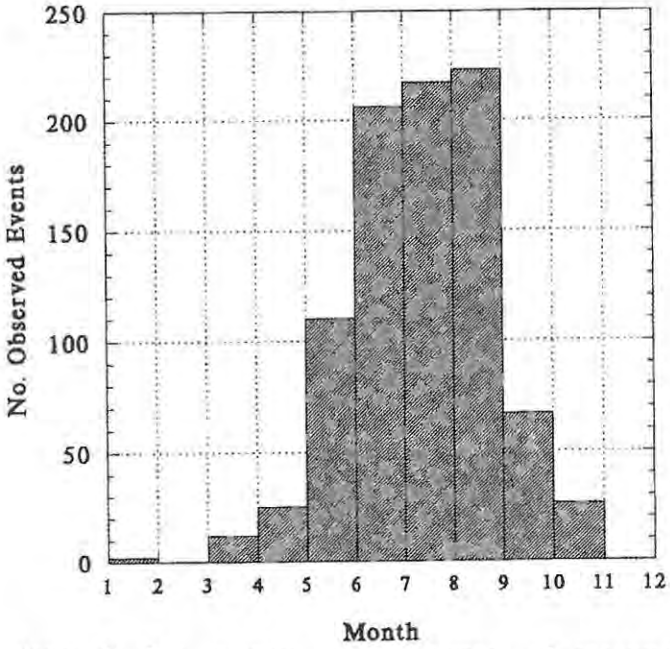

Figure 3: The average monthly number of observed non-tornadic severe weather events in southern Ontario

The Ontario Weather Centre definition of a severe weather event has changed over the years. The changes have been made in order to tighten up the criteria and to achieve national consistency. The following details the criteria before and after 1988.

A summer severe weather event is defined as a convective storm which produces a tornado, large hail having a diameter 20 mm or larger (except 10 mm or larger prior to 1988), strong winds greater than 90 km/h (except greater than 80 km h^{-1} prior to 1988) or heavy rain with amounts greater than 50 mm in one hour or 75 mm in three hours. Where no measurements are available but significant crop or property damage occurs, then the presence of a severe weather event is inferred. The vast majority of events are logged because of reported damage from newspapers, weather stations and volunteers, not measured amounts or sizes. Although it cannot be demonstrated, it seems likely that the impact of the above changes (before and after 1988) should be small, though they would tend to reduce the number of events.

Another change, adopted in 1990, was a tightening up of the definition of an event. Since 1990 two damage

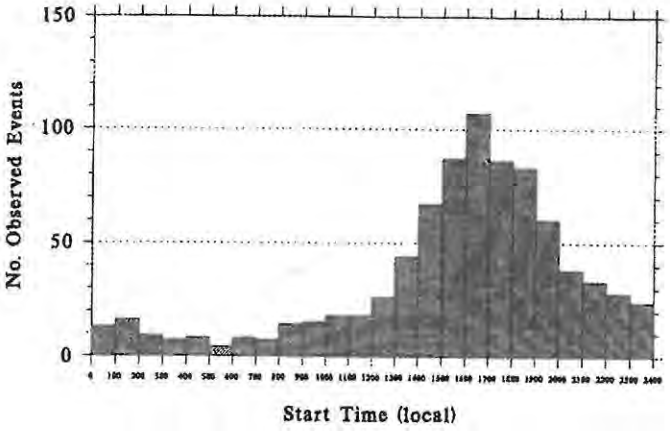

Figure 4: The diurnal frequency of non-tornadic severe weather events in southern Ontario.

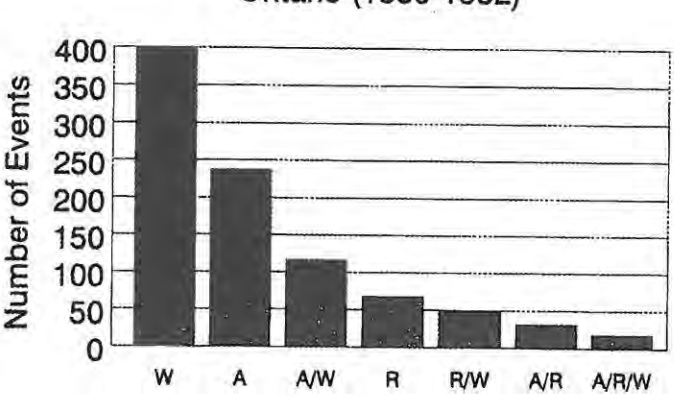

Figure 5: The frequency of non-tornadic severe weather events in the Ontario Weather Centre forecast region delineated by type. The event code is: hail (A), rain (R), wind (W). By comparison, the number of tornadoes observed in the same time period was 360.

reports separated by either 30 km or 30 minutes are considered two separate events. If this criterion is not met only one event is counted even if the damage reports cross a political boundary. Prior to 1990 events were "region events"; damage reports over 30 km or 30 minutes apart were often scored as one region event.

The percentage of storms defined as tornadoes in Ontario has dropped since the early 1980's. The advent of Doppler radar and the increased understanding of microbursts, derechos and other straight line wind damage producers have lead to better evidence for deciding that a storm is non-tornadic. This would have the tendency to increase the number of non-tornadic wind events over the years.

The chance that any particular event gets included in the database depends on many factors. Population and building densities are important, as well as the presence of a local weather office or community newspapers. Others might include the cost of telephoning a weather office in the event it is long distance, or the interest of the local population in weather events.

4. Analysis

Figure 2 shows the number of recorded non-tornadic events in the database, by year. This graph must be read with caution, as it is a function of the quality of the observing network and the definition of severe weather as well as the number of events. Note the maximum in 1987. On average the record shows 68 events per year, which, as will be shown later, is probably less than the true number of events by almost an order of magnitude. Most of the events occur, as expected, during the months of July and August (as shown in Figure 3), with a very rapid drop off in the fall. The diurnal pattern of the events is shown in Figure 4, with the expected afternoon maximum occurring between 4 and 5 pm. Figure 5 shows the frequency of single and combined events by type. The most frequently observed events are winds(W), followed by hail(A), combined wind/hail(W/A), rain(R), combined rain/wind(R/W), hail/rain(A/R) and hail/rain/wind (A/R/W).

Of considerable interest, in addition to the above analysis, is how the events are distributed spatially. The number of events in each county was initially normalized by area (ie. the number of events per 1,000 km^2). This distribution of events appeared quite unrealistic, and it was clear that other effects such as population distribution had to be considered. The effect of population and urbanization on the reporting of severe weather (mainly tornadoes) has been noted by other authors (eg. Flora, 1953; Grazulis, 1991; Newark, 1983; Snider, 1977), with urban areas typically reporting more tornadoes by about a factor of 3, and areas with a local weather office also reporting more by a factor of 3 to 4.

In order to investigate the effect of population and urbanization, the 1991 city and county areas and populations were obtained from the provincial Municipal Directory (MMA, 1993). A scatter plot of events/area against population density is quite revealing (Figure 6). On this plot, except for the regional municipality of Toronto, all of the population densities are below $5.5ha^{-1}$. Toronto is the only area in the database which is saturated with respect to population. Toronto has a much higher event density (number of events a^{-1} (unit $area^{-1}$) than other areas, even though from a climatological perspective, it is not considered to be in a 'severe weather alley'. As there is no reason to assume that the number of events at Toronto are overestimated, this leads to the conclusion that the number of events in the other counties and regional municipalities are much higher in reality than were recorded.

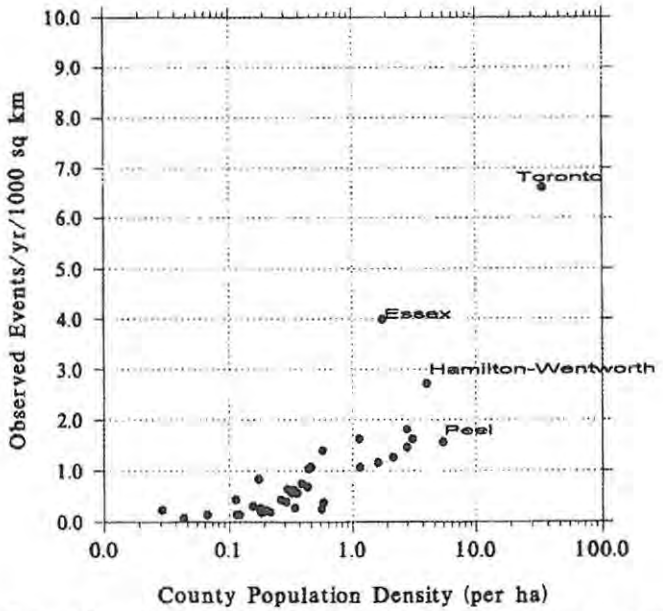

Figure 6: *Scatterplot of event density as a function of population density. Except for Toronto which is totally urban, each point represents a mixture of rural and urban.*

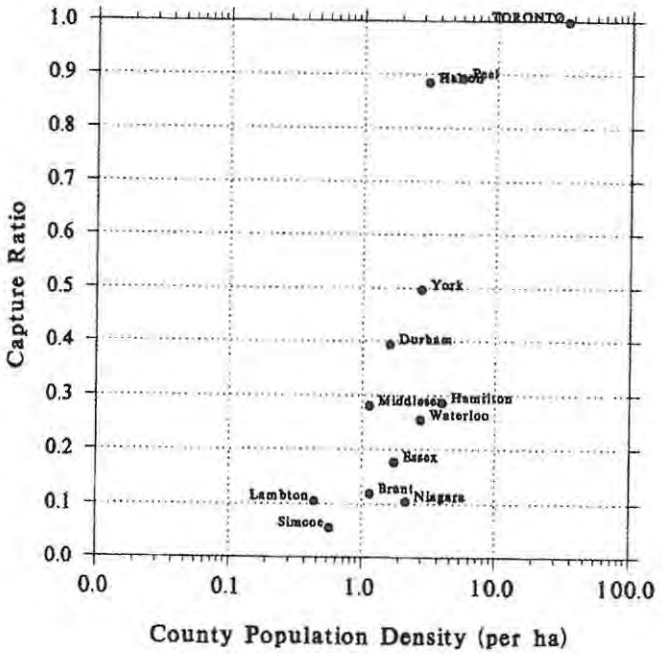

Figure 7: *Fraction of recorded events (capture ratio) as a function of population density.*

In order to investigate the urban/rural effect, counties or municipalities with significant cities were selected. A city is considered 'significant' if it has an area greater than 7,000 ha, a population greater than 70,000 and a population density greater than $6 ha^{-1}$.

The number of events in each city was compared to the number of county events. Assuming that all city events are captured and recorded in the database (an assumption which probably results in an underestimate of the number of events), then the ratio

$$\text{Capture Ratio} = \frac{\text{number of county events a}^{-1}\ [\text{unit area}^{-1}]}{\text{number of city events a}^{-1}\ [\text{unit area}^{-1}]}$$

represents the fraction of county events captured (where the city events are included in the county value). These ratios are shown on Figure 7, which compares it to county population density. As expected, the capture ratio increases with population density. Note that many counties capture less than 20% of the events. The areas with the best capture ratios, Peel (89%), Halton (89%), York (50%) and Durham (40%), lie adjacent or near to Toronto. It is interesting to note, though not necessarily significant, that the two areas (Peel and Halton) at 89% lie just west of Toronto where many of the staff at the weather office live!

An estimate of the 'true' number of events in each area can be made by extrapolating the city event density to the county or regional municipality. This assumes that the city climatology and the rural climatology are the same. For the four regions near Toronto (noted above), this led to an event density of about $^1/_2$ to $^1/_3$ of Toronto's, whereas the authors expected it to be about the same. It may be that these areas have a reporting bias, or the assumption that the population density in these cities is high enough to record all events may be optimistic. It is difficult to explain why Halton and Peel counties (west of Toronto) have lower event densities. Possibly the Toronto data does slightly overestimate the 'true' number of events by counting the occasional storm more than once due to frequent public reporting, though it is hard to conceive of an error of a factor of 2 to 3. It may result, in part, from sampling error, as the Halton analysis is only based upon 8 city events and the Peel analysis on 13 city events. Also, in the counties of Peel and Halton, most of the city population lies within the area which gets lake breezes off of Lake Ontario which tend to inhibit convective activity. Therefore extrapolating the city experience to more northern parts of the county might result in an underestimate.

It is difficult to estimate the number of events in counties without cities as the capture ratio is not known. It seems almost certain, though, that the capture ratio would tend to be lower than in the case of counties with cities. Certainly the population densities are lower, and lie outside the data range of the analysis above, mainly in the 0.1 to 0.4 ha^{-1} range. An estimate of the true number of events can be obtained by dividing the number of observed events by a typical capture ratio. Since the sample size of observed events tend to be small (less than 30) one must view the results of this exercise with caution. However, an order of magnitude estimate can be obtained by assuming a capture ratio of 0.1 (note that the estimate resulting from this assumption would be too low in most cases, however. The calculation becomes extremely uncertain for very small capture ratios since it involves division by very small numbers). This order of magnitude assumption avoids the problem relating to instability, but does not differentiate between counties with higher or lower population densities.

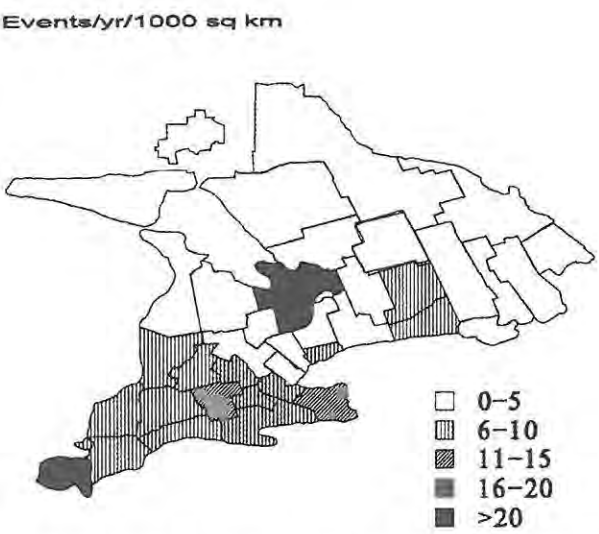

Figure 8: *Estimated severe weather event density for southern Ontario.*

These estimates along with the estimates for the counties with cities are plotted on Figure 8, which show the number of events a^{-1} $(1{,}000\ km^2)^{-1}$.

The two counties with the greatest number of events are Essex in the extreme southwest and Simcoe just southeast of Georgian Bay. Essex county, because of its extreme southwest location, is vulnerable to eastward moving storms from Michigan which have a land-only trajectory. Climatologically it also has a higher frequency of hot, humid days than other regions in southern Ontario. Explaining the higher frequency of storms in Simcoe county is complicated by the fact that the surrounding areas show low event densities, though the low population densities in these counties (the capture ratio of 0.1 is almost certainly an overestimate) may explain the lower numbers. The Simcoe maximum is likely due to local terrain effects, and has been often noted by forecasters at the Ontario Weather Centre.

5. Conclusions

The number of reported severe weather events depends critically upon population density, as well as a number of other factors which are less easy to define. As a result, it is difficult to estimate the true number of events that occur, which in rural areas could easily be an order of magnitude greater than observed. However, available information is sufficient to highlight climatological patterns and high risk areas. For southern Ontario, the two counties of highest incidence are Essex and Simcoe, with the southwest generally showing a greater number of severe weather events than elsewhere.

7. References

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Acknowledgements:

I would like to thank Shannon Smith for undertaking the onerous task of entering 13 years of data into a database.

. . . From CMOS Headquarters

I am pleased to report that the office is now on E-mail and our number is « CMOS@ottmed.meds.dfo.ca ». Thanks to DFO and our colleagues in Meds.

This office and perhaps members of the Society are in receipt of a promotional pamphlet sent out by *Gordon and Breach Science Publishers*, Switzerland, announcing the publication of a new scientific journal entitled « THE ATMOSPHERE-OCEAN SYSTEM ». The print is such that « ATMOSPHERE-OCEAN » is dominant in the title. We have sought advice on the matter and a letter has been dispatched to the publisher and senior editors drawing attention to the confusion that will be created with the duplication of titles. The matter may not rest there and will have to be addressed again in the near future.

Our membership files are showing that an alarming number of members have not renewed their memberships or have simply allowed them to lapse. We are serving notice to all, particular the chapters and centres, that by the fall a blitz will be undertaken to sign up lapsed past members. Everyone can help by contracting past members and bringing them back into the fold. The new CMOS ***Bulletin*** SCMO is a drawing card with news and informative articles.

With the forthcoming General Meeting coming up in May-June, I would like to seek your views on a couple of action items that came to this office. We were asked by individual overseas to verify the authenticity of a couple of Canadian meteorological consulting companies. Unfortunately we were unable to locate the companies in question and were in effect not very helpful. To me this was an unfortunate situation and started me to think whether or not CMOS should be in position to provide some insight on a company ? If not CMOS then who? I have toyed with the idea of a simple registry of company information that would be provided to a requester. The question I put to members of CMOS is whether or not this should be a function or service of CMOS? If so, what should be the policies and guidelines? If not - end of subject.

A couple of other external activities include the provision of information to the AGU for inclusion in an international directory, as well as a letter to the CRTC in support of the broadcast license renewal application of the Weather Network.

Neil J. Campbell
Executive Director

Volume 32, No. 2, June 1994 juin

A diagnostic study of an apparent *instant occlusion* cyclogenesis event during ERICA.
G.M. Pearson and R.E. Stewart

METOZ: Total ozone from meteorological parameters.
L. Poulin and W.F.J. Evans

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

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

Northern Hudson bay and Foxe Basin: Water masses, circulation and productivity.
E. Peter Jones and Leif G. Anderson

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

Stochastic interpolation as a means to estimate oceanic fields.
L.E. Borgman, C.D. Miller, S.G. Signorini and R.C. Faucette

Interannual variability of sea-ice cover in Hudson bay, Baffin Bay and the Labrador Sea.
J. Wang, L.A. Mysak and R.G. Ingram.

Sea-ice dynamics and CO_2 sensitivity on a global climate model.
D. Pollard and S.L. Thompson

On the detioration of icebergs in the marginal ice zone.
S. Venkatesh, D.L. Murphy and G.F. Wright

Research Notes:
A note on the effects of virtual temperature.
M. Danard

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

CLIMATE AND SEA LEVEL CHANGE

R.A. Warrick, E.M. Barrow and
T.M.L. Wigley, editors
434 pp., 138 figures. 2 Plates
Cambridge 1993

by

R.W. Stewart
University of Victoria, Victoria B.C.

Despite the unquestioned caliber of the editors and the contributors, this compendium is mildly disappointing. The editors have been unlucky. The volume derives from an International Workshop on Climate Change, Sea Level, Severe Tropical Storms and Associated Impacts held in September, 1987. At that time the Intergovernmental Panel on Climate Change (IPCC) was gearing up, and it was decided to delay this volume so that it could be updated by IPCC work. The ICCP moved very efficaciously and its first report was published in 1990 and update in 1992. The present volume was much slower (although with the same publisher) and did not appear until well into 1993. There are few signs that it was much modified by the IPCC work except for a final Annex which summarized some of the 1992 IPCC findings.

The result is that the volume has a very dated feel about it. Further, it was never designed to be an overview from a historical perspective, so does not meet the needs of those trying to ascertain what has been going on in the field in the last couple of decades. Thus it rather falls between stools.

Almost every discussion of the possible impacts of prospective climate change or « Global Warming » starts with discussion of sea-level rise. However a close reading of this book would lead one to ask what all the fuss is about. Case studies are given for a number of coast lines, including (for example) the Netherlands, East Anglia in England, Bangladesh, Argentina and Hong Kong. In all cases the conclusion, either explicit or implicit, is either that any problems are the result of local human folly (unwise land use, groundwater use or sediment flow modification) or are readily dealt with by ordinary measures. Even for the Netherlands, surely the most vulnerable of all thoroughly developed countries, « the extra costs of adaptation to a 1 m sea level rise over one century can be estimated at 10 billion dollars. » One meter is at the outer limit of contemporary estimates, and 10 billion dollars is only 4% of annual GNP, so these extra costs are deeply in the noise of the economy!

Bangladesh is of course less able to deal with the problems by spending money. The costs are more likely to be expressed in human lives than in dollars, perhaps because of changes in storm surge patterns or in starvation. However even in this case, sea level rather palls before the effects of storm surges (even without sea level rise,) river flooding, changes in river courses and (most importantly) the still inexorable natural increase in population.

The fuss, of course, arose from estimates made a couple of decades ago of sea-level rise of as much as 5 m over the next century, caused by a hypothetical collapse of the West Antarctic ice sheet. Such a collapse was perfectly legitimate scientific speculation at the time, but the ensuing close study has led to a great reduction in the estimates of risk. None of this is more than hinted at in this book and its omission is an unfortunate lacuna.

Another gap is the lack of serious discussion of small coral islands, despite the fact that inhabitants of these islands are among the most concerned and are the most vocal in intergovernmental fora in demanding consideration of the adverse effects of sea-level rise and the need for restraining the increase in atmospheric CO_2. It would have been particularly useful to have a chapter on the potential for growth of corals, and on how this potential is influenced by human activities.

Despite these weaknesses, and more minor annoyances like the failure to impose on authors any discipline in deciding whether time advances from right to left or from left to right in diagrams (sometimes different on opposing pages in the same article!) this book has its place. It should be in all the libraries, and to those with a generalist of peripheral interest in the subject is a valuable source of wide range of information. There are useful chapters on past sea-level changes, on the technology and methodology of measuring and analyzing date on sea level, on the sources of relative sea-level change and on impacts, to single out a few.

Specialists will find that they already have more and more-up-to-date information on their shelves.

Physically, the book is utilitarian. Margins are narrow and the print is rather small. The binding and cover are reminiscent of those on volumes of the Journal of Fluid Mechanics, and the paper is inferior to that used by Atmosphere-Ocean. Nevertheless, my copy has resisted a good deal of carrying in briefcases and on airplanes, so I suspect that it will stand up well to use in libraries.

André J. Robert Memorial Symposium on Numerical Methods in Atmospheric and Oceanic Sciences

5-7 October 1994

In honour of the late Dr. André Robert who passed away on November 19, 1993, Environment Canada's Recherche en prévision numérique is hosting the "André J. Robert Memorial Symposium on Numerical Methods in Atmospheric and Oceanic Sciences". The symposium will start at noon on Wednesday, October 5th, and end on Friday afternoon, October 7th, 1994. The venue will be l'Université du Québec à Montréal, where Dr. Robert was most recently a professor in the Department of Physics. The symposium will consist of invited oral presentations focusing on numerical methods in atmospheric and oceanic sciences, with the papers to be published subsequently in a book form. It is felt that this will reflect André Robert's personal commitment to scientific excellence, and will be a fitting tribute to someone who continued to make outstanding contributions right up until his untimely death. The list of confirmed invited speakers includes R. Bates, R. Benoit, J. Côté, R. Daley, J. Dukowicz, T.N. Krishnamurti, R. Laprise, L. Leslie, C. Lin, B. Machenhauer, F. Mesinger, K. Miyakoda, T. Nitta, T. Orlanski, J. Pailleux, R.A. Pielke, J. Pudykiewicz, H. Ritchie, R. Sadourny, A. Staniforth, C. Temperton and D. Williamson. Since there will be no parallel session, the number of oral presentations will be limited, but there will be a poster session for further contributed presentations. Interested authors are requested to submit abstracts, not exceeding 300 words, to Dr. Harold Ritchie, Recherche en prévision numérique, 2121 Trans-Canada Highway, 5th Floor, Dorval, Québec, Canada H9P 1J3; Tel. (514) 421-4739; FAX (514) 421-2106; e-mail hritchie@rpn.aes.doe.CA. Abstracts should be received by 1 August 1994.

There will also be several social activities associated with this symposium, which will follow a COMPARE Workshop (please see the companion announcement) that is being organized for the first half of the week. For registration details and further information regarding the symposium or the workshop, please contact Mr. Jean-Guy Cantin (Local Arrangements), Environment Canada, 100 Alexis-Nihon Blvd, 3rd Floor, Saint-Laurent, Québec, Canada H4M 2N8; Tel. (514) 283-1162; FAX (514) 283-1165; e-mail cantinjg@cid.aes.doe.CA.

Symposium à la mémoire d'André J. Robert sur les méthodes numériques en sciences atmosphériques et océaniques

du 5 au 7 octobre 1994

En hommage à monsieur André J. Robert, Ph.D., décédé le 19 novembre 1993, Recherche en prévision numérique d'Environnement Canada tiendra un "Symposium à la mémoire d'André J. Robert sur les méthodes numériques en sciences atmosphériques et océaniques". Le symposium débutera à midi, le mercredi 5 octobre, et se terminera en après-midi, le vendredi 7 octobre 1994. Le tout se déroulera à l'Université du Québec à Montréal où monsieur Robert agissait, encore tout récemment, à titre de professeur au sein du département de physique. Une pléiade de conférenciers invités feront alors une série d'exposés portant sur les méthodes numériques en sciences atmosphériques et océaniques; ces exposés seront ensuite sous forme de monographie. On soulignera ainsi l'engagement personnel d'André J. Robert à maintenir l'excellence dans le domaine scientifique, tout en rendant un hommage bien mérité à un homme qui a continué de s'impliquer à fond jusqu'à sa mort prématurée. La liste des conférenciers qui ont confirmé leur présence comprend R. Bates, R. Benoit, J. Côté, R. Daley, J. Dukowicz, T.N. Krishnamurti, R. Laprise, L. Leslie, C. Lin, B. Machenhauer, F. Mesinger, K. Miyakoda, T. Nitta, T. Orlanski, J. Pailleux, R.A. Pielke, J. Pudykiewicz, H. Ritchie, R. Sadourny, A. Staniforth, C. Temperton and D. Williamson. Étant donné qu'aucune séance parallèle n'aura lieu, le nombre d'exposés oraux sera limité, mais une séance d'affichage est prévue pour les personnes désireuses de présenter d'autres contributions. On peut donc soumettre un résumé, d'au plus 300 mots, à M. Harold Ritchie, Ph.D., Recherche en prévision numérique, 2121 route Transcanadienne, 5^{e} étage, Dorval, Québec, Canada H9P 1J3; tél. (514) 421-4739; télécopieur (514) 421-2106; courrier électronique hritchie@rpn.aes.doe.CA. Les résumés doivent être reçus avant le 1er août 1994.

Le symposium sera également marqué de plusieurs activités mondaines, suite à un atelier de travail COMPARE (veuillez référer à l'avis d'accompagnement) qui se déroulera en début de semaine. Pour obtenir de plus amples informations concernant l'inscription, le symposium ou l'atelier de travail, veuillez communiquer avec M. Jean-Guy Cantin (Comité organisateur), Environnement Canada, 100 boul. Alexis-Nihon, 3^{e} étage, Saint-Laurent, Québec, Canada H4M 2N8; tél. (514) 283-1162; télécopieur (514) 283-1165; courrier électronique cantinjg@cid.aes.doe.CA.

First COMPARE Workshop 3-5 October 1994

The COMPARE (Comparison Of Mesoscale Prediction And Research Experiments) Project is an international community effort for mesoscale modelling conducted under the auspices of the WMO/CAS/JSC Working Group on Numerical Experimentation. The objectives of the project are to:

1) propose and perform model and data assimilation inter-comparison experiments in a collaborative scientifically-controlled manner to further understanding and predictive capability at the mesoscale;
2) identify important issues of mesoscale research and prediction that may be addressed by numerical experimentation; and
3) establish over a period of years a test-bed of a broad range of mesoscale cases using high-quality raw data sets, assimilation systems, and analyses.

Results of forecast experiments for the first COMPARE case (a marine cyclogenesis event) from 10 participating groups have been compiled. A study to evaluate them is underway and will be presented at the workshop. A second case (a mountain meteorology case from the Franco-Spanish PYREX field study) has been selected, and further cases are also under consideration. The objectives of the workshop are to discuss:

1) the results of the first case and draw conclusions;
2) discuss the second case and formulate a set of numerical experiments to be conducted by interested groups; and
3) the long-term objectives for the project and select further cases.

If you are interested in participating in this international effort and expressing your views about the future orientations of the COMPARE project, please contact Dr. Clément Chouinard; Tel. (514) 421-4761; Fax (514) 421-2106; e-mail cchouinard@rpn.aes.doe.CA.

The workshop will be held at Hôtel des Gouverneurs in beautiful downtown Montreal from Monday morning to Wednesday noon, and will be followed by the "André J. Robert Memorial Symposium" which you are cordially invited to attend as well. For registration details and further information regarding the symposium or the workshop please contact Mr. Jean-Guy Cantin (Local Arrangements), Environment Canada, 100 Alexis-Nihon Blvd, 3rd Floor, Saint-Laurent, Québec, Canada H4M 2N8; Tel. (514) 283-1162; Fax (514) 283-1165; e-mail cantinjg@cid.aes.doe.CA.

Premier atelier de travail COMPARE du 3 au 5 octobre 1994

Le projet COMPARE (Comparison Of Mesoscale Prediction And Research Experiments) a été mis sur pied par la communauté internationale, dans le but d'étudier des modèles à méso-échelle, sous les auspices du Groupe de travail CSA/CSM de l'OMM portant sur l'expérimentation numérique. Les objectifs du projet sont les suivants :

1) proposer et effectuer des expériences d'intercomparison de modelisation et d'assimilation, afin de mieux comprendre et prévoir les phénomènes à méso-échelle;
2) identifier les problèmes de recherche et prévision à mésoéchelle que l'expérimentation numérique peut aborder; et
3) établir, sur un certain nombre d'années, un banc d'essai pour l'étude de phénomènes à méso-échelle, en utilisant des ensembles de données brutes de haute qualité, des systèmes d'assimilation et des analyses.

Dix groupes d'intervenants ont effectué des prévisions d'essai lors du premier cas COMPARE (cyclogénèse maritime). Les résultats font présentement l'objet d'une étude, et seront dévoilés lors de l'atelier de travail. Un deuxième cas (relié à la météorologie alpine faisant partie de l'étude sur le terrain PYREX, qui est menée par la France et l'Espagne) a déjà été choisi et d'autres sont présentement évalués. Lors de l'atelier, on vise à :

1) évaluer les résultats du premier cas et à en tirer des conclusions;
2) traiter du deuxième cas et à proposer une série d'essais numériques à l'intention des groupes intéressés; et
3) établir les objectifs à long terme pour le projet et à choisir d'autres cas.

Si vous êtes intéressé à participer à ce regroupement international et à faire valoir vos idées concernant l'orientation future du projet COMPARE, veuillez communiquer avec M. Clément Chouinard, Ph.D.; tél. (514) 421-4761; télécopieur (514) 421-2106; courrier électronique cchouinard@rpn.aes.doe.CA. L'atelier se déroulera à l'Hôtel des Gouverneurs, en plein coeur du centre-ville de Montréal, du lundi matin au mercredi midi, et sera suivi du "Symposium à la mémoire d'André J. Robert", auquel vous êtes cordialement invité. Pour obtenir de plus amples informations concernant l'inscription, le symposium ou l'atelier de travail, veuillez communiquer avec M. Jean-Guy Cantin (Comité organisateur), Environnement Canada, 100 boul. Alexis-Nihon, 3^{e} étage, Saint-Laurent, Québec, Canada H4M 2N8; tél. (514) 283-1162; télécopieur (514) 283-1165; courrier électronique cantinjg@cid.aes.doe.CA.

International GCIP / MAGS Workshop on Scaling in Hydrometeorological / Hydrologic Processes and Models

September 19-23, 1994
Dunsmuir Lodge
Victoria, British Columbia

Background

The science Panel for GCIP (GEWEX Continental-Scale International Project) has recognized the importance of the scaling issue in both the modelling and measurement aspects of its program. To a large extent, the program design addresses the fact that hydrologic modelling and process studies are most applicable for specific locations and small river basins. The GCIP program proposes to incorporate this understanding of local processes into larger-scale atmospheric models and macro-scale hydrologic models. This emphasis introduces many complications into the GCIP modelling and measurements programs. Similar scale-related issues have been identified within the Canadian GEWEX program which focuses on northern river basins.

This workshop is considered to be an important step in resolving a number of issues related to the natural scaling of hydrometeorological processes; procedures and data requirements for scaling up from point processes to model paramaterizations, and procedures for modifying hydrologic models developed for one scale to another scale of watershed. Recommendations from this workshop will provide important input into future GCIP and GEWEX plans.

The workshop will be held on Vancouver Island in British Columbia, Canada near Victoria at the Dunsmuir Lodge. The Lodge is located approximately 2 kilometres from the Victoria airport on the top of a hill overlooking Sidney and the southeastern coast of the Island. The lodge, which is owned and operated by the University of Victoria, has gained an international reputation for its excellent meeting facilities, its scenic view and its cuisine.

Scientific Program

Themes:

The workshop discussions will center on three main themes including:

- scaling of hydrometeorological processes including cloud systems, synoptic scale systems, precipitation patterns and land surface features and conditions including snow cover effects.
- techniques and data requirements for scale analysis, including the analysis of remote sensing data.
- scaling in macroscale models and the experiences in scaling up from small watersheds to large basins.

Specific Topics:

Sessions will include one or two theme overview papers followed by a number of scientific presentations based on current research. Papers are invited in the following subject areas:

- natural scaling of hydrological processes;
- multiscale processes in mesoscale convective cloud systems;
- scale analysis of precipitation, clouds, and soil moisture;
- scale characteristics of snow patterns before and during snow melt;
- parameterization of vegetation, topography and snow conditions;
- techniques and data requirements for scale analysis;
- procedures for scaling up from models of local processes to grid-scale parameterizations;
- practical limits for the inclusion of local processes in continental and global scale models;
- parameter estimation for hydrologic models;
- studied carried out as part of the GCIP Integrated System Test.

Some planned presentations include:

Dr. R. Avissar (USA): A parameterization of subgrid-scale land-atmosphere interactions in large-scale hydrometeorological models;

Dr. M. Jasinski (USA): Coupled land hydrology and mesoscale atmospheric simulation models;

Dr. M. S. Sivaplan (Australia): A nested catchment approach to modelling large catchments and associated scale issues;

Prof. A. Roback (USA): Temporal and spatial scales of soil moisture variations from Russian observations and AMIP simulations;

S. Benedict (Switzerland): Preliminary framework for a WCRP data system;

Dr. L. Means et al.(USA): Spatial scaling characteristics of observed and model generated hourly precipitation: raingauge vs MM4;

Dr. S. Lovejoy (Canada/France): Rain as a multi-fractal process: universality, phase transitions and generalized scale invariance.

A special session will also be held on the GIST (GCIP Integrated Systems Test) project being carried out in Oklahoma during the summer of 1994. (Contact John Lease

for more details.) A second session on hydrologic modelling is being planned by John Schaake.

Recommendations from the workshop will be submitted to both the GCIP and MAGS Science Panels. If appropriate, selected presentations will be integrated into a book on scaling.

Costs

There will be no registration fee for the Workshop. Participants will be expected to cover the costs of their rooms and their meals as well as their transportation to Victoria. Some support may be available for selected University participants through the NOAA Global Change Program Office and the Canadian GEWEX Program Office.

The rate for a single room and meals for a 24-hour period is $159.00 (Canadian). (Please note that the cost of the rooms subsidizes the conference rooms, consequently, we can forgo the registration fee). There are 45 rooms available at the lodge. If the lodge is filled, additional accommodation will be sought in Sidney, B.C.

Program Committee Members

Rick Lawford, National Hydrology Research Centre, Saskatoon, Canada;
John Schaake,National Atmospheric and Oceanic Administration, Washington, USA;
Mike Coughlan, National Atmospheric and Oceanic Administration, Washington, USA;
Eric Wood, Princeton University, Princeton, USA;
Terry Krauss, National Hydrology Research Centre, Saskatoon, Canada.

Workshop Sponsors

Atmospheric Environment Service (Hydrometeorological Processes Division)
The Canadian GEWEX Secretariat
The Canadian Meteorological and Oceanographic Society
The NOAA Office of Global Programs
The International GEWEX Project Office

ANDRÉ J. ROBERT MEMORIAL SYMPOSIUM
SYMPOSIUM À LA MÉMOIRE D'ANDRÉ J. ROBERT

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Registration Fees		Frais d'inscription	
Symposium	CDN $ 200	Symposium	200 $ CAN
Banquet (each extra ticket)*	CDN $ 40	Banquet (chaque billet supplémentaire)*	40 $ CAN
Wine and Cheese (each extra ticket)*	CDN $ 15	Vin et fromage (chaque billet supplémentaire)*	15 $ CAN
Cold Buffet (each extra ticket)*	CDN $ 10	Buffet froid (chaque billet supplémentaire)*	10 $ CAN

Please send your registration form, along with your cheque payable to the "Receiver General for Canada", to:

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PLEASE REGISTER BEFORE SEPTEMBER 1st, 1994

* Please do not forget to indicate the number of extra tickets required for each activity.

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All prices quoted include provincial and federal taxes when applicable.

Veuillez faire parvenir votre formulaire, accompagné de votre chèque fait à l'ordre du "Receveur général pour le Canada", à :

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Banquet_____ billet(s) suppl.
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Les frais d'inscription du symposium comprennent le banquet, le vin et fromage, et le buffet froid.

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

FIRST COMPARE WORKSHOP
PREMIER ATELIER DE TRAVAIL COMPARE

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On Monday 3rd and Tuesday 4th, the hotel will offer a luncheon buffet (hot and cold) for an approximate cost of CDN $ 15. or US $ 11. (tax and service included) payable at the time. Participants are encouraged to partake of the buffet to facilitate the scheduling of sessions.

Persons not registering for the André J. Robert Memorial Symposium are nevertheless invited to participate in the following symposium activities:

October 5, noon to 1:00 pm at UQAM
Cold Buffet (each ticket) $ 10
I wish to reserve _____ ticket(s) (payable at the registration desk).
October 5, 1:00 to 1:45 pm at UQAM
Overview of Dr. André J. Robert's contributions

Please send your registration form to:

Dr. Clément Chouinard
Recherche en prévision numérique
2121 Trans-Canada Highway
5th Floor
Dorval, Quebec
Canada H9P 1J3

Fax (514) 421-2106

Aucun frais d'inscription
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Les lundi 3 et mardi 4 octobre à l'heure du déjeuner, l'hôtel offrira un buffet (chaud et froid) à un coût d'environ 15 $ CAN ou 11 $ US (taxes et service inclus) payable au moment du déjeuner. Nous encourageons les participants à prendre part à ce buffet, afin de faciliter l'horaire des sessions.

Les gens qui ne s'inscrivent pas au Symposium à la mémoire d'André J. Robert, faisant suite au Premier atelier COMPARE, pourront toutefois se prévaloir des activités suivantes du symposium :

5 octobre de 12h00 à 13h00 à l'UQAM :
Buffet froid (chaque billet) 10 $
Je désire réserver ____ billet(s) (payable au bureau d'inscription)
5 octobre de 13h00 à 13h45 à l'UQAM :
Rétrospective de la carrière de M. André J. Robert, Ph.

Veuillez faire parvenir votre formulaire à :

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Recherche en prévision numérique
2121, route Transcanadienne
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Dorval (Québec)
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As set out in the document, "CMOS Guidelines for Accreditation", the criteria are:

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

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

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

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

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

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

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

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

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

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

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

   (ii) diplôme 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 d'expérience de travail, avec performance satisfaisante, dans un champ de spécialisation mentionné dans ce document. Une certaine expérience d'expert-conseil est nécessaire.

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

SEIMAC LIMITED, Weather Source
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_____ _____
(Signature) (Date)

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