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Editor / Rédacteur Prof. Jean-Pierre Blanchet
Alain Trudel, assistant
Département des sciences de la Terre,
Université du Québec à Montréal
Case Postale 8888, succursale "Centre-ville"
Montréal, Qc, H3C 3P8, Canada

Inside / En bref

- | | | |
|----|----------------|--|
| 3 | ARTICLES: | Northern Hemispheric Temperature Trends from Instrumental Surface Air Records. <i>M. Richard Morgan and Roger Pocklington.</i> |
| 6 | | Buoys On Ice - A Cooperative Effort. <i>Ed Hudson.</i> |
| 11 | COMMENTS: | Engineers and Scientists Reach Agreement on New Definition of Engineering Practice. <i>Ambury Stuart</i> |
| 12 | NEWS/NOUVELLES | Confirmation of Subarctic Warming Reported at Global Warming Conference in San Francisco. |
| 12 | | Scientists Say El Nino Can Now Be Predicted a Year in Advance. |
| 14 | CONGRESS: | 1994 CMOS Awards |
| 15 | | The 29 th Annual CMOS Congress |
| 16 | | CMOS Prizes and Awards for 1995 / Prix et Bourses de la SCMO pour 1995 |
| 17 | | Prizes and Awards Criteria / Critères d'éligibilité des Prix et Bourses |
| 19 | INFORMATIONS: | Long-Range Weather and Crop Forecasting Group Activity. |
| 19 | | Edinburgh '96. |
| 20 | | Memorial University of Newfoundland |
| 20 | | Royal Meteorological Society Calendar for 1996. |
| 20 | | Book Review / Recension. |
| 21 | | Special Notice to Members and Subscribers to <i>Atmosphere-Ocean</i> / Avis spécial à tous les membres et abonnés d' <i>Atmosphere-Ocean</i> . |
| 23 | | An Appeal to Holders of Any CMOS Publications / Appel à tous les détenteurs de publications de la SCMO. |
| 24 | | CMOS New Members / Nouveaux membres de la SCMO. |
| 25 | | ACCREDITED CONSULTANTS / EXPERTS-CONSEIL ACCRÉDITÉS |

EDITOR'S COLUMN

The next issue of the **BULLETIN 23** (6), December 1995, will go to press by mid December. We desperately need your contributions, short articles, notes, chronicles, etc. (see p.21 "Important request...").

We 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. We 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 we use Word 6.0 for Windows), however, we 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 23** (6), Décembre 1995 sera mis sous presse vers la mi-décembre. Vos contributions sont les bienvenues (voir p. 21). Veuillez me les faire parvenir d'ici le début décembre.

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,
rédacteur du Bulletin de la SCMO

FRONT PAGE: Photos from the 1995 CMOS Congress in Kelowna, B.C..

FRONTISPICE: Mosaïque d'images du congrès de la SCMO 1995 à Kelowna, C.B.

Top-left / en haut à gauche Dr. Jim Bruce, Dr. P. E. Merilees receiving Patterson medal / recevant la médaille Patterson, Dr. B. E. Goodison (prize in Applied Meteorology / prix en météorologie appliquée), Dr. M. Béland, (bottom / bas) panel, (bottom-right / en bas à droite) Dr. P. Zwack.

Northern Hemispheric Temperature Trends from Instrumental Surface Air Records

M. Richard Morgan¹ and Roger Pocklington²

*¹CLIMARCON Dartmouth, N.S., and ²Department of Fisheries and Oceans,
Physical and Chemical Sciences, Bedford Institute of Oceanography*

ABSTRACT

We have examined annual mean surface-air temperature records for defined regions of the Northern Hemisphere (in northwestern Europe, northern North Atlantic, and North America north of Mexico). We find that in only two regions, South-Pacific Coast and California-interior Valleys of the US, has there been significant warming, greater than 0.3°C, over the last 30 years. Conversely, in 13 of 44 regions, there has been a comparable decline in temperature over the same time-period. Warming of the US and Canada as a whole has been marginal over the past 60 years and is largely confined to warming in the northwestern part of North American continent during the past decade, while in eastern and southern regions there has been significant cooling.

1. Introduction

In the last issue of the *Climatological Bulletin*, we published regional analyses of annual mean air and sea-surface instrumental temperature records collected during this century at meteorological stations in eastern Canada and around the periphery of the northern North Atlantic Ocean (Morgan et al. 1993). We showed that curvilinear relationships fitted regional data more closely than simple linear relationships, and that the North Atlantic area, as a whole, has been cooling since the middle of this century.

At the 28th CMOS Congress in 1994, we presented analyses of instrumental surface air temperature records dating back to the early 18th century for 20 stations in northwest Europe having a reasonably continuous record over the past 200 years. Some stations in the mid-to-late 1700s were as warm as in the mid-to-late 1900s; the warmest decade on record for the majority of stations in northwest Europe occurred before the 1980s (often in the 1930s).

Having established that data collected over a 200-year period gives a different appreciation of temperature change from that derived from analyses of only the last 100 years (e.g. Gullet and Skinner 1992), we now present analyses of northern hemisphere data for the more-recent years, 1931-1990. Reasons for this choice of time-period are:

- the increase in the observational data-base from the start of this period due to the demands for information for aviation;

- the greater reliability of the data resulting from World Meteorological Organization (WMO) efforts to standardise equipment and specify observational practices;
- the recent publication of historical data-sets of national and regional temperature anomalies for the United States (1900-92, relative to a 1961-90 reference period for 1221 individual stations; Karl et al. 1994), and Canadian national and regional annual temperature departures (1895-1992, from a 1951-80 reference period for 131 individual locations; Findlay et al. 1994).

2. Methods

Temperature change has been quantified by two indices:

- the difference between the temperature for the most recent decade (1981-90) and that of the warmest decade prior to 1980 during the period of study, and
- the difference between the 1931-60 temperature normal (30-year mean; the time-interval recommended by WMO (1967)) and the 1961-90 temperature normal.

The former indicates whether the most-recent decade is the warmest in each region during the period of study; the latter shows whether the most-recent 30-year period is warmer than the preceding one.

¹ 32 Rocklin Drive, Dartmouth, N.S., Canada B2X 2S1; tel: (902) 435-4234.

² PO Box 1006, Dartmouth, N.S., Canada B2Y 4A2; tel: (902) 426-8880; FAX: (902) 426-6695; Internet: pocklington@bionet.bio.dfo.ca

3. Results

Analyses of regional decadal mean surface air temperature records (Table 1) show that in 26 out of 44 defined regions in the area of study, the warmest decade of the century occurred before the decade of the 1980s. Moreover, in 14 of these regions, temperatures were over 0.3 °C warmer in an earlier decade than in the 1980s. The regions showing this amount of cooling between an earlier decade and the most-recent decade are: Greenland, Iceland + Jan Mayen; northern and southern Norway, Faeroes + Shetland, Gulf of Bothnia; Southern Plains, South Coastal Plain, Gulf Coast, Eastern Prairies, Southern Appalachians, Southern Piedmont, and Coastal Southeast of the US; Atlantic Canada. Regions showing comparable (> 0.3 °C per decade) recent warming are: North and South Pacific Coasts, California Interior Valleys, Southern Desert, and Northern Plains of the US; Northwestern Forest, Prairies, and Southern BC Mountain regions of Canada. Some of these warming regions meet at the national boundaries (e.g. Northern Plains region of US is contiguous with Prairies region of Canada).

In the case of the normals (Table 1), in only 13 out of the 44 regions has the most recent normal (1961-90) been warmer than the 1931-60 normal. The regions with the greatest decline in temperature (> 0.3 °C over 30 years) between the earlier normal and the most recent normal are: Greenland, Iceland & Jan Mayen, Bermuda; northern and southern Norway, Faeroes & Shetland, Gulf of Bothnia; South Coastal Plain, Gulf Coast, Eastern Prairies, Southern Appalachians, Southern Piedmont, and Coastal Southeast of the US; Atlantic Canada. Regions showing comparable (> 0.3 °C over 30 years) recent warming are: South Pacific Coast, and California Interior Valleys of the US.

Table 1. Regional decadal-mean surface air temperatures and normals.³

Region	Warmest decade	Decadal diff. (D)	Normal diff. (N)
NORTH ATLANTIC			
Greenland	1930s	-1.55	-0.83
Iceland + Jan Mayen	1930s	-1.28	-1.01
Bermuda	1950s	-0.03	-0.39
NORTHWEST EUROPE			
Northern Norway	1930s	-0.67	-0.45
Southern Norway	1930s	-0.62	-0.38
Faeroes + Shetland	1930s	-0.64	-0.49
Ireland	1940s	-0.21	-0.22
England	1940s	-0.07	-0.14
Continental Europe (1)	1940s	-0.29	-0.23
Continental Europe (2)	1940s	-0.15	-0.05
Gulf of Bothnia	1930s	-0.76	-0.47
UNITED STATES			
North Pacific Coast	1980s	+0.33	+0.23
South Pacific Coast	1980s	+0.31	+0.37
North Cascades	1980s	+0.16	+0.16
California Interior Valleys	1980s	+0.34	+0.35
East Slope North Cascades	1980s	+0.07	+0.14
Great Basin	1980s	+0.13	+0.17
Southern Desert	1980s	+0.31	+0.06
Northern Rockies	1980s	+0.20	+0.22

³ Data sources:

North Atlantic individual station means; Jones et al. 1993.
 NW Europe individual station means; Jones et al. 1993.
 Canadian regional temperature departures; Findlay et al. 1994.
 US regional temperature anomalies; Karl et al. 1994.

Northern Plains	1980s	+0.36	+0.04
Southern Rockies	1980s	+0.27	-0.07
Northern Steppes	1980s	+0.02	-0.01
Great Lakes	1980s	+0.08	-0.20
Southern Steppes	1930s	-0.28	-0.19
Southern Plains	1930s	-0.36	-0.28
South Coastal Plain	1930s	-0.42	-0.44
Gulf Coast	1930s	-0.48	-0.47
Eastern Prairies	1940s	-0.34	-0.43
Northern Appalachians	1950s	-0.11	-0.24
Southern Appalachians	1930s	-0.32	-0.42
Northern Piedmont	1950s	-0.02	-0.19
Southern Piedmont	1940s	-0.38	-0.52
Coastal Northeast	1950s	-0.01	-0.10
Coastal Southeast	1940s	-0.40	-0.44
CANADA			
Atlantic Canada	1950s	-0.46	-0.29
Northeastern Forest	1950s	-0.10	-0.12
Great Lakes/St. Lawrence	1980s	+0.01	-0.17
Northwestern Forest	1980s	+0.52	+0.06
Prairies	1980s	+0.44	+0.07
Southern BC Mountains	1980s	+0.55	+0.11
Mackenzie District	1980s	+0.06	+0.01
Yukon/North BC Mountains	1980s	+0.17	-0.05
Pacific Coast	1930s	-0.02	-0.04
Arctic Tundra	1950s	-0.21	-0.12

(D) is decadal mean for the 1980s minus warmest decadal mean prior to 1980.

(N) is normal for 1961-90 minus normal for 1931-60. Norway is divided North and South of the Arctic circle. Continental Europe:

(1) is mean of Paris, Brussels, Berlin and Copenhagen;

(2) is mean of Prague, Munich, Zurich.

Table 2. United-States and Canadian national decadal means and normals.⁴

	Warmest decade	Decadal diff. (D)	Normal diff. (N)
United States national	1930s	-0.01	-0.09
Canadian national	1950s	+0.12	-0.08

(D) is decadal mean for the 1980s minus warmest decadal mean prior to 1980.

(N) is normal for 1961-90 minus normal for 1931-60.

Analyses of the national annual temperature records for the US and Canada (Table 2) show a small cooling in the US on both the decadal and normal scales. In Canada, the most recent decade was the warmest, but only by 0.1 °C and the 1961-90 normal is cooler than the 1931-60 normal by approximately this same amount. Any warming in Canada (nationally) over the past 60 years has been marginal and the case for overall warming since 1885 rests upon the sparse pre-1930 record.

4. Discussion

That increases in the atmospheric concentration of greenhouse gases might influence global climate was proposed in the last century ("Thus if the quantity of carbonic acid increases in geometric progression, the augmentation of the temperature will increase nearly in arithmetic progression."; Arrhenius 1896). However, it is only in the past two decades that this hypothesis has become the most important topic in climate research and a major international

⁴ Data sources:

U.S. national temperature anomalies; Karl et al. 1994.
 Canadian national annual temperature departures; Findlay et al. 1994.

political issue. Reports by the International Panel on Climate Change (IPCC; Houghton et al. 1990 et seq.) advise that global warming is inevitable if greenhouse gas emissions (especially those from combustion of fossil fuels) are not stabilised, and governments have agreed to develop response strategies to counter this eventuality. Such responses must take into account the high cost of adaption and abatement measures. It is essential to be sure of the sign and the magnitude of the climate change signal regionally - as well as globally - if appropriate measures are to be initiated.

Examining temperature change over the period 1880-1990 using linear correlation indicates that warming is occurring in consonance with the rise in CO₂ emissions over the same period. However, when either a longer record of 200-250 years (Pocklington et al. 1994), or the shorter record of the last 60 years (present paper) is examined, a less simplistic picture emerges. There has been significant cooling in eastern North America, around the northern North Atlantic and in northwestern Europe since the 1950s. Although CO₂ increase may in theory be capable of raising surface air temperature globally, its actual impact is questionable when compared to the magnitude of naturally-induced climate change (Rind and Overpeck 1993) and of counteracting effects (e.g. cooling due to aerosols; Jones 1994).

5. Conclusion

It would be premature to develop responses in anticipation of a general warming when so many regions in the North Atlantic, northwest Europe and North America are indicating not a warming but a cooling trend. This is particularly true of the US and Canada. Warming as a whole has been marginal over the past 60 years and is largely due to warming in the northwestern part of the North American continent during the past decade, while in the eastern and southern regions, cooling has prevailed. The rate of increase of global mean temperature of about 0.3 °C per decade required by current IPCC warming models (Houghton et al. 1990 et seq.) requires much greater rates of warming in high-latitude regions of the Northern Hemisphere than we have seen to date. Acknowledgements

The assistance of the Climatological Section of the Atmospheric Environment Service, the Hadley Centre of the Meteorological Office (U.K.), and the Carbon Dioxide Information Center (Oak Ridge, Tenn.), in the provision of data is gratefully acknowledged. Funding for this research was provided, in part, by the Panel on Energy Research and Development. We thank Kenneth F. Drinkwater, J. Michael Bowers and Owen Hertzman for reviewing the manuscript.

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Buoys On Ice - A Cooperative Effort

Ed Hudson¹

Environment Canada, Prairie and Northern Region

Introduction

Participants in the International Arctic Buoy Programme (IABP) (<http://iabp.apl.washington.edu/>) cooperate to ensure that the objectives of the International Arctic Buoy Programme: "to establish and maintain a network of drifting buoys in the Arctic Ocean to provide meteorological and oceanographic data for real-time operational requirements and research purposes including support to the World Climate Research Programme (WCRP) and the World Weather Watch Programme" are met. It is a continuous struggle as buoys sometimes fail on deployment, get battered to the point of no longer working when the ice around them breaks up or melts away, batteries finally power down, or the buoys exit the Arctic Basin through Fram Strait to a watery grave in the North Atlantic. An ongoing program of putting buoys on ice is a reality of the International Arctic Buoy Programme and Canadian participants play an active role. This paper shares some of the cooperation that has already occurred, or is about to occur, during 1995 with a focus on the deployment of 19 May 1995.

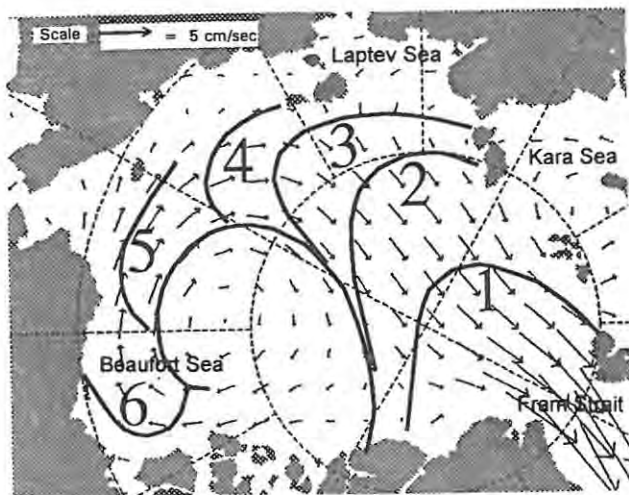


Figure 1. Annual mean of ice motion across the Arctic Basin (small arrows) and the number of years the ice resides in the Arctic Basin before exiting through Fram Strait (solid lines and numbers). (Figure courtesy Polar Science Center Applied Physics Laboratory, University of Washington.)

Banner year for cooperation

1995 is shaping up to be a banner year for cooperation both nationally (Canada) and internationally. March 23rd, 1995, a Canadian Forces *Aurora* deployed 2 buoys for Environment Canada. In May, a buoy owned by Environment Canada was shipped to the U.S. where it will join 2 German, 1 U.K., and 2 U.S. buoys being provided for deployment aerially later this summer by the U.S. Navy in the Beaufort Sea. May 19th, 1995, Environment Canada personnel did a surface deployment of 2 U.S. buoys on the ice to the northwest and west of Mould Bay respectively. The deployment is discussed in the next section. Later this year, there will be deployments in the Laptev Sea as a result of cooperation between Russian and German participants in the International Arctic Buoy Programme and in the Kara Sea as a result of cooperation between Russian and American participants in the Programme.

More opportunities

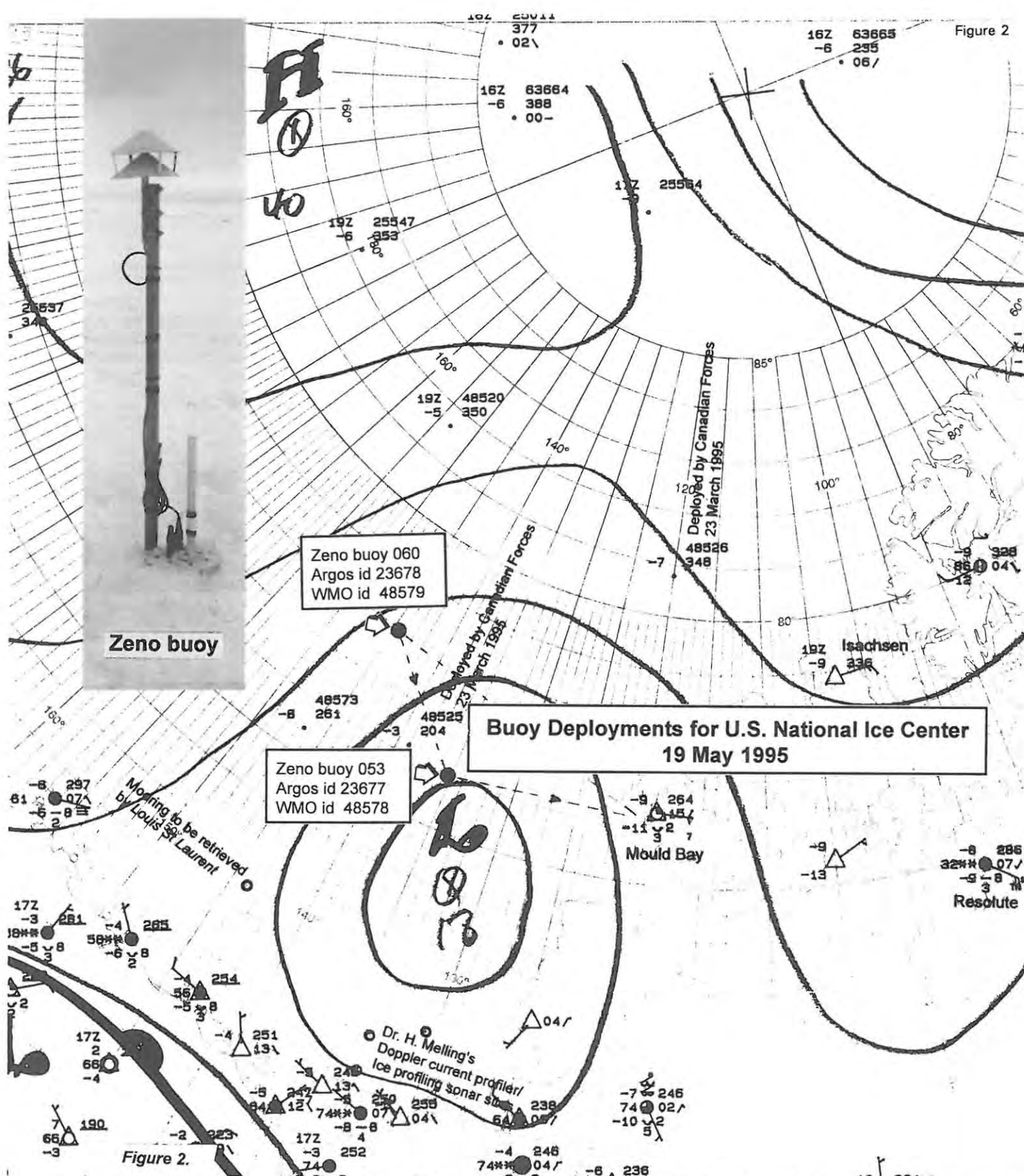
There were/are other opportunities for cooperation. For example, Dr. Humfrey Melling, Institute of Ocean Sciences (melling@ios.bc.ca) offered to do a buoy deployment in the Canadian Beaufort late March/ early April. Since 1990 when he first put them in, Dr. Melling has visited his 3 Doppler current profiler / ice profiling sonar sites located in the southern Canadian Beaufort late March. While he is 'up there' Dr. Melling also does CTD profiles to 72°N. He offered to do a buoy deployment as an extension of one of these CTD flights. That opportunity has passed but there is another potential deployment asset. Late August or early September 1995, the Canadian Coast Guard icebreaker *Louis St. Laurent* will be in the Beaufort retrieving a scientific mooring at 72° 30'N 144°W and is 'available' for a buoy deployment in that area.

See Figure 2 for both deployments done and areas where there are 'opportunities' for deployments.

Adventures on ice 19 May 1995

Early May 1995 two buoys belonging to the U.S. National Ice Center arrived in Edmonton. The question was could Environment Canada and specifically the Monitoring and Systems personnel of Prairie and Northern Region get the buoys deployed where the National Ice Center wanted them and at a cost that was not huge. Fortunately, two electronics

¹ hudson@edm.ab.doe.ca



This map, the surface analysis for 1800 UTC 19 May 1995 done at the Arctic Weather Centre, has been annotated to show the deployment sites of 19 May 1995. Looking at the data plots, you will note that deployments of 19 May are close to existing buoys. However, the buoys deployed by the Canadian Forces *Aurora* in March have small batteries so they are not expected to last much longer and buoy 48573 is old so its transmissions are expected to cease any day.

The map has also been annotated to show the mooring sites of Dr Melling's 3 Doppler current profiler / ice profiling sonar sites and the site of the mooring that the icebreaker *Louis St Laurent* will be visiting late August or early September 1995.

technicians were to be in the Canadian Arctic Islands mid May working at Environment Canada sites. For their work, they had arranged for, and would be paying for, a charter from Resolute Mould Bay. Thus, the American buoys and the technicians could all be in Mould Bay for a deployment exercise mid May. The buoys were shipped off to Resolute from Edmonton to meet their destiny. There was another race on and that was with the temperatures on the pack. Climatologically, temperatures rise dramatically to reach values near zero by the end of May and temperatures near freezing make landing on the ice of the Arctic Basin tricky. Thus, it was important to get the deployment done as soon as possible.

May 19th, 1995, Environment Canada Monitoring and Systems Electronics Technicians Mark Pyper and Boyd Jahnke assisted by Richard Maurice, a contract person stationed at the Mould Bay upper air station, and two Bradley aircrew deployed a buoy at 77°59.12" N, 144°43.22" W and another at 75°58.28" N 135°18.94" W. The buoys provide both air and internal temperature and pressure data and their positions can be calculated each time they transmit thereby allowing ice motion computations. The buoys also share battery voltage information. The buoys sample continuously but only transmit during 4 time slots totalling 8 hours a day. The buoys transmit the observations taken during their non-transmitting times.

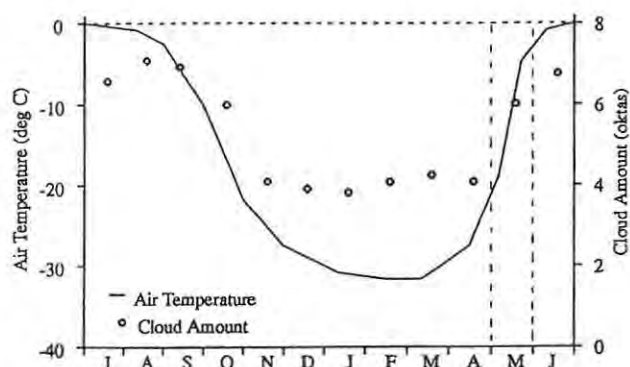


Figure 3. Seasonal mean of surface air temperature and mean cloud cover for the Arctic Basin. Note the rapid increase in temperatures through April into May to reach near zero values by the end of May. (Figure courtesy Polar Science Center, Applied Physics Laboratory, University of Washington.)

First Buoy, Zeno 060

The first buoy, Zeno 060, is at approximately 78°N 145°W or about 650 km northwest of Mould Bay - A Bradley Aviation *Twin Otter* chartered though Polar Continental Shelf Project departed Mould Bay, NWT on May 19, 1995 and flew off to the northwest. On board were two crated buoys - each wooden crate containing the payload canister weighing 136 kg

with each canister 8' in length and 8" in diameter. The aircraft was ski equipped and temperatures several degrees below freezing made landing with skis possible. Once 'on ice' at 77°59.12" N, 144°43.22" W, under sunny skies and a biting wind, a hole was drilled through the ice to accommodate the 8" diameter shaft of the buoy and Zeno ice buoy 060 (Argos id 23678 / WMO id 48579) was assembled. Several holes were drilled before 'thick' ice was encountered, ice thickness across the pan of ice varying from 0.8 to 2 metres. The buoy got planted in the 2 metre thick ice and was activated at 192130 UT. The aircraft then departed for the next location. This buoy continues to 'report' faithfully and its data is accessed, processed, and put on the global tele-communications network by the Environment Canada, Edmonton, local users (satellite) terminal. For those with access to the GTS, the buoy data can be found under the header SSVX02 with its Argos id 23678. The data is in WMO buoy code.

Second Buoy, Zeno 053

The Second Buoy, Zeno 053, is located at approximately 76° N 135° W or about 350 kilometres west of Mould Bay - At the next location, 75°58.28" N 135°18.94" W, under cloudy skies and still biting winds, Zeno Ice Buoy 053 (Argos id 23677 / WMO id 48578) was assembled and slipped into a drilled hole. The hole for this buoy was 1.5 metres thick. The buoy was activated at 20/0058 UTC but, as discovered in subsequent days, this buoy is not transmitting data.

See Figure 4 for some 'action' shots during the deployment of the second buoy.

1996 and opportunities

Having successfully deployed buoys from Mould Bay 19 May 1995, Environment Canada looks to a similar exercise from Mould Bay, or perhaps Isachsen, in 1996. Such on-ice deployments, allow one to deploy a buoy with additional sensors such as a thermistor chain through the ice and down into the water. Secondly, temperature readings can come from a sensor mounted on a mast rather than from on or within the buoy. Thirdly, on site deployments facilitate using a battery that can last at least 2 to 3 years.

Now, if only we can track down, build, or buy enough buoys to take advantage of these opportunities!

Acknowledgments

The author gratefully acknowledges the figures (Figures 1 and 3) made available by the Polar Science Center, Applied Physics Laboratory, University of Washington.

Deploying Zeno buoy 53

75°58.28" N 135°18.94" W

19 May 1995

Figure 4



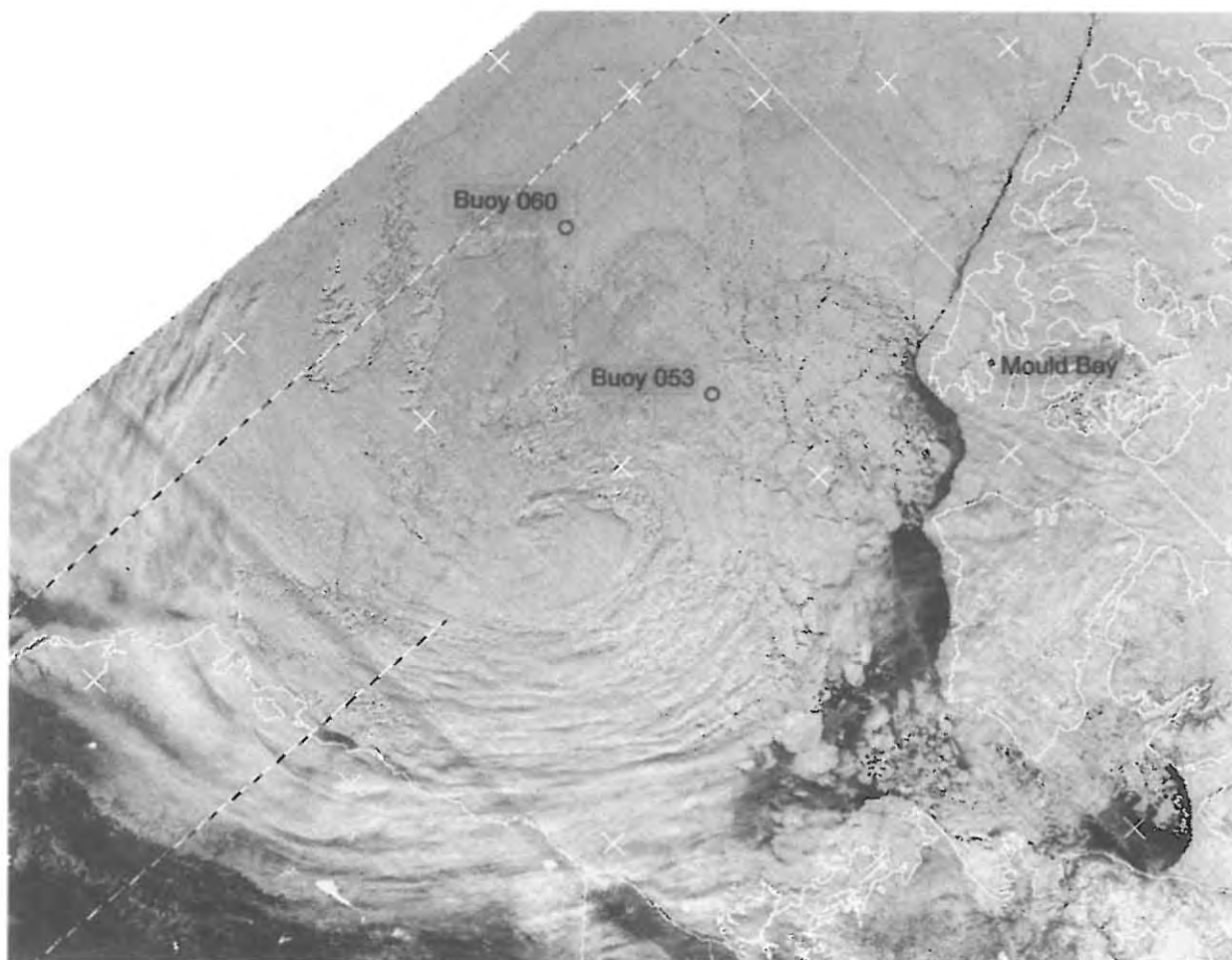


Figure 5. Satellite photo, 1946 UTC 19 May 1995, NOAA 14 channel 2 'visible' photo approximately 45 minutes before buoy 060 was activated. The 2 deployment sites are indicated by a 'O'. Per the logs of Pyper and Jahnke, it was sunny during the first deployment. Skies were cloudy for the second deployment.

Engineers and Scientists Reach Agreement on New Definition of Engineering Practice

by Ambury Stuart

In a previous article in the CMOS Bulletin and in a presentation to CMOS Council at the 1994 Congress I described negotiations that have been going on between the Canadian Council of Professional Engineers (CCPE) and the Natural Science Societies of Canada (NSSC) concerning a new definition of engineering practice that had been recommended by CCPE to provincial engineering associations for use in Engineering Acts across Canada. Scientists within the thirteen scientific societies constituting NSSC were greatly concerned that this new definition was so broad that it would bring many scientific activities within the scope of provincial engineering Acts, with the result that these activities could no longer be carried out by non-engineers. CMOS is one of the originating members of NSSC, and I have been representing our society in discussions with the engineers and other members of NSSC.

I am now delighted to be able to announce that CCPE and NSSC have successfully concluded our negotiations, and that CCPE has agreed to an exemption clause for natural scientists which it will recommend to all provincial and territorial engineering associations. This exemption for natural scientists reads as follows:

Nothing in the Act shall prevent an individual who either

i) holds a recognized honours or higher degree in one or more of the physical, life, computer or mathematical sciences, or who possess an equivalent combination of education, training and experience, or

ii) is acting under the direct supervision and control of an individual described in the preceding paragraph, from practising natural science, which, for the purposes of this Act, means any act (including management) requiring the application of scientific principles, competently performed.

It should be emphasized that this exemption is recommended by the CCPE to provincial engineering associations, but it is these associations and the relevant provincial legislature committees and ministries that determine the content of provincial Engineering Acts. The B.N.A. Act gives provincial governments authority over the professions, and each provincial Engineering Act is a unique document which is different from those of other provinces. Several provinces have begun to incorporate this exemption into proposals for amendments to their Engineering Acts. Others continue to avoid the issue.

It is the view of NSSC that engineering acts that include this exemption clause will not threaten the scientific

profession, but it is essential that the exemption be included in every provincial Engineering Act. In the past, scientists have been fortunate to have Peter Kirkby of the Canadian Association of Physicists staying in touch with legislative agendas across the country. Unfortunately, Peter is no longer with us, and it will be up to interested scientists in each province to be in touch with the relevant officials in provincial ministries of Justice, Labour or whatever to remain up to date with activities in each province. NSSC is available to advise members of its scientific societies, but it is no longer realistic to expect NSSC to remain current with all activities in all provinces.

NSSC societies and their members owe a great deal to Peter Kirkby, the long-time Chair of Professionalism at the Canadian Association of Physicists for his persistent attention to the welfare of scientists in Canada. It was Peter who recruited me to the NSSC project, who educated me in the intricacies of the various Engineering Acts and their implications, who lead us through the negotiations with the engineers, and who played an essential role in the successful conclusion of these negotiations. It came as a great shock to all of us when Peter suddenly passed away in March following an accident on his farm north of Toronto. Peter was a unique human being in very many ways. He was a careful and conscientious scientist with a heightened sensitivity to issues of justice and fair play. He was a very effective organizer and was able to pull individual scientists from a variety of disciplines together in a common cause. He was a dogged negotiator, whose persistent arguments wore down engineers and bureaucrats alike.

At his memorial service, we sang John Bunyan's "To be a Pilgrim", which neatly sums up Peter Kirkby:

*(He) who would true valour see, let him come hither,
here's one will constant be, come wind, come
weather*

*There's no discouragement shall make him once
relent*

His first avowed intent to be a Pilgrim.

*Whoso beset him round with dismal stories
Do but themselves confound; his strength the more
is.*

*No lion can him fright; he'll with a giant fight,
But he will have the right to be a pilgrim.*

An award in Peter Kirkby's name for Service to Canadian Science has been established by the Canadian Association of Physicists, and donations from Canadian scientists and others will be gratefully accepted at the Headquarters of the Canadian Association of Physicists in Ottawa. This office is co-located with our CMOS Ottawa office and has the same address: Suite 903, 151 Slater Street, Ottawa, Ontario, K1P 5H3.

Confirmation of Subarctic Warming Reported at Global Warming Conference in San Francisco

San Francisco - Researchers have definitively established a subarctic warming using the forest trees as barometers. They found throughout 20th century a definitive northward movement of the northernmost limit for pine trees in Finland, according to a paper presented at the 6th Global Warming Science and Policy Conference (GW6), April 3-6, 1995, San Francisco USA. The movement has been ongoing for most of the 20th century, and is due to climate warming.

A team led by Gustaf Siren of the Global Treeline Project (known as BLESCCO) has been working on this problem between 1951 and 1995. They have observed over half a century the movement of the coniferous treeline. This week they reported their finding for the first time in San Francisco.

In a paper to appear in the international journal the World Resource Review (WRR), Siren reports for their project the detailed scientific methodology, data, and conclusions. For half a century, they have tracked seed year frequencies to monitor successive warm years, performed dendrochronological time-series studies, fire studies, and detailed ecological studies in the field. This consistent observation and analysis have been conducted since the observation of an abundant seed year during 1948-50, up to the present time (1995), and the researchers discovered that climate change has favored the northward movement of the pine limit.

This extensive landmark experiment was performed in the tundra forest region of northernmost Finland in the subarctic. Similar experiments, although for such shorter time period, are being performed in Siberia and Alaska, the movement of the pine treeline northward is now confirmed throughout the second half of the 20th century in subarctic Finland and their rates are as follows: In the mountains the average advance of pine up the slopes has been about 20 m per seed year in the vertical direction. In the plains, the rate of advance varies between 40- 2,000 m per seed year northward.

This definitive result confirms our earlier anticipation that signals of climate warming can be clearly observed in the circumpolar region of the world", according to Dr. Sinyan Shen, Director of the Global Warming International Center, whose international headquarters is located in Chicago.

Professor Siren is one of many scientists and policy makers taking part in the week-long GW6 International Conference in San Francisco at the Hyatt Regency Hotel San Francisco Airport. The GW6 Conference is the sixth in the series of international conferences focusing on the science and policy concerning global warming and climate change. This series of conferences is coordinated by the Global Warming International Center, which sponsor unbiased research and studies on all aspects of global warming. It is a sponsor of the Global Treeline Project.

For further information about this news item contact:
Global Warming International Center, PO Box 5275,
Woodridge IL 60517. Tel: 708-910-1551. FAX: 708-910-1561.

Scientists Say El Nino Can Now Be Predicted a Year in Advance

Recent advances in computer models and how they use ocean data now allow predictions of El Nino -- a dramatic climate shift that can affect weather and economies worldwide -- to be made more than a year before the event, new NASA, NOAA and university research indicates.

"Certain aspects of El Nino, such as equatorial Pacific sea-surface temperatures and related changes in precipitation patterns can now be predicted with confidence more than one year in advance", said Dr. Antonio Busalacchi of NASA's Goddard Space Flight Center, Greenbelt, MD.

The new study used data from the ten-year Tropical Ocean Global Atmosphere (TOGA) project, an international research program that studied how Earth's oceans and atmosphere affect one another. The team's paper will be published today in the journal "Science". Busalacchi's co-authors are Dr. Dake Chen, University of Rhode Island, and Dr. Stephen Zebiak and Dr. Mark Cane of Columbia University's Lamont Doherty Earth Observatory, Palisades, NY.

TOGA has successfully completed its decadal mission and the world legacy of the Tropical Atmosphere Ocean array and all the research infrastructure is in place. New programs will continue to move this research into operational application mode. In November, an "International Forum on Forecasting El Nino" will be held in Washington, DC. The forum will launch an International Research Institute for climate prediction.

El Nino, which can occur every two to seven years, originates in the tropical Pacific ocean and causes global-scale disruptions in normal weather patterns. When an El Nino occurs, torrential rainfall and flooding is common along the coasts of Ecuador, Peru and southeast Brazil. At the same time, Australia, Indonesia, northeast Brazil and southeast Africa experience extreme drought and famine conditions.

The impact of El Nino on the continental United States is less direct than in the tropics, but still distinct. Increased precipitation over the Gulf Coast states and warmer winter temperatures over the north-central tier of Gulf Coast states are common, with important implications for the agricultural sector of the economy.

A common indicator of El Nino occurs when the warmest water of the global ocean shifts from the International Dateline in the Pacific eastward by 3,100 miles (5,000 kilometers), increasing sea-surface temperature by 4 to 7 degrees Fahrenheit (2 to 4 degrees Centigrade). This eastward migration of a heat source critical to the atmosphere

changes global weather patterns, including precipitation and temperature, far beyond the equatorial Pacific.

Forecasts of El Nino have commonly started with scientists introducing ocean-wind data models into a computer model of the ocean, which is then used separately to "force" a model of the atmosphere. At that point the two models are joined, and the likelihood of an El Nino is forecast. The new approach mathematically joins the models before introducing the data. Since the real ocean and atmosphere are closely linked, this approach yields results that lead to a more accurate forecast.

"That's the breakthrough", said Busalacchi. "This is the first time data are being assimilated into a coupled model, and that's what gives us this expanded forecasting capability.

"Developing and developed countries are getting this data through one-on-one contacts and through NOAA. They're beginning to use these forecasts to adapt to these events and to mitigate their dangers. Advances such as these suggest that it is time to implement a process to issue El Nino forecasts on a routine basis, so that the affected countries may benefit from this information," Busalacchi said.

This kind of computer model, and its use to predict changes in the Earth's environment, is the heart of NASA's Mission to Planet Earth and the U.S. Global Change Research Program. A long-term, coordinated research program, Mission to Planet Earth is designed to provide near-term benefits. The program provides improved forecasting of economically threatening climate changes such as El Nino, with improved understanding of the Earth's climate and how it changes.

Mission to Planet Earth combines surface measurements and computer models with space-based measurements to provide a view of the Earth's global environment. Busalacchi's model, for example, will increase in importance when the NASA scatterometer begins returning worldwide data on sea-surface winds. The instrument is scheduled for launch in August 1996 aboard a Japanese satellite.

Miles Schumacher - WSFO DMX

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1994 CMOS Awards

(presented on 1st June 1995
at the 29th Annual
CMOS Congress in Kelowna, B.C.)

Left to right: L. Lefèvre, T Warn,
B. Goodison, J. Derome,
S. Bélair, K. Drinkwater,
R. Janes and A. Cooping



President's Prize :
awarded to Dr. Tom
Warn, of the Department of Atmospheric and Oceanic Sciences at McGill University, for his original and outstanding research contributions to the subject of balance dynamics.

The Dr. Andrew Thomson Prize in Applied Meteorology :
awarded to Dr. Barry Goodison, of the Atmospheric Environment Service at Downsview, for his outstanding contributions to improving our understanding of the roles that snowfall and snow cover play in climate and weather.

Prize in Applied Oceanography : awarded to Dr. Ken Drinkwater, of the Bedford Institute of Oceanography, for his many valuable contributions in the application of physical oceanography to fisheries, climatology and other environmental issues in eastern Canada.

The Rube Hornstein Prize in Operational Meteorology :
awarded to Mr. Jean-Guy Desmarais, of the Canadian Meteorological Center at Dorval, for his significant contributions over many years to the advancement of operational weather forecasting across Canada.

Graduate Student Prize : awarded to Dr. Stephane Belair for his important contributions to the numerical prediction of midlatitude squall lines, in his doctoral thesis from the Department of Atmospheric and Oceanic Sciences at McGill University. [please add acute accent to first e in Stephane and to e in Belair]

Environmental Citation Prize : awarded to Dr. Andrea Copping, a Canadian citizen but currently Director of the Sea Grant Program at the University of Washington in Seattle, for her outstanding and effective leadership as Chair of the British Columbia/Washington Marine Science Panel.

Citation for Outstanding Radio and Television Weather Presentations : awarded to Mr. Ralph Janes, former manager of the Kelowna Weather Office, for his effective contributions over many years in providing weather information to the public and the media.





The 29th Annual CMOS Congress, 29 May - 2 June, 1995

The 29th annual Congress was held at the Okanagan University College in Kelowna, B.C., from 29 May to 2 June, 1995. The conference was considered very successful, and the Scientific Program Committee received many compliments on the novel and efficient way the abstracts were handled, and the excellent choice of invited speakers.

somewhat higher than that of the previous CMOS congress, probably because of the current poor economic conditions.

In contrast to the shortage of oceanographers at the 28th CMOS congress, there was a healthy balance this time. During most of the week, five concurrent sessions were held. A panel discussion was held on the congress theme "Environmental Services: Clients, Innovation and Commercialization".



Of the total of 283 abstracts received (267 for oral and 16 for poster presentations), all except about half a dozen were submitted via the Internet. Abstract senders were not required to know anything about the Latex language, and yet could invoke the power of Latex if necessary for math symbols or French accents, thereby making our system simple yet powerful. Abstracts were also immediately displayed on the Internet.



Despite the physical separation between the Local Arrangements Committee and the Scientific Program Committee, the cooperation was smooth, and the result was one of the more memorable CMOS congresses. Internet has also for the first time played a major role in a CMOS congress, and its role will no doubt expand in future congresses.

William Hsieh Chair, Scientific Program Committee

We received 25 withdrawal notices (22 for oral presentations and 3 for posters). The cancellation rate was

CMOS PRIZES AND AWARDS FOR 1995

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 26, 1996 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
3320 Pleasant Street
Richmond, B.C. V7E 2P4

Telephone (604) 664-9185
Fax (604) 664-9004
E-mail: phillipsd@aesvan.dots.doe.ca

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 apporté 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, ainsi qu'aux scientifiques canadiens au premier rang de leur domaine d'expertise, d'être cités par les médias.

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 26 janvier, 1996. 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 médias.

Les nominations peuvent être adressées à:

M. David Phillips
Secrétaire du Comité SCMO pour les prix et bourses
3320 Pleasant Street
Richmond, B.C. V7E 2P4

Téléphone (604) 664-9185
Fax (604) 664-9004
E-mail: phillipsd@aesvan.dots.doe.ca

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 Atmosphere-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 26, 1996.
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 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. The Committee has adopted a new policy of considering nominations (kept on file) submitted to the Calls in the two preceding years. Nominators are encouraged to re-affirm and / or update these nominations.

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 26 janvier, 1996.
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.
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". Le comité considérera désormais les nominations antérieures et conservées durant les deux dernières années. Nous encourageons les nomaniteurs à réitérer ou à préciser leurs nominations.

Long-Range Weather and Crop Forecasting Group Activity

March 21-23, 1995, the Canadian Wheat Board in Winnipeg hosted the second meeting of the Long-Range and Crop Forecasting working group which brought together about 30 participants from across Canada and USA, using a format similar to the first meeting of this working group: discussions, recommendations, panel deliberations and an open floor discussion. After welcoming remarks by the Chief Commissioner of the Canadian Wheat Board, the meeting opened with two invited presentations by David Unger (Climate Analysis Centre, Washington, USA) and Harold Ritchie (Numerical Prediction Research Division of Atmospheric Environment Service, Dorval, Quebec). Unger presented an overview of the long-lead (one to twelve months) forecasts currently issued by the Climate Analysis Centre in Washington and discussed the various forecast products that are being disseminated at present. Ritchie presented details of the Canadian Meteorological Centre in Washington and discussed the various forecast products that are being disseminated at present. Ritchie presented details of the Canadian Meteorological Centre global atmospheric model and discussed plans for making extended range (one month) prediction using this model. Solicited papers covered a wide range of subjects examining aerosols, oceanography, tree ring analysis, paleoclimatology, streamflows, forest fire activity, grain yields and ENSO teleconnections as related to long range forecasting. Working groups dealt with four topics: monitoring global weather anomalies, aerosols and climate, prospects for long-lead forecasting and El Nino, La Nina and prairie moisture. The meeting concluded with an Open floor Discussion on the Weather and Crop Outlook for the summer of 1995 in North America. The presence of several well known American forecaster gave the meeting added profile and international flavour.

The next meeting of this working group is being planned for the spring of 1997 possibly in Downsview/Ontario or Dorval/Quebec. The 1995 meeting was organized and coordinated by Madhav Khandekar of Environment Canada in Downsview, Ontario and Ray Garnett of Weather and Crop Surveillance, Canadian Wheat Board, in Winnipeg. Proceedings of this meeting are scheduled to be published by September 30, 1995. Those wishing to obtain copies of the proceedings of this workshop can do so by sending a nominal fee of \$15 (Canadian) to:

Mr. E.R. Garnett
Weather and Crop Surveillance Department
Canadian Wheat Board
423 Main Street
Winnipeg, Manitoba, Canada
R3C 2P5
Telephone: (204) 983-3563

Edinburgh '96

EDINBURGH '96

*The Fourth International: Conference on-School and Popular
Meteorological and Oceanographic Education*

22 - 26 July 1996 University of Edinburgh Scotland

*Organised by the Royal Meteorological Society and co-
sponsored by the American Meteorological Society and the
World Meteorological Organisation*

*Royal Meteorological Society
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Berkshire RG1 7LJ
United Kingdom*

Environmental fun

Weather on a kite string; a national balloon launch; temperature safaris; dry ocean travel logs; cumulus clouds-made out of shaving cream; xylophones made out of ice blocks; the radiation balance of a bed of nettles; rainbows in the classroom; soap bubbles in the boundary layer - it's amazing what teachers do to excite interest in the atmosphere and the oceans! Meteorological and oceanographic education can certainly be fun.

The role of the Conference

Like its predecessors, Oxford (1984), Crystal City (1989) and Toronto (1993), the Fourth International Conference on School and Popular Meteorological and Oceanographic Education will focus upon the roles of meteorology and oceanography in science education and the benefits to be gained from improving environmental awareness and literacy, particularly-weather awareness, meteorological literacy and knowledge of the sea. It will also focus upon uses of modern technology and oceanographic education, as well as ways and means of improving disaster preparedness in the less-developed countries.

Who's the conference intended for?

The conference is intended for all who are interested in school and a popular meteorological and oceanographic education, be they teachers, educationists, publishers amateur observers, professional scientists, equipment manufacturers, journalists, weather hobbyists, or whatever. The format of the conference will be mixed, with poster displays, oral presentations of papers, workshops and 'hands-on' demonstrations of equipment and teaching aids. In addition, there will be an exhibition of books and other resources for teachers.

Accommodation:

In the University of Edinburgh's Pollock Halls of Residence Located within walking distance of the Conference venue. Double and single rooms with own shower, hand basin and toilet are available as are single rooms with a hand basin. All are at a reasonable cost. Hotel accommodation is obtainable through the Scottish Accommodation Agency.

CALL FOR PAPERS

Summaries of papers and descriptions of demonstrations must be received by 30 November 1995. The official language of the conference is English. The summaries and descriptions should not exceed 500 words and authors should indicate the preferred format for presentation (oral or poster). Those who wish to demonstrate equipment must provide details of special requirements. Authors will be notified of acceptance by 31 January 1996. A pre-print volume will be prepared for distribution at the conference.

All correspondence to: Mr J M Walker Department of Maritime Studies University of Wales P.O. Box 907 Cardiff CF1 3YP: United Kingdom. Telephone: +44-1222 874271 ext. 6754. Fax: +44-1222 874301. E-mail: walkerjm@cardiff.ac.uk

Registration fee: £85

Royal Meteorological Society Calendar For 1996

The 1996 Royal Meteorological Society Calendar is now ready for distribution. It is beautifully produced with photographs of high meteorological and artistic merit.

The cost is (British sterling) 4.70 each or 18.50 for five, including postage and packing, and can be ordered from:

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

Book Review / Recension

by Paul LeBlond,
University of British Columbia

Long Gravitational Waves in the Ocean: Trapping, Resonance, Leaking. 1993. Alexander B. Rabinovich. Saint-Petersburg, Hydrometeoizdat. 325 pp. (In Russian).

In this compact monograph, Sasha Rabinovich reviews theories and observations of gravity waves in the period range of tens of seconds to a few hours: that part of the spectrum between directly wind-generated waves and storm surges. While tsunamis as such are barely mentioned in this book, much of the discussion about the behaviour of long gravity waves on shelves and in coastal areas also applies to them.

The book begins with a definition of the nature of the waves discussed, dividing them into two classes: anemobaric waves, directly forced by atmospheric perturbations of the same frequency, and infragravitational waves, arising from non-linear interactions of wind-waves with themselves and the ocean bottom. There follows an overview of instruments for coastal and deep sea observations of long waves and a discussion of general spectral characteristics of these waves.

As fundamental background for understanding long gravitational waves, the author presents the linear theory of surface wave motion in a non-rotating, homogeneous fluid over variable bathymetry. Starting with Stokes' edge wave over a linearly sloping bottom, he goes on to include other shelf profiles, discusses trapped and leaky modes as well as shelf resonance. The influence of shelf currents and the possibility of instabilities is discussed. Calculations for realistic bathymetries are presented for the shelves along the Kuril Islands, an area where the author spent his early scientific career (on Sakhalin Island). Seiches in harbours and bays are also discussed.

Under anemobaric waves, the author first reviews the properties and observed spectral characteristics of atmospheric waves. He then proceeds to discuss the properties of waves forced by the atmosphere in an ocean of uniform depth, and then on the shelf. An important mechanism for long wave generation discussed in this chapter is the scattering of meteorologically forced waves by bathymetric irregularities. Forced seiches are illustrated by applications again taken from the Kuril Islands.

Memorial University of Newfoundland Department of Physics

Applications are invited for a tenure-track faculty appointment in Physical Oceanography to be made in the Physics Department, Memorial University of Newfoundland. Rank and salary are negotiable and commensurate with the qualifications of the appointee. The final appointment will be subject to budgetary approval. Experience beyond the Ph.D. degree is preferred. The position offers a challenging academic career with stimulating research opportunities. The Department's Physical Oceanography Group is engaged in theoretical and experimental studies of coastal and continental shelf oceanography, nearshore processes, global climate modelling, deep ocean circulation, computational fluid mechanics, and ocean acoustics.

Qualified individuals with expertise in any area of physical oceanography are encouraged to apply. An interest in interdisciplinary research would be an asset. Applications from both experimentalists and theoreticians are encouraged. The appointment will include teaching at the graduate and undergraduate levels. The closing date for the applications is 31 October 1995. Applications including curriculum vitae and the names of at least three referees should be submitted to:

Head
Department of Physics
Memorial University of Newfoundland
St. John's, NF
Canada, A1B 3X7

In accordance with Canadian immigration requirements, this advertisement is directed, in the first instance, to Canadian citizens and permanent residents. Memorial University is committed to employment equity.

In the final chapter, the author first reviews the history of research on long waves in the nearshore zone. Starting with an overview of wind wave statistics, he goes on to give a rather cursory account of the generation process of infragravitational edge waves. Their properties, as well as their role in the generation of rip currents, beach cusps and crescentic bars are described within the framework developed in great part by Anthony Bowen and his collaborators at Dalhousie University and at Scripps, which will be familiar to many Canadian oceanographers.

This monograph is a useful introduction to the study of waves in the intermediate frequency range described, bringing together results widely scattered in the Japanese, Russian and English language literature. While one might have wished a discussion of the wave-wave and wave-bathymetry interaction processes which are important in the energy transfer from wind waves to infragravitational waves, there is only so much that can be put in one book. Unfortunately, it is also missing an index. The applications are drawn from a region (the Kuril Islands) which is unfamiliar to most North American readers, but which is of great oceanographic interest as a site of considerable recent tsunami activity, strong air-sea interaction and a strong western boundary current (the Oyashio). Too bad Rabinovich's monograph is available only in Russian!

The Oceanography Society (TOS) Meeting on Marine Environment and The Global Change Programs

July 8-11, 1996
Amsterdam, The Netherlands

TOS announces its first international multidisciplinary scientific meeting, being planned in cooperation with IGBP, WCRP, HDP and SCOR.

The meeting format will include daily plenary sessions of invited talks, contributed poster abstracts, invited demonstrations of on-line data access systems, social events and facility tours. The meeting program and call for poster abstracts, as well as housing and travel information, will be available in October, 1995. Mark your calendars now and start making plans to attend this important international ocean sciences meeting.

TOS members will receive additional information as it develops. All others who wish to be placed on the TOS 96 Amsterdam Meeting mailing list to receive further information should contact the Society at:

TOS
4052 Timber Ridge Drive, Virginia Beach, VA, USA
Phone: (804) 464-0131 ; Fax: (804)
464-1759
E-mail: jrhodes@ccpo.odu.edu

PROGRAM AND ABSTRACTS - 29TH CMOS CONGRESS, KELOWNA, B.C.

CMOS Members who have not received a copy of the Congress Program and Abstracts of the 29th CMOS Congress (1995) can request one from the CMOS Business Office (903-151 Slater Str., Ottawa, Ontario, K1P 5H3). It will be sent to them free of charge.

*Executive Director
U. Schwarz*

IMPORTANT REQUEST TO CMOS MEMBERS

We are experiencing a great lack of material for the CMOS Bulletin SCMO which, as you are aware, forced us to combine the April and June 1995 issues. The same situation has arisen again in respect of the October issue which now will come out late. There must be many activities and things of interest to members that go unreported, unrecorded and unannounced: meetings, papers of special interest, retirements of long standing members, reorganizations of meteorology and oceanography in Canada. Letters to the Editor, photographs, short papers on meteorology, hydrology or oceanography are all desirable subjects. Also what has been lacking for a long time is a permanent column on News from CMOS Centres and Chapters. Chairpersons get going! Committee chairpersons are also invited to provide updates on the work of their committees.

Other ideas on how to keep the CMOS Bulletin SCMO a worthwhile and interesting publication of the Society are urgently needed and would be appreciated. The CMOS Bulletin SCMO must be made the flagship of the Society but it is leaking badly.

Executive Director

Special Notice to Members and Subscribers to Atmosphere-Ocean

If you are a CMOS member and have not yet taken out a subscription to A-O, now is your chance to acquire up to seventeen years of back issues by simply signing up for a 1996 subscription to A-O. The additional cost to you is postage and a three dollar handling charge per volume (four issues) or less, with a minimum charge of \$5.00. This is the deal of a lifetime and a one-chance opportunity of acquiring an A-O library of distinction for the price of a one-year subscription.

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1982	20	1	2	3	4
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1984	22				4
1985	23	1	2	3	
1986	24			3	4
1987	25	1	2	3	4
1988	26	1	2	3	4
1989	27	1	2	3	4
1990	28	1	2	3	4
1991	29	1	2	3	4
1992	30	1	2	3	4
1993	31	1	2	3	4
1994	32	1	2	3	4
1995	33	1	2	3	4

Note that not all issues are available from vol 23 and 24 and only issue 4 of vol 22. The supply of these early issues is limited and hence orders will be processed on a first come, first served basis.

Please circle the relevant volumes and/or issues and return this form or photocopy along with your payment to CMOS.

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Institution	\$100.00

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5 issues + envelope 1 kg + 775 g

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CANADIAN METEOROLOGICAL AND
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903-151 SLATER STREET
OTTAWA, ON, CANADA
K1P 5H3

Neil J. Campbell
Executive Director

Avis spécial à tous les membres et abonnés d'Atmosphère-Océan

Si vous êtes membre de la SCMO et que vous n'êtes toujours pas abonné à *Atmosphère-Océan*, voici votre chance d'acquérir jusqu'à seize années de vieux numéros tout simplement en vous abonnant à A/O en 1996. Les frais qui vous seront demandés seront le coût de la poste et les frais de manutention de trois dollars par volume (quatre numéros) ou moins, avec des frais minimum de 5.00\$. Ceci est une affaire en or et une chance unique d'acquérir une bibliothèque de distinction d'A/O pour le prix d'un abonnement annuel.

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Si vous êtes présentement abonné à A/O (membre, non-membre ou membre institutionnel) et aimeriez garnir votre bibliothèque d'A/O, vous n'avez qu'à nous laisser savoir quel volume ou numéro vous seriez intéressé à acquérir. Les frais seront le coût de la poste et les frais de manutention de trois dollars par volume (quatre numéros) ou moins, avec des frais minimum de 5.00\$.

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1985	23	1	2	3	
1986	24			3	4
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1991	29	1	2	3	4
1992	30	1	2	3	4
1993	31	1	2	3	4
1994	32	1	2	3	4
1995	33	1	2	3	4

Veuillez noter que certains numéros des volumes 23 et 24 ne sont pas disponibles et qu'il n'existe que le numéro 4 du volume 22. L'approvisionnement de ces premiers numéros est limité. Ainsi les premières commandes reçues seront les premières traitées.

Veuillez encrer les volumes et/ou numéros désirés et retourner ce formulaire ou une photocopie avec votre paiement à la SCMO.

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151, RUE SLATER, BUREAU 903
OTTAWA, ON K1P 5H3
CANADA

Neil J. Campbell
Directeur exécutif

An Appeal To Holders of Any CMOS Publications

Along with our offer to reduce inventory of past issues of A-O I am also seeking missing issues of A-O, Chinook and the Newsletter. Council has approved the costs of binding two complete sets of A-O which are to be held in perpetuity by the Society. Unfortunately, we do not have a sufficient number of issues to make up the binding and maintain an archive, hence the appeal to CMOS members to fill in the gaps.

A recently-written publications policy has been reviewed and recommended by the Publications Committee and approved by Council which amongst other things recognizes the need to reduce the number of presently-held issues of A-O to a manageable number.

In order to implement these policies I would like to seek your assistance in obtaining additional copies of the following:

ATMOSPHERE-OCEAN

Volume 24	Issue 1	two on hand
	Issue 2	one on hand
Volume 23	Issue 4	two on hand
Volume 22	Issue 3	one on hand
Volumes 1 to 10	Only two issues of each are on hand	

While we are on the subject, I would like to obtain a few additional issues of CHINOOK for binding. We have no copies of Vol. 6 No. 1 and Vol. 5 No. 4. I would like to stock a minimum of five copies of all issues of other volumes.

The CMOS Bulletin SCMO stock is in good shape, but we have a lot of digging ahead to determine the status of the NEWSLETTER. Stand by and hold onto your old copies. If you have no further need of any CMOS publications in your library, please get in touch with us before throwing anything out.

Please give us a hand in completing our publications library or contributing to our archives; get in touch with us, either through the CMOS Business Office or our FAX (613) 993-4658 or e-mail: CMOS@ottmed.meds.dfo.ca at the Department of Fisheries and Oceans.

Neil J. Campbell
Executive Director

Appel à tous les détenteurs de publications de la SCMO

J'aimerais ajouter à mon offre de réduction de l'inventaire des vieux numéros d'A/O une requête pour des numéros manquants de A/O, de *Chinook* et du *Bulletin*. Le Conseil a approuvé les frais pour relier 2 séries complètes d'A/O qui seront gardées à perpétuité par la SCMO. Malheureusement, nous n'avons pas suffisamment de numéros pour être en mesure de relier et maintenir des archives, donc cet appel à tous les membres pour votre aide.

Une politique sur les publications récemment écrite a été revue et recommandée par le comité des publications. Cette politique a été approuvée par le Conseil et entre autres reconnaît le besoin de réduire le nombre de numéros A/O en main à un nombre raisonnable.

Pour nous permettre de mettre en vigueur cette politique, je sollicite votre aide pour obtenir des copies additionnelles des numéros suivants:

ATMOSPHERE-OCEAN

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Volume 23	Numéro 4	deux en main
Volume 22	Numéro 3	un en main
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Puisque nous sommes sur le sujet, j'aimerais obtenir quelques copies additionnelles de CHINOOK afin de les relier. Nous n'avons aucune copie de Vol. 6 no. 1 et Vol. 5 no. 4. J'aimerais stocker un minimum de cinq copies de tous les numéros des autres volumes.

Les stocks du CMOS Bulletin SCMO se portent bien, mais il nous reste beaucoup de travail afin de déterminer le statut du Newsletter. Gardez vos vieilles copies. Si vous n'avez plus aucune utilité pour les publications de la SCMO dans votre bibliothèque, veuillez nous contacter avant de vous en débarrasser.

Donnez nous un coup de main en complétant notre bibliothèque ou en contribuant à nos archives. Vous pouvez nous rejoindre au bureau administratif de la SCMO, par télécopieur au (613) 993-4658 ou par courrier électronique à CMOS@ottmed.meds.dfo.ca au ministère Pêches et Océans.

Neil J. Campbell
Directeur exécutif

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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.

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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 des règlements et un formulaire d'application.

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NOTE: Les membres étudiants reçoivent Atmosphère-Océan gratuitement de la SCMO. Tous les périodiques réguliers de la Société sont envoyés aux membres moraux et de soutiens. Les membres résidant au Canada, veuillez SVP ajouter 7% (TPS) aux frais d'abonnement annuel.

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August-October/août-octobre 1995 Vol. 23 No. 4-5

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(Date)

Mail completed form to CMOS at the address above.

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

☐ Le fonds de développement de la Société

☐ Autre (spécifiez) _____

(Signature)

(Date)

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

(Signature)

(Date)

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