ATMOSPHERE-OCEAN

12th ANNUAL CONGRESS

31 May-2 June 1978

University of Western Ontario

Canadian Meteorological and Oceanographic Society

La Société Canadienne de Météorologie et d'Océanographie

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Constitution and By-Laws

ATMOSPHERE-OCEAN

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Canadian Meteorological and Oceanographic Society

La Société canadienne de météorologie et d'océanographie

The Canadian Meteorological and Oceanographic Society assumed its present constitution in 1977. The organization was first established in 1940 as the Canadian Branch of the Royal Meteorological Society, later becoming the Canadian Meteorological Society in 1967. The Society exists for the advancement of Meteorology and Oceanography (including Limnology) and membership is open to persons and organizations sharing these interests. There are nine Local Centres of the Society which hold meetings of interest to the membership. *ATMOSPHERE-OCEAN* is the scientific journal of the Society and is distributed free to all members. Each spring the Society convenes a National Congress.

Correspondence regarding Society affairs and membership should be directed to the Corresponding Secretary, Canadian Meteorological and Oceanographic Society, c/o Department of Geography, Simon Fraser University, Burnaby, B.C., V5A 1S6.

There are three types of membership – Member, Student Member and Sustaining Member. For 1978 the dues are $25.00, $5.00 and $60.00 (min.), respectively. The annual Institutional subscription rate for *ATMOSPHERE-OCEAN* is $25.00.

Correspondence relating to Institutional subscriptions should be directed to the University of Toronto Press, Journals Department, 5201 Dufferin St., Downsview, Ontario, Canada, M3H 5T8. Cheques should be made payable to the University of Toronto Press.

La Société canadienne de météorologie et d'océanographie a adopté la présente constitution en 1977. La Division canadienne de la Société royale de météorologie a été fondée en 1940 et remplacée par la Société météorologique du Canada en 1967. Cette société existe pour le progrès de la météorologie et de l'océanographie (y compris la limnologie) et accueille comme membres toute personne ou organisation intéressée à ces sciences. Les neuf centres locaux de la société réunissent les membres pour des discussions et conférences. *ATMOSPHÈRE-OCÉAN*, la revue scientifique de la société, est distribuée gratuitement à tous les membres. La société organise chaque printemps un Congrès national.

Toute correspondance concernant les activités de la Société et les souscriptions devrait être adressée au Secrétaire-correspondant, Société canadienne de météorologie de d'océanographie, Département de Géographie, L'Université Simon Fraser, Burnaby, B.C., V5A 1S6.

Il y a trois types de membres: Membre, Membre-étudiant, et Membre de soutien. La cotisation pour 1978 est de $25.00, $5.00 et $60.00 (min.) respectivement. Les institutions peuvent souscrire à *ATMOSPHÈRE-OCÉAN* au coût de $25.00 par année.

La correspondance concernant les souscriptions des institutions doit être envoyée aux Presses de l'Université de Toronto, Département des périodiques, 5201 rue Dufferin, Downsview, Ontario, Canada, M3H 5T8. Les chèques doivent être payables aux Presses de l'Université de Toronto.

TWELFTH ANNUAL CONGRESS

CANADIAN METEOROLOGICAL SOCIETY

The Twelfth Congress and Annual General Meeting of the Canadian Meteorological and Oceanographic Society will be held at the University of Western Ontario, London, Ontario, from 31 May to 2 June 1978.

Meteorologists and oceanographers share full partnership in the Society this year, for the first time. This encouraging step forward is reflected in the theme of the opening session and in the development of joint sessions of interest to both groups.

The search for new sources of energy in nature, attempts to use these sources skilfully, and occasionally the results of their mismanagement, – all make the daily headlines. What related responsibilities are being borne by our two groups now, and what will society demand from us in the future? The theme session of the Congress provides an opportunity for senior scientists to divulge their convictions on the role of meteorologists and oceanographers in today's society.

The chairman of the Local Arrangements Committee is R.P. Lowe. D.R. Hay, F.M. Boyce and A.G. Davenport have organized the scientific sessions from invited and contributed papers.

DOUZIÈME CONGRÈS ANNUEL

SOCIÉTÉ CANADIENNE DE MÉTÉOROLOGIE ET D'OCÉANOGRAPHIE

Le douzième congrès et l'assemblée générale annuelle de la Société Canadienne de Météorologie et d'Océanographie auront lieu à l'Université de Western Ontario, London, Ontario, du 31 mai au 2 juin 1978.

Pour le première fois cette année, les météorologues et les océanographes sont associés comme partenaires à part égale dans la Société. Ce pas en avant fort encourageant se réflète dans le thème de la session inaugurale comme dans l'organisation de sessions conjointes d'intérêt commun aux deux groupes.

La recherche de nouvelles sources d'énergie, les tentatives d'utilisation rationelle de ces sources et, parfois, les résultats de leur mauvaise gestion font aujourd'hui les manchettes des quotidiens. Quelle part de ces responsabilités repose aujourd'hui sur les épaules de nos deux groupes, et qu'exigera demain de nous la société où nous vivons? La session thématique du congrès donnera l'occasion à quelques scientifiques de s'exprimer sur le rôle que les météorologues et les océanographes sont appelés à jouer dans notre société.

Le président du comité d'organisation local est R.P. Lowe. D.R. Hay, F.M. Boyce et A.G. Davenport se sont chargé des sessions scientifiques.

SUMMARY OF SESSIONS

Wednesday, May 31

Natural Sciences Centre

0830 – 0850		Opening Welcome	Room 1
0850 – 1200		Theme Session	1
1330 – 1500	1	Ocean Chemistry and Sedimentology	1
1315 – 1500	2	Cloud Physics	7
1530 – 1630	3	Descriptions of Ocean Currents	7
1515 – 1700	4	Transport of Airborne Pollutants	1
1700 – 1900		Reception (Oxford University Press)	Great Hall (Somerville House)
1000		Annual General Meeting of CMOS	1

Thursday, June 1

0830 – 1015	5*	Climate and People	1
1030 – 1200	6	Ocean Tides	7
1030 – 1200	7	Dynamic Meteorology, Part I: Models	1
1200 – 1430		Annual Awards Banquet	Great Hall (Somerville House)
1430 – 1530	8	Surface Sea Waves	1
1430 – 1530	9	Heating and Evaporation in the Atmospheric Boundary Layer. Part I	7
1600 – 1700	10	Theoretical Oceanography	7
1600 – 1700	11	Heating and Evaporation in the Atmospheric Boundary Layer. Part II	1
Evening		Optional trip to the Stratford Shakespearean Festival, and dinner.	

Friday, June 2

0830 – 1015	12*	Winds and Temperature in the Atmospheric Boundary Layer	1
1045 – 1215	13	Motion in Lakes and Seas	1
1045 – 1215	14	Atmospheric Electricity	7
1330 – 1500	15	Mixing in Fjords	7
1315 – 1500	16	Dynamic Meteorology, Part II: Models	1
1530 – 1700	17	Sea and Lake Ice	1
1530 – 1700	18	Dynamic Meteorology, Part III, Winds	7

* Joint Session

PROGRAM

Wednesday Morning, May 31, 1978

Opening Welcome:	Dr. G.E. Connell, President University of Western Ontario	0830 – 0850
		Location: NSC-1*
	Mr. K.F. Harry, President Canadian Meteorological and Oceanographic Society	

THEME SESSION	*Energy, The Meteorologist and the Oceanographer*	Wed. 0850 – 1200
		Location: NSC-1
Chairman:	K.F. Harry	

THE OCEANS, THE CLIMATE AND PEOPLE
R.W. Stewart, Institute of Ocean Sciences, Patricia Bay, B.C.

METEOROLOGY AND ENERGY: A EUROPEAN PERSPECTIVE
N.E. Busch, Risø National Laboratory, Roskilde, Denmark

Coffee (1040 – 1100)

ENERGY-ENVIRONMENT TRADEOFFS: THE ROLES AND RESPONSIBILITIES OF ENVIRONMENTAL SCIENTISTS
A.L. Hamilton, Whiteshell Nuclear Research Establishment, Pinawa, Man.

Lunch (1200 – 1330)

Wednesday Afternoon, May 31, 1978

SESSION 1	*Ocean Chemistry and Sedimentology*	Wed. 1330 – 1500
Chairman:	R.G. Ingram	Location: NSC-1

INFERRING SALINITY FROM TEMPERATURE OR DEPTH
W.J. Emery and A. O'Brien
Texas A & M University, Department of Oceanography
College of Geosciences, College Station, Texas

NUTRIENTS IN THE CANADIAN ARCTIC ARCHEPELAGO
A.R. Coote and E.P. Jones, Atlantic Oceanographic Laboratory
Bedford Institute of Oceanography, Dartmouth, Nova Scotia

* Natural Sciences Centre room number

SEDIMENTARY REGIME OF A SUBARCTIC ESTUARY, RUPERT BAY, NORTHERN QUEBEC
B. d'Anglejan, Marine Sciences Centre, McGill University, Montreal, P.Q.

RADIONUCLIDE CONTAMINATION AND REDISTRIBUTION IN ATLANTIC SEDIMENTS AT THE NUCLEAR WASTE DISPOSAL SITE
R. Dayal and A. Okubo, Marine Sciences Research Center, State University of New York, Stony Brook, New York

Coffee (1500 – 1530)

SESSION 2 *Cloud Physics* Wed. 1315 – 1500

Chairman: R.B. Charlton Location: NSC-7

WATER DROPLET GROWTH IN NON-PRECIPITATING CUMULUS CLOUDS
R.A. Stuart, Atmospheric Environment Service, Downsview, Ontario

CUMULUS CLOUD-SEEDING EXPERIMENTS IN NORTHERN CANADA
G.A. Isaac, R.S. Schemenauer, R.A. Stuart and A.J. Chisholm, Atmospheric Environment Service, Downsview, Ontario
J.I. MacPherson, Flight Research Laboratory, National Aeronautical Establishment, National Research Council of Canada, Ottawa

ANALYSIS OF SILVER IODIDE DISPERSION FOR THE ALBERTA HALL PROJECT
D.S. Davison and K.L. Grandia, Intera Environmental Consultants Ltd Calgary, Alberta

A SIMPLE MODEL OF A SEEDED CUMULUS CLOUD
R.A. Stuart, Atmospheric Environment Service, Downsview, Ontario

AN ESTIMATE OF THE SPATIAL VARIABILITY OF RAWINSONDE-DERIVED PARAMETERS FOR CONVECTIVE STORMS IN ALBERTA
F.E. Robitaille, Atmospheric Sciences Division, Alberta Research Council, Edmonton, Alberta

Coffee (1500 – 1530)

SESSION 3 *Description of Ocean Currents* Wed. 1530 – 1630

Chairman: F.G. Barber Location: NSC-7

ON THE STRUCTURE OF THE DEEP GULF STREAM
R. Hendry, Atlantic Oceanographic Laboratory, Bedford Institute of Oceanography, Dartmouth, Nova Scotia

A DESCRIPTION OF THE CURRENTS IN EASTERN PARRY CHANNEL, N.W.T. – SUMMER, 1977
D.B. Fissel and J.R. Marko, Arctic Sciences Ltd, Sidney, B.C.

CHARACTERISTICS OF THE INTERMEDIATE LAYER IN THE ST LAWRENCE ESTUARY
R.G. Ingram, Marine Sciences Centre (GIROQ), McGill University, Montreal, P.Q.

SESSION 4 *Transport of Airborne Pollutants* Wed. 1515 – 1700

Chairman: K.D. Hage Location: NSC-1

CORRELATION OF TURBULENCE MEASUREMENTS WITH PLUME SPREAD AND DIFFUSION COEFFICIENTS IN THE ATHABASCA OIL SANDS AREA
D.S. Davison, Intera Environmental Consultants Ltd, Calgary, Alberta

AIRBORNE PARTICULATE TRANSFER FROM A METAL PROCESSING INDUSTRY AT A LAND-WATER BOUNDARY
D.R. Hay and V.E. Sells, Dept. of Physics, University of Western Ontario, London

A MICROMETEOROLOGICAL STUDY OF AN URBAN VALLEY
R. Patterson and K.D. Hage, Division of Meteorology, Department of Georgraphy, University of Alberta, Edmonton

LONG-RANGE TRANSPORT MODELLING
M.P. Olson and K.K. Oikawa, Atmospheric Dispersion Division, Atmospheric Environment Service, Downsview, Ontario

CLOUDS, PRECIPITATION AND ICE FOG FROM PETROCHEMICAL INDUSTRIES DURING VERY COLD ALBERTA WEATHER
R. Charlton, University of Alberta, Dept. of Geography, Edmonton, Alberta

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Thursday Morning, June 1, 1978

SESSION 5 *Climate and People* Thurs. 0830 – 1015

Chairman: Nancy Wailer Location: NSC-1

A STUDY OF CLIMATIC VARIABILITY
K. Higuchi and G.J. Boer, Numerical Studies Division, Atmospheric Environment Service, Downsview, Ontario

THE SEASONS: HOW CANADIANS RESPOND
S.M. Kevan, Department of Geography, John Abbott College, Ste Anne de Bellevue, P.Q.

ENERGY AND THE METEOROLOGIST IN SINGAPORE
J.E. Pakiam, Department of Geography, University of Singapore, Singapore

AVAILABILITY OF CLIMATIC DATA FOR ENERGY RESEARCH
J. Donegani, Computer Centre, Atmospheric Environment Service, Downsview, Ontario

WIND IN THE CITY
A.G. Davenport and N. Isyumov, Boundary-Layer Wind Tunnel Laboratory, Faculty of Engineering Science, University of Western Ontario, London

Coffee (1000 – 1030)

SESSION 6 *Ocean Tides* Thurs. 1030 – 1200

Chairman: L.A. Mysak Location: NSC-7

TUKTOYAKTUK HARBOUR, FREE OSCILLATIONS AND ICE COVER
F.G. Barber, J. Taylor and P.A. Bolduc, Ocean and Aquatic Science Affairs Branch, Fisheries and Environment Canada, Ottawa

SEAMOUNT PRESSURE MEASUREMENTS IN THE NORTH PACIFIC
W.R. Crawford, Tidal and Current Survey Section, Institute of Ocean Sciences, Patricia Bay, Sidney, B.C.

THE 18.6-YEAR CYCLE OF SEA-SURFACE TEMPERATURE IN SHALLOW SEAS DUE TO VARIATIONS IN TIDAL MIXING
J. Loder and C. Garrett, Dept. of Oceanography, Dalhousie University, Halifax, Nova Scotia

TIDES IN SHALLOW RIVERS
P.H. LeBlond, Institute of Oceanography, University of British Columbia, Vancouver

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SESSION 7 *Dynamic Meteorology, Part I: Models* Thurs. 1030 – 1200

Chairman: N. Yacowar Location: NSC-1

ATTEMPTS TO TUNE THE GRID-POINT PRIMITIVE EQUATIONS MODEL FOR REGIONAL FORECAST APPLICATIONS
D. Davies, Division de Recherche en Prévision Numérique, Service de l'environnement atmosphérique, Dorval, P.Q.

RESULTS OF A SENSITIVITY EXPERIMENT WITH A SPECTRAL MODEL
E. Yakimiw, Recherche en Prévision Numérique, Service de l'environnement atmosphérique, Dorval, P.Q.

THE APPLICATION OF NON-LINEAR NORMAL MODE INITIALIZATION TO AN OPERATIONAL FORECAST MODEL
R. Daley, Division de Recherche en Prévision Numérique, Service de l'environnement atmosphérique, Dorval, P.Q.

A JANUARY SIMULATION WITH THE AES GENERAL CIRCULATION MODEL
G.J. Boer and N.A. McFarlane, Numerical Studies Division, Atmospheric Environment Service, Downsview, Ontario

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ANNUAL AWARDS BANQUET Thurs. 1200 – 1430

(Bar open 1200 – 1235) Location: Great Hall (Somerville House)

Thursday Afternoon, June 1, 1978

SESSION 8 — *Surface Sea Waves* — Thurs. 1430 – 1530

Chairman: M.A. Donelan — Location: NSC-1

SOME OBSERVATIONS OF THE FIELD OF MOTION IN BREAKING WAVES IN DEEP WATER
M.A. Donelan, Canada Centre for Inland Waters, Burlington, Ontario

SURF BEAT
A.J. Bowen, Dept. of Oceanography, Dalhousie University, Halifax, Nova Scotia

A NON-SPECTRAL, STATISTICAL MODEL FOR WIND WAVES
J. Hamilton, University of Waterloo, Waterloo, Ontario

Coffee (1530 – 1600)

SESSION 9 — *Heating and Evaporation in the Atmospheric Boundary Layer, Part I* — Thurs. 1430 – 1530

Chairman: J.H. McCaughey — Location: NSC-7

SURFACE CONTROL ON EVAPOTRANSPIRATION
W.G. Bailey, Agriculture Canada Research Station, Beaverlodge, Alberta

ENERGY AND WATER BUDGETS OF THE UPPER NIGER
P. Christin, Dept. of Meteorology, McGill University, Montreal, P.Q.

USE OF THE β-ABSORPTION METHOD IN MICROMETEOROLOGICAL STUDIES
N. Barthakur, Dept. of Agricultural Chemistry and Physics, Macdonald Campus, McGill University, P.Q.

Coffee (1530 – 1600)

SESSION 10 — *Theoretical Oceanography* — Thurs. 1600 – 1700

Chairman: S. Pond — Location: NSC-7

RESONANT INTERACTIONS BETWEEN TOPOGRAPHIC PLANETARY WAVES
L.A. Mysak, Department of Mathematics and Institute of Oceanography, University of British Columbia, Vancouver

QUASIGEOSTROPHIC FLOW ABOVE SLOPING BOUNDARIES
E.R. Johnson, Department of Mathematics, University of British Columbia, Vancouver

LONG-PERIOD EQUATORIAL TOPOGRAPHIC WAVES
L.A. Mysak, Department of Mathematics and Institute of Oceanography, University of British Columbia, Vancouver

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SESSION 11 — *Heating and Evaporation in the Atmospheric Boundary Layer. Part II* — Thurs. 1600 – 1700

Chairman: A.B. Fraser — Location: NSC-1

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J.H. McCaughey, Department of Geography, Queen's University, Kingston, Ontario

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J. Dionne et L. Bilodeau, Université du Québec à Rimouski, P.Q.

A METHOD FOR FLUXES AND TEMPERATURE-PROFILE PREDICTIONS USING WIND DATA AS THE SOLE INFORMATION
A.K. Lo, Atmospheric Environment Service, Downsview, Ontario

Friday Morning, June 2, 1978

SESSION 12 — *Winds and Temperature in the Atmospheric Boundary Layer* — Fri. 0830 – 1015

Chairman: J.S. Marshall — Location: NSC-1

SATELLITE DETECTION OF PRECURSOR MARITIME CONDITIONS FOR SEASONAL CLIMATE PREDICTION: PROSPECTIVE CONTRIBUTIONS OF SEASAT-A TO CLIMATE DIAGNOSTICS
J.A. Ernst, NOAA/NESS, Spacecraft Oceanography Group, Washington, D.C.

INTERMITTENT AIR FLOW: ITS EFFECT ON HEAT TRANSFER AND EVAPORATION
P.H. Schuepp, Dept. of Agricultural Chemistry and Physics, Macdonald Campus, McGill University, P.Q.

ESTIMATE OF THE TIME-AVERAGE WIND SPEED AND ITS STANDARD ERROR FROM AN INCOMPLETELY OBSERVED TIME PERIOD
M.L. Thiebaux, 13 Lynwood Drive, Halifax, Nova Scotia

TEMPERATURE PROFILES FROM THE INFERIOR MIRAGE
A.B. Fraser, Department of Meteorology, The Pennsylvania State University, University Park, Pennsylvania

MODELS FOR DESCRIBING THE CLIMATOLOGY OF SNOWFALL, WIND SPEED AND AIR TEMPERATURE
N. Isyumov and M. Mikitiuk, Boundary Layer Wind Tunnel Laboratory, Faculty of Engineering Science, University of Western Ontario, London

Coffee (1015 – 1045)

SESSION 13 *Motion in Lakes and Seas* Fri. 1045 – 1215

Chairman: D. Farmer Location: NSC-1

GENERATION AND PROPAGATION OF DOWNWELLING FRONTS
T.J. Simons, Canada Centre for Inland Waters, Burlington, Ontario

NEARSHORE FLOW OFF DOUGLAS POINT IN LAKE HURON: STRUCTURE OF THE COASTAL BOUNDARY LAYER AND SOME APPLICATIONS OF THE DATA
C.R. Murthy and F.M. Boyce, Basin Investigation and Modeling Section, Canada Centre for Inland Waters, Burlington, Ontario

CIRCULATION AND MIXING OF THE BRAS D'OR LAKES
D.P. Krauel, Royal Roads Military College, FMO Victoria, B.C.

A NUMERICAL MODEL OF THE HOMOGENEOUS LABRADOR SEA
K.T. Tee, Atlantic Oceanographic Laboratory, Bedford Institute of Oceanography, Dartmouth, Nova Scotia

Lunch (1215 – 1330)

SESSION 14 *Atmospheric Electricity* Fri. 1045 – 1215

Chairman: H.E. Turner Location: NSC-7

RADAR STUDY OF THUNDERSTORMS OVER SINGAPORE – SOME PRELIMINARY RESULTS
J.E. Pakiam, Department of Geography, University of Singapore, Singapore
K.H. Chong, L. Hock, P.G. Swee, T.Y. Piu, T.H. Kim, W.S. Lai, Y.M. Koon
Meteorological Service, Singapore

V.H.F. RADIO PICTURES OF LIGHTNING
R.C. Murty and W.D. MacClement, Department of Physics, University of Western Ontario, London

SNOW CRYSTAL OBSERVATIONS AT INUVIK, N.W.T.
S.R. Shewchuk, Saskatchewan Research Council, Saskatoon, Sask.
C. Magono, K. Kikuchi and T. Endoh, Hokkaido University, Sapporo, Japan

RADIO-LOCATED LIGHTNING RELATED TO RADAR-OBSERVED PRECIPITATION
E.J. Stansbury and J.S. Marshall, Macdonald Campus, McGill University, P.Q.

Lunch (1215 – 1330)

Friday Afternoon, June 2, 1978

SESSION 15 *Mixing in Fjords* Fri. 1330 – 1500

Chairman: T.J. Simons Location: NSC-7

WIND AND TIDAL FORCING OF SUBSURFACE CURRENTS IN A FJORD
J.R. Buckley, Geophysical Institute, University of Bergen, Norway
S. Pond, Institute of Oceanography, University of British Columbia, Vancouver

TIDAL FLOW OVER SILLS AND THE GENERATION OF INTERNAL HYDRAULIC JUMPS
D. Farmer, Institute of Ocean Sciences, Patricia Bay, Sidney, B.C.

THE TIDAL JET IN RUPERT-HOLBERG INLET
D. Stucchi, Ocean and Aquatic Sciences, Institute of Ocean Sciences, Sidney, B.C.

A MODEL FOR FLOOD TIDE PENETRATION OF A FJORD
J.R. Birch, Dalhousie University, Dept. of Oceanography, Halifax, Nova Scotia

Coffee (1500 – 1530)

SESSION 16 *Dynamic Meteorology, Part II: Models* Fri. 1315 – 1500

Chairman: E.R. Reinelt Location: NSC-1

REGIONAL FORECAST ERROR STRUCTURE: SENSITIVITY TO THE REMOVAL OF INFORMATION
H.J. Thiébaux, Department of Mathematics, Dalhousie University, Halifax, Nova Scotia

PERCENT OF POSSIBLE SUNSHINE – A VERIFICATION TOOL, A NEW FORECAST PARAMETER
N. Yacowar and L. Garrand, Quebec Forecast Office, Service de l'environnement atmosphérique, Ville St Laurent, P.Q.

THE EFFECT OF SURFACE DRAG IN THE CMC OPERATIONAL SPECTRAL MODEL
Y. Durocher, Recherche en Prévision Numérique, Service de l'environnement atmosphérique, Dorval, P.Q.

VERTICAL RESOLUTION EFFECTS IN A STEADY LONG WAVE MODEL
G. Toth, Department of Meteorology, McGill University, Montreal, P.Q.

AN ENERGY INDEX CALCULATION FOR THE STUDY OF SEVERE CONVECTIVE ACTIVITY OVER SOUTHERN ONTARIO
M.L. Khandekar and V.R. Neralla, Atmospheric Environment Service, Downsview, Ontario

Coffee (1500 – 1530)

SESSION 17 *Sea and Lake Ice* Fri. 1530 – 1700

Chairman: B. d'Anglejan Location: NSC-1

A PRELIMINARY EVALUATION OF THE ICE PREDICTION MODULE FOR THE BEAUFORT SEA COMPUTERIZED PREDICTION SUPPORT SYSTEM
V.R. Neralla and M.L. Khandekar, Atmospheric Environment Service, Downsview, Ontario

THICK SEA ICE FLOES
E.R. Walker, Frozen Sea Research Group, Institute of Ocean Sciences, Sidney, B.C.

THE IMPORTANCE OF ALBEDO VARIATIONS IN THAWING OF CANADIAN LAKES
J.D. Reid and P.A. Taylor, Atmospheric Environment Service, Downsview, Ontario

STRAIT OF BELLE ISLE STUDY: FEASIBILITY OF PROVIDING AN ELECTRICAL POWER LINK BETWEEN LABRADOR AND NEWFOUNDLAND
B.P. Sukhov and R.W. Crocker, NORDCO Limited, St John's, Newfoundland

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SESSION 18 *Dynamic Meteorology, Part III: Winds* Fri. 1530 – 1700

Chairman: D. Davies Location: NSC-7

ON THE NATURE OF CROSS-BARRIER FLOWS ASSOCIATED WITH LEE CYCLOGENESIS
E.R. Reinelt, Dept. of Geography, University of Alberta, Edmonton

ASSIMILATION OF SATELLITE CLOUD MOTION VECTORS: COMPARISON OF FOUR-LEVEL DETERMINATION METHODS
D.H. Lee, Naval Environmental Prediction Research Facility, Monterey, California

VORTEX STREETS IN THE WAKE OF THE ALEUTIAN ISLANDS
R.E. Thomson, Fisheries and Environment Canada, Institute of Ocean Sciences, Sidney, B.C.

PRÉVISION DES VENTS DE SURFACE AUTOMATISÉE À 15 STATIONS DU QUÉBEC EN TERMES DE PROBABILITÉ
C. Lelièvre, Bureau de Prévisions du Québec, Service de l'environnement atmosphérique, Ville St Laurent, P.Q.

Session 1 Ocean Chemistry and Sedimentology Wed. 1330 – 1500

INFERRING SALINITY FROM TEMPERATURE OR DEPTH

W.J. Emery and A. O'Brien

In much of the North Pacific, mean temperature-salinity relationships can be used to infer salinity from observed temperature profiles. Density and dynamic height can then be computed from measurements of temperature alone saving the time and expense required for salinity measurements. North of 40°N due to strong surface salinity changes and the presence of sub-surface temperature inversions, application of this method results in large errors in both salinity and dynamic height. Study of existing data from this region demonstrated that frequently, mean salinity profiles were sufficiently conservative for salinities to be inferred from them for matching with observed temperature profiles. All available hydrographic data were enlisted to determine where the mean salinity profile was most useful or where in the North Pacific a mean temperature-salinity curve should be used. The basis for this decision was the RMS error in inferred dynamic height which should be kept small. Using each method where it was most appropriate, monthly maps of dynamic topography were computed from temperature profiles collected with expendable bathythermographs between 30 and 50°N. These maps depict the month-to-month changes in the geostrophic flow in part of the North Pacific.

NUTRIENTS IN THE CANADIAN ARCTIC ARCHEPELAGO

A.R. Coote and E.P. Jones

Nitrate, phosphate and silicate concentrations have been measured for several sections in Lancaster Sound, Jones Sound and Smith Sound during September, 1977. Typical values for nitrates, phosphates and silicates, respectively, were 12, 1.9, and 24 μg-at/l in western Lancaster Sound, 13, 1.7, and 22 μg-at/l in western Jones Sound, and 13, 1.3 and 13 μg-at/l in Smith Sound. The silicate and nitrate values are slightly higher than those previously reported for Lancaster Sound and Kennedy Channel (Codispoti and Owens, 1975. *Limnol. Oceanogr.* 20, 115-119). Using values from sections in Lancaster Sound near Resolute Bay, in Jones Sound at the entrance to Fram Sound, and in Smith Sound, we find the silicate imbalance between the inflow and outflow of the Arctic Ocean to be considerably smaller than that reported by Codispoti and Owens and thus easily accounted for by the uncertainty in the water volume transport values. Arguments regarding relatively silicate and nitrate rich Bering Sea water flowing out through the Canadian Archepelago seem to be substantiated.

SEDIMENTARY REGIME OF A SUBARCTIC ESTUARY, RUPERT BAY, NORTHERN QUEBEC

B. d'Anglejan

Rupert Bay is a vast (875 km^2) shallow estuarine embayment opening into James Bay. Three large rivers with a total mean discharge of 2550 m^3s^{-1} converge into the bay. Marine deposits of the early post-glacial Tyrrell Sea invasion, provide a source of silty clays to Rupert Bay. Because of low shoreline relief and fine sediments, extensive intertidal mudflats have developed along the western shores.

The sediment transport in and out of the Bay is subject to strong seasonal fluctuations characterized by a five-month 1.5-m thick ice cover, erosion of the marginal flats by ice-floe migration during breakup, and spring discharges with peak values 5 to 6 times the summer minima. The salt intrusion into the bay varies by several kilometres in response to changes in the fresh water discharge and to the fortnightly tide.

During the open season, high turbidity prevails with a pronounced streakiness in the flow direction determined by extensive longitudinal fronts at the boundary of the river plumes. Both the turbulence by local wind waves and the tidal action hinder deposition except along the western tidal flats, subject to slow accretion by sediments imported from James Bay via the salt wedge. In the remainder of the bay, determination of the suspended transport flux indicates that conditions are met for constant tidal flushing of the sediment brought in by the rivers. Low present depositional rates are confirmed by measurements of the Cs^{137} activity of surface deposits.

Under winter conditions, there is a pronounced decrease in suspended matter concentration, suggesting that deposition takes place temporarily below the ice cover, the resulting sediments being flushed out in the spring.

From a two-dimensional mathematical model of the circulation, areas of nil net velocity, favorable to sediment deposition, are indicated and the effects of the fortnightly tidal cycle emphasized. The probability of significant sediment imports from James Bay is confirmed. The model also allows some predictions of the sedimentological changes likely to take place following harnessing of the rivers.

RADIONUCLIDE CONTAMINATION AND REDISTRIBUTION IN ATLANTIC SEDIMENTS AT THE NUCLEAR WASTE DISPOSAL SITE

R. Dayal and A. Okubo

A sediment geochemical study of the 2800-m Atlantic nuclear waste dumpsite was conducted as part of a multi-disciplinary investigation of the waste disposal site characteristics. Data are presented showing the presence of Cs-137 and Cs-134 in sediments collected in the vicinity of a radioactive waste container using the submersible ALVIN. The Cs-137 concentration level and the lateral and vertical distribution patterns of both cesium isotopes in sediments indicate the waste container as the source of sediment contamination. The Cs-137 profile in sediment core suggests bioturbation as the most probable mechanism for redistributing this radionuclide in sediment. A model representing sediment reworking has been developed. A value of 273 cm^2 kyr^{-1} is calculated for the vertical mixing coefficient. This value lies within the range of values reported by other workers for Atlantic, Pacific and Mediterranean sea sediments using distributions of impulse source and continuously supplied radionuclides as tracers.

Session 2 Cloud Physics Wed. 1315 – 1500

WATER DROPLET GROWTH IN NON-PRECIPITATING CUMULUS CLOUDS

R.A. Stuart

The natural clouds investigated by the Rainfall Enhancement Project of AES, NAE and CFS (see Isaac et al. for a review of this project) are mainly composed of water droplets with diameter less than 40 μm. The colloidal stability of such a population is very high and the process of rain development by condensation-coalescence will be slow. Nevertheless an accurate description of the evolving liquid water spectrum is very important to obtain a proper simulation of the effects of cloud seeding. In particular, the concentration of larger drops must be closely estimated to predict the onset of ice-water collisions.

Linear basis functions of local support (Chapeau functions) are used in the numerical solution of both the condensation and coalescence equations. This approach is new to this aspect of cloud microphysics although it is extensively used in other areas of meteorology. An

important advantage of this numerical method is that any radius grid-point scheme may be chosen for the description of the spectrum.

A grid scheme that is expected to provide very accurate simulations of both processes simultaneously is introduced. Under certain restrictions analytical solutions to the spectrum development equations are available. Numerical simulations under these restrictions are carried out and the results compared with the exact solutions. The agreement is very encouraging.

CUMULUS-CLOUD SEEDING EXPERIMENTS IN NORTHERN CANADA

G.A. Isaac, R.S. Schemenauer, R.A. Stuart, A.J. Chisholm and J.I. MacPherson

In 1976, a weather modification project was conducted in northern Canada to determine the potential for enhancing rainfall from cumulus clouds. A T-33 turbulence research aircraft, a Twin Otter instrumented for cloud microphysical measurements, and a cloud-base observation aircraft were used. A total of 47 cumulus clouds were examined within 370 km of Yellowknife, N.W.T., from 28 June to 17 July. The concentration and phase of large particles ($>70\ \mu m$), as well as the turbulence characteristics, observed during each penetration made in supercooled cloud have been summarized. Eleven clouds were seeded (between -5 and $-10^{\circ}C$) with AgI by burning TBI flares in wing mounted pods on the T-33. Ice crystals or rain were not produced in many of the seeded cumuli. However, measurements of ice crystal and ice nucleus concentrations, and calculations of the growth of precipitation-sized particles, suggest that the AgI nuclei caused rain to form on 3 occasions approximately 8 to 25 min after seeding. The amounts of rain produced by these clouds have been estimated. Measurements indicate that ice crystals continued to be generated several minutes after the AgI was released. Numerical calculations using diffusional and accretional growth cannot always predict the observed fast growth of millimetre-sized ice particles.

ANALYSIS OF SILVER IODIDE DISPERSION FOR THE ALBERTA HAIL PROJECT

D.S. Davison and K.L. Grandia

During the summers of 1976 and 1977 a program was undertaken by the Alberta Weather Modification Board to determine if adequate dispersion was taking place within seeded hailstorms. Turbulence measurements were made by an instrumented aircraft beneath and within various parts of hailstorms. Eleven storms were selected for detailed analysis which included measurements of turbulent velocity standard deviations, integral length scales and dissipation. The data were applied to the three stages of relative dispersion as identified by Pasquill to develop logistical criteria for adequate dispersion of seeding material. The sensitivity of the dispersion criteria to various parameters of the turbulent structure and storm motion were examined. The results of the analysis indicated that for the time scales involved in cloud seeding, dispersion was not sensitive to the values of dispersion and integral scales but was sensitive to the standard deviations of the tubulent velocities. The relative motions of various parts of the storm structure is a very important parameter in the design of appropriate seeding logistics.

A SIMPLE MODEL OF A SEEDED CUMULUS CLOUD

R.A. Stuart

A one-dimensional model that simulates the growth of ice from activated nuclei is described. The only microphysical growth processes considered are deposition and riming. The resultant ice particles move through the cloud according to their terminal fall speeds and through turbulent mixing.

At the end of each time step the model predicts the particle spectrum at each of 50 levels equally spaced between an arbitrary cloud top and melting level. This information is compared with particle spectra observed during the AES-NAE-CFS Rainfall Enhancement Project in three seeded clouds.

Agreement of model predictions and observations at the seeding level is good for smaller particle sizes. In two of the clouds rapid growth of larger particles is observed at the seeding level which cannot be explained by the theory. In the field project several cloud penetrations were also made approximately 1 km below the seeding level. Here agreement of observed larger particle concentrations with the model is better.

This model is the first in a series being developed in the Rainfall Enhancement Project.

AN ESTIMATE OF THE SPATIAL VARIABILITY OF RAWINSONDE-DERIVED PARAMETERS FOR CONVECTIVE STORMS IN ALBERTA

F.E. Robitaille

During the summer of 1976 the rawinsonde facilities of the Alberta Hail Project obtained more than 100 soundings within 80 nautical miles of existing radar echoes. This paper is concerned with those echoes nearest to rawinsonde stations at release times. Radar reflectivity criteria are applied to classify these nearest echoes as "weak" or "strong". Motion vectors, valid at release times, are calculated for each echo of interest. Data point arrays referenced to echo centres are then composited for the two intensity categories.

Composited fields for two sounding-derived parameters are presented. One of them is the parcel energy, obtained using Chisholm's Loaded Moist Adiabatic (LMA) cloud model and proportional to the positive area on a thermodynamic chart. The other is the maximum hailstone size category obtained using the LMA model output in conjunction with Maxwell's empirical nomogram.

Marked differences are found between the fields for "strong" and "weak" echoes. Within the "strong" field distinct maxima appear in the two quadrants ahead of the composite storm centre. Guidelines for obtaining soundings "representative" of potential instability in the vicinity of existing echoes are given.

Session 3 Description of Ocean Currents Wed. 1530 – 1630

ON THE STRUCTURE OF THE DEEP GULF STREAM

R. Hendry

The deep flow beneath the Gulf Stream between 55° and 56°W is examined in an analysis of 18 months of moored current and temperature data. The measurements were obtained at 4000-m depth in a zonal array along 40°30'N, and revealed an energetic and highly structured field of low-frequency oscillations with periods from 20 days to longer than 100 days. Over the measurement period from late 1975 to early 1977 the rms fluctuating current was 0.16m s^{-1}; a mean flow of 0.04 m s^{-1} flowing towards 300°T was also obtained. A particularly energetic current burst gave speeds of up to 0.60 m s^{-1} and dominated the last two months of record. There is clear evidence of zonal propagation, with phase velocities of order 0.2 m s^{-1} towards the west. Isotherm displacements of up to 750 m occurring as pulses of warmer temperature are inferred from the temperature records. It is suggested that horizontal temperature gradients at 4000 m associated with the strong thermocline gradients in the Gulf Stream were advected through the array as the Stream meandered, giving rise to the observed temperature fluctuations.

A DESCRIPTION OF THE CURRENTS IN EASTERN PARRY CHANNEL, N.W.T. – SUMMER, 1977

D.B. Fissel and J.R. Marko

Parry Channel forms the major east to west connection between Baffin Bay and the Beaufort Sea. In the summer of 1977, current measurements were obtained in the eastern Parry Channel

region through a combination of moored subsurface current meters and satellite tracked drifting surface buoys. Three subsurface current moorings, located near the mouth of Lancaster Sound, were recovered after approximately 60 days operation. Each mooring had three Aanderaa current meters at depths of 35, 200 and 550 m. Ten drifting buoys, deployed in late July, transmitted useable position data over periods ranging from 24 to 105 days, with an average of 8 positions reported per day.

From current meter data, a net southward drift was found at two stations located in the centre of the Sound at the level of both the upper and middle current meters. We suggest that this southward current represents an extension of the Baffin current which flows southward along the west side of Baffin Bay. On the southern side of the Sound, the currents set easterly or westerly, in alignment with the longitudinal axis of Lancaster Sound. Based on a spectral analysis of the data, most of the variance of the upper and mid-depth currents is found at periods greater than 6 days. At 550-m depth, these longer period variations are diminished in magnitude and the diurnal and semi-diurnal tidal currents dominate the spectrum with typical amplitudes of 0.15 m s^{-1}. Large differences between the two stations in the centre of the Sound, separated by 30 km, suggest considerable spatial variations in the current patterns.

From the paths of the satellite tracked drift buoys, some persistent current patterns emerge. These include:

(a) a clockwise circulation around Griffith Island in Barrow Strait;
(b) an eastward current on the south side of Barrow Strait which turns to the right and flows southward along the western side of Prince Regent Inlet – this current reaches speeds of up to 1.0 m s^{-1};
(c) in central Lancaster Sound, the drift tracks of the two buoys which reached this area suggested the presence of large eddies with spatial scales ranging from 20 to 55 km;
(d) a strong current was found along the southern shore at the mouth of the Sound with recorded speeds as high as 0.97 m s^{-1}.

A preliminary comparison indicates only fair to low correlation between the surface currents and the winds measured at shore stations.

CHARACTERISTICS OF THE INTERMEDIATE LAYER IN THE ST LAWRENCE ESTUARY

R.G. Ingram

From observations taken during both winter and summer at the head of the Laurentian Channel, seasonal and fortnightly tidal period variations of the temperature and salinity fields are examined. The cold intermediate layer is found to be much warmer in mid-winter than at any other time of the year. Three months later, upstream advection of colder water from the Gulf produces the lowest temperature values observed. The relative importance of vertical diffusion and horizontal advection in this layer is discussed.

Session 4 Transport of Airborne Pollutants Wed. 1515 – 1700

CORRELATION OF TURBULENCE MEASUREMENTS WITH PLUME SPREAD AND DIFFUSION COEFFICIENTS IN THE ATHABASCA OIL SANDS AREA

D.S. Davison

In June 1977, airborne measurements were made of plume dispersion and associated turbulence levels about the GCOS plant as part of the Alberta Oil Sands Environmental Research Program (AOSERP). The measurements were similar to those of the first field trip in March 1976 reported previously, but for the June field trip, more extensive analysis of the turbulence data was undertaken including integral scale and spectral analysis. The plume sigma values required by the conventional Gaussian formulation were classified by turbulent parameters and compared to Taylor's theory and Draxler's classification scheme. Draxler's approach was

extended to involve measured integral length scales in the parameterization. The results of this study were compared to Fickian diffusion coefficients which represent a practical approach to diffusion modelling as an alternative to the Gaussian approach.

AIRBORNE PARTICULATE TRANSFER FROM A METAL PROCESSING INDUSTRY AT A LAND-WATER BOUNDARY

D.R. Hay and V.E. Sells

This preliminary, short-term study of the air surrounding a complex of metal processing industries on the south shore of Hamilton Harbour was carried out with the U.W.O. optical Lidar positioned at C.C.I.W. during the interval 12-22 July 1976. The Lidar observations were supported by point sampling of particulates with more conventional instruments at numerous locations surrounding the industrial complex. Particulates of radius exceeding 0.1 μm generally followed closely the Junge size-distribution of exponent 3 and the number concentrations of Aitken nuclei were clustered around the extrapolation of the Junge distribution towards radii 0.01 – .001 μm. The conventional particulate samplers showed that mass concentrations exceeding 220 $\mu g\ m^{-3}$ occurred for a few hours or less at all stations, but prevailed for intervals from 1 to 4 days downwind of the industrial complex. 21 observing episodes with the Lidar yielded maps indicating strongest particulate concentrations (exceeding 400 $\mu g\ m^{-3}$) at elevated inversion layers some 220 m deep around 1000 m above ground. The haze dome above the industrial complex, 100-300 m above ground, supported accumulations 100-400 $\mu g\ m^{-3}$. In stable air, light winds carried the high concentrations in industrial stack plumes over horizontal distances of several kilometres. Moderate-strong winds transferred the haze dome almost intact several kilometres away from the industrial complex. Broad plumes of concentration 30-200 $\mu g\ m^{-3}$, with local patches of higher density, appeared to arise from the traffic density 0.006-0.027 vehicles m^{-1} on the Skyway. The traffic plumes usually were confined to the Skyway region, rarely extending more than a few hundred metres laterally,

A MICROMETEOROLOGICAL STUDY OF AN URBAN VALLEY

R. Patterson and K.D. Hage

Measurements of wind, temperature and carbon monoxide concentration were made in a cross-section of the North Saskatchewan River Valley in Edmonton in the vicinity of the High Level Bridge. Results indicate that this small river valley, under conditions of light prevailing wind and clear skies, has its own microclimate, which more closely resembles that of large valleys than would be expected. Drainage winds were observed on the valley slopes and the effects of these winds were noticed in the spatial variations of carbon monoxide concentration from a major road running parallel to the river in the valley. Winds from several locations were analysed using a Fast Fourier Transform spectral analysis method and evidence was found for periodicities in the drainage winds.

LONG-RANGE TRANSPORT MODELLING

M.P. Olson and K.K. Oikawa

For application to the long-range transport of pollutants, an operating trajectory model has been developed which is being used in the determination of the concentration and deposition of SO_2 and SO_4 particularly over eastern North America.

The model uses the objectively analyzed height, temperature and wind fields at 500, 700, 850 and 100 mb from the Canadian Meteorological Centre history data base to compute backward or forward trajectories at selected levels below 500 mb for selected starting points (grid points or stations), data periods and time steps. Vertical motions are computed from the "omega" equation and the model will operate on grid scales from 381 to 127 km.

A concentration/deposition box model based on the trajectories has been developed to provide information for episode measurements and field studies. The model incorporates a SO_2 emission inventory, variable mixing heights and parameterized physical processes. Some

trajectories and SO_4 concentration results for the August 1976 intensive sulphate study will be shown.

CLOUDS, PRECIPITATION AND ICE FOG FROM PETROCHEMICAL INDUSTRIES DURING VERY COLD ALBERTA WEATHER

R. Charlton

The potential for petrochemical industries to form clouds on very cold days can be summarized as follows. A large chemical plant, oil refinery or oil sand extraction plant emits about 10^7 kg d^{-1} of water vapour while it rejects about 10^{14} J d^{-1} (1.2 GW) of waste heat. This is comparable to the emissions from a city of 100,000 inhabitants. This daily emission could raise the temperature of 100 km^3 of air by 1°C and, at −40°C, could saturate an equal volume of dry air.

Most industrial emissions rise to altitudes greater than 100 m where temperatures critical to the formation of true ice fog (−35°C) are much less frequent than at ground level. As the oil industry moves northward, however, ice fog temperatures aloft will be encountered on tens of days per year during which persistent regional fog, cloud and precipitation could develop. For instance, the oil sands area in northern Alberta experiences ten times more days with −35°C aloft than does Edmonton.

Field studies at Edmonton and in the oil sands area have been conducted during the very cold days of the last two winters. Weather data analyzed includes photographic records, tower data, surface networks, and precipitation samples.

Photographs indicate that persistent clouds formed by the petroleum industries dominate the skies over Edmonton and the oil sands industrial sites on very cold days. Tower data and photographic records show that day-time solar heating in mid-winter is quite effective in dispersing ice fog in Alberta. At higher latitudes this would not be the case. Observations of cold weather precipitation from industrial sources show that it is substantial and demonstrate some interesting aspects of cloud micro-physics. On comparing urban ice fog with industrial ice fog one concludes that the industrial variety is much deeper, more persistent and tends to form precipitation particles more readily.

Session 5 Climate and People

Thurs. 0830 – 1015

A STUDY OF CLIMATIC VARIABILITY

K. Higuchi and G.J. Boer

There have been numerous suggestions that the climate has become "more variable" in recent years. In order to test this hypothesis, a study of the variance of the 500-mb height field over the Northern Hemisphere has been carried out. The data consist of some 28 years of daily values on a latitude-longitude grid.

The mean height of the 500-mb surface (which is closely associated with the mean temperature of the 1000-500 mb layer) decreased over the 28-year period while the variance increased. If the long-term trend is removed, however, there is little evidence of a statistically significant connection between the mean and the variance.

THE SEASONS: HOW CANADIANS RESPOND

S. M. Kevan

Long ago it was recognized that certain types of human behaviour show seasonal fluctuations to their occurrence. The most noteworthy of the seasonal phenomena are the changes which are exhibited by birth, death, suicide, crime and rates of daily admission to mental institutions. Data obtained from Statistics Canada as well as research, which has been conducted in the past, show that Canadian populations do exhibit seasonal trends to many of those forms of human

behaviour. A controversy exists about how important are atmospheric factors in creating these seasonal trends. Some avenues of research which could help to settle the matter are discussed.

ENERGY AND THE METEOROLOGIST IN SINGAPORE

J.E. Pakiam

Singapore, an island city state with few natural resources, is heavily dependent on imported fuel oil for its primary source of energy. The fourfold increase in oil prices in 1973 accelerated a Research and Development (R & D) programme into alternative sources of energy including nuclear, coal and the "clean" sources of sun and wind.

Rapid industrialization, urbanization and modernisation in the last decade have also brought with them a concern about physical pollution of the environment in Singapore.

This paper looks at the progress of R & D towards new energy sources and the part played by the meteorologist is discussed. Pollution monitoring and control programmes and the role of the meteorologist in R & D are also examined.

AVAILABILITY OF CLIMATIC DATA FOR ENERGY RESEARCH

J. Donegani

The Atmospheric Environment Service is currently reorganizing the format and structure of its digital archives. In so doing, a major influence has been the demand of scientific users involved in radiation synthesis models, and in other studies directly related to the demand for consumable energy resources.

In order to meet this demand, and to ensure that "proxy" users of meteorological data bases are aware of the data available as well as acquainted with their potential use, attention is directed to recent applications of the digital archive and also to descriptions of the primary and secondary data to be stored in the future.

WIND IN THE CITY

A.G. Davenport and N. Isyumov

The paper discusses first a familiar problem encountered in city streets – the battering of pedestrians by gusts – which has recently received the attention of city planners. Its treatment at the design stage is discussed, using an approach centred around wind-tunnel modelling of the urban region in a boundary-layer wind tunnel. Measurements of the mean and fluctuating components of the wind are made at a grid of points and related to the wind at a reference point above the buildings. These relative wind speeds are then compared with the climate of wind speed and direction derived from meteorological measurements and adjusted for differences in terrain and height. This enables an estimate of the wind climate at pedestrian level to be determined for each point and a prediction of the recurrence of strong wind speeds. These results are then compared with criteria for various levels of activity. Measures to alleviate unfavourable conditions are mentioned.

The paper also refers to some other characteristics of the wind in cities. These include the characteristics of turbulence found near buildings and the measurement of wind conditions from masts above buildings.

Session 6 Ocean Tides Thurs. 1030 – 1200

TUKTOYAKTUK HARBOUR, FREE OSCILLATIONS AND ICE COVER

F.G. Barber, J. Taylor, and P.A. Bolduc

The existence of oscillations faster than tidal in sea-level data from Tuktoyaktuk and the application of analytic models indicate that the ice cover can change both the open mode frequency of Kugmallit Bay and the Helmholtz response to the harbour. As well, in the presence of ice, shallow water constituents occur which may extract energy from the semi-diurnal tide and so account for the reduction in amplitude that has been noted,

SEAMOUNT PRESSURE MEASUREMENTS IN THE NORTH PACIFIC

W.R. Crawford

In 1974 and 1975 pressure gauges were placed on, and records receovered from Union Seamount (49°35'N, 132°47'W), Bowie Seamount (53°19'N, 135°37'W) and Surveyor Seamount (56°08'N, 144°22'W) in the North Pacific in depths of 314, 170 and 630 m, respectively. These records have been analyzed to derive harmonic constituents and co-phase and co-range charts have been prepared for the neighbouring regions. The temperature recorded by the gauge on Surveyor Seamount revealed a predominantly semi-diurnal signal of range 0.1°, which represents a vertical displacement of the water column of up to 50 m. Significant diurnal oscillations are not present.

The three pressure records were low pass filtered to remove tidal signals. The residual pressure fluctuations at Union Seamount were about 10 mb in range, about one quarter of the range of local sea-surface pressure fluctuations, and were poorly coherent with these sea-surface pressures. STD casts along line P by the weathership indicate that less than half of the low frequency pressure fluctuations at Union Seamount can be attributed to density changes within the water column. Low frequency pressure changes at Bowie Seamount are similar in magnitude to those at Union, and those at Surveyor are larger. Coherence among these three records is poor.

THE 18.6-YEAR CYCLE OF SEA-SURFACE TEMPERATURE IN SHALLOW SEAS DUE TO VARIATIONS IN TIDAL MIXING

J. Loder and C. Garrett

The semi-diurnal and diurnal lunar tidal forces are modulated by a few per cent over the 18.61-year nodal cycle, with corresponding variations in the average speed of tidal currents. A simple model of vertical mixing in coastal seas indicates that a fractional variation ϵ in the strength of tidal currents should lead to a variation in sea-surface temperature (SST) of at least ϵ 4/3 times the average temperature difference from surface to bottom. Thus, we hypothesize that long-term records of SST might show a significant nodal cycle. Available records of SST from the Atlantic coast of North America and the Pacific coast of Canada have been examined using low-pass filtering, least squares regression, and spectral analysis techniques. Many of these records contain a low frequency variation of approximately 20-year period and amplitude up to 0.6°C. Although analysis techniques do not precisely identify the period of this variation, the agreement of its phase with that of the 18.61-year nodal modulation is suggestive of significant effects of tidal mixing on SST at some locations.

TIDES IN SHALLOW RIVERS

P.H. LeBlond

It is shown that the dynamic regime most appropriate to the description of the tide in shallow rivers obeys the strongly damped "kinematic-wave" equations. The upper St Lawrence and the Fraser are used for illustration. A simple application of the model readily explains the very long time lag associated with the low tide in the Fraser.

Session 7 Dynamic Meteorology, Part I: Models Thurs. 1030 – 1200

ATTEMPTS TO TUNE THE GRID-POINT PRIMITIVE EQUATIONS MODEL FOR REGIONAL FORECAST APPLICATIONS

D. Davies

Following the choice of the spectral model as the main operational forecast model at the Canadian Meteorological Centre in 1975, it was decided to try to use a limited area version of

the grid-point primitive equations model as a high resolution Regional Model. The idea was to start out with a model with a 5-level vertical resolution and a horizontal grid spacing of 127 km, and then attempt further increases of resolution at a later stage should the circumstances warrant it. Time-dependent horizontal boundary conditions are supplied by the spectral model.

The 24-h forecasts produced by daily integrations of the original version of the Regional Model are inferior in quality to those produced by the 29-wave spectral model. The two main weaknesses are the under-estimation of baroclinic development and boundary distortions. Consequently, an attempt is being made to tune carefully the arbitrary aspects of both the basic dynamics and the time-dependent boundary conditions. So far, slight improvements in the model's performance have come from each of half-a-dozen tuning adjustments to the dynamics.

It is hoped that further tuning, in combination with a new small scale moisture effects package developed earlier, will lead to an operationally viable Regional Model.

RESULTS OF A SENSITIVITY EXPERIMENT WITH A SPECTRAL MODEL

E. Yakimiw

A sensitivity test experiment extending over a 5-day forecast period was performed with a 5-level spectral model. A radially symmetric depression of about 1900-km radius with a maximum central value of −10 dam was superimposed on the initial conditions in the Gulf of Alaska. Comparisons were made between the 12-h interval forecasts obtained from the same initial conditions both with and without the perturbation. We shall briefly report the results of this experiment, in particular that: the R.M.S. error centres observed over the 5-day period propagate at an average speed of 12 m s^{-1}; the major wave of the R.M.S. error, at about 18 m s^{-1}; while the total hemispheric R.M.S. error increases with a doubling time of 2¼ days at all levels.

THE APPLICATION OF NON-LINEAR NORMAL MODE INITIALIZATION TO AN OPERATIONAL FORECAST MODEL

R. Daley

Non-linear normal mode initialization is capable of adjusting the initial fields for a baroclinic primitive equations model integration in such a way that there will be no high frequency gravity wave oscillations during the forecast. The procedure produces initial vertical motion and precipitation rate fields completely consistent with the model, and if used in a variational context will not destroy reliable initial data. The procedure has been tested on the Canadian Operational Spectral Model, and some results will be presented.

A JANUARY SIMULATION WITH THE AES GENERAL CIRCULATION MODEL

G.J. Boer and N.A. McFarlane

At the last Congress we reported on the dynamical and physical structure of the AES general circulation model which was then in its test-run stage.

Since that time a number of modifications and improvements have been made to the model, diagnostic programs have been written, and the model has been used to simulate the general circulation.

Basic information concernng the model and the diagnostic package will be reviewed and the results of a January simulation will be presented and compared with observations.

SOME OBSERVATIONS OF THE FIELD OF MOTION IN BREAKING WAVES IN DEEP WATER

M.A. Donelan

Measurements of the velocities produced by deep water wave breaking are just beginning to appear. However, because of the transitory nature of whitecaps, the question of the flow field distortions and turbulence produced by a single whitecap has received little attention. In this paper a steady breaking wave is produced in the wake of a towed ship's model. The spilling breaker so formed has many of the surficial characteristics of a whitecap without its annoying evanescence.

A two-axis electromagnetic current meter is used to explore the mean flow, turbulence and Reynolds stress distribution beneath the steady "whitecap". The departure from the irrotational flow field beneath a comparable Stokes wave takes the form of a downwards "jet" on the forward face of the wave which sets up a flow towards the rear of the wave. Turbulent intensities are greatest where the "jet" velocity is normal to the free surface on the forward and rear slopes of the wave, but significant turbulence was measured to depths of the order of the wave height.

SURF BEAT

A.J. Bowen

It has often been noted that waves tend to occur in groups so that when waves break on a beach a rather regular variation from high to low breaker heights is seen. Popular superstition has it that the 7th or 9th wave will be a big one, and indeed it has been suggested there is a real correlation between the wave frequency and the beat frequency.

Direct measurements in the early 1950's showed waves at frequencies corresponding to those of the wave groups and this rather low frequency motion (typical period 30-300 s) was therefore described as surf beat. However, even with modern instrumentation, it is difficult to describe the spatial variation of the low frequency motion; consequently, the relative importance of a number of suggestions which, at least in theory, provide mechanisms for the generation of low frequency energy has never been established. Recent observations have reinforced the idea that edge waves, the free wave modes trapped at the shoreline, are a major component of the low frequency energy: one of the most interesting explanations of surf beat suggests that the beating between particular pairs of incoming waves leads to resonant growth of edge wave modes, which may then dominate the low frequency spectrum. As any full, theoretical development breaks down when the incoming waves break, empirical evidence is essential. Experimental results from the laboratory show that the response at the beat frequency is much stronger when the resonance conditions for edge wave growth are satisfied and that the response is in the form of the theoretically predicted edge wave mode, even when the incident waves are breaking. These results suggest that surf beat may be predominantly an edge wave phenomena.

Practical interest in the phenomena of surf beat has been reinforced by the discovery that a wave field which has a strong beat component can be much more destructive than a similiar wave field which does not have these particular phase relationships.

A NON-SPECTRAL, STATISTICAL MODEL FOR WIND WAVES

J. Hamilton

A model is presented for wind waves which possess a narrow spectrum. The model involves the concept of groupiness and the decoupling of the phases of the waves after a certain time. It is not intended to be truly realistic, but rather to contain only those features which are necessary to aid in the understanding of some features of the correlation function and the frequency spectrum.

Using the model, it is possible to identify the size of the random contribution to the correlation function and thence relate confidence limits on the wave spectrum to the ratio of mean group length to the length of record analysed.

Extension to three dimensions is discussed.

Session 9 — Heating and Evaporation in the Atmospheric Boundary Layer, Part I — Thurs. 1430 – 1530

SURFACE CONTROL ON EVAPOTRANSPIRATION

W.G. Bailey

An investigation of surface control on hourly and daytime evapotranspiration from a cropped surface was conducted at Simcoe, Ontario during the growing season of 1974. The combination model, which combines equations dealing with the energetics of evapotranspiration and turbulent transfer, was employed in the study of hourly relationships. In the variant of the combination model used, surface control on evapotranspiration is explicitly considered through the deployment of a bulk stomatal resistance which is approximately equal to the stomatal resistance of all leaves acting in parallel. Bulk stomatal resistances evaluated by residual from the combination model compared well with independent estimates developed from field measurements of leaf area index and stomatal resistane. When used in the combination model, these independent estimates of bulk stomatal resistance provided reliable evapotranspiration values on an hourly basis. Daytime evapotranspiration totals normalized by equilibrium evapotranspiration were strongly linked with available soil moisture after leaf area index exceeded 1.0. With volumetric soil moisture above 0.12 mm^3 H_2O/mm^3 soil, maximum values of normalized evapotranspiration were constant. Confirmation of the Priestley and Taylor potential model is found with these results. When soil moisture drops below the threshold level for potential conditions, evaporative response is linearly related to soil moisture availability. This relationship could be employed in estimating daytime water loss from the cropped surface.

ENERGY AND WATER BUDGETS OF THE UPPER NIGER

P. Christin

A computer model is used to study the actual different energy and water terms in the Upper Niger (Africa). One establishes that the water parameters vary significantly from one watershed to the oher and even within different regions contained in the same watershed. This conclusion allows one to delineate those regions which would be most affected by any artificial surface modifications. Secondly, some artificial surface modifications are introduced with a view to estimating their maximum possible extent. One thus observes that vast surface areas can theoretically be modified without destroying the water equilibrium between different watersheds.

USE OF THE β-ABSORPTION METHOD IN MICROMETEOROLOGICAL STUDIES

N. Barthakur

The use of the β-absorption method is described for measuring the moisture content of plant leaves as a function of time to determine the onset of moisture stress under drought conditions. Current studies also indicate that the method is sensitive enough to study stomatal dynamics of foliage. Evaporation of water from attached leaves and other surfaces, under various environmental conditions in the laboratory, have been measured and compared to each other.

These results will be discussed and evaluated with respect to the field measurements of dew on soil and plant surfaces made elsewhere. Finally, the method as a valuable tool in micrometeorological studies of agricultural importance will be examined in terms of sensitivity and accuracy of measurements.

RESONANT INTERACTIONS BETWEEN TOPOGRAPHIC PLANETARY WAVES

L.A. Mysak

The resonant interactions between topographic planetary waves in a continuously stratified fluid have been investigated theoretically. The interacting waves form a resonant triad and travel along a channel with a uniformly sloping bottom. The basic state stratification in the channel is characterized by a constant buoyancy frequency. The existence of solutions to the quadratic resonance conditions has been established graphically. Each wave by itself is a bottom-intensified oscillation of the type discovered by Rhines (1970) except for the addition of a small positive frequency correction. This correction must be included to satisfy higher order terms in the bottom boundary condition. It is analogous to the frequency correction for surface gravity waves required to satisfy higher order terms in the free surface boundary condition. For strong stratification ($r^2 \gg L^2$, where r = internal deformation radius and L = channel width), the waves are strongly bottom-trapped and this frequency correction is negligible. For weak stratification ($r^2 \ll L^2$) the waves are barotropic and the frequency correction is O (δ), where δ = fractional change in depth across the channel. In many oceanic contexts, δ lies in the range 0.1 – 0.4 and therefore this correction can produce a significant change in the phase speed. The amplitudes of the waves in the triad obey the classical gyroscopic equations usually encountered in quadratic resonance problems. In particular, the amplitudes evolve on the slow time scale $t = \hat{O}\,(1/f_0\,\delta^2)$, which, for our scaling assumptions, is also O $(1/f_0 Ro)$, where Ro is the Rossby number.

The results have been applied to the Norwegian continental slope region. It was found that in this vicinity, there may exist resonant triads consisting of two short, high-frequency waves (periods around 3-4 days) and one long low-frequency wave (period around 9 days).

QUASIGEOSTROPHIC FLOW ABOVE SLOPING BOUNDARIES

E.R. Johnson

The form of quasigeostrophic flow past isolated topography on a sloping planar boundary is obtained for both homogeneous and strongly stratified flows. The results for a homogeneous flow are closely related to those for homogeneous flow on a β-plane but the stratified solutions differ significantly from the corresponding β-plane ones. In particular, the stratified Rossby-wave wake, present behind obstacles on planes sloping upwards to the left of the flow direction, is trapped next to the boundary. The magnitude of a perturbation to the basic parallel bottom contours required to cause current branching is calculated for arbitrary slopes and varying stratification. Expressions are also given for the force exerted on obstacles in these flows.

LONG-PERIOD EQUATORIAL TOPOGRAPHIC WAVES

L.A. Mysak

A theory of barotropic, non-divergent, zonally propagating waves on an equatorial beta-plane with topography has been developed. The bottom contours are assumed to be parallel to the equator, so that the depth profile H is a function only of y, the northward coordinate. Solutions for trapped waves have been derived for the following depth profiles: (1) a single-step escarpment; (2) a flat continental shelf; (3) a semi-infinite sloping beach; (4) an exponentially varying continental shelf/slope region that monotonically increases to a constant depth far from the shoreline; and (5) an exponential shelf of the type used by Buchwald and Adams at mid-latitudes. For each wave solution obtained, numerical examples of typical periods and phase speeds have also been calculated. The eigenfrequencies ω_n for the waves trapped on a sloping beach with depth profile $H = H_0 + \alpha y$ (Case 3) take a particularly simple form: $\omega_n = -\beta H_0/|\alpha|\ (2n+3)$, where $n = 0, 1, 2, \ldots$ and $\beta = 2\,\Omega_E/R$ (Ω_E and R being the Earth's angular speed of rotation and radius, respectively). A number of qualitative results have also been

derived. For example, a WKB-type argument was used to show that equatorial trapping will always occur over any monotonic depth profile that straddles the equator. Also, it has been proved that the phase of an equatorial topographic wave propagates westward or eastward according as the equilibrium potential vorticity $\beta y/H(y)$ is a monotonic increasing or decreasing function of y.

The theory for a flat continental shelf (Case 2 above) has been applied to the Ghana coast. It is suggested that a 0.07 cpd westward propagating signal in the sea-surface temperature observed by Houghton and Beer (1976) could be due to an equatorial shelf wave of the type discussed here.

Session 11 — Heating and Evaporation in the Atmospheric Boundary Layer, Part II — Thurs. 1600 – 1700

ALBEDO AND NET RADIATION CHANGES DUE TO LOGGING OF CONIFEROUS FOREST

J.H. McCaughey

In this paper the results of field studies conducted in 1975 and 1976 are reported. This work was done in the Montmorency Research Forest (P.Q.). Two surface types are present in this basin: coniferous forest stands and cleared areas which have been logged. The forest is composed of balsam fir (*Abies balsamea* L. Mill.) with small amounts of black spruce (Picea mariana Mill.) and white spruce (Picea glauca Moench). One site (designated the forest site) was chosen in an extensive stand of mature forest. Another site (designated the cleared site) was chosen adjacent to the forest site. The forest on this site had been clear-cut in the fall of 1975. Global solar radiation ($K\downarrow$), and reflected solar radiation ($K\uparrow$) from each site were measured with Eppley pyranometers (Model 8-48). Net radiation (Q^*) on each site was measured with a Swissteco net pyrradiometer (type S-1).

Albedo values have been calculated from hourly average values of $K\downarrow$ and $K\uparrow$. For the forest site, 1975 and 1976 data are used, and the sample size is 264. For the cleared site 1976 data are used, and the sample size is 171. The zenith angle variation for both data sets is essentially the same: 25 to 86° for the forest site, and 28 to 81° for the cleared site. The albedo of neither surface exhibits systematic variaton with zenith angle. Daily mean values of albedo have been calculated by weighting the hourly values, in zenith angle classes, according to the value of $K\downarrow$. For the forest site the daily mean albedo is 0.07, compared to 0.18 for the cleared site.

The change in net radiation due to logging is characterised by a sample of 21 days of data collected between early July and late August, 1976. On all days simultaneous, continuous measurements were available for the forest site (Q^*_f), and for the cleared site (Q^*_c). Typically, during the night $Q^*_f < Q^*_c$, and during the daylight period $Q^*_c < Q^*_f$. The difference at night reflects differences in net terrestrial radiation, and implies that the surface temperature of the forest is higher than that of the cleared site. During the daylight period the difference in net radiation between the sites can be explained by the difference in albedo. Given the difference in the daily mean albedo, the net global radiation on the cleared site will be 88% of the value for the forest on a daily basis. This agrees very closely with the mean difference in net radiation which, in terms of daily totals is $Q^*_c = 0.89Q^*_f$, with a correlation coefficient of 0.98 and a standard error of estimate of 0.65 (MJ m^{-2} day^{-1}). This implies that the surface temperatures of both sites are equal during daylight periods.

OBSERVATIONS DE LA COUCHE LIMITE ATMOSPHÉRIQUE DANS L'ESTUAIRE DU ST-LAURENT

J. Dionne et L. Bilodeau

Durant la période du 26 août au 3 septembre 1977, une expérience conjointe a été menée avec une équipe du SEA (Toronto) en vue d'étudier la structure verticale de la couche limite atmosphérique (CLA) à l'aide de ballons captifs. Les conditions d'observations ont été marquées par une forte advection d'air chaud venant du sud-ouest accompagnée de vents violents et par une période de très haute pression suivie de vents faibles du nord-ouest. Les observations dans la CLA, pour $0 < z < 600$ m, nous ont permis de recueillir de nombreux profils verticaux de la température, du vent et de l'humidité, ainsi que des séries chronologiques de ces mêmes paramètres à niveaux fixes.

L'analyse des profils a mis en évidence la présence d'une couche de surface (CS) très mince caractéristique d'une couche très stable ($\partial\theta/\partial z \cong 1°C\ m^{-1}$), d'une couche interne (CI) d'épaisseur variable et d'une couche bien mélangée (CM) correspondant à la partie non perturbée de la CLA côtière. Généralement, on peut faire correspondre le sommet de la CS avec un maximum dans la vitesse du vent et un changement notable de courbure dans le profil de la température potentielle. Le virement du vent avec l'altitude est aussi très important en raison des effets conjugués de la vallée et de la baroclinité.

Des études en cours devraient nous permettre d'évaluer les flux verticaux de momentum et de chaleur, bien que l'on ne puisse mesurer les composantes haute-fréquence de ces flux dans une représentation spectrale. Nous espérons établir cependant une limite inférieure de ces flux pour différentes valeurs du paramètre de stabilité.

A METHOD FOR FLUXES AND TEMPERATURE-PROFILE PREDICTIONS USING WIND DATA AS THE SOLE INFORMATION

A.K. Lo

A method based on the "least square error method" for evaluating fluxes and other surface layer parameters is presented. The special feature of this method is that it does not require *a priori* knowledge of the temperature profile. It, in fact, predicts the temperature profile.

This method has been tested on both the Kansas and the Wangara experimental data. Excellent agreement for fluxes and the Monin-Obukhov length is obtained.

Session 12 — Winds and Temperature in the Atmospheric Boundary Layer — Fri. 0830 – 1015

SATELLITE DETECTION OF PRECURSOR MARITIME CONDITIONS FOR SEASONAL CLIMATE PREDICTION: PROSPECTIVE CONTRIBUTIONS OF SEASAT-A TO CLIMATE DIAGNOSTICS

J.A. Ernst

The severe winter of 1976-77 has caused increased attention to be paid to the measurement of upstream atmospheric and oceanic quantities that may effect large-scale downstream climatic fluctuations. The coupling of persistent Summer-Fall maritime wind regimes with anomalous sea-surface temperature (SST) patterns may predispose or favour large departures from downstream "normal" continental winter weather. With a successful launch of Seasat-A in May 1978, the first dedicated oceanic satellite will be in-place to provide global marine data on a scale and at a spatial resolution never before available.

With all-weather microwave sensors onboad, both active and passive, Seasat-A will be able to "see through" cloud cover that ordinarily blinds infrared (IR) sensors. This paper describes three ocean-specific sensors and their application to the collection of global marine data, and details the on-going effort to develop techniques and applications designed to further

understanding of those air-sea interactions and processes that cause favourable as well as unfavourable changes in our climate. In addition to daily SST data (at approximately 100 km spatial resolution), measurements such as marine boundary-layer vector winds (at 50 km resolution), sea ice and glacial sheet ice areal change detection, deep ocean waves and spectra, oceanic currents, and estimates of atmospheric water vapour, will be acquired in both research and demonstration modes to aid in advancing climatic model's skill in the long-range prediction of seasonal weather.

Econometric and agrometric models may then more realistically take weather into account in the shifting of national priorities. For example, the early detection of identifiable maritime precursor conditions for categories of departures from normals will give planners in energy-intensive industries increased lead-time to develop and modify their "menu" of fuel stocks in order to minimize the economic impact of adverse weather such as the Winter of 1976-77.

INTERMITTENT AIR FLOW: ITS EFFECT ON HEAT TRANSFER AND EVAPORATION

P.H. Schuepp

In order to make existing micrometeorological models on heat and water vapour transfer from the ground more adaptable to the discontinuous flow in and near vegetation, the heat transfer from an electrically heated plate and evaporation from a small porous surface were measured in the laboratory with air flows consisting of 0.5 to 10 velocity pulses per minute. The resulting transfer was expressed as a fraction of that observed for steady flow with velocity equal to pulse height. Similarly the time-integrated mean velocity of intermittent flow was expressed in fractions of the steady flow.

A positive intermittency effect, i.e. a higher fractional transfer than would be expected for steady flow with velocity equal to the mean intermittent one, was observed in all cases. Fractional transfers of 0.4 and 0.7 for fractional mean velocities of 0.25 and 0.5, respectively, were typical for heat transfer. The effect on evaporation was more striking, particularly at low velocities (infrequent pulses), with fractional transfer of $\geqslant 0.6$ for fractional velocity of 0.2. Even higher intermittency effects were observed behind artificial barriers.

Possible explanations for these effects will be discussed.

ESTIMATE OF THE TIME-AVERAGE WIND SPEED AND ITS STANDARD ERROR FROM AN INCOMPLETELY OBSERVED TIME PERIOD

M.L. Thiebaux

It is desired to determine the time-average wind speed (and power) over some definite period of time at a site where a more-or-less continuous record of observations is available. If a complete and continuous record of observations exists, then exact average values are determinable, assuming instrument errors are negligible. However, if observations are missing during an appreciable part of the time period the time-average speed (and other stochastic parameters) over the total period can be known only approximately.

Assuming that the wind speed distribution at the site is weakly stationary over an ensemble of the time period in question, it is clear that the wind speed average over the observed portion of the period is an unbiased estimate of the average over the total period. Further, assuming that the lagged time correlation function of the wind speed is known, either as an estimate from the period in question or from other records, we demonstrate a method of estimating the standard error of the estimated wind speed.

The general case is treated and then specialized to several commonly occurring types of missing observation structures. These are further specialized to red noise time series with and without diurnal sinusoidal components in the lagged time correlation function. The method is applied to records of hourly mileage observations at a site in Prince Edward Island in an attempt to detect long-term trends in the average wind speed and available power.

TEMPERATURE PROFILES FROM THE INFERIOR MIRAGE

A.B. Fraser

The potential advantages of determining a surface layer temperature profile by using atmospheric refraction have long been recognized. For example, a remote measurement of the profile over a lake could be made which not only went down to the surface but gave the skin temperature. The measurements would give a horizontal average and would not be subject to radiation errors. The practice, however, has always fallen well short of the ideal. The only analytic solution found, until recently, assumed a constant temperature gradient and so was severely limited. Later, a general solution was found, and even though it has been used with considerable success, it requires careful site surveying and, because of its extreme nonlinearity, a large computer.

Now a new solution to the problem has been found which allows a great simplification in both the measurements and the calculations. It is an explicit analytic solution for a second-order temperature profile. As such, it is only applicable to the inferior mirage (heat flux up) but, as this accounts for most cases, it should prove very useful.

The solution says that $x_c\beta_c{}^3 =$ a constant, where x_c is the horizontal distance to some point on the caustic (the dividing line between the two images) and β_c is the angular depression of that point. This surprisingly simple result enables one to take the appropriate measurements for a profile over a lake (or cooling pond) with nothing more than a good theodolite, a tape measure and a topographic map. The final profile can be obtained with a pocket calculator. The additional measurement of a wind would quickly give the heat flux.

MODELS FOR DESCRIBING THE CLIMATOLOGY OF SNOWFALL, WIND SPEED AND AIR TEMPERATURE

N. Isyumov and M. Mikitiuk

The authors have carried out an extensive analysis of wind, air temperature and precipitation data at 28 Canadian stations with record lengths typically around 30 years. The objective was to provide suitable models for the parent and annual extreme value statistics of daily snowfall and related meteorological variables. Although the primary purpose of that work was to provide a statistical base for simulations of roof snow loads, many of the findings have general value.

The objective of this paper is to present findings of this work which are of general climatic significance. This includes marginal statistics of wind speed, air temperature, and both solid and liquid forms of precipitation and information on their interdependence. Cycling rates of hourly wind speeds estimated from computed power spectra and auto-correlation functions are presented. These are required for predictions of annual extreme wind speeds. Also presented are estimates of annual extreme snowfalls computed from the developed parent statistics. These are compared with actual extremes obtained directly from the records.

Session 13 Motion in Lakes and Seas Fri. 1045 – 1215

GENERATION AND PROPAGATION OF DOWNWELLING FRONTS

T.J. Simons

The dynamics of downwelling fronts observed along the steep and elongated southern shore of Lake Ontario is investigated by considering the nonlinear response to surface forcing of one- and two-layer fluids on a rotating, semi-infinite plane. Analytical and numerical solutions for idealized situations exhibit typical characteristics of the observed fronts such as off-shore propagation and periodic recurrence with near-inertial periods. A numerical simulation of an actual downwelling episode in Lake Ontario shows that this type of model reproduces the observed behaviour of the thermocline as well as the associated oscillatory currents. It is

concluded that the fronts are to be visualized as internal surges associated with the oscillatory rather than the quasi-geostrophic response of a lake to wind.

NEARSHORE FLOW OFF DOUGLAS POINT IN LAKE HURON: STRUCTURE OF THE COASTAL BOUNDARY LAYER AND SOME APPLICATIONS OF THE DATA

C.R. Murthy and F.M. Boyce

Time series flow data obtained from a network of current meters deployed in a coastal chain perpendicular to the local shoreline at Douglas Point, Lake Huron, have been analysed to resolve the large-scale horizontal transport and exchange processes in the coastal boundary layer. Mean flow properties, horizontal turbulence and diffusion parameters were computed for selected episodes to reveal the characteristics of the coastal boundary layer. The results suggest two distinct boundary layers, an inner boundary layer dominated by shore and bottom friction (FBL-frictional boundary layer) and an outer boundry layer (OBL) as a consequence of the adjustment of the open-lake circulation to the lateral boundaries.

Methods are proposed for the evaluation of the effluent-dispersal capabilities of the coastal zone and some results are presented for the Douglas Point region.

CIRCULATION AND MIXING OF THE BRAS D'OR LAKES

D.P. Krauel

The Bras d'Or Lakes form a brackish water system which can be considered to be a complex estuary. Since the Lake System, with depths to more than 250 m, is separated from the Atlantic by a sill of 9-m depth, the circulation within the System has similarities to the circulation in a fjord.

The fresh water input is small (50 – 300 $m^3 s^{-1}$) in comparison to the surface area (1100 km^2) and the inputs are dispersed around the shores of the lakes, so that fresh water has a minor effect on the circulation in the System. As the tide progresses into the lakes through the long, narrow entrance channels in the north, it is attenuated to a fraction of its range at the mouth. Therefore, the tidal currents are generally weak and do not have a major effect on the circulation and mixing. The wind and barometric pressure changes cause seiches and long period motions in the lakes which are of the same order of magnitude or larger than those caused by the tide. But winter cooling and ice formation cause a weakening of the stability which can result in overturning or extensive vertical mixing by the wind. Thus, although no one driving force has a year round predominating influence on the circulation and mixing, meteorological factors can produce catastrophic mixing events.

Physical oceanographic data collected during a two-year study of the lakes have been interpreted and simple models have been developed to explain the circulation within the lakes at various time scales.

A NUMERICAL MODEL OF THE HOMOGENEOUS LABRADOR SEA

K.T. Tee

The three-dimensional ocean circulation model of K. Bryan (*J. Comput. Phys.* 3: 347-376, 1969), with some modification, has been applied to the Labrador Sea. Results are presented here for the homogeneous case. Two models, driven by wind and/or current at the open boundary, are considered: the first has a coarse grid and a similar shape to the Labrador Sea; the second approximates the actual configuration of the area studied. The numerical solutions produced a cyclonic gyre in the centre of the Sea, and a wave motion along the Labrador coast, These results compare well with the observations available. The effects of different parameters and open boundary conditions on the results were studied.

RADAR STUDY OF THUNDERSTORMS OVER SINGAPORE – SOME PRELIMINARY RESULTS

J.E. Pakiam, K.H. Chong, L. Hock, P.G. Swee, T.Y. Piu, T.H. Kim, W.S. Lai, Y.M. Koon

A 10-cm Plessey weather radar, operated on a routine forecasting basis at Paya Lebar International Airport by the Meteorological Service of Singapore, has been used during the past year for studies of severe storms in the Singapore area. Using 35-mm SLR cameras and manual photography, film records for a number of storms over periods of several hours were obtained. The data were analysed as to the storm structure, organization and propagation.

This paper presents and discusses the results of analysis of two different types of severe storms, one moving eastward from Sumatra and the Straits of Malacca before dying out over Singapore; the other, a westward-travelling disturbance during the North-East monsoon season.

Comparison with mid-latitude severe storms is attempted.

V.H.F. RADIO PICTURES OF LIGHTNING

R.C. Murty and W.D. MacClement

The V.H.F. emissions from electrically-charged clouds passing near London, Ontario have been observed on a millisecond time scale by a system comprising an L-shaped array of 3 antennas (spaced about 125 m apart), two time interval meters, and a mini-computer. The resulting three-dimensional pictures of azimuth, elevation and time show that the V.H.F.-emitting corona-discharges that prepare the way and build up the electric potential for the main plasma discharge (lightning stroke) are scattered widely through the cloud volume, often occurring simultaneously in different regions. There are also specific events lasting several tens of milli-seconds which can be identified with the stepped leader or similar fast corona discharge just prior to the main lightning strokes. These occur several times in many flashes lasting 0.5 to 1.5 s. It has also been found that lightning emits radiation at 120 to 160 pulses per second.

SNOW CRYSTAL OBSERVATIONS AT INUVIK, N.W.T.

S.R. Shewchuk, C. Magono, K. Kikuchi and T. Endoh

In the winter of 1977 a joint Hokkaido University-SRC research group began a program of snow crystal observation at Inuvik, N.W.T. The results of the program will be discussed. Many parameters of the cloud microphysical process of snow crystals were studied. New and exciting crystal structures were found at the cold temperatures, including a natural snow crystal with a peculiar "V" shape.

Atmospheric aerosol concentrations in and near the town were studied. Concentrations ranged from a low value of 120 particles cm^{-3} to a high value of 500,000 particles cm^{-3}.

The electrical properties of snow crystals were also studied in detail. It was found that a light snowfall intensity generally did not alter the electric fields dramatically, but conditions of riming, snowdrift and ice fog had strong effects.

RADIO-LOCATED LIGHTNING RELATED TO RADAR-OBSERVED PRECIPITATION

E.J. Stansbury and J.S. Marshall

Larsen and Stansbury (1974) found convective cells, identified by area A at height h within which the radar reflectivity factor of precipitation exceeds Z_L, to be sources of lightning. Marshall and Radhakant (1978) found a relation between the sferics rate L, the area A and range r: $Lr^{3/5} \propto A^{5/3}$. Stansbury and Marshall (1978) found that one could weight A to allow for variations of precipitation intensity within A. This allowance reduced the index somewhat, but did not improve the correlation between L and A significantly. Now we have replaced the area A by a volume

$$V = \iint (h\text{-}h_0)\, da$$

and find

$$L r^{3/5} \propto V.$$

Again the correlation is not improved, but with the proportionality between L and V it is no longer vital that a thunderstorm complex be broken down into individual storms or lightning generators.

The spatial relation between the precipitation core and the lightning it causes is not simple. Triangulation on individual flashes from two sferics stations, one at the radar and the other 57 km and distant is accurate enough that this relation can be investigated, for such thunderstorms taking an appropriate path past the observing system.

Session 15 Mixing in Fjords Fri. 1330 – 1500

WIND AND TIDAL FORCING OF SUBSURFACE CURRENTS IN A FJORD

J.R. Buckley and S. Pond

An investigation was made of the effects of wind and tide on the subsurface currents in a fjord. This study was based on data from a current meter string moored in the northern basin of Howe Sound, B.C., in 1973. Spectral analysis was performed on the six-month segment of data recorded during the spring and summer, when stratification of the water column was strongest. Power spectra of the wind and currents were calculated as were coherence and phase between the various records in order to look for wind-current and tide-current relationships. Wind effects were noticeable down to a depth of 30 m and tides were observed in all current records. Possible errors in the results due to current-meter speed or direction errors were examined. Consideration was also given to errors arising from lateral inhomogeneities in the flow field. The results of this study are compared with those from other fjords.

TIDAL FLOW OVER SILLS AND THE GENERATION OF INTERNAL HYDRAULIC JUMPS

D. Farmer

When stratified fluid passes over an obstacle, it is possible for critical conditions to occur at the crest together with a transition from super-critical to subcritical flow downstream via an inernal hydraulic jump. While such phenomena have been extensively studied in meteorological applications their role is less well known in oceanography. When the flow is tidally forced such jumps may be important in extracting energy from the barotropic tide, some of which may be made available for entrainment or mixing. Periodic relaxation of the flow near slack-water may give rise to travelling internal surges or bores which can advect energy considerable distances. These phenomena will be discussed in connection with recent observations of internal hydraulic jumps in Knight Inlet. They have been observed directly, through the deformation of isopycnals, and indirectly through small effects on tidal response. Time series observations of the tides demonstrate the seasonal variation in these secondary effects, which appear to be correlated with the stratification. Consideration wil be given to the possible importance of hydraulic transitions on mixing processes in deep estuaries.

THE TIDAL JET IN RUPERT-HOLBERG INLET

D. Stucchi

Observations of the tidal jet issuing from Quatsino Narrows into Rupert-Holberg Inlet reveal that there are two types of discharge: a buoyant surface jet and a negatively buoyant jet.

Observations of the buoyant jet have been compared with the results predicted by an existing model of heated surface discharges in which the behaviour of the discharge is

determined by the initial densimetric Froude number of the flow. Based on the Froude number of the flow the agreement between the predicted and observed vertical penetration of the jet is encouraging.

Volume fluxes calculated for the negatively buoyant jet show that the jet entrains about 2 to 3 times its volume. Entrainment constants for the flow are larger than those observed for the two-dimensional case on similar inclines.

Precipitation, through its influence on the density of the surface waters, appears to be the dominant factor controlling the type of discharge. The rapid and frequent exchange of the deep basin waters resulting from the intense tidal mixing of the jet gives Rupert-Holberg Inlet a character atypical of shallow silled fjords.

A MODEL FOR FLOOD TIDE PENETRATION OF A FJORD

J.R. Birch

A mathematical model is presented which describes the flood tide penetration of Little Narrows Pond, a fjord-like estuary in Cape Breton, N.S. Observations, including a rhodamine-B dye tracer experiment, confirmed the belief that there should be a surface convergence where the flood tide plume dips beneath the surface. The plume was found to extend from surface to bottom out to the point where the convergence was observed. During the first phase the entrainment of ambient fluid is assumed to be lateral, into the edges of the plume. Past the point of convergence it is assumed that no significant entrainment occurs, at least none that would effect the density of the intrusion, and the plume collapses into a thin layer at its depth of equilibrium density. The model was used to predict depths of penetration for various cases and they compared well with field observations.

Session 16 Dynamic Meteorology, Part II: Models Fri. 1315 – 1500

REGIONAL FORECAST ERROR STRUCTURE: SENSITIVITY TO THE REMOVAL OF INFORMATION

H.J. Thiébaux

Observing-point verifications of forecasts for well-defined regions or grid arrays generate forecast errors whose statistical structure is important to forecast improvement. It is reasonable to consider three components of forecast errors, separately, since the goal of optimizing forecast accuracy calls for their separate investigation and treatment. These are: (1) failure of the numerical algorithm to reproduce geophysical processes; (2) use of a suboptimum interpolation scheme by inaccurate representation of spatial statistical relationships; and (3) observation errors of both explicitly and implicitly observed variables.

The current report shall not be concerned with numerical forecast error growth per se, nor with the interpolation error component. Rather, the present object is to make explicit the partitioning of error structure into these attributable sources and, then, to examine specifically the contribution of observing point errors. In particular, we look at the impact on regional accuracy of replacing a detailed, fixed-point vertical sounding with combinations of observations from alternative observing systems.

PERCENT OF POSSIBLE SUNSHINE – A VERIFICATION TOOL, A NEW FORECAST PARAMETER

N. Yacowar and L. Garrand

Sunshine data are received daily on a real-time basis at the Quebec Forecast Office and are converted into terms of percent of possible sunshine. Through a preliminary survey held in the Quebec Forecast Office and complemented by a national survey of all Canadian forecast

offices, sky cover terminology was associated with the percent of possible sunshine. Data in numerical form are now available to provide rapid verifications of worded forecasts. Techniques are being developed to produce automated forecasts of the percent of possible sunshine to be used as a forecast aid.

THE EFFECT OF SURFACE DRAG IN THE CMC OPERATIONAL SPECTRAL MODEL

Y. Durocher

The effect of variations in the surface drag in the CMC spectral model was studied in two different experiments.

In the first experiment, 36-h forecasts were run in which the surface drag was varied. A total of some 30 closed meteorological systems were analyzed by locating the position and evaluating the value of the associated extremum on different fields (height and wind at 4 levels, vertical wind at 2 levels). The changes in position and central value of each extremum were carefully studied and plotted against variations of the surface drag scaling coefficient. In addition, the study includes global statistics of energy and some statistics of the spectral coefficients.

In the second experiment, 48-h forecasts were run varying the location of a discontinuity in the surface drag field, otherwise homogeneous. The study includes cases where the discontinuity is nearly parallel to these trajectories and cases where it is nearly perpendicular. In fact, two lows were followed on the 100-mb surface. Their positions and central values were carefully analyzed every 6 h. The changes in trajectory and deepening of these lows were plotted against the location and orientation of the discontinuity.

VERTICAL RESOLUTION EFFECTS IN A STEADY LONG WAVE MODEL

G. Toth

A linearized spherical coordinate quasi-geostrophic steady-state long wave model has been developed to extend previous vertical resolution studies which used the β-plane approximation.

A winter mean wind profile varying with both latitude and pressure is used, along with realistic vertical profiles of static stability and Newtonian cooling. The vertical velocity dp/dt at the upper boundary ($p = 0$) is assumed to be 0, as in most NWP models; it is specified at the lower boundary to provide the model's forcing. There are high, medium and low resolution versions (54, 18 and 6 vertical levels), and the model has either equal Δp increments or a stretched vertical coordinate concentrating more levels higher in the atmosphere. Forced wavenumber 1 is studied.

Using equal pressure increments significant differences between the wave structure of the 54-level model (top level near 10 mb) and those of the two lower resolution models (top levels near 30 and 80 mb) are found. Energy reflections off the rigid tops, occurring at different levels in different models, are hypothesized to cause the differences. Low resolution models stretched in the vertical so their top levels "see" the higher stratospheric winds seen by the high resolution model closely reproduce the high resolution solution, indicating that truncation error is not a decisive factor. The wave structure from a stretched model resolving the stratospheric jet (near 0.1 mb) closely resembles that of the high resolution equal Δp model which, having levels only up to near 10 mb, does not resolve the jet. It is hypothesized that the natural energy reflections off the mean winds are mainly occurring at or below the 10-mb level, leaving little energy to be reflected off a rigid top (or off mean winds) above this level, so that the models with top levels higher than 10 mb show similar wave structure.

AN ENERGY INDEX CALCULATION FOR THE STUDY OF SEVERE CONVECTIVE ACTIVITY OVER SOUTHERN ONTARIO

M.L. Khandekar and V.R. Neralla

Calculations of static energy and a related energy index are made to analyze severe convective activity associated with selected synoptic situations over southern and central Ontario. Synoptic-scale analysis of static energy and the energy index allows us to delineate areas of

severe convective activity over southern Ontario. In addition moisture and wind-shear analysis enables us to identify tornado producing and non-tornado producing situations.

The vertical profiles of static energy are comparable to that of the equivalent potential temperature, θ_e, which is an important measure of convective activity over the tropical atmosphere. It is shown that the energy index together with the vertical static energy profiles can serve as useful indicators for predicting severe convective activity over southern Ontario.

Session 17 Sea and Lake Ice Fri. 1530 – 1700

A PRELIMINARY EVALUATION OF THE ICE PREDICTION MODULE FOR THE BEAUFORT SEA COMPUTERIZED PREDICTION SUPPORT SYSTEM

V.R. Neralla and M.L. Khandekar

The ice prediction module was developed to obtain ice velocities in the Beaufort Sea area during the oil drilling operations. This module is a part of the Computerized Prediction Support System (CPSS) which is a complex set of computerized prediction modules to provide a variety of real-time environmental forecasts. A brief description of the ice module is presented.

The ice module was in operation at the Meteorological Services Research Branch (MSRB) experimental weather office facility during August to October, 1976. Based on observed data obtained during the 1976 drilling season the ice module is evaluated and the results are presented. The performance of this module is clearly linked to the performance of the Small Area Model (SAM) which is also one of the modules in the CPSS designed to obtain surface winds. After the incorporation of a more realistic treatment of stability in SAM, which resulted in producing reasonable surface winds, the performance of the ice module was improved. The evaluation is severly restricted due to limited availability of observed data on water currents and ice floe motion. Preliminary results suggest the usefulness of the ice module for operational work.

THICK SEA ICE FLOES

E.R. Walker

Thick sea ice can be formed by thermodynamic processes or by mechanical processes. Only the former are considered. Numerical modelling indicates that with the present climate the equilibrium thickness of sea ice formed thermodynamically in the Arctic Ocean seems to be about 3 m. There have been isolated reports of sea ice floes that have attained thicknesses of over 10 m, while retaining the crystal structure indicating purely thermodynamic growth. This note considers where and how this thick sea ice may have formed.

THE IMPORTANCE OF ALBEDO VARIATIONS IN THAWING OF CANADIAN LAKES

J.D. Reid and P.A. Taylor

Experiments have been conducted on the frozen surface of Lake Simcoe during 1977 and 1978 to investigate interaction with the overlying atmosphere. A case study on 8 March 1977 showed that the net short-wave radiation was the major component of the surface energy budget leading to melting. A drastic albedo reduction, from 0.7 to 0.4 in 6 h, occurred as the surface melted, accelerating the melting process. Data from other days are examined to assess the generality of this case. Some calculations are performed to examine the possible advantage of using artificial albedo reduction agents to accelerate thawing.

STRAIT OF BELLE ISLE STUDY: FEASIBILITY OF PROVIDING AN ELECTRICAL POWER LINK BETWEEN LABRADOR AND NEWFOUNDLAND

B.P. Sukhov and R.W. Crocker

The paper summarizes the oceanographic and sea-floor characteristics of the Strait of Belle Isle and their significance for the proposed power link between Labrador and the island of Newfoundland. Particular attention is paid to ice and iceberg conditions in the Strait and the probability of damage to a sea-bottom link from such hazards.

Results of the author's preliminary field work (CSS Hudson trip 77-021) in the southern part of the Strait are presented. The short side scan sonar survey indicates that a sea floor cable may be safely laid with careful selection of the route in the area of Forteau Bay, L'Anse-au-Clair and Flowers Cove. Preliminary conclusions and recommendations for future work are given.

Session 18 Dynamic Meteorology, Part III: Winds Fri. 1530 – 1700

ON THE NATURE OF CROSS-BARRIER FLOWS ASSOCIATED WITH LEE CYCLOGENESIS

E.R. Reinelt

Lee cyclogenesis, the initiation of a new low in the lee of a mountain range, is ultimately a consequence of net mass divergence in the overlying atmosphere, augmented by orographic effects such as stretching and adiabatic heating of the descending flow of air. Thus falling surface pressure is the small residual of several larger contributions of opposite sign from alternate cells of convergence and divergence aloft, a mechanism usually referred to as Dines' compensation. The net contribution from an individual cell does not depend only on the wind field, but also on the vertical extent of the cell, and this in turn depends on the location of the levels of non-divergence.

It is shown that the lowest "level", the *orographic surface of non-divergence*, exists close to the terrain, and conforms in general shape to the mountain profile, for it is near the surface of the barrier that the vertical velocities will reach maximum values for the first time. In the case of the Canadian Rockies, a second level, the *synoptic level of non-divergence*, is found at about 350 mb over the Divide, lowering windward and leeward to about 600 mb, over the Pacific and the Central Prairies, respectively.

ASSIMILATION OF SATELLITE CLOUD MOTION VECTORS: COMPARISON OF FOUR-LEVEL DETERMINATION METHODS

D.H. Lee

Problems involved in determining the most satisfactory objective analysis or numerical model level(s) for assimilation of cloud-tracked winds were examined. Heights assigned to geostationary satellite-derived wind vectors cannot be determined exactly. When these vectors are assimilated into numerical models or analyses which define finite slabs in the vertical, a compounding of errors may result. In this study, the method of determining the insertion level within an assimilation system is varied in an attempt to minimize these errors and study their effect on the resultant analyses.

Rawinsonde data and SMS-2 satellite data were assimilated using the NCAR limited area Multivariate Statistical Objective Analyses. In addition to a control experiment (insertion of rawinsonde data only), experiments varied the method of cloud-wind vertical placement. They included wind insertion: (1) at the level nearest the cloud-top temperature; (2) at all levels within the cloud layer as defined by the cloud-top temperature and a physical thickness; (3) at the level nearest the cloud-base; and (4) at the level of best fit (the level at which the insertion wind most agrees with the forecast wind).

Resultant analyses from the four-level determination methods were compared to each other and to the control experiment. Results, in addition to confirming the value of cloud-winds in data sparse regions, show that slight differences in the level of insertion can produce significant differences in the resulting analyses. Although no "best" method becomes evident, advantages and disadvantages of the respective methods are discussed.

VORTEX STREETS IN THE WAKE OF THE ALEUTIAN ISLANDS

R.E. Thomson

The characteristics of a series of cloud-delineated wake patterns downwind of isolated mountain barriers on the Alaskan Peninsula and eastern Aleutian Islands have been studied using a geometrically corrected NOAA satellite picture in conjunction with available meteorological information. Four of these wakes are shown to be atmospheric analogs of Kármán-type vortex streets observed in laboratory experiments. A critical Reynolds number of 92 ± 5 has been estimated for the flow. The drag coefficients associated with the vortex streets varied from 1.1 for an irregular, asymmetrical wake to 2.3 for a regular, symmetrical wake; the turbulent eddy viscosity ranged from 1.2-1. 8 x $10^3 m^2 s^{-1}$ for the four vortex streets. The two vortex streets having the lowest Reynolds number flows (R = 97, 112) appear to have developed through a "double vortex street" laminar instability while the vortex street having the largest Reynolds number flow (R = 183) apparently developed through a "single vortex street" instability. Formation of the remaining vortex street (R = 120) appeared to result from a downstream growth of a mountain-induced instability in the wind field.

PRÉVISION DES VENTS DE SURFACE AUTOMATISÉE À 15 STATIONS DU QUÉBEC EN TERMES DE PROBABILITÉ

C. Lelièvre

Les directions du vent géostrophique à 1000 mb sont reliées aux directions de vents observés à la surface dans une matrice climatologique en se servant de 10 années de donnés accessibles au CMC. 4 saisons, 4 heures du jour et 2 catégories de vitesse de vent géostrophique sont utilisées comme critères pour former des groupes. À chaque direction de vent géostrophique correspond une distribution de fréquence d'observation de directions de vents de surface ainsi qu'un rapport moyen du vent observé sur le vent géostrophique. En se servant des prévisions du vent géostrophique du modèle spectral on peut trouver les 2 directions les plus probables ainsi qu'une vitesse moyenne à partir des matrices climatologiques. Les prévisions sont disponibles deux fois par jour jusqu'à 36 h par périodes de 6 h depuis juin 1977 au Bureau météorologique de Montréal.

TWELFTH ANNUAL GENERAL MEETING
CANADIAN METEOROLOGICAL AND OCEANOGRAPHIC SOCIETY

UNIVERSITY OF WESTERN ONTARIO
31 MAY 1978

AGENDA

1. Minutes of the Annual General Meeting, 1 June 1977

2. Annual Reports from the Executive
   a) President's Report
   b) Treasurer's Report

3. Annual Reports from the Committees
   a) Editorial Committee
   b) Awards Committee
   c) Citations Committee
   d) Standing Committee on Public Information
   e) Scientific Committee
   f) Ad Hoc Committee on Meteorological Consulting Standards in Canada

4. Annual Reports from Local Centres

5. Budget for 1979

6. Motions from Council

7. Locations of Future Congresses

8. Other Business

9. Report of Nominating Committee

10. Installation of Officers for 1978-79

DOUZIÈME ASSEMBLÉE GÉNÉRALE ANNUELLE DE LA SOCIÉTÉ CANADIENNE DE MÉTÉOROLOGIE ET D'OCÉANOGRAPHIE

UNIVERSITY OF WESTERN ONTARIO
LE 31 MAI 1978

ORDRE DU JOUR

1. Procès-verbal de l'assemblée générale annuelle, le 1er juin 1977

2. Rapports annuels du bureau d'administration
   a) Rapport du président
   b) Rapport du trésorier

3. Rapports annuels des comités
   a) Comité de rédaction
   b) Comité des récompenses
   c) Comité des citations
   d) Comité permanent responsable de l'information publique
   e) Comité chargé des questions scientifiques
   f) Comité ad hoc pour l'établissement des normes pour les conseils météorologiques dans le Canada

4. Rapports annuels des centres locaux

5. Budget 1979

6. Propositions du conseil d'administration

7. Emplacement des congrès à venir

8. Divers

9. Rapport du comité de mise en candidature

10. Investiture des membres du bureau d'administration pour 1978-79

CANADIAN METEOROLOGICAL SOCIETY

SOCIÉTÉ MÉTÉOROLOGIQUE DU CANADA

MINUTES OF THE ELEVENTH ANNUAL GENERAL MEETING HELD ON JUNE 1, 1977
AT THE CONVENTION CENTRE, WINNIPEG, MANITOBA

The meeting was chaired by Dr. J. Hay, President of the Society. There were 95 members present and several guests.

After some introductory remarks by Dr. Hay it was moved by P. Merilees, seconded by J. Maybank that the agenda be adopted. Adopted unanimously.

1. Minutes of the 10th Annual General Meeting.

Moved by B. Sagar, seconded by M. Hacksley that the minutes be approved.

Approved unanimously.

2. Annual Reports from the Executive

2(a) President's Report

The President's formal report is at page 46 of the Congress Issue.

The President added that

- the CMS Booklet was not yet complete but it was hoped to have it ready by year end.
- the role of the Oceanographers in our Society would be brought forward later in the evening.
- the Executive were awaiting the report of the Ad Hoc Committee on the Status of Meteorological Consulting in Canada.

The President moved adoption of the President's Report as published in the Congress Issue. Adopted unanimously.

2(b) Treasurer's Report

The Treasurer moved, seconded by J. Derome, the adoption of the Treasurer's Report as published in the Congress Issue. Adopted unamimously.

3. Annual Reports from the Committee

3(a) Editorial Committee

Dr. J. Derome, Editor, moved, Dr. Hitschfeld seconded adoption of the Editorial Committee Report as published in the Congress Issue. Approved unanimously.

The Editor noted the steady growth in size of Atmosphere and the attendant financial problems. He had been asked to limit the number of pages per issue to 60 in order to curb costs and to maintain a backlog of papers equivalent to one issue. Inasmuch as promptness of publication was an attractive feature of our Journal he had suggested a page charge as a possible solution if the backlog grew too large. Presently the number of papers being submitted has dropped and current policy is to postpone the question of page charges until such time as a problem arises.

He gave thanks for the assistance provided him by the Technical Editor, E. Truhlar, who will be assuming this post this summer.

He regretted that his new duties at McGill make it necessary to resign no later than June 30, 1977.

The President thanked Dr. Derome for his services and advised that the National Executive and Council will be considering replacements. Nominations from members would be welcomed.

3(b) Awards Committee

Dr. Burling, Chairman, thanked the members of his committee for their efforts and announced the committee's recommendations as published on page 55 of the Congress Issue.

President's Prize	-	W.F.J. Evans
Graduate Student Prize	-	H. Melling
Prize in Applied Meteorology	-	E. Vowinckel & S. Orvig
Rube HOrnstein Prize in Operational Meteorology	-	S.V.A. Gordon.

The President thanked the Committee. Council had approved the recommendations and the Awards were to be given at the luncheon.

3(c) Citations Committee

J.H. Renick, Chairman, thanked the committee members, and announced the recommendations as published on page 57 of the Congress Issue.

Professor Douglas H. Pimlott.
Conseil Quebecois de l'Environmmement.

The President advised that Council has accepted the recommendations and the awards will be presented at the luncheon.

3(d) Standing Committee on Public Information

The Chairman, J. KNox, was unable to attend.

Moved by G. Goyer, seconded by D. Leakey that the Report as published in the Congress Issue be adopted. Adopted unanimously.

3(e) The Scientific Committee

J. Maybank moved, M. Ferland seconded that the Report as published in the Congress Issue be adopted. Adopted unanimously.

The Chairman reported that the Scientific Committee had met the previous day and he outlined the topics which had been discussed.

Professor Hitschfeld asked for the makeup of the Scientific Committee. Dr. Maybank responded. (Appendix I).

It was agreed that this executive recommednd to future executives that a membership list accompany each committee report.

4. Annual Reports from Local Centres and Oceanography Division.

The Reports as published in the Congress Issue were updated at the Council meeting. Representative made the following comments:

4(a) B.C. Centre - G. Schaefer

The Vancouver Island Chapter was successfully launched. There was actual participation by the Oceanographic Division.

A film, "A Day in the Life of the Forecaster" has been prepared in cooperation with the Pacific Weather Centre.

4(b) Winnipeg Centre - M. Hacksley

Two further meetings had been held, one with Mr. Mackay and one with Mr. Huntley as speakers.

A shopping centre display had been arranged in cooperation with the AES.

4(c) Toronto Centre - R. Lawford

Five additional meetings had been held. The Centre had undertaken a High School Speaker's Program and response had been good.

Through an oversight the report had not included a financial statement. The Chairman provided the figures.

Balance carried forward	.....$ 69.41
Subvention	..... 473.75
Interest	..... .90
	$544.06

Meeting expenses	-$382.89
Loan	100.00
P.O. Box	21.00
Miscellaneous	17.60
	$521.49
Balance	$ 22.57

4(d) Ottawa Centre - D. Wright

The Ottawa Centre had been most active during the year and felt the addition of several oceanographers as members had been a decided benefit.

The President commended the Ottawa Centre for their activities and remarked that their organization was one which we could all take direction from.

4(e) Montreal Centre - R. Fichaud

M. Fichaud reviewed the activities of the past year and made special reference to the successful efforts made to attract new members into the Society.

4(f) Quebec Centre - M. Ferland

M. Ferland amplified briefly the report as published in the Congress issue.

4(g) Halifax Centre - P. Jones

The Halifax Centre had had limited success in attracting oceanographers to their meetings but had been quite successful in spending their subvention. A display kit had been constructed and was available to museums, schools, centres, etc.

4(h) Oceanography Division - D. Farmer

Dr. Farmer noted the active participation of the Oceanographers in the Society, especially on the West Coast and at this meeting. The proposed constitutional changes reflected this interest.

5. Budget for 1978

It was moved by G. Schaefer, seconded by J. Derome that the budget as published on page 53 of the Congress Issue be approved.

The Treasurer explained that the budget was based largely on extrapolation of income and expenditures over the past five years and was predicated on

(a) continued support from AES at the current level, and

(b) approval of the new fee structure to be submitted as Agenda Item 6.

Mr. Hacksley pointed out that the fees item must be dealt with before the motion could be put to the meeting. The mover and seconder withdrew the motion.

6. Membership Fees for 1978

G. Schaefer moved, P. Garrison seconded that the fee structure for 1978 be

General Members	$25.00
Student Members	5.00
Sustaining Members	60.00
Institutional Members	25.00

The Treasurer based the requirement for a fee increase on the general increase in costs, the cost of Atmosphere and the likelihood of a further deficit in 1978 if no action were taken.

Dr. Leahay suggested that we pay comparably low fees and should be paying $30.00 to $40.00 per year. P. Garrison warned that the possible loss of members from such a fee structure might offest any gains. If a fee of $25.00 would suffice, why go higher. Dr. Maybank asked for assurance from the Treasurer that a feee of $25.00 would allow the Society to remain solvent. The Treasurer felt it was sufficient. The motion was carried.

Moved by G. Schaefer, seconded by J. Derome that the budget as published on page 53 of the Congress Issue be approved. Approved unanimously.

7. Motions from Council

Amendments to the Constitution & By-Laws

K. Harry referred the meeting to the Notice of Motion from Council, page 60 of the Congress Issue. He reminded the members that a two-thirds majority was required for acceptance of changes to the Constitution.

K. Harry moved, M. Boulama seconded the proposed change of Article I.

Mr. Harry spoke to the motion noting that the proposed changes to incorporate the Oceanographers into the Society had been widely discussed. He cited the oceanographers involvement in Society affairs and their wish to share in its identity.

J. Donegani was opposed. He did not deny the contribution made by the Oceanographic Division but believed they should make this contribution within the present framework.

P. Garrison and S. Orvig supported the motion saying that we shared a common discipline and that oceanographers and meteorologists have more in common than not.

Discussion centered around the desirability of changing the name of the Society and the possibility of further changes as other disciplines become active within the Society. Dr. Hitschfeld pointed out that frequent name changes were undiscernable but this was a moment when such action was necessary and desirable. Dr. Merilees reminded the members of the evolution of the present AES nomenclature through its many changes.

The members were polled. The vote was 76 for 10 against

1 abstention.

Motion carried.

Moved by J. Walmsley, seconded by J. Reid that the proposed changes to Articles 2, 3 and 6, as corrected, be approved. Carried unanimously.

Moved by P. Garrison that the spelling of "ammendment" in the Notice of Motion be corrected when it occurs, to "amendment".

Carried unanimously.

Moved by K. Harry, seconded by B. Sagar that the proposed amendments to By-Laws 2(c), 4(b), 9(b), 10(a), 12(a), 14(a), 14(d) be approved. Carried unanimously.

Moved by K. Harry, seconded by B. Sagar that the proposed amendments to By-Laws 6(f) and 14(e) be approved with the change that the French version of "Atmosphere-Ocean" be capitalized if accents are omitted. Carried unanimously.

8. Locations of Future Congresses

The 1978 Congress will be held at the University of Western Ontario, London, Ontario at the end of May. The theme will be "Meteorology-Oceanography and the Energy Crisis".

It is proposed to hold the 1979 Congress in Victoria. Council is currently awaiting a formal request from the Vancouver Island Chapter to host the Congress.

It is proposed to hold the 1980 Congress in Toronto in conjunction with the American Geophysical Union. The Canadian Geophysical Union, the Canadian Association of Physicists and the Canadian Meteorological and Oceanographic Society will be co-sponsors.

9. Other Business

9(a) Auditor

The Treasurer moved the nomination of Mr. Langlois as Auditor for the coming year. Seconded by P. Merilees. Carried unanimously.

9(b) Freedom of Information

Mr. Hacksley presented to the meeting a motion of Mr. H. Kruger as follows:

"Therefore be it resolved that Members of the CMS advocate as a matter of professional responsibility the removal of government restrictions on public access to information on the state of the environment and the enactment of freedom of information legislation similar to that proposed in Bill C225, a private member's bill introduced into the HOuse of Commons on 17th October, 1974."

Dr. Hitschfeld moved to refer this item, referred to as "Freedom of Information", to Council. Seconded by T. Oke. Carried unanimously.

10. Report of the Nominating Committee

P. LeBlond, Chairman, moved that the report of the Nominating Committee as reported on page 54 of the Congress Issue be accepted. Seconded by R. Thomson. Carried unanimously.

There were no further nominations.

The President declared the following elected for 1977-1978:

President	-	K.F. Harry
Vice President	-	R.W. Burling
Treasurer	-	D.G. Schaefer
Corresponding Secretary	-	R.B. Sagar
Recording Secretary	-	P. Sagert
Councillors-at-Large	-	F. Dobson
	-	E. Einarson

11. Installation of Officers

The President extended his thanks for the generous support he had received during his tenure.

He felt that the first-hand experience he had gained while visiting all Centers as Vice-President had helped him immensely and he strongly recommended that such a familiarization journey be repeated whenever the Executive were again relocated.

Dr. Hay thanked Dr. Merilees for his tremendous support, members of the National Executive for their hard work, J. Derome for a job well done as Editor of Atmosphere and all Committee Members for their efforts.

At this point the President turned over the Chair to the President-elect K.F. Harry.

The new President stated he was looking forward to an interesting year but, hopefully, one of consolidation rather than change. He welcomed the Oceanographers full integration into the Society. He gave thanks to J. Hay and P. Merilees for the excellent way they had accomplished the movement of the Executive to the West Coast and welcomed Dr. Burling and P. Sagert into the Executive.

R. Fichaud moved a vote of thanks to Dr. Hay for a job well done.

The meeting was declared closed at 9.50 p.m.

L.E. Parent,
Recording Secretary

APPENDIX I

PRESENT MEMBERS OF CMS SCIENTIFIC COMMITTEE
WITH LOCATION AND SCIENTIFIC INTEREST AREA

1. Retiring in 1978

Dr. G.G. Goyer (Sec.)	- Alberta Research, Edmonton	- Cloud Physics, Weather Modification
Prof. G.W. Thurtell	- Univ. of Guelph, Guelph, Ont.	- Agrometeorology, Micrometeorology
Prof. T. Warn	- UQUAM, Montreal, P.Q.	- Geophysical fluid dynamics

2. Retiring in 1979

Dr. M. Kwizak	- AES, Downsview, Ont.	- Numerical weather prediction, environmental meteor
Dr. J. Maybank	- SRC, Saskatoon, Sask.	- Cloud Physics, agricultural meteor
Prof. W.R. Peltier	- U of T, Toronto, Ont.	- Mesoscale dynamics Geophysical fluid
Prof. R.R. Rogers	- McGill Univ. Montreal	- Physical meteorology

3. Retiring in 1977 (at CMS Congress in May)

Dr. D.M. Leahey	- West. Scientific, Calgary, Alta-	- Diffusion meteorology
Dr. G.A. McBean	- AES Downsview, Ont.	- Bounday layer meteor. Atmospheric Physics
Mr. S. Nikleva	- AES, Vancouver, B.C.	- Forest Meteorology
Dr. S.D. Smith	- Bedford Inst., Halifax, N.S.	- Oceanography, air-sea interaction

4. New Members:

Dr. T.R. Oke	- UBC, Vancouver
Dr. A.B. Fraser	- Pennsylvania State University
Dr. G.T. Needler	- Bedford, Halifax
Dr. P.F. Hamblin	- CCIW, Burlington, Ontario.

PRESIDENT'S REPORT

In the year just past the Society took another important step in its development by accepting oceanographers as full partners. To do this the name of the Society was changed to the Canadian Meteorological and Oceanographic Society, membership was opened to those having an interest in meteorology and/or oceanography and the name of *Atmosphere*, the principal publication of the Society was expanded to the new title *ATMOSPHERE-OCEAN*. The changes, overwhelmingly approved by the members in congress at Winnipeg will, no doubt, rank in historical significance with the formation of the Canadian Branch of the Royal Meteorological Society in 1940 and with the establishment of the autonomous national body, the Canadian Meteorological Society in 1967.

To bring about this amalgamation of scientific interests a great deal of work was done by members of the Executive and by members of the Oceanographic Division. This body, which was formed in 1975 for a term of two years to convene oceanographic sessions in concert with the meteorological programs at annual congresses and to discuss the responsibilities, purpose and future of the Division, has now been disbanded. Since the decision, the efforts of members of Council have been directed largely toward consolidating the change. To this end the management committee is working well in its second year on the west coast while the nine Centres and two Chapters, unchanged in number in 1977, are busy promoting the interests of both meteorology and oceanography in their respective locales.

A matter of particular concern to the executive has been funding; the demands of growth, inflation and financial restraint all causing budgetary pressures. To meet commitments, fees were raised and through the co-operation of the Centres the number of sustaining memberships was substantially increased. Moves to increase membership, particularly among oceanographers, were made. An approach to Ocean and Aquatic Sciences for support to the Society on behalf of Oceanography, like that accorded in recent years by the Atmospheric Environment Service on behalf of Meteorology, has been made. Finally, and since it is believed that members do not wish to be unnecessarily dependent upon government agencies, a move to popularize the Development Fund, earlier established by the generosity of a few, has been started. While the financial situation of the Society is sound, reflecting the good management earlier received, it certainly is not a time for complacency.

The members of the Scientific Committee, the Standing Committee on Public Information and the Ad Hoc Committee on Meteorological Consulting Standards in Canada continue to work well in the interests of the Society. The first two, co-operating effectively, put forward to the executive a timely letter of protest to government when publicity on a matter of popular scientific interest reflected unfairly on meteorologists in Canada. The Consulting Standards Committee, under a new chairman and with membership augmented by an Atmospheric Environment Services appointee, is working hard and expects to have a final report to present to members at the 1978 Congress.

With the need for Jacques Derome to resign as editor of *Atmosphere* after only a short time in office, a new editor, Tim Oke, was appointed. Under his direction the editorial committee has been re-shaped and following discussions with the publisher, recommendations for format changes to the journal were made to the Executive and have been approved. These will be implemented in Volume 16, Number 1, the first issue of the journal under its new title, *ATMOSPHERE-OCEAN*. Also, a new editor, Merton Horita, was selected for *Newsletter* and since mid-year, he has been busy establishing contacts and setting up a production schedule with the objective of producing an informative issue of *Newsletter* every two months. Finally in publications, the CMOS Booklet, now in broadened form to include a discussion of oceanography, should be ready for the printers in 1978.

In the important field of joint sponsorship of symposia, there were three; *Living with Climatic Change, Phase II* in January and the *24th Canadian Spectroscopy Symposium* and the *Second Conference in Hydrometeorology*, both in October. Now that the Society has a larger scientific responsibility this form of involvement will probably increase.

That the Canadian Meteorological and Oceanographic Society is well-founded and has a vigorous, concerned membership was demonstrated this year by the acceptance into it of

oceanographers as equals in all respects. This bodes well for the future. At the same time the larger and more diverse membership will require more attention and action will be needed to satisfy the societal needs of the members, whether they are meteorologists or oceanographers or whether they are employed in operations, research, teaching, administration or wherever.

K.F. Harry,
President

RAPPORT DU PRÉSIDENT

Durant l'année qui vient de se terminer, la Société a fait un pas de plus en avant en acceptant les océanographes comme partenaires à part égale. Le nom de la Société a été changé en Société canadienne de météorologie et d'océanographie, dont toute personne intéressée à la météorologie ou à l'océanographie peut devenir membre; *Atmosphère*, la principale publication de la Société, sera désormais connu sous le titre de *ATMOSPHÈRE-OCÉAN*. Ces changements, approuvés par une forte majorité des participants au congrès de Winnipeg, auront sans doute une importance historique comparable à celle de la formation de la Division canadienne de la Société royale de météorologie en 1940 et à la foundation d'un organisme national autonome, la Société météorologique du Canada, en 1967.

Les membres du bureau d'administration de la Société ainsi que ceux de la division océanographique ont travaillé ferme afin de réaliser cette fusion d'intérêts scientifiques. La division océanographique, formée en 1975 pour une période de deux ans afin d'organiser des sessions océanographiques aux congrès annuels et aussi pour discuter de ses responsabilités et de son avenir au sein de la Société, a maintenant cessé ses travaux. Depuis ce temps, les membres du conseil d'administration de la Société se sont efforcé de consolider cette union. Le bureau d'administration oeuvre en ce sens depuis deux ans sur la côte ouest, tandis que les neuf centres et les deux sections (dont le nombre n'a pas changé en 1977) s'affairent à promouvoir les intérêts de la météorologie aussi bien que de l'océanographie au niveau local.

Le bureau d'administration de la Société s'est beaucoup préoccupé de la question du financement de la Société; l'expansion de la Société, l'inflation et les contraintes financières se sont traduites en autant de pressions budgétaires. Afin de respecter les engagements de la Société, le prix des cotisations a dû être augmenté, grâce à la coopération des centres, le nombre de membres de soutien a aussi augmenté considérablement. De nouvelles mesures ont été prises pout accroître le nombre des membres, particulièrement parmi les océanographes. Une démarche a été faite, au nom de l'océanographie, auprès du Service des sciences de la mer, pour qu'elle vienne en aide à la Société, comme le fait déjà depuis plusieurs années le Service de l'environnement atmosphérique. Enfin, comme nous sommes convaincus que les membres de la Société ne tiennent pas à dépendre trop étroitement de la générosité des agences gouvernementales, des mesures ont été prises pour augmenter la popularité du Fond de développement, déjà créé grâce à la générosité de quelques membres. Quoique la Société se trouve dans une situation financière solide, et ce grâce à l'excellente gestion des années précédentes, il n'est certes pas le temps de s'asseoir sur nos lauriers.

Les membres du comité scientifique, du comité permanent d'information publique et du comité ad hoc sur les standards de la consultation météorologique au Canada ont continué de travailler aux intérêts de la Société. Les deux premiers comités, travaillant en collaboration, ont présenté au bureau d'administration une lettre de protestations adressée au gouvernement et ayant rapport à la publicité sur une question scientifique d'intérêt populaire qui présentait les météorologues canadiens sous une optique défavorable. Le Comité sur les standards de la consultation est maintenant dirigé par un nouveau président, et s'est enrichi d'un membre nouveau désigné par le Service de l'environnement atmosphérique; ce comité travaille d'arrache-pied et compte présenter un rapport final au congrès de 1978.

A la suite de la démission de Jacques Derome comme rédacteur en chef d'*Atmosphère*, après un terme assez court, un nouveau rédacteur en chef, Tim Oke, a été désigné. Sous sa direction, le comité de rédaction a été remanié et, après discussions avec la maison d'édition, des recommandations ont été présentées au bureau d'administration afin de changer le format de la revue. Ces recommandations ont été approuvées et entreront en vigueur avec le premier numéro du seizième volume, numéro où notre revue paraîtra pour la première fois sous son nouveau titre *ATMOSPHÈRE-OCÉAN*. De plus, un nouveau rédacteur, Merton Horita, a été choisi pour diriger le *Bulletin de Nouvelles*; il s'occupe depuis déjà quelques mois à établir des contacts et à dresser un horaire de production qui permettra de publier un numéro du Bulletin à tous les deux mois. Finalement, le livret de la SMOC, dont le contenu a été élargi pour tenir compte de l'océanographie, devrait aller sous presse en 1978.

Trois conférences parrainées conjointement par la Société ont eu lieu cette année: *L'adaptation aux changements de climat, Phase II*, en janvier, et le *Vingt-quatrième symposium canadien de spectroscopie* ainsi que la *Deuxième conférence sur l'hydrométéorologie*, tous deux en octobre. Etant donnée la responsabilité scientifique élargie de notre Société, ce genre de collaboration ira sans doute en augmentant.

Que la Société canadienne de météorologie et d'océanographie est solidement établie et compte des membres énergiques et intéressés a été bien démontré cette année par l'accueil favorable fait aux océanographes, comme associés à part égale. Ce pas est de bon augure! Toutefois, l'augmentation en nombre tout autant que la diversité des intérêts des membres de la Société demandera de plus en plus d'attention et de soins afin de satisfaire aux besoins de tous les membres de la Société, qu'ils soient météorologues ou océanographes et engagés dans les aspects opérationnels, de recherche, d'enseignement, d'administration ou autres.

Le président
K.F. Harry

TREASURER'S REPORT

Transactions of the Society in 1977 were comparable to those of the previous year, reflecting a stable situation which resulted in a modest net gain of just over $3,000. Contributing factors included somewhat lower operations costs and a delay in the publication of the CMOS Booklet.

Financial Statement for 1977

The INCOME STATEMENT for 1977 indicates items entered into the accounts during that year. Thus, dues and subscriptions cover the period from October 1, 1976 to September 30, 1977. Charges for *Atmosphere* include the Congress issue and four regular issues to Volume 15, Number 3.

The STATEMENT OF FINANCIAL POSITION, detailing the Society's assets and liabilities, shows an increase in the Society's equity of $3,004.93 over the previous year-end balance.

APPENDIX I presents the balance of each account on December 31, 1977. Account numbers have been restructured to separate income (100's), expenses (200's), assets (300's) and liabilities (400's).

Budget for 1978-79

Budget statements for 1978 and 1979 indicate a substantial increase in both income and expenditures. Income from dues and subscriptions reflects the rates approved at the previous Annual General Meeting. Grants include both that from the Atmospheric Environment Service for $16,000 and a grant of $6,000 applied for from Ocean and Aquatic Sciences of Environment Canada. Entries under the Development Fund are in consonance with remarks made in the President's Report.

Expenditures shown for *ATMOSPHERE-OCEAN* are based on cost estimates for the newly formatted journal as discussed in the Editor's Report. Costs for *Newsletter* presuppose the continued publication of six issues per year.

As of the fall of 1977, U of T Press voluntarily changed the basis for the calculation of commissions from 20 percent of dues to $3.00 per subscriber, a welcome change to the Society in view of the recent increase in dues.

Major increases in the budget under Operations and the Scientific Committee are intended to allow for needed executive and committee travel and communications costs in a time when employers are less able to indirectly subsidize the Society's operations as they often did in the past.

A projected deficit of $3,000 in 1978 is due to the cost of publication of the CMOS Booklet. Funds for the project will be allocated from the Development Fund.

D.G. Schaefer
Treasurer

RAPPORT DU TRÉSORIER

Les transactions de la Société en 1977 ont été comparables à celles des années précédentes, et reflètent une position financière solide qui s'exprime par un gain modeste d'un peu plus de $3,000. Parmi les facteurs qui ont contribué à cette situation, on compte une légère baisse des coûts d'administration ainsi qu'un délai dans la publication du livret de la SCMO.

État financier pour l'année 1977

L'ÉTAT DU REVENU pour 1977 représente les items enregistrés dans les comptes pendant cette année. Les cotisations et les souscriptions couvrent la période 1 octobre 1976 au 30 septembre 1977. Les coûts de la revue *Atmosphère* incluent le numéro du congrès et quatre numéros normaux jusqu'au troisième numéro du volume 15.

Le BILAN décrit l'actif et le passif de la Société; l'avoir de la Société se chiffre à $3,004.93 au dessus du solde de l'année précédente.

En APPENDICE I, on trouve le solde de chaque compte pour l'année se terminant le 31 décembre 1977. Les numéros de comptes ont été réorganisés pour séparer les revenus (comptes 100 . . .),des dépenses (200 . . .), l'actif (300 . . .) du passif (400 . . .).

Budget de 1978-79

L'état du budget pour 1978 et 1979 indique une augmentation sensible du revenu et des dépenses. Le revenu provenant des cotisations et des souscriptions reflète les taux approuvés à la dernière assemblée générale annuelle. Les subventions comprennent celle du Service de l'environnement atmosphérique ($16,000) ainsi qu'une somme de $6,000 solicitée auprès du Service des sciences de la mer du Ministère des pêches et environnement. Les sommes inscrites au Fond de développement sont conformes aux remarques faites sous le rapport du président.

Les dépenses inscrites pour la revue *ATMOSPHÈRE-OCÉAN* sont basées sur un estimé des coûts de publication sous le nouveau format discuté sous le rapport du rédacteur-en-chef. Les frais de publication du *Bulletin de Nouvelles* supposent la publication de six numéros par année.

A partir de l'automne 1977, les Presses de l'Université de Toronto ont de leur propre gré changé leurs commissions de 20% des cotisations à $3.00 par abonné. Ce geste a été apprécié de la Société, vue l'augmentation récente des cotisations.

Les principales augmentations budgétaires allouées aux frais d'administration et au comité scientifique sont destinées à couvrir les frais de voyages et de communication du bureau d'administration et du comité scientifique au moment où les employeurs sont moins en état de couvrir ces frais de façon indirecte, comme ils l'ont souvent fait auparavant.

On prévoit pour 1978 un déficit de $3,000, qui découlera des frais de publication du livret de la SCMO. L'argent pour ce projet sera titré du Fond de développement.

D.G. Schaefer
le trésorier

CANADIAN METEOROLOGICAL and OCEANOGRAPHIC SOCIETY/
LA SOCIÉTÉ CANADIENNE DE MÉTÉOROLOGIE ET D'OCÉANOGRAPHIE
INCOME STATEMENT/ÉTAT DU REVENU
FOR THE FISCAL YEAR ENDED 31 DECEMBER, 1977/
POUR L'EXERCICE FINANCIER TERMINÉ LE DÉCEMBRE, 1977

INCOME/REVENU		
Dues and Subscriptions/Cotisations et souscriptions[1]	$18,452.51	
AES Grant/Subvention SEA	16,000.00	
Congress Revenue/Revenu Congrès	2,826.60	
Other/Autre	1,531.13	
		$38,810.24
EXPENDITURES/DÉPENSES		
Atmosphere[3]	$23,234.54	
Newsletter/Bulletin de Nouvelles	1,805.74	
Other Printing Services/Autres frais d'imprimerie	253.84	
U of T Press (Commissions)	3,142.51	
Centre Expenses/Dépenses centres	2,838.00	
Operations/Opérations	2,056.55	
Scientific Committee/Comité scientifique	1,308.74	
Congress Expenses/Dépenses du Congrès	1,000.00	
Information Services/Services d'information	165.39	
		35,805.31
NET GAIN/REVENU NET		$ 3,004.93

[1] Accounts/Comptes no. 101, 102
[2] Accounts/Comptes no. 105, 106, 107, 108
[3] Accounts/Comptes no. 201, 207
[4] Accounts/Comptes no. 203, 204, 206
[5] Accounts/Comptes no. 211, 212, 213, 214, 215, 216, 217, 218, 219

CANADIAN METEOROLOGICAL and OCEANOGRAPHIC SOCIETY/
LA SOCIÉTÉ CANADIENNE DE MÉTÉOROLOGIE ET D'OCÉANOGRAPHIE
STATEMENT OF FINANCIAL POSITION/BILAN
31 DECEMBER 1977/31 DÉCEMBRE 1977

ASSETS/ACTIF

CURRENT ASSETS/DISPONIBILITÉS

Cash/Caisse (Royal Bank/Banque Royale)	$ 1,607.27	
Short Term Deposit/Dépôt à court terme	10,000.00	
Development Fund/Fonds de développement	4,150.00	
Development Fund Interest/ Intérêt du fonds de développement	747.70	
Hornstein Fund/Fonds Hornstein	1,000.00	
Hornstein Fund Interest/ Intérêt du fonds Hornstein	237.36	
Canada Savings Bonds I/ Obligations d'épargnes du Canada I	950.00	
Canada Savings Bonds II (Coupons)/ Obligations d'épargnes du Canada II	627.13	
Bell Canada Shares/Parts de Bell Canada	643.50	
Accounts Receivable/Comptes à recevoir	2,000.00	
		$22,107.96

LIABILITIES AND SOCIETY'S EQUITY/PASSIF ET AVOIR DE LA SOCIÉTÉ

CURRENT LIABILITIES/EXIGIBILITÉS

Accounts Payable/Comptes à payer[2]	$ 5,277.00	

SOCIETY'S EQUITY/AVOIR DE LA SOCIÉTÉ

Society's Equity (31 December 1976)/ Avoir de la Société (31 décembre 1976)	$ 13,736.03	
Increase from operations/Augmentation due aux opérations.	3,004.93	
Society's Equity (31 December 1977)/ Avoir de la Société (31 décembre 1977)	16,740.96	
		$22,017.96

TOTAL LIABILITIES AND SOCIETY'S EQUITY/
TOTAL PASSIF ET AVOIR DE LA SOCIÉTÉ

[1] Value of Shares as of 31 December 1977/
Valeur des Parts au 31 décembre 1977
[2] U of T Press

APPENDIX I/APPENDICE I

CANADIAN METEOROLOGICAL AND OCEANOGRAPHIC SOCIETY/ LA SOCIÉTÉ CANADIENNE DE MÉTÉOROLOGIE ET D'OCÉANOGRAPHIE BALANCE OF EACH ACCOUNT/SOLDE DE CHAQUE COMPTE FOR THE YEAR ENDED 31 DECEMBER 1977/ POUR L'ANNÉE TÉRMINÉE LE 31 DÉCEMBRE 1977

N[1]		
101	U of T Press (Dues and subscriptions/Cotisations et souscriptions)	$17,712.51
102	Sustaining Members/Membre de soutien	740.00
103	AES Grant/Subvention SEA	16,000.00
104	Congress revenue/Revenu Congrès	2,826.60
105	Interest earned/Revenus intérêts	1,415.75
106	Dividend Income/Revenu dividendes	47.88
107	Advertising revenue/Revenus annonces	0.00
108	Other revenue/Revenus divers	67.50
201	U of T Press *(Atmosphere)*	22,224,54
202	U of T Press *(Newsletter/Bulletin de Nouvelles)*	1,805.74
203	U of T Press (Labels, letterheads) Etiquette, En-tête de lettres)	116.76
204	U of T Press (Citation)	103.06
205	U of T Press (Commissions)	3,142.51
206	U of T Press (Other/Divers)	34.02
207	*Atmosphere* (Technical editing/Rédaction technique)	1,010.00
208	Scientific Committee/Comité scientifique	1,308.74
209	Congress expenses/Dépenses Congrès	1,000.00
210	Centre expenses/Dépenses Centres	2,838.00
211	Travel expenses/Dépenses de voyages	902.53
212	Prizes, gifts expenses/Dépenses prix, dons	419.96
213	Service expenses/Dépenses frais de services	0.00
214	Office expenses/Dépenses de bureau	8.24
215	Communications expenses/Dépenses de communications	605.82
216	Interest expenses/Dépenses Intérêts	0.00
217	Exchange expenses/Dépenses frais d'échanges	0.00
218	Auditor expenses/Dépenses vérificateur	100.00
219	Translation expenses/Dépenses de traduction	20.00
221	Information services/Services d'information	165.39
301	Cash/Caisse (Royal Bank/Banque Royale)	1,607.27
302	Short-term deposit/Dépôt à court terme	10,000.00
303	Development Fund/Fonds de développement	4,150.00
304	Development Fund interest/Intérêt du fonds de développement	747.70
305	Hornstein Fund/Fonds Hornstein	1,000.00
306	Hornstein Fund interest/Intérêt du fonds Hornstein	247.36
307	Canada Savings Bonds I/Obligations d'épargnes du Canada I	950.00
308	Canada Savings Bonds II (Coupons)/ Obligations d'épargnes du Canada II	672.13
309	Bell Canada shares/Parts de Bell Canada	643.50
310	Accounts receivable/Comptes à recevoir	2,000.00
401	Accounts payable/Comptes à payer	5,277.00
402	Society's equity/Avoir de la Société	16,740.96

[1] Account number/Numéro de compte

CANADIAN METEOROLOGICAL AND OCEANOGRAPHIC SOCIETY/
LA SOCIÉTÉ CANADIENNE DE MÉTÉOROLOGIE ET D'OCÉANOGRAPHIE
INCOME STATEMENT BUDGET/
BUDGET DE L'ÉTAT DU REVENU

INCOME/REVENU	1978	1979
Dues and subscriptions/Cotisations et souscriptions	$22,000	$23,000
Sustaining Members/Membre de soutien	1,000	1,200
Grants/Subventions	22,000	22,000
Congress revenue/Revenu du Congrés	2,500	2,500
Development Fund/Fonds de développement	2,000	2,000
Other/Autre	1,400	1,400
	$50,900	$52,100
EXPENDITURES/DÉPENSES		
ATMOSPHERE-OCEAN[1]	$27,000	$28,000
Newsletter/Bulletin de Nouvelles	2,400	2,400
U of T Press (Commissions)	3,000	3,200
Centre Expenses/Dépenses - Centres	3,000	3,000
Operations/Opérations	8,000	8,000
Scientific Committee/Comité scientifique	5,000	5,000
Congress Expenses/Dépenses du Congrès	2,500	2,500
Information Services/Services d'information[2]	3,000	0
	$53,900	$52,100
NET GAIN (LOSS)/REVENU (PERTE) NETTE	($ 3,000)	$ 0

[1] Accounts/Comptes no. 201, 207
[2] To be allocated from the Development Fund/A porter au compte du Fond de développement

AUDITOR'S REPORT

I have examined the Statement of Financial Position of the Canadian Meteorological and Oceanographic Society as of 31 December 1977, and the related Income Statement for the year then ended. My examination was made in accordance with generally accepted auditing standards and according to procedures as I considered necessary in the circumstances.

In my opinion the accompanying Statement of Financial Position and Income Statement present fairly the financial position of the Canadian Meteorological and Oceanographic Society at 31 December 1977, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Wayne R. Koch, RIA

RAPPORT DU VÉRIFICATEUR

J'ai examiné le bilan de la Société canadienne de météorologie et d'océanographic au 31 décembre 1977 et l'état du revenu pour l'année se terminant à cette date. J'ai fait mon examen en respectant les normes généralement acceptés et en utilisant les méthodes que je considérais nécessaires dans les circonstances.

A mon avis le bilan et l'état du revenu présentent équitablement la situation financière de la Société au 31 décembre 1977 et les résultats de ses activités en 1977, conformément aux principes comptables généralement acceptés tels qu'appliqués d'une façon compatible avec celle de l'an passé.

Wayne R. Koch

REPORT OF THE NOMINATING COMMITTEE
RAPPORT DU COMITÉ DE MISE EN CANDIDATURE

The Nominating Committee is unaminous in nominating the following persons to the 1978 CMOS Executive. All nominees have expressed their willingness to serve in the indicated positions. The nominations have been made with the understanding that the CMOS Executive will shift from Vancouver to Edmonton in 1979.

Dr. G.L. Pickard's comments were much appreciated.

C'est à l'unanimité que le comité de mise en candidature soumet la liste suivante de candidats au bureau d'administration pour 1978. Tous les candidats ont consenti à occuper le poste indiqué. Les mises en candidature ont tenu compte du déménagement prévu du bureau d'administration de la Société de Vancouver à Edmonton en 1979.

Les commentaire de G.L. Pickard ont été fort appréciés.

President/Président

R.W. Burling
Institute of Oceanography
University of British Columbia
Vancouver, B.C. V6T 1W5
Tel: (604) 228-6571

Vice-President/Vice-Président	J.M. Powell Northern Forest Research Centre Canadian Forestry Service Fisheries and Environment Canada 5320 – 122nd Street Edmonton, Alberta T6H 3S5 Tel: (403) 435-7333/7210
Treasurer/Trésorier	P. Sagert B.C. Hydro 970 Burrard Street, H0-15 Vancouver, B.C. V6H 1Y3 Tel: (604) 663-3323
Corresponding Secretary/ Secrétaire correspondant	R.B. Sagar Dept of Geography Simon Fraser University Burnaby, B.C. V5A 1S6 Tel: (604) 291-3327
Recording Secretary/ Secrétaire d'assemblée	T.S. Murty Institute of Ocean Sciences P.O. Box 6000 Sidney, B.C.
Councillors-at-large/Conseillers	R.P. Angle Division of Pollution Control Alberta Dept of Environment 4th Floor, Milner Building 10040 – 104 Street Edmonton, Alberta T5J 0Z6
	G.A. McBean Atmospheric Environment Service 4905 Dufferin Street Downsview, Ontario M3H 5T4
	J. Dionne Section d'océanographie, Université du Québec à Rimourski Rimouski, Québec G5L 3A1

T.A. Black
Chairman/Président

EDITORIAL COMMITTEE REPORT

Late in 1976 the rate at which papers were being accepted for publication in *Atmosphere* had reached a high level, but it was decided, for financial reasons, to limit the size of the journal to an average of about 60 pages per issue. This created a small backlog of papers in the early part of 1977 but then the number of papers submitted for publication dropped rather suddenly, with the net result that for 1977 the average number of pages per issue was only 54. While

a page count says nothing of the quality of the papers published, which in our opinion was excellent, it does point to the type of problems involved in trying to predict the growth and budget of the journal.

J. Derome served as Editor for the first three issues of Volume 15 and was then replaced by T.R. Oke. Both are happy to report that the transition of the Editor's office from Montreal to Vancouver took place smoothly and it seems that the publication schedule has not been unduly affected by the transition.

Soon after the transfer of the Editor's office it was necessary to re-constitute the Editorial Committee whose term had expired, and to prepare for the journal alterations coincident with the change of name to *ATMOSPHERE-OCEAN*. The change in personnel on the Committee was accompanied by a more formal structuring of the functions of some members. The Committee now consists of an Editor, Deputy Editor, Book Review Editor, Technical Editor and sixteen Associate Editors.

It was decided to combine the change in the name with a number of other modifications to the physical appearance of the journal starting with Volume 16 in 1978. The cover has been re-designed so as to best express the new title and content, and the page size increased to the standard metric dimensions typical of many international journals. Abstracts of all papers will appear in both English and French, and the journal will have a square spine with a glued rather than stapled binding. These developments should enhance the appeal of our journal to the readership and to potential contributors. It should be stressed that this has been achieved without any increases in costs, indeed the cost per page of the journal in its new format will be less. Given this saving and new budgetary allocations it should be possible to expand the number of pages published.

We have also established the copyright of the Society to the material published in *ATMOSPHERE-OCEAN* as of Volume 16. This may provide a small source of revenue in the future.

We take great pleasure in thanking all those who have contributed their talent, energy and time in helping us as Editors. A number of scientists, for example, have served as anonymous referees to advise us on the merits of papers submitted for publication. Others accepted to review books for the benefit of our readers. In this regard we owe some special thanks to Professor R. Rogers who not only wrote a book review but also was most helpful in finding serveral qualified book reviewers.

J. Derome and T.R. Oke,
Editors, *Atmosphere*

RAPPORT DU COMITE DE LA RÉDACTION

Vers la fin de 1976 le nombre d'articles soumis à la revue *Atmosphère* avait atteint un niveau relativement élevé et on décida, pour des raisons financières, de ne publier en moyenne que 60 pages par numéro. Cela créa une petite réserve d'articles au début de 1977 mais elle fut de courte durée puisque le nombre d'articles soumis pour publication diminua soudainement. Il en résulta un moyenne de seulement 54 pages par numéro en 1977. Le nombre de pages imprimées ne dit rien évidemment de la qualité des articles, qui à notre avis fut excellente, mais il souligne la difficulté de planifier la croissance et le budget de la revue.

Après avoir eu la responsabilité des trois premiers numéros du volume 15 le directeur J. Derome fut remplacé par T.R. Oke. Nous sommes heureux de constater que le transfert de la direction s'est effectué sans contretemps important et que la bonne marche de la revue n'en a pas été affectée.

Après le transfert de la direction on a dû procéder à des changements au sein du Comité de la rédaction, dont les membres avaient terminé leur mandat. On a dû aussi se préparer à effectuer quelques modifications au format de la revue au moment où l'on adopteraite le nouveau nom *ATMOSPHÈRE-OCÉAN*. En plus de changer les membres du Comité on a défini de façon plus officielle la fonction de quelques uns des membres. Le Comité est

maintenant composé d'un directeur, d'un directeur adjoint, d'un directeur de la section des critiques de livres, d'un responsable de la mise en page et de seize autres membres.

On a décidé de profiter du changement de nom pour introduire quelques modifications d'ordre visuel à partir du volume 16 de 1978. La couverture a été refaite pour mieux s'harmoniser avec le nouveau nom et le nouveau contenu, et on a adopté le format métrique, plus grand, déjà utilisé par plusieurs revues internationales. Tous les articles auront des résumés en anglais et en français et la revue aura un dos plat avec reliure collée plutôt qu'avec agraffes. Avec sa nouvelle apparence notre revue devrait plaire davantage à nos lecteurs et aux auteurs. Il est important de souligner que ces modifications seront faites sans augmenter les coûts; en fait le nouveau format est plus économique. Avec les économies ainsi réalisées et un budget plus élevé il devrait être possible d'augmenter le nombre de pages de la revue.

Nous avons enregistré le copyright de la Société en ce qui concerne le contenu *d'ATMOSPHÈRE-OCÉAN* à partir du volume 16. Cela pourrait créer éventuellement une petite source de revenus.

Il nous fait plaisir de remercier tous ceux qui nous ont aidé sans compter au cours de 1977. En particulier plusieurs scientifiques nous ont fourni des évaluations d'articles soumis pour publication. D'autres ont accepté d'écrire des critiques de livres pour le bénifice de nos lecteurs. A cet égard nous remercions tout spécialement le professeur R. Rogers qui en plus d'avoir écrit lui-même une critique de livre s'est occupé de trouver plusieurs autres auteurs de critiques.

J. Derome et T.R. Oke
Directeurs, *Atmosphère*

AWARDS COMMITTEE REPORT/RAPPORT DU COMITÉ DES RÉCOMPENSES

The Committe (composed of E.R. Walker, H.M. Fraser, L. Parent, E.R. Pounder, C. Young) reviewed the submitted nominations and recommended Awards to Council

Le Comité (composé de E.R. Walker, H.M. Fraser, L. Parent, E.R. Pounder, C. Young) a étudié les nominations qui ont étés soumises et a recommandé au Conseil la présentation des récompenses.

CITATIONS COMMITTEE REPORT/RAPPORT DU COMITÉ DES CITATIONS

The Commitee (composed of S.V.A. Gordon, K. Denman, J. Powell, P.G. Sagert, M. Sanderson) reviewed the submitted nominations and recommended awards to Council.

Le Comité (composé de S.V.A. Gordon, K. Denman, J. Powell, P.G. Sagert, M. Sanderson) a étudié les nominations qui ont étés soumises et a recommandé au Consiel la présentation des citations.

LIST OF PREVIOUS RECIPIENTS OF SOCIETY AWARDS/ LAURÉATS DES ANNÉES PRÉCÉDENTES

President's Prize/Prix du président

1967 A. Robert
1968 A.W. Brewer
1969 G.T. Csanady
1970 R.E. Munn
1971 M. Kwizak and A. Robert
1972 T.R. Oke
1973 A.J. Chisholm and Marianne English
1974 Gordon A. McBean
1975 Not awarded
1976 W.F.J. Evans

Dr. Andrew Thomson Prize in Applied Meteorology/
Prix du Dr Andrew Thomson en météorologie appliquée

1967 A. Davenport
1968 D. Davies
1969 M.K. Thomas
1970 N. Yacowar
1971 J.S. Marshall
1972 P.W. Summers
1973 H.P. Wilson
1974 Roger Daley
1975 Gordon A. McKay
1976 S. Orvig and E.A. Vowinckel

Graduate Student Prize/Prix aux étudiants gradués

1967 S. Woronko
1968 Not awarded
1969 T. Warn
1970 N.A. McFarlane
1971 R.S. Schemenauer
1972 L. Ettinger
1973 V.S. Chung
1974 Geoffrey Strong
1975 Helen Warn
1976 H. Melling

Rube Hornstein Prize in Operational Meteorology/Prix de météorologie opérationelle Rube Hornstein

1975 Waldimar L. Gutzman
1976 S.V.A. Gordon

Citations

1973 John A. Livingston
Pierre Dansereau
P.D. McTaggart-Cowan
1974 Barbara Frum Alan Maitland, Harry Browne and Staff, CBC "As It Happens".
Alberta Environmental Conservation Authority
Lydia Dotto (Globe and Mail Science reporter)
1975 Tony Le Sauteur
1976 Conseil Québecois de l'environnement.
Douglas H. Pimlott

LIST OF AES/CMOS LECTURE TOUR SPEAKERS/CONFÉRENCIERS EN TOURNÉE, SOUS L'ÉGIDE DE LA SCMO ET LE SEA

1969 K.M. King
1970 T.R. Oke
1971 F.K. Hare
1972 M.B. Danard
1973 W.R. Frisken
1974 A.G. Davenport
1975 P.E. Merilees
1976 J. Maybank
1977 D.A. Huntley

LIST OF SUSTAINING MEMBERS OF THE SOCIETY/MEMBRES DE SOUTIEN DE LA SOCIÉTÉ

Air Canada
Alberta Weather Modification Board
Airflow Developments (Canada) Ltd
Beak Consultants Ltd
Bendix-Aviation Electric
Bristol Aerospace Ltd
Case Existological Laboratories
Dobrocky Seatech Ltd
Hermes Electronics Ltd
McLaren Atlantic Ltd
MacDonald, Dettweiler and Associates Ltd
P.E. Merilees
Neil Sargent

REPORT FROM THE STANDING COMMITTEE ON PUBLIC INFORMATION

1. *Resolution on Freedom of Information*

At the last Annual General Meeting (June 1, 1977), this item was referred back to Council who instructed that it be discussed within the Public Information Committee. This has been done, by correspondence, and a re-draft of the Resolution was prepared for consideration by Council at its Meeting in Vancouver, 17 February, 1978

2. *Formation of Policy Statements by the CMOS*

No progress to report.

3. *Michrowski Episode (November, 1977)*

The Public Information and Scientific Committees, respectively, coordinated and prepared a statement for Council, which culminated in a letter from the President to the Prime Minister outlining the views of CMOS concerning Michrowski's statements.

4. *General*

The Chairman has indicated to the Executive the difficulty of the Public Information Committee communicating exclusively by correspondence. He wishes to thank Committee members for their cooperation and participation.

J.L. Knox
Chairman

RAPPORT DU COMITÉ PERMANENT D'INFORMATION PUBLIQUE

1. *Résolution sur la liberté de l'information*

À la dernière assemblée générale annuelle (1 juin 1977) cette question a été renvoyée au conseil d'administration de la Société qui, à son tour, chargea le comité permanent d'information publique d'en discuter. Après discussion (par la poste), une nouvelle rédaction de cette résolution a été préparée pur être présentée au conseil d'administration à sa réunion du 17 février 1978.

2. *Enoncés de prises de position de la SCMO*

Aucun progrès.

3. *L'incident Michrowski (novembre 1977)*

Le comité permanent d'information publique et le comité scientifique de la Société ont respectivement coordonné et préparé pour le conseil d'administration de la Société un énoncé de prise de position qui aboutit à une lettre envoyée par le président de la Société au Premier ministre du Canada, exprimant l'opinion de la Société sur les affirmations de Michrowski.

4. *Divers*

Le président du comité a fait part au bureau d'administration des difficultés qu'éprouve le comité d'information publique à ne communiquer que par écrit. Il tient aussi à remercier les membres du comité de leur coopération et de leur participation.

Président
J.L. Knox

REPORT FROM THE SCIENTIFIC COMMITTEE

The Scientific Committee, chaired by Dr John Maybank of the Saskatchewan Research Council, comprised the following members: Dr G.G. Goyer, Alberta Research Council, Secretary; Dr A.F. Fraser, Pennsylvania State University; Dr P. Hamblin, Canada Centre for Inland Waters, Ontario; Dr M. Kwizak, Atmospheric Environment Service, Ontario; Dr G.T. Needler, Bedford Institute of Oceanography; Dr T. Oke, University of British Columbia; Dr W.R. Peltier, University of Toronto; Prof. R.R. Rogers, McGill University; Dr G.W. Thurtell, University of Guelph; Dr T. Warn, McGill University.

The Scientific Committee met twice during the year, May 31 and November 16, to consider several problems of concern to the CMOS, and to make recommendations, where appropriate, to the Executive Committee.

The topics discussed and acted upon by the Committee included, among others, certification of meteorologial consultants, fluorocarbon research, GARP, long-range transport of pollutants, and acidic rains. Weather modification in Canada was reviewed and the possibility of Canadian participation in WMO's Precipitation Enhancement Project (PEP) was discussed. The effects of a large involvement in international research projects on national programmes were noted.

The rules and procedures for awarding the CMOS Prizes and the Patterson Medal were reviewed, and several modifications proposed to extend the number of possible candidates, and to increase the visibility and stature of the CMOS Prizes. The programmes of grants-in-aid to Canadian universities by NRC and AES were reviewed after NRC announced expansion of research support to three areas: energy, environmental toxicology, and oceanography.

The Committee also supported very strongly the maintenance of weathership PAPA on the basis of its valuable contributions to meteorology.

Finally, the Committee responded strongly, through the Executive Committee and the President of the Society, to Dr Michrowski's news media release concerning the effects of powerful Russian radio waves on the Canadian climate.

The terms of Drs Goyer, Thurtell, and Warn expire at the May, 1978 meeting of the Committee; three new members and a new secretary will be nominated at that meeting.

Guy S. Goyer
Secretary

RAPPORT DU COMITÉ SCIENTIFIQUE

Le comité scientifique, présidé par le Dr John Maybank du Saskatchewan Research Council, est composé de: Dr G.G. Goyer, Alberta Research Council, secrétaire; Dr A. Fraser, Pennsylvania State University; Dr P. Hamblin, Centre canadien des eaux intérieures, Ontario; Dr M. Kwizak, Service de l'environnement atmosphérique, Ontario; Dr G.T. Needler, Bedford Institute of Oceanography; Dr T. Oke, Université de la Columbie-Britannique; Dr W.R. Peltier, Université de Toronto; Prof. R.R. Rogers, Université McGill; Dr G.W. Thurtell, Université de Guelph; Dr. T. Warn, Université McGill.

Le comité s'est réuni deux fois (31 mai et 16 novembre) durant l'année pour se pencher sur plusieurs problèmes d'intérêt particulier pour la Société et, lorsque jugé opportun, pour faire des recommandations à son bureau d'administration.

Les sessions portèrent sur, entre autres, quelques sujets tels que la certification, la recherche sur les fluorocarbures, GARP, le transport à long cours des pollutants et sur les pluies acides. La modification du temps au Canada a été étudiée et la possibilité d'une participation canadienne dans le Projet d'augmentation des précipitations (PEP) de l'OMM fut discutée. Les effets d'une participation canadienne accrue aux projets internationaux sur les projets nationaux ont été soulignés.

Les procédures régissants le choix des candidats aux prix de la Société et à la médaille Patterson ont été revues, et plusieurs recommandations furent proposées pour étendre le nombre des candidatts et pour augmenter la stature et la visibilité des prix de la Société.

Les politiques d'aide financière aux universités canadiennes suivies par le Conseil national des recherches et Canada Environnement ont été étudié après l'annonce par le CNR d'aide que dans les trois domaines suivants: énergie, toxicologie de l'environnement et océanographie.

Le comité a aussi fortement supporté le maintien du vaisseau PAPA à cause de ses grandes contributions à la météorologie.

Enfin, le comité a répondu fermement, par l'entremise du bureau d'administration et du président de la Société, aux allégations publiées dans les media par le Dr Michrowski sur les effets de puissantes ondes radiophoniques russes sur le climat du Canada.

La période de service au comité des Drs Goyer, Thurtell et Warn expire à la réunion de mai 1978. A cette occasion, trois nouveaux membres et un secrétaire seront nommés.

Le secrétaire,
Guy G. Goyer

REPORT OF THE AD HOC COMMITTEE ON METEOROLOGICAL CONSULTING STANDARDS IN CANADA

This Committee was established in 1976 with the following Terms of Reference:

1. To review the current extent of, the requirements for, and the standard of, meteorological consulting in Canada.
2. To review and recommend procedures for maintaining or improving the standard of meteorological consulting in Canada.
3. To provide a written report to the National Executive by December 31, 1976. (This requirement was later relaxed.)

The Committee which began work that year consisted of Dr A.J. Chisholm (AES), Chairman; Mr A. Boyer (Ontario Hydro); Mr M. Ferland (Service de la météorologie, Québec); Mr M. Hirt (Consultant, MEP Co.), Dr D.P. McIntyre (Consultant); Dr J.E. Hay (CMOS, Ex Officio).

Early in 1977 Dr Chisholm was forced to relinguish the chairmanship due to greatly increasing pressure of his primary duties although he did agree to remain a member of the committee. Dr McIntyre was appointed chairman. At the same time Mr G.A. McKay (AES) was added to the Committee. In response to a request by CMOS the Atmospheric Environment Service also appointed an official representative, Mr D.M. Scott. The Committee met 7 times in 1977 and expects to make its final report and recommendations to the CMOS Executive Committee by March 1978.

D.P. McIntyre
Chairman

RAPPORT DU COMITÉ AD HOC SUR LES STANDARDS DE CONSULTATION MÉTÉOROLOGIQUE AU CANADA

Ce comité a été formé en 1976 avec mandat de

1. Passer en revue la consultation météorologique au Canada, ses besoins et ses standards.
2. Examinet et recommander des procédures pour maintenir ou améliorer les standards de la consultation météorologiques au Canada.

3. Faire rapport par écrit au bureau d'administration de la Société au plus tard le 31 décembre 1976. (Un sursis a été par la suite accordé.)

Le comité qui commença les travaux en 1976 consistait de A.J. Chisholm (SEA), président; A. Boyer (Ontario Hydro); M. Ferland (Service de la météorologie, Québec); M. Hirt (Conseiller, MEP Co.), D.P. McIntyre (Conseiller), et J.H. Hay (SCMO, ex-officio).

Au début de 1977, sous la pression accrue de son travail, Dr Chisholm se vit forcé de démissionner comme président du comité; il consentit néamoins à en rester membre. Dr McIntyre fut désigné président; en même temps, le comité s'enrichit d'un nouveau membre: G.A. McKay (SEA). À la suite d'une requête de la SCMO, le Service de l'environnement atmosphérique désigna aussi un représentant officiel, D.M. Scott. Le comité s'est réuni sept fois en 1977 et compte présenter son rapport final et ses recommandations au bureau d'administration de la SCMO en mars 1978.

Président
D.P. McIntyre

REPORTS FROM LOCAL CENTRES

B.C. CENTRE

Chairman	P. LeBlond	UBC Inst. of Oceanography
Vice Chairman	J. Knox	UBC Dept of Geography
Secretary-Treasurer	V. Puss	AES Pacific Weather Centre
Program Director	N. Boston	Beak Consultants, Vancouver
Past Chairman	D. Faulkner	AES Pacific HQ

The major project of the year was the completion of a videotape entitled "A Forecaster's Day", which was produced in conjunction with the Atmospheric Environment Service. The star of this epic is Ike Baerg, a meteorologist at the Pacific Weather Centre in Vancouver. Minor expenses of Norm Thyer's West Kootenay School Weather Observing Program were covered. The Fall executive meeting discussed further uses of the annual subvention. It was decided to purchase several videotape cartridges to produce duplicates of "A Forecaster's Day" for distribution to local schools. Some concern was expressed regarding recent items of questionable meteorological veracity in the local media. The Victoria (Vancouver Island) Chapter completed an active year in 1977 (see report following).

The following speakers presented lectures during the year:

11 Jan.	Dr S. Venkatesh	"Wind-wave Forecasting in the Beaufort Sea"
23 Mar.	Drs J. Hay and R.W. Stewart G. Schaefer	Panel discussion, "Who Stole Winter – or The Grinch in the Jet Stream"
25 Mar.	D.A. Huntley	"Waves and Currents on Beaches"
13 Apr.	D. Sloan	"MDA's Weather Satellite Receiving System"
13 Oct.	J. Knox	"The Ocean Precipitation Issue"
30 Nov.	Dr. N. Boston	"The First GARP Global Experiment Drifting Buoy Program"

Financial Statement 1977

Income

Cash on hand, December 31, 1976	$ 748.43
Bank Interest, April 29	10.56
Grant from National Executive, Oct.	306.00
Bank Interest, October 31	5.04
	$1,070.03

Expenses

Mailing of Notices to Membership	$ 64.72
Refreshments at Meetings	17.01
Videotape Supplies	54.09
Honoraria to Reimer and Karl – Videotape	325.00
Norm Thyer's School Program	14.71
	$ 475.53
Credit Balance as of 31 December, 1977	$ 594.50

V. Puss
Secretary-Treasurer

VICTORIA CHAPTER

Our chapter had an active lecture programme this spring – see list below. The lecture series has suffered this fall and winter, since much of the Chapter's activities have been centred around preparations for the 13th Congress to be held in Victoria in 1979.

List of Speakers:

Dr Gargett	"Turbulence Research from Towed and Self-Propelled Vehicles"
Dr Rick Thomson	"Vortex Streets in the Wake of the Aleutian Islands"
Peter Haering	"Role of Satellites in Weather Forecasting at Pacific Weather Central – Present and Future"
Dr Jim Gower	"Role of Remote Sensing in Oceanographic Research at the Institute of Ocean Sciences"
E.G. Morrissey	"Current Research Activities in Satellite Remote Sensing"
Dr David Huntley	"Waves and Currents on Beaches"
AES/CMS Tour Speaker	

Lecture Series Programme Coordinators:

R.C. Bennett
M. Miyake

Organizing Committee for 1979 CMOS Congress:

R.C. Bennett	Chairman
E.R. Walker	Scientific Committee – Oceanography
Mike Blake	Scientific Committee – Meteorology
R.G. Wilson	Local Arrangements
Rick Thomson	Treasurer

ALBERTA CENTRE

The executive of the Alberta Centre from 1 January, 1977 to 20 April, 1977 were:

Dr R.L. Barge	Chairman
Dr R.G. Humphries	Vice-Chairman
L. Wojtiw	Secretary-Treasurer
D.B. Fraser	Past Chairman
N.C. Meadows	Calgary Representative

and from 20 April, 1977 till 31 December, 1977 were:

Dr R.G. Humphries	Chairman
L. Wojtiw	Vice-Chairman
G. Lunn	Secretary-Treasurer
Dr B.L. Barge	Past Chairman
Dr D. Davison	Calgary Representative

During 1977, eight meetings were held, six in Edmonton and two in Calgary. The list of speakers and the subjects of their presentations are as follows:

17 Jan.	Prof. Choji Magono	"Recent Studies on Natural Snow Crystals"
15 Feb.	Dave Fraser John Linton Gary Wells	"Beaufort Sea Observation and Prediction System in 1976"
23 Mar.	Dr D.A. Huntley (AES/CMOS speaker)	"Waves and Currents on Beaches"
20 Apr.	Prof. R.W. Longley	"Relating Weather and Weather Maps in South Africa"
15 May Calgary	Dr D. Leahey	"A Study of the Chinook on Air Pollution Levels in Calgary"
5 Oct.	E. Stashko	"Fire Weather Forecasting"
23 Nov. Calgary	Dr S. Benjamin	"Tetroon Studies in an Area of Complex Terrain"
29 Nov.	G. Legg S. Checkwitch D. Fraser	"Tour of New AES Facilities – Edmonton"

The meetings have averaged 20 people and several had 30 or more in attendance.

Financial Statement 1977

Balance brought forward from 31 December, 1976:				$ 890.17
Income	1977-1978	Subvention	$304.50	
		Interest	8.92	
		Total	$313.42	
Expenses	Mailings/coffee, etc.		$ 95.34	
	Regional Science Fair Prize		50.00	
		Total	$145.34	
		Net		$ 168.08
Bank Balance as of 31 December 1977				$1,058.25

Again this year, the Alberta Centre's expenses were minimal. As in 1977, a Regional Science Fair Prize will be presented in 1978. We have also undertaken to have a permanent plaque made, and small cups will be given to winners in this and future years' fairs. These expenses will appear on the 1978 budget. Appeals for ideas have been made concerning promotion of CMOS within Alberta. Possibilities include the making of a film, along lines of the British Columbia Centre's efforts and public displays. It is hoped that some progress will be made towards this goal.

G.R. Lunn
Secretary-Treasurer

SASKATOON CHAPTER

The sole elected officer, Corresponding Secretary John Maybank, arranged a number of varied and interesting meetings during 1977. In late January approximately 40 persons attended a seminar sponsored jointly by the Saskatoon Chapter of the CMS and the University of Saskatchewan Physics Department. Guest Speaker, Dr Choji Magono of Hakkaido University, Sapporo, Japan, discussed "The Investigation of the Scavenging Effects of Snow Crystals". This was followed by a second seminar in early February in which members of Dr Magono's University of Hokkaido Ice Crystal Research Group and Dr S.R. Shewchuk of the Saskatchewan Research Council discussed the operation and presented preliminary findings of two recently completed investigations, one at North Battleford, Sask. and the other at Inuvik, N.W.T.

The CMS speaker tour lecture was given on March 22 to an audience of approximately 35 persons. The following week, on March 31, members were invited to a seminar on "Climate and the Changing Sun" given by Dr J.A. Eddy of the Special Projects Staff of the High Altitude Observatory, NCAR, Boulder.

A general meeting was held on November 30 in which members reported on conferences and meetings they had attended. Don Bauer was elected as Corresponding Secretary for the coming year.

D.J. Bauer
Corresponding Secretary

WINNIPEG CENTRE

List of speakers during 1977:

13 Jan.	Gordon McKay	"Weather Variability, Climatic Change and Planning"
18 Mar.	Dr D.A. Huntley	"Waves and Currents on Beaches"
9 May	J. Waddell	"River Regimes of the High Arctic"
6 Oct.	B. Wiebe	"Rocketry"

Displays and awards:

1. On March 25 and 26 a meteorological display in connection with WMO Day was held in Polo Park shopping mall. This display consisted of meteorological instruments, weather charts, and an operating teletype and facsimile machine receiving weather data, and staffed at all times by two meteorologists.

2. We also once again awarded trophies and cash prizes for the best displays on a meteorological theme at the Manitoba Schools Science Symposium held at the University of Winnipeg in May.

Financial statement

Cash on hand as of January 1, 1977			$ 526.44
Receipts			
Dinner meeting January 13, 1977		$ 222.75	
Dinner meeting March 18, 1977		156.00	
Dinner meeting October 6, 1977		138.00	
From Congress		505.68	
Subvention cheque		255.00	
Interest		18.31	
	Total	$1,295.74	1,295.74
			$1,822.18
Expenditures			
Dinner meeting January 13, 1977		$ 230.21	
Dinner meeting March 18, 1977		168.98	
Dinner meeting October 6, 1977		151.41	
Science Symposium Awards		99.82	
Postage and miscellaneous		25.00	
Service charges on account		2.15	
	Total	$ 677.57	677.57
			$1,144.61
Cash on hand as of January 1, 1978			$1,144.61

P.G. Murray
Secretary-Treasurer

TORONTO CENTRE

Executive:

76-77		*77-78*
R. Lawford	Chairman	N. Waller
J. Donegani	Program Chairman	Dr T. Jakobsson
M. Hewson	Secretary	I. Savdie
N. Waller	Treasurer	F. Conway

Speakers:

6 Jan.	Prof. Shoji Horie	"Long Term Climatic Reconstruction"
22 Feb.	Dr J. Rennie	"Users Voice their Views on Meteorology"
	Dr R. Slater	
	L. Sleeman	
15 Mar.	Dr David A. Huntley	"Waves and Currents on Beaches"

20 Apr.	Dr J. Terasmae	"Techniques and Problems of Dendrochronology"
29 June	Honourable George Kerr Minister of the Environment Government of Ontario	"Environmental Problems – How They Affect Ontario and How They are Dealt With"
9 Nov.	Dr R.E. Munn Dr J. Wiebe Dr M. Phillips (moderator)	"Environmental Assessment and Review Process"
21 Dec.	Dr J.C. McConnell	"The Atmospheres of Jupiter, Mars and Venus"

The Toronto Centre has continued to carry out a School speakers program commenced in the spring of 1977. The response from the schools in the Metro area has been good and appears to be increasing. We are now attempting to keep a file of talks given and A/V materials used. We hope that this will act as an aid to people giving their first talk and as a source of material to all our speakers.

We have a relatively full program of speakers planned for the first half of 1978 which includes our annual election night/wine and cheese party in May. So, that by the time of the Congress the Toronto Centre should have a new executive.

Nancy B. Waller
Chairman

Financial statement 1977

Cash on hand as of 1 January, 1977		$ 559.53
Receipts		
Balance (January 1, 1977)	$ 282.25	
Contribution to Andrew Thomson Memorial Lecture Fund (from National Executive)	250.00	
Tickets and Wine Sales (Election Meeting)	144.60	
Subsidy	419.25	
Interest	3.98	
Total	$1,100.08	
Expenditures		
Printing	$ 65.29	
Mail Box Rental	21.00	
Stamps	85.70	
Meeting Refreshments	24.95	
Speakers' Dinners	81.76	
Donation to AES RA Golf Tournament	15.00	
Envelopes	41.35	
Wine and Cheese	198.70	
Typing	2.00	
Service Charges	4.80	
	$ 540.55	
Balance (December 31)	559.53	
Total	$1,100.08	

Outstanding Debit (Memorial Lecture Fund Contribution)	250.00
Net Assets (December 31, 1977)	$ 309.53

Fred Conway
Treasurer

OTTAWA CENTRE

1977-78 Executive

Chairman	D.W. Boyd
Past Chairman	H.W. Watson
Vice-Chairman	Dr N.J. Campbell
Secretary-Treasurer	K.C. Morris

A list of speakers and their topics for all presentations made at the Ottawa Centre for the 1977 calendar year is as follows:

25 Jan.	W.E. Markham Chief, Ice Forecasting Central	"Where is Canada's Ice Program Going?"
22 Feb.	Dr John Chapman Assistant Deputy Minister Dept. of Communications, Space Programs	"Space Programs Come of Age"
10 Mar.	Prof. D.A. Huntley Dept. of Oceanography Dalhousie University	"Waves and Currents on Beaches"
18 Apr.	G.D. Williams Agrometeorology Research and Service Agriculture Canada, Ottawa	"Mapping Agro-Climatic Resources"
20 Oct.	J.R. Stallabrass Low Temperature Laboratory National Research Council	"Measurements of the Concentration of Falling Snow"
30 Nov.	Dr C.R. Mann Director of Atlantic Oceanographic Laboratory Bedford Institute of Oceanography	"Interdisciplinary Research – Its Management and Conduct"

Average attendance for the meetings was about 30 although over 40 persons were present for some of the talks. Another three meetings have been scheduled for the first half of 1978.

During 1977 the Ottawa Centre established an annual prize for the best entry on a meteorological or an oceanographic subject at the Ottawa Regional Science Fair. The award consists of an engraved plaque to be held for one year by the school attended by the winning student, as well as smaller keeper plaques and a cash prize of up to 50 dollars for the students making the entry. A panel of judges selected from members of the Ottawa Centre awarded the first trophies to Laureen Bratton and Maureen Quinn, both Grade 13 students at Immaculata High School, Ottawa, for their project on snow ecology.

Financial Statement – 1977

Bank Balance, 1 January, 1977	$662.61	
Petty Cash on Hand, 1 January, 1977	1.62	
Total Cash on Hand, 1 January, 1977	$664.23	$ 664.23
Receipts		
Tickets – Annual Dinner Meeting, February	$308.00	
Bank Interest – April and October	16.37	
CMOS Subvention, November	277.50	
Total	$601.87	$ 601.87
		$1,266.10
Expenditures		
Postage and Envelopes	$ 86.89	
Science Fair – plaques, engraving and cash prizes	84.95	
Annual dinner expenses, February*	274.29	
Speaker and other meeting expenses	28.35	
Total	$474.48	$ 474.48
Difference		$ 791.62
Bank Balance as of 31 December, 1977	$744.78	
Petty Cash as of 31 December, 1977	$ 46.84	
Total Cash on Hand 31 December, 1977	$791.62	

*An advance of $50.00 was also paid in 1976 for a total expenditure for the Annual dinner of $324.29.

K.C. Morris
Secretary-Treasurer

CENTRE DE MONTRÉAL

Président	C. East, Université du Québec à Montréal
Secrétaire	G. Desautels, Service de l'environnement atmosphérique
Trésorier	S. Roy, Hydro-Québec
Président sortant	R.J. Fichaud, Service de l'environnement atmosphérique
Secrétaire sortant	R. Rioux, Service de l'environnement atmosphérique, CMC

La liste des conférenciers et le sujet de leur présentation est la suivante:

27 jan.	Prof. Pierre-André Dubé Dépt de Phytologie Université Laval	"Possibilités de la phénologie pour le zonage climatique"

9 mars	Prof. D.A. Huntley Dept of Oceanography Dalhousie (AES touring speaker)	"Waves and Currents on Beaches"
12 avril	Prof. K. Hare University of Toronto	"The Spread of Deserts – Is Climate the Villain?"
25 mai	Michel Jurdant Service de la gestion de l'environnement	"Les insolences d'un écologiste"
27 oct.	N. Yacowar Service de l'environnement atmosphérique	"Hours of Possible Sunshine – A New Forecast Parameter"
9 nov.	Béatrice Félin Hydro-Québec	"Observations de dépôts de givre et de verglas pour l'Hydro-Québec
7 déc.	Dr Isztar Zawadzki Univ. du Québec à Montréal	"Relations entre le taux maximal de précipitation et certains paramètres de l'échelle moyenne"

Rapport financier: du 1er janvier au 31 décembre 1977

Revenus

Solde (au 1er janvier 1977)		$367.51
Réserve (au 31 décembre 1977)		37.63
Recettes (au 1er janvier au 31 décembre 1977)		189.22
Subventions SMOC (7 octobre 1977)		348.75
Intérêt sur compte bancaire (29 avril 1977)		1.19
	Total	$944.30

Dépenses

Timbres		$ 26.55
Rafraîchissements et friandises		363.34
Divers des conférenciers (8)		125.00
Frais d'administration sur compte bancaire (31 janvier 1977)		0.40
	Total	$515.29
Actifs au 1er janvier 1977		$367.51
Actifs au 31 décembre 1977		$429.01

Trésorier
Serge Roy

CENTRE DE QUÉBEC

Président	Gaston Paulin	
Vice-Président	Raymond Poiré	
Conseillers	Paul-André Dubé	Guy Lemelin
	Jean-Pierre Fortin	Gilles Tardif
	Ghislain Jacques	
Secrétaire	Guy Bergeron	
Trésorier	Gaétan-D. Soucy	

Conférenciers pour 1977

26 jan.	Dr André Plamondon	"Influences des facteurs hydrométéorologiques sur la production de sève de l'érable à sucre"
7 mars	Dr David A. Huntley	"Waves and Currents on Beaches"
13 avril	Drs Jean-Pierre Fortin et Hubert Demard	"Les prévisions des besoins en eau de pelouse en milieu urbain"
18 oct.	Raymond Perrier	"Hydrométéorologie, déserts et tourisme dans les régions équatoriales"
16 nov.	Dr Richard Asselin	"Progrès en prévisions numériques"
14 déc.	Dr Gilles Taschereau	"Problèmes d'environnement atmosphérique"

L'année 1977 marque la remise du premier prix annuel de la Société de Météorologie de Québec, prix attribué pour une contribution digne de mention au progrès de la météorologie. Le Dr G.-Oscar Villeneuve en est le récipiendaire en raison de sa brillante carrière entièrement dévouée au développement de la météorologie.

D'un autre côté, notre société a procédé aux premiers prêts de la station météorologique mobile élaborée à partir des subventions annuelles de la SMOC; celle-ci sera bientôt accompagnée de dépliants décrivants les diverses facettes de la météorologie.

Le secrétaire
Guy Bergeron

Rapport du Trésorier 1977

Actif

Actif en caisse au début de l'exercice		$1,492.73
Cotisation des membres (90)		360.00
Octrois du MRN (2)		1,100.00
Subvention de la SMOC		156.00
Intérêts		11.36
Remboursement pour timbres		1.12
	Total	3,121.21
	Capital social	5.00
	Actif total	$3,126.21

Passif

Frais de séjour et de déplacements des conférenciers	$ 143.60
Location de salles	100.00
Achat de timbres et matériel de bureau	35.99
Frais de secrétariat (dactylographie)	40.00
Frais pour assemblée générale et réunion d'ouverture	376.32
Fabrication et mise au point d'une station météorologique mobile	425.86
Prix de la S.M.Q. (plaque-écusson)	77.44
Total	1,199.21
Immobilisation du capital social	5.00
Passif total	$1,204.21
Excédant de l'actif sur le passif	$1,922.00

Le trésorier
Gaétan-D. Soucy

HALIFAX CENTRE

Chairman	Dr R. Shaw
Secretary	J. Dublin
Treasurer	D. Dockendorff

List of Speakers:

10 Mar.	Shane Hollett Canadian Meteorological Centre	"Operation of the Canadian Meteorological Centre"
2 May	W. James Shuttleworth Institute of Hydrology Great Britain	"Models of Vegetation-Atmosphere Exchange Processes"
8 June	Dr R. Shaw Environmental Protection Service	"Long Range Transport of Air Pollutants – Atlantic Region"
16 Nov.	Mr Graham Smith Hermes Electronics Limited Dartmouth, N.S.	"The Canadian Ocean Data System"
13 Dec.	Hugh Hall, Environmental Protection Service Hans Neu, Bedford Institute of Oceanography Dartmouth, N.S. Paul Galbraith Atmospheric Environment Service, Bedford, N.S.	"Environmental Aspects of Liquified Natural Gas Terminals"

Activities Planned For or Held in 1978:

A Dinner Meeting was held on January 23rd at the Royal Nova Scotia Yacht Squadron, Halifax, N.S. The speaker was Fred Dobson, of Bedford Institute of Oceanography, who described a scientific expedition to the Bahamas, where he conducted a wave-follower experiment.

The Educational Committee is meeting on February 1st to prepare orders for meteorological instruments and teaching aids which will comprise kits that will be placed in resource centres operated by the Nova Scotia Museum at six locations in the province. Samples of the items being considered for the kits have been received. Surplus subvention funds are being used to finance this project. The Educational Committee consists of Dr H. Jean Thiébaux, Rebecca L. Wall and the 1977-78 Executive.

On March 8th, Dr D. Davison, of Intera, Calgary, the AES/CMOS speaker for 1978 will deliver an address entitled, "Atmospheric Turbulence and Air Quality".

J. Dublin
Secretary

Financial statement

Receipts

Forwarded from 1976		$1,258.22	
Interest April 30, 1977		33.25	
Interest October 31, 1977		37.45	
Subvention November 28, 1977		309.00	
	Total	$1,637.92	$1,637.92

Expenditures

Refreshments (six meetings)		$ 35.66	
Stationery		4.32	
Postage		7.86	
Photocopying		8.10	
Educational material and instruments for prototype weather study module		68.91	
	Total	$ 124.85	$ 124.85
			$1,513.07
Cash on Hand as of January 24, 1978:	Bank		$1,496.31
	Petty Cash		16.76
			$1,513.07

D.L. Dorkendorff
Treasurer

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CONSTITUTION

THE CANADIAN METEOROLOGICAL AND OCEANOGRAPHIC SOCIETY

ARTICLE 1 – Name

The name of this Society shall be the Canadian Meteorological and Oceanographic Society – La Société canadienne de météorologie et d'océanographie.

ARTICLE 2 – Aim

The Society exists for the advancement of meteorology and oceanography (the term oceanography as used here includes limnology).

ARTICLE 3 – Membership

Membership is open to persons and organizations having an interest in meteorology and/or oceanography.

ARTICLE 4 – The Executive and Council

The Executive of the Society shall consist of the President, the Vice-President, the Treasurer, the Corresponding Secretary and the Recording Secretary, who together with the immediate Past President, the Chairmen of Centres and three Councillors-at-Large, shall constitute the Council of the Society.

ARTICLE 5 – Amendment of Constitution

a) Notice of motion for amendment to the Constitution shall be delivered in writing over the signatures of at least five members to the Corresponding Secretary at least eight weeks prior to the date of the General Meeting at which it is to be considered. Such notice shall be sent by the Corresponding Secretary to each member at least five weeks prior to the said meeting.
b) Changes in the Constitution shall require the assent of two thirds of the members present at the General Meeting.

ARTICLE 6 – Non-profit status

The Society does not have as its purpose financial gain for its members and any profits or other accretions to the organization shall be used in promoting the advancement of meteorology and oceanography. In the event of the dissolution or winding up of the Society all its remaining assets, after payment of liabilities, shall be distributed to one or more recognized charitable organizations in Canada.

BY-LAWS

BY-LAW 1 Amendment of By-Laws

a) Notice of motion for amendment to the By-Laws shall be delivered in writing over the signatures of at least five members to the Corresponding Secretary at least eight weeks prior to the date of the General Meeting at which it is to be considered. Such notice shall be sent by the Corresponding Secretary to each member at least five weeks prior to the said meeting.
b) Changes in the By-Laws shall require a simple majority of the members present at the General Meeting.

BY-LAW 2 Membership

a) Applications for membership are accepted by Council or by the Executive on behalf of Council. Council has the power to remove members for non-payment of dues or for other reasons.

b) Student membership is open to bona fide full-time students.

c) Sustaining membership is open to individuals, institutions, companies, firms and organizations who wish to support the Society in promoting meteorology and/or oceanography and their application for the benefit of Canada. A Sustaining membership will require a certain minimum annual contribution determined as indicated in By-Law 3.

BY-LAW 3 Annual Fees

a) Annual fees shall be paid by members. The amount for each calendar year shall be established at the previous Annual General Meeting.

b) The annual fee is due on January 1st.

c) Any member whose annual fee remains unpaid after April 30th shall not be entitled to any of the rights or privileges of membership, including receipt of publications.

BY-LAW 4 Nomination, Election and Term of Office of Officers

a) Election to Council shall be for a period of one year. The President and Vice-President shall not hold the same office for more than two consecutive years; other members of Council shall not hold the same office for more than four consecutive years.

b) Before March 1st in each year, a Nominating Committee appointed by Council, shall prepare a list of nominations for Council and Auditor for the following year. There shall be at least one nomination for each office. No nomination shall be made without the consent of the nominee to accept office if elected. The Nominating Committee shall take into consideration the need for proper representation of the two fields of interest of the Society.

c) On or before March 1st the Corresponding Secretary shall send to each member of the Society (i) a list of the members of the current Council, (ii) a list of the nominations made by Council or the Nominating Committee, and (iii) a copy of By-Law 4(d).

d) Nominations (in addition to those made by the Nominating Committee) will be accepted by the Recording Secretary up to the last day of March, provided (i) that the nominee is eligible for the office for which he is nominated, (ii) that the nominee acknowledges his willingness to accept office if elected by signing the nomination, and (iii) that the nomination is signed by four members.

e) If there is more than one nomination for any office, the Recording Secretary shall prepare a ballot, on which shall appear the names of all members properly nominated for the offices of Council for the coming year. This ballot shall then be sent by the Corresponding Secretary on or before April 15th to each member of the Society with notice that ballots will be accepted by the Recording Secretary up to May 15th, and that, to be counted, ballots must be in the hands of the Recording Secretary at this time.

f) The Recording Secretary and a scrutineer appointed by Council shall be responsible for counting the ballots immediately before the Annual General Meeting.

g) By-Laws 4(a) to 4(f), inclusive, shall not apply to Chairmen of Centres as such who shall be elected by the individual Centres.

h) Chairmen of Centres who hold any other concurrent office on the Executive or on Council shall be permitted only one vote at Business Meetings of the Executive or Council.

BY-LAW 5 Duties and Powers of the Executive and Council

a) Council shall hold meetings at least twice annually at the call of the President, or at the request of any three members of Council.

b) The Executive shall conduct the business of the Society in accordance with the Constitution and By-Laws and at the direction of Council.

c) Council may appoint committees consisting of members of Council, members of the Society, or other persons, with such terms of reference and powers as Council may prescribe. Committees shall report to Council.

d) Council shall ensure that proper and sufficient accounts are kept of the funds, receipts and expenditures of the Society.

e) Council shall have power to invest surplus funds of the Society in such forms of investment as they deem in the interests of the Society.

f) *Duties of the President*

1) The President shall take the chair at business meetings of the Society, of Council and of the Executive.
2) The President shall not vote on any question brought before any meeting, except that, where a deciding vote is necessary, he shall cast such a vote.

g) *Duties of the Vice-President*

1) The Vice-President shall assume all the duties of the President in the absence of the latter.

h) *Duties of the Treasurer*

1) The Treasurer shall, on behalf of the Society, open an account at a chartered bank, and shall keep a regular account of receipts and payments in a manner acceptable to Council. Council shall retain direction and control of the funds of the Society.
2) No sum of money payable on account of the Society and amounting to five hundred dollars ($500.00) or more shall be paid except by an order of the Executive recorded in the minutes. Accounts for amounts less than five hundred dollars ($500.00) may be paid by the Treasurer subject to later approval by the Executive.
3) The Treasurer shall be responsible for the collection of fees, subscriptions and other accounts due to the Society.
4) The Treasurer shall prepare the accounts of the Society for audit, and shall make available to the auditor or auditors such books and documents relating to the Society as the latter shall require.

i) *Duties of the Recording Secretary*

1) The Recording Secretary shall take minutes of the proceedings at all the meetings of the Society, Council, and the Executive, and have them entered in proper books. He shall distribute, at least two weeks in advance, the printed minutes of the preceding business meeting.
2) The Recording Secretary shall carry out the duties of the Corresponding Secretary in the absence of the latter.
3) The Recording Secretary shall carry out such other duties as these By-Laws and the Executive or Council shall direct.

j) *Duties of the Corresponding Secretary*

1) The Corresponding Secretary shall be responsible for the correspondence of the Society. He shall keep a list of the names and addresses of all members and arrange for the forwarding of notices and publications to them.
2) The Corresponding Secretary shall carry out the duties of the Recording Secretary in the absence of the latter.
3) The Corresponding Secretary shall carry out such other duties as these By-Laws and the Executive or Council shall direct.

BY-LAW 6 Committees

a) The President shall be an ex officio member of all committees.

b) A Nominating Committee shall be established in accordance with By-Law 4.

c) A Membership Committee shall be established. The Corresponding Secretary shall be an ex officio member of this committee.

d) An Awards Committee shall be established. In order to provide continuity, at least one member of this committee shall have served in the preceding year. The Committee shall be responsible for recommending candidates for all awards sponsored by the Society and shall review annually the desirability of establishing new awards or of modifying the terms of reference of existing awards.

e) A Committee on Centres and Chapters shall be established. The Committee shall be chaired by the Vice-President. It shall actively encourage the organization and scientific activities of Centres and Chapters.

f) An Editorial Committee shall be established, elected by Council and responsible to the Executive. Each member will normally remain on the Committee for at least two years. *ATMOSPHERE-OCEAN* shall be an official publication of the Society and the Editor elected by Council shall be Chairman of the Editorial Committee. The Committee shall review annually the desirability of publishing other scientific reports, proceedings or journals and shall make recommendations to Council. All publications may be in either or both of the official languages of Canada.
g) A Citations Committee shall be established. The Committee shall be responsible for recommending candidates for the award of citations by the Society and shall review annually the desirability of modifying the terms of reference for the award of citations.
h) A Scientific Committee shall be established to study and act on scientific matters of concern to the society when directed by the Executive or on the initiative of the Committee itself. The Committee shall have a total of not more than 11 regular members, including the Chairman and Secretary. The Chairman and Secretary shall be elected from and by the members of the committee. The Chairman and Secretary shall not hold office for more than 3 consecutive years and, except for the Chairman and Secretary, no one shall be a member of the committee for more than 3 consecutive years. Members are appointed by Council with advice from the Scientific Committee. The Committee shall meet at least once a year and will prepare an annual report on its activities for Council.

BY-LAW 7 Finances
a) The Financial Year of the Society shall end on December 31st in each year.
b) The accounts of the Society shall be made up to that date, and after being examined by an auditor or auditors, shall be laid before the Annual General Meeting next following.

BY-LAW 8 Auditors
a) One or more auditor(s) shall be appointed at each Annual General Meeting to hold office until the next Annual Meeting.
b) It shall be the duty of the auditor or auditors to examine the accounts of the Society, and to assure himself, or themselves, that the accounts are properly kept, and that they represent the true state of the finances of the Society.

BY-LAW 9 Cooperation
a) The Society shall cooperate with other societies, organizations and agencies throughout the world having objectives similar to those of Article 2 of the Constitution.
b) In view of the historical connection between the Royal Meteorological Society and the Canadian Meteorological and Oceanographic Society, the Society shall maintain the closest possible relations with the Royal Meteorological Society.

BY-LAW 10 Meetings
a) Ordinary National Meetings of the Society shall be held at such times and places as Council shall decide to hear papers, addresses, or discussions on matters of meteorological and/or oceanographic interest.
b) No business relating to the management of the Society shall be transacted at an Ordinary Meeting.
c) Notice of an Ordinary National Meeting shall be sent at least one month in advance to all members of the Society.
d) A General Meeting, to be called the Annual General Meeting, shall be held each year, on a day and at an hour to be determined by Council, to approve the minutes of the preceding Annual General Meeting, to receive the reports of Council, the auditor or auditors, and the ballot counters, to establish the fees for the next calendar year, to discuss and determine such questions as may be proposed relative to the affairs of the Society, to appoint an auditor or auditors for the ensuing year, and to install the Council elected for the ensuing year.
e) Council shall have the power to call a Special General Meeting to consider and determine any question relative to the affairs of the Society.

f) Any measure proposed by five or more members must be considered at a General Meeting, but the Council shall have power to decide whether it is to be brought before a Special General Meeting or the next Annual General Meeting.
g) Notice of all General Meetings shall be sent to all the members at least one month before the meeting. The notice shall state the subject of any business to be brought before the meeting.

BY-LAW 11 Quorum
a) Twenty members shall form a quorum at any General Meeting of the Society.
b) Four members shall form a quorum at any meeting of Council.

BY-LAW 12 Local Centres
a) Council may, upon the request of a sufficient number of members, set up a Local Centre for the reading of papers, and holding of discussions on subjects of meteorological and/or oceanographic interest. Council shall have the power to dissolve a Local Centre at any time after it has been formed.
b) The Officers of a Local Centre shall include a chairman, a secretary and a treasurer, and such other officers as a Local Centre may decide. Each Officer of a Local Centre must be a member of the Society in good standing.
c) Notices of meetings of a Local Centre shall be sent to any member who so requests.
d) The secretary of a Local Centre shall report to the Recording Secretary of the Society on April 15th of each year,or earlier if requested by Council, on the meetings that have been held by such Local Centre, including the names of the speakers and the topics on which they spoke.
e) Local Centres, in the conduct of their affairs, shall comply with the rules laid down by Council from time to time.
f) Council may, at its discretion, authorize the expenditure of Society funds on behalf of a Local Centre. In general, an expenditure of more than $20.00 on any one scientific meeting requires prior approval of Council.
g) The treasurer of a Local Centre shall submit to the Executive an annual financial statement, based on the calendar year, by March 1st of each year.

BY-LAW 13 Chapters
a) A Chapter shall consist of a group of at least 5 members of the Society resident in one location who do not wish to elect a local executive but who wish to hold scientific meetings occasionally.
b) A Chapter shall have a Correspondent appointed by the local members in consultation with Council.
c) Council may, upon the request of a sufficient number of members, set up a Chapter. Council shall also have the power to dissolve a Chapter at any time after it has been formed.
d) It shall be the duty of Council to give every assistance to Chapters.
e) Jurisdictional disputes shall be resolved by Council in consultation with the Centres and/or Chapters involved.

BY-LAW 14 Awards
a) The Society may make suitable awards with a view to recognizing scientific achievement and promoting interest in meteorology and/or oceanography among scientists and the community in general.
b) All awards shall be made by Council after receiving the recommendations of the Awards Committee.
c) A list of the awards usually made and their terms of reference as determined by Council shall be appended to these By-Laws. Changes in the terms of reference shall take effect 12 months after the date on which they were approved by Council.
d) For the purpose of determining eligibility for Society awards and prizes, the Chairmen of Local Centres and the correspondents of Chapters shall, late in December each year, provide the Corresponding Secretary with a list of speakers and the subjects of their papers which were read before the Centre or Chapter during the year, together with any nominations that they may see fit to make. The Corresponding Secretary will pass this information, together with a

list of papers and authors from national Canadian Meteorological and Oceanographic Society or Canadian Meteorological and Oceanographic Society sponsored meetings during the year, to the Awards Committee for their consideration.
c) Nominations for the Society's Awards from members and Centres will be called for by the Corresponding Secretary in an appropriate issue of *ATMOSPHERE-OCEAN* each year, with March 1 as the deadline for receipt of nominations. Nominations received by this date will be forwarded to the Awards Committee for their consideration.

BY-LAW 15 Citations
a) The Society may award citations to individuals or groups who in the opinion of Council have, in the previous year, made some outstanding contribution in helping to alleviate pollution problems, in promoting environmental improvements, or in developing environmental ethics.
b) All citations shall be made by Council after receiving the recommendations of the Citations Committee.
c) Nominations for the award of citations from members and Centres will be called for by the Corresponding Secretary in an appropriate issue of *ATMOSPHERE-OCEAN* each year, with March 1 as the deadline for receipt of nominations. Nominations received by this date will be forwarded to the Citations Committee for their consideration.

Appendix to By-Laws

CANADIAN METEOROLOGICAL AND OCEANOGRAPHIC SOCIETY AWARDS AND PRIZES

a) *President's Prize:*
A President's prize may be awarded for each calendar year to a member of the Society for an outstanding contribution in the field of meteorology and/or oceanography. All papers presented at national, local centre or chaper meetings of the Society, and subsequently published in a recognized journal, shall be eligible for the prize in the year of publication.
b) *The Dr Andrew Thomson Prize in Applied Meteorology:*
A prize in applied meteorology may be awarded for each calendar year to a member of the Society for an outstanding contribution in the field of applied meteorology.
c) *Graduate Student Prize:*
When a contribution of special merit in meteorology and/or oceanography by a graduate student comes to the notice of the Awards Committee, a special graduate student prize may be awarded.
d) *The Rube Hornstein Prize in Operational Meteorology:*
A prize known as the Rube Hornstein Prize in Operational Meteorology may be awarded for each calendar year 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.

CONSTITUTION

LA SOCIÉTÉ CANADIENNE DE MÉTÉOROLOGIE ET D'OCÉANOGRAPHIE

ARTICLE 1 – Nom

Le nom de la société est la Société canadienne de météorologie et d'océanographie – The Canadian Meteorological and Oceanographic Society.

ARTICLE 2 – But

La Société a pour but de stimuler l'intérêt pour la météorologie et l'océanographie (le terme océanographie ici inclut la limnologie).

ARTICLE 3 – Adhésion

Toute personne ou tout organisme intéressé à la météorologie ou à l'océanographie peut devenir membre de la Société.

ARTICLE 4 – Le bureau et le conseil d'administration

Le bureau d'administration de la Société se compose d'un président, d'un vice-président, d'un trésorier, d'un secrétaire-correspondant et d'un secrétaire d'assemblée. Ces personnes, avec le président sortant, les présidents des divers centres et trois conseillers élus à ce titre, constituent le conseil d'administration de la Société.

ARTICLE 5 – Amendement à la constitution

a) Pour amender la constitution, un avis écrit de motion, portant les signatures d'au moins cinq membres, doit parvenir au secrétaire-correspondant au moins huit semaines avant la date de l'assemblée générale au cours de laquelle l'amendement doit être discuté. Copie de cet avis est alors retransmise à chacun des membres par le secrétaire correspondant au moins cinq semaines avant la date de la dite assemblée.

b) Tout changement à la constitution requiert l'approbation des deux tiers des membres à l'assemblée générale.

ARTICLE 6 – Société sans but lucratif

La Société ne doit pas viser des gains financiers pour ses membres et tout profit ou autre bénéfice de la Société sera utilisé en vue de stimuler l'intérêt pour la météorologie et l'océanographie. Advenant la dissolution ou la liquidation de la Société, tous les biens restants, après paiement des dettes, seront distribués à une ou plusieurs oeuvres de charité reconnues au Canada.

RÈGLEMENTS

RÈGLEMENT 1 Amendement aux règlements

a) Pour amender les règlements, un avis écrit de motion, portant les signatures d'au moins cinq membres, doit parvenir au secrétaire-correspondant au moins huit semaines avant la date de l'assemblée générale au cours de laquelle l'amendement doit être discuté. Copie de cet avis est alors retransmise à chacun des membres par le secrétaire-correspondant au moins cinq semaines avant la date de la dite assemblée.

b) Tout changement aux règlements requiert l'approbation de la majorité relative des membres présents à l'assemblée générale.

RÈGLEMENT 2 Adhésion

a) Les candidatures pour adhésion à titre de membres de la Société sont acceptées par le conseil d'administration ou par le bureau d'administration au nom du conseil d'administration. Le conseil d'administration peut expulser tout membre pour défaut de paiement des sommes dues ou pour toute autre raison.

b) Les étudiants suivant un programme de cours à plein temps peuvent devenir membres-étudiants.

c) Les membres de soutien peuvent être des individus, des institutions, des compagnies, des firmes et des organismes désireux, pour le bien du Canada, d'encourager la Société à stimuler l'intérêt pour la météorologie, l'océanographie et leurs applications. Le membre de soutien doit verser une cotisation minimale annuelle dont le montant est fixé selon le règlement 3.

RÈGLEMENT 3 Cotisation annuelle

a) Tous les membres paient une cotisation annuelle. Le montant de cette cotisation est déterminé pour l'année à venir à l'assemblée générale annuelle.

b) Cette cotisation annuelle est exigible dès le premier janvier.

c) Tout membre dont la cotisation annuellle n'est pas acquittée avant le 30 avril ne peut plus se prévaloir des droits ni des privilèges de membre, y compris la réception des publications.

RÈGLEMENT 4 Mise en candidature, élection et durée du mandat des membres du conseil d'administration

a) Les membres du conseil d'administration sont élus pour un an. Le président et le vice-président ne peuvent occuper le même poste que pendant deux années consécutives; les autres membres du conseil d'administration ne peuvent occuper le même poste pendant plus de quatre années consécutives.

b) Avant le premier mars de chaque année, un comité de mise en candidature, désigné par le conseil d'administration, prépare une liste des candidats aux postes de conseillers et de vérificateur(s), pour l'année suivante. Au moins un candidat doit être proposé pour chacun des postes. Aucune candidature n'est présentée sans le consentement du candidat à occuper le poste s'il est élu. Le comité de mise en candidature doit tenir compte d'une juste représentation des deux champs d'intérêt de la Société.

c) Le ou avant le premier mars, le secrétaire-correspondant fait parvenir à chacun des membres de la Société (i) une liste des membres du conseil d'administration en poste, (ii) une liste des candidatures soumises par le conseil d'administration ou le comité de mise en candidature, et (iii) une copie du règlement 4(d).

d) Les déclarations de candidatures (en plus de celles proposées par le comité de mise en candidature) sont acceptées par le secrétaire d'assemblée jusqu'au dernier jour de mars, pourvu (i) que le candidat soit éligible au poste pour lequel il est présenté, (ii) que le candidat confirme sa volonté d'accepter le poste s'il est élu en contresignant l'acte de mise en candidature, et (iii) que l'acte de mise en candidature soit signé par quatre membres.

e) S'il y a plus d'un candidat à un poste, le secrétaire d'assemblée prépare un bulletin de vote, sur lequel apparaissent les noms des candidats aux postes du conseil d'administration pour l'année à venir. Ce bulletin de vote est alors expédié par le secrétaire-correspondant, le ou avant le 15 avril, à chacun des membres de la Société avec l'avis que les votes sont acceptés par le secrétaire d'assemblée jusqu'au 15 mai et que, pour le dépouillement du scrutin, ces derniers doivent parvenir au secrétaire d'assemblée avant cette date.

f) Le secrétaire d'assemblée et un scrutateur désigné par le conseil d'administration sont responsables du dépouillement du scrutin immédiatement avant l'assemblée générale annuelle.

g) Les règlements 4(a) à 4(f) inclusivement ne s'appliquent pas comme tels dans le cas des présidents des centres lesquels sont élus de façon autonome par les centres.

h) Les présidents des centres qui cumulent tout autre poste du bureau ou du conseil d'administration, ne se voient accorder qu'un seul vote aux réunions du bureau ou du conseil d'administration.

RÈGLEMENT 5 Fonctions et pouvoirs du bureau et du conseil d'administration

a) Le conseil d'administration se réunit au moins deux fois par année, à la demande du président ou de trois membres du conseil d'administration.

b) Le bureau d'administration administre la Société en conformité avec la constitution et les règlements et sous la direction du conseil d'administration.

c) Le conseil d'administration peut former des comités constitués de membres du conseil d'administration, de membres de la Société, ou d'autres personnes, avec des attributions et des pouvoirs définis par le conseil. Les comités font rapport au conseil d'administration.

d) Le conseil d'administration veille à la tenue d'une comptabilité appropriée et adéquate des fonds, des recettes et des déboursés de la Société.

e) Le conseil d'administration a le pouvoir d'investir les surplus monétaires de la Société selon les modes d'investissement qu'il juge les plus avantageux pour la Société.

f) *Fonctions du président:*
   1) Le président préside les réunions de la Société, du conseil et du bureau d'administration.
   2) Le président ne prend pas part au vote lors des délibérations d'une assemblée; toutefois, lorsqu'un vote décisif est nécessaire, il doit alors enregistrer son suffrage.

g) *Fonctions du vice-président*
   1) Le vice-président assume toutes les fonctions du président en l'absence de ce dernier.

h) *Fonctions du trésorier*
   1) Le trésorier, au nom de la Société, ouvre un compte dans une banque privilégiée (banque à charte) et tient la comptabilité régulière des recettes et des déboursés de la manière jugée satisfaisante par le conseil d'administration. Le conseil d'administration se réserve l'administration et le contrôle des fonds de la Société.
   2) Aucune somme d'argent de cinq cents dollars ($500.00) ou plus ne peut être déboursée sans une autorisation formelle préalable du bureau d'administration, inscrite au livre des procès-verbaux. Les comptes s'élevant à moins de cinq cents dollars ($500.00) peuvent être acquittés par le trésorier sous réserve d'une approbation ultérieure par le bureau d'administration.
   3) Le trésorier est responsable de la perception des cotisations, des contributions et des autres sommes dues à la Société.
   4) Le trésorier doit préparer le journal comptable de la Société pour vérification et fournir, sur demande, au(x) vérificateur(s), les livres et documents de la Société.

i) *Fonctions de secrétaire d'assemblée*
   1) Le secrétaire d'assemblée prend les notes des discussions de toutes le réunions de la Société, du conseil et du bureau d'administration et les inscrit dans les livres appropriés. Il distribue, au moins deux semaines avant la prochaine réunion, copies du procès-verbal de l'assemblée précédente.
   2) Le secrétaire d'assemblée remplit les fonctions du secrétaire-correspondant en l'absence de ce dernier.
   3) Le secrétaire d'assemblée assume toute autre fonction qu'exigent les présents règlements, le bureau ou le conseil d'administration.

j) *Fonctions de secrétaire-correspondant*
   1) Le secrétaire-correspondant est responsable de la correspondance de la Société. Il garde une liste des noms et adresses de tous les membres et veille à l'envoi des avis et publications à ces derniers.
   2) Le secrétaire-correspondant exerce les fonctions du secrétaire d'assemblée en l'absence de ce dernier.
   3) Le secrétaire-correspondant assume toute autre fonction qu'exigent les présents règlements, le bureau ou le conseil d'administration.

RÈGLEMENT 6 – Comités

a) Le président est membre à titre d'office de tous les comités.

b) Un comité de mise en candidature doit être formé selon le règlement 4.

c) Un comité d'éligibilité des membres doit être formé. Le secrétaire-correspondant est membre à titre d'office de ce comité.

d) Un comité de récompenses doit être formé. De façon à assurer une continuité, au moins un membre de ce comité doit avoir participé à un tel comité l'année précédente. Le comité est chargé de la recommandation des candidats à toutes les récompenses attribuées par la Société et examine annuellement la possibilité d'en créer de nouvelles ou de modifier les critères d'attribution des récompenses actuelles.
e) Un comité des centres et des sections doit être établi. Ce comité est présidé par le vice-président. Il encourage l'organisation et les activités scientifiques des centres et des sections.
f) Un comité de rédaction, élu par le conseil d'administration et faisant rapport au bureau d'administration, doit être formé. Normalement, chaque membre désigné participe à ce comité pour au moins deux ans. La publication officielle de la Société est la revue *ATMOSPHÈRE-OCÉAN*, dont le rédacteur en chef est élu par le conseil d'administration et est le président du comité de rédaction. Le comité examine annuellement l'avantage de publier tout autre genre de rapports scientifiques et fait des recommandations au conseil d'administration. Toutes les publications paraissent dans l'une des deux langues officielles du Canada ou dans les deux.
g) Un comité des citations doit être formé. Ce comité aura la responsabilité de recommander des candidats susceptibles de se voir décerner une citation par la Société, et il examinera chaque année la possibilité de modifier les critères utilisés pour l'attribution de ces citations.
h) Un comité scientifique doit être formé afin d'étudier les problèmes scientifiques et de leur donner suite, soit à la demande du bureau d'administration, soit sur l'initiative propre du comité. Le comité comprendra au maximum 11 membres, y compris le président et le secrétaire. Le président et le secrétaire doivent être élus parmi et par les membres du comité. Le président et le secrétaire n'occuperont pas leur poste pendant plus de 3 années consécutives et, à l'exception du président et du secrétaire, personne ne sera membre du comité pendant plus de 3 années consécutives. Les membres sont nommés par le conseil d'administration après consultation du comité scientifique. Le comité doit se réunir au moins une fois par année et doit soumettre au conseil d'administration un rapport annuel de son exercice.

RÈGLEMENT 7 – Finances
a) L'année budgétaire de la Société prend fin le 31 décembre de chaque année.
b) La comptabilité de la Société est mise à jour jusqu'à cette date et, après avoir été examinée par un (des) vérificateur(s), elle est déposée devant la prochaine assemblée générale annuelle.

RÈGLEMENT 8 – Vérificateurs
a) On nomme à chaque assemblée générale annuelle, un (plusieurs) vérificateur(s) qui demeure(nt) en post jusqu'à la prochaine assemblée générale annuelle.
b) Le rôle du (des) vérificateur(s) est d'examiner les livres de comptes de la Société, de façon à s'assurer que ces derniers sont bien tenus et qu'ils sont conformes à l'état financier de la Société.

RÈGLEMENT 9 – Collaboration
a) La Société peut collaborer avec d'autres sociétés, organismes ou agences qui ont des objectifs similaires à celui énoncé à l'article 2 de la constitution et ce, partout de par le monde.
b) En vertu du lien historique entre la *Royal Meteorological Society* et la *Société canadienne de météorologie et d'océanographie*, la Société doit maintenir les relations le plus étroites possibles avec la *Royal Meteorological Society*.

RÈGLEMENT 10 – Réunions
a) Les réunions ordinaires de la Société à l'échelle nationale ont lieu aux endroits et aux heures fixés par le conseil d'administration, dans le but de recevoir des communications, d'entendre des allocutions ou de discuter du sujets d'intérêt météorologique ou océangraphique.
b) Les affaires administratives de la Société ne sont pas discutées à une réunion ordinaire.
c) On avise, au moins un mois à l'avance, tous les membres de la Société d'une réunion ordinaire à l'échelle nationale.
d) Une assemblée générale, appelée l'assemblée générale annuelle, est tenue chaque année, au jour et à l'heure déterminés par le conseil d'administration, aux fins d'approuver le procès-verbal de l'assemblée générale annuelle précédente, de prendre connaissance des rapports du

conseil d'administration, du (des) vérificateur(s) et des scrutateurs, de fixer les montants des cotisations pour la prochaine année civile, de discuter et de prendre des décisions sur les questions concernant les affaires de la Société, de choisir un (des) vérificateur(s) pour l'année suivante et de procéder à l'investiture des administrateurs élus pour l'année suivante.

e) Le conseil d'administration a le pouvoir de convoquer une assemblée générale spéciale pour discuter toute question se rapportant aux affaires de la Société.

f) Toute démarche ou toute proposition faite par cinq membres ou plus doit être soumise à une assemblée générale, mais le conseil d'administration a le pouvoir de décider si telle démarche ou proposition doit être étudiée à une assemblée générale spéciale ou à l'assemblée générale annuelle.

g) Un avis de convocation à une assemblée générale est envoyé à tous les membres au moins un mois avant le tenue de l'assemblée. L'avis de convocation doit spécifier le sujet devant être discuté à l'assemblée.

RÈGLEMENT 11 – Quorum

a) Le quorum d'une assemblée générale est de vingt membres.

b) Le quorum de toute réunion du conseil d'administration est de quatre membres.

RÈGLEMENT 12 – Centres locaux

a) Le conseil d'administration peut, à la demande d'un nombre suffisant de membres, constituer un centre local dans le but d'organiser localement des conférences ou de discuter de sujets d'intérêt météorologique ou océangraphique. Le conseil d'administration a le pouvoir de dissoudre un centre local en tout temps après sa formation.

b) Un centre local doit avoir comme directeurs, un président, un secrétaire et un trésorier; il peut également nommer un trésorier et tout autre membre qu'il juge à propos de désigner. Chaque directeur d'une centre local doit être un membre en règle de la Société.

c) Les avis de convocation d'un centre local doivent être envoyés à tout membre qui en fait la demande.

d) Le secrétaire d'un centre local doit faire rapport au secrétaire d'assemblée de la Société sur les réunions tenues par le centre, en incluant les noms des conférenciers et le sujet de leurs communications, le 15 avril de chaque année, ou plus tôt si le conseil d'administration le demande.

e) Les centres locaux, dans l'administration de leurs affaires, se conforment aux règles établies de temps à autre par le conseil d'administration.

f) Le conseil d'administration peut, à sa discrétion, autoriser l'usage des fonds de la Société au bénéfice d'un centre local. De façon générale, toute dépense de plus de vingt dollars ($20.00) pour une réunion scientifique exige l'autorisation préalable du conseil d'administration.

g) La trésorier d'un centre local soumettra au bureau d'administration un rapport financier annuel, basé sur l'année civile, le 1er mars de chaque année.

RÈGLEMENT 13 – Sections

a) Une section est constituée d'un group d'au moins cinq membres de la Société demeurant dans une même localité, lesquels membres ne désirent pas élire un conseil local mais organiser occasionnellement des réunions scientifiques.

b) Les membres locaux d'une section désignent un correspondant en consultation avec le conseil d'administration.

c) Le conseil d'administration peut, à la demande d'un nombre suffisant de membres, organiser une section. Le conseil d'administration a aussi le pouvoir de dissoudre une section en tout temps après sa mise sur pied.

d) Il est du devoir du conseil d'adminstration de fournir toute l'aide possible aux sections.

e) Le conflits de juridiction sont tranchés par le conseil d'administration après consultation avec les centres et/ou les sections concernés.

RÈGLEMENT 14 – Prix

a) La Société peut offrir des prix intéressants en vue de reconnaître le mérite scientifique et de mousser l'intérêt envers la météorologie et l'océanographie parmi les scientifiques et le public en général.

b) Le conseil d'administration décerne chaque prix après avoir reçu les recommandations du comité de récompenses.

c) On trouve en appendice aux présents règlements, une liste des prix habituellement décernés et leurs critères d'attribution déterminés par le conseil d'administration. Les changements des critères d'attribution entrent en vigueur douze mois après la date où ils sont approuvés par le conseil d'administration.

d) Pour établir des listes d'éligibilité aux prix et aux récompenses de la Société, les présidents des centres locaux et les correspondants des sections doivent, à la fin de décembre de chaque année, fournir au secrétaire-correspondant une liste des conférenciers avec le sujet de leurs communications présentées au centre ou à la section durant l'année, de même que toute candidature qu'ils jugent bon de faire. Le secrétaire-correspondant transmet à l'attention du comité de récompenses, ces renseignements, de même qu'une liste, avec les noms d'auteurs, des communications présentées aux réunions nationales de la Société canadienne de météorologie et d'océanographie ou aux réunions parrainées par la Société.

e) Le secrétaire-correspondant fait appel aux candidatures pour les prix de la Société dans un numéro approprié d'*ATMOSPHÈRE-OCÉAN* chaque année, le premier mars étant la date limite d'acception. Les candidatures reçues au plus tard à cette date sont transmises au comité de récompenses.

RÈGLEMENT 15 – Citations

a) La Société peut décerner des citations à des individus ou à des groupes qui, à son opinion, ont apporté, dans l'année qui précède, une contribution exceptionnelle à la solution des problèmes de pollution, à l'amélioration de l'environnement, ou au développement d'une éthique écologique.

b) Toutes les citations serong attribuées par le Conseil d'administration, sur recommandation du comité des citations.

c) Le secrétaire-correspondant se chargera de recueillir les nominations des membres et des centres locaux, après en avoir fait l'annonce officielle dans la revue *ATMOSPHÈRE-OCÉAN,* chaque année; la date du 1er mars marque la fin des mises en nomination. Toutes les nominations recueillies par le secrétaire-correspondant avant cette date seront alors remises au comité des citations afin qu'il puisse les prendre en considération.

Appendice aux Règlements

PRIX ET RÉCOMPENSES DE LA SOCIÉTÉ CANADIENNE DE MÉTÉOROLOGIE ET D'OCÉANOGRAPHIE

a) *Prix du président*

Le prix du président peut être attribué, à chaque année civile, à un membre de la Société pour un travail jugé exceptionnel en météorologie ou en océanographie. Toutes les communications présentées aux assemblées nationales ou aux réunions des centres locaux ou des sections de la Société et publiées subséquemment dans un journal scientifique reconnu rendent leurs auteurs éligibles à ce prix dans l'année même de leur publication.

b) *Prix du Dr Andrew Thomson en météorologie appliquée*

Le prix de météorologie appliquée peut être décerné, à chaque année civile, à un membre de la Société pour un travail exceptionnel dans le domaine de la météorologie appliquée.

c) *Prix aux étudiants gradués*

Quand un travail d'une qualité exceptionnelle en météorologie ou en océanographie est porté à l'attention du comité de récompenses, un prix spécial pour étudiant gradué peut être décerné à l'auteur.

d) *Prix de météorologie opérationnelle Rube Hornstein*

Le prix de météorologie opérationnelle Rube Hornstein peut être décerné, à chaque année civile, à un individu pour un travail exceptionnel dans l'exploitation des services météorologiques, au sens large du terme, en excluant cependant comme critère d'évaluation les publications scientifiques, à moins que les résultats de ces recherches ne soient déjà utilisés pour améliorer la performance au jour le jour des services d'exploitation. Le travail pour lequel le prix est donné peut avoir été effectué durant plusieurs années précédant l'année en cours ou encore, pour un accomplissement exceptionnel.

NOTES

MEMBERSHIP APPLICATION FORM

(Please write in Block Letters)

General or Student Member

SURNAME .....

GIVEN NAMES .....

PERMANENT ADDRESS .....

.....

TITLE, RANK, DECORATIONS, DEGREES OR PROFESSIONAL QUALIFICATIONS .....

OCCUPATION .....
(for record purposes only; if student, indicate university and year studies will be completed)

Sustaining Member

NAME OR AGENCY .....

BUSINESS ADDRESS .....

.....

Membership Status Required

Please enroll me as a .....member of the Canadian Meteorological and Oceanographic Society effective January 1, 19....., to receive all publications issued by the Society from that date. I attach a cheque for $..... payable to the *Canadian Meteorological and Oceanographic Society*.

Signature of Applicant

Mail completed application forms to:
Corresponding Secretary
Canadian Meteorological and
Oceanographic Society
c/o Dept. of Geography
Simon Fraser University
Burnaby, B.C. V5A 1S6

CMOS dues for 1978:

General Member	$25.00	
Student Member	$ 5.00	
Sustaining Member	$60.00	(min.)

FORMULE D'ADHÉSION

(Lettres moulées, s.v.p.)

Membre ou Membre-étudiant

NOM.....

PRÉNOM(S) .....

ADRESSE .....

.....

TITRE, RANG, DÉCORATIONS, DEGRÉS OU QUALIFICATION PROFESSIONNELLE .....

.....

OCCUPATION.....

(Pour registres seulement. L'étudiant doit inscrire le nom de son université et la date où il finira ses études)

Membre de soutien

NOM OU RAISON SOCIALE .....

ADRESSE .....

.....

Type de Membre

J'aimerais devenir membre.....de la Société canadienne de météorologie et d'océanographie à compter du 1er janvier 19....., et recevoir toutes les publications de la Société par la suite. Vous trouverez ci-inclus un chèque de $..... libellé à *La Société canadienne de météorologie et d'océanographie*.

Signature du candidat

Envoyer cette formule d'adhésion au:

Secrétaire
La Société canadienne de
météorologie et d'océanographie
a/s Département de Géographie
Université Simon Fraser
Burnaby, Colombie-Britannique
V5A 1S6

Cotisation annuelle, pour 1978:

Membre	$25.00
Membre étudiant	$ 5.00
Membre de soutien	$60.00 (min.)

INFORMATION FOR AUTHORS

Editorial Policy. *ATMOSPHERE-OCEAN* is a medium for the publication of the results of original research, survey articles, essays, book reviews, notes and correspondence in all fields of the atmospheric and oceanographic sciences. It is published quarterly by the Society with the aid of a grant from the Canadian Government. Articles may be in either English or French. Contributors need not be members of the Society nor need they be Canadian; foreign contributions are welcomed. All contributions will be subject to a critical review before acceptance. Because of space limitations articles should not normally exceed 16 printed pages.

Manuscripts should be submitted to: *ATMOSPHERE-OCEAN*, Dept. of Geography, The University of British Columbia, 2075 Wesbrook Mall, Vancouver, British Columbia, V6T 1W5. Three copies should be submitted, typewritten with double spacing and wide margins. Headings and sub-headings should be clearly designated. A concise, relevant and substantial abstract in both English and French is normally required.

Tables should be prepared on separate sheets, each with concise headings.

Figures should be provided in the form of three copies of an original which should be retained by the author for later revision if required. A list of legends should be typed separately. Labelling should be made in generous size so that characters after reduction are easy to read. Line drawings should be drafted with India ink at least twice the final size on white paper or tracing cloth. Photographs (halftones) should be glossy prints at least twice the final size.

Units. The International System (SI) of metric units is preferred. Units should be abbreviated only if accompanied by numerals, e.g. "10 m" but "several metres".

Footnotes to the text should be avoided.

Literature citations should be indicated in the text by author and date. The list of references should be arranged alphabetically by author, and chronologically for each author, if necessary.

RENSEIGNEMENTS POUR LES AUTEURS

Politique éditoriale. *ATMOSPHÈRE-OCÉAN* est un organe de publication de résultats de recherche originale, d'articles sommaires, d'essais, de critiques et de courtes notes et de lettres dans tous les domaines des sciences de l'atmosphère et de l'océan. Il est publié par la Société à l'aide d'une subvention accordée par le gouvernement canadien. Les articles peuvent être en anglais ou en français. Il n'est pas nécessaire que les auteurs soient membres de la société; les contributions étrangères sont les bienvenues. À cause des limitations d'espace les articles ne doivent pas dépasser 16 pages dans le format final. Tout article sera soumis à un critique indépendant avant d'être accepté.

Les manuscrits doivent être envoyés à: *ATMOSPHÈRE-OCÉAN*, Dép. de géographie, Université de la Columbie-Britannique, 2075 Wesbrook Mall, Vancouver, La Columbie-Britannique, V6T 1W5. Ils doivent être soumis en trois exemplaires dactylographiés à doubles interlignes avec de larges marges. Les titres et sous-titres doivent être clairement indiqués. Chaque article doit comporter un résumé qui soit concis, pertinent et substantiel; ce résumé sera normalement soumis sous versions françaises et anglaises.

Les tableaux doivent être préparés et présentés séparément accompagnés d'un titre concis et d'un numéro.

Les graphiques doivent être présentés en trois copies dont les originaux devraient être conservés par l'auteur au cas où ils seraient nécessaire de les reviser. Une liste des légendes des graphiques doit être dactylographiée séparément. L'étiquettage doit être de grand format de façon à ce qu'il soit facilement lisible après réduction du format. Le traçage des lignes doit s'effectuer au moyen d'encre de chine en doublant, au moins, le format final, le tout sur papier blanc ou sur papier à calquer et identifié adéquatement. Les photographies (demi-teintes) devraient être présentées sur épreuves glacées au double du format final.

Les unités. Le Système International (SI) d'unités métriques est préférable. Les unités devraient être abrégées seulement lorsqu'elles sont accompagnées de nombres, ex: "10m," mais "plusieurs mètres".

Les notes de renvoie au texte doivent être évitées.

Les citations littéraires doivent être indiquées dans le texte selon l'auteur et la date. La liste des références doit être présentée dans l'ordre alphabétique, par auteur et, si nécessaire, dans l'ordre chronologique pour chaque auteur.

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