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CMOS Bulletin SCMO
"at the service of its members
au service de ses membres"

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Cover page: Sometime, meteorological conditions have catastrophic effects which in turn make our behaviour unusual. Here the sudden flood caused by extreme rainfall on August 8 in Ottawa required the rescue of the passengers from this OC Transpo bus. You may read more details on ten of such catastrophic events for the year 1996 (see page 1) as compiled by Atmospheric Environment Service. Photograph reproduced by authorization of the Ottawa Citizen (9 August 1996, first page).

Page couverture: Les conditions météorologiques extrêmes ont souvent des effets catastrophiques qui nous font adopter des comportements inusités. Ici la crue soudaine des eaux à cause des pluies diluviennes du 8 août à Ottawa a obligé le sauvetage des passagers de l'autobus de OC Transpo. Vous pouvez lire des détails additionnels sur dix de ces événements marquants pour l'année 1996 (voir page 3) tels que compilés par le Service de l'Environnement Atmosphérique. Photographie reproduite avec la permission du Ottawa Citizen (Édition du 9 août 1996, page frontispice).

Next Issue - Prochain numéro

The next issue of the ***Bulletin 25 (2)***, April 1997, will go to press by mid-April. We need your contributions, short articles, notes, presentations, chronicles, etc., by early April. Don't miss your chance! Send your old photographs with a legend. They could be useful to us! You never know!

Le prochain numéro du ***Bulletin 25 (2)***, Avril 1997 sera mis sous presse vers la mi-avril. Vos contributions sont les bienvenues. Veuillez bien me les faire parvenir d'ici le début du mois d'avril. Ne manquez surtout pas votre coup! Envoyez-nous vos photographies. Elles pourraient nous être utiles! Vous seriez vous-même surpris!

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Adresses électroniques de la SCMO

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Articles

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The Top Ten Weather Stories of 1996

by David Phillips
AES / Environment Canada

In 1996, Canadians suffered through some of the most extreme and destructive weather to ever hit the country. For most of the year, the weather either froze, buried, soaked, buffeted or frightened us. No part of the nation seemed to escape the wrath of the weather gods in 1996.

It was truly the stuff of a Hollywood catastrophe film - weather bombs on Vancouver Island, hailers on the Prairies, deluges of biblical proportion in Québec. Three drive-in theatres were heavily damaged by tornadoes, and yes, they were about to show "Twister."

The outbursts of extreme and freakish weather made the year, by far and away, the most expensive for Canada's property and casualty insurers. Most of the financial fallout stemmed from flooding in Québec's Saguenay region – Canada's first billion dollar catastrophe – but multi-million dollar hailstorms in Winnipeg and Calgary; flash flooding in Ottawa and Montreal; and severe thunderstorms in Ontario, Saskatchewan and Alberta also took their toll.

Total property damage will likely exceed $1.5 billion when final figures are tallied. Indirect costs and losses from revenue shortfall, cancelled events, missed opportunities and slowed business will probably be a $3 billion hit to the Canadian economy.

Remarkably though, the number of personal injuries and fatalities linked to weather incidents could have been much higher. Unofficial numbers point to fewer than 25 weather-related deaths (excluding deaths from road accidents and hypothermia) - 10 from the storms in the Saguenay and six from lightning in separate incidents. Timely and accurate weather warnings and advisories issued by Environment Canada have helped reduce the number of casualties and damage from natural hazards.

Here are the top ten weather stories of 1996, ranked according to total estimated losses:

#1 The Saguenay Flood

By far the worst catastrophe of the year, and Canada's first billion dollar natural disaster, was the flooding and mud slides in Québec's Saguenay River valley in mid-July. The storm produced the largest ever overland deluge in Canada this century - an amount equivalent to a two-month flow over Niagara Falls - triggering a surge of water, rocks, trees and mud that killed ten people and forced 12,000 residents to flee their homes. It was the deadliest flood since Hurricane Hazel in Toronto in 1954.

The scale of the tragedy was staggering. Many of the region's roads and bridges and delivery systems for power and water simply disappeared. To the insurance industry it was Canada's worst-ever weather disaster in economic losses. By including insured and uninsured losses and indirect costs to the economy, total losses are sure to exceed $1.5 billion.

#2 High Energy Costs

In much of Canada, 1996 featured one of the longest and most vicious winters in recent memory. Three straight weeks of frigid weather gripped almost the entire country in January making it colder in most cities in western and central Canada than it was at the North Pole. To keep up with the cold, utility companies pumped out power in record amounts from British Columbia to New Brunswick. Canadians paid an additional $500 million to keep their dwellings as comfortable as in winter 1995.

#3 Costly Prairie Hailstorms

In July, hailstones the size of fists bombarded Winnipeg and Calgary, racking up close to $300 million in property losses. In Manitoba, more than half the losses were for auto damage, making it the worst single disaster claim against the Manitoba Public Insurance Corporation in its 25-year history. At least a third of the cars damaged had to be written off. In Calgary, hail and flooding rains knocked out the city's 911 service and swept away cars.

#4 Wet and Cold Weather Reduces Crop Yields

Unfortunately for western farmers, prospects in early September for one of the most bountiful grain crops in Canadian history didn't exactly materialize. Fall temperatures across the west were much-below normal (the Prairies had their second coldest fall in half a century) and precipitation was much-above normal (the 7th wettest fall in about 50 years). Cool wet weather during the harvest of western red spring wheat led to a severe drop in its grade distribution, denying farmers an additional $180 million.

In southern Ontario winter wheat production was severely affected by the wet cool weather throughout the growing season. Record rainfall resulted in the worst outbreak of blight fungus ever seen in Ontario. According to Agriculture Canada, the excessive moisture and disease not only reduced yields, but it also reduced the quality of most of the crop to feed, since affected grain cannot be used for human consumption. The loss was estimated to be about $90 million.

#5 Deep Winter Snows

So much snow fell early in the winter that before 1996 even started, many cities in western and central Canada had all but exhausted their snow removal budgets. Hardest hit was the central Ontario snowbelt from Barrie to Sault Ste. Marie, where on several occasions, cars disappeared in snow drifts, service centres became refugee camps, roofs collapsed, and schools closed up.

Insurance claims paid in the first three months of 1996 were 11% higher than in 1995 when the weather was much less severe. Total insured losses owing to the weather were estimated at $165 million.

#6 Slow Spring Affects Retail Sales

For most of Canada, the winter season gave way to the monsoon season. Unrelenting rains and dreary weather plagued the country from April to June. Garden centres and golf courses were virtually empty during the spring. Retailers blamed the persistent cool and rainy weather for a 30% drop in the sales of weather-sensitive goods and services, such as pools, air conditioners and warm season apparel. Sales of general merchandise in April and June were down by $100 million over the previous year's numbers.

#7 Flash Flooding in Ottawa and Montréal

The third major storm in less than two weeks, and the worst on record, hit Ottawa-Hull in early August with a deluge of 100 to 150 mm of rain in 90 minutes. Total insured property damage exceeded $20 million, not including the cost of repairs to damaged sewers and roads. Between November 7 and 9, thirty hours of steady rains drenched parts of Montréal and southwestern Québec. The rains washed out sections of highway, collapsed bridges, derailed trains, and undermined road and rail beds. Damage estimates put the event at $50 million and climbing.

#8 Severe Thunderstorms and Tornadoes

The snow had hardly melted in southern Ontario when the season's first tornadoes tore through regions east of Lake Huron in April. The twisters injured two people and caused total property losses, much of it uninsured, approaching $8 million.

Severe thunderstorms on July 4 spawned at least eight tornadoes in Saskatchewan. Winds of 140 km/h and hail the size of golf balls produced $15 million in property damage. Two weeks later seven tornadoes touched down in Alberta, trashing trailers and flattening granaries to the tune of $10 million. Near Stoney Plain, more than 100 mm of rain fell in severe thunderstorms backing up sewers and flooding basements for another $10 million in losses. Tornado-related damage in Canada easily exceeded $50 million.

#9 Spring Flooding

Significant flooding occurred in several communities across Canada during much of the spring and early summer. The Okanagan experienced its worst flooding in six years. The Red River inundated farm fields, roads and major highways leading authorities to declare a provincial flood disaster for the first time since 1979. In Winnipeg, the costs of filling 336,000 sandbags and protecting pumping stations alone cost $1.2 million. In Timmins, Ontario the Mattagami River overflowed its banks in the worst flooding in 36 years. Although damage figures for spring flooding across Canada are still being tallied, final figures are expected to range between $20 and $50 million.

#10 Hurricanes and Weather Bombs

Four hurricane-force storms struck Eastern Canada in 1996: Bertha, Edouard, Fran and Hortense. It was the second consecutive season with above-average hurricane formation in the North Atlantic. In 1996 there were 13 named storms of which 9 were hurricanes, including six intense ones, compared to a normal of 9 storms, 6 hurricanes and 2 intense ones.

Hortense, which swept east of Halifax and traversed western Newfoundland on September 14, was the first hurricane to achieve landfall in Canada in 21 years. Winds topped 161 km/h on Cape Breton Island, felling trees, lifting roofs and blowing out windows. Total property losses approached $5 million.

Described as the worst storm since Typhoon Freda in 1962, a weather "bomb" struck Vancouver Island on October 17, causing massive power outages while felling trees, setting adrift 50 pleasure boats and ripping apart docks. A weather "bomb" is a storm that intensifies very quickly and moves faster than a hurricane. This storm packed winds as strong as 161 km/h and produced waves as high as 30 metres. Final cost figures are not available yet, but the insured property damages could exceed $1 million.

Putting it All in Perspective

So are the number of weather-related disasters in Canada and around the world increasing? According to the Insurance Bureau of Canada, ever since the Edmonton tornado of 1987, the number of multi-million dollar losses from weather disasters has been on the rise in Canada. Around the world, insurers have witnessed, over the last 20 years, a four-fold increase in the number of weather catastrophes. More worrisome, costs from natural disasters have risen ten-fold during the same period. Before 1987 there was not a single natural disaster with damages exceeding $1 billion anywhere in the world, but since then there have been at least 18 such disasters.

While the outbursts of extreme and freakish weather were interesting for many climatologists in Canada, they weren't generally surprised by the unusual weather patterns. By its very nature, weather is quite chaotic and turbulent, and extremes, especially in Canada, are a normal feature of the climate. Climatologists are, however, becoming increasingly concerned that the volatile weather in 1996 might be a dry run of the extreme conditions we might expect from a warming climate.

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Palmarès des dix événements météorologiques les plus marquants de 1996

par David Phillips
SEA / Environnement Canada

En 1996, la population canadienne a connu les conditions météorologiques les plus exceptionnelles et les plus dévastatrices à s'abattre sur le pays. Pendant la plus grande partie de l'année, la température nous a gelés, la neige nous a envahis, la pluie nous a mouillés, le vent nous a secoués ou le temps nous a fait peur. Aucun coin du pays n'a semblé échapper aux furies du climat cette année.

Il y a eu tous les ingrédients pour faire un film de catastrophes digne de Hollywood: emportements de la météo sur l'île de Vancouver, averses de grêle dans les Prairies et déluges aux proportions bibliques au Québec. Trois ciné-parcs ont été lourdement endommagés par des tornades au moment où le film *Tornade* était à l'affiche.

La série d'événements météorologiques exceptionnels et insolites en 1996 a été de loin la plus coûteuse pour les assureurs de biens et les assureurs contre les risques divers. La majorité des pertes financières est attribuable aux inondations de la région du Saguenay au Québec (la première catastrophe dont les dégâts atteignent le milliard de dollars au Canada), mais il ne faut pas oublier les averses de grêle à Winnipeg et à Calgary (plusieurs millions de dollars), les crues soudaines à Ottawa et à Montréal, et les violents orages en Ontario, en Saskatchewan et en Alberta.

Les dommages matériels dépasseront certainement le milliard et demi de dollars une fois les derniers chiffres compilés. Les coûts indirects et autres pertes liés aux manques à gagner, aux activités annulées, aux occasions ratées et au ralentissement des affaires porteront sans doute un coup de trois milliards de dollars à l'économie canadienne.

En fait, ces incidents météorologiques auraient pu blesser ou tuer beaucoup plus de personnes. Selon certaines statistiques officieuses, ils auraient causé moins de 25 décès (sans compter les accidents de la route et les décès causés par l'hypothermie), dont dix à la suite des orages au Saguenay et six par la foudre. Les avertissements météorologiques précis et opportuns émis par Environnement Canada ont aidé à réduire le nombre d'accidents et les dommages causés par les catastrophes naturelles.

Voici les dix événements météorologiques les plus marquants de 1996 (classés selon les pertes estimées) :

N° 1 Inondations au Saguenay

De loin l'événement le plus catastrophique de l'année, l'inondation et les glissements boueux de la vallée du Saguenay au Québec à la mi-juillet ont constitué la première catastrophe naturelle qui a coûté un milliard de dollars au Canada. La tempête a causé le plus important déluge du siècle au Canada, avec un écoulement d'eau équivalant à celui des Chutes Niagara durant deux mois. Ce déferlement d'eau, de roches, d'arbres et de boue a tué dix personnes et forcé l'évacuation de 12 000 résidents. Il s'agit de la catastrophe la plus meurtrière depuis l'ouragan Hazel à Toronto, en 1954.

La tragédie a pris des proportions renversantes. Bien des routes et des ponts de la région ont été détruits, de même que les mécanismes de distribution de l'électricité et de l'eau. Pour l'industrie des assurances, cette catastrophe a été la pire en terme de pertes économiques au pays. Si l'on tient compte des pertes assurées et non assurées ainsi que des coûts indirects liés à l'économie, on dépassera assurément le milliard et demi de dollars.

N° 2 Coûts énergétiques élevés

De mémoire, l'hiver 1996 a été un des plus longs et des plus froids dans la plupart des régions du Canada. Trois semaines consécutives de froids intenses ont sévi dans presque tout le pays en janvier, faisant de la plupart des villes de l'ouest et du centre du pays des endroits plus froids que le pôle nord. Pour combattre le froid, les services publics ont fourni des quantités records d'énergie, de la Colombie-Britannique au Nouveau-Brunswick. La population canadienne a déboursé 500 millions de dollars de plus qu'en 1995 pour garder son logement au chaud.

N° 3 Averses de grêle coûteuses dans les Prairies

En juillet, des grêlons de la taille d'un poing ont bombardé Winnipeg et Calgary, causant près de 300 millions de dollars de dommages. Au Manitoba, plus de la moitié des pertes étaient liées à des dégâts causés aux voitures. Cette catastrophe a entraîné un nombre record de réclamations en 25 ans pour la Société d'assurance publique du Manitoba. Au moins le tiers des voitures endommagées ont dû être déclarées pertes totales. À Calgary, la grêle et les pluies diluviennes ont débranché le service 911 de la ville et balayé des voitures.

N° 4 Le temps froid et pluvieux diminue le rendement des cultures

Malheureusement pour les fermiers de l'Ouest, les prévisions du début de septembre selon lesquelles la récolte de grains allait être une des plus abondantes de l'histoire canadienne ne se sont pas concrétisées. Les températures automnales de tout l'Ouest ont été bien au-dessous des normales (les Prairies ont connu leur deuxième automne le plus froid depuis un demi-siècle) et les précipitations ont été largement en dessus (le septième automne le plus pluvieux des cinquante dernières années). Le temps froid et pluvieux durant la récolte de blé roux de printemps dans l'Ouest a beaucoup abaissé le classement de cette céréale, privant encore les fermiers de 180 millions de dollars.

Dans le sud de l'Ontario, la production de blé d'hiver a été grandement perturbée par le temps froid et pluvieux tout au long de la saison de croissance. Des précipitations records ont causé la pire épidémie de rouille jamais connue en Ontario. Selon Agriculture Canada, l'humidité anormale et la maladie ont non seulement diminué le rendement des récoltes, mais aussi la qualité des céréales, puisque les grains affectés ne peuvent servir à l'alimentation humaine. On estime que les pertes se sont élevées à 90 millions de dollars.

N° 5 Neige abondante

Une telle quantité de neige est tombée au début de l'hiver qu'avant même l'arrivée de 1996 bien des villes de l'Ouest et du centre du Canada avaient déjà épuisé leur budget de déneigement. La région la plus touchée a été celle du centre de l'Ontario, depuis Barrie jusqu'à Sault-Sainte-Marie; à maintes reprises, des voitures ont disparu sous la neige, des centres de dépannage sont devenus des refuges, des toits se sont effondrés et des écoles ont été fermées.

Dans les trois premiers mois de 1996, les compagnies d'assurances ont accordé 11 % de plus de remboursements qu'en 1995 parce que la température a été beaucoup moins clémente. On estime que les pertes totales attribuables à ces conditions météorologiques se sont élevées à 165 millions de dollars.

N° 6 Un printemps tardif freine les ventes au détail

Dans une grande partie du Canada, l'hiver a fait place à la mousson. D'avril à juin, le Canada a connu des pluies incessantes et un printemps morne. Les centres de jardinage et les terrains de golf ont presque été déserts au printemps. Les détaillants ont blâmé le froid tenace et la pluie pour la baisse de 30 % de leurs ventes de biens et services tributaires de la température, tels que les piscines, les appareils de climatisation et les vêtements d'été. D'avril à juin, les ventes d'articles d'usage courant étaient en baisse de 100 millions de dollars par rapport à 1995.

N° 7 Crues soudaines à Ottawa et à Montréal

La troisième grande tempête en moins de deux semaines, et la pire jamais connue, s'est abattue sur Ottawa-Hull au début d'août et a amené de 100 à 150 mm d'eau en 90 minutes. Les dommages ont dépassé les 20 millions de dollars, sans compter les réparations des égouts et des routes. Du 7 au 9 novembre, trente heures de pluies continues ont délavé une partie de Montréal et du sud-ouest du Québec. Elles ont emporté des parties d'autoroutes et des ponts, ont fait dérailler des trains et ont endommagé des routes et des voies de chemin de fer. On estime que les dommages s'élèvent à 50 millions de dollars, et ce chiffre continue à augmenter.

N° 8 Orages violents et tornades

La neige avait à peine fondu dans le sud de l'Ontario que le première tornade s'abattait sur les régions à l'est du lac Huron en avril. Elles ont blessé deux personnes et ont causé des dommages, dont la majorité n'étaient pas assurés, de près de huit millions de dollars.

Le 4 juillet, des orages violents ont fait place à au moins huit tornades en Saskatchewan. Des vents de 140 km/h et des grêlons de la taille d'une balle de golfe ont causé 15 millions de dollars de dégâts. Deux semaines plus tard, sept tornades ont dévasté l'Alberta, démolissant des roulottes et écrasant des greniers à céréales, entraînant des pertes de dix millions de dollars. Près de Stoney Plain, plus de 100 mm de pluie sont tombés au cours d'un violent orage qui a fait refouler les égouts et qui a inondé des sous-sols; encore dix millions de dollars de dommages. Les dégâts causés par des tornades au Canada dépassent largement les 50 millions de dollars.

N° 9 Inondations printanières

D'importantes inondations ont eu lieu à divers endroits au Canada, surtout au printemps et au début de l'été. La vallée de l'Okanagan a connu ses pires inondations en six ans. La rivière Rouge a inondé des champs, des routes et des autoroutes, ce qui a forcé les autorités à déclarer un sinistre provincial causé par les inondations pour la

première fois depuis 1979. À Winnipeg, le remplissage de 336 000 sacs de sable et la protection des stations de pompage ont coûté 1,2 million de dollars. À Timmins (Ontario), la rivière Mattagami a causé les pires inondations en 36 ans. Même si on continue de compiler les statistiques sur les inondations à l'échelle du pays, on estime que les dommages s'élèveront entre 20 et 50 millions de dollars.

N° 10 Ouragans et conditions météorologiques exceptionnelles

Quatre tempêtes-ouragans se sont abattus sur l'est de l'Ontario en 1996 : Bertha, Edouard, Fran et Hortense. Il s'agit de la seconde saison où le nombre d'ouragans dépasse la moyenne en Atlantique nord. En 1996, trois tempêtes ont reçu un nom, dont neuf ouragans (six d'entre eux étaient violents), par opposition à neuf tempêtes d'habitude (y compris six ouragans, dont deux violents).

Hortense, qui est passé à l'est d'Halifax et a traversé l'ouest de Terre-Neuve le 14 septembre, a été le premier ouragan à arriver au Canada en 21 ans. Des vents ont atteint 161 km/h sur l'île du Cap-Breton, des arbres sont tombés, des toits ont été emportés et des fenêtres ont volé en éclats. Le total des dommages s'est élevé à près de cinq millions de dollars.

Décrite comme la pire tempête depuis le typhon Freda en 1962, une "bombe" météorologique a éclaté sur l'île de Vancouver le 17 octobre, causant d'importantes pannes de courant, déracinant des arbres, menant 50 bateaux de plaisance à la dérive et détruisant des quais. Une "bombe" météorologique est une tempête qui s'intensifie très rapidement et qui se déplace plus vite qu'un ouragan. Cette tempête a produit des vents de 161 km/h et des vagues de 30 m de haut. Même si le total des coûts n'est pas encore connu, les biens matériels pourraient avoir subi des dégâts évalués à un million de dollars.

Perspective d'ensemble...

Le nombre de catastrophes naturelles au Canada et dans le monde entier est-il à la hausse? Selon le Bureau d'assurance du Canada, depuis la tornade d'Edmonton en 1987, le nombre de désastres causant des millions de dollars de dommages augmente au pays. Dans le monde, les assureurs ont observé que le nombre de catastrophes a quadruplé depuis vingt ans. Il est encore plus inquiétant de constater que les coûts des désastres naturels ont été dix fois plus importants au cours de la même période. Avant 1987, aucune catastrophe naturelle n'a causé plus d'un milliard de dollars de dommages où que ce soit dans le monde, mais depuis, il y a eu au moins 18 événements de la sorte.

Bien que nombre d'entre eux aient trouvé intéressante cette série d'événements météorologiques exceptionnels et insolites au Canada, les climatologues ont en général été étonnés par la configuration du temps inhabituelle. Le temps est de nature plutôt changeante et turbulente, et les températures extrêmes, particulièrement au Canada, sont une des caractéristiques normales du climat. Toutefois, les climatologues croient que les conditions météorologiques explosives que nous avons connues en 1996 ne sont qu'un aperçu de ce qui nous attend à cause du réchauffement de la planète.

Pour de plus amples renseignements, prière de communiquer avec:

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WEATHERWATCH '96: The Business of Climate

Meteorological Society of New Zealand Symposium 1996
Auckland, New Zealand, Nov. 18-21, 1996

by Richard Berry[1]

General Impressions

The New Zealand Meteorological Society was formed 17 years ago and currently has about 300 members. The President is Dr. Jim Salinger (New Zealand Institute for Water and Atmospheric Research - NIWA) who will leave this office in 3 months. The Society's annual symposium was held at the Tamaki campus of the University of Auckland. The theme of the symposium was the Business of Climate and attracted participants from Canada, Australia, Brunei, and Switzerland as well as New Zealand.

The range of presentations was diverse, from current state of the art scientific presentations on the prediction of climate to descriptive expositions by NZ business interests on how climate and weather impact on their enterprises. In general, I would describe the presentations as:

- low key and friendly;
- pitched to help the listener understand, not to impress;
- back-to-basics of synoptic meteorology blended with the insight provided by newer model approaches.

I found it particularly valuable to have users involved, especially those from the farming, insurance, and marine transportation communities. With few exceptions the presentations all had an end-user focus that made the need for and impacts of climate/weather very immediate.

Summary of Proceedings

Over the four days of presentations it became very clear that the business of climate is very much about risk management. It is a factor whether you are growing kiwi fruit, planning hydroelectric supplies, or determining insured loss exposure. The skill of the NZ MetService at predictions beyond several weeks is marginal and does not yet factor into large scale, long term business strategies. Statistical analysis of past climate information is still the tool of preference for most customers.

The impact of the El Nino/La Nina on the climate and weather fluctuations in NZ is so large that useful longer term forecasts for the southern hemisphere will depend to a large extent on the ability to understand and predict these phenomena. The work on climate prediction in NIWA and other organizations in NZ that was presented at this conference focused on the diagnostic study of what happens when these southern oscillations occur and less on prediction of the phenomena.

From a customer perspective the needs fell into two general categories - can weather and climate help me determine what business I want to be in, and once I've decided, can weather and climate information make me more competitive. In the largely agricultural economy of NZ, it was clear that the answer to both these questions was yes, but the current products are only marginally useful for decision making beyond one month.

At the close of four days of presentations my parting thoughts were that climate prediction is still basically an experiment and we in the business must be careful to separate the theory and practice from the on-the-ground reality of impacts on the end users.

Notable User / Client Based Presentations

The drought of '92 in the North Island made it clear that the forecast and response to the forecast are equally important. We must also separate the science of weather and climate forecasting from reality that the end user lives with. Politics, weather and uncertainty are a potent brew. Decisions were made after the drought that are still controversial, including the diversion of waters from the Waikato river to meet the needs of Auckland.

Ferry service is subject to weather in many ways - wind/waves, fog/precipitation are most critical. Some water cruising events are booked a year in advance. If they are cancelled then lead time becomes critical. Customers blame the ferry operator for schedule problems even though it's weather-related. Wrong forecasts (of either good or bad weather) affect business, and timing of weather events is critical. Fullers Ferries of NZ have started training sales and land-based staff on weather impacts to improve customer relations. Clear linkage was made between forecasts available at 6:00 pm and the next day's bookings - people make decisions and don't get updates the next day to revise their thinking.

The consuming public in NZ is becoming more meteorologically literate due to the use of Metphone (up to 20,000 calls per day on an episodic basis), better packages for radio and TV, exposure to Special Weather Bulletins, and a high level of personal & corporate involvement. This in turn is leading to more client awareness of forecast accuracy. Incentives identified to produce more accurate forecasts included:

- commercial customers are paying the real costs for information and providers are vulnerable if it is incorrect;
- in competitive markets you must be able to show your product is better - perception of incorrect forecasts will affect future sales;
- you must be able to show previous investments in equipment, etc., have had measurable payoff.

Almost 75% of NZ electricity comes from hydroelectric sources but there is no major water reserve to draw upon - only 10% of the supply needed is in storage so water management is critical. Being able to model and predict inflow rates to hydro catchments is essential to allow thermal offsets to be used efficiently and effectively. The basic objective is to reduce the uncertainty over the period from hours to five years. Inflow uncertainty peaks at one month. Since the North Island drought of '92 the Electricity Corporation of NZ has moved from 1/20 risk levels to 1/60. The lack of flow control also leads to concern with floods. The climate variability linkage to floods/seasonal snow storage is a factor on these time scales. Volcanic activity is also a factor on 20 mo. delay period. The best predictors for inflow are still those based on analyses of past hydrological and climatological records.

Notable Science Focused Presentations

NIWA uses a non-hydrostatic model called the Regional Atmospheric Modelling System (RAMS). It seemed to me to be built along the lines of the MCC used at the Canadian Meteorological Centre but runs on workstation type equipment. It is used mostly for diagnostic purposes and draws its initial/boundary data from larger scale

model outputs.

The growing demand for pilots, especially in the Asia/Pacific area has attracted the attention of one NZ university (Masi) who are looking at opportunities. The particular presentation focused on identifying the most suitable airfields for the training of pilots based on stated minimum weather criteria for operations. The approach was basically a contingency-table type analysis coupled with old fashioned common sense.

NZ is an agricultural economy. Leaf wetness has been shown to have a major impact on plant disease epidemics. Agricultural researchers are integrating hardware and software systems to provide farmers with advice on susceptibility of crops. The approach is based on measured leaf wetness and climate data from surrounding sites. An electrified coil around a plastic cylindrical centre has demonstrated better results than flat plate leaf wetness indicators.

NIWA began climate forecasting on a monthly basis after the water shortages of '92. The conclusion was that current climate predictions show some skill over climatology, but that basically we don't have a viable product yet for decision-making beyond 5-10 days. Southern oscillation, SST/persistence appear to be useful predictors for NZ.

Mary Voice and Peter Bernstein from Australia presented a very good summary of statistical techniques for climate prediction. Ensemble forecasting shows some skill but the variation inside the ensemble is huge and begs the question of our real understanding of the problem. Climate prediction is still an experiment and users in Australia are very cautious about using this information to make significant decisions.

Points of Interest

IPCC climate change scenarios (A to F) are being used as basis for serious research. MetService gives awards to press-media users of their weather. These are presented during the dinner which is part of the annual meeting of the Meteorological Society. This is brilliant PR. Those receiving the awards were clearly proud and you can bet they are going to keep buying MetService products. Many people make decisions based on weather information from a day before their activity and don't get updates. Checking for the most recent weather information is a message that needs to be promoted continuously. I recognize the problems with the way climate statistics are archived, but we need to move away from monthly anomalies and focus instead on conditions over the next several weeks where we can rely more on patterns and persistence. If this can be coupled with the notion of regional scale variations then maybe we can take the next step and focus on client-sensitive conditions.

Some people living in New Zealand

John Hay (ex-UBC), Geoff Austin (ex-McGill), Tom Steiner (retired, ex-McGill) and John Maunder (retired), all said to "*say Hello to their friends and colleagues in Canada*". Done.

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CMOS at the 30th Anniversary of the Korean Society of Oceanography Seoul, Korea October 29th to November 4th 1996

by Michel Béland, Director
Centre de recherche en calcul appliqué
Outgoing President of CMOS, 1996-97

On the occasion of its 30th anniversary, the Korean Society of Oceanography (KSO) hosted an International Ocean Science Symposium on the theme of " Strategy and Goals for Ocean Research in the 21st Century ", held at the Seoul National University (SNU). The first day of the symposium consisted of eight invited 30 minute presentations, given by the presidents of other national societies of oceanography. Canada, through CMOS, was one of the invited countries, and in the end it was decided that I should sacrifice myself (the KSO was adamant that CMOS should be represented by its president: we reached a compromise for an outgoing president...). The KSO, and KORDI, a government oceanographic R&D institution, paid all expenses, including first class roundtrip air travel for all invited guests!

After an 18 hour unexpected delay in Vancouver (thank you Canadian), I finally arrived in Seoul at noon on Wednesday the 30th of October, grateful that my e-mail message from the hotel the night before had made it to the young graduate student who was supposed to pick me up at the airport. A two-hour drive (25km) brought me to the Hoam Faculty House at SNU where I was to reside with other guests. The symposium started officially a few hours later by what turned out to be the first of many parties, banquets and receptions, this one at the SNU Faculty Club. Seven countries (USA, Canada, Japan, China, France, Germany, Korea) were officially represented through their society presidents or equivalents, as well as the IOC, through its Executive Secretary, Prof. Gunnar E.B. Kullenberg.

The following day, I gave my presentation, along with the others, on the theme that had been proposed. The title of my presentation was: "*Canadian Ocean Research: The Next Decade*". Being a meteorologist, I had of course to rely on the contributions of a few oceanographers, DFO, and, not the least, our Executive Director Neil Campbell, who was very helpful in getting me started on this: I thank

you all for your help. The day ended with a formal discussion, and I must have said a few interesting things because I ended up answering more than my share of questions, particularly on the importance of taking the longer view in budget cutting exercises (i.e., impacts on training young scientists in universities and institutes), and on the unusual Canadian coupling in one single Society of oceanography and meteorology (the question being: how the hell did you make that work?). The good news is that the presentations will be published (for those of you who wish to read them) in a special issue of the Korean Journal of Oceanography; the bad news is that they will have been translated into Korean (CMOS has a copy in English).

The following two days were devoted to the scientific part of the symposium proper, as well as to other social activities. The French-speaking guests (myself and two French representatives) were treated by the French-speaking Korean oceanographers (to my surprise, quite a few, having studied in France mostly) and the President of the KSO to a typical whisky (Korean) and beer party in a private (Korean-only) club in Seoul. We got to visit the Folk Village, an hour out of Seoul, which is a very well done and very instructive reconstruction of a typical Korean village of a few centuries ago (don't miss that tour if you ever go to Seoul), and the Samsung Museum, which has an extraordinary collection of Korean artefacts, particularly porcelain. The official part of my visit ended by a banquet at Korea House in Seoul, on Saturday night, with a one-hour show of traditional music and dance.

In the remaining days, I managed to visit a meteorological scientist (Prof. Jeong-Woo Kim, of Yonsei University) to discuss potential collaboration in the Seoul Yellow Sea field experiment (use of coupled mesoscale-hydrological-basin models, such as MC2-Watflood, to better forecast landfall of storms and their impacts): so far, they are almost exclusively aware of American meteorological technology: this is a shame! One wonders who represents Canadian interests in all those nice Korean-Canada collaborative projects... It turned out that Prof. Kim had known André Robert quite well during the FGGE years. The rest of my stay (two days) was spent on tourism and shopping, for which Seoul, and its two huge markets, is truly fascinating.

In conclusion, I believe the trip was worth it for CMOS; my impression is that there exists already a healthy collaboration in oceanography between Korea and Canada, particularly the west coast, although some of the people I met had actually worked at the Inland Waters Institute (and still remembered the chilly winters)! They showed some concern on the major cuts in R&D funding in DFO, as well as in Canadian universities; this was made even more apparent as it appears that in most of the other countries present, budgets are either increasing (Japan, USA, Korea) or steady (France, Germany, China). We are the only one going down! Clearly, it would be worth the effort to increase our collaboration in meteorology, if not just to offer an interesting and quite competitive (superior?) technology; after all, Korea has a population of 45 million, and experiences a range of weather not unlike most of the Canadian weather. Perhaps my colleagues of AES might want to explore this further.

L'atelier du CERCA sur la modélisation environnementale intégrée de précipitations abondantes (5-6 décembre 1996) remporte un vif succès!

Le Centre de recherche en calcul appliqué (CERCA) a tenu un atelier sur la modélisation environnementale intégrée de précipitations abondantes, les 5 et 6 décembre 1996. Avec 82 participants (le maximum permis par les espaces disponibles), cet événement, organisé par Charles Lin, membre du CERCA et professeur au département des sciences atmosphériques et océaniques de l'Université McGill, rassemblait plusieurs des principaux experts en la matière avec les objectifs suivants:

- Discuter des moyens d'intégrer les outils de modélisation environnementale dans le but de prédire, entre autres, les événements de précipitation abondante ainsi que leurs impacts (crues).
- Examiner les inondations de juillet 1996 dans la région du Saguenay au Québec comme un cas test pour les modèles météorologiques et hydrauliques.
- Identifier les besoins de l'industrie en modélisation environnementale, et discuter des façons de répondre à ces besoins.

L'atelier comprenait deux séances de présentations et une autre pour discussion générale. La première séance, sur les outils pour la modélisation environnementale intégrée, était consacrée à la description du modèle de mésoéchelle compressible et communautaire MC2 (Robert Benoit, SEA), du modèle du climat régional canadien MRC (René Laprise, UQAM), de la modélisation glace-océan du golfe du St-Laurent (François Saucier, Institut Maurice Lamontagne), du modèle hydrologique WATFLOOD pour la prédiction des inondations (Nicholas Kouwen, University of Waterloo), et du modèle hydrologique HYDROTEL (Jean-Pierre Fortin, INRS-Eau).

Les présentations de la deuxième séance traitaient d'applications pour la prévision de précipitations abondantes, d'abord avec une description de l'impact sur l'environnement des pluies diluviennes de juillet 1996 au Québec (Jules Dufour, UQAC), et une rétrospective des événements météorologiques pour cette période (André

Sévigny et Mario Gaudette, BSME Environnement Canada). La modélisation des précipitations abondantes au Québec avec le MC2 a ensuite été discutée (Wei Yu, CERCA, C. Lin, McGill/CERCA et Robert Benoit, SEA). W.Q. Chin, de B.C. Hydro, a traité de l'intégration de la météorologie et de l'hydrologie pour la modélisation des précipitations et du ruissellement pour le bassin de la rivière Columbia. Enfin, Theresa Rossi, du U.S. National Weather Service, a décrit un système "probabilistique" de prévision du niveau des rivières utilisé à Pittsburgh.

La séance ouverte à la fin de l'atelier était consacrée à une discussion concernant les besoins pour des systèmes intégrés pour la modélisation environnementale. Il y a eu quelques présentations, suivies par une discussion générale.

Pour l'Alcan, la modélisation hydrologique est importante pour la gestion optimale des ressources hydrauliques. Les modèles de prédiction présentement utilisés sont des modèles à régression linéaire multiple, des images de satellite pour suivre la fonte des neiges et l'output du modèle spectral global d'Environnement Canada. Des améliorations dans la modélisation hydrologique incluront l'utilisation des modèles de prédiction météorologique locale ("DEA"), un modèle hydrologique semi-distribué ("CEQUEAU"), l'utilisation de nouvelles stations hydrologiques, la validation de données hydrométéorologiques en temps réel, et la prédiction hydrologique stochastique.

Le besoin principal pour Hydro-Québec est celui de méthodes d'interpolation pour obtenir de bonnes estimations de l'écoulement des rivières à partir de données météorologiques, à des sites où il n'y a pas de pluviomètres. Il est important de pouvoir modéliser les distributions spatiales et temporelles de la précipitation maximum probable et du champ de température correspondant. Des modèles de décharge d'eau douce dans la mer sont aussi importants. Les modèles actuels ("SSARR" et "HSAMI") donnent de bons résultats, mais des améliorations sont toujours désirables, compte tenu du coût des estimations imprécises de l'écoulement des rivières.

Pour la région du Québec d'Environnement Canada, les besoins sont la mise en application de l'utilisation de données de radar dans les modèles hydrologiques. L'intégration en temps réel de telles données est aussi requise. Les besoins opérationnels de modèles à mésoéchelle sont la réaction environnementale d'urgence, l'application au fleuve St-Laurent, les services maritimes, et les services spécialisés tels que l'hydrologie et l'agriculture. Des systèmes pour prise de décision qui peuvent intégrer les données météorologiques et environnementales sont aussi requis.

Pour l'Institut Maurice-Lamontagne du ministère des Pêches et Océans, il y a un besoin pour des modèles couplés météorologiques, hydrologiques et "glace-océan" du système du St-Laurent. Les prédictions jusqu'à 30 jours du niveau de l'eau entre Montréal et Québec sont utilisées pour la détermination de l'espace libre sous la quille des bateaux. Il existe un besoin pour des prédictions tactiques de 36 heures de la distribution de la glace pour le déploiement des brise-glaces, l'itinéraire des bateaux et le dégagement des amoncellements de glace. La modélisation contribuerait également aux urgences environnementales (exemple: un déversement accidentel) et aux opérations de secours, à la simulation de changement de climat, à la détection et son impact, et à la prédiction des formations d'orage dans le golfe et l'estuaire.

L'Université de Colombie-Britannique s'intéresse à la prévision météorologique à mésoéchelle en temps réel en vérifiant deux modèles numériques d'origines totalement différentes (MC2 et le "University of Wisconsin-Nonhydrostatic Modelling System" (UW-NMS), en résolvant les caractéristiques locales contrôlées par les montagnes et la côte, en développant des techniques de prévision globale pour réduire au minimum les effets de l'absence de données du Pacifique nord, et en améliorant la physique de la couche limite dans les modèles. On utilise trois maillages (100, 25 et 5 km), avec le maillage fin centré au-dessus de Vancouver; cette dernière résolution est requise pour prédire correctement les effets topographiques qui sont importants pour la température dans cette région.

L'Université du Québec à Montréal (UQAM) s'intéresse à la modélisation environnementale intégrée dans le cadre d'un modèle du climat régional canadien (MRC) qui regroupe le noyau MC2 pour la partie dynamique et la paramétrisation des processus physiques de sous-échelle du modèle climatique canadien (GCM) (plutôt que la paramétrisation utilisée dans les modèles de prévision à court terme). Le MRC (comme le MC2) permet donc d'effectuer des simulations allant de quelques jours à plusieurs années, sur un domaine restreint, et ce, à une échelle beaucoup plus fine que les modèles climatiques mondiaux. Puisque le climat et les processus régionaux dépendent de phénomènes à l'échelle planétaire, le MRC est un modèle "piloté" (nested model): ses conditions aux frontières lui sont fournies par une simulation correspondante du GCM à grande échelle ou encore par des observations.

Lors de la discussion qui a suivi les présentations de cette dernière séance, un consensus s'est dégagé sur les points suivants:

* Les outils de modélisation pour les composantes d'un système de modélisation intégrée sont disponibles présentement: météorologiques, hydrologiques et modèles

glace/océan. Ce qui est requis, c'est l'intérêt et la volonté des scientifiques de travailler ensemble, et le financement nécessaire pour créer de tels systèmes intégrés.

* Les utilisateurs, qu'ils soient de l'industrie ou des services gouvernementaux, devraient être consultés dès le début quant à leurs besoins précis. Ils devraient être impliqués dans la recherche scientifique dans tous les aspects.

* Il y a un intérêt pour mettre sur pied un consortium de recherche au Québec afin de créer des systèmes de modélisation environnementale intégrée. Le consortium devrait se concentrer sur un ou deux projets scientifiques bien définis. Par exemple, on pourrait considérer des modèles couplés atmosphériques/hydrologiques de simulation des inondations pour la ligne de partage des eaux du Saguenay, et la modélisation couplée atmosphère-glace-océan pour le golfe du Saint-Laurent.

Le CERCA a l'intention de mettre sur pied un tel consortium, en coopération avec les utilisateurs de l'industrie et des services gouvernementaux.

L'atelier a suscité l'intérêt des medias avec une douzaine d'entrevues à la radio et la télévision, et avec des articles dans "La Presse" du 25 novembre et du 1er décembre.

Michel Béland, Directeur CERCA

Boundary-Layer Meteorology - 25th Anniversary Volume, 1970~1995

Invited Reviews and Selected Contributions to Recognise Ted Munn's Contribution as Editor over the Past 25 Years

edited by J.R. Garratt, *CSIRO, Div. of Atmospheric Research, Aspendale, Vict., Australia;* P.A. Taylor, Dept. of Earth and Atmospheric Science, York University, Ont., Canada.

The Journal *Boundary-Layer Meteorology* was started in 1970 and has become the premier vehicle for the publication of research papers in its field. Dr R.E. Munn served as Editor-in-Chief until recently. The special 25th Anniversary volume, on which this book is based, was compiled from review and other articles solicited and selected as a 'Festschrift' to honour Ted Munn's achievement as editor of the journal over that time.

Articles by leading contributors to the field include reviews of field studies (Askervein, HEXOS, Cabauw) and their impacts; numerical modelling (large-eddy simulation of the surface layer, frontal structures); analyses and critical discussions (of the von Karman constant, bulk aerodynamic formulations, air-sea interaction, vegetation canopies); and reviews or previews of progress in our understanding of the atmospheric boundary layer, turbulence simulation, Lagrangian descriptions of turbulent diffusion and remote sensing of the boundary layer.

The collection provides an excellent perspective on the state of the subject and where it is headed. It should provide fascinating and stimulating reading for researchers and students of boundary-layer meteorology and related areas.

CONTENTS: Editorial. R.E. (Ted) Munn - Founding Editor; A Mini-Biography; *P. Taylor, et al.* The Atmospheric Boundary Layer - Advances in Knowledge and Application; *J.R. Garratt, et al.*
Atmospheric Boundary Layer Research at Cabauw; *A.P. van Ulden, J. Wieringa.* Experimental Micrometeorology in an Era of Turbulence Simulation; *J.C. Wyngaard, L.J. Peltier.*
The Bulk Aerodynamic Formulation over Heterogeneous Surfaces; *L. Mahrt.*
The Impact of the Hexos Programme; *S.D. Smith, et al.*
The Von Karman Constant Determined by Large Eddy Simulation; *X.-M. Cai, D.G. Steyn.*
Frontal Substructures Within the Planetary Boundary Layer; *A. Becker, et al.*
Review of Lagrangian Stochastic Models for Trajectories in the Turbulent Atmosphere; *J.D. Wilson, B.L. Sawford.*
Review of Some Basic Characteristics of the Atmospheric Surface Layer; *U. Hogstrom.*
Air-Sea Fluxes: 25 Years of Progress; *S.D. Smith, et al.*
Boundary-Layer Flow over Topography: Impacts of the Askervein Study; *J.L. Walmsley, P.A. Taylor.*
Ground-Based Remote Sensing of the Atmospheric Boundary Layer: 25 Years of Progress; *J.M. Wilczak, et al.*
Coherent Eddies and Turbulence in Vegetation Canopies: The Mixing-Layer Analogy; *M.R. Raupach, et al.*
On an Instability Mechanism in a Stably Stratified Atmospheric Layer over a Moistened Surface; *O.V. Perestenko, L.Kh. Ingel.*
The Footprint for Flux Measurements, from Backward Lagrangian Stochastic Models; *T.K. Flesch.*
A Model for the Height of the Internal Boundary Layer over an Area with an Irregular Coastline; S.-E. Gryning, E. Batchvarova.

Author Index. Subject Index.

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Canada and the Arctic Ocean CD-Rom Announced by Al Gore

by R. G. Perkin[1]

Just this week, Vice-President Gore announced the publication of the first of a series of CD-ROMs of Arctic Ocean data: Russian data, in the form of grids, and "western" data sets complete with station locations and times. The Web site for this announcement is http://ns.noaa.gov/atlas and, there is an article in the Feb., 1997 issue of National Geographic Magazine. CD's can be ordered from the web site for shipping on April 1, 1997. This is a big step forward and although I feel it would have benefited from more Canadian participation, they are to be congratulated for their accomplishment and commitment to the cause of science. Few people will realize that this project was built on the remains of a similar project initiated in Canada.

World Data Center ocean data sets have been assembled to freely disseminate our knowledge of the ocean to researchers around the world. Among other applications, they provide the backdrop for site specific studies, and project planning, time series for climatic monitoring, and, perhaps the most extensive use, initiation and verification of numerical models. The most famous compilation is the Levitus(1982) data set, the average of all good quality oceanographic observations available; it serves as a climate average. The WOCE data set, still under construction, is the most recent of the large data sets, and is being assembled from a best-possible-quality world ocean survey; it serves as a snapshot of current conditions prior to any climatic changes which may beset us. IOS and Bedford have participated fully in the WOCE program.

Unfortunately, the Arctic Ocean has been poorly served by these data set resources. High quality surveys cover only limited regions of the Arctic and much of the extensive data collected under military control has been kept classified to maintain the security of submarine operations. As a result, we have only poorly defined and missing data for much of the Arctic; in the case of WOCE, no Arctic data was taken at all.

Because of snow and ice albedo feedback, global models generally show that climate change will be amplified in the Arctic. At the same time, the Arctic has increasingly been assigned a more important role in the world's climate because of its ability to shut down the ventilation of the North Atlantic Ocean. In order to understand the controlling physical processes, we badly needed to enhance our observational base in the Arctic. Only then can we build the relevant physics into numerical models. This was brought into sharp focus recently when IOS's TransArctic Expedition (1994) (Aagaard, 1996, Lake, 1994, Macdonald, 1996) found that the Arctic Ocean's circulation and water mass structure had undergone a fundamental change in just a few years. This process brought water as much as 1 degree Celsius warmer to the middle layers of the water column and shifted the frontal pattern between the Arctic basins to bring the heat of the ocean up 200 m closer to the ice in some areas. No model has ever predicted such a change and yet it has strong implications for Arctic and global climate as well as issues of special interest to Canada such as Arctic pollution transport and navigation in ice-covered waters.

In 1990, the World Climate Research Programme initiated the Arctic Climate System Study(ACSYS). Canada is always a welcome participant and as part of this study, I was given the job of assembling an Arctic Ocean database gathering first the data from western sources, including notable Canadian work, then trying to get the extensive data collected by Russian scientists. This Russian data is the world's major resource for studying climate trends and includes surveys from as far back as the 1930's to the present as well as several surveys done in the 1980's which covered the entire Arctic Ocean. Data collection was not interrupted by the war but has been recently crippled by the economic chaos in Russia. Although collected under a civilian agency, the Arctic and Antarctic Institute in St. Petersburg, the majority of these data were and still are held under security restrictions by the Soviet Navy. However, an Atlas of the Arctic Ocean, edited by Admiral Gorshkov, was published in 1980 giving heavily smoothed data fields of physical and chemical variables. This atlas has not been revised after the recent extensive surveys of the 1980's nor is there any information on climate trends. In any event, for detailed comparisons with modern data, it is necessary to get at the underlying measurements, a goal yet to be achieved.

IOS has been active in Arctic Ocean Research since the late '60's and, using our contacts with the Russians developed by Bob Lake, I was able to get an invitation to visit AARI in 1993. I made a proposal to exchange data and to release their data in CD-ROM format with the western data. They agreed to raise the issue of declassification with the Navy and for the present, to provide me with a gridded data set for the Arctic Ocean as a numerical analog of the Gorshkov Atlas which could be considered published information. In order to avoid possible problems crossing the border (I didn't want to be arrested as a spy), data was exchanged only through the Internet after the appropriate approvals had been obtained. The timing was good because it was the most relaxed period in Russian history since Peter the Great and we were well on our way to achieving the goal. Fig. 1 shows the grid point locations and an example of a contoured data field.

At about this time, the US government decided to devote its considerable resources to this problem and began to negotiate with the Russians at a high level. At the same

time, a separate "data archeology and rescue" program was begun under NOAA and World Data Center B in Russia. Although invited to participate in the CD-ROM project, I had been re-assigned to work on the B.C. coast and couldn't find the time or resources to participate in any way. Using US funding, I reluctantly assembled and documented my collection of data from Canadian, U.S. and European sources and sent it to the US team. Thus ended our participation in the endeavor.

I can't help thinking that we lost an opportunity to participate in a significant project and to tell the world about our activities and accomplishments. If you read the overviews and article, you will find only vague reference to Canada's contributions and the Canadian researchers who have spent decades in the pursuit of excellence in Arctic research. Our story won't be told by others and when opportunities arise in the future, I hope it will be possible for Canada to be a full participant.

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Russian Data: Salinity at 500 m

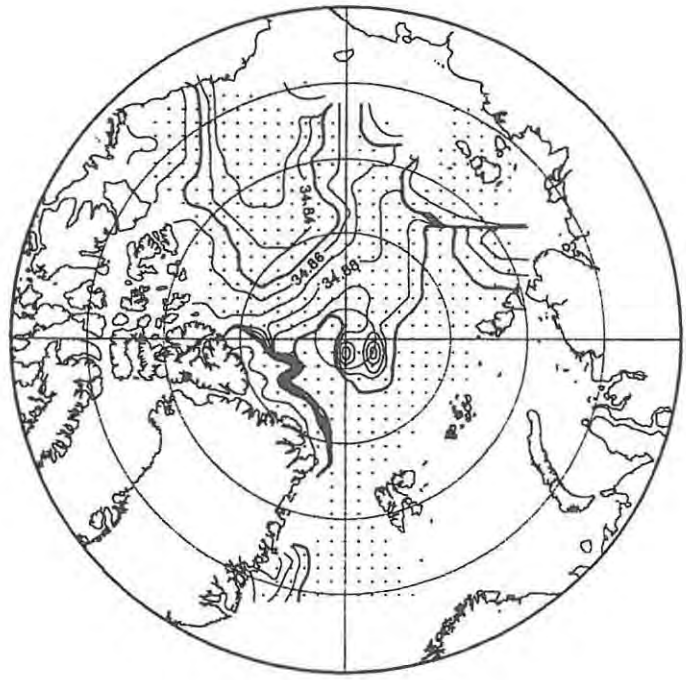

Fig 1: Example of contoured data from the original Russian grid

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1998

The International Year of the Oceans

by Geoff Holland, Chairman of the IOC

Next year is officially the year of the oceans and for those who are working directly or indirectly on marine issues, whether in science, operations, management, or policy, there is an obvious opportunity to increase the public and political awareness of the importance of their interests.

First of all, how did 1998 become officially designated as "The International Year of the Oceans"? In this case, the idea was born in 1993 at the Assembly of the Intergovernmental Oceanographic Commission (IOC), where a recommendation was sent to UNESCO to request the endorsement of the UN General Assembly. Needless to say, UNESCO agreed and the 27th General Conference of the UN adopted the proposal. Throughout this process, Portugal was a very interested spectator, because that country already had plans for an International Exhibition in Lisbon in 1998, with the theme and title **Ocean Expo '98**.

So what is being done, here and elsewhere? Speaking as the current Chairman of the IOC, I can report that it is a slow and somewhat frustrating exercise to get governments to react. I fully believe that nations will be looking for ocean activities and events to celebrate the

year, but it is difficult to obtain concrete information in advance for coordination and correlation purposes.

There are many national and international actions that can be taken and many of these were discussed at the IOC Executive Committee in September, 1996. I shall review a few of these for interest and as examples of what could be expected.

An affirmation of the importance of the oceans and its resources could be undertaken by having Heads of State or appropriate national officials sign an Ocean Charter. This Charter would be a statement of principle and not a legally binding document; however, its intent is the same as that expounded for the signing of the Earth Charter in Rio in 1992. It is a declaration of intent, of belief and of promise for the oceans' future. The concept of an Ocean Charter, open for signature during 1998, has already been accepted by the Assembly. A variation of this idea would be to have a companion charter suitable for signing by the general public.

An important activity presently being initiated is for global capacity building cruises. The proposal is for a partnership between developmental agencies and ocean science institutions to create a series of science training and educational cruises that will operate in each major ocean region of the globe during 1998.

It is hoped that such training cruises will be linked to an educational program so that the results can reach young people all over the world. Environmental science is an accepted part of the curricula of many schools. For the Year of the Oceans in 1998, attention should be given to the supply of project ideas, educational material and teaching aids to educational ministries and school boards. Costs could be minimized if countries cooperated on the exchange of materials, ideas and in some cases in the investment of joint programs. The interest of our youth in the long term preservation of the oceans and the sustainability of its resources is absolutely critical. An activity that would interest a scientific society such as CMOS would be to have a broader recognition of ocean awards. Awards given in recognition of achievements in ocean-related fields in 1998 could be compiled into a global "Ocean Roll of Honour" and published internationally.

National and international programs could promote the awareness in ocean events, achievements and issues. Media information could be prepared for use in the press, literature, television, screen and radio to publicize the year of the oceans. Suitable contributions and extracts can be exchanged through an international clearing house for possible use in a broader regional or global context.

It is expected that many ocean conferences and ocean related meetings will be held in conjunction with 1998; the **1998 WOCE Conference** in Halifax is an example. It would be useful if an early list of these were prepared so that duplications and overlaps of time and subjects could be avoided and participation maximized. Again, the IOC has the intention of providing such information on the Internet.

The above only touch on the large number of possible activities that could be implemented. Any events, whether international or a class project at an elementary school, can contribute to the celebration. I hope that CMOS will be involved and play a leading role.

ANNOUNCEMENT

The Society takes pleasure in announcing that Ms. Claire Martin of ITV Station, Edmonton, Alberta and Mr. Harold R. Hosein of CITY TV and CFRB, Toronto, have both qualified as CMOS Endorsed Weathercaster. It is to their credit that we can be assured of high standards in weather broadcasts. Catch them on your TV watching program and see for yourselves.

Neil J. Campbell,
CMOS Executive Director

UNIVERSITY OF TORONTO
DEPARTMENT OF PHYSICS

Contractually-Limited Faculty Appointment (5 year term)

Atmospheric Remote Sounding from Space

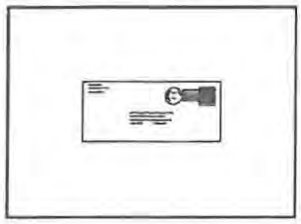
The Department of Physics plans to make a term appointment of up to five years' duration in the above area, with a starting date ASAP after 15 April 1997.

The ideal candidate will possess a Ph.D. in a relevant area. The candidate will undertake teaching and research activities in the Atmospheric Physics Group working with the holder of the NSERC Industrial Chair in Atmospheric Remote Sounding from Space. Potential areas of research include, space instrument testing (including testing of the MOPITT instruments currently under construction), instrument design, atmospheric spectroscopy, data processing and global analysis. Salary will be commensurate with qualifications and experience.

Applications, including a curriculum vitae and three letters of reference, should be sent to Professor D. York, Department of Physics, University of Toronto, Toronto, Ontario, Canada, M5S 1A7. The deadline for the receipt of applications and letters of reference is 15 April 1997.

The University of Toronto is committed to employment equity and encourages applications from qualified women and men, members of visible minorities, aboriginal persons and persons with disabilities.

Comments on "Intercomparisons of the Vaisala and Airsonde Sounding Systems during BOREAS"



This letter makes reference to the article "Intercomparisons of the Vaisala and Airsonde Sounding Systems during BOREAS" by G.S. Strong, A.G. Barr and C.L. Hrynkiw in the June 1996 CMOS Bulletin (Vol.24, No.3,p.49).

In the referenced article, the authors imply that the new Navaid Upper Air Systems and in particular, the Vaisala system, was implemented in Canada without any controlled field testing. I would like to point out that in the five years prior to my retirement (in 1994), the Aerology Section of the Weather Services Directorate performed literally hundreds of flight intercomparisons from our Downsview Headquarters location. The salient results of these tests were documented in our internal Technical Memoranda publications which are available from our headquarters library.

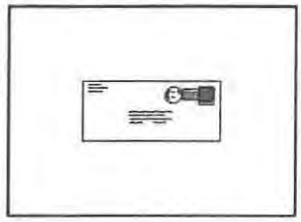
Early in our tests, it was determined that both temporal and spatial data differences resulting from the use of two separate balloons released "simultaneously" totally masked any real errors. Therefore all of our flights consisted of two and occasionally three sondes on the same balloon train. The majority of our intercomparisons (PTU and wind) concentrated on the then-commonly - used GMD sonde vs the Vaisala RS-80 or the VIZ Navaid sondes. We did conduct a limited (about 50) intercomparisons with the AIR sonde. However, data from the AIR sonde had generally larger differences (plus other operational problems) than the VIZ or Vaisala sonde and its use in our system at that time was considered acceptable.

As a direct result of our tests several errors and other shortcomings in these new sondes were corrected by the manufacturer prior to their introduction to our network. For example, the Vaisala RS80 sonde originally came equipped with their "A" humidity sensor which could produce the RH errors noted in the author's paper. At our insistence this was subsequently replaced with the "H" humidity sensor which showed agreement to the VIZ Carbon element to within 2% RH under most conditions over their operational range.

When these systems were placed into operational use in the Canadian Upper Air Network, our Inspection Services Division closely monitored the manufacturers' testing by conducting in-plant inspection. All of the sonde calibration equipment was directly traceable to the US NBS. In conclusion, I believe the meteorological community can rest assured that these new systems have been thoroughly tested and are providing data equivalent to or better than any previously used systems. Furthermore, continual monitoring of the manufacturers' sondes should ensure continuing quality.

G. Klein
(MT - retired).

Reply to "Comments on 'Inter-comparisons of the Vaisala and Airsonde Sounding Systems during BOREAS'"



Klein (1997) makes four main points in his comments on our short article (Strong et al., 1996), and we will address these in the same order. In his first comment he seems to interpret our paper as a criticism of the inter-comparison work done by the former Aerology Section of Atmospheric Environment Service (AES). This was certainly not the intention of the article. In fact, we were careful to acknowledge that work in a positive way when we stated that "AES no longer maintains a group dedicated to .....", and that, by implication, the testing carried out by the Aerology Section was not only valuable, but still required today. Many of the results reported by this group back up the results and comments which we reported. For example, Klein and Hilton (1986) concur with us on the problem of winds in the lower 1-2 km from many Vaisala soundings using Omega Navaid tracking, where, because of the necessity to average winds over 3-4 minutes, the lower-level winds are essentially bogussed using an Ekman spiral profile. This can lead to serious inaccuracies, for example, if one is concerned with boundary layer moisture convergence.

Klein's second point criticizes our use of two separate balloons released simultaneously, which, he claims, "totally mask any real errors". We certainly agree that sondes released on the same balloon train provide a better comparison in general. We were careful to point out this weakness in our comparisons (top p. 51), made necessary by the nature of BOREAS field operations and our decision to carry out these impromptu but necessary field tests. However, our limited results (e.g., our Fig. 4) demonstrated errors which would not have been quantified without these tests, which argues against Klein's contention that 'separate balloons mask real errors'. Our main intent was to point out the very need for the tests which Klein discusses, and, in this respect, the

results were successful.

Concerning Klein's other comment in this paragraph regarding larger differences in Airsonde® data compared with VIZ or Vaisala, it should be pointed out that the latter two systems have data selection and filtering routines built into the system software, whereas, to our knowledge, the Airsonde® does not, so that its data may not 'look as nice', but this at least allows the user to impose his own filtering on the raw data. Klein may be referring to the fact that Airsonde® signal strength (in the system which we used) was uncertain above about 200 mb, so that it is not recommended for synoptic scale operational soundings. However, while the Airsonde® humidities were on average 4% RH higher than Vaisala in the 25-80%RH range, our later laboratory tests (see our Fig. 3) suggested that the difference may have been at least equally due to a negative bias in the Vaisala humidities. This concurs with extensive WMO tests reported by Ivanov et al. (1991).

The third point made by Klein is that the Vaisala 'A' humidity sensor could produce the RH errors which we noted, while the 'H' sensor (used by all AES operational sites) showed agreement with the VIZ carbon hygristor to within 2% RH under most conditions. The Vaisala 'H' sensor was, in fact, used in all of our tests, including the laboratory tests. The absolute comparisons of these latter tests clearly showed a negative bias in Vaisala 'H' ranging from near zero at 10% RH to 4% RH at 70% RH. The Airsonde® used in our field tests, which contained the same VIZ hygristor which Klein used to compare with Vaisala above, was not given similar laboratory tests at this time simply because we had exhausted our supply of airsondes and time.

Note from the Editor

The ideas expressed in the letters to the Editor are the sole responsibility of their respective authors. Our readers are encouraged to provide comments and/or criticism.

Avis du Rédacteur

Les idées exprimées dans les lettres au Rédacteur sont la seule responsabilité de leurs auteurs respectifs. Nos lecteurs sont encouragés à les critiquer et à nous faire parvenir leurs commentaires.

Klein's last point to which we would like to respond, is his contention "that these new systems have been thoroughly tested and are providing data equivalent to or better than any previously used system". We agree with this statement, and said as much in our own article (p. 56). However, we repeat that AES no longer maintains a group dedicated to testing instrumentation. Our contention here is that (1) on-going field tests independent of manufacturer's reports are necessary, since systems and sensors are now upgraded much more frequently than in the past. Moreover, these have become automated to the point that little training is required to operate these systems, and our concern is that many groups may buy these directly 'off the shelf', trusting in whatever the manufacturer reports. This is not to imply dishonesty on the part of manufacturers; however, we would like to ensure that operational meteorologists in the field are aware of potential data problems, such as frequent bogus low-level winds from the Vaisala Omega Navaid system? (2) More stringent requirements are necessary in dealing with accuracy and resolution of upper air data in a mesoscale field research environment, as opposed to data for synoptic scale operations required for weather forecasting (although this is also rapidly changing).

In other words, changing equipment in the marketplace and changing needs by the user, necessitates field tests such as we have reported for virtually every field research experiment. Detailed testing such as Klein carried out with the old Aerology Section may be required more so than ever. Recently, AES has started contracting out data inter-comparison tests of the current radiosonde systems in their operational network. This is reassuring in that they once recognize the on-going changes in equipment and needs which we stressed in our article, and the continued need for independent testing.

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L'écosystème du Saint-Laurent

Vol:1, Rapport-synthèse sur l'état du Saint-Laurent
Environnement Canada
Région du Québec, 1996. Édition Multimondes

Ce rapport sur l'état du Saint-Laurent comporte trois aspects; les aspects physico-chimique, biologique et socio-économique. Je me suis intéressé plus spécifiquement aux aspects physico-chimiques. Le fleuve est divisé en quatre secteurs; le tronçon fluvial, l'estuaire fluvial, le moyen estuaire et Saguenay, et l'estuaire maritime et le golfe. Les caractéristiques spécifiques pour chacune des régions comme les courants, les marées, le transport sédimentaire et le manteau glacial sont indiquées. On présente aussi les divers critères de l'eau dépendant de l'usage qui en sera faite (la consommation, l'activité sportive...) en étudiant les substances organiques ou inorganiques contenues. Une évaluation de la qualité des sédiments, la contamination et la répartition de ceux-ci dans les quatres secteurs ainsi que l'indice Chimiotox sont présentés pour à peu près tous les tributaires du Saint-Laurent.

C'est un rapport très bien documenté et bien illustré par des graphiques et cartes synthèses facilitant la compréhension de cet écosystème. C'est un document qui peut s'adresser au public averti puisqu'il représente un excellent travail de synthèse avec une bibliographie qui complète chacun des aspects étudiés. Mais il s'adresse également au grand public puisqu'il ne nécessite pas de connaissances approfondies et parce qu'il introduit de façon claire chacun des domaines étudiés.

Personnellement je trouve l'aspect océanographique du rapport un peu mince et la section sédimentaire un peu trop garnie, mais ce n'est qu'une question de goût!. Ce premier volume est une excellente synthèse car les aspects biologiques et économiques ne sont pas non plus à négliger. Enfin c'est un document qui aurait avantage à être connu du milieu de l'éducation ainsi que de tous ceux qui ont le goût de découvrir ce majestueux et grand fleuve. C'est un document qui devrait être à la portée des yeux ou de la main de tous et chacun.

André April, M.Sc.
Département des Sciences de la terre
Direction Science de l'atmosphère
Université du Québec à Montréal

Color and Light in Nature
by David K. Lynch and William Livingston

Book reviewed by B.J. Topliss,
Bedford Institute of Oceanography,
Dartmouth, Nova Scotia.

This book arose from the mutual interest of the two authors to "know everything about what (they) saw....with the naked eye". The authors have succeeded in providing simple explanations for a wide category of both everyday and exceptional optical processes. These processes cover everything from those many of us learnt about at school, how shadows and rainbows are formed to the classical; aurora borealis and mirages; to the more unusual; a blue moon and moon circles, fogbows and floaters in the eye. Northern readers might find the chapter on Ice and Halos particularly interesting.

The book has a very pleasing informal style - at times the reader can almost hear the authors talking over a point or thinking out the reasoning behind a visual phenomenon. Chapters divide the book according to different physical processes with each distinct visual phenomena being dealt with in its own section. Together with a glossary this makes the layout of the book ideal for "dipping into" on dark wintry evenings as well making it a good reference book. The book does not attempt to be a text book but instead provides many quick and simple explanations for sometimes brief and picturesque optical processes.

The authors also provide extremely useful lists of when and where solar eclipses will be visible for the next decade; when lunar eclipses will occur and at what time of year to expect shower meteors (which occur at regular intervals each year).

There is rarely a page without a picture or an explanatory diagram. With over 80 colour plates the book can match any "coffee table" book for beauty. The black and white photographs are often equally dramatic and the authors provide some basic tips on how to take photographs.

The book is perhaps the ideal present for those who can't look at a scenic lake without noting the pattern of waves on the surface; cannot see a sunset without commenting on the cloud structure. For families who "endure" such a member, this book may be an ideal "truce" to keep that family analyst occupied whilst the rest can quietly enjoy and admire the beauty of nature. Later, should the "watchers" feel an inquisitive urge, this book will probably provide the explanations, and for the family analyst the beautiful photographs will provide a glimpse of the beauty they may have missed out on whilst they were so busy analyzing it.

CLIMATE CHANGE 1995
THE SCIENCE OF CLIMATE CHANGE

Contribution of Working Group I to the Second Assessment
Report of the Intergovernmental Panel on Climate Change (IPCC)

J.T. Houghton, L.G. Meira Filho, B.A. Callander, N. Harris, A.K. Kattenberg, and K. Maskell (Editors),
Cambridge University Press (on behalf of IPCC), 1996, 572 p.

Book reviewed by Charles Schafer, Bedford Institute of Oceanography, Dartmouth, Nova Scotia.

The IPCC was jointly established in 1988 by the World Meteorological Organization and the UN Environment Program. IPCC is recognized as a prime source of scientific and technical information for the UN Framework Convention on Climate Change which is responsible for leadership in developing global climate change policy. IPCC completed its first assessment report in 1990.

Climate Change 1995 was produced by Working Group I between 1994 and 1995 and published in 1996. The Preface section gives a concise review of the aims and conclusions presented in earlier (1990, 1992 and 1994) reports. The main body of the text includes contributions to lead authors from more than 400 experts from 26 countries. Its core consists of 11 chapters that cover key climate change subjects. Among the important findings that can be found in this part of the text is the recurring suggestion that there has been a "discernible human influence" on global climate. Core chapters are preceded by a Technical Summary and a Summary for Policymakers. Remarks addressed to policymakers stress the uncertainty of intra-regional scale predictions and the limitations of current data sets. In this section, the writers reflect on data regarding the continuing increase of greenhouse gas concentrations (CO2, CH4,N2O), the negative direct forcing by tropospheric aerosols, and the shift of focus from studies of global mean changes to comparisons of modelled and observed spatial and temporal patterns of climate change. They stress time and again that the confidence of regional projections remains low at this point. Locally, aerosol forcing can be large enough to more than offset the positive forcing due to greenhouse gases. However, the authors go on to point out that the spatial and temporal distribution of aerosols greatly influence regional-scale projections, which are therefore more uncertain than global-scale projections. They also remind the policymaker that there remains inadequate data to determine whether consistent global changes in climate variability or weather extremes have occurred during the 20th century (policymakers and politicians take note).

The Technical Summary section offers more details and illustrated data sets on the general conclusions reported in the Policymakers Summary. Section "C" of the Technical Summary is particularly provocative because it evaluates hypotheses on trends in climate and sea level through a series of fundamental questions. This section re-iterates the fact that the estimate of global-scale warming has not changed significantly from that suggested in the IPCC 1990 report, that the warming has not been globally uniform, that since about 1980 precipitation over land has decreased, and that snow cover extent over the northern hemisphere land surface has been consistently below the 21-year average (1974-1994) since 1988. The explanations for many observed conditions continue to point to the inadequacy of current data to allow definitive conclusions to be drawn (e.g., the scope of natural climate variability, the regional impact of aerosol forcing, changes in storminess). The complexity of these issues reflect the need for continued support of the current international research effort.

The eleven chapters that follow the Technical Summary focus on the major issues surrounding the climate change problem. This section of the text begins with a review of fundamental elements comprising the earth's climate system (energy balance, the greenhouse effect, the role of the oceans) and concludes with a chapter that is focused on critical issues related to advancing our understanding of this complex system, especially at the sub-regional scale (e.g., government funding, international co-operation, continued re-assessment of climate change research results). The authors present us with the highlights of a comprehensive and ambitious research agenda that covers the entire range of spatial scales and process-related phenomena germane to achieving a deeper understanding of climate change. A recurrent theme throughout this section is the call for systematic and sustained observations (i.e., monitoring) of key variables. The core chapters comprise 466 pages of well referenced, clearly presented and strategically illustrated observations on a variety of data sets.

At the back of the volume are several appendices that provide useful supplementary information on other IPCC reports, and on lists of contributors to the 1995 volume. This text represents a well-organized general reference tool, not just for researchers, but also for policymakers and politicians that require a conservative, easily digested and up-to-date perspective on key climate issues. The soft cover version is well constructed and should be part of any personal or institutional reference collection on climate change science.

Atmospheric Change and Biodiversity: Formulating a Canadian Science Agenda

Summary Report of a Workshop
R.E. Munn (ed), Institute for Environmental Studies, 1996, 71 pp., ISBN 1-896598-02-1
Book reviewed by Peter Schuepp, McGill University.

At a time when we hear that Canada has been more prominent in signing conventions on biodiversity than in acting on them, we welcome this Workshop, organized and co-sponsored by the Institute for Environmental Studies at the University of Toronto, February 26-29, 1996. Other sponsors were various agencies of Environment Canada, including AES, the University of Toronto and the United Nations Environment Programme (UNEP).

The report is commendable in its structured account of the problem, summaries of participants' contributions, government initiatives, working group and panel discussions, with executive summary. The workshop dealt with the link between biodiversity and atmospheric change, where the latter included climate change, ozone depletion (increase in UV-B), acidic deposition, smog, suspended particulates and hazardous pollutants. Observed patterns of biodiversity dynamics depend on the spatial and temporal scales over which data are collected, and can be discussed in terms of genetics, populations, species within habitats, and habitats within landscapes, from ethical, economic or ecosystem-function perspectives. This makes for complexity, which should be reflected by a science agenda that stresses mutually supportive programs across sectors and disciplines, including health sciences, social sciences and industry, supported by federal and provincial agencies. This is one of the recommendations of the report. To what degree "concepts of ecosystem integrity, self-organizing non-equilibrium systems .... and uncertainty ..... provide a valuable policy tool" is more debatable. These concepts, linked to Prigogine's approach to irreversible thermodynamics and chaos theory, provide an interesting framework for study, but given their inherent abstractions (and the language used) it is hard to see how legislators would see them as guides to policy decisions.

The report calls for better education through schools, the media, Internet, etc., combined with more interdisciplinary training. The public should be "persuaded and involved", which presupposes a degree of interest on its part that seems to be at variance with our reluctance (with media complicity) to pay attention to environmental issues until they reach crisis proportions with visual impact. The statement that improvements in human behaviour "can and do occur when appeals to social solidarity are made" is not supported by everyday experience.

The Workshop addressed some interesting questions: Does the long-term viability of ecosystems under atmospheric change depend on biodiversity? What role does the "right" to resource exploitation play in this debate? Is maintenance of a status quo a valid goal or should management decisions be focused on adaptation? What are appropriate economic theories to deal with risk and uncertainty? The statement that "it is always preferable to reduce exposure to atmospheric stressors than to attempt to mitigate the damages...." is not shared by many economists. What role does landscape fragmentation play in the maintenance of biodiversity, and to what degree can it be monitored from satellites? The Workshop (not surprisingly) posed, rather than answered, such questions, and gave only partial answers to questions on whether changes in biodiversity could be used as indicators of atmospheric change and vice versa.

Among biomes, the Workshop participants judged freshwater wetlands most at risk from atmospheric change, followed by arctic tundra, prairie grassland and various forests. Among sectors, fishery was seen as most threatened, followed by human health (through effects on the evolution of infective disease), while energy and agriculture (with indigenous biodiversity) were judged least at risk. Given the complexity of the issues involved, the scientific uncertainty, the inertia of fiscally constrained governing bodies, not to mention the lack of goodwill among nations, it is not surprising that many recommendations of the report are general ("reports should be disseminated", etc.) or vague (to "achieve consensus, develop interdisciplinary frameworks", etc.). UNEP is given the role to raise political awareness and the Ecological Monitoring and Assessment Network (EMAN) endorsed as a foundation for further studies. More specific recommendations may be expensive to implement, such as establishing new conservation sites linked by corridors, or ambitious (in the "anticipate and prevent" category, or calling for "biodiversity mapping, ... linked to mechanistic theories that predict population dynamics as a function of landscape attributes").

All in all, however, a commendable effort to let us share these deliberations on an aspect of atmosphere-biosphere interaction which, as the report states, affects the hydrological cycle, helps to regulate climate, maintains the composition of the atmosphere, generates soils, cleanses air, water and soil, pollinates crops and cycles nutrients, through interactions that are often not well understood.

Electronic Publishing Session at the next CMOS Congress

Note from the Editor / Avis du Rédacteur en chef

Recently, because of my role as Editor of CMOS Bulletin SCMO, I have received copies of the following e-mail. As these messages open up a new era in "Electronic Publishing" and as they may change significantly and permanently the way our Society publishes A-O in the near future, I thought that they may be of interest to other CMOS members. With permission of their respective authors, I have reproduced here large extracts of these four messages. The debate is now open! Now is the time to speak-up!

Étant donné mon rôle en tant que rédacteur du CMOS Bulletin SCMO, j'ai reçu dernièrement une copie des quatre messages électroniques qui suivent. Comme ces messages ouvrent une nouvelle ère dans la publication électronique de A-O et qu'ils peuvent affecter d'une façon significative et permanente les publications de notre Société, il m'a semblé qu'ils pouvaient intéresser les autres membres de la SCMO. J'ai donc reproduit de larges extraits de ces messages dans ce numéro du Bulletin. Auparavant, selon les règles d'usage, j'ai obtenu l'autorisation des différents auteurs. Le débat est maintenant ouvert! À vous d'en discuter et de décider!

Dear Geoff,

As the new Director of Publications for the Society, I have recently been introduced to the idea of electronic publishing (for what this means, please read the article on pages 42-47 of Physics Today, January 1996), and wonder whether we should have a special session on this very interesting topic during the Congress. The other alternative is simply to have this discussion as part of the agenda of the Editorial Board of A-O, or of the Publications Coordination Committee.

Neil Campbell and I recently met with the Director and staff of NRC Research Press, who have taken several steps in this direction, and would very much like to make a presentation to us, and participate in a discussion. Peter Bartello has given me a demonstration of LATEX, and I think this is the way to go for A-O. NRC are using this also, and editing some of their journals directly in this language....

I would like some input from you on this question. Specifically, Geoff, would there be a time and room available for a large group, possibly an evening? Has a time/place been determined for the various committee meetings, including the above two? Dan, Peter, others, would you like to participate in making a presentation or demonstration on LATEX? Other thoughts?

I feel we have to move into this way of doing some time in the future, and we must prepare ourselves. Developments proceed rapidly!

Richard Asselin,
Director CMOS Publications.

Dear Richard,

Regarding a schedule for committee meetings, no, there is no schedule yet. But I did ask Council to have the various chairs coordinate this with me so that I can attempt to set up non-conflicting schedules - I try to attend 3 or 4 meetings myself, being on various committees, but usually you can only make one or two at best....

You also suggested the possibility of a presentation during CMOS. That might even be a better idea to draw in as many as possible, since not many will arrive in time for a Sunday meeting. We can find a way to add presentation/discussion time if necessary. Look over the session titles as now listed. If it fits in with these fine; otherwise, suggest another session name that could incorporate other things.

Regarding the use of Latex - I know this is popular in the universities, and no one would argue its capabilities, but don't forget your non-university readers. Will others be able to read/print from that? Is it possible that some networks may not be capable of accessing the information? If not the case, then go ahead - I'm not experienced enough in that area to judge. I do know that most of the non-university world uses MS-WORD or WORD PERFECT.

Good idea there. Check out other electronic web pages to see how successful they've been. AMS has one I know. Also, I believe someone within AES started up such a page, but I understand it is in trouble. In any event - CMOS Congress '97 will try to accommodate whatever you decide in this area. Let me know.

Geoff Strong,
31st CMOS Congress Chairperson,
Scientific Program Committee

Dear Richard,

You have well stated a concern for the future direction of publishing by CMOS. However, there remains some resistance to moving away completely from paper.

Anyone who has surfed, searched and read material from the Web probably realizes their absorption and capacity to absorb is probably less than from a printed document published on paper. The sheer volume and surfability of on-line material tends to make perusal of the electronic universe somewhat of a skimming exercise.

An example to look at might be the popular AES Magazine "Zephyr". Even when I retired nine months ago, Zephyr was already in full electronic format and could easily have been placed somewhere on the "Green Lane" Web pages for all to read. Certainly Communications Directorate was considering that then as a great cost-saving measure, but, in their wisdom, they have not moved on this yet.

Another example might be newspapers on-line. I still find it easier and more pleasurable to curl up with a paper than to browse the paper's web site which has almost the same material on line (much more in any case than I would read).

In the case of A-O or the Bulletin, possibly many articles might be found and read by Members but I wonder if they themselves would not print articles of interest, or maybe miss others they may have seen in the paper version delivered to their door.

Another problem is the current state of the Web and its hierarchical structure necessary to move up and down levels. "Desktop Publishing" style reading on the Internet may be a few years away yet and widespread use of such PCs (with say 21" monitors) may be stalled for a time due to cost.

I do agree that it is a good idea to discuss this at the Congress in whatever session, and by copy of this message, would ask you to include any of the above ideas in the discussions, as well as what role the CMOS Web Page might play.

Bob Jones,
Nepean, Ontario, Canada.

Cher Peter,

Si je comprends bien ton message, tu préférerais ne pas discuter de publication électronique avec "NRC Research Press" au congrès de Saskatoon. Je n'ai pas reçu l'opinion de Dan; j'attendrai son avis avant de contacter de nouveau le NRC à ce sujet.

Pour moi, l'usage de LateX par les auteurs serait une façon d'économiser sur les coûts de photocomposition (typesetting). On pourrait même réduire les frais de page pour ceux qui nous fournissent leur texte dans ce langage. Encore faudrait-il que Sheila puisse lire leur disquette et puisse faire les corrections électroniquement! Nous ne sommes pas encore prêts à faire cela, mais il faudrait y penser. Ensuite, quand on aura tous les textes en LateX, on pourrait les convertir en langage utilisable sur l'Internet. Mais il y a encore beaucoup de problèmes à régler, comme l'article de l'American Astronomy Society le souligne si bien. C'est de cela dont le NRC voudrait nous parler.

Richard Asselin,
Directeur des publications de la SCMO.

Hi Richard,

I just read the messages regarding electronic publishing. I would be in favour of having a discussion of this topic at the editorial board meeting. However, I wouldn't be in too much of a hurry to move away from paper.

I'd be interested in a session that gave some overview talks, provided it didn't interfere with the science talks. The latter will probably be a problem for many people that would be interested in getting a bit of information, so you might consider a special evening session. I have no idea how well it would be attended though.

Dan Wright, Ocean Science Division, BIO
Co-Editor of A-O.

--- Announcement --- Annonce ---

Forecasts for Flying: Meteorology in Canada 1918-1939 is the new title of another book written by the CMOS archivist, Morley Thomas. This volume deals with meteorological history in a period when the needs of aviation for meteorological services began to shape an expansion of the Meteorological Service, the ancestor of today's Atmospheric Environment Service. Copies have been provided to Regional and Headquarters offices. The book was published by ECW Press of Toronto and is distributed by General Distribution Services, 30 Lesmill Road, Toronto, Ontario M3B 2T6. Because of its specialized nature, it is unlikely that many bookstores will stock the book but local stores could order copies from the distributor.

CMOS member being honoured

On January 7, 1997, His Excellency the Governor General of Canada, Roméo LeBlanc, announced seventy-three (73) appointments to the Order of Canada. Among the recipients of this honourable distinction is **Lawrence A. Mysak**, McGill University, Montréal. "These 73 new appointees to the Order of Canada are a true example of what it is to be Canadian," said the Governor General. "They are women and men from across Canada united by their hard work, talent, and dedication to their communities and to the country. I believe their commitment will continue to be a source of inspiration to their fellow Canadians." The new appointments are in effect as of November 14, 1996. The appointees will be invited to future investiture ceremonies to be held at Rideau Hall. At that time, the Governor General will present the insignia of the Order.

SIncere congratulations, Dr. Mysak, from all the CMOS community.

Lawrence A. Mysak, Ph.D, F.R.S.C.
A short biographical sketch

Dr. Mysak was born in Saskatoon (1940) and is a graduate of the University of Alberta (Assoc.Mus.in flute, B.Sc. in Mathematics), Adelaïde University (M.Sc.) and Harvard University (A.M.,Ph.D). With his broad training in mathematics, physics, engineering sciences and geophysical fluid dynamics, he has been able to employ a wide range of mathematical techniques and scientific concepts in his research on wave propagation, physical oceanography, climate influences on fisheries, climate dynamics and paleoclimates. During the first part of his career at UBC as professor of Mathematics and Oceanography (1967-86), Dr. Mysak made many notable contributions to our understanding of ocean wave propagation, and in 1978 he published (with Dr. P.H. LeBlond)the 600-page treatise "Wave in the Ocean", for which they were awarded the President's Prize of the Canadian Meteorological and Oceanographic Society. While at UBC, Dr. Mysak also carried out fundamental studies on the stability of geophysical flows and the influence of ocean climate fluctuations on fish migration and populations. During his tenure at UBC he was awarded sabbaticals at Cambridge, U.K. (1971-72), Boulder, CO (1977) and Zurich, Switzerland (1982-83).

Upon to moving to McGill to take up the Atmospheric Environment Service/NSERC Chair in Climate Research (1986-96), Dr. Mysak established an active research program on modelling and data analysis studies of air-ice-sea interactions in the Arctic, natural climate variability on decade-to-century and millennial timescales, and paleoclimates. In 1990 he founded the Centre for Climate and Global Change Research, which involves 16 faculties from seven departments working on climate variability and air-sea interactions, land surface and biogeochemical processes, and economic implications of climate change.

Dr. Mysak is widely known as an enthusiastic and dynamic teacher and seminar speaker in the fields of applied mathematics, oceanography, meteorology, climate dynamics and fisheries, and he has attracted scores of graduate students, postdoctoral fellows and research associates to work in his laboratories, first at UBC, and then at McGill. He is a member of many national and international geophysical, meteorological and oceanographic societies, and has been a consultant for several international climate research programs.

Since his election to the Royal Society of Canada in 1986, Dr. Mysak has served on many important committees and executive positions. During 1993-96, he was President of the 850-member Academy of Research Committee. Since 1992, he has been Co-Chair of the Fund-raising Committee for RSC-Ukrainian National Academy of Science exchanges. Dr. Mysak is widely appreciated for his effective administrative and leadership skills.

Dr. Mysak is married to photographer and religious studies student Mary Mysak, and they live with their children, Paul (21) and Claire (18) in Montréal West. Dr. Mysak plays flute in, and performs as soloist with, the McGill faculty chamber orchestra "I Medici de McGill". He also keenly promotes the public awareness of science and the arts.

Lawrence A. Mysak, Ph.D, F.R.S.C.
Une courte biographie

Ses travaux de pionnier en climatologie, en mathématiques et en océanographie ont débouché sur de nouvelles stratégies scientifiques pour l'amélioration de la gestion des pêches, de la mise en valeur des ressources extracôtières et de la navigation. La recherche qu'il a effectuée nous a permis de mieux comprendre les enjeux complexes du réchauffement de la planète et des changements environnementaux et climatiques. Doué pour dynamiser les équipes, il est le directeur fondateur du Centre de recherche sur le climat et le changement planétaire à l'université McGill et le président de l'Académie des sciences de la Société royale du Canada.

NUMERICAL METHODS IN ATMOSPHERIC AND OCEANIC MODELLING

The **André J. Robert** Memorial Volume

(approx. 624 pages, hardbound, ISBN:0-9698414-4-2)

Announcement

The Canadian Meteorological and Oceanographic Society (CMOS) in association with NRC Research Press, Canada Institute for Scientific and Technical Information, is pleased to announce the publication in April 1997 of a companion volume to Atmosphere-Ocean dedicated to the memory of Dr. André J. Robert, who passed away November 19, 1993. Dr. Robert had a long and distinguished career in numerical methods for atmospheric and fluid models. Among his major contributions are the first integration of a global spectral primitive equation model, the development of an efficient time filter, and pioneering studies in the use of the semi-implicit and semi-Lagrangian methods. The volume is a collection of refereed papers by leading scientists in the field of numerical modelling, based on invited presentations at the André J. Robert Memorial Symposium on Numerical Methods in Atmospheric and Oceanic Sciences, held at the Université du Québec à Montréal, October 5-7, 1994.

Of the 27 papers in the hardcover volume, 25 are research papers reporting or reviewing recent original research findings. The other two papers present a historical perspective of numerical weather prediction and Dr. Robert's pioneering contributions to numerical modelling. The volume will also include as a supplement four previously unpublished manuscripts by Dr. Robert.

The authors are from laboratories around the world, and their papers cover different aspects of numerical methods in meteorology and oceanography. They include extensions of the semi-implicit and semi-Lagrangian schemes, non-hydrostatic models, applications of models using the semi-Lagrangian scheme, data assimilation, operational model development, air-sea interaction and ocean models, and discussion of unresolved issues. This Memorial volume is a most fitting tribute to the fundamental contributions made by Dr. Robert. It will provide an up-to date comprehensive and long-lasting reference for students and researchers in numerical weather prediction, climate simulation, dynamic meteorology and ocean modelling.

The editors for the volume are Charles Lin (McGill University), René Laprise (Université du Québec à Montréal) and Harold Ritchie (Atmospheric Environment Service, Environment Canada).

Annonce

C'est avec plaisir que la Société canadienne de météorologie et d'océanographie (SCMO), en association avec les Presses scientifiques du CNRC, Institut canadien de l'information scientifique et technique, annonce la publication en avril 1997 d'un volume accompagnant Atmosphère-Océan et dédié à la mémoire du Dr André J. Robert, décédé le 19 novembre 1993. Le Dr Robert a eu une carrière longue et remarquable de recherche en méthodes numériques appliquées aux modèles des fluides et de l'atmosphère. Parmi ses contributions majeures, on retrouve la première intégration d'un modèle spectral global utilisant les équations primitives, le développement d'un filtre temporel efficace ainsi que des études fondamentales sur l'usage des méthodes semi-implicite et semi-lagrangienne. Le volume est une collection d'articles révisés par des comités de lecture, basés sur des conférences présentées par des scientifiques réputés lors du Symposium tenu à la mémoire d'André J. Robert sur les méthodes numériques en sciences atmosphériques et océaniques à l'Université du Québec à Montréal, du 5 au 7 octobre 1994.

Des 27 articles que comporte ce volume à reliure cartonnée, 25 sont des articles de recherche rapportant ou faisant revue de découvertes originales récentes. Les deux autres articles présentent une perspective historique de la prévision numérique et des contributions originales du Dr Robert à la modélisation numérique. Le volume incluera aussi en supplément quatre manuscripts indédits du Dr Robert.

Les auteurs proviennent de laboratoires situés à travers le monde, et leurs articles touchent différents aspects des méthodes numériques en météorologie et en océanographie. Ils incluent des extensions aux schémas semi-implicite et semi-lagrangien, les modèles non-hydrostatiques, les applications des modèles utilisant le schéma semi-lagrangien, l'assimilation des données, le développement des modèles d'exploitation, l'interaction air-mer et les modèles océaniques, ainsi qu'une discussion de problèmes importants non-résolus. Ce volume commémoratif est un hommage des plus appropriés aux contributions fondamentales du Dr Robert. Il servira comme référence extensive et à jour pour les étudiants et les chercheurs en prévision numérique du temps, simulation climatique, météorologie dynamique et pour les modèles des océans.

Les rédacteurs de ce volume sont Charles Lin (Université McGill), René Laprise (Université du Québec à Montréal) et Harold Ritchie (Service de l'Environnement atmosphérique, Environnement Canada).

NUMERICAL METHODS IN ATMOSPHERIC AND OCEANIC MODELLING

The **André J. Robert** Memorial Volume

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—> Les résumés de chaque article, en anglais et en français, se trouveront sous peu à la page d'accueil de la SCMO à: http://www.meds.dfo.ca/cmos/

27. Pielke et al. (U.S.A.), *Several unresolved issues in numerical modelling of geophysical flows.*

28. Supplement: Previously unpublished manuscripts by André J. Robert:
i) *An anomaly in the behaviour of a time filter used with the Leapfrog scheme in atmospheric models* (with Mario Lépine).
ii) I*ncompressible homogeneous fluids.*
iii) *Comportement du schème lagrangien dans une équation différentielle relativement simple / Behavior of the Lagrangian scheme for a relatively simple differential equation* (English translation).
iv) *Erreurs induites par le schème lagrangien dans les ondes stationnaires / Errors produced by the Lagrangian scheme in stationary waves* (English translation).

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Intergovernmental Oceanographic Commission (IOC)
29th Session of the Executive Council (EC)
Paris, Sept. 24 - Oct. 4, 1996
Brief Summary Report

The following summarizes a few of the important issues that were discussed at the IOC EC which was chaired by Mr. Geoff Holland, Department of Fisheries and Oceans. Geoff was elected IOC Chair at the 18th General Assembly in June 1995 for a 2-year mandate. The report is reproduced here for the benefit of all CMOS members.

Implementation of Global Ocean Observing System (GOOS)

GOOS consists of five modules. Two (climate, health of the oceans) are proceeding rather well, while three (coastal, living resources and services) are still in the early stages of discussion. There was considerable support from IOC EC Member States to move the GOOS agenda forward, particularly through the regionalization of GOOS by such efforts as EuroGOOS, NEAR-GOOS, etc., and through the IOC regional subsidiary bodies such as WESTPAC.

International Year of the Oceans

The UN General Assembly has declared 1998 as the UN International Year of the Oceans. Many countries reported on special initiatives that they will be undertaking during that time frame to take maximum advantage and visibility of ocean programs and issues: EXPO-98 in Lisbon, ocean satellite launches, hosting of ocean scientific symposia, dedicated research efforts, special publications, etc. Canada reported on planned contributions, including the hosting of an international conference on WOCE (World Ocean Circulation Experiment) in Halifax, the possibility of official development assistance programs in marine sciences with partners in developing countries, and the probability of being able to launch the "Oceans Charter" at the Ministerial level at the St. John's international conference on the "Summit of the Sea".

UNCLOS

While the IOC is not the main body for the application of the UN Convention on the Law of the Sea (UNCLOS), it is the competent authority for UNCLOS for a number of ocean science activities. A summary report of IOC's relation to UNCLOS was presented to, and endorsed by, the IOC EC. Issues included S&T related to the definition of the continental shelf, transfer of marine technology in marine science, and various issues related to oceanographic equipment. There was some concern expressed that UNCLOS should be reviewed with the idea of ensuring that it becomes up-to-date with current world events.

Proposition of the World Intellectual Property Organization (WIPO)

The IOC was made aware of a proposed new legal regime by WIPO, to be considered in Geneva, Dec. 2-20, 1996, that could, potentially, restrict the use or exchange of databases. Such a new regime would severely impact IOC and national ocean science programs. Accordingly, it was suggested that Member States brief national delegates to the WIPO conference on the ramifications of the WIPO proposal to ongoing and proposed data exchange programs.

Rimouski Declaration

The Canadian delegation drew the IOC's attention to, and provided all participants with, a copy of the so-called Rimouski Declaration (see copy in CMOS Bulletin SCMO, Vol.24, No.5, p.122-123) which was developed at the International Conference "Coastal Zone Canada '96". The Declaration calls for the sustainable and wise use of coastal and ocean resources world-wide.

Position of Executive Secretary

Dr. Gunnar Kullenberg, Executive Secretary to the IOC, made his intention known that he intends to resign his position in the coming months. The DG/Unesco will take steps to advertise the availability of this very senior post (a D3 position).

R.B.L. Stoddart, Department of Fisheries and Oceans

Commission d'étude!

Le débat est ouvert! Une nouvelle commission doit étudier la manière la plus appropriée de traduire l'expression anglaise "*e-mail*". Certains auteurs suggèrent l'utilisation de "*courrier-e*". Il est bon de rappeler que le mot anglais "*mail*" dérive du mot français "*malle*" dans laquelle on déposait autrefois les dépêches.

D'autres suggèrent au contraire l'utilisation du mot "*courriel* " pour exprimer l'idée de courrier électronique. Il est clair que cette expression est bien répandue dans la francophonie informatique comme l'atteste une recherche du mot "*courriel*" avec Yahoo. Un professeur de l'université de Montréal serait à l'originine de cette nouvelle expression fort originale et de bon goût. "*Courriel*" indique qu'il ne s'agit pas de courrier ordinaire, la terminaison "*el*" suggérant électronique.

Qu'en pensez-vous? Quelle expression vous semble la plus appropriée? Avez-vous d'autres suggestions?

Paul-André Bolduc, Rédacteur CMOS Bulletin SCMO

WMO/ICSU/IOC World Climate Research Programme (WCRP) Conference on POLAR PROCESSES AND GLOBAL CLIMATE

Rosario Resort, Orcas Island
Washington, USA
3 - 6 November 1997

Announcement and Call for Papers

The World Climate Research Programme invites your participation in a scientific conference on Polar Processes and Global Climate. The conference is intended to examine climatic processes in both the north and south polar regions, and the connections between these processes and the global climate system. The conference will also address the need for global climate investigations to account realistically for cryospheric and other high-latitude processes. The objective of the conference is therefore to link climate issues in both polar regions with global climate investigations. This is the second scientific conference of the Arctic Climate System Study (ACSYS) of the WCRP.

The conference will be structured around four sub themes:

- Polar Climate System: new observations insights;
- Polar Climate System: sources, sinks, and budgets;
- Polar Climate System: Processes and their modeling;
- Polar and Global Climate: variability and feedbacks.

Invited talks and contributed posters will be followed each day by plenary discussions to assess the major problems and opportunities, recent progress, and needed work.

Abstracts of all talks, posters, and discussions will be published in the conference proceedings. All submissions require a titled abstract not to exceed 200 words, in English, sent to the ACSYS project office via e-mail (acsys@npolar.no) prior to **15 May 1997**. Camera-ready final abstracts for all submission are not exceed a total of three (3) pages of text and figures and are to be submitted to the ACSYS Project Office (format to be provided in the second circular) by 1 October 1997 at the following address:

International ACSYS Project Office
P.O. Box 5072 Majorstua
N-0301 Oslo
Norway
Tel: +47 22 95 96 05; Fax: +47 22 95 96 01

Venue

The conference will be held at the Rosario Resort on Orcas Island, Washington, USA, about 120 km northwest of Seattle and reachable by ferry or air. Orcas is the largest island of the San Juan archipelago and lies between Vancouver Island and the US mainland. Both air and frequent ferry connections serve the island.

To be placed on the mailing list to receive further circulars, please contact Mr. Roger Colony (Director IAPO) at the above address, or by e-mail to acsys@npolar.no. Further information will be made available on the ACSYS web site http://www.npolar.no:80/acsys/.

Further information is also available from the scientific organizing committee for the conference:

- Knut Aagaard: aagaard@apl.washington.edu
- Dennis Hartmann: dennis@atmos.washington.edu
- Vladimir Kattsov: kattsov@mgo.spb.su
- Ron Stewart: rstewart@dow.on.doe.ca
- Andrew Weaver: weaver@ocean.seos.uvic.ca

The Summit of the Sea

A series of conferences on people and the sustainable development of ocean resources
St-John's, Newfoundland, Canada
September 1-19, 1997

At least 500 years before John Cabot landfall, the Norse Vikings had landed at l'Anse aux Meadows on the north tip of the island of Newfoundland. Aboriginal peoples had lived there for centuries, and an Irish monk, St. Brendan, is rumoured to have reached the shores of Newfoundland in the 6th century. But it was Cabot's voyage to Newfoundland in 1497 that marked the beginning of a new era: the European colonisation of North America.

In 1997, Newfoundland will celebrate the 500th anniversary of Cabot's landfall and will showcase its unique culture and colourful history, its extraordinary landscape and renowned hospitality. It will be a year when the world will be welcome in this province.

When John Cabot entered the waters of the Grand Banks of Newfoundland in 1497, the fish were so plentiful they slowed the progress of his ship. Early European fishermen reported that one needed only to lower a basket over the side and it would come back filled with cod. They were not exaggerating. The cod stocks off the coast of Newfoundland and Labrador supported people in this part of the world and supplied cod to the rest of the world for nearly 500 years. Today, these fish stocks and many of our dependent communities have been devastated by over-exploitation and environmental changes.

Mismanagement of marine resources is a global problem that is not confined to fisheries. Members of the

international community must develop and adopt cooperative, integrated ocean management policies if we are to wisely use and preserve our shared ocean resources.

The Summit of the Sea is the major environmental initiative of the Cabot 500th Anniversary Celebrations. More than 3,000 policymakers and shapers from around the world will meet in St. John's to discuss our dependence on the sea, the lessons we have learned and failed to learn, and new approaches to developing a truly sustainable relationship between mankind and the oceans.

Public lectures by leading thinkers on ocean issues, the world premiere of composer Jim Duff's Newfoundland folk suite, a gala screening of "People of the Sea", a major exhibition on the history of the Atlantic fishery, and an international youth event are just some of the activities that will surround the Summit of the Sea.

For more information on Core Conference sessions or workshops, please contact:

Summit of the Sea
John Cabot 500th Anniversary Celebration
P.O. Box 1997, Station "C"
St. John's, Newfoundland
A1C 5R4, Canada
Phone: (709) 579-1997; Fax: (709) 579-2067

AVIS: Surplus de cartes agroclimatiques du Canada

Cet avis est pour vous informer que Agriculture et Agroalimentaire Canada a encore des copies de l'Atlas agroclimatiques du Canada. Ces copies peuvent être obtenues gratuitement.

L'Atlas agroclimatique a été produit du milieu des années 1980 par la section agroclimatologique du centre de recherches chimiques et biologiques et plus tard le Centre de recherches sur les terres de la Direction de Recherche d'Agriculture Canada. Le projet était co-ordonné par le Dr. Wolfgang Baier qui durant ce temps était le chef de la section. Les cartes ont été préparées par Monsieur Wilbur Sly.

L'Atlas contient une série de 34 cartes à l'échelle de 1:5 million, de diverses variables climatiques importantes pour l'agriculture. Celles-ci incluent des cartes pour tout le Canada de l'évapotranspiration potentielle, besoins saisonniers en eau, les dates de gel au printemps et à l'automne, et la durée de la période sans gel, les températures du sol et les ressources thermiques pour la maturité du blé et de l'orge. Il y a aussi plusieurs cartes de réserves d'eau dans le sol pour la région des prairies.

Bien que les cartes sont basées sur les périodes 1931-60 et 1941-70, l'information est encore utile pour certaines applications en recherche et en éducation.

Si vous êtes intéressés à obtenir une ou plusieurs copies de l'Atlas au complet ou certaines cartes gratuitement pendant qu'il en reste encore, veuillez envoyer votre demande à:

M. Andrew Bootsma
Agriculture & Agroalimentaire Canada
Centre de recherches de l'Est pour les céréales et les oléagineux
Ferme Expérimentale Centrale, Édifice # 74
Ottawa, ON K1A 0C6
Tél.: (613) 759-1526; Facsimilé: (613) 996-0646
courrier-e: bootsmaa@em.agr.ca

Notice of surplus agro-climatic maps of Canada

This notice is to advise you that Agriculture & Agri-Food Canada still has a number of surplus copies of the Agroclimatic Atlas of Canada available for free distribution upon request while quantities last.

The Agroclimatic Atlas was produced in the mid 1970's and early '80's by what was then known as the Agroclimatology Section of the Chemistry & Biology Research Centre and later the Land Resource Research Centre of Agriculture Canada's Research Branch. The project was co-ordinated by Dr. Wolfgang Baier who was Section Head at the time. Maps were prepared by Mr. Wilbur Sly.

The complete Atlas contains a series of 34 maps at the 1:5 million scale, depicting a variety of climatic variables that are of importance to agriculture. These include maps for all of Canada for potential evapotranspiration, seasonal water deficits, spring and fall frost dates (for both 0 and -2 degrees C), frost-free period, soil temperatures and thermal resources for maturing wheat and barley. There are also several maps of soil water reserves for the prairie region.

Although the maps are rapidly becoming outdated (they are based on the 1931-60 and 1941-70 periods), the information may still be useful for some research and educational applications.

If you are interested in obtaining one or more copies of the entire Atlas or of selected maps at no cost while quantities last, please send your request to:

Mr. Andrew Bootsma
Agriculture & Agri-Food Canada
Eastern Cereal & Oilseed Research Centre
Central Experimental Farm Bldg. # 74
Ottawa, ON K1A 0C6
Tel: (613) 759-1526; Fax: (613) 996-0646
e-mail: bootsmaa@em.agr.ca

First announcement

Meeting on Biogenic Hydrocarbons in the Atmospheric Boundary Layer

Charlottesville, Virginia, U.S.A.
August 24 - 27, 1997

It has become clear in recent years that biogenic volatile organic compounds (BVOCs) introduced in the lower troposphere can significantly influence tropospheric chemistry thereby impacting the abundance of ozone and other oxidants. This has prompted a great interest in determining the origin of these hydrocarbons, quantifying their rate of emissions and identifying their fate in the atmosphere. Considerable progress has been made in all these aspects and it now appears timely to take stock of recent developments to review what has been learned and discuss future research endeavors. Thus, this topical meeting is organized to address the following central themes:

1. Plant physiological and environmental controls on BVOC emissions.
2. Measurements and modeling of BVOC emissions at the foliage and ecosystem levels. Work related to gas exchange using cuvette systems and micrometeorological techniques will be considered.
3. Atmospheric observations. Results from recent measurement campaigns, and new developments of analytical methods and measurement technologies will be included.
4. Chemical mechanisms for BVOC. Laboratory kinetic studies and smog chamber experiments will be reviewed.
5. Photochemically modeling the role of BVOCs. This will include the application of chemical mechanisms, combined with emission model developments, to examine regional and global chemical processes.

To accomplish these goals, conference presentations will come primarily from invited speakers. However, organizers welcome suggestions for additional participation. It is also our aim to foster future research endeavors. Qualified graduate student participation will be considered for which some financial support is being sought.

Meeting proceedings will be widely distributed. To this end discussions are being pursued with publishers of relevant scientific journals. Initial contacts have also been made to investigate the possibility of publishing a collection of contributions in book form. These initiatives are not final and therefore we invite your opinion on the preferred publishing media.

The meeting venue will be the campus of the University of Virginia, Charlottesville, Virginia, United States. The plan calls for oral presentations during approximately 3-hour long sessions in the morning and evening, with the afternoons reserved for informal discussions and relaxation. Although every effort is being made to keep the cost for participation to a minimum, it should be anticipated that a fee of approximately US $ 100 will be necessary to cover organization expenses; the actual amount will depend in part on the success in securing sponsorship for the meeting.

Accommodation will be available at hotels within walking distance of the conference place (the University of Virginia). Accommodation fees range between US$65 to US$125. To express interest in proposing a contribution and/or participate in the meeting, please send a message, preferably by e-mail (fax would be an alternative), no later than 28 February 1997 to one of the following addresses:

Theme 1: Thomas D. Sharkey, Department of Botany, 430 Lincoln Drive, University of Wisconsin, Madison, WI 53706, USA.
E-mail: tsharkey@facstaff.wisc.edu
Phone: (608) 262-6802; Fax: (608) 262-7509.
Theme 2 & 3: Jose D. Fuentes, Department of Environmental Sciences, Clark Hall, University of Virginia, Charlottesville, VA, 22903, USA.
E-mail: jf6s@virginia.edu
Phone: (804) 982 2654; Fax: (804) 982 2137. **or**
Alex Guenther, Atmospheric Chemistry Division, National Center for Atmospheric Research, 1850 Table Mesa Drive, Boulder CO 80303, USA.
E-mail: guenther@ucar.edu
Phone: (303) 497 1447; Fax: (303) 497 1477.
Theme 4 & 5: Jan W. Bottenheim, Atmospheric Environment Service, Environment Canada, 4905 Dufferin Street, Downsview, Ontario, Canada, M3H 5T4, CANADA
E-mail: jan.bottenheim@ec.gc.ca
Phone: (416) 739 4838; Fax: (416) 739 5704.

All Themes (European Contributors only):
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Global Measurements of Atmospheric Chemistry

IGAC Conference on Global Measurement Systems for Atmospheric Composition
Toronto, Ontario, CANADA
May 20 - 22, 1997

Introduction

The realisation that the chemical composition of the atmosphere is changing on a global scale has far reaching implications for the health of the environment and the future of human society. This leads to a requirement that many nations participate in assessing the current state and trends of the chemical state of the atmosphere. This requires in turn the assembly of global measurement systems for atmospheric composition.

The aim of this conference is to bring together managers, scientists and policy makers to discuss current knowledge of and predictive capabilities for atmospheric composition, to define the near-term requirements for global measurement systems, and to begin developing a framework for more comprehensive systems in the future.

Background for the discussions will be provided by invited papers from leaders in the field from around the world as well as contributed papers on all of the associated topics.

Who Should Attend?

This conference is intended to stimulate interaction between three different groups of people: those who plan and conduct large space-based experiments, those who are involved in other large scale measurement programs both as planners and experimenters, and modelers. The conference format will be designed to facilitate discussion and exploration of synergistic opportunities through invited presentations, contributed papers, and opportunities for discussion and feedback.

Preliminary List of Topics:

- Space-based measurements - are being planned by several countries and have great potential for global measurements. These systems have the capability for great coverage, but also have some specific limitations.
- Ground-based networks - are an essential part of any comprehensive measurement system. New initiatives are likely to enhance this capability and the strengths of this approach must be appropriately used.
- Upper Atmosphere Measurements - Many years of progress in upper atmospheric measurements has created a tremendous wealth of information about this region. New challenges continue in the areas of monitoring and the success of international agreements on emission control.
- Lower Atmosphere Measurements - This area of the atmosphere is just being opened up to space-borne measurements which will supplement a long history of other measurement techniques. The heterogeneous nature of the region and the complexity of the interactions with the surface make this a very challenging area of expansion.
- Calibration and Validation - These are essential parts of a comprehensive measurement program maintained over any long period of time. The "honesty" of a measurement system and the disentanglement of artifacts from real events require continual assessment and vigilance.
- Modeling - is an essential element in a system where not all parameters can be measured at all times. The diagnostic and predictive properties of the models are extremely important to our deep understanding of the global atmospheric system.
- Data Assimilation - complements the models and assists the measurements, constructing a comprehensive view of the atmosphere. These systems will need expansion and refinement as our desire for knowledge increases.
- Policy Issues - It is apparent that selection of objectives will be required due to limitations on funding, and priorities will need to be set based on requirements from both the scientific community and society as a whole.
- Future Requirements and Possibilities - As we look to the future there are always new possibilities and new things to consider.

Abstracts & Proceedings

Abstracts will be due on March 1, 1997. Abstract submittal will be by electronic means wherever possible. For further information on electronic submission, please see below. Where electronic submission is impossible, authors are requested to prepare a one-page abstract on 8.5" by 11" or A4 paper using 12-point or larger type. Further instructions can be obtained by mailing or faxing to the address below. Abstracts will be publicised on the World-Wide Web as well as being presented in an abstract volume. The conference proceedings will be published shortly after the meeting. The conference language will be English.

Further Information

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Program Committee

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Student Travel Grants available for CMOS CONGRESS '97

Graduate students interested in attending the CMOS Congress in Saskatoon in June, 1997, should consider submitting an application for a grant to their local CMOS Centre.

Approximately $5,000 has been allocated to support students up to a maximum of $500 each for this year. At present, one student per centre will be supported. The executive members at each centre are being asked to evaluate applicants from within their centre. All applicants must satisfy the requirements given below.

Requirements:

1. The student must give a paper at the Congress or be a recipient of a CMOS prize at the congress.
2. The student or his/her supervisor must be a member of CMOS.

Considerations:

1. Preference will be given to students who have not received a CMOS travel grant previously.
2. Only one grant will be given per supervisor each year, unless there are insufficient applications.
3. Preference will be given to students presenting first-author papers.

Amount:

Up to $500 towards travel cost (air flights must be "3 weeks in advanced fixed date" fares or better, land transport must be multi-occupancy vehicles etc) and double occupancy accommodation at the residence.

Applications must contain:

1. Name of the Student and whether he/she is a CMOS member.
2. Name of the Supervisor and whether he/she is a CMOS member.
3. Photocopy of notification of a prize, if any.
4. Abstract of submitted paper and list of authors.
5. List of any previous CMOS travel grants awarded to the student and to the supervisor.
6. For supervisors submitting with more than one student, the rank of this student.

Applicants should submit their application to the Chair of their local CMOS Centre (not to the Congress '97 executive) no later than 31 March, 1997. The local Centres will then forward their recommendation to the host centre in Saskatoon by 30 April, 1997. To communicate with an executive member of your local CMOS Centre, contact the national CMOS Executive Office at (613) 990-0300, or e-mail to cmos@ottmed.meds.dfo.ca or cap@physics.uottawa.ca.

Bourses de voyages pour les étudiants pour le congrès 1997 de la SCMO

Les étudiants de deuxième cycle intéressés à participer au congrès de la SCMO à Saskatoon en juin 1997 devraient songer à soumettre une demande de bourse à leur centre local de la SCMO.

Environ 5 000$ ont été alloués afin d'aider les étudiants pour un maximum de 500$ chacun. En ce moment, un étudiant sera aidé pour chaque Centre intéressé à participer. Les membres exécutifs de chaque Centre de la SCMO choisiront des candidats satisfaisant aux exigences énumérées ci-dessous.

Exigences:

1. L'étudiant doit faire une présentation au Congrès ou être le récipiendaire d'un prix de la SCMO au Congrès.
2. L'étudiant ou son superviseur doit être un membre de la SCMO.

Considérations:

1. La préférence sera accordée aux étudiants qui n'ont jamais reçu de bourse de voyage de la SCMO auparavant.
2. Seulement une bourse par superviseur sera attribuée chaque année, à moins qu'il y ait peu de demandes.
3. La préférence sera accordée aux étudiants qui sont les premiers auteurs de leur présentation.

Montant:

Jusqu'à 500$ pour le coût du transport (les billets d'avion doivent être achetés au moins trois semaines avant la date du congrès, le transport routier doit être par train ou autobus) et l'hébergement en occupation double dans les résidences.

Toutes les demandes doivent inclure:

1. Le nom de l'étudiant et s'il est membre de la SCMO.
2. Le nom du superviseur et s'il est membre de la SCMO.
3. La photocopie de l'avis qui indique la réception d'un prix, s'il y a lieu.
4. Le résumé de la présentation soumise et la liste des auteurs.
5. Liste des bourses de voyages de la SCMO accordées à l'étudiant et à son superviseur.
6. Pour les superviseurs qui font la demande pour plus d'un étudiant, le classement de cet étudiant.

Toutes les demandes doivent être soumises au Président de leur Centre local de la SCMO (non pas à l'exécutif du Congrès 1997) au plus tard le 31 mars 1997. Les Centres locaux feront ensuite parvenir leur recommendation au Centre hôte à Saskatoon avant le 30 avril 1997. Pour obtenir le nom et l'adresse d'un membre de l'exécutif de votre Centre local, veuillez contacter le bureau national de la SCMO à (613) 990-0300 ou par courrier électronique à cmos@ottmed.meds.dfo.ca ou cap@physics.uottawa.ca.

Dernier Avis pour présenter des communications

Le 31^{e} Congrès annuel de la Société canadienne de météorologie et d'océanographie se tiendra à l'Université de la Saskatchewan à Saskatoon, Saskatchewan, Canada du 2 au 5 juin 1997, avec possibilité de prolongation jusqu'au 6 si nécessaire. Le thème choisi pour le congrès est **«les cycles de l'eau et de l'énergie»** afin de refléter l'importance actuelle de deux projets majeurs de recherches interdisciplinaires au Canada, BOREAS, qui en est presque à sa fin, et le programme canadien GEWEX, MAGS (Mackenzie basin GEWEX Study). Un bon nombre d'autres sessions et événements spéciaux auront lieu, entre autres un "Atelier sur les glaces marines", une session spéciale sur la "Grêle" prévue concurremment avec la réunion du 40ème anniversaire commémorant les programmes sur la grêle ALHAS/ALHAP de l'Alberta, et enfin le déjeuner-retrouvailles fêtant le 30^{ième} anniversaire des diplômés du cours #23 du SEA. Vous pouvez trouver tous les détails de ces différents événements sur la page d'accueil du Congrès 1997 à:

http://ecsask65.innovplace.saskatoon.sk.ca/pages/cmos97/congrs97.html

ou en vous mettant en rapport avec le président du programme scientifique (voir page couverture arrière extérieure).

Quoique la date limite de réception des résumés (300 mots ou moins) soit le 14 février 1997, les résumés tardifs pourraient être acceptés jusqu'au moment de l'impression du cahier des résumés. Si vous soumettez votre résumé en retard, veuillez communiquer avec le président du Comité du programme scientifique, Geoff Strong, avant de le soumettre. Nous recommendons fortement aux auteurs de soumettre leur résumé par courrier électronique, quoique vous puissiez le faire par copie papier ou disquette au Dr. Strong. Un modèle pour transmettre un résumé électronique peut être obtenu par la page d'accueil du congrès 1997 de la SCMO (à l'adresse citée plus haut). Le comité apprécierait grandement que tous les efforts possibles soient déployés pour soumettre vos résumés par courrier électronique puisque cela accélérera le processus d'acceptation et d'impression et ainsi réduira les coûts et vous donnera une réponse plus rapide.

Last Call for Papers

The 31st Annual Congress of the Canadian Meteorological and Oceanographic Society will be held at the University of Saskatchewan, Saskatoon, Saskatchewan, Canada, June 2-5, 1997, with spill-over into June 6 if necessary. The theme of the congress, **"water and energy cycles"**, reflects the current focus on two major inter-disciplinary research projects in Canada, BOREAS, which is just winding down, and the Canadian GEWEX program, MAGS (Mackenzie basin GEWEX Study). A number of other special sessions and events are planned, including a "Marine Icing Workshop", a special session on "Hail" in conjunction with a 40th Anniversary Reunion commemorating the Alberta ALHAS/ALHAP hail programs, and a 30th anniversary reunion luncheon for the AES MT Course #23 graduates. Details on any of these can be found on the Congress '97 homepage at:

http://ecsask65.innovplace.saskatoon.sk.ca/pages/cmos97/congrs97.html

or by contacting the chairman of the Scientific Program (see outside back-cover).

While the deadline for abstracts (300 words or less) is 14 February, 1997, late abstracts may be accepted up until the printing deadline for the abstracts book. If late, please contact the Science Program Chair, Geoff Strong, before submitting. Authors are strongly encouraged to submit abstracts by email, although you may if you wish submit your abstract in hard-copy form or on diskette to Dr. Strong. A template for sending an electronic abstract can be obtained through the CMOS Congress 97 homepage (above). The committee would greatly appreciate all efforts to submit abstracts electronically, as this will accelerate the approval and printing processes and therefore reduce our costs, and also provide you a faster response.

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