WINTER 2000

Zephyr

METEOROLOGICAL SERVICE OF CANADA

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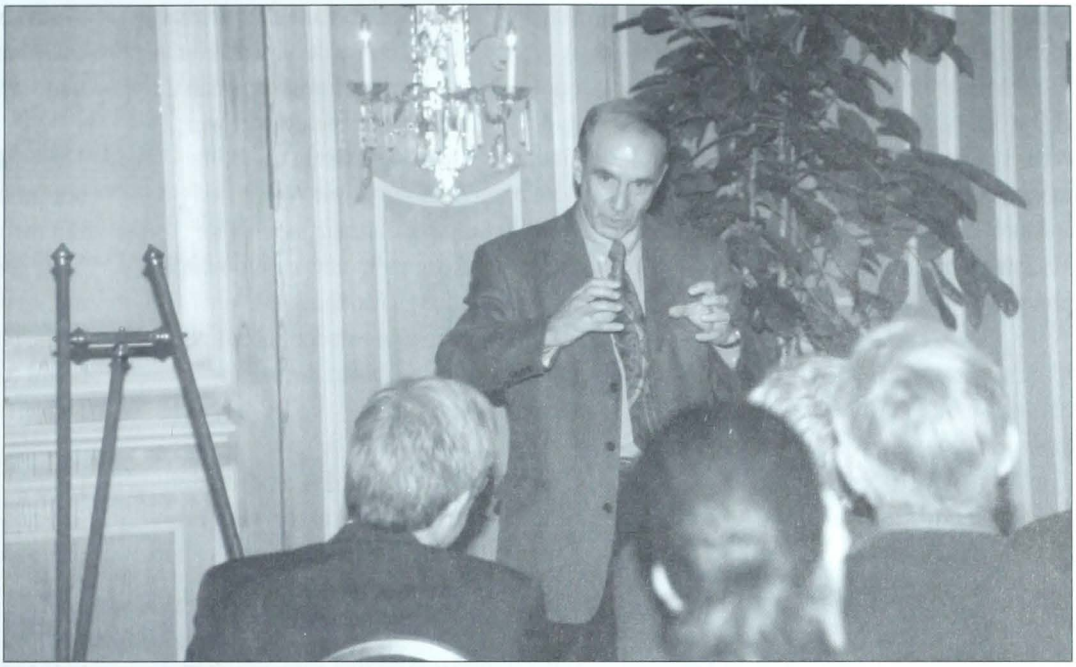
ADM's Message:

Thoughts on the Road Ahead



The new Assistant Deputy Minister of MSC, Marc Denis Everell, speaks to MSC employees of the National Capital Region on October 31. Photo: Marc Boucher

It's hard to believe that half a year has passed since I joined the Meteorological Service of Canada (MSC). I already feel very comfortable here, and very proud to be working as part of this organization. By the end of December, I will have had the opportunity to visit all of the MSC staff across the country, and listen to their concerns and suggestions. I intend to continue meeting with staff in different regions at least twice a year, because we must work together as a team to achieve our goals.

We've spent a lot of time lately planning our direction for the future, and speaking to decision-makers in the government about obtaining their support for our new vision, which will lead to improved services to Canadians. I think they are beginning to further understand MSC's potential and its current impact.

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ADM's Message:
Thoughts on the Road Ahead

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Obviously we have to be open to various scenarios, and what we're doing now is trying to plan for these different scenarios. Sometimes it takes a few years to get a vision fully financed and supported. What I do know is that the direction our management team is headed seems to be synchronized with that of our Deputy Minister, who is encouraged by our progress so far.

As I look at the year ahead, there are a number of other critical issues at the forefront of our agenda. For one, I think that the MSC family must become much more integrated over the next few years, so that we're working more closely together and more aligned with each other. Staff in the regions have told me that they want this kind of relationship, and I plan to reinforce it. Obviously, it will mean that some responsibilities we have with respect to policy and standards will have to be better exercised.

I believe that there are great opportunities for MSC with regard to Canadian private-sector development. We need to accelerate our shift away from business as usual and move forward to create a win/win situation, where we assist in the development of the private sector. As a result, we can gain their support for our own development and evolution as an organization. I also think that our information and knowledge should be much more accessible to the private sector than it is now.

I'm also looking forward to a positive conclusion to our negotiations with Nav Canada. To me, this is a partnership effort to provide certain services that are essential in Canada. There are many other opportunities that MSC needs to capitalize on.

We are very much a world class organization, but one with ambitions for improvement. We will be looking into how to make MSC better with respect to our international involvement, and more strategic in terms of our investments, where possible. At home, we must become a lot more visible in the federal bureaucracy. The breadth of the MSC and the significance of our contribution to Canadians and their economy is not always obvious, nor is our contribution to advance scientific research on environmental issues. We must therefore find ways of making them more so.

The public is an important beneficiary of our information, and we're reaching them. But there is room for improvement. We must continue to improve the delivery of our services to Canadians. That's why we're in the process of setting up an advisory board to make MSC even more client-responsive in the future.

I intend to be with this organization for several years. I want to devote a part of my life to working with you and to making MSC a better place. I believe an important part of that will be to support staff in their development, and help them attain their objectives within our walls. The most important part of my job will be to work with you and the members of my management team to create an MSC that is sustainable for the future.

Just like you and your families, MSC is looking forward to the twenty-first century with optimism and confidence. I'd like to wish you and yours a happy holiday, good health and much success in 2001!

Marc Denis Everell

ZEPHYR

Published by the Communications Directorate of MSC, Environment Canada, **Zephyr** is a newsletter for and about the staff of the Meteorological Service of Canada.

Zephyr is your newsletter. We would like to hear from you. Your submissions, story ideas, graphics and pictures are most welcome. Submissions for the spring issue should be sent to us by February 16, 2001.

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Zephyr is now available electronically on the Intranet **wwwib.tor.ec.gc.ca/cd/zephyr** and the Internet **www.msc.ec.gc.ca/cd/zephyr**

Zephyr Readers Polled

Many thanks to all the ***Zephyr*** readers who responded to our on-line survey in November. MSC Communications is in the process of realigning its publication and other products, and your input will help to ensure that ***Zephyr*** provides you with the information you want in an employee newsletter. If you missed the opportunity to give us your comments and would like to do so, please call Lucie Lafrance at (819) 953-9740 and she will send you a copy of the survey.

MSC Web Sites Shine at GTEC

Environment Canada demonstrated five departmental Internet web sites at the annual GTEC conference and fair in Ottawa from October 2 to 5, including two sites developed by the Meteorological Service of Canada (MSC).

The annual show-and-tell for technology in government is an opportunity for companies that do business with government to display their latest products, and for governments at all levels to display their own innovations. Environment Canada's booth, prepared with the assistance of Communications and Systems and Informatics, also featured two sites from the Environmental Protection Service, and one from the Environmental Conservation Service.

Many people, including personnel from Transport Canada, the Department of National Defence, and Treasury Board, stopped by the MSC booth to discuss access to weather on the web and the yet-to-be-released Aviation Weather Display (AWeD), and see a brief on-line presentation. The weather web site (at weather.ec.gc.ca)—and in particular its newest feature, weather radar data—was among the most popular stops at the EC booth. AWeD also received a warm welcome from visitors, who were impressed by its user-friendliness. Developed in cooperation with NavCanada, the new site will enable pilots to stay ahead of the weather by interpreting weather along planned flight paths.

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Visitors at the Environment Canada booth were impressed with the weather on the web provided by MSC and the yet-to-be released Aviation Weather Display. Photo: Marc Boucher

THUMBS UP from a Blind User

Andrew Hunt, a Web designer with CMC's Informatics Branch, recently received the following e-mail message from a user in Belleville, Ontario, regarding the accessibility of MSC's weather page. Hats off to Andrew and his colleagues for their work, and to Mr. Corbett for sharing his kind words of praise.

Hello Mr. Hunt,

First of all, I should tell you straight out that I am totally blind. I have lost my sight to diabetes. Anyhow, as my footer indicates, I am still a computer programmer that codes for a visual interface.

Too often I run into situations where a Web page or even a Windows-based application is not accessible to the blind computer user. A totally blind person can interact with a PC or mainframe with either a screen-review application or via a Braille display. In my case, it's the former. A screen-review application draws an off-screen model of the actual screen. A virtual cursor then traverses the page, either by scrolling up and down or through the use of a tab key movement. The actual mechanics of it are obviously more complex than that, but my explanation suffices for the purpose of this message. Each screen of an HTML page is read left to right, top to bottom, in its entirety.

Typically, the use of frames and graphics tend to leave the blind viewer with less than desirable results. However, your page at Weather.ec.gc.ca is a prime example of how it should be done. It is wonderful and uplifting to be able to read a page and get all the information out of it. Keep up the good work—more designers should take lessons from you.

Many, many thanks for opening my eyes, so to speak, to the WEATHER.

Sincerely,
Jim Corbett
Belleville, Ontario

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National Water Survey Workshop

Environment Canada held the first national workshop of the Water Survey of Canada (WSC) from September 23 to 27 in Edmonton, Alberta. About 170 people, representing nearly 95 per cent of staff from the 32 WSC offices across Canada, attended, plus 30 guests from within Environment Canada, other government departments, the U.S. Geological Survey, the Canadian Water Resources Association, and the private sector.

The WSC traces its beginnings to 1908, when Canada initiated a formal approach to determining the extent of the nation's water resources in order to identify reliable supplies of good-quality water, determine hydro-power potential, assess irrigation potential, and maintain sovereignty over these resources. Today the WSC is responsible for the collection, interpretation and dissemination of standardized surface-water quantity data and information in Canada for use in infrastructure planning and environmental activities, including climate change, wetland management, and flood and drought planning and mitigation.

Sixty-three presenters held plenary, concurrent, demonstration, and display sessions at the workshop. Key objectives of the event included strengthening cohesiveness and consistency in the national Water Survey program, introducing personnel to leading-edge technology and software applications, clarifying the priorities and business plans of the hydrometric program, and encouraging interaction among all levels of personnel on operational, safety and health, training and development, human resources, and administrative issues.

Several positive messages came out of the workshop, including the fact that staff have noticed a significant increase in the profile of water in the Department, and are pleased with the support and positive messages they have received from key partners, such as the Province of Alberta. There is also a strong sense of loyalty among staff, who feel that the national program has been eroded under the regional management model, and are pleased to see a stronger national thrust with increased communications with all parts of the program.

Water Survey staff share experiences with new instrumentation.

As well, several issues were identified for follow-up, including human resource planning, workloads imposed by resource restrictions and occupational health and safety regulations, demands for real-time data provision and government-on-line initiatives, and the need to increase the visibility of the WSC, both within the Department and society at large.

Summary reports of the workshop will be provided to senior management for follow-up, and all presentations and discussion notes are available on CD-ROM and the Water Survey web page at http://wwwib.tor.ec.gc.ca/wsc.

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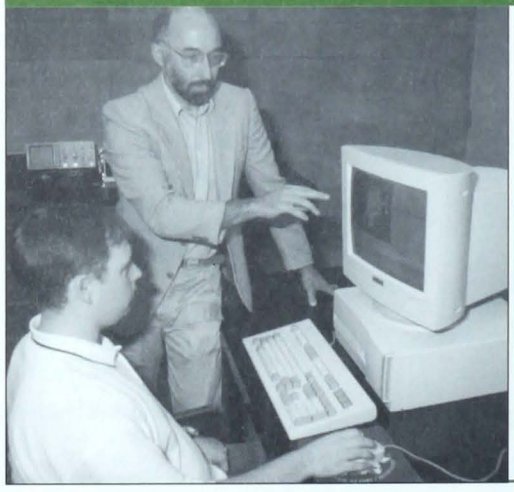
LAKEHEAD UNIVERSITY PARTNERSHIP



Dr. Fred Hopper of the Thunder Bay Regional Centre has become a part-time adjunct professor in the physics department at Lakehead University as part of a new partnership between MSC Ontario Region and the university. Dr. Hopper is teaching a second-year meteorology course, as well as engaging in collaborative research. He is pictured with Robert Girardin, a fourth-year Lakehead University physics student.

Photo: Nancy Angus

Forecasting in Sydney an Olympian Task

One of the prime tourist attractions in Sydney is a walk up Harbour Bridge. The walking-tour company BridgeClimb acted as a guinea pig to study the impact and decision-making changes required to adapt to the FDP's precision nowcasts. Circles indicate groups of walkers.

They received no medals for their efforts, but meteorologists with the Meteorological Service of Canada (MSC) carried out an olympian task at this year's Summer Games in Sydney, Australia, as part of an international team demonstrating state-of-the-art weather forecasting technology.

Using the data provided by Doppler weather radar and radar forecasting software, the team from Canada, Australia, Britain and the United States produced precise, short-range forecasts or "nowcasts". This information was provided to the Australian Bureau of Meteorology for dissemination to the media, to specific clients and to the Olympic Organizing Committee for use in scheduling weather-sensitive outdoor activities.

"Sydney's spring weather can be very unstable," said Dr. David Hudak, a research scientist at Environment Canada. "With the nowcasting system we were able to predict weather conditions for the next 90 minutes with a precision of five minutes, allowing the Olympic event organizers to decide if the event should be re-scheduled."

The objective of the Sydney 2000 Forecast Demonstration Project (FDP), which ran from August 24 to November 16, was to demonstrate the new technologies for severe weather forecasting and short-term forecasting using data from Canadian, Australian, British and American nowcasting systems—some of which are operational and others still prototypes. Environment Canada demonstrated its Canadian Radar Decision Support (CARDS) system.

On November 3, a violent hail and tornadic storm that was initially heading offshore suddenly veered left and bore down on Sydney. The forecast systems picked up the change in direction and were able to provide more than an hour's warning to weather-sensitive clients in the city. As a result, BridgeClimb, a private company that offers walks up the famous Sydney Harbour Bridge and is a trial user of the nowcasts, was able to safely evacuate seven groups of bridge walkers—a process that takes over half an hour. The CARDS system provided unparalleled and accurate estimates of hail sizes greater than 7.5 centimetres, and also identified the location and intensity of the circulations associated with the tornadoes.

In November 2000, researchers and meteorologists from around the world participated in a severe weather training course based on these nowcasting systems at a conference in Sydney. The conference also discussed other forecasting research being done around the world, and what is in store for the future.

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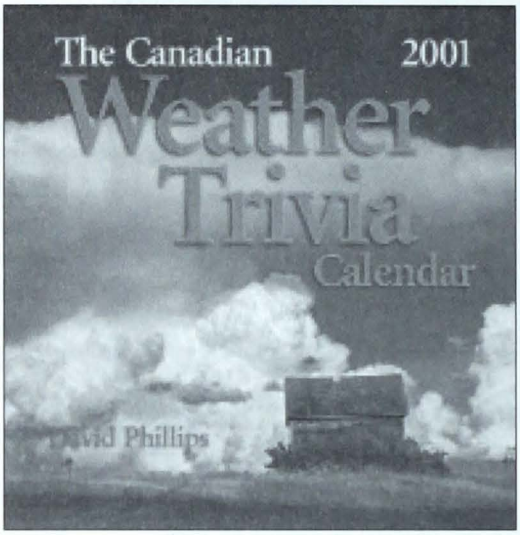
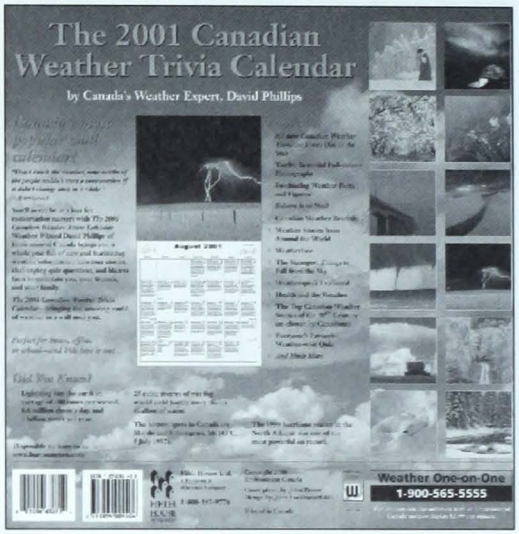
Weather Trivia Calendar Still a Best Seller

If you've ever wondered how long it takes for a snowflake to fall to the ground, or when the first storm-tossed ship was wrecked off the shores of Canada, the perfect gift may be closer than you think. Tens of thousands of weather-trivia obsessed buyers make the *Canadian Weather Trivia Calendar* a perennial sell-out—with 20 000 to 25 000 copies sold in Canada, the United States, the UK, Australia and parts of Europe each year.





Front and back cover of the 2001 Canadian Weather Trivia Calendar

The 2001 calendar, which hit the stands in September, is the 13th edition of the popular calendar, which was dreamed up by MSC senior climatologist David Phillips. Phillips got the idea in the early 1980s when the trivia rage was in full swing, and researched and wrote his first edition in 1985. It sold 10 000 copies during its trial run, and tripled its sales the following year. Ever since it has outsold every other calendar peddled in Canada.

The oft-quoted calendar is filled with hundreds of weather facts—one for each day of the year, plus a trivia quiz—all presented in a light, easy-to-digest format.

Phillips spends months poring over history books, news clippings and climate data and visiting museums and historical societies in an effort to feed his store of more than 14 000 weather facts. The result is an intriguing balance of tidbits from every region of the country, past and present.

"There are all kinds of startling stories and photographs, because the best weather stories are about misery, hardship and misfortune," says Phillips. "That's just the nature of weather—you don't notice it when it's nice, but the tough stuff really catches your attention."

It takes Phillips about six weeks to pull the calendar together for publishing, and he spends another several months each fall on a 23-city promotional tour, doing dozens of media interviews. But collecting the story ideas is a never-ending task. "A day doesn't go by that I don't find or hear something that I write down," he says. "What keeps the project fun is digging out interesting little sidebars—like how much beer Canadians consumed during a record high summer." Equally interesting, he says, is reading how much differently weather events were reported in years gone by. "A century ago, the worst thing someone might say about a storm is that it was 'invigorating'," says Phillips. "The ice storm would have been buried on page five under a recipe for plum pudding. People were much more fatalistic, and they accepted these things as part of life."

Environment Canada earns about $15,000 annually in royalties from the calendar, which is published by Fifth House Ltd. in Calgary. It is sold in book stores across the country and on-line at www.weatheroffice.com/calendar/ for $15.95 a copy. Offices within Environment Canada can buy copies at a discount directly from the publisher, and may sell them to employees at a reduced price.

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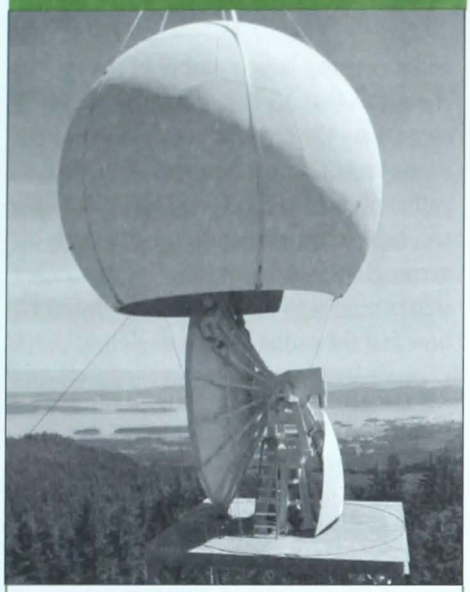
NATIONAL RADAR INSTALLATION



Martin Stanley-Jones climbed a radio tower to take this photograph of the dome being installed on the Victoria radar on the summit of Mount Sicker, near Duncan, British Columbia. Details about the National Doppler Radar Project's most recent addition and photos of other radar installations can be found on the Web at http://www.msc-smc.ec.gc.ca/doppler.

Trudeau's WALK IN THE SNOW

This fall, the nation mourned the death of former Prime Minister Pierre Elliott Trudeau. Many memorable events took place while Trudeau was in office, including a natural event that set the stage for one of his most important decisions. That event was a blustery winter evening when the Prime Minister "went for a walk in the snow". He retired from politics three days later.

The media originally identified February 26, 1984, as the night of the walk, and MSC's senior climatologist, David Phillips, included the date in his 1988 *Canadian Weather Trivia Calendar*. A couple of years later colleague Gordon Black suggested that, while snow fell that night, it was not with the drama that suggests a moment of epiphany. He surmised that Trudeau's stroll likely took place during the mid-week blizzard of February 28-29, when 36 centimetres of snow fell on the Capital—conditions that might inspire one to retire.

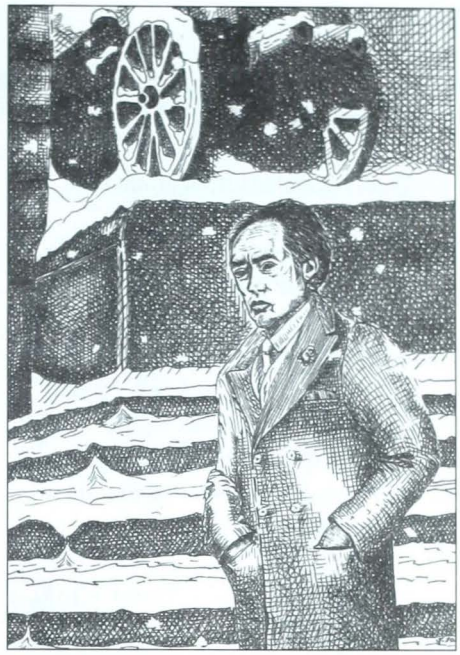


Illustration by: Susan Jose

Determined to find the truth, Phillips wrote to the former PM in 1992. He received a letter back from Trudeau shortly afterward, confirming Black's suspicions and setting the record straight on another piece of historical weather trivia. Phillips says the former PM's closing remarks were vintage Trudeau: "I hope the above will set your mind to rest. I appreciate your being so thorough."

Help Trace *Zephyr's* Roots!

Zephyr celebrates its 20th anniversary in 2001, but some digging suggests that its roots date back to the early 1960s.

According to historian Morley Thomas, the Meteorological Branch of Transport Canada's Air Service began publishing a *Monthly Report for the Deputy Minister, Air* around 1963, but the report was labelled "for official use only." About five years later, the newsletter was given a more general circulation, and its name was changed to the *Monthly Report of the Meteorological Branch*.

Between 1968 and 1971, the Branch was gearing up for transformation into the Canadian Meteorological Service and, later, Environment Canada's Atmospheric Environment Service. The name ***Zephyr***, which came into effect in 1971, was likely suggested by its first editor, the late Bernice Brent.

Zephyr's design has changed several times since its inception in 1971. Photo: Marc Boucher.

Although we have scoured Environment Canada's library, we can't find any copies of ***Zephyr's*** precursors dated previous to 1971. If you have any early reports, or know more about the history of our newsletter, please drop us a line. We'd love to hear from you!

2002 A SPACE ODYSSEY

Fifty scientists from around the world met at the MSC in Downsview, Ontario, on October 26 and 27 to discuss preparations for the payload that will go into space aboard the Canadian satellite SCISAT-1 at the end of June 2002. The Canadian Space Agency mission, dubbed the Atmospheric Chemistry Experiment (ACE), will launch the first Canadian science satellite since the flight of ISIS II in 1971.

One of the instruments on board SCISAT-1 will be MAESTRO, an instrument developed by MSC, the University of Toronto and EMS Technologies of Ottawa in cooperation with the Canadian Space Agency. The system, which stands for "Measurements of Aerosol Extinction in the Stratosphere and Troposphere Retrieved by Occultation," will measure the chemical processes involved in the depletion of the ozone layer.

MAESTRO's primary goal in the mission will be to provide high-resolution data on the atmosphere and precise profiles of ozone concentration. Other goals include measuring the amount of organic and inorganic particles under polar ozone holes and near large tropospheric pollution sources, such as active volcanoes. The troposphere is the region of the atmosphere up to 15 kilometres above the earth's surface, and consists of the water vapour, gases and vertical winds that account for much of our weather.

MAESTRO will be flying with the Canadian-made ACE Fourier Transform Spectrometer (FTS), and together the two will measure a large number of the chemicals that are important in controlling the amount of ozone in the ozone layer. Comparisons between the data gathered by MAESTRO and the ACE FTS will help scientists determine the levels of aerosol in the atmosphere—information that is crucial to understanding why and how fast the ozone layer is depleting.

This mission will provide the scientific community with the information needed to gain an understanding of the trends that are occurring within our ozone layer and the consequences, and perhaps solutions, that lay ahead in the future.

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MSC Hosts Data Buoy Co-Operation Panel

The Meteorological Service of Canada's Pacific and Yukon Region hosted the annual meeting and technical workshop of the Data Buoy Co-operation Panel (DBCP) in Victoria, British Columbia, October 16-25—marking the first time the conference has been held in Canada.

More than 70 participants from 15 countries attended, including experts from the Department of Fisheries and Oceans, Institute of Ocean Sciences, and representatives from nine companies. Discussions centered on the international co-operative effort to operate a network of buoys measuring meteorological and oceanographic data around the world.

Canada operates 45 moored buoys in the Pacific, Atlantic and Arctic Oceans and major inland waters, making it the second-largest national data buoy network in the world. It also deploys and maintains a network of drifting buoys in the Pacific and Atlantic oceans, and provides technical expertise to countries trying to start buoy programs.

Delegates tour the buoy maintenance facility in Victoria, British Columbia.
Photo: Mike Gustafsson

The DBCP is an official joint body of the World Meteorological Organization (WMO) and the Intergovernmental Oceanographic Commission (IOC) that was formally established in 1985. The panel is made up of representatives of WMO members or member States of the IOC, including Australia, Canada, France, Greece, Iceland, Ireland, Netherlands, New Zealand, Norway, South Africa, the United Kingdom, and the United States.

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Field Study Logistics, or "Are You Sure They Emptied All the Cargo Bays?"

Field studies are an important element of many research efforts, and anyone who has ever tried to organize and undertake one knows that more goes into ensuring success than meets the eye. Alan Gallant, one of the MSC researchers who headed the Alert 2000 polar sunrise experiment in the High Arctic this spring, reflected on his experience up North with the following tongue-in-cheek look at field study logistics.

First Law of Logistics:

Given:
a) unlimited time
b) unlimited money, then:
c) anything is possible.

Any reduction in a) or b) means that c) must be renegotiated.
Therefore, for a given c), an increase in a) means a reduction in required b) and vice-versa.

The level of difficulty of any field study can be predicted with the formula:

$$I = \frac{(DHQ \times NPI) - (T)}{\$} \times Id$$

Where:

- I = degree of impossibility
- DHQ = distance from the lead agency's headquarters
- NPI = number of principal investigators in the field
- T = days allowed for preparation
- $ = project budget in U.S. dollars
- Id = sum of the egos of all principal investigators (always **greater** than 1)

To give a practical example using Alert 2000:

- DHQ = 3000
- NPI = 40
- T = 150 and
- $ = 500 000 Canadian (roughly 316.28 US).

If we take the average project leader as an example, then Id equals infinity—resulting in a study with an extremely high degree of impossibility!

Seriously, however, Alert 2000 was the exception, and all involved are to be commended for their contributions. We learned several important lessons as a result of the exercise that could be of help to others faced with similar tasks in the future. They are:

- ❑ allow as much time for preparation as possible;
- ❑ try to have equipment delivered to the site ahead of the principle investigators;
- ❑ use labourers rather than scientists to move heavy equipment;
- ❑ have a customs specialist as part of the take-down team;
- ❑ have a project meteorologist on site; and
- ❑ have a data archivist responsible for archiving data from all experiments daily, ensuring that calibrations and intercomparisons are carried out on a routine basis, and keeping a log of all experiments and their locations, significant events, and any factors that could interfere with other experiments.

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TOUR A THUNDERING SUCCESS

Meteorologists with MSC and other members of the Association professionnelle des météorologistes du Québec (APMQ) made presentations to 25 000 students in more than 132 schools in Quebec and Ontario's Cornwall region between September 1999 and June 2000 during the largest tour of its kind ever held in Canada.

APMQ president Gilles Brien and meteorologists at the Montreal Bureau de services météorologiques et gouvernementaux present the Meteorologist for a Day certificate to winning student Stéphane Houle, while his science teacher looks on. Photo: Jacques Lavigne

The aptly named Thunder Tour was organized by the APMQ and funded by the federal Climate Change Action Fund and Environnement Québec. MSC's Quebec Region was also a sponsor, providing equipment and financial support to the effort.

The students had a barrage of questions for the experts, who came armed with equipment, maps, satellite images and activity books to talk to students about climate change and extreme weather. Not surprisingly, many of their queries centred around the two greatest weather disasters in Canadian history—the 1996 Saguenay flood and the 1998 ice storm—both of which hit Quebec.

The Tour wrapped up in June, when one lucky student was awarded the opportunity to become a "Meteorologist for a Day".

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Pollution Controls Working

A scientific report released by the North American Research Strategy for Tropospheric Ozone (NARSTO) indicates that North American pollution controls are starting to work. The controls, established over the last 30 years to reduce the amount of ground-level ozone (also known as smog) have demonstrated positive results, especially in some large urban areas.

NARSTO is a partnership of government, utilities, industry, and academe in the United States, Canada and Mexico, that seeks to improve the atmospheric and related sciences used to support air-quality management policies. Its report, entitled *An Assessment of Tropospheric Ozone Pollution: A North American Perspective*, is the first comprehensive effort to address the status of ozone reduction efforts since a 1991 U.S. National Research Council review.

Ozone, a natural constituent of the atmosphere, plays a critical function in the stratosphere by protecting life on earth from the sun's harmful ultraviolet rays. However, in the lower troposphere and in the presence of sunlight, ozone reacts with nitrogen oxides and volatile organic compounds and becomes a pollutant. These two precursor gases are produced by natural sources such as forest fires and by motor vehicle exhaust and industrial emissions. Ground-level ozone can damage human health, vegetation, and many common materials.

While efforts to reduce ground-level ozone have produced some notable successes, the report notes that much of the potential for real air-quality improvement has been offset by expanding populations and human activity. Despite this, the report emphasizes that air quality would be considerably worse if the pollution controls were not in place. In addition, it recognizes that ozone science is much better understood than it was a decade ago.

The report recommends that the scientific and policy communities continue to work together in the areas of research, monitoring and coordination to secure substantial improvements in North American air quality. For more information on NARSTO, including the ozone assessment document, visit: http://cgenv.com/Narsto/assess_activities.html

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Ottawa-Beijing Twinning Gets Off to a Good Start

On October 20 -27, a delegation from the Beijing Meteorological Bureau (BMB) visited Environment Canada for the first time as part of the Ottawa-Beijing Weather Centre Twinning Initiative. The initiative is one of many initiated under the Canada-China Meteorological Cooperation agreement, which was renewed in 1996.

The four Chinese delegates—namely the BMB's Director General and Directors of Research, Informatics, and Operations—enjoyed a warm reception in Toronto and a day trip to Niagara Falls on the weekend. The group was given tours and presentations on MSC Ontario Region's and MSC Headquarter's structure, research, operational activities, modeling, air- quality forecasting, commercial services and operational forecasting tools in Downsview, King City, Montréal and Ottawa. The broad exposure they received will lay a strong foundation for continued cooperation between our two weather centres.

A follow-up visit by a Canadian delegation may be proposed for next Fall. Discussion items could include exchanges of personnel, tools and expertise, and possible development of a common website.

Sincere thanks to the numerous volunteers who helped organize the event and host our visitors during their stay. The delegates expressed their appreciation and gratitude before leaving, and have already sent us a note of thanks.

Chinese visitors and Ottawa Weather Centre Staff pose in front of the Lasalle Academy entrance on the last day of their visit. Left to right: Mr. Guo, Mr. Yun, Mrs. Catherine Conrad, Mr. Xie, Mrs. Wang, and Mr. Stan Siok.

Photo: Denis Paquette

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Researchers Test Wings in Hurricane

Researchers from the Meteorological Service of Canada (MSC) and the National Research Council (NRC) flew into the eye of Hurricane Michael shortly before it slammed into the coast of Newfoundland on October 19 in an effort to learn more about the structure of these dangerous storms.

Walter Strapp, Stewart Cober, and Mohammed Wasey from MSC's Cloud Physics Research Division were on board the Convair aircraft, which is owned and operated by the NRC and equipped with many instruments provided by MSC for cloud and other studies. Strapp, who has flown in a wide variety of airborne research programs, called his first flight into a hurricane one of his most exciting ever. "Turbulence levels were only moderate," he said, "but we could see the tremendous strength of the hurricane on our instruments." Unlike most hurricanes, which weaken as they move over colder water, Michael intensified after borrowing energy from another low forming south of Nova Scotia—creating, among other things, a low-level jet of 140-knot winds near its centre.

While on board, Strapp and his colleagues measured winds, temperature structure, and the precipitation field of the hurricane. The plane also released 16 global positioning system "dropsondes" into the hurricane and its surrounding environment 300 nautical miles off the coast of Nova Scotia to collect temperature readings, humidity levels, wind speeds and other information on the physics of the storm. Instruments mounted on the aircraft measured properties of the clouds and precipitation, including liquid and ice content, and the height of the precipitation inside the clouds. It also allowed the scientists to see highly magnified images of cloud and precipitation particles.

The flight not only gathered data, but also evaluated the potential contributions of this kind of research to an international hurricane landfall experiment to be led by the U.S. National Weather Service in 2001. "Canada is recognized for its scientific leadership in the area of extra-tropical transition," said Jim Abraham, Director of Weather Research for MSC. "As the first of its kind anywhere, this flight has drawn enormous interest from the hurricane research and forecast community, which now supports Canada's participation in the 2001 experiment."

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NRC's Convair aircraft before MSC added special measurement equipment used in the flight into Hurricane Michael.
Photo: Harry Turner, National Research Council of Canada

Fast Facts About Michael

- Hurricane Michael made landfall in Newfoundland at 7:30 pm NDT October 19, just west of Harbour Breton. It was the third hurricane to make landfall in eastern Canada over the past five years.
- Michael generated wind speeds of 130 km/h, with gusts near 170 km/h. As the storm moved northeast of the island on October 20, it continued to effect some coastal areas with hurricane-force winds of 120 km/h.
- Newfoundland received 25-50 mm of rain because of the hurricane.
- A Coast Guard vessel towing a barge carrying 8 000 metric tonnes of cement and some 10 000 litres of diesel had to set the barge adrift due to the high winds. The barge later sank, resulting in a response from Environment Canada and the Canadian Coast Guard.
- A few fishing boats were sunk, and in many areas siding and shingles were torn from residential buildings by high winds.

Atlantic Forecasters Accurately Predict STORM SURGE

The remains of a tropical storm caused problems for Atlantic Canada on October 29. The Gulf of Saint Lawrence coastal areas were particularly hard hit as waves and high tides wreaked havoc. As the storm moved north it underwent a short period of deepening and pushed up against a strong and cold high-pressure area. It then sat to the south of Nova Scotia, trapped under a stationary circulation. The result was nearly 18 hours of storm-force northeasterly winds (in excess of 120 km/h in gusts), which built up a wave field of 7-11 meters pounding into coastal areas and riding on top of a storm surge of 1.6 metres above the high tide.

The impact of the storm surge on the coast of Prince Edward Island.

The storm, particularly the behaviour of the associated storm surge, was well predicted by the Maritimes Weather Centre and the New Brunswick Weather Centre . The forecasters used the historical database of storm surges, the Dalhousie University storm surge model and the tidal gauges at Charlottetown, Prince Edward Island, and Escuminac, New Brunswick. They worked to warn the public of the danger and provided emergency measures organizations (EMOs) with 30 hours of lead time to prepare for the storm.

Starting with the early morning forecast on Saturday, there was a general information statement about the problem with higher-than-normal water levels and high seas. By the early morning hours of Sunday, the forecasts were very specific, stating that a 1.5 metre surge would carry the waves even higher than normal. By the time the event had subsided, a total water level of over 2.4 meters had been measured in Escuminac.

MSC forecasters worked closely with the EMOs, helping them pinpoint areas that would be most affected. The fact that the storm arrived on a Sunday made communication to the public difficult, and the media did not pick up on the storm until the damage was done. Despite this, emergency officials had ample warning and were able to plan far enough in advance to ensure public safety.

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New Group of Interns in Atlantic

Atlantic Region has rounded up another group of keen and bright meteorology interns, who will soon be the future forecasters of Environment Canada. Seven interns from across Canada (and a few from even further) reported to class for their first lecture on September 5. They will be participating in the Meteorology Operational Internship Program (MOIP)—MSC's main training program—until next spring. MOIP is run out of Dartmouth, Montréal and Edmonton.

Back row, left to right: Alexandre Parent, Lee Titus, Mitch Meredith, Jeremy March. Seated, left to right: Stephen Hatt, Catalin Obreja, Mesobework Asrat Photo: Jen Creber

A mix of lectures, self-directed studies, computer and practical exercises, weather-office simulations, team-building exercises, and many other tools will help the interns develop the necessary skills, and on-the job training will take place after the program has wrapped up for the year. Steve Miller, program coordinator in Atlantic region, estimates that the new interns will be ready to report to their first posting by April 1, 2001.

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