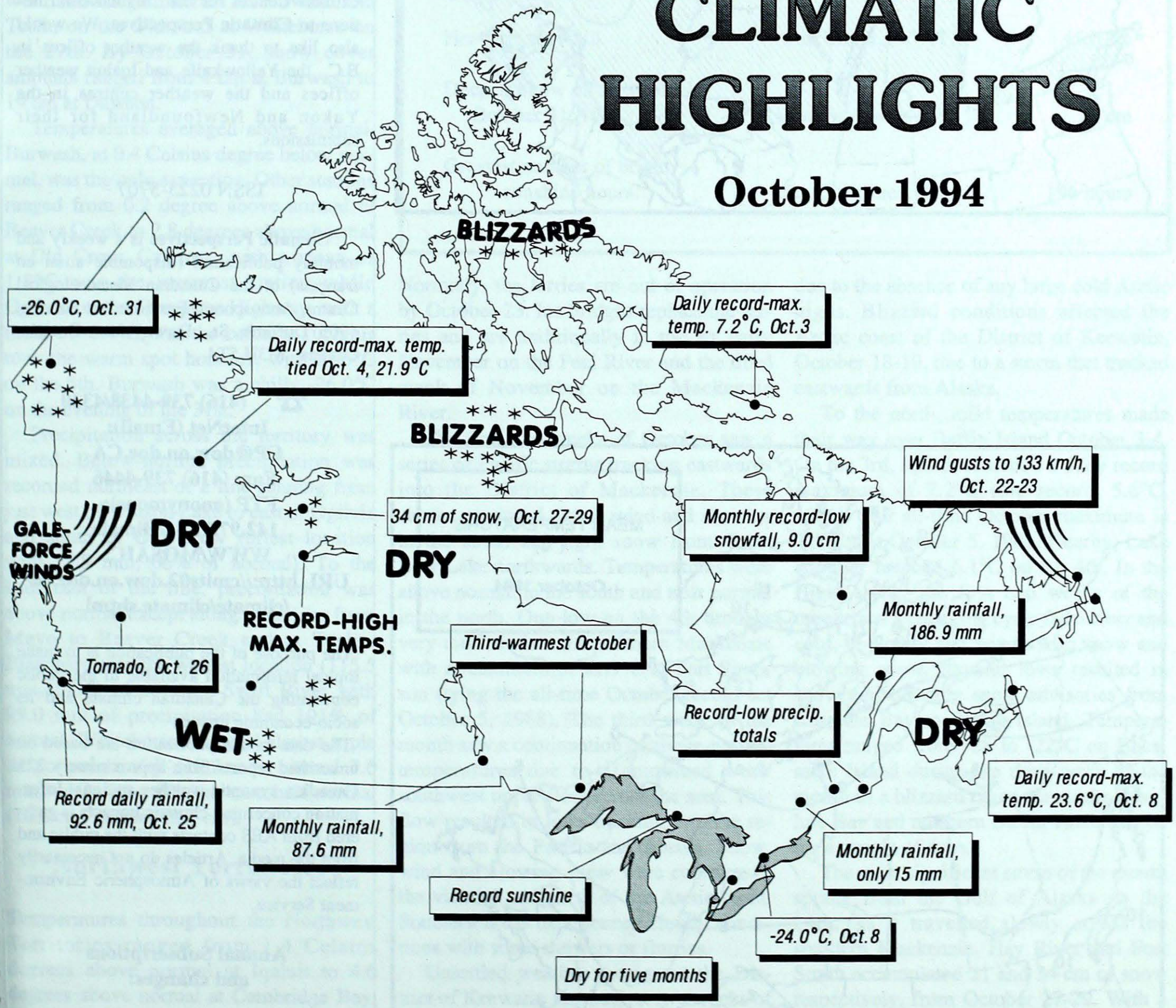
Climatic Perspectives

October 1994 — *Monthly review of Canadian climate and water* — vol. 16

CLIMATIC HIGHLIGHTS

October 1994



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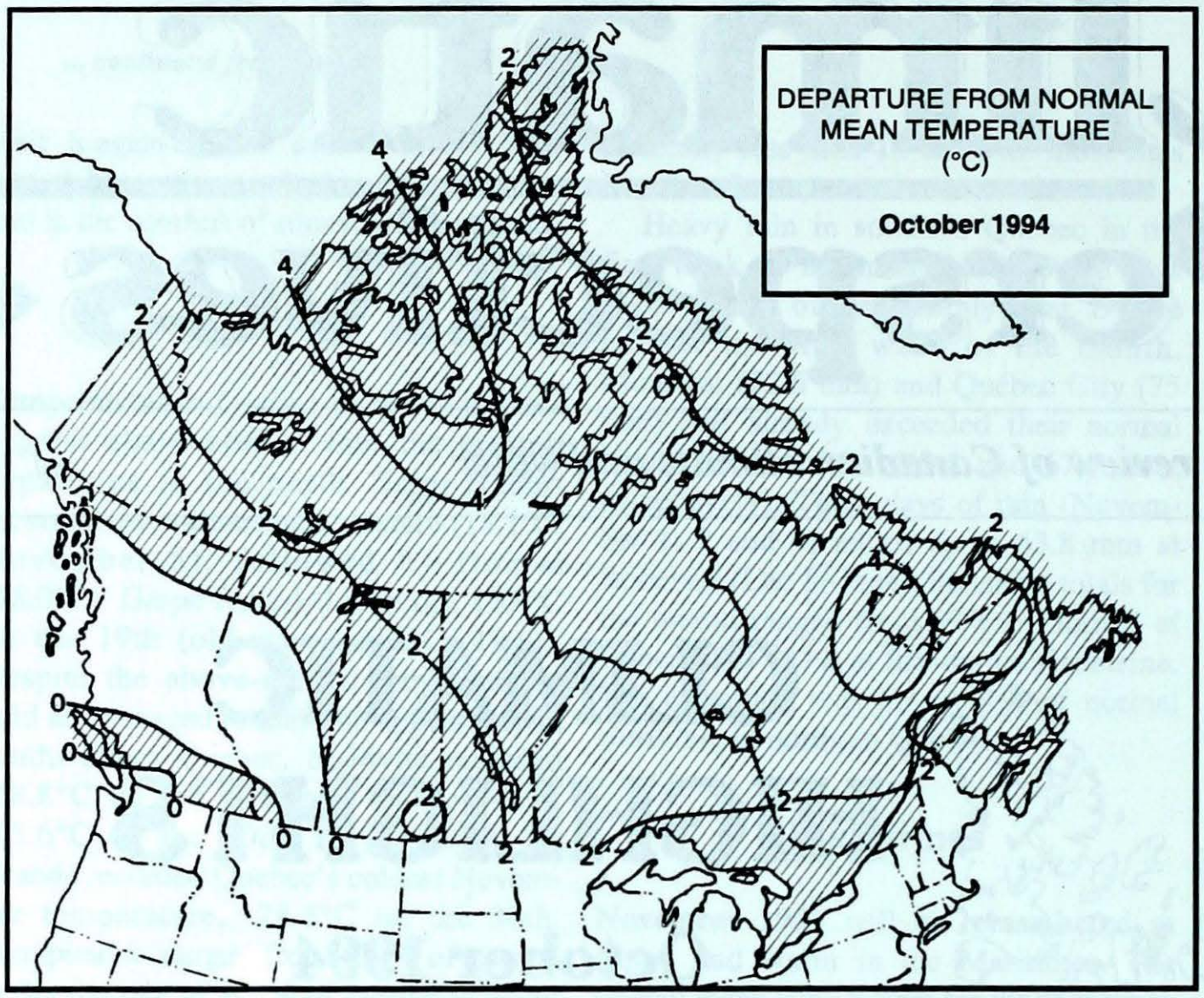
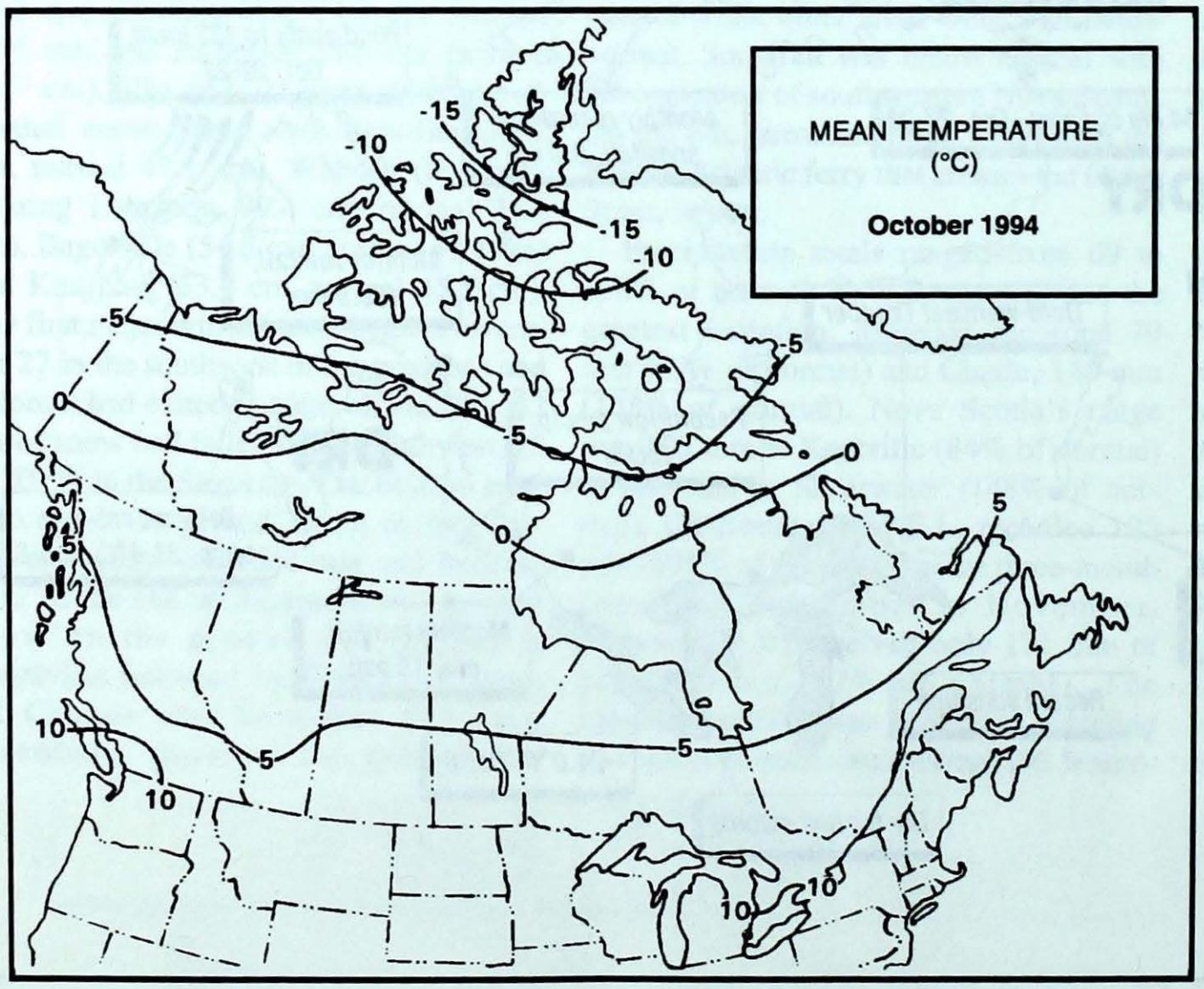
Canada





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VOLUME 16

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The purpose of the publication is to make topical information available to the public concerning the Canadian climate and its socio-economic impact.

The data in this publication are based on unverified reports from approximately 225 Canadian synoptic weather stations. Information concerning climatic impacts is gathered from AES contacts with the public and from the media. Articles do not necessarily reflect the views of Atmospheric Environment Service.

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Across the country

Yukon

In October, fall turned to winter and this was reflected in the advancing snow cover. Over the northern Yukon, October 1st saw winter in full swing with 2 cm of snow on the ground. As the month progressed, the snow cover slowly moved south. By the 17th, snow was on the ground to stay, at Dawson, while to the southeast, permanent snow cover at Mayo, Faro and Ross River did not start until the 21st. In the southwest, snow cover started at Burwash and Teslin on the 24th and at Whitehorse on the 27th. By October 31, snow cover amounts ranged from 4 cm at Burwash to 19 cm at Dawson.

Temperatures averaged above normal. Burwash, at 0.4 Celsius degree below normal, was the only exception. Other stations ranged from 0.2 degree above normal at Beaver Creek to 2.8 degrees above normal at Old Crow. Carcross, with a mean of 1.8°C was the warmest station while Ogilvie on the Dempster Highway, with a mean of -8.4°C, was the coldest. Tuchitua took the warm spot honours, with 17.5°C on the 5th. Burwash was a chilly -26.0°C on the evening of the 31st.

Precipitation across the territory was mixed. Below-normal precipitation was recorded northeast of a line running from just west of Watson Lake to east of Ogilvie and south of Old Crow (driest location with 15.5 mm, 66% of normal). To the southeast of the line, precipitation was above normal except along a corridor from Mayo to Beaver Creek and at Teslin. Blanchard was the wettest location (115.5 mm, 143% of normal). Swift River with 99.0 mm of precipitation had 191% of normal. Whitehorse recorded almost triple its normal rainfall (19.2 mm, normal 7.6 mm) while snowfall was near half normal (10.8 cm, normal 18.7 cm).

CLIMATIC EXTREMES IN CANADA - OCTOBER 1994

Mean temperature:		
Highest	Windsor, Ont.	11.8°C
Coldest	Eureka, N.W.T.	-20.5°C
Highest temperature:	Estevan, Sask.	25.8°C
Lowest temperature:	Eureka, N.W.T.	-34.4°C
Heaviest precipitation:	Prince Rupert, B.C.	394.5 mm
Heaviest snowfall:	Fort Smith, N.W.T.	45.0 cm
Deepest snow on the ground October 31, 1994:	Fort Smith, N.W.T.	28 cm
Greatest number of bright sunshine hours:	St. Catharines, Ont.	196 hours

Northwest Territories

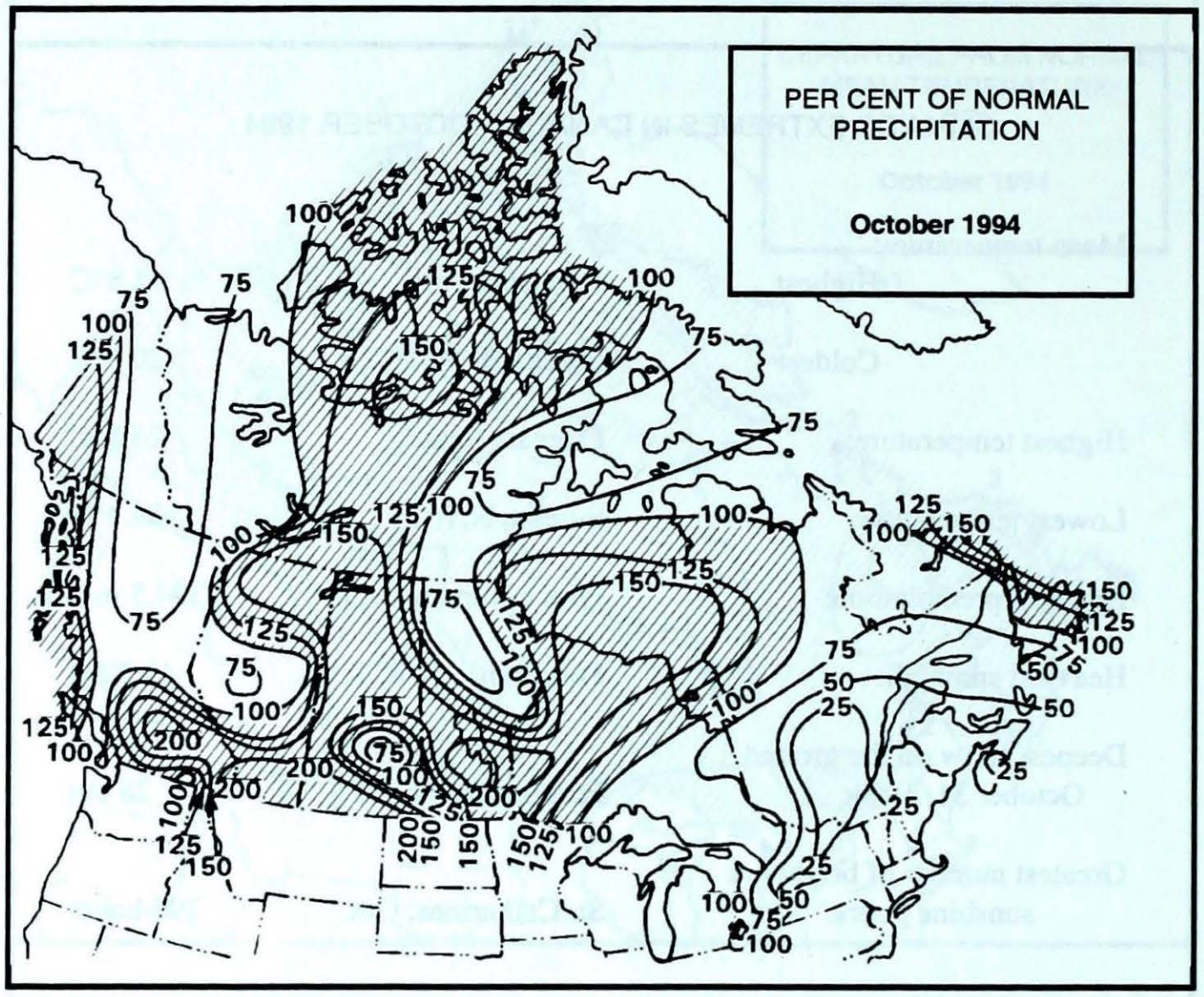
Temperatures throughout the Northwest Territories ranged from 1.4 Celsius degrees above normal at Iqaluit to 4.6 degrees above normal at Cambridge Bay. The mild temperatures allowed the ferries on the Peel and Mackenzie Rivers to operate later in the season than usual. Normally, the ferries are out of operation by October 23. Ice bridges replace the ferries and are traditionally in use by early November on the Peel River and the third week of November on the Mackenzie River.

The first two weeks of October saw a series of Pacific storms tracking eastwards into the District of Mackenzie. These storms produced cloud, wind and showers in the south and light snow from Great Bear Lake northwards. Temperatures were above normal in the south and near normal in the north. One low on the 4th brought very mild air into the southern Mackenzie with a maximum of 21.9°C at Fort Simpson (tying the all-time October record set October 5, 1988). The third week of the month saw a continuation of above-normal temperatures due to a continued west/southwest upper flow across the area. This flow resulted in lows tracking into the region from the Pacific and Alaska. Snow, wind and blowing snow were common in the vicinity and north of the Arctic coast. Southern areas experienced cloudy conditions with some showers or flurries.

Unsettled weather dominated the District of Keewatin for the first two weeks of the month as the Pacific disturbances made their way east. Temperatures were in the -10 to 0°C range, with no extreme cold, due to the absence of any large cold Arctic highs. Blizzard conditions affected the Arctic coast of the District of Keewatin, October 18-19, due to a storm that tracked eastwards from Alaska.

To the north, mild temperatures made their way over Baffin Island October 3-4. On the 3rd, Iqaluit recorded a daily record maximum of 7.2°C (old record, 5.6°C, 1981). The all-time October maximum is 7.3°C, set October 5, 1981. Nearby, Lake Harbour reached 6.1°C on the 4th. In the High Arctic, the first two weeks of the month saw a changing cycle from clear and cold, to cloudy and windy with snow and blowing snow. Several lows resulted in snow and blowing snow advisories from Resolute Bay to Baffin Island. Temperatures ranged from -28 to -22°C on Ellesmere Island during the third week of the month as a blizzard raged across the Resolute Bay and northern Baffin Island region for a couple of days.

The most significant storm of the month sprang from the Gulf of Alaska on the 24th. As it travelled slowly across the southern Mackenzie, Hay River and Fort Smith accumulated 21 and 34 cm of snow respectively, from October 27-29. With a nearly-stationary ridge to the east, strong winds formed from the Keewatin mainland to the Arctic islands. Again, blizzards bat-



tered the region. In Resolute and area, winds gusted to 70 km/h for a few days. The strong winds followed a track over southern Baffin Island and by the end of the month, 70 km/h gusts were experienced at Coral Harbour as the low curved westwards towards Hudson Bay.

British Columbia

For most of southern B.C., fall arrived in the third week of the month. The first-of-the-season Pacific weather systems seen early in the month on the north coast, affected most of the province by month's end. Temperature, precipitation and sunshine values were generally near normal, with no new records set.

Temperatures were within 0.5 Celsius degree of normal with exceptions being the far northwest, 1.5 degrees above normal and the Columbia/Shuswap/Okanagan areas, near one degree above normal. Sunshine totals were near normal in much of B.C. Exceptions were 135% of normal on the north coast, 110 to 120% in the far north, Columbia and West Kootenay areas, and 80% in the Princeton area.

The northeast corner of the province was the driest with near 50% of normal precipitation. Central portions of the province reported 75 to 100% of normal. Along a line from Kamloops to Cranbrook, precipitation was 200 to 300% of normal, falling both south and north of this line to 100 to 125% of normal. Southern coastal areas recorded near-normal precipitation while farther north, 110 to 130% of normal. Port Hardy reported a daily record of 92.6 mm of rain (old record, 42.4 mm, 1971) from a Pacific disturbance on the 25th. Except coastal areas, all areas reported at least some snow but only spotty locations had snow on the ground at the end of the month. Drivers crossing the mountains in the south had their first taste of winter driving conditions on the 14th.

An active system with severe thunderstorms crossed B.C. on the night of October 25-26, seting off a tornado at Prince George at 4:30 a.m. Up to $1 million damage was reported. Please see feature article in this issue, entitled: *Prince George Tornado*.

A sure sign that fall had arrived was the increase in gale-force winds in coastal regions. The north and central coasts reported eight days with general gales and seven more with local gales. The south coast reported five days of general gales and three days of local gales. Two mishaps involving fishing boats, were reported, with one fatality.

Alberta

Monthly precipitation totals were well-above normal in many southern locations, but near or below normal in central and northern areas. Province-wide, temperatures were generally within one Celsius degree of normal.

Several disturbances affected southern Alberta, notably in the first half of the month. The south experienced its first significant snowfall and near-blizzard conditions as a low pressure area moved across southern Alberta October 1-2. Snowfalls on October 2-3 included Banff (14 cm), Lethbridge (26 cm) and Waterton Park (50 cm). On the 2nd, Calgary's maximum was only 2.2°C. A ridge of high pressure built into central and northern areas and Peace River was the warmest location in the country on the 4th with a record-maximum of 23.5°C (old record, 22.3°C, 1980). Temperatures rebounded in the south as the snow melted. Under a westerly flow, daytime temperatures across the province (up to the 9th) were eight to ten degrees above normal. A disturbance October 11-12 deposited 27.6 mm of rain on Lethbridge and 15.3 mm on Medicine Hat. Another deep low formed, October 14-15, giving significant rain, stretching from southern Alberta to Lloydminster. At the end of the first two weeks, precipitation totals were as high as 863% of normal at Lethbridge and 596% of normal at Medicine Hat. The northern half of the province experienced various amounts of rain or snow, but their moisture totals put them only at near- or slightly-below normal values to the middle of the month. With drier weather for the second half of the month, percentage of normal precipitation values dropped in southern locations, but were still above normal for the month. Lethbridge with 69.4 mm of rain for the month, recorded 436% of normal precipitation.

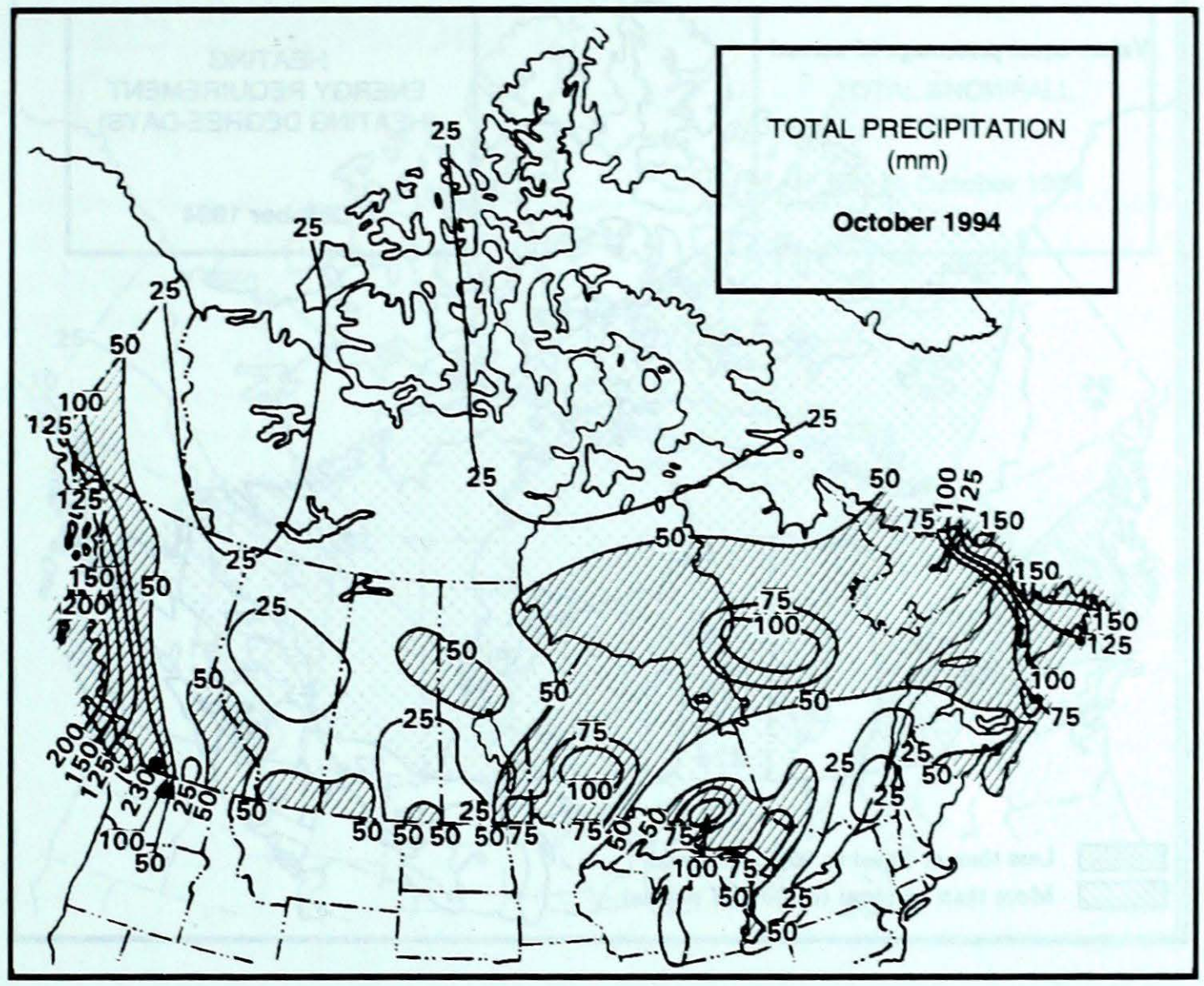
Warmer-than-usual conditions were ushered into the province as an upper ridge established itself over the province for the 24th. The ridge deflected most of the weather systems into the Northwest Territories. On the 25th, the south topped 20°C and on the 26th, record maximums were set at Edmonton (18.8°C) and Fort Chipewyan (8.0°C). A strong southwesterly flow over the majority of Alberta, October 28-29, was set up by an intense system in the Northwest Territories. Winds gusted to 80 km/h and the system produced

up to 30 cm of snow, October 27-29, in northeastern Alberta and adjacent Northwest Territories. As the end of the month loomed, so did the departure of the warmer weather.

Saskatchewan and Manitoba

September's warmth continued into October. The first week of October saw temperatures across the south soar into the mid-twenties. Generally, most days of the month had above-normal temperatures, but as is common for the time of year, conditions changed dramatically. A shift in wind direction from southerly to northerly meant daytime temperatures would differ by more than ten Celsius degrees from one day to the next. By the end of the month, the shorter days saw temperatures struggling into the double digits in the south. In the north, there were days when the mercury stayed below freezing. Precipitation totals were generally above normal. Winnipeg, the wettest location, recorded 87.6 mm of precipitation for the month, compared to the normal of 29.5 mm. The only areas of below-normal precipitation were Regina (63% of normal) and northwestern Manitoba/northeastern Saskatchewan (65 to 90% of normal).

At the beginning of the month, a storm moved through southern Alberta and southwestern Saskatchewan and left 20 to 30 mm of rain in its wake. The system intensified and stalled when it reached southern Manitoba. As a result, 40 to 90 mm of rain was reported October 6-7 in extreme southern Manitoba - Winnipeg recorded 47.2 mm of rain, double the normal monthly rainfall for October. On the 16th, a low centred over the Dakotas gave 20 to 25 mm of rain to extreme southern Manitoba. Another system gave 25 to 50 mm of rain to southern Manitoba, October 17-18. A low pressure system crossed the southern Prairies October 21-22, with strong winds, rain, wet snow and well-below normal temperatures. Thompson, Manitoba, recorded 11 cm of snow, overnight October 22-23. An intense low in the Northwest Territories set up a strong southwesterly flow with temperatures topping 20°C in the south, October 28-29. The month ended with another intense low pressure system that moved out of Alberta and into central Saskatchewan just in time for Hallowe'en. With colder temperatures, the precipitation



fell as wet snow in Alberta and western Saskatchewan.

Ontario

Beautiful fall weather continued through October as warm temperatures and sunny skies prevailed. Monthly mean temperatures ranged from two Celsius degrees above normal in the north - warmest October since 1973, to one degree above in the south. At Thunder Bay, a mean of 7.6°C (normal, 5.4°C) was the third-warmest October since records began in 1941. Sunshine and warm temperatures justified Thanksgiving weekend (October 8-10) standing out in many people's minds - Toronto reached 24.0°C on the 8th.

October 1994 was one of the driest October's ever recorded across most regions of Ontario and the driest since 1984. Monthly total precipitation amounts totalling only 20 to 75% of normal were common from Thunder Bay to Quebec. At Ottawa, only 15 mm of rain fell (normal, 70.3 mm), the driest since 1947. Peterborough recorded only 23 mm, the least since 1975 and Thunder Bay, 27 mm, the least since 1978. In southern Ontario, it was the fifth successive dry month. Toronto's normal precipitation for the five-month period is 366 mm, but only 276 mm fell for the 1994 period. The record (236 mm) was set in 1963. Some wells in south-central Ontario ran dry due to the dry conditions. Conditions for harvesting, however, were excellent. The exception to the dry weather occurred in the Lake of the Woods/Pickle Lake areas in the northwest as well as the Wawa area where precipitation totals were near 100 mm.

Snowfall was conspicuously absent except for the extreme northwest which received amounts totalling near 10 cm. Not even a flake of snow fell anywhere south of a line from Sault Ste. Marie to Temagami. At North Bay, the last snowless October was in 1985. Some areas along the lower Great Lakes had not experienced a hard frost as of the 31st.

Sunshine hours were above normal, resembling normal September values, despite the shortened daylight hours. Sault Ste. Marie recorded 60 hours more than normal sunshine, making it the sunniest October in its 34-year climate history. Sarnia recorded its sunniest October in 27 years.

Quebec

October was warmer and drier than normal at most locations. Mean temperatures

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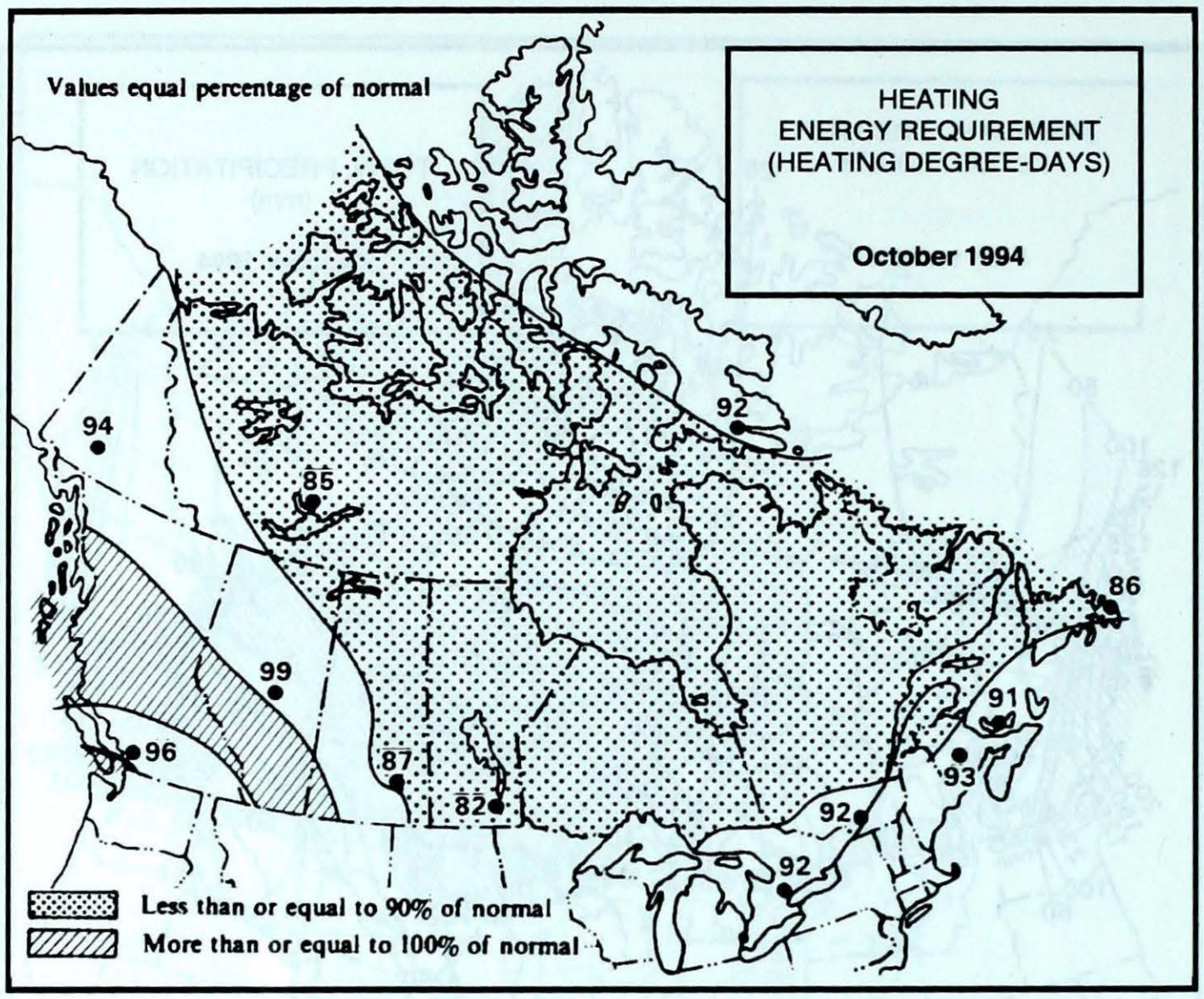
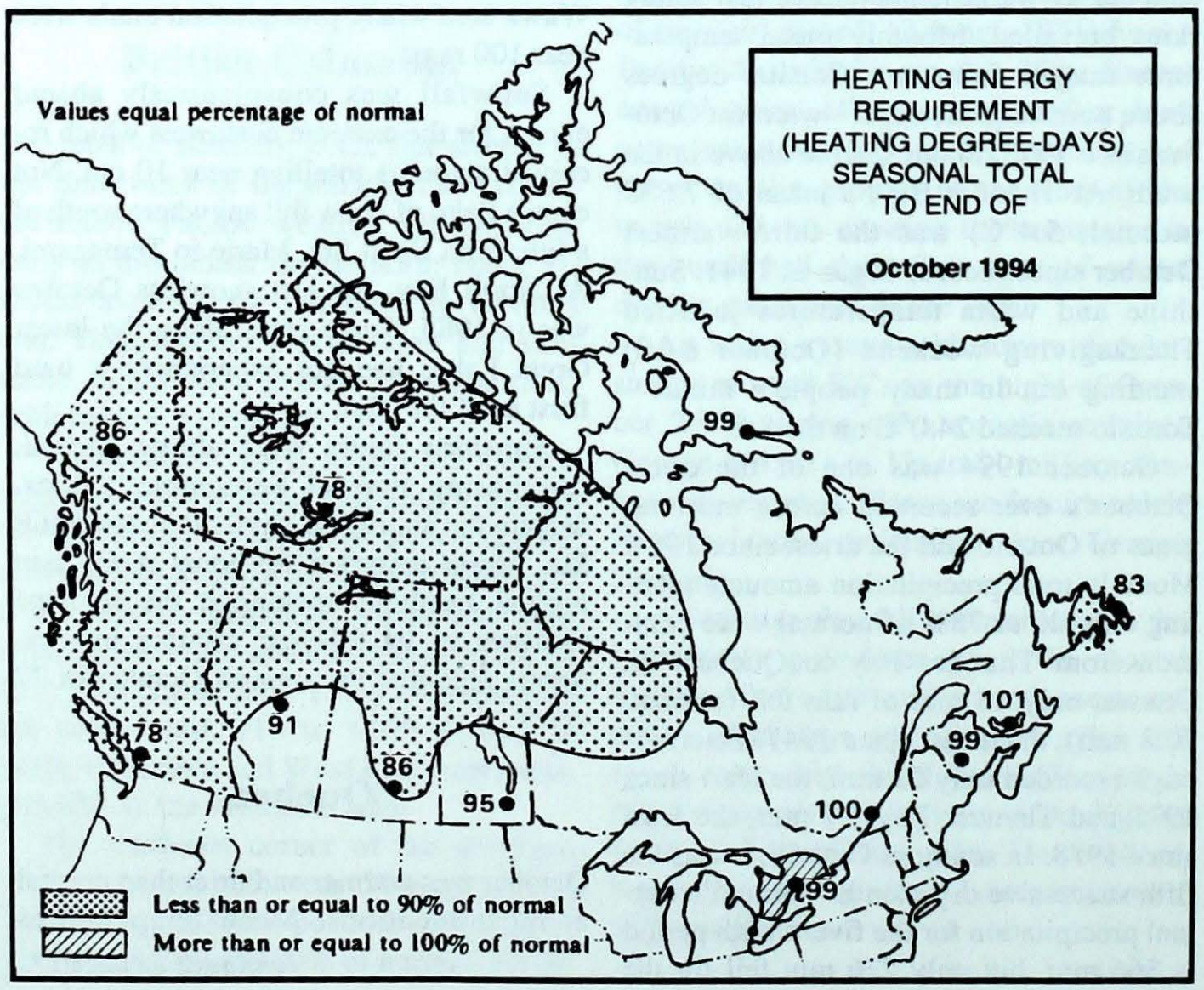


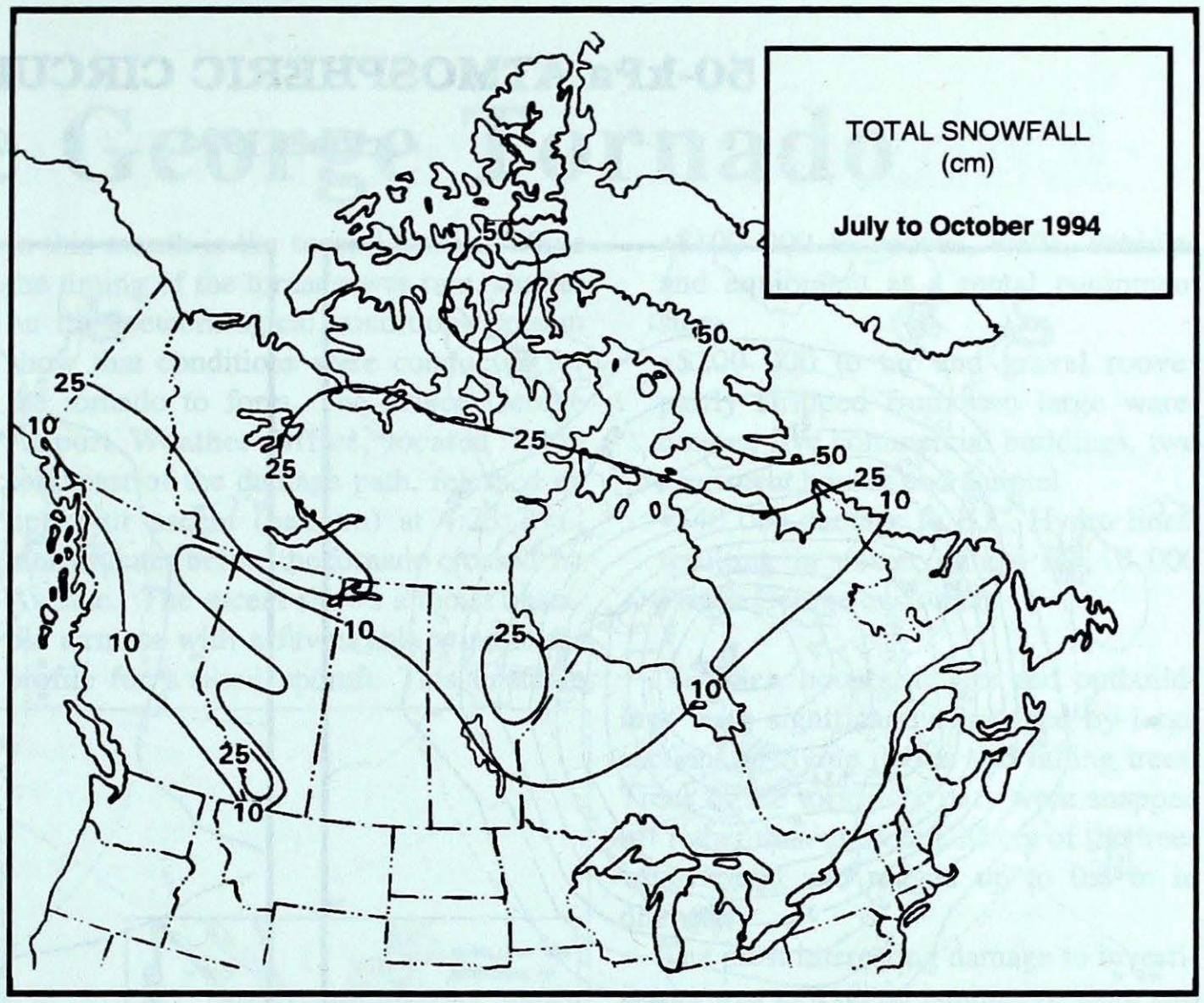


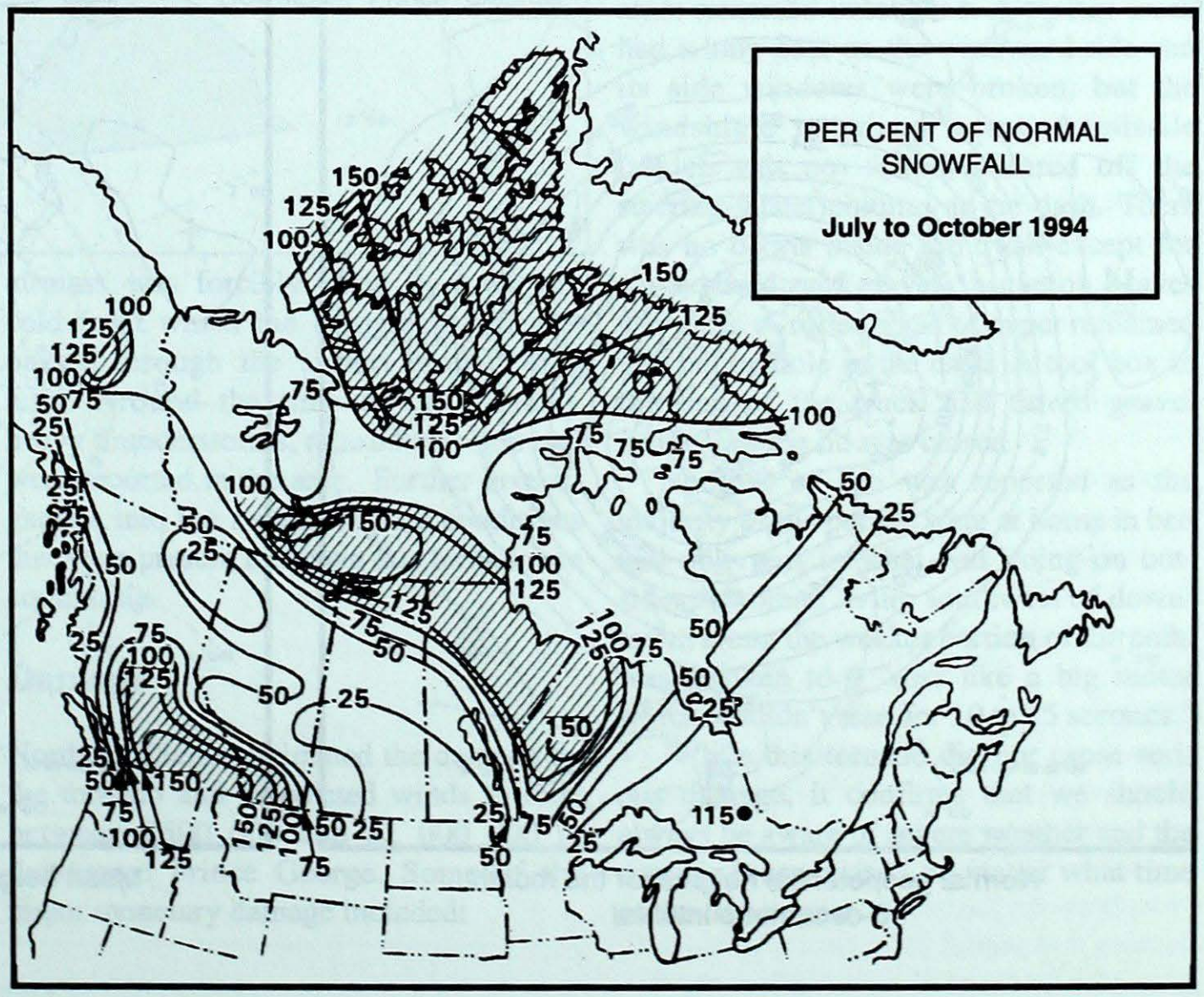
SEASONAL TOTAL OF HEATING DEGREE-DAYS TO END OF OCTOBER

	1994	1993	NORMAL
BRITISH COLUMBIA			
Kamloops	341	398	393
Penticton	331	395	393
Port Hardy	625	666	744
Vancouver	324	377	416
Victoria	397	461	492
YUKON TERRITORY			
Whitehorse	982	1040	1149
NORTHWEST TERRITORIES			
Iqaluit	1838	1872	1850
Inuvik	1352	1389	1623
Yellowknife	867	1146	1121
ALBERTA			
Calgary	688	853	748
Edmonton Mun.	612	720	667
Grande Prairie	751	831	844
SASKATCHEWAN			
Estevan	529	794	535
Regina	525	780	608
Saskatoon	616	844	646
MANITOBA			
Brandon	614	898	619
Churchill	1181	1512	1386
Dauphin	613	851	626
Winnipeg	514	757	546
ONTARIO			
Kapuskasing	704	890	786
London	363	465	347
Ottawa	399	513	420
Sudbury	552	703	565
Thunder Bay	597	828	658
Toronto	340	454	352
Windsor	236	344	249
QUEBEC			
Baie Comeau	787	907	848
Montréal	387	484	389
Québec	510	606	540
Sept-Îles	855	1009	919
Sherbrooke	588	626	612
Val-d'Or	720	846	752
NEW BRUNSWICK			
Fredericton	479	563	483
Moncton	504	600	501
NOVA SCOTIA			
Yarmouth	430	477	502
PRINCE EDWARD ISLAND			
Charlottetown	481	591	468
NEWFOUNDLAND AND LABRADOR			
Gander	633	854	694
St. John's	582	843	702

SEASONAL SNOWFALL TOTALS (cm)
TO END OF OCTOBER

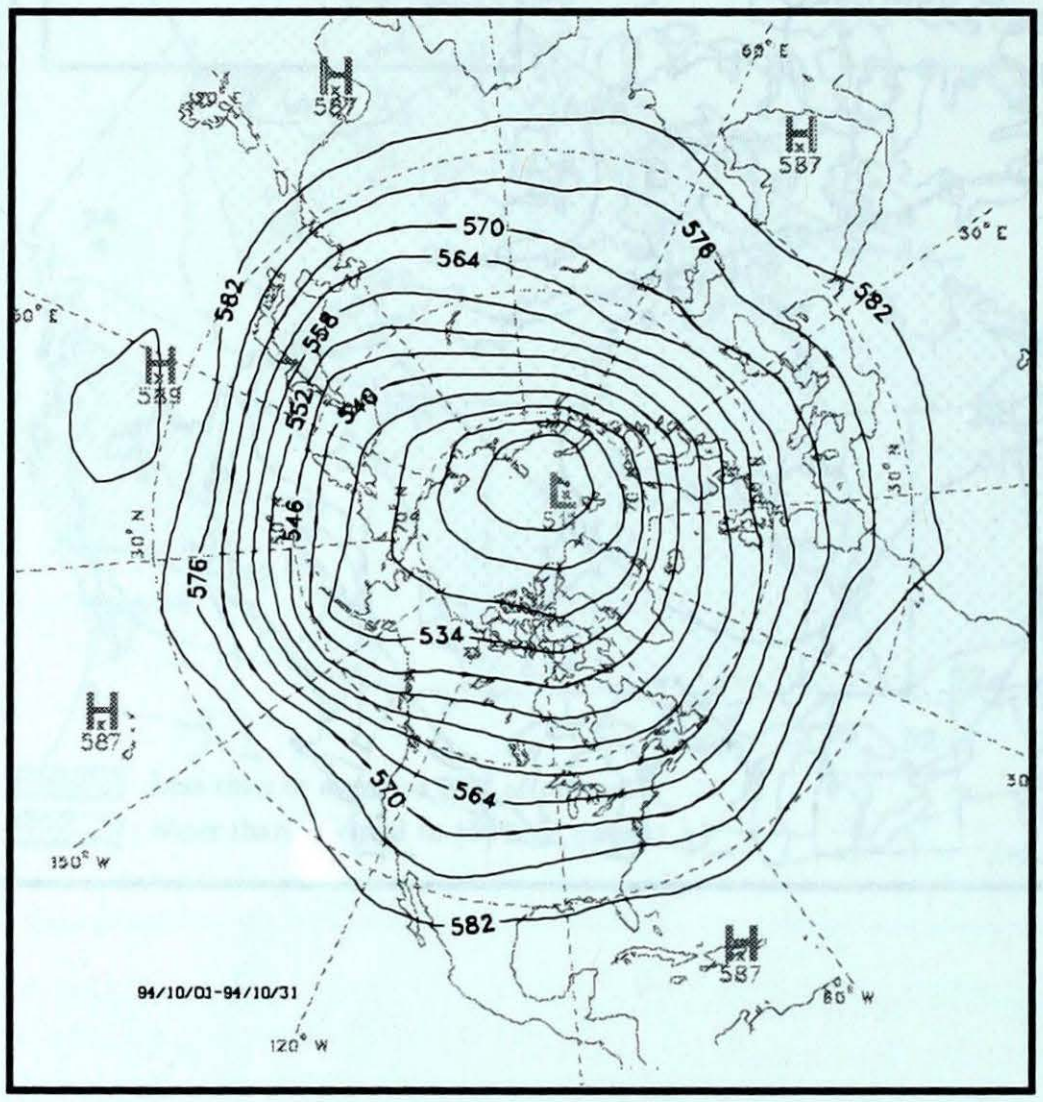
	1994	1993	NORMAL
BRITISH COLUMBIA			
Kamloops	0	0	0
Port Hardy	0	0	0
Prince George	8	0	10
Vancouver	0	0	0
Victoria	0	0	0
YUKON TERRITORY			
Whitehorse	11	21	21
NORTHWEST TERRITORIES			
Iqaluit	50	44	54
Inuvik	45	40	53
Yellowknife	14	20	27
ALBERTA			
Calgary	12	8	19
Edmonton Mun.	4	1	10
Grande Prairie	9	5	16
SASKATCHEWAN			
Estevan	2	1	8
Regina	0	4	10
Saskatoon	0	0	10
MANITOBA			
Brandon	0	0	7
The Pas	3	9	12
Winnipeg	0	5	5
ONTARIO			
Kapuskasing	3	27	24
London	0	3	2
Ottawa	0	2	2
Sudbury	0	4	7
Thunder Bay	0	7	3
Toronto	0	1	0
Windsor	0	2	0
QUEBEC			
Baie Comeau	0	18	6
Montréal	0	1	2
Québec	0	0	4
Sept-Îles	0	30	11
Sherbrooke	0	5	6
Val-d'Or	1	35	16
NEW BRUNSWICK			
Fredericton	0	2	2
Moncton	0	1	3
NOVA SCOTIA			
Sydney	0	0	2
Yarmouth	0	0	3
PRINCE EDWARD ISLAND			
Charlottetown	0	2	3
NEWFOUNDLAND AND LABRADOR			
Gander	1	13	12
St. John's	0	1	4



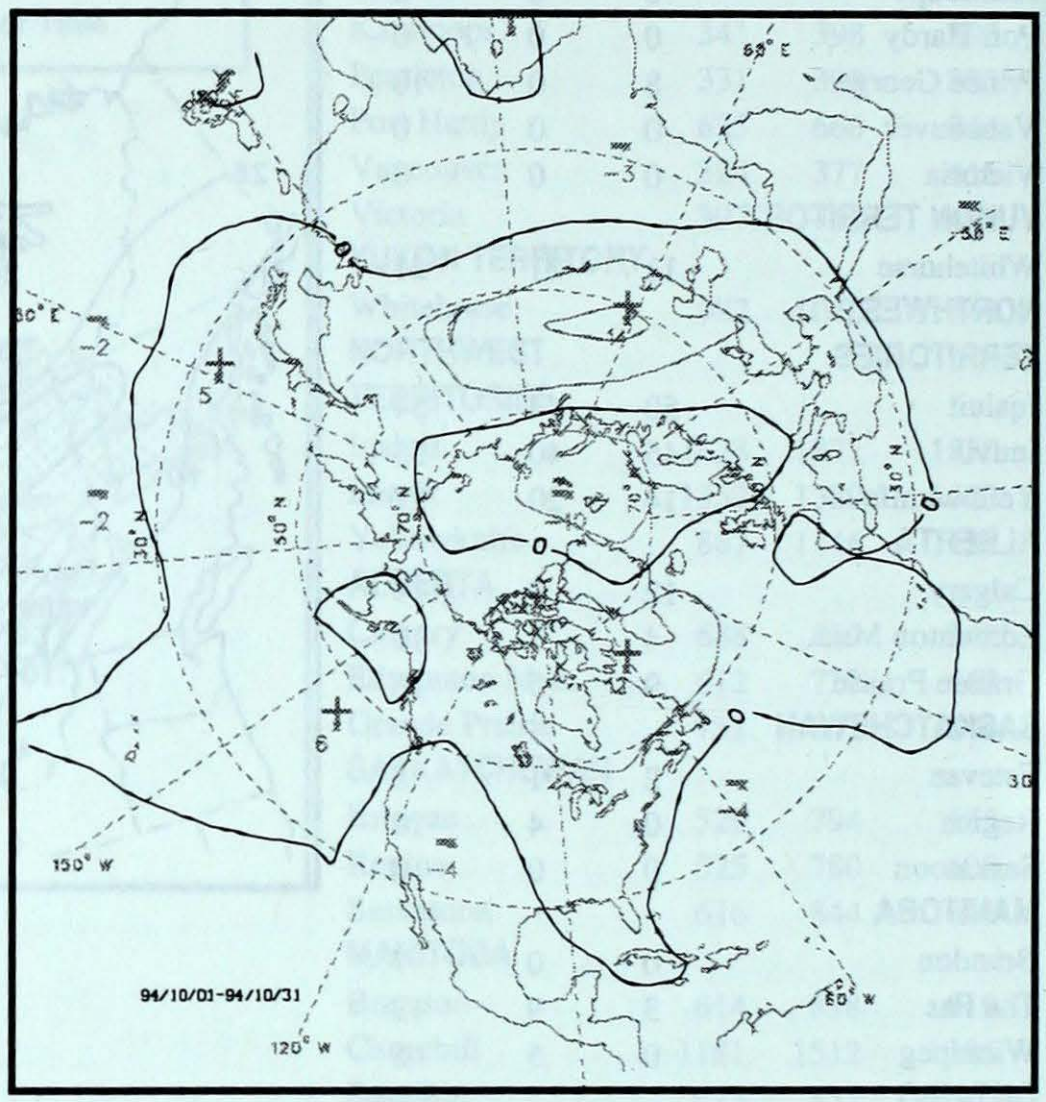


50-kPa ATMOSPHERIC CIRCULATION

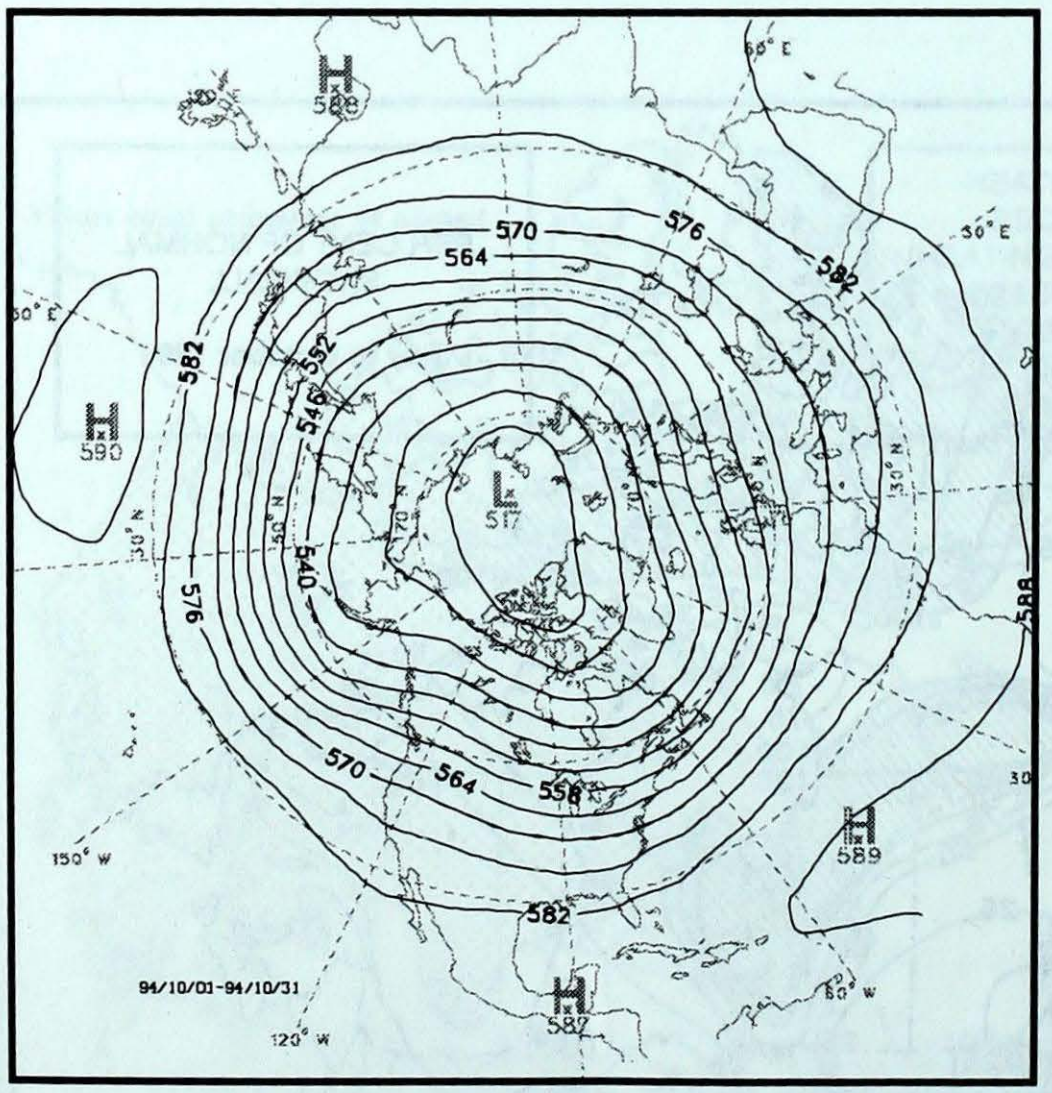
October 1994



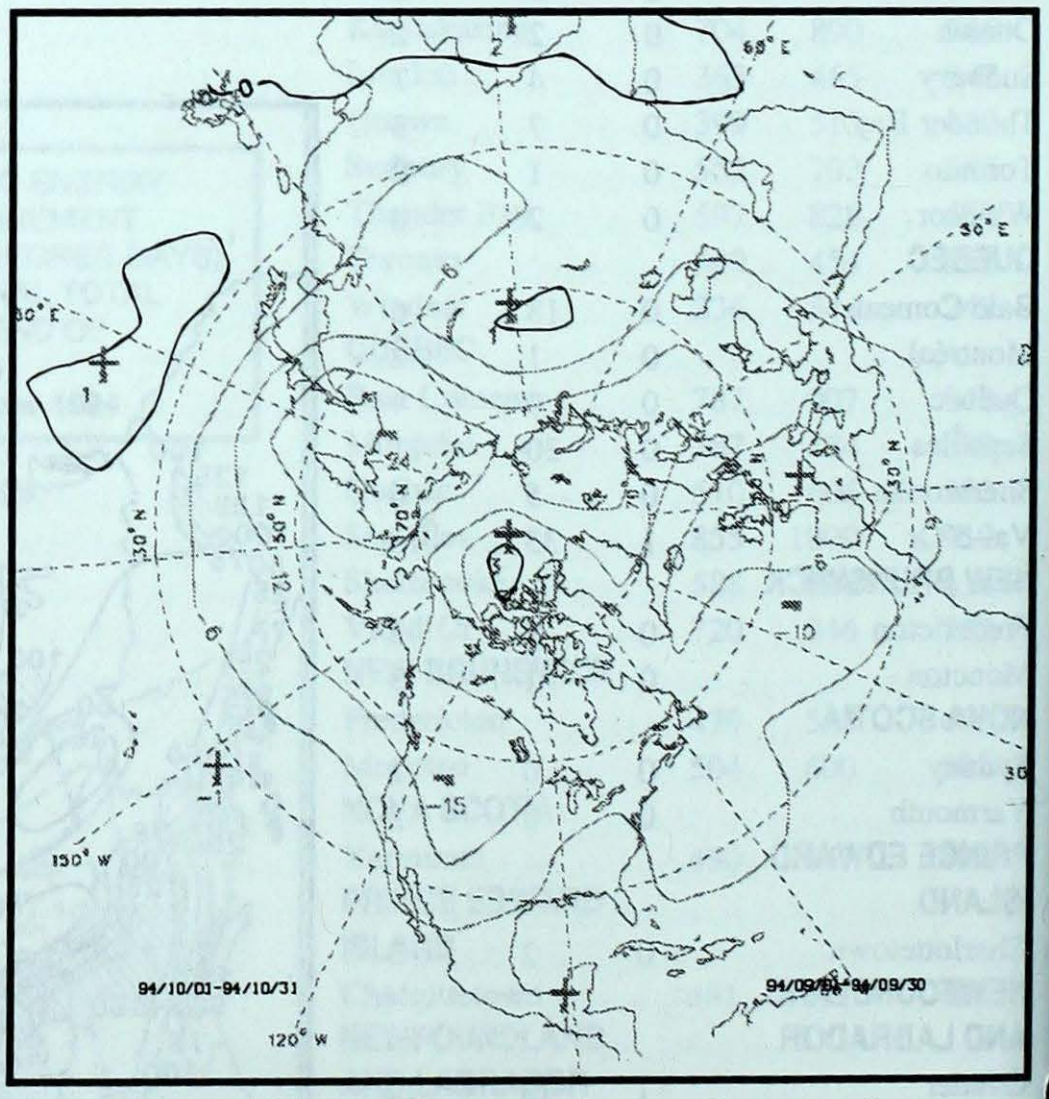
Mean geopotential heights
6-decametre interval



Mean geopotential height anomaly
6-decametre interval



Normal geopotential heights for the month
6-decametre interval



Mean heights difference w/r to previous month
6-decametre interval

Prince George Tornado

At approximately 4:30 a.m. October 26, 1994, a tornado touched down in Prince George, British Columbia. Damage assessments have placed the tornado at a magnitude of F1, with some F2, on the Fujitta scale. The destructive path was from the southwest to the northeast, only three blocks from the centre of the city. The path ranged from 60 m to 140 m in width to over 4 km in length. Figure 1 shows the path that the tornado took through Prince George.

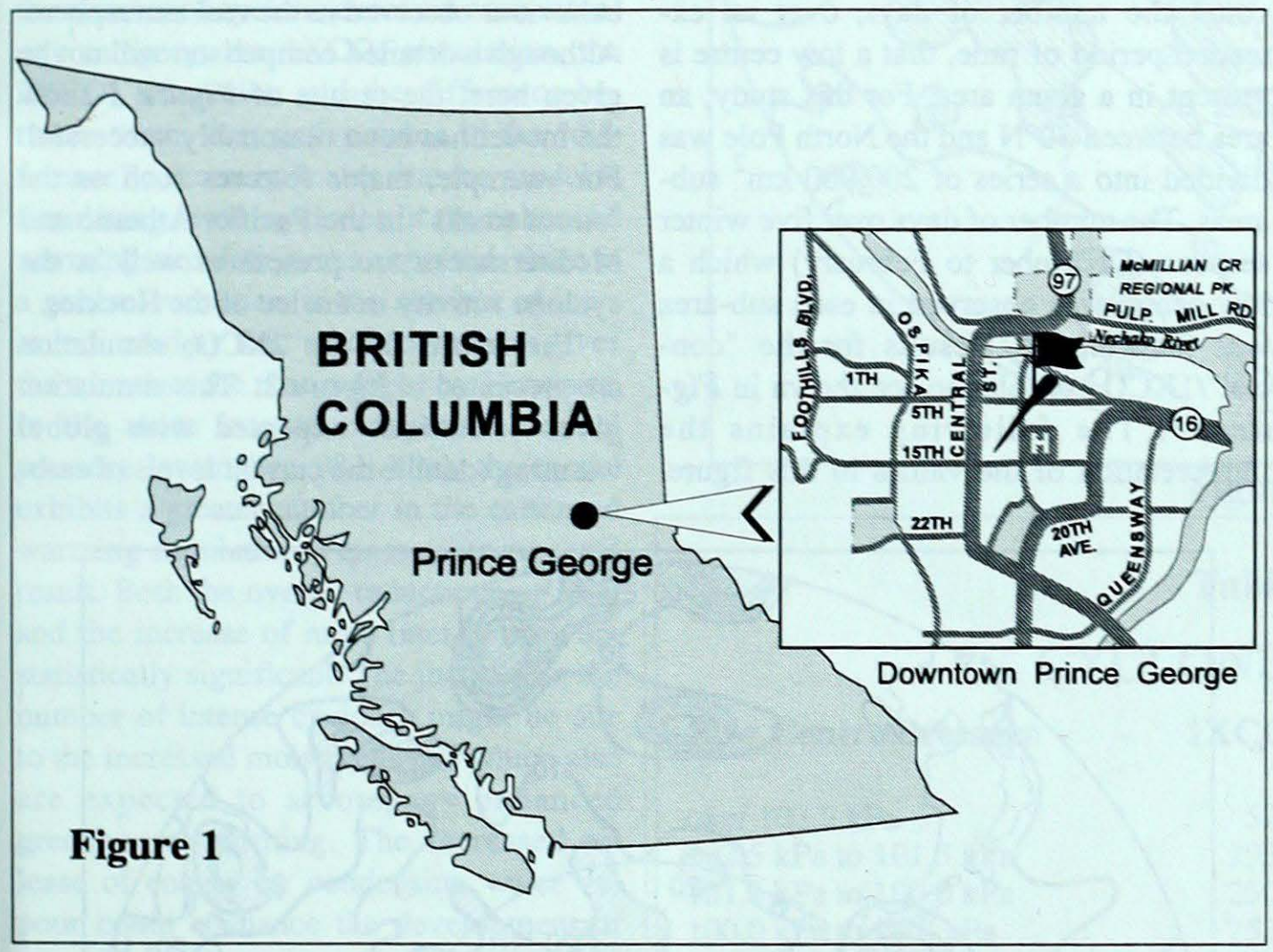


Figure 1

Rarity of Event

The Prince George tornado has exemplified the fact that a tornado can occur at anytime, diurnally or seasonally. The rarity of this event is that the tornado occurred when the frequency of a tornado on the diurnal and seasonal scale were near their lowest values. An article by David Etkin in *Climatic Perspectives*, Volume 15, October 1993, provides graphs of the diurnal and seasonal frequencies of tornadoes in Canada. The graphs show some tornado frequency between midnight and 6:00 a.m., the lowest point being around 4:00 a.m.. Tornadoes have been reported as late as October, but the frequency of a tornado in this month is the second-lowest. While the timing of the tornado was rare, studies on the meteorological conditions present show that conditions were conducive for the tornado to form. The Prince George Airport Weather Office, located 7 km southeast of the damage path, released an upper-air ascent (balloon) at 4:23 a.m., nine minutes before the tornado crossed 1st Avenue. The ascent shows a moist unstable airmass with a favourable wind-shear profile for a tilted updraft. This unstable airmass was forcibly lifted by a violent cold front which the barograph indicates passed through the airport around 4:30 a.m.. Around the time of the tornado, heavy thunderstorms, rainshowers and hail were reported in the area. Further investigations into the meteorological conditions that were present to spawn this tornado are continuing.

Damage

Northern Claims estimated the damage by the tornado and associated winds to total between $500 000 and $1 000 000 in downtown Prince George. Some of the major monetary damage included:

- $100 000 to rooves, walls, vehicles and equipment at a rental equipment store
- $200 000 to tar and gravel rooves partly stripped from two large warehouses, five commercial buildings, two apartment houses and a motel
- $40 000 damage to B.C. Hydro lines, resulting in power outage for 10 000 Prince George customers.

Vehicles, houses, fences and outbuildings were significantly damaged by large sections of flying debris and falling trees. Trees in the tornado's path were snapped off rather than uprooted. Many of the trees were sound and ranged up to 0.8 m in diameter.

The most interesting damage to investigators was to a rental equipment store and yard. Numerous examples throughout the equipment yard show capricious damage. Heavy objects were thrown about while large sail-area objects (i.e. tarps) went untouched. A compact group of five generators in the yard, each the size of a shopping cart and weighing 320 kg each, were lying on their sides. Adjacent generators remained untouched. A pickup truck had a long dent on the windward side and its side windows were broken, but the windshield remained intact. A missile (which was not found) sheared off the steering-wheel column at the dash. There was no debris inside the truck except for some tarred roof gravel, insulation, leaves and glass. A rolled sheet of paper remained in a cubby hole in the dash. A tool box in the bed of the truck had tarred gravel inside, but the lid was closed.

No loss of life was reported as the majority of the people were at home in bed and oblivious to what was going on outside. A woman living southwest of downtown, along the weaker portion of the path, was awoken to a "roar like a big motor which wouldn't start for 10 to 15 seconds."

While this tornado did not cause serious damage, it confirms that we should always be aware of severe weather and the damage it can cause - no matter what time of the day or year.

Enhanced Greenhouse Warming and Cyclones

Introduction

Cyclones (low pressure systems) play an important and active role in the observed climate. Areas under the influence of migratory cyclones experience frequent cloudiness and precipitation. In addition, they experience high variability brought on by the alternation between cyclonic and anticyclonic (high) regimes.

The increase in concentration of certain gases in the atmosphere enhances the greenhouse effect. Previous work suggests that this global warming, brought on by the greenhouse effect, will result in a general temperature increase in the lower atmosphere. The increase in temperature is expected to be greater in the polar regions than in the tropics. This differential warming leads to a reduction of the pole-to-equator temperature difference. Since this temperature difference leads to the development of cyclones, it would be expected that the number of cyclones would decrease in response to global warming.

The influence of global warming on cyclones is addressed through sensitivity experiments using General Circulation Models (GCM). In a sensitivity experiment the first step is to perform a simulation of the present-day climate using currently--observed levels of carbon dioxide. This step is often termed the "control" or $1XCO_2$ simulation. The behaviour of cyclones in the $1XCO_2$ simulation is examined and compared to their behaviour in the real atmosphere. If the model simulation can reproduce the observed cyclone behaviour satisfactorily, then an enhanced warming or $2XCO_2$ is conducted. For this simulation, the amount of carbon dioxide is set to double the current level. The cyclone behaviour in the $2XCO_2$ simulation is examined and compared to the behaviour in the $1XCO_2$ simulation. Any differences between the two simulations indicate changes that would be expected to accompany global warming. The following describes the results of such a sensitivity experiment performed with the Canadian Climate Centre GCM.

Results

One measure of cyclone behaviour is to count the number of days, over an extended period of time, that a low centre is present in a given area. For this study, an area between 30°N and the North Pole was divided into a series of 200,000 km^2 sub-areas. The number of days over five winter seasons (December to February) which a low centre was observed in each sub-area was determined. Results for the "control"/$1XCO_2$ simulation are shown in ***Figure 1***. The following explains the interpretation of the values in this figure. The value 10 at 90°E and 60°N indicates that for 10 days during the five winters, low centres were observed in a 200,000 km^2 area centred on this point. Since the control/$1XCO_2$ simulation was conducted using currently-observed levels of carbon dioxide, it should reproduce the cyclone behaviour observed in the real atmosphere. Although a detailed comparison will not be given here, the results of ***Figure 1*** show the model has been reasonably successful. For example, major features such as the "storm tracks" in the Pacific, Atlantic and Mediterranean are present as well as the cyclone activity in the lee of the Rockies.

The results for the $2XCO_2$ simulation are presented in ***Figure 2***. This simulation gives conditions expected with global warming (double the current levels of carb-

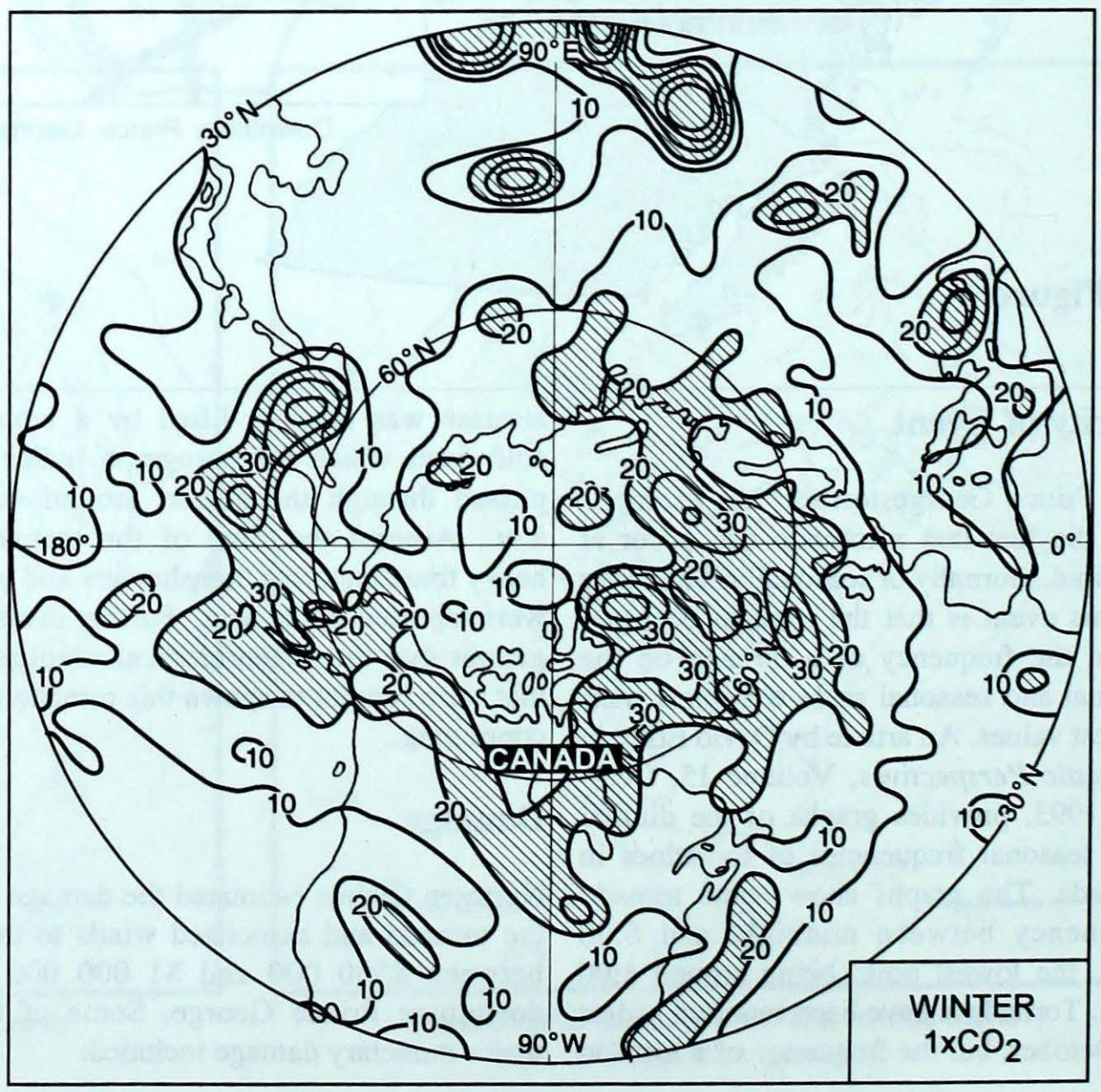


Figure 1

on dioxide). Differences between ***Figure 1*** and ***2*** indicate the expected changes in the behaviour of cyclones in a warmer world. ***Figure 2*** is very similar to ***Figure 1***. Little change has occurred in the geographical positions of the lows. There is a general lowering of the days with cyclones as shown by a "thinning" of the storm tracks.

To make a more detailed comparison of the differences between the two simulations, the number of low centres present in each of the 200,000 km^2 areas north of 30°N are totalled for each simulation. The total numbers are subdivided into nine intensity categories determined by the central pressure of each low. ***Table 1*** displays the number of cyclone events in each intensity category; the $1XCO_2$ simulation, the $2XCO_2$ simulation and the difference between them. A negative value in the "difference" column indicates that the model is simulating fewer cyclones in the enhanced warming simulation. As expected, there is a general reduction in the number of lows as indicated by the "total" row which gives the sum over the nine categories. However, in the more intense categories (central pressure lower than 98.8 kPa), the model exhibits a greater number in the enhanced warming simulation. This is an unexpected result. Both the overall reductions of lows and the increase of more intense ones are statistically significant. The increase in the number of intense cyclones might be due to the increased moisture levels which also are expected to accompany enhanced greenhouse warming. The increased release of energy by condensing water vapour could enchance the development of more intense lows.

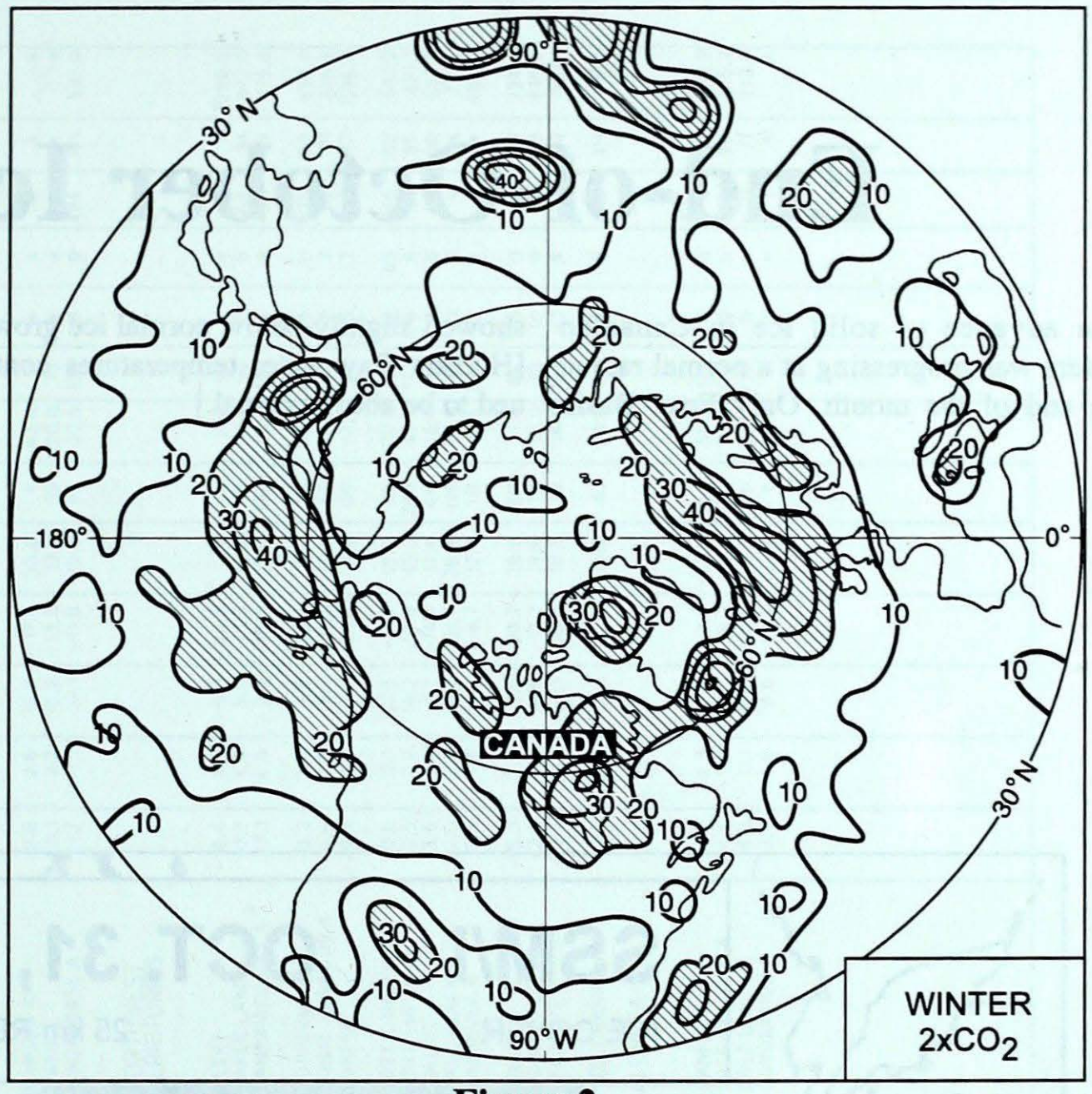


Figure 2

Table 1

CYCLONE COUNTS

Low Centre Pressure	$1XCO_2$	$2XCO_2$	Difference
over 102.5 kPa	524	373	-151
102.5 kPa to 101.3 kPa	1952	1815	-137
101.3 kPa to 100.0 kPa	2509	2122	-387
100.0 kPa to 98.8 kPa	2520	2425	-95
98.8 kPa to 97.5 kPa	1357	1560	203
97.5 kPa to 96.3 kPa	500	596	96
96.3 kPa to 95.0 kPa	123	154	31
95.0 kPa to 93.8 kPa	11	23	12
under 93.8 kPa	0	1	1
Total	9496	9069	-427

Summary

The results of a sensivity experiment performed with the Canadian Climate Centre General Circulation Model indicate that global warming will be accompanied by a decrease in the total number of extratropical lows. Based on theory, this is an expected result which is supported by the model simulations. Although there is an overall reduction in the total number of lows, the simulations suggest an unexpected result, that the number of more intense lows will increase.

Finally, it must be cautioned that this study examined only extratropical low pressure systems and the results of this study cannot be extended to tropical storms such as hurricanes which owe their existence to a different set of physical processes.

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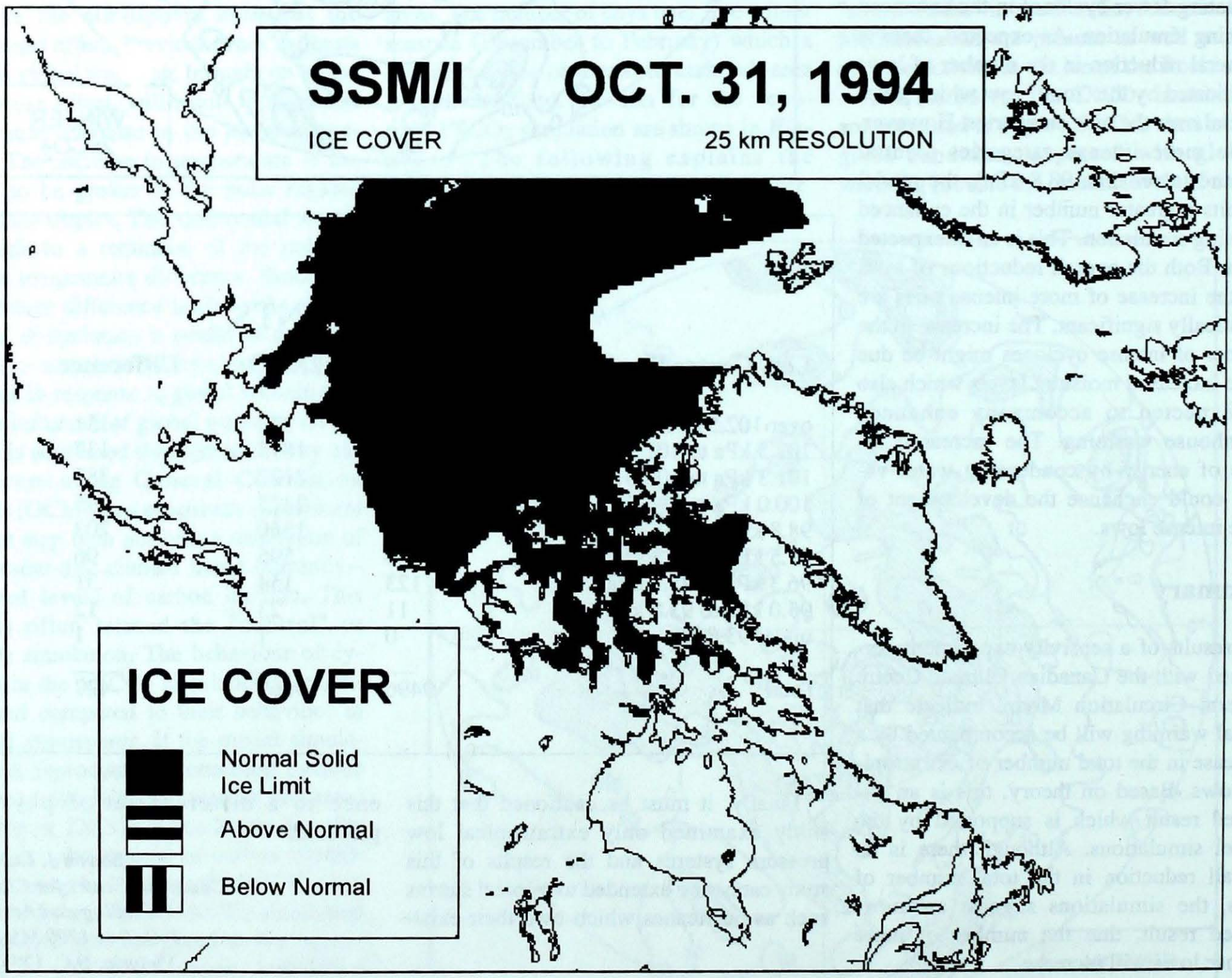
End-of-October Ice Image

The advance of solid ice in Canadian waters was progressing at a normal rate at the end of the month. Only Foxe Basin showed slightly-below normal ice growth. [Hudson Bay water temperatures continued to be above normal.]

Arvids Silis
Climate Processes and
Earth Observation Division



OCTOBER 1994

STATION	Temperature C Mean	Difference from Normal	Maximum	Minimum	Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
BRITISH COLUMBIA													
ABBOTSFORD A	10.4	0.3	21.8	1.6	0.0	0	164.4	107	0	15	120	88	235.7
AMPHITRITE POINT	10.5	0.0	18.5	3.2	0.0	*	260.9	73	0	16	0	*	231.7
BLUE RIVER A	4.9	-0.1	18.2	-4.5	18.6	564	63.2	83	7	13	96	105	*
CAPE SCOTT	9.8	0.0	14.5	4.2	0.6	300	374.6	105	0	21	0	*	245.6
CASTLEGAR A	8.6	0.8	21.2	-1.4	9.0	643	54.2	95	2	7	144	116	291.8
COMOX A	9.3	0.1	19.0	1.8	0.0	0	117.2	92	0	15	135	*	269.9
CRANBROOK A	6.1	0.7	20.7	-4.9	6.6	200	44.2	243	0	8	158	93	370.2
FORT NELSON A	1.4	0.3	14.8	-13.6	3.0	16	16.2	67	0	4	116	*	514.8
FORT ST JOHN A	4.5	0.2	20.9	-8.6	16.2	90	26.2	95	0	5	132	*	417.4
HOPE A	10.1	-0.3	22.1	2.3	0.0	0	230.0	134	0	16	91	87	243.7
KAMLOOPS A	8.4	0.0	19.4	-2.8	0.0	0	42.2	320	0	7	138	101	297.7
KELOWNA A	8.0	1.3	20.6	-2.9	0.0	0	40.0	207	0	9	132	88	310.9
PENTICTON A	9.0	0.3	22.9	-4.0	0.0	0	20.2	132	0	4	130	83	279.5
PORT ALBERNI A	9.7	-0.1	21.4	-0.7	0.0	*	186.9	106	0	12	115	*	258.0
PORT HARDY A	8.7	0.0	15.9	0.8	0.0	0	352.5	144	0	18	122	125	289.7
PRINCE GEORGE A	4.4	-0.4	18.0	-4.7	8.0	88	44.2	75	0	14	105	95	421.0
PRINCE RUPERT A	7.7	-0.4	11.1	4.3	0.0	0	394.5	108	0	25	90	138	318.1
PRINCETON A	6.6	0.0	20.5	-4.5	5.0	185	52.6	231	0	9	128	*	*
REVELSTOKE A	7.5	1.2	18.5	1.0	*	*	*	*	*	*	*	*	*
SMITHERS A	4.3	-0.4	14.2	-4.7	0.0	0	42.0	66	0	11	83	91	424.0
TERRACE A	6.2	-0.2	13.7	-0.7	0.0	0	163.2	98	0	16	60	96	366.0
VANCOUVER INT'L A	10.2	0.2	20.0	3.1	0.0	*	113.0	99	0	14	117	97	242.1
VICTORIA INT'L A	9.7	-0.2	19.3	0.8	0.0	*	85.6	109	0	14	144	100	258.0
WILLIAMS LAKE A	3.8	-1.3	19.1	-5.4	11.4	152	42.5	140	1	8	118	86	438.8

STATION	Temperature C Mean	Difference from Normal	Maximum	Minimum	Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
YUKON TERRITORY													
DAWSON A	-2.8	2.6	8.8	-17.9	33.0	*	43.4	*	*	*	*	*	*
MAYO A	-0.1	2.2	10.3	-13.8	12.2	59	20.8	73	*	*	*	*	*
WHITEHORSE A	1.7	1.1	12.1	-11.6	10.8	67	27.5	128	8	9	94	101	507.0
NORTHWEST TERRITORIES													
ALERT	-14.4	5.3	-8.0	-30.5	*	*	11.8	87	*	*	*	*	1090.8
BAKER LAKE A	-3.7	4.0	5.0	-13.9	13.4	58	17.2	56	3	6	44	61	672.0
CAMBRIDGE BAY A	-7.1	4.6	2.5	-18.9	25.0	162	26.0	176	16	9	29	49	775.8
COPPERMINE A	-3.3	3.3	7.9	-18.3	5.0	24	33.3	103	19	11	38	83	658.0
CORAL HARBOUR A	-5.4	2.4	3.0	-17.9	14.6	55	18.8	51	2	7	62	71	726.4
EUREKA	-20.5	1.6	-7.2	-34.2	6.0	80	3.8	173	3	2	18	197	1194.3
FORT SIMPSON A	0.5	2.1	21.9	-12.7	18.4	99	20.8	78	19	60	86	102	542.2
FORT SMITH A	2.5	2.2	14.2	-10.0	45.0	283	45.8	173	28	6	83	95	481.1
IQALUIT	-3.6	1.4	7.2	-14.7	17.4	44	16.4	37	4	6	58	100	667.5
HALL BEACH A	-7.0	3.5	0.2	-21.7	38.4	179	24.6	116	21	9	*	*	774.1
HAY RIVER A	2.5	1.6	20.2	-6.7	32.4	171	41.4	136	22	4	*	*	480.3
INUVIK A	-5.3	2.8	7.5	-20.7	29.8	80	21.4	64	20	8	30	60	724.4
NORMAN WELLS A	-2.0	2.6	14.0	-12.2	19.6	78	21.0	78	10	6	61	103	618.0
RESOLUTE A	-12.7	2.4	-4.1	-25.5	18.9	128	16.8	122	23	4	20	81	951.1
YELLOWKNIFE A	1.3	2.9	9.1	-7.6	14.0	61	28.9	84	4	8	62	111	517.5
ALBERTA													
BANFF	4.1	-0.3	17.5	-7.0	27.4	154	55.6	178	0	8	*	*	432.2
CALGARY INT'L A	4.5	-1.0	20.7	-8.2	12.2	90	31.4	178	0	5	169	96	416.9
COLD LAKE A	4.6	0.1	19.8	-10.0	4.6	66	23.0	136	0	4	111	71	413.9
CORONATION A	3.0	-1.8	18.6	-9.4	*	*	*	*	*	*	*	*	*

OCTOBER 1994

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EDMONTON INT'L A	4.6	-0.1	19.0	-10.7	2.8	42	18.2	118	0	4	174	107	415.6
EDMONTON MUNICIPAL	5.4	-0.4	18.4	-7.6	3.5	*	14.6	88	0	3	177	109	389.0
EDMONTON NAMAO A	4.9	-0.2	18.6	-6.0	5.4	70	15.6	86	0	4	*	*	406.6
EDSON A	2.0	-1.7	21.0	-10.5	*	*	*	*	*	*	*	*	*
FORT MCMURRAY A	4.2	0.9	19.0	-14.4	4.4	35	24.4	87	0	2	130	104	428.1
GRANDE PRAIRIE A	3.9	-0.3	23.0	-7.7	8.7	74	20.6	77	0	7	142	*	436.2
HIGH LEVEL A	1.9	-0.1	19.6	-13.9	0.8	5	25.8	179	1	4	129	91	500.7
JASPER	3.8	-0.9	18.0	-6.2	2.8	52	25.8	88	0	7	111	*	*
LETHBRIDGE A	6.2	-1.3	20.6	-6.2	36.6	313	69.4	390	0	5	167	95	365.2
MEDICINE HAT A	6.8	-0.6	24.0	-6.0	6.2	77	45.7	282	0	5	156	90	345.5
PEACE RIVER A	3.5	-0.2	23.5	-9.2	2.4	25	23.0	115	0	4	*	*	441.5
RED DEER A	4.2	-0.4	20.3	-9.8	6.3	53	25.1	122	0	5	*	*	415.6
ROCKY MTN HOUSE A	3.0	-1.9	17.6	-8.2	*	*	*	*	1	*	*	*	*
SUFFIELD A	6.5	*	23.2	-7.3	1.9	*	39.7	*	0	4	162	*	358.4
WHITECOURT A	3.5	0.1	17.5	-9.2	6.2	40	14.6	53	0	6	*	*	441.9
SASKATCHEWAN													
BROADVIEW	6.6	2.3	24.2	-10.1	0.0	0	18.2	126	0	4	148	93	354.3
ESTEVAN A	7.3	0.9	25.8	-8.9	1.6	23	45.0	204	0	7	153	81	332.1
HUDSON BAY A	4.9	*	20.0	-7.7	*	*	17.9	*	*	*	*	*	404.8
KINDERSLEY	5.2	-0.1	20.2	-11.1	2.4	35	39.4	283	0	5	166	*	396.4
LA RONGE A	4.2	1.6	17.8	-7.4	4.3	44	57.9	170	0	8	*	*	427.7
MEADOW LAKE A	4.1	*	19.2	-13.0	0.0	*	26.8	*	0	2	142	*	430.2
MOOSE JAW A	7.3	0.9	22.8	-11.3	0.0	0	23.4	128	0	3	158	91	330.5
NIPAWIN A	4.8	*	19.0	-7.8	0.0	*	29.6	*	0	7	128	*	409.6
NORTH BATTLEFORD A	5.7	0.8	17.7	-10.8	0.0	0	25.3	160	0	5	*	*	410.0
PRINCE ALBERT A	4.6	0.9	18.9	-7.8	0.0	0	40.3	187	*	*	*	*	*
REGINA A	6.7	1.5	23.2	-10.1	0.0	0	22.2	118	0	2	157	93	351.9
SASKATOON A	5.6	0.7	20.1	-12.6	0.0	0	18.8	109	0	4	147	*	385.7
SWIFT CURRENT A	6.0	0.2	24.5	-6.9	10.2	112	51.6	285	0	7	165	98	371.9
WYNYARD	6.1	1.6	19.5	-11.0	*	*	15.0	63	*	*	*	*	369.2
YORKTON A	6.2	1.4	23.7	9.2	0.0	0	19.6	86	0	4	157	100	366.1
MANITOBA													
BRANDON A	6.6	1.4	22.4	-10.8	0.0	0	21.8	101	0	4	134	*	350.3
CHURCHILL A	1.0	2.5	13.4	-10.2	*	*	62.6	146	*	*	*	*	338.3
DAUPHIN A	7.2	1.7	23.0	-8.5	*	*	29.4	283	*	*	*	*	335.1
GILLAM A	2.3	3.0	15.8	-9.7	35.8	170	40.4	103	0	7	*	*	486.1
ISLAND LAKE	4.9	2.3	17.1	-6.2	23.0	140	49.2	90	0	6	*	*	403.9
LYNN LAKE A	1.7	2.2	16.0	-12.0	16.8	60	32.7	70	7	6	66	93	507.6
NORWAY HOUSE A	4.7	*	17.1	-6.4	20.8	*	32.6	*	0	9	*	*	410.9

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THE PAS A	5.3	1.7	17.7	-6.5	3.4	33	51.6	155	0	8	111	93	392.5
THOMPSON A	2.4	2.7	17.8	-11.6	20.6	75	35.0	66	0	6	95	121	487.0
WINNIPEG INT'L A	8.1	2.0	18.4	-6.0	0.0	0	87.6	283	0	6	114	75	308.2
ONTARIO													
EARLTON A	7.0	1.6	22.0	-4.8	9.0	120	45.2	65	0	8	*	*	339.2
GERALDTON A	6.5	*	18.7	-3.1	11.0	*	36.8	*	0	10	*	*	358.2
HAMILTON A	9.8	0.4	22.2	-1.4	0.0	0	28.0	46	0	4	*	*	253.9
KAPUSKASING A	6.9	2.5	21.4	-3.5	2.4	11	45.0	58	0	11	*	*	343.3
KENORA A	7.6	2.0	18.1	-2.9	7.0	95	66.4	163	0	11	*	*	322.6
KINGSTON A	9.8	0.8	18.6	-2.4	0.0	0	20.4	25	0	4	168	112	253.5
LONDON A	10.0	0.6	23.4	-0.9	0.0	0	48.6	66	0	6	150	105	246.1
MUSKOKA A	8.2	0.7	23.4	-4.4	0.0	0	79.2	84	0	9	*	*	306.3
NORTH BAY A	8.0	1.6	21.1	-2.1	0.0	0	84.4	96	0	10	135	114	310.4
OTTAWA INT'L A	9.1	1.0	22.7	-2.3	0.0	0	15.4	23	0	6	*	*	277.5
PETAWAWA A	7.1	0.8	24.5	-7.0	0.0	0	41.7	58	0	8	*	*	337.4
PETERBOROUGH A	7.5	0.0	22.3	-7.1	0.0	0	23.2	37	0	4	*	*	324.5
PICKLE LAKE	5.2	2.5	16.5	-3.5	29.2	140	100.8	160	*	13	*	*	398.5
RED LAKE A	6.2	2.2	17.9	-3.8	15.4	141	106.0	210	0	10	96	*	365.9
ST CATHARINES A	10.6	0.5	24.3	-1.2	0.0	0	33.0	46	0	6	196	*	230.4
SARNIA A	11.0	1.1	23.4	0.5	0.0	0	48.4	81	0	7	180	124	215.0
SAULT STE MARIE A	9.1	1.5	20.5	-1.8	0.4	7	70.8	95	0	13	176	149	275.5
SIOUX LOOKOUT A	6.9	2.2	20.0	-2.9	16.6	116	89.3	138	0	11	*	*	343.2
SUDBURY A	7.7	1.4	19.3	-1.6	0.0	0	71.7	96	0	9	124	102	319.2
THUNDER BAY A	7.6	1.9	22.3	-5.6	*	*	27.1	83	0	5	132	103	321.3
TIMMINS A	6.7	1.9	23.4	-4.0	1.7	13	58.6	85	0	12	*	*	349.6
TORONTO	11.5	*	21.8	3.2	0.0	*	33.4	*	0	6	*	*	201.4
TORONTO INT'L A	10.0	0.7	23.8	-1.4	0.0	0	27.4	44	0	4	*	*	249.3
TORONTO ISLAND A	10.5	*	18.1	3.2	0.0	0	21.4	*	0	4	*	*	230.8
TRENTON A	9.2	0.0	21.5	-2.6	0.0	0	31.8	45	0	7	*	*	271.9
WATERLOO WELLINGTON	9.3	1.1	23.1	-2.6	0.0	0	37.4	55	0	5	*	*	268.7
WAWA A	7.3	*	19.2	-2.6	*	*	103.4	*	0	10	*	*	342.1
WIARTON A	9.5	0.5	24.5	-1.8	0.0	0	76.4	93	0	12	154	115	261.3
WINDSOR A	11.8	0.7	23.8	2.4	0.0	0	63.8	112	0	6	*	*	193.3

OCTOBER 1994

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QUEBEC													
BAGOTVILLE A	7.5	2.2	23.6	-4.5	0.0	0	*	*	0	9	*	*	326.0
BAIE COMEAU A	6.1	1.8	17.5	-5.3	0.0	0	22.8	26	0	8	151	125	368.1
BLANC SABLON A	7.3	3.6	10.8	-6.0	0.0	0	35.2	36	0	6	6	*	421.3
CHIBOUGAMAU CHAPAIS	5.1	*	20.6	-6.2	*	*	28.3	*	9	6	53	75	421.3
GASPE A	7.0	*	24.8	-4.5	0.0	*	67.6	*	0	8	163	*	339.8
KUUJJUAQ A	2.3	3.2	11.4	-9.0	21.2	78	48.6	100	0	11	33	67	485.9
KUUJJUARAPIK A	4.9	2.9	16.4	-1.6	14.4	53	112.8	153	0	21	55	117	406.5
LA GRANDE IV A	4.6	*	14.5	-3.3	9.0	*	102.2	*	0	15	48	*	416.9
LA GRANDE RIVIERE A	4.6	*	15.8	-2.7	6.2	*	79.8	*	0	13	50	*	414.9
MANIWAKI	7.5	1.0	22.5	-3.3	*	*	21.0	29	0	4	*	*	326.2
MONT JOLI A	7.9	2.2	23.9	-2.9	0.0	0	29.4	39	0	9	148	128	316.7
MONTREAL INT'L A	9.4	0.7	24.2	-2.8	0.0	0	19.8	26	0	6	161	118	264.7
MONTREAL MIRABEL I/	8.4	*	23.6	-3.5	0.0	*	26.0	*	0	4	165	*	298.0
NATASHQUAN A	6.1	2.0	19.3	-4.3	0.0	0	59.0	54	0	7	127	98	369.3
QUEBEC A	8.4	1.8	22.5	-2.4	0.0	0	41.2	45	0	5	169	146	299.4
ROBERVAL A	7.6	2.4	22.2	-3.4	0.0	0	8.8	14	0	3	137	*	320.5
SEPT-ILES A	5.8	2.2	15.7	-4.9	0.0	0	60.4	63	0	9	133	106	379.6
SHERBROOKE A	7.0	0.6	24.1	-6.6	0.0	0	20.6	23	0	4	153	*	339.7
ST HUBERT A	9.4	1.0	22.6	-3.9	*	*	16.7	22	0	4	161	*	267.1
VAL D'OR A	6.3	1.7	20.8	-6.2	1.0	7	52.2	63	0	11	107	120	361.9
NEW BRUNSWICK													
CHARLO A	7.3	1.9	22.9	-2.8	0.0	0	28.4	31	0	6	169	132	326.7
FREDERICTON A	7.9	0.4	24.4	-4.5	0.0	0	76.2	78	0	40	*	*	311.4
MONCTON A	8.0	0.4	23.9	-4.1	0.0	0	27.2	28	0	5	162	114	311.2
SAINT JOHN A	8.2	0.6	17.9	-1.9	0.0	0	54.6	43	0	4	168	119	305.4

STATION	Temperature C Mean	Difference from Normal	Maximum	Minimum	Snowfall (cm)	% of Normal Snowfall	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	% of Normal Bright Sunshine	Degree Days below 18 C
NOVA SCOTIA													
GREENWOOD A	8.8	0.2	24.2	-3.6	0.0	0	20.2	21	0	5	*	*	286.3
HALIFAX INT'L A	8.9	0.3	21.5	-0.6	0.0	0	33.9	25	0	7	*	*	282.8
SABLE ISLAND	11.3	-0.2	19.2	2.6	0.0	*	55.0	47	0	10	153	128	209.2
SHEARWATER A	9.7	0.2	20.1	-0.6	0.0	0	57.5	30	0	8	189	120	257.3
SYDNEY A	8.7	0.3	23.6	0.2	0.2	8	88.9	72	0	7	129	98	287.9
YARMOUTH A	9.6	0.1	16.8	-1.2	0.0	0	57.0	49	0	4	204	136	261.2
PRINCE EDWARD ISLAND													
CHARLOTTETOWN A	8.6	0.5	21.1	-1.3	0.0	0	42.0	39	0	8	*	*	293.0
NEWFOUNDLAND													
BONAVISTA	8.5	1.3	20.3	-0.7	0.0	0	172.2	169	0	14	*	*	292.9
BURGEO	8.1	1.2	16.3	0.0	0.0	0	93.2	57	0	9	*	*	306.3
CARTWRIGHT	5.0	1.9	15.8	-4.6	1.8	15	185.2	258	0	14	82	92	404.4
COMFORT COVE	7.5	1.7	21.6	-1.0	0.6	5	162.8	138	0	19	*	*	327.4
DANIELS HARBOUR	6.9	1.0	18.0	-3.5	0.4	9	97.4	108	0	12	69	82	355.0
DEER LAKE A	7.1	1.7	20.4	-5.1	0.0	0	71.8	62	0	9	*	*	338.9
GANDER INT'L A	7.5	1.5	21.3	0.1	1.4	11	137.6	131	0	17	105	94	324.1
GOOSE A	4.8	2.1	17.3	-5.9	1.6	6	58.2	76	0	14	68	72	408.3
MARY'S HARBOUR	5.1	1.5	19.0	-3.3	0.4	5	101.0	136	0	10	*	*	398.0
PORT AUX BASQUES	8.6	1.6	16.7	1.2	1.6	50	101.5	46	0	13	102	*	291.1
ST ANTHONY	4.9	1.7	1.7	-3.2	0.1	1	140.6	133	0	13	*	*	406.4
ST JOHN'S A	8.2	1.3	20.1	-1.9	0.0	0	186.9	128	0	16	97	*	304.8
ST LAWRENCE	8.2	1.0	18.9	-2.9	0.0	0	*	*	0	9	*	*	306.3
STEPHENVILLE A	7.7	0.7	17.3	-1.1	0.0	0	106.8	96	0	15	103	*	318.0
WABUSH LAKE A	3.5	4.2	15.4	-7.2	9.0	*	58.9	69	0	14	68	*	448.6

AGROCLIMATOLOGICAL STATIONS — OCTOBER 1994

STATION	Temperature C				Snowfall (cm)	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	Degree days above 5 C	
	Mean	Difference from Normal	Maximum	Minimum							This month	Since jan. 1st
BRITISH COLUMBIA												
AGASSIZ	10.9	0.0	22.0	3.0	0.0	197.6	112	0	15	122	182.0	2396.5
SUMMERLAND	8.6	-0.4	21.5	-2.0	0.0	29.0	165	0	5	131	113.3	2425.4
ALBERTA												
BEAVERLODGE	4.0	-0.4	23.5	-6.5	12.0	25.5	89	0	8	139	28.0	1426.5
LACOMBE	3.6	-1.1	20.1	-12.0	0.0	15.6	89	0	3	**	23.6	1499.4
VEGREVILLE	3.6	0.5	19.0	-11.5	10.4	34.4	220	2	5	*	*	1399.5
SASKATCHWAN												
INDIAN HEAD	6.7	1.4	24.5	-11.0	0.0	22.0	89	0	6	**	81.3	1708.3
MELFORT	5.2	1.0	18.0	-7.0	0.0	15.9	60	0	2	132	42.0	1553.5
SCOTT	5.0	0.8	18.0	-9.5	1.5	28.0	204	2	5	160	29.6	1534.1
SWIFT CURRENT	6.0	0.1	24.0	-7.0	4.0	42.7	264	0	7	**	69.4	1815.5
MANITOBA												
BRANDON	7.3	1.7	22.6	-11.0	0.0	22.0	94	0	5	**	90.2	1726.5
MORDEN	8.6	2.8	19.0	-3.0	0.0	181.0	481	0	9	145	126.5	1994.5
GLENLEA	8.0	1.0	18.5	-5.5	0.0	116.4	370	0	10	122	114.7	1847.9
ONTARIO												
DELHI	10.1	0.2	23.0	-1.5	0.0	59.2	79	0	7	**	158.2	2186.8
ELORA	9.0	0.5	22.8	-2.9	0.0	35.7	54	0	6	**	*	1902.0
HARROW	11.2	-0.1	23.0	0.0	0.0	23.4	42	0	3	180	208.5	2377.4
KAPUSKASING	6.9	2.3	21.5	-2.5	0.2	45.4	61	0	12	96	85.4	1377.8
OTTAWA	9.2	0.7	23.1	-2.1	0.0	23.2	34	0	6	153	144.5	2113.3
SMITHFIELD	10.2	1.3	23.4	-2.9	0.0	29.8	37	0	5	**	163.1	2202.1

Courtesy of Agriculture Canada

STATION	Temperature C				Snowfall (cm)	Total Precipitation (mm)	% of Normal Precipitation	Snow on ground at end of month (cm)	No. of days with Precip 1.0 mm or more	Bright Sunshine (hours)	Degree days above 5 C	
	Mean	Difference from Normal	Maximum	Minimum							This month	Since jan. 1st
QUEBEC												
LA POCATIERE	8.3	1.4	21.5	-4.0	0.0	23.2	32	0	5	177	106.3	1603.4
L'ASSOMPTION	6.7	0.7	14.2	3.1	0.0	15.0	19	0	5	142	*	1938.7
NORMANDIN	6.4	1.8	22.6	-5.3	0.0	18.3	31	0	12	131	69.2	1350.6
NEW BRUNSWICK												
FREDERICTON	8.9	1.2	24.5	-3.5	0.0	84.0	83	0	3	184	122.0	1897.0
NOVA SCOTIA												
KENTVILLE	9.2	0.1	23.5	-2.5	0.0	20.0	20	0	5	148	131.0	1982.6
NAPPAN	9.2	0.9	22.0	-4.0	0.0	27.4	27	0	7	149	132.0	1789.5
PRINCE EDWARD ISLAND												
CHARLOTTETWN	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
NEWFOUNDLAND												
ST.JOHN'S WEST	8.6	1.5	21.5	-3.0	0.0	206.3	142	0	13	98	116.9	1418.1

Courtesy of Agriculture Canada

... continued from page 5

ranged from 2.3°C at Kuujjuaq (normal, -0.8°C) to 9.4°C at both Dorval and St-Hubert (normals, 8.3°C and 8.0°C). The mean temperature for the province, based on 23 stations, was 6.1°C (normal, 4.8°C respectively). In Sept-Îles, with a mean of 5.8°C, it was the warmest since 1966 (6.6°C). Gaspé with a mean of 7.2°C, was the warmest since 1970 (7.6°C). Record monthly mean temperatures were set at La Grande Rivière (4.6°C, old record 2.9°C, 1977) and Blanc Sablon (7.3°C, old record 6.1°C, 1968). Daily record temperatures included 24.8°C at Gaspé on the 9th (old record 18.0°C, 1985) and near the end of the month, 16.2°C at Québec City (old record 16.1°C, 1971).

Dry conditions were evident as a few stations had record-low precipitation totals - Montreal Mirabel Airport (26.0 mm, old record 44.2 mm, 1982); Sherbrooke (20.6 mm, old record 22.1 mm, 1977); and Baie Comeau (22.8 mm, old record 25.8 mm, 1984). No snow was recorded at Sept-Îles, unusual for October and had not been repeated since 1947. Low snowfall totals included Val-d'Or with only 1 cm of snow (normal 14.7 cm); a trace at Bagotville (normal 11.2 cm) and a trace at Québec City (normal 3.4 cm). Sunshine totals were generally above normal in the south and below normal in the north. Examples of below-normal sunshine were Inukjuak (20.2 hours, normal 50.1 hours) and La Grande (50.1 hours, normal 70.9 hours). In the south, Québec City recorded 169.5 hours of sunshine (normal 122.0 hours).

Maritimes

With only a few exceptions, October was generally sunnier, drier and warmer than normal. The dry weather was the most significant feature and caused problems with forest fires in New Brunswick. Rural residents throughout the region had to deal with dry wells. In Prince Edward Island, it was the third-driest October at Charlottetown Airport since records began in 1943. Some rivers and streams flowed at close to record-low levels.

Mean temperatures for the month were warmer than normal by 0.4 to 1.8 Celsius degrees with the only exception being Sable Island, 0.2 degree below normal. The mean monthly temperature for the Maritimes was 8.7°C, compared to the normal of 8.1°C. Thanksgiving weekend saw record- to near-record temperatures. Sydney, Nova Scotia, recorded 23.6°C on the 8th (old record, 22.2°C, 1882). Charlottetown, at 21.0°C on the 9th, beat the 1966 record of 20.6°C.

Precipitation totals were 19 to 82% of normal. In New Brunswick, rainfall totals ranged from 27 mm at Moncton (26% of normal) to 76 mm at Fredericton (82% of normal). Nova Scotia's range was 20 mm at Dentville (19% of normal) to 89 mm at Sydney (65% of normal). Charlottetown, P.E.I., recorded 42 mm (38% of normal). Much of the precipitation occurred on the weekend of the 22nd, helping to extinguish the forest fires in New Brunswick. Up to that point in the month, Fredericton had only received 3 mm of rain but welcomed the 72 mm that weekend. Snow was seen in only a few areas, with Cape Breton recording the greatest amount (0.2 cm at Sydney). St. Leonard, New Brunswick and Charlottetown both reported a trace.

Sunshine hours were above normal, except Charlottetown (2.7 hours below normal). Fredericton reported the sunniest October since 1949 (45.1 hours more than the normal of 139.0 hours). Other sites in New Brunswick ranged from 22.2 to 36.2 hours greater than normal. In Nova Scotia, sunshine ranged from 0.1 hour above normal at Sydney to 52.6 hours above normal at Yarmouth (normal, 151.6 hours).

Newfoundland and Labrador

Cloudy and warm best describes the weather over the Island. Temperatures averaged one to two Celsius degrees above normal but sunshine was below normal. Comfort Cove recorded the highest temperature, 21.6°C on the 10th. Deer Lake recorded the lowest temperature, -5.1°C on the 13th. Rainfall divided the Island into two parts. Southwestern and central areas received 30 to 60 mm less rain than normal while eastern and extreme northern regions received 30 to 70 mm above normal. Due to the unusual warmth, snowfall was practically nonexistent. St. John's was the wettest location with 186.9 mm (123% of normal). A cold front crossed Newfoundland on the 11th, with a low pressure system forming along it, off the Avalon Peninsula. The system stalled, resulting in a two-day rainfall total of 64.9 mm at St. John's. Strong northerly winds developed October 12-13, with a peak gust of 133 km/h at Bonavista. A 15-metre fishing boat was smashed during the storm with the loss of five lives.

Labrador's temperatures ranged from two to four degrees above normal. Mary's Harbour recorded the warmest temperature, 19.0°C on the 10th. Wabush Lake at -7.2°C on the 17th, was the coldest. Sunshine was below normal along the coast and precipitation was well-above normal. Cartwright recorded 185.2 mm (normal 78.3 mm), the greatest precipitation in Labrador. This represented 236% of normal precipitation. On the 15th, a daily-record rainfall of 76.2 mm fell at Cartwright (old record, 16.8 mm, 1961). Inland, precipitation totals were generally 20 mm below normal. Snowfall was lacking, being 10 to 35 cm below normal. Wabush recorded only 9.0 cm of snow, a record, much less than the former 1981 record of 14.0 cm.

Just a reminder...

Please complete and mail back the questionnaire sent out with the September 1994 issue of ***Climatic Perspectives***.

Thank you