Environment Canada Environnement Canada

Climatic Perspectives

Monthly Review **MARCH – 1990** *Vol. 12*

CLIMATIC HIGHLIGHTS

Two major events dominated the weather news for March. On the east coast, Newfoundland extended its streak of below normal mean weekly temperatures to 15 weeks in some of the western parts of the Island, while on the central Prairies some areas recorded a five to six-week stretch of abnormally warm and dry weather.

In the Gulf of St. Lawrence and the shipping lanes between Anticosti Island and Port aux Basques, the persistent cold has maintained and thickened the ice pack. Coast Guard ice-breakers have been busy trying to clear lanes and free the ice-bound vessels. Figure 2 shows that for Stephenville, Nfld., mean weekly temperatures were well below-normal for 15 consecutive weeks; an indication of the generally cold weather in the Gulf of St. Lawrence area.

Perennial concern over potential drought continued to trouble the Prairies in this relatively dry, warmer than normal March. While heavy snow and rain in the second week of the month somewhat alleviated the surface water shortage in some areas, parts of southern Manitoba and Saskatchewan face serious shortages of surface and ground water unless precipitation increases significantly. Another relatively snow-free winter has failed to provide the snow cover required to insulate the soil, to combat erosion, and to furnish melt-water. Figure 1 shows that except for three weeks during the 15-week period shown, temperatures were well above-normal for Saskatoon, Sask., particularly for the periods December 25, 1989 to January 28, 1990 (periods 2 to 6 on Figure 1) and February 19 to March 18, 1990 (periods 10 to 13 on Figure 1).

Mean weekly normal and observed temperatures for the period Dec.18, 1989 - April 01, 1990

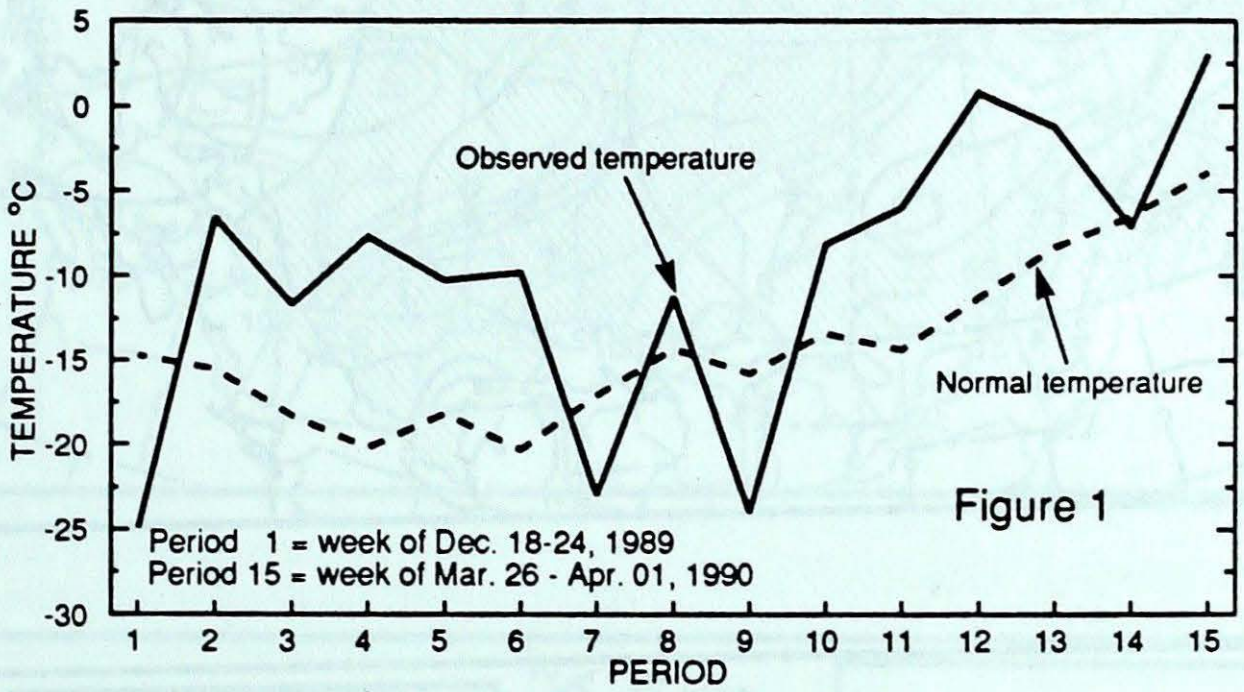


Figure 1

Saskatoon, Sask.

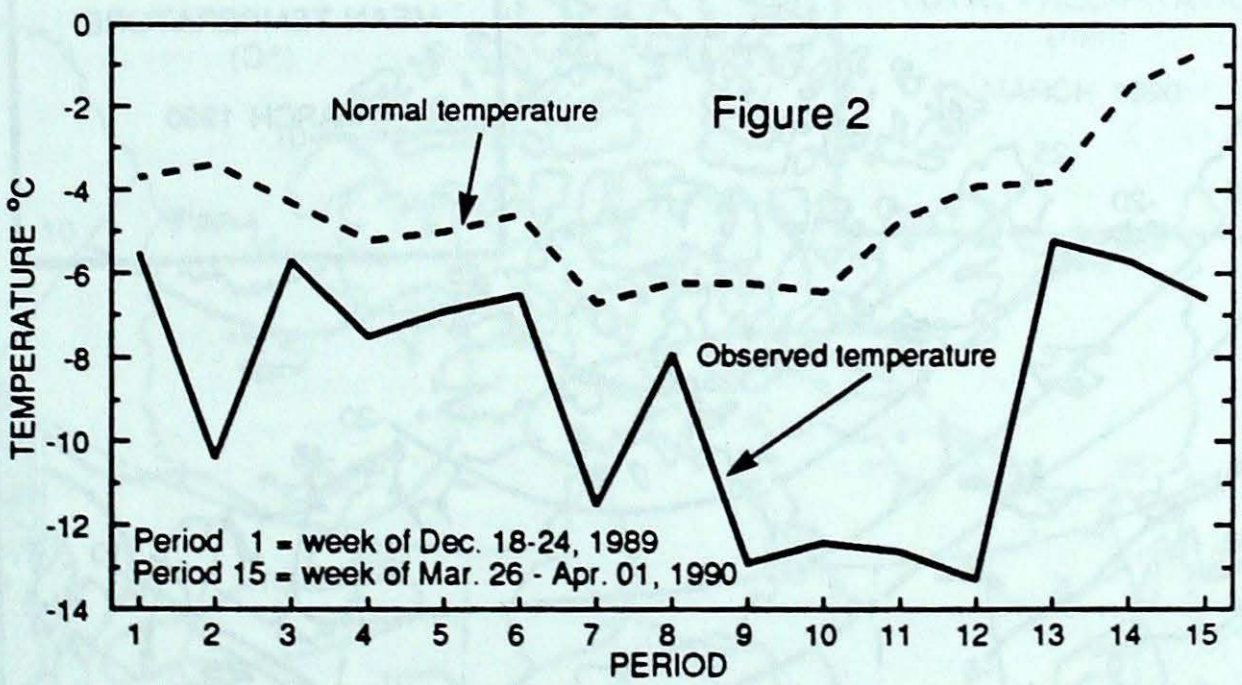
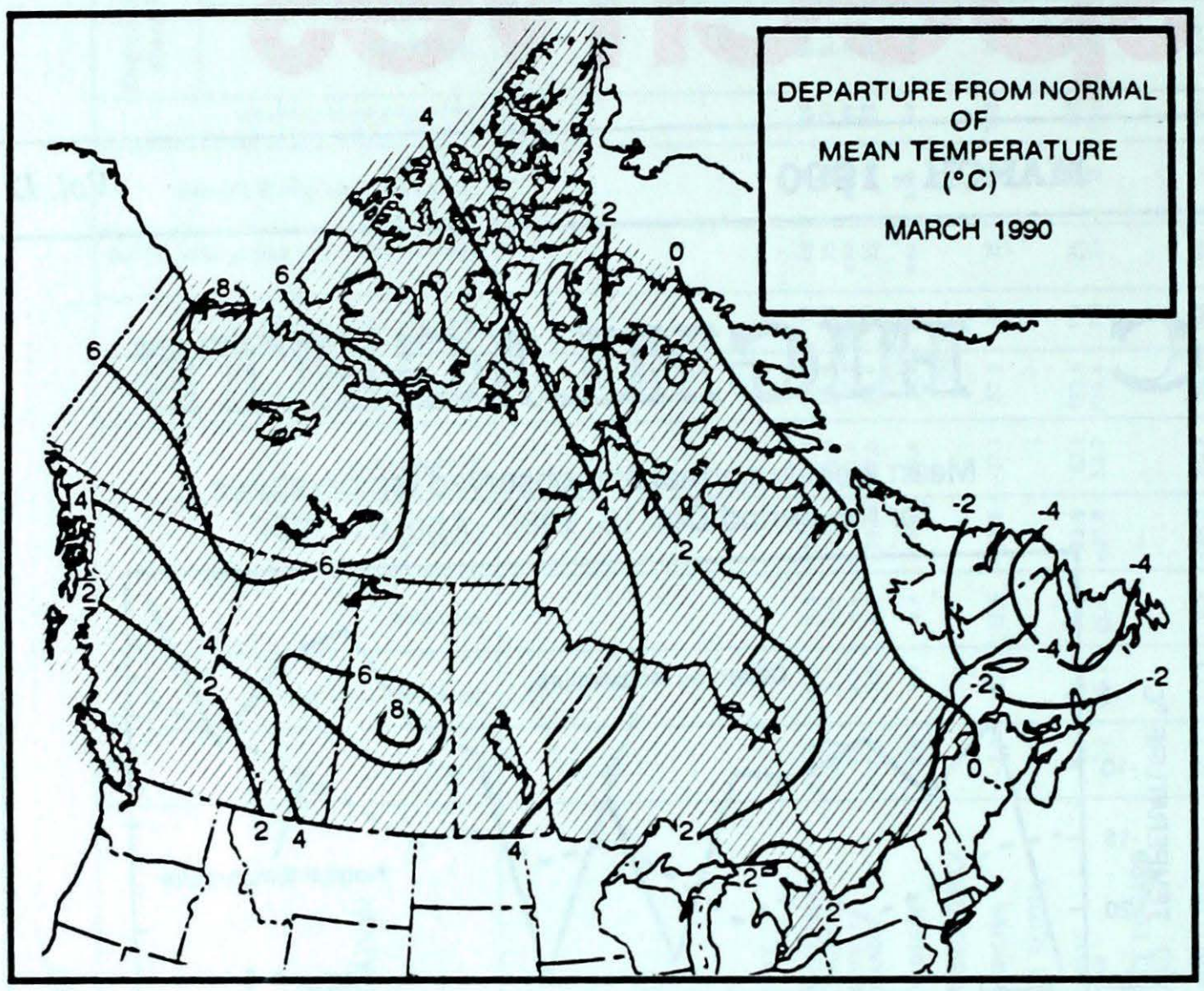
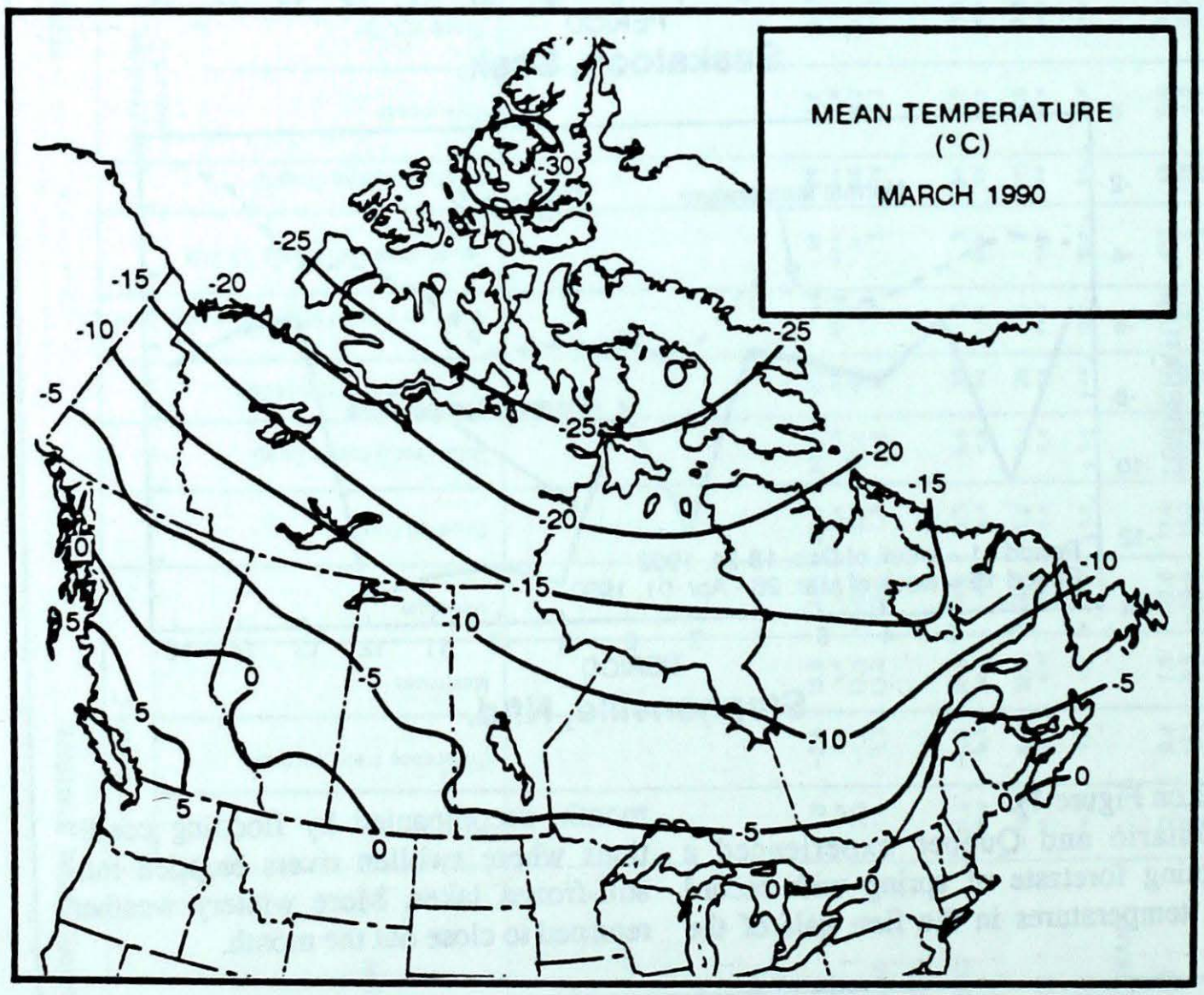


Figure 2

Stephenville, Nfld.

Ontario and Quebec experienced a tempting foretaste of spring with record high temperatures in the first half of the month, accompanied by flooding conditions where swollen rivers emptied into still-frozen lakes. More wintery weather returned to close out the month.





Across the country

Yukon and Northwest Territories

March seemed to be a better than normal month for Yukon residents. It was brighter, warmer and drier with a number of record-breaking temperatures set in the southern and central regions, where some spring flowers have already emerged. Accompanied by greater than normal hours of bright sunshine, daytime temperatures in the south managed to climb well-above freezing on many occasions. In contrast, in the more northern areas minimums still dropped down to the mid-minus forties.

Heavy precipitation fell along the coastal passes into the southern Yukon, but little made its way inland into the southern and central locations, where monthly precipitation totals were less than half the normal. Whitehorse received only 5 mm, less than half the normal. An area around Ross River recorded only a trace of precipitation all month. This was in stark contrast to the Ogilvie Mountains, in the northern Yukon, where precipitation amounts were more than three times the normal.

Much the same type of weather prevailed in the Mackenzie Valley. The Arctic Winter Games, held in Yellowknife, were favoured with very pleasant weather conditions. Above-freezing, daily-record maximum temperatures were even broken along the Arctic coast. Because of the warmer weather, restrictions were placed on winter roads, and by the end of the month some of the bush roads were shut down. Airlines began to limit the use of ski planes flying out of Yellowknife.

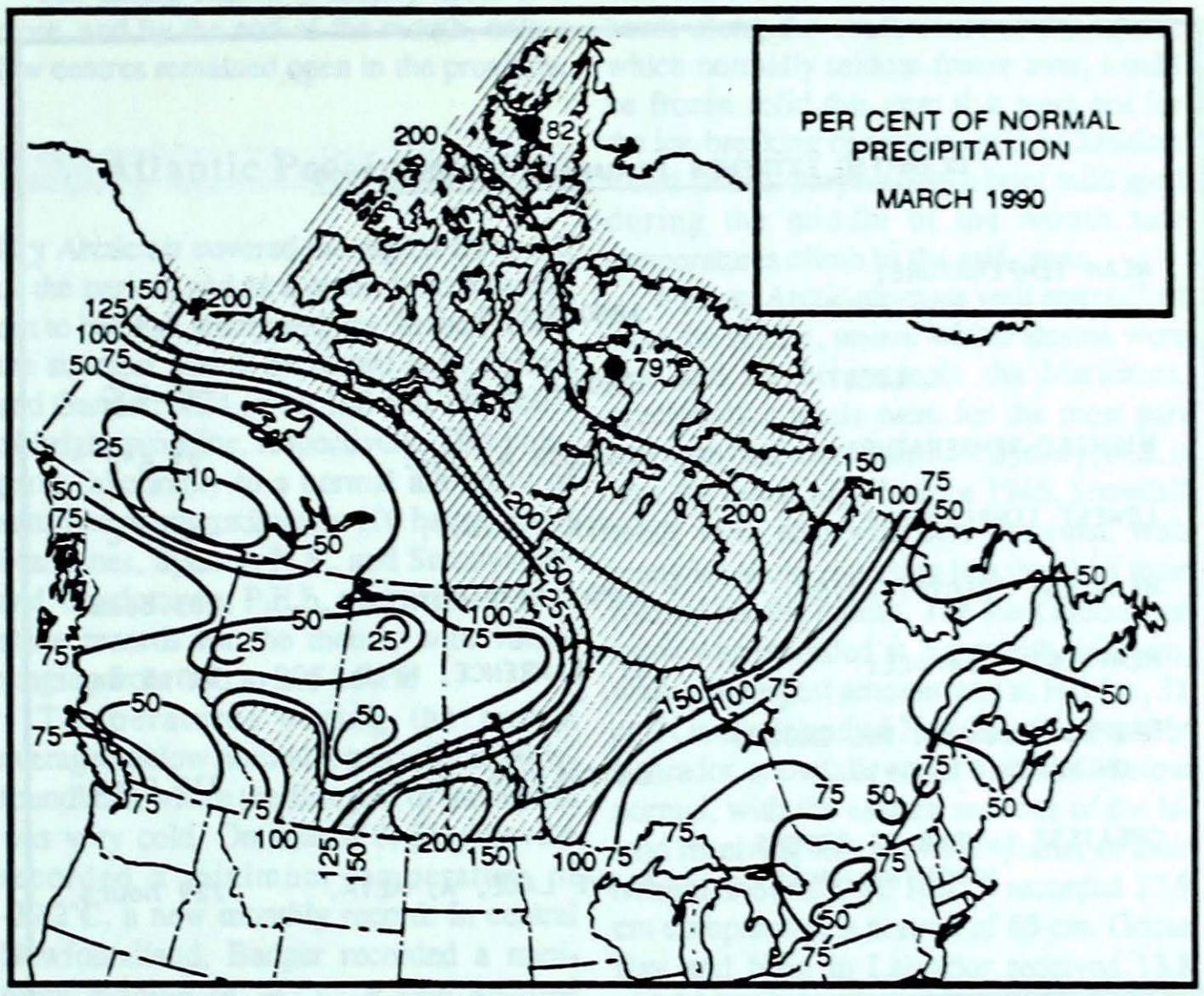
It was a much different story in the eastern Arctic, where cold temperatures, heavy snowfalls and blizzard conditions were the order of the day. Because of a succession of low pressure disturbances, a good portion of the Arctic had snowfalls that were more than double the normal. The south-central area of the Northwest Territories had extremely heavy snowfalls this month. Baker Lake, near Hudson Bay, received 43.7 cm compared to a normal of 7.6 cm - more than four times the normal.

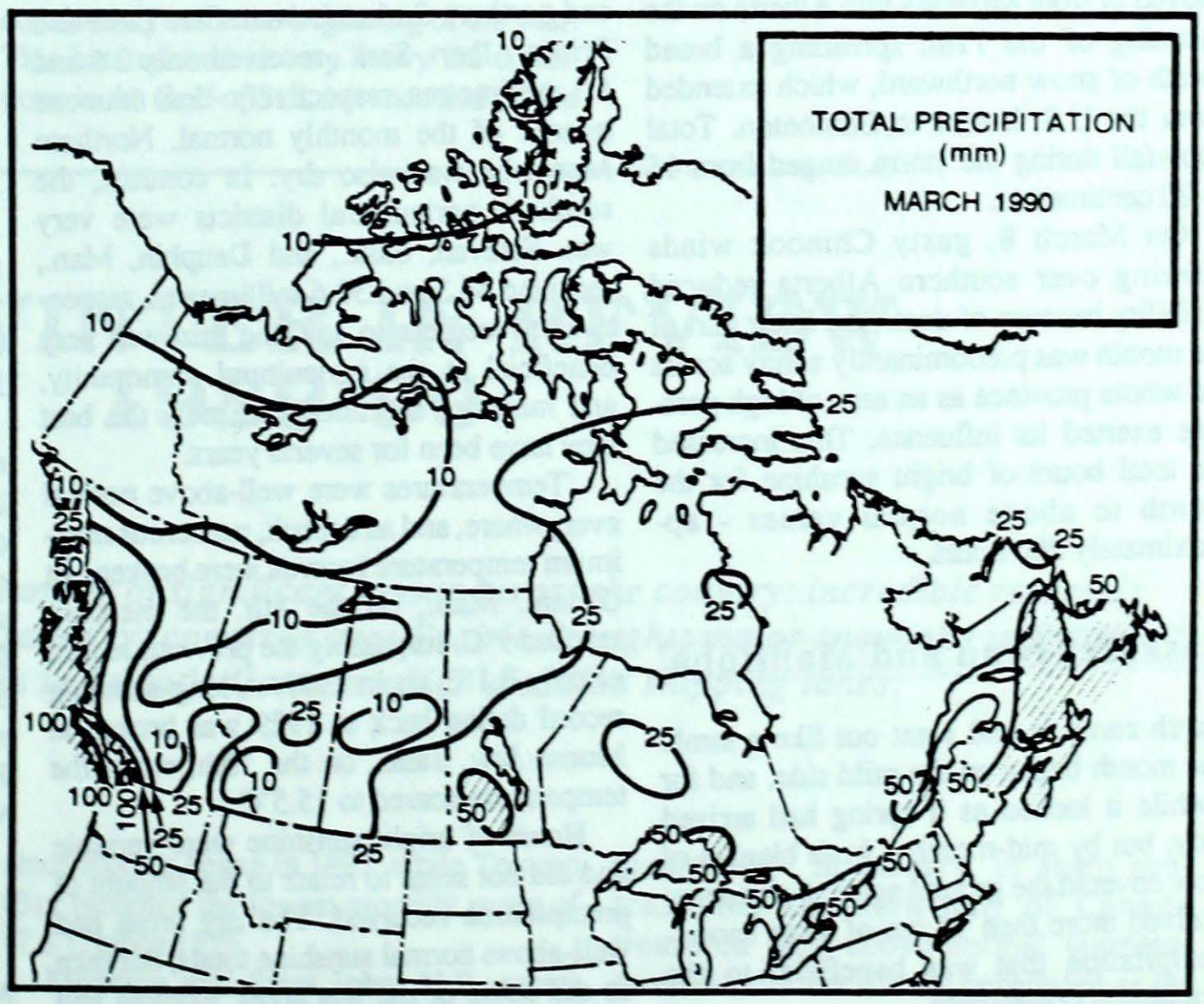
British Columbia

March proved to be rather spring-like. Changeable weather conditions during the first half of the month gave way to a fine weather regime during the latter part. Temperatures averaged above normal, with the greatest departures reported in the northeast. Cranbrook had the highest temperature reading, 18.6°C.

For the most part, precipitation was below normal; only the north coast had monthly precipitation values that totalled above average. The least precipitation fell in southern B.C. Kamloops and Kelowna both reported record low March precipitation totals of 0.4 and 7.4 millimetres, respectively. Except for parts of northern B.C., snowfalls were also light. While areas in the southern interior received below normal monthly snowfalls, some south coast districts received heavy but short-lived falls of snow. Gales buffeted the north coast on 8 days this month.

With the exception of the coastal areas it was a pleasantly sunny month. The sunniest areas were the South Thompson, North Okanagan and West Kootanays, where hours of bright sunshine were one and a half normal values. In contrast, sunshine was well-below normal in the Queen Charlottes, where total hours of bright sunshine were half the normal.





Alberta

All areas of Alberta experienced warmer than normal mean temperatures, with the central and northern regions having the greatest temperature departures. Warmest readings were recorded at the end of the month, when the thermometer climbed into the teens. The highest reading, 19.7°C, occurred at Lethbridge on the 30th. A cold Arctic air mass made several brief intrusions into the southern agricultural districts. The lowest temperatures were registered during the 3rd week of the month; Fort Chipewyan recorded -28.5°C on the 22nd.

Precipitation varied widely, with the dry southern agricultural districts receiving the most. Elsewhere across the province, it was on the dry side, with the Peace River district getting only a quarter of their normal

CLIMATIC EXTREMES IN CANADA - MARCH 1990

MEAN TEMPERATURE:		
HIGHEST	ABBOTSFORD, B.C.	7.4°C
COLDEST	EUREKA, N.W.T.	-35.4°C
HIGHEST TEMPERATURE:	WINDSOR A, ONT.	23.5°C
LOWEST TEMPERATURE:	EUREKA, N.W.T.	-46.2°C
HEAVIEST PRECIPITATION:	AMPHITRITE POINT, B.C.	283.00mm
HEAVIEST SNOWFALL:	ST. LAWRENCE, NFLD.	111.5 cm
DEEPEST SNOW ON THE GROUND ON MARCH 31, 1990	CARTWRIGHT, NFLD.	230.0 cm
GREATEST NUMBER OF BRIGHT SUNSHINE HOURS:	SLAVE LAKE, A, ALTA.	229 hours

monthly allotment. A major winter storm moved in from Montana into Alberta on the morning of the 11th, spreading a broad swath of snow northward, which extended from the U.S. border to Edmonton. Total snowfall during the storm ranged from 15 to 20 centimetres.

On March 8, gusty Chinook winds blowing over southern Alberta reduced visibility because of dust. The latter part of the month was predominantly sunny across the whole province as an area of high pressure exerted its influence. This increased the total hours of bright sunshine for the month to above normal values - approximately 200 hours.

Saskatchewan and Manitoba

March came in and went out like a lamb. The month began on the mild side, and for a while it looked as if spring had arrived early; but by mid-month a fresh blanket of snow covered the ground again. Some areas received more than 15 cm of fresh snow - precipitation that was beneficial to the agricultural community.

Monthly precipitation totals were quite variable, with the driest areas being central and northern Saskatchewan. Cree Lake and Prince Albert, Sask., received only 2.6 and 5.1 millimetres, respectively - less than one quarter of the monthly normal. Northern Manitoba was also dry. In contrast, the southern agricultural districts were very wet. Estevan, Sask., and Dauphin, Man., received 46.3 and 50.6 millimetres, respectively. Needless to say, the rain was very beneficial to the agricultural community, and moisture conditions are now the best they have been for several years.

Temperatures were well-above normal everywhere, and as a result, numerous maximum temperature records were broken. At Gillam, Man., on the 8th, the mercury reached 9°C, surpassing the previous record of only 3.1°C set in 1977. A long-standing record dating back to 1929 was broken at Moose Jaw, Sask., on the 10th, when the temperature soared to 15.5°C.

Hours of bright sunshine were variable and did not seem to relate to the amount of precipitation received. The dry areas had well-above normal sunshine totals, but then so did some of the wet areas. Estevan and Swift Current were the sunniest locations, recording more than 200 hours of sunshine.

Ontario

On average, March turned out to be a mild month, with below normal snowfall and precipitation totals. The week of the March school break saw very warm temperatures infiltrate the province. Daytime readings from March 13 to 15 soared to the record low twenties. This was the earliest twenty-degree maximums ever recorded in Ontario. The rest of the month paled by comparison, as many days lagged well-below seasonal normals. However, in spite of this, March 1990 still stood as the mildest March since 1987 everywhere in Ontario, except the southwest, where it was the warmest since 1977.

Although major storms were non-existent this month, a series of small snowfalls and freezing rain episodes still created many traffic problems in urban areas. In addition, the combination of melting snow, rain and ice jams resulted in some flooding in the Lake Simcoe and Georgian Bay watersheds.

Snowfalls in Ontario ranged between 25 to 60 percent of normal. Sarnia had the least snow in the province, with just 1.6 cm - the lowest for any March since 1967. Other low totals included Thunder Bay, 5 cm (least since 1973), Gore Bay, 5 cm (lowest since records began in 1947), and London, 12 cm (least since 1962). Total precipitation was also on the low side this month. However, for most areas, March 1987 and/or 1988 were drier, with a few exceptions. At North Bay, where 34 mm fell, it was the driest March since 1978.

March 1990 marked the third successive month of above-normal mean temperatures in Ontario, and March's low snowfall totals contributed to another winter of below-normal seasonal snowfalls for much of southern and northwestern Ontario. Only the northeastern regions and a few snow belt communities recorded normal to moderately high seasonal snow totals, and those higher amounts were mostly due to November and December snowstorms.

Quebec

Warmer than normal temperatures were evident over western Quebec, while it remained unusually cool in the east. A new

record-low mean monthly temperature of -11.7°C was set at Blanc Sablon. The month started off cold, but very warm weather during the middle of the month caused significant flooding in the southern portions of the province. Before the month was over, colder temperatures and snow returned.

Precipitation was light over much of the province, especially in the southwest, where in some cases amounts were half the normal. Except in the higher mountainous elevations, southern areas received generally less than 25 cm of snow. Several locations established new records for the least amount of snow in March: Matagami, 15.6 cm, Gaspé, 15.8 cm and Roberval, 9.4 cm. Trois-Rivières recorded only 4.4 cm of snow. Surprisingly, in the extreme northwest snowfalls were more than double the normal. Inukjuak, on the Hudson Bay coast, received 43.1 cm, but the greatest amounts fell along the north coast, with Blanc Sablon receiving 52.6 cm.

Hours of bright sunshine were less than expected near Hudson Bay, as low as 76% of normal. In eastern Quebec, where cold Arctic air kept a firm grip, sunshine was greater than normal, ranging from 125% of normal in Quebec City to 170% of normal in the Magdalen Islands.

The skiing season gradually drew to a close, and by the end of the month, only a few centres remained open in the province.

Atlantic Provinces

Dry Arctic air covered the region for much of the period, and as a result March turned out to be cold, sunny and dry. In fact, it was the sunniest March on record at St. John's and Gander, Nfld., with 168 and 185 hours of bright sunshine, respectively. This compares favourably to a normal allotment of sunshine of approximately 100 hours. In the Maritimes, Sydney, N.S., and Summerside and Charlottown, P.E.I., also set new sunshine records for the month, with values ranging from 190 to 205 hours.

Temperatures during the month averaged below normal, especially in Newfoundland, where the first part of the month was very cold. On March 8, Stephenville recorded a minimum temperature of -29.2°C, a new monthly record. In central Newfoundland, Badger recorded a minimum reading of -42°C, a new all-time record. Weekly mean temperatures in Newfoundland have remained below normal consistently since the beginning of the year. This has resulted in very heavy ice conditions in the Gulf of St. Lawrence and off the east coast of Newfoundland. In fact, harbours along the south coast of the Island, which normally seldom freeze over, would be frozen solid this year if it were not for the ice-breaking operations of the Canadian Coast Guard. Surprisingly a brief mild spell during the middle of the month saw temperatures climb to the mid-teens.

With an Arctic air mass well entrenched over the region, severe winter storms were few and far between. In the Maritimes, precipitation totals were for the most part less than half the normal. At Sydney, N.S. it was the driest March since 1946. Snowfall totals were also well below normal, with many locations reporting less than half their normal for the month. The least amount of snow was recorded at Yarmouth, 10.6 cm, while the largest amount was at Halifax, 31 cm. On the Island of Newfoundland and in Labrador snowfalls were also well below normal, with the eastern sections of the Island receiving less than one quarter of their normal snowfall. St. John's recorded 17.8 cm compared to a normal of 65 cm. Goose Bay and Nain in Labrador received 13.8 and 26.8 centimetres of snow, compared to normals of 74.6 and 63.9 cm, respectively.

THE WINTER IN REVIEW 1989-90

The winter of 1989-90 produced a number of significant events across the country: incredible reversals in temperatures from December to January; concerns over Prairie drought; major snowfalls in British Columbia; and, unwieldy ice growth in Atlantic Canada which disabled shipping lanes.

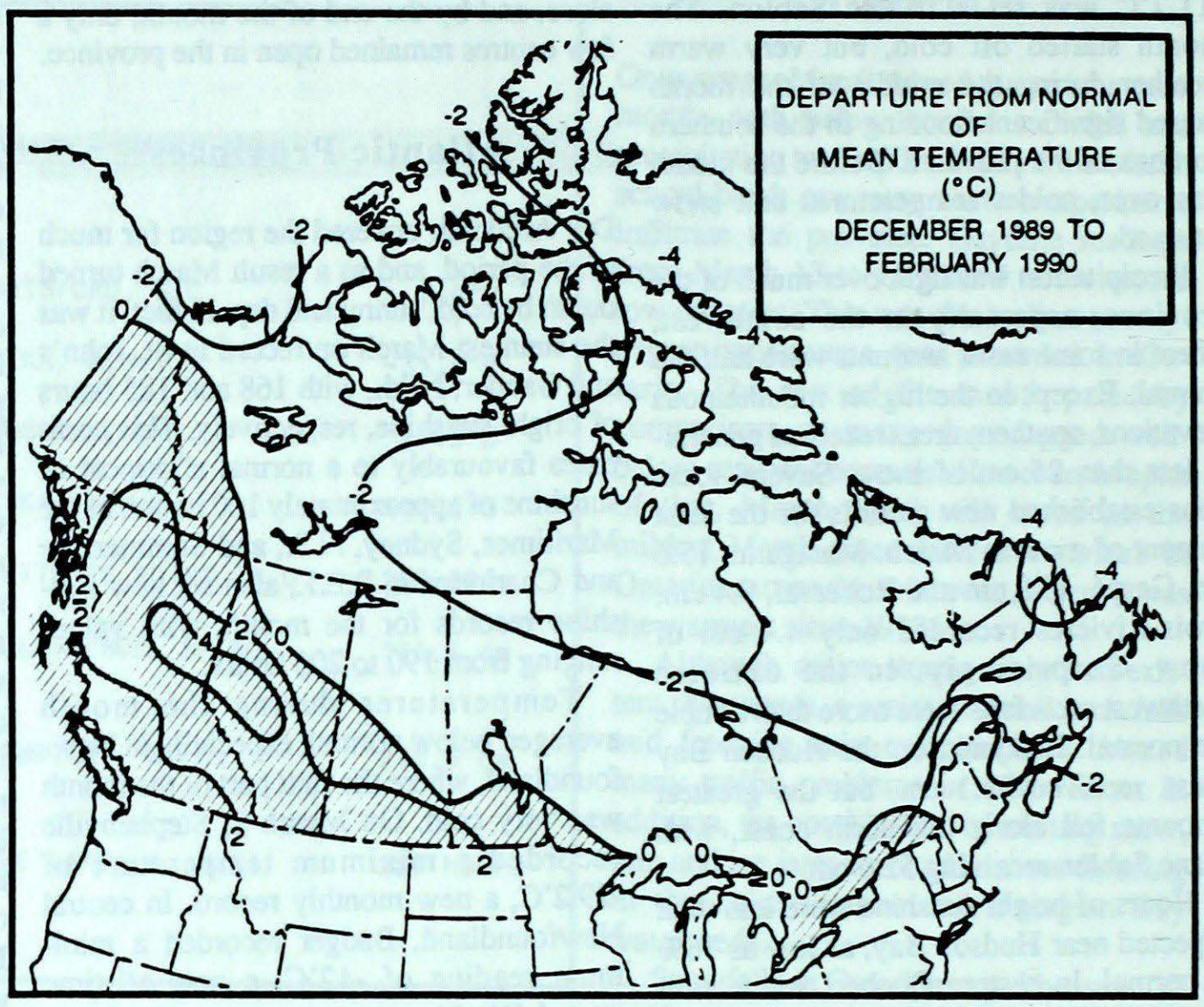
During December, Ontario and southern Quebec experienced temperatures 6 to 9°C below monthly normals, while Manitoba cooled to 4 to 6°C below monthly means. On the 20th, Saskatoon endured the lowest daily maximum reading for December since records began in 1892, while Toronto City recorded the lowest monthly mean of -7.8°C since 1876.

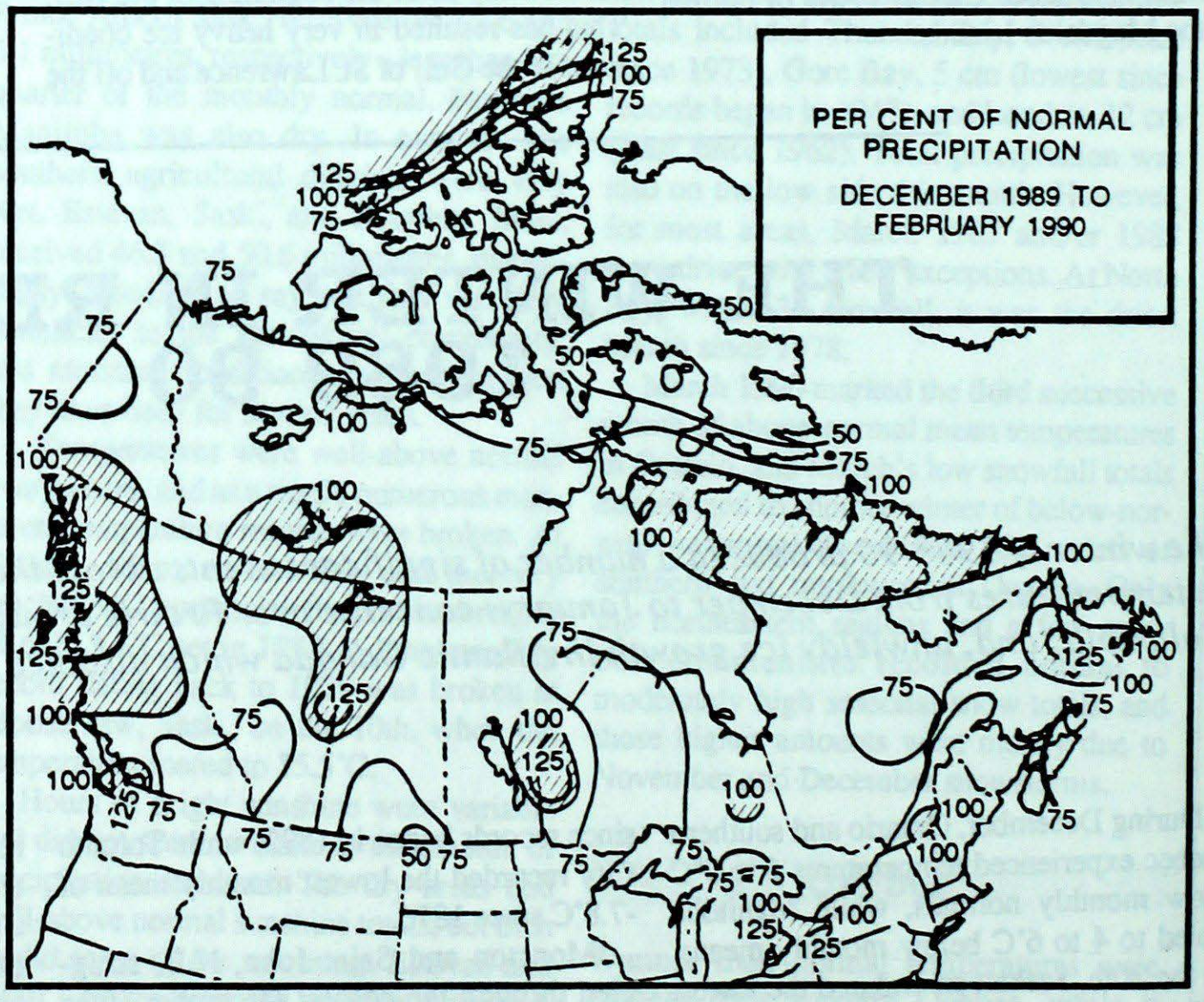
Moncton and Saint John, N.B. struggled through the coldest December since their records began in 1939 and 1871 respectively. In January, in sharp contrast, the southern half of Canada treasured well-above-normal temperatures as mild Pacific air penetrated as far east as the Atlantic provinces. British Columbia and the Prairies enjoyed

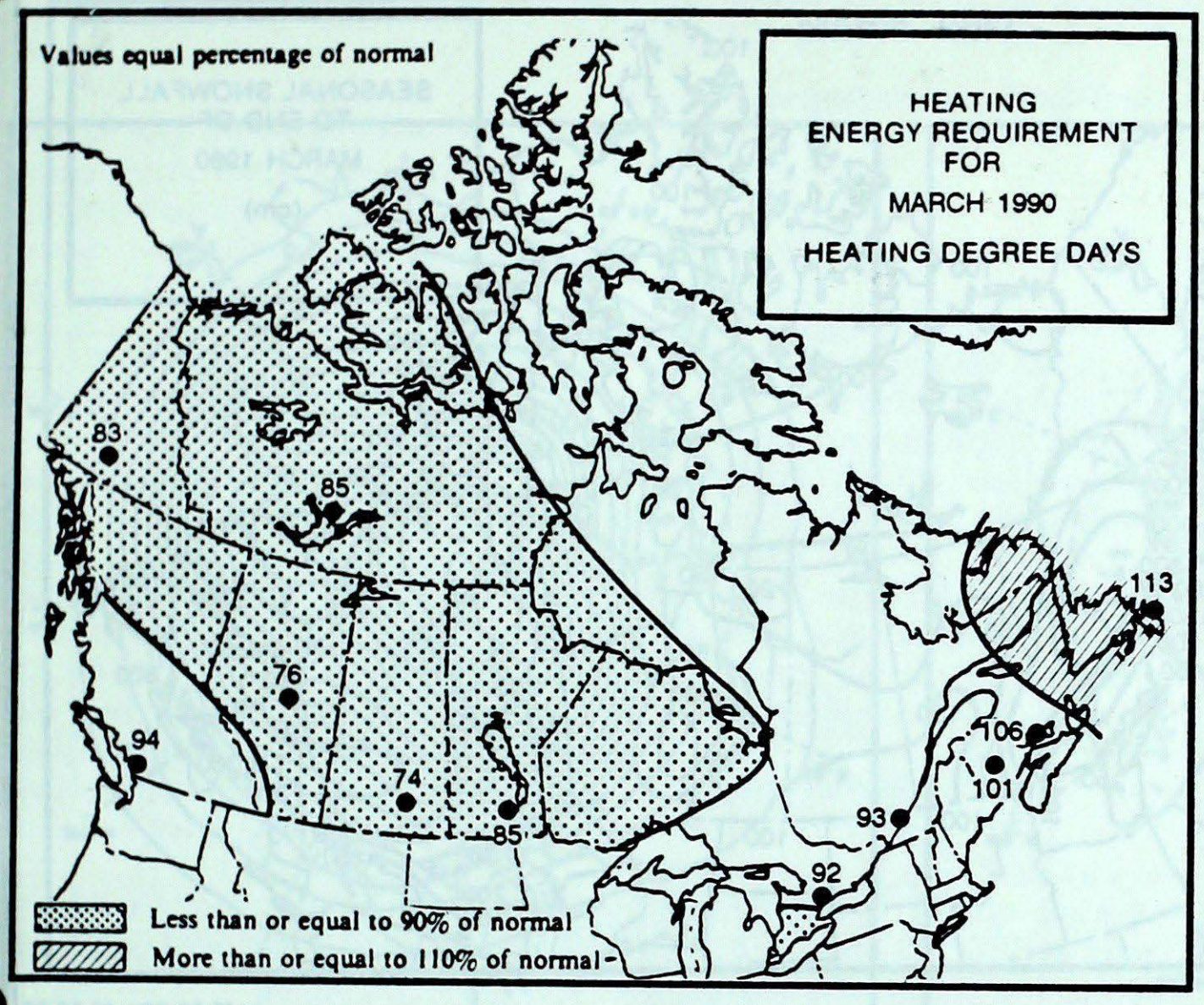
temperatures 6 to 8°C above the monthly norm, while most of Ontario and southern Quebec were 4 to 6°C above normal for January. Skiers grimaced at the warm weather, which interrupted logging operations in B.C., while Prairie farmers once again became concerned over depleted soil moisture and soil erosion due to drying winds and a lack of snow-cover. By the end of February, the Soil and Climate Section of Agriculture Canada had predicted that by the end of May 1990, the greatest threat for Prairie drought lay in a stretch from Lacombe, Alberta to North Battleford and Scott, Saskatchewan. There were other dry areas, mainly due to a persistence of soil moisture deficits from the summer of '89. The risk areas at the time the forecast was issued were less extensive than what was projected at the end of February for either 1988 and 1989.

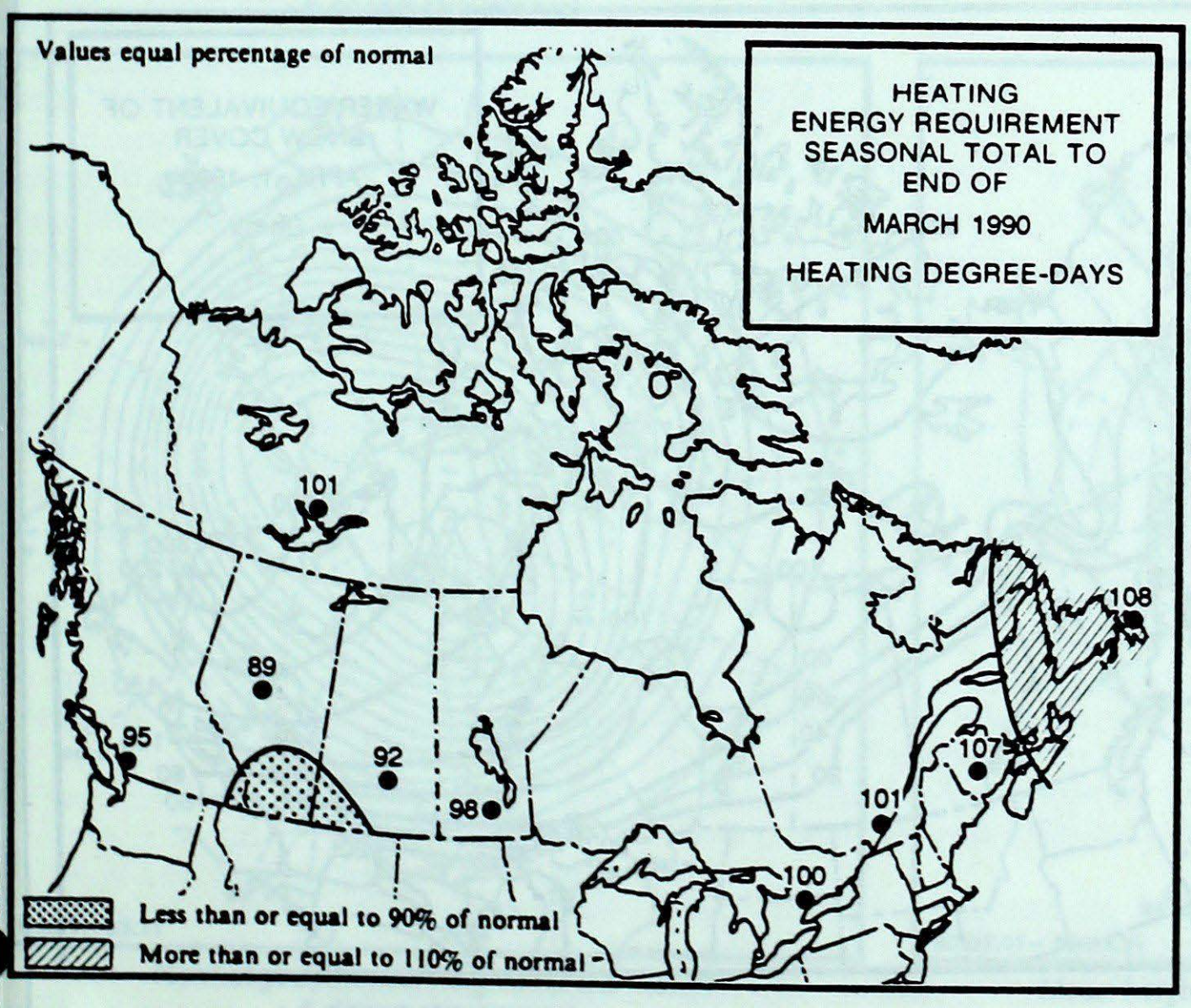
From late January to mid-February, Vancouver and the Lower Mainland endured four major snowfalls. The storms each heaped between 15 and 30 centimeters of snow on the ground. The usual chaos ensued; a plethora of traffic accidents, abandoned cars, and road and school closures.

Cold weather during February caused rapid ice growth in the waters of Atlantic Canada. The most arduous conditions experienced in recent years were in the Gaspé Passage, the Gulf of St. Lawrence, the Cabot Strait, and the Bay of Chaleur. Ice thicknesses ranged from 30 to 70 centimeters. Persistent northwest winds packed the ice along the western shores of Newfoundland, where in some areas, the ice cover was two meters thick. Six Canadian Coast Guard icebreakers attempted to keep the shipping lanes open with shipping convoys stuck in the ice for days awaiting wind shifts to alleviate ice pressure. Deep-sea trawlers leaving St. John's, Nfld had to detour well to the south to evade the ice pack.







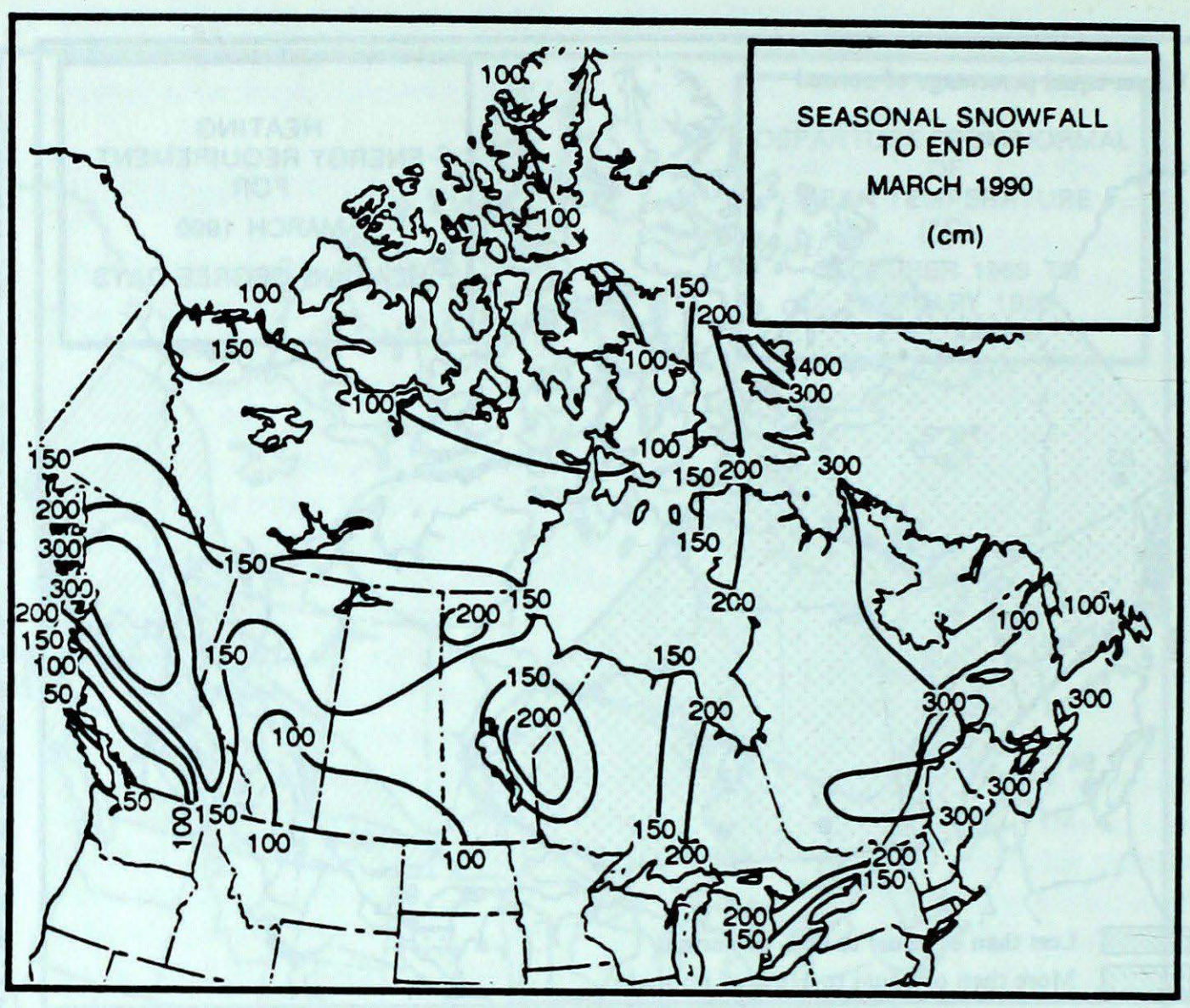


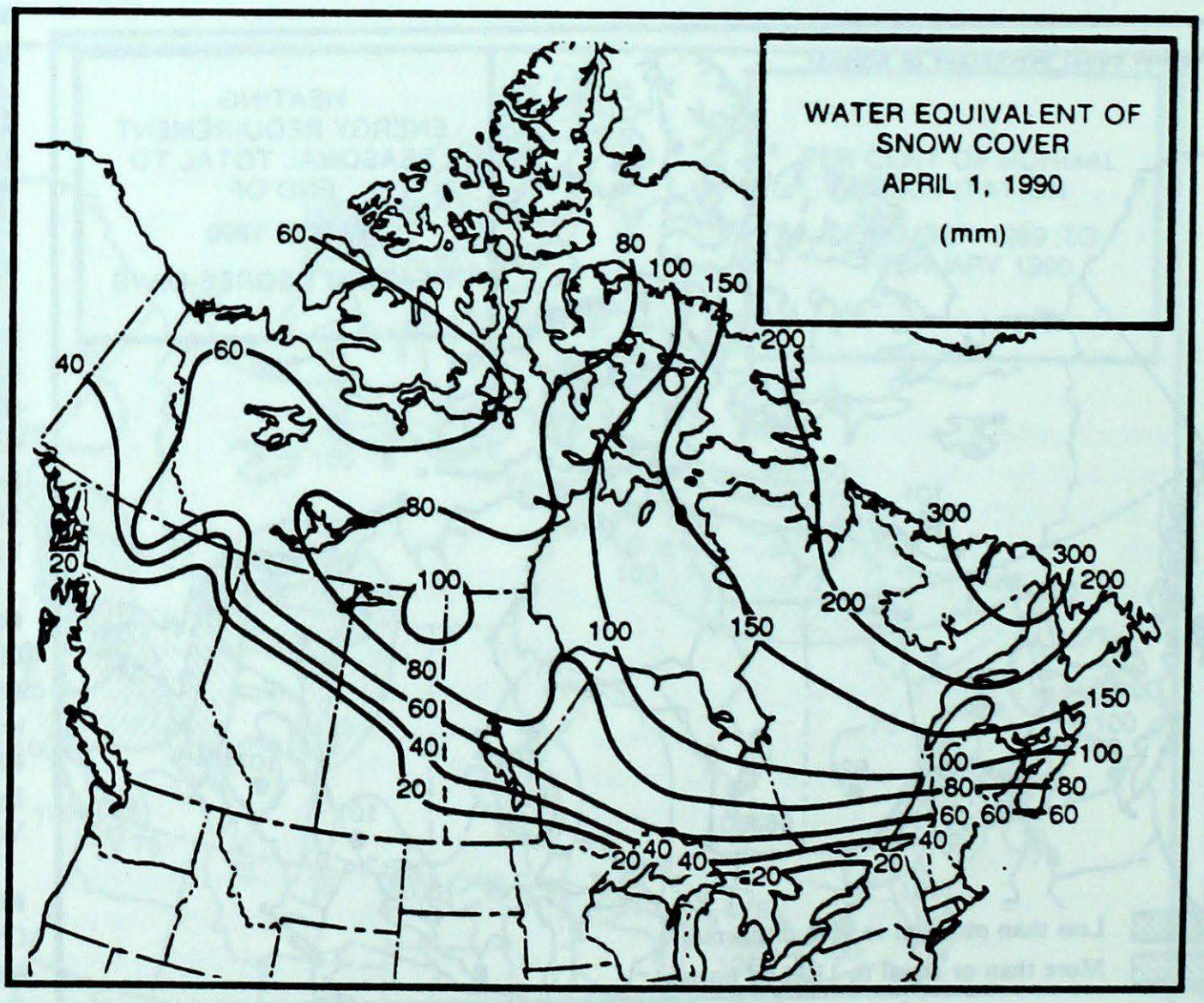
SEASONAL TOTAL OF HEATING DEGREE-DAYS TO END OF MARCH

	1990	1989	NORMAL
BRITISH COLUMBIA			
Kamloops	3018	3215	3272
Penticton	2804	3039	2983
Prince George	4005	4510	4522
Vancouver	2334	2442	2454
Victoria	2415	2605	2500
YUKON TERRITORY			
Whitehorse	5591	6035	5909
NORTHWEST TERRITORIES			
Iqaluit	8115	*	7852
Inuvik	8272	8006	8306
Yellowknife	7270	7224	7183
ALBERTA			
Calgary	3912	4418	4478
Edmonton Mun	4181	4578	4703
Grande Prairie	4622	5177	5267
SASKATCHEWAN			
Estevan	4398	4794	4726
Regina	4632	5171	5054
Saskatoon	4879	5166	5242
MANITOBA			
Brandon	5084	5366	5277
Churchill	7406	7502	7361
The Pas	5861	5687	5809
Winnipeg	5028	5212	5116
ONTARIO			
Kapuskasing	5423	5488	5406
London	3444	3364	3484
Ottawa	4095	4106	4036
Sudbury	4694	4606	4590
Thunder Bay	4934	4965	4830
Toronto	3472	3451	3487
Windsor	3443	3033	3114
QUÉBEC			
Baie Comeau	5180	5099	4934
Montréal	3954	4013	3908
Québec	4568	4571	4360
Sept-Iles	5447	5233	5035
Sherbrooke	4321	4418	4408
Val-d'Or	5365	5325	5176
NEW BRUNSWICK			
Charlo	4735	4699	4557
Fredericton	4238	4120	3952
Moncton	4153	4000	3885
NOVA SCOTIA			
Sydney	3929	3812	3514
Yarmouth	3391	3222	3236
PRINCE EDWARD ISLAND			
Charlottetown	4148	3957	3747
NEWFOUNDLAND			
Gander	4427	4256	3962
St. John's	3993	3882	3683

SEASONAL SNOWFALL TOTALS (cm)
TO END OF MARCH

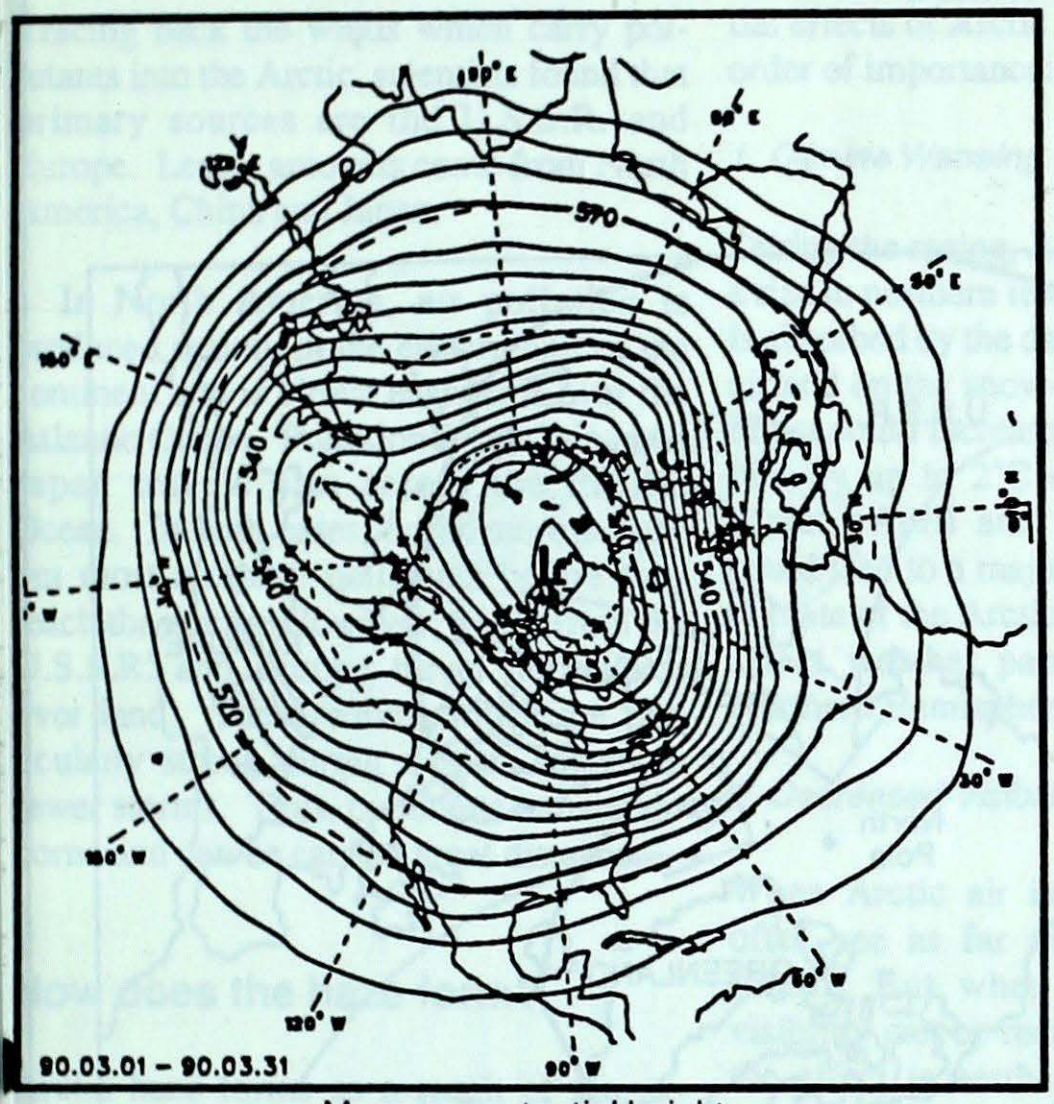
	1990	1989	NORMAL
YUKON TERRITORY			
Whitehorse	152.8	126.6	122.3
NORTHWEST TERRITORIES			
Cape Dyer	*	491.0	476.2
Inuvik	162.2	133.2	144.9
Yellowknife	144.9	138.7	121.7
BRITISH COLUMBIA			
Kamloops	50.9	40.4	91.2
Port Hardy	81.6	49.9	70.8
Prince George	238.8	201.9	229.6
Vancouver	50.7	41.8	60.1
Victoria	36.2	60.1	49.6
ALBERTA			
Calgary	77.8	100.7	116.3
Edmonton Namao	79.7	87.2	116.9
Grande Prairie	128.4	119.3	164.3
SASKATCHEWAN			
Estevan	64.1	130.8	98.0
Regina	102.0	75.4	101.6
Saskatoon	62.0	54.8	101.6
MANITOBA			
Brandon	106.8	102.2	103.5
Churchill	129.8	183.3	150.2
The Pas		103.0	144.6
Winnipeg	88.4	146.6	111.7
ONTARIO			
Kapuskasing	334.3	283.2	284.8
London	216.5	146.5	199.4
Ottawa	224.4	213.0	217.9
Sudbury	257.6	257.8	229.3
Thunder Bay	144.0	202.8	192.6
Toronto	78.3	65.2	123.7
Windsor	107.7	76.0	113.2
QUEBEC			
Baie Comeau	274.7	286.0	336.9
Montréal	182.0	194.2	223.7
Québec	300.0	299.2	326.3
Sept-Îles	318.2	351.0	387.9
Sherbrooke	294.6	232.4	289.3
Val-d'Or	297.2	314.2	285.1
NEW BRUNSWICK			
Charlo	295.2	306.8	368.6
Fredericton	302.3	214.3	267.8
Moncton	294.4	288.6	310.6
NOVA SCOTIA			
Shearwater	175.6	148.1	183.8
Sydney	273.0	336.1	287.2
Yarmouth	227.9	150.0	200.9
PRINCE EDWARD ISLAND			
Charlottetown	237.5	324.4	301.2
NEWFOUNDLAND			
Gander	376.2	500.5	342.2
St. John's	231.6	340.8	311.7



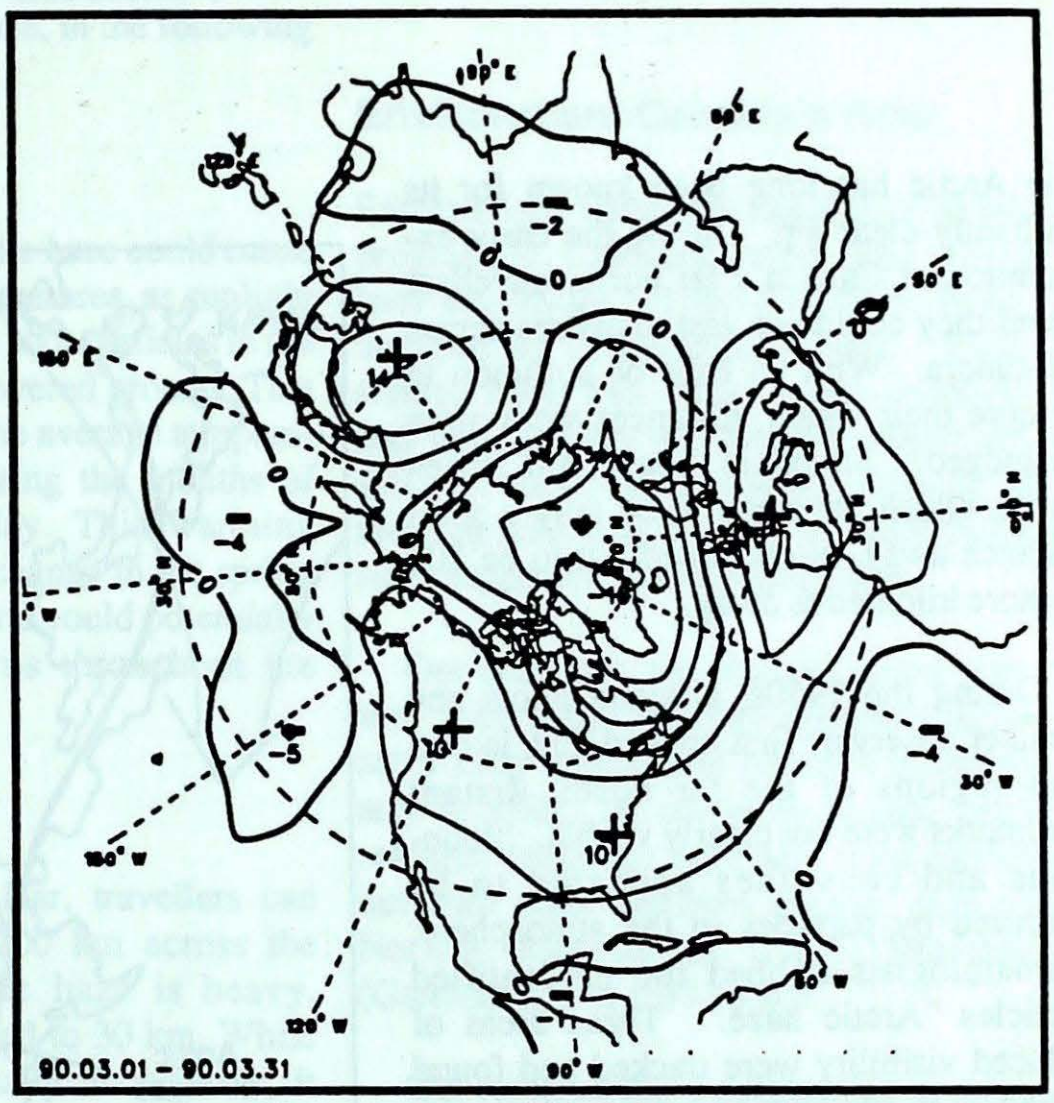


50-kPa ATMOSPHERIC CIRCULATION

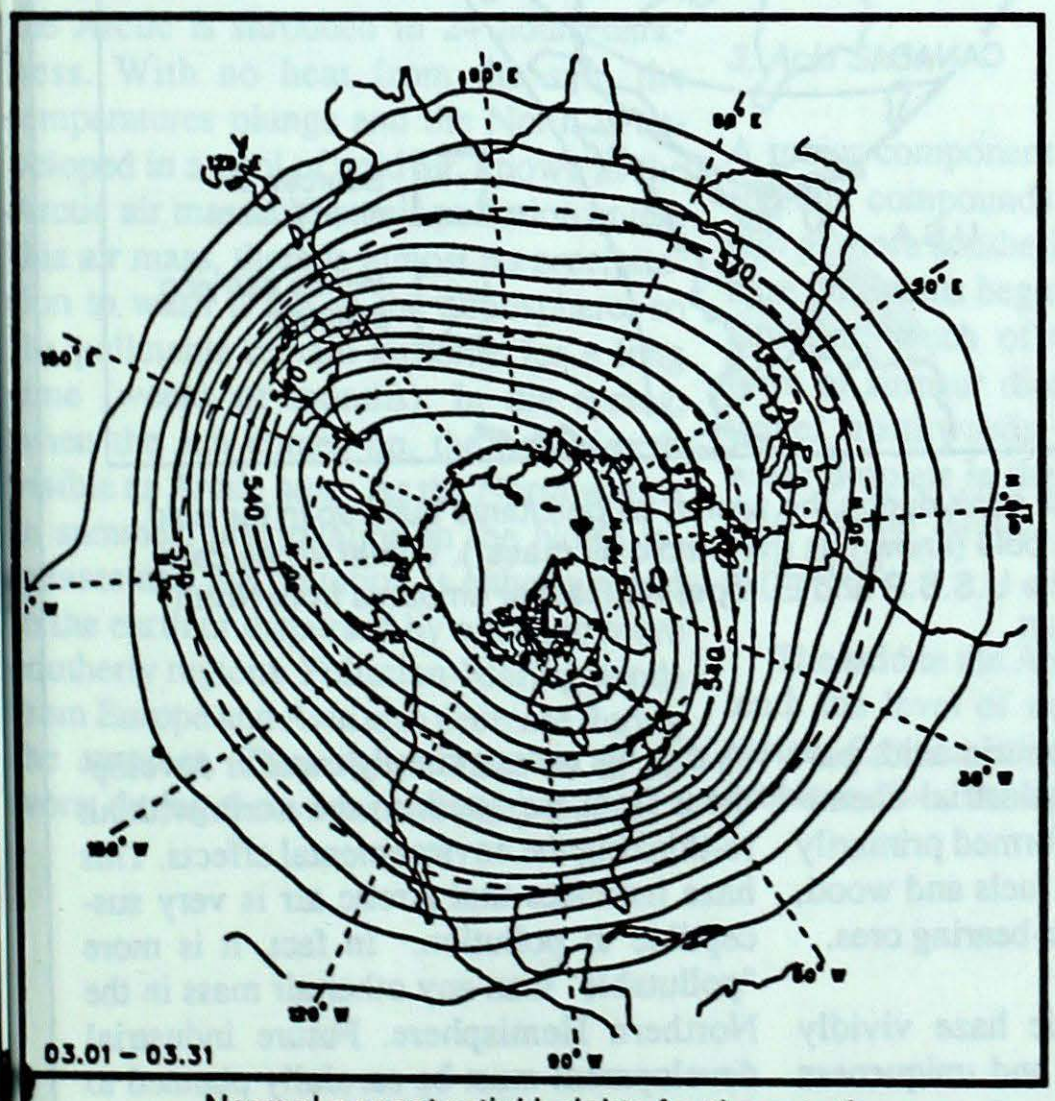
March 1990



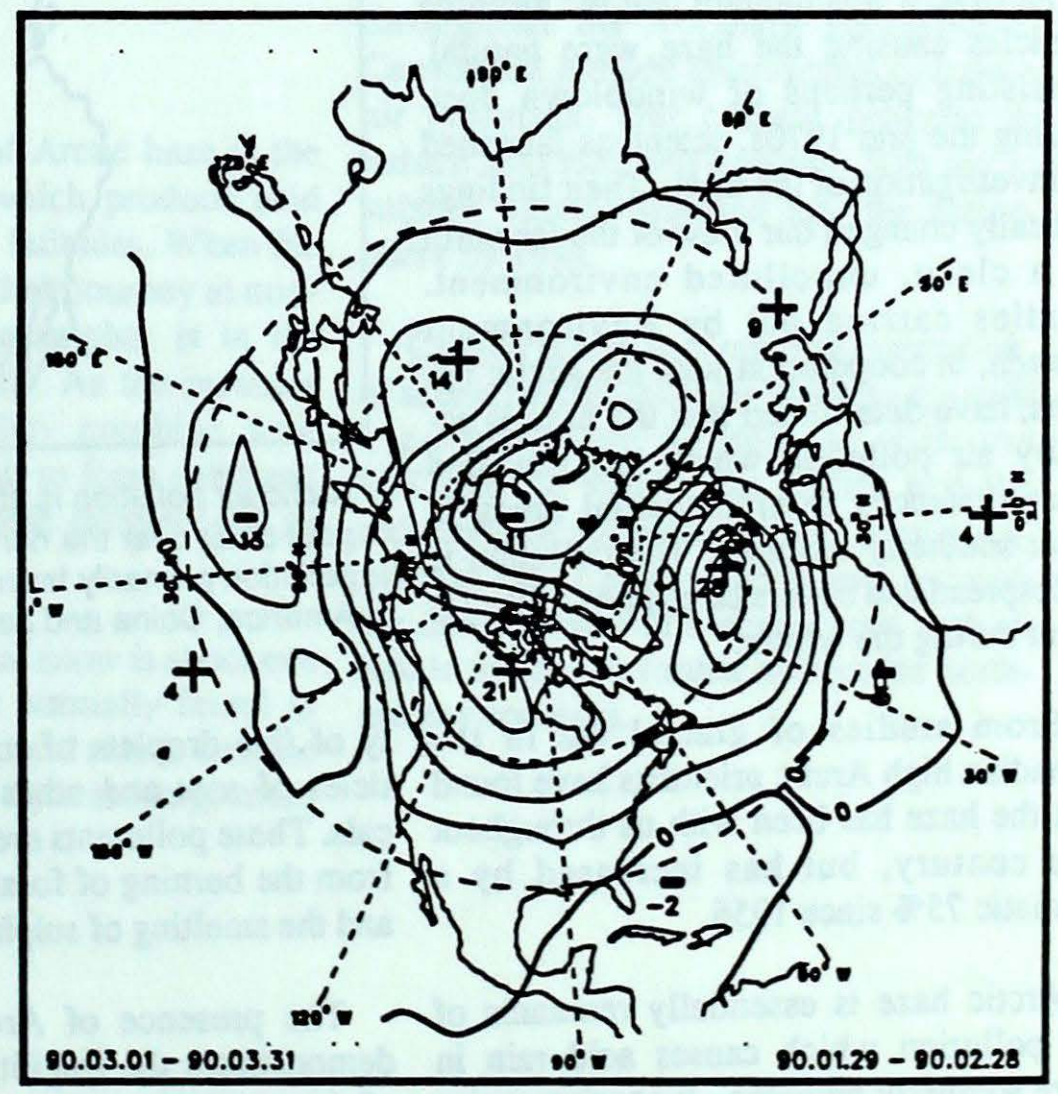
Mean geopotential heights
- 5 decametre interval -



Mean geopotential height anomaly
- 5 decametre interval-



Normal geopotential heights for the month
- 5 decametre interval -



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

Canada

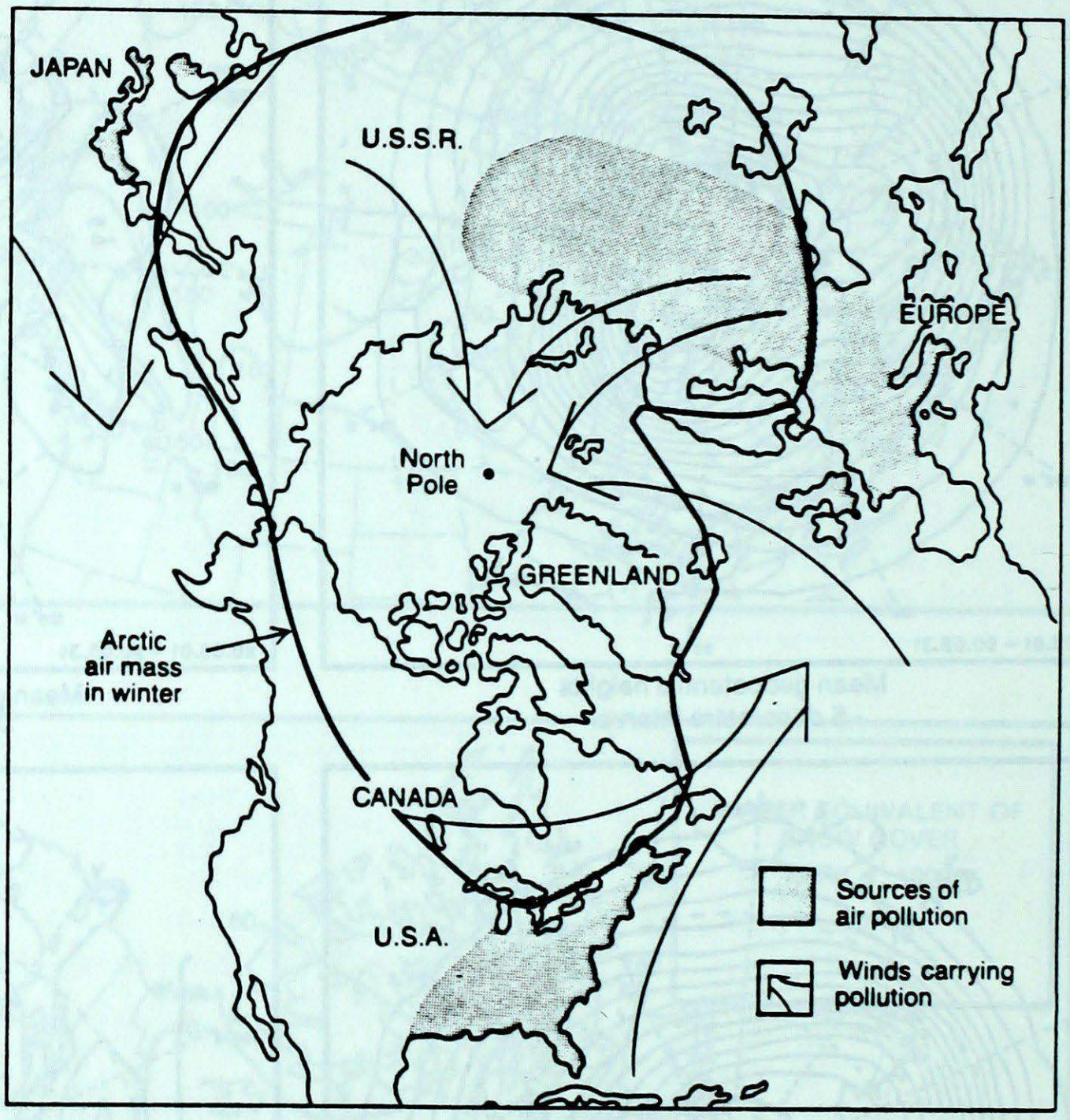
Arctic Haze

Visible Air Pollution

The Arctic has long been known for its brilliantly clear air. During the early exploration of Canada's far north, travellers found they could see vast distances across the tundra. With no haze or pollution to obscure their vision, distances were often misjudged. Mountain ridges and frozen fjords, which appeared to be only a short distance away, often turned out to be 100 or more kilometres away.

During the 1950s, airplane pilots and weather observers first noticed that, in certain regions of the far north, distant landmarks were not clearly visible. Mountains and coastlines appeared to be obscured by particles in the atmosphere. Climatologists dubbed the unidentified particles "Arctic haze." These areas of reduced visibility were tracked and found to be 800 to 1300 km across.

At first, it was thought that the airborne particles causing the haze were natural, consisting perhaps of windblown dust. During the late 1970s, scientists launched an investigation of the haze. Their findings radically changed our view of the far north as a clean, unpolluted environment. Studies carried out by Environment Canada, in cooperation with the Arctic nations, have determined that the haze is actually air pollution which has travelled great distances from industrial areas in more southerly latitudes. The pollution is widespread and covers large parts of the far north during the winter.



Arctic air pollution is at its peak during the winter, as pollutants build up in the cold pool of air over the north pole (known as the "Arctic air mass"). Winter winds carry pollution primarily from the U.S.S.R and Europe, with lesser amounts from North America, China and Japan.

From studies of glacial ice in the Canadian high Arctic scientists have found that the haze has been with us throughout this century, but has increased by a dramatic 75% since 1956.

Arctic haze is essentially remnants of the pollution which causes acid rain in more southerly latitudes. It consists mainly of fine droplets of sulphuric acid, particles of soot and other industrial chemicals. These pollutants are formed primarily from the burning of fossil fuels and wood, and the smelting of sulphur-bearing ores.

The presence of Arctic haze vividly demonstrates the fragility and uniqueness of the northern environment. It has taught us that we cannot simply transfer development from the south to the north without re-thinking the environmental effects. This haze indicates that Arctic air is very susceptible to pollution. In fact, it is more "pollutable" than any other air mass in the Northern Hemisphere. Future industrial development must be carefully planned to take this into account.

Where does the haze come from?

Tracing back the winds which carry pollutants into the Arctic, scientists found that primary sources are the U.S.S.R. and Europe. Lesser amounts come from North America, China and Japan.

In North America, air pollution is produced mainly in the eastern half of the continent and is blown eastwards over the Atlantic Ocean. Pollution from China and Japan travels east across the Pacific Ocean. In both cases, ocean storms wash out most airborne pollutants before they reach the Arctic. However, winds from the U.S.S.R. and Europe travel northwards over land. These winds, which are particularly strong during winter, encounter fewer storms. Thus, pollutants remain airborne and can be carried great distances.

How does the haze form?

Arctic haze forms as a result of the extreme cold and unusual weather conditions found in the far north. During the winter, the Arctic is shrouded in 24 hours darkness. With no heat from the sun, the temperatures plunge and the North is enveloped in a pool of cold air, known as the Arctic air mass. When air pollution enters this air mass, there is almost no precipitation to wash it out of the atmosphere, so the pollutants remain airborne for a long time (weeks or months). In the spring, when the sun comes up, the pollution is visible as Arctic haze. As the North warms in summer, precipitation in the North increases and the pollution is either washed to the earth or dispersed by winds to more southerly regions. Pollution-bearing winds from Europe and Asia also decrease during the summer. Thus Arctic haze is at its worst during the winter and early spring.

Effects of Arctic Haze

Scientists are concerned about three potential effects of Arctic haze, in the following order of importance:

1. Climate Warming

During the spring, Arctic haze could cause a rise in northern temperatures, as sunlight is absorbed by the dark soot particles in the air and on the snow-covered ground. This effect could increase the average temperature by up to 2°C during the months of March, April and May. This warming could lead to a major change in the spring climate of the Arctic and could potentially affect weather patterns throughout the Northern Hemisphere.

2. Decreased Visibility

When Arctic air is clear, travellers can often see as far as 200 km across the tundra. But when the haze is heavy, visibility can be reduced to 30 km. While the effect is aesthetically undesirable, it has not yet been shown to be a hazard to air navigation.

3. Acid Snow

A major component of Arctic haze is the sulphur compounds which produce acid rain at more southerly latitudes. When the haze pollutants begin their journey at mid-latitudes, much of the sulphur is in the form of sulphur dioxide. As the particles travel northwards, they combine with water droplets in the air to form sulphuric acid. In the Arctic, these droplets fall as acid snow.

The acid in the Arctic snow is about one tenth the level of that normally found in eastern Canada, where acid rain is a major problem. Even though there are large areas of the eastern Arctic which are sensitive to acid snow, there is no evidence that current levels are damaging to the environment.

Environment Canada's Role

Environment Canada maintains an active program in Canada's north. Our Arctic haze studies are focussed at Alert, on the northern tip of Ellesmere Island. Other studies have been carried out at Mould Bay and Igloolik. We also maintain a network of stations throughout Canada to measure acid rain, with the most northerly site located near Great Slave Lake.

Our scientists are working in cooperation with other federal departments to more fully understand northern pollution and its effect on the environment. Joint research programs have also been carried out with other northern nations, such as Norway, Sweden, the U.S.A., Denmark (Greenland) and the U.S.S.R.

Our research has indicated that to clean up the Arctic, air pollution must be reduced in industrial and agricultural areas throughout the Northern Hemisphere. Canada has already taken action to reduce air pollution. Our current program to reduce acid rain will ensure a 50% cut in sulphur dioxide released into the atmosphere by 1994.

Canada is also encouraging international action on this issue by working towards a co-operative agreement with the U.S.S.R. in which the Arctic and the reduction of air pollution will play a significant part. Canada is also involved with the development of a new accord with all Arctic nations to further protect the northern environment.

MARCH 1990

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	Mean	Difference from Normal	Maximum	Minimum									
BRITISH COLUMBIA													
ABBOTSFORD A	7.4	1.8	19.4	-2.6	2.0	18	118.6	85	0	11	151	135	327.7
ALERT BAY	6.8	1.6	14.8	-1.4	0.0	0	51.0	42	0	10	*	*	348.6
AMPHITRITE POINT	7.3	1.1	12.2	0.2	9.2	204	283.0	83	0	17	*	*	333.5
BLUE RIVER A	0.6	1.6	15.5	-16.7	26.4	71	48.0	71	44	6	114	118	*
CAPE ST JAMES	6.2	1.3	12.8	-0.3	4.1	45	120.3	92	0	21	69	*	365.9
CAPE SCOTT	6.4	1.0	12.8	-1.2	8.7	75	190.4	69	0	19	*	*	359.9
CASTLEGAR A	4.7	1.7	21.2	-7.0	6.8	25	29.8	52	0	6	162	132	413.9
COMOX A	6.2	1.2	16.3	-2.6	6.7	65	80.6	72	0	11	127	*	368.0
CRANBROOK A	2.6	1.8	18.6	-12.0	5.7	38	7.6	45	0	3	195	118	504.4
DEASE LAKE	-3.6	3.8	9.1	-28.0	26.0	98	20.8	93	73	4	154	116	668.6
FORT NELSON A	-2.4	7.4	15.4	-18.6	15.1	51	12.5	51	9	3	218	*	632.8
FORT ST JOHN A	-0.7	5.9	12.1	-19.0	26.4	81	23.8	80	0	5	203	*	577.3
HOPE A	7.6	2.0	20.6	-0.4	0.3	2	89.7	61	0	13	109	108	324.0
KAMLOOPS A	5.3	1.8	18.7	-7.8			0.4	4	0	0	204	140	392.1
KELOWNA A	4.4	1.8	19.6	-8.5	1.2	19	7.4	37	0	3	175	131	422.6
LYTTON	6.7	1.5	20.3	-5.1			14.8	44	0	4	153	105	353.3
MACKENZIE A	-1.9	2.5	13.2	-22.2	44.8	105	43.0	87	30	11	159	127	616.8
PENTICTON A	4.9	1.0	20.1	-7.5			9.4	54	0	3	162	116	406.5
PORT ALBERNI A	6.2	1.1	20.2	-4.8	26.0	210	143.1	66	0	13	118	*	363.9
PORT HARDY A	6.0	1.6	14.4	-2.9	4.6	42	86.5	61	0	15	98	97	372.6
PRINCE GEORGE A	0.1	1.9	13.3	-15.5	16.6	56	26.9	73	0	10	153	111	555.9
PRINCE RUPERT A	4.8	1.7	11.7	-6.0	21.8	84	216.0	112	0	20	69	73	409.4
PRINCETON A	3.2	2.2	18.6	-10.2	3.6	27	11.8	62	0	4	161	*	*
REVELSTOKE A	1.7	0.9	14.9	-11.1	5.4	17	31.3	45	3	5	*	*	*
SANDSPIT A	5.8	1.9	10.8	-2.5	3.1	28	74.4	75	0	14	52	43	377.2
SMITHERS A	0.9	2.2	12.4	-12.3	17.6	79	31.3	122	0	8	115	94	530.9
TERRACE A	3.1	1.6	11.7	-4.3	8.6	19	80.9	97	0	16	76	69	462.1
VANCOUVER INT'L A	6.5	0.7	14.4	-1.7	0.2	3	107.8	107	0	12	139	107	357.1
VICTORIA INT'L A	6.5	0.8	17.5	-1.8	1.8	30	58.0	81	0	12	155	108	356.8
VICTORIA MARINE	7.0	0.7	14.0	-0.9	1.3	16	66.6	59	0	11	*	*	342.3
WILLIAMS LAKE A	0.2	1.2	14.9	-15.3	7.0	32	8.3	37	0	4	165	102	551.4

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	Mean	Difference from Normal	Maximum	Minimum									
YUKON TERRITORY													
DAWSON A	-9.4	*	9.0	-30.0	11.2	*	7.4	*	51	*	*	*	*
MAYO A	-6.6	5.1	9.1	-28.1	11.2	104	2.6	25	*	*	*	*	*
WATSON LAKE A	-5.8	5.5	8.9	-28.3	1.4	5	0.8	3	51	0	166	123	738.2
WHITEHORSE A	-3.5	4.7	6.6	-25.1	7.8	48	5.2	39	30	2	196	128	665.4
NORTHWEST TERRITORIES													
ALERT	-29.8	3.4	-17.0	-39.6	12.0	167	12.0	157	32	5	33	49	1478.2
BAKER LAKE A	-22.5	5.4	-6.9	-36.9	43.7	527	35.7	470	*	76	125	66	1129.3
CAMBRIDGE BAY A	-25.4	5.9	-11.3	-38.1	13.2	244	9.2	196	37	4	121	66	1346.5
CAPE PARRY A	-21.9	5.7	-5.9	-28.0	22.2	209	19.1	313	10	5	*	*	1237.6
CLYDE A	-27.6	-1.2	-14.4	-44.8	12.9	215	11.2	187	37	3	169	105	1412.3
COPPERMINE A	-20.9	6.2	-5.1	-38.2	11.7	113	11.7	119	80	4	129	80	1204.9
CORAL HARBOUR A	-24.3	0.9	-5.4	-38.6	25.0	231	25.0	231	59	6	169	85	1311.2
EUREKA	-35.4	2.0	-17.4	-46.2	2.0	83	1.8	82	14	1	126	107	1654.1
FORT RELIANCE	-16.0	5.9	7.0	-37.4	7.6	61	5.4	52	41	2	*	*	1053.2
FORT SIMPSON A	-7.7	7.2	13.5	-29.1	0.4	2	0.4	2	29	0	208	130	796.1
FORT SMITH A	-8.4	6.4	9.5	-27.5	12.2	77	10.6	74	35	1	228	*	818.0
IQALUIT	-22.8	-0.1	-3.2	-35.3	48.2	191	35.4	152	32	10	143	81	1264.7
HALL BEACH A	-27.7	1.8	-13.2	-41.7	10.4	85	9.2	79	45	4	*	*	1415.9
HAY RIVER A	-8.6	7.7	10.9	-27.1	1.1	6	1.1	6	26	0	*	*	825.2
INUVIK A	-16.3	8.7	4.7	-33.6	22.2	148	19.6	163	44	4	156	89	1064.9
MOULD BAY A	-27.7	5.1	-14.9	-39.7	8.0	267	6.6	275	24	2	68	62	1416.8
NORMAN WELLS A	-13.0	6.8	6.5	-32.3	6.2	46	3.8	29	7	2	176	104	963.5
POND INLET A	-29.5	*	-15.4	-41.9	8.0	*	6.8	*	25	4	174	*	11.5
RESOLUTE A	-29.0	2.4	-17.0	-40.2	10.2	329	10.0	333	29	4	140	96	1460.0
YELLOWKNIFE A	-13.4	5.5	3.8	-29.8	11.0	76	9.1	73	40	2	206	105	971.6
ALBERTA													
BANFF	-0.1	3.3	13.0	-21.0	23.7	96	15.2	73	0	4	*	*	*
CALGARY INT'L A	0.9	4.9	18.4	-17.8	14.2	71	8.7	54	0	4	223	137	531.2
COLD LAKE A	-3.0	4.6	11.1	-22.8	21.0	100	18.6	93	0	6	188	109	647.4
CORONATION A	-2.6	4.5	12.8	-19.3	28.8	123	25.5	123	0	4	217	118	639.6

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	Mean	Difference from Normal	Maximum	Minimum									
EDMONTON INT'L A	-0.5	6.2	14.5	-16.7	16.4	88	18.2	114	0	5	218	127	573.1
EDMONTON MUNICIPAL	0.6	5.6	15.4	-17.1	13.5	*	15.8	85	0	4	217	129	538.9
EDMONTON NAMAO A	0.2	5.8	15.9	-17.7	13.2	76	11.4	63	0	2	*	*	553.0
EDSON A	-0.2	4.5	14.4	-22.8	12.0	37	20.4	89	0	5	204	133	564.3
FORT CHIPEWYAN A	-8.6	4.2	8.5	-28.5	19.0	115	17.6	95	*	*	*	*	*
FORT MCMURRAY A	-3.1	6.1	14.2	-24.2	9.4	39	7.1	34	9	2	197	119	652.3
GRANDE PRAIRIE A	0.1	7.3	12.5	-18.2	3.3	14	3.0	14	0	2	208	*	573.9
HIGH LEVEL A	-6.7	4.3	13.3	-27.6	14.8	70	14.0	71	26	4	226	129	766.8
JASPER	-0.4	2.3	13.7	-21.7	16.6	113	18.6	116	0	4	177	*	569.8
LETHBRIDGE A	2.4	4.5	19.7	-15.4	30.0	114	29.2	121	0	5	216	*	483.4
MEDICINE HAT A	1.5	4.3	18.2	-16.9	19.4	106	21.0	114	0	4	208	129	516.6
PEACE RIVER A	-2.3	6.2	10.8	-20.8	9.5	46	9.5	55	0	3	*	*	627.9
RED DEER A	-2.0	4.2	13.0	-20.8	17.1	85	16.3	84	0	5	*	*	619.6
ROCKY MTN HOUSE A	-1.8	2.8	13.4	-24.8	29.4	98	30.8	115	0	8	*	*	613.6
SLAVE LAKE A	-1.7	4.6	13.2	-19.4	11.2	41	10.0	49	0	4	229	136	609.6
WHITECOURT A	0.4	6.3	14.9	-20.8	6.2	24	4.6	19	0	1	*	*	543.5
SASKATCHEWAN													
BROADVIEW	-3.2	4.9	12.0	-16.9	31.4	177	44.7	279	0	7	199	115	653.8
COLLINS BAY	-10.0	*	8.8	-29.4	15.4	*	10.8	*	58	4	208	*	868.9
CREE LAKE	-8.7	4.8	9.0	-30.5	4.2	20	2.6	18	19	0	208	116	810.6
ESTEVAN A	-1.1	4.8	14.4	-15.8	21.8	126	46.3	240	0	6	208	112	590.7
HUDSON BAY A	-4.4	*	11.7	-21.3	26.8	*	23.8	*	2	6	159	*	694.1
KINDERSLEY	0.1	6.7	15.5	-18.8	15.0	103	16.4	112	0	4	212	*	557.8
LA RONGE A	-5.8	4.9	13.7	-23.2	14.2	65	13.1	71	23	5	*	*	736.5
MEADOW LAKE A	-5.4	*	8.5	-24.9	16.4	*	12.3	*	17	3	216	*	724.3
MOOSE JAW A	-0.2	5.4	16.0	-15.5	23.5	127	31.6	181	0	6	196	117	564.4
NIPAWIN A	-4.7	*	11.2	-19.7	9.8	*	7.2	*	3	2	186	*	703.7
NORTH BATTLEFORD A	-2.3	6.3	15.1	-19.2	6.9	33	5.2	25	0	1	*	*	631.7
PRINCE ALBERT A	-2.3	8.0	13.7	-19.7	4.9	25	5.1	27	0	2	195	118	690.3
REGINA A	-1.2	6.6	15.6	-16.8	30.0	164	35.8	201	0	6	185	119	597.8
SASKATOON A	-2.0	6.6	14.3	-19.3	9.4	51	7.8	42	0	2	*	*	619.1
SWIFT CURRENT A	-0.2	5.5	15.7	-16.5	20.6	97	23.0	114	0	3	209	133	564.7
YORKTON A	-5.5	4.1	8.4	-20.2	32.6	124	34.8	133	0	5	173	104	735.3
MANITOBA													
BRANDON A	-0.1	8.6	14.6	-19.2	22.0	111	36.2	181	0	6	180	*	704.5
CHURCHILL A	-14.0	6.4	6.4	-30.9	26.1	140	21.1	117	20	7	146	77	990.1
DAUPHIN A	-4.5	4.6	8.3	-21.0	39.4	162	50.6	207	9	7	115	65	684.0
GILLAM A	-10.8	5.7	9.0	-33.6	12.2	39	11.6	59	25	4	*	*	892.5
GIMLI	-5.3	*	13.8	-22.6	29.4	*	44.8	*	1	6	187	96	722.6
ISLAND LAKE	-8.8	3.2	11.5	-33.5	29.4	53	36.2	116	45	7	*	*	826.1
LYNN LAKE A	-10.0	4.7	9.1	-30.0	25.8	104	13.6	89	10	2	185	100	867.1
NORWAY HOUSE A	-8.1	*	12.3	-30.6	42.4	*	35.0	*	10	4	*	*	808.7

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	Mean	Difference from Normal	Maximum	Minimum									
PORTAGE LA PRAIRIE	-3.6	3.8	15.4	-21.7	31.7	117	54.9	201	0	6	*	*	652.4
THE PAS A	-5.7	5.5	12.4	-22.4	15.4	54	13.6	58	3	4	173	99	743.8
THOMPSON A	-9.1	5.1	11.2	-34.1	11.6	40	11.3	55	6	3	187	96	841.3
WINNIPEG INT'L A	-4.1	4.1	12.9	-23.7	12.6	60	32.8	144	0	6	186	106	685.8
ONTARIO													
BIG TROUT LAKE	-9.7	4.8	8.2	-33.0	26.1	114	42.1	195	34	7	147	*	857.5
EARLTON A	-6.1	1.5	12.5	-31.3	8.6	19	38.8	67	7	7	*	*	763.1
GERALDTON A	-7.0	*	13.0	-34.0	9.8	*	25.4	*	4	6	*	*	774.8
GORE BAY A	-2.3	2.0	14.2	-21.0	5.2	17	40.6	76	5	6	*	*	630.1
HAMILTON RBG	1.3	*	23.1	-12.7	4.4	*	32.4	*	0	8	161	*	*
HAMILTON A	1.1	1.9	23.7	-12.8	9.6	48	42.5	55	0	9	*	*	523.7
KAPUSKASING A	-5.7	3.7	15.1	-33.9	16.6	35	41.2	74	19	7	*	*	734.9
KENORA A	-4.2	2.9	13.3	-21.0	15.3	52	40.3	134	*	8	*	*	684.6
KINGSTON A	-0.4	1.2	19.1	-18.5	14.6	45	65.0	76	*	9	151	106	569.0
LONDON A	2.1	3.0	22.8	-11.4	12.1	43	59.3	79	0	10	132	109	502.8
MOOSONEE	-8.2	4.1	11.6	36.2	17.0	51	19.2	51	16	8	166	112	812.0
MUSKOKA A	-2.3	1.5	19.6	-26.4	9.8	27	40.4	61	*	8	*	*	629.2
NORTH BAY A	-3.3	2.0	19.8	-24.1	14.4	37	34.0	56	16	7	159	107	659.0
OTTAWA INT'L A	-1.8	1.2	3.0	-6.5	12.2	34	35.3	52	5	7	172	116	612.6
PETAWAWA A	-3.6	0.7	13.4	-28.2	8.6	29	36.8	56	*	6	*	*	669.3
PETERBOROUGH A	-0.7	1.8	21.4	-18.7	13.2	57	70.6	98	*	7	*	*	580.4
PICKLE LAKE	-7.1	3.6	11.1	-30.4	14.1	37	23.6	56	24	8	*	*	778.4
RED LAKE A	-6.5	2.2	12.2	-29.7	14.2	59	50.8	176	15	7	180	*	759.8
ST CATHARINES A	2.1	1.0	25.3	-13.0	3.4	19	26.6	32	0	6	145	*	493.5
SARNIA A	2.6	2.3	23.2	-12.5	1.6	7	52.8	78	0	11	155	121	476.0
SAULT STE MARIE A	-3.8	1.1	12.0	-25.1	21.6	71	59.7	102	*	8	148	98	675.5
SIOUX LOOKOUT A	-5.4	2.9	13.2	-29.6	16.4	51	31.8	91	11	5	*	*	882.7
SUDBURY A	-4.2	1.8	15.9	-24.5	7.6	22	31.8	58	4	6	165	109	687.2
THUNDER BAY A	-3.9	2.4	18.1	-23.8	5.2	15	29.7	66	0	5	182	105	678.3
TIMMINS A	-5.7	2.7	19.9	-34.5	17.0	31	45.4	76	42	8	*	*	735.0
TORONTO	2.0	*	20.4	-12.5	7.8	*	30.4	*	0	7	*	*	497.1
TORONTO INT'L A	0.7	1.7	21.4	-13.5	4.4	20	28.7	47	0	9	*	*	539.3
TORONTO ISLAND A	1.1	*	19.2	-11.2	2.6	12	22.2	*	0	6	*	*	524.5
TRENTON A	-0.1	0.9	19.1	-16.8	8.4	31	53.2	74	0	7	*	*	561.7
WATERLOO WELLINGTON	0.5	2.4	23.1	-14.1	11.8	49	39.0	48	0	8	*	*	543.6
WAWA A	-5.5	*	18.6	-30.0	19.6	*	53.8	*	35	9	*	*	727.1
WIARTON A	-0.8	2.0	23.1	-20.7	34.3	80	50.3	77	0	9	170	123	583.0
WINDSOR A	3.8	2.6	23.5	-9.9	16.6	83	50.4	70	0	12	*	*	439.4

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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
QUEBEC													
BAGOTVILLE A	-6.3	0.2	8.0	-27.0	14.0	29	30.4	59	18	6	*	*	754.3
BAIE COMEAU A	-7.3	-0.6	5.2	-27.9	19.2	32	30.6	39	41	8	202	135	783.6
BLANC SABLON A	-11.7	-5.9	3.3	-28.8	52.6	63	61.2	54	62	9	158	*	906.1
CHIBOUGAMAU CHAPAIS	-10.3	*	8.9	-36.9	39.4	*	51.2	*	51	10	181	115	876.6
GASPE A	-6.1	*	9.7	-23.1	15.8	*	38.4	*	1	5	194	*	747.9
INUKJUAK A	-19.3	1.3	0.7	-35.0	20.8	231	20.8	231	41	5	151	94	1154.6
KUUJJUAQ A	-17.5	0.2	2.7	-36.6	26.4	99	29.4	113	24	10	171	104	1104.2
KUUJJUARAPIK A	-14.8	2.3	5.5	-38.3	27.3	135	30.8	147	19	7	129	76	1018.6
LA GRANDE IV A	-14.8	*	4.8	-42.7	34.2	*	37.2	*	78	13	156	*	1018.0
LA GRANDE RIVIERE A	-13.4	*	6.2	-35.5	41.4	*	39.6	*	40	11	153	*	974.2
MANIWAKI	-4.1	1.0	17.7	-28.7	7.4	22	29.8	58	5	6	180	124	684.4
MATAGAMI A	-9.0	*	9.8	-36.9	15.6	*	31.5	*	30	8	158	103	836.8
MONT JOLI A	-4.8	0.2	7.1	-18.8	12.2	19	26.8	37	4	7	169	130	707.1
MONTREAL INT'L A	-1.1	1.4	12.8	-16.6	12.8	36	46.4	63	4	7	173	112	591.6
MONTREAL MIRABEL I/	-3.2	*	9.9	-23.6	14.4	*	39.1	*	12	7	*	*	656.7
NATASHQUAN A	-9.4	-3.2	1.2	-29.4	32.0	56	49.2	61	66	9	212	149	846.4
QUEBEC A	-4.5	0.0	12.1	-21.5	18.2	34	77.2	94	49	8	175	125	695.7
ROBERVAL A	-6.7	0.2	8.7	-23.9	9.4	16	28.5	47	16	5	184	*	750.7
SCHEFFERVILLE A	-16.5	-1.4	3.6	-38.7	39.8	95	27.8	67	68	8	181	110	1069.9
SEPT-ILES A	-8.9	-2.3	5.1	-30.6	33.2	47	37.2	45	31	8	201	131	835.7
SHERBROOKE A	-2.9	1.1	21.5	-25.2	31.8	60	47.0	59	6	8	165	*	648.6
STE AGATHE DES MONT	-4.7	0.8	18.9	-29.5	29.8	45	42.1	44	32	10	167	109	703.8
ST HUBERT A	-1.5	0.9	12.4	-17.2	19.4	*	50.4	63	8	7	169	*	602.9
VAL D'OR A	-7.4	0.9	8.7	-31.8	15.6	33	45.0	76	20	9	186	119	786.8
NEW BRUNSWICK													
CHARLO A	-5.8	-0.3	8.0	-24.8	24.6	32	33.7	37	23	8	199	134	738.8
CHATHAM A	-3.7	-0.4	9.9	-22.5	29.6	44	40.6	42	19	9	182	125	672.3
FREDERICTON A	-2.6	-0.2	11.2	-24.7	24.6	51	59.2	70	6	8	198	*	638.2
MONCTON A	-2.9	0.0	15.1	-22.0	24.5	36	51.5	46	2	9	180	130	646.0
SAINT JOHN A	-2.7	-0.2	10.8	-21.6	29.4	59	54.8	48	7	9	180	125	641.0

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	-0.7	0.2	18.2	-19.5	26.0	54	59.8	71	11	8	*	*	579.5
HALIFAX INT'L A	-2.3	-0.7	10.9	-17.2	36.2	80	55.1	43	3	9	*	*	629.3
SABLE ISLAND	-0.6	-1.3	9.6	-10.4	14.0	49	109.4	94	0	12	141	121	574.2
SHEARWATER A	-1.3	-0.5	10.5	-14.9	25.8	66	62.4	53	7	8	182	124	598.6
SYDNEY A	-4.6	-2.1	12.3	-21.0	25.6	40	54.8	42	0	8	190	151	701.1
YARMOUTH A	0.2	-0.1	10.9	-12.2	10.6	32	44.8	45	3	9	165	121	551.5
PRINCE EDWARD ISLAND													
CHARLOTTETOWN A	-4.0	-0.9	11.0	-21.1	25.9	42	56.0	59	0	10	204	*	683.0
SUMMERSIDE A	-3.7	-0.9	9.1	-19.6	24.4	44	45.4	54	2	10	205	144	671.6
NEWFOUNDLAND													
BONAVISTA	-5.3	-2.6	9.4	-18.5	81.2	207	*	*	1	8	*	*	721.9
BURGEO	-6.2	-3.6	4.0	-22.1	31.0	65	68.9	46	28	12	*	*	752.0
CARTWRIGHT	-11.8	-3.7	6.0	-21.3	24.5	29	24.5	26	230	9	173	138	939.5
CHURCHILL FALLS A	-14.8	-1.7	6.0	-34.5	33.6	52	29.6	45	85	7	210	152	1017.0
COMFORT COVE	-7.6	-4.0	10.8	-24.0	44.0	64	73.4	73	79	10	*	*	809.5
DANIELS HARBOUR	-9.3	-4.8	3.6	-27.8	42.6	69	60.2	80	32	10	137	119	846.2
DEER LAKE A	-10.0	-5.5	7.9	-33.3	28.0	52	37.9	48	36	8	*	*	864.4
GANDER INT'L A	-7.6	-4.1	8.8	-24.9	49.0	68	78.4	71	11	9	185	178	794.9
GOOSE A	-11.0	-2.4	8.1	-30.4	13.8	18	12.6	17	17	4	215	*	907.5
MARY'S HARBOUR	-10.8	-4.3	4.4	-30.2	10.6	14	15.4	17	80	4	*	*	981.8
PORT AUX BASQUES	-7.9	-5.2	4.5	-21.1	37.8	74	77.7	74	33	11	180	*	769.0
ST ANTHONY	-10.0	-3.3	2.2	-25.0	26.4	43	28.2	27	79	9	*	*	870.5
ST JOHN'S A	-5.0	-2.7	13.4	-17.8	17.8	27	68.8	52	0	11	168	177	710.9
ST LAWRENCE	-5.0	-3.2	7.5	-18.9	111.5	252	*	*	0	10	*	*	704.0
STEPHENVILLE A	-8.1	-5.3	5.4	-29.2	49.2	84	80.0	98	48	12	150	143	812.0
WABUSH LAKE A	-14.7	-0.9	3.1	-38.6	43.1	72	39.2	69	33	10	172	117	1003.6

AGROCLIMATOLOGICAL STATIONS

MARCH 1990

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	8.2	2.1	20.5	-2.5	0.0	100.4	68	0	10	160	104.5	140.7
KAMPLOOPS	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
SIDNEY	6.9	1.2	16.0	-0.5	0.0	48.8	72	0	9	148	66.5	94.5
SUMMERLAND	5.2	1.5	18.5	-5.0	1.0	12.2	82	0	4	184	49.2	54.5
ALBERTA												
BEAVERLODGE	0.3	6.4	13.0	-20.0	7.6	5.5	22	0	2	204	5.3	5.8
ELLERSLIE	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
LACOMBE	-1.6	4.4	14.0	-21.0	14.6	16.3	85	0	3	211	0.7	0.7
LETHBRIDGE	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
VEGREVILLE	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
SASKATCHWAN												
INDIAN HEAD	-2.5	5.4	12.0	-18.0	33.2	51.9	238	0	6	**	0.5	0.5
MELFORT	-4.1	6.1	11.0	-18.5	5.7	6.0	34	22	1	168	1.8	1.8
REGINA	-3.6	4.6	15.0	-16.5	28.0	32.2	200	0	6	**	2.0	2.0
SASKATOON	-2.2	6.3	14.0	-18.5	8.4	9.4	42	0	2	185	5.5	5.5
SCOTT	-1.3	7.6	14.5	-19.0	9.2	7.6	40	0	2	199	6.4	6.4
SWIFT CURRENT	-0.4	4.3	15.5	-17.0	14.2	18.2	118	0	2	187	9.0	9.0
MANITOBA												
BRANDON	-3.6	4.8	15.7	-20.6	19.8	52.2	222	0	7	**	3.8	3.8
GLENLEA	-3.1	5.9	15.5	-22.0	19.8	51.0	213	0	7	160	6.5	6.5
MORDEN	-5.0	1.7	12.5	-21.0	28.2	46.0	163	0	7	184	1.0	1.0
ONTARIO												
DELHI	1.4	1.7	25.0	-13.0	7.0	58.2	69	0	9	**	44.9	48.5
ELORA	-0.1	2.6	22.3	-15.3	0.0	43.2	58	0	*	**	*.*	*.*
GUELPH	0.3	2.2	23.5	-15.6	11.8	45.3	72	0	9	155	45.2	46.5
HARROW	3.7	2.5	23.0	-15.0	0.0	43.4	58	0	9	112	67.1	77.8
KAPUSKASING	-5.9	3.7	16.0	-35.5	7.0	41.4	77	15	6	173	0.0	0.0
OTTAWA	-1.8	1.1	12.1	-19.4	11.6	30.4	51	4	7	172	3.4	3.4
SMITHFIELD	0.8	2.2	20.3	-17.3	1.3	61.9	73	0	6	**	35.7	36.1
VINELAND	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
WOODSLIE	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
QUEBEC												
LA POCATIERE	-3.9	0.5	8.5	-23.5	14.5	44.2	66	2	6	183	0.0	0.0
L'ASSOMPTION	-2.2	1.5	9.5	-24.0	11.4	43.0	62	8	5	157	0.0	0.0
LENNOXVILLE	*.*	*.*	*.*	*.*	*.*	*.*	**	***	***	**	*.*	*.*
NORMANDIN	-8.8	-0.1	6.0	-34.0	5.4	19.0	32	32	3	168	0.0	0.0
STE.CLOTILDE	-0.9	1.6	16.5	-20.0	13.0	62.0	84	9	***	11	*.*	*.*
NEW BRUNSWICK												
FREDERICTON	-2.0	0.5	12.5	-26.0	18.6	46.1	57	0	9	198	0.0	0.0
NOVA SCOTIA												
KENTVILLE	-0.5	0.5	15.5	-19.5	24.8	94.4	96	6	7	182	10.3	18.6
NAPPAN	-2.4	-0.1	15.0	-26.0	28.4	60.6	67	4	8	194	5.8	5.8
PRINCE EDWARD ISLAND												
CHARLOTTETWN	-3.2	-0.5	11.5	-19.5	23.0	55.0	65	10	***	2	*.*	*.*
NEWFOUNDLAND												
ST.JOHN'S WEST	-3.5	-1.5	13.0	-18.0	14.2	78.0	52	0	13	150	7.3	14.8