



Environment
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Climatic Perspectives

Monthly review

FEBRUARY

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CLIMATIC HIGHLIGHTS

by

P. Scholefield, Monitoring and Prediction Division

Prolonged Spell of Mild, Dry Weather Continues in the West

February was another mild winter month over most of western Canada. Monthly temperature anomalies however were not particularly strong, in fact, a few sites in central B.C. recorded slightly negative departures from normal. Except for these few central B.C. sites and a small region in southwestern B.C. that experienced below-normal temperatures in December, the remainder of B.C., all of Alberta and the Yukon, and the western half of the District of Mackenzie have now experienced 6 consecutive months of above-normal temperatures. This is the second mild winter in a row for this part of western Canada. Some B.C. coastal stations (Comox, McInnes Island, Prince Rupert and Sandspit) have recorded above-normal mean monthly temperature for 18 consecutive months.

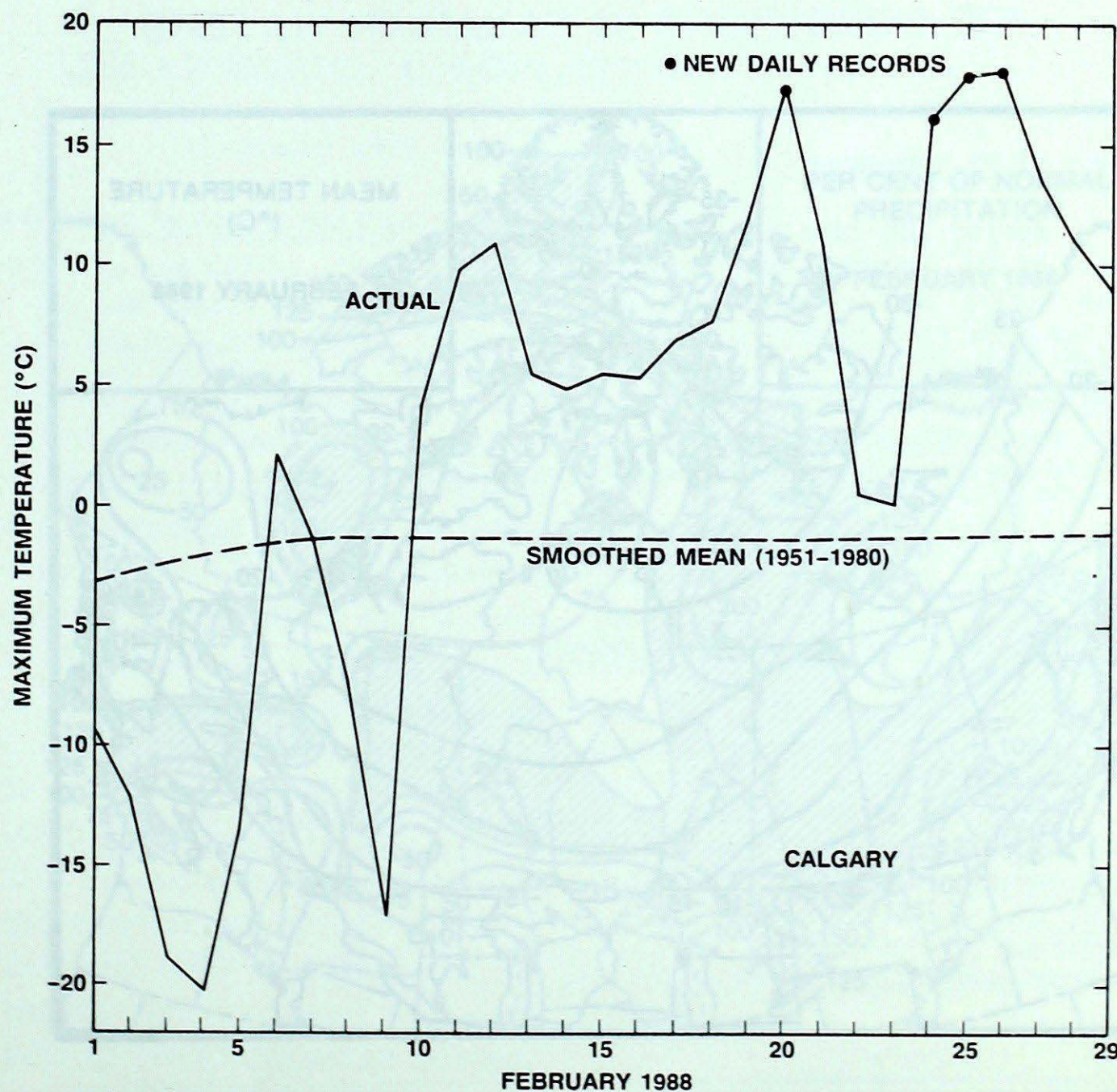
The El Nino event which was so prominent last winter seems likely to be related to this winter's mild weather as well although it would appear to have been more of a residual effect. Pronounced, above-normal sea surface temperature anomalies in the central and eastern tropical Pacific Ocean persisted right into the early part of this winter but have diminished significantly since during the past month.

Calgary demonstrated to the world in a dramatic fashion how a mild-temperature anomaly in the winter can affect the city's

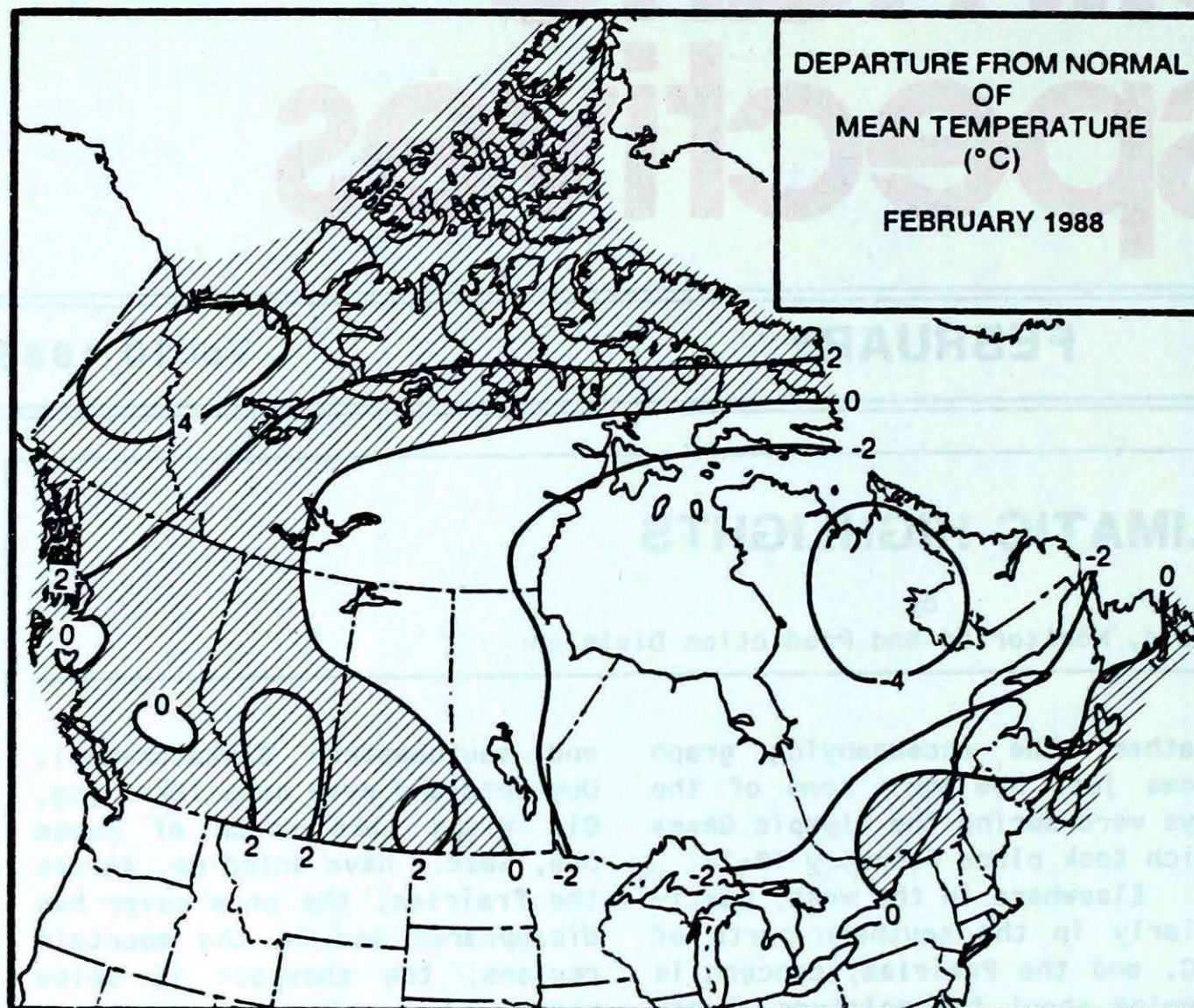
weather. The accompanying graph shows just how warm some of the days were during the Olympic Games which took place February 13-28.

Elsewhere in the west, particularly in the southern parts of B.C. and the Prairies, concern is growing about the moisture shortage. Monthly precipitation has been below normal for the past 6 months (7 months in southern B.C.

and southeastern Saskatchewan). Dug outs and even some lakes (eg. Old Wives Lake south of Moose Jaw, Sask.) have dried up. Across the Prairies, the snow cover has disappeared and in the mountain regions, the snowpack is below normal. A continuation of these conditions into the growing season could be disastrous for the agricultural sector.



TEMPERATURE

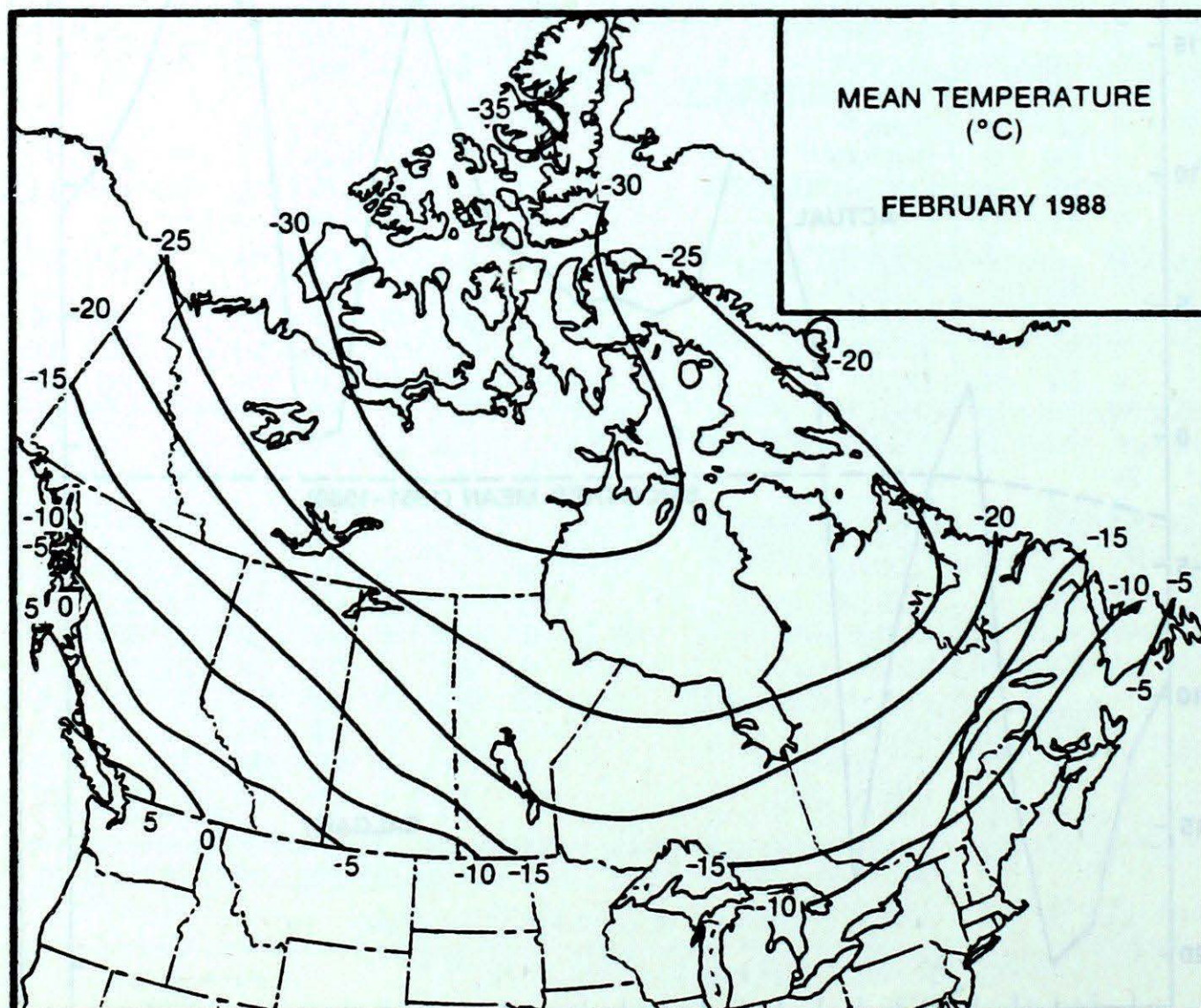


ACROSS THE COUNTRY

Yukon and Northwest Territories

Mild winter weather continued over the western Arctic. With temperatures readings of 3 to 4°C above normal, February 1988 marks the fifth consecutive month with above normal readings in the Yukon. Although the month started with bitterly cold temperatures (minimums colder than -40°C), pacific air brought mild temperatures towards the middle of the month setting record high values (9.3°C at Watson Lake). Eastern Arctic also experienced above normal temperatures this month.

Precipitation amounts varied from a low of 13% of normal in central Yukon to more than 250% of normal over Baffin Island. Moderate to heavy snowfalls along with strong winds created threats of avalanches and forced closures of roads on the Haines and Klondike highways in southwestern Yukon during February 16-20th. At Whitehorse, the Rendezvous week was the second warmest in 20 years as daytime highs reached above the freezing mark. It was also one of driest with very little snow.



British Columbia

Except for brief intrusions of cool air, the weather was generally mild throughout most of the month. The temperatures were near 1°C above normal in southern B.C. Only Cariboo and Cariboo mountains experienced cooler than normal February. Northern B.C. was especially mild with temperatures that were 2 to 3°C above normal. Record-high maximums were established at several locations including 16.6°C at Penticton.

Precipitation was above normal in a band stretching from the central and north coasts eastward across the Chilcotin plateau-Caribou and southeastward to the upper Columbia. Elsewhere, drier than normal conditions continued. Less than 25% of normal amounts fell in southeastern B.C. (23% of normal at Cranbrook). Record high sunshine hours were recorded at Cranbrook (145 hrs) and Penticton (106 hrs), while Port Hardy received a record low of 36 hours.

Prairie Provinces

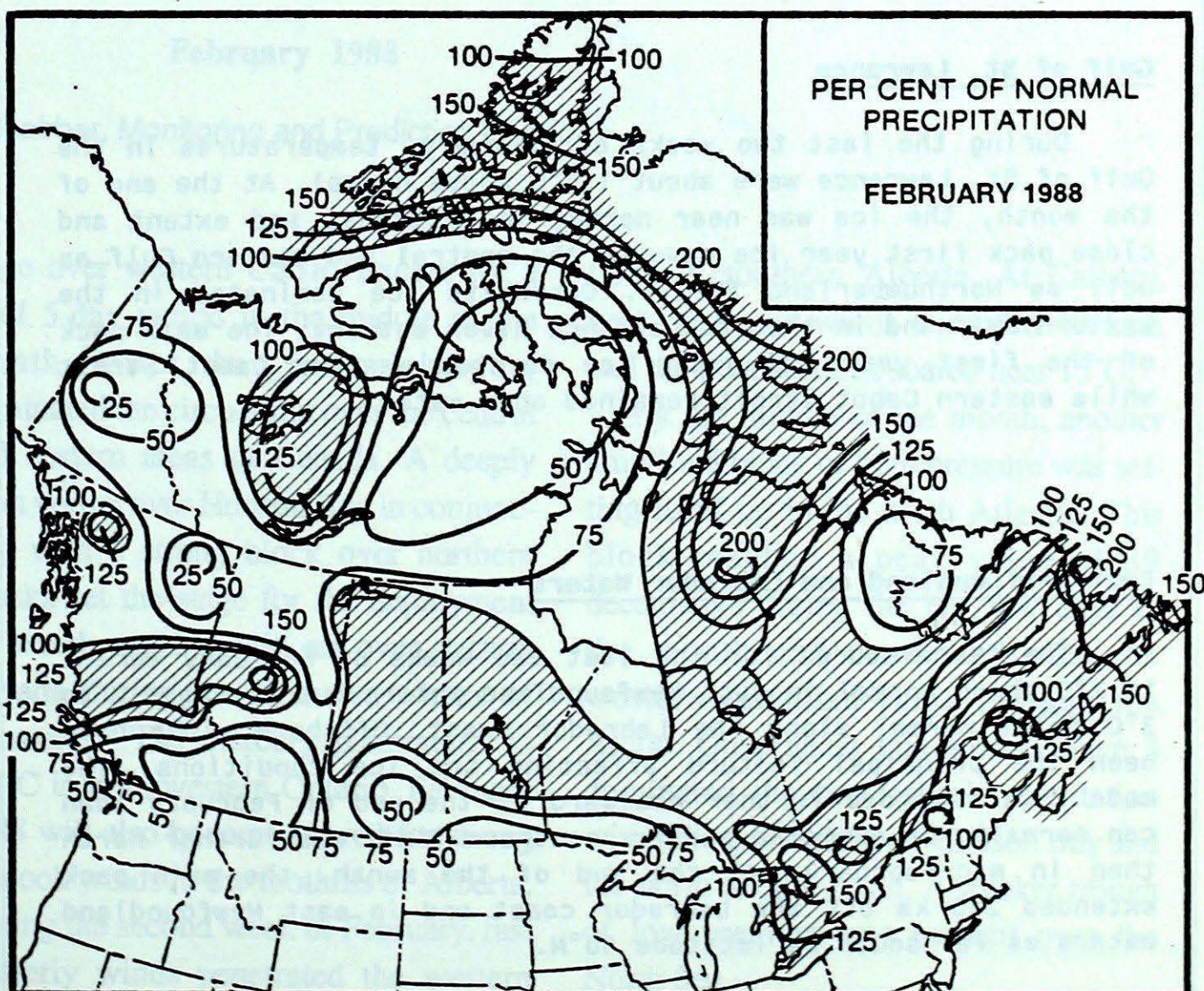
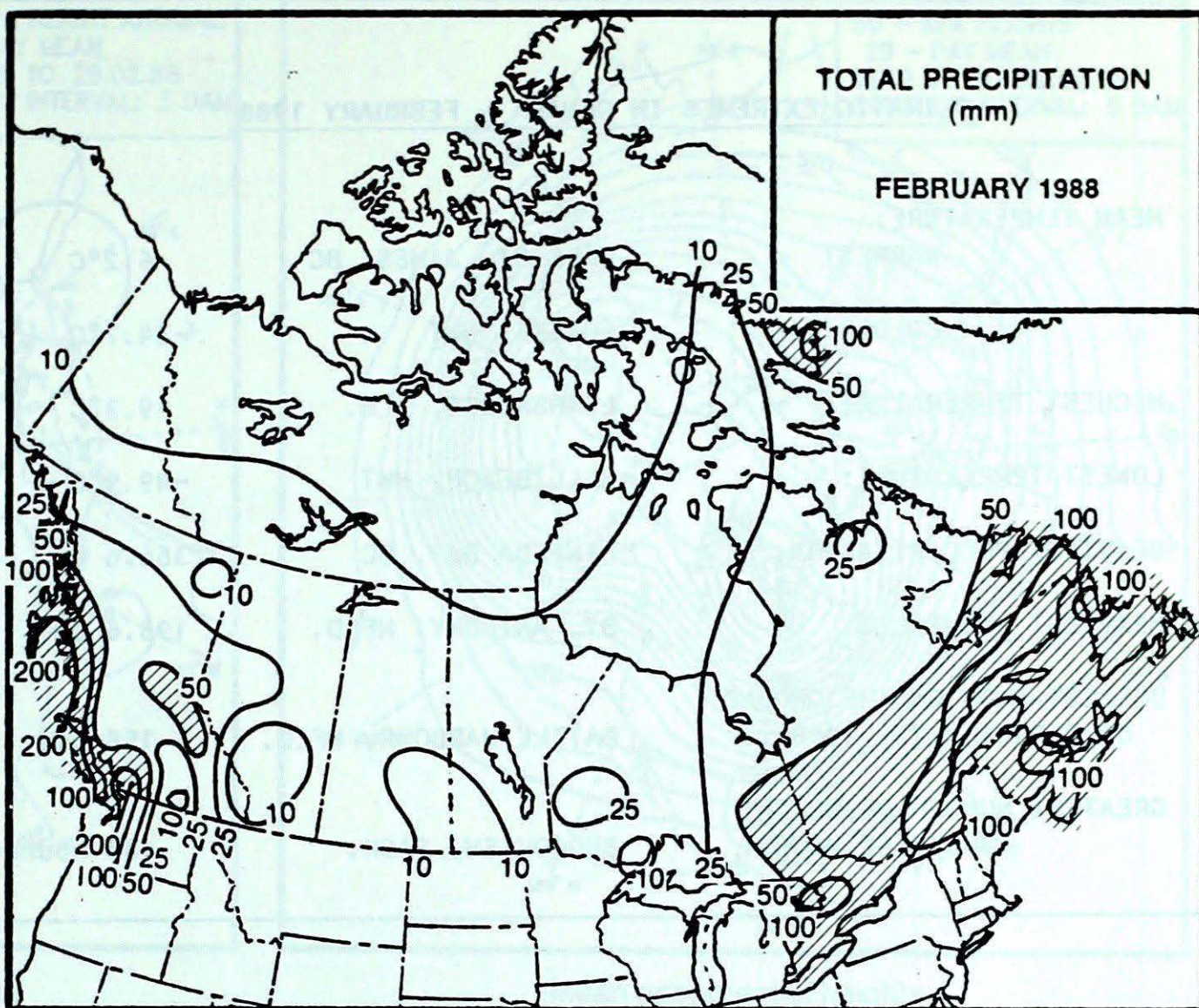
Record-setting cold temperatures highlighted the beginning of the month as the mercury dropped to below -40°C at several locations. However, towards the middle of the month, mild pacific air invaded the prairies and record-high values were set at many locations as the temperatures soared into the mid-teens (for example, 16.8°C at Estevan). With the exception of northeastern Manitoba, monthly mean temperatures were 1 to 3°C above normal across the prairies.

Below normal precipitation continued to be the main story. Once again this month, less than 50% of normal precipitation fell across the agricultural areas. Most dugouts in southern Saskatchewan were dry and mountainous snowpack was below normal. Frequent chinook winds depleted the already thin snow cover in southern Alberta where snowfall was also below normal. Alberta had to cope from near blizzard conditions on the 6th in Edmonton to freezing rain near Whitecourt on the 12th.

Ontario

Winter arrived a few months late in Ontario this season with February establishing the onset of real winter weather across the Province. Following a mild and relatively snow-free December and January, February was cooler than normal throughout Ontario with snowfall nearly double the usual amounts in southern and central areas. In particular, Gore Bay (77 cm) and Wiarton (66 cm) recorded their snowiest February ever. February was quite cold. In the north and northwest, the temperatures were 2 to 3°C below normal—their coldest February since 1979. In central and southern Ontario, the readings were about 1°C below normal which for the majority of sites represented their coldest February since 1982. Only Ottawa bucked the trend with a monthly mean of 0.2°C above normal.

Snowfall was plentiful. Areas south of a line from Kingston through Sudbury to Wawa collected twice their normal share. Toronto city's 56 cm was the most in



EXTREMES

CLIMATIC EXTREMES IN CANADA - FEBRUARY 1988

MEAN TEMPERATURE:		
WARMEST	CAPE ST. JAMES, BC	6.2°C
COLDEST	EUREKA, NWT	-34.7°C
HIGHEST TEMPERATURE:	LETHBRIDGE, ALB.	19.3°C
LOWEST TEMPERATURE:	HALL BEACH, NWT	-49.5°C
HEAVIEST PRECIPITATION:	ETHELDA BAY, BC	386.6 mm
HEAVIEST SNOWFALL:	ST. ANTHONY, NFLD.	198.6 cm
DEEPEST SNOW ON THE GROUND ON FEBRUARY 29, 1988:	BATTLE HARBOUR, NFLD.	158 cm
GREATEST NUMBER OF BRIGHT SUNSHINE HOURS:	BROADVIEW, SASK.	188 hours

ICE CONDITIONS IN CANADIAN WATERS

Gulf of St. Lawrence

During the last two weeks of February, temperatures in the Gulf of St. Lawrence were about 1.5°C above normal. At the end of the month, the ice was near normal in thickness and extent and close pack first year ice covered the central and western Gulf as well as Northumberland Strait. Greywhite ice dominated in the eastern Gulf and in the St. Lawrence River estuary. The main pack of the first year and young ice covered western Cabot Strait while eastern Cabot Strait remained open water.

East Newfoundland and Labrador Waters

The temperatures for the last two weeks of February were 1 to 2°C above normal in east Newfoundland waters but averaged 2 to 3°C below normal along the Labrador coast. Offshore winds have been the principal feature affecting the ice conditions. The main pack extended further eastward at the end of February than can normally be expected and the southern limit was further north than in mid-February. At the end of the month, the main pack extended 240 km off the Labrador coast and in east Newfoundland waters as far south as latitude 40°N.

February since 1962 and marked an abrupt reversal to the dry forepart of winter. In the north, snowfall was 10-25 cm above normal. Thunder Bay received record-high bright sunshine hours this month, 187 hours.

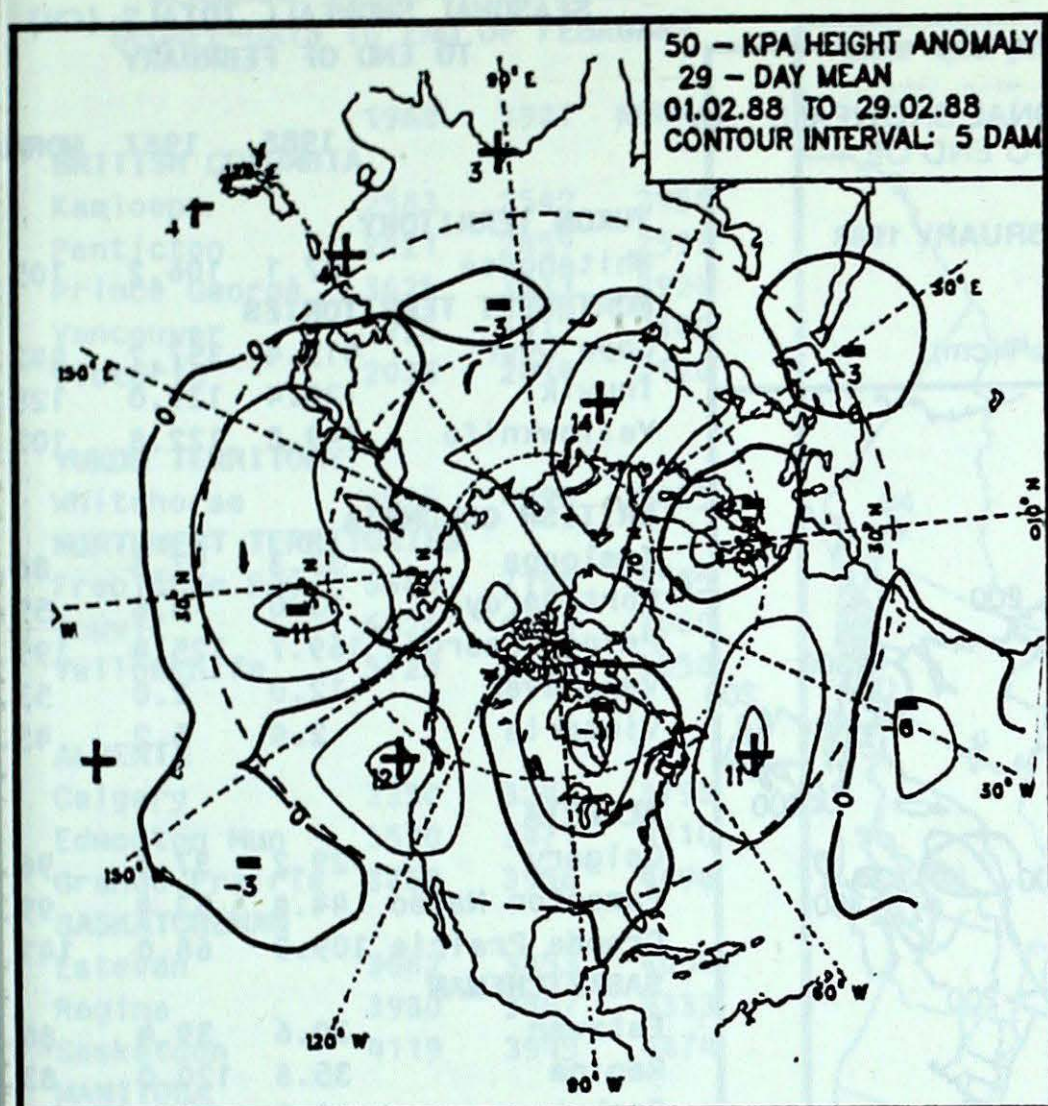
Quebec

February was about a degree below normal from the Ottawa Valley to Quebec City. Elsewhere, the readings ranged from 0.5°C below normal at Roberval to as much as 3.8°C below normal at Blanc Sablon. Over northern Quebec, colder than normal temperatures continued into February. Inukjuak recorded the largest departure of -5.3°C. At Gaspe, a monthly value of -12.9°C was the lowest February reading since 1982.

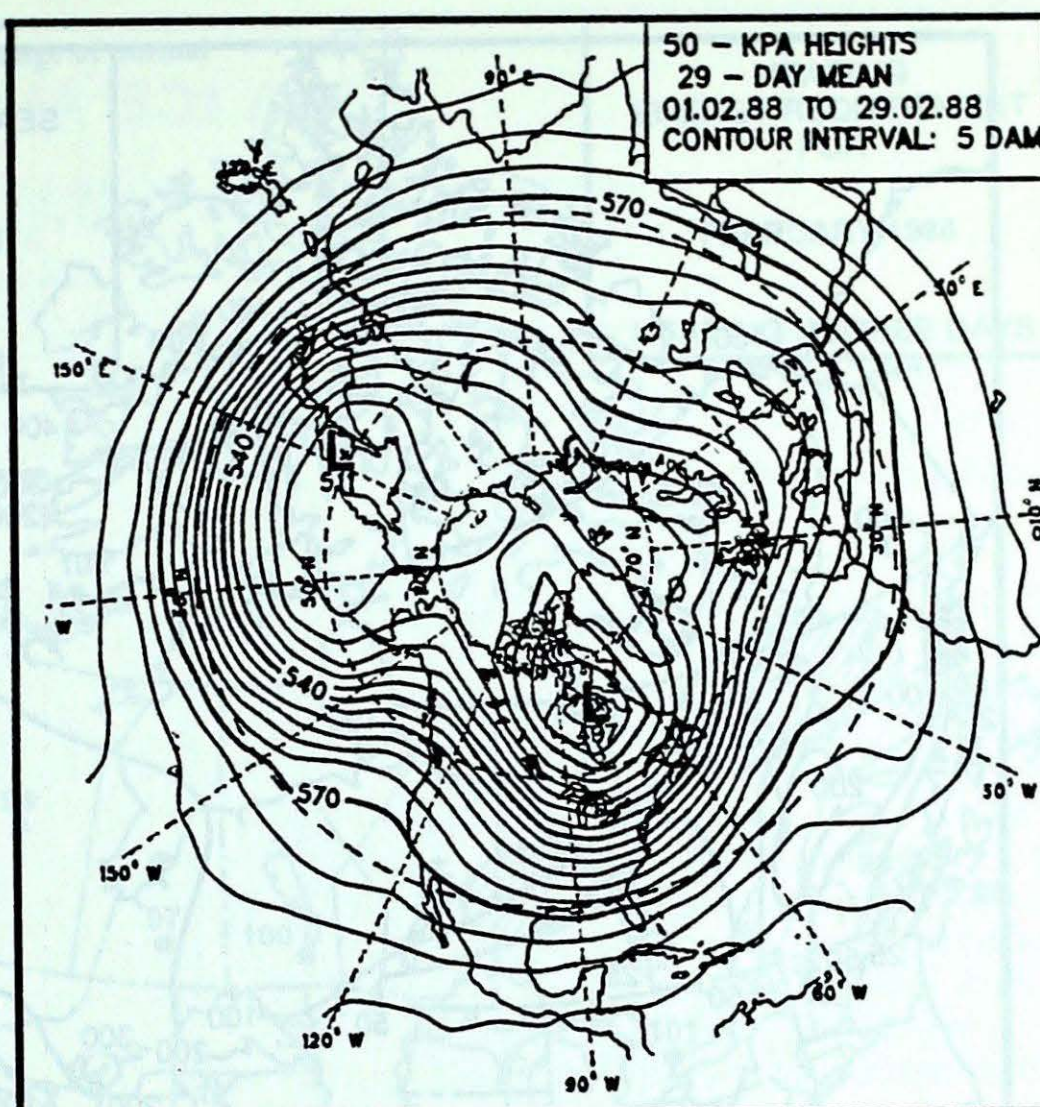
Precipitation exceeded 100 mm over the southern Laurentians and from Quebec City eastward to the Gulf of St. Lawrence. Baie Comeau received 200% of normal. Copious amounts of snow fell over southern Quebec. At Baie Comeau, nearly 141 cm of snow proved to be a record and almost twice the normal for February. In addition, record snowfall amounts were established at Matagami (67.4 cm), Gaspe (115.6 cm) and Mirabel (83.2 cm).

Atlantic Provinces

January's cold temperatures continued into February in Newfoundland and New Brunswick, however the month was milder than normal in Nova Scotia. The temperatures ranged from nearly 3°C above normal at Truro to more than 4°C below normal in Labrador. On February 7, the mercury fell to record low levels in the maritimes. February was a stormy month with above normal precipitation. Charlo received 120 mm setting a record for the month, while Truro's 168 mm was the second largest February amount since 1872. Heavier than usual snowfall amounts were reported in New Brunswick, Prince Edward Island and Newfoundland. Charlo's 136 cm of snowfall was the most since 1972, and a whopping 199 cm at St. Anthony was more than 95 cm above normal. Cont'd on page 10B



Mean geopotential height anomaly
50 kPa level - 5 decametre interval



Mean geopotential heights
50 kPa level - 5 decametre interval

50 kPa ATMOSPHERIC CIRCULATION

February 1988

Amir Shabbar, Monitoring and Prediction Division

The 50 kPa circulation during February was characterized by a southward displaced Arctic vortex over Hudson Bay and strong blocking ridge at high latitude throughout most of the month. For the fifth consecutive month, lower than normal heights remained over the Aleutian Islands. Along the west coast of Canada, a persistent ridge of high pressure deflected storm systems from the Pacific keeping most of southern British Columbia drier than normal.

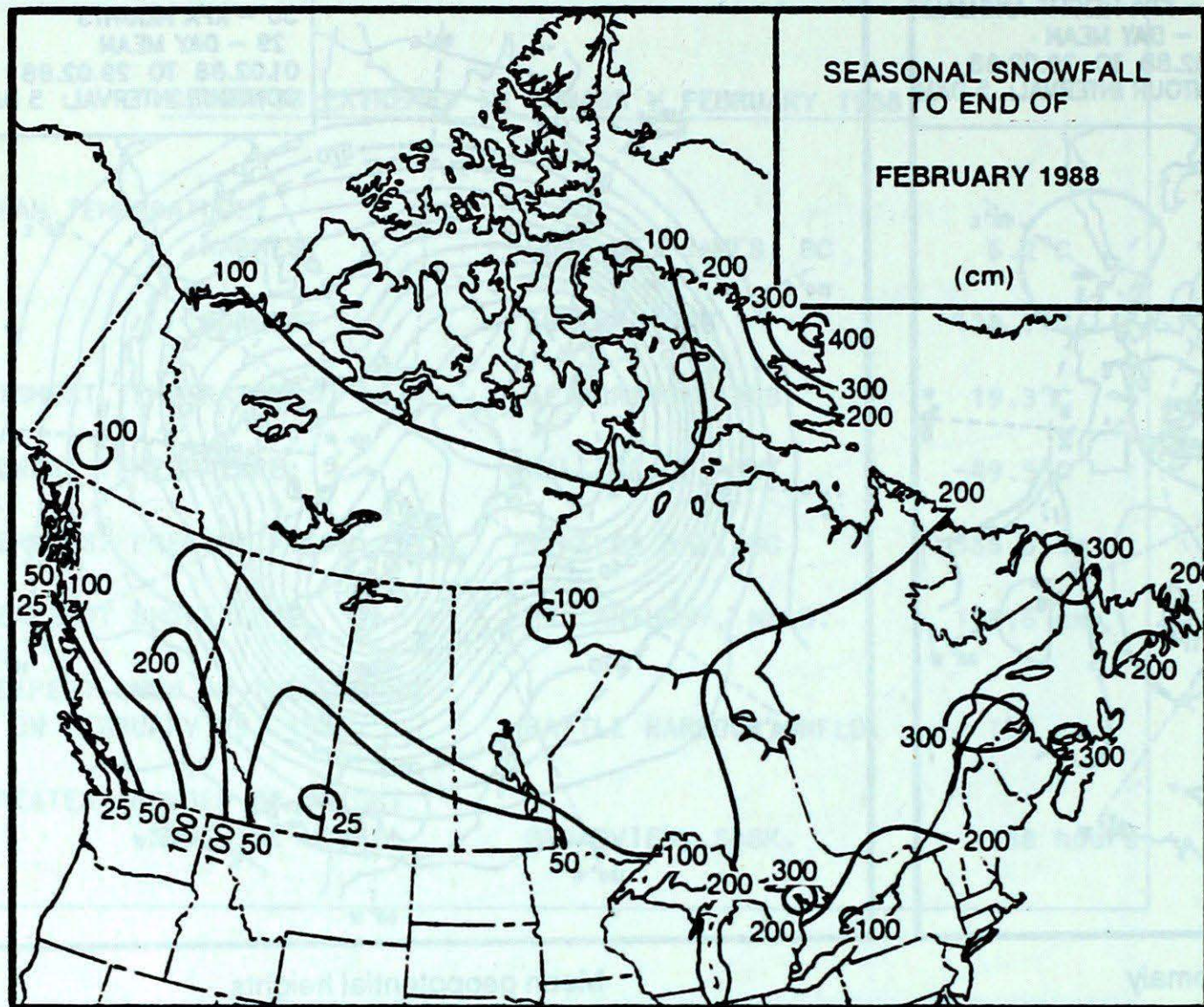
The month started with a strong block over the Beaufort Sea. Towards the middle of the month, this block moved into the polar regions and subsequently contributed to the build up of an amplified

ridge over western USSR. Except for a brief 5-day period in the middle of the month, lower than normal heights dominated the circulation over the central and eastern areas of Canada. A deeply spun vortex over Hudson Bay in conjunction with a strong block over northern Alaska set the stage for the deployment of bitterly cold Arctic air over eastern Canada during the first two weeks of February. The mercury plummeted to -41°C in northwestern Ontario. February 1988 will also be remembered for strong chinook winds in the foothills of Alberta. During the second week of February, fast westerly winds penetrated the western ridge and produced chinook wind condi-

tions in southern Alberta. At Calgary, peak sustained winds exceeded 40 kmh and the temperatures soared near 15°C .

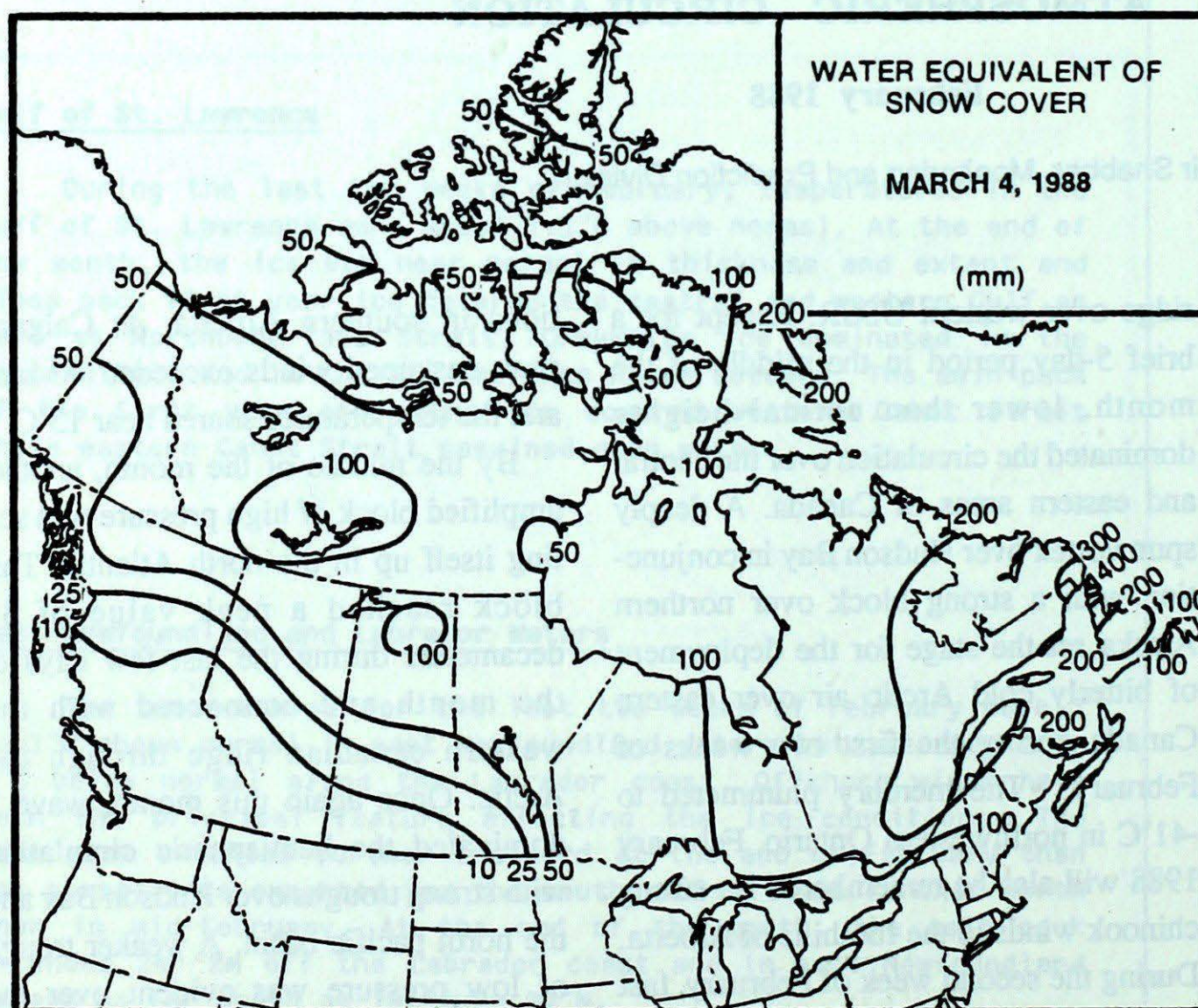
By the middle of the month, another amplified block of high pressure was setting itself up in the north Atlantic. This block reached a peak value of 39 decameters during the last few days of the month and connected with the western Canadian ridge through the Arctic. Once again this month, wave 3 dominated the hemispheric circulation with strong troughs over Hudson Bay and the north Pacific basin. A weaker trough of low pressure was evident over the North Sea.

SNOWFALL



SEASONAL SNOWFALL TOTALS (CM) TO END OF FEBRUARY

	1988	1987	NORMAL
YUKON TERRITORY			
Whitehorse	87.1	106.2	105.9
NORTHWEST TERRITORIES			
Cape Dyer	415.4	357.2	442.0
Inuvik	128.4	129.0	129.9
Yellowknife	149.8	122.8	107.3
BRITISH COLUMBIA			
Kamloops	33.3	57.3	86.7
Port Hardy	13.0	8.6	59.8
Prince George	169.7	125.4	199.7
Vancouver	12.0	2.0	53.5
Victoria	2.4	5.2	43.5
ALBERTA			
Calgary	29.2	37.1	96.4
Edmonton N. Am.	44.4	53.4	99.6
Grande Prairie	109.9	68.0	141.2
SASKATCHEWAN			
Estevan	30.6	39.4	80.7
Regina	35.8	120.0	83.3
Saskatoon	41.3	50.8	83.1
MANITOBA			
Brandon	40.0	63.9	83.7
Churchill	89.1	143.5	131.6
The Pas	106.4	108.4	116.3
Winnipeg	42.7	107.5	90.6
ONTARIO			
Kapuskasing	250.4	207.5	237.3
London	167.6	137.4	171.5
Ottawa	197.8	138.4	182.2
Sudbury	273.0	196.6	194.4
Thunder Bay	86.1	102.6	158.4
Toronto	76.0	104.6	101.4
Windsor	107.4	88.1	93.2
QUÉBEC			
Baie Comeau	301.0	223.4	276.5
Montréal	151.4	172.3	188.0
Quebec	276.4	175.6	272.1
Sept-Îles	238.0	197.1	317.9
Sherbrooke	232.3	228.4	236.1
Val-d'Or	246.8	215.2	237.4
NEW BRUNSWICK			
Charlo	332.3	206.9	292.8
Fredericton	240.4	223.0	219.1
Moncton	347.8	*	243.0
NOVA SCOTIA			
Shearwater	156.0	155.8	144.9
Sydney	232.0	248.0	223.3
Yarmouth	144.0	195.2	168.2
PRINCE EDWARD ISLAND			
Charlottetown	303.1	236.6	239.6
NEWFOUNDLAND			
Gander	314.0	472.4	269.9
St. John's	202.3	379.3	246.7



SEASONAL TOTAL OF HEATING
DEGREE-DAYS TO END OF FEBRUARY

	1988	1987	NORMAL
BRITISH COLUMBIA			
Kamloops	2583	2542	2958
Penticton	2421	2459	2593
Prince George	3625	3433	3928
Vancouver	1926	1912	2100
Victoria	2038	2014	2120

YUKON TERRITORY

Whitehorse	4525	4290	5025
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NORTHWEST TERRITORIES

Frobisher Bay	6680	7194	6535
Inuvik	6426	6763	7060
Yellowknife	5723	5456	6058

ALBERTA

Calgary	3350	3240	3798
Edmonton Mun	3520	3471	4110
Grande Prairie	3869	3956	4498

SASKATCHEWAN

Estevan	3662	3453	4056
Regina	3980	3807	4333
Saskatoon	4119	3945	4474

MANITOBA

Brandon	4204	4101	4416
Churchill	6103	6115	6162
The Pas	4684	4507	4932
Winnipeg	4069	3945	4325

ONTARIO

Kapuskasing	4564	4467	4561
London	2828	2882	2908
Ottawa	3310	3389	3418
Sudbury	3777	3728	3899
Thunder Bay	4049	3796	4096
Toronto	2810	2893	2907
Windsor	2570	2491	2606

QUÉBEC

Baie Comeau	4193	4325	4164
Montréal	3163	3397	3248
Quebec	3649	3828	3643
Sept-Îles	4273	4442	4264
Sherbrooke	3597	3804	3781
Val-d'Or	4356	4429	4402

NEW BRUNSWICK

Charlo	3820	4020	3630
Fredericton	3434	3640	3333
Moncton	3347	3612	3250

NOVA SCOTIA

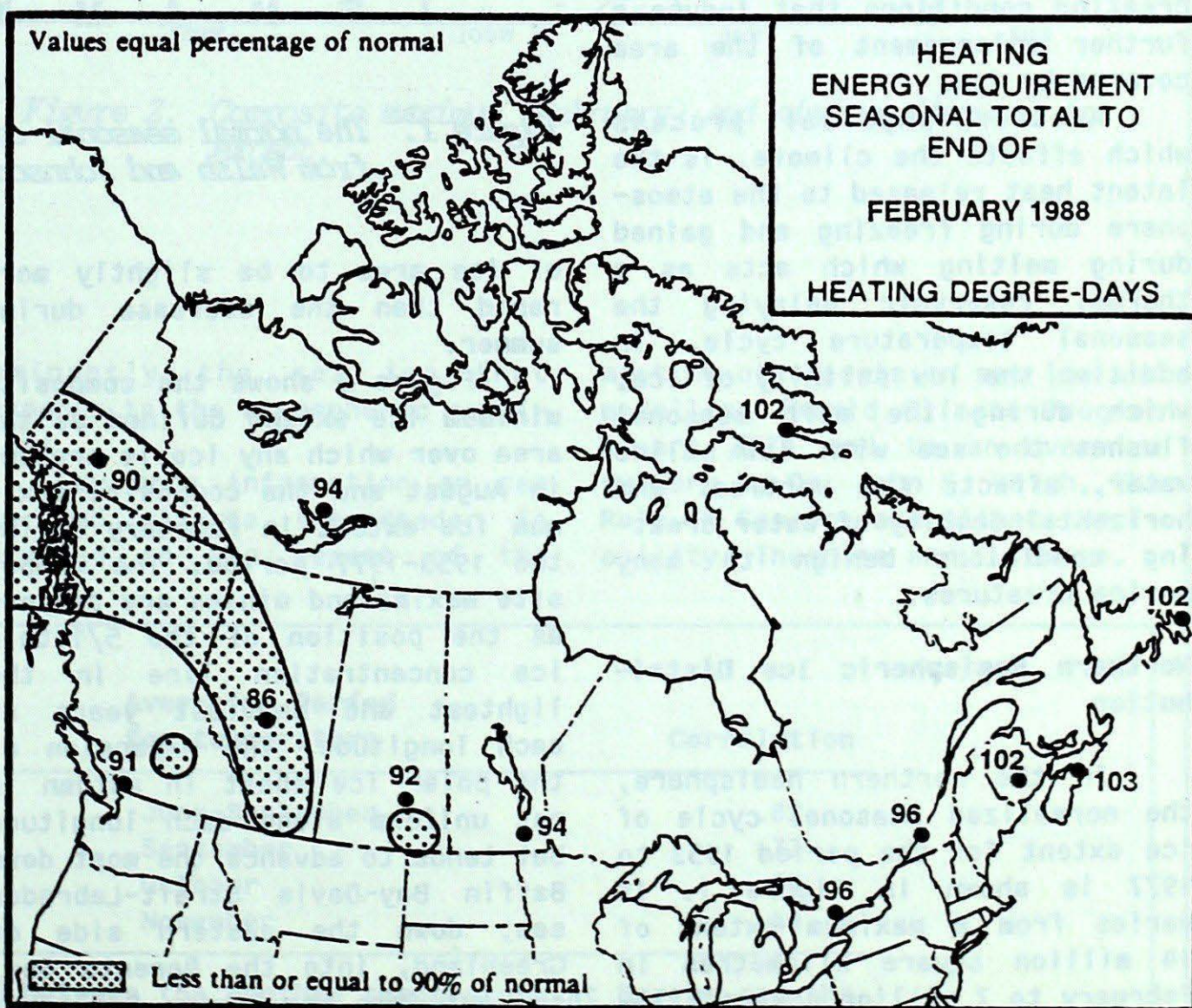
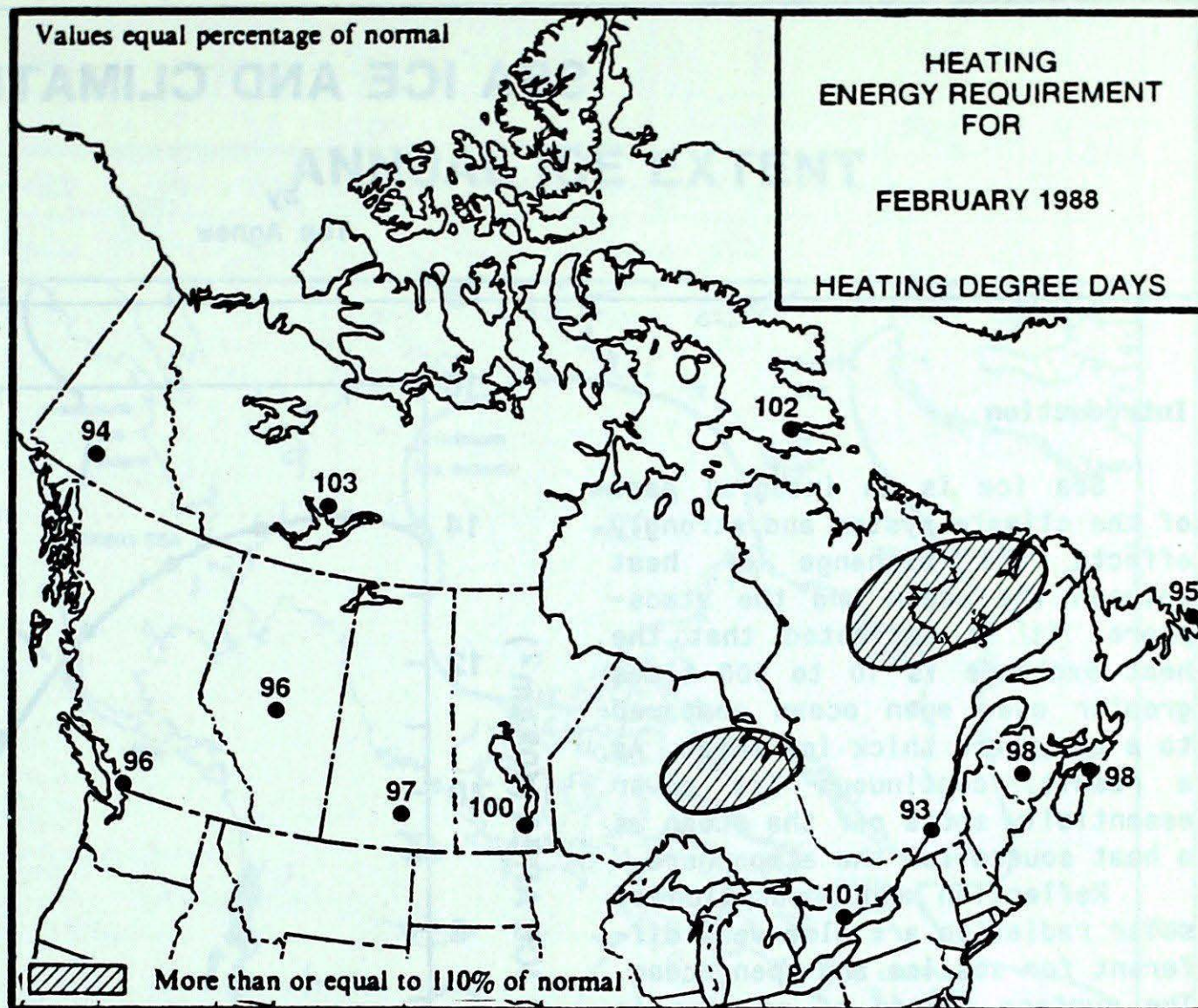
Halifax	*	3006	2712
Sydney	2985	3320	2873
Yarmouth	2718	2888	2678

PRINCE EDWARD ISLAND

Charlottetown	3186	3450	3082
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NEWFOUNDLAND

Gander	3408	3697	3301
St. John's	3144	3457	3068



SEA ICE AND CLIMATE

by
Tom Agnew

Introduction

Sea ice is an integral part of the climate system and strongly effects the exchange of heat between the ocean and the atmosphere. It is estimated that the heat exchange is 10 to 100 times greater over open ocean compared to a two metre thick ice sheet. As a result, continuous ice cover essentially shuts off the ocean as a heat source for the atmosphere.

Reflection and absorption of solar radiation are also very different for sea ice and open ocean. The surface albedo of sea ice is about .6 compared to .1 for open ocean hence profoundly alters the heat balance at the surface. Large ice-covered areas reduce the amount of absorbed solar radiation creating conditions that induce a further enlargement of the area covered by ice.

Another physical process which affects the climate, is the latent heat released to the atmosphere during freezing and gained during melting which acts as a thermal reservoir delaying the seasonal temperature cycle. In addition the low salinity of ice, which during the melt seasonal flushes the sea with low saline water, affects the vertical and horizontal density of water creating conditions benign to many marine creatures.

Northern Hemispheric Ice Distribution

In the northern hemisphere, the normalized seasonal cycle of ice extent for the period 1953 to 1977 is shown in Figure 1. It varies from a maximum extent of 14 million square kilometres in February to 7 million square kilometres in August. The slopes of the graph show the autumn increase

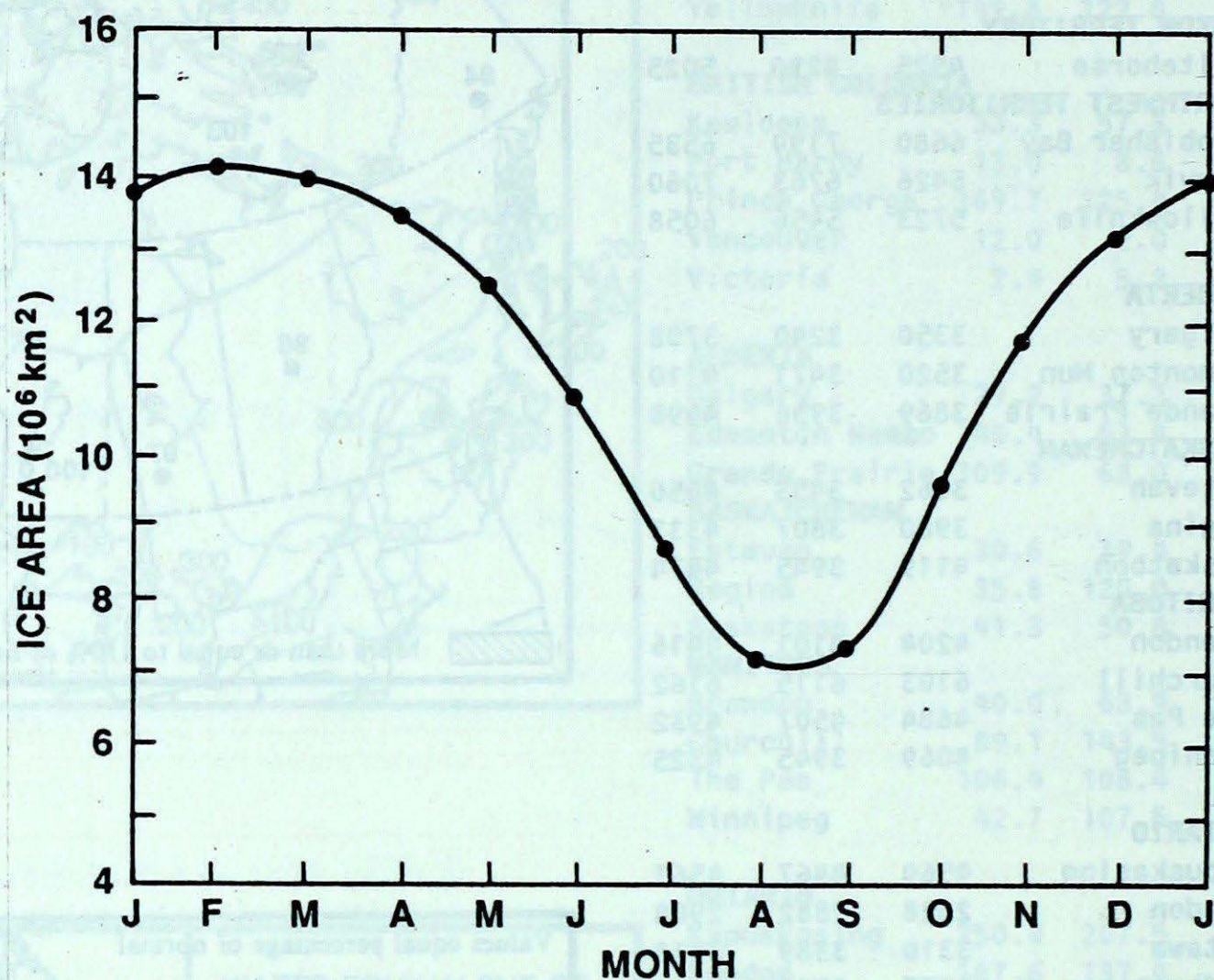


Figure 1. The normal seasonal cycle of Arctic sea ice extent. (taken from Walsh and Johnson, 1979)

of ice area to be slightly more rapid than the decrease during summer.

Figure 2 shows the composite minimum ice extent defined as the area over which any ice is present in August and the composite maximum ice extent in February during the 1953-1977 period. The composite maxima and minima are defined as the position of the 5/10th's ice concentration line in the lightest and heaviest years at each longitude. The expansion of the polar ice sheet in autumn is not uniform along each longitude but tends to advance the most down Baffin Bay-Davis Strait-Labrador sea, down the eastern side of Greenland, into the Barents Sea, and out into the Bering Sea. This is due mainly to the proximity of the continental land masses.

Interannual Variations

The fluctuation from year to year in ice extent can vary considerably and has been estimated to exceed 5 degrees of latitude along any longitude not blocked by a continental land mass. Figure 3 shows the annual variation in ice coverage and ice extent for the eastern arctic (longitude 90 E to 90 W) from 1972 to 1984. Ice coverage is a measure of the equivalent area of 100% concentration of ice and is always less than or equal to ice extent.

This interannual variation tends to have anomalies of opposite sign in different longitude sectors. The dominant mode of variation is a positive ice cover anomaly in the Atlantic basin

(down Labrador and the eastern side of Greenland) with a negative anomaly in the Pacific basin (Bering Sea) and vice versa. The time scales of these anomalies tends to be several months and longer.

Ice-Atmosphere Interactions

On a hemispheric scale, analysis of ice anomalies and atmospheric fields of pressure and temperature indicate that the atmosphere forces (leads) ice anomalies during the decay season (February to July) and that during the ice growth season (August to January), there is as much a tendency for the ice to be forcing the atmosphere as for the atmosphere to be forcing the ice.

On the local scale, sea patterns ice anomalies tend to affect the climate by modifying the air temperature field. Table 1 shows the results of a study done along the Beaufort coast comparing the average air temperature over land and the distance from the coast to the ice edge.

The positive correlations indicate that coastal land station temperatures are warmer when the average position of the ice pack is further away from the shore and vice versa. This provides evidence that a portion of the interannual air temperature variability is attributable to interannual ice variability as would be expected.

Conclusions

The interaction of sea ice and atmospheric processes exist on all scales however on the hemispheric scale there is strong evidence to suggest that is pre-

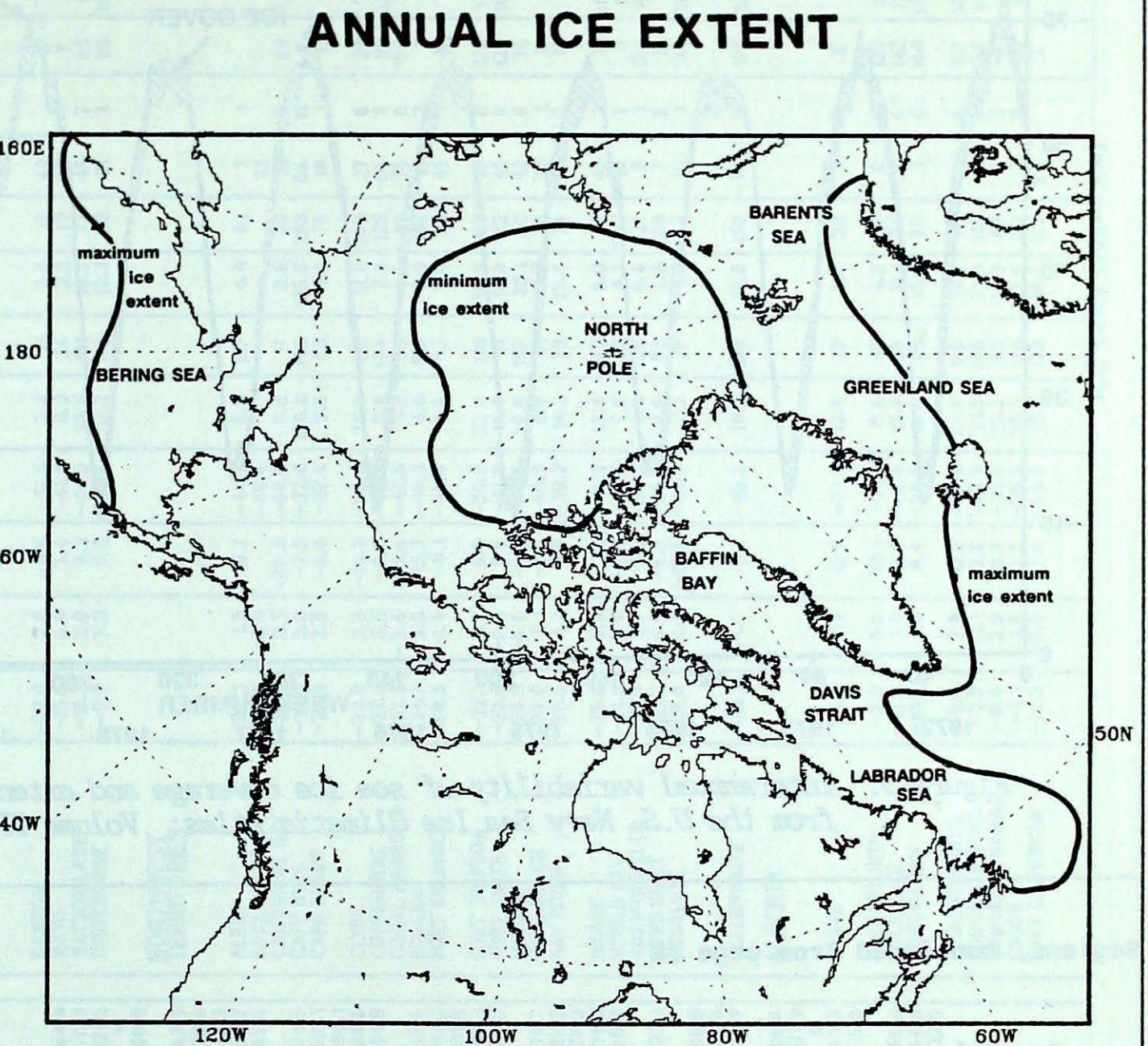


Figure 2. Composite maximum (February) and minimum (August) ice extent.

dominantly the sea ice that responds to the atmospheric conditions.

For more information on sea ice and climate the reader is referred to the report of the

meeting of experts on sea ice and modelling (World Climate Program Report #77) and to an overview summary by Dr. John E. Walsh, The Role on Sea Ice and Climate Variability: Theories and Evidence.

Time of ice observation	Averaging Period for temperature	Correlation
Mid-September	June-September	.82
Mid-September	September	.77
Mid-September	October	.61
Mid-September	November	.44

Table 1. Correlation between the monthly temperature at Barrow and the distance from the northern Alaskan coast to the sea ice edge.

FEATURE

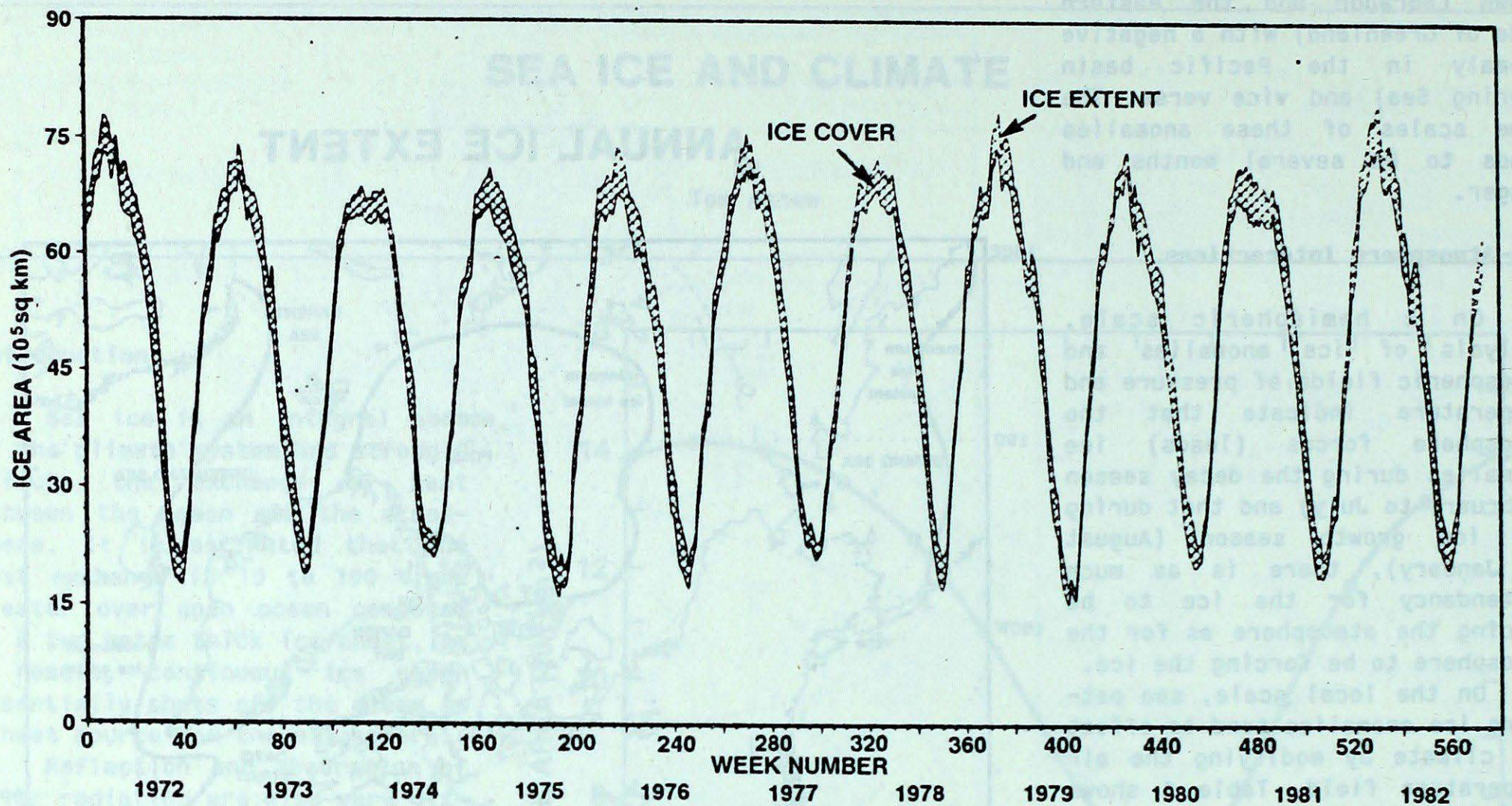


Figure 3. Interannual variability of sea ice coverage and extent for the eastern Arctic (taken from the U.S. Navy Sea Ice Climatic Atlas: Volume II)

Regions, continued from page 3B

Several major storms crossed the east coast. During February 13-14th, Shelburne received over 75 mm of precipitation of which 53 mm fell in a 24-hour period

establishing a record for that period in February. Owing to above normal precipitation, streamflows increased from their January values in all three maritime

provinces, and in Nova Scotia storage in six reservoirs increased to 65% of full rated capacity.



STATION	Temperature C				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
	Mean	Difference from Normal	Maximum	Minimum									
BRITISH COLUMBIA													
ABBOTSFORD	5.4	1.0	18.7	-8.8	5.2	43	107.5	67	0	14	80	104	364.9
ALERT BAY	5.3	0.7	11.2	-4.9	4.5	46	172.6	128	0	17	X		370.3
AMPHITRITE POINT	7.0	0.9	15.0	-2.4	1.2	38	242.7	69	0	18	X		321.5
BLUE RIVER	-4.7	-0.2	9.5	-31.6	72.9	118	82.7	155	62	13	54	93	*
BULL HARBOUR	5.6	1.0	13.9	-5.6	0.9	8	275.9	152	0	16	X		360.0
CAPE SCOTT	6.1	0.8	11.6	-2.0			309.6	122	0	22	X		343.9
CAPE ST. JAMES	6.2	1.4	11.4	-0.3			135.0	98	0	18	66	*	329.0
CASTLEGAR	0.3	1.1	14.3	-13.0	22.2	51	28.6	45	0	9	93	135	513.3
COMOX	4.8	0.8	12.8	-6.3	0.2	1	36.9	29	0	8	X		383.7
CRANBROOK	-2.5	1.0	11.5	-23.4	5.1	19	5.0	23	0	2	145	*	593.4
DEASE LAKE	-9.7	3.2	7.4	-37.8	51.4	166	33.7	136	48	8	81	76	804.5
ETHELDA BAY	3.8	-0.1	12.4	-7.4	17.0	68	386.6	128	0	23	X		410.1
FORT NELSON	-15.1	1.8	8.3	-38.4	9.2	39	3.8	19	32	4	132	*	958.1
FORT ST. JOHN	-9.1	2.3	9.6	-38.6	15.9	52	11.8	43	1	4	X		785.8
HOPE	4.5	1.1	17.9	-12.1	27.0	86	212.3	108	0	16	53	110	391.8
KAMLOOPS	0.1	1.4	14.4	-20.5	12.4	97	9.8	61	0	4	95	101	518.4
KELOWNA	0.1	1.7	14.7	-22.6	16.8	114	17.6	83	0	5	91	131	519.2
LANGARA	4.8	1.2	6.3	3.4	12.2	68	145.6	101	0	24	X		381.8
LYTTON	2.5	1.0	15.9	-18.0	2.8	10	16.2	41	0	4	95	109	450.1
MACKENZIE	-8.6	0.5	7.0	-36.9	47.4	91	40.2	68	87	10	75	104	770.3
MCINNES ISLAND	5.2	0.8	9.9	-2.7	3.8	20	292.4	131	0	20	X		370.7
PENTICTON	1.4	0.8	16.6	-13.5	8.9	78	4.7	23	0	2	106	140	482.3
PORT ALBERNI	5.0	*	16.3	-8.9	1.0	*	104.5	*	0	13	49	*	376.3
PORT HARDY	5.2	1.3	11.7	-6.5	5.2	49	249.4	156	0	19	36	48	406.2
PRINCE GEORGE	-6.1	0.0	9.0	-34.6	48.1	134	52.9	134	22	11	75	86	698.3
PRINCE RUPERT	3.4	1.1	12.5	-7.7	27.8	119	209.5	94	0	20	41	64	423.1
PRINCETON	-2.1	0.9	10.9	-30.7	20.6	84	13.4	45	5	4	101	*	*
QUESNEL	-4.7	0.2	10.1	-31.6	42.7	143	41.2	128	15	13	X		656.8
REVELSTOKE	-2.0	0.3	10.6	-20.7	119.4	155	98.7	109	*	*	65	117	579.0
SANDSPIT	4.9	1.4	10.2	-1.7	1.2	7	68.2	60	0	16	64	77	378.9
SMITHERS	-4.7	0.6	9.6	-25.6	42.6	138	30.8	97	34	11	84	100	656.6
TERRACE	-1.8	-0.4	7.1	-17.8	79.4	110	104.0	84	0	18	54	74	571.9
VANCOUVER HARBOUR			12.7	-5.3	8.6	90	125.3	80	0	14	X		*
VANCOUVER INT'L	5.6	1.0	13.7	-8.0	3.0	40	71.7	62	0	12	75	86	360.3
VICTORIA GONZ. HTS	5.9	0.1	14.4	-4.8			49.9	67	0	8	88	91	325.0
VICTORIA INT'L	5.4	0.6	15.0	-7.0			35.5	35	0	9	83	96	366.0
VICTORIA MARINE	6.1	0.7	12.0	-5.4			102.5	65	0	12	X		344.8
WILLIAMS LAKE	-4.6	-0.4	9.9	-29.0	34.8	137	28.8	120	1	10	71	65	632.9
YUKON TERRITORY													
DAWSON	-22.0	2.6	-0.5	-42.5	3.0	11	3.0	12	49		X		
MAYO	-15.5	4.4	7.4	-41.0	4.3	24	2.2	13	28	1	X		970.9
WATSON LAKE	-15.7	3.0	9.3	-46.5	32.6	101	18.7	73	45	7	85	99	991.2
WHITEHORSE	-9.9	3.3	5.5	-36.6	17.2	113	12.3	92	31	3	99	108	809.3
NORTHWEST TERRITORIES													
ALERT	-32.3	1.3	16.7	-46.2	8.8	157	4.8	92	3	1			1460.0
BAKER LAKE	-33.5	-0.9		-46.4					72				
CAMBRIDGE BAY	-33.7	0.7	-20.6	-44.0	0.8	17	0.8	20	31	0	89	172	1498.9
CAPE DYER	-18.9	3.8	-2.5	-32.6	154.8	265	135.6	260	64	11	X		1068.3
CAPE PARRY	-25.9	3.8	-9.6	-37.6	5.6	68	4.0	75	10	1	X		1273.1
CLYDE	-23.9	3.8	-14.3	-38.0	26.0	412	12.6	203	27	6	29	72	1214.2
COPPERMINE	-27.8	3.3	-9.8	-43.5	8.6	134	7.8	125	44	3	95	124	1329.6
CORAL HARBOUR	-32.8	-3.4	-16.4	-47.8	5.2	56	5.2	59	34	0	83	72	1472.0
EUREKA	-34.7	3.3	-16.7	-49.3	4.6	176	3.9	162	15	2	2		1527.9
FORT RELIANCE	-28.5	-1.4	-0.1	-45.4	8.4	63	3.0	28	45	1	X		1349.2
FORT SIMPSON	-22.1	0.7	8.3	-39.8	22.6	119	18.8	98	43	6	126	131	1161.9
FORT SMITH	-22.6	-0.8	5.6	-41.8	16.9	91	10.0	62	45	4	120	105	1176.9
IQUALUIT	-26.5	-0.6	-4.5	-39.5	39.6	162	35.1	151	42	6	70		1290.4
HALL BEACH	-29.0	3.1	-7.5	-49.5	4.4	51	3.2	38	33	1	X		1361.4
HAY RIVER	-20.5	1.2	9.8	-39.2	14.2	73	13.4	74	41	3	X		1116.5
INUVIK	-25.0	3.9	1.1	-41.9	13.0	103	8.0	76	45	3	71	108	1246.1
MOULD BAY	-31.8	3.4	-17.1	-47.6	7.6	230	6.7	223	16	2	3	65	1446.2
NORMAN WELLS	-23.5	2.7	5.5	-32.3	4.6	26	4.4	27	8	1	124	162	1201.8
POND INLET	-27.1	6.9	-8.6	-34.0	7.6	83	5.8	109	7	8	X		1308.7
RESOLUTE	-29.6	3.6	-15.6	-41.4	2.2	70	1.9	63	10	1	30	169	1380.6
YELLOWKNIFE													
	-26.1	-1.0	3.2	-45.3	18.2	138	16.8	150	35	3	125	122	1278.8
ALBERTA													
BANFF	-5.0	1.3	12.5	-31.0	12.8	39	8.6	30	8	4	X		
CALGARY INT'L	-3.8	3.5	18.1	-27.1	8.6	45	4.3	27	0	2	122	95	632.7
COLD LAKE	-12.6	1.0	11.0	-40.4	17.9	98	11.1	70	8	4	142	113	887.6
CORONATION	-10.7	1.0	8.4	-36.5	19.0	95	16.8	98	2	6	140	105	832.2
EDMONTON INT'L	-8.6	2.8	12.2	-32.9	25.4	118	19.7	111		4	127	107	771.6
EDMONTON MUNI.	-7.5	2.1	13.8	-28.9	21.5	100	21.3	113	0	5	136	116	739.4
EDMONTON NAMAO	-8.0	2.9	13.9	-31.0	18.2	85	14.3	69	0	2	X		754.6
EDSON	-8.1	1.8	16.5	-36.5	35.5	118	23.4	121	3	5	96	82	754.8
FORT CHIPEWYAN	-21.3	-0.6	7.5	-44.0	18.7	102	18.7	125	44		X		

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	Mean	Difference from Normal	Maximum	Minimum									
FORT MCMURRAY	-14.7	0.7	12.1	-42.7	16.3	74	12.0	63	33	5	131	101	947.7
GRANDE PRAIRIE	-10.3	1.8	7.7	-39.0	41.2	155	32.9	138	11	6	120	*	823.0
HIGH LEVEL	-18.2	0.3	10.7	-45.1	16.2	78	15.0	94	50	5	130	103	1055.0
JASPER	-5.1	1.4	13.4	-31.9	12.8	58	17.0	82	8	6	93	*	667.4
LETHBRIDGE	-2.8	2.6	19.3	-30.9	13.1	61	10.6	56	0	3	146	118	602.5
MEDICINE HAT	-5.6	2.1	17.7	-31.5	7.5	40	7.5	45	0	4	150	122	683.2
PEACE RIVER	-11.9	1.6	8.5	-41.5	12.7	49	12.5	59	2	4	X		867.8
RED DEER	-7.8	2.9	18.1	-32.6	9.5	48	8.2	46	0	3	X		749.1
ROCKY MTN HOUSE	-7.6	-0.2	18.7	-34.3	21.3	91	13.0	66	0	6	X		741.1
SLAVE LAKE	-11.4	0.9	14.8	-39.2	29.7	136	19.6	97		5	135	118	852.9
SUFFIELD													
WHITECOURT	-7.8	2.4	13.5	-35.0	43.4	163	39.5	164		7	X		752.9
SASKATCHEWAN													
BROADVIEW	-13.0	1.6	12.5	-35.9	8.8	58	9.0	71	0	3	188	137	898.3
COLLINS BAY	-23.5	-2.4	2.2	-39.1	34.3	158	23.2	131	25	8	134	*	1201.9
CREE LAKE	-21.2	-1.5	5.3	-45.1	26.2	145	20.5	152	27	5	121	90	1137.9
ESTEVAN	-9.9	2.1	16.8	-31.6	11.8	67	9.2	53	0	2	174	128	809.2
HUDSON BAY	-15.9	0.1	7.6	-37.1	22.6	111	14.6	90	25	4	153	*	982.9
KINDERSLEY	-10.4	0.1	5.7	-36.0	16.2	103	13.2	81	4	3	X		880.9
LA RONGE	-17.5	-0.2	7.9	-40.6	15.9	67	17.4	113	26	5	X		1039.2
MEADOW LAKE	-15.9	-1.1	5.9	-45.1	22.8	148	16.0	101	18	6	155	*	983.8
MOOSE JAW	-9.7	1.8	13.3	-35.6	14.7	78	12.9	83	0	4	178	142	804.2
NIPAWIN	-16.2	*	8.5	-38.1	16.0	*	10.4	*	10	4	167	*	991.2
NORTH BATTLEFORD	-13.1	1.0	7.2	-37.4	19.9	128	18.8	129	6	5	X		904.3
PRINCE ALBERT	-15.3	1.2	9.0	-41.6	12.6	76	12.5	83	4	4	154	126	963.9
REGINA	-12.7	0.9	11.3	-37.5	8.8	48	9.6	59	0	4	170	140	889.3
SASKATOON	-13.5	1.1	7.4	-38.0	10.6	57	9.8	59	1	5	X		912.2
SWIFT CURRENT	-9.6	0.7	13.5	-35.1	14.3	79	14.3	83		6	144	126	798.6
WYNYARD											X		
YORKTON	-14.0	0.5	6.4	-37.2	7.4	41	6.9	45	2	4	166	121	928.2
	-13.1	2.4	11.0	-36.7	9.4	49	7.2	40		3	165	128	838.0
MANITOBA													
BRANDON	-14.5	1.2	13.4	-34.5	8.3	42	7.3	39	0	3	X		942.4
CHURCHILL	-28.1	-2.2	-14.4	-40.0	11.6	79	10.2	77	20	3	136	103	1336.9
DAUPHIN	-14.4	1.2	13.9	-33.0	11.4	60	9.7	55		4	167	123	938.9
GILLAM	-24.9	-1.0	-5.1	-40.6	16.4	73					X		1244.7
GIMLI	-17.0	0.0	5.6	-33.5	18.4	91	14.8	83	13	6	168	110	1014.7
ISLAND LAKE	-22.6	-2.3	2.0	-36.9	24.4	115	17.0	118	45	6	X		1176.6
LYNN LAKE	-23.6	-1.4	4.1	-43.2	29.8	197	16.2	106	39	7	131	99	1156.7
NORWAY HOUSE	-21.6	*	2.1	-37.9	21.0	*	18.4	*	42	6	X	*	1147.7
PORTAGE LA PRAIRIE	-14.6	0.0	9.8	-32.7	11.1	80	6.8	31		2	X		947.3

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	Mean	Difference from Normal	Maximum	Minimum									
THE PAS	-18.2	-0.2	4.7	-35.6	23.5	113	16.5	107	15	5	139	104	1046.3
THOMPSON	-23.6	-1.3	2.4	-43.8	15.9	141	14.1	146	18	4	151	105	1205.7
WINNIPEG INT'L	-15.7	-0.1	6.3	-31.2	11.0	58	10.7	61	2	3	169	117	976.3
ONTARIO													
ATIKOKAN	-18.6	-3.2	4.5	-38.5	19.8	61	13.6	62	26	6	160	119	1061.4
BIG TROUT LAKE	-23.5	-2.1	-0.5	-41.2	20.2	*	18.4	96	82	9	160	*	1203.4
EARLTON	-16.6	-2.5	4.2	-35.7	76.4	161	77.1	163	66	12	X		1002.9
GERALDTON	-20.2	-2.3	1.5	-38.2	34.8	105	30.2	90	56	7	X		1109.7
GORE BAY	-11.1	-1.4	3.2	-29.2	76.5	204	38.7	90	26	12	X		844.1
HAMILTON RBG	-5.1	-0.8	10.9	-18.4	42.4	151	63.7	118	3	9	116	*	
HAMILTON	-6.2	0.1	10.4	-18.6	54.2	180	60.0	114	1	12	X		702.1
KAPUSKASING	-19.1	-2.9	2.2	-36.2	60.0	136	55.2	128	105	13	X		1076.4
KENORA	-17.6	-3.2	4.3	-34.4	17.9	70	17.5	76	37	8	X		1031.0
KINGSTON	-7.6	-0.6	6.0	-23.0	66.8	187	92.0	156	3	11	104	80	735.8
LANSDOWNE HOUSE	-22.1	-2.6	1.4	-39.6	21.4	80	20.5	86	37	7	X		1151.3
LONDON	-6.5	-0.4	8.7	-18.5	63.3	162	67.0	110	2	12	93	95	709.6
MOOSONEE	-21.7	-3.2	2.1	-39.6	42.1	140	34.3	115	100	9	128		1152.5
MUSKOKA	-11.1	-1.5	5.0	-26.5	111.9	218	107.9	172	55	20	X		843.0
NORTH BAY	-12.8	-1.5	3.6	-28.9	93.0	183	74.8	133	59	14	117	93	892.7
OTTAWA INT'L	-9.3	0.2	6.8	-23.9	80.0	159	79.6	132	19	14	140	*	791.9
PETAWAWA	-12.0	-0.8	7.9	-27.4	56.8	124	52.6	103	33	8	X		868.3
PETERBOROUGH	-8.7	-0.2	9.0	-24.0	61.4	194	58.4	119	8	12	X		773.8
PICKLE LAKE	-21.7	-3.0	0.0	-37.7	33.6	123	30.0	117	58	8	X		1134.0
RED LAKE	-19.8	-3.0	2.5	-37.7	35.2	153	27.8	134	58	7	129	*	1095.5
ST. CATHARINES	-4.5	-0.8	11.6	-16.5	39.4	174	61.2	136		15	X		651.5
SARNIA	-5.7	-1.2	9.3	-18.7	50.5	213	60.7	133	5	11	106	99	688.2
SAULT STE. MARIE	-11.7	-1.7	5.7	-28.3	53.3	83	37.2	54	32	14	119	105	861.1
SIOUX LOOKOUT	-19.2	-3.5	0.9	-36.7	23.4	83	23.4	84	90	6	X		1080.5
SUDBURY	-13.5	-1.0	2.5	-29.0	92.6	206	75.7	161	75	15	125	94	913.0
THUNDER BAY	-16.0	-3.0	4.2	-36.7	11.6	37	7.1	25	8	4	187	127	984.8
TIMMINS	-17.8	-2.2	3.8	-37.3	65.8	123	54.6	120	106	14	X		1039.3
TORONTO	-4.1	-0.2	8.9	-17.4	56.0	196	71.8	138	5	8			641.4
TORONTO INT'L	-6.8	-0.7	8.9	-19.4	52.0	195	64.6	140	4	11	X		718.2
TORONTO ISLAND	-4.2	0.6	8.6	-16.8	41.4	166	61.0	127	1	11			642.0
TRENTON	-7.1	-0.6	8.9	-21.9	71.1	200	80.4	141	3	13	X		706.9
WATERLOO-WELL	-7.8	-1.0	9.0	-22.1	61.6	198	64.3	118	7	12	X		748.9
WAWA	-15.6	*	1.5	-35.2	93.0	*	68.4	*	68	15	*		973.4
WIARTON	-7.8	-0.3	5.0	-22.2	166.4	275	108.5	169	45	22	79	76	923.5
WINDSOR	-4.9	-1.1	12.2	-18.2	46.6	204	58.2	115	0	9	X		663.3

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	Mean	Difference from Normal	Maximum	Minimum									
QUEBEC													
BAGOTVILLE	-14.9	-1.1	3.5	-29.6	69.3	113	61.6	110	56	11	X		955.4
BAIE COMEAU	-14.6	-2.1	1.1	-32.3	140.6	192	123.8	199	74	13	139	*	946.2
BLANC SABLON	-13.8	-3.8	2.3	-28.0	124.0	122	132.4	121	68	16	86	*	
CHIBOUGAMAU	-19.8	-2.3	2.5	-39.8	67.4	128	52.4	102	87	14	142	113	1095.6
GASPE	-12.9	-2.8	5.3	-30.8	115.6	174	113.6	127	86	13	120	*	893.5
INUKJUAQ	-28.9	-3.9	-16.5	-38.6	25.2	289	25.2	293	49	6	151	141	1359.9
KUUJJUAQ	-26.7	-4.3	-0.8	-41.3	19.6	57	17.8	53	30	6	131	120	1296.7
KUUJUARAPIK	-25.2	-2.6	-3.1	-43.3	27.4	113	26.8	114	34	8	137	110	1250.3
LA GRANDE RIVIERE	-24.4	*	-0.4	-38.2	41.2	*	34.4	*	52	9	117	*	1229.7
MANIWAKI	-11.9	0.3	5.2	-26.1	73.8	161	66.8	132	38	12	124	98	863.5
MATAGAMI	-20.4	-2.6	2.1	-40.4	67.4	166	48.3	117	72	14	117	91	1114.2
MONT JOLI	-11.8	-1.3	3.9	-24.9	102.8	136	101.6	136	39	13	124	108	866.1
MONTREAL INT'L	-7.7	1.3	10.3	-26.2	69.6	129	74.6	114	3	13	123	95	745.8
MONTREAL M INT'L	-9.7	*	6.7	-28.9	83.2	*	90.8	*	33	18	152	*	804.2
NATASHQUAN	-14.3	-3.0	1.1	-31.2	108.2	192	99.2	126	52	16	99	75	935.8
QUEBEC	-10.5	0.3	4.6	-27.5	124.6	177	119.4	152	103	17	110	97	827.5
ROBERVAL	-15.2	-0.5	6.1	-31.4	66.7	110	65.8	110	92	11	132	*	964.0
SCHEFFERVILLE	-25.5	-4.3	-3.8	-41.3	35.4	78	29.6	68	73	5	154	*	1263.4
SEPT-ILES	-15.0	-2.5	0.8	-32.0	101.6	137	100.4	126	30	14	121	87	956.9
SHERBROOKE	-9.3	1.6	8.8	-30.0	58.8	104	56.0	90	29	10	105	*	791.8
STE AGATHE DES MONTS	-11.0	1.1	6.6	-29.5	117.4	141	118.6	137	89	17	114	90	840.2
ST-HUBERT	-8.0	1.0	8.1	-26.2	64.8	115	82.2	113	10	13	*	*	755.7
VAL D'OR	-17.1	-2.2	5.5	-34.8	69.0	137	63.6	125	62	13	130	96	1018.1
NEW BRUNSWICK													
CHARLO	-12.7	1.3	3.8	-30.0	136.4	185	119.7	154	75	11	135	99	891.5
CHATHAM	-9.2	-0.4	7.4	-26.5	72.0	111	80.6	92	42	10	141	107	788.3
FREDERICTON	-8.6	-0.2	7.8	-30.4	84.6	133	118.1	131	24	12	144	*	772.5
MONCTON	-8.3	-0.6	7.9	30.0	120.1	175	135.9	137	29	14	122	99	762.3
SAINT JOHN	-7.2	0.3	6.6	-29.7	63.6	100	154.5	133	10	13	148	118	731.1

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	Mean	Difference from Normal	Maximum	Minimum									
NOVA SCOTIA													
GREENWOOD	-5.3	0.1	13.6	-24.5	51.5	82	142.1	157	2	12	X		675.8
HALIFAX INT'L	-5.0	1.1	9.4	-21.4	38.1	58	169.6	127	8	11	*		665.1
SABLE ISLAND	-0.2	0.8	8.8	-8.3	8.8	27	104.4	88	0	11	79	108	527.5
SHEARWATER	-3.8	0.7	8.5	-18.5	21.6	41	142.6	116	8	8	138	106	632.0
SYDNEY	-5.3	0.6	6.9	-19.0	31.6	46	160.0	112	3	15	0		645.5
YARMOUTH	-2.9	0.3	8.9	-14.0	31.6	58	145.8	127	0	12	131	141	604.6
PRINCE EDWARD ISLAND													
CHARLOTTETOWN	-8.0	-0.5	8.5	-24.9	80.4	122	128.5	131	19	16	X		755.2
SUMMERSIDE	-7.7	-0.5	7.7	-23.2	86.8	155	97.8	118	48	13	116	92	744.0
NEWFOUNDLAND													
BATTLE HARBOUR			3.4	-30.0	134.2	160	187.8	264	158	15	X		
BONAVISTA	-4.3	0.9	6.9	-19.0	31.6	70	160.0	184	3	15	X		646.5
BURGED	-5.1	0.1	4.0	-18.1	53.4	105	185.7	141	8	18			677.7
CARTWRIGHT	-15.5	-2.9	4.5	-28.0	64.6	98	65.8	97	155	11	133	125	972.1
CHURCHILL FALLS	-22.7	-3.8	-2.2	-39.1	37.9	64	34.6	59	105	7	176	141	1180.6
COMFORT COVE	-7.8	-0.8	7.6	-23.4	109.8	149	142.2	149	58	19	X		747.3
DANIEL'S HARBOUR	-10.8	-3.1	6.0	-24.6	85.0	113	83.8	102	109	11	49	65	835.2
DEER LAKE	-10.4	-1.4	7.6	-35.2	137.3	210	135.7	186	77	18	X		820.2
GANDER INT'L	-6.9	-0.1	7.7	-20.9	125.6	164	175.1	175	7	17	119	120	722.2
GOOSE	-18.4	-3.9	1.7	-32.3	73.5	121	62.2	103	85	9	158	135	1057.3
PORT-AUX-BASQUES	-5.5	0.2	3.9	-16.2	58.0	83	138.4	118	8	21	85	*	
ST ANTHONY	-12.7	-1.5	2.2	-26.8	198.6	327	230.7	281	64	16	*	*	849.9
ST JOHN'S	-3.9	0.6	9.6	-18.7	31.3	42	172.6	123	1	15	83	*	633.4
ST LAWRENCE	-4.6	-0.1	7.5	-16.2	29.2	60	168.8	156	1	17	*	*	
STEPHENVILLE	-7.4	-1.2	4.4	-21.2	112.2	148	126.1	140	48	19	78	*	736.9
WABUSH LAKE	-25.4	-4.6	4.3	-43.8	47.9	90	33.9	70	80	5	166		1200.8

AGROCLIMATOLOGICAL STATIONS

FEBRUARY 1988

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	5.0	0.5	18.5	-10.0	12.8	149.2	84	0	14	78	47.5	54.5
SIDNEY	5.6	*	14.5	-2.0	0.0	66.3	*	0	13	78	27.2	32.5
SUMMERLAND	1.3	1.2	15.0	-16.0	9.6	8.6	46	0	3	113	7.5	7.5
ALBERTA												
BEAVERLODGE	-9.0	1.2	10.0	-36.0	45.0	30.0	118	2	5	102	1.3	1.3
ELLERSLIE												
LACOMBE	-7.0	3.5	18.0	-33.3	8.5	7.6	42	0	3	122	1.5	1.5
LETHBRIDGE												
VEGREVILLE	-9.3	4.1	14.5	-35.0	11.4	4.0	29	0	3	N/A	1.0	1.0
SASKATCHEWAN												
INDIAN HEAD	-13.2	0.6	10.5	-38.0	10.6	8.8	49	TR	1	N/A	0.0	0.0
MELFORT	-15.8	0.5	5.5	-39.0	11.6	11.6	72	22	3	147	0.0	0.0
REGINA	-13.8	0.0	10.0	-40.0	7.6	5.2	35	0	2	N/A	1.5	1.5
SASKATOON	-12.9	1.6	7.5	-39.5	10.3	10.3	47	0	3	157	0.0	0.0
SCOTT	-13.4	1.0	7.5	-38.5	4.8	7.4	57	0	2	161	0.0	0.0
SWIFT CURRENT SOUTH	-9.0	1.4	13.0	-34.0	10.8	11.0	73	0	5	137	0.8	0.8
MANITOBA												
BRANDON	-14.1	1.1	15.0	-36.5	7.4	7.4	37	0	4	N/A	0.0	0.0
GLENLEA	-14.0	2.4	6.6	-33.0	7.0	7.0	26	2	3	151	0.0	0.0
MORDEN	-13.3	0.1	11.5	-31.0	6.8	6.4	34		3	163	0.0	0.0
ONTARIO												
DELHI	-5.9	-0.5	12.5	-20.5	47.0	77.3	136	2	13	95	0.0	4.0
ELORA	-8.1	-0.8	5.6	-24.9	N/A	60.7	124	14	N/A	N/A	0.0	2.1

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
GUELPH	-7.7	-1.2	6.4	-23.0	61.1	76.5	151	11	13	102	0.0	3.4
HARROW	-4.7	-0.9	10.0	-18.0	35.2	54.8	103	0	6	123	0.0	4.0
KAPUSKASING	-20.1	-3.8	1.0	-39.0	48.1	47.1	114	65	12	118	0.0	0.0
OTTAWA	-8.4	-1.1	5.8	-23.7	65.0	69.5	128	12	13	140	0.9	0.9
SMITHFIELD	-6.2	0.4	5.2	-22.2	82.7	88.4	123	12	9	N/A	0.0	2.9
VINELAND STATION	-3.9	-0.3	10.8	-16.7	30.8	61.4	110	TR	8	99	0.0	8.7
QUEBEC												
LA POCAIERE	-10.4	-0.2	6.5	-25.0	102.1	105.4	148	85	14	126	0.0	0.0
L'ASSUMPTION	-9.3	1.3	5.0	-29.5	91.0	9.6	16	32	18	118	0.0	0.0
LENNOXVILLE												
NORMANDIN	-17.9	-1.8	3.5	-37.5	78.4	54.2	100	50	10	149	0.0	0.0
ST. AUGUSTIN												
STE CLOTHILDE	-7.6	1.5	10.0	-33.0	64.2	65.9	102	8	13	115	2.3	5.1
NEW BRUNSWICK												
FREDERICTON			9.5		71.6	92.3	106	28	8	144	0.0	0.0
NOVA SCOTIA												
KENTVILLE	-4.4	0.8	13.0	-23.5	78.9	172.8	162	19	14	126	1.0	2.0
NAPPAN	-7.2	0.3	11.5	-31.5	76.2	114.1	128	4	10	119	0.0	0.0
PRINCE EDWARD ISLAND												
CHARLOTTETOWN	-7.1	-0.1	8.0	-27.5	73.8	145.0	179	43	12	110	0.0	0.0
NEWFOUNDLAND												
ST. JOHN'S WEST	-3.4	0.9	9.0	20.5	33.0	170.0	102	0	15	76	1.8	1.8