Environment Canada | Environnement Canada

Climatic Perspectives

Monthly review | NOVEMBER | Vol.8 1986

CLIMATIC HIGHLIGHTS

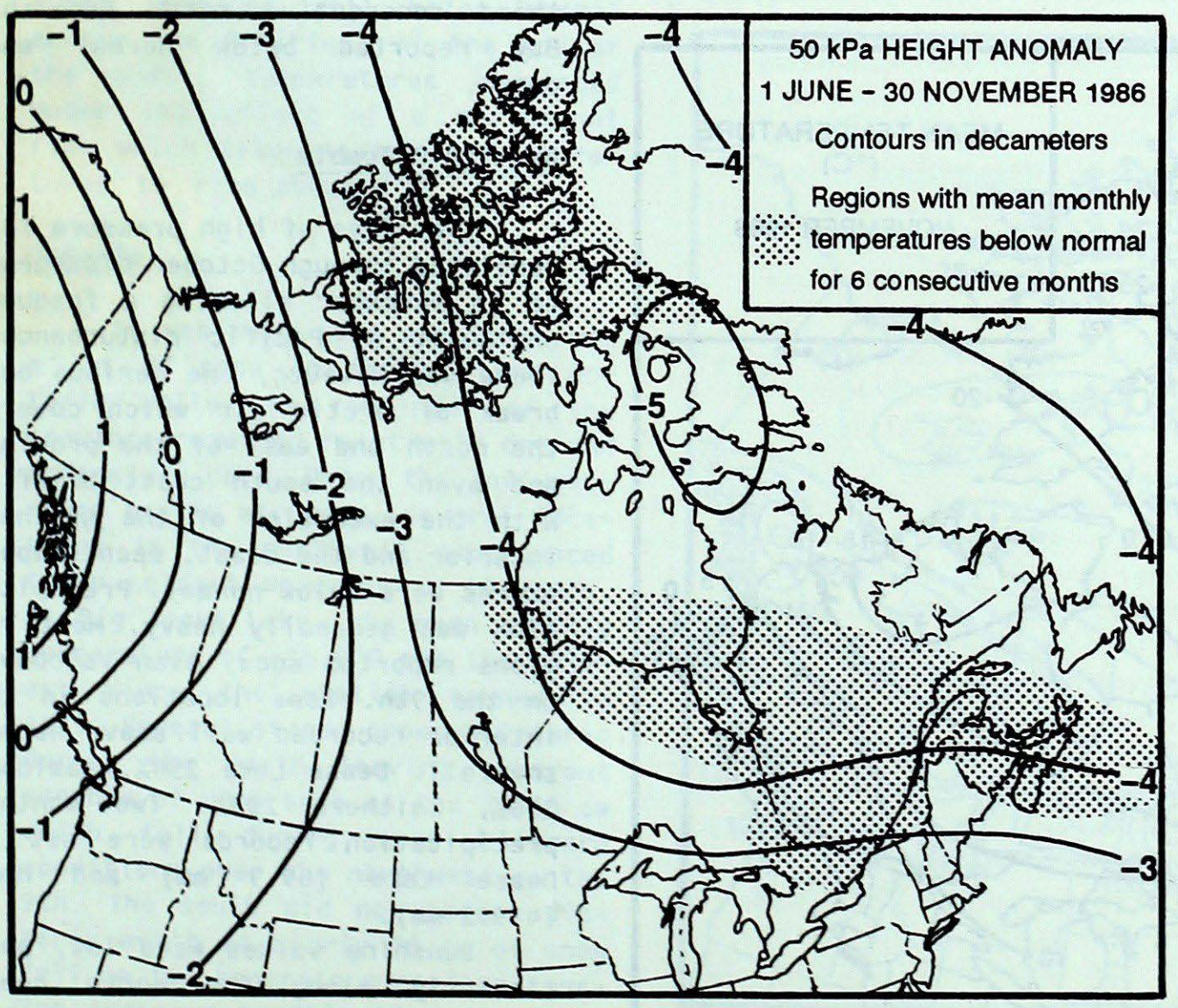
by
P. Scholefield, CCRM

Cold Spell Extends to 6 Months in the East

The eastern Canada cold spell was discussed briefly last month. Now that it has continued for another month and in fact has intensified it is worthy of further analysis. The accompanying map shows that there are two extensive areas that have had below normal temperatures for the past six months.

The intensity and the southward displacement of the polar vortex and its southward extending Canadian trough have been the principal reasons for the extended period of cold weather. The strong negative height anomaly over Baffin Island can be attributed directly to this upper level circulation feature.

The impact in the Arctic has been on the shipping which has had to contend with heavy ice conditions during the summer and more recently an unusually early freeze-up (see the article on ice conditions on page 4B).



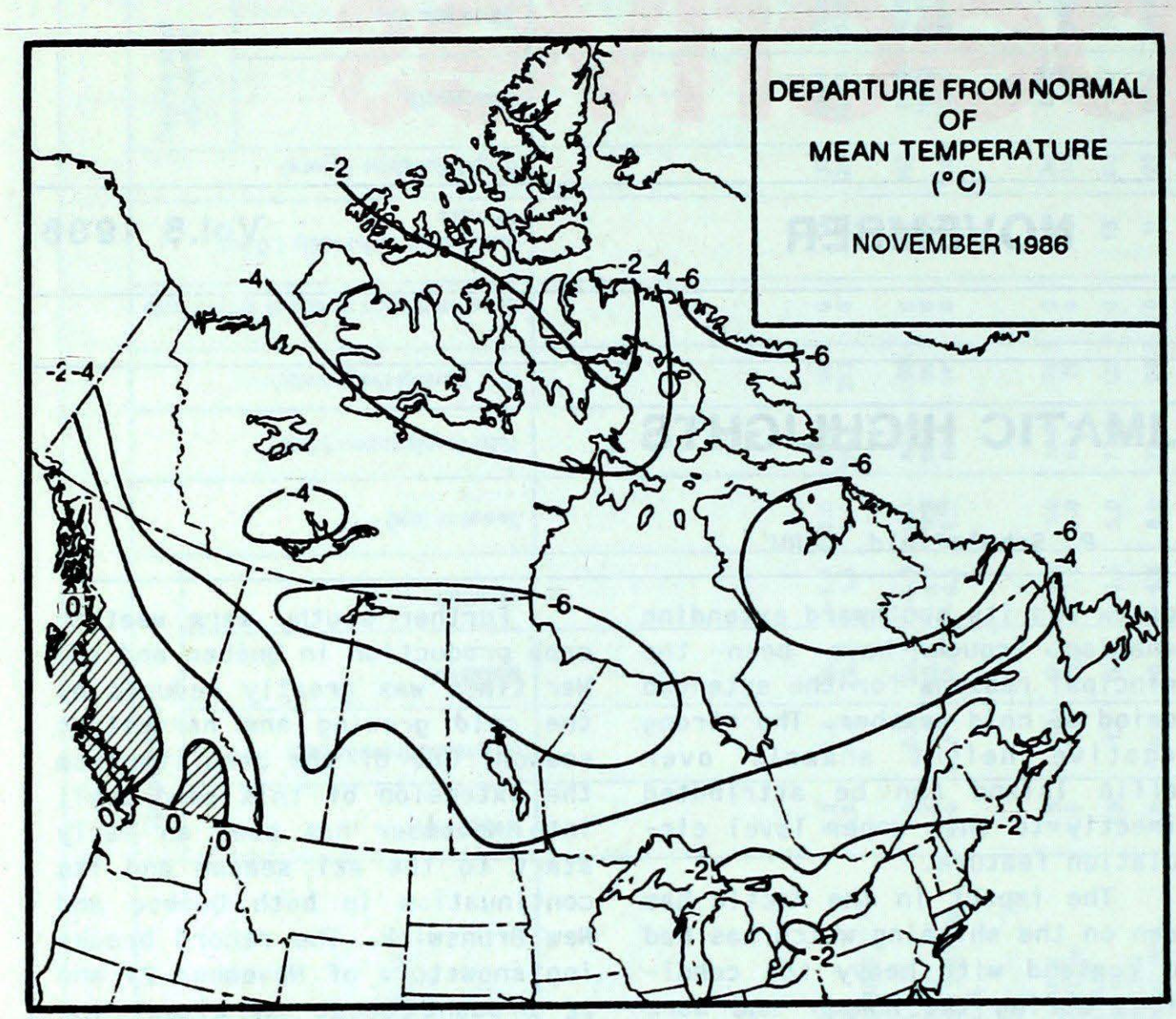
Further south, warm weather crop production in Québec and the Maritimes was greatly reduced by the cold growing and harvesting season. One of the benefits from the extension of this cold spell into November has been an early start to the ski season and its continuation in both Québec and New Brunswick. The record breaking snowstorm of November 21 and 22 brought about an almost instantaneous start-up of ski resort operations.

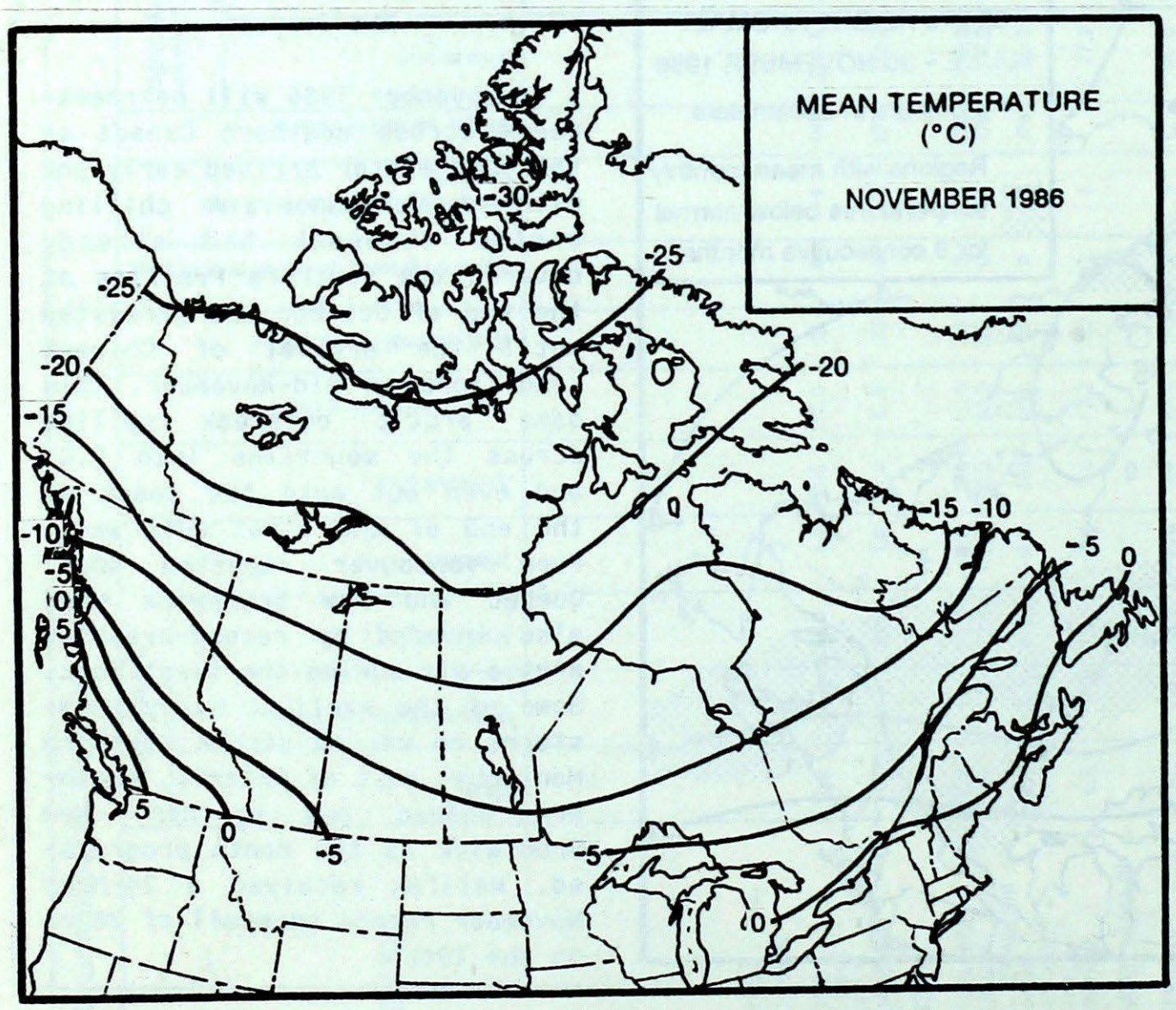
Winter Arrives Early Across The Country

November 1986 will be remembered across southern Canada as the year winter arrived early and with a vengeance. A chilling arctic outbreak had already covered the southern Prairies at the end of October and persisted until the arrival of Chinook conditions in mid-November. This same arctic outbreak spilled across the mountains into B.C. and even out onto the coast at the end of the first full week. Even Vancouver reported snow. Québec and New Brunswick were also invaded by record-breaking arctic air during the first week. Some of the earliest heavy snowstorms on record struck southern Manitoba, most of Ontario, southern Québec and northern New Brunswick as the month progressed. Halifax received a 24-hour November record snowfall of 28 cm on the 19th.

Canada

TEMPERATURE





ACROSS THE COUNTRY

Yukon and Northwest Territories

It was generally very cold through the Yukon and Northwest Territories in November. Over the far north, the central and the eastern territories, the cold was a continuation of a trend which began in September under the influence of a frigid dome of arctic air associated with the upper level trough which extended further south than usual. In the northwest, the influence of the upper ridge was not as favourable as last monthly because of a dramatic change in location as it retreated further west. This allowed cold arctic air to invade the Yukon and District of Mackenzie. At the beginning of the month, temperatures plunged well below seasonal normals. Ogilvie reported the country's lowest daily temperature of -43°C on the 9th. It was clear and frigid most of the time despite some snow and drifting snow. Several daily minimum temperature records were established on Baffin Island. Winds were generally strong over the eastern Arctic all month. For the third consecutive month Frobisher Bay reported below normal snow depth.

British Columbia

The ridge of high pressure that persisted through October disappeared in November allowing a frequent onslaught of Pacific disturbances. There was however, one serious outbreak of arctic air which covered the north and east of the province and even the south coast briefly. With the exception of the southern interior and the coast, mean temperatures were below normal. Precipitation was generally heavy. Most regions reported snow, even Vancouver on the 9th. Some locations in the interior recorded well above normal snowfall. Dease Lake 254%, Kamloops 276%, Smithers 209%. Two monthly precipitation records were set at Dease Lake (69.9 mm) and Hope (479.2 mm).

Sunshine values were low, particularly along the north coast because of the frequency of weather

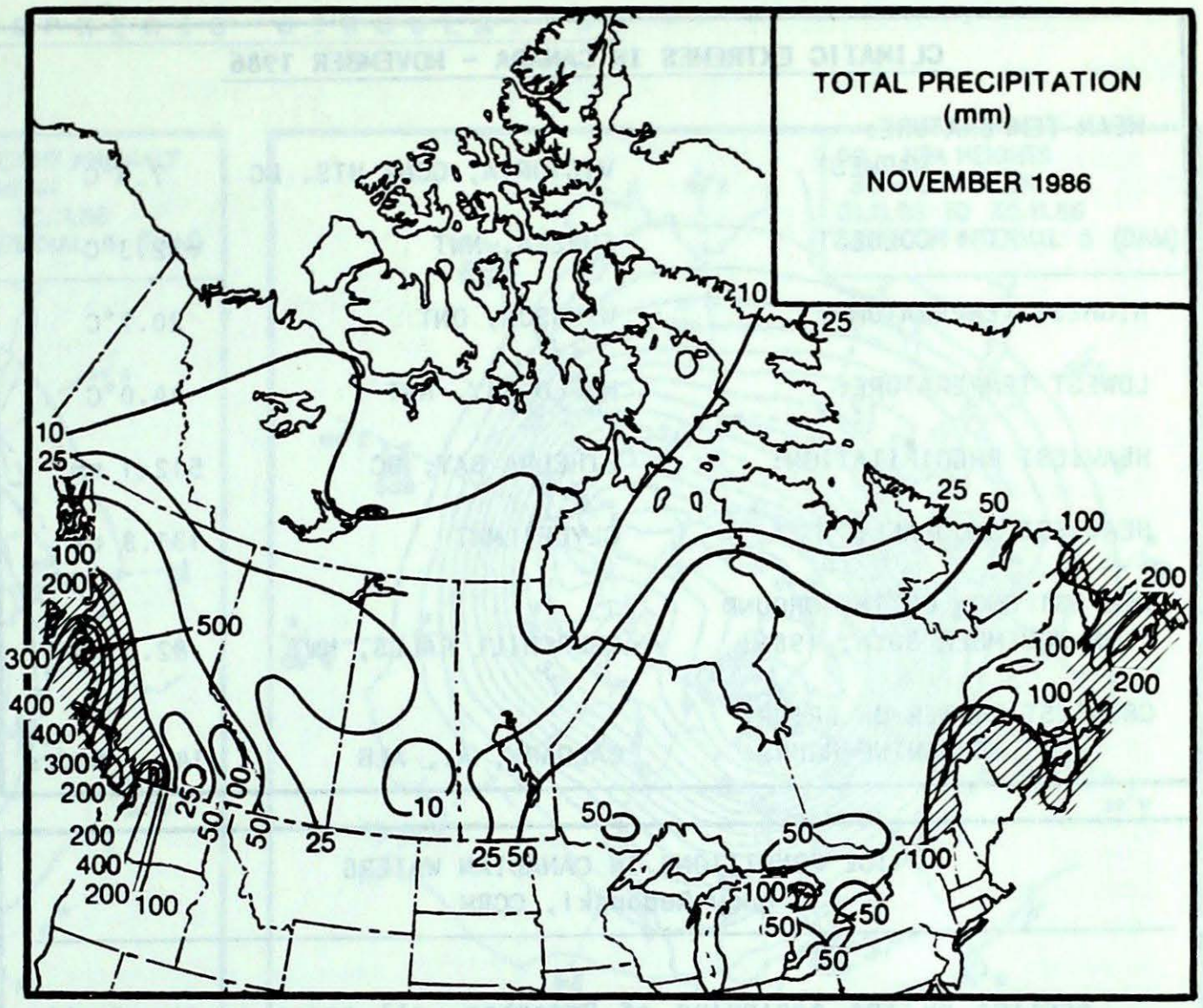
disturbances. Strong winds occurred in coastal areas. Ferry service to Vancouver Island was interrupted at the end of the month.

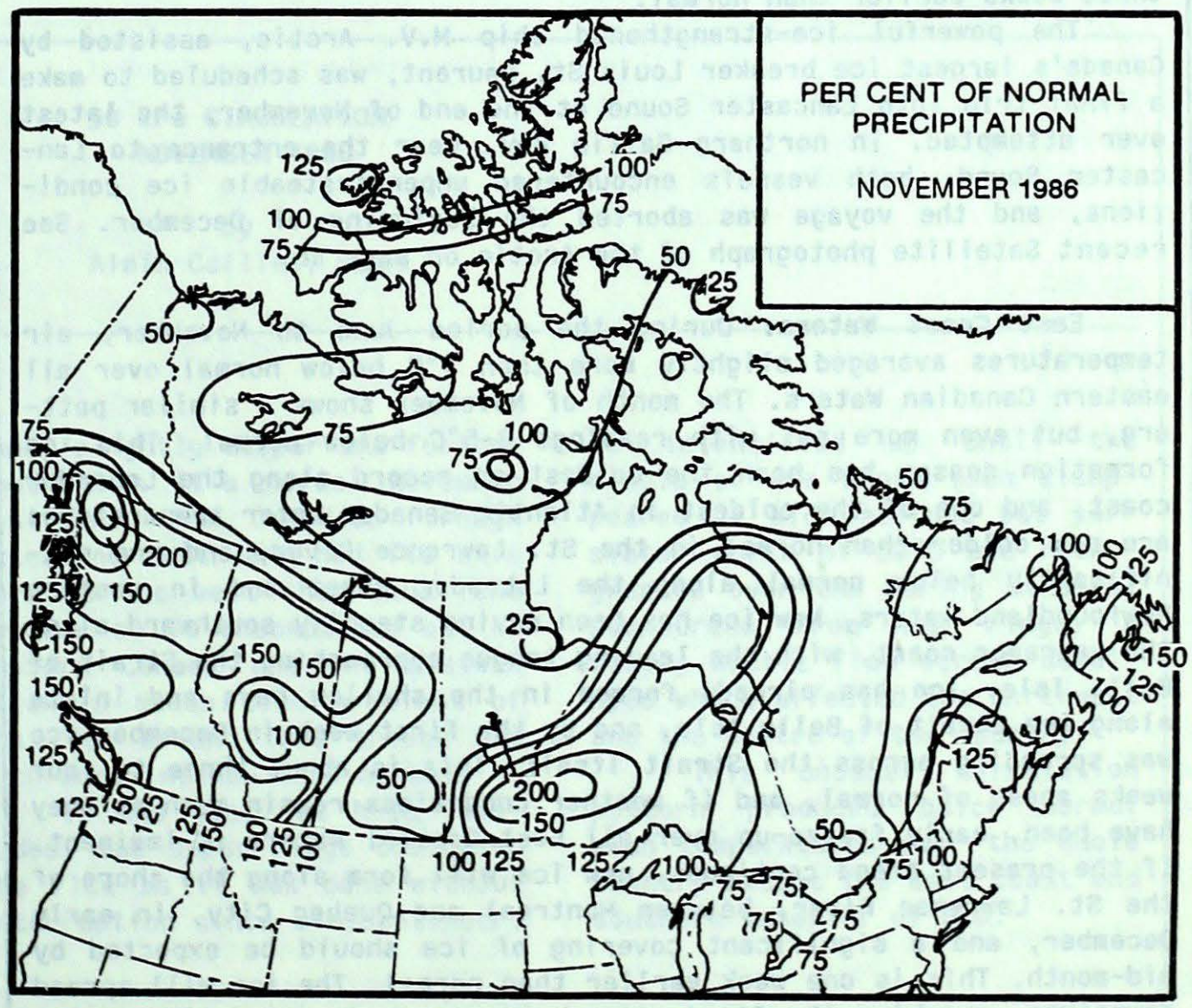
Prairie Provinces

Winter, which had already arrived at the end of October became well entrenched during November. From the 6th of November onward, a frigid outbreak of arctic area infiltrated the south and remained for nearly three weeks. Southern Manitoba experienced the worst snowstorm since March 1966. Winnipeg was paralysed by a 35.8 cm snowfall accompanied by winds gusting to 90 km/hr and visibilities near zero. Saskatchewan and Alberta were spared the worst of the storm. Monthly precipitation amounts were high in the Rockies where Banff received 72 cm of snow, the largest monthly accumulation since 1946. In southern Manitoba, Portage-la-Prairie, Gimli and Winnipeg received nearly twice their monthly snowfall. Numerous daily minimum temperature records were set. Despite pronounced chinooks in southern Alberta (on the 15th, 20th and 21st) mean temperatures remained well below normal across the Prairies. At the end of the month, temperatures moderated under the effect of a meridional flow which allowed maximum temperatures to rise above 0°C.

Ontario

It was very cold and there was a lot of snow in northwestern Ontario while the remainder of the province remained relatively dry and moderately cold. Under the influence of an arctic air mass, several locations in the northwest experienced their coldest November in 20 years. At Big Trout Lake, the mean monthly temperature of -15.9°C was the coldest since the station opened in 1939. Several storms crossed Ontario during the month leaving generous amounts of snow such as the 30-50 cm which fell during near blizzard conditions over the northwest on the 9th. The south did not escape winter's wrath as nearly 20 cm of snow fell on two separate occasions causing numerous traffic tie-ups in the





EXTREMES

CLIMATIC EXTREMES IN CANADA - NOVEMBER 1986

MEAN TEMPERATURE:		
WARMEST	VICTORIA, GONZ HTS. BC	7.4°C
COLDEST	EUREKA, NWT	-32.3°C
HIGHEST TEMPERATURE:	WINDSOR, ONT	20.7°C
LOWEST TEMPERATURE:	MOULD BAY, NWT	-44.0°C
HEAVIEST PRECIPITATION:	ETHELDA BAY, BC	512.1 mm
HEAVIEST SNOWFALL:	CLYDE, NWT	131.8 cm
DEEPEST SNOW ON THE GROUND ON NOVEMBER 30th, 1986:	CHURCHILL FALLS, NWT	82.0 cm
GREATEST NUMBER OF BRIGHT SUNSHINE HOURS:	CALGARY, A., ALB	142 hours

ICE CONDITIONS IN CANADIAN WATERS

Andy Radomski, CCRM

Arctic: By the beginning of December, all areas in the Arctic were extensively ice covered. Due to the unusually cold temperatures in the eastern Arctic during October and November, the rate of ice growth and its extent was excessive. This year has been one of the earliest freeze-ups on record in the eastern Arctic, approximately three weeks earlier than normal.

The powerful ice-strengthened ship M.V. Arctic, assisted by Canada's largest ice breaker Louis St. Laurent, was scheduled to make a final trip into Lancaster Sound at the end of November, the latest ever attempted. In northern Baffin Bay, near the entrance to Lancaster Sound, both vessels encountered unpenetrateable ice conditions, and the voyage was aborted the beginning of December. See recent Satellite photograph of the Arctic on page 8b.

East Coast Waters: During the period June to November, air temperatures averaged slightly more than 1°C below normal over all eastern Canadian Waters. The month of November shows a similar pattern, but even more so, with readings 3-5°C below normal. This ice formation season has been the coldest on record along the Labrador coast, and one of the coldest in Atlantic Canada. Water temperatures are now colder than normal in the St. Lawrence River, and are significantly below normal along the Labrador coast and in eastern Newfoundland waters. New ice has been moving steadily southward along the Labrador coast, with the leading tongue approaching the Strait of Belle Isle. Ice has already formed in the shallow bays and inlets along the Strait of Belle Isle, and by the first week in December ice was spreading across the Strait itself. This is about three to four weeks ahead of normal, and if weather conditions remain much as they have been, early freeze-up over all East Coastal Waters is imminent. If the present trend continues, new ice will form along the shore of the St. Lawrence River, between Montreal and Quebec City, in early December, and a significant covering of ice should be expected by mid-month. This is one week earlier than normal. The ice will spread downriver, reaching the St. Lawrence estuary during the latter part of December.

Toronto area on the 20th and a big multi-car pile-up near Barrie on the 27th. Monthly precipitation totals for southern and central regions remained below normal as they were in October, a complete reversal from the excesses of summer and early autumn. Winds associated with the storms again aggravated the high water level problem on the Great Lakes (see article on page 8B).

Quebec

The Quebec weather was dominated by the long-wave upper level trough which, for the second consecutive month, was deeper and more intense than normal. Arctic air invaded the province several times keeping mean temperatures below normal. Many minimum temperature records were set: -10°C at Outawais and at Dorval on the 4th which was the lowest ever recorded so early in the season - 28 daily minimum records on the 13th and 14th in total, no less than 8 new monthly minimum records and 3 others equalled at Sept-Iles, Gaspé and Chibougamau. Although precipitation amounts were moderate and variable, there were a few extremes. A heavy snowstorm on the 21st and 22nd dumped 70 cm of snow at Gaspé bringing the monthly total up to 107.2 cm, a monthly record. During the same period, Québec City and Sherbrooke received 32 and 52.4 cm respectively, which was the largest accumulation ever so early in the season. Milder weather at the end of the month melted most of the snowcover in the south.

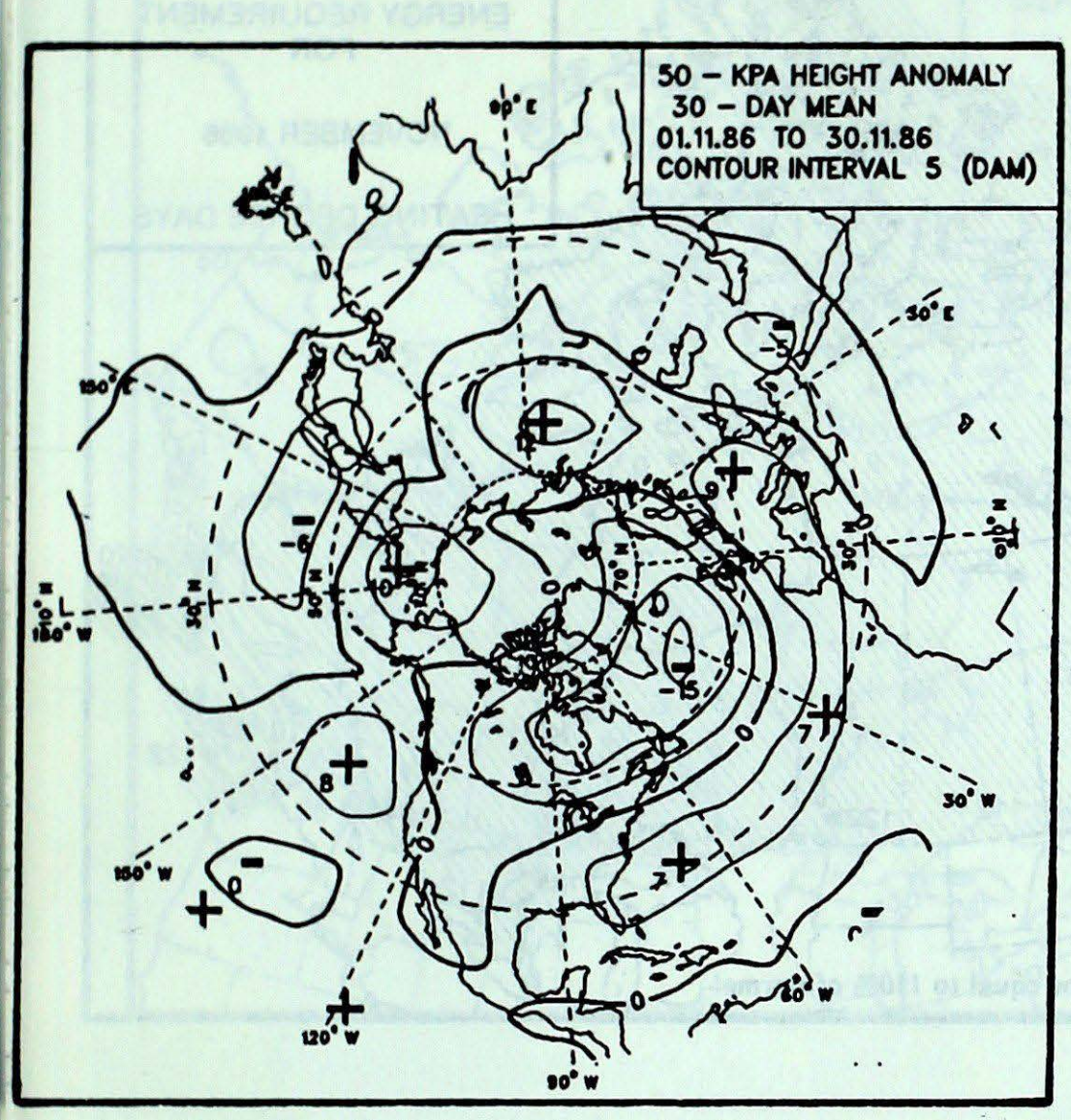
It was remarkable that Kuujjaq received nearly double (186%) its normal sunshine even though it was near the centre of the polar vortex.

Atlantic Provinces

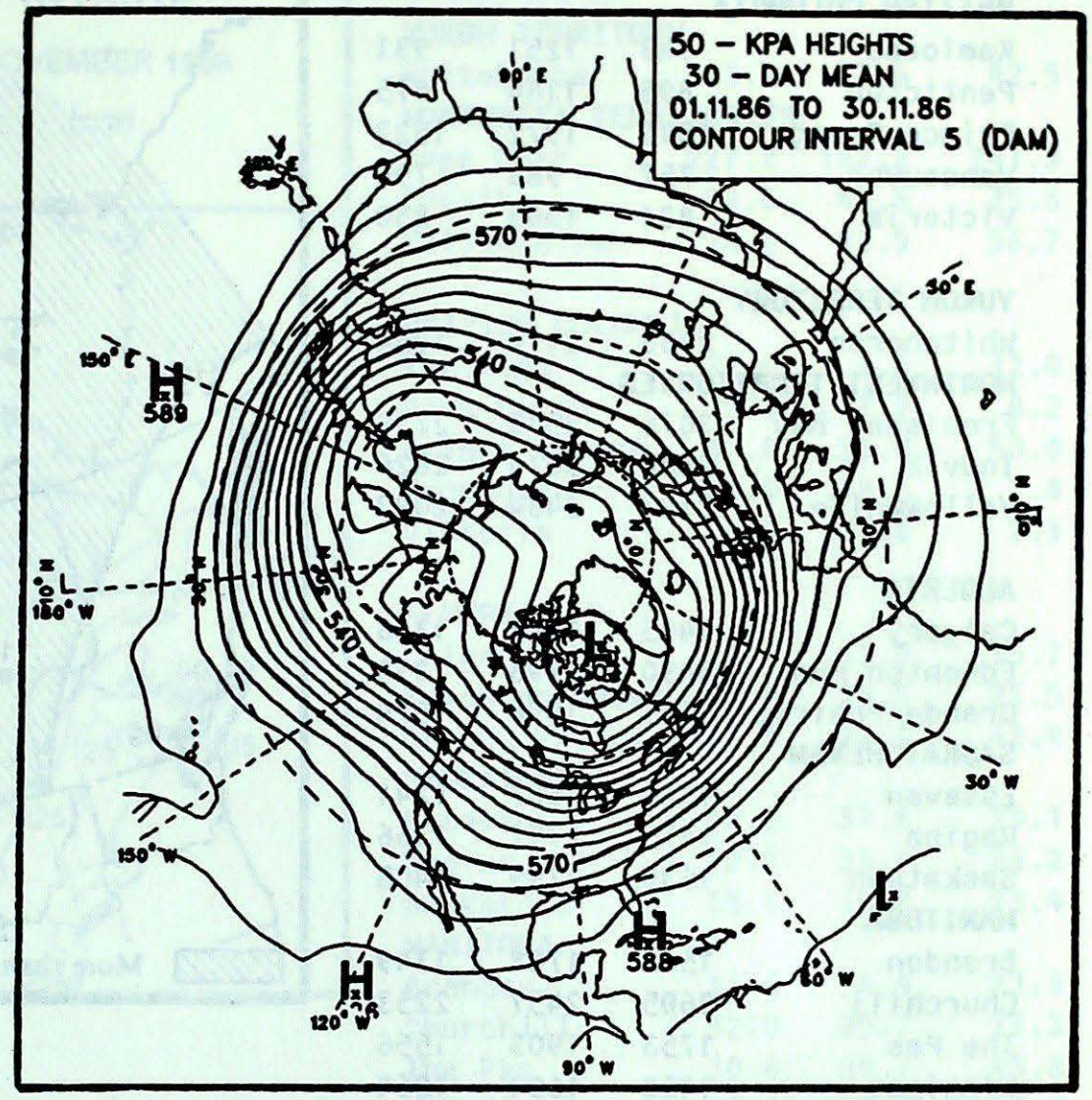
All the Atlantic Provinces have experienced an unusual winter noted more for its early arrival than its severity. It was generally very cold with several storms which dumped record snowfalls and were accompanied by violent winds. Mean

... Continued on page 7B, Regions

ATMOSPHERIC CIRCULATION



Mean 50 kPa height anomaly (dam)
November 1986



Mean 50 kPa heights (dam)
November 1986

50 kPa CIRCULATION
NOVEMBER 1986

by
Alain Caillet, CCRM

An examination of the mean upper air chart for November, 1986 shows the evolution of the trends over North America from last month, that is, the intensification of long wave trough over the east and the breakdown of the ridge over the west coast.

The seasonal drop in geopotential heights, caused by winter cooling, was general across Canada but particularly pronounced over the east. The polar vortex was located over Baffin Island, slightly deeper and further south than it's normal November position. The Canadian trough extending southward had its axis more to the west than usual and broader so it encompassed all of eastern Canada and the western Atlantic ocean. The gradient of the flow around this trough was much more intense than normal.

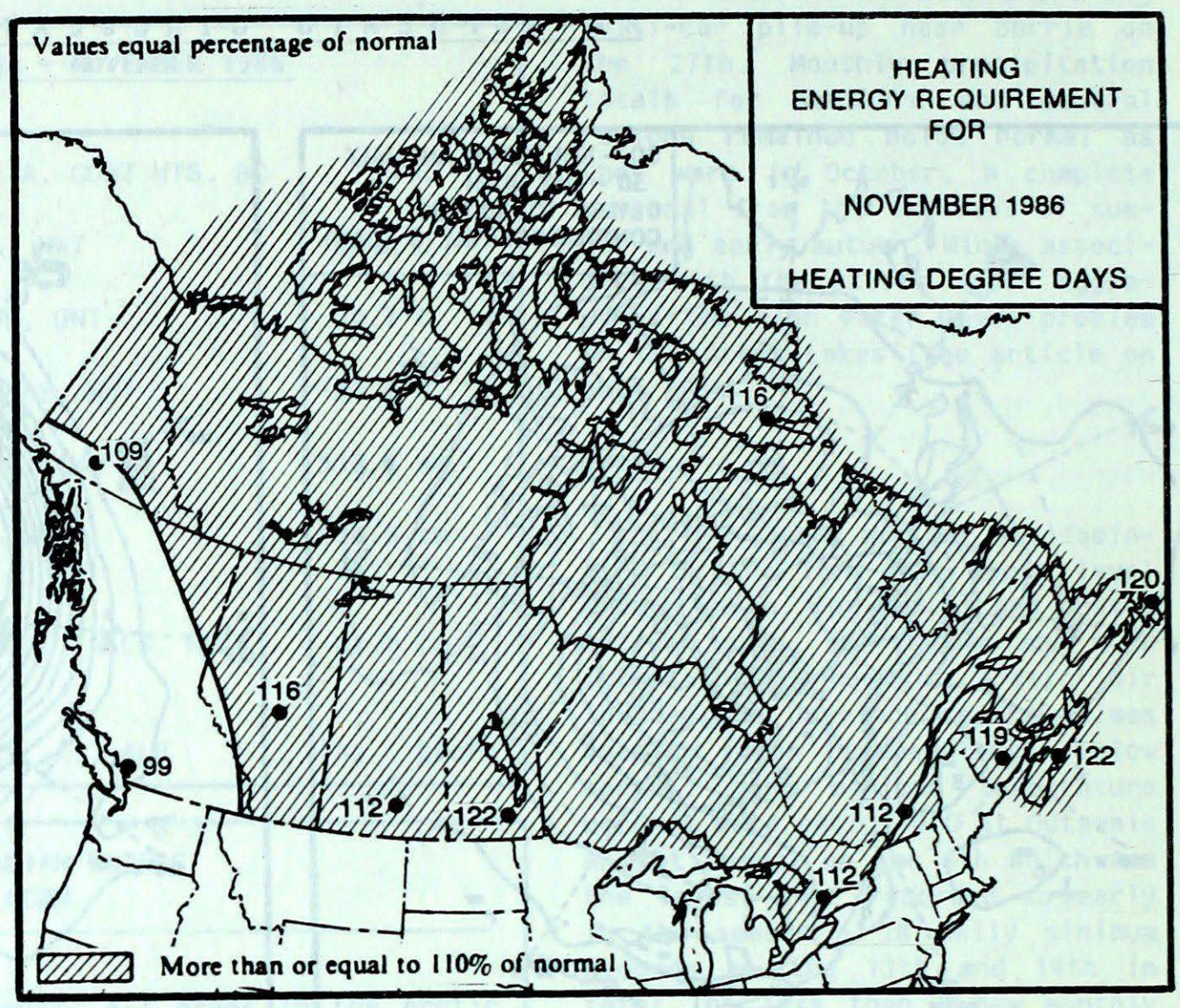
In the west, at high latitudes, the upper ridge dominated the flow as it has done without interruption since mid-September. It intensified up until the middle of the month then disappeared at mid latitude but persisted north of 50°N and retrogressed over the Bering Straits. Downstream from the ridge, a strong arctic flow stream developed which affected the northwest and the centre of the country.

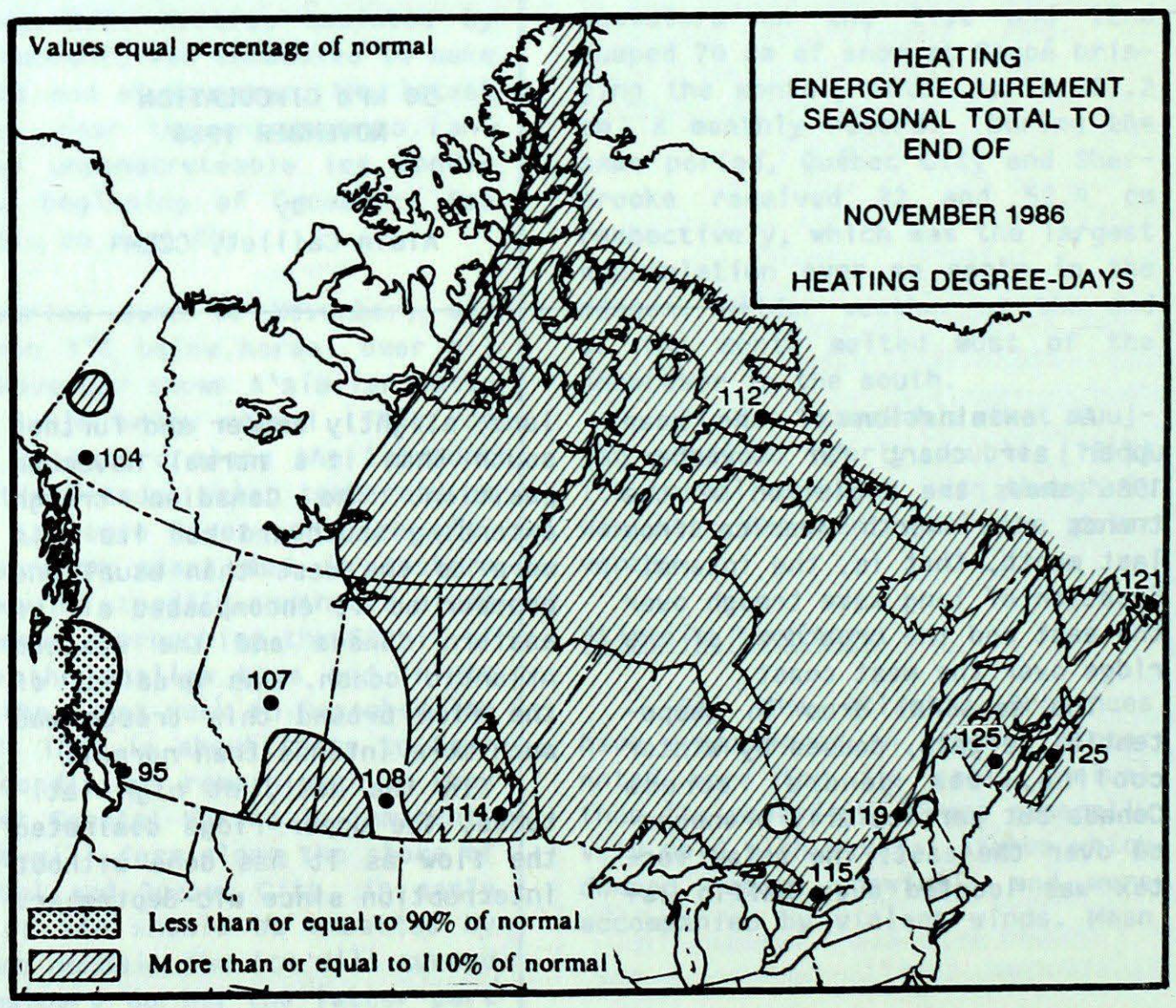
This unusual circulation pattern produced below normal mean temperatures over the whole country except the west coast and southern interior of B.C.

ENERGY

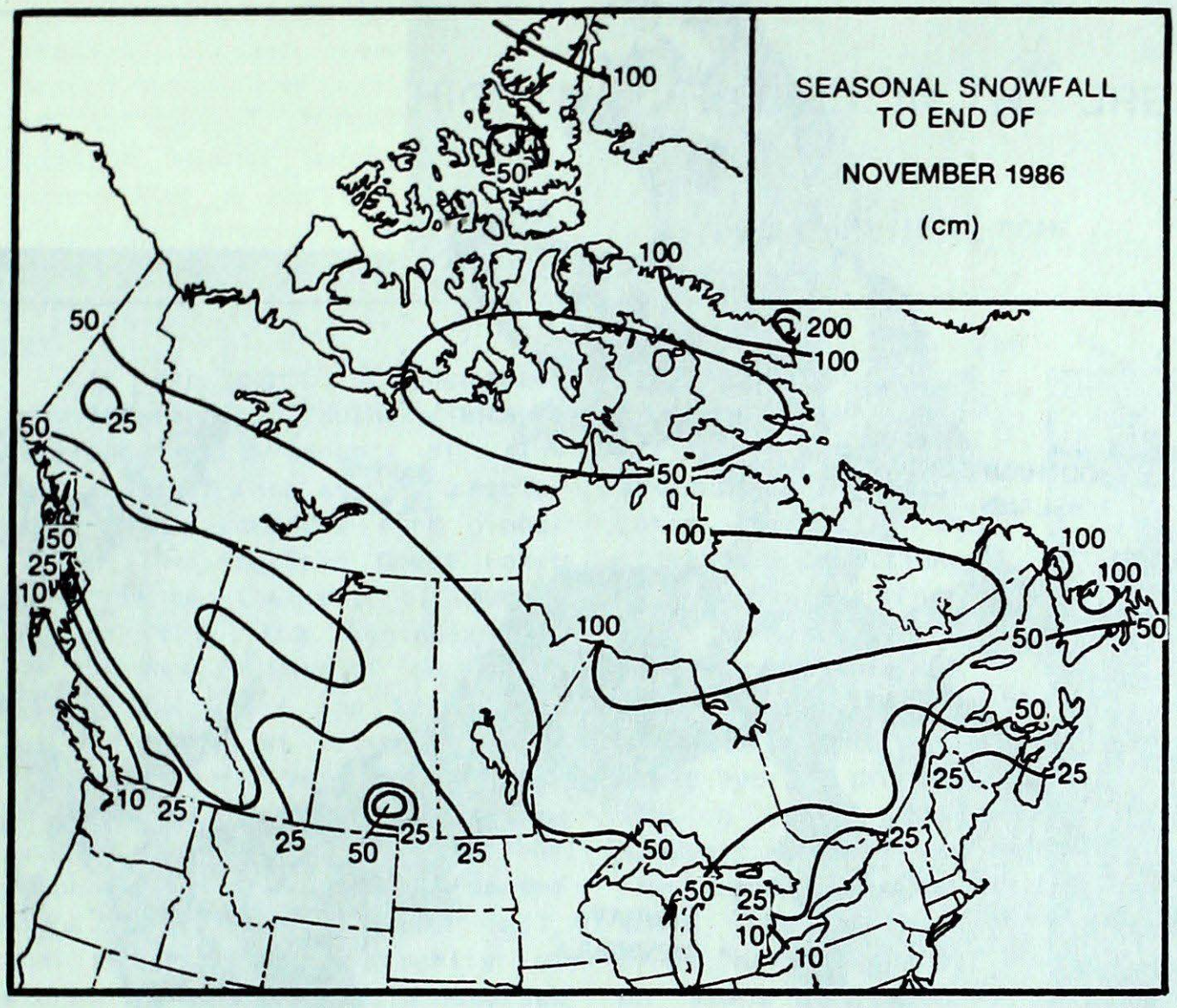
SEASONAL TOTAL OF HEATING DEGREE-DAYS TO END OF NOVEMBER

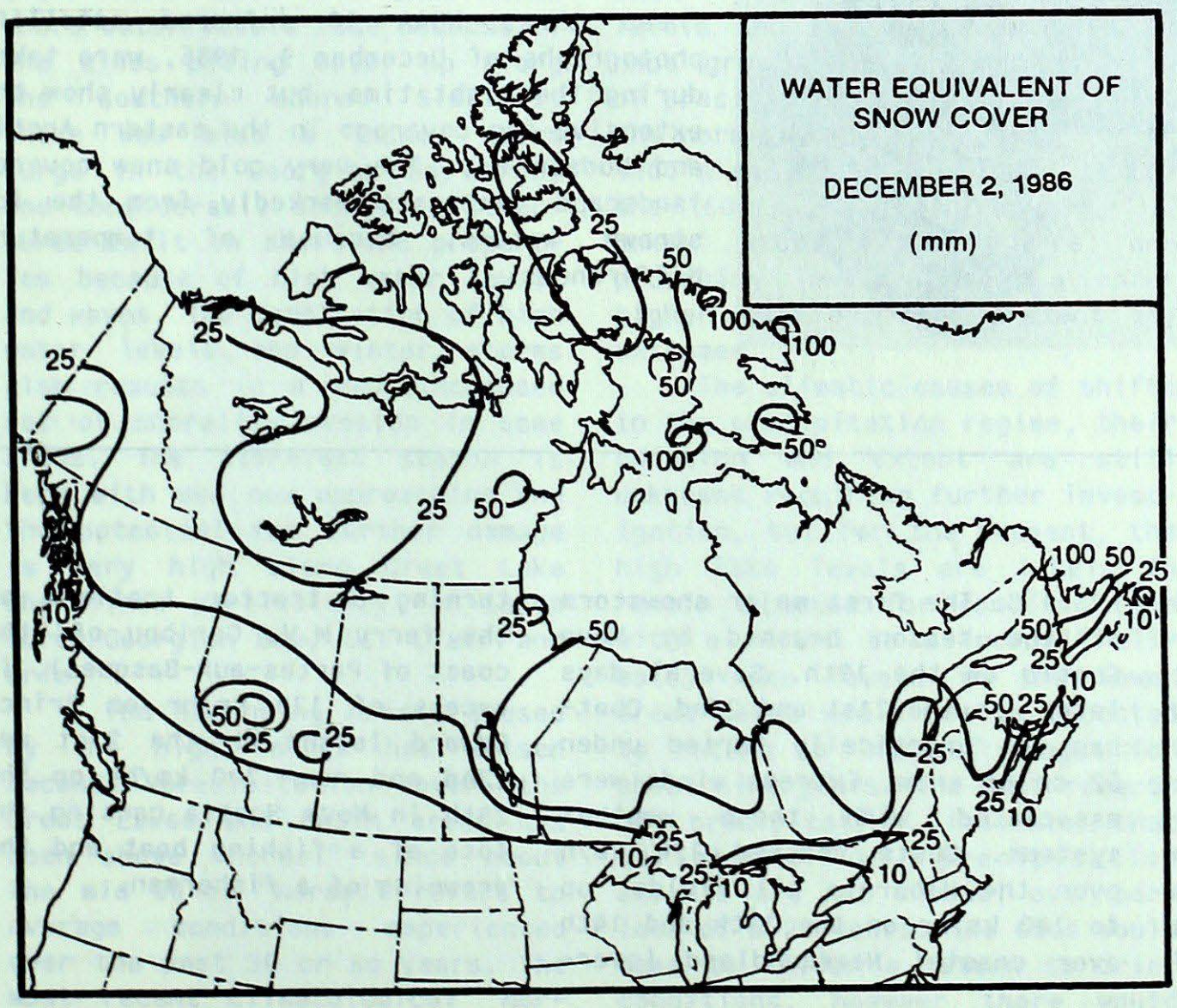
	1986	1985	NORMAL
BRITISH COLUMBIA			
Kamloops	943	1251	931
Penticton	895	1184	875
Prince George	1510	1972	1522
Vancouver	757	983	794
Victoria	831	1005	850
YUKON TERRITORY			
Whitehorse	2033	2414	1954
NORTHWEST TERRITORIES			
Frobisher Bay	3076	2573	2739
Inuvik	2880	3014	2826
Yellowknife	2197	2484	2092
ALBERTA			
Calgary	1495	1845	1388
Edmonton Mun	1490	1793	1398
Grande Prairie	1661	1996	1574
SASKATCHEWAN			
Estevan	1340	1607	1241
Regina	1475	1757	1366
Saskatoon	1530	1799	1405
MANITOBA			
Brandon	1562	1788	1349
Churchill	2605	2457	2253
The Pas	1753	1903	1556
Winnipeg	1438	1604	1264
ONTARIO			
Kapuskasing	1757	1508	1488
London	903	764	829
Ottawa	1073	934	706
Sudbury	1323	1167	1186
Thunder Bay	1465	1456	1316
Toronto	938	803	819
Windsor	709	612	694
QUÉBEC			
Baie Comeau	1715	1459	1461
Montréal	1040	890	872
Quebec	1300	1083	1087
Sept-Iles	1779	1517	1533
Sherbrooke	1301	1114	1200
Val-d'Or	1672	1435	1428
NEW BRUNSWICK			
Charlo	1506	1225	1145
Fredericton	1266	1047	1013
Moncton	1274	1050	1007
NOVA SCOTIA			
Halifax	1029	870	822
Sydney	1193	977	915
Yarmouth	1041	902	881
PRINCE EDWARD ISLAND			
Charlottetown	1196	978	936
NEWFOUNDLAND			
Gander	1482	1358	1211
St. John's	1415	1287	1166





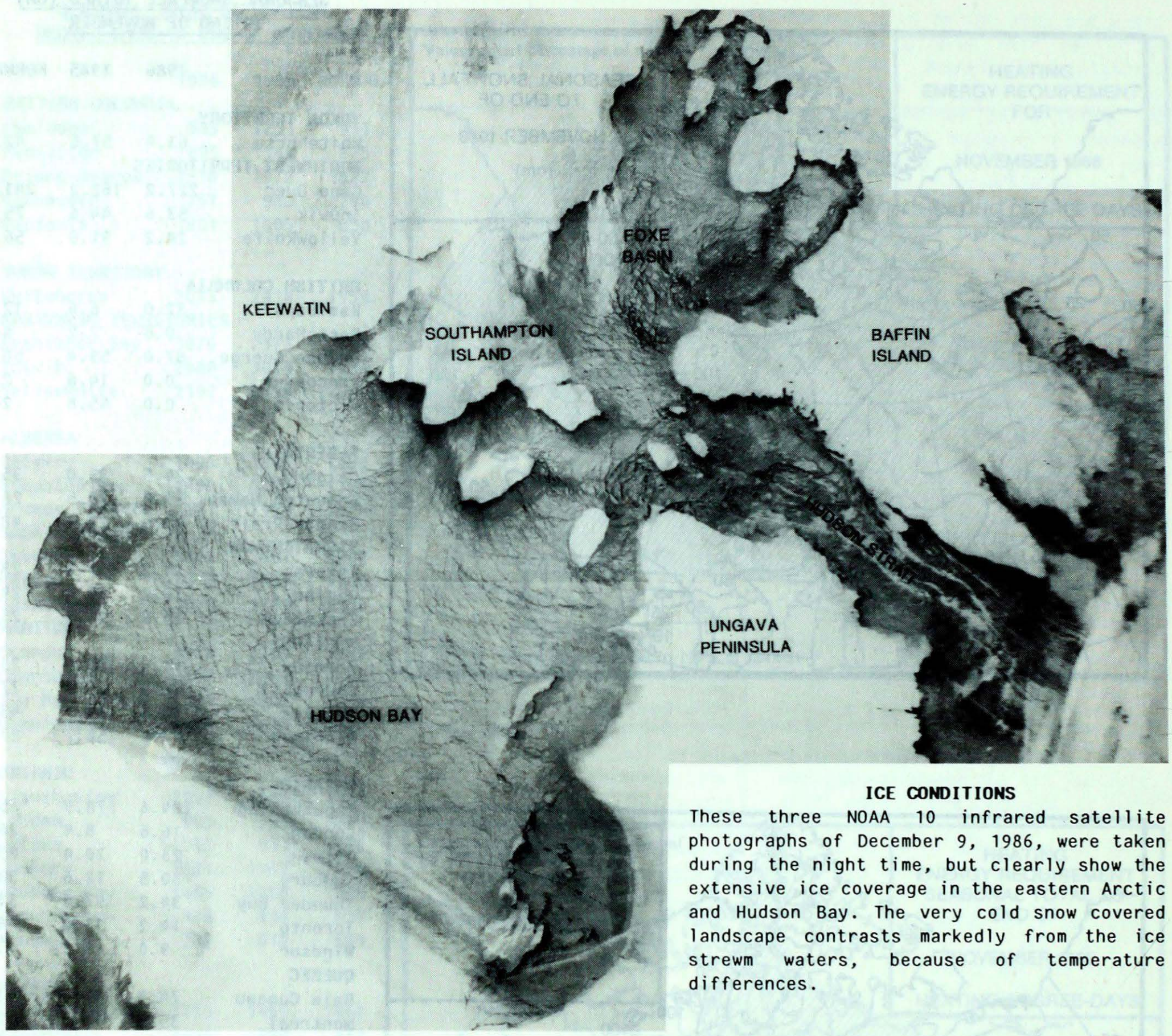
SNOWFALL





SEASONAL SNOWFALL TOTALS (CM)
TO END OF NOVEMBER

	1986	1985	NORMAL
YUKON TERRITORY			
Whitehorse	63.4	57.6	42.5
NORTHWEST TERRITORIES			
Cape Dyer	227.2	162.2	241.3
Inuvik	53.6	44.6	75.6
Yellowknife	24.2	91.9	56.7
BRITISH COLUMBIA			
Kamloops	32.0	6.6	12.0
Port Hardy	0.6	7.2	4.2
Prince George	67.0	53.4	50.0
Vancouver	0.0	14.6	2.8
Victoria	0.0	45.8	2.3
ALBERTA			
Calgary	26.5	33.0	35.7
Edmonton Namao	30.4	28.5	26.5
Grande Prairie	40.5	29.4	42.4
SASKATCHEWAN			
Estevan	14.2	37.8	23.1
Regina	72.2	35.4	24.2
Saskatoon	15.6	14.8	23.4
MANITOBA			
Brandon	11.6	78.9	23.3
Churchill	52.0	85.7	77.3
The Pas	30.6	39.7	43.8
Winnipeg	47.6	58.7	27.3
ONTARIO			
Kapuskasing	104.6	78.9	85.0
London	16.6	8.4	26.3
Ottawa	23.0	20.4	25.5
Sudbury	30.5	12.6	38.6
Thunder Bay	34.2	97.6	33.1
Toronto	14.2	11.0	8.9
Windsor	9.0	9.8	11.6
QUEBEC			
Baie Comeau	74.4	42.6	41.6
Montréal	35.9	14.7	22.9
Quebec	62.2	36.2	38.3
Sept-Iles	65.9	32.5	61.4
Sherbrooke	68.4	33.7	42.4
Val-d'Or	69.8	29.2	63.7
NEW BRUNSWICK			
Charlo	79.0	34.9	42.9
Fredericton	16.9	20.5	22.7
Moncton	*	16.9	24.7
NOVA SCOTIA			
Shearwater	22.8	11.3	9.5
Sydney	42.4	33.5	14.6
Yarmouth	14.4	2.2	8.3
PRINCE EDWARD ISLAND			
Charlottetown	23.8	32.3	24.2
NEWFOUNDLAND			
Gander	137.6	51.6	44.1
St. John's	67.1	41.7	25.6



ICE CONDITIONS

These three NOAA 10 infrared satellite photographs of December 9, 1986, were taken during the night time, but clearly show the extensive ice coverage in the eastern Arctic and Hudson Bay. The very cold snow covered landscape contrasts markedly from the ice strewm waters, because of temperature differences.

Regions ... continued from 4b

monthly temperatures over all regions were below normal for the 3rd consecutive month. Eight monthly minimum records were equalled or broken such as at Charlot (N.B.) -4°C one degree less than in 1978, at Goose Bay -10.3°C which was 3.7°C lower than the previous record in 1977. On the 20th, Goose Bay reported a record monthly extreme minimum of -26.1°C. The first major snowstorm of the season brushed by Nova Scotia on the 19th. Several days later, on the 21st and 22nd, Chatham was practically buried under 62 cm of snow. Extreme winds were associated with these weather systems. Gusts reached 120 km/h over the Hibernia oil fields, up to 140 km/hr on the 13th and 14th over coastal Newfoundland (overturning 3 tractor trailers on the ferry M.V. Caribou off the coast of Portes-aux-Basques), in excess of 130 km/hr on Prince Edward Island on the 21st and 22nd and near 100 km/hr on the 24th in Nova Scotia causing the loss of a fishing boat and the drowning of a fisherman.

FEATURE

HIGH WATER LEVEL IN THE GREAT LAKES

by
André Saulesleja, CCAH

In the month of September many locations in Southern Ontario received record amounts of rainfall. Greater than average precipitation was recorded over almost all of the southern Great Lakes Basin. From the end of August through till the beginning of October Lake Levels on Lakes Huron, St. Clair and Erie crept upwards by almost 10 cm. This was time when levels are usually falling because of increased autumn evaporation. At the end of October, levels were at record highs. With the coming of fall, the frequency and severity of storms increases. An cold outbreak October 5th was accompanied by storm force winds over the Lake Huron/Georgian Bay areas. This resulted in flooding at the St. Clair River exit from Lake Huron where water levels rose because of the winds piling water up along the southern shore. Similarly there was also a lesser storm surge in the Georgian Bay area, and considerable damage to structures built on shoreline properties because of high water levels and waves. The combination of high water levels and winter storms also results in a much increased rat of shoreline erosion in some areas. The stormiest season is here with use now approaching and the potential for further damage is very high along Great Lake shorelines particularly for Lakes Huron/Georgian Bay, St. Clair and Erie

The impending crisis caused by the high levels has arisen because precipitation over the Great Lakes and basin areas has been above "normal" since about the mid 60's. "Normal" refers to average conditions experienced over the past 30 or so years. The most recent climatological "normals" have been prepared for period 1951-1980. Most of the structures and facilities designed around the Great Lakes are based on climatic conditions experienced before 1970. The recent high lake levels are an accumulated result of a number of years of above average precipitation (page 10b). However, climate and the conditions we would like to think of as "normal" are by no means a static process. Some historical information and paleoclimatological analyses indicate that higher lake levels and thus perhaps greater amounts of precipitation were the norm in the early 1800's and before. In the 1600's levels on Lakes Michigan/Huron were approaching levels almost a meter higher than even the present day extremes.

The climatic causes of shifts in the precipitation regime, their duration and extent are still unknowns requiring further investigation, but for the present, the high lake levels are likely to remain a cause for concern. Even with a return to a "normal" climate, lake levels in the lower Great Lakes would not be expected to return to "normal" ranges for about nine years. The past records of precipitation indicate that variations in precipitation amounts are not unusual over periods of 5-20 years. The odds would seem to favour a return to drier conditions, however there would always remain the possibility of

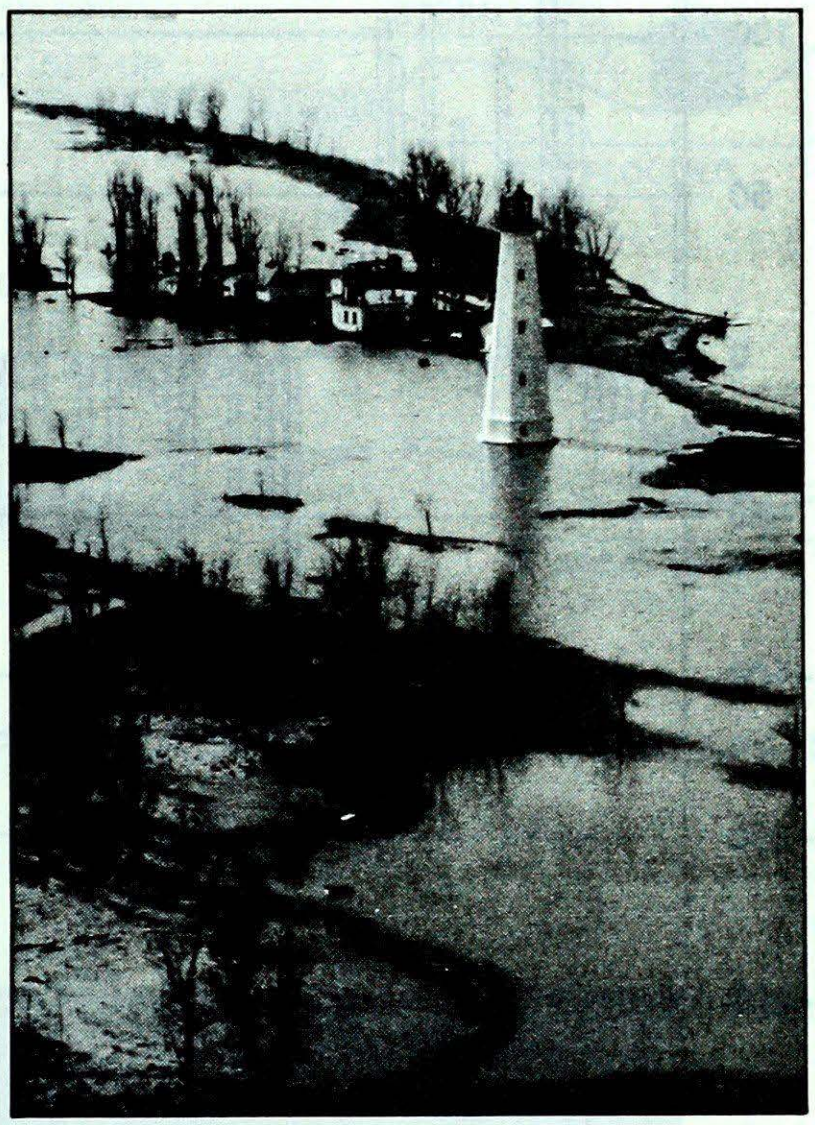


PHOTO: ROSE LE STUDIO LTD., Simcoe, Ont.

Long Point Lighthouse, Lake Erie
April 2, 1986

climatic variations which could last for a much longer time.

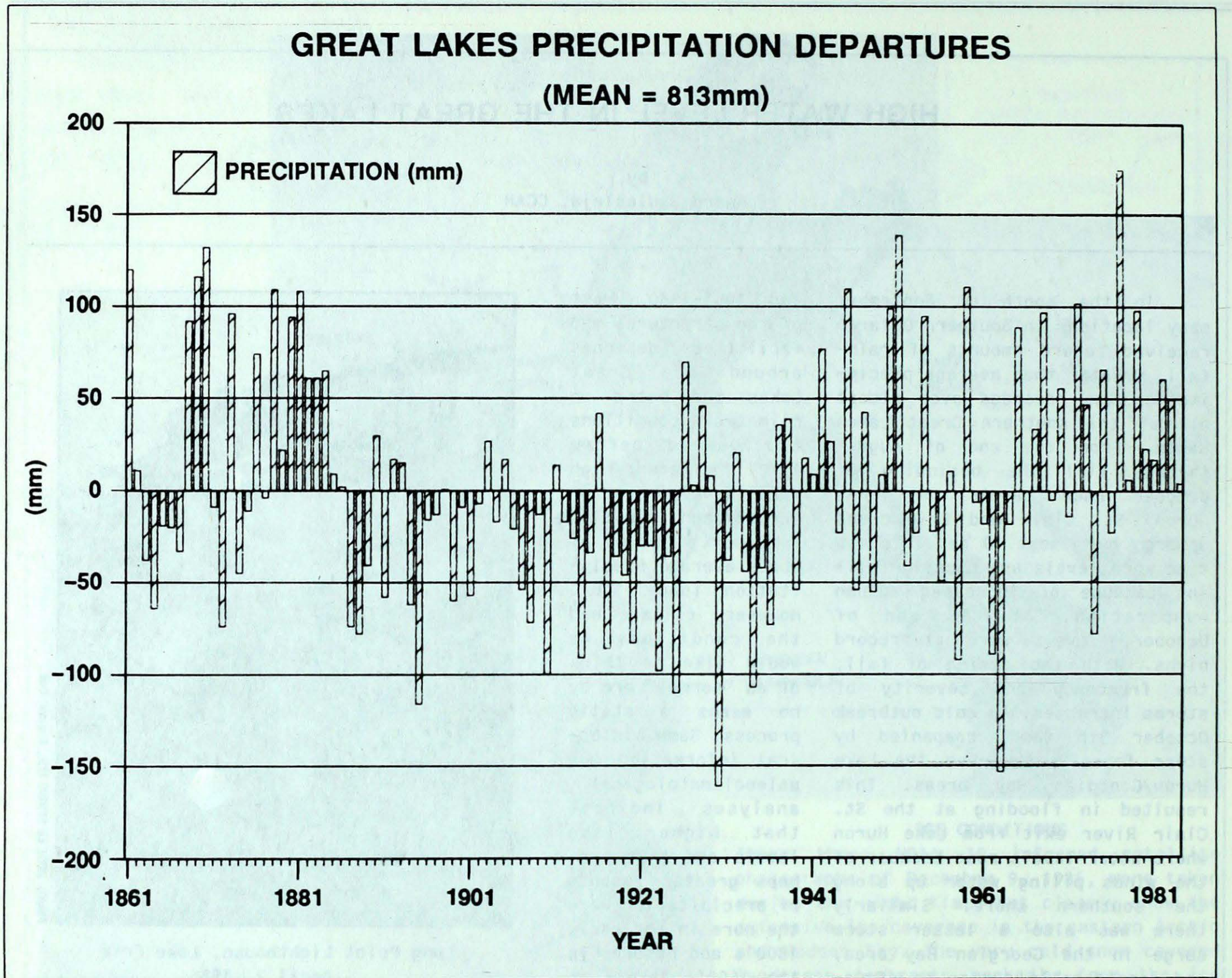
Damages resulting from high lakes levels will occur during winter storms. The damages will result from a combination of storm surge and waves.

What is a Storm Surge

A storm surge is a temporary change in water level brought about by a combination of wind and differences in pressure across a water body. For the Great lakes, the wind is the most important factor in determining the magnitude of short-period water level fluctuations.

Each lake responds uniquely to wind blowing across its surface. The water level increase, or set-up at the downwind end of

FEATURE



the lake is approximately directly proportional to the wind speed and length of the water body, but inversely poportional to its depth. Moreover, the wind forcing of the water body results in some inertial or sloshing motions of the water body. These motions are periodic and are generally referred to as seiching motions. The period for these seiches is about 15 hours for Lake Erie, and 6 hours for the major part of Lake Huron for the principal mode of oscillation along the greatest length of the lake. The storm response is actually much more complex, and a storm surge is made up of the set-up and the many possible modes of oscillation which are induced by wind forces on the lakes surface.

The combination of possible modes of motion was numerically modelled. The model used is that developed from the Lake circulation model of Simons and Lam of the Canadian Center for Inland Water. This model is also being used by the Ontario Weather Centre for producing warnings of high lake levels.

In order to gauge the kind of damage which might be anticipated and as a basis for the

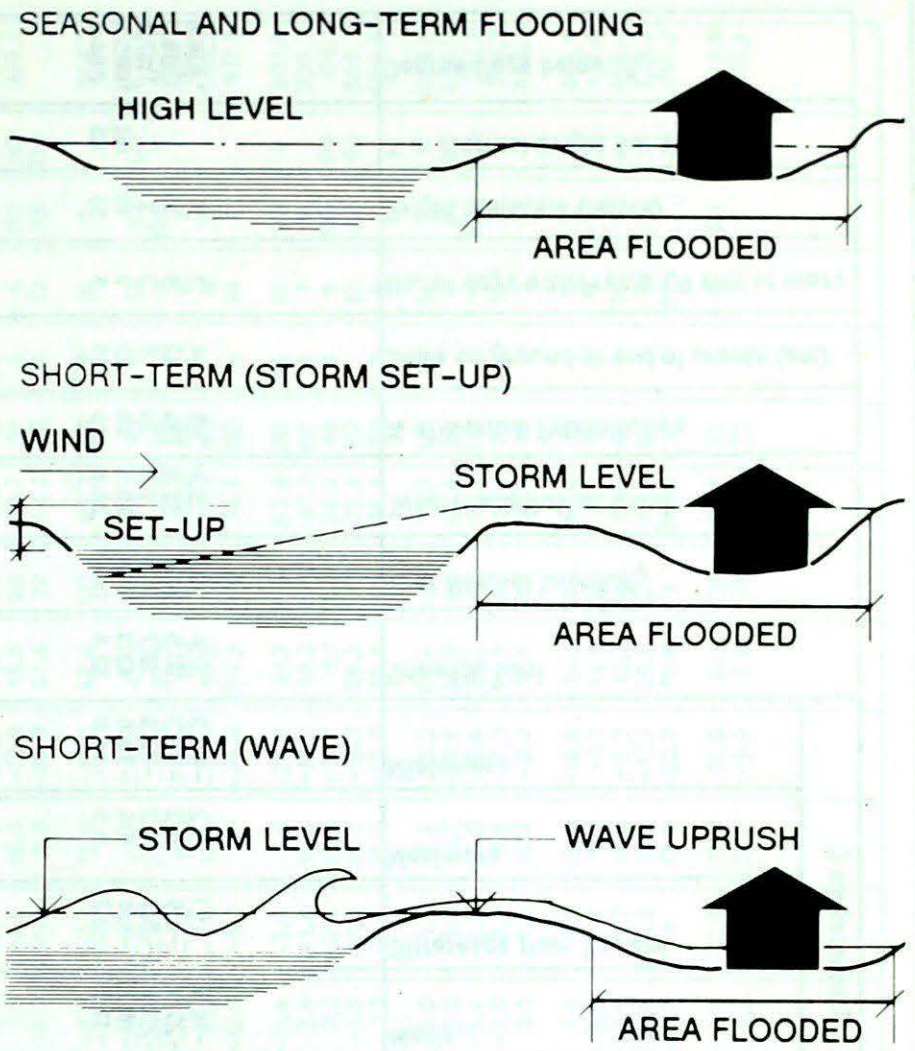
SURGES AND WAVES DURING WINTER STORMS ON THE GREAT LAKES

Lake	Max storm surge in m	Remarks
Erie	1.7-2.5	Eastern End
St. Clair	1	South and Eastern
Huron	1-1.5	Mainly South
Georgian Bay	0.5 - 1	30 Thousand Islands to Owen Sound
	Wave Height in m	
Erie	10	Deep water waves approaching shorelines
St. Clair	4	
Huron	10	
Georgian Bay	7-8	

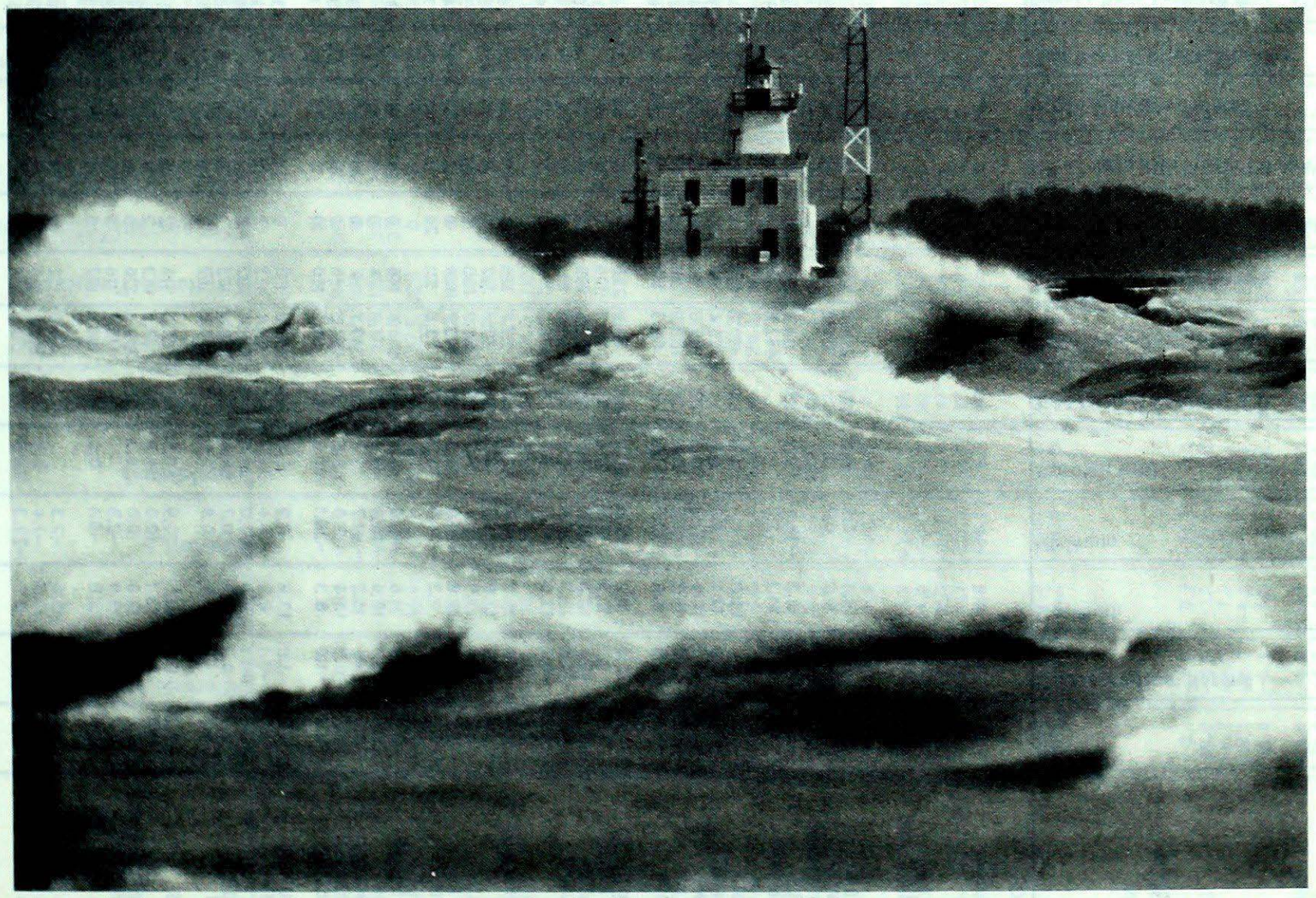
development of contingency plans, estimates have been prepared of the temporary increase in water level (storm surge) and expected wave heights during a normal or typical extreme winter storms. These are the kind of storms which can be expected as the most severe for a particular lake in each winter. The figures of previous table are intended to serve as a rough guide to the conditions possibly occurring this winter.

Some further words about waves

The wave heights in the previous table are the waves which would be produced in deep water. These should not be construed as the waves which would directly impact a shoreline. When large waves approach a shoreline, they will commence breaking when their height is about 3/4 of the water depth. During a storm the width of the breaker zone increases and the wave reaching any depth within this zone will have a height about 80% of the depth at that time. This depth will be the sum of the mean or still water depth and any change in depth arising from wind-set or the storm surge. Shoreline damage is the result of a combination of higher than normal levels, the greater waves these sustain, and increased erosion during these events.



TYPES OF FLOODING ON THE GREAT LAKES



Waves appear to be engulfing Port Colborne Lighthouse - Photo - Toronto Star

NOVEMBER 1986

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	5.4	-0.2	13.5	-3.3	0.8	14	244.0	127	0	18	70	96	377.1
ALERT BAY	5.8	0.1	12.2	0.7	0.0		375.3	176	0	23	X		360.3
AMPHITRITE POINT											X		
BLUE RIVER	-2.2	0.1	9.3	-18.4	90.9	160	110.2	147	45	15	36	77	MSG
BULL HARBOUR	6.7	0.6	14.1	-2.3			462.8	171	0	25	X		338.8
CAPE SCOTT			13.3		0.8	19	427.8	129	0	25	X		
CAPE ST.JAMES	7.7	0.8	12.9	1.0	0.0		176.4	94	0	25	46	*	309.6
CASTLEGAR	1.9	0.2	10.4	-12.3	34.2	113	80.3	99	0	12	70	122	482.4
COMOX	5.9	0.6	14.2	-1.3	1.8	22	188.9	98	0	17	X		363.3
CRANBROOK	-2.6	-0.8	8.4	-20.2	51.8	221	60.3	181	7	13	61	*	620.2
DEASE LAKE	-11.1	-2.6	6.2	-29.0	88.2	254	69.9	238	38	14	48	79	871.4
ETHELDA BAY	5.3	0.1	12.5	-2.6	12.4	121	512.1	129	0	24	X		368.8
FORT NELSON	-17.7	-5.7	7.3	-31.5	26.0	91	22.6	99	29	7	79	*	1072.0
FORT ST.JOHN	-9.3	-3.3	12.3	-26.9	28.9	93	31.8	101	8	12	X		817.7
HOPE	4.5	-0.2	13.0	-7.0	9.8	58	479.2	214	0	21	25	85	405.2
KAMLOOPS	1.3	-0.3	16.8	-13.2	32.0	275	27.7	125	0	7	94	133	501.9
KELOWNA	1.0	-0.1	13.0	-14.2	14.6	114	30.8	127	0	8	75	130	510.6
LANGARA	6.2	0.6	13.5	-0.4	4.2	73	258.9	130	0	28	X		352.5
LYTTON	2.7	0.1	13.8	-11.9	23.6	107	92.7	129	0	10	62	95	459.9
MACKENZIE	-7.0	-3.1	7.2	-24.5	73.2	147	73.8	121	26	17	43	89	749.7
MCINNES ISLAND	6.9	0.9	11.6	-2.0	1.4	23	450.6	146	0	24	X		333.2
PENTICTON	3.1	0.1	13.5	-10.9	6.3	81	17.8	74	0	6	80	133	
PORT ALBERNI	6.0	*	15.2	-1.7		*	357.7	*	0	17	31	*	359.5
PORT HARDY	6.1	0.8	13.4	-2.0	0.6	15	454.3	185	0	23	33	53	355.6
PRINCE GEORGE	-4.5	-1.6	8.3	-26.1	67.0	169	81.0	160	10	12	55	84	675.1
PRINCE RUPERT	4.8	1.0	13.8	-7.2	12.8	145	354.0	131	0	24	28	56	395.0
PRINCETON	-1.0	-0.1	8.8	-16.4	34.0	145	65.4	173	3	12	71	*	MSG
QUESNEL	-2.9	-1.1	9.0	-22.0	54.0	188	78.4	182	8	12	X		626.0
REVELSTOKE	0.9	0.2	10.7	-11.7	68.4	133	138.4	163	1	19	34	81	514.0
SANDSPIT	6.7	1.2	15.4	-0.9	0.4	7	294.8	162	0	28	42	65	338.5
SMITHERS	-3.2	-0.9	11.5	22.9	80.5	209	67.8	116	12	14	2	4	634.4
TERRACE	0.8	0.5	13.1	-10.0	89.0	182	187.5	103	2	19	25	44	509.9
VANCOUVER HARBOUR	6.8	0.0	12.6	0.0	0.2	7	269.3	126	0	18	X		335.7
VANCOUVER INT'L	6.2	0.3	13.9	-2.3			175.2	116	0	19	65	93	354.4
VICTORIA GONZ. HTS	7.4	0.2	13.8	-0.1	0.0		160.1	167	0	16	70	84	319.0
VICTORIA INT'L	6.4	0.4	15.6	-2.3			160.0	122	0	12	64	82	349.2
VICTORIA MARINE	6.4	-0.2	12.6	-2.4	0.0		287.4	154	0	18	X		348.7
WILLIAMS LAKE	-3.3	-0.7	9.3	-23.3	38.5	124	50.8	161	7	10	80	109	639.2

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													
BURWASH	-14.5	-1.1	9.2	-40.3	17.4	121	8.4	46	14	3	X		974.6
DAWSON	-25.0	-6.9	0.2	-46.3	61.5	243	38.6	155	42	8	X		1288.2
MAYO	-20.9	-5.7	0.2	-42.9	15.7	61	7.8	31	8	3	X		1167.6
WATSON LAKE	-18.2	-4.4	6.6	-38.6	42.3	113	30.6	96	22	9	61	142	1085.8
WHITEHORSE	-11.5	-2.7	8.5	-34.0	32.6	136	26.8	135	15	9	50	85	884.6
NORTHWEST TERRITORIES													
ALERT	-27.8	-1.2	-10.1	-39.7	26.2	301	9.3	112	35	4	0		1372.3
BAKER LAKE	-25.5	-5.2	-13.2	-35.1	26.9	155	22.2	135	34	7	77	151	1305.5
CAMBRIDGE BAY	-27.3	-3.5	-16.5	-36.0	8.2	91	7.5	97	20	1	29	305	1358.7
CAPE DYER	-21.3	-6.6	-8.5	-36.4	49.2	72	26.8	45	32	8	X		1178.4
CAPE PARRY	-23.0	-4.7	-10.8	-35.0	12.6	83	6.1	63	13	2	X		1228.2
CLYDE	-23.6	-6.2	-11.5	-39.5	3.2	19	3.2	21	32	0	0		1247.6
COPPERMINE	-23.7	-4.0	-11.2	-38.0	21.4	141	13.0	90	30	5	21	172	1250.8
CORAL HARBOUR	-21.5	-4.0	-9.3	-31.5	7.1	39	7.1	39	8	1	49	86	1184.3
EUREKA	-32.3	-0.8	-15.3	-43.6	3.8	126	3.0	120	15	2	0		1509.8
FORT RELIANCE	-18.1	-4.1	-2.4	-30.3	15.2	59	8.8	40	15	4	X		1081.3
FORT SIMPSON	-19.6	-4.0	-1.7	-32.6	14.6	57	13.4	49	15	4	44	85	1130.2
FORT SMITH	-16.9	-5.3	0.1	-33.4	30.1	104	18.6	71	21	6	52	119	1056.1
FROBISHER BAY	-17.3	-4.3	-21.1	-30.2	15.0	40	13.8	40	15	5	22	48	1057.7
HALL BEACH	-23.1	-1.6	-9.4	-36.7	10.5	81	6.8	53	17	2	X		1231.2
HAY RIVER	-16.7	-5.4	-0.2	-32.0	22.1	56	21.5	58	22	10	X		1039.9
INUVIK	-26.0	-5.3	-9.0	-41.1	12.6	55	8.8	49	18	5			1318.6
MOULD BAY	-28.2	-1.6	-14.4	-44.0	7.4	168	6.2	167	30	2	0		1387.2
NORMAN WELLS	-23.6	-5.4	-5.4	-40.6	18.0	84	18.0	86	12	5	40	123	1246.8
POND INLET	-28.7	-5.1	-16.6	-37.6	5.2	17	3.4	23	11	2	X		1400.7
RESOLUTE	-27.1	-2.6	-15.9	-36.1	3.4	56	3.4	60	10	0	0		1353.0
SACHS HARBOUR													
YELLOWKNIFE	-18.0	-3.9	-1.2	-31.3	12.4	41	7.6	31	6	2	76	182	1105.8
ALBERTA													
BANFF	-5.4	-1.5	11.5	-25.5	72.2	224	50.0	160	28	14	X		
BROOKS	-5.8	-2.8	14.0	-26.0	12.5	82	15.4	101	0		90	*	
CALGARY INT'L	-5.4	-2.7	16.7	-22.0	14.2	87	11.7	92		4	142	114	701.5
COLD LAKE	-10.5	-4.3	9.8	-25.5	33.0	155	28.5	140	12	5	81	85	853.6
CORONATION	-9.0	-4.1	13.4	-26.9	23.8	149	18.2	121	8	4	105	81	808.4
EDMONTON INT'L	-8.9	-3.4	11.4	-26.9	22.7	126	23.8	142	8	8	107	104	806.8
EDMONTON MUNI.	-7.8	-4.1	11.3	-24.3	24.2	157	27.2	173	2	8	117	109	774.6
EDMONTON NAMAO	-8.5	-3.6	10.9	-24.1	24.2	144	20.9	116	5	8	X		794.5
EDSON	-9.3	-2.9	13.8	-32.2	51.3	200	43.1	213	16	12	94	100	818.0
FORT CHIPEWYAN	-16.1	-5.2	3.0	-32.0	19.0	76	19.0	81	18		X		

NOVEMBER 1986

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									
FORT MCMURRAY	-13.6	-5.4	6.3	-27.7	40.8	140	32.3	128	28	7	57	68	947.3
GRANDE PRAIRIE	-9.6	-3.6	14.0	-30.3	32.1	122	29.5	106	9	11	89	*	827.2
HIGH LEVEL	-18.5	-7.1	8.4	-38.7	42.2	145	35.9	128	35	10	63	89	1093.8
JASPER	-6.0	-2.1	11.0	-27.5	35.2	143	26.8	90	23	8	71	*	721.4
LETHBRIDGE	-4.2	-3.4	14.4	-27.5	30.6	162	37.5	223	0	8	108	92	666.2
MEDICINE HAT	-4.7	-3.1	13.9	-24.5	15.2	107	23.3	159	0	5	100	89	680.0
PEACE RIVER	-11.8	-3.7	10.1	-30.3	21.7	98	23.7	118	8	10	X		893.2
RED DEER	-7.8	-3.2	12.7	-28.5	12.7	84	11.9	78	2	3	X		772.4
ROCKY MTN HOUSE	-8.0	-4.4	13.0	-28.6	22.0	111	13.1	73	5	8	X		779.6
SLAVE LAKE	-9.9	-3.6	10.1	-26.3	21.2	90	28.0	117	7	9	80	80	837.7
SUFFIELD	-4.9	-2.6	13.3	-24.0	10.1	72	14.2	97		5	93	76	683.8
WHITECOURT	-9.0	-2.7	10.5	-28.8	26.6	121	23.4	99	7	6	X		810.6
SASKATCHEWAN													
BROADVIEW	-8.9	-3.4	7.9	-25.5	9.6	64	9.6	71	0	*			806.2
COLLINS BAY	-18.6	-6.1	-3.2	-30.1	21.0	38	16.3	37	16	6	80	*	1097.7
CREE LAKE	-15.4	-5.0	1.5	-30.1	21.1	75	12.1	57	15	5	71	112	1003.8
ESTEVAN	-6.2	-2.6	12.4	-22.5	13.4	89	14.2	87		5	83	69	725.1
HUDSON BAY	-11.6	-4.5	5.6	-31.3	22.6	80	20.0	80	11	6	91	*	887.6
KINDERSLEY	-9.1	-3.9	11.8	-26.0	12.8	125	13.2	105	5	4	X		811.5
LA RONGE	-14.2	-6.3	6.0	-31.0	48.0	136	38.5	145	20	12	X		966.4
MEADOW LAKE	-13.0	-6.4	9.6	-33.8	27.8	147	27.4	127	13	6	65	*	928.6
MOOSE JAW	-6.0	-2.4	11.0	-22.0	9.8	52	13.1	78	TR	*	79	83	723.4
NIPAWIN	-11.2	*	7.0	-26.7	28.6	*	17.1	*	9	6	78	*	877.0
NORTH BATTLEFORD	-9.5	-3.7	10.9	-27.0	31.3	228	26.8	187	6	7	X		826.4
PRINCE ALBERT	-10.7	-3.5	10.0	-30.3	14.2	82	16.0	94	7	6	91	108	861.2
REGINA	-8.1	-3.0	11.2	-23.7	6.7	47	7.3	54	TR	4	79	75	784.2
SASKATOON	-9.0	-3.3	9.7	-25.3	12.6	96	13.0	88	4	6	X		809.6
SWIFT CURRENT	-6.7	-3.0	8.6	-24.2	8.1	54	9.5	60	TR	3	84	76	739.8
URANIUM CITY											X		
WYNYARD	-9.5	-3.8	7.3	-25.6	9.4	50	9.4	48	1	5	107	113	825.0
YORKTON	-9.7	-3.8	6.2	-24.8	9.6	49	8.8	43		4	98	108	799.8
MANITOBA													
BRANDON	-9.1	-3.4	8.2	-25.1	11.1	66	11.1	61		4	X		849.4
CHURCHILL	-19.0	-6.9	-1.9	-28.8	11.8	28	9.9	25	6	4	124	250	1108.6
DAUPHIN	-9.2	-4.0	7.2	-25.5	26.3	109	28.6	113		3	97	103	814.5
GILLAM	-18.7	-6.9	-4.5	-31.7	13.4	30	6.4	20	10	3	X		1101.6
GIMLI	-9.9	-5.3	5.5	-24.7	54.6	190	54.3	182	14	8	119	125	835.0
ISLAND LAKE	-14.4	-6.0	-0.7	-27.9	24.1	48	23.6	59	23	9	X		973.4
LYNN LAKE	-19.0	-6.7	-1.6	-33.3	12.4	33	14.8	45	11	7	*		110.5
NORWAY HOUSE	-15.1	*	1.7	-29.9	27.4	*	25.0	*	17	8	*	*	991.8
PILOT MOUND											X		
PORTAGE LA PRAIRIE	-8.4	-4.3	8.2	-24.3	51.7	449	44.6	151	3	7	X		792.6

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									
THE PAS	-12.9	-5.4	4.3	-27.8	25.4	79	17.6	61	11	6	80	119	927.5
THOMPSON	-19.2	-7.3	-2.5	-36.3	14.1	41	13.8	44	11	3			115.7
WINNIPEG INT'L	-9.6	-5.1	6.4	-26.3	47.4	216	48.4	192	15	7	107	117	829.2
ONTARIO													
ATIKOKAN	-7.5	-2.9	6.8	-28.3	49.0	119	45.8	112	11	13	86	119	764.9
BIG TROUT LAKE	-15.9	-6.9	-1.0	-29.4	57.8	*	57.6	139	47	11	89	*	1016.5
EARLTON	-5.3	-2.8	11.8	-24.0	45.3	115	44.4	62	2	10	X		679.1
GERALDTON	-9.4	-3.9	7.4	-28.9	56.8	101	56.2	91	16	15	X		821.6
GORE BAY	0.6	-1.3	13.5	-12.3	26.2	102	27.5	33		9	X		520.7
HAMILTON RBG	2.7	-1.8	19.2	-10.0	22.0	297	73.6	111	0	10	124	*	
HAMILTON	1.5	-1.9	17.5	-11.9	24.8	215	64.5	94	0	9	X		496.2
KAPUSKASING	-8.0	-3.6	8.9	-25.0	67.2	109	63.1	78	16	17	X		780.6
KENORA	-8.4	-3.8	3.8	-23.0	55.1	147	59.5	147	22	13	X		806.0
KINGSTON	2.1	-1.3	13.5	-11.0	19.8	137	74.6	88	0	11	111	142	476.9
LANSDOWNE HOUSE	-13.7	-6.3	1.3	-32.2	58.2	122	52.6	112	23	8	X		953.3
LONDON	1.5	-1.6	18.0	-12.9	16.6	68	50.7	59	0	6	110	147	497.2
MOOSONEE	-9.3	-4.8	4.3	-26.3	37.4	79	43.2	65	19	12	65	126	
MOUNT FOREST													
MUSKOKA	-1.0	-2.1	12.8	-16.0	49.4	122	63.7	63	0	16	X		564.2
NORTH BAY	-3.3	-2.3	12.0	-19.7	42.2	123	54.2	62	5	12	82	125	637.6
OTTAWA INT'L	-0.5	-1.7	13.8	-11.8	22.8	100	46.8	60	0	9	106	*	552.3
PETAWAWA	-1.7	-1.6	12.7	-17.0	18.1	95	32.3	49		8	X		592.7
PETERBOROUGH	0.3	-1.8	16.4	-12.4	16.8	105	37.4	53		8	X		508.2
PICKLE LAKE	-12.7	-5.1	2.1	-29.9	109.5	225	74.6	152	41	10	X		917.5
RED LAKE	-11.4	-5.6	1.9	-29.8	91.7	273	83.8	210	38	10	98	*	881.6
ST. CATHARINES	2.9	-1.8	18.5	-10.2	16.2	197	67.2	107	0	7	X		235.3
SARNIA	2.2	-2.0	18.8	-10.7	9.1	56	38.5	49	0	4	110	119	476.1
SAULT STE. MARIE	-1.0	-1.7	15.3	-15.1	58.5	141	70.9	82		13	60	93	569.3
SIMCOE	1.7	-1.9	18.0	-13.0	19.4	119	65.0	82	0	9	X		488.8
SIOUX LOOKOUT	-9.0	-3.7	4.4	-26.2	64.4	141	73.7	147	19	14	X		1075.5
SUDBURY	-3.0	-1.8	11.7	-20.4	28.9	90	42.6	54		9	81	104	630.2
THUNDER BAY	-5.4	-2.8	10.0	-19.4	24.2	81	62.7	118		9	105	121	701.2
TIMMINS	-7.0	-3.2	9.5	-27.3	59.9	98	62.1	78	7	16	X		749.2
TORONTO	3.5	-1.4	16.2	-8.2	14.4	194	52.0	76	0	7			436.7
TORONTO INT'L	1.6	-1.7	18.8	-10.8	14.2	177	44.4	70	0	5	X		492.4
TORONTO ISLAND	3.8	-0.8	15.1	-7.7	13.0	220	51.1	79	0	7			427.4
TRENTON	1.5	-1.7	14.9	-3.3	12.2	93	59.8	69	0	10	X		492.4
WATERLOO-WELL	0.4	-2.2	16.5	-11.7	28.0	195	62.6	86	0	8	X		528.2
WAWA	-4.3	*	13.5	-22.3	76.8	*	110.8	*	7	20		*	667.2
WIARTON	1.4	-1.5	17.0	-10.0	31.1	78	25.3	26	0	6	63	104	493.9
WINDSOR	3.2	-1.2	20.7	-9.9	9.0	78	47.4	72	0	7	X		445.5

NOVEMBER 1986

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	-5.2	-3.2	12.1	-19.7	45.3	95	58.1	79	5	13	X		694.7
BAIE COMEAU	-5.4	-3.6	5.0	-20.2	71.4	201	81.8	102	14	17	83	*	701.1
BLANC SABLON	-5.5	-5.1	4.2	-18.5	89.1	247	104.9	107	38	15	92	*	
CHIBOUGAMAU	-9.4	-4.0	6.6	-30.5	81.4	153	76.4	99	29	18	67	135	822.0
GASPE	-3.4	-3.2	9.6	-14.3	107.2	346	110.6	132	40	13	85	*	641.9
INUKJUAK	-13.0	-5.8	-2.5	-29.3	67.6	178	59.8	151	24	15	39	140	931.8
KUUJJUAQ	-15.1	-6.8	2.1	-28.1	20.4	56	18.6	46	15	9	96	185	96.3
KUUJJUARAPIK	-10.5	-5.6	2.8	-25.1	89.2	169	87.4	143	25	20	49	127	885.2
LA GRANDE RIVIERE	-11.7	*	3.1	-23.8	57.8	*	54.0	*	32	19	60	*	897.2
MANIWAKI	-2.4	-2.1	12.4	-15.9	28.6	110	38.4	51		14	87	132	610.4
MATAGAMI	-8.5	-3.3	8.9	-29.0	75.0	177	52.8	82	28	13	56	120	788.2
MONT JOLI	-3.1	-2.8	9.8	-16.3	48.9	137	112.1	150	3	16	69	90	633.0
MONTREAL INT'L	0.3	-1.7	16.2	-10.8	35.9	169	72.4	89		13	101	117	530.9
MONTREAL M INT'L	-1.3	*	14.4	-13.3	30.8	*	58.0	*	5	10	123	*	578.9
NATASHQUAN	-5.2	-4.1	5.9	-19.7	66.8	208	89.2	77	17	13	90	105	695.9
QUEBEC	-2.8	-2.6	12.0	-16.3	62.2	183	119.9	123	11	14	81	109	627.5
ROBERVAL	-4.9	-2.7	12.8	-22.0	31.3	65			32	11	98	*	886.0
SCHEFFERVILLE	-15.8	-6.8	1.2	-31.0	36.2	59	35.2	53	36	11	71	*	1014.6
SEPT-ILES	-6.8	-4.3	5.1	-23.5	64.9	127	83.8	83	20	13	93	99	744.7
SHERBROOKE	-2.0	-2.4	13.8	-16.5	68.4	185	100.0	110	14	15	64	*	600.6
STE AGATHE DES MONTS	-3.2	-1.7	12.7	-17.2	61.2	148	80.4	79	17	17	89	127	637.5
ST-HUBERT	-0.4	-2.2	14.0	-17.1	44.0	183	83.6	94		13	*		550.3
VAL D'OR	-6.3	-2.9	9.8	-28.2	60.8	126	57.1	72	17	17	65	109	728.1
NEW BRUNSWICK													
CHARLO	-4.0	-3.7	8.8	-17.6	78.0	210	84.3	100	58	12	79	84	660.2
CHATHAM	-2.5	-3.4	12.2	-14.1	61.8	235	101.6	99	15	12	82	82	614.3
FREDERICTON	-1.5	-2.9	13.4	-15.4	16.9	82			116	11	96	*	586.0
MONCTON	-1.1	-3.1	15.8	-16.2			112.0	101		11	95	98	
SAINT JOHN	-0.2	-2.5	12.2	-13.6	12.4	145	144.5	99	0	12	89	91	544.2

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	1.1	-2.8	18.6	-11.3	24.9	170	87.1	80	0	13	X		510.2
HALIFAX INT'L	1.0	-2.4	14.0	-10.9	33.2	278	160.1	104	0	15	*		511.2
SABLE ISLAND	5.4	-1.9	14.0	-4.3	0.4	12	217.6	159	0	15	73	103	376.6
SHEARWATER	2.2	-2.4	13.7	-10.5	22.8	292	144.7	101	0	13	98	90	471.9
SYDNEY	1.6	-2.2		-8.6	42.4	353	158.4	98	0	18	65	86	494.0
TRURO	0.5	-2.4	14.9	-12.6	23.6	182	93.6	80	0	11	80	95	527.6
YARMOUTH	3.1	-2.1	14.0	-9.0	14.4	225	114.8	85	0	12	90	101	448.1
PRINCE EDWARD ISLAND													
CHARLOTTETOWN	0.1	-2.8	14.4	-11.9	22.8	105	107.2	88	0	13	X		537.7
SUMMERSIDE	0.1	-2.9	13.2	-11.2	33.7	198	98.7	98	0	12	72	75	536.1
NEWFOUNDLAND													
BATTLE HARBOUR	-6.8	-6.2	4.8	-19.3	70.8	*	81.9	131	61	11	X		743.6
BONAVISTA	0.9	-2.5	10.7	-8.3	71.4	637	129.8	134	8	15	X		512.5
BURGEO	0.5	-2.7	9.7	-9.4	27.6	233	209.5	118		17	*		525.1
CARTWRIGHT	-6.9	-5.1	4.1	-17.6	77.3	166	70.9	88	50	10	89	127	746.5
CHURCHILL FALLS	-14.5	-6.6	0.9	-31.3	87.4	123	70.8	90	82	11	84	161	976.4
COMFORT COVE	-1.7	-3.6	1.9	-5.2	70.9	212	101.5	94	16	14	X		596.7
DANIEL'S HARBOUR	-2.2	-4.0	6.0	13.2	35.0	133	67.6	65	9	14	39	79	603.3
DEER LAKE	-2.1	-3.1	9.4	-15.8	63.6	183	90.2	83	13	15	X		595.1
GANDER INT'L	-1.4	-3.2	9.8	-12.3	111.8	351	138.7	129	27	16	82	123	582.3
GOOSE	-10.3	-6.5	5.5	-26.1	87.1	152	71.7	95	46	10	86	130	850.1
PORT-AUX-BASQUES	0.8	-2.4	9.4	-7.4	30.8	270	161.4	103	2	19	49	*	515.2
ST ANTHONY	-5.0	*	3.5	-15.3	131.8	*	137.2	*	49	23		*	686.4
ST JOHN'S	0.7	-2.7	12.8	-10.0	64.9	306	203.1	124	1	18	94	136	520.6
ST LAWRENCE	1.4	*	11.1	-8.3	38.7	*	244.8	*	0	20		*	
STEPHENVILLE	0.0	*	11.7	-7.8	45.5	*	133.1	*		15	46	84	540.0
WABUSH LAKE	-13.9	*	2.4	-33.1	82.1	*	61.0	*	59	12	95	173	961.8

AGROCLIMATOLOGICAL STATIONS — NOVEMBER 1986

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	5.2	-0.8	14.0	-3.5	7.2	344.8	163	0	20	62	40.0	2263.8
KAMLOOPS												
SIDNEY												
SUMMERLAND	2.3	-0.2	12.0	-11.0	5.0	20.0	79	0	13	81	17.7	2180.9
ALBERTA												
BEAVERLODGE	-9.0	-3.9	14.0	-31.0	34.0	41.0	153	6	9	76		1298.5
ELLERSLIE	-9.3	-4.4	11.2	-27.5	16.2	16.6	101	7	7	105	3.3	1323.9
FORT VERMILLION												
LACOMBE	-8.2	-3.8	13.0	-27.5	16.5	15.0	108	13	6	110	0.0	1261.9
LETHBRIDGE												
VAUXHALL												
VEGREVILLE	-9.9	-3.8	11.0	-28.0	15.3	20.9	143	10	8		3.2	1320.2
SASKATCHEWAN												
INDIAN HEAD	-8.2	-3.1	9.5	-24.5	9.6	8.0	47	TR	3		0.0	1575.0
MELFORT	-10.3	-3.4	9.0	-28.0	17.6	20.0	106	2	7	79	0.0	1495.5
REGINA	-8.8	-3.1	11.0	-27.0	6.8	9.6	71	1	3		0.0	1438.0
SASKATOON	-8.7	-3.2	9.5	-22.5	12.8	15.9	99	TR	5	84	0.5	1589.0
SCOTT	-9.9	-3.7	10.5	-26.0	26.3	21.8	158	11	4	85	0.0	1350.9
SWIFT CURRENT SOUTH	-6.0	-2.1	9.5	-24.5	4.8	6.5	50	0	4	74	1.8	1650.1
MANITOBA												
BRANDON	-8.1	-3.1	8.6	-24.6	10.2	12.2	61	1	5		0.0	1739.0
GLENLEA	-10.6	-5.7	6.5	-29.0	44.5	49.7	205	24	8	106	0.0	1619.2
MORDEN	-7.5	-4.0	9.0	-25.0	50.6	52.4	205	3	4	98	0.0	1935.0
ONTARIO												
DELHI	1.3	-2.4	17.5	-13.5	16.0	66.6	81	0	13	103	17.6	2188.7
ELORA	0.3	-1.6	14.9	-10.8		38.2	58					1810.5
GUELPH	0.3	-2.2	16.4	-11.6	2.2	50.0	67	0	8	102	9.3	1999.4
HARROW	3.3	-1.2	21.0	-10.0	0.0	73.6	110	0	8	112	29.6	2568.0
KAPUSKASING												
MERIVALE												
OTTAWA	-0.2	-1.8	14.1	-11.5	19.6	41.7	56	0	6	105	9.1	2038.9
SMITHFIELD	2.5	-0.5	17.0	-11.0	17.0	62.7	71	0	6		27.6	2195.3
VINELAND STATION	3.3	-1.8	18.3	-9.9	15.2	68.6	104	0	9	101	29.2	2278.0
WOODSLEE												
QUEBEC												
LA POCATIERE	-1.8	-2.2	11.0	-16.0	46.1	78.4	101	10	9	94		
L'ASSUMPTION	-0.8	-1.9	14.0	-19.0	40.2	78.0	94	3	13	111	6.0	1866.8
LENNOXVILLE												
NORMANDIN	-5.8	-2.9	12.5	-22.0	17.4	21.3	36	TR	7	99	2.2	1167.7
ST. AUGUSTIN												
STE CLOTHILDE	0.7	-1.2	18.5	-11.0	43.0	79.7	99	1	12	91	17.9	2026.3
NEW BRUNSWICK												
FREDERICTON												
NOVA SCOTIA												
KENTVILLE												
NAPPAN												
PRINCE EDWARD ISLAND												
CHARLOTTETOWN												
NEWFOUNDLAND												
ST. JOHN'S WEST												

AGRICULTURAL STATIONS

Environment Canada | Environnement Canada

Climatic Perspectives

Monthly review | DECEMBER | Vol. 8 1986

CLIMATIC HIGHLIGHTS

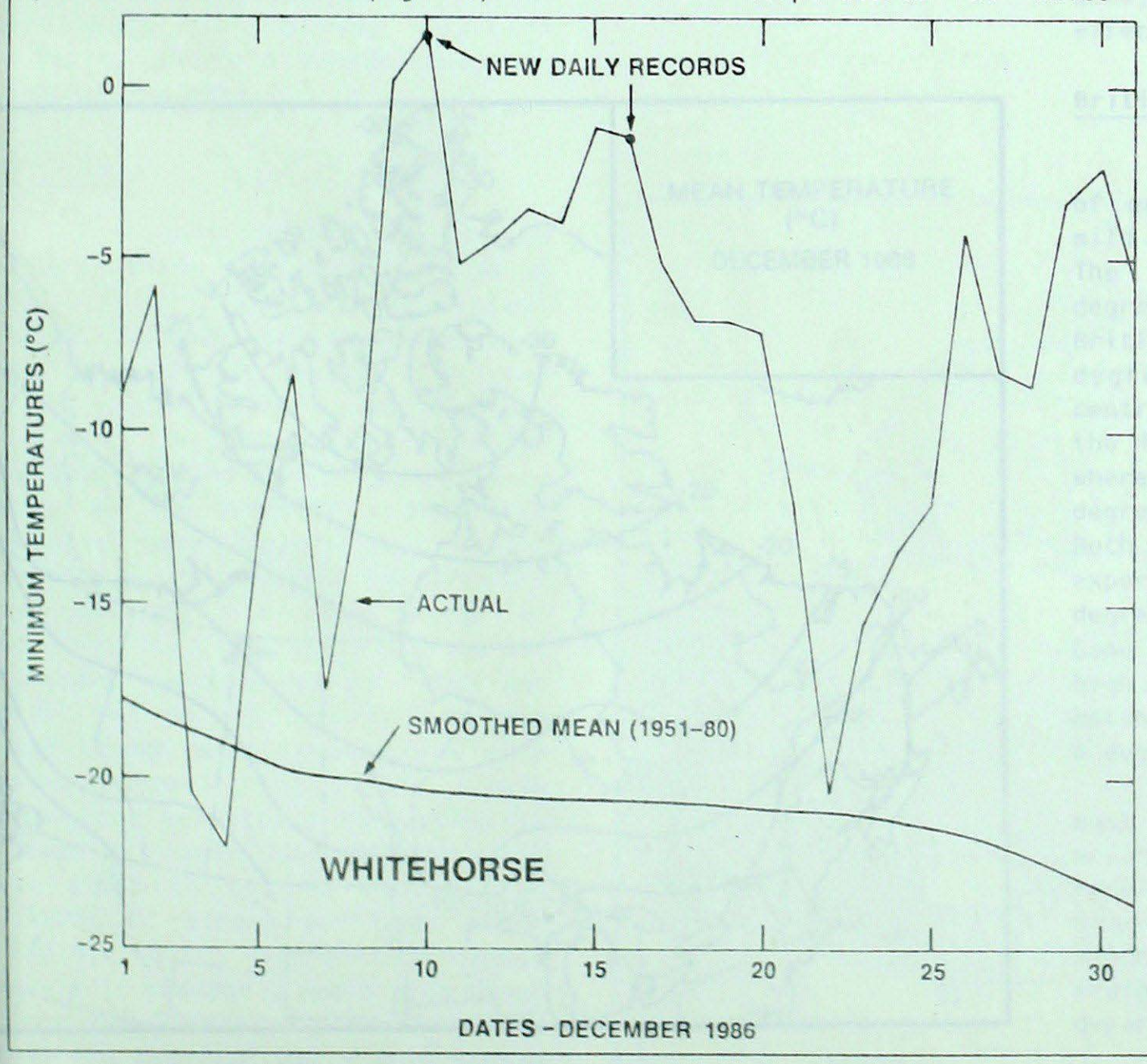
by
P. Scholefield, CCRM

Winter in Retreat as Mild Pacific Air Invades from the West

For most of central and western Canada December was almost a complete reversal of the unusually cold weather that dominated during November. Abnormally low 50 kPa heights in the North Pacific and a strong westerly current across the ocean carried mild Pacific air deep into the heart of Canada (see discussion of the upper atmospheric circulation on page 5B).

The areas with the largest positive monthly mean temperature anomalies were located in the lee side of the major mountain ranges in Alberta, northern B.C. and the southwestern Yukon. In these areas, the mild Pacific air was further warmed adiabatically as it descended to lower elevations.

The rather spectacular effect of this combined ocean and adiabatic air mass warming can be seen by examining the graph of daily minimum temperatures at Whitehorse. Note that minimum temperatures dropped below the seasonal mean on only two days, remained above freezing on two days and two daily high minimum temperatures records were set. Overall it was the 2nd warmest December (mean of -5.1°C) experienced in Whitehorse (warmest mean of -3.9°C occurred in 1943).

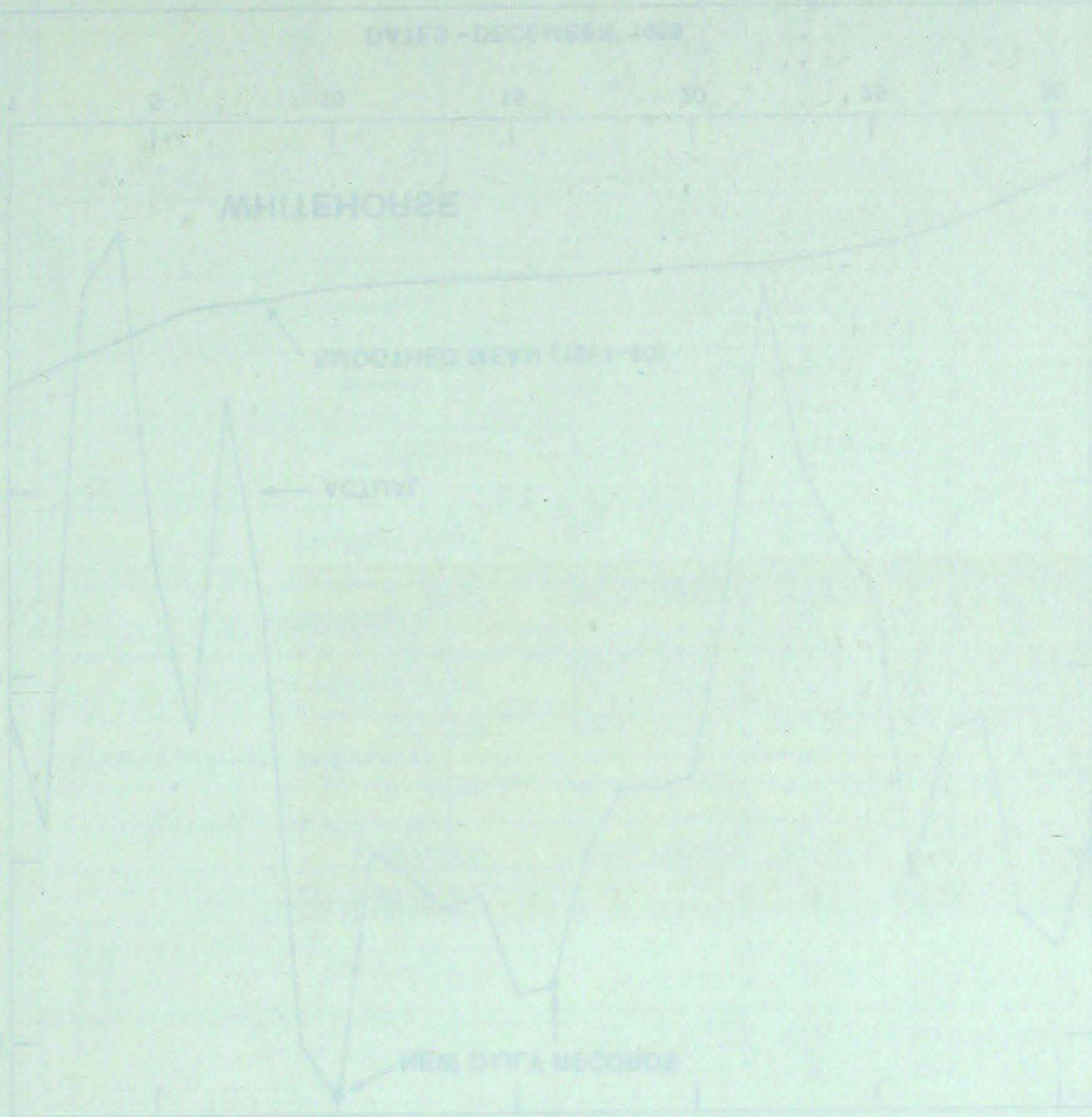


The mild air greatly depleted the snowcover across country. Valleys in southern B.C., southwestern Yukon, most of the southern Prairies and southern Ontario had less than 10 cm of snow on the ground at the end of December with many locations reporting no snowcover at all. Fortunately most major ski areas still have enough snow to maintain operations.

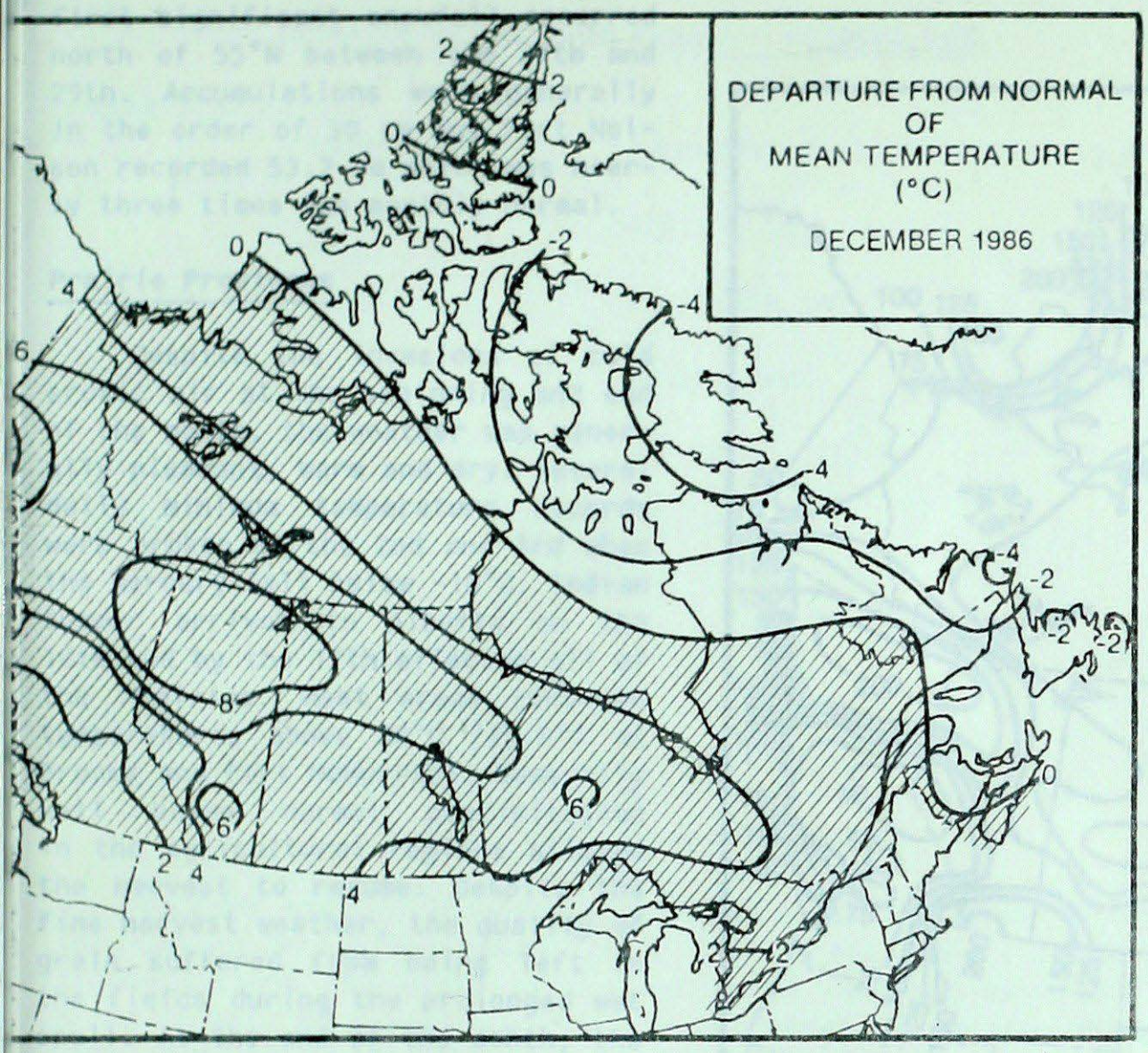
Cold Spell Continues in the East and North

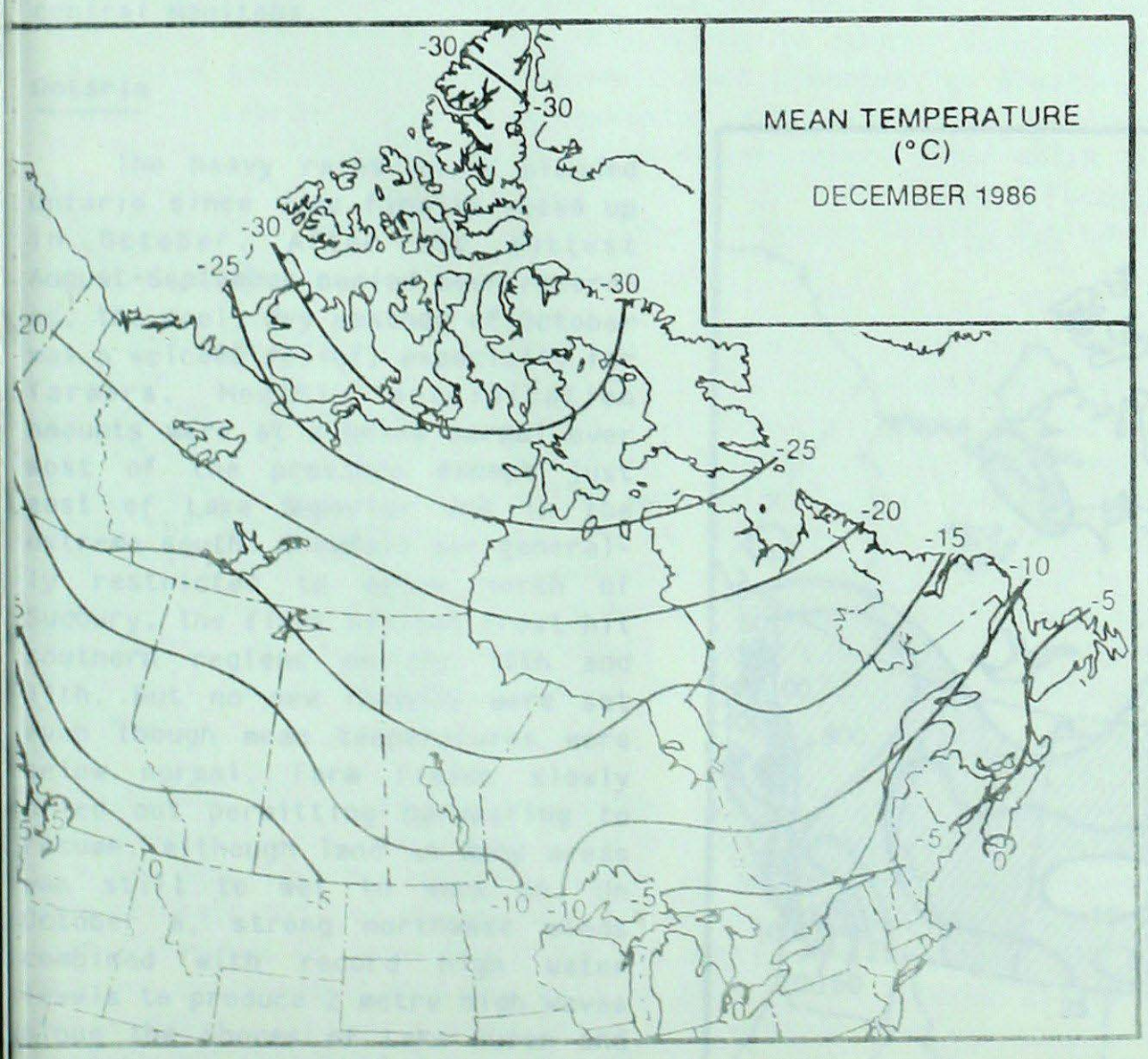
In the November monthly issue, the areas affected by a 6-month cold spell were delineated. The 50 kPa polar vortex has persisted over Baffin Island being further south and more intense than normal. As a result, the cold spell in the Arctic Islands has extended to 7 months. Further south, the intrusion of mild Pacific air terminated the cold spell in Quebec, northern Ontario and northeastern Manitoba. The cold spell has continued though in eastern New Brunswick, Prince Edward Island and Cape Breton, Nova Scotia.

Canada



EMPERATURE





ACROSS THE COUNTRY

Yukon and Northwest Territories

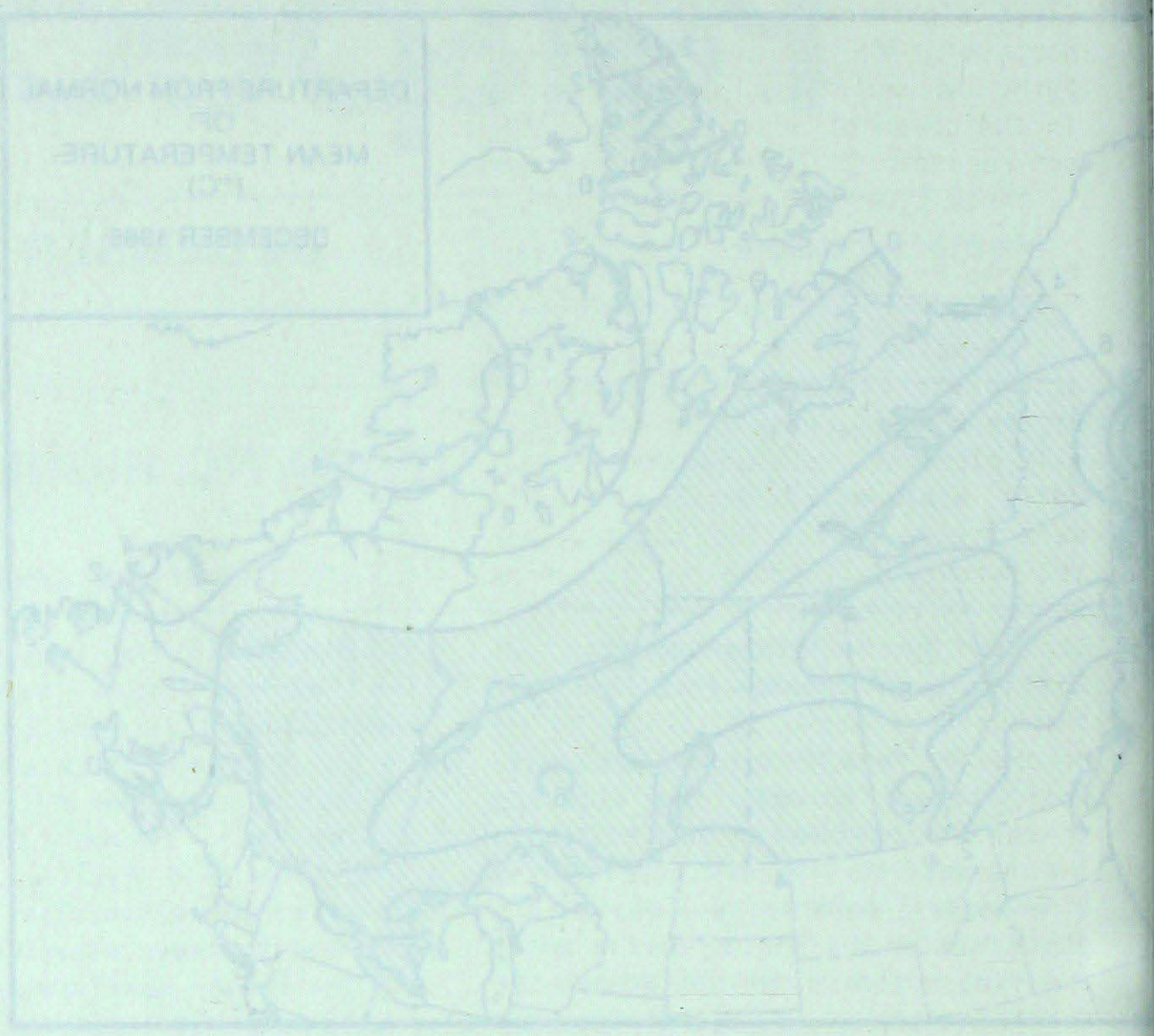
Record breaking warmth arrived over the Yukon and the Mackenzie Valley. The temperatures were 8 to 12 degrees above normal in the Yukon. A reading of 12.5 degrees at Burwash on December 9 was only half a degree shy from the all-time high for the Yukon for December. At Whitehorse, 9.5 degrees proved to be the highest maximum temperature for any December. In contrast, eastern Arctic continued to endure very cold weather. The temperatures were 2 to 4 degrees below normal over Baffin Island and Eureka experienced the coldest December temperature of -46 degrees.

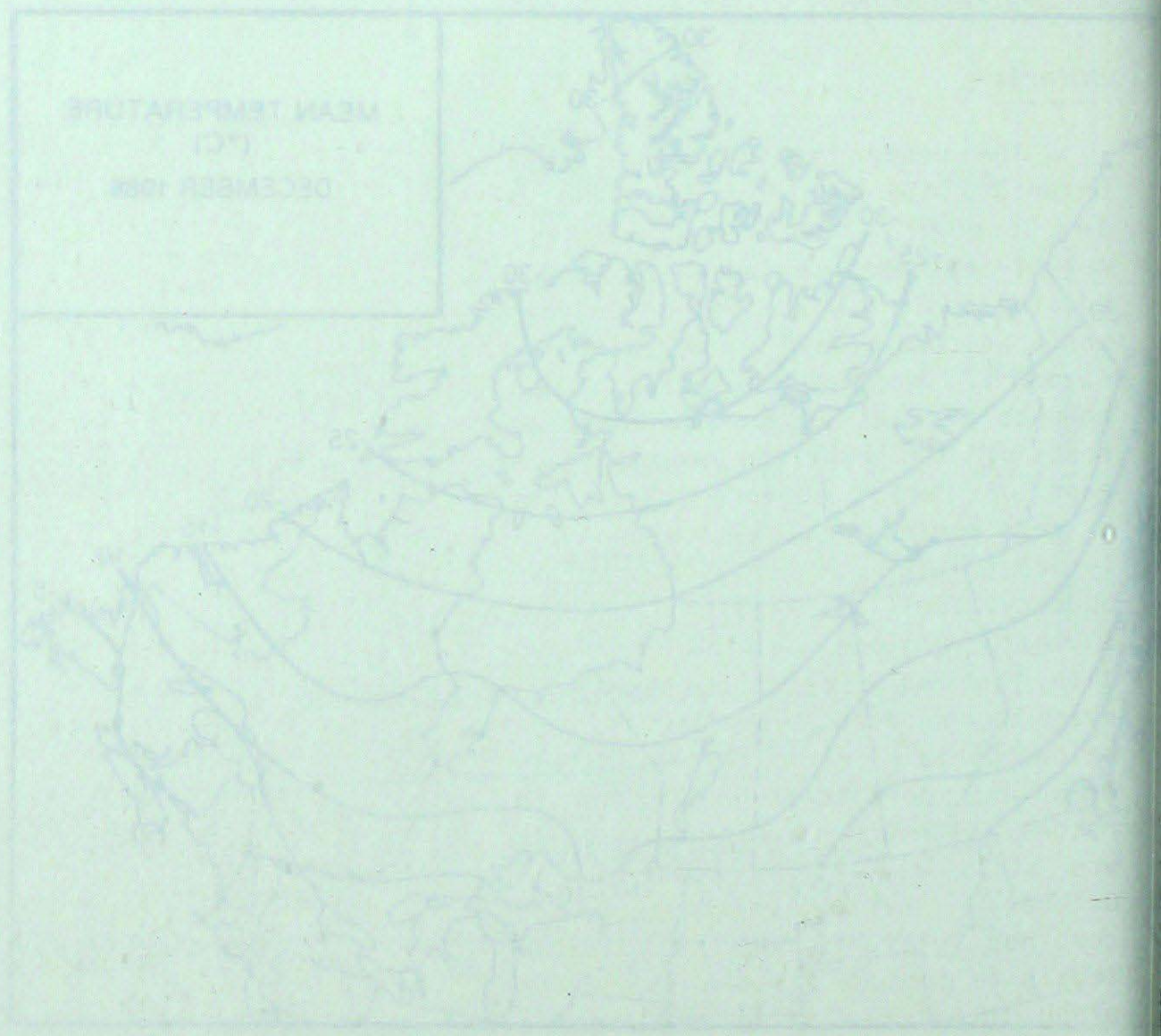
Snowfall was well below normal over western Arctic. At Whitehorse, 10 cm of snow was less than half the normal amount; however, some locations in eastern Arctic received up to 3 times their normal amounts. Trapping for fur in the Yukon was adversely affected by the lack of snow, snow sled could not be used effectively on scanty snow cover.

British Columbia

A persistent southwesterly flow of maritime air mass produced very mild December across the Province. The temperatures averaged about 2 degrees above normal in southern British Columbia and rose to 4 degrees above normal over the central areas. The northern third of the Province was particularly mild where the readings were 4 to 9 degrees above the long term average. Both Fort Nelson and Fort St. John experienced temperatures that were 8 degrees above normal. Cape Scott and Cape St. James tied their record high monthly values and Langara established a record for the month, 6 degrees.

Precipitation was light across most of the Province. Southeastern areas including the interior valley received less than their normal shares. However, above normal amounts fell over the south coastal regions, Comox had the highest departure from normal, 156 percent.

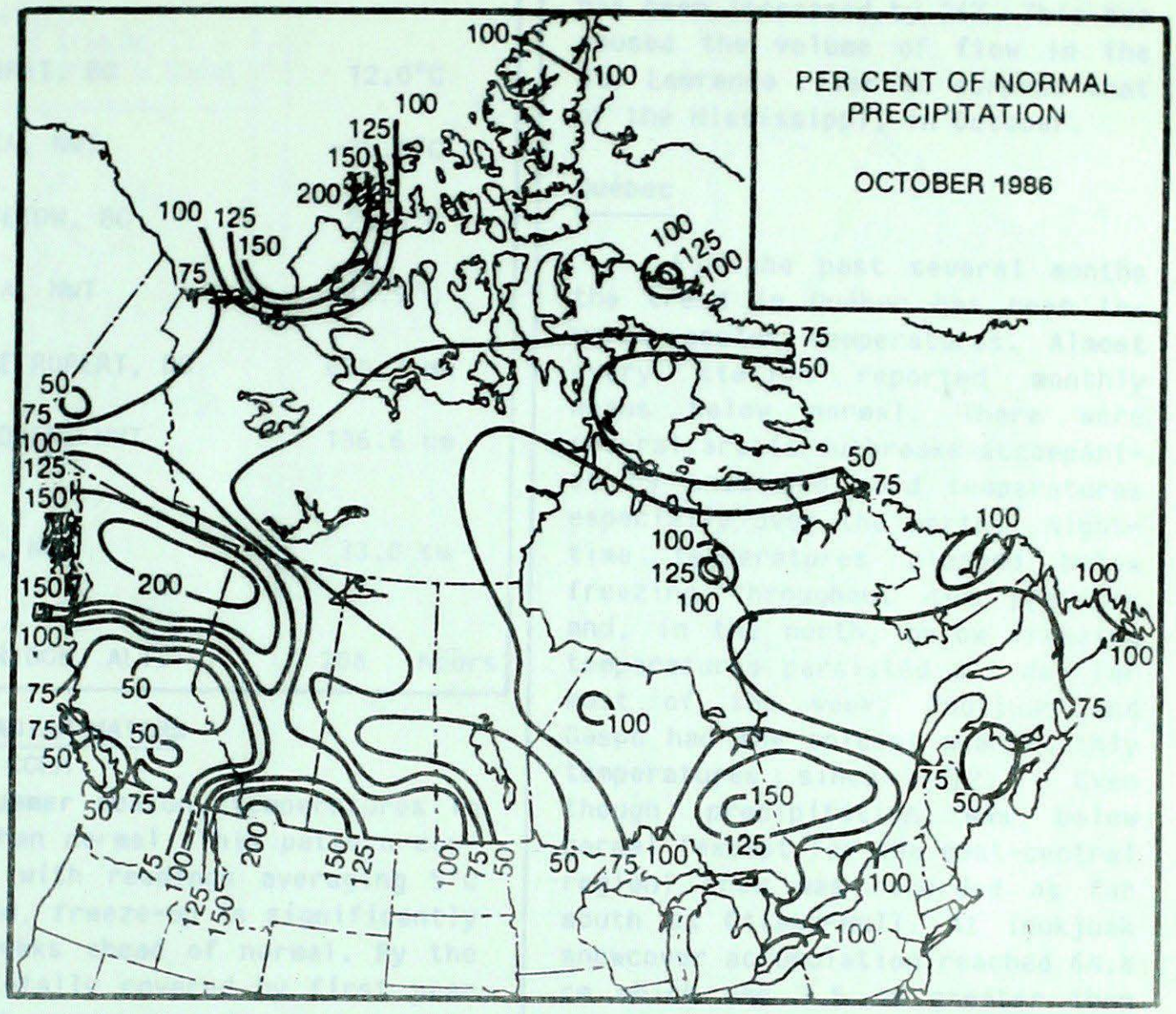




record of 19 days set in 1952. The first significant snowfall occurred north of 55°N between the 27th and 29th. Accumulations were generally in the order of 30 cm but Fort Nelson recorded 53.2 cm which was nearly three times the monthly normal.

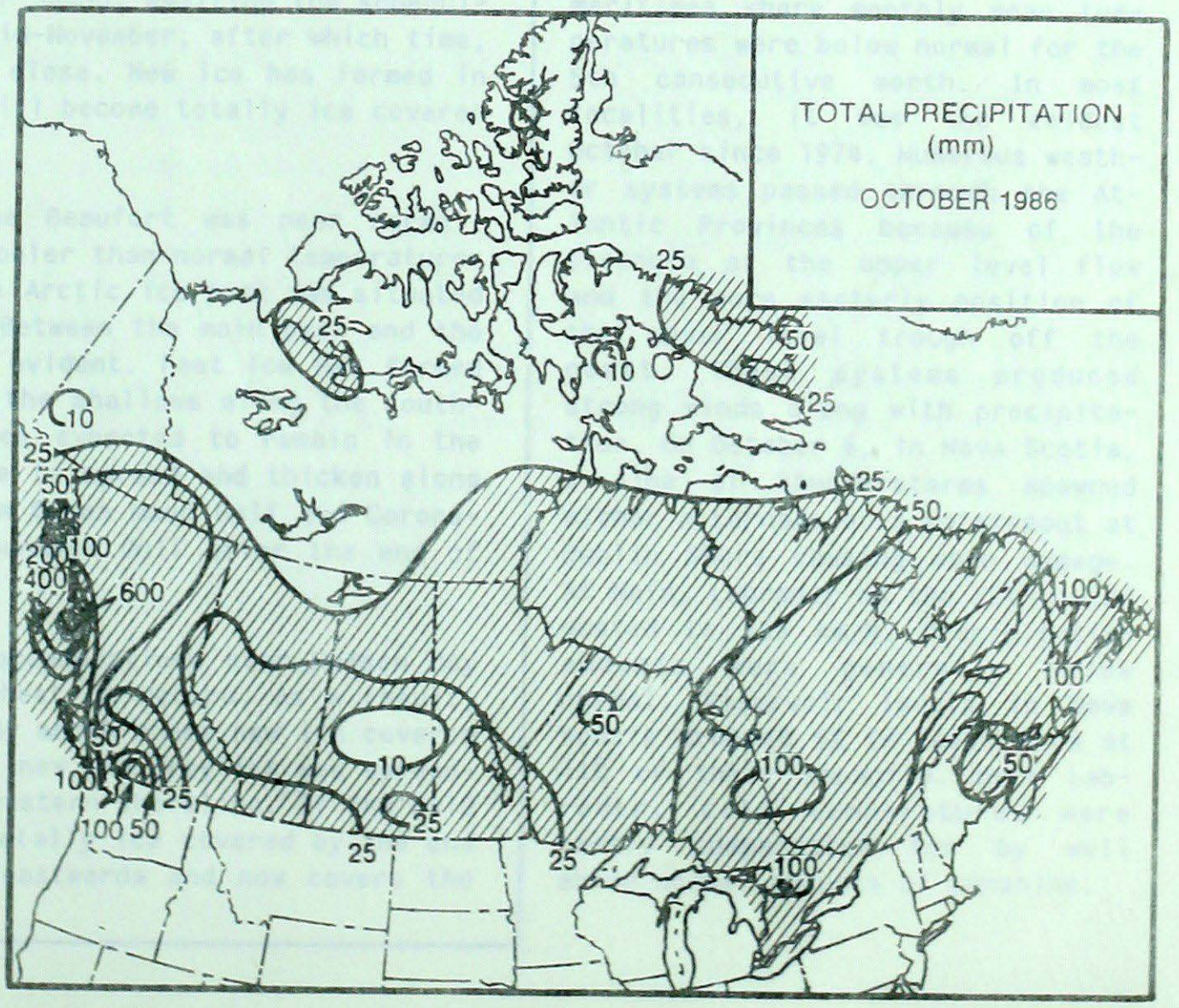
Prairie Provinces

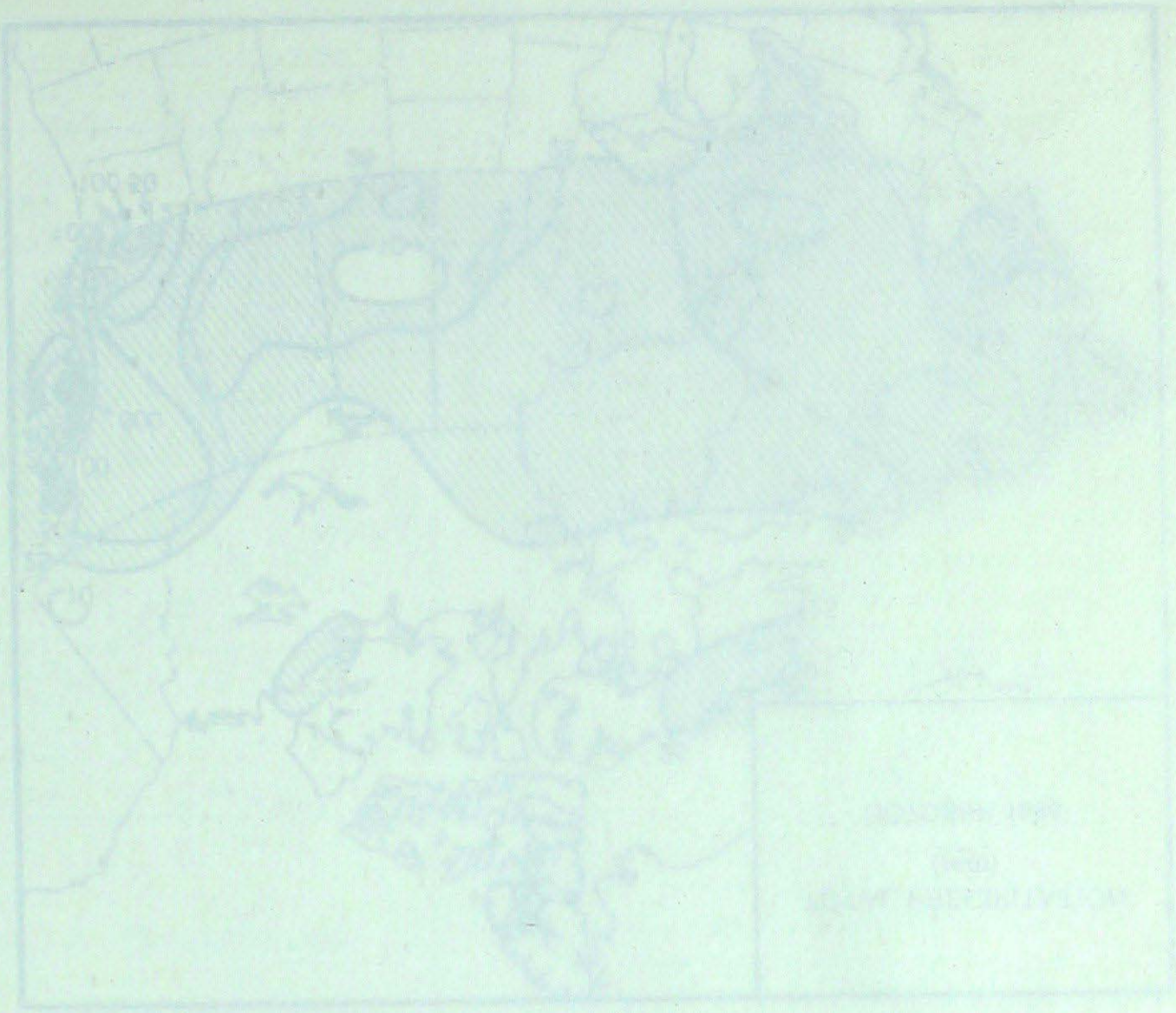
Despite the invasions of cold arctic air at the beginning and end of the month, the weather was generally pleasant, warm and dry. Several daily minimum temperature records were broken on the 2nd and 3rd when the mercury fell below -10°C. Indian Summer arrived in Alberta on the 10th and by the 12th affected all of the Prairies. Most areas recorded temperatures above 20°C (25.5°C at Brooks and Fort McMurray). Generally well below normal precipitation in the agricultural regions allowed the harvest to resume. Despite the fine harvest weather, the quality of grain suffered from being left in the fields during the prolonged wet spell. At the end of the month, the mercury plunged rapidly to -20°C and low daily temperature records became commonplace. Also the snowline moved southward to include southern Alberta, southern Saskatchewan and central Manitoba.

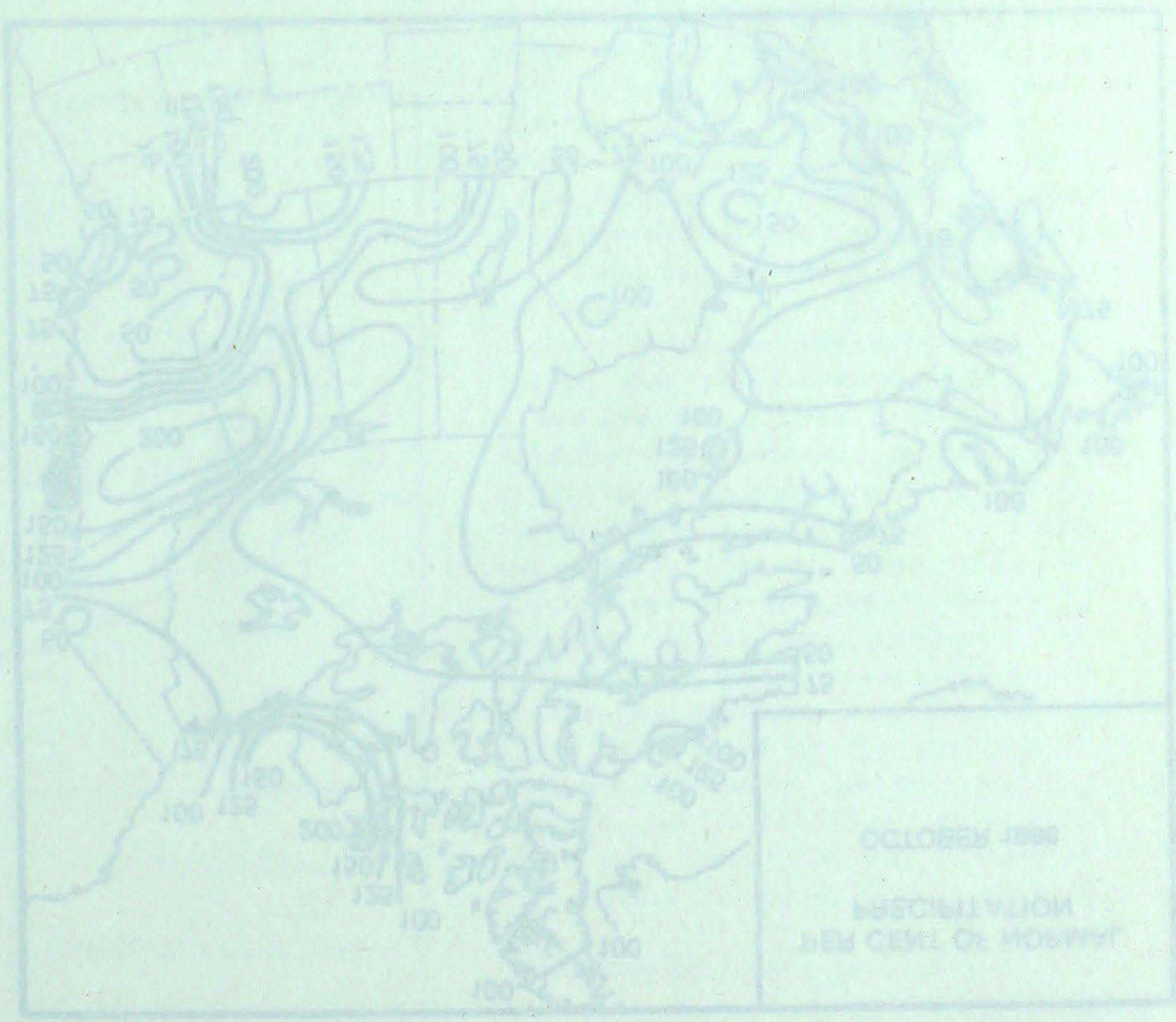


Ontario

The heavy rains which plagued Ontario since June finally eased up in October. After the wettest August-September period ever recorded, the cool, dry weather of October was a welcome relief, especially for farmers. Monthly precipitation amounts were at a below normal over most of the province except just east of Lake Superior and in the extreme south. Snowfall was generally restricted to areas north of Sudbury. The first killing frost hit southern regions on the 10th and 11th, but no new records were set even though mean temperatures were below normal. Farm fields slowly dried out permitting harvesting to resume, although land in many areas was still to wet to work on. On October 6, strong northwest winds combined with record high water levels to produce 2 metre high waves along the shores of Lake Huron and southern Georgian Bay. This caused considerable damage to lakefront







EXTREMES

CLIMATIC EXTREMES IN CANADA - OCTOBER 1986

MEAN TEMPERATURE:		
WARMEST	SANDSPIT, BC	12.0°C
COLDEST	EUREKA, NWT	-25.8°C
HIGHEST TEMPERATURE:	PRINCETON, BC	25.6°C
LOWEST TEMPERATURE:	EUREKA, NWT	-39.9°C
HEAVIEST PRECIPITATION:	PRINCE RUPERT, BC	674.7 mm
HEAVIEST SNOWFALL:	CAPE DYER, NWT	136.6 cm
DEEPEST SNOW ON THE GROUND ON OCTOBER 31st, 1986:	CLYDE, NWT	33.0 cm
GREATEST NUMBER OF BRIGHT SUNSHINE HOURS:	LETHBRIDGE, ALT.	208 hours

ICE CONDITIONS IN CANADIAN WATERS

Andy Radomski, CCRM

Eastern Arctic: Throughout the summer season, temperatures in the eastern Arctic have been cooler than normal. This pattern continued through the month of October, with readings averaging 5°C below normal. As a result of this trend, freeze-up is significantly more advanced, approximately 1 to 2 weeks ahead of normal. By the end of October, Lancaster Sound was totally covered by first year ice, as was most of Fox Basin. Old and second year ice had drifted into Barrow Strait and Viscount Melville Sound. The southern half of Baffin Bay was comprised of bergy water. If the cold temperature trend continues through November, pack ice, which now covers northern Baffin Bay should spread southwards to Hudson Strait shortly after the middle of month. Canada's most powerful ice breaker, the Louis St. Laurent, remains in Lancaster Sound, awaiting the scheduled arrival of the M.V. Arctic around mid-November, after which time, the 1986 Arctic shipping season will close. New ice has formed in the shallows of Frobisher Bay, which will become totally ice covered by mid-November.

Western Arctic: Freeze-up in the Beaufort was near normal, the combination of a mild summer and cooler than normal temperatures during the latter half of October. The Arctic ice pack was situated 120 km off the Tuktoyatuk Peninsula. Between the main pack and the coast, grey-white first year ice was evident. Fast ice has formed along the Tuktoyatuk Peninsula and in the shallows along the southern Arctic coastline. With temperatures expected to remain in the seasonal range, fast ice will continue to spread and thicken along the coast. The ice will consolidate in Queen Maud Gulf and Coronation Gulf by mid-November, and in Admundsen Gulf after the end of the month.

Hudson Bay: Freezing degree-day accumulations over Hudson Bay and Hudson Strait are amongst the highest on record. As a result, ice has developed rapidly this month. By month's end new ice covered the northern half of Hudson Bay, while new and grey ice was spreading southwards to James Bay along the western shoreline. If the cold weather continues Hudson Bay will be totally ice covered by the end of November. Ice has spread steadily eastwards and now covers the western two thirds of Hudson Strait.

homes, cottages and stores. In an effort to lower lake levels the outflow of water from Lake Ontario has been increased by 26%. This has caused the volume of flow in the St. Lawrence river to surpass that of the Mississippi, in October.

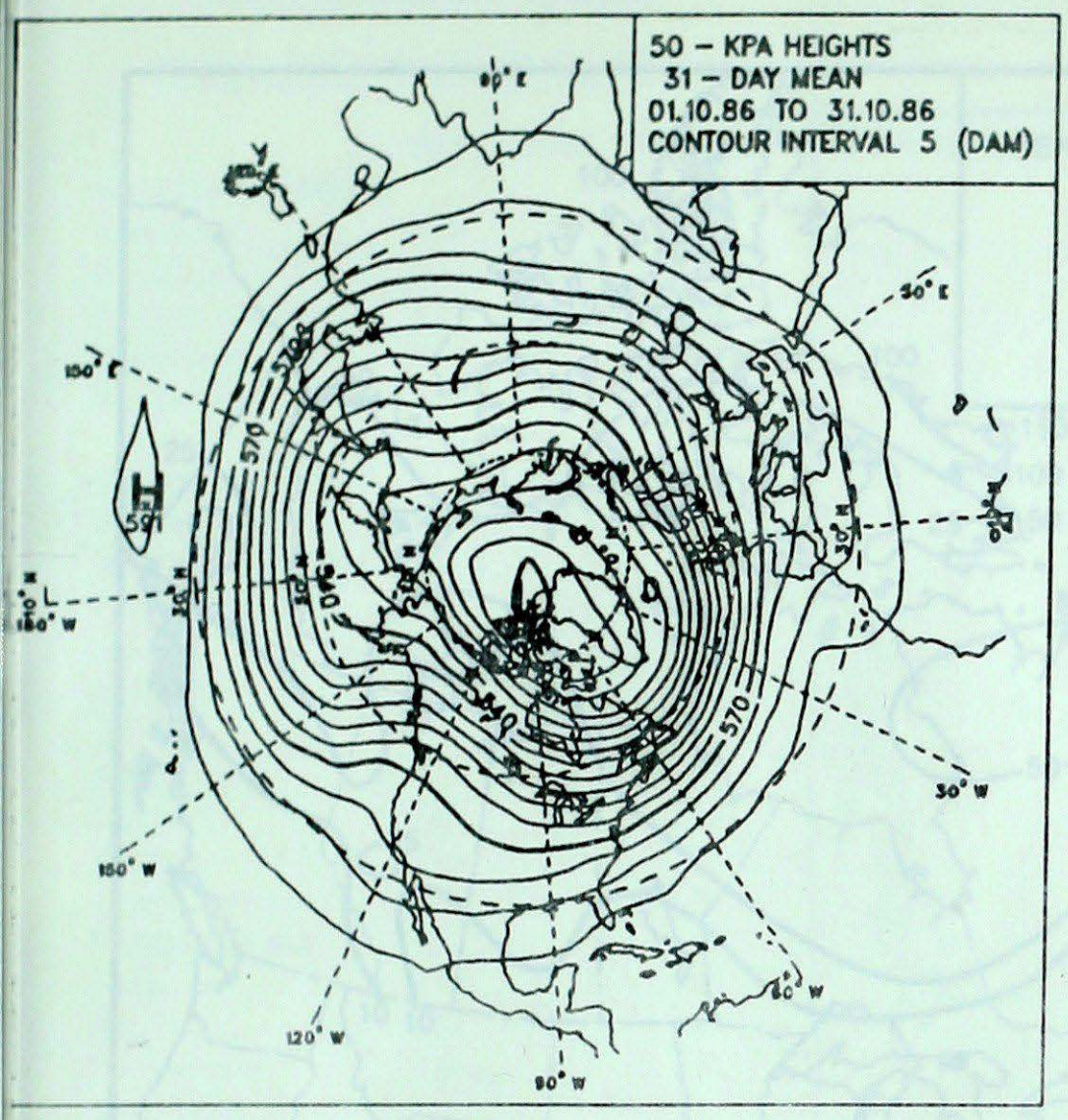
Québec

For the past several months the trend in Québec has been towards cooler temperatures. Almost every station reported monthly means below normal. There were several arctic outbreaks accompanied by snow and cold temperatures especially over the north. Nighttime temperatures plunged below freezing throughout the province and, in the north, below freezing temperatures persisted all day for most of the week. Kuujjuaq and Gaspé had the coldest mean monthly temperatures since 1972. Even though precipitation was below normal (except for the east-central region) snow was recorded as far south as Ottawa-Hull. At Inukjuak snowcover accumulation reached 64.8 cm which was 1.5 cm greater than the previous October record set in 1933.

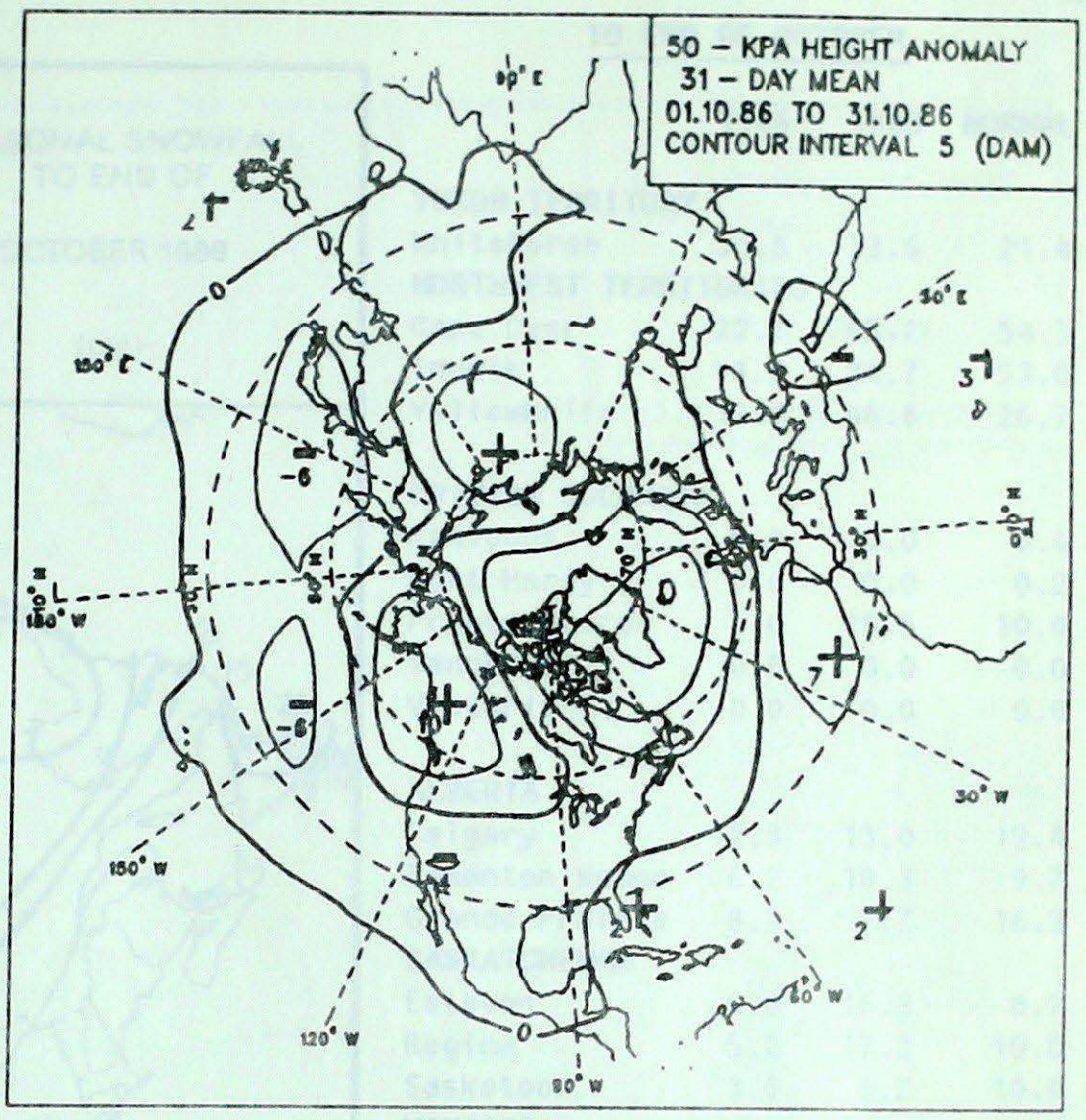
Atlantic Provinces

Cold weather continued in the maritimes where monthly mean temperatures were below normal for the 5th consecutive month. In most localities, it was the coldest October since 1974. Numerous weather systems passed through the Atlantic Provinces because of the strength of the upper level flow and the more easterly position of the upper level trough off the coast. These systems produced strong winds along with precipitation. On October 6, in Nova Scotia, a line of thunderstorms spawned either a tornado or a waterspout at Dublin Shore causing some damage. At Nain, Labrador on the 25th, wind gusted to 128 km/h. Precipitation amounts were generally below normal. Reservoir levels in Nova Scotia dropped 5% to leave them at 41% of their capacity. Over Labrador, cold temperatures were partly compensated for by well above normal amounts of sunshine.

ATMOSPHERIC CIRCULATION



Mean 50 kPa height anomaly (dam)
October 1986



Mean 50 kPa heights (dam)
October 1986

MEAN 50 kPa CIRCULATION
OCTOBER 1986

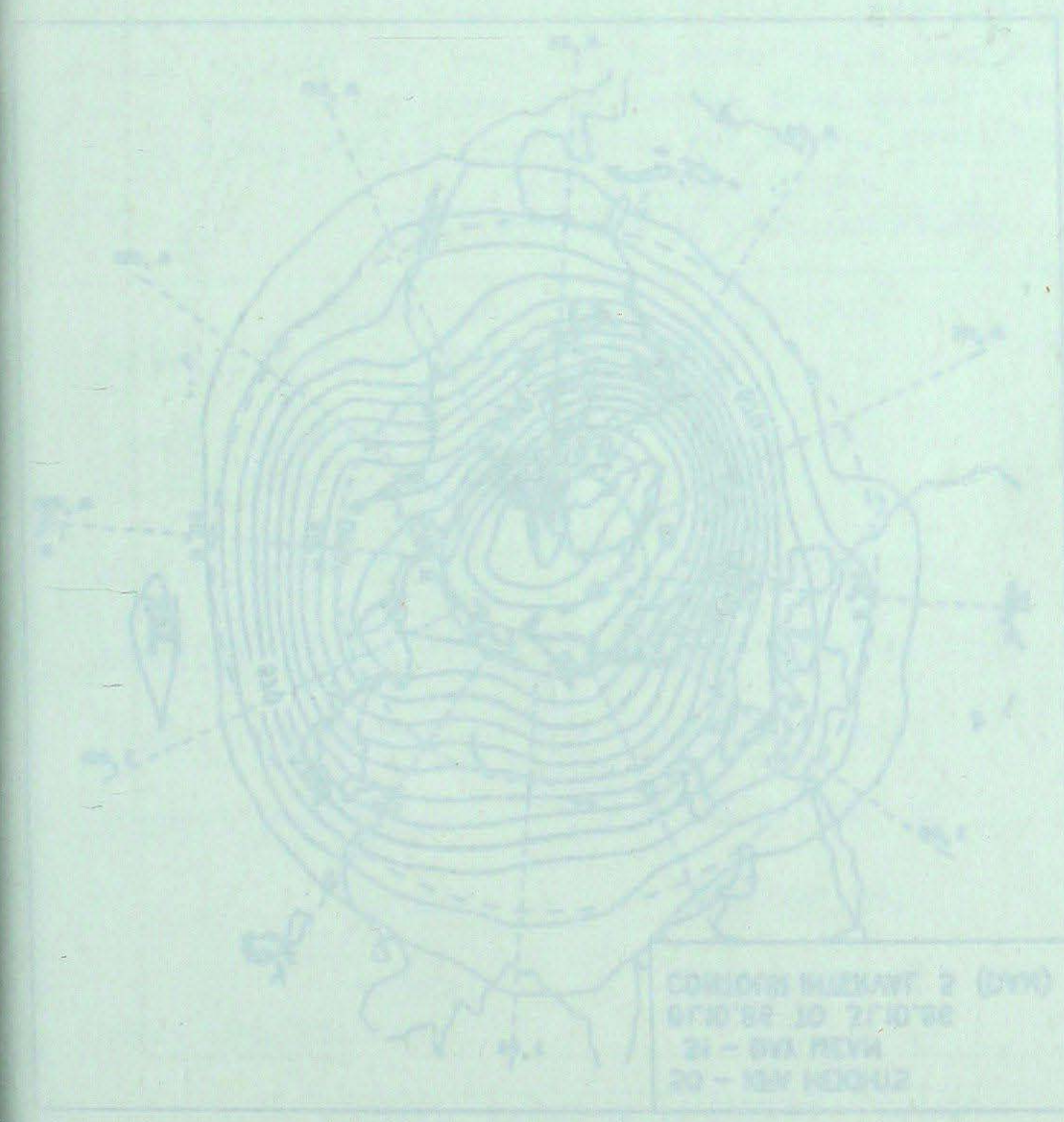
Alain Caillet, CCRM

The mean upper level circulation for October continued to intensify as the seasonal, northern hemispheric cooling continued. The geopotential height falls related to this cooling were most significant at high latitudes particularly over northeastern Canada. The monthly mean map shows a pronounced arctic vortex over Ellesmere Island which had shifted southward from its position last month over the north pole. There has also been a strengthening of the persistent wave features over North America; that is, the ridge over the west coast and the extensive trough over eastern Canada.

The Pacific coast ridge reestablished a more or less normal position with its axis just inland from the B.C. coast. It became a more pronounced feature than usual dominating the maritime flow stream as far south as 40°N. Despite a progressively slow displacement towards the east its position was quite stable throughout the month as indicated by the 10 dam positive height anomaly over the west.

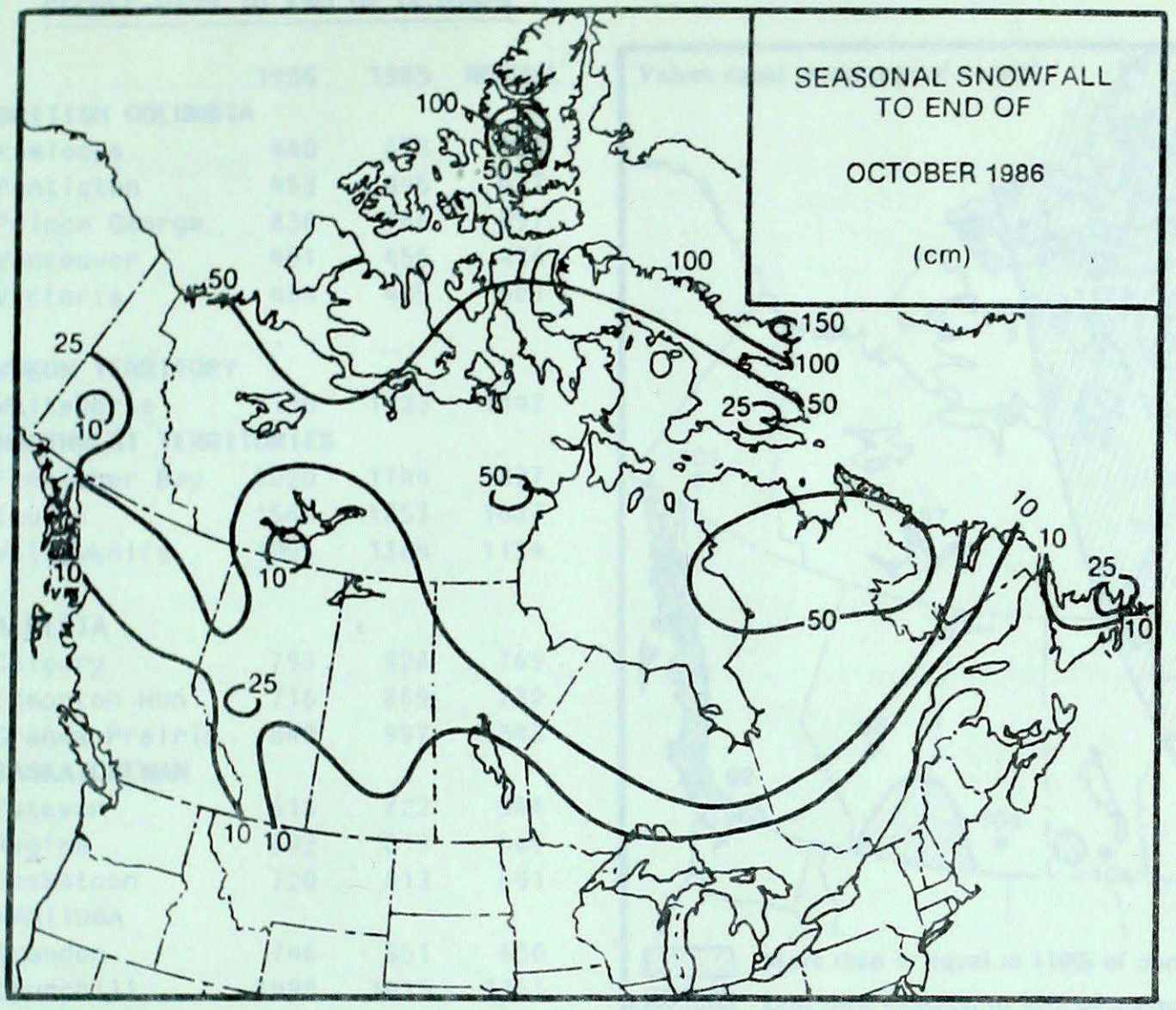
The Canadian trough progressed eastward with its axis lying along the west coast of Greenland and extending southward into the western Atlantic. This position is 30° east of its normal position over Labrador. Also it expanded southward to dominate the whole north Atlantic. The deepening and southward movement of the polar vortex caused an intensification of the gradient over eastern Canada and gave a more northerly component to the arctic flow stream over eastern Canada.

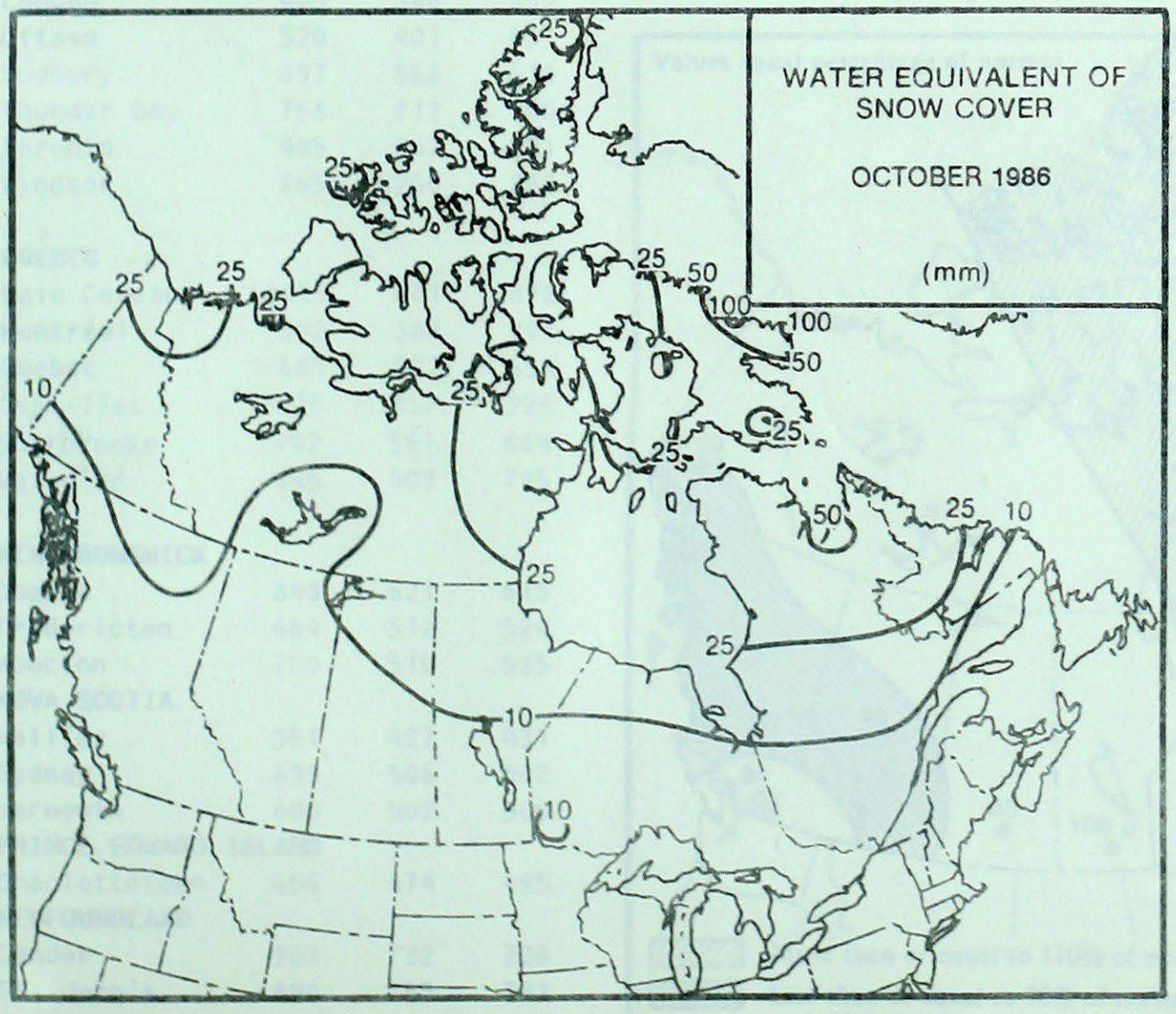
The surface temperature anomalies corresponded well with the upper height anomalies; that is above normal in the west and below normal in the east. Despite the flow of air off the Pacific, there was very little rain along the south coast of B.C. because of the strong anticyclonic character of the flow.



SNOWFALL

SNOWFALL

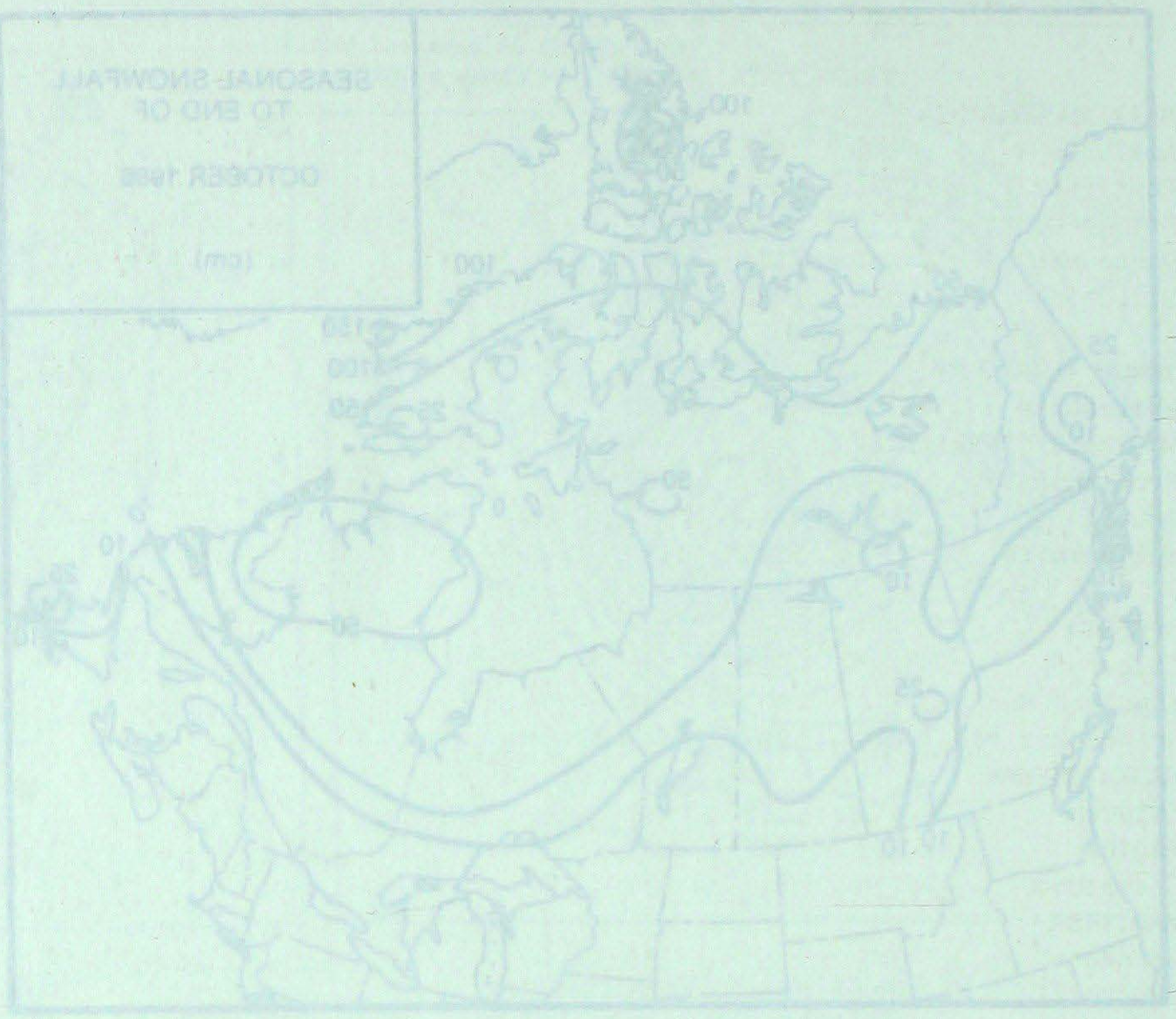


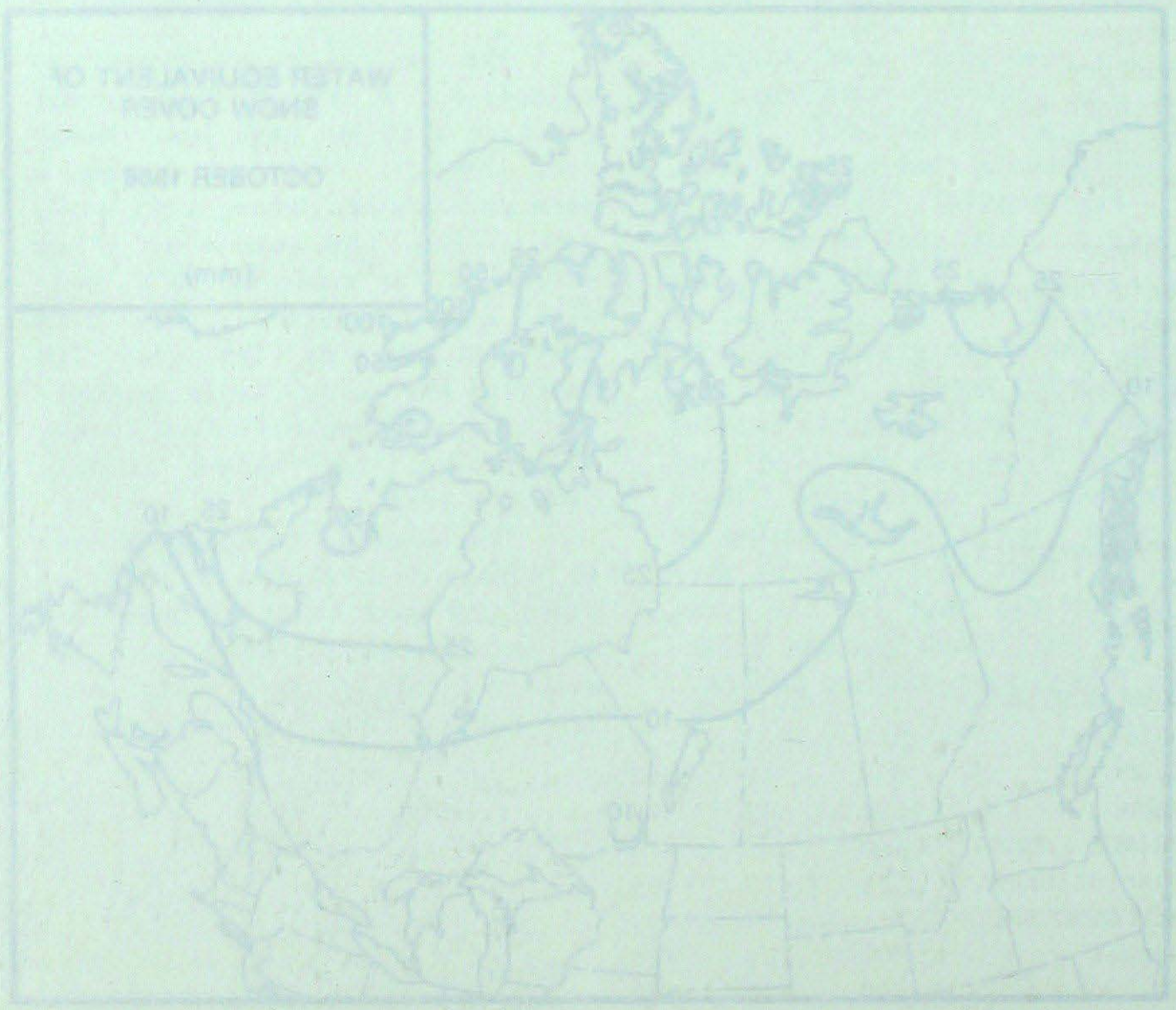


SEASONAL SNOWFALL TOTALS (CM)

TO END OF OCTOBER

	1986	1985	NORMAL
YUKON TERRITORY			
Whitehorse	30.8	33.6	21.4
NORTHWEST TERRITORIES			
Cape Dyer	22.7	45.2	54.3
Inuvik	41.0	24.7	53.0
Yellowknife	11.8	46.8	26.7
BRITISH COLUMBIA			
Kamloops	0.0	0.0	0.4
Port Hardy	0.0	0.0	0.2
Prince George	0.0	15.5	10.4
Vancouver	0.0	0.0	0.0
Victoria	0.0	0.0	0.0
ALBERTA			
Calgary	12.3	13.0	19.4
Edmonton Namao	6.2	10.3	9.7
Grande Prairie	8.4	7.7	16.3
SASKATCHEWAN			
Estevan	0.8	16.8	8.2
Regina	5.2	17.2	10.0
Saskatoon	3.0	6.2	10.4
MANITOBA			
Brandon	0.5	29.3	6.7
Churchill	40.2	36.1	35.7
The Pas	5.2	23.9	11.7
Winnipeg	0.0	14.2	5.4
ONTARIO			
Kapuskasing	37.4	12.2	23.5
London	0.0	0.0	1.9
Ottawa	0.2	0.0	2.7
Sudbury	1.6	0.0	6.5
Thunder Bay	10.0	11.6	3.3
Toronto	0.0	0.0	0.9
Windsor	0.0	0.0	0.1
QUEBEC			
Baie Comeau	3.0	0.0	6.1
Montréal	0.0	0.0	1.7
Quebec	0.0	0.0	4.4
Sept-Iles	1.0	15.9	10.6
Sherbrooke	0.0	0.0	5.6
Val-d'Or	9.0	4.4	15.7
NEW BRUNSWICK			
Charlo	1.0	0.2	5.8
Fredericton	0.0	0.0	2.3
Moncton	0.0	0.0	3.1
NOVA SCOTIA			
Shearwater	0.0	0.0	1.7
Sydney	0.0	7.2	2.6
Yarmouth	0.0	0.0	1.9
PRINCE EDWARD ISLAND			
Charlottetown	1.0	8.8	2.6
NEWFOUNDLAND			
Gander	25.8	28.0	12.3
St. John's	2.2	11.0	4.4



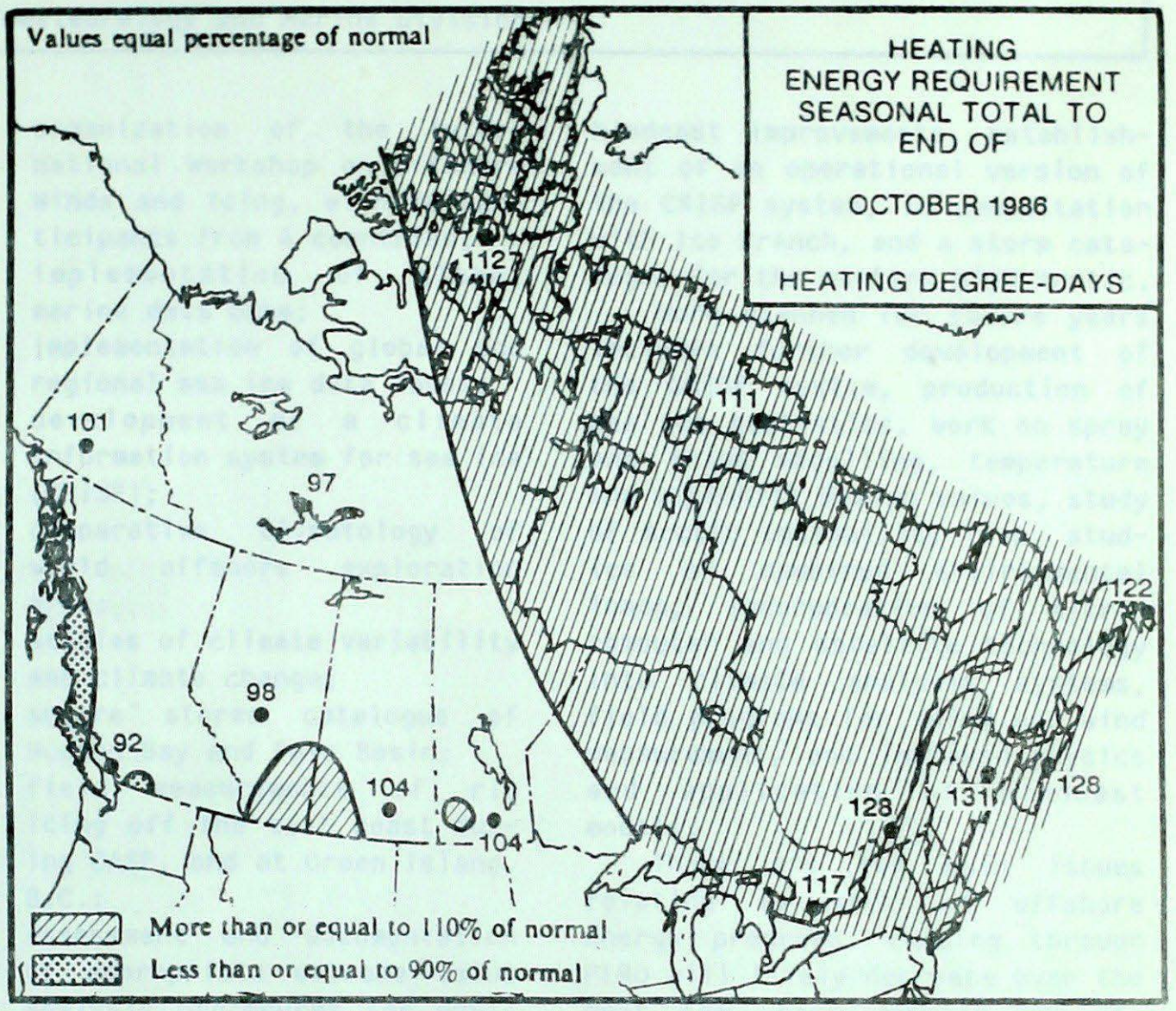


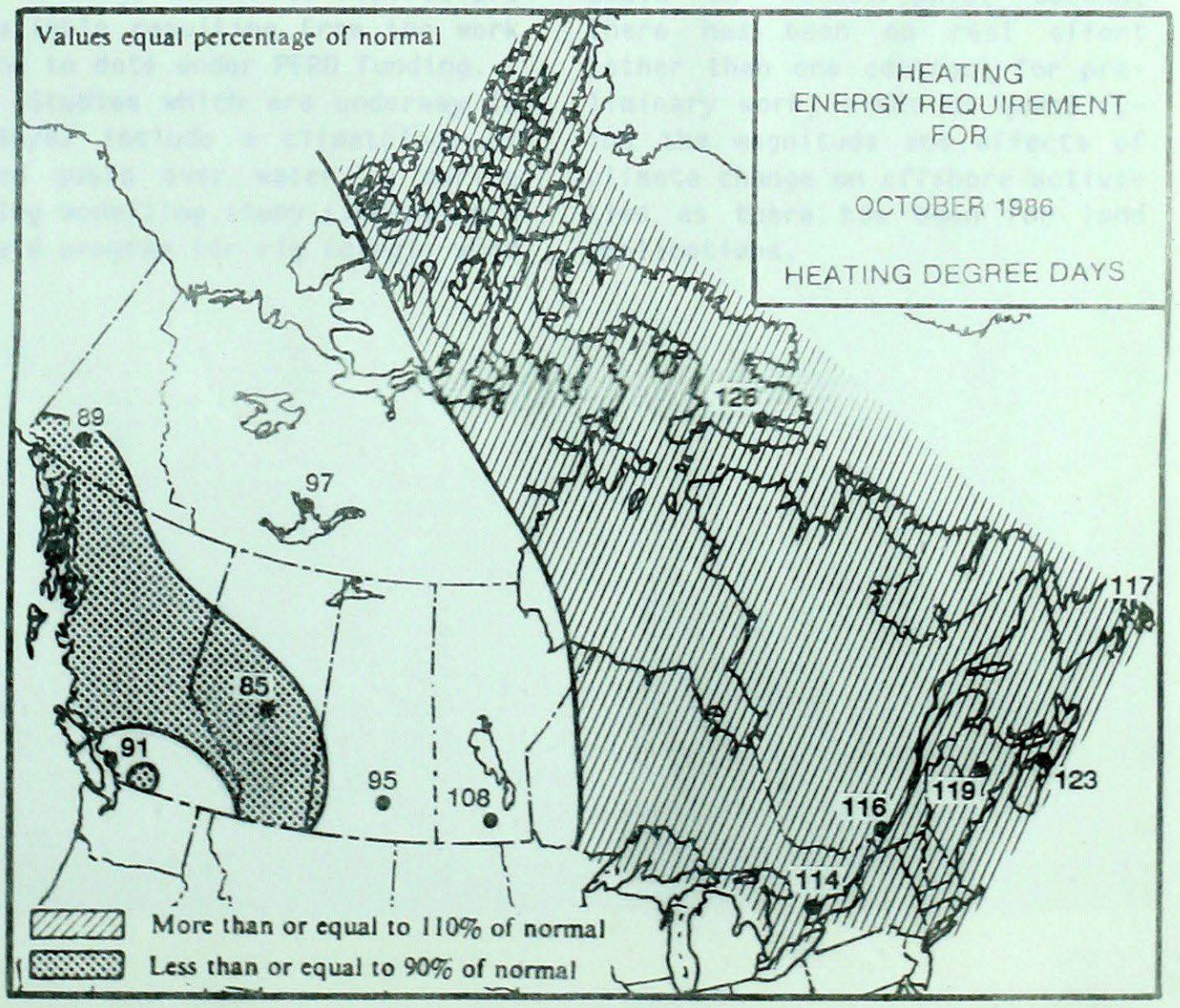
SEASONAL TOTAL OF HEATING

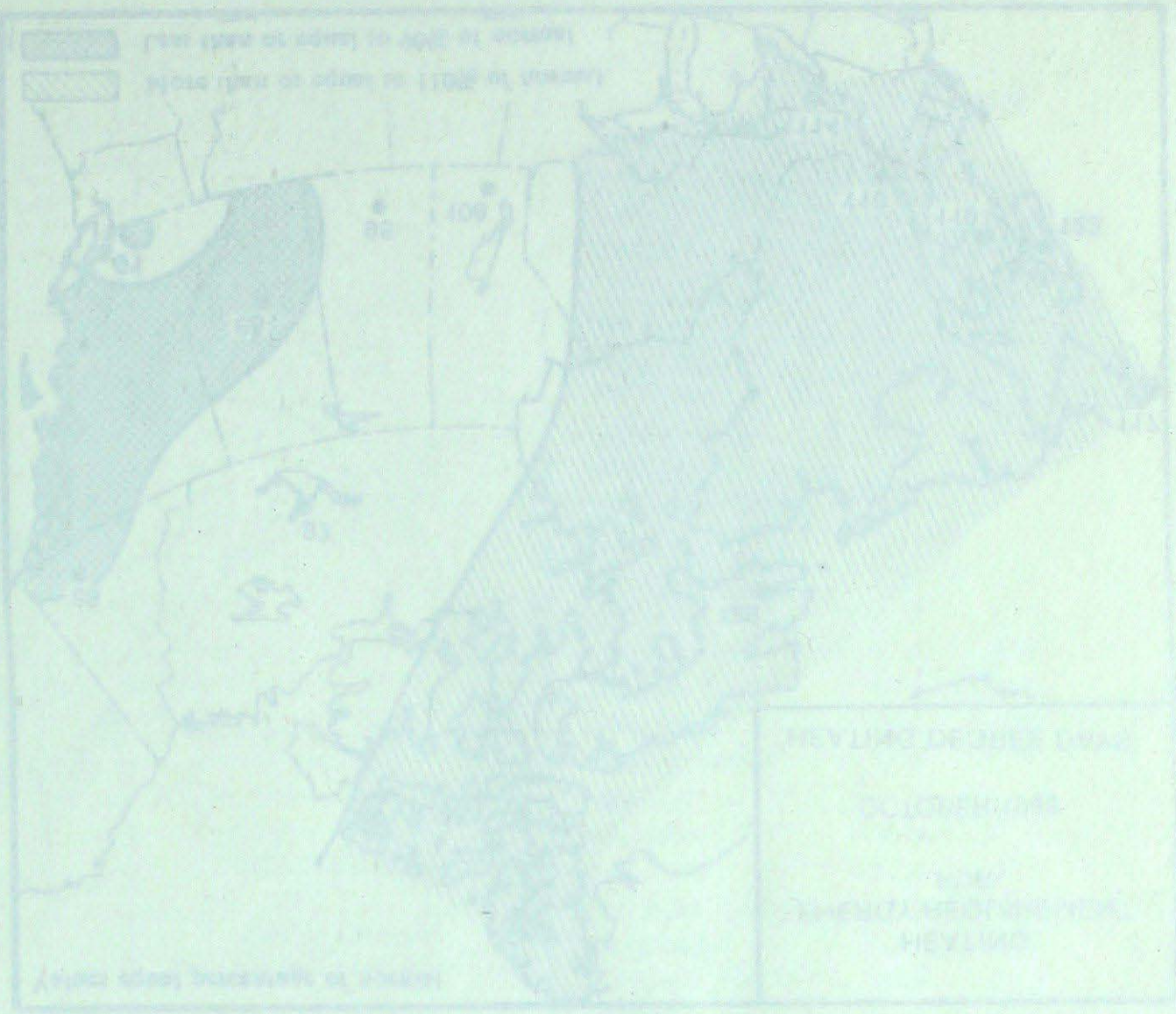
DEGREE-DAYS TO END OF OCTOBER

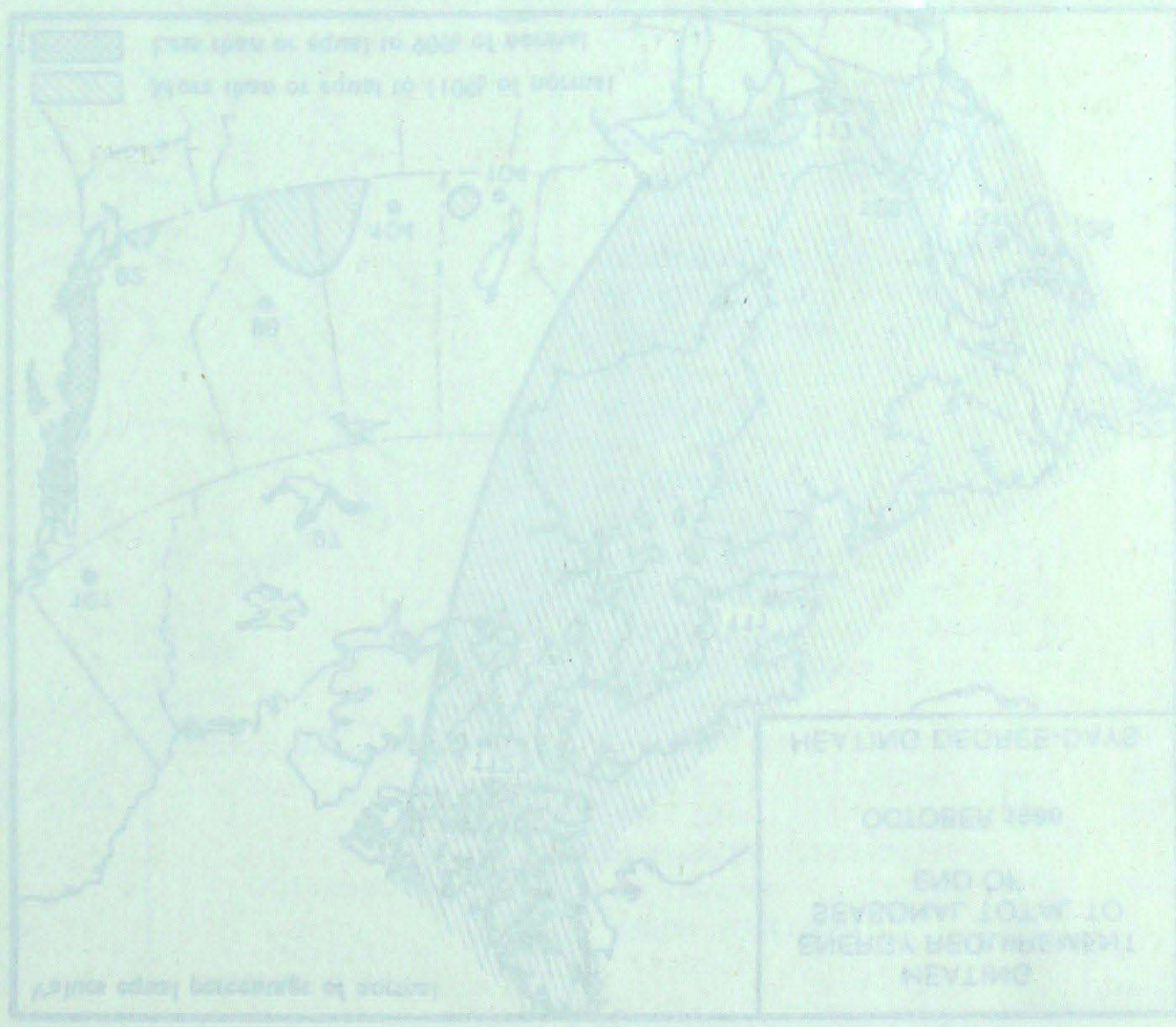
	1986	1985	NORMAL
BRITISH COLUMBIA			
Kamloops	440	473	436
Penticton	453	495	427
Prince George	836	966	897
Vancouver	401	455	436
Victoria	484	485	501
YUKON TERRITORY			
Whitehorse	1150	1333	1142
NORTHWEST TERRITORIES			
Frobisher Bay	2020	1744	1827
Inuvik	1565	1853	1637
Yellowknife	1095	1384	1124
ALBERTA			
Calgary	793	928	769
Edmonton Mun	716	869	732
Grande Prairie	840	997	843
SASKATCHEWAN			
Estevan	616	722	588
Regina	692	812	669
Saskatoon	720	813	691
MANITOBA			
Brandon	746	851	650
Churchill	1498	1415	1351
The Pas	827	934	790
Winnipeg	614	714	590
ONTARIO			
Kapuskasing	978	745	821
London	405	346	383
Ottawa	520	401	451
Sudbury	697	566	614
Thunder Bay	768	712	700
Toronto	445	367	381
Windsor	265	250	282
QUÉBEC			
Baie Comeau	1015	801	872
Montréal	512	383	401
Quebec	685	502	554
Sept-Iles	1035	852	926
Sherbrooke	702	561	664
Val-d'Or	945	409	795
NEW BRUNSWICK			
Charlo	848	621	615
Fredericton	684	512	524
Moncton	700	510	535
NOVA SCOTIA			
Halifax	551	427	431
Sydney	699	506	502
Yarmouth	600	502	505
PRINCE EDWARD ISLAND			
Charlottetown	656	474	495
NEWFOUNDLAND			
Gander	901	782	728
St. John's	894	755	731

ENERGY REQUIREMENTS









FEATURE

OFFSHORE ENERGY

V.R. Swail
Hydrometeorology and Marine Division

The Canadian Climate Centre continues to be involved in supporting the federal Panel on Energy Research and Development (PERD).

The objectives of the PERD projects are (1) to develop new methodologies to infer climate design parameters such as marine winds, icing and design storms, and (2) to develop climate information systems and data bases required for decision making. This information will be of use to design engineers and operational planners, as well as government regulatory agencies.

The bulk of the work is contracted out to consultants in private industry, both in the meteorological fields and computer systems. Contracts were awarded to 10 different companies in 1985/86. A considerable amount of work is also done in the Climate Centre, including work on the east and west coast marine atlases, organization of the International Workshop on Offshore Winds and Icing, and in the development of hindcast procedures. The programs are coordinated both within Atmospheric Environment Service, and other government departments.

Major achievements in marine meteorology have been made in the past year. A partial list is given below.

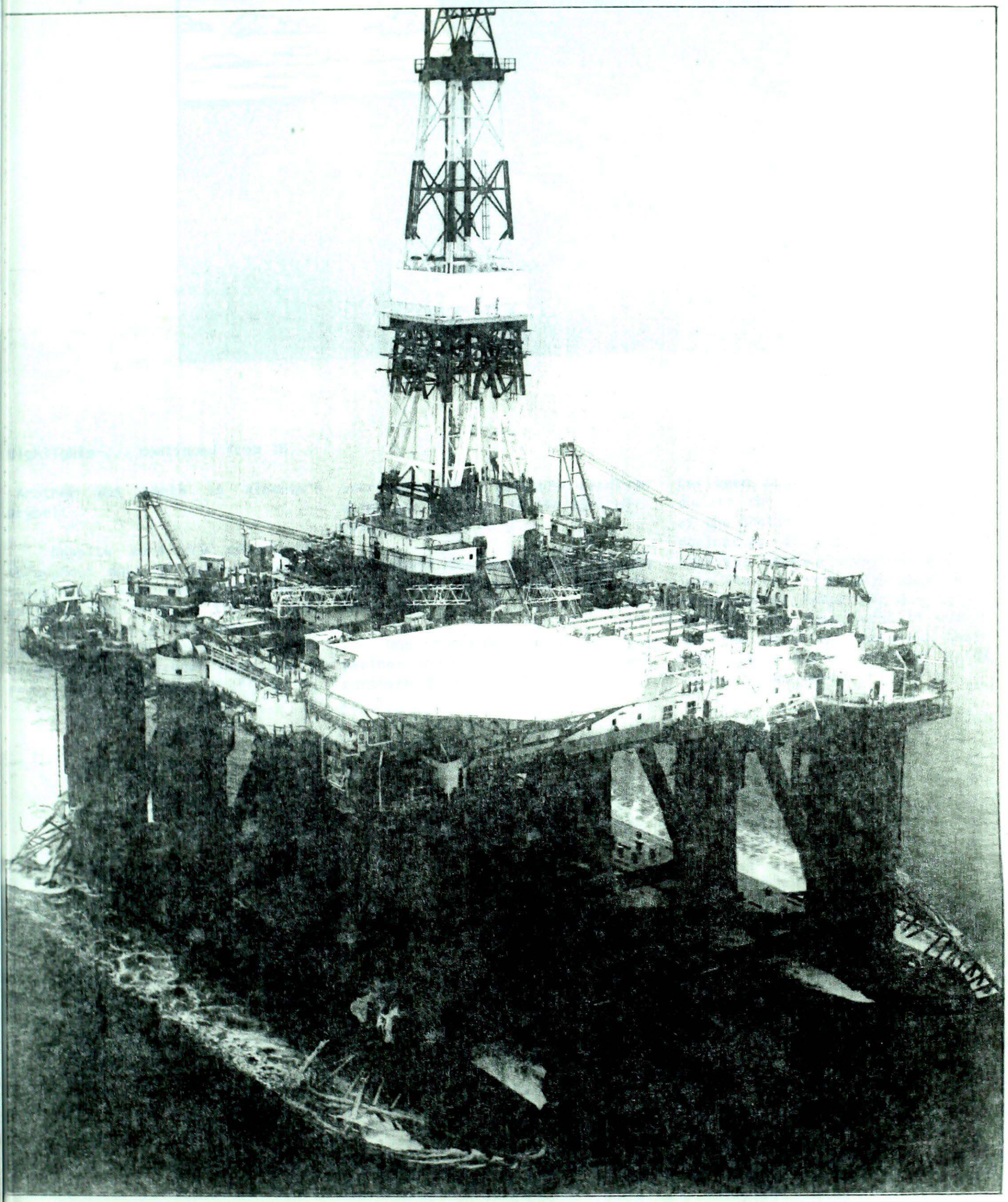
- organization of the International Workshop on Offshore Winds and Icing, with 70 participants from 6 countries;
- implementation of global marine data base;
- implementation of global and regional sea ice data bases;
- development of a climate information system for sea ice (CRISP);
- comparative climatology of world offshore exploration area;
- studies of climate variability and climate change;
- severe storms catalogue of Hudson Bay and Foxe Basin;
- field measurements of rig icing off the east coast during CASP, and at Green Island, B.C.;
- assessment and documentation of appropriate extreme value analysis procedures for environmental parameters;
- east and west coast coast marine environmental atlases.

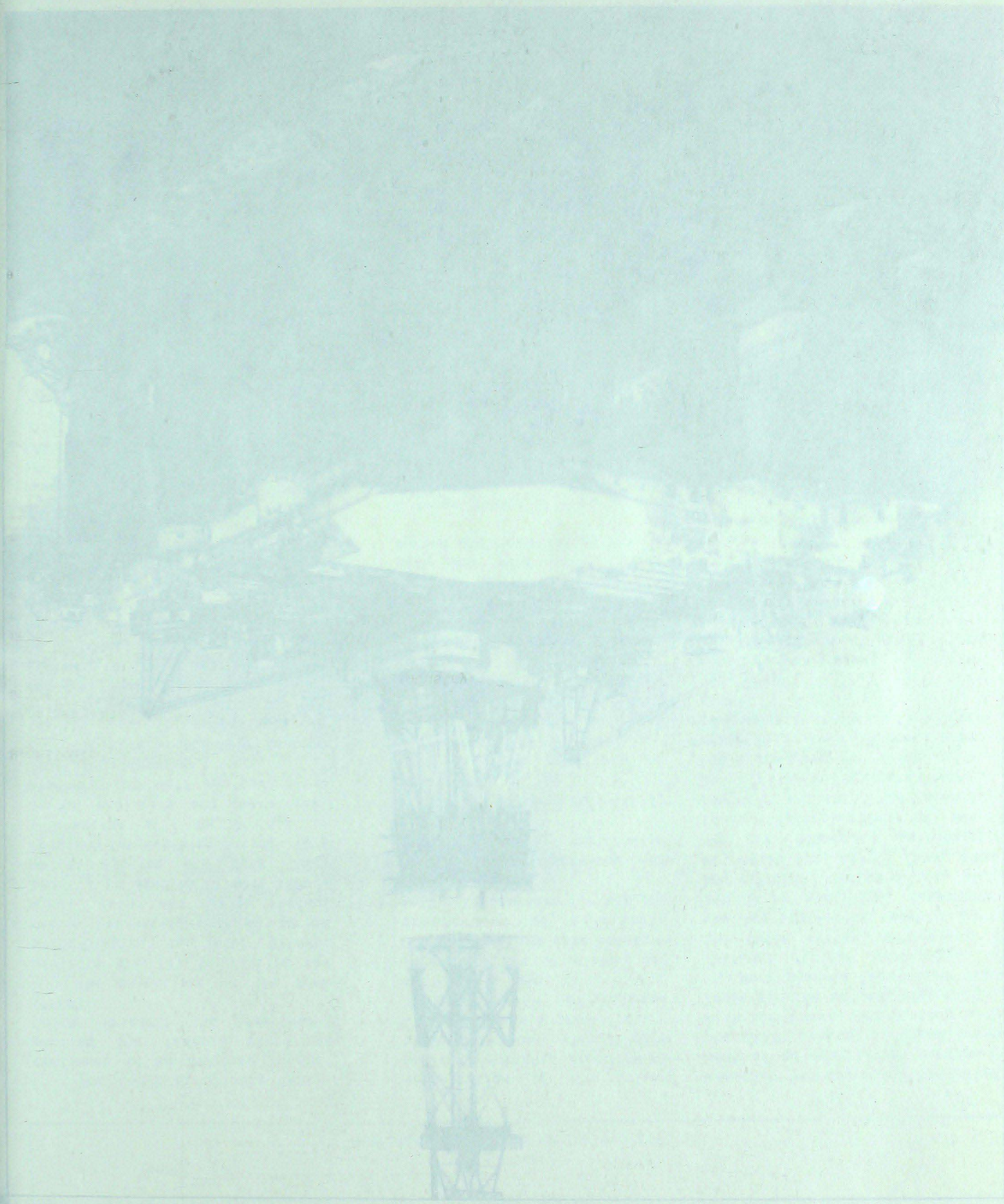
A large number of reports are available resulting from the work done to date under PERD funding.

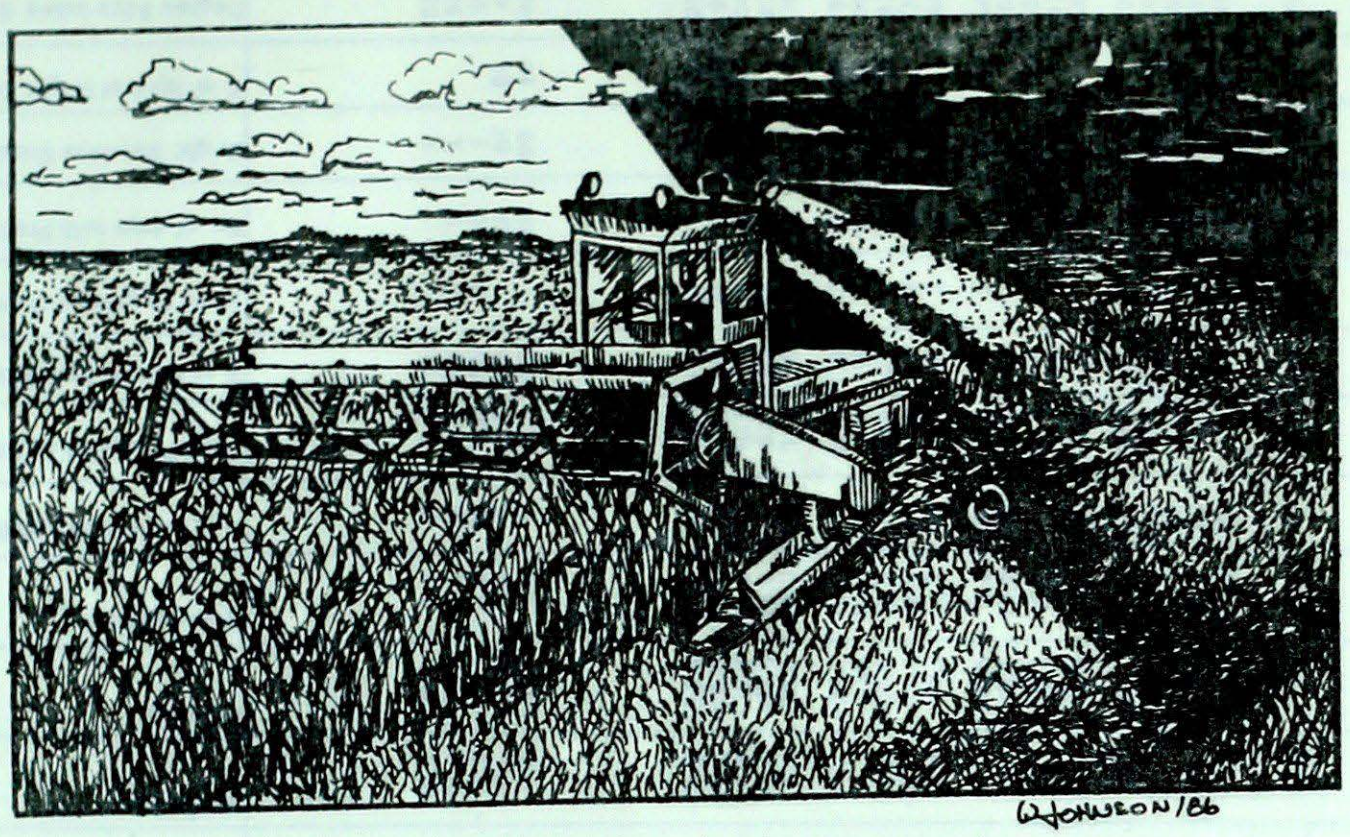
Studies which are underway in 1986/87 include a climatology of wind gusts over water, a marine icing modelling study (including a field program for rig icing), wind hindcast improvements, establishment of an operational version of the CRISP system, in consultation with Ice Branch, and a storm catalogue for the western high Arctic.

Work planned for future years includes further development of the CRISP system, production of sea ice statistics, work on spray and icing modelling, temperature and windchill design values, study of Arctic instability lows, studies of combined environmental loads, incorporation of microcomputer and satellite technology into climate analysis systems, field programs for icing and wind measurement, and improved physics and application of hindcast models.

There are two main issues relating to work on offshore energy programs. Funding through PERD will likely decrease over the next few years despite our attempts to the contrary. Should this funding be terminated, the impacts on the development of marine meteorology and climatology would be catastrophic. Second, there has been no real effort (other than one contract for preliminary work) aimed at quantifying the magnitude and effects of climate change on offshore activities as there has been for land applications.







Highlights ... continued from 1B

Another Wet Month in Alberta's Drybelt

Despite warm dry conditions throughout most of October, heavy rains fell over southern Alberta early in the month of the 1st and 2nd and again on the last day to push the monthly totals well above normal for the second month in a row. These rains were beneficial in increasing soil moisture reserves which are critical to the agricultural industry.

Cold Spell Continues over Eastern Canada and Intensifies over the Northeast

One naturally expects cold weather over Baffin Island and northern Québec in October but it has been abnormally cold this year due to the position and intensity of the Arctic vortex which has been dominating the upper level flow over the region. Frobisher Bay was into its 6th consecutive week with below normal temperatures. Elsewhere in the east, most of Québec and the Maritimes recorded their 5th consecutive month with below normal temperatures.

OCTOBER 1986

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	11.2	1.1	21.3	0.3	0.0		102.5	66	0	5	156	114	213.2
ALERT BAY	11.4	2.1	18.3	3.2	0.0		198.8	94	0	13	X		204.2
AMPHITRITE POINT	11.6	1.0	16.9	6.3	0.0		161.4	44	0	8	X		196.2
BLUE RIVER	5.9	0.4	18.5	-6.2	0.0		39.1	48	0	6	114	125	
BULL HARBOUR	10.4	1.0	19.7	1.4	0.0		137.9	51	0	16	X		219.3
CAPE SCOTT			15.7		0.0		194.0	55	0	16	X		
CAPE ST.JAMES	11.7	1.8	15.4	8.2	0.0		189.8	96	0	22			195.8
CASTLEGAR	8.8	0.7	21.3	-1.3	0.0		25.8	47	0	5	156	124	284.2
COMOX	10.4	1.2	19.0	2.0	0.0		27.0	21	0	5	X		235.1
CRANBROOK	6.2	0.3	19.1	-4.9	0.0		28.6	156	0	6	207	*	373.1
DEASE LAKE	2.8	1.5	16.3	-19.5	18.5	105	84.4	239	12	14	59	67	470.3
ETHELDA BAY	10.9	2.1	17.3	1.3	0.0		410.7	101	0	21	X		210.2
FORT NELSON	1.0	-0.1	19.5	-24.3	53.2	281	68.2	280	24	11	92	*	528.6
FORT ST.JOHN	6.3	2.0	21.9	-18.6	15.6	86	28.4	102	15	7	X		364.1
HOPE	11.8	1.4	20.9	2.1	0.0		121.8	70	0	5	135	129	192.0
KAMLOOPS	8.5	0.1	21.0	-1.6	0.0		3.1	20	0	1	163	120	294.7
KELOWNA	7.8	0.9	21.6	-2.8	0.0		19.2	101	0	5	166	110	317.4
LANGARA	11.0	2.0	16.0	6.1	0.0		418.0	157	0	26	X		216.9
LYTTON	10.3	0.2	22.5	0.3	0.0		28.1	75	0	2	154	113	237.6
MACKENZIE	4.6	1.0	16.9	-16.0	13.4	76	66.0	111	8	8	110	94	415.2
MCINNES ISLAND	11.1	1.6	15.6	6.0	0.0		284.4	84	0	18	X		213.6
PENTICTON	8.5	-0.2	22.1	-2.3	0.0		13.2	86	0	3	189	120	293.5
PORT ALBERNI	11.4	*	22.0	-2.6	0.0	*	68.0	*	0	7	120	*	205.1
PORT HARDY	10.6	1.9	18.5	1.1	0.0		109.9	44	0	11	112	114	231.7
PRINCE GEORGE	6.7	1.9	18.9	-12.5	0.0		26.0	43	0	8	145	132	352.0
PRINCE RUPERT	10.8	2.9	16.1	-0.2	0.0		674.7	184	0	27	66	101	220.7
PRINCETON	7.4	0.8	25.6	-5.2	0.0		9.2	40	0	3	208	*	
QUESNEL	7.0	1.3	22.3	-9.4	1.2	19	26.3	54	0	6	X		340.9
REVELSTOKE	8.3	1.4	17.1	-0.9	0.0		36.4	43	0	4	84	93	339.8
SANDSPIT	12.0	3.0	20.6	3.7	0.0		181.1	93	0	21	75	82	185.7
SMITHERS	7.6	2.9	18.5	-3.4	0.0		56.7	89	0	13	84	92	325.9
TERRACE	9.6	3.2	15.0	0.6	0.4	10	163.2	75	0	22	67	107	260.0
VANCOUVER HARBOUR	11.6	0.9	17.1	5.7	0.0		53.7	33	0	5	X		199.4
VANCOUVER INT'L	10.8	0.8	19.5	2.3	0.0		49.2	43	0	5	136	112	223.8
VICTORIA GONZ. HTS	11.5	0.7	18.7	5.4	0.0		35.9	56	0	3	136	93	202.4
VICTORIA INT'L	10.5	0.6	20.2	1.3	0.0		35.2	44	0	4	148	102	233.7
VICTORIA MARINE	10.1	0.2	20.1	3.0	0.0		57.1	43	0	6	X		244.2
WILLIAMS LAKE	7.7	2.6	22.4	-9.2	4.6	61	19.4	64	0	4	186	137	318.1

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													
BURWASH	-1.0	2.2	13.9	-22.8	1.0	6	2.6	14		1	X		586.2
DAWSON	-4.8	0.6	13.0	-29.4	6.2	25	16.2	58	3	5	X		676.0
MAYO	-1.1	1.2	14.8	-21.1	3.0	14	19.4	68	0	8	X		590.1
WATSON LAKE	2.6	2.7	16.4	-21.3	0.2	0	50.3	143		12	81	84	478.1
WHITEHORSE	2.5	1.9	14.5	-18.0	1.0	6	29.9	139		10	88	94	481.4
NORTHWEST TERRITORIES													
ALERT	-21.7	-2.0	-13.2	-33.6	30.4	194	16.1	119	25	5	12	141	1230.8
BAKER LAKE	-11.4	-3.7	2.6	-28.8	39.8	171	30.9	100	16	10	65	89	910.7
CAMBRIDGE BAY	-15.7	-4.0	0.4	-29.9	11.6	75	10.6	71	10	4	64	109	1044.8
CAPE DYER	-12.2	-4.5	-2.5	-27.9	136.6	137	87.1	86	26	12	X		936.8
CAPE PARRY	-7.3	-0.5	3.0	-20.0	34.2	126	31.3	155	17	7	X		784.5
CLYDE	-13.9	-7.0	-1.1	-28.7	57.2	153	44.4	129	33	12	66	138	989.1
COPPERMINE	-7.4	-0.8	5.3	-21.5	37.6	179	27.0	116	14	12	46	99	786.8
CORAL HARBOUR	-13.0	-5.2	0.5	-27.4	19.8	74	19.8	53	7	6	150	173	930.7
EUREKA	-25.8	-3.7	-17.0	-39.9	6.4	85	6.2	88	13	2	0		1377.0
FORT RELIANCE	-1.6	0.2	6.4	-17.1	18.9	93	17.7	63	3	5	X		606.7
FORT SIMPSON	-0.8	1.1	20.2	-19.5	12.2	65	17.4	72	5	5	85	99	583.0
FORT SMITH	0.4	0.1	18.7	-18.5	13.8	86	15.2	57	7	5			545.9
FROBISHER BAY	-10.8	-5.8	1.0	-23.4	17.0	42	14.6	33	5	4	100	173	891.9
HALL BEACH	-15.5	-5.0	-0.4	-30.5	12.1	56	9.6	45	9	3	X		1038.5
HAY RIVER	1.5	0.6	20.0	-16.8	9.0	47	21.7	71	3	9	X		508.8
INUVIK	-7.7	0.4	8.7	-23.7	23.6	83	22.2	66	7	8	0		796.1
MOULD BAY	-20.2	-2.6	-8.2	-37.9	27.8	253	21.8	232	28	9	2	18	1182.9
NORMAN WELLS	-4.1	0.5	9.2	-19.7	22.2	88	21.1	78	8	4	64	108	682.2
POND INLET	-18.0	-6.0	-2.4	-29.7	13.4	40	9.6	37	10	5	X		1115.4
RESOLUTE	-20.7	-5.6	-11.1	-37.3	16.3	110	12.6	91	13	3	24	101	1198.4
YELLOWKNIFE	-1.0	0.6	10.8	-18.1	11.0	47	24.2	70	1	5	77	137	587.0
ALBERTA													
BANFF	6.9	2.5	19.0	-10.0	9.4	52	17.8	56	4	4	X		
BROOKS	7.5	1.2	24.5	-7.5	9.5	139	25.3	147	0		189	*	
CALGARY INT'L	7.8	2.3	23.0	-11.7	4.2	31	10.6	60	4	3	206	117	315.2
COLD LAKE	5.4	0.9	23.2	-10.5	9.3	132	12.3	72	7	3	186	107	391.2
CORONATION	6.3	1.5	22.0	-11.4	0.4	4	14.8	98		4	195	109	362.7
EDMONTON INT'L	6.6	1.9	22.2	-9.5	4.0	59	20.8	135		5	177	108	353.2
EDMONTON MUNI.	7.3	1.5	22.2	-9.0	3.6	48	20.9	125		5	186	114	331.2
EDMONTON NAMAO	6.9	1.8	22.3	-9.1	6.0	77	19.3	106		5	X		346.3
EDSON	6.2	3.1	23.5	-15.4	6.4	31	12.0	41	1	4	166	110	297.4
FORT CHIPEWYAN	1.5	0.5	18.5	-17.0	11.8	65	18.0	58	8		X		

| | | |

OCTOBER 1986

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
FORT MCMURRAY	3.8	0.5	24.5	-14.0	12.2	96	27.6	98	3	5	137	110	441.1
GRANDE PRAIRIE	3.8	1.6	23.1	-19.0	6.4	54	12.7	47	3	5	140	*	379.7
HIGH LEVEL	1.0	-0.3	19.8	-23.4	17.0	111	34.4	234	10	5	119	83	526.7
JASPER	6.9	2.2	20.5	-11.4			10.2	34	0	4	161	*	343.7
LETHBRIDGE	8.6	1.1	24.4	-13.0	20.6	176	37.8	212	3	8	208	118	294.0
MEDICINE HAT	8.7	1.3	24.2	-12.1	8.8	110	25.1	154	4	4	205	118	289.2
PEACE RIVER	4.5	0.8	22.9	-21.0	25.9	269	32.4	162	13	8	X		417.3
RED DEER	6.4	1.8	24.2	-10.2	0.6	5	21.5	104		5	X		356.9
ROCKY MTN HOUSE	6.3	1.4	23.8	-11.7	1.0	6	12.4	54		3	X		363.1
SLAVE LAKE	4.7	0.6	20.1	-11.2	17.4	110	33.6	132	9	6	164	110	412.7
SUFFIELD	8.4	1.4	24.0	-11.0	9.3	136	18.9	124	5	2	198	106	293.9
WHITECOURT	6.4	3.0	22.8	-12.0	6.1	39	44.3	160	2	7	X		361.0
SASKATCHEWAN													
BROADVIEW	5.9	1.3	23.2	-9.8	9.0	105	26.2	118	4	6	195	122	375.8
COLLINS BAY	-1.0	-0.1	15.4	-18.1	36.5	120	42.9	113	11	9	100	*	235.5
CREE LAKE	1.5	-0.1	18.7	-14.2	16.6	112	38.5	127	4	4	118	121	511.4
ESTEVAN	6.7	0.3	23.9	-7.6	0.8	11	20.4	92	0	3	183	97	348.4
HUDSON BAY	4.7	0.8	22.0	-11.0	9.4	93	14.0	52	8	3	163	*	410.7
KINDERSLEY	6.7	1.4	22.7	-10.6	0.4	5	16.0	115		5	X		322.5
LA RONGE	3.3	-0.2	22.2	-12.3	12.4	126	33.2	111	4	5	X		458.7
MEADOW LAKE	4.4	-0.2	23.4	-14.9	2.0	22	7.2	40	0	4	175	*	420.8
MOOSE JAW	7.3	0.9	23.0	-9.6	6.7	88	17.1	93	3	5	200	115	333.1
NIPAWIN	4.4	*	22.3	-11.1	6.9	*	15.5	*		6	157	*	420.2
NORTH BATTLEFORD	5.7	0.8	23.5	-10.5	5.2	73	10.1	64	TR	3	X		315.1
PRINCE ALBERT	4.7	1.0	23.2	-9.2	0.2	2	3.0	13		2	151	103	412.0
REGINA	5.9	0.7	23.2	-10.9	5.2	63	11.8	62	2	4	201	119	374.1
SASKATOON	5.9	1.0	22.6	-10.0	3.0	32	6.8	39		3	X		375.2
SWIFT CURRENT	7.3	1.5	22.8	-13.1	4.5	49	27.5	151	1	6	186	110	330.1
WYNYARD	5.5	0.7	22.9	-11.1	9.6	84	13.9	56	7	2	X 153	102	387.5
YORKTON	5.3	0.5	23.5	-11.3	6.8	90	11.8	51	6	3	193	122	459.2
MANITOBA													
BRANDON	4.9	-0.3	22.3	-9.7	0.5	7	23.2	107	0	5	X		403.9
CHURCHILL	-2.2	-0.7	9.7	-15.1	37.8	129	41.7	96	5	10	61	98	625.6
DAUPHIN	6.2	0.7	24.8	-10.7	3.6	43	21.1	73	2	6	165	107	350.6
GILLAM	-1.0	-0.6	13.1	-16.9	31.9	151	24.9	76	9	4	X		588.2
GIMLI	4.8	-0.8	22.6	-9.3			12.8	33		3	165	114	409.5
ISLAND LAKE	2.4	-0.8	17.9	-11.0	14.8	90	44.2	101	8	8	X		484.3
LYNN LAKE	-0.2	-0.2	19.9	-15.5	23.0	82	30.3	73	11	10	81	113	565.4
NORWAY HOUSE	2.3	*	15.1	-11.4	21.6	*	52.2	*	16	7	8	*	487.4
PORTAGE LA PRAIRIE	6.3	-0.2	24.0	-6.7	7.1	112	14.7	47	0	6	X		363.7

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
THE PAS	5.7	2.1	23.5	-10.5	5.2	50	10.1	30	5	3	*		375.1
THOMPSON	-0.1	-0.3	18.8	-15.4	30.7	111	35.1	72	18	9	113	143	559.1
WINNIPEG INT'L	5.4	-0.7	23.4	-8.5	TR		11.6	37	0	4	189	124	390.9
ONTARIO													
ATIKOKAN	3.4	-1.6	19.6	-12.6	7.4	61	48.1	77	0	8	93	82	451.7
BIG TROUT LAKE	0.9	-0.9	14.8	-11.7	27.6	*	60.6	108	3	12	99	*	529.3
EARLTON	4.3	-1.1	17.8	-7.2	0.6	8	96.1	137	0	11	X		424.9
GERALDTON	2.3	-1.6	15.1	-12.2	9.4	87	74.6	115	0	10	X		485.9
GORE BAY	7.5	-0.8	18.8	-2.8	0.0		75.0	110	0	12	X		325.8
HAMILTON RBG	10.7	*	21.0	-1.9	0.0		59.6	*	0	10	154	*	
HAMILTON	9.4	0.0	20.0	-0.7	0.0		73.8	120	0	11	X		266.3
KAPUSKASING	2.5	-1.9	16.5	-10.0	32.8	155	90.6	117	0	14	X		583.3
KENORA	5.0	-0.6	18.4	-7.7	1.4	18	18.0	44	0	6	X		403.2
KINGSTON	8.7	-0.7	20.0	-4.0	0.0		81.8	106	0	12	145	95	289.6
LANSDOWNE HOUSE	1.6	-1.2	15.8	-11.8	13.2	42	48.4	74		10	X		508.5
LONDON	9.4	0.0	19.8	-1.2			82.7	112	0	12	121	85	267.3
MOOSONEE	2.0	-2.1	14.4	-11.0	26.8	184	80.1	107	0	12	61	69	495.6
MUSKOKA	6.6	-0.9	20.4	-6.7			103.5	110	0	11	X		344.7
NORTH BAY	5.0	-1.4	18.1	-6.2			86.5	98	0	12	132	111	403.4
OTTAWA INT'L	7.7	-0.4	19.5	-5.6	0.2	7	78.0	114	0	13	142	*	319.9
PETAWAWA	5.7	-1.4	11.7	-0.4			49.6	74	0	9	X		382.5
PETERBOROUGH	7.8	-0.1	20.1	-5.3	0.0		45.8	76	0	11	X		316.9
PICKLE LAKE	2.2	-0.5	16.2	-10.6	8.8	42	39.4	62	1	10	X		489.2
RED LAKE	3.2	-1.3	19.0	-10.9	0.2	1	22.5	44	0	6	130	*	459.9
ST. CATHARINES	10.4	-0.5	20.4	-1.5	0.0		51.8	78	0	13	X		235.3
SARNIA	10.0	-0.5	19.5	-0.3	0.0		69.4	115	0	13	133	91	248.1
SAULT STE. MARIE	6.6	-1.0	19.5	-5.3			85.6	115	0	15	124	105	353.6
SIMCOE	9.6	-0.3	21.0	-2.0	0.0		98.8	116	0	12	X		253.6
SIOUX LOOKOUT											X		
SUDBURY	5.2	-1.1	18.2	-7.0	1.6	25	76.5	102	0	10	121	99	397.5
THUNDER BAY	4.3	-1.4	21.5	-10.7	10.0	303	28.4	51	0	8	134	104	424.9
TIMMINS	3.3	-1.5	18.8	-9.7	8.0	63	104.0	151	0	15	X		459.1
TORONTO	10.6	-0.4	20.5	0.5	0.0		56.2	92	0	9			230.4
TORONTO INT'L	8.7	-0.6	20.4	-4.5	0.0		59.6	96	0	9	X		287.9
TORONTO ISLAND	10.3	0.2	20.5	1.9	0.0		55.7	98	0	11			239.0
TRENTON	8.6	-0.6	20.5	-4.2	0.0		59.3	84	0	11	X		291.4
WATERLOO-WELL	8.2	-0.6	19.3	-4.5			67.0	102	0	11	X		304.2
WAWA	4.0	*	16.1	-8.5	3.9	*	152.0	*	0	12		*	432.7
WIARTON	8.2	-0.8	18.8	-4.2			93.1	113	0	12	143	107	303.2
WINDSOR	11.4	0.3	23.2	1.5			75.4	132	0	11	X		207.0

| | | |

OCTOBER 1986

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	3.6	-1.7	15.0	-7.9	7.6	64	84.9	118		13	X		447.0
BAIE COMEAU	3.1	-1.2	16.5	-11.0	3.0	49	60.4	67	0	15	116	*	461.8
BLANC SABLON	1.9	-2.0	12.0	-10.4	5.0	55	64.0	69	0	10	140	*	
CHIBOUGAMAU	0.9	-1.7	14.7	-10.8	40.8	176	94.0	109		17	69	97	528.7
GASPE	3.8	-2.0	16.2	-11.8	6.6	132	50.6	55	0	10	113	*	437.9
INUKJUAK	-2.6	-2.2	5.1	-14.6	64.8	294	61.6	134	20	16	32	61	639.7
KUUJJUAQ	-4.9	-4.0	6.2	-18.4	30.4	185	45.6	93	8	15	64	131	708.7
KUUJJUARAPIK	-0.1	-2.1	7.3	-9.5	29.6	108	49.4	67	2	13	34	72	561.4
LA GRANDE RIVIERE	-1.1	*	8.4	-11.1	47.6	*	57.0	*	5	15	46	*	591.7
MANIWAKI	5.2	-1.3	19.5	-9.0			63.0	87	0	7	124	102	396.9
MATAGAMI													
MONT JOLI	4.3	-1.4	15.8	-7.4	5.6	75			66	12	112	96	426.2
MONTREAL INT'L	8.0	-0.7	20.9	-4.5	0.0		57.0	75	0	13	143	104	309.6
MONTREAL M INT'L	6.6	*	20.7	-7.9	0.0	*	59.2	*	0	11	163	*	352.8
NATASHQUAN	2.7	-1.4	-13.5		2.2	56	59.0	54		10	130	100	468.6
QUEBEC	5.7	-0.9	20.1	-5.1	0.0		77.2	85	0	12	124	106	381.1
ROBERVAL	4.3	-0.9	17.3	-8.9	7.2	71	89.8	140	0	13	77	*	435.9
SCHEFFERVILLE	-4.2	-2.8	7.2	-18.6	58.8	130	61.0	80	25	14	63	*	664.7
SEPT-ILES	2.4	-1.2	14.8	-10.6	1.0	9	70.6	73	0	10	126	100	483.1
SHERBROOKE	5.9	-0.7	18.3	-7.4	0.0		72.9	83	0	13	113	*	375.9
STE AGATHE DES MONTS	4.8	-0.6	18.4	-10.2	0.4	5	64.8	73	0	10	137	107	410.5
ST-HUBERT	7.5	-0.9	20.6	-7.4	0.0		61.2	79	0	11	*		326.2
VAL D'OR	3.1	-1.5	14.8	-10.3	9.0	52	105.4	128	0	14	90	101	463.2
NEW BRUNSWICK													
CHARLO	4.3	-1.5	15.8	-7.9	1.0	17	59.7	72	0	11	130	101	421.7
CHATHAM	5.3	-1.8	16.9	-5.6			30.3	31	0	5	*		392.6
FREDERICTON	5.9	-1.6	18.5	-6.9			30.1	30	0	8	138	*	374.4
MONCTON	6.0	-1.6	18.2	-5.7			41.1	41	0	11	138	97	372.2
SAINT JOHN	6.3	-1.3	18.5	-4.4	0.0		49.9	39	0	9	141	100	363.8

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
NOVA SCOTIA													
GREENWOOD	7.3	-1.3	20.4	-5.6			62.1	63	0	12	X		331.2
HALIFAX INT'L	7.3	-1.3	19.0	-2.7			75.3	56	0	9	*		333.3
SABLE ISLAND	10.1	-1.4	16.6	3.0	0.0		175.6	150	0	12	118	98	245.7
SHEARWATER	8.0	-1.5	19.8	-1.5	0.0		70.7	58	0	9	138	87	310.4
SYDNEY	7.0	-1.4	18.7	-4.7			87.3	71	0	16	127	96	343.1
TRURO	6.1	-1.7	19.0	-5.8			62.8	56	0	13	127	98	367.3
YARMOUTH	8.3	-1.2	19.5	-1.1	0.0		98.0	84	0	12	151	101	304.2
PRINCE EDWARD ISLAND													
CHARLOTTETOWN	6.7	-1.4	16.8	-3.4	1.0	38	61.8	58	0	13	X		352.2
SUMMERSIDE	10.6	2.0	16.6	-0.7	0.2	9	38.6	41	0	9	128	94	345.0
NEWFOUNDLAND													
ARGENTIA	6.6	-1.8	14.4	-1.2	0.0		105.0	117	0	13	X		352.8
BATTLE HARBOUR	1.8	-2.4	13.8	-11.4	8.0	216	57.6	74	7	8	X		502.4
BONAVISTA	5.6	-1.6	16.3	-2.8	24.6		119.6	117		14	X		383.4
BURGEO	5.6	-1.5	14.5	-4.5	0.0		133.6	93	0	14	*		383.9
CARTWRIGHT	1.0	-2.1	11.5	-11.3	5.8	48	74.6	103	0	8	128	143	491.9
CHURCHILL FALLS	-2.2	-2.1	10.5	-16.7	41.7	77	67.6	78	8	11	94	141	624.5
COMFORT COVE	3.9	-2.1	17.4	-6.2	13.6	107	100.5	90	3	12	X		435.4
DANIEL'S HARBOUR	3.4	-2.5	10.2	-5.7	1.0	22	88.3	98	0	12	110	131	452.7
DEER LAKE	4.8	-0.5	16.6	-7.5	11.6	158	67.5	64	2	12	X		436.3
GANDER INT'L	3.8	-2.2	17.7	-7.2	24.2	198	13.4	12	1	13	132	119	439.6
GOOSE	0.4	-2.3	14.1	-12.3	21.7	87	88.9	116	0	8	130	138	544.4
PORT-AUX-BASQUES	6.3	-0.7	14.8	-4.0	0.2	6	107.4	81	0	14	133	*	363.0
ST ANTHONY	1.9	*	11.5	-10.7	14.2	*	94.1	*	12	7		*	499.1
ST JOHN'S	5.4	-1.5	17.0	-3.5	2.2	50	157.2	108		17	118	106	391.5
ST LAWRENCE	6.0	*	14.0	-4.9	0.0	*	145.2	*	0	12		*	
STEPHENVILLE	5.6	-1.4	14.4	-5.1	0.6	17	96.6	87	0	15			385.4
WABUSH LAKE	-2.4	*	9.7	-16.3	32.3	*	52.1	*	4	10	90	*	

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	12.2	1.3	21.0	1.0	0.0	113.0	64	0	5	167	223.5	2223.3
KAMLOOPS												
SIDNEY												
SUMMERLAND	*		20.0	1.0	0.0	12.8	73	0	4	207	122.2	2163.0
ALBERTA												
BEAVERLODGE	6.0	1.6	23.0	-18.0	3.0	19.0	66	2	6	130	102.3	1391.1
ELLERSLIE	6.4	1.8	22.4	-8.9	3.2	20.2	120	0	6	179	78.9	1320.6
FORT VERMILLION												
LACOMBE	5.8	2.1	24.0	-9.0	0.0	16.3	93	0	5	176	90.0	1261.9
LETHBRIDGE												
VAUXHALL												
VEGREVILLE	6.0	1.9	23.0	-9.0	2.0	13.2	52	2	6		77.2	1317.0
SASKATCHEWAN												
INDIAN HEAD	6.1	0.8	23.5	-8.0	4.4	17.4	70	2	5		80.0	1575.0
MELFORT	5.0	0.8	22.5	-9.0	1.1	3.7	14	0	1	150	68.0	1495.5
REGINA	4.7	0.2	23.0	-11.5	3.5	15.3	83	3	3		0.0	1438.0
SASKATOON	5.9	0.7	23.5	-9.5	4.2	6.3	36	TR	2	155	85.0	1588.5
SCOTT	5.5	1.3	22.5	-8.5	0.0	9.8	72		5	183	63.2	1350.9
SWIFT CURRENT SOUTH	7.4	1.5	23.0	-9.5	5.4	26.4	163	5	5	173		1648.3
MANITOBA												
BRANDON	5.8	0.2	23.1	-9.2	0.0	21.0	90	0	6		70.2	1739.0
GLENLEA	4.9	0.9	23.0	-9.0	0.2	14.2	38	0	6	183	42.1	1619.2
MORDEN	6.4	0.6	24.0	-8.5	1.8	13.6	43	0	3	168	86.5	1935.0
ONTARIO												
DELHI	9.2	-0.7	20.5	-3.5	0.0	101.3	135	0	12	136	141.8	2171.1
ELORA	7.8	-0.7	18.9	-3.4	0.0	76.6	116	0	15		106.2	1907.2
GUELPH	8.3	-0.9	19.3	-5.0	0.0	69.4	95	0	12	137	109.4	1990.1
HARROW	11.6	0.3	23.0	1.0	0.0	118.4	213	0	11	129	208.4	2538.4
KAPUSKASING												
MERIVALE												
OTTAWA	7.8	-0.7	20.1	-5.3	0.0	62.9	92	0	12	142	98.5	2029.9
SMITHFIELD	9.5	0.6	20.5	-3.0	0.0	55.4	69	0	9		140.2	2167.7
VINELAND STATION	10.9	-0.1	20.6	-0.5	0.0	65.2	111	0	15	144	104.0	2248.8
WOODSLEE												
QUEBEC												
LA POCATIERE	6.0	-0.9	17.0	-4.5	1.0	52.8	74	0	9	134	65.3	
L'ASSUMPTION	7.4	-0.6	21.5	-7.0	0.0	62.8	79	0	10	143	94.1	1860.8
LENNOXVILLE												
NORMANDIN	2.9	-1.7	16.5	-10.5	5.0	73.0	122	0	13	86	19.7	1165.5
ST. AUGUSTIN												
STE CLOTHILDE	8.0	-0.3	20.5	-6.5	0.0	73.4	88	0	11	129	104.9	2008.4
NEW BRUNSWICK												
FREDERICTON												
NOVA SCOTIA												
KENTVILLE	8.3	-0.8	20.0	-3.0	0.0	53.7	53	0	8	126	106.1	1698.3
NAPPAN	7.1	-1.2	17.5	-8.0	0.0	53.4	53	0	11	124	85.8	1461.0
PRINCE EDWARD ISLAND												
CHARLOTTETOWN												
NEWFOUNDLAND												
ST. JOHN'S WEST	5.3	-1.8	16.0	-4.0	0.0	172.2	119	0	20	108	46.7	1154.5