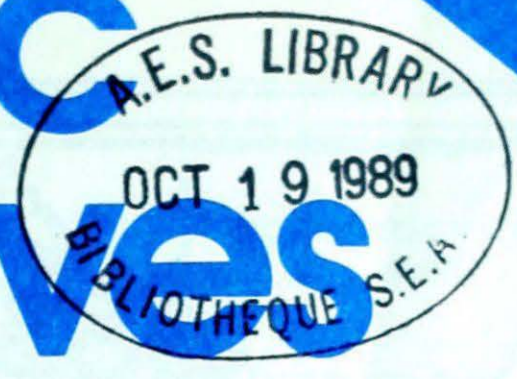




Climatic Perspectives



October 9 to 15, 1989

A weekly review of Canadian climate

Vol. 11 No 42

Vicious storms hit parts of Alberta and Ontario

Alberta

On Tuesday, October 10, a sharp cold front swept across southern Alberta, heralding the arrival of a cold Arctic air mass. In the wake of this frontal passage, fierce northwest winds buffeted parts of southern Alberta. Calgary and surrounding districts were hardest hit by the wind storm, which produced zero visibility due to blowing dust. At Calgary, winds were clocked gusting to 117 km/h, surpassing the previous October record of 115 km/h, set in 1978. The howling winds, which diminished a couple of hours later, flipped over trailers, planes, tore down trees and power lines and damaged buildings. Temperatures after the noon hour dropped from 18°C to 4°C in a matter of minutes, and falling rain changed to snow two hours later.

Although thunderstorms were associated with this front, the winds were not caused by them, but were mainly the result of strong pressure rises in the cold air mass after the frontal passage.

Ontario

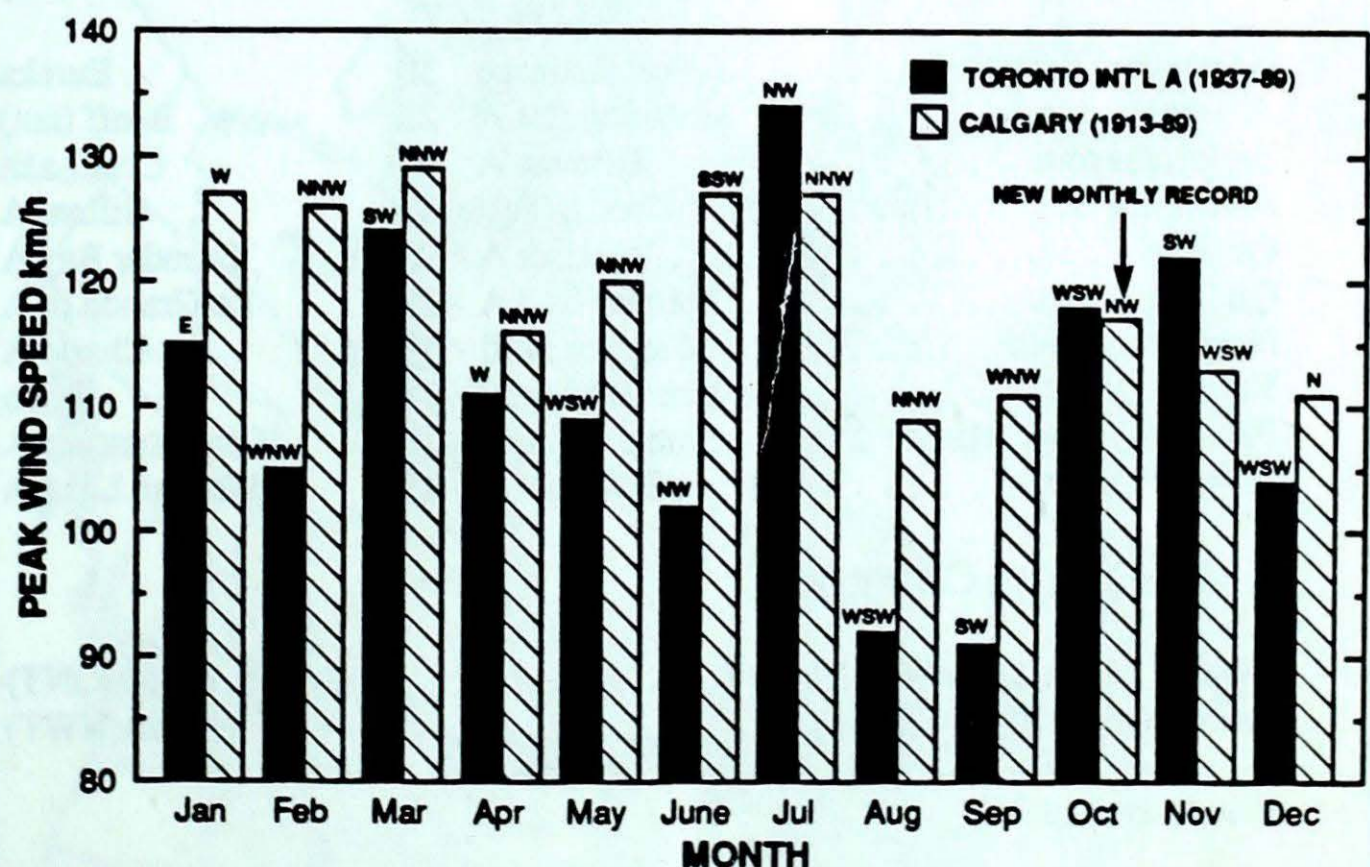
On Saturday, October 14, a severe thunderstorm complex developed rapidly along a warm front, and struck south-central Ontario during the afternoon. The storms spawned funnel clouds and water

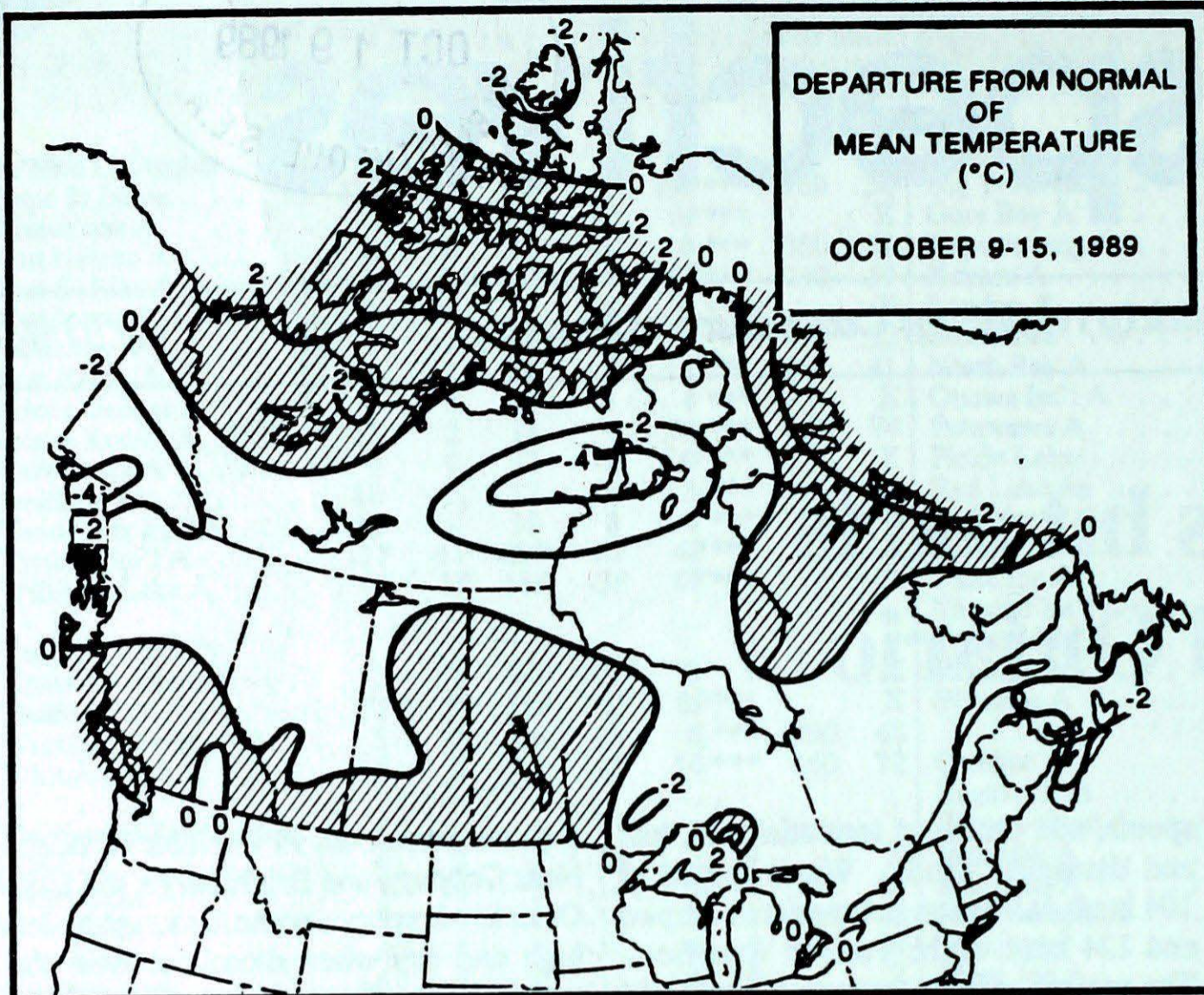
spouts, and produced torrential rain, hail and damaging winds. Winds gusted to 104 km/h at Pearson International Airport and 124 km/h at the Toronto waterfront. The storms, which tracked towards the east-southeast, left a swath of wind and flood damage. The thunderstorms also produced temporary, but startling water level fluctuations on Lake Ontario, Lake Simcoe and to a lesser extent Georgian Bay. This seiche phenomenon was caused by the strong winds and pressure differences generated by the thunderstorms. Reports indicate that, in some cases, water levels dropped almost two metres and

then recovered, all in a matter of hours. Near Cobourg and Brighton, on the Lake Ontario shoreline, some boats were left high and dry when shorelines were exposed, while others moored offshore were dragged further away and then partially submerged by their heavy mooring anchors, when the water levels recovered.

The next day, Sunday, another cluster of severe thunderstorms developed and moved across central Ontario.

At this time of year, thunderstorms of this magnitude are rare in Ontario, and yet, surprisingly, these storms were among the most severe of 1989.





Weekly normal temperatures (°C)

	max.	min.
Whitehorse A	5.8	2.1
Iqaluit A	-0.9	-3.7
Yellowknife A	2.2	-0.3
Vancouver Int'l A	14.2	10.7
Victoria Int'l A	14.7	10.5
Calgary Int'l A	13.2	6.4
Edmonton Int'l A	12.5	5.5
Regina A	13.1	6.3
Saskatoon A	12.7	6.1
Winnipeg Int'l A	12.9	7.4
Ottawa Int'l A	14.0	9.0
Toronto Int'l A	15.9	10.3
Montréal Int'l A	14.2	9.5
Québec A	11.7	7.2
Fredericton A	13.6	7.9
Saint John A	12.7	8.2
Halifax	13.8	9.8
Charlottetown A	12.6	8.6
Goose A	7.1	3.4
St John's A	10.9	7.5

Weekly temperature and precipitation extremes

	Maximum temperature (°C)	Minimum temperature (°C)	Heaviest precipitation (mm)
British Columbia	Penticton A 22	Puntzi Mountain (aut) -11	Hope A 116
Yukon Territory	Watson Lake A 6	Faro (aut) -17	Komakuk Beach A 18
Northwest Territories	Fort Reliance 10	Eureka -29	Watson Lake A 18
Alberta	Medicine Hat A 25	Banff (aut) -8	Hay River A 30
Saskatchewan	Estevan A 24	Cree Lake -7	Jasper 25
Manitoba	Gretna (aut) 21	Gillam A -10	Wynyard 18
Ontario	Windsor A 28	Thunder Bay A -8	Churchill A 31
Québec	Montréal Int'l A 18	La Grande Iv A -8	Wiarion 44
New Brunswick	St Stephen (aut) 19	Charlo A -4	Chibougamau Chapais a 18
Nova Scotia	Western Head (aut) 18	Truro -2	St Stephen (aut) 13
Prince Edward Island	Summerside A 16	Charlottetown A 0	Sydney A 81
Newfoundland	St John's A 15	Wabush Lake A -5	East Point (aut) 55
			Burgeo 78

Across The Country...

Highest Mean Temperature	Goderich (aut)(ONT) 14
Lowest Mean Temperature	Eureka(NWT) -23

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**CLIMATIC PERSPECTIVES
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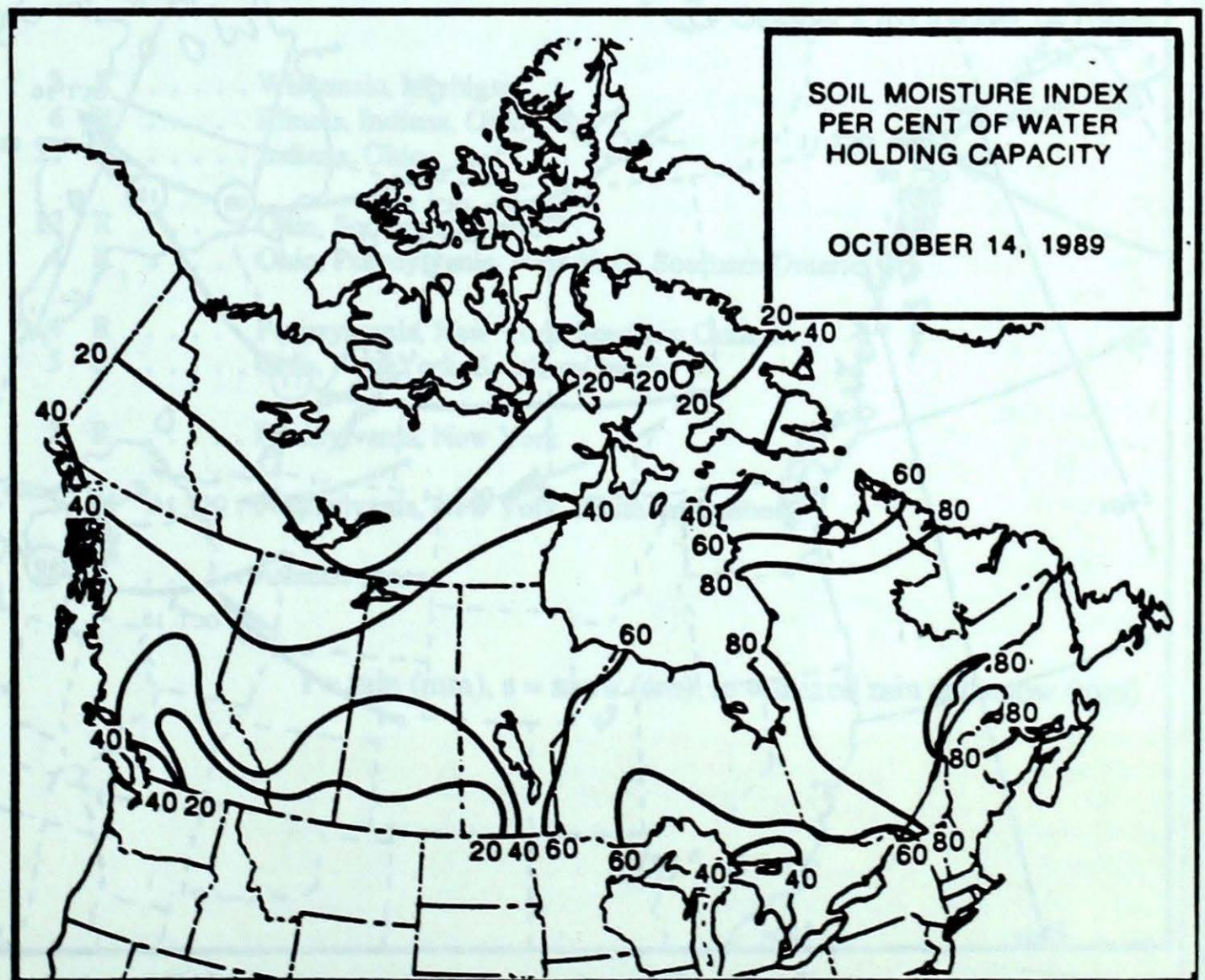
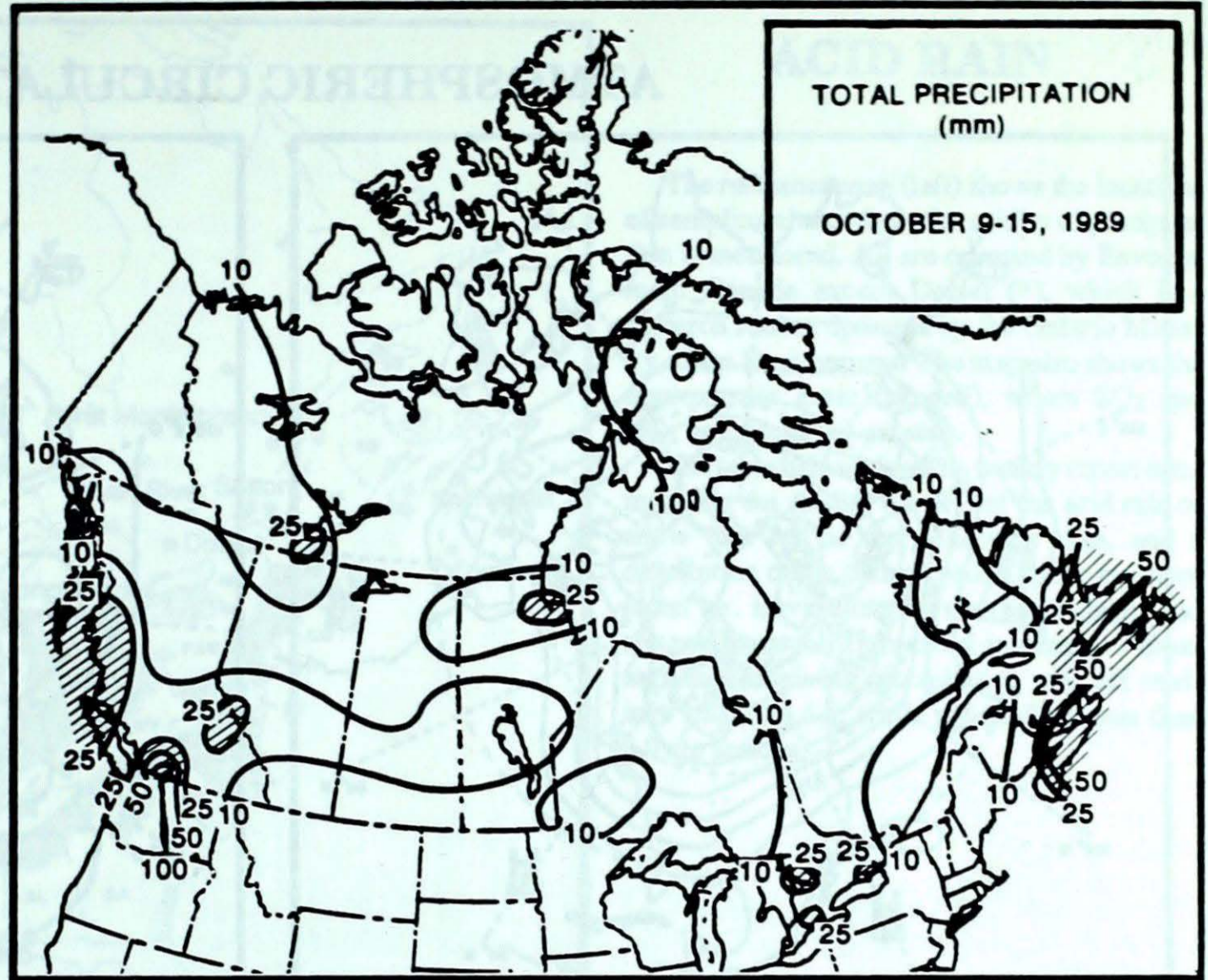
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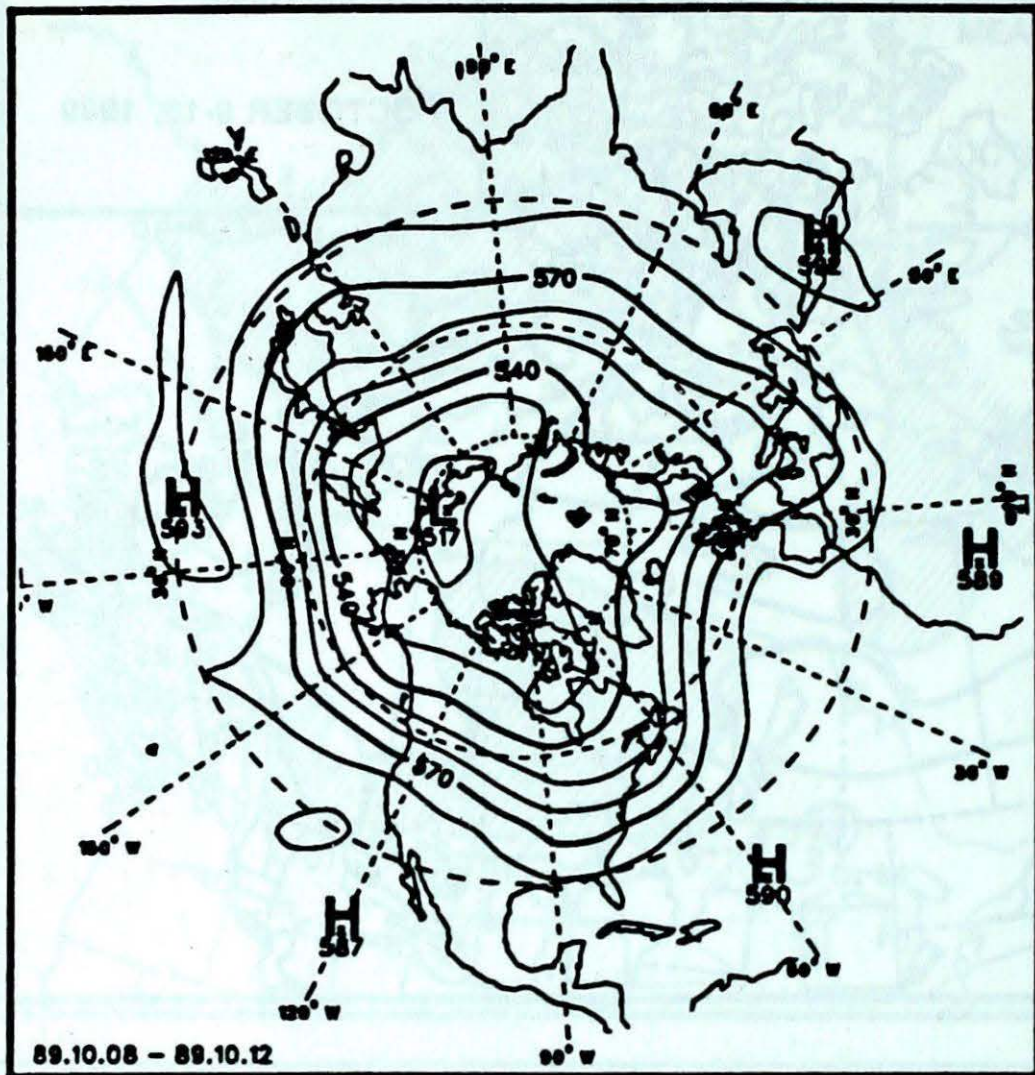
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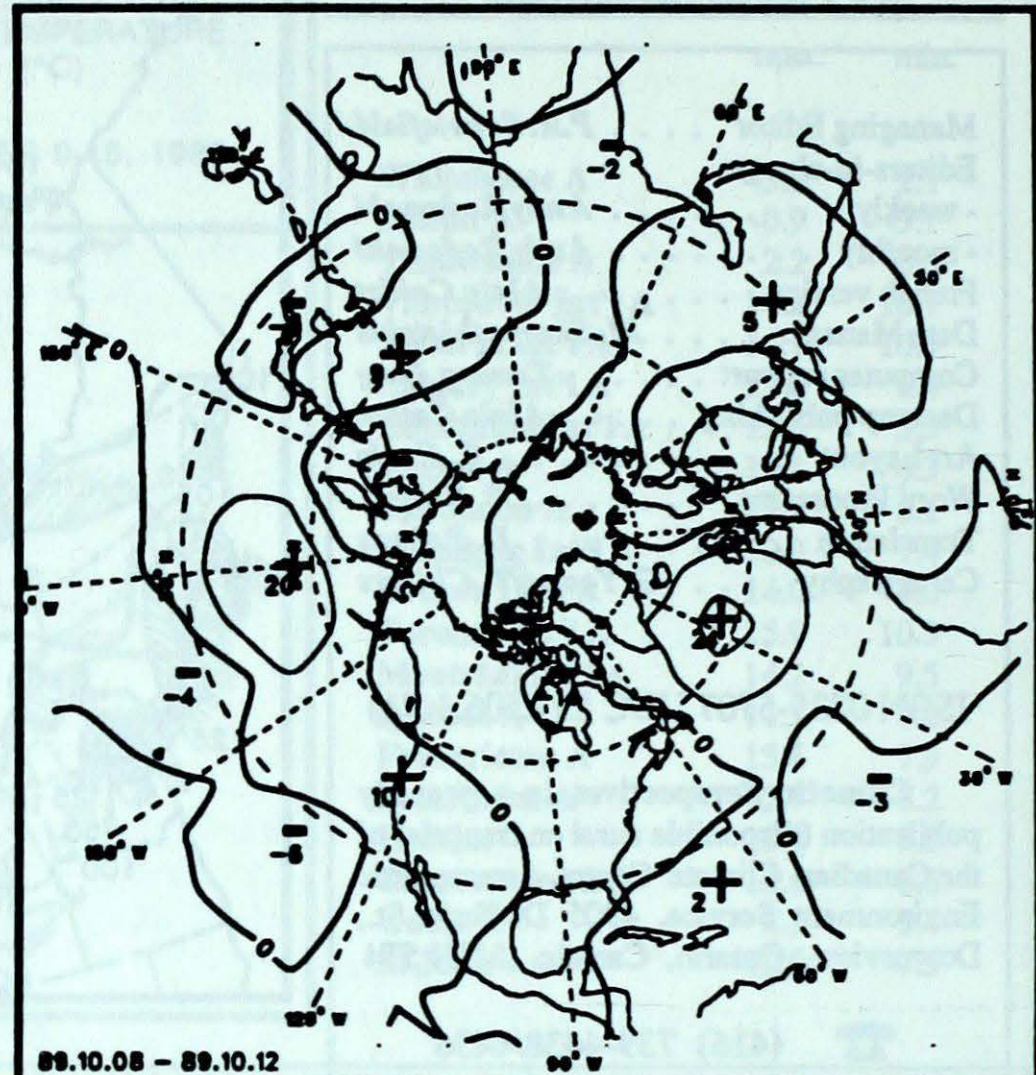
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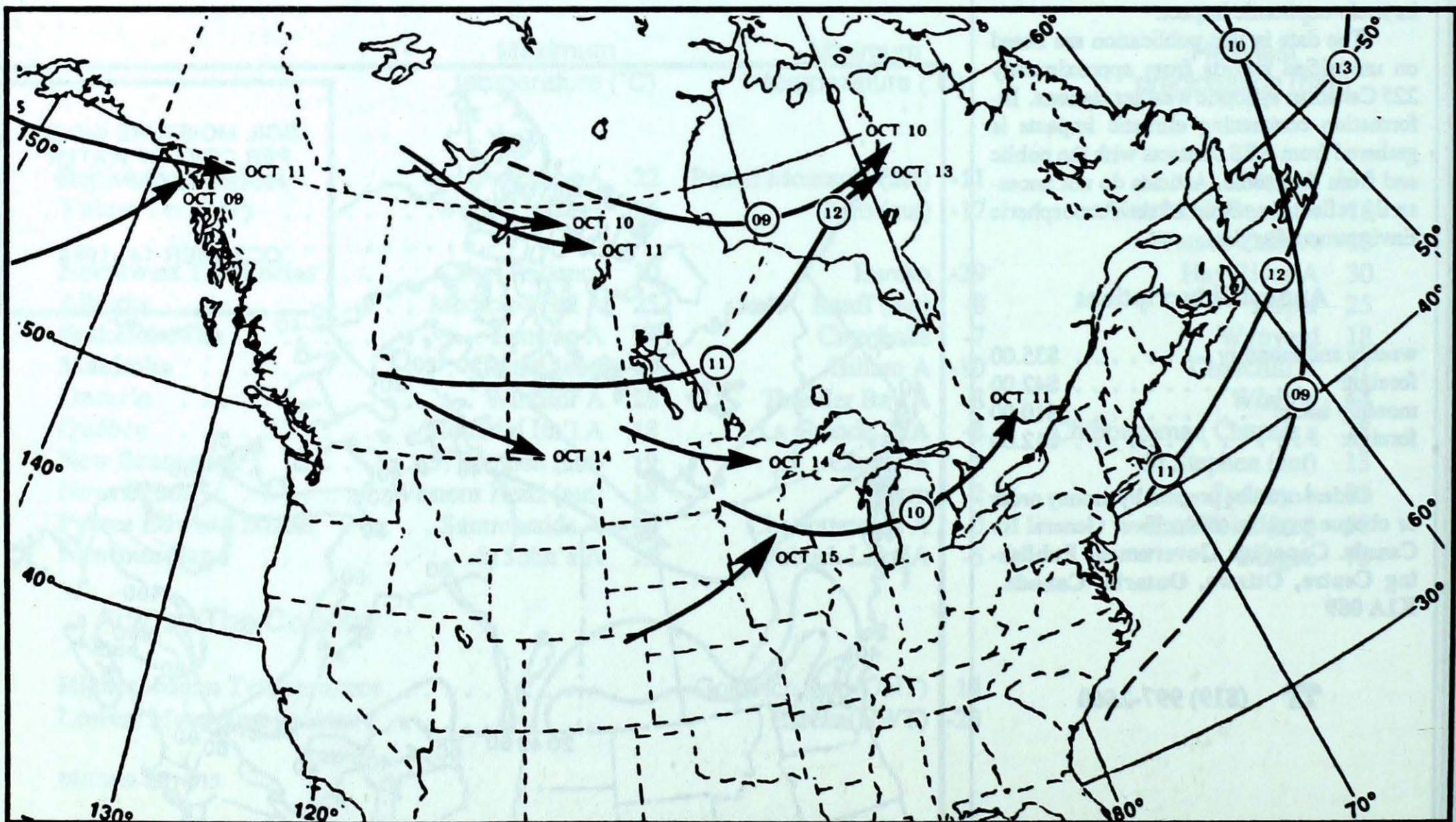
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Mean geopotential height
50-kPa level (10 decametre intervals)



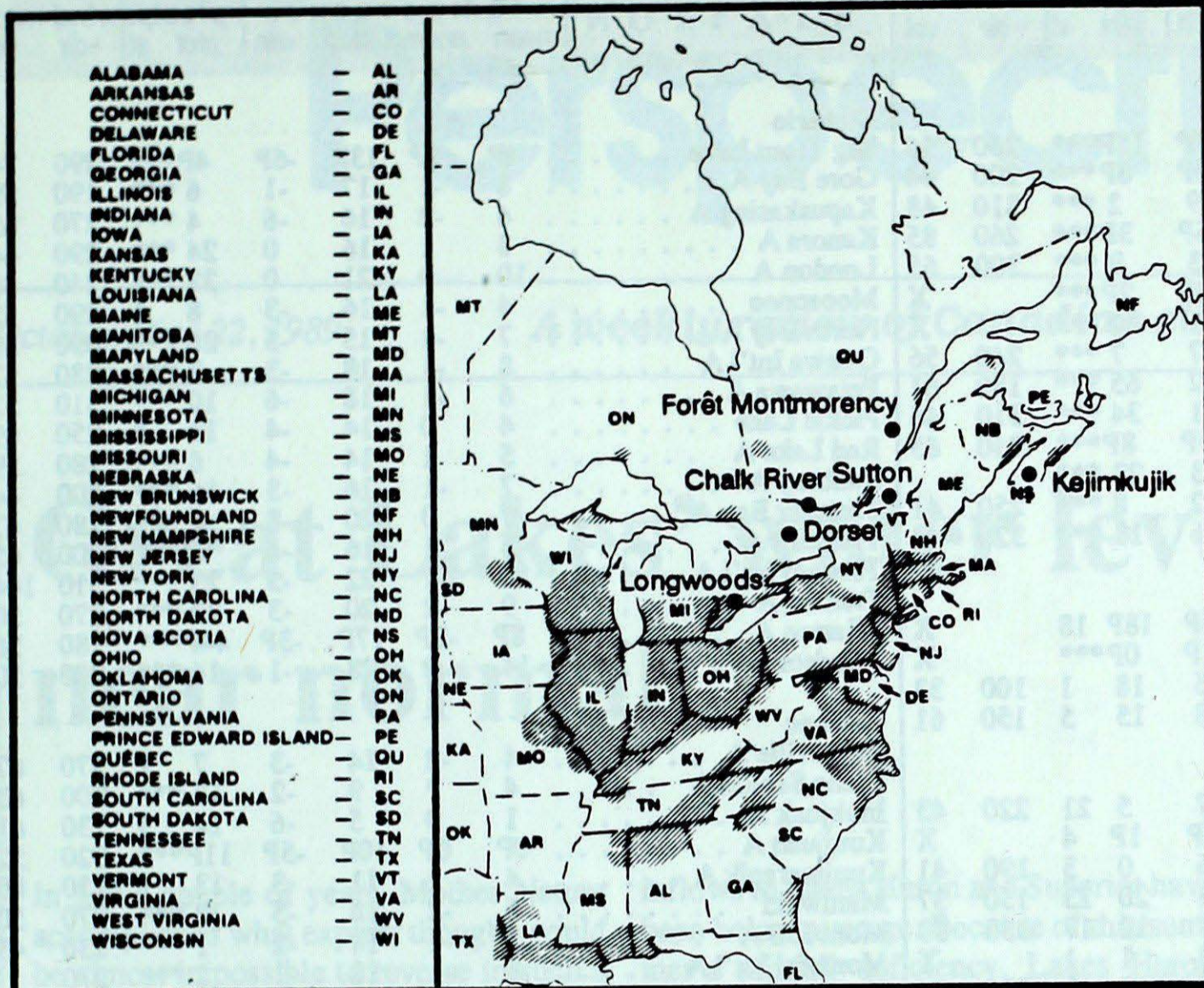
Mean geopotential height anomaly
50-kPa level (10 decametre intervals)



Tracks of low pressure centres at 12:00 U.T. each day during the period.

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ACID RAIN



The reference map (left) shows the locations of sampling sites, where the acidity of precipitation is monitored. All are operated by Environment Canada except Dorset (*), which is a research station operated by the Ontario Ministry of the Environment. The map also shows the approximate areas (shaded), where SO₂ and NO_x emissions are greatest.

The table below gives the weekly report summarizing the acidity (or pH) of the acid rain or snow that fell at the collection sites, and a description of the path travelled by the moisture laden air. Environmental damage to lakes and streams is usually observed in sensitive areas regularly receiving precipitation with pH readings less than 4.7, while pH readings less than 4.0 are serious.

SITE	day	pH	amount	AIR PATH TO SITE
------	-----	----	--------	------------------

October 8 to October 14, 1989

Longwoods	8	4.6	3 R	Wisconsin, Michigan
	9	4.0	6 R	Illinois, Indiana, Ohio
	10	3.6	21 R	Indiana, Ohio
Dorset *	10	4.3	12 R	Ohio, Southern Ontario
	12	5.8	4 R	Ohio, Pennsylvania, New York, Southern Ontario
Chalk River	10	3.8	4 R	Pennsylvania, New York, Southern Ontario
	12	4.2	5 R	Ohio, New York, Southern Ontario
Sutton	12	3.8	2 R	Pennsylvania, New York
Montmorency	12	4.3	5 M	Pennsylvania, New York, Southern Québec
Kejimikujik	11	5.0	18 R	Atlantic ocean

r = rain (mm), s = snow (cm), m = mixed rain and snow (mm)

STATION	temperature				precip.		wind max		STATION	temperature				precip.		wind max	
	mean	anom	max	min	ptot	st	dir	vel		mean	anom	max	min	ptot	st	dir	vel
British Columbia								Ontario									
Cape St James	11P	0P	15P	7P	15P***	260	56	Big Trout Lake	4P	1P	13P	-6P	4P***	290	74		
Cranbrook A	8P	2P	21P	-4P	8P***	200	44	Gore Bay A	8	-1	17	-1	6***	190	59		
Fort Nelson A	1	-2	12	-9	2***	310	48	Kapuskasing A	4	-2	16	-6	4***	270	65		
Fort St John A	5P	-1P	16P	-6P	3P***	260	85	Kenora A	8	1	16	0	24***	290	44		
Kamloops A	9	-1	17	-3	9***	300	65	London A	10	0	21	0	33***	240	48		
Penticton A	8P	-1P	22P	-2P	2P***		X	Moosonee	4	-1	16	-3	8 1	290	52		
Port Hardy A	10	1	14	1	42***		X	North Bay A	7	-1	15	-5	26***	090	32		
Prince George A	6	0	19	-7	7***	240	56	Ottawa Int'l A	8	-1	18	-3	7***	280	57		
Prince Rupert A	8	0	14	2	65***	180	61	Petawawa A	6	-1	18	-6	10***	310	52		
Revelstoke A	8	1	15	1	34***	310	46	Pickle Lake	4	0	14	-4	13 5	250	69		
Smithers A	5P	0P	15P	-3P	8P***	240	65	Red Lake A	5	1	14	-4	6***	280	59		
Vancouver Int'l A	12	1	20	3	23***			Sudbury A	7	-1	16	-3	16***	200	44		
Victoria Int'l A	11	1	18	2	8***	250	41	Thunder Bay A	7	0	20	-8	1***	280	67		
Williams Lake A	6	0	16	-6	11***	320	48	Timmins A	5	-1	16	-4	6***	200	65		
Yukon Territory								Toronto Int'l A									
Komakuk Beach A	-7P	2P	0P	-15P	18P 18		X	Trenton A	9	-2	20	-3	39***	270	50		
Teslin (aut)	-1P	*	6P	-11P	0P***		X	Warton A	8P	-2P	17P	-3P	44P***	180	56		
Watson Lake A	-1	-3	6	-15	18 1	100	33	Windsor A	14	2	28	-1	14***	200	50		
Whitehorse A	-2	-4	5	-13	15 5	150	61	Québec									
Northwest Territories								Bagotville A	4	-2	14	-3	7 1	270	67		
Alert	-20	-2	-14	-27	5 21	220	43	Blanc Sablon A	4	*	9	-2	17***	200	63		
Baker Lake A	-11P	-5P	-7P	-16P	1P 4		X	Inukjuak A	1	0	5	-6	14 5	130	61		
Cambridge Bay A	-10	0	-3	-16	0 3	190	41	Kuujuuaq A	0P	0P	10P	-5P	11P***	320	52		
Cape Dyer A	-5	2	0	-14	20 23	150	37	Kuujuuarapik A	4	1	11	-3	13 1	150	80		
Clyde A	-6	-1	-1	-17	12 17	330	39	Maniwaki	6	-2	18	-5	8***	270	50		
Coppermine A	-4	3	1	-13	1 1		X	Mont Joli A	5	-1	14	-2	1***	230	43		
Coral Harbour A	-12	-6	-5	-22	0 10	020	76	Montréal Int'l A	8	-1	18	-1	2***	270			
Eureka	-23	-3	-15	-29	1 11		X	Natashquan A	4	-1	9	-5	5***	270	44		
Fort Smith A	1	-1	8	-4	14***	300	48	Québec A	7	0	16	1	5***	310	44		
Hall Beach A	-10P	-1P	-2P	-19P	7P 23	330	67	Schefferville A	-1	0	5	-8	12 12	240	50		
Inuvik A	-5	1	2	-17	21 18		X	Sept-Îles A	4	-1	9	-4	10***	300	48		
Iqaluit A	-1P	3P	3P	-9P	21P 5	340	37	Sherbrooke A	6	-1	17	-3	1***	280	50		
Mould Bay A	-14P	2P	-7P	-22P	2P 7	090	46	Val-d'Or A	4	-1	13	-5	15***	230	69		
Norman Wells A	-2P	1P	4P	-12P	6P 1	300	41	New Brunswick									
Resolute A	-11	2	-5	-19	6 32	010	59	Charlo A	5	-1	15	-4	7***	290	46		
Yellowknife A	-1	-1	8	-6	1 1	110	35	Chatham A	6	-1	18	-2	1***	340	59		
Alberta								Fredericton A	6P	-2P	18P	-3P	1P***	280	44		
Calgary Int'l A	7	0	20	-3	2***	330	117	Moncton A	7P	-1P	18P	-2P	6P***	260	69		
Cold Lake A	4	-2	15	-2	4 1	270	32	Saint John A	7	-1	15	-2	4***	200	44		
Edmonton Namao A	5	-1	16	-5	5 1	310	44	Nova Scotia									
Fort McMurray A	3	-1	13	-4	7 1	240	43	Greenwood A	7	-2	17	-2	16***	160	50		
High Level A	1	-2	11	-6	14 7	280	48	Shearwater A	8	-2	17	0	67***	040	63		
Jasper	4	-2	17	-4	25***		X	Sydney A	6	-3	15	-2	81***	290	46		
Lethbridge A	8	0	22	-5	5***	260	109	Yarmouth A	9	-1	15	3	10***	310	52		
Medicine Hat A	9P	0P	25P	-6P	1P***	250	83	Prince Edward Island									
Peace River A	0P	-4P	16P	-6P	0P***		X	Charlottetown A	6	-2	15	0	33***	330	65		
Saskatchewan								Summerside A	7	-2	16	0	17***	270	69		
Cree Lake	2	0	10	-7	4***	210	39	Newfoundland									
Estevan A	9	1	24	-5	1***	320	57	Cartwright	5	1	12	-1	12***	320	50		
La Ronge A	4	1	14	-5	12***	290	44	Churchill Falls A	1	0	9	-3	7 1	300	5		
Regina A	8	1	20	-1	3***	260	80	Gander Int'l A	6	-1	13	0	22***	270	93		
Saskatoon A	5	-1	16	-5	12 1	340	59	Goose A	4	1	11	-1	12***	300	50		
Swift Current A	7	0	23	-4	1***	280	72	Port Aux Basques	6	-2	12	1	61***	320	74		
Yorkton A	6	0	17	-4	6 1	310	74	St John's A	7	-1	15	1	56***	250	96		
Manitoba								St Lawrence	7	-1	14	1	40***		X		
Brandon A	7	1	19	-6	0***	280	85	Wabush Lake A	0	-1	5	-5	7 1	180	44		
Churchill A	-1	-1	5	-8	31 9	010	78	89/10/09-89/10/15									
Lynn Lake A	1	1	9	-6	5 1	310	39										
The Pas A	5	0	15	-2	12***	250	59										
Thompson A	1	1	13	-10	3***	270	39										
Winnipeg Int'l A	8	0	19	-4	5***	290	67										

mean = mean weekly temperature, °C
 max = maximum weekly temperature, °C
 min = minimum weekly temperature, °C
 anom = mean temperature anomaly, °C

ptot = weekly precipitation total in mm
 st = snow thickness on the ground in cm
 dir = direction of max wind, deg. from north.
 vel = wind speed in km/h

— Annotations —
 X = no observation
 P = less than 7 days of data
 * = missing data when going to printing.

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