

Climatic Perspectives



November 9 to 15, 1992

A weekly review of Canadian climate and water

Vol. 14 No. 46

Heavy snow, rain and high winds whip central Canada

Intense early winter storms hit the Prairies and Ontario this week. As the weather systems tracked northeast, they left residents digging out from under substantial amounts of snow, and in the case of southern and central Ontario, record one-day rainfalls were reported.

More snow for the Prairies

In the wee hours of November 10, dense fog covered southeastern Manitoba and northwestern Ontario, with temperatures hovering near freezing. The ground was still covered by snow, which had fallen the previous week during the first major snowstorm of the season. Adding to this wintry scene, snow began to fall once again, accumulating at a rate of several centimetres per hour. By the time it was over, 15 to 20 centimetres of fresh snow covered southern Manitoba and northwestern Ontario. The previous day, Calgary and the southwest foothills were buried under 15 to 25 centimetres of the white stuff.

In Winnipeg, Tuesday morning rush hour was a mess. Buses were stuck and trees and branches were broken off, due to the weight of the wet snow. Power was interrupted, both in the urban and in rural areas, and the International Airport was closed, after a plane skidded off the runway. Luckily, this was not a typical snowfall event for the area, in that gusty winds,

which would normally accompany such a snowstorm, were not present.

Storm blasts Ontario

A fierce autumn storm, which emerged from the American mid-west, struck Ontario on November 12 and 13, producing heavy rain in the south and snow in the north. The low pressure system intensified rapidly on Thursday, and by 7 am Friday morning, the central pressure of the storm had dropped to an astounding 95.8 kPa, as it moved towards James Bay. The storm battered the Great Lakes Basin with storm-force winds, and even hurricane-force winds along the shorelines of the Great Lakes. Intense low pressure systems such as this one are normally observed in the stormy north Atlantic, not in this part of the country.

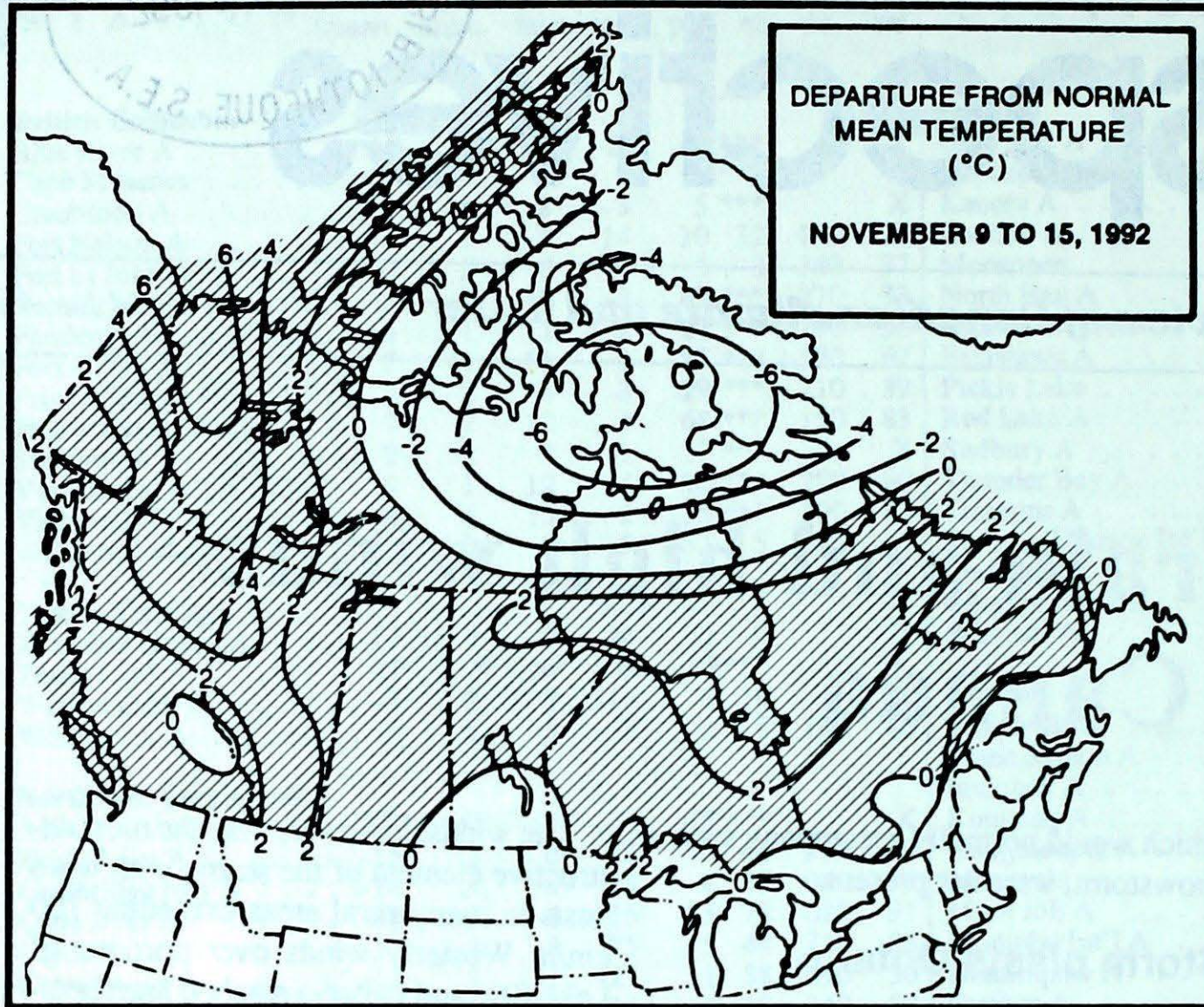
Rainfall amounts ranged from 25 to 60 millimetres in southern and central Ontario, with the greatest values occurring north and west of Toronto. In cottage country north of Toronto, 50 mm of rain in 12 hours, caused lakes to rise substantially and river flows to increase, damaging docks and boat houses. Heaviest snowfalls on Thursday and Friday were concentrated in northeastern Ontario, where amounts as high as 38 cm were reported at Timmins. Heavy blowing and drifting snow made the situation even worse.

The winds, however, were the most destructive element of the storm, with wind gusts in many rural areas exceeding 100 km/h. Westerly winds over portions of Lake Erie and Ontario reached hurricane-force - exceeding 115 km/h. Point Petre along the north shore of Lake Ontario recorded a wind gust of 135 km/h. The winds uprooted trees, snapped branches and downed powerlines. Some areas of Muskoka were without power for five days, as hydro crews used helicopters to get in and clear the debris.

As if this was not enough, Arctic air flooded southwards in the wake of the departing storm and streamed across the relatively warm, open waters of the Great Lakes, producing heavy snow squall activity along the lee shores. For four days, localized bands of snow streamers dumped heavy snow on some communities east of Georgian Bay and Lake Huron. Once again the Muskoka and Haliburton region was hardest hit, in some cases more than 40 cm of snow fell during the weekend.

A look ahead...

For the week of November 23, near to above normal temperatures are expected for the entire country. Precipitation will occur over the Yukon, British Columbia and areas east of Ontario. A mixture of rain and snow is likely east of Ontario.



DEPARTURE FROM NORMAL
MEAN TEMPERATURE
(°C)
NOVEMBER 9 TO 15, 1992

**Weekly normal
temperatures (°C)**

	max.	min.
Whitehorse A	-4.8	-11.5
Iqaluit A	-8.5	-15.9
Yellowknife A	-7.9	-15.7
Vancouver Int'l A	9.4	3.4
Victoria Int'l A	9.7	3.2
Calgary Int'l A	3.4	-7.8
Edmonton Int'l A	1.4	-8.8
Regina A	1.8	-8.4
Saskatoon A	0.3	-8.3
Winnipeg Int'l A	1.2	-7.0
Ottawa Int'l A	5.6	-1.6
Toronto (Pearson Int'l A)	7.9	-0.1
Montréal Int'l A	6.0	-0.6
Québec A	3.8	-2.8
Fredericton A	6.3	-2.3
Saint John A	6.4	-1.1
Halifax (Shearwater)	8.0	1.5
Charlottetown A	6.5	-0.2
Goose A	0.2	-6.8
St John's A	6.5	0.7

Weekly temperature and precipitation extremes

	Maximum temperature (°C)	Minimum temperature (°C)	Heaviest precipitation (mm)
British Columbia	Sandspit A 13	Fort Nelson A -16	Prince Rupert A 112
Yukon Territory	Komakuk Beach A 7	Faro (aut) -24	Whitehorse A 17
Northwest Territories	Fort Simpson A 1	Shepherd Bay A -37	Cape Young A 16
Alberta	Lethbridge A 15	High Level A -18	High Level A 15
Saskatchewan	Eastend Cypress (aut) 10	La Ronge A -18	La Ronge A 14
Manitoba	Dauphin A 6	Thompson A -26	Winnipeg Int'l A 23
Ontario	Burlington Piers (aut) 17	Armstrong (aut) -18	Warton A 73
Quebec	Maniwaki 15	Parent (aut) -17	Québec A 45
New Brunswick	Moncton A 16	St-Léonard A -13	Saint John A 60
Nova Scotia	Greenwood A 17	Greenwood A -8	Yarmouth A 45
Prince Edward Island	Charlottetown A 14	Charlottetown A -3	Charlottetown A 23
Newfoundland	St John's A 16	Churchill Falls A -23	Stephenville A 44

Across The Country...

Highest Mean Temperature	Estevan Point (aut) (B.C.)	8
Lowest Mean Temperature	Shepherd Bay A (N.W.T.)	-28

92/11/09-92/11/15

CLIMATIC PERSPECTIVES
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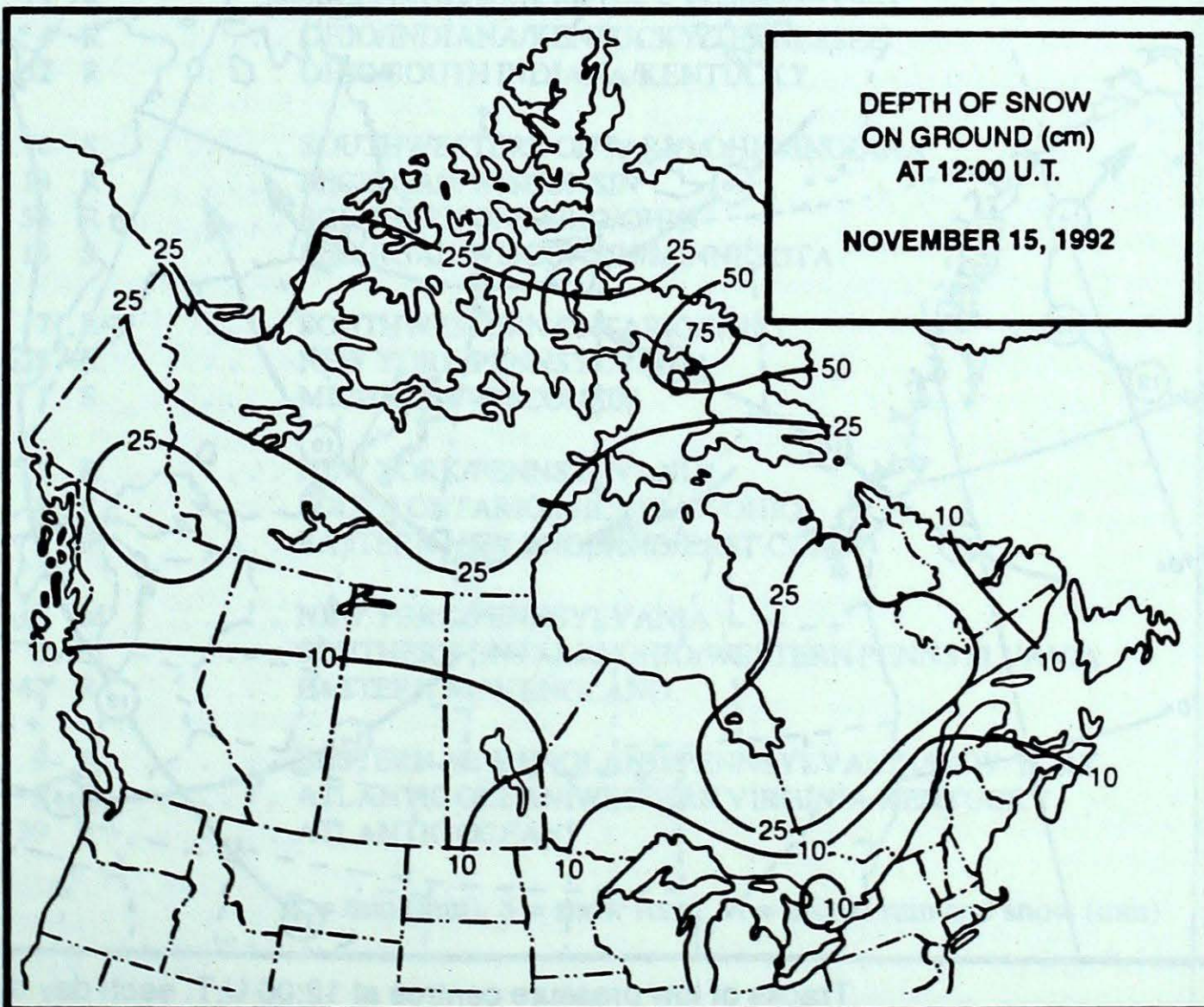
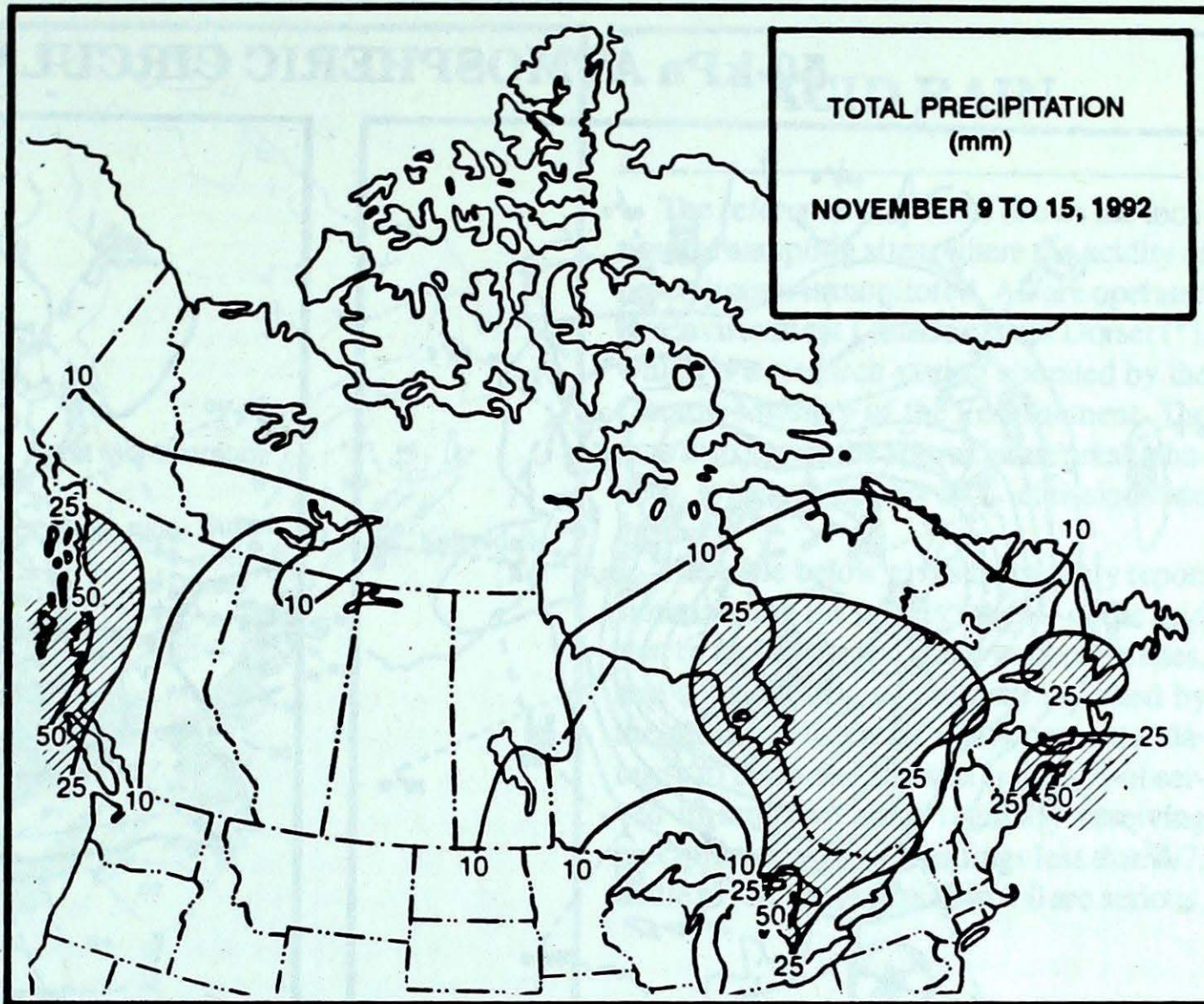
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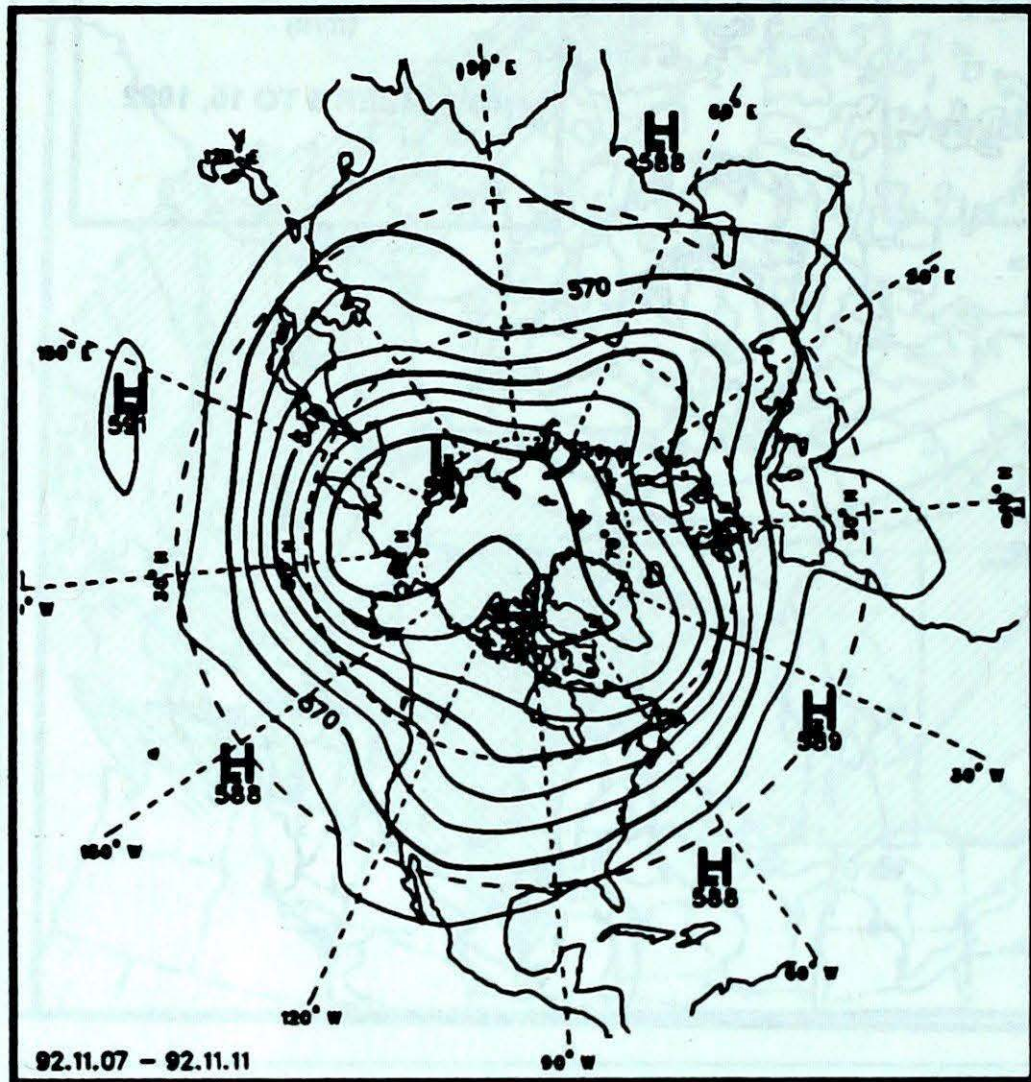
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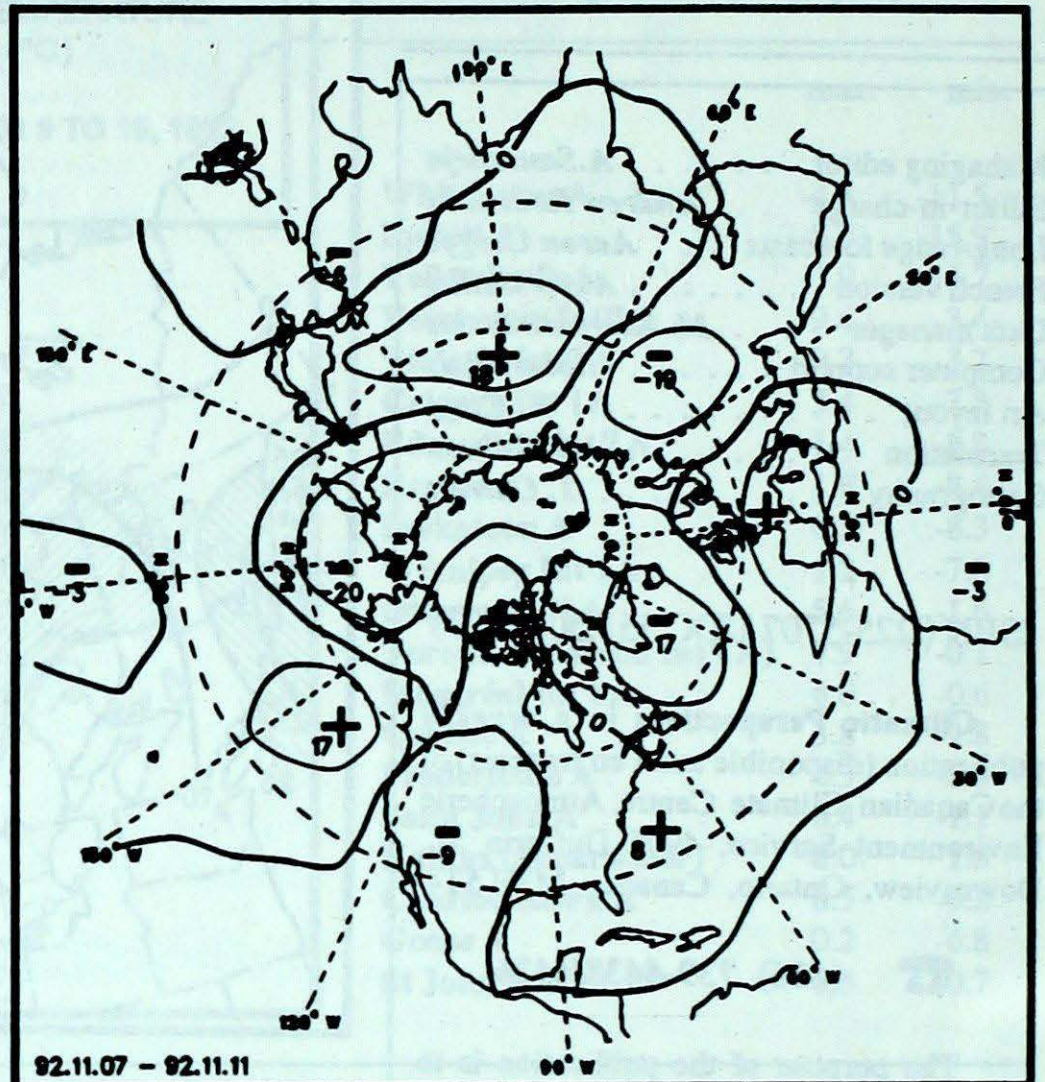
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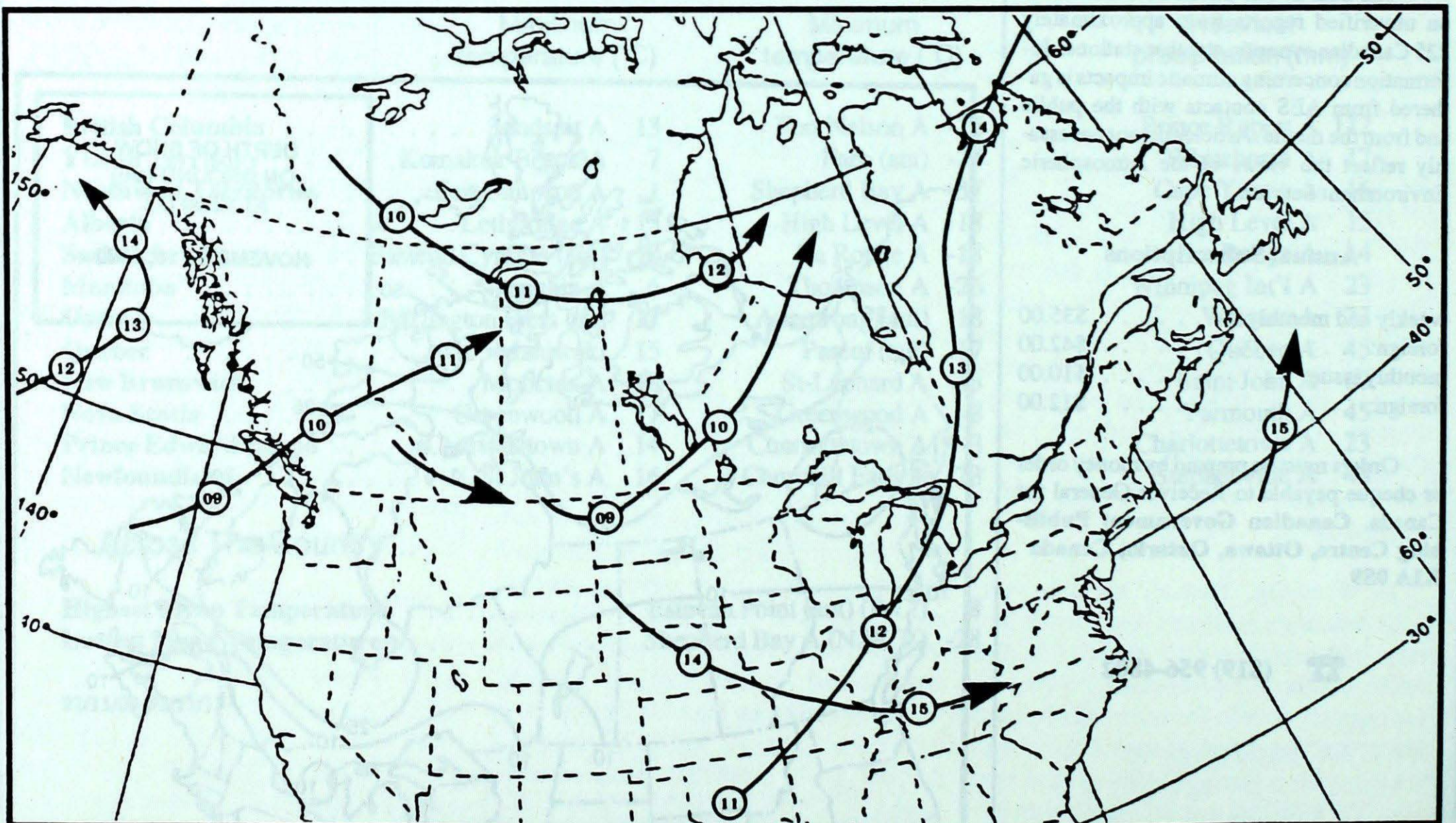
50-kPa ATMOSPHERIC CIRCULATION



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



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

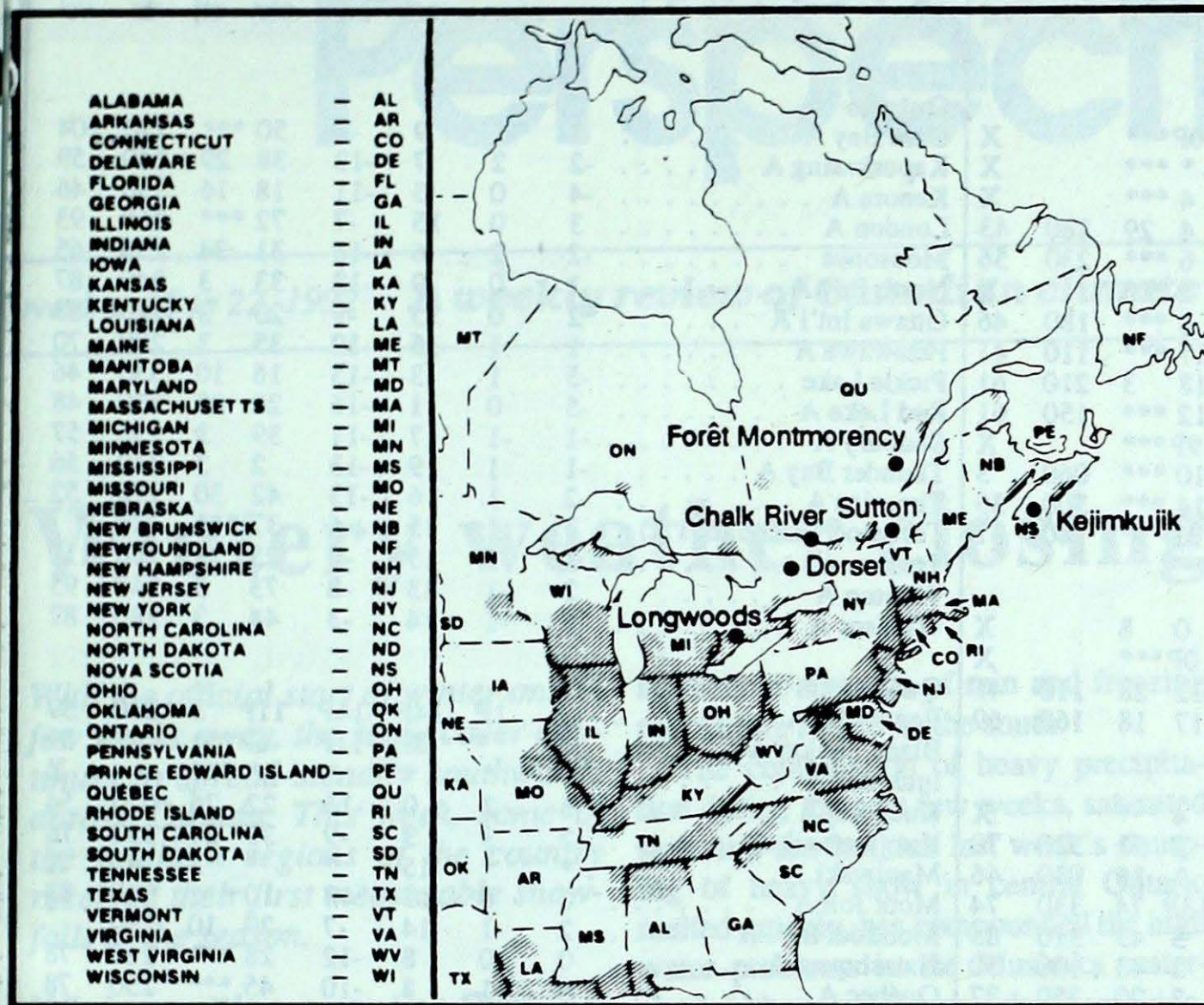


Tracks of low pressure centres at 12:00 U.T. each day during the period.

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.



- ALABAMA -- AL
- ARKANSAS -- AR
- CONNECTICUT -- CT
- DELAWARE -- DE
- FLORIDA -- FL
- GEORGIA -- GA
- ILLINOIS -- IL
- INDIANA -- IN
- IOWA -- IA
- KANSAS -- KA
- KENTUCKY -- KY
- LOUISIANA -- LA
- MAINE -- ME
- MANITOBA -- MT
- MARYLAND -- MD
- MASSACHUSETTS -- MA
- MICHIGAN -- MI
- MINNESOTA -- MN
- MISSISSIPPI -- MS
- MISSOURI -- MO
- NEBRASKA -- NE
- NEW BRUNSWICK -- NB
- NEWFOUNDLAND -- NF
- NEW HAMPSHIRE -- NH
- NEW JERSEY -- NJ
- NEW YORK -- NY
- NORTH CAROLINA -- NC
- NORTH DAKOTA -- ND
- NOVA SCOTIA -- NS
- OHIO -- OH
- OKLAHOMA -- OK
- ONTARIO -- ON
- PENNSYLVANIA -- PA
- PRINCE EDWARD ISLAND -- PE
- QUÉBEC -- QU
- RHODE ISLAND -- RI
- SOUTH CAROLINA -- SC
- SOUTH DAKOTA -- SD
- TENNESSEE -- TN
- TEXAS -- TX
- VERMONT -- VT
- VIRGINIA -- VA
- WEST VIRGINIA -- WV
- WISCONSIN -- WI

SITE	day	pH	amount	AIR PATH TO SITE
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November 8 to 14, 1992

Longwoods	10	4.2	13 R OHIO/INDIANA/KENTUCKY/TENNESSEE
	11	4.4	4 R	..... OHIO/INDIANA/KENTUCKY/TENNESSEE
	12	4.4	52 R	..... OHIO/SOUTH INDIANA/KENTUCKY
Dorset *	10	4.0	6 S	..... SOUTHWESTERN ONTARIO/OHIO/INDIANA
	11	4.1	13 R	..... MICHIGAN/WISCONSIN
	12	4.6	56 R	..... SOUTHERN ONTARIO/OHIO
	14	4.9	13 S	..... MICHIGAN/WISCONSIN/MINNESOTA
Chalk River	10	4.3	7 R	..... SOUTHWESTERN ONTARIO/OHIO
	12	4.6	23 R	..... NEW YORK/PENNSYLVANIA
	14	4.9	1 S	..... MICHIGAN/WISCONSIN
Sutton	10	4.0	4 R	..... NEW YORK/PENNSYLVANIA
	11	4.3	5 R	..... SOUTH ONTARIO/MICHIGAN/OHIO
	12	4.7	6 R	..... EASTERN NEW ENGLAND/EAST COAST
Montmorency	10	4.5	7 M	..... NEW YORK/PENNSYLVANIA
	11	4.7	5 S	..... SOUTHERN ONTARIO/OHIO/WESTERN PENNSYLVANIA
	12	4.7	42 R	..... EASTERN NEW ENGLAND
Kejimikujik	11	4.3	9 R	..... EASTERN NEW ENGLAND/PENNSYLVANIA/NEW-YORK
	12	4.0	5 R	..... ATLANTIC OCEAN/WESTERN VIRGINIA/KENTUCKY
	13	4.3	39 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																	
Blue River A	-2P	-1P	3P	-8P	0P***			X	Gore Bay A	2	-1	9	-7	50 ***	270	104	
Cape St James	*	*	*	*	* ***			X	Kapusking A	-2	2	7	-12	38 29	240	59	
Cranbrook A	0	1	6	-8	4 ***			X	Kenora A	-4	0	3	-11	18 16	330	46	
Fort Nelson A	-8	4	2	-16	4 29	280	43		London A	3	0	15	-7	72 ***	260	93	
Fort St John A	-1	5	6	-6	6 ***	230	56		Moosonee	-2	2	6	-14	31 34	250	65	
Kamloops A	3	1	9	-3	2 ***			X	North Bay A	-1	0	9	-12	33 3	240	87	
Penticton A	5	1	8	-4	4 ***	180	46		Ottawa Int'l A	2	0	15	-9	23 3	220	83	
Port Hardy A	6	1	11	0	17 ***	110	41		Petawawa A	1	1	15	-12	35 3	230	70	
Prince George A	0	2	6	-7	18 3	210	61		Pickle Lake	-5	1	3	-15	16 10	330	46	
Prince Rupert A	6	2	12	-1	112 ***	150	61		Red Lake A	-5	0	1	-16	20 23	330	48	
Smithers A	1P	2P	7P	-6P	9P***			X	Sudbury A	-1	-1	7	-11	39 3	230	57	
Vancouver Int'l A	7	0	11	1	10 ***	060	3		Thunder Bay A	-1	1	9	-13	2 3	330	56	
Victoria Int'l A	7	1	12	1	14 ***	300	35		Timmins A	-2	1	6	-13	42 30	270	52	
Williams Lake A	-2P	-1P	3P	-11P	3P***	140	37		Trenton A	3	-1	15	-9	25 3	240	111	
Yukon Territory																	
Komakuk Beach A	-10	7	7	-20	0 8			X	Wiaraton A	2	-1	13	-8	73 5	240	95	
Teslin (aut)	-7P	*	1P	-17P	0P***			X	Windsor A	5	-1	14	-3	44 3	280	87	
Watson Lake A	-12	2	1	-22	12 28	110	41		Québec								
Whitehorse A	-6	2	4	-22	17 18	160	69		Bagotville A	-1P	1P	14P	-14P	11P 3	210	59	
Northwest Territories																	
Alert	-25	1	0	-37	4 ***			X	Blanc Sablon A	-2P	*	8P	-11P	6P***	240	89	
Baker Lake A	-22	-4	-10	-30	2 51	320	70		Inukjuak A	*	*	*	*	* ***		X	
Cambridge Bay A	-24	-2	-12	-30	1 36	030	46		Kuujuuaq A	-6	2	0	-16	22 26	070	54	
Cape Dyer A	-18P	-4P	-9P	-30P	13P 74	330	74		Kuujuuarapik A	-2	3	3	-9	32 24	350	76	
Clyde A	-20	-4	-11	-26	5 45	310	85		Maniwaki	*	*	15	*	* 3		X	
Coppermine A	-16	-2	-5	-30	5 43	100	50		Mont Joli A	0	0	13	-8	10 ***	210	83	
Coral Harbour A	-22	-7	-10	-31	2 20	350	37		Montréal Int'l A	2	-1	14	-7	29 10	230		
Eureka	-28P	3P	-17P	-36P	0P 10			X	Natashquan A	0	0	8	-12	28 ***	260	78	
Fort Smith A	-9	1	-2	-18	11 14	290	52		Québec A	0	-1	8	-10	45 ***	250	78	
Hall Beach A	-27	-7	-19	-32	1 38	310	50		Schefferville A	-6	3	2	-15	16 23	220	69	
Inuvik A	-12	8	-5	-20	5 35	140	43		Sept-Îles A	-2	0	7	-14	37 ***	220	72	
Iqaluit A	-18	-6	-5	-30	3 9	350	50		Sherbrooke A	0	-1	13	-13	13 ***	250	61	
Mould Bay A	-23	4	-17	-31	0 22			X	Val-d'Or A	-2	1	10	-15	34 5	210	124	
Norman Wells A	-10	8	-1	-21	3 12	130	74		New Brunswick								
Resolute A	-24	-1	-19	-29	1 12			X	Fredericton A	1	-1	15	-11	27 ***	180	70	
Yellowknife A	-9	2	0	-18	10 10	120	52		Miscou Island (aut)	2P	0P	12P	-6P	4P***			
Alberta																	
Calgary Int'l A	0	2	11	-9	6 3	260	76		Moncton A	1	-1	16	-10	11 ***	180	65	
Cold Lake A	-3	2	3	-10	1 3	280	50		Saint John A	1P	-2P	14P	-7P	60P***	200	89	
Edmonton Namao A	0	4	7	-6	1 3	290	52		Nova Scotia								
Fort McMurray A	-5	2	3	-12	9 14	290	50		Greenwood A	3	-2	17	-8	33 ***	180	89	
High Level A	-7	2	2	-18	15 18	290	48		Shearwater A	4	-1	15	-4	37 ***	200	74	
Jasper	*	*	7	*	* 3			X	Sydney A	3	-1	15	-5	15 ***	220	59	
Lethbridge A	3	3	15	-7	1 ***	240	102		Yarmouth A	4	-1	14	-4	45 ***	200	83	
Medicine Hat A	2	2	12	-6	0 ***	330	52		Prince Edward Island								
Peace River A	-2	5	6	-10	4 5	280	56		Charlottetown A	3	0	14	-3	23 ***	180	69	
Saskatchewan																	
Cree Lake	-7	-1	-1	-17	9 14	300	50		East Point (auto)	4P	*	12P	-2P	0P***			
Estevan A	-3P	0P	4P	-11P	4P 3	320	57		Newfoundland								
La Ronge A	-5	2	3	-18	14 8	320	59		Cartwright	0	1	6	-6	6 3	220	74	
Regina A	-2	1	5	-14	1 ***	310	67		Churchill Falls A	-6	0	4	-23	19 37	220	65	
Saskatoon A	-3	1	5	-13	1 ***	280	59		Gander Int'l A	2	-1	14	-7	5 ***	170	70	
Swift Current A	-2	0	6	-11	0 ***	320	69		Goose A	-2	1	5	-12	11 6	250	85	
Yorkton A	-4	0	5	-12	7 3	310	65		Port Aux Basques								
Manitoba																	
Brandon A	-5	-1	3	-15	4 3	300	70		St John's A	3	-1	16	-7	19 ***	230	80	
Churchill A	-8	2	0	-20	6 18	320	67		St Lawrence	4	-1	11	-5	17 ***		X	
Lynn Lake A	-8	1	-1	-24	11 17	290	33		Wabush Lake A	-6	1	4	-20	23 28	250	70	
The Pas A	-4	1	4	-16	2 3	320	52		Annotations								
Thompson A	-7	2	1	-26	6 11	270	46		X	= no observation							
Winnipeg Int'l A	-5	-2	2	-18	23 18	300	48		P	= less than 7 days of data							
92/11/09-92/11/15																	

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