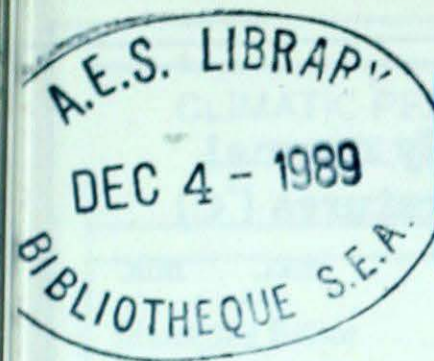




# Climatic Perspectives



November 20 to 26, 1989

A weekly review of Canadian climate

Vol. 11 No 48

## Heavy snowfalls cripple transportation in Atlantic Canada

*Two major storms battered the east coast, providing residents with an early taste of winter. Snowfall amounts in eastern Canada this week were as high as 46 cm.*

The first storm hit on November 21, dumping more than 35 cm of snow across parts of New Brunswick and 20 cm on P.E.I., while Nova Scotia and Newfoundland escaped with mostly rain. Moncton set a new 24-hour November snowfall record of 30.7 cm. Winds gusting in excess of 100 km/h whipped the snow into drifts and produced near-zero visibility in rural areas, forcing the closure of many schools. During the afternoon of the 21st, a new record low November station-pressure reading of 96.1 kPa was recorded at the Moncton weather office. Unusually intense thunderstorms were also reported with the passage of this storm, with lightning causing some damage.

The second storm developed off the eastern seaboard on the 23rd, tracked northwards east of Nova Scotia and across Newfoundland. Nova Scotia received the brunt of this storm on Thursday, with up to 30 cm of snow, province-wide. Many schools and some businesses were closed. For northern Nova Scotia, P.E.I. and parts of Newfoundland this was the second snowstorm in three days. Yarmouth, N.S., received 21 cm, which broke an old 24-

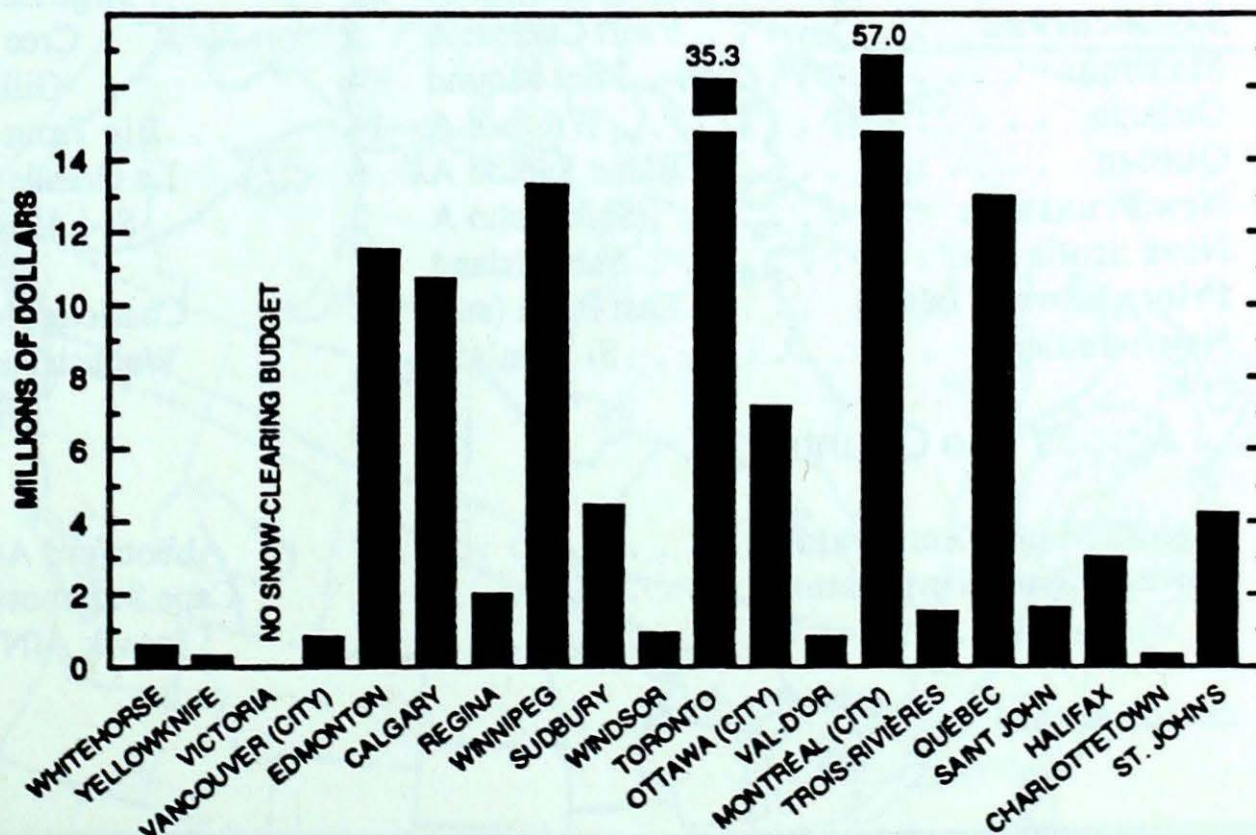
hour snowfall record for the month set in 1912. Heavy snow moved into Newfoundland on Friday, accompanied by very strong winds. At Twillingate, winds gusted up to 165 km/h. Some highways in western Newfoundland were impassable because of the blowing and drifting snow and schools were closed. Deer Lake received 27 cm, bringing the total for the week to 36 cm.

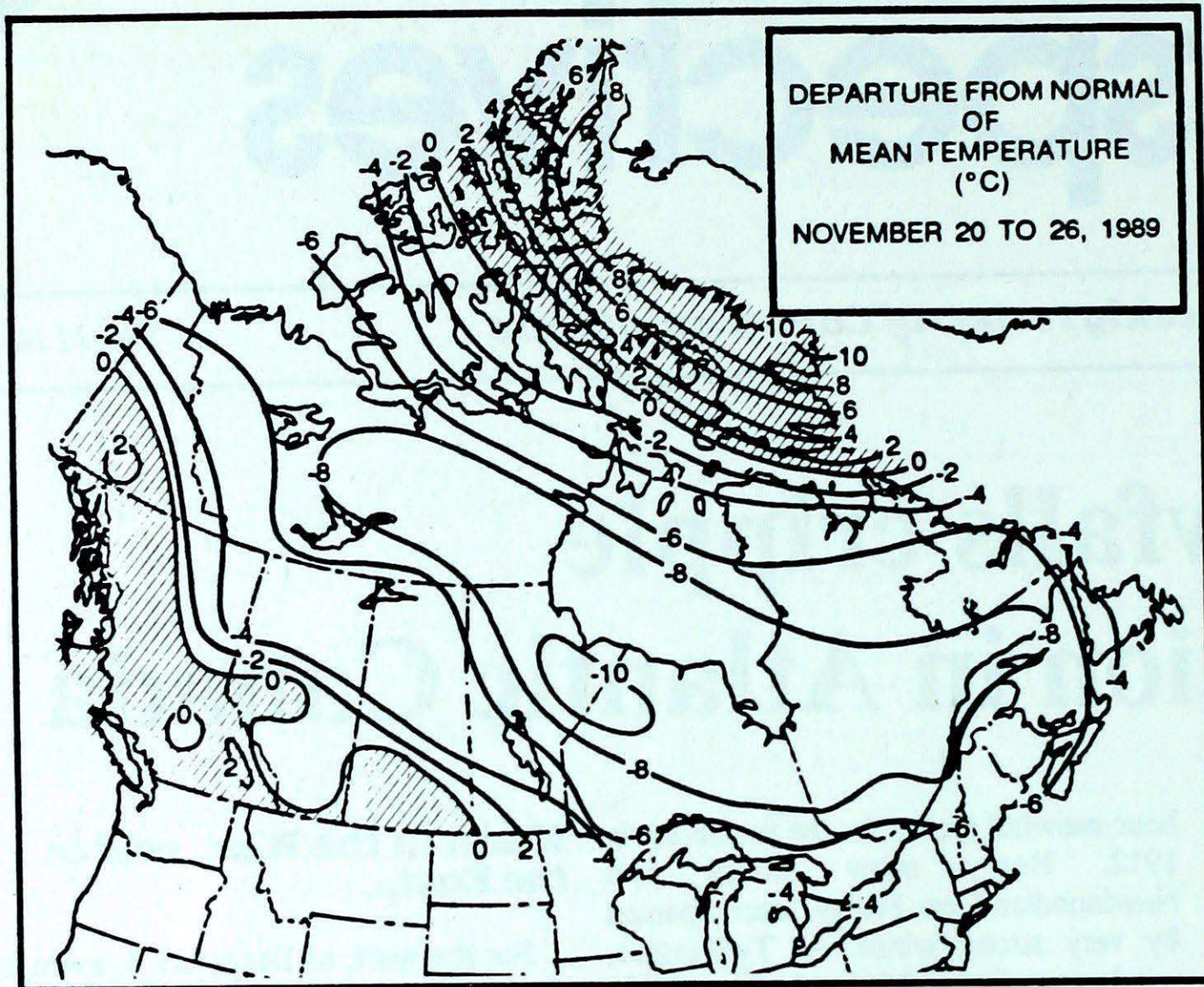
Weaker disturbances brought more snow during the weekend, bringing total snowfalls for the month to well-above normal. Shearwater, N.S., has received 35.4 cm of snow to-date; this is 1.5 cm short of tying the November record.

### Warm in the West, cold in the East...

For the week of December 4, average temperatures are expected to be above normal across western Canada, with maximum departures in the southern half of British Columbia. Below-normal temperatures are expected in eastern Canada, with greatest departures in the southern half of Ontario and Quebec. Snow is expected over the eastern half of the country, particularly over the southern parts of Ontario, Quebec and the Atlantic provinces. The western half of the country will receive below-normal precipitation.

ANNUAL (JANUARY - DECEMBER) SNOW AND ICE-CLEARING BUDGETS





**Weekly normal temperatures (°C)**

|                      | max.  | min.  |
|----------------------|-------|-------|
| Whitehorse A         | -7.5  | -14.5 |
| Iqaluit A            | -9.8  | -18.5 |
| Yellowknife A        | -14.3 | -22.6 |
| Vancouver Int'l A    | 7.9   | 1.8   |
| Victoria Int'l A     | 8.6   | 1.6   |
| Calgary Int'l A      | 0.8   | -10.6 |
| Edmonton Int'l A     | -3.2  | -13.5 |
| Regina A             | -2.7  | -12.8 |
| Saskatoon A          | -3.9  | -13.5 |
| Winnipeg Int'l A     | -3.3  | -11.6 |
| Ottawa Int'l A       | 2.8   | -4.2  |
| Toronto Int'l A      | 5.7   | -1.6  |
| Montréal Int'l A     | 3.4   | -3.2  |
| Québec A             | 1.1   | -5.4  |
| Fredericton A        | 4.0   | -4.8  |
| Saint John A         | 4.8   | -3.2  |
| Halifax (Shearwater) | 6.6   | -0.4  |
| Charlottetown A      | 4.6   | -2.1  |
| Goose A              | -1.6  | -9.3  |
| St John's A          | 5.3   | -0.8  |

**Weekly temperature and precipitation extremes**

|                       | Maximum temperature (°C) | Minimum temperature (°C) | Heaviest precipitation (mm) |
|-----------------------|--------------------------|--------------------------|-----------------------------|
| British Columbia      | Victoria Int'l A 11      | Fort Nelson A -28        | Hope A 110                  |
| Yukon Territory       | Carcross 0               | Old Crow -40             | Ogilvie Camp 26             |
| Northwest Territories | Iqaluit A 3              | Shepherd Bay A -43       | Cape Dyer A 153             |
| Alberta               | Lethbridge A 7           | High Level A -35         | Jasper 17                   |
| Saskatchewan          | Swift Current A 5        | Cree Lake -32            | Moose Jaw A 11              |
| Manitoba              | Pilot Mound 4            | Gillam A -39             | The Pas A 11                |
| Ontario               | Windsor A 14             | Big Trout Lake -36       | Point Petre (aut) 19        |
| Quebec                | Blanc Sablon A 6         | La Grande IV A -35       | Kuujuaq A 36                |
| New Brunswick         | Saint John A 2           | St-Léonard A -20         | Saint John A 42             |
| Nova Scotia           | Sable Island 12          | Truro -15                | Greenwood A 57              |
| Prince Edward Island  | East Point (aut) 8       | Charlottetown A -13      | Summerside A 52             |
| Newfoundland          | St John's A 11           | Wabush Lake A -29        | St Lawrence 65              |

**Across The Country...**

|                          |                     |
|--------------------------|---------------------|
| Highest Mean Temperature | Abbotsford A(BC) 6  |
| Lowest Mean Temperature  | Cape St James(BC) 6 |
|                          | Inuvik A(NWT) -32   |

CLIMATIC PERSPECTIVES  
VOLUME 11

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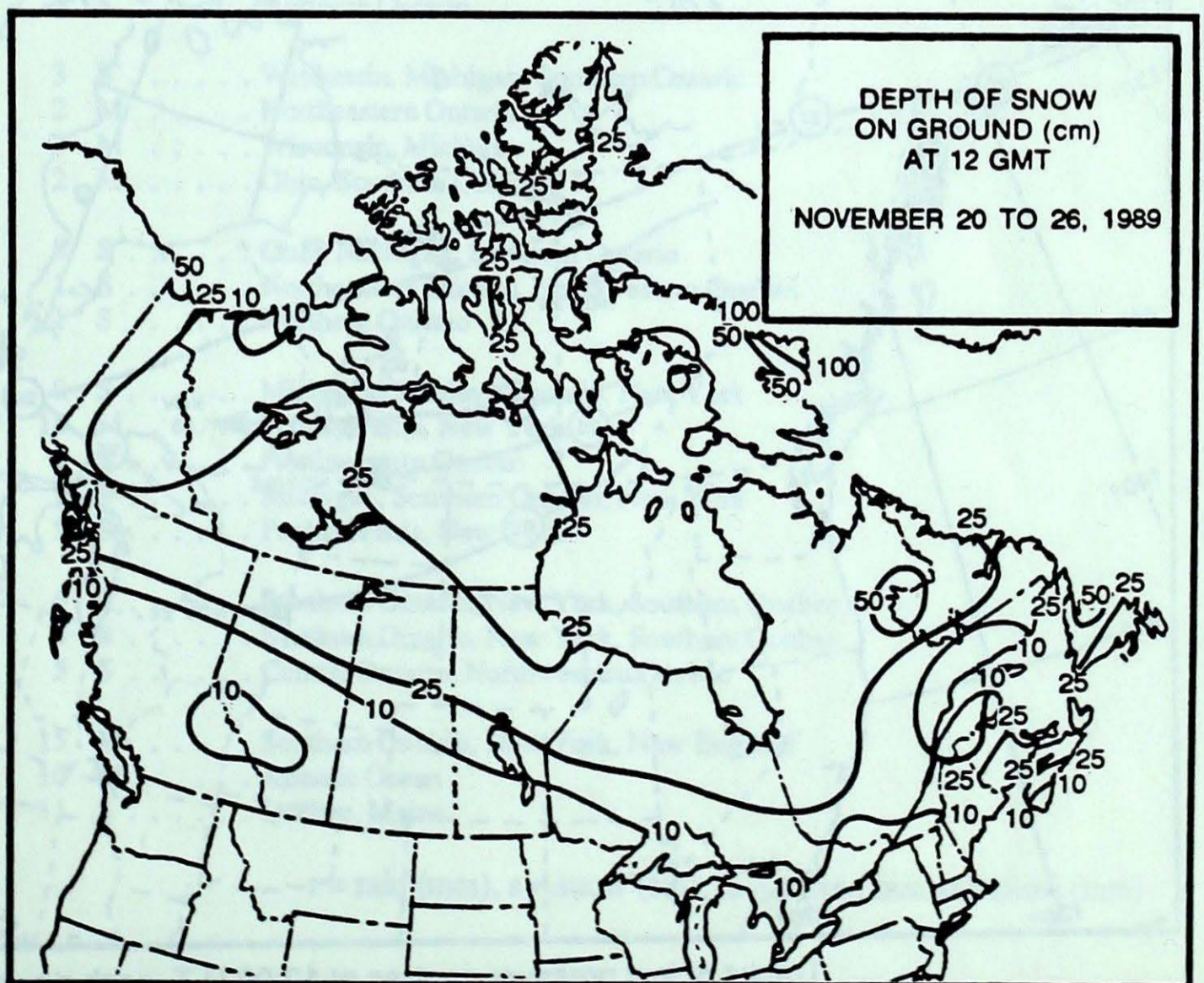
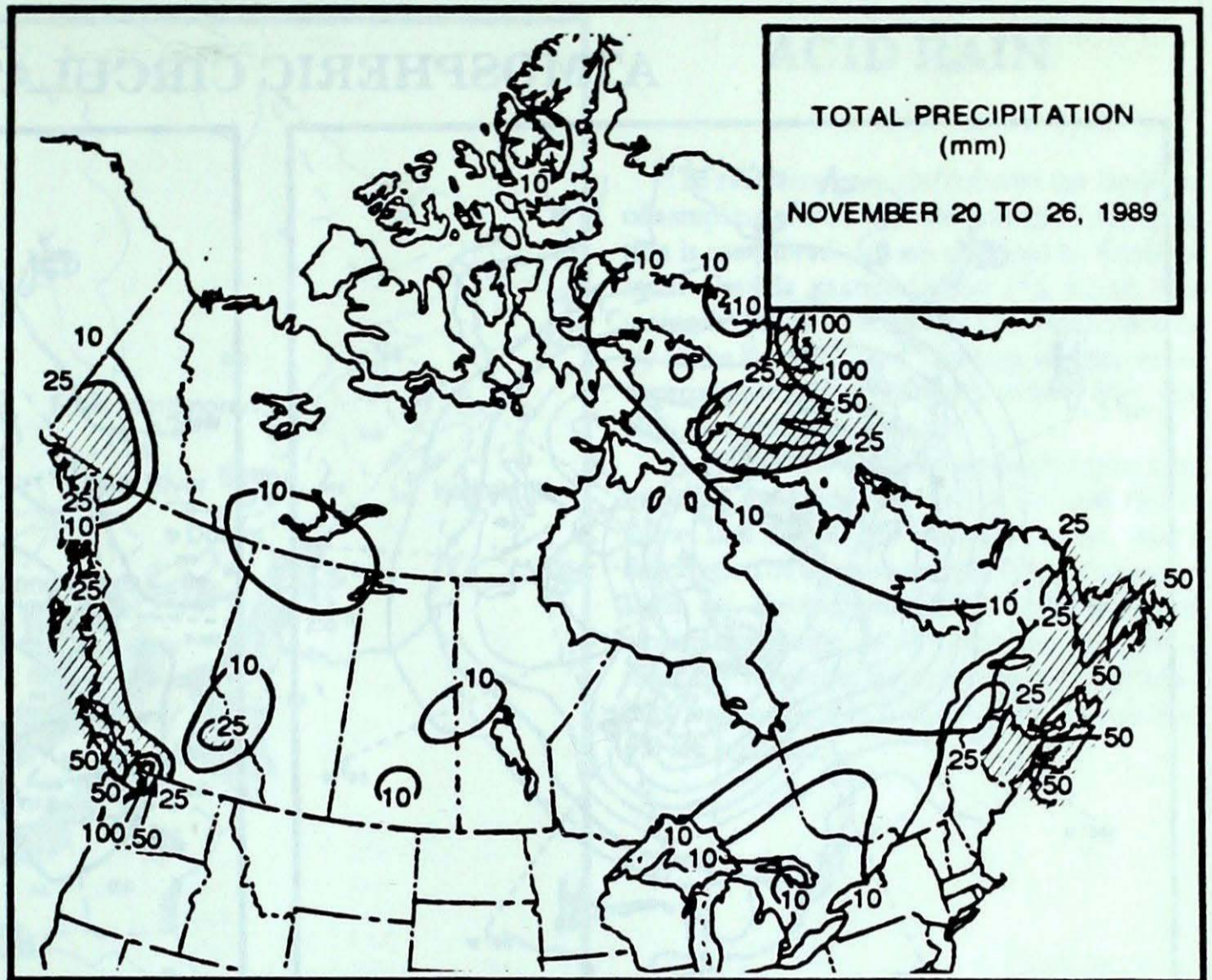
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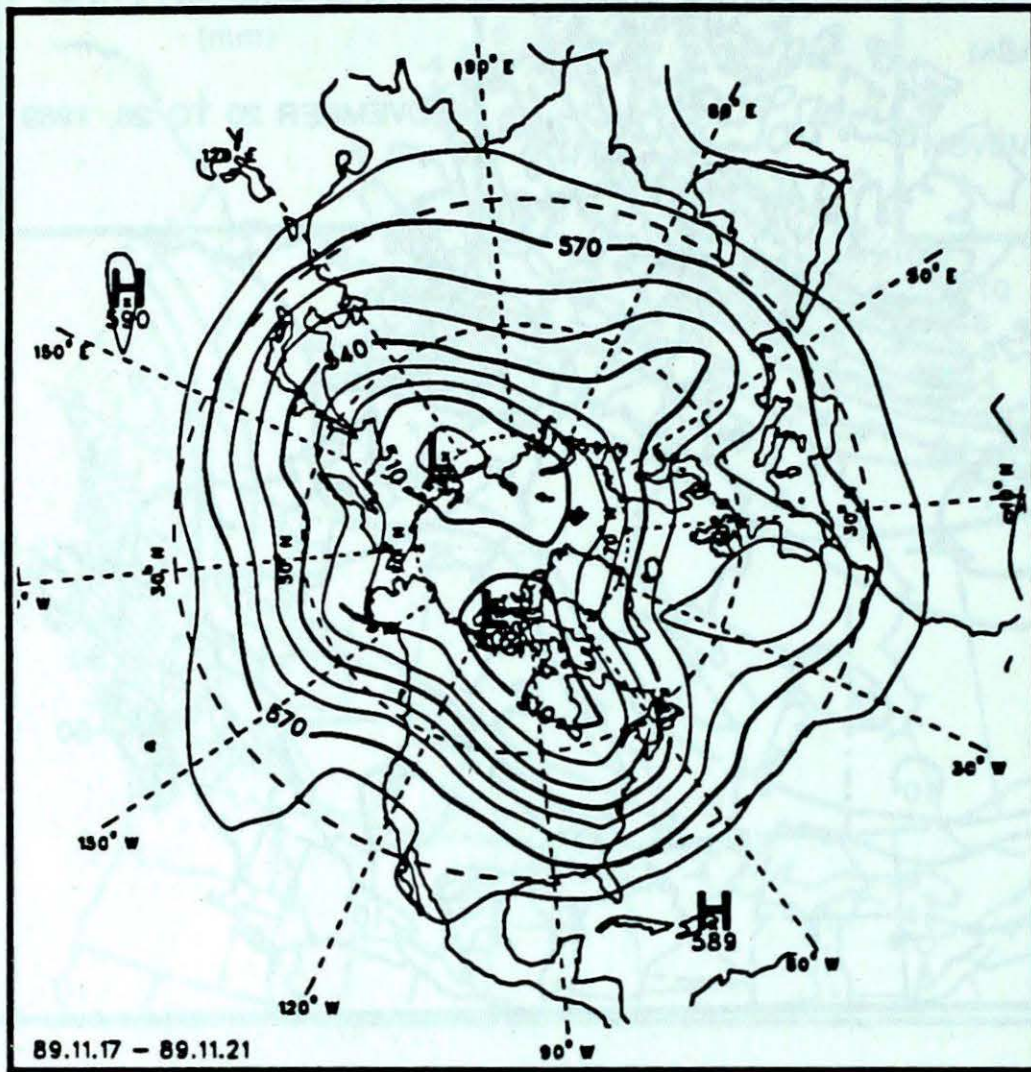
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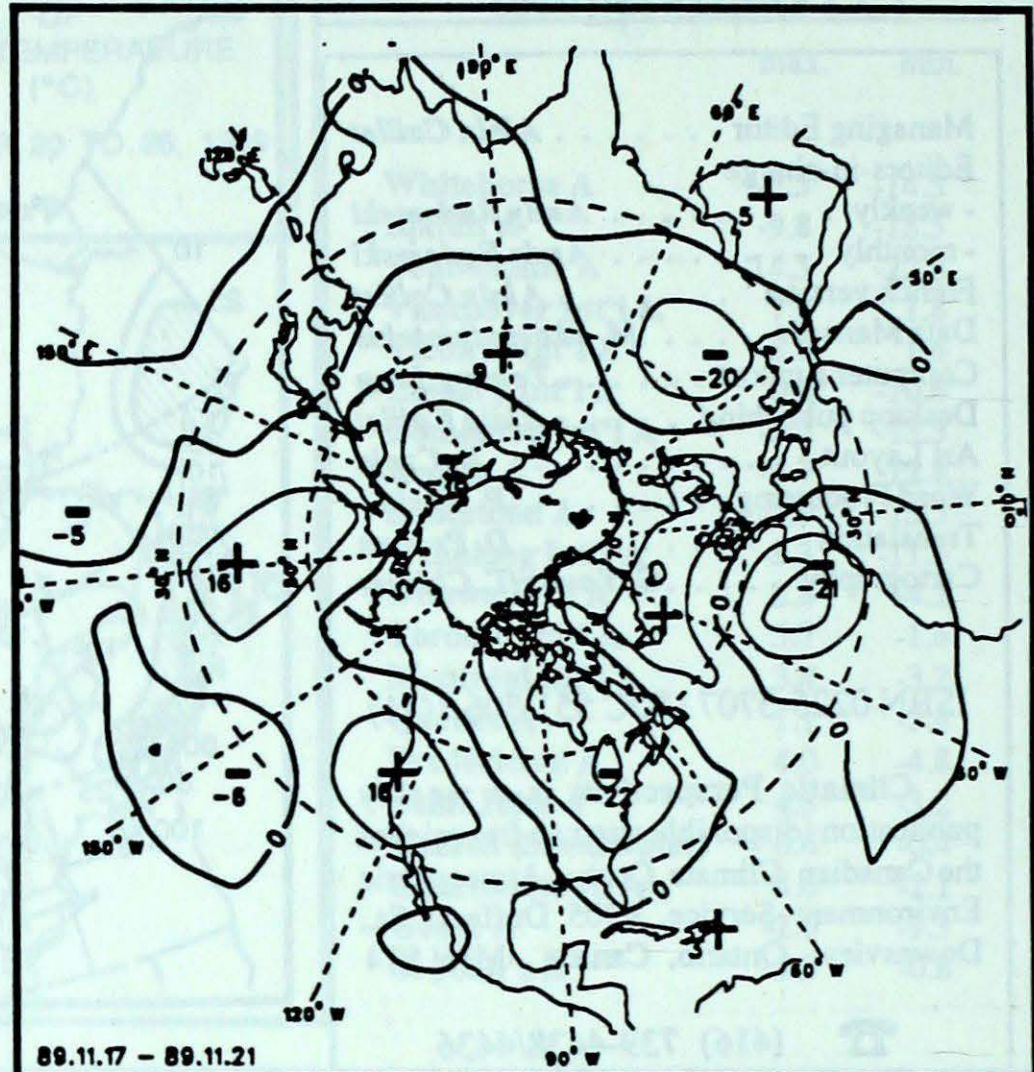
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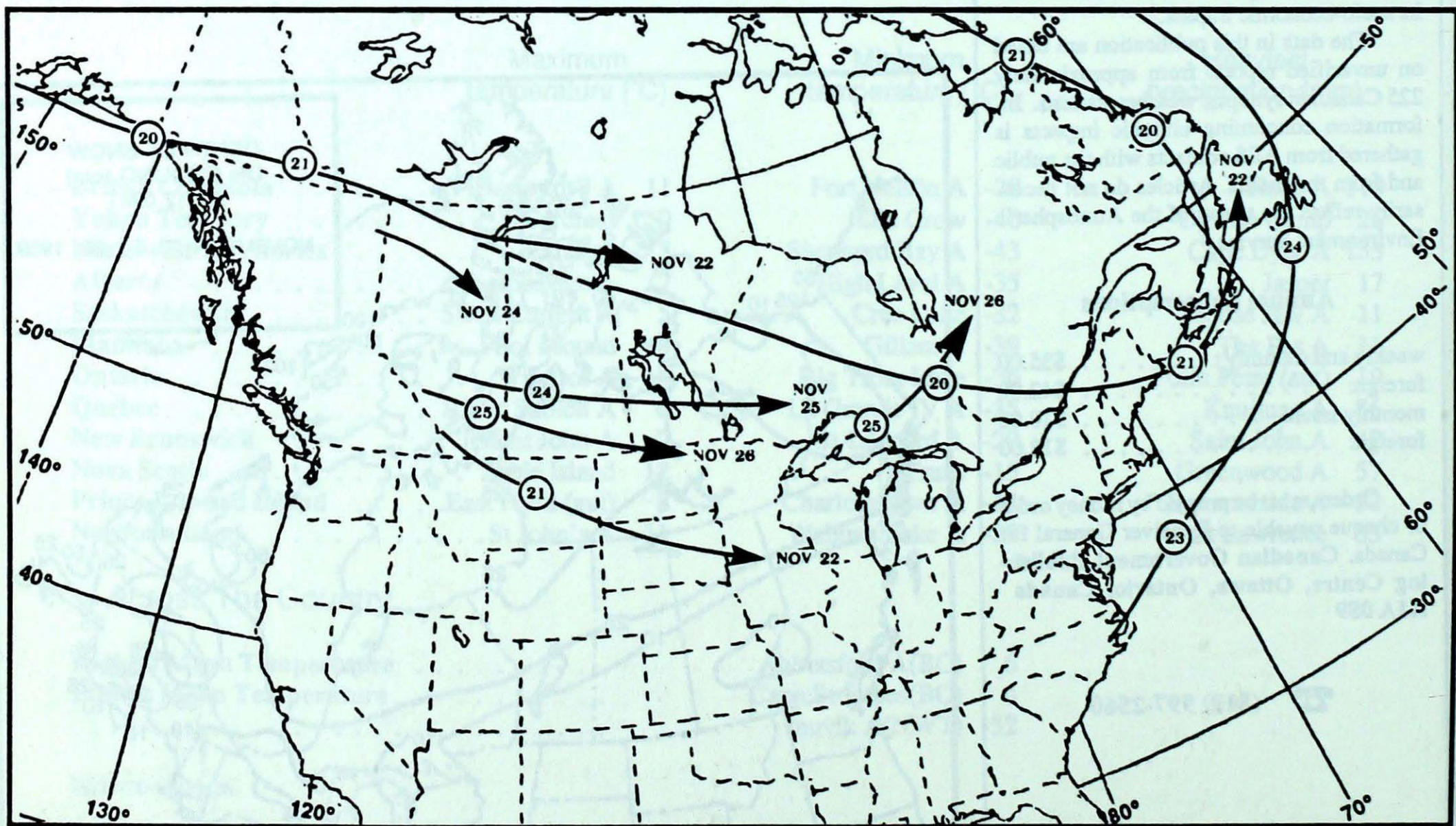
### ATMOSPHERIC CIRCULATION



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



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

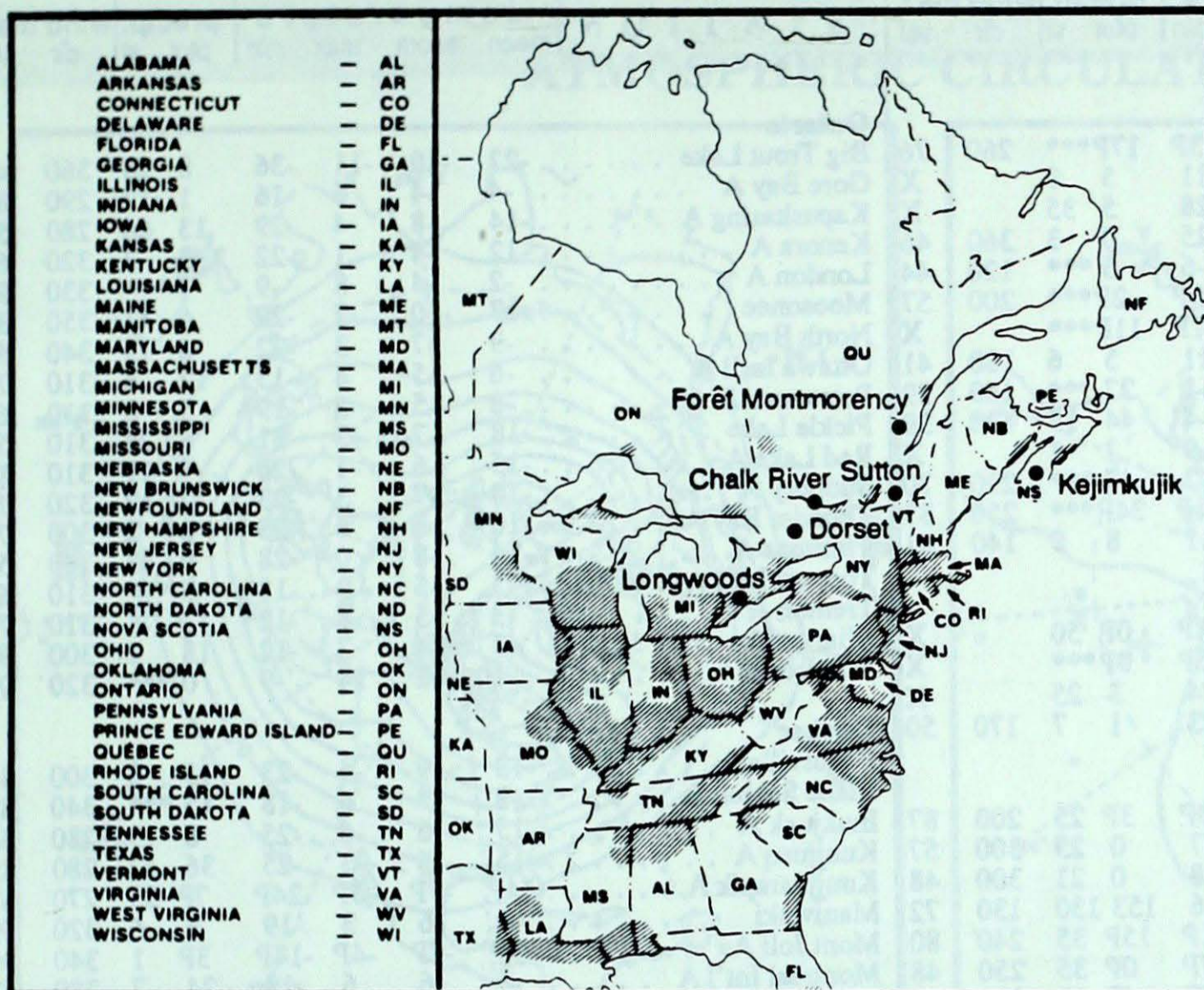


Tracks of low pressure centres at 12:00 U.T. each day during the period.

## 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 SO<sub>2</sub> and NO<sub>x</sub> 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 |
|------|-----|----|--------|------------------|
|------|-----|----|--------|------------------|

From November 19 to 25, 1989

|             |    |     |      |   |
|-------------|----|-----|------|---|
| Longwoods   | 20 | 4.2 | 5 S  | Lake Superior, Michigan, Southern Ontario   |
|             | 22 | 4.3 | 3 S  | Northern Ontario                            |
| Dorset *    | 19 | 4.5 | 3 S  | Wisconsin, Michigan, Southern Ontario       |
|             | 20 | 4.7 | 2 M  | Northeastern Ontario                        |
|             | 23 | 4.9 | 3 M  | Wisconsin, Michigan                         |
|             | 25 | 4.9 | 2 M  | Ohio, Southern Ontario                      |
| Chalk River | 19 | 4.3 | 8 S  | Ohio, Michigan, Southern Ontario            |
|             | 20 | 4.4 | 1 S  | Northeastern Ontario, Northwestern Quebec   |
|             | 22 | 4.7 | 1 S  | Northern Ontario                            |
| Sutton      | 19 | 4.3 | 8 S  | Michigan, Southern Ontario, New York        |
|             | 20 | 4.2 | 18 M | Pennsylvania, New York                      |
|             | 21 | 4.6 | 2 S  | Northwestern Quebec                         |
|             | 24 | 4.1 | 1 S  | Michigan, Southern Ontario, New York        |
|             | 25 | 3.9 | 5 S  | Pennsylvania, New York                      |
| Montmorency | 19 | 4.6 | 6 S  | Southern Ontario, New York, Southern Quebec |
|             | 20 | 4.5 | 3 S  | Southern Ontario, New York, Southern Quebec |
|             | 25 | 4.2 | 5 S  | Central Ontario, Northwestern Quebec        |
| Kejimikujik | 20 | 4.3 | 15 M | Southern Ontario, New York, New England     |
|             | 21 | 4.7 | 10 M | Atlantic Ocean                              |
|             | 23 | 5.0 | 11 S | Quebec, Maine                               |

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

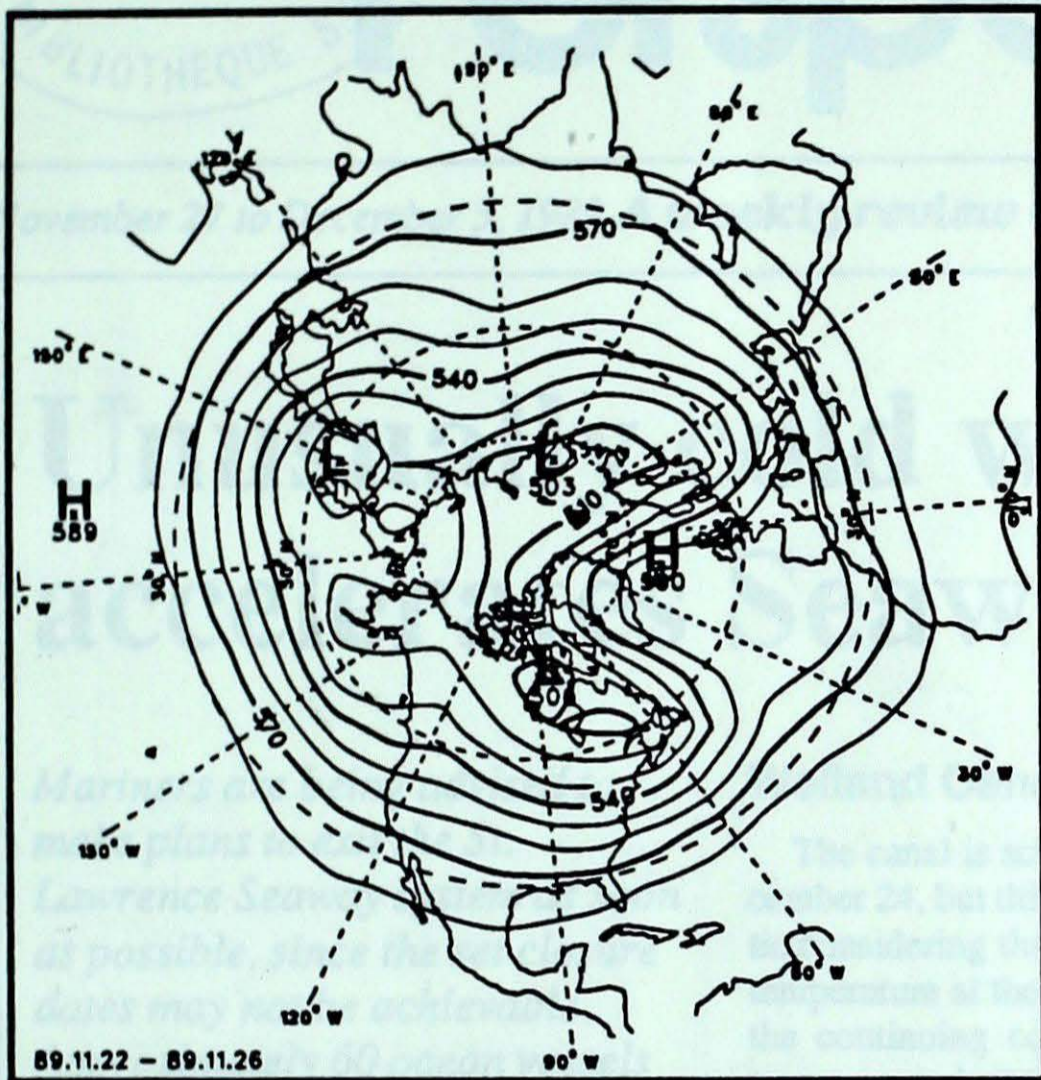
| STATION                      | temperature |      |      |      | precip. |     | wind max |     | STATION                     | temperature |      |     |      | precip. |     | wind max |     |
|------------------------------|-------------|------|------|------|---------|-----|----------|-----|-----------------------------|-------------|------|-----|------|---------|-----|----------|-----|
|                              | mean        | anom | max  | min  | ptot    | st  | dir      | vel |                             | mean        | anom | max | min  | ptot    | st  | dir      | vel |
| <b>British Columbia</b>      |             |      |      |      |         |     |          |     | <b>Ontario</b>              |             |      |     |      |         |     |          |     |
| Cape St James                | 6P          | 0P   | 10P  | 3P   | 17P***  |     | 260      | 76  | Big Trout Lake              | -22         | -10  | -11 | -36  | 8       | 28  | 360      | 41  |
| Cranbrook A                  | -1          | 4    | 8    | -11  | 5       | 9   |          | X   | Gore Bay A                  | -4          | -4   | 6   | -16  | 1       | 12  | 290      | 85  |
| Fort Nelson A                | -19         | -4   | -9   | -28  | 5       | 35  |          | X   | Kapuskasing A               | -14         | -8   | -4  | -29  | 13      | 66  | 280      | 52  |
| Fort St John A               | -14         | -5   | -1   | -25  | 0       | 3   | 360      | 46  | Kenora A                    | -12         | -4   | 1   | -22  | 3       | 3   | 320      | 65  |
| Kamloops A                   | 0           | 1    | 6    | -6   | 5       | *** | 120      | 44  | London A                    | -2          | -4   | 8   | -9   | 7       | *** | 330      | 93  |
| Penticton A                  | 3P          | 1P   | 10P  | -5P  | 2P***   |     | 200      | 57  | Moosonee                    | -17         | -10  | -7  | -29  | 6       | 41  | 350      | 37  |
| Port Hardy A                 | 4P          | -1P  | 8P   | -1P  | 11P***  |     |          | X   | North Bay A                 | -9          | -7   | 3   | -22  | 6       | 15  | 340      | 61  |
| Prince George A              | -5          | 1    | 0    | -11  | 5       | 6   | 180      | 41  | Ottawa Int'l A              | -6          | -5   | 4   | -15  | 12      | 4   | 310      | 72  |
| Prince Rupert A              | 3           | 0    | 7    | -1   | 27      | *** | 160      | 59  | Petawawa A                  | -8          | -5   | 5   | -19  | 5       | 8   | 310      | 63  |
| Revelstoke A                 | 0           | 3    | 6    | -4   | 44      | 15  | 170      | 39  | Pickle Lake                 | -18         | -7   | -3  | -31  | 6       | 26  | 310      | 59  |
| Smithers A                   | -3          | 1    | 2    | -9   | 2       | 1   |          | X   | Red Lake A                  | -15         | -6   | -1  | -26  | 7       | 19  | 310      | 80  |
| Vancouver Int'l A            | 6           | 1    | 10   | -2   | 47      | *** | 290      | 70  | Sudbury A                   | -10         | -7   | 3   | -23  | 2       | 12  | 320      | 78  |
| Victoria Int'l A             | 6P          | 1P   | 11P  | -1P  | 34P***  |     | 250      | 33  | Thunder Bay A               | -10         | -6   | 6   | -23  | 0       | 2   | 300      | 78  |
| Williams Lake A              | -5          | 0    | 2    | -11  | 8       | 9   | 140      | 41  | Timmings A                  | -14         | -8   | 0   | -28  | 9       | 48  | 300      | 54  |
| <b>Yukon Territory</b>       |             |      |      |      |         |     |          |     | <b>Toronto Int'l A</b>      |             |      |     |      |         |     |          |     |
| Komakuk Beach A              | -31P        | -9P  | -23P | -38P | 0P      | 50  |          | X   | Trenton A                   | -3          | -5   | 8   | -12  | 13      | 1   | 310      | 72  |
| Teslin (aut)                 | -10P        | *    | -3P  | -15P | 0P***   |     |          | X   | Warton A                    | -3          | -4   | 7   | -12  | 18      | 2   | 300      | 87  |
| Watson Lake A                | -16         | 1    | -7   | -24  | 3       | 25  |          | X   | Windsor A                   | 1           | -2   | 14  | -9   | 0       | *** | 320      | 91  |
| Whitehorse A                 | -9          | 2    | -1   | -23  | 1       | 7   | 170      | 50  | <b>Quebec</b>               |             |      |     |      |         |     |          |     |
| <b>Northwest Territories</b> |             |      |      |      |         |     |          |     | Bagotville A                |             |      |     |      |         |     |          |     |
| Alert                        | -22P        | 5P   | -7P  | -30P | 3P      | 25  | 200      | 87  | Blanc Sablon A              | -8          | *    | 6   | -18  | 15      | *** | 340      | 85  |
| Baker Lake A                 | -30         | -6   | -23  | -37  | 0       | 25  | 300      | 57  | Inukjuak A                  | -15         | -6   | -6  | -25  | 8       | 13  | 280      | 54  |
| Cambridge Bay A              | -31         | -4   | -23  | -38  | 0       | 21  | 300      | 48  | Kuujuuaq A                  | -15         | -6   | -3  | -25  | 36      | 42  | 280      | 82  |
| Cape Dyer A                  | -5          | 10   | 2    | -16  | 153     | 130 | 130      | 72  | Kuujuuarapik A              | -14P        | -7P  | -5P | -24P | 7P      | 33  | 270      | 67  |
| Clyde A                      | -10P        | 10P  | 0P   | -21P | 15P     | 35  | 240      | 80  | Maniwaki                    | -9          | -6   | 3   | -19  | 6       | 6   | 320      | 59  |
| Coppermine A                 | -30P        | -6P  | -24P | -37P | 0P      | 35  | 250      | 48  | Mont Joli A                 | -9P         | -7P  | -4P | -14P | 3P      | 1   | 340      | 96  |
| Coral Harbour A              | -24P        | -4P  | -15P | -33P | 4P      | 29  | 330      | 67  | Montréal Int'l A            | -6          | -6   | 6   | -14  | 24      | 7   | 280      | 63  |
| Eureka                       | -23         | 9    | -17  | -30  | 11      | 18  | 290      | 67  | Natashquan A                | -11         | -8   | -3  | -24  | 12      | 3   | 030      | 70  |
| Fort Smith A                 | -21         | -5   | -12  | -32  | 12      | 36  | 310      | 41  | Québec A                    | -10         | -8   | -3  | -21  | 20      | 20  | 060      | 43  |
| Hall Beach A                 | -19         | 5    | -5   | -34  | 12      | 53  | 340      | 59  | Schefferville A             | -18         | -7   | -10 | -27  | 9       | 51  | 300      | 61  |
| Inuvik A                     | -32         | -7   | -24  | -40  | 1       | 23  | 060      | 37  | Sept-Îles A                 | -13         | -8   | -5  | -23  | 4       | 2   | 350      | 72  |
| Iqaluit A                    | -9          | 5    | 3    | -21  | 44      | 37  | 080      | 82  | Sherbrooke A                | -9P         | -7P  | 2P  | -22P | 13P     | 7   | 270      | 57  |
| Mould Bay A                  | -31P        | -4P  | -25P | -38P | 5P      | 20  | 340      | 46  | Val-d'Or A                  | -14         | -8   | -1  | -30  | 18      | 29  | 330      | 57  |
| Norman Wells A               | -26         | -4   | -17  | -39  | 10      | 14  | 130      | 48  | <b>New Brunswick</b>        |             |      |     |      |         |     |          |     |
| Resolute A                   | -26         | 1    | -13  | -36  | 4       | 26  | 030      | 67  | Charlo A                    | -10         | -6   | -3  | -17  | 5       | 1   | 300      | 80  |
| Yellowknife A                | -27         | -8   | -19  | -35  | 0       | 22  | 060      | 41  | Chatham A                   | -9          | -8   | -1  | -15  | 33      | 12  | 320      | 80  |
| <b>Alberta</b>               |             |      |      |      |         |     |          |     | Fredericton A               |             |      |     |      |         |     |          |     |
| Calgary Int'l A              | -5          | -1   | 6    | -13  | 2       | 1   | 280      | 63  | Moncton A                   | -10P        | -10P | 0P  | -16P | 7P      | 30  | 330      | 37  |
| Cold Lake A                  | -9          | 0    | 0    | -22  | 4       | 4   | 340      | 37  | Saint John A                | -7          | -7   | 2   | -14  | 42      | 36  | 340      | 87  |
| Edmonton Namao A             | -7          | 1    | 1    | -14  | 4       | 2   |          | X   | <b>Nova Scotia</b>          |             |      |     |      |         |     |          |     |
| Fort McMurray A              | -17         | -5   | -4   | -31  | 3       | 28  | 320      | 41  | Greenwood A                 | -4          | -7   | 4   | -14  | 57      | 17  | 320      | 80  |
| High Level A                 | -21         | -5   | -13  | -35  | 13      | 36  | 330      | 41  | Shearwater A                | -3          | -6   | 11  | -9   | 41      | 15  | 330      | 67  |
| Jasper                       | -7          | -1   | 1    | -17  | 17      | 15  |          | X   | Sydney A                    | -3          | -5   | 10  | -10  | 56      | 26  | 360      | 59  |
| Lethbridge A                 | -4          | -1   | 7    | -14  | 7       | 1   | 260      | 95  | Yarmouth A                  | 0           | -4   | 9   | -7   | 46      | 2   | 340      | 106 |
| Medicine Hat A               | -4          | 0    | 5    | -16  | 9       | 1   | 210      | 56  | <b>Prince Edward Island</b> |             |      |     |      |         |     |          |     |
| Peace River A                | -12P        | 0P   | -2P  | -25P | 0P      | 6   |          | X   | Charlottetown A             | -6          | -7   | 3   | -13  | 49      | 17  | 320      | 74  |
| <b>Saskatchewan</b>          |             |      |      |      |         |     |          |     | Summerside A                |             |      |     |      |         |     |          |     |
| Cree Lake                    | -21         | -6   | -9   | -32  | 3       | 35  | 330      | 43  | -6                          | -7          | 2    | -11 | 52   | 22      | 010 | 89       |     |
| Estevan A                    | -6          | 0    | 4    | -21  | 2       | 1   | 110      | 57  | <b>Newfoundland</b>         |             |      |     |      |         |     |          |     |
| La Ronge A                   | -17         | -5   | -6   | -28  | 5       | 19  | 300      | 56  | Cartwright                  | -9          | -6   | 1   | -15  | 21      | 11  | 220      | 65  |
| Regina A                     | -8          | -1   | 3    | -22  | 4       | 5   | 320      | 52  | Churchill Falls A           | -17         | -6   | -9  | -28  | 15      | 48  | 340      | 63  |
| Saskatoon A                  | -8P         | 1P   | 2P   | -19P | 4P      | 2   | 300      | 46  | Gander Int'l A              | -3          | -3   | 10  | -11  | 47      | 10  | 280      | 113 |
| Swift Current A              | -5          | 1    | 5    | -19  | 5       | *** | 250      | 70  | Goose A                     | -13         | -7   | -1  | -21  | 19      | 45  | 250      | 44  |
| Yorkton A                    | -11         | -2   | 2    | -23  | 5       | 5   | 320      | 61  | Port Aux Basques            | -3          | -5   | 8   | -10  | 46      | 17  | 280      | 115 |
| <b>Manitoba</b>              |             |      |      |      |         |     |          |     | St John's A                 |             |      |     |      |         |     |          |     |
| Brandon A                    | -11P        | -3P  | 2P   | -23P | 0P      | 6   | 280      | 57  | 0                           | -2          | 11   | -9  | 52   | 5       | 130 | 91       |     |
| Churchill A                  | -24         | -9   | -10  | -30  | 1       | 19  | 300      | 48  | St Lawrence                 | 1P          | -1P  | 10P | -7P  | 65P     | 4   |          | X   |
| Lynn Lake A                  | -23         | -6   | -14  | -30  | 6       | 40  | 020      | 35  | Wabush Lake A               | -18         | -7   | -10 | -29  | 1       | 20  | 340      | 61  |
| The Pas A                    | -16         | -5   | -6   | -26  | 11      | 18  | 340      | 59  | 89/11/20-89/11/26           |             |      |     |      |         |     |          |     |
| Thompson A                   | -23         | -8   | -13  | -34  | 4       | 27  | 020      | 35  |                             |             |      |     |      |         |     |          |     |
| Winnipeg Int'l A             | -11         | -4   | 2    | -22  | 2       | 1   | 330      | 69  |                             |             |      |     |      |         |     |          |     |

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

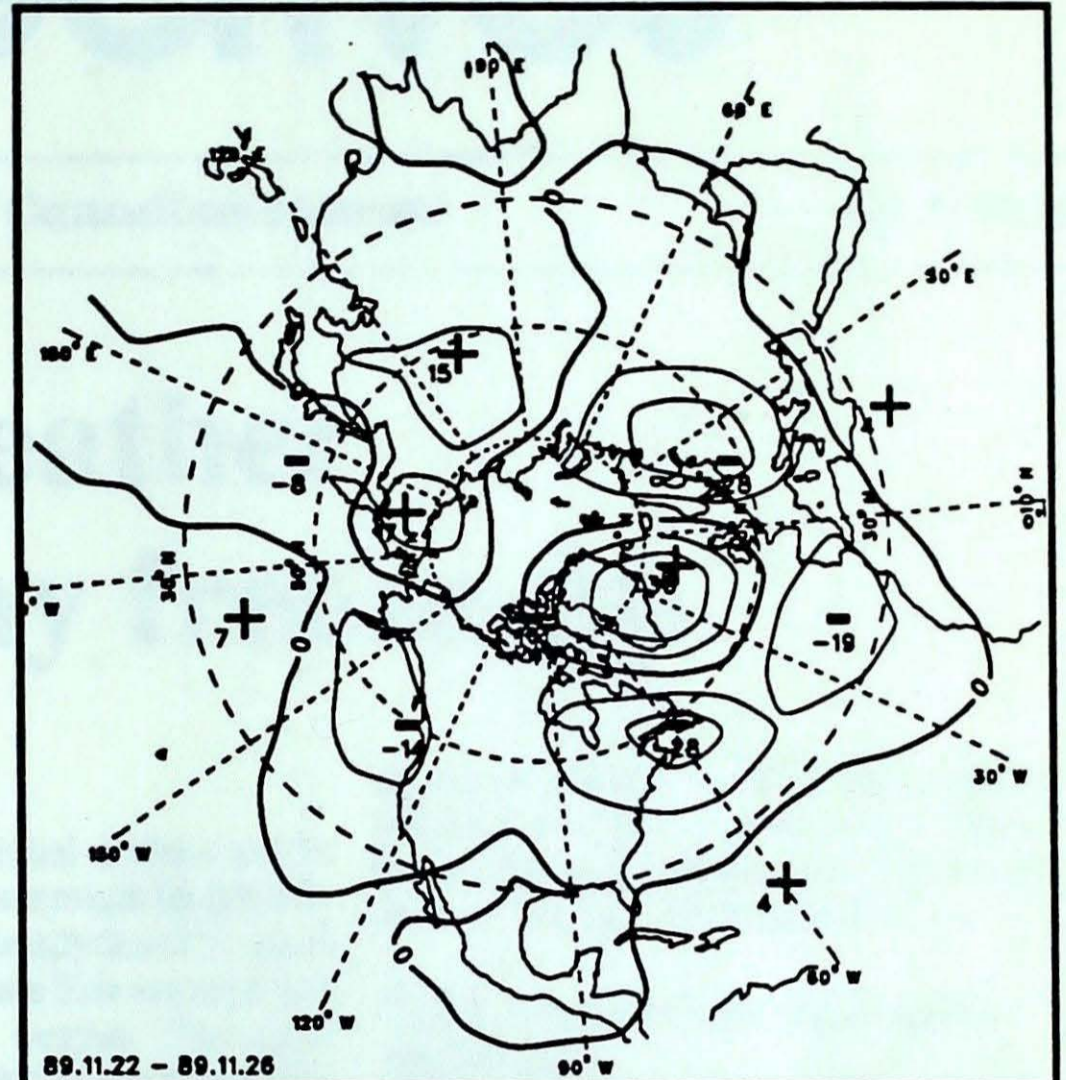
ptot = weekly precipitation total in mm  
 st = snow thickness on the ground in cm  
 dlr = direction of max wind, deg. from north.  
 vel = wind speed in km/h

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

### ATMOSPHERIC CIRCULATION



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



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

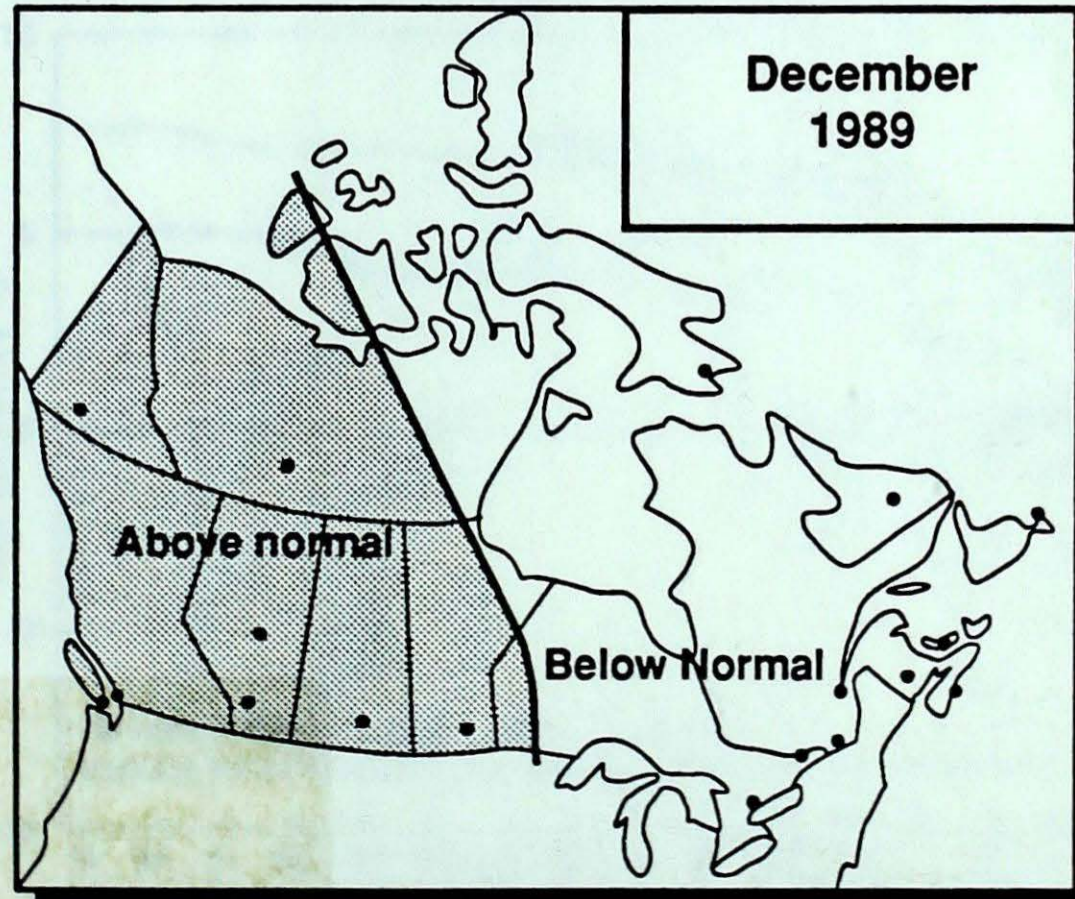


Environnement  
Canada  
Service  
de l'environnement  
atmosphérique

### MONTHLY TEMPERATURE FORECAST

*Normal temperatures for  
the month of December, °C*

|             |     |               |     |
|-------------|-----|---------------|-----|
| Whitehorse  | -17 | Toronto       | -4  |
| Yellowknife | -24 | Ottawa        | -8  |
| Iqaluit     | -22 | Montréal      | -7  |
| Vancouver   | 4   | Québec        | -9  |
| Victoria    | 4   | Fredericton   | -7  |
| Calgary     | -8  | Halifax       | -2  |
| Edmonton    | -12 | Charlottetown | -4  |
| Regina      | -13 | Goose Bay     | -13 |
| Winnipeg    | -14 | St. John's    | -2  |



Canada