Environment Canada Environnement Canada

# Climatic Perspectives

October 7 to 13, 1991 — A weekly review of Canadian climate and water — Vol. 13 No 41



# Autumn storms drench parts of the country

Substantial amounts of rain and snow fell in northern British Columbia this week. A strong atmospheric ridge of high pressure has been deflecting Pacific weather systems northward since early September, providing sunny, warm and dry weather to the southern half of the province. On the other hand, communities situated along the north coast, in the northern interior and in the Yukon have been plagued by inclement weather. This week Prince Rupert and Terrace were inundated with more than 200 mm of rain. Heavy snowfalls were reported at higher elevations and in the interior. Raging floods and washouts cut off two communities, Greenville and Canyon, situated between Terrace and Prince Rupert, where more than 340 mm of rain has soaked the area since October 10. Once the rains subside, it will take several days to rebuild the roads. Fort Nelson received 13 cm of snow.

In parts of eastern Quebec and the Maritimes, another 50 to 120 millimetres of rain was recorded this week. This is in addition to last week's abundant rainfalls between 50 to 110 millimetres. In Parc des Laurentides, north of Quebec City, the season's first major snowfall of 12 cm paralysed highway travel, and resulted in numerous accidents and injuries.

## Great Lakes water levels decline

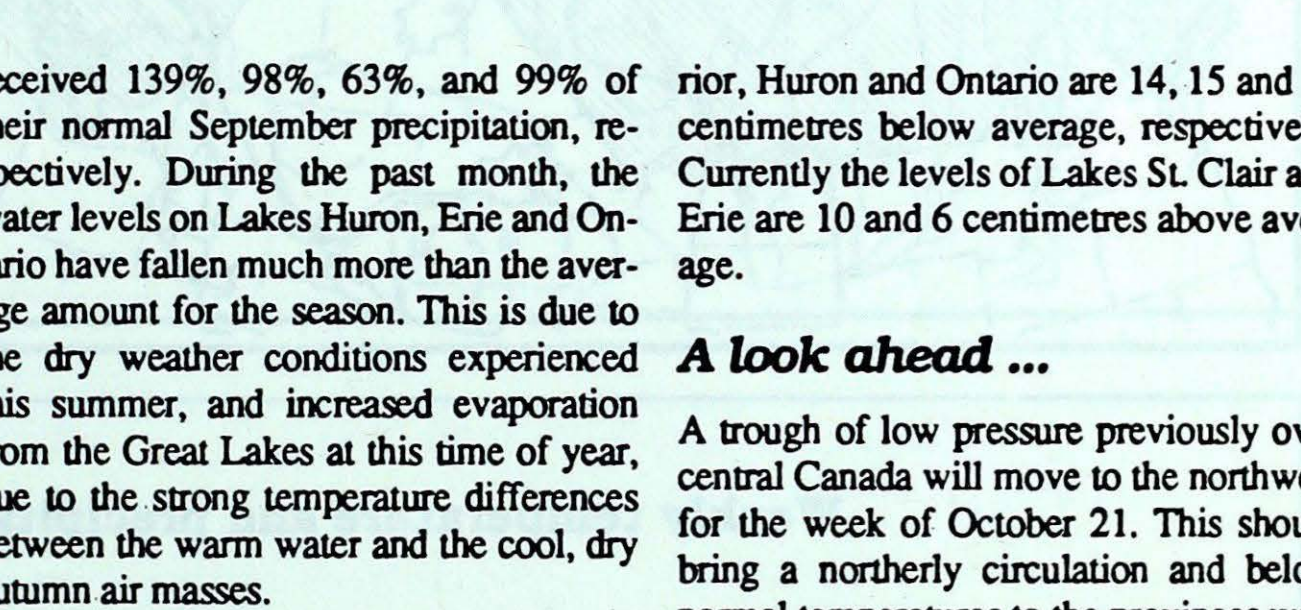
During September, Lakes Superior, Huron, Erie, and Ontario drainage basins received 139%, 98%, 63%, and 99% of their normal September precipitation, respectively. During the past month, the water levels on Lakes Huron, Erie and Ontario have fallen much more than the average amount for the season. This is due to the dry weather conditions experienced this summer, and increased evaporation from the Great Lakes at this time of year, due to the strong temperature differences between the warm water and the cool, dry autumn air masses.

At the beginning of October, the water levels of Lakes Huron, St. Clair, Erie and Ontario were 2, 6, 17, and 9 centimetres, respectively, below last years levels, while Lake Superior was 5 cm above. Compared to the long term, 1900-1989 average, the water levels of Lakes Superior, Huron and Ontario are 14, 15 and 15 centimetres below average, respectively. Currently the levels of Lakes St. Clair and Erie are 10 and 6 centimetres above average.

## *A look ahead ...*

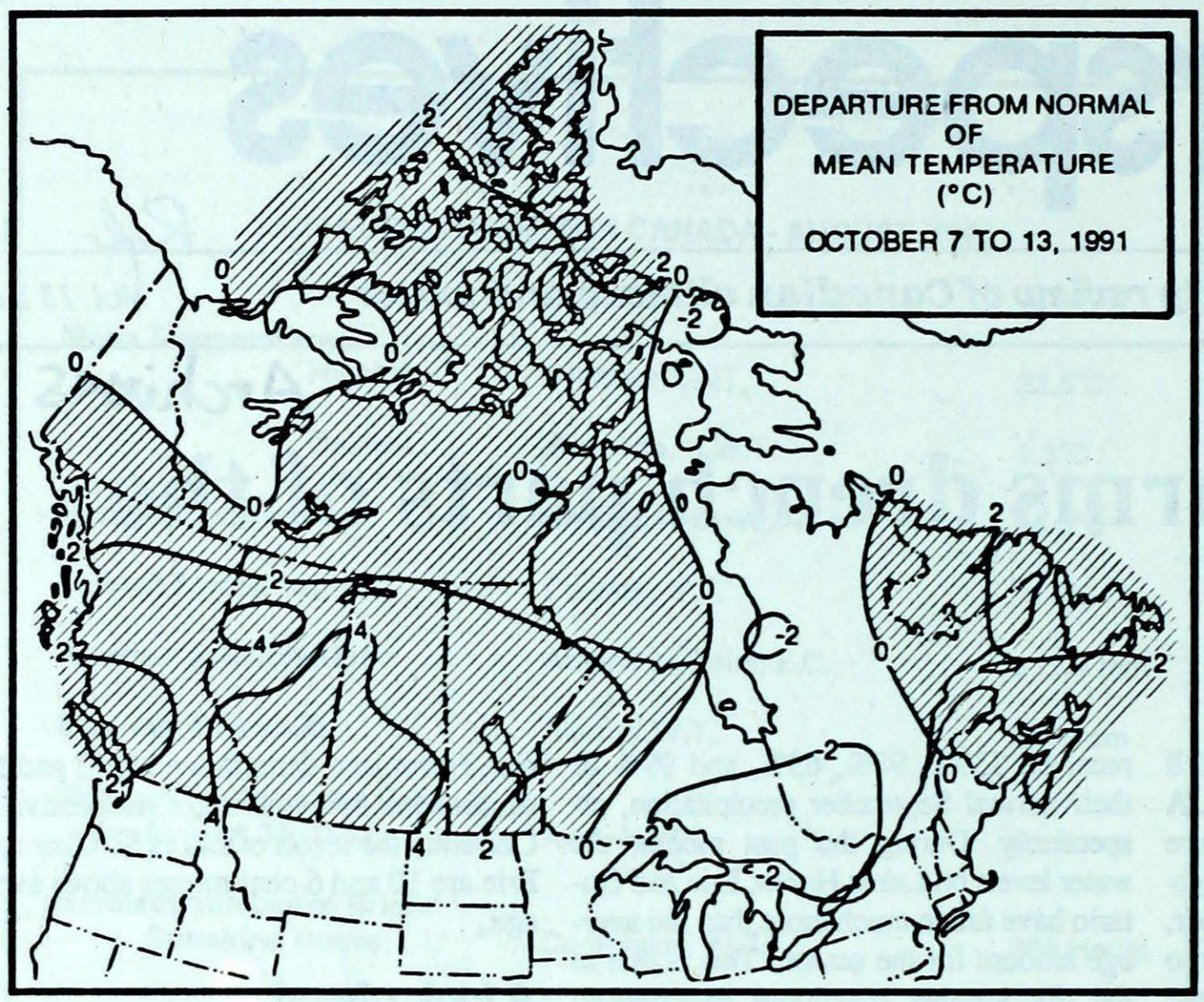
A trough of low pressure previously over central Canada will move to the northwest for the week of October 21. This should bring a northerly circulation and below normal temperatures to the provinces west of the Great Lakes and keep the Atlantic provinces in a mild southerly air flow, with slightly above normal temperatures. Ontario and Quebec are forecast to be near normal for the same period.

**Cumulative Rainfall October 1-14, 1991**




Heavy rainfalls between October 8 and 14, along the northern part of the B.C. west coast, resulted in major flooding, isolating two communities. Amounts to-date have already surpassed the average for the whole month of October.

Canada




## Weekly normal temperatures (°C)

| | max. | min. |
|---|---|---|
| Whitehorse A | 6.1 | -1.3 |
| Iqaluit A | -0.5 | -5.9 |
| Yellowknife A | 3.2 | -1.9 |
| Vancouver Int'l A | 14.5 | 7.7 |
| Victoria Int'l A | 15.0 | 6.6 |
| Calgary Int'l A | 13.6 | 0.0 |
| Edmonton Int'l A | 12.8 | -0.9 |
| Regina A | 13.4 | -0.2 |
| Saskatoon A | 13.0 | -0.1 |
| Winnipeg Int'l A | 13.1 | 2.2 |
| Ottawa Int'l A | 14.0 | 4.2 |
| Toronto (Pearson Int'l A) | 15.7 | 4.7 |
| Montréal Int'l A | 14.2 | 5.0 |
| Québec A | 11.9 | 3.0 |
| Fredericton A | 13.9 | 2.8 |
| Saint John A | 13.0 | 4.1 |
| Halifax (Shearwater) | 14.2 | 6.4 |
| Charlottetown A | 13.0 | 5.2 |
| Goose A | 7.8 | 0.0 |
| St John's A | 11.8 | 4.5 |

## Weekly temperature and precipitation extremes

| | Maximum temperature (°C) | | Minimum temperature (°C) | | Heaviest precipitation (mm) | |
|---|---|---|---|---|---|---|
| **British Columbia** | Hope A | 27 | Puntzi Mountain (aut) | -8 | Prince Rupert A | 286 |
| **Yukon Territory** | Watson Lake A | 13 | Komakuk Beach A | -17 | Watson Lake A | 19 |
| **Northwest Territories** | Fort Smith A | 13 | Alert | -23 | Fort Smith A | 36 |
| **Alberta** | Lethbridge A | 30 | Edson A | -8 | High Level A | 9 |
| **Saskatchewan** | Moose Jaw A | 28 | Collins Bay | -10 | Collins Bay | 6 |
| **Manitoba** | Dauphin A | 22 | Lynn Lake A | -7 | Churchill A | 24 |
| **Ontario** | Windsor A | 23 | Geraldton A | -6 | Britt (aut) | 25 |
| **Québec** | Sherbrooke A | 20 | Schefferville A | -8 | Sept-iles A | 87 |
| **New Brunswick** | Fredericton A | 17 | Fredericton A | -2 | Fredericton A | 55 |
| **Nova Scotia** | Greenwood A | 20 | Greenwood A | -1 | Sydney A | 64 |
| **Prince Edward Island** | Charlottetown A | 18 | Charlottetown A | 2 | Charlottetown A | 25 |
| **Newfoundland** | Daniel's Harbour | 20 | Churchill Falls A | -3 | Argentia A | 119 |

### Across The Country...

| | | |
|---|---|---|
| **Highest Mean Temperature** | Hope A (BC) | 15 |
| **Lowest Mean Temperature** | Eureka (NWT) | -14 |

91/10/07-91/10/13

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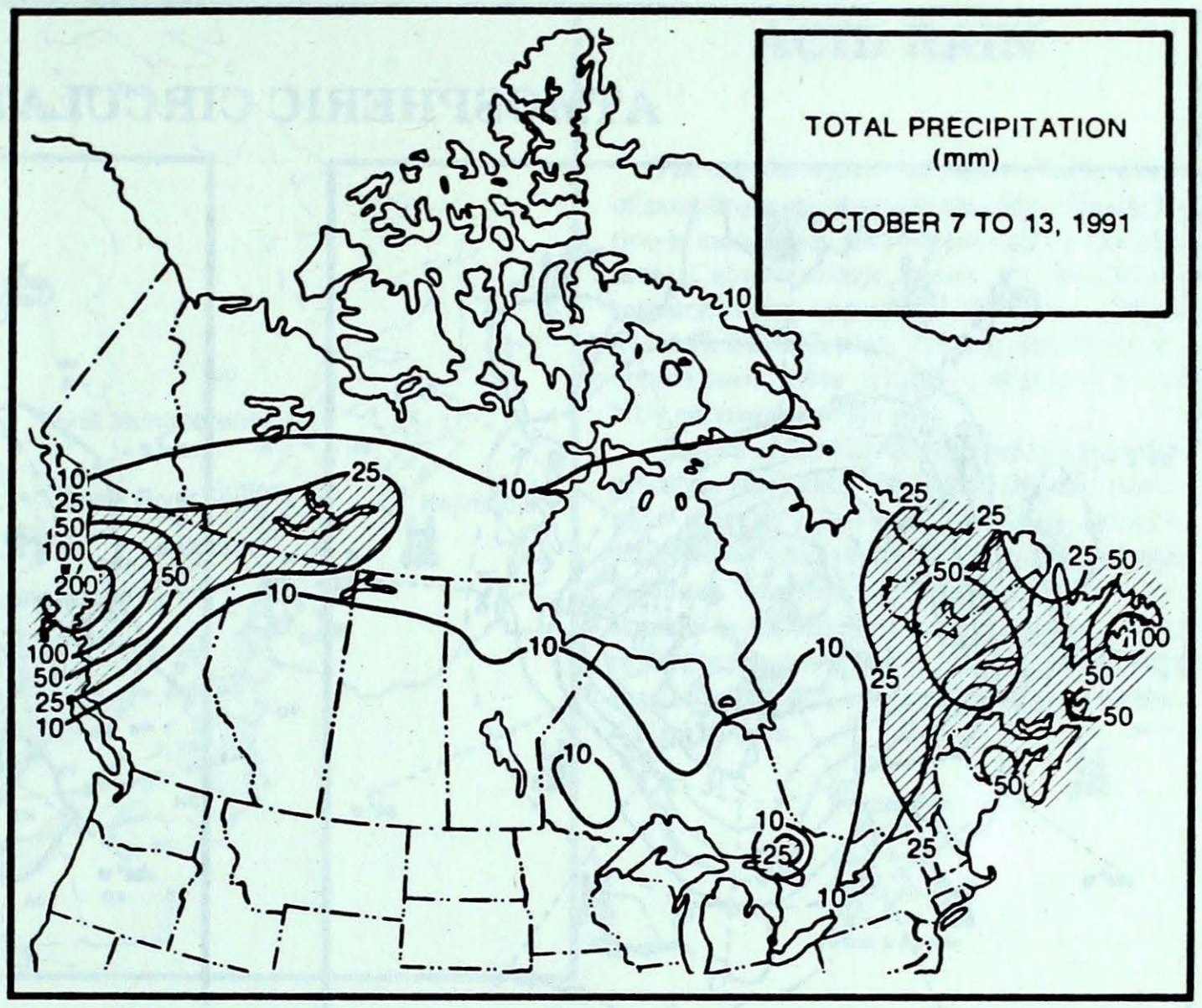


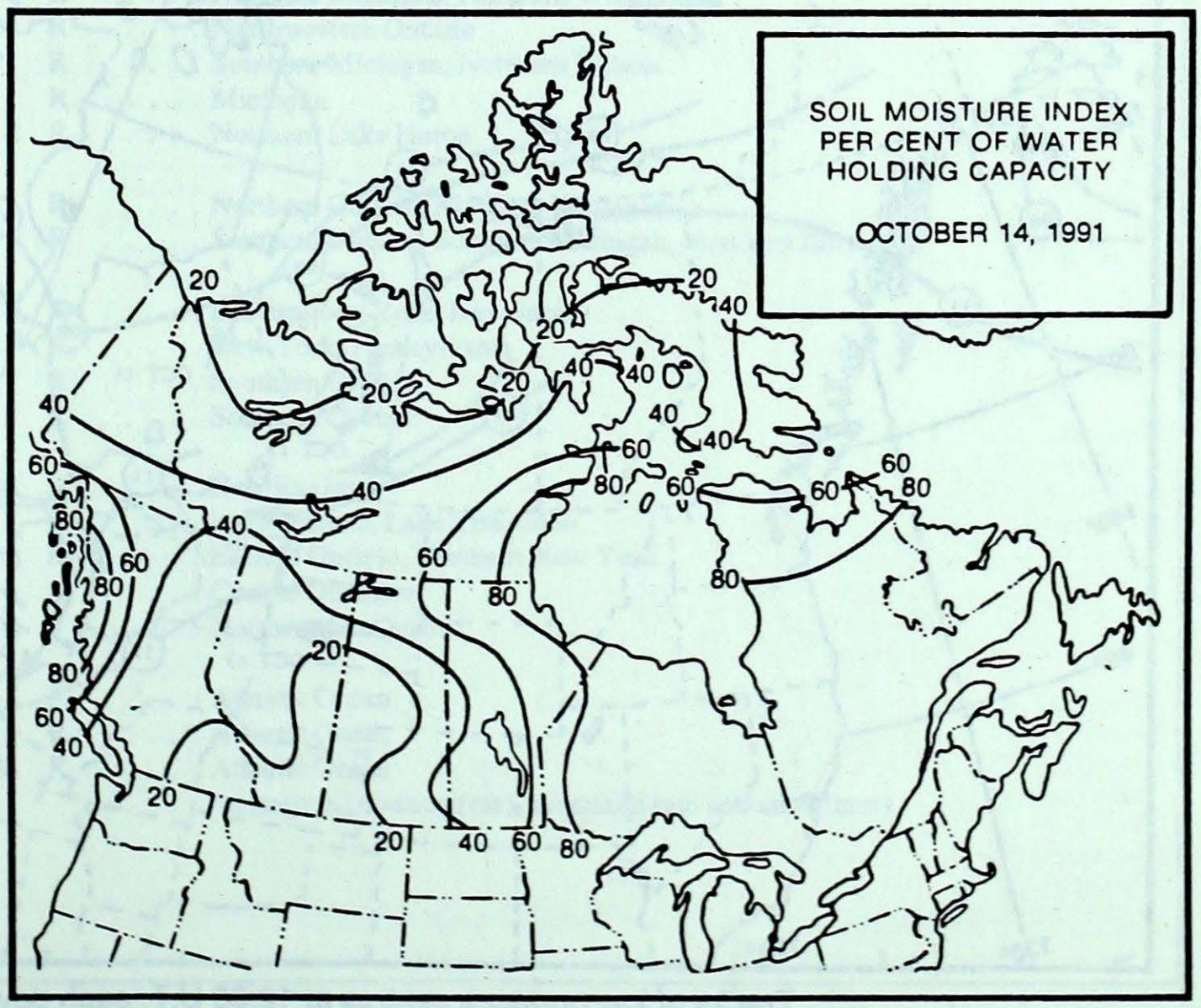

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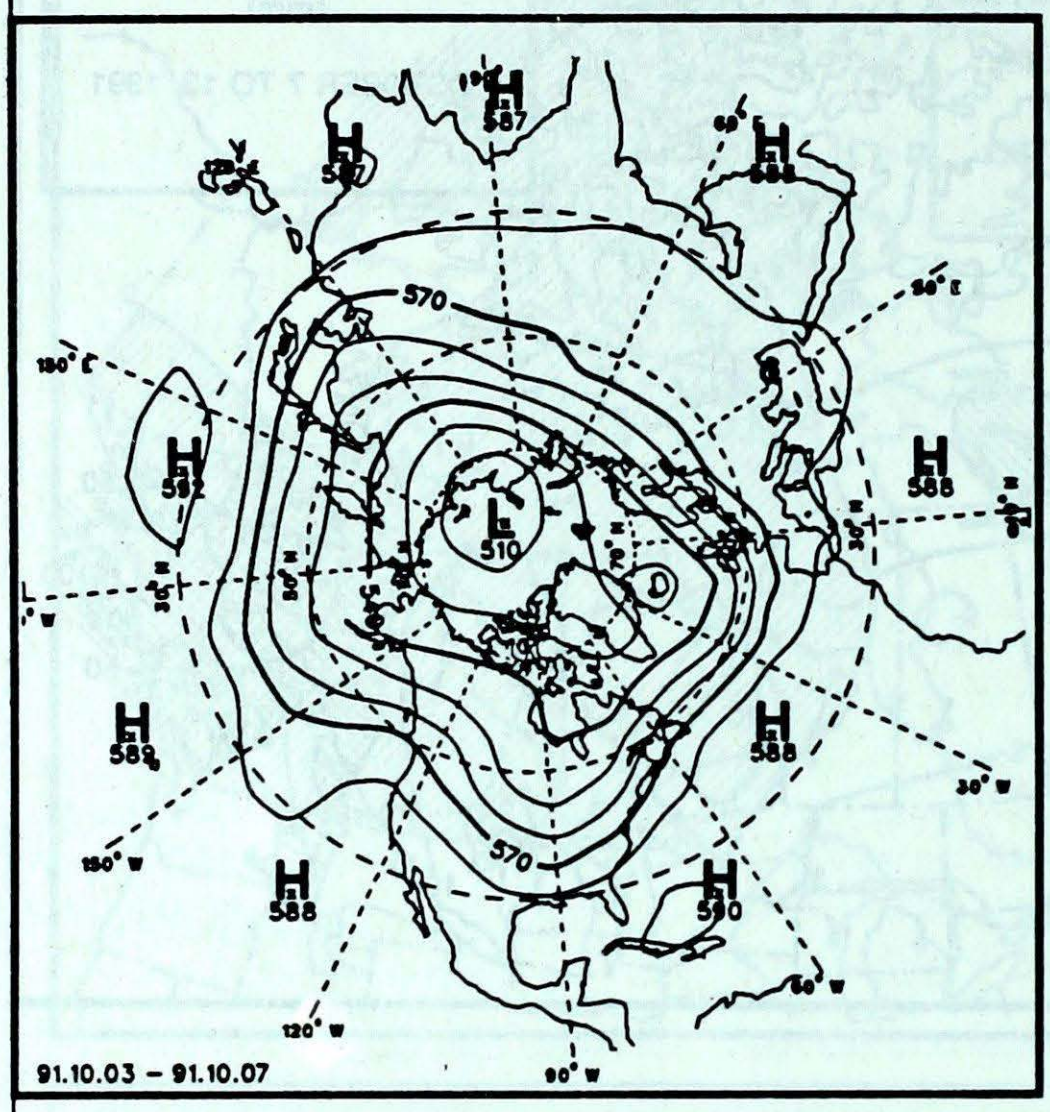
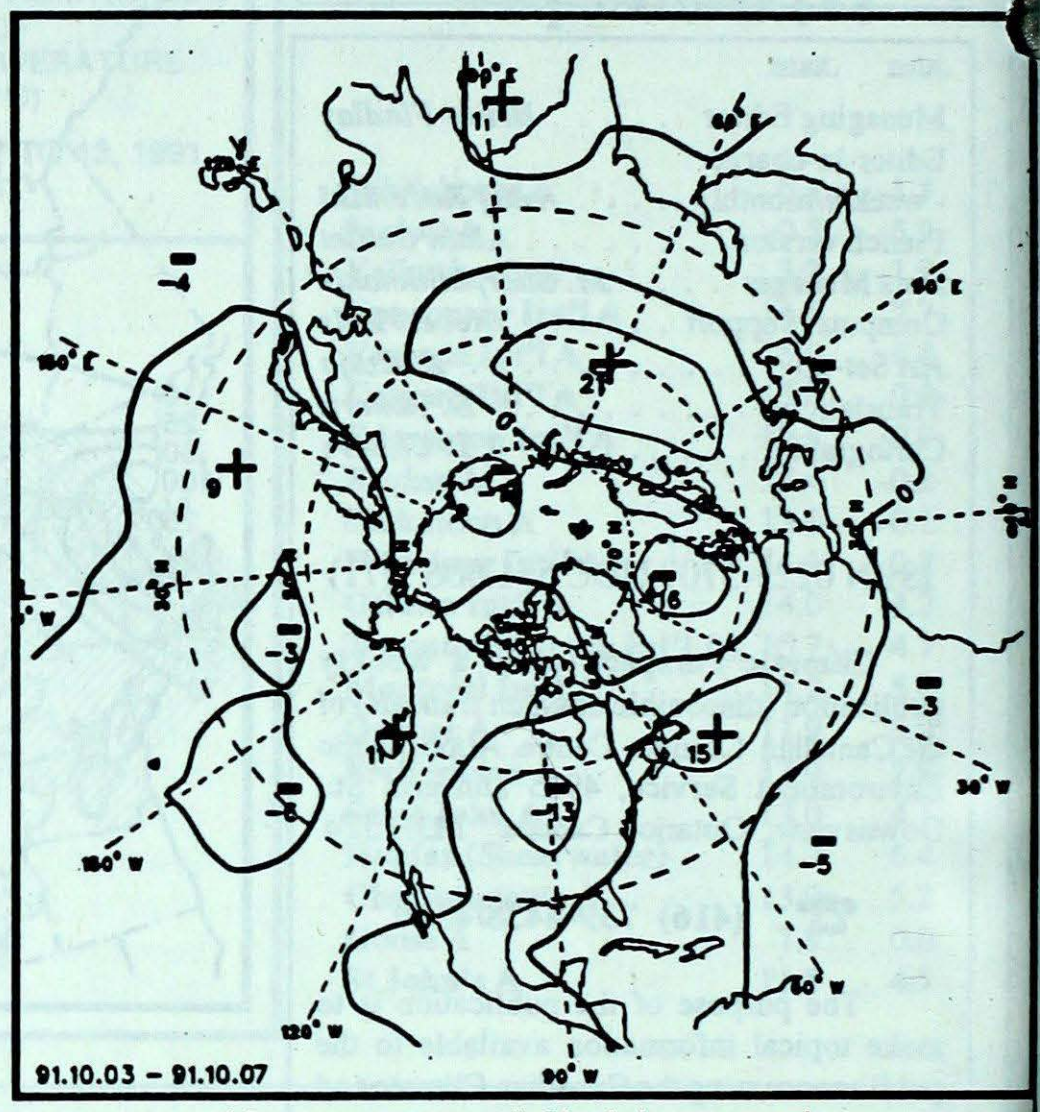
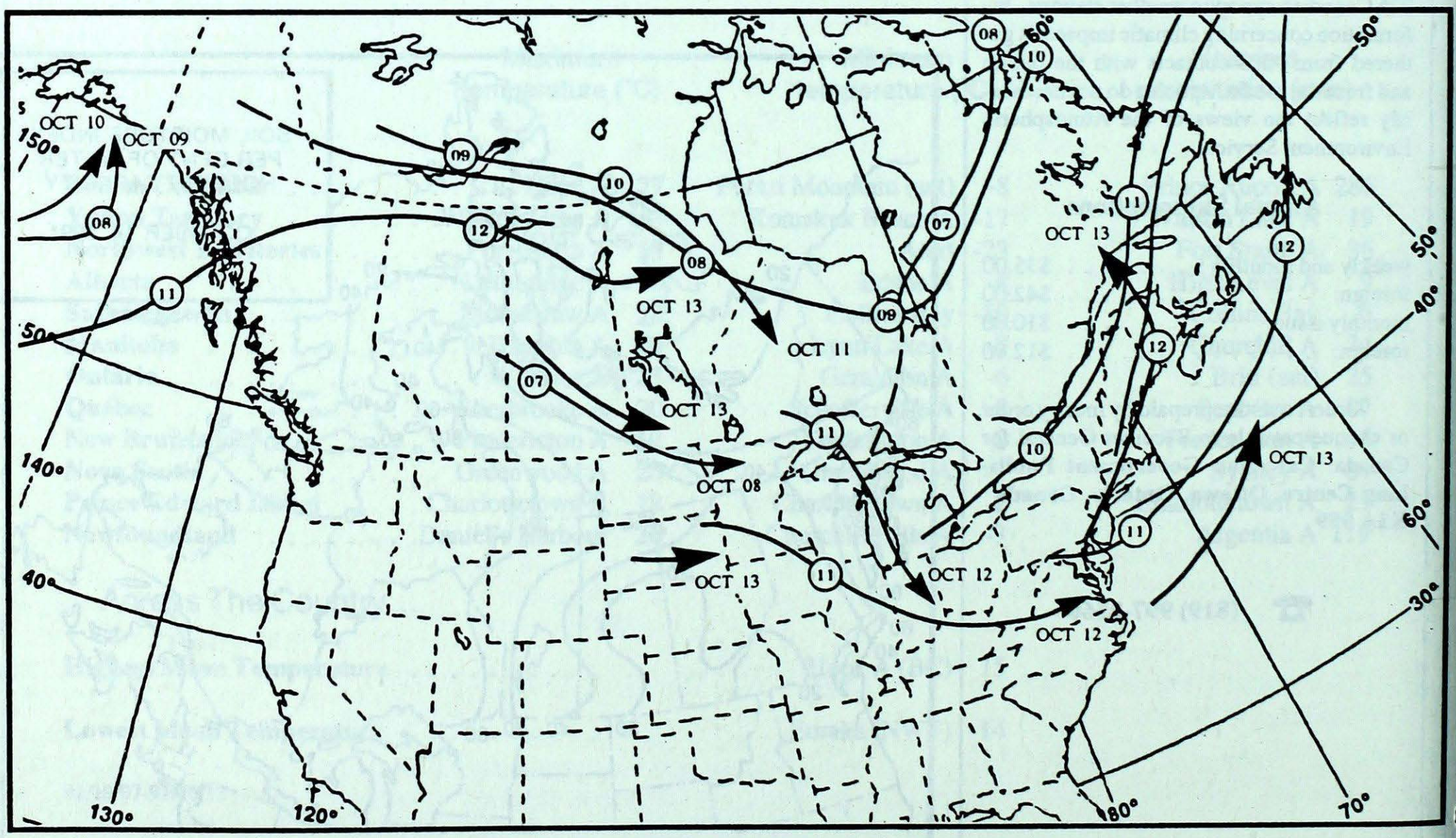


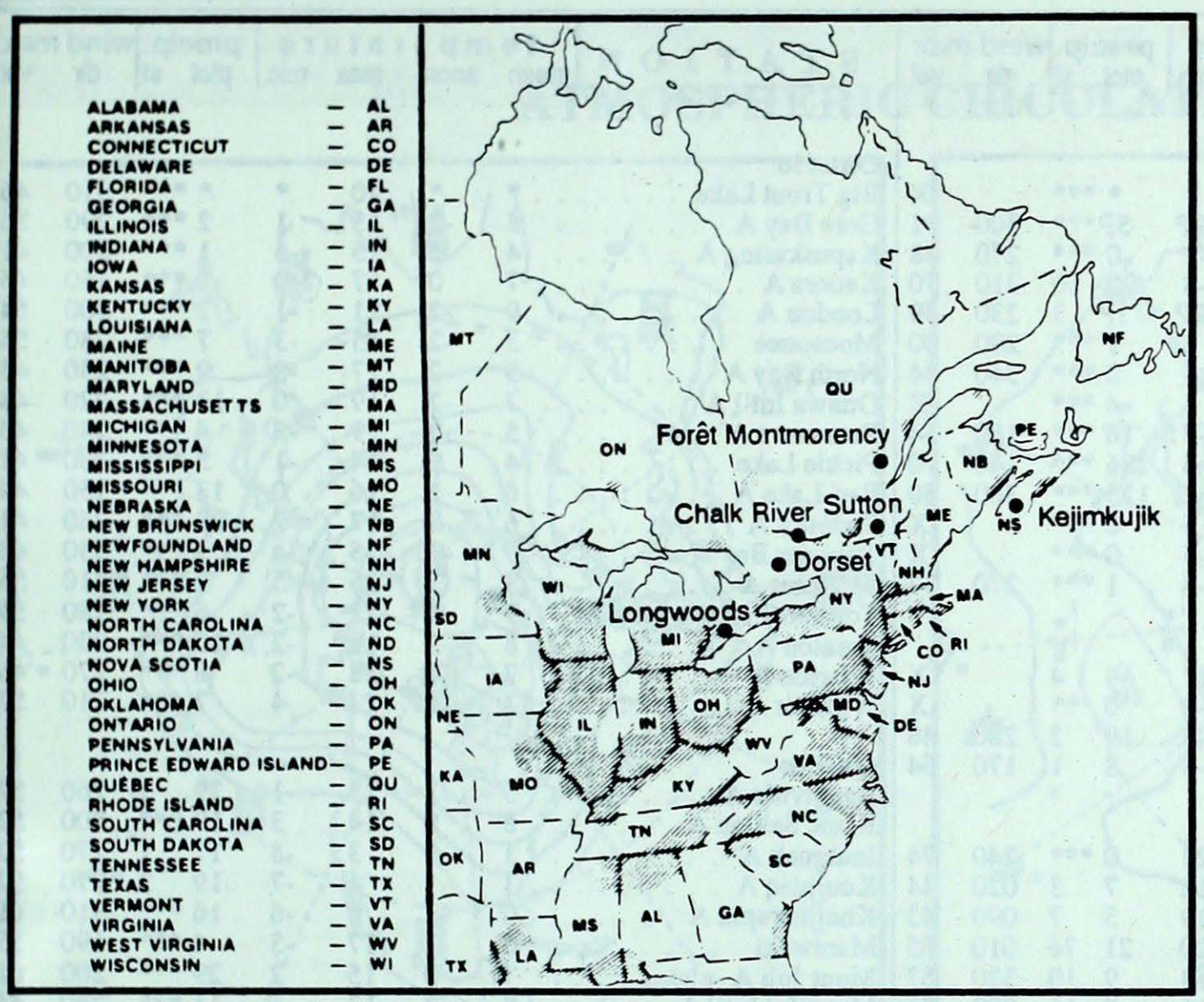

Mean geopotential height
50-kPa level (10-decametre intervals)




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.




# 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 $SO_2$ 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 6 to 12, 1991 |
| **Longwoods** | | | | | . . . . . No precipitation this week |
| **Dorset*** | 06 | 4.9 | 8 | R | . . . . . Northern Michigan, Northern Wisconsin |
| | 07 | 4.7 | 2 | R | . . . . . Northwestern Ontario |
| | 09 | 4.9 | 1 | R | . . . . . Southern Michigan, Northern Illinois |
| | 10 | 4.7 | 1 | R | . . . . . Michigan |
| | 11 | 4.2 | 2 | R | . . . . . Northern Lake Huron |
| **Chalk River** | 08 | 4.7 | 1 | R | . . . . . Northern Ontario, Northern Michigan |
| | 09 | 4.7 | 3 | R | . . . . . Southern Ontario, Southern Michigan, Northern Illinois |
| **Sutton** | 06 | 4.6 | 10 | R | . . . . . Eastern New York, New Jersey |
| | 10 | 4.3 | 14 | R | . . . . . New York, Pennsylvania |
| | 11 | 4.7 | 11 | R | . . . . . Southern Quebec |
| | 12 | 4.7 | 3 | R | . . . . . Southern Quebec |
| **Montmorency** | 06 | 4.9 | 18 | M | . . . . . New England |
| | 09 | 4.0 | 3 | R | . . . . . Lake Ontario, Lake Erie, Ohio |
| | 10 | 4.1 | 12 | M | . . . . . Eastern Ontario, Northern New York |
| | 11 | 4.7 | 5 | S | . . . . . Central Quebec |
| | 12 | 5.8 | 10 | S | . . . . . Northeastern Quebec |
| **Kejimkujik** | 06 | 4.8 | 8 | R | . . . . . Atlantic Ocean |
| | 07 | 5.1 | 2 | R | . . . . . Atlantic Ocean |
| | 11 | 4.8 | 13 | R | . . . . . Atlantic Ocean |
| | | | | | . . . . . r=rain(mm), s=snow(cm), m=mixed rain and snow(mm) |

| STATION | temperature mean | anom | max | min | precip. ptot | st | wind max dir | vel |
|---|---|---|---|---|---|---|---|---|
| **British Columbia** | | | | | | | | |
| Blue River A | * | * | * | * | * | *** | | X |
| Cape St James | 13P | 2P | 16P | 9P | 5P | *** | 300 | 91 |
| Cranbrook A | 11 | 4 | 24 | -2 | 0 | *** | 270 | 48 |
| Fort Nelson A | 5 | 2 | 19 | -8 | 28 | 10 | 310 | 70 |
| Fort St John A | 8P | 3P | 22P | 2P | 1P | 3 | 230 | 59 |
| Kamloops A | 12 | 2 | 26 | 1 | 1 | *** | 280 | 80 |
| Penticton A | 13 | 3 | 24 | 3 | 0 | *** | 340 | 44 |
| Port Hardy A | 11 | 2 | 19 | 3 | 4 | *** | | X |
| Prince George A | 9 | 3 | 24 | -5 | 16 | *** | 180 | 54 |
| Prince Rupert A | 12 | 3 | 17 | 6 | 286 | *** | 140 | 70 |
| Smithers A | 8 | 2 | 20 | -4 | 125 | *** | 360 | 50 |
| Vancouver Int'l A | 13 | 1 | 24 | 5 | 0 | *** | | X |
| Victoria Int'l A | 13 | 2 | 23 | 5 | 0 | *** | | X |
| Williams Lake A | 10 | 3 | 25 | -4 | 1 | *** | 270 | 37 |
| **Yukon Territory** | | | | | | | | |
| Komakuk Beach A | -9 | -2 | 5 | -17 | 4 | 4 | | X |
| Teslin (aut) | 4 | * | 12 | -3 | 0 | *** | | X |
| Watson Lake A | 4 | 2 | 13 | -3 | 19 | 2 | 280 | 48 |
| Whitehorse A | 3 | 0 | 11 | -4 | 8 | 1 | 170 | 54 |
| **Northwest Territories** | | | | | | | | |
| Alert | -14 | 4 | -7 | -23 | 0 | *** | 240 | 74 |
| Baker Lake A | -5 | 0 | 0 | -12 | 7 | 3 | 020 | 44 |
| Cambridge Bay A | -8 | 0 | -1 | -19 | 5 | 7 | 090 | 43 |
| Cape Dyer A | -8 | -2 | -2 | -20 | 21 | 76 | 010 | 85 |
| Clyde A | -6 | -1 | -1 | -14 | 9 | 10 | 320 | 57 |
| Coppermine A | -4 | 2 | 2 | -16 | 7 | 11 | 080 | 52 |
| Coral Harbour A | -5 | 1 | -1 | -10 | 11 | 1 | 360 | 52 |
| Eureka | -14 | 4 | -6 | -22 | 1 | 6 | | X |
| Fort Smith A | 3 | 0 | 13 | -5 | 36 | 6 | 250 | 82 |
| Hall Beach A | -8 | 1 | -2 | -12 | 0 | 1 | 360 | 54 |
| Inuvik A | -6 | -1 | 3 | -15 | 19 | 13 | 320 | 52 |
| Iqaluit A | -4 | -1 | 2 | -10 | 5 | 1 | 070 | 109 |
| Mould Bay A | * | * | * | * | * | *** | | X |
| Norman Wells A | -3 | -1 | 5 | -11 | 6 | 3 | 110 | 56 |
| Resolute A | -12 | 1 | -4 | -19 | 1 | 5 | 030 | 59 |
| Yellowknife A | 1 | 1 | 7 | -6 | 23 | *** | 120 | 57 |
| **Alberta** | | | | | | | | |
| Calgary Int'l A | 12 | 6 | 27 | -4 | 0 | *** | 290 | 56 |
| Cold Lake A | 10 | 4 | 23 | -2 | 0 | *** | 290 | 69 |
| Edmonton Namao A | 10 | 5 | 24 | -3 | 0 | *** | 280 | 76 |
| Fort McMurray A | 9 | 4 | 20 | -3 | 4 | *** | 270 | 67 |
| High Level A | 6 | 2 | 18 | -3 | 9 | *** | 280 | 57 |
| Jasper | 10 | 4 | 25 | -4 | 2 | *** | | X |
| Lethbridge A | 15 | 6 | 30 | 0 | 0 | *** | 250 | 69 |
| Medicine Hat A | 14 | 5 | 28 | -1 | 0 | *** | 250 | 63 |
| Peace River A | 9 | 5 | 21 | -6 | 4 | *** | 260 | 78 |
| **Saskatchewan** | | | | | | | | |
| Cree Lake | 6 | 4 | 15 | -6 | 0 | 1 | 280 | 65 |
| Estevan A | 11 | 4 | 26 | -2 | 0 | *** | 310 | 78 |
| La Ronge A | 7 | 4 | 20 | -3 | 2 | *** | 300 | 56 |
| Regina A | 11 | 5 | 26 | -4 | 0 | *** | 310 | 89 |
| Saskatoon A | 11 | 4 | 24 | -5 | 0 | *** | 300 | 54 |
| Swift Current A | 12 | 5 | 27 | -3 | 0 | *** | 310 | 65 |
| Yorkton A | 10 | 4 | 21 | 0 | 0 | *** | 330 | 67 |
| **Manitoba** | | | | | | | | |
| Brandon A | 9 | 3 | 22 | -5 | 0 | *** | 300 | 78 |
| Churchill A | 1 | 0 | 4 | -5 | 24 | *** | 350 | 87 |
| Lynn Lake A | 4 | 4 | 13 | -7 | 9 | *** | 340 | 65 |
| The Pas A | 7 | 2 | 18 | -1 | 2 | *** | 340 | 76 |
| Thompson A | 4 | 4 | 15 | -5 | 14 | *** | 330 | 41 |
| Winnipeg Int'l A | 8 | 0 | 18 | -3 | 8 | *** | 300 | 72 |

| STATION | temperature mean | anom | max | min | precip. ptot | st | wind max dir | vel |
|---|---|---|---|---|---|---|---|---|
| **Ontario** | | | | | | | | |
| Big Trout Lake | * | * | 10 | * | * | *** | 310 | 46 |
| Gore Bay A | 8 | -2 | 15 | 1 | 2 | *** | 290 | 56 |
| Kapuskasing A | 4 | -2 | 15 | -3 | 1 | *** | 300 | 41 |
| Kenora A | 7 | 0 | 17 | 0 | 9 | *** | 160 | 46 |
| London A | 9 | -2 | 21 | -1 | 1 | *** | 200 | 54 |
| Moosonee | 3 | -2 | 15 | -3 | 7 | *** | 280 | 54 |
| North Bay A | 5 | -2 | 17 | -3 | 9 | *** | 250 | 43 |
| Ottawa Int'l A | 7 | -2 | 19 | 0 | 13 | *** | 220 | 48 |
| Petawawa A | 5 | -2 | 19 | -3 | 4 | *** | 240 | 43 |
| Pickle Lake | 4 | 0 | 14 | -1 | 5 | *** | 180 | 41 |
| Red Lake A | 6 | 1 | 16 | 0 | 13 | *** | 150 | 44 |
| Sudbury A | 6 | -2 | 17 | -2 | 22 | *** | 240 | 41 |
| Thunder Bay A | 5 | -2 | 15 | -4 | 1 | *** | 330 | 48 |
| Timmins A | 3 | -3 | 15 | -5 | 2 | *** | 310 | 56 |
| Toronto(Pearson Int'l A) | 9 | -1 | 22 | -2 | 6 | *** | 280 | 59 |
| Trenton A | 8 | -2 | 18 | -2 | 10 | *** | 270 | 44 |
| Wiarton A | 7 | -3 | 18 | -2 | 8 | *** | 270 | 46 |
| Windsor A | 11 | -1 | 23 | 4 | 7 | *** | 210 | 57 |
| **Québec** | | | | | | | | |
| Bagotville A | 5 | -1 | 15 | -1 | 39 | 1 | 260 | 57 |
| Blanc Sablon A | 8 | * | 14 | 3 | 19 | *** | 200 | 52 |
| Inukjuak A | 1 | 0 | 3 | -3 | 11 | 1 | 170 | 52 |
| Kuujjuaq A | -1 | -1 | 4 | -7 | 19 | 2 | 270 | 57 |
| Kuujjuarapik A | 0 | -3 | 6 | -6 | 16 | *** | 310 | 61 |
| Maniwaki | 5 | -2 | 17 | -3 | 4 | *** | 190 | 35 |
| Mont Joli A | 7 | 0 | 15 | 2 | 29 | *** | 200 | 61 |
| Montréal Int'l A | 8 | -2 | 17 | 1 | 11 | *** | 250 | 44 |
| Natashquan A | 8 | 3 | 13 | 2 | 63 | *** | 140 | 54 |
| Québec A | 6 | -2 | 14 | 0 | 25 | *** | 270 | 48 |
| Schefferville A | 0 | 0 | 8 | -8 | 30 | 7 | 230 | 61 |
| Sept-Îles A | 6 | 1 | 12 | -3 | 87 | *** | 080 | 80 |
| Sherbrooke A | 6 | -1 | 20 | -1 | 33 | *** | 300 | 50 |
| Val-d'Or A | 3 | -3 | 15 | -7 | 2 | *** | 270 | 43 |
| **New Brunswick** | | | | | | | | |
| Chatham A | * | | * | * | * | *** | | X |
| Fredericton A | 9 | 1 | 17 | -2 | 55 | *** | 290 | 57 |
| Miscou Island (aut) | 9P | 1P | 13P | 5P | 0P | *** | | |
| Moncton A | 10 | 1 | 17 | -1 | 34 | *** | 270 | 56 |
| Saint John A | 9 | 1 | 16 | -1 | 47 | *** | 210 | 63 |
| **Nova Scotia** | | | | | | | | |
| Greenwood A | 11 | 2 | 20 | -1 | 17 | *** | 270 | 57 |
| Shearwater A | 12 | 1 | 18 | 3 | 22 | *** | 210 | 41 |
| Sydney A | 10 | 1 | 18 | 3 | 64 | *** | 100 | 69 |
| Yarmouth A | 11 | 1 | 16 | 4 | 20 | *** | 220 | 52 |
| **Prince Edward Island** | | | | | | | | |
| Charlottetown A | 11 | 2 | 18 | 2 | 25 | *** | 150 | 44 |
| East Point (auto) | 9P | * | 16P | 5P | 21P | *** | | |
| **Newfoundland** | | | | | | | | |
| Cartwright | 7 | 3 | 17 | 2 | 20 | *** | 180 | 57 |
| Churchill Falls A | 2 | 1 | 9 | -3 | 59 | 7 | 250 | 57 |
| Gander Int'l A | 10 | 3 | 18 | 3 | 59 | *** | 180 | 50 |
| Goose A | 6 | 2 | 16 | 1 | 36 | 1 | 250 | 61 |
| Port Aux Basques | 9P | 1P | 15P | 3P | 11P | *** | 120 | 74 |
| St John's A | 11 | 2 | 18 | 2 | 41 | *** | 190 | 83 |
| St Lawrence | 10 | 2 | 17 | 2 | 84 | *** | | X |
| Wabush Lake A | 2 | 1 | 10 | -3 | 43 | 17 | 040 | 56 |

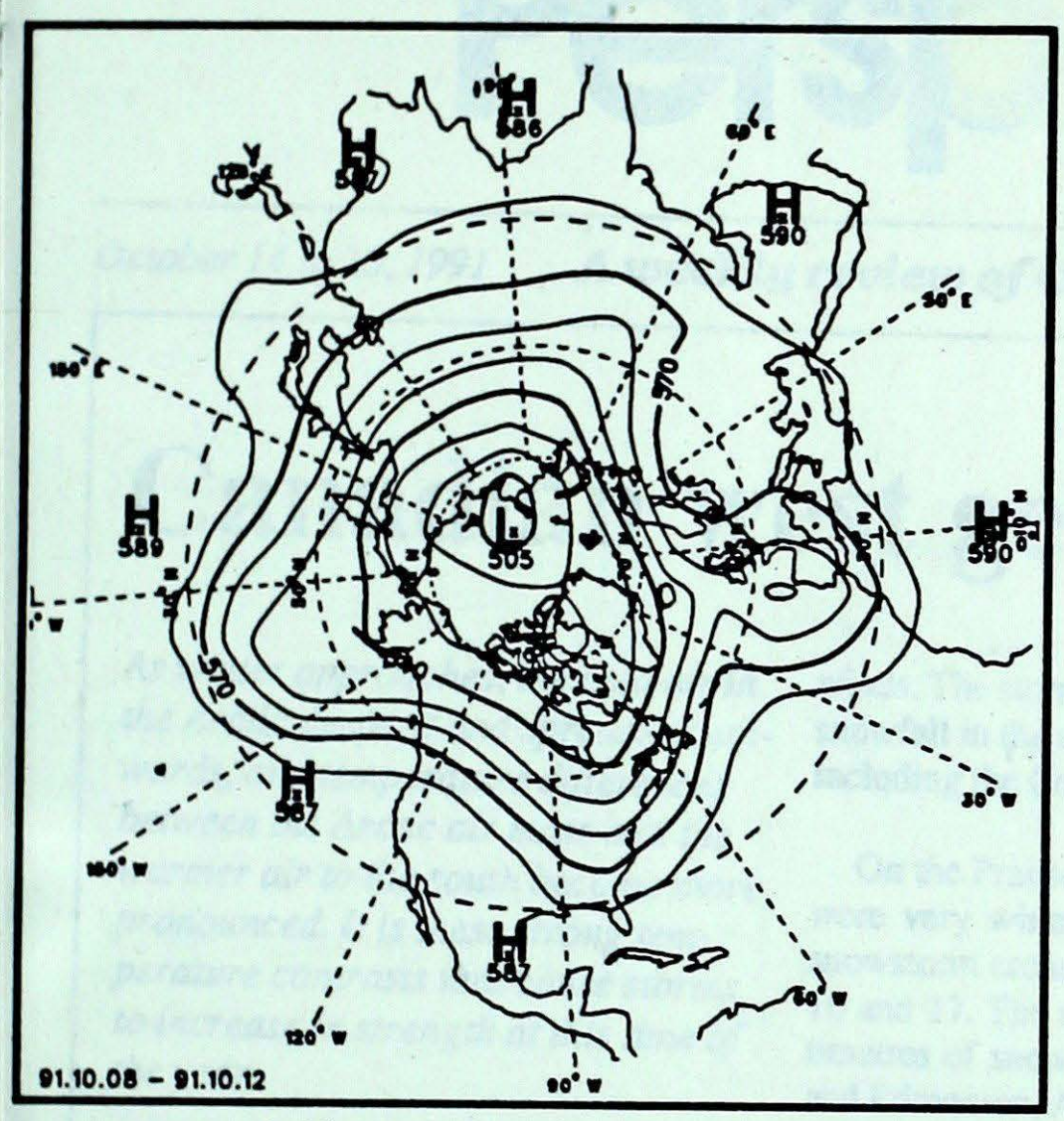
91/10/07-91/10/13

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

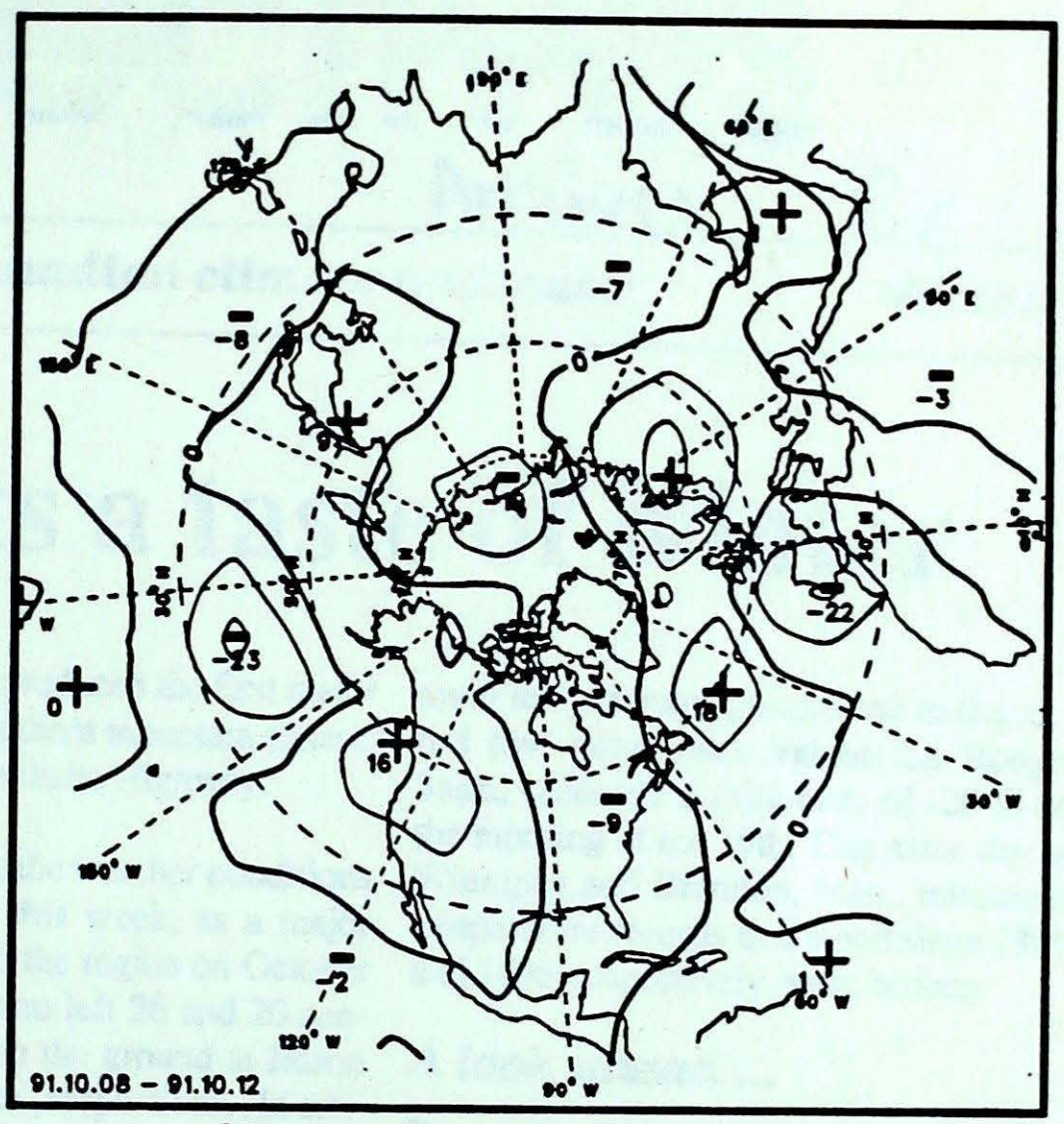
**ptot** = weekly precipitation total in mm
**st** = snow thickness on the ground in cm
**dir** = direction of max wind, deg. from north.
**vel** = wind speed in km/h

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

# ATMOSPHERIC CIRCULATION




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



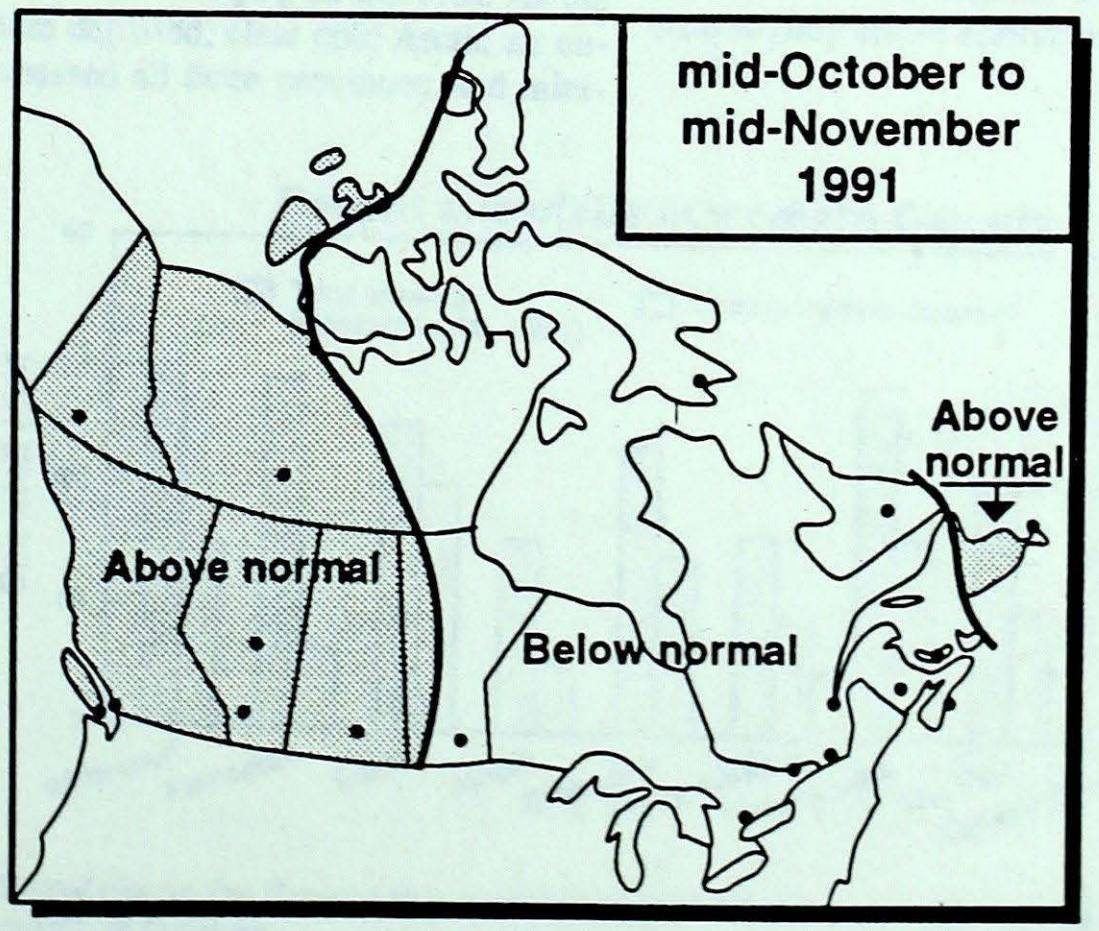

Mean geopotential height anomaly
50-kPa level (10-decametre intervals)

Environment Canada / Environnement Canada
Atmospheric Environment Service / Service de l'environnement atmosphérique

## MONTHLY TEMPERATURE FORECAST

***Normal temperatures for mid-October to mid-November, °C***

| | | | |
|---|---|---|---|
| Whitehorse | -4 | Toronto | 6 |
| Yellowknife | -8 | Ottawa | 5 |
| Iqaluit | -9 | Montréal | 5 |
| Vancouver | 8 | Québec | 3 |
| Victoria | 8 | Fredericton | 4 |
| Calgary | 1 | Halifax | 7 |
| Edmonton | 0 | Charlottetown | 6 |
| Regina | 0 | Goose Bay | 1 |
| Winnipeg | 1 | St. John's | 5 |

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