Environment Canada Environnement Canada

ClimPersp

Sept. 30 to Oct. 6, 1991 **A weekly review of Canadian climate and water** *Vol. 13 No 40*

Arctic shipping season nearing an end

The shipping season in the Arctic is approximately three months long, but its duration can vary, depending on weather conditions. During this short time, numerous northern communities have to be resupplied, and commercial vessels have to pick up stockpiled production of ore and petroleum.

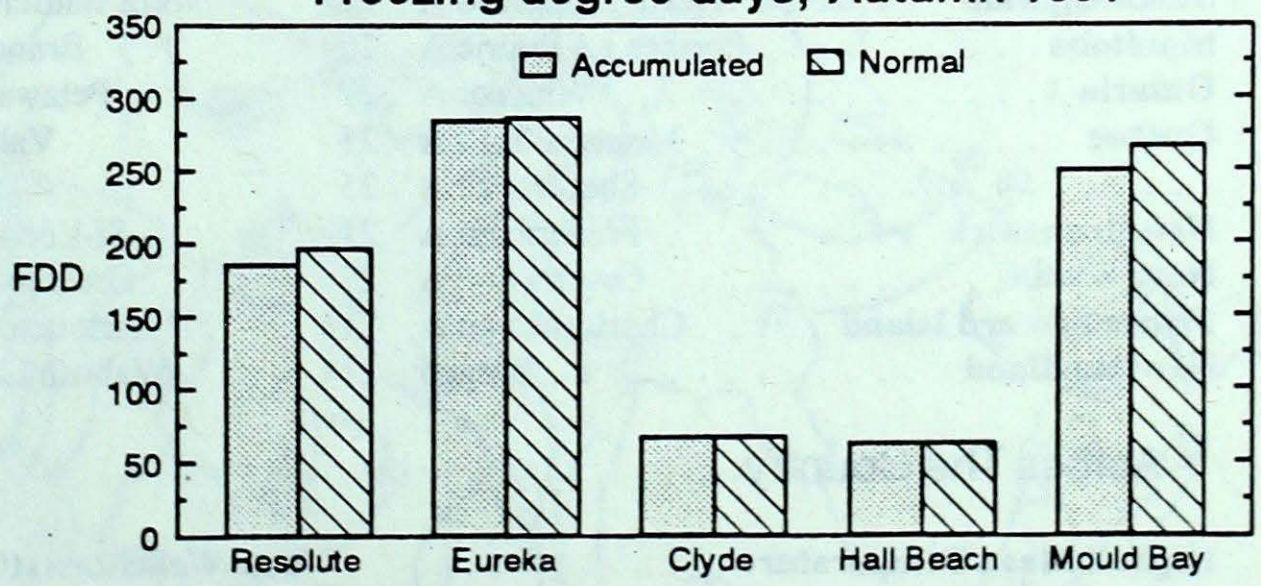
In the eastern Arctic the ice broke up on schedule, with marine traffic beginning in earnest by the end of June. In late August, ice conditions were favourable for resupply operations to begin to more northern communities situated along Ellesmere Island, including Eureka. During September, temperatures were above normal, but late in the month the M.V. Arctic failed in its bid to reach the oil terminal on Cameron Island, due to the presence of a large area of impenetrable multi-year ice. Freeze up is currently underway, and new ice in Lancaster Sound is already 15 cm thick. Only two ice breakers remain in this area, awaiting the arrival of the M.V. Arctic on October 21, on its final run to Little Cornwallis Island. Commercial vessels are still plying the waters of Hudson Bay and Strait, but this past week weather conditions have been anything but favourable, with snow, blowing snow and 100 km/h winds reported along the east coast of Baffin Island.

In the western Arctic, the season began on a positive note, with breakup beginning on schedule along the southern Arctic coastline. But the favourable situation in the Beaufort did not last long, when the Arctic ice pack, which normally remains well off shore, began drifting southwards. Hard multi-year ice moved in, where normally there would be approximately one hundred or more kilometres of open water along the Tuktoyaktuk Peninsula and off Alaska. This ice delayed and disrupted resupply operations and shipping most of the summer. In August, a cruise ship scheduled to navigate eastwards through the northwest passage was stopped by heavy ice along Alaska's north shore. There was even concern that an icebreaker stationed in the Beaufort might not be able to get out in time before freeze-up, but the ice situation improved at the end of September. Two Canadian icebreakers traversed the Northwest Passage with little difficultly this year; all are now in the process of leaving the western and central Arctic. This week gales and heavy snowfalls affected the western region.

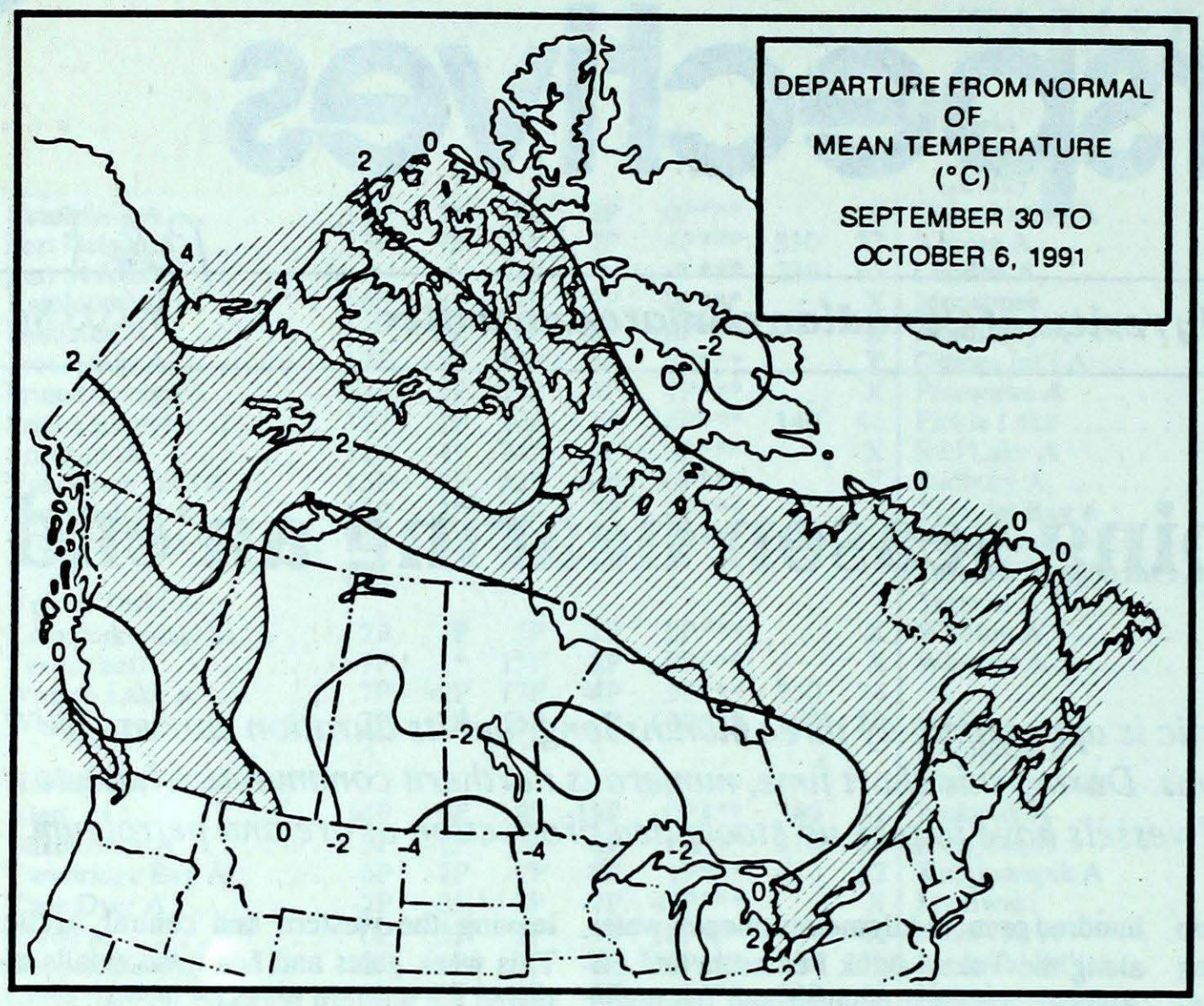
A look ahead ...

For the week of October 14, above normal temperatures are expected in eastern and western regions bordering the oceans: B.C., the Yukon and the Atlantic provinces. Inbetween, the rest of the country will experience below normal temperatures under the influence of a trough of low pressure, which will push cold arctic air into the Prairies, Ontario and Quebec.

Freezing degree-days, Autumn 1991



Freezing degree-days (FDD) are an accumulation of the number of degrees the mean daily temperature is below 0°C. For example, a day having a mean daily temperature of -10°C accumulates 10 FDD. Freezing degree-days are a good indicator for estimating ice growth and thickness during a season.



Weekly normal temperatures (°C)

	max.	min.
Whitehorse A	7.7	-0.6
Iqaluit A	0.5	-4.2
Yellowknife A	4.6	-0.9
Vancouver Int'l A	15.8	7.8
Victoria Int'l A	16.4	6.8
Calgary Int'l A	15.0	1.5
Edmonton Int'l A	14.6	0.7
Regina A	15.4	1.2
Saskatoon A	14.1	1.3
Winnipeg Int'l A	14.8	3.2
Ottawa Int'l A	16.0	5.6
Toronto (Pearson Int'l A)	17.5	6.2
Montréal Int'l A	16.2	6.7
Québec A	14.2	4.6
Fredericton A	16.0	4.2
Saint John A	14.7	5.5
Halifax (Shearwater)	16.0	7.9
Charlottetown A	14.8	6.7
Goose A	9.1	1.3
St John's A	12.4	5.0

Weekly temperature and precipitation extremes

	Maximum temperature (°C)		Minimum temperature (°C)		Heaviest precipitation (mm)	
British Columbia	Penticton A	24	Puntzi Mountain (aut)	-7	Prince Rupert A	41
Yukon Territory	Watson Lake A	14	Komakuk Beach A	-6	Watson Lake A	28
Northwest Territories	Fort Simpson A	17	Eureka	-27	Rankin Inlet A	36
Alberta	Lethbridge A	26	Lac La Biche (aut)	-7	Slave Lake A	9
Saskatchewan	North Battleford A	22	North Battleford A	-10	La Ronge A	9
Manitoba	Portage La Prairie A	20	Brandon A	-8	Island Lake	22
Ontario	Windsor A	27	Petawawa A	-5	Sudbury A	65
Québec	Montréal Int'l A	25	Val-d'Or	-6	Baie Comeau A	109
	Sherbrooke A	25				
New Brunswick	Fredericton A	21	St-Léonard A	-2	Moncton A	38
Nova Scotia	Greenwood A	23	Greenwood A	-1	Shearwater A	100
Prince Edward Island	Charlottetown A	21	Charlottetown A	1	East Point (aut)	76
Newfoundland	Burgeo	21	Wabush Lake A	-3	St Lawrence	84

Across The Country...

Highest Mean Temperature	Port Weller (aut) (ONT)	17
Lowest Mean Temperature	Eureka (NWT)	-18

91/09/30-91/10/06

CLIMATIC PERSPECTIVES
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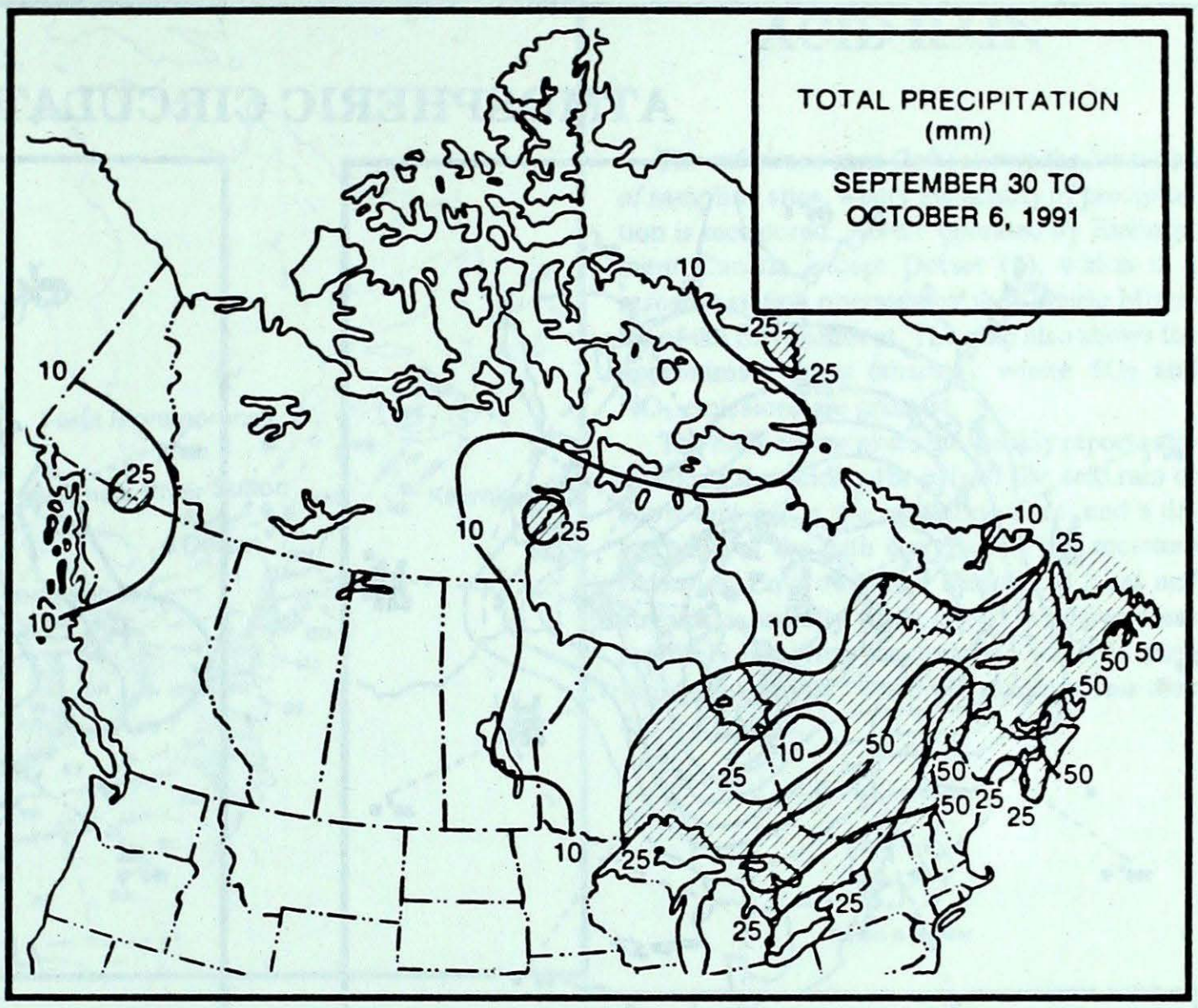

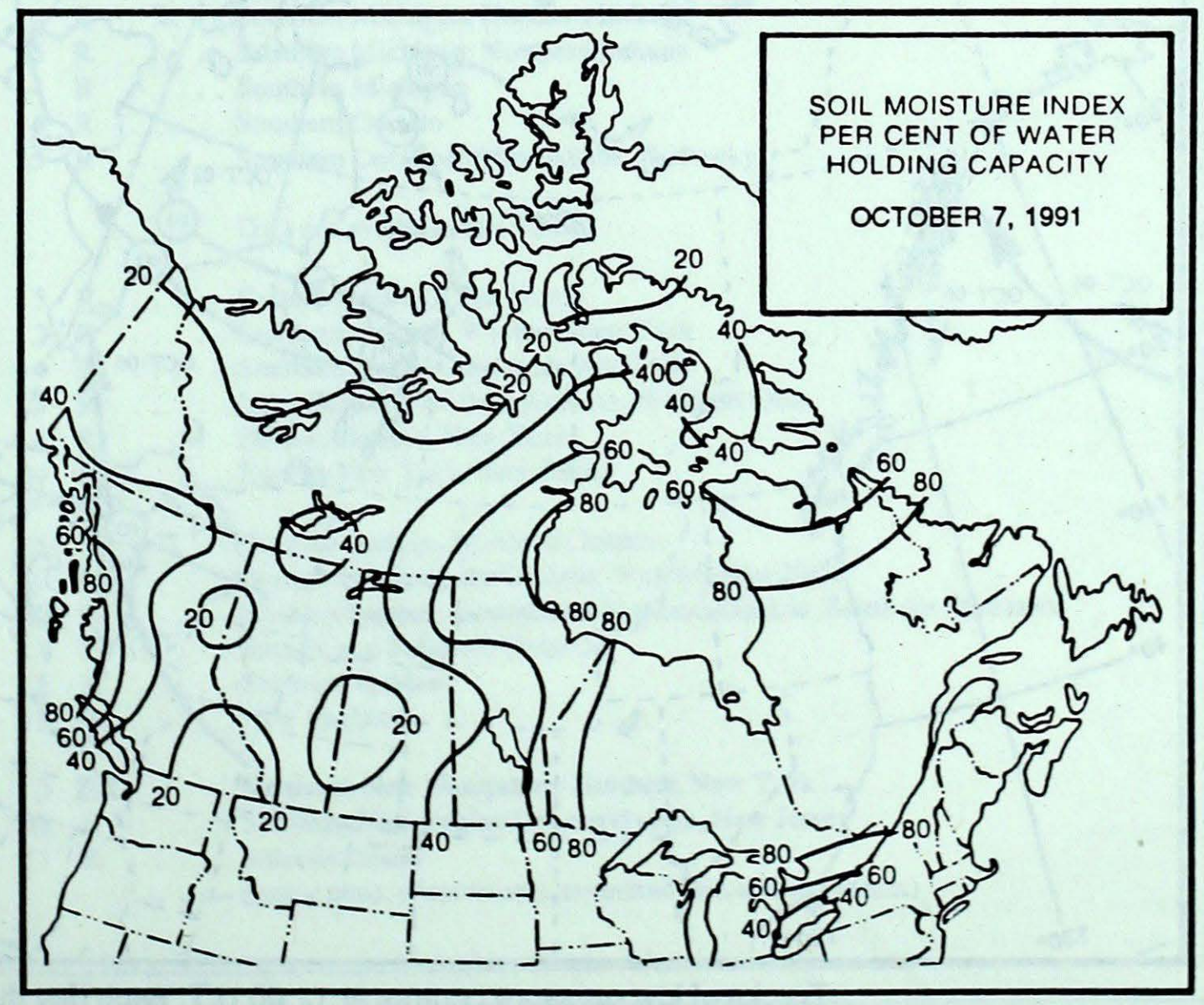

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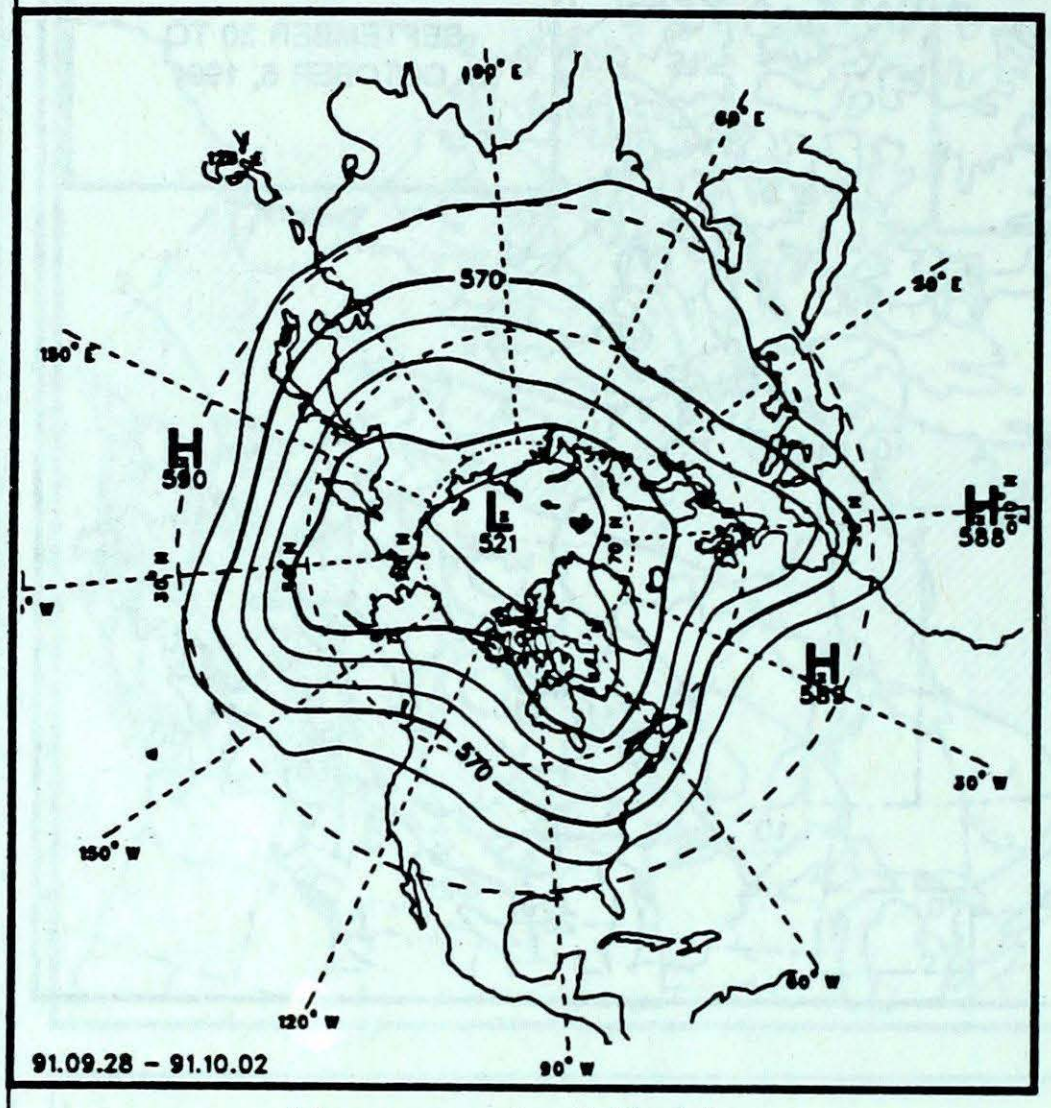
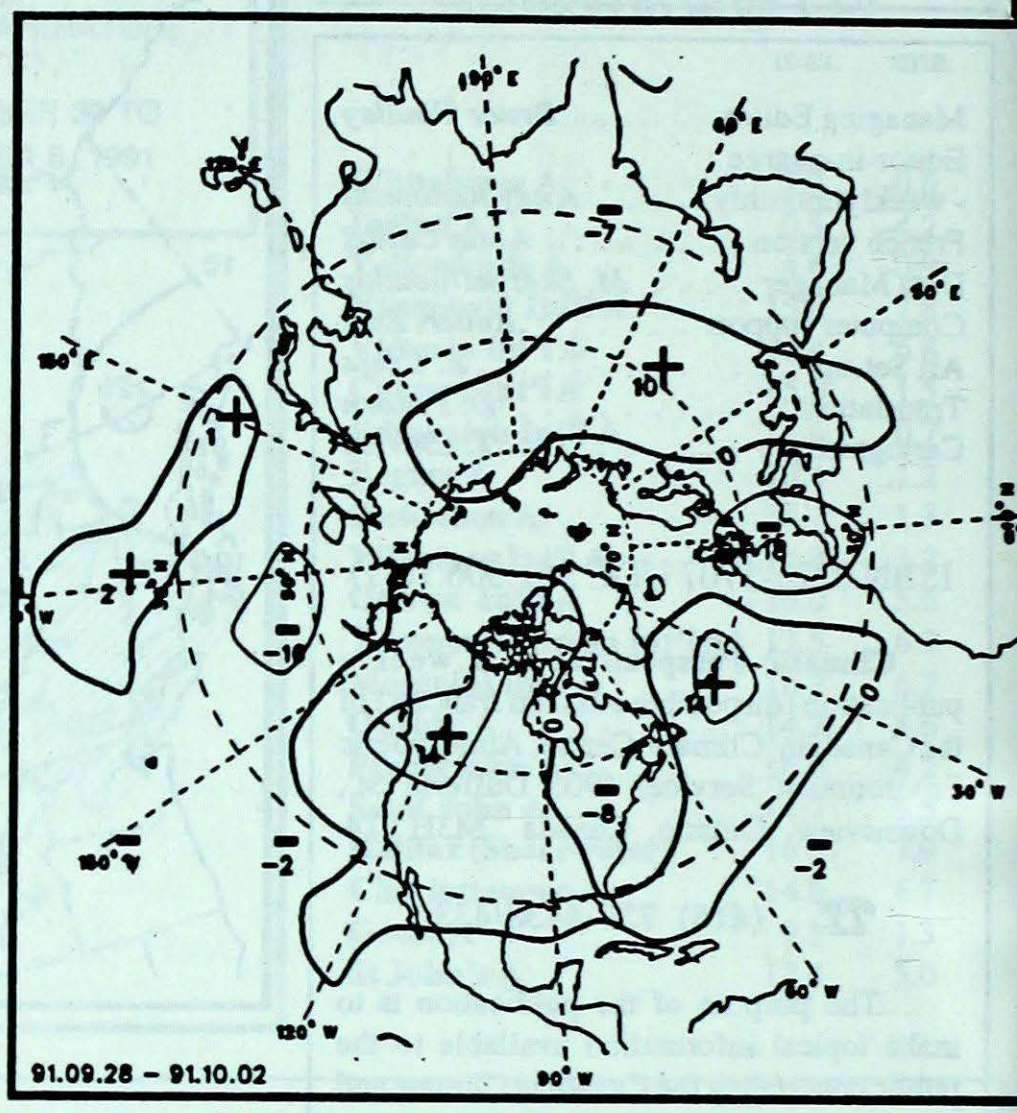
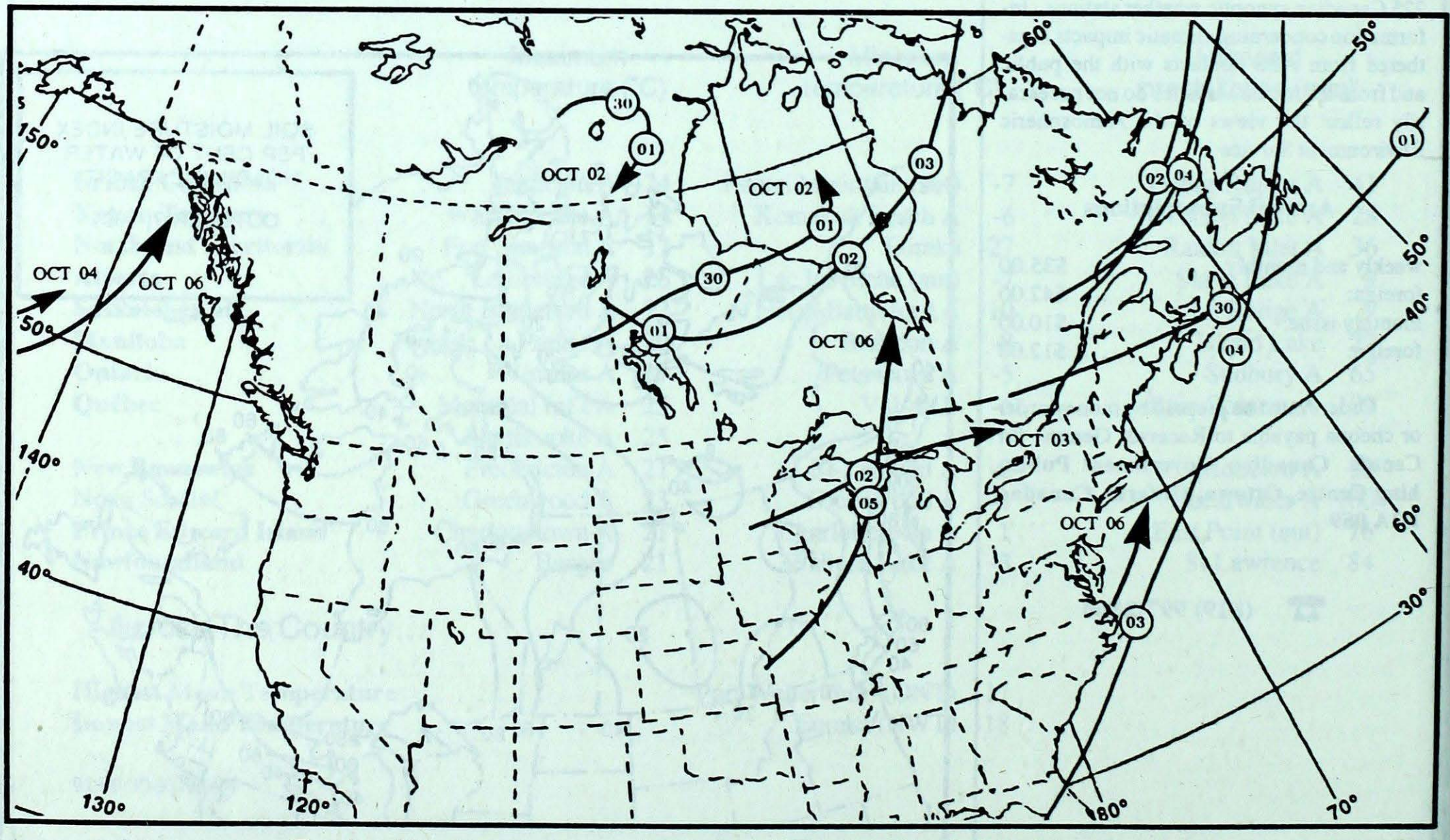


Mean geopotential height
50-kPa level (10-decametre intervals)

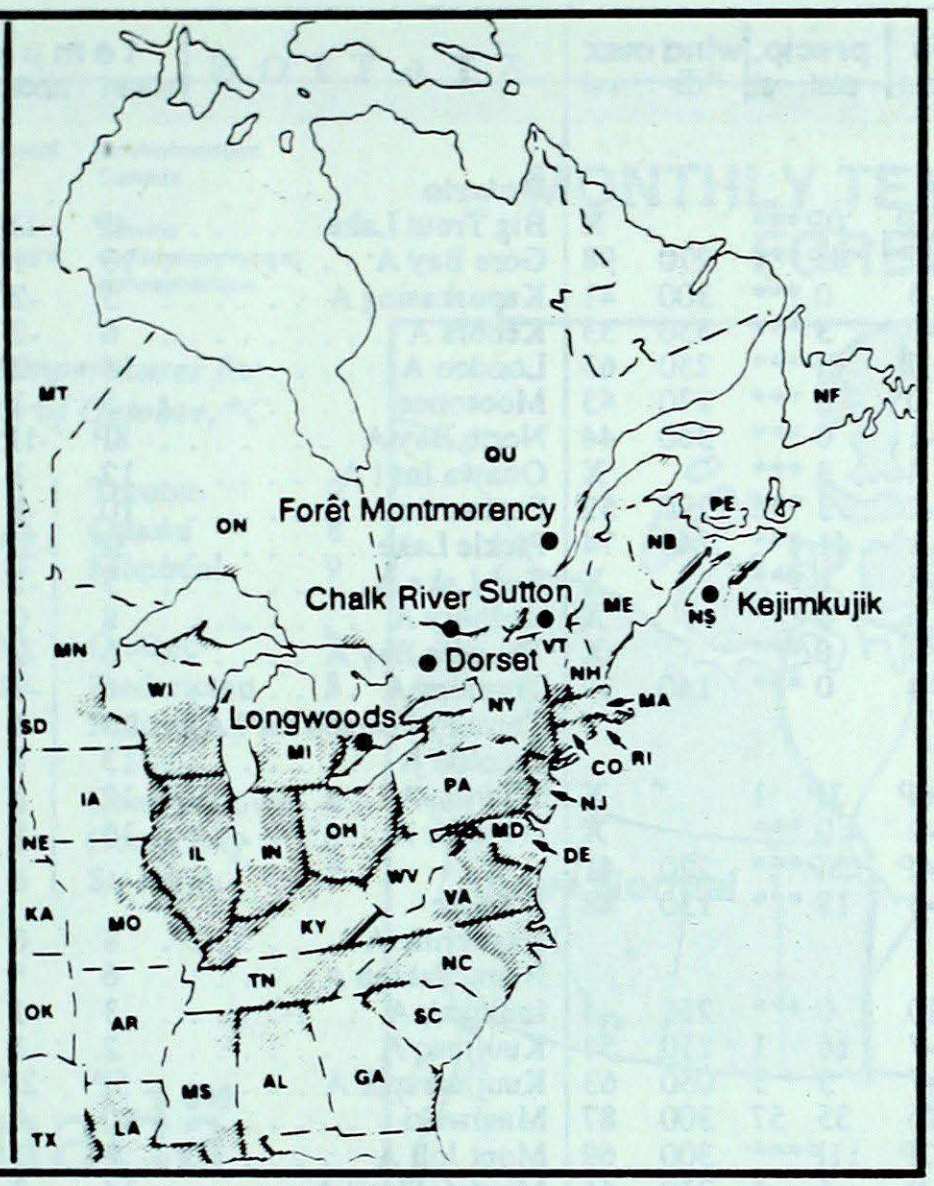


Mean geopotential height anomaly
50-kPa level (10-decametre intervals)



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

ALABAMA — AL
ARKANSAS — AR
CONNECTICUT — CO
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

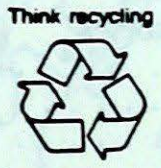


ACID RAIN

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.

Think recycling



Pensez à recycler

Site	day	pH	amount		air path to site
					September 29 to October 5, 1991
Longwoods	03	4.2	10	R	Southern Michigan, Northern Indiana
	04	4.4	24	R	Northern Indiana, Western Ohio
Dorset*	30	4.6	10	R	Iowa, Wisconsin, Cental Michigan
	01	4.6	6	R	Southern Michigan, Northern Indiana
	02	4.5	15	R	Southern Michigan, Northern Indiana
	03	4.6	4	R	Southern Michigan
	04	3.8	4	R	Southern Ontario
	05	4.4	15	R	Southern Ontario, Ohio, Indiana, Kentucky
Chalk River					Data not available this week
Sutton	29	4.7	5	R	Eastern Ontario, Lake Huron
	30	3.9	2	R	Southern Ontario, Western New York
	01	4.1	4	R	Southern Ontario, Southern Michigan
	03	3.9	5	R	Lake Ontario, Southern Ontario, Northern Ohio
	04	3.8	4	R	Eastern Ontario, New York
	05	3.8	24	R	Eastern New York, New Jersey
Montmorency	29	5.1	5	S	Western Quebec, Northern Ontario
	30	4.4	10	M	Eastern and Southern Ontario, Western New York
	02	4.2	20	R	Western Quebec, Eastern and Southern Ontario, Southern Michigan
	03	4.0	11	R	Eastern and Southern Ontario
	04	4.3	12	R	Southern Quebec
	05	4.1	15	R	New England
Kejimkujik	29	4.3	5	R	Vermont, New Hampshire, Northern New York
	01	4.1	35	R	Southern New England, Pennsylvania, New Jersey
	03	5.1	11	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	9P	2P	15P	3P	0P***			X
Cape St James	12P	1P	16P	8P	1P***		270	98
Cranbrook A	10	1	23	-3	0 ***		300	41
Fort Nelson A	8	3	19	-1	3 ***		330	33
Fort St John A	10P	3P	19P	-1P	0P***		250	63
Kamloops A	11	0	23	0	0 ***		270	43
Penticton A	13	1	24	-1	0 ***		360	44
Port Hardy A	10	0	18	4	3 ***			X
Prince George A	8	1	19	-2	3 ***		290	52
Prince Rupert A	9	-1	16	1	41 ***		140	74
Smithers A	7	0	18	-3	1 ***			X
Vancouver Int'l A	12	0	18	6	0 ***			X
Victoria Int'l A	12	0	20	4	0 ***			X
Williams Lake A	7	0	19	-4	0 ***		140	37
Yukon Territory								
Komakuk Beach A	-1P	4P	6P	-6P	3P	1		X
Teslin (aut)	5	*	11	-2	0 ***			X
Watson Lake A	5P	2P	14P	-4P	28P***		270	41
Whitehorse A	5	1	11	-3	18 ***		150	48
Northwest Territories								
Alert	-13	4	-8	-20	0 ***		260	44
Baker Lake A	-1	2	2	-7	16	1	110	54
Cambridge Bay A	-4	3	0	-7	3	3	050	63
Cape Dyer A	-7	-2	-1	-16	35	57	300	87
Clyde A	-6P	-2P	-1P	-12P	11P***		300	69
Coppermine A	-2	3	3	-9	6	4	210	44
Coral Harbour A	-3	1	2	-12	1	1	070	52
Eureka	-18	-1	-8	-27	2	6		X
Fort Smith A	3	0	13	-3	3 ***		330	48
Hall Beach A	-6	0	-2	-10	0	1	300	33
Inuvik A	3	6	11	-3	0 ***		150	33
Iqaluit A	-4	-2	0	-8	0	1	330	46
Mould Bay A	-16P	-3P	-13P	-19P	0P***			X
Norman Wells A	3	3	13	-3	2 ***			X
Resolute A	-10	0	-6	-17	1	3	050	52
Yellowknife A	2P	0P	6P	-2P	1P***		140	50
Alberta								
Calgary Int'l A	8	0	23	-6	0 ***		350	59
Cold Lake A	5	-2	20	-6	0 ***		280	48
Edmonton Namao A	8	0	23	-1	1 ***		310	56
Fort McMurray A	5	-1	17	-2	5 ***			X
High Level A	5	0	16	-6	3 ***		110	39
Jasper	8	1	22	-4	0 ***			X
Lethbridge A	10	0	26	-3	3 ***		250	65
Medicine Hat A	9	-1	24	-5	1 ***		360	65
Peace River A	7	1	20	-4	6 ***		250	65
Saskatchewan								
Cree Lake	4	-1	15	-1	0 ***		310	50
Estevan A	6	-4	20	-7	0 ***		330	54
La Ronge A	4	-1	14	-2	9 ***		310	46
Regina A	5	-3	18	-8	1 ***		300	54
Saskatoon A	6	-2	19	-3	2 ***		270	37
Swift Current A	5	-3	20	-9	2 ***		320	59
Yorkton A	5	-3	16	-8	0 ***		300	54
Manitoba								
Brandon A	5	-4	20	-8	2 ***		290	69
Churchill A	1	0	5	-2	9 ***		320	52
Lynn Lake A	2	-1	10	-3	6 ***		310	48
The Pas A	5	-2	13	-3	6 ***		300	56
Thompson A	2	-1	12	-3	4 ***		300	44
Winnipeg Int'l A	7	-2	20	-1	2 ***		290	70

STATION	temperature mean	anom	max	min	precip. ptot	st	wind max dir	vel
Ontario								
Big Trout Lake	4P	-1P	9P	1P	8P	1	300	65
Gore Bay A	10	-1	16	-1	59 ***		070	74
Kapuskasing A	5	-2	14	-3	47 ***		040	50
Kenora A	6	-2	16	-1	9 ***		280	56
London A	14	2	22	1	5 ***		200	80
Moosonee	5	-1	12	0	27 ***		060	69
North Bay A	8P	-1P	21P	-3P	62P***		070	56
Ottawa Int'l A	12	1	27	-2	35 ***		180	69
Petawawa A	10	-1	24	-5	62 ***		270	43
Pickle Lake	3P	-3P	11P	-1P	22P***		360	57
Red Lake A	5	-2	14	-2	7	1	270	48
Sudbury A	8	0	18	-2	65 ***		210	63
Thunder Bay A	6	-2	16	-4	32 ***		290	59
Timmins A	6	-1	14	-5	17 ***		080	61
Toronto(Pearson Int'l A)	13	1	27	-1	16 ***		210	65
Trenton A	13	1	24	-3	44 ***		220	63
Wiarton A	12	1	22	-2	63 ***		240	63
Windsor A	16	2	27	4	24 ***		240	46
Québec								
Bagotville A	8	0	16	-3	62 ***		100	54
Blanc Sablon A	6	*	12	1	26 ***		230	48
Inukjuak A	3	1	7	-2	22 ***		050	50
Kuujjuaq A	2	1	9	-5	11 ***		070	52
Kuujjuarapik A	5P	2P	11P	1P	15P***		360	80
Maniwaki	10	1	23	-3	65 ***		190	50
Mont Joli A	9	1	17	1	77 ***		160	82
Montréal Int'l A	14	2	25	-2	28 ***		260	69
Natashquan A	7	1	16	-4	42 ***		290	33
Québec A	10	1	21	-2	74 ***		080	54
Schefferville A	2	1	8	-4	28	3	250	54
Sept-Îles A	6	0	13	-2	61 ***		090	52
Sherbrooke A	12	3	25	-2	53 ***		150	50
Val-d'Or A	7	0	18	-6	38 ***		210	67
New Brunswick								
Chatham A	*	*	*	*	* ***			X
Fredericton A	11	1	21	-1	12 ***		200	61
Miscou Island (aut)	10P	-1P	15P	0P	2P***			
Moncton A	12	1	21	-1	38 ***		150	59
Saint John A	11	1	20	-1	15 ***		210	67
Nova Scotia								
Greenwood A	13	2	23	-1	34 ***		210	56
Shearwater A	12	0	20	2	100 ***		340	59
Sydney A	11	1	22	3	52 ***		350	54
Yarmouth A	13	1	21	2	37 ***		320	65
Prince Edward Island								
Charlottetown A	12	1	21	1	47 ***		160	50
East Point (auto)	12P	*	16P	5P	76P***			
Newfoundland								
Cartwright	5P	0P	12P	-2P	5P***		310	61
Churchill Falls A	4	2	12	-3	15	1	270	46
Gander Int'l A	9	0	17	3	32 ***		330	54
Goose A	6	1	16	0	5 ***		190	44
Port Aux Basques	10P	1P	18P	3P	24P***		090	65
St John's A	9	1	20	3	70 ***		250	69
St Lawrence	11	1	17	5	84 ***			X
Wabush Lake A	3	1	10	-3	28 ***		240	37

91/09/30-91/10/06

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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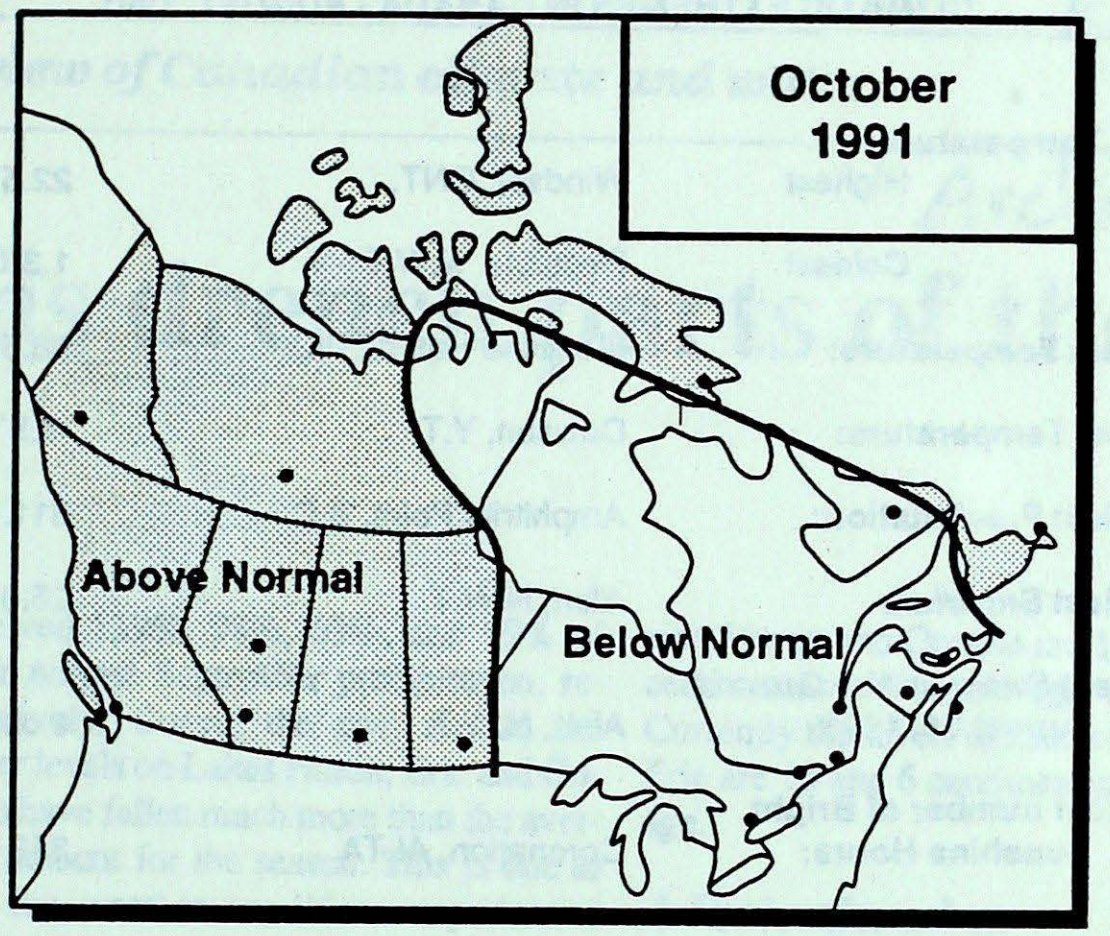
MONTHLY TEMPERATURE FORECAST



Normal temperatures for the month of October, °C

Whitehorse	1	Toronto	9
Yellowknife	-2	Ottawa	8
Iqaluit	-5	Montréal	9
Vancouver	10	Québec	7
Victoria	10	Fredericton	8
Calgary	6	Halifax	10
Edmonton	5	Charlottetown	8
Regina	5	Goose Bay	3
Winnipeg	6	St. John's	7

Canada

The following page is a correction to the August monthly issue

CLIMATIC EXTREMES IN CANADA - AUGUST, 1991

Mean Temperature:		
Highest	Windsor, ONT.	22.5°C
Coldest	Resolute, N.W.T.	1.3°C
Highest Temperature:	Medicine Hat, ALTA.	38.3°C
Lowest Temperature:	Dawson, Y.T.	-6.5°C
Heaviest Precipitation:	Amphitrite Point, B.C.	311.4 mm
Heaviest Snowfall:	Alert, N.W.T.	25.0 cm
Deepest Snow on the Ground on August 31, 1991	Alert, N.W.T.	9 cm
Greatest number of Bright Sunshine Hours:	Coronation, ALTA.	353 Hours

Three Valley Gap west of Revelstoke on the 8th and 9th. Heavy downpours and strong winds blew down numerous trees.

On August 26 and 27, Fort Nelson received 8.4 cm of snow, a new monthly record and the earliest snowfall since 1955. Tourists in the area were not pleased, but children practised building snowmen.

Alberta

Cool, unstable air, moved into central and southern Alberta early in the month, triggering severe weather in the central parts of the province. Hail, funnel clouds and small tornadoes were reported. At the same time, northern regions experienced record high temperatures in the low thirties.

Between August 4 and 9, it was very hot and dry, with record high maximum temperatures climbing into the 30's at many locations. The highest reading was recorded at Esther on August 10, a sizzling 42.4°C. However, there was a significant change in the weather pattern thereafter, as an atmospheric low pressure system moved into southern B.C. and the American northwest. Western regions were the first to feel the effects of this change. A cold front triggered severe weather in north-central Alberta on the 9th, and strong winds caused extensive damage to homes and trailers in the Sturgeon Lake area.

Central and southern Alberta received most precipitation between August 10 and 15. More than 100 mm fell at Red Deer. The central foothills, including Jasper reported 65 to 95 mm. Eastern sections of the province were the driest, with some locations receiving only one quarter of their normal August precipitation.

During the final week of the month, much colder air surged southwards, and northern districts experienced a sharp cooling trend. At month's end, daytime temperatures in northern Alberta were only in the mid to high teens, while readings in southern Alberta were still reaching the record high 30's.

Manitoba and Saskatchewan

For the most part the month was sunny, warm and dry. With few exceptions precipitation was below normal, with the driest area being southern Manitoba. A measly 6.2 mm fell at Winnipeg; only the Augusts of 1961 and 1915 were drier. Temperatures were well above normal. August 1991 was amongst the top ten warmest ever. The month was the hottest on record at: North Battleford (20.7°C), Prince Albert (19.8°C), Cree Lake (17.9°C) and Churchill (14.4 C). The month was also the second warmest on record at Saskatoon (21.0°C) and third warmest at The Pas (19.7°C). The warmest temperature recorded was a maximum of 37.9°C degrees at North Battleford, Sask., while the coldest was a minimum of 1.4°C at Stony Rapids, Sask.

Hours of bright sunshine were higher than normal, with many areas reporting 40 to 75 more hours of August sunshine than normal. Estevan was the only station that tallied less than normal sunshine.

Ontario

Warm summer weather continued, as once again above normal monthly mean temperatures were recorded in August. Thanks in part to a month's end heat wave, the northwest experienced their warmest August since 1983, while elsewhere in the province it was the warmest August since 1988. Kenora had the greatest above normal departure, with a mean temperature of 20.8°C, compared to their 17.6°C historical average. Ottawa had the highest extreme daily maximum reading this month, 34.8°C on August 30. So far this year all eight months have exceeded the 1951 - 1980 average.

August also proved to be a dry month, with most sections of Ontario receiving only 20 to 50 mm of rain - well below the August average of 70 to 90 mm. There were exceptions in the Wawa-Kapuskasing-Earlton areas, along the north shore of Lake Ontario and in extreme southwestern Ontario, where near normal rainfalls were realized. However, the bulk of the rain fell as locally heavy, but brief showers, and many farms remained in need of moisture. Kenora was the driest district in Ontario with only 20.8 mm; the driest August since 1940. In the south, London's 52 mm marked their least August rainfall since 1978.