

# Climatic Perspectives



April 9 to 15, 1990

A weekly review of Canadian climate and water

Vol.12 No.15

## Warm weather increases the risk of flooding in the Great Slave Lake watershed

During March, weather conditions in northwestern Canada were exceptionally warm. Autumn precipitation and winter snowfalls were above normal in the southern part of the watershed, and although the snowpack has diminished considerably over the northern and western sections, it has remained high in the southern areas. The depth of snow in the northwest corner of Alberta, while higher than in the remainder of the watershed, is somewhat lower than last year. The ice thickness on the Hay River is 3 feet as opposed to a normal 4 feet. On Great Slave Lake the ice is 5 feet thick, which is near normal. If the warm weather pattern holds, ice break-up could be one week early, occurring by the end of the month.

Stream flow on the Hay River is slowly rising and is currently higher than at any time in the last five years. Current indications are that there will be a higher than normal spring runoff in the most critical area of the watershed: Chinchaga River, Zama-Hay Lakes and the High Level area.

Future weather conditions will determine the extent of flooding at the town of Hay River itself. If significant warming occurs across the southern areas of the basin during the next two weeks, the increased water flow will be more than the river system can handle. Below-freezing temperatures at night however, could slow the melting process down sufficiently.

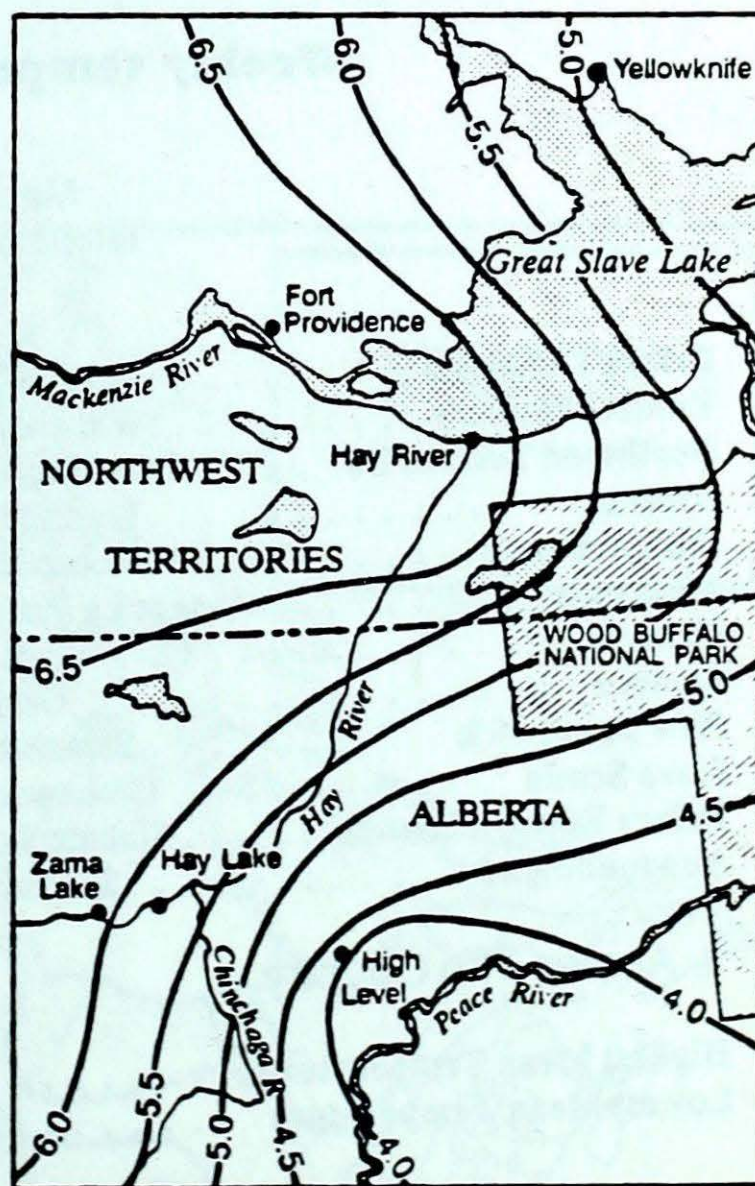
### Cool, wet spring in Ontario

April has been a cool, wet month in Ontario; in fact, it has been this way since the latter part of March. Mean temperatures have been running several degrees below normal. Periods of snow have made April more reminiscent of March, but for the most part, the showery precipitation has been beneficial, improving the soil moisture levels after a rather dry March. Total precipitation from March to mid-April, is approaching or has already exceeded the full two-month totals (March-April) received in southwestern Ontario for the past three years. As a result, field work has been delayed to some extent. Normally spring seeding does not get under way until the latter part of the month anyway, although the last few years it has started earlier than usual.

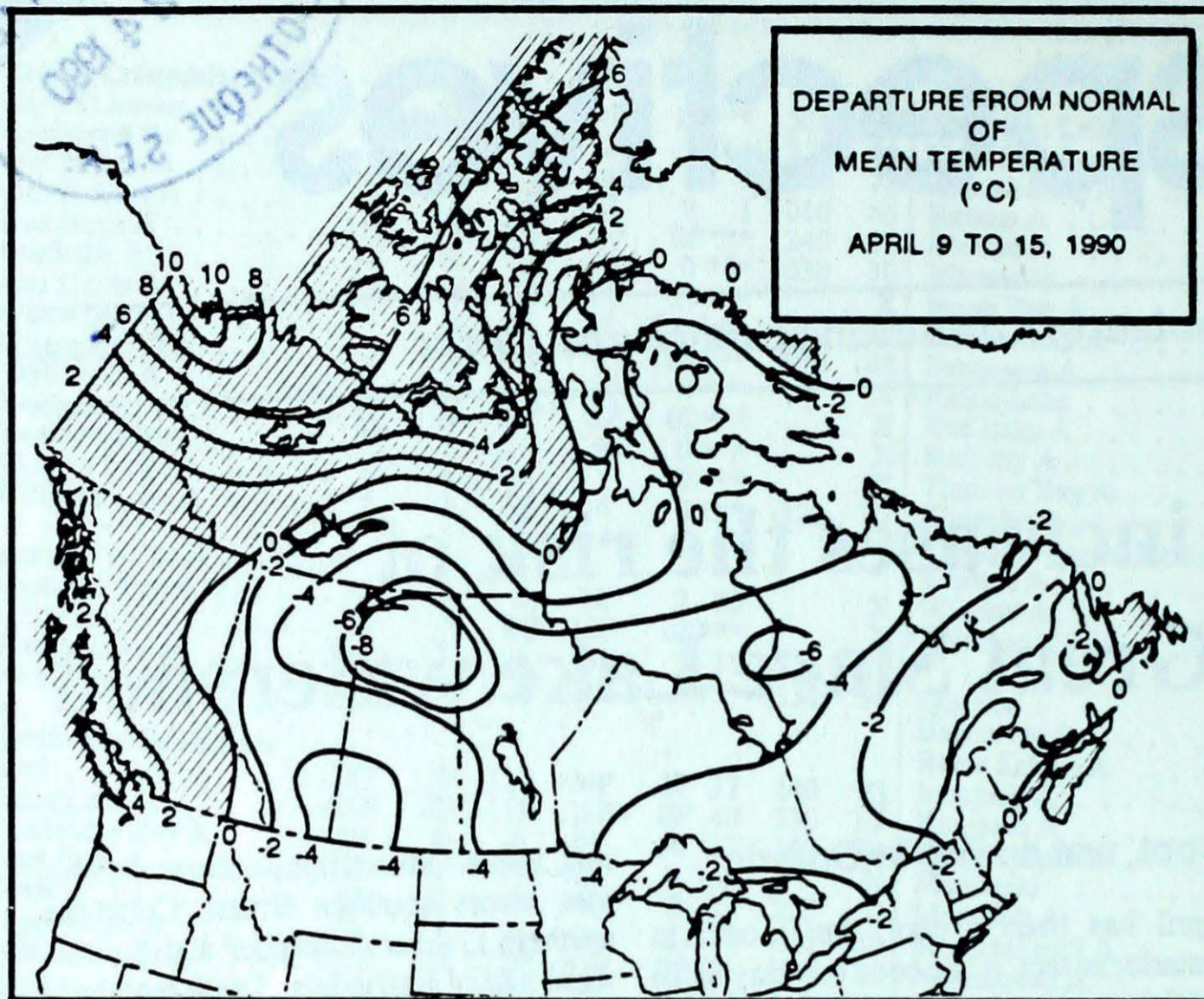
### Mild weather expected for most of the country

For the week of April 23, mild weather is expected over the southern half of Ontario and the Arctic Islands, where temperatures are expected to be 5 to 8 degrees above normal. The Prairies and the Northwest Territories can anticipate temperatures 2 to 5 degrees above nor-

mal. Below-normal temperatures are forecast across southern British Columbia, northern Quebec, Labrador and the southern half of Baffin Island with readings 2 to 5 degrees below normal.



Hay River Watershed. Isopleths show departure from normal mean temperature from February 26 to April 15, 1990.



**Weekly normal temperatures (°C)**

	max.	min.
Whitehorse A	4.4	-5.6
Iqaluit A	-11.1	-20.9
Yellowknife A	-2.4	-13.4
Vancouver Int'l A	12.3	4.5
Victoria Int'l A	12.5	3.5
Calgary Int'l A	9.5	-2.8
Edmonton Int'l A	8.0	-3.1
Regina A	9.5	-2.7
Saskatoon A	9.0	-2.3
Winnipeg Int'l A	8.8	-2.3
Ottawa Int'l A	9.8	-0.7
Toronto (Pearson Int'l A)	10.7	-0.2
Montréal Int'l A	9.5	-0.3
Québec A	6.7	-2.4
Fredericton A	8.0	-2.1
Saint John A	6.7	-2.4
Hallfax (Shearwater)	6.8	-0.7
Charlottetown A	5.0	-2.2
Goose A	1.7	-7.4
St John's A	3.8	-2.4

**Weekly temperature and precipitation extremes**

	Maximum temperature (°C)	Minimum temperature (°C)	Heaviest precipitation (mm)
British Columbia	Abbotsford A 24	Dease Lake -14	Cape St James 40
Yukon Territory	Whitehorse A 11	Komakuk Beach A -19	Komakuk Beach A 5
Northwest Territories	Fort Simpson A 12	Clyde A -38	Alert 27
Alberta	Lethbridge A 17	Lethbridge A -19	Lac La Biche (aut) 13
Saskatchewan	Moose Jaw A 15	Cree Lake -22	Yorkton A 7
Manitoba	Portage La Prairie A 11	Churchill A -22	Gimli 10
Ontario	Windsor A 17	Moosonee -19	Trenton A 37
Québec	Gaspe A 12	La Grande IV A -26	Ste Agathe Des Monts 42
New Brunswick	Saint John A 13	St-Léonard A -10	Fredericton A 53
Nova Scotia	Greenwood A 16	Sydney A -6	Greenwood A 68
Prince Edward Island	Summerside A 11	Charlottetown A -6	Summerside A 38
Newfoundland	St John's A 13	Churchill Falls A -23	Burgeo 68

**Across The Country...**

Highest Mean Temperature	Abbotsford A(BC) 13
Lowest Mean Temperature	Hall Beach A(NWT) -24

CLIMATIC PERSPECTIVES  
VOLUME 12

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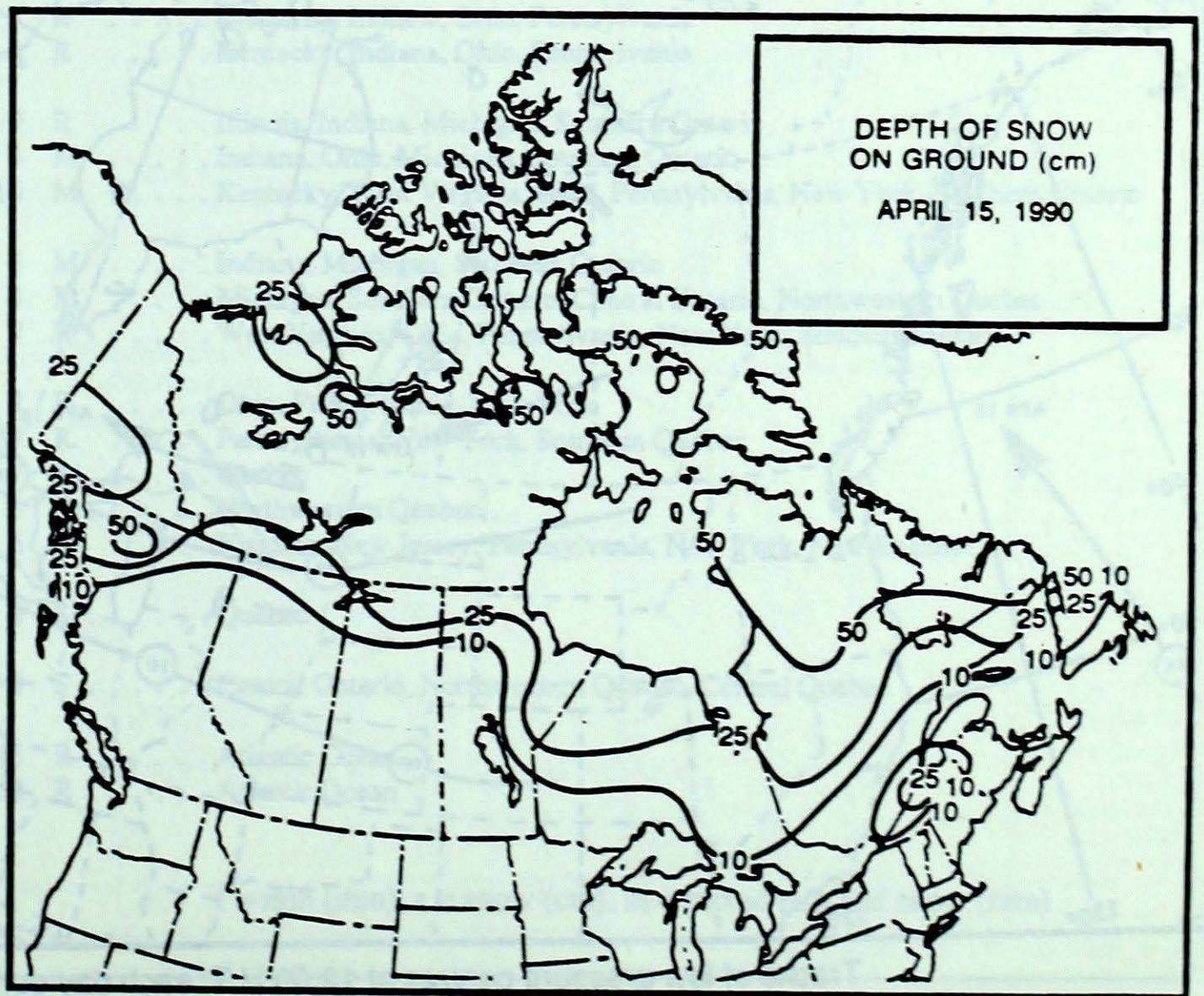
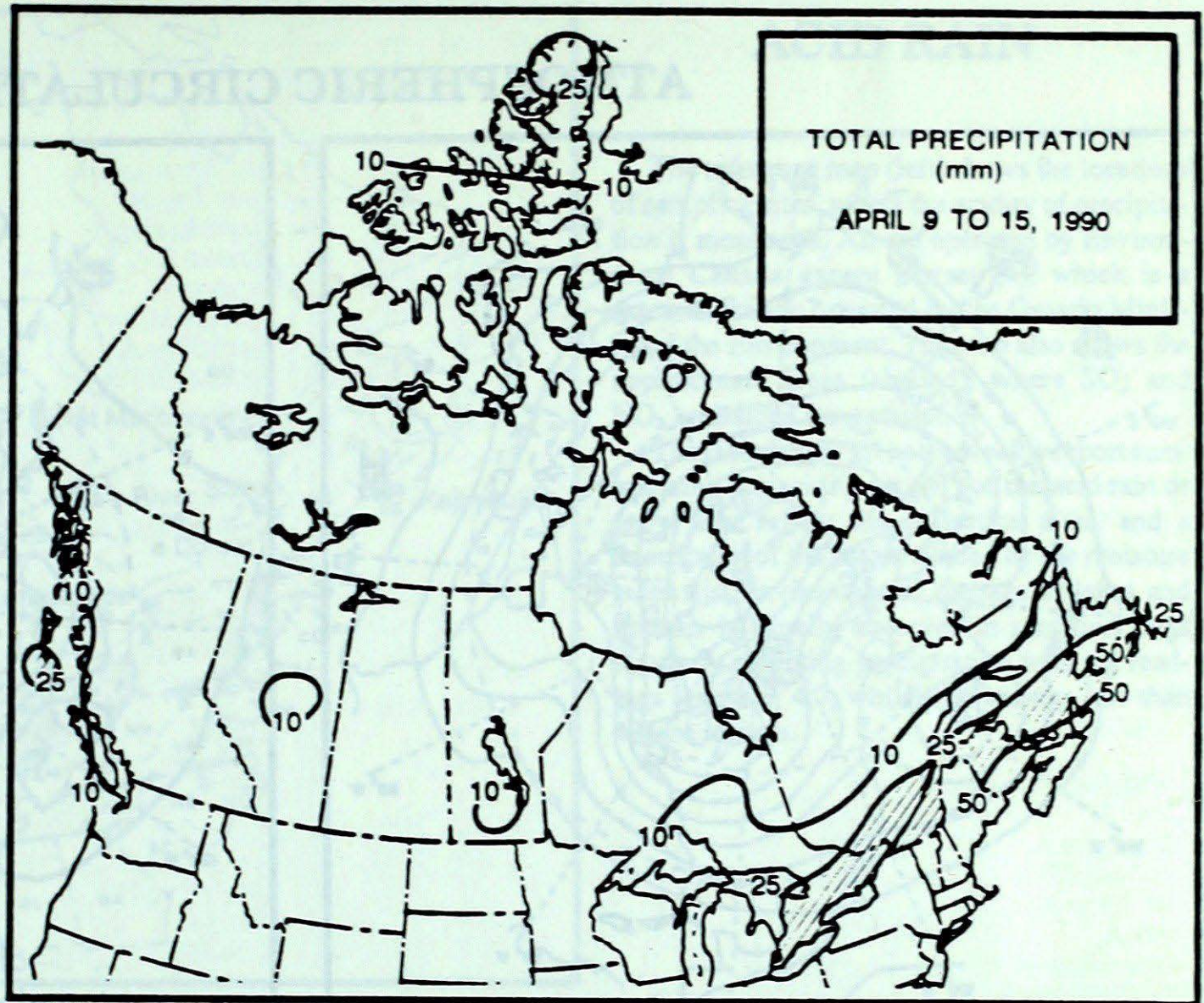
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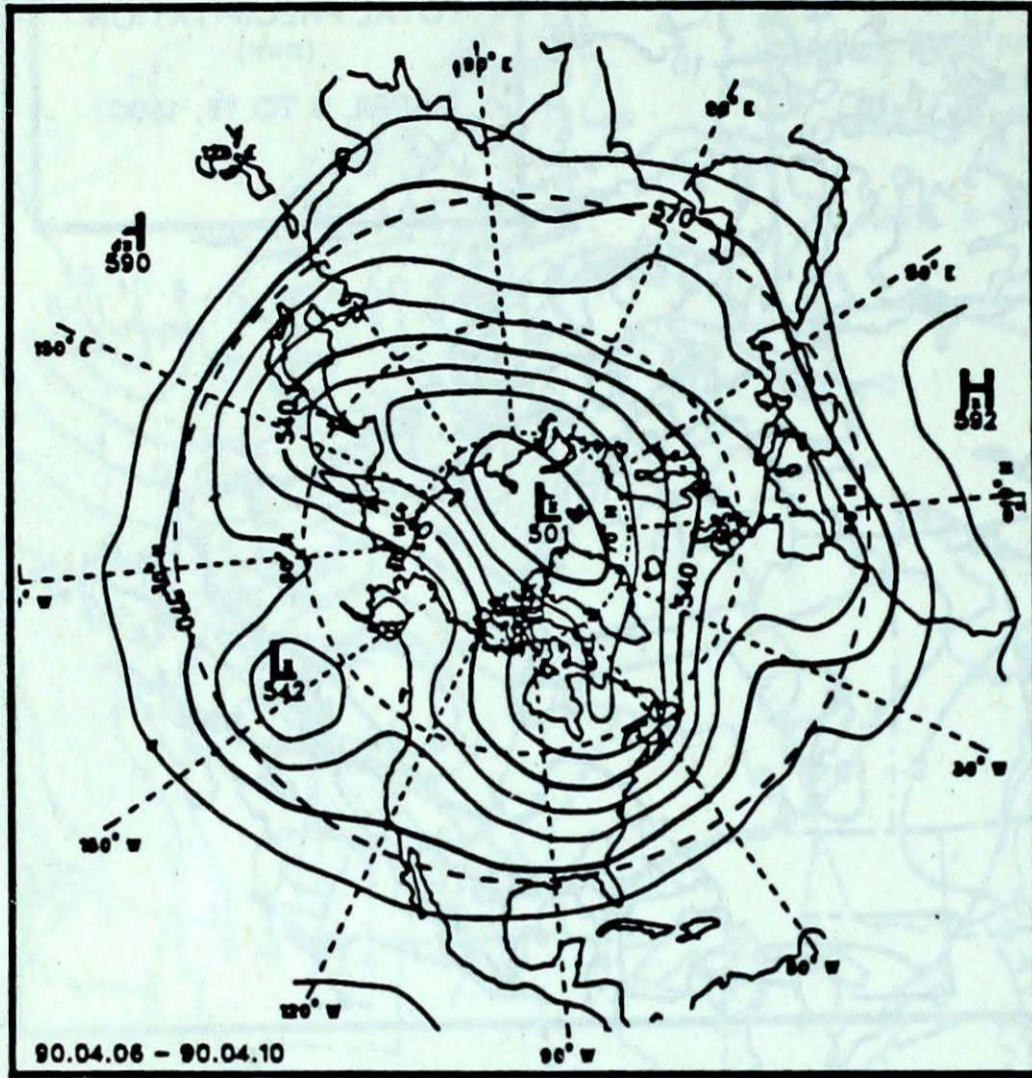
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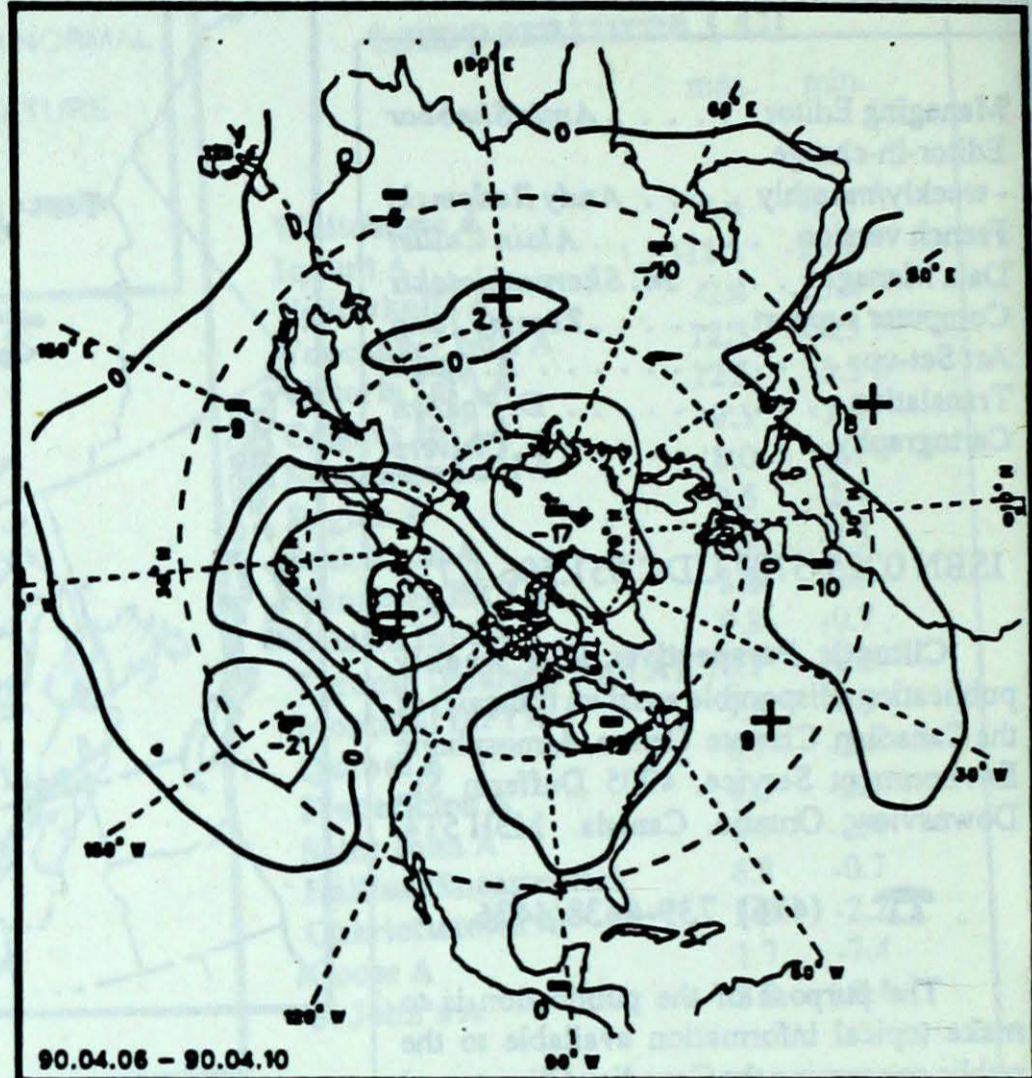
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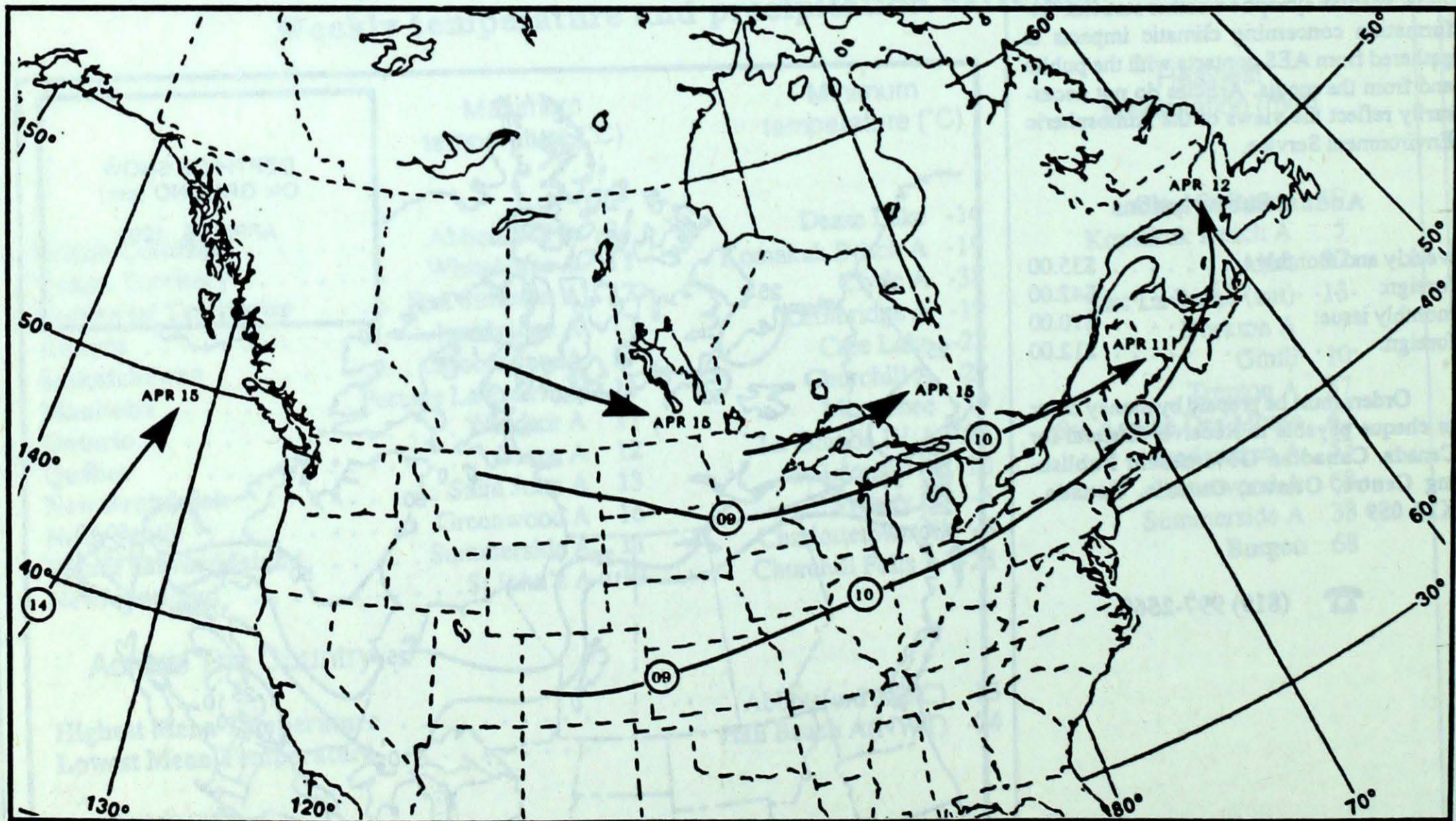
### ATMOSPHERIC CIRCULATION



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



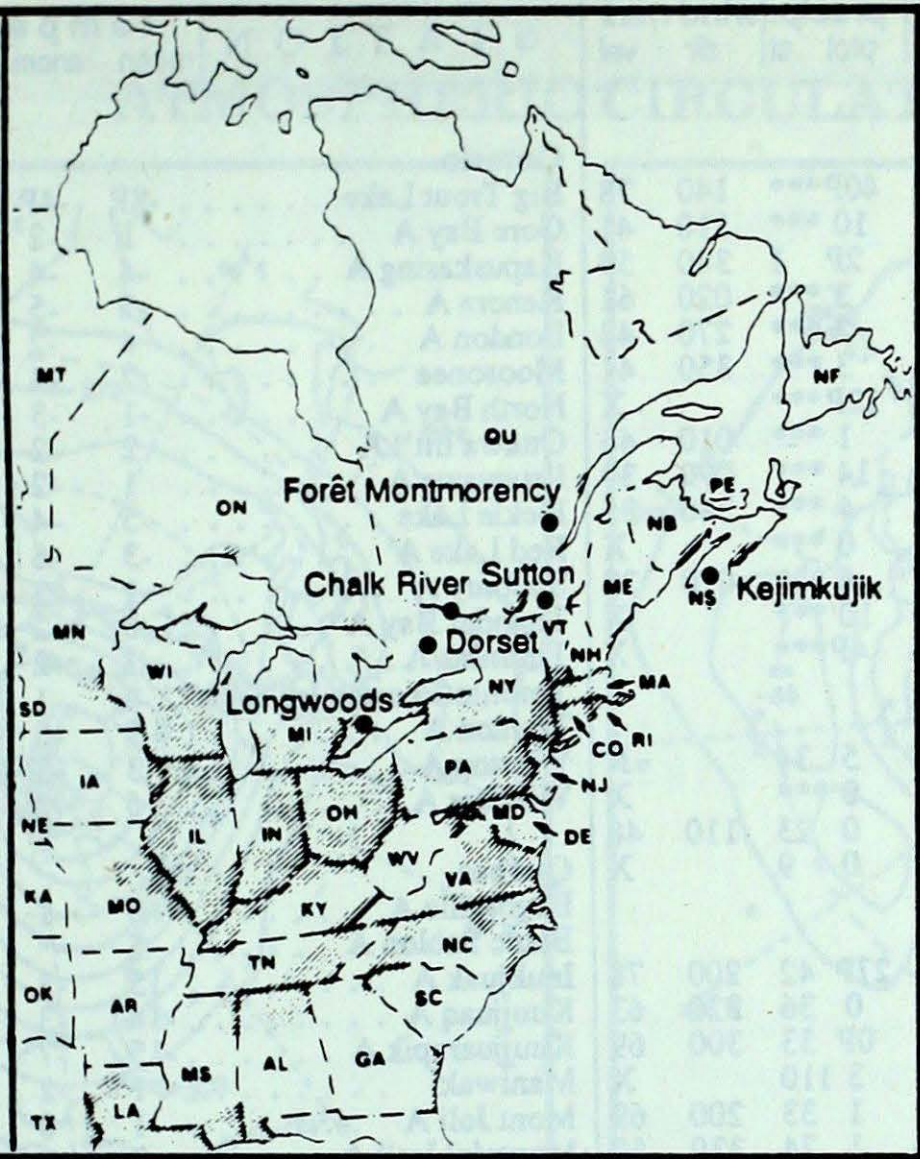
Mean geopotential height anomaly  
50-kPa level (10-decametre intervals)



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

## ACID RAIN

- 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



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 April 8 to 14, 1990.
Longwoods	9	3.7	6 R	Tennessee, Kentucky, Indiana, Ohio	
	10	4.0	16 R	Indiana, Ohio, Michigan, Southern Ontario	
	13	3.4	3 R	Kentucky, Indiana, Ohio, Pennsylvania	
	14	3.4	4 R	Kentucky, Indiana, Ohio, Pennsylvania	
Dorset *	9	4.4	9 R	Illinois, Indiana, Michigan, Southern Ontario	
	10	4.4	3 M	Indiana, Ohio, Michigan, Southern Ontario	
	14	4.0	10 M	Kentucky, West Virginia, Ohio, Pennsylvania, New York, Southern Ontario	
Chalk River	9	4.1	5 M	Indiana, Michigan, Southern Ontario	
	10	4.3	3 M	Michigan, Southern Ontario, Central Ontario, Northwestern Quebec	
	14	3.7	7 R	West Virginia, Ohio, Pennsylvania, New York, Southern Ontario	
Sutton	9	4.0	7 R	Ohio, Pennsylvania, New York	
	10	4.3	37 R	Pennsylvania, New York, Southern Quebec	
	11	4.2	7 S	Quebec	
	12	4.3	3 S	Northwestern Quebec	
	14	3.5	6 R	Virginia, New Jersey, Pennsylvania, New York, New England	
Montmorency	9	4.5	3 S	Quebec	
	10	4.4	9 S	Central Ontario, Northwestern Quebec, Central Quebec	
Kejimikujik	10	4.3	43 R	Atlantic Ocean	
	11	4.6	22 R	Atlantic Ocean	

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

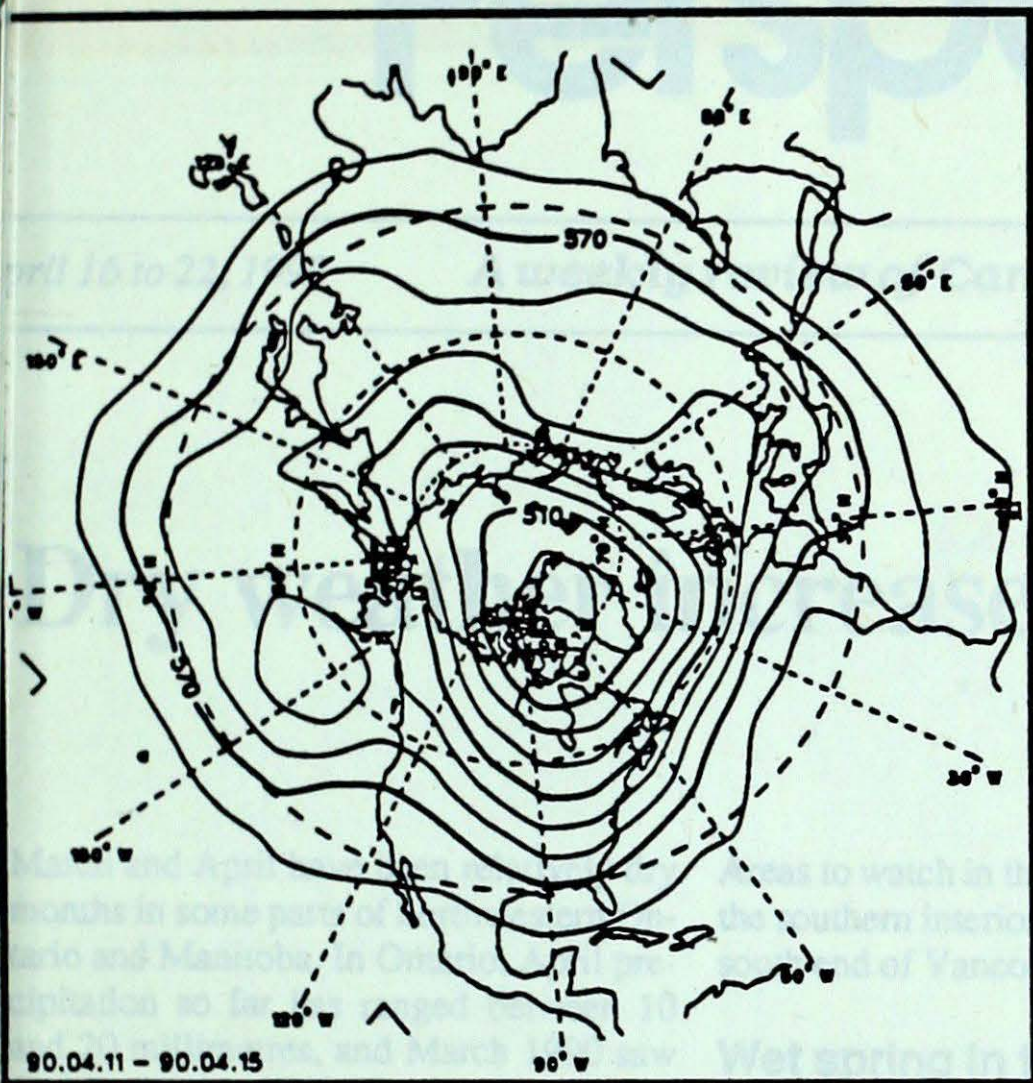
STATION	temperature				precip. ptot	st	wind max		STATION	temperature				precip. ptot	st	wind max	
	mean	anom	max	min			dir	vel		mean	anom	max	min			dir	vel
<b>British Columbia</b>								<b>Ontario</b>									
Cape St James	8P	1P	11P	5P	40P***		140	78	Big Trout Lake	-8P	-4P	4P	-17P	2P	31	010	57
Cranbrook A	5	0	17	-6	10 ***		110	41	Gore Bay A	1	-2	7	-6	18	1	030	37
Fort Nelson A	2P	1P	11P	-8P	2P 1		340	59	Kapuskasing A	-4	-4	8	-14	23	19	250	57
Fort St John A	1	-1	13	-10	3 ***		020	61	Kenora A	-2	-5	8	-12	8	1	320	39
Kamloops A	11	2	20	2	2 ***		270	44	London A	4	-2	16	-5	29 ***		230	70
Penticton A	10	1	20	4	3 ***		350	41	Moosonee	-7	-4	7	-19	3	12	310	52
Port Hardy A	10P	4P	16P	5P	12P***			X	North Bay A	-1	-3	6	-10	15	4	240	48
Prince George A	4	0	15	-9	1 ***		010	46	Ottawa Int'l A	2	-2	11	-6	33 ***		260	52
Prince Rupert A	8	4	20	-2	14 ***		090	39	Petawawa A	1	-2	10	-9	21	1	270	46
Revelstoke A	7	2	18	-1	4 ***		340	35	Pickle Lake	-5	-4	5	-13	0	15	330	33
Smithers A	5	1	17	-4	0 ***			X	Red Lake A	-3	-6	6	-12	1	3	240	41
Vancouver Int'l A	11	3	17	5	6 ***		070	32	Sudbury A	-1	-3	6	-8	17 ***		230	48
Victoria Int'l A	11	3	20	2	10 ***			X	Thunder Bay A	0	-2	14	-10	2 ***		310	43
Williams Lake A	5P	1P	16P	-7P	4P***			X	Timmins A	-2	-2	9	-12	9	14	240	50
<b>Yukon Territory</b>								<b>Toronto(Pearson Int'l A)</b>									
Komakuk Beach A	-7	12	2	-19	5 34			X	Trenton A	3	-3	10	-6	37 ***		270	56
Teslin (aut)	0	*	10	-11	0 ***			X	Warton A	3	-1	14	-5	22 ***		160	52
Watson Lake A	-1	1	11	-15	0 23		110	48	Windsor A	6	-2	17	-4	35 ***		250	63
Whitehorse A	1	2	11	-9	0 9			X	<b>Québec</b>								
<b>Northwest Territories</b>								<b>Bagotville A</b>									
Alert	-19P	7P	-11P	-26P	27P 42		200	78	Blanc Sablon A	-5	*	2	-11	10 ***		010	67
Baker Lake A	-17	1	-6	-25	0 36		320	63	Inukjuak A	-15	-3	-7	-24	3	41	249	43
Cambridge Bay A	-18P	5P	-5P	-27P	0P 33		300	69	Kuujuuaq A	-14	-3	-7	-20	1	11	250	59
Cape Dyer A	-16	2	-3	-28	3 110			X	Kuujuarapik A	-15	-7	-5	-27	6	20	190	41
Clyde A	-20	0	-2	-38	1 33		200	69	Maniwaki	1	-2	11	-9	30	1	180	39
Coppermine A	-12	7	-1	-22	1 74		330	59	Mont Joli A	1	0	9	-5	18 ***		050	67
Coral Harbour A	-19P	-2P	-8P	-34P	0P 46		330	41	Montréal Int'l A	2	-3	11	-6	32 ***		030	48
Eureka	-24	6	-6	-34	12 22		330	102	Natashquan A	-3P	-2P	2P	-13P	19P 41		280	46
Fort Smith A	-6	-3	6	-16	1 19		310	41	Québec A	0P	-2P	9P	-8P	17P 29		070	56
Hall Beach A	-24	-2	-8	-36	0 45		280	59	Schefferville A	-14	-5	-3	-25	4	47	250	80
Inuvik A	-6	10	8	-17	6 42		300	43	Sept-Îles A	-3P	-2P	5P	-11P	1P 9		210	50
Iqaluit A	-18	-2	-7	-34	3 34		350	44	Sherbrooke A	1	-2	10	-10	38 ***		270	50
Mould Bay A	-18	7	-1	-27	2 24		300	72	Val-d'Or A	-3	-3	8	-16	1	18	240	57
Norman Wells A	-3	5	8	-15	1 1		290	87	<b>New Brunswick</b>								
Resolute A	-21	3	-8	-33	3 31		360	78	Charlo A	0	1	10	-7	16	5	280	57
Yellowknife A	-9	-1	0	-22	1 39		340	61	Chatham A	1	-1	10	-6	33	7	070	67
<b>Alberta</b>								<b>Fredericton A</b>									
Calgary Int'l A	1	-2	15	-15	2 ***		350	50	Moncton A	2	0	12	-6	26	1	170	63
Cold Lake A	-2	-4	6	-12	5 1			X	Saint John A	3	1	13	-4	51 ***		220	56
Edmonton Namao A	-1P	-4P	15P	-12P	2P***		270	48	<b>Nova Scotia</b>								
Fort McMurray A	-3	-5	10	-14	0 1			X	Greenwood A	4	1	16	-5	68 ***		260	67
High Level A	-2	-4	9	-16	0 8		340	44	Shearwater A	4	1	9	-3	54 ***		210	76
Jasper	3	0	14	-14	0 1			X	Sydney A	2	1	10	-6	56 ***		210	70
Lethbridge A	1	-4	17	-19	9 ***		260	69	Yarmouth A	4	0	12	-2	54 ***		180	67
Medicine Hat A	1P	-5P	16P	-14P	8P***		020	44	<b>Prince Edward Island</b>								
Peace River A	0	-2	13	-11	2 1		361	43	Charlottetown A	2	1	10	-6	31	1	180	46
<b>Saskatchewan</b>								<b>Summerside A</b>									
Cree Lake	-8	-8	6	-22	2 11		330	46	2	0	11	-5	38	1	200	50	
Estevan A	2	-3	13	-7	1 ***		100	48	<b>Newfoundland</b>								
La Ronge A	-4	-5	7	-15	1 2		320	39	Cartwright	-5	-2	6	-13	4	202	320	56
Regina A	0	-3	14	-10	1 ***		300	63	Churchill Falls A	-9	-2	5	-23	0 ***		240	44
Saskatoon A	-1P	-4P	10P	-10P	1P***		240	43	Gander Int'l A	1	0	10	-7	26	2	200	82
Swift Current A	-1	-5	14	-12	4 ***		320	61	Goose A	-5	-2	8	-14	5	63	290	48
Yorkton A	-1	-3	7	-9	7 1		320	41	Port Aux Basques	-1P	-2P	4P	-8P	27P 2		310	102
<b>Manitoba</b>								<b>St John's A</b>									
Brandon A	-1	-4	8	-11	2 ***		300	43	2P	1P	13P	-6P	17P***		200	93	
Churchill A	-13	-2	-1	-22	0 24		300	48	St Lawrence	1	1	6	-5	41 ***			X
Lynn Lake A	-9	-9	2	-19	2 8		320	46	Wabush Lake A	-8	-2	4	-22	2	16	210	48
The Pas A	-4P	-4P	8P	-10P	1P 1		300	41	<b>90/04/09-90/04/15</b>								
Thompson A	-7	-6	4	-18	4 2		300	56									
Winnipeg Int'l A	-1	-4	10	-10	1 1		310	46									

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

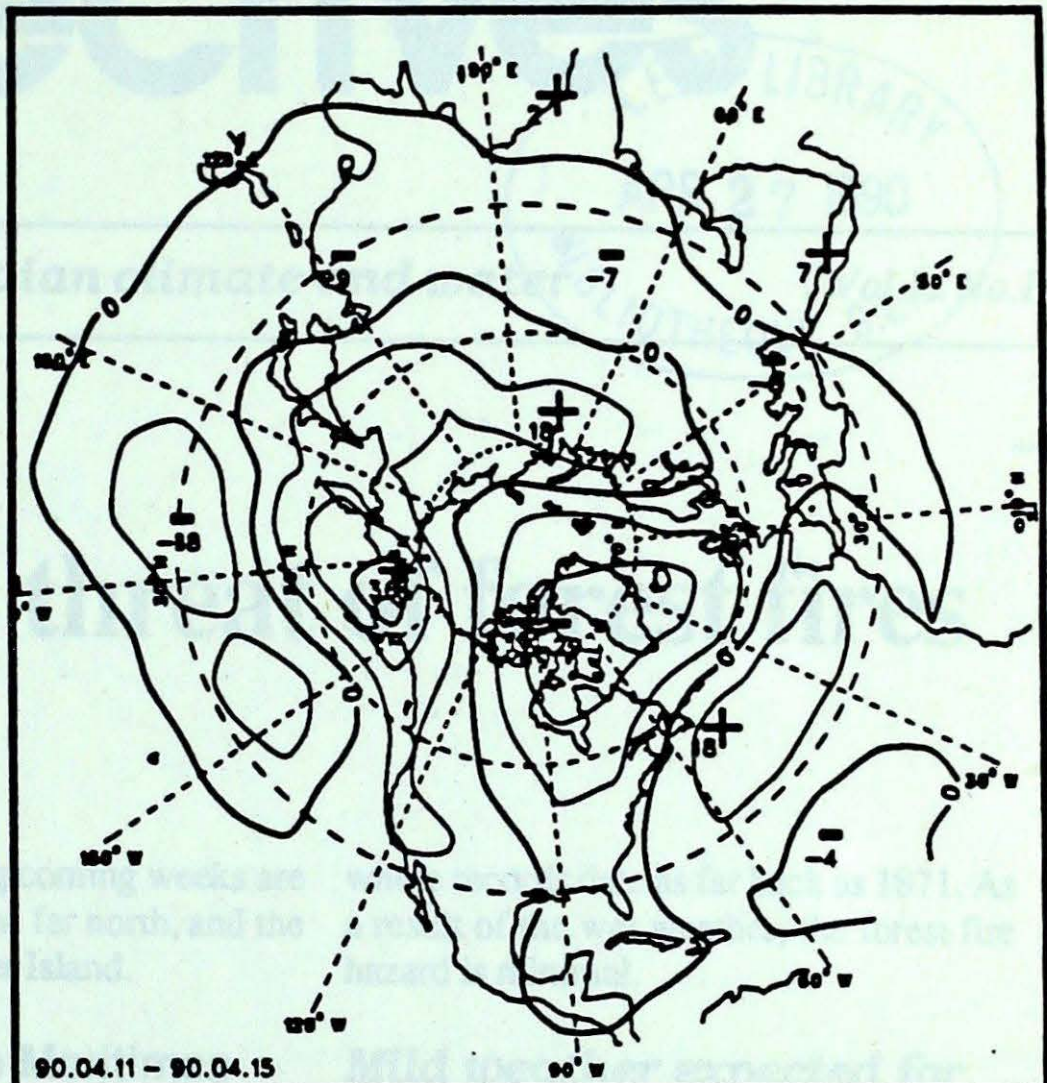
ptot = weekly precipitation total in mm  
 st = snow thickness on the ground in cm  
 dir = direction of max wind, deg. from north.  
 vel = wind speed in km/h

— 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)



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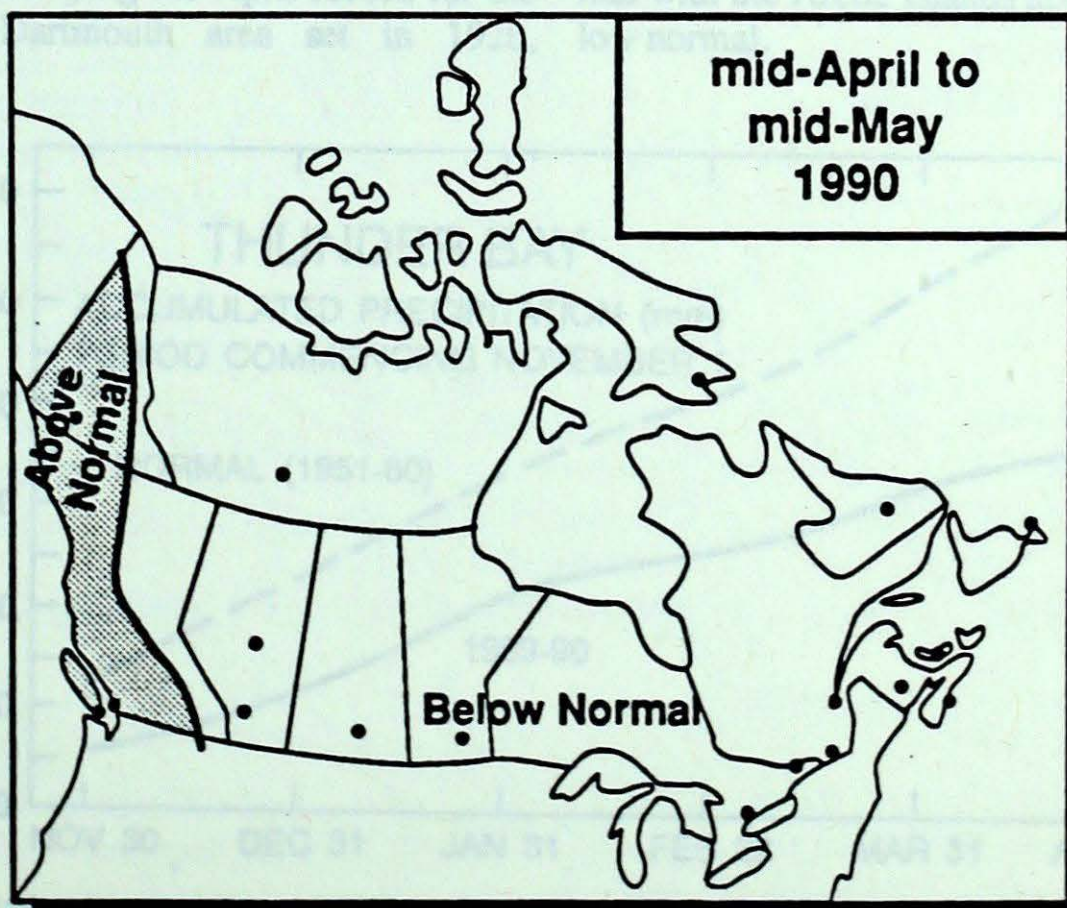
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### MONTHLY TEMPERATURE FORECAST

Normal temperatures for  
mid-April to mid-May, °C

Whitehorse	4	Toronto	9
Yellowknife	-1	Ottawa	9
Iqaluit	-9	Montréal	9
Vancouver	11	Québec	7
Victoria	10	Fredericton	7
Calgary	6	Halifax	6
Edmonton	7	Charlottetown	5
Regina	7	Goose Bay	2
Winnipeg	7	St. John's	3

mid-April to  
mid-May  
1990



Canada