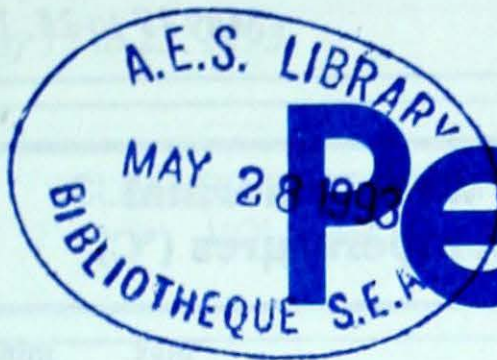




Climatic Perspectives



May 17 to 23, 1993

A weekly review of Canadian climate and water

Vol. 15 No. 21

British Columbia continues warm trend

A rather persistent circulation pattern became established over North America. A strong atmospheric ridge was evident over the west, while a closed upper low and associated trough of cold air was situated over Ontario and Quebec. This pattern allowed unseasonably cold Arctic air to flow southeastwards across central Canada. On the other hand, a southerly circulation of very warm air continued to affect British Columbia.

Temperatures throughout British Columbia remained above normal for most of the week. Numerous high temperature records were broken, as readings soared to the low to mid-thirties in many of the southern interior valleys. The summer-like trend was not without drawbacks, as scattered showers and thunderstorm activity were common, in some cases, resulting in heavy downpours. Lightning strikes also started a few small fires. Fairly intense thunderstorms developed during the middle of the week, producing strong gusty winds. As can be expected with very warm weather such as this, the snow pack in the mountains continued to melt rapidly, resulting in local flooding in some of the interior valleys.

In contrast, in northeastern B.C. it became much colder during the middle of the period. Weather advisories were issued for the eastern slopes of the Rockies, with as much as 11 cm of new snow falling.

Alberta cools off

Cool Arctic air from the Northwest Territories moved across Alberta, ending the above-normal temperature trend that Albertans have been experiencing for the past two weeks. Disturbances deposited significant amounts of precipitation in southeastern Alberta during the latter half of the period. A mixture of rain and snow fell in

some parts of northern Alberta and the higher elevations of the foothills.

Further to the east, in Saskatchewan and Manitoba, it was also unseasonably cool most of the week. On some days, daytime temperatures struggled to reach the double digits, but surprisingly, no temperature records were broken.

Ontario - unseasonably cold

Whatever happened to spring? Temperatures in the south this week averaged as much as 6°C below normal. There were many daily low temperature records broken, and even some frost was reported in the southern agricultural districts. One consolation to this week's weather was that the period was not particularly wet, allowing farmers to get most of the spring planting completed. In fact, the month of May has turned out to be rather dry this year. For example, only 25 to 40 millimetres has fallen up to the 24th, as compared to a normal of 40 to 60 millimetres.

Elsewhere...

Cooler, more seasonal weather returned to the Yukon, with snowfall advisories issued for the southeast. In the Great Slave Lake

district, many of the small lakes and rivers are free of ice. The Arctic Red River is open to the Mackenzie Delta, where there has been no sign of ice breakup. Snow and rain in the Mackenzie Mountains has caused the Liard River to rise. Light, mixed precipitation and cloud were reported over Baffin Island and the Keewatin.

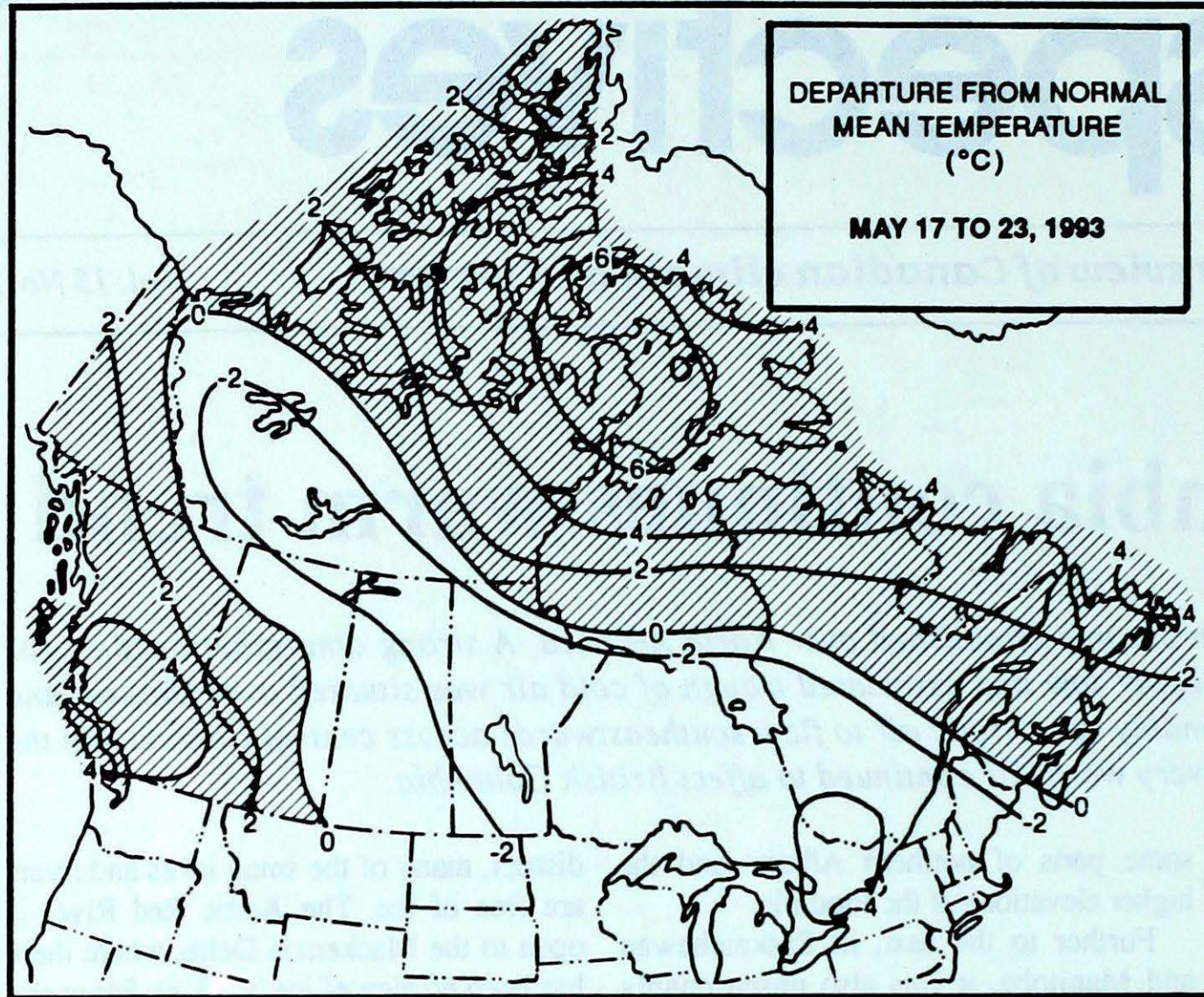
In southwestern Quebec, the weather was unseasonably cool and unsettled, much like Ontario.

It was a cloudy and damp week in the Maritimes, with significant amounts of precipitation. In Newfoundland, the week was marked by heavy thunderstorms, with hail, which developed in a warm, unstable air mass. Temperatures rose to the low twenties. Fog covered much of the south coast for a good part of the week - not an unusual event at this time of the year.

Look ahead...

For the week of May 31, below-normal temperatures are expected across southern Manitoba, Ontario, southwestern Quebec and Nova Scotia. Elsewhere, near to above-normal temperatures are likely. Unsettled weather is expected east of Manitoba. Warm, dry weather will dominate the Prairies and British Columbia.

» This issue of Climatic Perspectives includes a new seasonal forecast. Comments would be appreciated.



Weekly normal temperatures (°C)

	max.	min.
Whitehorse A	13.8	1.3
Iqaluit A	0.3	-5.9
Yellowknife A	12.1	1.8
Vancouver Int'l A	17.3	8.5
Victoria Int'l A	17.4	7.4
Calgary Int'l A	17.8	3.7
Edmonton Int'l A	18.8	3.6
Regina A	19.9	5.3
Saskatoon A	19.7	5.4
Winnipeg Int'l A	19.6	5.7
Ottawa Int'l A	20.1	8.2
Toronto (Pearson Int'l A)	19.8	7.2
Montréal Int'l A	19.9	8.7
Québec A	18.1	6.0
Fredericton A	18.5	5.6
Saint John A	15.5	4.8
Halifax (Shearwater)	14.3	5.3
Charlottetown A	15.1	4.7
Goose A	11.6	1.0
St John's A	11.2	1.9

Weekly temperature and precipitation extremes

	Maximum temperature (°C)	Minimum temperature (°C)	Heaviest precipitation (mm)
British Columbia Lytton	35	Dease Lake -1	Abbotsford A 43
Yukon Territory Watson Lake A	21	Komakuk Beach A -9	Watson Lake A 3
Northwest Territories Fort Simpson A	17	Cape Young -15	Fort Simpson A 16
Alberta Edmonton Int'l A	27	Lloydminster A -2	Calgary Int'l A 27
. Medicine Hat A	27		
Saskatchewan North Battleford A	28	Collins Bay -5	Collins Bay 22
Manitoba Winnipeg Int'l A	28	Dauphin A -6	Island Lake 8
Ontario Petawawa A	23	Petawawa A -3	Kenora A 30
Quebec Montréal Int'l A	20	Inukjuak A -5	Bagotville A 32
New Brunswick Fredericton A	21	St-Léonard A 0	Saint John A 24
Nova Scotia Sydney A	23	Yarmouth A 3	Yarmouth A 47
Prince Edward Island Charlottetown A	19	Charlottetown A 5	Charlottetown A 44
Newfoundland Badger (aut)	24	Wabush Lake A -3	St Lawrence 52

Across The Country...

Highest Mean Temperature	Kamloops A (B.C.) 19
Lowest Mean Temperature	Alert (N.W.T.) -12

CLIMATIC PERSPECTIVES
VOLUME 15

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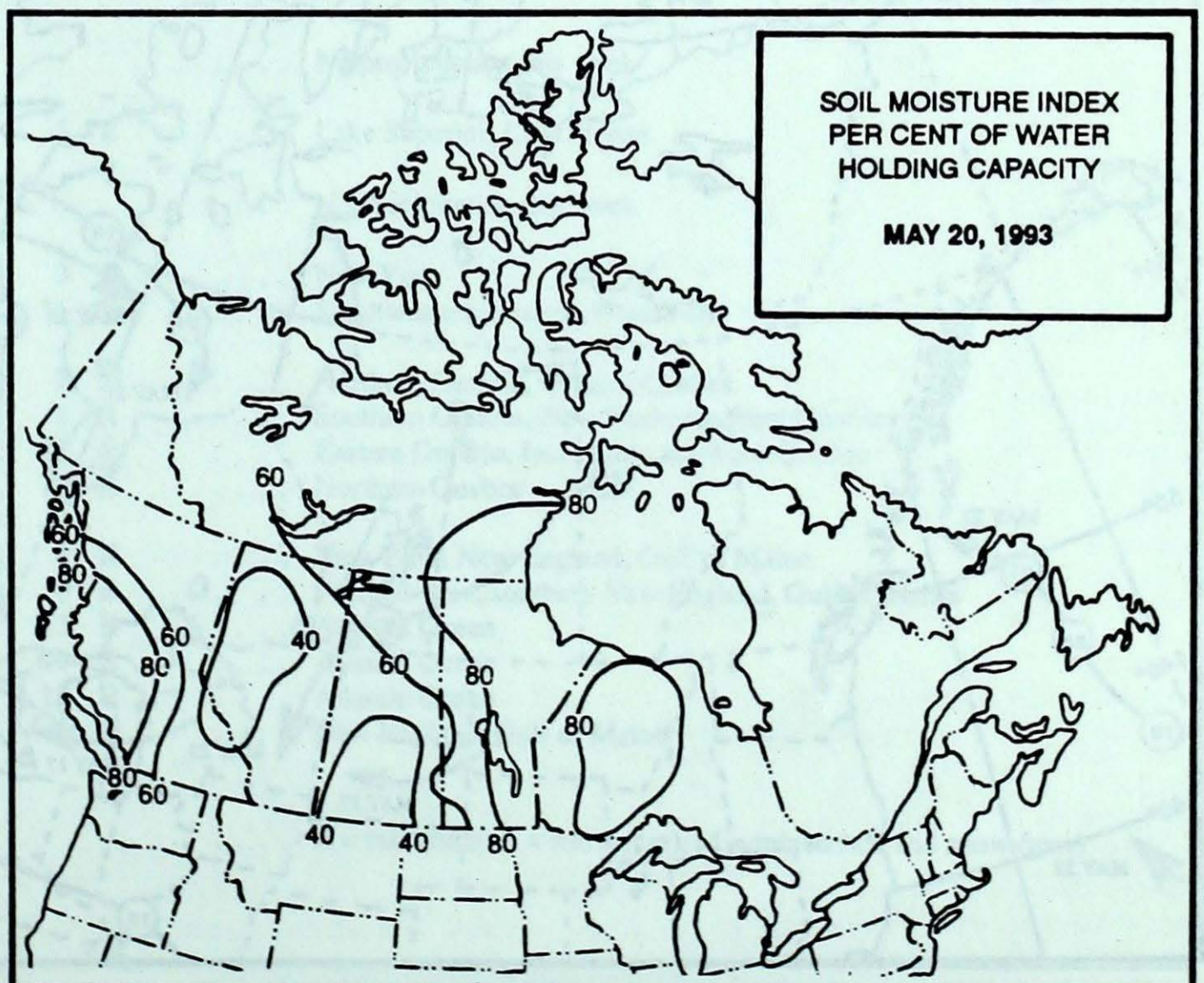
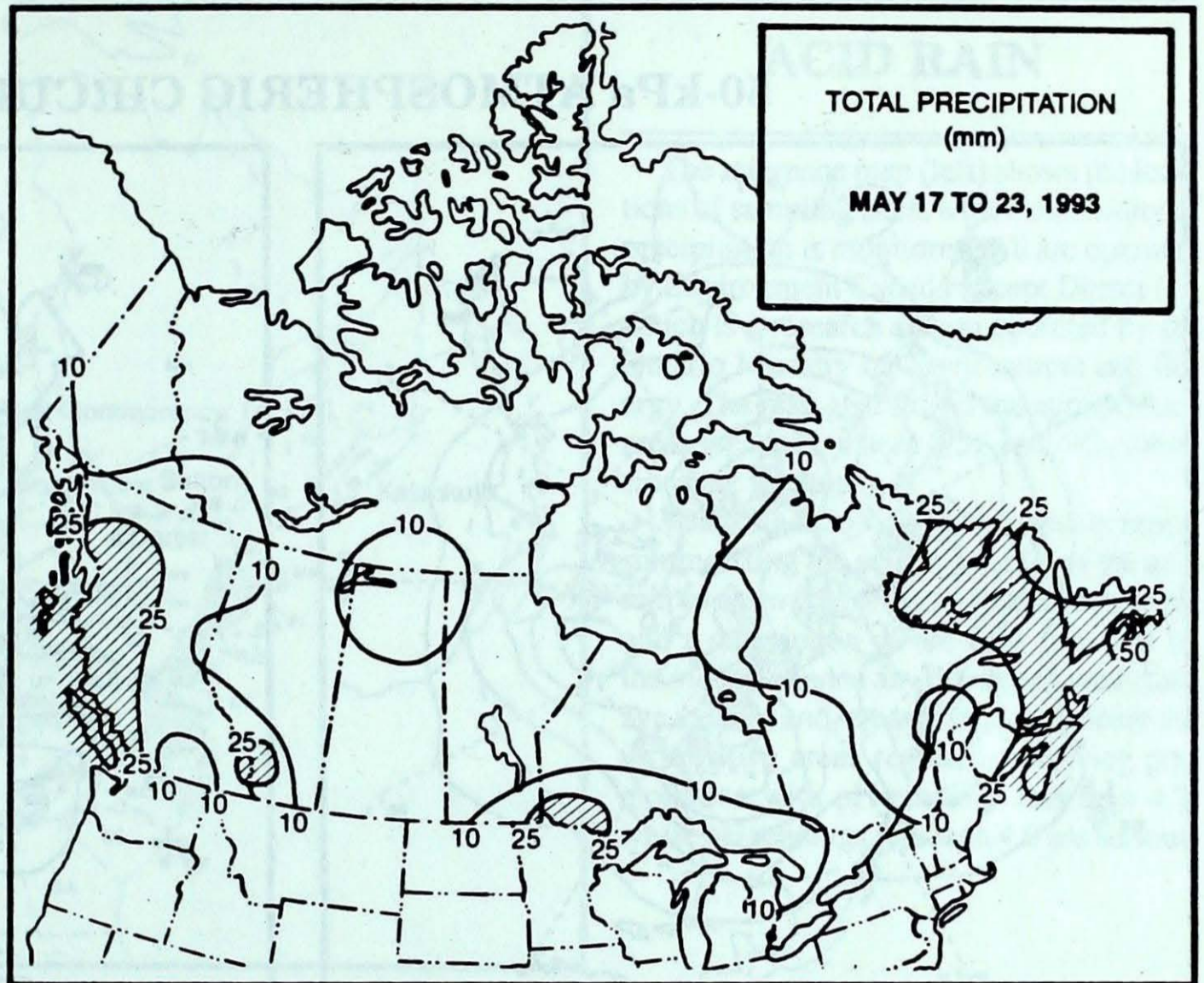
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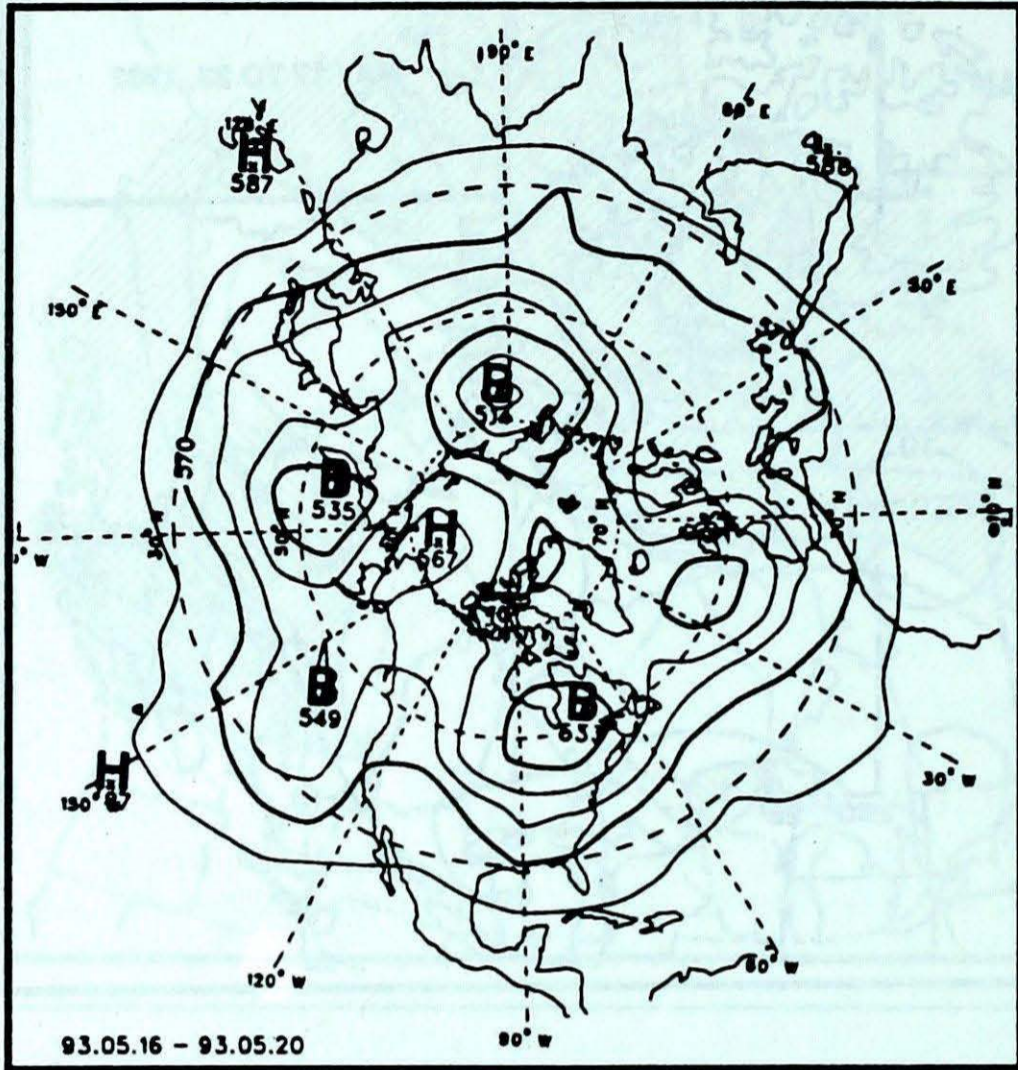
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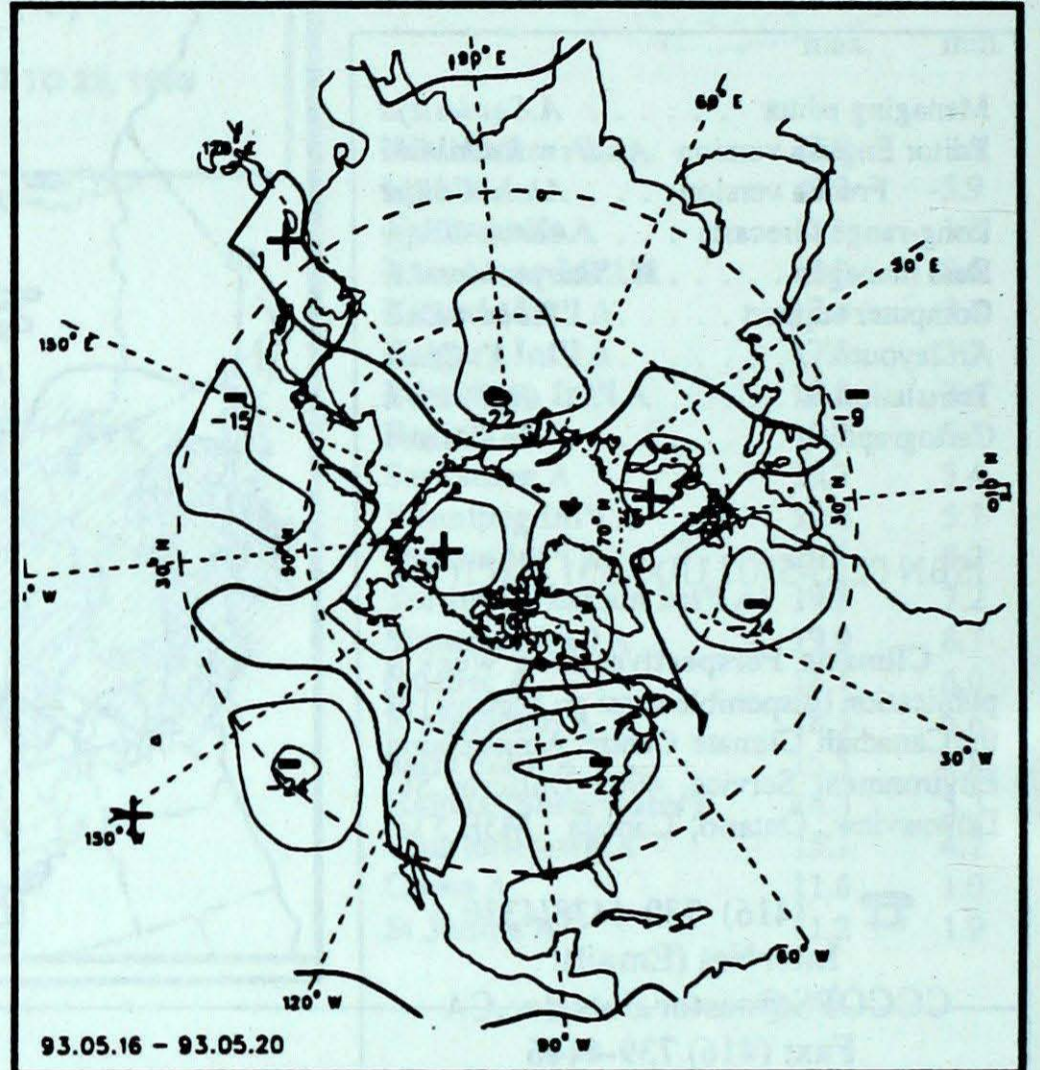
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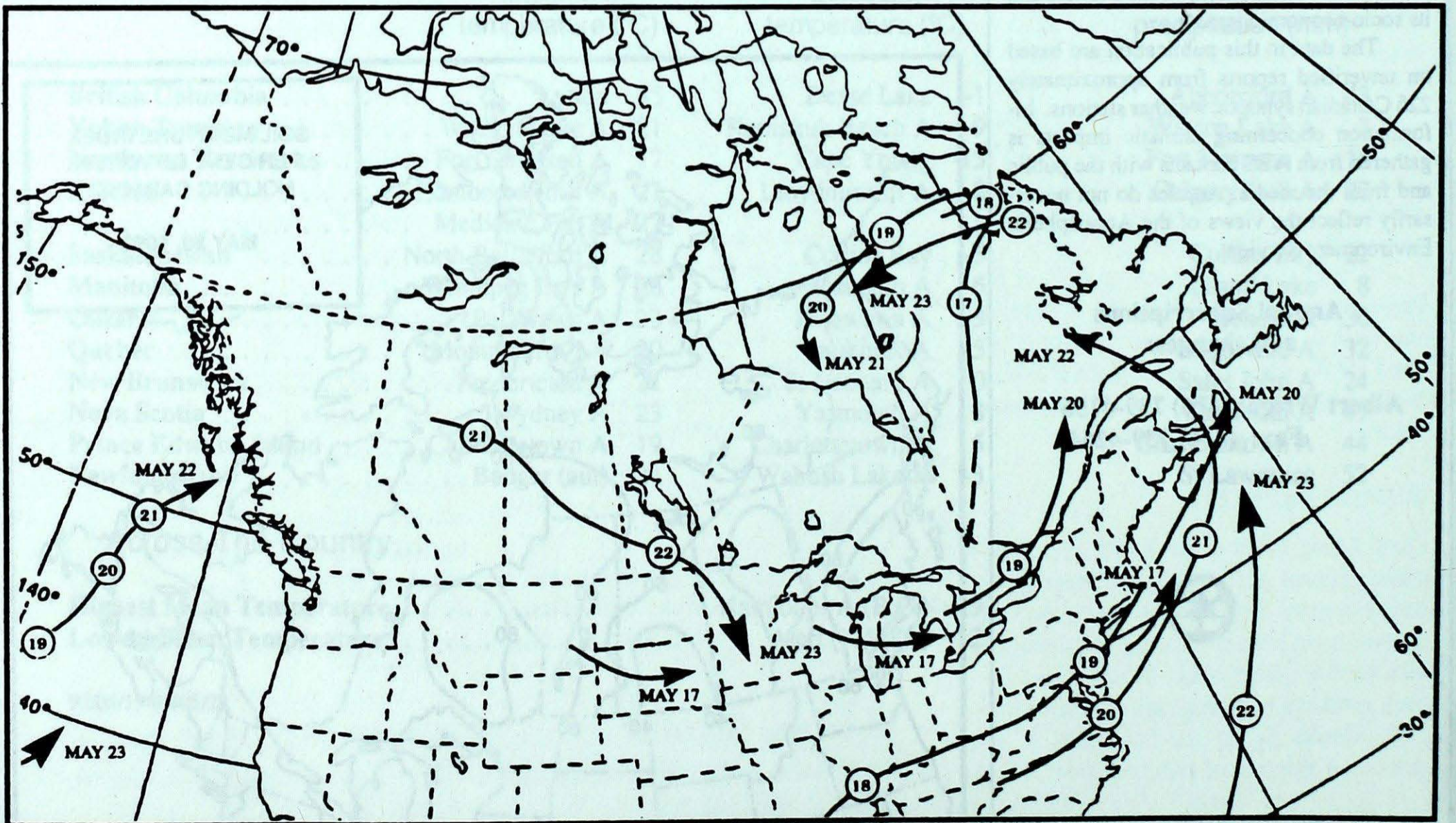
50-kPa ATMOSPHERIC CIRCULATION



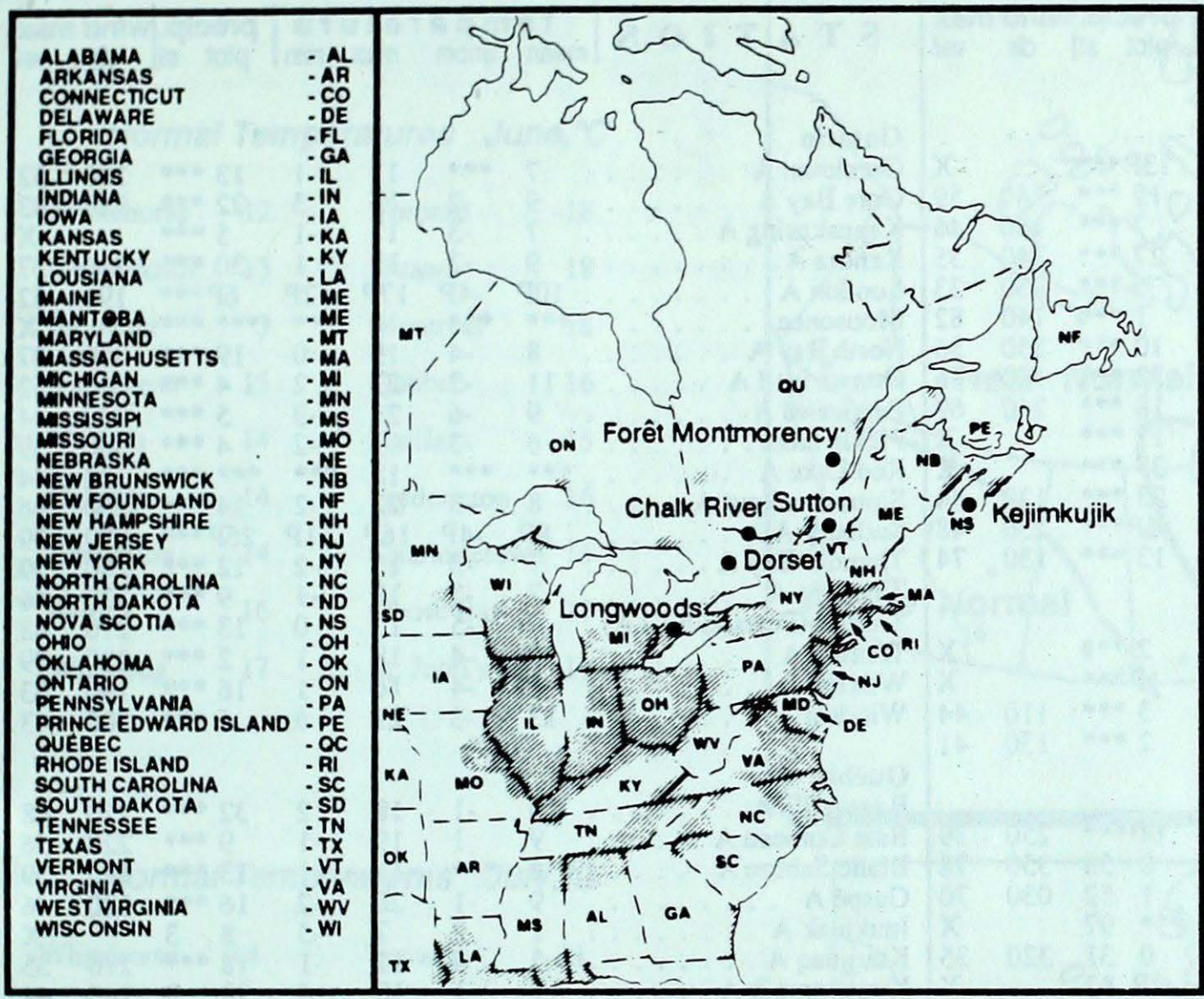
Mean geopotential height
50-kPa level (10 decametre intervals)



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 Environment and Energy. 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.

SITE	day	pH	amount	AIR PATH TO SITE
May 16 to 22, 1993				
Longwoods				..... No precipitation this week
Dorset *	21	4.2	3 R	..... Lake Superior, Lake Huron
Chalk River				..... No Precipitation this week
Sutton	19	4.1	3 R	..... New York
	20	4.5	11 R	..... Southwestern Ontario, New York
Montmorency	16	4.8	2 M	..... Northern Ontario, western Quebec
	19	4.3	7 R	..... Southern Ontario, New York, southern Quebec
	20	4.6	21 R	..... Eastern Ontario, New York, southern Quebec
	22	4.2	3 R	..... Northern Quebec
Kejimikujik	16	3.8	4 R	..... New York, New England, Gulf of Maine
	18	4.4	10 R	..... Pennsylvania, southern New England, Gulf of Maine
	19	4.6	13 R	..... Atlantic Ocean
	20	4.7	11 R	..... Atlantic Ocean
	21	4.9	13 R	..... Atlantic Ocean
	22	4.6	3 R	..... New England, Gulf of Maine
				..... R = rain (mm), S = snow (cm), M = mixed rain and snow (mm)

STATION	temperature				precip. plot st	wind max		STATION	temperature				precip. plot st	wind max		
	mean	anom	max	min		dir	vel		mean	anom	max	min		dir	vel	
British Columbia								Ontario								
Blue River A	16P	6P	31P	6P	13P***		X	Geraldton A	7	***	17	-1	13	***	200	52
Comox A	16	3	26	8	15	***	140	Gore Bay A	9	-2	15	3	22	***	320	43
Cranbrook A	16	4	28	7	7	***	180	Kapuskasing A	7	-3	17	-1	5	***		X
Fort Nelson A	10	-1	22	1	27	***	340	Kenora A	9	-3	18	1	30	***	330	37
Fort St John A	11	0	23	3	6	***	330	London A	10P	-4P	17P	2P	6P***	190	52	
Kamloops A	19	4	33	7	1	***	140	Moosonee	***	***	0	***	***	***		X
Penticton A	18	4	30	7	10	***	350	North Bay A	8	-4	19	0	19	***	300	37
Port Hardy A	13	3	27	6	32	***	120	Ottawa Int'l A	11	-3	22	2	4	***	240	52
Prince George A	15	4	28	5	18	***	240	Petawawa A	9	-6	23	-3	5	***	330	44
Prince Rupert A	14	5	24	5	17	***		Pickle Lake	6	-3	19	-2	4	***	300	39
Smithers A	13	3	25	3	37	***		Red Lake A	***	***	18	***	***	***	320	44
Vancouver Int'l A	17	4	26	9	23	***	130	Sioux Lookout A	8	-3	22	-2	14	***	200	46
Victoria Int'l A	16P	3P	25P	9P	6P***		230	Sudbury A	8P	-4P	16P	-1P	26P***	290	39	
Williams Lake A	15	5	28	3	13	***	130	Thunder Bay A	7	-3	15	-2	12	***	280	39
Yukon Territory								Québec								
Komakuk Beach A	-3	1	1	-9	2	***		Bagotville A	10	-1	18	2	32	***	270	48
Teslin (aut)	10P	***P	19P	2P	1P***			Baie Comeau A	9	1	19	-1	9	***	220	56
Watson Lake A	11	2	21	2	3	***	110	Blanc Sablon A	6	***	17	-1	13	***	080	59
Whitehorse A	11	4	20	2	2	***	130	Gaspé A	9	-1	20	-2	16	***	220	46
Northwest Territories								New Brunswick								
Alert	-12P	-2P	-8P	-18P	0P***		250	Fredericton A	11	-1	21	2	11	***	200	44
Baker Lake A	-1	5	4	-6	0	58	350	Miscou Island (aut)	9P	0P	16P	2P	19P***			X
Cambridge Bay A	-6	3	0	-11	1	52	030	Moncton A	11	0	19	3	23	***	270	44
Cape Dyer A	***	***	-22	***	***	97		Saint John A	11	0	17	4	24	***	200	41
Clyde A	-4	2	0	-8	0	31	320	St Leonard A	10	***	20	0	10	***	250	50
Coppermine A	-6P	-2P	-1P	-15P	2P	87		Nova Scotia								
Coral Harbour A	1	7	4	-1	5	10	030	Greenwood A	12	0	19	4	43	***	020	54
Eureka	-7P	2P	-3P	-13P	1P	19		Shearwater A	11	1	17	6	47	***	020	69
Fort Smith A	7	-3	14	0	3	***	320	Sydney A	***	***	23	***	***	***	300	44
Hall Beach A	0	8	2	-4	2	34	110	Yarmouth A	10	-1	15	3	47	***	090	61
Inuvik A	1	0	8	-6	1	3	120	Prince Edward Island								
Iqaluit A	2	5	5	0	2	5	070	Charlottetown A	11	1	19	5	44	***	160	41
Mould Bay A	-8	3	-1	-14	1	15		East Point (auto)	9P	***P	13P	6P	7P***			X
Norman Wells A	4	-3	14	-2	7	***	070	Newfoundland								
Resolute A	-5	5	0	-12	2	14	010	Cartwright	7	3	17	0	33	***	260	43
Yellowknife A	4	-3	11	-2	1	***		Churchill Falls A	9P	5P	16P	2P	7P***	260	41	
Alberta								Gander Int'l A	11	4	22	4	19	***	250	76
Calgary Int'l A	13	2	23	4	27	***	250	Goose A	9	3	20	1	41	***	260	52
Cold Lake A	10	-1	25	0	2	***	180	Stephenville A	11	3	20	2	31	***	070	46
Edmonton Namao A	13	1	26	0	2	***	160	St John's A	11	5	24	3	18	***	240	74
Fort McMurray A	10	-1	24	1	4	***	330	St Lawrence	8P	3P	15P	1P	52P***			X
Grande Prairie A	13P	2P	24P	2P	1P***		300	Wabush Lake A	4P	0P	12P	-3P	29P***	240	46	
High Level A	10	-1	21	0	11	***	010	93/05/17-93/05/23								
Lethbridge A	14	1	26	5	12	***	260									
Medicine Hat A	14	0	27	4	1	***	260									
Peace River A	12	1	23	3	2	***	070									
Saskatchewan																
Cree Lake	6	-3	17	-3	15	***	200									
Estevan A	11	-2	26	-3	1	***	180									
La Ronge A	8	-2	15	0	7	***	040									
Regina A	11	-1	26	0	1	***	340									
Saskatoon A	10	-2	27	-3	10	***	240									
Swift Current A	11	-1	26	-2	3	***	270									
Yorkton A	11	-1	26	2	1	***	020									
Manitoba																
Brandon A	10	-2	26	-1	1	***	340									
Churchill A	0	1	4	-3	2	3	310									
Lynn Lake A	5P	-2P	14P	-4P	1P***		020									
The Pas A	7	-2	15	-1	2	***	150									
Thompson A	6	-1	14	-3	0	***	340									
Winnipeg Int'l A	10	-3	28	-3	1	***	360									

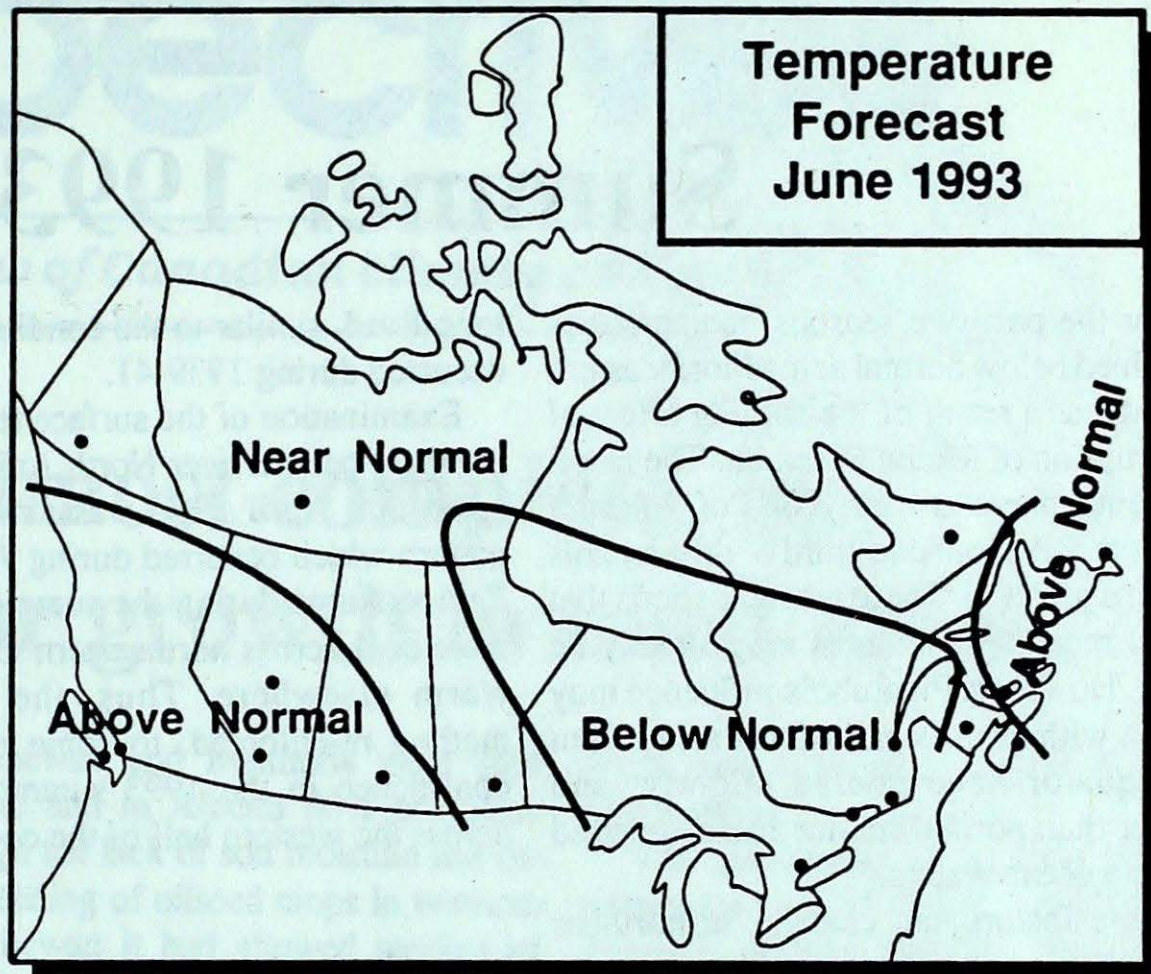
mean = mean weekly temperature, °C
 max = maximum weekly temperature, °C
 min = minimum weekly temperature, °C
 anom = mean temperature anomaly, °C

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.

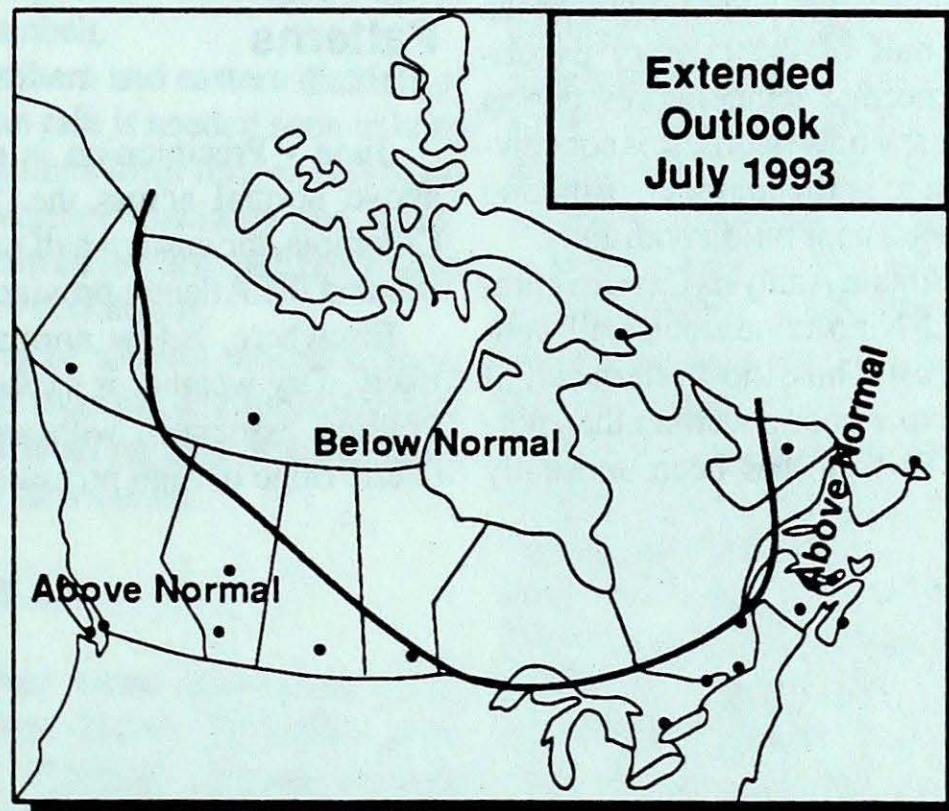
Normal Temperatures June, °C

Whitehorse	12	Toronto	18
Yellowknife	13	Ottawa	18
Iqqualuit	3	Montreal	18
Vancouver	15	Quebec	16
Victoria	14	Halifax	15
Calgary	14	Fredericton	16
Edmonton	14	Charlottetown	15
Regina	16	Goose Bay	11
Winnipeg	17	St. John's	11



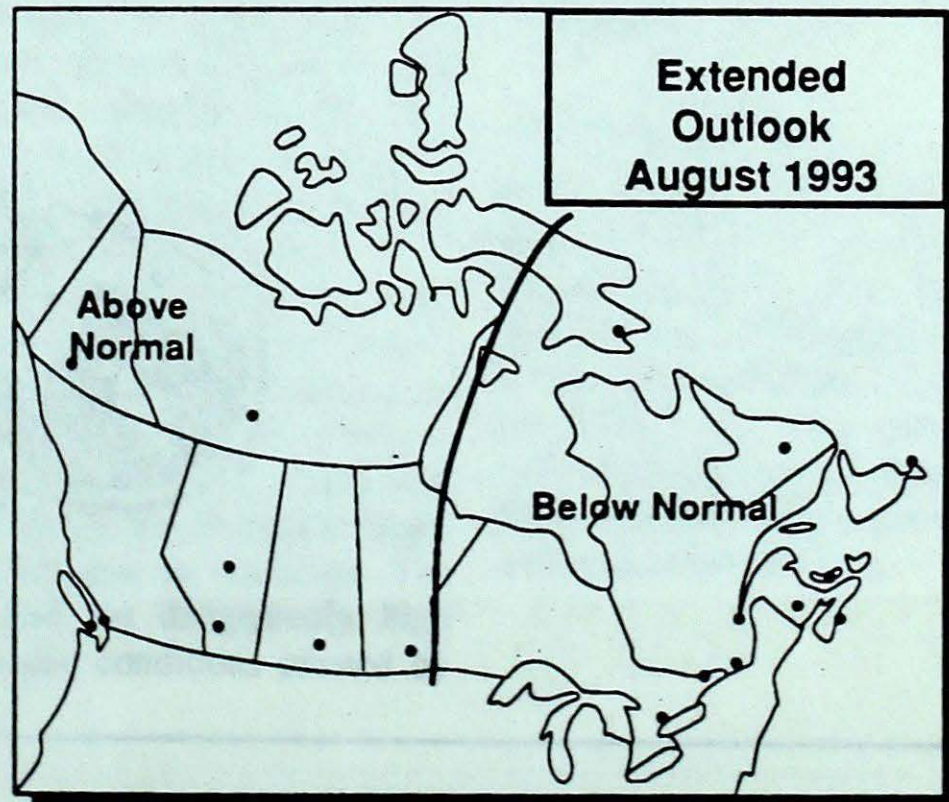
Normal Temperatures July, °C

Whitehorse	14	Toronto	21
Yellowknife	16	Ottawa	21
Iqqualuit	8	Montreal	21
Vancouver	17	Quebec	19
Victoria	16	Halifax	18
Calgary	16	Fredericton	19
Edmonton	16	Charlottetown	18
Regina	19	Goose Bay	16
Winnipeg	20	St. John's	16



Normal Temperatures August, °C

Whitehorse	13	Toronto	20
Yellowknife	14	Ottawa	19
Iqqualuit	6	Montreal	20
Vancouver	17	Quebec	18
Victoria	16	Halifax	18
Calgary	15	Fredericton	18
Edmonton	15	Charlottetown	18
Regina	18	Goose Bay	14
Winnipeg	18	St. John's	15



Summer 1993 Forecast

For the past two seasons, temperatures remained below normal across northeastern Canada, as a result of the cooling effect of the eruption of Mount Pinatubo. The tropical stratosphere is nearly free of volcanic aerosols and about one-third of the aerosols remains globally. There are indications that global mean temperatures may already be rising. However, Pinatubo's influence may still be with us as ocean waters away from the equator have cooled slightly, and greater than normal sea-ice has developed in some ocean waters.

These factors and changes in northern snowfall accumulations over the past winter may influence this summer's climate. The western half of the country experienced above normal temperatures during the winter and spring seasons. It is conceivable that El-Nino is the major contributing factor to the persistent mild conditions.

The U.S. Climate Analysis Centre is predicting that El-Nino conditions will continue into August. Thus, the western half of Canada may experience a warmer than normal summer. El-Nino has been unusually

long-lived, similar to the conditions which occurred during 1939-41.

Examination of the surface temperature anomaly pattern over North America indicated that April 1992 was similar to the pattern which occurred during April 1941. Temperatures during the summer of 1941 were cool across northeastern Canada and warm elsewhere. Thus, the analogue method re-enforced, to some extent, the confidence in the 1993 summer forecast across the western half of the country.

Inferred Precipitation Patterns

June - Precipitation is expected to be above normal across the Yukon, British Columbia, the eastern half of Ontario, Quebec and the Atlantic provinces.

Elsewhere, below normal amounts are likely. Dry weather is expected across the Prairies, associated with an upper atmospheric ridge of high pressure.

July - Precipitation should be above normal across British Columbia and southwestern Alberta, associated with an upper trough lying off the west coast. Storms will move rapidly eastward in the westerly flow across the southern Prairies, yielding near normal amounts of precipitation in these areas. With a major trough lying through Lake Erie, precipitation is expected to be above normal over the southern parts of Ontario and Quebec.

The Atlantic region will also receive above-normal amounts. Precipitation will be near normal across the Yukon, northern Quebec and Labrador, and below normal for the Northwest Territories and the northern half of the Prairies

August - A strong upper ridge extending from the Beaufort Sea to the foothills of Alberta will ensure dry conditions for the Yukon, the Northwest Territories, British Columbia, and the Prairie provinces. Ontario, Quebec, Labrador and the Atlantic region will receive above normal precipitation amounts.

