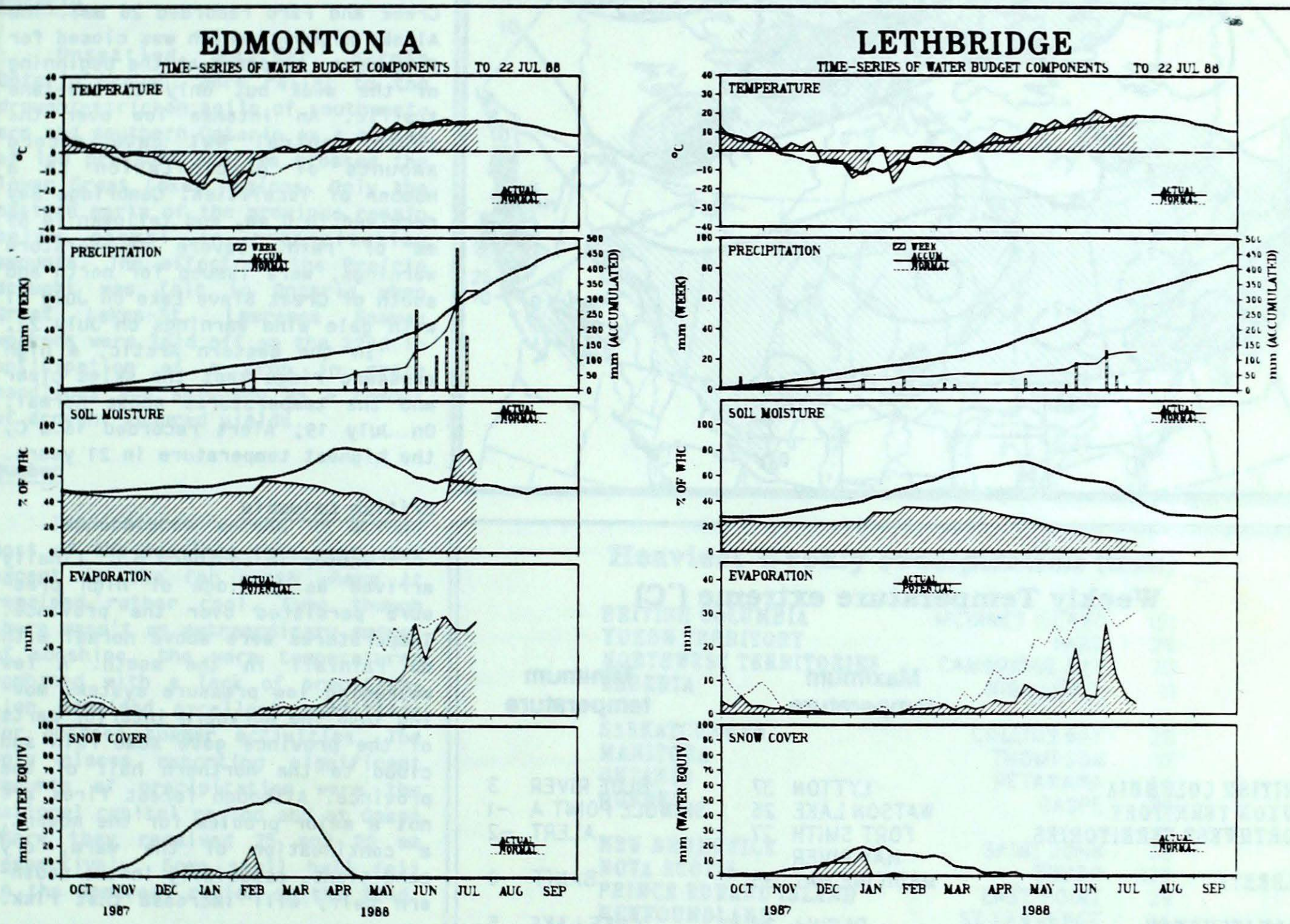
Environment Canada Environnement Canada

Climatic Perspectives

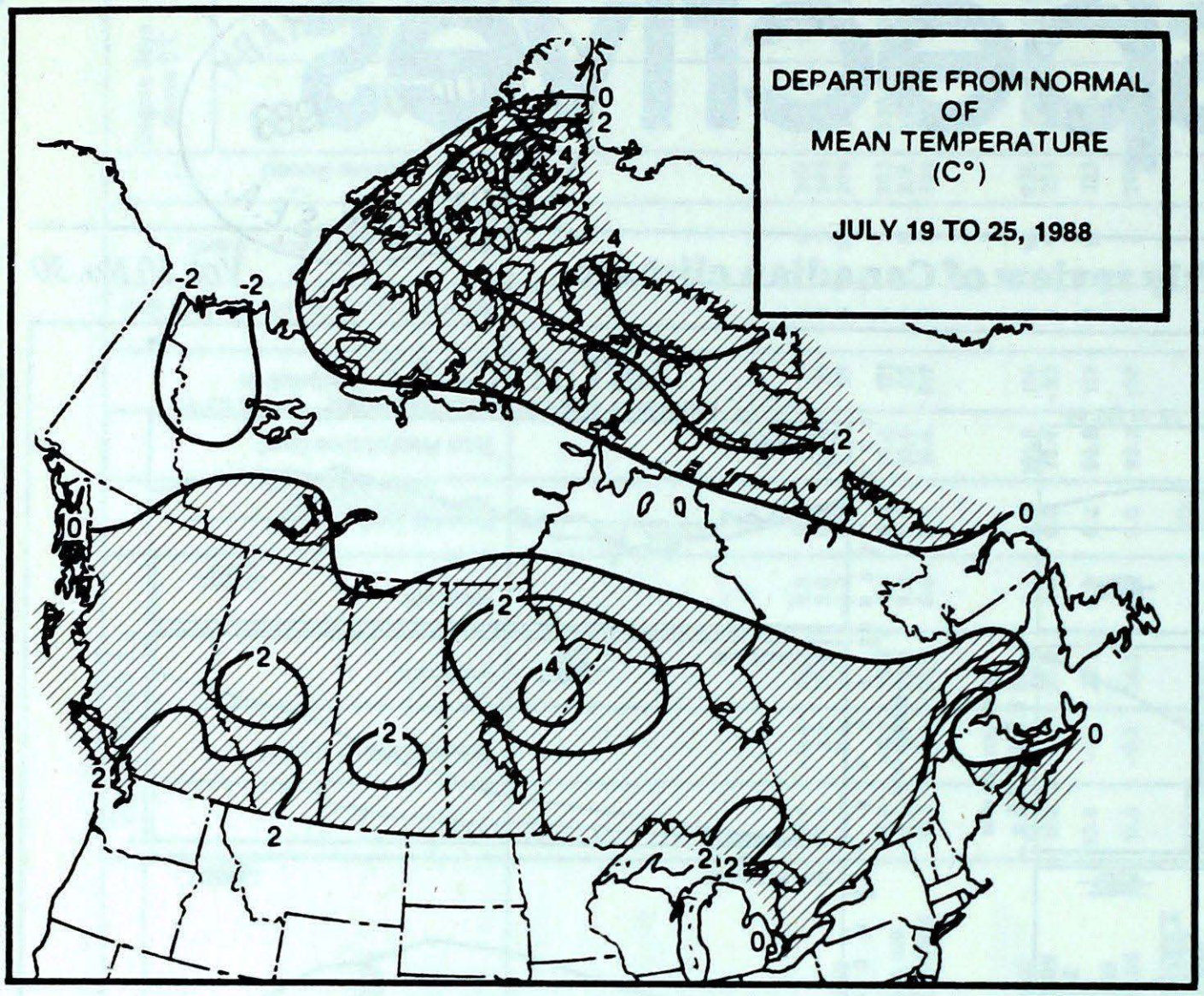
July 19 to 25, 1988 — A weekly review of Canadian climate — Vol. 10 No. 30



These two water budget time-series graphs were chosen to demonstrate the progression of the 1987/88 dry spell at two different sites in Alberta from October 1, 1987. At one site, Edmonton, heavy rains in June and July brought dramatic relief from the dry spell while further south the dry spell has persisted up to the present at Lethbridge. The graphs on page 8 show a similar contrast in southwestern Ontario where there has been significant relief this past week from the dry weather at London but persistence of dry conditions at Windsor. **S. Ishida/CCAH**

- ***More welcome rain in southern Ontario***
- ***Another big storm in the north***
- ***Summer finally arrives in southern B.C.***

Canada



Weekly Temperature extreme (°C)

	Maximum temperature		Minimum temperature	
BRITISH COLUMBIA	LYTTON	37	BLUE RIVER	3
YUKON TERRITORY	WATSON LAKE	26	SHINGLE POINT A	−1
NORTHWEST TERRITORIES	FORT SMITH HAY RIVER	27	ALERT	−2
ALBERTA	MEDICINE HAT	35	BANFF	0
SASKATCHEWAN	REGINA	38	CREE LAKE	5
MANITOBA	PORTAGE LA PRAIRIE	34	GRAND RAPIDS	5
ONTARIO	SIOUX LOOKOUT	32	MOOSONEE	1
QUEBEC	KUUJJUARAPIK	31	LA GRANDE RIVIERE	3
NEW BRUNSWICK	FREDERICTON	28	CHARLO	10
NOVA SCOTIA	GREENWOOD	29	WESTERN HEAD	10
PRINCE EDWARD ISLAND	CHARLOTTETOWN	26	CHARLOTTETOWN	13
NEWFOUNDLAND	WABUSH LAKE	26	CARTWRIGHT	3

Across the nation

WARMEST MEAN TEMPERATURE	26	LYTTON	BC
COOLEST MEAN TEMPERATURE	2	ALERT	NWT

Across the country...

Yukon and Northwest Territories

In the Yukon, the record rainfalls of the previous week eased off over most areas. Few stations received amounts over 20 mm (Beaver Creek and Faro recorded 26 mm). The Alaska Highway, which was closed for five days, reopened at the beginning of the week but only to one-lane traffic. An intense low over the south central NWT gave record amounts of precipitation to a number of localities. Cambridge Bay received 70.0 mm, and Yellowknife 69 mm of rain. Severe thunderstorm warnings, were issued for north and south of Great Slave Lake on July 21 with gale wind warnings on July 22.

In the eastern Arctic, a high pressure ridge kept the skies clear and the temperatures above normal. On July 19, Alert recorded 16.3°C, the highest temperature in 21 years.

British Columbia

Summer in southern B.C. finally arrived as a ridge of high pressure persisted over the province. Temperatures were above normal with no rainfall in the south. A few weakening low pressure systems moving into the northern interior parts of the province gave some rain and cloud to the northern half of the province. Although forest fires are not a major problem for the moment, a continuation of the warm, dry conditions, especially in the southern half, will increase that risk.

Prairie Provinces

Dry weather and fluctuating temperature extremes were experienced in Alberta during the period. Maximum temperatures rose into the low 30s on the 21st and 22nd, breaking several daily records. A cold outbreak on the 23rd provided a sharp contrast with record daily minimums occurring. Both Banff and Rocky Mountain House dropped to the freezing point and Red Deer came close at 1°C.

The warm weather moved eastward into Saskatchewan where at least 10 daily maximum temperature records were broken as the mercury climbed

into the mid 30s on Friday, the 22nd. There were some funnel cloud sitings on the 19th at various locations in Manitoba, otherwise it was a dry, uneventful week across the Prairies.

Ontario

Unsettled weather across Ontario brought more relief to the drought-stricken soils of southwestern and southern Ontario as a series of low pressure systems crossed the lower Great Lakes regions. Only the eastern parts of the province remain below normal in precipitation amounts. The effect of the Prairie drought was felt in Ontario when Great Lakes-St. Lawrence Seaway workers were laid off on the 22nd in anticipation of a drop in grain handlings and shipping as a result of drought-reduced yields.

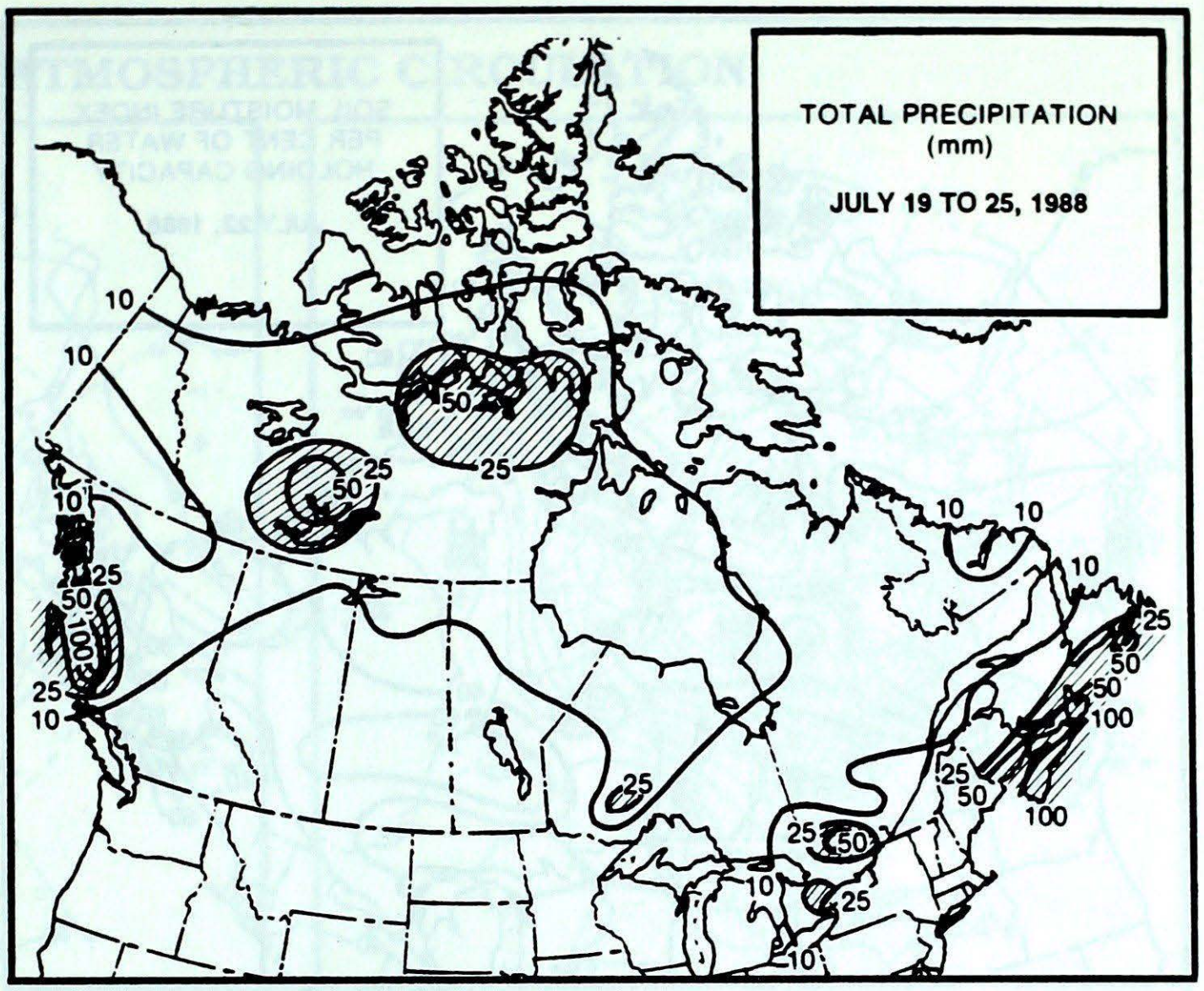
Quebec

Temperatures warmed up across most of the province this past week except in the far north where it remained rather cool. Even though there wasn't an extraordinary amount of sunshine, the warm temperatures combined with a lack of precipitation provided excellent conditions for outdoor summer activities. The only places reporting significant amounts of precipitation were the national capital region and at Gaspé where they received 25 and 20 mm respectively. Some small hail fell in the Montreal region on the 22nd.

Atlantic Provinces

Unsettled conditions were once again the scenario this week. Northern New Brunswick received the greatest amount of sunshine while Nova Scotia had the greatest amounts of rainfall. On Sunday, Nova Scotia received 50 to 100 mm of precipitation. Temperatures were near normal throughout the Maritimes with cool daytime temperatures in Nova Scotia and P.E.I. by the weekend.

Both Newfoundland and Labrador also experienced cool, unsettled conditions. St. Lawrence received the heaviest amount of rainfall with 84 mm for this week.

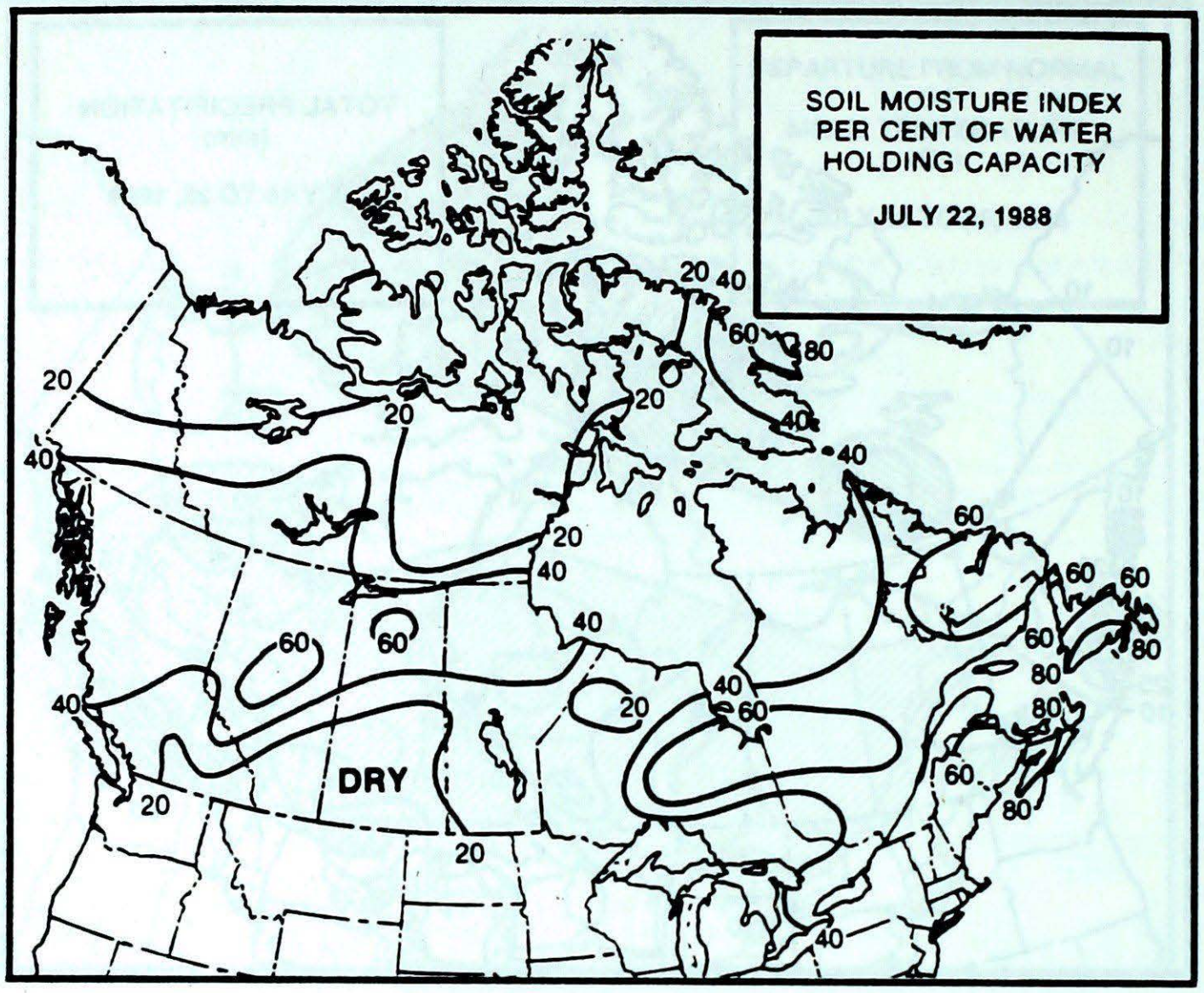


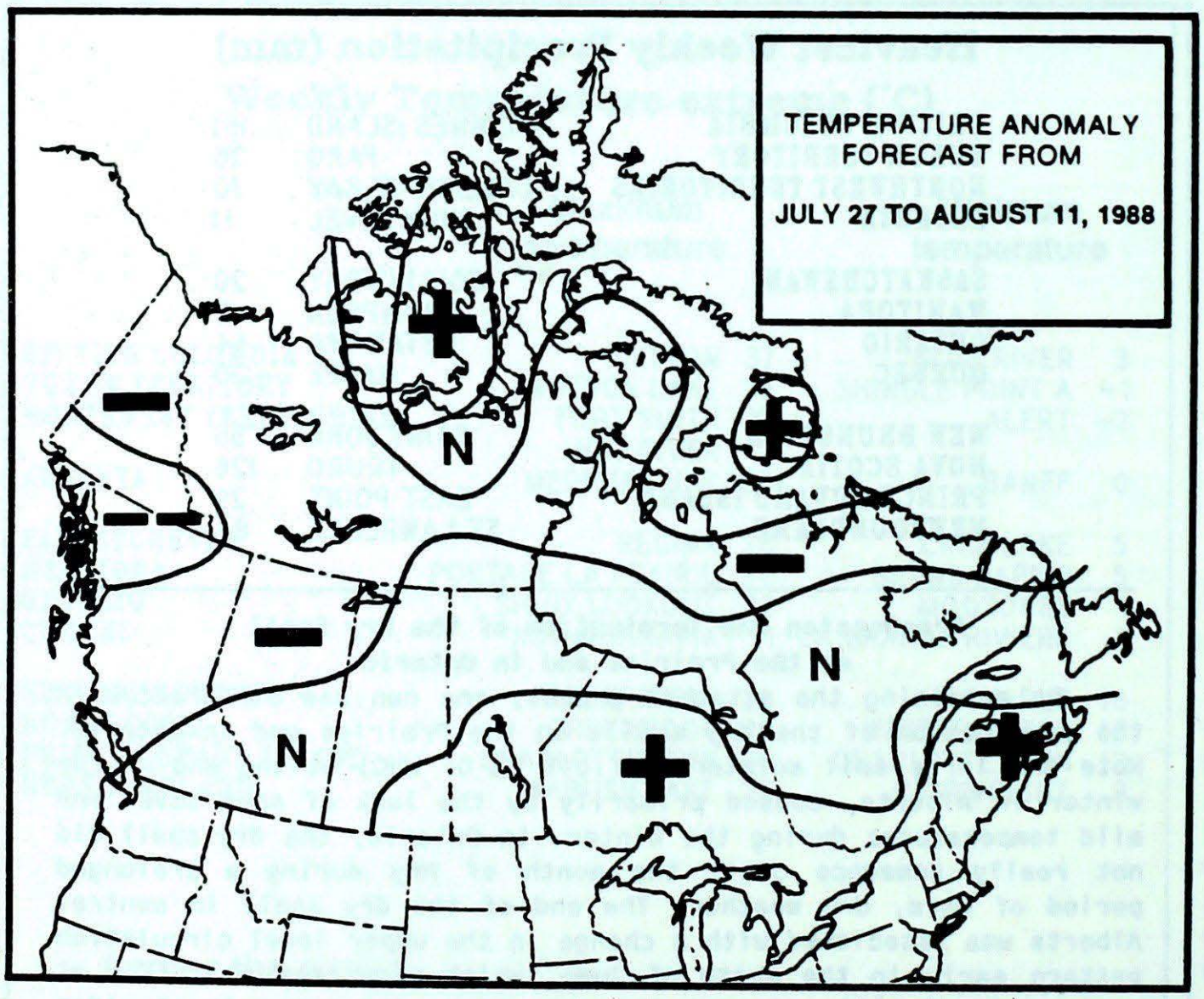
Heaviest Weekly Precipitation (mm)

BRITISH COLUMBIA	MCINNES ISLAND	151
YUKON TERRITORY	FARO	26
NORTHWEST TERRITORIES	CAMBRIDGE BAY	70
ALBERTA	HIGH LEVEL	11
SASKATCHEWAN	COLLINS BAY	20
MANITOBA	THOMPSON	17
ONTARIO	PETAWAWA	54
QUEBEC	GASPE	20
NEW BRUNSWICK	SAINT JOHN	55
NOVA SCOTIA	TRURO	126
PRINCE EDWARD ISLAND	EAST POINT	29
NEWFOUNDLAND	ST LAWRENCE	84

Progression and Termination of the Dry Spell on the Prairies and in Ontario

On examining the attached graphs, one can see differences in the progression of the dry spells on the Prairies and in Ontario. Note the large soil moisture deficit (% OF WHC) at the end of the winter in Alberta, caused primarily by the lack of snow cover and mild temperatures during the winter. In Ontario, the dry spell did not really commence until the month of May during a prolonged period of warm, dry weather. The end of the dry spell in central Alberta was associated with a change in the upper level circulation pattern early in the month of June, which permitted an influx of cool, moist Pacific air. At the same time, the upper level ridge over the Prairies shifted eastward, resulting in an intensification of the drought conditions in southern Ontario. The recent collapse of this ridge in mid July and the resulting establishment of a zonal (west to east) upper level circulation flow favoured a return to a more normal precipitation regime across the country.





+ +	much above normal
+	above normal
N	normal
-	below normal
- -	much below normal

Temperature Anomaly Forecast

This forecast is prepared by searching historical weather maps to find cases similar to the present. the historical outcome during the 15 days subsequent to the chosen analogues is assumed to be a forecast for the next 15 days from now.

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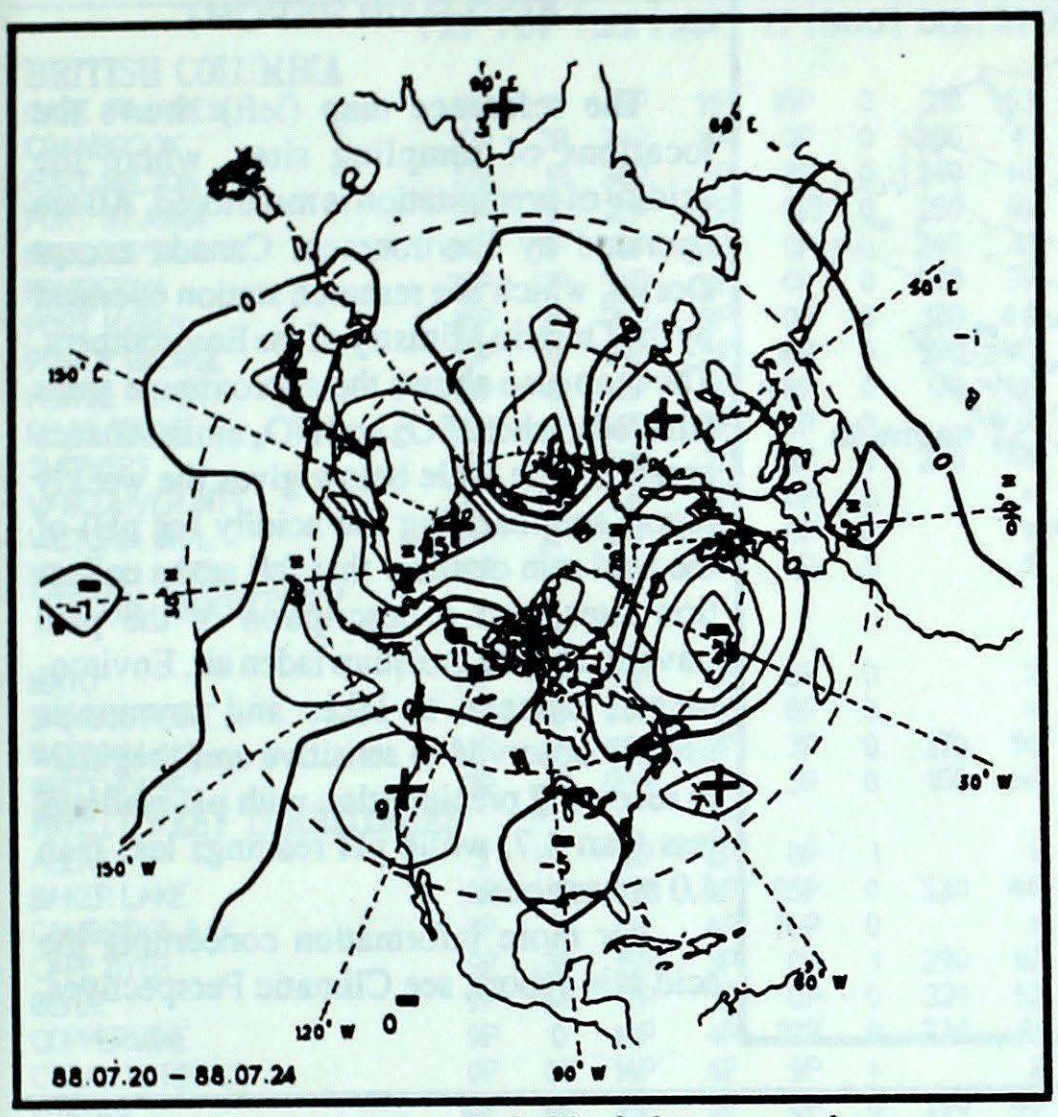
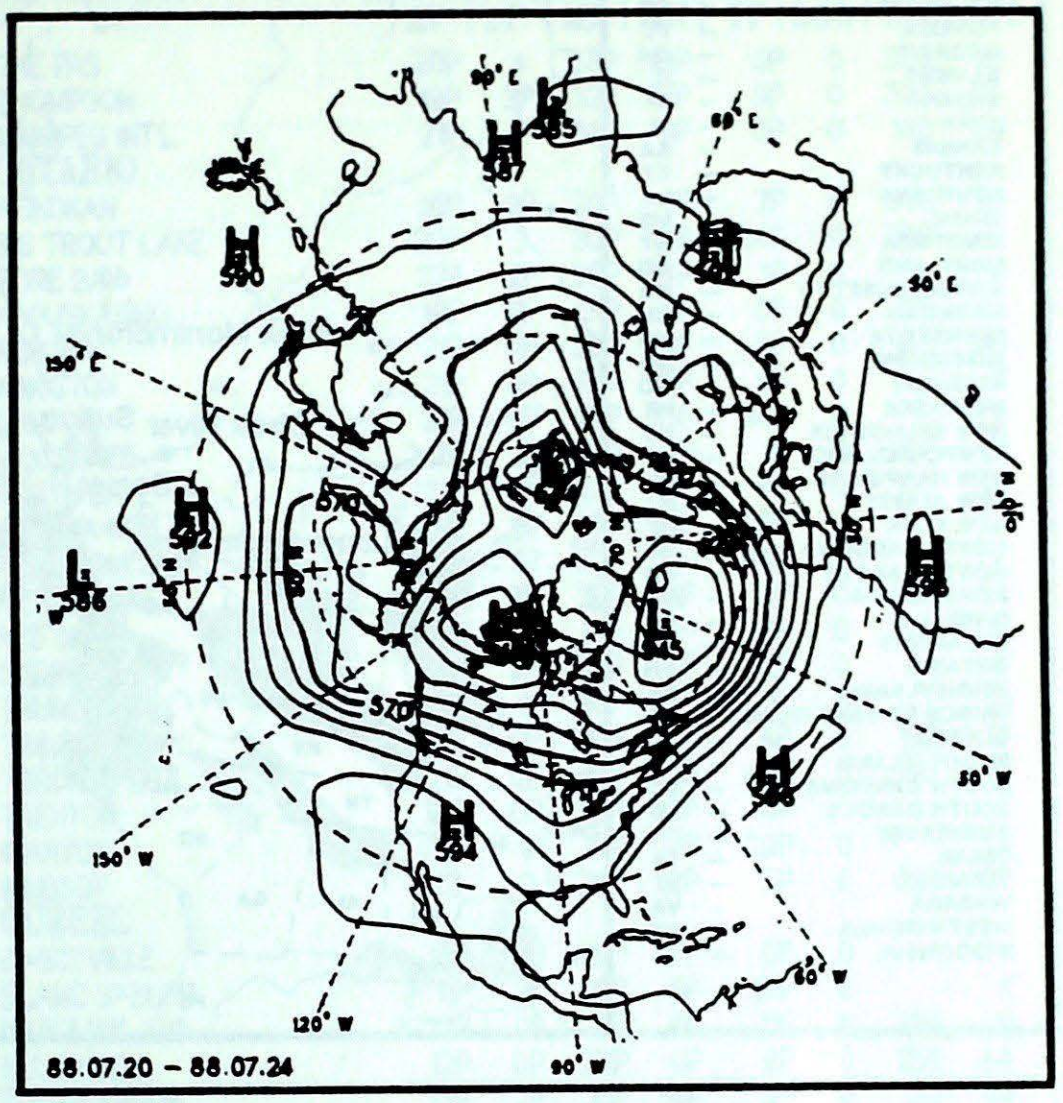
50 kPa ATMOSPHERIC CIRCULATION



**Mean geopotential height anomaly
50 kPa level (5 decameter intervals)**



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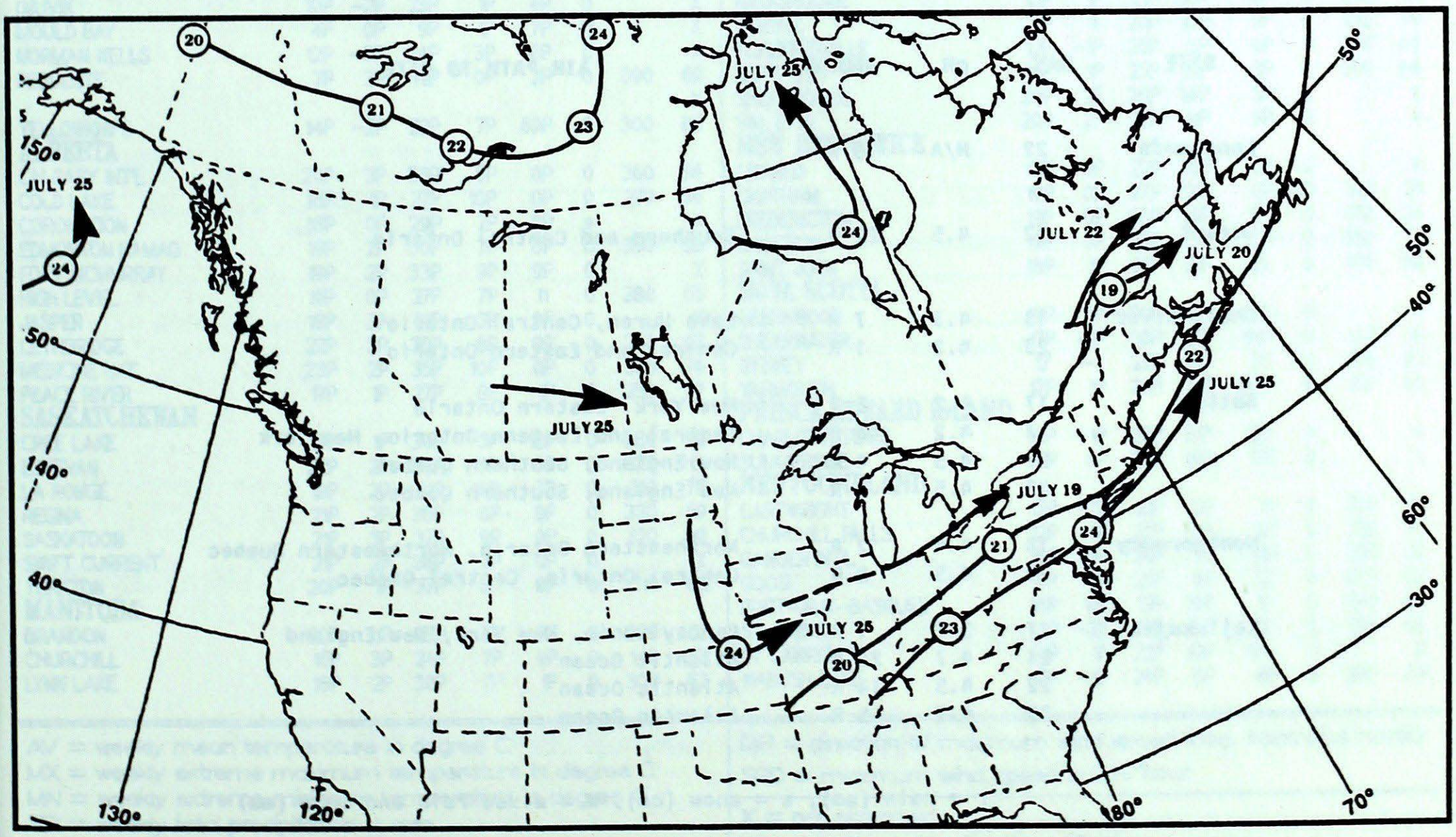
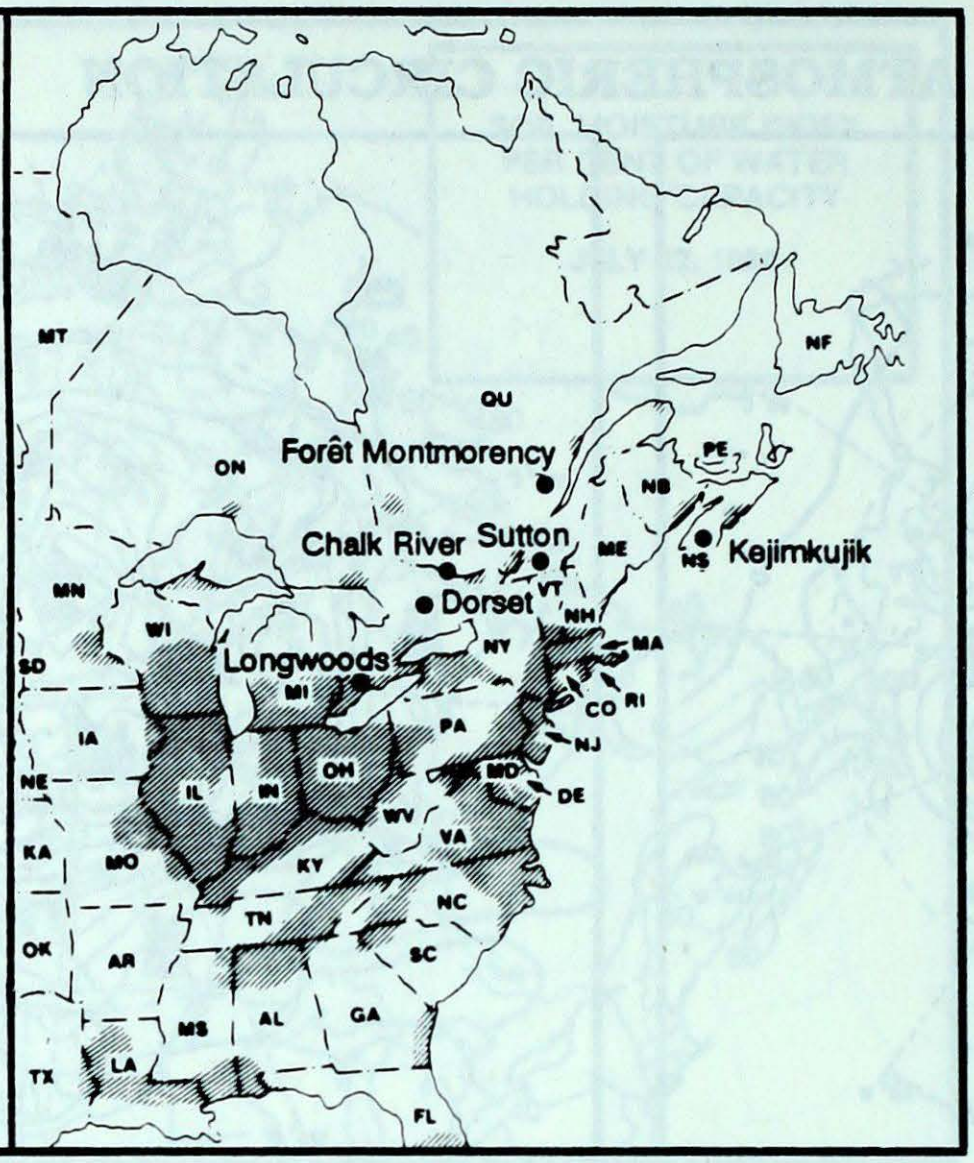


Storm track - Position of storm at 12 GMT during the period: July 19 to 25, 1988

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 REPORT

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.

For more information concerning the acid rain report, see Climatic Perspectives,

JULY 17 TO JULY 23, 1988

SITE	DAY	pH	AMOUNT	AIR PATH TO SITE
Longwoods	22	N/A	5 R	
Dorset	22	4.5	22 R	Southern and Central Ontario
Chalk River	18	4.3	7 R	Lake Huron, Central Ontario
	23	4.2	1 R	Central and Eastern Ontario
Sutton	17	4.2	5 R	New York, Eastern Ontario
	18	4.2	10 R	Central and Eastern Ontario, New York
	21	4.5	4 R	New England, Southern Quebec
	23	4.5	2 R	New England, Southern Quebec
Montmorency	18	4.4	2 R	Northeastern Ontario, Northwestern Quebec
	19	4.5	2 R	Central Ontario, Central Quebec
Kejimkujik	17	3.7	1 R	Pennsylvania, New York, New England
	21	4.7	26 R	Atlantic Ocean
	22	4.5	14 R	Atlantic Ocean
	23	4.7	5 R	Atlantic Ocean

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

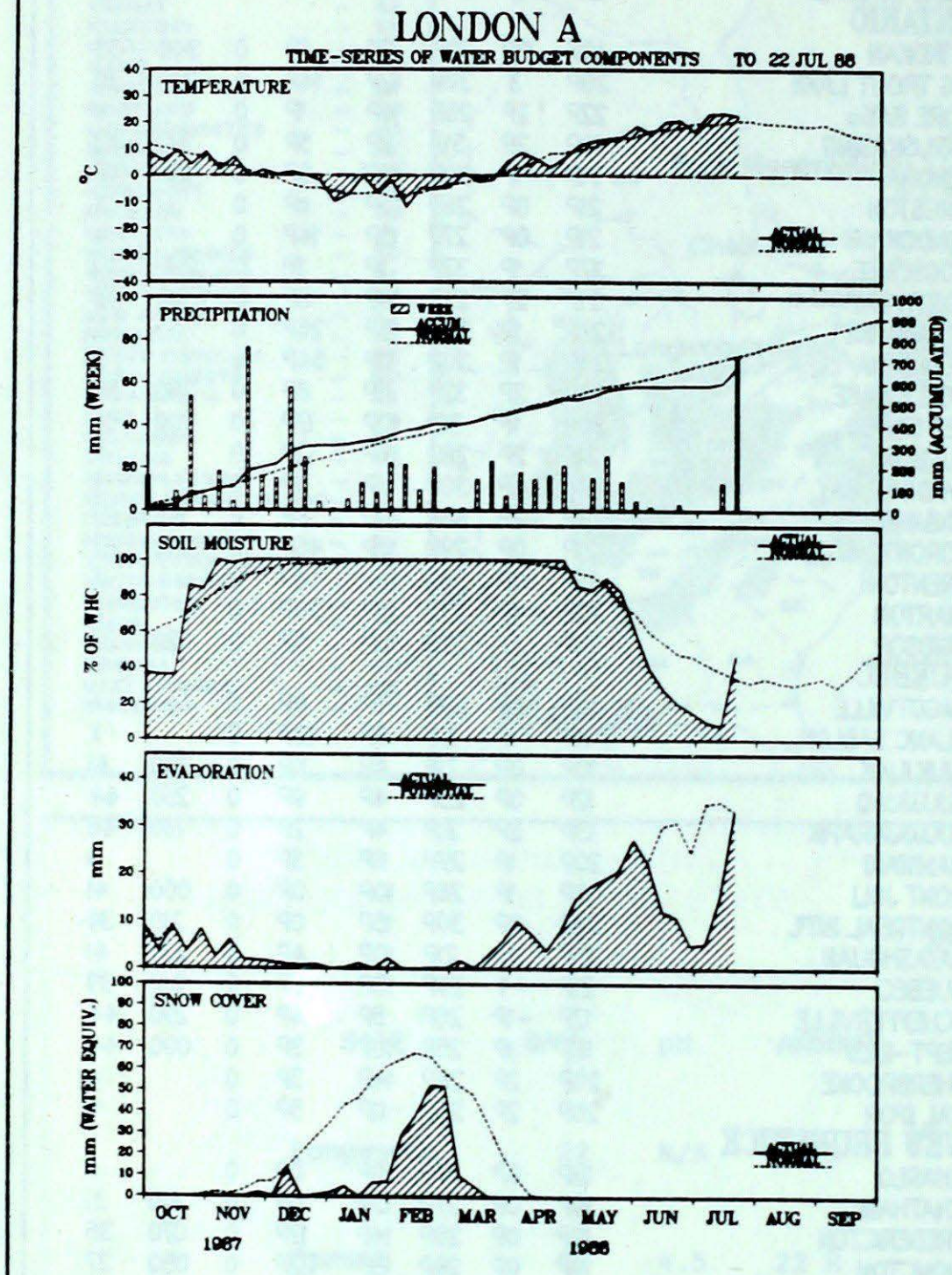
TEMPERATURE, PRECIPITATION AND MAXIMUM WIND DATA FOR THE WEEK ENDING 0600 GMT JULY 26,1988

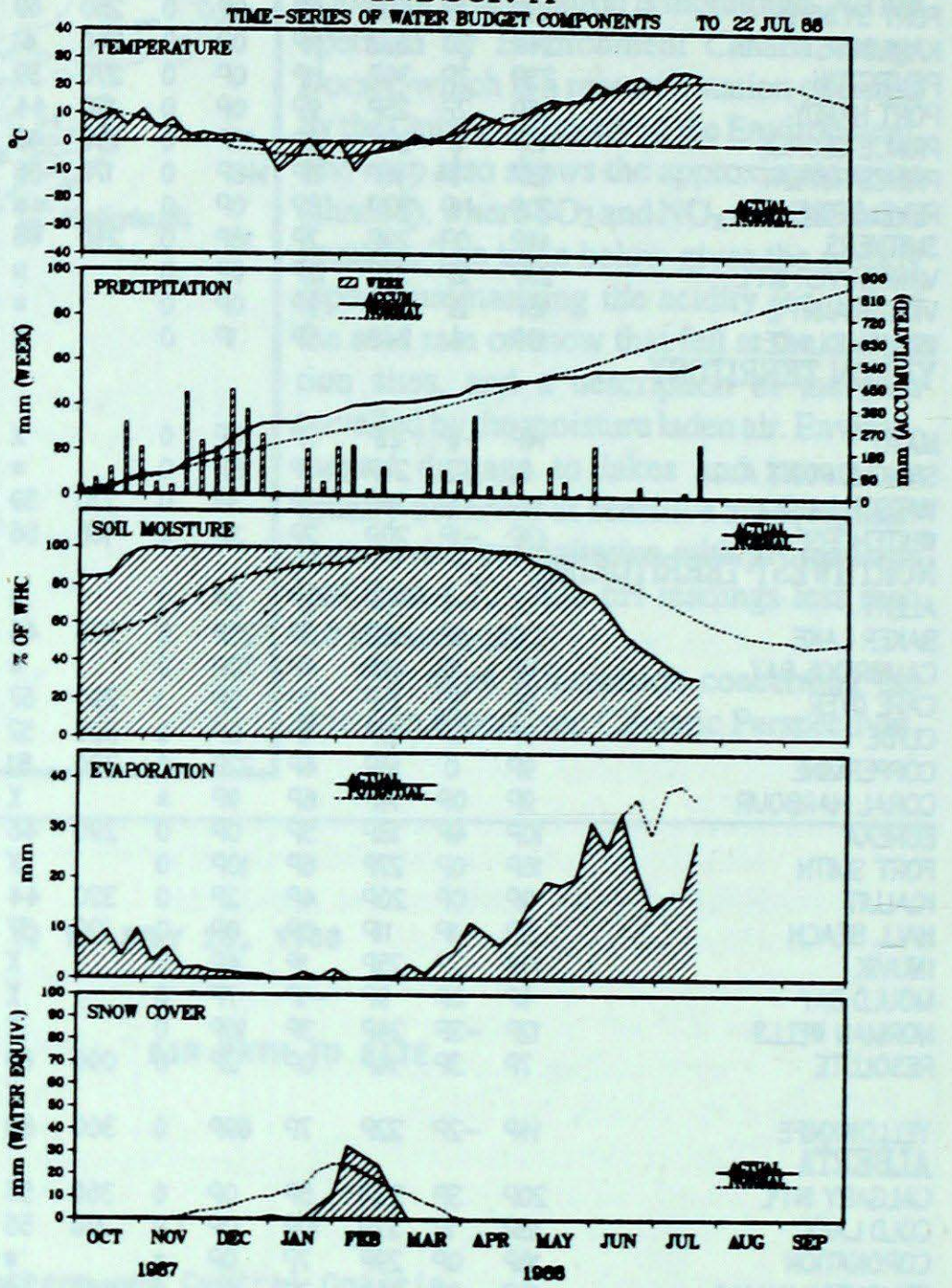
STATION	TEMPERATURE				PRECIP.		WIND MX	
	AV	DP	MX	MN	TP	SOG	DIR	SPD
BRITISH COLUMBIA								
CAPE ST.JAMES	14P	1P	18P	11P	16P	0	210	63
CRANBROOK	22P	3P	34P	11P	0P	0	280	41
FORT NELSON	17P	1P	30P	7P	8P	0	240	48
FORT ST.JOHN	16P	1P	25P	8P	0P	0	250	69
KAMLOOPS	24P	3P	37P	11P	0P	0	240	41
PENTICTON	23P	2P	36P	11P	0P	0	270	39
PORT HARDY	16P	2P	25P	9P	0P	0	120	44
PRINCE GEORGE	15P	0	29P	3P	16P	0	270	48
PRINCE RUPERT	13P	1P	16P	11P	148P	0	170	56
REVELSTOKE	20P	1P	33P	8P	0P	0		*
SMITHERS	14P	0P	29P	7P	18P	0	240	46
VANCOUVER INT'L	20P	2P	32P	12P	0P	0		*
VICTORIA INT'L	18P	2P	29P	9P	0P	0		*
WILLIAMS LAKE	19P	4	34P	5P	1P	0		X
YUKON TERRITORY								
MAYO	14P	-1P	21P	7P	18P	0		X
SHINGLE POINT A.	8	-2	24P	-1P	8P	0		*
WATSON LAKE	14P	0P	26P	7P	3P	0	270	59
WHITEHORSE	13P	-1P	20P	2P	3P	0	160	56
NORTHWEST TERRITORIES								
ALERT	3	-1	9P	-2P	0P	1		*
BAKER LAKE	10P	-1P	18P	6P	25P	0	330	46
CAMBRIDGE BAY	8P	1P	14P	4P	70P	0		*
CAPE DYER	9P	3P	15P	3P	0P	1	290	67
CLYDE	9P	4P	17P	1P	0P	0	320	52
COPPERMINE	9P	0	18P	4P	22P	0	330	81
CORAL HARBOUR	9P	0P	14P	6P	9P	*		X
EUREKA	10P	4P	18P	5P	0P	0	290	46
FORT SMITH	16P	0P	27P	6P	10P	0		X
IQALUIT	9P	0P	20P	4P	2P	0	320	44
HALL BEACH	5P	-1P	11P	0P	0P	0	100	37
INUVIK	10P	-2P	25P	1P	4P	0		X
MOULD BAY	4P	0P	9P	-1P	7P	0		X
NORMAN WELLS	12P	-3P	24P	3P	16P	0		X
RESOLUTE	7P	3P	14P	0P	2P	0	090	69
								X
YELLOWKNIFE	14P	-2P	22P	7P	69P	0	300	83
ALBERTA								
CALGARY INT'L	20P	3P	33P	5P	0P	0	360	56
COLD LAKE	18P	1P	27P	10P	0P	0	270	56
CORONATION	18P	0P	29P	7P	0P	*		*
EDMONTON NAMAO	19P	2P	30P	7P	0P	0	350	59
FORT MCMURRAY	19P	2P	33P	9P	9P	0		X
HIGH LEVEL	16P	0P	27P	7P	11	0	280	65
JASPER	18P	3P	31P	3P	0P	0		X
LETHBRIDGE	22P	3P	35P	8P	0P	0	260	67
MEDICINE HAT	23P	2P	35P	10P	0P	0	350	74
PEACE RIVER	17P	1P	27P	8P	1P	0	250	57
SASKATCHEWAN								
CREE LAKE	17P	1P	30P	5P	12P	0	280	59
ESTEVAN	22P	2P	38P	9P	0P	0	320	61
LA RONGE	19P	2P	31P	10P	7P	0	310	76
REGINA	21P	2P	38P	8P	0P	0	330	59
SASKATOON	21P	3P	37P	9P	0P	0	320	69
SWIFT CURRENT	21P	2P	36P	7P	0P	0		X
YORKTON	20P	1P	37P	8P	0P	0	310	63
MANITOBA								
BRANDON	20P	1P	33P	7P	0P	0	330	52
CHURCHILL	16P	3P	24P	7P	9P	0	140	33
LYNN LAKE	18P	2P	30P	7P	1P	0	300	63
THE PAS	20P	*	33P	10P	0P	0	300	52
THOMPSON	19P	3P	32P	17P	9P	0	300	54
WINNIPEG INT'L	21P	1P	34P	9P	0P	0	180	59
ONTARIO								
ATIKOKAN	18P	0P	30P	7P	7P	0	340	33
BIG TROUT LAKE	20P	3	30P	12P	14P	0	290	81
GORE BAY	22P	2P	28P	14P	1P	0		*
KAPUSKASING	19P	2P	31P	9P	5P	0	310	52
KENORA	21P	1P	30P	14P	5P	0	180	48
KINGSTON	21P	0P	26P	15P	*P	0		X
LONDON	21P	0P	27P	15P	14P	0		*
MOOSONEE	17P	1P	32P	1P	1P	0	290	31
NORTH BAY	21P	2P	27P	14P	8P	0	100	48
OTTAWA INT'L	22P	1P	30P	16P	26P	0		X
PETAWAWA	20P	1P	30P	11P	54P	*		X
PICKLE LAKE	20P	2P	32P	11P	8P	0	280	56
RED LAKE	20P	1P	31P	10P	17P	0	200	56
SUDBURY	21P	2P	28P	14P	12P	0		X
THUNDER BAY	19P	1P	30P	11P	1P	0		*
TIMMINS	20P	2P	30P	10P	4P	0	190	37
TORONTO INT'L	21P	0P	29P	16P	46P	0	290	67
TRENTON	21P	0P	28P	14P	4P	0		X
WIARTON	20P	1P	27P	14P	29P	0		X
WINDSOR	23	0	29P	18P	5P	0	020	37
QUEBEC								
BAGOTVILLE	18P	0P	29P	7P	0P	0		*
BLANC SABLON	11P	*	19P	5P	10P	0		X
INUKJUAK	10P	0P	21P	4P	11P	0	260	41
KUUJJUAQ	12P	0P	23P	4P	9P	0	250	44
KUUJJUARAPIK	13P	2P	31P	4P	2P	0	130	46
MANIWAKI	20P	1P	29P	11P	3P	0		*
MONT JOLI	18P	1P	26P	10P	0P	0	060	41
MONTREAL INT'L	23P	0P	30P	15P	0P	0	210	39
NATASHQUAN	15P	1P	21P	10P	4P	0	270	41
QUEBEC	21P	1	29P	13P	5P	0	010	39
SCHEFFERVILLE	12P	-1P	26P	5P	4P	0	290	44
SEPT-ILES	16P	1P	25P	10P	3P	0	090	44
SHERBROOKE	20P	2P	28P	14P	3P	0		*
VAL D'OR	20P	2P	28P	11P	5P	0		*
NEW BRUNSWICK								
CHARLO	18P	0P	27P	10P	0P	0		*
CHATHAM	19P	0P	27P	13P	0P	0	310	31
FREDERICTON	19P	0P	28P	14P	17P	0	070	35
MONCTON	19P	0P	28P	13P	22P	0	050	37
SAINT JOHN	18P	1P	27P	13P	55	0	100	50
NOVA SCOTIA								
GREENWOOD	19P	0P	29P	15P	102	0		*
SHEARWATER	17P	-1P	26P	12P	99P	0	100	39
SYDNEY	17	-1	27P	12P	78	0	100	33
YARMOUTH	17P	1P	24P	12P	100P	0	210	65
PRINCE EDWARD ISLAND								
CHARLOTTETOWN	18P	-1P	26P	13P	29	0		*
SUMMERSIDE	19P	0P	26P	14P	17P	0		*
NEWFOUNDLAND								
CARTWRIGHT	12P	-1P	21P	3P	11	0	320	61
CHURCHILL FALLS	12P	-1P	25P	4P	9P	0	310	56
GANDER INT'L	15P	-1P	24P	7P	12P	0	290	50
GOOSE	16P	0P	25P	6P	12	*	230	72
PORT-AUX-BASQUES	14P	0P	19P	10P	19	0	090	50
ST JOHN'S	13P	-2P	22P	10P	19	0	130	46
ST LAWRENCE	14P	1P	22P	10P	84	0		X
WABUSH LAKE	13P	-1P	26P	5P	6P	0	290	39

AV = weekly mean temperature in degree C
MX = weekly extreme maximum temperature in degree C
MN = weekly extreme minimum temperature in degree C
TP = weekly total precipitation in mm
DP = departure of mean temperature from normal in degree C
SOG = snow depth on ground in cm, last day of the period

DIR = direction of maximum wind speed (deg. from true north)
SPD = maximum wind speed in km/hour

X = not observed
P = value based on less than 7 days
* = missing


LONDON A
TIME-SERIES OF WATER BUDGET COMPONENTS TO 22 JUL 88
TEMPERATURE
°C
PRECIPITATION
WEEK
ACCUM
NORMAL
mm (WEEK)
mm (ACCUMULATED)
SOIL MOISTURE
% OF WHC
EVAPORATION
mm
SNOW COVER
mm (WATER EQUIV.)
ACTUAL
NORMAL
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
1987
1988


WINDSOR A
TIME-SERIES OF WATER BUDGET COMPONENTS TO 22 JUL 88
TEMPERATURE
°C
PRECIPITATION
WEEK
ACCUM
NORMAL
mm (WEEK)
mm (ACCUMULATED)
SOIL MOISTURE
% OF WHC
EVAPORATION
mm
SNOW COVER
mm (WATER EQUIV.)
ACTUAL
NORMAL
OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP
1987
1988