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Climatic Perspectives

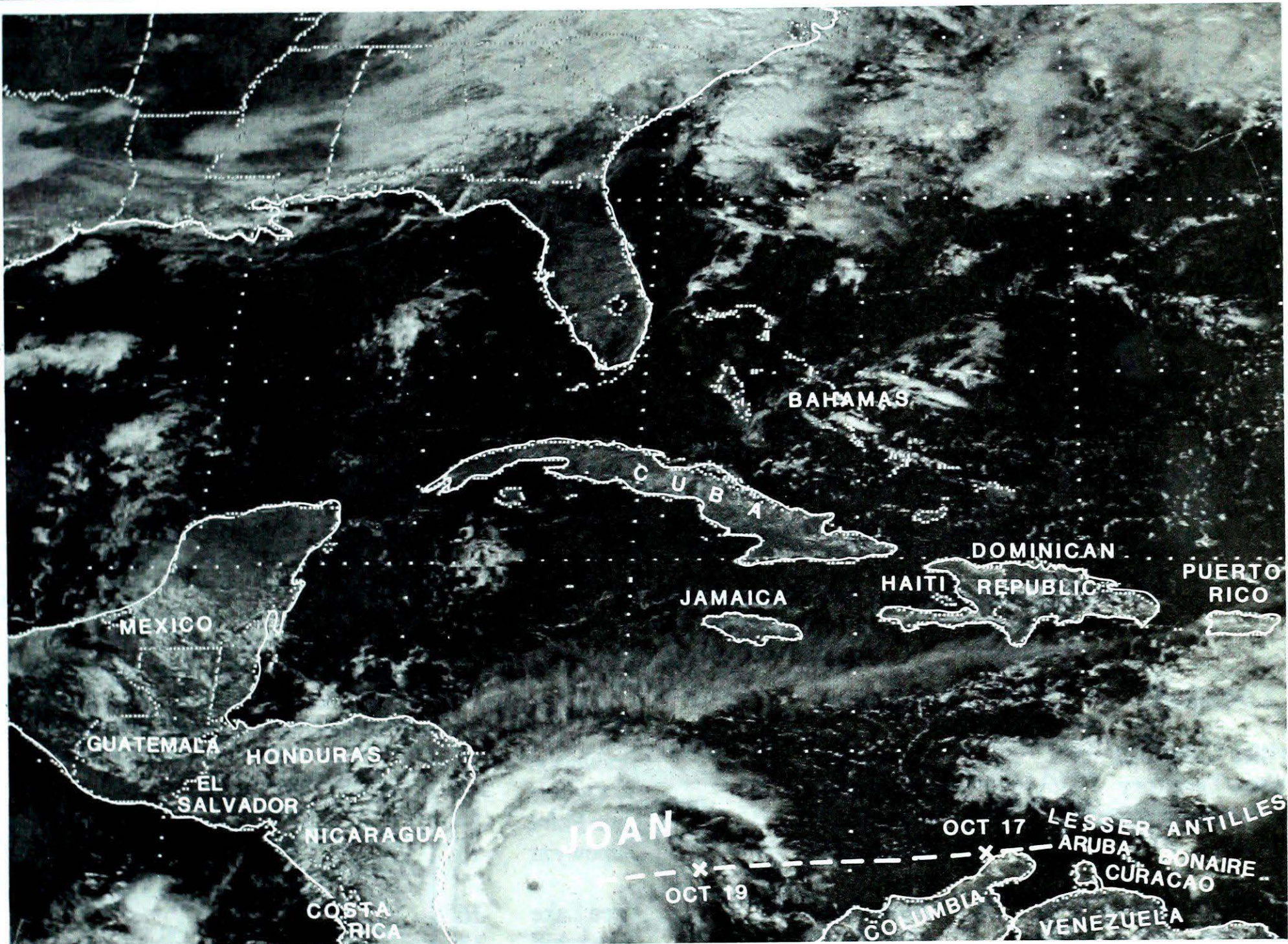
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October 18 to 24, 1988

A weekly review of Canadian climate

Vol. 10 No. 43



Hurricane Joan as seen by the GOES weather satellite from 35,800 km above the equator on October 21, 1988. At the time this photo was taken, Joan was approaching the coast of Nicaragua, sporting winds of 175 km/h, and producing torrential rainfalls of around 350 millimetres. The storm originated as a tropical depression in the Atlantic, 1500 km east of Barbados on October 11, 1988. Note the distinct eye of the hurricane. For more details about the storm see page 3.

● Major storms batter eastern Canada

- Record early snows eastern Ontario and southwestern Quebec
- Heavy rain and gales lash Atlantic Provinces

Canada

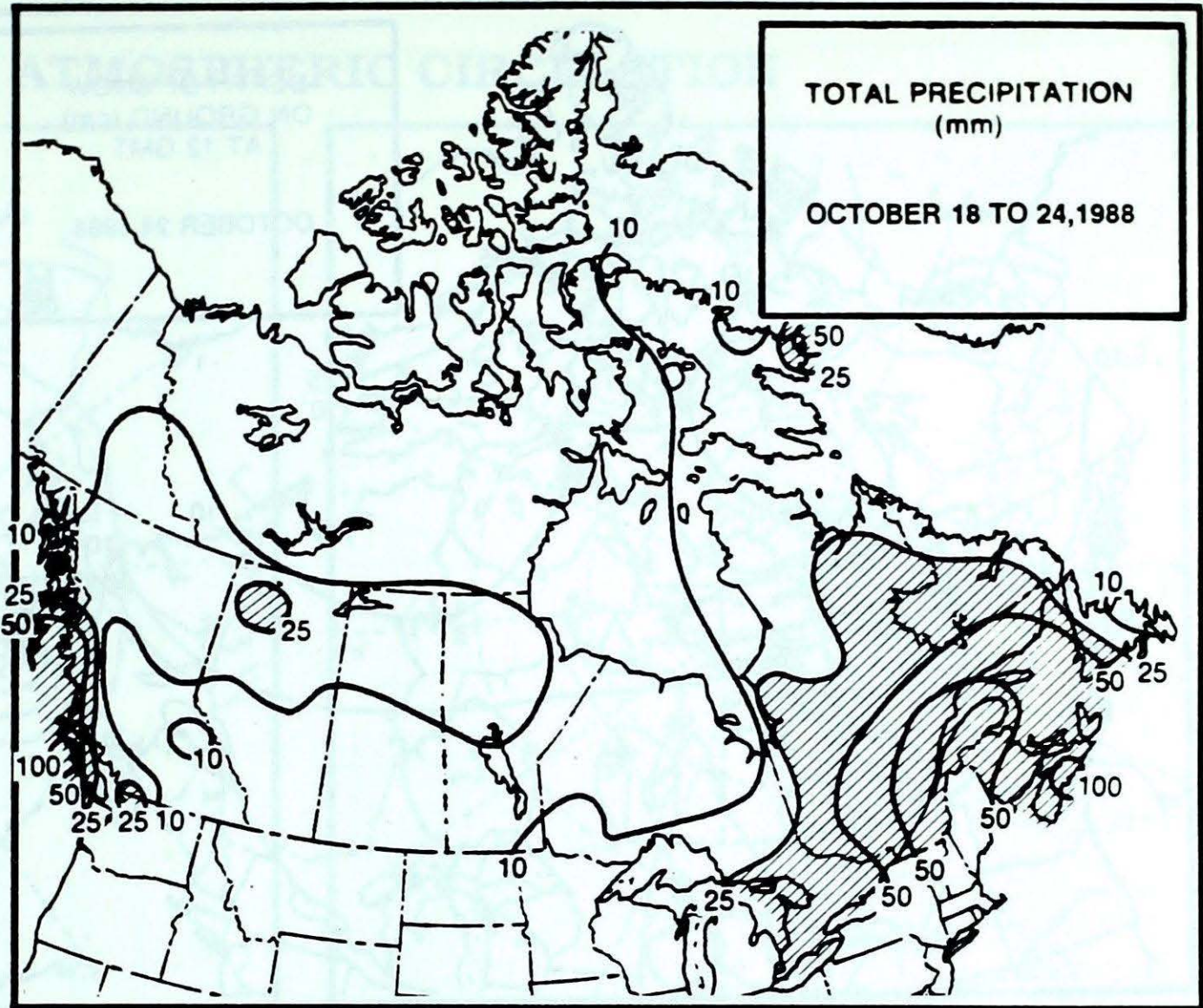
and associated sharp cold front crossed the province on October 18, resulting in heavy rain, plunging temperatures and gale-force winds. Unofficial reports had winds gusting to 90 km/h during the night, causing some minor damage. The rest of the week was showery, unseasonably cold and blustery, as Arctic air flooded the province. Light snowfalls were reported in central and northern Ontario. On October 22, because of the winter-like temperatures, an east coast storm spread heavy, wet snow as far west as the Ottawa Valley. The surprise snowstorm dropped 21 cm of snow during a Saturday afternoon CFL football game in Ottawa. The snowfall easily surpassed the previous October record of 16 cm set in 1962.

Quebec

Two intense weather systems gave heavy precipitation to a large portion of the province. The first storm produced a mixture of rain and snow in central and northern Quebec. On October 22, a second weather system produced record snowfalls in the southwest corner of the province, while heavy rain fell along the north shore and in the Gaspé. New October snowfall records were established at both Montreal Mirabel and Dorval airports, with 28 and 21 centimetres of snow, respectively. The heavy snowfalls extended to eastern Ontario. Slippery roads resulted in a rash of traffic accidents in the Trois Rivières and Sherbrooke regions. Strong winds also accompanied these intense cyclonic disturbances. Both on October 18 and 22, winds approached 100 km/h near the St. Lawrence Valley, damaging trees and outdoor structures, and resulting in power failures. On Lake Saint-Pierre one person drowned when a boat capsized.

Atlantic Provinces

It was a rather wet and stormy period. Heavy rain fell across the Maritimes on October 19 and 20. Truro received 102 mm in a 24-hour period, setting a new monthly record. Resultant flooding forced the closure of roads, as stalled cars were abandoned. In Truro, flooded basements were common. The same storm gave 10 to 15 centimetres of snow to Labrador. Another east coast storm on the 22nd and 23rd produced wind gusts in excess of 100 km/h along the Atlantic coast and in southwestern Newfoundland. St. Pauls Island reported a wind gust to 126 km/h on the 23rd. Rainfalls were not as high as with the first system, but Labrador received an additional 10 to 15 centimetres of snow.

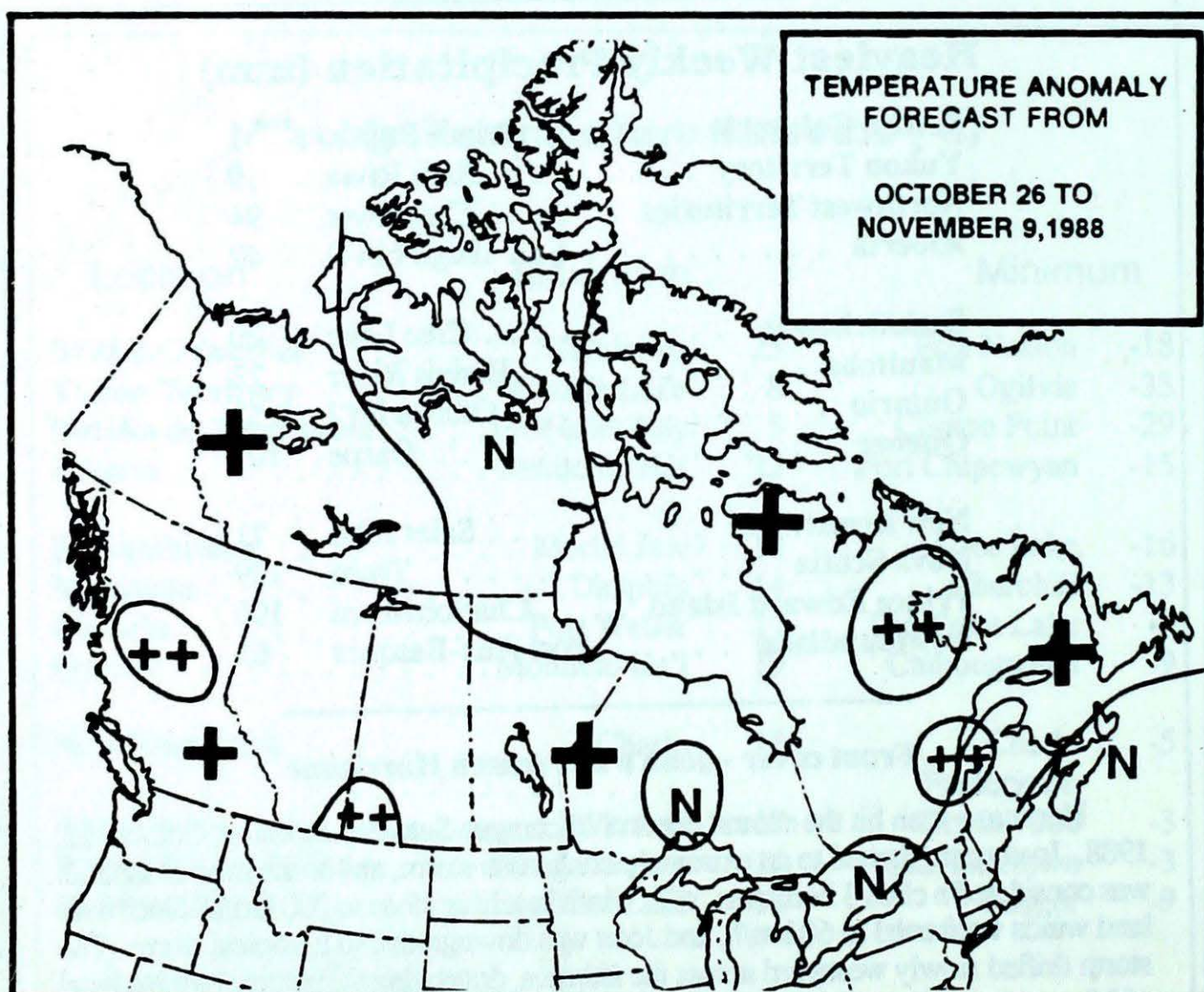
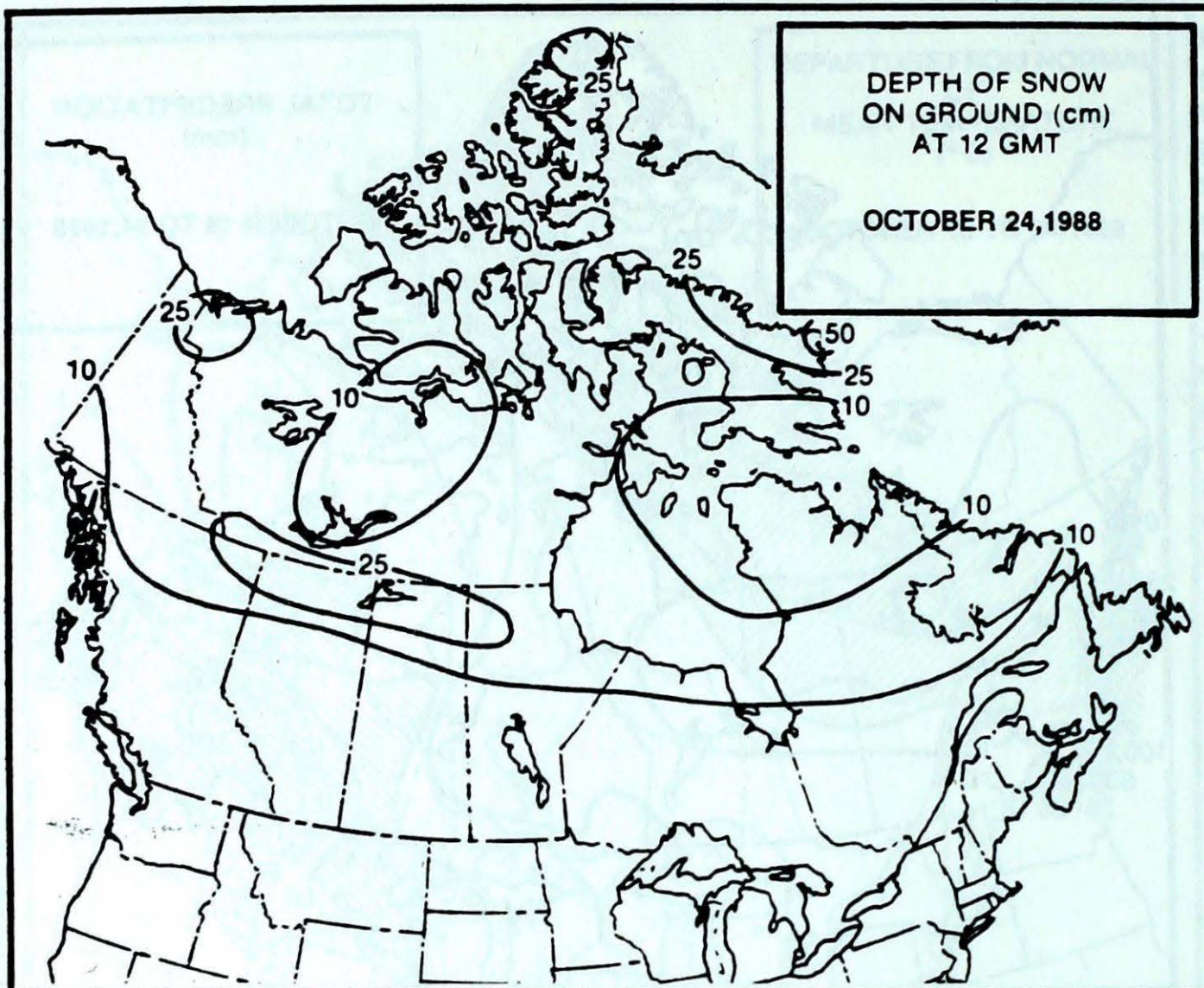


Heaviest Weekly Precipitation (mm)

British Columbia	Prince Rupert	141
Yukon Territory	Ross River	19
Northwest Territories	Cape Dyer	94
Alberta	High Level	42
Saskatchewan	Cree Lake	20
Manitoba	Berens River	23
Ontario	Ottawa Int'l	52
Quebec	Gaspe	102
New Brunswick	Saint John	71
Nova Scotia	Truro	139
Prince Edward Island	Charlottetown	100
Newfoundland	Port-Aux-Basques	63

Front cover - Joan a late season Hurricane

Hurricane Joan hit the central coast of Nicaragua Saturday morning, October 22, 1988. Joan strengthened to an extremely dangerous storm, and at the time of landfall was considered a class 3 hurricane, with winds reaching close to 200 km/h. Once over land winds weakened to 60 km/h, and Joan was downgraded to a tropical storm. The storm drifted slowly westward across the isthmus, destroying 90 percent of the capital of Managua, and emerged on the Pacific coast Sunday. The storm was then renamed Miriam. Up to 380 mm of rain fell on Nicaragua and Costa Rica, triggering flash floods and mud slides as far away as Honduras and Panama. As most of the dwellings are built of wood, and many are perched on stilts or situated on hillsides, damage was extensive. Several hundred thousand people were left homeless in Nicaragua alone. It is interesting to note that Costa Rica has never been hit by a hurricane in recorded history, and the last one to hit Nicaragua was in 1911.



- ++ 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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Managing Editor *P.R. Scholefield*
 Editors-in-charge
 - weekly *A. K. Radomski*
 - monthly *A. Gergye*
 French version *Alain Caillet*
 Data Manager *M. Skarpathiotakis*
 Art Layout *C. Czaja*
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 Translation *D. Pokorn*
 Cartography *G. Young/T. Chivers*
 *B. Taylor*
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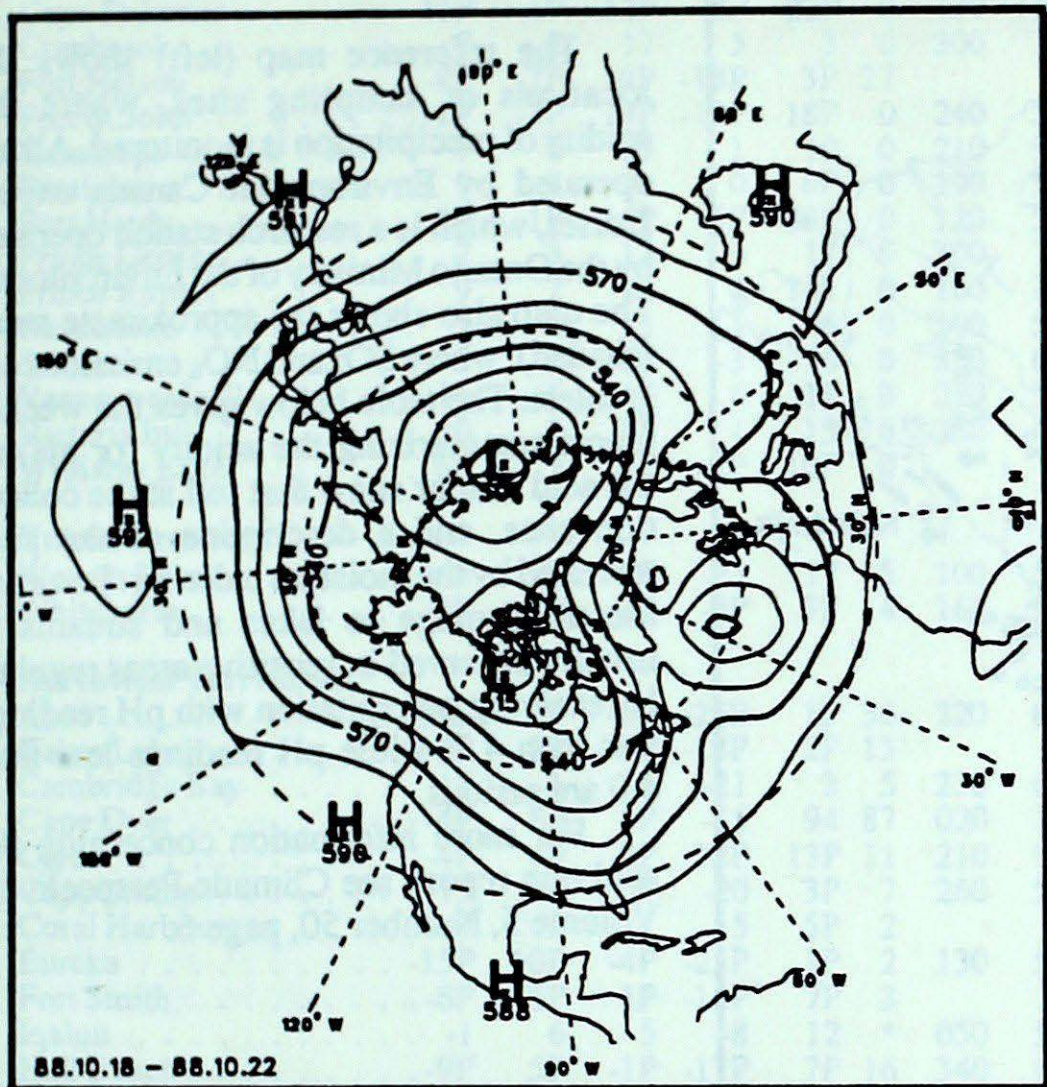
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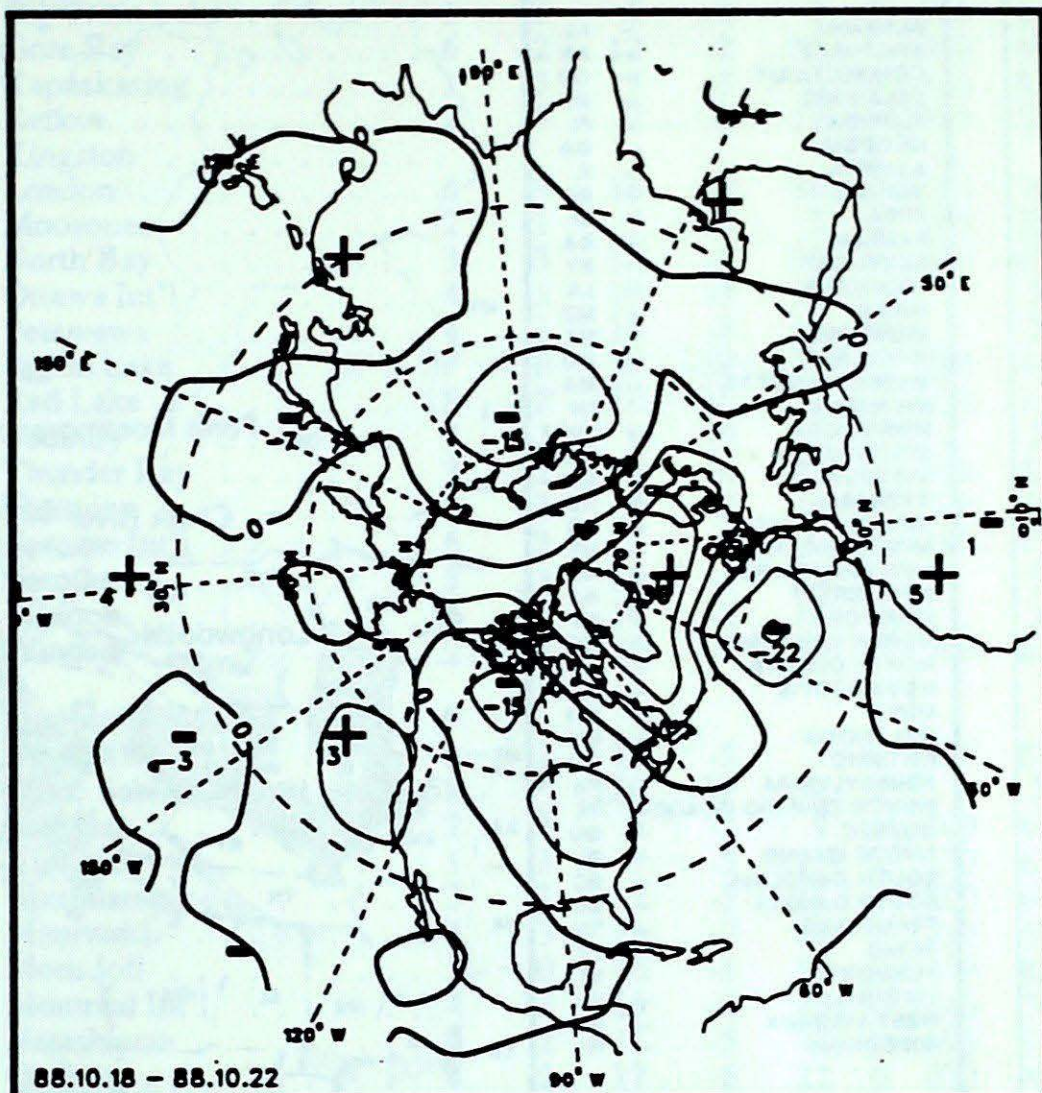
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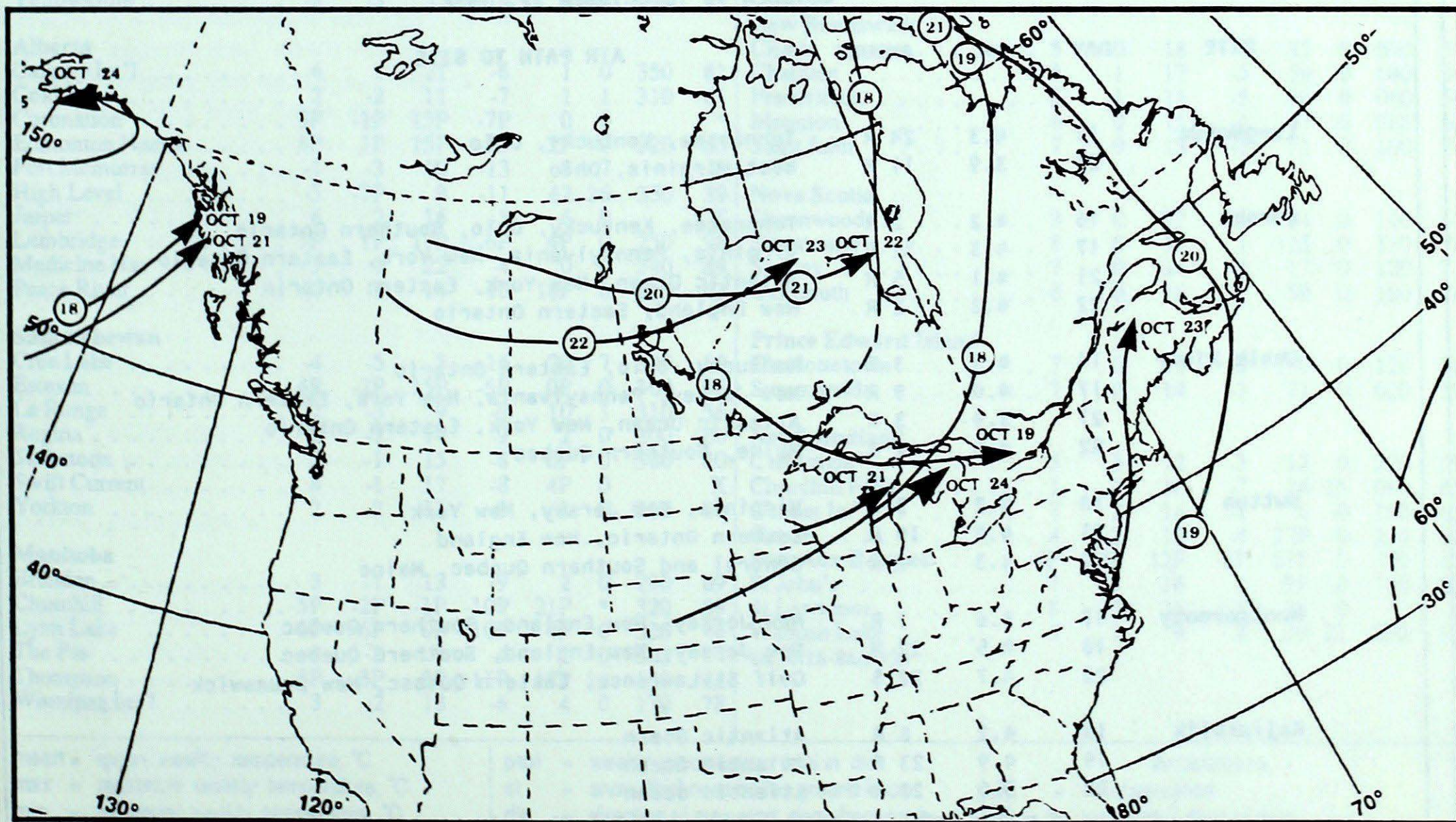
50 kPa ATMOSPHERIC CIRCULATION



Mean geopotential height
50 kPa level (5 decameter intervals)



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

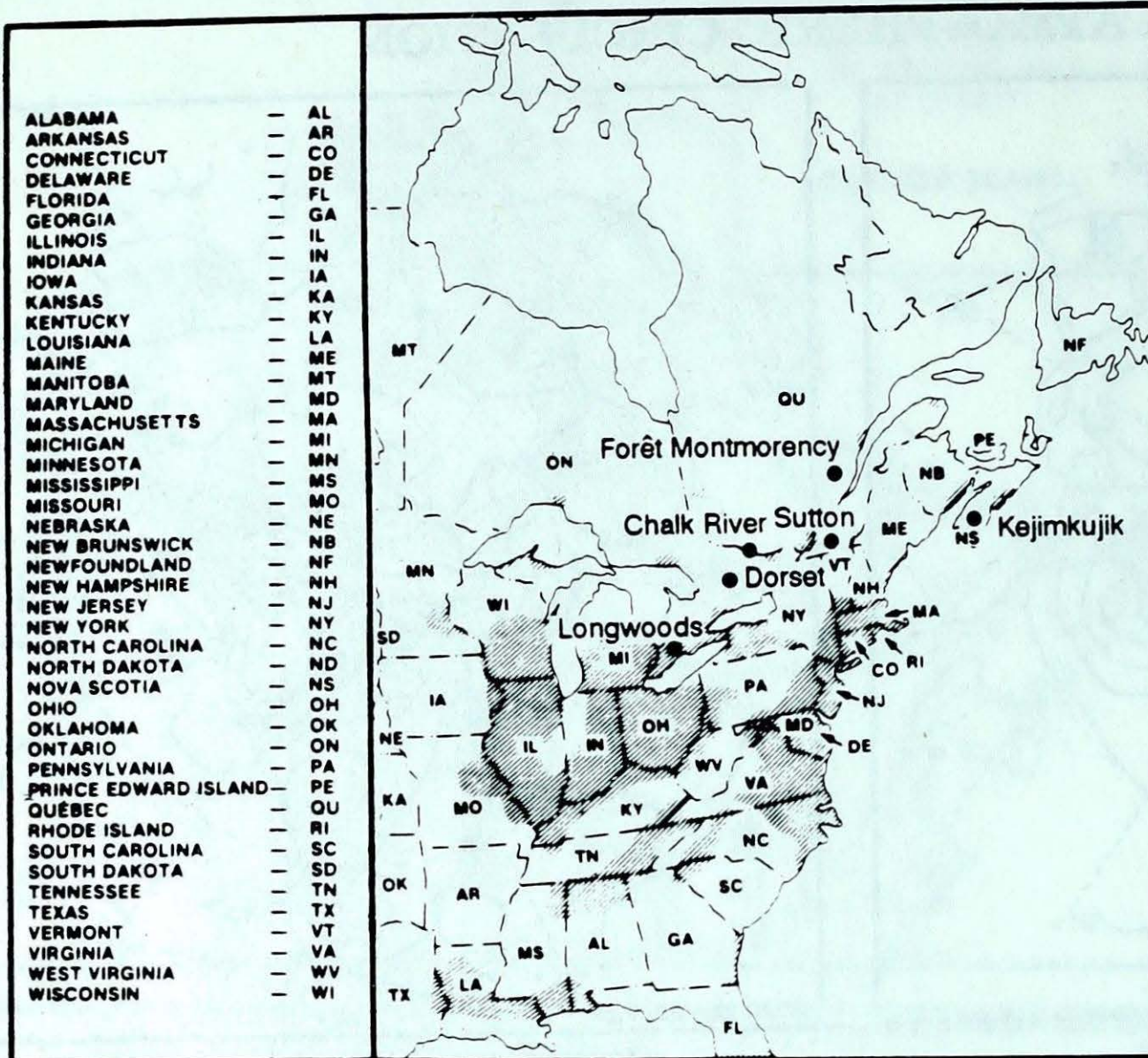


Storm track - Position of storm at 12 GMT each day during the period.

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 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.

For more information concerning the acid rain report, see Climatic Perspectives, Volume 5, Number 50, page 6.



OCTOBER 16 TO OCTOBER 22, 1988

SITE	DAY	pH	AMOUNT	AIR PATH TO SITE
Longwoods	17	4.3	24 R	Tennessee, Kentucky, Ohio
	21	3.9	11 R	West Virginia, Ohio
Dorset	16	4.2	2 R	Tennessee, Kentucky, Ohio, Southern Ontario
	17	4.3	32 R	Virginia, Pennsylvania, New York, Eastern Ontario
	21	4.1	5 R	Atlantic Ocean, New York, Eastern Ontario
	22	4.2	2 R	New England, Eastern Ontario
Chalk River	16	4.3	3 R	Kentucky, Ohio, Eastern Ontario
	17	4.0	9 R	New Jersey, Pennsylvania, New York, Eastern Ontario
	21	3.9	3 R	Atlantic Ocean, New York, Eastern Ontario
	22	4.6	2 R	Maine, Southern Quebec
Sutton	18	4.2	3 R	Virginia, New Jersey, New York
	21	4.9	19 M	Eastern Ontario, New England
	22	4.3	7 R	Central and Southern Quebec, Maine
Montmorency	17	3.6	1 R	New Jersey, New England, Southern Quebec
	18	4.5	22 M	New Jersey, New England, Southern Quebec
	22	4.7	22 S	Gulf St. Lawrence, Eastern Quebec, New Brunswick
Kejimikujik	18	4.2	8 R	Atlantic Ocean
	19	4.9	23 R	Atlantic Ocean
	22	5.0	23 R	Atlantic Ocean

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

STATION	temperature				precip.		wind max		STATION	temperature				precip.		wind max	
	moy	anom	max	min	ptot	st	dir	vit		moy	anom	max	min	ptot	st	dir	vit
British Columbia									Ontario								
Cape St. James	11P	1P	12P	8P	22P	0	130	102	Atikokan								2
Cranbrook	7	2	17	-5	3	0	300	78	Big Trout Lake	-1	-2	5	-8	8	0	320	63
Fort Nelson	-8P	-7P	8P	-18P	3P	27		*	Gore Bay	6	-2	12	-2	38	0	300	46
Fort St. John	-1P	-3P	14P	-13P	18P	0	240	57	Kapuskasing	1	-3	7	-6	6	0	320	43
Kamloops	7	0	23	1	10	0	210	98	Kenora	2	-3	7	-3	19	1	330	52
Penticton	9	1	16	0	6P	0	190	57	Kingston								0
Port Hardy	9P	1P	14P	5P	88P	0	120	50	London	6	-3	16	-2	36	0	180	70
Prince George	7	3	12	0	17	0	300	72	Moosonee	2	-1	7	-3	5	0	290	35
Prince Rupert	9	2	12	4	141	0	160	74	North Bay	3	-3	13	-5	36	0	350	67
Revelstoke	7	2	13	1	6	0	300	59	Ottawa Int'l	4	-3	17	-3	52	7		X
Smithers	5	2	15	-3	16	0	350	63	Petawawa	4	-1	14	-8	19	0		X
Vancouver Int'l	11	1	15	6	11	0	270	52	Pickle Lake	0P	-3P	7P	-5P	13P	1	310	48
Victoria Int'l	10	1	15	4	15	0	250	48	Red Lake	1P	-3P	7P	-5P	5P	1	330	52
Williams Lake	6P	*	17P	-2P	10P	0		X	Sudbury	2	-3	9	-5	45	0		X
Yukon Territory									Thunder Bay								
Watson Lake	-5	-3	8	-23	17	15	100	56	Timmins	1	-3	7	-8	14	1	320	46
Whitehorse	-3P	-2P	3P	-9P	3P	4	160	56	Toronto Int'l	6	-3	17	-2	30	0	190	72
Northwest Territories									Trenton								
Alert	-17P	4P	-5P	-25P	1P	36	220	87	Warton	6	-2	16	-2	34	0		X
Baker Lake	-12P	-2P	-3P	-18P	2P	13		*	Windsor	7	-3	15	1	20	0	290	65
Cambridge Bay	-15	-1	-6	-21	3	5	230	65	Québec								
Cape Dyer	-4P	5P	1P	-15	94	87	020	76	Bagotville	3	-1	18	-5	7	0	200	59
Clyde	-4P	4P	3P	-12P	13P	11	210	91	Blanc Sablon	5P	*	12P	-3P	14P	0		X
Coppermine	-13	-4	-7	-20	3P	7	260	54	Inukjuak	2	3	6	-2	9	1	300	61
Coral Harbour	-7	3	1	-15	5P	2		X	Kuujuuaq	1	3	7	-5	25	4	230	63
Eureka	-15P	10P	-4P	-25P	1P	2	130	59	Kuujuarapik	2	1	7	-3	17	0	200	67
Fort Smith	-6P	-5P	1P	-16P	7P	3		X	Maniwaki	3	-3	15	-7	48	0	210	69
Iqaluit	-1	6	5	-8	12	*	050	57	Mont Joli	5	0	16	-1	16	0	170	85
Hall Beach	-9P	5P	-1P	-17P	7P	16	340	63	Montreal Int'l	4	-3	19	-4	40	0	240	76
Inuvik	-15P	-5P	-12P	-20P	5P	27		X	Natashquan	5	2	11	-5	73	0	090	91
Mould Bay	-16	4	-7	-24	4	15		X	Québec	4	-2	17	-6	22	0	070	89
Norman Wells	-16P	-9P	-11P	-21P	2P	*		X	Schefferville	0P	3P	8P	-6P	28P	10	210	83
Resolute	-12P	6P	-3P	-18P	4P	24	060	67	Sept-Iles	4	1	10	-4	49	0	070	81
Yellowknife	-8	-5	-2	-14	2	1	040	35	Sherbrooke	4	-2	18	-5	13	0	190	63
Alberta									Val D'or								
Calgary Int'l	6	1	21	-6	1	0	350	81	Charlo	5	0	18	-5	32	0	090	76
Cold Lake	2	-2	11	-7	1	1	310	61	Chatham	5	-1	17	-5	59	0	090	46
Coronation	3P	-1P	13P	-7P	0	0		*	Fredericton	5	-1	16	-5	49	0	060	50
Edmonton Namao	5P	1P	15P	-5P	2P	0	320	85	Moncton	6	0	15	-4	47	0	080	63
Fort McMurray	-1	-3	10	-13	8	7		X	Saint John	7	0	13	-3	71	0	100	74
High Level	-5	-7P	9	-11	42	26	350	39	New Brunswick								
Jasper	6	2	16	-5	6	0		X	Charlo	5	0	18	-5	32	0	090	76
Lethbridge	7P	1P	17P	-6P	4P	0	250	98	Chatham	5	-1	17	-5	59	0	090	46
Medicine Hat	7	1	22	-4	0	0	340	89	Fredericton	5	-1	16	-5	49	0	060	50
Peace River	0	-3	14	-10	18P	0	310	43	Moncton	6	0	15	-4	47	0	080	63
Saskatchewan									Saint John								
Cree Lake	-4	-5	5	-16	20	7	340	69	Greenwood	8	0	17	-3	34	0	110	67
Estevan	4P	-2P	15P	-5P	0P	0	300	96	Shearwater	8	0	14	1	125	0	110	78
La Ronge	-1	-3	9	-9	10	1	310	56	Sydney	7	0	14	-3	17	0	120	74
Regina	3	-2	14	-9	2	0	300	80	Yarmouth	8	0	16	1	59	0	100	74
Saskatoon	3	-1	15	-8	0P	0	300	80	Nova Scotia								
Swift Current	4	-1	17	-8	4P	0		X	Greenwood	8	0	17	-3	34	0	110	67
Yorkton	2	-2	13	-9	1	0	310	80	Shearwater	8	0	14	1	125	0	110	78
Manitoba									Prince Edward Island								
Brandon	3	-1	13	-9	2	0	290	69	Charlottetown	7	0	15	-3	100	0	120	56
Churchill	-5P	-2P	-1P	-10P	21P	*	320	59	Summerside	7	0	14	-1	71	0	020	59
Lynn Lake	-6P	-6P	0P	-10P	4P	0	320	46	Newfoundland								
The Pas	1	-2	9	-4	2	0	300	74	Cartwright	5	3	12	-3	13	0	220	59
Thompson	-3P	-3P	3P	-11P	17P	14	130	48	Churchill Falls	1	4	10	-7	24	15	090	65
Winnipeg Int'l	3	-2	13	-6	4	0	170	78	Gander Int'l	7	2	16	-1	6	0	150	65
									Goose								
									2 12 -4 27P 0 230 69								
									Port-Aux-Basques 6P 0P 12P -1P 63P 0 100 83								
									St John's 7 1 16 1 9P 0 160 50								
									St Lawrence 8 2 16 -1 32 0 X								
									Wabush Lake -1 1 9 -8 39 21 230 69								
									88/10/18-88/10/24								

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.
 vit = wind speed in km/h

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

