

Climatic Perspectives



A weekly review of Canadian climate

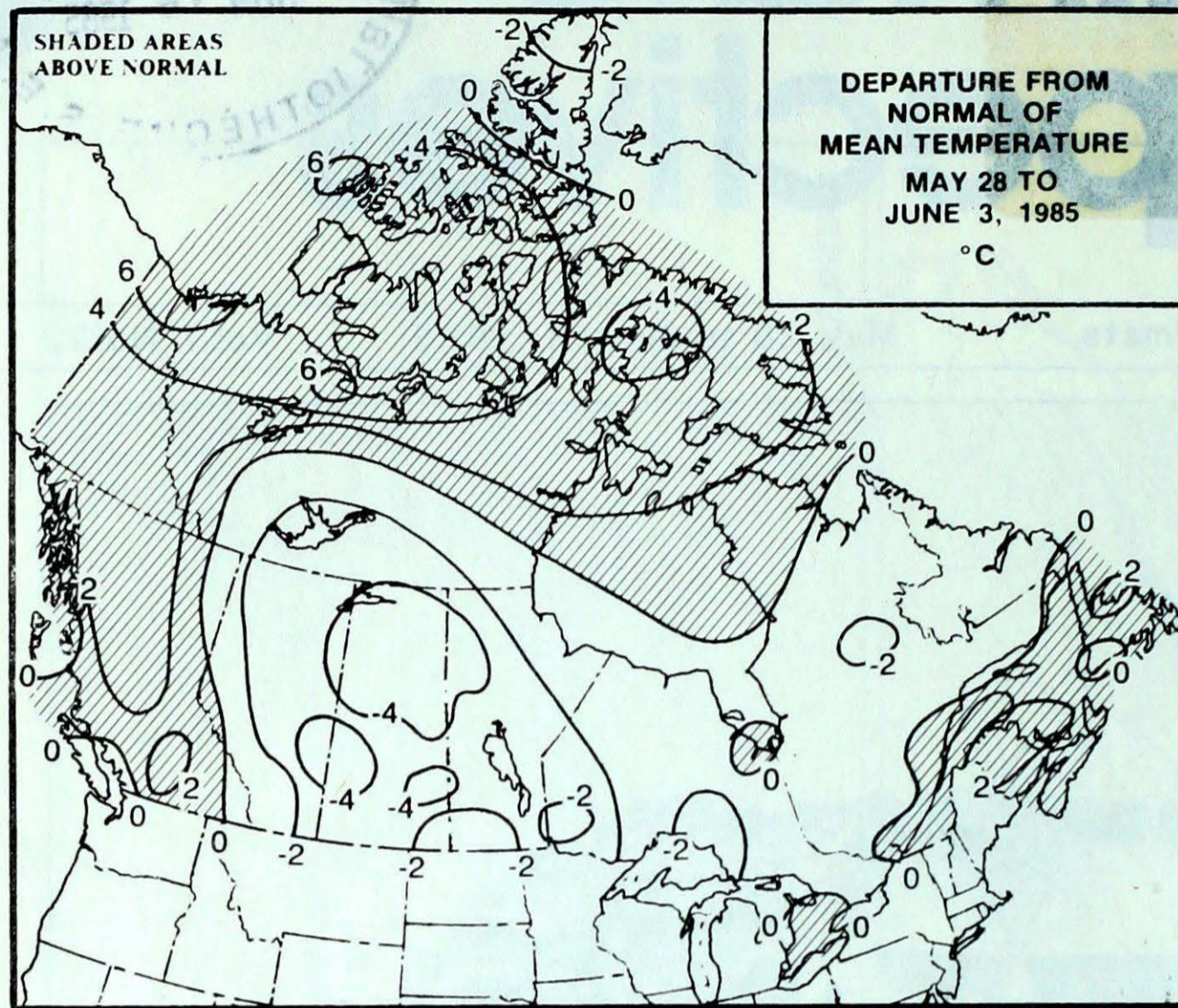
May 28 to June 3, 1985

Vol.7 No.22



TORNADO DISASTER

- *12 dead ... hundreds injured and homeless in Southern Ontario*
- *Devastating hail storm in Southwestern Ontario*



ACROSS THE COUNTRY...

Yukon and Northwest Territories

Under mainly sunny skies, temperatures in the Yukon climbed into the low to mid twenties. Many maximum temperature records were broken in the southern Arctic. Heaviest precipitation fell in central Yukon, between 10 and 20 millimetres. There have been several road closures and washouts due to the heavy spring runoff, including the Dempster Highway. All ferries are now operating in the Yukon. All major lakes are ice-free. Two major forest fires were burning near the BC-Yukon border. A 14,000 hectare fire was out of control near Watson Lake.

British Columbia

The week was mostly sunny and pleasant. Only the extreme south experienced a number of cloudy days and received above normal rainfalls, ranging between 15 and 45 millimetres. Showers and thunder showers occurred frequently in the Kootenays. The first hay crop was nearly ready for cutting. Two major fires, one out of control, were burning near the BC-Yukon border.

Prairies

A cold Arctic airmass spilled southward across the prairies, dropping temperatures to well below normal values after mid week. Damaging frost occurred in many localities during the weekend, and many new low temperature records were set. Temperatures in agricultural districts dropped to as low as -5°C . Skies were mainly sunny in Alberta, but some scattered shower and thunder-shower activity occurred during the week. Weather conditions were primarily unsettled to the east. Precipitation amounts generally ranged from 10 to 50 millimetres across the south. Snow fell in central and northern districts, with some locations receiving as much as 10 centimetres. Dauphin recorded 6 cm of snow on June 1, a record amount for the month.

WEEKLY TEMPERATURE EXTREMES ($^{\circ}\text{C}$)

	MAXIMUM	MINIMUM
YUKON TERRITORY	29.0 Dawson	- 7.3 Old Crow
NORTHWEST TERRITORIES	26.8 Norman Wells	-13.0 Alert
BRITISH COLUMBIA	29.7 Lytton	- 0.4 Dease Lake
ALBERTA	23.4 Grande Prairie	- 2.5 Coronation
SASKATCHEWAN	23.3 Estevan	- 3.6 Hudson Bay
MANITOBA	23.2 Dauphin	- 2.4 Churchill Gillam
ONTARIO	29.8 Windsor	- 2.9 Armstrong
QUÉBEC	26.8 Sherbrooke	- 5.2 Kuujuarapik
NEW BRUNSWICK	27.0 Chatham	0.4 St. Stephen
NOVA SCOTIA	24.9 Greenwood Shelburne Sydney	0.1 Shelburne
PRINCE EDWARD ISLAND	24.7 Summerside	2.6 Charlottetown
NEWFOUNDLAND	26.6 Deer Lake	- 6.1 Badger

ACROSS THE NATION

Warmest mean temperature	18.1	Kamloops, BC Penticton, BC
Coollest mean temperature	- 8.7	Alert, NWT

Ontario

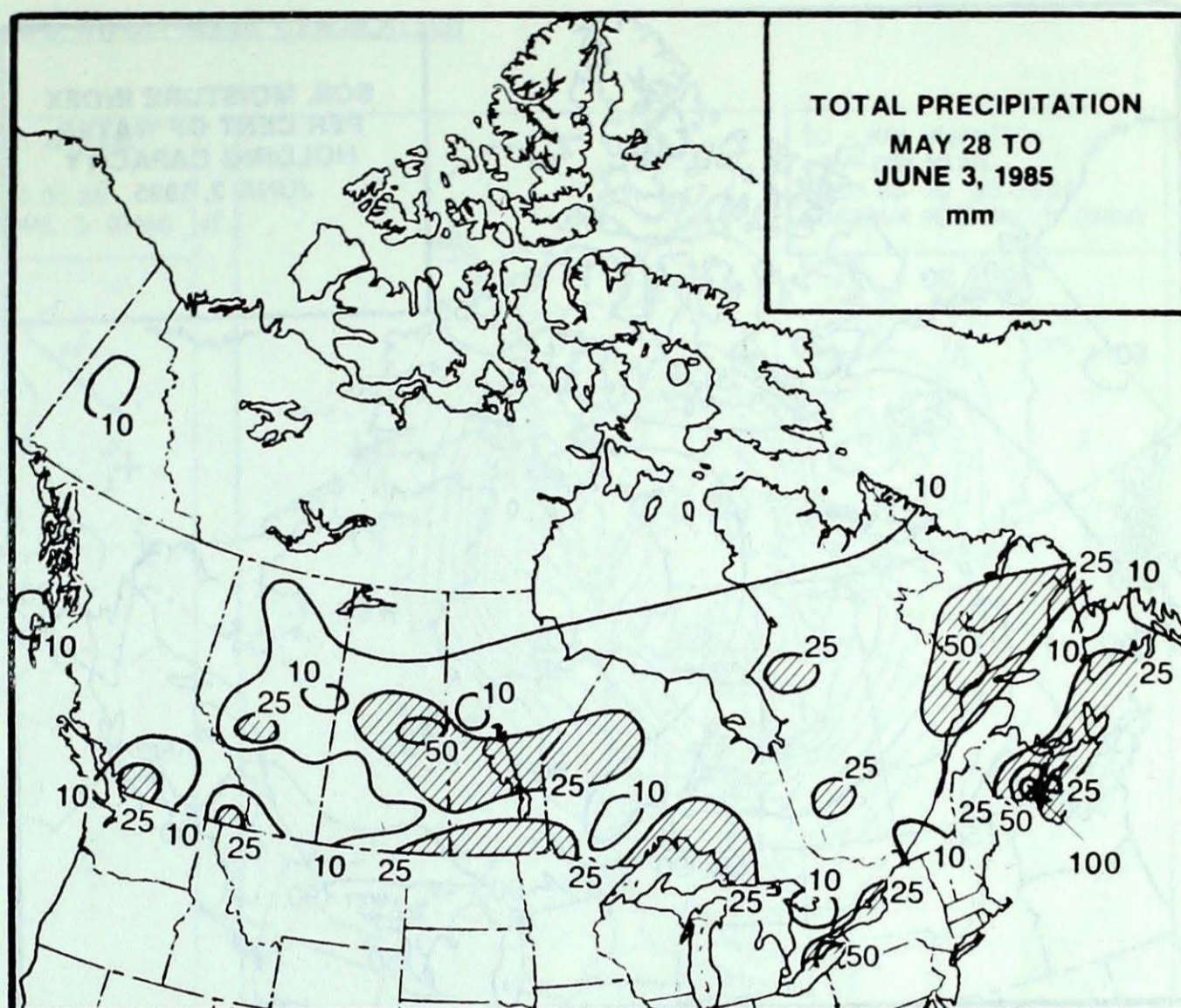
The worst tornadic activity in Canada in more than 30-years hit southern Ontario on May 31, causing devastation and hundreds of millions dollars in property damage. A line of severe thunderstorms developed in a very unstable airmass, triggered by a vigorous cold front. At least 3 tornados touched down between 4:30 and 5:30 in the afternoon, and moved eastwards north of Toronto. The tornadoes left death and destruction in many communities. At least 12 people were killed and hundreds were injured. A subdivision in the city of Barrie 80 km north of Toronto was ravaged. Armed Forces personnel and Toronto police were dispatched to assist in the disaster areas. Up to a quarter of the Holland Marsh, an intensive vegetable farming area, was torn up a twister. A day earlier, on May 30, during the noon hour, severe thunderstorms developed along a warm front in southwestern Ontario. A tornado was sighted, and in addition, golfball sized hail caused millions of dollars damage in the Leamington farming district, smashing greenhouse and flattening vegetable fields.

Québec

A line of heavy thunderstorms moved through the Ottawa Valley and the Eastern Townships on May 31. Strong winds and hail were reported near the communities of Luskville, northwest of Hull, and Ste-Lucie, in the Eastern Townships. Scattered ground frost occurred in some areas of the south. Eleven forest fires were reported burning in the province.

Atlantic Provinces

The Maritimes were mainly sunny, but variable skies were observed over Newfoundland, with rain being reported on a number of days. Heavy showers and thunderstorms moved through the Maritimes on June 1. Saint John was deluged with more than 100 mm of rain, flooding streets and basements; two shopping centres were forced to close. The strawberry crop in Nova Scotia appears to be doing fine.

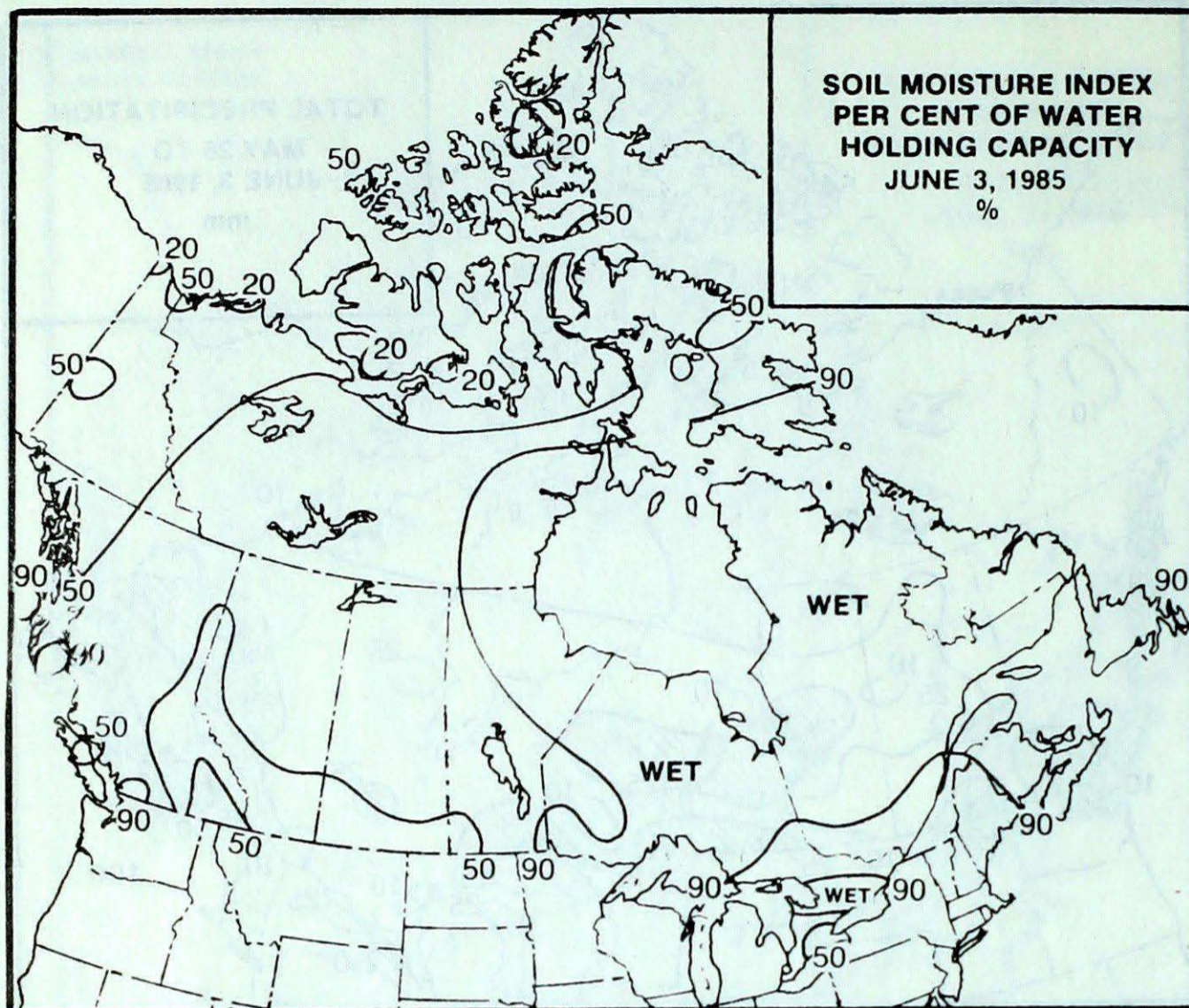


HEAVIEST WEEKLY PRECIPITATION (mm)

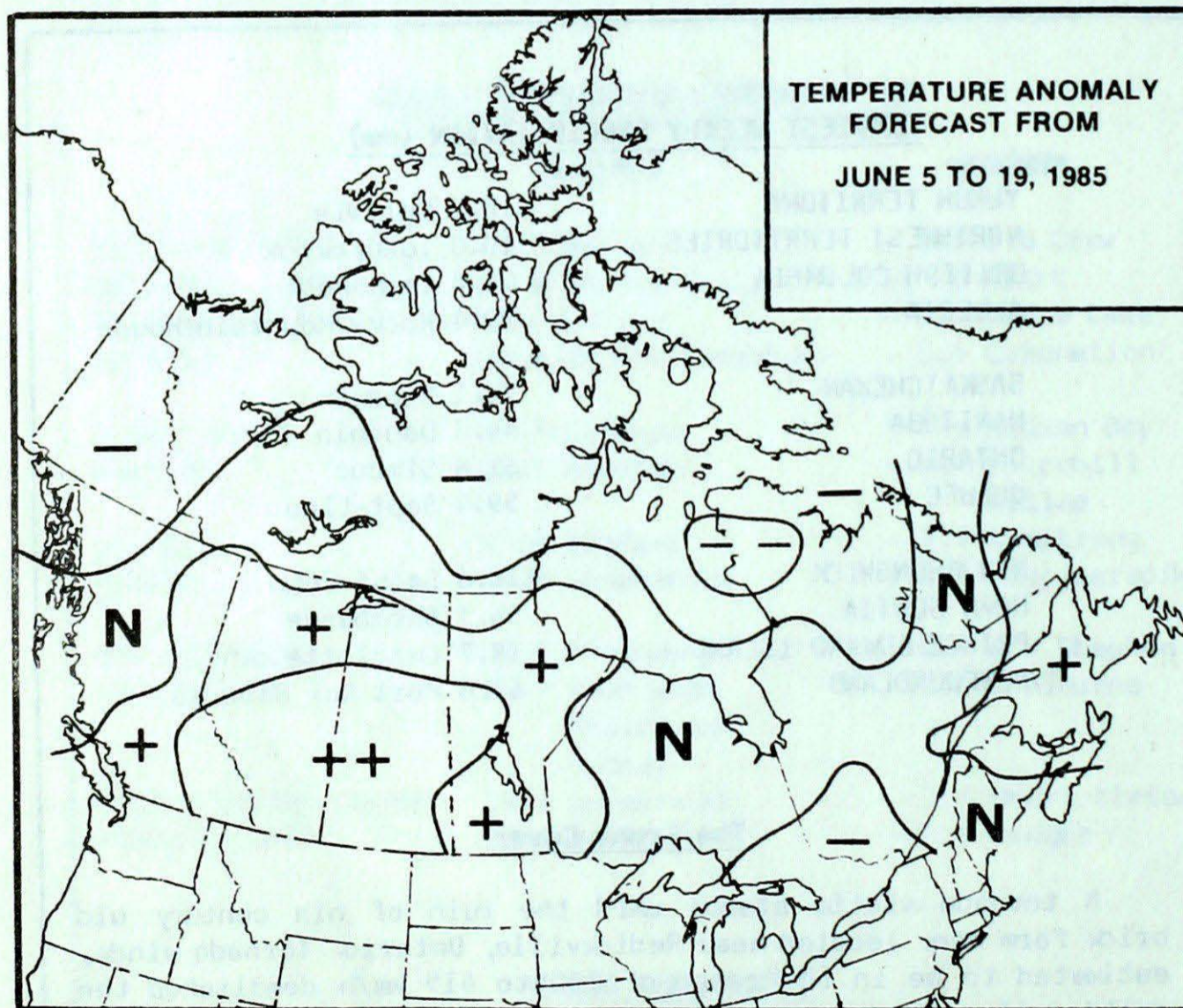
YUKON TERRITORY	18.0 Ogilvie
NORTHWEST TERRITORIES	10.0 Tukoyaktuk
BRITISH COLUMBIA	44.4 Cranbrook
ALBERTA	29.4 Rocky Mountain House
SASKATCHEWAN	71.1 Nipawin
MANITOBA	44.0 Dauphin
ONTARIO	61.6 Simcoe
QUÉBEC	59.4 Sept-Iles
NEW BRUNSWICK	116.6 Saint John
NOVA SCOTIA	56.3 Shelburne
PRINCE EDWARD ISLAND	18.7 Charlottetown
NEWFOUNDLAND	61.6 Port Aux Basques

The Front Cover

A tornado victim stands amid the ruin of his century old brick farm home located near Redickville, Ontario. Tornado winds, estimated to be in the range of 330 to 415 km/h demolished the solid walls, which were a double course of bricks in thickness. The sorry stump of a maple tree, bereft of its bark and limbs, stands in the foreground. The tornado struck at about 1620 EDT, and left a trail of disaster about 500 to 800 metres wide eastwards through Allandale, a southern suburb of the city of Barrie. Photo courtesy of S. Leitch.



**SOIL MOISTURE INDEX
PER CENT OF WATER
HOLDING CAPACITY
JUNE 3, 1985
%**



**TEMPERATURE ANOMALY
FORECAST FROM
JUNE 5 TO 19, 1985**

Temperature Anomaly Forecast

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

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.

CLIMATIC PERSPECTIVES VOLUME 7

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It began in 1978 and in 1983 was expanded to include a monthly supplement (formerly known as the Canadian Weather Review). The purpose of the publication is to make topical information available to the public concerning the Canadian Climate and its socioeconomic impact.

Unsolicited articles are welcome but should be at maximum about 1500 words in length. They will be subject to editorial change without notice due to publishing time constraints. Black and white photographs can be used, but not colour. The contents may be reprinted freely with proper credit.

The data shown in this publication are based on unverified reports from approximately 225 Canadian synoptic weather stations. Information concerning climatic impacts is gathered from AES contacts with the public and from the media. Articles do not necessarily reflect the views of the Atmospheric Environment Service.

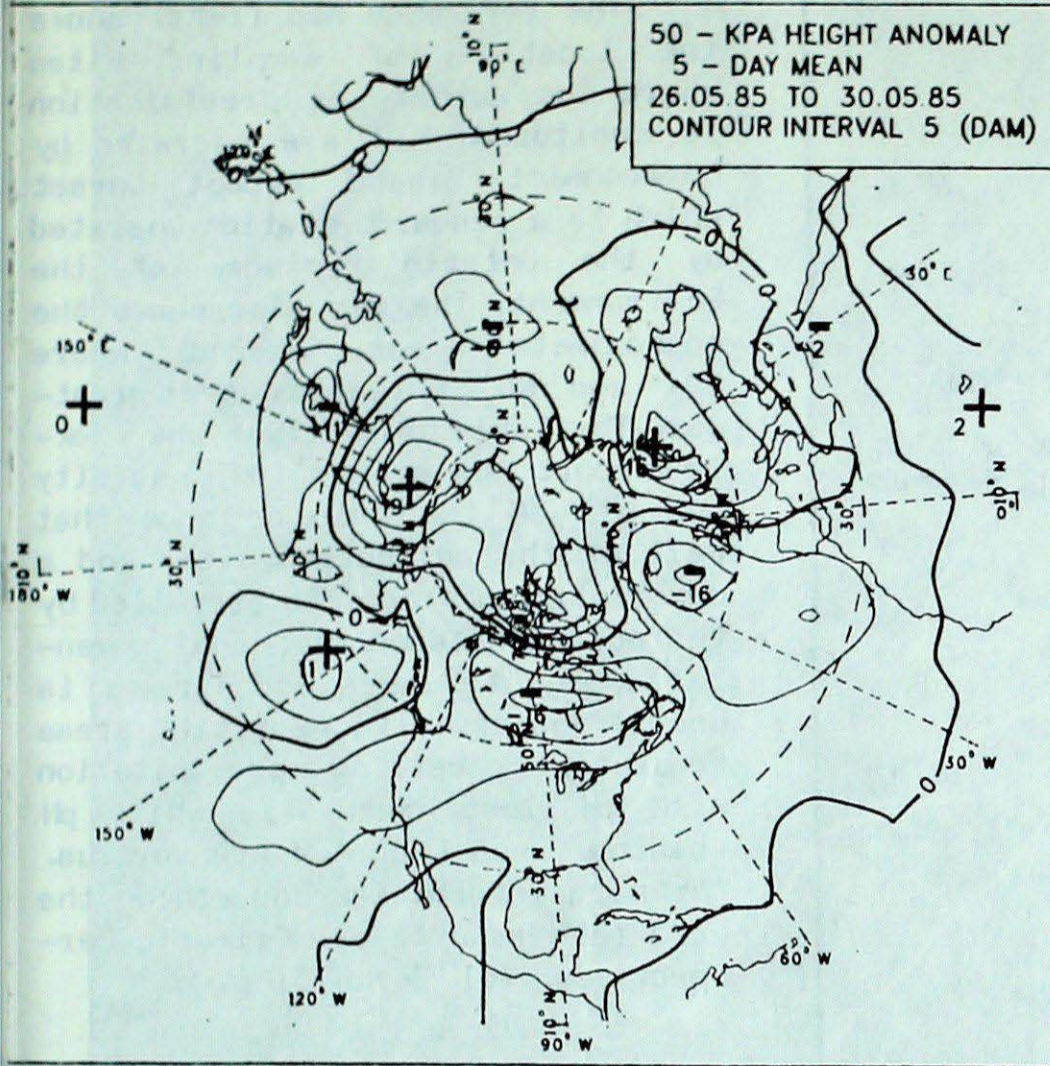
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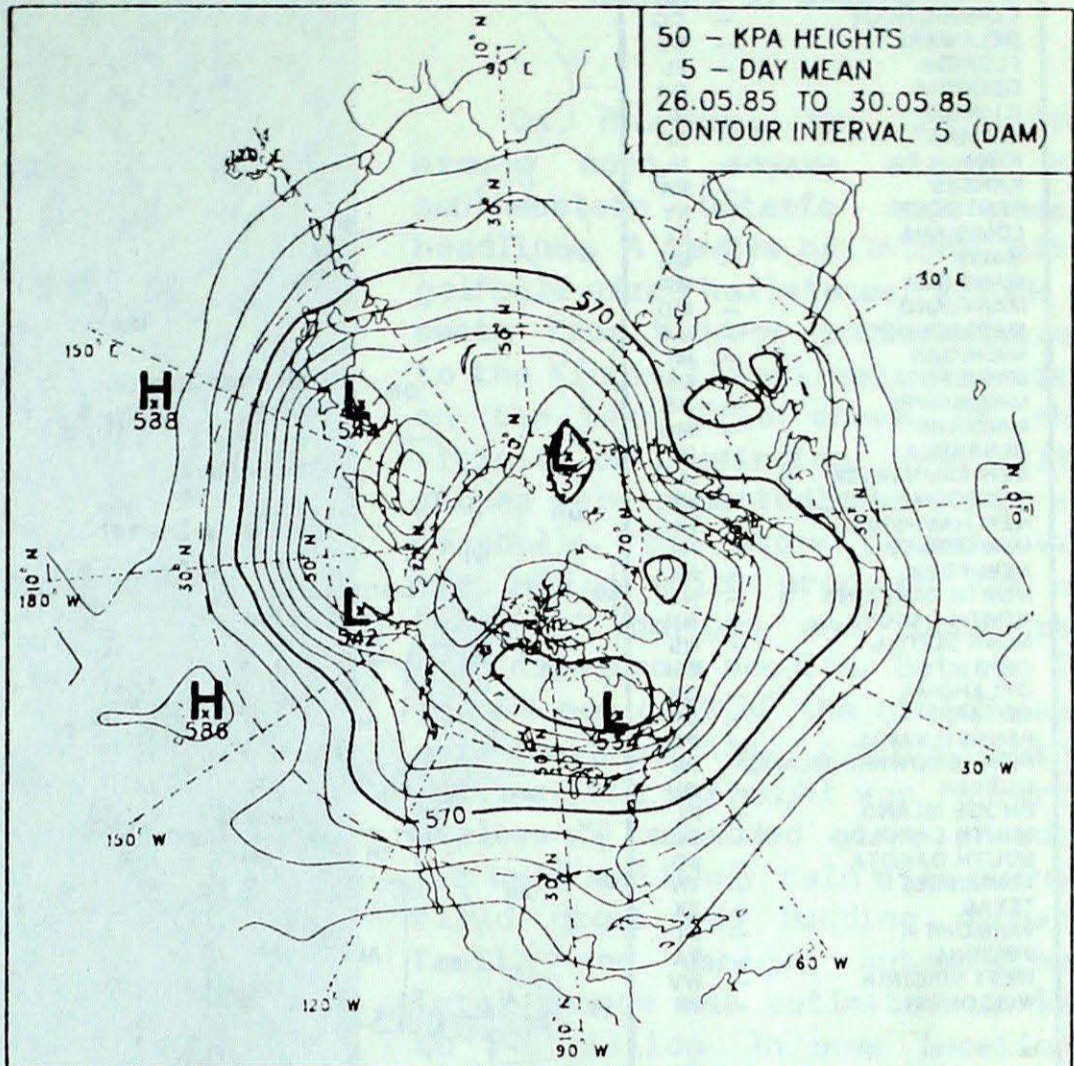
50 KPa ATMOSPHERIC CIRCULATION

50 - KPa HEIGHT ANOMALY
5 - DAY MEAN
26.05.85 TO 30.05.85
CONTOUR INTERVAL 5 (DAM)

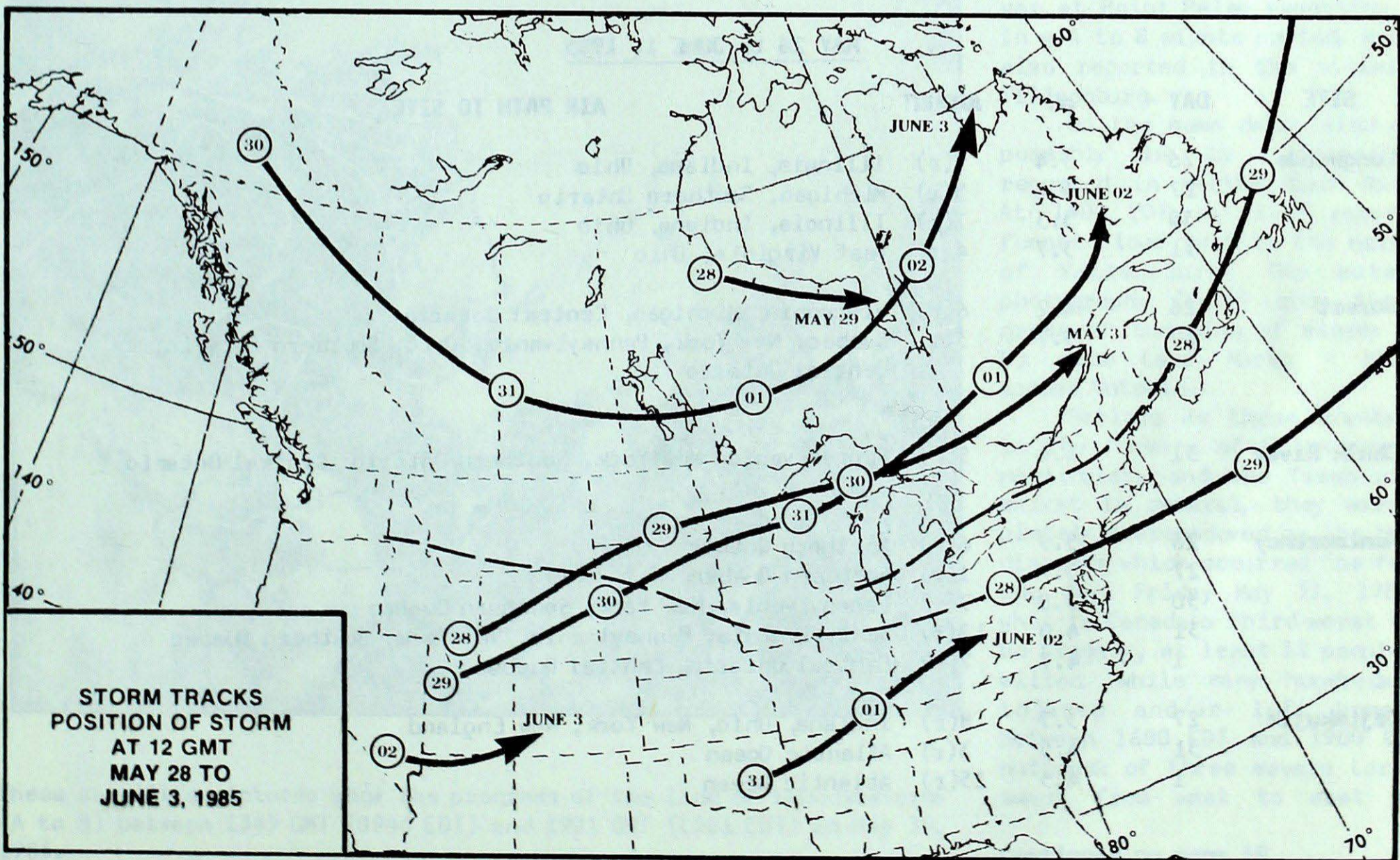


MEAN 50 KPa HEIGHT ANOMALY (dam)
May 26 to May 30, 1985

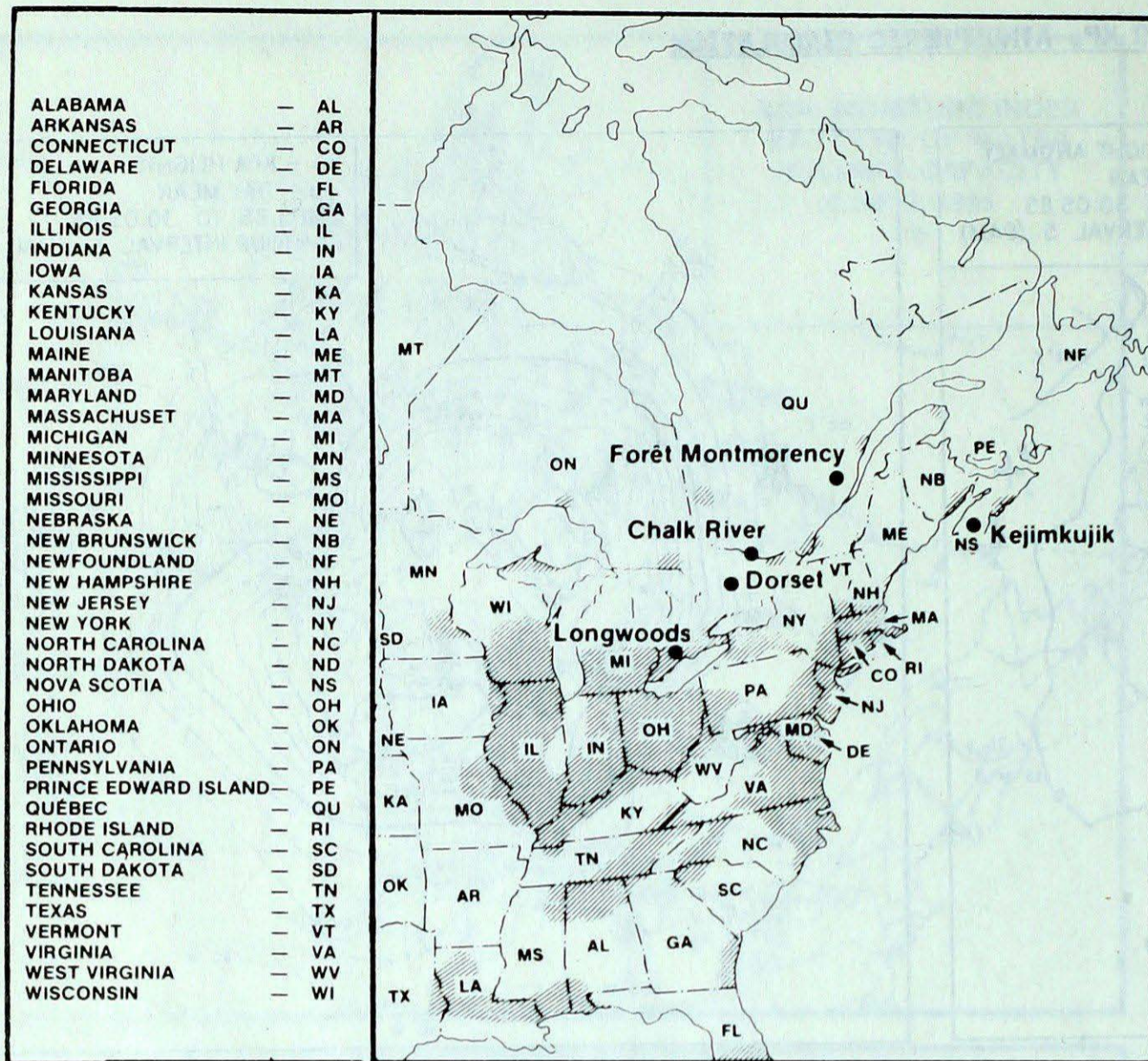
50 - KPa HEIGHTS
5 - DAY MEAN
26.05.85 TO 30.05.85
CONTOUR INTERVAL 5 (DAM)



MEAN 50 KPa HEIGHTS (dam)
May 26 to May 30, 1985



STORM TRACKS
POSITION OF STORM
AT 12 GMT
MAY 28 TO
JUNE 3, 1985



ACID RAIN REPORT

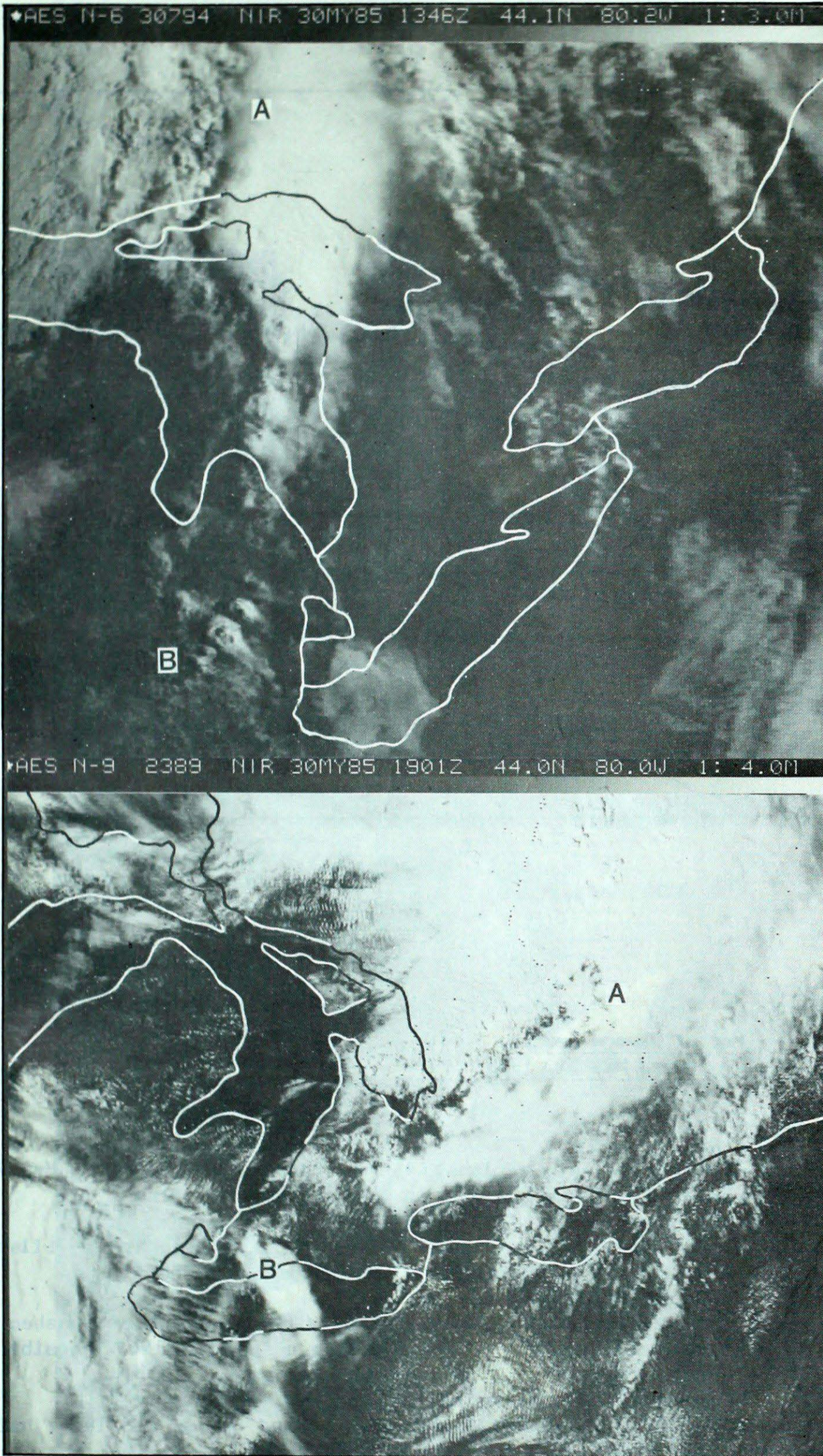
The reference map (left) shows the locations of sampling sites where the acidity of precipitation is monitored. All are operated by Environment Canada except Dorset which is a research station operated by the Ontario Ministry of the Environment. The map also shows the approximate areas (shaded) where SO₂ and NO_x emissions are greatest. The table below gives the weekly report summarizing the acidity (or pH) of the 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 less than 4.7, while pH readings less than 4.0 are serious. For more information concerning the acid rain report, see Climatic Perspectives, Vol. 5 No. 50 p. 6.

<u>MAY 26 to JUNE 1, 1985</u>				
SITE	DAY	pH	AMOUNT	AIR PATH TO SITE
Longwoods	26	3.4	7(r)	Illinois, Indiana, Ohio
	27	4.4	5(r)	Michigan, Southern Ontario
	30	3.3	7(r)	Illinois, Indiana, Ohio
	31	3.7	4(r)	West Virginia, Ohio
Dorset	26	4.2	6(r)	Wisconsin, Michigan, Central Ontario
	30	3.7	3(r)	Quebec, New York, Pennsylvania, Ohio, Southern Ontario, Central Ontario
Chalk River	31	4.4	5(r)	Pennsylvania, New York, Southern Ontario, Central Ontario
Montmorency	26	5.9	6(r)	Northern Quebec
	27	5.7	1(r)	Northern Quebec
	30	3.8	7(r)	Pennsylvania, New York, Southern Quebec
	31	4.0	12(r)	West Virginia, Pennsylvania, New York, Southern Quebec
	1	4.7	7(r)	Central Ontario, Central Quebec
Kejimikujik	27	3.7	8(r)	Indiana, Ohio, New York, New England
	31	4.5	3(r)	Atlantic Ocean
	1	4.5	15(r)	Atlantic Ocean

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

Special Storm Supplement

by
Michael J. Newark



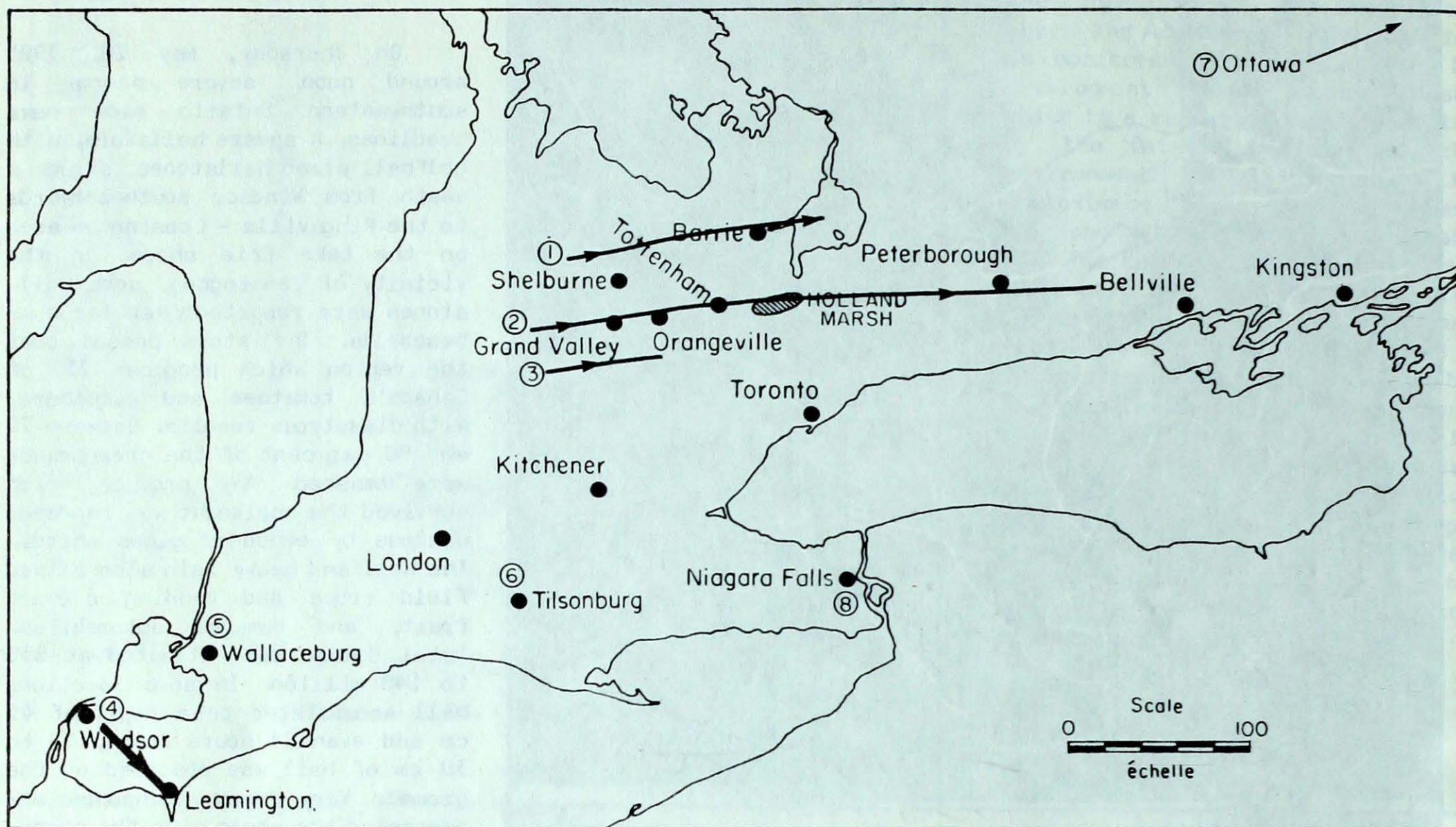
These satellite pictures show the progress of the line of thunderstorms (A to B) between 1345 GMT (0946 EDT) and 1901 GMT (1501 EDT) on May 30, 1985.

On Thursday, May 20, 1985 around noon, severe storms in southwestern Ontario made news headlines. A severe hailstorm, with golfball sized hailstones, struck a swath from Windsor southeastwards to the Kingsville - Leamington area on the Lake Erie shore. In the vicinity of Leamington, some hailstones were reportedly as large as baseballs. The storm passed over the region which produces 75% of Canada's tomatoes and cucumbers, with disastrous results. Between 70 and 90 per cent of the greenhouses were smashed. Any produce which survived the onslaught was rendered useless by embedded glass shards. The hail and heavy rain also ruined field crops and budding orchard fruit, and damaged automobiles. Total damage was estimated at \$30 to \$40 million. In some locations hail accumulated to a depth of 45 cm and even 24 hours later, 20 to 30 cm of hail was observed on the ground. Very heavy downpours accompanied the storm with the observer at Point Pelee reporting 20 mm in a 4 to 8 minute period. Hail was also reported in the vicinity of Tillsonburg.

On the same date, wind damage possibly due to a tornado, was reported in northwestern Windsor. At 1400 EDT, a pilot reported a funnel cloud just to the northeast of Wallaceburg. The satellite photographs (left) show the progress of the line of storms (A to B) from Lake Huron - Michigan across Ontario.

Serious as these events were to the farmers of Essex county in particular, and the fresh produce market in general, they were completely overshadowed by the tornado disaster which occurred the following day, Friday May 31, 1985. In what is Canada's third worst tornado tragedy, at least 12 people were killed, while many hundreds were injured and/or left homeless. Between 1600 EDT and 1900 EDT an outbreak of three severe tornadoes swept from west to east across

Continued on page 10



**Map of Damage Events,
May 30 and May 31, 1985**

1. Track of severe tornado May 31, 1985 from northeast of Mount Forest to Barrie and Lake Simcoe. Approximate length 100 km. At least 8 deaths in Barrie. Ambulances from as far away as Toronto rushed to aid the injured.

2. Track of severe tornado May 31, 1985 from the vicinity of Arthur to east of Campbellford. Information incomplete, but length

could exceed 260 km. At least 4 deaths (2 in Grand Valley and 2 in Tottenham).

3. Weak tornado track (although strong in some locations) May 31, 1985. Approximate length 30 km. Information incomplete.

4. Extremely destructive hail-swath, May 30, 1985. Possible weak tornado in Windsor.

5. Funnel cloud reported, May 30, 1985 near Wallaceburg.

6. Hail reported near Tillsonburg, May 30, 1985.

7. Wind damage, Aylmer Quebec to Ottawa on May 31, 1985. Possibly a weak tornado.

8. Wind damage and large hail, May 31, 1985.

NOTE: Damage was also reported at Lyndhurst, Ontario and Brighton, Ontario on May 31, 1985. We would be happy to hear from readers who may have information to add to what is already known.



Vehicles and farm equipment were tossed into tangled heaps by the "Barrie" tornado as it passed near Redickville, Ontario on May 31, 1985. Photos courtesy of S. Leitch.

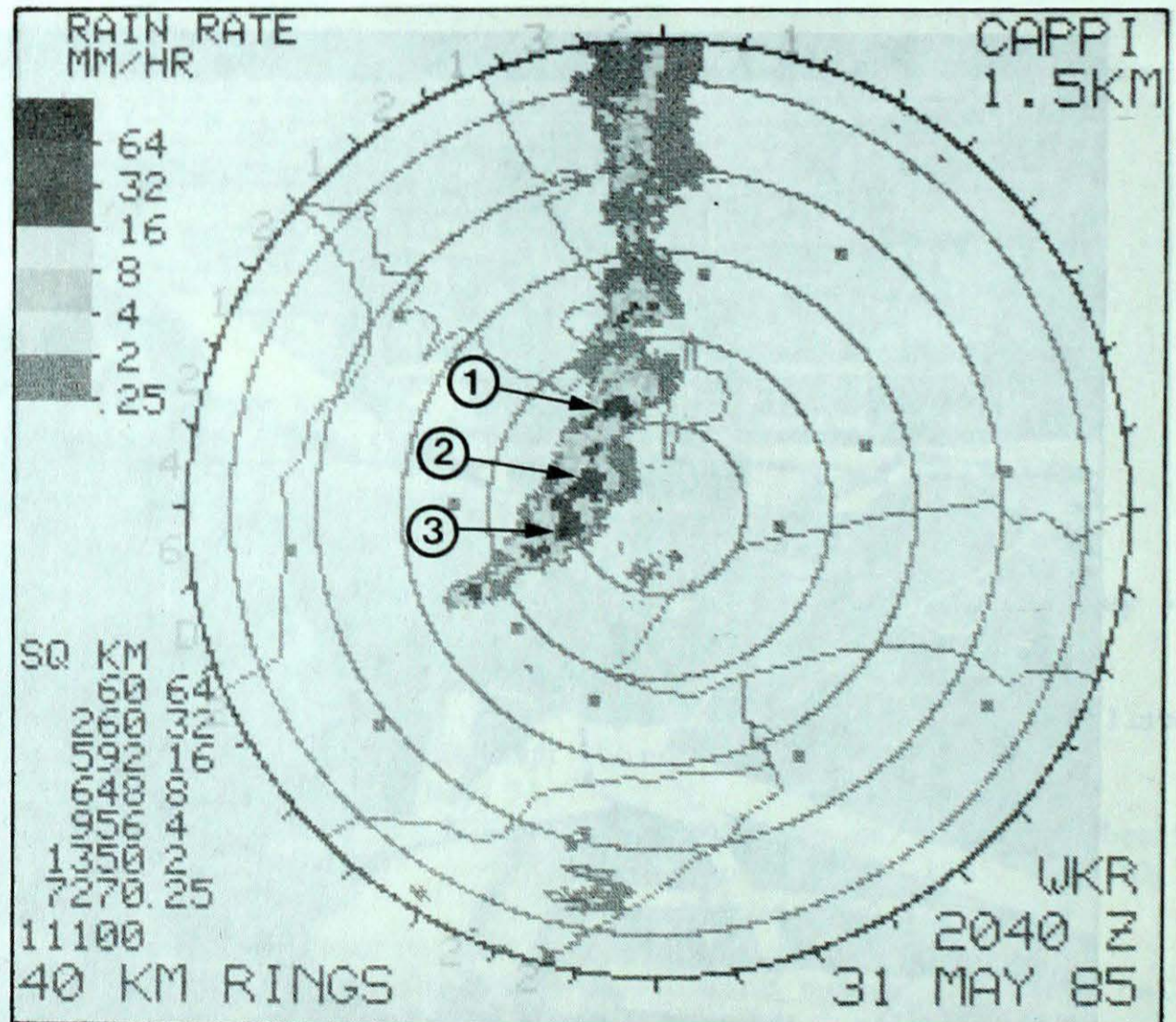
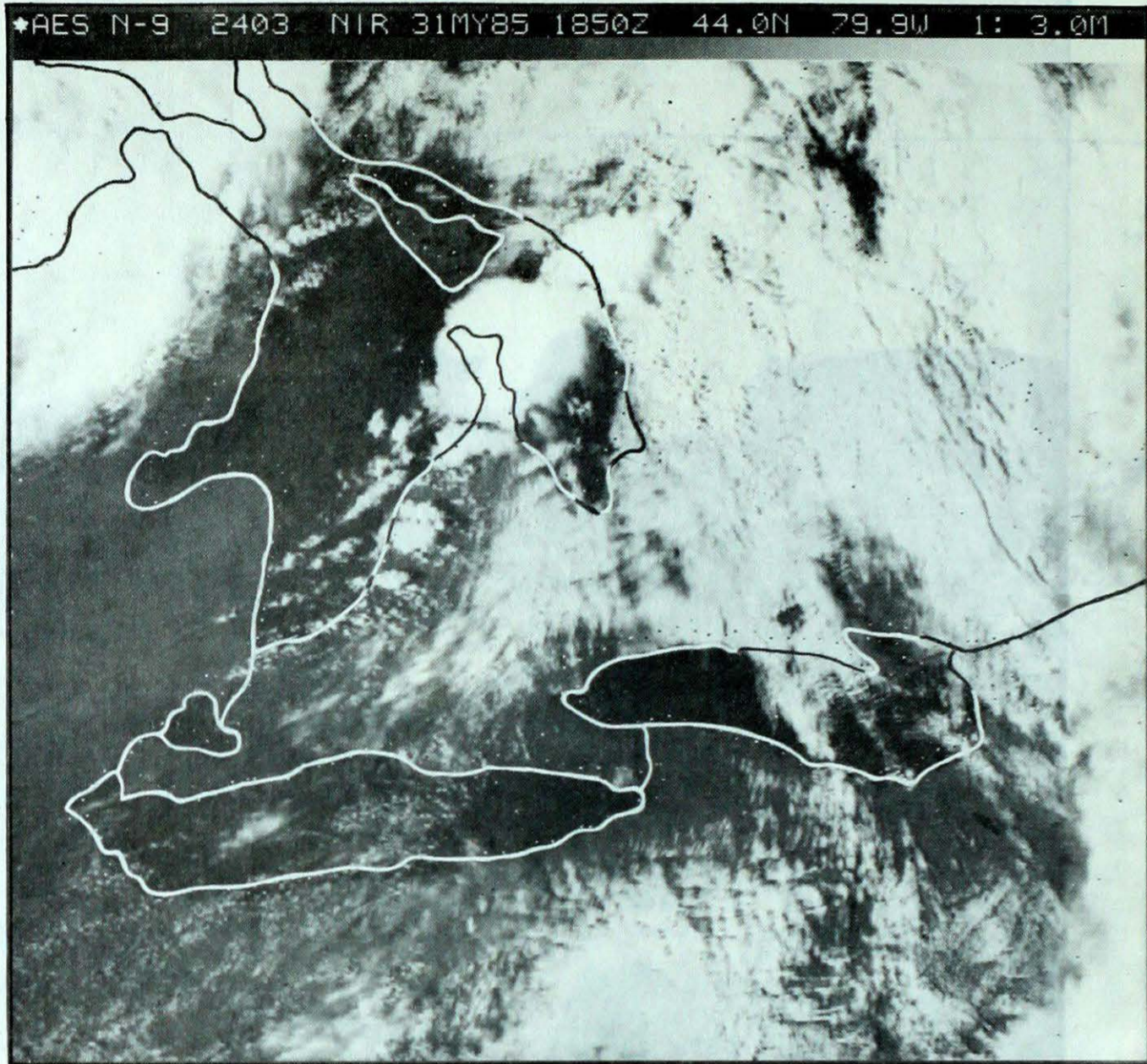
Continued from page 7

portions of southern Ontario (see map, page 8). A number of urban areas, including Grand Valley, Tottenham and Barrie, lay in their path and suffered major property damage. In Barrie alone, estimates run to about \$100 million for insured losses. Ontario's Premier Miller toured the stricken areas, and declared them a disaster area eligible for provincial aid.

A complete survey of the tornado tracks has not yet been completed, but one of them (from the vicinity of Arthur to east of Campbellford) has the potential for being the longest ever known in Canada by exceeding the length of 260 km ascribed to the "Sudbury" tornado of 1970. The last time such an outbreak of long-track tornadoes occurred in southern Ontario was on May 23, 1953. The number of tornado deaths was exceeded only by the 16 people killed by the "Windsor", Ontario tornado of 1946, and Canada's worst tornado tragedy in Regina, Saskatchewan, where 28 people lost their lives in 1912.

Farm property damage was also reported in Aylmer, Quebec, while light planes were overturned at Rockcliffe Airport in Ottawa. It is possible that these events were also tornadic, but no confirmation of this has been so far received. Hail was reported in association with the tornadoes, reaching golf ball size in some localities.

The tornado outbreak was part of an international event. The same storm system also caused killing tornadoes in the United States south of the lower Great Lakes. The NOAA-9 satellite picture on this page shows the developing thunderstorms aligned along the Ontario shoreline of Lake Huron at 1450 EDT. A different perspective is shown by the weather radar picture for 1640 EDT (also on this page). The radar, located at King City, Ontario (at the centre of the picture) was able to observe the intensity of the storm cells, which are formed into a north-south line. Very intense radar echoes responsible for the tornadoes are indicated by the numbers. More information will be available in our next monthly supplement.



The NOAA 9 satellite image (top) shows the development of a line of thunderstorms along the Ontario shore of Lake Huron at 1850 GMT (1450 EDT) on May 31, 1985. The radar picture (2040 GMT or 1640 EDT) shows the progress made by the line in two hours. The echoes believed responsible for the tornadoes are numbered 1 to 3.

