

Summer Severe Weather



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Sept 11 2009

ICLR Friday Forum



Environment Canada
www.ec.gc.ca

Contents

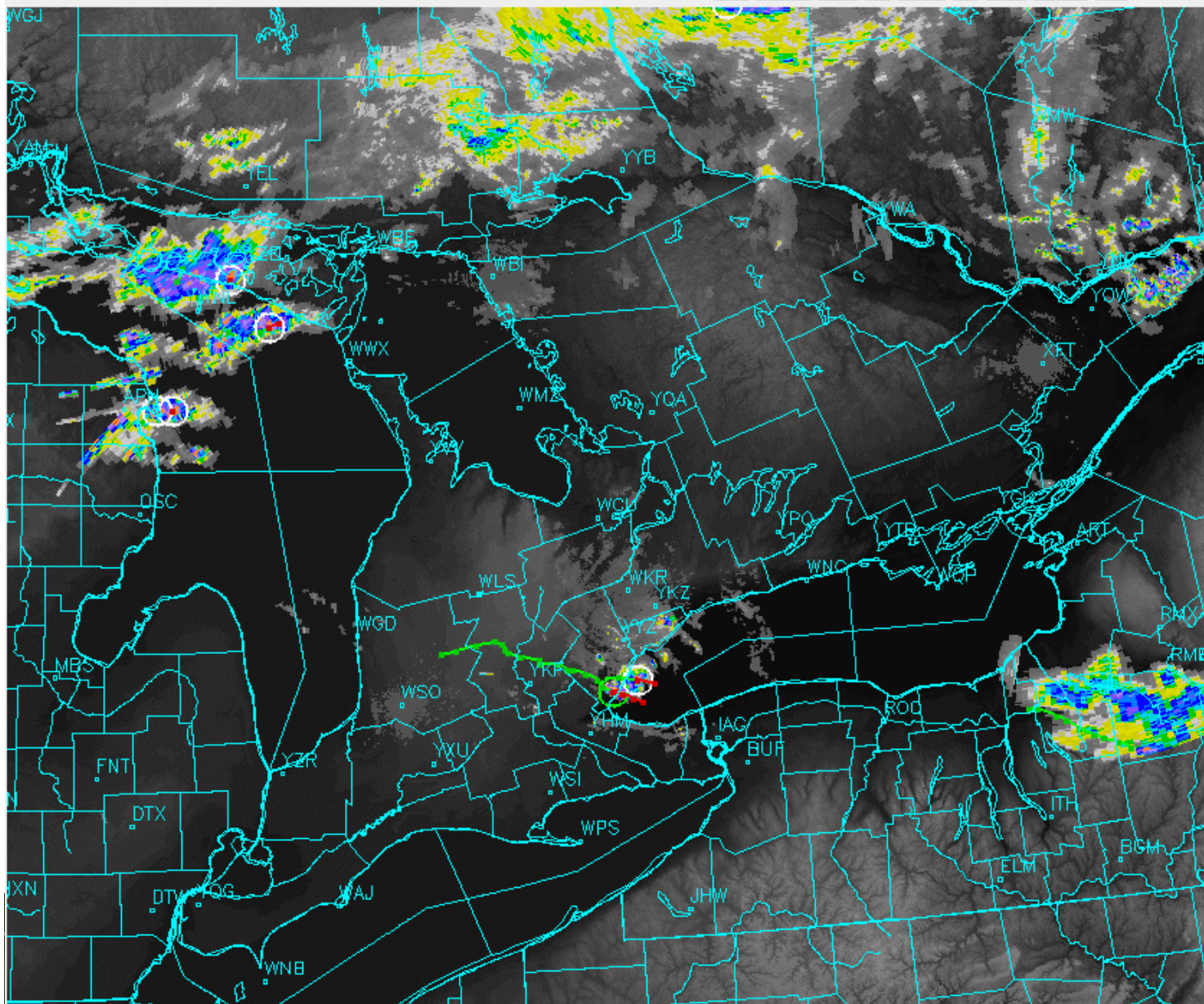
- Ontario Storm Prediction Centre
- Forecasting Technology
- Watch/Warning Program
- A closer look at August 20th tornado outbreak



Ontario Storm Prediction Centre - Toronto



2000 [Navigation Buttons] 0200



2000Z
02 August 2006

- Pencil Reset
- Extrap Reset
- GeoCursor
- X Sect Reset
- Zoom/Pan Reset
- CELL
- Radar
- Ruler Reset
- PickAPoint
- Text Reset
- Fcst Reg
- Geography
- Tracks 2000
- Cells 2000
- CLDN N/A
- SVRWX 2000
- MaxR 2000
- ECHOTOP 2000
- CAPPI 7.0 2000
- CAPPI 1.5 2000
- None
- Topography

Specify Time...

Min: [Left Arrow] 00 [Right Arrow]

Hour: [Left Arrow] 20 [Right Arrow]

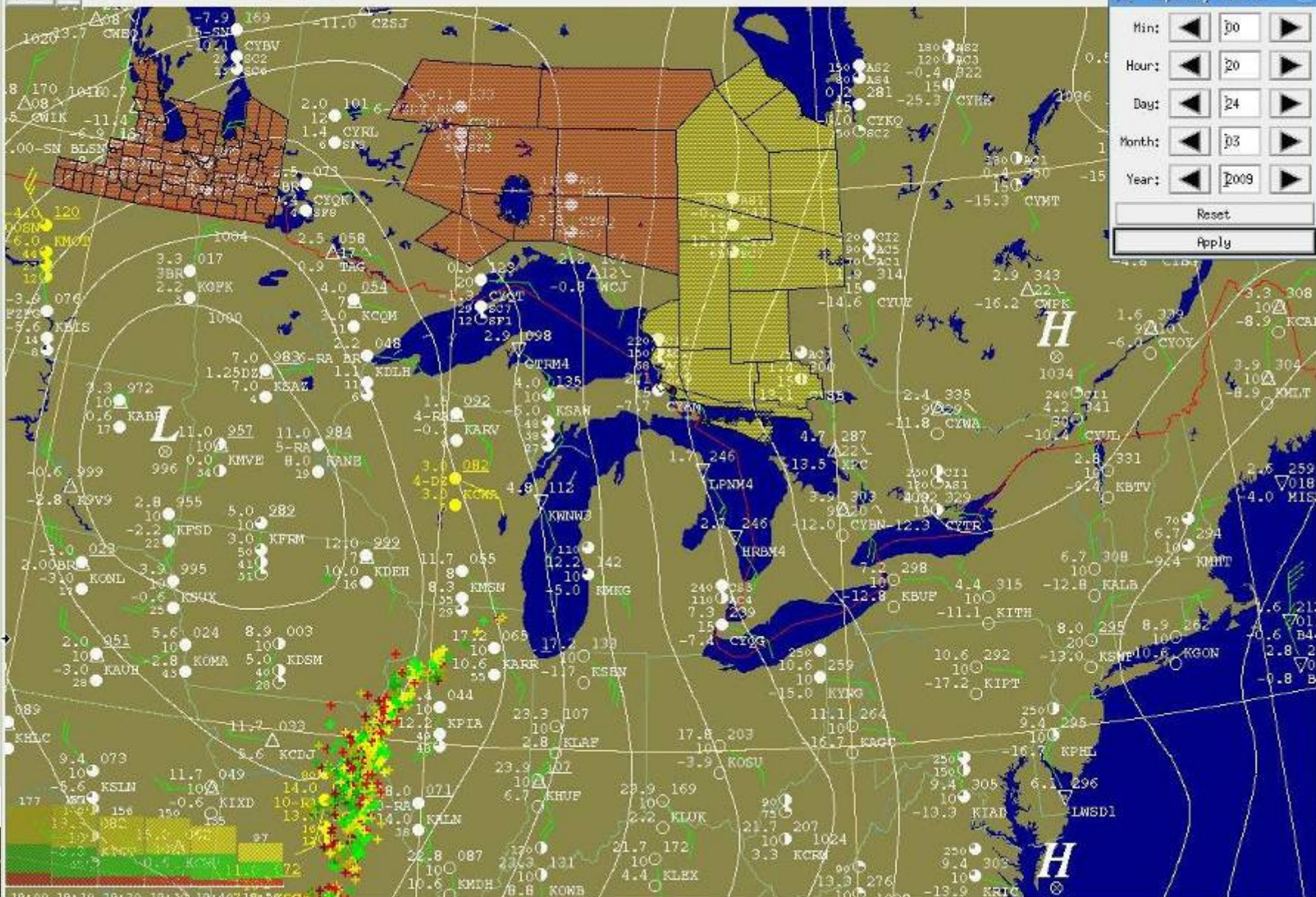
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Month: [Left Arrow] 03 [Right Arrow]

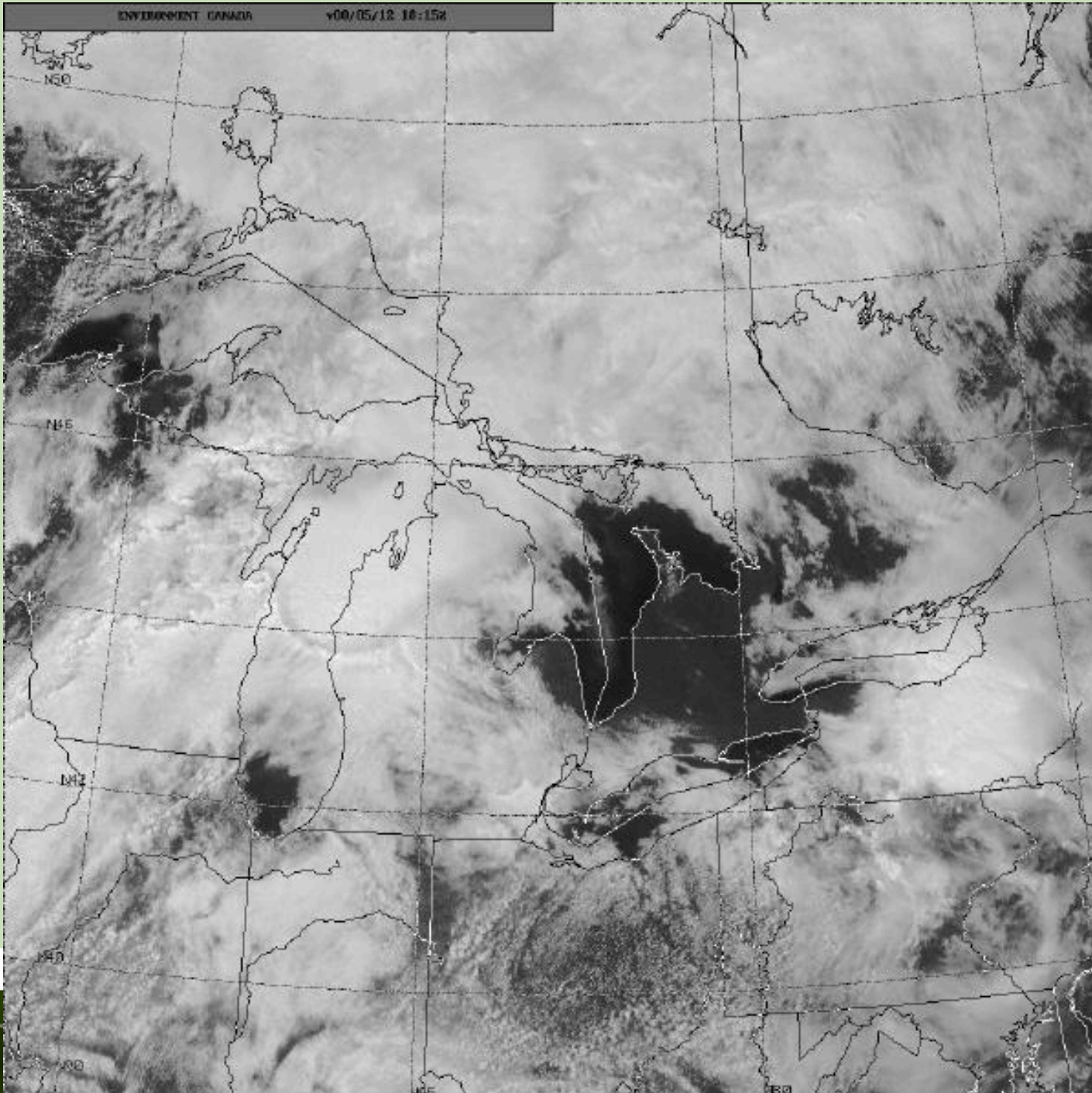
Year: [Left Arrow] 2009 [Right Arrow]

Reset

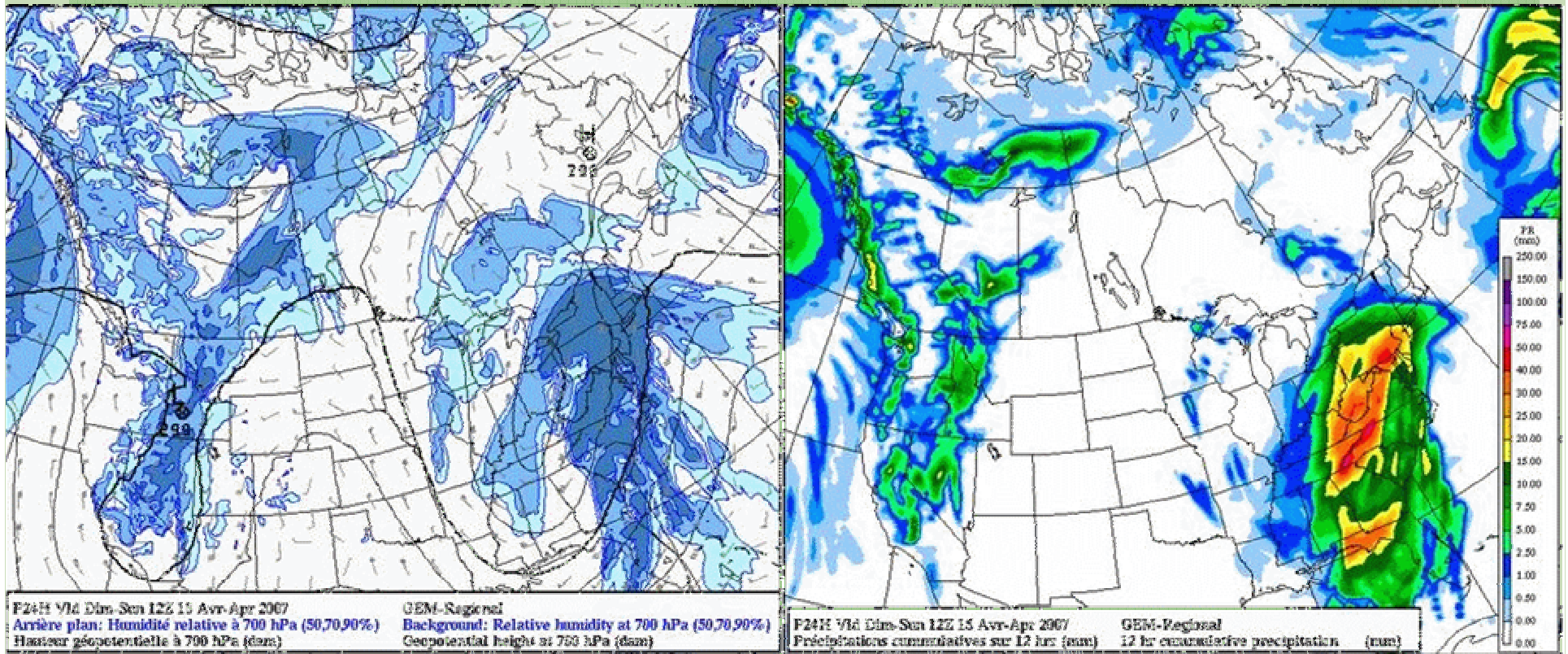
Apply



KHS1 00000 596e 1955ft 40'36"00N 98'26"00W US NE HASTINGS MUNICIPAL



Computer Models...



Forecast Area of Responsibility



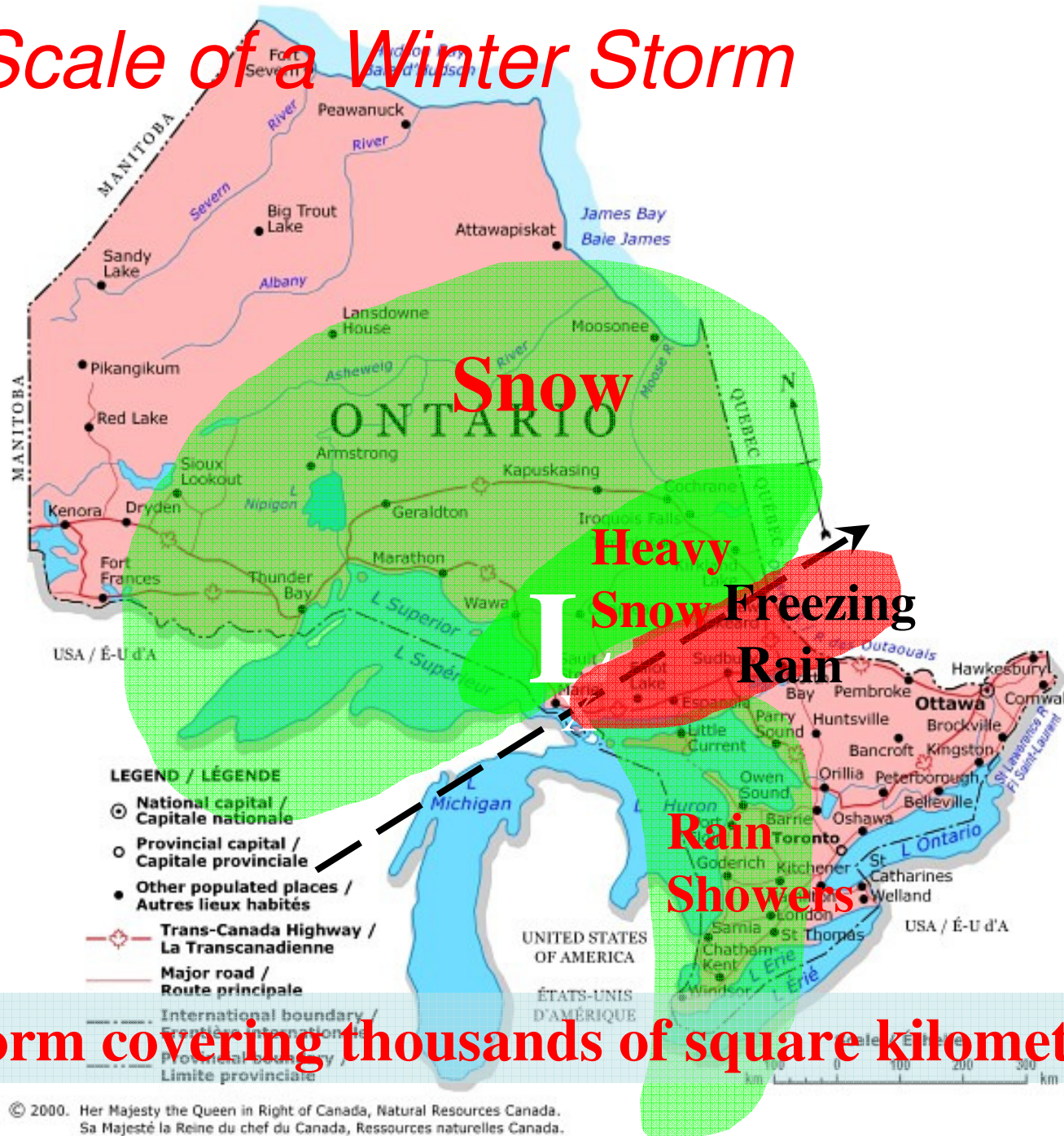
© 2000. Her Majesty the Queen in Right of Canada, Natural Resources Canada.
 Sa Majesté la Reine du chef du Canada, Ressources naturelles Canada.

Scale of a Summer Storm



One storm covering part of a county

Scale of a Winter Storm



One storm covering thousands of square kilometres

Severe Weather Lead Times

- Summer Severe Weather (severe thunderstorms, tornadoes etc..) minutes to hours
- Winter Severe Weather (heavy snow, freezing rain, strong winds etc..) – hours to days



Weather Watch vs. Weather Warning

- Weather **Watch** means there is the potential for severe weather
--- Be Alert
- Weather **Warning** means that severe weather will soon occur or is occurring
--- Take Action



Ron Gravelle



Severe Thunderstorms – A Breed Apart

- 5% of Ontario thunderstorms are categorized as severe each year...
- Severe thunderstorm has one or more of the following characteristics
 - *Wind gusts of 90 km/h or more*
 - *Hail of 2 cm diameter or larger (size of a nickel or larger)*
 - *Flooding rains*
 - *Tornado(s)*





By the Numbers



- On average around 120 summer severe events in Ontario each season (late April to early October)
 - **70 due damaging winds**
 - 20 heavy rain/flooding
 - 20 hail
 - 11 tornadoes



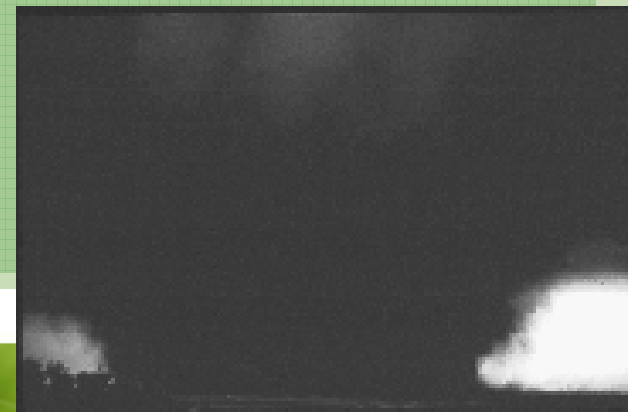
Fujita Wind Damage Scale

- F0 – winds up to 115 km/h
 - Shingle, siding damage
- F1 – winds 120 to 170 km/h
 - Numerous shingles, partial roof removal
- F2 – winds 180 to 240 km/h
 - Roof removed from well-built home
- F3 – winds 250 to 320 km/h
 - Roof and some exterior walls removed
- F4 – winds 330 to 410 km/h
 - 2 storey brick house left with only a few walls remaining
- F5 – winds 420 to 510 km/h
 - Brick house destroyed to foundation



Tornado Characteristics

- Duration
 - *5 minutes to 120 minutes*
- Speed of Motion
 - *30-70 km/h*
- Path length
 - *Less than 1 km-150 km*
- Path Width
 - *10's of metres - 2 km*
- Direction of travel
 - *Usually southwest to northeast*
- **IMPORTANT – Appearance of Tornado NOT an indication of its strength**



Ontario Tornadoes

- Vast majority are either F0 or F1
- 1 F2 every year or so
- 1 F3 every 8 years or so
 - Last confirmed Ontario F3 Violet Hill, April 20, 1996 – **OVERDUE!**
- 1 F4 every 15 years or so
 - Last confirmed Ontario F4 Barrie and Grand Valley tornadoes, May 31, 1985 – **OVERDUE!**
- No confirmed F5's in Ontario – **OVERDUE?**



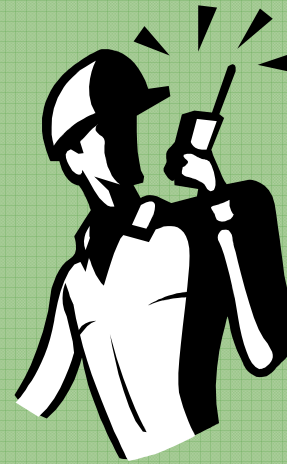
Tornado Warnings



- Strong evidence on radar
 - *Rotation at multiple levels in storm...however...*
 - *“hook” echo*
- Credible Eyewitness/Video Report
 - *CANWARN trained spotter*
 - *Police/Fire/Municipal Official*
 - *Multiple public reports/videos...right place at right time*



CANWARN Storm Spotters

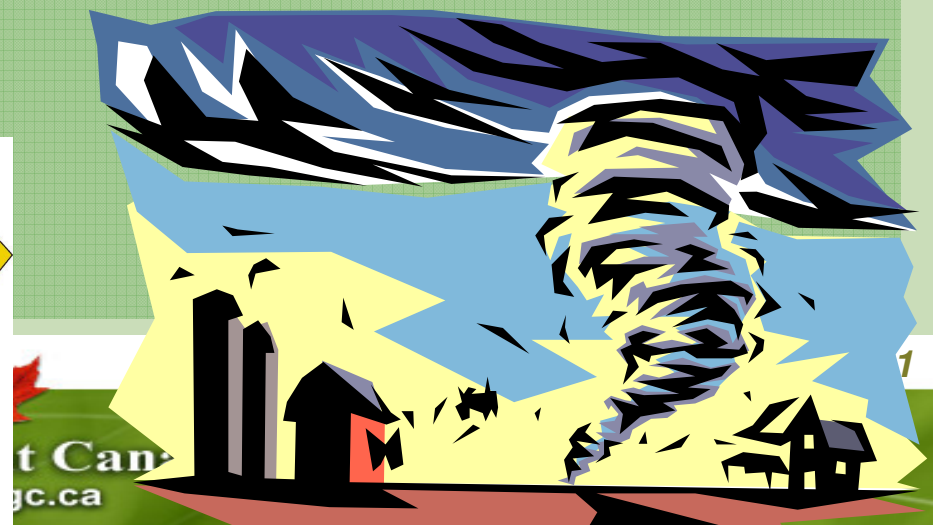


Project OPPportunity

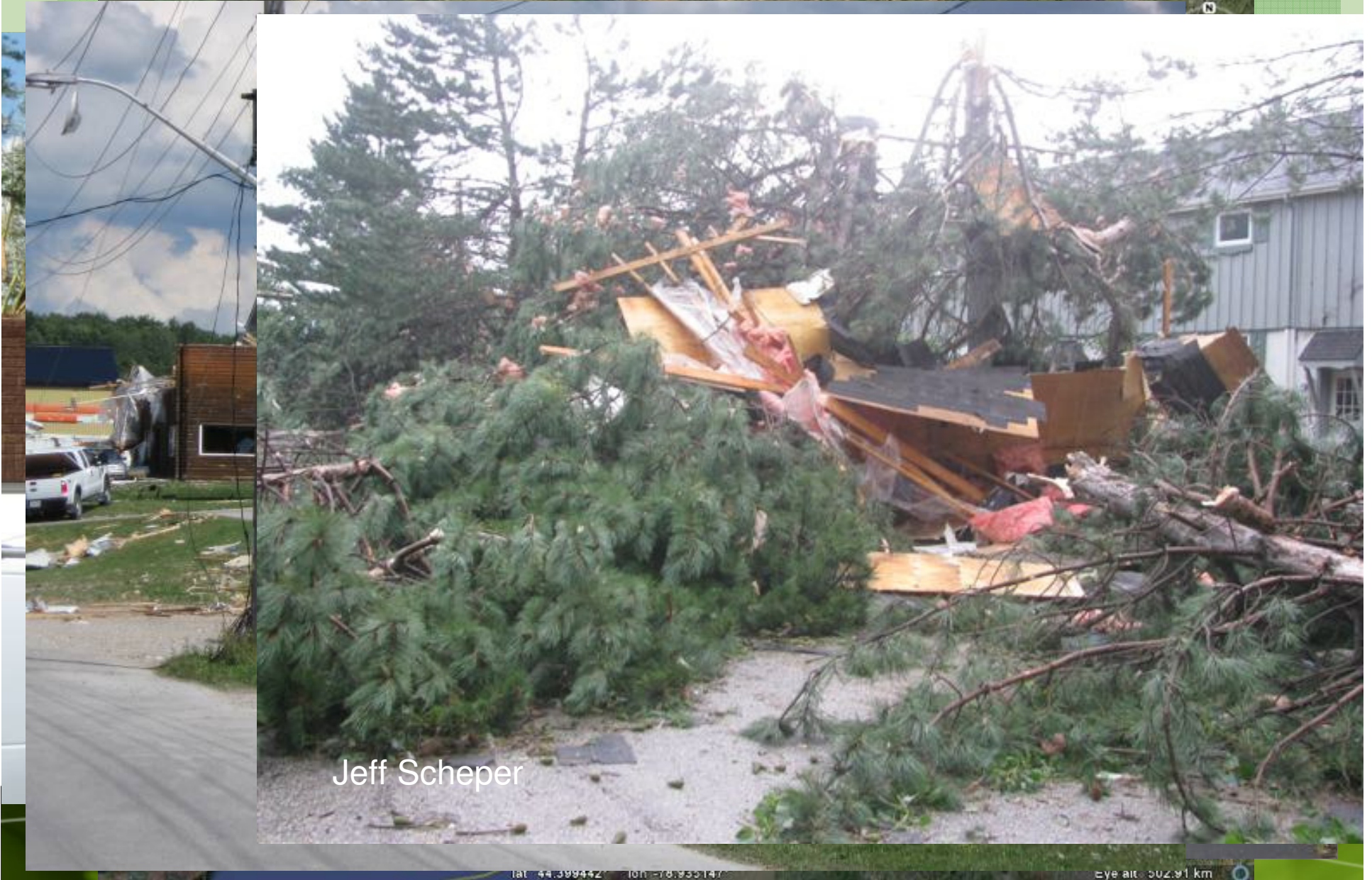


CANWARN/OPP reports important...

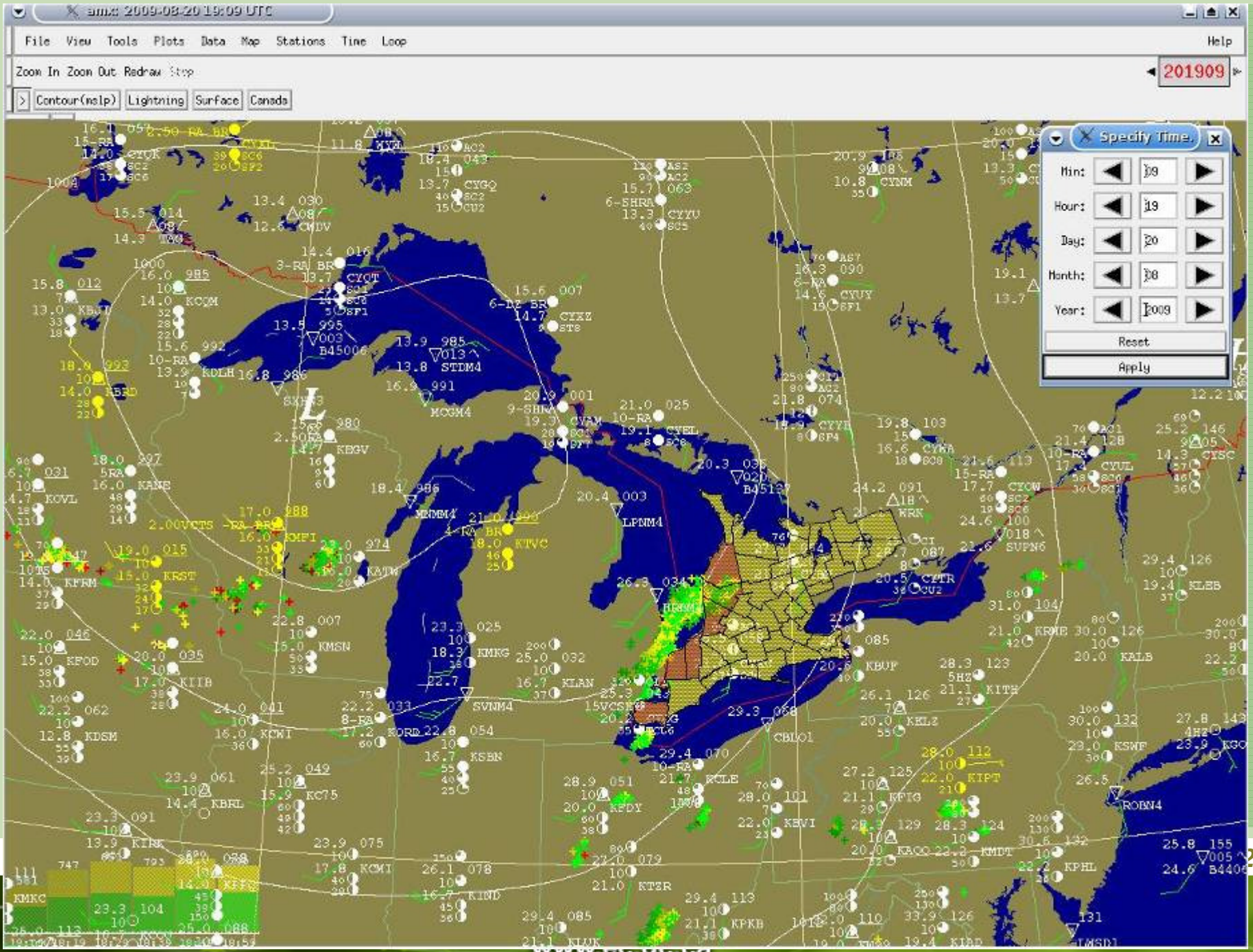
- Ground-truth info from radars, lightning detector and satellites
- Help protect members of the affected community and communities where storm may be headed
- Information could be used to issue/update Watches and Warnings



August 20th 2009 Tornado Outbreak



Jeff Scheper



Zoom In Zoom Out Redraw Stop

201609

> Lightning

Specify Time

Min: 09

Hour: 16

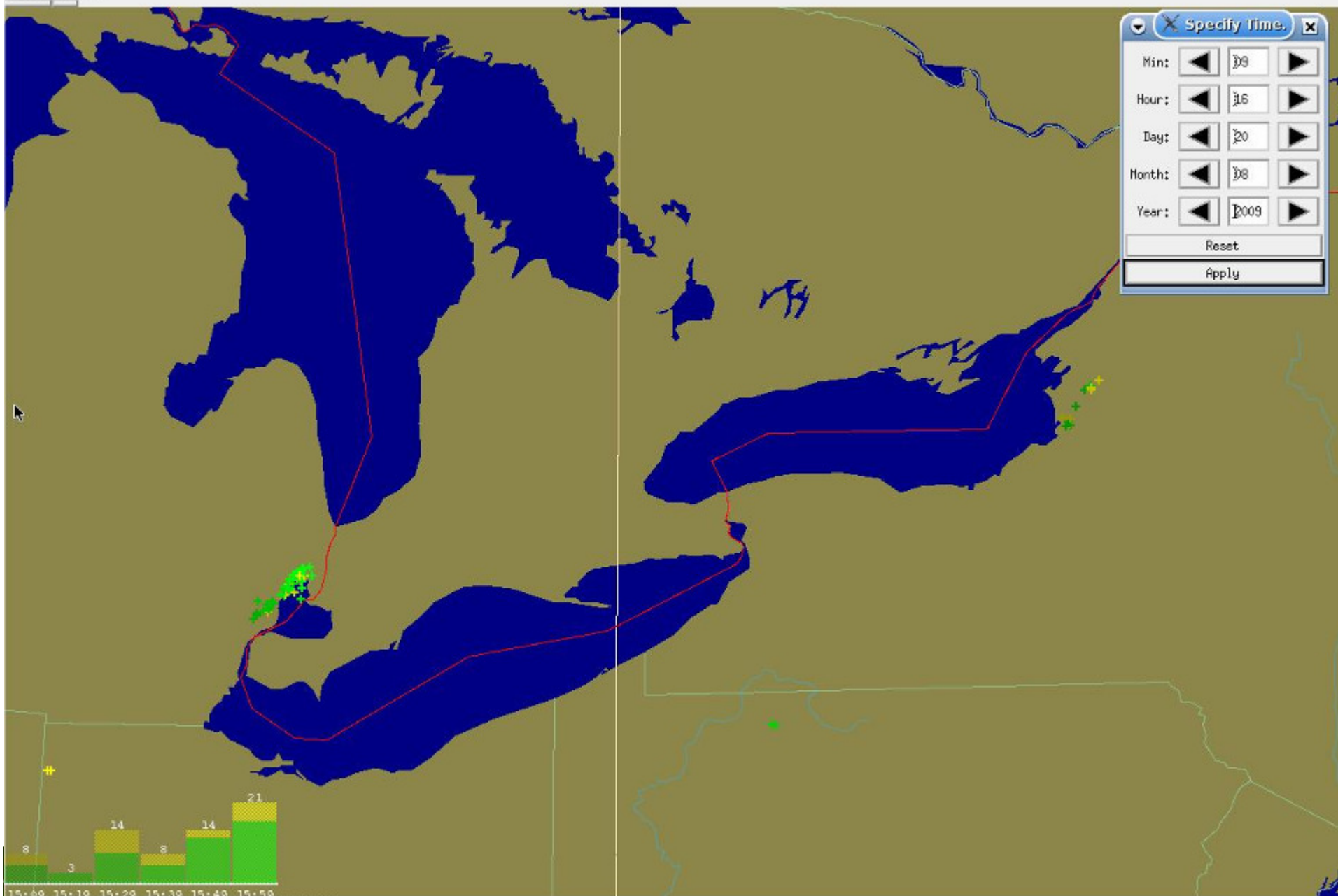
Day: 20

Month: 09

Year: 2009

Reset

Apply



307n 1007ft 43'40'23N 85'14'03W

ONT_SUDDS: SCIT 2 (WINDOW 2)

Screen

Table Time: 2000

sNumber	RANK	Rank_Weight	Category	WDRAFT	BWER	Meso	Hail	VILDENS	MAXZ	ETOP45	Speed
9732	1	2.7	SST	30.4	0.0	N/A	2.5	6.4	66.00	73.0	15.0
9764	2	2.6	SST	15.3	0.8	23.9	0.0	1.8	60.00	66.0	28.4
9875	3	2.4	MST	10.7	0.0	13.3	0.0	1.4	55.00	38.0	N/A
9825	4	2.4	SST	10.8	0.0	17.8	0.0	1.3	60.50	37.0	17.9
9782	5	2.3	WST	19.3	0.0	7.9	0.4	1.6	56.00	76.0	17.3
9805	6	2.3	SST	17.0	0.0	0.0	0.2	3.0	58.50	52.0	17.8
9705	7	2.2	WST	10.5	0.0	12.9	0.0	1.3	58.00	60.0	19.5
9881	8	2.2	WST	9.8	0.0	10.5	0.0	1.2	51.50	38.0	N/A
9847	9	2.2	WST	16.3	0.0	8.2	0.0	1.3	58.50	53.0	6.3
9866	10	2.2	WST	11.3	0.5	20.1	0.0	1.2	55.00	42.0	31.5
9867	11	2.1	WST	12.9	0.0	22.1	0.0	0.9	57.50	49.0	19.2
9768	12	2.1	WST	10.9	0.0	9.6	0.0	0.9	57.50	64.0	10.2
9759	13	2.1	SST	20.7	0.0	N/A	1.7	3.8	61.00	47.0	2.1
9819	14	2.0	WST	9.0	0.0	12.6	0.0	1.0	55.00	52.0	26.7
9877	15	2.0	SST	18.4	0.0	0.0	0.1	2.2	58.50	45.0	N/A
9824	16	2.0	WST	6.3	0.0	22.1	0.0	0.5	47.50	44.0	15.0
9865	17	2.0	WST	15.4	0.0	20.1	0.0	1.3	57.00	60.0	35.0
9855	18	2.0	SST	14.6	0.0	N/A	0.2	3.0	58.50	63.0	8.9
9878	19	2.0	WST	7.0	0.0	12.9	0.0	0.6	49.50	47.0	N/A
9850	20	1.9	SST	17.4	0.0	0.0	0.3	2.3	59.00	62.0	14.2
9876	21	1.9	WST	3.1	0.4	22.1	0.0	0.4	48.00	25.0	N/A
9828	22	1.9	WST	8.0	0.0	8.0	0.0	0.8	51.00	57.0	20.9
9886	23	1.9	WST	11.0	0.0	N/A	0.0	1.7	51.00	42.0	N/A
9832	24	1.9	SST	16.5	0.0	N/A	0.2	3.2	60.00	61.0	10.0
9784	25	1.9	WST	7.0	0.0	7.9	0.0	0.6	50.00	49.0	17.9
9874	26	1.9	WST	12.2	1.0	0.0	0.0	1.7	56.50	49.0	N/A
9858	27	1.9	MST	9.4	0.0	N/A	0.0	1.2	54.00	35.0	31.5
9829	28	1.8	MST	10.8	0.0	0.0	0.0	1.1	54.50	39.0	16.3
9681	29	1.8	WST	4.1	0.0	20.1	0.0	0.3	48.50	36.0	31.9
9869	30	1.7	WST	11.4	0.0	0.0	0.0	1.4	53.50	46.0	14.2
9884	31	1.7	WST	10.1	0.0	0.0	0.0	1.3	52.50	37.0	N/A
9820	32	1.7	SST	11.9	0.0	0.0	0.0	1.9	56.00	42.0	21.3
9852	33	1.7	SST	11.2	0.0	0.0	0.0	1.3	57.00	41.0	10.0
9836	34	1.7	SST	15.1	0.0	N/A	0.2	2.5	58.50	39.0	18.6
9879	35	1.7	WST	7.3	0.0	0.0	0.0	0.8	50.50	34.0	N/A
9863	36	1.6	WST	5.0	0.0	0.0	0.0	1.1	50.00	51.0	31.8
9849	37	1.6	WST	7.5	0.0	0.0	0.0	1.0	50.50	40.0	11.6
9873	38	1.6	SST	11.6	0.0	0.0	0.0	1.9	55.50	44.0	N/A
9646	39	1.6	WST	6.8	0.0	N/A	0.0	1.5	55.50	54.0	11.8
9859	40	1.6	WST	9.8	0.0	N/A	0.0	1.0	53.50	36.0	15.1
9844	41	1.6	WST	5.9	0.0	0.0	0.0	0.5	50.00	48.0	27.6
9857	42	1.6	WST	10.7	0.0	N/A	0.0	1.7	51.50	50.0	17.9
9872	43	1.5	WST	8.2	0.0	0.0	0.0	1.6	56.00	56.0	N/A
9864	44	1.5	WST	6.3	0.0	0.0	0.0	0.7	52.00	50.0	18.6
9882	45	1.5	WST	7.5	0.0	0.0	0.0	0.7	49.50	39.0	N/A
9871	46	1.5	WST	6.1	0.0	N/A	0.0	0.9	51.50	29.0	N/A
9657	47	1.5	WST	5.8	0.0	N/A	0.0	1.0	50.50	42.0	8.7

No row is selected.

Staying on Top of the Weather

Media



Internet



Weatheradio



Cell Phone/PDA

Time to React

- May be a few minutes or less
- Not all storms will have a watch/warning
- Not all storms will be easily visible
 - *Haze*
 - *Rain*
 - *Surrounding hills or trees*
- Preparation before event is key
 - *Check weather before going out...keep an eye on the sky*
 - *Where is my best shelter?*
 - *React...*



Ways Forward

- How do you alert people for the most significant of events?
 - *National Alert System?*
 - *Red banner on TV*
 - *Interrupt radio broadcasts (syndicated programming?)*
 - *Cell phone alerting?*
 - *Liability for cell phone companies if system unable to handle all the alerts that need to go out?*
 - *Reverse 911?*
 - *Sirens?*
- Education
 - *If caught outside do....*

