

NCEP Parallel AQ Forecasts: Experimental ETA-CMAQ

Verification for the Canadian
Maritime Provinces July - August
2007

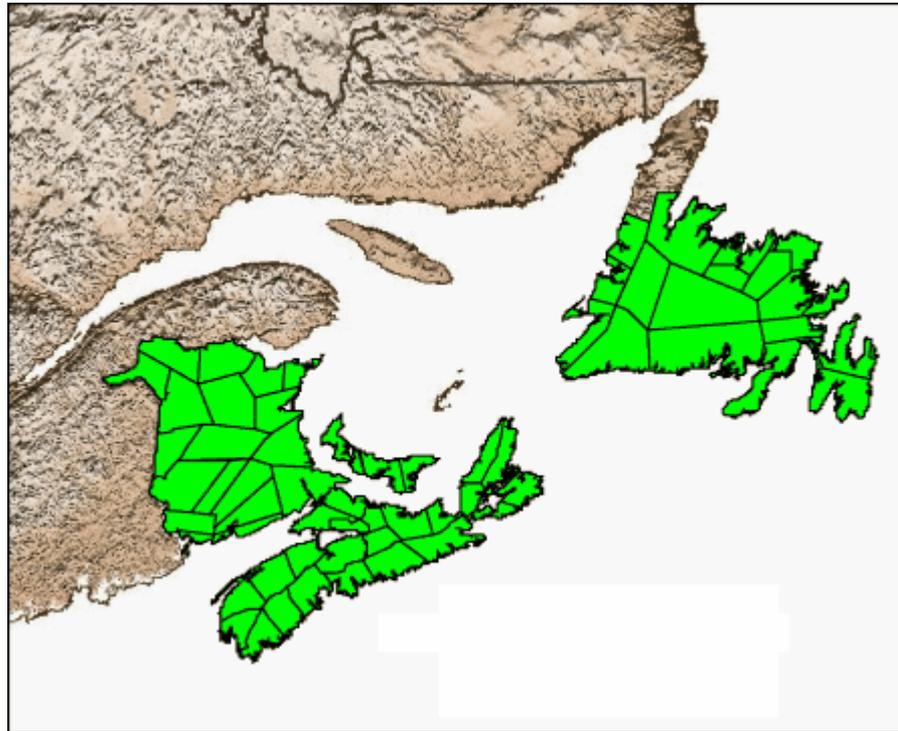
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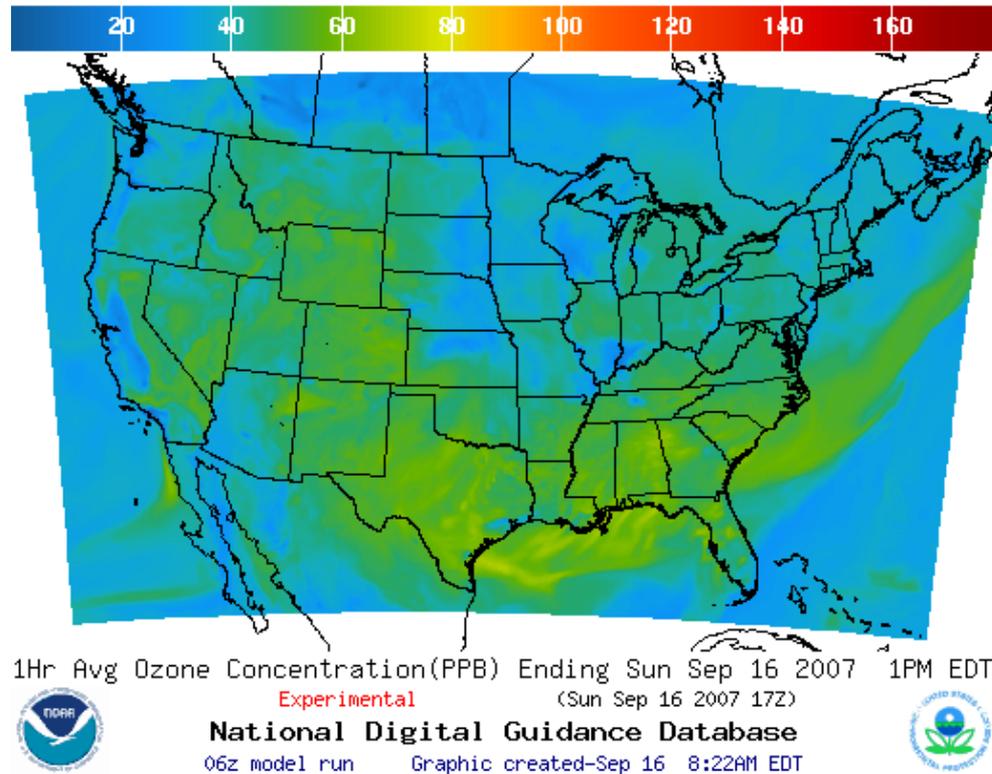
Atlantic Storm Prediction Centre

Meteorological Service of Canada, Atlantic
Region

Regional Forecast Region



Lateral Boundary Conditions for the 5x Domain



Air Quality Forecasts

- A Technical Synopsis is issued when the Air Quality is expected to be at least Fair during Day 1 or Day 2:
- Good AQ ~ 1 hour [O₃] = 0 - 50 ppbv
- Fair AQ ~ 1 hour [O₃] = 51 - 81 ppbv
- Poor AQ ~ 1 hour [O₃] = 82 - 150 ppbv
- Very Poor ~ 1 hour [O₃] > 150 ppbv

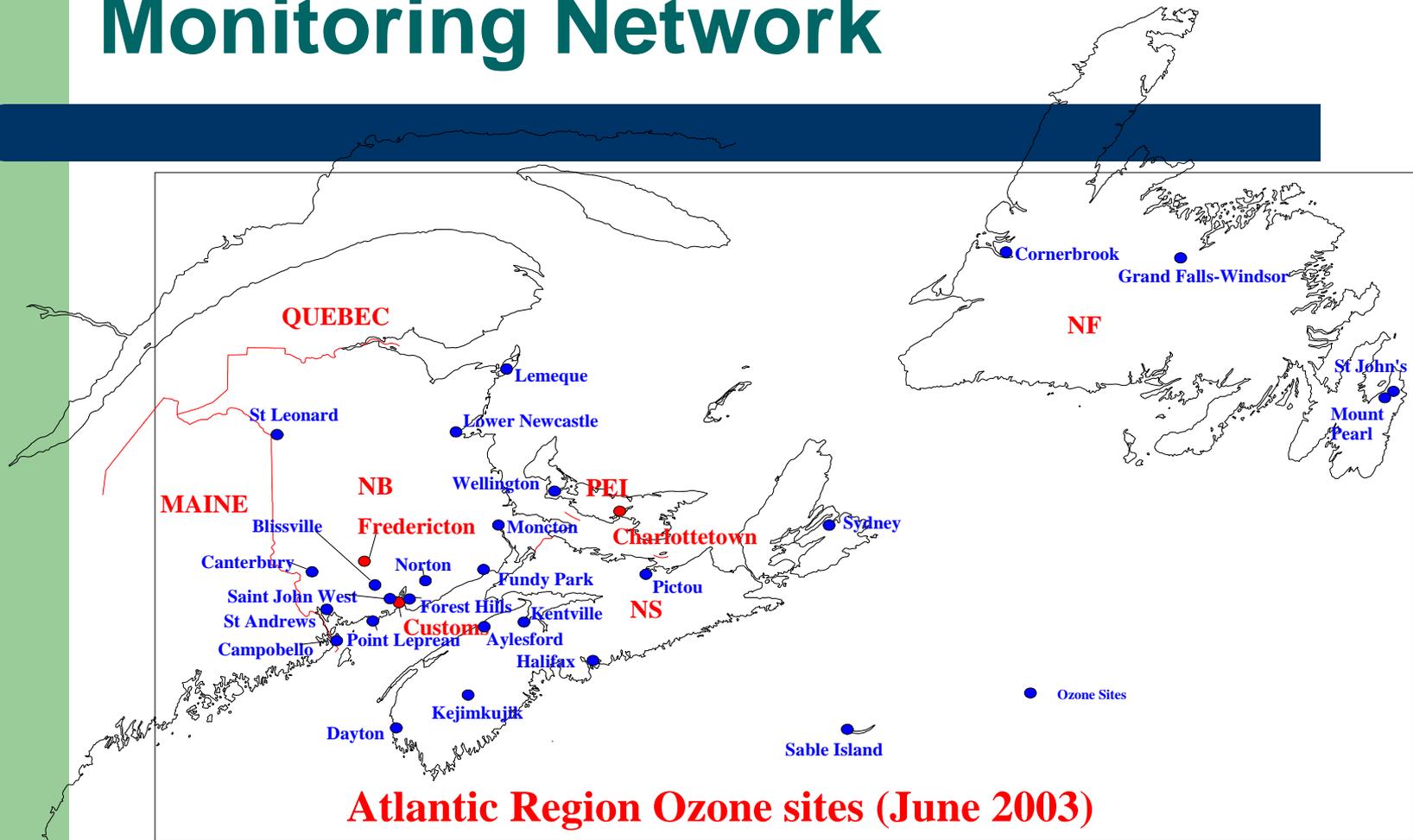
Methodology

- 12Z model run was used exclusively
- Verified for three points: Saint John (Customs Building) NB (elev 12 m), Fredericton NB (elev 15m), & Charlottetown (elev 59 m)
- Looked at cases where GLO concentrations were greater than 50 ppb or CMAQ predicted concentrations greater than 50 ppb.
- Each case was assessed subjectively as to whether it was considered a “hit”

Comparison of three stations

Saint John	Fredericton	Charlottetown
<ul style="list-style-type: none">-Low elevation-Near Bay of Fundy-Frequent Marine Inversions	<ul style="list-style-type: none">-Somewhat higher elevation-Inland-Unaffected by Marine Inversion	<ul style="list-style-type: none">-Higher elevation-Coastal/inland-Sometimes affected by Marine Inversion

Monitoring Network



Coastal vs. Inland Sites

- The marine inversion can mean a difference in ground level concentrations of advected species between coastal and the more inland monitoring sites
- Station elevation may be inadequately represented depending on model resolution

Verification

	Observed – yes	Observed - no
Forecast – yes	a	b
Forecast - no	c	

- a = correct forecast of events (hits)
- b = false alarm
- c = missed event

Formulas: $POD = a/a+c$ $FAR = b/a+b$

Results

	Saint John	Fredericton	Charlottetown
Correct fcst.	9	10	11
False alarms	6	2	3
Missed event	5	2	4
POD	0.64	0.83	0.73
FAR	0.40	0.17	0.21

Conclusions

- 2007 was a quiet Air Quality season for Atlantic Canada. Few fair AQ events and no poor events. Insufficient number of events for definitive conclusions
- CMAQ performed better for inland station with no marine inversion

Recommendations

- External access to previous model output – aids in verification
- A window in the far Northeastern US to aid forecasters in identifying poor AQ source areas

Thank you!

Questions?

