Ozonesonde Profiles From IONS: Characterization and Opportunities for Analysis

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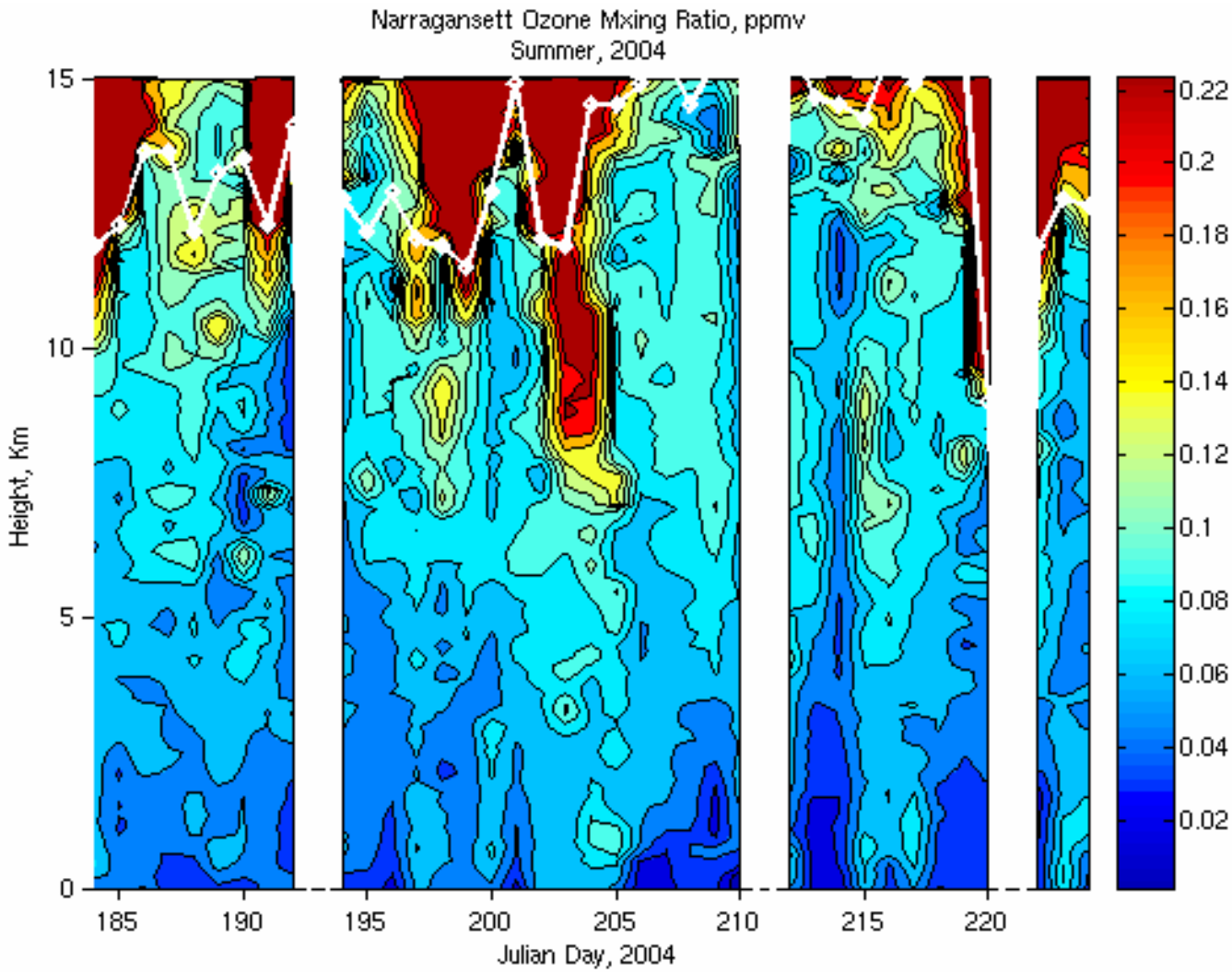
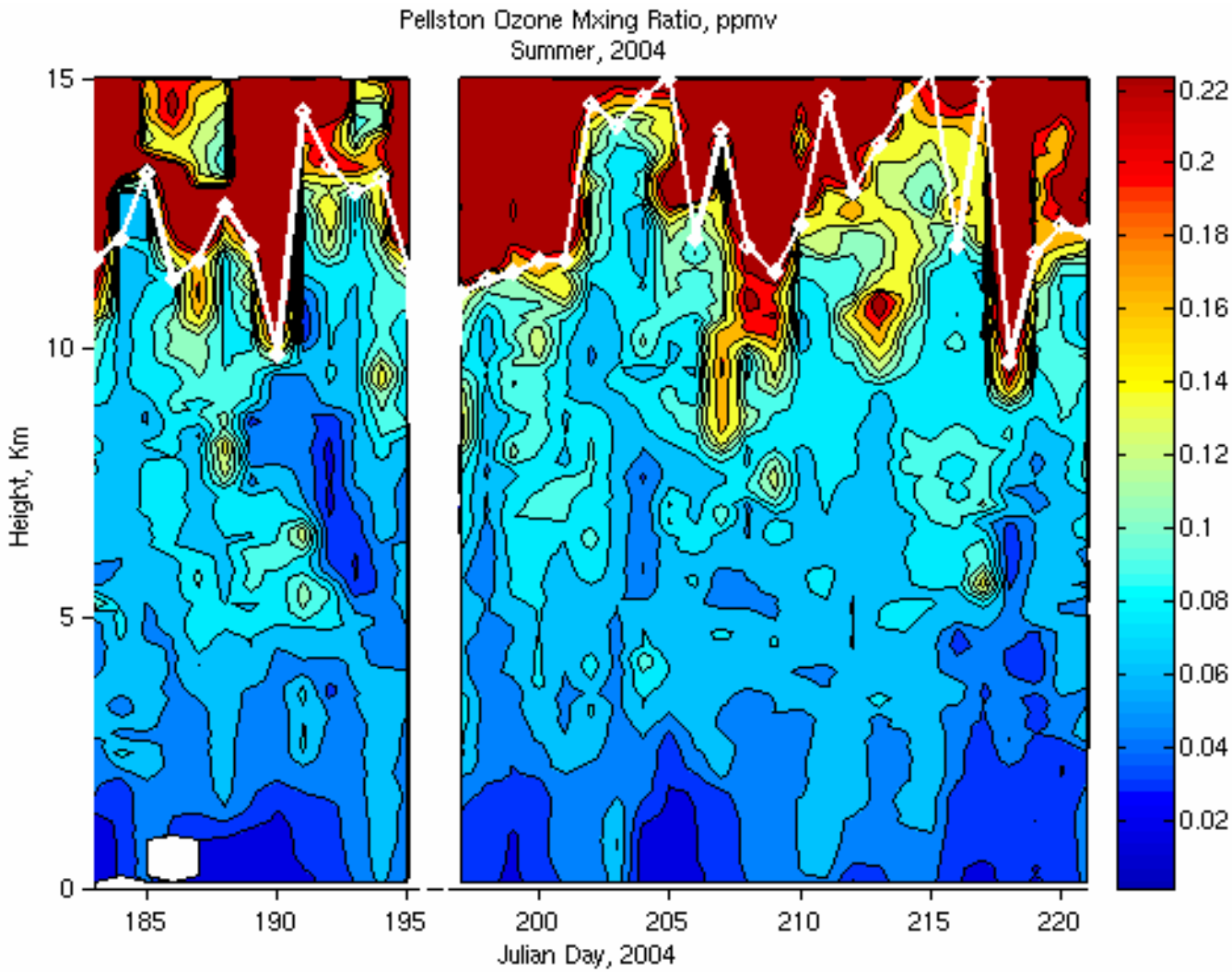
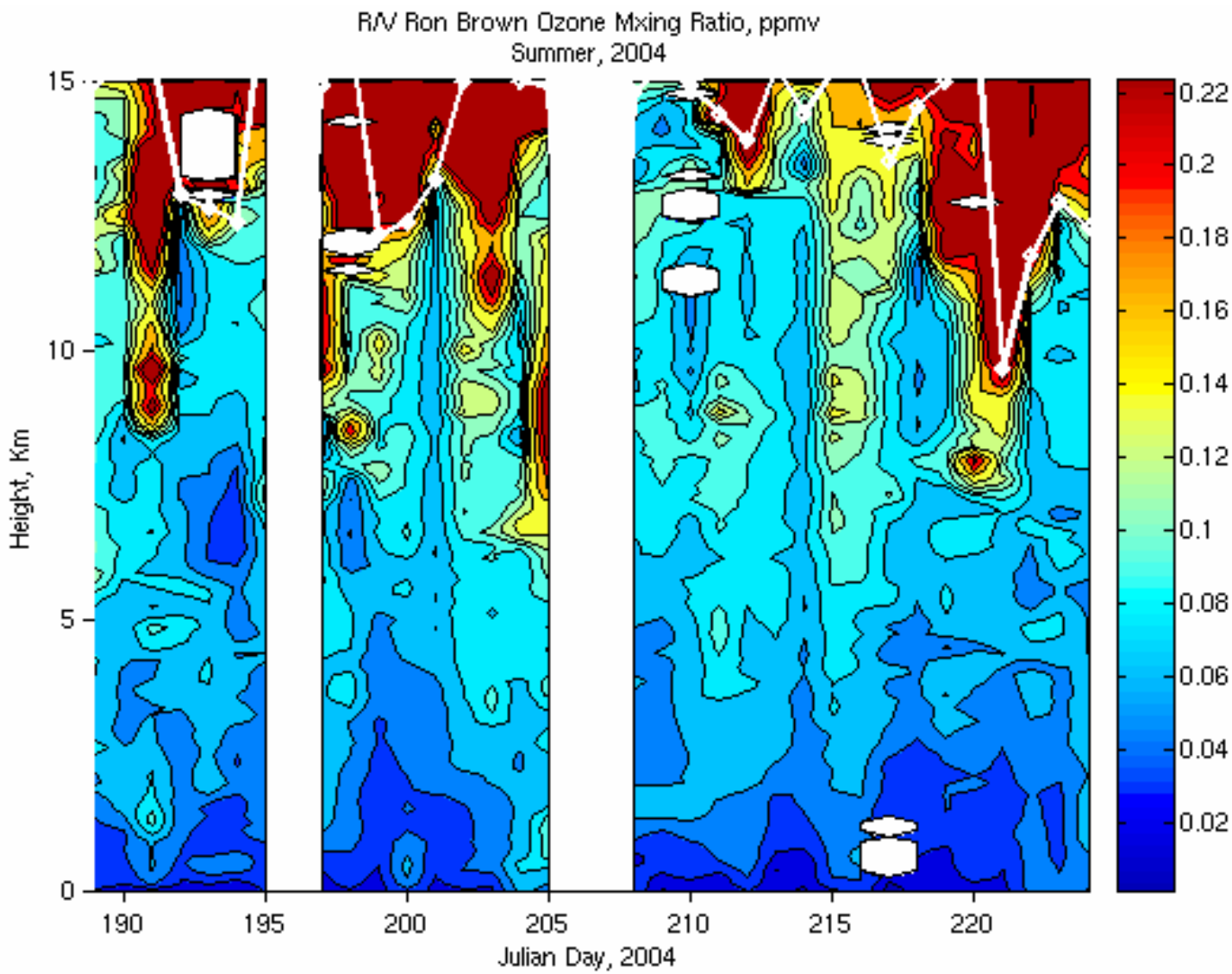

Narragansett Ozone Mxing Ratio, ppmv
Summer, 2004
Height, Km
15
10
5
0
185
190
195
200
205
210
215
220
Julian Day, 2004
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02


Pellston Ozone Mxing Ratio, ppmv
Summer, 2004
Height, Km
15
10
5
0
185
190
195
200
205
210
215
220
Julian Day, 2004
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02


R/V Ron Brown Ozone Mxing Ratio, ppmv
Summer, 2004
Height, Km
15
10
5
0
190
195
200
205
210
215
220
Julian Day, 2004
0.22
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02

Narragansett, RI Ozone Profile Data - PPBV

Height	10%	25%	50%	75%	90%
15 km	124	140	237	325	438
12 km	72	80	94	120	237
9 km	68	75	85	101	107
6 km	62	69	79	82	92
3 km	49	56	63	69	71
875 m	36	41	54	67	81

Pellston, MI Ozone Profile Data - PPBV

Height	10%	25%	50%	75%	90%
15 km	181	243	290	427	539
12 km	77	111	128	254	356
9 km	63	68	80	93	101
6 km	50	61	67	77	88
3 km	48	52	58	65	68
875 m	27	31	39	53	62

Site Profile Contrasts

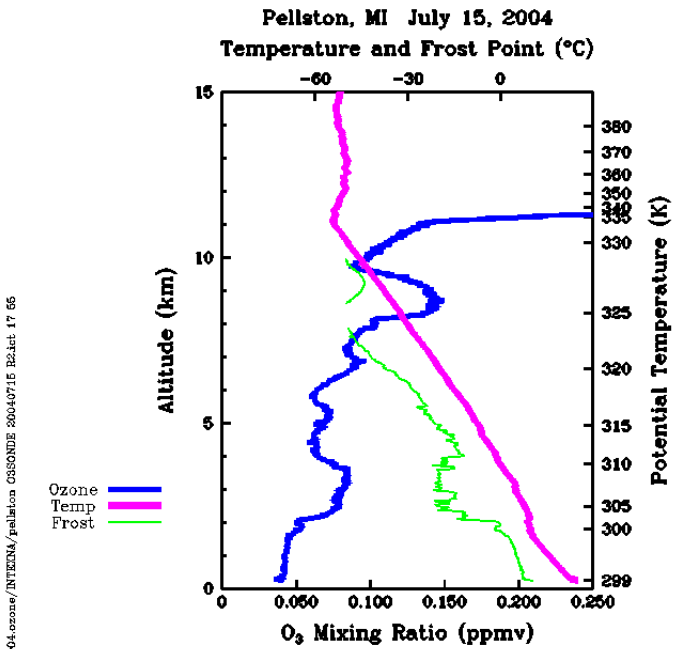
- Median boundary layer mixing ratio, inter-quartile range and 10%-90% ordered thus: Narragansett > Ron Brown > Pellston
- Variability higher above 6 km than below
- Median mixing ratio > 100 PPBV above 12 km at Narragansett, below 11 km at Pellston

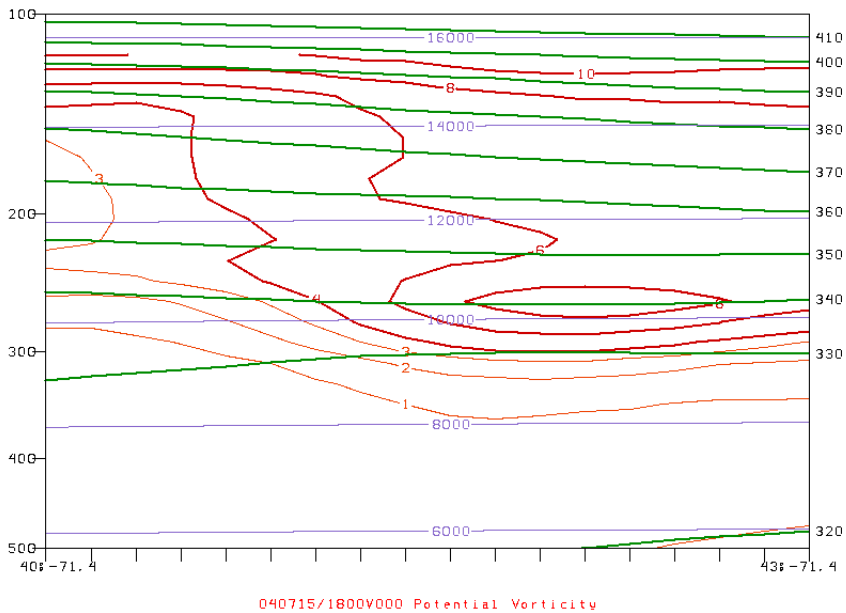
One Focus for Analysis:

Characterization of Stratospheric Intrusions.

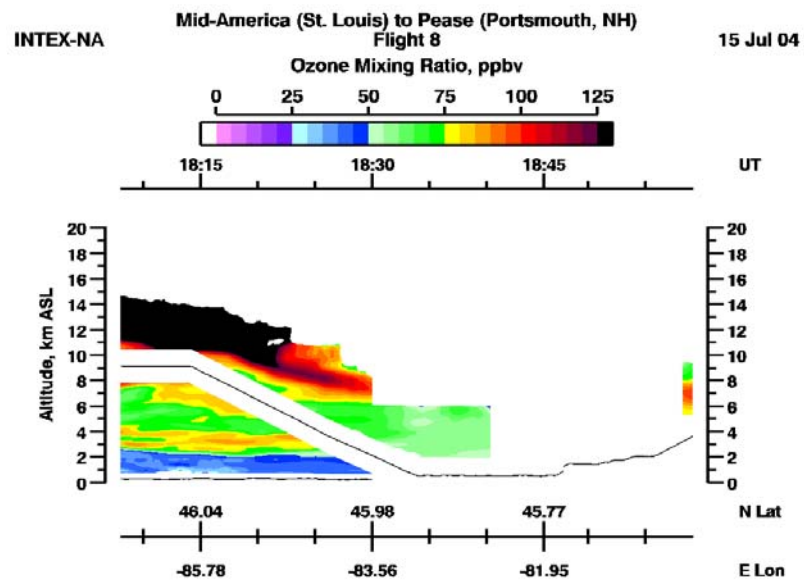
Multiple encounters of several intrusions with multiple platforms

July 15 Pellston, MI Profile



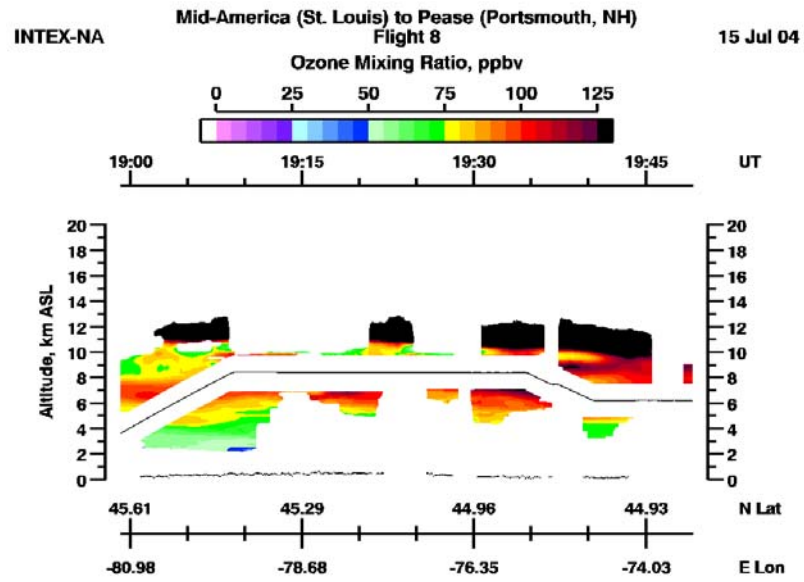


- UT peak in O_3 below 330 K, below peak in Potential Vorticity. Cross section from RUC analysis, 20 km grid. Composition data from DC-8 reveal a productive environment.



- DC-8 profiles over Wisconsin and Michigan - polluted lower troposphere.
- In vicinity of O_3 maximum in Pellston profile, CO ~ 200 ppb.

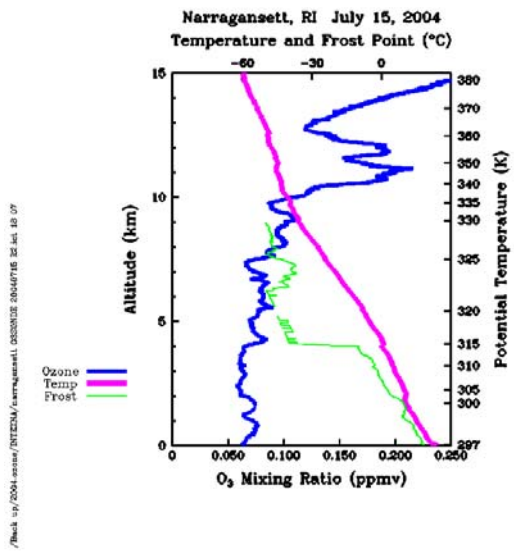
DC-8 Flight 8 July 15, 2004

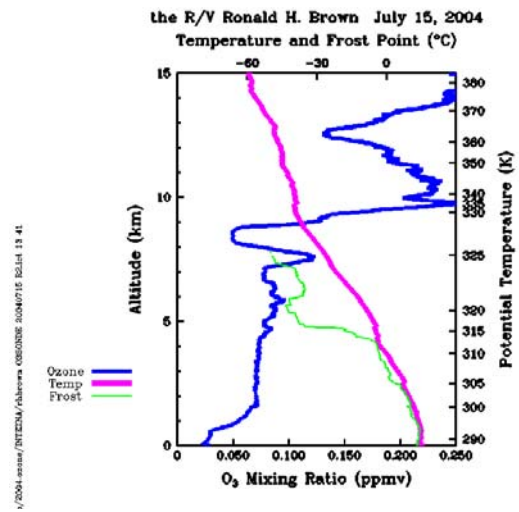


- These profiles upstream of surface low over upstate NY.
- DIAL O_3 data from transit leg reveal an extended layer in the middle to upper troposphere with elevated ozone

DC-8 Flight 8 July 15, 2004

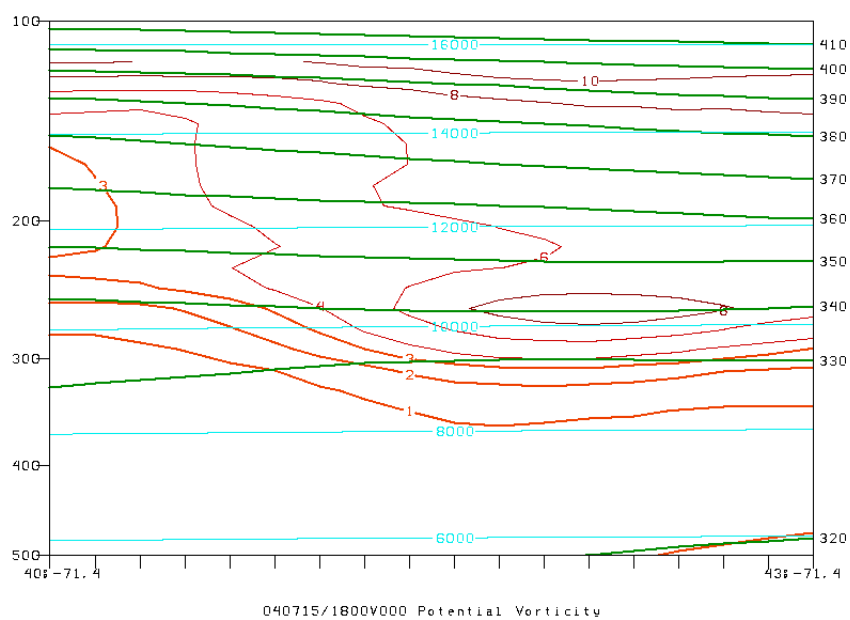
Sonde profiles from Narragansett and Ron Brown, July 15



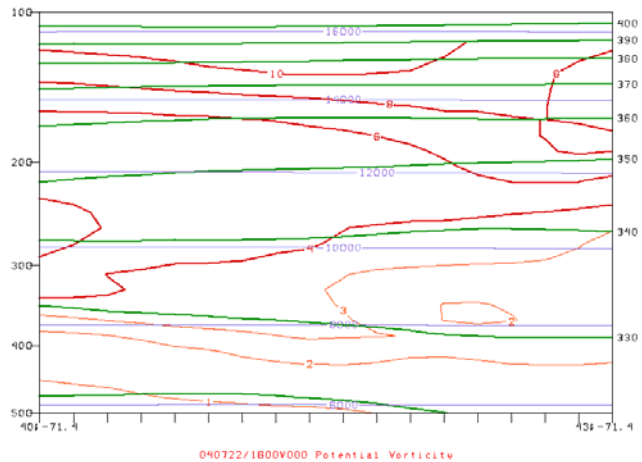


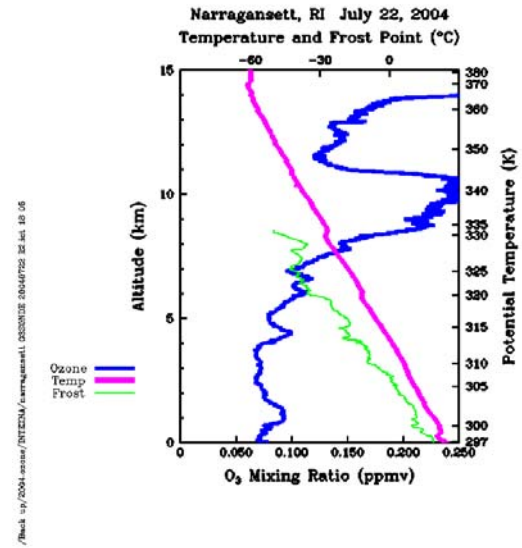
Upper tropospheric cross section over Narragansett reveals PV maximum.

Conformation similar to O_3 profile.

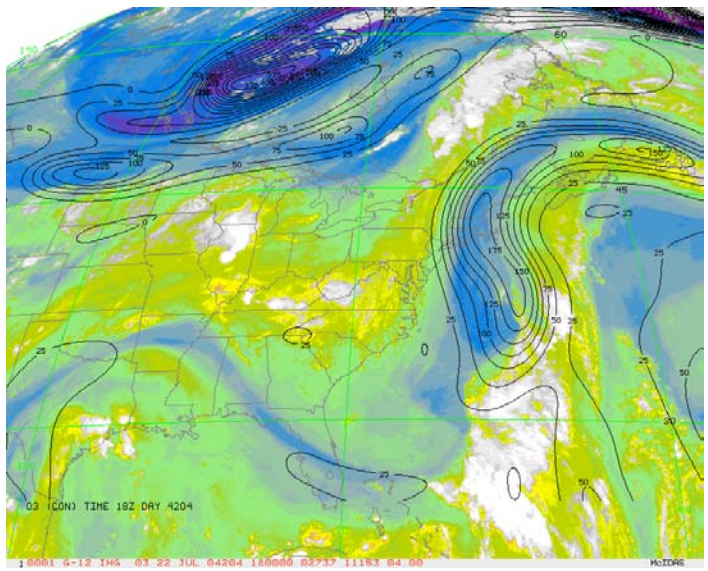


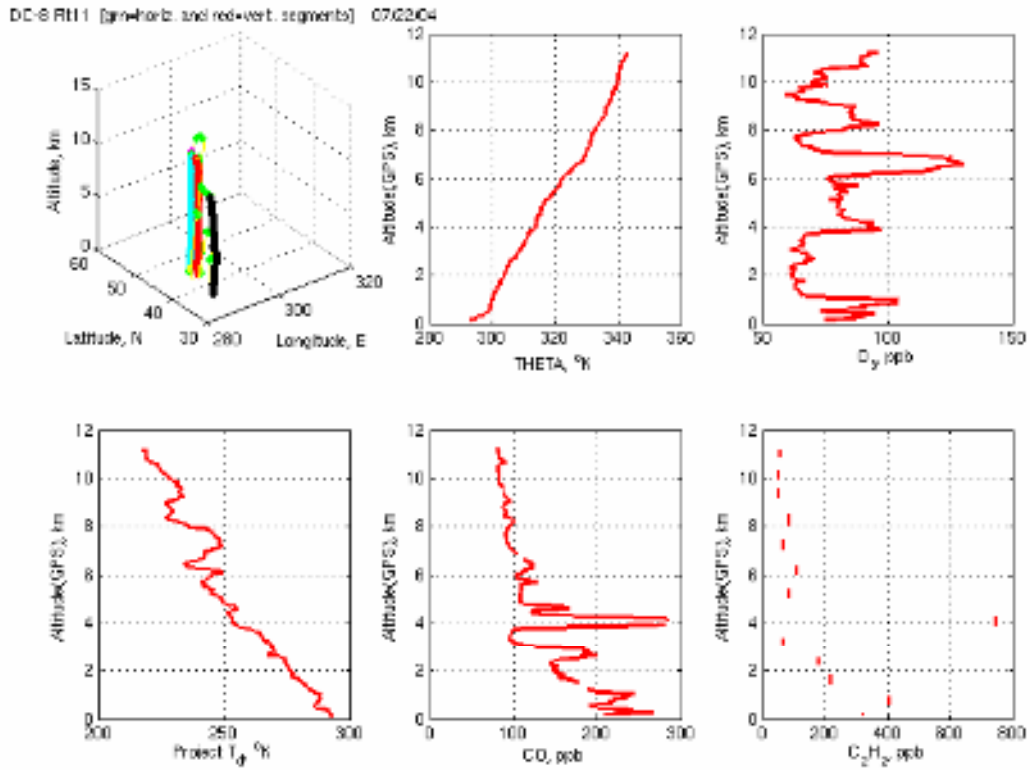
July 22 sonde profile, cross section and GLASH image



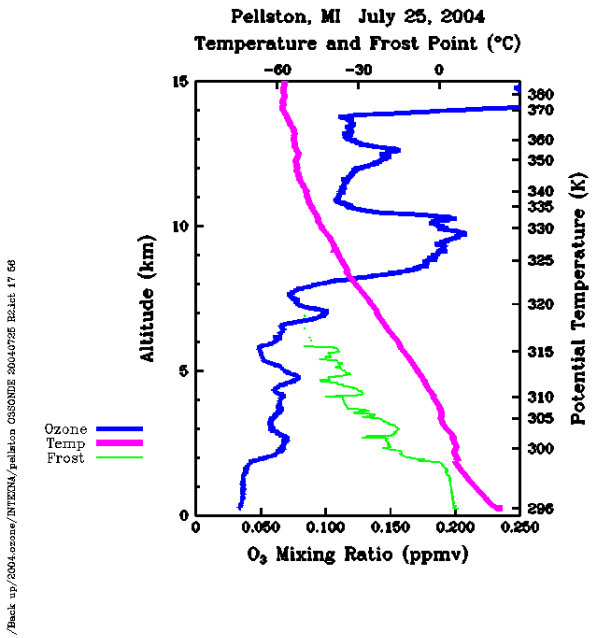


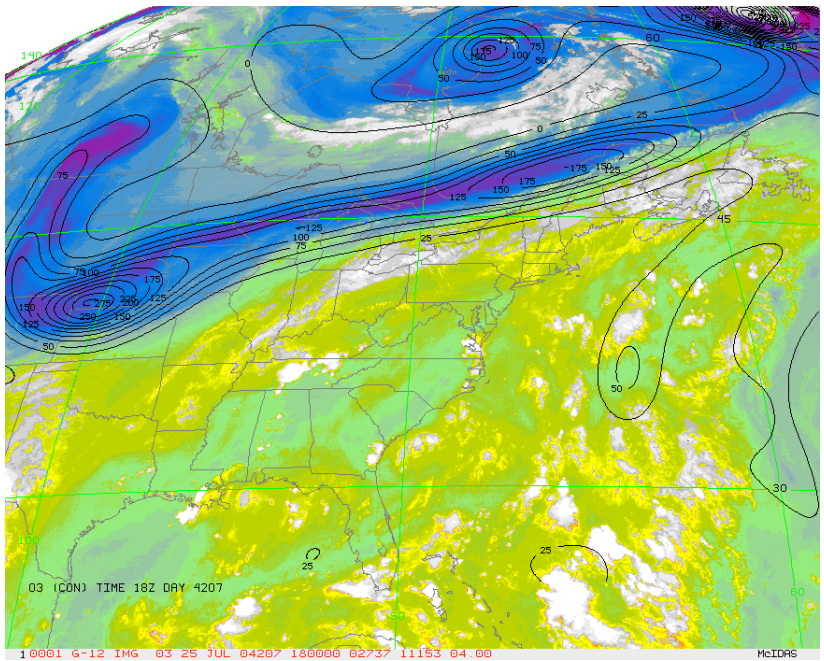
GOES Layer Average Specific Humidity and FLEXPART stratospheric tracer. Complex situation: sheared advection of moist, pollutant-rich air.





- DC-8 vertical profile data, NE of sonde profile, July 22. Moist, polluted air, here primarily below ozone-rich layer.





- STE event at Pellston, July 25.
- GLASH, with FLEXPART stratospheric tracer, ppbv superposed
- Impact over extended area

Acknowledgments

- Jennie Moody, UVa, for GLASH images
- Brian Heikes, URI, for DC-8 data figures
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- NASA for support