

**NEAQS 2004**

**Meteorological summary for Gulf of Maine and northern coastal New  
England**

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**31 July**

February 3, 2006

## General

An area of surface low pressure progressed northeastward into northeastern Ontario. A surface trough in association with the low moved into western New York by period's end. Near the coastline, a weak sea breeze developed. With the migrating surface low and the subtropical high parked to the southeast of New England, a strong pressure gradient developed between the two systems and produced strong southwesterly winds. During the evening, winds were generally from the SW at 5-10 kts for much of the Northeast, up to 15 kts offshore. During the day, winds were from the SW at 10-15 kts onshore and up to 20 kts over the nearshore waters. In midafternoon winds were SSW over nearshore waters. Daytime highs ranged from the upper 70's to low 80's (24-26C). Overnight lows were quite warm, as lows ranged from the mid to upper 60's (18-21C) for northern new England. Fog continued to develop for central and eastern portions of the Gulf of Maine, Nova Scotia, and along the southern coastlines of New England / Cape Cod. The fog burned off near the coastlines of New England, but continued to persist in the Gulf and in Nova Scotia. Hazy conditions also were being reported during the warm and humid afternoon. Scattered cloudiness existed for much of southern New England into the Gulf of Maine.

Soundings from the ship at 0500, 1100, and 2300 UTC showed a strongly statically stable marine boundary layer ~100 m deep. A near-neutral intermediate layer above extending up to 1.3-1.4 km was discernable in the 0500 and 2300 UTC soundings. Winds aloft were more westerly than near the surface.

Sounding winds	0500 UTC	1100 UTC	2300 UTC
100 m speed, m/s	15.1	14.4	17.9
100 m direction	220	215	200
500 m speed	11.6	17.3	15.5
500 m direction	245	240	220
1000 m speed	11.2	16.7	17.6
1000 m direction	235	235	230
2000 m speed	11.5	16.9	21.5
2000 m direction	240	230	250

## Ozone and CO

The peak ozone observed on the ship on this day was 70 ppb at 00Z, falling steadily to a low of ~10 ppb at 11Z and recovering slightly to 30-35 ppb at midday. CO fell from ~180 ppb at

00Z to ~80 ppb by 05Z, where it stayed for the rest of the day. The FLEXPART footprints suggest that the ship was on the eastern edge of the urban corridor plume most of the day, but the relatively strong winds kept concentrations down, and the core of the plume was probably on shore. The observed surface winds near the ship position were more southerly than the winds driving FLEXPART appear.

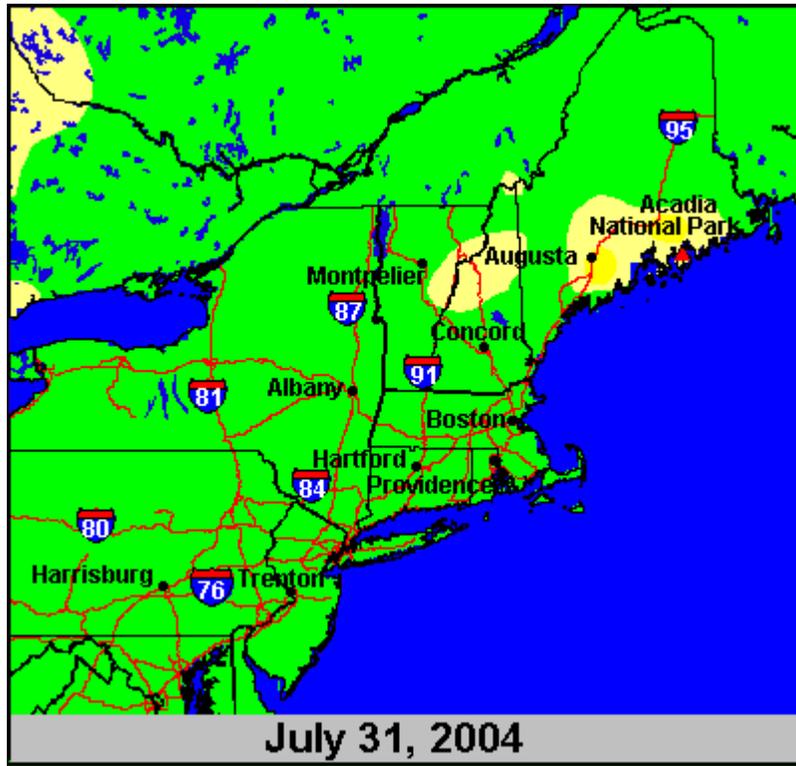


Figure 1: Maximum 1-h surface ozone from EPA AIRNOW

## Footprints

**Footprint S-R-Relationship for flight RHB\_cruise2**

Start time of sampling 20040730.234501 End time of sampling 20040731. 1101

Lower release height 0 m Upper release height 30 m

Meteorological data used is 1x1 deg ECMWF analyses

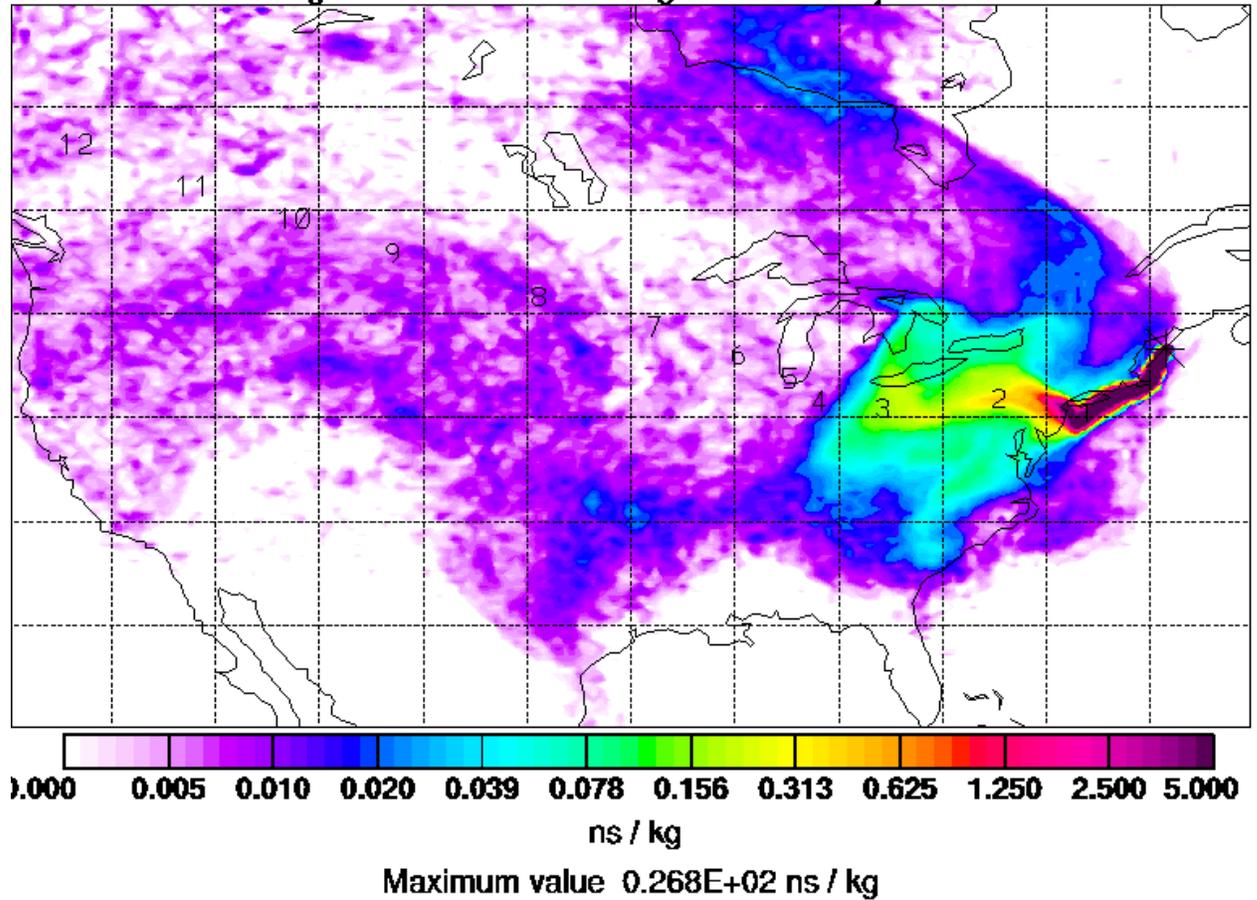


Figure 2: FLEXPART footprint for 30 July 2345 to 31 July 0011 UTC



**Footprint S-R-Relationship for flight RHB\_cruise2**

Start time of sampling 20040731.111101    End time of sampling 20040731.121101

Lower release height 0 m    Upper release height 30 m

Meteorological data used is 1x1 deg ECMWF analyses

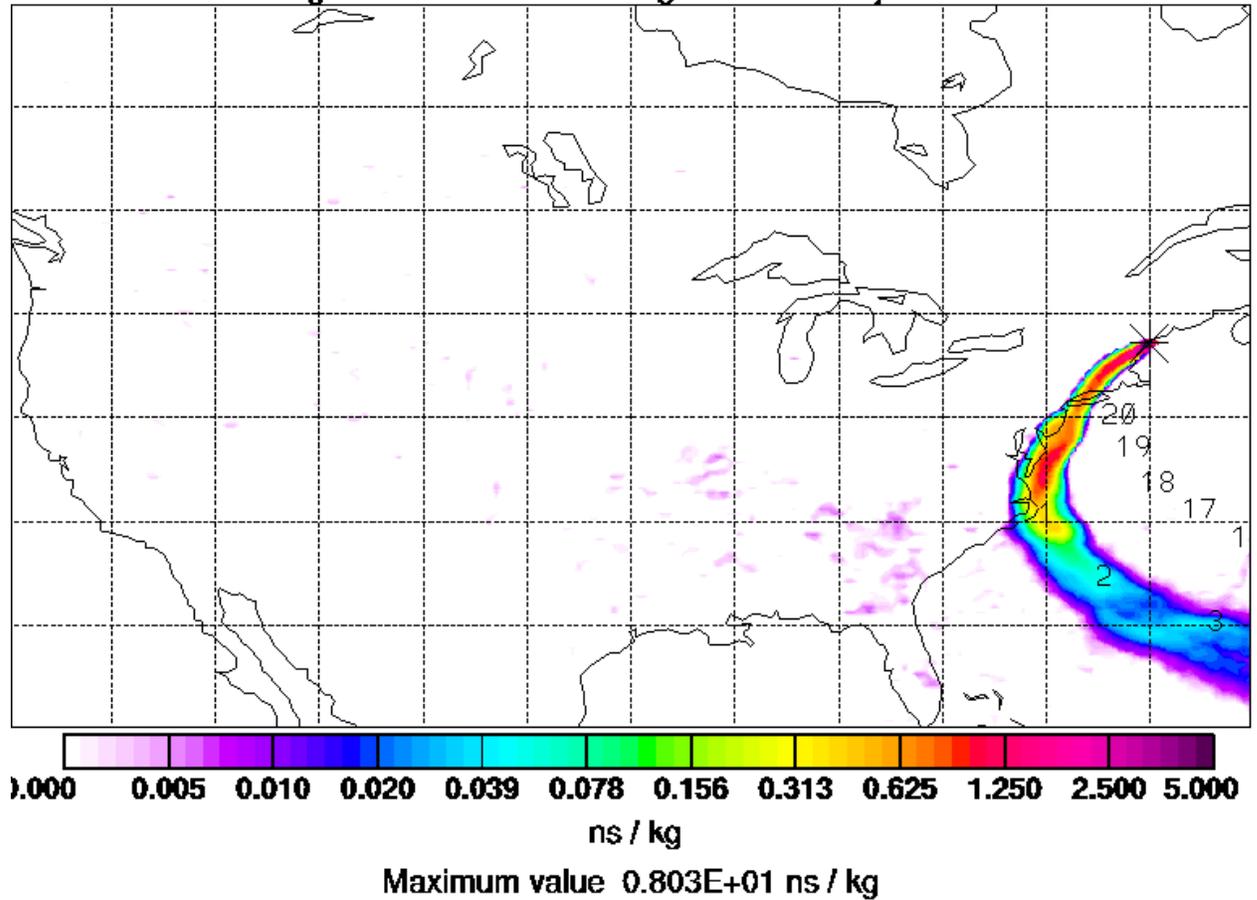


Figure 4: FLEXPART footprint for 1703-1750 UTC 31 July

### Footprint S-R-Relationship for flight RHB\_cruise2

Start time of sampling 20040731.170301    End time of sampling 20040731.175001

Lower release height 0 m    Upper release height 30 m

Meteorological data used is 1x1 deg ECMWF analyses

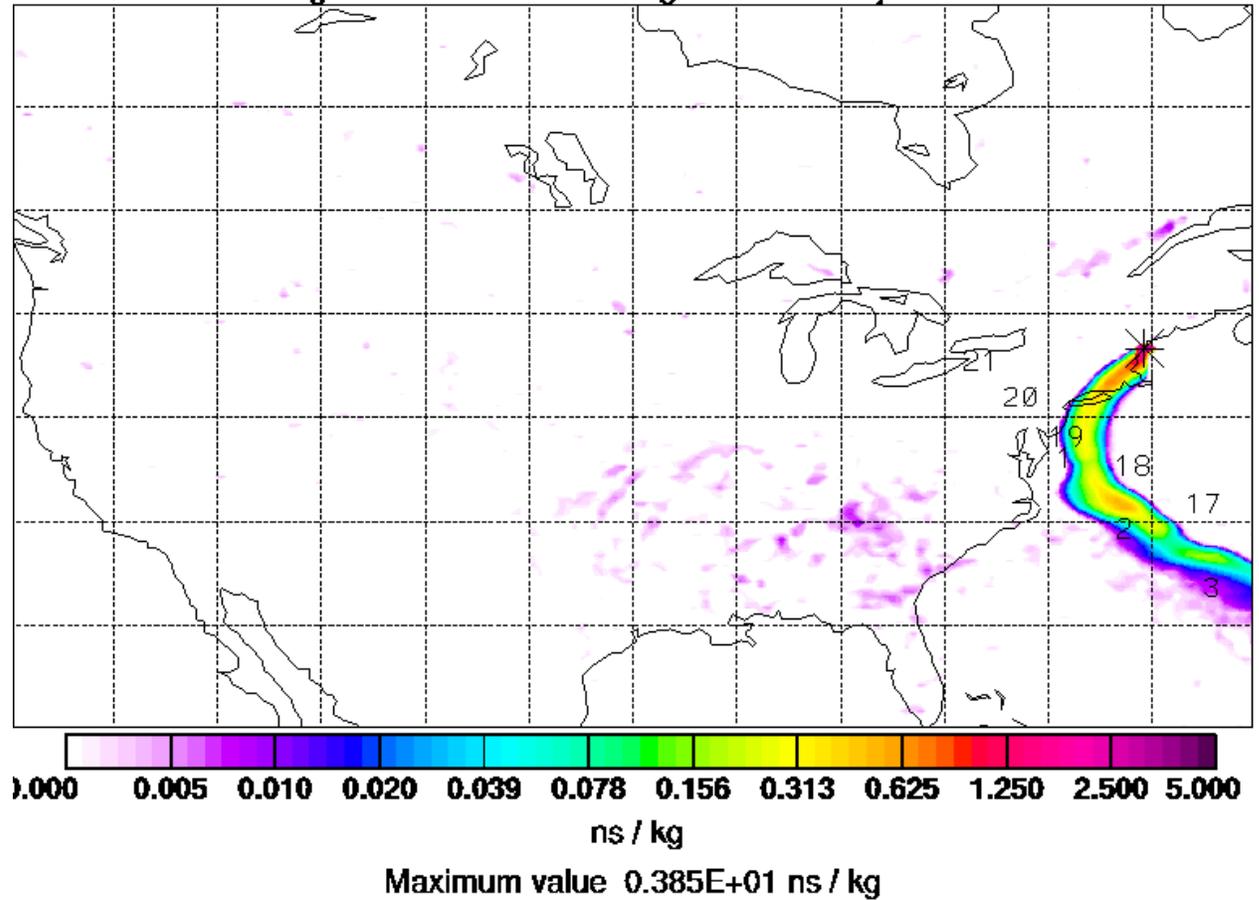
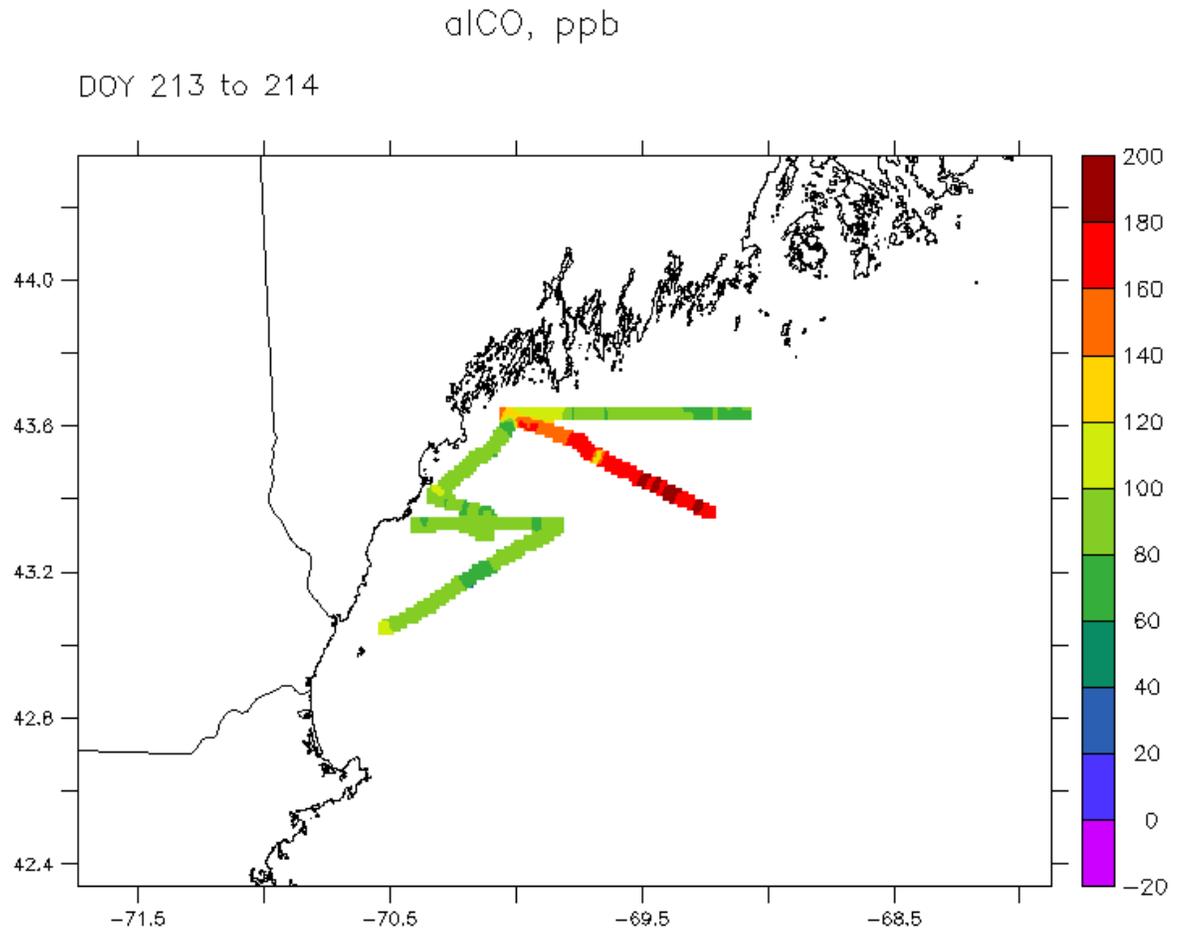
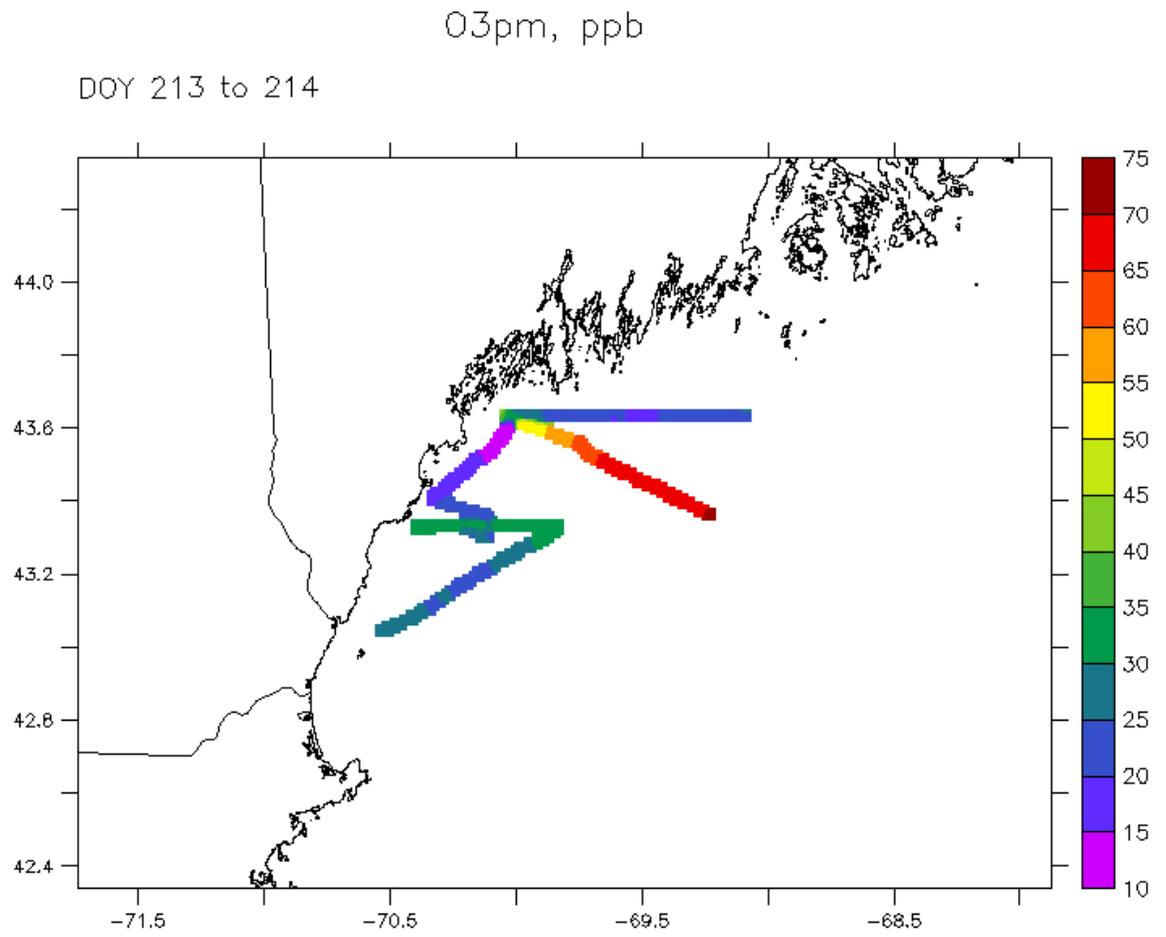


Figure 5: FLEXPART footprint for 1703-1750 UTC 31 July

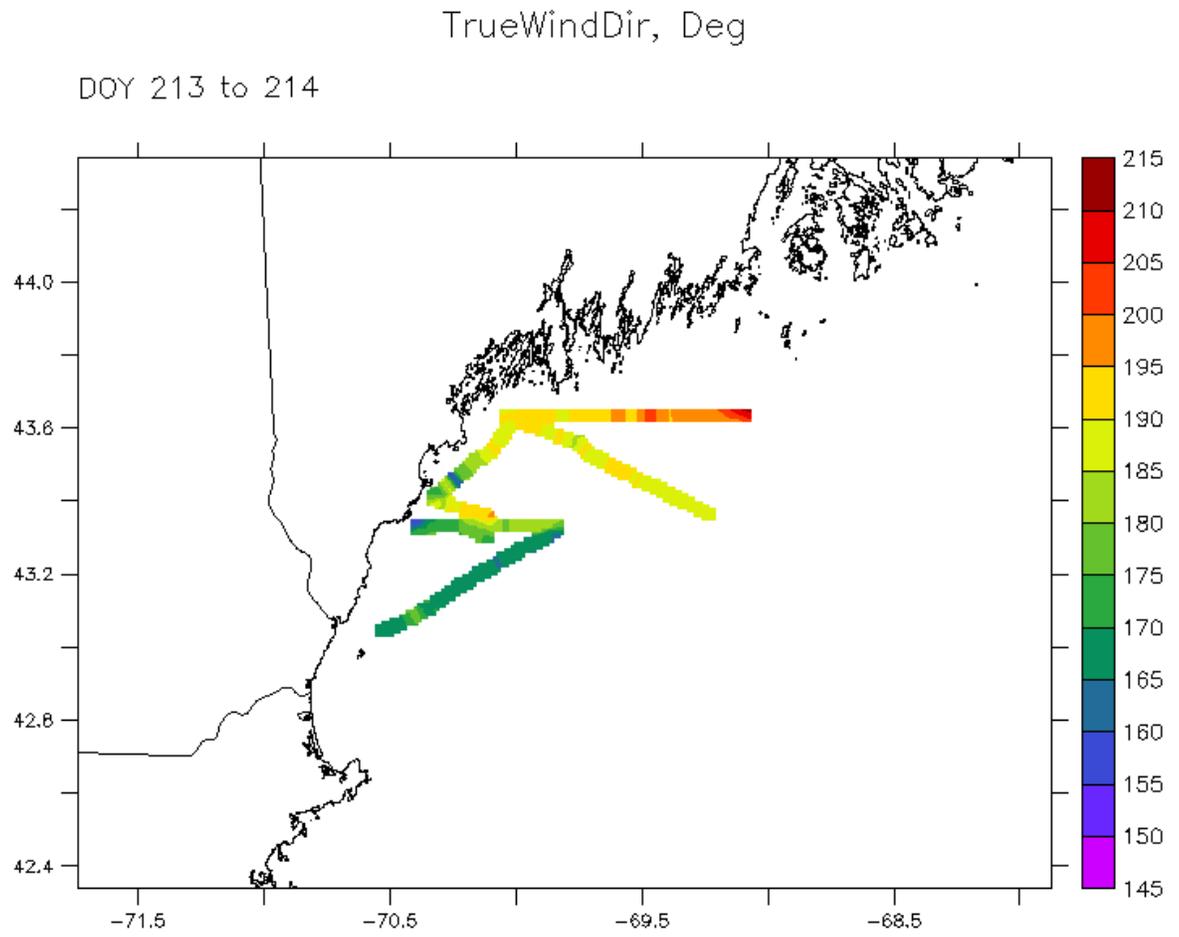
Ship track plots



**Figure 6: CO along the ship track**



**Figure 7: Ozone along the ship track**



**Figure 8: Wind direction along the ship track**