

# Smart Balloon Participation in TexAQS II

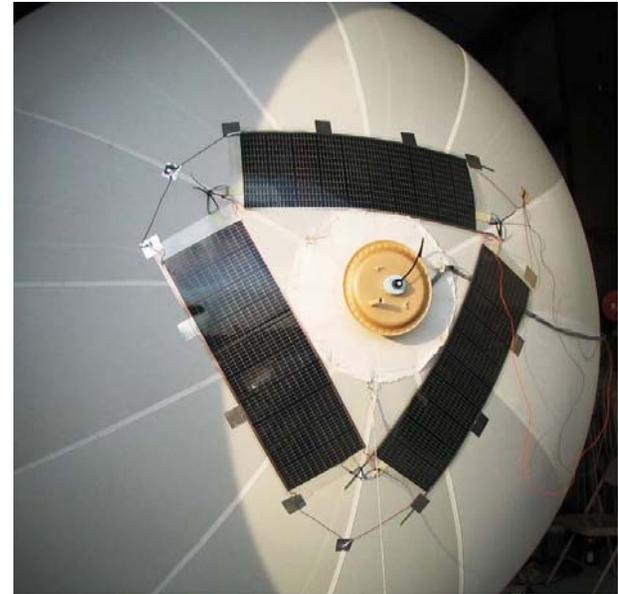
**Robert Talbot & Huiting Mao**  
**University of New Hampshire**

**Randy Johnson**  
**NOAA ARL-FRD**

**Steven Businger**  
**University of Hawaii**

TCEQ Meeting  
Austin, TX  
April 18, 2006

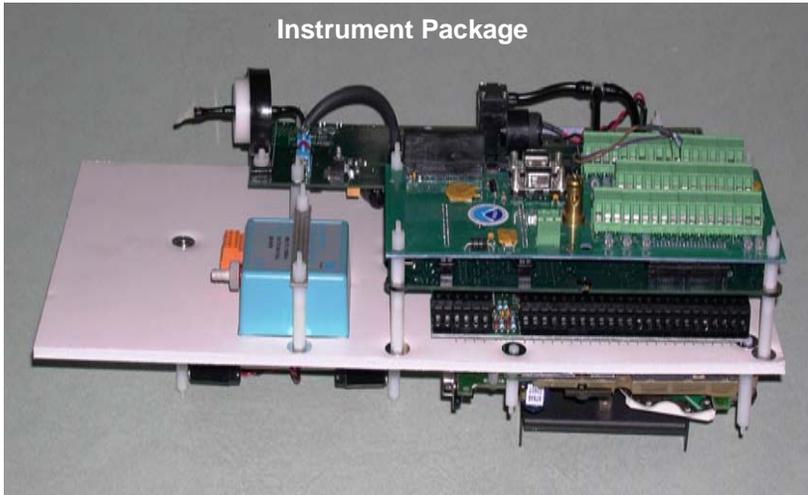
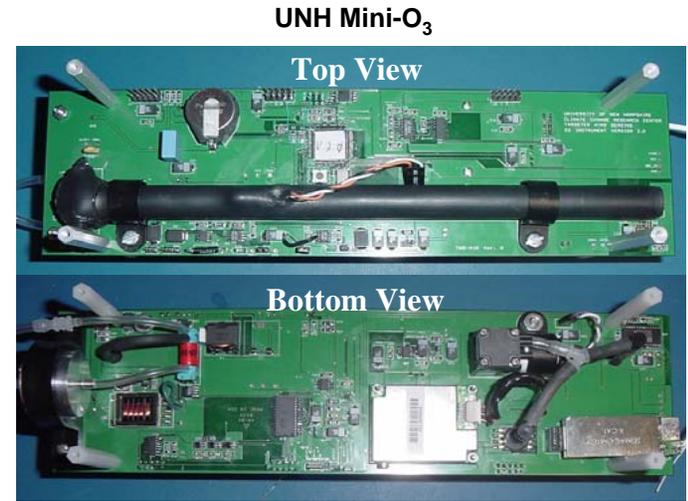
# Smart Balloon Platform



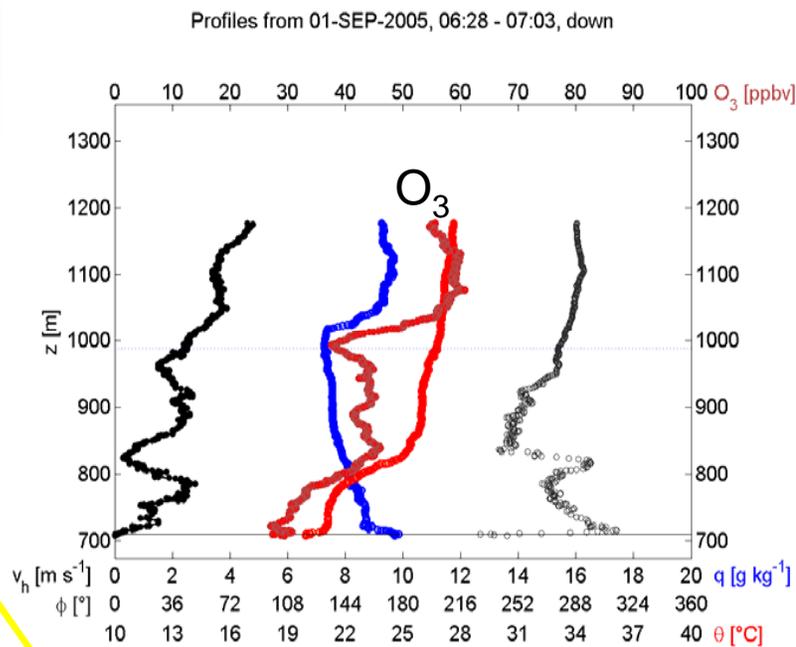
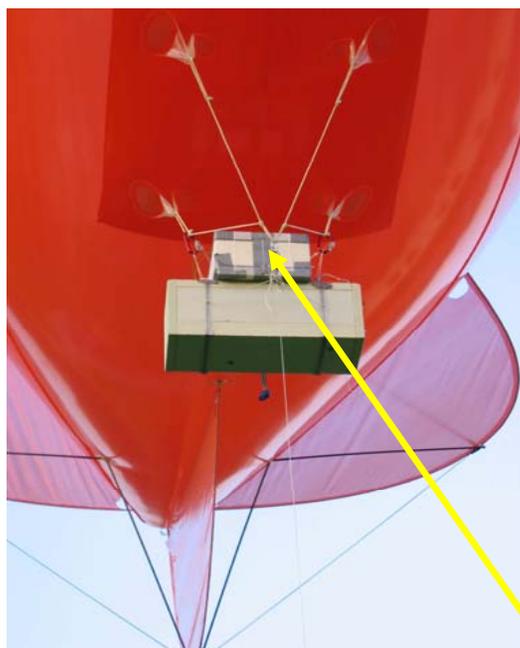
Power from the solar panels is routed via separate wires to the Li-ion batteries attached to the lower portion of the balloon.

Release from Orient, Long Island  
In July 2004 during ICARTT.

# Smart Balloon Components



# Application by Max Planck Scientists in Forest-Atmosphere Study in Germany



Collaboration with  
Sharon Zhong &  
Barry Lefer at  
Coastal Site During  
TexAQS II.

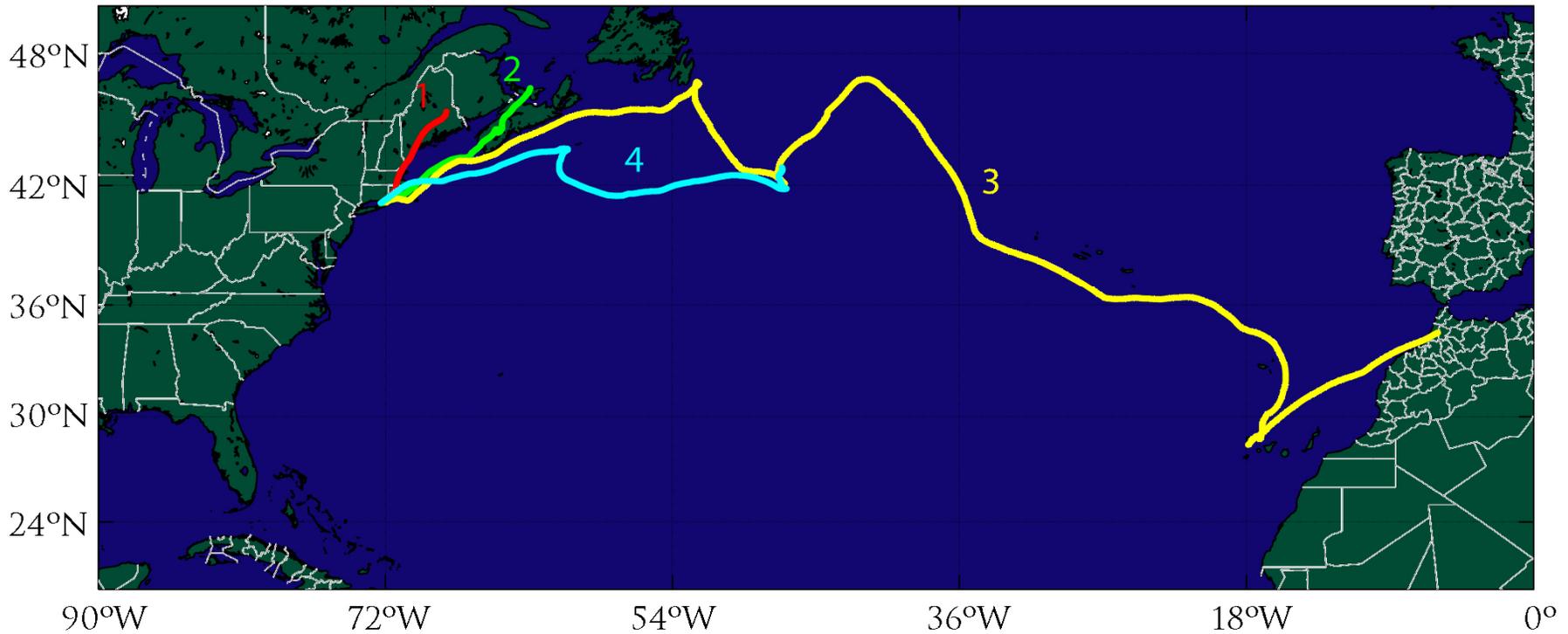
Tethered blimp with mini- $O_3$  sensors inside white styrofoam container (left) and example profile data collected with the system (right).

## Smart Balloon in ICARTT 2004

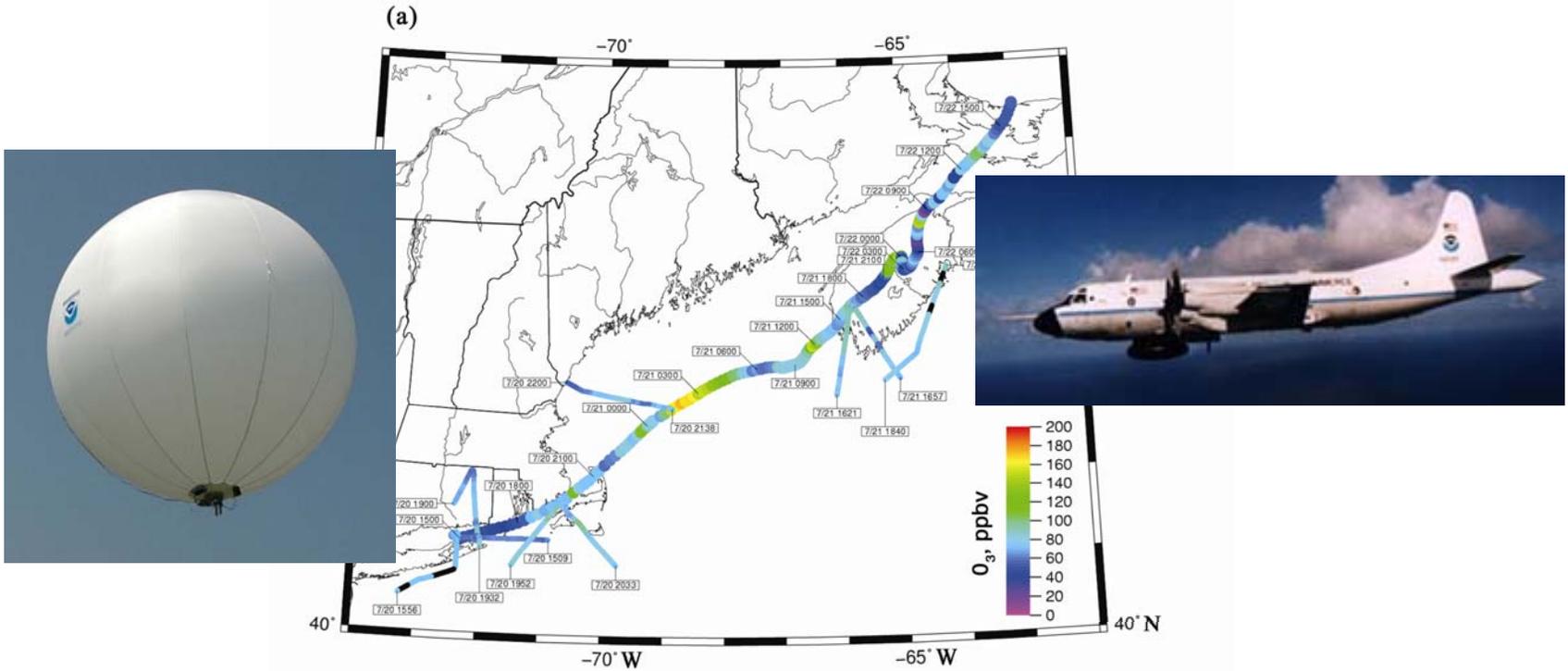


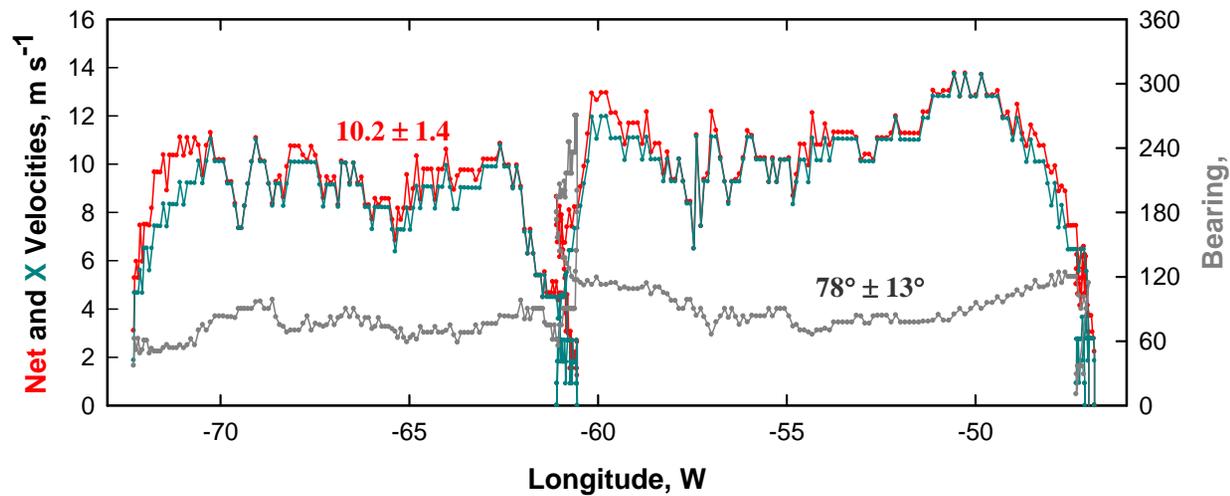
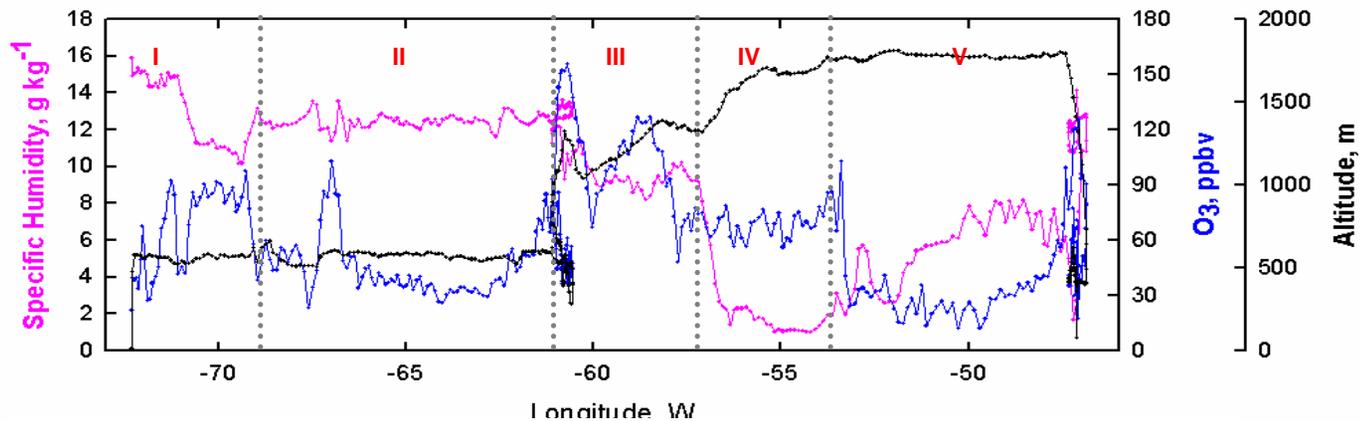
Balloon Flight	Duration hrs. (d)	Distance Traveled (km)
1	21 (0.88)	568
2	49 (2.0)	1030
3	295 (12.3)	6780
4	85 (3.5)	2530

## SMART BALLOON TRACKS



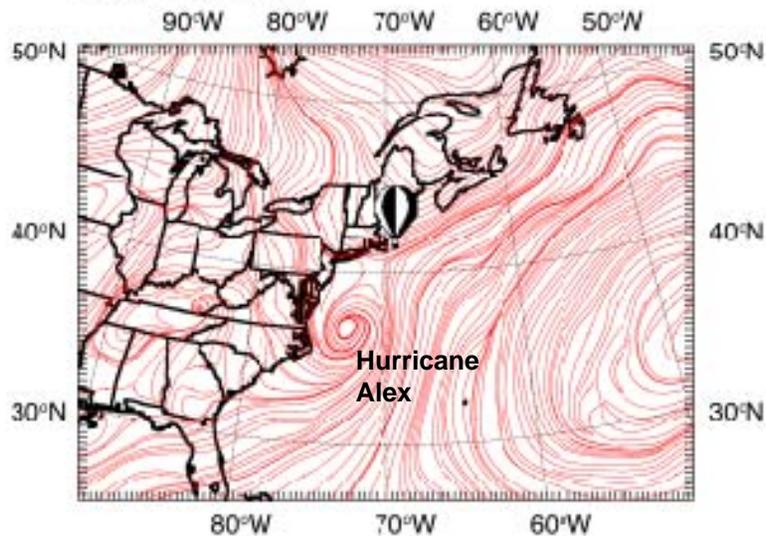
# In-flight Comparisons of O<sub>3</sub>



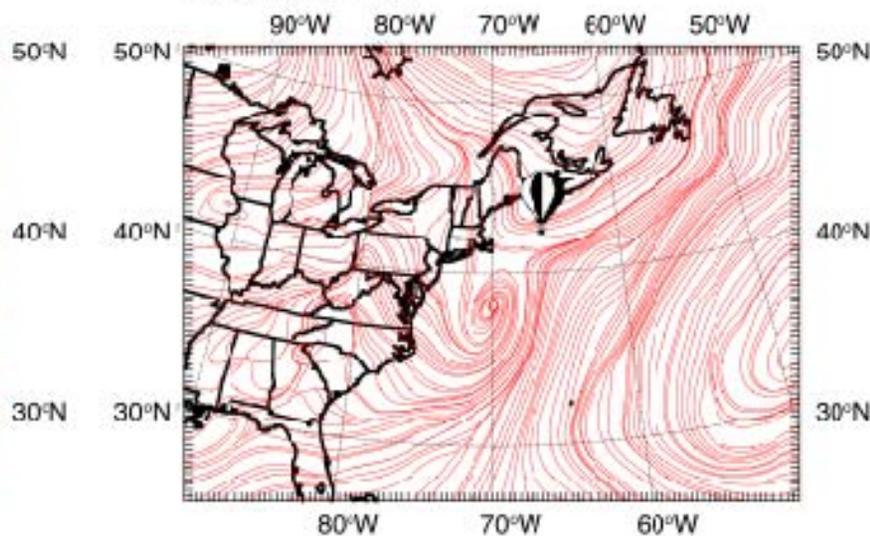


**Selected parameters (15 min. averages) measured along the flight path of balloon 4.**

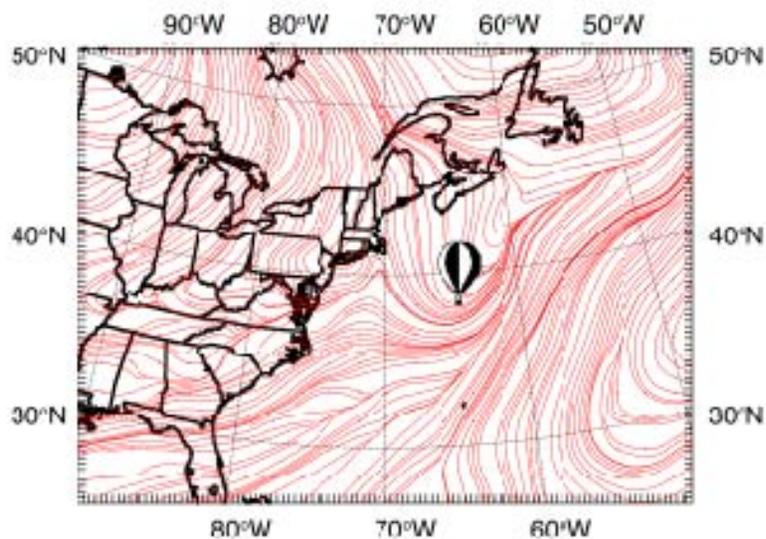
Type I 05Z 8/4



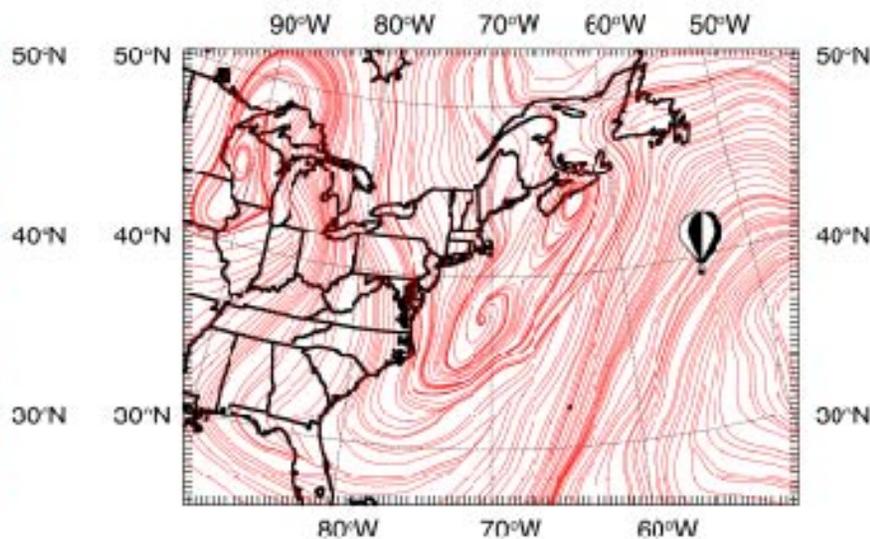
Type II 12Z 8/4



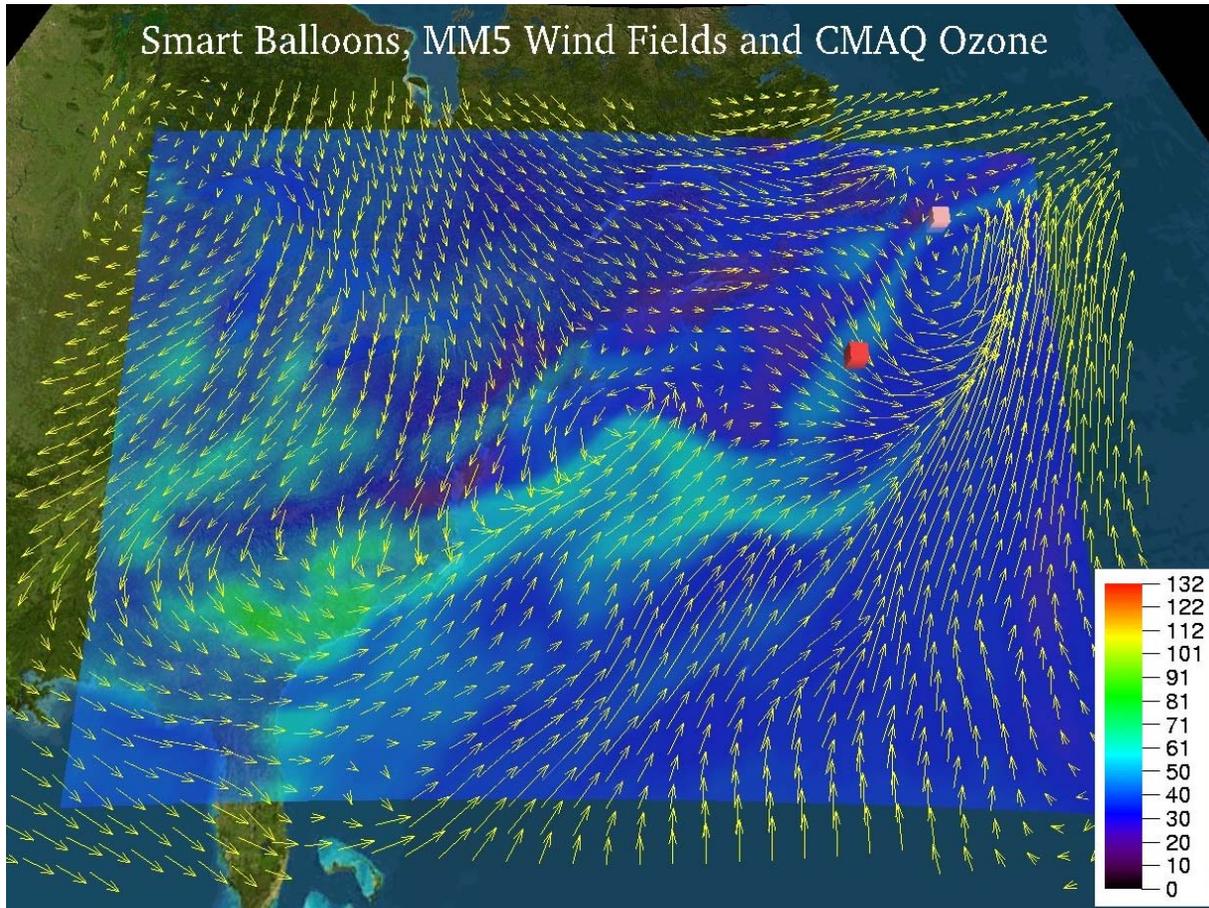
Type III 06Z 8/5



Type IV 18Z 8/6

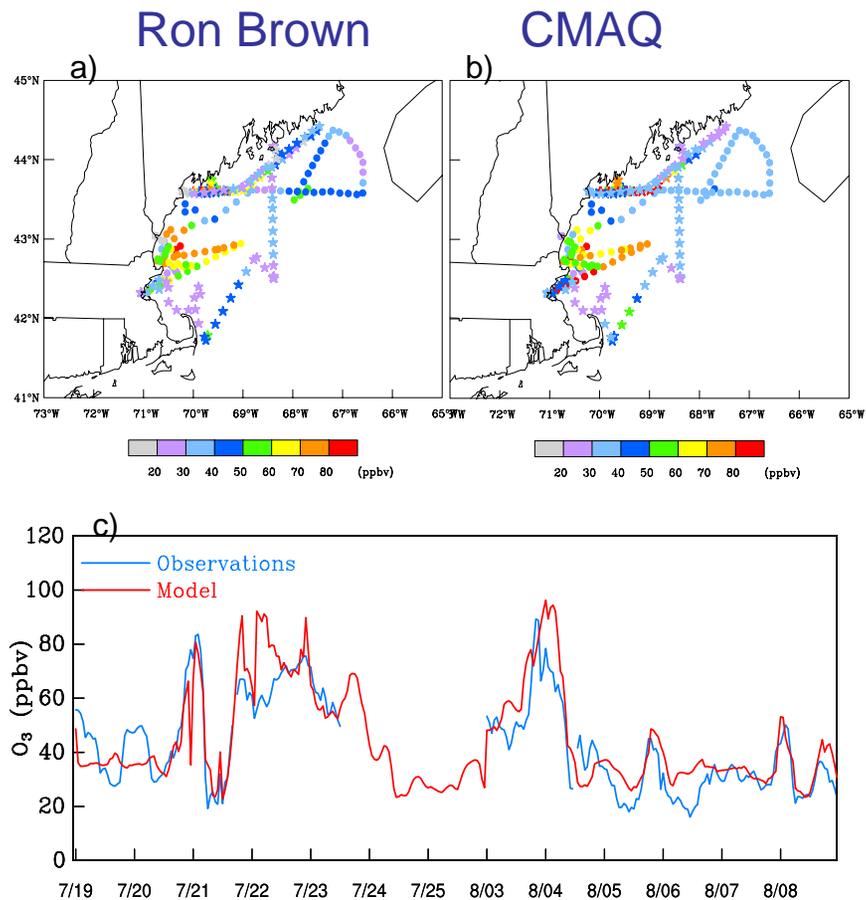


## 3-D Composite of Observations & Model Results

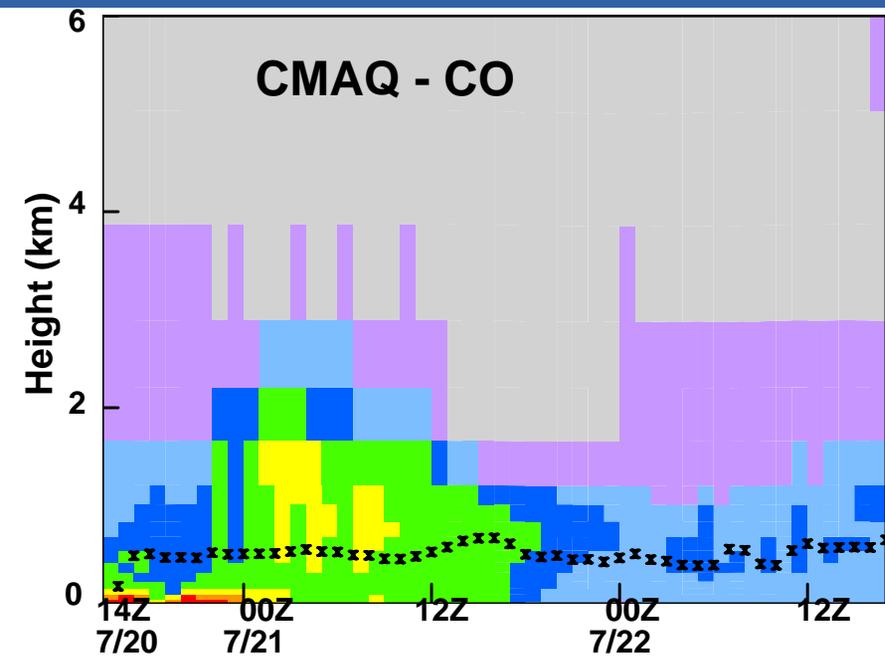


“Snap-shot image” of the MM5 instantaneous wind vectors at ~500 m altitude with CMAQ O<sub>3</sub> mixing ratios and balloon GPS/O<sub>3</sub> superimposed on the domain field for 2100 UT August 5. The O<sub>3</sub> mixing ratios from CMAQ and the balloons are on same color scale. Balloon 3 leads the way in the upper right hand corner of the domain.

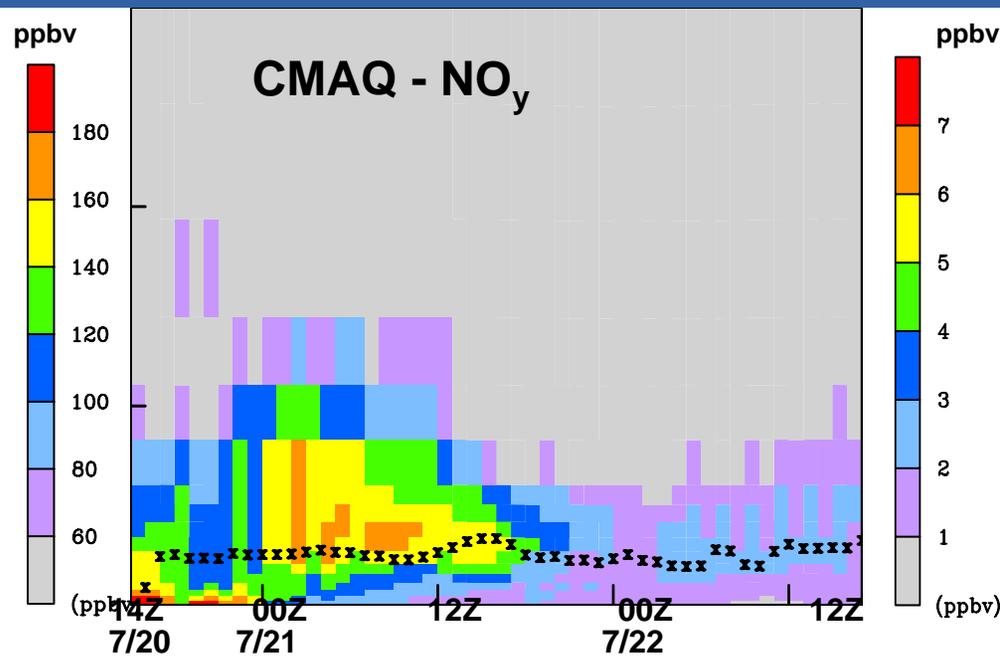
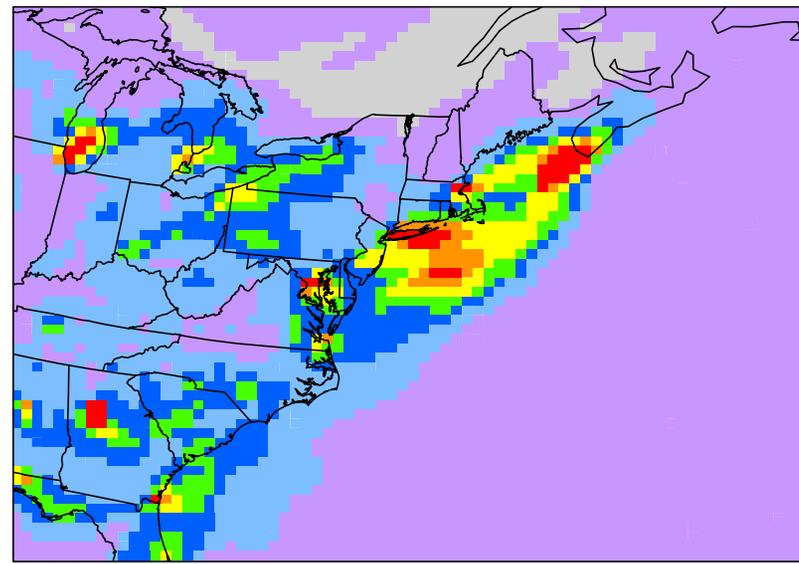
# Observed vs. CMAQ Comparison for Model Validation



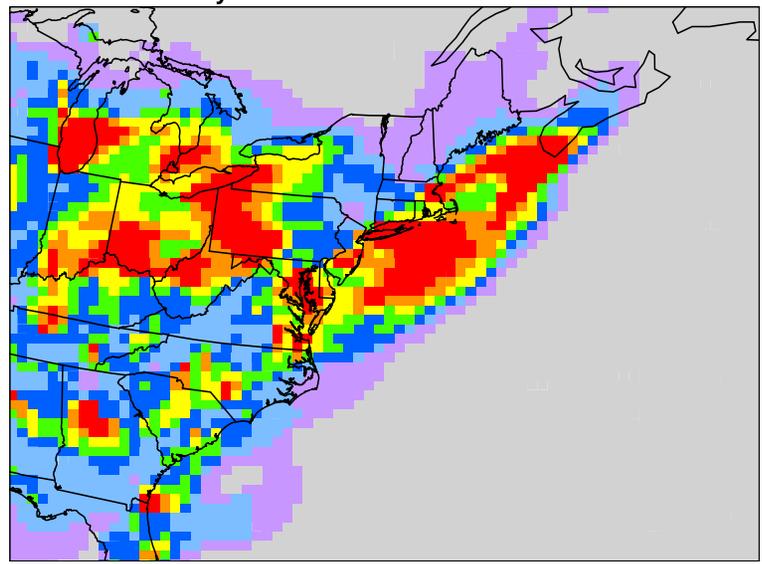
Geographic distribution of surface  $O_3$  during July 19 – 25 (dots) and August 3 – 8 (asterisks) from the *Ronald Brown* measurements (a), CMAQ model simulations (b), and as a time series comparison (c).

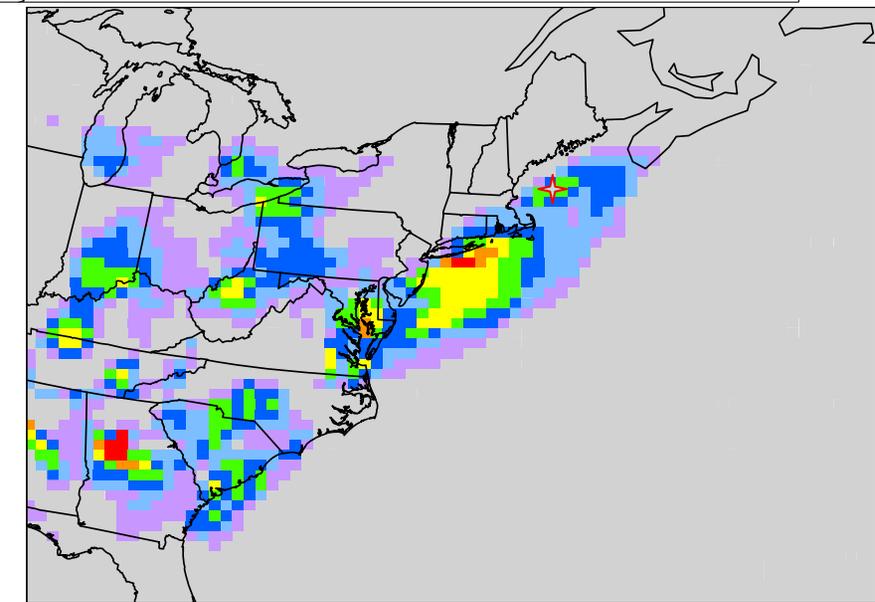
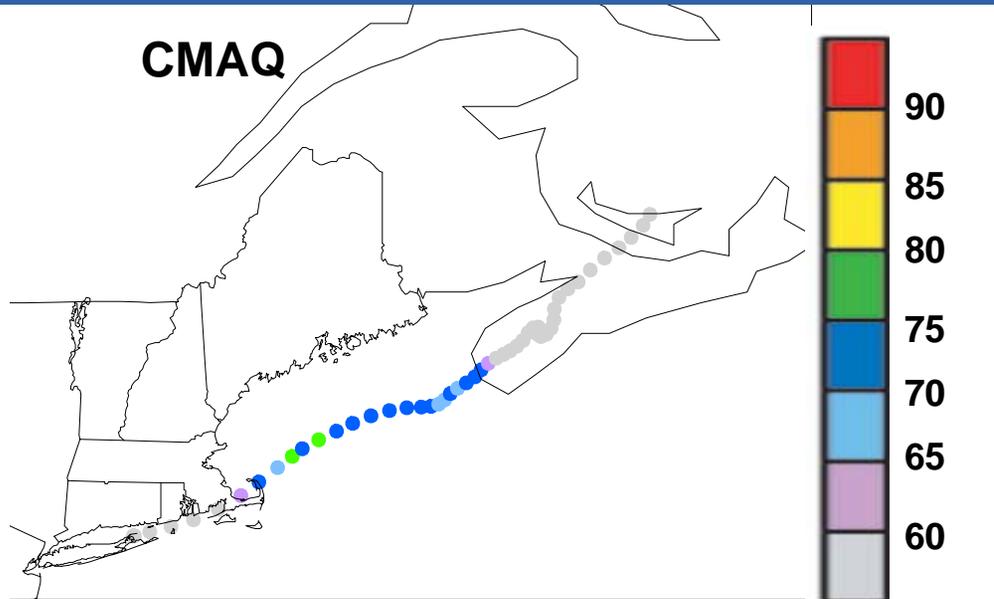
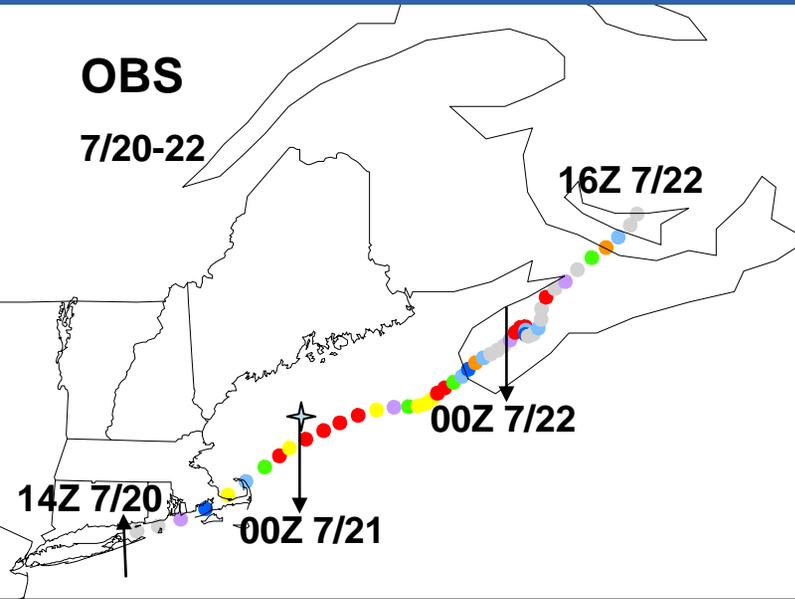


CO 00Z 7/21 at ~500 m

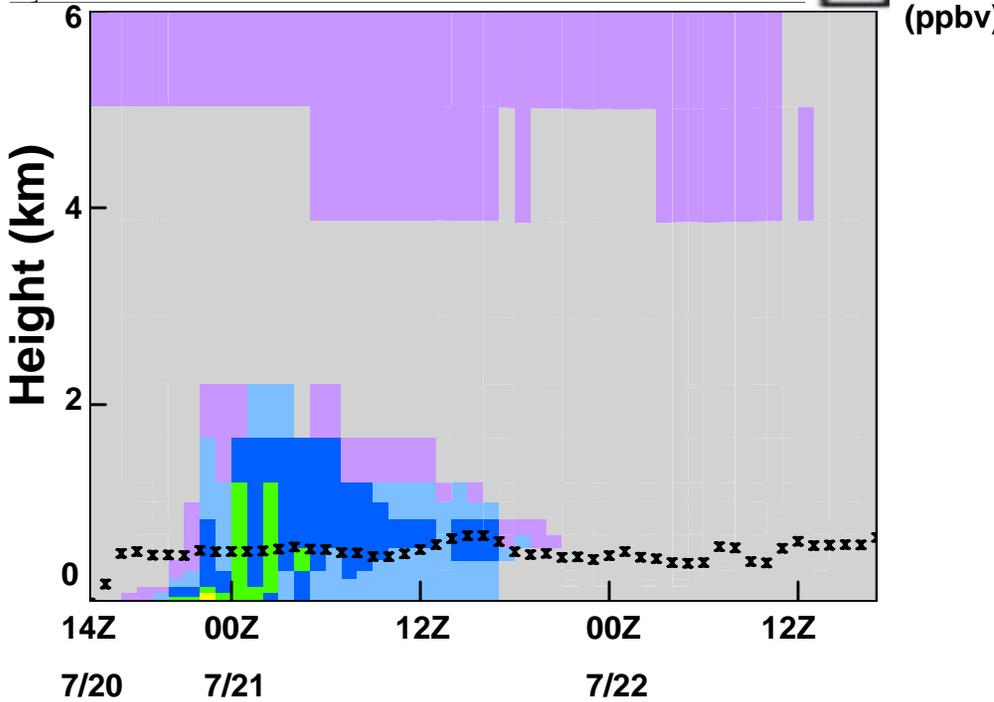


NO<sub>y</sub> 00Z 7/21 at ~500m





00Z 7/21 at ~500m





**Rob Griffin will conduct measurements with the UNH  
AMS at UH-Moody Tower Site**

