

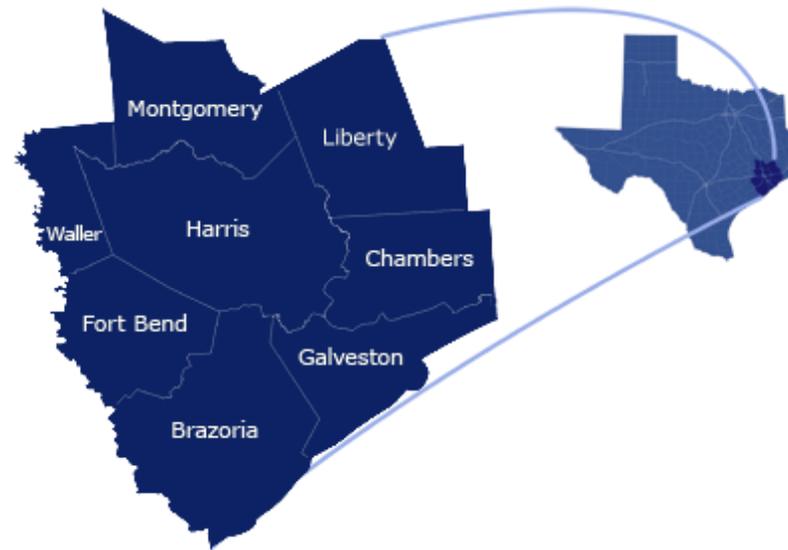
2008–2010 Base Case Model Performance Evaluation

Dennis McNally
James Wilkinson
Gregory Stella
Cyndi Loomis

Alpine Geophysics, LLC

T. W. Tesche

Consultant



On behalf of the Houston 8-hr Ozone Coalition

23 August 2012

Today's Focus

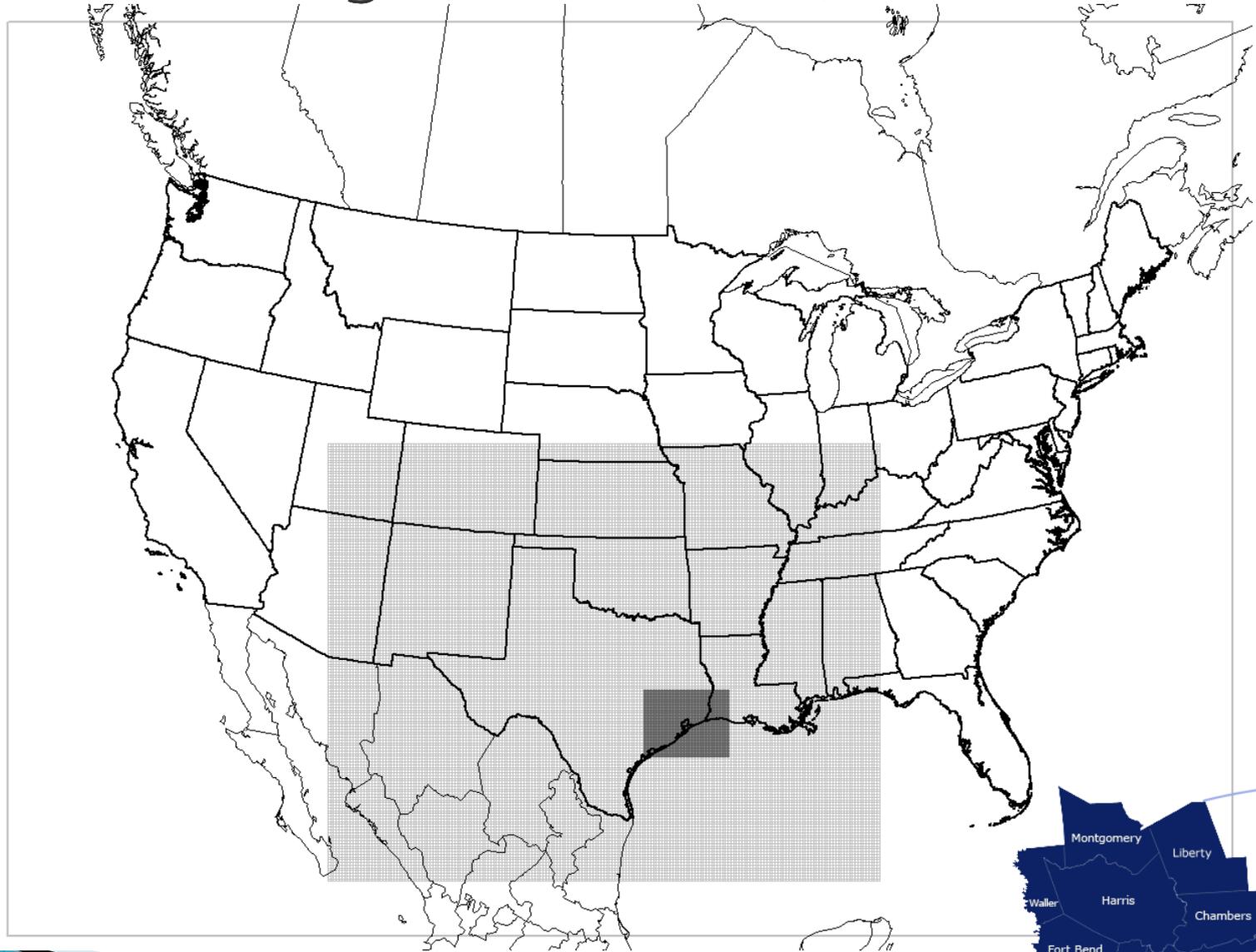
- ▶ Ensemble modeling approach
- ▶ 2008–2010 base case performance results
- ▶ Case studies
- ▶ Summary

Ensemble Member Science Configurations

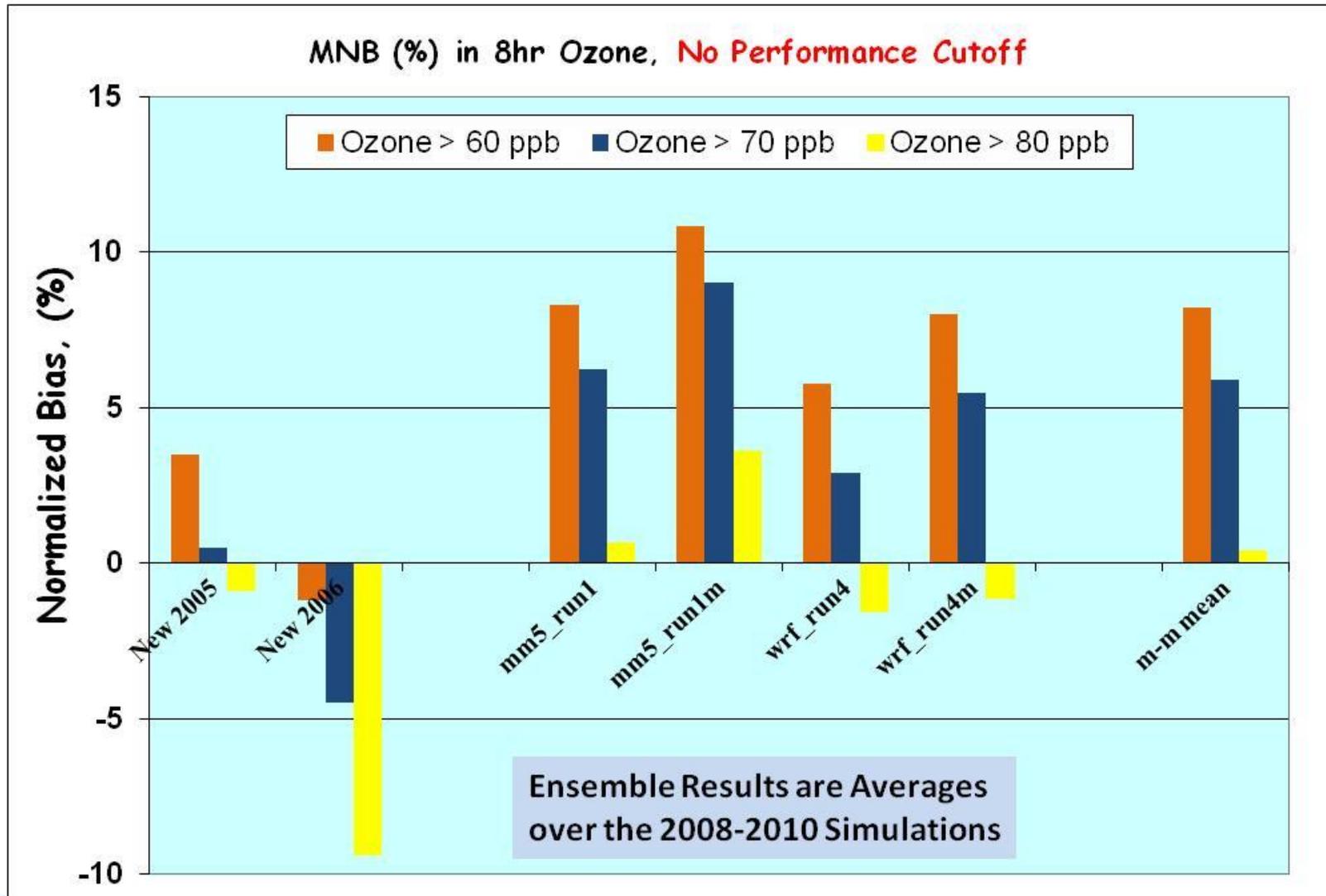
- ▶ Four (4) configurations:
 - MM5 / SMOKE_{GloEIS/MEGAN} / CAMx (mm5_run1)
 - MM5 / SMOKE_{MEGAN} / CAMx (mm5_run1 m)
 - WRF / SMOK_{GloBEIS/MEGAN} / CAMx (wrf_run4)
 - WRF / SMOKE_{MEGAN} / CAMx (wrf_run4m)

- ▶ Simulation Period
 - 13 April to 18 October (188 days)

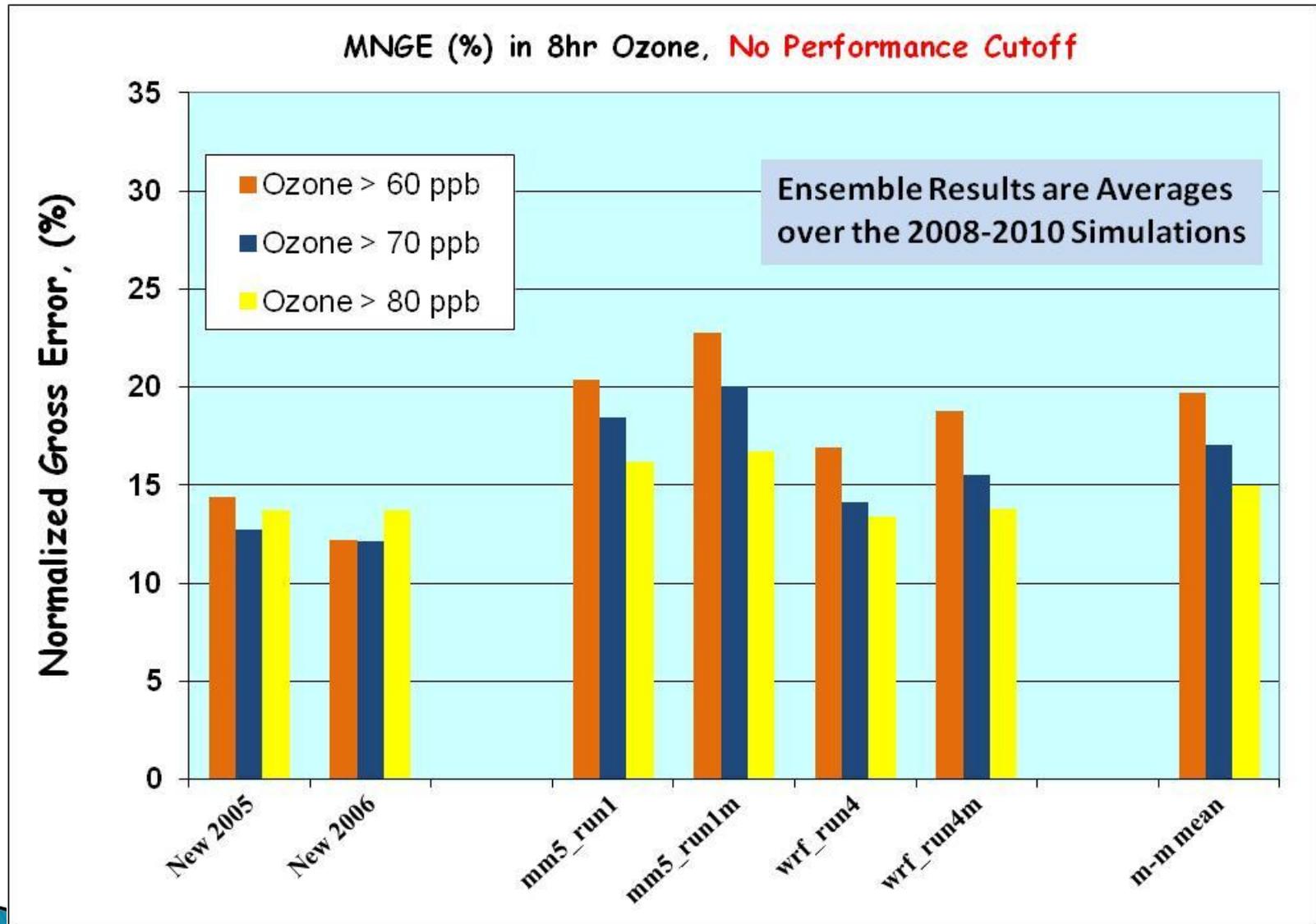
Modeling Domain (36/12/4 km)



Bias in Modeled Ozone: All Pairs

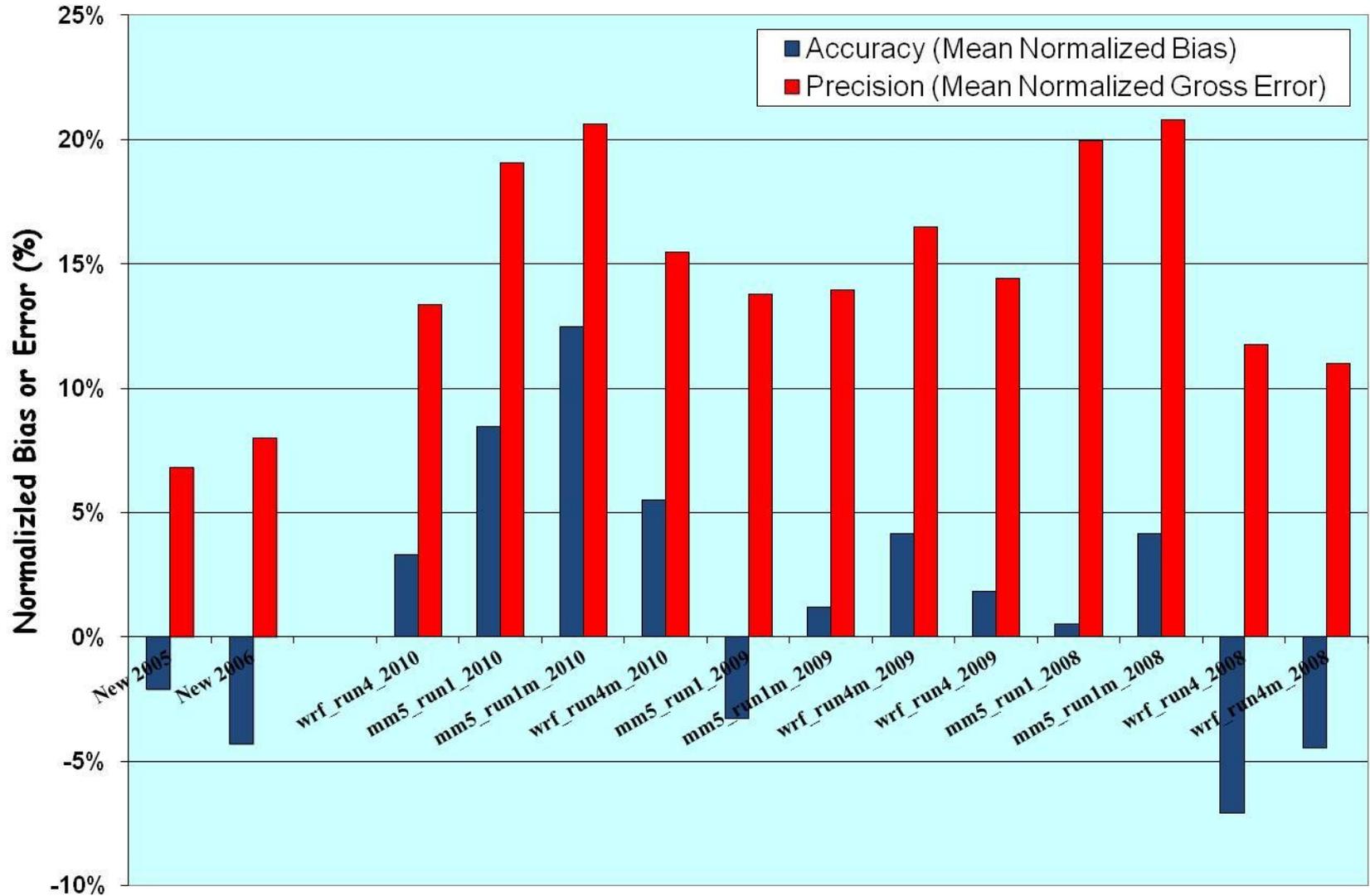


Error in Modeled Ozone: All Pairs



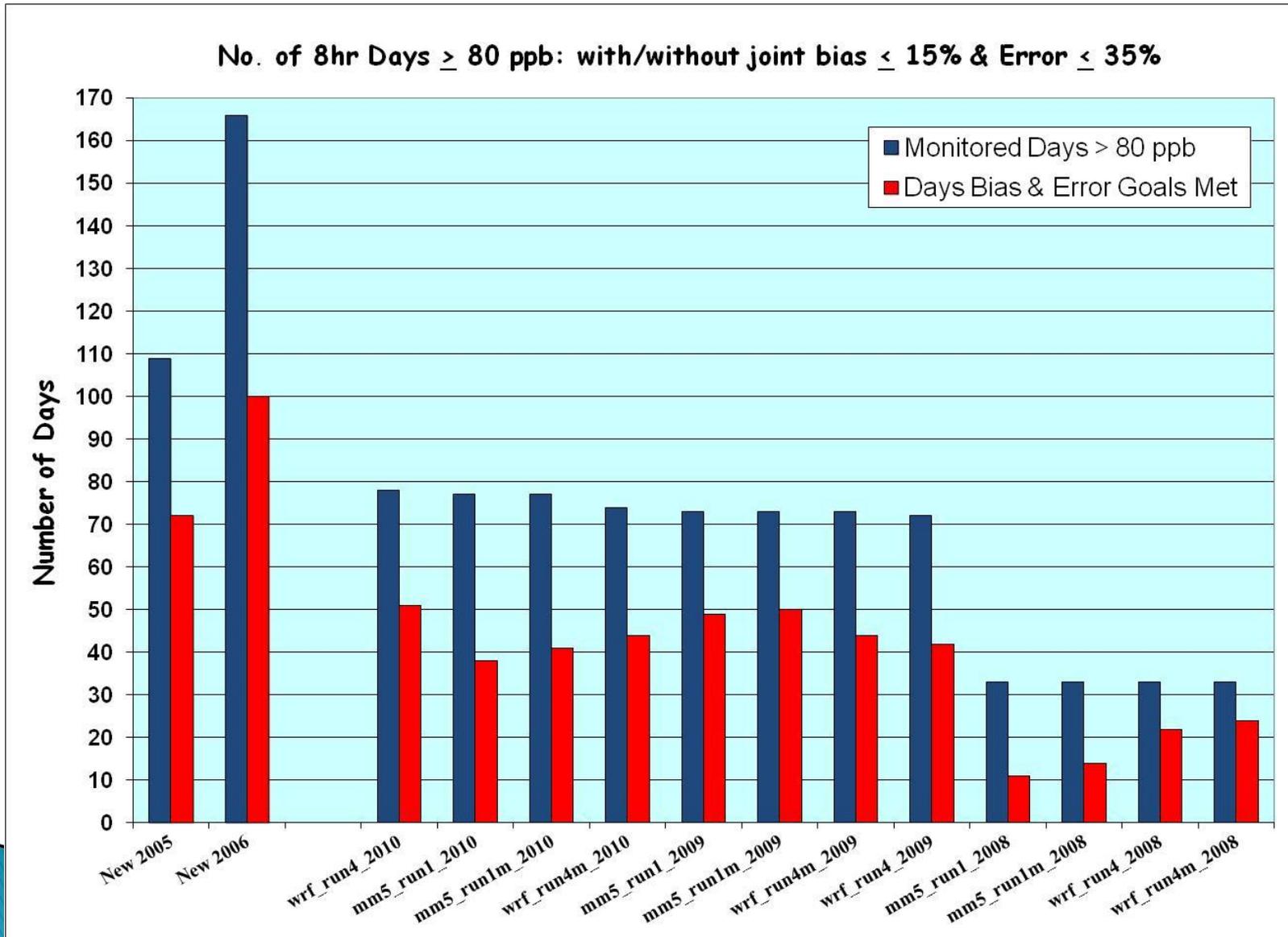
Bias & Error: Pairs Meeting Joint EPA Goals

8-hr O₃ Days \geq 80 ppb: with/without joint bias \leq 15% & error \leq 35%

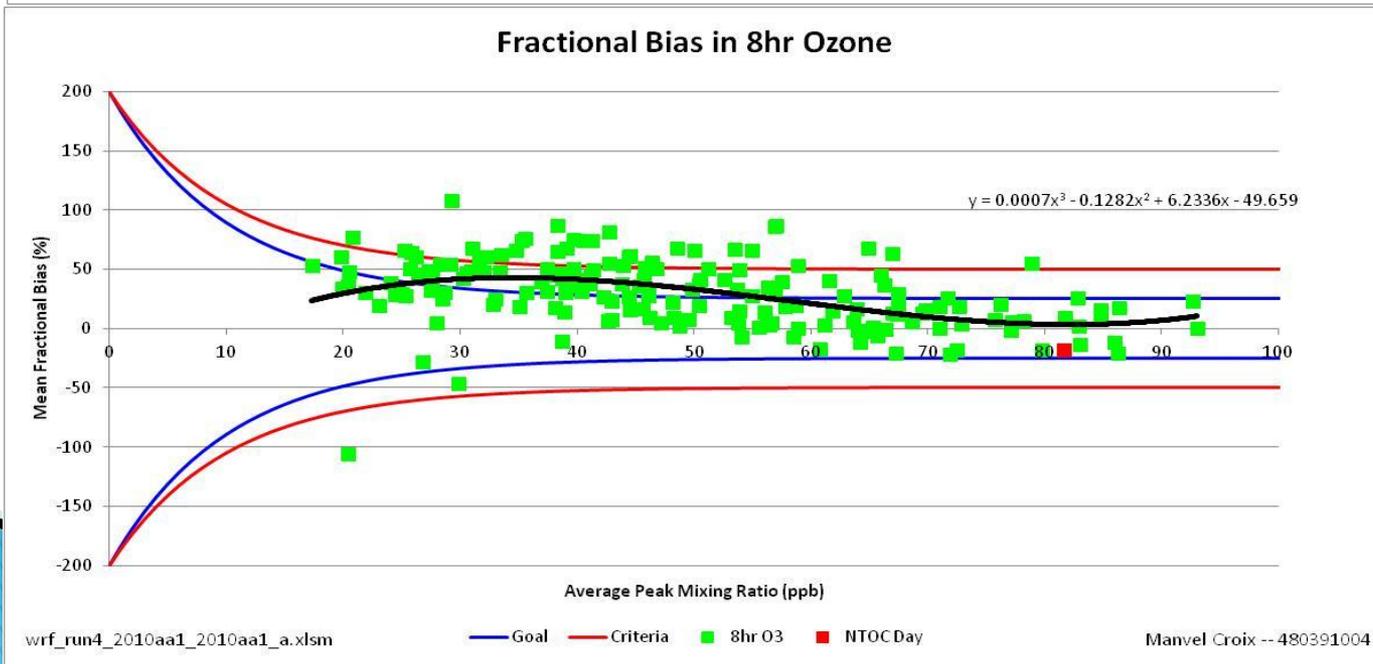
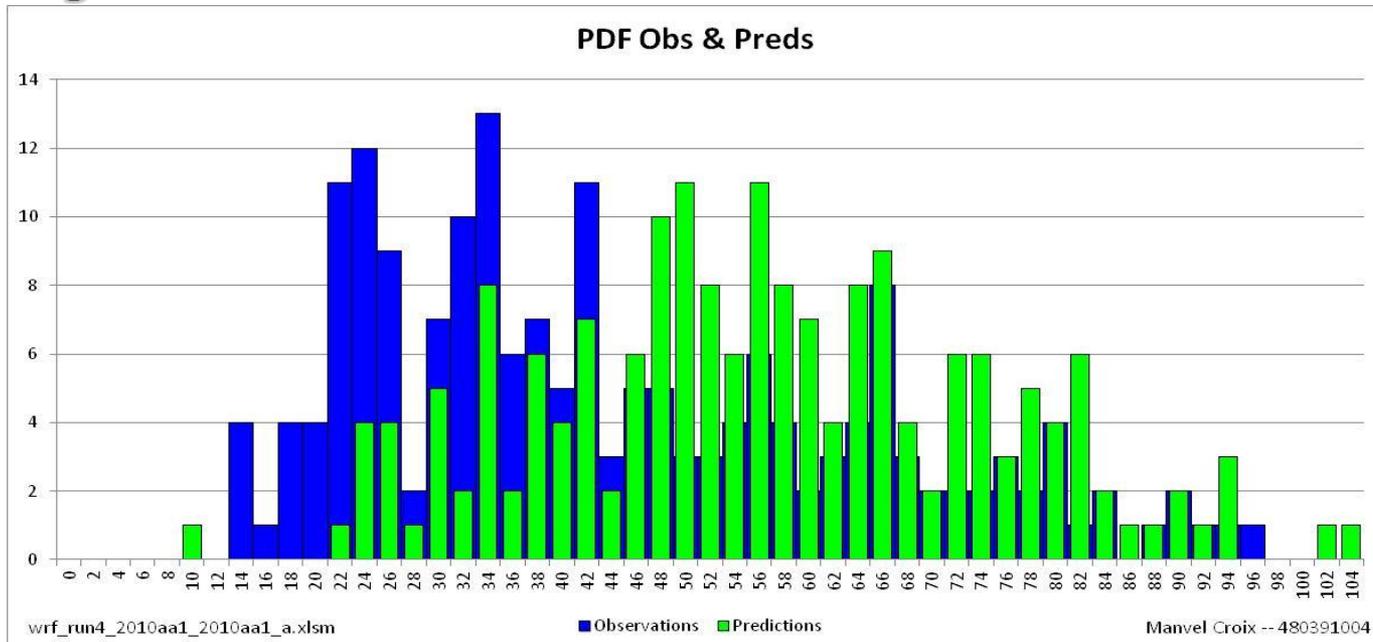


Number of High O₃ Days by Base Case

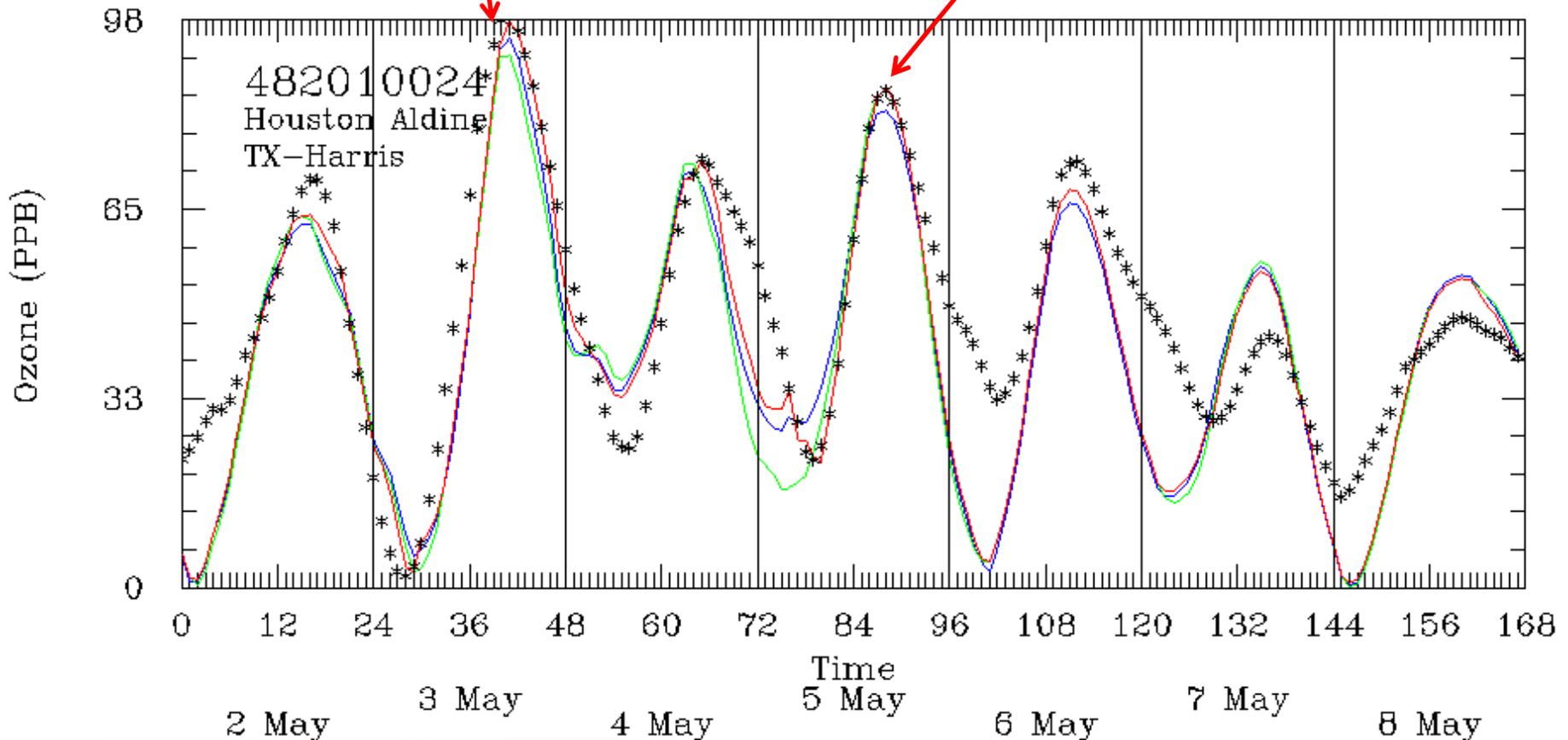
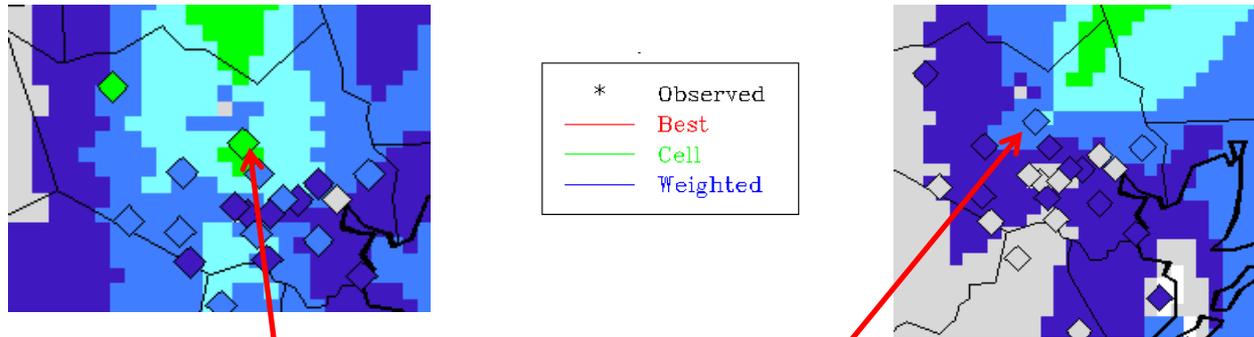
Between 58-67% of the days with O₃ ≥ 80 ppb satisfy the joint EPA bias (≤ ±15%) and error (≤ 35%) criteria.



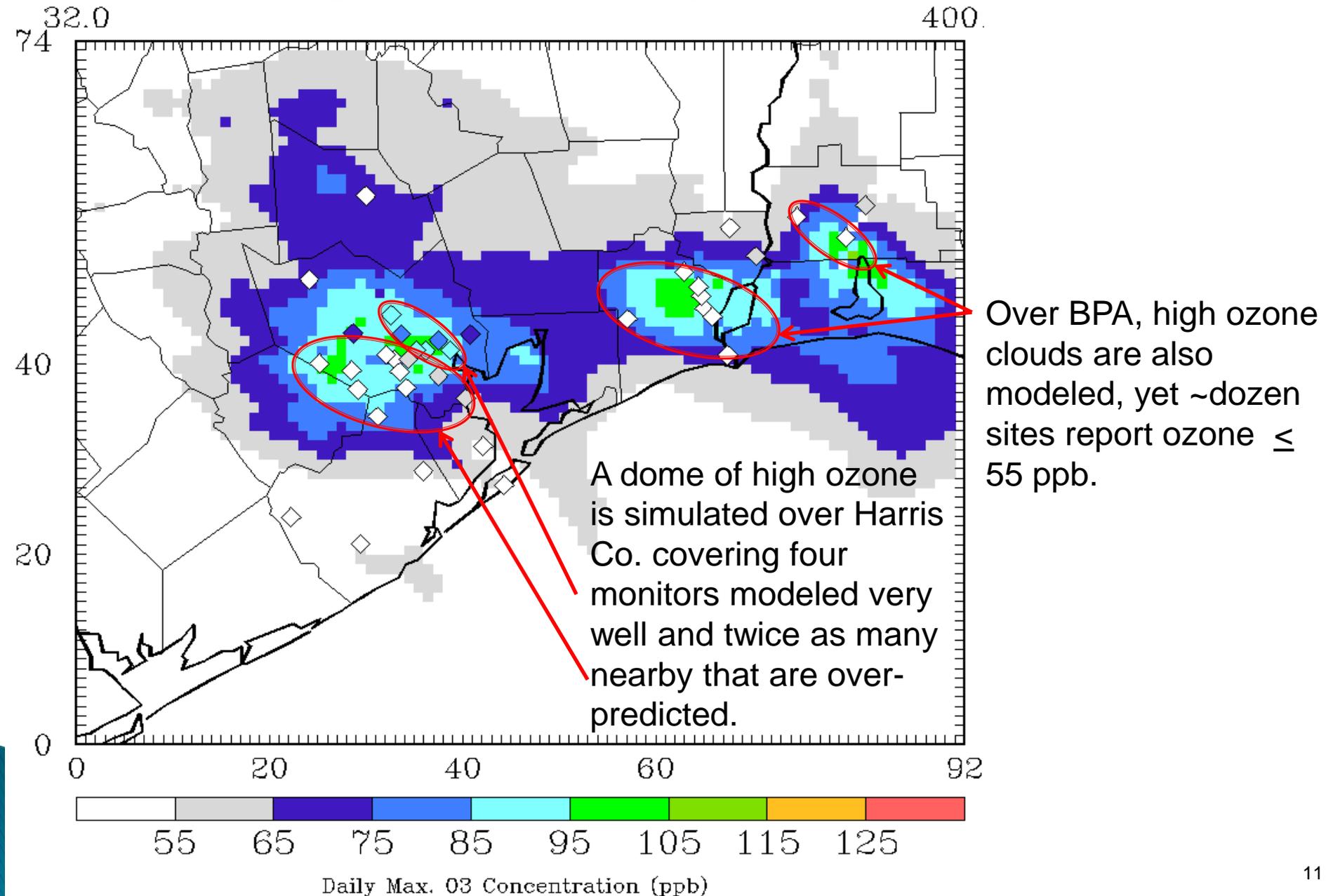
O₃ PDFs and Fractional Bias (wrf_run4)



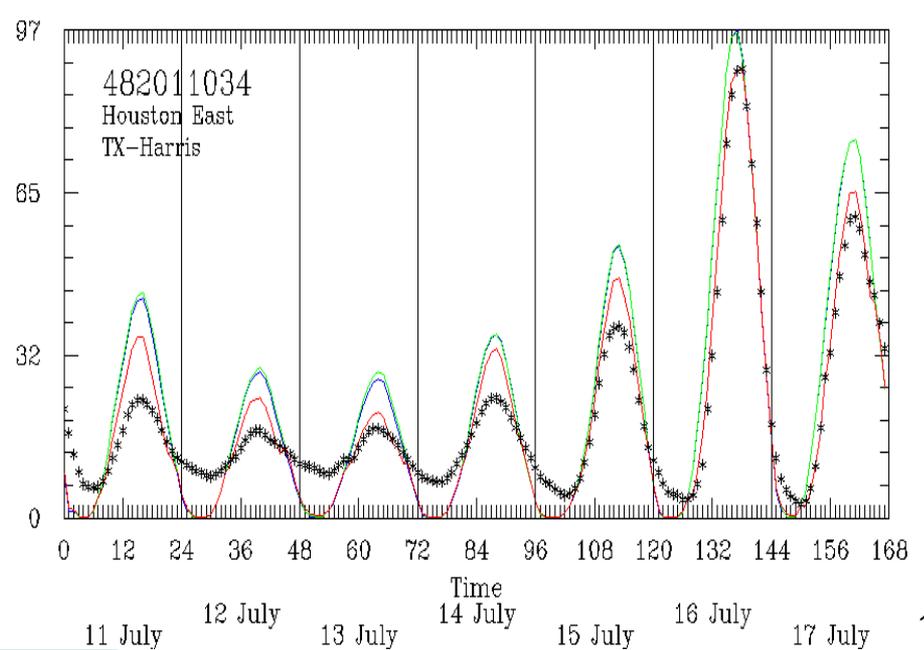
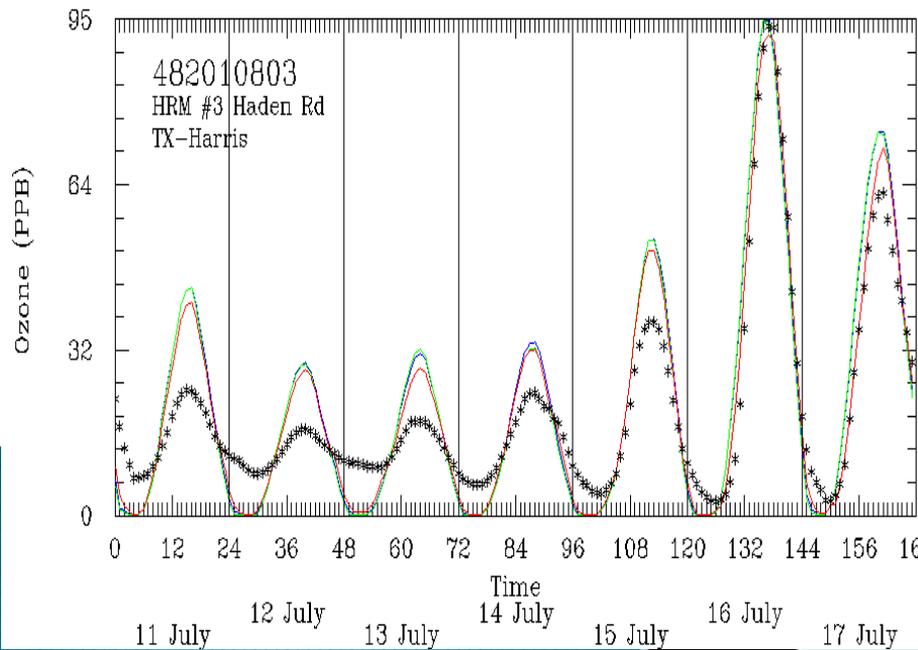
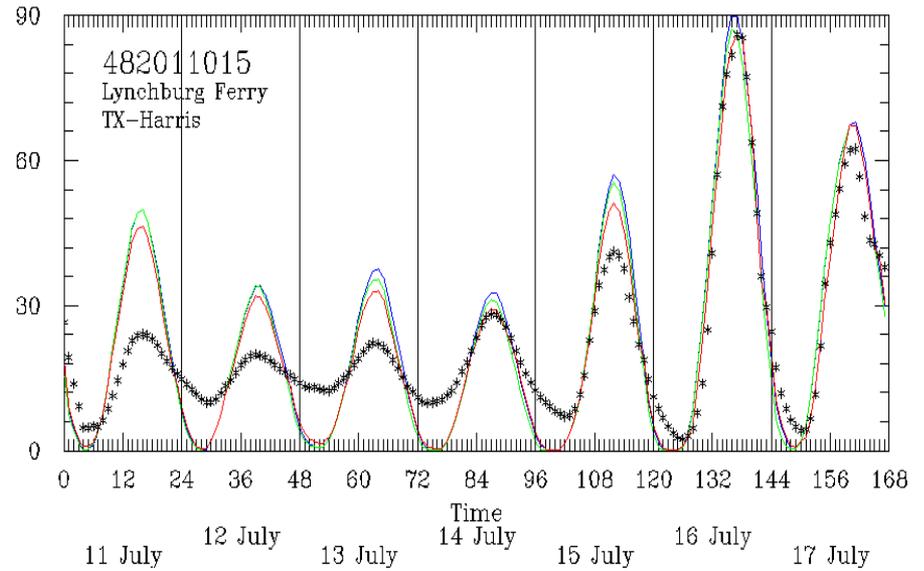
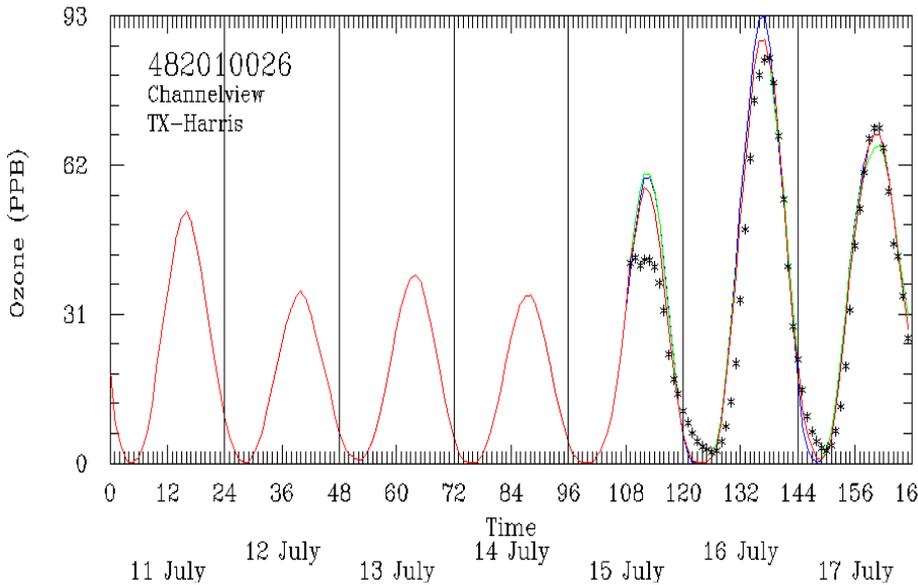
3 May & 5 May 2010 (wrf_run4)



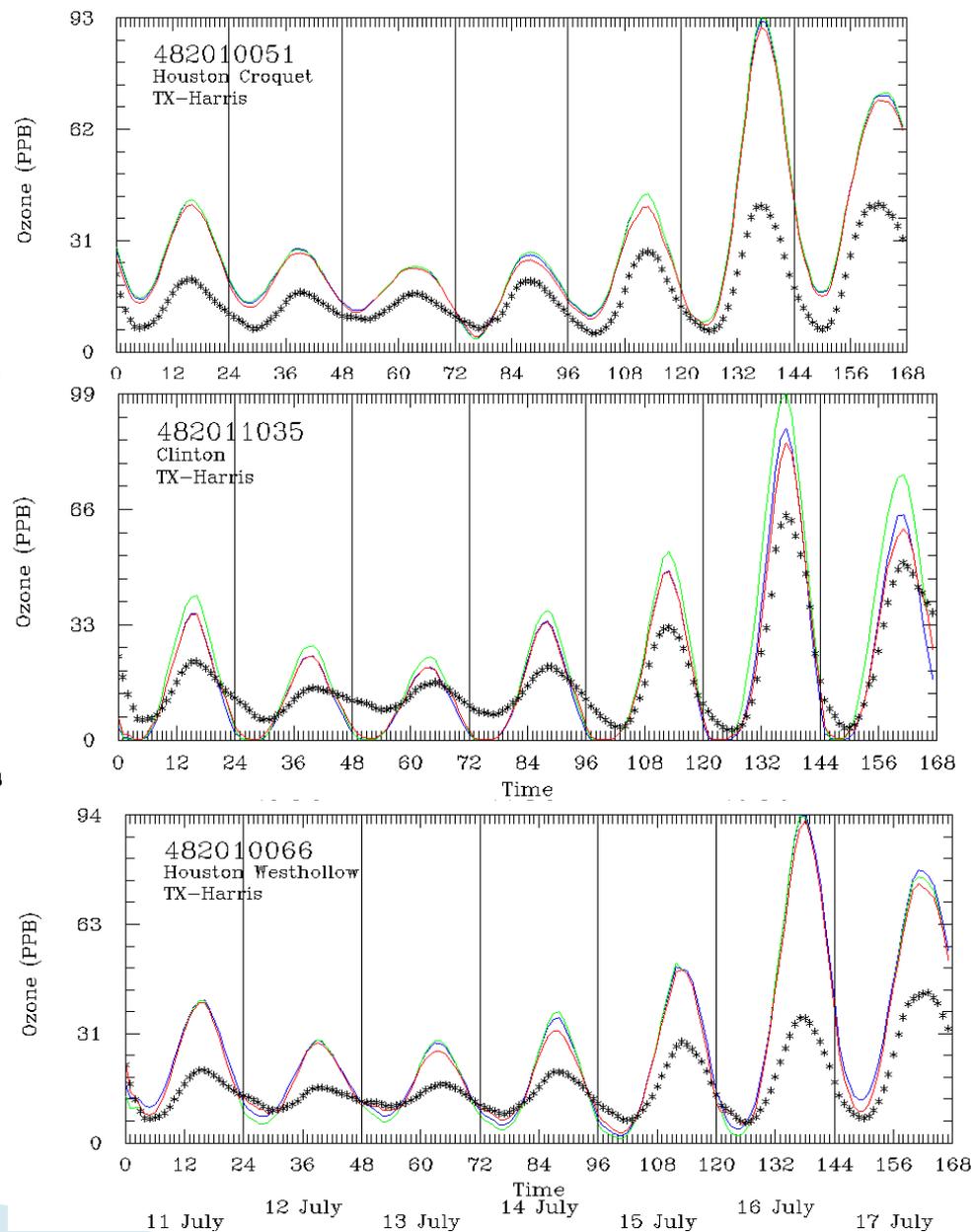
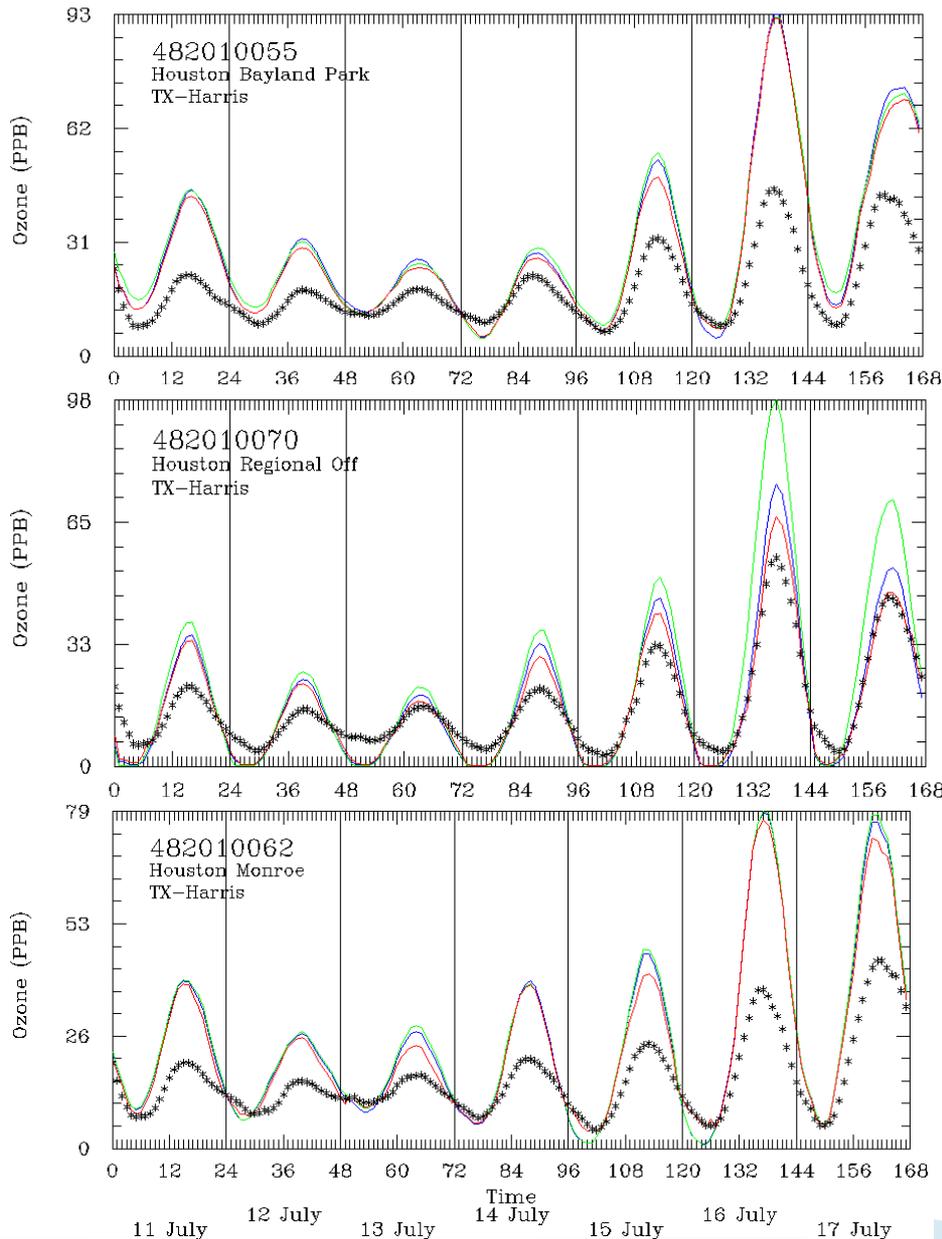
16 July 2010: Daily Max 8hr Ozone



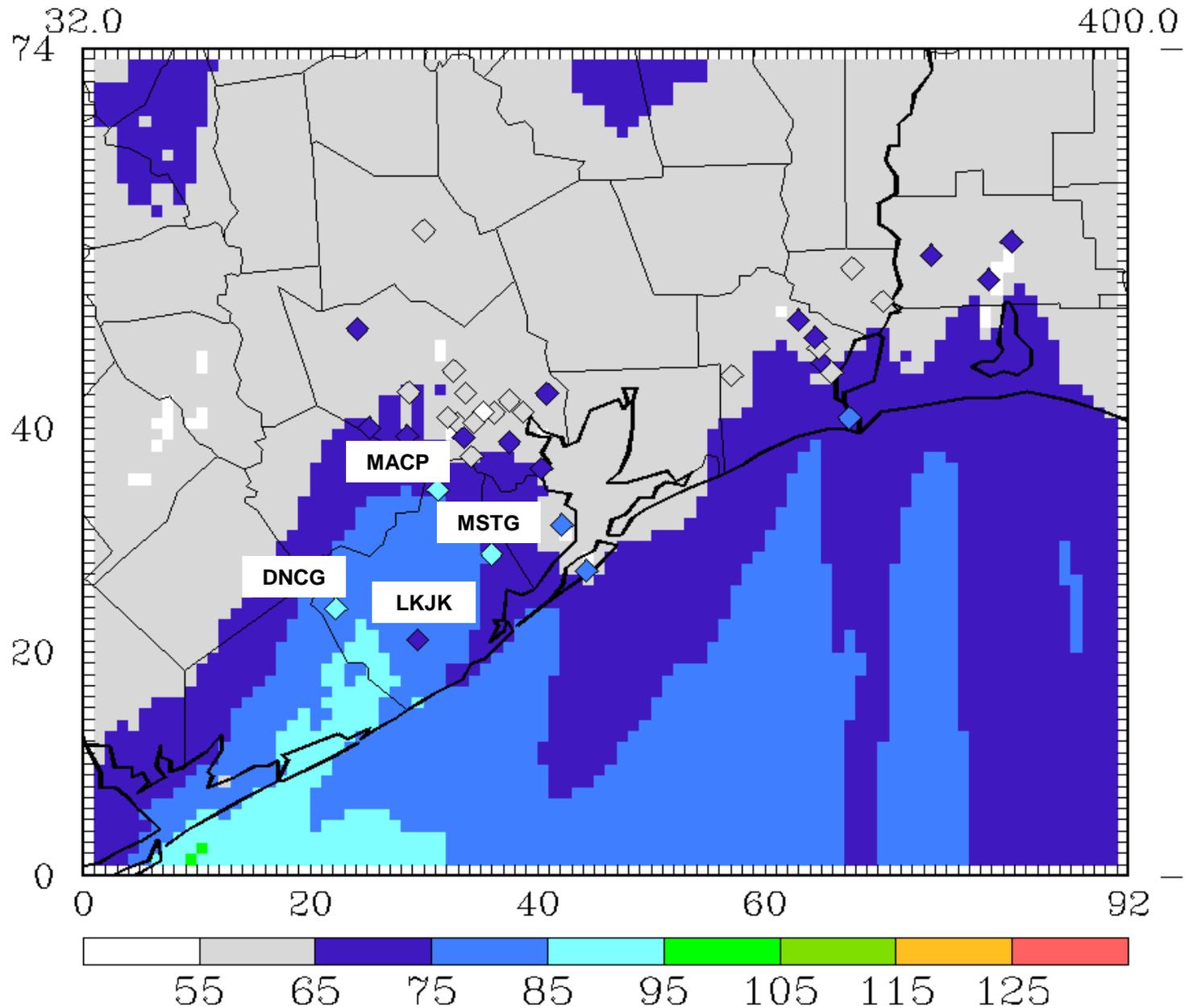
16 July 2010: 4 NTOC Sites



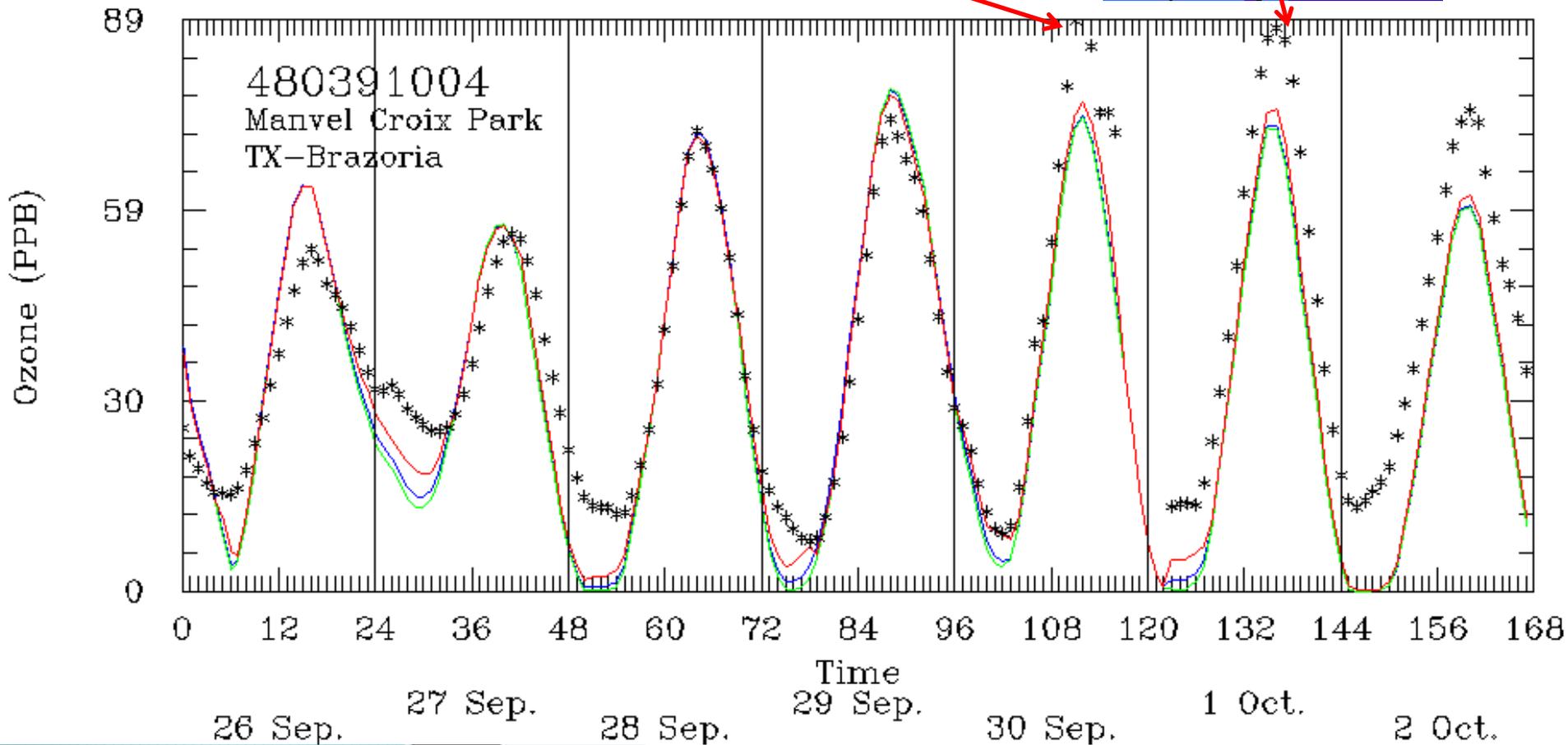
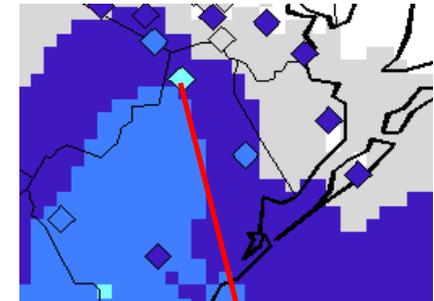
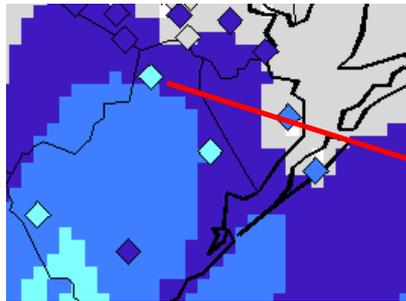
16 July 2010: O₃ Underprediction Sites



30 September 2010: Daily Max 8hr Ozone



30 Sept–1 Oct 2010 at Manvel Croix



Summary

- ▶ Performance of the 2008–2010 ensemble base cases comports with recent TX regulatory applications;
- ▶ Ample well-performing, high ozone days are available to support O₃ NAAQS attainment testing;
- ▶ The 2008–2010 ensembles provide a diverse set of source–receptor conditions for investigating model sensitivity and control scenario responses.