AIR QUALITY FORECAST VERIFICATION 2005: 5x, 5x3 and 3x Comparisons

- We compared the performance of two models with different configurations. The developmental model was subject to change.
- (5x) 5x developmental tests to provide feedback for possible model configuration changes, on conterminous U.S. (CONUS).
- (5x3) 5x developmental tests on the 3x domain which allowed comparisons in performance to the 3x model predictions.
- (3x) 3x Experimental tests on the eastern U.S. to assist in the validation of 3x verification provided by NCEP. A graphic of the 2005 3x domain is given in Fig. 2.

Table 1. Monthly contingency results for June - September, 2005. Data gaps may have affected June results.

Table 2. Contingency results for the 2005 season, lower 5x POD from under-prediction in California.

Fig. 1. Introduction: Objectives, Air Quality Verification, Summer 2005.

Fig. 2. 3x grid over the eastern U.S., 935 stations, 2005.

2X2 Contingency Definitions

- $H = (a + d)/(a + b + c + d)$
- $TS = a/(a + b + c)$
- POD = $a/(a + c)$
- FAR = $b/(a + b)$

Fig. 3. Definition of H, TS, POD, FAR.

Fig. 4. 8-h 5x3 vs. 3x, correctly predicted/observed events, June 15 – August 13, 2005. Similar performance after July 8.

Fig. 5. 8 hour 5x3 vs. 3x, POD, June 30 results (cold start).

Fig. 6. 8 hour 5x3 vs. 3x, FAR, June 15 – August 13, 2005.

Fig. 7. Bias, 8 hour 5x3 vs. 3x, August 1 - 15, 2005 (3x obs in black).

Fig. 8. MAE, 8 hour 5x3 vs. 3x, August 1 - 15, 2005 (5x obs in black).

Fig. 9. 8-h 3x ozone predictions with observations, August 13, 2005.

Fig. 10. 8-h 5x ozone predictions with observations, August 13, 2005, similar to 3x.

CASE STUDY, JULY 12, 2005, SURFACE OZONE REDUCTION ASSOCIATED WITH THUNDERSTORMS

- We examined the observations recorded at four stations located in the narrow band of predicted exceedances for July 11 - 12. Hits are correct predictions > 85 ppb.
- Table 3 shows verified hits over Delaware, Ohio, and Michigan, but not over Pittsburgh, PA, for day 2 (July 12).

Table 3. 8-h observations for four stations, July 11 - 12, 2005.

Fig. 11. 8-h 5x predictions and observations, July 12, 2005.

Fig. 12. Surface observations for July 12, 2005, 2300 UTC.

Fig. 13. Summary, Summer 2005.