

Emissions Sensitivity

Kirk Baker & Mark Janssen

MRPO and LADCO

June 2005 RPO Meeting: Denver, CO

Speciation Sensitivities

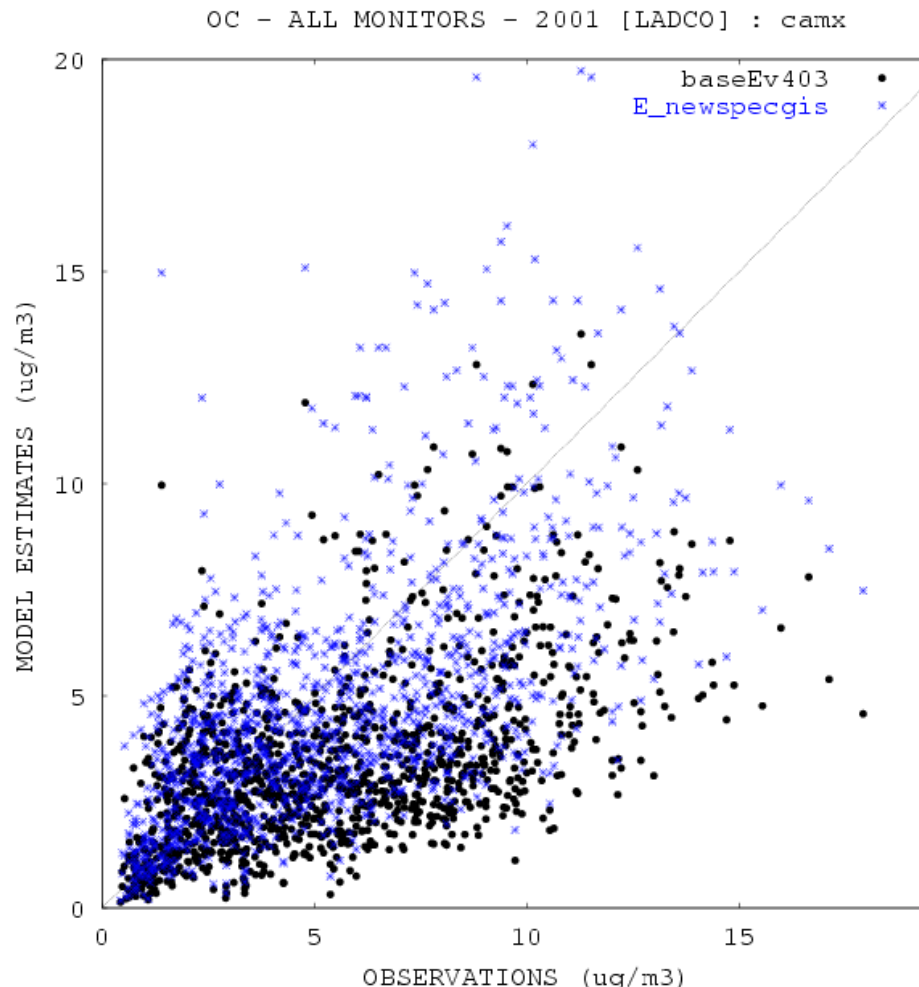
- Updated speciation profiles
- Explicitly speciate dust and “other”, not a single combined dust & other category
- Organics: large improvement
- SOIL: large “improvement”
- EC: stayed about the same
- PNO3: stayed about the same
- PSO4: no change

4 of the top 5 total mass profiles were updated:

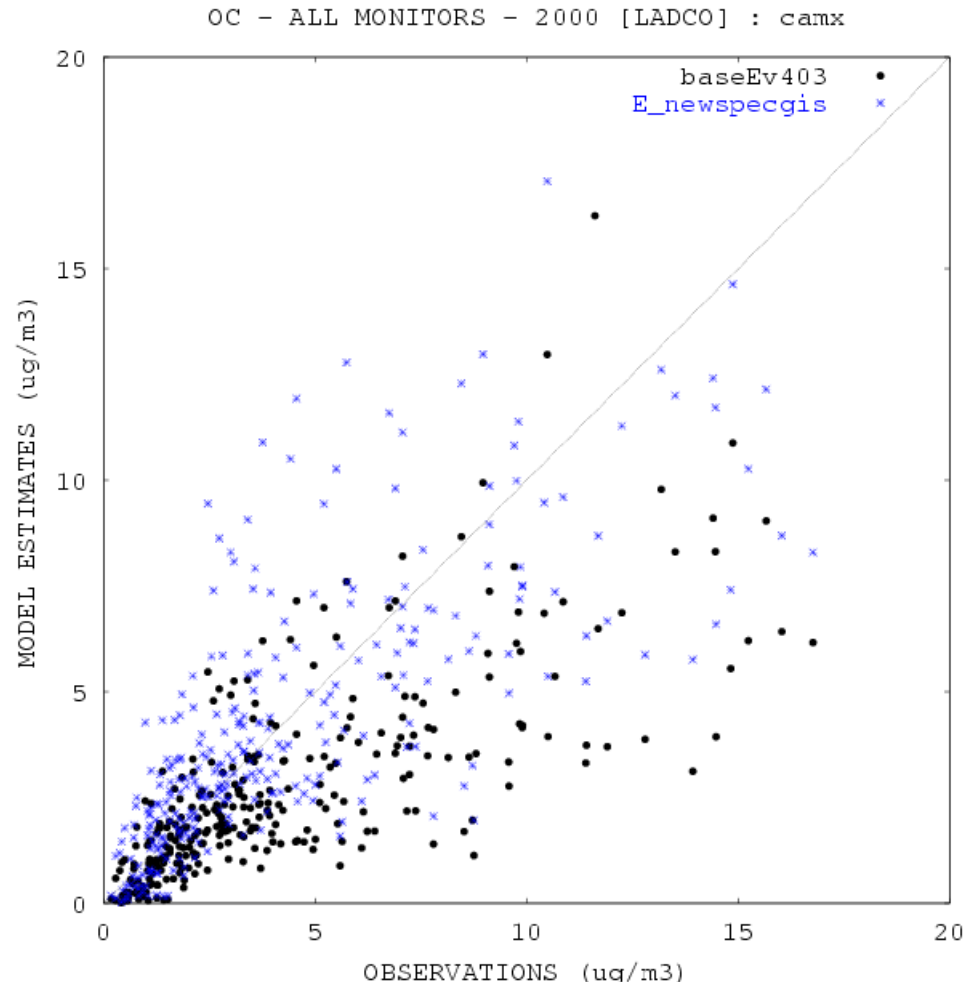
SCC1	SCC3	SCC6	SCC8	PROF#	TPD
Waste Disposal, Tre	Open Burning	All Categories	Land Clearing Debr	CMU03	698
Waste Disposal, Tre	Open Burning	Residential	Household Waste (us	CMU03	446
Mobile Sources	Off-highway Vehicle	Agricultural Equipm	Total	CMU01	420
Industrial Processe	Mining and Quarryin	All Processes	Total	CMU04	384
Mobile Sources	Unpaved Roads	All Unpaved Roads	Total: Fugitives	22059	297

New Speciation: PM2.5 Organics

July 2001 Episode



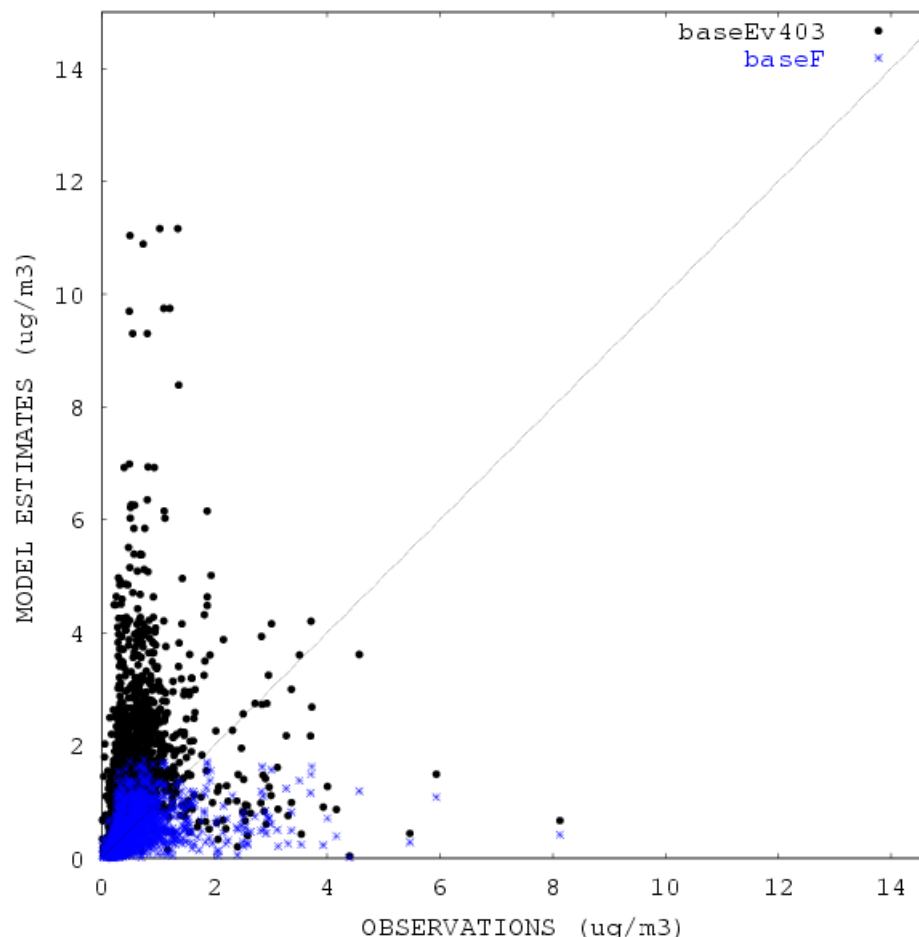
Jan 2000 Episode



Dust and “Other” Speciated Explicitly: **SOIL**

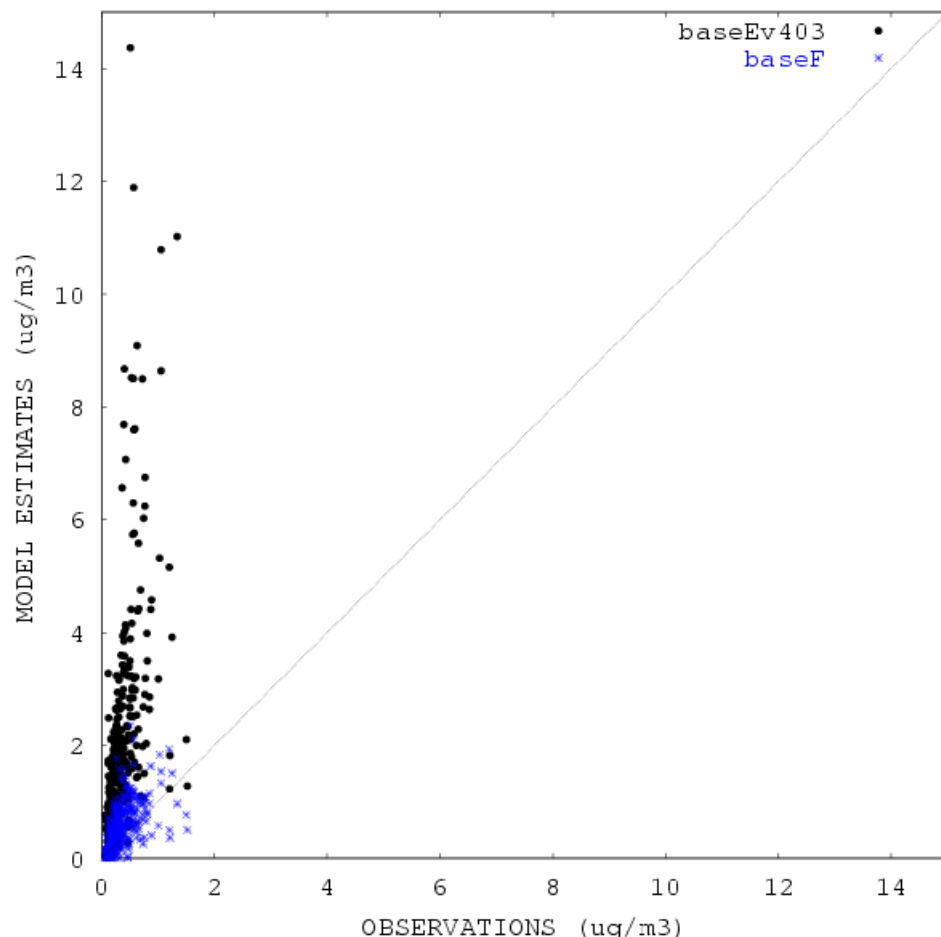
July 2001 Episode

SOIL - ALL MONITORS - 2001 [LADCO] : camx



Jan 2000 Episode

SOIL - ALL MONITORS - 2000 [LADCO] : camx



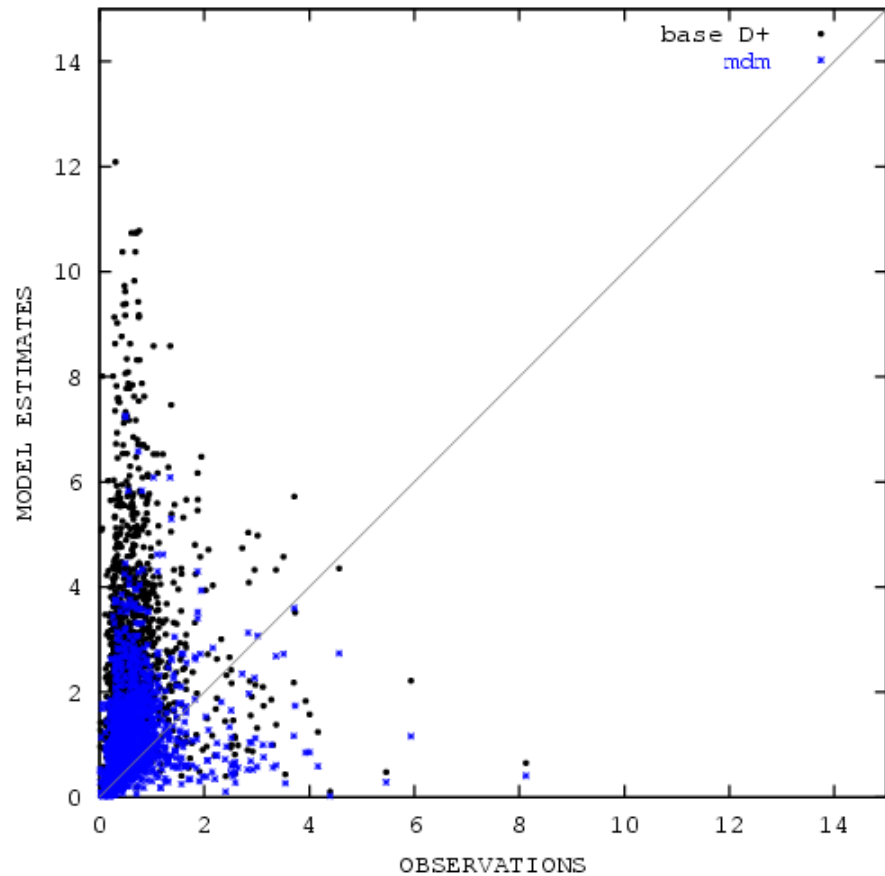
PM2.5 Crustal/Dust

- 90% transport fraction applied in EMS
- Additional mass removed based on landuse type and time of day; ultimately a 97.5% transport fraction for forest grid cells over-night and 90% transport fraction for rangeland during the day
- No amount of transport fraction applications makes the model performance better; it “improves” the bias but the correlation is still very poor
- The answer is not with transport fractions, but with a dust model

Dust Modification

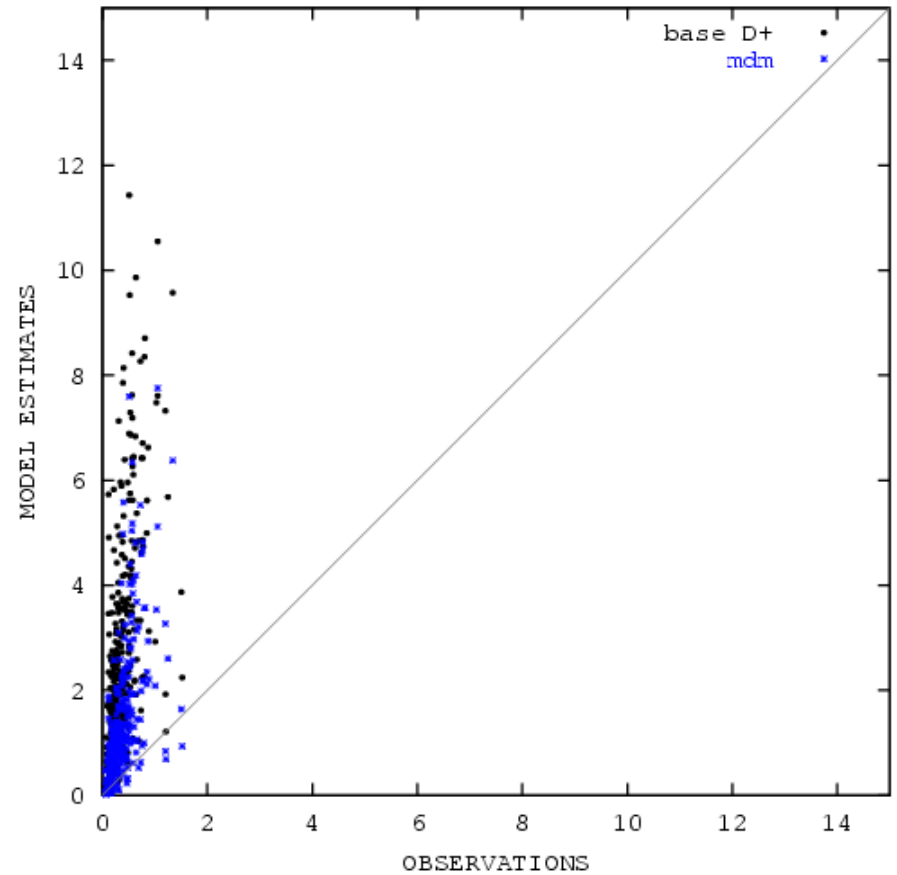
July 2001 Episode

SOIL (ug/m3) - ALL MONITORS - 2001 [LADCO]



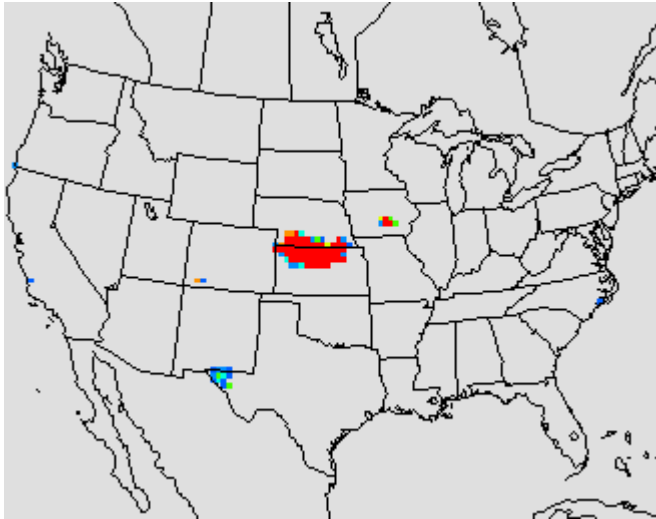
Jan 2000 Episode

SOIL (ug/m3) - ALL MONITORS - 2000 [LADCO]

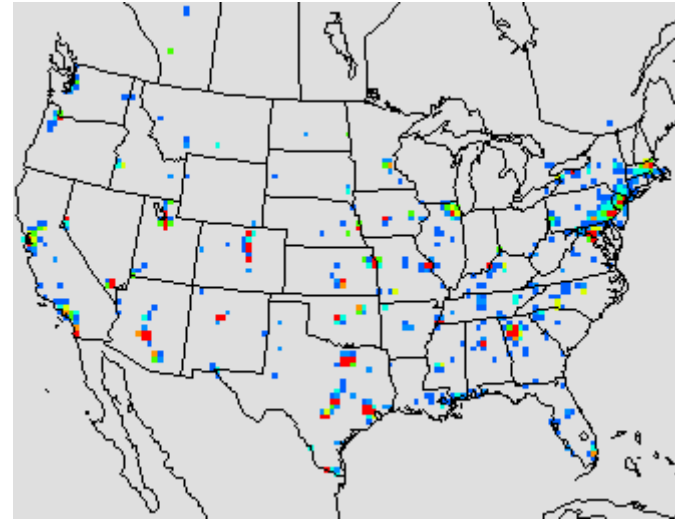


Dust Comparison

WRAP Dust Model



Traditional Inventory Techniques



- WRAP dust model relates dust emissions to landuse and meteorology
- Traditional inventory techniques relate dust emissions primarily to road dust and ultimately population centers

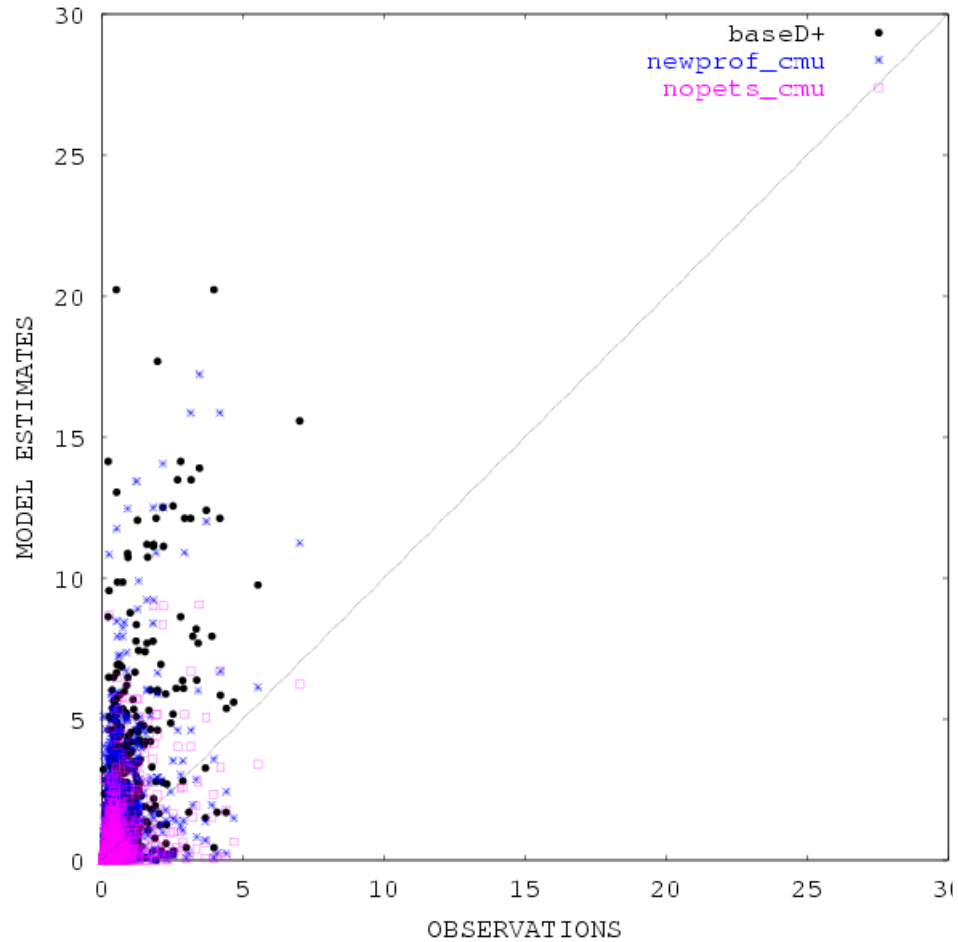
Ammonia Sensitivity Runs

- Using default confined animal operations temporal profiles, monthly fertilizer, and including all pets and human ammonia emissions
- Sensitivities:
 - Improved temporal profiles for confined animal operations
 - No pets, humans, or deer ammonia emissions

PNO3 Scatter Plots

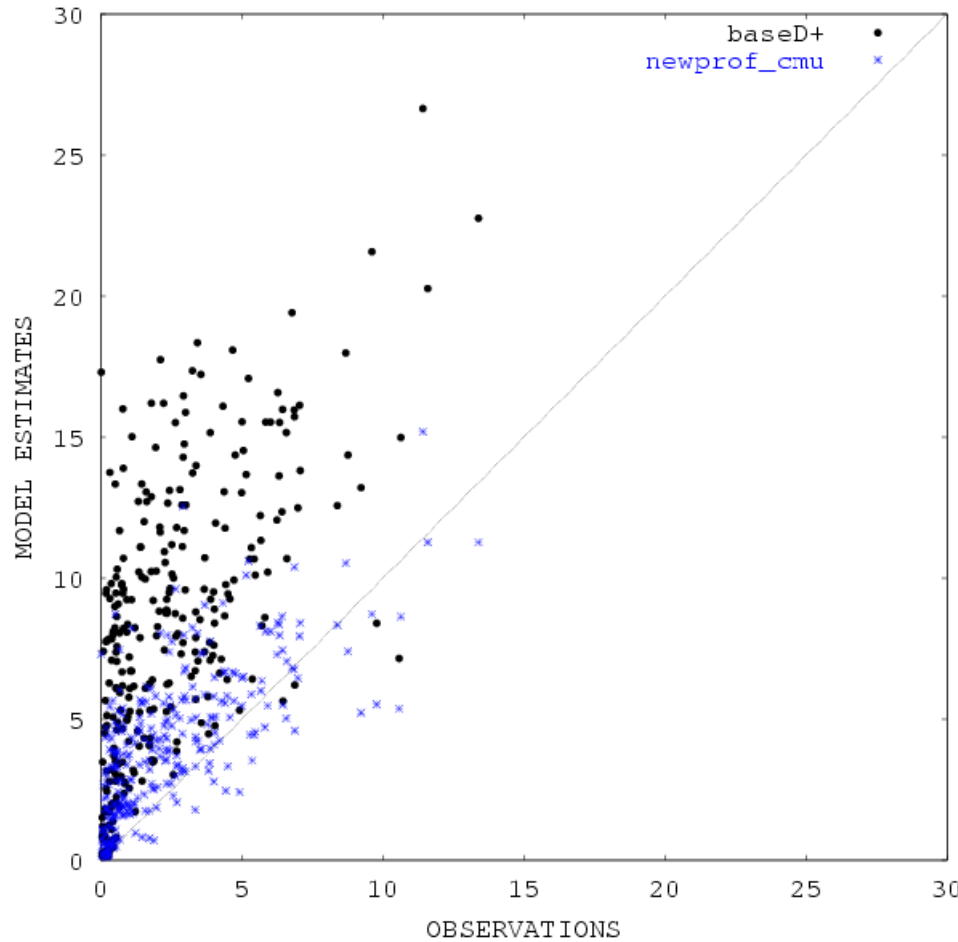
July 2001 Episode

NO3 (ug/m3) - ALL MONITORS - 2001 [LADCO]



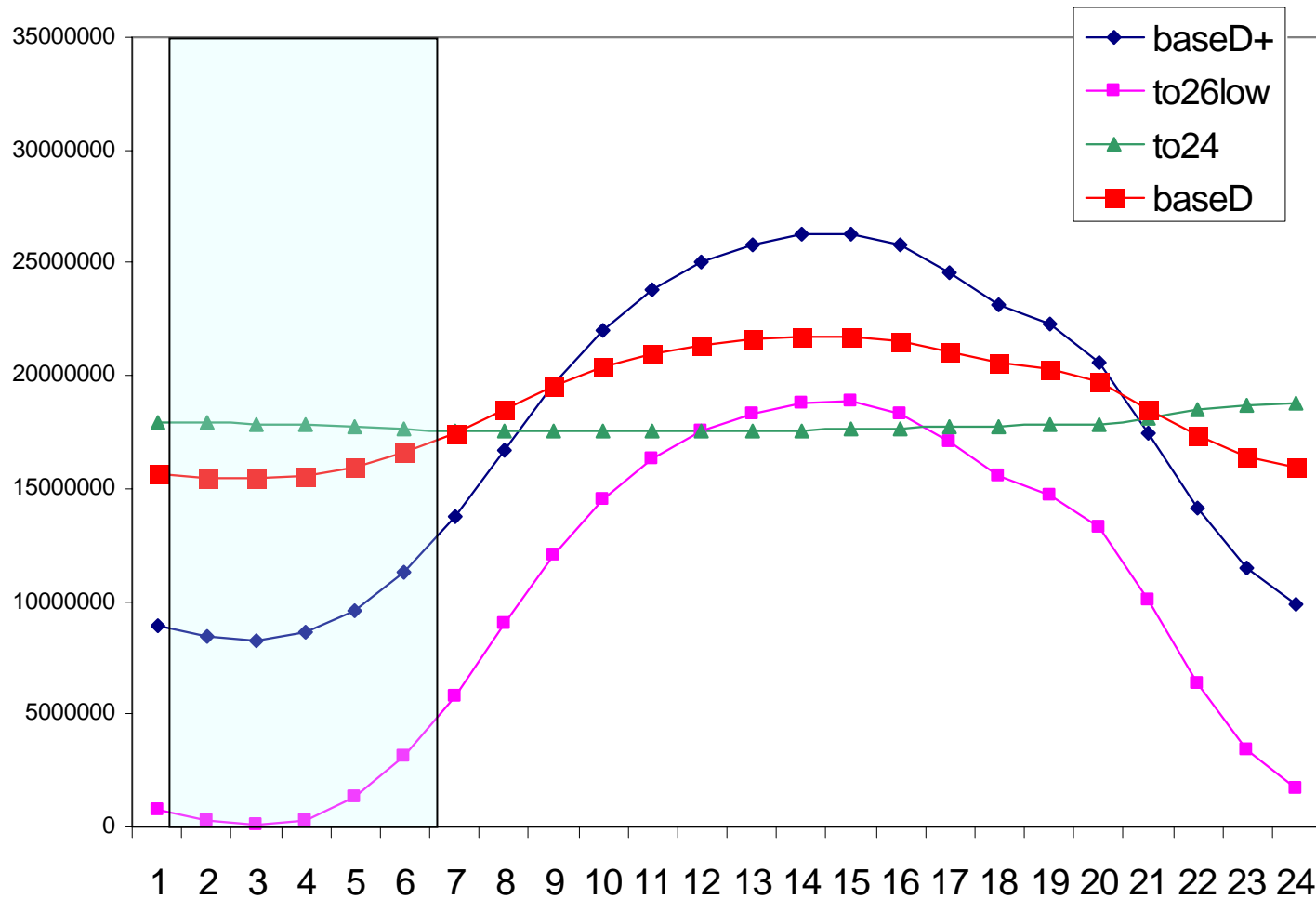
Jan 2000 Episode

NO3 (ug/m3) - ALL MONITORS - 2000 [LADCO]



Ammonia Diurnal Sensitivities

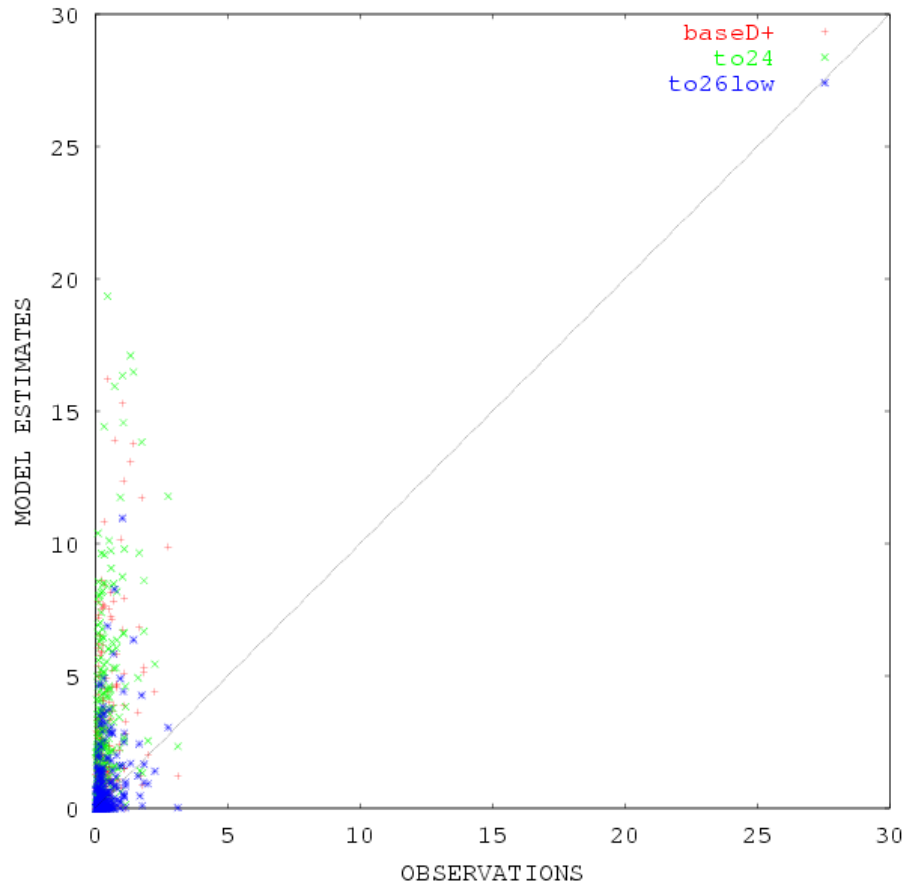
Ammonia Emissions (moles/hr)



PNO3 Scatter Plots

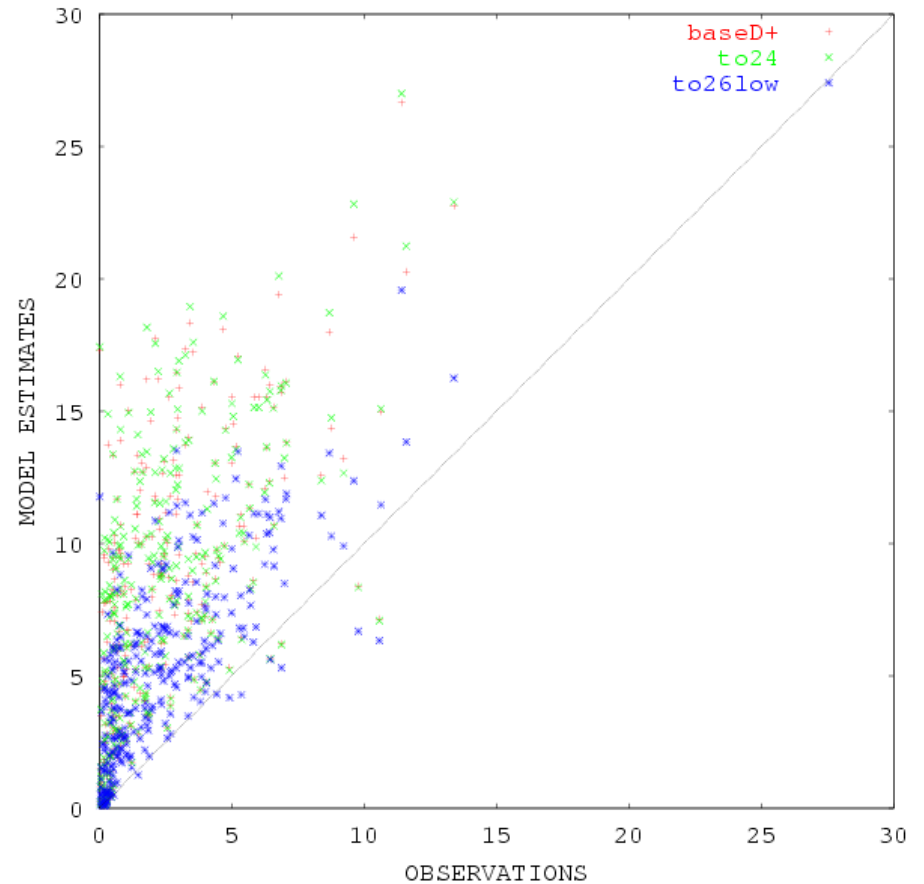
Aug 1999 Episode

NO3 (ug/m3) - ALL MONITORS - 1999 [LADC0]



Jan 2000 Episode

NO3 (ug/m3) - ALL MONITORS - 2000 [LADC0]

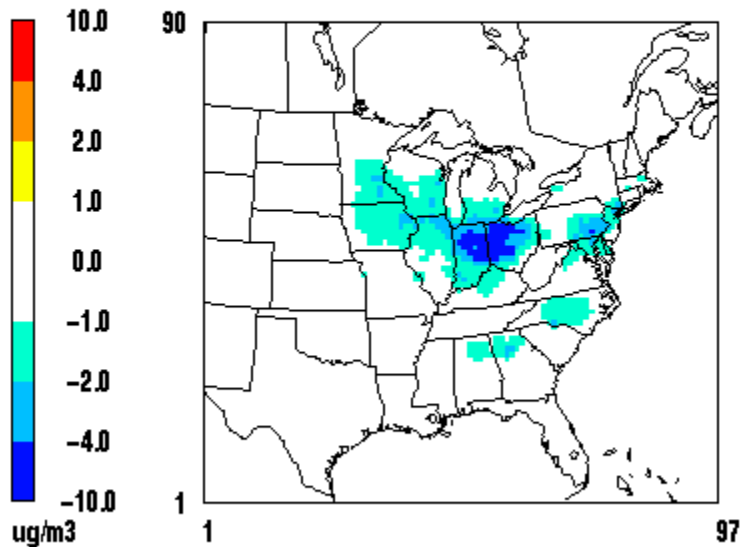


Episode Average Spatial Differences

Aug 1999 Episode

to26low – baseDplus

**Episode Average PNO3 Difference
36km grid**

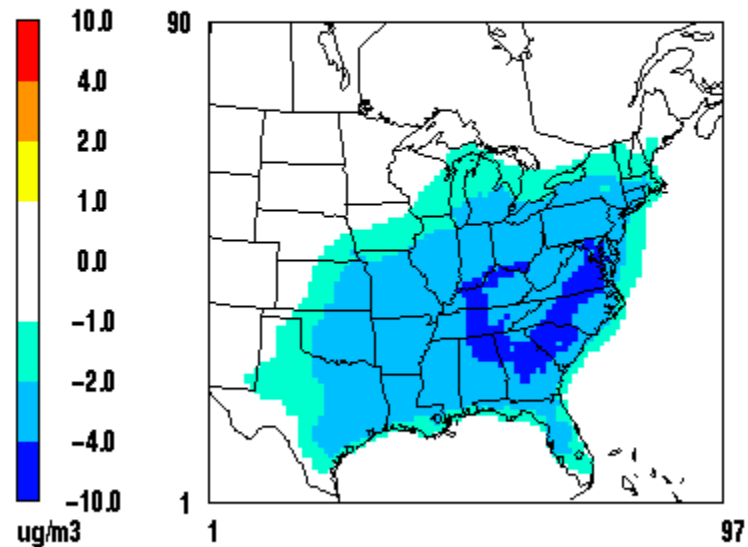


August 9, 1999 0:00:00
Min= -5.4 at (57,48), Max= 0.0 at (85,55)

Jan 2000 Episode

to26low – baseDplus

**Episode Average PNO3 Difference
36km grid**



January 8, 2000 0:00:00
Min= -4.6 at (65,32), Max= 0.0 at (64,2)

SOA and Biogenics

- Update CAMx4 SOA module to include yields from sesquiterpenes, OVOC, and high/low yield monoterpenes
- Additionally it will include CG reactivity, polymerization of biogenic and anthropogenic SOA
- Updating the biogenic model in CONCEPT to include the latest science and output the species needed to appropriately model SOA
- Project seeks to avoid having to make biogenic emissions estimates all be a function of the 'TERP' species output by BEIS