

New CASTNET Passive Ammonia Monitoring Program

Presented to IMPROVE Steering Committee, Durango, CO
Sept. 5-8, 2007

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A Brief History of Ammonia Monitoring, Part 1

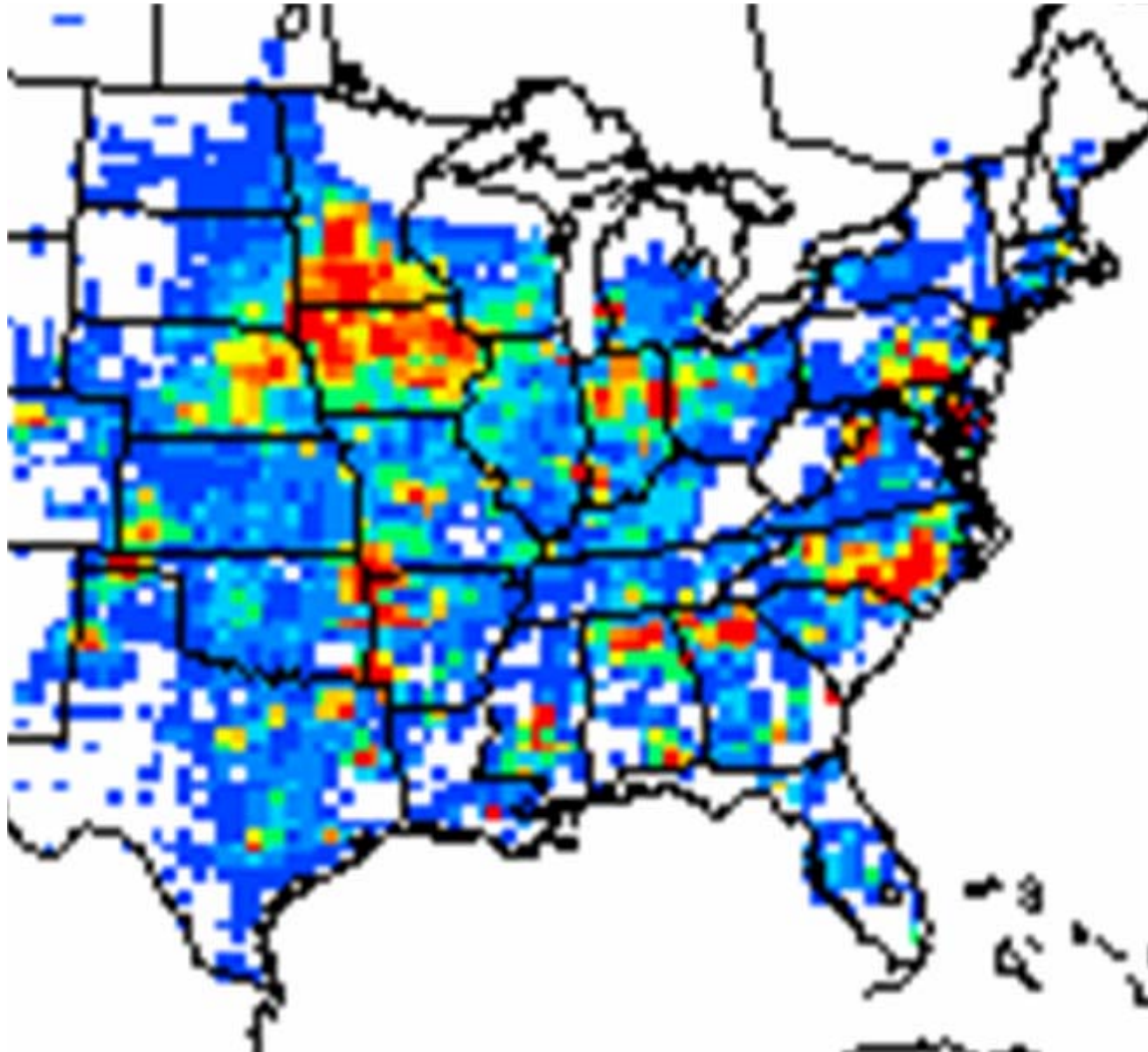
- Despite importance of ammonia in atmospheric chemistry, no national studies or routine monitoring of ambient (**non-source-influenced**) concentrations has been done
- To fill data gap, MRPO and CENRAP began rural monitoring in Oct. 2003
- 10 sites: 9 rural, 1 urban
- All IMPROVE sites except Pleasant Green, MO
- Denuder/filterpack sampling
 - Phosphoric acid coated denuder for NH_3
 - Sodium carbonate coated denuder for HNO_3 and SO_2
 - Teflon filter followed by nylon filter (for nitrate dissociation)
 - Two sites (Pleasant Green MO, Lake Sugema IA) use automated R&P samplers (different denuder/inlet configurations)
- 1/6 day sampling
- Two continuous samplers, Pranalytica and IC, at Bondville for QA
- Both NH_3 and HNO_3 very difficult to measure, due to reactivity, 'stickiness', low ambient concentrations, significant inlet losses

A Brief History of Ammonia Monitoring, Part 2

- Budget cuts led to network cutbacks, temporary shutdown, then switch to passive samplers
- Comparative study of several samplers led to choice of Radiello passive device
- Currently deployed at 6 sites sampling over 3 week intervals (~8 months of data so far)
- CASTNET plans to absorb LADCO network and expand to ~17 sites, funded for 4 years

Why focus on the Midwest?

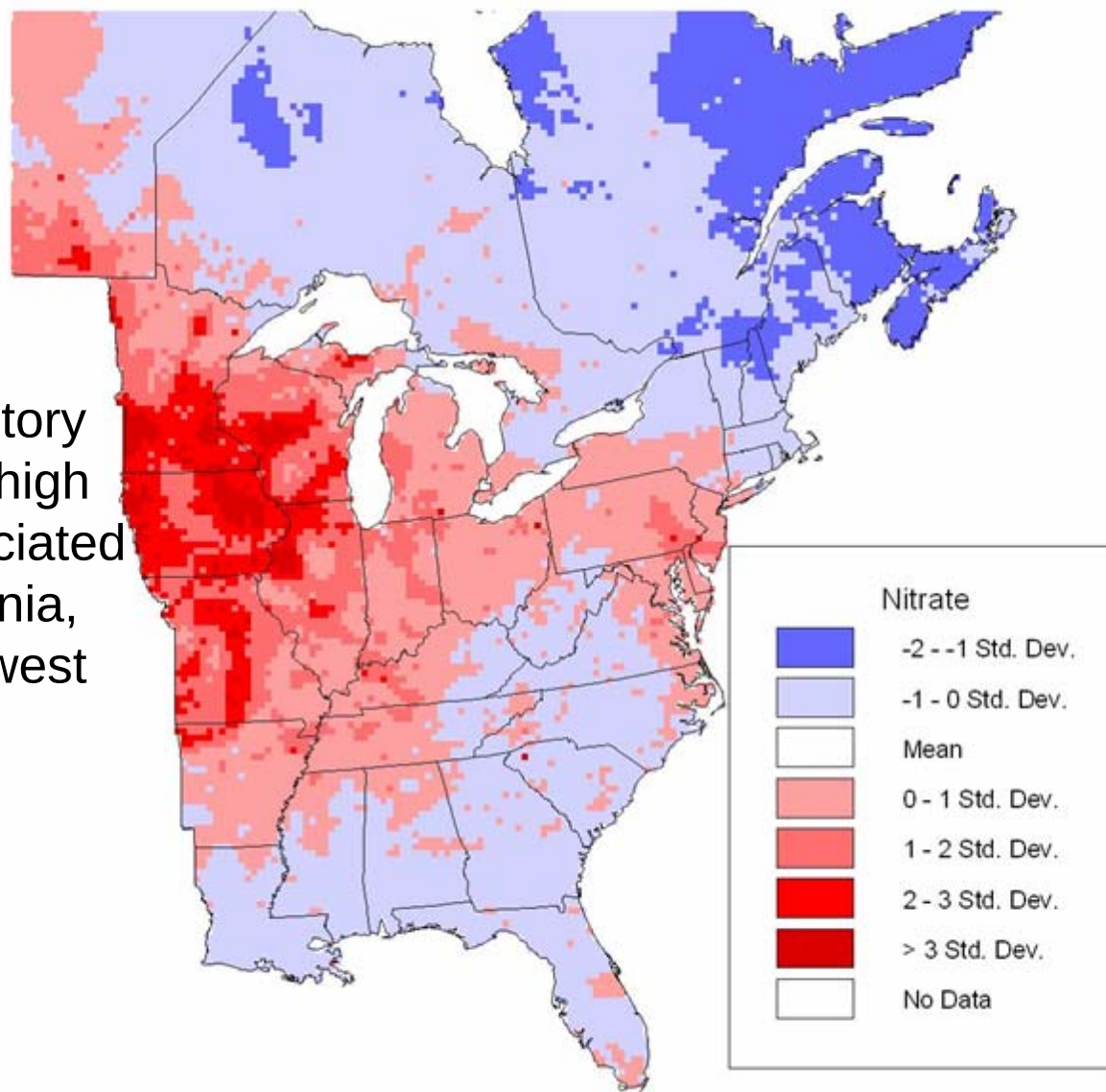
1. Ammonia Emissions Density



Why focus on the Midwest?

2. Ammonia/Nitrate link

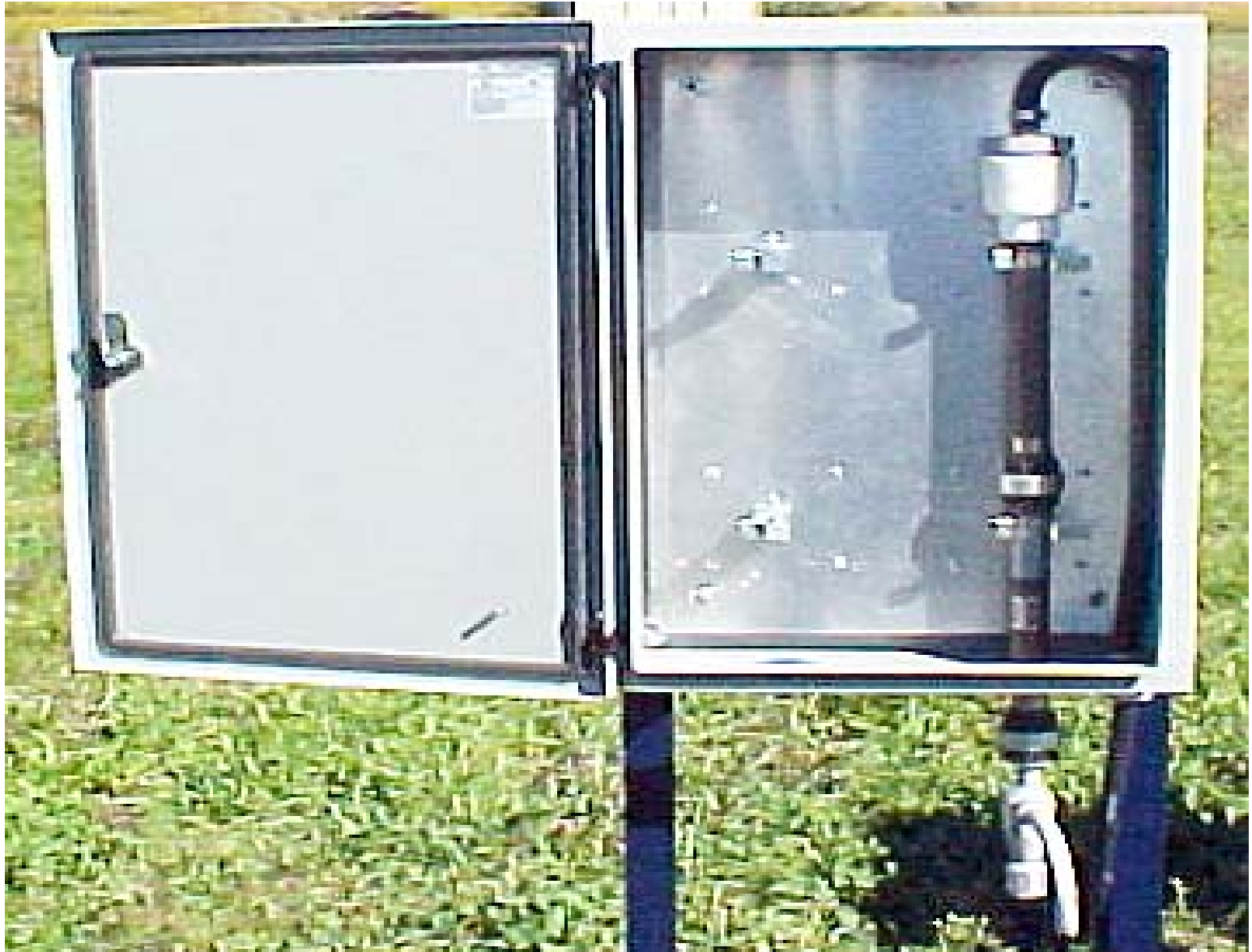
Ensemble trajectory analysis shows high PM nitrate associated with high-ammonia, agricultural Midwest



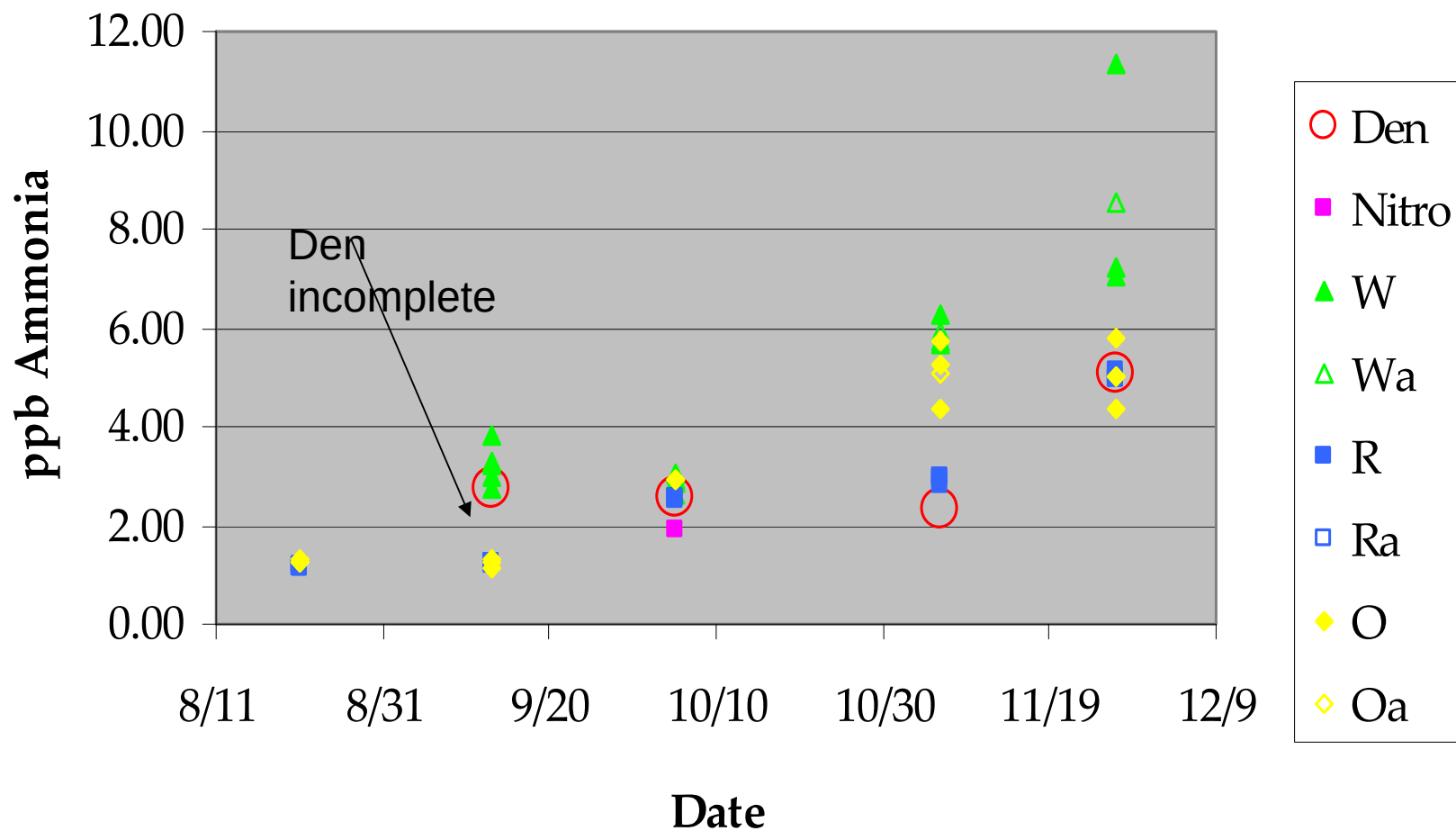
LADCO-CENRAP NH3 Network



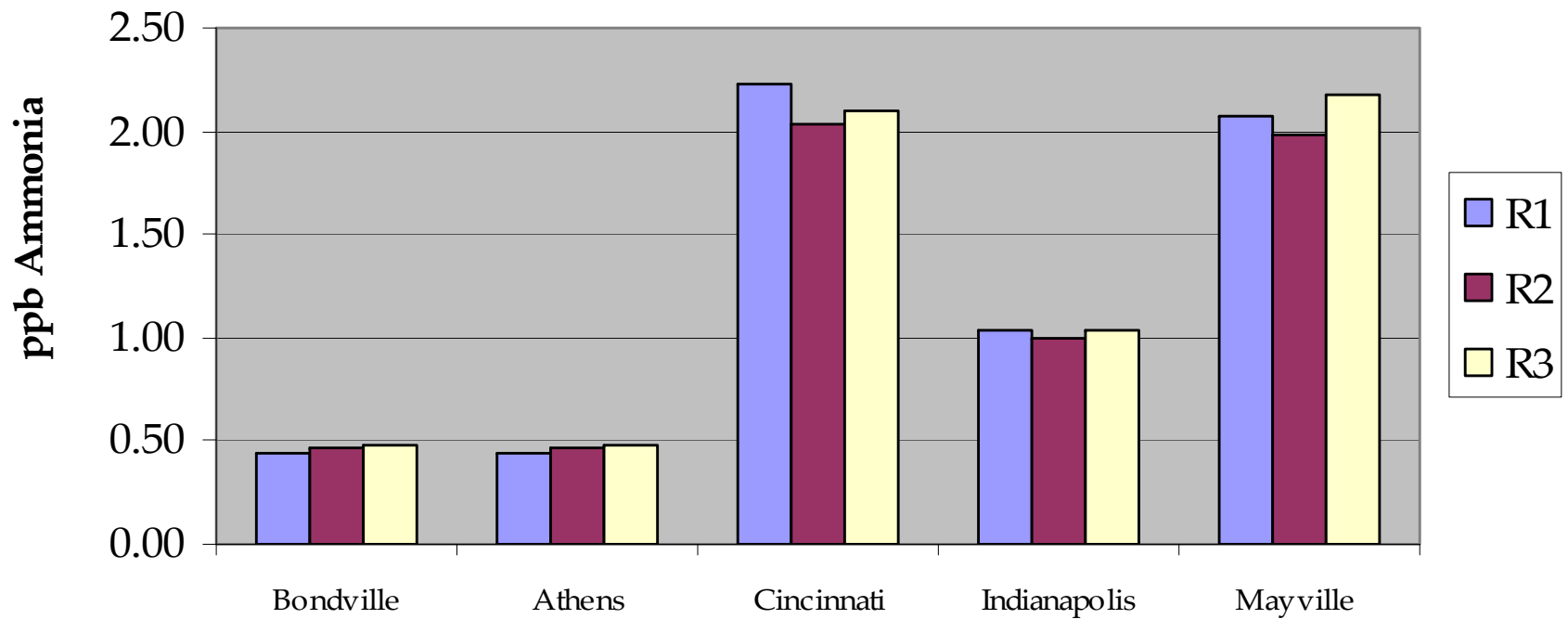
Custom-built URG sampler



Passive Results



Radiello Measures, January 2, 2007

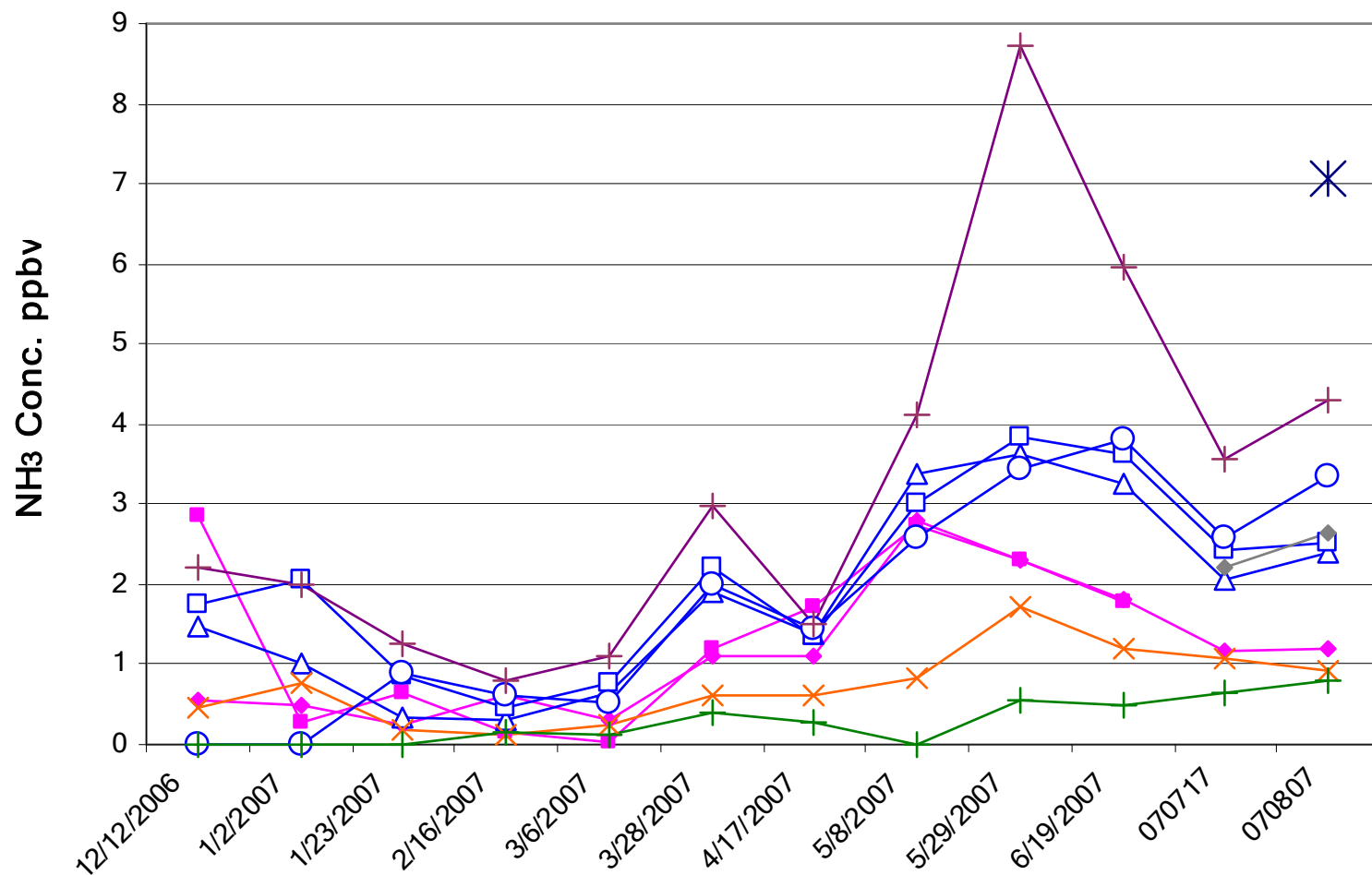








Passive NH₃ Summary

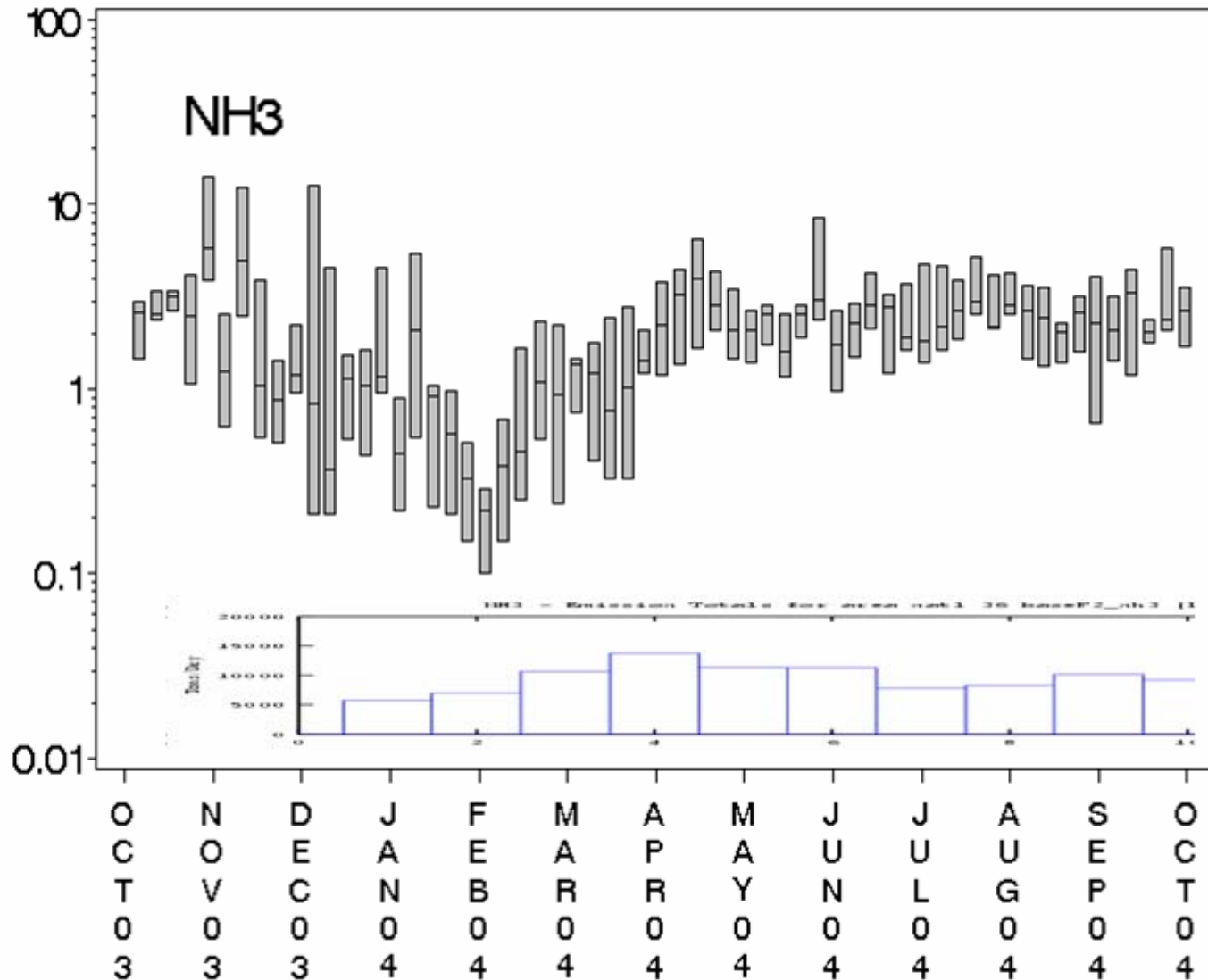




MN01	Blue Mounds, MN
MN02	Great River Bluffs, MN
MN03	Fernberg
IL01	Bondville
OH02	Ohio University
OH03	Cincinnati, Ohio
IN01	Indianapolis, Indiana
WI01	Mayville, Wisconsin
MI01	City of Detroit, MI
CO01	Fort Collins
KS01	
TX01	Palo Duro
NC01	Clinton Crops
NC02	Jamesville
NC03	Lenoir Community College
NY01	Connecticut Hill
OK01	Stilwell (Cherokee Nation)
CN01	Egbert
SC01	Congaree NP, Cape Romain, or Longcreek
MD01	Beltsville

Temporal variation in NH3

Log scale



Spatial variation in NH₃

