A sunset scene over a body of water with a forested shoreline in the distance. The sun is low on the horizon, creating a bright reflection on the water. The sky is filled with soft, colorful clouds.

Ground-based (Size-segregated
and time-resolved) Aerosol
Sampling and Elemental
Analysis during ICARTT

Steve Cliff, Kevin Perry and Tony
VanCuren

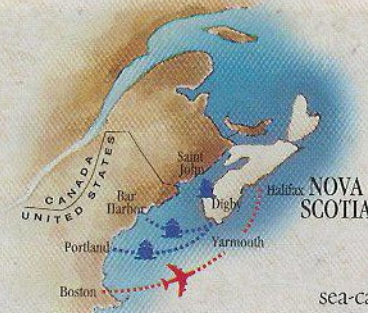
U.C.Davis/Univ. Utah/CARB

Thanks to: Support from NOAA,
IMPROVE NPS and help from Betsy
Andrews and NPS Staff (Emily Seger)

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LOOK FOR THIS LOGO.

Sampling and Analysis

- **8 Stage Rotating “DRUM” Impactor aerosol sampler**
- **Elemental analysis via (synchrotron source) x-ray fluorescence**
- **10 to 5.0 μm**
- **5.0 to 2.5 μm**
- **2.5 to 1.15 μm**
- **1.15 to 0.75 μm**
- **0.75 to 0.56 μm**
- **0.56 to 0.34 μm**
- **0.24 to 0.26 μm**
- **0.26 to 0.09 μm**
- **16.7 l/min, critical orifice control, 1/3 hp pump**
- **6.5 x 168 mm Mylar strips (for 42 day run, 4 mm/day)**

U.S. Pollution Event?



The Site...



Chebogue Point

- Chebogue Point
- July 30-August 12
- 3-hour data (ca. 43 days)
- 8-Stage Rotating DRUM Impactor
- 55% RH (heated inlet)
- Chebogue means “big marshes” in Mi’kmaq

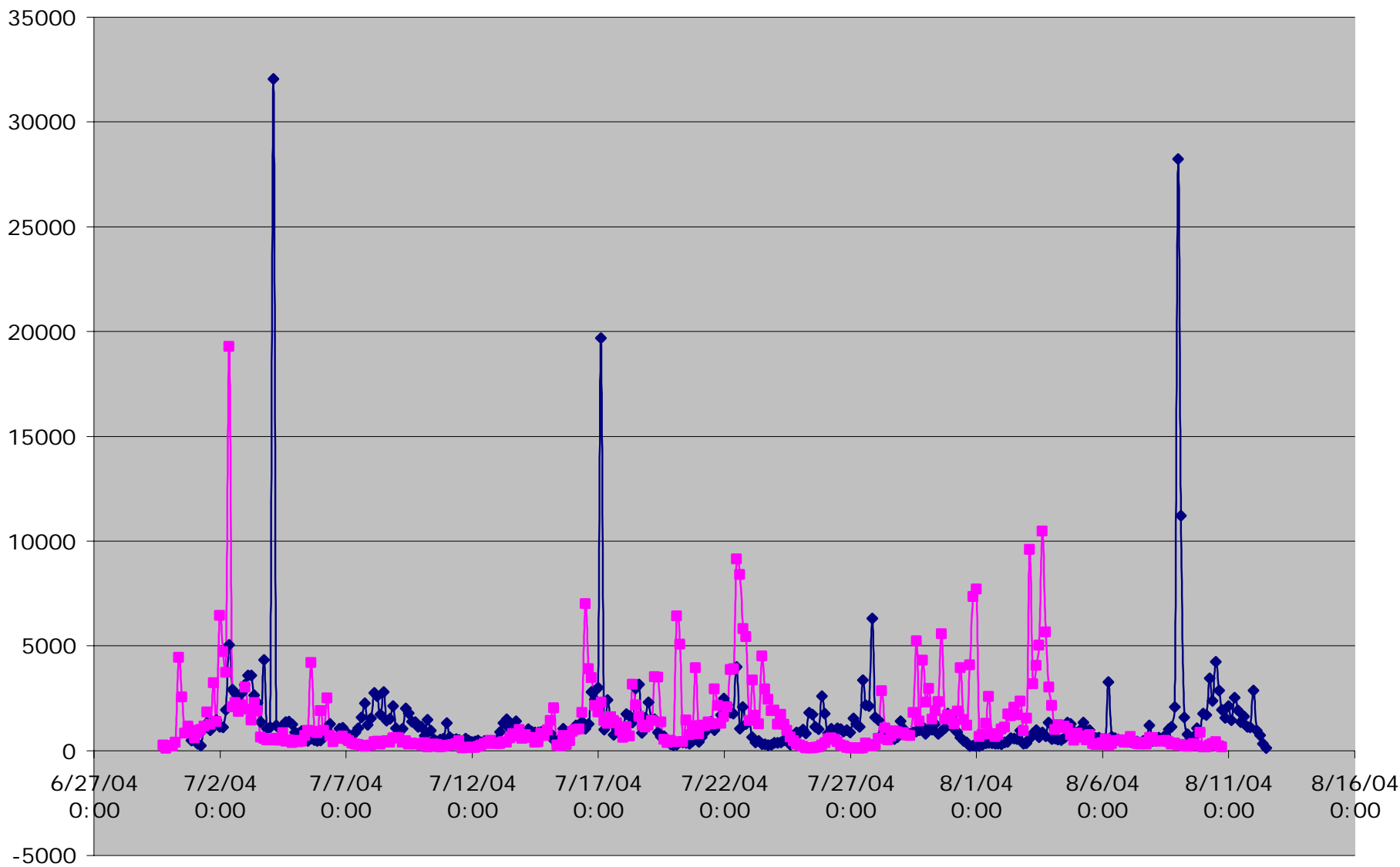


Acadia National Park

- July 29-August 10
- 8-Stage Rotating DRUM Impactor
- Ambient RH
- 3-hour data (ca. 41 days)
- Coincident with IMPROVE network sampling



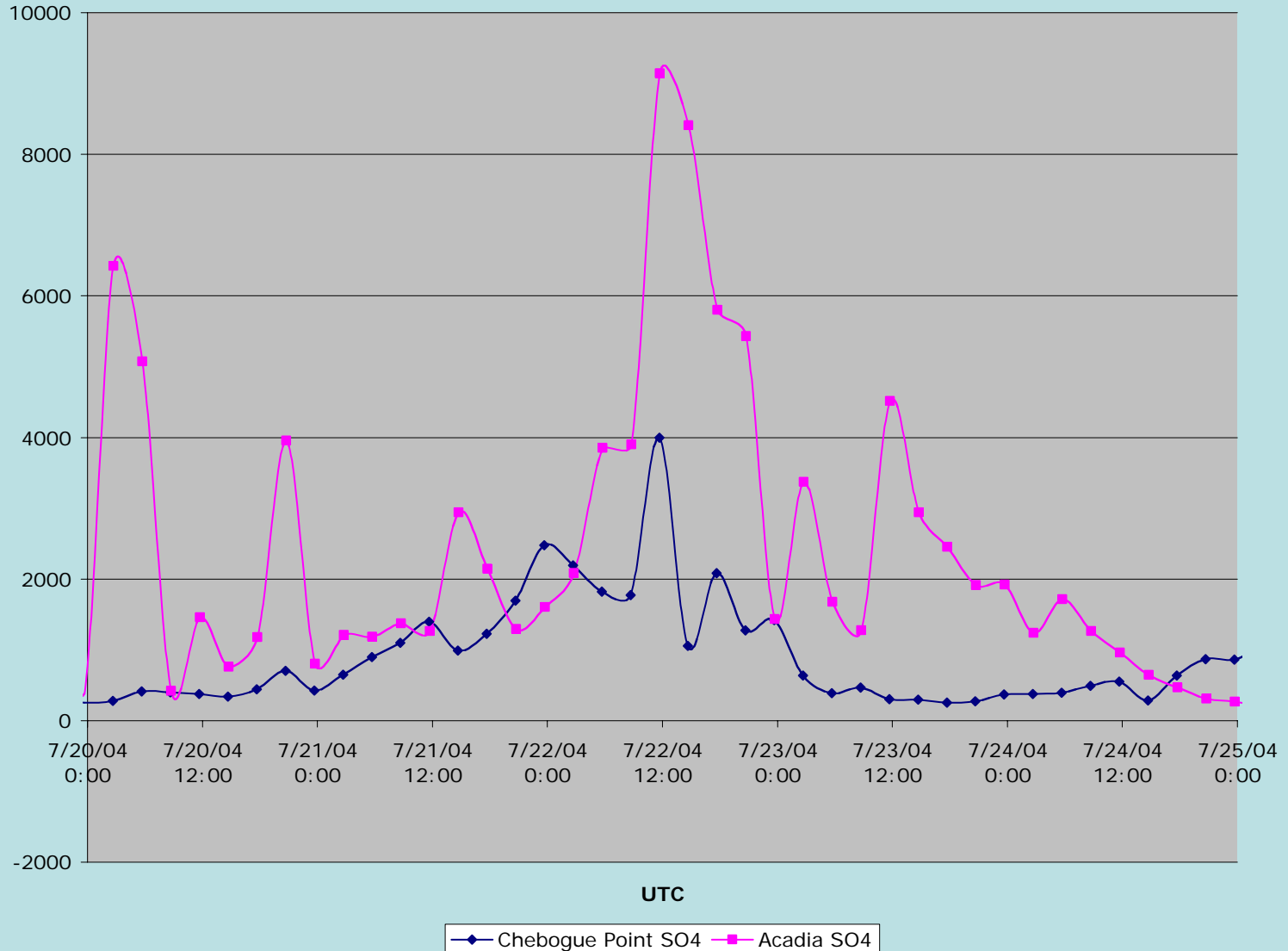
PM2.5 SO4 (S*3)



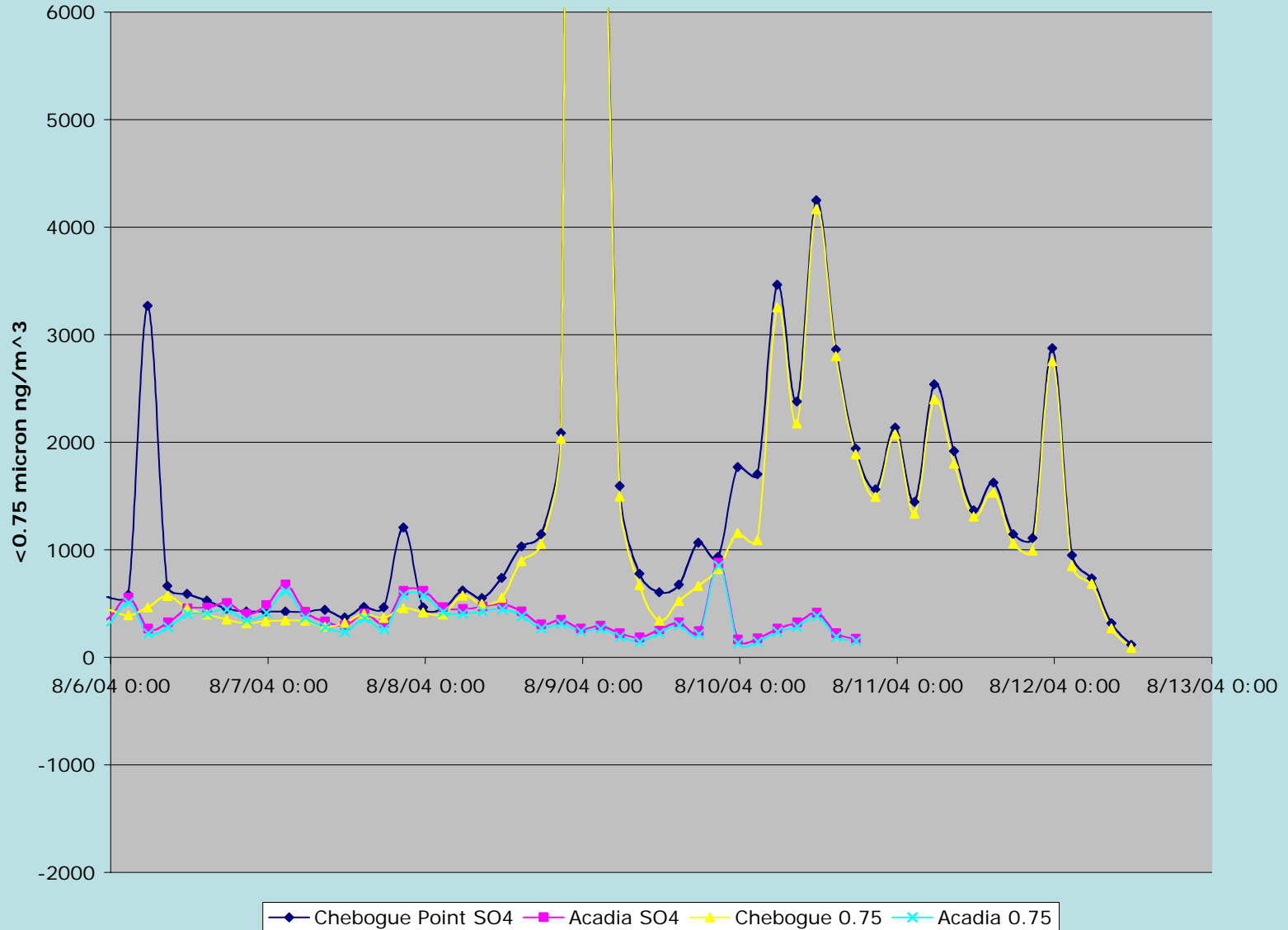
ng/m^3

—◆— Chebogue Point SO4 —■— Acadia SO4

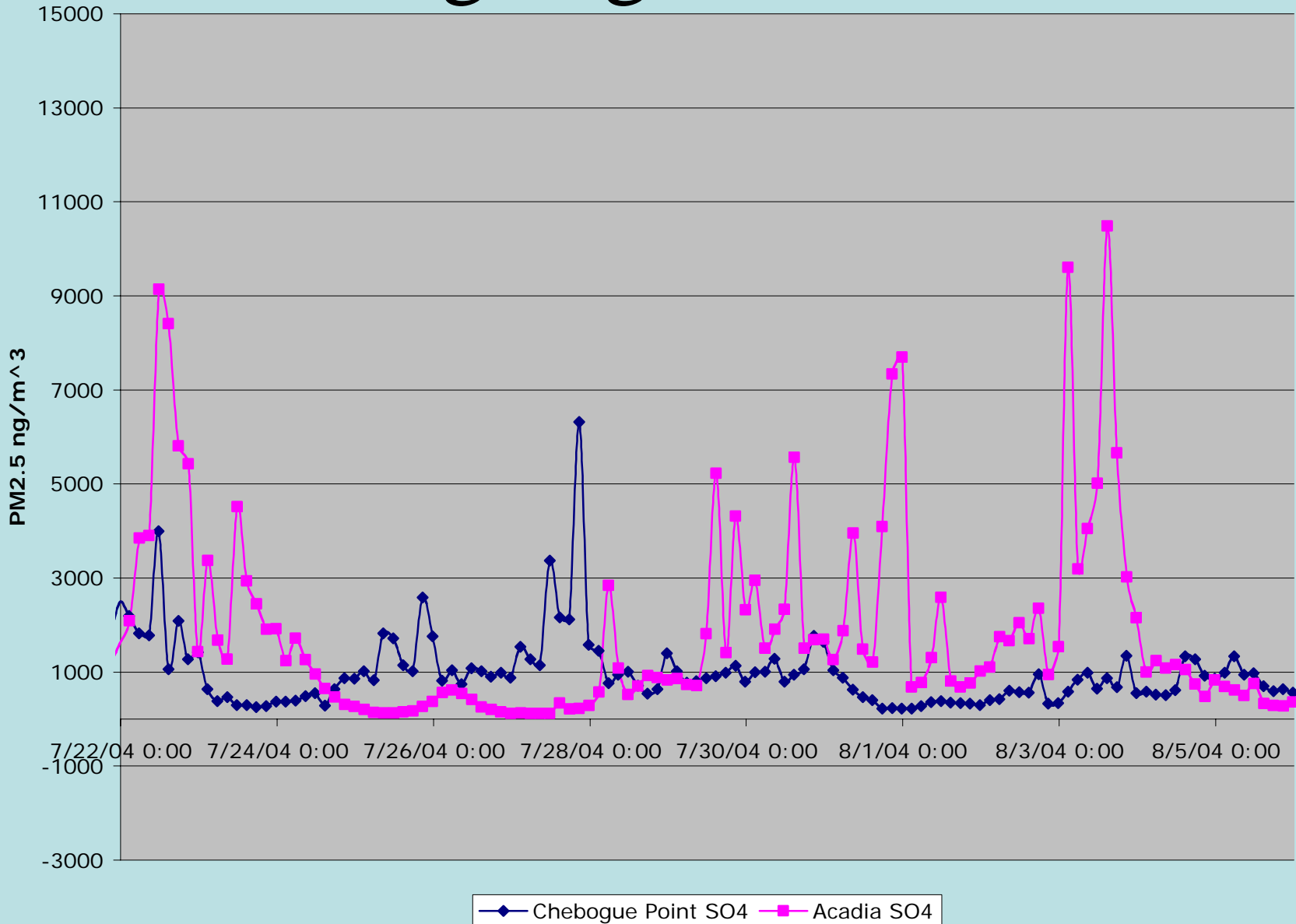
Transport Event?



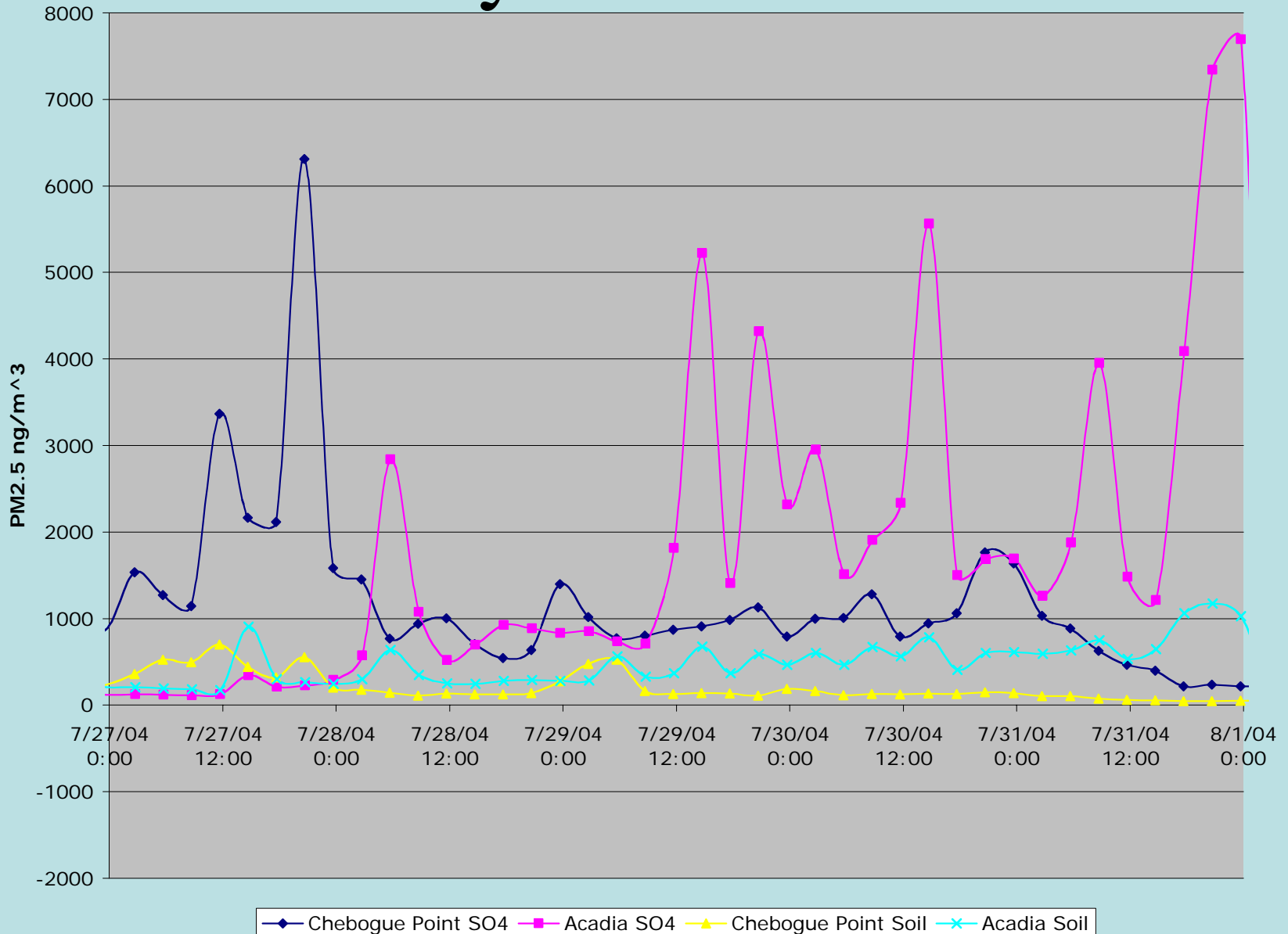
Transport Event?

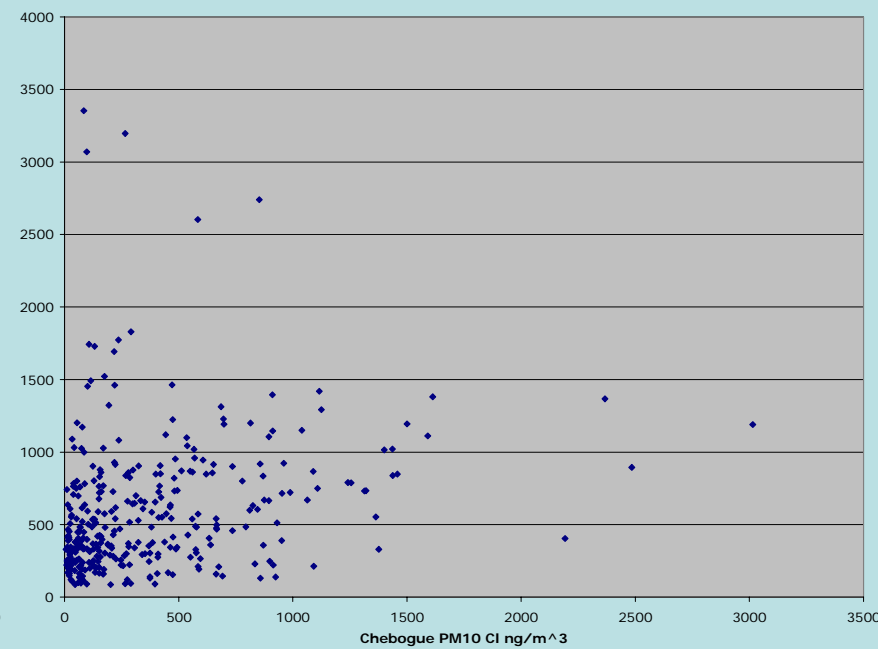
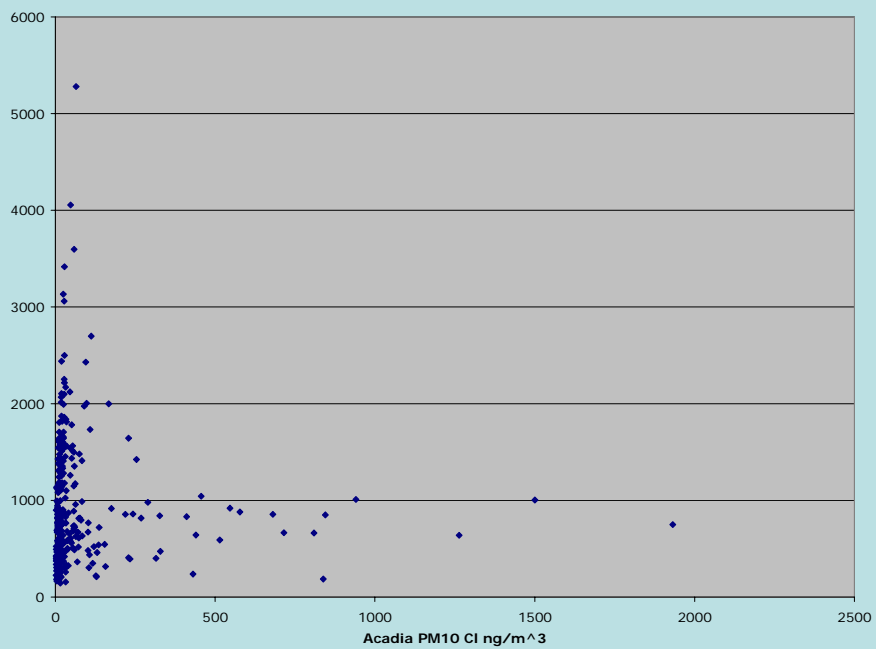
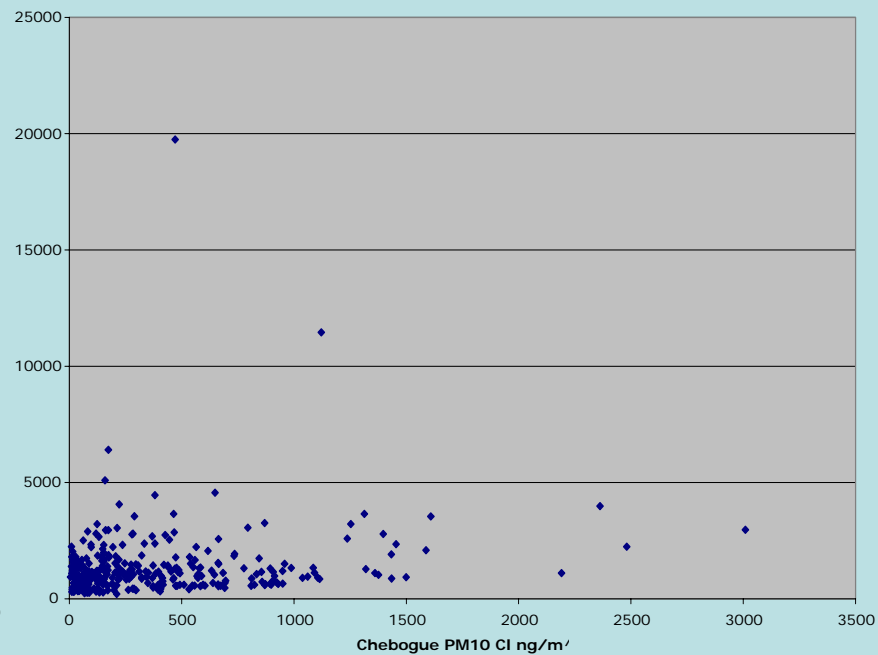
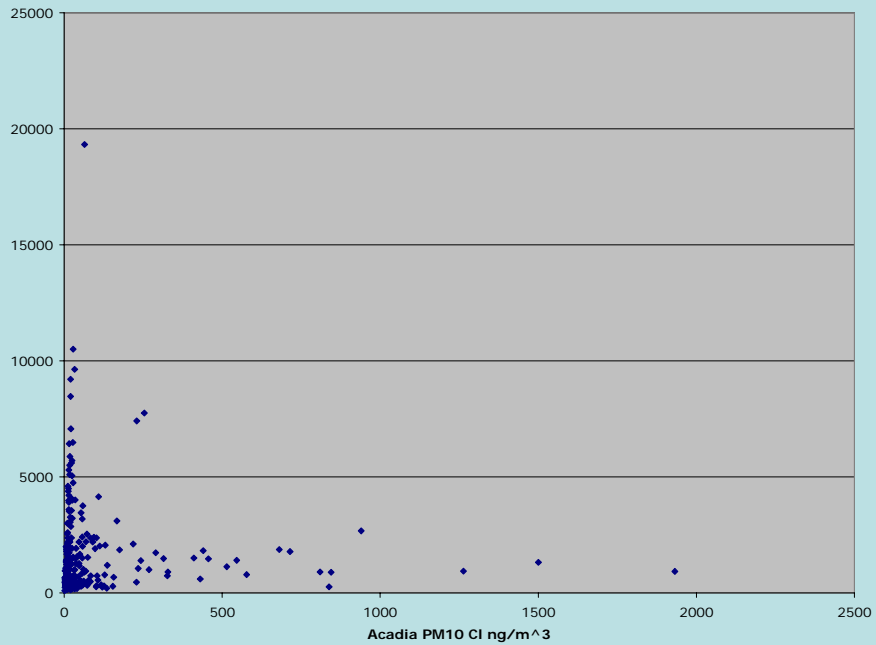


Lagrangian event?

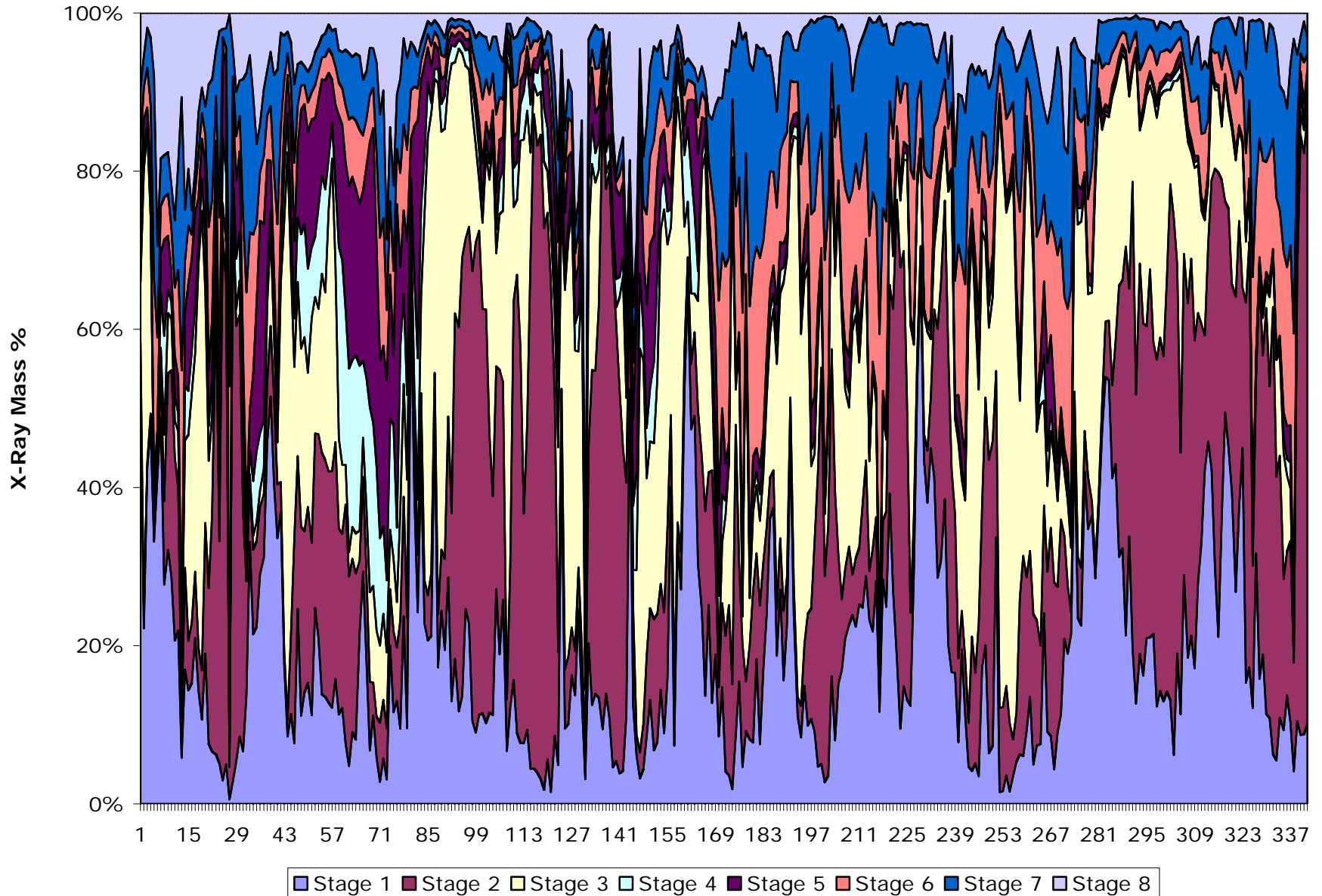


July 30 Event?

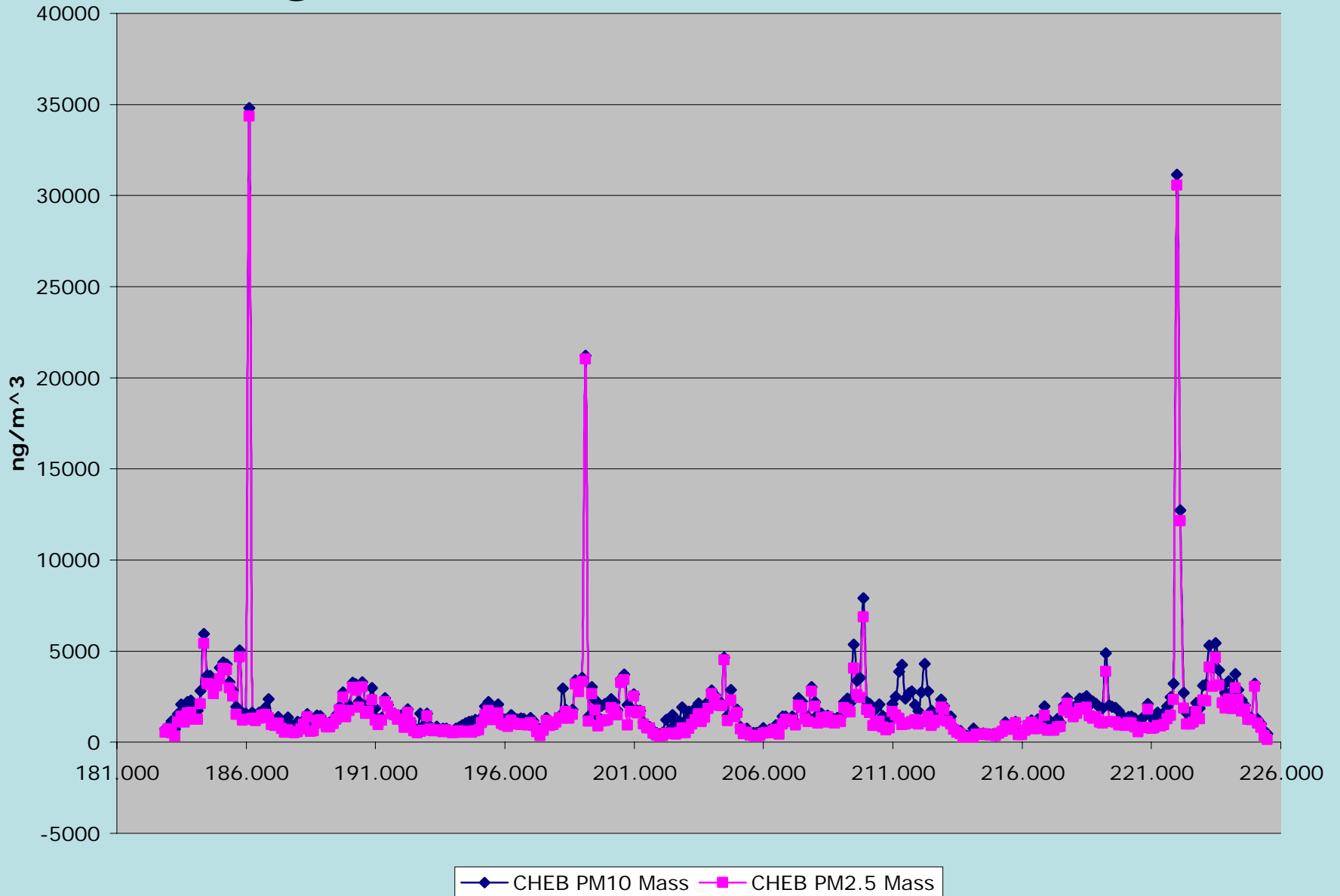




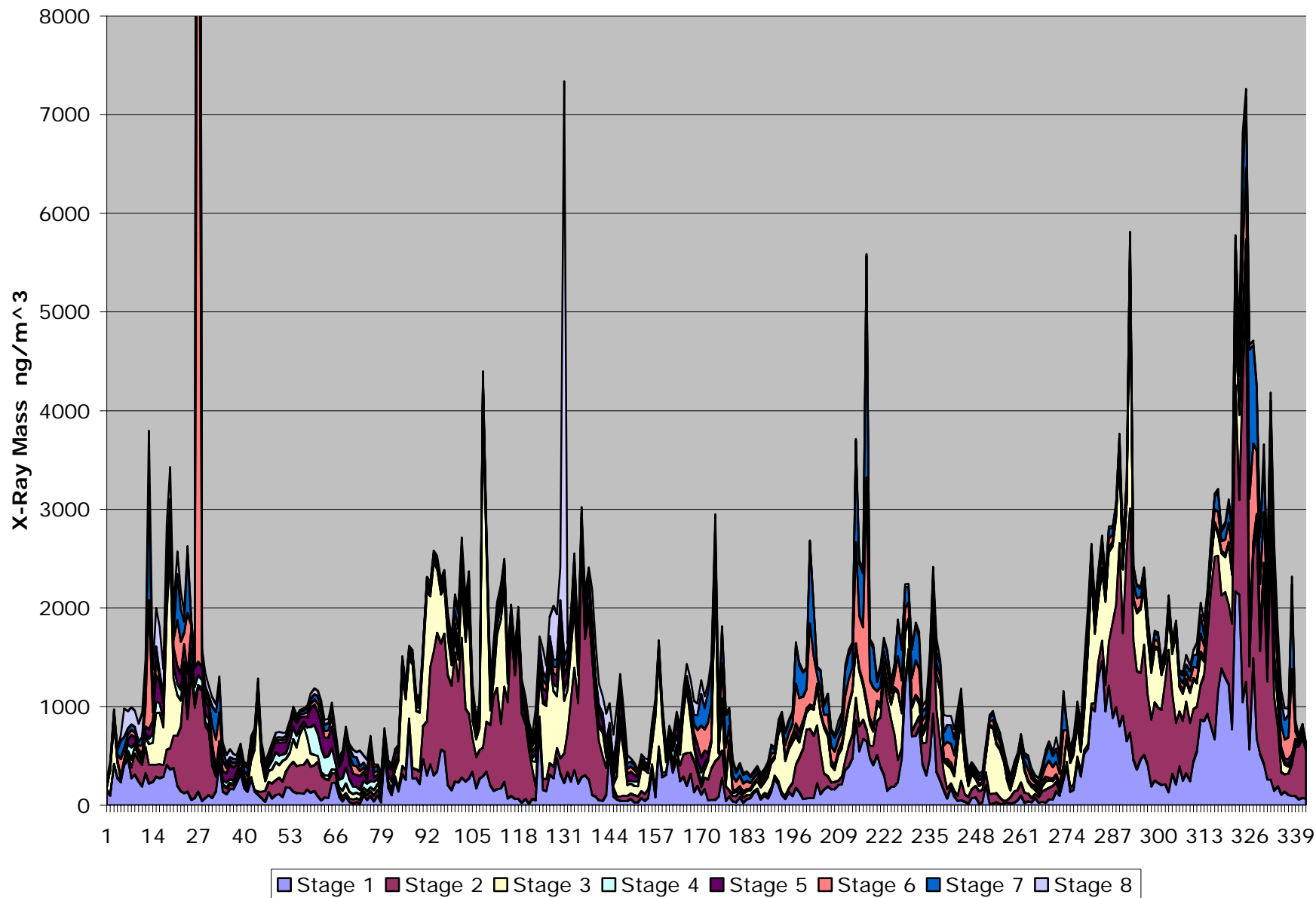
CP Mass %/particle size



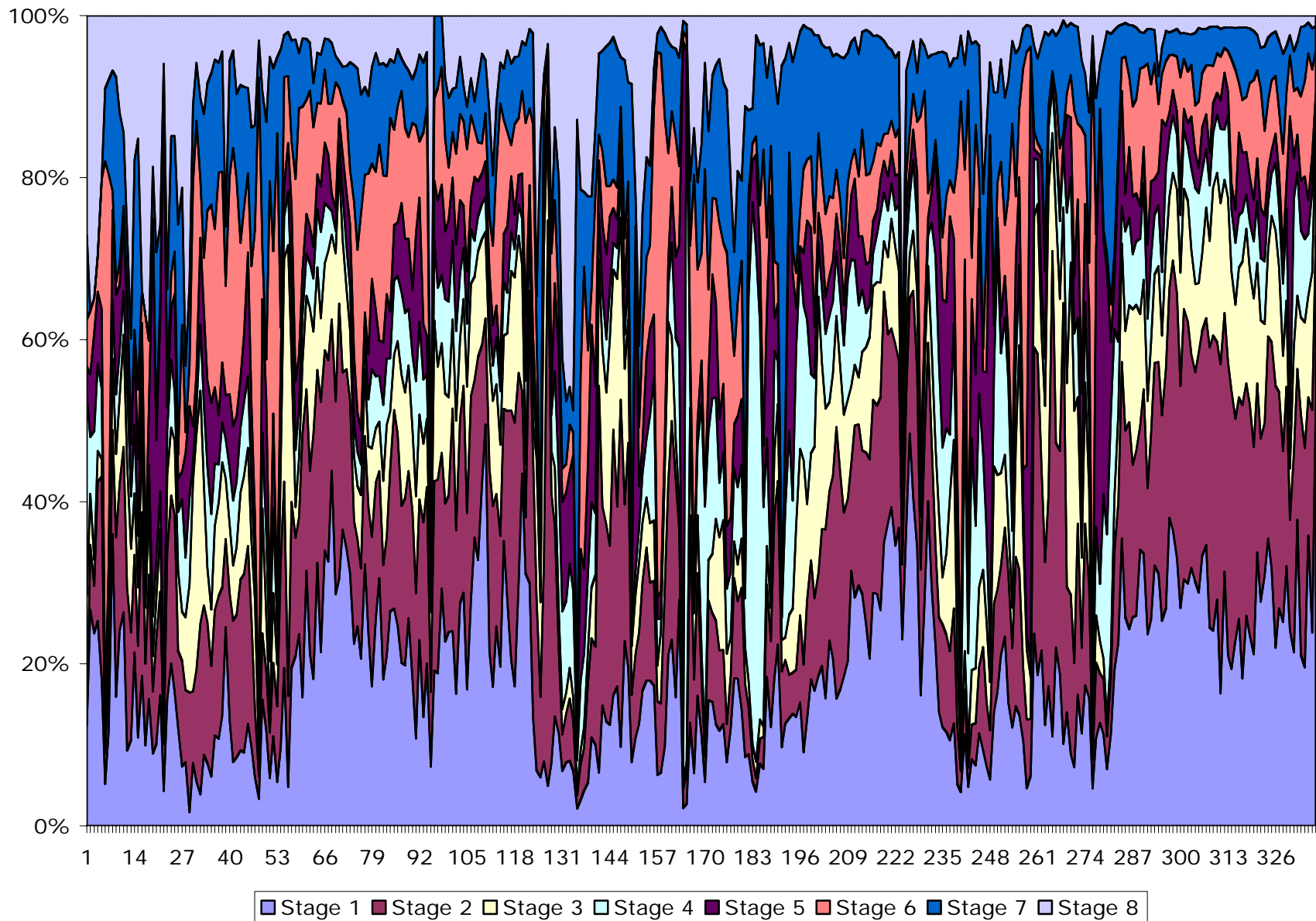
Chebogue Point Reconstructed Mass



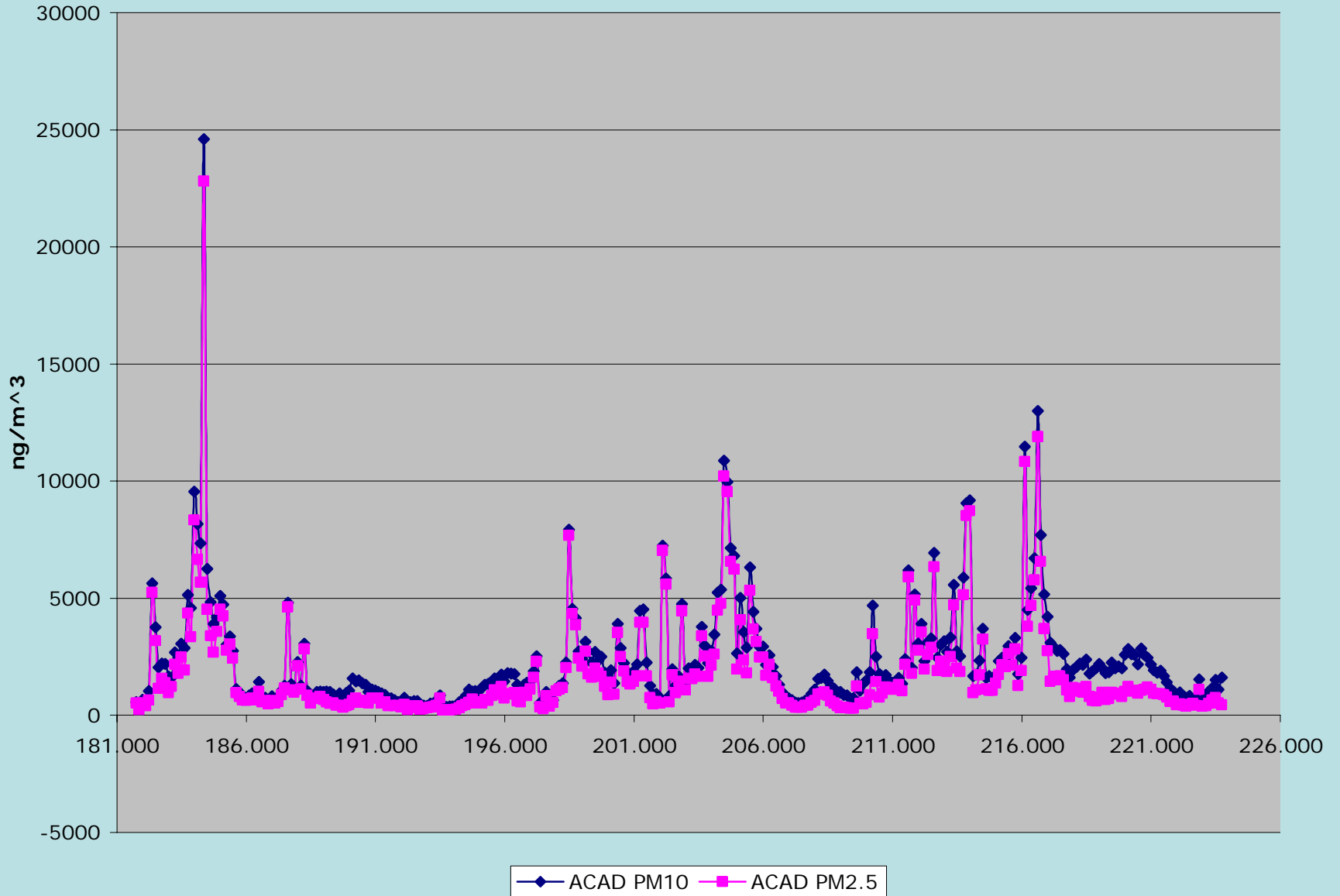
CP Mass/Size



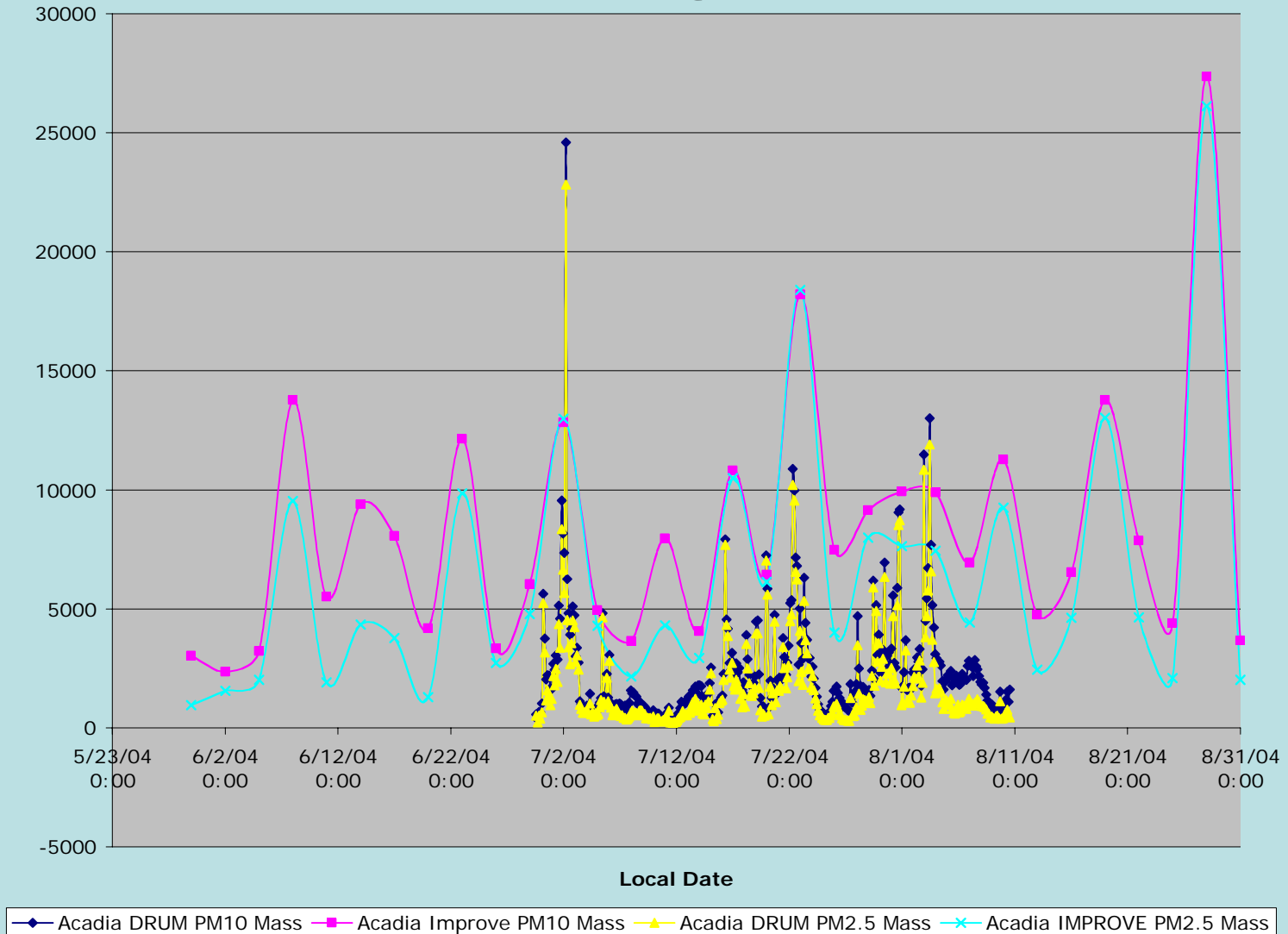
Acadia NP Mass%/particle size



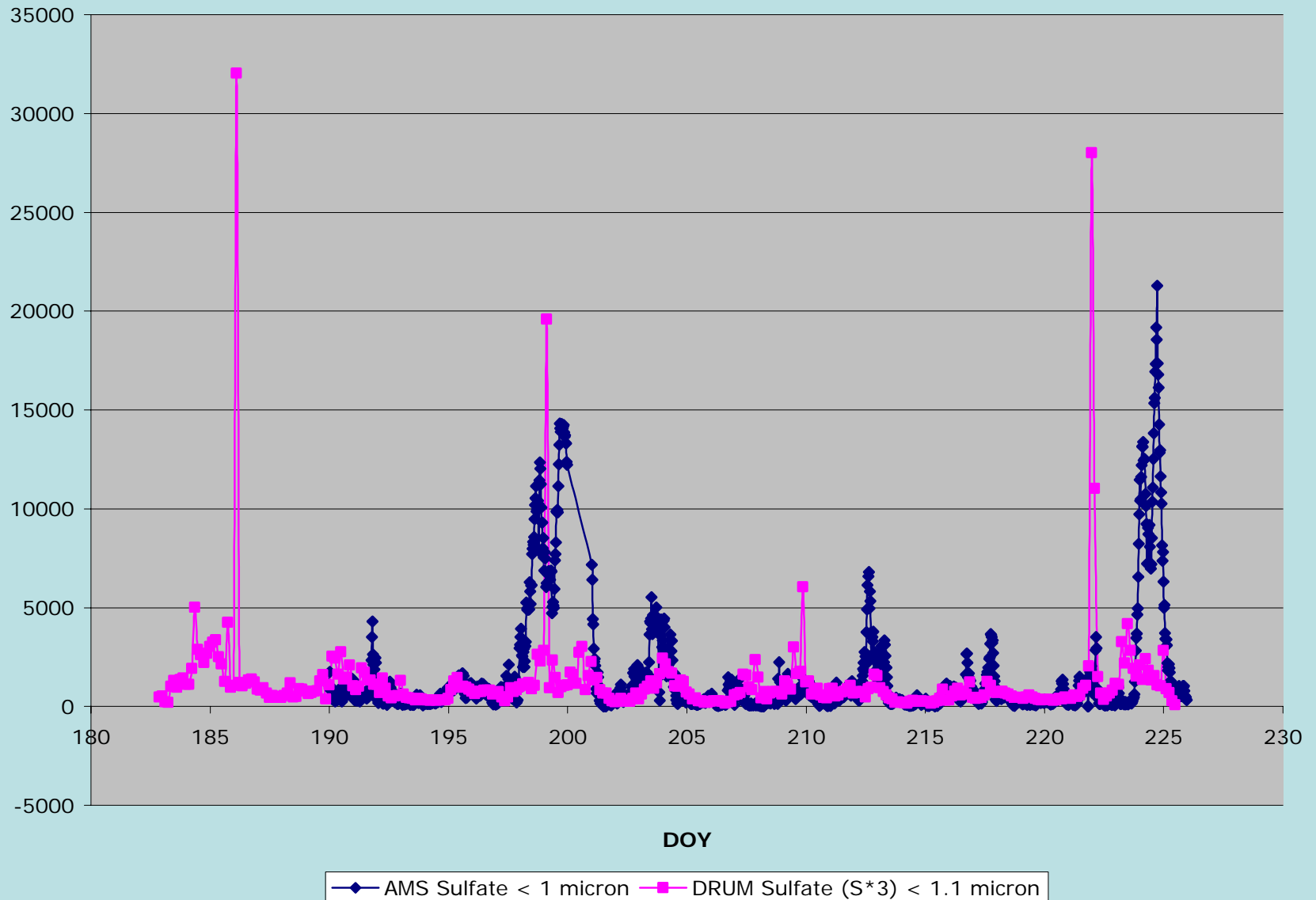
Acadia NP Reconstructed Mass



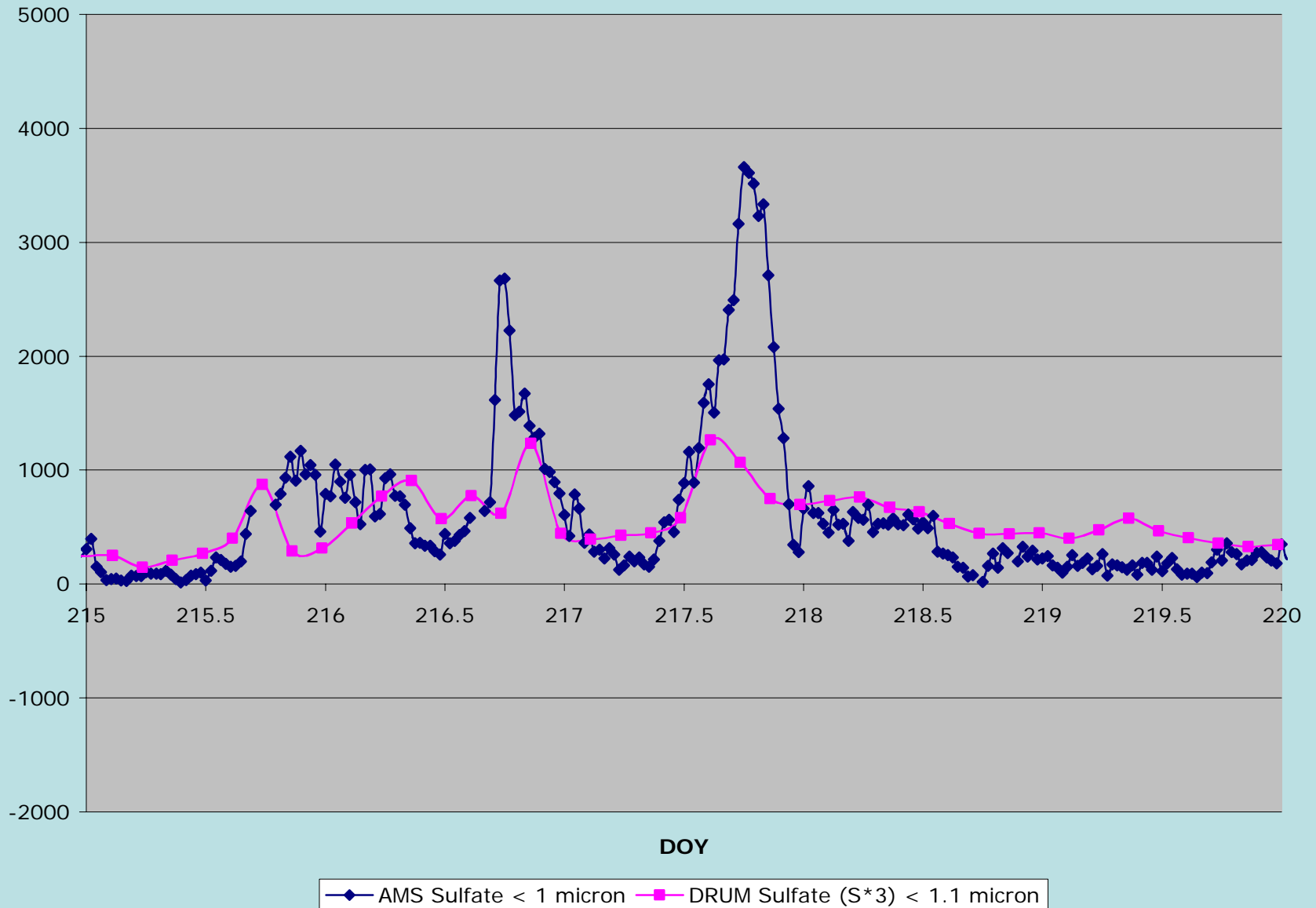
Mass comparison with IMPROVE



AMS/DRUM submicron sulfate



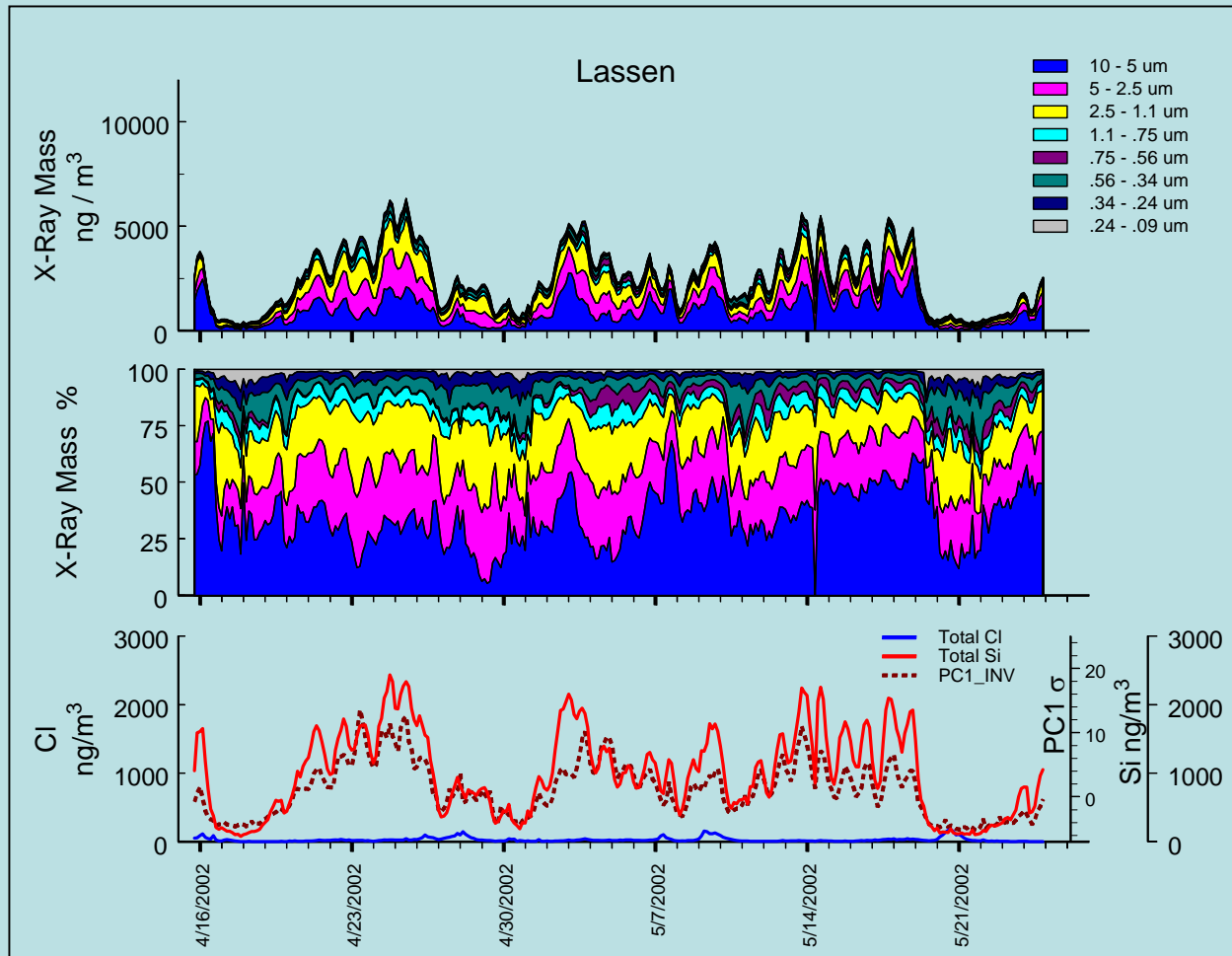
AMS/DRUM submicron sulfate



Elements used in PCA

ELEM	TRINIDAD	TRINITY	LASSEN	SOURCE ASSOCIATION
	HEAD MEAN S/N			
Cl	9.7	7.7	4.7	SEA SALT, GREEN BIOMASS
Na	4.9	2.2	1.1	SEA SALT, SOIL, FLY ASH
Mg	3.9	3.2	2.3	SEA SALT, SOIL, FLY ASH
Ca	11.1	12.6	11.4	SEA SALT, SOIL, FLY ASH
Fe	11.4	13.5	12.7	SOIL, FLY ASH
Al	3.8	7.0	5.4	SOIL, FLY ASH
Ti	11.1	11.4	10.8	SOIL, FLY ASH
Si	8.6	10.5	9.2	SOIL, FLY ASH
K	11.7	12.4	10.7	SOIL, FLY ASH, BIOMASS
P	9.4	7.6	7.2	SOIL, HEAVY OIL, LUBRICANTS, BIOMASS
Zn	10.2	9.7	9.4	SOIL, HEAVY OIL, LUBRICANTS
V	4.7	2.7	2.6	SOIL, HEAVY OIL
Ni	4.8	5.1	4.2	SOIL, HEAVY OIL
S	13.0	12.1	11.2	SEA SALT, FOSSIL FUEL

PCA in ITCT-2K2



What's next?

- PC Analysis of elemental data
- Further analysis of samples
 - Organics (PESA, other analyses)
 - RBS? (N, C, and O)
 - Mass (STIM or β^- Gauge)
- Comparison with filter and AMS data
- Couple with isotope data (UCSD)

How to find your house in the fog

