

**FASTNET:** Fast Aerosol Sensing Tools  
for Natural Event Tracking

**CATT:** Combined Aerosol Trajectory Tools

Web-Based Data Acquisition, Visualization, Analysis Tools,

Developed by CAPITA (R. Husar, S. Falke, K. Hoijarvi),

Funded by the 5 US Regional Planning Organizations,

Managed for MANE-VU by Gary Kleiman & Serpil Kayin

Based on Data Architecture Developed with previous support  
from NSF and NASA

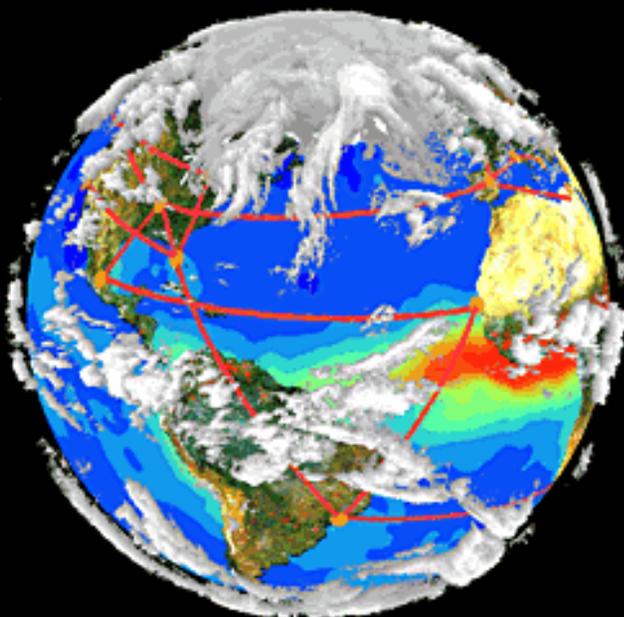
Found at <http://datafed.net>

- Projects
- FASTNET**
- CATT
- FSAN
- NAmEN
- SHAirED
- TableRock

**Catalog**

**ViewEdit**

**ViewURL**



**Animate**

**DataLog**

**Bulletins**

9/29 CATT and FASTNET report to: [RPO](#)

Sponsors



Membership



Technologies



# Data Catalog(s) Provide Access to Many: **Fast** (rapidly available), **Current** (near-real-time, recently archived & continuing) and **Slow** (historical data Like IMPROVE Aerosol & ATAD trajectories)



Dataset	Dataset Icon	Description	Domain *	Provider	Platform	Method	Format
<a href="#">View</a> ASOS_STI		Hourly avg. ASOS Surface Weather from NOAA NWS through NCDC and STI	Aerosol	 STI	Network	RemoteSens	Point
<a href="#">View</a> AIRNOW_PM25IMG		EPA AirNow PM2.5 Images Daily	Aerosol	 EPA	Network	ContSens	SeqImage
<a href="#">View</a> AIRNOW_OL		EPA Particulate Matter, FRM	Aerosol	 CAPITA	Network	FilterSmp	Point
<a href="#">View</a> WRFModel		Weather Research and Forecasting Model	Aerosol	 NOAA	Model	Model	SeqImage
<a href="#">View</a> AIRNOW		EPA Particulate Matter, FRM	Aerosol	 CAPITA	Network	FilterSmp	Point
<a href="#">View</a> TOMS_AI		TOMS Aerosol Index	Aerosol	 TOMS	Satellite	RemoteSens	SeqImage
<a href="#">View</a> PM25		EPA Particulate Matter 2.5, FRM	Aerosol	 CAPITA	Network	FilterSmp	Point
<a href="#">View</a> NAAPS_NAM_MIX_AOT		NAAPS model: Mixed Dust, Smoke, Sulfate AOT, N.America	Aerosol	 NRL	Model	Model	SeqImage

# Data Catalogs: Aerosol, Fire, Maps, Meteorology, Emissions, Images, Events



http://webapps.datafed.net/dvoy\_services/datafed\_catalog.aspx

## Aerosol

Dataset	Dataset Icon	Description	Agency	Product	Platform	Method	Format
AIRVOW		ERA Particulate Matter, PM	Aerosol	ERA	Network	Filtering	Point
AIRVOW_OL		ERA Particulate Matter, PM	Aerosol	ERA	Network	Filtering	Point
AIRVOW_PHZDSMG		ERA Surface PM2.5 Smager	Aerosol	ERA	Network	Cartilage	SeaImage
ASOS_BTI		Hourly avg. AQS Surface Weather from ASOS BRT through WDC and STC	Aerosol	ASOS	Network	RemoteSens	Point
ASOS_BTI_OL		Hourly avg. AQS Surface Weather from ASOS BRT through WDC and STC	Aerosol	ASOS	Network	RemoteSens	Point
AXRMS		AXRMS Oceanic AOT	Aerosol	AXRMS	Satellite	RemoteSens	SeaImage
EMEPAR		EMEP Air Concentrations	Aerosol	EMEP	Network	RemoteSens	Point
EMEPFPC		EMEP Precipitation Concentrations	Aerosol	EMEP	Network	RemoteSens	Point
GASP		GASP	Aerosol	GASP	Satellite	RemoteSens	SeaImage
ICOD_MED_DUST_COLCON		ICOD model: DUST Column Concentration, Mediterranean	Aerosol	ICOD	Model	Model	SeaImage
ICOD_MED_DUST_DRYDEP		ICOD model: DUST Dry Deposition, Mediterranean	Aerosol	ICOD	Model	Model	SeaImage
ICOD_MED_DUST_SURCON		ICOD model: DUST Surface Concentration, Mediterranean	Aerosol	ICOD	Model	Model	SeaImage
ICOD_MED_DUST_WETDEP		ICOD model: DUST wet Deposition, Mediterranean	Aerosol	ICOD	Model	Model	SeaImage
IMPROVE		IMPROVE Aerosol Chemical Composition	Aerosol	IMPROVE	Network	Filtering	Point
MODIS_AOT_BRS		MODIS AOT Brsra Image	Aerosol	MODIS	Satellite	RemoteSens	SeaImage
MODIS_NAM_AOT_BRS		MODIS AOT Brsra Image	Aerosol	MODIS	Satellite	RemoteSens	SeaImage
NAAPS_EAS_DUST_SURCON		NAAPS model: DUST Concentration, Asia	Aerosol	NAAPS	Model	Model	SeaImage
NAAPS_EAS_MX_AOT		NAAPS model: Mixed Dust, Smoke, Sulfate AOT, Asia	Aerosol	NAAPS	Model	Model	SeaImage
NAAPS_EAS_SMOK_SURCON		NAAPS model: SMOKE Concentration, Asia	Aerosol	NAAPS	Model	Model	SeaImage
NAAPS_EAS_SURF_SURCON		NAAPS model: SULFATE Concentration, Asia	Aerosol	NAAPS	Model	Model	SeaImage
NAAPS_EUR_DUST_SURCON		NAAPS model: Dust AOT, Europe	Aerosol	NAAPS	Model	Model	SeaImage
NAAPS_EUR_MX_AOT		NAAPS model: Mixed Dust, Smoke, Sulfate AOT, Europe	Aerosol	NAAPS	Model	Model	SeaImage
NAAPS_EUR_SURF_SURCON		NAAPS model: Sulfate AOT, Europe	Aerosol	NAAPS	Model	Model	SeaImage
NAAPS_GLO_DUST_AOT		NAAPS model: Dust AOT, Global	Aerosol	NAAPS	Model	Model	SeaImage
NAAPS_GLO_MX_AOT		NAAPS model: Mixed Dust, Smoke, Sulfate AOT, Global	Aerosol	NAAPS	Model	Model	SeaImage
NAAPS_GLO_SMOK_AOT		NAAPS model: Smoke AOT, Global	Aerosol	NAAPS	Model	Model	SeaImage
NAAPS_GLO_SURF_AOT		NAAPS model: Sulfate AOT, Global	Aerosol	NAAPS	Model	Model	SeaImage

## Aerosol (Cont.)

NAAPS_NAM_DUST_SURCON		NAAPS model: DUST Concentration, N.America	Aerosol	NAAPS	Model	Model	SeaImage
NAAPS_NAM_MX_AOT		NAAPS model: Mixed Dust, Smoke, Sulfate AOT, N.America	Aerosol	NAAPS	Model	Model	SeaImage
NAAPS_NAM_SMOK_SURCON		NAAPS model: SMOKE Concentration, N.America	Aerosol	NAAPS	Model	Model	SeaImage
NAAPS_NAM_SURF_SURCON		NAAPS model: SULFATE Concentration, N.America	Aerosol	NAAPS	Model	Model	SeaImage
PR25		PR25 Particulate Matter 2.5, PM	Aerosol	PR25	Network	Filtering	Point
SEAW_Glob		SeaWiFS Global 40 Smager	Aerosol	SEAW	Satellite	RemoteSens	SeaImage
SEAW_Glob2		SeaWiFS Global 40 Smager	Aerosol	SEAW	Satellite	RemoteSens	SeaImage
SEAW_US		SeaWiFS US 40 Smager	Aerosol	SEAW	Satellite	RemoteSens	SeaImage
TOMS_A1		TOMS Surface Index	Aerosol	TOMS	Satellite	RemoteSens	SeaImage
TOMS_RatI		TOMS US Pathology	Aerosol	TOMS	Satellite	RemoteSens	SeaImage
VISVIS_CC		CIRA-VisRS Cap Traffic	Aerosol	CIRA	Network	Filtering	Point
VISVIS_CHEN		VisRS Aerosol Chemical Composition	Aerosol	CIRA	Network	Filtering	Point
WWModel		Weather Research and Forecasting Model	Aerosol	WW	Model	Model	SeaImage

## Fire

Dataset	Dataset Icon	Description	Agency	Product	Platform	Method	Format
ARMA_GDES		ARMA Automated Remote Sensing algorithm	Fire	ARMA	Satellite	RemoteSens	Point
ATSR_FIREid		ATSR Fire Proxy, Daily	Fire	ATSR	Satellite	RemoteSens	Point
ATSR_FIREm		ATSR Fire Proxy, Monthly	Fire	ATSR	Satellite	RemoteSens	Point
BLM_FireHot		BLM Fire Hotspots	Fire	BLM	Network	FieldObs	Point
FINMA		Fire Identification Mapping and Monitoring Algorithm	Fire	FINMA	Satellite	RemoteSens	Point
FS_FIREDCS		Forest Service Fuel Management Fire Locations 1994-1999	Fire	FS	Network	FieldObs	Point
FS_FuelFire		Forest Service Fuel Management Fire Locations 1994-1999	Fire	FS	Model	RemoteSens	SeaImage
HRS_Fire		HRS Fire Locations	Fire	HRS	Satellite	RemoteSens	Point
MODIS_Fire		MODIS Fire Locations	Fire	MODIS	Satellite	RemoteSens	Point
NET_FireActive		NET Hotspot Fire Emissions 1999	Fire	NET	Emissions	Point	Point
NET_WBDFire		NET Wildfire Emissions, 1999	Fire	NET	Emissions	Point	Point
WFAS		Wildfire Fire Assessment System Fire Weather	Fire	WFAS	Network	ConfData	Point

## GIS Maps

Dataset	Dataset Icon	Description	Agency	Product	Platform	Method	Format
DEM		Digital Elevation Model	GIS	DEM	Model	DEM	SeaImage
MapImage		Map Smager	GIS	MapImage	Model	DEM	SeaImage

## Meteorology

Dataset	Dataset Icon	Description	Agency	Product	Platform	Method	Format
ATAD		ATAD Tephrolog	Meteorology	ATAD	Model	Model	Text
GOES_I2		GOES_I2 Eastern-MSR	Meteorology	GOES	Satellite	RemoteSens	SeaImage
NETAT_US		NETAT US	Meteorology	NETAT	Network	Cartilage	Point
NETRAD_RADAR		NETRAD Radar for the US	Meteorology	NETRAD	Network	RemoteSens	SeaImage
ReaTime		Tephrolog Facilitation Time	Meteorology	ReaTime	Network	RemoteSens	Point
SURF_MET		Global Hourly Surface Weather Data	Meteorology	SURF	Network	Point	Point
SURF_MET_OL		Global Hourly Surface Weather Data online	Meteorology	SURF	Network	Point	Point
SURF_MET_WIND		Hourly Surface Wind Data	Meteorology	SURF	Network	Point	Point
SURF_MET_WIND_OL		Hourly Surface Wind Data	Meteorology	SURF	Network	Point	Point

## Emissions

Dataset	Dataset Icon	Description	Agency	Product	Platform	Method	Format
BRAYO_Mex		BRAYO Mexican Emissions Inventory 1999	Emissions	BRAYO	Network	Filtering	Point
Can_Hg		Canada Mercury Emissions 1995 and 1999	Emissions	Can_Hg	Network	Point	Point
CARB_Emissions		Air Pollutant Emissions in Santa Barbara 2002 from the California Air Resources Board	Emissions	CARB	Network	Point	Point
CARB_Stacks		Emissions Stacks in Santa Barbara County	Emissions	CARB	Network	Point	Point
EPA_AirMarkets		EPA Clean Air Markets Emissions	Emissions	EPA	Network	Point	Point
EPA_eGhd		Emissions and Generation Resource Integrated Database	Emissions	EPA	Network	Point	Point
NET_EGU		1999 NET Electric Generating Unit's Emissions	Emissions	NET	Network	Filtering	Point
NET_HAPS_Only		1999 NET Hazardous Air Pollutants for US Sources	Emissions	NET	Network	Filtering	Point
NET_HAPS_PubId		1999 NET Hazardous Air Pollutants Emissions	Emissions	NET	Network	Point	Point
NPRI_Stacks		Canada National Pollutant Release Emissions	Emissions	NPRI	Network	Point	Point
SB_Emissions		Santa Barbara Air Pollution Control District Emissions	Emissions	SB	Network	Point	Point

## Events & Images

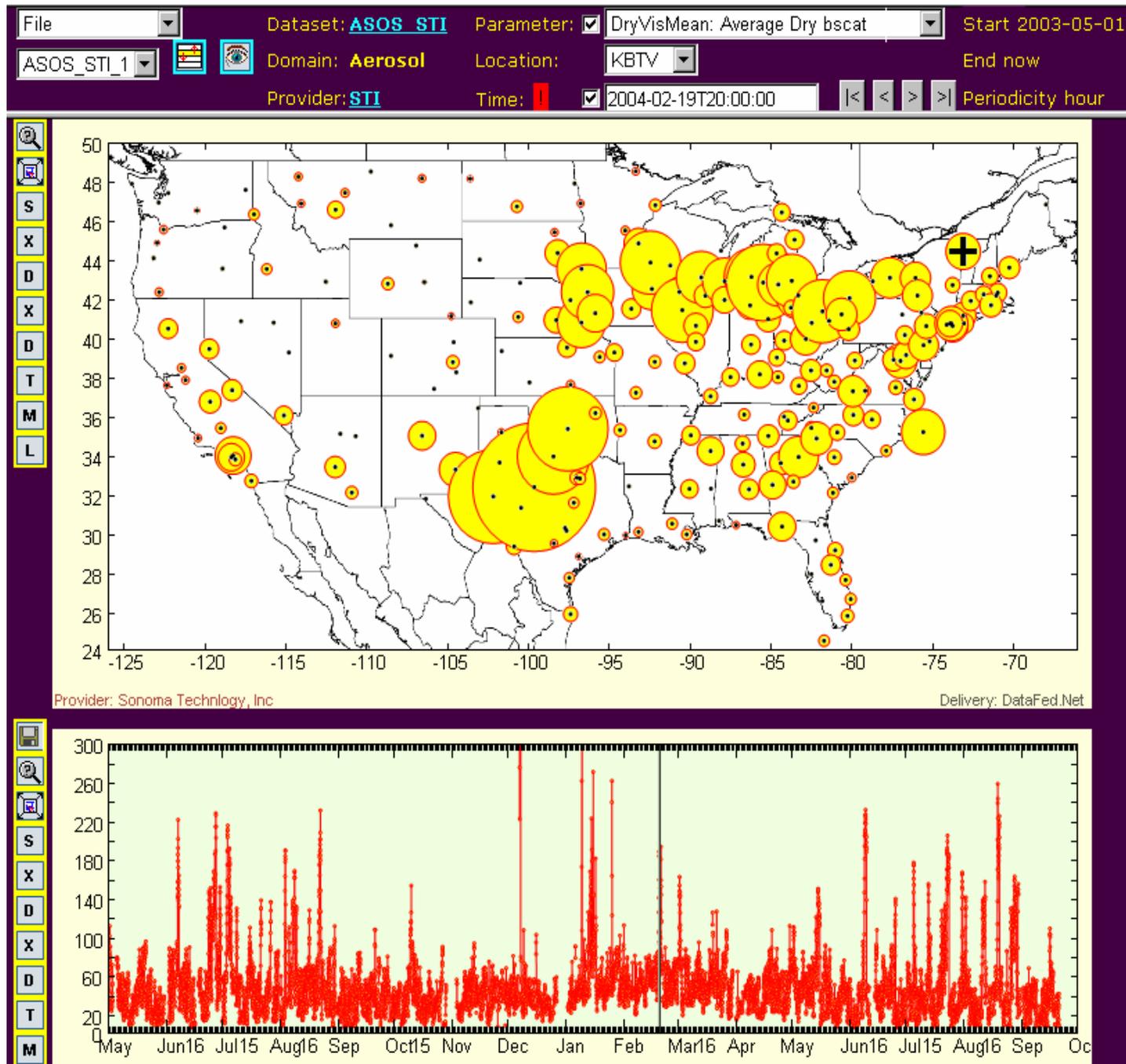
Dataset	Dataset Icon	Description	Agency	Product	Platform	Method	Format
Aerosol_event		Aerosol_event	GIS	Aerosol_event	Catalog	Catalog	URLCode
Astrophoto		Astrophoto	GIS	Astrophoto	Catalog	Catalog	URLCode
DATAFED		DATAFED Catalog	GIS	DATAFED	Catalog	Catalog	URLCode
Images		Images	GIS	Images	Catalog	Catalog	URLCode

## Data Viewer:

Open & View  
Any File in  
Catalog(s).

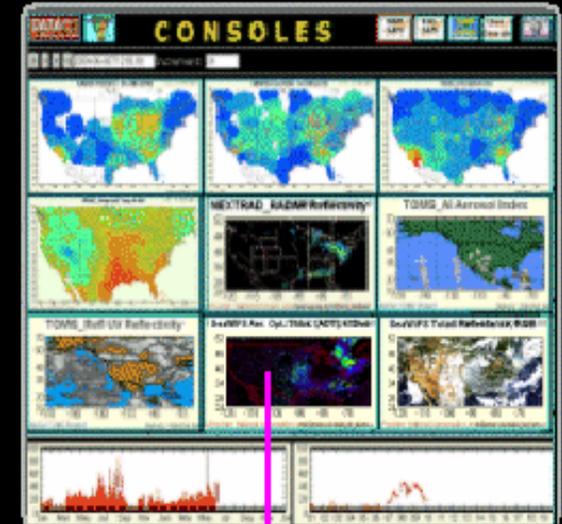
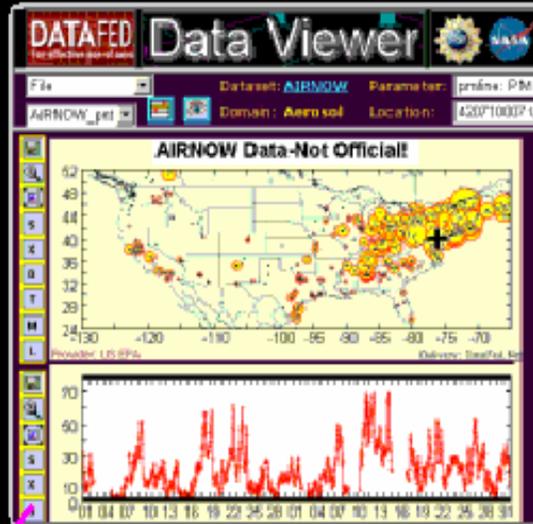
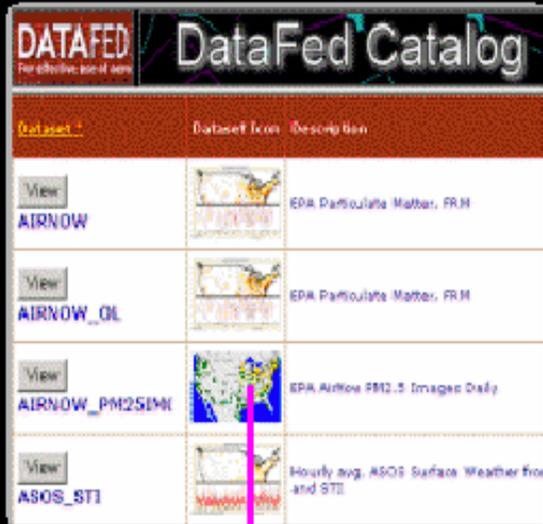
Many Files  
Include Time  
Series, Linked  
to Map –  
Point & Click.

Zoom Map or  
Time series,  
Change Size,  
Symbols,  
Variables,  
Add Layers,  
Export Data –  
Copy Paste.



# Fast Aerosol Sensing and Tools for Natural Aerosol Tracking

Real-time and retrospective detection and analysis of smoke, dust and other aerosol events.



Find It, Add To It

See It, Get It  
Screen It,  
Aggregate It,  
Show It, Grow It



Layer It, Compare It,  
Merge It, Analyze It  
Interpret It.

Save It, Share It,  
Communicate It,  
Discuss It,  
Understand It

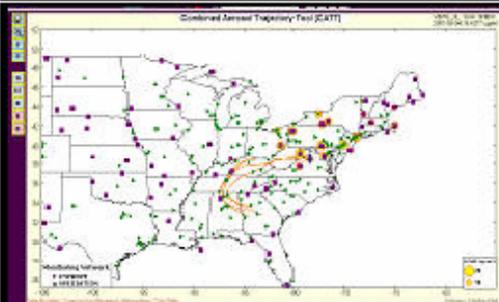
# Combined Aerosol Trajectory Tool

[Resources/Discussion](#)

[Manual -pdf , ppt](#)

## Ensemble Trajectory Browsers

[Single Site , Single Day](#)



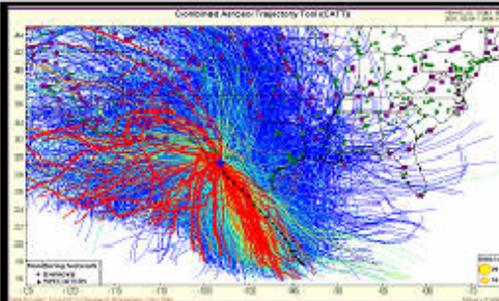
[Multi-Site, Single Day](#)



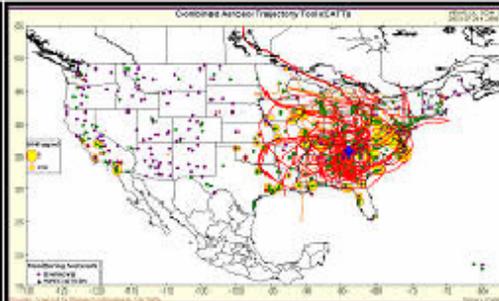
[All Sites, Single Day](#)



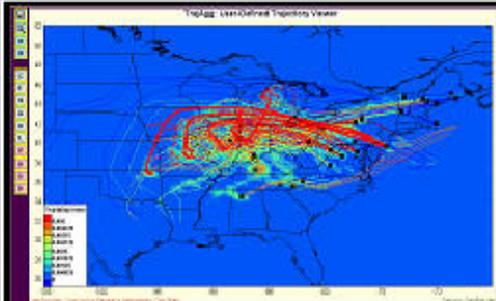
[Single Site, Time-Range](#)



[Concentr. Percentile](#)

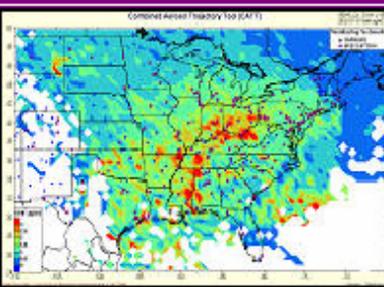


[User-Defined Filter](#)

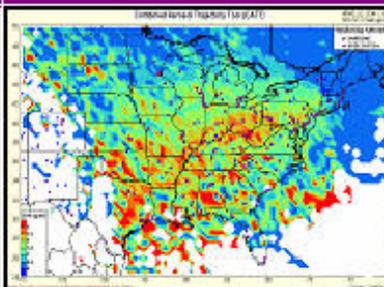


## Gridded Transport Metrics Browsers

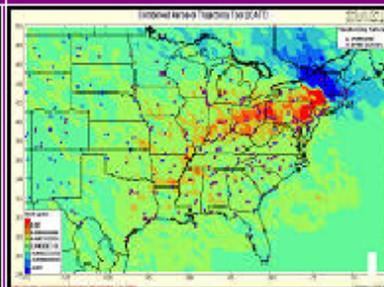
[Inc. Prob. 'Poirot'](#)



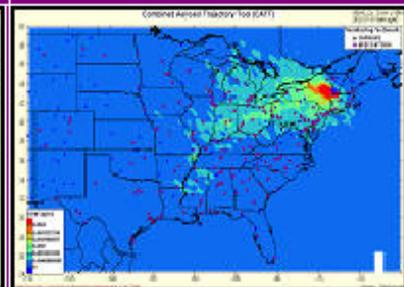
[Src. Contr. 'Hopke'](#)



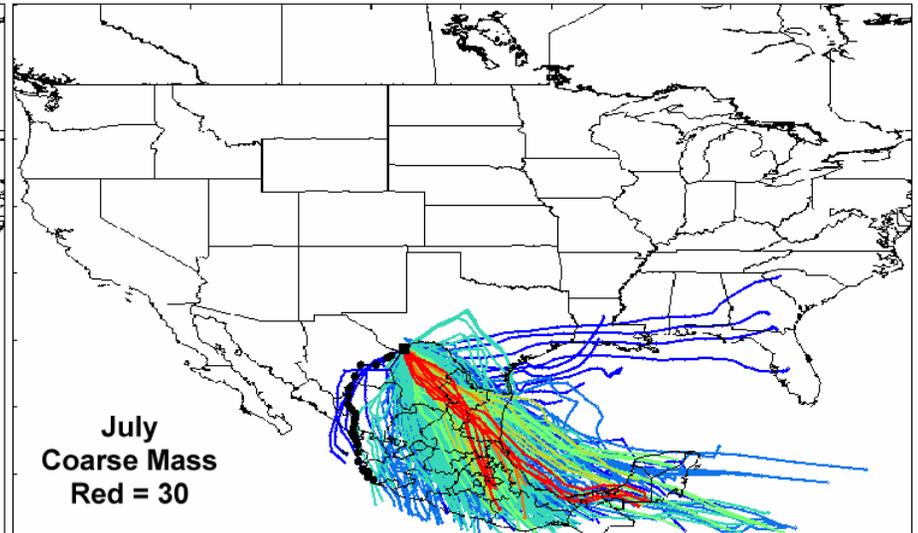
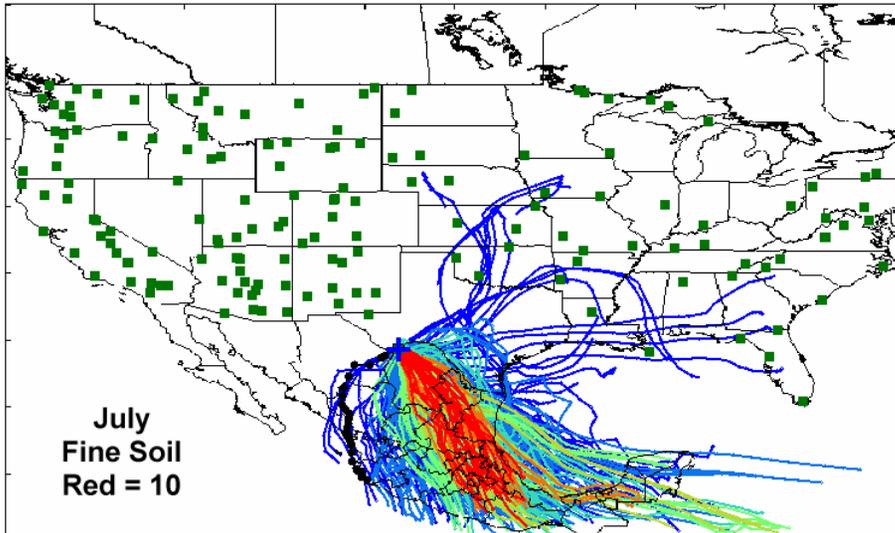
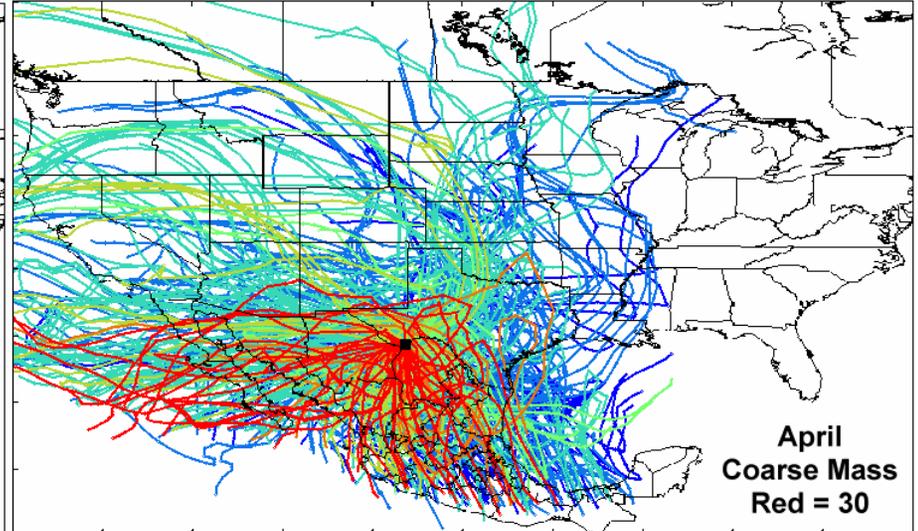
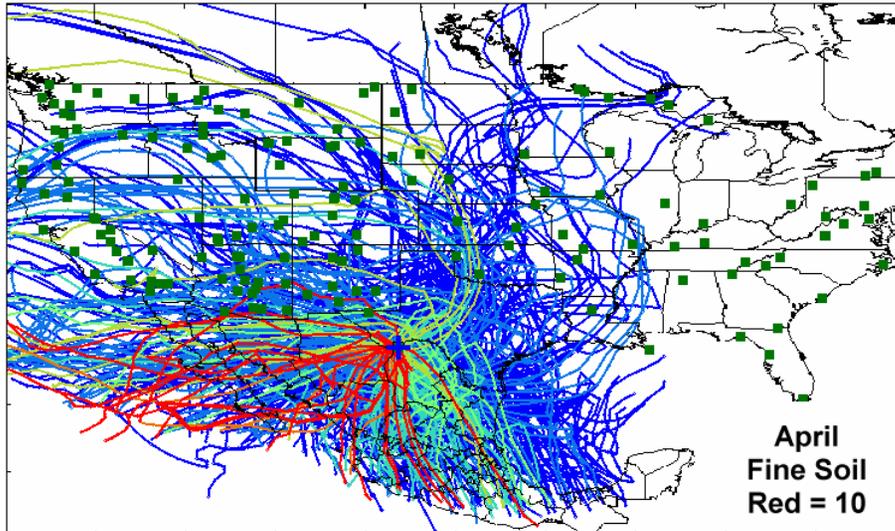
[Avg. Conc. 'Kenski'](#)



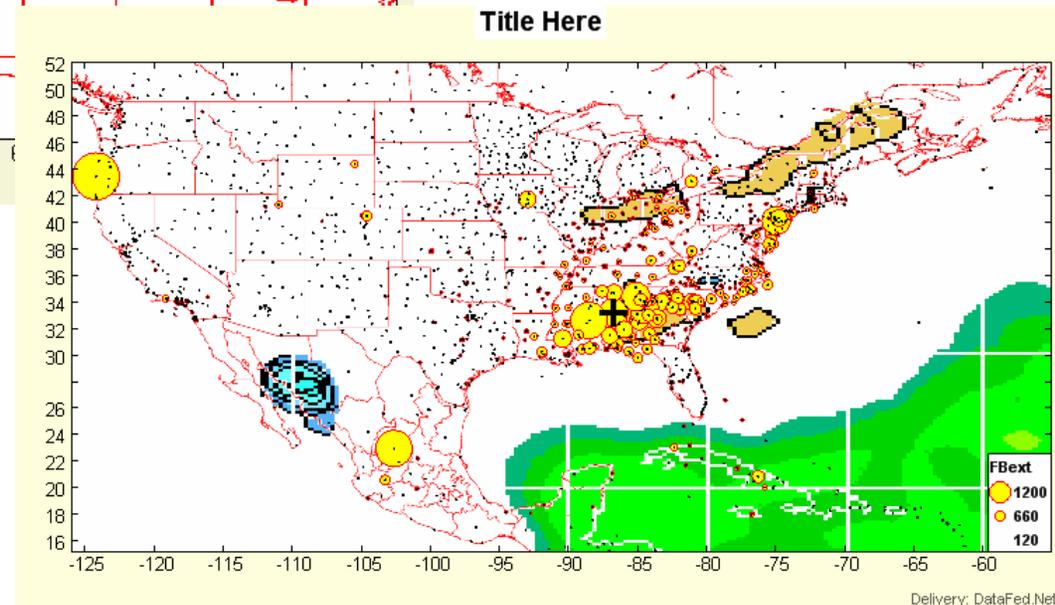
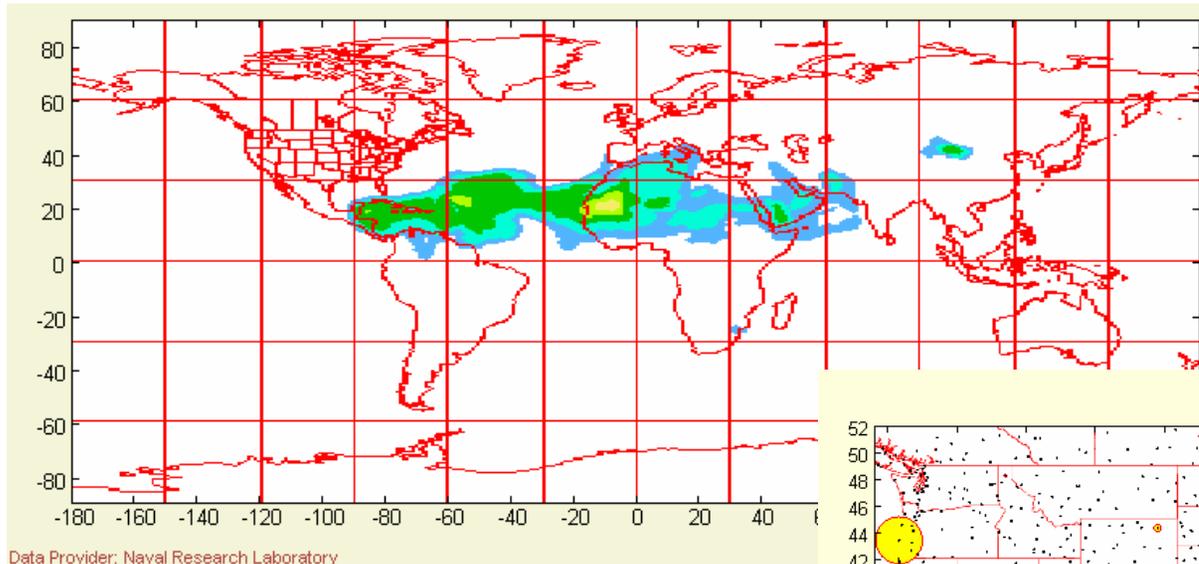
[Weighed Prob. 'Green'](#)



# Fine Soil (Left, Red = 10) and Coarse Mass (Right, Red = 30) for April (Top) and July (Bottom) at BIBE, 1989-03



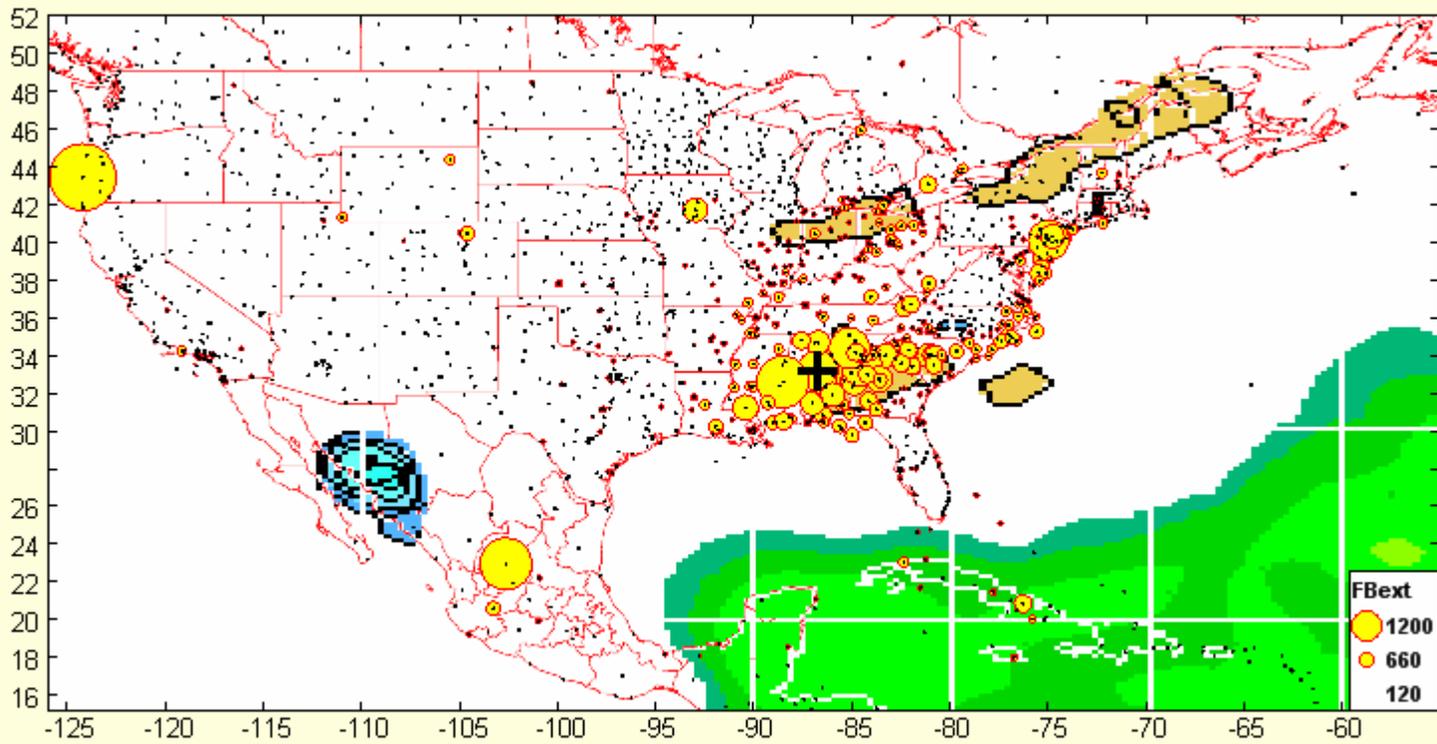
# NAAPS Aerosol Forecast Dust AOT for 07/27/05 18:00Z



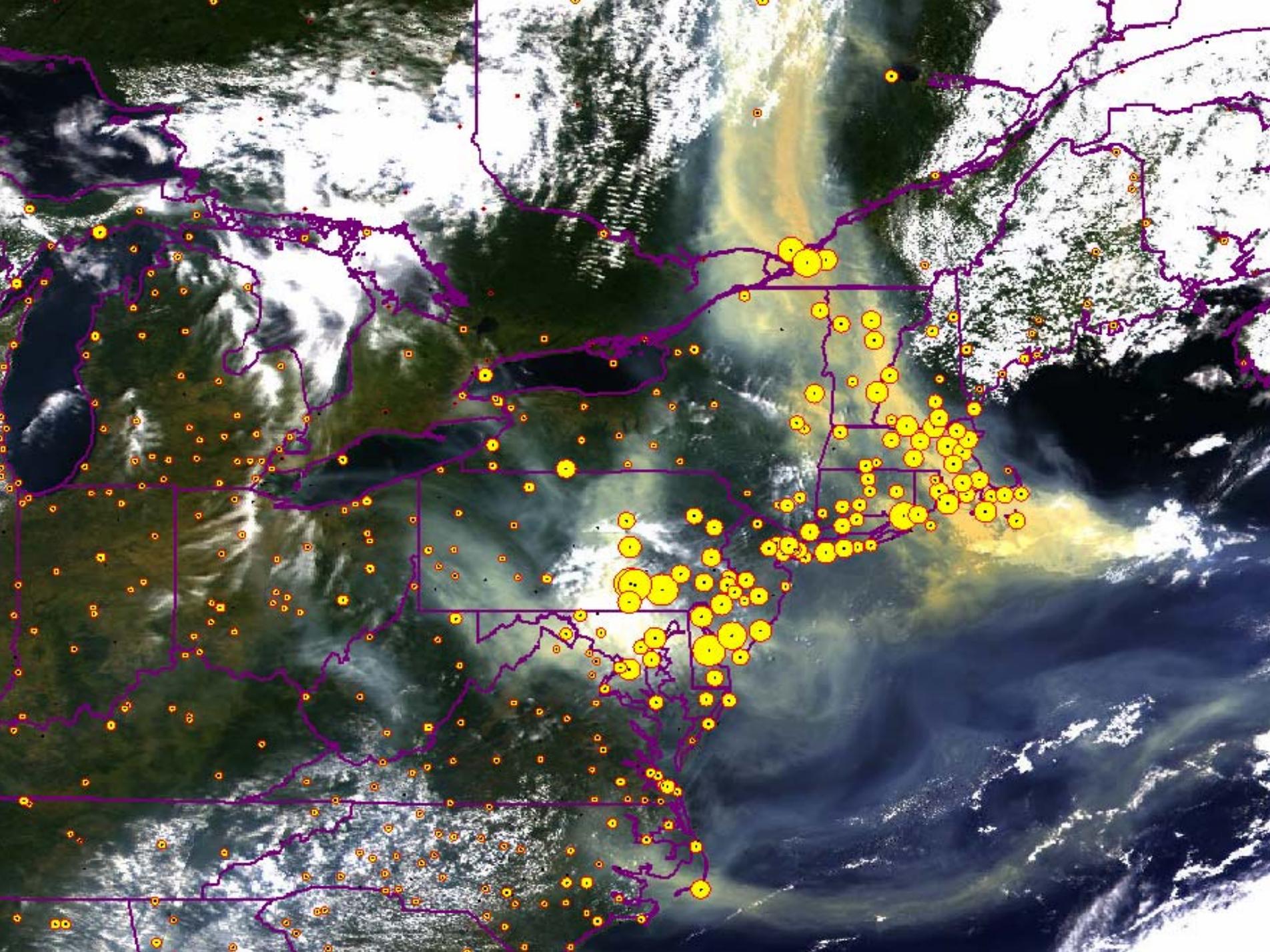
Can We See Sahara Dust (at Surface) First at  
Virgin Islands Nephelometer?

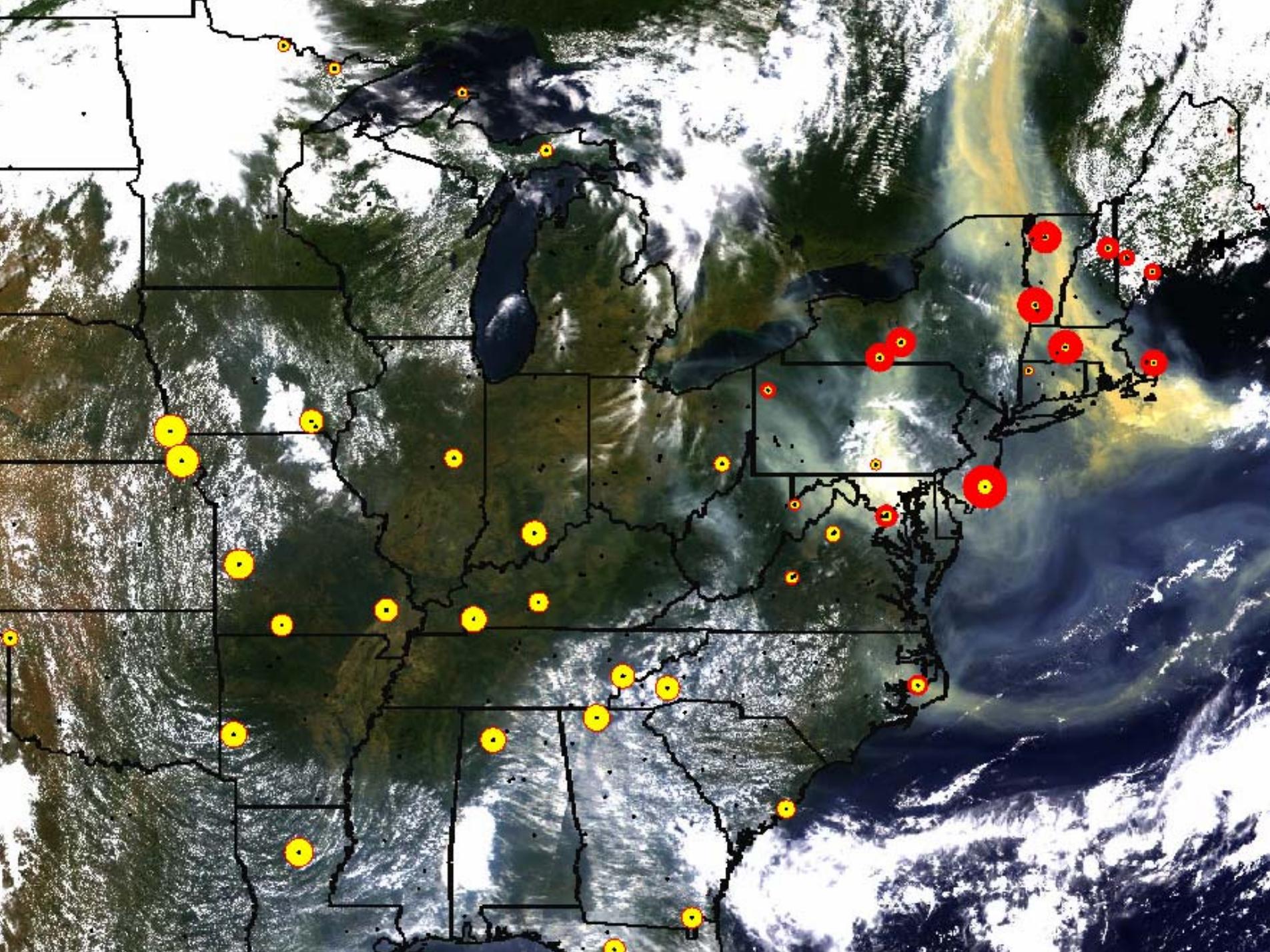
Can we report it in Near-Real-Time?

# Title Here

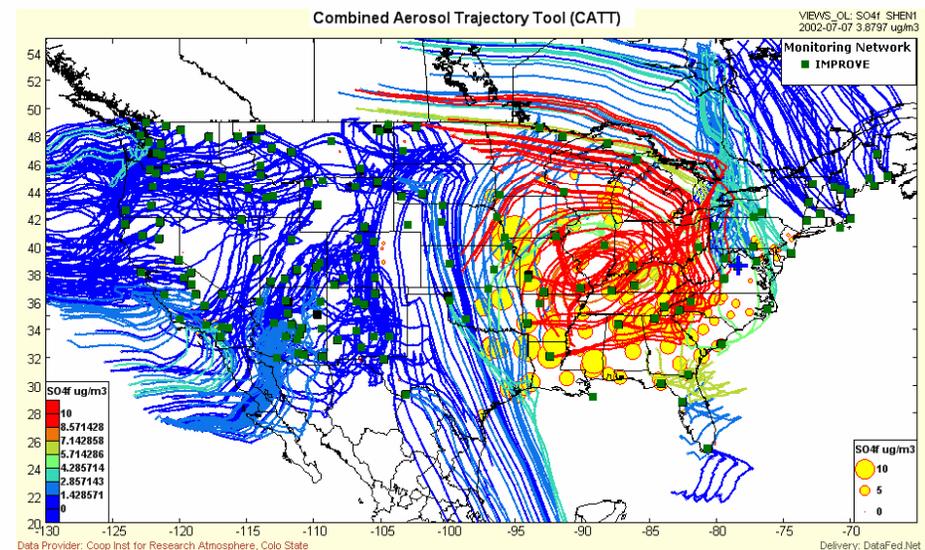
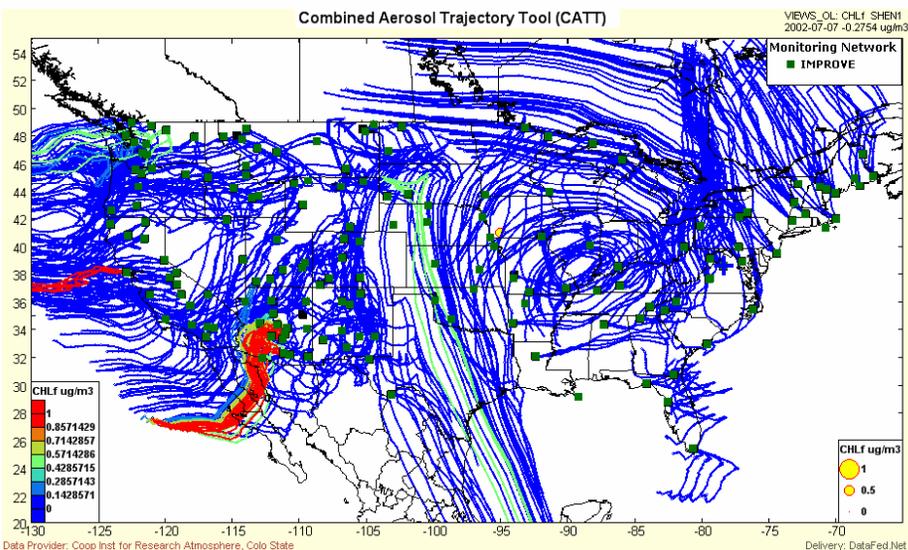
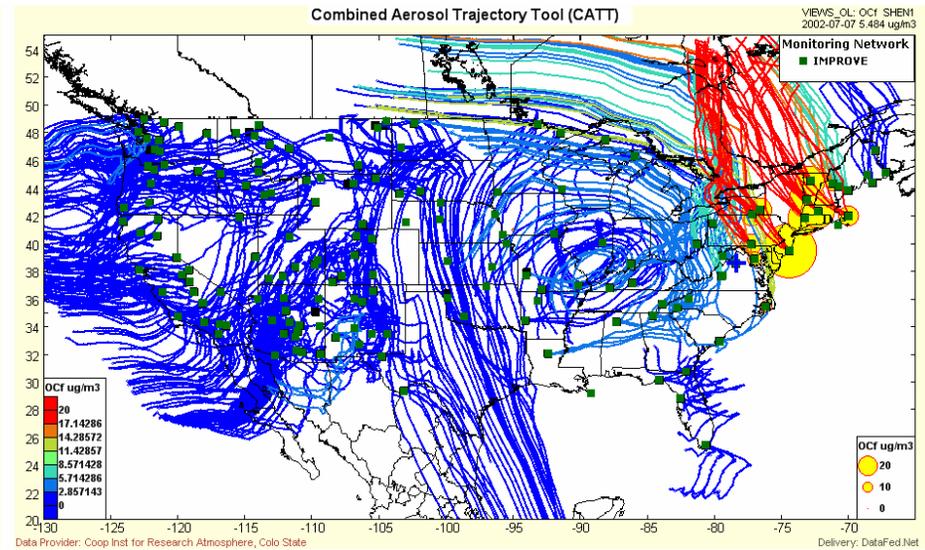
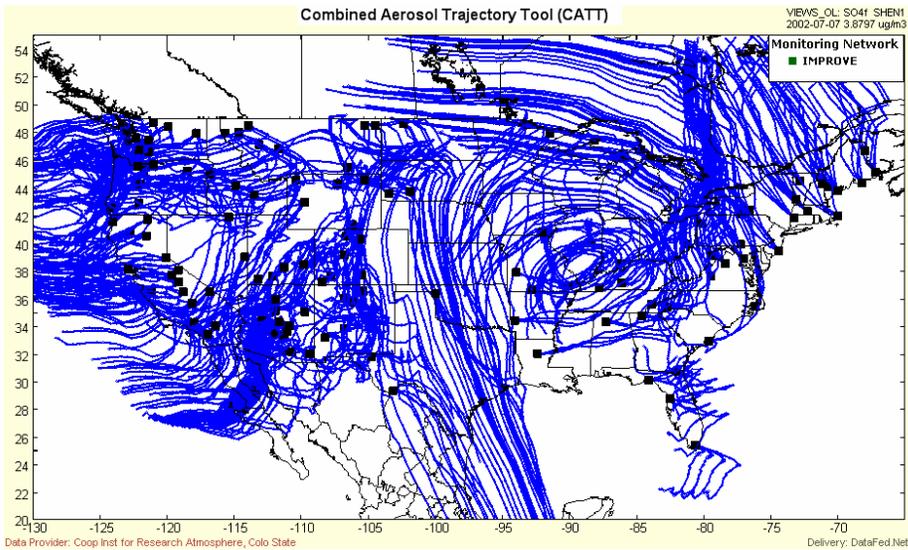


Delivery: DataFed.Net

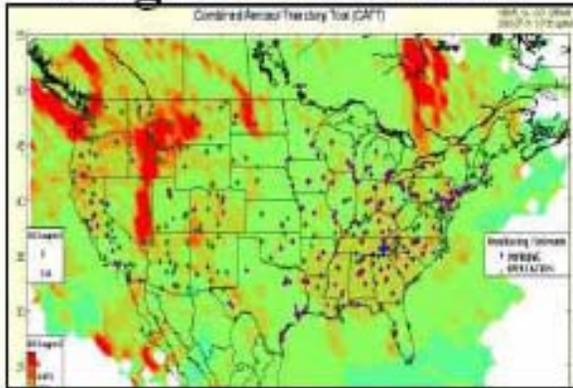




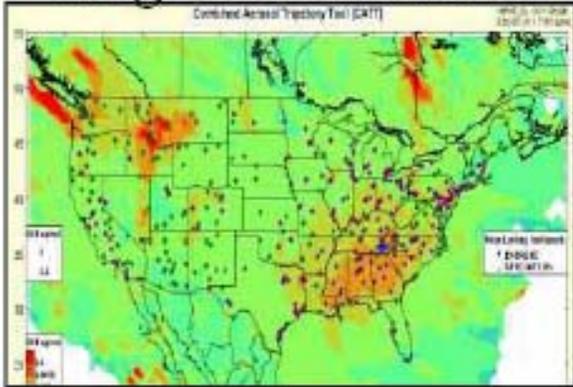
# Back Trajectories for All IMPROVE Sites on 7/7/02 Unweighted (top left), & color-weighted for OC (top right), SO4 lower right & Cl (lower left)



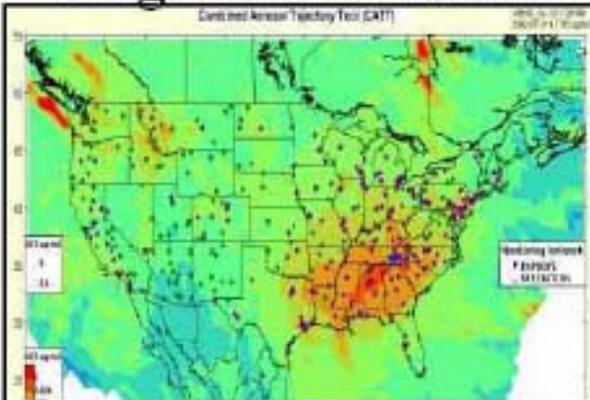
## Avg. 98 Percentile



## Avg. 95 Percentile



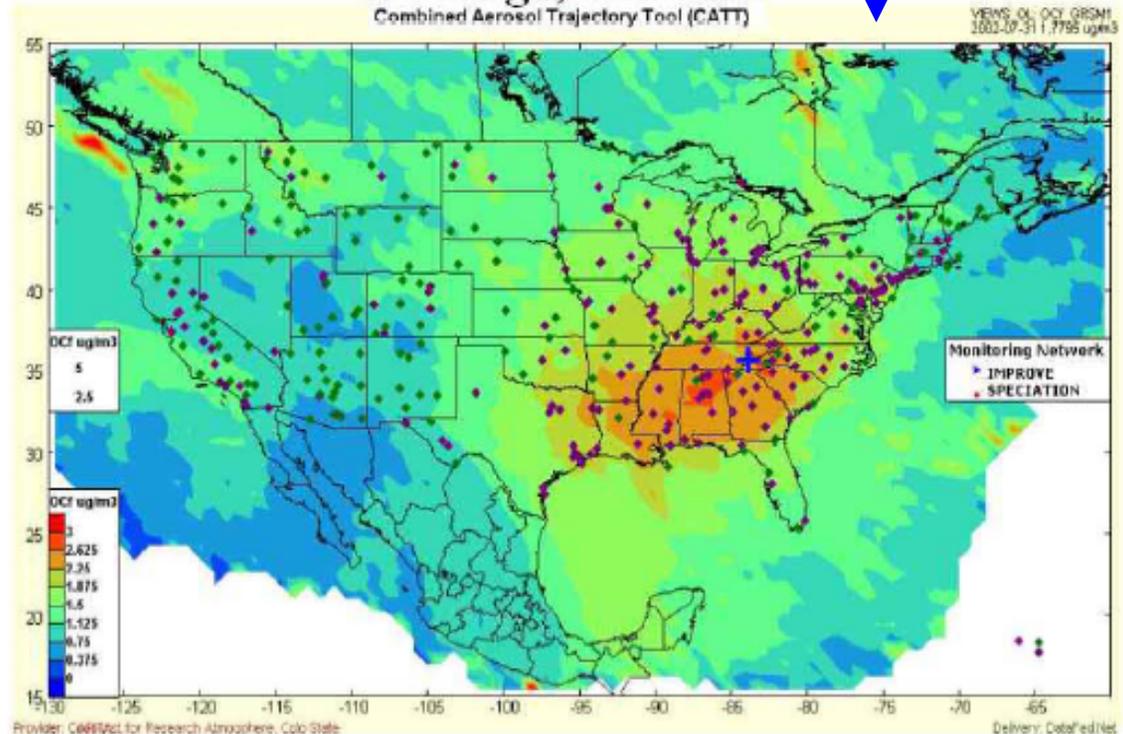
## Avg. 80 Percentile

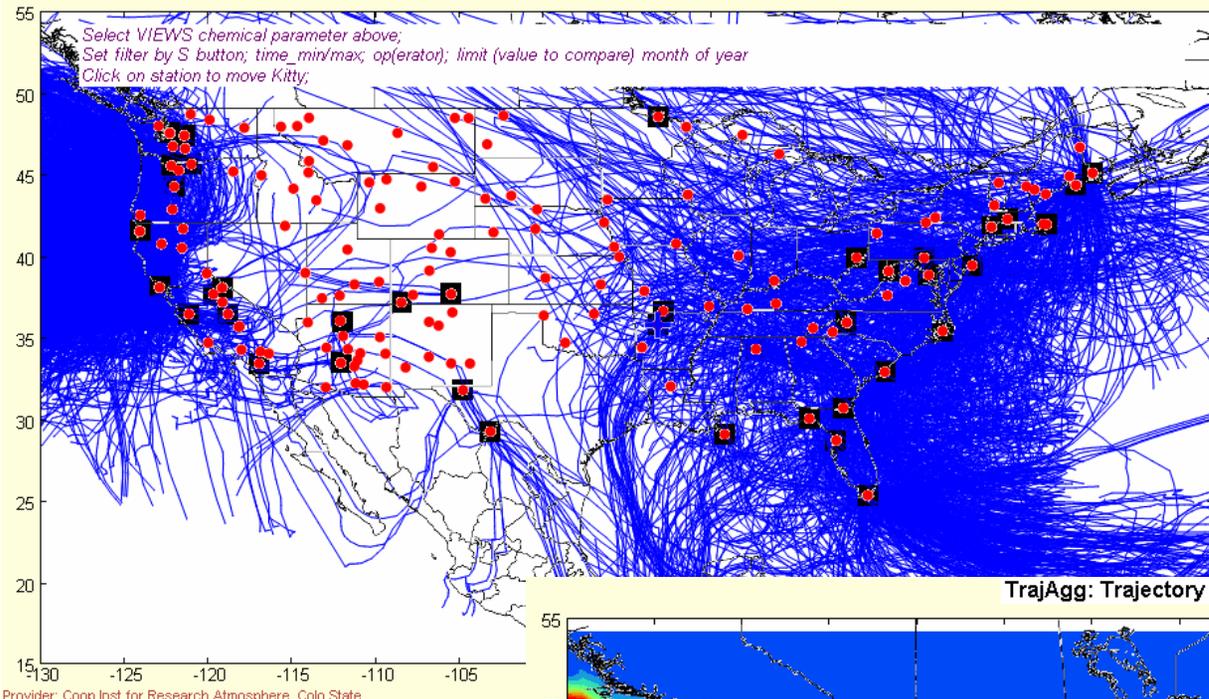


2001-03 Average Upwind Organic Carbon with "Percentile Screens" Imposed – i.e. Average Upwind OC above X percentile

...And with No Percentile Screen

## Average, All Data





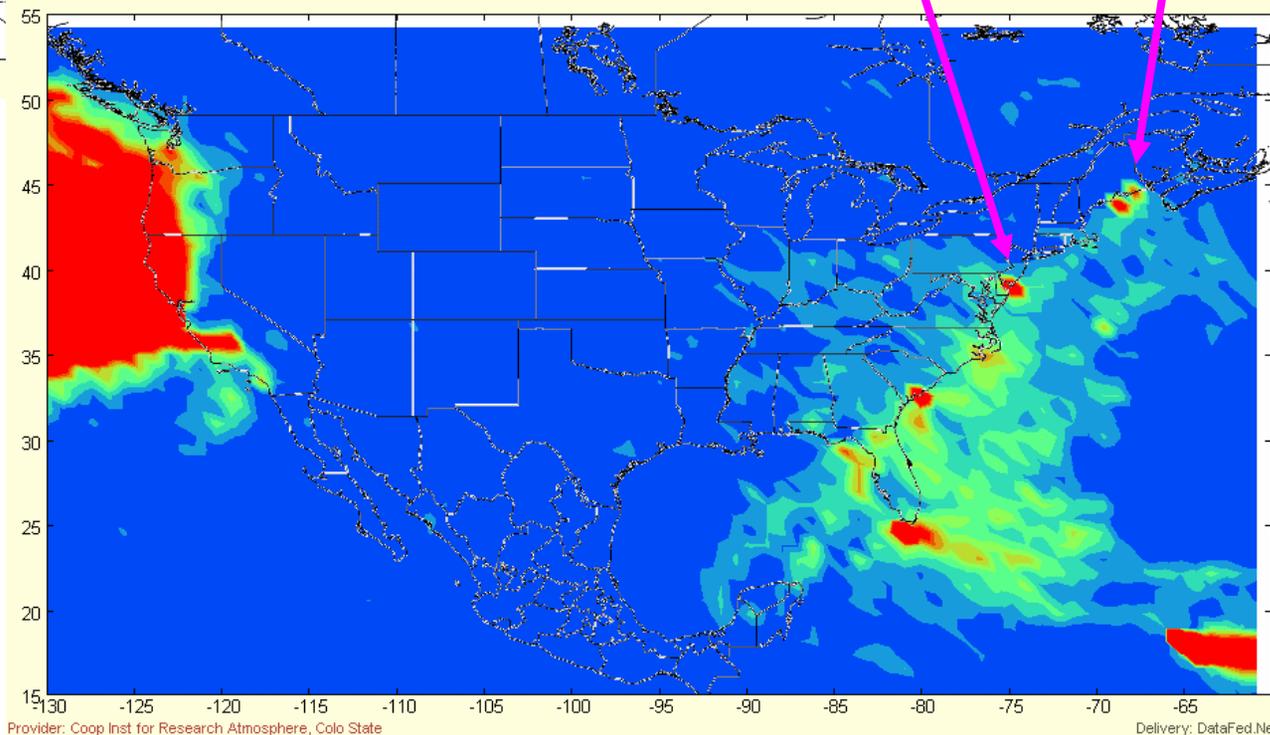
Na  $\geq$  1.5  $\mu\text{g}/\text{m}^3$

Sea Salt Comes from the Sea, as She Should.

BRIG & ACAD

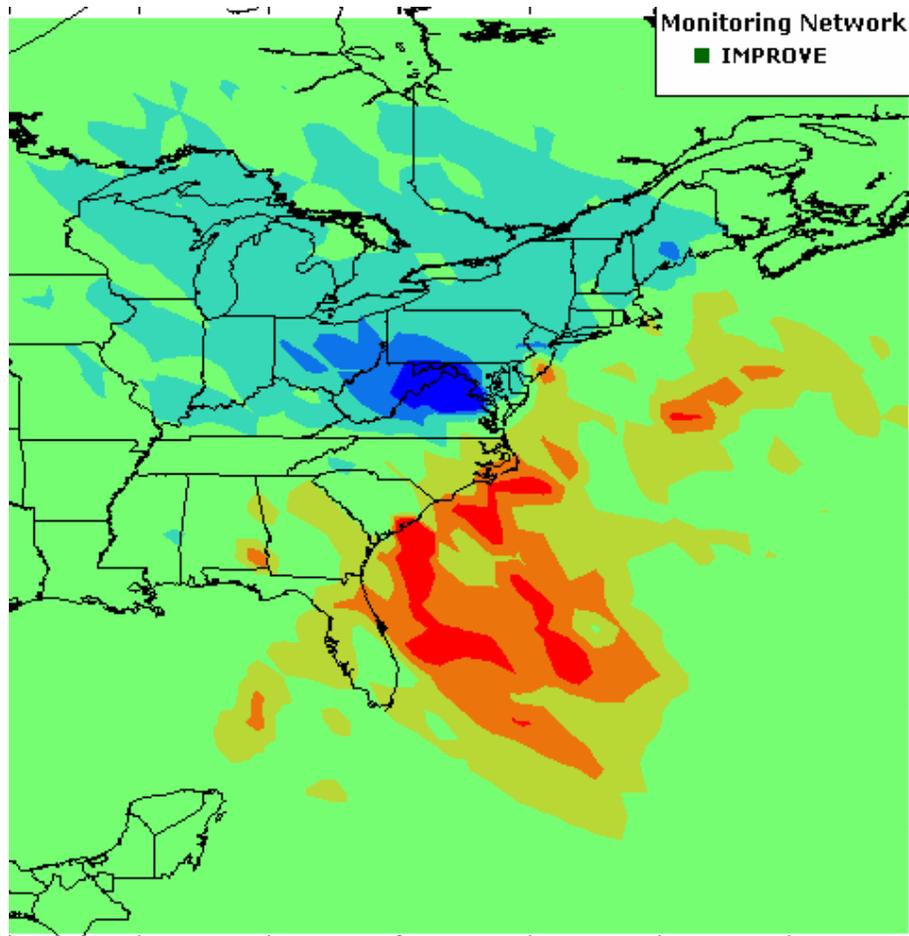
TrajAgg: Trajectory Aggregate

Battelle PMF/Unmix modeling indicated a Sea Salt source at 6 MANE-VU sites, Increasing over time. Why?  
Is West Coast Sea Salt Increasing?

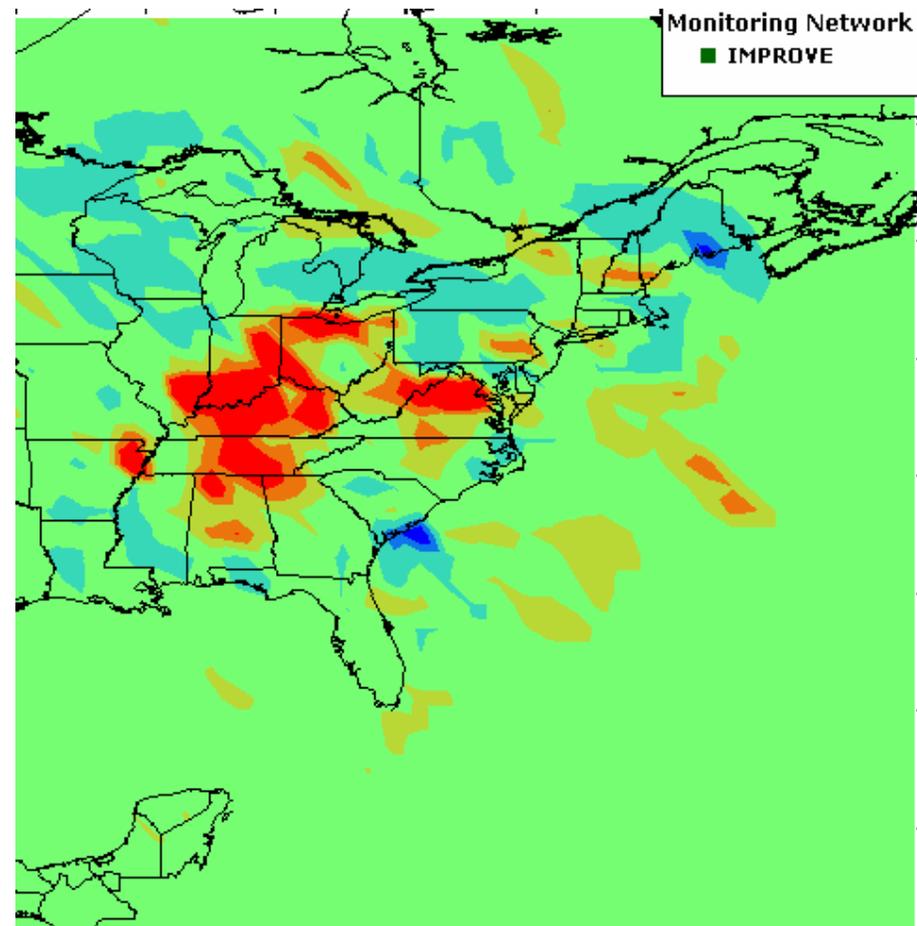


# CATT as a QA Tool: Incremental Probabilities for $\text{Na} > 1.5$ at 5 East Coast Sites: ACAD, BRIG, WASH SHEN & ROMA

1992-2000

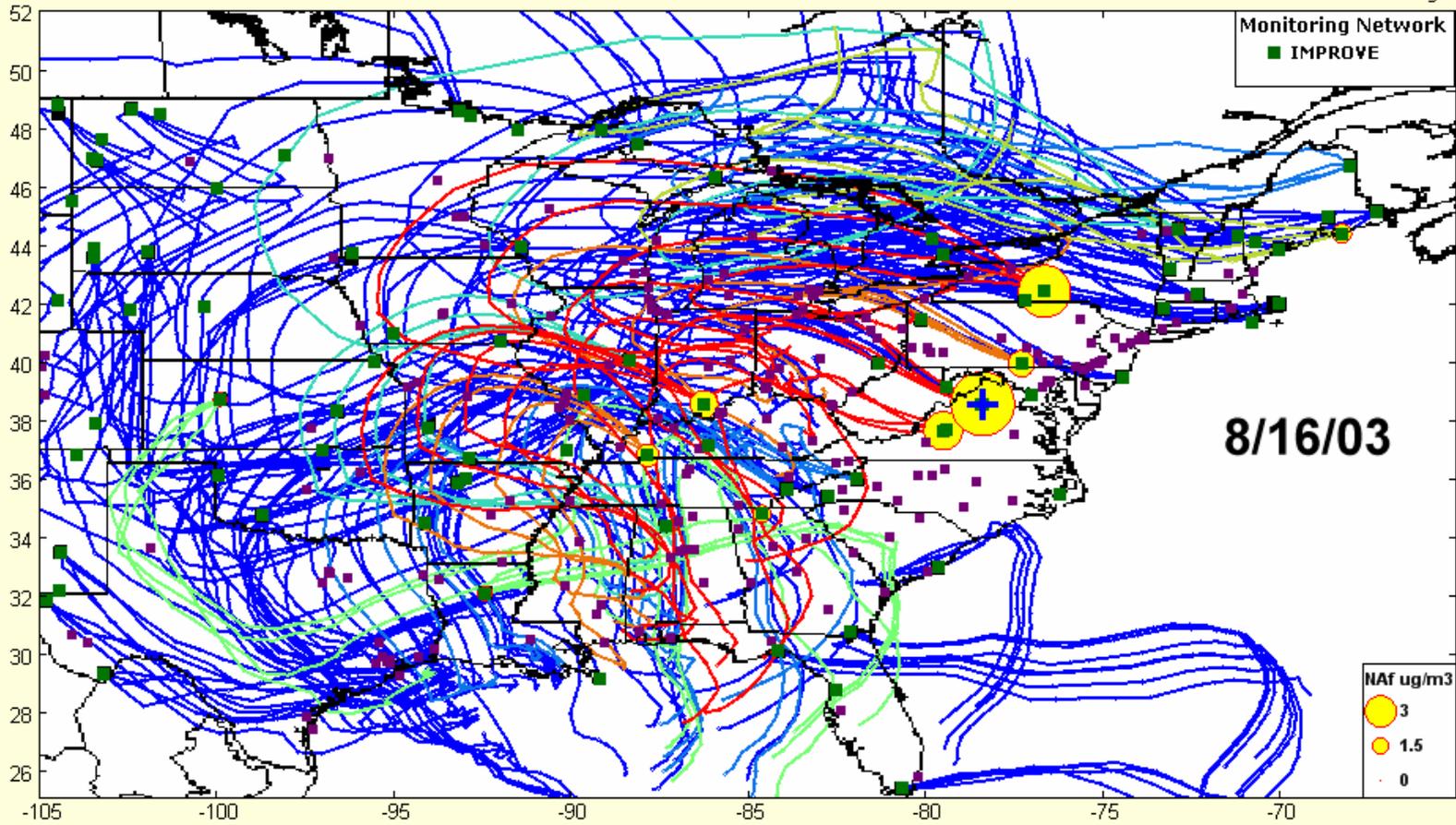


2001-2003



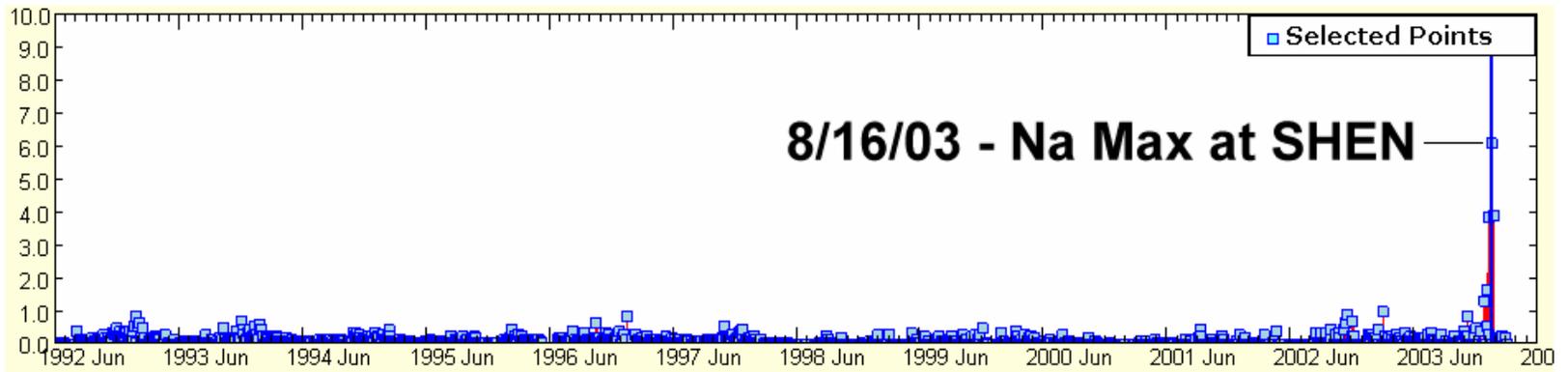
# Combined Aerosol Trajectory Tool (CATT)

VIEWS: NAF SHEN1  
2003-08-16 6.09141 ug/m3



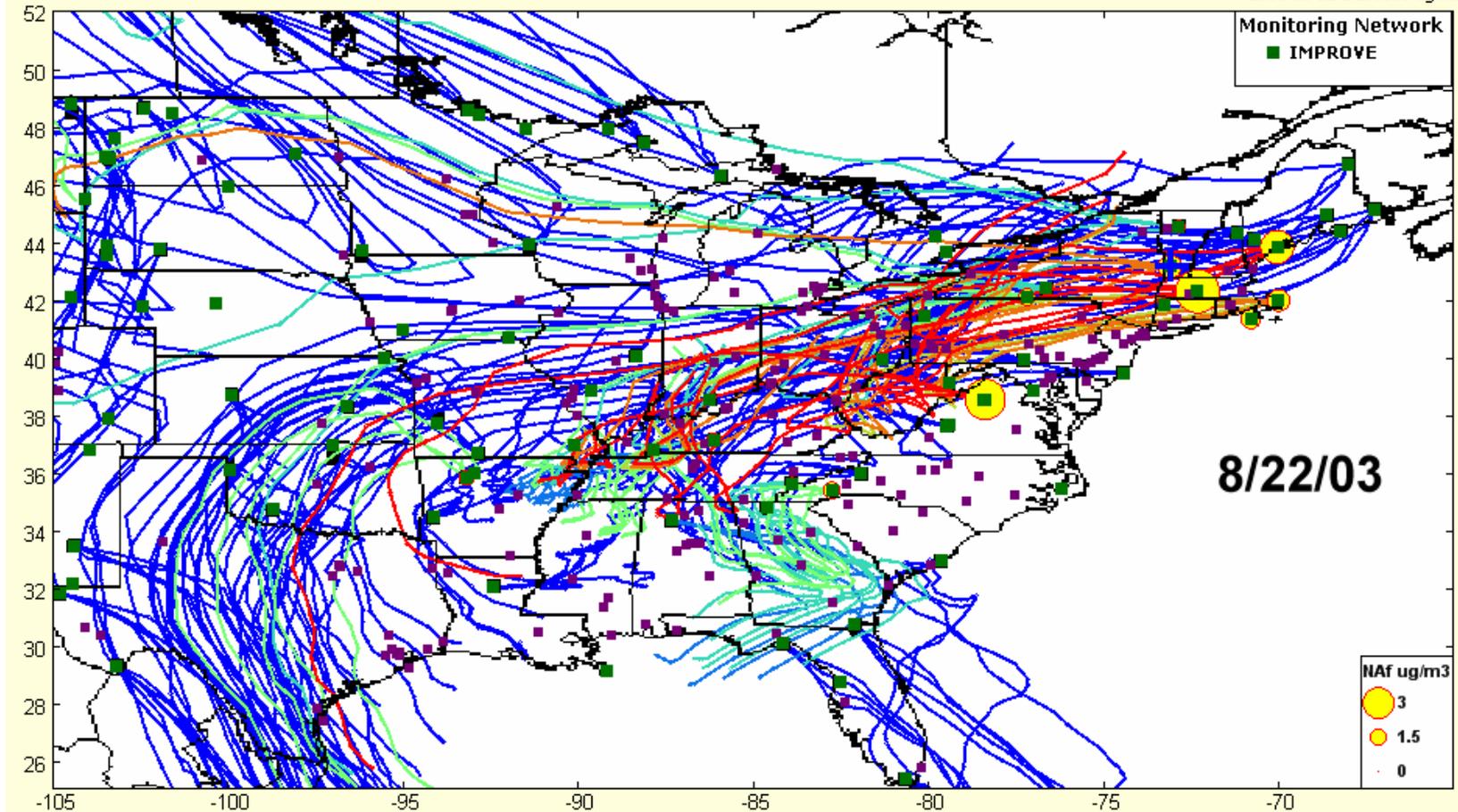
Data Provider: Coop Inst for Research Atmosphere, Colo State

Delivery: DataFed.Net



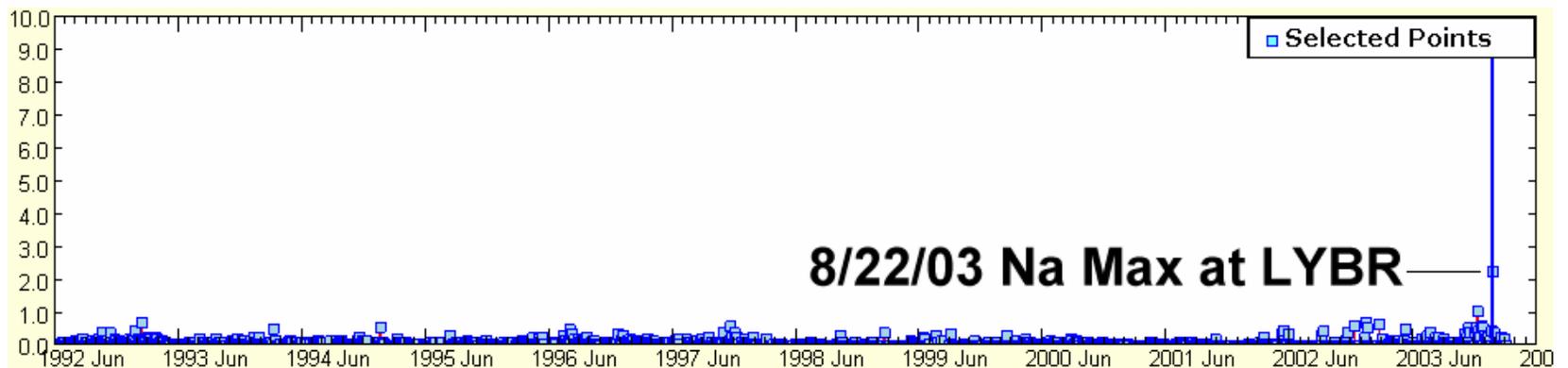
# Combined Aerosol Trajectory Tool (CATT)

VIEWS: NA1 LYBR1  
2003-08-22 2.260599 ug/m3



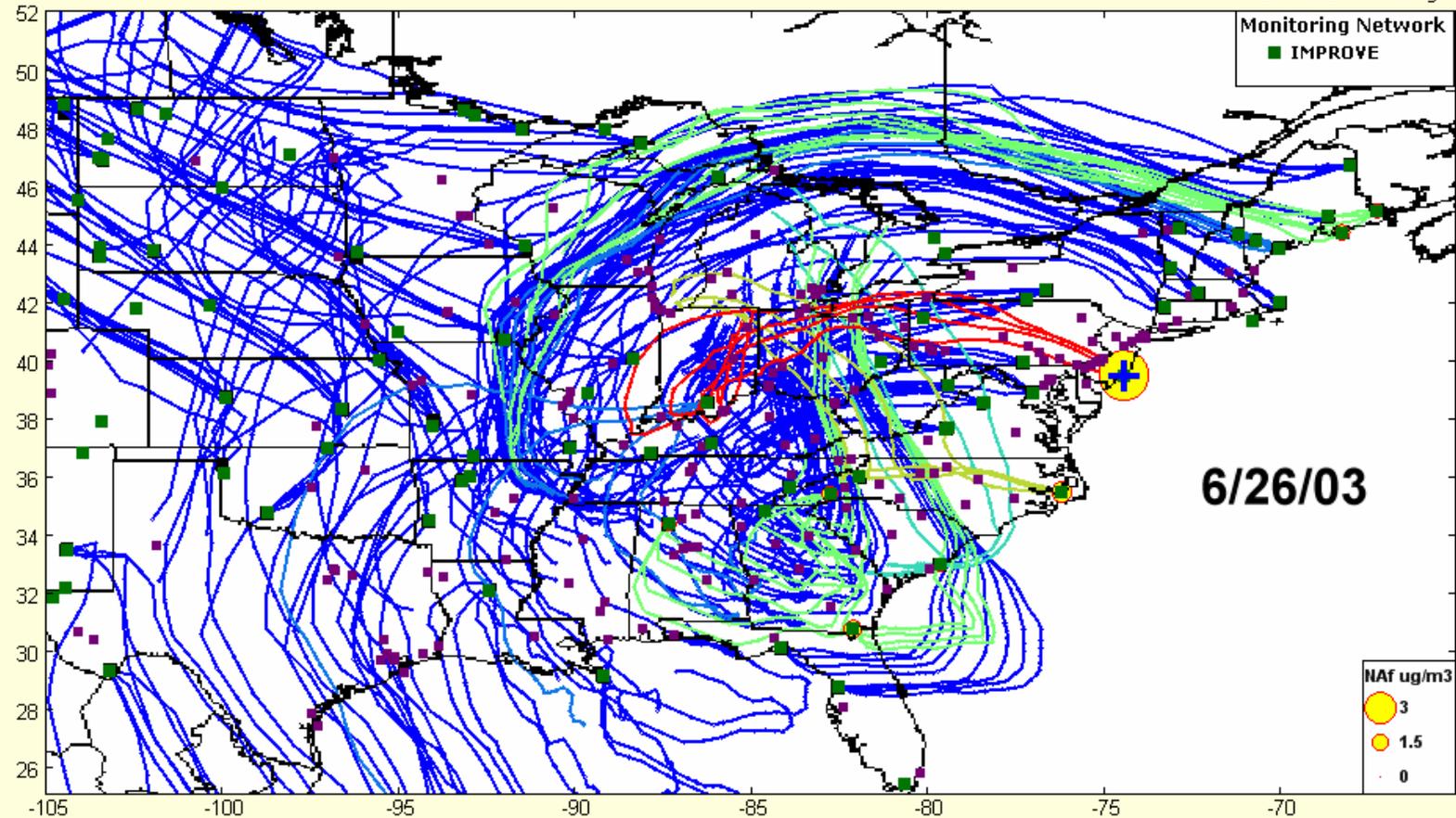
Data Provider: Coop Inst for Research Atmosphere, Colo State

Delivery: DataFed.Net



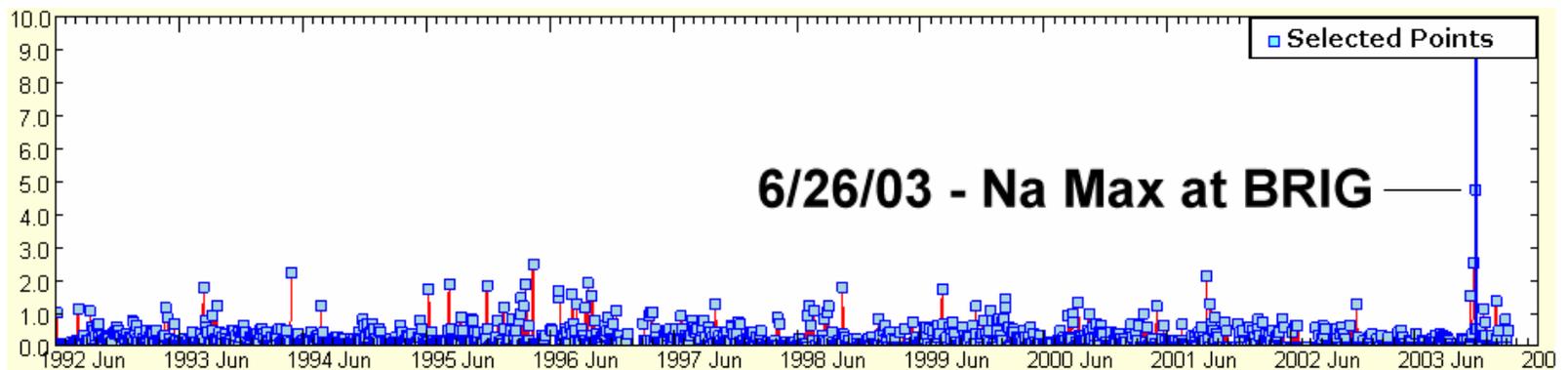
# Combined Aerosol Trajectory Tool (CATT)

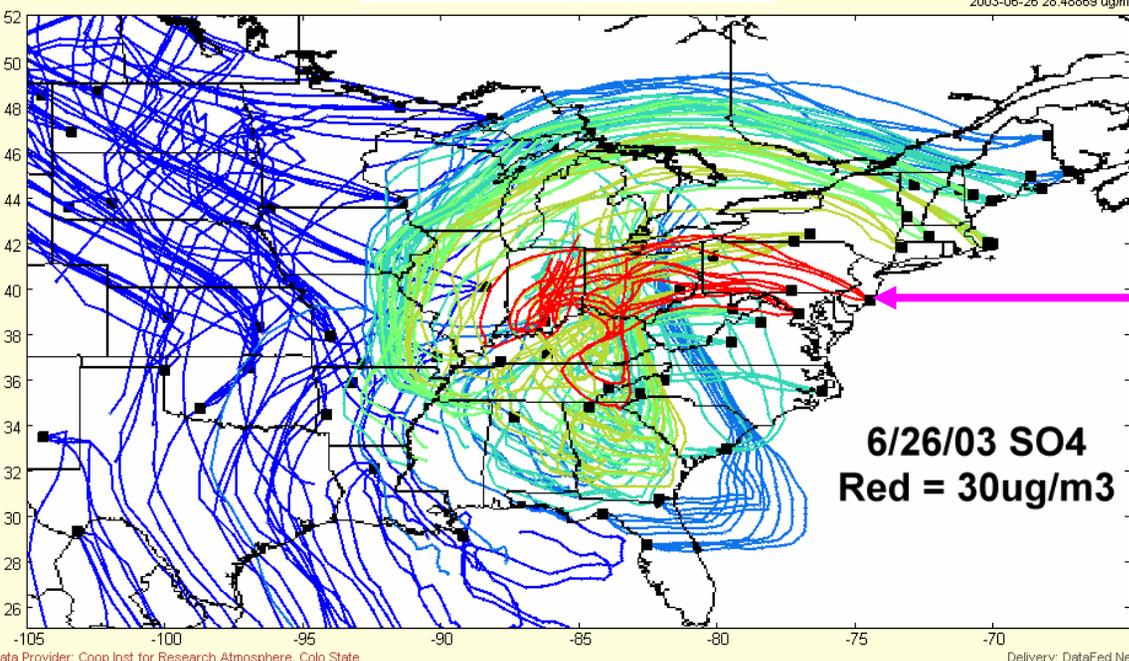
VIEWS: NAf BRIG  
2003-06-26 4.76536 ug/m3



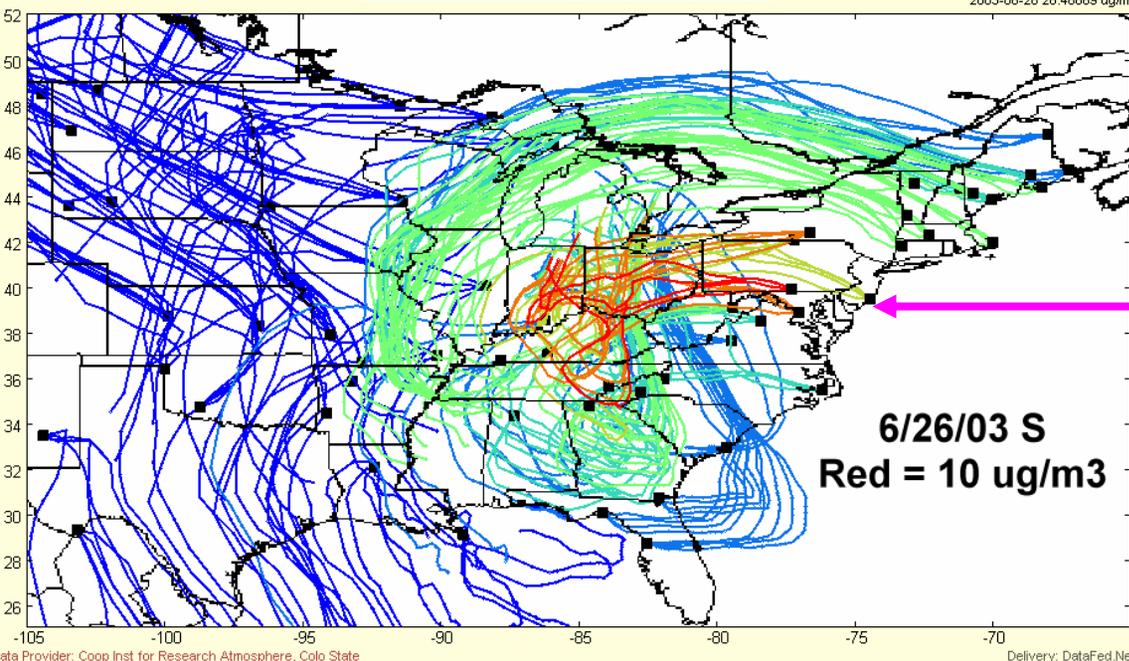
Data Provider: Coop Inst for Research Atmosphere, Colo State

Delivery: DataFed.Net

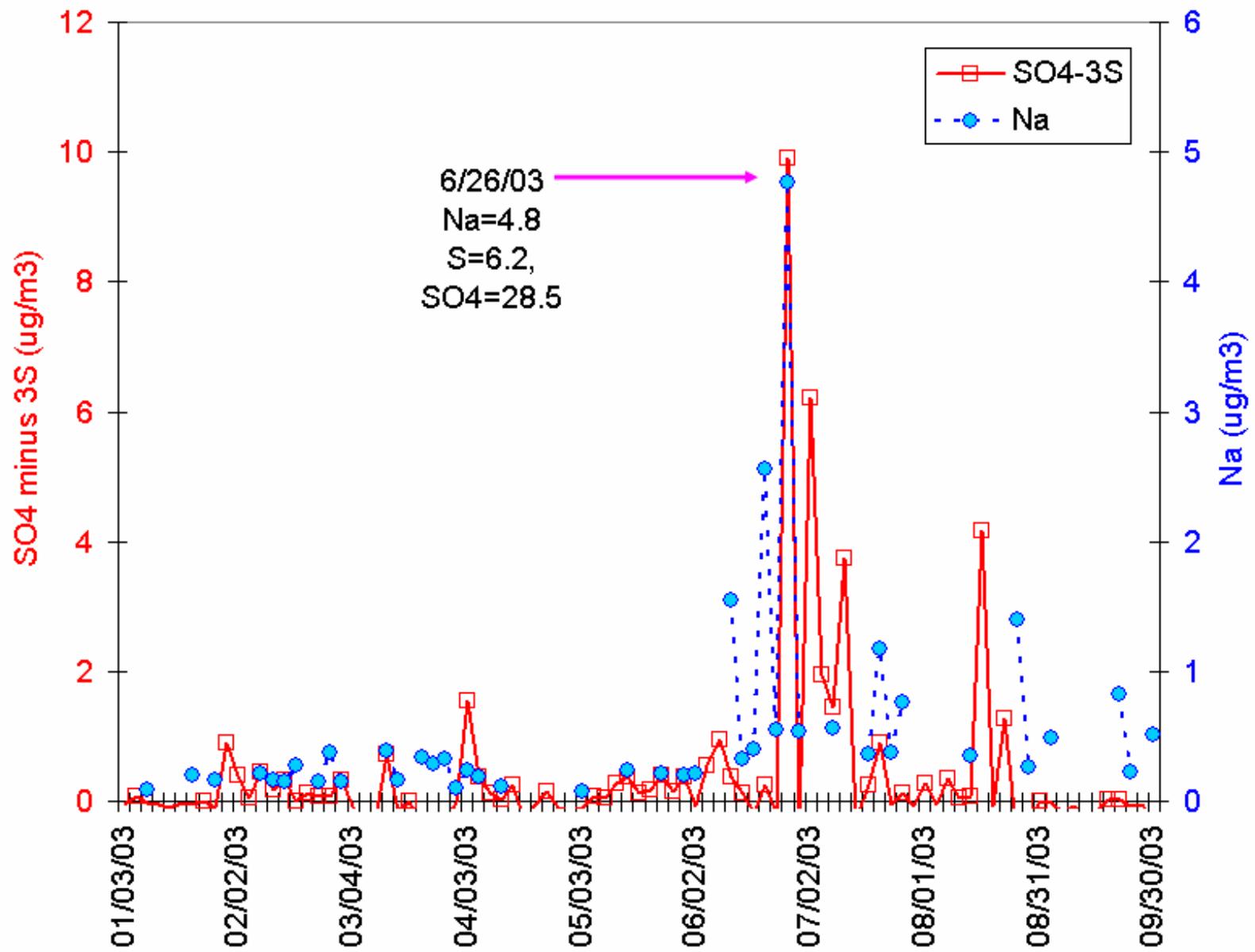




6/26/03, Day of  
Max BRIG Na (4.8 ug/m3)  
Was a **Very** High SO4 Day  
(28.5 ug/m3 at BRIG)

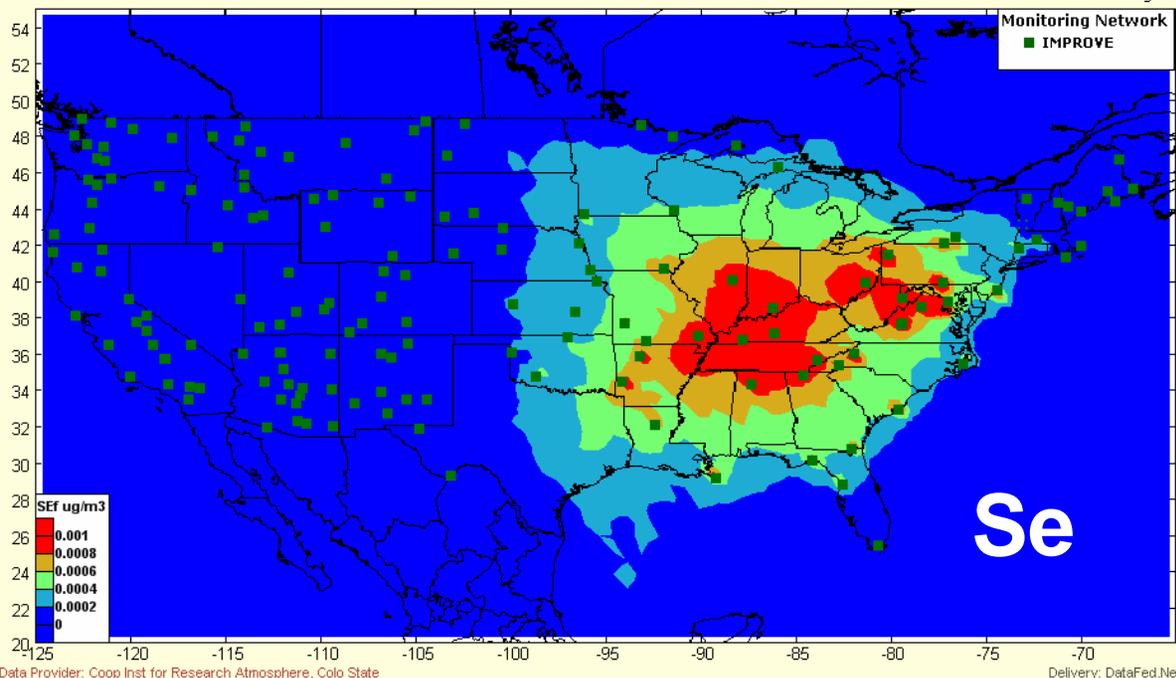


But was only a  
**Moderately** High S Day  
(6.2 ug/m3 at BRIG)



Combined Aerosol Trajectory Tool (CATT)

IEWS\_OL: SEf LYBR1  
2002-07-31 NaN ug/m3



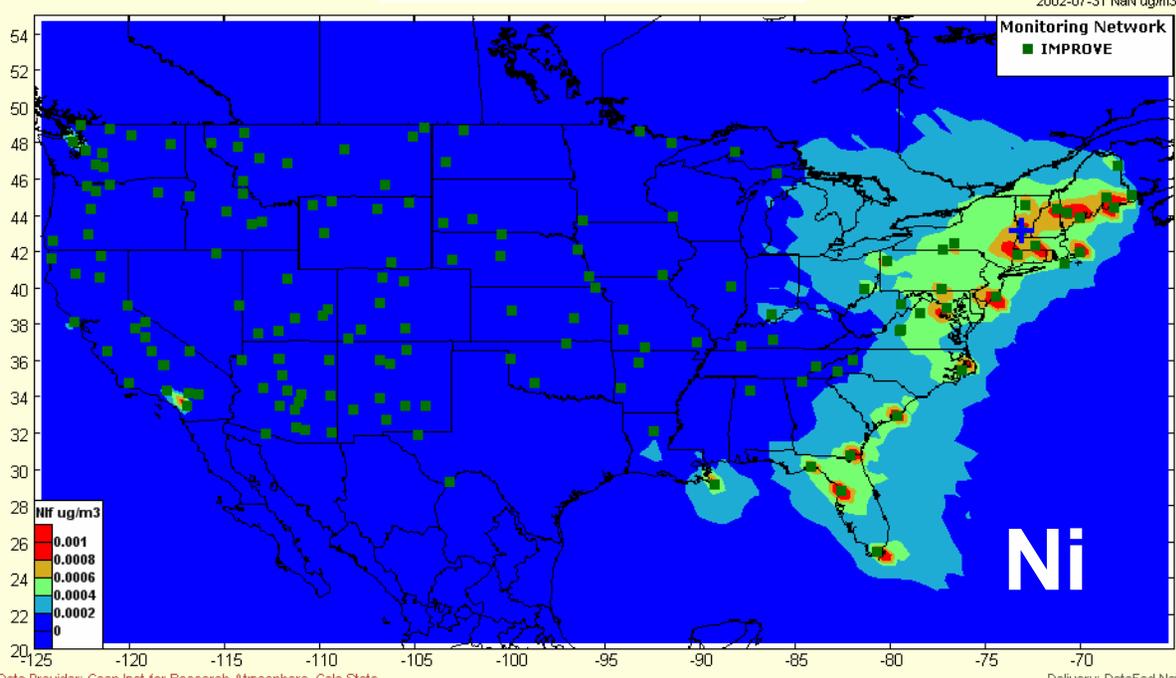
Data Provider: Coop Inst for Research Atmosphere, Colo State

Delivery: DataFed.Net

Incremental Probability for High Selenium 2000-2002 (using only 42 IMPROVE sites with data since 1992)

Combined Aerosol Trajectory Tool (CATT)

IEWS\_OL: NiF LYBR1  
2002-07-31 NaN ug/m3

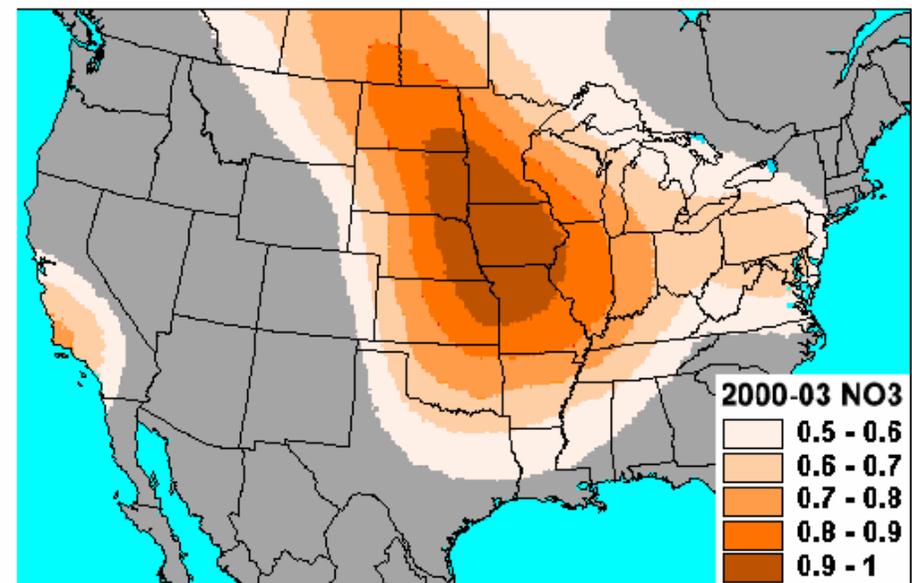
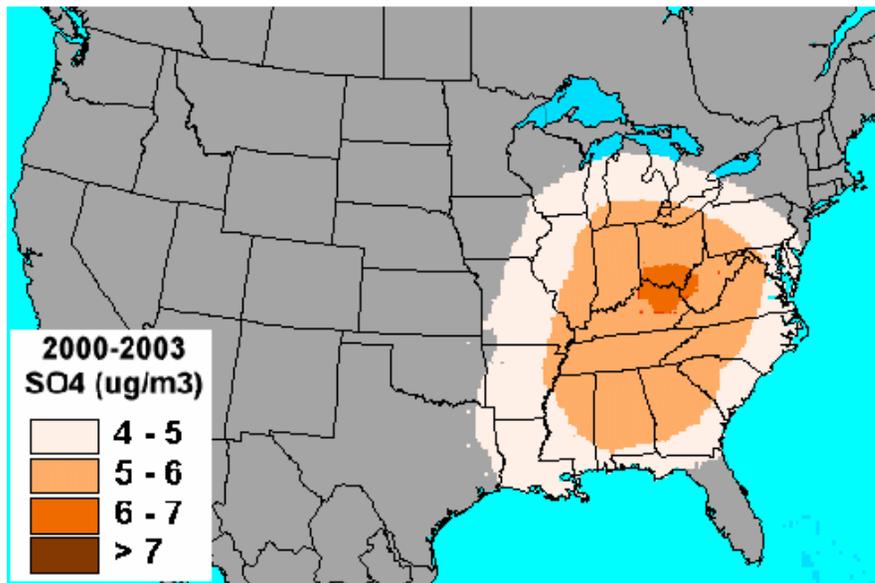
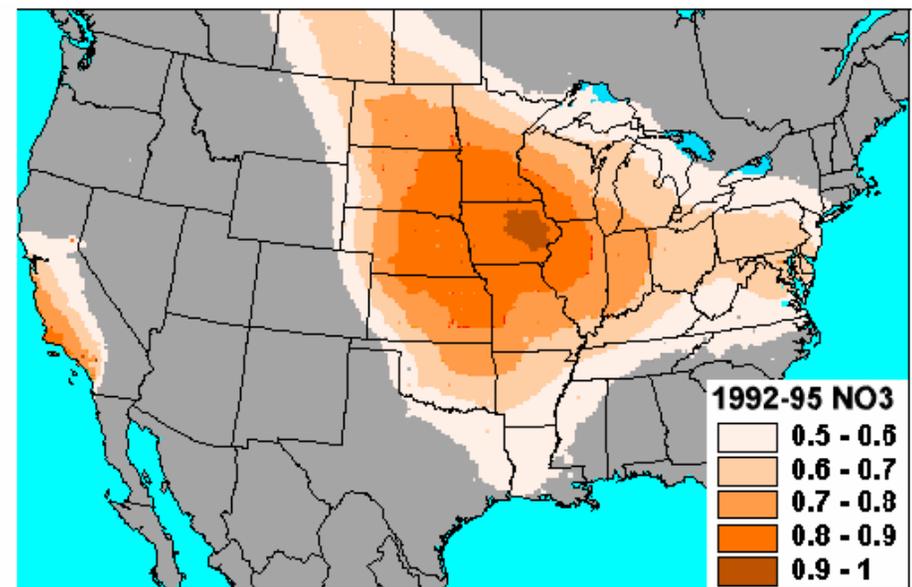
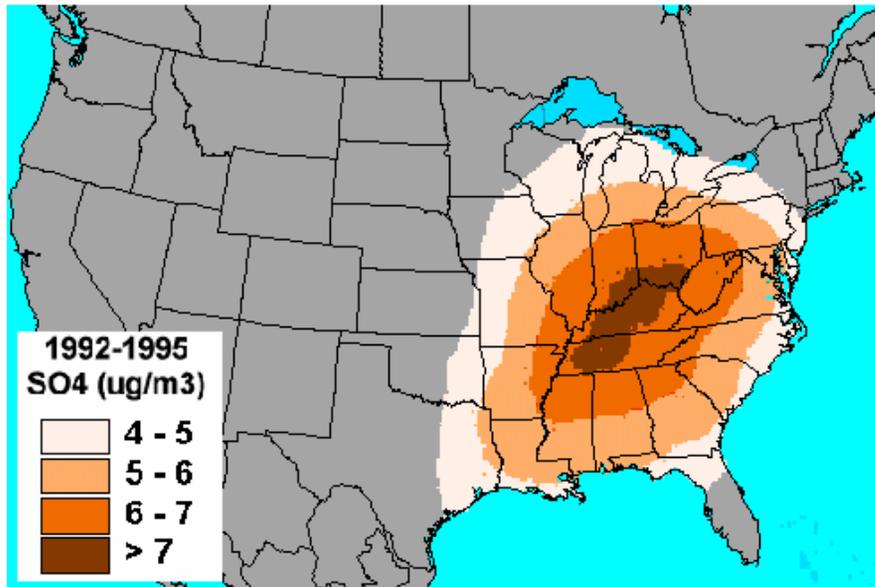


Data Provider: Coop Inst for Research Atmosphere, Colo State

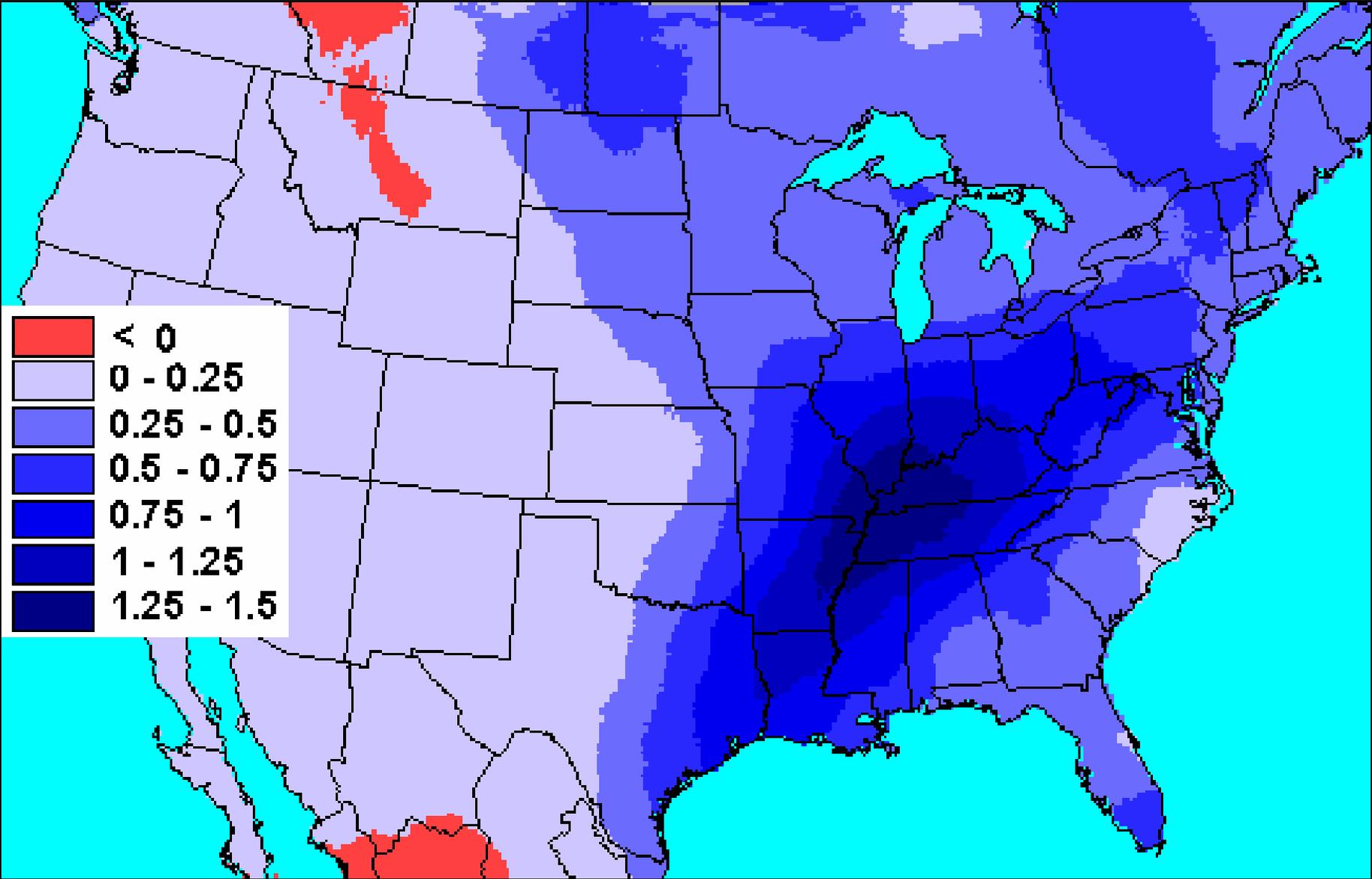
Delivery: DataFed.Net

Incremental Probability for High Nickel 2000-2002 (using only 42 IMPROVE sites with data since 1992)

# Changes In Average Upwind SO4 (left) & NO3 (right) from 1992-95 (top) to 2000-03 (bottom), based on 42 long-term IMPROVE sites



# Reduction in Average Upwind Sulfate 1992-95 to 2000-03 in ug/m3



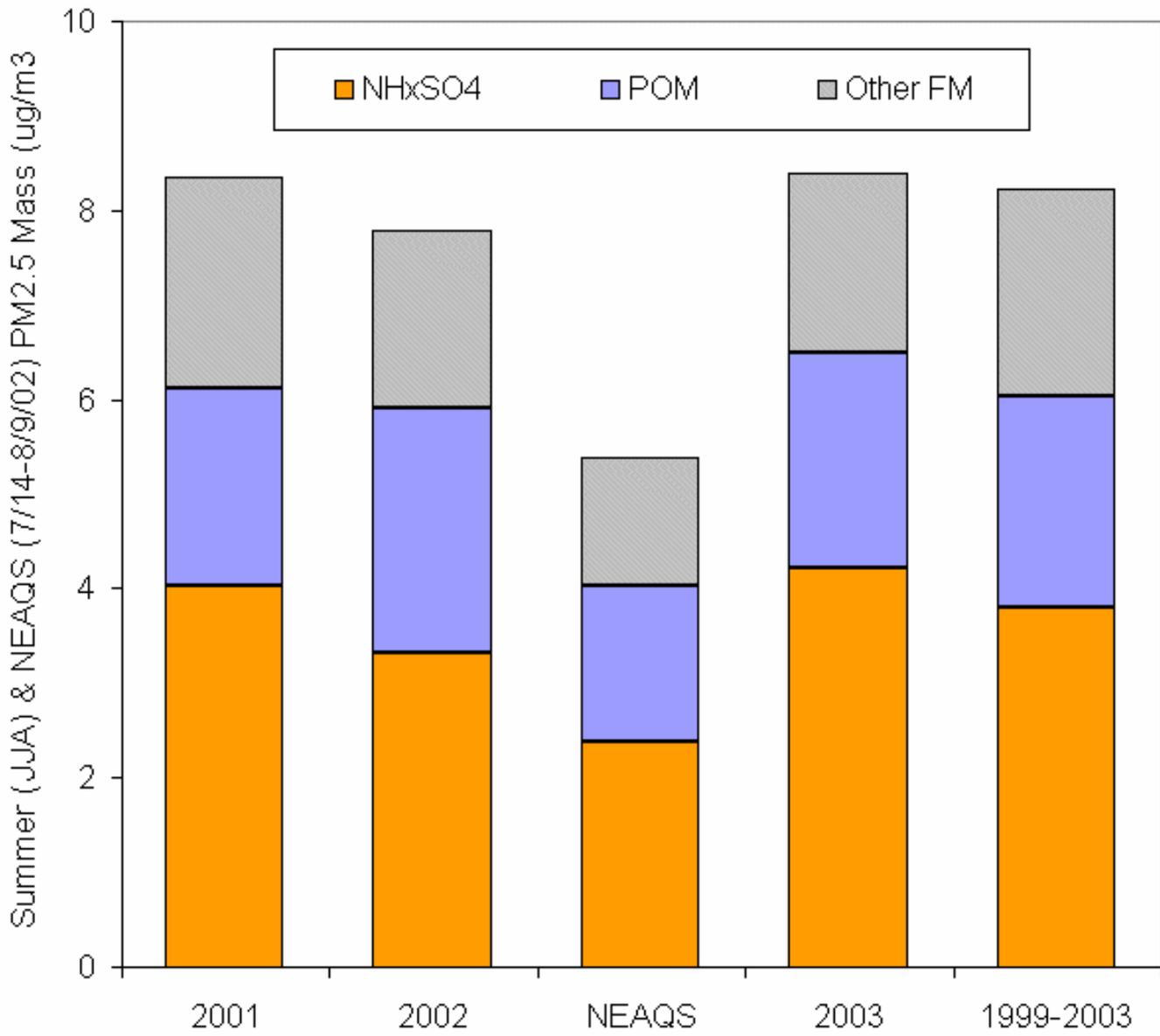
## **Preliminary (draft) Conclusions from NEAQS 2002:**

Organic aerosols dominated the total sub-micron aerosol mass and light scattering in the marine boundary layer off the New England coast during the summer of 2002.

The reduction in sulfate aerosol concentrations across the United States [*Malm et al.*, 2002] during the past decade may have led to the dominance of the organic aerosol.

**Was the 7/18/02 – 8/8/02 NEAQS study period  
representative of recent summers in coastal New England?**

Summer PM2.5 Mass Composition at Acadia NP (using 1.3 x SO4 and 1.6 x OC)



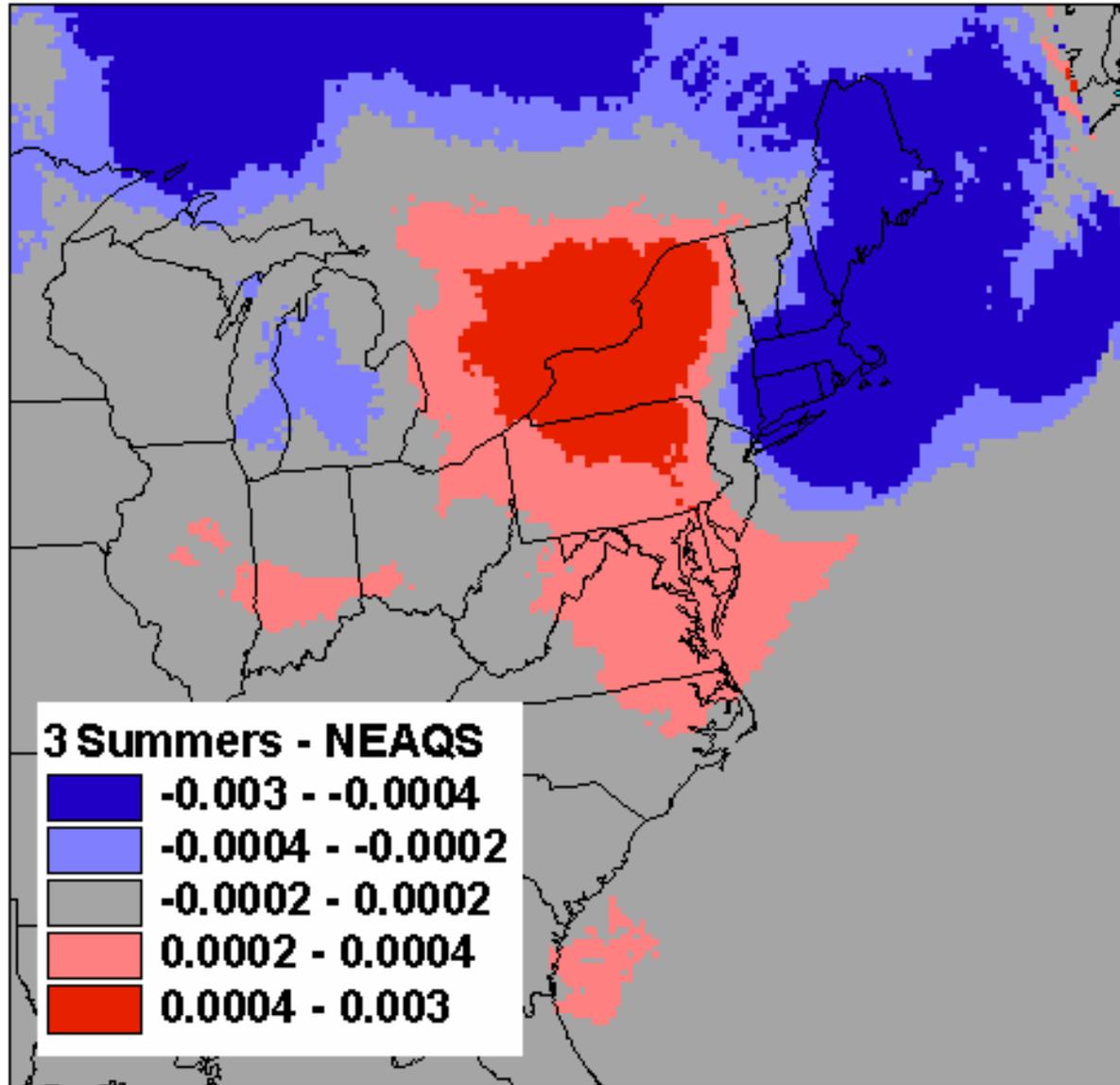
**2002 NEAQS study period (7/14-8/9/02)**

**Was atypically Clean at Acadia (especially for Sulfates)**

**Compared to Summers of 2001-2003**

**How Come?**

ATAD Trajectory Upwind Probability Fields for Acadia NP  
3 Summers (JJA 2001-03) minus NEAQS (7/18-02-8/8/02)



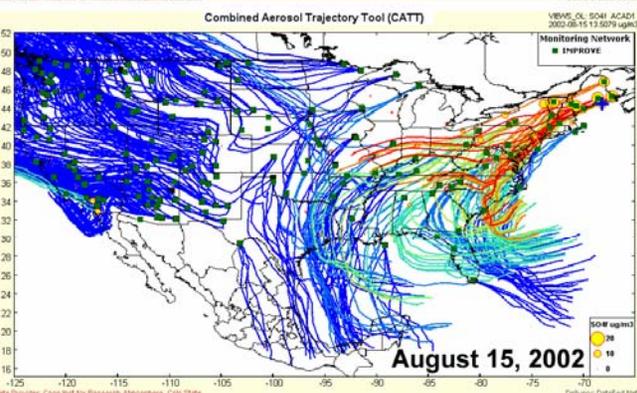
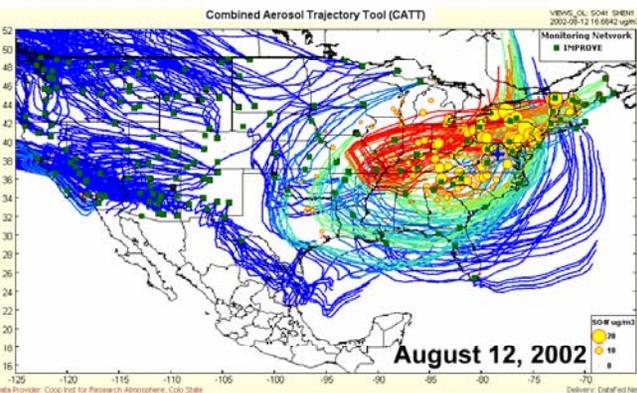
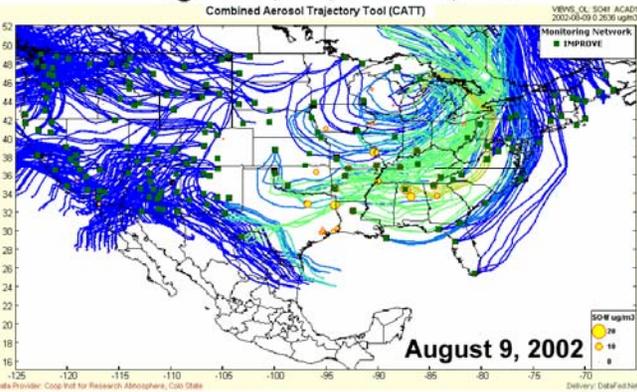
Acadia NP Everyday  
Upwind Probability  
Fields for Summers  
2001-2003, Minus  
2002 NEAQS

NEAQS characterized  
by atypically frequent  
Canadian flows and  
local Stagnation over  
Northeast Coast

And a relative  
absence of flows from  
the interior US

**IMPROVE Sulfate Concentrations and  
CATT Sulfate-Weighted Trajectories,  
August 9, 12, and 15, 2002**

**MODIS Terra, Northeast US (SSEC/DB)  
9 August 2002, 1540 UTC (clear):  
14 August 2002, 1815 UTC (hazy);**



8/9/02 (last day of NEAQS) was featured in MODIS Gallery as a clean day in Northeast (CATT flows from Canada)

But a few days later...

**Aerosol Data from IMPROVE,  
ATAD Trajectories from K. Gebhart, NPS,  
Delivery via CATT, Washington University**

**MODIS Gallery Images Created By Liam Gumley,  
Space Science and Engineering Center,  
University of Wisconsin-Madison.**

# **FAST-CAT Plans: 2005**

## MANE-VU Funding for Continuation & Enhancements

- Update IMPROVE & ATAD data to CATT, as available
- Add STN data & ATADs to CATT
- Add “User File Submittal” Options to CATT & FASTNET
- “User-Friendly” Screening/Aggregation tools to FASTNET
- Add NASA Satellite Images & Data Products to FASTNET

EPA Support for “Advanced User Training” (train the trainers)

# Have Tools; Need Users

**DATAFED.NET**  
For effective use of aerosol data

Aid air quality data flow  
Share processing services  
Support specific projects

Home Datasets Web Services Views Web Apps **Projects** Community

Projects  
FASTNET  
CATT  
FSAN  
NAmEN  
SHAirED  
TableRock

**Catalog**  
**ViewEdit**  
**ViewURL**

**Animate**  
**DataLog**

**Bulletins** 9/29 CATT and FASTNET report to: [RPO](#)

Sponsors: NSF, NASA  
Membership: OGC, ESIP  
Technologies: Web XML Services, SOA

<http://datafed.net>