Predicting Particle Pollution

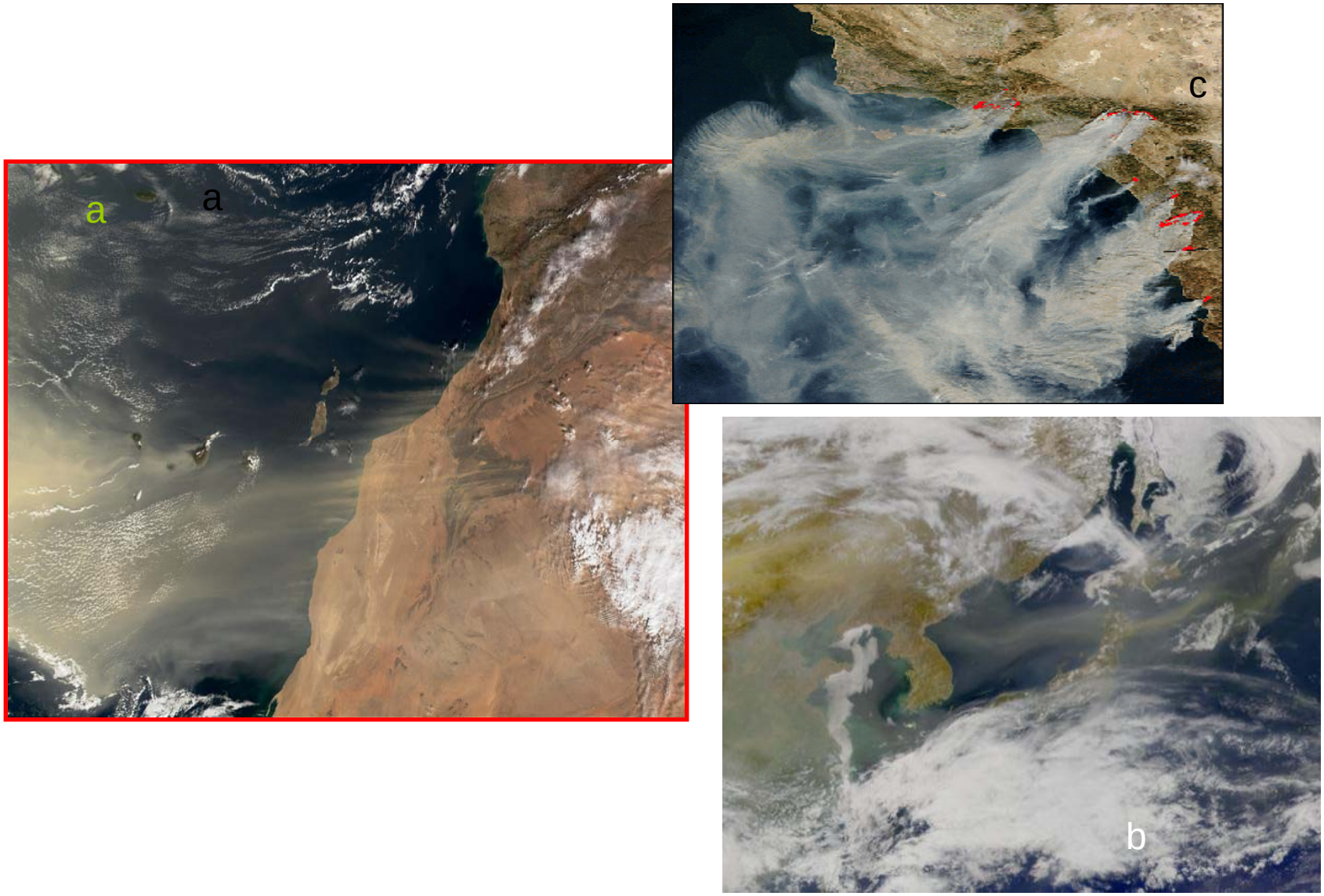
William A. Sprigg
Pima Co. Environmental Quality Advisory Council
May 17, 2006

Beijing, April 17, 2006

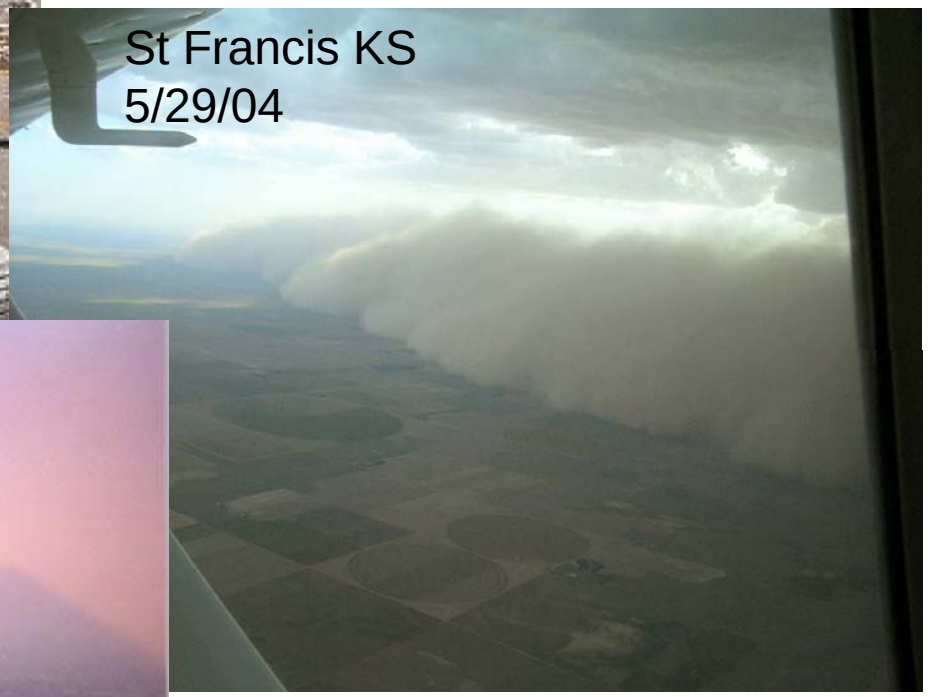
Lubbock, December 16, 2003

Counterclockwise from left: (a) Saharan Dust Over the Atlantic Ocean;

(b) Asian Dust Over the Pacific 2001; (c) California Wildfire 2003




Interstate 8, AZ
2/15/06


St Francis KS
5/29/04

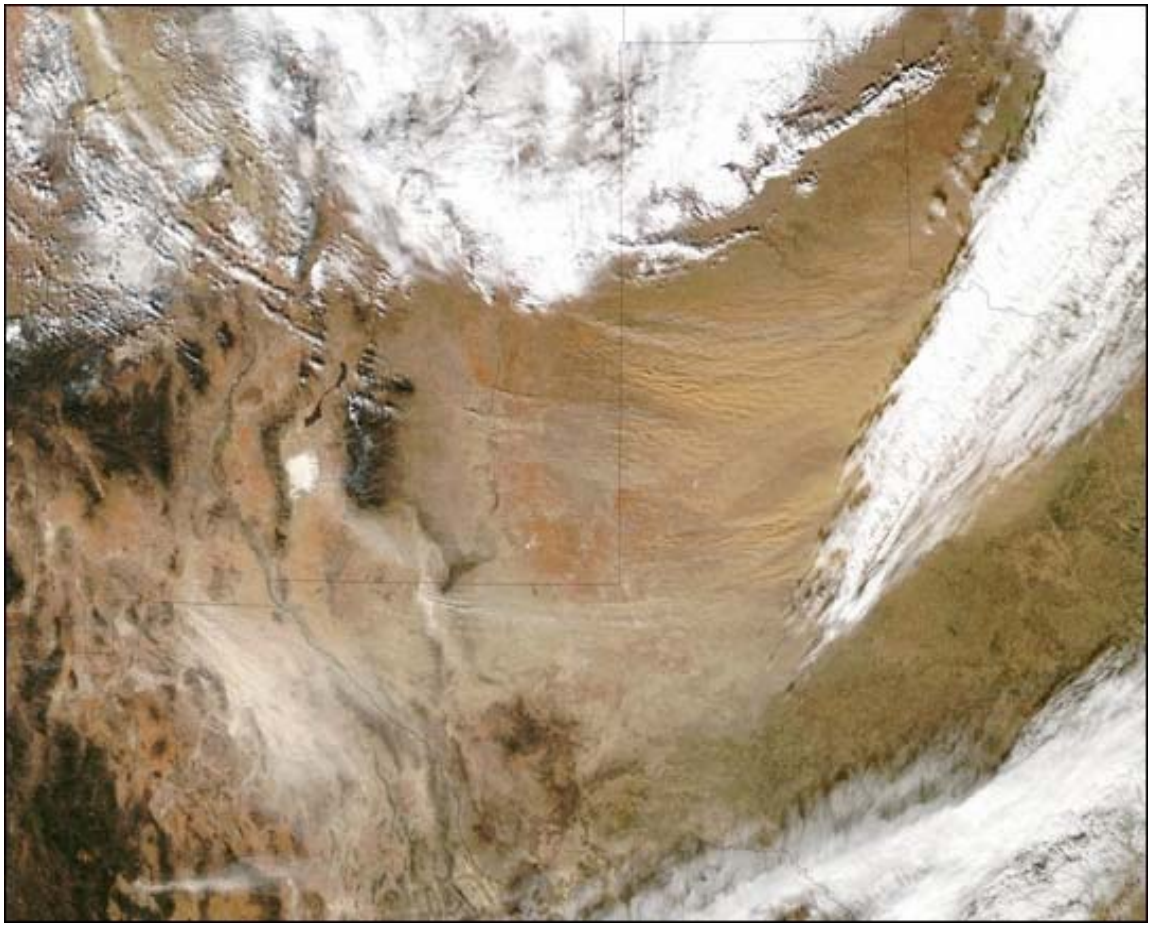

Phoenix AZ
2004

Objectives and Principles

- Objective: an operational (dust) forecast system for human health decision support
- Principles:
  - Numerical models, for objectivity & multiple use
  - NWS models, for world-wide use & operational continuity
  - Satellite sensors, to cover the globe
  - High resolution, for greater accuracy
  - International, for an intercontinental problem
  - Public Health Advisors, for practical design

DECEMBER 15-17, 2003, A FRONTAL SYSTEM SWEPT ACROSS NEW MEXICO, TEXAS AND NORTHERN MEXICO CREATING A SIGNIFICANT DUST STORM AND AN OPPORTUNITY FOR

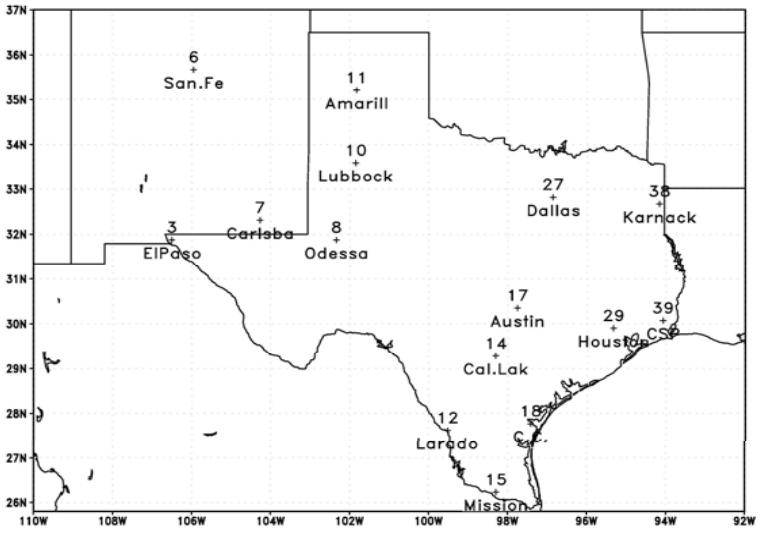
PREDICTING dust PARTICLE POLLUTION

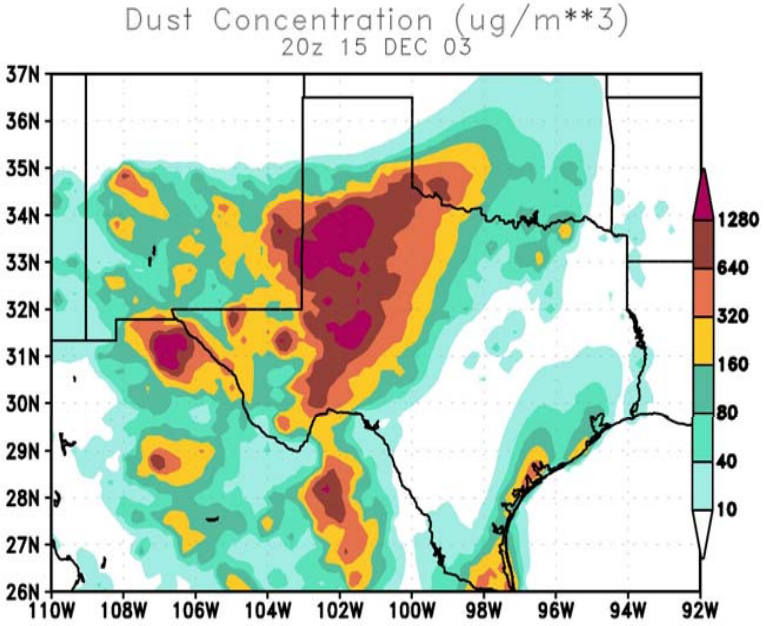


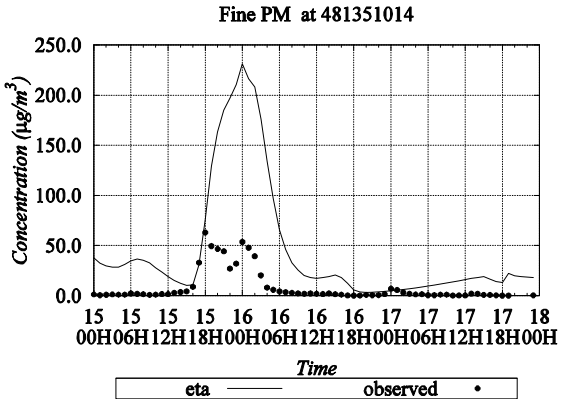
GOES 12 Vis/IR Composite, 12/15/03 @ 1426 CST

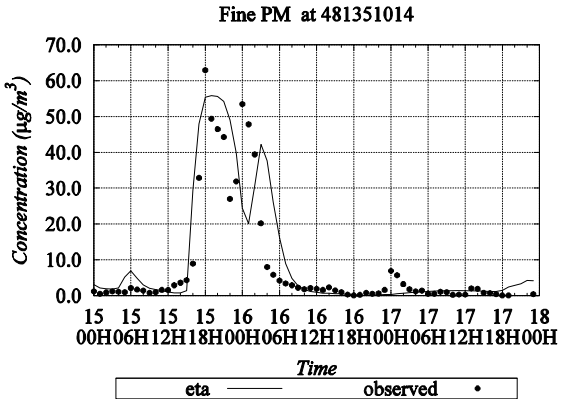
W.A.Sprigg to Pima Co. E.Q. Advisory Council, 5/17/06

Comparison of modeled and observed PM2.5 concentrations at Odessa1014, Texas (Dec'03)
LL: before MODIS land cover LR: after MODIS land cover

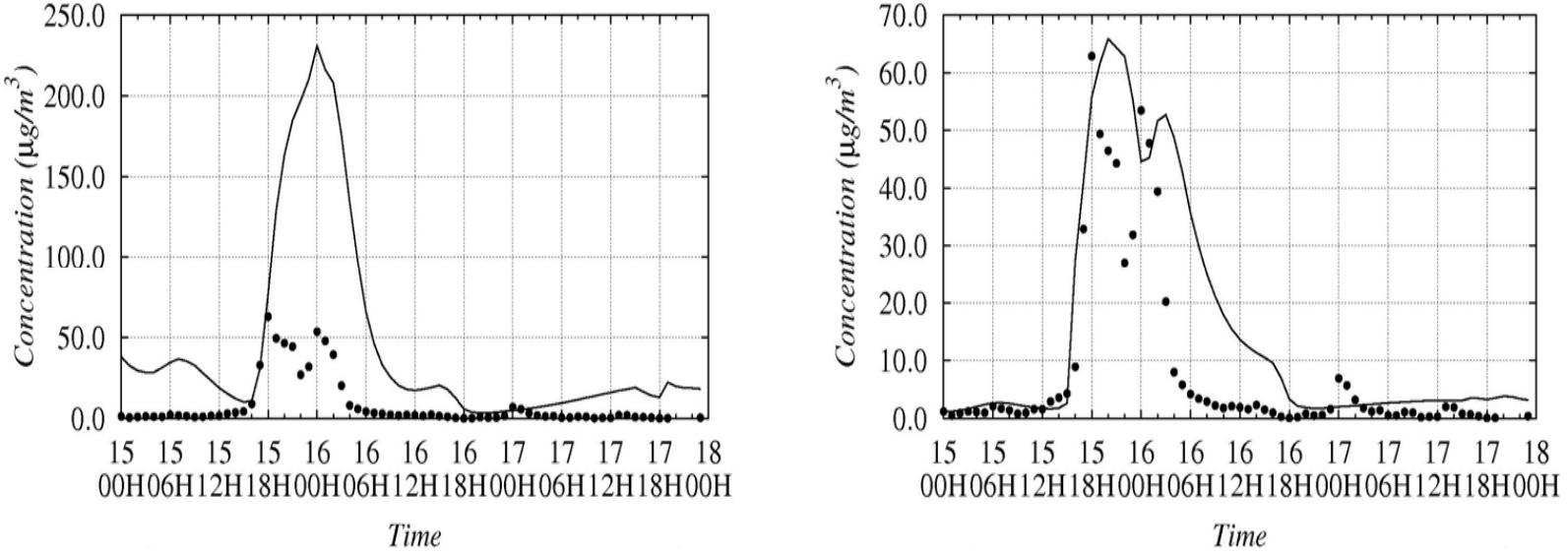








Comparison of Modeled and Measured PM2.5 Concentrations at Odessa (1014), Texas, Dec. 15, 2003



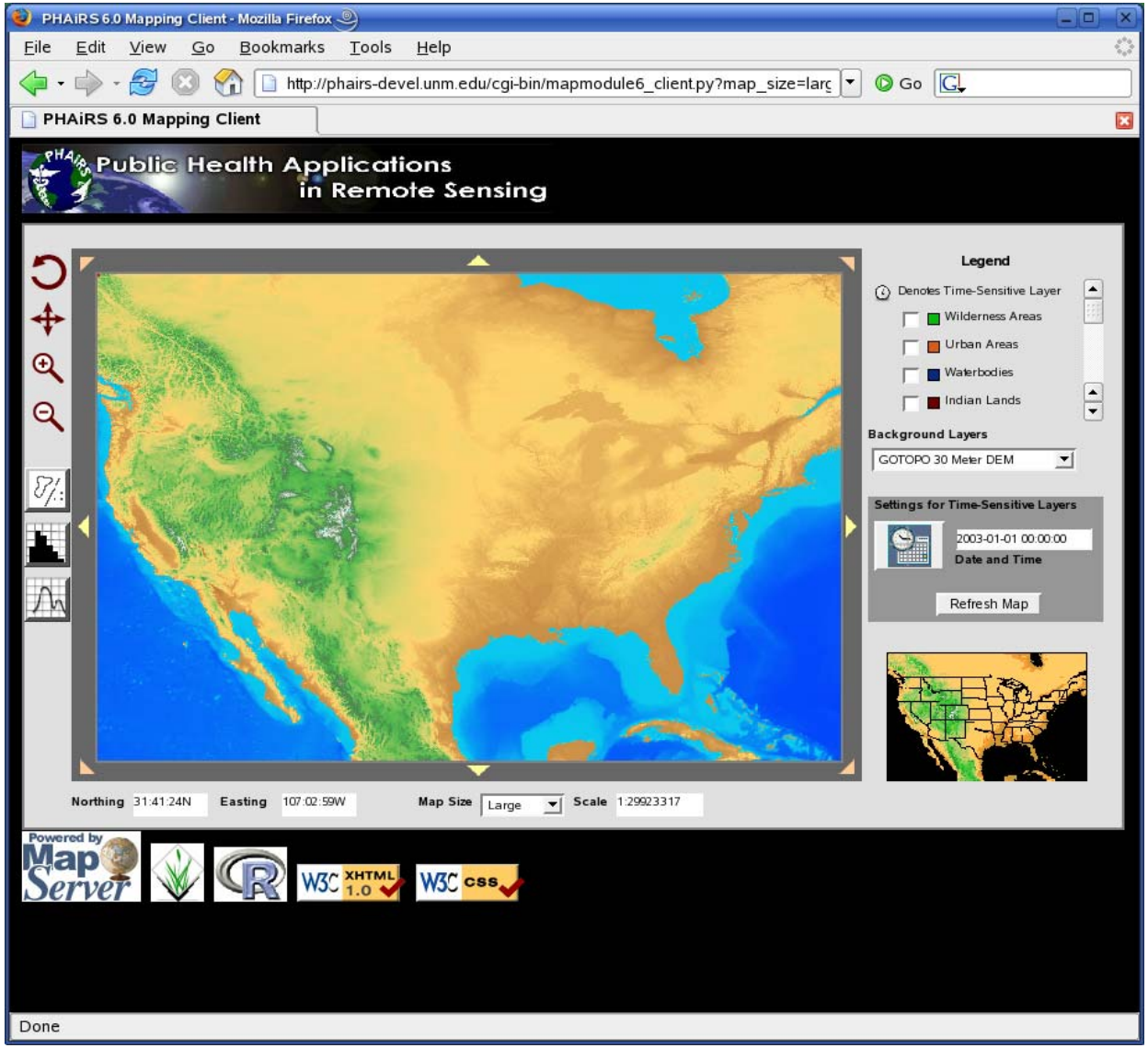
Left panel without NASA land surface data; right panel with NASA land data (dots show measured values and lines show modeled values)

Presented at World Federation of Scientists, October 2005, Geneva

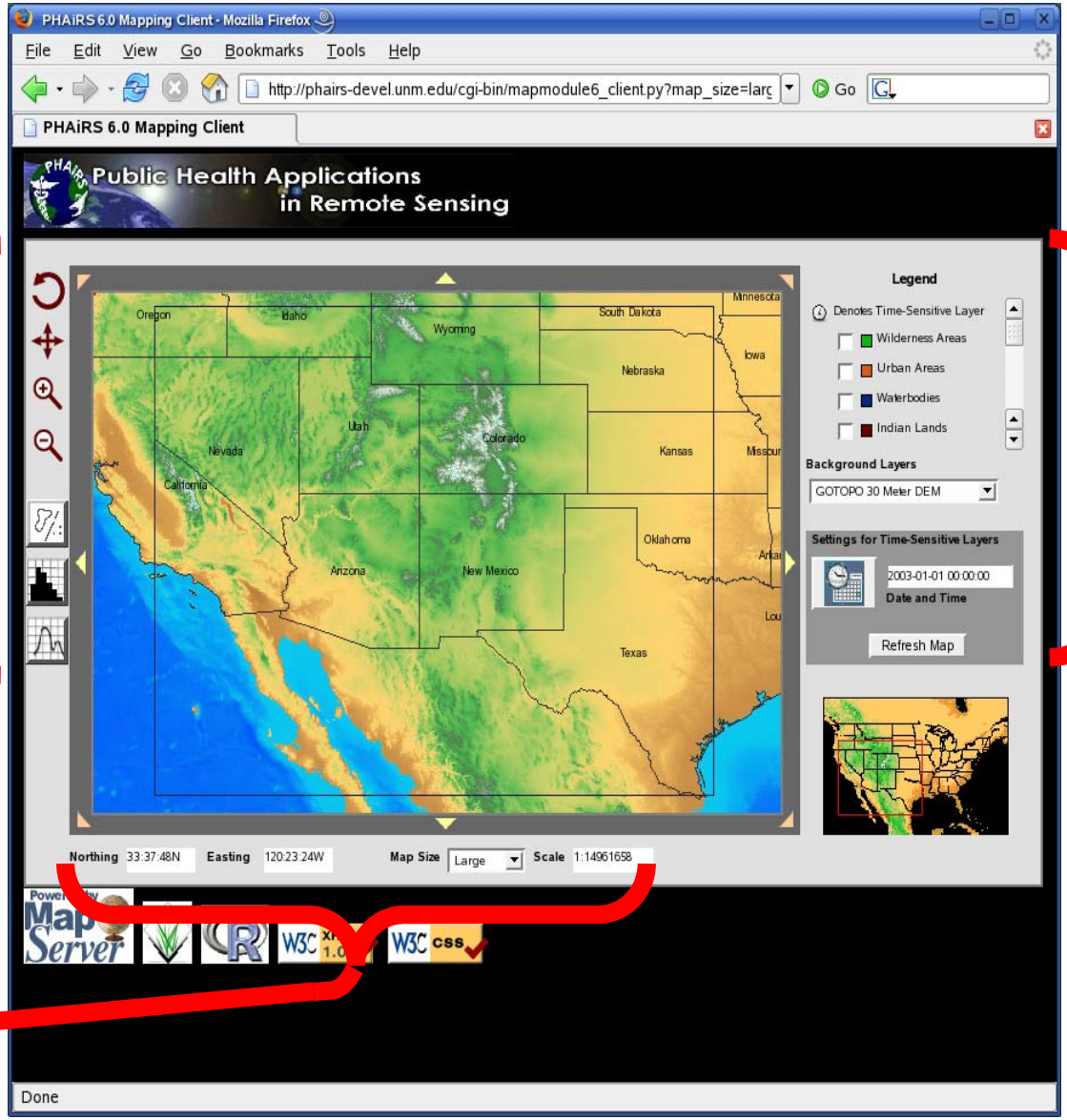
Current Product Aims

- 72-48-24-12-6-hour Forecasts
  - Regional, city-wide, or ‘at-your-zip-code’
  - Dust concentration at any height
  - ‘Critical-concentration-level’ arrival/departure time
  - Map, 3-D visualization, …
- Past dust event simulations
  - User needs: e.g. pinpoint dust sources, simulate areas/times affected

PHAiRS Mapping Client Main Page



Options

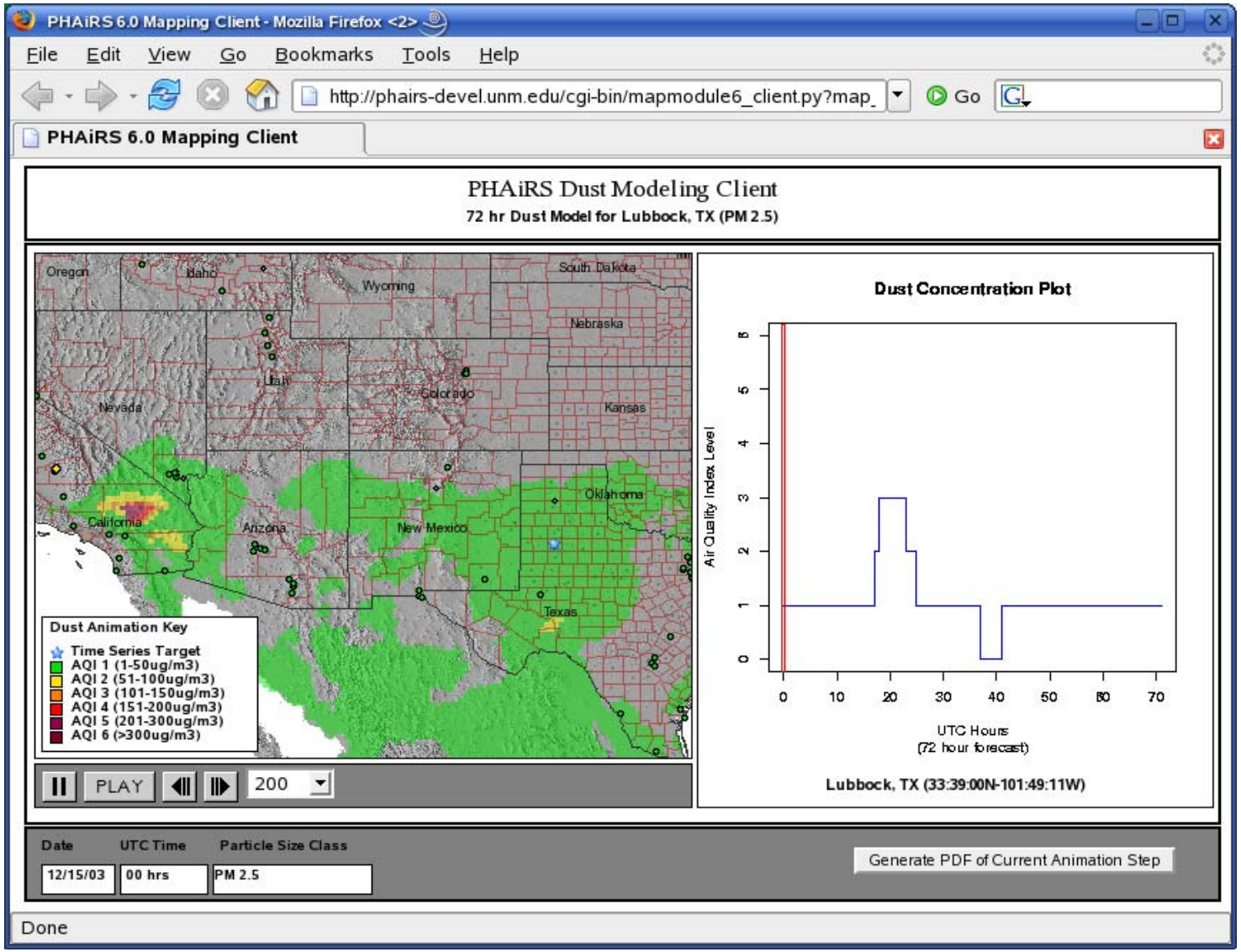


Zooming and Plot Options

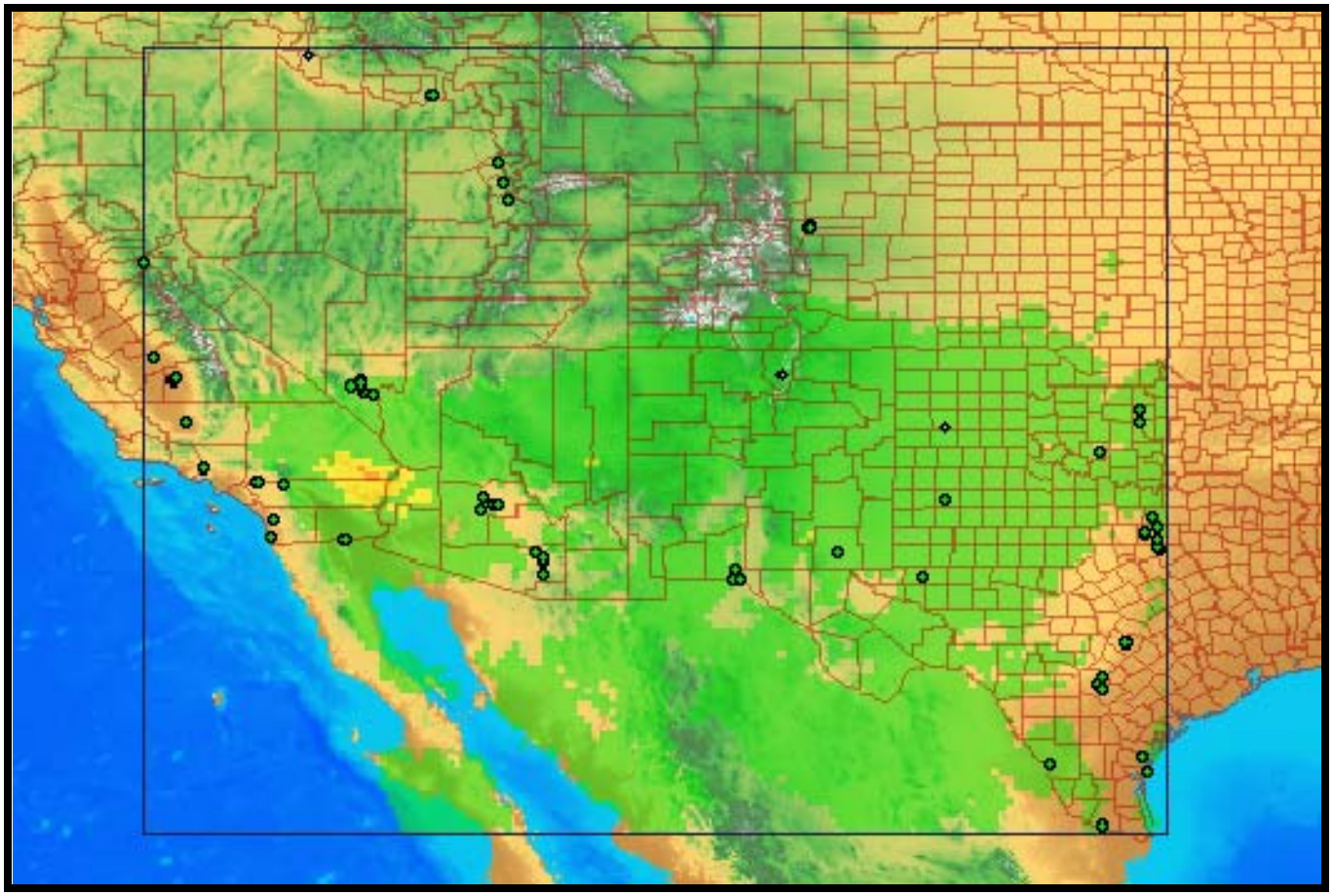
Boundary and Time Options

Lat/Lon and Map Size

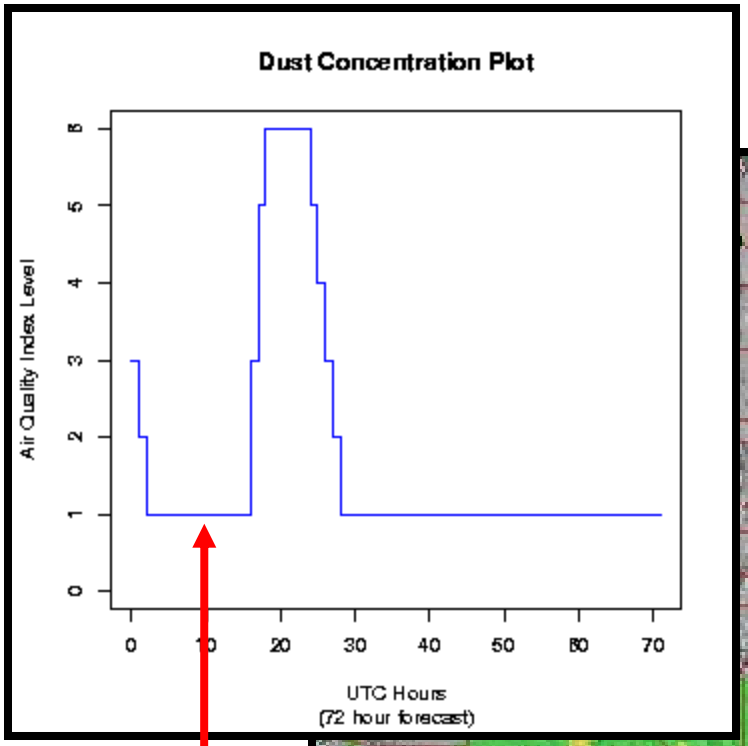
Sample Web Output



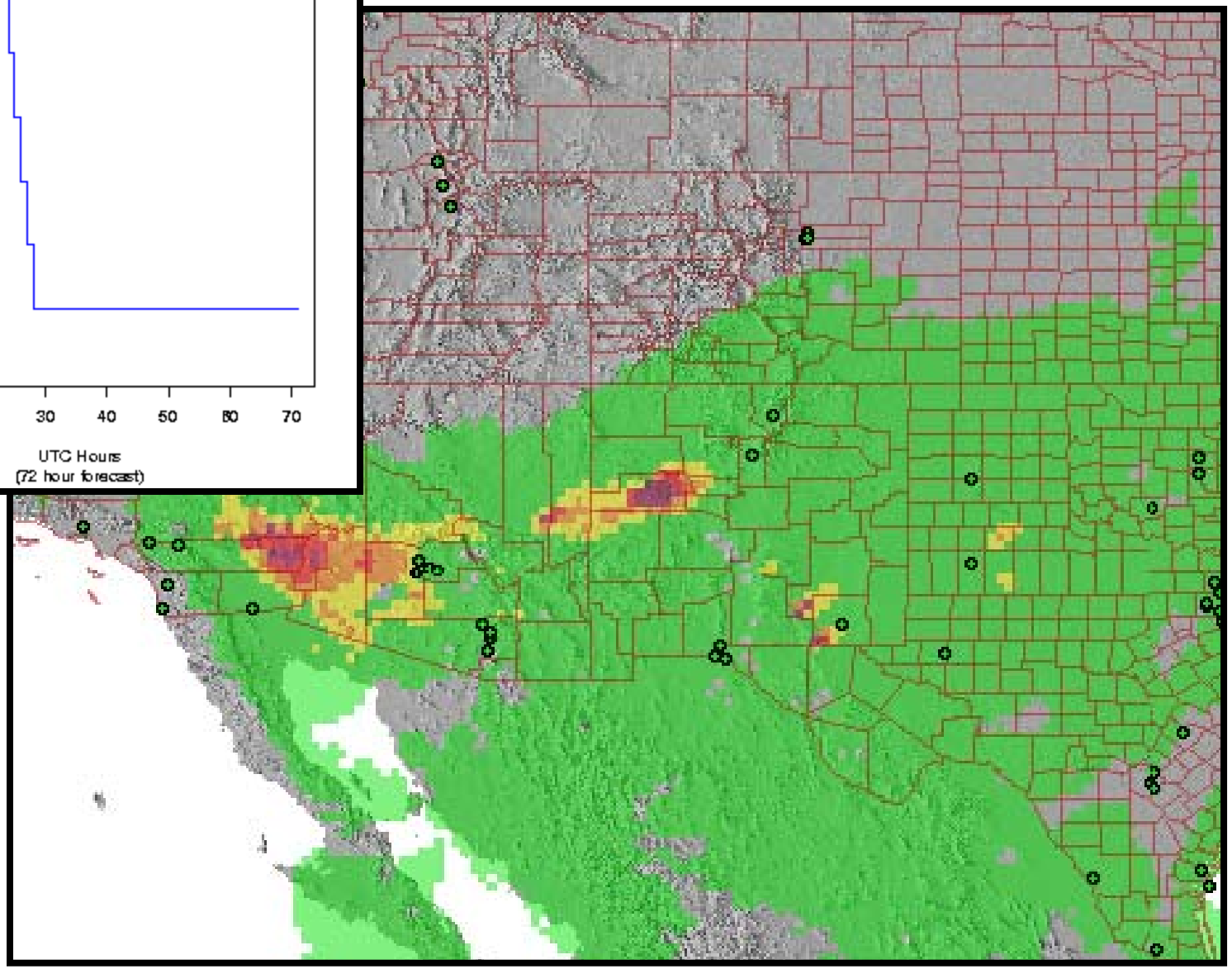
Public Health Applications in Remote Sensing



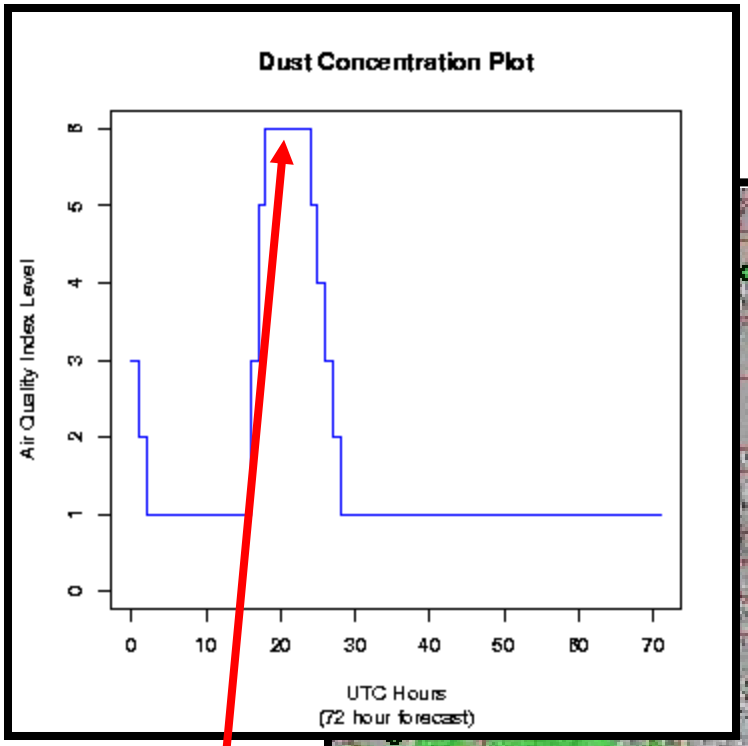
PM10 Lubbock, TX 12/15/03



T = 10 hours



PM10 Lubbock, TX 12/15/03



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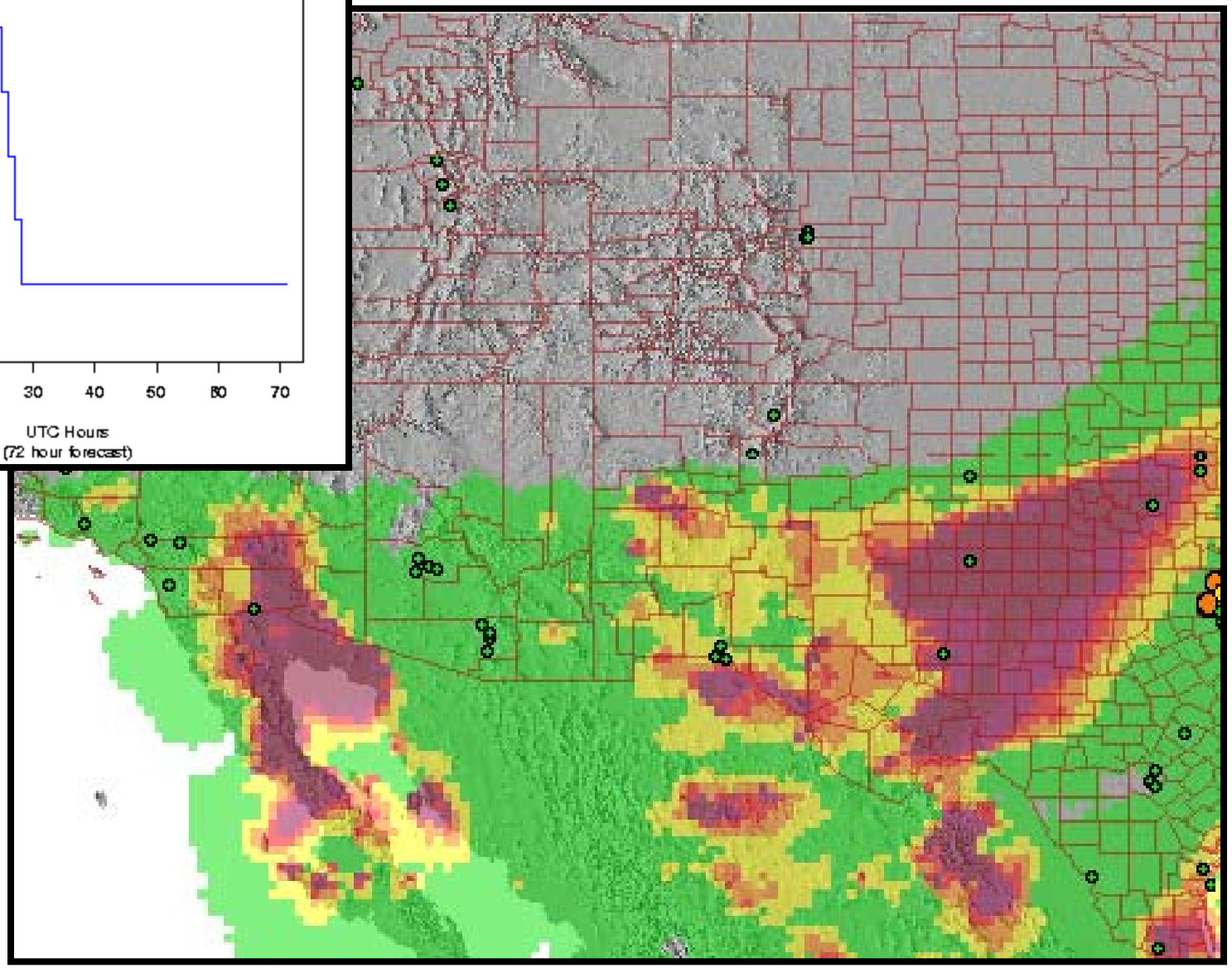
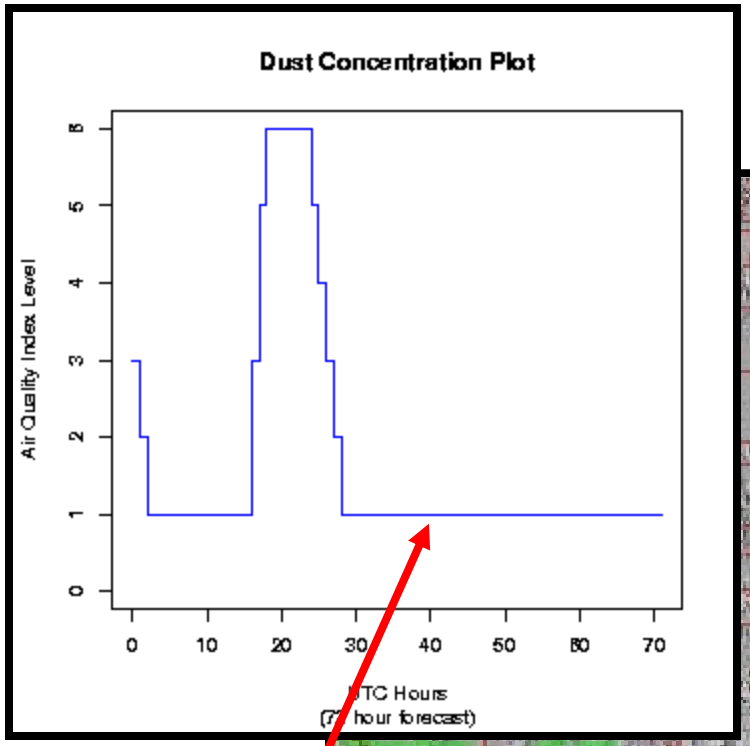
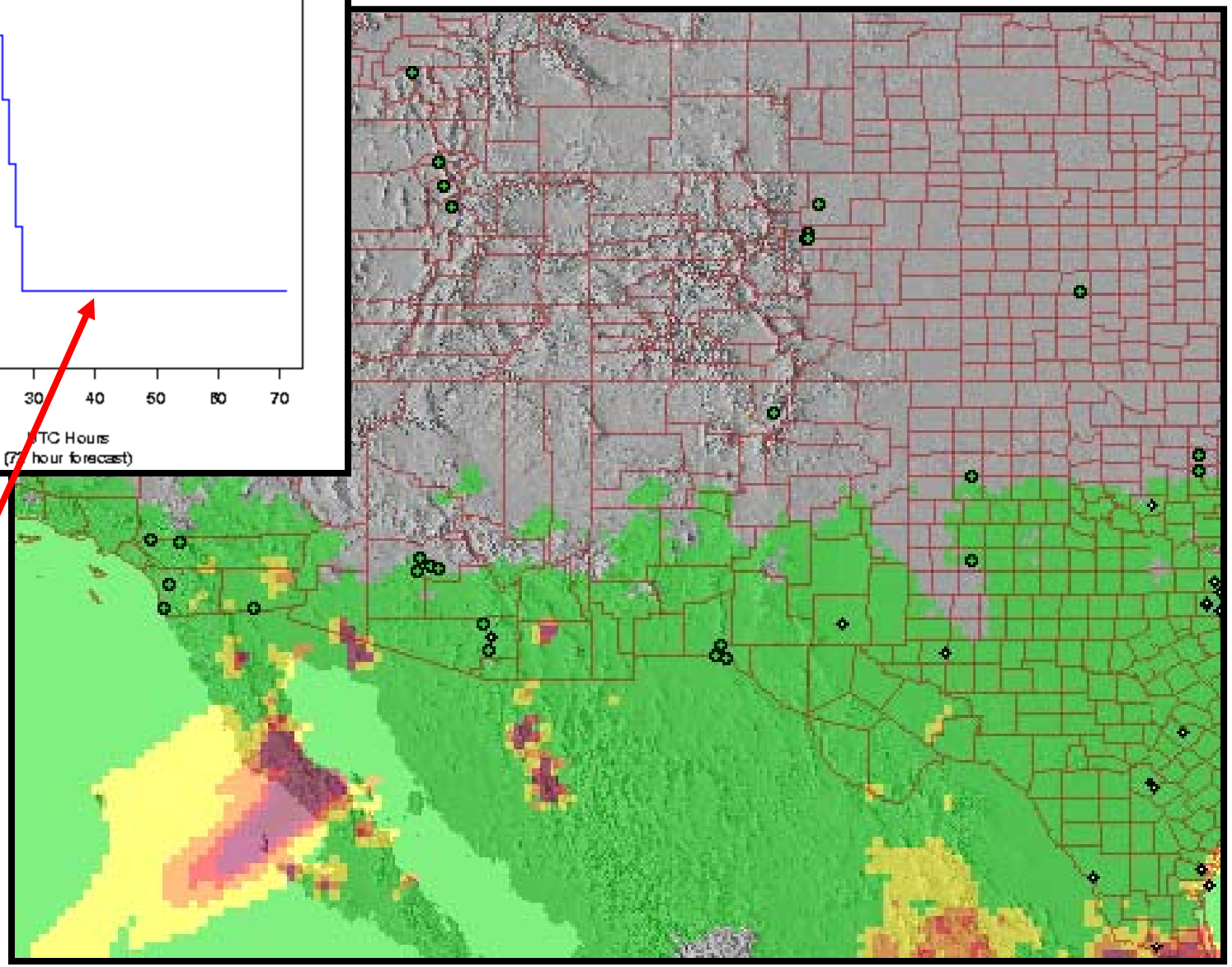


PM10 Lubbock, TX 12/15/03





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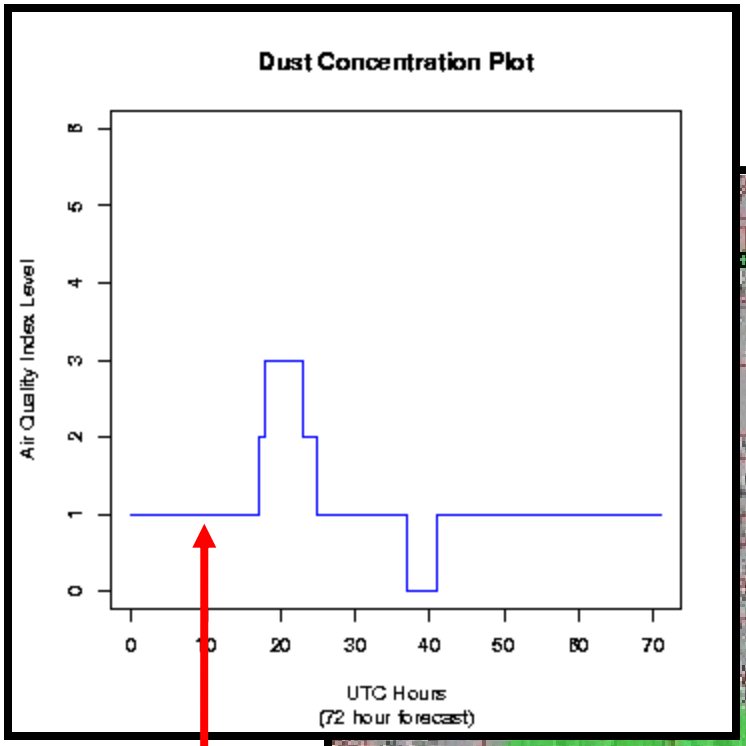
PM2.5 Lubbock, TX 12/15/03



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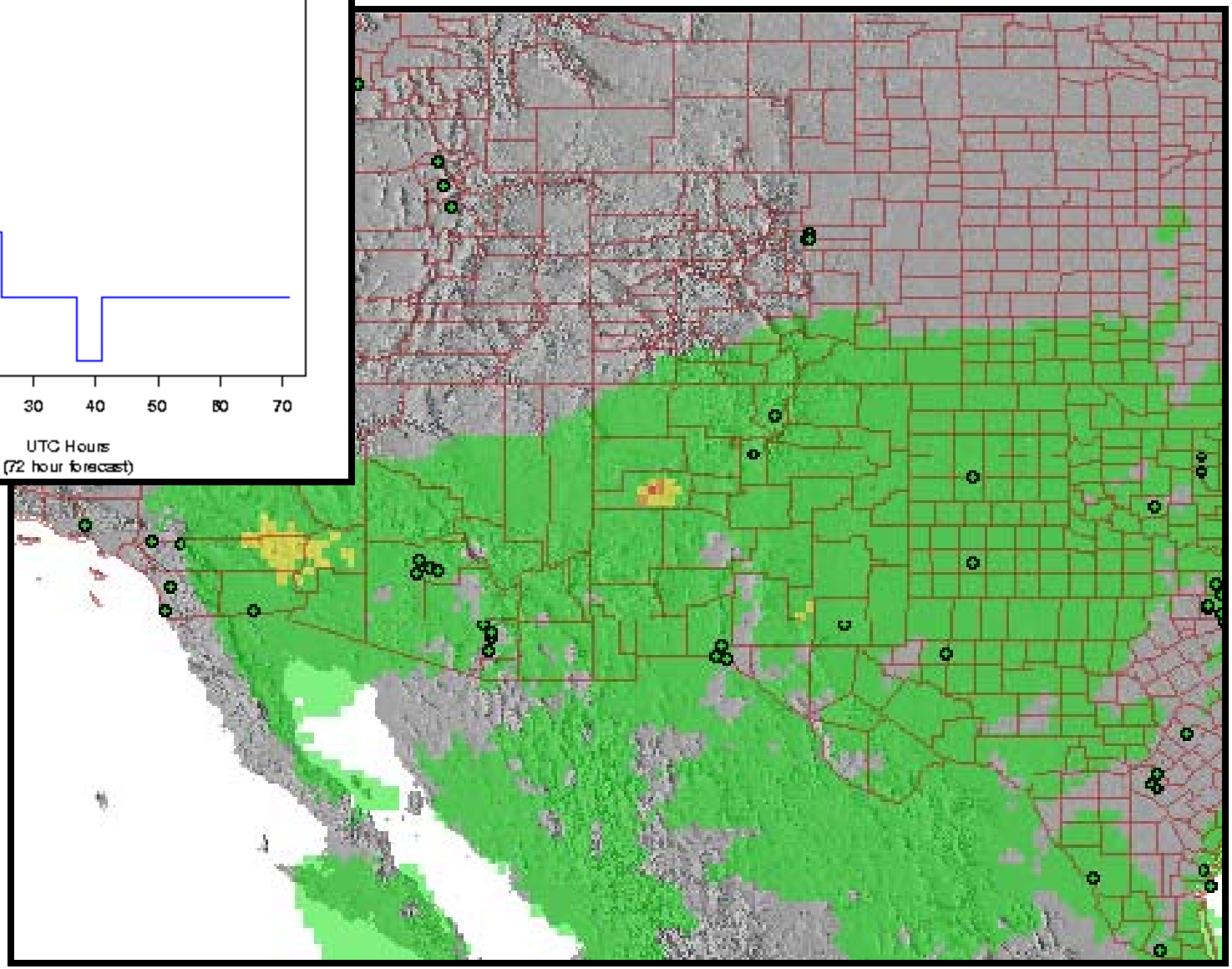
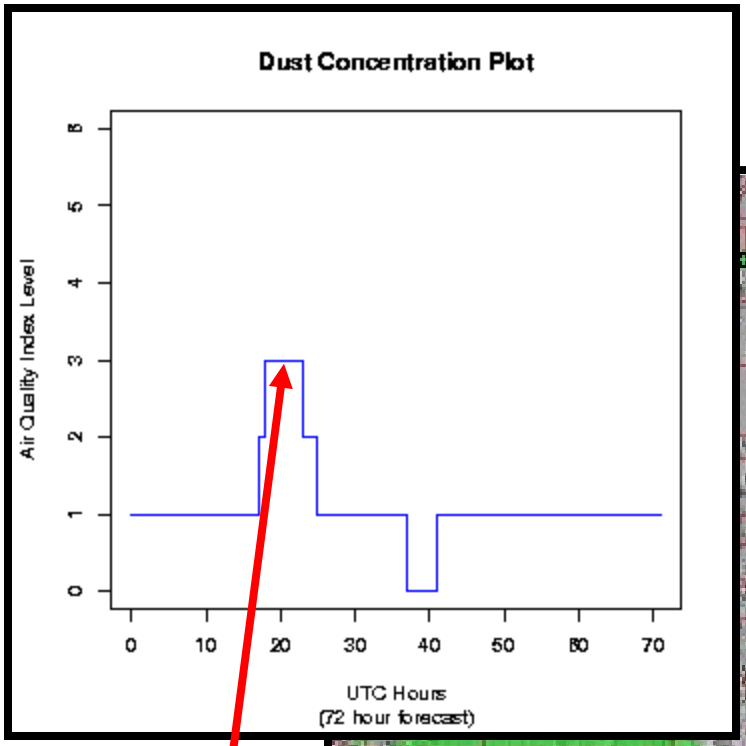


PM2.5 Lubbock, TX 12/15/03



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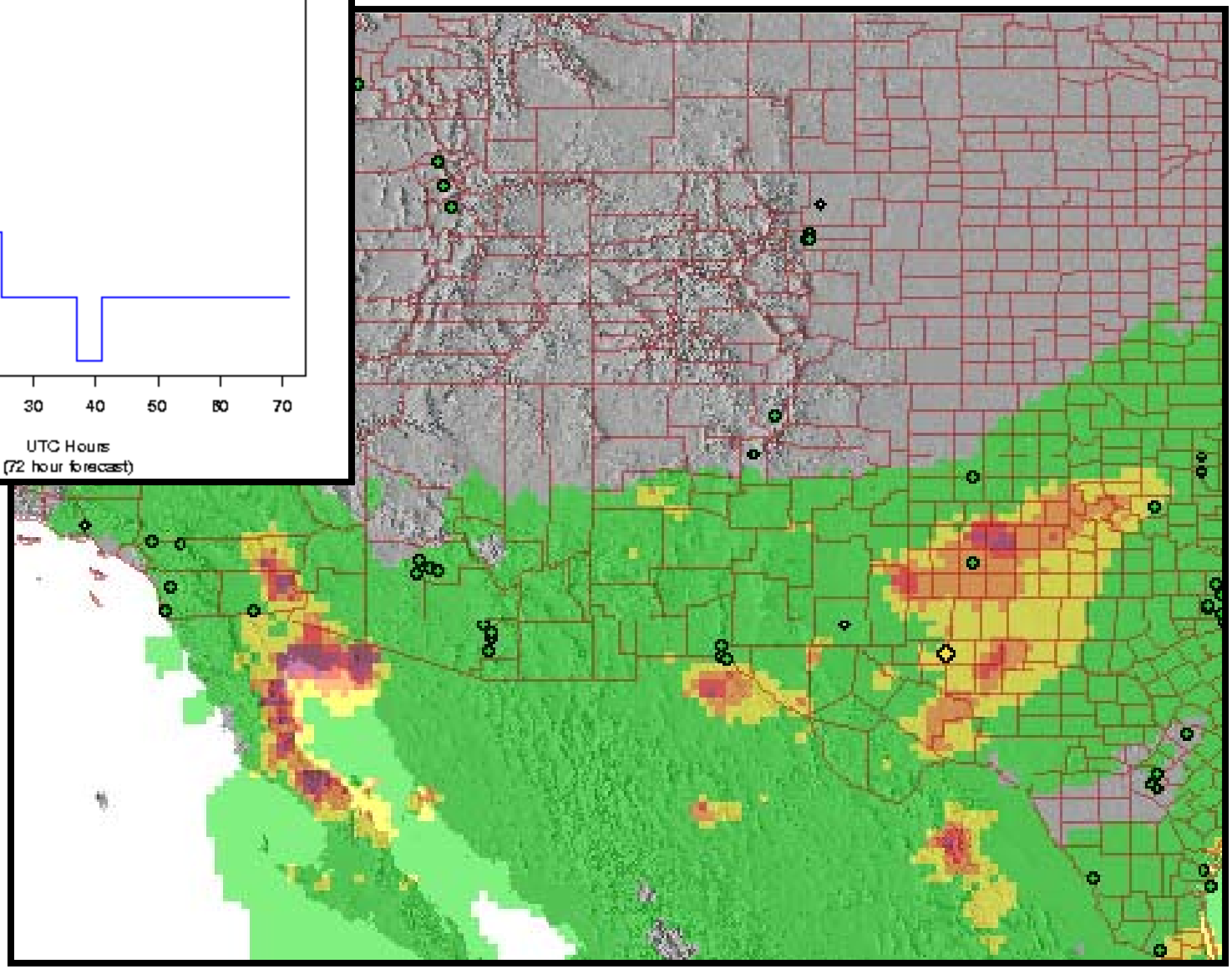
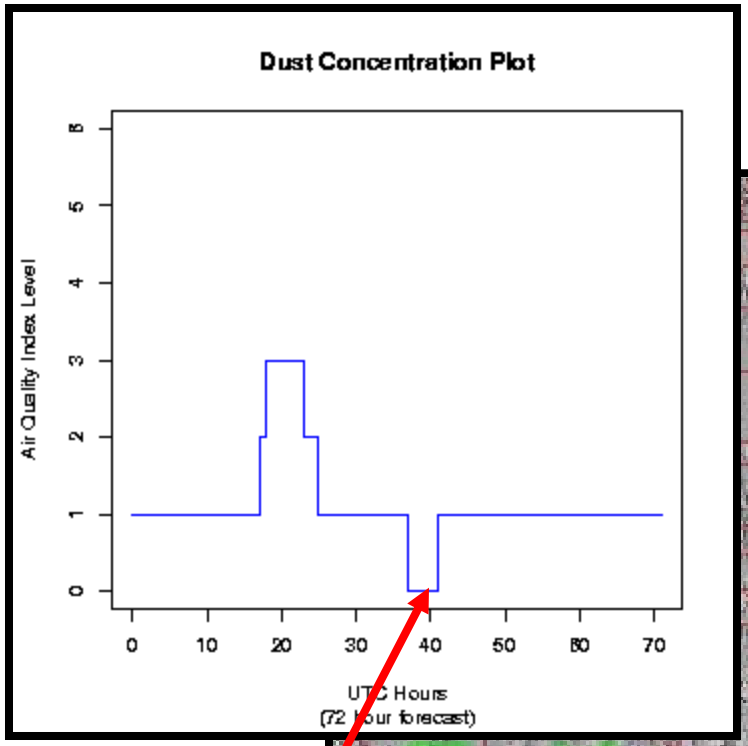


PM2.5 Lubbock, TX 12/15/03



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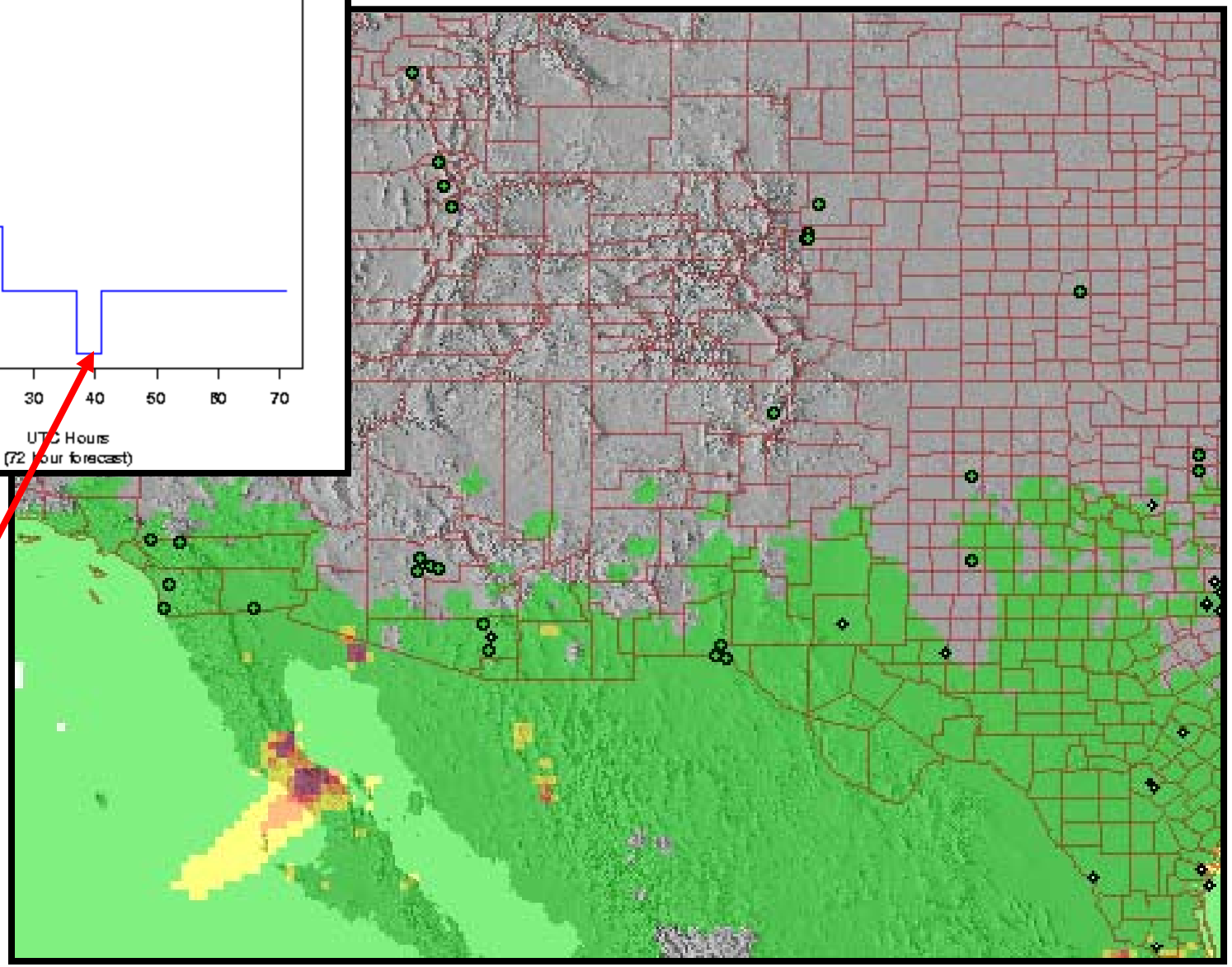
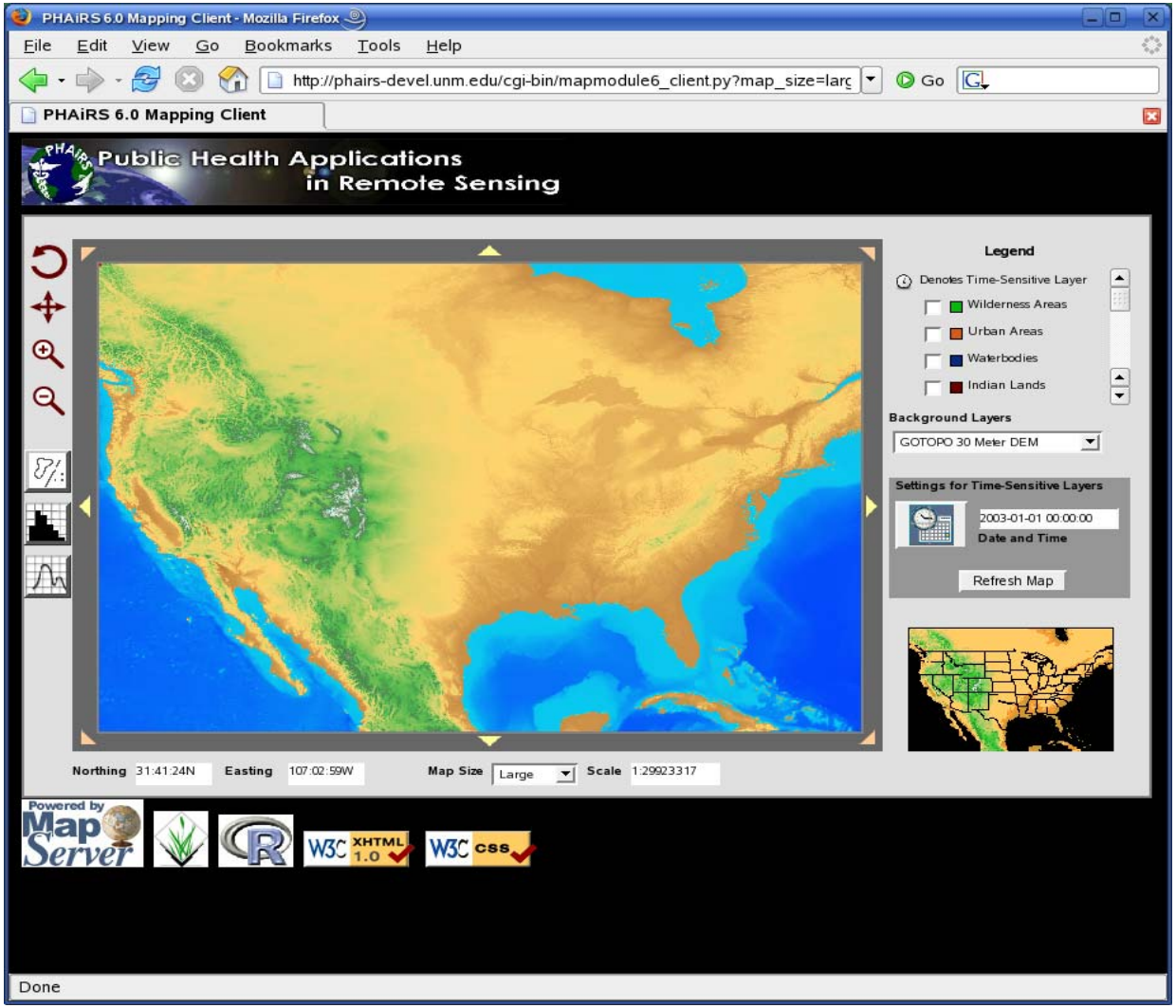
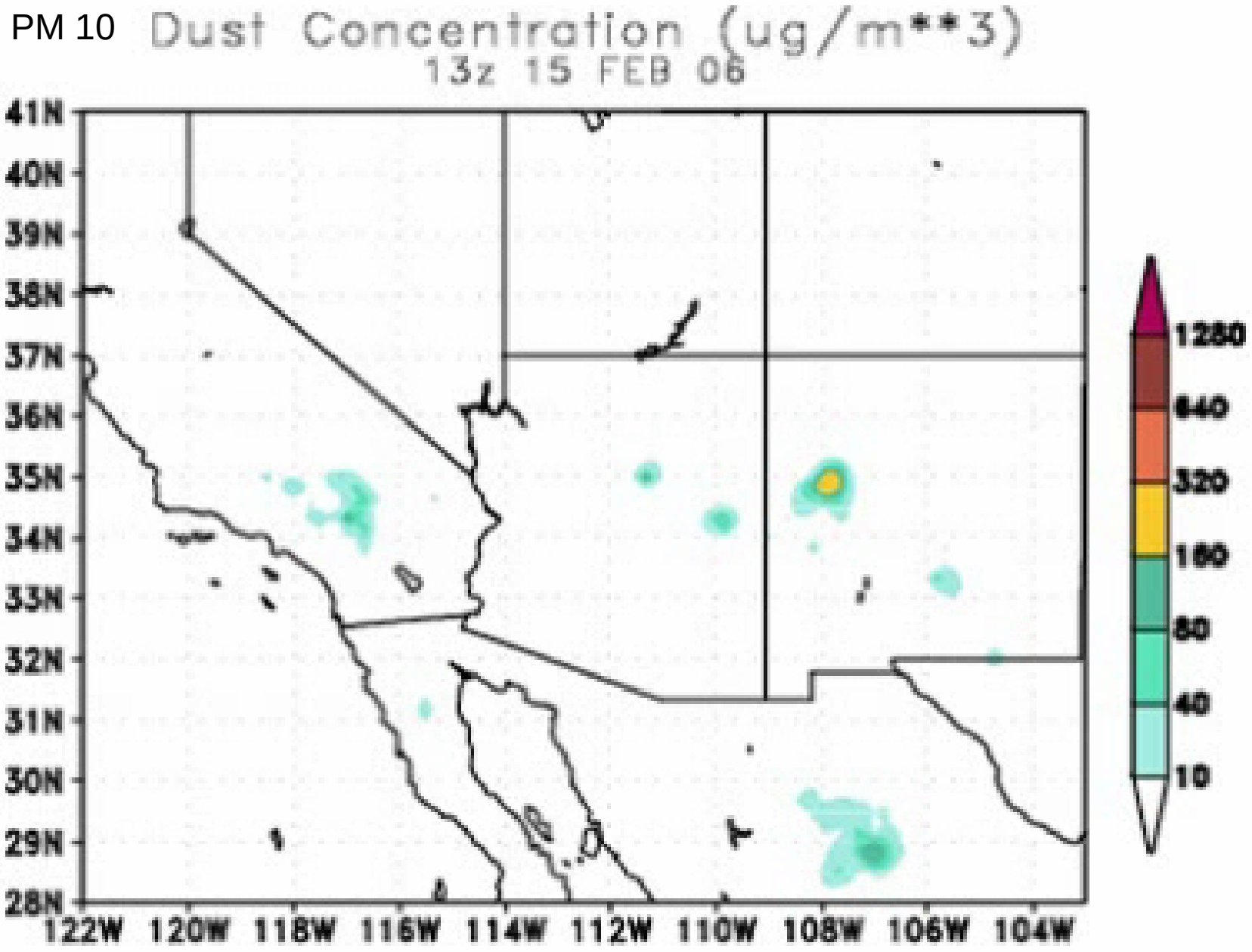


http://phairs-devel.unm.edu/cgi-bin/mapmodule6_client.py



PM 10


Dust Concentration (ug/m**3)
13z 15 FEB 06
41N
40N
39N
38N
37N
36N
35N
34N
33N
32N
31N
30N
29N
28N
122W
120W
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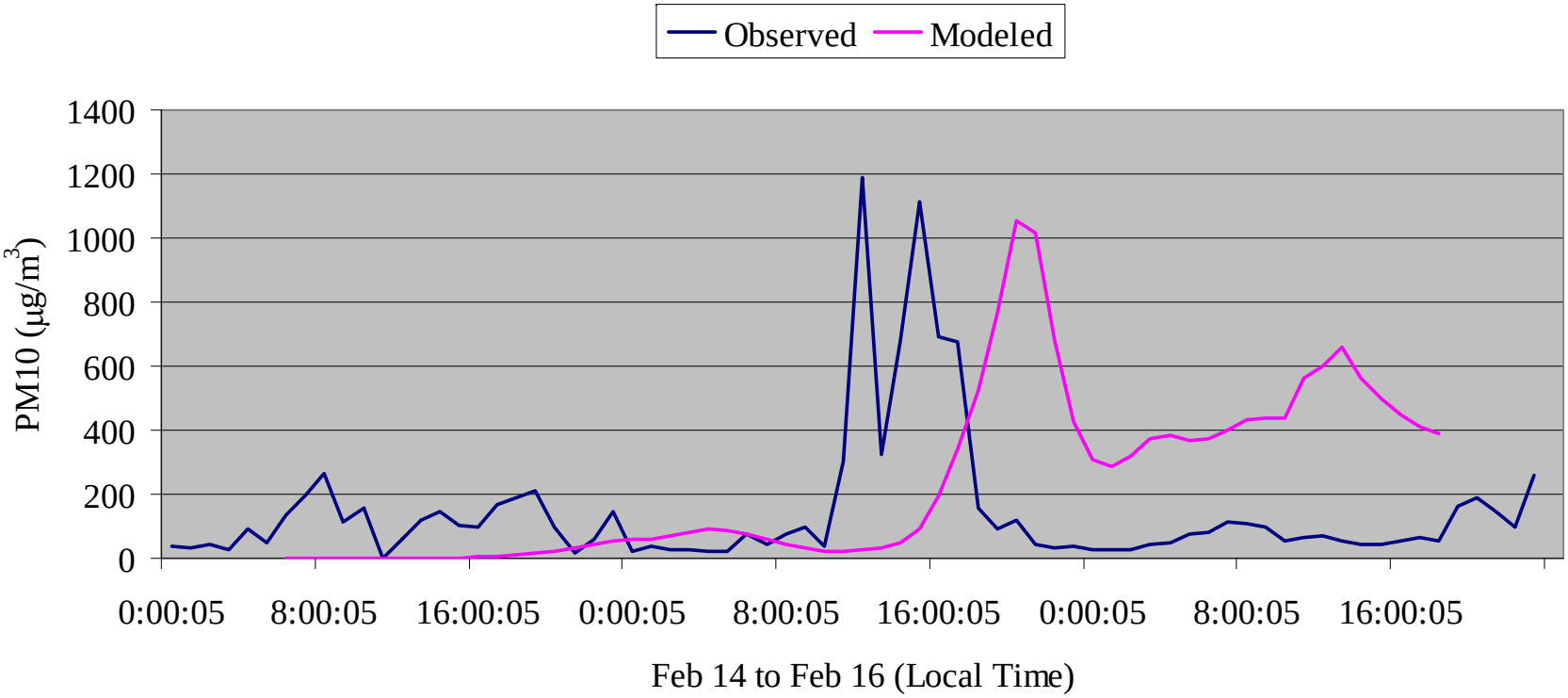
106W
104W
1280
640
320
160
80
40
10



PM10 at Stanfield (miles away from the accident scene), Arizona

Acknowledgements

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Integration: Stan Morain, Amy Budge, Bill Sprigg

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ARIZONA