Characterization of the Diurnal PM Peaks at Sunland Park, New Mexico

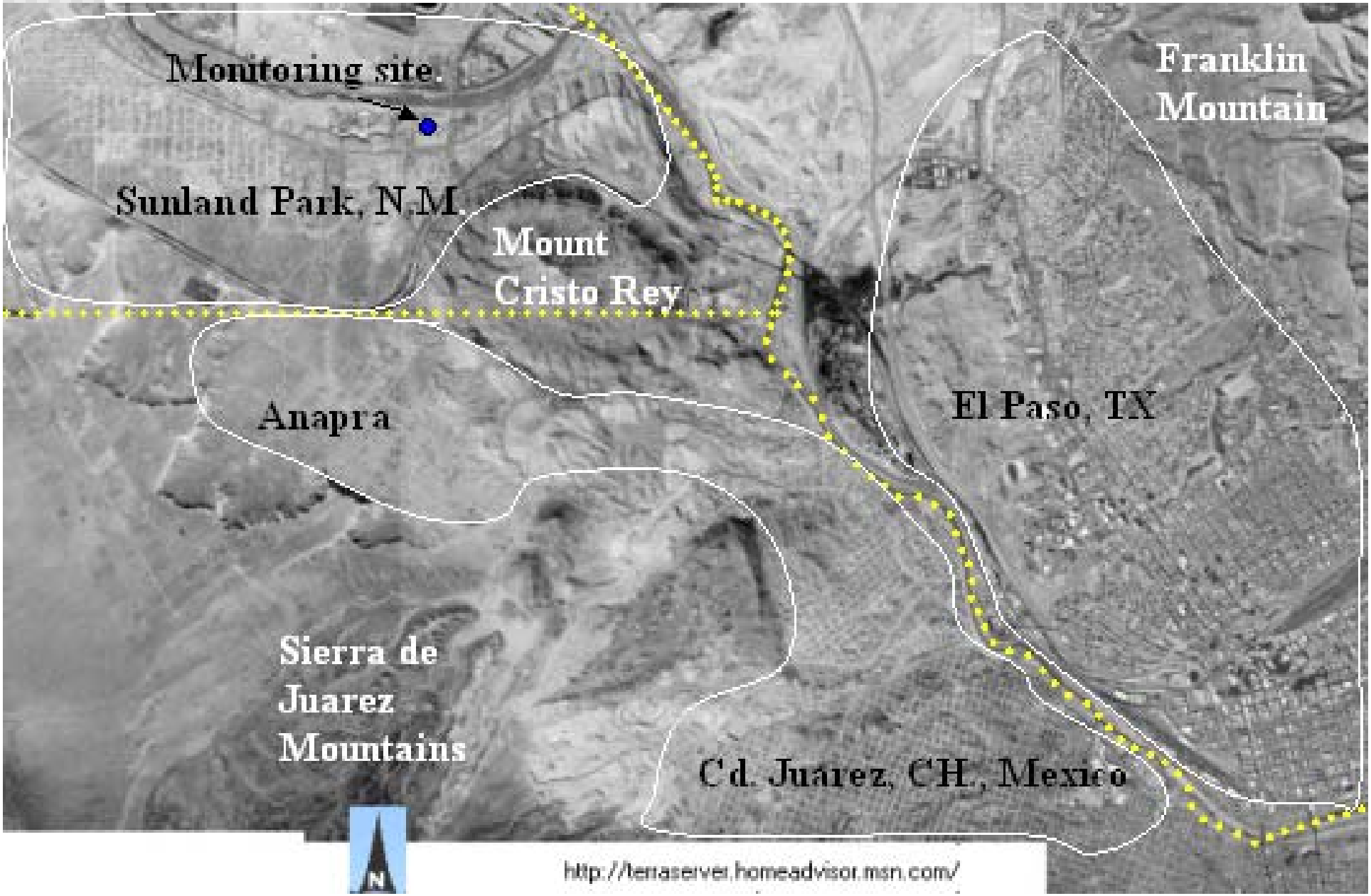
Nidia Cardenas[1], Wen-Whai Li[1,2], Richard Arimoto[3], John Walton[1,2], Cheryl Schloeesslin[3,] Sondra Sage[3]

1: Environmental Sciences and Engineering Program, The University of Texas at El Paso
2: Department of Civil Engineering, The University of Texas at El Paso
3: *Carlsbad Environmental Monitoring & Research Center, New Mexico State University*

Observation

- Spikes of airborne particulate matter (PM) show up in the late afternoon at Sunland Park, New Mexico, one of the three sister cities in the Paso del Norte (PdN) border region.

Location

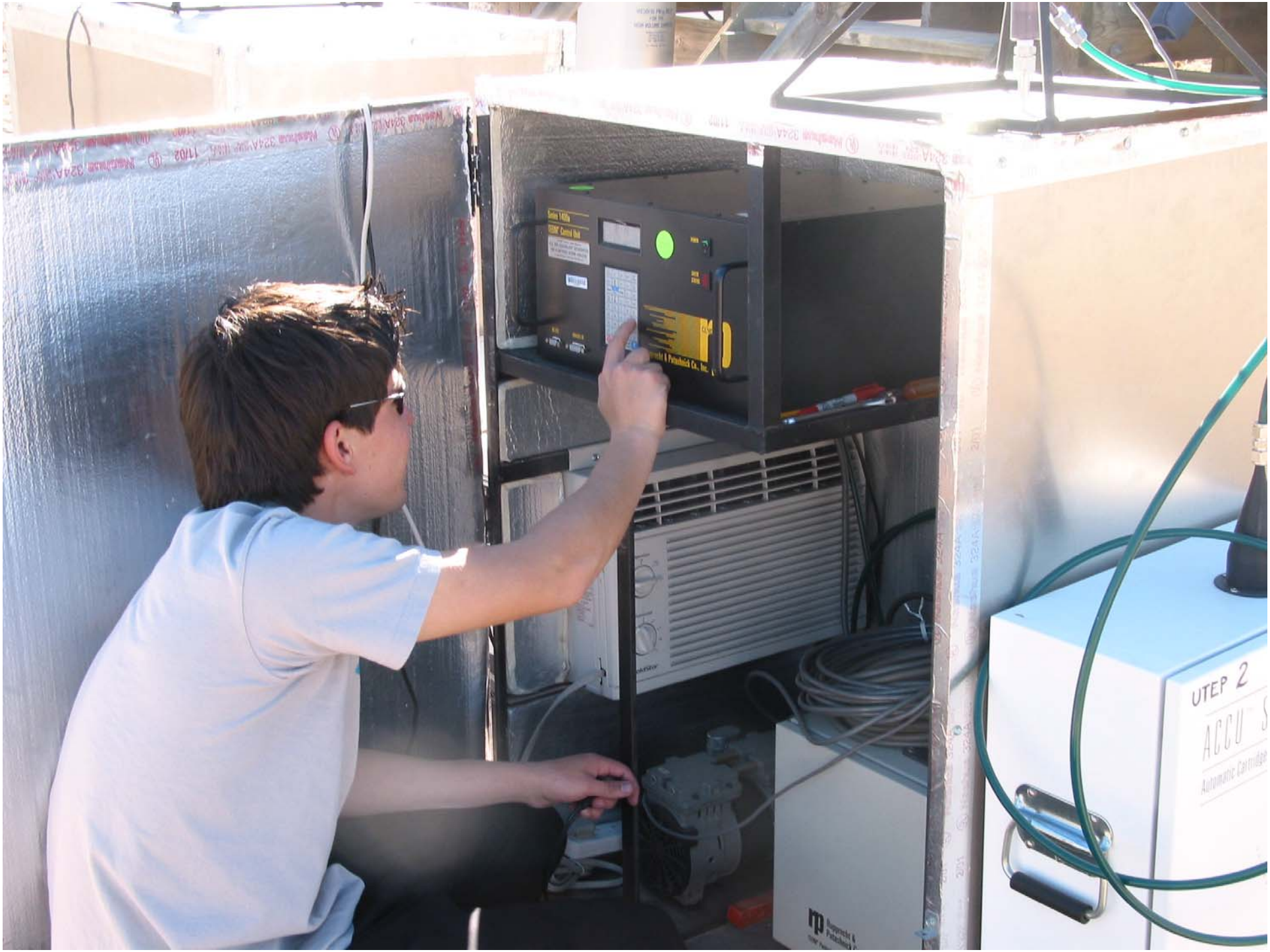

Monitoring site.
Franklin Mountain
Sunland Park, N.M.
Mount Cristo Rey
Anapra
El Paso, TX
Sierra de Juarez Mountains
Cd. Juarez, CH., Mexico
N
http://tenaserver.homeadvisor.msn.com/

Objective

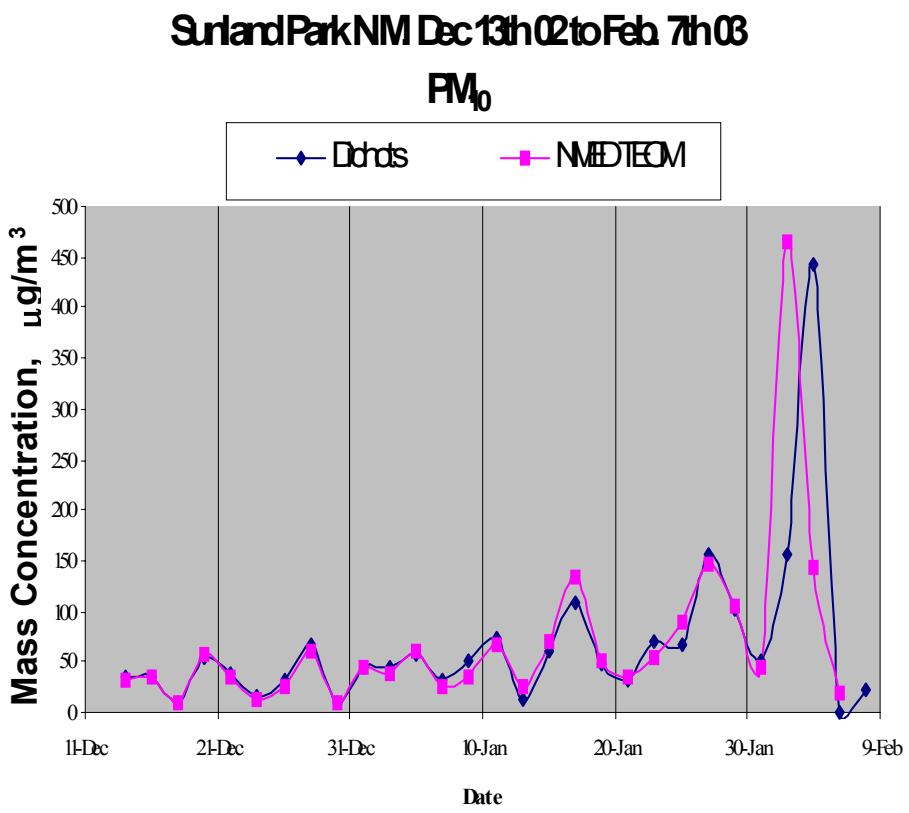
- To characterize the composition of PM from the Sunland Park area as a means of identifying major PM sources
- A study was performed between December 13, 2002 and February 7, 2003

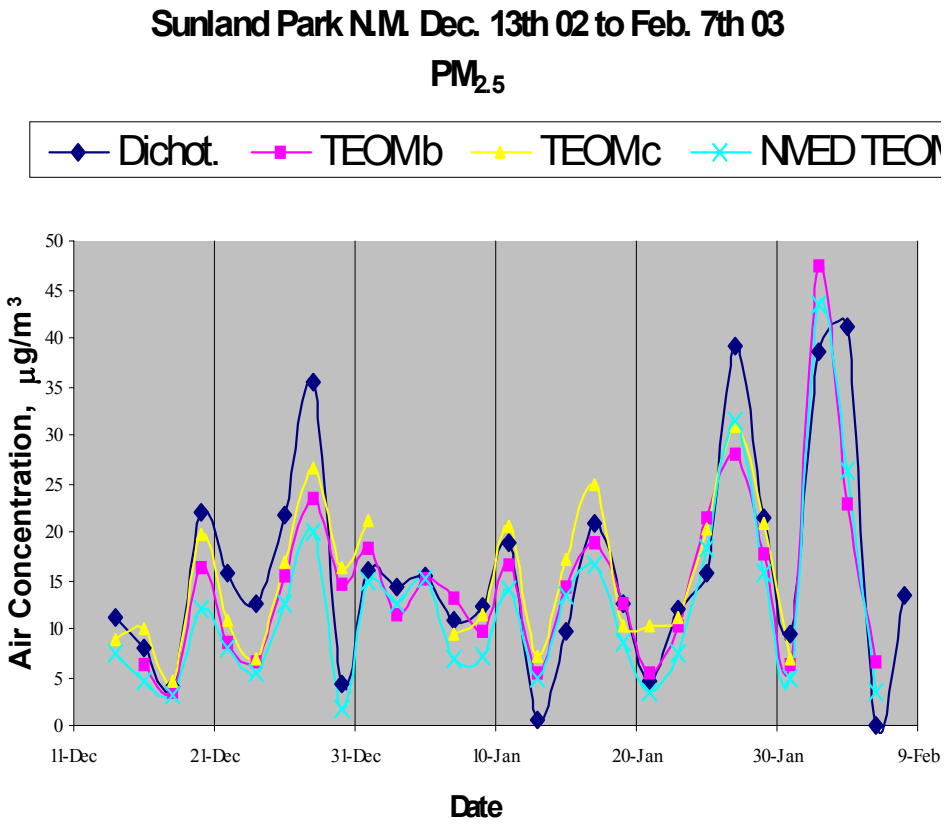
Data collection (UTEP equipment)

- Continuous 5-min and 1-hr avg $PM_{2.5}$ and 24-hr avg $PM_{2.5}$ and $PM_{2.5-10}$
- $PM_{2.5}$ and $PM_{2.5-10}$ daily samples every other day
- 4 wk of daily 6:00pm-9:00pm $PM_{2.5}$ samples
- 4 wk of composite time-resolved $PM_{2.5}$ samples
- Samples collected on Teflon and quartz fiber filters
- dichotomous air monitors and TEOM/ACCU instruments


UTEP 2

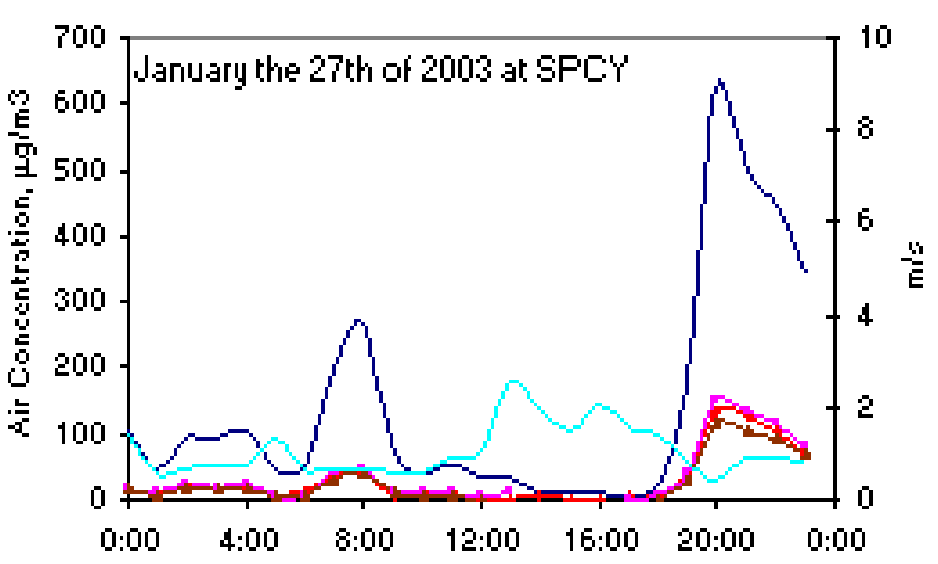
QA/QC Comparisons

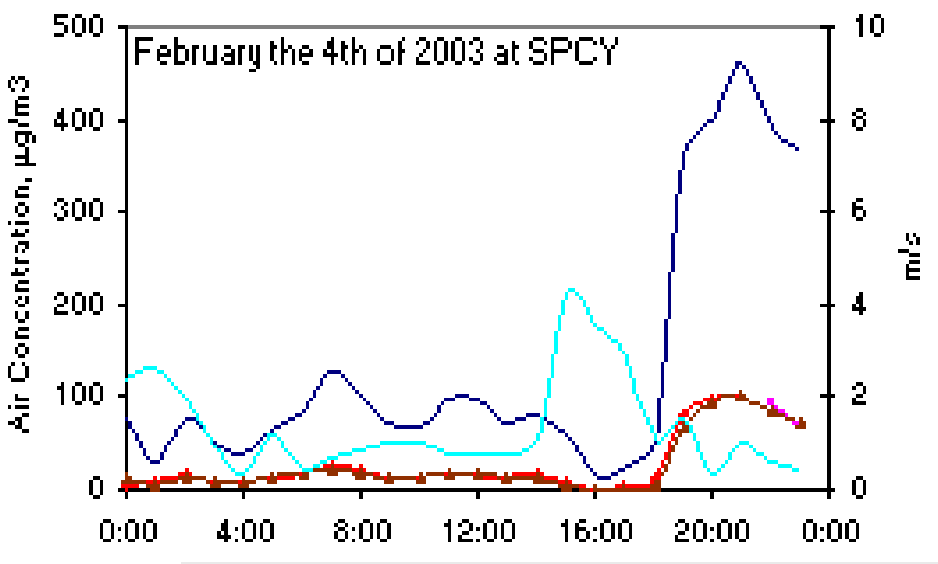




Top 10 worst days

- The following graphs show the worst days that occurred in Sunland Park during the period of study in terms of PM concentrations.





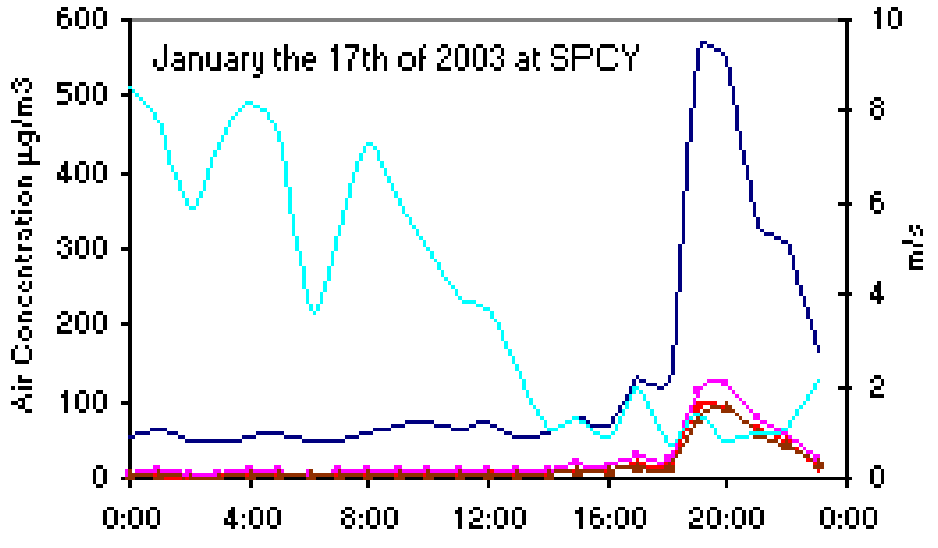
UTEP TEOM b PM2.5

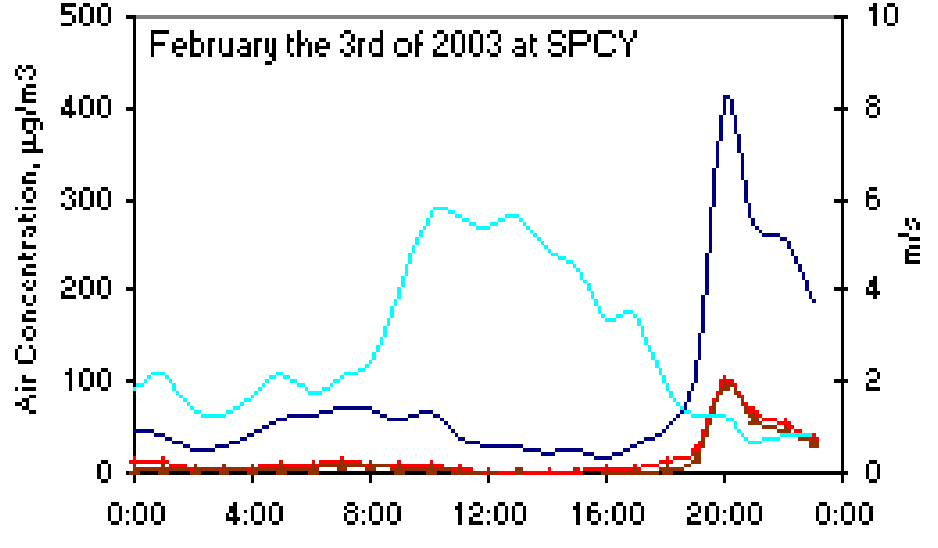
UTEP TEOM c PM2.5

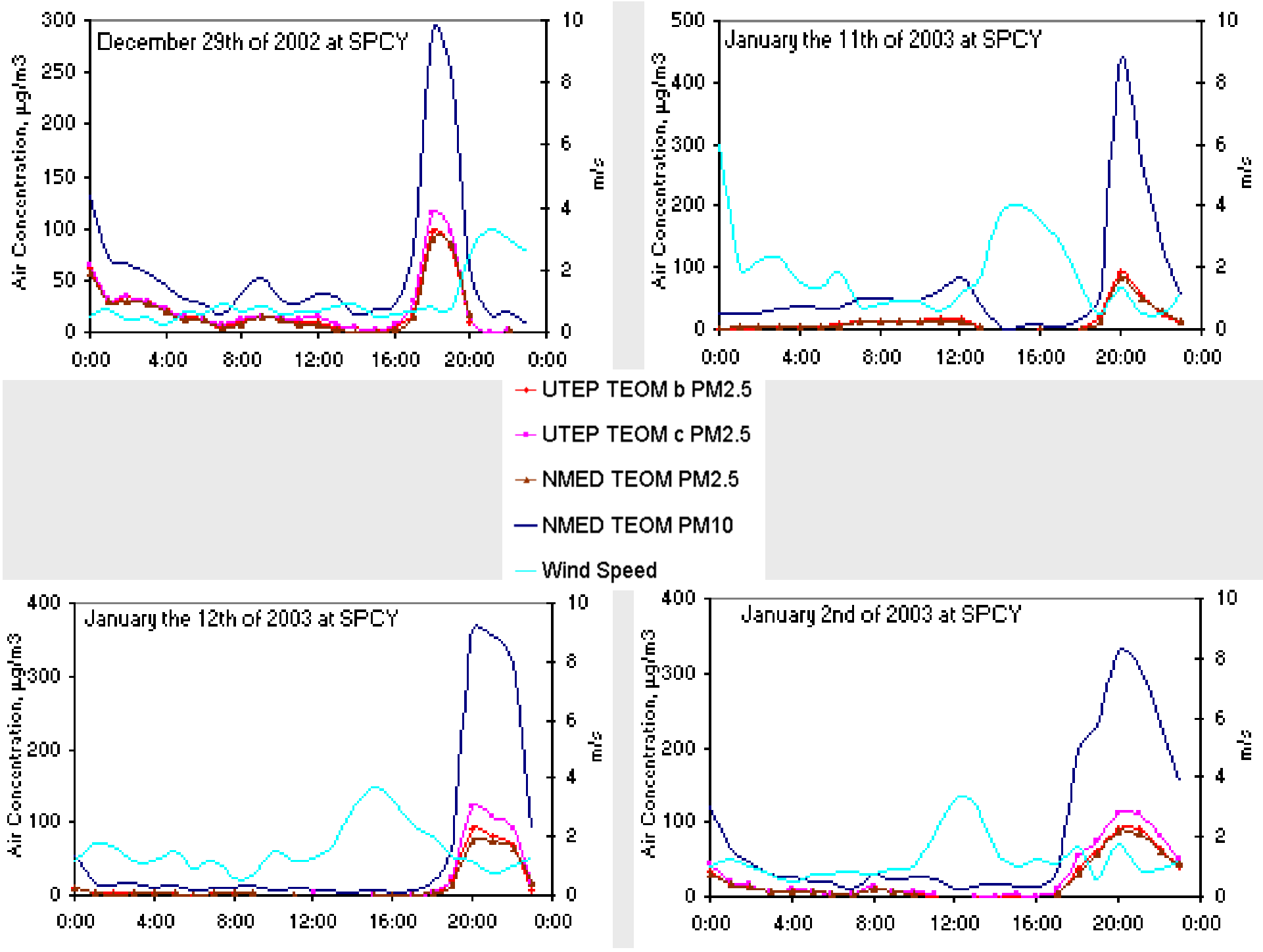
NMED TEOM PM2.5

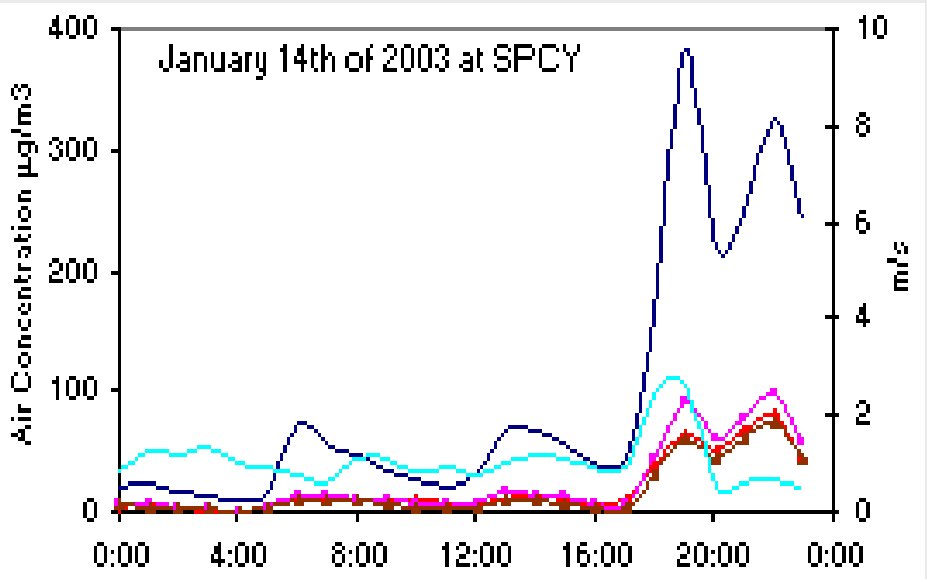
NMED TEOM PM10

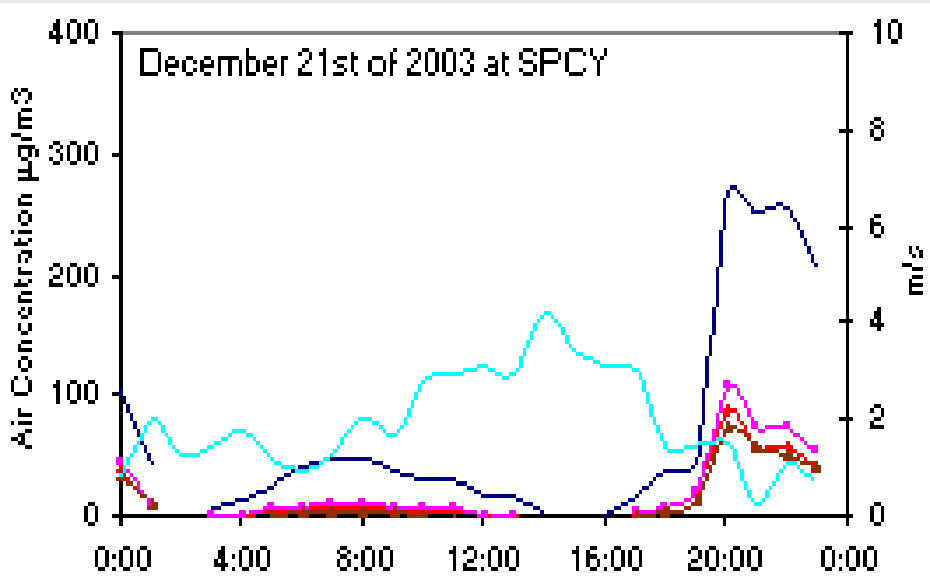
Wind Speed






December 29th of 2002 at SPCY
January the 11th of 2003 at SPCY
January the 12th of 2003 at SPCY
January 2nd of 2003 at SPCY
Air Concentration, µg/m3
m/s
0:00
4:00
8:00
12:00
16:00
20:00
0:00
UTEP TEOM b PM2.5
UTEP TEOM c PM2.5
NMED TEOM PM2.5
NMED TEOM PM10
Wind Speed





UTEP TEOM b PM2.5

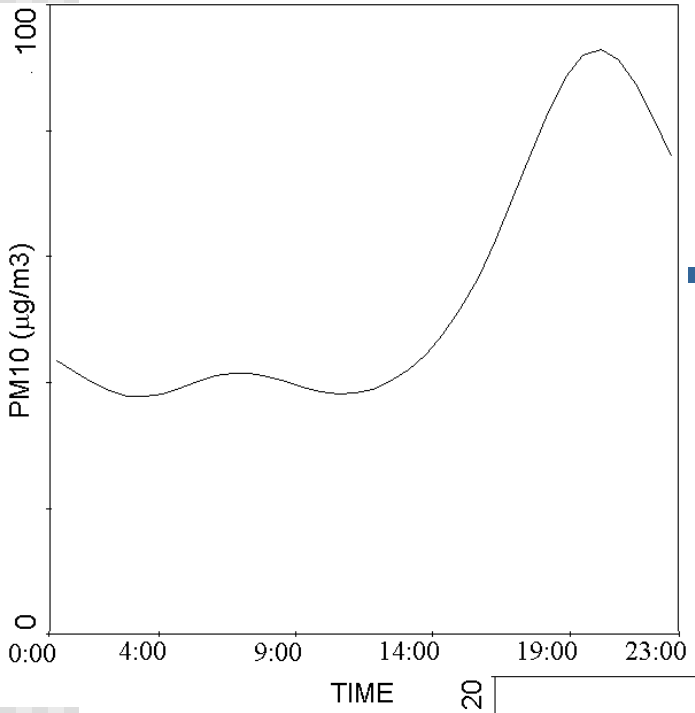
UTEP TEOM c PM2.5

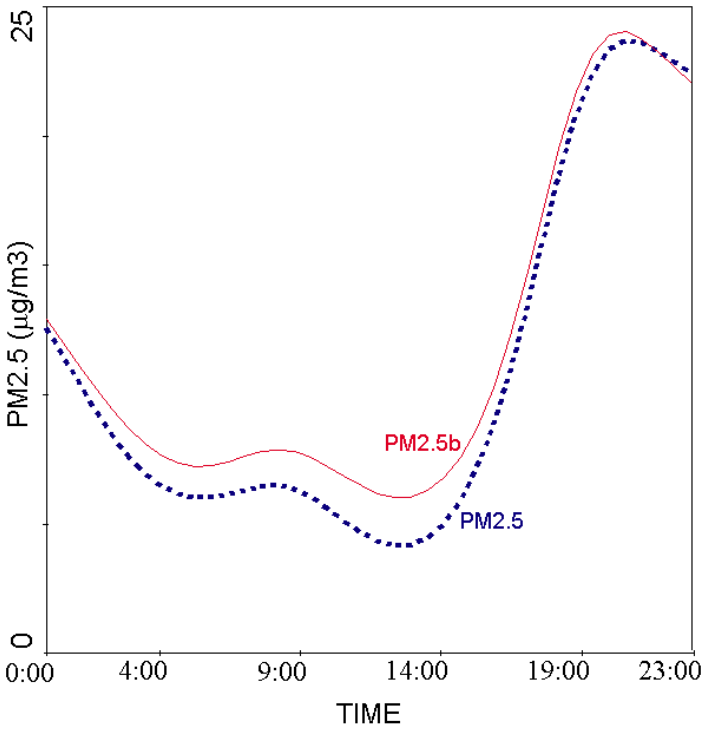
NMED TEOM PM2.5

NMED TEOM PM10

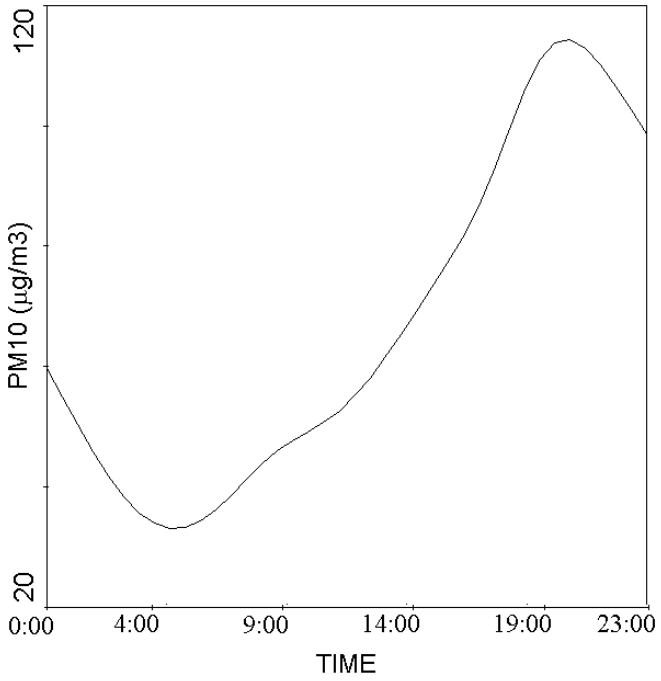
Wind Speed

GAM year 2000 At Sunland Park

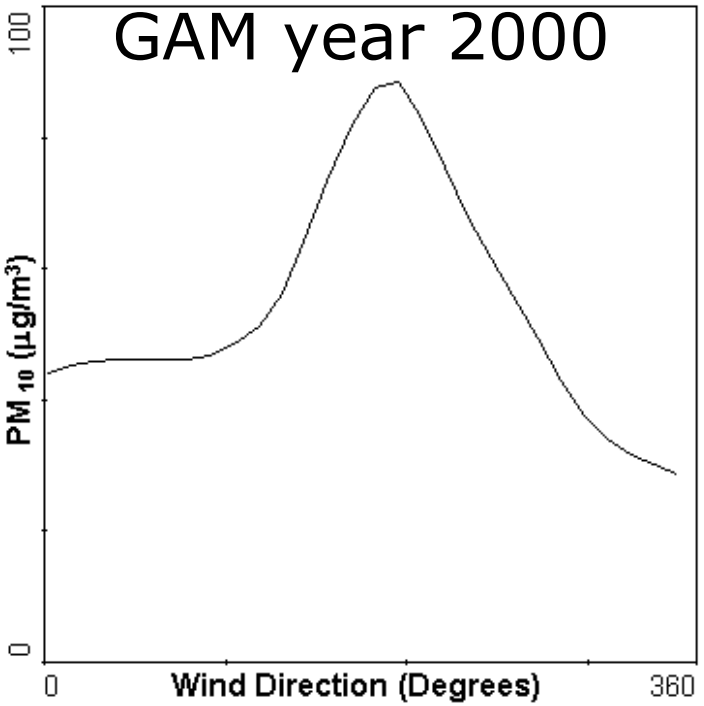




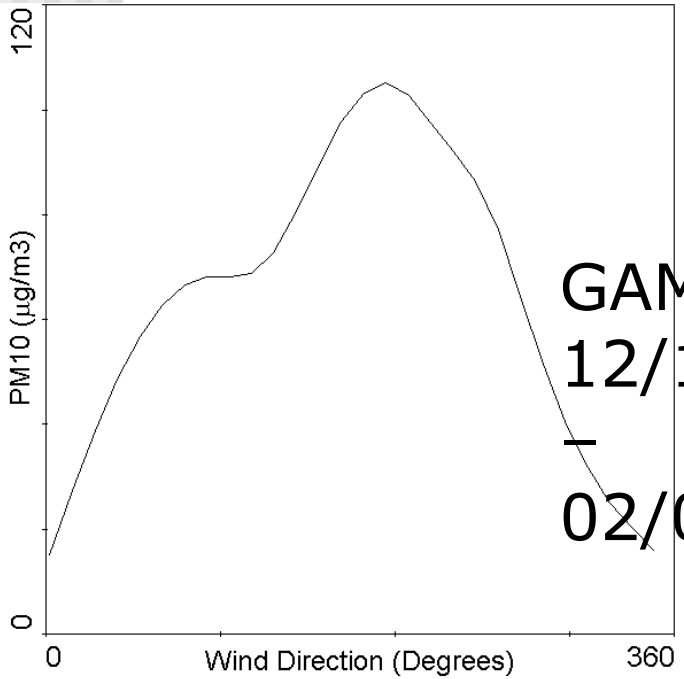
GAM 12/13/02 – 02/07/03



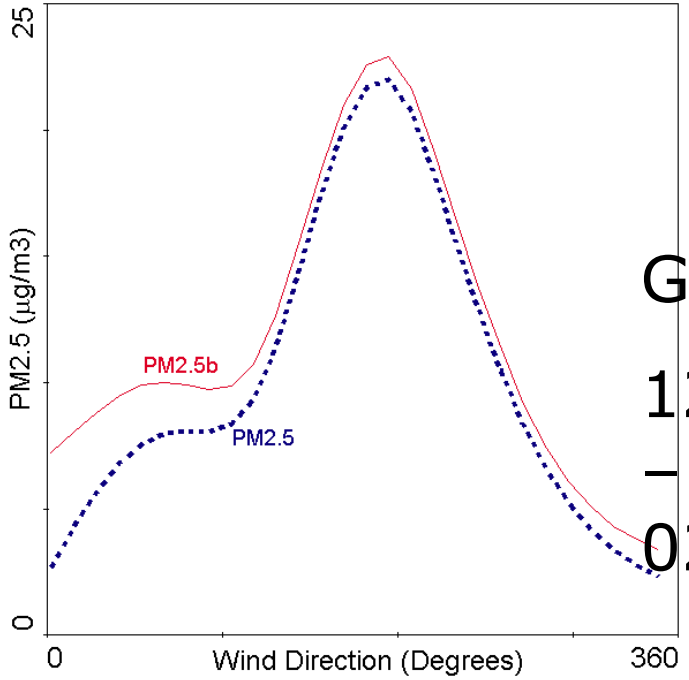
GAM 12/13/02 – 02/07/03



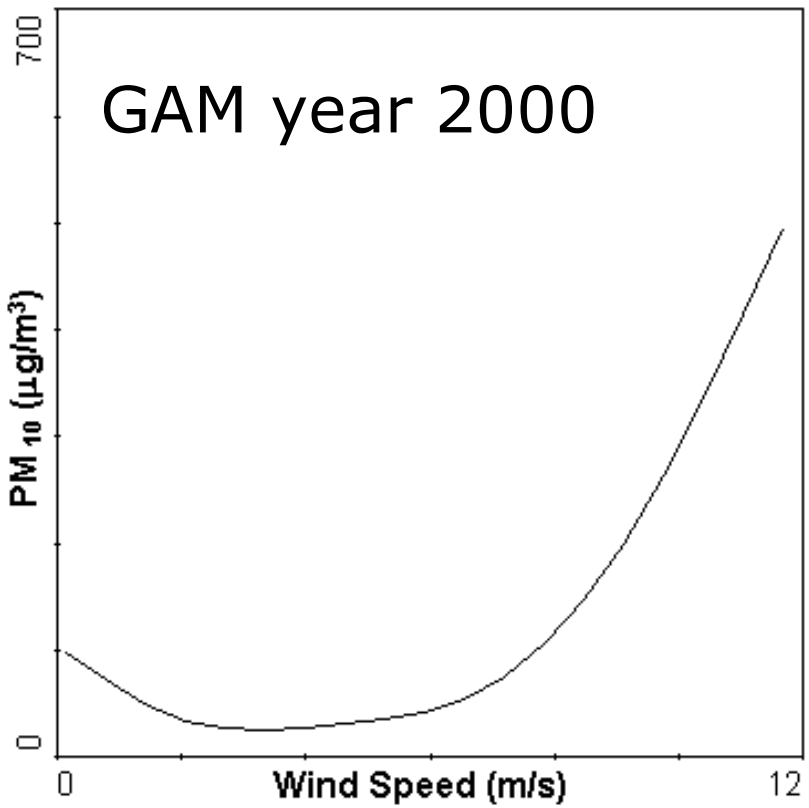
At Sunland Park



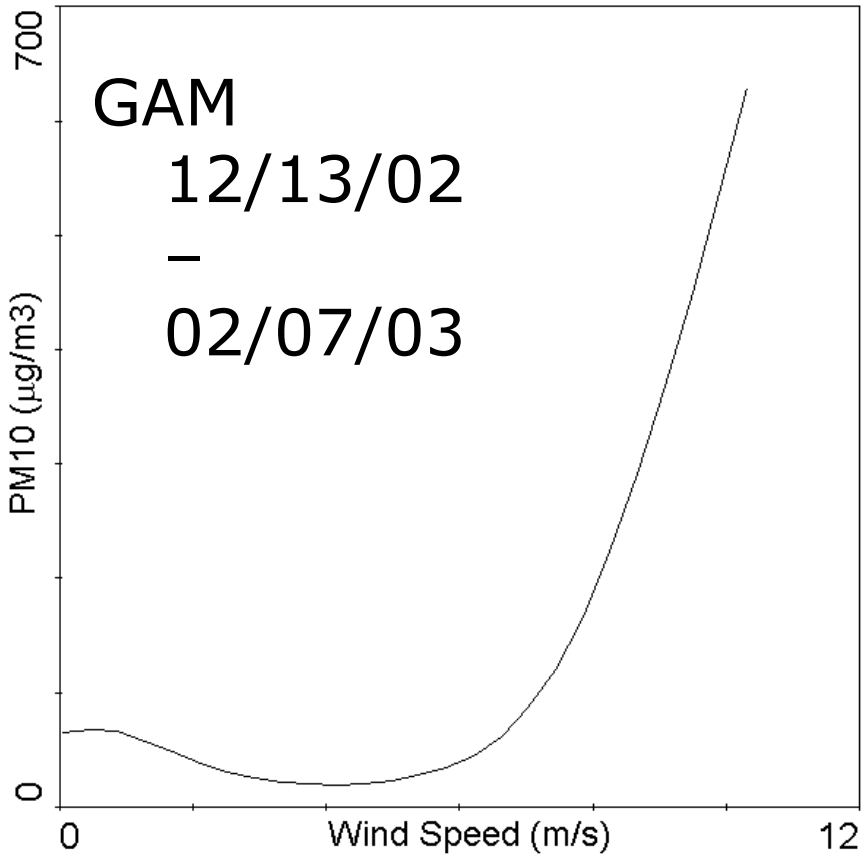
GAM
12/13/02
–
02/07/03

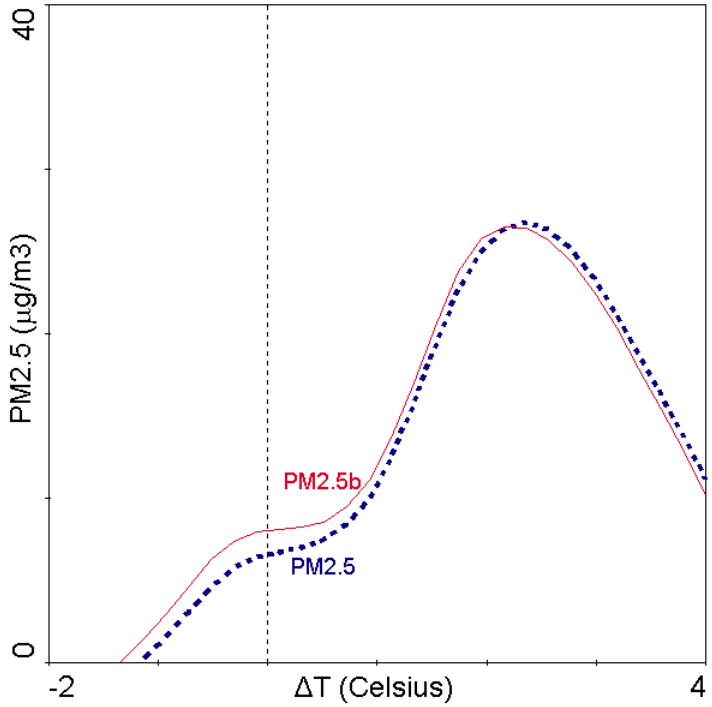


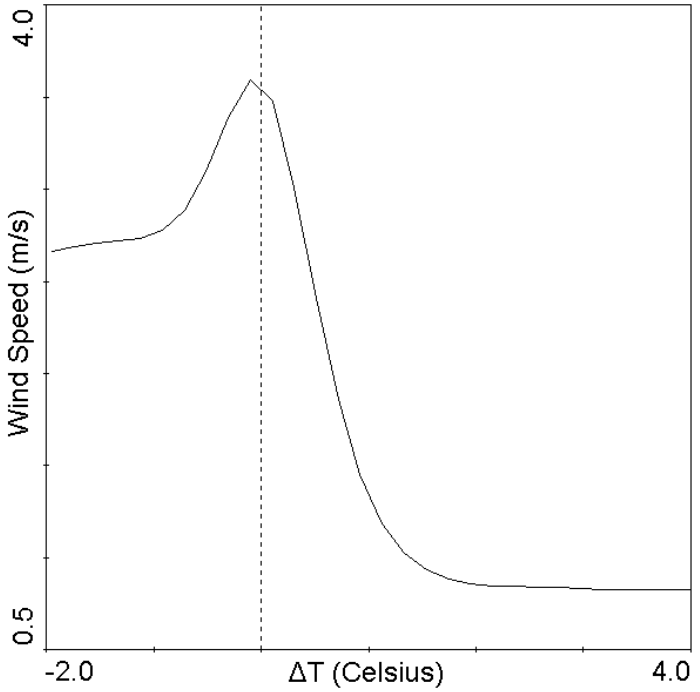
GAM
12/13/02
–
02/07/03



At Sunland Park







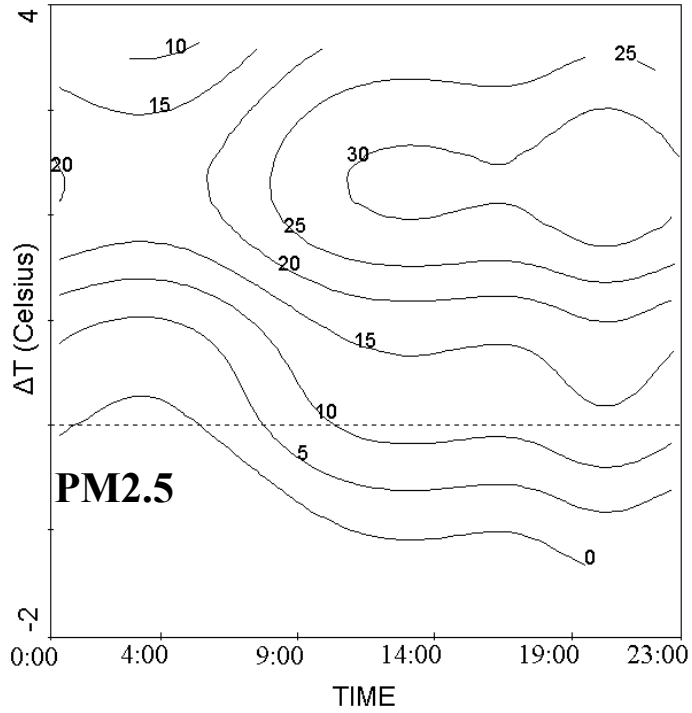
GAM

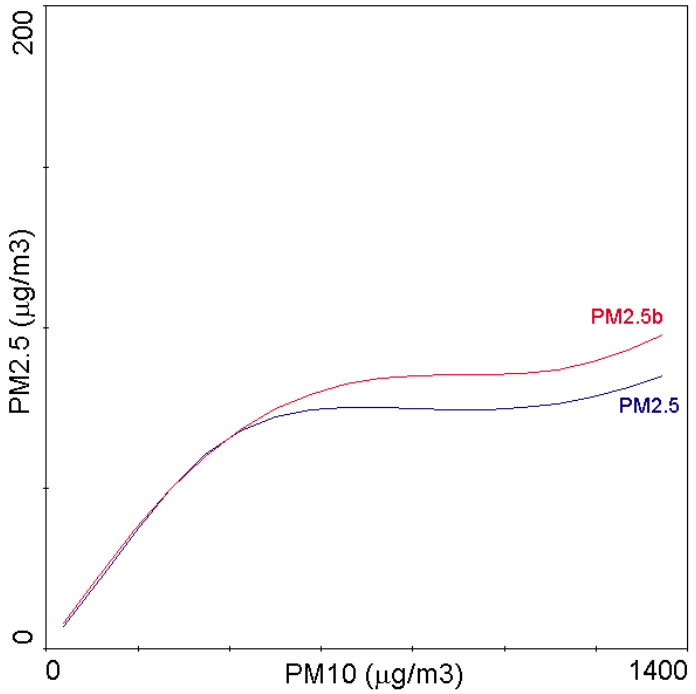
12/13/02

–

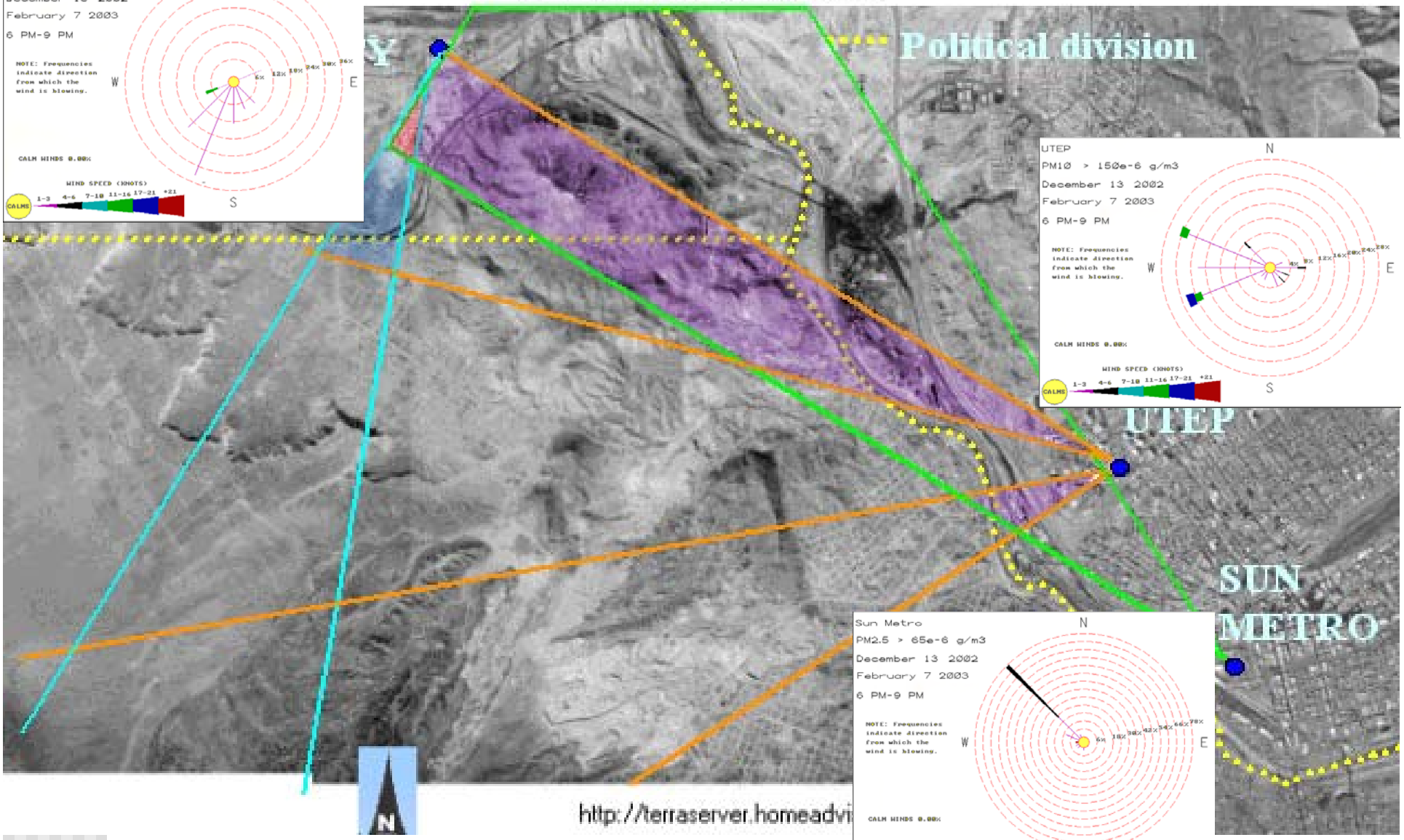
02/07/03

At Sunland Park

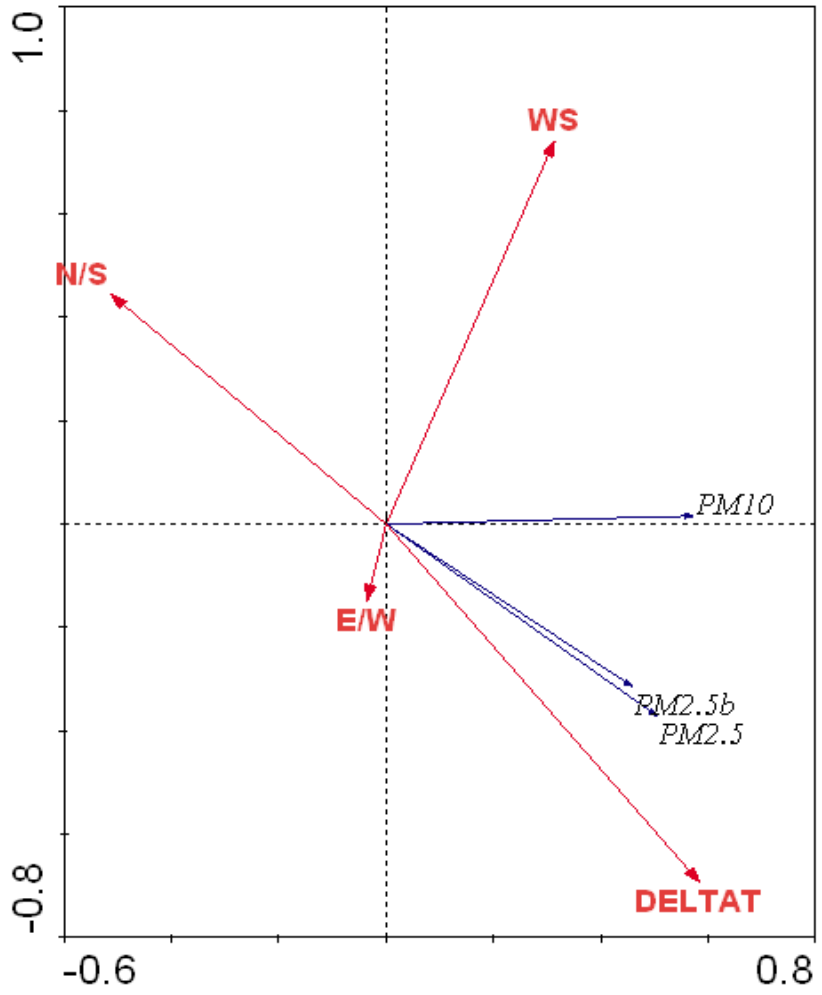




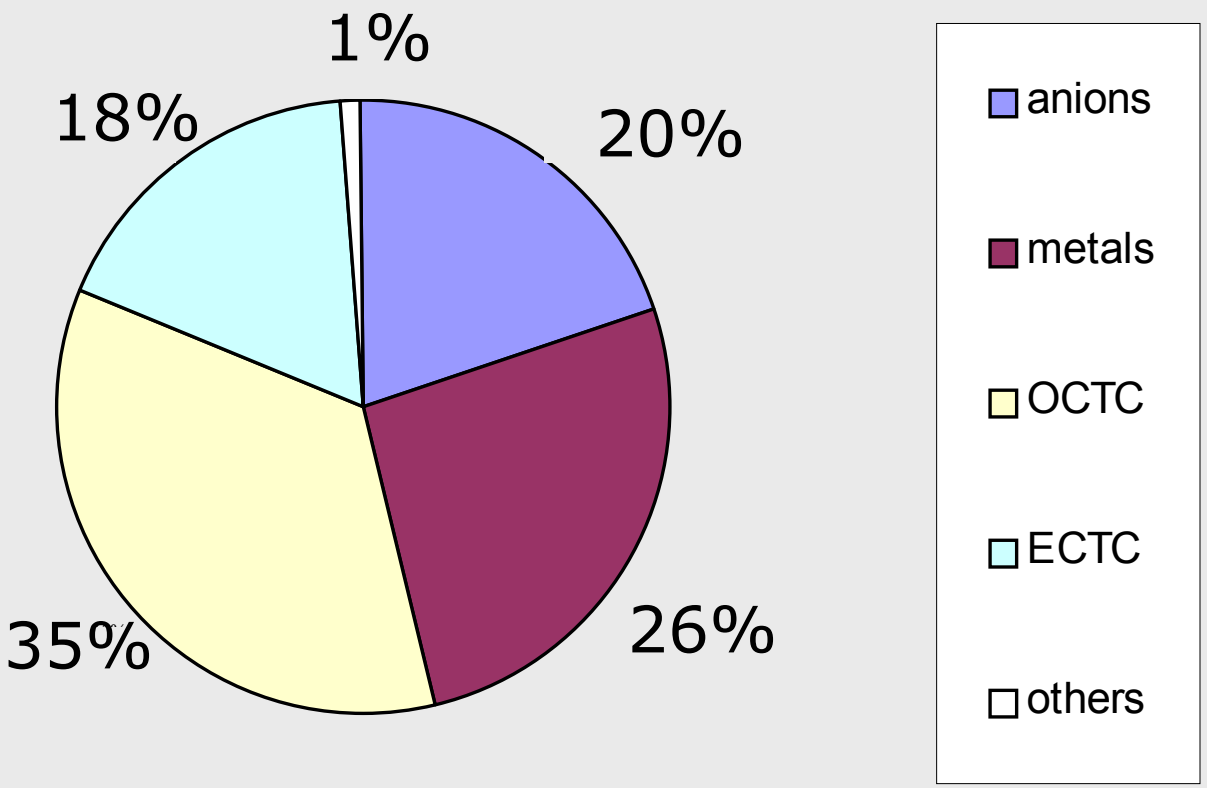
High PM concentrations from 6:00PM to 9:00PM for periods of 12/13/02 to 02/7/03 & year 2002



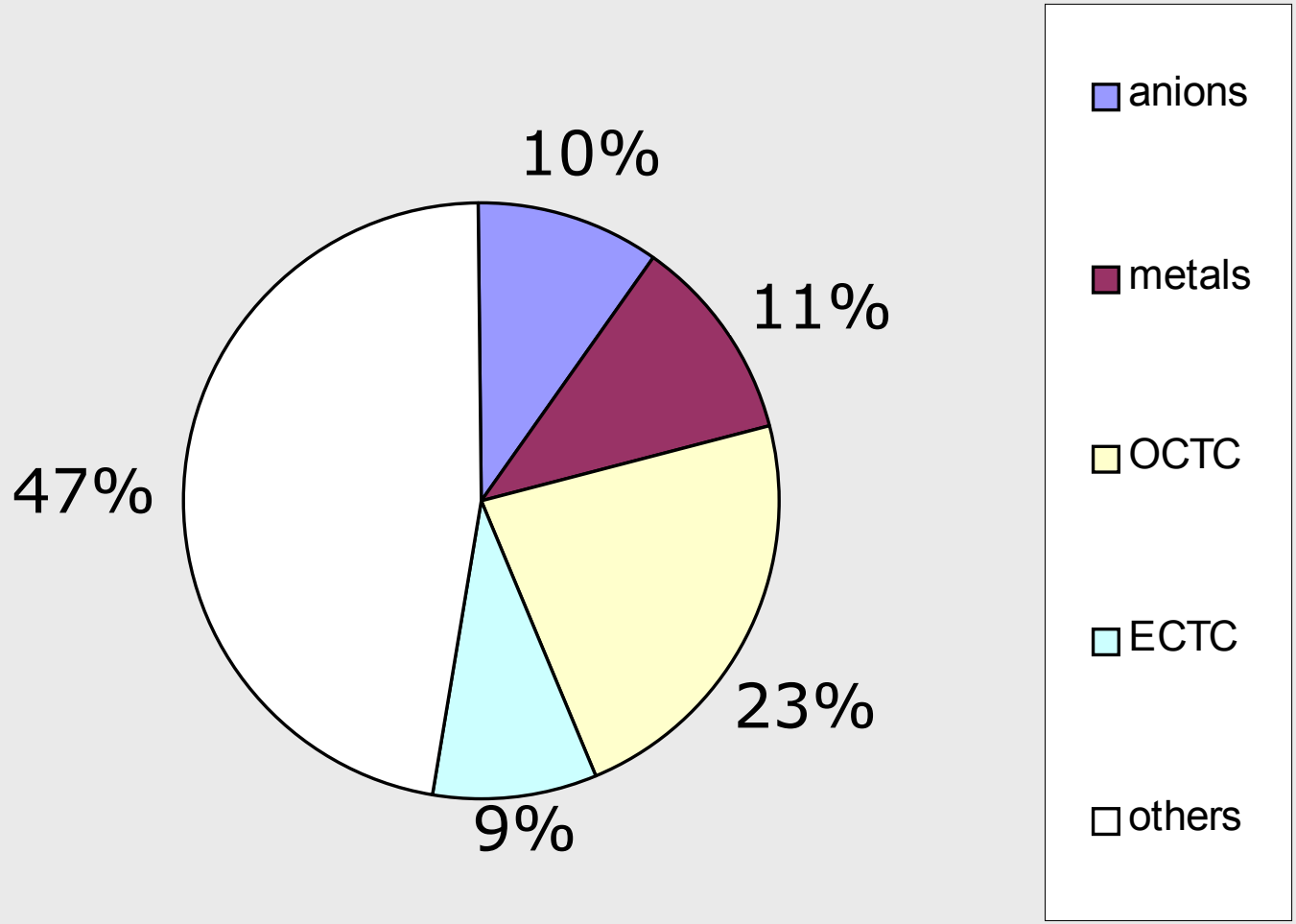
6:00 p.m. to 9:00 p.m RDA for the period of Dec. 13 2002 to Feb. 7 2003



24-hr avg $PM_{2.5}$



6:00pm-9:00pm avg PM2.5



Conclusion

- PM peaks occurred
  - Stable conditions
  - light winds from the south of Sunland Park
  - Hourly peaks were 10 times greater than the 24-hr average
  - from 6:00 p.m. to 9:00 p.m. and subsided after 12 a.m

- High carbon compounds in PM may be attributed to vehicular emissions, open burning, or emissions from brick kilns
- High geologic elements in PM and low wind condition indicate vehicular induced dust emission
- Meteorological analyses associate high PM with light southerly winds
- All together, evening traffic in Anapra, Cd. Juarez could be the source of the Sunland Park evening peaks

Acknowledgements

- SCERP (Southwest Center for Environmental Research and Policy)
- CERM (Center for Environmental Resource Management)
- NMED (New Mexico Environmental Department)
- NMSU (New Mexico State University)