The background of the slide is a photograph showing a panoramic view of the Phoenix, Arizona skyline from an elevated position. In the foreground, there are several tall saguaro cacti and rocky terrain. The city buildings are visible in the middle ground, and mountains are in the distance under a clear sky.

Measurement Methods for the 2006 Maricopa County PM₁₀ Source Attribution and Deposition Study

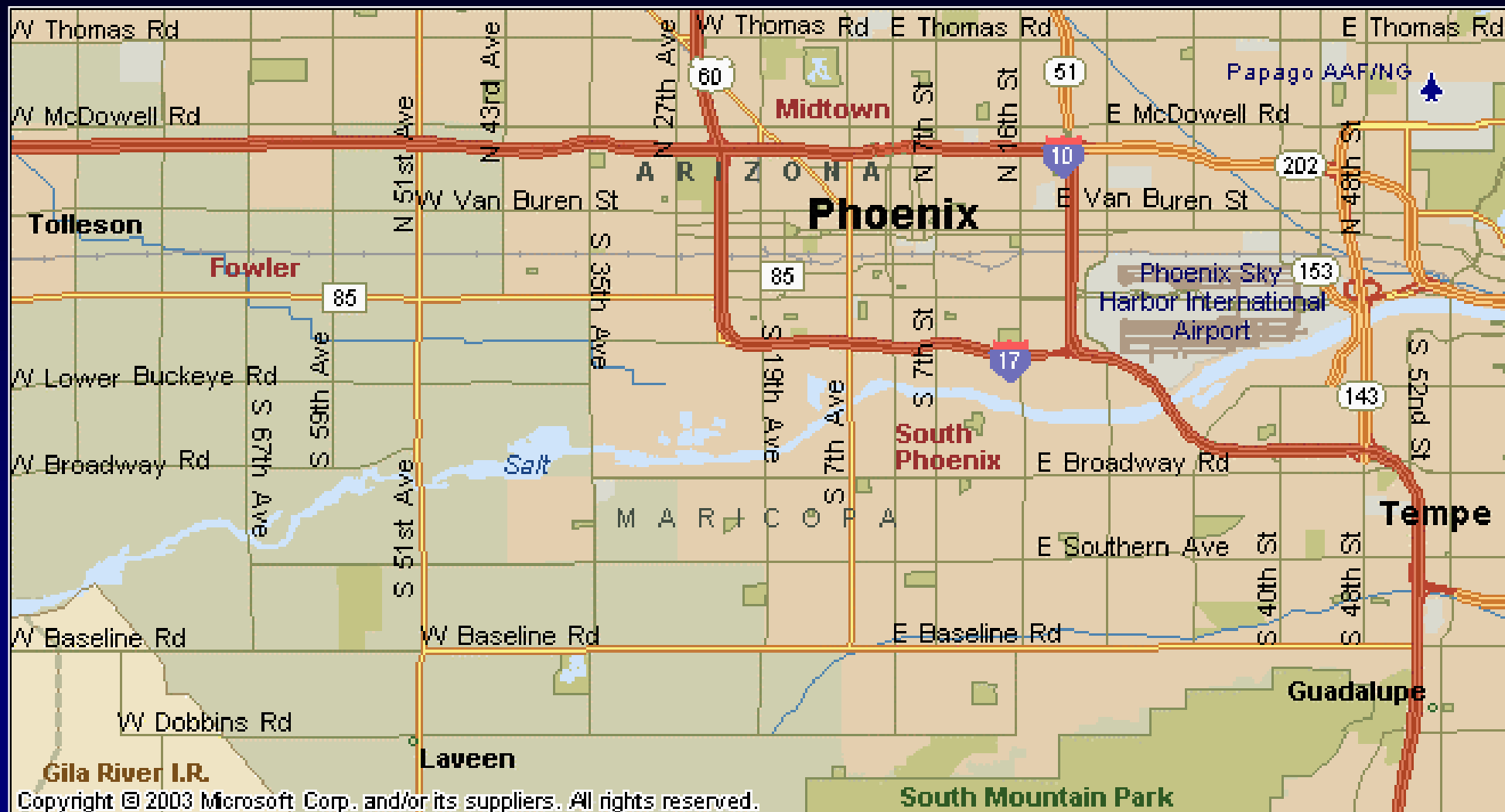
**Robert A. Baxter, CCM
T&B Systems
Valencia, CA**

Overview

- Study Background
- Approach
- Monitoring tools
- What we learned

Study performed for the Maricopa Association of Governments in conjunction with Sierra Research

Primary Study Area



Background

Evaluations of Salt River PM₁₀ Violations Recorded in Winter 2005

- Modeling provided limited insight into source contributions to monitored concentrations
- Low wind speed conditions
- Multi-day episode
- Peak values recorded in the morning
- Apparent correlation with morning traffic
- Morning drainage flow from east not evident
- High concentrations recorded at both West 43rd and Durango Complex

Approach

Mobile and fixed site sampling

- Define routes for mobile sampling
 - Map distribution of PM levels
 - Identify areas of interest
 - Characterize diurnal variations in PM levels
 - Characterize size distribution of PM
- Enhance the meteorological data collection
- Investigate dispersion of roadway sources
- Conduct sampling in two phases
- Coordinate with local agencies for related data
- Perform daily rapid review of collected data to identify insights, opportunities and problems.

Monitoring Tools

- Particle lidar
- Mobile monitoring
- DustTrak optical PM_{10}
- DustTrak optical $PM_{2.5}$
- MiniVol filter based
- Particle size analyzer
- Fixed site sampling
- Sodar
- SCAMPER



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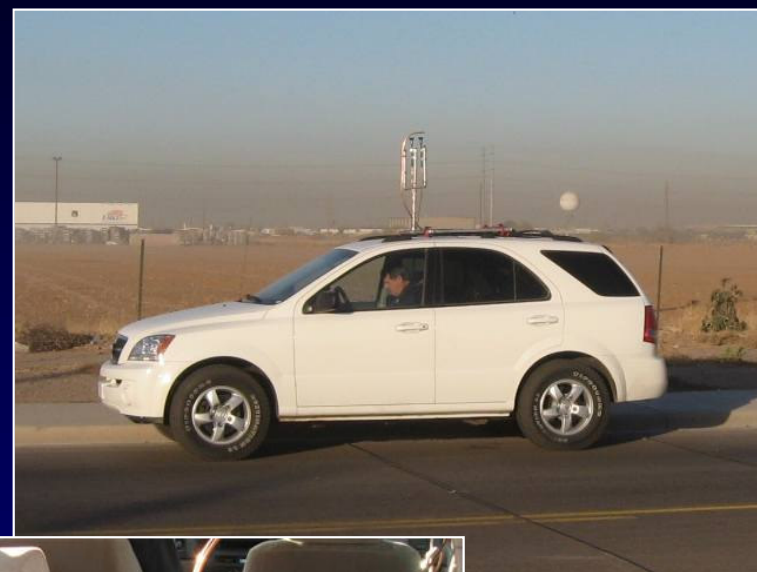
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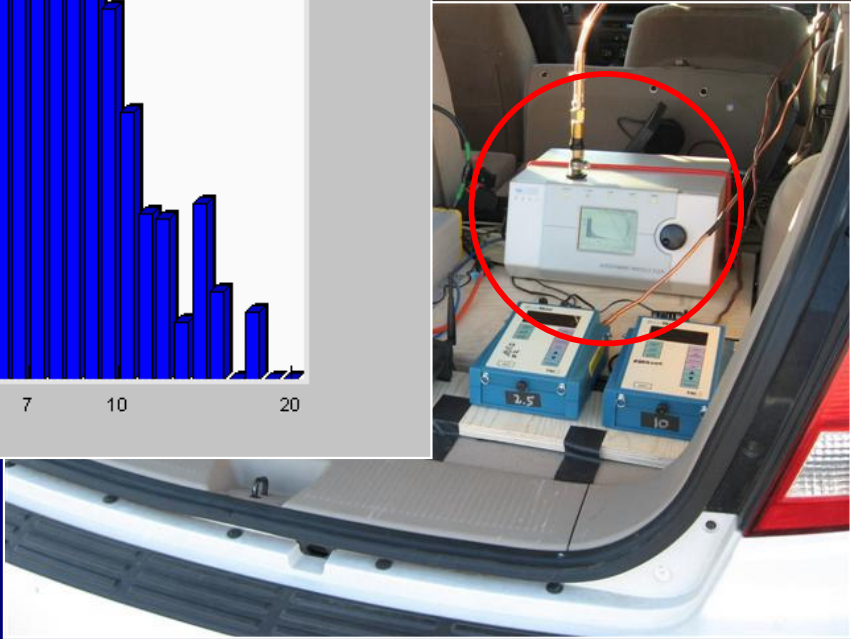
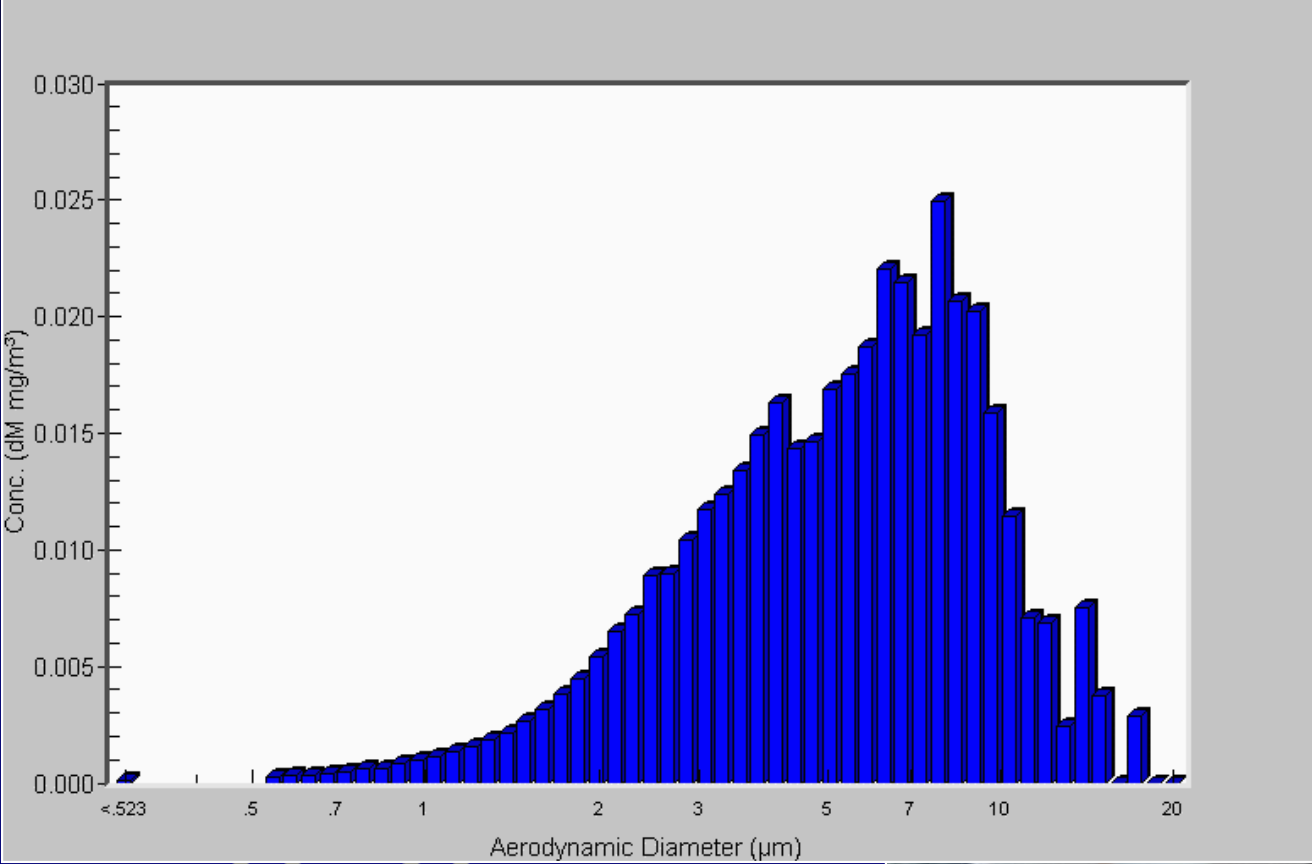


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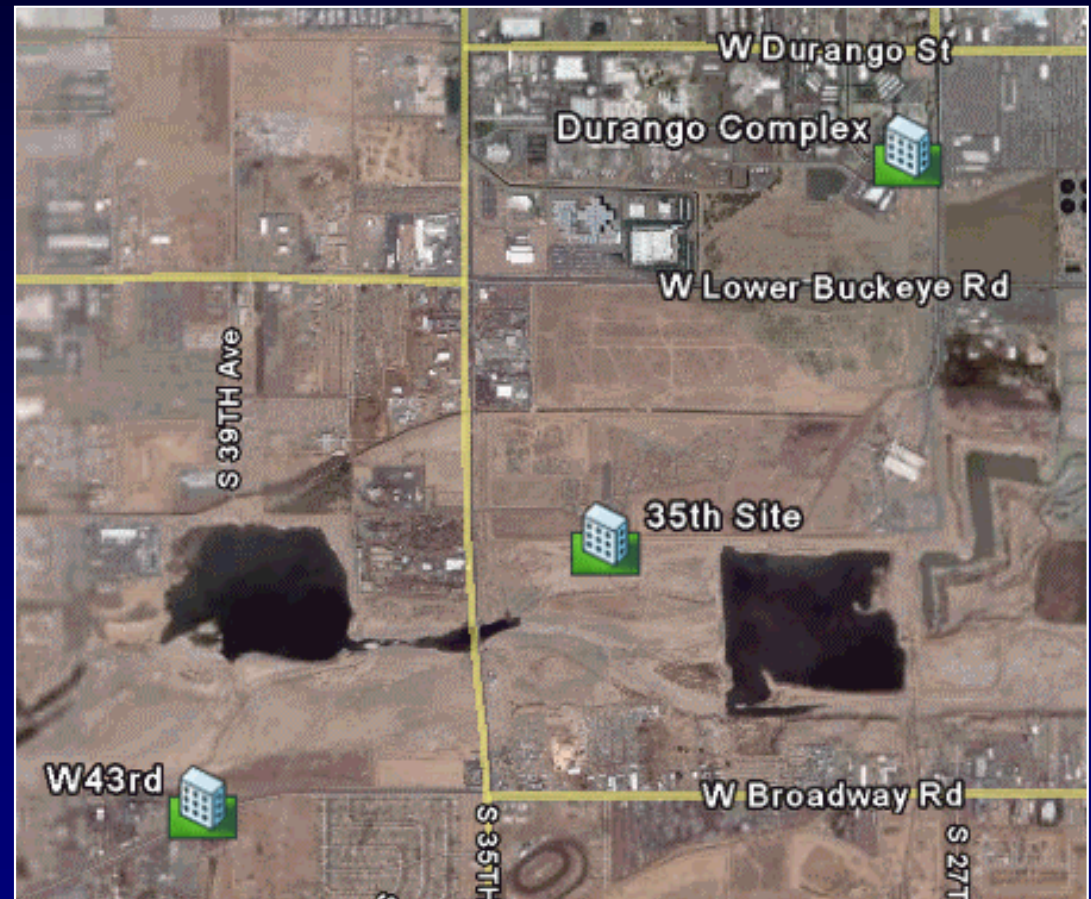


Monitoring Tools



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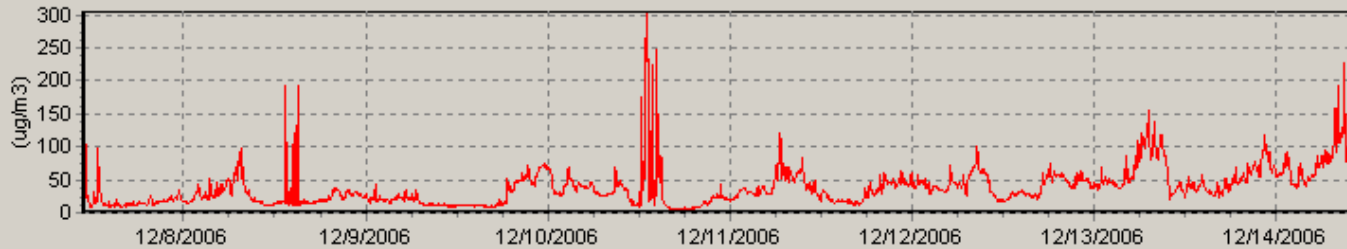
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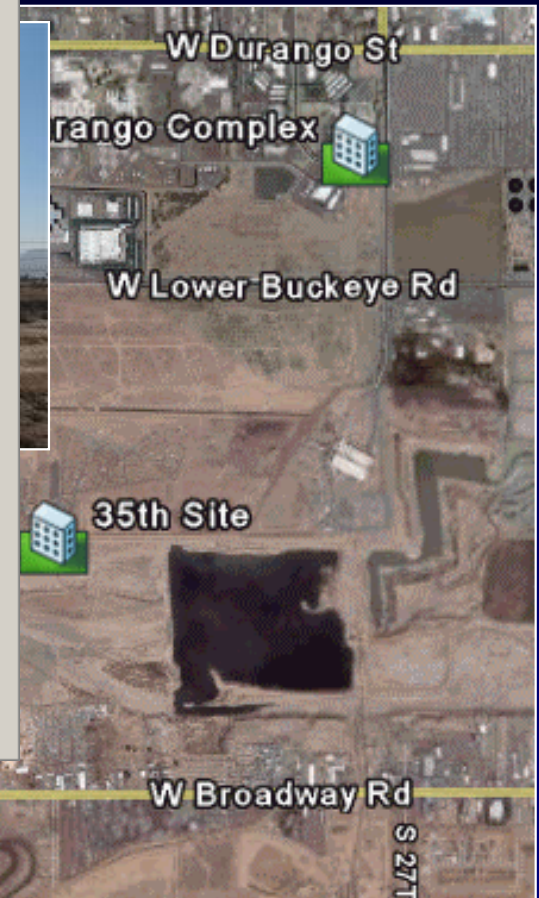
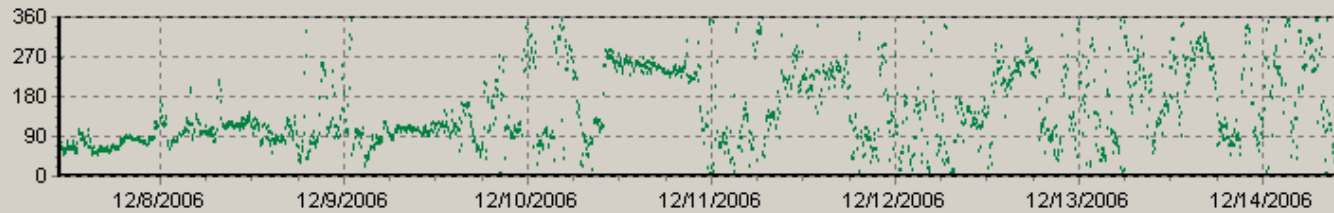
PM10 (DustTrak)



Wind Speed



Wind Direction



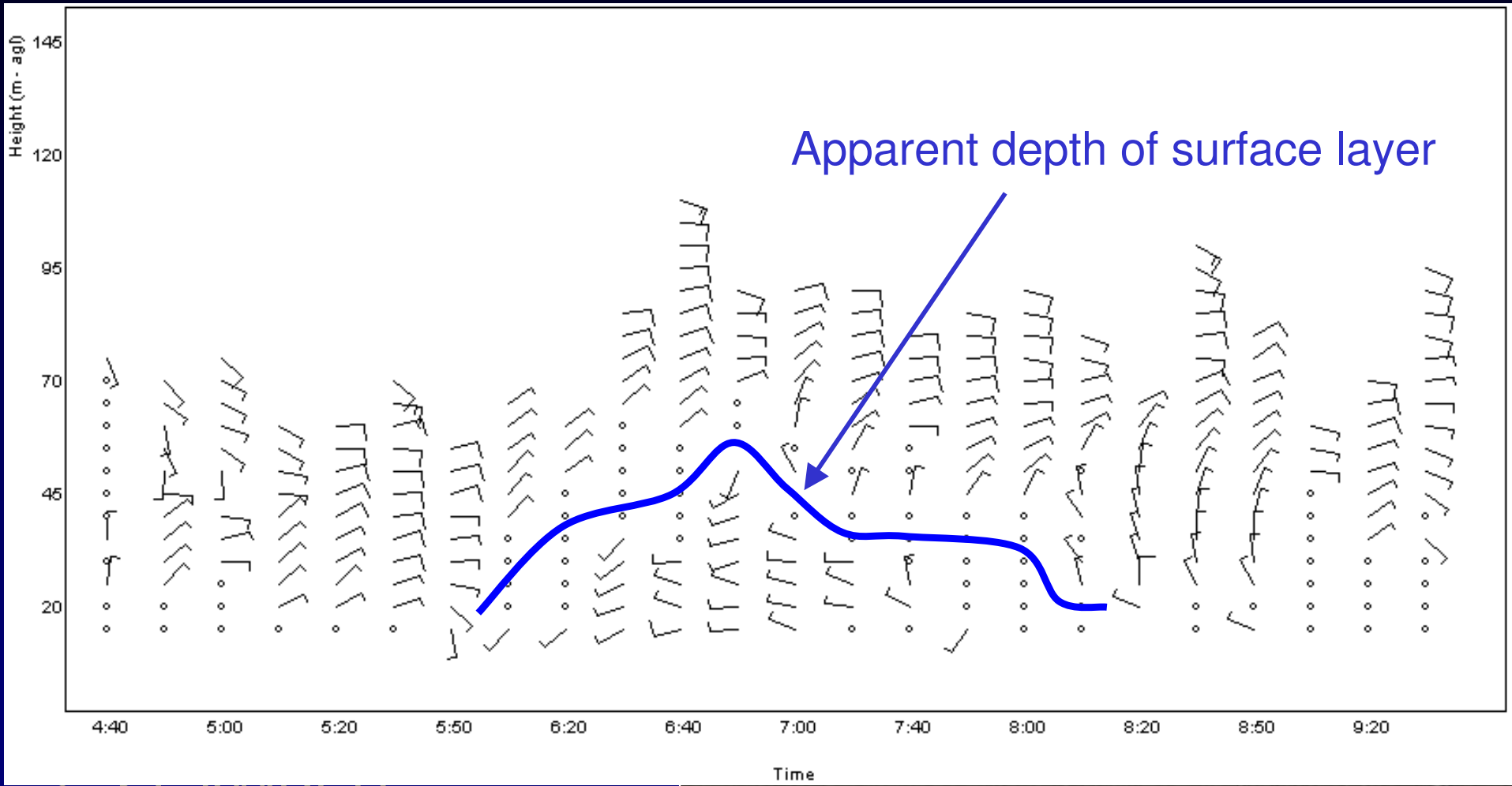
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Monitoring Tools



• SCAMPER

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Field Observations

- Detailed sampling on 17 days
 - Boundary conditions
 - North/South traverses
 - East/West traverses
 - Particle size distribution for source characterization
 - Gradients away from primary roads
 - Gradients across the Salt River
- Six days had high 24-hour concentrations at one or both stations

Field Observations

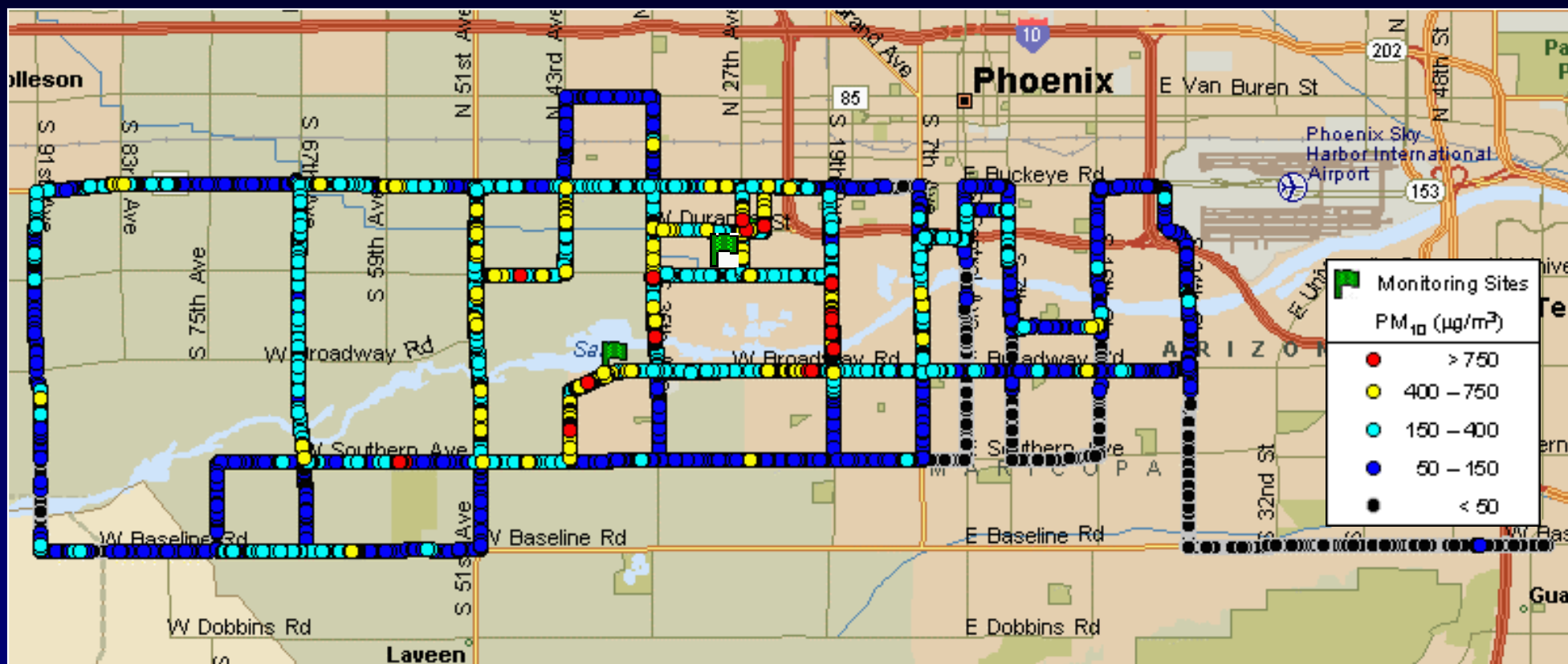
- Characterize the sources around the monitors
- Intercomparisons with site monitors
- Upwind/downwind monitoring
- Search for plumes and potential sources
- Major identified sources
- Tracking large plumes
- Visual documentation

Monitored Events

- Regional characterization
- Trackout
- “Dragout” from unpaved or poorly maintained paved roads or parking lots
- Unpaved shoulders
- Unpaved roads with “dragout”
- Open burning
- Agriculture
- Vehicle activity on unpaved or poorly maintained lots
- Industrial facilities
- Street sweeping effectiveness

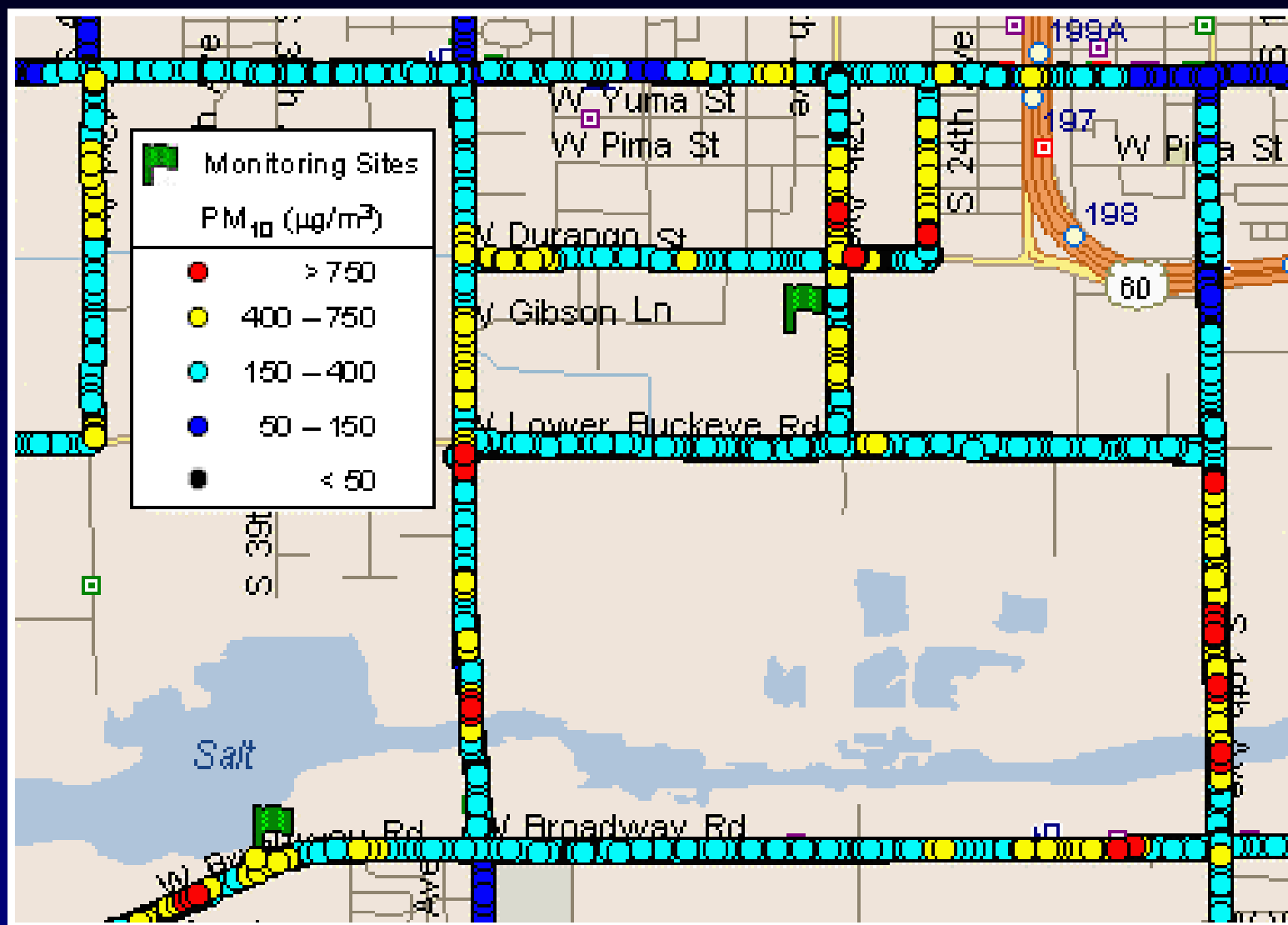
Regional Characterization

November 15 0400 to 1000



Regional Characterization

November 15 0400 to 1000



Trackout



Dragout



Unpaved Roads and Dragout



Unpaved Roads and Dragout



Open Burning



Open Burning and West 43rd PM₁₀

December 7, 2006

Time	Wind Speed (mph)	Wind Direction	PM ₁₀ ($\mu\text{g}/\text{m}^3$)
0400	1.2	S	102
0500	1.0	N	208
0600	0.8	ENE	381
0700	0.4	SSW	515
0800	0.7	WSW	566
0900	2.3	W	284
1000	3.0	W	240
1100	6.6	ENE	111

Open Burning and West 43rd PM₁₀

December 7, 2006



Agriculture



Agriculture



Vehicle Activity on Unpaved Lots

Saturday November 18, 2006



Vehicle Activity on Unpaved Lots

Sunday November 19, 2006



PM₁₀ Data Points 08:00 – 08:35

07:00 Wind North at 0.6 mph PM₁₀ – 151 µg/m³

08:00 Wind East at 0.8 mph PM₁₀ – 361 µg/m³

Vehicle Activity on Unpaved Lots

Sunday November 19, 2006



07:00 Wind North at 0.8 mph PM_{10} – 101 $\mu\text{g}/\text{m}^3$

08:00 Wind East at 0.8 mph PM_{10} – 361 $\mu\text{g}/\text{m}^3$

T&B Systems

Industrial Facilities



Industrial Facilities

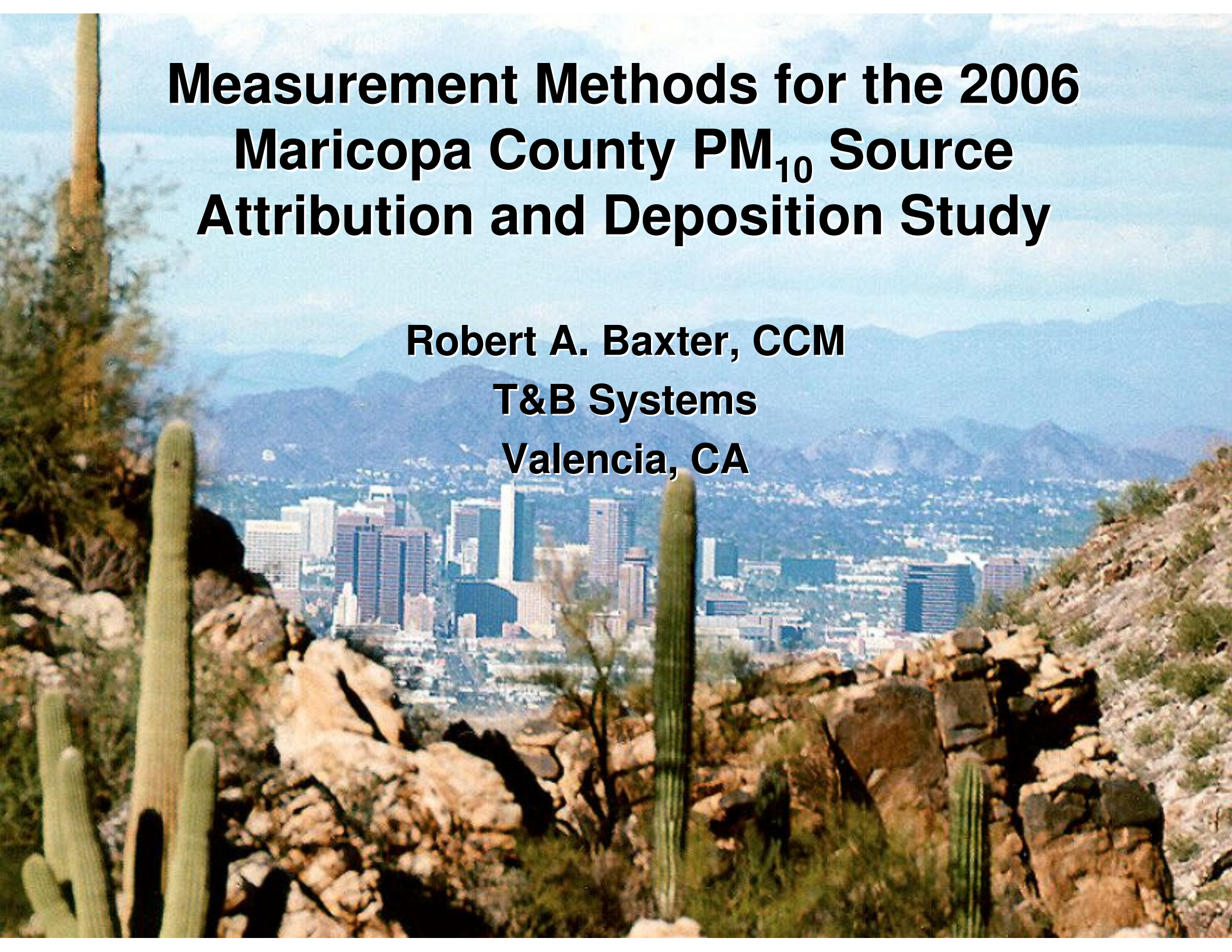


Street Sweeping Effectiveness



Final Notes

- Awareness of the monitoring played an obvious role in attempts to control fugitive emissions
- The data was used in demonstrating the problems and establishing new control measures
- No apparent exceedances during stagnant conditions in the 2007/2008 season.
- Use of a variety of fixed and mobile measurements collected the data needed to understand and start dealing with the issues



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