Megacity Aerosol Experiment Texas Session

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DEPARTMENT OF ENERGY
ATMOSPHERIC SCIENCE PROGRAM
FY 2007 SCIENCE TEAM MEETING
Boulder CO, October 25-27, 2006

The Texas Campaign

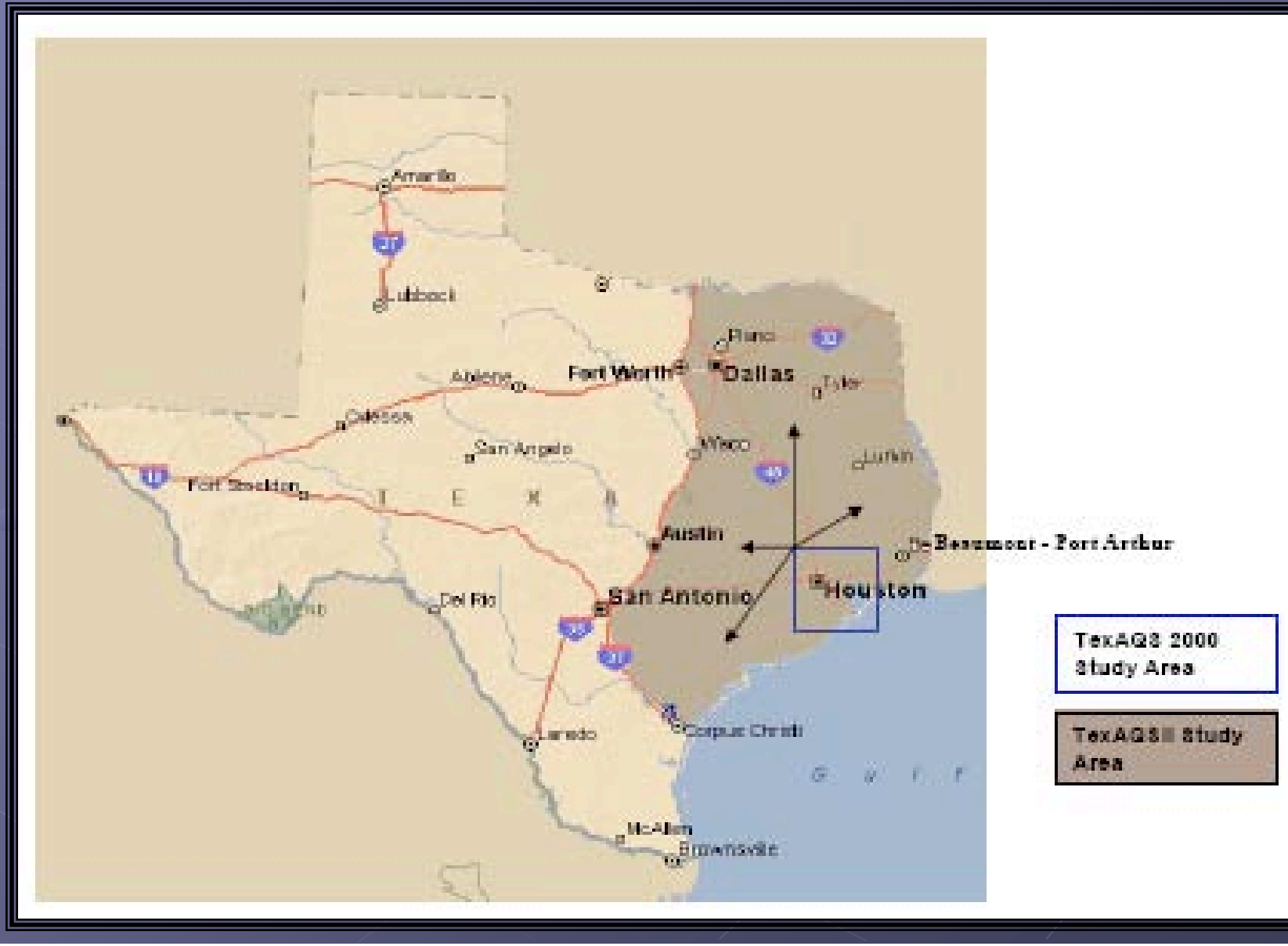
- A major field study to address aerosol and air quality issues in the eastern half of Texas.

- Lead Organizations: National Oceanic and Atmospheric Administration, the Texas Commission on Environmental Quality, the Texas Environmental Research Consortium, the Texas Air Research Center and universities from around Texas and the country.

Why Should ASP Be Interested in this Campaign?

- Houston is rich in aerosols.
- Past work suggests that different emission sources (e.g., anthropogenic, biogenic, industrial) influences $PM_{2.5}$ concentrations.
  - Expect different VOC/SOA relations at different locations
- Need to elucidate SOA formation mechanisms via oxidation of VOCs from anthropogenic and biogenic sources.
- Good emission inventories (e.g., Louie et al., Texas PM Emissions Atlas, 2006)

Regional Scale Study Area



Extensive Network to Support DOE/ASP Observations, including…

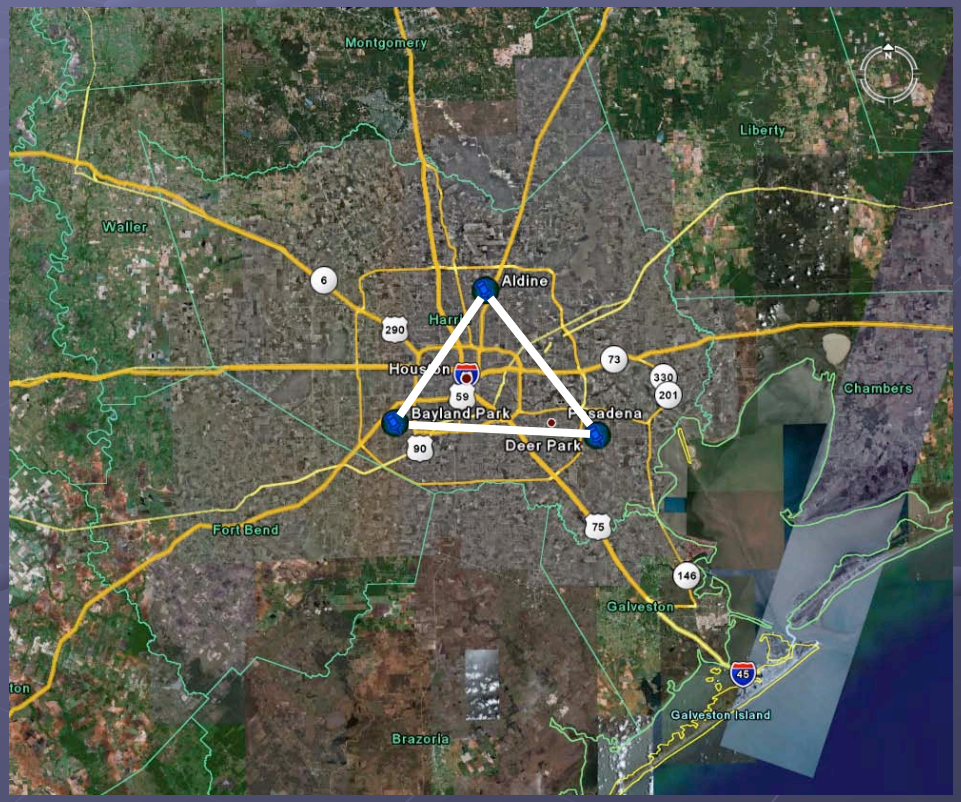
- Extensive surface network (auto-GCs, profilers, additional ‘sonde launches and gas-phase measurements)
- NOAA Twin Otter: airborne lidar for ozone
- NOAA Ronald H. Brown (aerosol composition (W-TOF-AMS): organic speciation (PTR-MS), radiometers, aerosol absorption, extinction, etc.)
- NOAA WP-3D: aerosol mass spec., soot fraction, PILS-IC, aerosol absorption/extinction
- Moody Tower (U/Houston): aerosol size, aerosol MS, CCN, scattering/extinction….

PNNL, Plan A

- Emphasis on vertical exchange processes
  - Williams Tower:
  - aerosol and VOC measurements from three stories of a 1000 ft skyscraper in western Houston.
- "Challenges" included…
  - Lien on equipment
  - Liability and insurance issues
- Support from ASP, TERC & EMSL

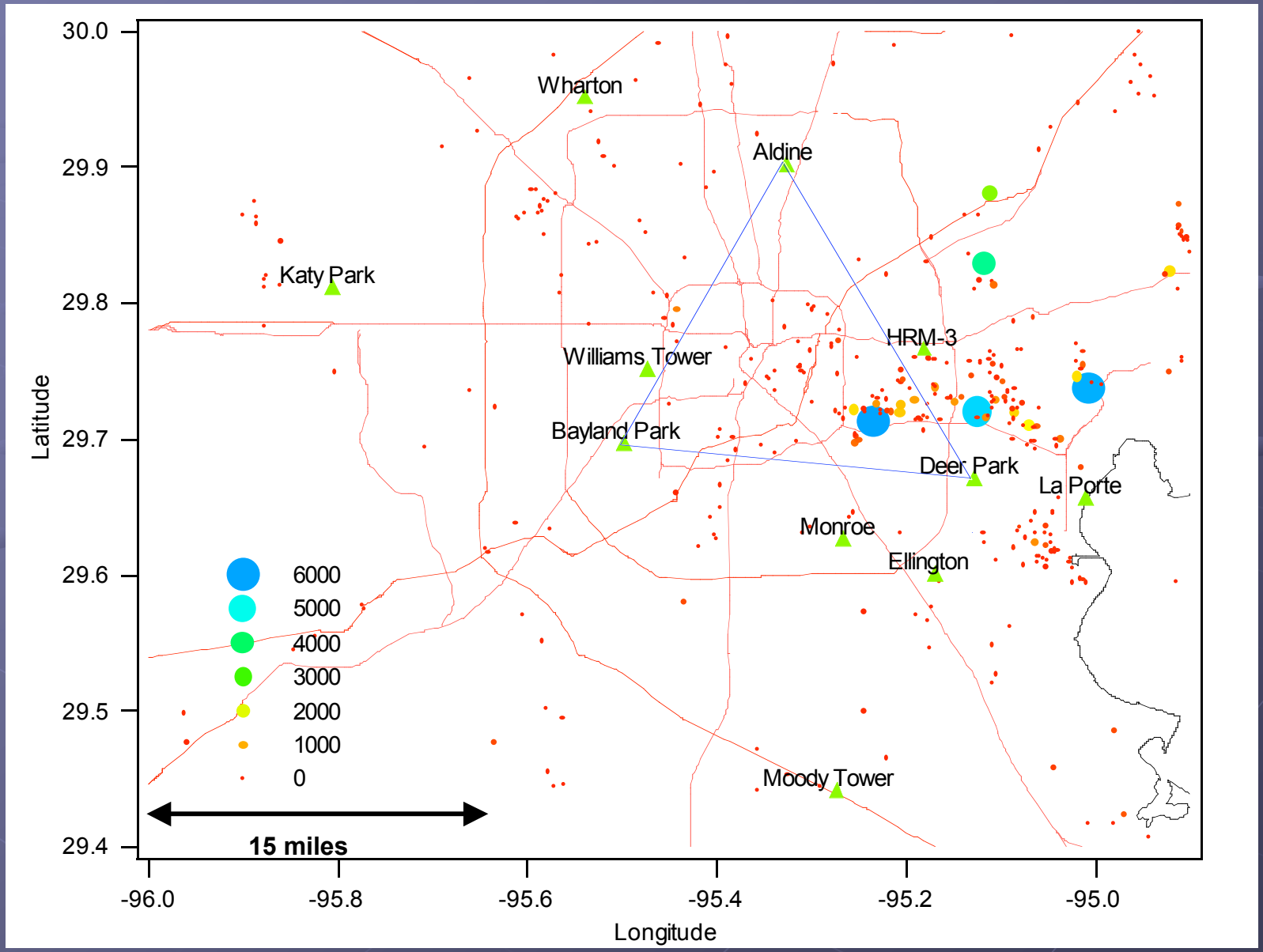
PNNL, Plan B

- Characterizing aerosol/VOC processes in different chemical environments
  - Three sites bordering greater Houston area.
  - Deployment of PTR-MS and Aerosol Mass Spectrometers (AMS) at three sites
- “Challenges”
  - Timely access to sites
- Support from ASP, TERC & EMSL



Measurement	Deer Park	Bayland Park	Aldine	Data Source
Aerosol Mass Spec.	×	×	×	PNNL/EMSL
PTR-MS	×	×	×	Battelle/WSU/TA&M
Canisters	×	×		WSU
O3	×	×	×	Battelle/WSU/TCEQ
CO	×	×	×	Battelle/WSU/TCEQ
NO/NO2/NOx	×	×	×	Battelle/WSU/TCEQ
SO2	×	×		Battelle/WSU
TDMA	×	×	×	Texas A&M Univ.
Ceilometer	×			Battelle
PM2.5 mass	×	×	×	TCEQ
GC for HC	×	×	×	TCEQ
Met data	×	×	×	TCEQ

Three Site Locations



Status of Houston Triangle Campaign

- Back from the field on September 30th
- Quality assurance procedures are just now being done on many of the observations.
- Have done first look at time series from
  - HSRL (NASA)
  - PTR-MS (DOE, Texas A&M Univ., W.S.U)
  - Aerosol mass loading and composition (DOE)
  - Meteorology (TCEQ)


…all this plus heat and high humidity!!

Science Questions

- How does aerosol composition vary between the three sites? Why?
- Are VOC/aerosol relations the same at all the sites?
- How does aerosol formation, growth and aging differ from site to site?
- How do these features relate to aerosol hygroscopicity?
- How do our in-field observations compare with aircraft observations to characterize far-field/regional aerosols?

A (truly) "First Look at…

- **…the Airborne High Spectral Resolution Lidar Observations from MAX-TEX".**
  - John Hair, Chris Hostetler, Rich Ferrare (NASA/Langley Research Center)

- **…Correlations and Differences Between AMS Instruments Deployed in the Houston Triangle in September 2006: Deer Park, Aldine, and Bayland Park.**
  - M.L. Alexander, X.-Y.Yu, J. V. Ortega, M. K. Newburn and C. M. Berkowitz (PNNL)

- **…PTR-MS and AMS observations from the Aldine site of The Houston Triangle**
  - X.-Y. Yu, J. Zheng, M.L. Alexander, J. Ortega, R. Zhang and C. M. Berkowitz (PNNL)