

Overview of Southeast Texas Balloon Study (SETBS)

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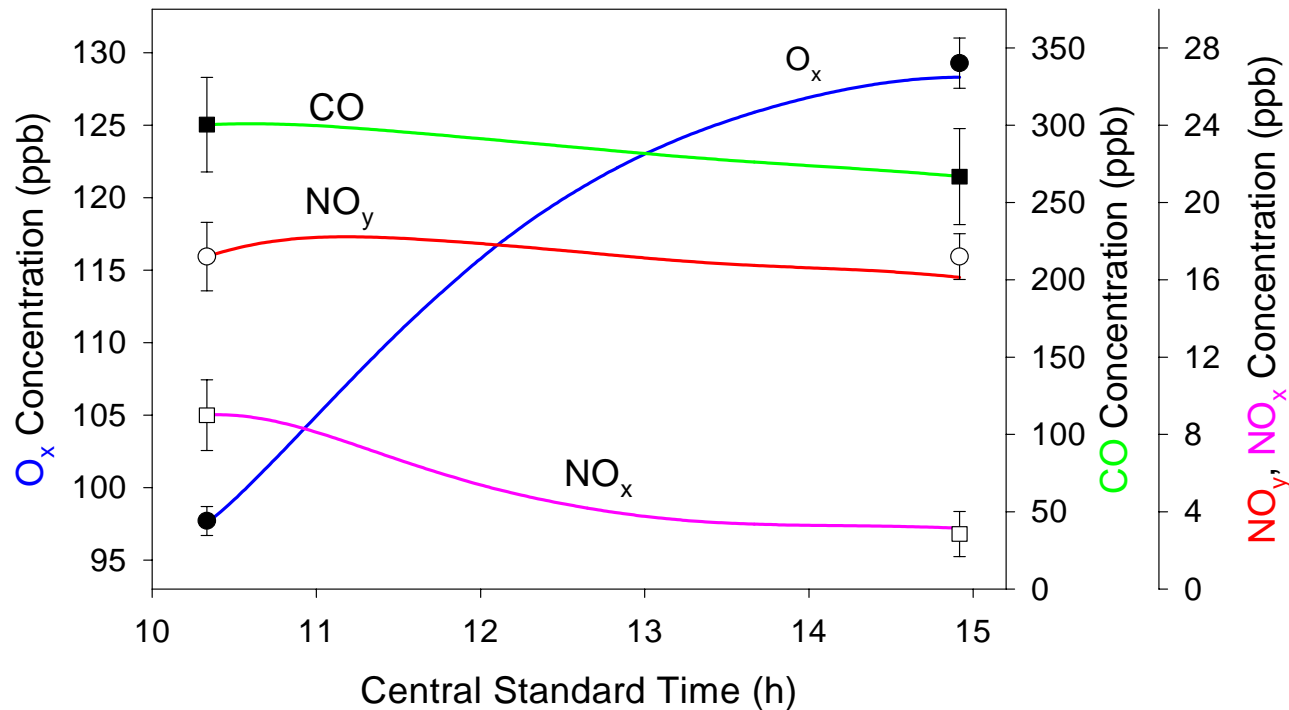
Paul Voss

University of Massachusetts, Amherst
TexAQS II 2005 Field Team Meeting
March 15-16, 2005

Houston Advanced Research Center

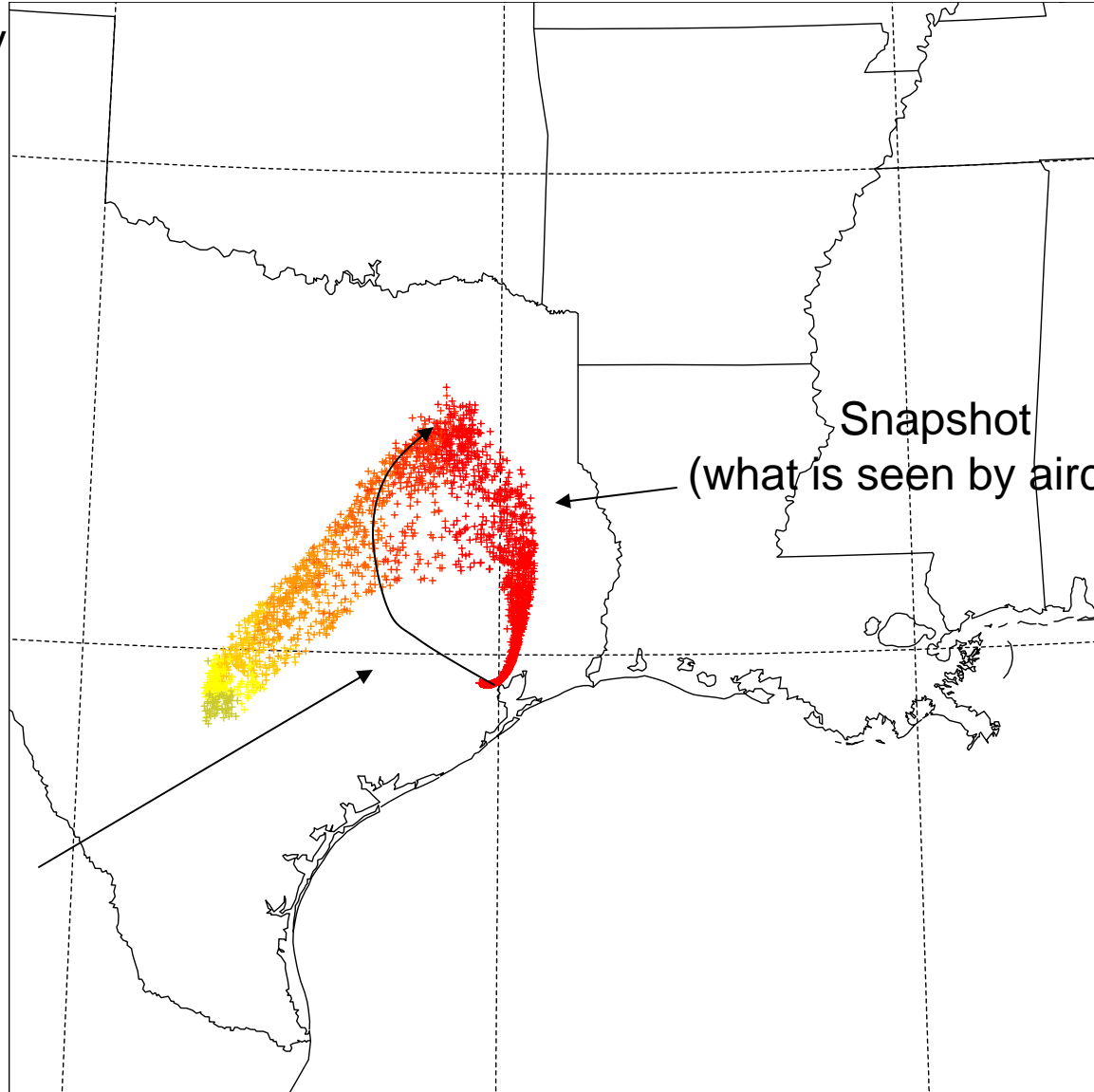
Motivation

Reduce model uncertainty using multiple observations of O_3 , NO_x , VOCs, etc. within a moving parcel of air.



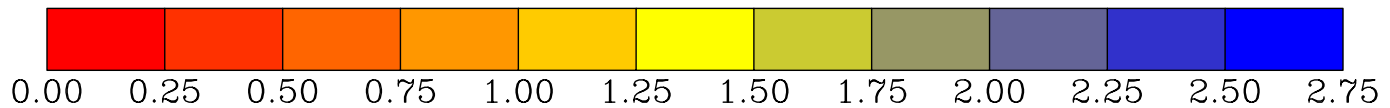
**MM5-12KM: TAMU
HOUSTON SHIP CHANNEL: 200 m AGL
1100 UTC 26 AUG 2000**

(LPDM produced by
Dick McNider and
Kevin Doty, U/AI.)



Path of particles
(approximate)

Snapshot
(what is seen by aircraft)



Mission/Objective

Develop and demonstrate improved strategies for tracking the transport and evolution of pollutants emitted in the Houston-Galveston area using newly developed controlled meteorological balloons in conjunction with an instrumented aircraft.

*What matters is not only **what** we measure, but **where** and **when** we measure it.*

Scope

- Upgrade balloon systems used during the ICARTT campaign
- Upgrade aircraft flight planning program and strategy to assimilate real-time wind profiles from the balloons.
- Carry out a pilot field study in the summer of 2005 to study the chemistry and transport of Houston emissions during the day and night.

Approach/Conceptual Plan

- Pre-Campaign Model Analysis:
 - test and optimize the proposed plume tracking strategy using archived wind fields produced by a mesoscale model for Houston area.
- Daytime chemistry and transport of early morning Houston/Ship Channel emissions under well defined southerly flow (useful for 3-D model evaluation).
- Noor's hypothesis: Nighttime long-range transport of ozone precursors from Ship Channel released into stable residual layer followed by fumigation and ozone production the following morning.

Expected Products from 2005 Field Campaign

- Proof of concept: a set of balloon launches with aircraft intercept to provide quasi-lagrangian data sets
- Proof of concept: tracking of plume segment from the greater Houston area, overnight, to....??
- Data sets suited for evaluating air quality models used in SIPS
 - transport and reactivity of $\text{NO}_x/\text{VOC}/\text{O}_3$ systems
 - Plume placement following nighttime transport

Recent Progress

- Identified a base of operation for balloon and aircraft deployment (Montgomery County Airport)
- Obtained contact information for FAA notification of balloon releases
- Hangar and balloon operation site identified

Recent Progress

- Alternate launch site: lakeside at Laughlan Park (pending approval by local homeowner organization)
- Balloon technology progress: to be reported by Paul Voss
- Flight planning software and daily logistical plan: to be reported by Rahul Zaverri

Montgomery County Airport







Resource Needs

- Meteorology data sets: MM5 4-km data
 - To evaluate various launch strategies
- LPDM simulations (puff release under various conditions)
- Contracts with airfield (hangar space)
- Finalize
 - aircraft hours (≤ 45 hrs), flight duration, duty day
 - aircraft instrumentation