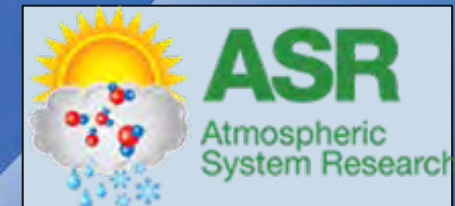


TRacking Aerosol Convection Interactions Experiment (TRACER) – An upcoming field campaign

M. P. Jensen and TRACER Science Team



ARM/ASR PI Meeting, 26 June 2020
Convective Processes Working Group Session
Zoom Virtual Webinar

TRacking Aerosol Convection Interactions Experiment (TRACER)

DOE Atmospheric Radiation Measurement (ARM) Program

<https://www.arm.gov/research/campaigns/amf2021tracer>

- Houston, TX region
- April 15th, 2021 – April 15th, 2022
- June 1st – September 30th, 2021
Intensive Observation Period (IOP)

ARM assets (so far)

- 1st ARM Mobile Facility
- 2nd generation C-band Scanning ARM Precip. Radar
- Additional site with aerosol, cloud and atmospheric state measurements

TRACER – Science Questions (A sampling)

I. Convective Cloud Lifecycle Kinematic and Microphysical Properties

- How are updraft size, depth and precipitation properties influenced by strength of the updraft?
- Where are cloud/rain/snow/graupel/hail particles generated and how do these particles impact up/downdraft properties?

TRACER – Science Questions (A sampling)

1. Convective Cloud Lifecycle Kinematic and Microphysical Properties

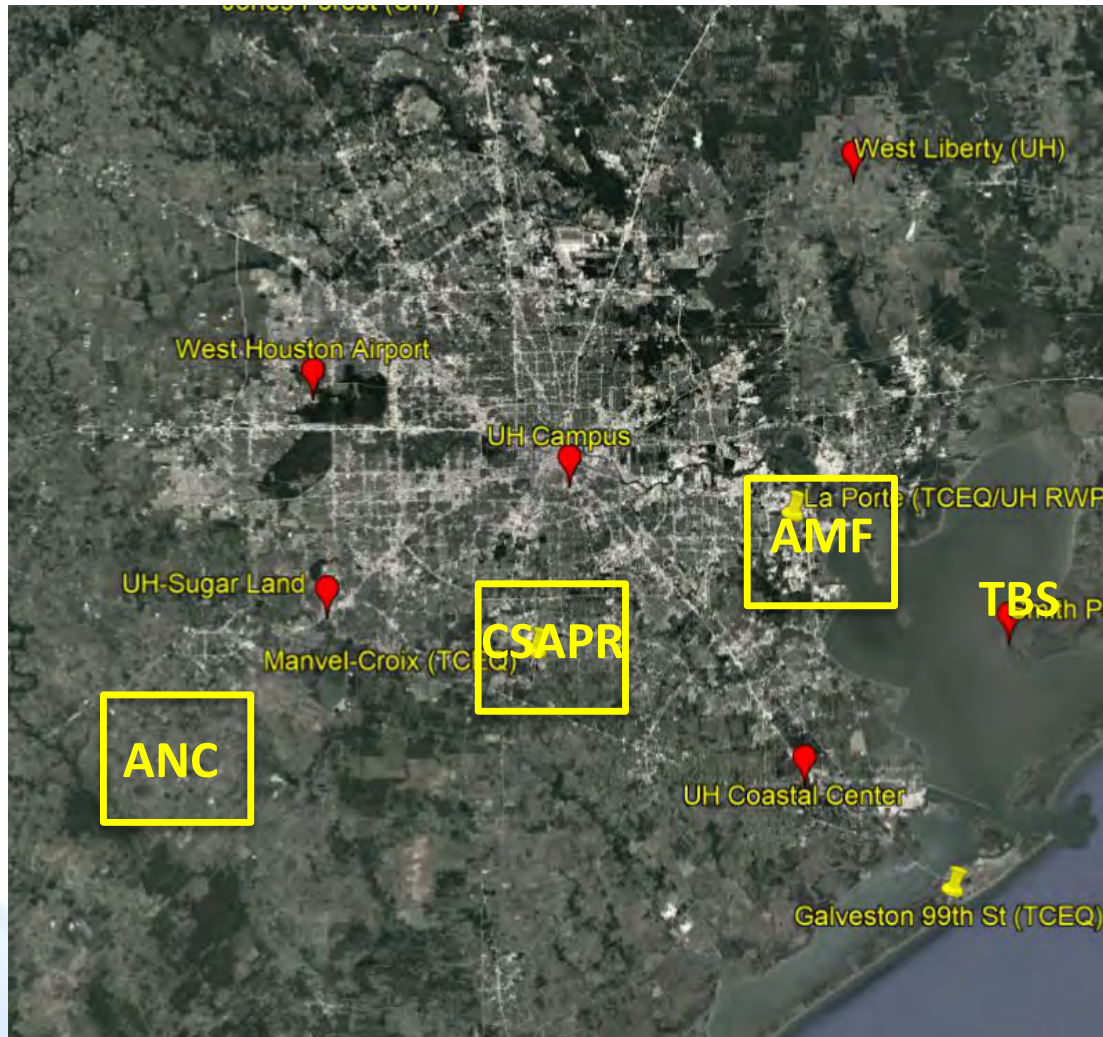
2. Meteorological Controls on Convective Lifecycle

- How do pre-convective (and during convection) conditions control initiation, location and intensity of convective cells?
- How do precipitation and local circulations modulate aerosol variability and aerosol-convection interactions?

TRACER – Science Questions (A sampling)

- 1. Convective Cloud Lifecycle Kinematic and Microphysical Properties**
- 2. Meteorological Controls on Convective Lifecycle**
- 3. Aerosol – Deep Convection Interactions**
 - Which deep convective processes are most influenced by aerosols (e.g. cold or warm phase)?
 - How do aerosols affect the height of and type (liquid or ice) of precipitation initiation?

TRACER – ARM Facility Siting Considerations



- AMFI in polluted region
- Ancillary site to SW of Houston in “clean” air
- C-SAPR2
 - Sample over both sites
 - Consider beam blockage and frequency allocation
 - 20-40 km distance from both AMFI and ancillary site

Intensive Observational Period (Jun-Sep)

ARM Ancillary site

Remote forecasting of convective (40) days

Cell-tracking scanning strategies with C-SAPR2

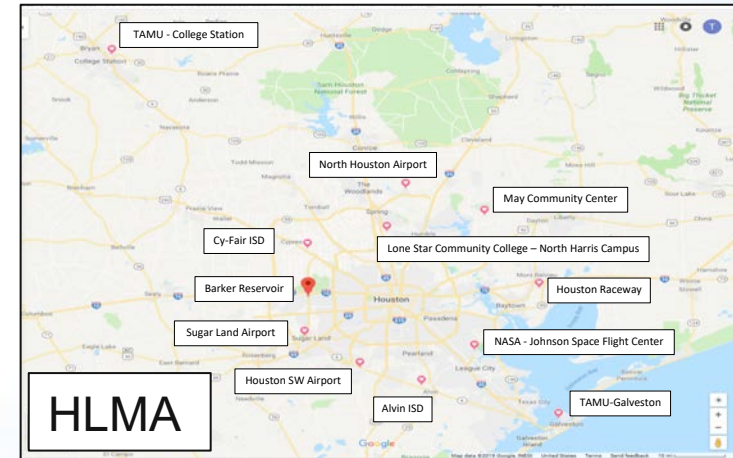
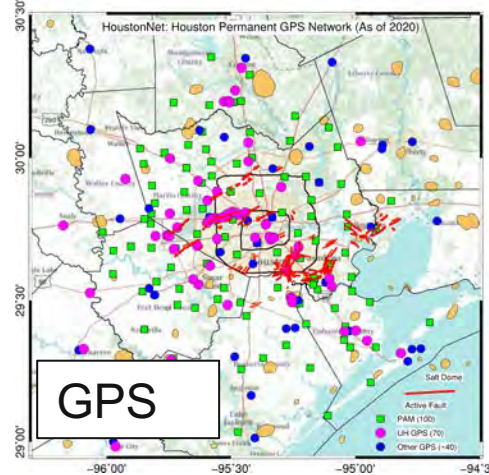
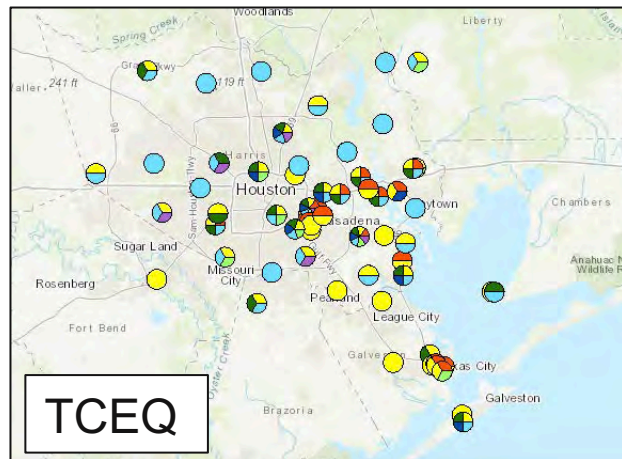
Sounding schedule – More frequent soundings, every 1.5 hours between 1200 and 1800 LT

ARM Tethered Balloon System

Evolving interagency participation (NSF, NASA, NOAA, TCEQ)

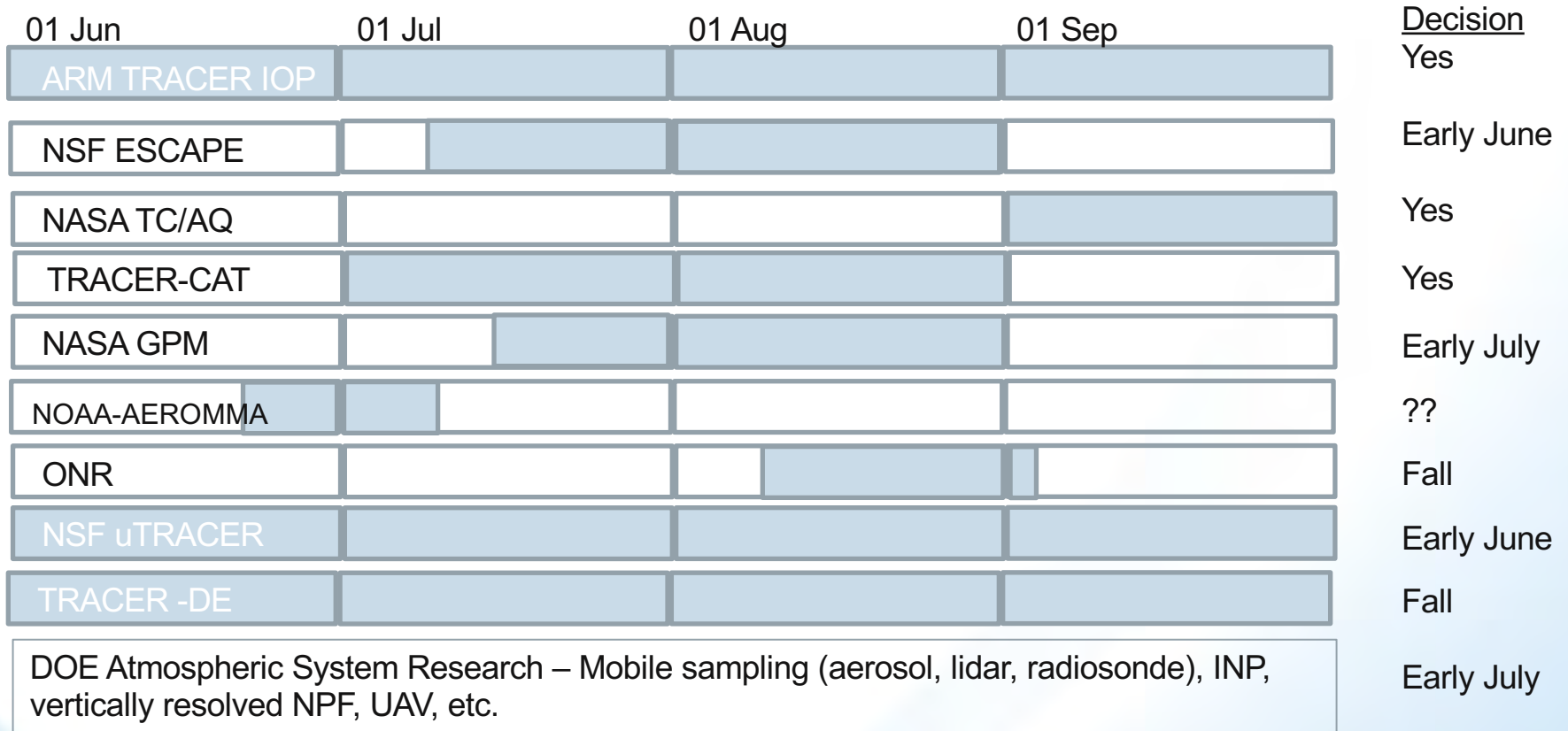
Existing Observational Networks in Houston Area

- **Texas Commission on Environmental Quality (TCEQ)**
 - Surface Meteorology Network, Trace Gas, PM2.5 measurements
 - 75 sites within Houston Metro-area
- **HoustonNet GPS Network** (Over 130 site on Houston area)
 - Precipitable Water Vapor



- **Houston Lightning Mapping Array (HLMA)**
 - Operated by Texas A & M
 - 4D quantification of lightning discharge
 - Charge distribution, flash location, flash rate

Inter-/Intra-agency schedule and timelines



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Next Monthly TRACER telecon
02 July 2:00 PM EDT

To be added to TRACER e-mail list:
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