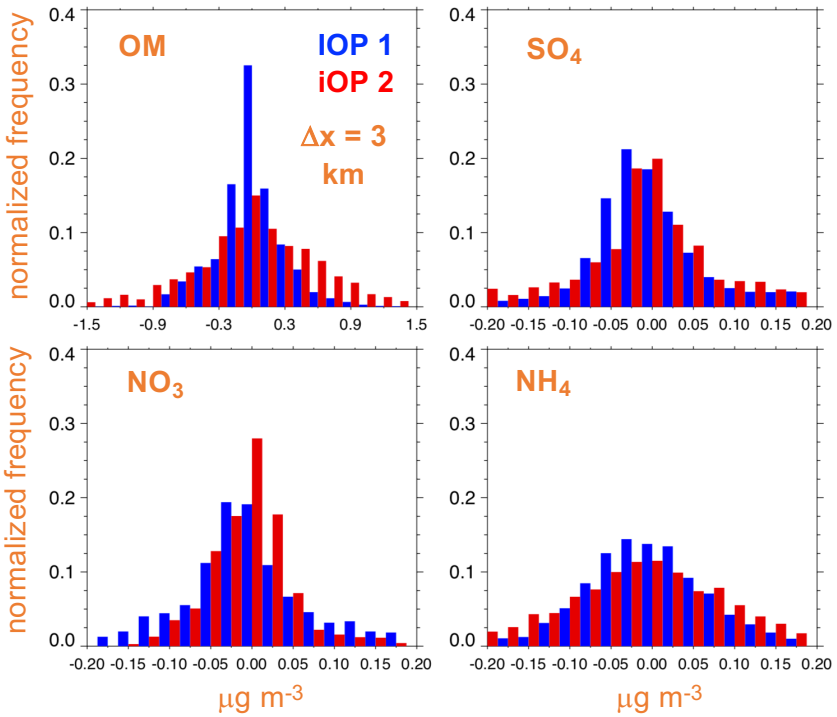
single-point versus distributed sampling

Chongai Kuang
Jerome Fast

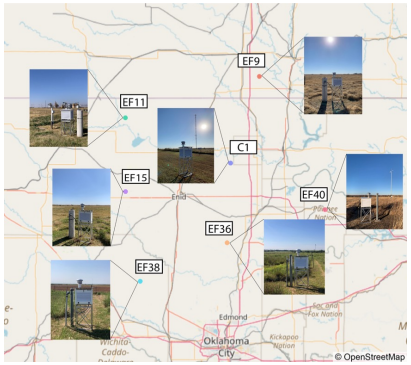
Single-Point Versus Distributed Sampling

Jerome Fast

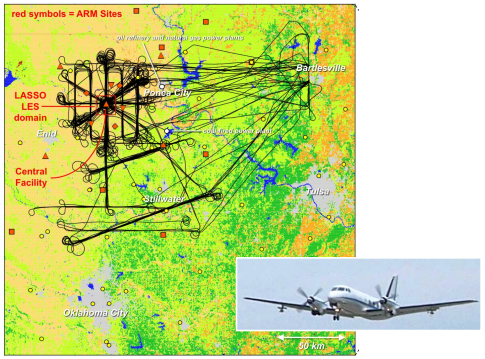
Two recent studies (Asher et al. 2022; Fast et al. 2022) described the spatial variability of aerosol properties around the SGP Central Facility.



POPS Network: October 2019– March 2020



HI-SCALE Aircraft: May and September 2016



- Large variability in aerosol number, mass, composition, and size within an area of a typical Earth system model grid cell
- Measurements suggest seasonal-dependance on spatial variability, although a longer record is needed

Single-Point Versus Distributed Sampling

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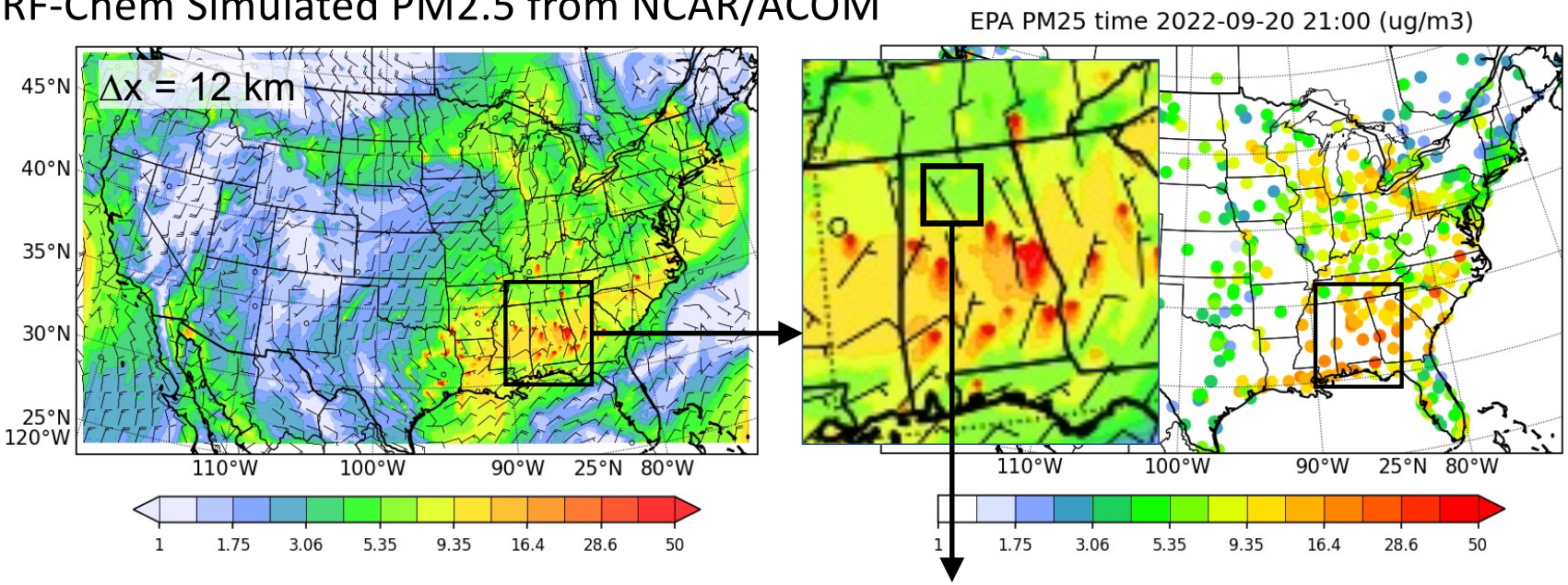
Modeling Shows Spatial Variations in Aerosols and Their Precursors at AMF3 Site

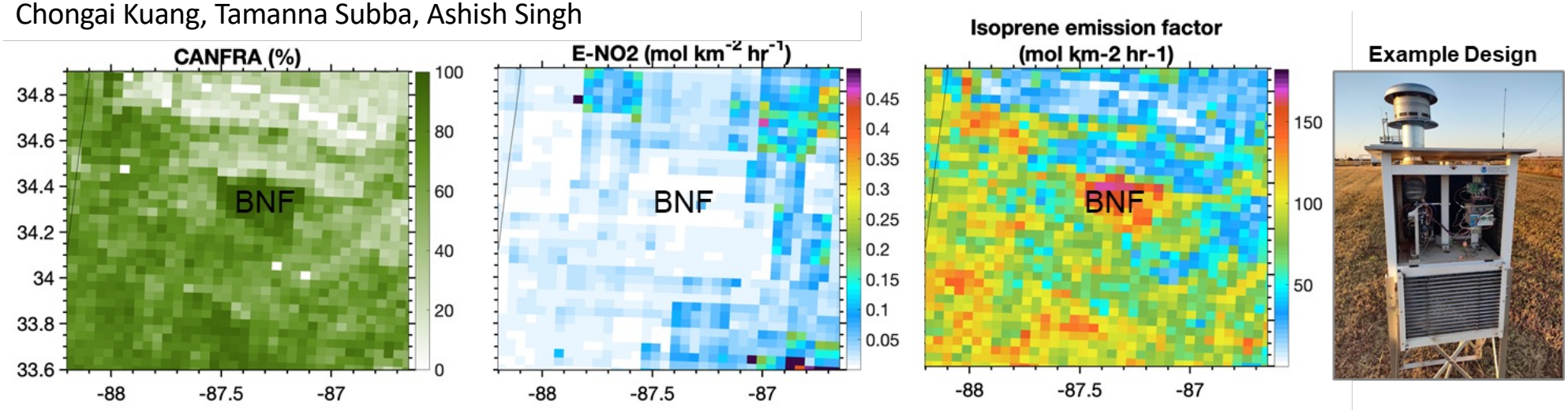
WRF-Chem Simulated PM2.5 from NCAR/ACOM



- Could examine simulations to estimate spatial variability of aerosol mass, number, size, and composition, around the AMF3 site to estimate variability among at satellite sites

AMF3 Southeast US: Developing an Aerosol Sensor Node Network

Chongai Kuang, Tamanna Subba, Ashish Singh



- "Typical" global climate grid cell over Northern Alabama domain exhibits high aerosol variability due to heterogeneous surface controls on: aerosol sources (e.g., BVOCs, anthropogenic emissions), aerosol sinks (e.g., wet / dry deposition), and aerosol transformations (e.g., water up-take).

- Initially develop 2+ aerosol sensor nodes that meet measurement requirements (e.g., aerosol number, size, composition) and operational requirements (e.g., lower cost / complexity), targeting aerosol variability in AMF3 domain.

- Questions / Concerns / Challenges:
  - What measurements should be prioritized? (e.g., aerosol size distribution, trace gases)
  - Where (and how) should the nodes be deployed to capture temporal and spatial heterogeneity? (e.g., balance operations and capturing "heterogeneity" - what kind?)