Holistic Interactions of Shallow Clouds, Aerosols, and Land-Ecosystem (HI-SCALE) Campaign

**Phase 1:** April 24 – May 20

**Phase 2:** Aug 28 – Sept 23

**Meteorology**
- Fast-response temperature and humidity
- Radiation
- Cloud properties

**Aerosol Properties**
- CCN (cloud condensation nuclei)
- Aerosol number and size distribution (2 CPC, UHSAS, PCASP, CAS)

**Instrumentation**
- HR-ToF-AMS (aerosol composition)
- miniSPLAT (single particle characterization)
- NO, NO₂, SO₂, CO, O₃
- CIMS (volatile organic compounds)

**Phase 2 Only**
- TDCIMS (nanoparticle composition)
- Cluster CIMS (inorganic and organic acids and HOMS)
- Amine CIMS, Amp-MS
Aerosol Variations during Phase 1

Organics are the dominate component, but there are periods where inorganics are 50% of total mass

CCN is somewhat correlated with aerosol mass as expected, but need to account for changes in size distribution and hygroscopicity.
New Particle Formation

**September 11**
- 1511-1814 UTC
- 1638-2009 UTC

**September 17**
- 1638-2009 UTC

**Central Facility**

- southerly winds
- variable winds

Diameter (nm)

particle # (cm$^{-3}$) from CPC 3025

Particle from CPC 3025
Aerosol Science That Can Be Addressed

► **New Particle Formation and Growth:** Does NPF occur at the surface or aloft? What are the mechanisms driving NPF? What processes are controlling the growth of nanoparticles to sizes relevant to CCN and optical properties?

► **Secondary Organic Aerosol:** What are the chemical mechanisms responsible for biogenic SOA? How does anthropogenic sources alter biogenic SOA? How do clouds affect organic aerosols via aqueous chemistry?

► **Model Evaluation and Improvement:** How well do state-of-the-science models represent NPF, SOA, and particle growth in the vicinity of the SGP site? What are the effects of photochemistry, vertical mixing, and long-range transport?