

critical processes/properties

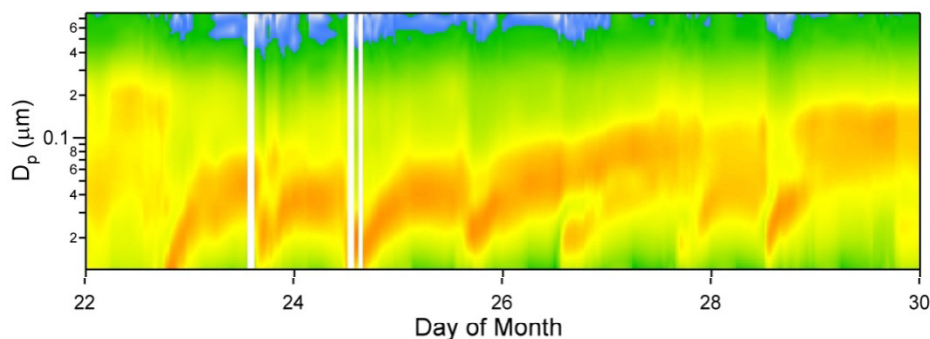
- precursors (for nucleation and growth): H₂SO₄, amines, organic acids, ammonia
- nucleation (~ 1 nm): mechanisms, rates
- early particle growth (1 → 100 nm)
- primary particle production (?? nm), sources: i.e., biological, mineral, anthropogenic, sea spray
- connection to CCN: hygroscopicity, surface tension, morphology, organics
- connection to IN formation: morphology, composition, biological sources, mineral dust
- temporal, seasonal, spatial distribution (e.g., vertical) of these processes (production, growth): e.g., marine NPF

research projects/approaches: field and lab studies

Process lab studies are crucial for understanding particle formation mechanisms and impacts

Southern Great Plains site for a new particle formation study

- wind profilers for turbulence charact.: atm. structure, transport
- coordination with MET group to study spatial/temporal variations
- Doppler LIDAR at SGP
- high spectral resolution for aerosol lidar (HSRL)



New particle formation at SGP is quite common in the spring and fall

research projects/approaches: ideas/perspectives

- direct measurements of J_1 and growth rates for developing modules for parameterization in regional/global models
- observations/modeling inconsistencies for sea spray
- link between turbulence/entrainment and new particle formation

research projects/approaches: instruments

- **dedicated size distribution instrument in ARM mobile facility II/aerosol observing system**
- particle counting/sizing near critical cluster (nano-CPC),
- Sulfuric Acid CIMS
- better SO₂ measurement
- amines/ammonia
- long-term IN meas
- quantitative composition of aerosol (10 – 100 nm)
- better detection of biological particles

research projects/approaches: data products

- probability of survival to a CCN-active size (aerosol surface area, growth rate, at SGP, input/constraint on models)
- nucleation rate/growth rate measurements