Chamber/Model/Field Crosscutting Activities

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Salient Features of an Aerosol Model Suitable for Use in Climate Models

- The model must be able to reliably predict the following climate-relevant end points:
  - Mass concentration
  - Number-diameter distribution
  - Composition (O:C ratio, functional groups, etc.) and mixing state, which together control
    - Hygroscopicity/CCN activity
    - Optical properties
    - Ice nucleation activity
- The model must be reasonably compact and computationally efficient

Purpose of Crosscutting SOA Activities

Present Challenges

- SOA processes and properties to be studied within each of the three focus areas (**Viscosity/Phase**, **Growth Mechanisms**, and **Inorganics as a Trigger for SOA**) can interact with each other.
- Single PI laboratory/chamber studies typically do not address all the climate-relevant endpoints associated with SOA formation.
- Existing SOA models differ in approaches, assumptions, levels of detail, and none of them predict all the climate-relevant end points.

The goal of crosscutting activities is to compile the process-level knowledge/data to be obtained within each SOA focus area with a **holistic** model development and evaluation strategy.

Crosscutting Activities

- Laboratory Campaigns
  - Design and carry out multi-PI collaborative chamber studies to simultaneously measure many different properties and climate-relevant end points associated with SOA formation under well-defined conditions.
- Holistic Model Development
  - Use detailed laboratory data sets to develop, constrain, and evaluate a holistic aerosol model that is capable of predicting SOA via all the different physical and chemical pathways along with all the climate-relevant end points.
- Field Campaigns
  - Design and carry out field campaigns that allow us to properly constrain and evaluate all the key aspects of the model using comprehensive field observations.