ASR Project Title

Objective: Investigate particle phase state as a function of relative humidity using particle rebound during impaction.

Climate Relevant SOA Property(s) Investigated: SOA phase state

Lead personnel: Adam Bateman, Scot Martin

Collaborators:

Summary of progress:

The technique has been tested and characterized using PSL spheres and ammonium sulfate up to <95% RH.

Particle rebound has been studied for a variety of SOA's generated in the HEC.

Reduction in particle rebound is observed at elevated RH for all materials.

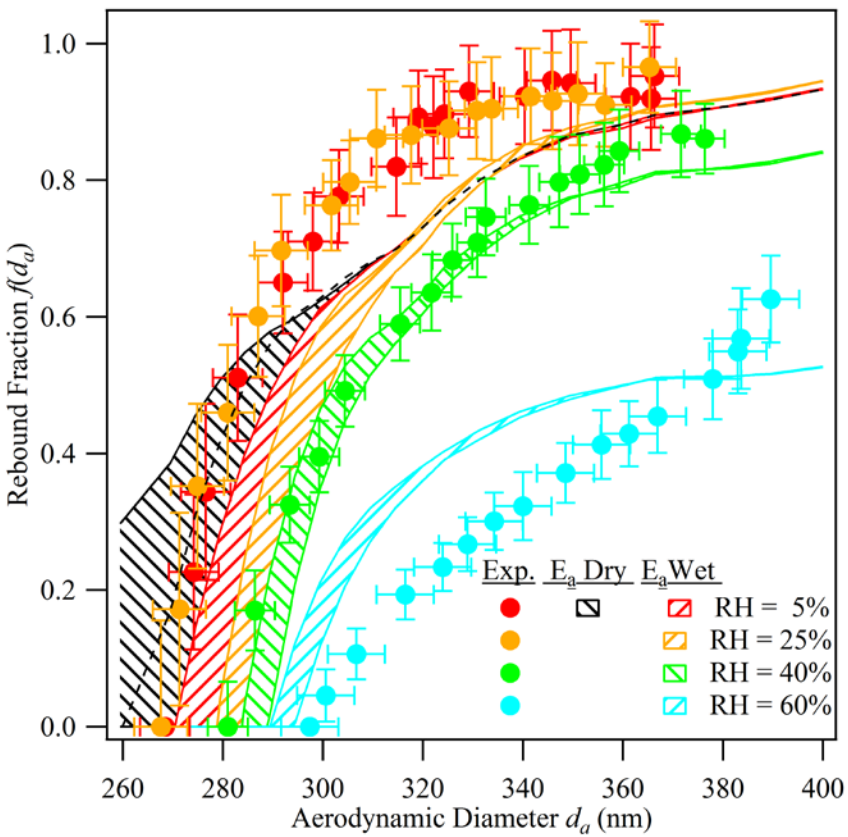
Materials have different critical RH values for initial reduction and reduction of rebound to zero

Challenges or needed resources/collaborators

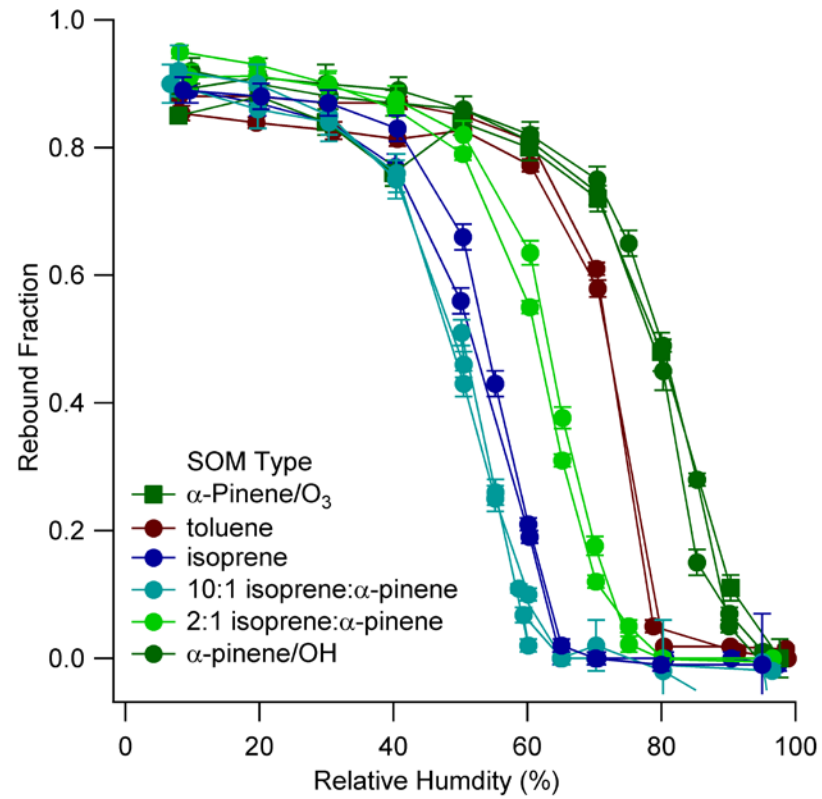
Additional studies needed with materials of known viscosity to establish a calibration of rebound fraction on a physical scale. Physical constants i.e. Young's modulus, bulk modulus, Poisson's ratio, yield Strength are needed to model plastic deformation during rebound.

Results

Particle Rebound vs. Particle Size for Isoprene SOA



Particle Rebound vs. Relative Humidity for many SOAs



Rebound fraction can be modeled using known physics during impaction.
The chemical composition of SOA particles is important for the particle phase state.