

# DELIVERABLE D11:

## INCLUDING MORPHOLOGY INFORMATION IN PARTMC FOR IMPROVED RADIATIVE FORCING ESTIMATES

### **Objective:**

Develop optical models constrained by microscopy data from ARM/ASR field campaigns to include realistic particle morphologies in PartMC

**Lead personnel:** B Scarnato, N Riemer, C Mazzoleni

**Collaborators:** S China, N Sharma, M Dubey, A Aiken, S Liu, K Gorkowski...

**Funding status:** proposed

### Summary of progress:

Analyzed the morphology of several aerosol samples from different field campaigns, the analysis will be used to guide the development of appropriate particle geometries and mixing for numerical calculations

# MICROSCALE

FORWARD

INVERSE

# MACROSCALE

## STEP 1

Q: WHAT IS MORPHOLOGY AND MIXING OF BC CONTAINING AEROSOLS?

Electron microscopy of a statistical ensemble of individual soot particles from ARM/ASR field campaigns

## STEP 2

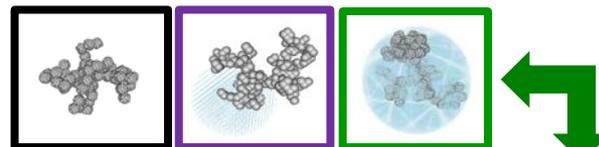
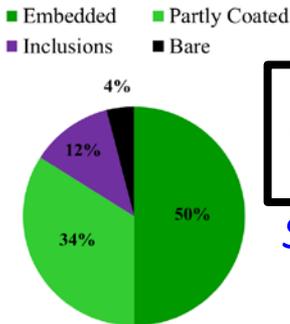
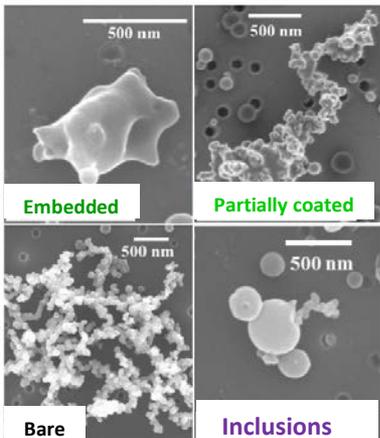
Q: WHAT IS THE EFFECT OF MORPHOLOGY AND MIXING ON OPTICAL PROPERTIES?

Core-grey shell simulations tuned to match discrete dipole approximation physically-based simulations

## STEP 3

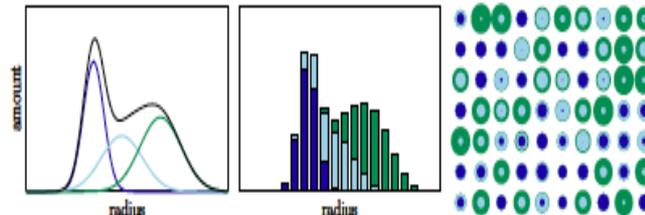
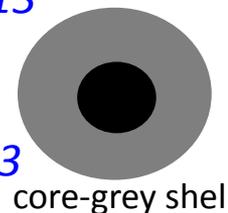
Q: WHAT IS THE EFFECT OF MORPHOLOGY AND MIXING ON RADIATIVE FORCING?

Implementation of core-grey shell method in PartMC-WRF



Scarnato et al., 2013

Kahnert et al., 2013



Riemer et al., 2009

China et al., 2013