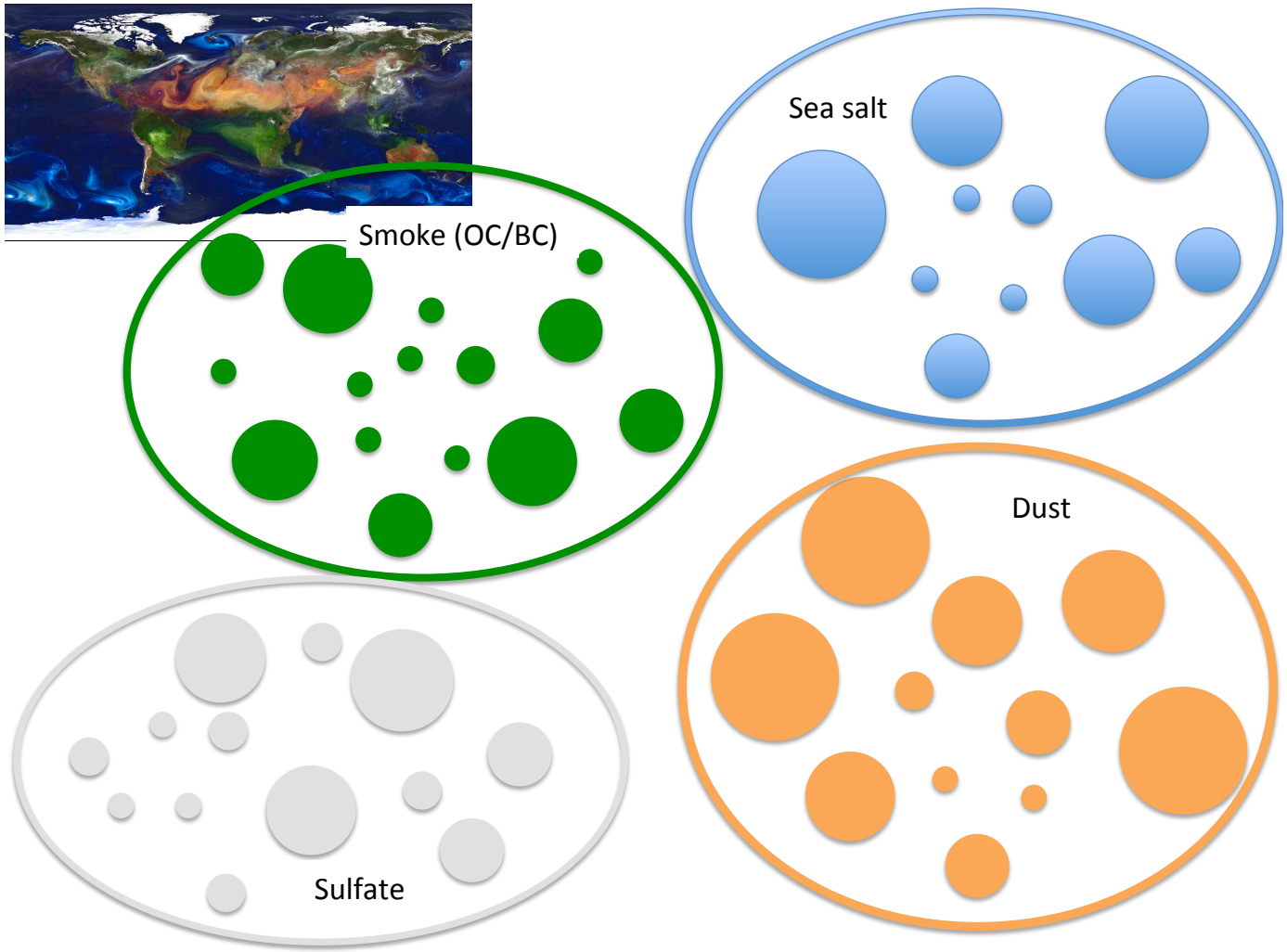
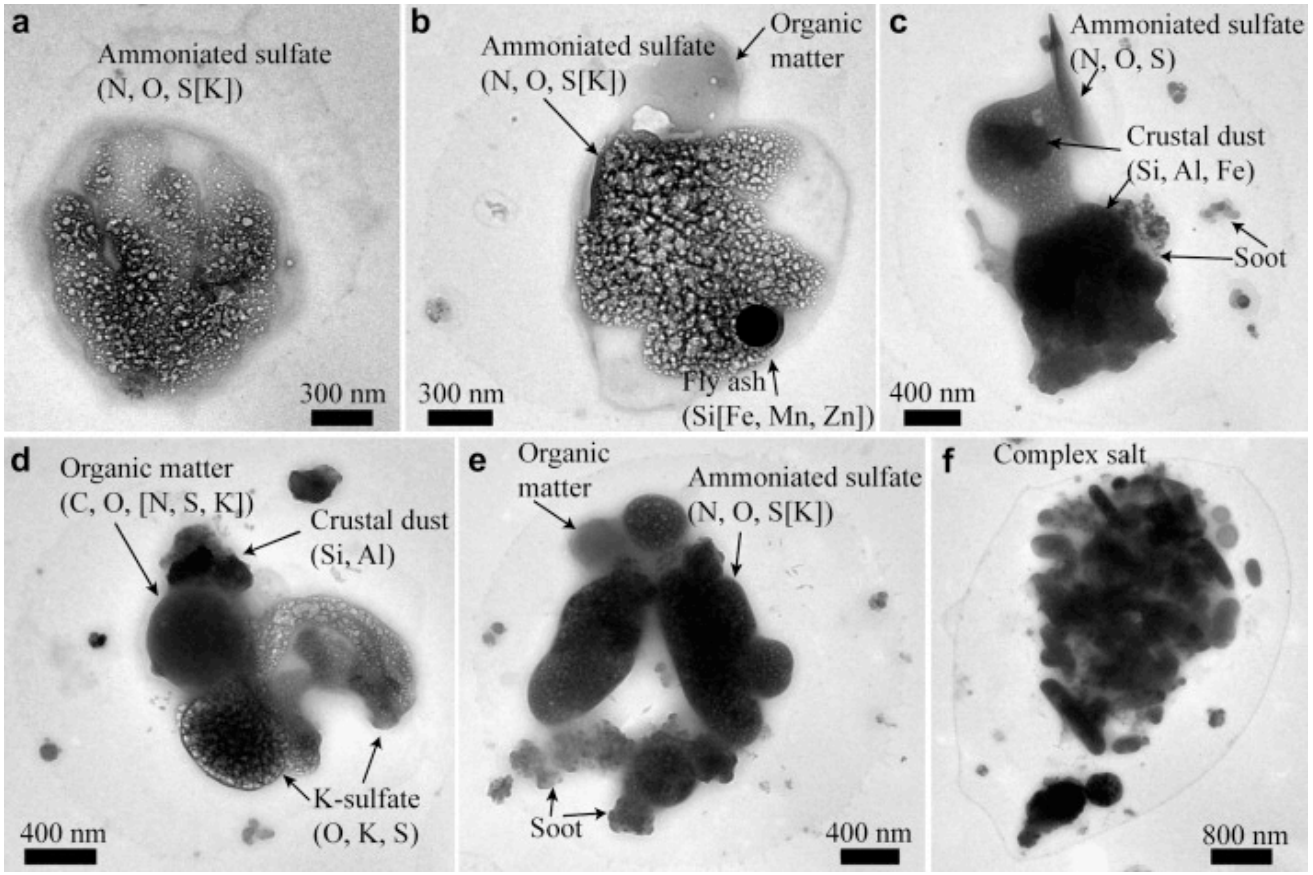
Agenda for today

- Working group aims (Nicole Riemer)
- Project updates (5 min each)
  - Ryan Moffet
  - Cari Dutcher
  - Mary Gilles
  - Gourihar Kulkarni
  - Claudio Mazzoleni
  - Kerri Pratt
  - Joseph Ching
  - Laura Fierce
  - Hailong Wang
  - Rahul Zaveri
  - Matthew West
  - Art Sedlacek
  - Allison Aiken
  - Alla Zelenyuk
- Summary of progress (Nicole Riemer)
- Discussion (everyone)
  - Jian Wang's request: feedback on aerosol measurement needs/priorities

Aerosol Populations in Current Models



Real Particles in the Atmosphere



Li et al., Atmospheric Environment, 45, 2488-2495, 2011

How much detail is needed to capture aerosol impacts in large scale models?

How important are these details?

Key question 1:

What is the impact of mixing state on CCN, IN, optical properties?

Key question 2:

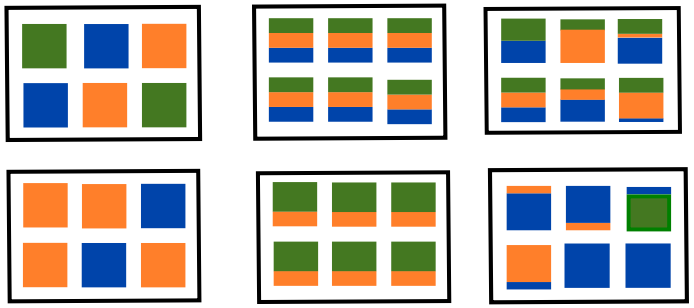
How should we include mixing state information in models that quantify aerosol climate impacts?

- What aerosol mixing states exist in different environments?
- How can we connect measurements (lab and field) to each other and to modeled mixing state information?
- What mixing state information should be measured in the field and in the lab?

Two Definitions of "Mixing State"

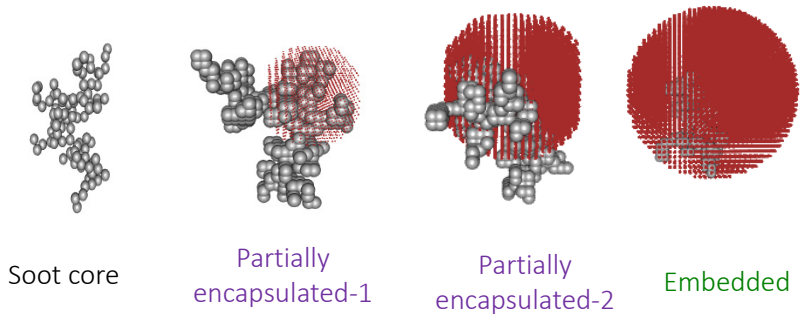
Population mixing state:

Distribution of chemical compounds across the particle population.

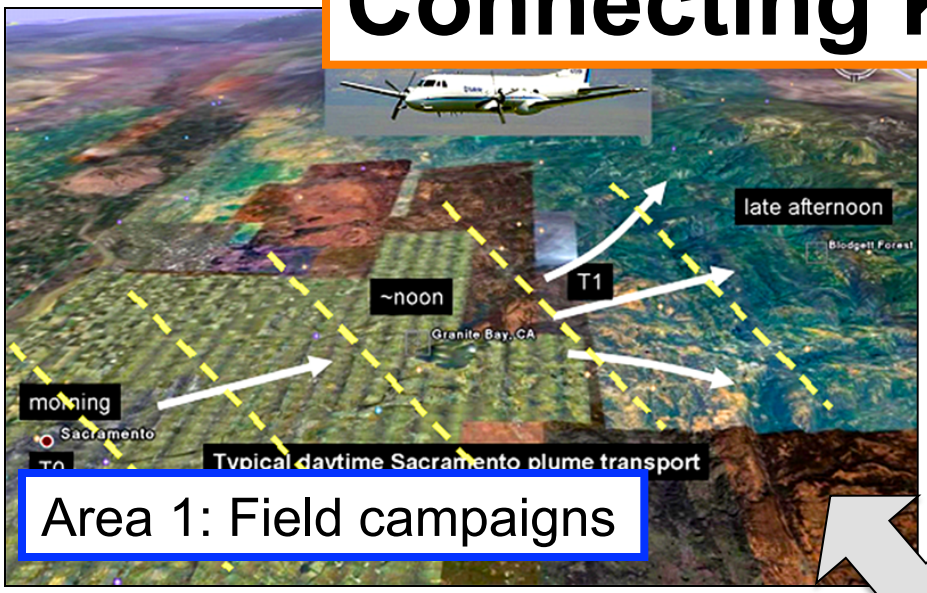


Morphological mixing state:

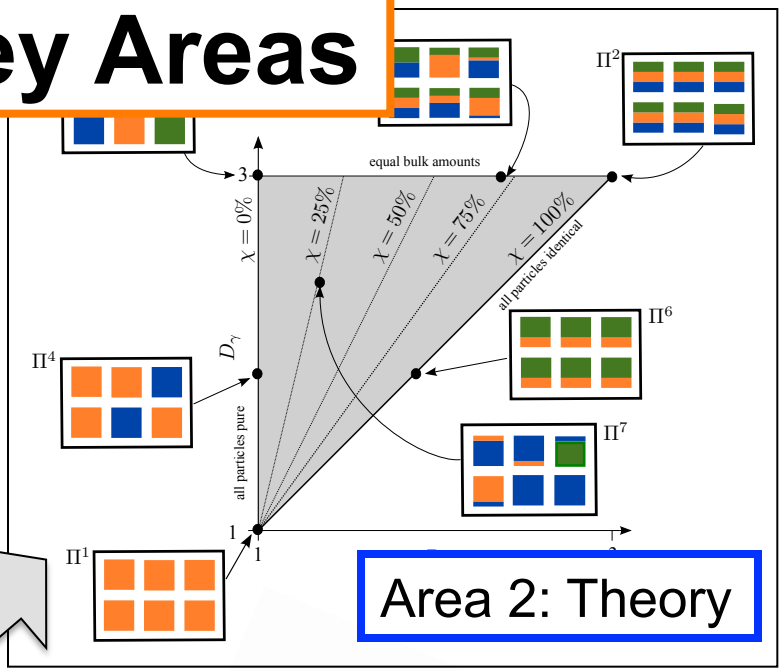
Distribution of chemical compounds within and on the surface of each particle.



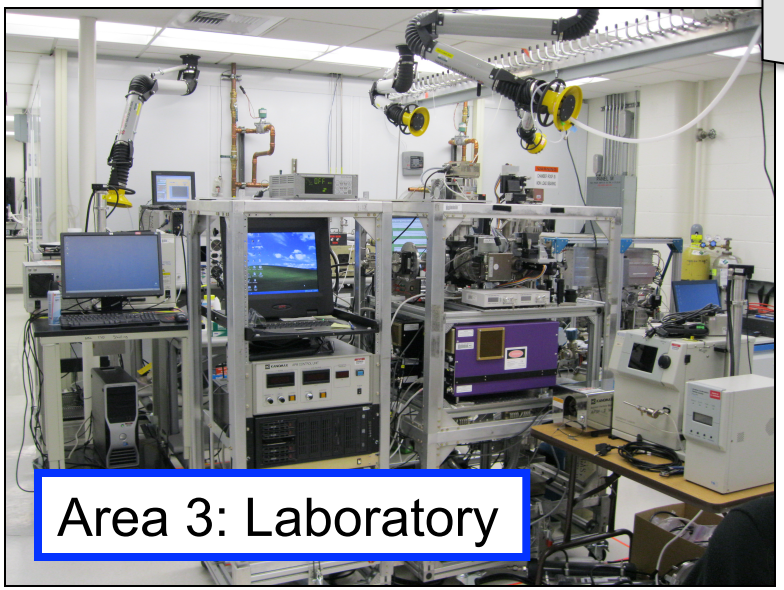
Connecting Key Areas



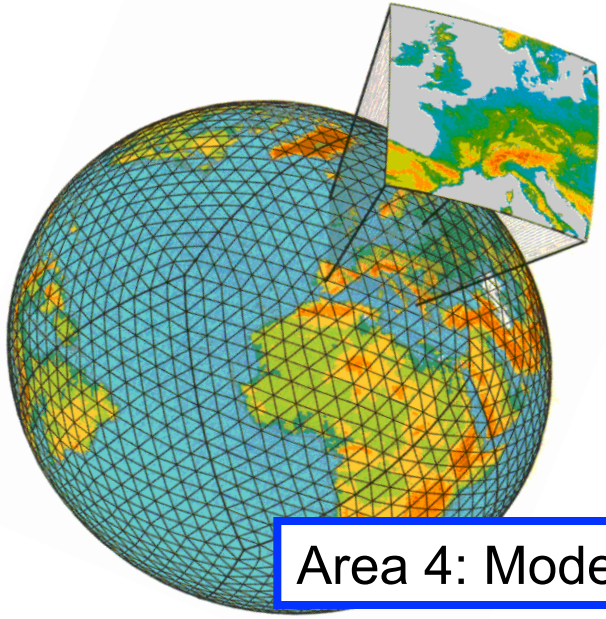
Area 1: Field campaigns



Area 2: Theory



Area 3: Laboratory



Area 4: Model

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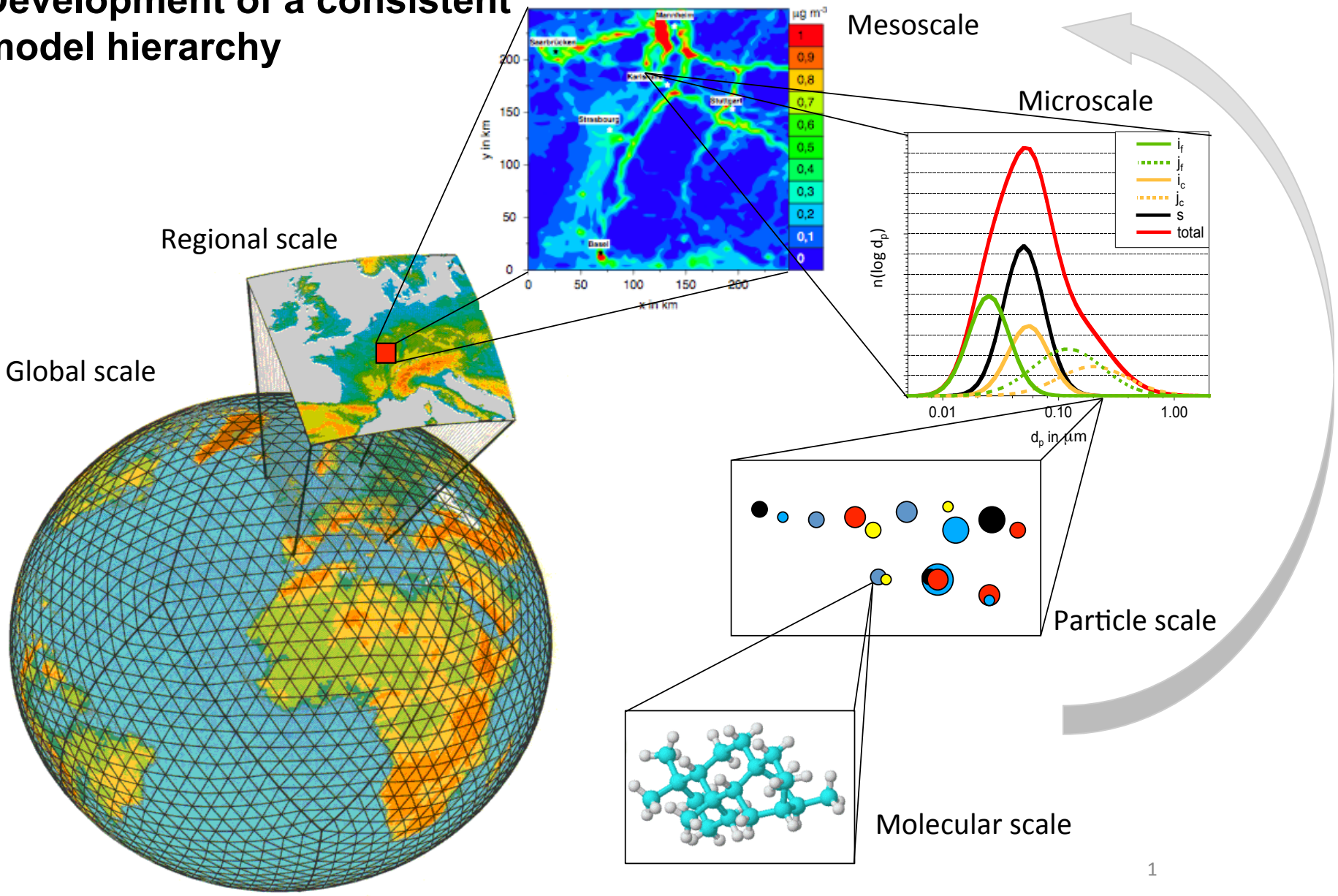
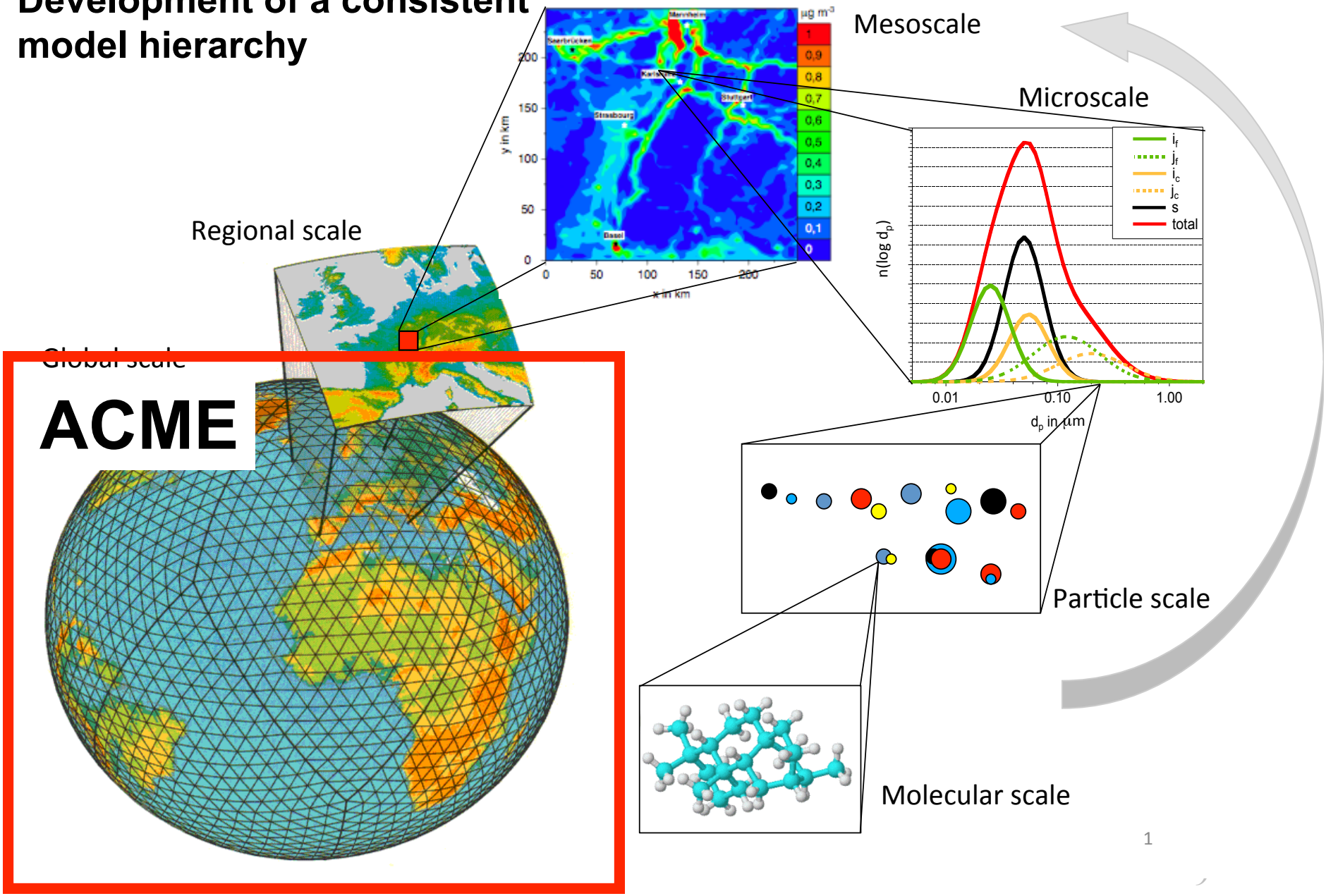
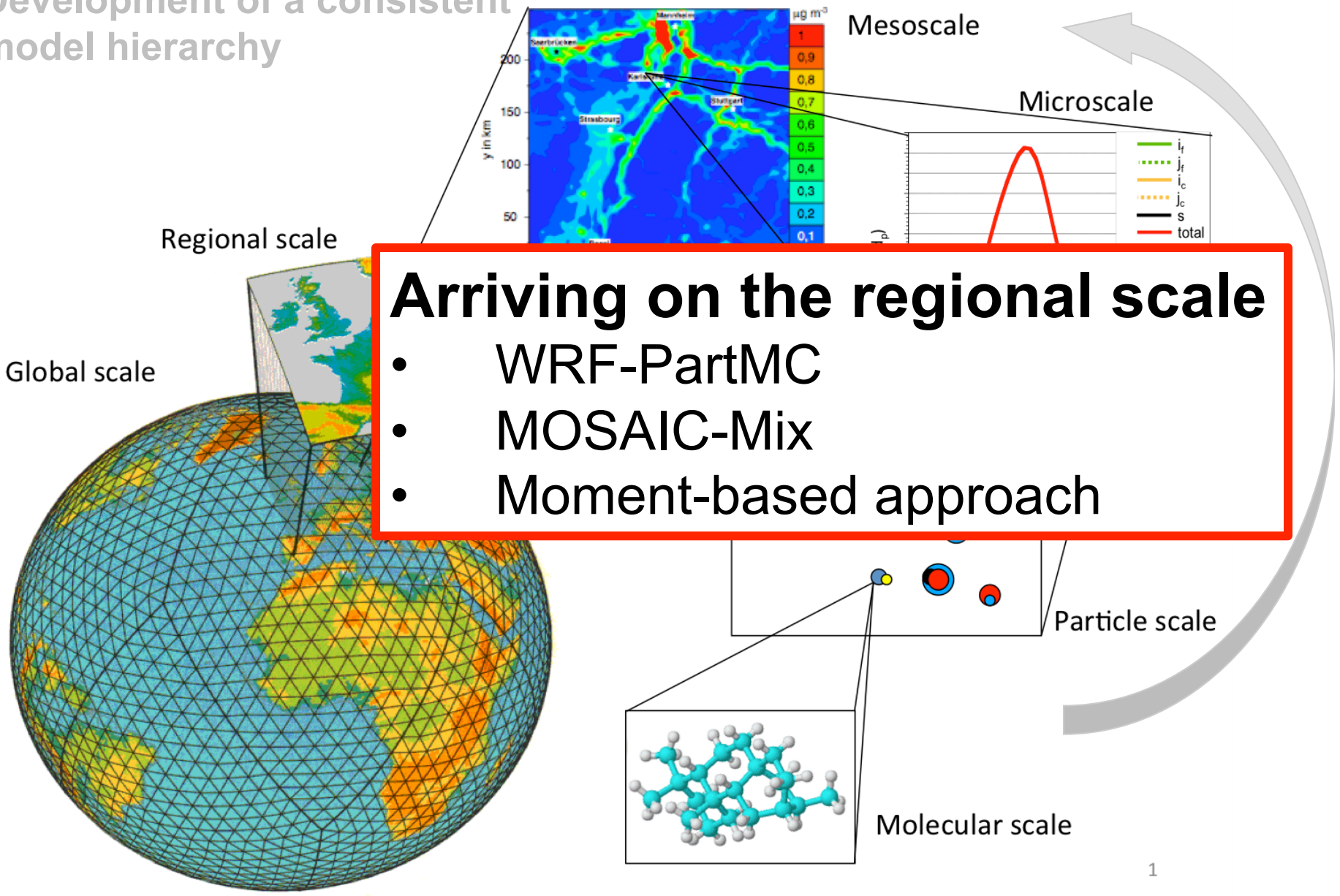
Development of a consistent model hierarchy



Development of a consistent model hierarchy



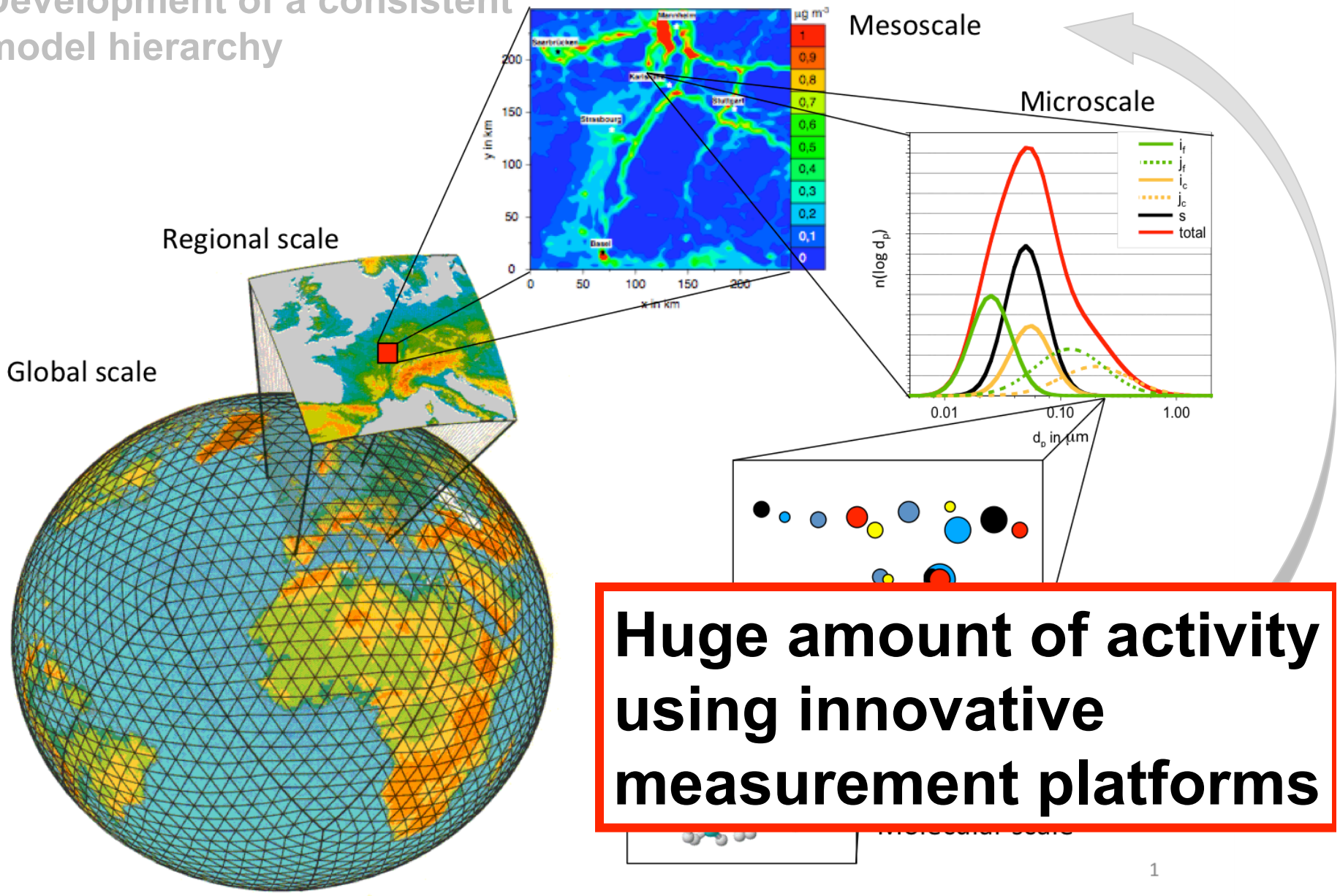
Development of a consistent model hierarchy



Arriving on the regional scale

- WRF-PartMC
- MOSAIC-Mix
- Moment-based approach

Development of a consistent model hierarchy



Huge amount of activity using innovative measurement platforms

Challenge questions

- Can we compare models from different levels of the model hierarchy to verify the mixing state representations, mechanisms and impacts?
  a) what might this look like?
  b) who is going to do it?
  c) what funding do we need to make this happen?

Common theme: requires people from different groups and backgrounds to come together.

Challenge questions

- How do we compare mixing state information between measurement platforms and models?
  a) population mixing state information
  b) morphology mixing state information

- How do we use measurements (lab and field) and theory to create and validate mechanisms for:
  a) mixing state *evolution*?
  b) mixing state *impacts* on IN/CCN/OP?

Common theme: requires people from different groups and backgrounds to come together.

Connections between Different Tools

	Theory/ Metrics[1]	PRM[2]	RM/ GCM[3]	SP2[4]	Micros-copy[5]	SP mass spectro-metry[6]	Remote sensing[7]	Bulk measure-ments[8]
Theory/ Metrics[1]		high	low	medium	medium	low	low	low
PRM[2]	high		low	medium	low	low	low	high
RM/ GCM[3]	low	low		low	low	low	high	medium
SP2[4]	medium	medium	low		low	low	low	high
Micros-copy[5]	medium	low	low	low		low	low	medium
SP mass spetro-metry[6]	low	low	low	low	low		low	medium
Remote sensing[7]	low	low	high	low	low	low		high
Bulk measure-ments[8]	low	high	medium	high	medium	medium	high	

Table 2: Assessment of current abilities to connect data and outputs amongst different tools. The lack of comparable mixing state outputs between many tools is a key bottleneck in our ability to understand mixing state impacts.

Bottleneck:

Lack of comparable mixing state outputs between many tools