

Session 16. Satellite + Sub-orbital Data

Chair: Ralph Kahn Rapporteur: Matt Christensen

14:00 – 14:05 **Ralph Kahn** *Introduction, Seed Questions*

14:05 – 14:25 **Claudia DiBaggio / Lucia Mona**

Lab experiments and ACTRIS data for satellite retrievals

14:25 – 15:30 **Joint Discussion:**

New ways to integrate sub-orbital, lab, & space-based data w/models



Satellites

frequent, global snapshots;
aerosol amount & aerosol type maps,
plume & layer heights

Aerosol-type Predictions;
Meteorology;
Data integration

Model Validation

- Parameterizations
- Climate Sensitivity
- Underlying mechanisms

Remote-sensing Analysis

- Retrieval Validation
- Assumption Refinement

Regional Context

CURRENT STATE

- Initial Conditions
- Assimilation

Suborbital

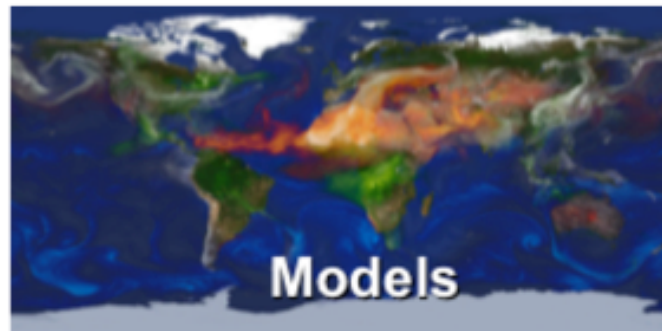


targeted chemical & microphysical detail



point-location time series

space-time interpolation,
Aerosol Direct & Indirect Effects
calculation and prediction



Models

Must *stratify* the global satellite data to treat appropriately situations where **different physical mechanisms** apply

Introduction

- Aerosol quantities **impractical** to obtain from satellites
 - Aerosol ***spatial variations*** on scales shorter than ~500 m (*esp. sources*)
 - Regional-to-global-scale AOD & aerosol type mapping ***at night***
 - ***Diurnal*** variation of ***aerosol type*** (*can't do currently from geo*)
 - ***Diurnal*** variation of ***vertical distribution*** (*can't do currently from geo*)
 - AOD & type over ***very bright surfaces at low-AOD*** (*high latitudes*)
- Aerosol properties **unobtainable** from remote-sensing
 - Particle ***Hygroscopicity***
 - Particle ***Chemical Composition***
 - Mass Extinction Efficiency (***MEE***)
 - Spectral ***Light-Absorption*** (*at the accuracy needed, e.g., for DARF*)

Seed Questions

Making the right sub-orbital measurements and integrating them with satellite data

- What **key quantities** should be or are being measured sub-orbitally to complement aerosol remote-sensing observations, for climate and air quality applications?
- What **flight-planning strategies** might be used to maximize the contributions made by aircraft to our overall aerosol-climate and air quality goals?
- How can **representative aerosol samples** be collected for laboratory analyses?
- Can we obtain optical properties for **non-spherical dust & volcanic ash** particles with aircraft and/or laboratory observations?
- What approaches might we use to **integrate sub-orbital data** with satellite data?