Shortwave-absorbing aerosols and their interactions with the large-scale environment

Conveners: Paquita Zuidema, Allison Aiken, Art Sedlaceck, Yan Feng

Main Findings: Progress towards articulating the full lifecycle of BBA in the remote troposphere, including through campaign synergism. Ongoing model assessment

Aerosol processes:

2:02 *Art Sedlacek*: on the mixing state lifecycle of biomass-burning black carbon, from BBOP to LASIC [10 minutes +2 Q/A]

2:14 *Amie Dobracki:* Rethinking the lifetime of biomass-burning-aerosol in the free troposphere [10 minutes + 2 Q/A]

2:26 *Michal Segal-Rozenhaimer*: Assessing the Link Between Aerosol Mixing State, Structure and Composition and their Optical Properties: Ascension Island as a Testbed for the South-East Atlantic Aerosol [10 minutes + 2 Q/A]

Aerosol-Cloud Interactions:

2:50 *Paul Barrett:* On the collaboration between UK CLARIFY and LASIC [10 minutes+ 2 Q/A]

3:14 *Pablo Saide and Calvin Howes*: Hygroscopicity parameter from LASIC observations and comparison to models [10 minutes + 2 Q/A]

The Modeling Frontier:

3:26 *Yan Feng*: Evolution of Biomass Burning Aerosol Properties: a Model Comparison to the LASIC and ORACLES Observations [10 minutes+ 2 Q/A]

Challenges – Issues – Needs

Still doable

- implementation of newer Muller (2014) filter correction scheme for nephelometer scattering measurements (e.g., we don't trust our AAE values)
- How to best integrate SMPS-UHSAS-CPC measurements into a 'best-estimate' aerosol size distribution compatible w CCN values?
- Need mass-resolved LASIC ACSM measurements (plan in place to do so)

With the power of hindsight

- Extinction values at both dry and ambient RH would be valuable
- Extinctions derived from Micropulse lidar measurements not able to resolve aerosol layer bottoms (doesn't depend on retrieval) => suggest investment in extinction lidars to support vertical profiling for aerosol-focused campaigns
- Filter measurements should be more doable (discussed early on but ultimately considered too ambitious)

Future Plans – Action Items

- Ongoing discussion relating lifecycle in organic nitrate to brown carbon
- Plan in place to produce size-resolved ACSM data, this will help with aerosol composition – optical properties closure, with integrating LASIC data with the size-resolved AMS/ACSM of the aircraft campaigns, and articulating a full biomass burning aerosol lifecycle
- Ongoing work relating aerosol composition to cloud nucleation and optical properties
- Ongoing planning for a fall virtual meeting to further model-observational integration
- LASIC overview paper

ongoing

- Copernicus ACP/AMT Special Issue, *"New observations and related modelling studies of the aerosol–cloud–climate system in the Southeast Atlantic and southern Africa regions "*
- Southeast Atlantic session at AMS 2021 annual meeting in aerosol-cloud interactions, lead-convener Michael Diamond UW