Breakout Session Report
ARM/ASR User and PI Meeting
March 19-22, 2018

Session Title: Absorbing Aerosols and Interactions with Clouds

Session Date: Thursday

Session Time: 10:45-12:45

Summary Authors: Paquita Zuidema and Allison Aiken

Main Discussion

The meeting agenda was as follows:

towards defining the LASIC aerosol single-scattering-albedo: 10:45-11:30 est
1. Allison Aiken - ambient aerosols in both smoky and reference conditions
2. Art Sedlacek - refractory black carbon
3. Tim Onasch - LASIC CAPS measurements
4. Connor Flynn - perspectives on filter-based derived SSA values

discussion: what do we still need to do to come up with a 'best-estimate' SSA

5. Yan Feng - Meteorological Influences on Biomass Burning Aerosol Long-range Transport: Observations vs CAM5 Simulations

other observational perspectives: 11:35-12:05 est
6. Yann Blanchard - Cloud properties from zenith-pointing and scanning cloud radars: statistics and implications
7. Ewan O'Connor - inferences on turbulence from the Doppler lidar
8. Rob Wood: ultra-clean conditions at Ascension
9. Laura Riihimaki - update on VAP status

discussion:

perspectives from modeling studies: 12:10-12:45 est
10. Tak Yamaguchi - perspectives on absorbing-aerosol-cloud interactions gained from recent modeling studies
11. Xiaohong Liu - WRF-Chem simulations of the southeast Atlantic
12. Zuidema/Saide - a community model-observational intercomparison project+assessment of WRF-CAM5 simulations using LASIC data

discussion:

Discussion was interspersed amongst the presentations. One topic was remaining issues with establishing the absorption/extinction measurements on Ascension, with Tim Onasch's presentation on the CAPS-SSA measurements supporting the PSAP/nephelometer measurements well.

Key Findings

Most of the aerosol mass is in the accompanying organics, but these do not necessarily constitute brown carbon, with most of the aerosol absorption residing in coated black carbon. Ewan O'Connor showed that the impact of the orography on the turbulence only extends upward by about 400 m. Rob Wood showed that ultra-clean (low CCN/UHSAS aerosol) conditions can also occur at Ascension, most commonly around September when the liquid water path is also high, but that these do not necessarily co-occur with low CO, suggesting that perhaps it is precipitation that is responsible for the low aerosol

values. Yann Blanchard provided Nd/LWP retrievals from a unique 3D retrieval first published in Fielding et al. 2014. Tak Yamaguchi provided a nice historical timeline on modeling studies of aerosol-cloud interactions relevant to the southeast Atlantic

Decisions

There is interest in a workshop bringing together scientists from the many campaigns active in the southeast Atlantic. Venues are discussed/explored, and include a joint session at AMS 2019, to a dedicated workshop in the spring of 2019.

Issues

1) the relative humidity of the air entering the PSAP and CAPS, though thought to be dry, is not actually measured. This would be useful.
2) The relative humidity of the air entering the nephelometer is measured, but fluctuates. Is controlling for the humidity useful?
3) A comprehensive best-estimate aerosol size distribution still needs to be developed
4) An Nd VAP is desirable
5) Lack of PM10 measurements

Needs

A better RH measurement protocol, and recommendation to include PM10 measurements in future deployments focusing on aerosol. A workshop.

Future Plans

Develop a workshop

Action Items

Find a time/venue for a larger workshop