

Breakout Session Report
ARM/ASR User and PI Meeting
March 16-20, 2015

Session Title: Layered Atlantic Smoke Interactions with Clouds (LASIC)

Session Date: Thursday, March 19, 2015

Session Time: 10:30am

Summary Authors: Paquita Zuidema

Main Discussion

LASIC is a strategy to understand the absorbing aerosol-cloud regime in the southeast Atlantic, with the observational centerpiece being the deployment of the first ARM Mobile Facility (AMF1) and mobile aerosol observing system (MAOS) to Ascension Island (8S, 14.5W) from June 1, 2016, to May 31, 2017. This session provided the first presentation on LASIC to the larger ARM/ASR community. LASIC is still in its developmental stage, and as such, an interactive discussion-based session was desired to seek input that could contribute to making the deployment as excellent as possible. The session began with an overview of the science and report from a site visit to Ascension Island in January by Paquita Zuidema, Kim Nitschke, and Amon Haruta.

Input was solicited from the session participants on the site decision-making and instrumentation. The presentation included an update on the aerosol instrumentation status by Alison Aiken, and Amon Haruta provided a presentation focusing on the island and its logistics. Sandra Yuter provided a presentation emphasizing the meteorological variability at the island. The discussion focused exclusively on logistical and measurement issues with many key scientists present.

Decisions

A decision was solidified to use the lower of the two surveyed sites for the AMF1 and MAOS deployment.

Issues

Remaining issues for the deployment are 1) how best to consider and mitigate for an island effect, 2) a possible change of venue for the radiosonde launching site away from the Georgetown site initially selected to the airport, 3) improving the reliability of the MAOS particle into liquid system (PILS) instrument, and 4) a search for another lidar, preferably an HSRL.

Needs

Several additional instruments, beyond what was in the original proposal, are desired. These include two additional ceilometers and surface met stations, located at other spots on the island towards determining the island effect on cloud-base height, cloud fraction, and surface air properties. An additional microwave radiometer is desired to be collocated with the radiosonde launch site. The radiosonde launch site will not be collocated with the AMF1/MAOS site, as full profiling of the boundary layer is too important. The additional microwave radiometer will be used to constrain the radiosonde humidity profiles and will also provide an additional characterization of the boundary layer flow around the island. The ceilometers, surface met stations, and microwave radiometer will all help us assess the representativeness of the AMF1/MAOS site. Another need is an additional lidar, preferably one that can measure extinction directly. This is both to ensure redundancy of a key measurement and to provide a measurement of the key variable desired (extinction rather than backscattered intensity).

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The PILS instrument also needs to be made more robust for deployment on Ascension. The PILS measurements will allow us to characterize the sea salt component of the boundary layer air. The sea salt will compete with biomass burning aerosol as a cloud condensation nuclei, and while sea salt measurements are valuable throughout the entire length of the deployment, the PILS measurements will be particularly useful during the July to October time frame.

Future Plans

A pre-proposal to extend LASIC by five months, through October 2017 (LASIC-2) was discussed. The motivation is to capture a second biomass burning season and to overlap with the National Aeronautics and Space Administration (NASA) Earth Venture 2 (EVS-2) Observations of Aerosols Above Clouds and Their Interactions (ORACLES) 2017 deployment. An additional component is to also deploy the ARM Aerial Facility (AAF) in August to September 2017. An AAF campaign is feasible as long as the payload is <2000 lbs and flights are kept to 1-2 hour duration because of the lack of a nearby alternate airport. The response from participants was favorable.

From a larger point of view, a stronger connection to a modeling component still needs to be created.

Action Items

- Expand the LASIC email list (done).
- Reconsider the siting of the radiosonde launches from Georgetown to the airport (in process).
- Construct an intensive operational period request (IOPR) to request two additional ceilometers and surface met stations for other locations on the island, as well as an additional microwave radiometer to place with the radiosonde launch site (done).
- Contact the United Kingdom (UK) Principal Met Officer for the South Atlantic Islands regarding saving the UK Met Office ceilometer data (done).
- Continue to work with the UK CLouds and Aerosol Radiative Impacts and Forcing: Year 2016 to place complementary instrumentation, primarily the University of Miami W-band radar, upon St. Helena Island, including developing an IOPR that includes DOE data archiving for all St. Helena-based data sets (in progress).
- Further followup with Ed Eloranta, University of Wisconsin, to see if the high spectral resolution lidar (HSRL) previously used in the Arctic is available for the LASIC deployment (currently awaiting reply from the University of Wisconsin).