IASOA Aerosol Working Group
November 9, 2016

Attendees: Jessie Creamean, Taneil Uttal, Aki Virkkula, Markus Fiebig, Patrick Hayes, Lauren Schmeisser, Eija Asmi, Bill Simpson, Nicholas Spada, Allison McComiskey, Kerri Pratt, Sangeeta Sharma, Olga Popovicheva, Andreas Massling, Kostas Eleftheriadis, Rebecca Sheeshley

Introductions

Aerosol optical properties at Hyytiälä, Finland (SMEAR II) – presentation given by Aki Virkkula from University of Helsinki. The SMEAR-II (Station for Measuring Ecosystem–Atmosphere Relations) station is located in a boreal forest and has 130 mast, a measurement tower, and aerosol cottage that has size distribution, scattering, absorption, filter sampling, hygroscopicity, CCN, volatility, and other measurements extending 20-25 years back in time (see more information here: http://www.atm.helsinki.fi/SMEAR/). Trajectory statistics show high scattering and absorption at SMEAR-II when air originates from over land, while Ångström Exponent shows larger particles originating over the sea and smaller particles originating over land. Overall decreasing trends in aerosol optical properties were observed for PM$_{10}$ and PM$_{1}$. However, these trends are not observed at Pallas, the neighboring IASOA station (Eija Asmi). Effective complex refractive index shows strong seasonal cycle.

Discussion on using sub-Arctic boreal and IASOA Arctic stations to look at sources – evaluate “horizontal fluxes” of aerosols from lower latitudes by comparing measurements such as aerosol size and number concentrations at coupled Arctic/sub-Arctic sites in Europe, Canada, and Alaska. For example, could use Hyytiälä, Pallas, and Ny-Ålesund. Sangeeta Sharma suggested the East Trout Lake boreal site in Canada, below Alert/Eureka. Canadian sites affected strongly by biomass burning in the summer (Canadian fires).

Update on aerosol climatology paper – Lauren Schmeisser updated us on the paper and the decision to use John Backman’s original trajectory plots. Source using trajectory statistics cannot fully explain seasonality. This could be due to removal mechanisms during aerosol transport (Jessie Creamean) and changes in emissions (Markus Fiebig). HYSPLIT air mass trajectories do not account for removal during transport.

Update on Oliktok Point site science – AOS (aerosol observing system) is up and running, and includes measurements of size, number, optical properties, and chemistry. ICARUS UAS and tethered balloon intensive operating periods occurred throughout 2016. Some flights include vertical profiles of aerosol size distributions. Data are being validated.

Action items:

- Continue to fill out IASOA atmospheric composition Google Sheet (all)
- Add references tab and lat/ion/elev columns to spreadsheet (Creamean)
- Send climatology paper to group for feedback (Schmeisser)
- Find sub-Arctic boreal sites near your IASOA site for “horizontal flux” comparison (all)
- Location local sub-Arctic boreal site on shared PowerPoint slide initiated by Taneil Uttal (all)