IASOA Aerosol Working Group
October 5, 2016

Attendees: Sara Crepinsek, Taneil Uttal, John Ogren, Jessie Creamean, Bill Simpson, Andreas Massling, Olga Popovicheva, Nicholas Spada, Aki Virkkula, Kerri Pratt, Rebecca Sheesley, Patrick Hayes, Rachel Chang

Introductions (several new attendees)

Updates of Arctic aerosols – 3D PEEX (Pan-Eurasian Experiment) conference in Moscow on September 19-21, 2017, proposal: special session on aerosol in Arctic ecosystem, propose organizing joint PEEX and IASOA extended session to discuss activities in Arctic region (collaboration with Creamean and Popovicheva)

Tiksi burning landfill waste from urban area near station, occurred for most of summer and fall 2016, burns have high organic content (“ecological catastrophe”), make sure to include this information when QC’ing Tiksi aerosol data, burning occurred when no snow on ground

New aerosol sampling in Cape Baranov - filter sampling and aethalometer

Thoughts about including Hyytiälä Finnish data to climatology publication, agreement within group that the publication is too far along to include this station (also since this is not a designated complete Arctic station it won’t fit as well in the paper), suggest using this data set in future publication that is more open to lower latitude regions, would like to have someone familiar with the station present at next meeting

MAX-DOAS Observations of Aerosol Optical Properties Presentation – presentation given by Bill Simpson from University of Fairbanks, MAS-DOAS is a passive optical remote sensing technique that observes clouds and optical properties, detects scattered skylight, analyze spectrum to determine slant column densities, vertical profile of gases in lower part of atmosphere, simple system solid-state spectrometer and single-board computer (inexpensive, low power, can be used at remote sites), can look at spectra from Arctic ocean (buoy) – Beer-lambert fit and absorption spectrum, O4 molecule spectrum (O2-O2) aka (O2)2 aka O4, can relate o4 density to altitude, aerosol measurement principle – light scattering by aerosol affects the path length, can look at time series of O4 profiles – get ball-park path length, less O4 is observed as you view up because your path now traverses regions with less O4 aloft, optimal estimation (extinction vs altitude), O4 absorption peaks allow determination of path length, near UV 300-460nm, path lengths typically 10-20 km at UV wavelengths, common springtime profile: AOD ~ 0.1 at 361nm, sometimes aerosol is aloft and sometimes it is surface based, vertical averaging kernels, high resolution at surface, degrades aloft, DOF ~ 2.3, vertical resolution and accuracy of layer height is “blurred”, highest elevation angles are 20 degrees, need to assume SSA in the inversion, comparison to in-situ aerosol observations, this measurement is not direct sun so can be made if sun is obscured, but then cloud properties are measured, extinction is at ambient (not dry) conditions, CINDI intercomparison, comparison to ceilometer, clouds vertical profiles, O-Buoy data covers the Arctic Ocean (data available: www.aoncadis.org), can’t tell between scatter and absorption with this method, future work: compare AOD and surface extinction at Barrow, compare cloud base height with Barrow ceilometer, extend work to Arctic Ocean (O-Buoy data)

Bulk Analysis of PM at Barrow and Oliktok Alaska Presentation – NOAA and DOE funded sampling campaigns, collaboration with Kerri Pratt at the University of Michigan, Two atmospheric radiation
measurement (ARM) sites on the North Slope of Alaska (NSA), data highlights August and September of 2012 and 2015, temp was higher in 2012, Aethalometer data in Aug-Sept 2015 – focus on organic carbon, filter based sampling (1-week collections), compare Barrow and Oliktok sites, measuring Chloride, Sulfate, Nitrate, no size range cut off (total suspended), Oliktok surrounded by oil activities, Barrow surrounded by town activities, compare Carbon at both sites (organic and elemental), also look at % contemporary, Oliktok higher OC, EC, transition from contemporary to fossil, 2012 compared to 2015 has higher OC, Barrow 2015 80% contemporary, Oliktok 2015 40-60% contemporary, Barrow 2015 OC >> EC, Oliktok 2015 OC > EC, water soluble organic carbon comparisons correlate higher with organic carbon, WSOC similar at both sites, current work: sampled in Barrow and Oliktok 2016 (Aug-Sept), analysis to be completed to compare against 2012 and 2015 results, will leave instruments installed for 2017 data collection, suggestion to compare data to ACME-V flights (https://www.arm.gov/campaigns/aaf2014armacmev), contrasts for Barrow and Oliktok, Olga working on similar study for Tiksi (submitted publication)

**Action Items:**

- Get contact info from Aki regarding Hyytiälä station, ask them to present at next meeting (Virkkula, Crepinsek, Creamean)
- QC details on Tiksi burn events (Crepinsek)
- IASOA/PEEX collaboration (Creamean, Popovicheva)
- Complete Arctic inventory (ALL)
- Compare Barrow/Oliktok study with ACME-V flights (Creamean, Sheesley)