Climatology of Aerosol Optical Properties from Storm Peak Laboratory

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The effect of aerosol particles is critical in understanding Earth's radiation budget, yet significant uncertainties in the radiative properties of aerosols globally and on regional scales prevent the needed accuracy within numerical models to define future climate change.

Establishing aerosol climatology is important for identifying aerosol sources, distributions, and movements. Mountain regions create unique difficulties for numerical models due to representation of complex terrain and insufficient model resolution. Thus, long-term *in situ* data collected at high elevations is particularly useful. Data will be presented from Storm Peak Laboratory (SPL) mountain-top (3,220 m asl) site located near Steamboat Springs, CO, owned and operated by the Desert Research Institute. Aerosol optical measurements have been collected from 2011 – 2016. Using these data, seasonal and diurnal trends in aerosol type have been elucidated. Specifically, the seasonal impact of dust and biomass burning aerosols are considered. This data set highlights the wide-scale implications of a warmer, drier climate on visibility in the western U.S.A.

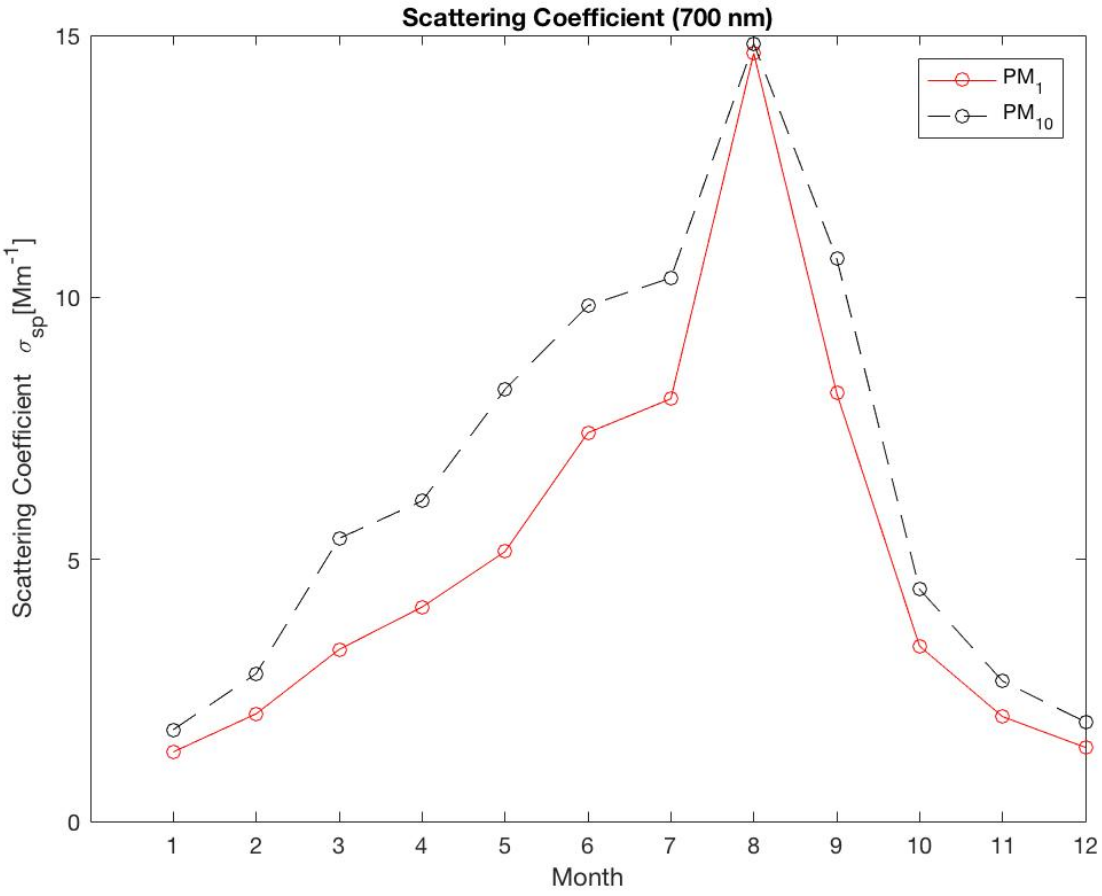

Figure 1. Monthly average of scattering coefficient (at 700 nm) from 2011-2016 measured at Storm Peak Laboratory in Steamboat Springs, CO using a TSI nephelometer. Particles were sampled behind an impactor, results are shown for particles smaller than 1 micron (PM1) and smaller than 10 microns (PM10) in red and black, respectively.