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Meteorological Influence on the Warm-Season Background SE U.S. Aerosol Properties[1] JAMES SHERMAN[2], HADI MORROW, MICHAEL LINK, YONG ZHOU, BAKER PERRY, Appalachian State University — Aerosols affect weather and climate directly by scattering and absorbing solar radiation and indirectly through their effects on cloud lifetimes and microphysical properties. These effects represent the largest sources of uncertainty in climate models and may have contributed to the lack of 20^{th} century warming in the SE U.S. The high-elevation site at Appalachian State University (APP) is home to the only co-located NOAA-ESRL / NASA AERONET aerosol monitoring stations in the SE U.S., with a near-continuous multi-year dataset of key aerosol radiative properties used to quantify the aerosol direct radiative effect. Aerosol loading, properties, and chemical composition measured at APP are influenced as much by local and synoptic meteorology as by aerosol source region, particularly during warm-season months, when aerosol radiative effects are largest. Approximately 67% of the non-refractory aerosol mass measured over two summers is organic, with most of the remaining mass comprised of sulfates. The relative fractions, along with most aerosol properties, depend largely on temperature and relative humidity. For this reason, aerosols and meteorology must be studied together in order to better predict the effects of changing air quality on regional climate.

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