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Calibration of cavity ring-down spectrometry, integrating nephelometery, and condensation particle counting for distinguishing aerosol scattering/absorption properties SOLOMON BILILIGN, North Carolina A&T State University, Department of Physics and NOAA-ISET Center, SUJEETA SINGH, North Carolina A&T State University, Energy and Environmental Systems, DAMON SMITH, North Carolina A&T State University, Department of Physics, MARC FIDDLER, North Carolina A&T State University, NOAA-ISET Center — Aerosol optical depth, Angstrom exponent, size distribution are critical for radiative forcing models and are necessary to adequately parameterize biomass aerosols and dust in RCMs to improve our understanding of the impacts of aerosols on regional climate. Recent studies on the impact of atmospheric heating by dust and black carbon in the Tibetan Plateau (TP) showed that the heating will lead to enhanced pre-summer monsoon surface warming and early snow melts the TP region.. As a first step to characterize biomass aerosols we use completely scattering particles (polystyrene latex (PSL) spheres) and absorbing spheres to compare three techniques: cavity ring-down spectrometry (CRDS), integrating nephelometery, and Mie and T-Matrix theory; along with ancillary techniques, including condensation particle counting (CPC) and differential mobility analysis (DMA). In this work we compare the values and uncertainties of the scattering and backscattering cross section at 589 nm, scattering efficiency, and scattering Ångstrom coefficient determined from CRDS, nephelometery, and Mie theory and T-matrix theory. This is applied to PSL spheres 100-300 μm diameter and extended to 400 μm absorbing PSL spheres.

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