

Abstract Submitted
for the NES21 Meeting of
The American Physical Society

Using Ground-Based Particulate Matter Measurements from a PA-II Dual Laser Air Sensor to Estimate Aerosol Optical Depth MARCUS ALCANTARA SILVA, ALICJA URBANCZYK, NIMMI SHARMA, Central Connecticut State University — Quantifying the aerosol optical depth (AOD) is important for a wide variety of applications such as studying correlations between air quality and adverse health effects and determining visibility of a particular area. Central Connecticut State University conducted a study to see if particulate matter data obtained using an inexpensive direct sampling sensor at ground level could be used to provide an estimate of the AOD in the region over time. In the study, data were obtained using a PA-II-SD air quality sensor manufactured by PurpleAir. As the air passes thru the sensor, laser light scattering is used to measure particulate matter of various sizes (1, 2.5, and 10 microns). Data were collected every 2 minutes for many days. These measurements provide particulate loading in the atmosphere at ground level. AOD is a total atmospheric column property, thus assumptions of uniform convective mixing in the atmospheric boundary layer and height of the boundary layer (where most aerosols reside) are needed to estimate AOD from the measurements. Balloon-borne radiosonde data launched from regionally nearby sites were used to estimate boundary layer height on the days data were collected, and AOD estimates were derived. The average derived AOD were compared to AOD estimates from satellites and ground-based photometers using data obtained from MODIS and AERONET.

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Date submitted: 06 Apr 2021

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