Abstract Submitted
for the NES21 Meeting of
The American Physical Society

Cloud-Aerosol Differentiation In Analysis of Laser Radar Atmospheric Side-Scatter Signals ALICJA URBANCZYK, SETH GAGNON, Central Connecticut State University, AMIN KABIR, University of Bahamas, NIMMI SHARMA, Central Connecticut State University — Laser radar side-scatter signals from a CCD Camera Lidar (CLidar) form images of side-scattered intensity over time and altitude for laser light transmitted vertically into the atmosphere and detected by a ground-based CCD camera aimed adjacent to the laser. Atmospheric structure layers at various altitudes are revealed through analysis of multiple images of the laser side-scatter. For atmospheric studies, being able to differentiate between layered structures that represent clouds and layers of suspended particulates, more known as aerosols. The images from this optical remote sensing instrumentation are analyzed through a program developed in IDL (Interactive Data Language). From the image analysis, aerosol extinction plots are extracted from each data set. Typical aerosol extinction plots reduce to nearly zero after the laser altitude reaches past the atmospheric mixing layer. To interpret these extinction plots to determine if the layers detected are aerosol layers of interest or thin clouds (that may be invisible to the naked eye), we merge data from additional scientific instruments. Through analysis of radiosonde data extracted from the University of Wyoming's database, the relative humidity as a function of increasing altitude is plotted. For each layer of interest on the aerosol extinction plots, the respective altitude of the radiosonde data is analyzed. The two graphs are analyzed concurrently to find strong evidence if the peaks observed in the extinction plot are viable aerosols of interest or potentially thin layers of clouds.

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Date submitted: 05 Apr 2021 Electronic form version 1.4