

Comparison of Aerosol Vertical Profiles from Spaceborne Lidar with *In Situ* Measurements

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NOAA began regular, *in situ* measurements of aerosol vertical profiles over Illinois with a light airplane in June, 2006. By late February, 2008, over 200 profiles of aerosol light scattering and absorption coefficients, hygroscopic growth factor for scattering, particle number concentration, and number size distribution had been obtained, and many of the flights included measurements of aerosol ionic composition. In addition to the primary objective of obtaining a climatology of aerosol properties aloft for evaluating aerosol radiative forcing and testing chemical transport models, the program has a secondary objective of evaluating aerosol measurements from satellites. Many of the profiles are located and timed to coincide with overflights of the A-Train constellation of satellites. Comparison of the *in situ* measurements with profiles derived from the CALIOP lidar on the CALIPSO satellite suggest that the lidar can reliably detect layers with aerosol scattering levels above about 25 Mm^{-1} . The long-term climatology of surface aerosols at the Bondville, IL monitoring site indicates that aerosol loadings are above this threshold roughly 70 percent of the time. At more remote sites, data from the NOAA long-term aerosol monitoring network (figure) indicate that the lidar will rarely report a detectable aerosol signal.

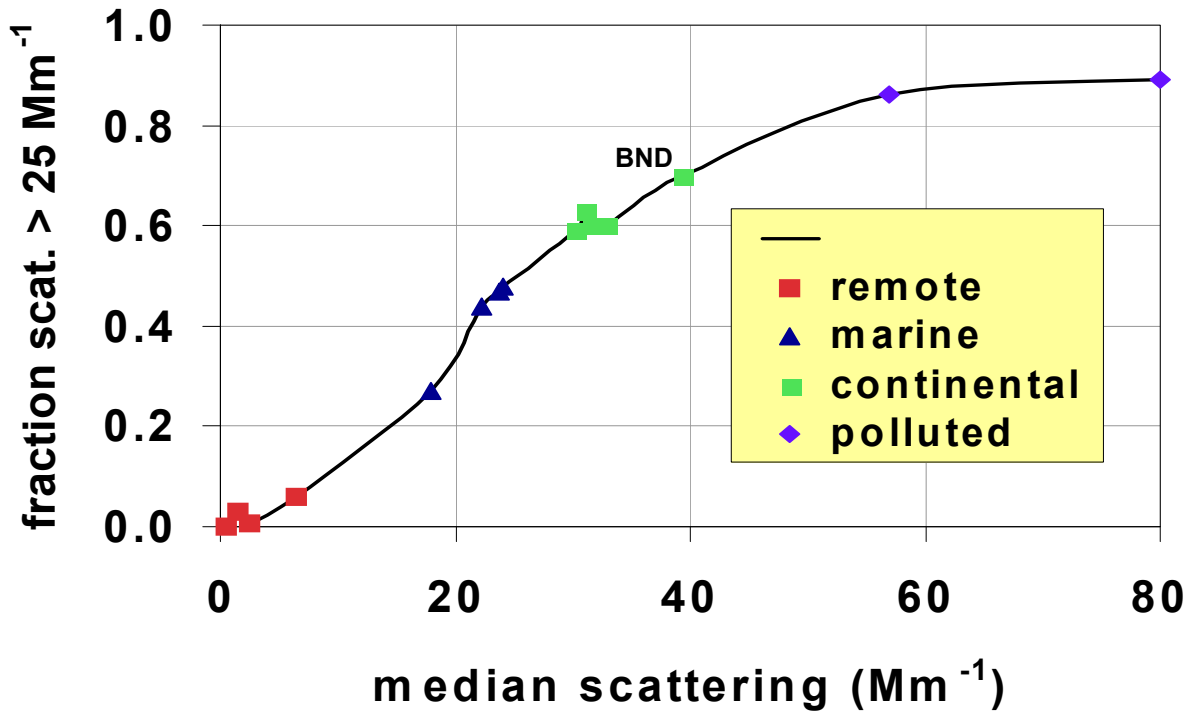


Figure 1. Fraction of observations when aerosol light scattering is above CALIPSO threshold of 25 Mm^{-1} .