

Diurnal variation of columnar aerosol optical depth in beijing using sun-sky-lunar photometer measurements

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Aerosol plays a key role in the assessment of global climate change and environmental health, while observation is one important way to deepen the understanding of aerosol properties. In this study, the new instrument sun-sky-lunar photometer with 6 bands is used to measure sun and moonlight. With the new developed algorithm, daytime and nocturnal column aerosol optical depth (AOD) is calculated. The AOD algorithm is tested and verified and spectral AOD is obtained from direct sun measurements with an accuracy of ~0.01 to 0.02 and for nocturnal AOD, the accuracy is about 0.06. In this paper, the daytime and nocturnal AOD and AE is analyzed and discussed. Lidar measurement is also used to auxiliary analyzed. It can be found in the daytime, in early morning, AOD is ascent quickly, but AE is stable. In the night, AOD ascend in the early night, then it will decent. This will be useful for aerosol concertation and transportation analysis.

Keywords: aerosol optical depth, sun-sky-lunar photometer, diurnal variation