CONTINUOUS LIDAR OBSERVATION OF NEAR SURFACE AEROSOL USING OPTICAL AND SAMPLING DATA FROM GROUND-BASED INSTRUMENTS

Publons ID	(not set)
Wos ID	WOS:000591371500026
Doi	10.1051/epjconf/202023702010
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Publish Date	2020
Journal Name	29TH INTERNATIONAL LASER RADAR CONFERENCE (ILRC 29)
Citation	
Abstract	Monitoring of near-surface aerosol is important for both public health issues and radiation budget studies. In this study, we report a continuous observation method of aerosol particles by means of a vertical Mie-scattering lidar in combination with other optical and sampling instruments operated at the ground level. In the Fernald method used for processing the lidar signal, the most appropriate value of lidar ratio at 532 nm is estimated from the Mie-scattering calculation. The input parameters, namely, the mode radius, variance, and both real and imaginary parts of refractive index, are so determined as to reproduce the data from ground-based sampling instruments. Instead of the far-end boundary condition, the extinction coefficient at the surface level is used for constraining the retrieved aerosol extinction profile. The correction of the truncation and relative humidity (RH) effects on the scattering data from the sampling is made with the help of the optical data from a visibility-meter. We discuss the observed features in both low and high RH cases. Such a capability will be useful for uninterrupted lidar observations of near-surface aerosols irrespective of the presence of clouds that often hinders signal observations at higher altitudes where the aerosol-free atmosphere is assumed for the conventional Fernald analysis.
Publish Type	Book in series
Publish Year	2020
Page Begin	(not set)
Page End	(not set)
Issn	2100-014X
Eissn	
Url	https://www.webofscience.com/wos/woscc/full-record/WOS:000591371500026
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