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Aerosol measurements by Raman-Mie-Rayleigh Lidar in Nanjing, China

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The aerosol measurements by using Raman-Mie-Rayleigh Lidar in Nanjing, China, were presented in this paper. The Lidar system consisted of transmission at 532 nm and receiver with 3 different channels. The aerosol Lidar signals generated from backscatter lights were obtained simultaneously from Raman (607 nm)-Mie (532 nm)-Rayleigh (532 nm) Channels. Aerosols at low/high altitude were measured by Mie/Rayleigh Channel at daytime, and measured by Raman Channel at night time. The start of data collection of Rayleigh & Raman Channel was controlled by the gate by setting different time delay. New aerosol extinction coefficient calculation methods by using Mie/Rayleigh Channel data were reported. According to the structure of Range corrected signal from Mie/Rayleigh Channel, the accurate extinction coefficient at the range of homogeneous aerosol layer was obtained, then, to be used as reference value to calculate the aerosol extinction coefficient profiles at whole range. The accurate aerosol extinction coefficient profile was obtained by comparison of different aerosol extinction coefficient profiles by slightly changing the boundary values. The aerosol optic properties were also calculated from the signals from Raman Channel by using Raman theory after Lidar data treatment by using multi-average calculation or small wave analysis. The aerosol extinction coefficient profiles obtained from Mie/Rayleigh Scatter were compared with from Raman Scatter. The aerosol extinction coefficients about 10-4 ~ 10-5 were calculated from Mie/Rayleigh Channels coincided with Raman Channel. The boundary aerosol optic properties were obtained by Mie/Raman channels, and aerosol optic properties at higher altitude were measured by Rayleigh/Raman channels. Aerosol parameters at different altitudes were measured simultaneously from one measurement by Raman-Mie-Rayleigh Lidar/ Multi-function Lidar system.

Biography

Nianwen Cao has completed his PhD from Anhui Institute of Optic & Fine Mechanics, Academic of Science of China. He is a Professor, engaged in Atmospheric Remote Sensing by Lidar, at Nanjing University of Information Science & Technology. He has published more than 40 papers in reputed journals.

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