

29B2 On the Feasibility of Using Multiwavelength Lidar Measurements
to Measure Cloud Condensation Nuclei

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Abstract

This paper addresses the feasibility of using multi-wavelength lidar backscatter measurements to differentiate both qualitatively and quantitatively between the relative concentrations of hygroscopic and non-hygroscopic aerosol particles. The proposed technique utilizes the fact that hygroscopic particles undergo a size increase and refractive index change with increasing relative humidity and that different wavelengths respond to these changes in different ways. It is shown that under certain conditions, a judicious choice of lidar wavelengths from the UV, visible and near infrared regions of the spectrum can provide a differential backscatter, sufficient to provide some information on the size and percentage number concentration of the hygroscopic aerosol, and, consequently CCN concentration. The potential benefits of distinguishing hygroscopic particle concentration from non-hygroscopic particle concentration are great since remote measurement can provide good temporal and spatial coverage of these properties and valuable information for climate monitoring.

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