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Atmos. Chem. Phys., 7, 5803-5813, 2007

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## Application of a diode array spectroradiometer to measuring the spectral scattering properties of cloud types in a laboratory

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**Abstract.** In the last few years diode array spectroradiometers have become useful complements to traditional scanning instruments when measuring visible and ultraviolet solar radiation incident on the ground. This study describes the application of such an instrument to the problem of measuring the radiation scattered by different cloud-types in a laboratory environment. Details of how the instrument is incorporated into the experimental set-up are given together with the development of the system as a whole. The capability to measure a full spectrum for each scattering angle is an undoubted advantage, although the limited sensitivity impacts on the usefulness for optically thin clouds. Nevertheless example results are presented: (1) scattering phase functions at a range of wavelengths recorded simultaneously for water clouds, showing spectral deviation at the rainbow angle and verification of Mie theory; (2) likewise for mixed phase clouds, with evidence of both halo and rainbow features in a single scattering function; and, (3) detail of the forward scattering region in a glaciated cloud showing a barely perceptible halo feature, with implications for the small-scale structure of the ice crystals produced.

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Citation: Smedley, A. R. D., Webb, A. R., and Saunders, C. P. R.: Application of a diode array spectroradiometer to measuring the spectral scattering properties of cloud types in a laboratory, Atmos. Chem. Phys., 7, 5803-5813, 2007. ▣ [Bibtex](#) ▣ [EndNote](#) ▣ [Reference Manager](#)



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