

Light scattering by preferred oriented ice crystals on cirrus clouds

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Scattering matrices for ice crystal particles of cirrus clouds are calculated usually in the suggestion that particles are randomly oriented in space. At the same time, it is known that a large-scale part of the falling particles prefers to be oriented in the horizontal plane. There are a few papers where the preferred orientation is taken into account.

Scattering matrices are calculated for hexagonal ice columns and plates with preferred orientation near the horizontal plane by means of an algorithm based on geometric optics. Distributions of scattered energy among the various arcs inherent to scattering by oriented crystals are obtained. Impact of small orientation deviations from the horizontal plane is discussed.

In this contribution, we present results of our calculation of the Muller matrices for ice hexagonal plates and columns that are randomly oriented only in the horizontal plane. These data can be of interest for an interpretation of lidar returns.