

ScIce-2026 database of light scattering on ice crystals for active and passive remote sensing retrieval algorithms

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The rapid development of active and passive remote sensing instruments for atmospheric monitoring, both from the ground and from space [1], has led to a unique opportunity to develop new algorithms for retrieving the properties of atmospheric constituents based on the synergy of observations from different instruments (such example for aerosol retrievals is the GRASP algorithm [2]). The retrieval of the microphysical parameters of the atmospheric constituents is an inverse problem, that utilizes the light scattering by atmospheric particles as its “forward model” (e.g. [2]). At present, different methodologies are used to calculate the light scattering and interpret active and passive remote sensing data.

In this work, we present the ScIce-2026 scattering database for ice crystals, suitable for use for both active and passive remote sensing retrieval algorithms. The database covers the entire range of ice crystal sizes observed in the atmosphere, from 0.01 to 10,000 μm . The scattering calculations were performed using three different methods: the discrete dipole approximation, the physical optics, and the geometric optics. The solution is available in the public domain.

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References

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