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Intercomparison of cloud property retrieved from MSG-SEVIRI and MODIS

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Cloud properties retrieved from satellite-based meteorological imagers have become an important reference for the validation of clouds in climate and weather prediction models. The MODIS cloud properties derived from the polar-orbiting TERRA and AQUA satellites are unique amongst such datasets, due to the large number of spectral channels, high spatial resolution, and an accurate on-board calibration.

Nevertheless, there is also demand for higher temporal resolution and information about the diurnal cycle, as can only be provided by geo-stationary satellites. The most advanced geostationary imager to date is the SEVIRI instrument on Meteosat Second Generation. Still, users have to sacrifice some accuracy, due to fewer and wider spectral channels, coarser resolution, and a reduced calibration accuracy. Within EUMETSAT's Satellite Application Facility on Climate Monitoring, cloud retrievals have been implemented and are distributed to the scientific community. The Royal Netherlands Meteorological Institute is responsible for the development and validation of the cloud thermodynamic phase, optical depth, and water path retrievals. As part of the validation activities, a detailed intercomparison with MODIS cloud products has been carried out, results of which will be presented here. Aspects considered include the sensitivity of products to calibration, and a direct comparison of the algorithms. Also, the impact of broken and mixed-phase clouds, and sub-scale variability at SEVIRI resolution on the retrieval accuracy are studied.

The understanding of the resolution dependence of retrievals, and the separation of resolution effects and algorithm differences, is of central importance for the interpretation of observed deviations between different satellite-retrieved cloud products, and their relevance for model validation tasks.