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Using SEVIRI radiances to retrieve cloud optical properties of convective cloud systems

J. Müller (1), J. Fischer (1), A. Hünerbein (2), H. Deneke (2), and A. Macke (2)

(1) Freie Universität Berlin, Institut für Weltraumwissenschaften, Germany (jenny.mueller.86@gmail.com), (2) Leibniz-Institute for Tropospheric Research, Leipzig, Germany

The radiative transfer model MOMO (Fell and Fischer, 2000), which is based on the Matrix Operator Method (Plass et al., 1973), has recently been extended to be capable of calculating terrestrial and atmospheric longwave emission. With this new version of the model we simulate measurements of the Spinning Enhanced Visible and InfraRed Imager (SEVIRI) including the 3.9 μm channel. The extended RTM is used as a forward operator in an optimal estimation procedure to retrieve cloud optical properties (cloud optical thickness, effective radius and liquid water path (LWP)). This retrieval is used over convective cells. We examine the changes of cloud optical properties during the life cycle of these cells by tracking a cell in a series of SEVIRI images. The trajectories of the analyzed cells pass over one ground station used in the project 'Integrating Cloud Observations from Ground and Space - A Way to Combine Time and Space Information' (ICOS). Thus our retrieval results can be compared at one time step with the ground-based measurements. The results are analyzed to get new insights into the formation and development of convective cells.
This investigation is part of the project ICOS.