Assimilation of cloud information into a short-range numerical weather prediction model with an ensemble Kalman filter

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The emerging field of ensemble Kalman filters for operational data assimilation in numerical weather prediction offers new perspectives for the assimilation of unconventional data, because also variables which are not state variables of the model can be assimilated in a straightforward way, and no adjoint or tangent-linear versions of the model code and of the forward operator are needed. Especially for short-range convection-permitting limited-area models the usage of ensemble Kalman filters is an active area of research.

In this context an approach to assimilate cloud information from satellite cloud products based on Meteosat SEVIRI into the COSMO model will be presented. In cloudy scenes relative humidity at cloud top and the cloud top height itself are used to weight the ensemble members in the ensemble Kalman filter, in cloudfree columns cloud cover for low, medium and high levels are used. Thus, both, "cloud" as well as "no cloud" observations are assimilated.