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Comparing raindrop size distributions from the two-moment microphysics scheme of the ICON-RUC model with disdrometer observations

Thursday 20 March 2025 15:00 (15 minutes)

The Rapid Update Cycle (RUC) has been developed to predict severe storms and especially-heavy rain falls over Germany. In order to forecast the precipitation more precisely, we have implemented a two-moment microphysics scheme, which predicts the number concentration of the hydrometeors in addition to their mass density. In the last two years we have found several cases where the predicted precipitation was too low, although the radar reflectivity showed realistic values. To investigate this behaviour, we started to compare more specific parameters of the model with more detailed precipitation observations.

Several stations in the Deutscher Wetterdienst measuring network include a disdrometer, which measures size and fall speed velocity of individual rain drops every minute. This enables the estimation of the drop size distribution, rain rate and mean diameter with high temporal resolution. Since all these parameters are also estimated by the two-moment microphysics scheme, a direct comparison between model and observations can provide a more specific insight into the problem.

First, observations of case days from the 2024 summer period with stratiform and convective conditions are evaluated and compared to short-time forecasts in the RUC setup. Specific areas around the disdrometers are used for this evaluation. We try to identify systematic model biases by comparing precipitation amount, the mean diameter and the droplet size distribution in the model and the disdrometers. Our aim is to understand these differences and evaluate possible model changes that can reduce these mismatches and thus improve precipitation forecasting.

VAT

Session

Enhancing Process Understanding: New observations for modeling and parameterization development

Preferred Contribution Type

Oral Presentation

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