The influence of RAL3.X settings in the UM model on forecasts of precipitation and selected meteorological parameters in the area of Poland

Marta Kopeć, Małgorzata Melonek, Leszek Herman-Iżycki, ICM

Several versions of RAL3 settings have been tested in the UM model in the domain over Poland. The most important change was implementation of the new (double-moment) cloud scheme. In this study we focus on the influence of these settings on the precipitation forecasts. Results were verified against measurements obtained from an official network of rain gauges (maintained by Institute of Meteorology and Water Management) and compared with similar results obtained for the currently used version of UM model (with dedicated settings). The main finding is that the new cloud scheme causes a significant reduction in very high (and unnatural) rainfall values (above 100 mm/h). It seems to also slightly improve the precipitation forecasts, but the results strongly depend on seasonal conditions, forecast lead times and diurnal cycle. The influence on these results may have a relatively low number of precipitation events (especially during winter conditions) in the analysed periods and sparse measuring network used for verification purposes. New settings also have significant influence on other meteorological parameters. The main difference is visible in cloud cover fields itself (especially in high and very low clouds, while results obtained for other cloud levels seems to be comparable). Differences in cloud cover at the lowest levels also impacts the results connected with the visibility, but in this case also the temperature field was playing an important role. All of the comparisons between new RAL3.X settings and the currently used model will be presented based on the selected test cases.