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Impact of assimilation of 3D radar reflectivity into the NWP model with a high horizontal resolution

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A method assimilating 3D radar reflectivity into a non-hydrostatic numerical weather prediction model (LM COSMO version 3.18) is proposed and tested. Radar reflectivity measurements are available at vertical levels from 1 to 14 km with a step of 500 m. The radar data with a horizontal resolution of 1 km are assimilated into the LM with the horizontal resolution of 2.8 km. Two methods based on the correction of model vertical profiles of water vapour mixing ratio are used and compared. The first one uses only ground data (radar derived precipitation at 1 km level), i.e. 2D information. The second one utilises the whole 3D structure of the measured radar reflectivity. The methods are applied to precipitation forecasts of several convective events and accuracy of the forecasts is evaluated. The study is focused on the evaluation of contribution of the vertical structure of radar data to the accuracy of precipitation forecasts.