Applying OPERA rain rate composite for assimilation into COSMO model

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Assimilation of observations with a high resolution in space and time is very important to improve the forecasts of a numerical weather prediction model. Especially for convection permitting models, like COSMO-DE (2.8 km mesh size) it is essential to trigger convection at the right place. Radar observations provide a very good data base for this purpose. Latent heat nudging (LHN) of radar derived precipitation is used in COSMO-DE since 2007, the very beginning of its operational trial. It is found to be beneficial for precipitation forecast. It also slightly improves forecasts of temperature and dew point, especially at 2m above ground. This is achieved by introduction of temperature increments — positive to increase model precipitation and negative to decrease it.

Will this approach still be beneficial when applying it at larger model scales, for example within COSMO-EU (7 km mesh size)? Here, in contrast to COSMO-DE, deep convection has to be parametrized by a convection scheme. One question is, if both approaches will work together or will have a detrimental effect on each other. The assimilation of precipitation at larger scales is important for on-going reanalysis projects within Heinz-Ertel-Zentrum and might be beneficial for nested forecasts.

The presentation will show results of latent heat nudging European radar composites in COSMO-EU. Two composites will be compared in this study. First a DWD composite, operationally used for assimilation in COSMO-DE and second the rain rate composite provided by EUMETNET program OPERA. For the latter several quality checks were done, necessary for data assimilation. It will be discussed if OPERA composite is already suitable enough to be used for assimilation.