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Evaluation of the convection resolving climate modeling simulations over different European regions

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Regional climate modeling (RCM) at the convection permitting scale allow to explicitly resolve deep convection at horizontal grid spacings (< 4 km) emerging as a promising framework that will lead to a better representation of spatial and temporal characteristics of heavy precipitation (HP) events and climate extremes at medium and small scales. On current computational resources, refining the grid spacing to the kilometer scale is still extremely demanding, and therefore, climate simulations at this resolution have so far largely been limited to subcontinental domains and the number of regions for which these simulations have been evaluated are still rather limited to make robust conclusions.Here we present some convection resolving climate simulations performed in the framework of CORDEX FPS on convection and the European Climate Prediction System (EUCP) project, using the non-hydrostatic version of the RegCM4.7.0 model. The simulations have a grid spacing of 3 km, over three different European regions (Pan-Alpine, Central Europe and South-East Europe). The perfect boundary simulations driven by the ERA-Interim reanalysis, cover the period 2000–2015, and the scenario simulation , driven by the Global Climate model HadGEM, is divided in 3 time slices each covering a 10 years period the historycal (1996-2005), the near future (2041-2050) and the far future (2090-2099) for the RCP8.5 scenarios. An assessment of the simulations is presented using a wide range of validation data sets, including in-situ and satellite-based observation of precipitation. Preliminary results of this analysis highlight that the RegCM convection resolving simulations are able to reproduce important features of the precipitation field in terms of intensity and spatial distribution at hourly resolution although the model performance can variate according to the nature of the differences between regions with and without strong orographic forcing. Examples of the projected climate change signal are presented too and compared with the mother domain simulation at 12 km resolution