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RCM ALADIN-Climate/CZ simulations of 2021-2050 and 2071-2100 climate over the Central Europe region with emphasis on analysis of extreme events

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In the frame of the EC FP6 project CECILIA, two simulations of the future climate conditions in the Central Europe were performed by the regional climate model ALADIN-Climate/CZ under high resolution of 10 km. The simulations according to the IPCC A1B emission scenario cover 30-years time intervals in the middle (2021-2050) and end of the 21st century (2071-2100). The regional model was driven by the general circulation model ARPEGE-Climate over the Central Europe integration domain covering 74 $\times$ 148 points (lat. $\times$ lon.). The presented analysis of the expected change in extreme events is focused only on the Czech Republic that represents a central part of the domain with 789 model's grid points.

Before the analysis of the future climate, the model data were corrected according to validation results carried out for the period 1961-1990. For this task a new gridded dataset of station observation was created from all available data records stored in the climatological database of the Czech Hydrometeorological Institute (CHMI). All input station observations were quality controlled and homogenized in daily scale and then recalculated to the ALADIN-Climate/CZ's grid of 10 km horizontal resolution while taking into account the model's elevation and distance from an individual grid point.

Gridded dataset of station observations was then compared with the past climate (1961-1990) GCM driven ALADIN-Climate/CZ simulation in each grid point. According to relationship between these two datasets, outputs of A1B scenario integrations of the future climate were corrected applying an approach of Déqué (2007) that is based on a variable correction using individual percentiles. After the correction, the model outputs are fully compatible with the station (measured) data.

Corrected model outputs are analyzed with regard to extreme events of air temperature and precipitation by applying 131 indices defined within the WP4 of the CECILIA project. The obtained results are compared both to 1961-1990 historic run and present time climatological observations.