



Does an increasing resolution of RCM leads to more accurate simulation of climate elements over Czech Republic?

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Regional climate models (RCM) are a useful tool for a simulation of surface climate with respect to conditions of individual regions. The need of the realistic representation of surface elements at the local scale is important particularly in terrain with complex orography. The Czech Republic with the mountain chains along its border and highlands as well as lowlands in the inland seems to be a good representation of such region. A good performance of the models in reproducing recent temporal and spatial distribution of temperature and precipitation can enhance our confidence in the changes projected for future climate conditions.

In this study, we compare two versions of the RCM ALARO covering a 30-year climate period (1961–1990); a simulation with a common resolution 25-km and a simulation with a very high resolution 6-km. The ALARO-Climate RCM has been developed in recent years in the Czech Hydrometeorological Institute on the basis of the numerical weather prediction model ALADIN and is already operated at other five national meteorological services. Both presented simulations are driven by the ERA-40 reanalysis and run on the large pan-European integration domain ("ENSEMBLES / Euro-Cordex domain").

As the reference dataset we use technical homogenized series based on time series from stations in the Czech Republic interpolated to the same network as both model simulations but with real altitude of the grid points (GriSt).

The seasonal and monthly values of mean, maximum and minimum temperature as well as precipitation amounts are examined. We display a spatial distribution of biases of seasonal means and the temporal distribution of biases based on monthly values with respect to the altitude for both simulations. The results indicate that a higher resolution of model tends to improve the simulation of present day climate, with larger improvements in areas affected by mountains.