Statistical localization of the outputs of a high-resolution regional climate model

J. Mikšovský (1), M. Belda (1), T. Halenka (1), and P. Štěpánek (2)

(1) Dept. of Meteorology, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic (jiri.miksovsky@mff.cuni.cz), (2) Czech Hydrometeorological Institute, Regional Office Brno, Brno, Czech Republic

The recent evolution of regional climate models (RCMs) has considerably increased their ability to reproduce the finer details of local climate conditions. But even in the 10-25 km horizontal grid, used by a substantial portion of the current RCMs, some local orographic features remain unresolved, and the related details of the fields of climate variables cannot be captured. In this contribution, we focus on the possibility of further localization of the outputs of a regional climate model beyond the resolution of the original grid. The analysis is carried out for temperature and precipitation fields, produced by the RegCM model, run in the 10 km resolution for Central Europe. Explored and compared are different interpolation strategies based on linear or nonlinear regression methods as well as geostatistical interpolation techniques. A particular attention is paid to realistic representation of the influence of terrain altitude, as one of the fundamental covariates forming the structure of both temperature and precipitation fields. It is also discussed how the available measured data can be employed for construction of statistical corrective mappings, reducing biases and other errors in the localized data, and whether and how these corrections can be improved by incorporating seasonal effects and/or by distinguishing between situations related to different patterns of large-scale circulation.