

Statistical downscaling models for seasonal mean extreme temperatures in Romania

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Statistical downscaling models for seasonal mean of maximum and minimum temperatures in Romania were developed. The winter and summer mean values at 26 stations, covering regions with various topographical characteristics (mountain, plain, hill, coastal area), were considered as predictands. The statistical model (SDM) based on the canonical correlation analysis (CCA) was used as downscaling procedure. The temperature at 850 mb (T850) was considered as predictor and the analysis was performed over the interval 1961-2000. The SDM capability to reproduce the observed linear trend over the independent data set as well as its stability (in terms of explained variance and correlation coefficient of the reconstructed values) over two independent sub-intervals (1961-1980, 1981-2000) were analyzed.

Skilful and stable SDMs for all stations, for both seasons and parameters were found, except for a few stations in summer, when, in terms of explained variance, no skilful SDMs were found. The observed linear trend was well reproduced by the skilful SDMs for both parameters and seasons over the two sub-intervals considered as independent data set, except for the magnitude of the signal at some stations. For summer, the SDM skill is higher for the mean minimum temperature than for maximum temperature. The obtained results show that the statistical link between the extreme temperature variability in Romania and the T850 variability in winter and summer is strong and stable, that allows constructing climate change scenarios at station scale based on this link.