Statistical downscaling of extreme rainfall events in Romania using artificial neural networks

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The main purpose of statistical downscaling methods is to model the relationship between large-scale atmospheric circulation and climatic variables on a regional and subregional scale. Downscaling is an important area of research as it bridges the gap between predictions of future circulation generated by General Circulation Models (GCMs) and the effects of climate change on smaller areas.

In this study we present the first results of a statistical downscaling model, using a neural network-based approach by means of multi-layer perceptron networks. As predictands, various indices associated to temperature and precipitation extremes in Romania are used over the entire country (for temperature extremes) and on selected homogenous areas (for precipitation extremes). Several large-scale predictors (sea-level pressure, temperature at 850 / 700 hPa, specific humidity at 850 / 700 hPa) are tested, in order to select the optimum statistical model for each predictand. Predictands are considered separately or in various combinations.

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