



Statistical downscaling of precipitation projections for climate change adaptation over Italy

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The development and implementation of climate change adaptation strategies relies on the assessment of present impacts, as well as on accurate climate projections for the next few decades. Since vulnerabilities to climate change and climate features are very site-specific, climate projections must be provided at the local scale. In this study we follow a Model Output Statistics (MOS) approach to investigate the benefits of bias correction of precipitation projections provided by a set of RCMs of the ENSEMBLES project. Thirty meteorological stations distributed over the Italian territory were selected for the calibration and validation process; all data are quality-checked and almost complete over the forty years period 1961-2000. The study was carried out in three steps. First, the statistical correction method was calibrated using time series of predictors and predictands over the 20 years 1961-1980. Then, its validation was run over the period 1981 - 2000, with RCMs used in "hindcast" mode. Finally, the RCMs' output was downscaled to predict future trends of precipitations at the thirty Italian locations under the IPCC SRES scenario A1B until 2050. During validation, the performance of the downscaling method is illustrated and discussed as a function of the season and the location of the stations. In addition, the uncertainty of precipitation projections is evaluated as the result of the use of different RCMs. The downscaled future trend is shown for the "Italian" precipitation (averaged over the thirty stations) and separately for a few locations representative of different precipitation regimes.