



## Validation of spatial and temporal characteristics simulated by a variety of downscaling models: Results of the VALUE project

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We present a comprehensive validation of a large set of downscaling models, produced within the VALUE (“Validating and Integrating Downscaling Methods for Climate Change Research”) international project, from the point of view of their temporal and spatial properties. The downscaling models include a wide range of types and individual methods, including classical (perfect-prognosis-type) statistical downscaling, bias correction (model-output-statistics-type) methods, stochastic generators, and regional climate models. The downscaling models were developed for daily minimum, maximum, and mean temperature and precipitation, making use of a unified database (ERA-Interim reanalysis, ECA&D and E-OBS datasets, time period 1979-2008). The statistical downscaling models were trained and evaluated using a common methodology, consisting of a five-fold cross-validation. The downscaling methods are evaluated at 86 stations, which are spread as uniformly as possible across the whole of Europe, and at gridpoints closest to them.

The validated temporal characteristics include temporal autocorrelations, moments of statistical distributions of day-to-day changes, growing season length, annual cycle, and interannual variability. The spatial aspects include spatial autocorrelations, autocorrelation distance, pairwise joint threshold exceedances, and regionalization.