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## Precipitation downscaling using random cascades: a case study in Italy

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**Abstract.** We present a Stochastic Space Random Cascade (SSRC) approach to downscale precipitation from a Global Climate Model (hereon, *GCMS*) for an Italian Alpine watershed, the Oglio river (1440 km<sup>2</sup>). The SSRC model is locally tuned upon Oglio river for spatial downscaling (approx. 2 km) of daily precipitation from the NCAR Parallel Climate Model. We use a 10 years (1990–1999) series of observed daily precipitation data from 25 rain gages. Scale Recursive Estimation coupled with Expectation Maximization algorithm is used for model estimation. Seasonal parameters of the multiplicative cascade are accommodated by statistical distributions conditioned upon climatic forcing, based on regression analysis. The main advantage of the SSRC is to reproduce spatial clustering, intermittency, self-similarity of precipitation fields and their spatial correlation structure, with low computational burden.

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