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From regional climate simulations to the hydrological information needed for basin scale impact studies

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Abstract. The accuracy of local downscaling of rainfall predictions provided by climate models is crucial for the assessment of climate change impacts on hydrological processes because the presence of bias in downscaled precipitation may produce large bias in the assessment of soil moisture dynamics, river flows, and groundwater recharge.

In this study, the output of a regional climate model (RCM) is downscaled using a stochastic modelling of the point rainfall process able to adequately reproduce the daily rainfall intermittency which is one of the crucial aspects for the hydrological processes characterizing Mediterranean environments. The historical time-series from a dense rain-gauge network were used for the analysis of the RCM bias in terms of dry and wet daily period and then to investigate the predicted alteration in the local rainfall regime. A Poisson Rectangular Pulse (PRP) model (Rodriguez-Iturbe et al., 1987) was finally adopted for the stochastic generation of local daily rainfall as a continuous-time point process with forcing parameters resulting from the bias correction of the RCM scenario.

Full Article in PDF (PDF, 941 KB)

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