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Empirical-statistical downscaling and error correction of extreme precipitation from regional climate models

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Significant effort has been made over the past few years toward a characterization of future climatic changes and the estimation of related impacts using different greenhouse gas emissions scenarios. According to different regional climate models, warming climate will presumable result in seasonal shifts and possibly an increase in extreme precipitation events. Climate projection information originates from Regional Climate Models (RCMs). Since even high resolution RCMs are still too coarse for direct application in local climate change impact studies and since they are known to feature considerable errors, particularly regarding the precipitation and their extremes, error correction is needed to provide accurate climate information. Here, statistical downscaling techniques will play a vital role between the RCM output and the impacts analysis. Such an empirical statistical error correction forces RCM outputs in direction of observations, thus correct them assuming that the observations is an error free reference.

The main objective of this paper is to describe a methodology for empirical statistical downscaling and error correction of extremes precipitation at local scale under climate change. Detailed evaluation procedures and methodological development for the application to higher quantiles of daily precipitation will be described. These investigations extend the analyses by looking at the entire distributions' tails, which will enable to identify suitable improved extrapolation methods to provide qualitative localized climate change signal for extreme precipitation events also in future scenarios.