



Downscaling daily precipitation for flood risk estimation using copulas

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Climate change may have impact on local hydrology in the context of flooding events. To assess the degree of influence downscaling daily precipitation is necessary. Especially, downscaling extreme value is of most importance. The purpose of this paper is to develop a downscaling methodology suitable for flood risk estimation. The downscaling procedure is a combination of classified circulation patterns (CP) and continuous moisture flux at large-scale. The classification scheme use information from both large-scale and local scale. The circulation patterns are derived from daily sea level pressure (SLP) data and described by fuzzy-logic with respect to the position of high and low pressure anomalies. The classified CPs are then optimized by local variable, increment of daily discharge. Conditioned to each CP a joint distribution function between moisture flux and precipitation amount is established. The joint distribution function is created using Copulas that are capable to represent the spatial and temporal variability of precipitation with given information of moisture flux. The established relationship is then used for a multi-site precipitation downscaling methodology. The method is applied to the German part of the Rhine catchment. Indices for extremes are used to assess quality of downscaling. This work is a part of the EU funded STARDEX project.