



Copula-based downscaling of rainfall

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Fine-scale rainfall data is important for many hydrological applications including soil moisture modelling, flood prediction and land-slide risk assessment. However, direct approaches to obtain such data are generally difficult, usually because the required sensors are expensive and a fine-grained network is needed. Evidently, this is unfeasible in many areas of the globe. In recent times, satellite-based measuring methods offer a new opportunity to gain unprecedented coverage, however, at the cost of a decreased resolution. This has given rise to downscaling methods, a group of stochastic and deterministic methods that allow for an increase in resolution of coarse-scale imagery.

In recent work, a copula-based approach to downscaling has been explored. In this work, it was shown that a copula-based framework can approximate the sub-pixel distribution of coarse-scale pixels. Through fitting a parametric copula, we can assess the dependence within and between storms of different types (stratiform, convective). Furthermore, we can examine the scaling behaviour of the dependence for a large range of scales. Finally, it will be shown how this approach can be used in a downscaling framework.