Dependence Types in a Binarized Precipitation Network

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In a network of binarized precipitation (i.e., wet or dry value), the connection or dependence between each pair of nodes can occur following one or more of the following conditions: wet→wet, dry→dry, wet→dry, or dry→wet. Here, we firstly investigate the different types of dependence, year by year, within a precipitation network of binarized variables. We compare the sample estimate of the probability of co-occurrence (or occurrence with a lag time within ±3 days) of each of the four possible combinations with respect to the correspondent confidence interval in hypothesis of independence. We develop a procedure to efficiently assess the dependence behavior of all couples of nodes within the network and apply the methodology to a network of rain gauges covering Europe and north Africa.