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Comparison of Different Methods to Produce Fuzzy Tolerance Relations for Rainfall Data Classification in the Region of Central Greece

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Abstract : The aim of this paper is the comparison of three different methods, in order to produce fuzzy tolerance relations for rainfall data classification. More specifically, the three methods are correlation coefficient, cosine amplitude and max-min method. The data were obtained from seven rainfall stations in the region of central Greece and refers to 20-year time series of monthly rainfall height average. Three methods were used to express these data as a fuzzy relation. This specific fuzzy tolerance relation is reformed into an equivalence relation with max-min composition for all three methods. From the equivalence relation, the rainfall stations were categorized and classified according to the degree of confidence. The classification shows the similarities among the rainfall stations. Stations with high similarity can be utilized in water resource management scenarios interchangeably or to augment data from one to another. Due to the complexity of calculations, it is important to find out which of the methods is computationally simpler and needs fewer compositions in order to give reliable results.

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