

Interactive comment on “Distance in spatial interpolation of daily rain gauge data” by B. Ahrens

Anonymous Referee #1

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General comments

The paper describes a new method for analysis (interpolation, calculation of areal mean or calculation of grid point values) of annual and daily precipitation data from gauges, applied to the Austrian hydrological station network. Goal of the paper is to improve precipitation analysis over the Alpine region by using climate information from time series statistics. The method applied is an inverse distance weighting schema widely used in the scientific community, but fare away from optimal in a statistical sense. It is incomprehensible why the author don't choose a state-of-the-art statistical interpolation method, to demonstrate his idea of selecting surrounding stations by statistical distances (defined as variogram and therefore compatible to kriging). The advantage of statistical methods (like various kriging methods or optimal interpolation) is, that the weighting function is objectively estimated by correlation, the spatial distribution of the

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stations (e.g. clustering) is considered, and an error estimate is provided.

Specific comments

The question to be addressed is: Is it meaningful to develop a new interpolation schema by combining simple empirical interpolation with cross-correlation of time series? From my point of view it is not meaningful. If the author would replace the inverse distance weighting method by an optimum interpolation (commonly used in meteorology, where correlation functions are calculated from time series by default in opposite to geology and hydrology where single realisations are common) without model background, then he can refer to a well established method. Additionally it is easy to implement the idea of statistical distance by don't assuming homogeneity and isotropy (i.e. applying correlations for each pair of stations instead of one spatial auto-correlation function or variogram). Whether or not it is further necessary to select the closest stations in the vicinity of a point of interest by their statistical distance instead of their inter-station distance as proposed by the author, is questionable since the statistical interpolation provides explicit for correlation. The success of the method may be demonstrated by cross validation.

In any case, the author should give an overview on existing interpolation methods as well as a classification of his method.

Technical corrections

1) page 1894/20: replace “Beck and Ahrens” by “Beck et al.” 2) page 1898/9: better formulation may be: “In the set of ALL the mean inter-station distance is 6.7 km.” 3) page 1906/11: better formulation may be: "because of higher stationarity of spatial patterns caused by frontal” 4) page 1909/20: Typing error: “mountains n”

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