Assessing regression kriging for its ability to represent precipitation fields over complex terrain using different gauging network densities.

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Distributed hydrological modeling require spatially continuous precipitation data of high quality. However, precipitation is usually measured locally at a limited number of stations. Especially in areas of complex terrain, where the topography plays key role in the precipitation process, the gauging network is usually sparse or malfunction. The need of reliable precipitation data has led to the development of various spatial interpolation techniques specially designed for precipitation. Methodologies that can combine precipitation data to secondary information have been developed improving the skill of the interpolation. Regression kriging is an interpolation methodology which uses variable point values by combining a regression approach with a geostatistical approach (i.e. measuring spatial autocorrelation by kriging). The methodology is simple to use and has been already implemented in R and ArcGIS environments, thus it has a wider board of potential users. The methodology is assessed for its ability to represent precipitation fields in various precipitation station densities. Moreover, the results of Regression Kriging interpolation are compared to other interpolation techniques such as IDW, Kriging, Natural neighbor and spline, implemented in ArcGIS toolbox.