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Investigation of the relationship between precipitation intensity and lightning strikes in Baden-Württemberg

Jochen Seidel, Hannah Auer, and András Bárdossy

University Stuttgart, Institute for Modelling Hydraulic and Environmental Systems, Hydrology and Geohydrology, Stuttgart, Germany (jochen.seidel@iws.uni-stuttgart.de)

Precipitation is highly variable in space and time which imposes problems when this parameter has to be interpolated between stations. Often, auxiliary parameters such as elevation are included in interpolation algorithms, e.g. External Drift Kriging. In this study we investigate the potential of using the information from the occurrence of lightning strikes as additional parameter to improve the regionalisation of precipitation.
A dataset of lightning strikes from 2009 to 2012 for the region of Baden-Württemberg (Germany) for the summer months June, July and August was analysed and compared with hourly precipitation data from 208 rain gauges. Lightning density maps were used to see whether there are any spatial patterns in lightning strikes in the study area. Furthermore, the rank correlation between the number of lightning strikes in the vicinity of the rain gauges and the precipitation intensity was analysed. We also address the question how the precipitation probability changes when a lighting strike is registered in the vicinity of a gauging station and how often, i.e. during how many hours, this additional information from lightning strikes is available.