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Effect of different Approaches for Estimating Semivariograms on the spatial Interpolation Performance of Precipitation

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For distributed hydrological modelling of floods precipitation data with high resolution in space and time are needed. While the spatial resolution of non-recording precipitation networks with daily data is often suitable, this is seldom the case for hourly or shorter time step data. Recently, radar derived precipitation has been used more frequently as input for hydrological modelling. To provide optimal input for distributed hydrological modelling the best strategy is probably a combination of all available information about rainfall and applying sophisticated interpolation methods.

Prior to the geostatistical interpolation task the spatial persistence structure of precipitation has to be analysed and described typically using a semivariogram model. This paper will focus on the analysis of different approaches for estimating semivariograms and assessing their effect on the spatial interpolation performance of precipitation. Semivariograms were inferred from short time step gauge and radar data considering either isotropic or anisotropic behaviour. Regarding semivariogram fitting it was differentiated between average, event type and automatic. The sensitivity of the semivariogram inference on the interpolation performance was evaluated by precipitation cross validation using ordinary kriging and kriging with external drift and partly by rainfall-runoff modelling using the hydrological model WaSiM-ETH.

The investigations were carried out for a larger area in northern Germany focussing on the Harz Mountains and its surroundings. For hydrological modelling the upper Selke subcatchment of the Bode river basin with a drainage area of about 100 km^2 was used

as study region.