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1 Adjustment of a robust Q-Z/R-relationship for hydrological modelling using observed river discharge data

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The quality of hydrological modelling is limited due to the availability of high resolution temporal and spatial input data such as precipitation. Rain gauge measurements give accurate information at a single point while radar measurements provide good spatial information. On the other hand, it is difficult to estimate areal precipitation from rain gauge measurements and absolute rainfall intensities from radar data.

In this study, a method to adjust a robust Q-Z/R-relationship to estimate rainfall intensities from radar reflectivities for hydrological modelling is presented. The coefficients of split, three-part, piecewise linear Z/R-relationship following the German Weather Service RADOLAN (2004) project are optimized using river gauge measurements from five catchments. The generated radar precipitation fields are used as input to the water balance model WaSiM to simulate river discharge for a three month period in summer 2001. On this base, the Nash-Sutcliffe efficiency (from observed and simulated discharge) is optimized and the final Q-Z/R-relationship estimated. The study is performed in the well known alpine Ammer watershed with very short reaction times of the river gauges to rainfall events. Results from the continuous, three-month discharge simulations using radar derived precipitation fields (adjusted Q-Z/R-relationship) are shown as well as the validation of the new found relationship against rain gauge measurements.