Spatial correlation of radar- and gauge-measured precipitation in different temporal aggregation steps

J. Brommundt, A. Bárdossy

Institute for Hydraulic Engineering, Universität Stuttgart, Germany
(juergen.brommundt@iws.uni-stuttgart.de / Fax: +49 711 685 4681 / Phone: +49 711 685-4665)

For the regionalisation of the correlation of precipitation in different temporal aggregation steps as input for a multi-site precipitation time series generator a model is needed. Spatial correlation of precipitation is strongly inhomogeneous and anisotropic. Additionally it depends on the time step the precipitation is aggregated to. All these properties should be incorporated in the model.

Rain gauges measure precipitation in a high temporal and a low spatial resolution and the accuracy of the gauges is high. Radar images provide a high temporal and spatial resolution, but the accuracy of the measurements with respect to precipitation is low, since radar measures reflectivity from which precipitation has to be derived using a functional relationship.

The goal of this paper is to present a comparison of the properties of the gauge-measured and radar derived precipitation time series with special emphasis on correlation. In a case study for the state of Baden-Wuerttemberg, Germany, classified radar data has been used to regionalize spatial indicator correlation of precipitation at the gauges on different aggregation steps. Therefore a functional relationship between the radar reflectivity classes and the ground measured precipitation has been estimated at 100 gauges. Applying this relationship the indicator correlation of precipitation can be calculated from the radar- and the gauge-measured data. A further relationship links the indicator correlation of the radar measured precipitation to the indicator correlation of gauge stations at the ground. This way the advantages of both techniques are combined to gain a model in high temporal and spatial resolution to estimate indicator correlation between any gauge stations in the project region.