



Evaluation of scaling relationships from radar data for whole Germany

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Precipitation usually exhibits scale-invariant behaviour on a large range of temporal and spatial scales which has been explained physically as well as empirically in many studies. Here, we investigate intensity-duration relationships from radar data for Germany from 2001 to 2016. A newly released radar composite product from the German Meteorological Service (Radolan-YW, DWD 2018) with a resolution of 5 minutes and $1 \times 1 \text{ km}^2$ was used for the analysis. After a conversion of the whole raster data set into time series, the maximum intensities per duration were derived with 1) moving window, 2) fixed window, and 3) interpolated fixed window aggregation. Out of the data set, the maximum and percentiles of maximums were plotted against their duration and compared with existing theoretical as well as empirical relationships from point observations. The results show unexpected scale breaks after around 1 hour, which suggests a non-consistent scaling behaviour of the radar data. This implies a careful usage of the data set in context of extreme value statistics as well as its application.