

### 3.9 CHARACTERISTIC SPATIAL EXTENSION OF RAIN EVENTS IN GERMANY FROM A RADAR BASED PRECIPITATION CLIMATOLOGY

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Precipitation is highly variable in space and time. In contrast to in-situ observations with rain gauges, weather radars provide reliable information also on the spatial variability and the extent of precipitation. Since 2001 the Deutscher Wetterdienst (DWD) operates a nationwide network of C-band weather radar systems. A climatology for Germany has been generated from this 16-year radar-based precipitation dataset permitting the analysis of extreme rainfall for different durations  $D$  and return periods  $T$  as well as their spatial distribution and extension on a 1 km x 1 km grid.

The spatial distribution for rare events with long durations (e.g.,  $T=20$  a,  $D=24$  h) obtained from the radar climatology is clearly influenced by the orography and coincides well with those obtained from interpolated rain gauge data. However, in case of short duration ( $D=1$  h) the spatial distribution and structure differs significantly between radar and rain gauge based climatologies, because these are mainly based on local events with sizes too small to be sufficiently captured by the rain gauge network. The radar based climatology indicates that strong short term events can occur everywhere regardless of the orography.

The correlation between the time series of all grid points allows for an estimation of the spatial extension of rain events with different durations. The correlation length (drop in correlation to  $1-1/e$ ) indicates that typical extensions are approximately ten times smaller for  $D=1$  h than for  $D=24$  h in case of  $T=20$  a. Additionally, the field of correlation coefficients reveals regions of similar characteristics of rain events, e.g., mountainous regions in South-West and Central Germany.

We will give a brief overview of the methods used to compute the radar climatology and a comparison of radar- and gauge-based precipitation maps for selected durations and return periods. Furthermore, the characteristic spatial extension of rain events with certain durations and return periods will be investigated.

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