

4.14 REGIONAL FREQUENCY ANALYSIS OF RADAR RAINFALL IN BELGIUM

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In Belgium, only rain gauge time series have been used so far to study extreme rainfall at a given location. In this study, the potential of a 12-year quantitative precipitation estimation (QPE) from a single weather radar is evaluated. The peak intensities are fitted to the exponential distribution using regression in Q-Q plots with a threshold rank which minimises the mean squared error. Compared to automatic rain gauges on a 2005-2016 period, the basic radar product exhibits unrealistic high extremes for 1h accumulation. The radar QPE needs a bias correction for 24h accumulations. Differences between radar and gauge rainfall values are caused by radar signal attenuation, spatial and temporal sampling, gauge underestimations and other remaining radar errors. Nonetheless, the fit to the QPE data is within the confidence interval of the gauge fit, which remains large due to the short study period. A regional frequency analysis for 1h duration is performed at the locations of four gauges with 1965-2008 records using the spatially independent QPE data in a circle of 20km. The confidence interval of the radar fit, which is small due to the sample size, contains the gauge fit for the two closest stations from the radar. In Brussels, the radar extremes are significantly higher than the gauge rainfall extremes, but similar to those observed by an automatic gauge during the same period. The extreme statistics exhibit slight variations related to topography. The radar-based extreme value analysis can be extended to different area sizes.