7.3 REAL-TIME RAINFALL FROM A COUNTRY-WIDE NETWORK OF COMMERCIAL MICROWAVE LINKS IN GERMANY

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Many cell phone base stations are interconnected using a network of commercial microwave links (CMLs). At the typical frequencies of these CMLs (between 15 GHz and 40 GHz) rainfall considerably attenuates the transmitted signal along the CML paths. Therefore, the measured attenuation can be used to derive path averaged rain rates. Retrospective analyses of CML data have already shown that this technique can provide valuable rainfall information. However, applications for rainfall data, e.g. using it as input for short-term flood warning system, require timely data availability.

We now process more than 4000 CMLs all over Germany in real-time. Our CML data is based on instantaneous attenuation measurements which we acquire every minute. This data is available within seconds and is immediately fed into our processing pipeline. The processing includes outlier detection, wet/dry classification, compensation for wet antenna attenuation and temporal aggregation. The resulting rainfall information for the individual CMLs is then interpolated to rainfall fields every five minutes.

We describe our data acquisition and management system, elaborate on the processing challenges and our processing methods and show a validation of CML-derived rainfall information for Germany using RADOLAN, the rain gauge adjusted radar product of DWD. Finally, we will do a live demonstration of our web-based visualization of the CML real-time rainfall fields.