



Challenges in the usage of commercial microwave links for the generation of transboundary German-Czech rainfall maps

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Attenuation data from commercial microwave links (CMLs) has proven useful for estimating rainfall. Their major benefits are a high abundance in most regions on earth, a high resolution in time, close to ground measurement, and the absence of installation costs and efforts. The spatial and temporal coverage of CMLs would theoretically enable the generation of continental rainfall maps for various aggregation times.

However, there exist limitations that have so far inhibited rainfall estimation on larger scales. The data is generally obtained on a national basis from different network providers and networks can vary significantly in characteristics such as frequency and length distributions. CML data requires careful processing that depends on these characteristics and which has so far been adjusted to independent data sets only.

In this study we investigate what kind of processing is required to use independent and heterogeneous CML data sets for the generation of transboundary rainfall maps. We use 3900 CMLs from Germany and 2500 CMLs from the Czech Republic. The German data set is rather evenly distributed with respect to spatial coverage, frequencies and lengths. The Czech data set, on the other hand, varies significantly more in all these regards: it is characterized by dense networks of short CMLs in the cities, a large share of CMLs with E-Band frequency, and hence a large range of sensitivities.

We find that quality control is important especially when dealing with independent data sets. We propose several algorithms and the consideration of network characteristics when combining two CML data sets, and show how adapted but straightforward processing allows the generation of transboundary rainfall maps.