



CML rainfall estimation in Africa: Recent results, challenges and suggested solutions

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Many studies have already shown that attenuation data from commercial microwave link (CML) networks can be used to derive rainfall information, also on a country-wide scale. Particularly in regions with coarse station networks and without radar coverage, CMLs provide an attractive solution to increase the spatial and temporal coverage of rainfall observations. There are, however, several challenges that we face when transferring the successful applications from Europe to developing countries. In this contribution we present recent results from dense CMLs networks in two African cities, discuss the challenges that we are facing when trying to expand CML rainfall estimation, and present potential solutions to tackle these challenges.

We show rainfall maps with temporal resolution of 15-minutes derived from CML networks in the city of Ouagadougou (Burkina Faso) and the city of Lusaka (Zambia). There is only one rain gauge for comparison in each city, which limits the options for validation. However, comparison of the CML-derived rainfall maps with the gauges shows good agreement. These results clearly show the large potential of the dense CML networks in African cities for rainfall observation.

Country-wide rainfall estimation based on CML data in developing countries can not always be done in the same manner, as e.g. in Germany. Based on our experience, a large number of CMLs in developing countries are long 7-GHz CMLs. At these frequencies the path attenuation is less sensitive to rainfall and the long CMLs seem more prone to fluctuations during dry periods. This makes the data processing more challenging. We suggest that a combination of CML data processing with data from geostationary satellites is considered a basic requirement and not only an option for further improvement. While this combination is methodologically feasible, it implies large organizational efforts. Either large amounts of satellite data have to be moved to the individual institutions that do CML data processing, or CML data, which is hard to get access to, has to be transferred to an institution that has direct access to the satellite data.

To be able to bring rainfall estimation from a combination of CML and geostationary satellite data to an operational level, simplified access to CML data and concerted processing is required. We do

not suggest a final solution, but we present ideas to initiate a discussion that should pave the way towards making operational usage of CML data in developing countries a reality.