EGU23-14295, updated on 20 Apr 2024
https://doi.org/10.5194/egusphere-egu23-14295
EGU General Assembly 2023

OpenMRG: Open data from Microwave links, Radar, and Gauges for rainfall quantification in Gothenburg, Sweden

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In a changing climate accurate measurements and near-real time rainfall monitoring are essential for sustainable societies. Commercial microwave links (CMLs) offer a great alternative, or addition, to traditional sensors, like rain gauges and radar. While CMLs are a great source of opportunistic sensors the data from CMLs are usually limited by their accessibility for both research and actual implementation. To help in gaining better access and research into CML-derived rainfall we present a dataset at 10 second resolution with true coordinates for 364 bi-directional CMLs gathered during a pilot study in Gothenburg, Sweden over a three-month period (June-August 2015). These data are complemented by additional data from 11 high-resolution rain gauges (ten 1 min and one 15 min) and radar data (5 min and 2 km resolution) from the Swedish operational weather radar composite over the Gothenburg area.

Analysis of the data show that data collection is very complete, with 99.99% of the CMLs, 100% rain gauges and 99.6% of the radar data available. The gauge data shows that around 260mm rainfall was measured during this period with 6% precipitation during 15-minute intervals. At the Torslanda gauge on 28 July 2015 one the of the most intense events was observed during the three-month period with a peak intensity of 1.1 mm min^{-1}. The CML data reflect this event well and show a drop of around 27 dB during the peak intensity. Radar data also showed a good distribution of the reflectivity of the precipitation with some measurements above 40 dBZ, which is commonly taken as an indication of convective precipitation. Some low intensity clutter was also found, mostly around -15 dBZ.

The data are accessible at https://doi.org/10.5281/zenodo.7107689 (Andersson et al., 2022). The sharing of these Open high-resolution data of Microwave links, radar and gauges (OpenMRG) should enable further research in microwave-link based environmental monitoring. In the longer term we hope that this dataset will also contribute to easier access of CML data and help in the development of the merging of multi-sensor products.