



## **Determining the ability of radar, commercial microwave links and crowdsourced personal weather stations to capture small scale urban rainfall**

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High resolution rainfall measurements are desirable for urban rainfall monitoring. In addition to the rainfall observations from radar, opportunistic sensing methods provide rainfall information as well in near real-time. C-band radar provides rainfall intensities over grids of 1 km<sup>2</sup> every 5 minutes. Personal weather stations (PWS) from weather amateurs can upload rainfall amounts automatically to online platforms in intervals of approximately 5 min. Commercial microwave links (CML) yield path averaged rainfall intensities every 15 min from the signal attenuation due to rain drops over the link path. The different network layouts and sampling methods result in different accuracy of each technique. The ability of radar, CML and PWS to measure the small scale rainfall are determined in an experimental set up in a study area of 400 km<sup>2</sup> in Amsterdam. A simulated rainfall event described as drop size distributions (DSDs) at 100 m spatial resolution and 30 second intervals is used as ground truth. From the DSDs, measurements are derived for radar, CML and PWS, mimicking their respective sampling method and the actual lay-out of the networks in the study area of Amsterdam. Comparisons with the ground truth show that, assuming perfect measurement accuracy, the PWS network captures the small scale rainfall best. CML accuracy improves most by considering the rainfall at larger scales, especially the temporal integration.