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One man's noise is another man's signal - the OpenSense project

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For effective urban stormwater management information on rainfall at sufficient temporal and spatial resolution is an essential input. The lack of, or insufficient, rainfall data in urban catchments is a global issue that is particularly pronounced in lower-income countries, where the absence of traditional observation systems, combined with rapidly growing urban populations, makes the challenge even more critical. Opportunistic sensing (OS) of precipitation can help in this regard, especially because the two most common OS sensors, i.e. commercial microwave links (CML) and personal weather stations (PWS), are densely distributed in populated areas and are accessible in near-real time. However, there are a number of challenges related to rainfall retrieval using opportunistic sensors. The rainfall data from opportunistic sensors contain high uncertainties and are often noisy, their networks are inhomogeneous, the data can be inconsistent and their interoperability is low. Moreover, the data are owned by private entities and are often not accessible even for scientific purposes.

In response to this situation, the European OpenSense project was launched. It focuses on improving access to OS data, international coordination of OS data standardisation, data processing and follow-up applications in collaboration with a number of European national meteorological services. Our contribution provides an overview of successful community efforts in tackling OS challenges and highlights the evolution of OS techniques from the initial experimental phase to early-stage practical applications. The benefits of OS observations for urban hydrology, along with the enhancement of high-resolution rainfall products are further demonstrated through several case studies.

However, despite significant advances in utilizing OS data for hydrometeorological purposes, a key challenge that remains in its early stage is the upscaling of OS data acquisition and achieving global data availability. Therefore the OpenSense community introduces the concept of a global initiative to allow collection, curation and usage of OS data from CMLs.