

## D3.3 - Report documenting case studies and other applications of OS datasets compiled by the Action

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Author	Maximilian Graf, Remco van de Beek, Jonas Olsson
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Description	Case studies and applications from both OpenSense curated and other OS datasets in form of a review paper
Key words	OS data, case study, application

**About OPENSENSE (COST Action CA20136).** *OPENSENSE brings together scientists investigating different opportunistic sensors (e.g. microwave links, citizen science), experts from weather services, and end-users of rainfall products to build a worldwide reference opportunistic sensing community. The overarching goals of the COST are to overcome key barriers preventing data exchange and acceptance as hydrometeorological observations, define*

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*standards to allow for large-scale benchmarking of opportunistic sensing precipitation products and develop new methods for precipitation retrieval, coordinate integration of the opportunistic observations into traditional monitoring networks, and identify potential new sources of precipitation observations. Further details can be found here:*

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## Glossary

<b>WG</b>	Working Group
<b>OS</b>	Opportunistic Sensors

## 1. Short summary

The review paper with the title “How close are opportunistic rainfall observations to providing societal benefit” describes the recent state of OS-rainfall applications in the area of rainfall mapping, nowcasting and hydrological modelling. This state is embedded in the question how far these applications are in terms of operationalism and what challenges have to be solved before widespread deployment of OS rainfall data. The review paper was written solely by OpenSense members and takes into account the OS datasets whose curation was coordinated by WG1.

### Abstract:

Mitigation of water-related hazards as well as sustainable water resources management are conditioned on accurate and detailed spatio-temporal rainfall observations. Today, water authorities like National Meteorological and Hydrological Services (NHMS) in developed countries operate observation systems consisting of meteorological stations and weather radars. These observations provide state-of-the-art precipitation products, but they remain error prone due to device-specific limitations. This has driven growing interest in opportunistic sensors (OS) of rainfall, primarily Commercial Microwave Links (CML) and Personal Weather Stations (PWS). In the Global South, where meteorological station networks are usually very sparse, OS rainfall data conceivably has an even higher potential to provide an added value. However, although numerous studies have demonstrated the capability and potential of accurate rainfall estimation by OS, no dedicated investigation has been made with regard to their application for operational monitoring and prediction. How close are OS rainfall data to providing societal benefit, e.g. by widespread integration in existing hydro-meteorological observation and prediction systems? We address this question by (1) making a review of studies that use OS rainfall data in applications (rainfall mapping, nowcasting and hydrological prediction), (2) providing a status report on the transition from research to operational usage from the perspective of EU COST Action OpenSense, and (3) discussing the challenges NHMS face in deploying OS rainfall data in operational services. We conclude that while distinct challenges still remain, in terms of both access and processing, the applicability of OS rainfall data is well scientifically supported and operation is underway in several countries.

## Reference

Olsson, J., Horváth-Varga, L., van de Beek, R., Graf, M., Overeem, A., Szaton, M., ... & Todorović, A. (2025). How close are opportunistic rainfall observations to providing societal benefit?. *Journal of Hydrometeorology*, doi: <https://doi.org/10.1175/JHM-D-25-0043.1>