

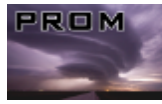
PrePEP 2025

Conference on Precipitation Processes – Estimation and Prediction

Title: Processing of opportunistic rainfall sensors data from CML, PWS and SML networks
Instructors: Dr. Christian Chwala, Karlsruhe Institute of Technology (KIT); Maximilian Graf, University of Augsburg E-Mails: christian.chwala@kit.edu; maximilian.graf@geo.uni-augsburg.de
Duration: 9 am - 5 pm including breaks
Format: in-person only
Location: Dept. of Meteorology, Auf dem Hügel 20, 53121 Bonn
Abstract: Opportunistic rainfall sensors offer an attractive solution to increase the spatial and temporal coverage of rainfall observations. As the name implies, opportunistic sensors were originally not meant to provide high-quality rainfall information. Because of that, data processing and quality control is crucial when using these sensors. In this workshop we will introduce the basics of rainfall estimations with data from commercial microwave links (CMLs), which form large parts of the backbone of the cellular network, and from satellite microwave links (SMLs), which are an emerging solution to provide cheap internet connectivity via two-way communication to geostationary satellites. In addition, we will introduce quality control and bias correction methods for rainfall data from personal weather stations (PWS), low-cost meteorological sensors that people install in their own garden. We will briefly introduce each sensor and discuss their pros and cons. Based on open datasets, e.g. the OpenMRG dataset, and open-source tools, e.g. pycomlink, we will then dive into the processing of the datasets. During these hands-on sessions you will learn about different processing methods, the effect of different parameters and the interplay of processing methods. We will conclude with an example application, showing how to use CML and PWS data for radar adjustment.
Learning objectives: <ul style="list-style-type: none">• Understand the operating principle of CMLs and SMLs• Understand the challenges of CML, SML and PWS data• Learn about and apply all relevant processing steps to derive quality controlled rainfall estimates from CML, SML and PWS data
Technical requirement: <ul style="list-style-type: none">• Participants should bring and use their own laptops• Setup instructions will be sent beforehand

Prior knowledge required from participants:

- Basic knowledge of Python and common scientific packages (matplotlib, numpy, xarray)
- Basic knowledge of working with notebooks in Jupyterlab



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