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Weather radar adjustment with pyRADMAN: Experiments with and without commercial microwave links

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Data from commercial microwave links (CMLs) have proven to provide useful rainfall estimates. With their extensive numbers, potential for real-time data availability, and measurement near the ground, they offer the potential to adjust weather radar data, similar to the operational use of rain gauges by national meteorological services (NMS). Furthermore, CMLs offer a path-averaged rainfall estimate that resembles the areal measurements obtained from weather radars more closely than the point measurements from rain gauges.

However, several challenges hinder the use of CML data for radar within the operational setting of NMS. These include the (real-time) acquisition of CML data from mobile network operators, the uncertainties related to their rainfall estimation and the question how to actually merge gridded data with their path-averaged information.

In the HoWa-PRO project, we have established a CML data stream from Ericsson to the German Weather Service (DWD) and developed the Python framework pyRADMAN to merge radar, rain gauge and CML data in real-time. In this contribution, we will present pyRADMAN and its resulting rainfall products. The methodology in pyRADMAN builds on the adjustment technique from the operational software RADOLAN, using refined methods for CMLs. Additionally, we tested other adjustments like kriging with external drift and conditional merging, used classic advection correction or the deep-learning model ResRadNet to correct the radar prior to the adjustment and increased the temporal resolution of adjusted products to up to 15 minutes. pyRADMAN enables modular implementation and testing of new pre-processing and adjustment methods, supporting future collaborative efforts.

VAT

Session

From Classical to Integrated Remote Sensing: New observation strategies for clouds and precipitation (multi-frequency, spectral polarimetry, multi-sensor)

Preferred Contribution Type

Oral Presentation

Presenting Author

Maximilian Graf

Email Address of Presenting Author

maximilian.graf@dwd.de

Affiliation of Presenting Author

Address of Presenting Author

Frankfurter Str. 135, 63067 Offenbach am Main

Author: GRAF, Maximilian (Deutscher Wetterdienst)

Co-authors: CHWALA, Christian (KIT (IMK-IFU)); Mr WENZEL, Malte (Deutscher Wetterdienst); Mr GOTTSCHALK, Matthias; Dr WINTERRATH, Tanja (Deutscher Wetterdienst); POLZ, julius (KIT/IMK-IFU)

Presenter: GRAF, Maximilian (Deutscher Wetterdienst)