

Weather radar adjustment with commercial microwave links at DWD

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Weather radars provide high-resolution precipitation data but are subject to uncertainties due to their indirect measurement high above ground. To improve data quality, national meteorological services calibrate radar observations using ground-based station measurements for both operational and climatological applications. The emergence of opportunistic sensors (OS), data sources not originally designed for high-quality hydrometeorological observations, such as commercial microwave links (CML) and private weather stations (PWS), offers the potential to increase the density of ground-based sensors for the radar adjustment.

As part of the HoWa-PRO project, the Deutscher Wetterdienst, in collaboration with Ericsson, has established a real-time CML data flow for radar adjustment. To facilitate this, the Python framework pyRADMAN was developed, enabling low-latency merging of radar, station, and CML data. Built upon the existing RADOLAN methodology, pyRADMAN extends its capabilities by incorporating CML observations and testing advanced methods such as kriging with external drift, conditional merging, and radar pre-correction techniques. These enhancements improve precipitation estimates and reduce latency compared to traditional RADOLAN products, tested up to a temporal resolution of 15 minutes.

Looking ahead, the modular architecture of pyRADMAN enables the seamless implementation of future calibration techniques. The integration of opportunistic sensor data gives opportunities for accurate, high-resolution precipitation estimation, both in an operational and research setting.

Are you an Early Career Scientist ?

Yes

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