Evaluation and Applicability Analysis of eDWIN Automatic Precipitation Gauge Network Using GPM IMERG and Radar Data

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In line with the recent trend of utilizing unconventional sources for weather measurements, a study was conducted at ICM Meteo Team analyzing the performance of the eDWIN automatic agricultural weather station network by comparing it to the well-established synoptic station network of the Polish Institute of Meteorology and Water Management. The evaluation process included a comprehensive analysis of each eDWIN and IMGW station's performance against GPM IMERG and POLRAD weather radar grid precipitation products. Subsequently, the study compared the overall performance of the eDWIN network to that of the IMGW network. The analysis period spans December 2021, April 2022, and July 2022, and covers the territory of Poland. The primary objective was to establish the reliability of the eDWIN network. By scrutinizing its performance under diverse conditions, the research aims to enhance understanding of the network's versatility and assess its potential integration into broader meteorological applications. The study also delves into the complex structure of the eDWIN network, comprising various subnetworks with different technical and geospatial characteristics. It also revealed that GPM IMERG and POLRAD exhibit distinct characteristics, and interestingly, they complement each other in certain instances throughout the research. The analysis conducted in this research primarily focuses on the accumulation of precipitation over a single day, with a brief extension to one month at the study's outset. This detailed examination involved a series of statistical analyses that shed light on the performance of weather stations across diverse precipitation intensities and various geographical locations. The primary finding of the study is that using eDWIN stations in colder months is not advisable. Numerous statistics indicate inferior performance, especially in December and to a lesser extent in April. Additionally, the research highlights regional variations in performance, pointing to characteristic biases in local subnetworks of the eDWIN network.