

## **Assessment of the reliability of satellite precipitation products for real-time monitoring of extreme precipitation**

Accurate rainfall information with high spatial and temporal resolution is crucial for monitoring flood events. This presentation analyses the reliability of selected satellite products operating in real-time (NWC SAF, H SAF), in non-real-time (PDIR-Now), and global reanalyses (IMERG Final Run). These products were evaluated during an extreme rainfall event in southern Poland in September 2024, which resulted in hazardous flooding.

The analysis revealed substantial discrepancies between satellite estimates and ground-based reference measurements derived from manual rain gauges. While PDIR-Now estimates offer high spatial resolution, they proved to be inaccurate in this case study, rendering them impractical for operational use. Satellite precipitation estimates, primarily based on visible and infrared channels – including SAT (a combination of several NWC SAF products), H61B, and PDIR-Now – demonstrated relatively low correlation and significant underestimation of precipitation maxima compared to reference measurements. Among the analysed satellite data, the IMERG Final reanalysis showed the highest accuracy in mapping rainfall fields. However, even these estimates underestimate maximum rainfall values in areas experiencing the highest precipitation. Furthermore, these data are subject to a latency of several months, limiting their use for real-time applications.

The results indicate the limited usefulness of the examined products, which rely mainly on infrared channels (IR) and, during part of the day, visible channels (VIS), without the support of data from passive microwave sensors (PMW). To effectively monitor and forecast extreme hydrological phenomena for various operational applications, these products should be integrated with ground data, particularly telemetric rain gauges and weather radars.