

Session HS7.2 – Precipitation variability from drop scale to catchment scale : measurement, processes and hydrological applications

Improvement of rainfall estimates using opportunistic sensors - the example of the flood in Rhineland-Palatinate in July 2021

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Precipitation is highly variable in space and time. Ground-based precipitation gauging networks such as those from national weather services are often not able to capture this variability. Weather radars have the potential to capture the spatio-temporal characteristics of rainfall fields but they also suffer from specific errors such as attenuation. The increasing number and availability of opportunistic sensors (OS), such as commercial microwave links (CML) and personal weather stations (PWS), provides new opportunities to improve rainfall estimates based on ground observations.

We have developed a geostatistical interpolation method that allows a combination of different opportunistic sensors and their specific features and geometric properties, e.g., point and line information. In addition, the uncertainty of the different data sets can be considered [1].

The flood event in the western provinces of Germany in July 2021 showed that both, the precipitation interpolations based on rain gauge data from the German National Weather Service and radar-based precipitation products, underestimated precipitation. We show that the additional information of OS data can improve precipitation estimates in terms of areal precipitation amounts and spatial distribution.

References

[1] Graf, M., El Hachem, A., Eisele, M., Seidel, J., Chwala, C., Kunstmann, H. and Bárdossy, A.: Rainfall estimates from opportunistic sensors in Germany across spatio-temporal scales, <https://doi.org/10.1016/j.ejrh.2021.100883>