Contribution ID: **36** Type: **Oral**

Flood forecasting based on personal weather station rainfall data

Thursday, June 26, 2025 5:45 PM (15 minutes)

An increasing number of personal weather stations (PWSs) is installed by citizens, resulting in a large amount of real-time available precipitation data. This study assesses the applicability of these data for flood forecasting. We focussed on 30 catchments (total area 2474 km2) located in the management area of Water Board Rijn and IJssel, a water authority in the Netherlands which actually uses PWS data as input for their operational flood forecasting system.

We compared rainfall from a network of Netatmo PWSs (after applying a quality filter) and the real-time radar product from the KNMI (Royal Netherlands Meteorological Institute). Next, we used both products as input for the rainfall-runoff model WALRUS and compared the simulated discharges. These two datasets with almost no latency were validated with the final reanalysis KNMI radar product and discharge observations, for a full year (2023), using the Kling–Gupta efficiency (KGE).

For precipitation the KGE was higher for the real-time radar (0.80 for the entire area) than for the PWSs (0.68). For discharge simulations the KGE was lower for the real-time radar (median of the subcatchments: 0.46) than for the PWSs (0.70). This contrasting result can be explained by the bias, which was higher for the real-time radar than for the PWSs, and is amplified in the discharge simulations due to the memory in the hydrological system.

During ten selected high discharge events, the simulations with real-time radar approached the observations more closely than with the PWSs. The results indicate a potential of these devices to be used in hydrological applications, especially when initial hydrological model conditions are improved with data assimilation in operational flood forecasting systems.

Are you an Early Career Scientist ?

No

Author: SCHOONHOVEN, Jisca (Wageningen University)

Co-authors: BRAUER, Claudia (Wageningen University); BOGERD, Linda (Wageningen University)

Presenter: BRAUER, Claudia (Wageningen University)

Session Classification: Application of OS rainfall data

Track Classification: Application of OS rainfall data