



## A Radar-Assisted and Enhanced Near-Real-Time Quality Control System for Daily Rainfall in Ireland

**Chang Liu** and Barry Coonan

Climate Services Division, Met Éireann, Dublin, Ireland ([chang.liu@met.ie](mailto:chang.liu@met.ie))

Daily precipitation observations support a wide range of hydrological and meteorological applications, including flood risk monitoring and numerical weather prediction. In Ireland, the quality control (QC) of rain-gauge data typically takes several weeks with a combination of automatic and manual analysis performed. As a result, near-real-time applications rely on provisional datasets whose quality has not yet been fully assessed.

We present a near-real-time QC workflow for daily rainfall observations based on approximately 150 stations reporting 09:00–09:00 UTC accumulations. The network comprises five manned airport stations, around 95 automatic stations, and approximately 60 volunteer stations operated by Met Éireann.

The QC framework adopts a two-stage methodology. First, a bootstrapping method is applied to manned stations and a subset of high-quality automatic stations to establish confidence intervals, which are then used to identify outliers in observations from other stations. Flagged outliers are subsequently cross-validated against neighbouring stations to assess their validity. Second, suspicious observations are evaluated using a radar-assisted consistency check based on cleaned 1 km × 1 km radar rainfall accumulations.

Applied to the 2024–2025 daily rainfall data stream, the workflow automatically detects anomalies, including isolated dry and wet stations, on a near-real-time basis; these anomalies were verified as erroneous observations. The proposed approach improves the accuracy and timeliness of provisional national rainfall grids and supports operational applications such as flood forecasting and weather modelling, with scope for extension to other observational datasets.