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Updating real-time flood forecasts of a grid-based distributed rainfall-runoff model

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This study combined Doppler radar rainfall measurements and forecasts with a grid-based distributed rainfall-runoff model to perform real-time flood forecasts one to three hours ahead. Due to the limitation of radar rainfall forecasts, the model performance of flood forecasting is not so well as the simulation results during model calibration. Therefore, two updating models are proposed to renew the real-time flood forecasting. One updating model is the support vector machine (SVM), a novel artificial intelligence-based method developed from statistical learning theory, and the other is a fuzzy rule-based model. The Keelung River in Taiwan was chosen as the study basin. The distributed rainfall-runoff model was calibrated with 7 historical rainfall events, and another 3 events were used as validation cases. Analytical results reveal that the both updating method can improve flood forecasts one to three hours ahead. The proposed updating technique can mitigate the problem of the phase lag in forecast hydrographs, and especially in forecast hydrographs with longer lead times.