



## **The use of MOGREPS and STEPS ensemble rainfall forecasts in operational flood forecasting systems across England and Wales**

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The Met Office nowcasting (STEPS) and short-range (MOGREPS) ensemble rainfall forecast products are tested for operational use within the Environment Agency's National Flood Forecasting System (NFFS) for England and Wales. Currently, the NFFS uses deterministic forecasts only. Operational configurations of the NFFS for North East and Thames regions are extended to trial the use of new ensemble rainfall forecasts in support of probabilistic flood forecasting. Evaluation includes considering issues of model performance, configuration (how to fit the ensemble forecasts within the current configurations), data volumes, run times and options for displaying probabilistic forecasts. Although ensemble rainfall forecasts available from MOGREPS are not extensive enough to fully verify product performance, it is concluded that their use within current Environment Agency regional forecasting systems can provide better information to the forecaster than use of the deterministic forecasts alone. Of note are the small number of false alarms of flow exceedance generated when using MOGREPS as input and that small flow events are also forecasted rather well, notwithstanding the rather coarse resolution of the MOGREPS grid (24 km) compared to the studied catchments. In addition, it is concluded that, with careful configuration in NFFS, MOGREPS can be used in existing systems without a significant increase in system load. STEPS is only evaluated on an event basis due to the limited number of forecasts available. However it is reasoned that use of a nowcasting ensemble rainfall product might prove of significant benefit in England and Wales where flood forecasts for many fast responding catchments rely very much on rainfall forecast inputs. The load to the system when implementing STEPS is significant and new hardware will be required to utilise STEPS operationally. Including new features in the underlying software that hosts the NFFS allows ensemble members to be run in parallel for better performance. Using these techniques will allow other ensemble rainfall products, such as STEPS, to be implemented within the current infrastructure and provide timely ensemble flood forecasts.