# Evaluation of NWP model rainfall forecasts for the 7-day ensemble streamflow forecasting service

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**Abstract**

The Bureau of Meteorology is planning to launch its national 7-day ensemble streamflow forecast service in mid-2019. Ensemble streamflow forecasts are generated using post-processed multi-model Numerical Weather Prediction (NWP) ensemble rainfall forecasts. In order to understand the characteristics of different NWP rainfall products, effects of rainfall and streamflow post-processing, and to identify capacity and efficiency of the operational forecast system, we evaluated four NWP rainfall products and corresponding streamflow forecasts for 26 catchments located in various hydro-climatic regions across Australia. The four NWP rainfall forecast products evaluated in this study are; (i) the Australian Community Climate and Earth-System Simulator – Global Ensembles (ACCESS-GE), (ii) ACCESS-G (deterministic), (iii) Poor Man's Ensemble (PME), and (iv) European Centre for Medium-Range Weather Forecasts (ECMWF). The evaluation results show that the rainfall post-processing reduces bias and improves the reliability of rainfall forecasts as well as the corresponding streamflow forecasts. Streamflow post-processing further improves the accuracy and reliability of forecasts significantly at shorter lead-times and the impact declines with the lead-time. Overall, the use of rainfall forecasts of ECMWF lead to better streamflow forecasts at the catchment scale. Further analysis on proper ensemble spread necessary to quantify forecast uncertainty reveals that 200 ensemble members are required from each ACCESS-GE and ECMWF products.