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A national framework for flood forecasting model assessment for use in operations and investment planning over England and Wales

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It has been common for flood forecasting systems to be commissioned at a catchment or regional level in response to local priorities and hydrological conditions, leading to variety in system design and model choice. As systems mature and efficiencies of national management are sought, there can be a drive towards system rationalisation, gaining an overview of model performance and consideration of simplification through model-type convergence. Flood forecasting model assessments, whilst overseen at a national level, may be commissioned and managed at a catchment and regional level, take a variety of forms and be large in number. This presents a challenge when an integrated national assessment is required to guide operational use of flood forecasts and plan future investment in flood forecasting models and supporting hydrometric monitoring.

This contribution reports on how a nationally consistent framework for flood forecasting model performance has been developed to embrace many past, ongoing and future assessments for local river systems by engineering consultants across England & Wales. The outcome is a Performance Summary for every site model assessed which, on a single page, contains relevant catchment information for context, a selection of overlain forecast and observed hydrographs and a set of performance statistics with associated displays of novel condensed form. One display provides performance comparison with other models that may exist for the site. The performance statistics include skill scores for forecasting events (flow/level threshold crossings) of differing severity/rarity, indicating their probability and likely timing, which have real value in an operational setting.

The local models assessed can be of any type and span rainfall-runoff (conceptual and transfer function) and flow routing (hydrological and hydrodynamic) forms. Also accommodated by the framework is the national G2G (Grid-to-Grid) distributed hydrological model, providing area-wide coverage across the fluvial rivers of England and Wales, which can be assessed at gauged sites. Thus the performance of the national G2G model forecasts can be directly compared with that from the local models.

The Performance Summary for each site model is complemented by a national spatial analysis of model performance stratified by model-type, geographical region and forecast lead-time. The map displays provide an extensive evidence-base that can be interrogated, through a Flood Forecasting Model Performance web portal, to reveal fresh insights into comparative performance across locations, lead-times and models.

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