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Impact-based forecasting for convective rainfall: a new approach combining rainfall ensembles and hazard impacts

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PREDICTOR (PREDICTing flooding impacts from cOnvective Rainfall) has been developed to improve the approach to forecasting the impacts of surface water flooding. PREDICTOR is a next generation decision-support tool that utilises the latest Met Office convective precipitation ensemble forecasting capabilities and Scotland's National Flood Risk Assessment (NFRA) flood maps.

The Impact-based Forecasting (IbF) approach of PREDICTOR combines the likelihood ("the chance") of flood-producing rainfall (from the Met Office ensemble forecasts) and the potential impact (from NFRA) to produce "Flood Risk" forecasts. The precipitation forecast product used is the Best Short Range (BSR) ensemble from the Met Office (MOGREPS-UK). 15-minute precipitation accumulations are available, extending out to ~32 hours and issued 4 times a day with 24 ensemble members. The NFRA surface water flooding maps have been generated using design rainfall inputs from the Flood Estimation Handbook (FEH) plus outputs from a number of different flood modelling studies, and used to consider property and road impacts.

Neighbourhood or 'in-vicinity' post processing of precipitation forecasts is performed to calculate exceedance probability (or ensemble confidence) of the forecast rainfall that would lead to surface water flooding impacts. This is calculated on a 10km grid basis across Scotland to provide individual gridded risk assessments of the likelihood and impact of flooding. The web-based system has been successfully used by SEPA forecasters during 2023 and in partnership with Transport Scotland to assess the value of predicting the risk on the trunk road network.