

Two models are better than one – Operational multi-model hydrological forecasting over the European continent

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The European Flood Awareness System (EFAS) has been running operationally since October 2012. The system produces early probabilistic information using a multi-model ensemble weather forecasts as input. Hydrological forecasts are currently based on the distributed LISFLOOD rainfall-runoff model, which was setup on a 5 x 5 km grid covering the European continent. In this study, forecasts based on LISFLOOD are compared with forecasts from the EFAS-HYPE v1.0, which was setup by the Swedish Meteorological and Hydrological Institute (SMHI). EFAS- HYPE v1.0 is an application of the HYPE model (Hydrological Predictions for the Environment) for European flood forecasting. The two models were compared over a number of stations (about 800) in Europe driven by deterministic forecasts from the European Centre for Medium-Range Weather Forecasts over a period of two years to assess the added benefit of a multi-model operational hydrological system. The models were also tested in two case studies to compare their performance for extreme discharge. Finally, the two models were combined using a Bayesian model averaging and compared against discharge observations.