



Assessing skill of global flood forecasting system in forecasting floods at local scales

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Currently, flooding is one of the most significant natural hazards globally, and it may become more frequent in the future. In order to have an efficient emergency response and contingency action plan, flood forecasting is required, as it is the most effective non-structural measure in reducing fatalities and economic damage in vulnerable areas.

Global flood forecasting data is freely available as 'open source', providing real-time discharge forecasts with global coverage. It can be applied in areas where there is no flood forecasting system, and availability of local flood risk data is limited.

The Global Flood Forecasting and Information System (GLOFFIS) model is an operational flood forecasting system setup by Deltares, based on Delft-FEWS in an open experimental ICT facility. Usually, GLOFFIS runs multiple models, W3RA and PCRGLOB-WB, but this study focuses on GLOFFIS-W3RA model, which is run in ensemble mode using ECMWF-EPS from TIGGE. GLOFFIS produces global flood predicting products which are shown on a web interface (i.e. www.globalfloodforecast.com).

In order to use GLOFFIS at the local level, users would like to know to what scale or for what catchment characteristics skilful forecasts can be provided. As global flood forecasting models as well as downscaling and bias correction methods are being improved regularly, a general framework to assess the skill would be useful for local users.

In this study we develop and apply a framework to assess the skill of the ensemble flood forecast derived with GLOFFIS system. We explore the performance of GLOFFIS at different scales and in catchments with different characteristics across the globe. We produce ensemble forecasts of daily discharge for 10 river basins with different climatologies in hindcast mode for a period of 12 years (2000-2012), with lead times of up to 10 days. We use different performance measures to quantify the skill of the system. These performance measures are used as the basis for the evaluation framework. The framework is setup from different potential uses of GLOFFIS and statistical properties of the performance measures. We show how the skill of GLOFFIS depends on topography, climatologies and the size of catchments.