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Skill of global hydrological forecasting system FEWS GLOWASIS using climatic ESP forecasts

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Forecasting of water availability and scarcity is a prerequisite for the management of hydropower reservoirs, basin-scale management of water resources, agriculture and disaster relief. The EU 7th Framework Program project Global Water Scarcity Information Service (GLOWASIS) aims to pre-validate a service that provides real-time global-scale information on water scarcity.

In this contribution, we demonstrate what skill (compared to a climatology) may be reached with a global seasonal ensemble forecasting system consisting of: a) a global hydrological model PCR-GLOBWB; b) an updating procedure for initial forecasting states, based on the best-guess global rainfall information. As best guess, a combination of ERA-Interim Reanalysis rainfall and Global Precipitation Climatology Project (GPCP) observations is being used; c) a forecast based on Ensemble Streamflow Prediction (ESP)procedure and reverse ESP procedure (Wood and Lettenmaier, 2008). In the ESP procedure, a meteorological forecast ensemble is generated based on past years of observation series (i.e. climatological observations). As observations, the combination of ERA-Interim and GPCP is used. In reverse ESP, an ensemble is generated by using a set of initial states from a large sample of updates at the specific month of interest, and forecasts are produced using one observed set.

This analysis allows us to measure how much skill may be expected from hydrological inertia and climatology alone, leaving aside for the moment potential skill improvement by using seasonal meteorological forecasts. In future work, we will measure how much skill improvement compared to the forecasts mentioned above may be reached, when ECMWF Seasonal forecasts are used. This will allow us to measure the contributions to skill of each component (initial state inertia, hydrology and meteorological inputs) of the forecast system.