Deployment automation of hydrological forecasting systems on a global scale.

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Hydrological forecasting systems represent an important decision-making tool for water and risk management. In this context, there is increasing development and implementation of such systems worldwide, which are commonly tailor-made: designed and configured according to the information and hydrological models available for a specific location and/or extent to answer to precise needs. Therefore, the concepts of setup automation and replicability of configuration of such systems are often overlooked, especially when they follow a model-centric approach.

However, in a global forecasting context such as the one adopted by Deltares' GLOFFIS (den Toom et al. 2020), the automation of hydrological forecasting systems' set up becomes an essential part for the development, as it enables the fast forward and constant addition of local specialized models where available in the system on a global extent, as well as by using local regional weather forecasts, reanalysis models or satellite data as forcing to produce estimates of various hydrological parameters, instead of focusing on a single model or NWP source.

In that sense, a prototype of a configuration production system for GLOFFIS was developed, which comprises two main components: (1) an external relational database holding the information regarding the set of hydrological models to be incorporated and weather data products used and, (2) a set of python scripts, that query the database and generate the configuration XML files needed for the system (as GLOFFIS is based on Delft-FEWS) to accomplish an automated deployment.

This new approach for system's configuration boosts the potential related to system maintenance, expansion, and replicability, which could be beneficial not only when developing large hydrological forecasting systems, but also for local systems developed using Delft-FEWS, as well as to encourage the distribution of forecasting systems worldwide.

References:

den Toom, M., Verkade, J., Weerts, A., and Schotmeijer, G.-J.: Development of the Deltares global fluvial flood forecast system, EGU General Assembly 2020, Online, 4–8 May 2020, EGU2020-22344,