EMS Annual Meeting Abstracts
Vol. 10, EMS2013-616, 2013
13th EMS / 11th ECAM

A risk-based visualisation tool to support decision making in low flow forecasting and water management: case-study of the Arzal dam in Brittany

L. Crochemore (1), M.-H. Ramos (1), C. Perrin (1), and A. Penasso (2)

(1) Irstea, Hydrology Research Group, UR HBAN, Antony, France, (2) Institution d'Aménagement de la Vilaine, La Roche-Bernard, France

The Arzal dam is located at the outlet of the Vilaine River basin (10,000 km^2) in Brittany, France. It controls a water reservoir (50 hm3) with multiple uses: drinking water, flood control, irrigation, sailing and fish by-passing. The reservoir plays an essential role in the regional water management system. Its operational management during the summer season poses several challenges, mainly related to the quantification of future water inflows and the risks of having restricted water availability for its different uses. Indeed, the occurrence of severe drought periods between May and October may aggravate the risk of salt intrusion and drinking water contamination due to lock operations controlling sea level. It is therefore important to provide decision-makers with reliable low-flow forecasts and risk-based visualization tools, which will support their choice of the best strategy for allocation of water among different users and stakeholders. This study focuses on an integrated hydro-meteorological forecasting system developed to forecast low flows upstream the Arzal dam. Forecast inflows are graphically represented with the help of a risk-based visualisation tool. The tool was designed to characterise the severity of extreme events and support decision-making in situations that may potentially be a source of conflict between stakeholders and users of the water of the reservoir. The forecasting system is based on the GR6J hydrological model (Pushpalatha et al., 2011). Medium-range meteorological forecasts from the ECMWF ensemble prediction system (51 scenarios up to 9 days ahead) are associated with historical data to provide streamflow scenarios for the summer period. These scenarios are summarized in a graphical way so as to provide decision makers with the probabilistic forecasts and the associated risks of low flows. Preliminary results are presented and the capacity of the system to provide useful information in an operational context is discussed.

This study is carried out within the Interreg IVB DROP Project (Benefit of governance in DROught adaPtation).

Pushpalatha, R., Perrin, C., Mathevet, T. and Andreassian, V. 2011. A downward structural sensitivity analysis of hydrological models to improve low-flow simulation. Journal of Hydrology, 411(1-2), 66-76.