PREMHYCE: An operational tool for low-flow forecasting

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In many countries, rivers are the primary supply of water. A number of uses are concerned (drinking water, irrigation, hydropower. . .) and they can be strongly affected by water shortages. Therefore, there is a need of early anticipation of low-flow periods to improve water management. This is strengthened by the perspective of having more severe summer low-flows in the context of climate change. Several French institutes (Irstea, BRGM, Météo-France, EDF and Lorraine University) have been collaborating to develop an operational tool for low-flow forecasting, called PREMHYCE. It is tested in real time on 118 catchments in metropolitan France since 2017, in cooperation with operational services which provide streamflow observations and use low-flow forecasts from the tool. PREMHYCE includes five hydrological models which can be calibrated on gauged catchments and which assimilate flow observations. Low-flow forecasts can be issued up to 90 days ahead, based on ensemble streamflow prediction (ESP) using historical climatic data as ensembles of future input scenarios. These climatic data (precipitation, evapotranspiration and temperature) are provided by Météo-France with the daily gridded SAFRAN reanalysis on the 1958-2018 period, which includes a wide range of conditions. The tool provides text files and graphical representation of forecasted low-flows, and probability to be under low-flow thresholds provided by users. Outputs from the different hydrological models can be combined into a simple multi-model approach to improve robustness of the forecasts. The PICO will show the main characteristics of this operational tool and results on the recent low-flow periods.