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The seasonnal hydro-meteorological forecasting system SIM-PS over France, evaluation and comparison with the AQUI-FR platform

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The SIM hydro-meteorological model is used in operation at Météo-France since 2003 for real time hydro-meteorological monitoring. It is also part of a real-time ensemble mid term prediction system and allows climate change impact studies as well as seasonnal forecast experiments.
An hydro-meteorological system based on SIM, called SIM-PS, was first developped for demonstration in the frame of the European FP7 EUPORIAS project. It was then improved to provide real time seasonnal prediction over France each month. The Météo-France-system6 meteorological forecasts presently drive SIM model. A quantile-quantile correction of temperature and precipitation forecasts is previously applied. SIM predicts streamflows and soil moisture fields among other variables. A quantile-quantile adaptation of streamflow is also applied. Finally, SIM-PS forecasts are made available on a french website dedicated to seasonnal forecasts. An evaluation of those forecasts using a 24-year hindcast will be presented. The forecasted streamflows will be compared to the SIM reanalysis through statistical scores. A focus will be made on the low flows forecasts.
SIM-PS is also used to produce so-called « climatological seasonnal forecasts ». The hydrological SIM simulation starts from the current initial soil moisture state and is driven by meteorological forcings from the past climatology. This kind of approach provides end-users with scenarii that happened previously but taking the current soil moisture situation into account. This system allows to assess the impact of the initial hydrological state (soil moisture, snow cover) on the hydrological forecasts. This is of high interest in some cases, such as a particularly dry period like the 2017 summer and autumn over France.
The performances of both systems, Météo-France-system6 based seasonnal forecasts and climatological seasonnal forecasts, will be compared, particularly for low flow forecasts.
Moreover, in the frame-work of the french AQUI-FR project, a new hydro-geological modelisation plateform is being developped. This platform aims at performing detailed hydro-geological analysis and forecasts over France. It gathers existing groundwater modeling tools, developped by the partners of the project. Within the next few months, the AQUI-FR platform is expected to replace the hydro-geological model MODCOU in the SIM system. In this context, the AQUI-FR platform was run to produce seasonnal hydro-geological forecasts, using the water fluxes derivated from SIM-PS. The streamflow forecasts performed with AQUI-FR for a 24-year hindcast will be compared to the one performed with the MODCOU model within SIM-PS. A focus will be made on the forecasts issued on the 1st of May for low flow prediction.