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The seasonnal hydro-meteorological forecasting system SIM-PS over France, and its use for low flow prediction within the PREMHYCE project

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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 developed 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-system5 meteorological forecasts presently drive SIM model (MF-system6 will be used soon). 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. Illustrations of particular situations will also be shown.
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.
This seasonnal hydro-meteorological forecasting system is also planned to be used within a French project called PREMHYCE led by IRSTEA. It aims at providing water resource managers with real time hydro-meteorological analysis, as well as predictions of low flows from mid- to seasonnal- range. Météo-France contributes to this project by providing real-time meteorological and hydrological analysis using the SIM2 system, and it is also planned to provide seasonnal forecasts of atmospherical variables and streamflows based on the "climatological" seasonnal prediction system, for river stations listed in the project.
Finally, a quick overview of undergoing developments using seasonnal hydro-meteorological forecasts will be shown. Mainly, in the framework of the French AQUI-FR project, seasonnal forecasts will be computed using the SURFEX surface scheme and the detailed hydro-geological modeling platform AQUI-FR.