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Using the Iterative Input variable Selection (IIS) algorithm to assess the relevance of ENSO teleconnections patterns on hydro-meteorological processes at the catchment scale

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Population growth, water scarcity and climate change are three major factors making the understanding of variations in water availability increasingly important. Therefore, reliable medium-to-long range forecasts of streamflows are essential to the development of water management policies. To this purpose, recent modelling efforts have been dedicated to seasonal and inter-annual streamflow forecasts based on the teleconnection between "at-site" hydro-meteorological processes and low frequency climate fluctuations, such as El Niño Southern Oscillation (ENSO).

This work proposes a novel procedure for first detecting the impact of ENSO on hydro-meteorological processes at the catchment scale, and then assessing the potential of ENSO indicators for building medium-to-long range statistical streamflow prediction models. Core of this procedure is the adoption of the Iterative Input variable Selection (IIS) algorithm that is employed to find the most relevant forcings of streamflow variability and derive predictive models based on the selected inputs.

The procedure is tested on the Columbia (USA) and Williams (Australia) Rivers, where ENSO influence has been well-documented, and then adopted on the unexplored Red River basin (Vietnam). Results show that IIS outcomes on the Columbia and Williams Rivers are consistent with the results of previous studies, and that ENSO indicators can be effectively used to enhance the streamflow forecast models capabilities. The experiments on the Red River basin show that the ENSO influence is less pronounced, inducing little effects on the basin hydro-meteorological processes.