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Contribution of a parsimonious distributed conceptual model for low flow simulation

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Low water is a seasonal phenomenon, which can be long or short and more or less intense, affecting the entire watercourse. This phenomenon is nowadays a concern for many countries seeking to have a better understanding of the processes that affect it and optimal management of water resources (pumping, irrigation). The estimation of low flow indices, in particular low water French reference flows (QA, QMNA5) is a real challenge for the knowledge of the available water resource in order to deduce management rules for this water resource and associated risks. A global rainfall-flow model with two parameters and at daily time step has been defined, calibrated and regionalised over French territory to answer this problem.

Currently, a new distributed version suitable for low flow (slow flow GRD) is developed and compared to the global version. This distributed model makes it possible to take into account the spatial variation of the input data estimates by Safran data spatialized throughout France; it can improve the predictions of the flows for the basins whose distribution of the rains is very variable. In addition, it brings an additional element not restituted by the global model: it makes it possible to know the flow rates of the intermediate points of the basins. This model includes interception, production, snowmelt, transfer and routing to capture flows at the outlet of the watershed. It will be a question of comparing the performances of these models, at the scale of the gauged basins. Their temporal robustness will also be tested. This work highlights the advantage of a distributed model without increasing the number of parameters. This point is important for the next step, which is regionalization for low flow estimation at ungauged basins.