The Aqui-FR project: the future operational modeling platform for the main regional multilayer aquifers in France.

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Abstract
The Aqui-FR project aims at taking benefits of existing regional groundwater modeling applications used by stakeholders. The objective is to develop new products that will provide useful informations for water resources management [1]. It will be exploited to monitor real time groundwater level and river flow over France, and will produce forecasts of the groundwater resources at time scales varying from the 10-day period, to seasonal and climate projections. To do that, Aqui-FR currently includes 2 distributed hydrogeological models (Marthe [2] and EauDyssee [3]), covering 13 mono or multilayers sedimentary aquifers and a conceptual model covering 25 karstic aquifers in France as presented figure 1. But its modularity will make possible the integration of new models in the future. These different models are assembled within the Open-Palm parallel dynamic coupler [4], and coupled to the Surfex physically-based land surface model [5] that provides the surface water budget.

Figure 1: Current coverage of the Aqui-FR hydrogeological modeling plateform.

As a first application of this platform, a long term reanalysis over the 1958-2017 period has been performed to assess the full modeling system and to provide a referential state in order to compare the forecast to known past situations and known past statistics.

In this study, we will present the structure of the platform and detail the integration of all these different models inside the Open-Palm dynamic coupler as show in picture 2 and the development of the real-time version that is necessary for forecasts. will also show the the challenge spatial coupling of the independent regional
groundwater applications through a common high resolution national surface drainage network.

Further developments such as the inclusion of the hard rocks aquifers or the use of data assimilation for a better estimation of initial states in operational forecast are currently being developed.

References


