

MODELLING THE COUPLED SURFACE WATER AND GROUNDWATER SYSTEM OF THE UPPER RHINE GRABEN

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Summary. The Upper Rhine Graben hydrosystem holds one of the most important groundwater resources in Europe. This alluvial aquifer provides three-quarters of the regional needs for water. Its functioning is tightly linked to the hydrographic network in the alluvial plain.

Indeed an important part of the available groundwater comes from the infiltration of rivers in the very permeable alluvial material of the plain. In other places in the plain a heavy drainage of the aquifer occurs, contributing to the very dense river network. Consequently, this hydrosystem has to be studied in a coupled way, taking into account the complex interaction between surface and subsurface processes.

In the framework of the VULNAR project that aims at studying the vulnerability of the Rhine aquifer, a modelling approach taking into account the multiple existing interactions between surface and ground water in the hydrosystem is built. The regional coupled model should be able to properly simulate the hydrological budget on the mountainous catchments bordering the alluvial plain, as well as the global circulation in the alluvial aquifer and its interaction with the surface network in the plain. Indeed if the surface discharges flowing from mountainous catchments of the Vosges and the Schwarzwald are quite well known, there are some uncertainties on the contribution of the subsurface flows to the aquifer. A reliable modelling of these catchments is required to be able to estimate the amount of water flowing to the Rhine alluvial aquifer through subsurface circulation, and thus, to better constrain the interactions between surface and groundwater in the alluvial plain.

An appropriate representation of these interactions also involves a good estimation of the topography and of the river height.

We will present the results obtained with the MODCOU hydrogeological model along with sensivity tests results on several model parameters.