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VERYFING CONCEPTUAL FLOW MODELS IN A RIVER-CONNECTED ALLUVIAL AQUIFER FOR MANAGEMENT PURPOSES USING NUMERICAL MODELING

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Summary. The Agència Catalana de l'Aigua (Catalan Agency of Water, ACA) is the organism responsible for the management and planning of the coastal, surface and groundwater in the so-called Inner Catalan Basin, in Spain; i.e., of those basins that only develop within the Catalan boundaries.

A main objective of the Water Framework Directive (WFD) is to guarantee water supply for human activities in a sustainable way. This implies to avoid unacceptable impacts on water ecosystems. In the case of groundwater abstractions, it means that a good ecological status should be reached despite the stresses that hold on the water bodies. Such objectives are especially difficult to achieve in Mediterranean areas with seasonal periods of water shortage.

As concerns the Santa Coloma River alluvial aquifer, ACA have recently conducted several studies with the aim to assess groundwater resources management and meet environmental goals. Nevertheless, those studies showed significant discrepancies among their conclusions. A hydrogeological model is being developed to define appropriate pumping strategies that overcome the different opinions given in former reports. Such numerical flow model will provide an estimation of the impact of groundwater abstraction rates on stream discharge.

In this sense, ACA, in collaboration with other institutions, adopted a two-fold strategy. For almost one year, two survey campaigns, that included continuous head and temperature data acquisition, were carried out to define the hydrological boundaries of the alluvial aquifer and the hydrogeological role of the underlying granitic and tertiary sedimentary formations. Afterwards, a groundwater flow numerical model was implemented to investigate flow relationships between these hydrogeological units and the river-connected alluvial, as well as actual flow rates. The model uses the Visual Modflow platform. Simulations are thus essentially oriented to build-up a conceptual model that clarifies former differing hypothesis about this hydrogeological system. Furthermore, quantitative estimates will contribute to the integrated water resources management plans in the area, according to WFD, and will lead future research/studies.