



## **Improving hydrogeological models of deltaic sedimentary media using GIS based 3D geological tools**

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Due to the natural heterogeneity the hydrological modeling in the deltaic sedimentary media is complex. Reliable 3D hydrogeological models could be created by integrating properly detailed and accurate data. This data has to be properly managed and interpreted.

The first task has been the creation of a geospatial database to store and to allow the management of a great amount of different data types coming from different sources (geophysical, geological, hydraulic, and others). The data structure allows storing an accurate and very detailed core geological description that can be straightforwardly generalized and further upscaled.

The second step was to create tools within a GIS environment allowing querying and visualizing the data. One consists in illustrating the core with the detailed geological description of each selected borehole. Another creates geologic profiles by using an on screen defined buffer zone selection for the needed boreholes. The lithological columns of the boreholes together with the defined stratigraphic subunits appear on screen as a geological profile. Complementary information like the DTM profile, the distance between the boreholes, the depth of each strata complete the geological picture. In this working environment the user is able to analyze the possible existing stratigraphical units and to define them on screen in a deterministic way or by using geostatistics. Additionally information like the type of the contact surface, the position between the geological units or subunits as well as other parameters could be attached as attributes. The possible faults or fractures can be identified within the same environment. To date, a dictionary of terms describing the possible geological contact surfaces types is on the way to be defined. In parallel, a tool of converting the geological units/subunits analyzed data is developed in order to project the obtained information within a 3D environment. The export procedure provides a spatial located points mass with their attached attributes. The points mass could be used within the same GIS environment or by external software packages to derive a reliable 3D model.