

AN XML-BASED PROBLEM-SOLVING ENVIRONMENT

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Summary. Understanding of hydrological systems increases steadily in several directions (eg geochemistry, geostatistics). In order to use and combine these advances, programmers and modelers need software that (1) facilitates adding new functionalities with relative ease, and (2) use them to build models.

The objective of this work is to describe the philosophy of an application designed to deliver on both points. The application is oriented to groundwater problems. That is, it allows simulation of single or multiphase flow and/or transport as well as stochastic or deterministic calibration problems. The form of an executable application was chosen because of user-friendliness.

In order to meet the first goal an object oriented design was used containing a more or less fixed global control structure (frozen spot) that delegates tasks to encapsulated and expandable classes (hot spots). Application expansion can take place by extending the classes in this last category. In order to achieve the second objective, an XML input format was defined, containing data structures both for specific for hydrological systems description, as for concepts that arise in generic numerical models (such as discretization, coupling of equations, optimization). By combining and cross-referencing XML elements, the user can build models with more freedom than in traditional, switch-based input files.