Aquarehab: The development of a decision support tool to integrate groundwater remediation technologies in river basin management

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Micropollutants such as chlorinated aliphatic hydrocarbons and pesticides can endanger the quality of groundwater and surface water at large scales. A number of in situ remediation technologies are developed to remove those compounds in groundwater and rivers, but remediation is costly, especially when pollution is diffuse and ubiquitous. Furthermore, due to slow travel times technologies need to be durable and longevity of in situ remediation is uncertain. In the 7FP EU project we developed a decision support tool called REACHER that incorporates in situ groundwater remediation measures with conventional measures in a river basin fate model to derive the cost-effectiveness of the different technologies. The REACHER tool essentially contains relational databases on chemical properties, ecotoxicological effects, removal rates and costs of measures related to specific micropollutants. Removal rates of micropollutants by the in situ groundwater technologies and are derived from parsimonious relationships deducted from complex reactive transport models incorporating all relevant chemical and biological reactions. Fate and routing of chemicals in the river basin is modeled using bayesian belief networks derived from scenarios with watershed models such as SWAT. The structure of the decision support system allows to assess the effect of a combination of remediation measures on water quality without having to run the models, saving computational effort and time. We will show the setup, general methodology and preliminary results of the REACHER tool.