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Parameter identification for large scale aquifers

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The identification of groundwater parameters in heterogeneous domains is a major challenge for modelling efforts. There is a need for flexible parameterization methods in order to assess the complexity of parameters' spatial distributions in real aquifers.
An adaptative parameterization to identify the hydraulic conductivity distribution over a large scale aquifer: the Upper Rhine aquifer is presented. The method is based on an adaptative multiscale triangulation (AMT) coupled with an inverse problem procedure which identifies the parameters' distribution by reducing the error between measured and simulated heads. The AMT method has the advantage of combining both zonation and interpolation approaches. The interpolation is based on geometrical rather than stochastic features.
The inverse problem is associated with two different Monte Carlo approaches to estimate the parameter unvertainities.
The methodology is applied to the uppr Rhine aquifer. The domain extension is 4400 km2. The simulation period covers 204 months from January 1986 to December 2002. 109 piezometers are used for the model calibration.