



Interpolation of Steady-State Concentration Data by Inverse Modeling

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In subsurface hydrology the estimation of total mass fluxes through a cross-sectional area and its uncertainty is an essential quantity, because it is needed to quantify the effect of natural attenuation or active remediation techniques. The available concentration measurements are typically point-like measurements and they are sparsely distributed within the domain of interest. The estimation of mass fluxes based on the small number of available measurements makes interpolation techniques necessary. Standard interpolation techniques are not suitable because the measurements are sparse, and the unconditional probability density function (*pdf*) of concentration is strongly non-Gaussian.

A geostatistical method for the interpolation of steady-state concentration measurements by inverse modeling will be presented. In the first step, the use of steady-state concentration measurements in geostatistical inversion will be introduced. With this method we are able to calculate hydraulic conductivity fields which are conditioned on steady-state concentration measurements. In the second step, the interpolation method of steady-state concentrations is presented, which uses the inverse modeling approach.

The presented method is tested to computer generated hydraulic conductivity fields in 2-dimensional and 3-dimensional space. These fields are used as “true” reference field.