A geostatistical approach to groundwater pollution source identification considering first-order reaction

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ABSTRACT

Chemical reaction is a very important factor of the groundwater pollution source identification (PSI). However, the PSI method based on the geostatistics is always applied on the conservative pollutants. In this paper, the finite difference is employed to obtain the transfer function of complex transference of pollutant in groundwater, and a PSI method considering the first-order reaction is proposed. A numerical test is employed to analyse the result of the new method and the impact of reaction rate on the PSI problem. In the case, the new method could identify the release process perfectly. Accurate PSI result could be obtained under high concentration or low chemical reaction consumption of pollution. Though the PSI result is insensitive to the reaction rate when the reaction rate is between 10^{-4} and 10^{-3}, the more accurate reaction rate is still very important for the PSI problem. The method prompted in this paper has good agreement with the transport rule of pollutant, and could be very helpful for identifying groundwater pollution.

Keywords: Geostatistical; Groundwater; Pollution; Identification; First-order reaction

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