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Groundwater protection of minimal water supply systems integrating simple hydrogeological information

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According to the current EU environmental legislation, groundwater protection is one of the key issues to be addressed when new industrial activities have to be authorised. This work shows a simple methodology that could be used by local and environmental authorities in order to analyse the potential risk caused by an industrial spill on a natural environment.

The methodology leads to the determination of the protection area around an extraction well system using the information given by: i) a set of local piezometers, ii) the chemical nature of the industrial spill and iii) the hydrogeological parameters of the local aquifer. The exact location of the contaminant source is not needed for the analysis. The flow equation is afterwards solved using a finite-difference approximation scheme under stationary conditions. Finally, the capture zones for different times are computed by a simple upstream advective transport model.

Results on the determination of the perimeter protection area definition of a water supply system in the municipality of L'Alcora (Castellón) in Spain are shown.