A regional flux-based risk assessment approach for multiple contaminated sites on groundwater bodies

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Abstract In the context of the Water Framework Directive, management plans have to be set up to monitor/maintain water quality in surface and groundwater bodies in the EU. In heavily industrialised and urbanised areas, the cumulative effect of multiple contaminant sources is likely, and presents a challenge which has to be evaluated. In order to propose adequate measures, the calculated risk should be based on criteria reflecting the risk of water quality deterioration, in a cumulative manner and at the scale of the entire surface water or groundwater body. An integrated GIS- and flux-based risk assessment approach for groundwater and surface water bodies is described herein, with a regional scale indicator for evaluating the quality status of the groundwater body. It is based on the SEQ-ESO currently used in the Walloon region of Belgium which defines, for different water uses and for a detailed list of groundwater contaminants, a set of threshold values reflecting the levels of water quality and degradation with respect to each contaminant. The methodology is illustrated with its first real-scale application on a groundwater body: a contaminated alluvial aquifer which has been classified at risk of not reaching a good quality status by 2015.

Key words regional risk assessment; groundwater body; groundwater quality; industrial contaminants; Water Framework Directive; multiple contaminant sources