

Interactive comment on “Modeling subsurface transport in extensive glaciofluvial and littoral sediments to remediate a municipal drinking water aquifer” by M. Bergvall et al.

M. Bergvall et al.

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Dear Prof. Dr. Grathwohl, thank you for your comment on our manuscript.

Comment: Surprising was the fact that the aquifer would be clean already in four years if extraction wells are placed according to the optimization of the model. Considering the uncertainties in the model parameters and the field measurements of the pesticides it might be more appropriate to give ranges of time periods which also account for the uncertainties in the prediction.

Reply: This aquifer has been contaminated by BAM for about three decades. Fortu-
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nately, the BAM concentrations decrease and approach the EU guideline limit in the contaminated extraction wells. Without any remediation wells in a worst-case scenario it was predicted that the concentration of BAM in the contaminated extraction wells will fall below the EU guideline limit in 2019. The prediction was based on the uncertainty of the observed and simulated concentrations at the extraction wells. The standard deviations of the residuals of observed and simulated concentrations were used to calculate a 98 % confidence limit ($\pm 0.095 \mu\text{g l}^{-1}$). In the worst-case scenario it was assumed that the model underestimates the true concentration, corresponding to the 98 % confidence limit.

The conditions of the worst-case scenario were also used for the prediction with remediation wells running from July 2010. Assuming that the model underestimates the true concentration it was predicted that the concentration of BAM in the contaminated extraction wells would fall below the EU guideline limit in 2014. On the other hand, if assuming that the model overestimates the true concentration, corresponding to the 98 % confidence limit, the concentration in the contaminated extraction wells would be less than the EU guideline limit without remediation. The reason is that the simulated concentrations in the contaminated extraction wells were fairly close to the EU guideline limit in 2010 when the extraction wells were established (Fig. 5). So, imposing the conditions of uncertainty based on observed and simulated concentrations, it was predicted that the contaminated extraction wells would be clean in 0 to 4 years.

In the results section the text at P1745 L3-6 would be replaced by the following text: ‘With the remediation wells running from July 2010, and imposing the uncertainty of observed and simulated concentrations at the contaminated extraction wells (98 % confidence limit $\pm 0.095 \mu\text{g l}^{-1}$), it was predicted that the concentration of BAM in the extraction wells would decrease to less than half the EU guideline limit at the latest of 2014.’

Sincerely, Martin Bergvall on behalf of the authors

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