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Hydrology and Earth System Sciences Discussions

Interactive comment on "Application of integral pumping tests to investigate the influence of a losing stream on groundwater quality" *by* S. Leschik et al.

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The paper deals with a new kind of application of integral pumping tests (IPTs). The authors show how the influence of a losing stream on groundwater quality might be assessed via IPT. This topic is relevant, suitable for HESSD and certainly of high international interest. The submitted paper is properly organised and well written. All figures and tables are informative and an up-to-date list of references is provided. Most results are well explained but the paper certainly needs improvement with regard to the interpretation of the behaviour of some ion concentrations (Fig. 2) and some mass fluxes

(e.g., Tab. 1). These issues are listed as items 1 – 4 below. When these questions will have been settled, the paper will provide a very useful contribution and help to enlarge the spectrum of IPT applications.

1) p. 4218, l. 5: The authors mention "higher concentrations of K+ ... at the downstream wells 11 and 12 (Fig. 2)". Fig. 2 clearly indicates that K+ concentrations at the downstream well 12 are higher than at the upstream counterpart, i.e. well 14. In addition, most of the time K+ concentrations decrease along the streamtube from well 13 to 11.

2) p. 4218, l. 7: Referring to the statement cited above it is said that "NO3- shows a similar concentration gradient between upstream and downstream wells". Fig. 2, however, does not appear to provide clear evidence for a gradient between wells 14 and 12. Between wells 13 and 11, NO3- concentrations decrease for the first 10 days or so. Later on, the gradient becomes comparatively small and changes its sign three times.

3) p. 4219, l. 12: Based on data given in Tab. 1 the authors claim that "micropollutant MCP's are mostly lower at the downstream wells with the exception of CAF in streamtube 2". I think that the decrease in MCP for CAF along streamtube 1 is only minor and should not be over-interpreted. The data definitely indicate an MCP decrease for NON but corresponding values for CAF basically remain unaltered.

4) p. 4221, l. 10 and p. 4224, l. 4: If there is exfiltration from the Bauerngraben, there will be an increase in MCP even if concentrations Cex are low. Of course, ΔMCP will be proportional to Cex but "temporally high concentrations in the stream" are certainly not required to explain positive ΔMCP values.

In addition, I would like to mention some minor technical issues:

5) p. 4210, l. 7: Please indicate that Mex denotes mass flow rate per unit length of stream.

6) p. 4210, l. 10: Check hyphenation.

7) p. 4215, l. 7/8: Exponent -1 is missing twice in the unit of Qex. Please also indicate that this quantity is a discharge per unit length of stream.

8) p. 4215, l. 13: I think that “13” should be replaced by “11”.

9) p. 4215, l. 23: How can JCP values be “given”?

10) p. 4216, l. 25: Please explain SPE for the non-specialists.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 4209, 2009.