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Hydrology and Earth System Sciences Discussions

Interactive comment on "An approach to identify urban groundwater recharge" *by* E. Vázquez-Suñé et al.

Anonymous Referee #2

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Review of "An approach to identify urban groundwater recharge " by E. Vazquez-Suné et al.

General

This paper presents an approach to identify the different origins of urban groundwater recharge. An interesting case study is presented for the city of Barcelona (Spain). I found this paper original and interesting to read. It is clear that the method has its limitations due to important uncertainty on the composition of the different end members. I have some suggestions to analyze this into more detail. Otherwise, I have only very few comments and recommend publication after a (very) minor revision. Nevertheless, if the authors would make an analysis for other time steps this could strengthen the

paper.

Main comments

Page 2556, line 26. The authors took one period for analysis. It would be interesting to see how stable the composition is of the water for other time periods. Although temporal variation will occur, it can be expected that the composition is rather stable, especially if for example data from May 1999 would be compared with May 2000, May 2001, etcetera. It would have been nice if data from another month would have been analyzed as well, which would serve as a kind of verification. At the same time, if results are positive in the sense that the mixing ratios are quite stable over time (for a certain month), it would be interesting to see whether the composition varies between winter and summer, for instance.

Page 2558. What is the role of other contaminant sources in the city? One would expect that they play also a role?

Page 2562, line 19-20. In fact, some of this information was already put in the conceptual model, setting some values to zero (for example, far away from rivers no river water). If you do not do this do you still get the right answers? It would also be an interesting test to leave all values free, in order to see if we indeed do not get river water far away from rivers.

Figure 2. This figure is not very clear.

Page 19, line 1-2. This seems speculative. I think that the authors should recognize that other explanations (e.g., preferential flow paths) are possible.

Page 19, line 23-25. There are many possible explanations for the different behaviour. In fact, this is an inversion problem with many different, possible solutions.

Minor comments

Page 2551, line 15. “Constraint” instead of “constrain”.

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Page 2551, line 15. “consists instead of “consist”.

Page 2551, line 18. “Constraints” instead of “constrains”.

Page 2557, line 14-15. Strange sentence.

Page 2557, line 17-18. Rephrase.

Page 2561, line 12. “Straightforward” instead of “straight forwards”

Figure 6 computed end-members should

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 2543, 2010.