Hydrol. Earth Syst. Sci. Discuss., 5, S514–S516, 2008
www.hydrol-earth-syst-sci-discuss.net/5/S514/2008/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Storage and transport in cave seepage- and groundwater in a South German karst system" *by* K. Schwarz et al.

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Received and published: 19 June 2008

General comments

This is a short but interesting contribution that is generally well-written. The topic is within the scope of HESS. The paper presents interesting data and reveals new aspects of the flowpaths of infiltrated water in a limestone area. The main conclusion (that nearly complete mixing of infiltrated water occurs in the vadose zone) is substantial and justified, although I have specific comments in regard to it (see below).

The methods and assumptions are valid and clearly described, and could easily be applied by other scientists. Data presentation is sparse; an extra table giving details of the site locations, including the thickness of the vadose zone above the seepage

locations, would be useful. The results are sufficient to support the conclusions. Satisfactory reference is given to previous work. The title clearly describes the contents of the paper. The abstract is concise and complete.

The presentation is clear and the language (for the most part, see detail comments below) is fluent and precise. The results and discussion verge on being too brief, and the figures too limited. It is not necessary to eliminate or reduce any section.

Specific comments

Section 3.2 contains the statement ".. our findings show that the local precipitation is indeed responsible for the recharge of the spring without any alteration of the isotope signal". However, while I agree with the conclusion that evaporation does not enrich the water isotopically, evapotranspiration does nevertheless have an effect by reducing the amount of the more positive summer precipitation that infiltrates the ground relative to the amount of the winter precipitation that infiltrates. This seasonal effect is due to the seasonal variation of evapotranspiration. The isotopic data given in the paper appears to support this effect, in spite of the authors claiming that the average values of the seepage and spring waters matched the long term average of the precipitation (in the Abstract and Conclusions (ii), and elsewhere). Their 11-month precipitation weighted mean of -9.4 permille is more positive than the ranges of the various seepages and Blautopf Spring they gave (around -9.5 to -10.6 per mille) and that determined by Nordhoff (2005) of -10.5 to -11.2 per mille. Consideration of evapotranspiration is important to the understanding of the processes in the upper layers of the vadose zone, which is the focus of the paper.

The isotope value of the spring is claimed to be homogeneous throughout the year (Conclusions (i)). Average or weighted average values as well as the standard deviations of the variations should be given for the seepages and spring where sufficient data is available, to substantiate this. Fig. 3b appears to show slight variations in both the spring and seepage waters.

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Detail comments

P1268, L12 I suggest you use the words “a representative” instead of “an integral”.

P1270, L6 The meaning of the words “to this zone that lies at the receiving end of the flow path” is not clear.

P1272, L20 Use the word “reduction” not “combustion”.

P1272, L24 Spelling: “Standard” not “satandard”.

P1274, L1 “relatively” not “relative”.

P1274, L15 “water only varied” not “water did only vary”.

P1275, L7 “almost not noticeable” not “hardly found”.

P1275, L22 “processes occur” not “processes to occur”.

P1276, L18 “gravimetric” not “gravimetrical”

P1276, L18 “events smaller fissures also become” not “events also smaller fissures become”.

P1276, L26 “determined to be only” not “determined with only”.

P1277, L12 “was not found” not “could not be found”.

P1278, L2 “focus on” not “focus at”.

P1278, L4 “travel” not “travelling”.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 1267, 2008.