

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

### **Anonymous Referee #3**

Received and published: 26 June 2008

Practically the same paper titled: “New aspects of Storage and Transport through Stable Isotopes in Precipitation, Cave Seepage and Groundwater in a South German Karst System” was submitted to the Journal of Hydrology in March 2007 and finally reject. However, the review included a lot of practical comments, which could help to improve the manuscript, the authors’ limited their present work only to reduce the manuscript. So, I would like to repeat some comments already known for the authors.

### General comments

Although the subject matter of this manuscript is of potential interest to the readership, the manuscript fell short of expectations regarding development of new concepts or

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conceptual model supported by field data. Unfortunately, the application of isotope data is very poor, limited to the qualitative speculation, and is not supported by any quantitative consideration.

In my view, the main problem of this paper is that its content is "in between" a research paper and a case study; therefore it is neither a good research paper nor a good case study because in both cases details are very limited and discussion and conclusions poorly supported by field data.

As a research paper, this study brings nothing new (contrary to what the title says) and does not even apply some new concepts developed recently; the field data are far from complete both in space and time: where are for instance the data of caves HWS and SH? Weekly samples are too few to really understand the dynamics of transport in karst system especially in the case of recharge events; it is not clear how the conceptual model (figure 5) relates to field data; no any modeling is developed to strengthen the discussion.

As a case study paper, the geological and hydrogeological settings should be developed with maps and detailed information; it would be necessary to describe other hydrogeological information available for the catchment (such as tracing experiments, diffuse vs. concentrated recharge, flow direction, spring functioning, connection with adjacent basins, etc...) Among these other field data, it would then be possible to present the isotopic data of this paper to describe the recharge processes (and the adequacy of the mean recharge elevation calculated with isotopes with the one known from the delineated catchment). If a research paper has to be published, it seems to me that more data (rainfall isotopes at different locations, soil water isotopes), short term sampling on a flood event, quantification of the flow and consequently of the isotopic fluxes. These additional data could bring interesting information that could improve existing soil-epikarst conceptual models.

The form of the paper should be improved: it is important to clearly explain each con-

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clusion based on field observations and present a conceptual model that tight all these conclusions together. The literature should be used when it is really necessary: to introduce the topic with a state of the art review (this is done but should be better presented i.e. showing the different existing models of karst aquifers, karst aquifer recharge), and at the end of the discussion (in this paper references are spread throughout the discussion section which makes the reading difficult). References are not always cited with the proper form.

#### Detailed comments

In the Blautopf spring one should expect the mean transit time of water in the order of magnitude 15-20 years. So it is evident that the stable isotope signal is washed out, as observed. Similarly, the flow through the unsaturated zone having app. 150 m thickness yields, by the recharge of 0.5 m/year, the transit time larger than 4 years. So, it is clear that the stable isotope variations measured in the caves are also nearly completely damped. The only scientific purpose of the presented research could be the estimation of the portions of fast flow (1) through the unsaturated zone to the caves and (2) to the spring. Considering these two points the question appears: why in such heterogeneous system during the observation period of 80 weeks, the authors collect so little water samples. Figure 3a shows that the input signal (precipitation), most important for any evaluations, was collected once per month or even less frequently (Why there is not sampling datums in the Table 1? Why there is not common time axis for three parts of figure 3?). Practically, all quantitative results are taken from the literature and the own yield of the authors is missed. Why there is not any trial to quantify the results?

The English should be improved: avoid the use of "we", "this nicely fits" is not appropriate; some sentences can be understood but are not written correctly.

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