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Hydrology and Earth System Sciences Discussions

Interactive comment on "Groundwater compartmentalisation: a geochemical analysis of the structural controls on the subdivision of a major aquifer, the Sherwood Sandstone, Merseyside, UK" *by* E. A. Mohamed and R. H. Worden

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The following is the preassesment I wrote on the original version of the paper. In perusing over the revised version, I see that they have been ignored, which is a pity, because the paper can hardly be analyzed in its present version.

PRE-ASSESSMENT

The paper lacks focus. A case study by itself cannot be considered of international interest. If the results are important for local water resources, it may deserve a local

publication, but not so much an international journal. For a case study to be of interest to the international scientific community, it should illustrate some methodological development or contribute to answering some scientific question of broad interest.

Here, it is not clear if focus is on geochemical evaluation of compartmentalization (as stated in the title, but ignored in the objectives section and rejected at the top of page 950), on the use of head data (as best argued in the text), on the role of structural geology (as mentioned in the objectives), on its relevance for groundwater management (well argued in section 5, but coming as a surprise) or on seawater intrusion (as suggested by the introduction and conclusions). I feel that any, or even combinations of the above, might be OK. But then the authors should argue for scientific relevance and concentrate on making a point.

Following is a set of recommendations. These are not meant as a formal review of the paper, but suggestions on issues I felt uneasy with and that the authors may wish to address if they feel they can reformulate the paper in a form amenable to HESS.

Follow a well defined rationale and balanced reasoning.

Lack of focus may have caused the lack of a well defined rationale. Still, some of the points of the paper are clearly unbalanced. For example, a lot of space is devoted to the history of site investigations, which is interesting, but does not seem relevant to any of the possible points of the paper. Yet, no information is provided about the location of head measurements or contouring methods, which are central to the discussion of hydraulic compartmentalization. A whole paragraph is devoted to charge balance, which is trivial (it barely deserves a sentence), but nothing is said about water sampling, which is important for geochemical analyses (and critical for seawater intrusion, where stratification is to be expected).

Design figures carefully.

To facilitate reading, make them all with the same scale and keep some geographical

HESSD
2, S432–S434, 2005

reference elements.

Include sources of data (head contours look like the output of surfer, or a similar code, with few data points).

Be consistent. Heads in Figure 3 are inconsistent with those of Figure 2; concentrations in Figure 4 (from below 50 to above 4000) are inconsistent with those of Figure 7 (below 150 mg/L).

Make them informative: Include in the figure all information that is relevant for the discussion (i.e., faults in Figures 2, 4 and 5, or the like).

Be consistent with nomenclature.

Heads are referred to as water table height, groundwater height or groundwater levels (I had to check to make sure it was always the same concept).

Interactive comment on Hydrology and Earth System Sciences Discussions, 2, 939, 2005.