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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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We would like to warmly thank the referee for his/her thoughtful comments and suggestions. The overall tone of the review was positive and constructive with lots of useful suggestions offered.

One of the chief criticisms was the problem of resolving information and details from some of the figures. Figures 1, 2, 4, 5 and 6 were all designed to occupy a normal journal page, i.e. a two column, standard journal page (HESS style paper). When printed as a pdf with two landscape HESS-D-journal pages per portrait page of A4, then the details in these figures are undoubtedly hard to discern! We surmise that two

completely separate versions of such figures are needed; one version designed for the HESS-D journal and the other designed for the final twin column HESS journal. We appreciate that selective use of colour would have helped but we conclude that it is the size of the figures that is the predominant problem. This issue can be solved without too much difficulty. In a separate comment to editors, it may be worth highlighting this generic issue to all would-be authors submitting papers with detailed figures to HESS-D and HESS.

We are puzzled that the referee feels that the paper does not focus on a single aspect and lacks focus especially when the referee would like us to include more specific partial objectives. We thought that stating the two scientific problems in the introduction was a transparent and helpful way of showing the reader what we are trying to achieve in the paper. The referee urged us to rewrite the paper focussing on only one or two aspects despite also urging us to discus in detail all the data. We felt that we had indeed focussed on one or two aspects. Moreover, we also used the geochemical data with a very specific objective (i.e. identifying compartments). We are of the opinion that discussing the vast plethora of geochemical data (in terms of the varied and multiple controls on cations and anions) would hugely distract from the two scientific questions that we have highlighted in the introduction. Interpretation of the onshore and coastal groundwater geochemical data would require approximately 10,000-15,000 extra words and approximately 20 more figures. We seek clarification from the editor on this point: to add a huge discussion of all the geochemical aspects of the Sherwood aquifer in this paper - or to focus on one or two key aspects?

We agree that presenting all the data from each part of the aquifer on Piper diagrams and cross-plots may help convince the reader of our interpretation. This can be easily done and will not change the interpretation of the data. It will, though, require more complex figures, for example one Piper diagram and one cross plot for each discrete compartment in the aquifer. Again, we seek clarification from the editor on this point.

Although reorganisation of the text can be done quite easily, we tend to prefer separate

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results and discussion sections simply to enable other scientists to use the data and even reinterpret it if they so wish. To that end, we would be happy to include a complete table of geochemical data. This will occupy considerable space and once more we seek editorial comment. Perhaps reference to a web page would be a sensible compromise.

Section 2 and parts of the introduction can be abbreviated without much difficulty. We do not disagree that focussing on the occurrence and reported nature of fault rocks is the most important aspect of the background geology.

Having worked with many oil companies on oil field compartmentalisation we must disagree that comparison of the Sherwood aquifer in the Liverpool area to oil fields (many in the UK in exactly the same lithology) is going too far! I am unsure if the referee has oil field experience but the methodology, data quality range and distribution are all remarkably similar.

We were disappointed that the referee recommended rejection at this stage. We can accept that there are substantial improvements to be made (particularly in terms of figures, especially the issue of web-based journal pages versus normal twin column journal pages) in terms of presentation but the referee did not disagree with the conclusions and found the paper to be an interesting case study. There are numerous points and apparent contradiction that need clarification by the editor but we consider that a most worthwhile HESS paper can transpire from our HESS-D paper. We await final editorial comment.

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