Interactive comment on "Interpolation of groundwater quality parameters with some values below the detection limit" *by* A. Bárdossy

P.J. Smith (Referee)

p.j.smith@lancs.ac.uk

General comments

This paper offers some useful and interesting techniques for the spatial interpolation of groundwater quality observation when the observations are truncated by a detection limit. In the opinion of this reviewer it will be a publication worthy of attention by the HESS readership.

The "will be" relates to the comments below and those of the other reviewers. In particular I wish to second the textual corrections in the annotated manuscript by Geoff Pegram. These are not repeated below. I also suggest the author rereads the manuscript

in detail, some reordering of sentences may significantly increase the accessibility of the document.

Clarification is required about the nature of the experimental data analysed to all the reader to make suitable judgements as to the validity of the application of the methodology in Section 2.2.

Specific comments

Introduction:

It may be useful to refer to the uses of copulas elsewhere in hydrology (e.g. Todini, E. A model conditional processor to assess predictive uncertainty in flood forecasting. International Journal of River Basin Management, 2008, 6(2), 123-137; Keef, C.; Tawn, J. Svensson, C. Spatial risk assessment for extreme river flows Journal of the Royal Statistical Society Series C-applied Statistics, 2009, 58, 601-618) which may allow readers to draw links to applications in their own fields of hydrology.

Methodology:

Computing the marginal distributions:

It is not clear why a fully non-parametric marginal transformation (e.g. the Normal quantile transform) cannot be used. It would presumably mean that the quantiles of the predictive distribution are themselves truncated, but this may not be of concern if the limit of detection was low enough.

z_{lim} can clearly be interpreted as a means of formulating an extreme value type analysis of the upper tail. Please comment as to how this may be used to derive a fully parametric form.

Equation (2) would appear to be incorrect – should the second term just be the product of values between the detection limit and z_{lim}?

The spatial (or temporal) distribution of the measurement points is not reported nor is it

clear if the measurements incorporate multiple observations at some or all of the sites. Without this information it is impossible to judge the validity of the assumption made in deriving the spatial structure in Section 2.2. (e.g. the common marginal distribution) for the problem being addressed

Pg 5270 "The above procedure..." this sentence is not clear, but appears significant to the computational application of the methodology.

Application and Results

Section 4.1: See comments above about describing the catchment data more fully.

Section 4.2: What parametric distribution was used?

Section 4.4: It is difficult to assess some of the claim made it this due to inadequate labelling of the figures.

Figures

Fig 1: Label needed for y-axis Fig 3: Label needed for y-axis. Are the blue and grey lines incorrectly labelled? Fig 4 10 Inadequate labelling, which case is which?

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