

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

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This paper is about the spatial interpolation of ground water quality variables and parameters. The introduction of copula-based interpolation makes it a valuable technique, not only for obtaining estimates of the values, but also offering informative and valid estimates of the estimation accuracy. What the paper’s main message is about is well described by the author’s own words in an excerpt from the conclusion:

“The main advantage of the copula based approaches is in the estimation of the interpolation uncertainty. While ordinary kriging yields unrealistic estimation variances depending only on the configuration of the measurement locations, the copula-based interpolation yields reasonable confidence intervals.”

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The main points concerning this paper, in my opinion, are the following:

Good use is made of an outstanding data-set. There is an unequivocal demonstration that Ordinary and Indicator Kriging are no match for copula-based methods in this application; the random fields are far from Gaussian. Many useful and originally combined mathematical methods make the application a solid success: * Maximum Likelihood fitting of copula models to multisite censored variables * use of quantiles rather than distribution functions to model highly skewed data * the convincing use of chloride data to ‘prove’ the methodology, using a range of censoring levels The paper is likely to set a new benchmark in inference methods applied to groundwater pollution estimation and modelling and is an example of outstanding applied science.

I have annotated the manuscript in detail and attach it as a pdf. There are places where I have made textual suggestions and request clarity in a few instances.

Geoff Pegram 13 June 2011

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/8/C2117/2011/hessd-8-C2117-2011-supplement.pdf>

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