

Interactive comment on “Interpolation of extensive routine water pollution monitoring datasets: methodology and discussion of implications for aquifer management” by Yuval et al.

Anonymous Referee #2

Received and published: 15 October 2013

General Comments

The authors set the stage in their abstract as to the need for spatial interpolation for analyzing groundwater pollution monitoring of an aquifer. As stated a common problem often encountered is that data from producing aquifers usually includes many zero pollution concentration values from clean part of the aquifer but may span a wide range (up to a few orders of magnitude) of values in the polluted areas. The motivation of the current manuscript is to present methodology that can cope with such datasets and use them to produce maps that present the pollution plumes but also delineates the clean areas that are fit for production. A method for assessing the quality of mapping

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in a way which is suitable to the data's dynamic range of values is also presented. Unfortunately after this point I do not agree with the authors and their proposing a variant of inverse distance weighting (IDW) as a scientific method for interpolation given these circumstances.

Specific Comments

IDW is a non-statistical method for spatial interpolation. The authors claim that given the variability structure of their data and it not following well-behaved statistical distributions that this eliminates a statistical approach like those developed in the field of geostatistics. I disagree. Data transformations and developing methods based on statistical mixture distributions (to handle the specific distributions described) are two immediate ideas for applying geostatistical methods to this problem. This in combination with a universal kriging approach that permits the inclusion of covariates to possibly help discern areas of differing distributions would seem (to me) to be the more scientific approach. Rather the authors decide to promote an overly simplistic approach; in their words "...goal of using simple interpolation schemes..." This leads to an approach and results that are not very scientifically defensible. The quality and quantity of the data are involved in all inferential steps of geostatistical modeling, as they would be in any statistical approach, and this crucial concept is missing in IDW. The authors also seem to imply that geostatistical methods are not well suited for sparsely monitored (sampled) scenarios. Although this may have some indirect truth, I would argue that it is when data are sparse that statistical procedures become even more important as such procedures would recognize this deficiency and behave accordingly. Process like IDW that are far more amenable to automation, the pushing of a few buttons after making subjective choices on the size and shape of areas of inclusion zones, are not easily able to tell the difference between sparsely and more intense monitored scenarios. I have sat on several panels and reviewed enough articles seeing a similar concept, this idea of making IDW better somehow or even making it statistical. My answer is always the same that this has already been done before and the results of that work are the

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current and developing field of geostatistics.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 9363, 2013.

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