Hydrol. Earth Syst. Sci. Discuss., 5, S732–S734, 2008
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Hydrology and Earth System Sciences Discussions

Interactive comment on "Incorporating landscape characteristics in a distance metric for interpolating between observations of stream water chemistry" *by* S. W. Lyon et al.

S. W. Lyon et al.

Received and published: 21 July 2008

We would like to thank Juraj Parajka for a favorable review of this manuscript. The review identifies two interesting points that we address in this response.

The first point suggests that we further extend the analysis of accuracy used in our original manuscript (root mean squared error) to include a method that elaborates more on the effect of extreme observations and bias (if any) in kriging predictions. To this end, the reviewer recommends using a cumulative distribution function to compare the at-site and interpolated characteristics. We have undertaken such an analysis (Figure 5 in the revised manuscript) for each of the nine constituents considered in this study. The figure is also available via the World Wide Web at:

http://people.su.se/~stlyo/Cumulative_error_distributions.pdf

From this analysis, there is slight shift in most cumulative error curves left of the vertical zero line indicating slight over prediction by all distance metrics. Also, there tends to be more spread in general when interpolation is made using the Euclidean distance compared to interpolations based on both the symmetric in-stream and adjusted distance metrics. Overall, though, these cumulative error distributions indicate that there are no clear effects of extreme values or strong bias in the interpolation. Similar text and a figure reflecting this analysis have been included in the revised manuscript.

The second point is excellent and recommends including reference to recent works by Skøien and others on interpolation within stream networks. It was an oversight omitting such references in the original manuscript. The text has been revised throughout the manuscript and specifically in the introduction (page 5, line 17) to reflect these recent advances in the field of in-stream interpolation:

'Recent work by Skøien et al. (2006, 2007) provides a method (Top-kriging) which takes both the area and the nested nature of catchments into account to estimate streamflow-related variables in ungauged catchments. This concept focuses on manipulation of the semivariogram estimate and builds upon the early work of Gottschalk (1993a, 1993b) with extension by Sauquet et al. (2000) developing a method for calculating covariance along a river network to interpolate along the network.'

References:

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Skøien, J.O., Merz R., and Blöschl G.: Top-kriging - geostatistics on stream networks, Hydrol. Earth Syst. Sci., 10, 277-287, 2006.

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