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Hydrology and Earth System Sciences Discussions

Interactive comment on "Geostatistical modeling of spatial variability of water retention curves" *by* H. Saito et al.

H. Saito et al.

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The manuscript has been substantially modified based upon comments by 4 referees and interactive comments posted by Dr. Romano. We are very grateful for their critical and constructive comments. We believe that the manuscript has been improved significantly by addressing those comments. In this summary, we would like to list some of major changes we have made.

1. The title of the manuscript has been changed to ''An alternative deterministic method for the spatial interpolation of water retention parameters" by accounting for suggestions by Drs. Harter and Ye.

2. Two approaches compared in this study are now called ''fit-first and interpolate

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later (FI)" and ''interpolate-first and fit-later (IF)" instead of ''parametric (P)" and ''non-parametric (NP)" as original terminologies may be misleading for those with statistical background. This was pointed out by Dr. Ye (referee) in his review comments.

3. In the revised manuscript, indicator kriging (IK) is also used in addition to ordinary kriging in the FI approach to account for non-symmetric distributions of some parameters. Among different kriging algorithms, IK was chosen because of its flexibility. Unlike lognormal kriging, IK does not require the data to follow any distribution. IK was also suggested by Dr. Ye. There are, therefore, two different FIs in the revised manuscript; FI_OK and FI_IK. Results, however, show that OK is much better than IK in this study.

4. In the IF approach, when retention models were fit to interpolated retention curves, all data are weighted by kriging variance to account for uncertainty . This makes much more sense than assigning equal weights to all data. Issues related to kriging variance and uncertainties were raised by referees as well.

5. To compare two approaches in cross-validation, we use mean absolute error (MAE) and mean error (bias) in the revised manuscript instead of MAE and MSE as these two statistics are similar. This was pointed out by one of the referees.

In addition to those listed above, we have made substantial modifications, including adding more relevant references. Some additional figures, such as histograms of parameters and water contents have been included as well following suggestions made by referees. With all these modifications, we believe that the manuscript becomes much stronger and more useful than the original one.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 2491, 2008.

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Interactive Comment