

Interactive comment on “Hydrostratigraphic modelling using multiple-point statistics and airborne transient electromagnetic methods” by Adrian A. S. Barfod et al.

Anonymous Referee #1

Received and published: 26 September 2017

The paper applies and compares three multiple point statistics (MPS) methods (snesim, DS and iqsim) for hydrostratigraphic modelling using geological and geophysical data. This research is very relevant as (1) three MPS methods, including very recent methods, are compared to evaluate the advantages and disadvantages of each method which is very useful for users that want to select one of the different available MPS methods and (2) since these methods are all applied on a real-world case with realistic geological complexity and data availability.

The authors first apply the three MPS methods on their case study where the training image is actually identical to the model they want to simulate. This part is very exten-

C1

sive: the three MPS methods are used and different ways of validating the results are compared. The results of this part are according to me not so interesting since in a real case you never have the model you want to simulate but only one or more training images depicting some general geological concepts of the area. The results are also not surprising: iqsim better reproduces the TI which is logical since iqsim uses relatively large patches instead of pixels. In real cases, however, you don't want an exact reproduction of the TI but you want to simulate another area with similar patterns.

In the last part of their paper, the left half of the existing geological model is used as TI to simulate the right half of the model. For me, this second part is much more interesting. However, this part is very short: only one MPS method is used and different aspects of validation (such as comparison with boreholes) are not shown or discussed. I would like to see an application of the three MPS methods here and a more thorough description and discussion of the results as for the first part where the TI is equal to the result you want to obtain. For clarity and compactness of the paper, I would even propose to only do the full analysis on the second problem where another area is modelled and to remove the part where the TI is identical to the model.

Abstract, line 13 + introduction, lines 32-37: I would replace “hydrological” models by “hydrogeological models” or “groundwater models” as “hydrological” models could also refer to surface water modelling, rainfall-runoff modelling or river modelling which do not involve inclusion of geological and/or geophysical data.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2017-413>, 2017.

C2