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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Identifying the connective strength between model parameters and performance criteria" *by* Björn Guse et al.

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The authors have provided the reply to the Referee 2's comment, and are invited to do the same for the the Referee 1's comment as well.

As an Editor, I have to take a quite "independent view", but I am quite interested in this subject, so decided to write a short comment, and thus to contribute to the discussion.

I would like to mention that - indeed - the paper would benefit if the difference between the presented approach and the more traditionally used sensitivity analysis (SA) and uncertainty analysis (UA) methods is explained clearer. If I understand it correctly, the presented method consists of the following: a) randomly sample parameters (using LHS) and run the model; b) using generated data build a surrogate model (RT) of the response surface (for each perf.crit.); c) estimate "strength" of relationship by looking

at the "percentage contribution of each model parameter in explaining the variability in a certain performance criterion". Both reviewers mention that this can be seen as a variation of SA (and even Monte Carlo based UA) - albeit, in my opinion, with an interesting twist of using a surrogate model and the way "strength" is estimated. However the idea of "propagating" variation (sampling) in parameters through a model, and estimating how much does it influence the output (or performance) can be seen by many readers as similar to SA and UA. So, again, the difference could be perhaps presented more convincingly.

A comment on RT: it is known that it is not the most accurate machine learning model: in its canonical form, its output in each leave is a zero-order regression model (i.e. a constant), whereas e.g. M5 model tree (Quinlan 1986) generates the 1-order (linear) regression model (unless R code of RT does this differently). (However RT has an advantage that is is simple.) Of course there are also many other methods like ANN. Would be useful to compare if (how) results using RT differe from the results if another type of the surrogate (approximating) model is used.

I hope this comment can be also taken on board.

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