Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2018-46-RC1, 2018

Hydrology and Earth System Sciences
Discussions

Interactive comment on "The effect of input data complexity on the uncertainty in simulated streamflow in a humid, mountainous watershed" *by* Linh Hoang et al.

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Received and published: 4 April 2018

This manuscript describes how an earlier developed version of SWAT with a wetness index spatial layer as an additional input, is tested for different input layer uncertainties. In particular, the paper focuses on the scale of the DEM and scale of the landuse and soil layers. In principle, this is an interesting concept, however, I believe that, at the moment, the authors don't do a good job identifying and describing what the important (of interest to a global audience of HESS) findings are. As a result, I struggled to understand why this paper should be published in its current form. There are to me two major issues that need to be expanded on in more detail and can actually be the

bit that makes this paper acceptable: 1. What is the influence of adding the wetness index layer to the input mix, and how does this interact with the other layers? I checked Hoang et al. (2017), which is actually twice in your references, and I did not see any analysis of this either. It mainly covers the improved predictions, and this is an important addition. However, thinking about the input layers, there has to be some sort of interaction between the slope, soil and wetness index, and this is not really explored. Note that I am not saying the algorithm is not valuable, it clearly is, however, what remains unexplored is how this addition interacts with the existing components. For example you would expect that at some of the DEM and soil map resolution, the soil slope interaction would be similar to your wetness index layer. Of course without the underlying lateral flow and surface aquifer algorithm, this would be useless information. What is valuable in your current research is that you seem to discover this in your results. All your results, I think, point to the fact that the wetness index layer dominates the actual flow behaviour, but I am not sure if this is specific to your water shed. For example, the latb parameter is a sensitive parameter. Is this because the watershed is dominated by lateral flow, or is it because you have introduced the wetness index layer? As you only calibrate on streamflow with some comparison of the saturated areas, we don't actually know. The dominance of the wetness index layer also explains why the uncertainty in the soil and landuse layers is minimal, specifically since you a-priori decided on a 10m DEM for that test. In summary, I believe you need to investigate this further and figure out how this exactly works in relation to the algorithm that you have introduced. 2. The second major issue is that it is unclear from your research whether the results are more generally applicable. What is the global significance of your research? I am asking this as there is now real way of telling whether your results are water shed specific. You even seem to write to a local audience in the paper, often referring to your results as being specific and decisions being specific for this watershed. In a way, this is fine, but for HESS, the real value is in research that is of interest to a global public. This means that I believe that you need to define this better or test this better. An example is your DEM result, you point out

that the 10m DEM seems best comparing the NSE and looking at saturated, but you don't seem to be able to explain why (which is the real wider interest). Is this because of the specific physiography of your watershed, or is this due to your specific model algorithms? Citing other literature that found similar things does not really help unless this helps you explain your result. So in summary, your results need to be explained better and it should be clearer what the value of your results to the wider research community. I have added many more comments on the attached pdf that are probably useful to address these issues.

Please also note the supplement to this comment:
https://www.hydrol-earth-syst-sci-discuss.net/hess-2018-46/hess-2018-46-RC1-supplement.pdf

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