

Interactive comment on “Using expert knowledge to increase realism in environmental system models can dramatically reduce the need for calibration” by S. Gharari et al.

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This is a very interesting article. It is very well written so I do not have any comments to the wordings. But as I've commented in hess-2013-520, these two papers should be merged into one.

Specific comments

- (1) Line 1, page 14805. Missed a DOT before “The”.
- (2) The introduction about FLEX-TOPO is excessively verbose. A very simple introduction, a sketch figure, a parameter table and a few equations are enough. The section

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3 is also too wordy, and the key points about the interface to “constrained-based sampling method” are not properly emphasized.

(3) This is the first case study that uses the newly proposed “constraint-based” sampling method, so I suggest moving the core content of hess-2013-520 to this paper, and use FLEX-TOPO as an example.

(4) Line 15, page 14818. I have three questions.

1. Is the NDVI data reliable? Please provide and check the quality information of your data.
2. NDVI is an indirect indicator of ET, can you use ET data products such as MOD16-evapotranspiration? See <http://www.ntsg.umt.edu/project/mod16>
3. The “one sigma” constraint seems arbitrary. Please give some material to support why you select “one sigma” as the bound. I think a more reasonable one is use the bound derived from the quality control information of the data product.

(5) Line 2, page 14821. Do you have any literature to support the value “0.2” and “5”? Or just by your experience?

(6) Line 3, page 14822. Why non-smooth? Could you give an example? Or a synthetic study that introducing constraints can make smooth objective functions becomes non-smooth?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 14801, 2013.