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Hydrology and Earth System Sciences Discussions

Interactive comment on "Conditioning rainfall-runoff model parameters for ungauged catchments and land management impacts analysis" *by* N. Bulygina et al.

Anonymous Referee #4

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General comments: Conditioning of parameter space by suitable and easily available data sets derivable from other sources than discharge data is a very important task within the PUB framework. This paper uses Baseflow index from HOST classes to condition parameters of a simple (1+5 parameter) hydrological model. In order to map changes in land-use (afforestation) and land-management (soil degradation through over-grazing) additional conditions are introduced.

Also the idea to add a variance term to the Nash-Sutcliffe coefficient is innovative.

In Detail: It becomes not entirely clear how the simulated BFI is achieved: On page 1917:15 you write "the model is run to estimate corresponding BFI for. . .." What is

the model input? I think, to calculate the BFI properly you need at least one year of simulation. . ..! Please state more precisely!

Unfortunately, the model validation has been done based on a very short time series of only 3 months (January to March). Why did you not extend this to a longer period of (at least) one year? The conditioning on BFI should be validated for both, the wetter and the dryer periods of the year!

Page 1914:20: You define NS statistic, but you name it only NS. Use NSstat or similar instead. Page 1915:11: What does NSdef mean? Please explain. Page 1918:10-13: Drop this sentence. Page 1919:24: You write "particulary, perhaps. . .", please drop one. Page 1919:25: please explain kf ("fast flow residence time") Page 1920:3: Why you expect changes in peak flow arrival time: While celerity is fixed, your model may not be able to predict this? While reduction of input (through higher interception storage and higher transpiration rate) explains the slightly slower response for the afforestation scenario, in the case of soil degradation conditioning seems not to select those parameters reflecting faster runoff response (even so we would expect a flashier and faster runoff response)? Page 1931/1934: Fig 1. / Fig. 4 should be combined Page 1925: Table 1: What is the source of your data (reference)? How the analogue classes are created? E.g. class 18: the switch to class 20 leads to higher variance (0.207) but the same BFI (0.52). Page 1936: Fig. 6: very small, should be enlarged, change unit for flow (SI unit is m^3/s, not "cumecs") Page 1938: Fig. 8: the quality should be better (higher resolution), change unit for flow (not "cumecs")

Conclusion: The paper is well written. The argumentation is clearly structured. The figures are well selected. The very short validation period makes the final results very uncertain. It must be clarified what data the simulated BFI is based on. The paper needs minor revision.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 1907, 2009.