Hydrol. Earth Syst. Sci. Discuss., 11, C1507–C1509, 2014
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Hydrology and Earth System Sciences
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Discussions

Interactive comment on "The Wageningen Lowland Runoff Simulator (WALRUS): application to the Hupsel Brook catchment and Cabauw polder" *by* C. C. Brauer et al.

Anonymous Referee #2

Received and published: 23 May 2014

This is a very comprehensive paper testing a newly developed model for areas with low topographic relief. The investigation is extensive, including sensitivity analysis, uncertainty analysis, extreme conditions analysis, and investigation of multiple model-predicted variables and routines.

While the majority of the paper is wonderfully written and explained as is, I have two concerns:

-Figure 4 implies to me that some of your parameter values are not identifiable: The 'best value' as identified by HydroPSO also occurs for some of the parameters in parts

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of the parameter space that are very different from other parts of the parameter space where NS values also appear to be high (e.g. cw and cg for Cabauw polder).

It may be worth investigating if a different parameter set with the same level of fit reproduces the time series in a very different way. Another option – see if you arrive at the same values by starting HydroPSO at a few different initial parameter sets. Single-objective optimization algorithms are often sensitive to this.

You do a very nice job later in the paper investigating the impacts of parameter sensitivity and uncertainty, but I think it's worth investigating just how robust your optimized parameter set is, given that this is a focus of a significant part of the manuscript.

-Section 5.1 Parameter identifiability Performing two different sensitivity analyses is comprehensive, and your figures that display these analyses are very nice. However, changing a single parameter value at a time or investigating first order effects does not address the most important issue when it comes to equifinality – how much do the parameters interact?

If the model is computationally inexpensive to run, I'd suggest applying a simple sensitivity analysis, e.g. Method of Morris, which measures the amount of interaction per parameter.

Minor suggestions follow:

Page 2096, line 26: remove e.g.

Page 2097, lines 8-9: a little awkwardly phrased!

Page 2097, lines 22 – 23: all were measured or observations – consider revising, reads awkwardly

Page 2098, line 8: I'd remove 'considered as a catchment in this study' unless this distinction is important, or replace 'considered' with 'treated'?

Page 2101, lines 24-29: run-on sentence

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Page 2103, line 17: ‘parameters’ should not be plural

Page 2105, line 9: ‘time’ should be plural

Figure 14 – difficulty distinguishing different dashes – maybe use a dot-dash combination instead?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 2091, 2014.