Hydrol. Earth Syst. Sci. Discuss., 4, S152–S154, 2007
www.hydrol-earth-syst-sci-discuss.net/4/S152/2007/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Soft combination of local models in a multi-objective framework" *by* F. Fenicia et al.

F. Fenicia et al.

Received and published: 12 April 2007

Answer to anonymous referee 1

The authors would like to thank the referee for his useful comments. Our response to the comments follows.

Note that in the revised paper terminology was slightly changed to make it consistent with our other papers on modular and composite modeling: the overall HBV model is now called "global model", and the combination of local HBV models is called "composite model".

Referee: There is a lack of detailed description of the HBV model which would enable the reader to better understand the results (e.g. Fig 4). For example, a schematic diagram of the model and a discussion about the parameters which control the low and

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

EGU

the high flow dynamics would be useful.

Authors: We have added the schematic diagram of HBV, as suggested.

Referee: The authors need to provide the parameter sets of the two local model used in providing the composite discharge to strengthen their discussion.

Authors: Done.

Referee: In page 93, the authors argue that simple conceptual model often display a lack of flexibility in capturing the dynamic and time varying nature of hydrological responses. In my view this is the main driver for the paper. However, the authors fail to address this point in a concise and a simple manner.

Authors: We think that we address this concisely enough in the paragraphs 2, 3 and 4 of the Introduction. We state that "simple conceptual model often display a lack of flexibility in capturing the dynamic and time varying nature of hydrological responses.", and that there are two alternative ways of dealing with this problem, and that we use the second one with several models.

Referee: For a more appreciation of this paper by the reader the authors need to show when the HBV model is calibrated using a non-weighted objective function (i.e. WHF=WLF=1) the model will fail the capture the low and high flow dynamics. It is also plausible that the model may succeed in capturing either of the low or the high flow dynamics. This would have a major impact on the development of the local models. The authors have demonstrated the composite global model has better results than the two models used in producing the global model. This is not surprising as these two models are local developed to provide better simulation in particular flow zones. Thus, it is paramount that the authors should demonstrate that the composite model will also has better results that the HBV model calibrated using the non-weighted objective function.

Authors: We evaluate the ability of the HBV model to simulate high flows and low

HESSD
4, S152–S154, 2007

flows with NHF and NLF respectively. We show that the composite model has better performance then the "overall" HBV model with respect to those two criteria. Hence, the composite model reduces the error (represented by NHF and NLF) with respect to the overall model. Surprising or not, this is the advantage of using our multi-model approach with respect to the non-multi-model one. The reviewer asks how the performance of the overall and composite model compares not only with respect to NHF and NLF, but also with respect to a non-weighted objective function. In order to answer this question, and the related question raised by the other reviewer, we will add a table or a graph in the revised paper, which compares the performance of overall and composite model with respect to other objective functions.

Referee: As pointed out the authors in the introduction section of the paper, there a number of methods which can be used to produce the composite/combined discharge. To test the efficacy of the fuzzy weighting method used in the paper to produce the composite discharge there is a need to benchmark its results against other methods. At least its results should be compared to those obtained using the simple and the weighted average method.

Authors: Our work is more about introducing a new approach rather than on comparing different approaches. We underline this in the "future research" section added to the paper. However, we will comment on how our work compares to others in a qualitative way. This will be done in the discussion section of the paper.

We would like to thank referee 1 for the time spent on reading and commenting the paper, and the useful suggestions.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 4, 91, 2007.

HESSD

4, S152–S154, 2007

Interactive Comment