

***Interactive comment on “Combining semi-distributed process-based and data-driven models in flow simulation: a case study of the Meuse river basin” by G. Corzo et al.***

**G. Corzo et al.**

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We thank the reviewer for the valuable comments. Following his/her suggestions we have brought the changes to the manuscript (which however will be uploaded only when the comments of all reviewers are included).

The replies to the specific comments follow:

1. The term "process-based model", indeed, used in the literature to denote the physically-based distributed models. However, the HBV model is also widely referred to as a process-based hydrological model, e.g., by the Swiss Hydrological and meteorological institute (SWHI); developers of the modelling principles. Other studies also refer to it as process-based (Bormann et al., 2005; Seibert, 1997; Uhlenbrook and

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Sieber, 2005). Therefore, for consistency with the literature on HBV, we would like to keep the term "process-based model".

2. Although we think the coefficient of efficiency is widely known, we will add it to the page 373, as suggested.

3. Indeed, the description of the methodology is quite long so we will add a descriptive diagram as suggested.

4. We agree that the HBV model indeed is working in simulation, and therefore no information from past discharge is used to or either update the model states or to correct its outputs; but this is the principle on which HBV and many other conceptual models used in practice are built. In this sense we consider that the physical representation provided by the HBV model is limited, and one of the objectives of this study is to present such limitation (on a 1 day simulation period). For sure, a more comprehensive comparison with conceptual models that would use some sort of data assimilation could have brought bring new insights, but in the presented study this has not been done. Another issue is that the HBV model is mainly based on precipitation forecast, which is highly inaccurate. It is part of an ongoing study the determination how the errors of precipitation forecast affect the HBV and ANN models.

#### Bibliography:

Bormann, H. et al., 2005. From local hydrological process analysis to regional hydrological model application in Benin: Concept, results and perspectives. *Physics and Chemistry of the Earth*, 30(6-7): 347-356.

Seibert, J., 1997. Estimation of parameter uncertainty in the HBV model. *Nordic Hydrology*, 28(4): 247-262.

Uhlenbrook, S. and Sieber, A., 2005. On the value of experimental data to reduce the prediction uncertainty of a process-oriented catchment model. *Environmental Modelling and Software*, 20(1): 19-32.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 729, 2009.

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