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Hydrology and Earth System Sciences Discussions

Interactive comment on "Teaching hydrological modeling with a user-friendly catchment-runoff-model software package" *by* J. Seibert and M. J. P. Vis

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The authors present a well structured and well written paper introducing the hydrological modelling software HBV light and possible application for teaching hydrological modelling. The paper consists of a general introduction of the model, a description of the technical aspects and model implementation and, finally, a description of possible exercises (and additional specific exercise in the Annex). The authors well explain the technical details of the model, its advantages and disadvantages for model application in the educational context. They embed the description in their teaching strategy,

which however – in my opinion – should be explained in more detail (referring to the title: “teaching hydrological modeling...”). I like the idea of the authors how to use such a model in education. I agree with the authors that conceptual models a suitable for modelling exercises including the different modelling tasks described in the paper (sensitivity analyses, uncertainty analyses, scenario analyses, etc.). Nevertheless I would like to urge the authors to explicitly explain their teaching strategy in more detail (how to introduce hydrology as a basis for hydrological modelling, hydrological modelling, model testing and application, etc.) in order to make more clear how the specific model fits into this strategy. My teaching strategy for hydrological modelling, for example, is different. After teaching the basics of which alternatives for the modelling of hydrological processes are available, I ask the students to compose their own conceptual rainfall runoff model in an ecological modelling environment. This includes deciding how to represent each hydrological process in the model, thinking about which process descriptions should be used in combination as well as debugging (as mentioned by the authors) and checking the mass balance. Having a first (may be preliminary) model available, I ask the students to analyse its behaviour (sensitivity analysis), to try a manual calibration and to check validity through applying statistical quality measures to a spilt sample test, to identify shortcomings, and to possibly revise the model in terms of parameterisation and individual process descriptions. A final task is then to apply the model to scenario analysis. As a second part I would then provide a standard hydrological model (e.g., HBV, WaSiM-ETH or others) in order to introduce such a model, its possibilities and limitations and to show the similarities (and differences) compared to the “student” models. My intention is to confront the students as early as possible with important decisions such as: - which processes to include in the model, - which process descriptions match to the aim (e.g., rainfall runoff model) of the study, to the available data, to the scale of interest, - which quality measures to use for (manual) calibration and validation, - etc. May be both (different) teaching strategies work well, may be it is even better to use such a model as introduced by the authors. I would like to ask for a better explanation in relation to the teaching goals which should be

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explained more explicitly.

Specific comments

- P5914, section 5.1: What about a systematic sensitivity analysis? That should be integrated in this exercise. - P5914, section 5.2: I like the idea of comparing the results of different groups, especially – in case of manual calibration – focusing on the differences due to the use of different objective functions (quality measures) or modelling aims (low flows, high flows). - P5915, L24: Please explain at least a few possibilities in detail, how different model variants can be tested in HBV light. - P5916, L9-14: in my opinion such exercises should be done earlier in order to make the students sensitive to such issues. - P5917, L2-3: in my opinion this is the most important goal of teaching hydrological modelling. It can be achieved by the action described in section 5.4, in particular.

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