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Hydrology and Earth System Sciences Discussions

Interactive comment on "The role of catchment classification in rainfall-runoff modeling" *by* Y. He et al.

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This is a review paper that makes a good start towards a nice contribution to the discussion on catchment classification. It currently fails short of being an exciting paper, but I think there is the potential to achieve this. I think if the authors revise the manuscript by deleting a bit of less related material (e.g. table if elements discussion), by focusing on creating a bigger picture discussion (advantages and possibilities of different strategies, open questions, knowledge gaps) and add some conceptual figures providing an overview, then it will be a nice contribution.

Specific Comments

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Interactive Discussion

Discussion Paper

- Using the word arbitrary in the abstract to describe non-natural schemes suggests a process that is not guided or not informed, which I do not think is the case. Is there not a better word than arbitrary? - The discussion of function of an object in section could be related to the discussion of catchment function in Black (1996) and Wagener et al. (2007). it might provide another connecting element. - There is some repetition in the text. For example the content of section 2.2.1 had been discussed earlier. - It would be good to include hydrologic landscape units as defined by Winter (2001, JAWRA) and ecoregions in the discussion here. - The review is missing some discussion of the idea of signature regionalization (e.g. Yadav et al., 2007, Advances in Water Resources, Bulygina et al., 2009, HESS, 2010, WRR; etc.) as model constraints and of kriging approaches to flow regionalization (e.g. Laaha or Archfield). The idea of classification (connected to RR modeling) is especially strong in the first approach. If we would know a priori how a catchment behaves hydrologically then we can use this information to constrain any hydrologic model! Hence a functional classification could achieve this. - There are some spelling mistakes that need to be corrected. - Why does 'catchment structural similarity' include wavelet analysis? Isn't this rather functional or behavioral similarity? - Section three has a reference to Bardossy lecture notes, which I think needs adjustment since these are not available for others to review. - See Wagener and Wheater (2006, JoH) for another discussion of the problem of lack of identifiability of parameters as well as of model structural uncertainty for regionalization. - The periodic table of elements paragraph does not really add anything. I suggest deleting it and just mention it as an example in a sentence elsewhere.

Specific Suggestions

- No review is going to be complete. I refrained from making a long list of papers that I think should also be included since it is not really the point. These days – due to the larger number of papers out there it is impossible to include them all – I expect a review to provide some nice connections or larger scale picture that I did not previously have. Here is where the paper falls short. - How about some conceptual figure that provides

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a structure for the discussion? Maybe even in the form of a decision/classification tree that 'classifies' the types of classification approaches and suggests when to use what? - It would also be good to discuss what the different approaches can ultimately achieve and how they might have to be combined. - The discussion of individual papers by others could be shortened (section 3.2) and the generic aspects of the paper could be enhanced. It might also be good to have another quick look through most recent papers and see where they could fit in. Not to include more discussion of other papers, but to show the large increase in PUB literature (for example).

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 6113, 2011.