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Hydrology and Earth System Sciences Discussions

Interactive comment on "Data-driven catchment classification: application to the PUB problem" *by* M. Di Prinzio et al.

Anonymous Referee #2

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General Comments

This is an interesting paper with a relevant contribution to the topic of catchment classification. How data can be analyzed – in a meaningful manner – to understand hydrological similarity, and therefore allow catchment classification is a current question. Using SOMs in combination with data reduction techniques is one strategy to achieve this.

My main criticism at this point is that there is no attempt made by the authors for a physical interpretation (explanation?) of the result. The authors should expand their discussion to explain what catchments are grouped, why this might be hydrologically appropriate to group them (with respect to flood behavior) etc. The authors present an interesting technique that they test in a reasonable way. Now they just have to expand

it so that the paper becomes appropriate for a hydrology journal. This is something that I think the authors are very capable of doing.

Specific Comments

- Please use more acronyms in your abstract!!! Just kidding. Please take out the acronyms there. It is not necessary and makes reading the abstract very cumbersome. - It would be good to have less detail on the method in the abstract, but actually read about real results there so that the reader knows what he/she will get from reading the paper. - The authors should avoid very short paragraphs. Certainly one sentence paragraphs are not good style. - It would be good to define in the beginning of the paper (or in the abstract), that the authors are not talking about predictions of continuous streamflow, but rather about different flow indices. - Is the ranking of controlling variables (i.e. controlling the classification) similar? - What assumptions are made regarding how the physical/climatic characteristics control the hydrologic behavior of catchments? - I would separate section 2 into one section reviewing catchment classification and one discussing the issue of SOMs for classification in general. - It would be good to discuss (at the end) how this information (regionalized streamflow indices) could be used further. For example, several authors (starting with Bardossy, 2007, JoH; and Yadav et al., 2007, Advances in Water Resources) suggest that these indices provide valuable information that can be assimilated into watershed models to reduce uncertainty in (continuous streamflow) predictions in ungauged basins. - It would be helpful to discuss how far this approach can be taken in the Italian context. For example, what other indices can (likely) be regionalized given what physical catchment descriptors are available? Mainly, what is known about subsurface characteristics. - The mapping onto nodes within the SOM means that there is a frequency distribution 'in' each node. Could the uncertainty in this mapping be used to derive estimates of uncertainty in the predicted streamflow indices? - It would be interesting if the authors would list the subjective choices that necessarily have to be made in this type of analysis, but that could influence the outcome (e.g. the Euclidean distance measure). This

might help to guide future studies.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 391, 2011.