**Hydrology and
Earth System
Sciences
Discussions**

Interactive comment on "A comparison of regionalisation methods for catchment model parameters" *by* J. Parajka et al.

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General Comments:

The paper definitely addresses a topic of relevance for the hydrologic community, since estimations for ungauged basins will be one of the core domains in the future hydrologic research. The paper is well structured, comprehensible and the steps undertaken by the study transparent and reproducible. The conclusions are supported by a systematic analysis on the grounds of a rich database and seem therefore well substantiated. Although the innovative contribution is limited, as the study is a kind of extension of the work of Merz and Blöschl (2004), the new elements are in any case worth of being made available to the scientific community. Graphs and tables are of good quality and support well the considerations and conclusions in the text.

Specific Comments:

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-page 520: it is not perfectly clear what exactly you mean and did with the local geo-regression; did you use the residuals from the global or the local mutiple regressions and how exactly you applied that: perhaps you could add a sentence to clarify that

- as to the "perfect" similarity case: on page 523 you write (and similarly your argue in the conclusions): "This indicates that there is indeed potential for improving the criteria for finding donor catchments". I don't quite follow that conclusion, but perhaps I don't understand it. But it is clear that while choosing the donor catchment with the most similar parameters, the performance will be best. That is evident but is not proofing anything of the sort you wrote in the conclusion. So either you can explain better why and what it proofs and substantiate your conclusion or - in the other case - I would skip the "perfect" case.

- page 524: you write that the spatial loss is larger for smaller catchments: perhaps you could add some hypotheses on the reasons for that: I would have expected so, since in smaller catchments peculiarities are stronger - in larger catchments there is always a sort of averaging taking place - and in regionalisation approaches, i.e. information transfer, peculiarities are more difficult to address. I would stress that point a bit since the paper is about information transfer and this is an essential aspect in that field.

- Page 525 (conclusion): you write: "For a number of catchments the regionalisation procedure does perform poorly..." I ask myself if it is in any case the regionalisation procedure (no adequate donor catchment available, the procedure chooses the wrong donor catchment because irrelevent attributes are applied for defining similarity etc) or if not partially the hydrologic modell could be part of the problem.

- the last two points lead me to recommend you adding some general comments on information transfer. Apart from the procedure the performance of regionalisation depends essentially on how good the original information is (i.e. the information to be transposed). In the present case these are the model parameters which by themselves are estimates - this needs to be duly considered in the interpretation. The performance

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of the individual regionalisation approaches therefore also depends on how sparse or well distributed the original information is available and how good it represents all hydrological conditions (e.g. there might be a type of catchments with peculiar hydrologic behaviour that is not present in the available donor catchment pool). I understand that for a relative comparison of different regionalisation approaches - and this is the main topic of your paper - that point is not that relevant. However for a due interpretation of the results you might drop some lines on that but I don't see it as a necessity for the paper.

In this respect this could be seen as a suggestion to exploit your rich data set for an additional research: why don' t you investigate the decrease in predicitve accuracy as you decrease the available information pool (i.e. your 320 calibrated catchments). You could do so by a stepweise thinning /reduction of the information pool - maybe the result could show something like a critical number of catchments or density of catchments below which the regionalisation performance drops significantly. But this is only a suggestion for a future work and has nothing to do with the paper (and to some extent you addressed that point by the global mean approach).

Technical Corrections (spelling mistakes etc):

- write "homoegeneous" consistently with ...eous

- page 512 first paragraph: "....while in the regression case...." or "....while as for regressions...."

- page 512 last sentence first paragraph: " ....catchment (no s) attributes".

- write West, southern, Northern, eastern, alpine etc. consistently in either upper or lower cases (of course if not at the beginning of a senctence)- the referee not beeing an expert in English, please find out the correct way

- page 521 first paragraph: "....can be achieved with an ideal donor catchment..."

- page 523 second paragraph: ".....to examine the geographical distances between...."

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(important to add because could also mean a distance measure of the similarity index)

- page 523 second paragraph: "...and was in the order of..."

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