

Interactive comment on “Importance of the information content in the study area when regionalising rainfall-runoff model parameters: the role of nested catchments and gauging station density” by Mattia Neri et al.

Anonymous Referee #1

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This paper compared several kinds of regionalization strategies with two kinds of rainfall-runoff models. Generally speaking, this paper is well written and provides convincing evidence to support the conclusion. The title, abstract, introduction and discussion should be substantially revised. Here are some detailed comments.

1. The title is inconsistent with the numerical experiments of this paper. In this paper, 5 kinds of regionalization approaches (KR, NN-1, MS-1, NN-OA, MS-OA) were comprehensively compared with test data from Austria. The effects of nested catchments and gauging station density were also evaluated. Two rainfall-runoff models (TUW and

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GR6J) were used in the evaluation and similar results can be obtained from different models, indicating the conclusion of this work can potentially be extended to various models. However, the key words 'Importance of the information content' has not been intensively discussed in the discussion part (please search 'information'). The concept 'information content' has not been well defined in this paper, and it seems not very necessary to have it defined. This paper is more likely to be a 'inter-comparison' paper instead of a 'concept promoting' paper. Consequently, I suggest the authors to revised the title in order to sharply and concisely show what have been done in this paper in a few words.

2. The abstract is too long! Please briefly introduce your work in a single paragraph. A wordy 'abstract' is not friendly to your potential readers. It is uncomfortable to locate useful information from a 'one-page, 5 paragraphs abstract'.

3. line 43-53: In order to clarify the relationships between different regionalization approaches, please add a 'mind map' about: regression-based, distance-based, output-averaging, parameter-averaging.

4. line 67: the best the best?

5. line 155: routing routine?

6. Discussion and conclusion part.

In this paper the hydrographs of simulated and observed streamflow were not presented. Although this is not necessary, a hydrograph may possibly intuitively show a lot of detailed mismatching patterns which are helpful for model diagnose. I suggest to add hydrographs from a typical catchment to compare not only the KGE and NSE criterions but also the details of systematic errors of different regionalization approaches. KGE and NSE criterions are good objective functions for optimization, but hydrographs can tell more useful information about the physical processes.

Consequently, the discussion part of this paper is mainly about explaining the results,

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but lack of physical reasons. This paper has too much statistics but not enough hydrological mechanics on explaining the performance of different regionalization approaches. A comparison of regionalized parameters is strongly suggested to be added in the discussion part in order to provide fundamental physical reasoning of regionalization. For an example, please compare the parameter values from KR, NN and MS methods in a typical catchment, and discuss the influence of parameter values to corresponding hydrographs.

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