

Response to Comments of Reviewer 1 (comments in black, response in blue)

The paper covers a very actual topic and presents it in a well-structured and consistent way. This paper provides impressive proof that classification based on signatures which are closely linked to catchment functioning results in spatially consistent clustering of catchments. The methods and results are well described. The discussion is very detailed and based on up-to-date knowledge.

We thank you for your comments, and for your detailed corrections below. Responses to your comments have been provided in italic below your initial comments.

The paper shows some minor inaccuracies that should be revised:

Names and abbreviation of signatures may be used in a continuous way. For example Baseflow Index: abbreviation IBF, IBF, BFI

Abbreviations have now been made consistent throughout the paper. Baseflow Index is abbreviated as IBF.

numbering from 3.1 should be altered (3.1.1 is not a sub-chapter of 3.1!)

The numbering of the section headings has been corrected.

page 4503, line 17: no line break

The line break has been removed.

page 4507, lines 11-17: ARI or ARO ?

What was mentioned as ARO in the paper should be ARI as in earlier in the paragraph. This error has been corrected.

page 4507, lines 22-25: same as page 4505 line 15-16

We agree that the topic of other signatures that were considered should be discussed solely in the section entitled "Other signatures tested," which is at the root of your comment. Changes have been made in order to simplify the structure of the paper in agreement with this comment.

page 4508, line 4: RR?

This should read, and has been changed to R_{QP} .

page 4509, lines 28ff: same as in legends for Fig. 4 and 5 without further explanations here

It is true that there is some overlap between the text and the legends for Figure 4 and 5. Detailed explanation has been reserved for the figure legends, and an interpretation of these figures has replaced the text detailing Figure 4 and 5.

page 4510, line 3: Figure 7: no further explanation or mention in the text. I recommend to drop Fig. 7: It is difficult to read and does not give additional information.

This figure doesn't introduce new information, but it simplifies information that was previously presented in Figure 4. The novelty of this figure lies in the ability to compare the order of clusters between different signatures. We will see whether we can find a better way to make our point in the revised manuscript than using this figure.

page 4512, line 20: (Fig. 7) or better AG in Fig. 6 ?

This line is referring to AG as you correctly inferred. The figure that this line refers to is Fig. 6. We have included the abbreviation to the line and correctly refer to Figure 6.

Page 4514, line 11: Carillo et al. 2011: not in references

This reference has been added to the references section.

page 4514 line 21: cluster 47 ?? do you mean 4, 7?

This should say cluster 4, 7, and 2 instead of the original 47 and 2

page 4516 line 6: Eleven clusters ??

It was meant to say nine clusters, not eleven clusters. This mistake has been corrected.

page 4526, Table 1: an alphabetical order of the variables would facilitate finding certain variables

This change has been made and indeed makes it easier to find variables.