Dear Editor,

We are very pleased that you considered our paper for publication in HESS.

Firstly, we have considered all the minor changes proposed in the Report #1, corresponding to the Anonymous Referee #2. In addition, we have checked the entire document to assure a consistent use of tenses through the manuscript.

Regarding the Report #2, we have considered all the comments suggested by the Anonymous Referee #1. We have modified several paragraphs of the manuscript, especially in the discussion and conclusion sections in order to acknowledge those comments. Following, we include a point-by-point response to the referee#1's comments and the specific changes included in the manuscript

> 1-An explanation of the PredF strategy and its consequences for the data is still missing. The reduced SRN for both strategies, PredF and ClassF does not really describe the PredF approach and its outcome. The advantage of the PredF approach is the possibility to generate data for underrepresented conditions and to reduce irregularities in data (noise, outliers), but it is linked to the risk of a loss of information. The advantage of the PredF approach is the possibility to generate data for underrepresented conditions and to reduce irregularities in data (noise, outliers), but it is linked to the risk of a loss of information. What are the consequences for the data: elimination of noise and outliers, equalization of data, loss of information or variability? The question is, if the general higher classification performance of the PredF approach is a result of an equalization of data or of a meaningful pre-processing. Please discuss this.
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> According to this comment, we have emphasized and clarified (section 4.1 of the discussion) the two main reasons that can cause that PredF performed better than ClasF. These main reasons are: (1) the loss of information linked to the ClasF strategy and, (2) the more effective data processing linked to the PredF strategy associated with the generation of a more complete distribution of the hydrologic variables, especially regarding the underrepresented hydrologic information within the observed hydrologic space. This issue was also clarified and emphasized in the conclusion section. In addition, the issue of loss of information when the SRN is classified using the ClasF strategy has been addressed in section 4.3 of the discussion.
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> 2- A better classification for data uniformly adjusted is not surprising. The recommendation of the PredF strategy strongly depends of kind and quality of prediction.
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> We agree that classification performance depends upon the quality of the predictions. We have included a paragraph (lines 475-478; section 4.1) to clarify

and stress this issue. However, based on our results we assume a similar prediction performance independently of the prediction strategy, i.e class membership prediction (ClasF) or prediction of synthetic Indices (PredF). Hence, we concluded that the better classification performance of PredF over ClassF was not due to different prediction ability but to the reasons explained above.

3- Why is a classification based on normalized series more difficult to interpret and predict? Because of more and other runoff characteristics than in the magnitude-dominated classification of the raw data? Which consequences has this? As stated in the conclusion, the choice of raw or normalized data depends on the aim of the work. Raw or normalized data lead to two different classifications. Please comment on this.

Our results indicated that a higher number of hydrologic indices were included in the PCs when classifications are based on normalized flow series. In addition, we found that these PCs shared a more even percentage of variance when using the normalized series. Hence, we assumed that classification based on these normalized series are more difficult to interpret than classifications based on raw flow series. We have include a sentence (Lines 426-428) to clarify this issue.

We have also emphasized the limitations when using classifications based on raw flow series. These ones fail to account with many important hydrologic attributes. They are easier to interpret (because river “size” is driving most of the data variability), but they have more limitations, as other hydrological aspects are not playing an important role in the classification. In this regard, we have added several examples (section 4.2) illustrating how hydrological classifications could be used when flow series are or are not normalized before the classification process.