**Hydrology and
Earth System
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Interactive comment on "The influence of methodological procedures on hydrological classification performance" *by* F. J. Pe nas et al.

Anonymous Referee #1

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The paper describes a comparison of different specifications of hydrological data with one clustering method. This is an important issue because data specification is a basic question for each clustering or classification and addresses a relevant scientific question within the scope of HESS.

The work is ranked as 'major revision' because of some aspects as explained below:

Two different data sets are used for classification: raw discharge data and normalized discharge data. The result of the classifications based on different processed data are then compared. However the paper lacks a discussion of the consequences of the data processing responsible for the different results. E.g. a classification with data recognizing catchment size has to be different of a classification with the same data

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and considerably less influence of the catchment size (as you get with normalization by average runoff). The meaning of a specification for the data, e.g. elimination of outliers, noise, unexpected runoff behaviour, range of dispersion or loss of information, is an important task for interpreting the results. Understanding the consequences of data specification is essential! A general recommendation for one specification, regardless the issue of the classification, cannot be made for a not completely understood Specification (PredF). Therefore, please consider the meaning of the specifications in the discussion and conclusion.

The PredF strategy should be explained more in depth to understand what is done with the data and what the consequences for the data are. It seems that the PredF strategy leads to a loss of information with respect to the variability of data. The resulting data may not cover the whole real data space. The advantage of PredF is the possibility to construct data for underrepresented conditions to obtain classes of equal size. However, to find classes of equal size is not a priority objective of clustering and classification. Please comment on this.

Type and necessity of normalisation depends on the type of data and the purpose of analysis or classification. If you compare runoff behaviour, normalization of data is necessary for each comparison of indices depending on catchment size. To compare runoff values of different catchments, normalization can be counterproductive. Therefore the aim of the classification determines normalization or not. For other indices like the timing of extreme flow events or numbers of days with increasing flow a normalization is meaningless.

Please comment on this.

Language: Frequently the text is difficult to read and imprecise. Many things remain unclear and should be revised.

Minor issues:

Why do you compare 19 classifications? Are there no optimal sizes of classification? Why do you use a different number of hydrological indices (101 for the raw data against 103 for the normalized data)? May this affect the result?

Page 953, line 21: average rock hardness: which rock characteristic is the basis of the calculation and what is the meaning of the hardness to hydrological processes? Please explain.

Page 957, line 5: acronym OBB unknown, or should this be OOB?

Page 965: 4.3 Analysis of distinctive gauges belongs to results Fig. 5 and 6: unreadable small figures - perhaps better in another arrangement.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 945, 2014.

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