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Interactive comment on "The hydrological response of baseflow in fractured mountain areas" *by* A. Millares et al.

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We acknowledge the comments by anonymous referee #2. Some observations, including the definitions of the parameter N and the geo-morphological indexes, coincide with the suggestions provided by referee #1, of which have been included in the last reviewed version.

In relation to the hydro-geological characteristics of the study area (see attached file page 7, lines 201-208), we must say that there are numerous published studies which analyze the nature of this particular aquifer which exhibits a significant volume of water flow throughout different configurations of fractures (Gisbert, 1997; Alwany, 1997; Adarve et al., 1997; Castillo et al., 2002). Alwany (1997) remarked the importance of considering snowmelt in the recharge of this aquifer, defining three flow types which depend on the settling of these fractures; deep flow, intermediate flow and shallow flow. Castillo et al., (1999) analyzed indirectly these flows from different sources and springs, distinguishing different responses related to the geological material and the nature of the fractures. Therefore, the complexity and heterogeneity of this aquifer limits the detailed knowledge of the hydro-geological parameters, forcing us to use an indirect study to include such influence on the baseflow in the integrated hydrological response of the watershed in terms of its hydrological modelling. Such a situation is typical for aquifers located in mountain areas associated with fractured materials.

The referee #2 suggests a more detailed description of the method used to obtain the MRC. We find this observation very interesting and could complete the paper. The description was not included in the previous manuscript in order to resume the methodological section. In this sense we propose to modify Fig. 2, adding the algorithm used with a short discussion (see file attached page 5, lines 143-151 and the figure 2 modified, page 17, line 462).

The generation of MRC from fragments of recession is normally part of a concatenation algorithm which establishes a relationship between these fragments (Nathan and McMahon, 1990; Lamb and Beven, 1997, Millares, 2008). This process can be referred to as an automated curve concatenation, since the first estimate of the MRC is formed by merging individual recessions together on a common time axis, to obtain a continuous synthetic curve (Lamb and Beven, 1997).

For this study we developed an algorithm based on the works described by Lamb and Beven (1997) adding downward procedures. The proposed algorithm (Millares, 2008), implemented in Matlab, is illustrated schematically in Fig. 2 (b) (see Fig.2 attached). Once the selection of the fragments is made, the first step is to sort these fragments, ordered in both the upward and downward direction. The concatenation procedure considers recessions in pairs, relating the flow by scanning one fragment and establishing the relationship existing when the flow is as close as possible to the flow of the next recession. Once the relation is made, the recession scanned is moved step equal to dt in order to obtain a continuous curve in time.

Finally, the reviewer suggests a reduction of the conclusions epigraph. In this case, we understand that the lines the reviewer refers to are related to the comparison between the catchment characteristic indices and the value of the storage parameter and they have been reduced (see file attached. Page 12, lines 365-369), assuming that the number of studied catchments is not large enough to draw conclusions.

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Please also note the Supplement to this comment.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 3359, 2009.