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Interactive comment on "Modelling subsurface storm flow with the Representative Elementary Watershed (REW) approach: application to the Alzette River Basin" *by* G. P. Zhang et al.

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We would like to thank the Referee, E. Zehe, for his valuable comments on our manuscript, which will greatly improve the quality of the paper.

In the referee's comments, some critical points are raised concerning the assumption to neglect water exchange between the soil matrix and the macropore domain, and treatment of net precipitation partitioning. The discrepancy between the simulated and the measured fluctuations of the saturated zone depth is one of the major concerns of the referee, apart from a number of detailed points with minor importance which he pointed out.

We have carefully studied the comments provided by Referee Zehe, and will revise our paper taking his comments into account as much as possible. We herewith present our brief responses to the referee's comments.

First of all, we agree with the referee that neglecting the water exchange between the soil matrix and the macropore domain does not universally hold. However, this assumption is motivated by the consideration that the observations in the field of the catchment indicate that subsurface preferential flow is a major contributor to the stream runoff and the process is so fast that the water exchange between the two domains is of minor effect on the runoff processes. Although, as a first step to analyze the rainfall-runoff relation of this catchment with the REW approach, water quantity is our main concern in modelling, relaxation of this assumption taking exchange between the two domains into account could be done in the future without much difficulty, particularly if water quality and residence times are concerned. For instance, the method described in Niehoff et al. (2002) is one of the choices that can be adapted to model the water exchange between the soil matrix and the macropores. We will justify our assumption in the revised version according to the referee's suggestions.

The second assumption that the referee questioned is the partitioning of the net rainfall (after interception). In our consideration, once the infiltration capacity of the soil matrix is reached by the net rainfall, the remaining water will infiltrate into the soil macropore system. This may be interpreted as a threshold that needs to be passed before connectivity is achieved. Similar to the previous assumption, this is motivated by the observations that Hortonian flow hardly occurs in this catchment. We agree with the referee that this assumption is not applicable to the areas where Hortonian flow is important, and we will provide justifications to this assumption in the revised manuscript.

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With regard to fluctuations of the saturated zone depth, we will provide more explanations for the simulated results based on the findings of our modelling experiences.

The detailed comments made with respect to technical corrections and the closure relations used, will all be implemented in our revised manuscript.

REFERENCE Niehoff, D., Fritscha, U. and Bronstert, A.: Land-use impacts on storm-runoff generation: scenarios of land-use change and simulation of hydrological response in a meso-scale catchment in SW-Germany, J. Hydrol., 267, 80-93, 2002.