Interactive comment on "lumpR: An R package facilitating landscape discretisation for hillslope-based hydrological models" *by* Tobias Pilz et al.

Anonymous Referee #2

Received and published: 3 March 2017

General comments: Authors have developed an R package, lumpR, for watershed discretization in hillslope-based hydrological models. While developing an open source package for catchment discretization is the main goal of this manuscript, this paper does not introduce any new algorithm for hillslope delineation and semi-distributed hydrologic modeling that is superior to the existing approaches. As discussed in Section 2.3, series of SHELL and MATLAB scripts are already available to process data for the LUMP modeling approach. As a result, most of the paper reads like a user manual for the R package.

On the other hand, the sensitivity experiment described as the case study in this paper is the strongest component of this paper. Therefore, I suggest authors to expand on

the sensitivity experiment by considering some of the limitations they discuss as well as examining the impact of catchment discretization on other components of the water budget.

How general are the findings from the sensitivity experiments? Do you expect to obtain similar results if you implement the approach in other basins?

Major comments:

1) Page 8-L10- Authors mention that they implemented the LUMP algorithm as the basis for development of the R package. However, it is not clear whether the semi-distributed approach that is implemented in the LUMP model is superior to other discretization approaches in other semi-distributed modeling approaches. What are the advantages of using the LUMP approach compared to other discritization approaches?

2) Please switch Figure 1 with Figure 2 as it makes sense to have the discretization approach first and then the software structure.

3) Page 10-L10-Could you please explain Environmental Hillslope Areas?

4) In Section 3.2-It will be great if you can refer to different components of Figure 2 as you explain various functions.

5) Page 10-L20-What criteria are used to further subdivide each LU to terrain components?

6) Figure 4- It seems reservoir volume is always overestimated compared to observations for various sensitivity runs. Can authors explain the reason for this behavior?

7) Figure 6- It is not clear how general is the results of this figure. Do authors predict that similar sensitivity pattern will be obtained if a different hydrologic model is used?

8) Additional information about soil and landcover parameters are required and how discretization approach impacted parameter selection for each hillslope.

C3