

## ***Interactive comment on “Automatic delineation of geomorphological slope-units and their optimization for landslide susceptibility modelling” by Massimiliano Alvioli et al.***

**Anonymous Referee #2**

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The manuscript presents a complex approach to optimized hillslope partitioning designed for landslide susceptibility modeling. One of the innovative contributions of this work is the optimization of parameters - many geoprocessing methods require tuning empirical parameters so even highly automated procedures can become time consuming and subjective - this paper tries to address this issue using an iterative process along with robust statistics. The proposed approach can be adapted to other types of landform units mapping so the paper could potentially have broader impact.

The most serious issue with the paper is unclear validation or evaluation of the results. In the fig. 7 the derived hillslope units appear to have little relation to the observed landslides - I assume that landslide model would have to be applied to each unit to

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find out whether there would be a landslide but many observed landslides cross the hillslope unit boundaries and the size of units is not very consistent with the distribution and size of the landslides.

The paper does not show the details of how the final optimized results look like when overlaid with the observed landslides. It would be useful to at least include reference to the figure 10 center as the optimal partitioning, if I understand the text correctly. Is there any way to measure the improvement achieved by the proposed approach versus using simpler approaches such as the half-basins derived from r.watershed with optimized threshold or a raster based landslide model?

Few minor comments and questions: - the term slope units could be misleading (e.g. it could be interpreted as classes of slope steepness) - perhaps hillslope units may be better, but leave the slope units if this term is used by this journal

- the landslides were from the years 1954-77, were the contours from which the DEM was interpolated from the same time period? Were at least some of the landslides captured by the contours?

Implementation as a module in open source GIS makes reproducing the results easier, the authors should also provide their data set to ensure full reproducibility and comparison with other methods

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