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Reply on RC1

Karel Martínek et al.

Author comment on "Main Ethiopian Rift landslides formed in contrasting geological settings and climatic conditions" by Karel Martínek et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2020-420-AC1>, 2021

Anonymous Referee #1

RC: In section 2.2 There are several toponyms. It could be helpful to report them in a map.

AC: OK, I will put them to Figs 1, 2, 4.

RC: Figure 1: please report from where the digital elevation model has been obtained and its resolution.

AC: We were using AsterDEM and SRTM3 (its noted in Methods section) with resolution 30 m. I will add this info also in fig. caption.

RC: Why did you chosen to remove all the boundaries between lithologies? Sometimes landslide slip surfaces can occur along boundaries between different lithologies.

AC: Yes, you are right, but in our case, the study area is highly weathered and rock properties and susceptibility to land sliding are more dependent on altitude, weather and rock age rather than lithology, which is similar across the area – volcanics and volcanoclastics. I put more info in the text.

RC: Figure 3 in not so easy to read. There are similar colours in among passes, ridges and channels. Please try a better way to shoe your results.

AC: OK, I will ask co-author to find better symbology.

RC: Figure 8 is a niche way to show the statistic results but considering the whole area it seems that all the considered factors have the same importance. Please clarify this point.

AC: The diagram is showing the mean values of particular factors occurring across landslides and rockfalls polygons normalized to the mean value for the whole area. So because of normalization, the whole area values are constant. Maybe its confusing to show the column with whole area (it has no information value, it is here just for better understanding how rockfall and landslide values were calculated), I will rather omit it from diagram.

RC: Please add the Gambelto and Genale rivers in figure 9.

AC: OK, I will.

RC: In the discussion section, please, try to justify why precipitation is not an important factor for rockfall formation.

AC: Its result of our statistical analysis, the precipitation values are virtually the same in rockfall areas as average for whole study area, no anomalies, no extremes as in the case of landslides (they have higher values of all precipitation parameters comparing to average whole area). Frankly speaking we are not 100 percent sure why, probably rockfalls are limited to very narrow areas along upper parts of fault escarpments, typically few hundreds of meters wide, its definitely major controlling factor. Also the resolution of climatic data is very poor, meteorological stations are often many tens of kilometers apart, so interpolation of grid can include in many case cases more mathematics than real world precipitation. Also spatial resolution is poor, no one station has continuous data longer than 10 yrs, there are many gaps in dataset. I will add more explanation to the discussion.

Thank you very much for your time and valuable comments.

Karel Martinek