

Response to Review 2 of “Shaping shallow landslide susceptibility as a function of rainfall events” by Fumagalli et al.

We would like to thank the editor and the two reviewers for the detailed and valuable comments on this manuscript. We revised the entire draft and, based on the given suggestions, made changes within some paragraphs, to the indicated figures, and to the cross-references.

Below we address the specific comments and questions made by the 2 reviewer (for lines numbering please refer to the original manuscript).

Looking forward to your replies,

Micol Fumagalli, on behalf of all co-authors

Review of the manuscript #NHES-2024-140 entitled "Shaping shallow landslide susceptibility as a function of rainfall events" by Micol Fumagalli and colleagues.

The manuscript entitled "Shaping shallow landslide susceptibility as a function of rainfall events" by Micol Fumagalli et al. presents an interesting rainfall-based shallow landslide susceptibility analysis, in Orba basin at Piedmont Region, Italy, using logistic regression. Five extreme rainfall events (3 with landslides, and 2 without) have been considered for both training and validation purposes. Three susceptibility scenarios have been performed for each of the five rainfall events.

This work consists of a good exercise for slope instability analysis, considering the modelling and validation processes, being also useful for civil protection warning and mitigation purposes.

This is an original and very good work. Nevertheless, there are few minor issues that should be considered.

Thus, I suggest accept with minor revisions.

Next I put some issues:

L. 158-159: Please, revise and correct the legend of cumulative rainfall, in Fig. 2.

Also following the suggestions of the other reviewer, rainfall maps in Figure 2 will be changed to show the maximum daily rainfall intensity,

L. 167: Frattini and Crosta (2013), instead of "(Frattini and Crosta, 2013).

The reference in L167 will be corrected as suggested.

L. 196-201: Which was the interpolation method and which is the resolution of the interpolated raster retrieved from rainfall data?

We used a Natural Neighbour interpolator (Sibson, 1981), which preserves the original values at the sample points and is less affected by biases that could be induced when data form spatial clusters. The final maps were produced at a resolution of 5 m, to match the resolution of the topographical information.

L197 will be modified as follows:

“These parameters were obtained by interpolating daily rainfall data collected at 39 and 51 gauging stations for the 1977 and 2014/2019 rainfall events, respectively, with a natural neighbour technique, at a spatial resolution of 5 m.”

L. 203: when you refer to study areas, do you mean the areas where the meteorological stations are, or do you refer to the different lithological subdivisions?

In L203 “areas” was a typo. In this line we refer to the Orba basin, meaning that the normalization values were calculated for each pixel within the basin. L203 will be changed accordingly.

L. 358: Please explain the meaning of "Ci".

In L358, “Ci” represents the relative closeness degree of each alternative to the ideal solution, but since it is unnecessary to the understanding of Figure 7, it will be removed from the caption.

L. 388: Could you write in parentheses the meaning of VL (very low), L (low), M (...), H, VH in Table 2, like you did for HST?

The meaning of the abbreviations will be added in the caption of Table 2, as suggested.