Author's response to the Interactive comment of Referee #1, on "Modelling deadwood for rockfall mitigation assessments in windthrow areas"

Dear Anonymous Referee #1,

We thank you for the positive conception of our manuscript and for highlighting the relevance of the results for stakeholders in charge of risk management. We present here the answers, which will also be included in the new manuscript version in a suitable form.

The most prominent criticism is the incorrect announce of the deadwood generator use, since forest managers cannot wait for the next windthrow event to get the deadwood logs placed as their mitigation strategy. This is, of course, correct. However, we instead thought about the better quantification of intentionally felled and left logs along the slope as a management strategy. We will clarify this idea within the new manuscript.

The second essential point you have mentioned is the not clearly emphasized conclusion that after windthrow events, a window of opportunity opens for forest managers, as the protective effect of forests against rockfalls is firstly raised. The duration of this increased protection effect is site-specific, as the decay rate is assumed to depend on soil wetness, which depends on precipitation, slope exposition, and temperature, the occurrence of rot fungi and tree species. Further, the amount of deadwood is decisive and the expected rock energies.

Here the follow-up question about the regeneration of the post-windthrow forest has to be discussed, mainly depending on local climate, pre-rejuvenation, and browsing-pressure conditions. But the expected rock energies are also crucial, as dense young forests will do for low energies. For thicker trees, which are necessary to stop mid-to high-energetic rockfalls, growth times are longer, especially in higher elevations.

Below you will find the response to your remaining criticisms,which we intend to incorporate in the amended manuscript:

1) Why did you limited the study to one mass class of 400 kg or 0.15 m3? Is it related the block volumes observed on the field?.

It is a conceivable rock mass for the study site, but it is not based on statistically relevant recording methods. Therefore, we do not highlight this point in the amended manuscript version. However, we will clarify the following: Based on experimental studies (Ringenbach et al., 2022), the high protective effect of deadwood against 45 kg rocks is shown. We aimed to extend this rock masses by roughly one order of magnitude.

2) Line 118 "To directly assess deadwood effectiveness against larger rockfall energies, the fracture impact energy of large-laboratory test data is used": if a simulated rock block impacts a tree with an energy exceeding the fracture impact energy, does it mean that the block will continue to propagate downslope without any disruptions?

As referee #2 pointed out: the rockfall impacts on deadwood are not described in detail, which led to your question. Your assumption is correct, and blocks exceeding the fracture impact energy propagate without disruptions. We amended the manuscript and added further details of the rockfall impacts on deadwood.

3) Figure 3: The colors blend. Maybe the orthophoto (background) could be in transparency to improve the reading?

We used stand-out colors to make the tree trunks easily visible. This color scheme was maybe too much of a treat, and the white background still disturbs it. The adaption of the background transparency might be an option, which we will check for the new manuscript.