REFEREE 1

This contribution is a sensitivity analysis of the code Rockyfor3D for various DEM grid cell sizes, and forest vs no-forest cover. A case study in Slovenia is used to calibrate /compare the simulations. Several indexes of "goodness of fit" are used to compare the actual propagation area to the modeled ones (in binary mode).

In the present form, this paper is more a technical report about some parametric tests made with Rockyfor3D than a research paper. As Rockyfor3D is widely used in the rockfall community, some results may be of interest, however not bringing a significant contribution to the understanding of rockfall processes or even to this specific numerical model.

The main goal of the submitted paper was certainly not to show how to do parametric tests with the widely used Rockyfor3D model, however some tests were used in order to show the possible calibration of the model in a real case study. Therefore, our purpose was not to just apply some model parameter values "blindly", but to justify the decision on why certain parameter values were used for further simulations. Due to the several (similar) calibration runs and the table summarising results, we understand that it might partially come across as a technical test of the model, however we think that is not the case. To minimise this impression of a technical paper, we will rewrite and rearrange this part in the revised manuscript, by reducing the length of this part in the revised manuscript, improving the graphical support of the results of calibration, and reducing the number of GOF indices to the two (sensitivity and specificity) most appropriate ones. In this way, the flow of the revised manuscript will be redirected to the topic that was really the main subject of study, namely to the influence of grid cell size of DTM and protection effect of forest in rockfall modelling.

Some important points are missing:
There is no proper description of the site, no profile of the slope, no indication of the source area, and a map of the soil types. Figure 1 is of very bad quality, with a large map of Eastern Europe and a small "unreadable" picture of the site.

The revised manuscript will include a more detailed description of the study site along with the improved map of the study area (a map showing the source area and soil types). The orthophoto image on the map will be increased, we will provide a photo from the field with the metrics of the rockfall (profile of the slope), and we believe that improved map will improve the visualisation of the studied rockfall.

There is no link between Rockyfor3D parameters and rockfall physics. One could expect some in the method or discussion parts. The relationships between soil type, restitution coefficients and rg coefficient are not discussed. A soil type = 3 is selected for the whole area (including the source ?), but the Rg coefficients seem to better correspond to a type 4. However, as the site is not really described, it's not possible for the reader to have a clear view on that. Discussion is also limited to "what if" questions (what if DEM resolution increases: : :), but no explanation are provided about the reasons/mechanisms. The relation (ratio) between the block size and rg coefficients is a critical point in Rockyfor3D and should have been discussed.

As argued by the Referee, we agree that there is a lack of presentation/discussion about the relationship between soil type, restitution coefficient and rg coefficients. Therefore, in the revised manuscript we will focus on this relationship, both in improving the methodological part as well as the discussion. In order to justify the chosen soil types, we will make an

additional mapping of soil types in the field and we will divide the potential runout area in several soil types based on these additional field observations. Thorough explanation of the chosen soil types in the propagation and runout area will be given along with the photograph evidence for better visualisation and description of the study area. In the current manuscript version we used soil type 4 - talus slope (Ø > ~ 10 cm or compacted soil with large rock fragments) for the whole potential propagation and runout area, excluding the source area which is in the model defined separately. We agree that the discussion needs to be rewritten into more detail, especially considering the relation between soil type and restitution coefficient - rg coefficients, and their effect on modelling results using DTMs with different grid cell sizes. In addition, as our main focus was on the protective role of forest, more conclusions on this side will be provided in order to give readers some outcomes that would be useful when modelling rockfalls in forest, and on different spatial scales.

There is a so-called calibration procedure of rg coefficient done on the 1m resolution DEM (even if Rockyfor3D was not made to work with such high resolutions). There is no explanation about the range of values selected. Finally, the best set of parameters corresponds to the smallest values of the range. This is NOT an optimization (line 270) and we don't understand why not trying smaller values.

Since the authors of the model have expressed that the optimal DTM grid cell size lies between 2 and 10m, we agree that 1m resolution shouldn't have been used in the calibration stage. Regarding the calibration on 1m, we have decided to test it on the best possible resolution (i.e. 1m), however, in the revised manuscript we will use grid cell size of 2m for the calibration procedure. The justification of why not more rg values were not used: we have used an arbitrary interval of rg values that were used which lead to the state where the smallest values correspond to the most successful ones, and yes, we should have continued with the calibration procedure with even lower rg values. In the revised manuscript we will not use the same increment of 0.01 in changing rg values, but we will use randomly selected values from intervals (e.g. 30 combinations), i.e. rg70 between 0.05 and 0.30, rg20 between 0.30 and 0.7, and rg10 between 0.7 and 0.9 – without overlapping of intervals. By such computations we will get an optimum combination of rg values. In such way we will be able to observe how the length and area of the runout area will change, and where there is a limit between the more or less successful modelling of rockfall propagation and runout area.

For all these considerations, I would not recommend this contribution to be published in NHESS. Even if people working specifically with Rockyfor3D may find some hints, the overall scientific content is too poor for a scientific journal.

We will consider above written comments provided by the Referee, and with that we believe that we will improve its scientific value as a research paper. The major changes to the manuscript will be: i) decreasing the content (e.g. tables, GOF indices) on the calibration so that the paper will not be read as a technical report, ii) improving the presentation map of the study site, including additional photographs of the area and metrics of the rockfall, iv) improving the categorization of the study site in different, more precise soil types based on the additional field collection of data, also leading to improved discussion in that relation accordingly to the DTMs grid cell sizes, v) using DTM grid cell of 2m in calibration stage instead of 1m, and vi) using wider set of values of rg coefficients in the calibration stage, not only changing them in the linear way but also randomly with all three rg coefficients (rg70, rg20, rg10). Furthermore, considering also comments of the Referee #2, we will add to the

revised manuscript another case study of a nearby rockfall triggered recently that will add further discussion on the application possibilities of the used rockfall model.