

# ***Interactive comment on “Evaluating earthquake-induced rockfall hazard by investigating past rockfall events: the case of Qiryat-Shemona adjacent to the Dead Sea Transform, northern Israel” by Mor Kanari et al.***

## **Anonymous Referee #1**

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**General comments** The manuscript is interesting and potentially useful for identifying the rockfall hazard in the study area. It seems that a lot of effort was spent collecting the information required to define the hazard. Nevertheless, some methodological aspects need to be better explained in order to let the reader fully understand the analysis chain that drove to the obtained results.

**Specific comments** Section 3.1. Authors should provide some information about the block size; this should explain why in the subsequent sections they use only selected values of the block sizes. Section 3.3. The calibration method is not clear, since two out

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four pink lines are out of the field mapping (green polygon in Fig. 3) and it seems that only one of the lines intersects a relatively boulder-dense area. Please, explain better this point and give the number of the field-mapped rock-blocks (“high” is too generic). Line 31, page 4, a different letter for the velocity (e.g.  $u$ ) should be used, since  $V$  is the block volume. A simulation is supposed to output a mean value and an uncertainty, but the reported results of the sensitivity analysis are sharp numbers. Could the authors give an uncertainty on these numbers? Is the surface roughness  $S$  a dimensionless quantity in the CRSP algorithm? If not, please add the proper measurement unit (feet, meters?) Lines 6 to 8, page 5. This statement is not clear, please rephrase it. Section 4.1. The scaling exponent of the probability density function is  $-1.17$ . How much are the authors confident on the second decimal number? Could you give an estimation of the uncertainty on this number? If not, I would give  $-1.2$  as a likely value. Lines 23 to 28, page 6, need to be better explained. How does Eq. (2) relate to Eq. (3)? In Eq. (2), the cumulative probability for blocks with diameter less or equal to  $D$  is the sum from  $V_{min}$  to  $V_D$  (the integral for very small bins) of the probabilities calculated for each bin. Applying the relationship between volume  $V$  and diameter  $D$  for a sphere ( $V = 4/3\pi(D^3)/8$ ) in Eq. (2) does not yield the expression shown in Eq. (3). Could you explain the difference? As in the previous comment, how much are the authors confident on the decimal values in Eq. (3)? Section 4.2.1. Could authors give a definition of the profile cell? What is the size of it? Fig. 7 is potentially interesting, but I’m not sure to have fully understood it. The number of profiles shown on the horizontal axis is 30, while in the Figure caption is 25. The vertical axis title should be better placed along the graduated curved axis. Grey circles are defined as “other cells”. Could the author explain better what these other cells represent? Line 11, page 7, how do you calculate the range of variation  $3^\circ$ - $12^\circ$  from a mean of  $7.7^\circ$  and a SD of  $2.3^\circ$ ? Section 5.1. The sentence: “Thus, rainstorms are ruled out as a favorable triggering mechanism” should be smoothed since it is supported by a very poor statistics, i.e. only two seasons. In Sect. 5.2 the correlation observed between rockfall events and earthquakes is investigated only for the largest blocks, therefore rainstorms cannot

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be ruled out for small-size blocks. Section 5.3.2. This subsection, which is the main outcome of the manuscript requires to be rewritten in a more understandable form. The hazard contains usually three terms: one is a time-dependent term, one is size-dependent and another one is the susceptibility. Starting from this definition the author should describe each term on the base of the results described in the previous sections of the manuscript.

Technical corrections See attached PDF file.

Please also note the supplement to this comment:

<https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2018-250/nhess-2018-250-RC1-supplement.pdf>

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