Natural Hazards
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Discussions

Interactive comment on "Sea cliff instability susceptibility at regional scale: a statistically based assessment in southern Algarve, Portugal" by F. M. S. F. Marques et al.

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The authors wish to thank the careful revisions of the manuscript and the valuable suggestions. Most of the corrections and suggestions will be included in the paper to submit for publication in NHESS. The referee comments (Q) are followed by the authors answers (A).

Q: I found out that too many sentences in this paper are just "Copy and Paste" from Redweik et al. (2009).

Q: My main concern was about the international perspectives of this study, which were

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Interactive Discussion

Discussion Paper

not included by the authors.

A: Questions addressed

Q: The main finding was that the failures are best correlate with height and protection. Although, the height calculation was capture from a DEM which post-dated most of the failures, the finding is not so shocking.

A: The main factors obtained with the Information value method were, by decreasing order of importance: Lithology, Toe protection, Aspect, Maximum slope, Plan curvature and cliff Height. The logistic regression provided the following order: Lithology, Toe protection, Cliff height, Mean slope, Plan curvature and Aspect. The more important factor is cliff height but Lithology, followed by Toe Protection. The cliffs height in the studied area is not significantly affected by being assessed after or before cliff failures, because the slope angles of the areas adjacent to the cliffs top are generally low, and in consequence, the cliff top retreat causes only minor cliff height variations.

Q: Concerning the toe protection, this could be an artifact of the calculation method. The authors used a 0.999 value in the cases where a variable is not present (Si=0), thus, the "Ii absolute value mean" (table 2) was calculate to be 0.4963. Second place of importance.

A: The 0.999 was used to enable the calculation of Ii, in a variable with zero failures, and a value near 1 was used in order to not cause excessive increase in the score, what would happen if a near zero value was adopted. The score 0.4963 affects the mean of the absolute values of Ii for the factor protection, but does not able to affect the success rate curve. On the other hand, the variable is only present in 14 of the 595 terrain units (2.35%), having reduced impact on the global results of the model. The variable (Sea Stacks) which corresponds to the presence of large stacks is relevant in terms of the geomorphology of the cliffs, providing a very effective protection role on wave erosion. By this reason the variable was considered in the study, instead of merging it with another one just to avoid the computation problem caused by a zero

value of terrain units with cliff failures.

Q: I believe that the authors could try to use their data and statistical correlation factor as a predictive tool, or just to point out areas where the statistical parameters show a high probability for failure, which did not occurred during the last 60 years.

A: The maps presented with the model results indicate terrain units with high suscepibility but no cliff failures occurred in the monitoring period, and this information is, in general terms, included in the success rate and ROC curves. The predictive capacity of the models was not tested due to limitations of the inventory data. If cliff failure causes and triggering factors remain constant along time, it is expected that the models have some predictive capacity.

Q: I could not understand how did the authors got to the conclusions of the sentence in 1967:26.

A: Question clarified

Q: I did not found where the authors are using the Total Information Value (Ij) (1974:2) in the paper?

A: Was used to build a model which results are close to those provided by logistic regression, and also to construct the validation success rate and ROC curves.

Q: 1980:9 to 1980:12 - If the DEM is based on images obtained between 2001 to 2003, and represent the cliff after most of the failures occurred (between 1947 and 2007). Most of the calculated parameters (height, slope and so on) are for the cliff after the failure already occurred.

A: Question addressed but impossible to solve, as it is not possible to obtain a good detail topographical map that portrays the cliff morphology before failures.

Q: Page 1994 (figure 1): the legend is a mixture You Legend is a mixture of lithology (basalt, aluvium, sand), of geomorphology (beach_sand), of morphology (sea

cliffs), Epoch based chronology (Pliocene, Pleistocene), and Period based chronology (Miocene, Barremian, Aptian).

A: Corrected

Q: Many people believe that a one-sentence-paragraph is not legitimate in manuscripts.

A: Corrected

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