Reply to GMD-2021-343 reviewer comments

In the following, we reply to the editor and the reviewer comments. The original comments are in black, and our answers are in red. The added or modified text is in red italic.

****

Reply to Comments on gmd-2021-343'

Editor, 22 May 2022

As one of the reviewers pointed out, this version still looks like a software specification. And the scientific contributions need to be emphasized. Please restructure the manuscript and highlight the scientific contributions (not functionality contributions) after LAND-SE.

See the replies below.

****

Reply to 'Comment on gmd-2021-343'

Anonymous Referee #1, 21 May 2022

The current version still looks like a software specification. However, the scientific contributions of this manuscript are unclear and still need to be stressed.

Thanks for the comment. Unfortunately, we do not completely understand what is unclear and what needs to be stressed throughout the entire manuscript. The article is composed of two documents: the text and the software specifications. We have explained in text what we assume to be the scientific contribution of the new version of the tool and in the manual all the software specifications.

In chapter 3.2 we have described different analyses on continuous and categorical input variables. We consider Chapter 4 as an example of the scientific contribution of the tool to the improvement of landslide susceptibility assessment. The use of LAND-SUITE can optimize the selection and the combination of the variables that are an essential and significant component for landslide susceptibility assessment. In addition, LAND-SUITE can be used to test diversified geomorphological hypotheses allowing to verify and discuss initial assumptions and to prepare less subjective statistically-based susceptibility zonation.

To highlight more clearly the scientific contributions of the manuscript, we have largely modified the "Final remarks" section and we decided to rename this section in "Scientific contribution and final remarks" to better explain its content. Please find the modified text of the section in the following.

5 Scientific contributions and final remarks

LAND-SUITE was developed to support the landslide susceptibility inference process, which is a complex task. LAND-SUITE includes a suite of tools for statistically-based landslide susceptibility zonation implemented in R and released with an open source license.

As highlighted by Reichenbach et. (2018), only a reduced number of scientific contributions on statistical landslide susceptibility modelling, properly select and combine the suitable variables and apply the relevant statistical evaluations for realising high-quality zonations. This is mainly due to the lack of a comprehensive and shared approach for susceptibility modelling. LAND-SUITE can be used for the preparation and the selection of the variables/data required for a reliable statistical analysis and it is designed to support the geomorphological/geological experience and competence of the operator. . LAND-SUITE facilitates and simplifies the testing of diversified geomorphological hypotheses allowing the verification and discussion of the initial modelling assumptions, the preparation of less subjective statistically-based susceptibility zonation and the evaluation of the quality of the modelling results. A key step for a reliable landslide susceptibility modelling, is the preparation of robust and unbiased input data, which largely depends on the user's skill and experience. In many cases, the data classification approaches, reliability and representativeness of the thematic information are more important than the statistical methods and tools used for the landslide susceptibility estimation. Low quality output and errors often derive from incomplete or not significant data. The tool has the ambition to help a skilled user with the preparation of statistically correct and robust models, allowing to apply and test easily different classical statistical procedures (e.g., random sampling, data scaling, use of common machine learning approaches and commonly-used evaluation metrics).

Using LAND-SUITE, the user can compare results of different mapping units (e.g., pixel, slope units, administrative units, etc.), with distinct configurations and data resolution at diverse spatial scales. LAND-SUITE does not consider all the statistical approaches for landslide susceptibility modelling and zonation, which can be potentially included in future software upgrades. Possible LAND-SUITE advancements can also be achieved by implementing new procedures to evaluate the variables' significance across the different statistical approaches.

The suite has high flexibility and allows to perform different partitions of the training/validation dataset and diversified validation tests (e.g., temporal, spatial, cross validation, etc.), which are relevant evaluation steps to realise robust scientific susceptibility modelling exercises.

LAND-SUITE can be used to model and evaluate the spatial probability of the occurrence of other types of natural phenomena (such as floods, forest fires, rock falls source areas, e.g. see Rossi et al., 2021) and this use may highlight the need for specific code modifications and refinements.