Natural Hazards
and Earth System
Sciences
Discussions

Interactive comment on "Learning in an Interactive Simulation Tool against Landslide Risks: The Role of Amount and Availability of Experiential Feedback" *by* Pratik Chaturvedi et al.

Anonymous Referee #1

Received and published: 9 October 2017

General comments:

The paper deals with a very relevant topic, the involvement of stakeholders in landslide risk management and the adoption of "gamification" type approaches to promote it. The ILS software results a promising tool for capturing the interest of attendees and it could be applied with reduced effort to other test cases. The sections 3 and 4 show in effective ways procedures and results. However, several elements would require further examination. First, the test case is not adequately introduced: geology, past and recent events, rainfall patterns recognized as main triggers. In this regard, also in ILS, dynamics inducing the events (physical or anthropic) are not adequately taken

into account. For example, it is not clear how the spatial distribution of landslide events is accounted for in ILS or if the information about occurrence probability are used in simulation. The role of "anthropic activities" on slopes could often be detrimental and the reduction in earnings due to reducing these one for preserving stability should be taken into account. Moreover, the main stakeholders for ILS are probably not citizens but policy makers and administrators and then financial management (daily income) should be revised accordingly. The timescales also for simulations does not appear adequate. Several decisions and protection measures need substantial longer times. Timing for measure implementation could be crucial for deciding the more effective strategies. Finally, the references in first part should be extended and updated. Under such constraints, a substantial revision (major revision) of the text should be performed in order to address the issues arisen above (and below) on specific items; on the other side, the text could be rearranged only to promote the general approach and followed procedures and main results stressing the role that it could cover for landslide risk management after proper characterizations of areas of interest.

Specific issues: Abstract:

-rephrase the first sentence; the verb appears missing

Introduction

L25-27: please give further details; in my view, "Knowledge about causes-and-consequences of landslides and awareness about landslide disaster mitigation" act in different ways; the first one supporting structural protection measurements could reduce the occurrence/magnitude of landslides. The other one tends reducing people and assets vulnerability not varying the physical processes inducing them

L31-33: please add further details about Early Warning System tools; e.g. you could refer to reviews available in literature.

L71: "Chaturvedi et al. (2016)" reference is missing in the list

L82-83: please consider, I'm not sure that "increasing the amount of damage feedback" and " increasing the probabilities of landslide damages" could be assumed equivalent

2 Computational model of landslide risk

L106-108 (Figure 1): for landslides, the issue could be quite more challenging; indeed, you should consider "human interventions" detrimental for slope stability. For example, land use/cover changes (e.g. deforestation, conversion to agricultural practices). In this regard, rainfall required to induce the phenomena (e.g. duration, intensity) could be affected by "human interventions". Furthermore, researchers monitor data for landslide occurrence but not determine them as for "user" with investments. Finally, both influence not only the hazard ("total probability of landslide") but the risk.

L109: please specify if you consider weather(rainfall)-induced landslides

L128: the main part of investments for protection measurements as structural (e.g. drainages, retention walls) as soft (e.g. EWS) are funded by Administrations (National, Regional and Local); in which ways it is accounted for?

Section 2.1.2: further clarifications are needed. Firstly, brief information about the landslides in the area of interest are required; indeed, the relevance of antecedent precipitations is strictly linked to several geomorphological factors (e.g. soil depth, bottom boundary conditions, hydraulic and mechanical properties); without them, it is not possible to evaluate if considered durations (1d, 3d, 30d) are proper. Moreover, it is not clear the role of "Landslide Susceptibility Zonation"; indeed, "susceptibility" does not provide details about frequency of phenomena but attempts defining the area more "vulnerable" to the events while in this case it is intended providing also Hazard. Moreover, please add details about the rating (0-11). Finally, all the slopes in the area are recognized to be affected by the same rainfall patterns (similar properties, similar soil depths and so on)?

L170: what do you intend for landslide "benign"?

C3

Section 2.1.3: please, what do you intend for "random numbers"? which ways are the three damage probabilities computed in?

Section 2.2: why do you consider a daily time step? Several decisions and protection measures need substantial longer times. Timing for measure implementation could be crucial for deciding the more effective strategies

L205: who is the reference stakeholder of interest? Citizens, administrators, policy makers.

L212-213: in ILS, how is it decided if, for a certain day, landslide could occur or not?

3 Experiment

L289-295: I am not sure that the sample composition is consistent with those of communities living in the area affected by landslides as in terms of background as in terms of age. It could deeply affect the findings and the generalization of the results also taking into account the very interesting issues arisen in L44-47

L302: It is quite equal to what reported in L287; in my view, it could be removed

L313: please, provide further details about the symbols reported in brackets

L374: what do you intend for "K-12"?

L457: Mathew et al. reference should be moved in proper alphabetical order

Appendix A

It reports information quite similar to those in Figure 4; for these reason, it could be removed