

***Interactive comment on* “Community-based landslide hazard probability and risk assessment: A case in west Hubei, China” by Sheng Fu et al.**

Anonymous Referee #1

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A. General comments This manuscript presents a work regarding the landslide hazard and risk assessment of landslides in mountainous terrains of the Hubei Province (China). The study area is called Yuyangguan community which spreads over 34 km². The authors applied a probabilistic method from different maps and datasets to propose landslides hazard, vulnerability and risk maps for four return periods (5, 10, 20, 50 years) and landslides size scenarios equal or greater than 50 000 m³. After the presentation of the introduction and context in the Yuyangguan area, the used methodology depicted in the part 3 is the heart of this project. The results are presented in part 4 and discussed in part 5 before the conclusion presented in the last part.

This manuscript represents a considerable work of analysis according to a methodology developed and supported by different bibliographical works. All the results are

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rather convincing however the methodology was not reviewed in detail (part 3) and might require a further examination. I consider this contribution as can very useful and replicable in engineering practices to control the risks and to ascertain a sustainable development for this kind of geological context with frequent landslides. On the other hand, there are a few points that need clarification or complementary developments. In addition, some figures (maps) should be improved to appreciate the quality of this work.

B. Specific comments

1) It needs to present in more details the work on the field done by the authors to analyze the different causes of landslides (lithology, slopes, etc..). The authors present only 2 examples (figures 2 and 3) with field analysis.

In particular they do not talk enough about Chengguan area which represents the most historical cases in their database. Their approach seems to illustrate more the Chengguan area than Yuyangguan area indeed. That should be more highlighted in this manuscript. In addition, the Chengguan area shall be more detailed in terms of similarities of context with the Yuyangguan area (geology, geomorphology, climate, etc) to support the analysis with both.

Related to this topic of historical landslides: - Figure 1: the location of Chengguan community does not sufficiently precise in regard to the location of Yuyangguan community. What is Wufeng (Fig 1b) with respect to Yuyangguan ? It is not clear enough for the reader. - Figure I and Table II: the localization of historical landslides is not provided on the figure 1. In addition and the coordinates of each landslide in the table II should be added maybe.

2) This analysis on the field of historical cases is used to discuss and support the landslide susceptibility result in the paragraph 5.1 (Discussion on landslide susceptibility map). However the authors should develop also: a. The description with more details about the observed lithology on the field (like the most important controlling factor);

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b. The structural control (fault, joints) which plays also a potential part in the cause of some landslides (aggravating factor). It is not sufficiently discussed if we note the presence of numerous faults in the study area indicated on the Figure 1 c.

Other point related to this topic, the authors have not mentioned the potential earthquake source (other triggering factors). If it's not relevant in this zone then it must be at least mentioned and discarded. Related to this point, the tectonic context should be added in the presentation of the geological context too brief in the manuscript.

3) Hypothesis from lines from 215 to 216: the assertion “assuming that the past is the future”, landslides in the study area will probably occur with the same amount of landslides over the next 50 years as the past 50 years” is not sufficiently discussed and argued. In particularly the possibility of impacts of climate change (more heavy rains) should be included or at least introduced for the next 50 years like a limit or a next development to this study. This paragraph echoes to lines from 335 to 337 where the authors remind this assumption of a same condition between future and past to cause landslides. They indicate without details some possible changes of conditions but this issue deserves to be developed.

4) From line 105 to 109: Please develop, the explanation lacks of information. It needs to detail more (“Subsequently. . . . in study area”)

5) Line from 319 to 322: Would other factors exist to explain the difference with the classical distribution model (Malamud et al, 2004; Stark and Hovius, 2001) ?

6) The conclusion should be more developed about of limits and potential application of results.

C. Technical corrections

Figure 1: About faults on the figure 1c, could you indicate more information about the type of faults?

Figure 3: add scale into the zoom called “landslide surface”

Figures 4, 11, 12, 13 and 14: those maps are too small to be readable and impact the quality of this work. The names of villages or localities are difficult to read also.

Text:

From line 61 to 62: the main lithological units should be presented in the order of the geological ages.

From line 115 to 155: the methodology should be presented with more of clarity between each paragraph: determination of spatial probability (1), temporal probability (2) and size probability (3).

Line 199: rewrite and clarify the second part of this sentence “these two geological units can be susceptible to erosion and can quickly accelerate erosion “.

Line from 204 to 205: rewrite “the value of slope varies from 10° to 30° is 0.19”

Line from 304 to 305: rewrite, problem with the grammar sentence “This is because that although. . . , but the area. . .”

Line 314: The word compatible or suitable seems to be more adapted than “feasible”

Line 318: Bibliographical order according the growing age: 2001 before 2004. Review in the whole document.

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