

Reply to editor

Dear editor,

Many thanks for your great comments, and we thank you for giving us an opportunity to revise this manuscript. The manuscript had been edited and revised by English-speaking editing agency (enago), and the references cited are also by way. Some terminologies about landslide such as “main body”, “crown”, “crown crack”, “sliding surface” et al. have been corrected in the paper (Highland and Bobrowsky, 2013). We had revised “sliding body” to “main body”, “plate girder” to “plate-shaped body”, “trailing edge” to “crown” in this revised manuscript and figures. And the Fig. 2 and 3 have been revised according to your comments, and we have enlarged the font dimension both in Figs. 10, 11 and 12.

Please see the detailed revision for point-by-point reply, and the modified parts are marked in red in the revised manuscript.

Thank you very much for your suggestions and consideration, we believe that the quality of the paper has been greatly improved after this revision, and we look forward to hearing from you.

Best regards,

Yimin Liu, Guiyun Gao, Pu wang, Chenghu Wang et al.

Lynn Highland, Peter Bobrowsky. The Landslide Handbook—a Guide to Understanding Landslides: A Landmark Publication for Landslide Education and Preparedness[M]. Springer Berlin Heidelberg, 2013.



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CERTIFICATE OF EDITING

This is to certify that the paper titled **Analysis of the instability conditions and failure mode of a special type of translational landslide based on long-term monitoring data: A case study of the Wobaoshi landslide in Bazhong, China** commissioned to us by **Yimin Liu** has been edited for English language, grammar, punctuation, and spelling by Enago, an editing brand of Crimson Interactive Inc.



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Issued by:
Enago, Crimson Interactive Inc.
616 Corporate Wty, Suite 208-406
Valley Cottage, NY 10989
Phone: +1-877-712-2177
Fax: +1-978-371-5883



Disclaimer: The author is free to accept or reject our changes in the document after our editing. However, we do not bear responsibility for revisions made to the document after our edit on **February 29, 2020**.

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Detailed revision for editor's comments

1. *Page 1*

Explanation and modification:

“special type” in line 2 means that the shape of the Wobaoshi landslide is special, especially the plate-shaped main body and its sliding mode, and the paper focus on special type of the deformation and failure mechanism of the landslide, so we think “special type” in title is reasonable.

We have revised in line 10 and line 18 to avoid ambiguity.

According to *The Landslide Handbook* (Highland and Bobrowsky, 2013), “sliding body” in line 17 and 19 had been corrected to “main body”, and “sliding body” in the manuscript had been revised.

Lynn Highland, Peter Bobrowsky. *The Landslide Handbook—a Guide to Understanding Landslides: A Landmark Publication for Landslide Education and Preparedness*[M]. Springer Berlin Heidelberg, 2013.

2. *Page 2*

Explanation and modification:

“translational landslides” in line 28 means that this type of landslide, which had been developed in the Ba river basin of the Qinba–Longnan mountain area (Fan, 2007; Xu et al., 2010), not just only one.

“sand and mudstone” in line 35 should be “sandstone and mudstone”, which describe the regional geology condition of this landslide in generalized, including sandstone, mudstone and siltstone. “narrow” in line 37 should be “thin”, and “rock layer inclination angle” in line 37 should be “inclination angle of rock bed”.

3. *Page 3*

Modification:

The sentences from line 43 to 53 had been rephrased and revised by English-speaking editing, and “scholars” in line 37 should be “scholars and researchers”, which is more accurate.

4. *Page 4*

Explanation and modification:

The sentence from line 82 to 83 means that these translational landslides may be mistaken as collapse due to its special shape, and “hence, the dangers posed by such kind of landslides were easily ignored” in this sentence may not be accurate, and we deleted it and added “instead of focusing on the hidden dangers associated with landslides”.

As you said, the sentence from line 88 to 89 means is not so accurate. We revised like this, “long-term on-site monitoring data and related analysis except the remote observation based on synthetic aperture radar (SAR) or satellite for such landslides, have not been reported in publications according to literature review”, we focus on the

on-site and field monitoring in this paper.

5. *Page 5*

Modification:

“rear crack” in line 90 had been corrected to “crown crack”.

“research” in line 94 had been corrected to “we selected”.

6. *Page 6*

Modification:

As you said “This landslide is common” in line 116 is confusing and ambiguity, we had corrected to “This landslide occurred”.

“Forming Conditions” in line 123 should be corrected to “Formation Conditions”, and we want to analyze the characteristics and reasons of formation for this landslide.

“Engineering Geology Characteristics” in line 125 can be revised as “Geometric Characteristics”.

“width” in line 128 can also be revised as “length”. And we added a reference for definition of landslide scale in line 130 (Ministry of Land and Resources of the PRC, 2006), and we added it in reference table.

“ $\angle 6^\circ - 8^\circ$ ” in line 132 represents inclination degree of the rockbed is between 6° to 8° . If it does not meet international standards, we can write like this, “the inclination degree of the rockbed is $6^\circ \sim 8^\circ$ ”.

“which is a typical nearly horizontal consequent bedding rock slope” in line 132 and 133 should be corrected to “which is a gently inclined bedding rock landslide”.

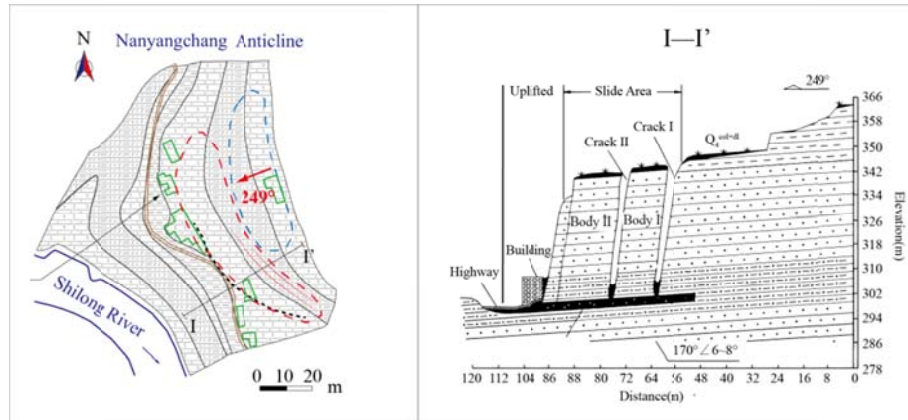
“sectional graph” in line 132 had be corrected to “cross section graph”,

7. *Page 7*

Modification:

We are very sorry about this figure, which lacks some information due to confidentiality issue, The formation lithology information has been added in the figure, and the elevation information of the main part is also displayed in the section view. However, this figure is mainly to show our work and provide data support for subsequent numerical simulation, so we have changed the “topographic map” to “schematic map”.

We are very sorry about this issue, as shown in Figure 3, the right side of the figure points to 249° , but 249° points to the left of the figure 2, that's why the plan view is the opposite of the section view, in fact, these pictures are all correct, If we want to correspond exactly, as follow next figure.



“Fig. 3 I-I’ sectional graph of the landslide” in line 141, we changed it to “Fig. 3 I-I’ cross section of the landslide”. As you said that it is difficult to be a translational landslide, we also regarded it as a bedrock collapse during the preliminary investigation. However, we observed that the plate-shaped main bodies is cut by the crown cracks, the houses had cracked at the front edge, and the roadbed is pushed uplifted at the front edge, which are shown in Fig. 2. Considered the Xima middle school landslide (Xu et al., 2010), Dahe middle school landslide (Li, 2009) in Nanjiang County, Bazhong City, and the Tiantai township landslide in Xuhuan County (Fan et al., 2008), the Wobaoshi landslide and above-mentioned landslides are all located in the red beds of the Qinba–Longnan mountainous area, and the characteristics and genetic mechanism are roughly the same. After consulting with Professor Xu, we defined the Wobaoshi landslide as a special type of translational landslide.

“longitudinal length is much less than the lateral width” in line 143, the description of landslide shape is not clear, we changed it to “the landslide is in a flat shape integrally, and the lengthwise is considerably smaller than the crosswise on the plane”.

“multistage dangerous rock mass with deformation” in line 145 is ambiguous, we changed it to “a bedrock collapse”.

“during disaster investigation” in line 145 means the investigation of geological hazard, which is funder of this manuscript, *CGS of China Geological Survey Project (Geological Disaster Investigation and Monitoring in Bazhong)*. And we changed it to “during investigation of geological hazard”.

Xu, Q., Fan, X., Li, Y., and Zhang, S.: Formation condition, genetic mechanism and treatment measures of plate-shaped landslide, *Chinese Journal of Rock Mechanics and Engineering*, 29(2):242-250, 2010.

Li, Y.: Study on formation mechanism and prevent methods of plate girder landslide. Chengdu University of Technology, 2009.

Fan X., Xu Q., Zhang Z., Meng, D and Tang, R.: Study of genetic mechanism of translational landslide, *Chinese Journal of Rock Mechanics and Engineering*, 27(Supp.2):3753-3759, 2008.

8. *Page 8*

Explanation and modification:

“a certain degree of aperture” in line 149 means that the structural surface of sliding body had cracks, may be “a certain degree of aperture” is confused, we had corrected to “the structural surface of the sliding body contain cracks”.

“and the bottom of the crack is filled with clay in addition to gravel and collapse debris” in line 150 and 151, this phenomenon was obtained through field investigations, and the first author (Yimin Liu) participated in the investigation and also according to the investigation report of Wobaoshi landslide, maybe we should added this reference here.

“obvious” in line 152 had been corrected to “main”.

“Then, the plate-shaped sliding bodies I and II were formed.” in line 155 had been corrected to “and the plate-shaped sliding bodies I and II are also shown in Fig. 2.”

“two-stage” in line 155 means that this landslide has two plate-shaped sliding bodies.

“the pore-water in the cracks can be observed” in line 160, you want to know how we can observe the pore-water. When we did a field investigation of the landslide, we discovered water remain in the cracks during rainy season, especially during large rainfall, thus we deduced the cracks will have preferable water-storage conditions, and it can be found in the investigation report of Wobaoshi landslide (Chen et al.,2015). Then we installed pore-water pressure gauges to monitoring the pore-water level.

“trailing edge” in line 162 means crown of the landslide, and this glossy is not professional, we changed it to “crown” (Highland and Bobrowsky, 2013).

“plate-shaped landslide” in line 173, this glossary was first put forward by Professor Xu and Professor Fan (Xu et al., 2010), and I added this reference after this sentence.

Xu, Q., Fan, X., Li, Y., and Zhang, S.: Formation condition, genetic mechanism and treatment measures of **plate-shaped landslide**, Chinese Journal of Rock Mechanics and Engineering, 29(2):242-250, 2010.

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9. *Page 9*

Explanation and modification:

“the pore-water in the cracks exists” in line 188, our explanation is the same as the line 160. Maybe here are some repetitions with the line 160, and we deleted this sentence.

“multilevel plate girders” in line 193 is inconsistent with the previous glossary in line 19, and we corrected to “multi-stage main bodies”.

10. *Page 12*

Modification:

The font dimension in Fig.7 was so small in previous vision, and we have enlarged the font dimension both in Fig.7(a) and Fig.7(b), then Fig.7 would be readable.

“rainfall intensity” in line 241 and 243 is wrong, and we have revised it as “amount of rainfall”.

“absolute stretching amount” in line 246 and 248 is not so clear, and we have revised it as “absolute value of extension”, and also revised in line 240, 248 and 331. And the absolute value of extension is shown in Table 3.

11. *Page 13*

Modification:

“Absolute slippage amount curves of crack I and II” in line 252 in Fig.8 is not so correct, and we have revised it as “Curves of the absolute extension value of crack I and II”.

“the Wobaoshi landslide is still moving along the sliding surface” in line 257 and 258 is not accurate here, and this conclusion which only rely on absolute extension value of crack I and II is not reliable, and this conclusion should be obtained by the model calculation and numerical simulation in chapter 3. Therefore, we deleted this sentence in line 258.

“rainfall intensity” in line 258 is wrong, and we have revised it as “amount of rainfall”.

“replenishment” in line 263 means the pore-water supplement by rainfall, we should revised it as “rainfall”.

“plate girders” in line 263 is inconsistent with the previous glossary in line 19 and 193, and we revised it to “main bodies”. And we also revised it to “body” or “plate-shaped body” in other sentences in revised manuscript.

12. *Page 14,15*

Explanation and modification:

The chapter 3 had been revised, especially the terminology and ambiguity. The sentence “that is, the problem’s solution is solved by analyzing the destruction of the soil’s balance” in line 284 and 285, means that stability calculation of the main bodies is based on the limit equilibrium method, and basic characteristic of this method is the Mohr-Coulomb failure criterion, and we add a reference here about the Mohr-Coulomb failure criterion in line 285.

We have done a proofreading on Page 15.

13. *Page 16, 17, 18 and 19*

Modification:

“sectional graph” in line 312 have be changed to “cross section”.

“trailing edge” in line 323 have been changed to “rear”.

“landslide monitoring engineering” in line 327 and 328 have been changed to “long-term monitoring”.

The font dimension in Figs. 10 and 11 was so small in previous vision, and we have enlarged the font dimension both in Figs. 10(a), 10(b), 11(a) and 11(b), then Figs. 10 and 11 would be readable.

The sentences from line 358 to 361 are not so clear, we have revised like this, “The left boudary and right boundary are about 30m from the body I and II respectively, and the lower boundary location is at sea level.”

We have increased the font dimension in Fig. 12. And “Sliding bodies occur when pore-water level increase” in line 379 in Fig. 12(b) have been changed to “Tilt and slide occurs when pore-water level increase”.

14. *Page 20*

Modification:

“Fig 12(b) shows that, under the combined effect of the pore-water pressure and seepage, the multistage girders slide horizontally along the sliding surface.” from line 384 to 386, we have revised them as “Fig 12(b) shows that, under the combined effect of the pore-water pressure and seepage, the multistage main bodies deform horizontally along the sliding surface.”

“this special structure of translational landslide widely occurs in the Qinba–Longnan mountainous area during the investigation of geological hazard hidden dangers” from line 393 to 394, we have revised them as “this special structure of translational landslide widely develops in the Qinba–Longnan mountainous area during the investigation of geological hazard”.

The title “Failure Mode Exploration” in line 403 should be changed to “Failure Mode Analysis”.

14. *Page 20-34*

Explanation and modification:

We have done a proofreading on the chapter 4 and 5, and the chapter 4 and 5 have been rephrased according to your comments and the suggestions of English-speaking editing agency (enago).