Response to Reviewer-1: MS #: eSurf-2021-81

Reviewer's comments are denoted by C and our responses are denoted by R, respectively.

General comments

C: This manuscript presented a simple and physics-based general analytical landslide velocity model which helps solve more landslide problems. The logic of the manuscript is clear, and the structure is reasonable, but there are still some problems.

R: We very much appreciate the Reviewer for supporting our work. Our sincere thanks to the Reviewer for your time and constructive comments and explicit suggestions that results in the substantially improved manuscript in which we appropriately address all the concerns you raised.

Specific comments

C1.: In my opinion, the title of this manuscript should be modified. You can make it more specific. It can't be seen from the current title that what you introduce in your article is related to landslide speed model.

R1.: Thank you very much for the suggestion. We can understand the reviewer's concern. We also thought to change the title to "A novel class of non-linear advective - dissipative system". We can be open to this choice. There are two major aspects of this manuscript. First, the development of the new Landslide Velocity equation (5), which, based on the physical parameters, involved forces and the dynamics, namely, the net driving and the resisting forces, presents a novel class of non-linear advective - dissipative system, the physical-mathematical model for landslide velocity. This has been exclusively discussed in Section 2.3. Second, construction of several novel exact analytical solutions to the model (5) for the velocity of the landslide. So, the overall essence of the manuscript is on the landslide velocity. The nice thing is that the same equation (5) can describe many different natural and physical phenomena by appropriately changing u (the velocity) to any relevant state variable. Even the simplified version of (5); the equation (6) or (10); can describe wide range of physical phenomena, including: the Schrödinger equation, the Ermakov-Pinney, and the Friedmann equations in physical cosmology (https://arxiv.org/pdf/2112.11526.pdf). However, since our principle model is developed for velocity, and the manuscript is in the earth science journal, we think that the present title of the manuscript fits very well to what it describes. Also, the title as it stands now is nice. Whatever we call it, scientific communities may use the general exact analytical solutions constructed here to the context it fits to their interests.

C2.: Figure 3 is the combination of Figure 1 and Figure 2. There is no need to draw it again.

R2.: Thanks a lot for this legitimate suggestion. Fig. 3 will be removed, and the text improved accordingly.

C3.: The conclusion could have been a little more concise and organized. It can be divided into 1, 2 and 3 points.

R3.: We can make the Conclusion [Summary] much more concise and reduce it substantially by focusing only to the major outcomes. However, we think, it looks nicer in a plain text without dividing into points.

C4.: In Fig.10, Which graph represents the initial conditions $s_0(x) = x^{0.50}$ (top panel) or $s_0(x) = x^{0.65}$ (bottom panel)? In Fig.14, Which graph represents the initial conditions $\beta = 0.0019$ or $\beta = 0.019$? The different initial conditions should be represented in the diagram so that we can quickly distinguish between them.

R4.: The caption of Fig.10 will be improved, where, "The profiles correspond to the initial conditions $s_0(x) = x^{0.50}$ (top panel) and $s_0(x) = x^{0.65}$ (bottom panel), respectively." will read "The profiles evolve based on the initial conditions $s_0(x) = x^{0.50}$ (top panel, at $t = 0.0$ s) and $s_0(x) = x^{0.65}$ (bottom panel, at $t = 0.0$ s), respectively." In Fig.14, $\beta = 0.0019$ and $\beta = 0.019$ will be placed in the top and bottom figure panels, respectively. And, the figure caption will be improved consistently, from "The top panel with drag $\beta = 0.0019$, while the bottom panel with higher drag, $\beta = 0.019$, which strongly controls the wave breaking and folding,

and also the magnitude of the landslide velocity." to "The top panel with lower drag, while the bottom panel with higher drag, showing the drag strongly controls the wave breaking and folding, and also the magnitude of the landslide velocity."

C5.: In section 6.1: "the significant to large large geometric deformations" is not written correctly?

R5.: We change it to: "the significant to large geometric deformations"