Earth Surface Dynamics Discussions

Earth Surf. Dynam. Discuss., referee comment RC1
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Comment on esurf-2021-53

Anonymous Referee #1

Referee comment on "Modeling Supraglacial Ponding and Drainage Dynamics: Responses to Glacier Surface Topography and Debris Flux Conditions" by Da Huo and Michael P. Bishop, Earth Surf. Dynam. Discuss., https://doi.org/10.5194/esurf-2021-53-RC1, 2021

General:

The article addresses the importance of meltwater ponds on heavily debris covered glaciers in the Pakistan Karakorum. This is an important field where more knowledge is needed in order to better understand the rapid recession of glaciers in the greater Himalayan region.

The article is well written in good language. Adequate space is used for discussion and conclusion and tangible results are provided. As such the article will provide an important contribution to the literature on glacial process, with particular focus on the greater Himalayan region.

Unfortunately, my expertise does not allow me to do a thorough review of the methodology used. Thus, it will be important to bring on board a reviewer who have that expertise.

Comments on figures and visual presentation:

The visual presentation of the field area is poor. The reader must wait until the results chapter when a small inset map of the field area is provided as part of Fig. 3. I strongly recommend that a good map of the field area, as well as the glacier, is provided as part of the Introduction chapter.

I also recommend that one, or ideally several, pictures of the glacier and its setting

(valley?) in which it is located is provided to give the reader a better understanding of the glacier and the environment in which it is situated. Currently, there is only one picture of a meltwater pond, which is good, but additional pictures of the study area would be desirable.

Fig 2. Is useful. However, it seems incomplete in its current form. There is no presentation on what different colours and arrows mean. Furthermore, are the two diagrams part of a sequence or not? This is not described. I suggest developing this figure into a "cartoon" to present the evolution of a meltwater pond from the original debris covered glacial surface, to the emerging meltwater pond, which then is being enlarged, until it maybe gets connected to the englacial channel system and becomes inactive.

Fig 4. It is difficult to detect the differences between S1 and S2 scenarios in diagram A-D. Could it be pinpointed in the figure text what to look for to help the reader out? Also, only a small part of the scale bar for "Standard deviation" is utilized. Would it be possible to change the scale to enlarge the register of interest and thereby increase the resolution of the diagrams?