This is my review of the manuscript entitled "Downstream rounding rate of pebbles in the Himalaya" submitted by Pokhrel et al for publication in Earth Surface Dynamics. In this work, the authors propose a relationship between the the roundness of coarse sediments found in rivers and transport distance. The manuscript is well written and presented, and supported by adequate and readable figures. The idea is not new but the authors developed a new formalism that allow for quantification. They show how this model can be used to reconstruct transport distances of old deposits, leading to discussion about sediment recycling and drainage reorganisation. Overall, I think this is a great work with large potential for the community that should be published. However, I think that the current manuscript requires some extra work before publication. First, I feel that the manuscript needs some reorganisation (for example, some methods appear as Results, or Discussion is rather a conclusion). Second, I missed some discussions about the implications of this work. Please find below my detailed comments that will hopefully help. I have no doubt the authors can address my major concerns so I'm looking forward to reading this manuscript in Esurf.

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Introduction

I found these pages interesting, however, they look a bit like a report rather than a paper introduction. In the current form, it is quite difficult to identify what is already known,/done how it is used and what are the current flaws that motivate this study. I strongly recommend to shorten this part in order to be more focus and somehow more conclusive about what is known and not known on the relationship between roundness and transport distance. This would really highlight the relevancy of this work.
Grain size is also used to discuss transport dynamics so it could be interested to discuss briefly what can be done with it and why shape is more interesting.

Materials and Methods

From section 2.1, I didn't really understand if you use a metric that has been developed by others (as suggested by the various references) or if you add something new (as suggested by line 159). In addition, I didn't understand the motivations to use this definition of roundness more than another. I think this could be clarified in the revised introduction. Similarly, if I understood correctly, you didn't develop new algorithm for image processing but you used options that are already available in ImageJ. It is totally fine but it is not that clear from the current section 2.4. Also, there are several methods available to segment grains and extract geometrical information (see for example BaseGrain, PebblesCount, G3point) so this could be explored a bit in the introduction. Some might avoid the use of 2 softwares including one commercial (ImageJ and ArcGIS) and make your methodology more open access.

In addition, I feel that the level of details is sometimes too high (for example, I don't think you need to mention that you used HCl to identify rocks - again, this gives the feeling of a report rather than a paper). There are also some repetitions (for example, l. 208 is a repetition of L. 184, l. 211 is a repetition of l. 193).

Results

As a general comment, a lot of this section sounds like methods and should be presented as such, or at least in a part dedicated to "Modelling" for example.
I like your interpretation that the percentiles of the roundness distributions are families of pebbles evolving along the river. However, I'm a bit concerned by the limited number of points in the lower quantiles. With on average 30 samples for the granite, the 5th percentile might be represented by 1 grain, a few at best. I would recommend to have a minimum number of samples (maybe 5?) in a percentile before to use it.
I was a bit confused at first by the statement line 287 as panel c on Figure 4 shows that angular grains round faster than the others. I assume you mean that whatever the initial angularity, once two grains have the same roundness, they continue to round at the same rate. I suggest to rephrase a bit this part to make it more clear.

A major issue of this part is that I didn't find a definition for the transferred distance. I assume that it is the total transport distance of the grains, which is different from the distance to the headwaters to due drainage reorganisation and recycling. Please add a clear sentence about it (and I think it should be defined in the Methods, not in the Results).

On Figure 7, you show the theoretical rounding curves for the two populations of grains. I really like it but I have a few questions:
- do you think it is possible to derive an enveloppe, rather than a curve, in order to estimate uncertainties ?
- The x-axis goes up to 2000 km, yet, it is quite unlikely that pebbles survive that long (see for example Dingle et al, 2017). Therefore, what was the motivation for such a long x-axis and in which configuration do you expect pebbles to live that far?

Section 4

I really like this part, but I would have appreciate to see it as Results followed by a proper discussion. I understand the potential impact of recycling on total transport distance, however, the way it is shown in Figure 8 will not increase the distance. In order for recycling to have a significant impact of total distance with respect to the position where the grain is found, you need to have shortening. This leads to two comments:
- The results should be discussed with respect to the known shortening rates in the area.
- Do you think your approach could be used to estimate shortening from the difference between position and total transport distance?

It is interesting to compare with the geological map, but I think you could better articulate the two approaches. Somehow, the map confirms your findings but it would have been easier to simply look at the map and identify that the grains must come from an area that is no longer part of the catchment. I think you could explain a it more the advantages of your approach in this kind of context (this comment is related to my first comment on the Introduction).

Discussion

This section is more a long conclusion. It's fine but in consequence, I missed a proper discussion on the results: is there a relationship between the initial size and the initial angularity? How can rock breaking affect the rounding curve? More specific to the results on the Himalaya: are they evidences for major drainage reorganization as suggested by the transport distance? What about the transferred distances? How can we use this approach elsewhere? It would really strengthen the manuscript.

Conclusions

Please make a it more clear what is new results from this study and what is not.

Minor Comments

- l. 14 "eight times that of quartzite" : it is written "seven" in the caption of Figure 7. Please correct.
- l. 66: Feher et al is a preprint that has been withdrawn by the authors. It can't be used as a reference.
- l. 191 missing (before "Mudd"
- Lines 237 to 266 should be in Appendix rather than in the main text.
- Fig. 4 The text at the top of each panel is quite close to the boxes. If possible, consider adding a bit of space. Missing captions about the colors on panels a and b (it does not seem to carry any information but maybe it can be use also on Figure 2 ?)
- l. 371 extra capital s "Sample"
- Fig. 9 missing "a" in quartzite
- Fig. 10 what are A and B for? Missing space in the caption between Basin and Note.
- l. 409 extra "