Solid Earth Discussions

Solid Earth Discuss., referee comment RC3
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Comment on se-2021-51

Anonymous Referee #3

Referee comment on "Roughness of fracture surfaces in numerical models and laboratory experiments" by Steffen Abe and Hagen Deckert, Solid Earth Discuss., https://doi.org/10.5194/se-2021-51-RC3, 2021

Scientific significance:
Does the manuscript represent a substantial contribution to scientific progress within the scope of Solid Earth (substantial new concepts, ideas, methods, or data)?
Yes, mostly regarding data obtained during the research.
Scientific quality:
Are the scientific approach and applied methods valid?
Yes.
Are the results discussed in an appropriate and balanced way (consideration of related work, including appropriate references)?
Yes.
I suggest the inclusion of Hobbs (1993) within the Introduction. This is an important paper for integrating structural geology with rock mechanics (note its inclusion within Comprehensive Rock Engineering, which is probably not on the reference list for most structural geologists), focussing on fractures and joint roughness.
I suggest also the inclusion of, for example, Weerasekara et al. (2013) and/or Cleary and Morrison (2016), in the discussion regarding grain size reduction. Further, Cleary (2001) describes an approach for direct inclusion of breakage in the Distinct Element Method, now implemented on a supercomputer. Different mechanisms of grain size reduction are noted, and their energy approach to size reduction in DEM could well be applied in consideration of the mechanisms active during evolution of a fracture surface.
References
Cleary, P.W., 2001b. Recent advances in DEM modelling of tumbling mills. Miner. Eng. 14, 1295–1319.
Cleary, P.W., Morrison, R.D. 2016. Comminution mechanisms, particle shape evolution and collision energy partitioning in tumbling mills. Minerals Engineering 86, 75-95.
Hobbs, B.E., 1993. The significance of structural geology in rock mechanics. Chapter 2 in Comprehensive Rock Engineering. Vol 1, 25-62. Editors, E. Hoek, J. Hudson, E.T. Brown. Pergamon Press .
Weerasekara, N.S., Powell, M.S., Cleary, P.W., Tavares, L.M., Evertsson, M., Morrison, R.D., Quist, J., Carvalho, R.M., 2013. The contribution of DEM to the science of comminution. Powder Technol. 248, 3–24.
Presentation quality:
Are the scientific results and conclusions presented in a clear, concise, and well-structured way (number and quality of figures/tables, appropriate use of English language)?
Yes.
I do not think the conclusions are substantial, but the work is useful.

Access review, peer review, and interactive public discussion (SED)
In the full review and interactive discussion, the referees and other interested members of the scientific community are asked to take into account all of the following aspects:
1. Does the paper address relevant scientific questions within the scope of SE?
Yes
2. Does the paper present novel concepts, ideas, tools, or data?
Yes
3. Are substantial conclusions reached?
Not particularly, but useful nonetheless.
4. Are the scientific methods and assumptions valid and clearly outlined?
Yes
5. Are the results sufficient to support the interpretations and conclusions?
Yes
6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)?
Yes - or at least until someone attempts the reproduction.
7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution?
Fairly well.
8. Does the title clearly reflect the contents of the paper?
Yes
9. Does the abstract provide a concise and complete summary?
Yes
10. Is the overall presentation well structured and clear?
Yes
11. Is the language fluent and precise?
Yes
12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used?
Yes
13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated?
A figure would be helpful in 3.1, around lines 163-196, for visualisation of the model and the boundary constraints.
14. Are the number and quality of references appropriate?
Mostly.
15. Is the amount and quality of supplementary material appropriate?
None available.
Peer-review completion (SE)
At the end of the interactive public discussion, the authors may make their final response and submit a revised manuscript. Based on the referee comments, other relevant comments, and the authors' response in the public discussion, the revised manuscript is re-evaluated and rated by the topical editor. If rated excellent or good in all of the principal criteria and specific aspects listed above, it will normally be accepted for publication in SE. Additional advice from the referees in the evaluation and rating of the revised manuscript will be requested by the topical editor if the public discussion in SED is not sufficiently conclusive.
I apologise for not involving myself within the public discussion. I find I did not know what I was letting myself in for when I accepted.