Impact of grain size and rock composition on simulated rock weathering

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General comments:

This manuscript presents the use of a numerical model to assess the effect of grain size on chemical weathering and chemo-mechanical grain detachment. Simulation of rock weathering takes into account a range of grain sizes, and different proportions of high reactivity and low reactivity minerals. Results indicate that the weathering rate decreases with increasing grain size, as well as nonlinear dependence on the proportion of low reactivity minerals. This is a very interesting research with interesting conclusions and hopefully future studies will confirm (or reject) these findings.

Specific comments:

In Methods section authors describe dissolution (chemical weathering), but it is not clear how mechanical weathering is calculated. Authors do give "hint" of that explanation in Page 3, Line 28-29 and in the last paragraph of Methods section (Page 4, Lines 1-5), but this should be described more clearly.

In the last paragraph of Conclusions section (Page 7, Lines 11-19) authors mention implications of their research. Although it is encouraged to mention this in Conclusions with intention to describe/direct future research it is too extensive and general. Rephrased version of this paragraph should be included in Introduction section, accompanied with references.

Technical comments:

References in text should be listed chronologically. As well, in References section abbreviated journal names should be used.

Page 1

Line 20: Wilson, 2004 – reference is not listed in the References. I presume this is the reference for weathering of architectural stone. If not, please provide additional reference.

Page 7

Line 13: Correct CO2 to CO_2

Thank you for the opportunity to review!

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