

Interactive comment on “A new mixed-mode fracture criterion for large scale lattice models” by T. Sachau and D. Koehn

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This is a well presented manuscript on a relevant area of geophysics: The use of lattice models for microscopic modelling of fragmentation. The use of lattice models for fragmentation started with Peter Mora et al. and has been refined by Yucang Wang et al. The main refinements include the development of a finite deformation model for calculating contact interactions, the use of quaternion algebra to incorporate bending and twisting forces, and the introduction of a mixed model of fracture criteria that includes tension, bending, shear and twisting failure. These advances need to be discussed in the manuscript. The paper proposes to use strain energy instead of maximal stresses in the breaking criteria. It is interesting to see that the new breaking criteria affects the fragmentation modes. But what is missing is a discussion of what is the role of the

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rotational modes (bending and twisting) in the fragmentation patterns. Other questions are: how does the fracture criteria affect the Yield function of the lattice model; how does the new model compare to the wind crack simulations of Yucang Wang et al? how are the results of Fig 7 for the case of the stress fracture criterion?

Technical correction: P10: fracture criterion is not a "boundary condition"

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