

Geosci. Model Dev. Discuss., referee comment RC1 https://doi.org/10.5194/gmd-2021-45-RC1, 2021 © Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.

## Comment on gmd-2021-45

Anonymous Referee #1

Referee comment on "RHEA v1.0: Enabling fully coupled simulations with hydrogeomechanical heterogeneity" by José M. Bastías Espejo et al., Geosci. Model Dev. Discuss., https://doi.org/10.5194/gmd-2021-45-RC1, 2021

This is a good description of what sounds like an elegant and useful numerical tool for modelling coupled hydro-geomechanical processes in heterogeneous subsurface environments. I like the model. I think other researchers in the field will find great value in it as well. The modelling results are impressive.

My point of concern is that the authors, in justifying the raison d'etre of this publication, seem to imply that the list modelling platforms they discuss in the build-up is exhaustive. I know this is not stated explicitly. It is implicit though. In fact, the authors list is, I presume, simply based on their experience. My point is that the list does not have to be exhaustive (in my opinion), but I would advise the authors to state this more clearly.

I cannot seem to find any statement regarding the computational effort of this code. I would consider this important information.

The examples are in 2D. What is the practical feasibility – both in terms of availability of information/data and in terms of computational effort -- of such simulations in 3D?

Line 74: "However, a more robust implementation is Porous Flow, ..." I cannot say whether this statement is true or not, but I suggest that the authors buttress such statements with facts. Why is PorousFlow the more robust implementation and where has this been shown?

Line 82: I cannot see why the MOOSE naming convention or which kind of bird Rhea is should be relevant to the reader.