Dear topic editor,
Thank you for your careful judgment of the manuscript and helpful comments. Authors appreciate your insights and suggestions. Comments are addressed below and a new version of the manuscript with track changes is uploaded.

Dear authors,
After receiving the comments from the second round of reviews to your manuscript, and based on your responses to the reviewer's criticism, I'm now in a position to provide my comments as topical editor to your submission. I agree with the reviewers' main criticisms (also with respect to the first round of revision) on not well described limitations of the model described in the study. This is especially the case if one considered that the approach has only limited applicability in terms of more realistic geological scenarios. To be limited to prescribed simple fault geometry of uniform (vertical) dip is indeed an important limitations of the procedure. As a matter of facts, fault surfaces show rarely a uniform geometry, but showcase rather varying spatial geometric features (apart from inherent self-affine corrugations). In this respect, I personally found the answers provided to justify the model limitations not scientifically sound, stating that varying the dip of the fault has not direct influence of the thermo-hydraulic response of the latter is against a more than 30 years of literature research. Similarly, I found that the lack of a clear discussion (at least) on a more quantitative uncertainty analysis also comes as an important limitation to the scientific merit of the study. What is the reason of automatizing an approach if not to enable proper sensitivity analysis to be carried out, where the range of effective parameters (geometry and properties) can be quantified in a robust statistical sense? Another important limitation is related to the fault behaviour (likely inherent from the dynamic modelling approach adopted throughout the study), which only provide to test permeable faults if not under the unrealistic assumption of large offset (remember that fault offset is not only a geometric features but comes with important consequences on the fault hydraulic behaviour). This said, I would be willing to consider your submission after another round of major revision, where all these important limitations are discussed in details (also by providing at least hints for future development to overcome the latter.

The remarks on principal aspects (bold red titles) are addressed in the following:

1. ***Limitations of the presented work and possible solutions***

The updated manuscript emphasizes the limitations of the presented methodology further. The developed script for manipulating the DeepStor model has limitations and is not intended to be as robust as advanced geomodelling tools like Petrel, Leapfrog, and Gempy. It was designed specifically to embed one vertical fault with a uniform offset into the base case model of the DeepStor and return features of the geological model as adjusted inputs for the mesh generator. More sophisticated assumptions can be directly integrated into the abovementioned tools and further discretized.
Section 2.2 is updated to detail the technical limitations of the developed workflow. Section 4 (Discussion) has been updated to address the existing limitations and potential solutions in a new sub-section: **4.1 Limitations of the workflow**. The last paragraph of the conclusion also addresses new outlooks for the future direction (based on the existing limitations).

2. ***Oversimplified fault surface***

We include a hypothetical fault and look for the potential impact of it and there is a lack of any clue about the fault surface. This way, we cannot put any complex surface topography on the fault plane. Section 2.2 is updated to make this point clear.

3. Impact of the fault on the thermo-hydraulic response of the model

We agree that the dip of the fault typically has a thermo-hydraulic impact. However, in a model with specifications like the DeepStor, the dipping angle did not affect the results. A dip variation of even 25° (at 4 m distance of the injector) on a 10 m thick reservoir did not impact the simulation results over 10 years. This point has been made clear in Section 4.1 of the updated manuscript.

4. A more quantitative uncertainty analysis

- GGB case: 11 models were tested and the uncertainty did not impact results.
- DeepStor case: the location of the fault controls the pressure distribution in the model. Fig. 14 in the updated manuscript presents the relation between the fault location and pressure. More simulations will confirm this general trend. The manuscript shows that a correlation exist between a geological structure (like the fault location) and the model uncertainty. As it was shown in this case, more simulations will not change the uncertainty significantly. Section 4.3 is updated accordingly.

5. Fault behaviour and representation in the model

In our meshing procedure, faults (as 2D planes) are integrated only for displacing the 3D elements. They do not have any significance for the MOOSE simulation and can be considered as being only a virtual plane. Section 2.4 is updated to address this point.