

## ***Interactive comment on “Brine migration along vertical pathways due to CO injection – a simulated case study in the North German Basin with stakeholder involvement” by A. Kissinger et al.***

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Reply to comments of referee #1

First of all thank you for carefully reading the manuscript. We understand that the central messages of the paper were not delivered sufficiently clear. Indeed, it is a melange and an overlap of different central themes. One might think, of course, of subdividing this into more than one paper (maybe two). Before doing so, we want to await the end of the review and discussion process. As the referee points out correctly, the numerical models in this work cannot be used to accurately forecast reality, but rather provide valuable qualitative insights. We will make this point clearer in the revised version.

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The first central theme is the presentation of the participatory model process (PM), its idea, who was involved at which stage, which methods were used, and how the geological data were collected and prepared prior and during the PM. This also includes a reflection of possibilities and limits of PM for this study case and an attempt to draw general conclusions.

The second central theme deals with the actual question of the PM, the identification of the main geological features and other parameters that control saltwater migration into the target aquifers. Our study allows to draw some conclusions that hold for other sites in general as well, at least within the North German Basin.

The third central theme can be seen as an add-on study that is conducted once the PM process has converged on a certain geologic scenario as we have in this case here. For this given geologic setup, we investigate different model simplifications and compare them with respect to target variables. The motivation to simplify models is obvious: less computational costs, less data required. Less data means less accuracy, but if data are scarce, results are uncertain anyway. This is exactly, what the referee points out correctly. Our hypothesis is that uncertainties are handled easier for simpler models, since it allows more realizations, or even Monte-Carlo simulations.

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