

Interactive comment on “Regional-scale brine migration along vertical pathways due to CO₂ injection – Part 2: a simulated case study in the North German Basin” by Alexander Kissinger et al.

Anonymous Referee #2

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Regional-scale brine migration along vertical pathways due to CO₂ injection – Part 2: a simulated case study in the North German Basin

By Alexander Kissinger et al.

I was involved already as a reviewer in the first round of reviewing. I find the applied changes of the manuscript in accordance to both reviewer comments suitable.

Below are some comments about the revised manuscript:

First of all, the text is still for my impression far too long and the authors should try to shorten it where possible.

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A linkage with the participatory modeling approach (part 1) is missing at all. This should be changed.

The motivation to identify a setup with a minimum of computational cost while delivering a maximum of valuable results is understandable. However, it should be emphasized that every simplification leads to a loss of accuracy. If this is kept in mind it is absolutely okay to use these somewhat simplified models for understanding the occurring processes and for obtaining estimates.

I do understand that the study shows that it seems to be okay to neglect buoyancy effects for this model. However, for this finding maybe more simple box model studies (with comparisons to experiments) would be a more straight forward approach. Also, the number of simplifications is quite accumulated, keeping in mind that the effect of CO₂ (two phase flow) is neglected in the first.

The conclusions are mainly banal.

Buoyancy effects due to temperature are not discussed. Peclet numbers (temperature and concentration) and Rayleigh numbers (occurrence of free convection) are not discussed.

The study is about injecting CO₂ into the middle Buntsandstein in the North German Basin. However, it is well known that the Buntsandstein is under very high formation pressure (more than 600 bar). Have the authors considered the extreme effort of pumping CO₂ in to such an overpressurized formation, for instance by considering the energy consumption?

Page 25, Line 7 – 8, this sentence seems to be wrong

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