

Interactive comment on “Simulating permeability reduction by clay mineral nanopores in a tight sandstone by combining μ XCT and FIB-SEM imaging” by Arne Jacob et al.

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The manuscript presents sandstone samples' imaging at different resolutions to account for the role of nano clays in the permeability of the porous media. They implemented the Navier-Stokes-Brinkman simulation technique to model the flow behavior of the sandstone samples containing clays. The paper is well-written and of great interest to the technical readers. Different imaging techniques, including micro-CT, SEM, FIB-SEM, and EDX, were successfully implemented to characterize the sandstone samples. The imaging techniques were properly described and the techniques for laboratory measurements of the real rock sample. The data support conclusions.

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However, I believe that the author should address the following points too:

The paper's Appendix comparing micro-CT, BSE, and EDX should be merged into the main text. FigA provides a clear insight into the "problem definition" of the paper. The readers should wait until reading this Appendix and see this figure to understand why illites are not visible in micro-CT images.

-Authors considered a 2-voxel pore layer next to solid surfaces as pore locations for illites in the primary simulation model. The reason for selecting this value was not discussed in the paper. Also, the methodology used in Eq. 7 requires more detailed explanations.

The authors well-explained the impact of adding porous voxels to the micro-CT image and discussed its impact on the domain's permeability value. However, the discussion of the same effect on the porosity of the system is missing.

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