

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

## **Anonymous Referee #1**

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This paper investigates the effect of clay mineral in nanopores on the overall permeability in porous rocks. The main innovation is the combination of imaging method with machine learning and Brinkman solutions. Very few studies have done this before. This paper is well-written with explicit structure, however, there are some comments needed to be addressed: 1. Line 40-41, in the Introduction section, the following references (Liu and Mostaghimi 2018; Liu et al. 2020) can't be ignored to discuss the recent advances in the pore-scale studies below  $\mu$ XCT resolution. Liu, M., & Mostaghimi, P. (2018). Reactive transport modelling in dual porosity media. *Chemical Engineering Science*, 190, 436-442. Liu, M., Starchenko, V., Anovitz, L. M., & Stack, A. G. (2020). Grain detachment and transport clogging during mineral dissolution in carbonate rocks with

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permeable grain boundaries. *Geochimica et Cosmochimica Acta*, 280, 202-220. 2. Line 87, “The term . . .”, this sentence seems have different font style with the context. Please check it through the paper 3. Line 89, reference is needed for the definition of “nanoporous” 4. Line 208, can the authors provide the values of the parameters used in Equation (1)? 5. Scale bar is missing for Figure 2. 6. Line 175, I think there should be more introduction about the machine learning method used in Figure 3.

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