11.07: Lithology dependent permeability for Wolfcamp interval, Eastern Delaware Basin

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ABSTRACT

I describe porosity and permeability of representative Wolfcamp lithologies and infer the impact of these properties on well production. I estimated total porosity by combining helium porosimetry and nuclear magnetic resonance. I measured liquid permeability using the steady-state method. My results demonstrate the presence of thin beds with permeabilities up to 300 times greater than in the mudrocks that store most of the liquids. I used a 2D single-phase flow model to suggest that permeable layers can drain fluids from low-perm mudrocks due to cross-facies flow, increasing the effective perm of the system from 30 nD to 100 nD.

CLICK ON IMAGE FOR LARGER VIEW

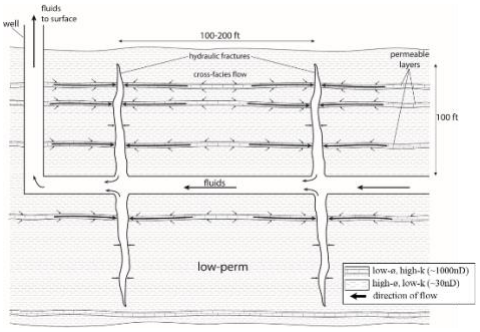


Fig 1: Conceptual hydrostratigraphic model consisting of permeable layers draining fluids from low-perm mudrocks because of cross-facies flow during production.

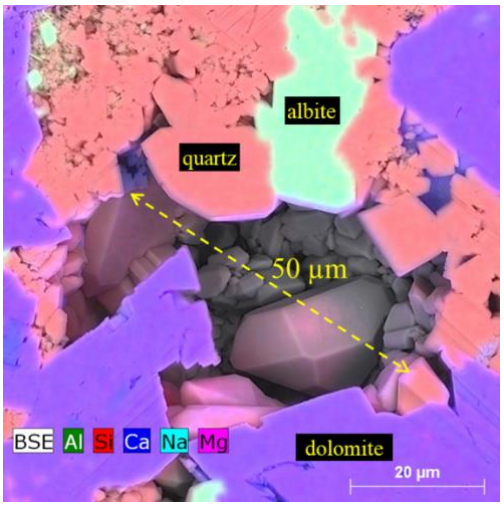
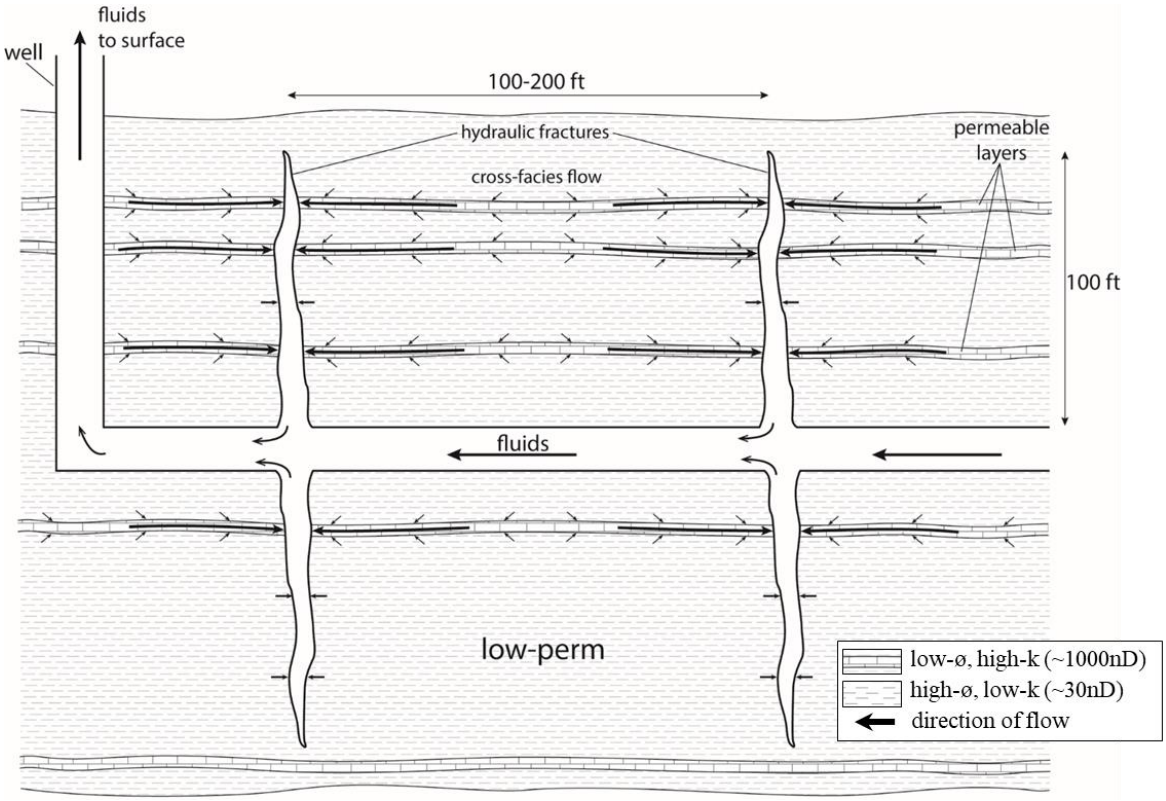


Fig 2: Scanning electron microscope (SEM) photomicrograph of interparticle pore in high-permeability (k = 2000 µD) sample.



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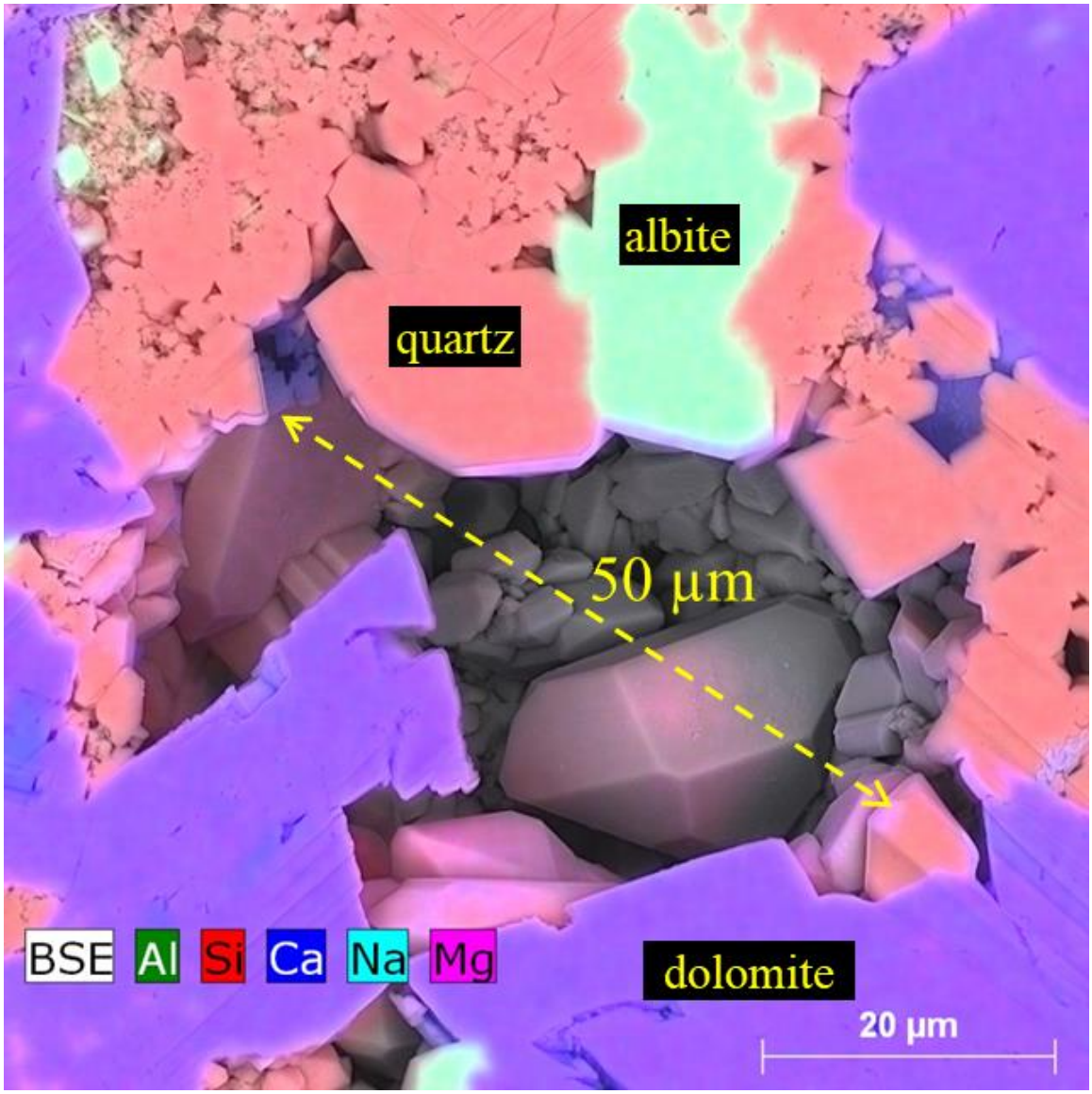

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