

Digital analysis of the pore network of Fontainebleau sandstone

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Context

The effectiveness of fluid transport in a porous rock depends both on the total porosity and on the geometric characteristics of the pores and of the pore network. The characterization of porous rocks at the microscale helps to understand indirect geophysical measurements playing a fundamental role in several activities such as production of geothermal energy, monitoring of geological CO₂ sequestration or of nuclear waste disposal. Here we will study in depth the micro-structure of a thermally treated Fontainebleau sandstone.

Objectives and Methods

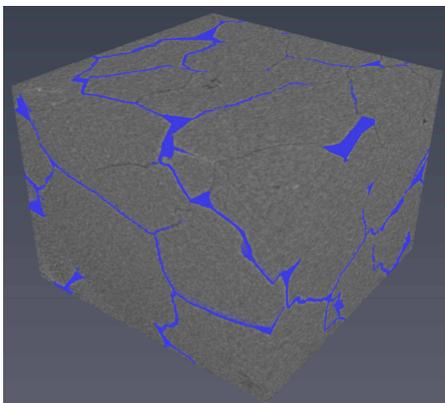
A high resolution microtomographic (3D) image of a thermally treated Fontainebleau sandstone will be analyzed using the software Avizo. The student will start with a 3D gray-scale image and will segment it into two constituent phases: solid phase and pore phase. Then, she/he will perform a few quantitative analyses to characterize the geometry of the pore network.

The aim of this analysis is to quantify the number and size of isometric (or roundish) pores and of cracks (including grain contacts), and their degree of interconnectivity. Special attention will be paid to the aperture, length, and wall roughness of the cracks, as well as, to the properties of the pore network.

This work will potentially be incorporated into a bigger project involving the numerical study of seismic attenuation caused by squirt-flow in such types of pore/crack networks.

Literature

Thomson, P.-R., A. Aituar-Zhakupova, and S. Hier-Majumder, 2018, Image Segmentation and Analysis of Pore Network Geometry in Two Natural Sandstones, *Frontiers in Earth Science*, 6, doi: 10.3389/feart.2018.00058.



WEB sites

Choice of orientation : (supprimer les orientations qui ne conviendraient pas)

1) Sedimentary, Environmental and Reservoir Geology / 2) Geochemistry, Alpine tectonics, Ore Deposits / 3) Geological Risks