Geophysical Research Abstracts
Vol. 21, EGU2019-14969, 2019
EGU General Assembly 2019

Nonlinear effects of the rock toughness on the hydrofracturing.

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The work is aimed at the research of the nonlinear effects of the rock toughness on the hydraulic fracturing process and hence at the necessity of knowledge of rock fracture toughness. Fracture toughness characterizes the rock's ability to resist the cracking process. Numerical models of the fracture propagation based on the postulates of failure mechanics. Fracture toughness is one of the determining parameters along with the elastic properties of the rock and the injection conditions. The aim of the paper is to study the nonlinear effects of the rock toughness and determine how much the fracture toughness affects the fracture length in the created numerical model describing the laboratory experiment. The laboratory setup made it possible to create conditions that determine the actual fracturing process. The strength parameters of the model material were measured. In particular the fracture toughness was measured too. The paper considers how strongly the fracture toughness of a medium affects the fracture length obtained with the help of a numerical model calibrated in the laboratory experiment.