

عنوان مقاله:

A Detailed Modeling for Enhanced Fluid Percolation in Fractured Porous Media by Application of Low_ Frequency Elastic Waves: An Extension of Previous Models to Fractured Reservoirs

محل انتشار:

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خلاصه مقاله:

Application of elastic vibration technologies in fluid flow through porous media is outspreading day after day, but lack of knowledge about the governing mechanisms is the Achilles heel of this technology. During past few years, models for predicting the flow behavior under radiation of elastic waves have been presented for granular porous media by geosciences Researchers. But till now, no mathematical model is presented to be applied in fractured media. This will be more noticeable when we bear in mind that several reservoirs in Middle East region are fractured. In this work the current model applied on granular medium is extended to fractured systems, and the effects of elastic waves on capillary trapping and mobility of Bingham plastic fluids in fractures have been investigated. Eventually, a model for predicting the influence range of the wave in fractured reservoirs is presented. Oil is considered as Bingham plastic and water as Newtonian fluid. The Gravitational forces are assumed to be negligible and the wave range of frequency is considered below the critical frequency in fractured reservoirs, 100 Hz. So, the time derivation in modeling of wave propagation could be neglected. The results of this study clarified that radiation of wave with low frequency and intensity extremely increases the flow rate and decreases the minimum pressure gradient required for flow of Bingham plastic fluids in fractured porous media. In addition, the fractional flow of Bingham plastic fluid is increased dramatically.

کلمات کلیدی:

low frequency sonic wave, bingham plastic, fracture, two phase flow, capillary force

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