THE RESEARCH OF PROPAGATION PROPERTIES AND RESONANCE EFFECT OF KRAUKLIS WAVE AND ITS POTENTIAL APPLICATION IN CHARACTERIZATION OF FRACTURED RESERVOIR AND MONITORING HYDRAULIC FRACTURING

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ABSTRACT

In the past few years, as one of coda signals, Krauklis wave caused the interest of researchers to investigate its mechanism and potential application. The resonance effect and propagation properties of Krauklis waves carry critical information of solid surfaces and liquid inside, which can be used to characterize fractured reservoir and monitor hydraulic fracturing operations. While, our understanding from Krauklis waves remains in the preliminary stage, in this research, we introduced the geometry and anisotropy of fracture, the density and viscosity of fluid as initial factors and investigated its relationship with resonance effect initiated by K-waves. The method of physical modeling is used to record the full seismic waveform, including coda signal in addition to P-wave and S-wave. The corresponding programming code is developed to extract, process and analyze the propagation properties of Krauklis waves. Numerical simulation is researched to compared with the results of physical modeling experiment. Based on the above, the theoretical models in terms of those relationship are established and modified. The intended results include the correlation graphs between resonance frequency and the anisotropy of fractured reservoir, the theoretical models for facture and fluid interpretation, and a series of conclusions after investigating the fundamentals and primary application of Krauklis waves. This project is expected to elucidate the mechanism of Krauklis waves and provide the valuable accomplishment, which will have long-term impact on this research area and the industry.

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