Calibration of Seismic Fracture Model Using Dynamic Data and Borehole Images, an Example of Fractured Carbonate Reservoir

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Abstract

The development of a naturally fractured reservoir with a dual permeability system is a challenging task. Placement of wells into fractured zones can help to ramp up initial hydrocarbon production. However, at the same time it can lead to future problems, especially when fractures are connected to a strong aquifer.

This paper describes an example of integrating seismic attributes with static and dynamic data and predicting fracture occurrence in a major Middle East oil field. Proposed workflow is composed of three major steps: 1) micro scale fracture characterization by integrating core, logs and production performance, including PLT and well tests 2) large scale fracture detection using seismic attributes 3) validation of seismic discontinuities to log derived fractures.

The reservoir is a strongly fractured carbonate formation with a natural water drive support mechanism. Presence of high permeability fractures together with strong water support leads to fast water breakthrough, especially in horizontal wells intersecting several fractures. Major field development challenge is to drill new infill wells avoiding fractured zones.