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Fracture and Mechanical Stratigraphy in Naturally Fractured Carbonate Reservoirs-A Case Study from Zagros Region

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Abstract

Fracture stratigraphy and mechanical stratigraphy are investigated in a naturally fractured carbonate reservoir in the Zagros region. In this study, borehole images are used to identify and to characterize the existing natural and induced fractures in terms of orientation and attributes. Mechanical properties of the interval are analyzed using conventional and dipole sonic logs. This analysis also considers stratigraphic characteristics of the rock such as bed thickness to improve the mechanical stratigraphic description. The relationship between the fracture stratigraphy (both natural and induced) and the mechanical stratigraphy as a critical input in fracture prediction process is elaborated. This study shows that while fracture stratigraphy can discriminate intervals based on fractures attributes, mechanical stratigraphy should be viewed from two different angles, either natural or induced fractures. Natural fractures are representative of mechanical properties of the rock in time of fracturing, while current mechanical stratigraphy is primarily portrayed by contemporary failure features such as drilling-induced fractures. This distinction is of prime importance in any process requiring a predictive knowledge of fractures such as static modeling and wellbore stability in naturally fractured carbonates reservoirs.

Keywords: Mechanical stratigraphy, fracture stratigraphy, carbonate reservoirs, Zagros.

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