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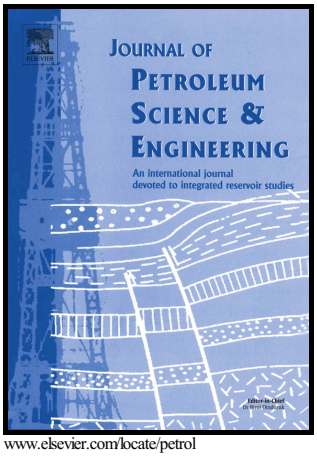

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Tectonic fractures in the Lower Cretaceous Xiagou Formation of Qingxi Oilfield, Jiuxi Basin, NW China Part one: Characteristics and controlling factors

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Abstract:

The Lower Cretaceous Xiagou Formation of Qingxi Oilfield is a typical reservoir with low porosity and permeability in China. Fractures within the Xiagou Formation play an important role in the petroleum exploration and development. In the present study, analysis data of conventional drill core, thin section and imaging logging were used to determine the characteristics and controlling factors of tectonic fractures in the Xiagou Formation. The majority of tectonic fractures in the Xiagou Formation were unfilled, and their apertures were less than 1.0×10^{-4} m. The dominant strikes of tectonic fractures were in the NE-SW and NW-SE directions. Approximately 68.8% of tectonic fractures were bedding fractures, followed by oblique fractures (about 18.2%) and vertical fractures (about 13.0%). In different places, the densities of tectonic fractures varied greatly. The controlling factors, including tectonic and non-tectonic factors, for tectonic fractures in the Xiagou Formation were confirmed, which have been analyzed qualitatively or semi-quantitatively. Analysis of tectonic factors indicated that tectonic fractures were more probably formed (or the fracture density was high) in regions with larger stress gradients and/or closer to faults. Within the same tectonic setting and stress field, non-tectonic factors of the lithology and mineral composition became the dominant factors governing the development of tectonic fractures. Analysis of non-tectonic factors showed that tectonic fractures were most developed in dolomitic mudstone. The fracture density was positively related to the proportion of brittle minerals in rocks of the Xiagou Formation.

Keywords: fracture parameters; controlling factors; tectonic fractures; Xiagou Formation; Qingxi Oilfield