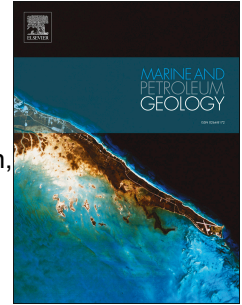


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In-situ stress orientations in the Xiagou tight oil reservoir of Qingxi Oilfield, Jiuxi Basin, northwestern China

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1 ***In-situ stress orientations in the Xiagou tight oil reservoir of Qingxi Oilfield,***  
2 ***Jiuxi Basin, northwestern China***

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11 **Abstract:** Knowledge of the present-day in-situ stress orientation is important for borehole stability,  
12 fluid flow in fractured reservoirs, and hydraulic fracture stimulation, etc. The Qingxi Oilfield of  
13 Jiuxi Basin, northwestern China, is an old oilfield; however, within which there were no systematic  
14 investigations into the present-day in-situ stress orientation prior this study. In the present study, the  
15 orientation of horizontal maximum stress ( $S_{Hmax}$ ) in the Qingxi Oilfield was interpreted and analyzed  
16 based on 149 borehole breakouts (BOs) and 131 drilling induced fractures (DIFs) from electrical  
17 borehole imaging logs in 23 wells. Our interpretations revealed a prevailing ~NE-SW-trending  
18 ( $14.94^{\circ}N\sim 52.74^{\circ}N$ )  $S_{Hmax}$  orientation in the Xiagou tight oil reservoir of Qingxi Oilfield. However,  
19 the  $S_{Hmax}$  orientation indicated various tendencies both laterally and with burial depth within single  
20 wells, which were influenced by well-developed faults, natural fractures and bedding planes. The  
21 presence of these structures caused great contrasts of rock mechanical properties, influencing stress  
22 orientation variations. In addition, the effects of present-day in-situ stress orientation on natural  
23 fractures, hydraulic fracture stimulation and borehole stability were discussed. In the Qingxi Oilfield,  
24 ~NE-SW-trending natural fractures indicated favorable contributions to subsurface fluid flow.  
25 Hydraulic fractures would propagate vertically following ~NE-SW-trending. Wells were more likely  
26 to experience borehole instability issues if they were deviated towards ~NE-SW-trending. The  
27 results can provide geological references for subsequent tight oil production in the Qingxi Oilfield of  
28 Jiuxi Basin.

29 **Keywords:** in-situ stress orientation; drilling induced tensile fracture; borehole breakout; Xiagou  
30 tight oil reservoir; Qingxi Oilfield; natural fracture

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