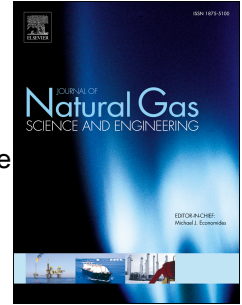


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Integration of microseismic data, completion data, and production data to characterize fracture geometry in the Permian Basin

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1 Integration of microseismic data, completion data,
2 and production data to characterize fracture
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9 **KEYWORDS:** Hydraulic fracturing; microseismic events; Permian Basin; fracture geometry;
10 fracture propagation
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12 **ABSTRACT:**

13 Understanding how fractures propagate during multi-stage hydraulic fracturing enables better
14 prediction for production and increases reserves. Fracture complexity due to fracture interaction
15 makes it challenging to accurately quantify fracture geometry. Some solutions like proppant
16 tracers and microseismic data acquisition may give a rough representation of fracture geometry,
17 but they cannot provide complete information for fracture geometry without separate model
18 verification. Through data synthesis from microseismicity, stimulation treatment, and
19 production, calibrated models increase reliability in determining fracture geometry. The Permian
20 Basin's unique lithology contains a high degree of vertical heterogeneity, accentuating the
21 complexity that makes fracture modeling difficult. Microseismic data give gross fracture
22 dimensions, including fracture height, length, and azimuth, and the direction of maximum
23 horizontal stress while also providing a baseline for calibrating stimulation and reservoir
24 simulators. Our stimulation model indicates that initiating fractures inside the Wolfcamp B2
25 formation results in propped height growth being contained by the Wolfcamp B1 and Wolfcamp
26 B3 layers. Furthermore, the reservoir model also suggests that contributing reservoir volume

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