Dear Editors

We sincerely appreciate your valuable suggestions and have revised the manuscript accordingly. Upon careful examination, we identified that the absence of tracked changes was due to the use of EndNote software for inserting references. To address this, we have provided a detailed list specifying the locations and citations of the newly added references.

Furthermore, after consulting with the editorial office and receiving their approval:

- We have followed Professor Limin Sa's wishes by removing his name from the author list and acknowledging his contributions in the acknowledgment section. In line with this change, the author list, contributions and acknowledgment sections have been updated accordingly in the revised version.
- We have updated the acknowledgments and financial support sections in the revised version.

Introduction of New References:

The locations where the newly added references have been cited are as follows:

These compacted shales exhibit a microstructure with a preferential orientation in the plane (Bandyopadhyay, 2008)

Chapman et al. (2010) gave a multi-scale fractures equivalent model.

Our regional data show that the area mainly contains horizontal fractures with a common preferred orientation, a sufficiently small aspect ratio, and low fracture porosity and density (Han et al., 2022; Zhang et al., 2022).

The research focuses on the tight sand gas in the Xujiahe Formation in the Sichuan Basin. The region has dense lithology, with fractures serving as the primary migration pathways (Huang et al., 2022).

He proposed a Taylor expansion approximation to calculate the stiffness matrix for fracture-porosity composite system (Hudson et al., 1996):

In these studies, fracture compliance (rather than stiffness) should be the primary focus. We recommend using the LSD model (Michael et al., 1995).

Previous Chinese scholars have analysed horizontal fractures, which exhibit preferential distribution and structural features of VTI anisotropy (Su, 2011).

Horizontal fractures can help identify tight gas reservoirs in this area (Yue et al., 2018; Zhang, 2021).

The developed horizontal fractures can also effectively assist in the water injection development of tight gas (Zhao et al., 2021).

List of Newly Added References:

Bandyopadhyay, K.: Seismic anisotropy Geological causes and its implications to reservoir geophysics, Stanford University, 2008.

Chapman, M.: Frequency-dependent anisotropy due to meso-scale fractures in the presence of equant porosity, Geophysical Prospecting, 51, 2010.

Han, L., Liu, J., Yang, R., Zhang, G., and Zhou, Y.: Application of Prestack Elastic Impedance Inversion Method Based on VTI Media: A Case Study of Tight Sandstone Fractured Reservoirs in the Xujiahe Formation, Oil & Gas Reservoir Evaluation and Development, 12, 313-319， 328, 10.13809/j.cnki.cn32-1825/te.2022.02.006, 2022.

Huang, Y., Wang, A., Xiao, K., Lin, T., and Jin, W.: Types and genesis of sweet spots in the tight sandstone gas reservoirs: Insights from the Xujiahe Formation, northern Sichuan Basin, China, Energy Geoscience, 3, 270-281, 2022.

Hudson, J. A., Liu, E., and Crampin, S.: The mechanical properties of materials with interconnected cracks and pores, Geophysical Journal International, 1, 1996.
Michael, Schoenberg, Colin, M., and Sayers: Seismic anisotropy of fractured rock, GEOPHYSICS, 60, 204-211, 1995.
Su, Y.: Fracture Identification and Distribution Evaluation in the Xu-2 Member of the Xinchang Area, Chengdu University of Technology, 2011.
Yue, D., Wu, S., Xu, Z., Xiong, L., Chen, D., Ji, Y., and Zhou, Y.: Reservoir quality, natural fractures, and gas productivity of upper Triassic Xujiahe tight gas sandstones in western Sichuan Basin, China, Marine & Petroleum Geology, 89, 370-386, 10.1016/j.marpetgeo.2017.10.007, 2018.
Zhang, J., Fan, Xin, Huang, Zhiwen, Liu, Zhongqun, Qi, Yuanchang: Evaluation Method of Anisotropic In-Situ Stress in the Upper Triassic Xujiahe Formation Reservoir in the Western Sichuan Depression, Sichuan Basin, Oil & Gas Geology, 42, 963-972, 10.11743/ogg20210416, 2021.
Zhao, H., Shang, X., Li, M., Zhang, W., Wu, S., Lian, P., and Duan, T.: Investigation on petrophysical properties of fractured tight gas sandstones: a case study of Jurassic Xujiahe Formation in Sichuan Basin, Southwest China, Arabian Journal of Geosciences, 14, 1-8, 2021.

Update Information:

Author contributions.

HL was responsible for the writing, analysis, discussion, and conclusion of the paper. XH contributed to the review and revision of the paper. LF, LL, and TC were responsible for data collection, organization, and conceptual support.

Acknowledgements.

We appreciate the constructive comments from the two anonymous referees and the editors, Florian Fusseis and Charlotte Krawczyk, which have significantly improved the manuscript. In addition, we would like to thank Professor Limin Sa for providing the authors with valuable suggestions regarding fracture research.

Financial support.

This research was supported by the National Natural Science Foundation of China (grant no. U20B2016), the Natural Science Foundation of Sichuan Province (grant no. 2024NSFSC1992), and the Sinopec Science and Technology Research and Development Project (grant no. P2158).