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# Editorial: Gas hydrate appearance, accumulation, exploration and exploitation in continental margins

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Editorial on the Research Topic
Gas hydrate appearance, accumulation, exploration and exploitation in continental margins

Gas hydrate (GH) is so fascinating whether in exploring natural principle of geological evolution or for pursuing economic benefits of human sustainable development. GH plays an essential role in global carbon cycle and climate change. Two prominent events, the Paleocene–Eocene thermal maximum (PETM) and the three submarine Storegga Slides off Norway's continental shelf, are typical consequences subjected to GH dissociation with scales from global continental to local shelf (Paull et al., 2007; Ruppel and Kessler, 2017). Spanning from cold Alaska and Siberia permafrost zones, to busy merchant nautical routes in warm seas, like the north South China Sea (SCS), Nankai Trough, northeast India Ocean, and northern Gulf of Mexico, many governments and petroleum companies pay great interests on utilizing the huge resource potential of GHs.

Our Research Topic is divided into two format-separate and content-coherent volumes, aims to deepen theoretical cognition and broaden technological applications on the exploration and exploitation of GH-bearing sediments, including the appearance, accumulation, and abundance. A total of 30 research papers and abstracts publishing in this topic present exciting and distinguishing detections and conceptions on understanding the properties of GHs.

General natural principles of geology, geochemistry and geophysics are extensively adopted to explore GH-related system in fields. Ai et al. (2022), Feng C. et al., Feng J. et al. (2022), and Kong et al. (2022) focus on the records of methanogenesis and anaerobic oxidation of methane in shallow sediments and investigate related methane seepage activities in northern SCS. Li H. et al. (2022), Liang et al. (2022), Liu et al., Song et al. and Xing et al. (2022) use *in-situ* seismic and logging data and drilling cores to investigate the existence and characteristics of GH in sediments. In addition, many authors theoretically evaluate the influence of sedimentary geological structure on the accumulation of free gases and hydrates (Fan et al., 2022; Liao et al.; Luo et al., 2022; Ren et al., 2022; Zhang et al.; Zhong et al., 2022).

This topic exhibits some novel engineering methods and technological improvement for exploiting GH reservoirs. A thermodynamic plot to calculate the whole heat consumption of

GH dissociation through gas production and assess free gas proportion is proposed by Li Z. et al. A high pressure rotating water jets technology is presented to promote the efficiency of gas production in low-permeability hydrate-bearing sediments (Li. S et al.). Wei et al. (2022a) and Wu et al. (2022) conceive structure and parameter group optimization proposals to economically extract gas from hydrate reservoirs. Wei et al. (2022b) and Pei et al. (2022) summarize recent progresses on the drilling techniques on hydrate-bearing sediments and reveal geotechnical behaviors when drilling fluid invading associated layers through experimental studies.

Thanks for the hard work of all authors and reviewers in our topic Research Topic. Fruitful achievements are acquired for enhancing insightful learning on natural GH layers in continental margins, including diverse aspects in theory, numerical simulation, and experimental observation. However, continued work based on the idea of geological-engineering integration is required to accurately predict reservoir potential and environmentally and friendly utilize the resource. Finally, we sincerely appreciate the immense help from the editorial board of Frontiers in Earth Science.

## Author contributions

All authors are editors for "Gas Hydrate Appearance Accumulation, Exploration and Exploitation in Continental Margins."

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Publisher's note



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