



Research article

# Breakthrough and prospect of shale gas exploration and development in China<sup>☆</sup>

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## Abstract

In the past five years, shale gas exploration and development has grown in a leaping-forward way in China. Following USA and Canada, China is now the third country where industrial shale gas production is realized, with the cumulative production exceeding  $60 \times 10^8 \text{ m}^3$  until the end of 2015. In this paper, the main achievements of shale gas exploration and development in China in recent years were reviewed and the future development prospect was analyzed. It is pointed out that shale gas exploration and development in China is, on the whole, still at its early stage. Especially, marine shale gas in the Sichuan Basin has dominated the recent exploration and development. For the realization of shale gas scale development in China, one key point lies in the breakthrough and industrial production of transitional facies and continental facies shale gas. Low–moderate yield of shale gas wells is the normal in China, so it is crucial to develop key exploration and development technologies. Especially, strictly controlling single well investment and significantly reducing cost are the important means to increase shale gas exploration and development benefits. And finally, suggestions were proposed in five aspects. First, continuously strengthen theoretical and technical researches, actively carry out appraisal on shale gas “sweet spots”, and gradually accumulate development basis. Second, stress on primary evaluation of exploration and development, highlight the effective implementation of shale gas resources, and control the rhythm of appraisal drilling and productivity construction. Third, highlight fine description and evaluation of shale gas reservoirs and increase the overall development level. Fourth, intensify the research on exploration and development technologies in order to stand out simple and practical technologies with low costs. And fifth, summarize the experiences in fast growth of shale gas exploration and development, highlight the demonstration and evaluation of key indicators, and try to achieve more breakthroughs and replacement in new areas, new domains and new strata. © 2016 Sichuan Petroleum Administration. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**Keywords:** Shale gas field; Super-large gas province; New progress; Effective resource; Development prospect; Enlightenment; South China

## 1. Main achievements in shale gas exploration and development in China

### 1.1. Marine shale gas exploration & development breakthrough in Wufeng–Longmaxi Fms in the Sichuan Basin and massive proven geologic reserves

After the first shale gas exploration and evaluation well, W201, obtained the industrial gas in marine shale of Upper

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Ordovician Wufeng Fm—Lower Silurian Longmaxi Fm in 2010, with reference to the successful experiences of the North America in shale gas exploration and development and focusing on marine shale of Lower Paleozoic Wufeng—Longmaxi Fm and Qiongzhusi Fm (and the corresponding stratum) in the south, China has carried out comprehensive geological evaluation, exploration evaluation

and development pilot test of shale gas, and successively explored the shale gas in Wufeng—Longmaxi Fms in the Sichuan Basin, eastern Chongqing and western Hubei, northern Yunnan and Guizhou, western Hunan, etc. (Fig. 1); and also industrial shale gas production has been made in Weiyuan, Changning (Changning—Zhaotong), Fushun—Yongchuan, Fuling and other regions of Sichuan Basin



Fig. 1. Shale gas exploration and development in China.

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