

Geochemical characteristics and paleoenvironment reconstruction of the Longmaxi Formation in southeast Sichuan and northern Guizhou

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Shale gas exploration is a hot field in unconventional oil and gas exploration in China. Black shales in the Longmaxi Formation of the Lower Silurian developed in southeast Sichuan and northern Guizhou are widely distributed with a great thickness and rich in organic matters. The Longmaxi Formation is the favorable strata of shale gas exploration in South China.

High quantity and high quality of organic matters are the main condition for high quality source rocks. The paleoenvironment which had an important effect on the quantity and quality of sedimentary organic matters was greatly influenced by the tectonic movement occurred in southeast Sichuan and northern Guizhou since the period of late Sinian. It has an important geological signification for this region to reveal the paleoenvironment of the source rocks.

On the basis of the research data at home and abroad, integrated with the results of geochemical test data of the Longmaxi Formation (the tested samples from 30 field profiles and 12 wells), we discussed the trace elements, REE geochemical characteristics, stable isotope and organic matters, recovered the paleoenvironment of the Longmaxi Formation. The results showed that the effective source rocks are mainly concentrated in anoxic reduction environment of deep muddy shelf in the lower part of the Longmaxi Formation. The anoxic environment was destroyed in late Longmaxi stage, as a result of which, the preservation condition of organic matter become bad. This study is beneficial to the shale gas exploration of this area.