

Formation Mechanisms and Distribution Patterns of a Deep Volcanic Gas Reservoir in Songliao Basin, East China

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A giant gas reservoir has been found while exploring the deep layer of a faulted depression in the Songliao Basin, northeast China. The gas was sourced from the early Cretaceous lacustrine mudstone-bearing coal (the Shahezi Formation). The source rocks, about 200-500 m thick, consist mainly of kerogen type II or III rocks and have a high thermal evolution degree. The reservoir rocks are of the early Cretaceous volcanics with predominant acidic rhyolite (the Yingcheng Formation) with an estimated reservoir interval of 100-400 m thick.

The volcanics are distributed along a deep fault belt with abrupt facies variations laterally indicating several volcanic eruptions. The cap rocks in the area are a 100-300 m thick mudstone (Denglouku-Quantou Formation). The gas reservoir is of a structural-stratigraphic reservoir play with the extent of the gas accumulation being controlled primarily by the volcanic features. The giant gas accumulation is controlled by the hydrocarbon kitchen and facilitated by the presence of some favorable local structures and. Most of the gas has been found to be associated with the areas around the uplift and the slope belts near the deep fault.