

Gas Accumulation Mechanism of Denglouku Formation in Changling Fault Depression of Southern Songliao Basin

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Project supported by the National Natural Science
Foundation of China (41472101)

Changling Gasfield is discovered in tight sandstone reservoir of lower Cretaceous Denglouku Formation in Changling fault depression, Southern Songliao Basin, which expands a novel exploration domain of this fault depression. Based on source-reservoir-cap assemblage, fault activity and single well burial history of Denglouku Formation, we clear up the formation genesis of Changling Gasfield combined with reservoir fluid inclusions and laser Raman spectroscopy and find out that this fault depression has no hydrocarbon generation condition. Coal-derived methane generated from underlying hydrocarbon source rock accumulated in lower Cretaceous Yingcheng Formation. To the end of the Late Cretaceous Qingshankou, a submarine volcanic eruption occurred in the northern part of Changling Gas field near Qian'an, which initiated an original deep resource fault reactivation. Mantle source inorganic CO₂ migrated along the fault to hydrocarbon gas reservoirs of Yingcheng Formation volcanic rocks in upper crust, at the same time, the replaced methane hydrocarbon gas migrated upward to sand reservoir of Denglouku Formation, which accumulated and formed secondary gas reservoir, so fault activity is the main factor of Denglouku gas reservoir formation obviously.