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Petroleum Source Correlation and Hydrocarbon Accumulation of Deep Petroleum Resources in Fukang Sag, Junggar Basin

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The Junggar Basin is a petroliferous basin in western China. In recent years, abundant oil and gas resources have been discovered in the deep strata of the Fukang Sag in the eastern part of this basin. Two sets of important source rocks occur in the deep strata of the Fukang Sag, the Carboniferous Bashan Formation coal-measure mudstones and the Permian Lucaogou Formation mudstones. Significant differences in biomarker characteristics and bulk oil carbon and compound-specific of n-alkanes isotopic compositions of the derived crude oils, can be used to distinguish crude oils from different sources in the deep strata.

Natural gas in the deep strata of the Fukang Sag is dominated by hydrocarbon gases, mostly occurring as crude oil-associated gas. The deep Permian and Carboniferous reservoirs are still dominated by wet gas, with dryness coefficients of 0.81 and 0.92, respectively. Obvious differences exist in the isotopic compositions of natural gas among different regions. Natural gas in the Permian reservoirs is mostly coal-type gas derived from Carboniferous humic organic matter, with a minor contribution from Permian sapropelic organic matter. Fluid inclusion studies reveal three distinct stages of hydrocarbon accumulation, Hydrocarbon accumulations exhibit obvious characteristics of episodic charging and entrapment, accompanied by significant overpressure.