

Structural Features and Large Oil and Gas Fields of Kuqa Foreland Basin

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The Kuqa Basin, a Mesozoic-Cenozoic foreland basin superimposed on the Paleozoic passive continental margin, is abundant in oil and gas resources. It has undergone several episodes of tectonic movement, of which, the Himalayan phase is the strongest one. The foreland thrust belt is divided into two structural layers: (1) the supra-salt structural layer and (2) the sub-salt structural layer based on the detachment within the Tertiary salt layer or the Jurassic coal seam. Each structure layer has different structural features. The supra-salt structural layer is mainly composed of fault-propagation folds, whereas the sub-salt structural layers are duplex and pop-up structures. The Kuqa foreland basin is favorable for hydrocarbon accumulation with good hydrocarbon source rocks of Triassic to Jurassic swamp facies, coal measures and lacustrine facies mudstone; Cretaceous to Paleogene reservoir-cap-rock assemblages in the western-central region and Jurassic assemblages in the east. Strata of gypsum-bearing evaporite (or coal measures) are excellent regional cap-rocks for the Kuqa foreland basin.

The unique geology provided favourable conditions for large scale of oil and gas accumulations in the thrust belts. Large oil and gas fields can be expected in the anticline traps or stratigraphic traps under salt layers (or coal measures). Although some large to middle oil and gas fields, such as the Kela-2 gas field, have been found in the Kuqa foreland basin, petroleum exploration is still in a relatively early stage and potentially there may be a vast range of hydrocarbon prospects in the basin.