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Please fill in your abstract title.	Salt Tectonic Control on the Subsalt Petroleum System in the Ultradeep Layer of the Kuqa Fold-Thrust Belt in Northwestern China

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Abstract

This paper focus on the salt tectonic and it's effective on the petroleum system in the ultra-deep layer of Kuqa fold-thrust belt, where the giant gas field was found in Cretaceous sandstone reservoir in sub-salt layer. The depth of the reservoir is between 6500m-8000m, but the daily production of single well is between 30-60 million cubic meters. The effective of salt tectonic on the structural traps, reservoir, and gas migration and accumulation is still unknow.

The effectiveness of salt on the subsalt petroleum system is indicated by the results of the 2D/3D seismic interpretation, data analysis on the ultra-deep wells, balance section restoration, and physical and numerical experiments.(1)The salt layer, as a roof decollement, controlled the styles, deformation range, and thrusts in the Mesozoic. The basement-involved thrusts cut to the surface that developed on the boundary of the salt range, where the thickness of the salt is less than 300 m. The duplex, imbricate, and pop-up structures formed inside the salt range in the subsalt layer, where the thickness of the salt is 500–4000 m. The fault anticlines were the main trap style and were more widely distributed in the subsalt layer than they were in the suprasalt layer. (2) The “salt-roof-protection effect” was observed through well logging, core analysis, and DEM method. The results indicated that the stresses in the reservoir rocks were lower than expected and thus the rock had increased porosity (4%–7%) and were not structurally damaged in the subsalt layer with depth of over 7000 m. (3) In subsalt layer, the thick salt generated lower temperatures than thin salt, and thus the geothermal and thermal evolution of the source rock was delayed. It has also maintained the hydrocarbon window for 2.5 Ma, thus prolonging the time for gas accumulation, which corresponded perfectly to the trap-forming time in the subsalt layer.The thick salt layer not only controlled the gas migration as a cap rock but also controlled the trap styles and provide the "protective effective" for the ultra-deep reservoir. Over 1 trillion cubic meters gas resource was found in ultura-deep layer of Kuqa fold-thrust which are beneficial for the ultra-deep exploration worldwide.

Key words：Kuqa fold-thrust belt，subsalt layer，ultra-deep exploration，giant gas field