Structure of the Triassic Sediments of South Mangyshlak

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Most of the local structures of the platform of South Mangyshlak show an inherited development. The present paper analyzes these uplifts using an intra-Triassic marker. In areas where this marker has been penetrated by few or no wells, constructions are based on Triassic reflecting horizons V₁ and V₂.

Reflecting horizon V₁ is the eroded surface of the Triassic sediments. Reflecting horizon V₂ is within the Triassic Olenek sediments and in most places is correlated with the top of carbonate member T°₁-E, which is in the lower part of the Olenek stage. This member is a dense, dark-gray, locally clayey limestone.

The structural plan of the Yuzhno-Zhetybay area is examined on maps constructed for the tops of the oil-gas-bearing horizons T-III and T-IV, which correlate with the upper and middle parts of the Olenek sediments, respectively, and also for the base of the Jurassic, Cretaceous, Paleogene, and Neogene sediments. See Fig. 1.

Overall dimensions of the Yuzhno-Zhetybay brachyanticline on the minus 3300 m closed structure contour are 2 by 10 km, and closure is 450 m. The north flank is steeper than is the south; angles of dip are 14-16° and 5-9°, respectively.

The structural plan on the base of the Jurassic is in general conformable with the underlying Triassic. The two crests and the fault persist; however, displacements and closures are less than in the Triassic.

The structural plan on the base of the Cretaceous is different. The fault does not show up, and the Normaul crest is larger than the Karzhau.

The structural plan along the base of the Paleogene and Neogene sediments is completely different from that below; a monocline is present.

Paleo-structural analysis of intra-Olenek horizon T-IV for the beginnings of the various stages shows that in the time from late Olenek time to the Neogene the anticlinal structure of the Yuzhno-Zhetybay area were retained. The dimensions and amplitude on the whole persisted at. 2.5 by 10 km and 280-300 m, respectively.

In the modern structural plan for the top of oil-gas-bearing horizon T-IV, which is near the top of the Olenek sediments, an east-west-trending anticline is present. The north flank dips at 5° and the south at 2°. On the minus 3700 m structure contour the dimensions of the uplift are 3.5 by 9 km, and closure is 70 m. Marker T-III has a similar structure; this horizon is at the base of the Middle Triassic.

On the base of the Jurassic and Cretaceous the dimensions of the uplift change insignificantly; however, closure decreases to 50 and 25 m, respectively.

In the Cenozoic stage the structure of the Severo-Rakushech anticline is preserved on the whole. The crest shifts to the northeast into the region of well 10, and closure decreases to 10 m.

The correspondence of structural and paleo-structural plans is a characteristic feature of the oil-gas fields and local structures in the various tectonic zones of the South Mangyshlak downwarp: Zhetybay-Uzen tectonic step and Peschanomyssko-Rakushech zones of uplift. Thus, the factor of inherited development of local structures in South Mangyshlak plays no small part in exploration for oil and gas in Triassic sediments because structure maps on Jurassic and younger sediments can be used.