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Geodynamic model of development and the tectonic structure of Kazakhstan from the standpoint plume tectonics

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According to the seismic tomography, the lithosphere formation of Kazakhstan has a plume origin. In the Paleozoic Kazakhstan was a separate continent and consisted of three concentric rings of bounded geometry sutures. The rings made vertical movement under the active influence of mantle plume and their axes made horizontal movement. The development of variously oriented lineaments led to the formation of clumpy-block structure. The modern structure of Kazakhstan was formed during the interaction with Europe, Siberia and southern continents during the Paleozoic-Cenozoic [1].

The end of the XX century was marked by a dramatic breakthrough in understanding of the deep Earth's interior based on well-designed studies, including the subsurface geophysical studies, ultra-deep continental and oceanic drilling, as well as instrumental studies at the Earth's surface and from the space [2-5].

New data on the deep structure of the crust and upper mantle of continents from complex studies of the international system geo-traverses were collected. Some of them have been laid through the territory of Kazakhstan. On their basis, the models of the lithosphere to a depth of 100-200 km in the Republic were established, which revealed non-uniform-block structure of the upper mantle. At a depth of about 200 km, the mantle electrical resistance is dramatically reduced, which presumably is linked with the rise of the roof of the asthenospheric layer. The structures of the crust in some cases are continuing in the upper mantle. Asthenosphere in the geo-suture areas rise to the level of 80-100 km, and asthenolith penetrate above the Moho in the crust [1, 2].

The proposed geodynamic model of the Kazakhstan development explains the features of the localization of active zones of sedimentation, intrusions and effusive magmatism and metamorphism of the geological

formations, ophiolitic zones and olistostromes availability and promising metallogenic zones and areas with large and unique mineral deposits [1].

References:

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