Rift systems of the East Siberian basin, Arctic region

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The growing interest of geoscientists to the Eastern Arctic shelf is caused one of the most important problems of the present time – the creation of a tectonic model for assessing the hydrocarbon potential of the Eastern Arctic basins. In this time, over the past decade, the study of the East Siberian sea seismic lines have increased. Now, we operated a new seismic data, the interpretation of which gives the key to understanding the structure of the East Siberian continental margin.

This paper presents an analysis of the tectonic structure and geological history of the shelf of the East Siberian continental margin based on the interpretation of seismic lines in conjunction with geological information.

The modern ideas of the East Arctic rift tectonic evolution and formation of sedimentary basins over the entire East Siberian shelf resulted from the large-scale tectonic and magmatism events took place and the intense rifting or stretching phase widespread the entire shelf in the Albian-Aptian.

The East Siberian basin includes the main structural elements, formed in a postcollisional destructive stage of development – the New Siberian rift, the De Long uplift, the Zhokhov Foredeep basin, the Melville trough, the Baranov rise, the Pegtymel trough, the Shelagskoe rise.

The New Siberian rift is located between the elevations of the New Siberian Islands and the archipelago De Long. Rift extends in a southeast direction from the East-Anisin Trough deflection to the Islands of Faddeev Island and New Siberia Islands. The New Siberian rift is a bright negative structural element and clearly stands out on the maps of the anomalous magnetic and gravitational fields, contrasting with the positive anomalies of surrounding rises and ridges.

De Long Plateau is a large positive structure. The uplift boundaries and internal structure are clearly visible in the gravitational and magnetic fields. The magnetic anomaly expressed in the De long, it is a typical for the areas of development of volcanogenic formations and basalts trap magmatism.

The East Siberian Rift System located from the northwestern part of the De long Plateau to the eastern part of the North Chukchi basin. System includes the Melville trough in the southern part
of the East Siberian Sea. The reflector packages on seismic lines in the De Long Plateau and The East Siberian Rift System indicate that continental rifting occurred over the mantle plum.

The length of the Melville trough is a 350-370 km; with a width of 100-150 km. Trough is the symmetrical deflection consists of two narrow rifts separated by a rise.

The eastern branch of the rift system of the Melville trough joins the Baranov rise. The Baranov rise has a block structure with the geometry of which is similar to the block structure of the De-Long Plateau.

The Dremkhed trough is a deep rift structure transitional between the East Siberian and North Chukchi basins, the thickness of the sedimentary cover in central part of section is 7000 ms.

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