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Stratigraphic, regional unconformity analysis and potential petroleum plays of East Siberian Sea Basin

Yury Karpov, Antonina Stoupakova, Anna Suslova, and Mariia Agasheva

Lomonosov Moscow State University, Faculty of Geology, Department of Oil and Gas, Moscow, Russian Federation (y.a.karpov@yandex.com)

The East Siberian Sea basin (ESSB) one of the most unexplored part of the Russian Arctic shelf, extending for over 1000 km from New Siberian Islands archipelago to Wrangel Island. This region is considered as a region with probable high petroleum potential.

Within the ESSB several phases of orogeny are recognized [1]: Elsmerian orogeny in Early Devonian, Early Brooks orogeny in Early Cretaceous, Late Brooks orogeny in Late Cretaceous.

Two generations of the basins could be outlined. Both of these generations are controlled by the basement domains [1]: Paleozoic (post-Devonian) to Mesozoic basins preserved north of the Late Mesozoic frontal thrusts; Aptian-Albian to Quaternary basins, postdating the Verkhoyansk-Brookian orogeny, and evolving mainly over the New-Siberian-Chukchi Fold Belt.

Basin is filled with siliclastic sediments and in the deepest depocentres sediments thickness exceeds 8-10 km in average. Seismic data was interpreted using methods of seismic stratigraphy. Finally, main seismic horizons were indicated and each horizon follows regional stratigraphic unconformities: mBU – in base of Cenozoic, BU – in base of Upper Cretaceous, LCU – in base of Cretaceous, JU – in middle of Jurassic, F – in top of Basement. In ESSB, we can identify Permian, Triassic, Jurassic, Cretaceous, Paleogene and Neogene seismic stratigraphy complexes.

Perspective structures, investigated in ESSB were founded out by comparing seismogeological cross-sections with explored analogs in other onshore and offshore basins [2, 3, 4]. The majority of structures could be connected with stratigraphic and fault traps. The most perspective prospects are probably connected with grabens and depressions, where thickness of sediments exceed 10 km. Reservoirs in ESSB are proposed by regional geological explorations on New Siberian Islands Archipelago and Wrangel Island. Potential seals are predominantly assigned to Jurassic and Cretaceous periods.

Thick clinoform units of various geometry and trajectories were found in Southern part of ESSB. These clinoform sequences could be formed as a result of significant subsidence followed by rapid sedimentary influx. All possible perspective structures were mapped on tectonic scheme of basin.

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