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Tectonics of East Siberian Sea Basin and its influence on petroleum systems

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The East Siberian Sea basin (ESSB) is the largest part of the Siberian Arctic shelf, extending for over 1000 km from New Siberian Islands archipelago to Wrangel Island. Nowadays East Siberian Sea margin is considered as a region with probable high petroleum potential. This part of Russian Arctic shelf is the least studied. The major problems in geological investigation of East Siberian Sea shelf are absence of deep wells in area and low seismic exploration maturity. Only general conclusions on its geology and hydrocarbon systems can be drawn based on limited seismic, gravity and magnetic data, supported by projection of onshore geological data to offshore. So, that's why now only complex geological and seismic stratigraphy interpretations are provided. Today we have several concepts and can summarize the tectonic history of the basin. The basin is filled with siliclastic sediments. In the deepest depocentres sediments thickness exceed 8 km in average.

Seismic data was interpreted using methods of seismic stratigraphy. Stratigraphic interpretation was possible to achieve because seismic reflections follow chronostratigraphic correlations. Finally, main seismic horizons were indicated. Each indicated horizon follows regional stratigraphic unconformity.

In case of absence of deep wells in ESSB, we can only prove possible source rocks by projection of data about New Siberian Islands archipelago source rocks on offshore. The petroleum potential of these rocks was investigated by several authors [1, 2, 3]. Perspective structures, investigated in ESSB were founded out by comparing seismogeological cross-sections with explored analogs in other Russian and foreign onshore and offshore basins. The majority of structures could be connected with stratigraphic and fault traps.

New data on possible petroleum plays was analyzed, large massif of data on geology and tectonic history of the region was collected, so now we can use method of basin modelling to evaluate hydrocarbon saturation in most perspective prospects. Factors of tectonic history, high thickness of sediments in basin, founded possible oil and gas source rocks promise success in future exploration, but in ESSB we also recommend further geophysical investigations (seismic, gravy and magnetic) and well testing of some most perspective prospects, despite of high cost of these activities. We suppose, that investigations of ESSB should be continued to receive positive effects for Russian national economy in the nearest future.

References

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