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Identification and Localization of Oil and Gas Perspective Zones and Large Objects Based on Regional Volumetric Modeling.

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Our Institute has been studying the hydrocarbon potential of large areas. As a rule, the object of research is a sedimentary basin, covering one or more oil and gas regions.

A fundamentally new trend to create volumetric images of studied regions has formed in this avenue of research in 2010.

The relevance of this topic is related to the fact that seismic and geological sections, two-dimensional charts and maps which are conventional for the regional stage of geological exploration and reflecting mainly tectonic structure of large sedimentary complexes have become insufficient.

Realization of the fact that the regional model must be volumetric since we study the three-dimensional geological environment and three-dimensional objects have appeared.

We must learn not only the morphology and thickness of the sedimentary complex, but its internal structure, material composition and reservoir properties also.

However, the construction of three-dimensional seismic and geological models of poorly studied sedimentary basins is not possible by using standard software.

To solve this problem, an innovative technology of geological and geophysical modeling of sedimentary basins and petroleum called RegionSeis-3D was developed [1]. This technology is based on a combination of sediment-capacity modeling, formation analysis and seismic modeling. The technology

includes a set of procedures for the 3D modeling of sedimentary basins as well as creating models of the local oil and gas objects - hydrocarbon deposits. The methodology of interpretation of volumetric regional models is also developed.

The objective of our research is the identification and localization of new oil and gas perspective zones and large objects within poorly studied sedimentary basins. This technology allows us to clarify the recommendations for planning future exploration works.

To date, we have been carrying the regional research using the new method of modeling in Timano-Pechora, Volga-Ural, Yenisei-Khatanga and Lena-Tunguska petroleum provinces. As a result of these studies the new oil and gas perspective objects of different ranks are allocated.

For example, in the territory of Siberian platform created by sedimentation and capacitive models of the main oil and gas complexes - Nepsky, Tirsky, Danilovsky and Usolsky horizons of Lower-Middle Cambrian. Perspective Aikhal reef complex is identified. And drilling of one parametric well is recommended.

References:

[1] Mushin I.A. Fortunatova N.K, Belousov GA. Technologies of creation of volumetric sediment-capacity models of sedimentary basins: Seismic technology, №1 Moscow, 2012

