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PALEOSTRUCTURAL AND SEDIMENTARY PROVENANCE ANALYSIS OF LOWER DEVONIAN-UPPER PERMIAN OIL AND GAS COMPLEXES OF THE TIMAN-PECHORA BASIN PROVINCE

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Paleostructural analysis is based on well log data, the results of recent seismic work and also previous geological works of the Timan-Pechora Basin Province. The main purpose of this investigation is to define the main stages of the structural and tectonic development of the study area. Sedimentary basin analysis is a geologic method by which the history of a sedimentary basin is revealed, by analyzing the sediment fill itself. The results show the formation of sedimentation depocenters, the formation of barrier reefs and other features of a sedimentary basin. According to this analysis several sedimentatary complexes were distinguished: Middle Ordovician-Lower Devonian, Middle Devonian-Sargaevskiy, Domanic-Tournaisian, Middle Visean-Lower Permian, Lower Permian, Upper Permian.

Middle Ordovician-Lower Devonian. Paleostructural surface of this oil and gas complex (OGC) have a complicated structure. In the central part of the study area is situated a large paleo-high bounded from the west, north and east by several deep depressions. Northern and eastern depressions in Ordovician time perhaps originated as aulacogens formed by deep faults.

Analysis of the thickness map allowed identifying three depocenters. It should be noted that in the Middle Ordovician-Early Devonian time there are two types of sedimentation. During the Early Ordovician and the first half of the Middle Ordovician terrigenous sedimentation prevailed (Severo-Zapadnaya-202 and B Ugrinskaya wells). During the Late Ordovician, Silurian and Devonian terrigenous sedimentation type changes to carbonate.

Middle Devonian-Sargaevskiy. Paleostructural surface of this complex contrasts with the previous one. In the Early and Middle Devonian tectonic structural alteration of

the surface happened. West depression in all probability was filled with deposits of Ordovician-Devonian and the end of time is formed by a large high, the central part of which is land. The eastern depression was significantly reduced in size. Two depressions in the Varandey-Azdvinskaya and Severo-Preduralskaya areas were separated by large arched high, the southern part of which was perhaps located outside of sedimentation area. The rest of the territory is a monocline, gradually deepening in the north-east. Analysis of the thickness map allowed identifying three depocenters. It should be noted that the formation of is OGC was in two stages: regressive and transgressive.

Domanic-Tournasian. Paleostructural surface varies slightly. Western part of the study area is still a monocline complicated by two small uplifts. The eastern part has undergone tectonic reconstruction. The result is a large, complex depression, divided in the northern part by the small uplift.

Analysis of the thickness map allows identification of only one sedimentation depocenter, located in the land area of the Timan-Pechora Basin Province. Only the northern end of Domanic depression shows marine sedimentaion. D_{3fr}-D_{3fm} time is characterized by the accumulation of carbonate-terrigenous sediments, which by the end of early Famennian fill the Domanic depression. In the shallow-water part of the shelf, the carbonate phase of sedimentation begins. In the land area of the Timan-Pechora Basin Province reef rock and biostromes were formed.

Lower-Middle Visean. Tectonic reorganization divided the study area into two parts: a large uplift was elevated in the west and south-west part while in the east and north-east part shallow depression with marine type of sedimentation was formed.

Middle Visean-Lower Permian. Paleostructural surface is characterized by the development of major depression in the central part of the study area. Depression is complicated by two cavities. In the south-west and south-east of the study area two major uplifts were formed. Late Visean is characterized by transgressive stage of development. Marine type of sedimentation covers the whole territory. Two depocenter of sedimentation were formed; one in the central part of the territory, the other – outside the study area. In both depocenters accumulation of terrigenous or carbonate-terrigenous sediments is possible. Early Permian period is characterized by calm tectonic conditions and, therefore, carbonate type of sedimentation.

Lower Permian. Paleostructural surface changes. Artinskian-Kungurian time is characterized by a sharp shallowing marine basin, evidenced by small power complex. Relatively deep sea is preserved only in the east area. Accumulation of terrigenous (clay) material represent the type of sedimentation **Upper Permian**. Paleostructural surface is characterized by fragmentation of the tectonic area, affected by several major fault zones, which formed depressions and uplifts. Based on this, we can assume that this proess represent a fundamental tectonic reorganization, which controlled the sedimentation in the basin. The tectonics caused change in the type of sedimentation.