

## **Astrakhan Arch, seismostratigraphic correlation of subsalt deposits**

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The Astrakhan Arch is part of a system of arch uplift in the South-East of the Precaspian syncline. Within the Astrakhan Arch the Astrakhanskoye gas and condensate field is located. The amplitude of the structure is more than 2000m. The deepest carbonate slopes are located on the North-East and South-West, where the carbonate platform is restricted by a series of tectonic faults.

Industrial gas reserves are located in the Bashkirian limestone (Middle Carboniferous age). The presence of reservoir oil and gas shows was detected in the process of drilling and testing of the Lower Devonian deposits. The Lower Palaeozoic deposits have not been drilled yet. That's why the ideas about their geological structure is based upon geophysical information and the comparison with other regions of the Precaspian Syncline.

Within the Astrakhan Arch basement at a depth of 8-12 km, according to geophysical data, there is a block structure (Brodskiy et al., 2000). Under salt deposits (Rifean-Lower Permian age) they are divided by seismic horizons into four formational complexes. The sedimentation model was made on the basis of seismo-geological sections and well data. The lower formation complex is distinguished between the basement surface ("F") and the reflection horizon II P. The thickness of the deposits varies from 1000 m (to the North) to 3000 m (to the South). The age is Riphean-Lower Palaeozoic, the probable composition - carbonate-terrigenous.

The second formation complex is located between the reflecting horizons II P and II P<sup>1</sup>, age – Lower, Middle and Upper Devonian, composition - alternation of terrigenous and carbonate rocks. The maximum thickness is related to the North-Eastern part of the arch - 1000-1400 m, to the South the thickness decreases to 200 m and less. Obviously, the North-Eastern part of the arch is characterised by a more stable tectonic regime in Late Devonian time.

Between the reflecting horizons II P<sup>1</sup> and I P, a third formation complex; mainly of carbonate composition, is distinguished, aged Upper Devonian-Upper Carboniferous. The reflecting horizon "B", divided the complex into two parts - a lower one (Upper Devonian-Tournaisian Stage) and an upper one (Visean- Bashkirian Stage). The lower part has a thickness of 1300-1500 m that decreases to the North to 900-1200 m. The thickness of the Vise-Bashkirian deposits changes within the arch: in the central part to 900-800 m, and on the South, North-Eastern and Eastern slopes to 400-200 m.

The pay zones of Bashkirian age were studied most of all. They are composed of organic limestones with some dolomitized and bitumenized intervals. Rock porosity is 6-15%. Reservoir types are: porous, crack porous, cavity porous. Clayish-siliceous-carbonate rocks of Asselian-Artinskian age (P<sub>1</sub>) have seal functions.