



## **Bazhenov formation as a unique geological object: modelling and characterization of perspective zones**

Maria Topchii

Lomonosov Moscow State University, Geological, Russian Federation (m.s.topchii@gmail.com)

### Abstract

Nowadays the increased interest of oil companies around the world is focused on studying and developing methods for economically profitable development of unconventional shale formations.

Although shale formations are ubiquitous in sedimentary rock sequences throughout the world, not all shale formations have the qualities that make them self-sourcing reservoirs capable of producing hydrocarbons. Hydrocarbon-producing shale formations are known since 1821, when the first gas produced in the U.S. came from Devonian shale reservoirs in the Appalachian Basin.

Shale reservoirs are more complex-built even in comparison to conventional sandstone and carbonate reservoirs. They have extremely low permeability. These reservoirs are lithologically heterogeneous and are generally thinly bedded or laminated. Such characterization refers to the Bazhenov formations of West Siberia.

Bazhenov formation is the most potential shale formation according to estimated oil reserves. This is a unique geological object for a number of reasons:

- This is one of the greatest source rock on the planet, producing more than 80% of the geological resources of Western Siberia;
- One of the most reliable seal rock in the terrigenous section of the West Siberia plate;
- This is the reservoir with a different type of porosity;

Today the Bazhenov's analogues, in particular Eagle Ford Shale in South Central Texas and Bakken formation in Williston are being successfully evolved. Oil production from Bazhen has been going on for almost 50 years, but by this moment its development is far from being successful.

Due to the complex structure and variability of the lateral properties, many of the drilled wells are either "dry", or their rate of inflow is insignificant. It often corresponds with the low degree of maturity of the organic matter, which has not reached the main zone of the oil window. Therefore, in addition to the task of searching for productive zones, there is an advanced aim to create a cross functional model of Bazhenov deposits.

Thus, for a comprehensive study of the Bazhenov deposits, the work is concerned with determination of the boundaries of the distribution of this high-carbon formation with its subsequent zoning and characterization of every perspective zone with its specific pattern on the logging curves.

Herein was created a map of Bazhenov formation thickness, and revealed the main parameters for identification of sweet spots in the perspective zones.