



Geo-information approach to the study of Romashkino oil field geodynamics

S. Usmanov (1), B. Sharipov (2), A. Akhmetov (3), and A. Delev (4)

(1) Institute of Geology and Petroleum Technology, Kazan (Volga region) Federal University, Kazan, Russian Federation (sergei-usmanov@mail.ru), (2) Institute of Geology and Petroleum Technology, Kazan (Volga region) Federal University, Kazan, Russian Federation (geolog1990@mail.ru), (3) Institute of Geology and Petroleum Technology, Kazan (Volga region) Federal University, Kazan, Russian Federation (bez.raznicy.91@gmail.com), (4) Institute of Geology and Petroleum Technology, Kazan (Volga region) Federal University, Kazan, Russian Federation (Lehad.91@yandex.ru)

Geodynamic processes have an immediate influence on a fluid dynamics, for that version they are of significant importance in the formation and reformation processes of oil and gas deposits.

The object of our analysis was Romashkino oil field, which is confined to the anticlinal structure of the arch part of the South Tatar Arch.

The initial data in our project include the series of a paper maps, which contain the location of the intersection of production and injection wells with the Kyn horizon at the Romashkino oil field and geologic engineering information, which contains the flow rates's inversions data of the well's production activity.

Inversion occurs as a periodic increasing of the flow rates which is not caused by the external special influence on the well, against the long-term production activity's decreasing by the decreasing of oil's flow rates.

During the analysis of the data we identified the anomalous wells in which the hydrocarbon feed process was observed with the highest probability based on several criteria.

By the using of modern GIS technology we have compared the plots, in which an anomal wells are located, with a block structure of the basement and the sedimentary cover, and with the deconsolidated and fluid's penetrability zones of the crystalline basement.

For analysis of tabular data array we used ArcGis software package.

Romashkino's map was vectorized by using the EasyTrase and when we assigned a number to each object.

When the project was exported to ArcGIS and data obtained the geographic coordinates.

We obtained the following attributes for the testing wells: the year of exploitation's beginning, the period of the inversion, the ratio of flow rates before and after inversion, and others.

We created a series of maps with location of wells, with a flow rate's inversion by the year (1957-1998) for Minnibayevo area and by the five-year intervals for Minnibayevo area separately and for the Romashkino oil field. The maps of the inversion's density were built by the interpolation from the values of the ratio of oil flow rates before and after the inversion in the wells.

These data was selected as a characterizing of the inversion strength.

Thereby we created the convenient and informative geodata base through using GIS technology.

The comprehensive interpretation of a series of maps, created by ArcGIS software package, is in progress.

Firstly an analysis of the location of arrangement of the production wells, in which was occurred inversion of oil production in the process of production activity was made.

After this, we compared their location with the block structure scheme.

We noticed that the wells are grouped in linear- elongated zone along the fault, there is an affinity of this well to the certain parts of the small-sized blocks.

The development of scientific and practical research in this direction is of a high significant because it can lead to a change in the strategy and methodology of the geological prospecting on the one hand and of the exploration of hydrocarbon deposits on the other hand.