

Geological structure and oil-and-gas content perspectives of Crimea region transition zone using method for Earth's spontaneous electromagnetic emission analysis (MESEMEA)

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The MESEMEA is a new independent passive method for subsurface exploration. The field of Earth's spontaneous electromagnetic emission (ESEME) is researched in a radio-wave frequency range that the stress-strain rocks are sourced. The integration of tectonic and geologic processes is physical basement that allows regenerating geological structure of Earth's crust by measurement of the ESEME field.

The ESEME fields properties are significantly differ from properties of the widely known electromagnetic fields and are considered in a range of conception about lithosphere as electromagnetic active medium [1].

The basic type ESEME signal registration is aircraft survey. There are possible measurements by walking and by sea also. The special engineered multipurpose device “Astrogon” with broad-band antenna that records a magnetic component of field is used for measurement. The interpretation procedure has been developed on the basis of surveys on certain territories well studied by other geophysical methods.

In 2009 for detailing geological structure of deep formations and studying oil-and-gas content perspectives the areal and line aerogeophysical surveys by the MESEMEA in transition zones (offshore-onshore) of Crimea region are carried out. Areal surveys are fulfilled in Prikerchensky offshore area of Black sea and in northwest part of the Crimean peninsula within Karkinitisk-North-Crimea sag. Line surveys are fulfilled along south part of regional line “DOBRE”.

Comparison of the data received by the MESEMEA to results, executed geophysical surveys before has shown high conformity of heterogeneousness to the basic tectonic elements. The series of unknown faults and connected with them folds, that is defining presence of perspective structures is revealed, their relationship with the structures of subsurface are considered.

On the sites of areal survey, anomalies of ESEME field have been revealed above the certain gas-bearing structures. Above the similar anomalies new perspective structures are discovered. The horizons for which are specified deposits of hydrocarbons are established. Expected contours of oil-and-gas content are defined.

The obtained information by the independent MESEMEA with expected geological section and oil-and-gas content will improve significantly a reliability of estimate of oil-and-gas content in region for picking the most perspective zones and structures out.

[1] Shuman V. N, Bogdanov Yu. A. // Geophysical Journal.— 2008.— **30**, No. 2.— P. 32–41 (in Russian).