Dynamic Magnetoprospecting in Oil Fields Exploration

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ABSTRACT
We have developed a dynamic magnetoprospecting apparatus-methodical complex for prospecting and exploration of hydrocarbon deposits by recognizing that together with constant components of the Earth's magnetic field, also dynamic ones, having a variable character, have to be taken into account. Their parameters carry essential information on the peculiarities of the structure of geological section including the presence of oil deposits.

The apparatus-methodical complex consists of: 1) magnetotelluric station registering three components of Earth's magnetic field and two components of electric field simultaneously in autonomous regime; 2) methods of field observations in profile areal and monitoring variants for different geological objects; 3) methods of data processing and interpretation.

The field tests were carried out on two fields in Ukraine:
- Selyukhy (Dnieper-Donets Depression), having two oil deposits connected with terrigenous (3106-3110 m) and carbonate (3280-3360 m) deposits. Geological structure of both is simple, the beds are subhorizontal, not complicated by tectonic dislocations;
- Stynava (Carpathians Mts). Oil deposits occur in the interval 3000-5000 m. The field is complicated, blocky, with covering structural elements.

Local anomalies of Earth's variable geomagnetic field components are registered at both fields. These anomalies correlate with the zones of anomalous mechanical stress and the contours of hydrocarbon deposits. They also depend on peculiarities of structural construction of the fields.

Our apparatus-methodical complex can be used for searching the oil and gas fields. It is capable in verifying the structural-tectonic construction of the fields and in revealing and parametrization of oil and gas deposits.

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