



Features of the lithosphere structure of oil-gas-bearing zones of the Atlantic Ocean European site on the base of the geomagnetic field components measurements data

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The purpose of this paper is to investigate the geomagnetic field of the oil-gas-bearing pools. The feature of this problem is that the object investigated (petroleum series deposit) in itself does not produce magnetic anomalies. To map such kind of weakly magnetic measures the technique of spectral-spatial analysis has been suggested by us. Successive linear spectrum filtering followed by the inverse transformation of the spectra set obtained within interested range of anomalies periods lies at the heart of this method.

This technique was applied by us to investigate the deep structure features of earthcrust of the Atlantic Ocean European site which are involved in oil-gas-accumulation processes. The input data used by us were the results of geomagnetic field components measurements which had been obtained along the length profiles crossing North Sea and Norwegian Sea during the expeditions on the non-magnetic schooner Zarya over 1955-1980 period. The geomagnetic sections of the earth crust for Viking trough (Norwegian - North Sea), Forties trough, West sole trough (Southern North Sea basin) were made on the base of an analysis of the spectrum structure of the geomagnetic field Z component. The distribution pattern of a rock magnetization was analyzed in the depth range from 1 to 30km. The rock magnetic characteristics were obtained for regions of the big gas and oil fields such as Frigg, Brent, Beril (Viking trough.), Ekofisk, Erskin, Franklin (Forties trough), Leman, Infatigeb, Ok (West sole trough).

It was obtained that petroleum series deposits are located near the depth permeable zones which contain lenses of marker beds differing in the lower magnetization. At that weakly magnetic lenses were revealed not in sedimentary cover mass only but in a basement in the depth range from 8 to 11 km and from 15 to 18 km and in the lower crust from 20 to 28 km. The similar lithosphere structure was obtained early for the Russia oil-gas-bearing provinces Volga-Ural, Siberian, Barents and Caspian Sea as a result of the interpretation of geomagnetic surveys during the gas-oil exploration in the time range from 1972 to 2008.

The basic result of this research is that the analysis of long geomagnetic profiles allows to find the characteristic properties of an anomalous magnetic field structure in the areas of known gas and oilfields and to suggest the regional forecasting feature to reveal new gas-oil pools using the geomagnetic data.