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Looking for hydrocarbon occurrences by the airborne transient soundings

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The airborne transient electromagnetics (ATEM) is successfully used for locating hydrocarbon (HC) halos above HC fields [1].

A light Ka-26 helicopter-borne survey system was developed in Moscow Geological Prospecting Institute and used for HC halos mapping between 1985 and 1993. A total area of 70 thousands sqm km was surveyed, which allowed to estimate its practical applicability.



A power Mi-8 helicopter-borne survey system named as “Impulse-A” series was developed in Siberian Research Institute of Geology, Geophysics and Mineral Resources of Novosibirsk. It is used for HC halos mapping since 2000.

Figure 1: Ka-26 ATEM system

Figure 2: IMPULSE-A ATEM system

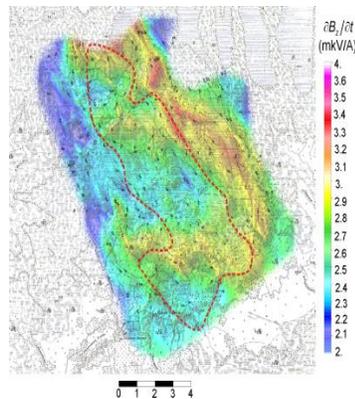
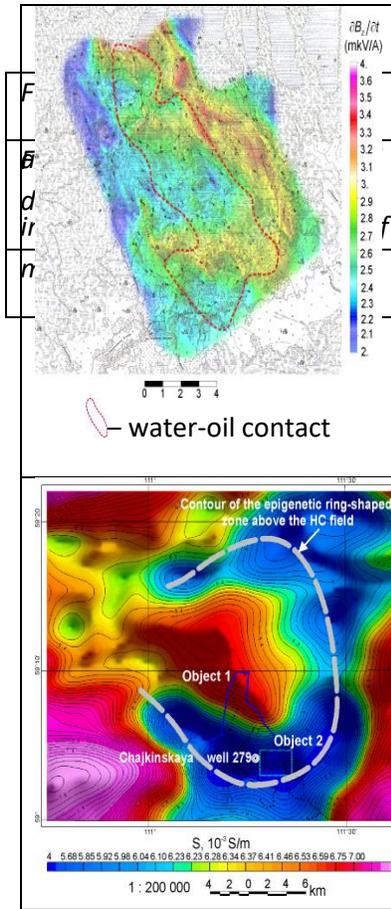


Figure 3: Impulse-A survey

Figure 4: Impulse-A survey



Verkh-Tarskoye oil field is located in the south-east border part of the West Siberian. The epigenetic alternation zone above the HC field is characterized by an oval-shaped anomaly with a higher conductivity, which position correlates with the water-oil contact (Fig. 3)

A number of oil, gas and condensate fields were found within the Chajkinsky area, which is located in the Siberian platform. Here the ATEM data map of the conductance distribution at the depth of 300 m is shown (Fig. 4). The epigenetic alternation zone above the expected HC deposit has an oval-like ring structure and covers an area of about 50 sqr km, which includes a localized fragment of the productive reservoir in the southern part.

Many HC fields have an electrically altered zones (halos) formed by hydrocarbon vertical migration at shallow depths above them. These halos can be cost-effectively mapped with the ATEM techniques, which are most effective for use at the early stages of a regional study and for the preliminary probability estimation of

the HC potential of prospective areas.

References:

[1] F. M. Kamenetky, G. M. Trigubovich, E. H. Stettler, 2010. Transient Geo-Electromagnetics, Vela Verlag, Munich, Germany.

