

# SEARCH CRITERIA FOR MINERAL DEPOSITS IN THE ZONES OF MODERN AND ANCIENT VOLCANISM ON URANIUM AND THORIUM AND THEIR FISSION PRODUCTS

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In the work, by the method of gamma - spectroscopy [1,2], new data are presented on the deep recharge of the Nizhnechutinsk oil field by ascending gases and hydrotherms with different elemental composition. It has been established that formation waters, as well as oils, are enriched in As, Br, Ba, Re, Ir, Au, REE in the fluid replenishment zones. In this case, the greatest differences relate to the distribution of uranium and thorium over the area of the deposit and over the underlying oil reservoirs.

The results of the studies indicate the overlap and coexistence of deposits of hydrocarbons and ore minerals in the area of ancient volcanism, while the criteria for the influence of the manifestation of deep processes are both the well-known ratios of uranium and thorium (U/Th and/or Th/U) and the established we determined the values of the ratios Th/Ba, Mo/U, Ba/Mo.

The elements Ba and Mo are fission products of uranium and thorium. In this regard, we assume other types of mineralization, associated not with the release of magmas of different composition and post volcanic hydrotherms, but with known exhalation mineralization. According to our ideas, this type of mineralization is accompanied by a constant emanation of radioactive elements U, Th and elements of their radioactive decay along the zones of development of modern and paleovolcanic formations. At the same time, oils in the Upper Devonian deposits are enriched in a number of elements, the associations of which depend on the temperature of the ascending gas flows. Taking into account the results obtained, the search for deposits of solid minerals and hydrocarbons is carried out not only in terms of U / Th, but also according to the new criteria we have established - certain values of the ratios Th / Ba, Mo / U, Ba / Mo in the composition of rocks and accumulations of hydrocarbons.

## Literature

- 1.Makarova I.R., Laptev N.N., Gorobets S.A., Valiev F.F., Yafyasov A.M., Sergeev V.O., Zippa A.I., Sukhanov N.A., Makarov D. K., Grishkanich AS/ Application of methods of gamma spectroscopy and IR spectroscopy for the purposes of prospecting geology. Georesources, 2021, No. 1. – P.17 – 29.
2. Yafyasov A.M., Makarova I.R., Valiev F.F, Laptev N.N., Gorobets S.A., Sergeev V.O. / The application of gamma-spectrometry with a germanium detector for oil and ore geology // Bulletin of the Russian Academy of Sciences : Physics, 8 no. - T. 86. - 2022 (in print).

## The speaker is a student or young scientist

Yes

## Section

1. Applications of nuclear methods in science and technology

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