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Isotope composition (C, H, O) and gas potential assessment in the South Caspian depression (Azerbaijan)

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The large amount of HC isotope composition material of over 330 samples allows to study gas potential assessment within the South Caspian depression.
Maps of isotope composition changes according to area extent, as well as graphs of HC distribution depending upon stratigraphic age including rocks, graphs of isotope composition change on sampling depth were compiled for HC study and oil-gas deposits formation. Comparison of mud volcanoes gases, oil and gas fields, gas-hydrates and bottom sediments was conducted. Gases genesis according to M. Shoelle and A. James methodic was studied. Model of area paleoconstruction was studied.
Comparison of mud volcanoes gases with gases of oil fields within South Caspian depression shows that their isotope composition varies within the same ranges. Their difference is observed in chemical composition. Mud volcanoes gases are sharply impoverished by amount of heavy hydrocarbons.
Study of isotope gases composition distribution in extent area allowed to distinguish zones and areas with different composition of heavy isotope. For example, in the deep-seated areas of the South Caspian depression toward flank zones of Low Kura depression as well some areas of Baku archipelago and Absheron peninsula gradually one can observe zones with a low content of heavy carbon isotope etc.
Isotope gases composition depending upon stratigraphic age of including rocks has a certain peculiarities. From low to the upper section of PS as well as deposits of Cretaceous system toward chokrak regiostage (underlying PS deposits) one can observe increase of light carbon isotope. This fact allows to suppose that there exits two stages of HC formation.
Comparison of HC gases isotope composition with sampling depth allowed to conclude that in the near-flank zones oil-gas deposits were re-formed by a large gas volumes the source of which was there same deposits within new thermobaric conditions.
Gases of biochemical, diagenetic and thermocatalytic genesis etc. were obtained. Isotope HC data in the deposits testify to the fact that within oil-gas bearing suite of Azerbaijan – PS in the deep-seated zones of the South Caspian depression there occurs generation in large amounts of liquid and gaseous HC.
The studied chemical and HC gases isotope composition showed that basic source of oil and gas formation is located in the deep areas of central and near-flank parts of depression. HC migration has mainly occurred upward the layer. Study of HC migration trend in time and space and generation areas etc. allows to reveal some structures where there is evidence of HC accumulation with large and gigantic reserves.