

## Results of numerical modelling of formation of deep salt diapirism

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**Abstract:** The most part of world oil and gas fields fall on the field of salt and dome tectonics. Therefore geologic-geophysical researches, laboratory and theoretical researches are devoted to studying of formation of salt and dome structures. The last achievements in this area confirm.

D. I. Mendeleev's hypothesis of an inorganic origin of oil, and indicate prospect of her search and production at big depths. Adequate physical, mathematical and discrete models of formation of a deep salt diapirism which have been developed and proved in works [1,2] are necessary for effective search and extraction of hydrocarbons from big depths. In these models thermal effects and exponential dependence of dynamic viscosity on temperature on the basis of Reley-Taylor's instability in approach of Bussinesk's are considered.

Calculations have shown that thermal gradients significantly influence as volume profiles of diapirs, their distribution in space, and their speed of formation. Process of gravitational instability prevails over thermal effects [1,2]. In these models thermal effects and exponential dependence of dynamic viscosity on temperature on the basis of Reley-Taylor's instability in approach of Bussinesk's are considered.

Calculations have shown that thermal gradients significantly influence as volume profiles of diapirs, their distribution in space, and their speed of formation. Process of gravitational instability prevails over thermal effects [1,2]. By the technique offered in [3] were allocated a collector of oil and gas. They are formed in areas of their wings and in areas of a subsalt bed that has been earlier established by drilling of salt domes. Calculations have also shown that in areas of collectors of oil and gas temperature is increased that has been confirmed with space monitoring of fields of hydrocarbons of the Western Kazakhstan and the water area of the Aral Sea. At a certain heterogeneity of a thermal stream from the lower horizons of the crust and dynamic viscosity independent of temperature salt columns are formed. Exponential dependence of viscosity on temperature, with other things being equal, promotes formation of salt structures with " similar to a leaf of a tree" structure. In more detail about it will be said in the report.

**Keywords:** Salt diaper, crust, sedimentary cover

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REFERENCES

- [1] Baymukhametov A.A., Martynov N. I., Tanirbergenov A.G. "Computer modeling of formation of a deep salt diapirism" // NAN RK News, -2(300), pp.36-40, 2015.
- [2] Baymukhametov A.A., Martynov N. I., Tanirbergenov A.G. "Mechanics of a deep salt diapirism" the Collection of works 11y of the All-Russian congress on fundamental problems of theoretical and applied mechanics., pp.298-300, 2015.
- [3] Baimukhametov A.A., Martynov N.I., Tanirbergenov A.G. "Thermo gradient model of formation of oil and gas traps at salt diapirism" Proceeding of the 23d ICTAM, Beijng, China, 2p, sm06-013, 2012.