

## **Possible Space Weather Influence on the Oil Production Activity in Azerbaijan**

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Space Weather is determined by the most varied interactions between the Sun and interplanetary space, and the Earth. It is already evident that space-borne and ground-based technological systems in our planet tend to be more and more exposed to the solar activity and to changes in this activity, and in general, to the Space Weather. It is of great importance to get more and better knowledge about solar and geomagnetic storms' effects on technological processes.

In this paper some results of studies on possible influence of Space Weather conditions on the oil extraction in Azerbaijan during last fifty years are briefly described. For purposes of the study the influence of solar and geomagnetic activity on technological processes of development of oil fields, main indexes of oil production activity of the Unit-5 of the Horizon-10 at the oil-field "Neft Dashlary" ("Oil Rocks") in the Caspian Sea as well as some land oil-fields in Azerbaijan were analyzed. For reliable estimation of heliogeophysical conditions on the bedded system, the certain time period of oil-development was selected, at which a comparatively stable state of the technogenic effects on oil-production activity was registered. At the analysis of dynamics of change of technological indexes of oil-field development and at the study of influence, the non-parametrical index of correlation (Spearman correlation coefficient) was applied. The significance of a correlation coefficient was evaluated with the help of Student's t-criterion.

On the basis of analysis of correlation coefficients between solar activity indexes and one of the practically important technological indexes – the success of Treatment of Bottom-hole Formation Zone (TBFZ) - a high degree of correlation between considered processes is established. Correlation picture reflecting the dynamics of another index – the success of Hydraulic-Fracturing Seam (HFS)- could be explained by the influence of geomagnetic activity (double peak in the geomagnetic activity during solar cycle) or by an influence of two magnetic cycles (the main 22 year and the quasi-two year period) on the Sun.

It is concluded that the strength of geomagnetic field and its changes affect the double electron layers at the border of medium "solid matter – reservoir fluid" (oil, water or gas) which leads to changes of filtration characteristics of porous medium and, as a result, of indexes of oil-field development process (A.M.Mammad-zadeh, private communication). Depending on the state of geomagnetic field, filtration characteristics in the process of oil extraction could be changed.

These conducted Space Weather effects studies are very important not only for Azerbaijani oil industry and could be used at planning and realization of different technological processes of oil production activity, especially during periods of high solar- and geomagnetic activity.