

GEOPHYSICAL SETTING OF THE DEEP WELL 6042 DELENI IN CENTRAL TRANSYLVANIA, ROMANIA

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Deep well 6042 Deleni was drilled for hydrocarbon exploration in the central part of Transylvanian Depression (TD). It penetrated at a depth of about 4700 m and went through for more than 350 m, some basic rocks (basalts, basaltic-andesites, etc.), located beneath Tithonian carbonate series (dolomites). The mafic sequence was considered by several authors as the ophiolite suture of the Transylvanian branch of the Tethys Ocean.

The paper is intended to present airborne/surface geophysical data related to the area in correlation with well-logging data (caliper logs, electric, gamma-ray, and neutron logs) and previous regional geotectonic framework. It was aimed at adding geophysical and tectonic setting to the thorough mineralogical studies dedicated to the mafic rocks encountered by this well (HOECK & IONESCU, 2003).

Gravity, magnetics (both ground and airborne), geothermal gradient (heat flow), as well as seismics were taken into account in this analysis. Various filtering techniques (matrix smoothing, polynomial regression, etc.) were extensively used in order to improve the signal/noise ratio in separating effects made by sources of different extent and/or located at various depths.

Airborne data (CRISTESCU & STEFANCIUC, 1968) clearly outlined a large regional geomagnetic anomaly over the whole central part of the TD. Later on, it has been fully confirmed in the images provided by the ground vertical component geomagnetic map of Romania (AIRINEI *et al.*, 1983, 1985).

Several previous geological interpretation (BESUTIU, 1984) considered this regional geomagnetic effect as a composite anomaly mainly due to sources located at least at three levels: (i) Dej tuffs, located in the upper part of the section; (ii) basic to intermediate igneous rocks located at the level of the TD basement; (iii) a large wavelength component due to the basaltic layer geomagnetic expression in the "colder" part of TD.

It should be noted that analyses made on core samples from the 6042 Deleni borehole clearly exhibited high magnetic susceptibility for the above mentioned basalts, but rela-

tively low densities. The fact was attributed to the presence of some deep fracture zones located at the basement level, hidden beneath the TD Mesozoic and Cenozoic cover. Gravity and geomagnetic data processing allowed outlining several regional deep faults striking eastward and north-northeastward in the borehole area. The presence of the fracture zone is confirmed in the well logging data reflected in the combined γ -ray highs, low resistivity, and larger neutron porosity values, which are completely unusual for basalt rocks.

Based on gravity and geomagnetic data, under the constraint of seismics and rock physics laboratory determinations, attempts were made to model the borehole environment.

Finally, some concluding remarks and speculations are made on the regional geotectonic framework of the 6042 Deleni deep well.

References

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