



Results of the Joint Project (NASU-TUBITAK) “The Thermal Structure of the Crust in the Black Sea Analysis of Magnetic and Heat Flow Data”

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The interest in the Black Sea crust is based on its key role in understanding the tectonic evolution of the middle Tethyan Realm and its hydrocarbon potential. There is still a need to obtain quantitative data for determining the thermal regime which is one of the most important energetic factors controlling the geodynamics of the lithosphere and intensity of oil and gas fields of the Black Sea.

The Joint Project by the NASU and TUBITAK started in May 2011 comprises the Curie Point Depth (CPD) determinations of the Black Sea and modeling thermal sources from heat flows. The CPD map of the Black Sea was constituted from spectral analysis of total field magnetic data. The isotherm of CPD of the Black Sea shows a distribution at a range of 22 and 36 km. Deepening of CPDs (ca. 30-36 km) are observed in the western and eastern Black Sea basins correspond with the thickest sediment areas. A NNW-SSE trending belt of shallow CPD zone (ca. 22-28 km) separates these two deep CPD basins correspond with the Mid-Black Sea Ridge. The other shallow CPDs are related to the thin sediment areas at the costal side of the Black Sea.

Moreover, the cross-sections oriented in approx. north-south direction named as 18, 25 and 29 Deep Seismic Sounding (DSS) were used to construct the geothermal models. The thermal regime of the crust was inferred from these profiles in the western, central and eastern parts of the Black Sea. The CPD of profile 18 changes from 22 to 28 km. The CPD isotherms show depths of 26-32 kms along the profile 25. The CPD along the profile 29 occurs at depths of 27-35 kms. The obtained CPD results along the profiles have been compared with results from the traditional geothermal studies based on heat flow determinations in the subsurface layer and model computations of temperature distribution. The isotherm of CPD from magnetic and heat flow data strongly evidences the efficiency of such an approach and the results of two methods are compatible with the anomalous areas.

Keywords: Black Sea, Curie Point Depth, Heat Flow, Thermal Structure