This paper presents the first study of mapping of the Curie Point Depth (CPD) from magnetic data for the Black Sea and a comparison with a classical thermal modeling from heat flow data. The provided relationship between radially averaged power spectrum of the magnetic anomalies and the depths to the magnetic sources of the Black Sea vary from 22 to 36 km. Deepening of CPDs observed in the western and eastern Black Sea basins correspond with the thickest sediment areas, whereas the shallow CPDs are related to the Mid-Black Sea Ridge and thin sediment areas at the coastal side of the Black Sea. For comparison, the temperature field was also modeled from heat flow data from the Black Sea along three approximately north-south directed profiles corresponding to known DSS soundings. The Curie isotherm along the profiles occurs at depths of 22-35 km. A comparison of the results of the two independent methods reveals only 8-10% discrepancy. This discrepancy is equal to an accuracy of temperature determination from heat flow data.