For the first time, ground magnetic data were obtained and inverted by means of total horizontal derivative (THD), horizontal gradient analytic signal (HGAS), and hyperbolic tilt angle (HTA) techniques to identify subsurface volcanic structures around Isparta city (SW Turkey). Here, Gölcük volcanism took place at the apex of the Isparta Angle at the intersection of the Lycian and Antalya nappes. It initiated between 4.0-4.7 my ago mainly as lava extrusions and ended with phreatoplinian eruptions during Quaternary time. The study area is covered by authochtonous and allochthonous units that are intruded by Pliocene and Quaternary Gölcük volcanics and also overlain by pyroclastic fall and flow deposits. The boundaries were revealed for the buried volcanic structure from the edge detection methods. The geometry of the trachytic dome southwestern of the Gölcük Lake and its downward continuation were studied by 2D modelling with the control of the power spectrum depth results applied to the focussed anomaly. The azimuthally – averaged logarithmic power spectra plot indicates that the downward continuation of source depth of the trachytic dome reaches up to 850 m. The forward inversion results indicate that the horizontal size of the model for this trachytic dome is 1250 m beneath the surface while it’s surface extension is only about 400 m.