ABSTRACT
Imaging buried geological boundaries is one of a major objective during the interpretation of potential field data in Geophysics. Therefore edge detection and edge enhancement techniques assists a crucial role on this aim. There have been various edge detection applications in order to determine the edges of subsurface structures which are in general high-pass filters based on the horizontal and vertical derivatives of the field data. Beside this, all edge detection methods have characteristic edge indicators which are used to determine the reference value for finding the edges of sources on the derivative data. For this reason, the data must be analyzed by a comparative interpretation in order to achieve an appropriate result. Regarding the interest on the studies focusing to obtain the horizontal source coordinates from potential field anomalies, it was assumed that it might be favorable to develop a computer code comprising the frequently used techniques into a common platform which provides the user a comprehensive and quantitative analyzing scope. Hence we present an easy-to-use graphical user interface (GUI) designed in Matlab for edge estimation of subsurface structures by the methods of the horizontal gradient analytic signal, the total horizontal derivative, the analytic signal, the tilt angle, the theta map and the normalized standard deviations. By the supplied graphical options, the GUI allows the user to switch between resulting maps obtained by these different techniques. The feasibility of the proposed code was tested on synthetic data from various complex models. A real data edge detection was performed to a magnetic data set measured from an archaeological site located to northern Isparta. The resulting images obtained from the different techniques are in general similar to each other where they also show a well correlation to the measured GPR data available for this site.

Keywords: Edge detection, potential field data, horizontal-vertical derivative.