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# GMinterp, A Matlab Based Toolkit for Gravity and Magnetic Data Analysis: Example Application to the Airborne Magnetic Anomalies of Biga Peninsula, NW Turkey

Y. L. Ekinci (1) and E. Yiğitbaş (2)

(1) Çanakkale Onsekiz Mart University, Geophysical Engineering Department, Çanakkale-Turkey (ylekinci@comu.edu.tr),
(2) Çanakkale Onsekiz Mart University, Geological Engineering Department, Çanakkale-Turkey (erdinc.yigitbas@gmail.com)

The analysis of gravity and magnetic field methods is becoming increasingly significant for the earth sciences as a whole and these potential field methods efficiently assist in working out both shallow and deep geologic problems and play important role on modeling and interpretation procedures. The main advantage of some gravity and magnetic data processing techniques is to present the subtle details in the data which are not clearly identified in anomaly maps, without specifying any prior information about the nature of the source bodies. If the data quality permits, many analyzing techniques can be carried out that help to build a general understanding of the details and parameters of the shallower or deeper causative body distributions such as depth, thickness, lateral and vertical extensions.

Gravity and magnetic field data are usually analyzed by means of analytic signal (via directional derivatives) methods, linear transformations, regional and residual anomaly separation techniques, spectral methods, filtering and forward and inverse modeling techniques. Some commercial software packages are commonly used for analyzing potential field data by employing some of the techniques specified above. Additionally, many freeware and open-source codes can be found in the literature, but unfortunately they are focused on special issues of the potential fields.

In this study, a toolkit, that performs numerous interpretation and modeling techniques for potential field data, is presented. The toolkit, named GMinterp, is MATLAB-based consisting of a series of linked functions along with a graphical user interface (GUI). GMinterp allows performing complex processing such as transformations and filtering, editing, gridding, mapping, digitizing, extracting cross-sections, forward and inverse modeling and interpretation tasks. The toolkit enables to work with both profile and gridded data as an input file. Tests on the theoretically produced data showed the reliability of developed toolkit. Additionally some experiments on real data sets were performed to interpret the geological structure of Biga Peninsula, NW part of Anatolia, Turkey.

Keywords: GMinterp, GUI, airborne magnetic data, geology, Biga Peninsula