The effect of finite thickness extent on estimating depth to basement from aeromagnetic data

By

Ahmed Salem

Getech and University of Leeds

Abstract

Depth to basement estimation methods using various components of the spectral content of magnetic anomalies are in common use by geophysicists. Examples of these are the Tilt-Depth and SPI methods. These methods use simple models having the base of the magnetic body at infinity. Recent publications have shown that this ‘infinite depth’ assumption causes underestimation of the depth to the top of sources, especially in areas where the bottom of the magnetic layer is shallow, as would occur in high heat-flow regions. This error has been demonstrated in both model studies and using real data with seismic or well control. To overcome the limitation of infinite depth this contribution presents the mathematics for a finite depth contact body in the Tilt depth and SPI methods and applies it to the central Red Sea where the Curie isotherm and Moho are shallow. The difference in the depth estimation between the infinite and finite contacts is such a case is significant and can exceed 200%.