

## Magnetic mapping in Southeast Asia — Dealing with a low inclination field

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The low inclination of the geomagnetic field in Southeast Asia poses some challenges in the interpretation of magnetic and aeromagnetic surveys conducted in the region. Foremost among these is that the almost horizontal total-field vector gives rise to a directional sensitivity with more prominent magnetic expression of east-west trending body edges relative to those of a north-south trend. Furthermore, some of the enhancement transforms and automated edge-detection and depth-estimation techniques applied in magnetic interpretation need to be modified for their optimal use at low latitudes. Successful interpretation of magnetic and aeromagnetic surveys within this region, therefore, requires familiarity with the characteristics of anomalies induced in such a low inclination field, and some preparation of the transforms and algorithms to be used in their analysis.

Some of these aspects of anomalies in a low inclination geomagnetic field are illustrated by an example from Malaysia. A magnetic anomaly has been delineated using both total field and vertical component measurements over a small area near Senaling in Negeri Sembilan. The anomaly is closely adjacent to a serpentinite body. It does not appear to be within the serpentinite as mapped by soil colour, but probably represents a magnetite rich pod derived from the serpentinite and intruded into the surrounding schists by igneous, metasomatic or tectonic activity. The total field and vertical component anomalies have peak to trough ranges of 1,900 and 2,500 nT respectively and are essentially independent because their vectors are almost orthogonal. The total field anomaly has been modelled using Encom Technology's Modelvision package. Using this software the total field anomaly is presented as it would have been measured for the same body at different latitudes. Some of the transforms available such as reduction-to-the-pole and analytic signal are presented both of the measured data and of the modelled fields for different geomagnetic inclinations. The study illustrates the capabilities and limitations of applying these transforms at such low latitudes.

The source body for the magnetic anomaly near Senaling is almost equidimensional. The anomaly over an elongate mineralisation-related dike-like body from a nearby area in Indonesia is presented and also interpreted using Modelvision. The modelled source body is rotated horizontally and the new magnetic responses are computed to show the directional sensitivity of the magnetic field at these low latitudes to the trend of the source body. The north-south trending elongate body does not have a single magnetic anomaly, but has discrete polarisation anomalies at its extremities with a very weak magnetic expression across the centre of the body, which is quite different to the magnetic expression of the identical body of east-west trend.

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