Global centroid distribution of magnetized layer from World Digital Magnetic Anomaly Map

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The first version of World Digital Magnetic Anomaly Map (WDMAM) was recently released [Korhonen et al., 2007]. WDMAM is an international scientific joint effort to compile a reliable world map of magnetic anomalies that provide a new generation of high-resolution global lithospheric field models, including wavelengths shorter than about 2600 km. Spectral analysis of this new magnetic anomaly data is applied to estimate the centroid depths of crustal magnetic layers (Zo) to constrain the lithospheric structure. The method is based on that of Spector and Grant [1970], which assumes a uniform distribution of parameters for an ensemble of magnetized blocks. The obtained Zo distribution provides a comprehensive view of regional-scale features, which are well correlated with known tectonic regime. Shallower values of Zo well delineate mid-oceanic ridges, and deeper values correspond to old continents. Comparing our results with current knowledge of the crustal structure as in CRUST2.0 [Bassin et al., 2000], variation of Zo generally corresponds very well with that of CRUST2.0, however certain regions, such as Himalaya and Andes, seem to be thinner than those estimated by CRUST2.0. One of possible reasons to this discrepancy is that each area for spectral analysis might not be large enough to capture longer wavelengths of magnetic anomalies associated with deeper Zo. The correlation between the two and its correspondence with tectonic regime indicates that Zo is useful to delineate regional crustal thermal structure. It is expected that Zo combined with multidisciplinary data should help to infer geophysical and geological information in the less explored regions.