

Constrained grid matching of large magnetic databases — the magnetic anomaly grid of Queensland

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Unconstrained merging of continental-scale airborne magnetic data into composite grids, which faithfully retain all wavelengths of crustal origin, has traditionally not been an easy task. Geoscience Australia has recently developed a new merging method that aids the solution of this problem, and the software is now commercially available. The method minimises all the differences of the grid boundary overlaps in one process, as an inverse problem. Although this works very successfully, particularly with modern data, edge grids are still difficult to deal with. A much better result can be obtained if the merge is constrained by independent accurate data. Such data are available for continental Australia as a result of the Australia-wide Array of Geomagnetic Stations (AWAGS) experiment in 1990. Concurrent with the AWAGS array two aeromagnetic loops were flown around Australia over several weeks, one well inland, and one closer to the coast. Data acquired along these loops have been diurnally corrected using the array magnetic data, and are now a valuable reference dataset for constrained merging of large areas of magnetic grid data. An example of the value of such constraint is demonstrated for the new magnetic anomaly grid of Queensland. Constrained matching of the data grids reduces magnetic levels in the Cape York Peninsula region by approximately 100 nT. This removes what appears to be an anomalously high area for the region in pseudocolour images of the composite grid.