

Application of Airborne Gravity Gradiometer Technology in Coal Exploration

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Airborne gravity gradiometer technology has been successfully used to explore for a range of ore types (IOCG, Iron Ore, Kimberlite) and for geological mapping. BHPBilliton has successfully demonstrated that airborne gravity gradiometer can be used to map coal seams.

Synthetic modelling established that use of gravity gradiometer in coal exploration is viable provided there is a favourable combination of dip and seam thickness: the combination of thick seam ($>10\text{m}$) and relatively steep dip ($>10^\circ$) being most favourable. The response due to a less favourable combination, at noise level can also be recognised due to the continuity of the coal seam. The continuous pattern of the coal seam distinguishes it from random and discrete noise.

BHPBilliton has flown an airborne gravity gradiometer test survey over known coal deposits in the Latrobe Valley (Gippsland Basin, Victoria, Australia) in June 2002. The survey was flown at 200m line spacing and 130m above ground. The result conforms well to the existing borehole data. The average seam thickness in the area is 30-50m with extremes of more than 100m and less than 10m in places. The dip is quite shallow, less than 10° on average. Geophysical modelling of the AGG data along with the borehole information it is demonstrated that gravity gradiometry is a useful exploration tool for coal.

Key words: Gravity Gradiometer, Coal, Latrobe Valley Geophysical Modelling