

**FILTERING AEROMAGNETIC
DATA
TO REDUCE THE MASKING EFFECT
OF NEAR-SURFACE BASALT**

by

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**Map References:
Clermont SF55-11
Clarke River SE55-13**

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Abstract

This project investigated two areas in northern Queensland where Tertiary basalt covers igneous and metamorphic rocks considered prospective for gold. The moderate to high magnetic susceptibility of the basalt, combined with variations in its thickness, give a high degree of variability to the aeromagnetic data which impedes interpretation of deeper structures.

Low-pass filters of the Butterworth, averaging-window and median-window types were used initially, because the near-surface signals tends to be higher in spatial frequency. Upward continuation was also used. All were able to remove high frequencies but none showed a clear superiority at simultaneously resolving detail. The best results eventually were obtained from a differencing method in which the high-frequency signals were first emphasised by downward continuation and then subtracted from the original signal. This enabled identification of several features which had not been visible in either the original, or low-pass-filtered data.

The differencing method is shown to be equivalent to subtracting the first vertical derivative (multiplied by a scaling factor) from the total magnetic intensity.

The generality of this approach was then tested by applying it to another dataset with different sampling and geological parameters. The resolution available in the second case is limited by the 400m flight line spacing, instead of the 200m of the first dataset. The results were less successful but there is evidence that the approach is still valid.