

THE NORTHERN ANOMALY
***An unresolved magnetic anomaly adjacent to the Merlin
diamondiferous kimberlite field***

Introduction

During the course of exploring for diamondiferous kimberlites in what is now known as the Merlin Diamond Field airborne magnetic surveys identified a larger and deeper magnetic anomaly than the anomalies attributed to the shallow kimberlitic bodies which is referred to as the Northern Anomaly. The anomaly lies within 2500m of the diamondiferous kimberlites at Merlin.

The Northern Anomaly, which is slightly more elongate in N-S direction, has amplitude of 10 nT (70 metre flying height) and interpreted maximum dimensions of 1000mX 500m. The source of the anomaly is interpreted to be at a depth of approximately 400 metres below ground level. The magnetic source appears to be a vertical ellipsoidal shaped source consistent with an intrusive or a vertical breccia pipe.

A GEOTEM survey conducted over the area of the Merlin kimberlites did not indicate a significant conductor associated with the magnetic anomaly but the depth of the magnetic source is likely to be well beneath the level of detection of the GEOTEM system.

Previous attempts at drilling this anomaly have fallen short of the interpreted depth. The previous drill-hole encountered 150 metres of Bukalara Sandstone underlain by Proterozoic brecciated carbonates with sulphides to a depth of 174 metres. At this point the drilling was terminated due to technical reasons.

The geology surrounding the Northern Anomaly implies a relatively stable cratonic environment where a relatively thin cover of Cambrian aged sediments overlie Proterozoic aged rocks which include the giant McArthur Pb/Zn deposit in Mesoproterozoic rifted structures.

Discussion of possible sources and justification for drilling this target

The following is a brief discussion of some of the potential sources for the 10 nT Northern Magnetic Anomaly which would warrant drilling of the anomaly.

1. Whilst it is considered less likely that the Northern Anomaly represents a kimberlitic source identical to the Merlin pipes it may well reflect an earlier event which has close affinity to these kimberlites. Examples exist in Southern Africa where kimberlites of Cretaceous age intrude kimberlitic and ultramafic sills associated with an older intrusive event of Proterozoic age.

Should the source of the Northern Anomaly be identified as reflecting an earlier as yet unrecorded ultramafic (kimberlitic?) event in the Proterozoic of this region it may have significant regional implications for kimberlite exploration in the NT.

(NB- at the Abner kimberlite occurrence there is evidence of potential kimberlite melts which have not vented at the surface and where the only evidence of possible emplacement at depth is the presence of indicator minerals in drill core and brecciated outcropping Proterozoic sandstones. For this reason the possibility that the Northern Anomaly reflects a kimberlite

cannot be entirely ruled out but it would represent a much larger body than any of the known Merlin pipes at surface but these are also known from drilling to merge into larger bodies at depth).

Consideration has been given to the possibility of the anomaly resulting from a carbonatite or related source. Globally carbonatites occur proximal to kimberlites, for example in Angola and are also often related spatially to the margins of rifts.

2. The Northern Anomaly is proximal to one of the world's giant Pb/Zn deposits at McArthur River. The possibility of the anomaly being due to mineralised breccia pipes hosting Cu, Pb, Ag deposits similar to those which occur in areas such as the Otavi Mountainland in Namibia should also be considered. The Kombat "vertical pipe"-like ore bodies are associated with flexures in the host carbonates. Discrete magnetic anomalies are associated with these ore-bodies.

The lithologies encountered in the failed previous drill hole are encouraging in the context of this possible exploration model. This was not pursued at the time the hole was drilled as the main focus was on defining the extent of the Merlin kimberlite field.

Immediately south of the Northern Anomaly airborne geophysical data acquired by the NTGS highlights the extent of a major outpouring of mafic lavas over a large area during the early – mid Proterozoic (1700-1800Ma). These are represented by the Settlement Creek, Gold Creek and Seigal Volcanics which form part of the Tawallah Group and represent a diverse suite of mafic volcanics. That the Northern Anomaly represents an intrusive related to this major event deserves consideration. Globally there are examples of major Cu-Ni-PGE deposits being related to small discrete intrusives which in turn are related to vast outpourings of flood basalts. An example of this type of deposit would be the Norlisk deposits in Siberia which have a close relationship to the Siberian traps and major structures. Deposits of this type are not well documented in Australian geology but may exist beneath younger cover in areas supported by major structural discontinuities.

Concluding Remarks

The Northern Anomaly represents an anomalous discrete magnetic response in close proximity to the Merlin diamondiferous kimberlites, the giant McArthur Pb/Zn deposit and a major early to mid Proterozoic mafic volcanic event extending over an area in excess of 30,000 sq km.

Whilst there is no obvious unequivocal source proposed for the anomaly the above models justify the drilling of this target as the outcome may have important implications not only in possibly locating a mineralised source but also in enhancing the exploration knowledge and potential of this region.

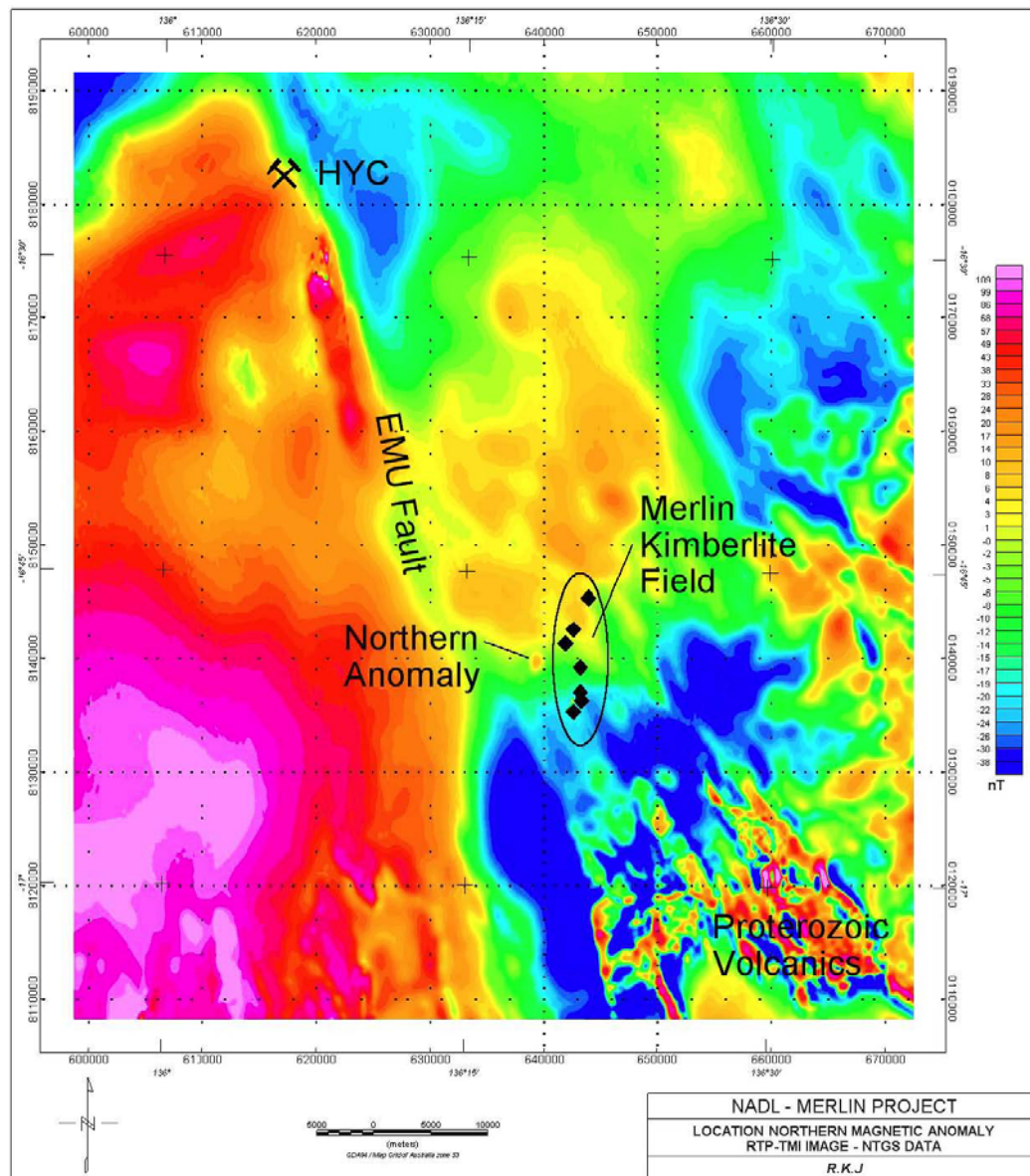


Figure 1: Location of the Northern Anomaly in relation to the Merlin Kimberlite Field and the HYC Pb/Zn Deposit. Image is of Reduced to Pole TMI NTGS aeromagnetic data.

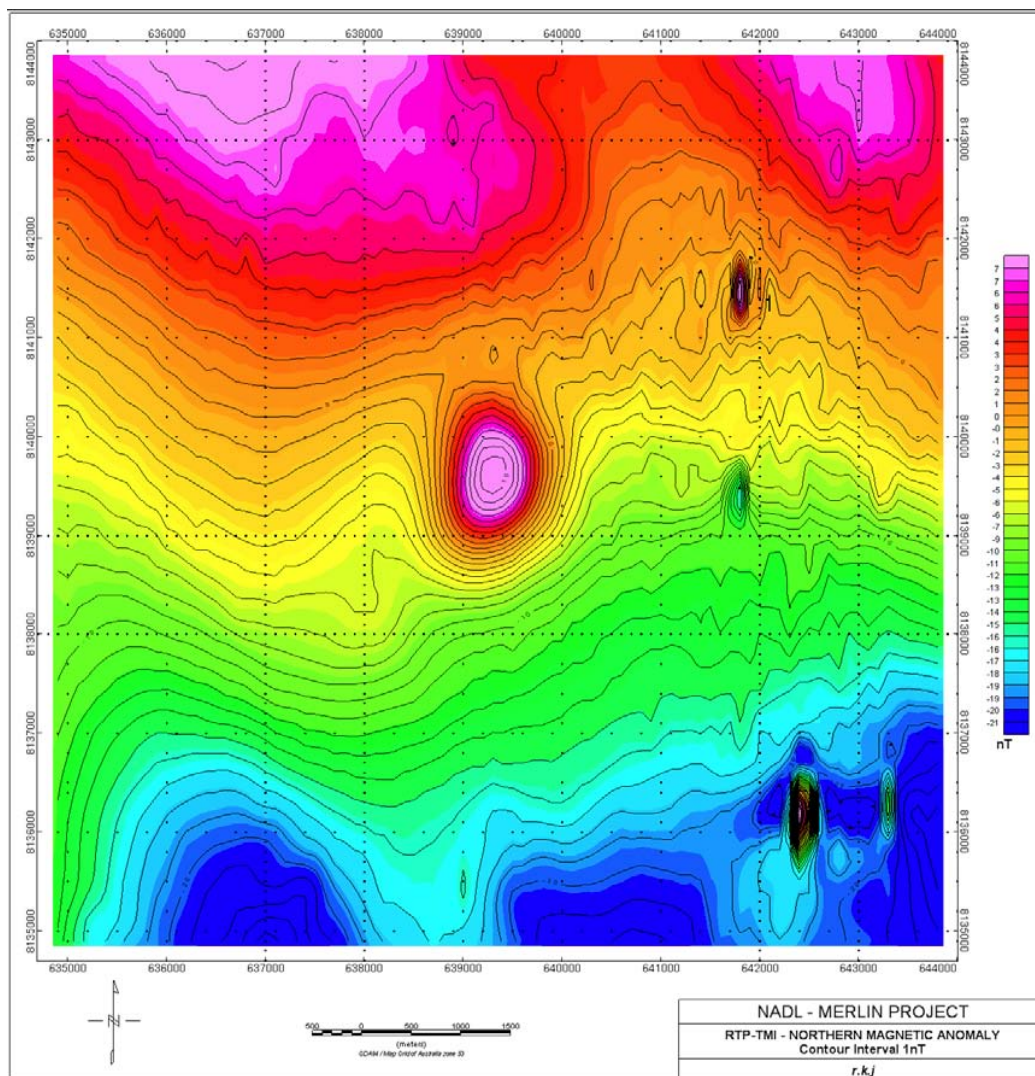


Figure 2: RTP TMI Image of the Northern Anomaly-Contour Interval 1nT