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INSIGHTS FROM AEROMAGNETIC DATASETS AND STRUCTURAL CORRELATION IN THE LAMBERT GRABEN REGION, EAST ANTARCTICA

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Pre-existing Russian magnetic data collected in the Lambert Graben region delineates a series of northeast trending magnetic anomalies in the vicinity of Beaver Lake. These anomalies are characterised by a smooth magnetic response and a relatively short wavelength signature. Russian interpretations suggest these anomalies are attributed to Larsemann supracrustals and Reinbolt orthogneisses, related to the Proterozoic charnockite-granulite terrane of the Rayner Complex. Ion microprobe dating of these lithologies indicate that these rocks were deformed during the Neoproterozoic (~990 – 900 Ma).

An extensive airborne magnetic, gravity, and ice penetrating radar survey was conducted during the Austral summer of 2002/2003. The southern region of the magnetic data is also dominated by alternating high-low northeast trending magnetic anomalies. These anomalies have been truncated by a northwest trending feature suggesting separation of major blocks by crustal scale faults / shear zones. The extension of the Lambert Graben to the south of the Prince Charles Mountains as delineated by the free-air gravity dataset bears little resemblance to the magnetics. Since the free-air gravity is dominated by the subglacial topography, we suggest that the formation of the Lambert Graben is not responsible for the anomalies observed in the magnetic dataset. Therefore, we argue that the northeast trending anomalies were attributed to an event(s) prior to the onset of continental rifting.

Interestingly, the northeast trending magnetic anomalies in the southern region of the main survey grid have the same magnetic character as the anomalies near Beaver Lake. Conclusive interpretations of this data in the south is problematic since it is almost completely covered by the Antarctic ice sheet. However, potential field forward modelling demonstrates that the anomalies near Beaver Lake can be modelled as the same structure as the anomalies in the extreme south of the newly acquired survey grid. This suggests that these northeast trending anomalies are the response of a structure which formed during the earlier 900 Ma event.