



Aeromagnetic connection between the Exiles Thrust and the Lanterman Fault, Oates Land, East Antarctica

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In Northern Victoria Land (NVL) three fault bounded terranes of Cambrian – Ordovician age are generally recognized: the Wilson Terrane, the Bowers Terrane and the Robertson Bay Terrane. These terranes are part of the Paleo- Pacific active margin of Gondwana that gave rise to the Ross Orogen. The main suture zone lies between the Wilson and the Bowers Terrane and is marked by the Lanterman Fault. Within the Wilson Terrane there are two major intra-terrane thrust faults the Wilson and Exiles thrusts. Geological studies of brittle fault arrays indicate that the inherited terrane bounding and intra-terrane fault architecture was reactivated in the Cenozoic in a dominantly right lateral strike-slip regime. The northern part of the Rennick Graben may have formed during Cenozoic reactivation of the Lanterman and other basement faults.

Here we present new aeromagnetic compilations that reveal for the first time the subglacial extent of a major inferred fault that lies on strike with the Lanterman Fault. The inferred fault, crosscuts the Rennick Graben and appears to link to the Exiles Thrust system, where the prominent Matusevich aeromagnetic anomaly is observed. The broad similarity between the Matusevich anomaly and the anomalies over the northern Bowers Terrane, along the eastern flank of the Rennick Graben, is particularly intriguing as it may imply a hitherto unrecognized link between the Wilson and Bowers terranes. To explain these aeromagnetic signatures we propose a new tectonic model that involves major strike-slip movements along both the terrane bounding and intra-terrane faults.

Three alternative scenarios can be put forward :

- 1) Strike-slip faulting occurred in an early stage of the Ross Orogen as has been identified much further south over the Transantarctic Mountains;
- 2) Strike-slip faulting occurred as part of a late-stage, and dominantly traspressional phase of the Ross-Orogen, which was also responsible for the development of major intra-terrane thrusting
- 3) Strike-slip faulting occurred during the Cenozoic and led to both transpressional and transtensional structures (the latter represented primarily by the Rennick Graben). Superposition of all three scenarios is also a distinct possibility. Regardless of which alternative scenario holds true, it is clear that our new aeromagnetic findings have major implications for the debate on Ross age tectonics and accretion and the proposed Cenozoic reactivation of these inherited structures.