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Subglacial geology and tectonics of the Dome F, Dronning Maud Land, East Antarctica: preliminary results

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The region around Dome Fuji is considered as one of the most suitable areas in East Antarctica to find the oldest continuous ice record on Earth. Besides this importance, a basic understanding of the subglacial geology and its interpretation in terms of the tectonic histories of Rodinia and Gondwana is lacking. To address this, new airborne magnetic data covering ca. 170 000 km^2 with 10 to 15 km line spacing were acquired by the Alfred Wegener Institute during the austral summer 2016/17. The magnetic data analysis, combined with the survey's radar-derived bed topography and gravity data from the ANTGG compilation, allow mapping of geological domains and their assumed bounding structures. Combined with existing studies of the adjacent areas, this approach provides a tectonic interpretation. Magnetic data reveal three magnetic domains delineated by N-S oriented boundaries that are enhanced by the pseudo-gravity and upward continuation data filtering technics. These magnetic domains partly correlate with gravity domains characterized by imaging and filtering of isostatic residual gravity anomalies. In addition, three major sets of magnetic lineaments can be distinguished: (1) NW–SE-oriented lineaments of short to intermediate lengths that correlate with mountain ranges and valleys; (2) E–W-oriented elongated lineaments that correlate with steep slopes and the locations of marked magnetic anomaly offsets, and thus can be interpreted as E–W oriented faults; (3) short and less numerous NE–SW trending lineaments. Moreover, a set of curvilinear magnetic highs correlate well with gravity highs. These may represent circular granitoids in a continuation of the Tonian Oceanic Arc Super Terrane, allowing us to determine its continuation further south than previously known. Finally the potential field analysis may reveals the eastern extent of the recently-proposed subglacial Valkyrie craton.