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Dronning Maud Lands (East Antarctica) significance for Late Mesoproterozoic/Early Neoproterozoic supercontinent reconstructions

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The recent study of a so far white spot on the geological map of Dronning Maud Land (DML) during the international GEA expeditions sheds new light on the significance of major tectono-metamorphic provinces of Dronning Maud Land, East Antarctica. The western part of eastern DML allows the characterization and ground-truthing of a large and mostly ice-covered area, that is geophysically distinct and which was previously interpreted as a potentially older cratonic block south of a Late Neoproterozoic/EarlyPaleozoic mobile belt, which is exposed in the Sør Rondane Mts. (SRM). SHRIMP/SIMS zircon analyses of 20 samples together with new geochemistry indicate that the exposed basement consists of a ca. 1000-900 Ma juvenile terrane that is very similar to the juvenile rocks of the SW-Terrane of the SRM, a characteristic gabbro-trondhjemite-tonalite-granite suite. However, in contrast to the southern part of the SW-Terrane, our study area shows intense crustal reworking at medium to high-grade conditions between ca. 630-520 Ma, associated with significant felsic melt production, including A-type granitoid magmatism. Therefore, the study area, and thereby the aeromagnetically distinct SE DML province does neither represent the foreland of a Late Neoproterozoic/EarlyPaleozoic mobile belt, nor a craton, as has previously been speculated. It more likely represents the westward continuation of Rayner-age crust (1000-900 Ma) that has undergone additional protracted LN/EP overprinting. We interpret the southern part of the only weakly overprinted SW-Terrane as a mega-boudin within a broad, rheologically weaker, NW-SE trending LN/EP mobile belt. Rayner-type crust likely continues further west, where it abuts along the SW-trending Forster Magnetic Anomaly. The latter is interpreted as a suture, which separates typical Grenville-age crust of the Maud Belt to the W from Rayner-age crust to the E. The study area has therefore clearly Indian affinities. Its juvenile character with a lack of metamorphic overprint at the end of crust formation could point to an accretionary history along this part of the Indian segment of Rodinia, immediately following final Rodinia assembly.