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Geodynamic evolution of eastern Dronning Maud Land: research highlights from an international geological-geophysical approach

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East Antarctica formed by amalgamation of a number of cratons along distinct Ediacaran mobile belts, including the ca. 600-500 Ma East African-Antarctic Orogen (EAAO) and the Kuunga Orogen that apparently converge in Dronning Maud Land (DML). In central DML, the major Forster Magnetic Anomaly separates rocks with Grenville-age protolith ages of ca. 1130-1000 Ma to the W, from rocks with Early Neoproterozic protolith ages, c. 1000-930 Ma, to the East. The Forster Magnetic Anomaly is therefore interpreted as a suture. New field-work during two recent international expeditions, Geodynamic Evolution of East Antarctica (GEA) I + II, and first geoscientic results reveal a complex tectonic architecture between Sør Rondane and central DML. East of the Forster anomaly, the magnetic anomaly pattern changes significantly and typical Maud type crust is not present any longer. GEA II targeted a range of nunataks between Sør Rondane and central DML that had never been visited previously (from Blåklettane and Bergekongen in the E to Urna and Sørsteinen in the W). These nunataks are dominated by medium- to high-grade metasedimentary and metavolcanic rocks of possibly Neoproterozoic age, including abundant marble and graphite schists. Sør Rondane in eastern DML, is dominated by two distinct blocks separated by the dextral Main Shear Zone. The northwestern block appears as part of the EAAO or the Kuunga Orogen, where new SHRIMP zircon data from metamorphic rims provide ages of ca. 560 Ma. The southeastern block is made up of a TTG terrane, which provides 12 new zircon crystallistation ages ranging from 1000-930 Ma. The TTG terrane has predominantly oceanic affinities and the wide range of ages might indicate long-lasting accretionary tectonics. The TTG terrane shows in part limited tectonic overprint and could be the southeastern foreland of the EAAO or the Kuunga Orogen. Close to the contact of the two blocks, grey geisses and augen-gneisses gave zircon crystallization ages of ca. 750 Ma, ages which were previously unknown from the EAAO. The Forster anomaly therefore separates distinctly different parts of the EAAO: a) a reworked, mainly Grenville-age crust to the W (the overprinted margin of the Kalahari Craton) and b) a part of the orogen dominated by Neoproterozoic accretionary tectonics to the E. This difference is also reflected in the geochemistry of voluminous late-tectonics granitoids across the belt.