# Delineation and characterisation of major tectonic provinces of Dronning Maud Land (East Antarctica) and significance for Rodinia assembly

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We present a large new geochronological data set from a critical transition zone in central Dronnig Maud Land, East Antarctica, where Grenville-age rocks of the Maud Belt are juxtaposed along the juvenile Tonian Oceanic Arc Super Terrane (TOAST). Previously, central Dronning Maud Land had been interpreted as part of the Kuunga Orogen (580-500 Ma) by some researchers, because of the lack of metamorphic ages of ca. 630-600 Ma, though based on a relatively small study. However, our new study clearly highlights the significance of metamorphic ages also in the range from 670 –600 Ma in this region and shows that a subdivision into Kuunga vs. East African Orogen is not valid. Our new data rather support a long-lasting, protracted Late Neoproterozoic/Early Palaeozoic tectono-metamorphic history along the margin of Kalahari. We can trace characteristic Kalahari-type rocks until the Wohlthat massive (12˚E), to the E of which typical TOAST-related rock crop out. The boundary zone coincides largely with the Forster Magnetic Anomaly, a major aeromagnetic lineament in the region. The second part of this study includes the age analyses of glacial drift from the southern side of the Dronning Maud Land Mts.. The moraines stranded as a result of the northward flowing ice-sheet and they therefore should characterise the cryptic subice geology inboard of the Dronning Maud Land Mts. Nine moraine bulk samples from 15-25˚E resulted in ca. 1100 new U-Pb zircon spot ages that range between ca. 2000 and 500 Ma. The very few oldest Palaeoproterozoic ages come from the easternmost localities and may indicate a provenance of the Ruker Craton. All samples are dominated by a major TOAST age peak of ca. 990 –900 Ma, clearly indicating that the TOAST reaches far inland, as has also been suggested by geophysical data. In addition, however, a significant Stenian age peak of ca. 1080 Ma also occurs. Although Late Mesoproterozoic ages are common in both the Maud Province of western-central DML as well as in the Rayner Complex to the E, the Stenian moraine sample differ with respect to composition and/or isotope geochemistry. They are juvenile, with depleted mantle extraction ages around 1.3 Ga, are subduction-related, and therefore resemble an early phase of oceanic arcs that was so far unknown in this region. Thus, TOAST related rocks are produced over a protracted period of time from ca. 1080 to at least 900 Ma. There is no sign of major metamorphic overprint immediately after crust formation. Therefore, these island arcs may have formed independent or peripheral to Rodinia and may reveal major accretionary tectonics outboard of Rodinia. Much later, the TOAST underwent major tectono-metamorphic overprint at 670 –500 Ma, as a result of the extroversion of Rodinia and its subsequent incorporation into Gondwana.

Keywords: Tonian Oceanic Arc Super Terrane (TOAST), Supercontinent assembly, Dronning Maud Land, East Antarctica

 