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EARLY PALAEOZOIC DEFORMATION AND POST-TECTONIC COOLING IN THE RAUER GROUP AND SOUTHERN PRINCE CHARLES MOUNTAINS EAST ANTARCTICA CONSTRAINED BY ^{40}AR/^{39}AR THERMOCHRONOLOGY

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^{40}Ar/^{39}Ar dating from metamorphic rocks was undertaken with the aim of characterising the Early Palaeozoic thermal history of the Rauer Group and the southern Prince Charles Mountains with an attempt to put this in a regional context. The Rauer Group, in Prydz Bay, contains high-strain zones that have reworked Archaean-Proterozoic crust during a pervasive high-temperature ductile deformation event that is related to intracratonic mechanisms. The effects of this event extend southwards from Prydz Bay into the southern Prince Charles Mountains. The associated structural evolution involved development of ductile and brittle structures that formed during an approximately north-south directed transpressional deformation event that is confined to high-grade (>800°C) shear zones in the Rauer Group. Mineral ages from the Rauer Group, reveals ^{40}Ar/^{39}Ar cooling ages ranging from 570 to 450 Ma. Thermal histories derived from hornblende and biotite and feldspar suggest onset of rapid cooling began sometime prior to 570 Ma and was roughly synchronous from *c.* 510 Ma to *c.* 500 Ma with cooling rates of 42 to 33°C myr^{-1}. A similar range of ^{40}Ar/^{39}Ar cooling ages was obtained from the Archaean and Palaeo-Mesoproterozoic sequences in the southern Prince Charles Mountains. Whereas, the thin-skinned folding (D_1) of the Neoproterozoic Sodruzhestvo Group records mica cooling ages of *c*. 504 Ma in the upper stratigraphic levels, and *c*. 494-489 Ma in the lower levels. Early Palaeozoic cooling histories and comparable palaeostress regimes therefore occur over a regional extent and have important implications for the tectonothermal and stress-field variability across Gondwana. The elevated thermal conditions would induce lithospheric weakening and promote the Early Palaeozoic intraplate orogeny observed in the basement rocks with the development of a large intracratonic shear system. In Drönning Maud Land this was active between c. 530-510 Ma and provides a possible conjugate for the synchronous dextral system exposed in Prydz Bay. Whereas, the synchronous cooling in the overlying Sodruzhestvo Neoproterozoic basin involved thin-skinned deformation associated with basin inversion along basement shear zones.