Paleoproterozoic supercrustal deformation, Amer Lake, Nunavut

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The Amer basin comprises a sequence of Paleoprotorozoic units centered on Amer Lake, Nunavut (65°26'24"N, 96°46'44"W) approximately 150 km north of Baker Lake. There has been long standing interest in this area because of both its known uranium potential and its implications to the overlying uraniferous Thelon basin. The Amer Group supercrustals are divided into eight formations (from youngest to oldest): (1) Ayagaaq Lake, (2) Resort Lake, (3) Aluminium River, (4) Five Mile Lake, (5) Three Lakes, (6) Oora Lake, (7) Showing Lake, and (8) Itza Lake. These formations record four transitions, from a shallow marine environment to deep marine and back to shallow marine. Lithologies are characterized by orthoquartzite, quartzarenite, pelite, and dolomite with one episode of basalt volcanism in the lower part of the section. The Paleoproterozoic units in the study area structurally overlie mainly Archean granitoid gneisses with variable amounts of amphibolites.

The current disposition of units is as northeast and southwest doubly plunging synclinoria (D_2) that define the regional structure. Despite the apparent simplicity of the latter, most of the internal deformation of units takes place prior to D_2 as locally variable generations of D_1 structures. This study examines the relationship between D_1 and D_2 structures in a critical area of the larger Amer basin structure. The study area consists of a well-defined D_2 antiformal structure containing the Ayagaaq Lake through to the Oora Lake formations. The Aluminium River Formation dolomite exhibits extreme pre-D_2 transposition, components of which are observed in the other units. In particular, mixed sandstone and phyllite units of the lower Resort Lake Formation contain multiple foliations and lineations. The complexity of deformation in this area is addressed by integrating detailed field mapping, high resolution geophysics, and microstructural analysis.

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