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PUNCTUATED MAGMATISM IN THE NORTH CARIBOU GREENSTONE BELT, SUPERIOR PROVINCE

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The North Caribou Greenstone Belt (NCGB), located in the centre of the Superior Province, hosts the Musselwhite BIF-hosted orogenic gold deposit. Like most Archean greenstone belts, the NCGB is characterized by central metavolcanic and metasediment assemblages surrounded by variably deformed granitoids. We are investigating these external granitoids in an attempt to understand the regional magmatic history. The granitoids have an array of compositions, ranging from tonalite to granite (*sensu stricto*), and they all are deformed—some with migmatitic textures—except for late pegmatitic dykes. Al-in-hornblende geobarometry indicates a spread of emplacement depths across the region, ranging from pressures of 3.5 ± 0.5 kbar (~10 km) to the southeast (granodiorite) and 6.5 ± 0.5 kbar (~20 km) to the north (tonalite). To complement the geobarometric data, we performed U-Pb geochronology on titanite and zircon using LA-ICP-MS. The oldest zircons have ca. 3000 Ma inherited cores, but the majority of grains have well-defined concordant ages of ca. 2850 Ma or ca. 2730 Ma. The former age signature is more extensive, in contrast to the younger age, which is localized proximal to the NCGB. In several samples, zircons have 2850 Ma cores and 2730 Ma rims. Titanite ages are similar to those from zircon rims, and pegmatites did not yield datable accessory minerals. The oldest crust in the NCGB, recorded by inherited zircons in this study and detrital and volcanic zircons from the NCGB, formed by ca. 3000 Ma and was subsequently intruded by, or incorporated into, a mid-crustal 2850 Ma tonalitic event. A second episode of magmatism is characterized by more evolved granodioritic to granitic compositions at 2730 Ma, and occurred at shallower, mid- to upper-crustal levels. A late, post-tectonic melting event is recognized as granitic pegmatites, intruding near the brittle-ductile transition, and having a highly evolved composition. These post-orogenic pegmatites are thought to be contemporaneous with the gold mineralization in the Musselwhite deposit. A protracted history of crustal growth and reworking, as recorded by the granitoids surrounding the NCGB, is a central theme in the evolution of the North Caribou Terrane.