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EVIDENCE FOR 2.45 GA TECTONISM RECORDED IN THE NORTH CARIBOU GREENSTONE BELT, NORTHWESTERN ONTARIO

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The North Caribou Greenstone Belt (NCGB) is in the centre of the North Caribou Terrane (NCT), at the core of the western Superior Province. Consisting of variably deformed metavolcanic and metasedimentary rocks, the belt is bounded by granitoids with crystallization ages of c. 3.0 Ga to 2.7 Ga, and magmatism is broadly coeval with pervasive deformation and metamorphism. The North Caribou-Totogan Shear Zone (NCTSZ) marks portions of the contact of the belt with the Island Lake Domain to the north and roughly parallels most large-scale suture zones in the NCT. Our mapping suggests the west-trending transpressive Markop Lake Deformation Zone (MLDZ) may be a projected continuation, and potential termination, of the Totogan shear zone. It is observed to extend westward into an external batholith and does not parallel the suture zone further along strike to the northwest. The strain in this eastern stretch of the NCGB tends to increase with metamorphic grade and mineral alteration in proximity to the northern contact with granitoids and the shear zone. Ar-Ar ages of biotite and amphibole in a tightly folded mineralized BIF in the Musselwhite Mine are 2.45 Ga. These ages correspond to crustal cooling or a 400-500°C thermal pulse, nearly 300 m.y. after the latest stage of magmatism. New U-Th-total Pb monazite data from the MLDZ indicate similarly young (re?)crystallization ages of c. 2.45 Ga. Upper greenschist facies metasediments in the shear zone yield robust young ages whereas those more distal to high strain appear to contain an older age population that is similar to the youngest age of plutonism. The abundant sericite, chlorite, and biotite alteration combined with grain boundary migration and mica pinning microstructures indicate the deformation-induced recrystallization of monazite is likely contemporaneous with hydrothermal infiltration. Major and trace element analysis of garnet from a range of rock types yields a Fe-rich (%Alm = 67.4) composition, and a notable Eu depletion in the crystal rims. Garnet crystals that cluster within pods have an HREE content that varies significantly throughout the crystal by three orders of magnitude, suggesting a hydrothermal origin. The link between hydrothermal activity and deformation sheds some light on the c. 2.45 Ga event, possibly related to craton-wide magmatic underplating.