The metamorphic record of crustal assembly in the Paleoproterozoic Southeastern Churchill Province, Trans-Hudson Orogen, Canada

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Dating the onset of the continental collision and amalgamation of crustal blocks is at the basis of the reconnaissance of orogenic cycles and yields time constraints for the estimate of rates of accretionary processes over the last 4.5 Gyrs. The Paleoproterozoic Southeastern Churchill Province (SECP) represents the easternmost branch of the Trans-Hudson Orogen, squeezed between the Superior and North Atlantic Cratons (NAC). It comprises a collage of Archean to Paleoproterozoic crustal blocks (Core Zone), and two transpressive orogenic belts (New Quebec and Torngat Orogens), for which crustal amalgamation and associated collisional events are largely undated. We apply a multi-chronometer approach coupled with trace elements geochemistry on supracrustal sequences from the granulitic Tasiuyak Complex accretionary prism and the occidental margin of the NAC (upper plate) to estimate the timing of prograde, peak and retrograde metamorphism in the core of the Torngat Orogen. Our results yield to prograde garnet growth at 1885 ± 12 Ma (Lu-Hf), peritectic prograde monazite growth at 1873 ± 5 Ma (U-Pb), retrograde zircon growth during melt crystallization at 1848 ± 12 Ma, and rutile closure during slow exhumation at 1705 ± 5 Ma in the Tasiuyak Complex. Garnet from the NAC are dated at 2567 ± 4.4 Ma (Lu-Hf) and suggest that the granulite facies metamorphism in the NAC margin largely predates the Torngat Orogeny. We integrate the metamorphic record throughout the SECP to decipher its Paleoproterozoic tectonometamorphic evolution and propose a sequential collisional evolution from ~1.9 to 1.8 Ga.