

$^{40}\text{Ar}/^{39}\text{Ar}$ traverse across the Reindeer Zone, Trans-Hudson Orogen, Reindeer Lake, Saskatchewan

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The Trans-Hudson Orogen (THO), which extends from South Dakota through the Canadian Shield across Hudson Bay to Greenland, is a dominant component of the North American craton (Laurentia) that formed during a major period of accretion during the Paleoproterozoic. In northern Saskatchewan and Manitoba, the THO comprises juvenile (1910–1830 Ma) arc-related volcanic and plutonic rocks, derived sedimentary rocks, a continental arc batholith, and syn-collisional sedimentary rock assemblages, collectively termed the Reindeer Zone. These lithotectonic terranes are bound by the reworked margins of the Superior craton to the southeast and the Rae-Hearne craton to the northwest. Much of the deformation and metamorphic overprint observed in the orogen is the result of folding and thrust imbrication during convergence and the subsequent continent-continent collision between the Superior and Rae-Hearne cratons ca. 1830–1790 Ma.

In Saskatchewan, from south to north, the Reindeer Zone comprises the Glennie, Kiseynew, and La Ronge domains, the Wathaman Batholith and the Archean Peter Lake Domain, many of which are separated by ductile shear zones. However,

metamorphic P-T conditions and U-Pb ages on monazite and titanite grains display little variation across the region from orogen core (southeast) to margin (northwest). Recently, an orogen-scale $^{40}\text{Ar}/^{39}\text{Ar}$ thermochronological study conducted across the western segment of the Reindeer Zone also revealed consistent ages across domain boundaries, suggesting that the THO cooled as a single block. The current study has been designed to test this interpretation by acquiring $^{40}\text{Ar}/^{39}\text{Ar}$ data on hornblende and muscovite from single or closely associated samples in a well exposed transect from the core region (Kiseynew Domain) of the orogen internides to the Archean Hearne margin. In some cases, results have been combined with U-Pb data from the same locations to provide well constrained cooling histories across individual lithotectonic domains and domain boundaries in the Reindeer Zone.

Preliminary results from the two southernmost domains indicate cooling to ~500°C at 1780–1740 Ma, and to ~350°C at 1740–1730 Ma. The data acquired thus far supports the hypothesis that this part of the THO most likely cooled as a single block. We believe that thermal equilibration may have been attained during the late stages of crustal thickening or

shortly thereafter, and that erosion may have been the main mechanism by which exhumation occurred.