The Trans-Hudson Orogen (THO) in Canada is the most extensively preserved Proterozoic orogenic belt on earth, but much of its post-1.7 Ga history after it became part of the larger Canadian shield remains unknown. Understanding this cryptic history will shed insight into tectonic and geodynamic effects in continental interiors far from plate boundaries. We place important new constraints on the post-orogenic erosional and burial history of the THO using apatite (U-Th)/He (AHe) thermochronology. Single-grain AHe dates from 6 samples in the THO are widely spaced between 378.98 ± 38.66 Ma and 58.76 Ma. When viewed along a northeast trending 1000 km transect, samples locations exhibit an increase in mean AHe date to the northeast from 378.98 ± 38.66 Ma to 58.76 Ma. When viewed along a northeast trending 1000 km transect, samples from Cambrian through Silurian time in most of the eastern THO. Date-eU patterns suggest that easternmost samples did not experience slow cooling or partial resetting, while decreased date dispersion and younger dates in western samples leave open the possibility of a later reheating event at these locations. Future thermal modeling work will utilize other thermochronologic data and geologic constraints from nearby basins to further constrain the THO's Phanerozoic thermal history and will contribute to deciphering the broader history and causes of Canadian Shield burial and erosion during the Phanerozoic.

What was the erosional and burial history of the THO during the Phanerozoic?

Samples contained AHe dates that are significantly younger than the proterozoic basement

The mean AHe dates of the samples are as old or older than the oldest stratigraphic units in the surrounding basins.

Possible exhumation from as early as the Cambrian to as late as the Mississippian.

The younger dates at lower eU in the southwestern samples suggest either partial resetting or slow cooling due to slow exhumation.

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