Extinct radionuclide signatures from juvenile crustal blocks within the Slave craton

REIMINK, JR[1]; PEARSON, DG[2]; SHIREY[1], SB; CARLSON, RW[1]; A MUNDL-PETERMEIER[3]; RJ WALKER[4]

[1]Department of Terrestrial Magnetism, Carnegie Institution for Science, Washington, DC, USA
[2]Department of Earth and Atmospheric Sciences, University of Alberta, Edmonton, AB, Canada
[3]Department of Lithospheric Research, University of Vienna, Vienna, Austria
[4]Department of Geology, University of Maryland, College Park, MD, USA

Debate continues on the nature and formation mechanism of Earth's ancient crust, including the mantle sources from which preserved crust was ultimately derived. The Central Slave Basement Complex (CSBC) consists of a large terrane of tonalitic to granodioritic gneiss that provides a history of continent formation spanning from 4.02 Ga to 2.9 Ga. The majority of CSBC samples have zircon initial Hf values indicating melting from juvenile source rocks derived from incompatible element depleted mantle [1]. In the western portion of the craton these felsic magmas were overprinted by interaction with older incompatible element rich crust. The distribution of isotopic compositions in space and time from Acasta through the CSBC are reminiscent of isotopic trends seen in later, Neoarchean, magmatism, as well as in modern Cordilleran systems [1]. New μ^{142}Nd and μ^{182}W isotope data from these Archean felsic rocks derived from a Mesoarchean depleted mantle help elucidate the timing of mantle depletion and aid in interpreting modern μ^{182}W variability, respectively. Rocks from the CSBC show little variability in μ^{142}Nd, suggesting protoliths formed in the Archean, not Hadean, yet have exclusively positive μ^{182}W, with most samples ~+12 ppm. The Archean crust in this region appears to have had a μ^{182}W composition elevated from the modern mantle.

[1] Reimink et al, (2019) Geoch. Pers. Lett., **10**, 7-12.