Crustal evolution of the Archean Slave craton, NWT, Canada

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The Slave craton, located in the northwestern portion of the Canadian Shield, contains the oldest known remnant of evolved crust on Earth [1–3] and more extensive suites of granitoid basement gneisses with crystallization ages that nearly span the breadth of the Archean. Portions of these basement gneisses form the Central Slave Basement Complex (CSBC), a belt of exposures recording magmatic events that occurred approximately every 100–150 million years from 3.5–2.7 Ga [4]. When considered with the 4.02 Ga Acasta Gneiss Complex, the good exposure and wide age range of basement gneisses of the Slave craton provide a unique record of the geological processes involved in continent formation.

A suite of 3.5–2.7 gyr old Slave craton granitoids collected from a 200 km-long traverse of the CSBC has intermediate to felsic compositions, textures that range from migmatitic gneisses to preservation of primary magmatic features. Preliminary Sm-Nd isotope systematics, as well as zircon U-Pb and Hf isotope data suggest that the granitoids reflect both the products of reworking of Hadean crust, as indicated by the presence of ^{142}Nd deficits in some of the units, but also new additions from the mantle as indicated both in the chemical composition and initial isotopic composition of other rock units. For those samples that derive from remelting of older crustal materials, the initial Hf isotopic composition of zircons are most consistent with a source component that includes Hadean mafic crust. The multiple U-Pb age peaks documented by accessory minerals show a close correspondence with age spectra from the well-documented mantle lithosphere beneath this region [5] illustrating the coupled evolution of crust and mantle.

[1] Bowring & Williams, (1999) *Cont. Min. Petro.* 134, 3-16. [2] Stern & Bleeker, (1999) *Geosci Can* 25, 28-31. [3] Reimink et al. (2016) *Nature Geoscience* 9, 777–780. [4] Ketchum et al. (2004) *Precambrian Research* 135, 149–176. [5] Heaman and Pearson (2010) *Canadian Journal of Earth Sciences* 47, 369–388.

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