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A legacy of Hadean silicate differentiation inferred from Hf isotopes in Eoarchean rocks of the Nuvvuagittuq supracrustal belt (Québec, Canada)

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New Lu-Hf isotopic data for mafic and felsic rocks from the Nuvvuagittuq supracrustal belt (NSB) in northern Québec (Canada) yield an Eoarchean age of 3864 $\pm$ 70 Ma consistent with both zircon U-Pb and whole-rock ^{147}Sm-^{143}Nd chronology, but in disagreement with ca. 4400 Ma ages inferred from the ^{146}Sm-^{142}Nd chronometer (O'Neil et al., 2008). The Lu-Hf result is interpreted as the mean emplacement age of the different autochthonous units of the NSB. An observed alignment of the data along a Lu-Hf "scatterchron" precludes a Hadean age for the NSB because its isotopic characteristics appear to be controlled by long-term radiogenic ingrowth. Emplacement of the NSB in the Hadean (e.g., 4362 Ma; re-calculated in Kinoshita et al., 2012) should have caused age differences of hundreds of millions of years to manifest as strong deviations from the Lu-Hf scatterchron. Combined Lu-Hf and Sm-Nd data on the same NSB amphibolite samples (Ca-poor cummingtonite- and hornblende-bearing) define a mixing hyperbola at ca. 3800 Ma with end-member compositions representative of the compositional groups identified for these lithologies (O'Neil et al., 2011). Anomalously low ^{142}Nd/^{144}Nd values relative to Bulk Silicate Earth are endemic to "low-TiO_2" amphibolites; this is attributable to an ancient multi-stage history of their mantle source as indicated by rare-earth element patterns. Modeling shows that the ^{142}Nd/^{144}Nd deficits could have developed in response to a re-fertilization episode within a mantle domain depleted by primordial crust extraction at 4510 Ma.