ANALYTICAL METHODS

Microdrill cores (2 mm diameter x 15 – 20 mm length) from chert and magnetite layers from the Neoarchean Temagami BIF were crushed and powdered in an agate mortar. All samples were digested in Parr® bombs in HF-HNO₃ and subsequently treated with HClO₄ to ensure complete digestion, followed by further dry down steps in conc. HNO₃ and 6 N HCl - 0.06 HF. All analytical procedures followed protocols that have been described in detail elsewhere (Bau & Alexander, 2009; Münker et al., 2001; Weyer et al., 2002)

Trace element concentrations of sample aliquots were measured at Jacobs University Bremen using a PerkinElmer® quadrupole ICP-MS. After Parr® bomb digestion at 180 °C, the isotope compositions and the concentrations of Lu, Zr, Hf and Sm, Nd were determined by isotope dilution using a ¹⁸⁰Ta-¹⁸⁰Hf-¹⁷⁶Lu-⁹⁴Zr and a ¹⁴⁹Sm-¹⁵⁰Nd tracer. After ion exchange separation, all isotope compositions were measured with a Finnigan® Neptune MC-ICPMS in the joint Cologne-Bonn laboratory at the University of Bonn. Hafnium isotope data were mass bias corrected to a ¹⁷⁹Hf/¹⁷⁷Hf ratio of 0.7325 using the exponential law, and are given here relative to the ¹⁷⁶Hf/¹⁷⁷Hf ratio of 0.282160 of the Münster AMES standard with an external reproducibility of ±40 ppm (2σ), that is indistinguishable from the JMC-475. Measured ¹⁴³Nd/¹⁴⁴Nd ratios were mass bias corrected to a ¹⁴⁶Nd/¹⁴⁴Nd ratio of 0.7219 using the exponential law. During the course of the study the LaJolla Nd standard was measured with a ¹⁴³Nd/¹⁴⁴Nd value of 0.511816 ±19 (2σ, n=5). All data are given relative to a ¹⁴³Nd/¹⁴⁴Nd value of 0.511859 for the LaJolla Nd standard. Lutetium measurements were performed employing mass bias correction to ¹⁷³Yb/¹⁷¹Yb, Zr measurements were performed by normalisation relative to doped Sr. The typical external reproducibility was ±0.2% (2σ) for ¹⁷⁶Lu/¹⁷⁵Hf, ±0.2% (2σ) for ¹⁴⁷Sm/¹⁴⁴Nd, and ±0.6 % (2σ) for Zr/Hf. For calculating the initial εHf and εNd value of each particular isochron, a ¹⁷⁶Lu decay constant of 1.867*10⁻¹¹ (Scherer et al., 2001; Söderlund et al., 2004) and a ¹⁴⁷Sm decay constant of 6.54*10⁻¹¹ were used (Lugmaier and Marti, 1978). CHUR parameters for the calculation of initial epsilon Hf and Nd ratios were taken from Bouvier et al. 2008). Blanks for Sm-Nd were <50 pg, blanks for Lu-Hf were 7 pg and 74 pg, respectively. Two aliquots of iron formation reference standard IF-G (Eoarchean Isua BIF, Greenland) were analysed for reference.
Table DR1. Trace element data for the Temagami cherts, magnetites, shales and the BIF reference standard were obtained by quadrupole ICP-MS analyses at the JUB. *marked Zr and Hf concentrations were determined by isotope dilution and high-precision Neptune MC-ICPMS at the Steinmann Institut, University of Bonn.

Table DR2. Zr/Hf, Y/Ho ratios, Hf and Nd isotope compositions and Lu, Hf, Sm and Nd concentration data for ~2.70 Ga Temagami BIFs and the Isua-BIF standard IF-G.
REFERENCES CITED

Bau, M. and Alexander, B.W., 2009, Distribution of high field strength elements (Y, Zr, REE, Hf, Ta, Th, U) in adjacent magnetite and chert bands and in reference standards FeR-3 and FeR-4 from the Temagami iron-formation, Canada, and the redox level of the Neoarchean ocean: Precambrian Research, v. 174, p. 337-346.


