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-HNO_3 and subsequently treated with $HClO_4$ to ensure complete digestion, followed by further dry down steps in conc. HNO_3 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 ^{180}Ta-^{180}Hf-^{176}Lu-^{94}Zr and a ^{149}Sm-^{150}Nd 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 ^{179}Hf/^{177}Hf ratio of 0.7325 using the exponential law, and are given here relative to the ^{176}Hf/^{177}Hf 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 ^{143}Nd/^{144}Nd ratios were mass bias corrected to a ^{146}Nd/^{142}Nd ratio of 0.7219 using the exponential law. During the course of the study the LaJolla Nd standard was measured with a ^{143}Nd/^{144}Nd value of 0.511816 ±19 (2σ, n=5). All data are given relative to a ^{143}Nd/^{144}Nd value of 0.511859 for the LaJolla Nd standard. Lutetium measurements were performed employing mass bias correction to ^{173}Yb/^{171}Yb, Zr measurements were performed by normalisation relative to doped Sr. The typical external reproducibility was ±0.2% (2σ) for ^{176}Lu/^{175}Hf, ±0.2% (2σ) for ^{147}Sm/^{144}Nd, and ±0.6 % (2σ) for Zr/Hf. For calculating the initial εHf and εNd value of each particular isochron, a ^{176}Lu decay constant of $1.867*10^{-11}$ (Scherer et al., 2001; Söderlund et al., 2004) and a ^{147}Sm decay constant of $6.54*10^{-11}$ were used (Lugmaier and Marti, 1978). Error bars of samples in the isochron calculation include uncertainties of the minimum and maximum blank concentrations. 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.

TABLE DR1. TRACE ELEMENT CONCENTRATIONS (PPM) OF THE TEMAGAMI IF AND THE IF-G

	FUM23 mgt.	FUM24 mgt.	FUM25 mgt.	FUM27 mgt.	FUM28 mgt.	FUM26 chert	FUM29 chert	FUM30 chert	FUM31 chert	FUM St1 IF-G	FUM St2 IF-G	SMS-8 shale	SMS-4 shale	SMS-7 shale
Y	11.8	4.96	17.9	17.0	13.3	1.82	1.18	1.11	4.06	8.58	8.58	21.0	19.6	13.3
Zr*	12.0	5.74	21.854	15.6	7.10	1.34	3.22	3.53	2.77	0.853	0.854	162	210	200
La	9.58	4.75	14.0	12.7	8.02	0.570	0.485	0.533	1.47	2.68	2.53	23.9	20.2	16.0
Ce	15.4	7.76	22.7	21.3	13.2	1.14	0.830	0.893	2.55	3.96	3.73	49.2	42.4	33.9
Pr	1.68	0.832	2.50	2.36	1.48	0.147	0.0941	0.100	0.306	0.438	0.409	5.61	4.79	3.86
Nd	6.45	3.13	9.58	9.23	5.74	0.617	0.378	0.394	1.30	1.87	1.78	22.0	18.1	14.9
Sm	1.10	0.510	1.69	1.73	1.13	0.156	0.0751	0.0856	0.287	0.440	0.418	4.37	3.58	2.83
Eu	0.789	0.369	1.16	1.25	0.869	0.129	0.0610	0.0629	0.261	0.376	0.378	1.14	1.07	0.932
Gd	1.24	0.564	1.87	2.14	1.41	0.207	0.0993	0.104	0.402	0.695	0.693	4.17	3.42	2.42
Tb	0.175	0.079	0.264	0.318	0.208	0.0325	0.0157	0.0179	0.0621	0.109	0.112	0.629	0.558	0.376
Dy	1.10	0.513	1.72	2.03	1.39	0.227	0.112	0.118	0.417	0.833	0.831	3.93	3.64	2.38
Ho	0.261	0.123	0.402	0.470	0.332	0.0521	0.0285	0.0284	0.100	0.208	0.206	0.815	0.740	0.508
Er	0.814	0.394	1.26	1.43	1.06	0.165	0.100	0.0998	0.322	0.641	0.657	2.45	2.31	1.62
Tm	0.114	0.0539	0.170	0.195	0.141	0.0258	0.0144	0.0140	0.0452	0.0923	0.0909	0.345	0.337	0.246
Yb	0.688	0.347	1.07	1.2	0.886	0.159	0.108	0.0955	0.284	0.578	0.578	2.35	2.33	1.70
Lu	0.118	0.0605	0.177	0.198	0.144	0.0293	0.0231	0.0203	0.0480	0.0955	0.0933	0.355	0.360	0.271
Hf*	0.306	0.151	0.513	0.365	0.151	0.0709	0.165	0.170	0.0974	0.0219	0.0217	4.54	5.78	5.37

Note: *marked elements were analysed by isotope dilution and MC-ICPMS.

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.

TABLE DR2. TRACE ELEMENT RATIOS AND Sm-Nd, Lu-Hf DATA FROM THE ~2.7 Ga TEMAGAMI IF AND THE ~3.75 Ga IF-G

Sample		Zr/Hf	Y/Ho*	Lu [ppm]	Hf [ppm]	Sm [ppm]	Nd [ppm]	$^{176}Lu/^{177}Hf$†	$^{176}Hf/^{177}Hf$†	εHf(t)§	$^{147}Sm/^{144}Nd$†	$^{143}Nd/^{144}Nd$†	εNd(t)§
Neoarchean Temagami BIFs													
FUM23	mgt.	39.2	45.2	0.109	0.306	1.01	5.97	0.05045 ± 2.0	0.283927 ± 116	9.6 ± 0.4	0.1025	0.511016 ± 6	1.0 ± 0.1
FUM24	mgt.	38.1	40.3	0.0546	0.151	0.459	2.81	0.05140 ± 2.0	0.283942 ± 238	8.4 ± 0.4	0.09866	0.510949 ± 8	1.0 ± 0.2
FUM25	mgt.	42.6	44.5	0.137	0.513	1.48	8.63	0.03785 ± 1.0	0.283684 ± 66	24.1 ± 0.5	0.1035	0.511037 ±9	1.1 ± 0.2
FUM27	mgt.	42.9	36.2	0.186	0.365	1.51	0.584	0.07228 ± 2.0	0.284973 ± 106	6.7 ± 0.5	0.1131	0.511201 ± 13	0.9 ±0.3
FUM28	mgt.	47.1	40.1	0.141	0.151	1.00	8.06	0.13308 ± 4.0	0.288392 ± 299	16.5 ±0.8	0.1163	0.511278 ± 8	1.3 ± 0.2
FUM26	chert	18.9	34.9	0.0263	0.071	0.139	5.22	0.05277 ± 2.0	0.284046 ± 1143	9.6 ± 0.7	0.1438	0.511737 ± 12	0.7 ± 0.3
FUM29	chert	19.5	41.4	0.0217	0.165	0.0691	0.360	0.01866 ± 1.0	0.282203 ±191	6.8 ± 0.3	0.1160	0.511258 ± 10	1.1 ± 0.2
FUM30	chert	20.8	39.1	0.0188	0.170	0.0736	0.391	0.01571 ± 1.0	0.282052 ± 222	6.8 ± 0.4	0.1138	0.511317 ± 10	3.0 ± 0.2
FUM31	chert	28.5	40.6	0.0456	0.097	0.255	1.21	0.06646 ± 2.0	0.284684 ± 381	7.1 ± 0.5	0.1274	0.511419 ± 9	0.2 ± 0.2
SMS-8	shale	37.5	25.8	0.370	4.54	4.01	19.7	0.01157 ± 0.4	0.281778 ± 13	4.6 ± 0.3	0.1230	0.511454 ± 9	2.4 ± 0.2
	replicate			0.367	4.53	4.19	21.0	0.01150 ± 0.2	0.281776 ± 13	4.7 ± 0.8	0.1209	0.511424 ± 7	2.6 ± 0.4
	replicate			0.367	4.52	4.20	21.0	0.01149 ± 0.2	0.281784 ±14	5.0 ± 0.8	0.1208	0.511429 ± 8	2.7 ± 0.4
Eoarchean Isua BIF standard													
FUM St1	IF-G	39.0	41.3	0.0564	0.022	0.359	1.55	0.36894 ± 11	0.329135 ± 943	785.8 ± 3.1	0.1395	0.511294 ± 11	1.3 ± 0.3
FUM St2	IF-G	39.4	41.6	0.0878	0.022	0.363	1.54	0.57932 ± 21	0.330281 ± 513	282.5 ± 5.7	0.1430	0.511360 ± 13	0.9 ± 0.3

Note: Element concentrations and isotopic compositions were determined by isotope dilution technique and MC-ICPMS.

* Y-Ho concentrations of sample splits were measured by a Perkin Elmer quadrupol ICP-MS.

† Errors of isotopic ratios were calculated by the error propagation method.

§ Errors of initial isotopic values are internal errors (2σ).

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.

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