Table S1 Information on sampling stations and radiolarian silicon isotopes ($\delta^{30}Si_{rad}$) in plankton samples and surface sediments

Station	Longitude	Latitude	Water depth (m)	Sampling depth (m)	Sampling time	$\delta^{30}Si_{rad}$ (‰ ±2SD[a])		
						0-100 m	100-300 m	surface sediments
7	114.49 E	19.75 N	944	0-100, 100-300	2016-09-13, 13:30-14:55	1.81 ±0.20	No data	1.85 ±0.21
8	114.09 E	19.46 N	706	0-100, 100-300	2016-09-14, 10:50-12:10	1.75 ±0.20	No data	1.61 ±0.10
10	112.03 E	18.06 N	2444	0-100, 100-300	2021.8.13, 21:00-22:30	No data	1.56 ±0.20	1.61 ±0.10
11	113.46 E	18.17 N	2384	0-100, 100-300	2021.8.14, 20:21-21:45	No data	1.83 ±0.20	1.82 ±0.20
12	114.15 E	18.06 N	3497	0-100, 100-300	2021.8.15, 0:20-2:10	No data	1.77 ±0.20	1.79 ±0.21
13	114.42 E	17.59 N	3561	0-100, 100-300	2021.8.10, 12:30-14:10	1.80 ±0.20	No data	1.83 ±0.20
28	114.10 E	10.05 N	1734	0-100, 100-300	2020.11.03, 10:10-11:50	1.68 ±0.20	No data	1.63 ±0.20

[a] SD is the standard deviation estimated from the repeated standard bracketing measurements of a single sample solution.

Table S2 Wilcoxon signed-rank tests for relative abundances of prominent radiolarian species between depths of 0-100 m and 100-300 m,

and between the 0-100 m water column and surface sediments (SS) at each station.

	Station 7 (100-300 m) - Station 7 (0-100 m)	Station 7 SS- Station 7 (0-100 m)	Station 8 (100-300 m) - Station 8 (0-100 m)	Station 8 SS - Station 8 (0-100 m)	Station 10 (100-300 m) - Station 10 (0-100 m)	Station 10 SS - Station 10 (0-100 m)	Station 11 (100-300m) - Station 11 (0-100 m)	Station 11 SS - Station 11 (0-100 m)	Station 12 (100-300 m) - Station 12 (0-100 m)	Station 12 SS - Station 12 (0-100 m)	Station 13 (100-300 m) - Station 13 (0-100 m)	Station 13 SS - Station 13 (0-100 m)	Station 28 (100-300 m) - Station 28 (0-100 m)	Station 28 SS - Station 28 (0-100 m)
Z	-.175[a]	-.500[a]	-.172[b]	-.081[a]	-.256[b]	-.200[a]	-.356[b]	-.584[a]	-1.005[a]	-1.315[a]	-.808[a]	-.915[a]	-.027[b]	-.243[a]
Asymp. Sig. (2-tailed)	0.861	0.617	0.864	0.935	0.798	0.841	0.722	0.559	0.315	0.188	0.419	0.360	0.979	0.808

SS = surface sediments, [a] Based on negative ranks, [b] Based on positive ranks
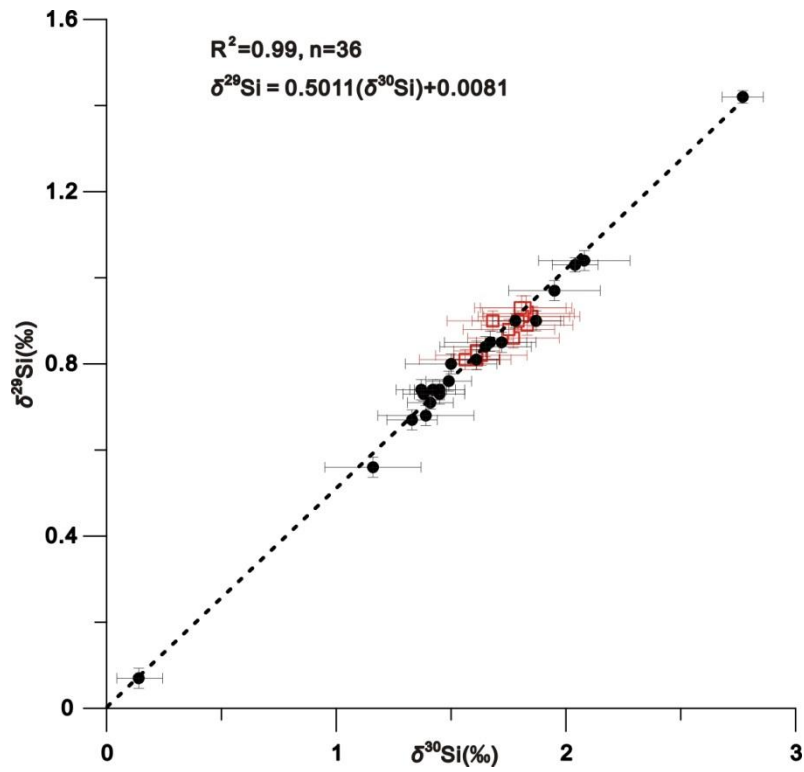
Figure S1 Scatter plot of δ^{29}Si and δ^{30}Si values of radiolarian tests. The black dashed line indicates the expected mass-dependent fractionation line of δ^{29}Si $= 0.51 \times \delta^{30}$Si (Reynolds et al., 2007). Horizontal and vertical bars represent the analytical uncertainty (2σ). Red squares represent the radiolarian silicon isotope data (n = 14) from this study, while black dots represent unpublished radiolarian silicon isotope data (n = 22) from the same analytical batch.