

1 **Supplemental Table S1**

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3 All data presented in this manuscript are provided in Table S1. Site names and

4 locations (refer to Fig. 1) are given along with photic zone depth (m) and Light

5 Attenuation Coefficients (LAC) (Kd m^{-1}). Water profile sampling depths (0-180 m) at

6 each site and the respective parameter sampled are also provided. These include

7 $\delta^{30}\text{Si}_{\text{DSi}}$ (‰) with respective 2σ analytical error (‰), DSi concentrations (ppm and

8 μM), fucoxanthin, zeaxanthin and Chl-*a* concentrations ($\mu\text{mol L}^{-1}$).

BAIK13-1 (51°45'31.2" N 104°25'27.2" E) [Photic zone depth: 23.5 m; LAC: 16 m ⁻¹]							
Depth (m)	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L ⁻¹	Zeaxanthin concentration nmol L ⁻¹	Chl-a concentration nmol L ⁻¹
1	2.97	0.17	0.62	21.95	0.27	0.83	1.46
3					0.25	1.14	2.59
5					0.16	0.79	3.41
10					0.18	0.64	4.01
20	2.39	0.15	0.64	22.80	0.36	0.42	3.47
30					0.28	0.10	1.87
50	2.17	0.15	0.67	23.91	0.04	0.01	0.87
100	2.28	0.10	0.67	23.94	0.02	0.00	
180	2.22	0.13	0.70	24.85	0.00	0.00	
BAIK13-4 (51°42'01.1" N 104°19'01.8" E) [Photic zone depth: 24.6 m; LAC: 15 m ⁻¹]							
Depth (m)	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L ⁻¹	Zeaxanthin concentration nmol L ⁻¹	Chl-a concentration nmol L ⁻¹
1	2.49	0.20	0.66	23.44	0.47	0.22	3.18
3					0.39	0.65	4.05
5					0.38	1.00	3.10
10					0.32	1.71	5.38
20	2.44	0.19	0.67	23.77	0.30	0.97	3.92
30					0.21	0.09	2.28
50	2.41	0.21	0.69	24.61	0.06	0.02	1.25
100	2.22	0.19	0.69	24.59	0.01	0.00	
180	2.18	0.34	0.72	25.72	0.01	0.01	
BAIK13-5 (51°39'01.9" N 104°24'58.2" E) [Photic zone depth: not measured; LAC: 14 m ⁻¹]							
Depth (m)	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μmol)	Fucoxanthin concentration nmol L ⁻¹	Zeaxanthin concentration nmol L ⁻¹	Chl-a concentration nmol L ⁻¹
1	2.39	0.14	0.66	23.35	0.42	0.38	4.26
3					0.26	0.97	3.38
5					0.35	1.09	3.11
10					0.19	1.34	4.01
20	2.49	0.20	0.66	23.39	0.24	0.69	3.63
30					0.18	0.28	3
50	2.28	0.12	0.66	23.40	0.03	0.02	1.16
100	2.40	0.13	0.67	23.90	0.01	0.01	
180	2.77	0.13	0.69	24.66	0.00	0.00	
BAIK13-7 (51°34'06" N 104°31'43" E) [Photic zone depth: 16.9 m; LAC: 28 m ⁻¹]							
Depth (m)	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L ⁻¹	Zeaxanthin concentration nmol L ⁻¹	Chl-a concentration nmol L ⁻¹
1	2.47	0.15	0.69	24.55	0.30	0.36	8.47
3					0.46	0.96	8.62
5					0.37	1.06	8.23
10					0.25	1.77	9.72
20	2.35	0.19	0.64	22.95	0.04	1.02	2.86
30					0.04	0.10	0.62
50	2.57	0.20	0.64	22.67			0.74
100	2.28	0.19	0.66	23.34	0.00	0.00	
180	2.25	0.14	0.71	25.24	0.01	0.00	
BAIK13-8 (51°44'37" N 105°18'52" E) [Photic zone depth: 19.5 m; LAC: 23 m ⁻¹]							
Depth (m)	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L ⁻¹	Zeaxanthin concentration nmol L ⁻¹	Chl-a concentration nmol L ⁻¹
1	2.42	0.25	0.65	23.08	0.26	1.38	1.09
3					0.37	1.60	1.32
5					0.37	1.61	2.17
10					0.37	1.74	5.69
20	2.19	0.21	0.68	24.13	0.07	0.24	1.73
30					0.03	0.04	0.85
50	2.32	0.12	0.68	24.22			0.41
100	2.38	0.14	0.72	25.81	0.00	0.02	
180	2.01	0.13	0.74	26.21	0.01	0.00	
BAIK13-9 (51°52'49" N 105°52'40" E) [Photic zone depth: 27.8 m; LAC: 14 m ⁻¹]							
Depth (m)	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L ⁻¹	Zeaxanthin concentration nmol L ⁻¹	Chl-a concentration nmol L ⁻¹
1	2.18	0.22	0.69	24.46	0.48	1.21	0.88
3					0.53	1.31	1.37

5					0.47	1.03	2.08
10					0.55	1.17	4.28
20	2.30	0.21	0.70	25.06	0.08	0.31	4.31
30					0.16	0.13	2.08
50	2.41	0.21	0.68	24.33			0.48
100	2.48	0.21	0.67	23.86	0.00	0.00	
180	2.29	0.24	0.68	24.24	0.01	0.01	
BAIK13-10 (52°11'07" N 106°05'38" E) [Photic zone depth: 23.7 m; LAC: 17 m ⁻¹]							
Depth (m)	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L ⁻¹	Zeaxanthin concentration nmol L ⁻¹	Chl-a concentration nmol L ⁻¹
1	2.30	0.16	0.68	24.26	0.36	0.56	0.84
3					0.39	0.54	1.09
5					0.47	0.61	1.51
10					0.53	0.66	3.91
20	2.48	0.20	0.67	23.94	0.69	0.72	6.41
30					0.08	0.14	5.86
50	2.79	0.22	0.55	19.44			
100							
180							
BAIK13-11 (52°12'49" N 106°06'36" E) [Photic zone depth: 36.3 m; LAC: 12 m ⁻¹]							
Depth (m)	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L ⁻¹	Zeaxanthin concentration nmol L ⁻¹	Chl-a concentration nmol L ⁻¹
1	3.18	0.20	0.35	12.36	0.30	0.72	0.91
3					0.30	0.77	1.02
5					0.30	1.25	1.21
10					0.42	1.68	3.46
20	2.68	0.20	0.56	19.94	0.46	0.28	1.19
30					0.13	0.03	0.63
50	2.64	0.21	0.59	20.96			0.53
100	2.61	0.18	0.63	22.26	0.05	0.00	
180	2.54	0.22	0.67	23.69	0.06	0.03	
BAIK13-12 (52°47'53.3" N 107°09'28.8" E) [Photic zone depth: 43.2 m; LAC: 9 m ⁻¹]							
Depth (m)	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L ⁻¹	Zeaxanthin concentration nmol L ⁻¹	Chl-a concentration nmol L ⁻¹
1	2.84	0.27	0.13	4.65	0.14	0.26	0.47
3					0.17	0.34	0.53
5					0.20	0.99	0.99
10					0.21	1.23	1.92
20	4.69	0.31	0.06	2.21	0.24	0.76	1.76
30					0.28	0.09	2.08
50	3.75	0.20	0.36	12.74			7.36
100	3.11	0.17	0.52	18.40	0.58	0.23	
180	2.86	0.18	0.61	21.81	0.23	0.00	
BAIK13-13 (53°09'21" N 107°01'07" E) [Photic zone depth: 35.0 m; LAC: 13 m ⁻¹]							
Depth (m)	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L ⁻¹	Zeaxanthin concentration nmol L ⁻¹	Chl-a concentration nmol L ⁻¹
1	2.40	0.15	0.70	24.91	0.03	0.02	0.41
3					0.07	0.02	0.35
5							0.5
10					0.28	0.11	0.66
20	2.55	0.13	0.70	25.10	0.44	0.51	5.67
30					0.14	0.29	1.31
50	2.38	0.22	0.75	26.69			0.15
100							
180							
BAIK13-14 (53°21'06.0" N 107°30'17.1" E) [Photic zone depth: 43.0 m; LAC: 9 m ⁻¹]							
Depth (m)	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L ⁻¹	Zeaxanthin concentration nmol L ⁻¹	Chl-a concentration nmol L ⁻¹
1	2.33	0.17	0.66	23.39	0.10	0.08	0.46
3					0.13	0.09	0.59
5					0.12	0.09	1.11
10					0.24	0.21	2.44
20					0.63	0.30	10.72
30	2.98	0.12	0.52	18.42	1.99	0.11	9.68
50	2.71	0.17	0.67	23.96			4.05
100	2.22	0.15	0.77	27.25	0.07	0.00	
180							
BAIK13-16 (53°52'31" N 109°09'53" E) [Photic zone depth: 30.5 m; LAC: 14 m ⁻¹]							

Depth (m)	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L^{-1}	Zeaxanthin concentration nmol L^{-1}	Chl-a concentration nmol L^{-1}
1	2.53	0.17	0.49	17.39	0.37	0.37	1.25
3					0.30	0.34	2.04
5					0.33	0.37	1.86
10					0.32	0.42	2.65
20	2.69	0.21	0.47	16.79	0.08	0.20	1.99
30					0.07	0.16	2.06
50	2.98	0.20	0.49	17.35			0.81
100	2.50	0.13	0.77	27.34	0.01	0.01	
180	2.28	0.20	0.75	26.57	0.01	0.01	
Depth (m)	BAIK13-17 (54°32'39" N 108°57'01" E) [Photic zone depth: 26.1 m; LAC: 16 m^{-1}]						
	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L^{-1}	Zeaxanthin concentration nmol L^{-1}	Chl-a concentration nmol L^{-1}
1	2.21	0.22	0.87	31.05	0.09	0.21	0.3
3					0.08	0.18	0.69
5					0.11	0.42	0.86
10					0.41	0.56	3.02
20	2.12	0.22	0.89	31.69	0.36	0.50	8.19
30					0.14	0.08	4.46
50	2.09	0.20	0.89	31.80			1.46
100	2.18	0.21	0.91	32.38	0.00	0.00	
180	1.98	0.15	0.91	32.39	0.01	0.01	
Depth (m)	BAIK13-18 (54°47'31.4" N 109°14'15.3" E) [Photic zone depth: 19.1 m; LAC: 21 m^{-1}]						
	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L^{-1}	Zeaxanthin concentration nmol L^{-1}	Chl-a concentration nmol/L
1	2.02	0.12	0.87	31.14	0.04	0.80	0.46
3					0.08	0.98	0.93
5					0.11	1.00	0.87
10					0.14	0.80	1.64
20	2.10	0.21	0.87	31.04	0.44	0.60	5.20
30					0.29	0.46	2.53
50	2.06	0.19	0.90	32.01			0.78
100	2.40	0.20	0.89	31.59	0.01	0.01	
180	1.99	0.16	0.90	32.02	0.00	0.00	
Depth (m)	BAIK13-19 (55°38'54.9" N 109°46'54.6" E) [Photic zone depth: 20.6 m; LAC: 22 m^{-1}]						
	$\delta^{30}\text{Si}_{\text{DSi}}$ (‰)	$\delta^{30}\text{Si}_{\text{DSi}}$ error (2 σ)	Dsi (ppm)	DSi (μM)	Fucoxanthin concentration nmol L^{-1}	Zeaxanthin concentration nmol L^{-1}	Chl-a concentration nmol L^{-1}
1	1.74	0.14	0.93	33.10	0.09	0.73	0.39
3					0.13	0.78	1.05
5					0.16	0.95	1.26
10					0.12	0.24	2.01
20	1.87	0.14	0.96	34.27	0.05	0.04	0.99
30					0.02	0.06	0.69
50	1.88	0.16	0.96	34.22			0.36
100	1.87	0.20	0.98	34.93	0.00	0.00	
180	2.69	0.34	0.99	35.20	0.02	0.00	