

Table S1. Hydrochemical data of sea water and Lake 21 waters, Kiritimati atoll.

Sample	Sampling depth [m]	Date	T [°C]	EC 25°C (mS cm ⁻¹)	Salinity (‰)	Eh (mV)	pH		
Seawater (Captain Cook Hotel)	0.1	19.03.2011	28.4	53.0	34.7	n.d.	8.36		
Lake 21 (SE-side 4 m from shore)	0.1	13.03.2011	31.7	189.8	171.8	91	7.95		
Lake 21 (seepage-affected lake bottom)	1.0	15.03.2011	28.7	124.8	94.4	n.d.	8.03		
Lake 21 (surface, 2002)	0.1	04.09.2002	32.5	140.1	112.9	263	8.37		
Sample	O ₂	Ca ²⁺	Mg ²⁺	Na ⁺	K ⁺ (mmol L ⁻¹)	Sr ²⁺	Cl ⁻	SO ₄ ²⁻	TA meq L ⁻¹
Seawater (Captain Cook Hotel)	0.198	10.4	54	474	10.3	0.093	552	28.6	2.31
Lake 21 (SE-side 4 m from shore)	0.079	29.3	299	2633	57.1	0.426	3054	143.3	4.84
Lake 21 (seepage-affected lake bottom)	n.d.	19.1	155	1363	29.7	0.232	1588	74.7	3.44
Lake 21 (surface, 2002)	n.d.	38.0	197	1643	34.7	0.312	1841	113.6	4.24
Sample	Si	Fe	NH ⁴⁺ (μmol L ⁻¹)	PO ₄ ³⁻	PCO ₂ (μatm)	SI _{Calcite} ^a	SI _{Aragonite} (log IAP/KT)	SI _{Gypsum} ^a	
Seawater (Captain Cook Hotel)	3.6	1.10	n.d.	0.44	269	0.86	0.72	-0.66	
Lake 21 (SE-side 4 m from shore)	54.6	1.35	0.086	0.02	871	1.26	1.12	0.13	
Lake 21 (seepage-affected lake bottom)	n.d.	0.23	n.d.	n.d.	676	0.92	0.78	-0.26	
Lake 21 (surface, 2002)	31.1	1.97	2.25	0.46	224	1.44	1.30	0.13	

^aSaturation index $SI_{\text{Calcite}} = \log \Omega_{\text{Calcite}} = \log [\text{ion activity product (Ca}^{2+}) \times (\text{CO}_3^{2-}) / \text{solubility product } K_{\text{calcite}}]$

n.d., not determined