

Supplementary Material Table 1. Temperature, calculated salinity, total alkalinity ( $A_T$ ), total dissolved inorganic carbon ( $C_T$ ), and water volume: calculated fugacity of  $\text{CO}_2$  ( $f(\text{CO}_2)$ ) and aragonite saturation state ( $\Omega_a$ ) at experiment temperature, salinity,  $A_T$  and  $C_T$ ; and net dissolution rate between each experimental time interval.

Sampling time(hh:mm)	Temperature (°C)	Salinity (Calculated)	$A_T$ ( $\mu\text{ mol kg}^{-1}$ )	$nA_T$ ( $\mu\text{ mol kg}^{-1}$ )	$C_T$ ( $\mu\text{ mol kg}^{-1}$ )	$f(\text{CO}_2)$ ( $\mu\text{ atm}$ )	$\Omega_a$	Water Volume (kg)	Average Dissolution Rate (% day $^{-1}$ )
<b>Bulk sediment Run#1</b> $\rho\text{CO}_2=2030\text{ppm}$ Sample weight:12.68g									
0:00	26.6	34.55	2460	2459	2387	1703	1.36	3757	
1:00	26.1	34.56	2463	2461	2391	1694	1.34	3600	
1:15	26.0	34.57	2467	2465	2409	1856	1.24	3444	0.006
2:15	25.9	34.58	2471	2468	2389	1573	1.43	3288	
2:30	25.9	34.58	2469	2465	2406	1792	1.28	3236	0.004
3:30	26.0	34.60	2477	2472	2414	1806	1.28	3080	
3:45	26.0	34.60	2474	2469	2417	1878	1.24	3028	0.004
5:00	26.0	34.62	2480	2474	2391	1518	1.49	2871	
5:15	26.0	34.62	2482	2475	2398	1579	1.44	2819	0.003
6:30	26.3	34.64	2488	2480	2389	1447	1.58	2663	
6:45	26.3	34.64	2489	2480	2406	1612	1.44	2611	0.004
<b>Bulk sediment Run#2</b> $\rho\text{CO}_2=1290\text{ppm}$ Sample weight:15.72g									
0:00	28.8	34.44	2386	2392	2268	1318	1.73	4395	
1:05	27.7	34.45	2389	2395	2251	1093	1.94	4239	
1:20	27.4	34.45	2388	2394	2250	1080	1.93	4082	
1:35	27.1	34.46	2390	2395	2246	1034	1.98	3926	0.004
2:50	26.6	34.48	2395	2398	2243	973	2.04	3770	
3:05	26.5	34.49	2395	2398	2245	980	2.03	3614	0.003
4:20	26.5	34.51	2400	2401	2247	964	2.06	3457	
4:35	26.5	34.52	2399	2400	2246	963	2.06	3301	
4:50	26.4	34.52	2400	2401	2249	973	2.04	3145	
5:05	26.4	34.53	2399	2399	2260	1046	1.92	2989	0.002
5:50	26.5	34.54	2400	2399	2260	1044	1.94	2832	
6:05	26.5	34.55	2401	2400	2259	1026	1.96	2676	-0.001
<b>Bulk sediment Run#3</b> $\rho\text{CO}_2=1110\text{ppm}$ Sample weight:11.33g									
0:00	27.8	34.45	2400	2405	2226	935	2.20	3294	
1:30	26.8	34.49	2407	2410	2250	998	2.02	2981	
1:45	26.7	34.50	2405	2407	2249	1004	2.00	2825	0.001
3:00	26.6	34.53	2405	2405	2221	845	2.28	2669	-0.001
5:00	26.5	34.58	2416	2413	2216	777	2.44	2357	0.002
6:15	26.4	34.61	2421	2415	2216	758	2.48	2200	0.002
<b>Bulk sediment Run#4</b> $\rho\text{CO}_2=820\text{ppm}$ Sample weight:14.11g									
0:00	27.8	34.55	2374	2372	2146	667	2.77	4098	
2:30	26.8	34.55	2377	2375	2154	661	2.70	3786	
2:45	26.8	34.55	2381	2379	2158	661	2.70	3630	0.001
3:45	26.7	34.56	2379	2377	2165	688	2.62	3473	
4:00	26.7	34.56	2377	2375	2162	688	2.61	3317	0.003
7:05	26.5	34.56	2389	2386	2183	725	2.52	3161	
7:20	26.4	34.56	2387	2385	2185	732	2.49	3005	
7:35	26.2	34.56	2388	2385	2185	724	2.49	2900	0.003
9:00	26.0	34.57	2392	2389	2186	710	2.52	2744	
9:15	26.0	34.57	2393	2390	2184	699	2.55	2588	
9:30	25.8	34.57	2395	2393	2192	714	2.49	2432	
9:45	25.5	34.57	2398	2395	2186	679	2.57	2275	0.003

Supplementary Material Table 1. (continued)

Sampling time(hh:mm)	Temperature (°C)	Salinity (Calculated)	$A_T$ ( $\mu\text{ mol kg}^{-1}$ )	$nA_T$ ( $\mu\text{ mol kg}^{-1}$ )	$C_T$ ( $\mu\text{ mol kg}^{-1}$ )	$f(\text{CO}_2)$ ( $\mu\text{ atm}$ )	$\Omega_a$	Water Volume (kg)	Average Dissolution Rate (% day <sup>-1</sup> )
<b>Bulk sediment Run#5</b> $\rho\text{CO}_2=750\text{ppm}$ Sample weight:10.65g									
0:00	29.4	34.44	2372	2378	2160	767	2.64	3431	
2:15	27.7	34.51	2378	2379	2136	621	2.90	2764	0.001
4:30	29.5	34.56	2383	2381	2160	734	2.76	2296	0.001
6:00	29.8	34.60	2390	2384	2167	751	2.76	2140	
6:30	30.0	34.61	2392	2386	2168	751	2.78	1983	0.003
7:00	30.2	34.63	2394	2387	2163	733	2.85	1827	
7:15	30.2	34.63	2393	2386	2165	741	2.83	1671	0.001
<b>Bulk sediment Run#6</b> $\rho\text{CO}_2=590\text{ppm}$ Sample weight:13.23g									
0:00	26.8	34.47	2400	2404	2104	466	3.47	3962	
0:45	26.4	34.48	2399	2402	2094	440	3.55	3806	
1:00	26.4	34.48	2400	2404	2088	427	3.62	3754	-0.002
1:45	26.3	34.48	2400	2403	2070	389	3.83	3598	
2:00	26.3	34.48	2399	2403	2063	377	3.90	3545	-0.001
2:45	26.4	34.49	2400	2403	2082	412	3.70	3389	
3:00	26.4	34.49	2400	2403	2083	415	3.68	3337	0.000
3:55	26.4	34.49	2404	2406	2089	422	3.66	3285	
4:00	26.4	34.49	2403	2405	2069	387	3.86	3129	
4:15	26.5	34.49	2405	2408	2076	397	3.81	2973	
4:30	26.5	34.50	2404	2406	2063	376	3.94	2816	
4:45	26.5	34.50	2406	2408	2070	386	3.88	2660	
5:00	26.5	34.50	2406	2408	2072	390	3.85	2577	0.000
6:45	26.4	34.51	2407	2409	2072	385	3.88	2420	
7:00	26.4	34.51	2407	2409	2075	391	3.84	2368	0.001
7:45	26.3	34.51	2408	2409	2076	390	3.84	2212	
8:00	26.3	34.51	2410	2411	2073	383	3.89	2160	0.001
<b>Bulk sediment Run#7</b> $\rho\text{CO}_2=420\text{ppm}$ Sample weight:10.25g									
0:00	26.4	34.50	2394	2395	2095	452	3.48	2998	
1:00	25.7	34.51	2394	2395	2094	436	3.48	2842	
1:15	25.7	34.51	2393	2394	2082	415	3.59	2790	-0.001
3:32	25.7	34.52	2390	2391	2084	423	3.54	2603	
3:50	25.7	34.52	2389	2389	2064	389	3.73	2446	
4:05	25.8	34.52	2390	2390	2072	402	3.66	2290	
4:20	25.8	34.52	2389	2390	2078	416	3.60	2134	
4:35	25.8	34.52	2391	2391	2083	423	3.55	1957	0.000
6:24	25.8	34.53	2392	2392	2081	416	3.59	1790	
6:40	25.8	34.53	2393	2393	2091	434	3.50	1634	
6:55	25.8	34.53	2393	2393	2076	405	3.66	1446	
7:13	25.8	34.53	2393	2393	2092	435	3.49	1290	0.001

Supplementary Material Table 1. (continued)

Sampling time(hh:mm)	Temperature (°C)	Salinity (Calculated)	$A_T$ ( $\mu\text{ mol kg}^{-1}$ )	$nA_T$ ( $\mu\text{ mol kg}^{-1}$ )	$C_T$ ( $\mu\text{ mol kg}^{-1}$ )	$f(\text{CO}_2)$ ( $\mu\text{ atm}$ )	$\Omega_a$	Water Volume (kg)	Average Dissolution Rate (% day <sup>-1</sup> )
<b>Coralline algae Run#1</b> $\rho\text{CO}_2=2000\text{ppm}$ Sample weight:12.55g									
0:00	26.3	34.31	2412	2427	2375	2115	1.07	3721	
1:00	26.0	34.32	2423	2437	2393	2206	1.03	3564	
1:15	26.0	34.32	2423	2437	2394	2227	1.02	3512	0.019
2:00	26.1	34.34	2429	2442	2379	1932	1.17	3356	
2:15	26.1	34.34	2430	2444	2404	2287	1.01	3304	
2:20	26.1	34.34	2428	2442	2407	2361	0.98	3200	0.007
3:45	26.2	34.36	2448	2460	2414	2191	1.07	3044	
4:00	26.2	34.36	2448	2460	2415	2203	1.06	2992	0.013
5:00	26.2	34.37	2457	2468	2424	2207	1.07	2835	
5:15	26.2	34.37	2457	2468	2420	2155	1.09	2783	0.008
6:30	26.2	34.39	2471	2481	2434	2159	1.10	2627	
6:45	26.2	34.39	2472	2481	2434	2159	1.10	2575	0.009
8:00	26.3	34.41	2487	2496	2447	2129	1.13	2419	
8:15	26.3	34.41	2487	2495	2447	2145	1.12	2367	0.010
9:00	26.3	34.42	2498	2505	2454	2102	1.15	2210	
9:15	26.3	34.43	2499	2507	2457	2124	1.14	2158	0.009
<b>Coralline algae Run#2</b> $\rho\text{CO}_2=1070\text{ppm}$ Sample weight:12.33g									
0:00	26.6	33.98	2331	2368	2192	1014	1.87	3651	
2:05	26.0	34.03	2341	2375	2228	1182	1.63	3286	
2:20	26.0	34.03	2341	2375	2211	1058	1.78	3234	0.004
3:18	26.0	34.06	2345	2378	2234	1196	1.62	3114	
3:30	26.0	34.06	2346	2379	2234	1194	1.63	3052	0.003
4:05	26.0	34.07	2351	2382	2221	1067	1.79	2896	
4:20	26.0	34.08	2352	2383	2235	1159	1.67	2843	0.007
5:35	26.0	34.11	2359	2388	2242	1164	1.68	2687	
5:50	26.0	34.11	2359	2388	2240	1155	1.69	2635	0.004
6:35	25.9	34.13	2363	2391	2245	1154	1.69	2479	
6:50	25.9	34.13	2364	2392	2248	1168	1.67	2427	0.003
7:45	26.0	34.16	2371	2397	2249	1133	1.73	2271	
8:00	26.0	34.16	2373	2398	2253	1158	1.70	2218	0.005
<b>Coralline algae Run#3</b> $\rho\text{CO}_2=830\text{ppm}$ Sample weight:10.86g									
0:00	26.5	34.51	2394	2395	2222	877	2.20	3242	
1:40	26.0	34.52	2397	2398	2181	671	2.63	3086	
1:55	25.9	34.52	2398	2399	2172	639	2.72	3033	0.006
3:57	25.6	34.52	2403	2404	2179	637	2.71	2846	
4:15	25.6	34.52	2405	2406	2170	604	2.82	2794	0.004
5:06	25.5	34.53	2406	2407	2190	665	2.62	2648	
5:20	25.5	34.53	2407	2407	2192	669	2.62	2492	0.002
5:35	25.6	34.53	2410	2410	2187	645	2.70	2336	
5:50	25.6	34.53	2413	2413	2202	691	2.57	2185	0.010
<b>Coralline algae Run#4</b> $\rho\text{CO}_2=570\text{ppm}$ Sample weight:12.55g									
0:00	26.2	34.33	2369	2382	2107	522	3.08	2677	
1:00	26.2	34.34	2371	2384	2131	585	2.86	2521	0.000
1:15	26.2	34.34	2369	2382	2129	584	2.86	2469	
2:45	26.2	34.34	2375	2388	2133	578	2.89	2313	0.003
3:00	26.2	34.34	2375	2387	2132	577	2.89	2261	
4:15	26.3	34.35	2376	2389	2138	594	2.85	2105	0.001
4:30	26.3	34.35	2377	2390	2137	588	2.87	2053	
5:45	26.3	34.35	2379	2392	2137	583	2.90	1896	0.001
6:00	26.3	34.35	2380	2392	2139	588	2.88	1844	
7:00	26.3	34.36	2382	2394	2143	594	2.86	1688	0.001

Supplementary Material Table 1. (continued)

Sampling time(hh:mm)	Temperature (°C)	Salinity (Calculated)	$A_T$ ( $\mu\text{ mol kg}^{-1}$ )	$nA_T$ ( $\mu\text{ mol kg}^{-1}$ )	$C_T$ ( $\mu\text{ mol kg}^{-1}$ )	$f(\text{CO}_2)$ ( $\mu\text{ atm}$ )	$\Omega_a$	Water Volume (kg)	Average Dissolution Rate (% day <sup>-1</sup> )
<b>Foraminifera Run#1</b> $\rho\text{CO}_2=2210\text{ppm}$ Sample weight:11.64g									
0:00	29.2	34.52	2424	2425	2375	2109	1.23	3482	
1:15	26.6	34.54	2432	2431	2393	2127	1.10	3326	
1:30	26.6	34.54	2434	2433	2400	2208	1.07	3269	0.013
2:15	26.4	34.55	2438	2436	2388	1968	1.17	3112	
2:30	26.3	34.56	2438	2436	2413	2337	1.01	3029	0.005
3:55	26.3	34.58	2446	2443	2417	2270	1.04	2873	
4:10	26.3	34.58	2447	2443	2419	2299	1.03	2821	0.005
6:15	26.3	34.61	2459	2453	2428	2247	1.06	2665	
6:30	26.3	34.61	2458	2452	2429	2292	1.04	2613	0.005
7:20	26.3	34.63	2464	2457	2434	2268	1.05	2508	
7:35	26.3	34.63	2463	2456	2437	2342	1.02	2456	0.004
8:10	26.3	34.64	2463	2455	2441	2414	1.00	2352	
8:25	26.3	34.64	2468	2460	2442	2342	1.03	2300	
8:30	26.3	34.65	2465	2457	2442	2380	1.01	2144	0.001
<b>Foraminifera Run#2</b> $\rho\text{CO}_2=1240\text{ppm}$ Sample weight:10.23g									
0:00	27.5	34.51	2436	2437	2262	925	2.26	2889	
0:45	26.6	34.53	2437	2437	2273	947	2.15	2733	
1:00	26.6	34.53	2438	2438	2281	988	2.08	2681	0.001
2:00	26.2	34.55	2442	2440	2285	977	2.08	2524	
2:15	26.2	34.55	2442	2440	2287	993	2.05	2472	0.003
3:30	26.2	34.58	2447	2443	2288	970	2.10	2316	
3:45	26.2	34.59	2447	2443	2291	986	2.07	2264	0.002
4:30	26.1	34.60	2449	2444	2289	958	2.11	2108	
4:45	26.1	34.61	2450	2444	2289	959	2.11	2056	0.001
5:30	26.1	34.63	2455	2448	2278	878	2.27	1899	
5:45	26.1	34.63	2454	2447	2278	880	1.85	1847	0.003
<b>Foraminifera Run#3</b> $\rho\text{CO}_2=570\text{ppm}$ Sample weight:11.49g									
0:00	26.4	34.08	2326	2356	2086	563	2.86	3387	
0:45	26.0	34.08	2326	2356	2083	546	2.88	3231	
1:00	26.1	34.08	2325	2355	2081	546	2.88	3179	-0.001
3:00	26.3	34.09	2325	2354	2081	552	2.88	3022	
3:15	26.3	34.09	2325	2355	2073	528	2.97	2970	-0.001
4:15	26.3	34.09	2332	2362	2069	500	3.10	2866	
4:30	26.3	34.10	2331	2361	2075	520	3.01	2731	0.006
6:15	26.3	34.10	2334	2364	2094	566	2.85	2575	
6:30	26.3	34.10	2334	2363	2096	570	2.84	2522	0.001
7:45	26.4	34.11	2337	2366	2099	575	2.84	2366	
8:00	26.5	34.11	2336	2365	2102	587	2.80	2210	
8:15	26.5	34.11	2336	2365	2098	576	2.84	2054	0.001
9:30	26.5	34.11	2341	2370	2109	597	2.78	1897	
9:45	26.5	34.11	2342	2371	2106	585	2.83	1845	0.003
<b>Foraminifera Run#4</b> $\rho\text{CO}_2=510\text{ppm}$ Sample weight:12.47g									
0:00	26.5	34.37	2403	2414	2135	527	3.18	3694	
1:00	26.2	34.37	2399	2409	2136	532	3.11	3537	
1:15	26.1	34.38	2398	2409	2133	524	3.14	3485	-0.008
2:00	26.0	34.38	2401	2411	2139	533	3.09	3329	
2:15	26.0	34.38	2402	2412	2125	496	3.25	3277	-0.001
4:10	26.0	34.38	2400	2410	2138	530	3.11	3121	
4:25	26.0	34.38	2402	2412	2137	525	3.13	3069	0.000
5:10	26.0	34.39	2401	2411	2129	507	3.20	2912	
5:25	26.0	34.39	2399	2409	2127	506	3.20	2853	-0.002
6:45	26.1	34.39	2406	2415	2133	509	3.21	2697	
7:00	26.1	34.39	2403	2412	2121	484	3.31	2645	0.003
9:00	26.3	34.40	2402	2411	2125	499	3.26	2333	
9:15	26.3	34.40	2402	2411	2123	494	3.29	2281	-0.001

Supplementary Material Table 1. (continued)

Sampling time(hh:mm)	Temperature (°C)	Salinity (Calculated)	$A_T$ ( $\mu\text{ mol kg}^{-1}$ )	$nA_T$ ( $\mu\text{ mol kg}^{-1}$ )	$C_T$ ( $\mu\text{ mol kg}^{-1}$ )	$f(\text{CO}_2)$ ( $\mu\text{ atm}$ )	$\Omega_a$	Water Volume (kg)	Average Dissolution Rate (% day <sup>-1</sup> )
<b>Coral Run#1</b> $\rho\text{CO}_2=2100\text{ppm}$ Sample weight:12.94g									
0:00	26.3	34.50	2436	2437	2390	2017	1.14	3684	
1:00	26.0	34.51	2435	2436	2412	2302	1.00	3528	
1:15	25.9	34.51	2437	2438	2392	1977	1.14	3476	0.000
2:10	25.7	34.52	2442	2442	2412	2207	1.03	3320	
2:25	25.7	34.53	2442	2442	2397	1980	1.14	3268	0.005
3:30	25.5	34.54	2442	2441	2418	2252	1.01	3111	
3:45	25.5	34.54	2442	2441	2421	2293	0.99	3059	-0.001
4:30	25.4	34.55	2447	2446	2396	1871	1.18	2903	
4:45	25.3	34.55	2448	2447	2425	2261	1.00	2747	
5:00	25.3	34.55	2447	2446	2428	2308	0.98	2590	
5:15	25.2	34.55	2450	2448	2425	2220	1.02	2434	0.004
6:30	25.2	34.57	2454	2452	2433	2265	1.00	2278	
6:45	25.2	34.57	2455	2452	2421	2071	1.09	2226	0.003
<b>Coral Run#2</b> $\rho\text{CO}_2=1550\text{ppm}$ Sample weight:12.72g									
0:00	26.5	34.84	2579	2556	2473	1470	1.68	3773	
1:00	25.9	34.85	2582	2558	2461	1311	1.80	3617	
1:15	25.8	34.85	2581	2557	2486	1549	1.57	3565	0.004
2:30	25.7	34.86	2582	2557	2482	1483	1.62	3408	
2:45	25.7	34.86	2583	2558	2493	1589	1.53	3356	0.000
4:10	25.6	34.87	2583	2557	2495	1604	1.51	3200	
4:25	25.6	34.88	2583	2557	2485	1499	1.59	3148	0.000
5:40	25.5	34.89	2585	2558	2487	1506	1.59	2992	
5:55	25.5	34.89	2587	2560	2491	1519	1.59	2940	0.002
7:00	25.6	34.90	2583	2556	2488	1526	1.58	2783	
7:15	25.6	34.90	2582	2555	2498	1645	1.48	2731	-0.003
9:10	25.6	34.91	2585	2557	2487	1503	1.60	2523	
9:30	25.6	34.91	2586	2558	2488	1507	1.60	2367	
9:45	25.6	34.92	2586	2558	2504	1662	1.47	2210	0.001
<b>Coral Run#3</b> $\rho\text{CO}_2=1070\text{ppm}$ Sample weight:12.97g									
0:00	26.4	34.41	2411	2419	2233	853	2.26	3852	
0:50	26.0	34.44	2409	2416	2250	930	2.08	3652	
1:05	25.9	34.44	2412	2419	2249	908	2.12	3600	-0.002
3:50	26.0	34.50	2418	2420	2263	967	2.04	3076	
4:05	26.0	34.51	2419	2421	2265	969	2.04	3024	0.001
5:20	26.1	34.54	2421	2420	2264	959	2.06	2868	
5:35	26.1	34.54	2420	2419	2266	974	2.04	2816	0.000
6:20	26.0	34.56	2423	2421	2265	952	2.07	2659	
6:35	26.0	34.56	2424	2422	2266	952	2.07	2607	0.002
7:20	26.0	34.58	2425	2421	2268	961	2.06	2453	
7:35	26.0	34.58	2426	2422	2268	953	2.08	2401	0.000