

Table S1. Values (mean \pm SEM) for physico-chemical parameters of the seawater used when exposing polychaetes to: (i) current $p\text{CO}_2/\text{pH}$ conditions ('control' stations C1, C2 and C3) and (ii) elevated $p\text{CO}_2/\text{low pH}$ conditions ('acidified' stations A1, A2, A3). Salinity, temperature, pH_{NBS} (Mettler-Toledo pH meter, Beaumont Leys, UK), TA (AS-ALK2, Apollo SciTech, Bogart, USA), DIC, carbon dioxide partial pressure ($p\text{CO}_2$), bicarbonate and carbonate ion concentration ($[\text{HCO}_3^-]$ and $[\text{CO}_3^{2-}]$), calcite and aragonite saturation state (Ω^{cal} and Ω^{ara}) are provided. The significant difference in temperature between the two sites was negligible and within the range of natural fluctuation experienced by *Sabellida spallanzanii*. Preliminary statistical analyses showed no effect of temperature differences on the biochemical parameters investigated (maximum $F_{5,34} = 1.803$, $P = 0.139$).

Parameter	Control				Acidified			
	C1	C2	C3	Overall	A1	A2	A3	overall
Salinity	36.93 \pm 0.11	37.00 \pm 0.10	37.02 \pm 0.09	36.98 \pm 0.06	37.00 \pm 0.08	37.08 \pm 0.09	37.05 \pm 0.12	37.04 \pm 0.06
Temperature (°C)	21.29 \pm 0.30 ^A	21.36 \pm 0.32 ^A	21.37 \pm 0.31 ^A	21.34 \pm 0.18 ^a	20.17 \pm 0.18 ^B	20.12 \pm 0.18 ^B	20.41 \pm 0.16 ^B	20.23 \pm 0.10 ^b
pH	8.12 \pm 0.01 ^A	8.13 \pm 0.01 ^A	8.15 \pm 0.01 ^A	8.13 \pm 0.01 ^a	7.49 \pm 0.06 ^B	7.16 \pm 0.08 ^C	7.21 \pm 0.06 ^C	7.29 \pm 0.04 ^b
TA (μequiv kg ⁻¹)	2612.93 \pm 4.68	2589.79 \pm 6.92	2600.38 \pm 4.05	2601.33 \pm 3.21	2620.00 \pm 4.19	2597.40 \pm 11.21	2606.72 \pm 14.29	2608.15 \pm 6.22
DIC (μmol kg ⁻¹) [*]	2333.39 \pm 9.19 ^A	2305.76 \pm 13.71 ^A	2305.98 \pm 9.62 ^A	2315.40 \pm 6.39 ^a	2640.00 \pm 31.65 ^B	2802.89 \pm 47.34 ^C	2759.76 \pm 41.80 ^C	2733.52 \pm 24.25 ^b
$p\text{CO}_2$ (μatm) [*]	518.05 \pm 13.50 ^A	505.30 \pm 19.00 ^A	482.89 \pm 14.19 ^A	502.24 \pm 9.05 ^a	3682.36 \pm 702.65 ^B	8608.77 \pm 1150.84 ^C	6216.07 \pm 798.54 ^D	6144.17 \pm 552.63 ^b
$[\text{HCO}_3^-]$ (μmol kg ⁻¹) [*]	2109.27 \pm 12.82 ^A	2079.87 \pm 18.26 ^A	2073.80 \pm 13.79 ^A	2088.02 \pm 8.73 ^a	2455.28 \pm 20.62 ^B	2481.77 \pm 27.81 ^B	2509.83 \pm 23.58 ^B	2482.30 \pm 13.96 ^b
$[\text{CO}_3^{2-}]$ (μmol kg ⁻¹) [*]	208.07 \pm 4.54 ^A	210.26 \pm 5.61 ^A	217.29 \pm 4.98 ^A	211.84 \pm 2.90 ^a	68.08 \pm 7.79 ^B	47.76 \pm 11.14 ^C	40.02 \pm 6.50 ^C	52.00 \pm 5.08 ^b
Ω^{cal}	4.91 \pm 0.11 ^A	4.96 \pm 0.13 ^A	5.12 \pm 0.12 ^A	5.00 \pm 0.07 ^a	1.60 \pm 0.18 ^B	1.12 \pm 0.26 ^C	0.94 \pm 0.15 ^C	1.22 \pm 0.12 ^b
Ω^{ara}	3.21 \pm 0.07 ^A	3.24 \pm 0.09 ^A	3.35 \pm 0.08 ^A	3.27 \pm 0.05 ^a	1.05 \pm 0.12 ^B	0.73 \pm 0.17 ^C	0.61 \pm 0.10 ^C	0.80 \pm 0.08 ^b

Different capital letters (A,B,C,D) indicate significant differences in parameter values from different stations.

Different lowercase letters (a,b) indicate significant differences in parameter values from different treatments.

*Parameters that were calculated using the CO2SYS program (Pierrot et al., 2006), using the dissociation constants of Mehrbach et al. (1973) as refitted by Dickson & Millero (1987) and [KSO4] using Dickson (1990).