

Supplementary Online Material

Table S1. Seawater carbonate chemistry parameters during the experimental period. Temperature and pH in each tank were measured daily ($n = 27$) and Total Alkalinity (TA) in each tank measured weekly ($n = 7$). $p\text{CO}_2$ (μatm), ΩCa and ΩAr were calculated based on the measured parameters using CO2SYS program for Excel (Pierrot et al. 2006) with constants from Mehrbach et al. (1973) as adjusted by Dickson & Millero (1987). Values are means \pm SE.

Treatment		Measured			Calculated		
Temp. (°C)	[CO ₂] (ppm)	pH	Temperature (°C)	TA ($\mu\text{mol ml}^{-1}$)	$p\text{CO}_2$ (μatm)	ΩCa	ΩAr
28	400	8.13 \pm 0.01	27.86 \pm 0.05	2365.88 \pm 99.46	334.9 \pm 15.1	6.4 \pm 0.30	4.2 \pm 0.20
	700	7.80 \pm 0.00	27.84 \pm 0.03	2172.95 \pm 12.27	754.9 \pm 6.8	3.2 \pm 0.02	2.1 \pm 0.02
	1000	7.61 \pm 0.01	27.99 \pm 0.04	1974.93 \pm 67.47	1117.5 \pm 37.2	2.0 \pm 0.08	1.3 \pm 0.05
31	400	8.10 \pm 0.01	31.00 \pm 0.02	2165.28 \pm 5.69	331.9 \pm 4.9	6.0 \pm 0.06	4.0 \pm 0.04
	700	7.80 \pm 0.00	30.93 \pm 0.03	2156.10 \pm 19.46	745.4 \pm 10.3	3.5 \pm 0.03	2.4 \pm 0.02
	1000	7.59 \pm 0.03	30.99 \pm 0.02	2007.92 \pm 116.27	1166.2 \pm 30.6	2.2 \pm 0.17	1.5 \pm 0.12
33	400	8.09 \pm 0.01	32.98 \pm 0.03	2215.49 \pm 24.00	348.4 \pm 11.7	6.4 \pm 0.10	4.3 \pm 0.07
	700	7.81 \pm 0.00	32.98 \pm 0.03	2140.60 \pm 16.63	732.3 \pm 8.2	3.8 \pm 0.03	2.5 \pm 0.02
	1000	7.61 \pm 0.01	33.00 \pm 0.02	2097.67 \pm 64.67	1199.6 \pm 41.9	2.5 \pm 0.10	1.7 \pm 0.06

Fig S1. Thermal ramps showing mean metabolic rates ($\text{mg L}^{-1} \text{g FW}^{-1} \text{h}^{-1}$) of the sea urchin *Heliocidaris crassispina* after exposure to crossed combinations of different CO_2 concentrations (400, 700, or 1000 ppm) and temperatures (28°C, blue; 31°C, yellow; 33°C, red) for one month. Curves are modelled using an Exponentially Modified Gaussian Function.

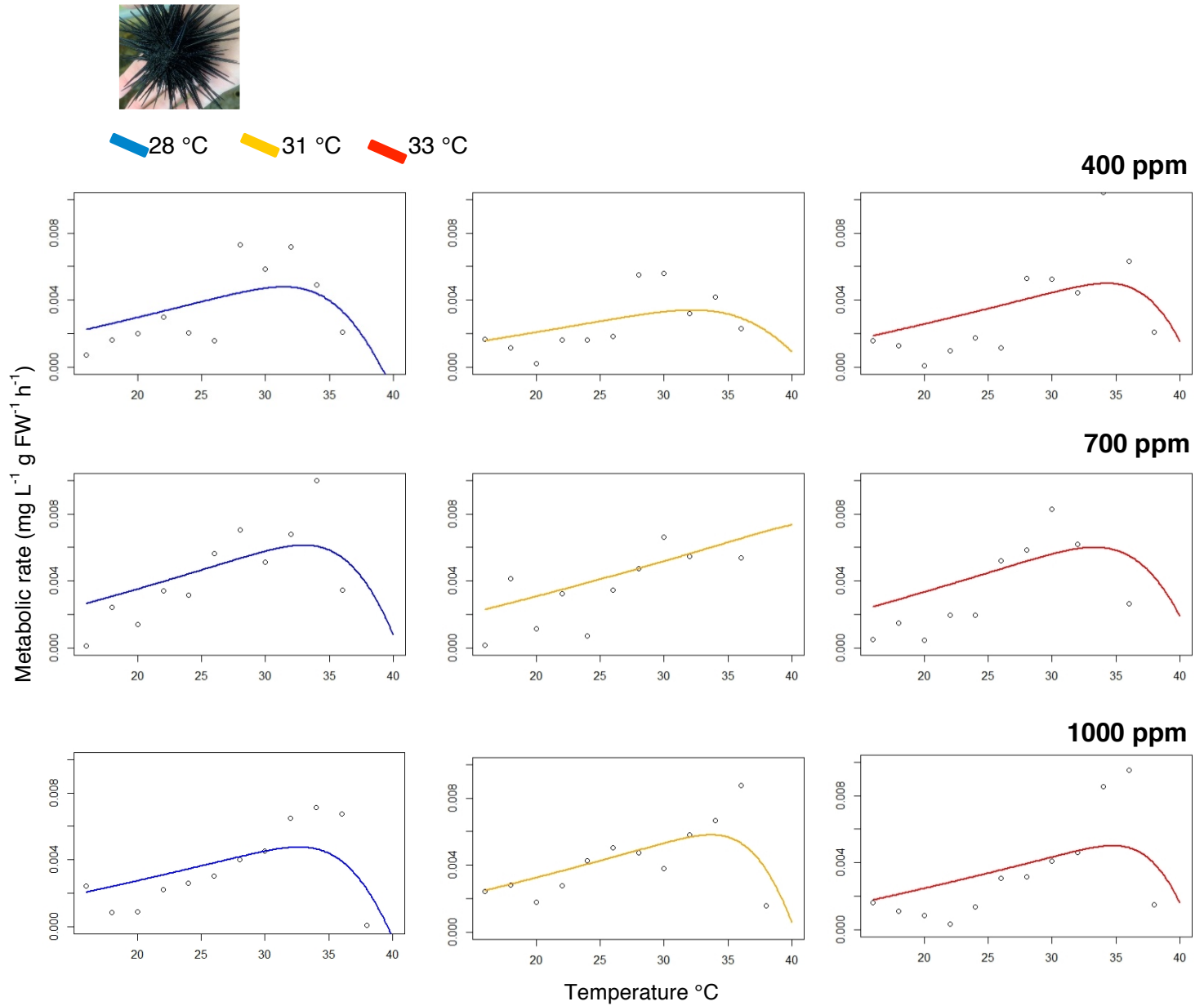
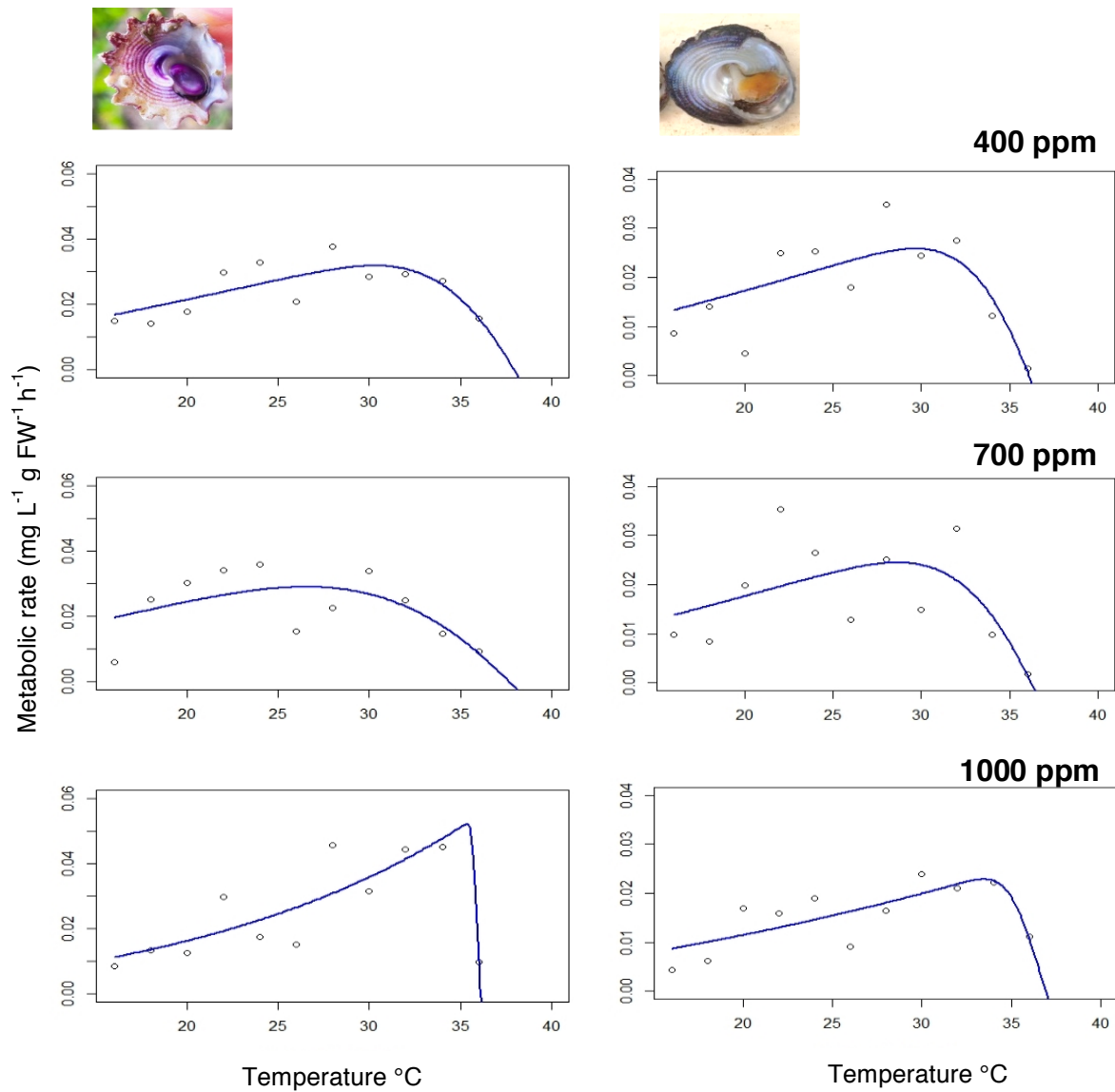


Fig S2. Thermal ramps showing mean metabolic rates ($\text{mg L}^{-1} \text{g FW}^{-1} \text{h}^{-1}$) of the gastropods (a) *Trochus maculatus* and (b) *Astralium haematragum* after exposure to different CO_2 concentrations (400, 700, or 1000 ppm) for one month at 28 °C. Curves are modelled using an Exponentially Modified Gaussian Function.



LITERATURE CITED

- Dickson AG, Millero FJ (1987) A comparison of the equilibrium constants for the dissociation of carbonic acid in seawater media. *Deep-Sea Res A* 34:1733–1743
[https://doi.org/10.1016/0198-0149\(87\)90021-5](https://doi.org/10.1016/0198-0149(87)90021-5)
- Mehrbach C, Culberson CH, Hawley JE, Pytkowicz RM (1973) Measurement of the apparent dissociation constants of carbonic acid in seawater at atmospheric pressure. *Limnol Oceanogr* 18:897–907 <https://doi.org/10.4319/lo.1973.18.6.0897>
- Pierrot D, Lewis E, Wallace DWR (2006) MS Excel Program Developed for CO₂ System Calculations. ORNL/CDIAC-105a
https://doi.org/10.3334/CDIAC/otg.CO2SYS_XLS_CDIAC105a