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Short-term metabolic stress response of the temperate cup coral *Caryophyllia smithii* to a simulated marine heatwave

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Supplemental information

Figure S1. A schematic of the experimental setup.

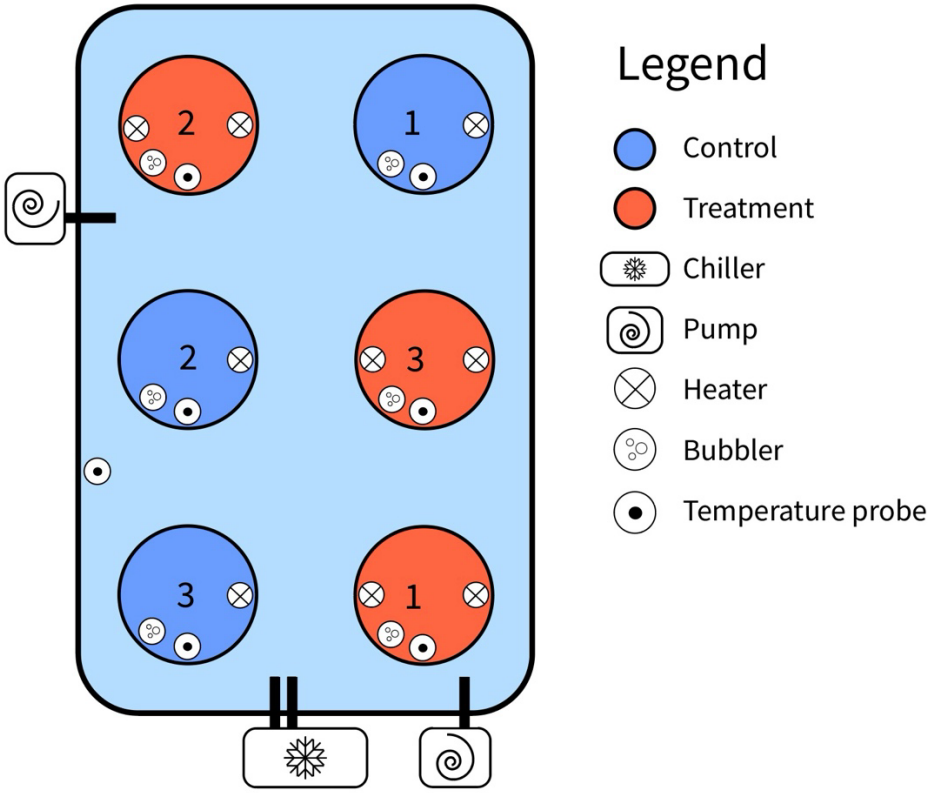


Figure S2. Mean (± SD) temperature trajectory of the control and marine heatwave treatments over the course of the experiment. Grey dashed lines indicate the sampling intervals (T0–T5).

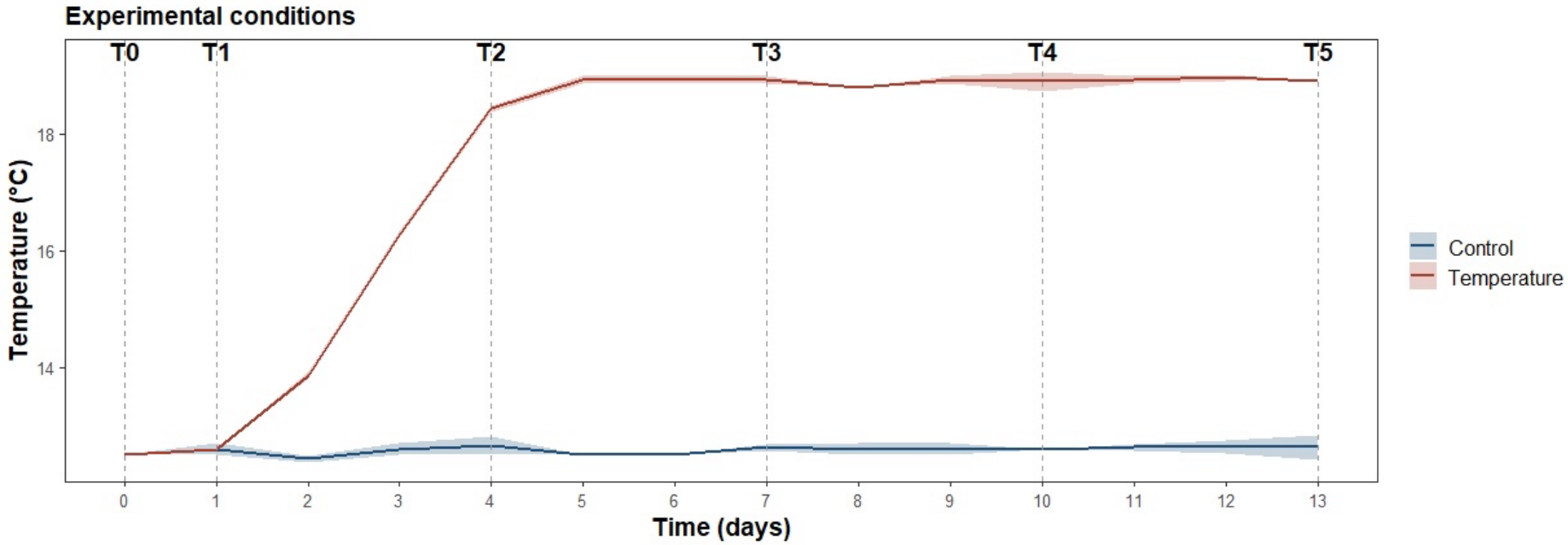


Table S1. Mean daily temperatures (°C) and SD in the experimental units at Lough Hyne. Control tanks include C1-C3 while treatment tanks include T1-T3.

	Control Conditions (12.5°C)			Treatment (19°C)			
Day	C1	C2	C3	T1	T2	T3	Water bath
0	12.4 ± 0.28	12.5 ± 0.30	12.4 ± 0.21	12.8 ± 0.84	12.7 ± 0.77	12.7 ± 0.82	12.1 ± 0.63
1	12.6 ± 0.24	12.6 ± 0.17	12.5 ± 0.14	12.5 ± 0.15	12.5 ± 0.69	12.5 ± 0.77	12.3 ± 0.28
2	12.5 ± 0.16	12.5 ± 0.19	12.5 ± 0.15	13.1 ± 0.70	13.1 ± 0.69	13.0 ± 0.72	11.9 ± 0.41
3	12.5 ± 0.16	12.4 ± 0.16	12.5 ± 0.15	15.3 ± 0.72	15.3 ± 0.72	15.2 ± 0.72	11.5 ± 0.14
4	12.6 ± 0.18	12.5 ± 0.17	12.5 ± 0.17	17.4 ± 0.76	17.3 ± 0.79	17.3 ± 0.78	11.6 ± 0.16
5	12.6 ± 0.14	12.5 ± 0.17	12.6 ± 0.14	18.3 ± 0.25	18.2 ± 0.25	18.3 ± 0.21	11.8 ± 0.11
6	12.6 ± 0.12	12.4 ± 0.15	12.6 ± 0.12	18.4 ± 0.30	18.3 ± 0.30	18.3 ± 0.28	12.0 ± 0.10
7	12.6 ± 0.14	12.6 ± 0.16	12.6 ± 0.13	18.8 ± 0.25	18.8 ± 0.31	18.8 ± 0.25	12.2 ± 0.06
8	12.6 ± 0.13	12.5 ± 0.14	12.6 ± 0.14	18.8 ± 0.24	18.8 ± 0.25	18.8 ± 0.25	12.2 ± 0.08
9	12.6 ± 0.09	12.5 ± 0.08	12.5 ± 0.10	18.9 ± 0.23	18.8 ± 0.23	18.8 ± 0.20	12.2 ± 0.06
10	12.6 ± 0.18	12.6 ± 0.14	12.6 ± 0.14	18.9 ± 0.28	18.9 ± 0.21	18.8 ± 0.21	12.2 ± 0.12
11	12.6 ± 0.12	12.6 ± 0.13	12.6 ± 0.13	18.9 ± 0.22	18.8 ± 0.22	18.8 ± 0.21	12.3 ± 0.19
12	12.7 ± 0.13	12.6 ± 0.16	12.6 ± 0.11	18.9 ± 0.21	18.8 ± 0.23	18.8 ± 0.17	12.1 ± 0.31
13	12.7 ± 0.12	12.6 ± 0.17	12.6 ± 0.10	18.9 ± 0.24	18.8 ± 0.23	18.8 ± 0.18	12.3 ± 0.04

*** The *water bath* was maintained at 12.1°C ± 0.32 for the entirety of the experiment.

Table S2 Pairwise results of Type III ANOVA with Satterthwaite's method for comparisons between treatment (a) and time (b) using estimated marginal means (*emmeans* package in R) for *Caryophillia smithii*. Respiration data were square root transformed. P-values are uncorrected, but significance after correction with Benjamini-Hochberg Procedure (SignBH) is reported as: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; ****$p < 0.0001$; ns, non-significant.

Pairwise comparisons: Treatment

Linear mixed effects model (*lmer*). Square root (Respiration) ~ Treatment * Time + (1|Tank)
Pairwise Comparison by Treatment (*emmeans*) with Control = 12.5 °C; Treatment = 19 °C

contrast	Time	estimate	SE	df	t.ratio	*p*-value	SignBH
Control - Treatment	Day 1	0.0764	0.0707	48	1.0805	0.2854	ns
Control - Treatment	Day 4	0.0933	0.0645	45	1.4477	0.1548	ns
Control - Treatment	Day 7	-0.2311	0.0664	46	-3.4812	**0.0011**	**
Control - Treatment	Day 10	-0.2968	0.0661	46	-4.4891	**< 0.0001**	***
Control - Treatment	Day 13	-0.3594	0.0709	53	-5.0685	**< 0.0001**	****

a) Pairwise comparison: Time

Pairwise Comparison by Time (*emmeans*) with Control = 12.5 °C; Treatment = 19 °C

Comparison	Treatment	Estimate	SE	df	t.ratio	*p*-value	SignBH
Day 1 - Day 4	Control	-0.0682	0.0676	78	-1.0079	0.3166	ns
Day 1 - Day 7	Control	0.1752	0.0695	80	2.5213	**0.0137**	*
Day 1 - Day 10	Control	0.1991	0.0696	80	2.8624	**0.0054**	*
Day 1 – Day 13	Control	0.0622	0.0676	80	0.9194	0.3607	ns
Day 4 - Day 7	Control	0.2434	0.0652	78	3.7338	**0.0004**	***
Day 4 - Day 10	Control	0.2673	0.0652	78	4.1018	**0.0001**	****
Day 4 - Day 13	Control	0.1304	0.0634	78	2.0580	0.0429	ns
Day 7 - Day 10	Control	0.0239	0.0670	79	0.3565	0.7225	ns
Day 7 - Day 13	Control	-0.1130	0.0652	78	-1.7336	0.0869	ns
Day 10 - Day 13	Control	-0.1369	0.0652	78	-2.1010	0.0389	ns
Day 1 - Day 4	Treatment	-0.0512	0.0654	79	-0.7827	0.4361	ns

Day 1 - Day 7	Treatment	-0.1323	0.0654	79	-2.0216	0.0466	ns
Day 1 - Day 10	Treatment	-0.1741	0.0654	79	-2.660	**0.0094**	*
Day 1 – Day 13	Treatment	-0.3735	0.0714	78	-5.2280	**< 0.0001**	****
Day 4 - Day 7	Treatment	-0.0811	0.0634	78	-1.2795	0.2045	ns
Day 4 - Day 10	Treatment	-0.1228	0.0634	78	-1.9392	0.0561	ns
Day 4 - Day 13	Treatment	-0.3223	0.0701	79	-4.5971	**< 0.0001**	***
Day 7 - Day 10	Treatment	-0.0418	0.0634	78	-0.6597	0.5114	ns
Day 7 - Day 13	Treatment	-0.2413	0.0701	79	-3.4411	**0.0009**	**
Day 10 - Day 13	Treatment	-0.1995	0.0701	79	-2.8450	**0.0057**	*