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Appendix 1

Supplementary tables

Table A1. Plate characteristics.

Pair number	Rock type	Plate tidal height (m +MLLW)
1	Sandstone	1.69
2	Sandstone	1.73
3	Granite	1.72
4	Granite	1.73
5	Slate	1.46
6	Slate	1.46
7	Granite	1.88
8	Granite	1.80
9	Granite	1.27
10	Granite	1.33
11	Basalt	1.79
12	Basalt	1.68

Table A2. Final model parameters. The swash and short-wave absorptivity values used to hindcast daily maximum temperature (top half of table) and daily degree minutes (bottom half of table) are given for each plate and bedrock sample. The slope, intercept and coefficient of determination for the best-fit linear regression between measured and modeled values are given. Finally, the calculated confidence intervals from the bootstrapped residuals are shown.

Thermocouple number	Sample	Size (m)	Absorptivity (α)	Swash	Slope	y-intercept	R^2	5%	95%
Daily max temperature									
1	1, 2	0.1	0.95	0.5	0.58	7.60	0.80	-0.66	0.65
2	1	0.1	0.95	0.5	0.56	9.0	0.64	-1.0	1.04
3	2	0.1	1	0.5	0.60	7.53	0.69	-0.92	0.95
4	3	0.1	0.95	0.5	0.60	7.00	0.78	-0.64	0.59
5	3	0.1	1	0.5	0.59	8.25	0.66	-1.02	0.94
6	4	0.1	1	0.5	0.59	8.33	0.66	-1.02	0.96
7	4	0.1	0.95	0.5	0.50	8.47	0.80	-0.73	0.68
8	5	0.08	0.9	0.5	0.49	8.62	0.72	-1.17	1.19
9	5, 6	0.1	0.8	0.7	0.80	3.24	0.78	-0.69	0.74
10	6	0.1	0.9	0.55	0.61	6.56	0.72	-1.04	1.12
11	7	0.1	1	0.5	0.71	7.74	0.62	-0.77	0.84
12	8	0.1	1	0.5	0.74	5.93	0.65	-0.83	0.79
13	9	0.1	0.8	0.55	1.08	-0.39	0.62	-0.87	0.80
14	10	0.1	0.9	0.5	0.83	2.49	0.63	-1.09	1.19
15	9, 10	0.1	0.85	1	1.56	-8.39	0.66	-0.69	0.76
16	7, 8	0.1	1	1	1.39	-2.22	0.76	-0.53	0.52
17	11	0.1	0.95	0.5	0.64	6.41	0.72	-0.84	0.84
18	11, 12	0.1	1	0.5	0.57	7.36	0.72	-0.78	0.71
19	12	0.1	0.9	0.5	0.53	10.06	0.59	-1.26	1.19
Daily degree minutes									
1	1, 2	0.1	1	0.95	1.23	305.86	0.69	-123.88	140.96
2	1	0.1	1	0.95	1.14	476.37	0.68	-171.61	184.82
3	2	0.1	0.95	0.95	1.17	518.90	0.74	-170.92	170.16
4	3	0.1	1	1	1.39	295.50	0.70	-109.97	114.05
5	3	0.1	1	0.95	1.13	556.53	0.69	-180.09	199.10
6	4	0.1	0.95	0.95	1.16	658.64	0.69	-183.79	200.93
7	4	0.1	0.95	1	0.92	253.42	0.71	-186.25	187.15
8	5	0.08	1	1	0.73	206.57	0.69	-220.83	215.61
9	5, 6	0.1	0.8	1	1.04	219.12	0.69	-112.07	118.58
10	6	0.1	1	1	0.84	206.96	0.72	-180.34	180.18
11	7	0.1	1	0.85	1.63	889.61	0.67	-132.03	127.67
12	8	0.1	1	0.8	1.35	527.70	0.74	-121.87	127.21
13	9	0.1	0.9	0.5	0.84	9.12	0.65	-46.33	52.50
14	10	0.1	0.85	0.8	1.21	250.20	0.68	-120.18	122.67
15	9, 10	0.1	0.9	0.8	1.42	74.19	0.68	-43.46	53.94
16	7, 8	0.1	1	0.8	1.80	467.37	0.61	-87.12	84.88
17	11	0.1	0.95	1	1.50	617.87	0.71	-160.47	176.02
18	11, 12	0.1	0.95	1	1.5	321.56	0.70	-128.40	125.80
19	12	0.1	0.8	1	1.41	825.83	0.52	-209.50	211.84

Table A3. Differences between temperature measurements within plate-bedrock pairs. For each pair, the average difference between daily maximum plate temperature and daily maximum bedrock temperature (top half of table), and the average difference between daily plate degree minutes and daily bedrock degree minutes (bottom half of table) are shown. The significant difference column contains the average differences between significant annual temperatures and significant annual degree minutes. The *t*-statistic and p-value for each paired *t*-test are shown. For daily difference tests, there were 20 (tests between pairs 9 and 10) or 53 degrees of freedom; for significant difference tests, there were 11 degrees of freedom.

Pair number	Daily diff.	*TDD*	p	Sig. diff.	*TSD*	p
Significant annual temperature						
1	3.0	13.58	< 0.001	2.7	11.07	< 0.001
2	3.3	16.53	< 0.001	2.6	11.72	< 0.001
3	2.7	19.98	< 0.001	2.7	9.62	< 0.001
4	1.4	6.05	< 0.001	2.1	7.21	< 0.001
5	5.0	11.93	< 0.001	8.0	15.31	< 0.001
6	3.4	11.88	< 0.001	5.0	15.19	< 0.001
7	5.0	4.95	< 0.001	2.9	7.15	< 0.001
8	3.5	21.03	< 0.001	3.6	9.49	< 0.001
9	0.8	2.71	0.01	-0.8	-4.86	< 0.001
10	3.6	12.10	< 0.001	3.4	10.97	< 0.001
11	0.8	1.16	0.25	0.07	0.34	0.74
12	0.08	0.11	0.91	1.3	5.22	0.003
Significant annual degree minutes						
1	402.3	7.41	< 0.001	1110.5	29.61	< 0.001
2	538.2	8.28	< 0.001	1263.3	19.92	< 0.001
3	353.6	8.18	< 0.001	1523.4	15.96	< 0.001
4	203.6	4.75	< 0.001	583.9	6.67	< 0.001
5	663.0	6.44	< 0.001	2952.9	12.82	< 0.001
6	513.8	6.19	< 0.001	2089.7	13.45	< 0.001
7	396.4	6.72	< 0.001	1154.8	20.99	< 0.001
8	481.8	6.53	< 0.001	1419.8	14.15	< 0.001
9	49.3	1.80	0.09	-325.84	-8.18	< 0.001
10	248.6	3.57	0.002	1120.0	11.38	< 0.001
11	397.2	8.91	< 0.001	584.3	15.02	< 0.001
12	102.8	2.10	0.04	606.8	13.43	< 0.001

Table A4. Comparisons between sessile richness of taxa, mobile richness of taxa and percent cover of sessile taxa on paired plate and bedrock communities for each of four surveys. The *t*-value, degrees of freedom and p-value from paired *t*-tests between plate and bedrock richness of taxa and percent cover are shown. Average deviations are relative to the bedrock community.

Survey	Season	*t*	df	p	Av. deviation
Sessile richness of taxa					
1	August 2013	-2.00	11	0.07	-1.08
2	December 2013	-4.83	11	< 0.001	-2.19
3	March 2014	-3.43	11	0.006	-1.89
4	June 2014	-2.52	11	0.03	-1.28
	Average				-1.61 ± 0.26
Mobile richness of taxa					
1	August 2013	-2.36	11	0.04	-0.64
2	December 2013	-3.83	11	0.003	-0.83
3	March 2014	-2.55	11	0.03	-0.53
4	June 2014	-1.15	11	0.28	-0.22
	Average				-0.56 ± 0.13
Percent cover of sessile taxa					
1	August 2013	-0.80	11	0.44	-3.83
2	December 2013	-5.53	11	< 0.001	-28.69
3	March 2014	-1.28	11	0.23	-7.22
4	June 2014	-3.00	11	0.01	-15.50
	Average				-13.81 ± 5.53

Table A5. Comparison between measured and modeled average maximum daily temperatures and daily degree minutes. The *t*-value, degrees of freedom and *p*-value from paired *t*-tests between modeled and measured daily maximum temperatures (top half of table) and daily degree minutes (bottom half of table) for each plate and bedrock sample between August and October 2013 are shown. Average deviations are relative to the measured value.

Thermocouple number	Pair number	Rock type	*t*	df	p	Av. deviation
Daily max temperature						
1	1, 2	Bedrock	-2.48	53	0.016	-1.12
2	1	Sandstone	-2.91	53	0.005	-1.81
3	2	Sandstone	-2.60	53	0.012	-1.47
4	3	Bedrock	-2.88	53	0.006	-1.13
5	3	Granite	-0.36	53	0.721	-0.24
6	4	Granite	-2.38	53	0.021	-1.15
7	4	Bedrock	-2.74	53	0.008	-1.32
8	5	Slate	-1.95	53	0.056	-1.50
9	5, 6	Bedrock	-2.41	53	0.020	-1.14
10	6	Slate	-1.63	53	0.108	-1.12
11	7	Granite	-1.41	53	0.166	-1.29
12	8	Granite	-1.87	53	0.066	-1.00
13	9	Granite	-1.22	20	0.236	-0.65
14	10	Granite	-0.46	20	0.654	-0.16
15	9, 10	Bedrock	-0.76	20	0.457	-0.46
16	7, 8	Bedrock	-1.55	53	0.126	-0.55
17	11	Basalt	-2.32	53	0.024	-1.24
18	11, 12	Bedrock	-3.04	53	0.004	-2.52
19	12	Basalt	-2.33	53	0.024	-1.73
Daily degree minutes						
1	1, 2	Bedrock	0.84	53	0.402	74.06
2	1	Sandstone	0.83	53	0.413	107.88
3	2	Sandstone	0.75	53	0.458	95.75
4	3	Bedrock	0.77	53	0.447	68.15
5	3	Granite	2.30	53	0.025	316.82
6	4	Granite	1.91	53	0.062	285.73
7	4	Bedrock	0.43	53	0.667	59.73
8	5	Slate	0.94	53	0.350	161.49
9	5, 6	Bedrock	1.47	53	0.147	119.57
10	6	Slate	1.00	53	0.322	141.81
11	7	Granite	1.99	53	0.052	171.87
12	8	Granite	1.68	53	0.098	143.56
13	9	Granite	1.41	20	0.173	-43.70
14	10	Granite	0.57	20	0.574	12.46
15	9, 10	Bedrock	0.10	29	0.922	6.36
16	7, 8	Bedrock	2.83	53	0.007	158.12
17	11	Basalt	0.57	53	0.576	65.79
18	11, 12	Bedrock	0.50	53	0.619	47.46
19	12	Basalt	0.95	53	0.347	134.74

Supplementary figures

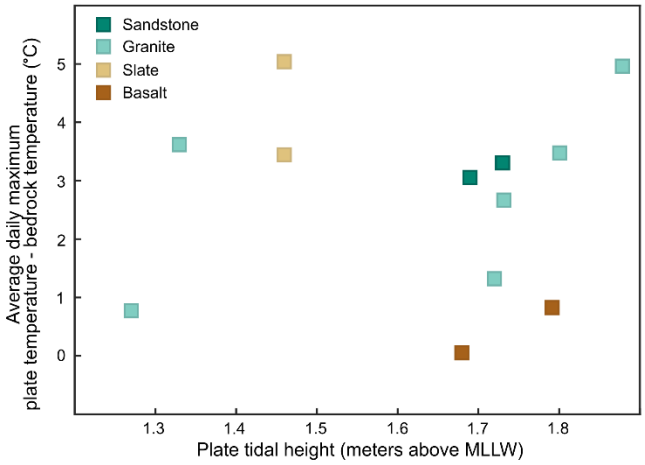

Figure A1. Relationships between rock type, plate tidal height and relative temperature between plate and bedrock paired samples. The lack of trends is evident.

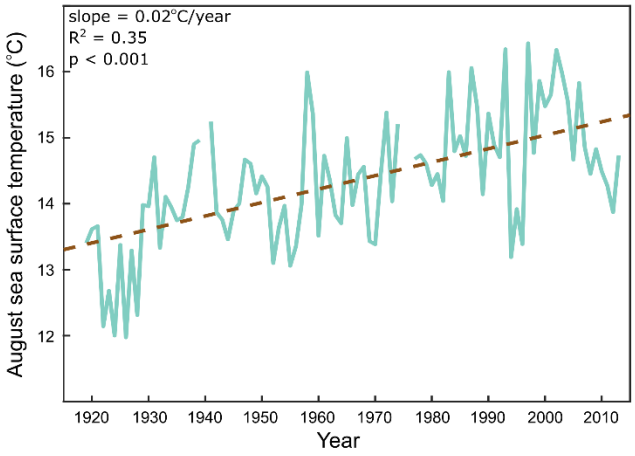

Figure A2. Recent, cooler years are part of a longer trend of increasing sea surface temperatures, recorded daily at Hopkins Marine Station since 1919. Here, average August sea surface temperature is plotted through time; linear regression indicates that August temperatures are increasing by 0.02 °C/year.

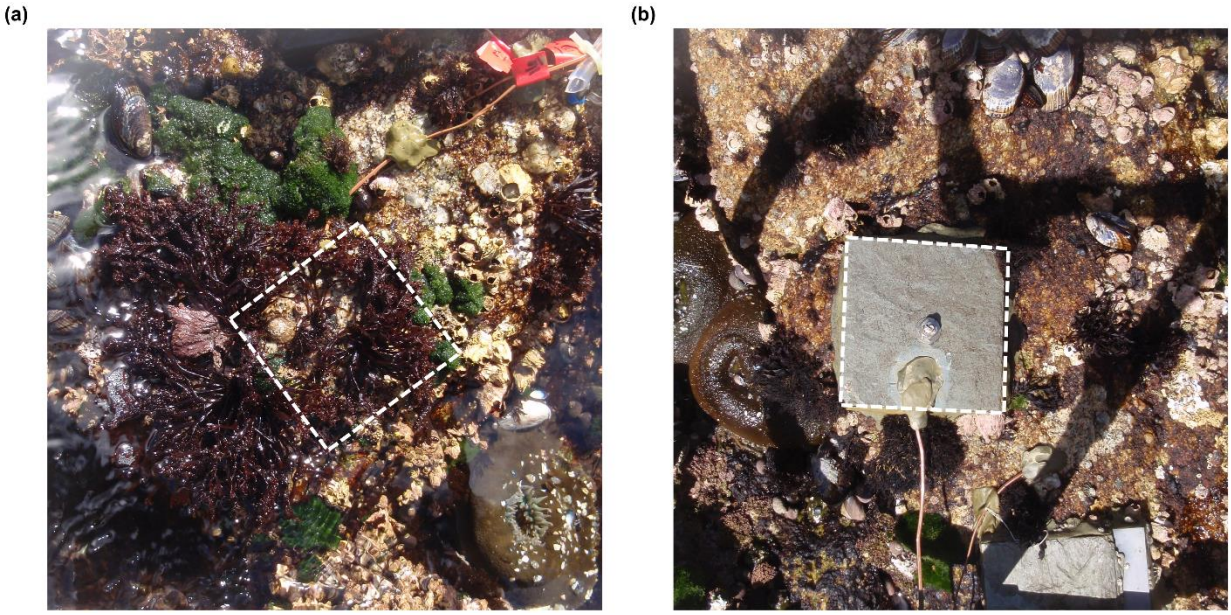

Figure A3. Photographs of (a) the coolest plate (pair 9) and (b) the warmest plate (pair 5) taken in August 2013. Plates are outlined in white dashed lines, and are 10x10 cm in size.

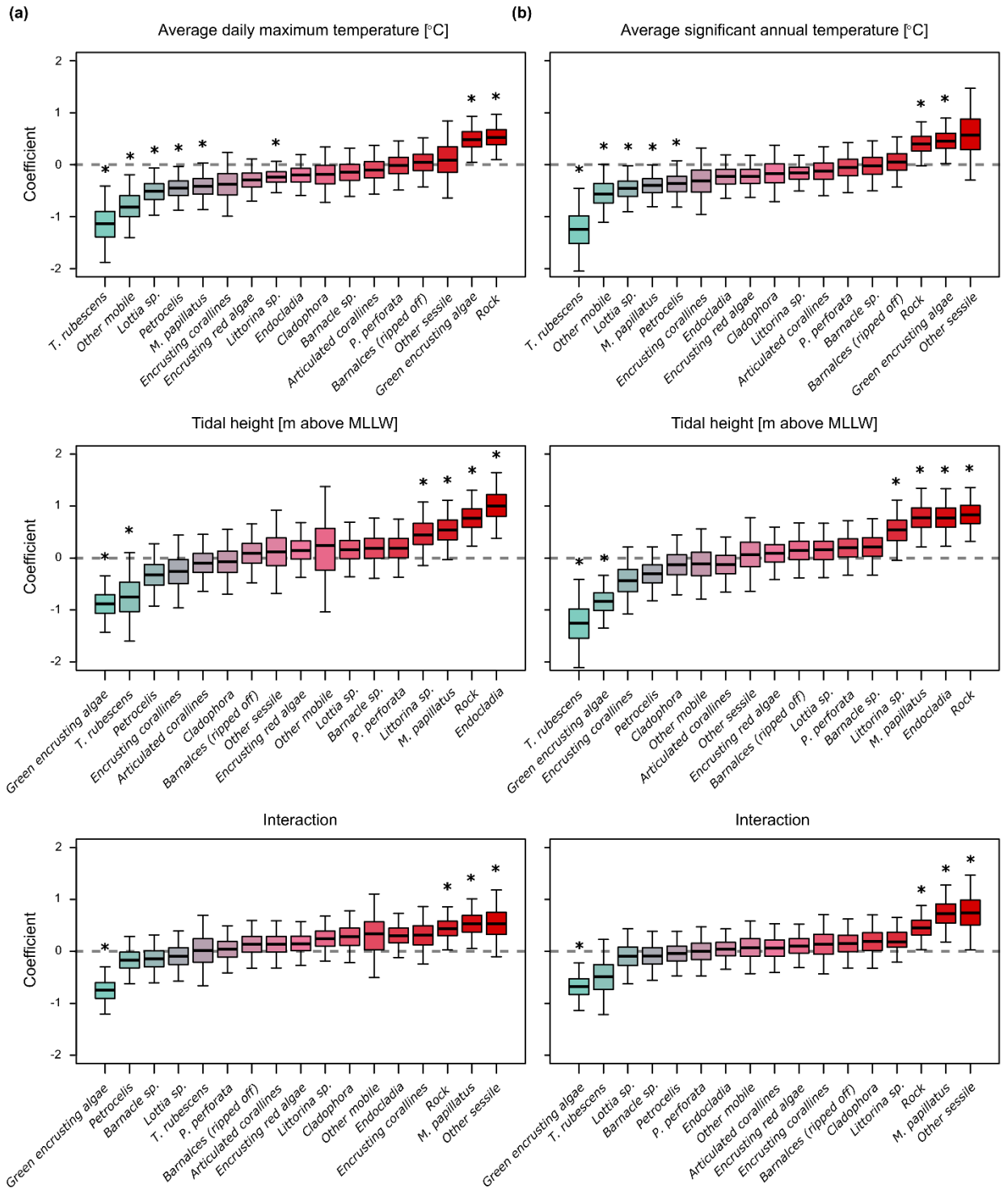

Figure A4. Effects of temperature, tidal height, and their interaction on the abundances of intertidal taxa in model 1 (a) and model 2 (b). Central black lines indicate median values, box and error bar sizes indicate interquartile range, stars indicate significant differences ($p < 0.05$) and color indicates the direction and magnitude of regression coefficients (blue = strongly

negative, pink = neutral, red = strongly positive). Green encrusting algae is referred to as 'biofilm' in the main paper.

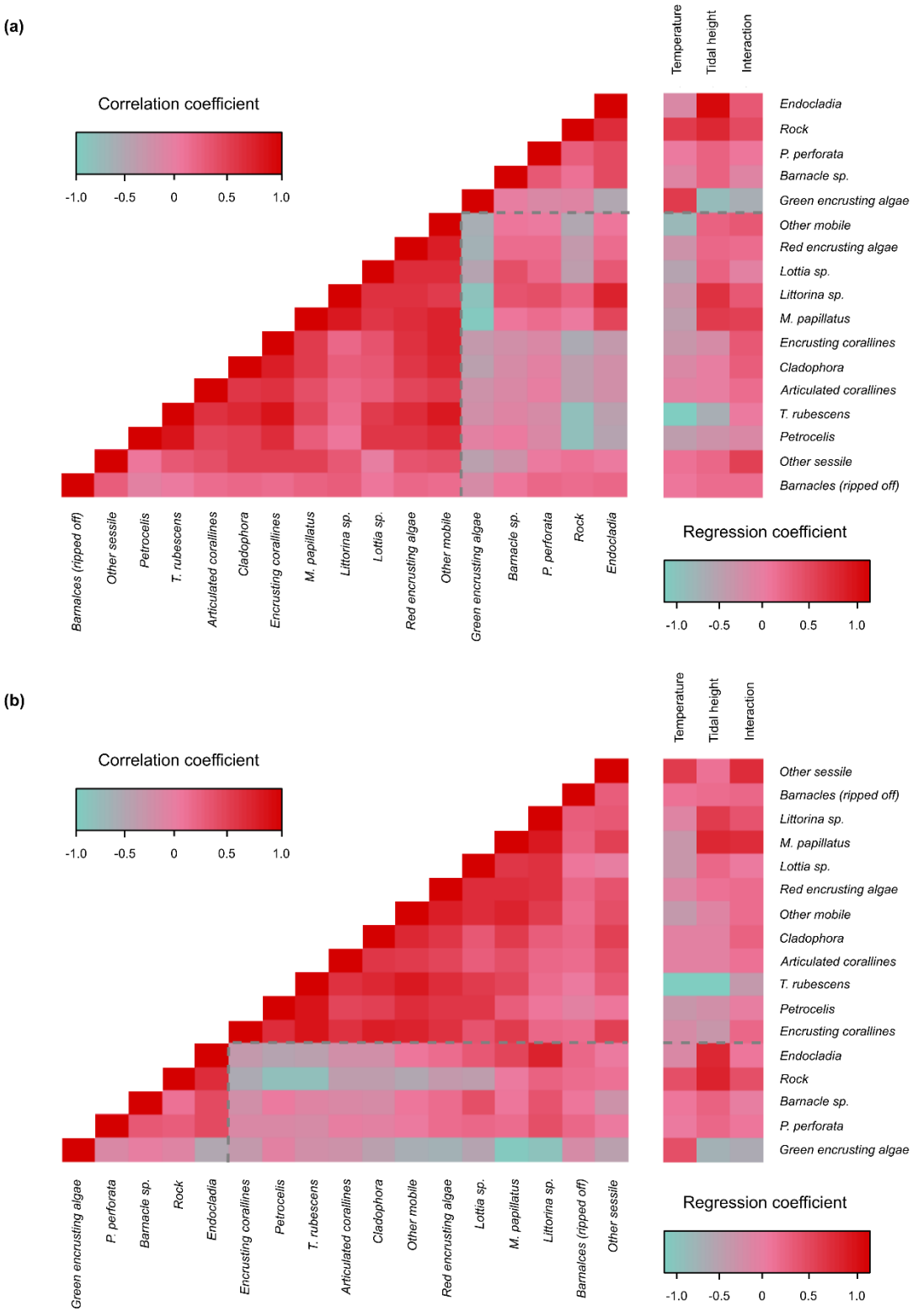

Figure A5. Heat maps of the effects of temperature, tidal height, and their interaction on the abundances of intertidal taxa paired with covariance matrices indicating clustering between those

taxa for model 1 (a) and model 2 (b). Colors in the heatmaps indicate the magnitude and direction of regression coefficients, while colors in the matrices indicate the magnitude and direction of correlation coefficients. Dashed lines separate clusters of associated species; green encrusting algae is referred to as 'biofilm' in the main paper.

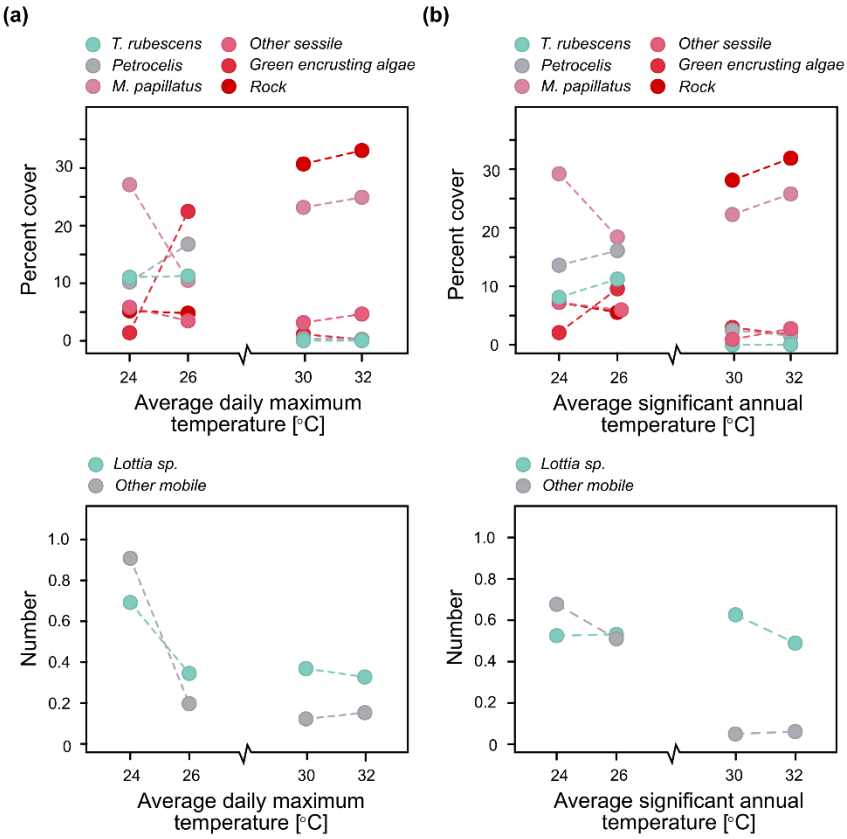

Figure A6. Changes in abundance of intertidal taxa as a function of temperature and tidal height as predicted by model 1 (a) and model 2 (b). Within each plot, points on the left indicate expected changes at 1.0 m above MLLW, while points on the right indicate expected changes at 2.0 m above MLLW. Colors indicate the direction and magnitude of the regression coefficient for temperature (blue = strongly negative, pink = neutral, red = strongly positive). Green encrusting algae is referred to as 'biofilm' in the main paper.