Supplementaries

Different Environmental Response Strategies in Sympatric Corals from Pacific Islands

Porro & Zamoum et al.

Figures	Page
Figure S1	2
Figure S2	3
Figure S3	4
Figure S4	11
Figure S5	15
Figure S6	17
Figure S7	18

Tables	Page
Table S1	5
Table S2	6
Table S3	7
Table S4	8
Table S5	9
Table S6	11
Table S7	12
Table S8	13
Table S9	16

Notes	Page
Note S1	14

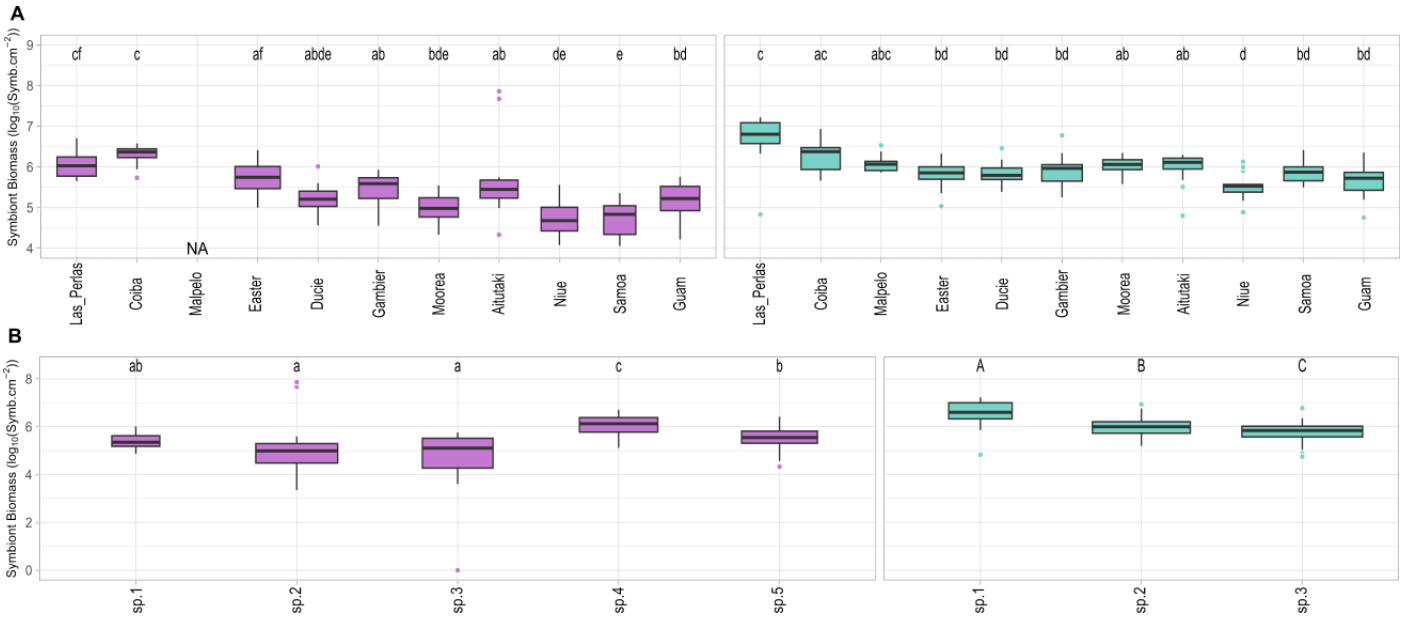

Figure S1: Symbiont biomass of coral colonies in function of Pacific island origins (A) and coral species (B). *Pocillopora* and *Porites* symbiotic biomasses are displayed in pink and cyan respectively. Significant differences among the islands (A) or the species (B) within the two genera have been tested by a Kruskall-Wallis' test and a Dunn's test as post-hoc. Identical letter above boxplots indicates no statistically significant differences. Island coordinates and dates are indicated in Table S8; species distributions and lineages are indicated in Figure S6 and Table 3.

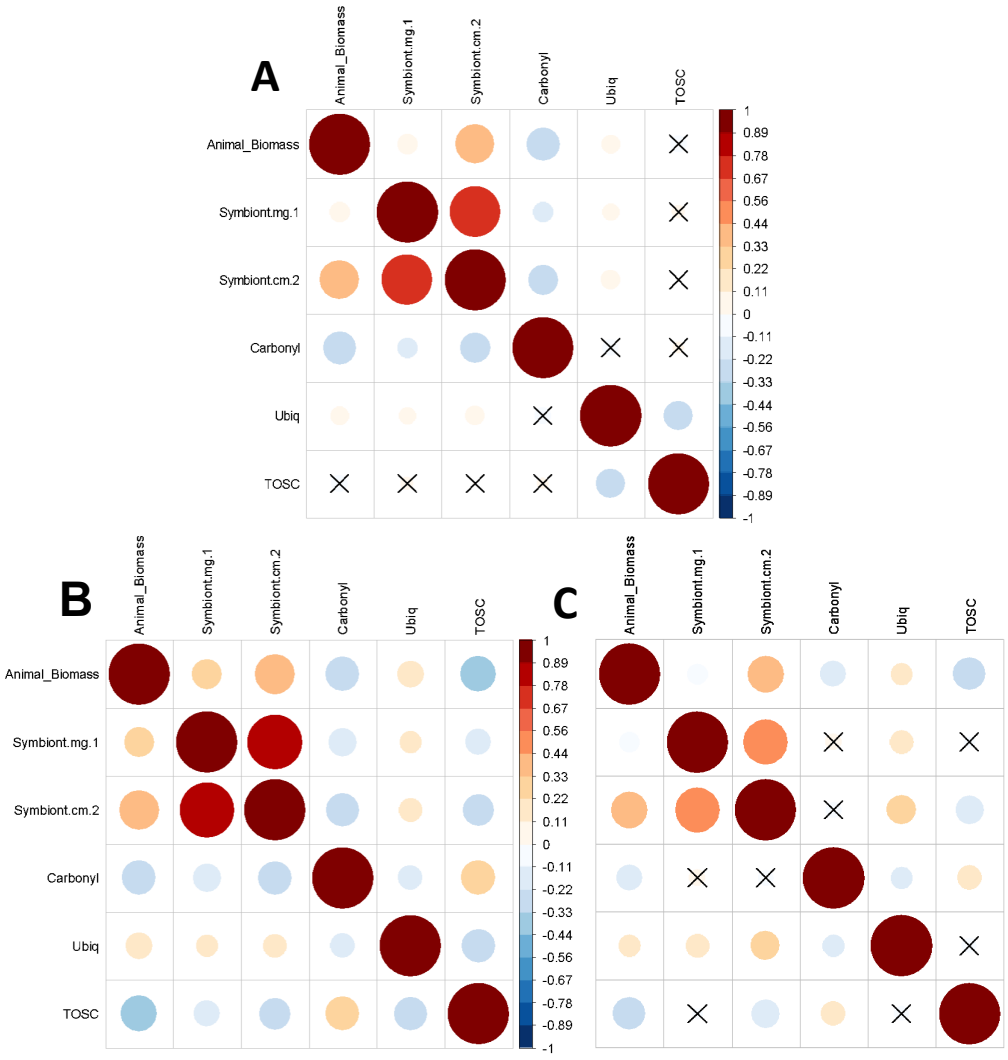

Figure S2: Pairwise correlations among the biomarkers, over the global dataset (A), for *Pocillopora* colonies (B) or for *Porites* colonies (C). The correlations were calculated with a Kendall's tau correlation; the bigger the dots are, the stronger the correlation is (positive correlations in red, negative correlations in blue). The crosses indicate non-significative correlations.

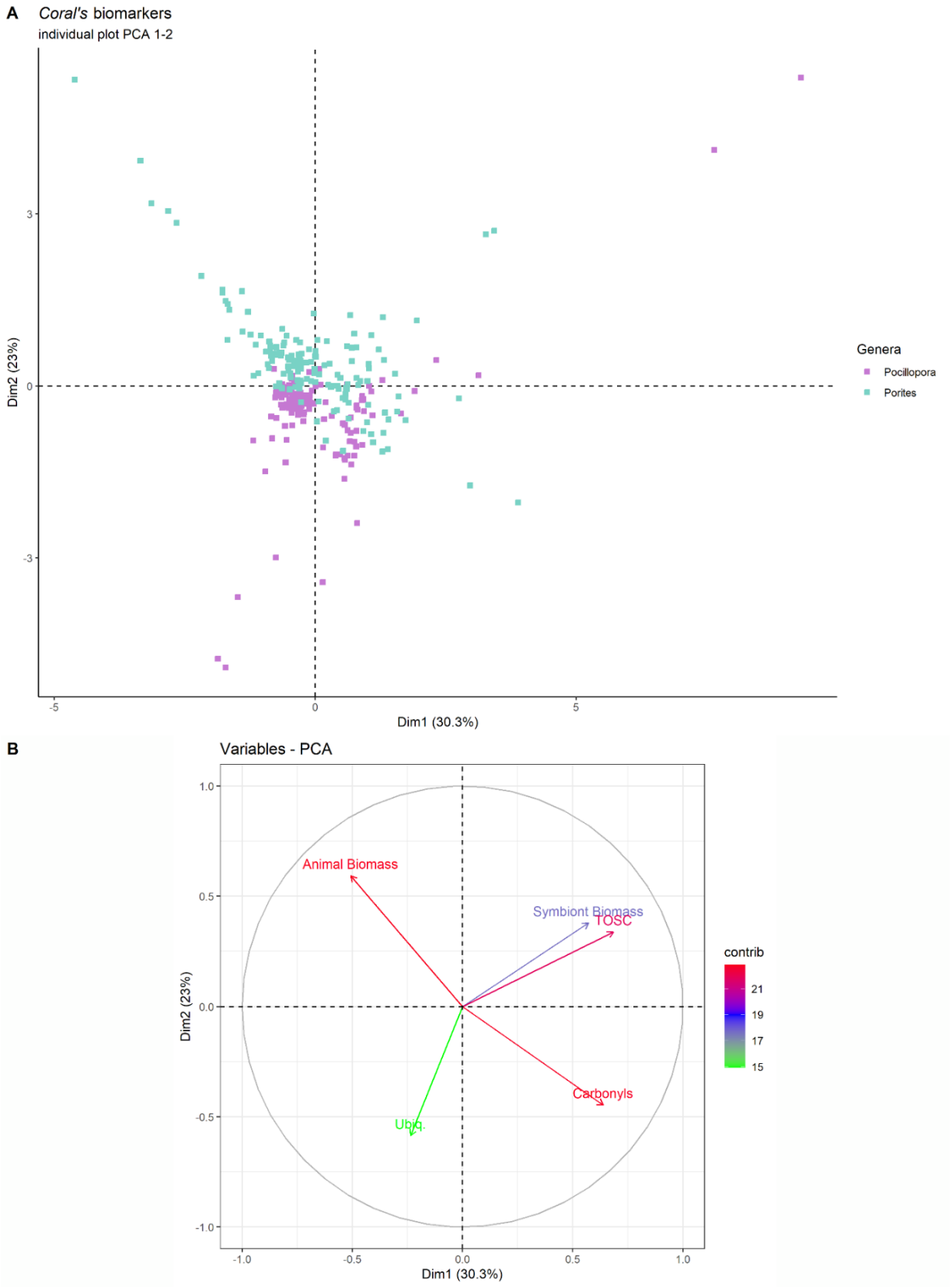

Figure S3: Phenotypic signatures of sampled corals

PCA on biomarkers data from *Pocillopora* (purple-pink) and *Porites (*cyan*)* colonies **(A)** and the contribution of the different biomarkers to the axes are shown in a correlation circle in **B** where the colour scale is the contribution of each biomarker to the plotted PCA dimensions.

Table S1: Phenotypes partitioning PERMANOVA and betadispersion test

PERMANOVA	Df	Sums of Squares	Mean Squares	F Model	R2	Pr(>F)
Genera	1	3.58	3.5796	23.041	0.07384	1.00E-04
Residuals	289	44.898	0.1554		0.92616	
Total	290	48.477			1	
betadisper	Df	Sum of Squares	Mean Square	F Model	N Perm	Pr(>F)
Genera	1	1.3161	1.31613	33.315	1000	0.001
Residuals	289	11.4173	0.03951			

Table S2: Biomarkers contribution to the PCA axes for *Pocillopora* and *Porites* genera

	Dim.1	Dim.2
Pocillopora		
Symbiont_Biomass	14.75549	16.5480988
Animal_Biomass	24.83581	0.09236123
Ubiquitination	1.48272	79.201819
TOSC	25.60077	3.78243821
Carbonylation	33.32521	0.37528276
Porites		
Symbiont_Biomass	0.2210198	52.2564307
Animal_Biomass	34.5795306	0.00211126
Ubiquitination	2.1847758	43.5524615
TOSC	31.9335822	0.61935624
Carbonylation	31.0810917	3.56964029

Table S3 : pairwise PERMANOVAs for *Pocillopora*'s phenotypic signatures according to the island origin of colonies. Statistically significant pairwise comparisons are in bold. P-values were computed over 30000 permutations, three times to ensure congruence, and adjusted with an FDR correction.

pairs	Df	SumsOfSqs	F.Model	R2	p.value	p.adjusted	p.value	p.adjusted	p.value	p.adjusted
Las_Perlas vs Coiba	1	0.2825	3.5028	0.1187	5.72E-02	8.87E-02	5.64E-02	8.75E-02	5.42E-02	8.40E-02
Las_Perlas vs Easter	1	0.4022	4.0181	0.1116	2.94E-02	**4.72E-02**	3.03E-02	**4.86E-02**	3.09E-02	**4.97E-02**
Las_Perlas vs Ducie	1	0.8534	8.5568	0.2996	2.07E-03	**4.23E-03**	1.23E-03	**3.08E-03**	2.10E-03	**4.50E-03**
Las_Perlas vs Gambier	1	1.0061	10.7563	0.2926	3.67E-04	**9.71E-04**	4.00E-04	**1.06E-03**	4.00E-04	**1.06E-03**
Las_Perlas vs Moorea	1	0.6412	6.6770	0.2328	6.07E-03	**1.09E-02**	6.73E-03	**1.21E-02**	5.17E-03	**9.30E-03**
Las_Perlas vs Aitutaki	1	0.8343	4.7459	0.1449	1.67E-03	**3.93E-03**	1.50E-03	**3.52E-03**	1.60E-03	**3.79E-03**
Las_Perlas vs Niue	1	2.8527	20.8536	0.4358	3.33E-05	**1.15E-04**	3.33E-05	**1.50E-04**	3.33E-05	**1.50E-04**
Las_Perlas vs Samoa	1	3.8503	30.5524	0.5218	3.33E-05	**1.15E-04**	3.33E-05	**1.50E-04**	3.33E-05	**1.50E-04**
Las_Perlas vs Guam	1	1.7967	14.4755	0.3408	3.33E-05	**1.15E-04**	3.33E-05	**1.50E-04**	3.33E-05	**1.50E-04**
Coiba vs Easter	1	1.2832	14.7219	0.3292	1.33E-04	**3.75E-04**	3.33E-05	**1.50E-04**	1.33E-04	**4.00E-04**
Coiba vs Ducie	1	1.5649	20.0271	0.5267	3.33E-05	**1.15E-04**	1.33E-04	**3.75E-04**	3.33E-05	**1.50E-04**
Coiba vs Gambier	1	1.9994	26.0226	0.5202	3.33E-05	**1.15E-04**	6.67E-05	**2.50E-04**	3.33E-05	**1.50E-04**
Coiba vs Moorea	1	1.4210	18.6413	0.4824	3.33E-05	**1.15E-04**	1.00E-04	**3.21E-04**	6.67E-05	**2.31E-04**
Coiba vs Aitutaki	1	1.6231	9.7364	0.2725	3.33E-05	**1.15E-04**	3.33E-05	**1.50E-04**	3.33E-05	**1.50E-04**
Coiba vs Niue	1	3.4780	27.9992	0.5283	3.33E-05	**1.15E-04**	3.33E-05	**1.50E-04**	3.33E-05	**1.50E-04**
Coiba vs Samoa	1	4.4098	38.9900	0.5999	3.33E-05	**1.15E-04**	3.33E-05	**1.50E-04**	3.33E-05	**1.50E-04**
Coiba vs Guam	1	2.7579	24.8350	0.4885	3.33E-05	**1.15E-04**	3.33E-05	**1.50E-04**	3.33E-05	**1.50E-04**
Easter vs Ducie	1	0.2469	2.3589	0.0895	1.02E-01	1.39E-01	1.05E-01	1.43E-01	1.05E-01	1.43E-01
Easter vs Gambier	1	0.2162	2.1987	0.0683	1.19E-01	1.52E-01	1.19E-01	1.53E-01	1.16E-01	1.50E-01
Easter vs Moorea	1	0.0912	0.9015	0.0335	3.91E-01	4.64E-01	3.92E-01	4.65E-01	3.91E-01	4.63E-01
Easter vs Aitutaki	1	0.3225	1.8971	0.0560	1.02E-01	1.39E-01	1.01E-01	1.43E-01	1.01E-01	1.43E-01
Easter vs Niue	1	2.1538	15.8549	0.3384	3.33E-05	**1.15E-04**	3.33E-05	**1.50E-04**	6.67E-05	**2.31E-04**
Easter vs Samoa	1	3.1307	24.7582	0.4362	3.33E-05	**1.15E-04**	3.33E-05	**1.50E-04**	3.33E-05	**1.50E-04**
Easter vs Guam	1	0.8435	6.7598	0.1744	1.83E-03	**3.93E-03**	2.10E-03	**4.30E-03**	1.97E-03	**4.42E-03**
Ducie vs Gambier	1	0.0179	0.1854	0.0102	8.38E-01	8.58E-01	8.39E-01	8.59E-01	8.36E-01	8.55E-01
Ducie vs Moorea	1	0.0442	0.4348	0.0301	6.30E-01	6.60E-01	6.26E-01	6.55E-01	6.30E-01	6.59E-01
Ducie vs Aitutaki	1	0.1962	0.9274	0.0443	4.37E-01	5.05E-01	4.43E-01	5.10E-01	4.42E-01	5.10E-01
Ducie vs Niue	1	0.7244	4.5834	0.1943	1.98E-02	**3.30E-02**	2.16E-02	**3.60E-02**	2.23E-02	**3.72E-02**
Ducie vs Samoa	1	1.1146	7.8553	0.2820	1.83E-03	**3.93E-03**	1.97E-03	**4.21E-03**	2.30E-03	**4.70E-03**
Ducie vs Guam	1	0.0967	0.6947	0.0336	5.07E-01	5.57E-01	5.17E-01	5.67E-01	5.12E-01	5.62E-01
Gambier vs Moorea	1	0.0118	0.1270	0.0063	8.90E-01	8.90E-01	8.90E-01	8.90E-01	8.92E-01	8.92E-01
Gambier vs Aitutaki	1	0.2476	1.3786	0.0504	2.27E-01	2.76E-01	2.30E-01	2.80E-01	2.28E-01	2.78E-01
Gambier vs Niue	1	1.2839	9.3300	0.2718	1.13E-03	**2.83E-03**	1.57E-03	**3.52E-03**	1.43E-03	**3.58E-03**
Gambier vs Samoa	1	1.9407	15.4054	0.3721	3.33E-05	**1.15E-04**	6.67E-05	**2.50E-04**	6.67E-05	**2.31E-04**
Gambier vs Guam	1	0.2595	2.0943	0.0745	1.29E-01	1.61E-01	1.29E-01	1.61E-01	1.27E-01	1.59E-01
Moorea vs Aitutaki	1	0.1846	0.9335	0.0407	4.52E-01	5.09E-01	4.53E-01	5.10E-01	4.54E-01	5.10E-01
Moorea vs Niue	1	1.1682	7.8606	0.2724	2.77E-03	**5.19E-03**	2.77E-03	**5.19E-03**	2.80E-03	**5.25E-03**
Moorea vs Samoa	1	1.7303	12.8774	0.3692	6.67E-05	**2.00E-04**	1.00E-04	**3.21E-04**	2.00E-04	**5.62E-04**
Moorea vs Guam	1	0.2929	2.2198	0.0917	1.12E-01	1.49E-01	1.09E-01	1.44E-01	1.14E-01	1.50E-01
Aitutaki vs Niue	1	1.2106	5.5116	0.1695	2.60E-03	**5.09E-03**	2.43E-03	**4.76E-03**	2.47E-03	**4.83E-03**
Aitutaki vs Samoa	1	1.8260	8.8674	0.2405	6.67E-05	**2.00E-04**	1.33E-04	**3.75E-04**	1.33E-04	**4.00E-04**
Aitutaki vs Guam	1	0.4305	2.1103	0.0701	8.22E-02	1.19E-01	8.13E-02	1.18E-01	8.10E-02	1.18E-01
Niue vs Samoa	1	0.1005	0.5981	0.0217	5.67E-01	6.07E-01	5.64E-01	6.05E-01	5.68E-01	6.08E-01
Niue vs Guam	1	0.4721	2.8430	0.0953	6.90E-02	1.04E-01	7.06E-02	1.06E-01	6.89E-02	1.03E-01
Samoa vs Guam	1	0.8913	5.7785	0.1711	7.87E-03	**1.36E-02**	7.00E-03	**1.21E-02**	8.73E-03	**1.51E-02**

Table S4: pairwise PERMANOVAs for *Pocillopora*'s phenotypic signatures according to the colony species. Statistically significant pairwise comparisons are in bold. P-values were computed over 10000 permutations, three times to ensure congruence, and adjusted with an FDR correction.

pairs	Df	SumsOf Sqs	F.Model	R2	p.value	p.adjusted	p.value	p.adjusted	p.value	p.adjusted
species4 vs species5	1	1.4224	13.6509	0.1853	2.00E-04	**3.33E-04**	1.00E-04	**2.00E-04**	2.00E-04	**4.00E-04**
species4 vs species1	1	1.7268	17.5450	0.2947	1.00E-04	**2.50E-04**	1.00E-04	**2.00E-04**	1.00E-04	**2.50E-04**
species4 vs species2	1	5.1697	32.3991	0.3326	1.00E-04	**2.50E-04**	1.00E-04	**2.00E-04**	1.00E-04	**2.50E-04**
species4 vs species3	1	3.5823	22.8841	0.2901	1.00E-04	**2.50E-04**	1.00E-04	**2.00E-04**	1.00E-04	**2.50E-04**
species5 vs species1	1	0.2041	1.9938	0.0475	1.36E-01	1.51E-01	1.40E-01	1.56E-01	1.41E-01	1.57E-01
species5 vs species2	1	2.2004	13.4163	0.1756	1.00E-04	**2.50E-04**	1.00E-04	**2.00E-04**	1.00E-04	**2.50E-04**
species5 vs species3	1	1.3910	8.6067	0.1375	2.00E-04	**3.33E-04**	5.00E-04	**8.33E-04**	6.00E-04	**1.00E-03**
species1 vs species2	1	0.7574	4.1491	0.0844	1.01E-02	**1.44E-02**	1.27E-02	**1.81E-02**	1.10E-02	**1.57E-02**
species1 vs species3	1	0.5586	3.0426	0.0779	4.35E-02	5.44E-02	4.36E-02	5.45E-02	4.36E-02	5.45E-02
species2 vs species3	1	0.1157	0.5315	0.0089	6.62E-01	6.62E-01	6.70E-01	6.70E-01	6.66E-01	6.66E-01

Table S5: pairwise PERMANOVAs for *Porites*' phenotypic signatures according to the island origin of colonies. Statistically significant pairwise comparisons are in bold. P-values were computed over 10000 permutations, three times to ensure congruence, and adjusted with an FDR correction.

pairs	Df	SumsOfSqs	F.Model	R2	p.value	p.adjusted	p.value	p.adjusted	p.value	p.adjusted
Las_Perlas vs Coiba	1	0.4632	3.7373	0.1347	2.16E-02	**4.75E-02**	2.30E-02	**4.86E-02**	2.33E-02	**4.93E-02**
Las_Perlas vs Malpelo	1	0.3630	4.1059	0.1945	1.62E-02	**3.87E-02**	1.60E-02	**3.83E-02**	1.68E-02	**4.02E-02**
Las_Perlas vs Easter	1	0.8109	11.4410	0.2574	1.00E-04	**1.37E-03**	2.00E-04	**1.57E-03**	4.00E-04	**3.14E-03**
Las_Perlas vs Ducie	1	0.2902	3.5370	0.1197	2.26E-02	**4.78E-02**	2.13E-02	**4.86E-02**	1.94E-02	**4.45E-02**
Las_Perlas vs Gambier	1	0.2386	2.7340	0.0919	4.78E-02	9.06E-02	4.74E-02	8.99E-02	4.79E-02	9.08E-02
Las_Perlas vs Moorea	1	0.1267	1.3946	0.0491	2.08E-01	2.86E-01	2.05E-01	2.82E-01	2.20E-01	2.99E-01
Las_Perlas vs Aitutaki	1	0.0507	0.4663	0.0164	7.04E-01	7.59E-01	7.11E-01	7.66E-01	7.12E-01	7.68E-01
Las_Perlas vs Niue	1	1.2360	14.7687	0.3453	2.00E-04	**1.57E-03**	1.00E-04	**9.17E-04**	1.00E-04	**1.10E-03**
Las_Perlas vs Samoa	1	0.0248	0.3183	0.0117	9.55E-01	9.55E-01	9.57E-01	9.57E-01	9.57E-01	9.57E-01
Las_Perlas vs Guam	1	0.0866	0.8489	0.0328	5.22E-01	5.86E-01	5.21E-01	5.96E-01	5.20E-01	5.96E-01
Coiba vs Malpelo	1	0.7422	5.6048	0.3013	1.38E-02	**3.45E-02**	1.59E-02	**3.83E-02**	1.45E-02	**3.62E-02**
Coiba vs Easter	1	1.6042	18.1925	0.3855	1.00E-04	**1.37E-03**	1.00E-04	**9.17E-04**	1.00E-04	**1.10E-03**
Coiba vs Ducie	1	0.9399	8.7938	0.2856	2.30E-03	**1.26E-02**	1.90E-03	**1.04E-02**	2.00E-03	**1.00E-02**
Coiba vs Gambier	1	0.8494	7.5876	0.2481	2.70E-03	**1.35E-02**	3.50E-03	**1.60E-02**	1.90E-03	**1.00E-02**
Coiba vs Moorea	1	0.2195	1.8899	0.0759	1.42E-01	2.18E-01	1.45E-01	2.22E-01	1.43E-01	2.20E-01
Coiba vs Aitutaki	1	0.4624	3.4008	0.1241	3.11E-02	6.33E-02	3.23E-02	6.34E-02	3.08E-02	6.05E-02
Coiba vs Niue	1	1.8192	17.0442	0.4153	1.00E-04	**1.37E-03**	1.00E-04	**9.17E-04**	1.00E-04	**1.10E-03**
Coiba vs Samoa	1	0.4861	4.8169	0.1732	1.19E-02	**3.17E-02**	1.15E-02	**3.19E-02**	1.26E-02	**3.62E-02**
Coiba vs Guam	1	0.6143	4.6594	0.1816	1.03E-02	**3.15E-02**	1.06E-02	**3.19E-02**	9.60E-03	**3.11E-02**
Malpelo vs Easter	1	0.0036	0.0721	0.0033	9.30E-01	9.55E-01	9.31E-01	9.56E-01	9.25E-01	9.56E-01
Malpelo vs Ducie	1	0.0605	1.0308	0.0643	3.30E-01	4.04E-01	3.36E-01	4.10E-01	3.44E-01	4.20E-01
Malpelo vs Gambier	1	0.0824	1.1944	0.0695	2.80E-01	3.50E-01	2.89E-01	3.61E-01	2.84E-01	3.56E-01
Malpelo vs Moorea	1	0.5665	7.5535	0.3207	7.70E-03	**2.65E-02**	6.80E-03	**2.49E-02**	6.00E-03	**2.20E-02**
Malpelo vs Aitutaki	1	0.2599	2.4659	0.1267	9.29E-02	1.55E-01	9.29E-02	1.57E-01	9.28E-02	1.55E-01
Malpelo vs Niue	1	0.0466	0.7269	0.0410	4.44E-01	5.19E-01	4.41E-01	5.16E-01	4.36E-01	5.11E-01
Malpelo vs Samoa	1	0.3667	6.9048	0.3015	1.21E-02	**3.17E-02**	1.16E-02	**3.19E-02**	1.33E-02	**3.62E-02**
Malpelo vs Guam	1	0.1615	1.7427	0.1107	1.87E-01	2.71E-01	1.88E-01	2.72E-01	1.82E-01	2.70E-01
Easter vs Ducie	1	0.0964	1.7415	0.0532	1.78E-01	2.65E-01	1.68E-01	2.50E-01	1.89E-01	2.74E-01
Easter vs Gambier	1	0.1439	2.3750	0.0691	1.00E-01	1.62E-01	9.88E-02	1.60E-01	1.06E-01	1.71E-01
Easter vs Moorea	1	1.2873	20.2347	0.3874	4.00E-04	**2.75E-03**	1.00E-04	**9.17E-04**	1.00E-04	**1.10E-03**
Easter vs Aitutaki	1	0.5558	6.9809	0.1746	3.30E-03	**1.51E-02**	3.00E-03	**1.50E-02**	2.80E-03	**1.28E-02**
Easter vs Niue	1	0.1522	2.6071	0.0732	9.05E-02	1.55E-01	9.43E-02	1.57E-01	8.58E-02	1.47E-01
Easter vs Samoa	1	0.8009	15.2043	0.3221	1.00E-04	**1.37E-03**	3.00E-04	**2.06E-03**	5.00E-04	**3.44E-03**
Easter vs Guam	1	0.2992	4.2075	0.1230	2.01E-02	**4.61E-02**	2.27E-02	**4.86E-02**	2.30E-02	**4.93E-02**
Ducie vs Gambier	1	0.0049	0.0701	0.0028	9.43E-01	9.55E-01	9.38E-01	9.56E-01	9.38E-01	9.56E-01
Ducie vs Moorea	1	0.5905	8.0666	0.2440	5.30E-03	**2.08E-02**	5.80E-03	**2.28E-02**	4.80E-03	**1.89E-02**
Ducie vs Aitutaki	1	0.1771	1.9015	0.0682	1.43E-01	2.18E-01	1.45E-01	2.22E-01	1.44E-01	2.20E-01

Ducie vs Niue	1	0.3719	5.6213	0.1778	1.20E-02	**3.17E-02**	1.33E-02	**3.48E-02**	1.39E-02	**3.62E-02**
Ducie vs Samoa	1	0.2812	4.7500	0.1597	3.36E-02	6.60E-02	2.94E-02	5.99E-02	3.02E-02	6.05E-02
Ducie vs Guam	1	0.0666	0.7948	0.0334	4.35E-01	5.19E-01	4.18E-01	5.00E-01	4.28E-01	5.11E-01
Gambier vs Moorea	1	0.5119	6.4818	0.1996	1.00E-02	**3.15E-02**	1.11E-02	**3.19E-02**	1.25E-02	**3.62E-02**
Gambier vs Aitutaki	1	0.1325	1.3528	0.0477	2.59E-01	3.39E-01	2.55E-01	3.34E-01	2.46E-01	3.22E-01
Gambier vs Niue	1	0.4415	6.1334	0.1851	7.50E-03	**2.65E-02**	9.80E-03	**3.19E-02**	7.90E-03	**2.72E-02**
Gambier vs Samoa	1	0.2321	3.5437	0.1199	5.13E-02	9.35E-02	5.70E-02	1.01E-01	5.45E-02	9.67E-02
Gambier vs Guam	1	0.0447	0.4988	0.0204	6.44E-01	7.08E-01	6.34E-01	6.98E-01	6.45E-01	7.09E-01
Moorea vs Aitutaki	1	0.1647	1.6226	0.0567	2.01E-01	2.83E-01	2.03E-01	2.82E-01	1.99E-01	2.80E-01
Moorea vs Niue	1	1.6593	21.9602	0.4485	2.00E-04	**1.57E-03**	1.00E-04	**9.17E-04**	1.00E-04	**1.10E-03**
Moorea vs Samoa	1	0.1034	1.4941	0.0543	2.17E-01	2.91E-01	2.18E-01	2.92E-01	2.23E-01	2.99E-01
Moorea vs Guam	1	0.2878	3.0734	0.1135	5.27E-02	9.35E-02	5.20E-02	9.53E-02	5.16E-02	9.46E-02
Aitutaki vs Niue	1	0.8755	9.3152	0.2496	1.10E-03	**6.72E-03**	1.10E-03	**6.72E-03**	8.00E-04	**4.89E-03**
Aitutaki vs Samoa	1	0.0562	0.6348	0.0230	5.22E-01	5.86E-01	5.31E-01	5.96E-01	5.33E-01	5.98E-01
Aitutaki vs Guam	1	0.0293	0.2585	0.0102	8.32E-01	8.80E-01	8.26E-01	8.73E-01	8.30E-01	8.78E-01
Niue vs Samoa	1	1.2375	19.7721	0.4227	2.00E-04	**1.57E-03**	1.00E-04	**9.17E-04**	2.00E-04	**1.83E-03**
Niue vs Guam	1	0.5886	6.8842	0.2159	4.30E-03	**1.82E-02**	5.60E-03	**2.28E-02**	4.00E-03	**1.69E-02**
Samoa vs Guam	1	0.0977	1.2360	0.0490	2.65E-01	3.39E-01	2.66E-01	3.40E-01	2.70E-01	3.46E-01

Table S6: pairwise PERMANOVAs for *Porites'* phenotypic signatures according to the colony species. Statistically significant pairwise comparisons are in bold. P-values were computed over 10000 permutations, three times to ensure congruence, and adjusted with an FDR correction.

pairs	Df	SumsOfSqs	F.Model	R2	p.value	p.adjusted	p.value	p.adjusted	p.value	p.adjusted
species1 vs species2	1	0.1978	1.9826	0.0279	1.21E-01	1.21E-01	1.19E-01	1.19E-01	1.27E-01	1.27E-01
species1 vs species3	1	0.8028	9.5221	0.0911	3.00E-04	**4.50E-04**	2.00E-04	**3.00E-04**	1.00E-04	**1.50E-04**
species2 vs species3	1	2.8658	32.7290	0.2088	1.00E-04	**3.00E-04**	1.00E-04	**3.00E-04**	1.00E-04	**1.50E-04**

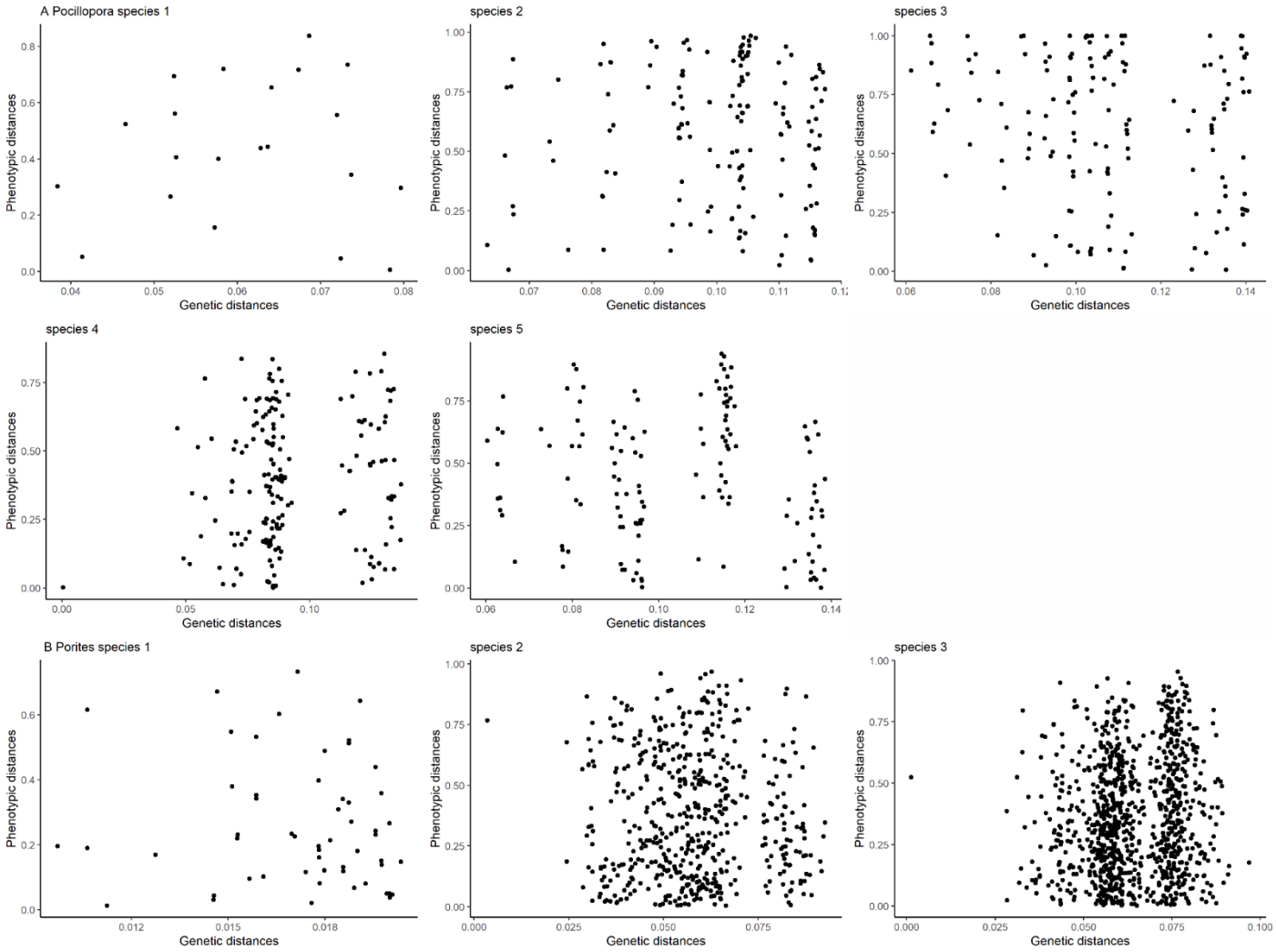

Figure S4: Mantel test analyses of the correlation between phenotypic and genetic distances within *Pocillopora* and *Porites*' species.

(A) Scatterplots of *Pocillopora*'s species are represented separately for the five identified species; **(B)** Scatterplots of *Porites*' species are represented separately for the three identified species**.** No significant correlation highlighted with Mantel's test.

Table S7 : The sPLS correlation coefficient values of the environmental variables shared by *Pocillopora* and *Porites*

	Pocillopora				*Porites*			
Variables (abbreviation and name)	Animal Biomass	Symbiont Biomass	Carbonyl	TOSC	Animal Biomass	Symbiont Biomass	Carbonyl	TOSC
KD490_Sat (C_Phy_090)	0.3626205	0.3078991	-0.1884307	-0.1510324	0.3718055	0.13943318	-0.2967091	-0.3280806
o2_copernicus (C_Phy_081)	0.3066492	0.2293903	-0.5926832	-0.3474275	0.3688245	-0.14596093	-0.2948410	-0.2220710
ssh_copernicus (C_Dyn_077)	-0.4842860	-0.3961279	0.4625137	0.3086157	-0.5490040	-0.05183744	0.4383943	0.4284195
SST_anomaly_freq_max_day (H_Cli_013)	0.4733444	0.3887522	-0.4300496	-0.2904815	0.4981014	0.02336264	-0.3977898	-0.3800900
SST_anomaly_freq_std_day (H_Cli_015)	0.4766603	0.3910880	-0.4384812	-0.2952639	0.4872034	0.02914795	-0.3890752	-0.3740638
Sun (C_Phy_101)	0.5101358	0.4048833	-0.6604692	-0.4129376	0.4201951	-0.01595004	-0.3356369	-0.3076740
TSA_DHW_freq_snapshot_ sampling_day_day (R_Cli_029)	0.3898923	0.3244463	-0.2950377	-0.2092572	0.1790870	0.35823906	-0.1423924	-0.2638789

Table S8: Sampling sites and GPS coordinates

Islands	ISCOA	lat	lon	date
Las Perlas	S01	8.57953	-79.02073	17 July 2016
	S02	8.597767	-79.02493	18 July 2016
	S03	8.6501	-79.0339	25 July 2016
Coiba	S01	7.8732	-81.7942	20 July 2016
	S02	7.65115	-81.6876	21 July 2016
	S03	7.2092	-81.7962	23 July 2016
Malpelo	S01	3.9873	-81.5915	05 August 2016
	S02	3.9857	-81.5999	06 August 2016
Easter Island	S01	-27.068765	-109.32638	03 September 2016
	S02	-27.068517	-109.32072	04 September 2016
	S03	-27.12205	-109.42873	06 September 2016
	S04	-27.147855	-109.4393	07 September 2016
Ducie	S01	-24.677467	-124.7701	13 September 2016
	S02	-24.696867	-124.79448	14 September 2016
	S03	-24.6797	-124.80182	15 September 2016
Gambier	S01	-23.0748	-135.01727	21 September 2016
	S02	-23.1651	-134.84798	23 September 2016
	S03	-23.237333	-134.9566	24 September 2016
Moorea	S01	-17.482567	-149.88647	06 November 2016
	S02	-17.518433	-149.924	07 November 2016
	S03	-17.489667	-149.75505	08 November 2016
Aitutaki	S01	-18.839967	-159.8009	13 November 2016
	S02	-18.913967	-159.8451	15 November 2016
	S03	-18.8678	-159.81868	16 November 2016
Niue	S01	-19.113433	-169.91423	22 November 2016
	S02	-18.985417	-169.90327	23 November 2016
	S03	-19.041817	-169.9185	24 November 2016
Samoa	S01	-14.017767	-171.8425	01 December 2016
(Upolu)	S02	-14.061447	-171.43037	02 December 2016
	S03	-13.918767	-171.54157	03 December 2016
Guam	S01	13.249733	144.64495	28 January 2017
	S02	13.4172	144.64463	29 January 2017
	S03	13.3434	144.6361	30 January 2017

Note S1: REFERENCES FOR RESEARCH (UNCLOS) PERMITS and FOR CITES PERMITS

UNCLOS PERMITS

Sampling permit for PANAMA under the reference 'SE/AP-18-16' delivered by the Direccion de Areas Protegidas y Vida Silvestre - LIC. Samuel Valdez Diaz Director - Ministerio de Ambiente – Republica de Panama on the 13/06/2016; Sampling permit for PANAMA under the reference '2016-0701-2019-2' delivered by the Smithsonian Tropical Research Institute Instituto Smithsonian de Investigaciones Tropicales - STRI Animal Care and Use Committee (ACUC) on the 28/06/2016; Sampling permit for PANAMA under the reference '2016-0701-2019-2-A1' delivered by the Smithsonian Tropical Research Institute Instituto Smithsonian de Investigaciones Tropicales - STRI Animal Care and Use Committee (ACUC) on the 21/06/2018; Sampling permit for COLOMBIA under the reference 'N°009' delivered by the MINISTERIO DE AMBIENTE Y DESARROLLO SOSTENIBLEPARQUES NACIONALES NATURALES DE COLOMBIA on the 04/03/2016; Sampling permit for CHILE under the reference '13270/24/457/Vrs' delivered by the Servicio Hidrografico y Oceanografico de la Armada de Chile (SHOA) – Patricio Carrasco Hellwig Contraalmirante Director on the 29/08/2016; Sampling permit for UNITED-KINGDOM (PITCAIRN ISLANDS) under the reference 'N/A' delivered by the Government of Pitcairn islands /Environmental, Conservation & Natural Resources Division Manager // Christian Michele on the 25/02/2016; Sampling permit for COOK under the reference '11-16' delivered by the Foundation for National Research – Cook Island Research Committee – Office of the Prime Minister – Elizabeth Wright-Koteka (Chairperson) on the 12/09/2016; Sampling permit for NIUE under the reference '34/16' delivered by the Government of Niue – Office for External Affairs on the 17/11/2016; Sampling permit for SAMOA under the reference 'Memorandum of Agreement' delivered by the THE GOVERNMENT OF THE INDEPENDENT STATE OF SAMOA acting by and through the Ministry of Natural Resources and Environment on the 29/11/2016; Sampling permit for GUAM under the reference 'U2021-023' delivered by the Marine Scientific Research Coordinator Office of Ocean and Polar Affairs – United States Department of State Bureau of Oceans and International Environmental and Scientific Affairs on the 27/10/2021.

CITES PERMITS

CITES export permit for PANAMA (I01) under the reference 'SEX/A-72-16' delivered by the Autoridad Nacional del Ambiente (ANAM) de la República de Panamá – Autoridad Administrativa CITES on the 28/07/2016; CITES final import permit under the reference 'FR1609100066-I' delivered the 04/08/2016 by the DRIEE ILE-DE-FRANCE; CITES export permit for PANAMA (I02) under the reference 'SEX/A-72-16' delivered by the Autoridad Nacional del Ambiente (ANAM) de la República de Panamá – Autoridad Administrativa CITES on the 28/07/2016; CITES final import permit under the reference 'FR1609100066-I' delivered the 04/08/2016 by the DRIEE ILE-DE-FRANCE; CITES export permit for COLOMBIA (I03) under the reference '41499' delivered by the Ministerio de Ambiente y Desarrollo Sostenible de la República de Colombia on the 13/02/2017; CITES final import permit under the reference 'FR1707506158-I' delivered the 17/03/2017 by the DRIEE ILE-DE-FRANCE; CITES export permit for CHILE (I04) under the reference '16CL000007WS' delivered by the Servicio Nacional de Pesca y Acuicultura on the 02/09/2016; CITES final import permit under the reference 'FR1607525599-I' delivered the 03/11/2016 by the DRIEE ILE-DE-FRANCE; CITES export permit for UNITED-KINGDOM (PITCAIRN ISLANDS; I05) under the reference 'FR1698700198-E' delivered by the Haut-Commissariat de la République en Polynésie Française on the 03/11/2016; CITES final import permit under the reference 'FR1607525646-I' delivered the 04/11/2016 by the DRIEE ILE-DE-FRANCE; CITES export permit for FRENCH POLYNESIA (GAMBIER – TUAMOTU; I06) under the reference 'FR1698700198-E' delivered by the Haut-Commissariat de la République en Polynésie Française on the 03/11/2016; CITES final import permit under the reference 'FR1607525646-I' delivered the 04/11/2016 by the DRIEE ILE-DE-FRANCE; CITES export permit for MOOREA (I07) under the reference 'FR1698700218-E' delivered by the Haut-Commissariat de la République en Polynésie Française on the 21/11/2016; CITES final import permit under the reference 'FR1707503441-I ' delivered the 07/02/2017 by the DRIEE ILE-DE-FRANCE; CITES export permit for COOK (I08) under the reference 'CK/2016 – 14278' delivered by the Tu'anga Taporoporo national environment service of the Cook Islands on the 17/11/2016; CITES final import permit under the reference 'FR1707503442-I ' delivered the 07/02/2017 by the DRIEE ILE-DE-FRANCE; CITES export permit for NIUE (I09) under the reference 'N/A' delivered by the N/A on the N/A; CITES final import permit under the reference 'FR1707511900-I' delivered the 11/06/2017 by the DRIEE ILE-DE-FRANCE; CITES export permit for SAMOA (I10) under the reference 'SAMC16012' delivered by the Ministry of Natural Resources and Environment (MNRE) of the Government of Samoa on the 29/11/2016; CITES final import permit under the reference 'FR1707503440-I' delivered the 07/02/2017 by the DRIEE ILE-DE-FRANCE; CITES export permit for GUAM (I15) under the reference '17US18844C/9' delivered by the U.S. Fish and Wildlife service – Division of management authority – Branch of permits on the 02/03/2017; CITES final import permit under the reference 'FR1707503440-I' delivered the 07/02/2017 by the DRIEE ILE-DE-FRANCE.

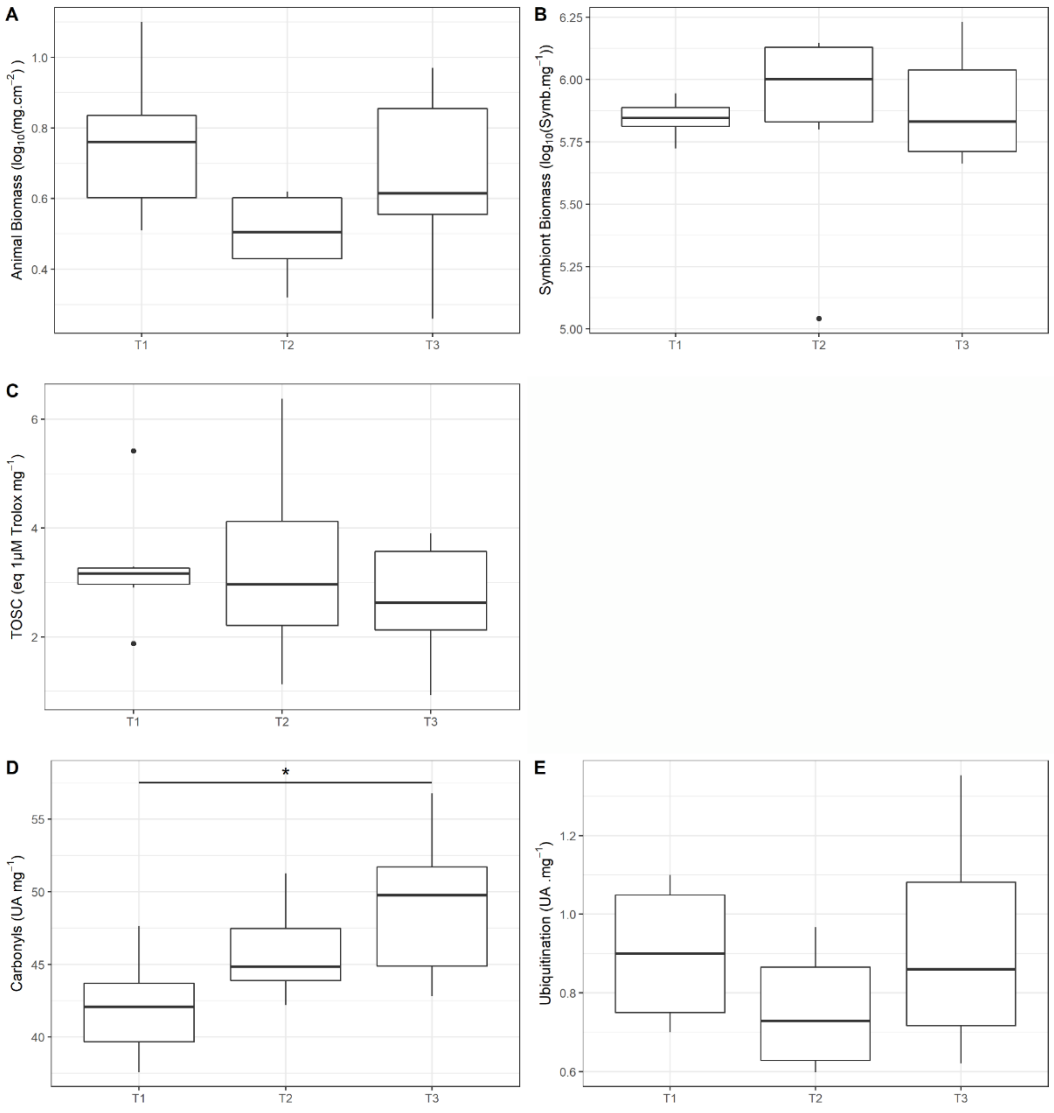

Figure S5: Impact of freezing time lag after *Pocillopora* coral sampling

The five biomarkers were measured on fragments of six *Pocillopora* colonies, which have endured different lag times before on board freezing (T1=30min, T2=1h30, and T3=3h). During the entire TaraPacific transect, the freezing time lag after sampling was variable, between 30min and 1h30 in function of sampling site distance from the TARA goelette. None sample used in the present study endured 3 hours before freezing but this time point was used as an extreme time point. During the time lab before freezing, the samples were maintained on board in seawater and shadow conditions. Parametric statistical tests were performed with R for all biomarkers (one-way ANOVA and if necessary HSD Tukey's post-hoc test), except for symbiont biomass analysed with non-parametric statistical test (Kruskal-Wallis test following by Dunn test with an FDR correction). Only colony fragments experiencing 3 hours of freezing time lag started to present signs of suffering with a significant increase of protein carbonylation ($p<0.05$).

Table S9: Environmental variables and abbreviations (from Lombard et al. 2023)

The environmental data are identified as historical (H), recent (R) and contemporary to the sampling (C) and classified with a 3-letters code for biological (Bio); hydro- and aerodynamics (Dyn); physico-chemical (Phy); and climatic data (Cli). Additional symbols highlight the interpretation we give to the highest correlated environmental variables to the biomarkers (Figure 6 et 7, Table 2)

Variables	Codes	Variables	Codes	Variables	Codes
SST_min_DegC	H_Cli_001	TSA_DHW_maxlenght_day	H_Cli_035	TSA_DCW_lastsum_DegC	H_Cli_069
SST_max_DegC	H_Cli_002	TSA_DHW_meanlenght_day	H_Cli_036	TSA_DCW_lastduration_day	H_Cli_070
SST_mean_DegC	H_Cli_003	TSA_DHW_stdlenght_day	H_Cli_037	TSA_DCW_minrecovery_day	H_Cli_071
SST_std_DegC	H_Cli_004	TSA_DHW_lastmax_DegC	H_Cli_038	TSA_DCW_maxrecovery_day	H_Cli_072
seasonal_min_DegC	H_Cli_005	TSA_DHW_lastsum_DegC	H_Cli_039	TSA_DCW_meanrecovery_day	H_Cli_073
seasonal_max_DegC	H_Cli_006	TSA_DHW_lastduration_day	H_Cli_040	TSA_DCW_lastrecovery_day	H_Cli_074
seasonal_mean_DegC	H_Cli_007	TSA_DHW_minrecovery_day	H_Cli_041	airTemp	C_Cli_075
seasonal_std_DegC	H_Cli_008	TSA_DHW_maxrecovery_day	H_Cli_042	true_wind_speed	C_Dyn_076
SST_anomaly_min_DegC	H_Cli_009	TSA_DHW_meanrecovery_day	H_Cli_043	ssh_copernicus	C_Dyn_077
SST_anomaly_max_DegC	H_Cli_010	TSA_DHW_lastrecovery_day	H_Cli_044	current_speed_copernicus	C_Dyn_078
SST_anomaly_mean_DegC	H_Cli_011	TSA_cold_snapshot_sampling_day_DegC	R_Cli_045	MLD_copernicus	C_Phy_079
SST_anomaly_std_DegC	H_Cli_012	TSA_cold_min_DegC	H_Cli_046	wavesignificantheight_copernicus	C_Dyn_080
SST_anomaly_freq_max_day	H_Cli_013	TSA_cold_mean_DegC	H_Cli_047	o2_copernicus	C_Phy_081
SST_anomaly_freq_mean_day	H_Cli_014	TSA_cold_std_DegC	H_Cli_048	phyc_copernicus	C_Bio_082
SST_anomaly_freq_std_day	H_Cli_015	TSA_cold_freq_snapshot_sampling_day_day	R_Cli_049	spco2_copernicus	C_Phy_083 H+
TSA_heat_snapshot_sampling_day_DegC	R_Cli_016	TSA_cold_freq_max_day	H_Cli_050	SST	C_Cli_084 °C
TSA_heat_max_DegC	H_Cli_017	TSA_cold_freq_sum_day	H_Cli_051	SSS	C_Phy_085
TSA_heat_mean_DegC	H_Cli_018	TSA_cold_freq_mean_day	H_Cli_052	chl	C_Bio_086
TSA_heat_std_DegC	H_Cli_019	TSA_cold_freq_std_day	H_Cli_053	PAR_Sat	C_Phy_087
TSA_heat_freq_snapshot_sampling_day_day	R_Cli_020	TSA_DCW_snapshot_sampling_day_DegC	R_Cli_054	PIC_Sat	C_Phy_088
TSA_heat_freq_max_day	H_Cli_021	TSA_DCW_min_DegC	H_Cli_055	bb_GSM_Sat	C_Phy_089
TSA_heat_freq_sum_day	H_Cli_022	TSA_DCW_sum_DegC	H_Cli_056	KD490_Sat	C_Phy_090
TSA_heat_freq_mean_day	H_Cli_023	TSA_DCW_mean_DegC	H_Cli_057	Syn_mL	C_Bio_091
TSA_heat_freq_std_day	H_Cli_024	TSA_DCW_std_DegC	H_Cli_058	Nano_mL	C_Bio_092
TSA_DHW_max_DegC	H_Cli_025	TSA_DCW_freq_snapshot_sampling_day_DegC	R_Cli_059	OrgNano_mL	C_Bio_093
TSA_DHW_sum_DegC	H_Cli_026	TSA_DCW_freq_max_DegC	H_Cli_060	TotalEuks_mL	C_Bio_094
TSA_DHW_mean_DegC	H_Cli_027	TSA_DCW_freq_sum_day	H_Cli_061	CorrectedBact_mL	C_Bio_095
TSA_DHW_std_DegC	H_Cli_028	TSA_DCW_freq_mean_day	H_Cli_062	corrected_AT	C_Phy_096 H+
TSA_DHW_freq_snapshot_sampling_day_day	R_Cli_029	TSA_DCW_freq_std_day	H_Cli_063	corrected_CT	C_Phy_097
TSA_DHW_freq_max_day	H_Cli_030	TSA_DCW_minlenght_day	H_Cli_064	PO4	C_Phy_098
TSA_DHW_freq_sum_day	H_Cli_031	TSA_DCW_maxlenght_day	H_Cli_065	SiOH	C_Phy_099
TSA_DHW_freq_mean_day	H_Cli_032	TSA_DCW_meanlenght_day	H_Cli_066	pH	C_Phy_100 H+
TSA_DHW_freq_std_day	H_Cli_033	TSA_DCW_stdlenght_day	H_Cli_067	Sun	C_Phy_101
TSA_DHW_minlenght_day	H_Cli_034	TSA_DCW_lastmin_DegC	H_Cli_068		

°C Sea Surface Temperature | Cold anomalies & temperature fluctuations | Warm anomalies

Upwelling | H+ Acidification | Pollution | Nutrition

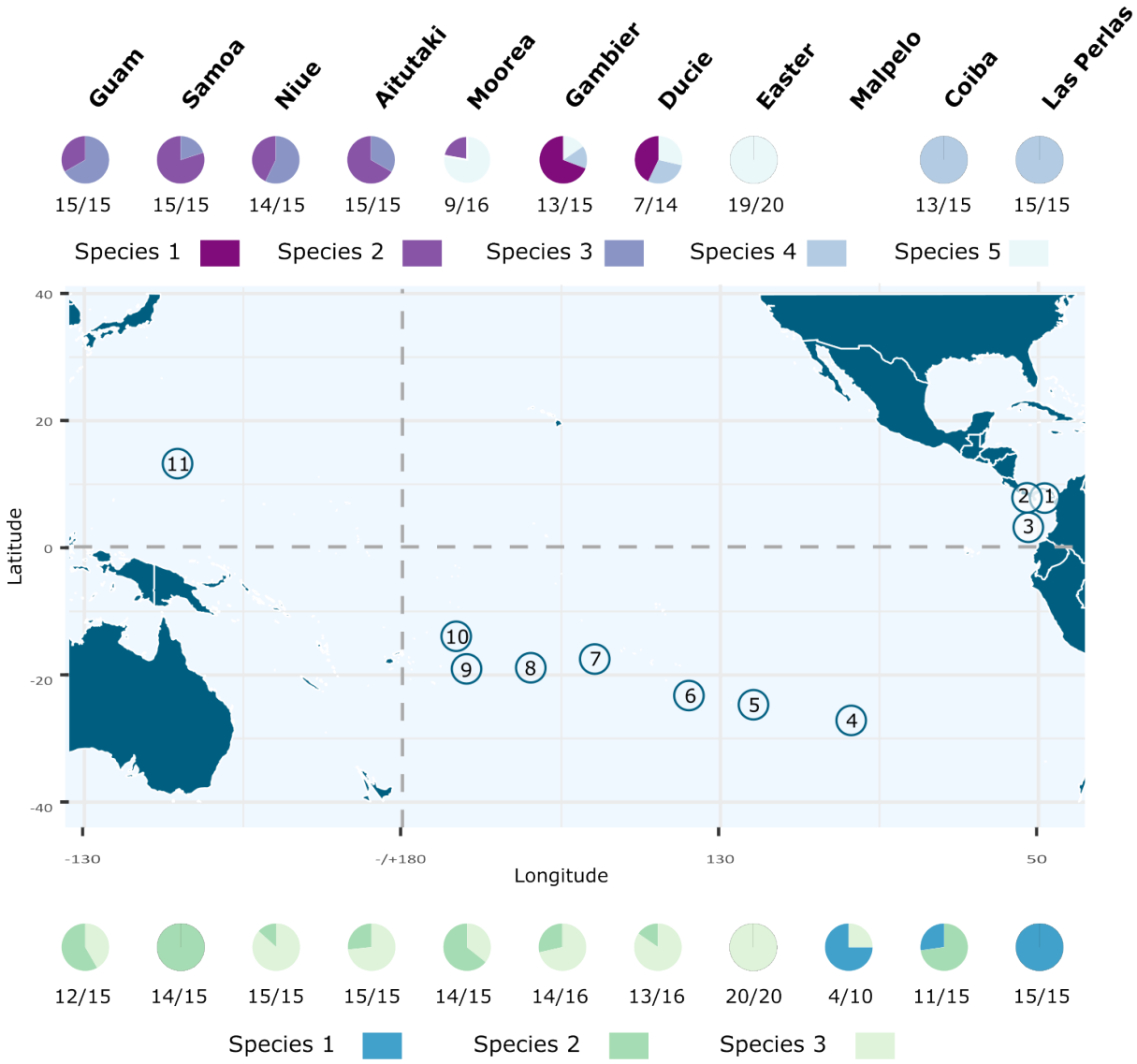

Figure S6: Geographical distribution of the species used for phenotypic analysis. For branched *Pocillopora* (above the map) and massive *Porites* corals (below the map) the number of colonies used for phenotypic analysis is indicated below the island pie charts (the number of colonies with no missing data, used for integrative over-all biomarker and displayed by the pie charts - left number - over the total number of colonies by island - right number). The species delineation and attribution came from Hume (2022) and Deshuraud et al. (2023). The islands are numbered as follow: 1-Las Perlas; 2-Coiba; 3-Malpelo; 4-Easter; 5-Ducie; 6-Gambier; 7-Moorea; 8-Aitutaki; 9-Niue; 10-Samoa; 11-Guam.

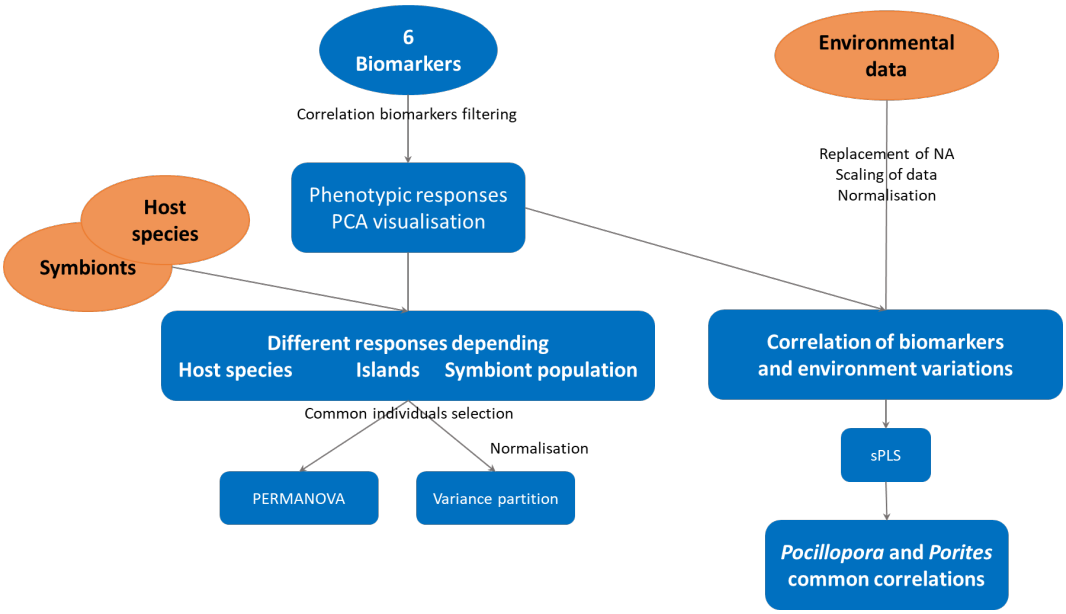

Figure S7: Analysis pipeline of the phenotypic signatures from Pocillopora and Porites colonies. The biomarkers measured and their analysis are displayed in blue. The additional information used to identify correlation with coral holobiont diversity (host species and Symbiodiniaceae and other microbiota diversities) or with the environment (historical, recent and contemporary variables) are displayed in orange and come from the TARA consortium collaborators.