

Table S7. Results of distance-based permutational three-way PERMANOVA comparing spatio-temporal variation in species density, number total of individuals, total cover, and community structure using 'zone' (two levels: lava deltas, control zone), and 'time' (three levels: 2 months, 4.5 months, 7 months), as fixed factors and 'sites' according to the Figure 1 as a random factor nested in 'zone × time' interaction. Z = zone, T = time, Si = site.

Species density test					
Main test					A posteriori comparisons
Fishes					
Source	df	MS	Pseudo-F	P(perm)	Term 'ZxT' for pairs of levels of factor 'Zone'
Z	1	265.720	62.074	0.0003	Within level '2 m' of factor 'Time': t = 4.345, p = 0.048
T	2	21.417	5.007	0.031	Within level '4.5 m' of factor 'Time': t = 8.753, p = 0.012
ZxT	2	18.235	4.2627	0.047	Within level '7 m' of factor 'Time': t = 8.753, p = 0.069
Si(ZxT)	12	4.2745	2.,3576	0.013	
Res	143				Term 'ZxT' for pairs of levels of factor 'Time'
Total	160				Within level 'lava flows' of factor 'Zone'
					Groups t P(perm)
					2 m,4.5 m 0.121 0.901
					2m, 7 m 2.002 0.291
					4.5m, 7m 3.880 0.018
					Within level control zone' of factor 'Zone'
					Groups t P(perm)
					2 m,4.5 m 5.955 0.009
					2m, 7 m 1.329 0.297
					4.5m, 7m 1.279 0.307
Intertidal macroinvertebrates					
Source	df	MS	Pseudo-F	P(perm)	Term 'ZxT' for pairs of levels of factor 'Zone'
Z	1	24036	58.109	0.0001	Within level '2 m' of factor 'Time': t = 22.702, p = 0.0001
T	2	1860.4	4.497	0.035	Within level '4.5 m' of factor 'Time': t = 3.52, p = 0.023
ZxT	2	2392.4	5.784	0.017	Within level '7 m' of factor 'Time': t = 2.013, p = 0.287
Si(ZxT)	12	413.63	4.733	0.0001	
Res	143				Term 'ZxT' for pairs of levels of factor 'Time'
Total	160				Within level 'lava flows' of factor 'Zone'
					Groups t P(perm)
					2 m,4.5 m 0.225 0.806
					2m, 7 m 1.015 0.395
					4.5m, 7m 1.479 0.497
					Within level control zone' of factor 'Zone'

Groups	t	P(perm)
2 m,4.5 m	1.467	0.386
2m, 7 m	3.818	0.103
4.5m, 7m	1.479	0.302

Subtidal macroinvertebrates

Source	df	MS	Pseudo-F	P(perm)
Z	1	93.593	68.856	0.0002
T	2	1.574	1.158	0.337
ZxT	2	3.796	2.792	0.1077
Si(ZxT)	12	1.359	1.084	0.3758
Res	143			
Total	160			

Intertidal algae

Source	df	MS	Pseudo-F	P(perm)
Z	1	195.2	23.212	0.001
T	2	0.647	7.698E-2	0.932
ZxT	2	27.978	3.326	0.078
Si(ZxT)	12	8.422	3.741	0.0001
Res	344			
Total	360			

Subtidal algae

Source	df	MS	Pseudo-F	P(perm)	
Z	1	1961	43.570	0.0003	<u>Term 'ZxT' for pairs of levels of factor 'Zone'</u>
T	2	57.969	1.288	0.310	Within level '2 m' of factor 'Time': t = 2.249, p = 0.156
ZxT	2	213.68	4.747	0.037	Within level '4.5 m' of factor 'Time': t = 9.631, p = 0.007
Si(ZxT)	12	45.008	12.752	0.0001	Within level '7 m' of factor 'Time': t = 2.920, p = 0.042
Res	525				<u>Term 'ZxT' for pairs of levels of factor 'Time'</u>
Total	542				Within level 'lava flows' of factor 'Zone'
					Groups t P(perm)
					2 m,4.5 m 0.569 0.692
					2m, 7 m 2.048 0.103
					4.5m, 7m 4.912 0.009
					Within level control zone' of factor 'Zone'
					Groups t P(perm)

2 m,4.5 m	0.455	0.800
2m, 7 m	0.985	0.384
4.5m, 7m	1.883	0.129

Total number of individuals					A posteriori comparisions
Main test					
Fishes					
Source	df	MS	Pseudo-F	P(perm)	
Z	1	211.52	6.434	0.028	
T	2	87.604	2.666	0.115	
ZxT	2	55.788	1.698	0.237	
Si(ZxT)	12	32.828	4.151	0.0001	
Res	143				
Total	160				
Intertidal macroinvertebrates					
Source	df	MS	Pseudo-F	P(perm)	
Z	1	2.229E5	16.972	0.003	
T	2	1161.6	8.843E-2	0.914	
ZxT	2	581.67	4.428E-2	0.957	
Si(ZxT)	12	13135	2.273	0.011	
Res	143				
Total	160				
Subtidal macroinvertebrates					
Source	df	MS	Pseudo-F	P(perm)	Term 'ZxT' for pairs of levels of factor 'Zone'
Z	1	1158.9	6.9036	0.0312	Within level '2 m' of factor 'Time': t = 0.779, p = 0.516
T	2	952.6	5.6749	0.0223	Within level '4.5 m' of factor 'Time': t = 1.613, p = 0.179
ZxT	2	935.72	5.5743	0.0274	Within level '7 m' of factor 'Time': t = 3.460, p = 0.024
Si(ZxT)	12	167.86	1.7929	0.0611	Term 'ZxT' for pairs of levels of factor 'Time'
Res	143				Within level 'lava flows' of factor 'Zone'
Total	160				Groups t P(perm)
					2 m,4.5 m 0.280 0.792
					2m, 7 m 2.103 0.133
					4.5m, 7m 2.799 0.048
					Within level control zone' of factor 'Zone'

Groups	t	P(perm)
2 m,4.5 m	0.103	0.013
2m, 7 m	0.102	0.044
4.5m, 7m	0.302	0.165

Total cover

Intertidal algae

Source	df	MS	Pseudo-F	P(perm)
Z	1	417.03	0.129	0.726
T	2	4452.2	1.377	0.291
ZxT	2	11998	3.711	0.063
Si(ZxT)	12	3235.2	1.896	0.039
Res	344			
Total	360			

Subtidal algae

Source	df	MS	Pseudo-F	P(perm)
Z	1	47606	10.318	0.011
T	2	8261.9	1.790	0.214
ZxT	2	753.66	0.163	0.849
Si(ZxT)	12	4614.1	11.292	0.0001
Res	525			
Total	542			

Community structure

Fishes

Source	df	MS	Pseudo-F	P(perm)	Term 'T'
Z	1	36669	6.282	0.004	Groups
T	2	17759	3.044	0.004	2 m,4.5 m
ZxT	2	8056.8	1.381	0.213	2m, 7 m
Si(ZxT)	12	5829.1	2.776	0.0001	4.5m, 7m
Res	143				
Total	160				

Intertidal macroinvertebrates

Source	df	MS	Pseudo-F	P(perm)
Z	1	91129	9.2454	0.001
T	2	5729.5	0.58128	0.793
ZxT	2	8302.8	0.84235	0.557
Si(ZxT)	12	9856.7	4.5135	0.0001
Res	143			
Total	160			

Subtidal macroinvertebrates

Source	df	MS	Pseudo-F	P(perm)
Z	1	1.4004E5	22.533	0.0002
T	2	6828.3	1.098	0.374
ZxT	2	7952.8	1.279	0.265
Si(ZxT)	12	6214.9	4.130	0.0001
Res	143			
Total	160			

Intertidal algae

Source	df	MS	Pseudo-F	P(perm)	
Z	1	1.726E5	12.933	0.0002	<u>Term 'ZxT' for pairs of levels of factor 'Zone' (Bonferroni $\alpha \leq 0.016$)</u>
T	2	21305	1.595	0.071	Within level '2 m' of factor 'Time': t = 2.860, p = 0.001
ZxT	2	24951	1.868	0.038	Within level '4.5 m' of factor 'Time': t = 2.191, p = 0.002
Si(ZxT)	12	13373	4.964	0.0001	Within level '7 m' of factor 'Time': t = 2.212, p = 0.006
Res	344				<u>Term 'ZxT' for pairs of levels of factor 'Time' (Bonferroni $\alpha \leq 0.008$)</u>
Total	360				Within level 'lava flows' of factor 'Zone'
					Groups t P(perm)
					2 m, 4.5 m 2.463 0.013
					2m, 7 m 1.840 0.068
					4.5m, 7m 1.308 0.223
					Within level control zone' of factor 'Zone'
					Groups t P(perm)
					2 m, 4.5 m 1.073 0.341
					2m, 7 m 1.094 0.318
					4.5m, 7m 0.689 0.886