Supplementary Materials

Table S1. Morphological attributes (mean ± SD) of rhodoliths at each depth strata across five regions, including the size, shape (% of spheroidal rhodoliths, as defined by Sneed and Folk, 1958), mean diameter (mm) and the epiflora (g/kg) found on rhodoliths.

	Brittany	Galicia	Madeira	Gran Canaria	Principe Island
Mean Diameter (mm)					
Shallow	14.20 ± 2.97	-	35.40 ± 3.78	16.90 ± 1.85	24.80 ± 3.39
Intermediate	17.10 ± 2.60	14.10 ± 1.52	39.30 ± 2.00	30.10 ± 8.95	25.30 ± 5.38
Deep	18.40 ± 5.72	12.10 ± 2.56	42.90 ± 1.85	22.00 ± 4.81	20.00 ± 4.24
Sphericity (%)					
Shallow	71.60 ± 4.12	-	83.78 ± 0.56	80.24 ± 2.07	76.69 ± 3.25
Intermediate	65.67 ± 2.65	37.12 ± 23.40	87.93 ± 0.40	81.26 ± 1.69	71.63 ± 4.38
Deep	63.45 ± 8.07	29.86 ± 1.88	88.41 ± 0.69	79.64 ± 0.49	71.77 ± 4.39
Epiflora (g/kg)					
Shallow	0.90 ± 1.02	-	0.00 ± 0.00	0.87 ± 1.07	1.09 ± 0.95
Intermediate	1.79 ± 1.48	0.49 ± 0.24	0.01 ± 0.02	1.01 ± 1.48	0.16 ± 0.10
Deep	1.96 ± 2.16	0.59 ± 0.37	1.40 ± 1.63	0.13 ± 0.14	0.80 ± 0.26

Table S2. Results of the GLM testing whether the mean diameter differed among depth strata across latitudes. Significant differences at P <0.1 * < 0.05, **< 0.01, ***< 0.0001.

	Estimate	Std. Error	Z Value	*P*	
Intercept (Depth [Shallow])	2.87	0.05	55.49	＜2e-16	***
Latitude	-0.01	0.00	-4.47	7.75e-06	***
Depth [Intermediate]	0.11	0.05	2.05	0.0409	*
Depth [Deep]	0.02	0.05	0.42	0.6744	
Intercept (Depth [Intermediate])	2.98	0.05	59.56	＜2e-16	***
Latitude	-0.01	0.00	-4.47	7.75e-06	***
Depth [Shallow]	-0.11	0.05	-2.05	0.0409	*
Depth [Deep]	-0.09	0.05	-1.73	0.0843	.
Intercept (Depth [Deep])	2.89	0.05	56.62	＜2e-16	***
Latitude	-0.01	0.00	-4.47	7.75e-06	***
Depth [Shallow]	-0.02	0.05	-0.42	0.6744	
Depth [Intermediate]	0.09	0.05	1.73	0.0843	.

Table S3. Results of the GLM testing whether sphericity differed among depth strata across latitudes. Significant differences at P <0.1 * < 0.05, **< 0.01, ***< 0.0001.

	Estimate	Std. Error	Z Value	*P*
Intercept (Depth [Shallow])	-0.13	0.24	-0.54	0.588
Latitude	-0.00	0.01	-0.76	0.450
Depth [Intermediate]	-0.11	0.25	-0.46	0.647
Depth [Deep]	-0.14	0.25	-0.58	0.563
Intercept (Depth [Intermediate])	-0.24	0.24	-0.99	0.320
Latitude	-0.00	0.01	-0.76	0.450
Depth [Shallow]	0.11	0.25	0.46	0.647
Depth [Deep]	-0.03	0.24	-0.13	0.899
Intercept (Depth [Deep])	-0.27	0.24	-1.11	0.266
Latitude	-0.00	0.01	-0.76	0.450
Depth [Shallow]	0.14	0.25	0.58	0.563
Depth [Intermediate]	0.03	0.24	0.13	0.899

Table S4. Results of the GLM testing whether epiphytic algal biomass differed among depth strata across latitudes. Significant differences at P <0.1 * < 0.05, **< 0.01, ***< 0.0001.

	Estimate	Std. Error	Z Value	*P*	
Intercept (Depth [Shallow])	-0.77	0.27	-2.83	0.0047	**
Latitude	0.02	0.01	2.34	0.0193	*
Depth [Intermediate]	-0.08	0.25	-0.31	0.7538	
Depth [Deep]	0.27	0.24	1.13	0.2568	
Intercept (Depth [Intermediate])	-0.85	0.28	-3.10	0.0020	**
Latitude	0.02	0.01	2.34	0.0193	*
Depth [Shallow]	0.08	0.25	0.31	0.7538	
Depth [Deep]	0.35	0.22	1.56	0.1185	
Intercept (Depth [Deep])	-0.50	0.26	-1.95	0.0517	.
Latitude	0.02	0.01	2.34	0.0193	*
Depth [Shallow]	-0.27	0.24	-1.13	0.2568	
Depth [Intermediate]	-0.35	0.22	-1.56	0.1185	

Table S5. Faunal abundances (number of individuals, standardized by the sample weight of rhodoliths (mean ± SD) at each depth strata across regions.

Abundance ($Ind \cdot kg^{-1}$)	Brittany	Galicia	Madeira	Gran Canaria	Príncipe Island
Annelida					
Shallow	149.7 ± 144.9	-	6.3 ± 4.2	3.5 ± 2.3	3.8 ± 1.7
Intermediate	39.5 ± 22.0	2.9 ± 2.0	4.4 ± 3.3	1.4 ± 1.2	5.2 ± 4.2
Deep	37.6 ± 29.7	13.3 ± 11.5	2.6 ± 2.1	2.8 ± 3.4	12.6 ± 9.5
Arthropoda					
Shallow	1425.2 ± 956.6	-	42.9 ± 18.0	86.6 ± 24.3	16.2 ± 9.8
Intermediate	531.3 ± 546.4	71.7 ± 409	43.2 ± 21.5	72.8 ± 46.7	12.1 ± 4.9
Deep	727.7 ± 956.6	125.6 ± 120.0	16.6 ± 8.0	36.5 ± 12.8	10.5 ± 6.0
Echinodermata					
Shallow	69.7 ± 45.1	-	3.3 ± 9.2	0.9 ± 1.2	4.9 ± 3.7
Intermediate	26.6 ± 31.4	7.3 ± 4.5	4.5 ± 2.4	1.1 ± 1.4	6.7 ± 5.2
Deep	34.3 ± 23.1	17.2 ± 8.9	1.4 ± 1.1	2.1 ± 2.0	10.1. ± 5.1
Mollusca					
Shallow	64.2 ± 83.4	-	313.4 ± 129.6	96.7 ± 130.3	3.9 ± 3.1
Intermediate	75.0 ± 67.1	103.2 ± 42.8	245.9 ± 69.4	153.4 ± 66.2	5.9 ± 5.1
Deep	114.1 ± 88.8	39.8 ± 17.6	124.2 ± 83.4	14.6 ± 8.1	4.0 ± 3.3

Table S6. Results of the GLM testing whether epifaunal abundances (Arthropoda, Mollusca, Echinodermata and Annelida) differed among depth strata across latitudes. Significant differences at P <0.1 * < 0.05, **< 0.01, ***< 0.0001.

	Estimate	Std. Error	Z Value	*P*	
Arthropoda					
Intercept (Depth [Shallow])	-0.02	0.05	-0.35	0.729	
Latitude	0.15	0.00	147.73	<2e-16	***
Depth [Intermediate]	-1.10	0.01	-77.84	<2e-16	***
Depth [Deep]	-0.88	0.01	-66.65	<2e-16	***
Intercept (Depth [Intermediate])	-1.12	0.05	-23.65	<2e-16	***
Latitude	0.15	0.00	147.73	<2e-16	***
Depth [Shallow]	1.10	0.01	77.84	<2e-16	***
Depth [Deep]	0.23	0.02	14.43	<2e-16	***
Intercept (Depth [Deep])	-0.89	0.05	-18.99	<2e-16	***
Latitude	0.15	0.00	147.73	<2e-16	***

Depth [Shallow]	0.88	0.01	66.65	<2e-16	***
Depth [Intermediate]	-0.23	0.02	-14.43	<2e-16	***
Mollusca					
Intercept (Depth [Shallow])	3.99	0.03	155.80	< 2e-16	***
Latitude	0.03	0.00	41.16	< 2e-16	***
Depth [Intermediate]	-0.10	0.02	-4.87	1.13e-06	***
Depth [Deep]	-0.77	0.02	-32.94	< 2e-16	***
Intercept (Depth [Intermediate])	3.90	0.03	149.19	< 2e-16	***
Latitude	0.03	0.00	41.16	< 2e-16	***
Depth [Shallow]	0.10	0.02	4.87	1.13e-06	***
Depth [Deep]	-0.68	0.02	-29.98	< 2e-16	***
Intercept (Depth [Deep])	3.22	0.03	110.61	<2e-16	***
Latitude	0.03	0.00	41.16	<2e-16	***
Depth [Shallow]	0.77	0.02	32.94	<2e-16	***
Depth [Intermediate]	0.68	0.02	29.98	<2e-16	***
Echinodermata					
Intercept (Depth [Shallow])	0.64	0.10	6.29	3.27e-10	***
Latitude	0.07	0.00	28.37	< 2e-16	***
Depth [Intermediate]	-0.89	0.06	-15.21	< 2e-16	***
Depth [Deep]	-0.55	0.05	-10.34	< 2e-16	***
Intercept (Depth [Intermediate])	-0.25	0.11	-2.33	0.0196	*
Latitude	0.07	0.00	28.37	< 2e-16	***
Depth [Shallow]	0.89	0.06	15.21	< 2e-16	***
Depth [Deep]	0.34	0.06	5.65	1.57e-08	***
Intercept (Depth [Deep])	0.09	0.10	0.88	0.379	
Latitude	0.07	0.00	28.37	< 2e-16	***
Depth [Shallow]	0.55	0.05	10.34	< 2e-16	***
Depth [Intermediate]	-0.34	0.06	-5.65	1.57e-8	***
Annelida					
Intercept (Depth [Shallow])	0.42	0.10	4.39	1.15e-05	***
Latitude	0.09	0.00	41.15	< 2e-16	***
Depth [Intermediate]	-1.31	0.05	-28.16	< 2e-16	***
Depth [Deep]	-1.20	0.04	-26.82	< 2e-16	***
Intercept (Depth [Intermediate])	-0.89	0.10	-8.76	<2e-16	***
Latitude	0.09	0.00	41.15	<2e-16	***
Depth [Shallow]	1.31	0.05	28.16	<2e-16	***
Depth [Deep]	0.11	0.05	2.03	0.0426	*
Intercept (Depth [Deep])	-0.78	0.10	-7.73	1.06e-14	***

Latitude	0.09	0.00	41.15	< 2e-16	***
Depth [Shallow]	1.20	0.04	26.82	< 2e-16	***
Depth [Intermediate]	-0.11	0.05	-2.03	0.0426	*