

Supplementary materials

Table S1. Environmental controls of ostracod and foraminifera alpha diversity ($q=0$ and $q=2$) in Zanzibar, East Africa. Statistics from GAMM modelling showing the significant parameters in the averaged top model. RI: relative importance; L: linear term; Q: quadratic term.

Organism	Order.q	Term	Estimate	Std. Error	t value	Pr(> t)	RI
Ostracod	0	(Intercept)	3.886274	0.046391	83.77293	0	
		Sediment Fine-grained sand	-0.68357	0.258644	-2.64288	0.014249*	0.546562
	2	(Intercept)	3.248227	0.069692	46.60837	0	
		Habitat Fringing reef	-0.07999	0.086699	-0.92264	0.366674	0.95763
		Habitat Back reef	-0.8706	0.3191	-2.7283	0.012593*	0.95763
		Habitat Sand flat	-0.53711	0.323102	-1.66234	0.111299	0.95763
		Habitat Mangrove	-2.11057	1.523336	-1.38549	0.180442	0.95763
Foraminifera	0	(Intercept)	4.399923	0.245562	17.91775	0	
		Human impact. L	0.51031	0.112898	4.520082	0.000168*	0.79177
		Human impact. Q	0.148077	0.083972	1.763401	0.091664	0.79177
	2	(Intercept)	2.77883	0.307554	9.03526	1E-07	
		Algae coverage. L	-0.05968	0.46942	-0.12715	0.900278	0.964998
		Algae coverage. Q	1.25216	0.317651	3.941936	0.001006*	0.964998

Table S2. Environmental controls of ostracod and foraminifera faunal composition ($q=0$ and $q=2$) in two regions by dbRDA analysis. Only significant effects are shown.

Organism	Region	Order.q	Predictor	SumOfSqs	F	Pr(>F)
Ostracod	Zanzibar, E Africa	0	Habitat type	1.20522	2.8471	0.001***
			Human impact	0.49872	2.3562	0.001***
			Algae coverage	0.6979	3.2973	0.001***
		2	Habitat type	2.01444	6.8674	0.001***
			Human impact	0.74315	5.0669	0.001***
			Algae coverage	1.18334	8.0682	0.001***
			dist2land	0.17267	2.3546	0.026*

	STP, W Africa	0	Habitat type	0.33888	2.0385	0.034 *
			Algae coverage	0.21861	2.6301	0.012 *
		2	Habitat type	0.59761	114.4319	0.002 **
			Human impact	0.42577	163.053	0.001 ***
			Algae coverage	0.38738	148.353	0.002 **
Foraminifera	Zanzibar, E Africa	0	Habitat type	0.55557	2.2109	0.001 ***
			Human impact	0.21227	1.6894	0.044 *
			Algae coverage	0.38739	3.0832	0.001 ***
		2	Habitat type	1.43859	10.1082	0.001 ***
			Human impact	1.03596	14.5582	0.001 ***
			Algae coverage	1.36782	19.2217	0.001 ***
			dist2land	0.14174	3.9838	0.014 *
	STP, W Africa	0	Habitat type	0.94915	3.6005	0.001 ***
			Algae coverage	0.55279	2.097	0.031 *
			Sediment type	0.42095	3.1937	0.007 **
			dist2land	0.32701	2.481	0.016 *
		2	Habitat type	1.9065	6.5705	0.011 *

Table S3. The autoecology summary of the top 10 ostracod genera of highest mean relative abundance in each cluster ($q=1$) in two regions.

Genus	Ecology	References
<i>Neonesidea</i>	Reefal	(Whatley and Watson, 1988; Maddocks, 2013; Titterton and Whatley, 1988; Maddocks, 1969a)
<i>Paranesidea</i>	Reefal	(Whatley and Watson, 1988; Titterton and Whatley, 1988; Maddocks, 1969a)
<i>Macrocyprina</i>	Reefal	(Maddocks, 1990)
<i>Glyptobairdia</i>	Reefal	(Maddocks, 1969a)
<i>Mydionobairdia</i>	Reefal	(Maddocks, 1969a)
<i>Kotoracythere</i>	Reefal	(Sridhar et al., 2007)
<i>Xestoleberis</i>	Phytal	(Keyser and Mohammed, 2021; Munef et al., 2012; Kamiya, 1988)
<i>Loxoconcha</i>	Phytal	(Keyser and Mohammed, 2021; Munef et al., 2012; Kamiya, 1988)
<i>Loxocorniculum</i>	Phytal	(Kamiya, 1988; Munef et al., 2012)

<i>Propontocypris</i>	Phytal	(Maddocks, 1969b)
<i>Paracytheridea</i>	Bottom-dwelling	(Purper and De Orenellas, 1987)
<i>Bosasella</i>	Bottom-dwelling	(Kamiya, 1988; Munef et al., 2012)
<i>Hermarnites</i>	Bottom-dwelling	(Kamiya, 1988; Omatsola, 1972)
<i>Perissocytheridea</i>	Brackish	(Nogueira and Ramos, 2016; Keyser, 1977)
<i>Cyprideis</i>	Brackish	(Wouters, 2017, 2003)
<i>Caudites</i>	Non-specific	
<i>Hiltermannicythere</i>	Non-specific	
<i>Callistocythere</i>	Non-specific	
<i>Neohornibrookella</i>	Non-specific	
<i>Patrizia</i>	Non-specific	
<i>Berguecythere</i>	Non-specific	
<i>Neocaudites</i>	Non-specific	
<i>Polycopse</i>	Non-specific	
<i>Neomonoceratina</i>	Non-specific	
<i>Aglaiella</i>	Non-specific	
<i>Puriana</i>	Non-specific	

Table S4. The occurrence of STP ostracod species in all tropical Atlantic provinces. 1 indicates presence. NWA: Northwestern Atlantic; SWA: Southwestern Atlantic; NEA: Northeastern Atlantic; TEA: Tropical East Atlantic; SEA: Southeastern Atlantic.

species	NWA	SWA	NEA	TEA	SEA
<i>Aglaiella sanctamariae</i>				1	
<i>Aurila convexa</i>			1		
<i>Berguecythere insularis</i>		1			
<i>Cativella iyemojai</i>				1	
<i>Copytus fusiformis</i>				1	
<i>Cyprideis nigeriensis</i>				1	
<i>Cyprideis torosa</i>			1	1	
<i>Cytherella adenensis</i>					
<i>Cytherella cf. omatsolai</i>					1
<i>Eucytherura mistrettai</i>			1		
<i>Hermanites macrodictyota</i>				1	
<i>Hermanites batei</i>				1	
<i>Keijia demissa</i>	1	1		1	
<i>Kotoracythere inconspicua</i>	1	1		1	
<i>Loxoconcha bullata</i>		1			
<i>Loxoconcha rhomboidea</i>			1		
<i>Loxocorniculum tricornatum</i>	1	1			
<i>Mutilus nigeriana</i>				1	
<i>Neocaudites atlantica</i>	1			1	
<i>Neocaudites purii</i>				1	
<i>Neocaudites rectangularis</i>				1	
<i>Neocaudites triplistriatus</i>	1	1			
<i>Neocaudites tuberculatus</i>				1	
<i>Neomonoceratina iddoensis</i>				1	
<i>Neomonoceratina porocostata</i>					

<i>Neonesidea schulzi</i>			1		1
<i>Paracytheridea tschoppi</i>	1	1		1	
<i>Paranesidea multiforma</i>				1	
<i>Phacorhabdotus hazeli</i>				1	
<i>Puriana</i> aff. <i>interrasilis</i>				1	
<i>Reymentia microdictyota</i>				1	
<i>Sclerochilus hicksi</i>			1		
<i>Triebelina sertata</i>	1	1			
<i>Triebelina intermedia</i>				1	
<i>Xestoleberis hanaii</i>					
<i>Xestoleberis lenae</i>				1	
<i>Xestoleberis rotunda</i>					1
<i>Xestoleberis rubens</i>			1		

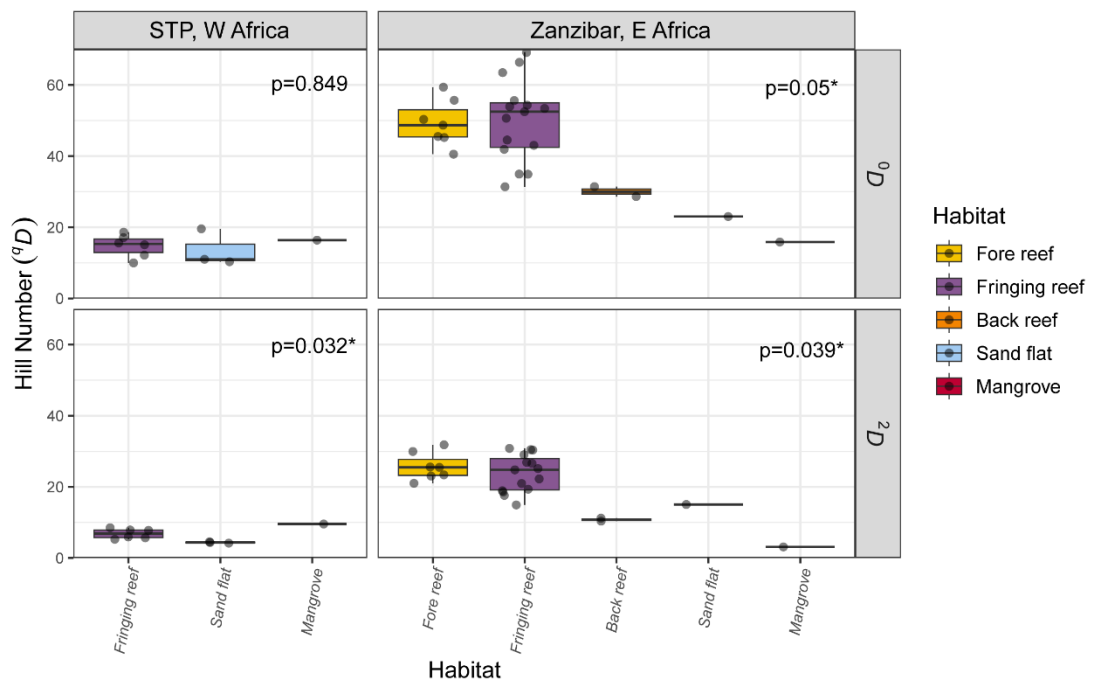


Fig. S1. Box plots showing variations in ostracod alpha diversity between habitat types for orders $q=0$ and $q=2$ in STP and Zanzibar regions. p-value given by the Kruskal-Wallis test.

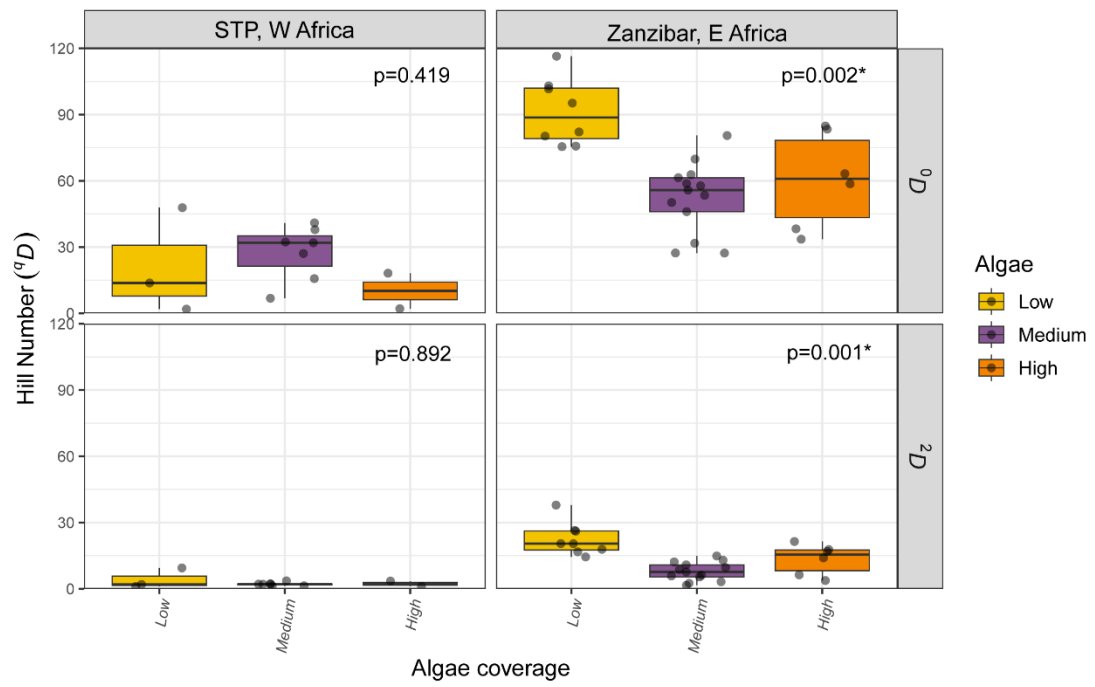


Fig. S2. Box plots showing variations in foraminifera alpha diversity between algae coverage levels for orders $q=0$ and $q=2$ in STP and Zanzibar regions. p-value given by the Kruskal-Wallis test.

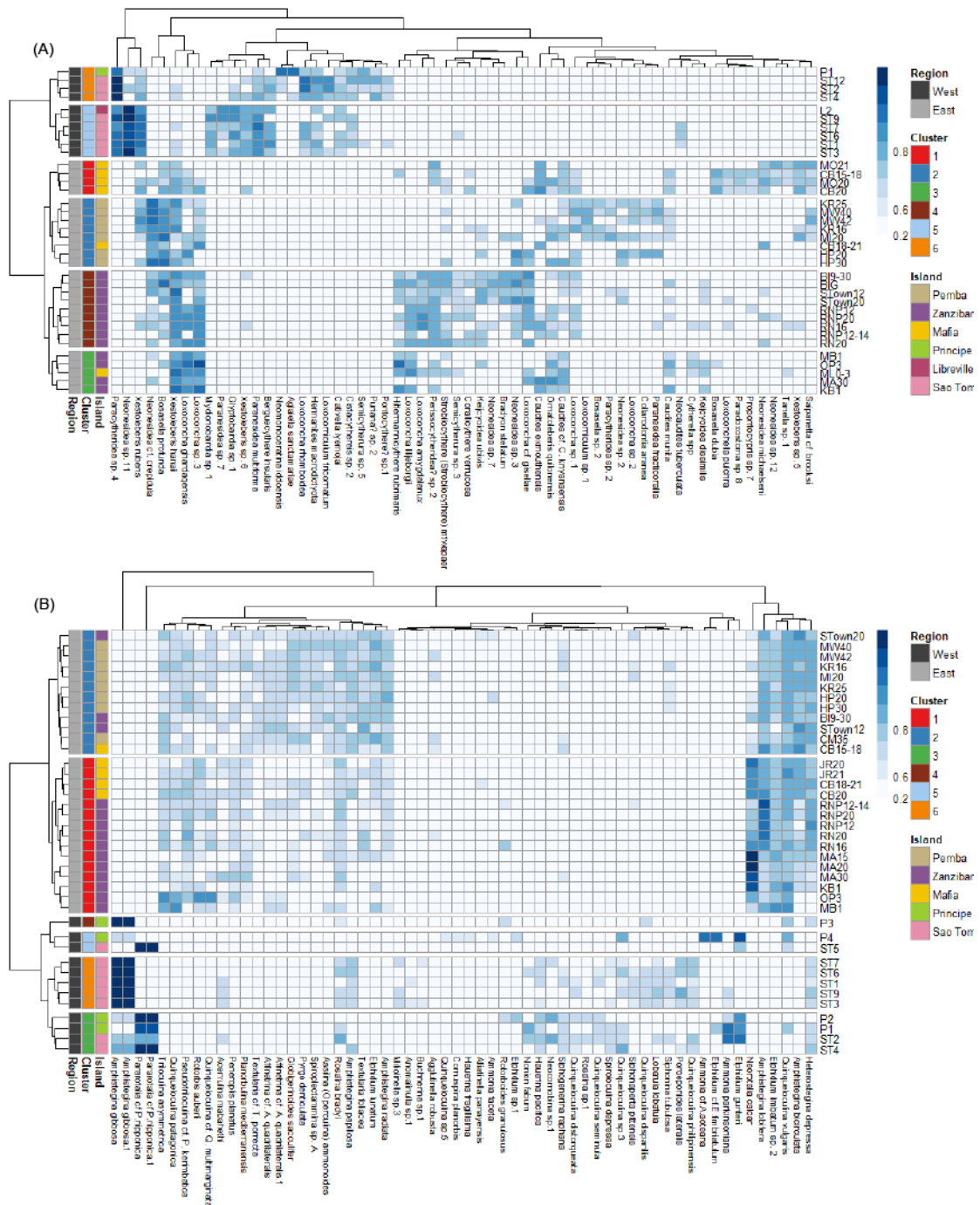


Fig. S3. Composition of ostracod (A) and foraminifera (B) assemblages in STP and Zanzibar in terms of the top 10 indicator species of each cluster at order $q=0$. The blue heatmaps illustrate species count in each sample after applying a fourth root transformation. Dendrograms based on Sørensen dissimilarity between samples and Hellinger distances between species. Color of each cluster as in Fig. 6.

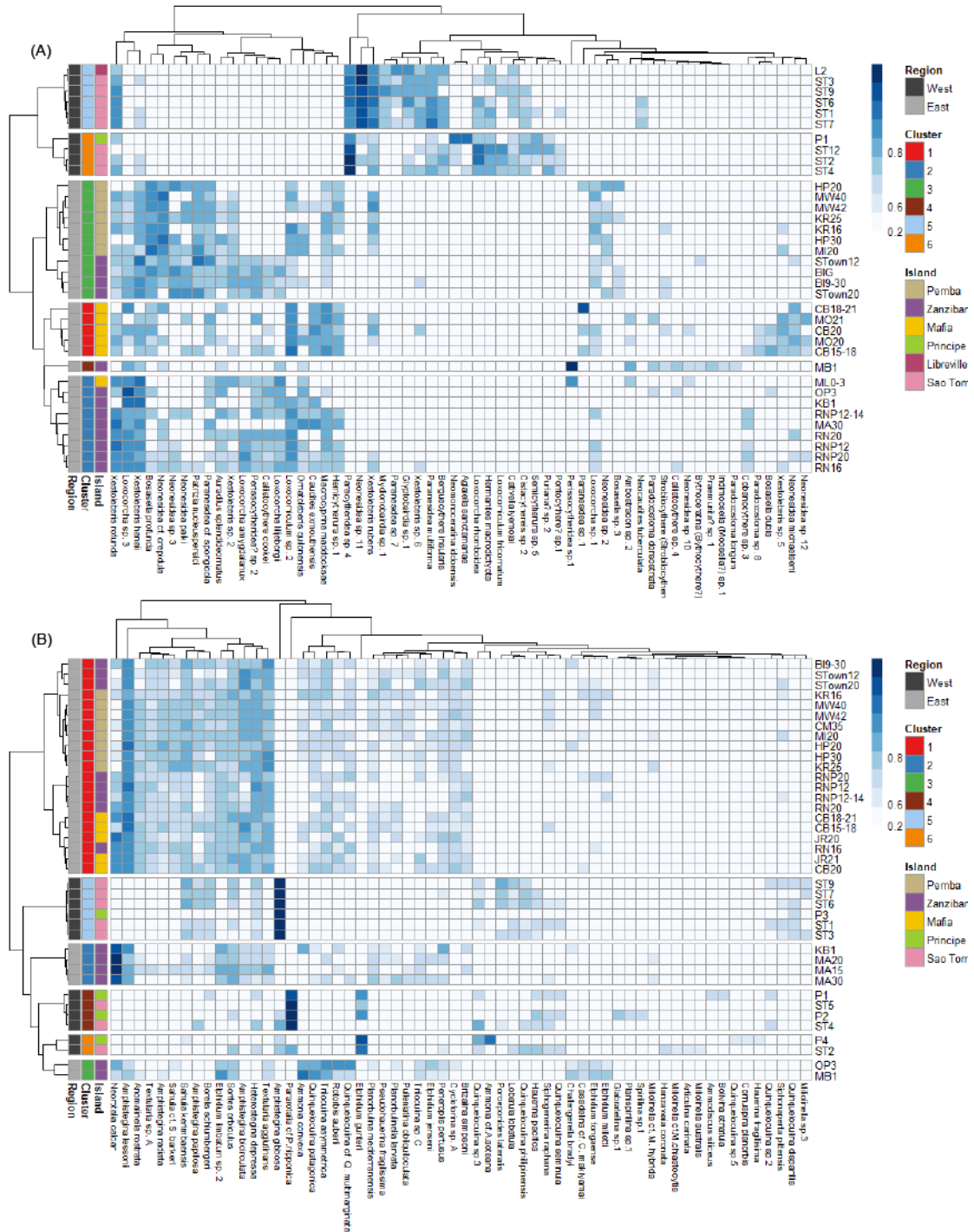


Fig. S4. Composition of ostracod (A) and foraminifera (B) assemblages in STP and Zanzibar in terms of top 10 indicator species of each cluster at order $q=2$. The blue heatmaps illustrate species count in each sample after applying a fourth root transformation. Dendrograms based on Morisita–Horn dissimilarity between samples and Hellinger distances between species. Color of each cluster as in Fig. 6.

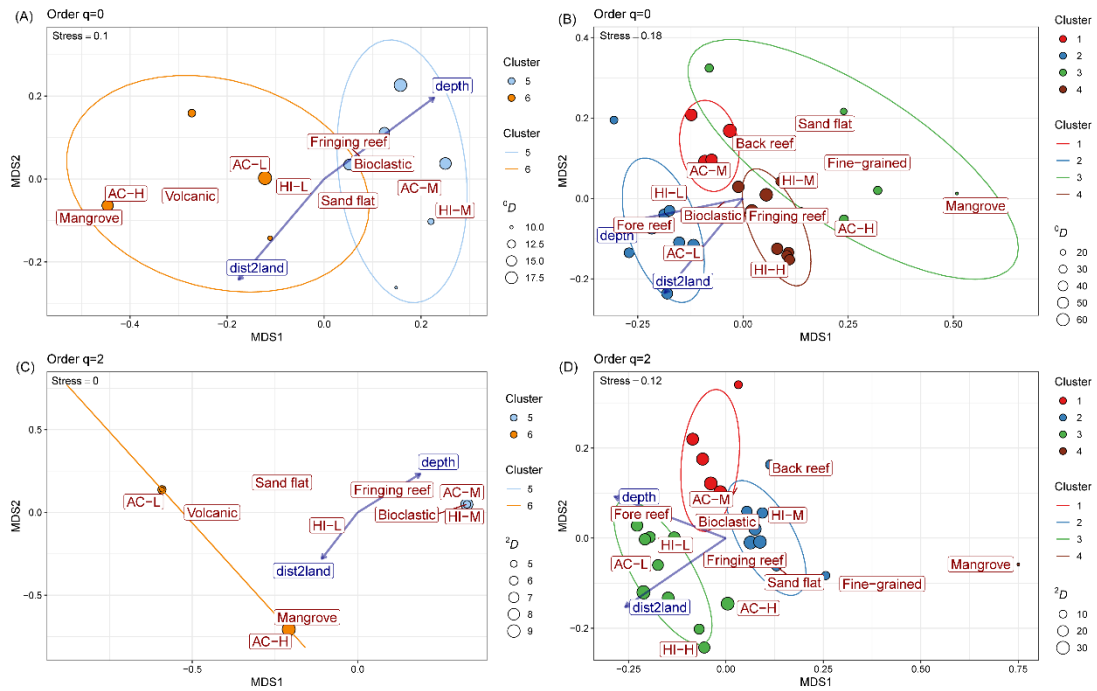


Fig. S5. nMDS ordination showing faunal variation correlated with environmental factors in STP and Zanzibar for ostracods at orders $q=0$ and $q=2$. (A) STP $q=0$; (B) Zanzibar $q=0$; (C) STP $q=2$; (D) Zanzibar $q=2$. The vectors indicate correlations with continuous environmental variables and labels indicate the centroids of categorical environmental variables. AC: algae coverage; HI: human impact; H: high; M: medium; L: low. Size of sample dots represents alpha diversity at the respective order. Color of each cluster as in Fig. 6.

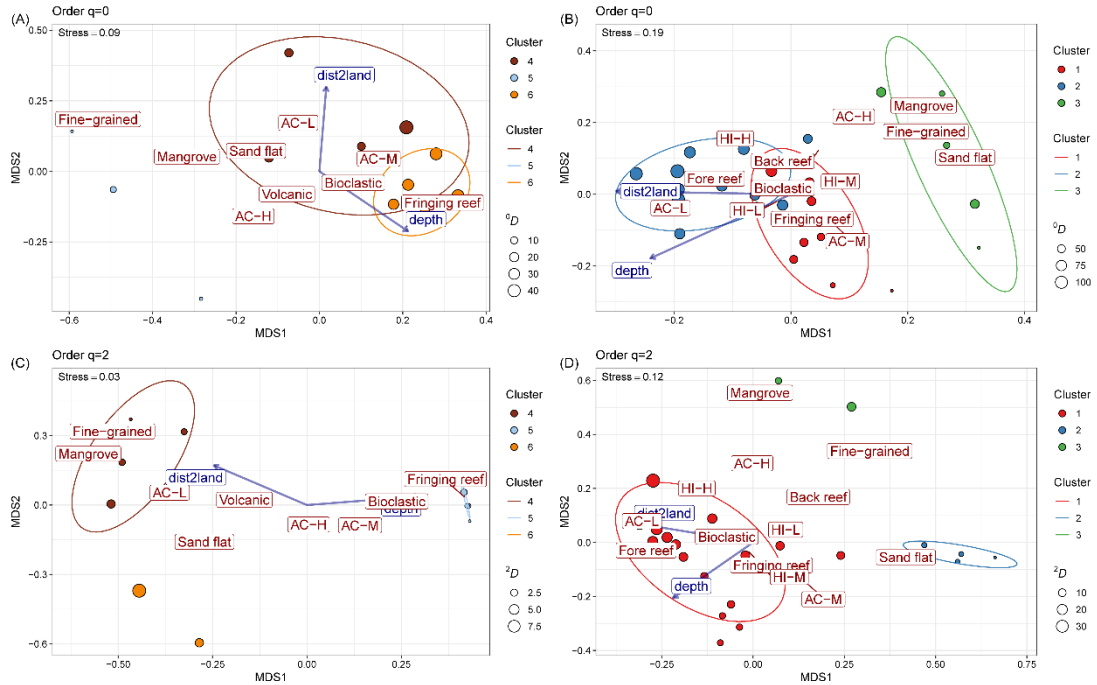


Fig. S6. nMDS ordination showing faunal variation correlated with environmental factors in STP and Zanzibar for foraminifera at orders $q=0$ and $q=2$. (A) STP $q=0$; (B) Zanzibar $q=0$; (C) STP $q=2$; (D) Zanzibar $q=2$. The vectors indicate correlations with continuous environmental variables and labels indicate the centroids of categorical environmental variables. AC: algae

coverage; HI: human impact; H: high; M: medium; L: low. Size of sample dots represents alpha diversity at the respective order. Color of each cluster as in Fig. 6.

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