

Online Supplement

Vertical distribution of epibenthic megafauna of a large seamount west of Cape Verde islands (tropical North Atlantic)

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Supplementary Tab. S1 List of distinguished morphotaxa significantly associated to the upper or deeper seamount region (indicator species analysis: total number of morphotaxa n = 44; upper seamount region: n = 7; deeper seamount region: n = 7; p<0.05) and structured based on higher-taxonomic levels.

Morphotaxa	Seamount	
	Upper seamount region	Deeper seamount region
	A 7/8 [1]	A 7/8 [2]
Porifera		
Undet. Hexactinellid morphotaxon V2	X	
Actiniaria		
Undet. Actiniaria morphotaxon V4	X	
Deep-sea corals		
Undet Octocorallia V1	X	
Undet Octocorallia V2	X	
Undet. deep-sea coral morphotaxon V1	X	
Undet. deep-sea coral morphotaxon V2	X	
Undet. deep-sea coral morphotaxon V5	X	
Undet. deep-sea coral morphotaxon V8	X	
Holothuroidea		
Undet. Holothuroidea morphotaxon V1		X
Teleostei		
Undet. Teleostei morphotaxon V4	X	

Supplementary Tab. S2 List of distinguished morphotaxa significantly associated to a specific substrate type (indicator species analysis: total number of morphotaxa n = 44; soft sediment: n = 12; mixed sediment: n = 11; soft sediment over stones: n = 12; stones: n = 13; p<0.05) and structured based on higher-taxonomic levels.

Phenotypes	Substrate			
	Soft sediment	Mixed sediment	Soft sediment over stones	Stones
Porifera				
<i>Poliopogon amadou</i>				X
Undet. Hexactinellid morphotaxon V1				X
Undet. Hexactinellid morphotaxon V2				X
Deep-sea corals				
<i>Iridogorgia</i> sp.				X
Undet. Scleractyonacea				X
Undet. deep-sea coral morphotaxon V1				X
Undet. deep-sea coral morphotaxon V8				X
Crinoidea				
Undet. Crinoidea morphotaxon V2				X
Holothuroidea				
Undet. Holothuroidea morphotaxon V3	X			
Asterozoa				
Undet. Brisingid asteroid				X
Undet. Asterozoa morphotaxon V3				X
Echinoidea				
Undet. Echinoidea	X			
Teleostei				
Undet. Teleostei morphotaxon V2	X			
Undet. Teleostei morphotaxon V3	X			
Undet. Teleostei morphotaxon V5	X			

Supplementary Tab. S3.1 Literature list considering megafauna densities as individual per m² and structured based on the higher taxonomic groups of Protists, Porifera (total and Hexactinellida), Cnidaria (Total, Actiniaria, deep-sea corals and Pennatulacea), Arthropoda (Total and Crustacea), Echinodermata (Total, Crinoidea, Holothuroidea, Asterozoa, Asteroidea, Ophiuroidea and Echinoidea), Mollusca and Chordata (Total and fish). Here concerning Atlantic seamounts.

	System & Depth	Annan seamount 200-2742m		Annan seamount 200-666m	Annan seamount 680-1300m	Annan seamount 1350-2132m	Annan seamount 2100-2742m	Annan seamount 1000-2000m	Knipovich seamount 1000-2000m	Vayda seamount 1000-2000m	Schulz Bank seamount 580-2700m
	Publication	Victorero et al. (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Meyer et al. (2022)
Fauna [ind/m²]		Total	Mean	Total	Total	Total	Total	Total	Total	Total	Total
Total	Total	0.644	0.633±0.684	1.657	0.287	0.245	0.344	0.194	0.228	0.709	73.049
Protist	Total										
Porifera	Total Hexa.	41.419									
Cnidaria	Total Acti. Coral Penn.	6.355									
Arthropoda	Total Crust.	0.292									
Echinodermata	Total Crino. Holo. Astero. Aster. Ophir. Echin.	7.816									
Mollusca	Total	0.146									
Chordata	Total Fish	17.094									

Supplementary Tab. S3.2 Continuation of the literature comparison list considering megafauna densities. Here Atlantic seamounts

System & Depth		Schulz Bank seamount 580-1098m		Schulz Bank seamount 1103-1485m		Schulz Bank seamount 1557-1982m		Schulz Bank seamount 1654-2397m		Schulz Bank seamount 2001-2774m	
Publication		Meyer et al. (2022)		Meyer et al. (2022)		Meyer et al. (2022)		Meyer et al. (2022)		Meyer et al. (2022)	
Fauna		Total	Mean	Total	Mean	Total	Mean	Total	Mean	Total	Mean
Total	Total	126.14-126.368	120.88±3.2	12.94-12.98	12.95±0.8	9,13-9.176	10.09±2.11	153.05-153.253	161.95±8.15	19.3-19.321	19.01±1.78
Protist	Total										
Porifera	Total	71.648-71.777		1.993-1.999		6.19-6.221		128.409-128.579		2.181-2.183	
	Hexa.										
Cnidaria	Total	13.245-13-269		0.854-0.857		0.603-0.606		0.306-0.307		0.791-0.792	
	Acti.										
	Coral										
	Penn.										
Arthropoda	Total	0.252-0.253		0.311-0.312		0.694-0.697		0.612-0.613		0.154-0.155	
	Crust.										
Echinodermata	Total	3.532-3.538		8.631-8.658		1.506-1.514		19.743-19.77		16.135-16.152	
	Crino.										
	Holo.										
	Asteroz.										
	Aster.										
	Ophir.										
	Echin.	0.05									
Mollusca	Total	0.126		0.194-0.195		0.055		0.031		0.006	
Chordata	Total										
	Fish	126.14-126.368		0.004							

Supplementary Tab. S3.3 Continuation of the literature comparison list considering megafauna densities. Here other oceans and alternative structures.

System & Depth		Vema transverse ridge 570-2940m		Vema transverse ridge 570-1310m	Vema transverse ridge 1100-1500m	Vema transverse ridge 1580-2940m
Publication		Victorero (2018)		Victorero (2018)	Victorero (2018)	Victorero (2018)
Fauna		Total	Mean	Total	Total	Total
Total	Total	~1.915	~2.026±1.513	3.415	2.248	0.414
Protist	Total					
Porifera	Total					
	Hexa.					
Cnidaria	Total					
	Acti.					
	Coral					
	Penn.					
Arthropoda	Total					
	Crust.					
Echinodermata	Total					
	Crino.					
	Holo.					
	Asteroz.					
	Aster.					
	Ophir.					
	Echin.					
Mollusca	Total					
Chordata	Total					
	Fish					

Supplementary Tab. S4.1 Literature list considering megafauna taxon-/species- and morphotype-richness and structured based on the higher taxonomic groups of Protists, Porifera (total and Hexactinellida), Cnidaria (Total, Actiniaria, deep-sea corals and Pennatulacea), Arthropoda (Total and Crustacea), Echinodermata (Total, Crinoidea, Holothuroidea, Asterozoa, Asteroidea, Ophiuroidea and Echinoidea), Mollusca and Chordata (Total and fish), concerning Atlantic seamounts.

System & Depth		Annan seamount 200-2742m		Annan seamount 200-666m		Annan seamount 680-1300m		Annan seamount 1350-2132m		Annan seamount 2100-2742m		Annan seamount 1000-2000m		Knipovich seamount 1000-2000m		Vayda seamount 1000-2000m	
Publication		Victorero et al. (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)
		Morpho.	Morpho.	Species	Species	Species	Species	Species	Species	Species	Species	Species	Species	Species	Species	Species	Species
Fauna		Total	Total	Mean	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
Total	Total	180	180	~76±12.728	62	71	79	92	167	141	137						
Protist	Total																
Porifera	Total																
	Hexa.																
Cnidaria	Total																
	Acti.																
	Coral																
	Penn.																
Arthropoda	Total																
	Crust.																
Echinoder	Total																
	Crino.																
	Holo.																
	Asteroz.																
	Aster.																
	Ophir.																
	Echin.																
Mollusca	Total																
Chordata	Total																
	Fish																

Supplementary Tab. S4.2 Continuation of the literature comparison list considering megafauna taxon-/species- and morphotype-richness for Atlantic seamounts

	System & Depth	Corner Rise & New England seamounts 713-3271m	Corner Rise & New England seamounts 713-3271m	Corner Rise seamounts 818-2379m	Kükenthal seamount (Corner Rise chain) 713-1831m		Goode seamount (Corner Rise chain) 1851-2156m	
	Publication	Lapointe et al. (2020a,b), Lapointe (2021)	Lapointe et al. (2020a,b), Lapointe (2021)	Cho (2008)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)
		Taxon	Morpho.	Morpho.	Taxon	Taxon	Taxon	Taxon
Fauna	Total	Total	Total	Total	Total	Total	Total	Total
Total	Total	183	184	~220	~39	~38	~24	~24
Protist	Total	>1						
Porifera	Total Hexa.	54		24	~13	~13	~9	~9-10
Cnidaria	Total	122		~73				
	Acti.	11		~12				
	Coral	97		~42	~25	~24	~14	~14-15
	Penn.	10		~4				
Arthropoda	Total Crust.	2		~26				
Echinodermata	Total							
	Crino.	3		~12				
	Holo.			~7				
	Asteroz.			~15				
	Aster.			~7				
	Ophir.			~8				
	Echin.	2		~7				
Mollusca	Total	~7						
Chordata	Total	3		~35				
	Fish	~32						

Supplementary Tab. S4.3 Continuation of the literature comparison list considering megafauna taxon-/species- and morphotype-richness for Atlantic seamounts

	System & Depth	Milne Edwards seamount (Corner Rise chain) 1280-1690m		Verrill seamount (Corner Rise chain) 1098-2129m	Verrill seamount (Corner Rise chain) 1098-2129m	Yakutat seamount (Corner Rise chain) 1380-2412m	New England seamounts 1322-2606m	Bear seamount (New England seamounts) 1395-1869m			
		Lapointe et al. (2020a); Lapointe (2021)		Lapointe et al. (2020b); Lapointe (2021)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)	Cho (2008)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)
		Taxon	Taxon	Taxon	Taxon	Taxon	Taxon	Morpho	Taxon	Taxon	
Fauna	Total	~23	~22	~33	~32	~45	~44	~210	~18	~18	
Protist	Total	>1									
Porifera	Total	~3-4	~4	~10	~10	~16	~16	~20	~3	~3	
	Hexa.										
Cnidaria	Total								~73		
	Acti.								~10		
	Coral	~17	~17	~20	~19	~24	~24	~47	~11	~13	
	Penn.								~4		
Arthropoda	Total										
	Crust.								~34		
Echinodermata	Total										
	Crino.								~7		
	Holo.								~12		
	Asteroz.								~20		
	Aster.								~9		
	Ophir.								~11		
	Echin.								~8	~2	
Mollusca	Total								~4		
Chordata	Total								~22		
	Fish								~21		

Supplementary Tab. S4.4 Continuation of the literature comparison list considering megafauna taxon-/species- and morphotype-richness for Atlantic seamounts

	System & Depth	Bear seamount (New England seamounts) 900-2500m		Mytilus seamount (New England seamounts) 2634-3271m	Mytilus seamount (New England seamounts) 2634-3271m	Physalia seamount (New England seamounts) 2378-2579m	Retriever seamount (New England seamounts) 1980-2140m		
	Publication	Moore et al. (2003)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)
		Species	Taxon	Taxon	Taxon	Taxon	Taxon	Taxon	Taxon
Fauna		Total	Total	Total	Total	Total	Total	Total	Total
Total	Total	~274	287	~22	~21	~16	15	~45	~45
Protist	Total	>3	>3						
Porifera	Total	5	5	~11	~11	~4-5	4	~9	~8
	Hexa.								
Cnidaria	Total	20	27						
	Acti.								
	Coral			~8	~9	~4-5	~7	~28	~32
	Penn.								
Arthropoda	Total	48-49	48-49						
	Crust.	46-47	47						
Echinodermata	Total	33	33						
	Crino.	1	1						
	Holo.	3	3						
	Asteroz.	25	25						
	Aster.	16	16						
	Ophir.	9	9						
	Echin.	3	3						
Mollusca	Total	36	39						
Chordata	Total								
	Fish	115	122						

Supplementary Tab. S4.5 Continuation of the literature comparison list considering megafauna taxon-/species- and morphotype-richness for Atlantic seamounts

System & Depth		Picket seamount (New England seamounts) 1944-2086m		Balanus seamount (New England seamounts) 1542-1933m		Kelvin seamount (New England seamounts) 1712-3935m		Atlantis II seamount (New England seamounts) 2548-2700m	
Publication		Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)
		Taxon	Taxon	Taxon	Taxon	Taxon	Taxon	Taxon	Taxon
Fauna		Total	Total	Total	Total	Total	Total	Total	Total
Total	Total	~29	~29	~41	~40	~76	~75	~28-29	~28
Protist	Total								
Porifera	Total	~5-6	~4	~9	~9	~19	~20	~13-14	~13
Hexa.									
Cnidaria	Total								
	Acti.								
	Coral	~22	~24	~27	~29	~47-48	50	~14	~14
	Penn.								
Arthropoda	Total								
	Crust.								
Echinodermata	Total								
	Crino.								
	Holo.								
	Asteroz.								
	Aster.								
	Ophir.								
	Echin.								
Mollusca	Total								
Chordata	Total								
	Fish								

Supplementary Tab. S4.6 Continuation of the literature comparison list considering megafauna taxon-/species- and morphotype-richness for Atlantic seamounts.

	System & Depth	Manning seamount (New England seamounts) 1325-1662m		Rehoboth seamount (New England seamounts) 1350-1936m		Gosnold seamount (New England seamounts) 1847-2138m		Gosnold seamount (New England seamounts) 1847-2138m		Nashville seamount (New England seamounts) 2097-2567m	
		Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)	Lapointe et al. (2020a); Lapointe (2021)	Lapointe et al. (2020b); Lapointe (2021)		
		Taxon	Taxon	Taxon	Taxon	Taxon	Taxon	Taxon	Taxon	Taxon	Taxon
Fauna		Total	Total	Total	Total	Total	Total	Total	Total	Total	Total
Total	Total	~42-43	~42	~54-55	~54	~37	~37	~50	~49		
Protist	Total										
Porifera	Total	~6	~7	~11-12	~12	~11-12	~12-13	~15	~15		
	Hexa.										
Cnidaria	Total										
	Acti.										
	Coral	~31	~33	~38	~37	~23	~22-23	~33	~33		
	Penn.										
Arthropoda	Total										
	Crust.										
Echinodermata	Total										
	Crino.										
	Holo.										
	Asteroz.										
	Aster.										
	Ophir.										
	Echin.										
Mollusca	Total										
Chordata	Total										
	Fish										

Supplementary Tab. S4.7 Continuation of the literature comparison list considering megafauna taxon-/species- and morphotype-richness for Atlantic seamounts.

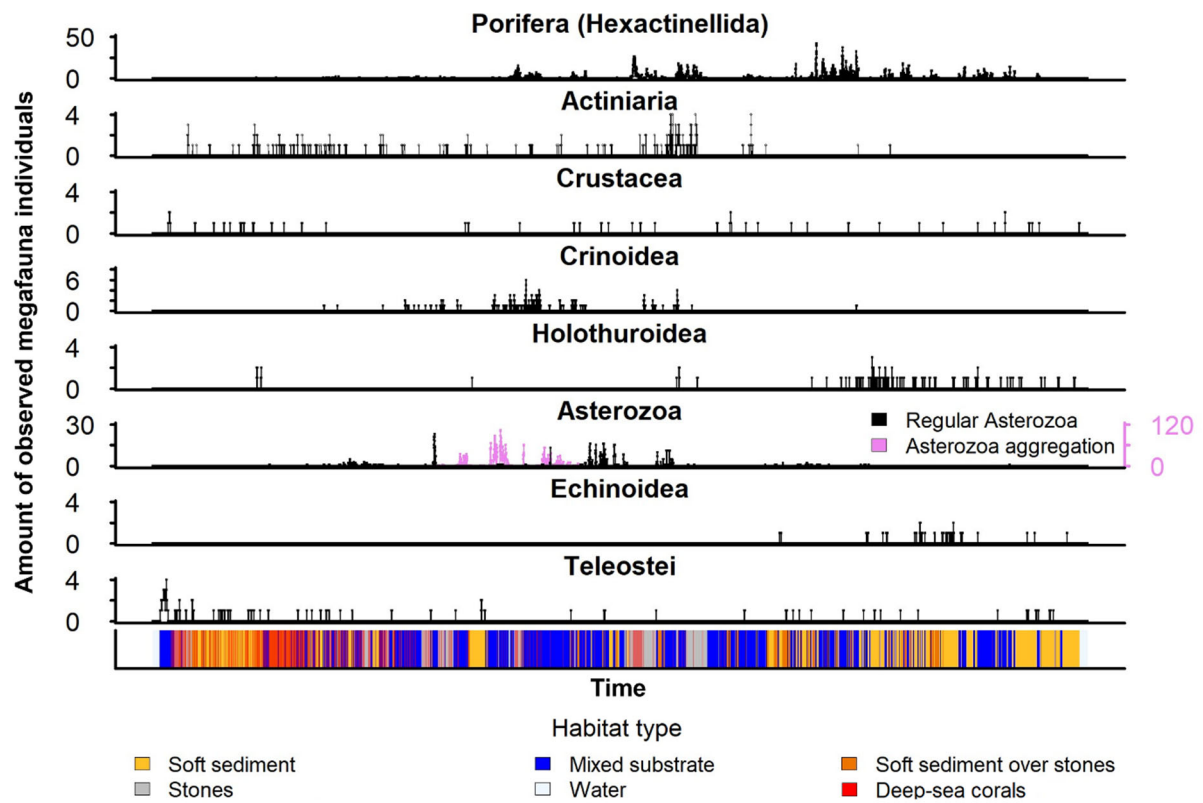
		System & Depth	Schulz Bank seamount 580-2700m	Schulz Bank seamount 1098m	Bank 580-1485m	Schulz Bank seamount 1103-1557-1982m	Schulz Bank seamount 1654-2397m	Schulz Bank seamount 2001-2774m
		Publication	Meyer et al. (2022)	Meyer et al. (2022)	Meyer et al. (2022)	Meyer et al. (2022)	Meyer et al. (2022)	Meyer et al. (2022)
			Morpho	Morpho	Morpho	Morpho	Morpho	Morpho
Fauna		Total	Total	Total	Total	Total	Total	Total
Total	Total	126	96	78	50	45	45	
Protist	Total							
Porifera	Total	54	39	35	22	25	22	
	Hexa.	10	6	3	2	3	3	
Cnidaria	Total	22	16	14	2	3	5	
	Acti.	12	9	10	1	2	2	
	Coral	10	7	4	1	1	3	
	Penn.							
Arthropoda	Total	10	7	7	8	2	5	
	Crust.	9	6	7	8	2	5	
Echinodermata	Total	16	13	9	8	6	7	
	Crino.	2	1	2	2	2	2	
	Holo.	1			1		1	
	Asteroz.	12	11	7	5	4	4	
	Aster.	10	9	5	3	2	2	
	Ophir.	2	2	2	2	2	2	
	Echin.	1	1					
Mollusca	Total	12	11	7	5	3	2	
Chordata	Total	13	9	5	5	5	4	
	Fish	9	5	1	2	3	3	

Supplementary Tab. S4.8 Continuation of the literature list considering megafauna taxon-/species- and morphotype-richness for other oceans and habitats.

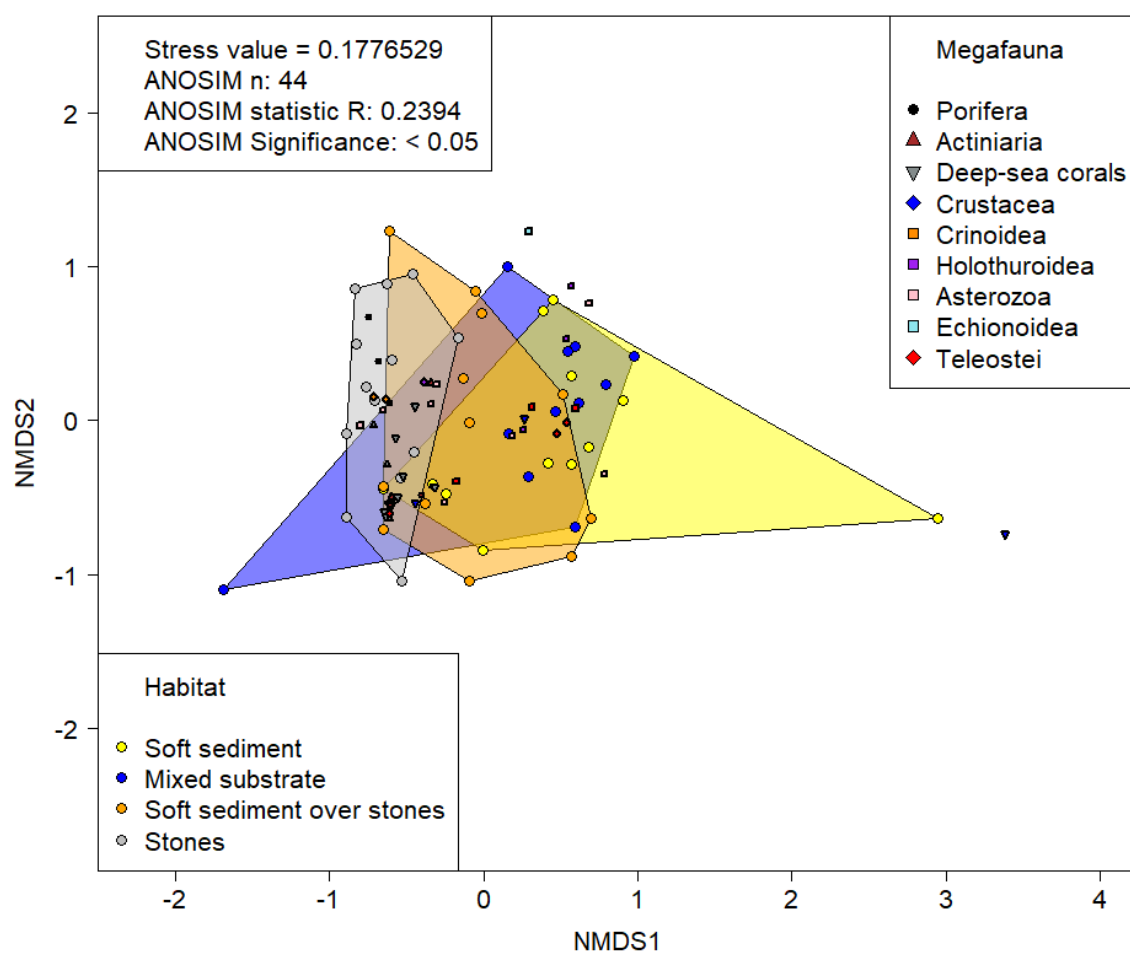
		System & Depth	Vema transverse ridge 570-2940m	Vema transverse ridge 570-1310m	Vema transverse ridge 1100-1500m	Vema transverse ridge 1580-2940m
		Publication	Victorero (2018)	Victorero (2018)	Victorero (2018)	Victorero (2018)
			Morpho	Species	Species	Species
Fauna			Total	Mean	Total	Total
Total	Total		172	~96.667±14.468	104	80
Protist	Total					
Porifera	Total					
	Hexa.					
Cnidaria	Total					
	Acti.					
	Coral					
	Penn.					
Arthropoda	Total					
	Crust.					
Echinodermata	Total					
	Crino.					
	Holo.					
	Asteroz.					
	Aster.					
	Ophir.					
	Echin.					
Mollusca	Total					
Chordata	Total					
	Fish					

Supplementary Tab. S5 List of each investigated seamount regions and their corresponding replicates, providing information on each replicate's duration (min:sec), the approximated area covered by the OFOS (m²) and each replicate's approximated start and end depth (m).

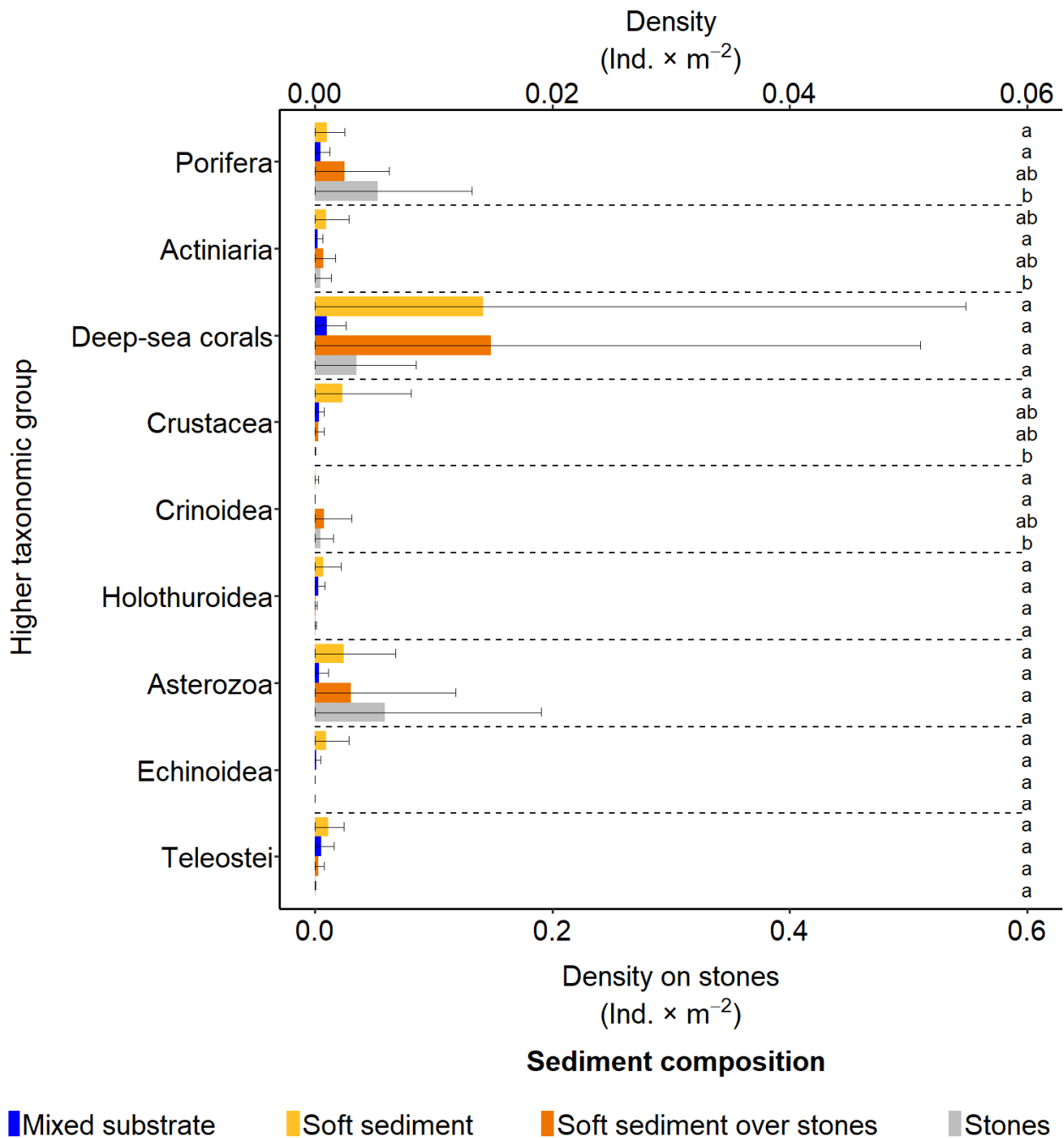
Upper seamount region							
Replicate	0	1	2	3	4	5	6
Duration (min:sec)	37:19:00	36:46:00	37:17:00	36:38:00	36:34:00	37:33:00	37:04:00
Approximated area covered (m ²)	~1983.701	~2153.565	~2183.828	~2145.755	~2141.85	~2199.448	~2171.137
Approximated start depth (m)	~1354.8	~1487.886	~1620.971	~1754.057	~1887.143	~2020.229	~2153.314
Approximated end depth (m)	~1487.886	~1620.971	~1754.057	~1887.143	~2020.229	~2153.314	~2286.4
Deeper seamount region							
Replicate	7	8	9	10	11	12	13
Duration (min:sec)	37:05:00	37:04:00	37:08:00	37:08:00	37:08:00	37:11:00	04:48
Approximated area covered (m ²)	~2172.114	~2171.137	~2175.042	~2175.042	~2175.042	~2177.971	~44.907
Approximated start depth (m)	~2286.4	~2419.486	~2552.571	~2685.657	~2818.743	~2951.829	~3084.914
Approximated end depth (m)	~2419.486	~2552.571	~2685.657	~2818.743	~2951.829	~3084.914	~3218



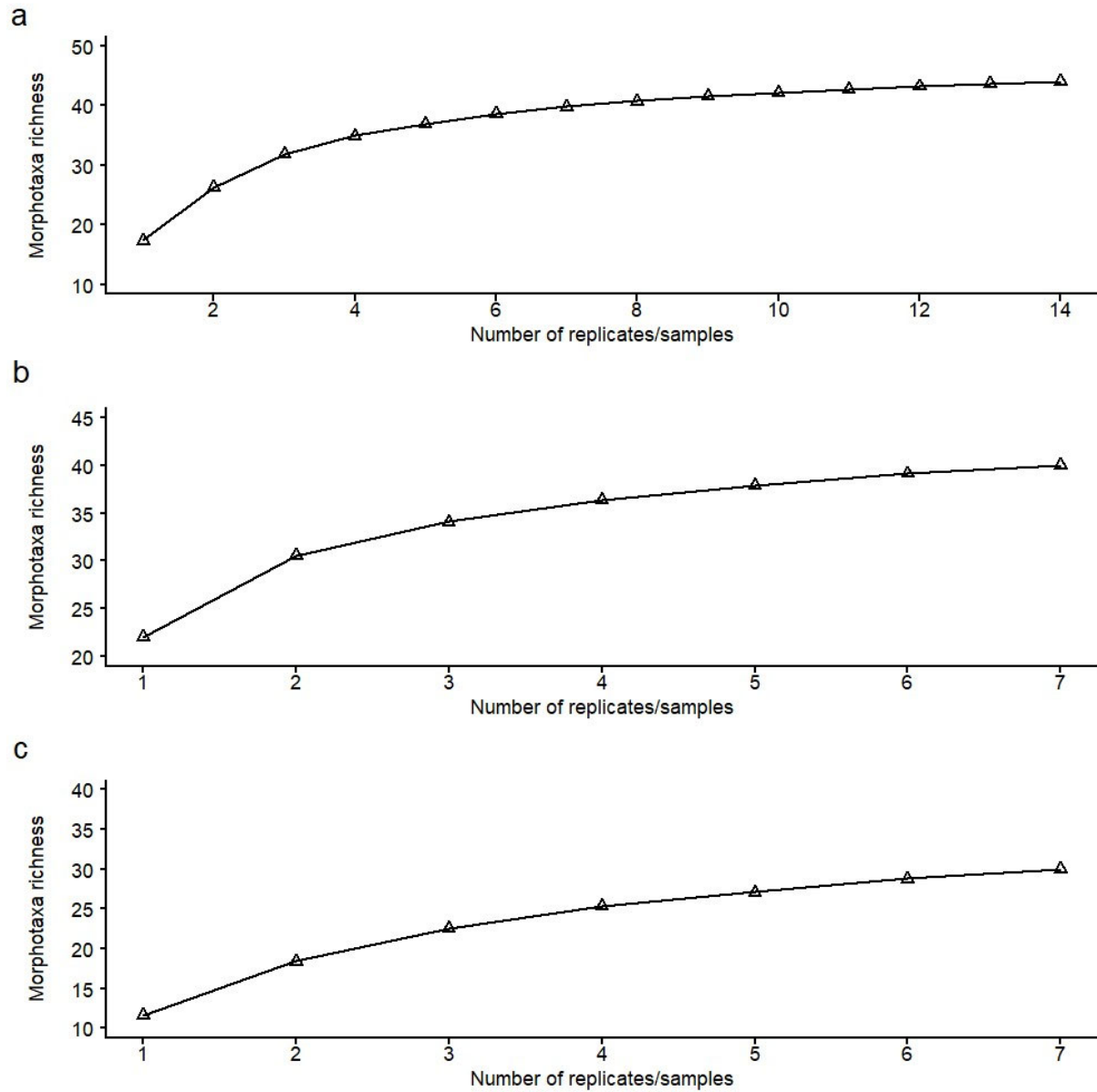
Supplementary Fig. S1 Distribution of bathyal and abyssal (Epi)-megafauna of observed individuals along the seamount. Upper graphs provide the number of occurred megafauna corresponding to time. The lower panel and its legend indicate the corresponding habitat composition.



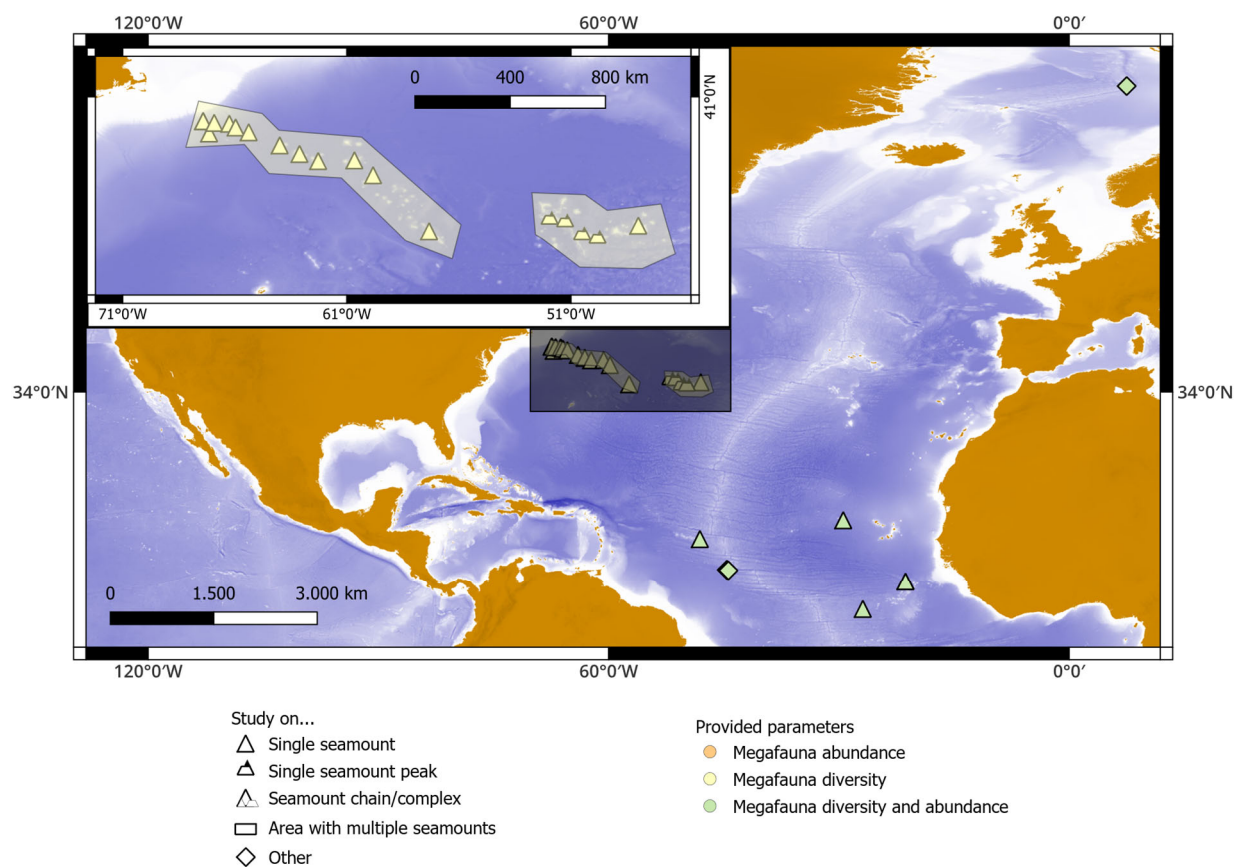
Supplementary Fig. S2 Non-metric multidimensional scaling plot depicting ordination of all 44 distinguished morphotaxa over each substrate-type based on density data (given as number of individuals per m²), as well as Bray-Curtis distance measures. ANOSIM with 9999 permutations and based on Bray-Curtis distance (Amount of morphotaxa n = 44; number of replicates per substrate: soft sediment = 12, mix = 11, soft sediment over stones = 12, stones 13; Stress-value = 0.1776529; R-value = 0.2394; p-value < 0.05).



Supplementary Fig. S3 Deep-sea megafauna densities (mean $\pm$ SD) summarized for the complete seamount with regard to population of substrate types: soft sediments, mixture of hard and soft sediment, soft sediment over stones and stones. Upper x-axis: densities related to all substrate types except for stones; lower x-axis: densities on stones. Error bars reaching into negative areas were cut-off at a value of 0. Megafauna taxa and morphotaxa were summarized for Porifera, Actiniaria, cold-water corals, Crustacea, Crinoidea, Holothuroidea, Asterozoa, Echinoidea and Teleostei. Significant differences within taxonomic groups were detected by Kruskal–Wallis and post-hoc analysis according to Dunn using 14 replicates for each taxonomic unit (Porifera: Kruskal–Wallis chi-squared = 23.071, df = 3, p-value = 3.9×10^{-5} ; Actiniaria: Kruskal–Wallis chi-squared = 7.849, df = 3, p-value = 4.92×10^{-2} ; Cold-water corals: Kruskal–Wallis chi-squared = 5.675, df = 3, p-value = 0.1285; Crustacea: Kruskal–Wallis chi-squared = 10.718, df = 3, p-value = 1.34×10^{-2} ; Crinoidea: Kruskal–Wallis chi-squared = 11.44, df = 3, p-value = 9.57×10^{-3} ; Holothuroidea: Kruskal–Wallis chi-squared = 5.6345, df = 3, p-value = 0.1308; Asterozoa: Kruskal–Wallis chi-squared = 6.8216, df = 3, p-value = 0.07781; Echinoidea: Kruskal–Wallis chi-squared = 9.2486, df = 3, p-value = 2.62×10^{-2} ; Teleostei: Kruskal–Wallis chi-squared = 2.8244, df = 3, p-value = 0.4195). Different letters on the right side mark significant differences between each taxonomic group regarding the substrate type.



Supplementary Fig. S4 Observed morphotaxa accumulation curves of the complete (a), as well as the seamount's upper (b) and deeper (c) region with morphotaxa richness as amount of observed morphotaxa plotted against the corresponding number of replicates



Supplementary Fig. S5 Overview map showing the location of systems included in the literature review on comparable seamount systems. Symbols refer to the type of structure the corresponding study focused on and colors represent the provided parameters.