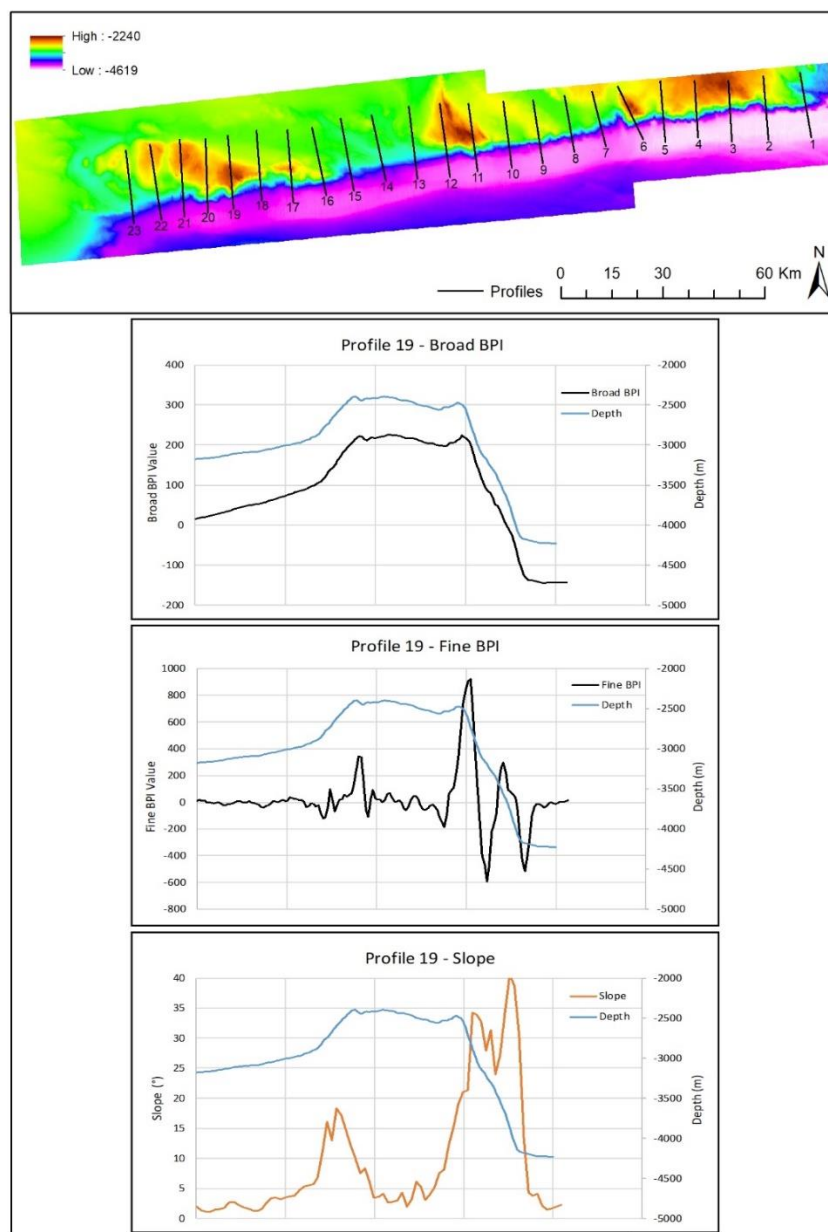
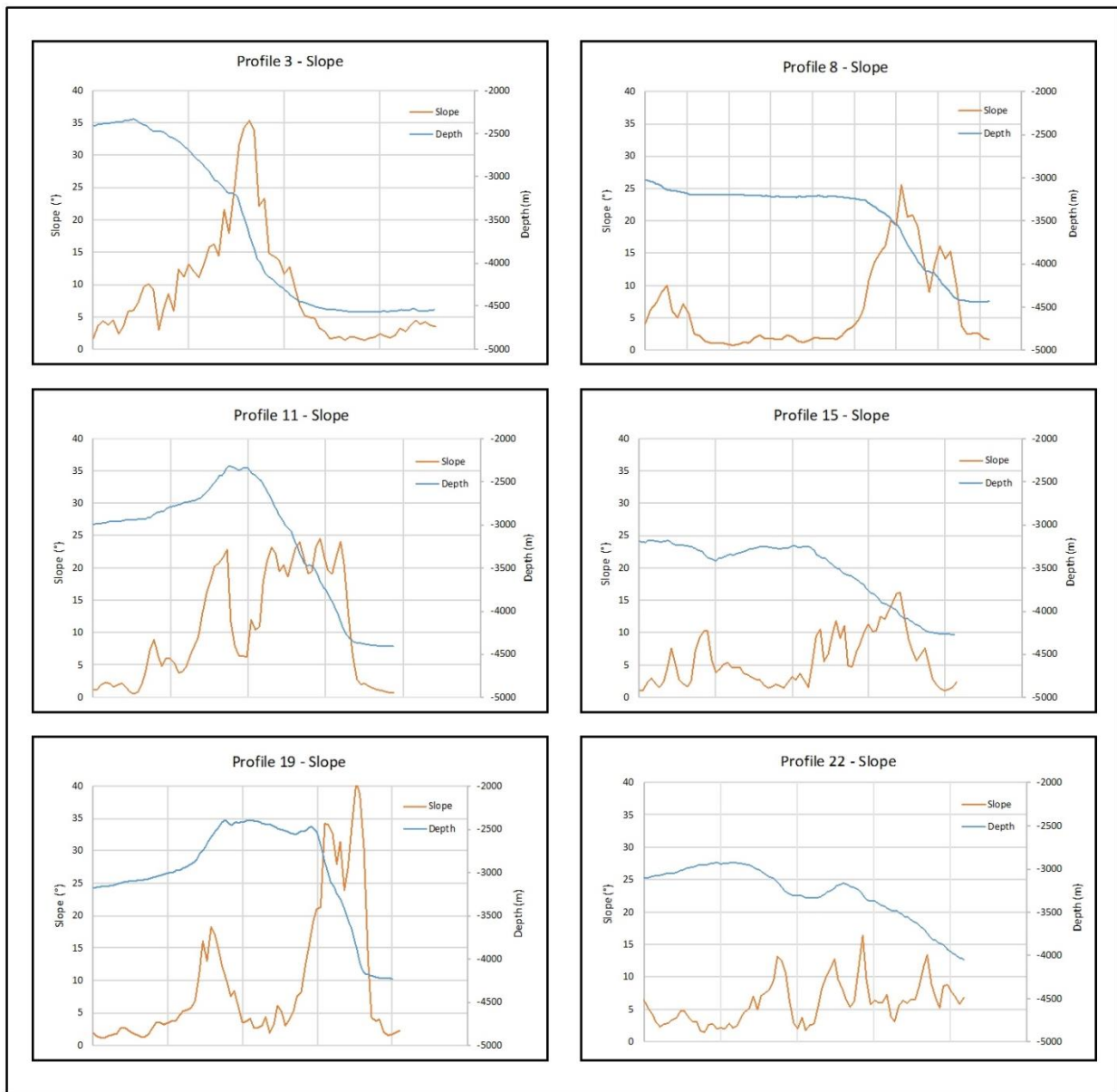


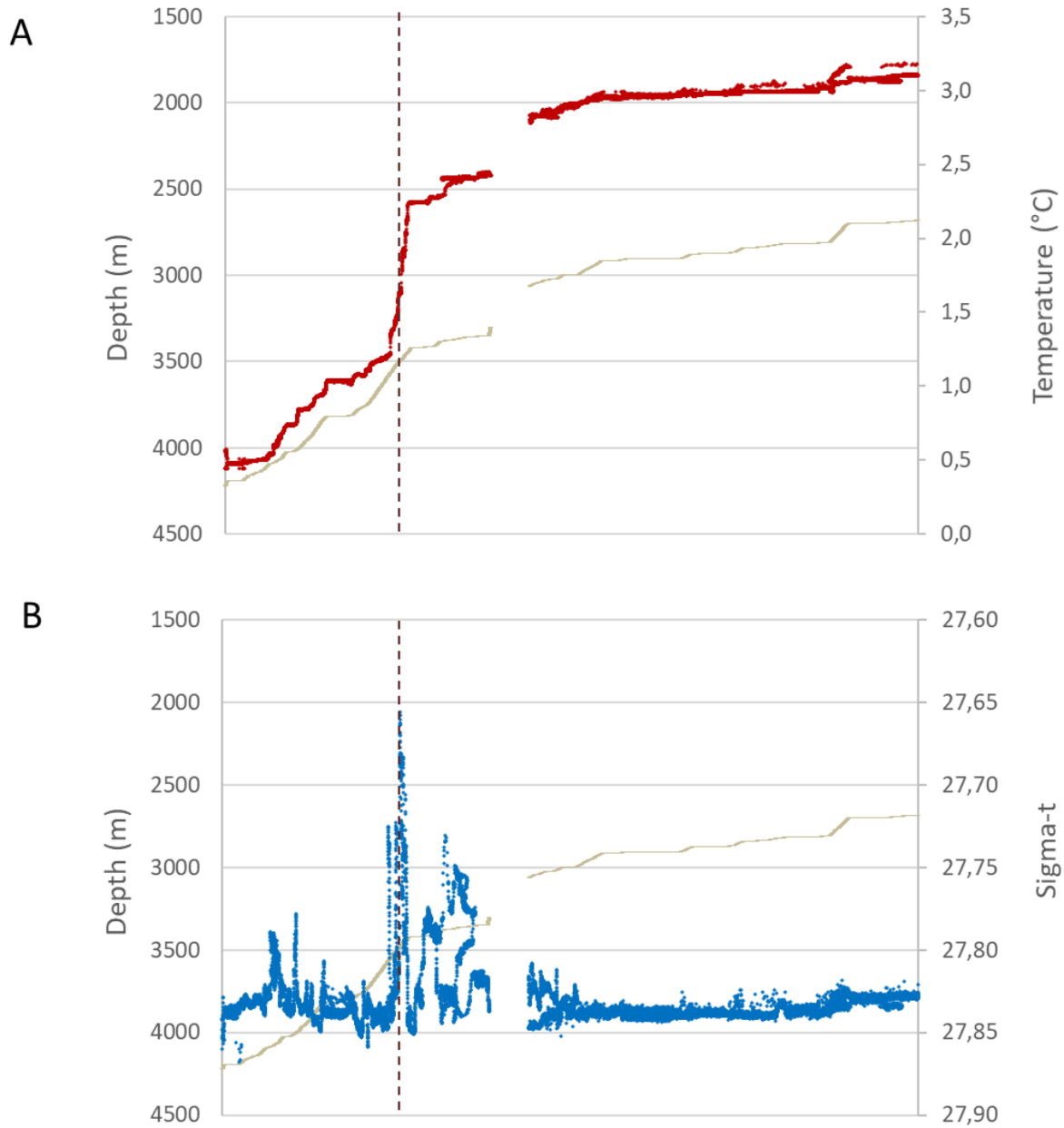
## Supplementary Material



**Supplementary Figure 1.** Transects delineated across the São Paulo Ridge digital bathymetric model (A) and terrain variables: BPI-broad (B), BPI-fine (C) and slope (D) extracted from profile 19, represented against depth



**Supplementary Figure 2.** Depth and slope profiles obtained from 6 transects delineated across the São Paulo Ridge Digital Bathymetric Model of the São Paulo Ridge, SW Atlantic.



**Supplementary Figure 3.** Potential temperature (°C) (A) and density (sigma-t) (B) recorded along the depth gradient during the deep-sea dives in the São Paulo Ridge, SW Atlantic. The grey line delineates the depth profile. Dashed lines depict boundary values for the Antarctic Bottom Water (AABW) and the North Atlantic Deep Water (NADW).

**Supplementary Table 1.** Classification table summarizing the terrain variables and depth (lower and upper limits) used for definition of seabed classes in the São Paulo Ridge, SW Atlantic.

Zonal Class	Structural Class	BPI-broad		BPI-fine		Slope (°)		Depth (m)	
		Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
I. Ridge Crest	1. Peak	+100		+400	+599				-2240
	2. High Summit	+100		+300	+400				
	3. Moderate Summit	+100		-100	+300				
	4. Low Summit	+100		-100	+100			-3319	
II. Plateau	5. Upper Plain	-100	+100		+346		6	-3726	
	6. Valley	-100	+100	-322	-10		6		
	7. Slope	-100	+100		+346				
III. Ridge Escarpment <sup>1</sup>	8. Terrace	-100	+100	-373	-29	6			-3300
	9. Scarp	-100	+100				58		-3150
IV. Ridge Foot	10. Channel <sup>2</sup>		-100		+44				-3300
	11. Depression		-100	-426	-164				-3300
	12. Lower Plain <sup>3</sup>	-100	+100		+346		6	-4667	-3727

<sup>1</sup>São Paulo Escarpment, <sup>2</sup>São Paulo Channel, <sup>3</sup>Santa Catarina Plateau

**Supplementary Table 2.** Summary of bottom types observed during exploratory deep-sea dives in the São Paulo Ridge, SW Atlantic. Capital letters represent substrate types: R = rocky ridge with rugged surface; F = flat rocky pavement with plain or granulated surface; B = loose boulders; C = cobbles; P = pebbles; G = gravel; U = unconsolidated substrate. In each bottom type the first capital letter refers to the substrate type covering more than 50% of the visible seafloor, and the second to the substrate covering between 30 and 50%. Seascape units: AMF, Abyssal mud flat; DF, Debris field; BC, Bedrock cliff; GF, Granular flat; BCR, Bedrock crest; MT, Mud terrace; GCR, Granular crest. Numbers below seascape units express the percentage of time each bottom type was observed in each seascape unit (column percentage). Numbers in bold are higher than 30%.

Bottom type	Obs.time (min)	Seascape Unit (% of observation time)							
		AMF	DF	BC	GF	BCR	MT	GCR	TOTAL
RU	213.4	15.7	0.7	<b>50.1</b>	0.0	<b>100.0</b>	0.0	<b>43.8</b>	<b>31.0</b>
UP	134.1	26.5	18.4	1.0	24.8	0.0	25.4	<b>38.4</b>	19.4
UC	119.9	3.7	<b>46.1</b>	9.0	0.0	0.0	29.5	2.8	17.4
UU	83.1	15.5	0.0	0.0	0.0	0.0	<b>45.2</b>	6.9	12.1
UF	32.9	24.8	1.7	0.0	0.0	0.0	0.0	5.1	4.8
UR	22.3	0.0	13.6	0.0	0.0	0.0	0.0	2.7	3.2
RC	17.8	2.0	0.0	14.4	3.8	0.0	0.0	0.0	2.6
CU	16.0	0.0	11.4	0.0	0.0	0.0	0.0	0.0	2.3
RR	13.6	0.6	0.0	12.3	0.0	0.0	0.0	0.0	2.0
RP	10.6	2.9	0.0	7.2	0.0	0.0	0.0	0.0	1.5
FU	10.2	0.0	0.0	6.0	28.4	0.0	0.0	0.3	1.5
PU	7.6	0.0	5.4	0.0	0.0	0.0	0.0	0.0	1.1
FP	6.3	1.1	0.0	0.0	<b>43.0</b>	0.0	0.0	0.0	0.9
UB	0.6	3.7	0.6	0.0	0.0	0.0	0.0	0.0	0.1
PC	0.4	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.1
BB	0.2	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CP	0.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BC	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Obs.time (min)	99.6	140.1	106.1	12.2	93.1	132.1	115.5	<b>698.6</b>
	% of obs. time	14.3	20.1	15.2	1.7	13.3	18.9	16.5	

**Supplementary Table 3.** Summary of estimated densities in individuals.m<sup>-2</sup> (means and lower – upper 95% CIs) of epibenthic and benthopelagic megafauna observed during exploratory deep-sea dives in the São Paulo Ridge, SW Atlantic. Numbers in bold highlight the highest densities observed (>0.01 individuals.m<sup>-2</sup>).

	Cnidarians	Poriferans	Crustaceans	Fish	Echinoderms	Others
Seascape						
GCR	0.0004	<b>0.0259</b>	0.0057	<b>0.0129</b>	0.0027	0.0015
	0.0004-0.0004	<b>0.0244-0.0274</b>	0.0054-0.0060	<b>0.0122-0.0137</b>	0.0025-0.0028	0.00144-0.0016
MT	0.0022	<b>0.0217</b>	0.0066	0.0036	0.0027	0.0010
	0.0020-0.0024	<b>0.0198-0.0235</b>	0.0060-0.0071	0.0033-0.0040	0.0024-0.0029	0.0009-0.0011
BCR	<b>0.0152</b>	<b>0.1085</b>	0.0071	0.0019	0.0055	0.0019
	<b>0.0142-0.0163</b>	<b>0.1013-0.1160</b>	0.0066-0.0076	0.0018-0.0021	0.0051-0.0059	0.0018-0.0021
GF	0.0014	0.0014	0.0027	0.00000	0.0027	0.0000
	0.0013-0.0015	0.0013-0.0015	0.0026-0.0029		0.0026-0.0029	
BC	0.0031	0.0046	0.0011	0.0008	0.0003	0.0000
	0.0029-0.0033	0.0043-0.0049	0.0011-0.0012	0.0008-0.0009	0.0003-0.0003	
DF	0.0002	0.0006	0.0012	0.0010	0.0006	0.0004
	0.0002-0.0002	0.0005-0.0007	0.0011-0.0013	0.0009-0.0011	0.0005-0.0007	0.0004-0.0004
AMF	0.0010	0.0012	0.0021	0.0011	0.0008	0.0004
	0.0008-0.0011	0.0010-0.0015	0.0017-0.0024	0.0009-0.0013	0.0007-0.0010	0.0003-0.0005
Depth Strata						
<2700m	0.0045	<b>0.1126</b>	0.0035	0.0040	0.0025	0.0000
	0.0040-0.0050	<b>0.1031-0.1301</b>	0.0031-0.0039	0.0035-0.0044	0.0022-0.0028	
2700-2900m	0.0073	<b>0.0772</b>	0.0077	<b>0.0137</b>	0.0032	0.0036
	0.0069-0.0077	<b>0.0730-0.0815</b>	0.0073-0.0081	<b>0.0130-0.0145</b>	0.0031-0.0034	0.0034-0.0038
2900-3300m	0.0039	0.0085	0.0051	0.0025	0.0025	0.0012
	0.0037-0.0041	0.0081-0.0100	0.0048-0.0053	0.0024-0.0027	0.0024-0.0027	0.0011-0.0012
3300-3800m	0.0061	0.0088	0.0027	0.0011	0.0016	0.0000
	0.0056-0.0066	0.0082-0.0096	0.0025-0.0030	0.0010-0.0012	0.001500.0018	
>3800m	0.0006	0.0015	0.0016	0.0008	0.0007	0.0003
	0.0005-0.0006	0.0014-0.0016	0.0015-0.0017	0.0008-0.0009	0.0006-0.0007	0.0002-0.0003
Total*	0.0029	<b>0.0158</b>	0.0028	0.0021	0.0014	0.0005
	0.0028-0.0030	<b>0.0151-0.0165</b>	0.0027-0.0030	0.0021-0.0023	0.0013-0.0015	0.0005-0.0006

