

Supplementary Materials

DESCRIPTION OF SAMPLING METHODS

Environmental and epifauna data were obtained from 26 stations sampled during INIDEP oceanographic missions on R/V *Oca Balda* during summer 1999–2000 (Figure 1, INIDEP stations). Sediment samples were collected with a Phleger extractor and a Picard dredge (see Fernández et al., 2003, for a full description). Bottom water samples were taken in January 2000 with an SBE CTD (Sea-Bird electronic I model XIX) that included a Seapoint Chlorophyll Fluorometer and a Niskin bottle. Epifauna samples were collected with an epibenthic trawl (see Fernández, 2003, 2005, for a full description) during a standard trawl duration of 10 minutes and at a speed of two knots, sampling an effective surface of approximately 356 m² by station. Organisms were identified to the lowest taxonomic level possible and counted by INIDEP researchers.

In addition, data from 13 stations sampled during the R/V *Coriolis II* MARES mission in February 2014 were analyzed (Figure 1, MARES stations). Sediment samples were

taken with a box corer and analyzed following the methods of Buchanan (1984) and Sargent et al. (1983). Bottom water samples in the MARES mission were collected with a Rosette-CTD (Sea-Bird Carousel SBE-32 CTD SBE-911plus). Additional infauna data were acquired with a box corer (50 × 50 × 60 cm). One half of the box corer sample was analyzed (0.125 m² cross-sectional area). Organisms were identified to the lowest taxonomic level possible.

Current velocities were estimated during January 2014 for INIDEP and MARES stations with a model grid of 1/60th-degree spatial resolution, which is approximately 1.3 km in latitude, has 40 vertical levels, and is forced by the ERA_interim atmospheric model at the surface, developed by Vincent Combes and Ricardo Matano of Oregon State University (*pers. comm.*, April 7, 2017).

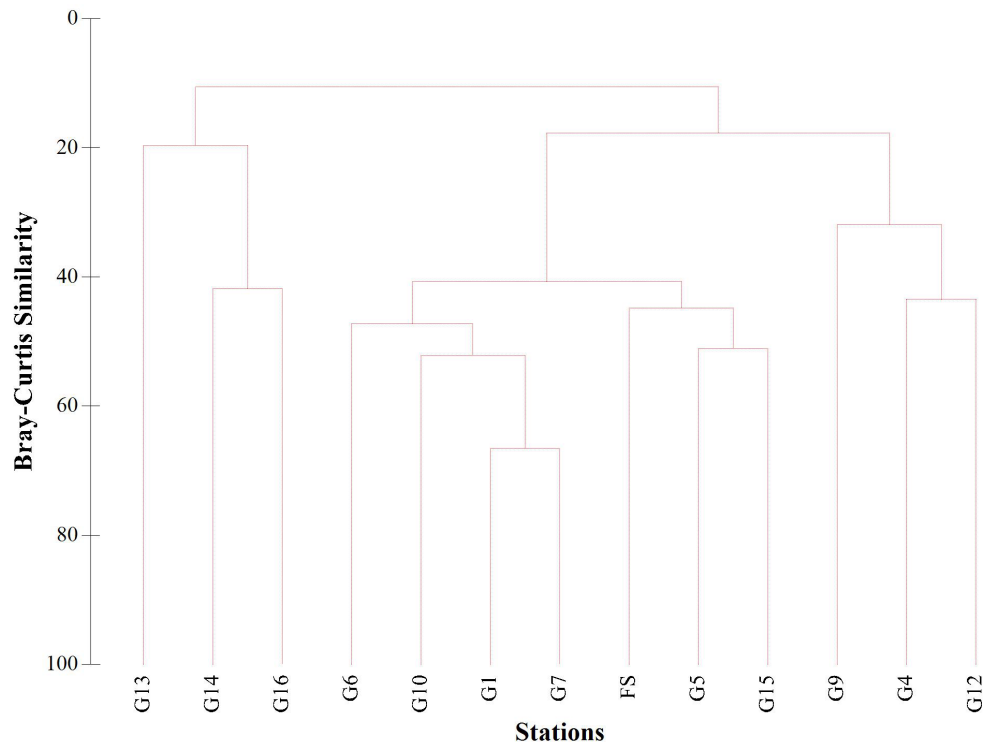


FIGURE S1. Functional cluster based on the Bray-Curtis Similarity matrix using abundances of infauna functional groups by station. No assemblages were identified.

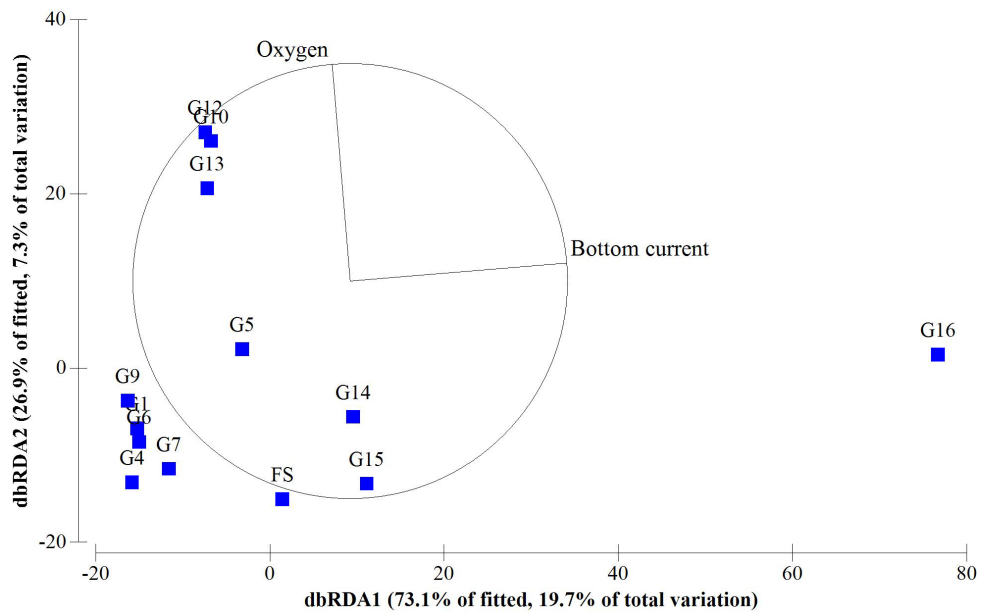


FIGURE S2. Distance-based redundancy analysis (dbRDA) plot of the distance-based linear model permutation test (DistLM) based on the best environmental variables fitted to the variation in assemblages of infauna functional groups (Best-fit model with 9,999 permutations, AICc = 108.14, $R^2 = 0.27$). Vectors indicate direction of the environmental variable in the ordination plot.

TABLE S1. Taxa classified by functional traits. Combining levels of traits resulted in identification of a functional group, for example: opportunist, x-large, mobile, crawl, surface dweller = OXMCS.

Taxa	Feeding Habit	Size	Mobility	Adult Life Habit	Bioturbation	Functional Groups
Eunicidae	O	X	H	C.B	T	OXHC.BT
Lumbrineridae	O	M	M	B	T	OMMBT
Onuphidae	P	L	M	C	T	PLMCT
Glyceridae	O	X	M	B	G	OXMBG
Nereididae	P	X	M	B	T	PXMBT
Polynoidae	P	M	M	B	B	PMMBB
Sigalionidae	P	M	M	B	B	PMMBB
Pectinariidae	S	L	S	B	T	SLSBT
Terebellidae	D	M	S	B	T	DMSBT
Echiurida	A	S	H	B	B	ASHBB
Maldanidae	S	M	H	B	T	SMHBT
Orbiniidae	S	M	M	B	B	SMMBB
Amphipoda indet 1	O	L	M	C.W	S	OLMC.WS
Amphipoda indet 2	O	L	M	C.W	S	OLMC.WS
<i>Gammarus</i> sp	P	M	M	C.W	S	PMMC.WS
<i>Alpheus puapeba</i>	P	L	M	C	S	PLMCS
<i>Notiax brachyophthalma</i>	D	X	M	B	G	DXMBG
<i>Munida gregaria</i>	O	X	M	C.W	S	OXMC.WS
<i>Lithodes santolla</i>	O	X	M	C	S	OXMCS
<i>Austropandalus grayi</i>	P	L	M	W	S	PLMWS
<i>Peisos petrunkevitchi</i>	F	L	M	W	S	FLMWS
<i>Peltarion spinulosum</i>	D.O	X	M	C	S	D.OXMCS
<i>Cirolana</i> sp	O	M	M	W	B	OMMWB
<i>Pterygosquilla armata armata</i>	P	X	M	C	B	PXMCB
Scalpellidae	F	M	S	S	S	FMSSS
<i>Terebratella dorsata</i>	F	L	S	S	S	FLSSS
<i>Bryozoa</i> indet	F	X	S	S	S	FXSSS
<i>Smittipora</i> sp	F	L	S	S	S	FLSSS
Priapulida	P	X	H	B	B	PXHBB
<i>Molgula</i> sp indet 1	F	X	S	S	S	FXSSS
<i>Boltenia</i> sp	F	L	S	S	S	FLSSS
<i>Myxine australis</i>	P	X	M	C.W	S	PXMC.WS
<i>Actinostolla crassicornis</i>	P	X	S	S	S	PXSSS
<i>Edwardsia</i> sp	F	X	H	S	S	FXHSS
<i>Peachia</i> sp	F	X	H	B	B	FXHBB
<i>Renilla</i> sp	F	X	S	S	S	FXSSS
<i>Stylatula</i> sp	F	X	S	S	S	FXSSS
<i>Diplasterias brandti</i>	P	X	M	C	S	PXMCS
<i>Ctenodiscus australis</i>	D.P	L	M	C	S	D.PLMCS
<i>Arbacia dufresnii</i>	O	X	M	C	S	OXMCS
<i>Pseudechinus magellanicus</i>	O	X	M	C	S	OXMCS
<i>Tripylaster philippii</i>	S	L	M	B	S	SLMBS
Holothuroidea indet	D.F	X	M	C	B	D.FXMCB
<i>Hemioedema spectabilis</i>	D	X	M	C.B	B	DXMC.BB
<i>Ophiactis asperula</i>	F	L	M	C	S	FLMCS
<i>Ophiura</i> sp	O	L	M	C	S	OLMCS
<i>Mytilus edulis</i>	F	X	S	S	S	FXSSS
<i>Malletia cumingii</i>	S	L	S	B	B	SLSBB
<i>Neilonella sulculata</i>	S.F	L	M	B	B	S.FLMBB
<i>Ennucula puelcha</i>	S.F	L	S	B	B	S.FLSBB
<i>Zygochlamys patagonica</i>	F	X	S	S	S	FXSSS
<i>Pandora cistula</i>	F	L	M	B	B	FLMBB
<i>Pitar rostratus</i>	F	L	M	B	B	FLMBB
<i>Semirossia tenera</i>	P	X	M	W	S	PXMWS
<i>Carolesia blakei</i>	P	L	M	C	S	PLMCS
<i>Odontocymbiola magellanica</i>	P	X	M	C	S	PXMCS
<i>Calyptrea pileolus</i>	F	L	H	C	S	FLHCS
<i>Falsilunatia patagonica</i>	P	L	M	C	B	PLMCB
<i>Notocochlis isabelleana</i>	P	L	M	C	B	PLMCB
<i>Marionia cucullata</i>	P	X	M	C	S	PXMCS
<i>Nemertean</i> indet	P	X	M	C	S	PXMCS

TABLE S2. Composition of assemblages (A, B, C, D) of epifauna functional groups. See Table 1 or Table S1 for functional group details.

Functional Group	Assemblages of Epifauna Functional Groups			
	A	B	C	D
ASHBB		x	x	x
D.OXMCS			x	x
D.PLMCS		x		
DXMBG			x	x
DXMC.BB	x	x		
FLHCS	x			
FLMBB				x
FLMCS	x			x
FLMWS			x	x
FLSSS	x	x		
FMSSS		x		
FXHBB		x	x	x
FXHSS			x	x
FXSSS	x	x	x	x
OLMC.WS				x
OLMCS			x	x
OMMBT			x	x
OMMWB	x	x		x
OXHC.BT				x
OXMBG		x		
OXMC.WS			x	x
OXMCS	x	x	x	x
PLMCB				x
PLMCS	x	x		x
PLMWS	x	x	x	x
PMMBB			x	x
PMMC.WS	x		x	
PXHBB			x	
PXMCB			x	x
PXMCS	x	x	x	x
PXMWS	x		x	x
PXSSS	x			x
S.FLMBB				x
S.FLSBB			x	x
SLMBS		x	x	x
SLSBB			x	x
SLSBT			x	x
SMHBT			x	x

TABLE S3. Contributions from similarity percentage (SIMPER) analysis on assemblages of epifauna functional groups (see Table 1 or Table S1 for functional trait abbreviations).

Assemblage C Average Similarity = 41.52					
Functional Group	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
OXMCS	2.41	21.64	1.14	52.13	52.13
OXMC.WS	0.94	9.93	0.94	23.92	76.05
SLSBT	0.34	3.54	0.91	8.53	84.58
DXMBG	0.16	1.23	0.58	2.97	87.55
PXMCB	0.08	1.02	0.95	2.45	90.01

Assemblage D Average Similarity = 36.51					
Functional Group	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
S.FLMBB	2.41	11.44	1.00	31.33	31.33
S.FLSBB	1.28	8.78	1.19	24.05	55.37
FXSSS	0.95	5.11	0.93	13.99	69.37
OXMC.WS	0.35	2.89	0.84	7.91	77.27
PXMCB	0.39	2.75	1.56	7.52	84.80
FLMBB	0.26	1.54	1.00	4.21	89.01
DXMBG	0.19	0.79	0.44	2.15	91.16

Assemblage A					
Fewer than two samples in group					

Assemblage B Average Similarity = 50.97					
Functional Group	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
FXSSS	1.45	42.87	#####	84.11	84.11
ASHBB	0.31	8.10	#####	15.89	100.00

Assemblages C & D Average Dissimilarity = 85.85						
Functional Group	Group C Av.Abund	Group D Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
OXMCS	2.41	0.04	18.49	1.24	21.53	21.53
S.FLMBB	0.00	2.41	16.97	1.16	19.77	41.30
S.FLSBB	0.06	1.28	8.78	1.67	10.23	51.53
FXSSS	0.10	0.95	7.09	1.02	8.26	59.79
OXMC.WS	0.94	0.35	7.03	0.92	8.19	67.98
OLMCS	0.13	0.96	4.03	0.48	4.70	72.67
SLSBT	0.34	0.29	3.55	1.12	4.13	76.81
PXMCB	0.08	0.39	2.31	1.10	2.70	79.50
FLMBB	0.00	0.26	2.19	0.97	2.55	82.05
SMHBT	0.10	0.33	2.11	0.88	2.46	84.51
DXMBG	0.16	0.19	1.85	1.04	2.15	86.66
PMMBB	0.11	0.23	1.58	1.17	1.84	88.50
PLMWS	0.12	0.07	1.37	0.66	1.60	90.10

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TABLE S3. Continued

Assemblages C & B Average Dissimilarity = 92.81						
Functional Group	Group C Av.Abund	Group B Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
OXMCS	2.41	0.06	25.91	1.42	27.91	27.91
FXSSS	0.10	1.45	18.80	2.59	20.26	48.17
OXMC.WS	0.94	0.00	12.59	1.01	13.57	61.74
SLSBT	0.34	0.00	4.48	1.02	4.83	66.57
ASHBB	0.07	0.31	3.27	1.91	3.52	70.09
PLMWS	0.12	0.23	3.21	0.99	3.45	73.55
PXMCS	0.01	0.28	3.07	0.97	3.31	76.86
PLMCS	0.00	0.20	2.11	0.94	2.27	79.13
DXMBG	0.16	0.00	2.01	0.89	2.17	81.30
DXMC.BB	0.00	0.19	2.00	0.94	2.15	83.45
OLMCS	0.13	0.00	1.66	0.34	1.79	85.25
PMMBB	0.11	0.00	1.50	0.93	1.61	86.86
FXHBB	0.05	0.11	1.36	1.21	1.46	88.32
OMMWB	0.00	0.12	1.33	0.94	1.44	89.75
SMHBT	0.10	0.00	1.10	0.73	1.19	90.94

Assemblages D & B Average Dissimilarity = 83.19						
Functional Group	Group D Av.Abund	Group B Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
S.FLMBB	2.41	0.00	19.24	1.15	23.13	23.13
FXSSS	0.95	1.45	11.00	1.45	13.22	36.35
S.FLSBB	1.28	0.00	10.58	1.74	12.71	49.07
OXMC.WS	0.35	0.00	3.98	1.11	4.79	53.85
PXMCS	0.39	0.00	3.49	1.41	4.20	58.05
OLMCS	0.96	0.00	3.18	0.36	3.82	61.87
ASHBB	0.05	0.31	2.94	1.86	3.54	65.41
PXMCS	0.04	0.28	2.58	0.98	3.10	68.51
FLMBS	0.26	0.00	2.54	0.95	3.05	71.56
PLMWS	0.07	0.23	2.24	1.25	2.69	74.25
SMHBT	0.33	0.00	2.12	0.67	2.55	76.80
DXMBG	0.19	0.00	1.86	0.74	2.24	79.04
PLMCS	0.01	0.20	1.76	0.91	2.11	81.15
DXMC.BB	0.00	0.19	1.65	0.87	1.98	83.13
FXHBB	0.09	0.11	1.21	1.01	1.46	84.59
PMMBB	0.23	0.00	1.21	0.72	1.45	86.05
OMMWB	0.01	0.12	1.13	0.94	1.35	87.40
FLMWS	0.06	0.00	1.07	0.33	1.28	88.68
SLSBB	0.14	0.00	1.01	1.12	1.21	89.89

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TABLE S3. Continued

Assemblages C & A Average Dissimilarity = 87.67						
Functional Group	Group C Av.Abund	Group A Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
PLMWS	0.12	2.94	18.43	6.31	21.03	21.03
PXMCS	0.01	1.77	11.58	6.96	13.21	34.24
OXMCS	2.41	0.89	10.74	1.18	12.25	46.49
FXSSS	0.10	1.37	8.38	4.95	9.55	56.04
PLMCS	0.00	0.97	6.33	6.91	7.22	63.27
OXMC.WS	0.94	0.00	6.12	1.07	6.98	70.24
FLMCS	0.00	0.63	4.11	6.91	4.69	74.93
FLSSS	0.00	0.50	3.25	6.91	3.71	78.64
OMMWB	0.00	0.50	3.25	6.91	3.71	82.34
SLSBT	0.34	0.00	2.16	1.11	2.47	84.81
DXMC.BB	0.00	0.22	1.45	6.91	1.66	86.47
FLHCS	0.00	0.22	1.45	6.91	1.66	88.12
PXSSS	0.00	0.22	1.45	6.91	1.66	89.78
PMMC.WS	0.00	0.22	1.42	7.38	1.62	91.40

Assemblages D & A Average Dissimilarity = 89.78						
Functional Group	Group D Av.Abund	Group A Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
PLMWS	0.07	2.94	16.29	3.68	18.15	18.15
S.FLMBB	2.41	0.00	11.54	1.10	12.86	31.01
PXMCS	0.04	1.77	9.87	3.48	10.99	41.99
S.FLSBB	1.28	0.00	5.93	1.69	6.60	48.60
PLMCS	0.01	0.97	5.44	3.61	6.06	54.66
FXSSS	0.95	1.37	5.40	1.69	6.02	60.67
OXMCS	0.04	0.89	4.83	3.35	5.38	66.05
FLMCS	0.01	0.63	3.50	3.57	3.90	69.95
FLSSS	0.00	0.50	2.82	3.61	3.14	73.09
OMMWB	0.01	0.50	2.74	3.51	3.06	76.15
OLMCS	0.96	0.00	2.51	0.34	2.80	78.95
OXMC.WS	0.35	0.00	2.05	1.19	2.29	81.23
PXMCB	0.39	0.00	1.93	1.40	2.15	83.38
FLMBB	0.26	0.00	1.40	0.99	1.56	84.93
SMHBT	0.33	0.00	1.27	0.68	1.42	86.35
DXMC.BB	0.00	0.22	1.26	3.61	1.40	87.76
FLHCS	0.00	0.22	1.26	3.61	1.40	89.16
PMMC.WS	0.00	0.22	1.26	3.61	1.40	90.57

Assemblages B & A Average Dissimilarity = 66.36						
Functional Group	Group B Av.Abund	Group A Av.Abund	Av.Diss	Diss/SD	Contrib%	Cum.%
PLMWS	0.23	2.94	19.87	3.55	29.95	29.95
PXMCS	0.28	1.77	11.06	2.36	16.66	46.61
OXMCS	0.06	0.89	6.04	3.74	9.11	55.72
PLMCS	0.20	0.97	5.76	1.96	8.68	64.39
FLMCS	0.00	0.63	4.56	6.12	6.87	71.26
FLSSS	0.06	0.50	3.20	2.78	4.83	76.08
OMMWB	0.12	0.50	2.80	1.63	4.22	80.31
ASHBB	0.31	0.00	2.21	32.03	3.33	83.64
FLHCS	0.00	0.22	1.61	6.12	2.43	86.07
PMMC.WS	0.00	0.22	1.61	6.12	2.43	88.49
PXMWS	0.00	0.22	1.61	6.12	2.43	90.92

TABLE S4. Contributions from SIMPER analysis on functional infauna data.

Average Similarity = 23.30					
Functional Group	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
S.FLMBB	2.22	7.64	0.56	32.80	32.80
DXMBG	1.22	5.77	0.58	24.78	57.58
SMHBT	1.16	3.91	0.43	16.77	74.36
S.FLSBB	1.18	2.71	0.48	11.63	85.99
SLMBS	0.37	0.71	0.20	3.03	89.02
FXSSS	0.43	0.66	0.20	2.82	91.84