The following supplement accompanies the article

Long-term progression and drivers of coastal zoobenthos in a changing system

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Supplement.

Table S1: SIMPER analysis showing species contribution to average similarities within each exposure group and across all years (1973, 1989, 2000, 2013 for Sheltered and Exposed 1 and 1994, 2000, 2006 and 2013 for Exposed 2) with cumulative contribution cut-off at 90%.

Sheltered	**Average similarity: 38.90**				
Taxa	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Chironomidae	2.92	14.44	1	37.11	37.11
Macoma balthica	2.71	9.01	0.69	23.16	60.27
Marenzelleria spp.	1.19	5.21	0.54	13.4	73.67
Oligochaeta	1.45	4.86	0.68	12.49	86.16
Potamopyrgus antipodarum	1.07	3.37	0.64	8.66	94.82
Exposed 2	**Average similarity: 52.35**				
Taxa	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Macoma balthica	4.38	30.07	2.33	57.43	57.43
Marenzelleria spp.	1.75	5.96	0.6	11.38	68.81
Monoporeia affinis	1.13	3.76	0.54	7.18	75.99
Chironomidae	1.3	3.73	0.59	7.13	83.12
Halicryptus spinulosus	0.58	2.91	0.6	5.55	88.67
Saduria entomon	0.34	1.63	0.51	3.11	91.78
Exposed 2	**Average similarity: 60.38**				
Taxa	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Macoma balthica	5.18	16.92	3.06	28.03	28.03
Ostracoda	4.01	10.99	1.78	18.2	46.22
Marenzelleria spp.	4.01	10.91	1.04	18.08	64.3
Monoporeia affinis	4.28	7.84	1.23	12.99	77.29
Oligochaeta	2.83	4.7	0.92	7.79	85.08
Halicryptus spinulosus	1.21	3.01	1.38	4.99	90.07

Table S2: SIMPER analysis showing species contribution to average similarities within each year and across all exposure groups (Sheltered, Exposed 1, Exposed 2) with cumulative contribution cut-off at 90%.

1973	**Average similarity: 43.04**				
Taxa	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Macoma balthica	2.56	23.63	1.22	54.9	54.9
Chironominae spp	1.7	11.3	0.71	26.27	81.17
Halicryptus spinulosus	0.32	3.52	0.57	8.19	89.36
Oligochaeta	0.78	3.48	0.56	8.09	97.44

1989	**Average similarity: 46.40**				
Taxa	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Macoma balthica	3.49	27.77	1.6	59.85	59.85
Chironominae spp	2.1	10.55	1.18	22.74	82.58
Saduria entomon	0.5	3.13	0.76	6.75	89.34
Oligochaeta	0.75	2.46	0.46	5.3	94.64

2000	**Average similarity: 54.38**				
Taxa	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Macoma balthica	4.35	19.11	1.74	35.14	35.14
Ostracoda	2.25	9.04	1.19	16.62	51.76
Marenzelleria spp.	1.72	6.63	0.85	12.18	63.94
Monoporeia affinis	2.15	6.6	0.99	12.13	76.08
Oligochaeta	1.5	3.37	0.81	6.2	82.28
Chironominae spp.	1.31	2.59	0.42	4.76	87.04
Halicryptus spinulosus	0.63	2.22	0.93	4.08	91.12

2013	**Average similarity: 56.17**				
Taxa	Av.Abund	Av.Sim	Sim/SD	Contrib%	Cum.%
Marenzelleria spp	5.13	15.59	1.58	27.75	27.75
Macoma balthica	4.89	15.23	2.03	27.11	54.86
Chironominae spp	2	5.66	0.63	10.08	64.94
Monoporeia affinis	2.08	4.37	0.9	7.78	72.72
Oligochaeta	1.86	3.79	0.7	6.75	79.47
Ostracoda	1.37	3.6	1.3	6.4	85.88
Halicryptus spinulosus	0.86	2.57	1	4.57	90.44

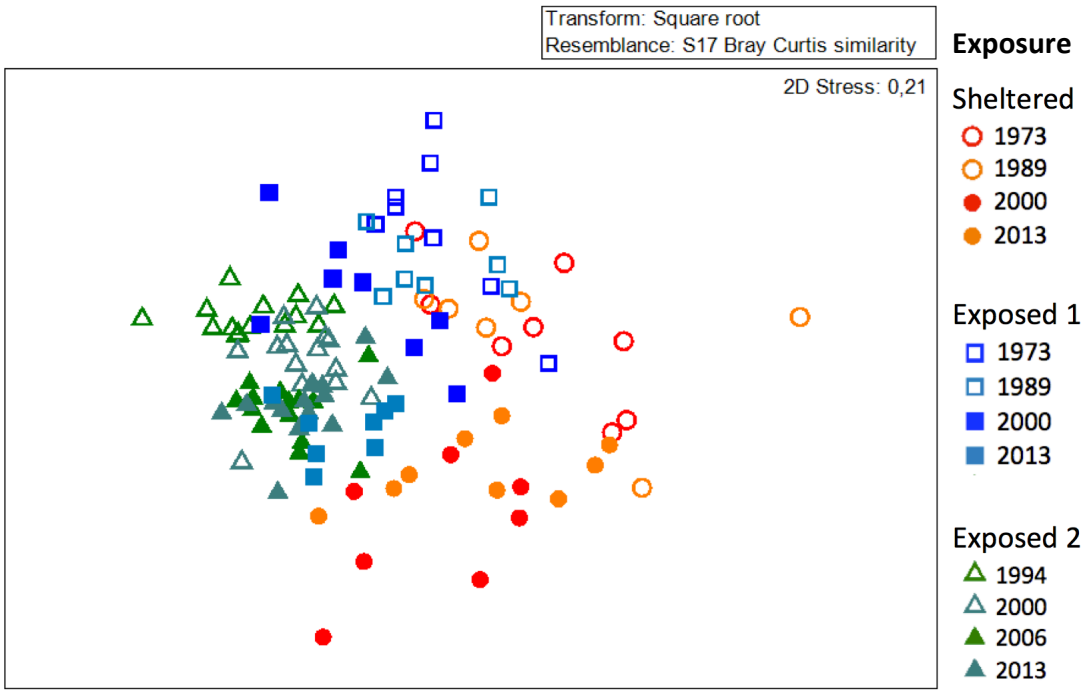

Figure S1: nMDS ordination between all exposure groups, including respective stations in all years derived from abundance data using the Bray-Curtis coefficient of similarity on previously square-root transformed data. Distances between points imply the degree of similarity.

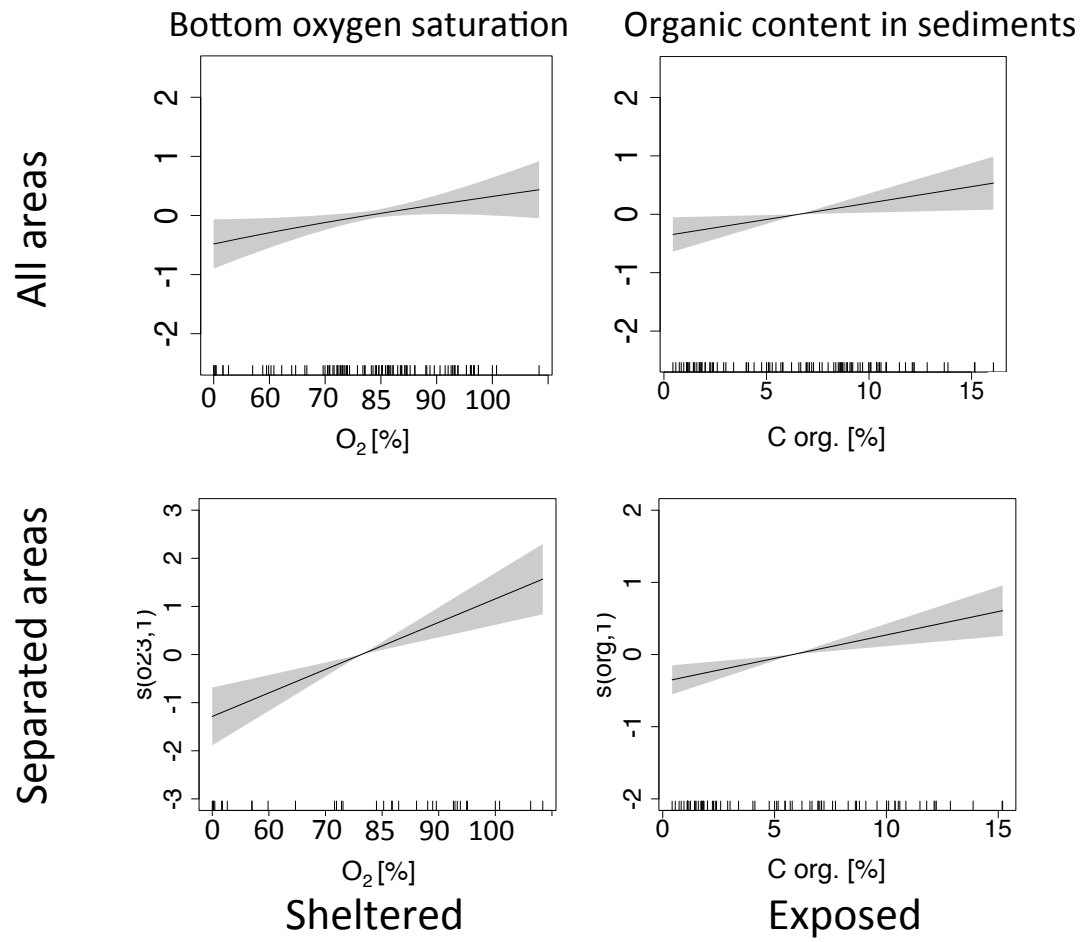

Figure S2: Generalized additive models explaining effect of selected predictor variables on zooobenthic biomass best with exclusion of SST; "All areas" included all exposure groups showing additive effects of oxygen saturation (O_2 %) and organic content of the sediment (C org.) on total zoobenthic biomass progression, "Separated areas" consist of "Sheltered" including only sheltered stations showing the effect of oxygen saturation on total zoobenthic biomass progression, and "Exposed" including Exposed 1 and 2 showing the effects of organic content (without SST as in Fig 5 in the main article). Grey areas represent the upper and lower 95% confidence intervals; vertical lines on x-axis represent sampled values.

Table S3: Statistics of parametric coefficients of models excluding SST as predictor, with standard error (SE) and smooth terms of selected generalized additive models on total zoobenthic biomass with estimated degrees of freedom (edf) for the model terms.

All areas: Parametric coefficients; Exposure:

Response	Estimate	SE	t-value	p-value	
sheltered	3.0706	0.1905	16.115	< 0.0001	***
exposed	1.7936	0.2232	8.035	< 0.0001	***

Approximate significance of smooth terms

Response	**Predictor**	edf	F	p-value	
log(total biomass +1)	s((O2 sat.)^3)	1.153	3.931	0.0403	*
	s(org. content)	1	5.53	0.0208	*

R-sq.(adj) =0.43 Deviance explained = 44.9%

Sheltered: Approximate significance of smooth terms

Response	**Predictor**	edf	F	p-value	
log(total biomass +1)	s((O2 sat.)^3)	1	18.39	0.000134	***

R-sq.(adj) = 0.338 Deviance explained = 35.8%

Exposed: Approximate significance of smooth terms

Response	**Predictor**	edf	F	p-value	
log(total biomass +1)	s(org. content)	1	12.13	0.000836	***

R-sq.(adj) = 0.132 Deviance explained = 14.40%

Significance codes: > 0.0001 '***', > 0.001 '**', > 0.01 '*'