Table S1. Detailed information on abiotic descriptors

Descriptor	Modality for qualitative descriptor	Detailed information	
Depth	Very shallow	< 10	Water depth in meters
	Shallow	[10; 20[	
	Intermediate	[20; 30[	
	Deep	[30; 40[	
	Very deep	≥ 40	
Current speed	Very low	< 0.15	Monthly median value in meters per second averaged from 1996 to 2008
	Low	[0.15; 0.20[	
	Intermediate	[0.20; 0.25[	
	High	[0.25; 0.30[	
	Very high	≥ 0.30	
Wave energy	Very low	< 0.5	Monthly median value in pascals averaged from 1996 to 2008
	Low	[0.5; 1.0[	
	Intermediate	[1.0; 1.5[	
	High	[1.5; 2.0[	
	Very high	≥ 2.0	
Stratification	PM	Permanently mixed	Modeled hindcast results from 1958 to 2008
	FI	Freshwater influence	
	IS	Intermittently stratified	
	SS	Seasonally stratified	
	TR	Transitional	
Sediment type	Muddy	Includes: – Mud – Sandy mud – Sandy and slightly gravely mud – Muddy sand	
	Sandy	Sand	
	Coarse	Includes: – Gravel and muddy sand – Slightly gravely sand – Gravely sand – Sandy gravel – Gravel and stone	
	Mixed	Gravely and slightly muddy sand	
Primary productivity		Average mg C m^{-2} d^{-1} monthly values in March and April averaged for the years 2002 - 2005 and 2006 - 2007	
Particulate organic matter Particulate organic carbon		Percentages of dry sediment mass averaged from 1998 to 2008	

Table S2. Detailed information on the biological trait data. "Code" indicates the corresponding trait modality in Table S3.

Trait	Modality	Code	Functional expression
Body mass (classes mg AFWD)	Very small (<0.34)	1	Translates metabolic requirements and demands
	Small (0.34–2.60)	2	
	Medium (2.60–17.00)	3	
	Large (17.00–150)	4	
	Very large (>150.00)	5	
Motility	Sessile	1	Translates foraging and survival potentials
	Tubicolous	2	
	Crawler	3	
	Crawler–Swimmer	4	
Burrowing depth	Surficial (or intermitently burried)	1	Deepest reachable sediment layer that enables to escape from predation or disturbance
	Intermediate (0–5 cm)	2	
	Deep (5–15 cm)	3	
	Very deep (>15 cm)	4	
Feeding type	Deposit feeding (De)	1	Informs on the nature of environmental resource (e.g. size, location and origin)
	Suspension-deposit feeding (SuDe)	2	
	Suspension feeding (Su)	3	
	Carnivory-Scavenging (CaSc)	4	
	Omnivory (Om)	5	
Life span (years)	<1	1	Time necessary to achieve a life cycle during which at least one reproductive success is ensured
	1–3	2	
	3–10	3	
	>10	4	
Age at maturity (years) (years)	<1	1	Time after which reproductive success can be expected; informs also on growth rate
	1–3	2	
	>3	3	
Reproductive frequency	Seasonal	1	Degree of reproductive resilience
	Continuous	2	
Annual fecundity (number of offspring)	$<10^2$	1	Potential of annual demographic recruitment
	10^2–10^3	2	
	10^3–10^4	3	
	10^4–10^5	4	
	$>10^5$	5	
Fertilization	Broadcasting	1	Possible in solitary dwelling species
	Spermcasting	2	Possible in relatively distant adults
	Pairing	3	Necessary proximity between adults
Offspring type	Egg	1	Offspring once released and independent from the parents Translates offspring survival
	Larva	2	
	Juvenile	3	
Offspring Size (mm)	<0.1	1	Reproductive allocation per capita
	0.1–0.5	2	
	0.5–1.5	3	
	>1.5	4	
Offspring protection	None	1	Expresses parental cares and offspring survival
	Jelly mass	2	
	Collar mass	3	
	Bearing/Brooding	4	
Offspring development	Internal	1	Informs on embryonic vulnerability and adult reproductive effort
	Lecithotrophic	2	
	Planktotrophic	3	
	Mixed lecithotrophic	4	
	Mixed planktotrophic	5	
Offspring benthic stage duration (days)	Null	1	Critical time on the sea floor necessary to achieve offspring development
	1–15	2	
	>15	3	
Offspring pelagic stage duration (days)	Null	1	Critical time in the water column necessary to achieve offspring development
	1–15	2	
	>15	3	

Table S3. Biological trait data. Body mass was derived from the field data as explained in the text. References are listed below the table

Taxon	Body mass	Motility	Burrowing depth	Feeding type	Life span	Age at maturity	Reproductive frequency	Annual fecundity	Fertilisation	Offspring type	Offspring size	Offspring protection	Offspring development	Offspring benthic stage duration	Offspring pelagic stage duration	References
Abludomelita obtusata	1	4	1	1	1	1	2	1	3	3	4	4	1	3	1	50,156,182,209,218,246,353,395,474
Abra alba	2	3	3	2	2	1	1	4	1	1	1	1	5	1	3	117,118,125,269,470
Abra nitida	2	3	2	2	2	1	2	2	1	1	1	1	5	1	3	60,125,182,294,476,477
Abra prismatica	3	3	2	2	2	2	1	4	1	1	1	1	5	1	3	117,125,294
Abra tenuis	1	3	2	2	2	2	1	2	2	1	2	2	4	3	1	125,130,193,234,269
Acanthocardia sp.	4	3	2	3	4	2	1	5	1	1	1	1	5	1	3	125,182,294,356,447
Acrocnida brachiata	4	3	3	3	3	3	1	4	3	1	2	1	5	1	2	52,53,171,187,291,294,320
Acteon tornatilis	2	3	3	4	2	2	1	5	3	1	1	3	3	3	3	125,179,496,497
Alitta virens	5	4	4	5	2	2	1	4	3	1	2	4	2	2	3	31,171,258,348,487
Ampelisca brevicornis	2	4	1	1	2	1	1	1	3	3	4	4	1	3	1	97,116,209,353
Ampelisca macrocephala	2	4	1	1	2	1	1	1	3	3	4	4	1	3	1	251,353
Ampelisca spinipes	1	4	1	1	2	1	1	1	3	3	4	4	1	3	1	209,246,251,294,295,353,384,394,492
Ampelisca tenuicornis	1	4	1	1	2	1	1	1	3	3	4	4	1	3	1	115,209,353,424,448,464
Ampharete sp.	2	2	3	1	1	1	1	3	3	1	2	1	4	2	1	45,118,189,294,371
Amphipholis squamata	1	3	1	5	2	2	2	1	3	3	4	4	1	3	1	143,151,248
Amphiura chiajei	3	3	3	1	4	3	1	4	3	1	2	1	5	1	3	61,164,230,294,319
Amphiura filiformis	3	3	2	2	4	3	1	4	3	1	1	1	5	1	3	51,54,61,142,314,321,464
Aonides paucibranchiata	1	3	2	1	1	1	1	2	2	1	2	1	4	1	2	41,163,182,294,375,484
Aphelochaeta marioni	2	3	2	1	3	2	1	2	3	1	2	2	4	2	1	109,118,160,163,192,194,362
Aphrodita aculeata	5	3	2	4	3	2	1	5	1	1	1	1	4	1	2	71,171,182,294,475
Aporrhais pespelecani	5	3	1	1	3	2	1	3	3	1	2	3	3	2	3	125,196,273,295,358,415
Arcopagia crassa	2	3	3	2	3	2	1	4	1	1	1	1	5	1	3	125,182,446
Arctica islandica	4	1	2	2	4	3	1	5	1	1	1	1	5	1	3	67,125,284,316,383,445,467
Asbjornsenia pygmaea	2	3	2	3	3	2	1	3	1	1	1	1	5	1	3	125,182,294
Astarte montagui	3	3	1	3	3	2	1	3	1	1	2	1	4	1	3	125,396,418,427,467
Asterias rubens	5	3	1	4	3	2	1	5	1	1	2	1	5	1	3	26,49,171,466
Astropecten irregularis	5	3	1	4	3	2	1	5	1	1	2	1	5	1	3	84,171,177,200,294,325
Balanus crenatus	1	1	1	3	2	1	1	3	3	2	2	4	3	3	3	27,28,171,353,373,376
Bathyporeia elegans	1	4	1	1	1	1	2	1	3	3	3	4	1	3	1	168,169,209,246,327,353
Bathyporeia gracilis	1	4	1	1	1	1	2	1	3	3	3	4	1	3	1	169,171,182,209,246,294,327,353
Bathyporeia guilliamsoniana	2	4	1	1	1	1	2	1	3	3	3	4	1	3	1	168,169,171,209,246,327,353
Bathyporeia pelagica	1	4	1	1	1	1	2	1	3	3	3	4	1	3	1	168,169,209,327,353
Bathyporeia sarsi	1	4	1	1	1	1	2	1	3	3	4	4	1	3	1	171,182,246,294,327,353,465
Bathyporeia tenuipes	1	4	1	1	1	1	2	1	3	3	3	4	1	3	1	169,171,209,246,294,327,353
Bela nebula	2	3	1	4	2	1	1	2	3	1	2	3	2	3	3	125,131,196,274
Bodotria arenosa	1	4	1	1	1	1	2	1	3	3	3	4	1	3	1	182,246,249,353,423,493
Bodotria scorpioides	1	4	1	1	1	1	2	1	3	3	3	4	1	3	1	246,249,353,423,493
Branchiostoma lanceolatum	3	4	2	3	3	2	1	3	1	1	2	1	5	1	3	136,180,228,270,385
Brissopsis lyrifera	5	3	2	1	3	3	1	5	1	1	1	1	5	1	3	63,64,166,229,434
Buccinum undatum	5	3	1	4	4	3	1	3	3	1	2	3	4	3	1	125,254,296
Bylgides sarsi	2	3	1	4	2	2	1	4	1	1	2	1	5	1	3	3,294,404
Callianassa subterranea	4	3	4	1	2	2	1	3	3	2	4	4	3	3	3	231,260,353,388,389,390
Capitella capitata	1	2	2	1	1	1	2	2	3	2	2	4	2	2	2	4,44,176,231,306

Table S3. Continued

Taxon	Body mass	Motility	Burrowing depth	Feeding type	Life span	Age at maturity	Reproductive frequency	Annual fecundity	Fertilisation	Offspring type	Offspring size	Offspring protection	Offspring development	Offspring benthic stage duration	Offspring pelagic stage duration	References
Carcinus maenas	5	3	1	5	3	2	1	5	3	2	4	4	3	3	3	34,101,171,308,353,469
Chaetopterus variopedatus	5	2	4	3	2	2	1	5	1	1	2	1	5	1	3	147,152,182,231,444,473
Chaetozone setosa	2	3	3	1	2	1	1	3	1	1	2	1	4	3	1	73,86,227,231,294,349
Chamelea striatula	3	3	2	3	4	2	1	5	1	1	1	1	5	1	3	15,125,133,210,231,488
Cheirocratus sundevalli	1	4	1	1	1	1	1	1	3	3	4	4	1	3	1	97,182,209,246,294,443,474
Corbula gibba	2	3	2	2	2	2	1	4	1	1	1	1	5	1	3	125,182,233,495
Corophium sp.	2	4	3	2	1	1	2	1	3	3	3	4	1	2	1	171,172,238,305,353
Corystes cassivelaunus	5	3	1	4	3	2	1	2	3	2	4	4	3	3	3	171,216,236,294,353
Crangon crangon	4	4	1	4	3	2	1	3	3	2	4	4	3	3	3	100,171,222,339,353,365,469
Diastylis bradyi	2	4	1	1	1	1	1	1	3	3	4	4	1	3	1	94,135,231,246,249,353,463
Diastylis lucifera	1	4	1	1	1	1	1	1	3	3	4	4	1	3	1	94,135,351,359
Diastylis rathkei	2	4	1	1	1	1	1	1	3	3	4	4	1	3	1	231,353,359,463
Diogenes pugilator	3	3	1	4	1	1	2	2	3	2	3	4	3	3	3	171,182,285,292,293,353,364,451
Donax vittatus	4	3	3	3	3	2	1	5	1	1	1	1	5	1	3	20,21,125,449
Dosinia exoleta	4	3	3	3	4	2	1	5	1	1	1	1	5	1	3	125,182,294,455,458
Dosinia lupinus	4	3	3	3	4	2	1	5	1	1	1	1	5	1	3	125,182,294,456
Dyopedos monacanthus	1	4	1	3	1	1	2	2	3	3	3	4	1	3	1	353,442
Ebalia sp.	4	3	1	5	2	2	1	3	3	2	3	4	3	3	3	246,271,294,397,408,409,410,411
Echinocardium sp.	4	3	3	1	4	3	1	5	1	1	2	1	5	1	3	62,79,123,124,212,231,309
Echinocyamus pusillus	2	3	2	1	2	2	1	4	1	1	2	1	5	1	3	171,188,231,280,294
Ensis ensis	5	3	3	3	4	3	1	5	1	1	1	1	5	1	3	125,171,223,294
Ensis leei	5	3	3	3	3	2	1	4	1	1	1	1	5	1	3	23,125,281,294
Ensis magnus	5	3	3	3	4	3	1	5	1	1	1	1	5	1	3	104,125,224
Ensis siliqua	5	3	3	3	4	3	1	5	1	1	1	1	5	1	3	105,125,158,223
Eteone flava	1	3	2	4	2	2	1	2	2	2	2	4	3	2	3	102,163,264,294,349
Eteone longa	2	3	2	4	2	2	1	2	3	1	2	1	5	1	3	231,294,350,377,378
Eulalia sp.	1	3	1	4	2	2	1	2	2	1	2	2	3	2	3	37,150,163,182,218,294,343,345
Eumida sanguinea	2	3	2	4	2	1	1	2	1	1	1	1	5	1	3	65,163,231,294,295
Eunereis longissima	4	3	1	5	1	1	1	4	1	1	2	1	4	1	2	163,182,294,435
Eupolymnia nebulosa	2	2	2	1	2	2	1	4	2	1	2	2	4	2	1	36,38,39,201,202,302,332
Eurydice pulchra	4	4	1	4	2	2	1	1	3	3	4	4	1	3	1	173,246,247,353
Euspira catena	5	3	1	4	3	2	1	3	3	1	2	3	4	2	1	18,19,125,196,197,275
Euspira nitida	3	3	1	4	3	2	1	4	3	1	2	3	2	3	3	17,125,255,256,275
Fabulina fabula	3	3	3	2	3	2	1	4	1	1	1	1	5	1	3	125,171,182,231,294,470
Galathowenia oculata	1	2	2	1	1	1	1	4	1	1	2	1	5	1	3	159,163,167,186,257,263,303
Gammaropsis sp.	1	4	1	1	2	1	1	1	3	3	3	4	1	3	1	209,239,246,294,322,353
Gammarus sp.	1	4	1	1	2	1	2	1	3	3	4	4	1	3	1	13,95,246,353
Gari fervensis	4	3	2	3	3	2	1	3	1	1	2	1	5	1	3	91,125,128,294,425
Gastrosaccus spinifer	2	4	1	5	2	1	2	1	3	3	4	4	1	2	1	171,289,294,353,378
Gattyana cirrhosa	4	3	4	4	3	2	1	4	1	1	2	1	5	1	3	102,182,231
Gilvossius tyrrhenus	4	3	4	1	2	2	1	2	3	2	4	4	3	3	2	146,260,353,354,439,440
Glycera sp.	3	4	4	4	3	3	1	5	1	1	2	1	5	1	3	70,98,99,163,294,335,487
Goniada maculata	2	4	2	4	2	1	1	2	1	1	2	1	5	1	3	182,231,257,294,299
Harmothoe sp.	3	3	1	4	2	2	1	4	3	2	2	4	3	2	3	102,110,163,171,231,294,378
Harpinia antennaria	1	4	1	5	1	1	2	1	3	3	4	4	1	3	1	209,231,246,353,391,395,474
Haustorius arenarius	1	4	3	2	1	1	1	1	3	3	4	4	1	3	1	134,138,182,353,461

Table S3. Continued

Taxon	Body mass	Motility	Burrowing depth	Feeding type	Life span	Age at maturity	Reproductive frequency	Annual fecundity	Fertilisation	Offspring type	Offspring size	Offspring protection	Offspring development	Offspring benthic stage duration	Offspring pelagic stage duration	References
Hediste diversicolor	5	4	4	5	2	2	1	3	3	2	2	4	2	2	3	108,140,154,171,189,203,407
Heteromastus filiformis	2	2	4	1	2	2	1	2	3	1	2	2	3	2	3	40,198,422
Hiatella arctica	3	1	1	3	4	2	1	1	1	1	1	1	4	1	3	56,125,294,417
Hypereteone foliosa	3	3	3	4	2	1	1	3	1	1	2	1	5	1	3	163,182,294,349,486
Idotea linearis	1	4	1	5	2	1	2	2	3	3	4	4	1	3	1	171,175,353
Iphinoe trispinosa	2	4	1	1	1	1	2	1	3	3	3	4	1	3	1	93,353,423
Jassa marmorata	1	4	1	3	1	1	2	1	3	3	3	4	1	2	1	88,323,353,395,414
Kellia suborbicularis	3	3	2	1	2	2	1	2	2	2	1	4	3	2	3	125,277,342
Kurtiella bidentata	1	3	2	1	2	2	1	2	2	2	2	4	3	3	3	125,334
Lagis koreni	3	2	3	1	2	2	1	4	1	1	1	1	5	1	2	118,231,237,265,326,441
Lanice conchilega	3	2	3	2	2	1	1	4	1	1	2	1	5	1	3	36,171,189,258,294,374
Laonice sp.	2	2	4	1	2	1	1	2	2	1	2	1	5	1	3	41,46,163,294,426,484
Lepidonotus squamatus	3	3	1	5	3	1	1	2	1	1	1	1	5	1	3	163,263,294,369,378
Leptosynapta inhaerens	4	3	3	1	3	2	1	2	3	3	4	4	1	2	1	171,294,419,420
Limecola balthica	3	3	3	2	3	2	1	5	1	1	2	1	5	1	3	125,204,232,266,283,340
Liocarcinus sp.	5	4	1	4	3	2	1	4	3	2	4	4	3	3	3	1,2,25,57,81,82,83,87,165,171,173,178,182,217, 294,318,353
Lucinoma borealis	4	3	4	3	3	2	1	3	1	1	2	1	4	1	3	111,125,206,457
Lumbrineris sp.	3	3	3	5	3	3	1	3	2	1	2	2	4	3	1	163,231,294,328,361,406
Lutraria lutraria	5	3	4	3	4	3	1	5	1	1	1	1	5	1	3	125,182,240,253
Macomangulus tenuis	3	3	2	2	3	2	1	4	1	1	1	1	5	1	3	22,30,125,129,182,432,452
Mactra stultorum	4	3	3	3	3	2	1	5	1	1	1	1	5	1	3	74,80,125,182
Magelona sp.	2	3	3	2	2	1	1	3	1	1	2	1	5	1	3	163,182,214,294,295,315,380,483
Malacoceros fuliginosus	4	4	2	2	2	2	1	3	2	1	2	1	5	1	3	41,46,121,122,163,171,207,294
Malmgrenia lunulata	2	3	3	4	3	2	1	5	1	1	1	1	5	1	3	163,182,231,294,295,502
Mediomastus fragilis	2	2	2	1	2	1	1	2	1	1	2	2	3	2	3	163,182,215,294,378
Megaluropus agilis	1	4	1	1	1	1	2	1	3	3	2	4	1	3	1	155,168,182,209,246,353
Mesopodopsis slabberi	2	4	1	5	1	1	2	1	3	3	4	4	1	2	1	132,171,353,381,472
Mimachlamys varia	3	1	1	3	3	2	1	5	1	1	1	1	5	1	3	55,125,294,379,421
Modiolus sp.	4	1	1	3	4	3	2	5	1	1	1	1	5	1	3	125,126,294,416
Musculus sp.	3	1	1	2	3	2	1	2	2	3	3	4	4	3	1	125,286,307,336
Mya arenaria	5	1	4	3	4	3	1	5	1	1	1	1	5	1	3	58,59,125,433
Mya truncata	5	1	3	3	4	3	1	5	1	1	1	1	5	1	3	8,9,56,125,182,294
Mysia undata	3	3	3	3	2	2	1	4	1	1	1	1	5	1	3	16,125,182,298
Mytilus edulis	3	1	1	3	4	2	1	5	1	1	1	1	5	1	3	125,127,235,294
Nassarius reticulatus	5	3	1	4	3	3	1	3	3	1	2	3	3	3	3	77,125,171,272,436
Natatolana borealis	3	4	3	4	3	2	2	1	3	3	4	4	1	3	1	244,250,290,438,490
Nephrops norvegicus	5	3	4	4	3	3	1	3	3	2	4	4	3	3	3	161,162,226,304,313,353,401,454
Nephtys sp.	3	4	4	4	3	2	1	4	1	1	2	1	5	1	3	68,69,89,137,182,189,231,257,264,294,297,344, 346,347,413,453,484,500,501
Notomastus latericeus	4	3	4	1	1	1	1	2	1	1	2	1	4	1	2	163,190,294,478,481,484
Nucula nitidosa	2	3	2	1	3	2	1	3	1	1	2	1	4	1	2	118,119,125,294,380,485
Nucula nucleus	2	3	3	1	3	2	1	2	1	1	2	1	4	1	2	125,294
Ophelia sp.	3	3	2	1	2	2	1	2	1	1	2	1	4	1	2	163,257,294,372,482
Ophiura sp.	3	4	1	5	3	2	1	3	1	1	2	1	5	1	3	48,106,171,294,460
Owenia fusiformis	3	2	3	1	2	2	1	4	1	1	2	1	5	1	3	10,102,107,118,171,186,329,480
Oxydromus flexuosus	3	4	2	4	2	2	1	4	1	1	2	1	5	1	3	211,352

Table S3. Continued

Taxon	Body mass	Motility	Burrowing depth	Feeding type	Life span	Age at maturity	Reproductive frequency	Annual fecundity	Fertilisation	Offspring type	Offspring size	Offspring protection	Offspring development	Offspring benthic stage duration	Offspring pelagic stage duration	References
Pagurus bernhardus	5	3	1	4	3	2	1	4	3	2	4	4	3	3	3	120,148,171,267,268
Paraonis fulgens	2	3	3	1	1	1	1	2	1	1	2	1	4	3	1	35,153,182,185,294,378,386,491
Peringia ulvae	1	3	1	1	2	1	1	2	3	1	2	3	2	3	3	11,29,125,170,171,428
Perioculodes longimanus	1	4	4	5	1	1	2	1	3	3	4	4	1	3	1	32,231,245,324,353
Petricolaria pholadiformis	5	3	3	3	3	3	1	5	1	1	1	1	5	1	3	6,125,145,392
Phaxas pellucidus	3	3	2	3	3	2	1	4	1	1	1	1	5	1	3	125,182,276
Philocheras trispinosus	4	4	1	4	1	1	2	2	3	2	4	4	3	2	3	262,337,338,353,360,400
Pholoe minuta	2	3	1	4	3	3	1	4	1	1	2	1	5	1	3	85,125,219,220,221,368
Phoronis sp.	2	2	3	3	1	1	2	2	1	1	1	1	5	1	3	41,149,205
Photis longicaudata	1	4	1	1	1	1	2	1	3	3	2	4	1	3	1	182,209,246,310,353,395,479
Phyllodoce sp.	3	3	3	4	3	2	1	4	3	1	2	2	4	1	3	231,279,317,393
Pisione remota	1	3	1	4	2	2	1	2	3	1	1	1	3	2	3	5,144,163,189,294,431
Poecilochaetus serpens	2	2	2	2	1	1	1	2	1	1	2	1	5	1	3	163,182,189,294,295,331
Polydora sp.	2	2	2	2	1	1	1	2	2	2	2	4	3	2	3	14,41,112,171,207,287,499
Pontocrates altamarinus	1	4	1	5	2	1	1	1	3	3	4	4	1	3	1	32,209,231,246,353
Pontocrates arcticus	1	4	1	5	1	1	2	1	3	3	4	4	1	3	1	32,33,209,246,353
Pontocrates arenarius	1	4	1	5	2	1	2	1	3	3	4	4	1	3	1	32,168,209,246,353,468
Portumnus latipes	3	4	1	5	2	1	1	4	3	2	4	4	3	3	3	76,92,245,278,353,355
Prionospio sp.	1	2	2	2	1	1	1	2	2	1	2	1	5	1	3	41,294,330,484
Pseudocuma longicorne	1	4	1	1	1	1	2	1	3	3	3	4	1	3	1	93,231,294,353,423
Pygospio elegans	1	2	2	5	2	1	1	2	2	2	2	4	3	3	3	14,41,46,207,301,312,363
Scalibregma inflatum	2	3	4	1	1	1	1	2	1	1	2	1	4	1	2	139,163,288,294
Schistomysis sp.	2	4	1	5	1	1	2	1	3	3	4	4	1	2	1	171,218,246,294,300,353,398,399,489
Scolelepis squamata	3	4	4	2	2	2	1	3	1	1	2	1	5	1	3	46,113,231,382,429
Scoletoma fragilis	2	3	3	4	3	3	1	2	1	1	2	2	4	3	1	163,218,294,349,405,462
Scoloplos armiger	3	3	3	1	2	2	1	3	1	1	2	1	4	2	1	12,75,191,231,259,367,412
Sigalion mathildae	3	3	4	4	3	3	1	4	1	1	2	1	5	1	3	182,189,231,303
Sphenia binghami	2	1	1	3	4	3	1	4	1	1	1	1	5	1	3	125,182,213,294,494
Spio decoratus	1	2	2	1	1	1	1	3	2	2	2	4	2	2	2	41,163,189,195,208
Spio filicornis	2	2	2	1	1	1	2	2	2	2	3	4	3	2	2	41,195,231,430,437
Spio martinensis	2	2	2	1	1	1	2	3	2	2	2	4	2	2	2	41,46,163,207,208,294,437
Spiophanes bombyx	2	2	2	2	2	1	1	2	2	1	2	1	5	1	3	41,46,103,114,231,294,380,484
Spirobranchus triqueter	1	2	1	3	2	1	2	2	1	1	1	1	5	1	3	96,163,171,261
Spisula elliptica	3	3	2	3	3	2	1	5	1	1	1	1	5	1	3	125,182,294
Spisula solida	4	3	2	3	4	3	1	5	1	1	1	1	5	1	3	125,157,171,242,243
Spisula subtruncata	4	3	2	3	3	2	1	5	1	1	1	1	5	1	3	66,118,125
Streblospio shrubsolii	1	2	2	2	1	1	2	1	2	3	3	4	4	2	1	41,46,72,387,402
Streptosyllis websteri	1	3	2	1	3	3	1	3	3	1	2	1	4	1	3	163,174,184,303
Synchelidium maculatum	1	4	1	5	1	1	1	1	3	3	4	4	1	3	1	32,209,246,353,468,498
Tellimya ferruginosa	2	3	3	3	2	1	1	2	2	2	1	4	3	3	3	125,171,181,231,277,341,342
Terebellides stroemii	3	2	3	1	2	1	1	3	2	1	2	2	4	2	1	102,141,163,183
Tharyx sp.	1	3	2	1	2	2	1	3	1	1	2	1	4	2	1	47,109,118,160,163,362
Thelepus cincinnatus	2	2	2	1	1	1	1	4	2	2	2	4	4	2	1	163,182,241,302
Thracia convexa	4	3	3	3	3	2	1	3	2	2	2	4	4	3	1	7,78,125,294,403
Thracia phaseolina	3	3	4	3	4	2	1	3	2	2	2	4	4	3	1	7,125,294,403
Thracia pubescens	5	3	3	3	4	2	1	3	2	2	2	4	4	3	1	7,125,294,333,403

Table S3. Continued

Taxon	Body mass	Motility	Burrowing depth	Feeding type	Life span	Age at maturity	Reproductive frequency	Annual fecundity	Fertilisation	Offspring type	Offspring size	Offspring protection	Offspring development	Offspring benthic stage duration	Offspring pelagic stage duration	References
Thyasira flexuosa	2	3	3	3	3	2	1	2	2	1	2	3	4	3	1	42,43,118,125,199,225,282
Tryphosa nana	1	4	1	4	1	1	2	1	3	3	3	4	1	3	1	311
Turritellinella tricarinata	4	3	2	3	3	2	1	3	3	1	1	3	3	2	2	125,252,273,295
Upogebia deltaura	5	3	4	2	3	2	1	3	3	2	4	4	3	3	3	294,353,366,459,471
Urothoe brevicornis	2	4	3	1	2	1	2	2	3	3	4	4	1	3	1	65,90,168,231,294,353,395
Urothoe marina	1	4	3	1	2	1	2	1	3	3	4	4	1	3	1	65,90,231,294,353
Urothoe poseidonis	1	4	3	1	2	1	2	2	3	3	4	4	1	3	1	65,90,231,294,353
Venerupis corrugata	5	1	3	3	3	2	1	5	1	1	1	1	5	1	3	125,243
Venus sp.	4	3	2	3	4	3	1	5	1	1	1	1	4	1	3	24,125,170,182,294,357,370,450
Westwoodilla caecula	1	4	1	1	1	1	2	1	3	3	4	4	1	3	1	33,246,353

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Table S4. Pearson's *r* correlations of all individual habitat and trait modalities (binary variables) with RLQ axes. Empty cell: absence of modality due to absence of habitat characteristic or representative taxon

Data	Variable	Whole area				Low dynamics				High dynamics			
		Axis 1		Axis 2		Axis 1		Axis 2		Axis 1		Axis 2	
		r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Habitat	Depth – Very shallow	0.051	0.00802	0.013	0.48950					0.017	0.57311	–0.053	0.04018
	Depth – Shallow	0.035	0.19352	0.070	0.00987					–0.112	0.01525	–0.078	0.08843
	Depth – Intermediate	0.072	0.00987	–0.031	0.25222	0.025	0.25311	–0.023	0.17245	0.074	0.02858	0.051	0.11620
	Depth – Deep	–0.023	0.14345	–0.023	0.11748	0.032	0.14727	–0.045	0.02120	0.006	0.83791	0.052	0.02338
	Depth – Very deep	–0.090	0.00987	0.003	0.94969	–0.039	0.06636	0.051	0.01490	0.040	0.12666	–0.026	0.32804
	Current speed – Very low	–0.084	0.00994	–0.038	0.25158	0.017	0.43355	0.055	0.00742	–0.029	0.36724	0.091	0.01074
	Current speed – Low	–0.025	0.10578	0.030	0.04133	–0.027	0.22215	–0.050	0.00742	–0.077	0.00346	0.000	0.99498
	Current speed – Intermediate	0.027	0.13085	0.013	0.47672	0.020	0.40213	–0.016	0.38451	–0.050	0.04070	–0.009	0.74665
	Current speed – High	0.083	0.00802	–0.004	0.93443					0.099	0.00346	–0.042	0.20003
	Current speed – Very high	0.055	0.05115	0.012	0.72285					0.060	0.10318	–0.046	0.20003
	Wave – Very low	–0.074	0.01097	0.004	0.93443	–0.035	0.10788	0.039	0.05632				
	Wave – Low	–0.067	0.00987	–0.001	0.97900	0.016	0.44125	–0.036	0.04670	–0.016	0.58202	0.030	0.12666
	Wave – Intermediate	0.048	0.01347	–0.035	0.07796	0.043	0.01305	–0.005	0.77231	0.052	0.06808	0.033	0.21343
	Wave – High	0.057	0.00987	–0.022	0.32853					0.042	0.08790	0.030	0.17414
	Wave – Very high	0.050	0.06891	0.056	0.04435					–0.088	0.04018	–0.073	0.08645
	Stratification – FI	0.044	0.03390	–0.002	0.94969	–0.018	0.43355	–0.022	0.22215	0.036	0.14764	–0.007	0.76945
	Stratification – PM	0.031	0.11349	0.041	0.03434					–0.037	0.12666	–0.048	0.05277
	Stratification – IS	0.038	0.01404	–0.019	0.19156	0.061	0.00220	–0.046	0.00742	0.015	0.57541	0.017	0.49515
	Stratification – SS	–0.027	0.08202	–0.013	0.36994	–0.001	0.97893	0.025	0.14727				
	Stratification – TR	–0.078	0.00802	0.004	0.93443	–0.047	0.02489	0.036	0.02802	–0.030	0.23304	0.032	0.14095
	Sediment – Muddy	–0.086	0.00802	0.029	0.33690	–0.094	0.00020	–0.012	0.61454	–0.018	0.49515	0.053	0.00346
	Sediment – Sandy	0.056	0.00802	–0.041	0.03646	0.108	0.00020	0.016	0.53211	–0.014	0.61262	–0.009	0.69833
	Sediment – Mixed	–0.020	0.19156	0.017	0.26936	–0.026	0.22215	–0.020	0.28070				
	Sediment – Coarse	0.034	0.05115	0.017	0.32853	–0.019	0.43355	0.004	0.74804	0.023	0.37777	–0.016	0.52155
	Particulate organic matter	–0.082	0.00987	–0.013	0.72631	–0.044	0.03325	0.032	0.06571	0.005	0.85834	0.040	0.11620
	Particulate organic carbon	–0.106	0.00817	0.046	0.24074	–0.093	0.00027	–0.040	0.09159	–0.094	0.01074	0.006	0.85834
	Primary productivity	0.080	0.00802	0.034	0.22220	–0.010	0.62008	–0.066	0.00160	0.055	0.04018	–0.081	0.00346
Traits	Body mass – Very small	0.074	0.01778	–0.001	0.97011	0.023	0.46644	–0.001	0.97572	0.033	0.23519	–0.031	0.26553
	Body mass – Small	–0.020	0.69516	–0.010	0.85489	–0.016	0.66697	–0.023	0.46644	0.036	0.18588	0.009	0.78128
	Body mass – Intermediate	0.003	0.97011	0.001	0.97011	0.019	0.56490	–0.010	0.81548	–0.017	0.60017	0.021	0.50120
	Body mass – Large	–0.047	0.17891	–0.011	0.81500	–0.013	0.71324	0.028	0.46048	–0.015	0.62088	0.039	0.16462
	Body mass – Very large	–0.020	0.69516	0.034	0.37655	–0.019	0.56490	0.023	0.46644	–0.095	0.00062	–0.070	0.00928
	Motility – Sessile	–0.058	0.09804	–0.009	0.86171	–0.018	0.59107	0.035	0.32072	–0.013	0.75252	0.018	0.61465
	Motility – Tubicolous	–0.048	0.17488	0.050	0.15203	–0.063	0.00733	–0.025	0.46644	–0.045	0.10974	–0.040	0.12972
	Motility – Crawler	–0.046	0.18139	–0.019	0.69516	0.008	0.85613	0.015	0.69134	–0.085	0.00114	0.052	0.05987
	Motility – Crawler–Swimmer	0.104	0.00114	–0.016	0.75347	0.051	0.03555	–0.007	0.89347	0.128	0.00019	–0.025	0.38443
	Burrowing depth – Surficial	0.068	0.03534	–0.011	0.81325	0.066	0.00418	0.003	0.95029	0.091	0.00062	0.019	0.52996
	Burrowing depth – Shallow	–0.083	0.00557	–0.003	0.97011	–0.028	0.45913	0.005	0.90764	–0.063	0.01969	0.011	0.71310
	Burrowing depth – Intermediate	0.055	0.10700	0.021	0.66997	–0.016	0.65451	0.002	0.96862	–0.038	0.16462	–0.044	0.10476
	Burrowing depth – Deep	–0.055	0.10983	–0.010	0.85265	–0.023	0.46644	–0.013	0.72096	0.021	0.43698	0.027	0.38443
	Feeding type – De	0.032	0.41769	0.002	0.97011	–0.008	0.86814	–0.020	0.54825	0.070	0.00536	–0.017	0.55887
	Feeding type – SuDe	–0.042	0.24712	0.026	0.54970	–0.024	0.46644	–0.005	0.90764	–0.067	0.01969	–0.028	0.29667
	Feeding type – Su	–0.025	0.59092	–0.035	0.37655	0.012	0.77218	0.024	0.46644	–0.052	0.06669	0.046	0.09624
	Feeding type – CaSc	–0.009	0.86286	–0.001	0.97011	0.017	0.63954	0.005	0.90764	0.014	0.60017	0.005	0.89745
	Feeding type – Om	0.042	0.22824	0.011	0.81325	0.005	0.90764	0.000	0.99876	0.015	0.59179	0.005	0.90032
	Life span – <1	0.045	0.18471	–0.002	0.97011	0.013	0.71324	–0.045	0.07098	0.054	0.04739	0.003	0.93830
	Life span – 1–3	0.017	0.74761	0.001	0.97011	–0.000	0.99876	0.023	0.46644	0.000	0.98294	–0.047	0.08205
	Life span – 3–10	–0.033	0.39275	0.026	0.54970	–0.022	0.46644	0.002	0.97572	–0.064	0.01912	–0.008	0.76699
	Life span – >10	–0.048	0.17488	–0.041	0.25167	0.014	0.70399	0.026	0.46644	0.014	0.60017	0.101	0.00033
	Age at maturity – <1	0.073	0.02332	0.015	0.76167	0.008	0.87224	–0.034	0.28255	0.047	0.08205	–0.056	0.04169
	Age at maturity – 1–3	–0.052	0.13030	0.001	0.97011	–0.005	0.90764	0.034	0.28255	–0.062	0.01969	0.000	0.99502
	Age at maturity – >3	–0.034	0.38853	–0.025	0.58538	–0.004	0.90764	–0.000	0.99876	0.023	0.40804	0.099	0.00051

Table S4. Continued

Data	Variable	Whole area				Low dynamics				High dynamics			
		Axis 1		Axis 2		Axis 1		Axis 2		Axis 1		Axis 2	
		r	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Traits	Reproductive frequency – Seasonal	–0.125	0.00057	–0.005	0.93112	–0.064	0.00608	0.020	0.55342	–0.076	0.00306	0.051	0.06337
	Reproductive frequency – Continuous	0.125	0.00057	0.005	0.93112	0.064	0.00608	–0.020	0.55342	0.076	0.00306	–0.051	0.06337
	Annual fecundity – $<10^2$	0.065	0.05016	–0.028	0.52896	0.055	0.02445	0.007	0.89347	0.094	0.00019	0.013	0.68151
	Annual fecundity – 10^2–10^3	0.021	0.69516	0.020	0.69516	–0.053	0.02668	–0.018	0.59881	0.021	0.43804	–0.050	0.06337
	Annual fecundity – 10^3–10^4	–0.028	0.54544	–0.012	0.81325	–0.006	0.90764	–0.010	0.81548	0.004	0.88487	0.023	0.44016
	Annual fecundity – 10^4–10^5	–0.043	0.23537	0.013	0.77043	0.025	0.46644	–0.012	0.72475	–0.111	0.00019	0.034	0.24708
	Annual fecundity – $>10^5$	–0.017	0.75347	0.002	0.97011	–0.016	0.66078	0.042	0.11836	0.004	0.88487	–0.013	0.61465
	Fertilization – Broadcasting	–0.064	0.05164	–0.022	0.65950	0.004	0.90911	0.024	0.46644	–0.046	0.09624	0.030	0.29124
	Fertilization – Spermcasting	–0.031	0.46782	0.033	0.39111	–0.059	0.01724	–0.009	0.83131	–0.044	0.12104	–0.023	0.40819
	Fertilization – Pairing	0.088	0.00475	0.001	0.97011	0.038	0.18500	–0.019	0.56490	0.080	0.00207	–0.015	0.60017
	Offspring type – Egg	–0.084	0.00557	–0.019	0.69516	–0.032	0.32386	0.014	0.70399	–0.027	0.35009	0.048	0.08205
	Offspring type – Larva	0.011	0.81325	0.047	0.17488	–0.009	0.83131	–0.025	0.46644	–0.094	0.00066	–0.040	0.12972
	Offspring type – Juvenile	0.089	0.00475	–0.018	0.74065	0.047	0.06244	0.005	0.90764	0.104	0.00019	–0.023	0.42190
	Offspring size – <0.1	–0.057	0.10282	–0.003	0.97011	–0.004	0.90764	0.027	0.46644	–0.098	0.00051	0.004	0.90563
	Offspring size – 0.1–0.5	–0.014	0.76167	0.001	0.97011	–0.030	0.37782	–0.022	0.46644	0.008	0.79601	0.028	0.31953
	Offspring size – 0.5–1.5	0.072	0.02584	–0.016	0.76167	0.080	0.00228	–0.019	0.56490	0.060	0.02478	–0.004	0.87727
	Offspring size – >1.5	0.025	0.56548	0.014	0.76167	–0.014	0.70399	0.013	0.72096	0.040	0.13213	–0.042	0.10974
	Off. protection – None	–0.054	0.10983	–0.034	0.38277	–0.005	0.90764	0.023	0.46644	–0.029	0.30184	0.050	0.06669
	Off. protection – Jelly mass	–0.056	0.10983	0.045	0.18471	–0.082	0.00228	–0.023	0.46644	–0.033	0.29667	–0.038	0.14095
	Off. protection – Collar mass	–0.015	0.76167	–0.010	0.85489	0.029	0.45913	0.000	0.99876	0.041	0.10974	0.025	0.44016
	Off. protection – Bearing/Brooding	0.085	0.00557	0.020	0.69516	0.032	0.32386	–0.014	0.70399	0.027	0.35229	–0.048	0.08205
	Off. development – Internal	0.090	0.00475	–0.019	0.71544	0.049	0.05121	0.003	0.93640	0.104	0.00019	–0.022	0.42515
	Off. development – Mixed lecithotrophic	0.060	0.07378	0.044	0.20163	0.030	0.45913	–0.025	0.46644	–0.046	0.12104	–0.043	0.09624
	Off. development – Mixed planktotrophic	–0.015	0.76167	0.040	0.25167	–0.028	0.45913	–0.023	0.46644	–0.040	0.15344	–0.033	0.22503
	Off. development – Lecithotrophic	–0.065	0.05016	–0.010	0.84783	–0.046	0.07098	–0.002	0.96862	0.014	0.60017	0.026	0.39914
	Off. development – Planktotrophic	–0.037	0.33375	–0.020	0.69516	0.009	0.83131	0.022	0.46644	–0.055	0.04698	0.040	0.14095
	Off. benthic stage duration – Null	–0.054	0.10983	–0.028	0.52365	0.003	0.95625	0.015	0.70399	–0.062	0.01969	0.048	0.08295
	Off. benthic stage duration – <15	–0.005	0.97011	0.063	0.05164	–0.069	0.00456	–0.006	0.89347	–0.034	0.24488	–0.084	0.00114
	Off. benthic stage duration – >15	0.060	0.07404	–0.012	0.81325	0.043	0.08935	–0.011	0.78331	0.086	0.00096	0.003	0.91248
	Off. pelagic stage duration – Null	0.047	0.17488	–0.016	0.75347	0.009	0.83131	0.010	0.81548	0.114	0.00019	–0.010	0.71310
	Off. pelagic stage duration – <15	–0.015	0.76167	0.014	0.76167	–0.001	0.97572	–0.023	0.46644	–0.052	0.07860	–0.020	0.45300
	Off. pelagic stage duration – >15	–0.034	0.38588	0.006	0.92891	–0.008	0.86814	0.006	0.89347	–0.074	0.00295	0.022	0.43804

Table S5. Spatial predictions of RLQ patterns by Moran's Eigenvector Maps (MEM) according to the forward selection procedure of Blanchet et al. (2008). For large-scale and low dynamics patterns, since only the first RLQ axis was significantly correlated to both habitat descriptors and biological traits, the modeling procedure was a multiple regression. For the high dynamics pattern, computations were performed through redundancy analysis of the two first RLQ axes. Fisher's *F* significance was tested by 99999 random permutations of the sampling stations

RLQ pattern	Selected MEM	R^2	Cumulative R^2	Adjusted R^2	*F*	*p*
Whole area	MEM1	0.64	0.64	0.63	176.77	< 0.0001
	MEM4	0.04	0.67	0.67	11.63	0.0011
	MEM5	0.03	0.71	0.70	10.62	0.0015
	MEM8	0.03	0.73	0.72	9.45	0.0026
	MEM2	0.02	0.75	0.74	8.67	0.0042
	MEM12	0.02	0.77	0.76	8.28	0.0047
	MEM7	0.02	0.79	0.78	8.41	0.0044
	MEM6	0.02	0.81	0.79	7.45	0.0072
	MEM24	0.01	0.82	0.80	7.55	0.0071
	MEM33	0.01	0.83	0.82	6.95	0.0093
	MEM15	0.01	0.85	0.83	7.23	0.0088
	MEM9	0.01	0.86	0.84	7.72	0.0069
	MEM44	0.01	0.87	0.85	7.04	0.0098
	MEM23	0.01	0.88	0.86	6.04	0.0162
	MEM21	0.01	0.88	0.86	5.18	0.0257
	MEM20	0.01	0.89	0.87	5.32	0.0235
	MEM30	0.01	0.90	0.88	5.43	0.0231
	MEM96	0.01	0.90	0.88	4.46	0.0380
	MEM18	< 0.01	0.91	0.89	4.39	0.0406
	MEM3	< 0.01	0.91	0.89	4.16	0.0449
	MEM97	< 0.01	0.92	0.89	4.07	0.0465
	MEM89	< 0.01	0.92	0.90	4.05	0.0475
	MEM84	< 0.01	0.92	0.90	4.19	0.0429
	MEM38	< 0.01	0.93	0.91	4.10	0.0464
	MEM13	< 0.01	0.93	0.91	4.12	0.0452
	MEM40	< 0.01	0.94	0.91	3.98	0.0496
Low dynamics	MEM1	0.30	0.30	0.28	16.44	0.0004
	MEM4	0.12	0.41	0.38	7.58	0.0094
	MEM33	0.07	0.48	0.44	4.94	0.0340
	MEM6	0.07	0.55	0.50	5.40	0.0267
	MEM13	0.06	0.61	0.55	4.98	0.0335
	MEM3	0.05	0.65	0.59	4.44	0.0428
	MEM14	0.04	0.69	0.63	4.24	0.0455
	MEM11	0.04	0.73	0.66	4.70	0.0403
High dynamics	MEM5	0.15	0.15	0.13	10.48	0.0002
	MEM3	0.13	0.28	0.26	11.02	0.0001
	MEM1	0.09	0.37	0.34	8.22	0.0009
	MEM13	0.06	0.43	0.39	6.11	0.0037
	MEM8	0.06	0.49	0.45	6.47	0.0022
	MEM7	0.05	0.54	0.49	5.71	0.0050
	MEM19	0.04	0.58	0.53	5.56	0.0059
	MEM20	0.04	0.62	0.56	5.43	0.0069
	MEM2	0.04	0.66	0.60	5.38	0.0059
	MEM40	0.02	0.68	0.62	3.86	0.0253
	MEM14	0.02	0.70	0.63	3.21	0.0426

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Table S6. Growth rate data used in Figure S7

Taxon	Growth rate (cm yr^{-1})	Reference	Taxon	Growth rate (cm yr^{-1})	Reference
Abra alba	1.5	Dauvin and Gentil 1989	*Heteromastus filiformis*	20.0	Can et al. 2009
Abra prismatica	1.5	Dauvin and Gentil 1989	*Hiatella arctica*	0.1	Sejr et al. 2002
Abra tenuis	0.4	Dekker and Beukema 1993	*Idotea linearis*	8.2	Franke and Beermann 2014
Acanthocardia sp.	0.8	Peharda 2012	*Iphinoe trispinosa*	1.8	Corey 1969
Acteon tornatilis	1.2	Yonow and Ryland 1992	*Jassa marmorata*	3.3	Clancy 1997
Alitta virens	5.0	Kristensen 1984	*Kurtiella bidentata*	0.1	Ockelmann and Muus 1978
Ampelisca brevicornis	4.0	Dauvin 1988	*Lanice conchilega*	5.3	Van Hoey 2006
Ampelisca macrocephala	1.6	Kanneworff 1965	*Lepidonotus squamatus*	4.4	Plyuscheva et al. 2004
Ampelisca tenuicornis	1.3	Dauvin 1988	*Limecola balthica*	0.3	Cardoso et al. 2007
Ampharete sp.	2.5	Price and Warwick 1980	*Macomangulus tenuis*	0.4	Dekker and Beukema 1999
Amphipholis squamata	3.6	Emson and Whitfield 1989	*Magelona mirabilis*	4.0	Rees 1983
Amphiura filiformis	2.5	Sköld et al. 1994	*Malacoceros fuliginosus*	5.0	Gudmundsson 1985
Arctica islandica	0.2	Ridgway and Richardson 2011	*Mesopodopsis slabberi*	1.0	Delgado et al. 1997
Astarte sp.	0.6	Selin 2007	*Modiolus* sp.	0.2	Anwar et al. 1990
Asterias rubens	2.4	Nichols and Barker 1984	*Mya arenaria*	0.8	Brousseau 1979
Astropecten sp.	2.7	Freeman et al. 2001	*Mya truncata*	0.4	Amaro et al. 2003
Balanus crenatus	1.9	Barnes and Powell 1953	*Mymachlamys*	0.8	Conan and Shafee 1978
Branchiostoma lanceolatum	0.8	Desdevises et al. 2011	*Mytilus edulis*	0.8	Bayne and Worrall 1980
Buccinum undatum	0.9	Kideys 1996	*Nassarius reticulatus*	0.6	Barroso et al. 2005
Callianassa subterranea	3.0	Rowden and Jones 1994	*Nephrops norvegicus*	1.5	Tuck et al. 1997
Capitella capitata	3.0	Warren 1976	*Nephtys* sp.	3.2	Kirkegaard 1970
Carcinus maenas	4.5	Yamada et al. 2005	*Notomastus latericeus*	3.0	Giangrande and Fraschetti 1993
Chaetopterus variopedatus	20.0	Enders 1909	*Nucula nitidosa*	0.1	Rees 1983
Chamelea striatula	0.3	Guillou and Sauriau 1985	*Ophiura* sp.	2.5	Gage 1990
Corbula gibba	0.6	Jensen 1990	*Pagurus bernhardus*	3.0	Lancaster 1990
Corophium volutator	2.0	McLusky 1967	*Peringia ulvae*	0.3	Sola 1996
Crangon crangon	0.6	Henderson and Holmes 1987	*Philocheras trispinosus*	3.0	Labat 1984
Diastylis rathkei	1.2	Valentin and Anger 1977	*Pholoe minuta*	0.1	Heffernan 1985
Diogenes pugilator	2.3	Manjón-Cabeza and García Raso 1998	*Phoronis* sp.	5.0	Emig 1982
Donax vittatus	0.5	Ansell 1972	*Polydora* sp.	6.0	Gudmundsson 1985
Dosinia exoleta	0.4	Tunberg 1983	*Pontocrates altamarinus*	0.9	Beare and Moore 1998
Dosinia lupinus	0.3	Tunberg 1983	*Pontocrates arenarius*	0.6	Beare and Moore 1998
Dyopedos monacantha	1.4	Thiel 1998	*Psammechinus miliaris*	0.2	Jensen 1969
Echinocardium sp.	0.6	Buchanan 1966	*Pygospio elegans*	2.3	Gudmundsson 1985
Ensis ensis	1.9	Henderson and Richardson 1994	*Sphenia binghami*	0.1	George and Warwick 1985
Ensis leei	4.0	Swennen et al. 1985	*Spio martinensis*	5.0	Gudmundsson 1985
Ensis siliqua	2.1	Henderson and Richardson 1994	*Spiophanes bombyx*	4.0	Rees 1983
Eupolymnia nebulosa	4.9	Bhaud 1988	*Spisula solida*	0.7	Gaspar et al. 1995
Eurydice pulchra	0.5	Fish 1970	*Spisula subtruncata*	0.6	Cardoso et al. 2007
Fabulina fabula	1.2	Withers 1977	*Streblospio shrubsolii*	3.4	Krevrekidis 2005
Gammaridae	3.5	Neuparth et al. 2002	*Thyasira flexuosa*	0.2	López-Jamar et al. 1987
Glycera sp.	7.5	Ockelmann and Vahl 1970	*Venus* sp.	0.4	Arneri et al. 1998
Harmothoe sp.	8.4	Plyuscheva et al. 2004	*Westwoodilla caecula*	0.6	Beare and Moore 1998
Hediste diversicolor	4.0	Kristensen 1984			

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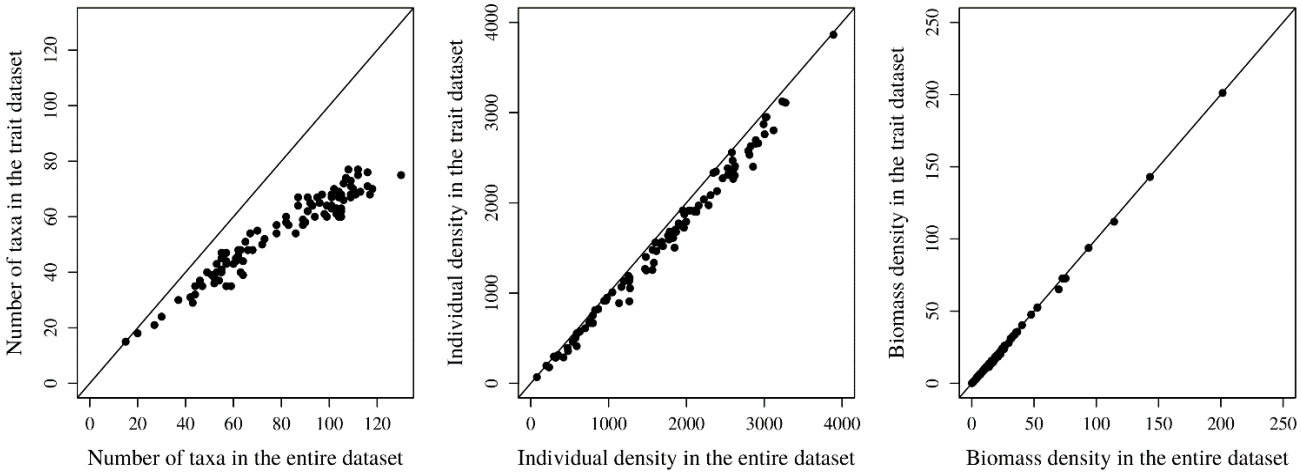

Figure S1. Comparison between the whole taxocenosis (391 taxa) and its subset documented for biological traits (190 taxa). The three basic community descriptors, number of taxa, individual density (number of individual organisms m^{-2}) and biomass density (ash-free dry weight g m^{-2}), were calculated for each of the 103 sampling stations (black dots, values averaged over the period 1995 – 2015).

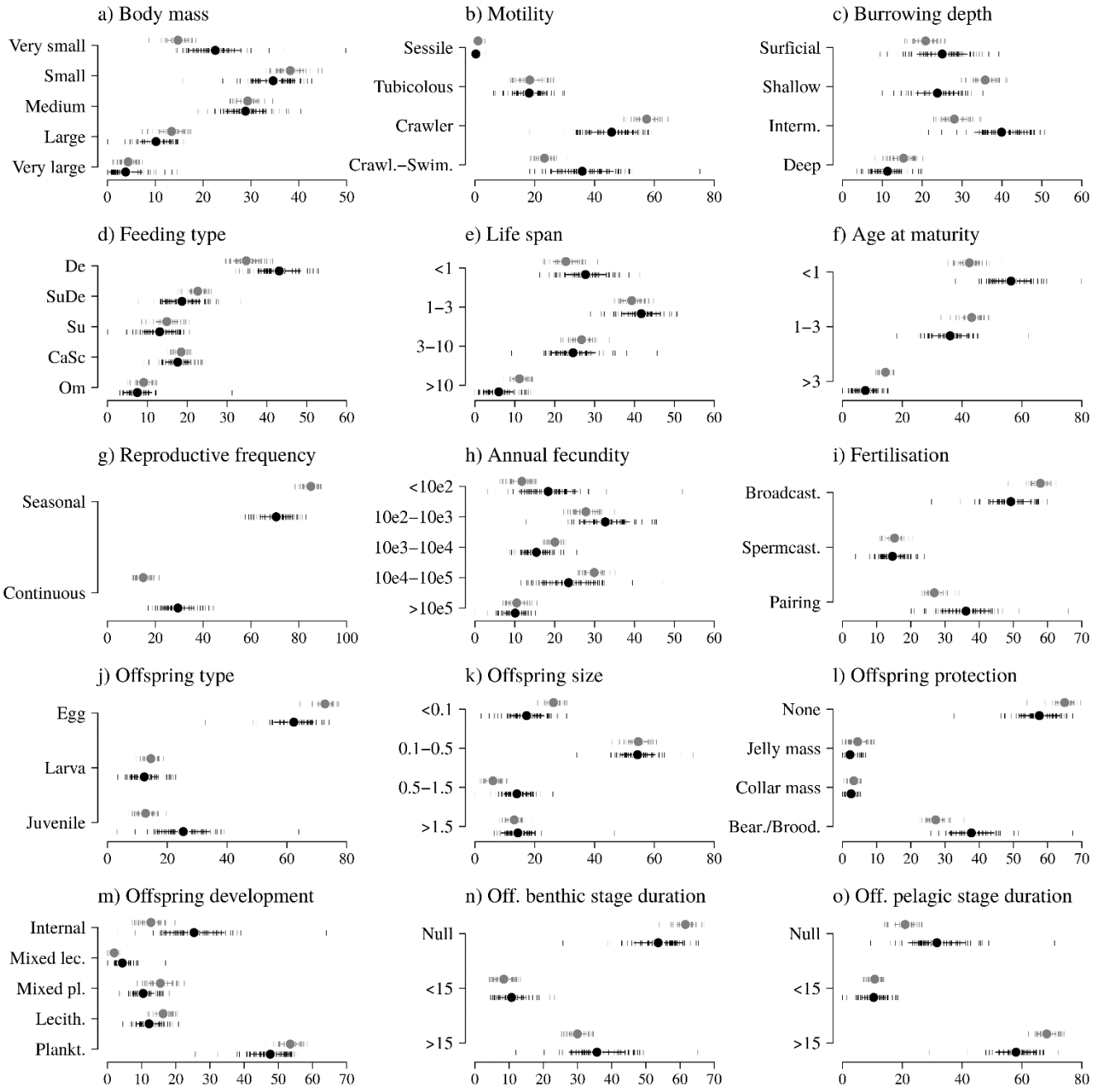

Figure S2. Trait modality distributions over the whole area. Trait modalities are represented as percentages of species within communities. Dot, mean ± SD. Grey, low dynamics; black, high dynamics. Within a community (vertical segment), modality scores sum to 100% within the considered trait. Feeding type: Su, suspension feeder; De, deposit feeder; CaSc, carnivore-scavenger; Om, omnivore. Globally, the high dynamics habitat is more functionally heterogeneous (mean SD = 5.26) than the low dynamics one (mean SD = 2.52)

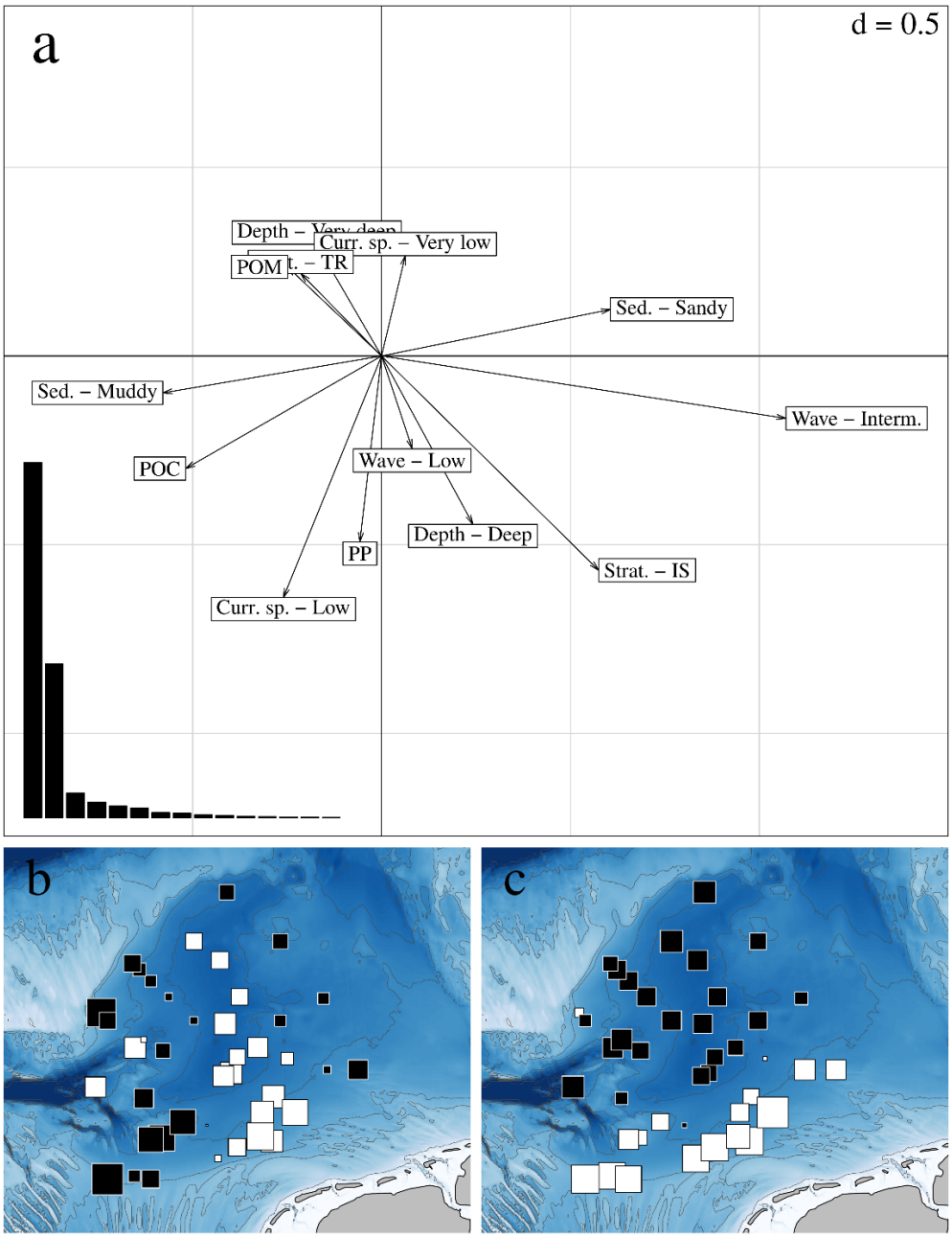

Figure S3. RLQ analysis of the low dynamics habitat. a) Habitat descriptors projected onto axes 1 and 2; "d" indicates the grid scale; bar diagram, eigenvalues (axis 1, 60%; axis 2, 26%); for clarity, only the significant modalities of qualitative variables are shown (according to Table S4). Abbreviations: Curr. sp., current speed; Interm., intermediate; POC, particulate organic carbon; PP, primary productivity; Sed., sediment; Strat., stratification (IS, intermittently stratified; TR, transitional). b) Station axis score 1. c) Station axis score 2. White squares, low scores; black squares, high scores; square size, proportional to the deviation from the mean

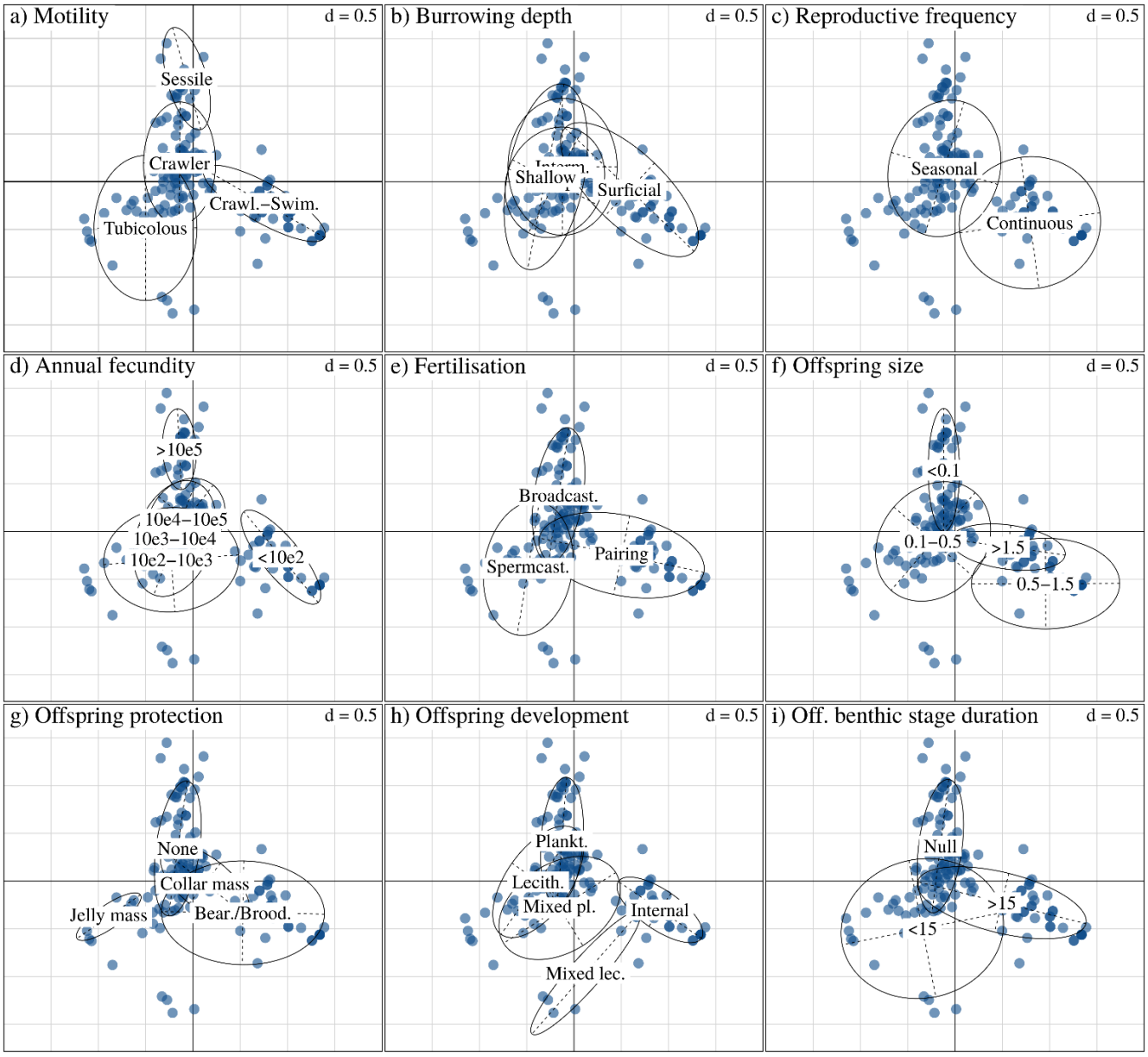

Figure S4. RLQ analysis of the low dynamics habitat. Distributions of trait modalities (ellipses) respective to each trait (windows); blue dots, species positions; trait modalities are positioned at the gravity center of their respective species. Only traits significantly related to the axes are represented. “d” indicates the grid scale

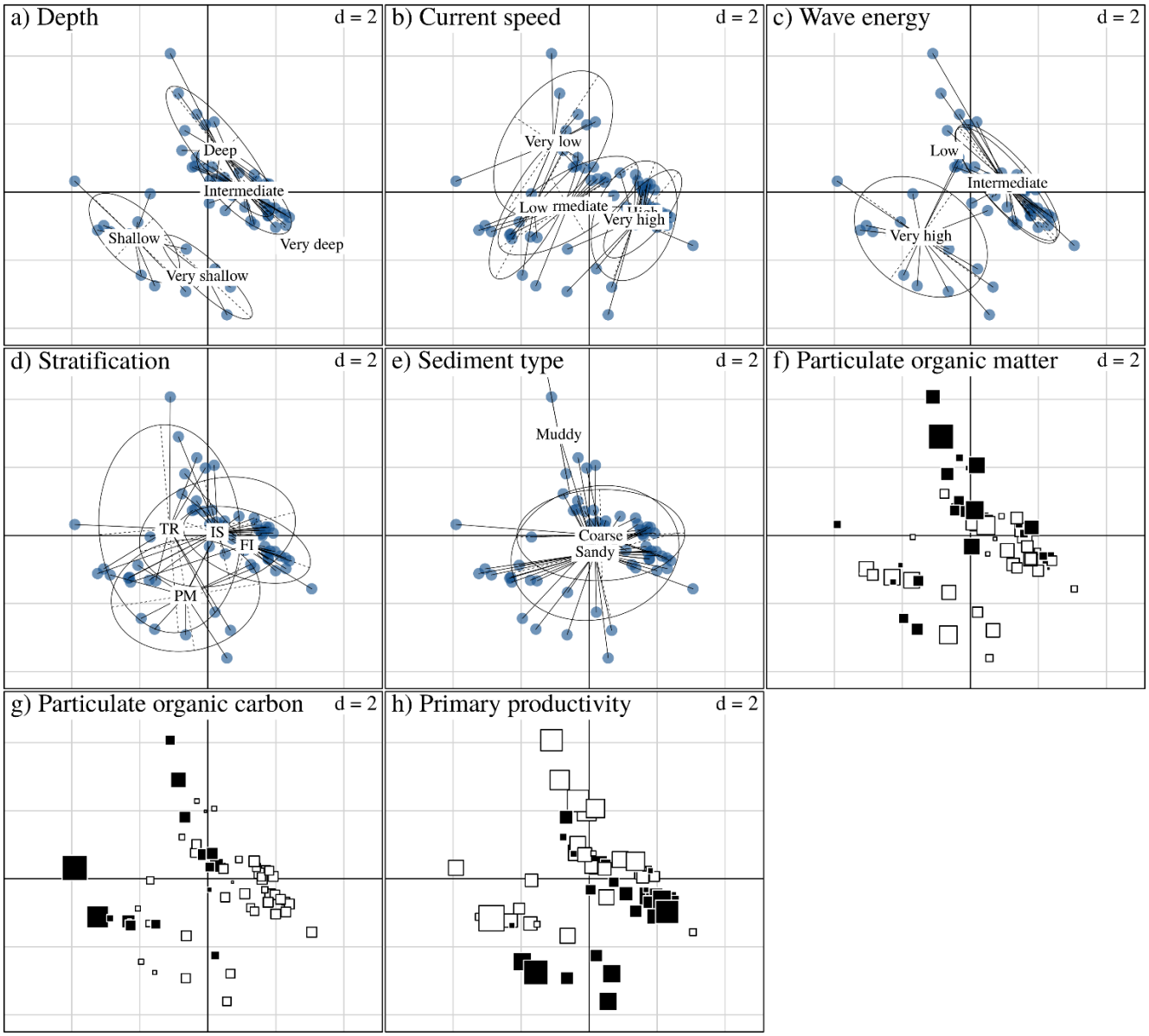

Figure S5. Detailed distributions of habitat descriptors in the high dynamics analysis (complementary to Fig. 4). Blue dots (a-e) and squares (f-h) indicate positions of sampling stations. d) IS, intermittently stratified; FI, freshwater influence; PM, permanently mixed; TR, transitional. f-h) White squares, low values; black squares, high values; square sizes are proportional to the deviation from the mean value. "d" indicates the grid scale

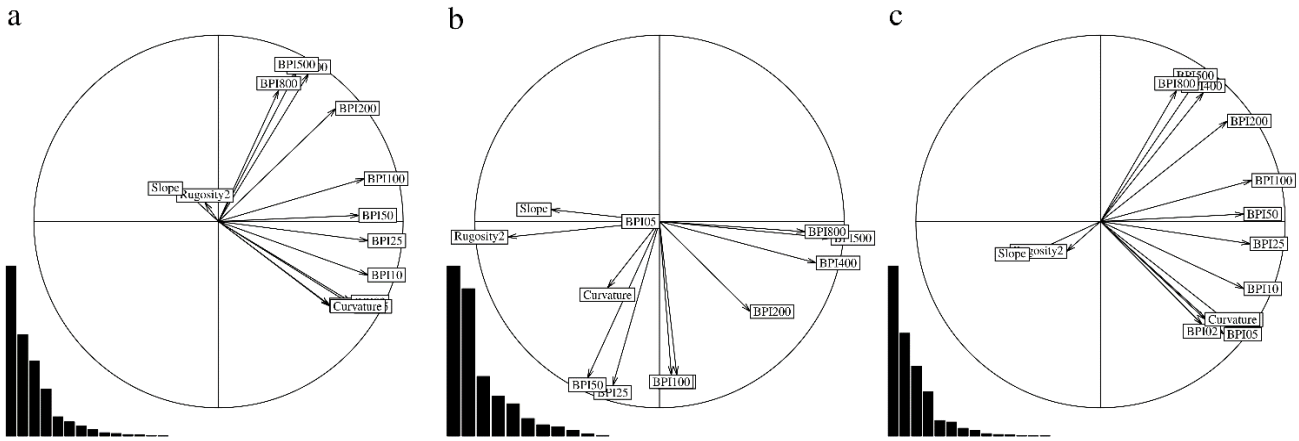

Figure S6. PCAs on geomorphological data, correlation circles of axis 1 and 2. a) Large scale. b) Low dynamics. c) High dynamics. Bar diagrams, eigenvalues. A common feature to the three patterns consists in positive correlations between large scale BPIs along the first axis (from left to right). Except in low dynamics, the second axis expresses a synthetic opposition between large scale (upward) and small scale (downward) BPIs. Third and fourth axes in a and c, although suggestive, are stretched only by a few stations with extreme scores

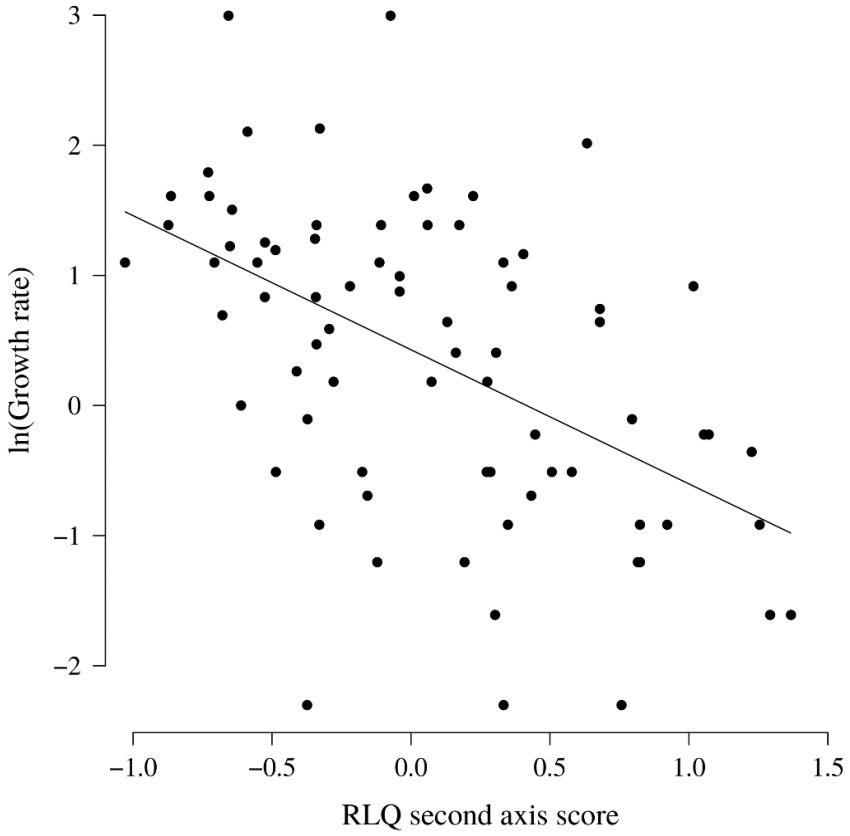

Figure S7. Relationship between taxon growth rate and the second RLQ axis of the high dynamics habitat analysis. Growth rate, prior to be *ln*-transformed, was measured in cm year^{-1}. $n = 77$, $r = 0.51$, p 0.001. Growth rate data provided in Table S6