

Ecological functioning of mudflats: global analysis reveals both regional differences and widespread conservation of functioning

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Table S1: Macrofaunal taxa (n = 448) from the mudflat assemblages for the 163 datasets used in the analysis. Taxa that were endemic to the: †Temperate N Atlantic; §Tropical Atlantic *Temperate Australasia; ‡Temperate S America; #Central Indo-Pacific; °Tropical E Pacific; and, ††Temperate N Pacific regions according to the Ocean Biogeographic Information System database (OBIS 2018).

Taxa		
<i>Abra</i> sp.	Bivalvia	<i>Cossura longocirrata</i>
<i>Abra alba</i>	<i>Boccardia</i> sp.	<i>Crangon crangon</i>
<i>Abra prismatica</i>	<i>Boccardia polybranchia</i>	<i>Cryptomya californica</i>
<i>Abra tenuis</i>	<i>Boccardia syrtis</i>	Cumacea
<i>Acrocnida brachiata</i>	<i>Borniopsis maipoensis</i> #	<i>Cumella vulgaris</i>
<i>Albunea lucasia</i>	<i>Bullacta exarata</i>	<i>Cumopsis goodsir</i>
<i>Alitta succinea</i>	<i>Callinectes arcuatus</i>	<i>Cyathura</i> sp.
<i>Alitta virens</i>	<i>Callinectes bocourti</i>	<i>Cyathura carinata</i>
<i>Alkmaria romijni</i>	<i>Camptandrium sexdentatum</i>	<i>Cyathura muromiensis</i>
<i>Alpheus</i> sp.	<i>Cancer (Gammarus)</i> sp.	<i>Cyprideis pacifica</i>
<i>Alpheus mazatlanicus</i>	Capitellidae	<i>Cyprideis torosa</i>
<i>Americorophium salmonis</i>	<i>Capitella</i> spp.	<i>Dendronereides</i> sp.
<i>Americorophium spinicorne</i>	<i>Capitella capitata</i>	<i>Dendronereis pinnaticirris</i>
<i>Ampelisca</i> sp.	<i>Caprella drepanochir</i>	<i>Desdemona ornata</i>
<i>Ampelisca vadorum</i>	<i>Carazziella citrona</i>	Dexamidae
<i>Ampharete</i> sp.	<i>Carcinus maenas</i>	<i>Diloma subrostratum</i>
<i>Ampharete acutifrons</i>	<i>Cardium</i> sp.	<i>Dinophilus gardineri</i>
<i>Ampharete baltica</i>	<i>Caulleriella</i> sp.	<i>Dipolydora coeca</i>
<i>Amphinome rostrate</i>	Cephalaspidea	<i>Dipolydora quadrilobata</i>
Amphipoda	<i>Ceratonereis</i> sp.	<i>Dipolydora socialis</i>
<i>Ampithoe valida</i>	<i>Ceratonereis marmorata</i>	<i>Discapseudes</i> sp.
<i>Anomalifrons lightana</i>	<i>Ceratocephale</i> sp.	<i>Discapseudes mackiei</i>
<i>Anthopleura aureoradiata</i>	<i>Cerastoderma edule</i>	<i>Discapseudes surinamensis</i> §
<i>Anthopleura hermaphroditica</i> ‡	<i>Cerastoderma glaucum</i>	<i>Dosinia</i> sp.
Anthozoa	<i>Cernosvitoviella immota</i>	<i>Ecrobia ventrose</i>
Anthuridae	<i>Chaetacanthus</i> sp.	<i>Edotia montosa</i>
<i>Aonides oxycephala</i>	<i>Chaetozone</i> sp.	<i>Eobrolgus chumashi</i>
<i>Aonides trifida</i>	<i>Chaetozone setosa</i>	<i>Eohaustorius</i> sp.
<i>Aphelochaeta marioni</i>	<i>Cheus</i> sp.	<i>Eohaustorius estuaries</i>
<i>Aphelochaeta multibranchis</i>	Chironomidae	<i>Ervilia</i> sp.
<i>Aphrodita</i> sp.	<i>Chondrochelia savignyi</i>	<i>Eteone</i> sp.
<i>Apseudes</i> sp.	Cirratulidae	<i>Eteone flava</i>
<i>Apseudopsis latreillii</i>	<i>Cirriformia tentaculata</i>	<i>Eteone longa</i>
<i>Arcuatula senhousia</i>	<i>Cistenides hyperborean</i>	<i>Euclymene oerstedii</i>
<i>Arenicola marina</i>	<i>Cleistostoma dilatatum</i>	<i>Eulalia viridis</i>
<i>Arthritica bifurca</i>	<i>Clenchiella</i> sp.	<i>Eulima</i> sp.
<i>Aricidea</i> sp.	<i>Clibanarius lineatus</i>	<i>Eupolymnia</i> sp.

Table S1: Continued

Taxa		
<i>Armandia</i> sp.	<i>Clinocardium nuttallii</i>	<i>Eurycarcinus orientalis</i>
<i>Assiminea</i> sp.	<i>Clymenella</i> sp.	<i>Eurytellina rubescens</i>
<i>Assiminea brevicula</i>	<i>Clymenella torquate</i>	<i>Exogone verugera</i>
<i>Assiminea succinea</i>	<i>Colurostylis lemurum</i>	<i>Exosphaeroma</i> sp.
<i>Assiminea violacea</i>	<i>Cominella glandiformis</i>	<i>Exosphaeroma hylecoetes</i>
<i>Astarte borealis</i>	<i>Corbicula javanica</i>	Fabriciidae
<i>Austrohelice crassa</i> *	<i>Corbula gibba</i>	<i>Fabricia</i> sp.
<i>Austromacoma constricta</i>	<i>Coricum nicoyensis</i> ^â	<i>Fabricia stellaris</i>
<i>Austrominius modestus</i>	<i>Corophium</i> sp.	<i>Ficopomatus enigmaticus</i>
<i>Austrovenus stutchburyi</i> *	<i>Corophium arenarium</i>	Gammaridea
<i>Baltidrilus costatus</i>	<i>Crassicorophium bonellii</i>	<i>Gammarus oceanicus</i>
<i>Bathyporeia sarsi</i>	<i>Corophium volutator</i> [†]	<i>Gammaropsis</i> sp.
<i>Batillaria zonalis</i>	<i>Cossura</i> sp.	<i>Gemma gemma</i>
<i>Bittium</i> sp.	<i>Cossura consimilis</i>	<i>Glauconome chinensis</i>
<i>Glycinde</i> sp.	<i>Leucothoe incisa</i>	<i>Monopylephorus</i> sp.
<i>Glycinde armigera</i>	<i>Limecola balthica</i>	<i>Monopylephorus evertus</i>
<i>Glycinde polygnatha</i>	<i>Limnodrilus</i> sp.	<i>Monopylephorus parvus</i>
Glyceridae	<i>Limnodriloides</i> sp.	<i>Montacuta semiradiata</i> *
<i>Glycera Americana</i>	<i>Lineus</i> sp.	<i>Mulinia cleyana</i>
<i>Glycera capitata</i>	<i>Lineus ruber</i>	<i>Mya arenaria</i>
<i>Glycera chirori</i>	<i>Linopyrga tantilla</i>	<i>Myrianida</i> sp.
<i>Glycera tridactyla</i>	<i>Linucula hartvigiana</i>	<i>Myrianida langerhansi</i>
<i>Glycera unicornis</i>	<i>Lysilla</i> sp.	<i>Mysella</i> sp.
Gnathiidae	<i>Littorina littorea</i>	<i>Mysella donaciformis</i>
<i>Grandidierella japonica</i>	<i>Littorina saxatilis</i>	Mysida
<i>Grandifoxus grandis</i>	<i>Loimia medusa</i>	<i>Mytilus</i> sp.
<i>Halicarcinus whitei</i>	<i>Lumbricillus</i> sp.	<i>Mytilus edulis</i>
<i>Halicryptus spinulosus</i>	Lumbrineridae	<i>Mytilus galloprovincialis</i>
<i>Halmyrapseudes spaansi</i> [§]	<i>Lumbrineris</i> sp.	Naididae
Harpacticoida	<i>Lumbrineris tetraura</i>	<i>Namalycastis abiuma</i>
<i>Hediste</i> sp.	<i>Lumbrineriopsis</i> sp.	<i>Nasima dotilliformis</i>
<i>Hediste diversicolor</i> [†]	<i>Lysidice ninetta</i>	Naticidae
<i>Hemiplax hirtipes</i> *	<i>Macomona liliana</i> *	<i>Neanthes glandincta</i>
<i>Heteromastus</i> sp.	<i>Macoma</i> sp.	<i>Neanthes uniseriate</i>
<i>Heteromastus filiformis</i>	<i>Macomangulus tenuis</i>	Nematoda
<i>Hobsonia florida</i>	<i>Macroclymenella stewartensis</i>	<i>Nematostella vectensis</i>
<i>Hyale</i> sp.	<i>Macrophthalmus definitus</i>	Nemertea
<i>Hydrobia</i> sp.	<i>Macrophthalmus japonicas</i>	<i>Neohelice granulata</i>
Hydrobiidae	<i>Magelona</i> sp.	<i>Neomysis integer</i>
<i>Hypereteone heteropoda</i>	<i>Magelona dakini</i>	<i>Nephtys</i> sp.
<i>Idotea chelipes</i>	<i>Malacoceras tetracerus</i>	<i>Nephtys caeca</i>
<i>Idotea emarginata</i>	<i>Manayunkia aestuarina</i>	<i>Nephtys californiensis</i>
<i>Iliacantha hancocki</i>	<i>Manningis arabicum</i>	<i>Nephtys cirrosa</i>
<i>Ilyoplax formosensis</i>	<i>Marcia hiantina</i>	<i>Nephtys hombergii</i>
<i>Ilyoplax ningpoensis</i>	<i>Marenzelleria viridis</i>	Nereididae
<i>Ilyoplax stevensi</i>	<i>Marphysa depressa</i>	<i>Nereis</i> sp.
<i>Iravadia</i> sp.	<i>Mediomastus</i> sp.	<i>Neripteron violaceum</i>
<i>Iravadia bombayana</i>	<i>Mediomastus ambiseta</i>	<i>Nicon aestuariensis</i>
<i>Iravadia ornata</i>	<i>Mediomastus californiensis</i>	<i>Nicolea</i> sp.
<i>Isolda</i> sp.	<i>Mediomastus fragilis</i>	<i>Nippoleucon hinumensis</i> [¶]
Isopoda	<i>Melinna</i> sp.	<i>Notomastus</i> sp.
<i>Kurtiella bidentata</i>	<i>Melinna palmate</i>	<i>Notomastus latericeus</i>
<i>Laeonereis acuta</i> ‡	<i>Melita</i> sp.	<i>Odostomia solidula</i>
<i>Lagis australis</i>	<i>Melita awa</i>	Oligochaeta
<i>Janice conchilega</i>	<i>Melita palmate</i>	<i>Onisimus litoralis</i>

Table S1: Continued

Taxa		
<i>Leiochone leiopygos</i>	<i>Metaplax elegans</i>	<i>Orchestia</i> sp.
<i>Leitoscoloplos</i> sp.	<i>Microcerberus</i> sp.	<i>Orchestia gammarellus</i>
<i>Leodamas cylindrifera</i>	<i>Micronephthys minuta</i>	Ostracoda
<i>Lepidonotus</i> sp.	<i>Micronephthys oligobranchia</i>	<i>Owenia</i> sp.
<i>Lepidophthalmus bocourti</i>	<i>Micropodarke dubia</i>	<i>Palaemon elegans</i>
<i>Leptocheirus pilosus</i>	<i>Microspio theeli</i>	<i>Palaemon longirostris</i>
<i>Leptocheirus plumulosus</i>	<i>Micrura</i> sp.	<i>Panopeus</i> sp.
<i>Leptochelia rapax</i>	<i>Monocorophium acherusicum</i>	<i>Paphies australis</i>
<i>Leptoplana</i> sp.	<i>Monocorophium insidiosum</i>	<i>Paradoneis lyra</i>
<i>Leucosilla jurinii</i>	<i>Monoculodes</i> sp.	<i>Paracalliope novizealandiae</i>
<i>Paracorophium hartmannorum</i>	<i>Prionospio patagonica</i> †	<i>Streblospio benedicti</i>
<i>Paradoxapseudes mortoni</i>	<i>Prionospio pulchra</i>	<i>Streblospio gynobranchiata</i>
<i>Paragnathia formica</i>	<i>Prionospio sexoculata</i>	<i>Streblospio shrubsolii</i> †
<i>Paralacydonia paradoxa</i>	<i>Protankyra bidentate</i>	<i>Syllis</i> sp.
<i>Paranais litoralis</i>	<i>Protodorvillea kefersteini</i>	<i>Tagelus politus</i>
<i>Paranthura</i> sp.	<i>Psammoryctides</i> sp.	<i>Tagelus plebeius</i>
<i>Paraonis</i> sp.	<i>Pseudopolydora</i> sp.	Tanaidacea
<i>Paraprionospio pinnata</i>	<i>Pseudopolydora kempi</i>	<i>Tarebia</i> sp.
<i>Parexogone hebes</i>	<i>Pseudopolydora paucibranchiata</i>	<i>Tectidrilus gabriella</i>
<i>Paridotea unguolata</i>	<i>Pygospio</i> sp.	Tellinidae
<i>Pectinaria</i> sp.	<i>Pygospio elegans</i>	Tellinoidea
<i>Penaeus occidentalis</i>	Pyramidellidae	<i>Thalassomyia</i> sp.
<i>Perinereis aibuhitensis</i>	<i>Reloncavia chilena</i>	<i>Tharyx</i> sp.
<i>Perinereis gualpensis</i>	<i>Reticunassa festiva</i>	<i>Tharyx parvus</i>
<i>Perinereis nuntia</i>	<i>Retusa</i> sp.	<i>Theora iridescens</i>
<i>Perinereis vallata</i>	<i>Retusa obtuse</i>	<i>Theora lata</i>
<i>Peringia ulvae</i> †	<i>Retusa truncatula</i>	Tipulidae
<i>Perkinsiana acuminata</i>	<i>Rimapenaeus byrdi</i>	<i>Torridoharpinia hurleyi</i>
<i>Persephona townsendi</i>	<i>Rissoina</i> sp.	Trichoptera
<i>Pholoe inornata</i>	<i>Saduriella losadai</i>	<i>Tritia neritea</i>
Phoxocephalidae	<i>Sagartia troglodytes</i>	<i>Tubificoides</i> sp.
<i>Phoxocephalus holbolli</i>	<i>Salinator fragilis</i>	<i>Tubificoides benedicti</i> †
<i>Phyllocomus</i> sp.	<i>Schistomeringos neglecta</i>	<i>Tubificoides brownie</i>
<i>Phyllodoce</i> sp.	<i>Scoloplos</i> sp.	<i>Tubificoides nerthoides</i>
<i>Phyllodoce koreana</i>	<i>Scoloplos armiger</i>	<i>Tubificoides pseudogaster</i>
<i>Phyllodoce maculate</i>	<i>Scoloplos tribulosus</i>	<i>Tubificoides wasselli</i>
<i>Phyllodoce mucosa</i>	<i>Scolecopides benhami</i>	<i>Turritella capensis</i>
Phyllodocidae	<i>Scrobicularia plana</i> †	<i>Uca maracoani</i>
<i>Phyllodoce arenae</i>	<i>Sermyla</i> sp.	<i>Umboonium thomasi</i>
<i>Phylofoetida atlantica</i>	<i>Sermyla riqueti</i> #	<i>Urothoe poseidonis</i>
<i>Pinnixa</i> sp.	<i>Sigambra grubii</i>	<i>Varuna litterata</i>
<i>Pinnixa valerii</i>	<i>Sigambra hanaokai</i> #	<i>Victoriopisa</i> sp.
Pinnotheridae	<i>Sigambra tentaculata</i>	<i>Zeacumantus lutulentus</i>
<i>Pinnotheres</i> sp.	<i>Simplisetia erythraeensis</i>	
<i>Pirenella cingulata</i>	<i>Sinocorophium triangulapedarum</i>	
<i>Platynereis bicanaliculata</i>	<i>Sinonovacula constricta</i>	
<i>Podarkeopsis arenicolus</i>	Sipuncula	
Podocopida	<i>Solen strictus</i>	
Polychaeta	<i>Spio decorata</i>	
<i>Polydora</i> sp.	<i>Spio martinensis</i>	
<i>Polydora ciliate</i>	<i>Spio setosa</i>	
<i>Polydora cornuta</i>	Spionidae	
Polynoidae	<i>Spiophanes bombyx</i>	
Porcellanidae	<i>Sphaeroma</i> sp.	

Table S1: Continued

Taxa

<i>Potamocorbula laevis</i>	<i>Sphaerosyllis californiensis</i>
<i>Prionoplax ciliata</i>	<i>Sphaerosyllis semiverrucosa</i>
<i>Prionospio</i> sp.	<i>Squilla aculeata</i>
<i>Prionospio aucklandica</i> *	<i>Stenothyra</i> sp.
<i>Prionospio cirrifera</i>	<i>Stenothyra divalis</i> #
<i>Prionospio japonicus</i> [¶]	<i>Streblospio</i> sp.

Table S2: SIMPER results showing taxa that cumulatively contributed ~50% of the pairwise dissimilarity between the seven biogeographic regions that significantly differed (pairwise ANOSIM, $p < 0.01$, Table 4). Taxa are listed in decreasing order of individual contribution, and nature of the differences are indicated as follows: taxa recorded in only the *first region of the pairwise comparison; the direction of any differences is indicated by [-] when present in lower and [+] and higher abundance in the ¹first zone compared with the ²second of the two zone comparison. See also Fig. 5B.

Region comparisons	Species/taxa contributing to 50% dissimilarity
Temperate N Atlantic¹ versus	
Temperate S America²	<i>Perinereis vallata</i> , <i>Peringia ulvae</i> *, <i>Hediste diversicolor</i> *, <i>Tubificoides benedii</i> *, <i>Oligochaeta</i> [+], <i>Limecola balthica</i> *, <i>Pygospio elegans</i> *, <i>Monocorophium insidiosum</i> , <i>Monocorophium acherusicum</i> , <i>Naididae</i> [-], <i>Heteromastus filiformis</i> *, <i>Ostracoda</i> [-], <i>Corophium volutator</i> *, <i>Prionospio patagonica</i> , <i>Cirratulidae</i> *, <i>Anthopleura hermaphroditica</i> , <i>Scrobicularia plana</i> *
Temperate Australasia²	<i>Heteromastus filiformis</i> [-], <i>Peringia ulvae</i> *, <i>Hediste diversicolor</i> *, <i>Tubificoides benedii</i> *, <i>Oligochaeta</i> [+], <i>Corophium</i> spp. [-], <i>Prionospio aucklandica</i> , <i>Limecola balthica</i> *, <i>Naididae</i> [-], <i>Montacuta semiradiata</i> , <i>Pygospio elegans</i> *, <i>Hemiplax hirtipes</i> , <i>Gammaropsis</i> sp., <i>Nemertea</i> [-], <i>Austrovenus stutchburyi</i> , <i>Corophium volutator</i> *, <i>Cirratulidae</i> [+], <i>Macomona Liliana</i> , <i>Capitella</i> spp. [-]
Central Indo-Pacific²	<i>Neanthes glandicinca</i> , <i>Capitella capitata</i> [-], <i>Borniopsis maipoensis</i> , <i>Peringia ulvae</i> *, <i>Hediste diversicolor</i> *, <i>Tubificoides benedii</i> *, <i>Oligochaeta</i> [+], <i>Perkinsiana acuminata</i> , <i>Limecola balthica</i> *, <i>Heteromastus filiformis</i> [+], <i>Pygospio elegans</i> *, <i>Sermyla riqueti</i> , <i>Corophium volutator</i> *, <i>Dendronereis pinnaticirris</i> , <i>Tharyx</i> sp. [-], <i>Stenothyra divalis</i> , <i>Cirratulidae</i> *, <i>Sigambra hanaokai</i> , <i>Scrobicularia plana</i> *
Tropical E Pacific²	<i>Coricuma nicoyensis</i> , <i>Cyprideis pacifica</i> , <i>Pinnixa valerii</i> , <i>Mediomastus californiensis</i> , <i>Carazziella citrona</i> , <i>Peringia ulvae</i> *, <i>Hediste diversicolor</i> *, <i>Paraprionospio pinnata</i> , <i>Eurytellina rubescens</i> , <i>Lumbrineris tetraura</i> , <i>Tubificoides benedii</i> *, <i>Glycinde armigera</i> , <i>Oligochaeta</i> *, <i>Tagelus politus</i> , <i>Limecola balthica</i> *
Tropical Atlantic²	<i>Halmyrapseudes spaansi</i> , <i>Sigambra grubii</i> , <i>Peringia ulvae</i> *, <i>Hediste diversicolor</i> *, <i>Tubificoides benedii</i> *, <i>Oligochaeta</i> [+], <i>Limecola balthica</i> *, <i>Discapseudes surinamensis</i> , <i>Pygospio elegans</i> *, <i>Assimineia succinea</i> , <i>Heteromastus filiformis</i> *, <i>Corophium volutator</i> *
Temperate N Pacific²	<i>Oligochaeta</i> [-], <i>Peringia ulvae</i> *, <i>Hediste diversicolor</i> *, <i>Pygospio elegans</i> [+], <i>Tubificoides benedii</i> *, <i>Limecola balthica</i> [+], <i>Chondrochelia savignyi</i> , <i>Heteromastus filiformis</i> [+], <i>Manayunkia aestuarina</i> [+], <i>Capitella capitata</i> [-], <i>Corophium volutator</i> *, <i>Cirratulidae</i> *, <i>Streblospio benedicti</i> [-], <i>Scrobicularia plana</i> *, <i>Nematoda</i> *, <i>Grandidierella japonica</i> , <i>Nippoleucon hinumensis</i> , <i>Pseudopolydora kempfi</i> , <i>Cumella vulgaris</i> , <i>Corophium</i> spp.* , <i>Streblospio shrubsolii</i> *, <i>Monocorophium acherusicum</i>
Central Indo-Pacific¹ versus	
Tropical E Pacific²	<i>Coricuma nicoyensis</i> , <i>Cyprideis pacifica</i> , <i>Pinnixa valerii</i> , <i>Neanthes glandicinca</i> *, <i>Borniopsis maipoensis</i> *, <i>Capitella capitata</i> *, <i>Mediomastus californiensis</i> , <i>Carazziella citrona</i> , <i>Paraprionospio pinnata</i> [-], <i>Eurytellina rubescens</i> , <i>Lumbrineris tetraura</i> , <i>Glycinde armigera</i> , <i>Tagelus politus</i> , <i>Perkinsiana acuminata</i> *, <i>Sermyla riqueti</i> *

Region comparisons	Species/taxa contributing to 50% dissimilarity
Central Indo-Pacific¹ versus cont.	
Temperate N Pacific²	<i>Neanthes glandicinca*</i> , <i>Capitella capitata</i> [+], <i>Borniopsis maipoensis*</i> , <i>Oligochaeta</i> [-], <i>Perkinsiana acuminata*</i> , <i>Chondrochelia savignyi</i> , <i>Sermyla riqueti*</i> , <i>Dendronereis pinnaticirris*</i> , <i>Stenothyra divalis*</i> , <i>Tharyx</i> sp. [+], <i>Sigambra hanaokai*</i> , <i>Discapseudes mackiei*</i> , <i>Grandidierella japonica</i> , <i>Nippoleucon hinumensis</i> , <i>Pseudopolydora kemp</i> , <i>Pygospio elegans</i> , <i>Heteromastus filiformis</i> [+], <i>Cumella vulgaris</i> , <i>Streblospio benedicti</i> , <i>Mediomastus</i> sp. [-], <i>Monocorophium acherusicum</i> , <i>Limnodriloides</i> sp.*, <i>Astarte borealis</i> , <i>Micronephthys oligobranchia</i> [+], <i>Mediomastus californiensis</i> , <i>Prionospio japonicus</i>
Temperate S America²	<i>Perinereis vallata</i> , <i>Neanthes glandicinca*</i> , <i>Capitella capitata*</i> , <i>Borniopsis maipoensis*</i> , <i>Perkinsiana acuminata*</i> , <i>Sermyla riqueti*</i> , <i>Monocorophium insidiosum</i> , <i>Monocorophium acherusicum</i> , <i>Ostracoda</i> , <i>Dendronereis pinnaticirris*</i> , <i>Prionospio patagonica</i> , <i>Stenothyra divalis*</i> , <i>Anthopleura hermaphroditica</i> , <i>Hyale</i> sp., <i>Sigambra hanaokai*</i> , <i>Laeonereis acuta</i> , <i>Tharyx</i> sp.*, <i>Discapseudes mackiei*</i>
Temperate Australasia²	<i>Neanthes glandicinca*</i> , <i>Capitella capitata*</i> , <i>Borniopsis maipoensis*</i> , <i>Heteromastus filiformis</i> [-], <i>Prionospio aucklandica</i> , <i>Perkinsiana acuminata*</i> , <i>Corophium</i> sp. [-], <i>Montacuta semiradiata</i> , <i>Sermyla riqueti*</i> , <i>Hemiplax hirtipes</i> , <i>Naididae</i> , <i>Gammaropsis</i> sp., <i>Austrovenus stutchburyi</i> , <i>Nemertea</i> , <i>Macomona liliana</i> , <i>Dendronereis pinnaticirris*</i> , <i>Stenothyra divalis*</i> , <i>Sigambra hanaokai*</i> , <i>Austrohelice crassa</i> , <i>Paraonis</i> sp., <i>Tharyx</i> sp.*
Tropical Atlantic¹ versus	
Temperate S America²	<i>Halmyrapseudes spaansi*</i> , <i>Sigambra grubii*</i> , <i>Perinereis vallata</i> , <i>Discapseudes surinamensis*</i> , <i>Assiminea succinea*</i> , <i>Monocorophium insidiosum</i> , <i>Monocorophium acherusicum</i> , <i>Ostracoda</i> , <i>Prionospio patagonica</i> , <i>Anthopleura hermaphroditica</i>
Temperate Australasia²	<i>Halmyrapseudes spaansi*</i> , <i>Sigambra grubii*</i> , <i>Heteromastus filiformis</i> , <i>Prionospio aucklandica</i> , <i>Corophium</i> sp., <i>Montacuta semiradiata</i> , <i>Discapseudes surinamensis*</i> , <i>Gammaropsis</i> sp., <i>Naididae</i> , <i>Hemiplax hirtipes</i> , <i>Assiminea succinea*</i> , <i>Nemertea</i> [-], <i>Austrovenus stutchburvi</i>
Temperate N Pacific	<i>Halmyrapseudes spaansi*</i> , <i>Sigambra grubii*</i> , <i>Oligochaeta</i> [-], <i>Chondrochelia savignyi</i> , <i>Discapseudes surinamensis*</i> , <i>Heteromastus</i> sp. [+], <i>Assiminea succinea*</i> , <i>Capitella capitata</i> , <i>Grandidierella japonica</i> , <i>Nippoleucon hinumensis</i> , <i>Pseudopolydora kemp</i> , <i>Pygospio elegans</i> , <i>Cumella vulgaris</i> , <i>Monocorophium acherusicum</i> , <i>Streblospio benedicti</i> , <i>Astarte borealis</i>
Central Indo-Pacific²	<i>Halmyrapseudes spaansi*</i> , <i>Sigambra grubii*</i> , <i>Neanthes glandicinca</i> , <i>Capitella capitata</i> , <i>Borniopsis maipoensis</i> , <i>Perkinsiana acuminata</i> , <i>Discapseudes surinamensis*</i> , <i>Sermyla riqueti</i> , <i>Assiminea succinea*</i> , <i>Dendronereis pinnaticirris</i> , <i>Stenothyra divalis</i> , <i>Sigambra hanaokai</i>
Tropical E Pacific²	<i>Coricuma nicoyensis</i> , <i>Cyprideis pacifica</i> , <i>Halmyrapseudes spaansi*</i> , <i>Sigambra grubii*</i> , <i>Pinnixa valerii</i> , <i>Mediomastus californiensis</i> , <i>Carazziella citrona</i> , <i>Paraprionospio pinnata</i> , <i>Eurytellina rubescens</i> , <i>Lumbrineris tetraura</i>
Temperate S America¹ versus	
Temperate N Pacific²	<i>Perinereis vallata*</i> , <i>Oligochaeta</i> [-], <i>Monocorophium acherusicum</i> [+], <i>Chondrochelia savignyi</i> , <i>Monocorophium insidiosum*</i> , <i>Ostracoda*</i> , <i>Prionospio patagonica*</i> , <i>Anthopleura hermaphroditica*</i> , <i>Capitella capitata</i> , <i>Hyale</i> sp.*, <i>Nemertea</i> [+], <i>Laeonereis acuta*</i> , <i>Boccardia</i> sp.*, <i>Naididae*</i> , <i>Grandidierella japonica</i> , <i>Nippoleucon hinumensis</i> , <i>Pseudopolydora kemp</i> , <i>Pygospio elegans</i> , <i>Cumella vulgaris</i> , <i>Streblospio benedicti</i> , <i>Astarte borealis</i> , <i>Polydora</i> sp.*
Temperate Australasia²	<i>Perinereis vallata</i> [+], <i>Heteromastus filiformis*</i> , <i>Naididae</i> [-], <i>Prionospio aucklandica*</i> , <i>Corophium</i> sp.*, <i>Montacuta semiradiata*</i> , <i>Gammaropsis</i> sp.*, <i>Hemiplax hirtipes*</i> , <i>Nemertea</i> [-], <i>Monocorophium insidiosum</i> , <i>Monocorophium acherusicum</i> , <i>Ostracoda</i> [+], <i>Austrovenus stutchburyi*</i> , <i>Macomona Liliana*</i> , <i>Prionospio patagonica</i> , <i>Anthopleura hermaphroditica</i> , <i>Hyale</i> sp.

Table S3: SIMPER results showing taxa that cumulatively contributed ~50% of the pairwise dissimilarity between the tropical, subtropical and temperate zones for those that significantly differed (pairwise ANOSIM, $p < 0.01$; Table 3). Taxa are listed in decreasing order of individual contribution, and nature of the differences are indicated as follows: taxa recorded in only the *tropical zone, ^subtropical zone, or # temperate zone; the direction of any differences is indicated by [-] when present in lower abundance and [+] when recorded in higher abundance in the first zone compared with the second of the two zone comparison. See Fig. 5A for visual representation of the data.

Climatic zone comparison	Taxa contributing to 50% of the cumulative dissimilarity
Tropical & Subtropical	<i>Halmyrapseudes spaansi</i> *, <i>Sigambra grubii</i> *, <i>Oligochaeta</i> [-], <i>Scrobicularia plana</i> ^, <i>Peringia ulvae</i> ^, <i>Capitella capitata</i> [+], <i>Neanthes glandicincta</i> *, <i>Borniopsis maipoensis</i> *, <i>Hediste diversicolor</i> ^, <i>Streblospio shrubsolii</i> ^, <i>Heteromastus filiformis</i> [-], <i>Perkinsiana acuminata</i> *, <i>Tharyx</i> sp. [+], <i>Sermyla riqueti</i> *, <i>Cyathura carinata</i> ^, <i>Heteromastus</i> sp. [-], <i>Discapseudes surinamensis</i> *, <i>Assiminea succinea</i> *, <i>Dendronereis pinnaticirris</i> *, <i>Stenothyra divalis</i> *, <i>Sigambra hanaoka</i> *, <i>Nemertea</i> [-], <i>Corophium</i> spp. [-], <i>Discapseudes mackie</i> *, <i>Mediomastus</i> sp. [+]
Tropical & Temperate	<i>Halmyrapseudes spaansi</i> *, <i>Tubificoides benedii</i> #, <i>Hediste diversicolor</i> #, <i>Oligochaeta</i> [-], <i>Limecola balthica</i> #, <i>Peringia ulvae</i> #, <i>Pygospio elegans</i> #, <i>Sigambra grubii</i> *, <i>Capitella capitata</i> [+], <i>Heteromastus filiformis</i> [-], <i>Neanthes glandicincta</i> *, <i>Corophium volutator</i> #, <i>Borniopsis maipoensis</i> *, <i>Cirratulidae</i> [-], <i>Manayunkia aestuarina</i> #, <i>Nematoda</i> #, <i>Corophium</i> spp. [-], <i>Perkinsiana acuminata</i> *, <i>Sermyla riqueti</i> *, <i>Capitellidae</i> [-], <i>Tharyx</i> sp. [+], <i>Discapseudes surinamensis</i> *, <i>Naididae</i> #, <i>Dendronereis pinnaticirris</i> *
Temperate & Subtropical	<i>Oligochaeta</i> [+], <i>Peringia ulvae</i> [+], <i>Tubificoides benedii</i> #, <i>Hediste diversicolor</i> [+], <i>Scrobicularia plana</i> [-], <i>Limecola balthica</i> #, <i>Pygospio elegans</i> #, <i>Heteromastus filiformis</i> [+], <i>Streblospio shrubsolii</i> [-], <i>Corophium volutator</i> #, <i>Cirratulidae</i> #, <i>Manayunkia aestuarina</i> #, <i>Corophium</i> spp. [+], <i>Nematoda</i> #, <i>Naididae</i> [+], <i>Cyathura carinata</i> [-], <i>Capitellidae</i> #, <i>Capitella capitata</i> [+]

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