

Appendix DR1 - Chronostratigraphy of the Orciano Pisano fossil site.

Preliminary micropaleontological analyses on calcareous nannofossils and foraminifera have allowed to well constrain the biochronostratigraphic framework of the Orciano Pisano whale-fall. Among the planktonic foraminifera, the sparse occurrence of *Globorotalia bononiensis*, the regular presence of *Globorotalia crassaformis* and the absence of *Sphaeroidinellopsis* s.l. allow to refer the sediments to the *Globorotalia bononiensis* subzone of biozone MPI 5 (*Globigerinoides elongatus*: Sprovieri 1992). These biostratigraphic data are indicative of an upper Piacenzian/lower Gelasian age, that is, to the interval between 3.19 and 2.41 Ma (Lourens et al. 2004). Calcareous nannofossils are common and diverse. Preservation varies from poor to moderate; reworking is present and mainly consists of Cretaceous and Eocene forms. The presence of *Pseudoemiliana lacunosa*, *Discoaster tamalis*, *Discoaster pentariadiatus*, and *Discoaster asymmetricus*, together with the absence of *Reticulofenestra pseudoumbilicus* (3.80 Ma) and *Sphenolithus* spp. (3.66 Ma) suggest that the studied samples belong to the *Discoaster tamalis* Zone (3.85-2.82 Ma) of Martini (1971). The overall data would thus suggest that W1 belongs to the 3.19-2.82 Ma interval.

References

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Appendix DR2 - List of taxa from Orciano Pisano fossil site.

List of taxa from Orciano Pisano site (WF species found only in contact with the bones, B species found only in the background biofacies)

FAMILY	SPECIES	
Trochidae	<i>Gibbula</i> sp.	B
Trochidae	<i>Calliostoma</i> sp.	
Trochidae	<i>Calliostoma granulatum</i>	
Skeneidae	<i>Skenea</i> sp.	B
Iravadiidae	<i>Hylaia vitrea</i>	B
Cerithiidae	<i>Bittium lacteum</i>	WF
Potamididae	<i>Potamides tricintus</i>	WF
Turritellidae	<i>Turritella tricarinata</i>	
Turritellidae	<i>Archimedella spirata</i>	
Vermetidae	<i>Petaloconchus intortus</i>	WF
Vermetidae	<i>Serpulorbis arenarius</i>	WF
Aporrhaiidae	<i>Aporrhais uttingeriana uttingeriana</i>	
Caliptraeidae	<i>Crepidula</i> sp.	WF
Naticidae	<i>Euspira helicina</i>	
Naticidae	<i>Natica</i> sp.	
Naticidae	<i>Natica tigrina</i>	WF
Cassidae	<i>Galeodea echinophora</i>	
Triphoridae	<i>Triphora perversa</i>	WF
Epitoniiidae	<i>Epitonium frondiculoides</i>	
Epitoniiidae	<i>Epitonium turtoni</i>	WF
Muricidae	<i>Ocenebrina aciculata</i>	WF
Buccinidae	<i>Phos</i> cf. <i>polygonus</i>	WF
Nassaridae	<i>Nassarius costulatus</i>	B
Nassaridae	<i>Nassarius semistriatus</i>	
Fasciolariidae	<i>Fusinus longiroster</i>	WF
Turridae	<i>Gemmula contigua</i>	WF
Conidae	<i>Comarmondia</i> sp.	WF
Pyramidellidae	<i>Pyramidella plicosa</i>	
Pyramidellidae	<i>Odostomia</i> sp.	B
Pyramidellidae	<i>Odostomia acuta</i>	WF
Pyramidellidae	<i>Odostomia conoidea</i>	
Pyramidellidae	<i>Turbanilla lactea</i>	WF
Ringiculidae	<i>Ringicula auriculata</i>	
Ringiculidae	<i>Ringicula ventricosa</i>	
Cylichnidae	<i>Cylichnina</i> sp.	WF
Nuculidae	<i>Nucula placentina</i>	B
Nuculidae	<i>Nucula jeffersi</i>	WF
Nuculidae	<i>Nucula sulcata</i>	
Nuculanidae	<i>Nuculana fragilis</i>	
Yoldiidae	<i>Yoldia nitida</i>	
Yoldiidae	<i>Yoldia mendax</i>	
Malletiidae	<i>Malletia</i> sp.	
Arcidae	<i>Arca tetragona</i>	B
Arcidae	<i>Anadara diluvii</i>	
Limopsidae	<i>Limopsis aurita</i>	
Limopsidae	<i>Limopsis minuta</i>	
Mytilidae	<i>Modiolus</i> sp.	WF
Mytilidae	<i>Modiolula phaseolina</i>	
Limidae	<i>Limea strigilata</i>	
Pectinidae	<i>Chlamys glabra</i> cf. <i>flexuosa</i>	

Pectinidae	<i>Chlamys pesfelis</i>	
Pectinidae	<i>Chlamys varia</i>	
Pectinidae	<i>Chlamys sp.</i>	
Pectinidae	<i>Aequipecten opercularis</i>	WF
Pectinidae	<i>Pecten sp.1</i>	
Pectinidae	<i>Pecten sp.2</i>	B
Pectinidae	<i>indet.</i>	WF
Pectinidae	<i>Amusium cristatum</i>	
Anomiidae	<i>Anomia ephippium</i>	
Lucinidae	<i>Megaxinus incrassatus</i>	WF
Lucinidae	<i>Megaxinus? juvenilis</i>	B
Lucinidae	<i>Myrtea spinifera</i>	
Cardiidae	<i>indet.</i>	WF
Cardiidae	<i>Parvicardium sp.</i>	WF
Cardiidae	<i>Parvicardium papillosum</i>	WF
Cardiliidae	<i>Cardilia michelottii</i>	
Tellinidae	<i>Tellina sp.</i>	WF
Tellinidae	<i>Tellina planata</i>	
Semelidae	<i>Abra alba</i>	WF
Semelidae	<i>Abra longicallus</i>	
Glossidae	<i>Glossus humanus</i>	WF
Veneridae	<i>Venus foliaceolamellosum</i>	WF
Veneridae	<i>Gouldia minima?</i>	B
Veneridae	<i>Clausinella sp.</i>	WF
Veneridae	<i>Timoclea ovata</i>	B
Corbulidae	<i>Corbula gibba</i>	
Hiatellidae	<i>Hiatella rugosa</i>	
Cuspidariidae	<i>Cuspidaria cuspidata</i>	B
Dentaliidae	<i>Dentalium inaequale</i>	
Dentaliidae	<i>Dentalium sexangulum</i>	
Dentaliidae	<i>Dentalium vulgare</i>	WF
Siphonodentaliidae	<i>Cadulus sp.</i>	

Appendix DR3 – Italian Pliocene fossil whales

Locality	Label	Hosting institution	Taxon	Environment	Lithology	Length (m)	Completeness	Articulation	Shark teeth	Bioerosion	Cementation	Chemosymbiotic bivalves	Bioskeletobiosis	Reference
Orciano Pisano (PI)	W1	Museo di Storia Naturale, Firenze	Mysticete	Offshore	Silty fine-grained sandstone	10	High	High	1	2	1	Lucinidae	1	This work
Ponte a Elsa (PI)	W2	Museo di Storia Naturale, Firenze	<i>Balaena</i> sp.	Offshore	Mudstone	10	High	High	1	2	2	Unknown	0	1
Castel San Gimignano (PI)	W3	Museo di Storia Naturale, Firenze	<i>Balaenoptera</i> sp.	Onshore	Sandstone	8	Low	High	0	1	0	Unknown	0	Unpublished
Castelfiorentino (FI)	W4	Museo di Storia Naturale, Firenze	Mysticete	Offshore	Mudstone	8	High	High	1	1	1	Unknown	0	2
Montalcino (SI)	W5	Castello di Villa Banfi (SI)	<i>Balaenoptera</i> sp.	Offshore	Mudstone	10	High	Low	1	1	0	Unknown	0	2
Vigliano d'Asti (AT)	W6	Museo di Geologia e Paleontologia, Torino	<i>Balaenoptera acutorostrata</i>	Onshore	Silty fine-grained sandstone	8	High	High	0	0	0	Unknown	1	3
San Marzanotto (AT)	W7	Paleontologico San Pietro in Consavia (AT)	<i>Balaenoptera acutorostrata</i>	Onshore	Mudstone	8	Low	Low	1	1		Unknown	1	4
Portacomaro d'Asti (AT)	W8	Museo di Storia Naturale, Pisa	<i>Balaenula astensis</i>	Onshore	Silty fine-grained sandstone	6	Low	Low	0	1	0	Unknown	0	5-6
Castellarano (RE)	W9	Musei Civici di Reggio Emilia	<i>Balaena</i> sp.	Onshore	Silty sandstone	12	Low	No	1	0	1	Unknown	1	7
Castell'Arquato (PC)	W10	Museo Paleontologico Parmense	<i>Balaenoptera acutorostrata</i>	Offshore	Mudstone	8	High	High	0	0	1	Unknown	1	3
Castell'Arquato (PC)	W11	Geologico, Castell'Arquato (PC)	<i>Archaeobalaenoptera castriarquati</i>	Offshore	Silty fine-grained sandstone	7	Low	High	1		0	Unknown	1	8
San Lorenzo (BO)	W12	Museo "G. Capellini", Bologna	<i>Balaenoptera acutorostrata</i>	Offshore	Mudstone	8	Low	Low	1	2	1	?Lucinidae	1	9
Gorgognano (BO)	W13	Museo "G. Capellini", Bologna	<i>Balaenoptera acutorostrata</i>	Onshore	Unknown	9	High	Low	0	2	1	Unknown	1	10
Castell'Arquato (PC)	W14	No longer available	<i>Balaenoptera acutorostrata</i>	Offshore	Unknown	7	High	High	1	1	0	Unknown	1	11

Taphonomic states: shark teeth and bioskeletobiosis: 0/1=absence/presence; Bioerosion 0=no damage to bone surface, 1=bioerosion limited to sharpest angles of bones, 2=extensive bioerosion on bone surface, ? =no data available; Cementation 0=uncemented bones, 1=some carbonate precipitation close to neurocranium, 2=extensive carbonate precipitation in the chest region, ? =no data available. Body lenght approximate.

References

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Appendix DR4 – Data set of the modern and fossil distribution of mollusk families.

Family-level taxonomic distribution of mollusk abundances in modern and fossil marine assemblages (146 samples, 163 variables; samples 24–26, 35, 51, 53–57 contain data previously standardized by the authors). Reference list and relevant external information on samples are detailed in Appendix 5.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Corbulidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hiatellidae	0	0	0	0	0	0	0	13	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xylophagidae	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	0	0	0	0	0
Teredidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thraciidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pandoridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poromyidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cuspidariidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Verticordiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dentaliidae	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Siphonodentaliidae	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0
Gadilinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Entalinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gadiliidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL ABUNDANCE	136	211	809	587	40	298	1155	1552	2011	493	66	51	62	128	69	21005	15082	171	383	154	1234	146

	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Lepetodrilidae	0	0	0	0	33894	328	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acmaeidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lottiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haliotidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepetidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cocculinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepetellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peltospiridae	0	0	0	0	94594	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clypeosectidae	0	0	0	0	1016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalogyrinidae	0	18.6	5.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pyropeltidae	0	2.6	0.2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fissurellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Scissurellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seguenzidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trochidae	0	0	0	0	22	10.3	0	0	0	0	0	0	0	1	0	0	1	2	0	1	1	1
Iravadiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
Turbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skeneidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Lissospiridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rissoidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Adeorbidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barleeidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Assimineidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrobiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micromelaniidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iravalidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clitoceratidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tornidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vitrinellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Capulidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cerithiidae	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0
Potamididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caecidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turritellidae	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	2	3	5	3	6	5	5
Neritidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vermetidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0

	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44		
Mitridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Drilliidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Turridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	3	1	1	
Conidae	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	
Terebridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cimidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Architectonicid.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ringiculidae	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	3	3	13	13	20	2	2	0	
Pyramidellidae	0	0	0	0	0	0	0	3	0	0	0	0	1.2	1	1	1	2	1	9	10	18	0	0	0
Orbitestellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ebalidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acteonidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Odostomiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ringiculidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cylichnidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Philinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diaphanidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haminoeidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bullidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retusidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Limacinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cavoliniidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Onchidiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ellobiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Siphonaridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spiratelloidea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	6	1	24	15	20	14	0
Solemyidae	0	0	1.2	1.4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nuculidae	0	0	0	0.6	0	0	0	0	0	0	0	0	0	0	1	0	2	2	3	4	4	3	2	0
Phaseolidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nuculanidae	0	2.5	0.2	0.1	0	0	0	0	0	0	0	0	0	0	2	1	4	1	5	15	13	11	9	0
Spinulidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yoldiidae	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malletiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	1	4	7	10	16	9	0	0	0
Neilonellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arcidae	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	7	6	2	4	5	0	0
Noetiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Limopsidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	2	2	1	2	1	0

	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
Corbulidae	0	0	0	0	0	0	0	0	0	0	0	0	0	26	29	22	36	18	114	90	81	50
Hiatellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	2	0	8	1	3	0
Pholadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xylophagidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teredidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thraciidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pandoridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poromyidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cuspidariidae	7	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	2	2	6	4	11	2
Verticordiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0
Dentaliidae	25	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0
Siphonodentaliid.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gadilinidae	0	0	0	0	0	0	2	2	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0
Entalinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gadiliidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL ABUNDANCE	170	32	14	3	134789	350	42	61	34	36	57	15	6	56	61	53	77	119	254	222	245	118

	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	
Lepetodrilidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acmaeidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lottiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haliotidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepetidae	0	0	0	0	0	0	0	0	0	1	1	3	2	0	0	9	6	3	0	0	0	0	0	0
Cocculinidae	0	0	0	0	0	0	0	0	0	0	2	2	0	0	4	2	3	0	0	0	0	0	0	0
Lepetellidae	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Peltospiridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clypeosectidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Halogyrinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pyropeltidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fissurellidae	0	0	0	0	1	0	1	0	4	5	5	10	0	0	1	2	5	31	0	0	0	0	0	0
Scissurellidae	0	0	0	1	1.0	1	1	0	1	0	1	1	1.0	0	1	53	102	17	7	0	0	0	0	0
Seguenzidae	0	0	0	0	12	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Turbinidae	0	0	0	3	1.0	0	0	0	13.4	5	0	0	3	3	0	26	9	4	1	0	1	0	0	0
Trochidae	1	4	1	51.9	66.9	13	12	1	376	259	6	5.0	7.0	6	23.2	73	116	209	19	11	10	1	10	10
Iravadiidae	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skeneidae	0	0	0	14.9	3.0	0	2.0	0	23.4	5	4	11	2.0	0	6	0	0	0	1	3	0	2	0	0
Lissospiridae	0	0	0	4	2.0	0	4.9	1	23.4	21.4	3	6.9	2.9	0	5	0	0	0	22	8	1	0	2	0
Rissoidae	0	0	0	6	3.0	0	17	44.1	122	76.4	123	77.7	3	0	3	447	26	10	85	13	38	1	18	0
Adeorbidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barleeidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Assimineidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydrobiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Micromelaniidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Iravalidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Clitoceratidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tornidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	1
Vitrinellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	52	25	1	0	0	0	0	0	0
Capulidae	0	0	0	0	0	0	1	0	10	8	2	6	0	1	0	0	0	0	0	0	0	0	0	0
Cerithiidae	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21	0	0	0	0
Potamididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Caecidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Turritellidae	8	102	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	11	5	4	1
Neritidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vermetidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0

	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	
Mitridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Drilliidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	0	4	3	
Turridae	0	0	0	2	2	0	0	1	9	11	1	2	6	0	1	0	2	0	3	2	0	0	0	
Conidae	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	4	7	0	3
Terebridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cimidae	0	0	0	0	0	0	0	0	3	2	0	3	1	4	1	0	0	0	0	0	0	0	0	
Architectonicidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	0	0	0	
Ringiculidae	18	4	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pyramidellidae	3	0	6	8	5	1	8	2	43	11	4	14	7	90	96	27	0	1	5	10	0	3	3	
Orbitestellidae	0	0	0	0	1	0	2	2	0	0	4	24	0	0	3	0	0	0	0	0	0	0	0	
Ebalidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Acteonidae	0	0	0	0	5	0	0	0	16.7	17.4	0	2	0	4	0	0	0	0	0	0	0	0	0	
Odostomiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ringiculidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cylchnidae	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9	6	0	2	
Philinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	9	1	0	0	0	0	0	
Diaphanidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Haminoeidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bullidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Retusidae	0	0	0	0	0	0	8	6	20	20.8	6	13.1	0	1	1	0	0	0	0	0	0	0	0	
Limacinaidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	
Cavoliniidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	3	7	1	6	
Onchidiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ellobiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Siphonaridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	
Spiratelloidea	14	0	14	0	0	0	0	0	0	0	0	0	0	0	0	3817	619	1639	0	0	0	0	0	
Solemyidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Nuculidae	0	0	7	18	15.9	6	3.0	1	29.4	10	19.1	38	27.1	13	40.4	27	17	1	30	7	14	8	0	
Phaseolidae	0	0	0	1	0	0	1	0	0	0	0	1	1	0	5	0	0	0	3	0	0	0	3	
Nuculanidae	8	4	4	100	50	25.9	59	34.1	326	232	88	101	57.9	49.9	254	10	37	30	36	9	32	10	4	
Spinulidae	0	0	0	13	13.9	78.9	14.1	4.0	135	122	5	11.8	46.1	132	15.4	0	0	0	0	0	0	0	0	
Yoldiidae	0	8	0	12	9	3	13	4.0	21.4	30.1	35.1	52.6	16	8	21	163	7	6	28	4	10	0	0	
Malletiidae	5	0	4	46.1	24.9	19.9	24	15.1	28.4	10.4	18	20.1	28.1	14.1	52.4	0	0	0	13	9	2	4	8	
Neilonellidae	0	0	0	39	19.9	28	29	38.9	134	66	42	38.1	5	24.9	82.2	0	0	0	0	1	7	4	1	
Arcidae	2	4	3	2	4	0	0	0	10	10	2	2	0	0	10	241	392	759	11	3	7	1	6	
Noetiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Limopsidae	1	0	0	14	4	0	0	0	10	15	3	2	0	1	0	0	0	0	32	7	0	7	1	

	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	
Corbulidae	48	48	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34	2	15	0	8	
Hiatellidae	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	0	0	4	0	0	
Pholadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Xylophagidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	2	5	0	0	2	0	
Teredidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	33	35
Thraciidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	1	0	
Pandoridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Poromyidae	0	0	0	2	0	0	0	0	1	3	0	1	0	0	0	5	1	11	0	0	0	0	0	
Cuspidariidae	5	1	3	0	0	1	1	0	1	2	1	5	1.96	1	3	0	1	2	0	0	0	0	0	2
Verticordiidae	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	
Dentaliidae	0	4	0	18.9	15.9	24.9	18.9	13.9	23.4	31.3	19.1	7	26.2	53.1	64.1	17	11	35	14	3	4	0	0	
Siphonodentaliid.	0	0	0	1	1.0	1	6	16	33.4	32.4	32.2	23	5	5	21.7	7	0	0	0	0	0	0	0	
Gadilinidae	0	0	0	13.8	33.1	8	2.0	1	68.4	39.4	3	2	20.9	9	7	0	0	0	0	0	0	0	0	
Entalinidae	0	0	0	25.1	15.9	22	38.1	43	43.4	29	55	38.1	38.9	41.8	87.6	58	51	77	15	8	6	0	31	
Gadilidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	50	1	9	4	
TOTAL ABUNDANCE	147	220	178	420	335	237	281	236	1638	1152	540	659	325	470	906	5920	1754	3525	832	244	493	143	318	

	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	
Corbulidae	6	65	4	5	503	627	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hiatellidae	4	8	3	1	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xylophagidae	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teredidae	2	72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thraciidae	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pandoridae	0	0	0	0	114	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poromyidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cuspidariidae	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1
Verticordiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dentaliidae	1	22	4	1	44	30	93	0	0	2	22	21	47	37	14	103	59	0	30	0	0	0	17
Siphonodentaliid.	1	1	0	0	0	0	85	80	106	3	22	23	145	0	21	31	0	143	52	13	23	0	0
Gadilinidae	0	0	0	0	29	44	12	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Entalinidae	0	59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	104	215	224	250	0	0
Gadilidae	29	102	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
TOTAL ABUNDANCE	421	2407	38	46	40731	63451	950	912	861	992	974	883	892	976	951	875	658	912	887	850	849	549	

	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	
Lepetodrilidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acmaeidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	55	85	87	3	
Lottiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Haliotidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	1	0	0	
Lepetidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cocculinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Lepetellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Peltospiridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Clypeosectidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Halogyrinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pyropeltidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Fissurellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	11	37	6	0	
Scissurellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Seguenzidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Turbinidae	0	0	0	0	0	1749	112	111	0	40	97	4	0	64	27	1	173	0	0	3	0	0	
Trochidae	4	9	0	0	0	0	1017	4	24	7	10	7	13	0	5	0	14	16	15	7	65	45	0
Iravadiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Turbinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Skeneidae	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Lissospiridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Rissoidae	26	38	0	0	1	981	89	25	1	3	40	4	0	79	1721	381	193	0	0	2	0	0	
Adeorbidae	0	0	0	0	0	59	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	
Barleeidae	0	0	0	0	0	3	60	231	8	46	328	7	0	0	0	0	0	0	0	3	0	0	
Assimineidae	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hydrobiidae	0	0	0	0	0	0	0	0	0	0	0	1	283	0	5	184	1	0	0	0	0	0	
Micromelaniidae	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Iravidae	0	0	0	0	0	56	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	
Clitoceratidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Tornidae	0	0	0	0	0	6	0	0	0	0	0	15	0	0	0	2	0	0	0	0	0	0	
Vitrinellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Capulidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cerithiidae	0	0	0	0	0	1419	1171	1720	52	89	258	185	97	627	561	100	234	6	3	12	12	0	
Potamididae	0	0	0	0	0	87	0	0	0	0	0	4	24	20	26	7	1	0	0	0	0	0	
Caecidae	0	0	0	0	0	0	0	0	0	0	0	0	0	39	0	0	13	3	0	1	0	0	
Turritellidae	15	0	15	7	13	461	508	138	40	180	274	183	0	283	0	0	0	0	0	0	0	0	
Neritidae	0	0	0	0	0	6763	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Vermetidae	0	0	0	0	0	42	0	0	0	0	0	0	0	0	0	0	0	9	9	12	10	9	

	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
Littorinidae	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	9	3	36	3	0
Lacunidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	3	9	0
Hippocnidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	36	33	3	3
Truncatellidae	0	0	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Pteropoda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triphoridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aporrhaidae	0	1	1	1	0	70	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Strombidae	0	0	0	0	0	55	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calyptaeidae	0	0	0	0	0	117	0	0	0	0	2	61	0	99	91	0	89	60	44	52	93	24
Capulidae	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xenophoridae	0	1	0	0	0	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cerithiopsidae	2	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
Triphoridae	0	3	0	0	0	37	0	0	0	0	0	1	0	288	0	0	29	0	0	1	0	0
Epitonidae	0	0	1	1	1	212	1	16	15	6	10	0	0	0	0	0	0	3	0	1	1	0
Eulimidae	2	10	3	0	0	116	2	3	0	7	1	3	0	0	0	0	0	3	0	1	0	0
Ficidae	0	0	0	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buccinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neptunidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Provannidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cassidae	1	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ranellidae	4	6	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triviidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1
Eratoidae	2	1	0	0	0	4	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
Naticidae	16	31	14	3	1	5098	465	305	51	357	413	174	10	116	0	0	96	9	0	3	1	9
Bursidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
Vitreolinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aclididae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Muricidae	1	7	0	0	0	160	0	0	0	0	0	0	0	0	0	0	0	21	53	40	56	15
Coralliophilidae	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Buccinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Columbellidae	6	11	0	0	0	1123	29	2	0	2	1	1	0	0	0	0	0	12	0	14	7	6
Nassaridae	78	186	8	5	1	7590	680	963	353	453	797	188	9	178	487	160	58	18	1	6	10	18
Fasciolariidæ	1	1	2	1	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cystiscidae	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Costellariidae	0	0	0	0	0	0	1	0	11	6	20	0	0	0	0	0	0	0	0	0	0	0
Cancellariidae	10	24	2	0	0	136	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Olividae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	138	132	138	130	129

	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
Glycymeridae	0	0	0	0	0	260	0	0	32	26	25	450	0	389	0	0	0	9	33	3	0	6
Mytilidae	0	0	0	0	0	6	0	0	0	0	8	1	0	0	0	1	9	4	2	3	3	3
Pteriidae	0	0	0	0	0	188	28	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0
Limidae	72	28	58	10	25	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Spondylidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ostreidae	0	0	0	0	0	72	0	0	24	15	21	37	11	0	0	0	0	0	0	0	0	0
Gryphaeidae	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pectinidae	25	36	23	17	38	328	358	228	317	170	441	9	0	10	0	0	0	3	9	2	0	3
Anomiidae	0	0	0	0	0	46	742	1932	578	379	667	0	0	0	0	0	3	0	3	0	3	0
Carditidae	0	0	0	0	0	9	1	21	14	10	18	309	0	41	634	0	36	3	9	3	1	3
Lucinidae	0	0	2	5	5	572	69	52	95	94	210	71	0	0	0	0	946	9	9	3	0	0
Thyasiridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
Chamidae	0	0	0	0	0	0	0	0	0	0	46	0	0	0	0	0	32	0	3	3	1	3
Ungulinidae	0	0	0	0	0	39	0	0	0	0	14	28	0	0	0	0	0	0	0	0	0	0
Galeommatidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kelliidae	0	0	0	0	0	8	13	13	20	8	12	18	0	0	0	1	0	0	0	0	0	0
Lasaeidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leptonidae	0	0	0	0	0	0	0	0	0	0	0	0	238	0	0	0	0	0	0	0	0	0
Montacutidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vesicomyidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Astartidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cardiidae	1	1	2	0	0	171	73	80	58	88	184	103	145	0	2624	192	30	0	1	0	0	0
Mactridae	0	0	0	0	0	155	1893	554	442	758	1218	242	0	2264	25	1	92	9	3	9	9	3
Pharidae	0	0	0	0	0	1	0	0	0	0	0	1	0	40	0	2	1	0	0	0	0	0
Semelidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	1	0	3
Psammobiidae	10	4	8	3	2	30	21	5	33	81	85	49	66	0	0	0	0	0	0	0	0	0
Mesodesmatidae	0	0	0	0	0	518	0	0	0	0	3	1	0	29	0	0	0	0	0	0	0	0
Solenidae	0	0	0	0	0	0	0	0	0	0	0	2	0	188	100	10	14	0	0	0	0	0
Tellinidae	0	0	0	0	0	72	20	26	89	132	167	437	5	0	261	6	58	16	2	5	3	0
Scrobiculariidae	0	0	0	0	0	0	0	0	0	0	0	0	858	0	525	327	64	0	0	0	0	0
Solecurtidae	0	0	0	0	0	4	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
Donacidae	0	0	0	0	0	3010	0	0	0	0	0	289	1	115	10	0	0	0	0	0	0	0
Kelliellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Veneridae	1016	87	2	6	0	6	0	0	2705	1251	0	697	0	227	227	264	214	10	9	12	10	9
Turtoniidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petricolidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
Myidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0

	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	
Corbulidae	0	0	34	20	46	1007	2625	6879	1599	2417	4181	1345	0	152	13438	77	716	0	0	0	0	0	0
Hiatellidae	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	
Pholadidae	0	0	0	0	0	0	0	0	0	0	0	2	2	0	59	72	0	3	3	4	1	0	
Xylophagidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Teredidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Thraciidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pandoridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Poromyidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cuspidariidae	0	0	0	0	0	4	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
Verticordiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Dentaliidae	15	15	9	2	3	140	15	99	17	39	29	27	0	23	0	0	1	9	0	6	1	18	
Siphonodentaliid.	0	0	0	0	0	195	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Gadilinidae	0	0	27	19	38	0	0	0	4	9	3	5	0	0	0	0	0	0	0	0	0	0	
Entalinidae	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Gadilidae	8	16	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL ABUNDANCE	1466	677	263	110	194	56691	9701	14005	7153	7660	11381	5820	1774	5853	20901	1927	3528	538	443	628	514	273	

	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	
Corbulidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hiatellidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pholadidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xylophagidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teredidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Thracidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pandoridae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poromyidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cuspidariidae	0	0	0	0	0	0	0	0	0	0	5	6	4	1	0	6	0	0	0	0	0	0	0	0	0
Verticordiidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dentaliidae	9	12	9	33	9	33	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Siphonodentaliid.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gadilinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Entalinidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gadilidae	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL ABUNDANCE	491	459	429	432	405	399	240	12	17	16	106	94	130	92	107	130	90	210	230	132	96	450	151	100	

	136	137	138	139	140	141	142	143	144	145	146
Mitridae	0	0	0	0	0	0	0	0	0	0	0
Drilliidae	0	0	0	0	0	0	0	0	0	0	0
Turridae	0	0	1	3	1	3	1	3	0	5	0
Conidae	0	0	0	0	0	0	0	0	0	0	0
Terebridae	0	0	0	0	0	0	0	0	0	0	0
Cimidae	0	0	0	0	0	0	0	0	0	0	0
Architectonicidae	0	0	0	0	0	0	0	0	0	0	0
Ringiculidae	0	0	0	0	0	0	0	0	0	0	0
Pyramidellidae	0	0	2	0	0	3	1	0	0	0	0
Orbitestellidae	0	0	0	0	0	0	0	0	0	0	0
Ebalidae	0	0	0	0	0	0	0	0	0	0	0
Acteonidae	0	0	0	0	0	0	0	0	0	0	0
Odostomiidae	0	0	0	0	0	0	0	0	0	0	0
Ringiculidae	0	0	0	0	0	0	0	0	0	0	0
Cylichnidae	0	4	29	7	22	9	11	3	3	4	0
Philinidae	0	1	10	1	20	4	1	2	5	1	0
Diaphanidae	0	1	2	0	28	1	1	2	0	0	0
Haminoeidae	0	0	0	0	0	0	0	0	0	0	0
Bullidae	0	0	0	0	0	0	0	0	0	0	0
Retusidae	0	0	0	0	0	0	0	0	0	0	0
Limacinidae	0	0	0	0	0	0	0	0	0	0	0
Cavoliniidae	0	0	0	0	0	0	0	0	0	0	0
Onchidiidae	0	0	0	0	0	0	0	0	0	0	0
Ellobiidae	0	0	0	0	0	0	0	0	0	0	0
Siphonaridae	0	0	0	0	0	0	0	0	0	0	0
Spiratelloidea	0	0	0	0	0	0	0	0	0	0	0
Solemyidae	0	0	0	0	0	0	0	0	0	0	0
Nuculidae	0	10	26	7	200	182	83	24	136	346	3
Phaseolidae	0	0	0	0	0	0	0	0	0	0	0
Nuculanidae	0	0	0	0	0	0	0	0	0	0	0
Spinulidae	0	0	0	0	0	0	0	0	0	0	0
Yoldiidae	0	67	155	222	48	162	83	42	11	183	9
Malletiidae	0	0	3	4	36	39	30	5	0	0	0
Neilonellidae	0	0	0	0	0	0	0	0	0	0	0
Arcidae	0	0	0	0	0	0	0	0	0	0	0
Noetiidae	0	0	0	0	0	0	0	0	0	0	0
Limopsidae	0	21	63	8	0	0	0	0	0	0	0

	136	137	138	139	140	141	142	143	144	145	146
Corbulidae	0	0	0	0	0	0	0	0	0	0	0
Hiatellidae	0	0	1	0	0	0	0	0	0	0	0
Pholadidae	0	0	0	0	0	0	0	0	0	0	0
Xylophagidae	0	0	0	0	0	0	0	0	0	0	0
Teredidae	0	0	0	0	0	0	0	0	0	0	0
Thraciidae	0	0	0	0	0	0	0	0	0	0	0
Pandoridae	0	0	0	0	0	0	0	0	0	0	0
Poromyidae	0	0	0	0	0	0	0	0	0	0	0
Cuspidariidae	0	25	34	22	5	45	18	8	17	16	6
Verticordiidae	0	0	0	2	0	0	0	0	0	0	0
Dentaliidae	0	0	4	7	3	3	0	4	0	0	0
Siphonodentaliid.	0	1	2	7	6	0	0	1	0	0	0
Gadilinidae	0	4	56	18	476	56	10	81	39	44	0
Entalinidae	0	0	0	0	0	0	0	0	0	0	0
Gadilidae	0	55	0	44	19	4	9	57	0	0	0
TOTAL ABUNDANCE	60	663	1278	782	1630	1959	986	1422	1737	5566	103

Appendix 5 – Relevant information used for interpreting the results of multivariate analysis.

SAMPLE NUMBER (This work)	NUMBER OF SAMPLES (Average)	n	AGE	DEPTH		LOCALITY	SAMPLE (Auct.)	REGION/HABITAT	REFERENCE
1	1	136	Modern	1240	Bathyal	California	V-1	Pacific whale-fall	1
2	1	211	Modern	1240	Bathyal	California	V-15	Pacific whale-fall	1
3	1	809	Modern	1240	Bathyal	California	V-18	Pacific whale-fall	1
4	1	587	Modern	1240	Bathyal	California	V-21	Pacific whale-fall	1
5	1	40	Miocene		Bathyal	Hokkaido	Rekifune	Pacific whale-fall	2
6	5	298	Modern	1600	Bathyal	Lucky Strike Mid-Atlantic	Eiffel Tower	Atlantic vent	3
7	5	1155	Modern	1600	Bathyal	Lucky Strike Mid-Atlantic	Sintra	Atlantic vent	3
8	5	1552	Modern	0	Intertidal	Alaska	Eagle Island	Pacific shallow-water	3
9	5	2011	Modern	0	Intertidal	Alaska	Jakolof Point	Pacific shallow-water	3
10	1	493	Eocene		Bathyal	Washington State		Pacific wood-fall	4
11	1	66	Eocene		Bathyal	Hokkaido		Pacific seep	5
12	1	51	Eocene		Bathyal	Hokkaido		Pacific bathyal	5
13	1	62	Oligoc.		Bathyal	Washington State		Pacific whale-fall	6
14	1	128	Miocene		Bathyal	Hokkaido		Pacific whale-fall	7
15	1	69	Oligoc.		Bathyal	Washington State		Pacific whale-fall	6
16	1	21005	Modern		Bathyal	California		Pacific whale-fall	8
17	1	15082	Modern		Bathyal	California		Pacific whale-fall	8
18	?	171	Modern	513-754	Bathyal	Florida	Tubeworm biofacies	Atlantic seep	9
19	?	383	Modern	513-755	Bathyal	Florida	Mussel biofacies	Atlantic seep	9
20	?	154	Modern	513-756	Bathyal	Florida	Vesicomyid biofacies	Atlantic seep	9
21	?	1234	Modern	513-757	Bathyal	Florida	Lucinid biofacies	Atlantic seep	9
22	?	146	Modern	513-758	Bathyal	Florida	<i>Thyasira</i> biofacies	Atlantic seep	9
23	?	170	Modern	513-759	Bathyal	Florida	Non-seep biofacies	Atlant Bathyal	9
24	8	246	Modern	770	Bathyal	Hydrate Ridge, Cascadia (offshore Oregon)	<i>Beggiatoa</i> biofacies	Pacific seep	10
25	9	131	Modern	770	Bathyal	Hydrate Ridge, Cascadia (offshore Oregon)	<i>Calyptogena</i> biofacies	Pacific seep	10

SAMPLE NUMBER (This work)	NUMBER OF SAMPLES (Average)	n	AGE	DEPTH		LOCALITY	SAMPLE (Auct.)	REGION/HABITAT	REFERENCE
26	7	25	Modern	770	Bathyal	Hydrate Ridge, Cascadia (offshore Oregon)	Acharax biofacies	Pacific seep	10
27	1	134789	Modern		Bathyal	Juan De Fuca Ridge		Pacific vent	11
28	4	350	Modern		Bathyal	East Pacific Rise		Pacific vent	12
29	1	42	Modern	50	Inner shelf	Eel River Margin	non-seep	Pacific shelf	13
30	1	61	Modern	50	Inner shelf	Eel River Margin	seep	Pacific seep	13
31	1	34	Modern	40	Inner shelf	Eel River Margin	non-seep	Pacific shelf	13
32	1	36	Modern	40	Inner shelf	Eel River Margin	seep	Pacific seep	13
33	1	57	Modern	35	Inner shelf	Eel River Margin	non-seep	Pacific shelf	13
34	1	15	Modern	35	Inner shelf	Eel River Margin	seep	Pacific seep	13
35	6	16	Modern	500	Bathyal	Eel River Margin	non-seep	Pacific Bathyal	13
36	1	56	Pliocene		Middle shelf	Orciano	OP1	Mediterranean shelf	14
37	1	61	Pliocene		Middle shelf	Orciano	OP2	Mediterranean shelf	14
38	1	53	Pliocene		Middle shelf	Orciano	OP3	Mediterranean shelf	14
39	1	77	Pliocene		Middle shelf	Orciano	OP4	Mediterranean shelf	14
40	1	119	Pliocene		Middle shelf	Orciano	OP5	Mediterranean whale-fall	14
41	1	254	Pliocene		Middle shelf	Orciano	OP6	Mediterranean whale-fall	14
42	1	222	Pliocene		Middle shelf	Orciano	OP7	Mediterranean whale-fall	14
43	1	245	Pliocene		Middle shelf	Orciano	OP8	Mediterranean whale-fall	14
44	1	118	Pliocene		Middle shelf	Orciano	OP9	Mediterranean whale-fall	14
45	1	147	Pliocene		Middle shelf	Orciano	OP10	Mediterranean whale-fall	14
46	1	220	Pliocene		Middle shelf	Orciano	OP12	Mediterranean shelf	14
47	1	178	Pliocene		Middle shelf	Orciano	OP13	Mediterranean shelf	14
48	1	419	Pleistoc.	500-1000	Bathyal	Archi	Archi 1	Mediterranean bathyal	15
49	1	338	Pleistoc.	500-1001	Bathyal	Archi	Archi 2	Mediterranean bathyal	15
50	1	237	Pleistoc.	500-1002	Bathyal	Archi	Archi 3	Mediterranean bathyal	15
51	1	282	Pleistoc.	500-1003	Bathyal	Archi	Archi 4	Mediterranean bathyal	15
52	1	236	Pleistoc.	500-1004	Bathyal	Archi	Archi 5	Mediterranean bathyal	15
53	1	1669	Pleistoc.	500-1005	Bathyal	Archi	Archi 6	Mediterranean bathyal	15
54	1	1158	Pleistoc.	500-1006	Bathyal	Archi	Archi 7	Mediterranean bathyal	15
55	1	545	Pleistoc.	500-1007	Bathyal	Archi	Archi 8	Mediterranean bathyal	15
56	1	657	Pleistoc.	500-1008	Bathyal	Archi	Archi 9	Mediterranean bathyal	15
57	1	327	Pleistoc.	500-1009	Bathyal	Archi	Archi 10	Mediterranean bathyal	15
58	1	470	Pleistoc.	500-1010	Bathyal	Archi	Archi 11	Mediterranean bathyal	15

SAMPLE NUMBER (This work)	NUMBER OF SAMPLES (Average)	n	AGE	DEPTH		LOCALITY	SAMPLE (Auct.)	REGION/HABITAT	REFERENCE
59	1	903	Pleistoc.	500-1011	Bathyal	Archi	Archi 12	Mediterranean bathyal	15
60	1	5920	Pleistoc.	600	Bathyal	NE Sardinia	BS 77/4/1	Mediterranean bathyal	16
61	1	1755	Pleistoc.	600	Bathyal	NE Sardinia	BS 77/4/2	Mediterranean bathyal	16
62	1	3525	Pleistoc.	600	Bathyal	NE Sardinia	BS 77/4/3	Mediterranean bathyal	16
63	1	832	Pliocene		Outer shelf	Campore	5,6,8,10	Mediterranean bathyal	17
64	1	244	Pliocene		Outer shelf	Campore	3,12	Mediterranean outer shelf	17
65	1	493	Pliocene		Outer shelf	Campore	11	Mediterranean outer shelf	17
66	1	143	Pliocene		Outer shelf	Campore	7	Mediterranean outer shelf	17
67	1	318	Pliocene		Outer shelf	Campore	1	Mediterranean outer shelf	17
68	1	421	Pliocene		Outer shelf	Campore	2	Mediterranean outer shelf	17
69	1	2407	Pliocene		Outer shelf	Campore	1-3. Etc	Mediterranean outer shelf	17
70	1	38	Pliocene		Outer shelf	Zinola	SV3	Mediterranean outer shelf	18
71	1	46	Pliocene		Outer shelf	Zinola	SV3b	Mediterranean outer shelf	18
72	1	40731	Pliocene		Shoreface	Sant'Anna	S. Anna A	Mediterranean shoreface	19
73	1	63451	Pliocene		Shoreface	Sant'Anna	S. Anna B	Mediterranean shoreface	19
74	1	950	Pliocene		Bathyal	Peschiera	Ca1	Mediterranean bathyal	19
75	1	912	Pliocene		Bathyal	Peschiera	Cb1	Mediterranean bathyal	19
76	1	861	Pliocene		Bathyal	Peschiera	Cc1	Mediterranean bathyal	19
77	1	992	Pliocene		Bathyal	Peschiera	Ca2	Mediterranean bathyal	19
78	1	974	Pliocene		Bathyal	Peschiera	Cb2	Mediterranean bathyal	19
79	1	883	Pliocene		Bathyal	Peschiera	Cc2	Mediterranean bathyal	19
80	1	892	Pliocene		Bathyal	Peschiera	Ca3	Mediterranean bathyal	19
81	1	976	Pliocene		Bathyal	Peschiera	Cb3	Mediterranean bathyal	19
82	1	951	Pliocene		Bathyal	Peschiera	Cc3	Mediterranean bathyal	19
83	1	875	Pliocene		Bathyal	Granatella	MT3	Mediterranean bathyal	19
84	1	658	Pliocene		Bathyal	Granatella	MT4	Mediterranean bathyal	19
85	1	912	Pliocene		Bathyal	Granatella	MT7	Mediterranean bathyal	19
86	1	887	Pliocene		Bathyal	Granatella	MT8	Mediterranean bathyal	19
87	1	850	Pliocene		Bathyal	Granatella	MT9	Mediterranean bathyal	19
88	1	849	Pliocene		Bathyal	Granatella	MT10	Mediterranean bathyal	19
89	1	549	Pliocene		Middle shelf	Breolungi	BP1	Mediterranean shelf	20
90	1	1466	Pliocene		Middle shelf	Breolungi	BP2	Mediterranean shelf	20
91	1	677	Pliocene		Middle shelf	Breolungi	BP3	Mediterranean shelf	20
92	1	263	Pliocene		Middle shelf	Breolungi	BP4	Mediterranean shelf	20

SAMPLE NUMBER (This work)	NUMBER OF SAMPLES (Average)	n	AGE	DEPTH	LOCALITY	SAMPLE (Auct.)	REGION/HABITAT	REFERENCE	
93	1	110	Pliocene	Middle shelf	Breolungi	BP5	Mediterranean shelf	20	
94	1	194	Pliocene	Middle shelf	Breolungi	BP6	Mediterranean shelf	20	
95	1	56717	Pliocene	Inner shelf	Monteu Roero	MR2	Mediterranean shelf	21	
96	1	9701	Pliocene	Inner shelf	Volpedo	VCB1	Mediterranean shelf	22	
97	1	14005	Pliocene	Inner shelf	Volpedo	VCB2	Mediterranean shelf	22	
98	1	7153	Pliocene	Inner shelf	Volpedo	VCB4	Mediterranean shelf	22	
99	1	7660	Pliocene	Inner shelf	Volpedo	VCB6	Mediterranean shelf	22	
100	1	11381	Pliocene	Inner shelf	Volpedo	VCB8	Mediterranean shelf	22	
101	1	5820	Pliocene	Middle shelf	San Lorenzo	CSL0	Mediterranean shelf	23	
102	1	1774	Pliocene	Intertidal	San Lorenzo	CSL1	Mediterranean shoreface	23	
103	1	5853	Pliocene	Intertidal	Catena	C1	Mediterranean shoreface	24	
104	1	20901	Pliocene	Intertidal	Catena	C3	Mediterranean shoreface	24	
105	1	1927	Pliocene	Intertidal	Catena	C4	Mediterranean shoreface	24	
106	1	3528	Pliocene	Shoreface	Catena	C6	Mediterranean shoreface	24	
107	1	538	Pleistoc.	Inner shelf	California	3445	Pacific inner shelf	25	
108	1	443	Pleistoc.	Inner shelf	California	3448	Pacific inner shelf	25	
109	1	628	Pleistoc.	Inner shelf	California	3393	Pacific inner shelf	25	
110	1	514	Pleistoc.	Inner shelf	California	3447	Pacific inner shelf	25	
111	1	273	Pleistoc.	Inner shelf	California	3446	Pacific inner shelf	25	
112	1	491	Pleistoc.	Inner shelf	California	3386	Pacific inner shelf	25	
113	1	459	Pleistoc.	Inner shelf	California	3387	Pacific inner shelf	25	
114	1	429	Pleistoc.	Inner shelf	California	3388	Pacific inner shelf	25	
115	1	432	Pleistoc.	Inner shelf	California	3389	Pacific inner shelf	25	
116	1	405	Pleistoc.	Inner shelf	California	3390	Pacific inner shelf	25	
117	1	399	Pleistoc.	Inner shelf	California	3391	Pacific inner shelf	25	
118	1	240	Pleistoc.	Inner shelf	California	3392	Pacific inner shelf	25	
119	1	12	now	2500	slope	Hausgarten	440	Atlantic Bathyal	26
120	1	17	now	2500	slope	Hausgarten	441	Atlantic Bathyal	26
121	1	16	now	2500	slope	Hausgarten	442	Atlantic Bathyal	26
122	1	106	now	2500	slope	Hausgarten	454	Atlantic Bathyal	26
123	1	94	now	2500	slope	Hausgarten	455	Atlantic Bathyal	26
124	1	130	now	2500	slope	Hausgarten	456	Atlantic Bathyal	26
125	1	92	now	2500	slope	Hausgarten	461	Atlantic Bathyal	26
126	1	107	now	2500	slope	Hausgarten	462	Atlantic Bathyal	26
127	1	230	now	2500	slope	Hausgarten	463	Atlantic Bathyal	26

SAMPLE NUMBER (This work)	NUMBER OF SAMPLES (Average)	n	AGE	DEPTH	LOCALITY	SAMPLE (Auct.)	REGION/HABITAT	REFERENCE
128	1	90	now	150	Outer shelf	North Sea	S4	Atlantic Shelf 27
129	1	210	now	150	Outer shelf	North Sea	S5	Atlantic Shelf 27
130	1	230	now	150	Outer shelf	North Sea	S6	Atlantic Shelf 27
131	1	132	now	153	Outer shelf	North Sea	R5	Atlantic Shelf 27
132	1	96	now	157	Outer shelf	North Sea	R8	Atlantic Shelf 27
133	1	450	now	157	Outer shelf	North Sea	S1	Atlantic Shelf 27
134	1	151	now	162	Outer shelf	North Sea	R1	Atlantic Shelf 27
135	1	100	now	166	Outer shelf	North Sea	S2	Atlantic Shelf 27
136	1	60	now	168	Outer shelf	North Sea	R7	Atlantic Shelf 27
137	2	661	now	370	slope	Norwegian Trough	1a, 1b	Atlantic Bathyal 28
138	2	1273	now	300	slope	Norwegian Trough	2a, 2b	Atlantic Bathyal 28
139	2	779	now	390	slope	Norwegian Trough	3a, 3b	Atlantic Bathyal 28
140	2	1630	now	470	slope	Norwegian Trough	4a, 4b	Atlantic Bathyal 28
141	2	1659	now	450	slope	Norwegian Trough	5a, 5b	Atlantic Bathyal 28
142	2	986	now	545	slope	Norwegian Trough	6a, 6b	Atlantic Bathyal 28
143	2	1422	now	450	slope	Norwegian Trough	7a, 7b	Atlantic Bathyal 28
144	2	1737	now	290	slope	Norwegian Trough	8a, 8b	Atlantic Bathyal 28
145	2	5566	now	480	slope	Norwegian Trough	9a, 9b	Atlantic Bathyal 28
146	2	103	now	440	slope	Norwegian Trough	10a, 10b	Atlantic Bathyal 28

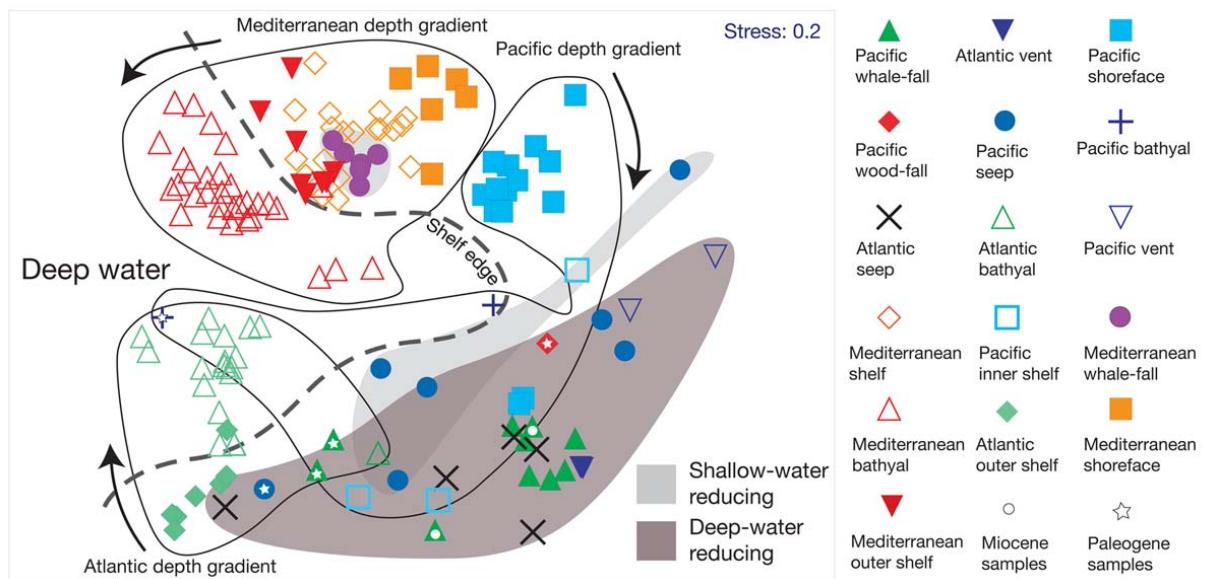
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Appendix DR6 – MDS ordination of samples with Atlantic gradient.



This ordination was run with an enlarged data set (146 samples, 163 families) including shelf and slope samples from the modern Atlantic. The Atlantic depth gradient clusters separately from the Mediterranean and the Pacific ones. Samples from worldwide, deep-water reducing environments form a further separate cluster, albeit not as clearly as in Figure 3.