Supporting online material for "The impact of the Pull of the Recent on the history of marine diversity"

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Materials and Methods

For each genus and subgenus in Sepkoski's Compendium (S1), we surveyed the paleontological and taxonomic literature for occurrences in the Pliocene or Pleistocene. Species assignments in older publications were corrected following modern taxonomic practice. When comparing diversity patterns, we omitted all single-interval taxa (S2), which is also conservative because inclusion of short-lived extinct taxa will reduce the proportion of taxa in a given interval whose range extends to the present day. We used the midpoint of each stage or substage to calculate the time of first and last occurrence of each taxon (S3), based on geologic ages provided by standard geologic timescales (S4, S5).

References

S1. J. J. Sepkoski, Jr., *Bull. Am. Paleontol.* **363**, 1-560 (2002).

S2. M. Foote, *Paleobiology* **26**, 74-102 (2000).

S3. J. J. Sepkoski, Jr., *Paleobiology* **4**, 223-251 (1978).

S4. W. A. Berggren, et al., Eds., *Soc. Sed. Geol. Spec. Publ.* **54**, 1-386 (1995).

S5. Geological Society of America, *1999 Geologic Time Scale* (Geological Society of America, Boulder, CO, 1999).

S6. K. Roy, D. Jablonski, K. K. Martien, *Proc. Natl. Acad. Sci. USA* **97**, 13150-13155 (2000).

Table S1. Bivalve genera having a fossil record but not yet recovered from the Pliocene or Pleistocene. First occurrence records from Sepkoski (S1), with a few corrections; stratigraphic abbreviations follow Sepkoski.

Order	Family	Genus	Author	First Occurrence
Myoida	Corbulidae	Physoida	Pallary 1900	Eo-l
Myoida	Pholadidae	Hatasia	Gray 1851	Maes
Myoida	Pholadidae	Particoma	Bartsch & Rehder 1945	Bajo?
Myoida	Spheniopsidae	Spheniopsis	Sandberger 1863	Eo-u?
Myoida	Teredinidae	Lyrodobankia	Moll 1941	Eo-l
Myoida	Teredinidae	Psiloteredo	Bartsch 1922	Ol-l
Mytiloida	Mytilidae	Exosiperna	Iredale 1929	Eo-u
Mytiloida	Mytilidae	Idasola [=Idas]	Iredale 1915	Mi-m
Mytiloida	Mytilidae	Mytella	Soot-Ryen 1955	Eo-u
Mytiloida	Mytilidae	Mytilisepta	Habe 1951	Pg
Mytiloida	Pinnidae	Streptopinna	von Martens 1880	Mi-l
Nuculoida	Nuculanidae	Propeleda	Iredale 1924	Mi-m
Nuculoida	Nuculidae	Brevinucula	Thiele 1934	Ol-l
Pholadomyoida	Cuspidariidae	Halonympha	Dall 1886	Maes-u
Pholadomyoida	Cuspidariidae	Myonera	Dall 1886	Ol-l-u
Pholadomyoida	Laternulidae	Exolaternula	Habe 1977	Mi-m-l
Pholadomyoida	Pandoridae	Clidiophora	Carpenter 1864	Mi
Pholadomyoida	Thraciidae	Parvithracia	Finlay 1927	Mi
Pholadomyoida	Thraciidae	Phragmorisma	Tate 1894	Ol-u
Pterioida	Anomiidae	Enigmonia	Iredale 1918	Eo-l
Pterioida	Isognomonidae	Crenatula	Lamarck 1803	Dani
Pterioida	Ostreidae	Striostrea	Vyalov 1936	Eo-m
Pterioida	Pulvinitidae	Pulvinites	Defrance 1824	Ceno
Solemyoida	Solemyidae	Solemyarina	Iredale 1931	Ol-u?
Veneroida	Carditidae	Lazariella	Sacco 1899	Mi-l-l
Veneroida	Condylocardiidae	Micromeris	Conrad 1866	Eo-m-l
Veneroida	Condylocardiidae	Radiocondyla	Iredale 1936	Mi
Veneroida	Crassatellidae	Salaputium	Iredale 1924	Eo-m-u
Veneroida	Donacidae	Iphigenia	Schumacher 1817	Mi-l
Veneroida	Donacidae	Latona	Schumacher 1817	Eo-l
Veneroida	Kelliidae	Cicatellia	Laseron 1956	Mi
Veneroida	Kelliidae	Nesobornia	Dall 1938	Eo-m
Veneroida	Lasaeidae	Amerycina	Chavan 1959	Mi
Veneroida	Lasaeidae	Pythina	Hinds 1844	Eo-m-u

Veneroida	Leptonidae	Vermitexta	Laseron 1956	Eo
Veneroida	Lucinidae	Callucinopsis	Chavan 1959	Maes
Veneroida	Lucinidae	Eamesiella	Chavan 1951	Ol
Veneroida	Lucinidae	Eomiltha	Cossmann 1910	Dani-u
Veneroida	Lucinidae	Nevenulora	Iredale 1930	Eo-l
Veneroida	Lucinidae	Pompholigina	Dall 1901	Eo-m
Veneroida	Lucinidae	Prophetilora	Iredale 1930	Dani-u
Veneroida	Lucinidae	Pseudolucinisca	Chavan 1959	Ol
Veneroida	Lucinidae	Talocodakia	Iredale 1936	Ol
Veneroida	Psammobiidae	Psammotella	Herrmannsen 1852	Mi-u
Veneroida	Psammobiidae	Sinonovacula	Prashad 1924	Ol-u
Veneroida	Tellinidae	Aeretica	Dall 1900	Mi-l-l
Veneroida	Tellinidae	Tellinidella	Hertlein & Strong 1949	Mi-u-l
Veneroida	Thyasiridae	Axinus	Sowerby 1821	Eo-l
Veneroida	Veneridae	Antinioche	Olsson 1961	Mi-m
Veneroida	Veneridae	Eucallista	Dall 1902	Mi-m
Veneroida	Veneridae	Marcia	Adams & Adams 1857	Mi-l-l
Veneroida	Veneridae	Parvicirce	von Cosel 1995	Eo-u

Table S2. Attributes of the extant bivalve taxa missing from the Pliocene-Pleistocene interval compared to those of the taxa recorded from that interval. Percentages ± 95% binomial confidence intervals.

Genera	Missing	Recorded
N	52	906
Aragonitic mineralogy	83 ± 11	83 ± 2
High-organic microstructure	25 ± 11	16 ± 2
Epifaunal habit	17 ± 11	24 ± 3
Deep-sea	10 ± 8	2 ± 1

Table S3. Biogeographic affinities of extant bivalve genera and subgenera that occur in the fossil record but are missing from the Pliocene and Pleistocene (total N = 52). The rank-order of missing taxa calculated by regions corresponds well to the relative taxonomic richness of the major biogeographic regions today, Indo-West Pacific > tropical America > southeast and southwest Atlantic and Mediterranean. Australia, however, has an unexpectedly high proportion of missing taxa. Percentages ± 95% binomial confidence intervals.

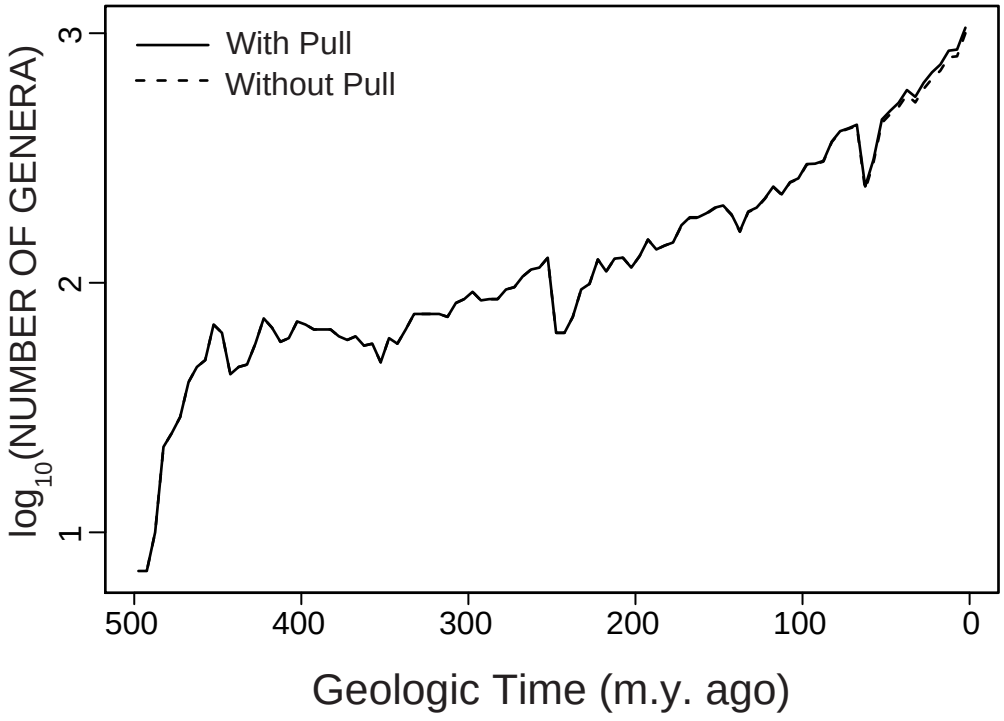
Region	Percentage
Australia/New Zealand	31 ± 13
Indo-West Pacific	29 ± 12
Tropical Americas	17 ± 11
Southeast Atlantic	4 ± 4
Southwest Atlantic	2 ± 2
North Atlantic	2 ± 2
Mediterranean	2 ± 2
Cosmopolitan	2 ± 2

Fig. S1. Semilog plot of bivalve diversity through the Phanerozoic, with and without the Pull of the Recent (solid and broken line, respectively). The pattern is remarkably similar to that recorded from uncorrected data (*12*).

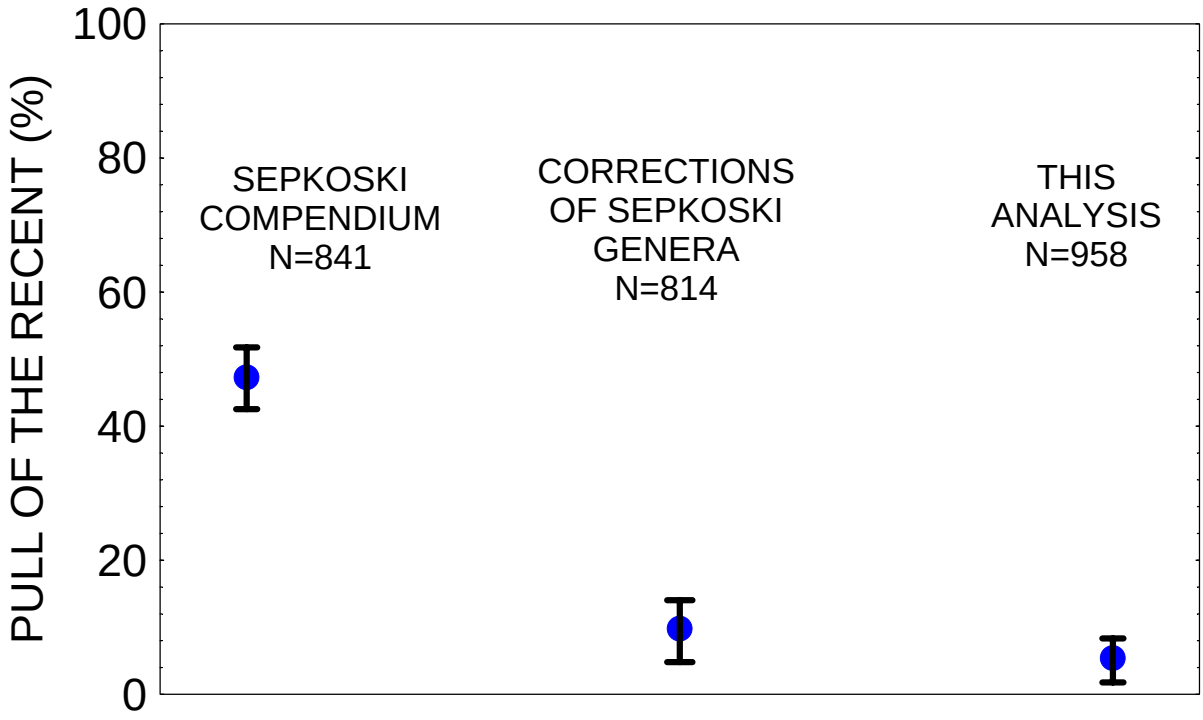
Fig. S2. Magnitude of the Pull of the Recent (with 95% binomial confidence limits) in Sepkoski's preliminary data as used by Peters and Foote (*5*), in our corrected inventory of Pliocene and Pleistocene occurrences of genera in Sepkoski's database (*9*), and in our inventory of Pliocene and Pleistocene occurrences including genera absent from (*9*).

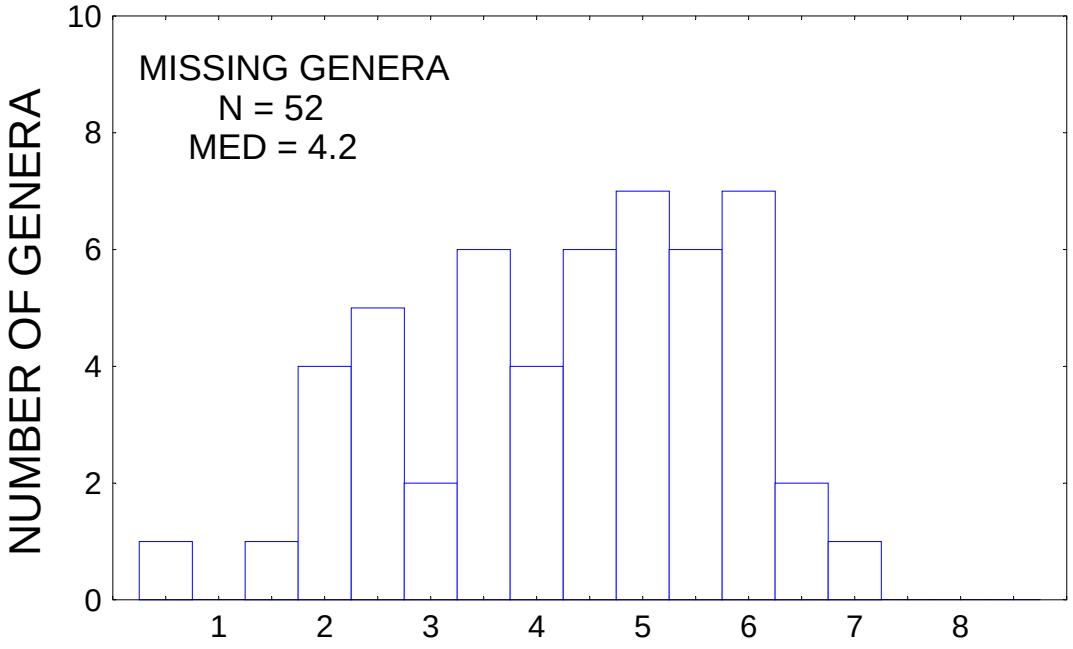
Fig. S3. As a group, taxa missing from the Pliocene-Pleistocene interval are significantly smaller than a representative sample of living bivalves ($p = .01$, Mann-Whitney U test). Above, frequency distribution of the sizes of the type species of the missing taxa, measured as the geometric mean of length and height and plotted on a log-2 scale. Below, size-frequency distribution of the median species for the bivalve genera occurring at shelf depths from Point Barrow, Alaska, to Cape Horn, Chile (S6). The eastern Pacific size data are the most extensive compilation available for marine bivalves, and as these data constitute over a quarter of the living shallow-water genera they provide the best available basis for comparison.

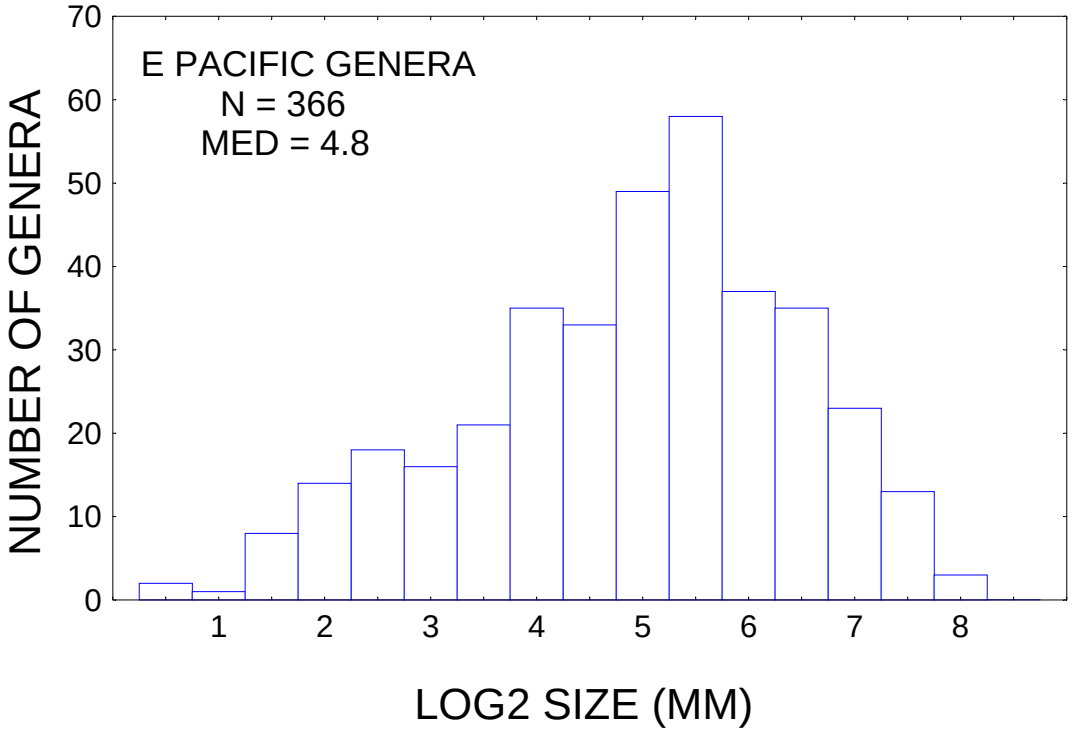
S1



Jablonski Fig. S1


PULL OF THE RECENT (%)
100
80
60
40
20
0
SEPKOSKI
COMPENDIUM
N=841
CORRECTIONS
OF SEPKOSKI
GENERA
N=814
THIS
ANALYSIS
N=958





Jablonski Fig. S3