



Supplement of

An unpredictable body size response to the Permo-Triassic climate crisis

William J. Foster et al.

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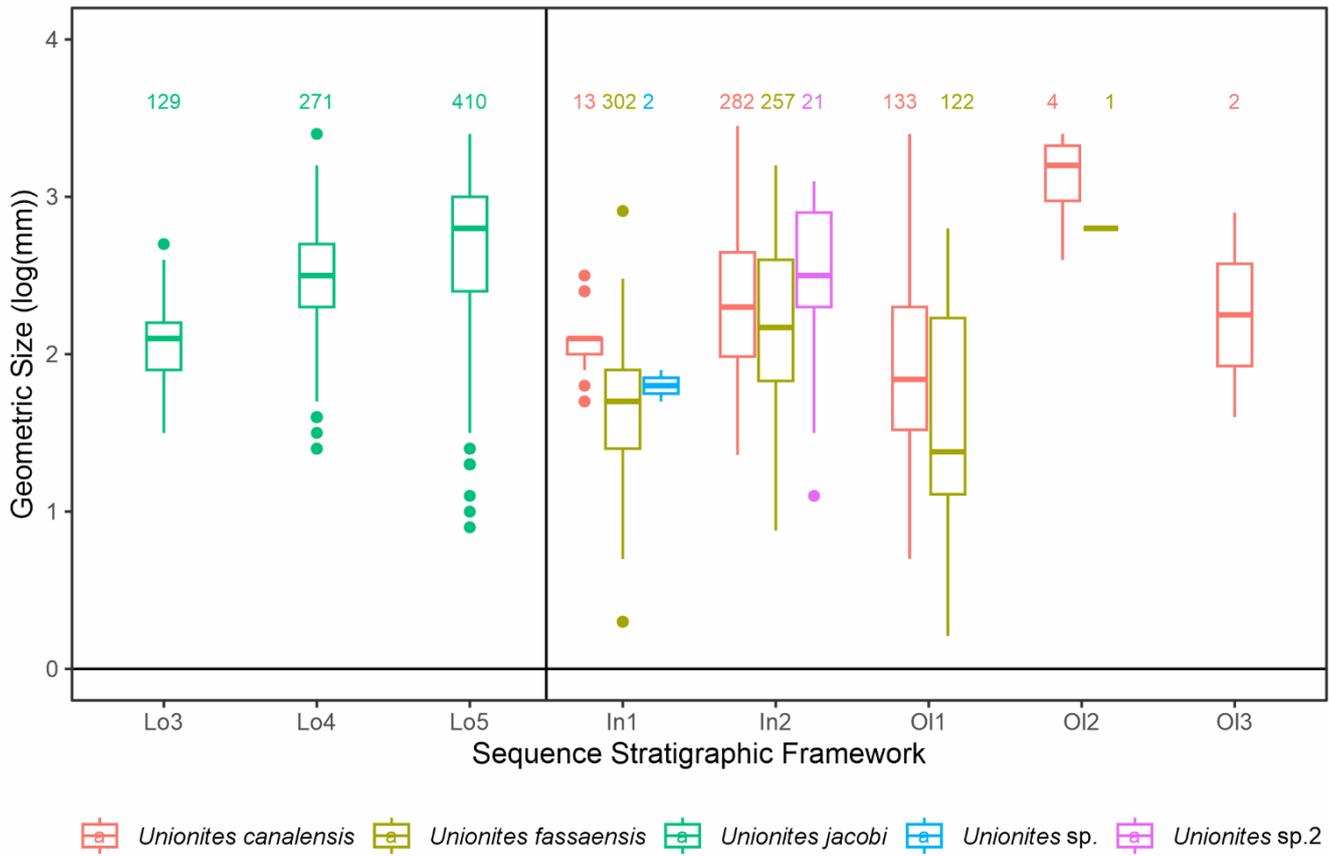
A) Species-level

| | | | |
|---|---|--|---|
|  <i>Vacunella elongata</i> |  <i>Unionites</i> sp. |  <i>Bakevellia preromangica</i> |  <i>Pernopecten latangulatus</i> |
|  <i>Stutchburia costata</i> |  <i>Unionites</i> sp.2 |  <i>Bakevellia</i> sp. |  <i>Pernopecten tirolensis</i> |
|  <i>Stutchburia</i> sp. |  <i>Permophorus bregeri</i> |  <i>Towapteria peracuta</i> |  <i>Etheripecten stuflesseri</i> |
|  <i>Stutchburia</i> sp. B |  <i>Edmondia hautmanni</i> |  <i>Towapteria scythica</i> |  <i>Eumorphotis beneckeii</i> |
|  <i>Stutchburia tschernyschewi</i> |  <i>Lovaralucina covidii</i> |  <i>Pteria ussurica</i> |  <i>Eumorphotis hinnitidea</i> |
|  <i>Schizodus obscurus</i> |  <i>Lovaralucina truncata</i> |  <i>Tambanella stetteneckensis</i> |  <i>Eumorphotis lorigae</i> |
|  <i>Neoschizodus elongatus</i> |  <i>Grammatodon obsoletiformis</i> |  <i>Promyalina schamarae</i> |  <i>Eumorphotis multiformis</i> |
|  <i>Neoschizodus laevigatus</i> |  <i>Palaeolima badiotica</i> |  <i>Avichlamys voelseckhofensis</i> |  <i>Eumorphotis praecurrens</i> |
|  <i>Neoschizodus orbicularis</i> |  <i>Promytilus merlai</i> |  <i>Claraia aurita</i> |  <i>Eumorphotis</i> sp. |
|  <i>Ladinomya fosteri</i> |  <i>Volsellina carinata</i> |  <i>Claraia</i> sp. |  <i>Eumorphotis striatocostata</i> |
|  <i>Unionites canalensis</i> |  <i>Bakevellia binneyi</i> |  <i>Claraia clarae</i> |  <i>Gardenapecten comelicanus</i> |
|  <i>Unionites fassaensis</i> |  <i>Bakevellia ceratophaga</i> |  <i>Claraia stachei</i> |  <i>Gardenapecten trinkeri</i> |
|  <i>Unionites jacobi</i> |  <i>Bakevellia exporrecta</i> |  <i>Scythentolium</i> sp.A |  <i>Acharax frenademezi</i> |

B) Genus-level

| | | | | |
|---|---|--|---|---|
|  <i>Acharax</i> |  <i>Entolium</i> |  <i>Ladinomya</i> |  <i>Pernopecten</i> |  <i>Stutchburia</i> |
|  <i>Bakevellia</i> |  <i>Etheripecten</i> |  <i>Leptochondria</i> |  <i>Promyalina</i> |  <i>Tambanella</i> |
|  <i>Claraia</i> |  <i>Eumorphotis</i> |  <i>Lovaralucina</i> |  <i>Promytilus</i> |  <i>Towapteria</i> |
|  <i>Costatoria</i> |  <i>Gardenapecten</i> |  <i>Neoschizodus</i> |  <i>Pteria</i> |  <i>Unionites</i> |
|  <i>Crittendenia</i> |  <i>Grammatodon</i> |  <i>Palaeolima</i> |  <i>Schizodus</i> |  <i>Vacunella</i> |
|  <i>Edmondia</i> |  <i>Homomya</i> |  <i>Permophorus</i> |  <i>Scythentolium</i> |  <i>Volsellina</i> |

Fig. S1. Legend to support Fig. 2, showing which colour represents each species (A) and each genus (B).



15 Figure S2. Changes in the sizes of *Unionites*, divided into the different species that were sampled from the Dolomites, Italy. The number of occurrences of each species are indicated above each box plot.

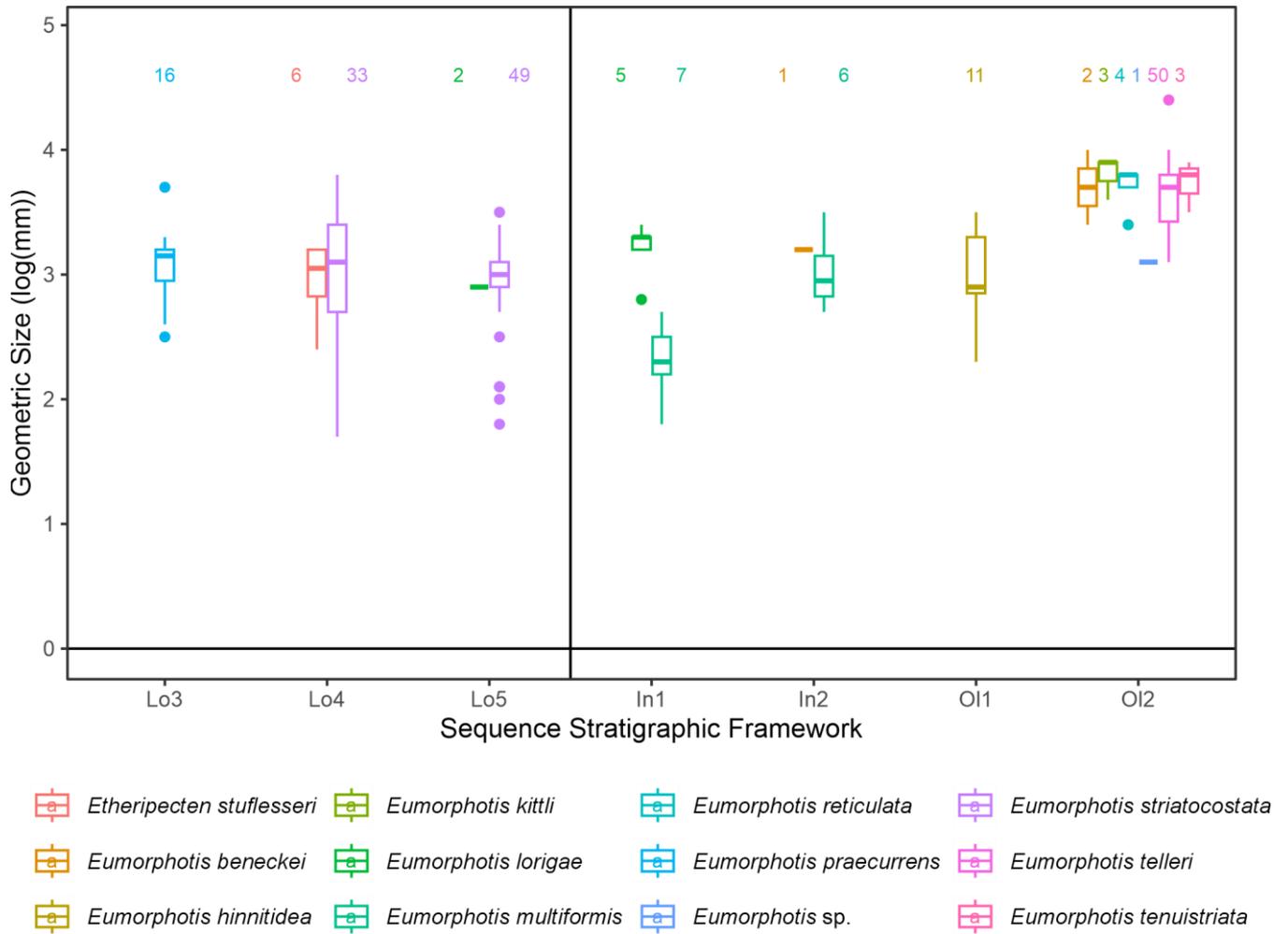
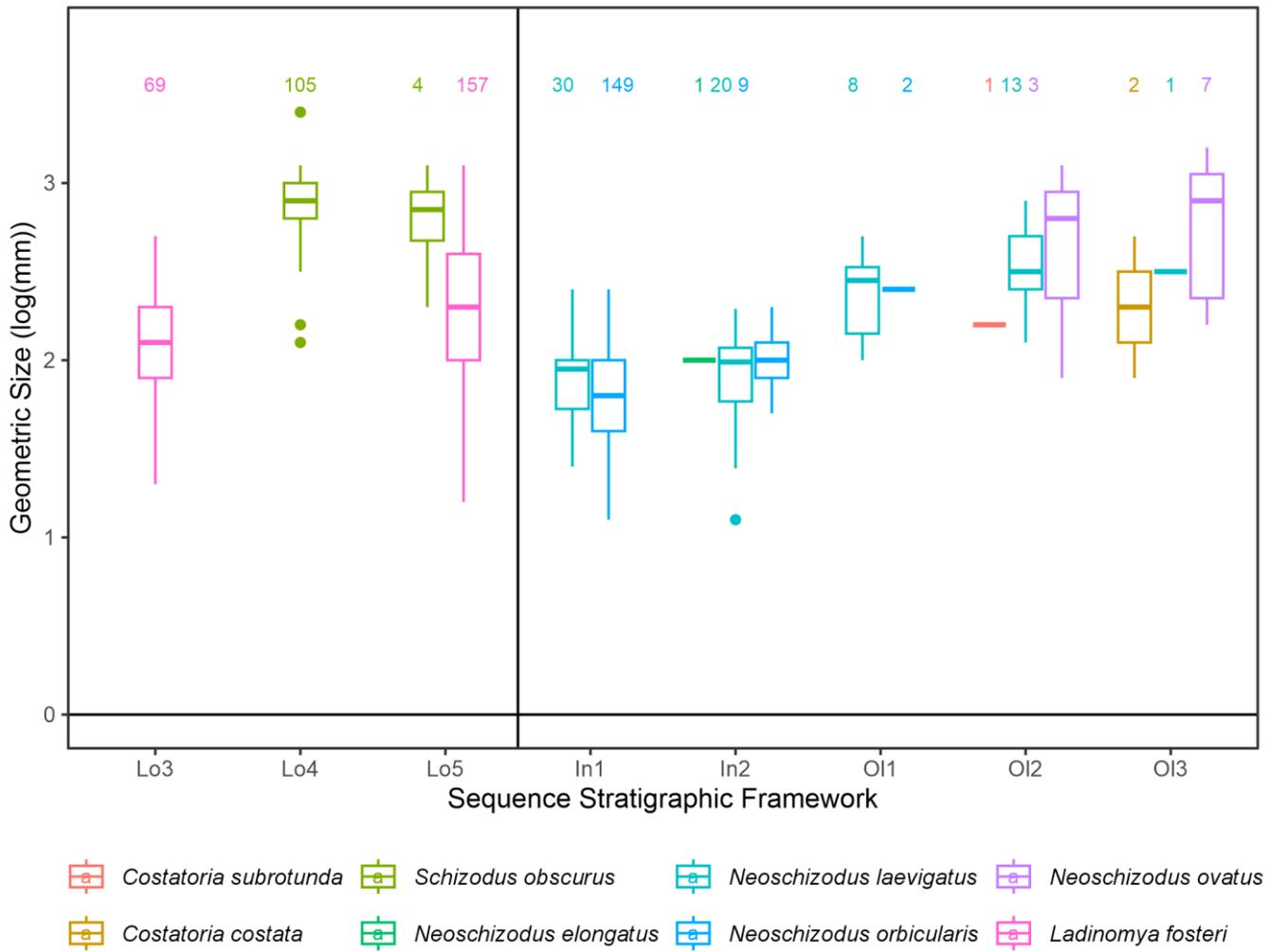
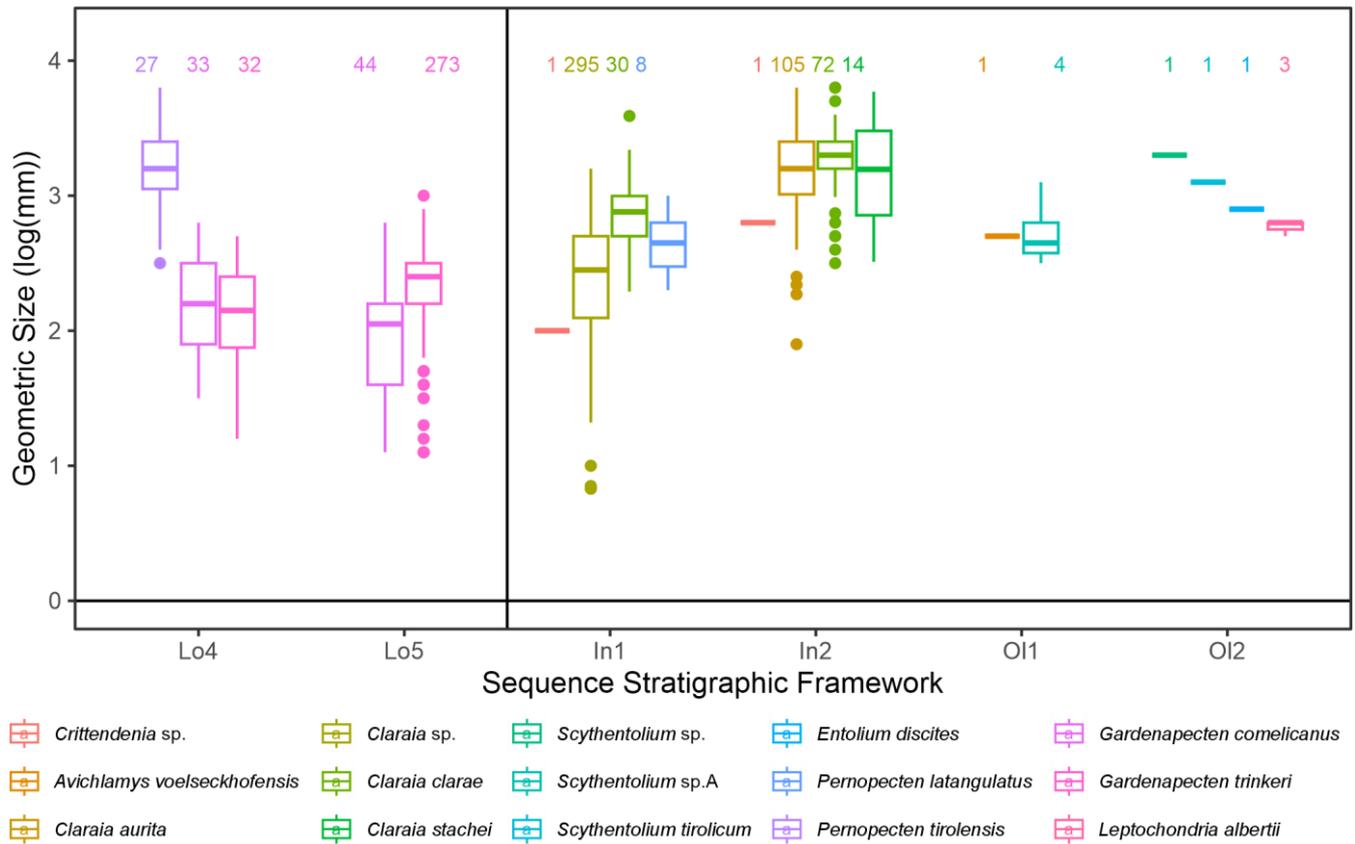


Figure S3. Changes in the sizes of Heteropectinidae, divided into the different species that were sampled from the Dolomites, Italy. The number of occurrences of each species are indicated above each box plot.



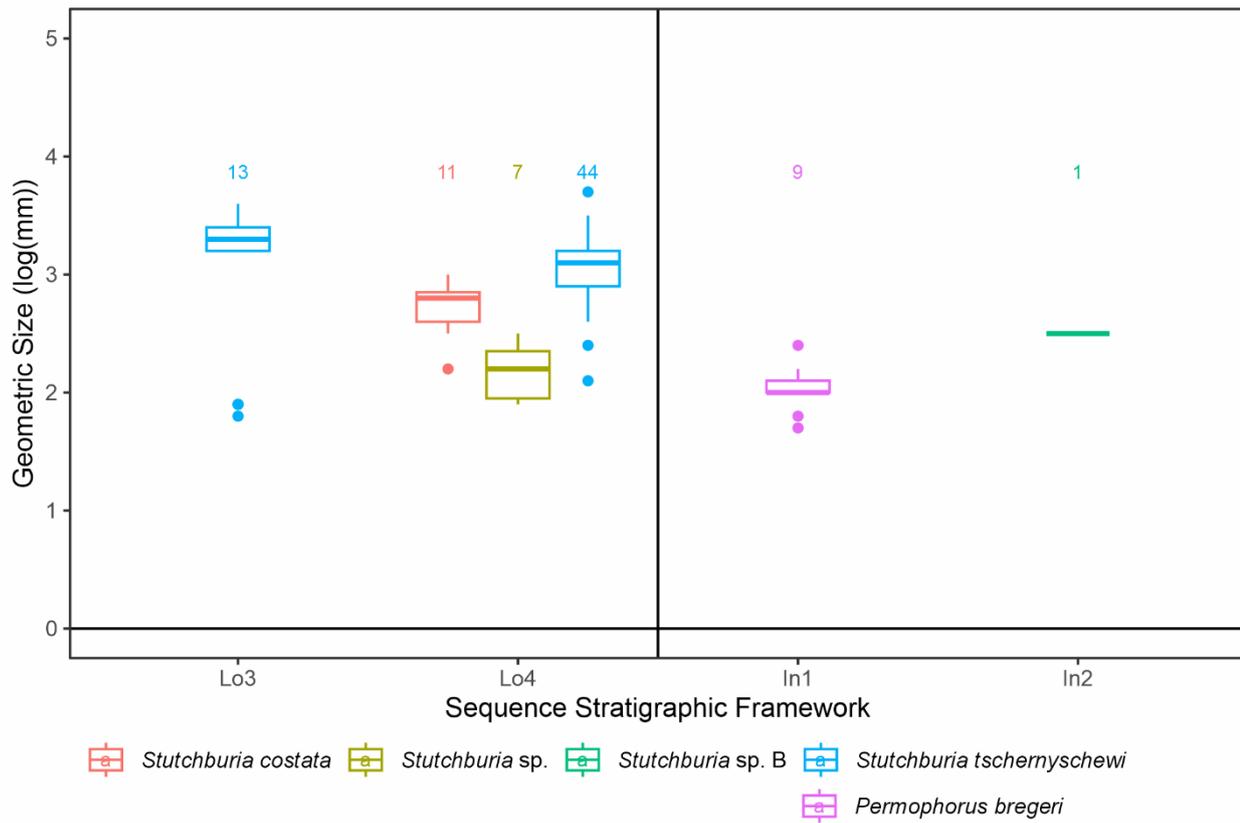
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Figure S5. Changes in the sizes of Trigonioidea, divided into the different species that were sampled from the Dolomites, Italy. The number of occurrences of each species are indicated above each box plot.



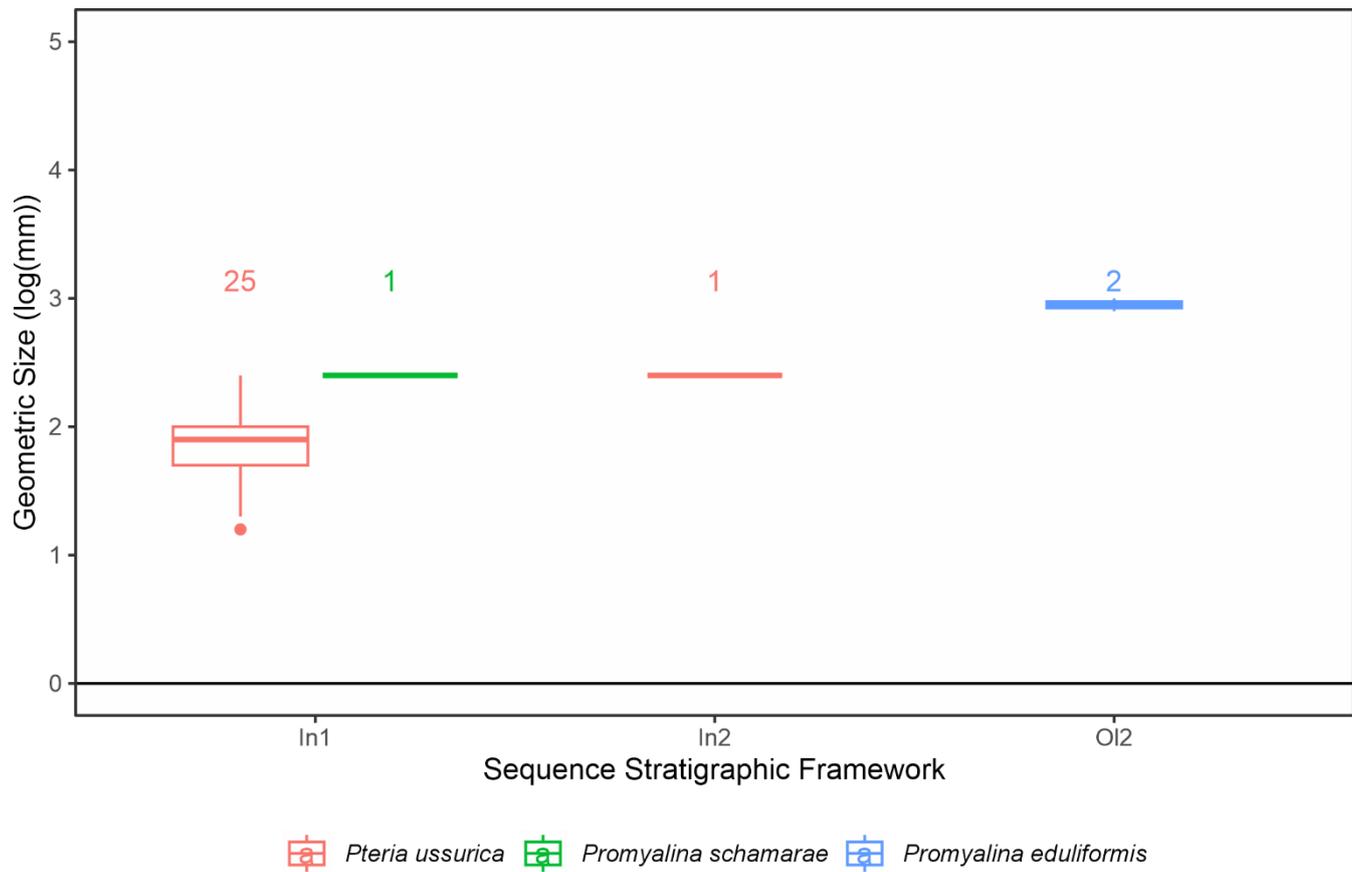
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Figure S6. Changes in the sizes of Pectinida (excluding the Heteropectinidae), divided into the different species that were sampled from the Dolomites, Italy. The number of occurrences of each species are indicated above each box plot.

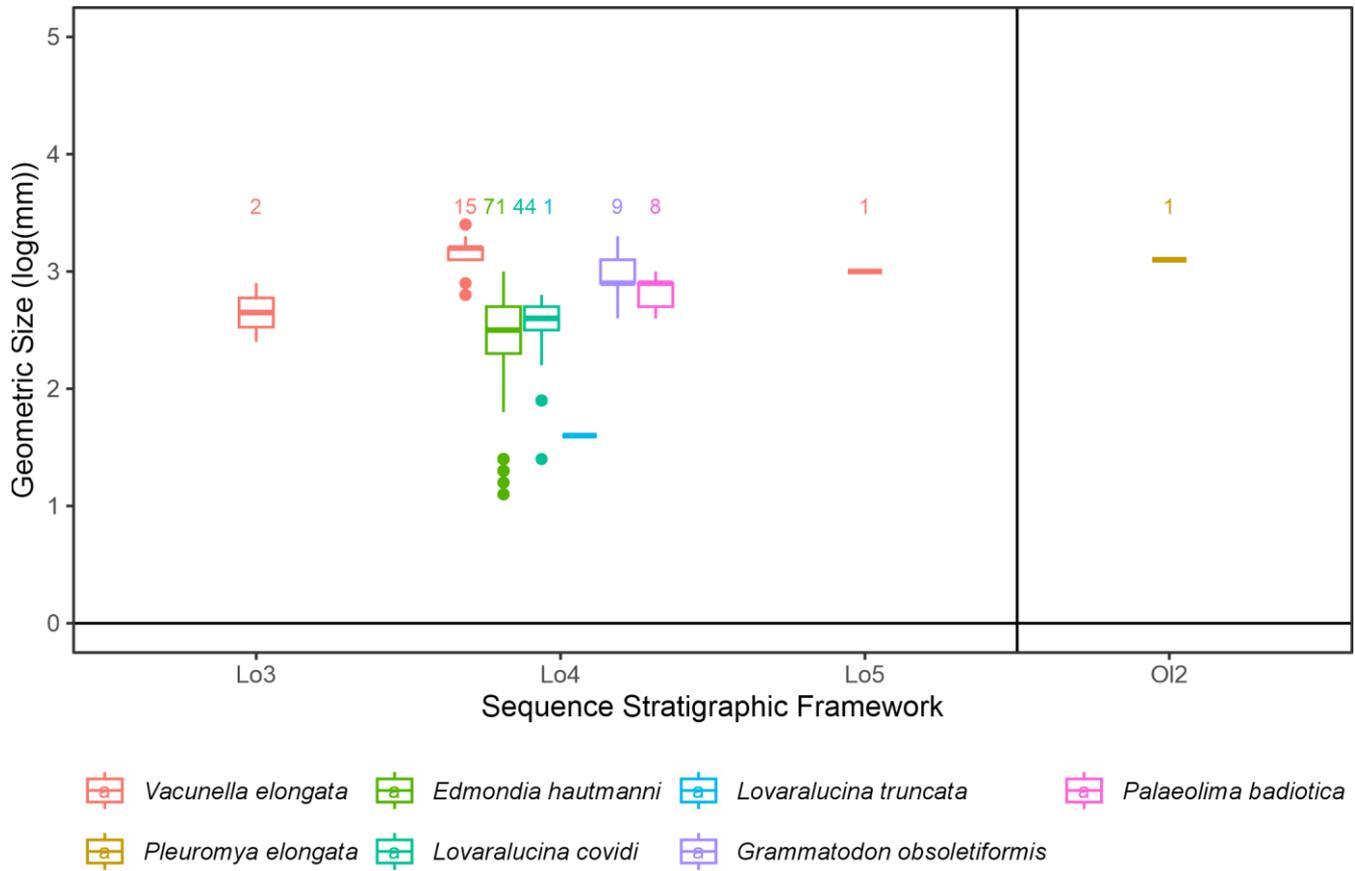


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Figure S7. Changes in the sizes of Modiomorphida, divided into the different species that were sampled from the Dolomites, Italy. The number of occurrences of each species are indicated above each box plot.



40 Figure S8. Changes in the sizes of Pterioida, divided into the different species that were sampled from the Dolomites, Italy. The number of occurrences of each species are indicated above each box plot.



45 Figure S9. Changes in the sizes of the Edmondioidea, Arcoidea, Anthracosioidea, Pleuromyoidea, Limoidea and Lucinacea, divided into the different species that were sampled from the Dolomites, Italy. The number of occurrences of each species are indicated above each box plot.

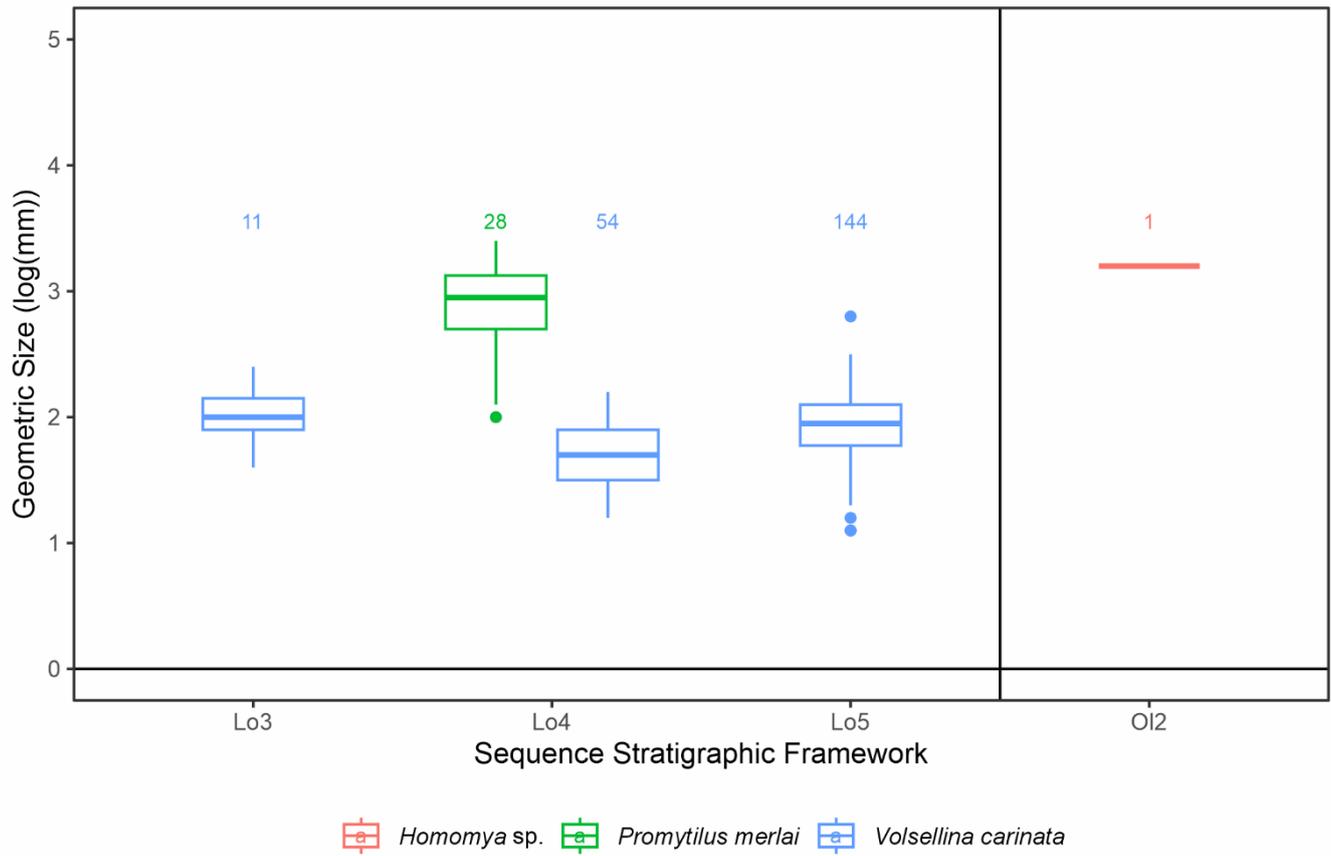


Figure S10. Changes in the sizes of Mytiloida, divided into the different species that were sampled from the Dolomites, Italy. The number of occurrences of each species are indicated above each box plot.

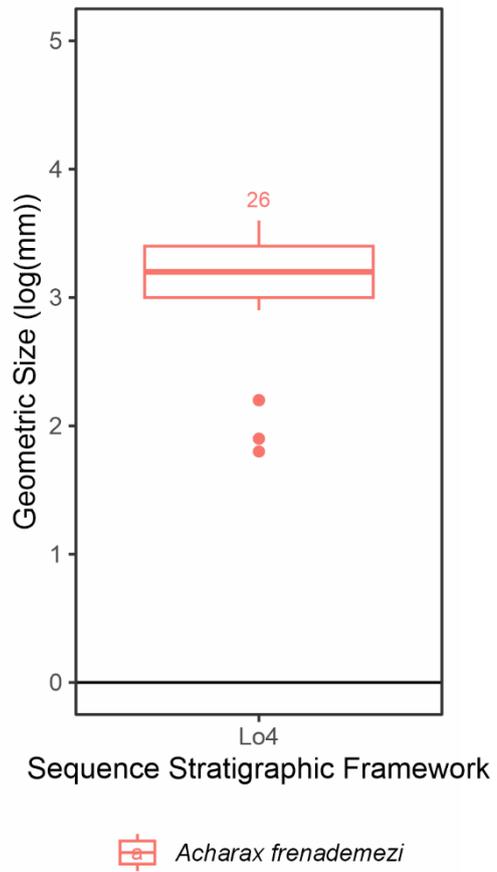


Figure S11. Changes in the sizes of Solemyoidea, divided into the different species that were sampled from the Dolomites, Italy. The number of occurrences of each species are indicated above each box plot.

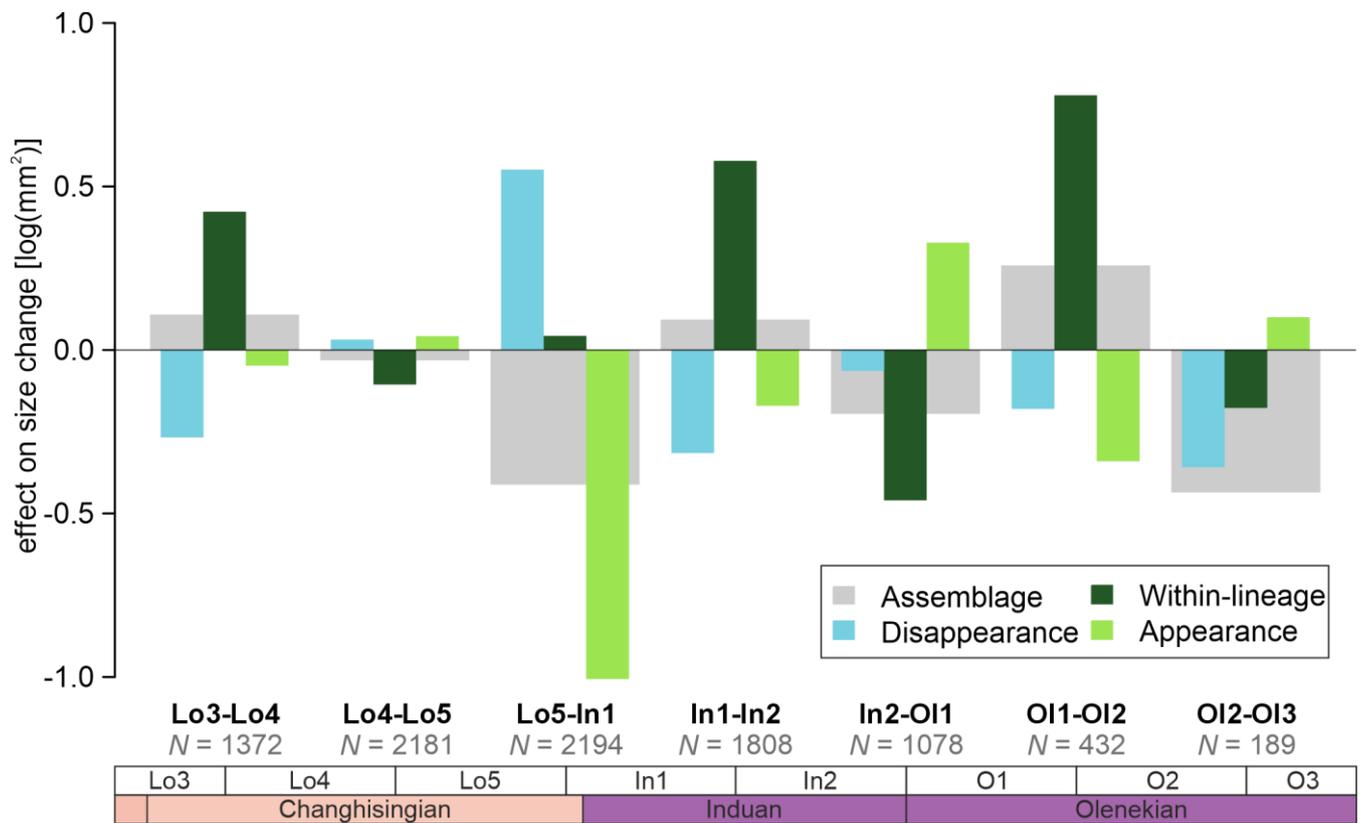


Figure S12. The effect on body-size change on bivalve assemblages and the three components of body size change from the Dolomites, Italy. This differs to Fig. 3, by not looking at the average body size for each taxon, but instead the average of all the specimens of all taxa. The number of observations based on each comparison are shown below each comparison. The effects of the Permian-Triassic mass extinction are shown between Lo5-In1.

60 **Table S1.** Mann-Whitney U-tests of changes in the body sizes of bivalves from the Permian-Triassic succession of the Dolomites, Italy. Genera and species that were only recorded from one time interval or lacked measurements in succeeding intervals were excluded. Significant results and the direction of the body size change are in bold.

| | Lo3→Lo4 | Lo4→Lo5 | Lo5→In1 | In1→In2 | In2→O11 | O11→O12 | O12→O13 |
|-----------------------------------|---------------|-------------------|---------------|-------------------|-------------------|-------------------|-------------------|
| <i>Bakevella</i> | 0.01 ↓ | <0.01 ↓ | 0.01 ↑ | 0.48 | 0.47 | 0.08 | <0.01 ↑ |
| <i>B. albertii</i> | | | | | | | <0.01 |
| <i>B. exporrecta</i> | | | | | 1.00 | 0.62 | 1.00 |
| <i>B. preromangica</i> | | 0.05 ↓ | | | | | |
| <i>Claraia</i> | | | | <0.01 ↑ | | | |
| <i>C. clarae</i> | | | | <0.01 ↑ | | | |
| <i>Crittendenia</i> sp. | | | | 1.00 | | | |
| <i>Eumorphotis</i> | 0.99 | 0.26 | 0.16 | 0.16 | 1.00 | <0.01 ↑ | |
| <i>E. lorigae</i> | | | 0.32 | | | | |
| <i>E. multiformis</i> | | | | 0.01 ↑ | | | |
| <i>E. stratocostata</i> | | 0.27 | | | | | |
| <i>Gardenapecten</i> | | 0.02 ↑ | | | | | |
| <i>G. comelicanus</i> | | 0.02 ↓ | | | | | |
| <i>G. trinkeri</i> | | <0.01 ↑ | | | | | |
| <i>Schizodus</i> | | 0.79 | | | | | |
| <i>S. orbicularis</i> | | 0.79 | | | | | |
| <i>Neoschizodus</i> | | | | 0.01 ↑ | <0.01 ↑ | 0.13 | 0.39 |
| <i>N. laevigatus</i> | | | | 1.00 | 0.03 ↑ | 1.00 | 1.00 |
| <i>N. orbicularis</i> | | | | 0.09 | 0.13 | | |
| <i>N. ovatus</i> | | | | | | | 0.73 |
| <i>Pteria ussurica</i> | | | | 0.12 | | | |
| <i>Stutchburia</i> | 0.03 | | | | | | |
| <i>S. tschernyschewi</i> | 0.03 | | | | | | |
| <i>Tambanella stetteneckensis</i> | 0.21 | 0.90 | | | | | |

| | Lo3→Lo4 | Lo4→Lo5 | Lo5→In1 | In1→In2 | In2→O11 | O11→O12 | O12→O13 |
|----------------------------|---------|---------|----------|---------|---------|---------|---------|
| <i>Towapteria</i> | <0.01 ↑ | 0.02 ↑ | < 0.01 ↓ | | | | |
| <i>T. peracuta</i> | <0.01 ↑ | 0.06 | | | | | |
| <i>Unionites</i> | <0.01 ↑ | <0.01 ↑ | <0.01 ↓ | <0.01 ↑ | <0.01 ↓ | <0.01 ↑ | 0.38 ↓ |
| <i>U. jacobi</i> | <0.01 ↑ | <0.01 ↑ | | | | | |
| <i>U. fassaensis</i> | | | | <0.01 ↑ | <0.01 ↑ | 0.56 | |
| <i>U. canalensis</i> | | | | 0.39 | <0.01 ↓ | 0.02 ↑ | 1.00 |
| <i>Vacunella elongata</i> | 0.06 | 0.36 | | | | | |
| <i>Volsellina carinata</i> | <0.01 ↓ | <0.01 ↑ | | | | | |