| **Phylum** | **Class** | **Order** | **Family** | **Genus** |
| --- | --- | --- | --- | --- |
| Annelida | 1 | 2 | 4 | 11 |
| Arthropoda | 6 | 25 | 114 | 519 |
| Brachiopoda | 6 | 22 | 296 | 1292 |
| Bryozoa | 2 | 15 | 114 | 257 |
| Chordata | 9 | 95 | 227 | 412 |
| Cnidaria | 3 | 15 | 177 | 575 |
| Echinodermata | 9 | 49 | 125 | 237 |
| Hemichordata | 1 | 3 | 6 | 20 |
| Hyolitha | 1 | 1 | 1 | 1 |
| Mollusca | 9 | 85 | 621 | 2449 |
| Nematoda | 1 | 1 | 1 | 1 |
| Porifera | 5 | 33 | 115 | 253 |

| **Model Structure** | **Overdispersed** | **AIC** | **BIC** |
| --- | --- | --- | --- |
| ~ Warming | no \*\*\* | 15762.2 | 15786.0 |
| ~ Warming + Pal. Int. | no \*\*\* | 15702.5 | 15734.3 |
| ~ Cooling + Lag | no \*\*\* | 18427.6 | 18451.8 |
| ~ Cooling + Pal. Int. | no \*\*\* | 17869.4 | 17901.5 |
| ~ Warming + Lag | no \*\*\* | 14976.0 | 15007.6 |
| ~ Warming + Lag + Pal. Int. | no \*\*\* | 14901.3 | 14940.8 |
| ~ Cooling + Lag | no \*\*\* | 14763.2 | 14794.8 |
| ~ Cooling + Lag + Pal. Int. | no \*\*\* | 14748.5 | 14788.1 |
| ~ Warming + Lag + Warming:Lag | no \*\*\* | 14969.9 | 15009.4 |
| ~ Warming + Lag + Warming:Lag + Pal. Int. | no \*\*\* | 14886.2 | 14933.6 |
| ~ Cooling + Lag + Cooling:Lag | no \*\*\* | 14680.0 | 14719.6 |
| ~ Cooling + Lag + Cooling:Lag + Pal. Int. | no \*\*\* | 14667.4 | 14714.9 |

| **Type** | **Model** | **Intercept** | **Interaction** |
| --- | --- | --- | --- |
| Warming | trend.st1 | -1.89 +- 0.03 \*\*\* | 0.05 +- 0.05 |
| trend.st2 | -1.91 +- 0.03 \*\*\* | -0.23 +- 0.07 \*\*\* |
| trend.st3 | -1.91 +- 0.03 \*\*\* | -0.4 +- 0.1 \*\*\* |
| trend.st4 | -1.91 +- 0.03 \*\*\* | -0.2 +- 0.11 |
| trend.st5 | -1.92 +- 0.03 \*\*\* | -0.43 +- 0.1 \*\*\* |
| trend.st6 | -1.93 +- 0.03 \*\*\* | -0.58 +- 0.1 \*\*\* |
| trend.st7 | -1.93 +- 0.03 \*\*\* | -0.6 +- 0.11 \*\*\* |
| trend.st8 | -1.93 +- 0.03 \*\*\* | -0.61 +- 0.12 \*\*\* |
| trend.st9 | -1.9 +- 0.03 \*\*\* | -0.21 +- 0.13 |
| trend.st10 | -1.89 +- 0.03 \*\*\* | 0.05 +- 0.13 |
| Cooling | trend.st1 | -1.81 +- 0.02 \*\*\* | 0.17 +- 0.04 \*\*\* |
| trend.st2 | -1.83 +- 0.02 \*\*\* | 0.26 +- 0.07 \*\*\* |
| trend.st3 | -1.81 +- 0.02 \*\*\* | 0.76 +- 0.11 \*\*\* |
| trend.st4 | -1.79 +- 0.02 \*\*\* | 1.31 +- 0.11 \*\*\* |
| trend.st5 | -1.81 +- 0.02 \*\*\* | 1.27 +- 0.11 \*\*\* |
| trend.st6 | -1.82 +- 0.02 \*\*\* | 1.32 +- 0.11 \*\*\* |
| trend.st7 | -1.85 +- 0.02 \*\*\* | 1.27 +- 0.12 \*\*\* |
| trend.st8 | -1.87 +- 0.02 \*\*\* | 1.26 +- 0.12 \*\*\* |
| trend.st9 | -1.88 +- 0.02 \*\*\* | 1.31 +- 0.13 \*\*\* |
| trend.st10 | -1.89 +- 0.02 \*\*\* | 1.34 +- 0.14 \*\*\* |

| **Type** | **Model** | **AIC** | **BIC** | **ΔAIC** | **ΔBIC** |
| --- | --- | --- | --- | --- | --- |
| Warming | trend.st1 | 15908.6 | 15932.5 | 28.8 | 28.9 |
| trend.st2 | 15897.7 | 15921.5 | 17.9 | 17.9 |
| trend.st3 | 15893.4 | 15917.3 | 13.6 | 13.7 |
| trend.st4 | 15906.8 | 15930.6 | 27.0 | 27.0 |
| trend.st5 | 15889.7 | 15913.5 | 9.9 | 9.9 |
| trend.st6 | 15880.1 | 15903.9 | 0.3 | 0.3 |
| trend.st7 | 15879.8 | 15903.6 | 0.0 | 0.0 |
| trend.st8 | 15883.4 | 15907.2 | 3.6 | 3.6 |
| trend.st9 | 15907.1 | 15931.0 | 27.3 | 27.4 |
| trend.st10 | 15909.6 | 15933.4 | 29.8 | 29.8 |
| Cooling | trend.st1 | 18159.7 | 18183.8 | 140.3 | 140.3 |
| trend.st2 | 18159.1 | 18183.2 | 139.7 | 139.7 |
| trend.st3 | 18123.4 | 18147.6 | 104.0 | 104.1 |
| trend.st4 | 18024.9 | 18049.0 | 5.5 | 5.5 |
| trend.st5 | 18028.7 | 18052.8 | 9.3 | 9.3 |
| trend.st6 | 18019.4 | 18043.5 | 0.0 | 0.0 |
| trend.st7 | 18048.1 | 18072.2 | 28.7 | 28.7 |
| trend.st8 | 18067.8 | 18091.9 | 48.4 | 48.4 |
| trend.st9 | 18076.8 | 18100.9 | 57.4 | 57.4 |
| trend.st10 | 18082.5 | 18106.7 | 63.1 | 63.2 |

| **Model** | **Term** | **Estimate** | **Std.error** | **Z value** | **P value** | **Group** |
| --- | --- | --- | --- | --- | --- | --- |
| Warming | Intercept | -1.930 | 0.026 | -74.396 | \*\*\* | fixed |
| Warming:Trend.st7 | -0.604 | 0.108 | -5.592 | \*\*\* | fixed |
| Random effect | 0.729 | NA | NA |  | genus |
| Cooling | Intercept | -1.824 | 0.021 | -86.255 | \*\*\* | fixed |
| Cooling:Trend.st6 | 1.321 | 0.109 | 12.072 | \*\*\* | fixed |
| Random effect | 0.423 | NA | NA |  | genus |

| **Model** | **Sigma** | **LogLik** | **AIC** | **BIC** | **Deviance** | **DF residual** | **Overdispersion** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Warming | 1 | -7936.88 | 15879.77 | 15903.62 | 14052.15 | 20919 | no \*\*\* |
| Cooling | 1 | -9006.70 | 18019.40 | 18043.53 | 17190.21 | 22981 | no \*\*\* |

| **Palaeoclimate Interaction** | **Lower Quartile** | **Median** | **Upper Quartile** |
| --- | --- | --- | --- |
| Cooling-Cooling | 0.127 | 0.145 | 0.161 |
| Cooling-Warming | 0.093 | 0.114 | 0.147 |
| Warming-Cooling | 0.099 | 0.116 | 0.131 |
| Warming-Warming | 0.082 | 0.106 | 0.139 |

| **Parameter** | **Lower CI** | **Estimate** | **Upper CI** | **Method** |
| --- | --- | --- | --- | --- |
| Difference in means | 3.17 | 3.24 | 3.30 | Bootstrapping |
| 3.09 | 3.15 | 3.22 | Bayesian Estimate |
| Percentage change | 23.82 | 24.36 | 24.86 | Bootstrapping |
| 23.24 | 23.70 | 24.23 | Bayesian Estimate |
| Cohen's d | 0.98 | 1.00 | 1.02 | Raw Data |
| 1.02 | 1.05 | 1.07 | Bayesian Estimate |

| **Group** | **Lower CI** | **Log Odds ratio** | **Upper CI** |
| --- | --- | --- | --- |
| Total | 2.01 | 2.08 | 2.14 |
| Annelida | 0.90 | 2.95 | 5.01 |
| Arthropoda | 2.53 | 2.77 | 3.01 |
| Brachiopoda | 2.17 | 2.31 | 2.45 |
| Bryozoa | 2.19 | 2.49 | 2.79 |
| Chordata | 1.75 | 2.01 | 2.27 |
| Cnidaria | 1.71 | 1.91 | 2.12 |
| Echinodermata | 1.54 | 1.85 | 2.16 |
| Hemichordata | 2.54 | 4.79 | 7.04 |
| Mollusca | 1.87 | 1.97 | 2.07 |
| Porifera | 1.47 | 1.76 | 2.05 |
| Stage 14:29 | 3.32 | 3.48 | 3.65 |
| Stage 30:45 | 1.03 | 1.22 | 1.41 |
| Stage 46:61 | 0.88 | 1.02 | 1.15 |
| Stage 62:77 | 1.60 | 1.84 | 2.07 |
| Stage 78:94 | 2.42 | 2.56 | 2.69 |