| **Phylum** | **Class** | **Order** | **Family** | **Genus** |
| --- | --- | --- | --- | --- |
| Annelida | 1 | 2 | 4 | 14 |
| Arthropoda | 5 | 23 | 164 | 615 |
| Brachiopoda | 5 | 21 | 293 | 1286 |
| Bryozoa | 2 | 15 | 127 | 279 |
| Chordata | 8 | 101 | 253 | 495 |
| Cnidaria | 3 | 15 | 185 | 571 |
| Echinodermata | 11 | 52 | 143 | 262 |
| Foraminifera | 3 | 6 | 23 | 81 |
| Hemichordata | 1 | 3 | 6 | 16 |
| Mollusca | 8 | 82 | 629 | 2463 |
| Nematoda | 1 | 1 | 1 | 1 |
| Porifera | 5 | 33 | 109 | 242 |

| **Model Structure** | **Overdispersed** | **AIC** | **BIC** |
| --- | --- | --- | --- |
| ~ Warming | no \*\*\* | 16576.2 | 16600.2 |
| ~ Warming + Pal. Int. | no \*\*\* | 16521.9 | 16553.8 |
| ~ Cooling + Lag | no \*\*\* | 19523.6 | 19547.9 |
| ~ Cooling + Pal. Int. | no \*\*\* | 18883.5 | 18915.9 |
| ~ Warming + Lag | no \*\*\* | 15762.3 | 15794.1 |
| ~ Warming + Lag + Pal. Int. | no \*\*\* | 15696.8 | 15736.6 |
| ~ Cooling + Lag | no \*\*\* | 15756.3 | 15788.2 |
| ~ Cooling + Lag + Pal. Int. | no \*\*\* | 15730.3 | 15770.1 |
| ~ Warming + Lag + Warming:Lag | no \*\*\* | 15751.0 | 15790.7 |
| ~ Warming + Lag + Warming:Lag + Pal. Int. | no \*\*\* | 15674.4 | 15722.1 |
| ~ Cooling + Lag + Cooling:Lag | no \*\*\* | 15660.2 | 15700.1 |
| ~ Cooling + Lag + Cooling:Lag + Pal. Int. | no \*\*\* | 15637.8 | 15685.6 |

| **Type** | **Model** | **Intercept** | **Interaction** |
| --- | --- | --- | --- |
| Warming | trend.st1 | -1.9 +- 0.02 \*\*\* | 0.03 +- 0.05 |
| trend.st2 | -1.91 +- 0.02 \*\*\* | -0.18 +- 0.06 \*\* |
| trend.st3 | -1.92 +- 0.02 \*\*\* | -0.36 +- 0.1 \*\*\* |
| trend.st4 | -1.92 +- 0.03 \*\*\* | -0.33 +- 0.11 \*\* |
| trend.st5 | -1.93 +- 0.02 \*\*\* | -0.51 +- 0.09 \*\*\* |
| trend.st6 | -1.94 +- 0.03 \*\*\* | -0.67 +- 0.1 \*\*\* |
| trend.st7 | -1.94 +- 0.03 \*\*\* | -0.69 +- 0.1 \*\*\* |
| trend.st8 | -1.94 +- 0.03 \*\*\* | -0.67 +- 0.11 \*\*\* |
| trend.st9 | -1.91 +- 0.02 \*\*\* | -0.24 +- 0.12 |
| trend.st10 | -1.9 +- 0.02 \*\*\* | 0.02 +- 0.13 |
| Cooling | trend.st1 | -1.81 +- 0.02 \*\*\* | 0.14 +- 0.04 \*\*\* |
| trend.st2 | -1.83 +- 0.02 \*\*\* | 0.2 +- 0.06 \*\* |
| trend.st3 | -1.81 +- 0.02 \*\*\* | 0.73 +- 0.1 \*\*\* |
| trend.st4 | -1.79 +- 0.02 \*\*\* | 1.35 +- 0.1 \*\*\* |
| trend.st5 | -1.8 +- 0.02 \*\*\* | 1.31 +- 0.1 \*\*\* |
| trend.st6 | -1.82 +- 0.02 \*\*\* | 1.31 +- 0.11 \*\*\* |
| trend.st7 | -1.85 +- 0.02 \*\*\* | 1.24 +- 0.11 \*\*\* |
| trend.st8 | -1.86 +- 0.02 \*\*\* | 1.21 +- 0.12 \*\*\* |
| trend.st9 | -1.88 +- 0.02 \*\*\* | 1.25 +- 0.13 \*\*\* |
| trend.st10 | -1.88 +- 0.02 \*\*\* | 1.27 +- 0.13 \*\*\* |

| **Type** | **Model** | **AIC** | **BIC** | **ΔAIC** | **ΔBIC** |
| --- | --- | --- | --- | --- | --- |
| Warming | trend.st1 | 16628.5 | 16652.5 | 42.7 | 42.7 |
| trend.st2 | 16621.0 | 16645.0 | 35.2 | 35.2 |
| trend.st3 | 16615.1 | 16639.1 | 29.3 | 29.3 |
| trend.st4 | 16620.0 | 16644.0 | 34.2 | 34.2 |
| trend.st5 | 16599.5 | 16623.4 | 13.7 | 13.6 |
| trend.st6 | 16585.8 | 16609.8 | 0.0 | 0.0 |
| trend.st7 | 16586.9 | 16610.9 | 1.1 | 1.1 |
| trend.st8 | 16594.9 | 16618.9 | 9.1 | 9.1 |
| trend.st9 | 16625.4 | 16649.3 | 39.6 | 39.5 |
| trend.st10 | 16628.9 | 16652.8 | 43.1 | 43.0 |
| Cooling | trend.st1 | 19159.7 | 19184.0 | 159.5 | 159.5 |
| trend.st2 | 19160.5 | 19184.7 | 160.3 | 160.2 |
| trend.st3 | 19120.0 | 19144.2 | 119.8 | 119.7 |
| trend.st4 | 19000.2 | 19024.5 | 0.0 | 0.0 |
| trend.st5 | 19001.9 | 19026.2 | 1.7 | 1.7 |
| trend.st6 | 19003.2 | 19027.5 | 3.0 | 3.0 |
| trend.st7 | 19037.4 | 19061.7 | 37.2 | 37.2 |
| trend.st8 | 19060.5 | 19084.8 | 60.3 | 60.3 |
| trend.st9 | 19072.3 | 19096.6 | 72.1 | 72.1 |
| trend.st10 | 19080.0 | 19104.3 | 79.8 | 79.8 |

| **Model** | **Term** | **effect** | **Group** | **Estimate** | **Std.error** | **Z value** | **P value** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Warming | Intercept | fixed |  | -1.944 | 0.025 | -77.150 | \*\*\* |
| Warming:Trend.st7 | fixed |  | -0.670 | 0.100 | -6.688 | \*\*\* |
| Random effect | ran\_pars | genus | 0.703 | NA | NA |  |
| Cooling | Intercept | fixed |  | -1.788 | 0.020 | -88.722 | \*\*\* |
| Cooling:Trend.st6 | fixed |  | 1.352 | 0.104 | 12.970 | \*\*\* |
| Random effect | ran\_pars | genus | 0.341 | NA | NA |  |

| **Model** | **Sigma** | **LogLik** | **AIC** | **BIC** | **Deviance** | **DF residual** | **Overdispersion** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Warming | 1 | -8289.91 | 16585.82 | 16609.79 | 14776.35 | 21839 | no \*\*\* |
| Cooling | 1 | -9497.10 | 19000.20 | 19024.46 | 18403.53 | 24072 | no \*\*\* |

| **Palaeoclimate Interaction** | **Lower Quartile** | **Median** | **Upper Quartile** |
| --- | --- | --- | --- |
| Cooling-Cooling | 0.126 | 0.141 | 0.160 |
| Cooling-Warming | 0.095 | 0.114 | 0.148 |
| Warming-Cooling | 0.101 | 0.123 | 0.138 |
| Warming-Warming | 0.082 | 0.104 | 0.136 |

| **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 | 1.58 | 1.64 | 1.70 |
| Annelida | 0.76 | 1.89 | 3.01 |
| Arthropoda | 2.42 | 2.67 | 2.92 |
| Brachiopoda | 1.88 | 2.02 | 2.16 |
| Bryozoa | 1.88 | 2.17 | 2.46 |
| Chordata | 0.95 | 1.20 | 1.46 |
| Cnidaria | 1.41 | 1.60 | 1.80 |
| Echinodermata | 0.94 | 1.23 | 1.52 |
| Hemichordata | 2.31 | 4.47 | 6.63 |
| Mollusca | 1.32 | 1.43 | 1.52 |
| Porifera | 1.33 | 1.63 | 1.93 |
| Stage 14:29 | 3.25 | 3.43 | 3.60 |
| Stage 30:45 | 0.33 | 0.49 | 0.66 |
| Stage 46:61 | 0.64 | 0.78 | 0.91 |
| Stage 62:77 | 1.74 | 1.95 | 2.17 |
| Stage 78:94 | 1.10 | 1.22 | 1.34 |