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*Supplement of*

# Future diversity and lifespan of metazoans under global warming and oxygen depletion

**Kunio Kaiho**

*Correspondence to:* Kunio Kaiho (kunio.kaiho.a6@tohoku.ac.jp)

**Supplement for Future diversity and lifespan of metazoans under global warming and oxygen depletion**

Kunio Kaiho

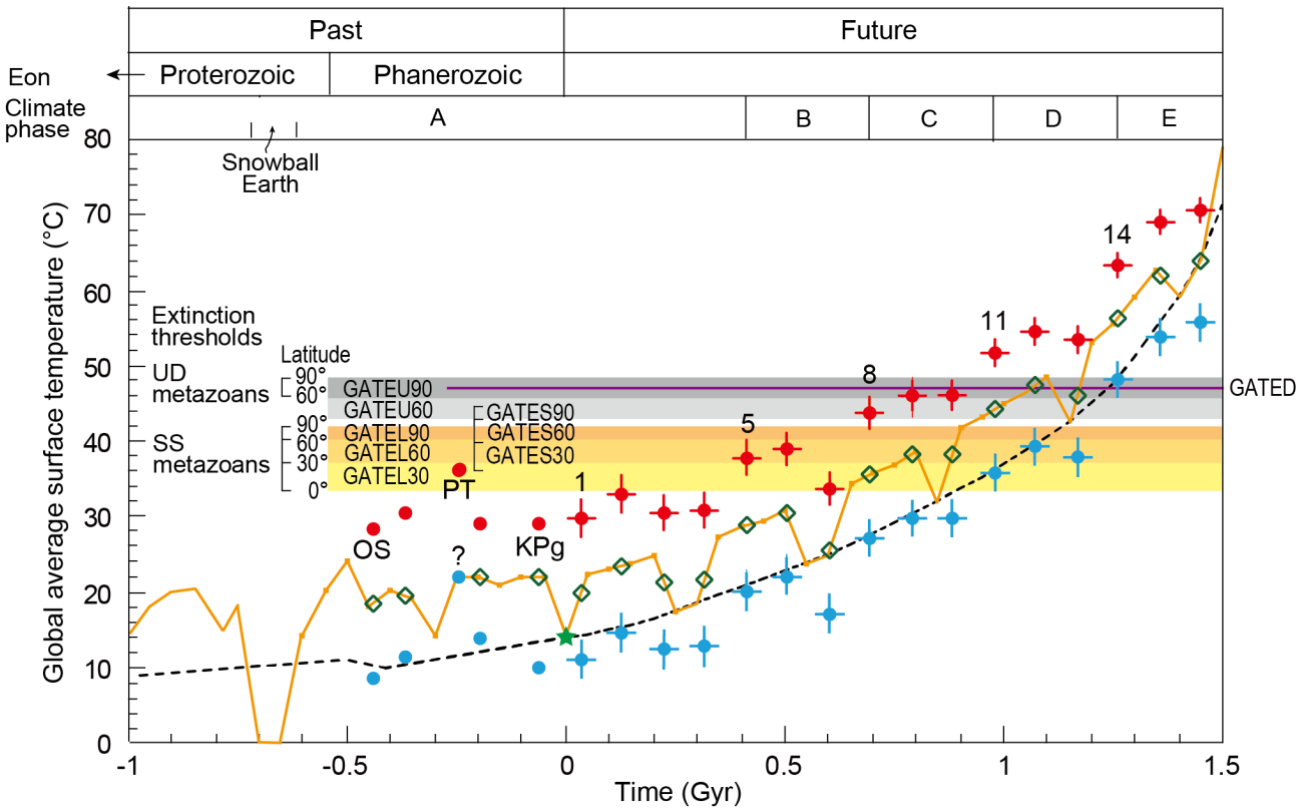


**Figure. S1.** Global average surface temperature changes over the past and future 2.5 billion years (Gyr) under a scenario in which long-term atmospheric $CO_2$ decline driven by increasing solar luminosity does not occur.

**Table S1.** Earth's average surface $CO_2$ content and temperature from 0.7 Gyr before the present to 1.5 Gyr into the future.

| Age from present (Gyr) | Long-term Temp. (°C) | Min $fCO_2$ (ppmv) | Max $fCO_2$ (ppmv) | Average $fCO_2$ (ppmv) | Rate to modern $CO_2$ Min $fCO_2$ | Max $fCO_2$ | Average $fCO_2$ | Temperature anomaly Long-term T + climate cycle (°C) Min Ice house | Max Green house | Average |
|---|---|---|---|---|---|---|---|---|---|---|
| -0.7 | 0 | | | | | | | | | -14 |
| -0.65 | 0 | | | | | | | | | -14 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| -0.6 | 10 | | | | | | | | | 0 |
| -0.55 | 11 | 3000 | 10000 | 6500 | | | | | | 6 |
| -0.5 | 11 | 3000 | 10000 | 6500 | | | | | | 10 |
| -0.45 | 10 | 2600 | 6000 | 4300 | | | | | | 4 |
| -0.4 | 10 | 1700 | 4000 | 2850 | | | | | | 6 |
| -0.35 | 10 | 1200 | 3000 | 2100 | | | | | | 5 |
| -0.3 | 11 | 600 | 1800 | 1200 | | | | | | 0 |
| -0.25 | 11 | 800 | 3000 | 1900 | | | | | | 8 |
| -0.2 | 12 | 500 | 1500 | 1000 | | | | | | 8 |
| -0.15 | 12 | 600 | 2300 | 1450 | | | | | | 7 |
| -0.1 | 13 | 1000 | 2700 | 1850 | | | | | | 8 |
| -0.05 | 13 | 700 | 1800 | 1250 | | | | | | 8 |
| 0.0 | 14 | 190 | 400 | 295 | | | | | | 0 |
| 0.05 | 14.4 | 180 | 500 | 340 | 0.6 | 1.7 | 1.2 | 1.3 | 8.6 | 5.0 |
| 0.1 | 15.0 | 170 | 1100 | 635 | 0.6 | 3.7 | 2.2 | 1.2 | 7.8 | 4.5 |
| 0.15 | 15.8 | 150 | 1000 | 575 | 0.5 | 3.4 | 1.9 | 1.0 | 7.8 | 4.4 |
| 0.2 | 16.7 | 130 | 1000 | 565 | 0.4 | 3.4 | 1.9 | 0.9 | 5.5 | 3.2 |
| 0.25 | 17.5 | 120 | 700 | 410 | 0.4 | 2.4 | 1.4 | 0.8 | 4.7 | 2.7 |
| 0.3 | 18.4 | 100 | 600 | 350 | 0.3 | 2.0 | 1.2 | 0.7 | 3.9 | 2.3 |
| 0.35 | 19.4 | 90 | 500 | 295 | 0.3 | 1.7 | 1.0 | 0.6 | 2.3 | 1.5 |
| 0.4 | 20.5 | 80 | 300 | 190 | 0.3 | 1.0 | 0.6 | 0.5 | 1.7 | 1.1 |
| 0.45 | 21.5 | 70 | 220 | 145 | 0.2 | 0.7 | 0.5 | 0.5 | 1.2 | 0.9 |
| 0.5 | 22.7 | 60 | 160 | 110 | 0.2 | 0.5 | 0.4 | 0.4 | 1.1 | 0.8 |
| 0.55 | 23.8 | 55 | 140 | 97.5 | 0.2 | 0.5 | 0.3 | 0.4 | 1.0 | 0.7 |
| 0.6 | 25.0 | 50 | 130 | 90 | 0.2 | 0.4 | 0.3 | 0.3 | 1.0 | 0.7 |
| 0.65 | 26.2 | 40 | 130 | 85 | 0.1 | 0.4 | 0.3 | 0.3 | 0.9 | 0.6 |
| 0.7 | 27.6 | 33 | 120 | 76.5 | 0.1 | 0.4 | 0.3 | 0.2 | 0.9 | 0.6 |
| 0.75 | 28.9 | 30 | 116 | 73 | 0.1 | 0.4 | 0.2 | 0.2 | 0.9 | 0.5 |
| 0.8 | 30.5 | 28 | 110 | 69 | 0.1 | 0.4 | 0.2 | 0.2 | 0.8 | 0.5 |
| 0.85 | 31.9 | 24 | 106 | 65 | 0.1 | 0.4 | 0.2 | 0.2 | 0.8 | 0.5 |
| 0.9 | 33.6 | 20 | 100 | 60 | 0.1 | 0.3 | 0.2 | 0.1 | 0.7 | 0.4 |
| 0.95 | 35.1 | 16 | 96 | 56 | 0.1 | 0.3 | 0.2 | 0.1 | 0.7 | 0.4 |
| 1.0 | 36.8 | 12 | 90 | 51 | 0.0 | 0.3 | 0.2 | 0.1 | 0.6 | 0.4 |
| 1.05 | 38.5 | 10 | 80 | 45 | 0.0 | 0.3 | 0.2 | 0.1 | 0.5 | 0.3 |
| 1.1 | 40.5 | 8 | 70 | 39 | 0.0 | 0.2 | 0.1 | 0.0 | 0.5 | 0.3 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.15 | 42.6 | 6 | 60 | 33 | 0.0 | 0.2 | 0.1 | 0.0 | 0.3 | 0.2 |
| 1.2 | 45.0 | 3 | 40 | 21.5 | 0.0 | 0.1 | 0.1 | 0.0 | 0.2 | 0.1 |
| 1.25 | 47.6 | 2 | 24 | 13 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 |
| 1.3 | 51.0 | 0 | 13 | 6.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1.35 | 54.8 | 0 | 6 | 3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1.4 | 59 | 0 | 3 | 1.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1.45 | 64 | 0 | 1 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1.5 | 71 | 0 | 0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Long-term temperatures are based on Mello and Friaça (2020) and correspond to the black dashed curve in Figure 2. The long-term climate cycle is represented by average temperature anomalies of +8 °C during greenhouse periods and 0 °C during icehouse periods, derived from Phanerozoic climate patterns (Scotese et al., 2021). Temperature anomalies of +8 °C and 0 °C were added to the long-term temperature series to represent greenhouse and icehouse phases, respectively. T: temperature.

**Table S2.** Earth's average surface temperature, including the long-term trend, long-term climate cycle, and short-term events, incorporating temperature anomalies and decreasing $CO_2$ and $SO_2$ emissions caused by declining mantle potential temperature during major mass extinction events from 0.7 Gyr before the present to 1.5 Gyr into the future.

| | | Long-term trend | | Long-term cycle (> 1 m.y.) | Short-term event (< 0.1 m.y.) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Event | Event Age (Gyr) | Mantle potential Temp. (°C) | Long-term temperature (°C) | Long-term temperature + climate cycle (°C) | Cooling anomaly considering mantle temp (°C) | Cooling Temp. SD (°C) | Warming anomaly considering mantle temp (°C) | Warming standard deviation (°C) | $SO_2$ Rate | $CO_2$ Rate | Temp. during warming event |
| 16 | 1.446 | 1184 | 64 | 65 | -7.47 | 2.21 | 6.46 | 1.65 | 0.76 | 0.65 | 71 |
| 15 | 1.352 | 1192 | 55 | 55 | -7.56 | 2.24 | 6.52 | 1.67 | 0.77 | 0.66 | 64 |
| 14 | 1.257 | 1199 | 48 | 48 | -7.66 | 2.26 | 6.57 | 1.68 | 0.79 | 0.66 | 56 |
| 13 | 1.163 | 1207 | 43 | 44 | -7.75 | 2.29 | 6.62 | 1.69 | 0.81 | 0.67 | 52 |
| 12 | 1.068 | 1215 | 39 | 40 | -7.84 | 2.32 | 6.93 | 1.77 | 0.82 | 0.70 | 48 |
| 11 | 0.974 | 1223 | 36 | 38 | -7.94 | 2.35 | 7.27 | 1.86 | 0.84 | 0.73 | 46 |
| 10 | 0.879 | 1232 | 33 | 35 | -8.03 | 2.37 | 7.53 | 1.92 | 0.85 | 0.76 | 43 |
| 9 | 0.785 | 1242 | 30 | 32 | -8.12 | 2.40 | 7.78 | 1.99 | 0.87 | 0.79 | 40 |
| 8 | 0.690 | 1251 | 27 | 30 | -8.22 | 2.43 | 8.04 | 2.05 | 0.89 | 0.81 | 38 |
| 7 | 0.596 | 1260 | 25 | 26 | -8.31 | 2.46 | 8.29 | 2.12 | 0.90 | 0.84 | 34 |
| 6 | 0.501 | 1270 | 23 | 27 | -8.40 | 2.48 | 8.55 | 2.18 | 0.92 | 0.86 | 36 |
| 5 | 0.407 | 1281 | 21 | 27 | -8.50 | 2.51 | 8.80 | 2.25 | 0.93 | 0.89 | 36 |
| 4 | 0.312 | 1293 | 18 | 22 | -8.59 | 2.54 | 9.06 | 2.31 | 0.95 | 0.91 | 31 |
| 3 | 0.218 | 1304 | 17 | 22 | -8.68 | 2.57 | 9.31 | 2.38 | 0.96 | 0.94 | 31 |
| 2 | 0.123 | 1315 | 15 | 23 | -8.78 | 2.59 | 9.57 | 2.45 | 0.98 | 0.97 | 33 |
| 1 | 0.029 | 1327 | 14 | 20 | -8.87 | 2.62 | 9.82 | 2.51 | 1.00 | 0.99 | 30 |
| | 0.000 | 1330 | 14 | 14 | – | – | – | – | – | – | – |
| -1 | -0.066 | 1335 | 13 | 22 | -12 | 0.00 | 7 | 0.00 | 1.00 | 1.00 | 29 |
| -2 | -0.201 | 1346 | 12 | 22 | -8 | 0.00 | 7 | 0.00 | 1.00 | 1.00 | 29 |
| -3 | -0.252 | 1350 | 12 | 22 | 0 | 0.00 | 14 | 0.00 | 1.00 | 1.00 | 36 |
| -4 | -0.372 | 1370 | 10 | 19 | -8 | 0.00 | 11 | 0.00 | 1.00 | 1.00 | 30 |
| -5 | -0.444 | 1380 | 10 | 18 | -10 | 0.00 | 10 | 0.00 | 1.00 | 1.00 | 28 |

Temperature values plotted in Figure 2 are sourced from this table. Methods for all calculations are described in Section 2.3. Gyr: billion years; temp.: temperature. SD: standard deviation.

**Table S3.** Number of insect families and extinction percentages over geological time (Labandeira and Sepkoski, 1993).

| Event | Age (Myr) | Insect | Extinction% |
|---|---|---|---|
| | -5 | 610 | |
| | -10 | 610 | |
| | -15 | 605 | |
| | -20 | 600 | |
| | -25 | 590 | |
| | -30 | 580 | |
| | -35 | 420 | |
| | -40 | 410 | |
| | -45 | 400 | |
| | -55 | 390 | |
| | -60 | 330 | |
| K-Pg | -65 | 350 | 8 |
| | -75 | 360 | |
| | -80 | 350 | |
| | -85 | 290 | |
| | -90 | 310 | |
| | -100 | 340 | |
| | -110 | 350 | |
| | -120 | 300 | |
| | -125 | 280 | |
| | -130 | 290 | |
| | -135 | 285 | |
| | -140 | 285 | |
| | -150 | 300 | |
| | -155 | 310 | |
| | -160 | 200 | |
| | -165 | 175 | |
| | -170 | 200 | |
| | -180 | 180 | |
| | -190 | 150 | |
| | -195 | 155 | |
| end-T | -200 | 120 | 14 |
| | -205 | 140 | |

| | | | |
|---|---|---|---|
| | -210 | 95 | |
| | -220 | 90 | |
| | -230 | 105 | |
| | -235 | 80 | |
| | -240 | 70 | |
| | -245 | 90 | |
| P-T | -250 | <u>110</u> | 35 |
| | -260 | <u>170</u> | |
| | -270 | 120 | |
| | -280 | 80 | |
| | -290 | 120 | |
| | -300 | 90 | |
| | -310 | 40 | |
| | -320 | 20 | |
| | -330 | 15 | |
| | -340 | 5 | |
| | -350 | 3 | |
| | -360 | 1 | |
| | -370 | 1 | |
| | -380 | 1 | |
| | -390 | 1 | |
| | -400 | 1 | |
| | -410 | 1 | |
| | Average | | 19 |

Data for −390 Myr and −410 Myr are from Engel and Grimaldi (2004). *Underlined* and *double-underlined* values indicate numbers immediately before and after extinction events, respectively.

**Table S4.** Number of tetrapod families and extinction percentages over geological time (Benton, 2010).

| Event | Age (Myr) | Mammals | Birds | Reptiles | Amphibians | Total | Extinction% |
|---|---|---|---|---|---|---|---|
| | 0 | 125 | 130 | 40 | 20 | 315 | |
| | -10 | 150 | 80 | 40 | 20 | 290 | |
| | -20 | 150 | 75 | 40 | 20 | 285 | |
| | -30 | 130 | 70 | 40 | 20 | 260 | |
| | -40 | 130 | 50 | 40 | 17 | 237 | |
| | -50 | 110 | 35 | 40 | 18 | 203 | |
| | -60 | 35 | 5 | 30 | 12 | 82 | |
| K-Pg | -65 | 14 | 5 | 30 | 12 | 61 | 38 |
| | -70 | 20 | 8 | 60 | 12 | 98 | |
| | -80 | 23 | 6 | 50 | 10 | 89 | |
| | -90 | 14 | 3 | 40 | 10 | 67 | |
| | -100 | 12 | 2 | 45 | 10 | 69 | |
| | -110 | 13 | 2 | 40 | 10 | 65 | |
| | -120 | 11 | 2 | 37 | 8 | 58 | |
| | -130 | 11 | 2 | 33 | 8 | 54 | |
| | -140 | 11 | 2 | 31 | 7 | 51 | |
| | -150 | 10 | 3 | 40 | 6 | 59 | |
| | -160 | 7 | 0 | 25 | 5 | 37 | |
| | -170 | 6 | 0 | 15 | 3 | 24 | |
| | -180 | 5 | 0 | 18 | 3 | 26 | |
| | -190 | 6 | 0 | 18 | 3 | 27 | 21 |
| end-T | -200 | 5 | 0 | 23 | 5 | 33 | |
| | -210 | 4 | 0 | 23 | 7 | 34 | |
| | -220 | 0 | 0 | 25 | 9 | 34 | |
| | -230 | 0 | 0 | 23 | 8 | 31 | |
| | -240 | 0 | 0 | 24 | 8 | 32 | |
| P-T | -250 | 0 | 0 | 10 | 3 | 13 | 54 |
| | -260 | 0 | 0 | 20 | 8 | 28 | |
| | -270 | 0 | 0 | 9 | 9 | 18 | |
| | -280 | 0 | 0 | 12 | 30 | 42 | |
| | -290 | 0 | 0 | 8 | 30 | 38 | |
| | -300 | 0 | 0 | 5 | 23 | 28 | |
| | -310 | 0 | 0 | 2 | 18 | 20 | |
| | -320 | 0 | 0 | 0 | 7 | 7 | |

| | | | | | |
|---|---|---|---|---|---|
| -330 | 0 | 0 | 0 | 6 | 6 |
| -340 | 0 | 0 | 0 | 5 | 5 |
| -350 | 0 | 0 | 0 | 2 | 2 |
| | | | | Average | 37 |

"Myr" refers to million years. The number of mammal families at −65 Myr is estimated from land temperatures immediately following the meteorite impact (Kaiho et al., 2016b). *Underlined* and *double-underlined* values indicate family numbers before and after extinction events, respectively.

**Table S5.** Family-level extinction percentages during major mass extinctions.

| Major mass extinction | Extinction percentage | | |
|---|---|---|---|
| | Insect | Tetrapod | Marine metazoan |
| K-Pg | 8 | 38 | 15 |
| end-T | 14 | 21 | 20 |
| P-T | 35 | 54 | 50 |
| LD | – | – | 21 |
| end-O | – | – | 22 |
| Average | 19 | 37 | 26 |
| Maximum | 35 | 54 | 54 |
| Minimum | 8 | 21 | 21 |

Data from Sepkoski (1982), Labandeira and Sepkoski, 1993), Bambach (2006), Kaiho (2022a), and Tables S3, S4.

**Table S6.** Projected numbers of insect, terrestrial tetrapod, and marine animal families in the future under three models in the average extinction rate case

| Event | Time (Gyr) | Conservative Model (Number of family) | | | New Evolutional Model (Number of family) | | | Continuous Worst Anthropocene Model (Number of family) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Insect | Tetrapod | Marine | Insect | Tetrapod | Marine | Insect | Tetrapod | Marine |
| 16R | 1.496 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 16E | **1.446** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15A | 1.446 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15R | 1.402 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15E | **1.352** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14A | 1.352 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14R | 1.307 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14E | **1.257** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13A | 1.257 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13R | 1.213 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13E | **1.163** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12A | 1.163 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12R | 1.118 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12E | **1.068** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11A | 1.068 | *0.05* | *0.03* | *1.70* | 16.23 | 11.73 | 195.47 | 0.05 | 0.02 | 1.53 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 11R | 1.024 | *0.05* | *0.03* | *1.70* | 16.23 | 11.73 | 195.47 | 0.05 | 0.02 | 1.53 |
| 11E | **0.974** | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10A | 0.974 | *2.31* | *1.20* | 15.20 | 76.55 | 55.34 | 349.05 | 2.20 | 0.96 | 13.68 |
| 10R | 0.929 | *2.31* | *1.20* | 15.20 | 76.55 | 55.34 | 349.05 | 2.20 | 0.96 | 13.68 |
| 10E | **0.879** | 0.01 | 0.00 | 0.86 | 0.06 | 0.02 | 5.48 | 0.01 | 0.00 | 0.77 |
| 9A | 0.879 | 27.89 | 14.40 | 86.87 | 184.46 | 95.26 | 554.04 | 26.50 | 11.52 | 78.19 |
| 9R | 0.835 | 27.89 | 14.40 | 86.87 | 184.46 | 95.26 | 554.04 | 26.50 | 11.52 | 78.19 |
| 9E | **0.785** | 11.12 | 4.55 | 68.70 | 29.42 | 12.05 | 197.17 | 10.57 | 3.64 | 61.83 |
| 8A | 0.785 | 116.21 | 60.01 | 241.32 | 307.44 | 158.76 | 692.55 | 110.40 | 48.01 | 217.18 |
| 8R | 0.74 | 116.21 | 60.01 | 241.32 | 307.44 | 158.76 | 692.55 | 110.40 | 48.01 | 217.18 |
| 8E | **0.69** | 88.54 | 35.66 | 197.09 | 140.54 | 56.61 | 307.95 | 84.12 | 28.53 | 177.38 |
| 7A | 0.69 | 276.70 | 142.88 | 492.48 | 439.20 | 226.80 | 769.50 | 262.86 | 114.31 | 443.23 |
| 7R | 0.646 | 276.70 | 142.88 | 492.48 | 439.20 | 226.80 | 769.50 | 262.86 | 114.31 | 443.23 |
| 7E | **0.596** | 400.22 | 160.74 | 569.43 | 444.69 | 178.61 | 632.70 | 380.21 | 128.60 | 512.49 |
| 6A | 0.596 | 494.10 | 255.15 | 769.50 | 549.00 | 283.50 | 855.00 | 469.40 | 204.12 | 692.55 |
| 6R | 0.551 | 494.10 | 255.15 | 769.50 | 549.00 | 283.50 | 855.00 | 469.40 | 204.12 | 692.55 |
| 6E | **0.501** | 292.07 | 117.31 | 703.00 | 292.07 | 117.31 | 703.00 | 277.46 | 93.84 | 632.70 |
| 5A | 0.501 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 579.50 | 252.00 | 855.00 |
| 5R | 0.457 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 579.50 | 252.00 | 855.00 |
| 5E | **0.407** | 292.07 | 117.31 | 703.00 | 292.07 | 117.31 | 703.00 | 277.46 | 93.84 | 632.70 |
| 4A | 0.407 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 579.50 | 252.00 | 855.00 |
| 4R | 0.362 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 579.50 | 252.00 | 855.00 |
| 4E | **0.312** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 | 469.40 | 158.76 | 632.70 |
| 3A | 0.312 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 579.50 | 252.00 | 855.00 |
| 3R | 0.268 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 579.50 | 252.00 | 855.00 |
| 3E | **0.218** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 | 469.40 | 158.76 | 632.70 |
| 2A | 0.218 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 579.50 | 252.00 | 855.00 |
| 2R | 0.173 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 579.50 | 252.00 | 855.00 |
| 2E | **0.123** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 | 469.40 | 158.76 | 632.70 |
| 1A | 0.123 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 579.50 | 252.00 | 855.00 |
| 1R | 0.079 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 579.50 | 252.00 | 855.00 |
| 1E | **0.029** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 | 469.40 | 158.76 | 632.70 |
| 0R, 0A | 0.029 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 579.50 | 252.00 | 855.00 |
| 0E | **0** | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 579.50 | 252.00 | 855.00 |
| 0 | 0 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |

Bold values correspond to major mass extinction events. *Underlined* numbers represent recovery periods following extinction events. Standard (non-bold, non-underlined) values correspond to times immediately prior to extinction events. Values <0.4 (terrestrial) and <0.2 (marine) families are interpreted as complete extinction, as described in Section 2.4.4. Red values denote complete extinctions, and blue values indicate the first appearance of <50% diversity. Italicized numbers represent true zeros, reflecting cases in which complete extinction had already occurred.

**Table S7.** Projected numbers of insect, terrestrial tetrapod, and marine animal families in the maximum and minimum extinction rate cases under the Conservative Model.

| Event | Time (Gyr) | Maximum extinction rate case (Number of family) | | | Minimum extinction rate case (Number of family) | | |
|---|---|---|---|---|---|---|---|
| | | Insect | Tetrapod | Marine | Insect | Tetrapod | Marine |
| 16R | 1.496 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16E | **1.446** | 0 | 0 | 0 | 0 | 0 | 0 |
| 15A | 1.446 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15R | 1.402 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15E | **1.352** | 0 | 0 | 0 | 0 | 0 | 0 |
| 14A | 1.352 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14R | 1.307 | 0 | 0 | 0 | 0 | 0 | 0 |
| 14E | **1.257** | 0 | 0 | 0 | 0 | 0 | 0 |
| 13A | 1.257 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13R | 1.213 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13E | **1.163** | 0 | 0 | 0 | 0 | 0 | 0 |
| 12A | 1.163 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12R | 1.118 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12E | **1.068** | 0 | 0 | 0 | 0 | 0 | 0 |
| 11A | 1.068 | 0.05 | 0.03 | 1.7 | 0.05 | 0.03 | 1.7 |
| 11R | 1.024 | 0.05 | 0.03 | 1.7 | 0.05 | 0.03 | 1.7 |
| 11E | **0.974** | 0 | 0 | 0 | 0 | 0 | 0 |
| 10A | 0.974 | 2.31 | 1.2 | 15.2 | 2.31 | 1.2 | 15.2 |
| 10R | 0.929 | 2.31 | 1.2 | 15.2 | 2.31 | 1.2 | 15.2 |
| 10E | **0.879** | 0.01 | 0 | 0.76 | 0.01 | 0 | 0.99 |
| 9A | 0.879 | 27.89 | 14.4 | 86.87 | 27.89 | 14.4 | 86.87 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9R | 0.835 | 27.89 | 14.4 | 86.87 | 27.89 | 14.4 | 86.87 |
| 9E | **0.785** | 8.92 | 3.33 | 60.35 | 12.63 | 5.71 | 78.91 |
| 8A | 0.785 | 116.21 | 60.01 | 241.32 | 116.21 | 60.01 | 241.32 |
| 8R | 0.74 | 116.21 | 60.01 | 241.32 | 116.21 | 60.01 | 241.32 |
| 8E | **0.69** | 71.05 | 26.04 | 173.12 | 100.57 | 44.72 | 226.39 |
| 7A | 0.69 | 276.7 | 142.88 | 492.48 | 276.7 | 142.88 | 492.48 |
| 7R | 0.646 | 276.7 | 142.88 | 492.48 | 276.7 | 142.88 | 492.48 |
| 7E | **0.596** | 321.17 | 117.37 | 500.18 | 454.57 | 201.57 | 654.08 |
| 6A | 0.596 | 494.1 | 255.15 | 769.5 | 494.1 | 255.15 | 769.5 |
| 6R | 0.551 | 494.1 | 255.15 | 769.5 | 494.1 | 255.15 | 769.5 |
| 6E | **0.501** | 234.38 | 85.65 | 617.5 | 331.73 | 147.1 | 807.5 |
| 5A | 0.501 | 610 | 315 | 950 | 610 | 315 | 950 |
| 5R | 0.457 | 610 | 315 | 950 | 610 | 315 | 950 |
| 5E | **0.407** | 234.38 | 121.03 | 617.5 | 331.73 | 147.1 | 807.5 |
| 4A | 0.407 | 610 | 315 | 950 | 610 | 315 | 950 |
| 4R | 0.362 | 610 | 315 | 950 | 610 | 315 | 950 |
| 4E | **0.312** | 396.5 | 144.9 | 617.5 | 561.2 | 248.85 | 807.5 |
| 3A | 0.312 | 610 | 315 | 950 | 610 | 315 | 950 |
| 3R | 0.268 | 610 | 315 | 950 | 610 | 315 | 950 |
| 3E | **0.218** | 396.5 | 144.9 | 617.5 | 561.2 | 248.85 | 807.5 |
| 2A | 0.218 | 610 | 315 | 950 | 610 | 315 | 950 |
| 2R | 0.173 | 610 | 315 | 950 | 610 | 315 | 950 |
| 2E | **0.123** | 396.5 | 144.9 | 617.5 | 561.2 | 248.85 | 807.5 |
| 1A | 0.123 | 610 | 315 | 950 | 610 | 315 | 950 |
| 1R | 0.079 | 610 | 315 | 950 | 610 | 315 | 950 |
| 1E | **0.029** | 396.5 | 144.9 | 617.5 | 561.2 | 248.85 | 807.5 |
| 0R, 0A | 0.029 | 610 | 315 | 950 | 610 | 315 | 950 |
| 0E | **0** | 610 | 315 | 950 | 610 | 315 | 950 |
| 0 | 0 | 610 | 315 | 950 | 610 | 315 | 950 |

**Table S8.** Projected numbers of insect, terrestrial tetrapod, and marine animal families in the future assuming no abrupt climate changes and no oxygen decline under the Conservative Model.

| | **No abrupt climate changes** | **No oxygen decrease** |
|---|---|---|

| Event | Time (Gyr) | Insect (Number of family) | Tetrapod (Number of family) | Marine (Number of family) | Insect (Number of family) | Tetrapod (Number of family) | Marine (Number of family) |
|---|---|---|---|---|---|---|---|
| 16R | 1.496 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 16E | **1.446** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15A | 1.446 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15R | 1.402 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15E | **1.352** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14A | 1.352 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14R | 1.307 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14E | **1.257** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13A | 1.257 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13R | 1.213 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13E | **1.163** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12A | 1.163 | 0.00 | 0.00 | 0.00 | *0.83* | *0.00* | *0.00* |
| 12R | 1.118 | 0.00 | 0.00 | 0.00 | *0.83* | *0.43* | *4.39* |
| 12E | **1.068** | *0.04* | *0.02* | 1.26 | *0.00* | *0.00* | *0.00* |
| 11A | 1.068 | *0.05* | *0.03* | 1.70 | *16.23* | *8.38* | *28.15* |
| 11R | 1.024 | 0.05 | 0.03 | 1.70 | *16.23* | *8.38* | *28.15* |
| 11E | **0.974** | 1.88 | 0.75 | 11.25 | 0.08 | *0.04* | 0.00 |
| 10A | 0.974 | 2.31 | 1.20 | 15.20 | 76.55 | *39.53* | 100.55 |
| 10R | 0.929 | 2.31 | 1.20 | 15.20 | 76.55 | *39.53* | 100.55 |
| 10E | **0.879** | 22.59 | 9.07 | 64.29 | 0.55 | 0.19 | 132.15 |
| 9A | 0.879 | 27.89 | 14.40 | 86.87 | 184.46 | 95.26 | 287.28 |
| 9R | 0.835 | 27.89 | 14.40 | 86.87 | 184.46 | 95.26 | 287.28 |
| 9E | **0.785** | 94.13 | 37.81 | 178.57 | 89.16 | 36.51 | 354.31 |
| 8A | 0.785 | 116.21 | 60.01 | 241.32 | 307.44 | 158.76 | 478.80 |
| 8R | 0.74 | 116.21 | 60.01 | 241.32 | 307.44 | 158.76 | 478.80 |
| 8E | **0.69** | 224.12 | 90.02 | 364.44 | 219.60 | 88.45 | 314.64 |
| 7A | 0.69 | 276.70 | 142.88 | 492.48 | 439.20 | 226.80 | 684.00 |
| 7R | 0.646 | 276.70 | 142.88 | 492.48 | 439.20 | 226.80 | 684.00 |
| 7E | **0.596** | 400.22 | 160.74 | 569.43 | 444.69 | 178.61 | 632.70 |
| 6A | 0.596 | 494.10 | 255.15 | 769.50 | 549.00 | 283.50 | 855.00 |
| 6R | 0.551 | 494.10 | 255.15 | 769.50 | 549.00 | 283.50 | 855.00 |
| 6E | **0.501** | 494.10 | 198.45 | 703.00 | 384.30 | 154.35 | 703.00 |
| 5A | 0.501 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 5R | 0.457 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5E | **0.407** | 494.10 | 198.45 | 703.00 | 384.30 | 154.35 | 703.00 |
| 4A | 0.407 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 4R | 0.362 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 4E | **0.312** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 |
| 3A | 0.312 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 3R | 0.268 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 3E | **0.218** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 |
| 2A | 0.218 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 2R | 0.173 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 2E | **0.123** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 |
| 1A | 0.123 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 1R | 0.079 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 1E | **0.029** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 |
| 0R, 0A | 0.029 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 0E | **0** | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 0 | 0 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |

**Table S9.** Projected numbers of insect, terrestrial tetrapod, and marine animal families in the future assuming no gradual $CO_2$ decrease (stable RRC only; stable RRC with no climate-cycle decline; or no climate-cycle decline only) under the Conservative Model.

| | | **No gradual $CO_2$ decrease** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Event** | **Time** | **Insect** | **Tetrapod** | **Marine** | **Insect** | **Tetrapod** | **Marine** | **Insect** | **Tetrapod** | **Marine** |
| | **(Gyr)** | stable RRC only | | | stable RRC with no decrease in climate cycle | | | no decrease in climate cycle only | | |
| 16R | 1.496 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 16E | **1.446** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15A | 1.446 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15R | 1.402 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15E | **1.352** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14A | 1.352 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14R | 1.307 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14E | **1.257** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13A | 1.257 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13R | 1.213 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13E | **1.163** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12A | 1.163 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 12R | 1.118 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12E | **1.068** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11A | 1.068 | *0.81* | *0.42* | *28.15* | *0.81* | *0.42* | *28.15* | *0.05* | *0.03* | *1.70* |
| 11R | 1.024 | *0.81* | *0.42* | *28.15* | *0.81* | *0.42* | *28.15* | *0.05* | *0.03* | *1.70* |
| 11E | **0.974** | *0.03* | *0.02* | 0.20 | 0.02 | 0.01 | 0.00 | *0.00* | *0.00* | 0.00 |
| 10A | 0.974 | *15.31* | *7.91* | 100.55 | 15.31 | 7.91 | 100.55 | *2.31* | *1.20* | 15.20 |
| 10R | 0.929 | *15.31* | *7.91* | 100.55 | 15.31 | 7.91 | 100.55 | *2.31* | *1.20* | 15.20 |
| 10E | **0.879** | 0.28 | 0.10 | 123.53 | 0.28 | 0.10 | 132.15 | 0.03 | 0.01 | 2.61 |
| 9A | 0.879 | 92.23 | 47.63 | 287.28 | 92.23 | 47.63 | 287.28 | 27.89 | 14.40 | 86.87 |
| 9R | 0.835 | 92.23 | 47.63 | 287.28 | 92.23 | 47.63 | 287.28 | 27.89 | 14.40 | 86.87 |
| 9E | **0.785** | 64.56 | 26.20 | 354.31 | 66.87 | 27.39 | 354.31 | 1.16 | 0.60 | 164.09 |
| 8A | 0.785 | 230.58 | 119.07 | 478.80 | 230.58 | 119.07 | 478.80 | 116.21 | 60.01 | 241.32 |
| 8R | 0.74 | 230.58 | 119.07 | 478.80 | 230.58 | 119.07 | 478.80 | 116.21 | 60.01 | 241.32 |
| 8E | **0.69** | 203.68 | 81.36 | 294.12 | 192.15 | 77.40 | 314.64 | 5.53 | 4.29 | 14.77 |
| 7A | 0.69 | 384.30 | 198.45 | 684.00 | 384.30 | 198.45 | 684.00 | 276.70 | 142.88 | 492.48 |
| 7R | 0.646 | 384.30 | 198.45 | 684.00 | 384.30 | 198.45 | 684.00 | 276.70 | 142.88 | 492.48 |
| 7E | **0.596** | 444.69 | 178.61 | 632.70 | 444.69 | 178.61 | 632.70 | 400.22 | 160.74 | 569.43 |
| 6A | 0.596 | 549.00 | 283.50 | 855.00 | 549.00 | 283.50 | 855.00 | 494.10 | 255.15 | 769.50 |
| 6R | 0.551 | 549.00 | 283.50 | 855.00 | 549.00 | 283.50 | 855.00 | 494.10 | 255.15 | 769.50 |
| 6E | **0.501** | 384.30 | 154.35 | 703.00 | 384.30 | 154.35 | 703.00 | 250.10 | 100.80 | 636.50 |
| 5A | 0.501 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 5R | 0.457 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 5E | **0.407** | 384.30 | 154.35 | 703.00 | 384.30 | 154.35 | 703.00 | 323.30 | 129.15 | 646.00 |
| 4A | 0.407 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 4R | 0.362 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 4E | **0.312** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 |
| 3A | 0.312 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 3R | 0.268 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 3E | **0.218** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 |
| 2A | 0.218 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 2R | 0.173 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 2E | **0.123** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 |
| 1A | 0.123 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 1R | 0.079 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 1E | **0.029** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 |
| 0R, 0A | 0.029 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 0E | **0** | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 0 | 0 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |

**Table S10.** Projected numbers of insect, terrestrial tetrapod, and marine animal families in the future assuming no gradual global warming (stable RRW) and no post-extinction food scarcity (FS) under the Conservative Model.

| Event | Time (Gyr) | Stable RRW (Number of family) | | | No food scarcity (Number of family) | | |
|---|---|---|---|---|---|---|---|
| | | Insect | Tetrapod | Marine | Insect | Tetrapod | Marine |
| 16R | 1.496 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 16E | **1.446** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15A | 1.446 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15R | 1.402 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 15E | **1.352** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14A | 1.352 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14R | 1.307 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14E | **1.257** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13A | 1.257 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13R | 1.213 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 13E | **1.163** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12A | 1.163 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12R | 1.118 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 12E | **1.068** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11A | 1.068 | 0.11 | 0.06 | 3.47 | 0.05 | 0.03 | 1.70 |
| 11R | 1.024 | 0.11 | 0.06 | 3.47 | 0.05 | 0.03 | 1.70 |
| 11E | **0.974** | 0.00 | 0.00 | 0.00 | 0.02 | 0.01 | 0.00 |
| 10A | 0.974 | 2.79 | 1.44 | 21.72 | 2.31 | 1.20 | 15.20 |
| 10R | 0.929 | 2.79 | 1.44 | 21.72 | 2.31 | 1.20 | 15.20 |
| 10E | **0.879** | 0.08 | 0.03 | 39.96 | 0.84 | 0.29 | 39.96 |
| 9A | 0.879 | 27.89 | 14.40 | 86.87 | 27.89 | 14.40 | 86.87 |
| 9R | 0.835 | 27.89 | 14.40 | 86.87 | 27.89 | 14.40 | 86.87 |
| 9E | **0.785** | 33.70 | 13.80 | 178.57 | 33.70 | 13.80 | 178.57 |
| 8A | 0.785 | 116.21 | 60.01 | 241.32 | 116.21 | 60.01 | 241.32 |
| 8R | 0.74 | 116.21 | 60.01 | 241.32 | 116.21 | 60.01 | 241.32 |
| 8E | **0.69** | 138.35 | 55.72 | 226.54 | 138.35 | 55.72 | 226.54 |
| 7A | 0.69 | 276.70 | 142.88 | 492.48 | 276.70 | 142.88 | 492.48 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 7R | 0.646 | 276.70 | 142.88 | 492.48 | 276.70 | 142.88 | 492.48 |
| 7E | **0.596** | 400.22 | 160.74 | 569.43 | 400.22 | 160.74 | 569.43 |
| 6A | 0.596 | 494.10 | 255.15 | 769.50 | 494.10 | 255.15 | 769.50 |
| 6R | 0.551 | 494.10 | 255.15 | 769.50 | 494.10 | 255.15 | 769.50 |
| 6E | **0.501** | 384.30 | 154.35 | 703.00 | 384.30 | 154.35 | 703.00 |
| 5A | 0.501 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 5R | 0.457 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 5E | **0.407** | 384.30 | 154.35 | 703.00 | 384.30 | 154.35 | 703.00 |
| 4A | 0.407 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 4R | 0.362 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 4E | **0.312** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 |
| 3A | 0.312 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 3R | 0.268 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 3E | **0.218** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 |
| 2A | 0.218 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 2R | 0.173 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 2E | **0.123** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 |
| 1A | 0.123 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 1R | 0.079 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 1E | **0.029** | 494.10 | 198.45 | 703.00 | 494.10 | 198.45 | 703.00 |
| 0R, 0A | 0.029 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 0E | **0** | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |
| 0 | 0 | 610.00 | 315.00 | 950.00 | 610.00 | 315.00 | 950.00 |

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