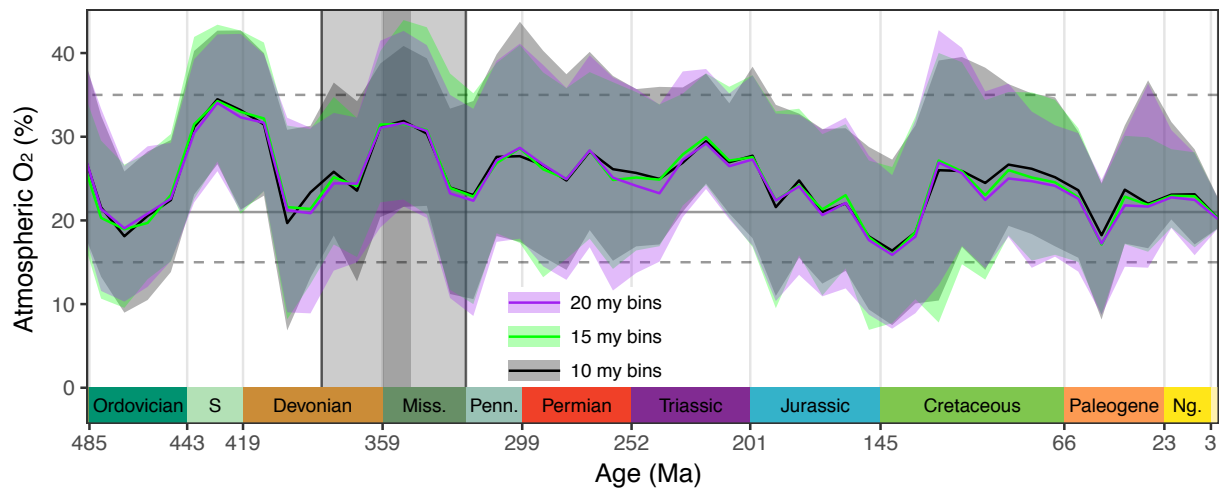


2 **Figure S1.** Isotope values used as input for the GEOCARBSULF model [18]. The shaded box
3 represents the Hexapod Gap. For the original isotope input, in red, individual data points are not
4 available. For the updated input, each individual data point is illustrated along with a line
5 representing the mean value for each 10-million-year bin. Each individual data point is
6 represented by a translucent circle, so a light point represents one single measurement
7 corresponding to a particular date and value, whereas a darker point represents multiple
8 measurements corresponding to the same date and value.

9
10



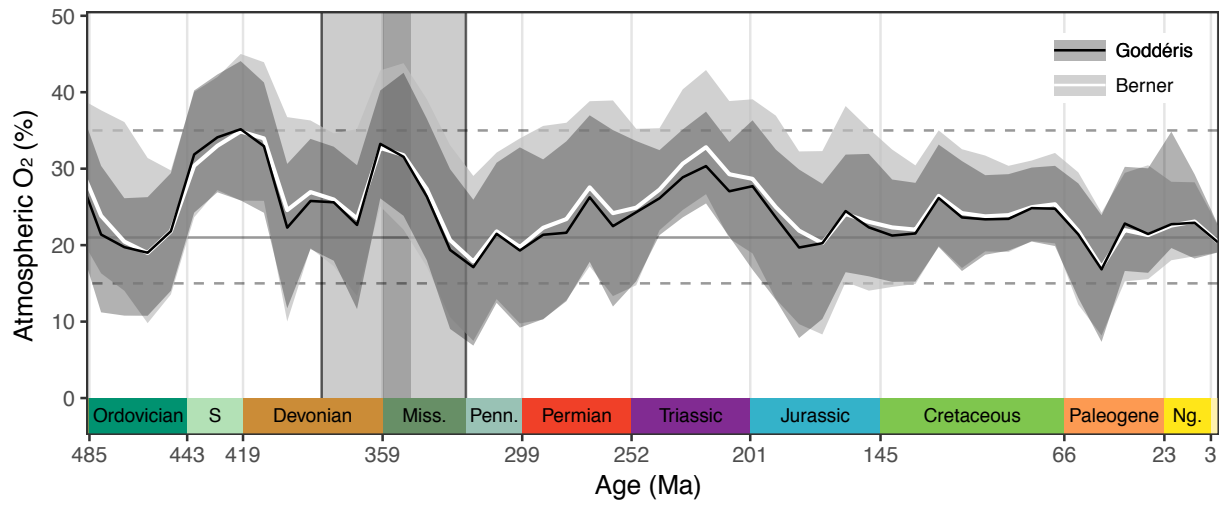
11

12 **Figure S2.** Phanerozoic atmospheric oxygen reconstructed by the GEOCARBSULF model [18]
13 with different time bins for sulfur. The "all samples" carbon isotope dataset was used here. The
14 shaded box represents the Hexapod Gap.

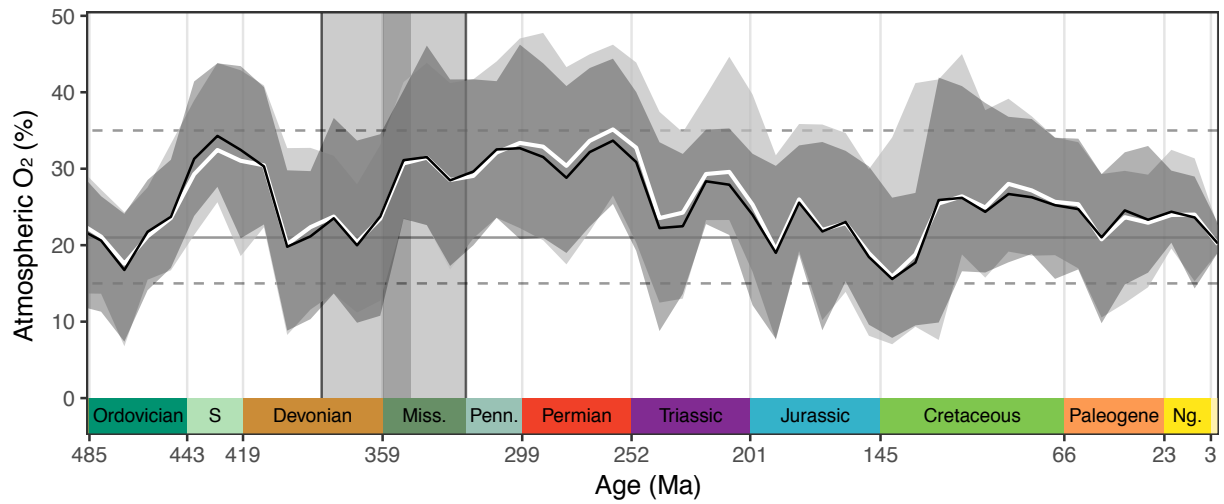
15

16

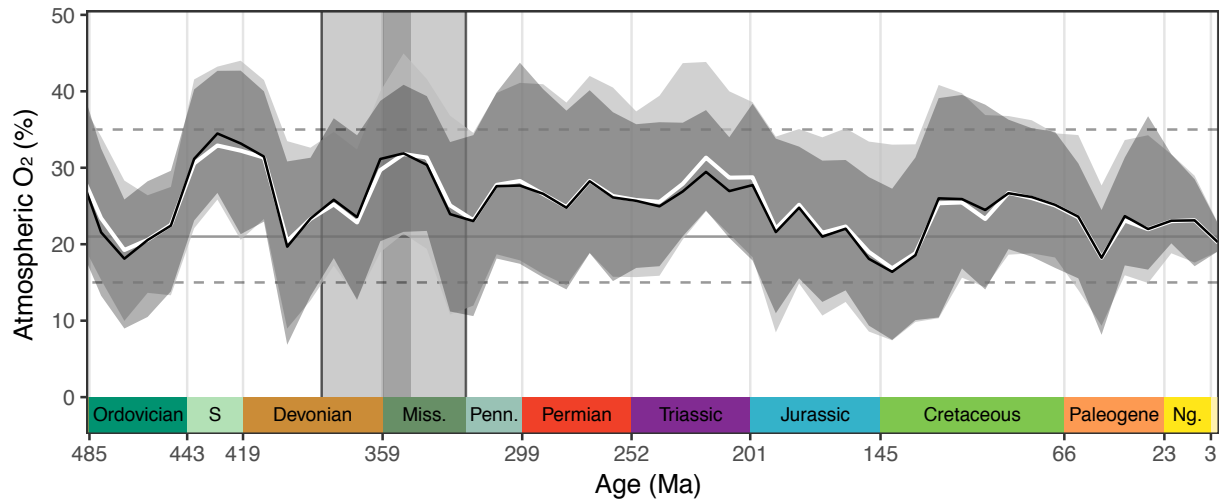
C isotope data from bulk rock samples



C isotope data from fossil samples

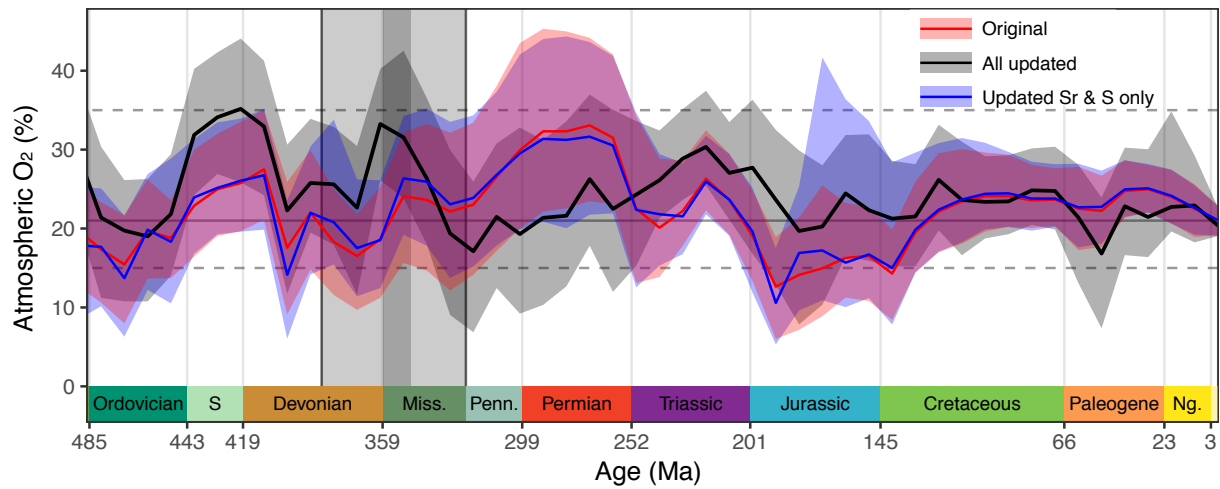


C isotope data from all samples



18 **Figure S3.** Phanerozoic atmospheric oxygen reconstructed by the GEOCARBSULF model [18]
19 with updated isotope input. The shaded box represents the Hexapod Gap.

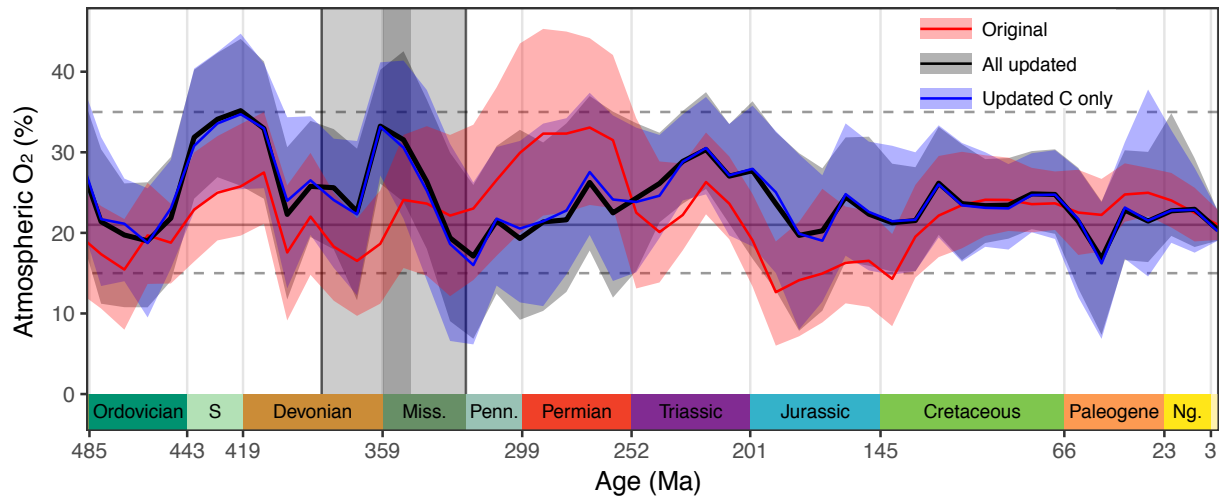
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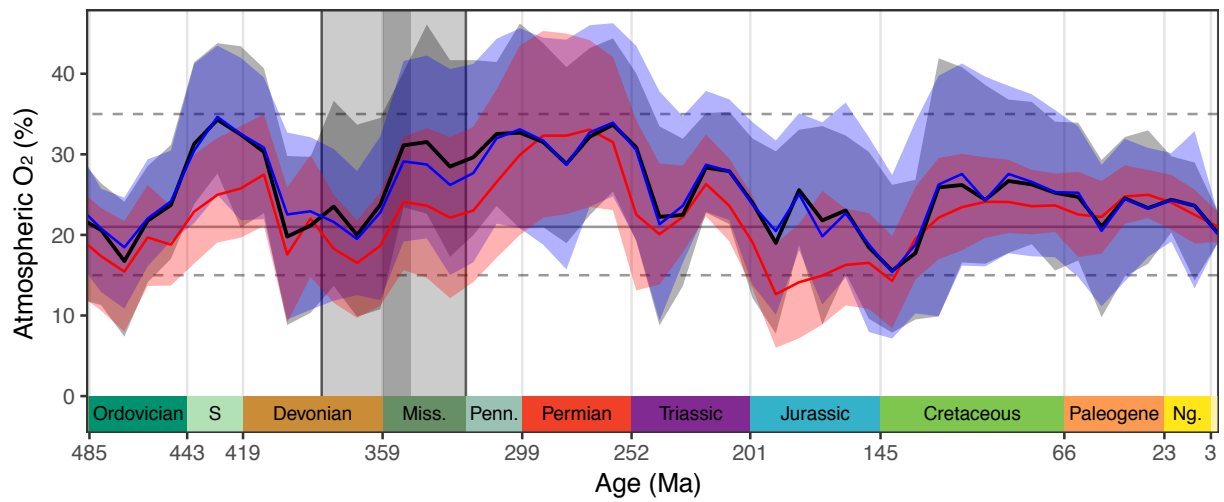
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Figure S4. Phanerozoic atmospheric oxygen reconstructed by the GEOCARBSULF model [18],
showing model output based on the previous carbon dataset and the new strontium and sulfur
datasets. The shaded box represents the Hexapod Gap.

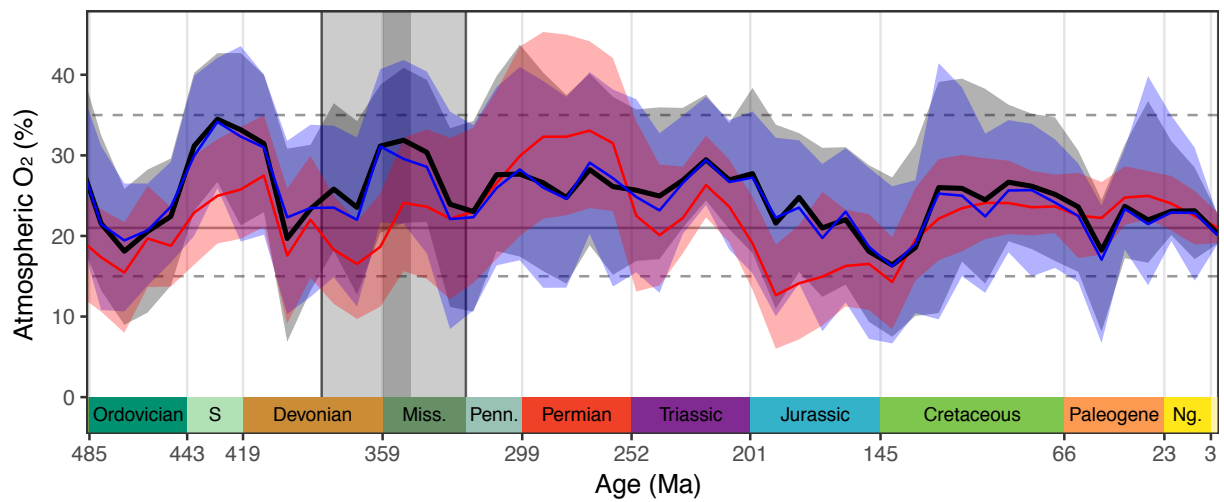
C isotope data from bulk rock samples



C isotope data from fossil samples



C isotope data from all samples

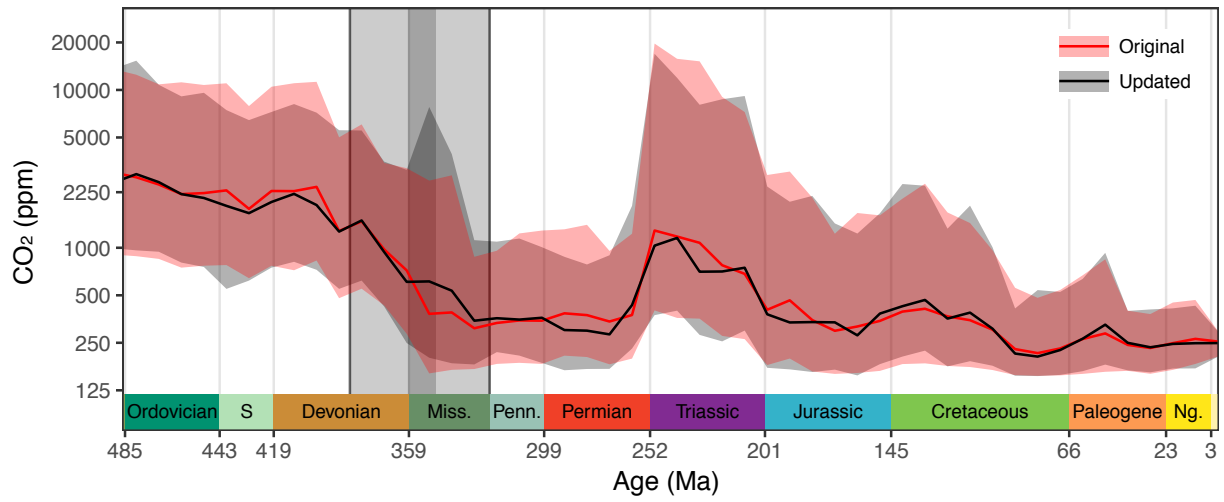


30 **Figure S5.** Phanerozoic atmospheric oxygen reconstructed by the GEOCARBSULF model [18],
31 showing model output based on the previous strontium and sulfur datasets and the new carbon
32 datasets. The shaded box represents the Hexapod Gap.

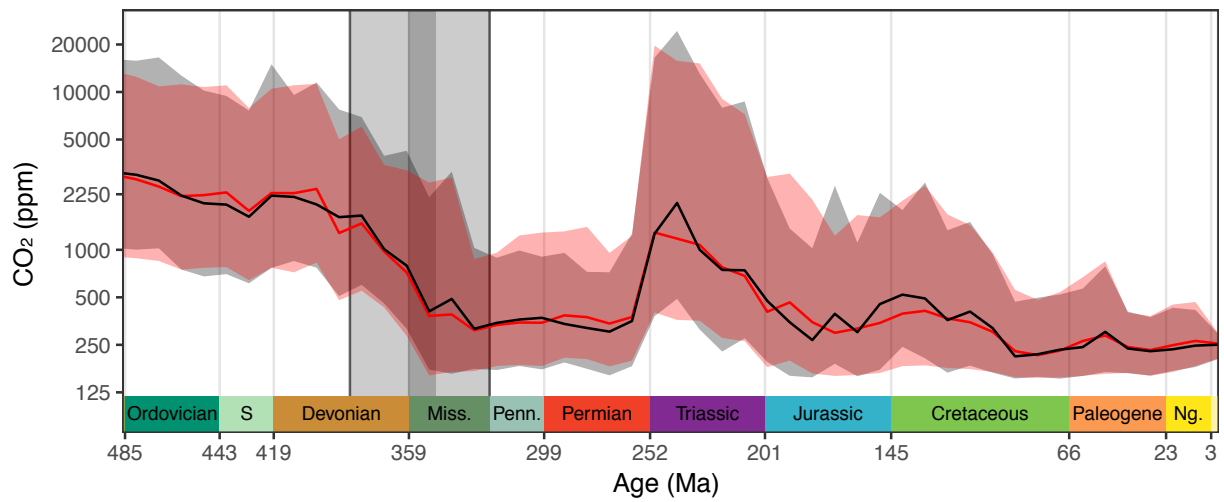
33

34

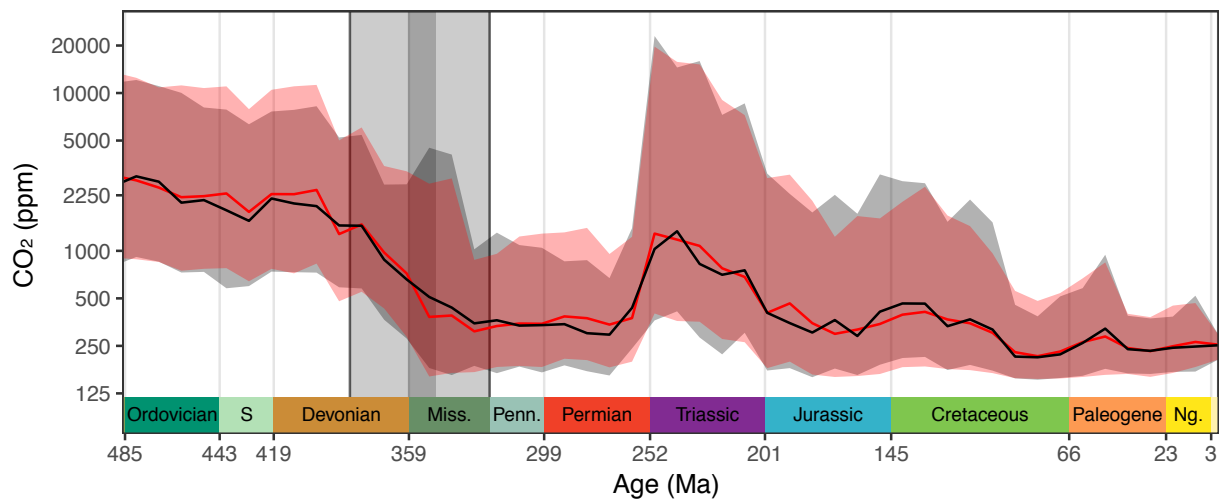
C isotope data from bulk rock samples



C isotope data from fossil samples



C isotope data from all samples



36 **Figure S6.** Phanerozoic carbon dioxide reconstructed by the GEOCARBSULF model [18]. The
37 black line and dark grey shading represent the mean and 95% confidence interval when the
38 model is run with updated isotope values. The shaded box represents the Hexapod Gap.

39 **Supplementary data file.** Reconstructions of atmospheric oxygen and carbon dioxide presented
40 here.