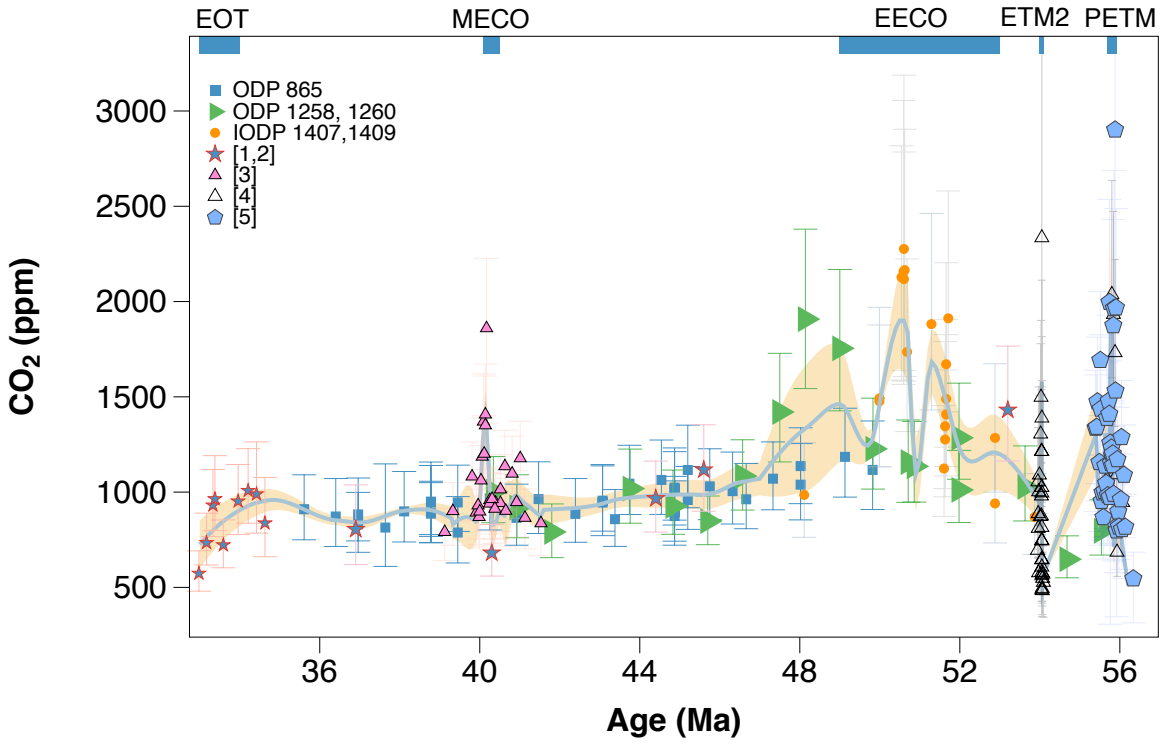
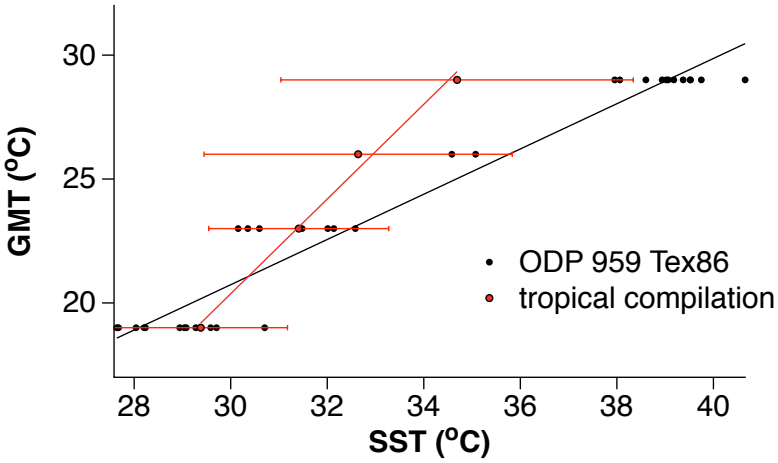
Supplementary Information

Proxy evidence for state-dependence of climate sensitivity in the Eocene greenhouse

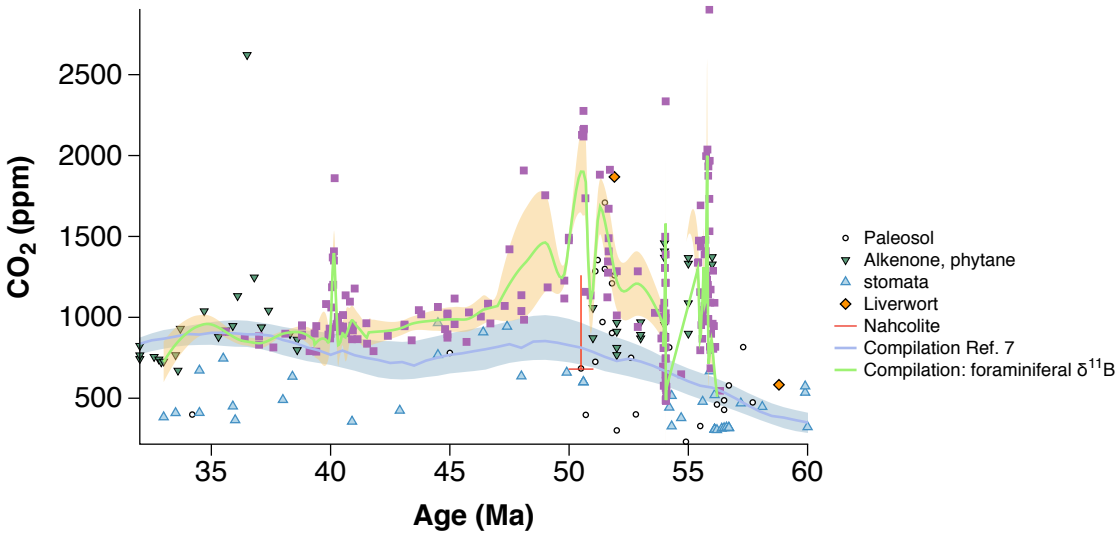
by Anagnostou et al.



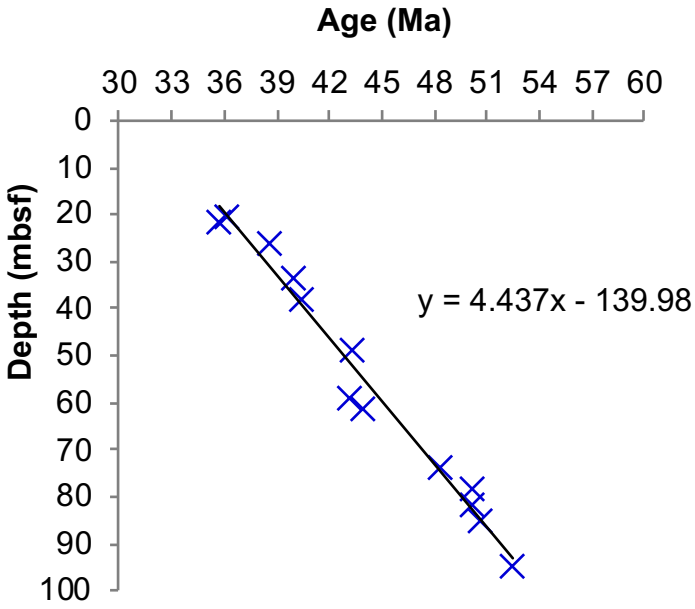
Supplementary Figure 1: Compilation of multi-site $\delta^{11}B$-derived CO_2 for the Eocene. The Middle Eocene Climatic Optimum (MECO)[3], Eocene Thermal Maximum 2 (ETM2)[4] and Paleocene-Eocene Thermal Maximum (PETM)[4,5] records were reprocessed, as described in the Methods, to be consistent with the rest of the data in the time series. The line and shaded region represent LOESS curve and its 95% confidence. All data and errors are summarized in Supplementary Data 1and 3.



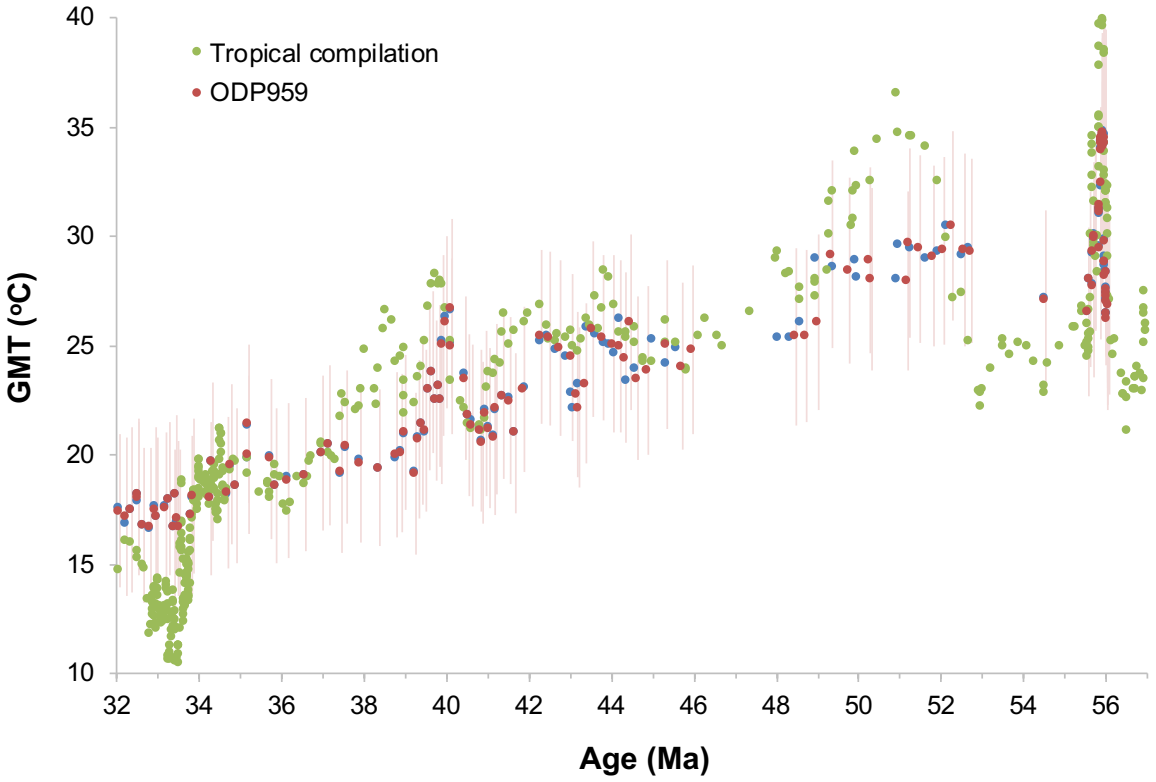
Supplementary Figure 2: Transfer functions between Global Mean Temperature (GMT) tie points and either the ODP 959 TEX_{86} record (black), or the tropical Sea Surface Temperature (SST) compilation (red). All data are summarized in Ref. [6], and also shown in Supplementary Fig. 5.



Supplementary Figure 3: Compilation of CO_2 records for the Eocene. Data are from the compilation in Ref. [7], including the new $\delta^{11}B$-derived CO_2 in this study and in Refs. [3-5], phytane-CO_2 [8], and stomata-CO_2 [9]. Note that the Nahcolite estimates best represent a minimum in atmospheric CO_2. Lines and shaded envelopes represent LOESS curves and their 95% confidence for the compilation in Ref. [7] (purple and blue) and the compilation from foraminiferal $\delta^{11}B$ in this study (green and orange).



Supplementary Figure 4: Age model used for ODP Site 865B in this study. The model is based on a linear fit through planktonic foraminiferal datums of Ref. [10] as modified here (Supplementary Table 1).



Supplementary Figure 5: Derived GMT time series for the Eocene. Brown symbols are based on the ODP 959 TEX_{86} record[6]. The green circles are based on the tropical compilation of Ref. [6], which includes Ref. [6,11-20]. Brown symbols are on the Ref. [21] age model. Blue symbols are the same as the brown but on the GTS2012 [22] age model, demonstrating the magnitude of potential misalignment due to the age model chosen. Error bars represent 1 s.d. uncertainties.

Planktonic foraminifera datum	Mean datum depth (mbsf)	Age (Ma) GTS2012 (± 0.169)
Top *Globigerinatheka semiinvoluta* [10]	20.35	36.18
Base *Turborotalia cunialensis*	21.81	35.71
Base *G. semiinvoluta*	26.3	38.62
Top *Orbulinoides beckmanni* [10]	33.63	40.03
Base *O. beckmanni* [10]	37.91	40.49
Top *Morozovella aragonensis*	48.88	43.26
Base *M. lehneri*	59.25	43.15
Base *G. kugleri*	61.28	43.88
Base *T. frontosa* [10]	73.94	48.31
Base *Astrorotalia palmerae* [10]	78.15	50.2
Base *Acarinina cuneicamerata*	81.81	50.2
Top *M. subbotinae*	85.35	50.67
Base *M. aragonensis*	94.85	52.54

Supplementary Table 1: Age model for ODP Site 865B. Planktonic foraminiferal datums, mean datum core depths, and GTS2012 datum ages.

Supplementary References

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