

Interactive comment on “The early Eocene equable climate problem revisited” by M. Huber and R. Caballero

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Much thanks to Dorian Abbot and the rest of the Chicago crew for taking a lunchtime to discuss our paper. Dorian raises two points (1) comparing with tropical SST proxies, and (2) the equivalency of doubling and enhanced forcing.

WRT the first point, Huber (2008) extensively reviewed the tropical SST record during the Eocene and found essentially that the mean values were shifted about 5 degrees above modern, but there was approximately a ± 5 degree "error" around that value. This error most likely represents sensitivity to choice of calibration equation and the choice of parameters (such as the mg/ca and/or d18O of seawater) that affect the final outcome. This compilation figure was moved to the SOM of Huber's Science Perspectives article (from the main text) by the Science Perspectives editor who decided it was

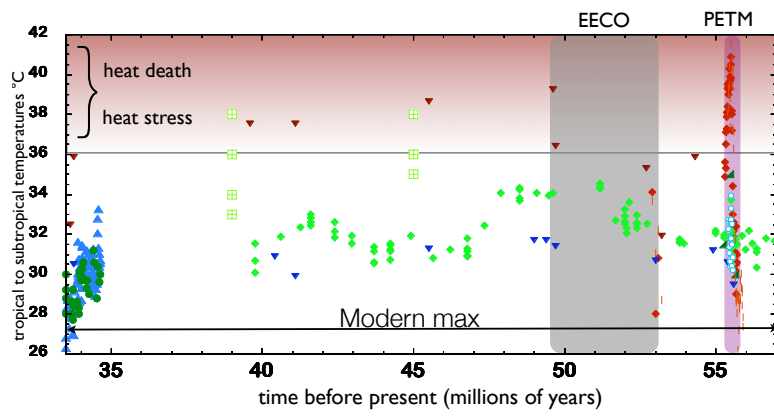
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too boring and scientific to include in the main text. A updated version is included here. We would be happy to include a semi-quantitative description of this in a figure in this paper (say a big red blob representing a range of possible tropical SSTs) but in reality we can't characterize the tropical SSTs in the Early Eocene with greater accuracy than that at the moment and there is too much uncertainty to warrant a pointwise comparison at this point. It is furthermore, beyond our mission in this paper to conduct that exercise for the ocean. But we agree that at least indicating the likely range would be helpful and we will do that in the subsequent revision.

WRT the second point, as described in the reference in the text, after suitably normalizing by the mean temperature change most IPCC class models actually have very similar zonal mean temperature changes except right near the poles. So there really is an equivalence at the grossest scales. But, we agree that we can soften that point a bit and allow for more variations. In reality, we have already performed a suite of simulations with CAM in Eocene configuration that have several global constants tuned slightly to better represent modern and all those simulations have higher sensitivity. Those simulations are much warmer than those shown in this study, and the statement we make in the text is backed up—CAM with higher sensitivity would produce nearly identical results but at lower CO₂. This is why we made the statements with some confidence.

Thank you again for taking the time to read a rather long, not very exciting, but we hope still important, paper.

Interactive comment on Clim. Past Discuss., 7, 241, 2011.



Wide spread of possible
tropical temperatures

Huber, 2008, Science

Fig. 1. reconstructed Eocene tropical SSTs