

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

**G. Dickens**

jerry@rice.edu

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Hej Matt:

Two and a half quick comments:

1/ Following Jim Ogg, it would be helpful to note and briefly discuss the timing within the “Early Eocene” (however defined), and what data is being used and what conditions are being modeled within this framework. It is very obvious that boundary conditions are changing significantly across the early Eocene (~Ypresian) between ~55.5 Ma (PETM) the EECO ~52-51.5 Ma and the “Azolla thing-o” at 49 Ma. One should be thinking of the late Paleocene-early Eocene (57.5 Ma – 49 Ma) as one where background conditions warmed significantly (the deep oceans by about 6°C), and super-

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imposed on this were a series of extreme short-term warming events; subsequently, the world started cooling. Modeling the “early Eocene” is, in some regards, like saying we’re modeling the 4 million year Holocene-middle Pliocene window and treating as a single problem.

I suspect that, for the generalities, it does not impact the overall modeling and conclusions, but it would be useful to state the problem and whether this is, in fact, correct.

2/ The issue of climate sensitivity is a bit cavalier, especially in regards to our work (Line 216), which was, unfortunately, also too cavalier on the subject. There may be very large differences between comparing short-, medium- and long-term climate sensitivities as various positive and negative feedbacks become incorporated. What we were trying to emphasize in our work was that the carbon injection at the PETM (as expressed by the CIE and dissolution) did not drive all the warming across this interval. In fact, this has been argued for a long-time, and is increasingly consistent with a variety of data. In other words, carbon emission during the PETM (and other hyperthermals) was not the primary driver of climate change during this interval but a response (and positive feedback) to environmental change ... and this is what’s missing in carbon cycle and climate models (at least to those pertaining to the 1000 yr plus time-scale).

2.5/ As a related aside, I do find one point of Dana’s comment very amusing: to suggest that Pagani et al. (2006 – if the one in Science) or Higgins and Schrag (2006) are part of “a growing number of proxy based studies that also find high climate sensitivity during the early Cenozoic” is ridiculous. There is no data in these papers! Both papers pertain to ideas about the PETM carbon isotope excursion, and both begin by inexplicably ignoring previous arguments (and evidence) that the PETM carbon input was a feedback (which would enhance sensitivity), and try to arrive at mechanisms to reduce climate sensitivity – neither with any luck by the way! Read the literature carefully!

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

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