

Interactive comment on “Mammal faunal response to the Paleogene hyperthermals ETM2 and H2” by A. E. Chew

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Dear Dr. Huber,

Thank you for your helpful review of my manuscript in *Climate of the Past*. I would like to correct my statement of expected temperature change in western North America (i.e., Wyoming) in the future (near or far) and I'm trying to figure out where I went wrong.

I do not know much about projections of climate change, so in writing this I just went with the *Climate Change 2007: Synthesis Report*. The report's table 3.1 summarizes the “best estimates and likely ranges for global average surface air warming for . . . six SRES marker emissions scenarios” expected by 2099 (section 3.2.1, p. 45). Estimates of the SRES marker emissions scenarios include temperature increases of 1.8 °C to

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4°C (with upper ranges of ~6 °C) in the next 100 years. More precisely, figure 3.2 shows temperature increases around Wyoming in western North America of around 4°C to 5 °C by 2099. The report does not offer an assessment of the reliability of these estimates but there are at least 2 scenarios (A2 and A1B) that generate these projected temperatures. Section 3.2.3 (p. 46) states “Anthropogenic warming and sea level rise would continue for centuries due to the time scales associated with climate processes and feedbacks, even if GHG concentrations were to be stabilized.” From this, I deduced that increases of ~4 °C/century could occur over the next 3 centuries in western North America (and specifically Wyoming) under at least some scenarios. This would result in ~12 °C MAT increase which would raise the current Wyoming MAT of ~8 °C to ~20 °C, similar to estimates of Wyoming PETM MAT.

Would you say that I have the rate of warming wrong or the starting MAT wrong, or both? Or perhaps I have conflated global temperature and regional MAT projections? In your review, you point out that “global mean temperature associated with regional temperatures this warm is ~15 °C warmer than modern. . . for non-hyperthermal conditions.” Add to that ~5 °C for the hyperthermal warming and we are looking at 15-20 °C of future warming to meet the hyperthermal temperatures of the past. But looking at regional MAT, the warming required appears to be less. I would appreciate any insight you could provide.

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