

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

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This paper address the possibility of correlating two isotopically documented hyperthermal events in the later early Eocene in western North America with potential faunal turnover events as documented in a densely sampled fossil record interval from an adjacent region, both purportedly representing the same time period. The main problem as I see it is that the isotopic records and the faunal sampling are not done through the same sedimentary sequences. The isotopic record is sampled from the Willwood Fm. in the northern part of the Bighorn Basin at McCullough Peaks and the faunal history is sampled from the same formation but in an area some 50 miles to the southeast in the Fifteenmile Creek Area in the central Bighorn Basin. There are documented sedimentary rate differences between the two areas and much vagueness as to how the

C417

McCullough Peaks samples relate to the Biohorizon B faunal interval documented from the central basin. Given the difficulty in precisely correlating one section (or series of sections) with the other, one has to wonder how these disparate records can provide the precision need to test whether or not these short-lived hyperthermal events can be correlated with the proposed faunal changes documented in the central basin section. I find the arguments for correlating one to the other to be rather unconvincing.

I found the use of terms on pages 1375-1376 like 'not sufficiently resolved...but can be extrapolated from' or 'loosely tied' or 'roughly 42% thicker' or 'rough predictions' to be quite bothersome, especially in a paper purportedly designed to test precise correlations.

Beyond that the complex data manipulation, rarefying, and resampling involved in producing 'comparable' faunal sample bins makes one wonder what actual biological reality is being compared and contrasted. This is especially true given that no central basin localities are precisely stratigraphically controlled enough to be able to eliminate or minimize time averaging in these surface collected samples. It may be a case of trying to look too closely at data that simply can't answer the questions being asked, at least at the resolution required to test the potential correlations between these two hyperthermal events and these two potential faunal turnovers, if that is, in fact, what they are.

In terms of more technical details:

Line 2, page 1374 - 'response' is spelled wrong

Line 16, page 1380 - the Caron and Jackson, 2008 citation is not in the refs.

I found most of the Figures to be adequate but difficult to decipher based on the minimal captions

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Interactive comment on Clim. Past Discuss., 11, 1371, 2015.

C418