Our responses to the reviewer's comments are included below as bulleted points in black text. We have also made some other small changes to improve the manuscript, including adding high-resolution copies of the maps and field photos to the supplemental data repository and small spelling and editorial changes. These changes are all included in the marked-up version of the manuscript.

Comments from Reviewer #1:

1) In the introduction line 82: the authors could add a few papers that have looked at other hyperthermals continental sections including in the Tornillo Basin looking at ETM2 and H2 (Bataille et al. 2016; 2018), some work in the Pyrennees Eocene hyperthermal (Honneger et al. 2020), and the Provence Basin probably the ETM2 (Cojan et al. 2000)

- We have added these references as additional continental hyperthermal records to the introduction. We note that the Tornillo Basin records do not record CIEs associated with ETM2 and H2, but they do show sedimentological changes, including increased sand deposition, that are interpreted to be related to these hyperthermals.

2) In the method section: line 196 and appendix A. I am still a bit unclear as to when the "bed traces" vs. elevation vs. marker beds were used to tie up section/subsections. It would be nice to define "bed traces" because to me this is following a marker bed from one section to the next but I don't think this is the case for the authors as shown in Appendix A. In many of the figures in Appendix A (e.g. Fig. A1, A3...etc...), the authors show a black double-sided arrow indicating "bed traces" between beds that are clearly not similar stratigraphically? If the beds are not similar how do they correlate them? The authors usually show dGPS measurements at the base and top of each sub-section, but they do not say if those match? Is elevation then the main basis for correlation in those cases? In general, I find that the authors could be more explicit as to how/when they use elevation/marker bed/BCM correlations between sub-sections/sections. Also, I suggest the authors should use a different symbology in the figure of appendix A for "marker beds" tying (black double-sided arrows showing clear correlation between identifiable beds) vs. "bed traces + elevation (maybe black dashed double-sided arrows to underline uncertainty in tying).

- Any time we say "bed trace" we were following one or more marker beds to trace between outcrops. Typically, we traced the base of a marker bed (usually, prominent, red paleosols or the contact between two contrasting paleosols) to a new subsection. Sometimes a marker bed would become covered as we moved up section, and we would measure up to the next prominent marker bed and trace it into the next section. In most cases, though, we were able to measure back down to the original marker bed when more complete exposure was available. Occasionally, we would measure up to the base of a marker bed and trace this contact to a new subsection. In these cases, the marker bed was not originally shown in the subsection where we did not measure it in Figs. A1-A6 and the double-sided arrows were placed along the surface that was traced. This may have led to some confusion. We have added shaded boxes to show these bed traces more clearly in Figs. A1-A6 in addition to the double-sided arrows. We have also updated the text in the figure captions and in the Methods lines 193-198 to explain this.
- Differential GPS elevation was never used to correlate between subsections within a section. It was only used as a secondary check on the field correlations and to confirm the correlations between sections that were based on biostratigraphy and the existing stratigraphic framework from

Bown et al. (1994). The only time when dGPS elevations were used to adjust the stratigraphic levels is in panel B of Fig. 4, where the isotope values are shown according to their elevation. This is used to show that the elevations provide a reasonable correlation between sections that is similar to what we determined using the previous stratigraphic framework for the area and our own field measurements. We have added some text to the beginning of Appendix A (lines 546-550) to help clarify this.

3) Line 376 "terrane" should be terrain

- We made this change.

4) Dip measurements. Could the average and standard deviation of those be provided to get an idea of what close to zero means? I think that will be useful to have a better idea of the uncertainty of several km of distance when using dGPS.

- In most cases, we did not measure and record dip while measuring sections. Rather, when a marker bed could be visually traced to a point in the distance we would shoot a horizontal like with a clinometer to check to see if it was different from zero. It typically was not different than zero. If it was, we would adjust the clinometer on the Jacob Staff to account for dip in the direction we were measuring up section. Such a dip would be a directional dip, useful for measuring section. However, because of the shallowness of dip (or lack of dip) and the lack of 3D exposure, we did not attempt to determine attitudes (strike and dip). An average and standard deviation derived from such directional dips would not give an accurate representation of the dip in the region. Additionally, the error on these measurements would often be greater than the dip itself, so we do not report them.

5) Line 378: Also a problem if there is some structural displacement.

- We have added structural displacement to that line as another possible source of uncertainty in the dGPS measurements.

6) The idea of uniform zero dip across the area is not really validated by some of the conclusions of this paper particularly line 505-515. Could the authors provide an hypothesis for Bassin Draw not being aligned with the expected dGPS elevation? A fault? Greater distance with dip not equal to zero? What is the basis for suggesting a 20m downward move of the BD section, is it only correlation or is there other evidence (e.g., biostrat?)? Based solely on chemostrat, I could see a positive 25m upward move also fitting pretty well that is why I am asking.

- We have modified that section to include the possibility that the Basin Draw section could also be shifted upward. The biostratigraphy in the section is equivocal in terms of favoring one over the other. We also suggest the possibility of a fault running through Fifteenmile Creek as a potential mechanism for the misalignment. The possibility of a buried, east-west trending fault is supported by Kraus (1992).
- The text in lines 515-524 now reads, “It seems likely that the Basin Draw section localities should be shifted downwards by ~20 meters in the Bown et al. (1994) composite section. This would align the excursion at the top of Basin Draw with CIE1 and place the productive localities D-1454 and D-1460 within Biohorizon B. Alternatively, shifting the section up by ~25 meters would align the low isotope values near the base of the Basin Draw section with CIE1 and place the productive localities D-1454 and D-1460 closer to faunal event B–2. The biostratigraphy is equivocal in terms of favoring

one adjustment over the other, although the dGPS elevation supports the first option. Making one of these stratigraphic adjustments would likely strengthen the distinction between Biohorizon B and the subsequent faunal events B–1 and B–2 in a revised faunal analysis should further stratigraphic work demonstrate that this move is warranted. The possibility of a buried fault along Fifteenmile Creek could be responsible for some of the discrepancies in correlation across the creek. This would also be consistent with other observations of east-west trending fault activity during Eocene deposition (Kraus, 1992)."