

## ***Interactive comment on “Sediment sequence and site formation processes at the Arbreda Cave, NE Iberian Peninsula, and implications on human occupation and climate change during the Last Glacial” by M. Kehl et al.***

### **Anonymous Referee #1**

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Kehl et al. provide an excellent and much-needed fine-grained analysis of the sedimentological record of L'Arbreda cave in NE Spain. This site remains one of the key localities for understanding the process of Upper Paleolithic anatomical modern human (AMH) colonization and replacement of Middle Paleolithic Neanderthals in Iberia. The cave has a highly debated chronology that requires the kind of analysis presented here to help settle a 20-year debate regarding the timing of the Middle-Upper Paleolithic transition at the cave. Since L'Arbreda returned earlier than expected radiocarbon dates for the Aurignacian (42–44 ka) and posited arrival of AMHs, several challenges to the

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stratigraphy and radiometric dates have been made. The Kehl et al. paper provides much-needed resolution to the former while the recently published article by Wood et al. in the *Journal of Human Evolution* that places the transition at l'Arbreda more in line with dates from the nearby sites of Abric Romaní and Labeko Koba. The sedimentological studies presented here confirm the intact nature of the archaeological remains shown by the work of Soler et al. (2008). Earlier speculations regarding the possible mixed stratigraphy at the I-H boundary (e.g. Zilhão and d'Errico 2003) are largely put to rest by the micromorphological evidence presented here. I would recommend publishing as is but perhaps a few minor things could be clarified.

I would recommend some clarification in discussion of the trace elements. For instance:

p.1071, lines 23-25: “The rise at 3.90 mbd is also reflected by Zn and Cu (Fig. 8) and is probably related to increased zoogenic inputs.” Can this be anthropogenic? Are we to assume this is evidence of carnivore denning or tossing of food remains or defecation by human (including Neanderthal) occupants?

p. 1072, lines 10-12: “In all subunits of B.1, above the boundary, Cu shows a close relation with P suggesting a common source for both elements; probably bat guano or mammal faeces. Significant decreases in P and Cu across the boundary of levels I and H document reduction in zoogenic inputs during the transition from final Mousterian to Archaic Aurignacian.” Same as above. Whose feces? Obviously, humans are mammals but it seems “non-human” is implied here. Also, is the reduction across the I-H boundary intended to imply an increased human presence in the cave at the beginning of the Upper Paleolithic?

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