

November 1, 2018

Dear Dr. Combourieu-Nebout,

We submit for your consideration the third revision of our manuscript “A Stalagmite Test of North Atlantic SST and Iberian Hydroclimate Linkages over the Last Two Glacial Cycles”. The second revision was evaluated by one reviewer, whom made some additional suggestions, one of which required us to run more stable isotopes. We address these edits below (reviewer’s comments in italics).

Sincerely,  
Rhawn Denniston

- 1) *The authors made some effort to show that recrystallization did not affect their isotope curve in a meaningful way and show a comparison with isotope data off-axis in Fig. S7. However, I cite from my first review: “BG66 (the part dated at 219 kyr) show evidence of recrystallization at the growth axis”. I’m highlighting 219 ka, because this is the oldest part of the entire record and shows an important shift in both carbon and oxygen isotopes that matches a large shift in Portugese margin SST. Instead of replicating this shift, the authors chose a different part of the stalagmite to obtain a second isotope transect off-axis, where potential recrystallization is much less clear. I’m puzzled about the reasons for this, and emphasize the importance of replicating the record between 222.5 to 210 ka. Because this is where the recrystallization in this stalagmite is most obvious. So this still has to be addressed.*

We have now replicated the portion of BG66 that the reviewer identified. A transect was milled parallel to the original sampling sites but outside the zone of alteration that exists within the stalagmite core. The data from this new transect agree quite well with the original time series. These data are included in the relevant figure in the Supplemental Material.

- 2) *I acknowledge that the authors have improved the structure of the manuscript before the manuscript was sent out to me. I made several suggestions, that I think would improve it further. However, the authors have not adapted the structure of the manuscript. My opinion on this matter has not changed, so it is up to the editor to decide whether the structure of the manuscript is acceptable or not. In either case, these are my suggestions:*

*a. Line 272: This is the point where the structure of the manuscript becomes less clear to me. The section on “hedy tests” is not brought to a conclusion. Instead, the authors start discussing other controls on  $\delta^{18}O$  and  $\delta^{13}C$ . This can be VERY easily improved by starting chapter 4.3. by discussing the controls as in lines 273 to 311. And then discuss potential equilibrium / disequilibrium effects. Finishing with a small paragraph that the function of hedy-tests have been questioned. Stating that the signals visible in these stalagmites can be interpreted as a climate signal.*

Please see our response to the next suggested edit.

*b. Another option would be to move the section on controls on  $d_{13C}$  and  $d_{18O}$  in section 4.3. to section 4.4. This way you can call section 4.3. "assessing equilibrium in speleothem  $\delta_{18O}$  and  $\delta_{13C}$ . I think this is the most elegant way to do it.*

We have made the changes to the structure of the manuscript as suggested in (b).

*3) I cannot see the locations of the GNIP stations on the map, but in the author's reply they mention that they do indicate it, so this might be an issue when uploading the manuscript? The addition of especially Portalegre is important, because it is located in the same climatic zone as the caves. The authors mention the correlations with air temperature at all GNIP stations, but not for precipitation amount. Please add this information for all GNIP stations.*

The relationship between precipitation amount and precipitation  $d_{18O}$  has been added to the relevant portion of the manuscript text.

*Line 474: "model ages" I think you mean "age model uncertainties"*

We did, in fact, shift the model ages in order to better mesh with the SST data. Age model uncertainties were not impacted.