

## **Review of “Reconstructing land temperature changes of the past 2,500 years using speleothems from Pyrenean caves (NE Spain)”**

### **General Comments:**

This is a well-written, thorough composite stalagmite record from a collection of caves from a novel location within the Pyrenees. The authors have used modeling software to provide a robust age model for the oxygen isotopes (and carbon and elements as well even though they are not the focus of the paper) as well as using iscam to generate a composite record from these four caves. The links between this composite stalagmite record and temperature in the region is well documented and these records have been compared to many other paleoclimate records from the region.

### **Specific Comments:**

Most of my comments fall into the technical corrections category. There are only a few things I will mention here. I would recommend you define the DA, RP, MCA, LIA in terms of time periods somewhere in the abstract or introduction as well as defining the abbreviations early. Many researchers have differing opinions on the start and end of these periods and it would help the reader if they know right away what definitions you are using.

You use the abbreviations CE for Common Era multiple times throughout the manuscript. Have you considered using CE instead of AD (and BCE instead of BC)?

### **Technical Corrections:**

Line 73 – I think a brief definition of the Great Acceleration would be useful here

Line 77 – “record decadal temperature changes...” would be less awkward

Lines 88-97 – please use correct  $\delta^{18}\text{O}$  notation.

Line 98 – what certain periods are you referring to?

Line 105 – does this altitude impact the record?

Line 120 – missing m for meters after 2-3

Line 158 – slightly moderated by precip...are you indicating that temperature is the main relationship with d18O and that precipitation is impacting it to a small extent?

Line 178 – Lacks instead of lack

Line 182 – One first batch – might be better phrased as “The first batch”

Line 228 – were instead of are

Line 235 – “were included in the iscam composite record” would be a better way to say this

Line 259 – I am not sure that F<sup>14</sup>C is the correct way to represent the <sup>14</sup>C data? The NOSAMS website is a good reference if you need one:

<https://www2.whoi.edu/site/nosams/calculations-and-reporting-of-results/>

Line 329 - please use correct δ<sup>18</sup>O notation.

Line 336 – driving instead of driven

Line 338 – “...due to the large dependence of temperature on d18Or in this region” might be clearer

Lines 345-346 – not a sentence – please re-work

Line 351 – significant instead of significance

Line 354 – no need for the work “what”

Line 355 – “Still” is not needed

Line 368 – phrases “varies at distinct range” and “it is really complicated” need to be re-phrased

Line 391 – check for an extra parenthesis

Line 401 – are you talking about speleothem d18O? It might be a good idea to specify this

Line 409 – the phrase “in spite it may continue...” seems a bit awkward – I would recommend re-phrasing

Line 414 - Roman Period has already been defined – can just use RP

Line 426 – “in spite of recent observations indicating that ...” would be a better way to phrase this

Line 432 – strange character shows up between our and speleothem

Lines 476-478 – this needs to be rephrased to be more clear to the reader

Lines 481-484 – this needs to be rephrased to be more clear to the reader

Line 485 – need “the” between isolate and last

Line 504 – I am not sure what is meant here by the Iberian-RP

Line 506 – either add “The” or “A” before the word record

Line 589 – Besides is not necessary here

Line 600 – NAO is not a driver of floods. A better way to phrase this is Atmospheric conditions associated with low/negative NAO index”

Line 614 – should higher be highest?

Line 1090 – whatever you decide to do for the 14C, please change it here

Line 1101 – for Figure 4, it might be helpful to have warm/cool indicated for the Pyrenees record presented in (a)

Line 1138 – I cannot see the line with the red asterisk

Line 1161 – please indicate (left) and (right) for the age models and proxy profiles, respectively