**Response to Reviewer 1 (responses in bold format)**

"Reconstructing land temperature changes of the past 2,500 years using speleothems from Pyrenean caves (NE Spain)"

The revised version of Bartolomé et al has significantly improved in the readability, is well structured and should, in my opinion, be accepted after some smaller modifications/clarifications.

**We appreciate this positive comment and acknowledge the acceptance of the manuscript after small changes.**

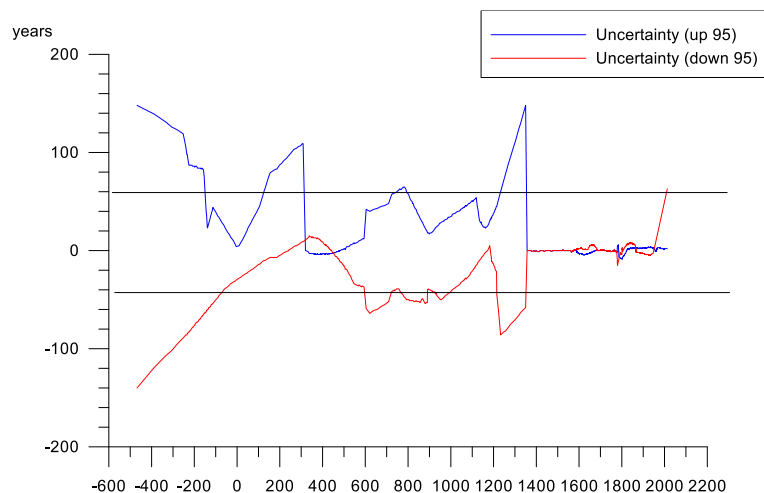
In L35 (and later on as well) the authors write about the potential influence of „precipitation". Please be more precise what is meant, it is not clear until the discussion which precipitation-related process or parameter the authors refer to.

**In general, we refer to changes in the amount of total precipitation but it is true that some other effects, such as changes in the seasonality of precipitation, or even the source (Atlantic vs Mediterranean precipitation) would also influence the speleothem record. Since distinguishing among all these effects is not possible with these data, we change in the text "precipitation" by "precipitation amount" but the different effects are indicated elsewhere (L101 in the introduction, L377, L389 and L494 in the discussion).**

L88 unclear why this reference fits to the statement and why it is needed at all.

**The reference fits to the statement since the limiting factors of every record type are discussed in that publication by PAGES2k group (see page 1858). We prefer to keep this reference since it is of general type and makes a good overview of the best proxies and archives to reconstruct hydrological changes in the Common Era.**

L294ff please make a clear statement about the uncertainties of the age control (in numbers)

**The U-Th dates uncertainties are indicated in Table 2, they are in the order of decades (some of them even more due to low Th for very recent ages or dirtier samples at the bases). With the ISCAM model, those uncertainties are considerably reduced reaching a century in very punctual cases and being below 40 years in most of the record. The uncertainty is plotted in the figure below following ISCAM results at 95% of probability. This information is now included in the text (L246-248).**

L357 please avoid isotope slang. **Done**

L362 please clarify what decadal scale means in numbers. 10 years? 50 years? This has implications when you refer to periods in the range of 10 year length!

**We agree that saying "decadal scale" may be not accurate enough but since age uncertainty changes along the record (see previous graph) it is difficult to be more precise. For some intervals, our composite records is accurate at a scale < 10 years (eg. last 600 years) but for some others the age uncertainty is >50 years.**

L378 Please clarify if this means the whole range (min - max) or the variance (mean - min?) (this means, does your record suggest +-1°C or +-0.5°C?)

**We assume that our record indicates mean annual temperature, so when we say +-1°C it represents changes in the annual mean. Still, this has to be taken with caution as we indicate in the text since not all the isotopic variation is due to air temperature changes and, in addition, we suspect the studied speleothems are recording all year-round calcite precipitation since it is happening at current times in those caves but there is no certainty that the same situation maintained during the past.**

L601 I find the NAO-discussion interpretation not yet convincing. To support this discussion I suggest to introduce the NAO as a potential driver of temperatures already in the introduction with a few more references that clearly demonstrate such a relationship. In my view, the NAO can be more invoked as a driver of hydroclimate patterns in Europe rather than temperature…? this is also in line with what the authors write in the response letter. (Btw, also in the response letter they announce a more comprehensive discussion of not only NAO, but also EA, an AO, but this is not really evident in the revised MS…) I am not sure if the NAO can be used as an explanation for the observations, or if the NAO and related predominant atmospheric circulation is rather a consequence than a driver of the recorded temperature changes in the Pyrenean and Central European records.

**In the text, the NAO index is understood as a representation of a pressure change in the N Atlantic, with consequences both in temperature and amount of precipitation changes in Europe, and the Pyrenees. We added a couple of references to this topic in the introduction. We agree that our discussion on the NAO connection with EA or AO indexes is just introduced but not further developed. We prefer to keep it as it is now to not complicate the manuscript with mechanisms we cannot really evaluate. Besides, it is also true that the NAO could also be seen as a consequence of the temperature changes in Europe rather than a driver, but probably other approaches (more on the modeling perspective) would be necessary to tackle with that idea which are far from the scope of this manuscript.**

Lastly, I also suggest to add at least a short statement/conclusion what this record now contributes to the understanding of processes/environmental response/… related to current/future warming, or something similar. This aspect is broadly opened in the introduction, but no word about it in the discussion/conclusions… e.g., does this record allow any statement about how unprecedented the current warming is?

**This record does not contribute to support the exceptionality of current warming in the last 2500 years since the way it is produced (normalizing and detrending records) prevents comparing different intervals. Therefore, we prefer not to add a statement on that regard and keep the conclusion section as it is now.**