

We would like to thank Marcelo Morales very much for his critical comments and helpful suggestions that enhanced the manuscript substantially!

1. *“Nonetheless, a detailed explanation of possible relations between the effects observed on CLP record and other records in the Andes is lacking. I consider that this section could be improved by discussing these changes (and others observed at CLP) in the light of the available information in neighboring areas in the Andes, and taking into account the particular spatial resolution of each of the proxies analyzed. This task could help to obtain valuable information of different spatial scope that supplements the excellent chronological resolution of the presented data.”*

We integrated several citations into the manuscript, which address the mentioned topics. To discuss all the other records in the neighbouring areas and the resolution and quality of other proxies used, would indeed fill another paper and exceed the range of our paper.

2. *In my opinion the weakest part of the paper is section 5.3*

We re-worked the archaeological discussion completely concerning your (as well as Dr. Bell's) comments, by taking into account “which environmental variables have affected social organizational patterns”.

3. *For instance, the authors stated that the earliest occupation in the area dates back to 5.25 Ka, coinciding with a moment characterized by “a transition to wetter conditions”. But, in my opinion, the relevant question should be why this did not take place before. Was the environmental instability suggested by Mn/Fe ratio (Fig. 3) a key variable determining the timing and tempo of peopling in the area?*

Based on Unkel et al. (2012) and Reindel (2009), we do not see the chance to say anything about earlier cultural stages in this area. Although your idea concerning the Mn/Fe ratio as “a key variable determining the timing and tempo of peopling” is very attractive to us, the reason of initial cultural evolution is beyond our knowledge.

*4. Other similar questions should be made in order to analyze the impact on societies, for example: How has environmental predictability or stability influenced the organization of settlement patterns?*

We improved the description of climatic influences on settlement patterns and social organisation. Many larger settlement places were re-occupied after abandonment. Even settlements from former cultural epochs were re-used and houses were overbuilt by the new inhabitants.

*5. Which subsistence strategies have been modified to face environmental uncertainty installed for long periods such as the one occurred during Ica stage (Mn/Fe ratio Fig 6.)?*

We added this information to chapter 5.3.

In general people were able to expand the natural given limits for settlement and agriculture by inventing and adapting techniques of water harvesting or irrigation and terracing techniques, but they were not able to master long lasting periods of severe shortage of water and unsecure water supply.

The “final” subsistence strategy was to migrate to the highlands when the rivers did not supply enough water to feed irrigation-based food production in the river oasis. This is possible as the highlands supported people with food also during less humid periods, as the resilience of production systems was much higher than in the oases (see Mächtle & Eitel 2013).