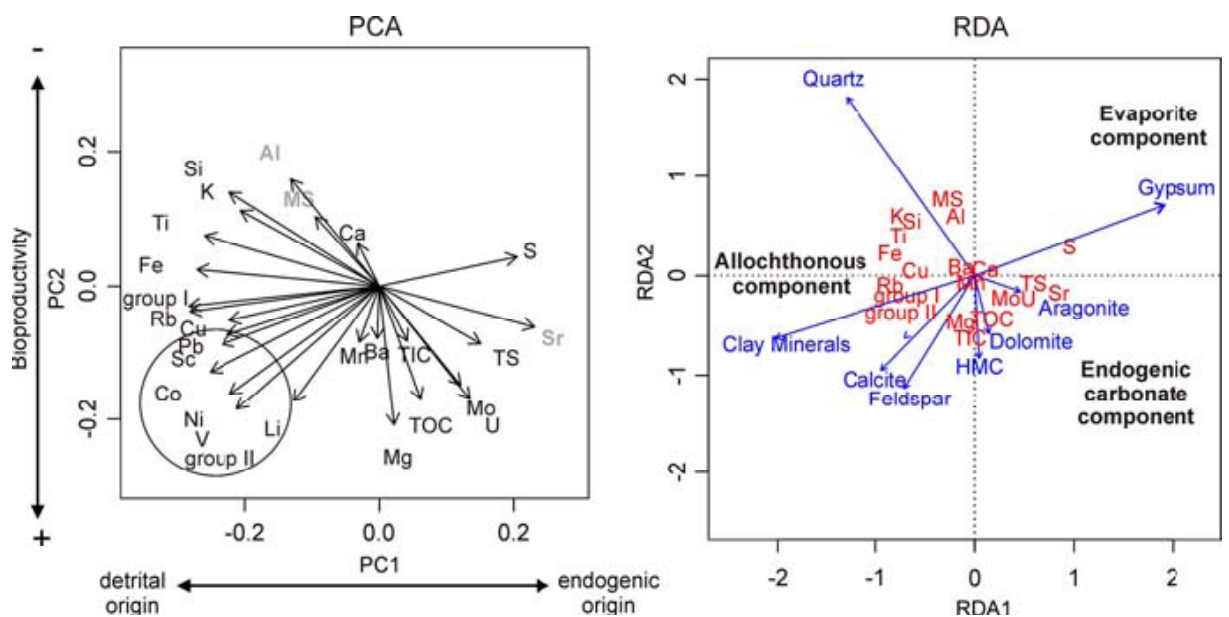


Referee #2

We thank Referee #2 for the comments and the good evaluation of our article “Clim. Past Discuss., 6, C908–C912, 2010 Late Holocene climate variability in the southwestern Mediterranean region: an integrated marine and terrestrial geochemical approach”. We consider this input will improve the final manuscript.

- Regarding the normalization to Al it has been addressed in the answer to Referee #1. Nevertheless we would like to justify the Rb/Al ratio from Zoñar Lake here. It is right that Al changes downcore and also that its profile is quite similar that Rb is. However statistical analyses carried out by Martin-Puertas et al., in press (JOPL) using the geochemical and mineralogical composition of the sediments as dataset show that Al and Rb are influenced by different processes. Both elements represent the allochthonous component of the sediments, composed of clay minerals, detrital carbonates, feldspar and quartz (Martin-Puertas et al., 2008).



Redundancy analyses (RDA), considering the mineralogy as independent variable, indicate a strong relationship between Rb and clay minerals, whereas Al is more related to quartz and magnetic susceptibility (MS). Indisputably, Al is one of the most important elements in clay minerals, however RDA show that Al also forms part of other fraction of the detrital component that is not controlled by clay minerals. Principal Component Analyses (PCA) suggest MS, Al, and Sr are influenced by PC3 unlike the rest of the elements and they are associated with aragonite and quartz (RDA). PC3 has been interpreted as a process occurring during saline to brackish lake environments (Martin-Puertas et al., in press). An increase in Al together with MS and quartz could be explained by higher reworked sediments supply (coarser material

from the exposed littoral zones) during the stages of lower lake level. So, we have preferred to show Rb/Al ratio in order to discriminate reworked sediments input from runoff.

Following the recommendation of the Referee #2, we have included a brief text in both, methodology and Zoñar Lake sections, to clarify the use of elements/Al ratios.

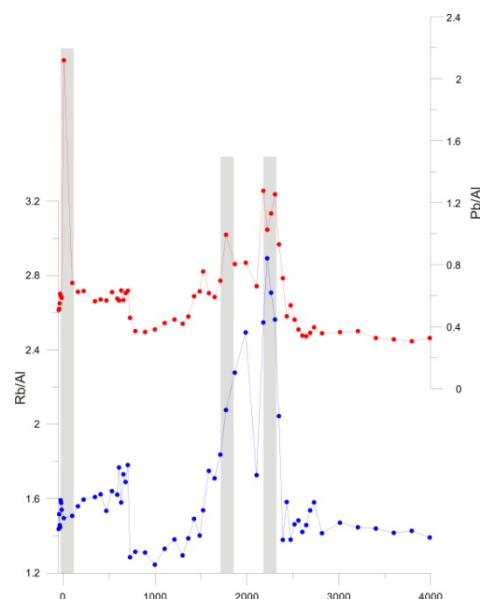
- Alboran Sea proxies.

The resolution of Zr/Al ratio is lower than Mg/Al ratio due to differences in sedimentation rates between cores ODP976 and 300G. We have included the number of samples for the Zr/Al ratio in figure 2. We agree with the referee and admit that the correlation between Zr/Al ratio and Mg/Al ratio is vague prior 2700 cal yr BP. Nevertheless, we consider that interpreting Mg/Al as possible proxy of precipitation before 2700 cal yr BP may be uncertain, since we cannot correlate this interval with the corresponding lake deposits. Thus, we do not discuss Mg/Al ratio during this interval and we use the evidences from Zoñar Lake, soil deposits, and the Zr/Al ratio (Saharan input) in order to support the more arid conditions.

- Chronology

The Pb peak from marine core after 500 BP is not discussed in the article. As it is said by referee #2, the Pb peak could be caused by core disturbance or a change in the sedimentation rate, but also by atmospheric pollution. In any case, this peak is not discussed in the section “chronological marker” because it has not been considered relevant for correlating marine and terrestrial cores.

In the case of Zoñar Lake, Pb can be supplied by both, runoff input or atmospheric. We discuss in the text the origin of the Pb peaks. In the figure, it is clear that the Pb



peak around 2300-2100 cal yr BP is due to an increase in the detrital input by runoff. It has been associated with Iberian mining and smelting activities (it is discussed in the second paragraph of the section “chronological marker”). Nevertheless the subsequent peak at Roman Epoch is not well-correlated with Rb/Al and it has been considered atmospheric pollution since the use of ovens in the mining was a common practice at Roman Time.

- Climate change.

We would like to thank Referee #2 the recommended reference and we have included it in the text as an example of the seesaw effect between eastern and western Mediterranean.

- Figures

We have accepted the most of the suggestions, but we have not extended the Mg/Al profile to the last 4000 years because we consider the interpretation of this proxy could be confused prior 2700 cal yr BP.