

Interactive comment on “Quantifying late-Holocene climate in the Ecuadorian Andes using a chironomid-based temperature inference model” by Frazer Matthews-Bird et al.

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We agree that palaeoclimate proxies are an invaluable component of climate science. The data generated by palaeoclimate proxies are important calibration points for modern and future climate science. Multi proxy studies from around the globe are vital for refining our understanding of long-term climate change and global teleconnections. Chironomidae, however, as a palaeoclimate proxy in tropical South America are still very much in their infancy. This study presents the first calibration dataset and the first quantitative temperature reconstruction using chironomids from the region.

As Dr Luening points out unfortunately the resolution of the fossil data is low and indeed the interpretation may change with a more detailed record. For this reason we

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cautioned against an over interpretation of the record. Our comments on this matter are confined to two brief paragraphs in the conclusion. We merely wished to demonstrate a proof of method, a better understanding of the different models (WA and Bayesian), and some interesting trends in the fossil data, that as Dr Luening highlights, further research can infill.

Dr Luening provides a detailed outline of the palaeoclimate research around our site. We wish to thank him for this contribution, and for fostering some important discussion on the past climate of tropical South America. The link to the map of palaeoclimate reconstructions from the region will be particularly important to many researchers working in the area.

However, as Dr Luening highlights, many of these reconstructions are of past precipitation. Even the few reconstructions of past temperature, namely the oxygen isotopic records of the Andean ice cores, have a strong precipitation component. As a result, it is difficult to place direct temperature estimates on the observations from isotopic records. We confine the discussion of the temperature variability observed in our record to studies with direct temperature estimates. We acknowledge that this is by no means an exhaustive list of the palaeoclimate research in the region but it does provide the most meaningful comparison to this study whilst contributing to our overarching aim, that of assessing the utility of chironomidae in the area.

Once more we wish to thank Dr Luening for his comment, all the points he raises are valuable contributions to this discussion. We will update the final manuscript with an expanded discussion including the records mentioned. These include the near by precipitation records of Laguna Pallcacocha (Mayewski et al. 2004; Rodbell et al. 1999) and the Sucus bog at Papallacta (Ledru et al. 2013), and the temperature reconstructions from the Bolivian Ice core of the Nevado Illimani (Kellerhals et al. 2010).

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