

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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Late Holocene reconstructions using multiple climate proxies are of greatest importance. The palaeoclimate results represent important calibration data for modern climate change and respective models. Under certain circumstances, chironomid data provide valuable palaeotemperature information. Pitfalls exist, as the authors have discussed in detail themselves (e.g. Brooks et al. 2012).

The reconstructed temperature curve is interesting. I am particularly looking at the last 1000 years. The number of samples is unfortunately rather small (every 100-200 years) and does not allow full resolution of the Medieval Warm Period and Little Ice Age. The interpolated curve segments may therefore look quite different when higher

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resolution data was plotted. Maybe future research on the same material can infill data here?

There is a number of nearby studies which are worth comparing to the new curve. Most of them record precipitation, but there are also a few temperature reconstructions. The respective studies are mapped here: https://www.google.com/maps/d/viewer?mid=zvwgQ0tAyx_k.keO5eR4ueHXE Click on the dots to get key information including the main graph. Yellow indicates a dry MWP, red a warm MWP.

The closest study is Ledru et al. 2013 <http://www.clim-past.net/9/307/2013/cp-9-307-2013.html> The study reconstructs precipitation. Result: Dry phase 1250-1550 AD, characterized by an abrupt decrease in the T/P index. During the Little Ice Age, two phases were observed: first, a wet phase between 1550-1750 AD, followed by a cold dry phase 1750-1800 AD. How does this fit with the new results?

There is another study by Mayewski et al. 2004, Rodbell et al. 1999 in Laguna Pallcacocha that found a dry phase 700-1200 AD. Needs discussion.

The next temperature reconstructions in the region that I am aware of is from Kellerhals et al. 2010 who write in their abstract: “For the time period from about 1050 to 1300 AD, our reconstruction shows relatively warm conditions that are followed by cooler conditions from the 15th to the 18th century, when temperatures dropped by up to 0.6°C below the 1961-1990 average. The last decades of the past millennium are characterized again by warm temperatures that seem to be unprecedented in the context of the last 1600 years.”

How do the new temperatures fit with this (higher resolution, different proxy) reconstruction? Other interesting temperature papers are from Salvatelli et al. 2014 & 2016 and Zuluaga et al. 2015: Offshore core G10. Results of Salvatelli et al. 2016: Organic-rich interval 1000-1400 AD indicates warm conditions with strongly developed oxygen-minimum zone (OMZ). Weak OMZ with low organic content sediment during

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subsequent cold phase of Little Ice Age.

It would be good if the authors could discuss their results in the light of nearby studies which would help to give more confidence in the validity of the technique and results.

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