

## ***Interactive comment on “The drivers of late Quaternary climate variability in eastern South Africa” by Charlotte Miller et al.***

### **Anonymous Referee #1**

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This paper was extremely interesting to read and presents a new record from eastern South Africa spanning from the LGM to the present. I have a few minor comments:

Line 40 - 52: Instead of starting by discussing the uncertainties about regional climate, first motivate the study with why we should care about the region. What challenges to water availability might future climate change pose, and how can paleoclimate help us address those uncertainties?

Line 61 - 65: There needs to be a citation for the evidence the claim that the Indian Ocean Walker circulation weakened in response to glacial forcings - see DiNezio and Tierney, 2014; DiNezio et al., 2018. In any case your site may be too far south to be directly influenced by Walker circulation changes in the Indian Ocean.

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I find the interpretation of the leaf wax data convincing - the  $\delta^{13}\text{C}$  shifts are quite small and are unlikely to majorly influence the  $\delta\text{D}$  signature as a result of major shifts in apparent fractionation. The changes in  $\delta\text{D}$  are consistent with an amount effect and/or changes in evapotranspiration. It is interesting, however, that at least in Figure 4 it looks like the most modern  $\delta\text{D}$  value seems to look similar to LGM values. Can the authors comment on this?

Figure 1 would be improved if it showed instead regional currents and winds for winter vs. summer and seasonal rainfall totals in two panels.

I would like a more detailed discussion of all the regional time series included in Figure 4 in the discussion, especially on the stacks of regional aridity and precipitation.

Line 425 - 436: It actually appears to me that there is a reasonably good correspondence between SST and the  $\delta\text{D}$  record at your site during the deglaciation and in the early holocene - there is just a lack of correspondence after 5 ka and during the LGM itself. It is therefore possible that SSTs played a key role in the response during the deglaciation itself. Something that might be useful to consider as well - how might the westerlies, as a result of the wind-evaporation-SST feedback and/or changes in Ekman transport influence SSTs and local ocean dynamics? It is possible that there is a link between the two...

As a broader point, calling the northeasterly flow into the region the ITCZ is probably overstated -the term means something very specific - a zonal band of rainfall most accurately applied to ocean regions (i.e. the marine ITCZ). it would be more accurate to characterize it as northeasterly flow that brings tropical moisture.

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Interactive comment on Clim. Past Discuss., <https://doi.org/10.5194/cp-2019-4>, 2019.

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