Comment on cp-2021-68
Anonymous Referee #2

Review van der Weijst et al. ‘Pliocene evolution of the tropical Atlantic thermocline depth’. This is a revised manuscript submitted to Clim. Past. Discuss in 2020 which I also reviewed. For this revised manuscript the authors carried out further planktonic foraminifera Mg/Ca measurements and also show the carbon isotopes (new Figures 3 and 4). Thermocline trends inferred from DMg/Ca, D$\delta^{18}$O and D$\delta^{13}$C more or less go in a similar direction between 2.8 and 3.5 Ma at Site 959, with a deepening in the later part (slight offset between oxygen isotopes and carbon and Mg/Ca).

Overall I am happy with the changes implemented by the authors and would like to see the manuscript published.

However, there are a couple of issues that I would like to authors to reflect on first:

- Having studied Figure 6, I am not convinced with the following statement (Lines 22-23): ‘The tropical thermocline depth evolution of the tropical Atlantic differs from the Pacific, which is characterized by gradual basin-wide shoaling across the Pliocene’. If you compare trends between the Pacific and Atlantic in Figure 6, they seem to more or less the same between ~4.2 and 2.8 Ma, with a shoaling between 4.2 and ~3.4 Ma, followed by a deepening until 2.8 Ma. The big contrasting thermocline changes occur earlier between ~4.2 and 5.2 Ma, where that of the Atlantic is deepening and that of the Pacific shoaling. I encourage the authors to make this clear in a further revised manuscript.

- Lines 181 to 191. I think that in this part of the discussion the authors should reference the work by LeGrande and Schmidt (2006, GRL), where slopes and intercepts for the various regions have been quantified. If using the basin-specific equations create any differences, please discuss this in your further revised manuscript.

- Please provide details about the LOESS smoothing.

Figures in general:
Consider making your figures (especially 4 to 7) more compatible for colour-blind individuals.

Figures detailed:

Figure 4: why are the axes and labels coloured in a and b? Your colour scheme only fits with c!

Figure 5: why are the axes and labels coloured in a and b? The colour scheme only fits with c. Is this figure actually needed? A lot of data is duplicated from Figure 4.

Figure 6: Data from ODP Site 959 and 1000 have considerable gaps. Can you stipple this in the smoothed records to reflect this? Specifically at site 959 between 3.5 and 4.4 Ma there isn't that much data.