

## ***Interactive comment on “Cold tongue/Warm pool and ENSO dynamics in the Pliocene” by A. S. von der Heydt et al.***

**A. S. von der Heydt et al.**

a.s.vonderheydt@uu.nl

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We thank Christina Ravelo for her encouraging comment on our manuscript.

We agree that most palaeoceanographic data suggest only a reduced zonal SST gradient and cannot say anything about associated ENSO variability itself (this is what we also say in the manuscript). However, from previous model studies and the known feedbacks involved in the ENSO process, it has been suggested that with a small zonal SST gradient none or only weak variability (Fedorov et al. 2006; why otherwise call it a permanent El Niño?) would be possible. From our analysis it turns out, that mean climate states with weak zonal SST gradients are difficult to create under parameter settings realistic for the Pliocene. Instead, the cold tongue may shift while the system still shows a similar zonal SST gradient. In the revised manuscript we make this point

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more clear and make it consistent with a correct interpretation of the palaeoceanographic data.

It is true, that the PRISM3D data set has only a few equatorial data points (two in the warm pool, one at 133W, one at 95W and a final one at 84W). Therefore, we cannot be very sure about the value of minimum SST as indicated by Fig. 7. What is sure, however is that the minimum SST must lie somewhere between 133W and 95W, which is in any case a westward shift of the cold tongue as compared to present day values. We discuss this more clearly in the revised manuscript.

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