We thank the reviewer for their constructive and helpful comments. In the following, the comments from the reviewer are shown using a blue, italic font and our response in black, regular font.

Lai et al. (2023) developed a new index using sea surface height by removing the local thermocline feedback to revisit its relationship with SST variability over the Central Pacific region. The new index corresponds well to the CP ENSO SST index, confirming the importance of thermocline feedback to EP ENSO and zonal advection feedback to CP ENSO. While I found this is a good approach to test whether model simulations could simulate relevant dynamics associated with different ENSO regimes, some points could be made clearer

Major points:

1. *3b shows the correlation of the new index with SST. I would suggest adding the correlation of the original SSH with SST. This will highlight the necessity of removing the local thermocline feedback.*

We now show the correlation of SSH with SST in Figure 3b and added a corresponding sentence to the text. The correlation of SST with SSH is close to one in the east and drops off to close to 0.5 in the west.

2. *The point made by this study that the zonal advection feedback is important for CP ENSO events especially for La Nina (Lines 184-185) is not clear from the current figures. Authors are encouraged to modify the Hovmoeller diagrams in Figs. 5-7 with arrows to indicate the propagations in CP ENSO years.*

We use arrows to highlight some of the events that exhibit westward propagation in what is now Figure 8c. We have also noted in the text that what are now Figures 7 and 8 capture documented CP ENSO events with reference to the appropriate papers.

3. *It is true that the (nonlinear) zonal advection term is particularly important to CP La Nina, leading to the negative SST skewness in CP region. Could authors plot the new index and generate its skewness?*

eta_nlti and SST averaged over the Nino4 region have negative skewness, as do the indices EMI and N_WP that have been used to measure CP ENSO. We now show histograms of the different indices in the new Figure 4 and also added a sentence to the main text on this topic.

4. *The method of removing the local thermocline feedback only considers the concurrent response. The reason for the negative relationship (D20 positive downward) over the CP region (Fig. 2) is that D20 leads the response of CP SST (Zelle et al. 2004; https://doi.org/10.1175/2523.1). Whether the current method can make it clean from the D20 influence is unknown. It should be discussed.*

An advantage of our approach is that it is based on the hydrostatic balance as described by our equations (1) and (2). This is an instantaneous balance and hence is concerned only with the concurrent response and not with lagged relationships. We now comment on this in the text.

5. It would be better to test this method in one of the models which can generally simulate both CP and EP ENSO events (Fig. 4 in Cai et al. 2021 https://doi.org/10.1038/s43017-021-00199-z).

We have decided not to do this. Rather we want to defer application to coupled models to a future study. The present manuscript is about verifying the utility of eta_nlti as a diagnostic using a freely running ocean model and against observations.

Minors:

I found Fig.2 is confusing using D20 positive upward. I would suggest revising it following what most other studies would do.

We now measure D20 positive downward throughout.