

Authors Response

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I would like to thank both reviewers for their comments, which forced me think more about the implications of the study. As my colleagues are all oceanographers, I am a bit disappointed that the strongest results from the work concern convection and the Hadley Cell. In contrast the response of the Cold Pool, a major oceanographic feature which attracts lots of funding, is rather weak. But I have to live with that.

Reviewer 1

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Title: This seems appropriate but it is not very catchy and does not mention El Nino.

[The title has been changed to that proposed in my original response to the reviewer - document R1]

Abstract.

[The abstract has been revised taking into account the reviewers comments]

Line 7: Longitudinal structure

[No change - following my comments in R1]

Typos:

[I have correct all that the spell checker and I could find]

Section 2.1 Heat Forcing

[Following my comments in R1 I have add some comments emphasising the importance and role of advection in section 2.1.]

Lines 175-190 - Section on Analysis

[As discussed in R1, I have not reorganised the text.]

Line 216.

['overall' inserted in the text.]

Lines 270-274:

[I have added the text "in the region between 230°E to 280°E and between 15°S and 35°S" in section 3.3.1 on Cloudiness]

Section 5

[After considering the reviewers comments further I decided that the results of sections 5.2 and 5.3 were really important and needed to be highlighted in the summary. For this reason I have made a major revision to the summary section emphasising the importance of the overlap between the NECC temperature range and the temperatures at which deep atmospheric convection can be triggered in the ITCZ.

The importance of the results from the ERA5 reanalysis are less clear so I have made no further changes.]

Figure B1

[Following the reviewer's comments I investigated the ERA5 data further. However it soon became clear that when major equatorial heating events occur at the height of strong El Ninos, the warmest temperatures on the Equator appear are linked to enhanced temperatures in the South Pacific Convection Zone.

Section B1 now includes a short comment on this.

Following both reviewer's comments I have added a comment on turbulent heat flux from warmer regions near the end of section 4.3]

Reviewer 2

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Single member Study

[See my published response to Review 2 - document R2]

Length of Paper

[As in R2]

Direct Dynamical Response

[Following both reviewer's comments I have added an extra section on heat flux to the end of section 4.3.]

The abstract and conclusion : El Nino like changes

[There are many possible definitions on El Nino, and I fell into the trap of meaning different things in the abstract and summary.

In the revised abstract I use the phrase "for many of the atmospheric and oceanic features associated with the El Ni~no and the Southern Oscillation". It is a bit wordy but does not imply that it covers everything.

In the revised summary I also write about "El Nino type changes" for the same reason.]

Hadley Circulation

[I appreciate that the I had not emphasised enough the change to the Hadley Circulation and the resulting impacts elsewhere.

I have therefore revised the summary section, i.e. 6.1 and 6.2, to give convection and the impact of the Hadley circulation more emphasis. I also included references to papers (Baines 2006, Li et al 2023) on the longitudinal structure of the Hadley Cell.

For a similar reason, section 6.3 now includes a reference to more local effects (Peng et al 2024).]

Figure 1 : Difference

[A difference plot has been added to Fig. 1]