

Interactive
Comment

Interactive comment on “Tropical convective transport and the Walker circulation” by J. S. Hosking et al.

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The authors would like to thank the referees for their helpful comments and suggestions.

1. The paper now includes a fuller validation of the model as suggested by the referee. The key validation findings from Hosking et al. (2010) are now included in a new section (2.2). We now also say that the seasonality of the Walker Circulation is in-line with that captured by the ERA-Interim model reanalysis (see Response to Referee #1). The methodology sections have been restructured.

2. The model has previously been compared against other models and observations in Russo et al. (2011) and Hoyle et al. (2011). This has now been highlighted in the

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paper to provide a better understanding of the model results.

3. The issue of vertical transport by the model's convective parameterisation scheme, and other key model parameterisations, is now discussed along with the vertical grid spacing. The model captures the broad structure of observed convection, as shown in Russo et al. (2011) and Hoyle et al (2011), which characterises the model's vertical transport within the tropical latitudes. This discussion has now been included in the paper.

4. The model uses a sigma-hybrid height level coordinate. As suggested by the referee, the analysis for the matrices seen in Figure 3 and 4 has been completely redone so that the matrices are now at the three TTL levels (LRM, Qclear=0 and CPT) for each region and for each season. This made very little difference to the tracer distribution patterns seen within the 12 matrices highlighting the low sensitivity to altitude near these three TTL levels.

5. The model description has now been expanded as suggested by the referee, and includes the model's vertical resolution and grid-spacing near the TTL region. We also discuss the findings of Russo et al., (2011) who show that the vertical transport within this model compares well against observations. Key model parameterisations are now discussed in the methodology.

6. An illustration of the meridional circulation in the model is now included in Figure 2. The Walker Circulation is a prominent feature.

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