

## ***Interactive comment on “Interannual variability of the boreal summer tropical UTLS in observations and CCMVal-2 simulations” by Markus Kunze et al.***

### **Anonymous Referee #1**

Received and published: 15 February 2016

The paper presents an assessment of the representation of the Asian Monsoon Anticyclone (AMA) in the UTLS in the CCMVal 2 models. The ERA-Interim reanalysis and the MIPAS satellite data are used to compare the dynamical variables and the water vapour and ozone concentrations. The manuscript provides new insights on the abilities and limitations of the models in representing the AMA structure and tracer distribution. The paper is nicely written and the methodology is accurately explained. I recommend publication in ACP after the following minor comments are addressed.

- P5 L14: This is the first time the terminology JA is used in the main text, explain what it means.

- Figure 1. In the top panel, showing the winter values of the MIDX is unnecessary and masks the interannual variability in the time series. I would suggest showing the sum-

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mer values alone in this Figure, in particular the JA indices used for the regressions.

- P8 L12-13: Why do you need to multiply the fit parameters by some factor? Also, in Eq. (2) some regression terms are included that are not shown in the paper (volcanoes, trend, solar). Is there a reason to include them?

- Figure 3 caption: divergence-free zonal wind anomalies

- P12 L4: Do you have an idea of why the models have higher water vapour values?

- In the main text Figure 7 is discussed before Figure 6. I suggest that you switch the order of the Figures.

- P14 L3-4: This sentence is not clear, what do you mean?

- P15 L6: remove comma

- P16 L4-5: What is the reason to show the 120E-160E?

- P16 L24-27: This sentence is too long, I suggest adding a parenthesis in: (annual average ... monsoon circulation)

- Figure 10 and related discussion (P2 L11-14): The main difference in OLR pattern with the Randel et al. (2015) results is in South-East China, where their results show reduced convection over a broad area, and Figure 10 in this paper does not show any significant anomaly. I do not see strong differences in the Bay of Bengal. Also, Randel et al. (2015) argue that anomalously cold temperatures associated with strong convection lead to stronger dehydration reducing water vapour in the subtropical UTLS. Do you propose an alternative mechanism? This should be clarified when contrasting your results to those of the mentioned paper. These comments refer also to the discussion on P25 L20-30.

- P21 L4: The positive anomaly is centred on an island in front of the Vietnam coast called Hanai.

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