

Dear Adrienne Jeske and Holger Tost,

thanks for the clarifications regarding the CVTRANS routine. I welcome the move to present it in the supplement, as it had previously taken away the focus (at least in my case) too much from the actual aim of your manuscript which you clarified in the answer to the editor. That move also improved the story line significantly.

There are some point I have for further clarification, as stated below.

Finally, I would suggest you to have a final re-read of the manuscript to remove those ‘little’ things that disturb the reading flow, like wrong line breaks, consecutive sentences that start the same, doubling of information within only a few lines, etc. (I haven’t specifically mentioned all of them below).

Specific comments:

line 6/7: “The upward transport increased...” From the context (and reading twice, including the sentence before), I read that you mean the increase in regard with altitude, however, increase could also be in terms of mass. Thus, I’d suggest to make that more clear (especially in the abstract).

line 50: I think, this sentence is a remnant of the old manuscript version? Please check!

line 81 (and other places): “minor” adjustments:

I am not sure, if it really is a ‘minor’ adjustment – if it was, would it be necessary at all? I’d suggest to remove the word ‘minor’ in regards to the adjustments here and in the other places in the manuscript/supplement, where the adjustments are mentioned.

line 85:

Maybe this is a bit ‘personal taste’ but I find this sentence makes a very abrupt start into this section. Maybe you can say something about where this mixing matrix was introduced (EMAC/MESSY/CVTRANS/other model), to soften the start and possibly link it to the models used in this study?

line 87: “An important remark”

I suggest removing this comment/sentence

line 88/89:

remove line break

Figure 1a:

On the y-axis, the word”surface” is split over two lines, please adjust to one line.

line 103/104: “The highest model level...”

Either a) add something like “Again, the highest model level...” or b) consider even removing the statement here (this and the following sentence). It has (now) been nicely introduced in the description of Figure 1 in the paragraph above, and is actually not needed here.

line 105: remove line break.

line 106/107: I think this is a repetition from lines 97f, and thus can be removed here.

line 111: “reach even” -> even reach

line 112: “starts also” -> also starts

line 126: “inside a whole mode grid cell”

Do you mean one grid cell here, or rather the vertical column including the grid cell?

line 137: “An overview of the used submodels...”

-> of all used submodels

l 148: “For the latter case”

I assume, this is also a remnant of the previous manuscript version, there are no cases specified so far in this section.

l 151: CVTRANS 3.0 -> CVTRANS v3.0

Please check for consistency throughout the manuscript/supplement.

l 156: “Remark:”

Maybe better something like: “We like to point out that ...

l 179/180: “transport has strengthened”

Similar as in my remark to the abstract. From the description of the exchange matrix, I understand that you model the mass transport, thus, does strengthened transport refer to more mass being transported here (and in the abstract)? The abstract reads more like strengthened in terms of reaching higher altitudes.

Figure 5:

Is it possible to write the numbers on the (updraft mass flux) axis in an angle? I find them a little hard to read/connect this way.

line 221: “in average” -> on average

line 224: “mass fluxes tended to higher values”

Not clear what you want to say here. Is it that the mass fluxes show higher values?

line 230: remove “On the other hand” (following sentence starts the same)

“impact of downdrafts” what do you mean with ‘impact’, in what regard?

l 232: “in average” -> on average

Figure 6:

The legend covers some of the points in the plot, please move legend (maybe above the plot) or re-align such that all points are visible.

Figure 7, caption: “30°S and 30°N”

Do you mean ‘30°S to 30°N’

l 250/251: “However,”

I am not sure, ‘however’ is the word that you want to use here. What does it refer to? I cannot see a ‘contradiction’ to the statement in the sentence before.

l 255: “laxer” -> layer

l 256: remove line break

l 260: “boundary layer (BL) to the upper troposphere (UT)”

Both terms have appeared in the manuscript before, so better introduce the abbreviations there.

l 265/266: “Different processes”
examples?

l 272-274: Move this sentence to line 281 (following “...upward mass transport.”)

Otherwise your reader immediately asks why you are not mentioning the Tibetan plateau.

l 272-273: Are you referring here to the ‘white areas’? Maybe add a range of latitudes, since ‘west of Africa/South America’ covers a large range of latitudes (including the ITCZ for example, which you already identified as a region with enhanced values).

l 294: “less convection”

This is confusing, the sentence before states that the transported portion increased?

l 297-299:

I cannot follow where you are looking at, e.g. eastern Atlantic equatorial region”: I mainly see blue areas here in Fig. 9, but you talk about an increase?

l 305/306: Any plans to use a “better” convective parameterisation in future studies?

l 318: “A huge decrease can be observed...”

Again, I am confused, I see a rather big increase? Or are you referring to further S/N, than better use latitudes to guide your reader!

l 322: “... identify climate changes in convective activity”

Climate changes (plural)? Do you mean ‘climate change’, ‘climatic changes’, or ‘changes in convective activity due to climate change’?

l 347: “goes well” -> aligns

l 350: “but a partly” -> but partly

l 367-369: These sentences seem to double information from lines 362-364. Can you combine these sentences?

l 370: “reaches higher” -> add ‘altitudes’

“tropopause altitude” -> ‘tropopause height’

l 372: “similar to the tropics” -> similar to those in the tropics.

l374: “hypothesis”

Is this really a hypothesis or rather a finding?

Supplement:

“Minor modifications...”

As mentioned before, I’d suggest removing ‘minor’

Section 2:

Why are you removing the comparison of old and new CVTRANS version (Fig. S1, that previously had 3 panels)? From the discussion in the review replies, I would understand removing the CVTRANSturb comparison, but would suggest to keep at least the old/new comparison.

Section 3

Please check for consistency, in the main manuscript you use at least some of the submodels with capital letters, here they are all in lower case. (E.g. CH₄ vs ch₄)

Section 4:

“In this table information,”
remove the comma

Section 5/Figure S2 caption:

“compared form 1990...” -> from

Section 6:

“La Niña event (Fig. S3)”
check reference! Also in the following for Fig. S4.