

Editor comments on ACP-2019-1169, 2nd revision of Kuilman et al.

The abstract and the manuscript reads now much better. On the abstract I have the following two comments (P1, L46):

- (1) Abbreviation SST has not been introduced.
- (2) Further, it has not been mentioned anywhere yet that changed SSTs have been considered. Either you add a sentence here or you add that the SSTs have been changed as well in line 32 where you write what is done in this study.

On the main text I have the following comments:

P5, L218: What do you mean with the latter is not considered in this study? No chemistry is considered! Please rephrase the sentence to be clearer.

P5, L229-230: This sentence is also very weird. Why do they do not play a role in your experiments? The question from the referee was quite simple and could have been answered with yes or no. Either CFCs are considered or not. Since you use pre-industrial conditions I would assume that these are either zero or low since to my knowledge anthropogenic production (and thus the increase) of CFCs started later than 1850. This is something which can easily be checked. So please check and rephrase the sentence accordingly.

P6, Table 1: The naming in the table is quite misleading and I needed a while to understand how your four experiments differentiate from each other. I would suggest to do the following change (and simplification) to the table to be clearer:

Experiment	CO ₂	SSTs
C1	PI	PI
C2	double	PI
S1	PI	double (or high)
S2	double	double (or high)

Further, it would be more logical if the naming would be C1, S1, S2 and S3 since you have one control run and three scenarios.

P7, L298-312: This text part is also quite difficult to read. I would suggest that you repeat here the sentences from the appendix what R, S and the deltas are. Further, I would suggest to move the second paragraph to the appendix or to make a list with bullets for CO₂, H₂O, O₃, cloud and Albedo where then is written what has been done for each species or you just simplify the text. In general the difference between control and experiment is considered, so just mention then what is the difference for the species. In your text especially the phrase “the other variables” is not clear and rather confusing.

P9, 392: add “(C1)” after control simulation.

P14, Figure 5 caption: Shouldn't it read “S1 - C1” and “C2 - C1”, respectively? The same holds for Fig7, Fig 9, Fig. 10, Fig 11 and Fig 13.

P18, L697: Be more precise than “higher up”. Above which level?

P24, L870: Sentence not clear. Please rephrase. Which exact mechanism are you talking about? What exactly is out of the scope of the paper? Do you mean to investigate the exact mechanism why the non-LTE effects are small is outside the scope of the paper?

P26, L897: Which errors? Do you mean the bars in the bar chart of Figure 13?

P30, L1122: What is the PRP method? Please add more details.

Other technical issues:

P2, L64: the -> this

P3, L122: these -> "the" or "the respective"

P3, L126: use plural, thus "forcing and feedbacks"

P3, L143: such idealized -> such "an" idealized

P6, L264: effect -> affect

P9, L391: add "to" before "the"

P10, L433: Past should be used here: "In this section, we have discussed....."

P10, L444: add "is found" after CO₂-concentration.

P11, L452: singular should be used here -> run

P13, L536: add "by" so that it reads "could be caused by an increase...."

P14, L545: add "the" so that it reads "....due to the.....".

P15, L589: add "scale" so that it reads ".....synoptic scale waves"

P16, L645: add "concentration" after CO₂.

P17, L652: add "to" before "the" so that it reads "...with respect to the....."

P18, L698: add "vapour" so that it reads "water vapour".

P20, L759: stratosphere -> stratospheric

P20, L760: until -> up to

P21, L771: add "average" so that it reads "by taking the average in this way".

P22, L814: add "is" so that it reads "is a bit smaller".

P22, L822-824: "before" appears in the sentence twice. I would suggest to delete the latter one.

P22, L832: move "mostly" before "contributes" so that it reads "which mostly contributes...".

P24, L874: "for due" is not correct, this "for" is obsolete here. Please remove.

P26, L890: add "the" so that it reads "shows the"

P26, L931-932: "before" twice. One is therefore obsolete. I would suggest to remove the latter one.