

**Dear Prof. Nicola Maher,**

Thank you for your useful comments. We checked and improved the manuscript.

**Line 20 - 'of' stronger droughts**

We changed 'in' to 'of' in line 20.

**Line 23 - 'among' is not the correct word here, perhaps 'of' is better**

**Line 23-26 is difficult to understand can you reword?**

We reworded those lines as the following in lines 23-26.

“We use observation-based empirical functions to estimate burned area, fire CO<sub>2</sub> emissions and fine (<2.5 μm) particulate matter (PM<sub>2.5</sub>) emissions from these simulations of precipitation. There are no significant increases in the chances of burned areas and the CO<sub>2</sub> and PM<sub>2.5</sub> emissions exceeding the 2015 observations due to past anthropogenic climate change. In contrast, even if the 1.5°C and 2.0°C goals are achieved, there are significant increases in the burned area and CO<sub>2</sub> and PM<sub>2.5</sub> emissions.”

**Line 29 – I think that this should this be climate change not climate changes? If you agree please check the entirety of the manuscript for this**

We changed “climate changes” to “climate change” in lines 30, 58 and 70.

**Line 37 - 'a' weakening**

“a” was inserted in line 37.

**Line 38 - 'relate' should be 'relates' and perhaps 'drives' or 'corresponds' would be a better choice of word**

We used “corresponds” (line 38)

**Line 45 - 'loss' for economy**

We rewrote the sentence to “large economic loss (at least 16.1 billion USD for Indonesia) and significant impacts on ecology and human health (Taufik et al., 2017; World Bank 2016, Hartmann et al., 2018).” in lines 44-46.

Line 47 - 'the' largest

"the" was inserted (line 47).

Line 62 – two sets of large ensembles

Done (line 62).

Line 63 - 'are' historical

'is' was changed to 'are'.

Line 129 - 'consistent'

We corrected it (line 129).

Line 140 - 'apply' is not needed

We rewrote the sentence to "we apply the above normalization process" (line 140).

Line 144 - 'Should this be 'it is suggested' or should it be 'we show that'

'we show that' is used. (line 144)

Line 149 - , ' one with factual ... and one with counter factual'

Done (line 149).

Line 157 - 'signal'

We used 'signal' (line 157).

Line 158 'using an empirical function that estimates x from y'

We rewrote the sentence to "using an empirical function that computes observed sea ice concentrations from surface temperature" line 158.

Line 200 - 'an' El Nino

We inserted 'an' (line 201).

Line 201 – define tropical ocean mean

It is defined in line 199.

Line 236 – define major El Nino year

We wrote “the year 2015 with the major El Niño” in line 237.

Line 244 - be specific do you mean 'fire emissions'

Line 244 should be line 246. We wrote 'fire emissions of CO<sub>2</sub>' in line 248.

Line 266 – Add – These results agree well with Lestart and Yin who also ...

Done (line 268).

Line 283 – This would read better as – 'Future work to compare ... would be useful.'

We rephrased it to “A future work to compare multi model simulations using multiple estimates of warming patterns in SST would be useful.” (line 286-287)

Caption F4 – What do you mean by omitted? Should this be subtracted?

“subtracted’ is used.

In general when you say fire or estimates fine (e.g. line 130, and the figure captions) do you mean a specific aspect of fire? If so this should be specified in the text

We improved the following sentences:

Line 130 “burned area and fire emissions”

Line 197 “burned area and fire emissions of CO<sub>2</sub> and PM<sub>2.5</sub>”

Line 271 “burned area”

Line 282 “burned area and fire emissions”

Caption of F2 “burned area”

Caption of F7 “fire emissions of CO<sub>2</sub>”

Caption of Supplementary Figure 1 “burned area”

I additionally ask that you add the following information to the manuscript before publication.  
A line or two of discussion about why the probability is smaller for 2degrees of warming than 1.5degrees of warming (see line 215).

The reason of larger responses in 1.5 degrees than 2 degrees are already mentioned in lines 201-206.

A line of discussion on a similar topic for probabilities stated in lines 243-244, the probabilities are not linearly related to the SSP number. Can you suggest why?

We added “Please note that the year 2100 land-use CO<sub>2</sub> emissions are not linearly related to the SSP numbers, because the SSP numbers did not indicate radiative forcing levels.” in line 244-245.

Best regards,

Hideo Shiogama