We thank the reviewer for their constructive criticism, and time spent to analyze this manuscript. The responses, and explanations related to their comments are listed below (in green).

This manuscript discusses expected future changes in Indian Monsoon precipitation amounts and variability. To this end, the authors use 32 CMIP-6 model projections under different shared socioeconomic pathways: SSP1-2.6, SSP2-4.5, SSP3-7.0 and SSP5-8.5. The main conclusions are that the Indian Monsoon will experience an increase in precipitation and its interannual variability will become larger. The methods are standard in this type of analysis, the results are properly discussed and well supported by easy to follow figures. The final discussion does a good summary of the findings. While the results would stand on their own, they seem to contradict previous studies summarized in the introduction. This discrepancy needs to be resolved before the manuscript is accepted for publication. There are also several minor comments that will need to be corrected.

1. The main conclusions in this study are that regardless of the shared socioeconomic pathway considered, most models show an increase in precipitation in the Indian Monsoon. Even more, the simulation ensemble indicates a linear dependence of rainfall on global mean temperature with high agreement between the models and independent of the SSP. These results contradict previous observational studies (see introduction) where it was shown that there was a decreasing trend of precipitation in the second half of the 20th century.

Response: Please note that the observed decreasing trend in the second half of the 20th century described in the introduction can also be found in the ensemble mean of the models as displayed in figure 05. Thus, observations are not opposing the model results.

Those same studies suggest possible physically-based reasons for the decreasing trend. If there was a decrease in the 20th century precipitation, it would contradict the assumption of a linear relation between rainfall and temperature.

Response: This is an important aspect and we would like to thank the reviewer for pointing this out. We will add a discussion of the matter in a revised manuscript. The reason why we believe that there is no real contradiction in the physics (but obviously in the manuscript which we will resolve in the revised manuscript) is the following: We analyzed the dependence of increase in annual monsoon rainfall on global mean temperature in the 21st century relative to 1985-2015 which is a period when the GHG warming and associated warming over land is expected to dominate the Indian summer monsoon dynamics. Thus, the found linear relationship is valid when GHG warming is the dominant factor. We added an explaining comment for clarifying more precisely when the found relationship is valid ("The simulation ensemble indicates a linear dependence of rainfall on global mean temperature with high agreement between the models and independent of the SSP if global warming is the dominant forcing of the monsoon dynamics as it is in the 21st century"). Besides, we added and explaining paragraph in the discussion: "The simulation ensemble indicates a linear dependence of rainfall on global mean temperature with high agreement between the models and independent of the SSP. This is not in contradiction with the observed decline in monsoon rainfall during the second half of the 20th century: While between the 1950s and 70s, approximately, high aerosol loadings led to subdued warming and a weakened land-sea thermal gradient, greenhouse gas-induced warming has dominated since then and is the dominant forcing in the 21st century projections." Nevertheless, we assume that this relationship would also be found if a period of the 20th century was to be included in the calculation since the increase in the 21st century is much stronger than the decrease in the second half of the 20th century (as can been seen in figure 04 & 05). Besides, please note that there was actually a stagnation of global temperature increase in 1950-1970.

What changed to start having the positive trend discussed in this manuscript?

Response: The land warming due to GHG emissions becomes dominant over the former forcing factors (e.g. dampened land warming due to aerosol emissions). This leads to an increased temperature gradient in the lower troposphere resulting in more summer monsoon rainfall. We explain this in line 76-82. Nevertheless, we do agree that the emphasize in the introduction on the forcing factors leading to a decrease of rainfall since the 1950s might be misleading and thus we changed the focus concentrating more on the factors relevant for the increasing temperature gradient analyzed in our study.

Can you offer a justification that explains the perceived differences between the 20th and 21st centuries?

Response: In the 20th century the forcing is dominating the Indian monsoon dynamics differ from the ones in the 21st century as explained above.

2. The figures show the projections for each model. The ensembles should be included as well.

Response: Thanks for this comment, we think displaying the ensemble mean is a valuable addition for figure 06, figure 09 as well as the figures in the Supplementary Information (vertical lines to mark the ensemble mean). Regarding figure 04, please note that figure 05 is already providing an ensemble mean for this figure. In order to make this clearer for the reader, we added: "For the multi-model mean under SSP5-8.5 and other scenarios refer to Fig. 5" in the figure caption of Fig. 4.".

3. A thorough review is necessary. Note, for example, the incomplete sentence in line 111, or the repeated text around lines 239-252 and 242-244.

Response: Lines 111, 239-252 and 242-244 were corrected. A thorough review has been done.

4. All Figure Captions in the Appendices are incomplete: They all state: "According to Fig. (missing number)"

Response: We added missing numbers in the figure captions in the Supplementary Information.

Minor comments:

Line 22: what is a retractable effect?

Response: We clarified the meaning in line 22.

Line 101 onle –> nly

Response: We corrected the typing error in line 101.

Lines 106, 249 It is "moisture flux convergence". Moisture (a scalar) does not converge. Moisture flux (a vector) does. There may be other instances with this mistake

Response: We corrected line 106 and 249 and checked if there are other instances with this mistake.

Line 108: Walker is uppercase

Response: Corrected.

Line 250: Moisture (flux) convergence is not a thermodynamic effect. It involves moisture, but it is a dynamic effect as well. It is mostly driven by the convergence of winds.

Response: We refer to the wording of Sooraj et al. 2015 which can be found as well e.g. in Mei et al. 2015 (doi: 10.1175/JCLI-D-14-00355.1), Cherchi et al. 2011 (doi:10.1007/s00382-010-0801-7) and Endo & Kitoh 2014 (doi: 10.1002/2013GL059158). The term seemingly refers to the origin of the dynamics which in this case is based on the thermodynamic gradient.