

RC2

The manuscript shows precipitation patterns in East Asia and three subregions using matrices. It compared projections in precipitation changes between CMIP5 and CMIP6 models of different SSP scenarios. The results are important, but the manuscript does not provide a physical basis for the conclusions. I suggest including the points below before publication.

The basis for choosing precipitation indices (1) the time of Northward migration of the rainband and (2) the peak of the monsoon band should be explained in detail although adopted from previous literature. What other monsoon indices were reported in previous studies? What is the advantage of choosing the above two monsoon indices should be given.

Thank you for the insightful point. We will provide more detailed explanations on the precipitation indices in comparison with other East Asian monsoon circulation and timing indices as appropriate (e.g., Wang et al. 2008; Ha et al. 2020). We will also highlight the advantage of our indices in terms of representing the intraseasonal evolution of monsoon rain bands for East Asia and its three subregions by conducting further observational analyses using pentad precipitation data.

Wang, B., Wu, Z, Li, J., Liu, J., Chang, C.-P., Ding, Y., & Wu, G. (2008) How to measure the strength of the East Asia summer monsoon. *Journal of Climate*, 21, 4449- 4463.

Ha, K.-J., Moon, S., Timmermann, A. & Kim, D. (2020) Future changes of summer monsoon characteristics and evaporative demand over Asia in CMIP6 simulations. *Geophys. Res. Lett.* 47, e2020GL087492.

The scientific basis for increased precipitation in different SSP scenarios and discussions on the associated physical mechanism is shallow.

Thank you for the useful comment. Based on your suggestions and questions provided below, we will improve our interpretations of the physical mechanisms associated with the future precipitation change patterns.

Discussions on thermodynamic effects on moisture thereby on precipitation enhancement should be elaborated.

We will add more discussions on thermodynamic effects by analyzing what thermodynamic factors in models. See below for details.

Influence of Wind and SST changes analysis should be provided to support the results.

We will perform an inter-model regression analysis, following Zhou et al. (2020) and Huang et al. (2022). By regressing the model TH (thermodynamic) and DY (dynamic) terms against the low-level wind and SST changes in the future, we will try to identify

modeling factors associated with the inter-model spread in TH and DY in East Asia and provide associated discussions in the manuscript.

Zhou, S., Huang, G., & Huang, P. (2020). Inter-model spread of the changes in the East Asian summer monsoon system in CMIP5/6 models. *Journal of Geophysical Research: Atmospheres*, 125, 2020JD033016.

Huang, D., Liu, A., Zheng, Y., & Zhu, J. (2022). Inter-Model Spread of the Simulated East Asian Summer Monsoon Rainfall and the Associated Atmospheric Circulations From the CMIP6 Models. *Journal of Geophysical Research: Atmospheres*, 127, e2022JD037371.

How does Hadley circulation change in different SSP scenarios?

Assuming that here you indicate the local Hadley cell in western North Pacific, we will check the possible role of local Hadley cell changes in shaping the East Asian monsoon precipitation patterns in different SSP scenarios.

Results on uncertainty factors do not quantify the uncertainty.

Thank you. We will provide a figure, so-called “fractional uncertainty”, which shows actual values of the total uncertainty in precipitation changes and the relative contributions of internal variability, model uncertainty, and scenario uncertainty.

Precipitation values documents in section 3.1 should be tabulated

Thank you for the good suggestion. We will add a table showing the future precipitation changes in East Asia and its subregions during the northward migration and peak time.

Use of short forms M, I, TH ...etc should be avoided although they are defined.

We will avoid some abbreviations for better reading throughout the manuscript.