

General comments:

The work titled "The Effects of Orbital Forcing on the East Asian Summer Monsoon for the Past 450 kyr" is intriguing. The authors have adeptly reviewed previous research progress and provided a detailed and clear explanation of the research methodology in this paper. However, the section discussing their own research findings appears to be rather weak, lacking a comprehensive showcase of the work's novel discoveries. Substantial revisions are necessary to better highlight the new contributions of the study.

Specific comments to the authors

The term "calculate and calculation" in the given sentence (Abstract) is not accurate; it should be replaced with "simulated" or "simulation." Please check similar issue thorough the manuscript.

The initial segment of the abstract is well-structured; however, the latter part, starting from "The calculated change in summer precipitation is dominated by a 20-kyr precession cycle over China, highly consistent with cave d18O records in southeast China," becomes overly generalized. The author delves into various aspects, addressing the periodicity of simulated East Asian Summer Monsoon (EASM) precipitation in connection with forcing cycles. Subsequently, a correlation analysis is presented to establish the relationship between EASM precipitation intensity and solar radiation forcing. This deviates somewhat from the conventional approach of enhancing mechanistic understanding through numerical simulations. Therefore, in this section, I recommend that the author enrich the paper by incorporating more explanations related to climate dynamics.

The Introduction section lacks a recent review of the advancements in the comparison of data and models in East Asian paleomonsoonal dynamics.

Sun, Y., H. Wu, G. Ramstein, B. Liu, Y. Zhao, L. Z. X. Li, X. Y. Yuan, W. C. Zhang, L. J. Li, L. W. Zou, T. J. Zhou. Revisiting the Physical Mechanisms of East Asian Summer Monsoon Precipitation Changes During the Mid-Holocene: A Data–model Comparison. *Climate Dynamics* 60, 1009–1022 (2023). <https://doi.org/10.1007/s00382-022-06359-1>.

Sun, Y., H. Wu, M. Kageyama, G. Ramstein, L. Z. X. Li, N. Tan, Y. T. Lin, B. Liu, W. P. Zheng, W. C. Zhang, L. W. Zou, T. J. Zhou. 2021. The contrasting effects of thermodynamic and dynamic processes on East Asian summer monsoon precipitation during the Last Glacial Maximum: a data-model comparison. *Climate Dynamics*. 56, 1303–1316.

Sun, Y., G. Ramstein, L. Z. X. Li, C. Contoux, N. Tan, T. J. Zhou. 2018. Quantifying East Asian summer monsoon dynamics in the ECP4.5 scenario with reference to

the mid-Piacenzian warm period. *Geophysical Research Letters*, 45: 12,523–12,533.

I could not agree with the authors statements “Section 4 discusses the possible climate systems that drive EASM variability”. As we knew, orbital forcing via solar radiation changes can be attributed fundamental driver of climate changes, here the authors may discuss the possible climate systems associated with EASM variability.

L86: “due to orbital forcing” needs to put behind the insolation changes

L131-135 should move to the method section somewhere.

Title in section 3.1 is confusing, if I understand well the authors want to express “simulated……”?

I have additional comments on the organization of the results section. In fact, it is not necessary to divide Section 3 into two subsections. The authors intend to focus on one specific task in this section: the model-data comparison of East Asian Summer Monsoon (EASM) precipitation evolution for the last 450,000 years. The current version contains numerous citations, making it challenging for the reader and reviewer to discern the extent of the authors' new findings. Consolidating the section into a single subsection may help clarify the presentation and emphasize the novel contributions of the authors. Please rephrase these sections.

Figure.4-5-6 can be merged into one new Figure.

L427: please use SEC instead South East China, as the abbreviation has already appeared.