Climate of the Past Discussions

Clim. Past Discuss., community comment CC1
https://doi.org/10.5194/cp-2021-188-CC1, 2022

Comment on cp-2021-188

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Community comment on "Greenhouse gases modulate the strength of millennial-scale subtropical rainfall, consistent with future predictions" by Fei Guo et al., Clim. Past Discuss., https://doi.org/10.5194/cp-2021-188-CC1, 2022

This paper introduce a new East Asian summer monsoon rainfall reconstruction from the northwest Chinese loess plateau over the last 650,000 years. The new precipitation proxy (Ca/Ti) and speleothem □^{18}O (□^{18}Osp) are assessed to illustrate the modulating drivers of magnitude of millennial monsoon variability (MMV) at the orbital timescale. Wavelet analysis highlights the remarkable ice volume and GHG modulation at 100 kyr band as well as GHG and local insolation forcing at precession band for the MMV of Ca/Ti, but not that of MMV in □^{18}Osp. The MMV of loess Ca/Ti and □^{18}Osp are modulated differently at orbital time scales, implying that these two proxies document different climatic response of millennial-scale monsoon circulations. At the precession band, increasing atmospheric GHG following with larger insolation results in further enhancement in MMV of EASM rainfall, which agrees with the model result and prediction in more frequently occurrence of extreme rainfall under future global warming conditions.

In general, the content of their paper is very interesting. They link the interactions between millennial-scale variability and orbital-scale driving factors. Based on their findings, they predict how would millennial-scale abrupt East Asian summer monsoon rainfall would evolve under future warming conditions. Some suggestion are as follows□

- One Highlight of this paper is the new summer rainfall indicator Ca/Ti. However, they do not mention too much about how Ca/Ti link to the East Asian summer rainfall and associated mechanism.
- In the introduction section, the logic of each paragraph could make some changes for improvements.
- In results section, the content includes some discussion sentences.