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Climate of the Past Discussions

Interactive comment on "Physical processes of cooling and megadrought in 4.2 ka BP event: results from TraCE-21ka simulations" *by* Mi Yan et al.

Anonymous Referee #1

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4.2K BP event is a hot topic issue. However, the cause of 4.2K BP event is remaining unclear. This study made contribution to understand how teh 4.2k BP event occurred, using a group simulation consisting of full forcing experiment and multpile single-forcing experiments. Through comparing the results from these experiments with each other, this study draws a conclusion that the 4.2K BP event is induced by internal variability. I recommend to accept this manuscript, but some issuse should be addressed. 1. Line 193-194, warming over the SH could be related to the orbital change, which induces insolation increases over the SH but decreases over the NH. How to approve this result. I recommend to plot the temperautre anomaly spatial distribution induced by oribital forcing. 2. Line 202-203, Over East China, the precipitation anomalies show a wet

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Discussion paper

south dry north pattern. The figure 3b could not support this result, since the signal is too weak to be insignificant. 3. Line 223-224. The subtropical highs and the relative anticyclones in both the SH and NH are strengthened. We only find the strengthened subtropic high over SH while we could not find the strengthened subtropic highs over NH (Figure 5c). Please examine it carefully. 4. Line 235-236. with higher SLP over land and lower SLP over the adjacent ocean (Fig. 5a). We also could not find this character. Please examine it carefully. 5. Line 244-245. The land over the SH experiences cool but wet conditions, and the mid latitude SH ocean is warmer. Is there proxy-based evidence over SH? 6. Figure 6. Please clarify the spatial domain of the EOF.

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