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Climate of the Past Discussions

Interactive comment on "Reexamining the barrier effect of Tibetan Plateau on the South Asian summer monsoon" *by* G.-S. Chen et al.

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Thank the reviewer for the comments and suggestions. We address the concerns as the following point by point:

Comment # 1: "From the difference in surface wind for JJA between FULL_TP and NO_TP (Fig. 2a, P.7), the southwest monsoon significantly strengthens from East African coast to Indian Subcontinent. However, JJA precipitation decreases significantly over western Arabian Sea and south Asia. This inconsistency is hard to understand. From existing knowledge, it is unreasonable that the simulated Indian monsoon precipitation decreases with uplift of the Tibetan Plateau."

Authors Reply: Thank you very much for the comment. Yes, it was hard to understand

for us too at the beginning when we fond this result. As we mention in the discussion part (line 305-309), "the result of less precipitation over the northern India in the FULL_TP experiment differs significantly from the findings in the previous model studies with fixed or slab ocean". Traditionally, we thought with the higher Tibetan Plateau it would be more precipitation over Indian continent. But it seems it is not true. First, many geologic observations suggest that during the uplift of East Tibetan Plateau, the climatology over the northern of India was drier. Please see the reference of Molnar and Rajagopalan (2012). It is very hard for the geologists to understand the reasons based on our traditional thinking. Inspired by our modeling results, Molnar and Rajagopalan published the paper to discuss the mechanism of the dryer condition with higher mountains. The detail mechanism is present in our discussion (line 311 – 316). For simple thinking, more convergence happens along the mountains, more divergence happens over Indian subcontinent.

Comment # 2: "On the discussion of barrier effect (P.8, P.11), the arguments seem to be insufficient. Some new references, which are closely related to this topic and had published a few months before this manuscript was submitted, have not been cited in this manuscript. For example, Boos and Kuang, 2013: Sensitivity of the South Asian monsoon to elevated and non-elevated heating, Sci Rep, 3, 119; Tang et al., 2013: Asynchronous responses of East Asian and Indian Summer monsoons to mountain uplift shown by regional climate modeling experiments, Clim Dyn, 40, 1531-1549. "

Authors Reply: Thank the reviewer very much! We add these two new references in our manuscript in our revised version.

Interactive comment on Clim. Past Discuss., 9, 5019, 2013.