

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

Anonymous Referee #1

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General comments:

This paper investigates relative roles of the full Tibetan Plateau (FULL_TP) and the Himalaya Mountains (BARRIER) by conducting 3 experiments. Authors find differences in precipitation and circulation fields between FULL_TP and BARRIER, showing the significant barrier effect but less effective than the full Tibetan Plateau. Authors propose that the deep convective heating along the southern slope of the Tibetan Plateau plays the significant role on the South Asian summer monsoon. This paper adds recent discussion on the barrier effect of the Tibetan Plateau, and thus is useful for publication after some major revisions.

Specific comments:

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(1) Model climatology may affect results. Please include JJA precipitation and surface wind climatology of the control experiment in Fig. 2. Based on Meehl et al. (2012), the CCSM4 performance for the East Asian summer monsoon precipitation is very poor with no Meiyu/Baiu rainfall band. Therefore, caution is needed for changes of the East Asian monsoon with this experiment.

(2) I do not understand why FULL_TP minus NO_TP shows negative precipitation anomalies over the broad regions of India and the Indochina Peninsula. Please explain why this mechanism creates subsidence to the "southwest" (not northwest) of the heating of the eastern Tibetan Plateau. The low-level entropy changes are just results of precipitation failure over India, and thus do not explain the fail of the barrier blocking mechanism.

(3) Differences in experiment setup could be the reason of the low-level entropy. The coupled modeling approach in this experiment may have resulted in lower temperature (and thus lower moisture) over India, as suggested by previous literatures.

(4) Difference of CAPE may not necessarily lead to difference of convection. Rather than comparison of CAPE between FULL_TP minus NO_TP, compare favorable regions for convection in each experiment.

(5) Authors may wish conduct another set of experiment where effect of air-sea interaction (changes in SST) is investigated.

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

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