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Persistent Weakening Trend in the Spring Sensible Heat Source over the Tibetan Plateau and its Impact on the Asian Summer Monsoon

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Using a dataset extended by the addition of data for 2004–2008, we re-examined the trend in the sensible heating (SH) flux at 73 meteorological stations over the Tibetan Plateau (TP) during 1980–2008 and investigated its impact on monsoon precipitation in the surrounding region. In contrast to ongoing climate warming, a weakening trend in SH is persistent over most of the plateau, despite a sharp increase in the ground–air temperature difference in 2004–2008. The weakening trend in SH over the TP is primarily a response to the spatial non-uniformity of large-scale warming over the East Asian continent, which is characterized by much greater warming amplitude at middle and high latitudes than over the tropics and subtropics. Furthermore, the suppressed air pump effect, which is driven by SH over the TP and acts as a strong forcing source, gives rise to reduced precipitation along the southern and eastern slopes of the plateau, and increased rainfall over northeastern India and the Bay of Bengal. No significantly stable correlation exists between the SH source over the TP and the overall trend or interdecadal variability in the East Asian or South Asian summer monsoon.