

Persistent weakening trend in the sensible heat source over the Tibetan Plateau and its impact on the Asian Summer Monsoon

Anmin Duan[†]; Meirong Wang; Fei Li; Guoxiong Wu

[†] LASG, China, People's Republic of

Leading author: amduan@lasg.iap.ac.cn

With extended recent 5 years data, we re-examined the trend in the sensible heating (SH) flux at 73 meteorological stations over the Tibetan Plateau (TP) during 1980 to 2008. Results indicates that, in contrast to the ongoing climate warming, the weakening trend in SH is persistent in most parts of the plateau for the subdued surface wind speed which is controlled by the subtropical westerly jet. Evidently spatial nonuniform in the large-scale warming trend over East Asia continent and the surrounding oceans, characterized by the much larger warming amplitude in the mid and high latitudes than that over the tropics, leads to a decreasing trend in the meridional pressure gradients and the resultant decelerated westerly over the subtropical Asia continent. Therefore, weakening trend in both the SH over the TP and the East Asian summer monsoon is primarily a response to the large-scale circulation shift. However, acting as a strong forcing source, the suppressed air pump effect driving by SH over the TP further brings on the reduced precipitation along the south slope of the Himalayas and increased rainfall over the northeastern India and Bay of Bengal. Moreover, negative correlation exists in most part of the period among the spring SH index over the TP and the summer monsoon indices in East Asia and South Asia, suggesting that change in the SH source over the TP may influence the interdecadal variability in Asian summer monsoon to a certain degree.