



## **Impact of the Tibetan Plateau sensible heat on heat waves in South Korea**

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In this study, we investigated the impact of the TP sensible heat on heat waves in South Korea in July and August over the period of 42 years from 1973 to 2014 and studied the convective activity over the region covering eastern Pakistan to northwestern India, which is induced by the TP heating, especially on the western and eastern parts of the TP. The composite analysis for the HWY and NHWY, which are determined based on the HWTI, indicates that the CGT-like pattern may generate a high-pressure anomaly over the Korean Peninsula, which corresponds to favourable conditions for heat waves in South Korea. The first coupled modes of the geopotential height at 250 hPa and sensible heat flux with the TMs in South Korea are characterized by the CGT-like pattern in the geopotential heights at 250 hPa, the TP sensible heating, and a homogeneous positive pattern over the whole of South Korea, indicating that the TP heating over the western and eastern parts of the TP induce high-pressure anomalies through a CGT-like mechanism. The regression analysis of the wind vectors in the upper and lower troposphere with the TC of the TP sensible heat obtained from the SVD coupled mode with the TM in South Korea suggests that the TP sensible heat induces a northward transport of warm, moist air from the Indian Ocean to northern India via the EHP effect, followed by a westward transport along the southern slope of the Himalayas and the TP, thereby generating strong convection over the PWI region that corresponds to the baroclinic structure with anomalous anticyclonic circulation at 250 hPa over the western TP and to the cyclonic circulation at 850 hPa over the PWI region. This baroclinic structure around the PWI and TP regions is associated with the barotropic structure with a deep high-pressure anomaly over the Korean Peninsula. Moreover, the correlation pattern of the IMRI, defined as the normalized rainfall amount over the PWI region, with a geopotential height of 250 hPa and wave activity flux pattern confirm that the active convective activity over the PWI region is responsible for the CGT-like pattern and, thus for the high pressure anomaly over the Korean Peninsula, showing a correlation coefficient of 0.70, through stationary Rossby wave propagation