

# Varying Rossby Wave Trains from the Developing to Decaying Period of the Upper Atmospheric Heat Source over the Tibetan Plateau in Boreal Summer

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This study demonstrates the two different Rossby wave train (RWT) patterns related to the developing/decaying upper atmospheric heat source over the Tibetan Plateau (TPUHS) in boreal summer. The results show that the summer TPUHS is dominated by quasi-biweekly variability, particularly from late July to mid-August when the subtropical jet steadily stays to the north of the TP. During the developing period of TPUHS events, the intensifying TPUHS corresponds to an anomalous upper-tropospheric high over the TP, which acts as the main source of a RWT that extends northeastward, via North China, the central Pacific and Alaska, to the northeastern Pacific region. This RWT breaks up while the anomalous high is temporarily replaced by an anomalous low due to the further deepened convective heating around the TPUHS peak. However, this anomalous low, though existing for only three to four days due to the counteracting dynamical effects of the persisting upper/lower divergence/convergence over the TP, acts as a new wave source to connect to an anomalous dynamical high over the Baikal region. Whilst the anomalous low is diminishing rapidly, this Baikal high becomes the main source of a new RWT, which develops eastward over the North Pacific region till around eight days after the TPUHS peak. Nevertheless, the anomaly centers along this decaying-TPUHS-related RWT mostly appear much weaker than those along the previous RWT. Therefore, their impacts on circulation and weather differ considerably from the developing to the decaying period of TPUHS events.

Keywords: Tibetan Plateau, upper atmospheric heat source, Rossby wave train, circulation and weather