

Characteristics and Mechanism of Subseasonal Eastward Extension of South Asian High

Xuejuan Ren , Dejian Yang , and Xiu-Qun Yang

School of Atmospheric Sciences, Nanjing University, Nanjing, China

This study investigates the features of eastward extension of the South Asian high (SAH) and its connection with diabatic heating/rainfall over eastern Asia on subseasonal timescale. The causes of SAH's eastward extension are examined by potential vorticity (PV) diagnosis with emphasis on the joint role of diabatic heating feedback and midlatitude wavetrain. The SAH's eastward extension features eastward propagation of a wavetrain across Eurasia. Among the wavetrain, the migration of weak high from the western flank of Tibetan Plateau (TP) to the east of TP contributes to the SAH's eastward extension at the early stage. When the SAH approaching its easternmost position, a strong negative PV (positive geopotential height) center prevails to the east of TP at 200 hPa. The associated anomalies in diabatic heating/rainfall include: the anomalous heating/above-normal rainfall over the South China Sea (SCS)-subtropical western Pacific occurring twelve-day before SAH's easternmost stretch, and then anomalous cooling/below-normal rainfall over the southern foot of TP-southern China and heating/above-normal rainfall over northern TP and North China a week later. The anomalous heating and ascending motion over northern TP-North China act to increase negative PV locally at 200 hPa. The cooling and descending induces positive PV over southern China. The north-south dipolar structure of PV anomaly with the climatological northerly is favorable to southward advection of negative PV anomaly at 200 hPa. The anomalous heating over the SCS-western Pacific helps to develop a below-normal rainfall condition over southern China via inducing a lower-level anomalous cyclone over coastal region. Above processes are conducive to the SAH's eastward extension at its later stage.

Key words: South Asian high, eastward extension, diabatic heating, wavetrain, subseasonal timescale

Reference: Xuejuan Ren, Dejian Yang, and Xiu-Qun Yang, 2015, Characteristics and mechanism of subseasonal eastward extension of South Asian high. *J. Climate*, doi:10.1175/JCLI-D-14-00682.1.