

# TRANSITIONAL CHARACTERISTICS IN THE EAST ASIAN SUMMER MONSOON

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## Abstract

The Asian monsoonal system is set up due to the thermal contrast of the large land mass and the Pacific ocean, the seasonal transition from the winter to the summer system in the Asian region are quite distinctive. Two distinct regimes can be identified in the Asian summer monsoon system, namely, the East Asian monsoon and the Indian monsoon. While the mid-latitude effect can have a large impact on the East Asian Monsoon system, its impact on the Indian monsoon is quite limited. Several evidences indicate the earlier onset on the East Asian summer monsoon than the Indian summer monsoon, thus the objective of this observational study is to characterize the dominant large scale features associated with East Asian summer monsoon, especially, its seasonal transition behavior.

Based on the 16 years data analyzed from the spring to summer time, results reveals that before and after the onset or stable establishment of the summer monsoonal system in the East Asia, there exists dramatic change of some large scale variables. That includes the reversal of the upper tropospheric north-south temperature gradient, the reversal of the wind shear between upper and lower level. The retreat of the low-level subtropical high, the northward movement of the easterly associated with the 200 hPa South Asian anticyclonic. The reversal of the height gradient between the northern part and southern part of the South China Sea can also be identified, which are related to the northward movement of the subtropical high system in 850 and 700 hPa and the south Asia high around 200 hPa. The first occurrence of the 30°C SST isoline and a kinetic energy minimum in the South China Sea area are also found to be associated with the seasonal transition.

Further analysis on the time series of those large scale variables discussed above revealed the sequence of transitional characteristics. If the onset of the East Asian summer monsoon is defined to be associated with the retreat of the 850 hPa subtropical high, then the 30°C SST isoline in the south China Sea region is normally found to appear 10 to 15 days before the onset. While in most of the cases, the occurrence of upper-level easterly to reach 15°N, upper tropospheric north-south temperature gradient reversal can also be identified 5 or 10 days before the onset. And the 850 hPa southwesterly flow around 15°N and the south China sea area mean vertical wind shear reversal (zonal wind difference between 200 hPa and 850 hPa) are usually found concurrently within the period of the onset.

**Key words:** East Asian Monsoon, Transitional Characteristics