

The Asian-Australian Monsoon: Mechanism associated with the difference of the flooding in Huaihe River Basin and Yangtze River Basin during Meiyu

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The atmospheric circulation difference between the periods of the Huaihe River flooding and Yangtze River flooding and its associated mechanism during the Meiyu season (June) are investigated based on the composite analysis derived from China national 743 station monthly precipitation data and the Japan Meteorological Agency global atmospheric reanalysis data JRA25 during 1979-2007. It was found that the subtropical anticyclone locates more north and west than the normal at 850 hPa during Huaihe River flooding cases. The strong northerly winds anomaly is converged over the Huaihe River Basin with the southwesterly wind of anticyclone in the Huaihe River flooding case, and yet the convergence over the Yangtze River is due to the convergence of the weak zonal wind and the southwesterly wind of anticyclone in the Yangtze River flooding case. At the middle troposphere the common feature is the equivalent barotropic Rossby-wave train in the mid-high latitudes in Eurasia. But the wave-train phase is opposite. Moreover during the Huaihe flooding years, there is a single blocking high with its center near Lake Baikal. While during the Yangtze River flooding period, there are dual blocking highs with one center over Ural Mountains and the other in the vicinity of the Sea of Okhotsk. At the upper troposphere, the significant difference in the westerly jet stream between the two flooding events is also identified. The westerly jet is weaker than normal during the Huaihe River flooding years but stronger during the Yangtze River flooding period. Further study shows that there is a positive condensation heating anomaly in the Arabian Sea - Indian peninsula during the Huaihe River cases and the heating is negative during the Yangtze River case. The abnormal positive/negative latent heating stimulates a Rossby-wave train above the Eurasia continent which is similar to anomaly circulation pattern when Huaihe River/Yangtze River flooding happens. The anomaly circulation pattern over the Western Pacific associated with Yangtze River flooding is related to the latent heating anomaly over the tropical Western Pacific. In summary, the wave-train generated by the Arabian Sea - Indian peninsula play important roles on the flooding in Huaihe River basin. And the heating anomaly over both the Arabian Sea - Indian peninsula and the tropical Western Pacific result in the flooding over the Yangtze River basin.