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Title: The characteristic intraseasonal oscillation of Summer Rainfall over the eastern China
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Abstract:
The intraseasonal oscillation (ISO) is observed as one of the dominant modes in summer rainfall within the eastern China. The interannual relationship between the ISO intensity and the summer mean rainfall over the lower reach of the Yangtze River basin (LYRB) shows a significant positive correlation. A strong low-level anticyclonic anomaly exhibits notably northward propagation from the tropical over the East Asia longitude during wet summers. The southwesterlies lie north of the anticyclonic anomaly and the northeasterlies lie south of the weak cyclonic anomaly which exists north of Yangtze Basin converge toward the Basin, resulting in more rainfall over LYRB. In contrast, the anticyclonic anomaly shows northwestward-moving from the tropical western Pacific Ocean during dry summers. The large area of eastern China is controlled by the southwesterlies lie north of the anticyclonic anomaly. But due to the absence of wind convergence and lack of plenty of moisture supply above the Basin, the rainfall over LYRB reduces significantly.
The vertical structure of ISO with respect to the occurrence of rainfall over the LYRB is examined. The result shows that the phase evolution of vertical motion is different. The upward motion is dominant in the lower troposphere in the ISO peak-phase during wet summers, that is favorable for the strong precipitation. However, it is downward motion in the peak-phase during dry summers. To elucidate different dynamic factors of the vertical motion which closely related with the rainfall over LYRB, the diagnostic analysis of a generalized omega equation is adopted. It is revealed that the low-level upward motion in the peak-phase during wet summers is induced by the gradually increase of advection of vorticity with height, while the downward motion during dry summers induced by the decrease of advection of vorticity with height restrains the occurrence of rainfall over the LYRB.
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