

Characteristics and mechanism of the off-equatorial eastward propagating intraseasonal oscillation in boreal summer

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Based on the NCEP reanalysis data, the characteristics and evolution of the eastward-propagating intraseasonal oscillation (ISO) over the south Asian monsoon region during boreal summer are analyzed. At first, a maximum convection center is located over Arabian Sea and the Indian subcontinent, then the center starts to move eastward via the Bay of the Bengal to South China Sea eventually. The eastward propagation may be closely connected to the onset of South China Sea monsoon. While at the beginning, the convection center occurs to the west of the Indian subcontinent, a positive vorticity with an equivalent barotropic structure appears to the east of the Indian subcontinent, and PBL moisture convergence in situ. To explain what has critical impact on the eastward-propagating intraseasonal oscillation, a 2.5-layer intermediate atmospheric model is used to reveal the effect of vertical shear of summer mean flow. During boreal summer, there is strong easterly shear over south Asian monsoon region. The easterly shear makes the barotropic and baroclinic modes interacting with each other in the free atmosphere possible, and leads to a generation of barotropic vorticity and divergence to the east of convection center. The developing divergence further induces a moisture convergence in the planetary boundary layer, causing the eastward shift of convection center.