

Effect of the Atmospheric Quasi-biweekly Oscillation on the Vortices Moving off the Tibetan Plateau

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In the present study, the relationship between the atmospheric quasi-biweekly oscillation (QBWO) and Tibetan Plateau vortices (TPVs) moving off the Tibetan Plateau during May-August of 1998-2012 was investigated based on the radiosonde and reanalysis data. It is found that the number of TPVs moving off the Tibetan Plateau (moving-off TPVs) has the distinct feature of the 10-20-day QBWO. 77% of the moving-off TPVs occur in the positive phases of the 10-20-day filtered 500 hPa vorticity over eastern Tibetan Plateau. Besides, distributions of the zonal and meridional components of E-vectors coincide well with the trajectories of TPVs, indicating the moving-off TPVs are well related with the propagation of the QBWO energy.

The atmospheric circulations and related thermodynamic fields are discussed to reveal the mechanism of the effect of 10-20-day QBWO on the moving-off TPVs. It is found that the atmospheric circulations and heating fields of 10-20-day QBWO have major impact on the moving-off TPVs. In positive QBWO phases, at 500 hPa over eastern plateau, there appear negative geopotential height anomalies and anomalous cyclonic wind shear; the anomalous jet stream and positive geopotential heights at 200 hPa lying over the northeast of the Tibetan Plateau stretch eastward gradually, benefiting for the upper level divergence and ascending motion. The condensation latent heat is released and shifts eastward with the heating centers located at 400 hPa, which depresses the isobaric surface at 500 hPa. All these conditions are in favor of the maintenance and eastward movement of TPVs in the positive QBWO phases.