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Modulation of the atmospheric quasi-biweekly oscillation on the diurnal variation of the occurrence frequency of the Tibetan Plateau vortices

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In this study, modulation of the atmospheric quasi-biweekly oscillation (QBWO) on diurnal variation of the occurrence frequency of Tibetan Plateau vortices (TPVs) during May-August of 2000-2009 was investigated. The diurnal variations of the occurrence frequency of the TPVs (OFTPVs) and the related dynamic and thermodynamic features in the positive and negative phases of QBWO were compared. In both the positive and negative phases, the OFTPVs reaches the maximum from evening to midnight (18-00 LT, LT indicates the local time), and minimum from early morning to noon (06-12 LT). At 18 LT, there is strongest convergence at 500 hPa and ascending motion, as well as the most abundant net water vapor budget over the Tibetan Plateau, which is in favor of the precipitation and the related condensation latent heat release, corresponding to the maximum of OFTPVs in 18-00 LT. On the contrary, in the early morning at 06 LT, the conditions are most unfavorable for genesis of TPVs in 06-12 LT. QBWO leads to stronger convergence at 500 hPa, ascending motion as well as more massive water vapor in the positive phases than those in the negative phases, resulting in larger numbers of TPVs occur in all of the four periods of a day (00-06 LT, 06-12 LT, 12-18 LT, and 18-00 LT) in the former. The TPVs generating from the early morning to noon (06-12 LT) are weaker and more sensitive and fragile to the disadvantageous background, while the TPVs occurring from evening to midnight (18-00 LT) are stronger and seem to be well tolerated, leading to more remarkable contrast between the OFTPVs in the negative and positive phases in 06-12 LT than in 18-00 LT.