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Effect of Semidiurnal Lunar Tides Modulated by Quasi-2-Day Wave on Equatorial Electrojet during Three Sudden Stratospheric Warming events

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We present an analysis of the perturbations and wave characteristics in equatorial electrojet (EEJ) and equatorial zonal winds in the mesosphere and lower thermosphere region during three sudden stratospheric warming (SSW) events, based on the wind observations by two meteor radars in Indonesia and the geomagnetic field observations in India. During three SSWs, the shifting semidiurnal perturbations are consistently observed in the EEJ and accompanied with strong 2-day periodic perturbations simultaneously. The semidiurnal lunar (L2) tidal amplitudes in the EEJ and zonal winds show the prominent enhancements during the episodes of EEJ perturbations. The time-period spectra of the L2 tidal amplitudes in both the EEJ and zonal winds present the obvious quasi-2-day wave (QTDW) amplification with good agreement during these periods. Our results firstly reveal the important contributions of QTDW to EEJ perturbations during SSWs and the semidiurnal lunar tides modulated by QTDW serve as the main forcing agent therein