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Midlaitude Sporadic E Layers Disturbance during 2012 Sudden Stratospheric Warming

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This paper investigates the response of middle and low latitude sporadic E layers (Es) during the 2012 sudden stratospheric warming (SSW) event in winter by using observations from 6 ionosonde stations over China and Japan region. The foEs (critical frequency of Es) of all these ionosonde stations presents obvious disturbance during SSW period. There is prominent enhancement of the planetary wave (PW) periodicities in time series of foEs and wind measurement in favor of the PW modulation on Es formation. The tidal wave (TW) oscillations of foEs and h'Es (virtual height of Es) also increase during SSW, according with the enhanced TW periodicities in simultaneous wind measurements. These observational results reveal that the intensive quasi-stationary planetary wave during 2012 SSW can modulate with TW in mesosphere and lower thermosphere (MLT) region, results in the enhancement of diurnal and semidiurnal tides, and consequently leads to the disturbance of Es.