

THE CAUSAL LINK OF THE DE-3 TIDE, VERTICAL DRIFT, AND PLASMA DENSITY

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We investigate the connection between the atmospheric tide, vertical plasma drift, and F-region plasma density in low latitude by investigating their annual and local time variations. The plasma distribution in the topside is investigated using the ROCSAT-1 data. The variation of the amplitude of the DE-3 tide is deduced from the TIMED/SABER and UARS/WINDII data. The high-resolution vertical plasma drift model is derived from the ROCSAT-1 data and the response of the ionospheric morphology to the input ROCSAT-1 vertical drift is examined by performing the Global Ionosphere and Plasmasphere model simulations. The annual variations of the wave-4 amplitudes in plasma density and vertical plasma drift show a good agreement with the annual variations of the DE-3 tide temperature and zonal wind in the E region. The eastward shift of the wave-4 peak locations in the plasma density and vertical plasma drift is also consistent with the eastward shift of the DE3 tide amplitudes. Our observation and model simulation results support the causal link between the DE-3 tide, vertical drift, and plasma density.

equatorial ionosphere, atmospheric tide, electric field

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