[EE] Evening Poster | P (Space and Planetary Sciences) | P-EM Solar-Terrestrial Sciences, Space Electromagnetism & Space Environment

[P-EM10]Coupling Processes in the Atmosphere-Ionosphere System

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Vertical coupling mechanisms throughout the whole atmosphere are critical to understanding the near Earth space environment, as well as its sensitivity to the solar, geomagnetic, and atmospheric drivers. This international session focuses on physical/chemical processes occurring in the mesosphere, thermosphere, and ionosphere (MTI) from both the poles to the equatorial region. Both quiet and disturbed states in response to lower atmospheric forcing or solar forcing are important for understanding the MTI system and its coupling to other regions. We invite presentations of observations and observational concepts with ground-based and/or space-borne instruments, theoretical studies, numerical simulations, and development of data analysis systems for various kinds of temporal and spatial variations in MTI system.

[PEM10-P03]Case studies for ultra-fast Kelvin waves in the mesosphere and lower thermosphere region during El Niño

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Kelvin waves are eastward propagating planetary waves generated in the equatorial lower atmosphere. Some studies have shown that slow Kelvin waves in the stratosphere are more active during El Niño. It may be because the strong convection occurs in the period. In this study, we investigated ultra-fast Kelvin waves (UFKWs) in the mesosphere and lower thermosphere (MLT) region in two different El Niño periods. The two periods are 2004-2005 and 2009-2010, which represent the normal and strong El Niño activity, respectively. This study may reveal some clues about the relationship between UFKWs and El Niño. We used temperatures from TIMED/SABER (Thermosphere Ionosphere Mesosphere Energetics Dynamics/Sounding of the Atmosphere using Broadband Emission Radiometry) to get wave's properties. Firstly, we binned temperatures in the equatorial region into the day-altitude-longitude data cube and then removed its background to get temperature fluctuations. The two-dimensional FFT was further applied to each 96-day data segment for each altitude. The FFT procedure steps forward in time by 1 day and outputs the Fourier spectrum. We analyzed spectra to get primary wave periods and amplitude variation. The background wind field was also checked to see its effect on the wave propagation. Based on spectra, we found that UFKWs in 2009-2010 is weaker than that in 2004-2005 in average. Moreover, large amplitude UFKWs mainly occur in the easterly phase of semiannual oscillation (SAO).