

## Ultra-Fast Kelvin Waves - Sources, Generation of Preferential Modes, and Effects on the Ionosphere-Thermosphere System

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It is known that eastward propagating atmospheric Kelvin waves (KW) are produced due to latent heat release in equatorial regions of deep convections and hence correlate with the outgoing long-wave radiation (OLR). To understand more closely the generation of KW, especially the ultra-fast KW (UFKW), and the relation between KW and OLR, the horizontal and vertical characteristics of UFKW have been investigated from tropopause to stratopause regions and in the thermosphere during 2011 using temperature and electron density data, respectively, obtained from GPS radio occultations by FORMOSAT-3/COSMIC constellation of satellites. Significant amplitudes of UFKW were found in the present investigations in the upper stratosphere (40 to 50 km) during September to November in the temperature retrievals. Simultaneously, the COSMIC electron density retrievals were also investigated and similar periodicities in the ionosphere were found showing the effects of lower atmospheric forcing in the upper atmosphere. We found that the propagation characteristics have little correlation with the mean zonal winds in the stratosphere, i.e., the quasi-biennial oscillation. Also, OLR over the Indonesian region showed very poor correlation with the UFKW amplitudes in contrast to earlier studies. This shows that the generation of UFKW is a more complex phenomenon than known and needs to be addressed in greater detail. Another intriguing aspect is the choice of modes - wavenumber, period, and vertical wavelength. What causes a preferential UFKW to be generated during a particular event? These questions regarding the generation and choice of preferential UFKW will be discussed with more results. How the effects on the ionosphere-thermosphere system depend on the varying characteristics of the UFKW will also be discussed in detail.

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