



Longitudinal wavenumber structure in the Mars ionosphere

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In this work we statistically investigate the tidal oscillation in the Mars ionosphere from the radio occultation (RO) measurements of Mars Global Surveyor (MGS) Radio Science (RS) experiment. Owing to the Sun synchronization of the MGS orbit, the RO measurements cover evenly the longitudes during a short period, while the local time (LT) remains unchanged. Thus the electron density profiles are used to derive the longitudinal wavenumber spectra in the LT-frame, which are closely related with the non-migrating tides of the Mars ionosphere. The results show that the wave 3 (WN3) is the dominant component of the longitudinal structure, and the wave amplitudes like to vary with latitudes and seasons of the Mars. It is important that the wave phase evaluates with both local time and altitude, which make us to estimate the tidal frequency (might be $f=2$) and the vertical wave length (10 to 100 km). The tidal analyses of the Mars ionosphere are finally comparatively studied with those of the Earth's ionosphere and atmosphere. As results, we may conclude that the non-migrating tides in both Mars and Earth's ionosphere/atmosphere are very similar in behavior.