

Lunar Tide in Ionosphere monitored by GPS-TEC

Method

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The lunar tides existing in the atmosphere have been an interesting subject for a long history. The similar tides also exist in the ionosphere. In this research direction, some researchers reported the tidal wind interaction with the ionospheric plasma at dynamo layer heights. However, the identification and the study of lunar tides in magnetosphere and ionosphere is still not a well-solved problem.

Following the fast development of dual and multi frequencies radio GPS/GNSS techniques, the global and regional scale ionospheric variation have been monitored with extremely high spatial and time resolution using GPS-TEC method. Based on the global and local TEC database obtained from GPS observation, the TEC variations have been extracted. In the periodical variations, very weak lunar tidal components with periods of semidiurnal M2, semimonthly Mf and 1 month MM are firstly found, besides the solar tidal S2 and SSA components, and the 1month (25-29 days) periodical mixed components. The mixed monthly components are estimated mainly due to the lunar orbit period locates at the same range of differential solar rotation periods. The phase lag of these lunar tidal components in ionosphere is also discussed.