

TRAVELING WAVE PACKETS OF TOTAL ELECTRON CONTENT DISTURBANCES AS DEDUCED USING THE DATA FROM THE GLOBAL GPS SYSTEM

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We identified a new class of mid-latitude medium-scale traveling ionospheric disturbances (MS TIDs), viz. traveling wave packets (TWP) of total electron content (TEC) disturbances. For the first time, the morphology of TWP is presented for 105 days from the time interval 1998–2001 with a different level of geomagnetic activity, with the number of stations of the global GPS network ranging from 10 to 300. The number of the radio paths used in the analysis is about 700000. Using the CPHASE method and the GPS interferometry method we carry out a detailed analysis of the space-time properties of TWP by considering an example of the clearest manifestation of TWP of October 18, 2001 over California, USA. It was found that TWP are observed no more than in 0.1-0.4% of all radio paths, most commonly during the daytime in winter and autumn at low geomagnetic activity. TWP in the time range represent quasi-periodic oscillations of TEC of a length on the order of 1 hour with the oscillation period in the range 10-20 min and the amplitude exceeding the amplitude of «background» TEC fluctuations by one order of magnitude, as a minimum. The radius of spatial correlation of TWP does not exceed 500–600 km (3–5 wavelengths). The velocity and direction of TWP correspond to those of mid-latitude medium-scale traveling ionospheric disturbances (MS TID) obtained previously from analyzing the phase characteristics of HF radio signals as well as signals from geostationary satellites and discrete cosmic radio sources.