



Long-period wave disturbance influence on HF-propagation characteristics

V. Moshkova, N. Polekh, V. Kurkin and L. Chistyakova

Institute of Solar-Terrestrial Physics SB RAS (moshkova@iszf.irk.ru)

One of significant effects of ionospheric storms is generation of traveling ionospheric disturbances formed in auroral zones and traveled equatorward on large distances causing considerable variations of critical frequencies and heights at the F2-region maximum at the same time. Such abrupt gradients of electron density can lead to considerable changes of radio wave propagation parameters.

This work studies variations of HF characteristics and ionospheric parameters recorded over Russian East-Siberian mid-latitude paths supplied with chirp sounders during May 15, 1997 and September 24-25, 2006. Investigation of radio wave propagation characteristics during the storm on May 15, 1997, has been carried out for the paths of oblique-incidence (OIS) and back-scattering sounding. It was determined, that abrupt wave-like changes of maximum observed frequencies (MOF) with large amplitudes and period of 2-3 hours were recorded during the main phase of investigated storm at the Magadan-Irkutsk OIS path. MOF variations for the first hop mode propagation at the path with the period of 60-90 minutes were bigger than 8-10 MHz, ones for the second hop were 6-8 MHz. Similar changes were monitored over the Magadan-Irkutsk OIS path during September 24-25, 2006.

Assuming that such MOF variations can be produced by the ionospheric disturbances propagating from the northern to the southern latitudes mathematical simulation of HF propagation conditions for this paths was carried out. According to the modeling calculations period of ionospheric disturbances was about 2-2,5 hours with a travel velocity about 450-500 m/s. This result agrees with commonly accepted estimations for velocity and time characteristics of wave ionospheric disturbances.