NEW RESULTS ON SELF-CONSISTENT MODELING OF MAGNETOSPHERIC PC-1 EMISSIONS

S.V. Isaev, A.G. Demekhov, and V.Y. Trakhtengerts

Institute of Applied Physics, Nizhny Novgorod, Russia.

We present some new results of self-consistent modelling the generation of Pc-1 emissions in the Earth magnetosphere. The model known as Alfven sweep maser takes into account the nonlinear coupling between the magnetospheric and ionospheric resonators for Alfven ion-cyclotron waves.

New factors included in the model are the diurnal variation of magnetically conjugate ionospheric regions reflecting the waves, realistic calculation of the ionospheric reflection using the IRI model, and modulation of the wave amplification with the period comparable to that of pearl sequence.

We discuss the simulation results in relation to both recent and previous satellite and ground-based observations of Pc~1 emissions. In particular, we study formation of Pc 1 emissions taking into account the diurnal variation of the difference between the conjugate ionospheres. The reflection coefficients are calculated using the IRI ionospheric model and a full-wave code kindly provided by A.A. Ostapenko. We show that a single bouncing-wave packet can be formed in the system even if properties of the conjugate ionospheres are strongly different.

The influence of the external modulation by large-period hydromagnetic oscillations is shown to be very sensitive to the mismatch between the modulation period and the intrinsic period of the system, related to the propagation of wave packet between the reflection points.