

Magnetic disturbances related with ionosphere HF heating

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It is proved that ionosphere electron heating by powerful ground-based HF transmitter modifies ionospheric conductivity and under conditions of background electric field produces disturbances of magnetic field. However the disturbances are not necessary observed in each heating experiment. The magnitude of these is very different in various conditions and even during an experiment without significant changes in ionosphere parameters. Two methods of the disturbance study are discussed: experimental data processing and numerical modelling. Most powerful and conventional technique for modulated heating is Fourier transform. We demonstrate advantages of this method for the experiment on November 19, 1998. Two regimes of modulation have been used in this experiment. For modulation in frequency range of Pc1 magnetic pulsations (time interval 15.30 - 17.30 UT) artificial emissions have been observed as far as 180 km from the heater foot point. Also very interesting case of interaction between artificial pulsations and natural ones has been observed. For 5 min ON / 5 min OFF cycles distinct maximum in the spectra is marked. We believe that this maximum is accounted for electrojet current system modification produced by the heating as its magnitude decays with distance from the heating site. Numerical modelling of quasi-stationary ionospheric currents related with localized area of enhanced conductivity has been made for two cases of voltage generator and current one. Differences of these two cases are discussed in relation of past and future heating experiments.

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