

Generation of geomagnetic Pc5 pulsations by compressional waves penetrating from the solar wind: a case study

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It was considered the development of compression geomagnetic pulsations in the Pc5 range during the recovery phase of the magnetic storm on May 23, 2007. Pulsations were excited in the spatially localized region: the maximum amplitude (150-200 nT) observed at latitudes 63-66° in the midnight-morning sector 23-05 MLT, outside this region experienced a sharp decline in the oscillation amplitude. Region of pulsations excitation coincided with the location of the westward electrojet.

There were two maxima ~1.3 mHz and ~1.7 mHz in the spectra of the oscillations in the interplanetary medium, in the magnetosphere and on the ground. In the interplanetary medium the compression oscillations corresponding to the slow magnetosonic wave were recorded. According to the observations in the magnetosphere (in noon and evening sectors), the maximum amplitude of the oscillations of the magnetic field has been registered in the compression component. Modulation of energetic protons fluxes was caused by pulsations. Anti-phase variations of the magnetic field and plasma pressure were registered.

Pulsations by both ground and satellite observations in the magnetosphere in the morning sector were circularly polarized corresponding to the formation of vortices in the ionosphere and magnetosphere. The change of polarization to the opposite at latitudes above 66° was observed.

By ground-based observations in the morning sector, the geomagnetic pulsations accompanied by modulation of intensity of riometer absorption and VLF emission at latitudes 66° and 56°, correspondingly.

The results of the data analysis indicated the resonance excitation mechanism of pulsations due to the penetration of compression waves from the interplanetary medium to the magnetosphere.

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