



The irregular Pi3 geomagnetic pulsations and its connection with the energetic particles in the magnetosphere and ionosphere

Vladimir Belakhovsky (1) and Vjacheslav Pilipenko (2)

(1) Polar Geophysical Institute, Apatity, Russian Federation (belakhov@mail.ru), (2) Institute of the Physics of the Earth of the RAS, Moscow, Russia

In this study we investigate the nighttime irregular Pi3 type geomagnetic pulsations generated as during strong single substorms as during sawtooth events using modern satellite (GOES, THEMIS) and ground-based observations (CARISMA, THEMIS, NORSTAR). These pulsations developed during all substorm period but not only during substorm growth phase as ordinary Pi2 pulsations. The maximum intensity of these pulsations lies in auroral zone ($\sim 66^\circ$ CGL). It is seen a good correspondence between Pi3 geomagnetic pulsations on the ground-based magnetometers of the CARISMA network and on the GOES geostationary spacecraft, THEMIS spacecrafts which located at $\sim 10 R_e$ in the magnetosphere tail. It is seen strong increase of the fluxes of the electrons on GOES, THEMIS spacecrafts, increase of CNA on the NORSTAR riometers, increase of the aurora intensity on the THEMIS all-sky imagers during the beginning of the substorm. The considered irregular Pi3 pulsations strongly modulate the fluxes of the electrons in the magnetosphere at GOES, THEMIS spacecrafts and CNA, aurora intensity. But there is no close phase correspondence between the Pi3 pulsations in the geomagnetic field and fluxes of the trapped and precipitated electrons. At the same time there is no simultaneous geomagnetic pulsations in the same frequency range was observed on the dayside (IMAGE network). We suppose that these Pi3 pulsations have another physical nature than dayside Pc5 pulsations. The Pi3 geomagnetic pulsations may be generated due to proper geomagnetic tail oscillations during substorm development.