

ON A POSSIBILITY OF EXISTENCE OF TWO AND MORE SOURCES PI2-PULSATIONS IN THE MAGNETOSPHERE.

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Geomagnetic Pi2 pulsations represent irregular oscillations in the range of periods from 20 to 200 s, which accompany the onset of the active phase of magnetospheric substorm and attain maximum amplitudes as large as a hundred nT in the aurora zone. The Pi2 intensity decreases poleward and toward mid-latitudes. Also, there is a secondary maximum at the latitudes of plasmapause projection. Dynamic spectra of the pulsations that accompany the beginning of the active phase of substorm in the midnight sector in high latitudes have the form of a noisy spike, whereas the spectrum width is rather limited in mid-latitudes.

Further, it should be noted that there is one further zone where the excitation of these pulsations can be different from high and mid-latitudes. It is the region of the geomagnetic equator. We have investigated near-equatorial pulsations, and have found out the following. In some cases the increase of amplitude is observed in near-equatorial fluctuations in relation to pulsations of mid-latitudes.

The difference between the Pi2 pulsation generation patterns in the auroral zone, mid-latitudes and near-equatorial regions supports our earlier suggestion of a possible existence of several Pi2 pulsation sources. The following scenario is likeliest for Pi2 pulsation development during magnetospheric disturbances. Substorm is an agent stimulating generation of these fluctuations. The source of high-latitude Pi2s can be provided by processes in field tubes adjacent to the electrojet development region in the auroral zone. During magnetospheric substorms, the partial ring current, developing in the magnetosphere's midnight sector, can interact with the plasmasphere, in the process stimulating generation of surface waves on the plasmapause or appearance of a global mode in the plasmasphere itself. Maximum amplitudes of mid-latitude Pi2 fluctuations coinciding with projections of the plasmapause on the Earth's surface is an evidence of such a source being capable of generating these pulsations. I.e. in mid-latitudes the source of Pi2 pulsations is in the plasmasphere or on the plasmapause, thereby providing for global generation of Pi2 pulsations in mid-latitudes. And, finally, there is a third area, where the anomalies in excitation of pulsations are observed – the near-equatorial regions. The amplification or attenuation of amplitude Pi2 (concerning mid-latitude Pi2) can be caused by the presence of one more source, or by the physical mechanism in ionosphere or magnetosphere, resulting to these effects.

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