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Effect of interplanetary conditions and auroral activity on intermittency regularities of *Pi3* irregular geomagnetic pulsations

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Earlier we showed that the cumulative distribution function (CDF) of the burst amplitudes of *Pi3* irregular geomagnetic pulsations observed during the development of substorms in the night sector of the magnetosphere follows the power law $f(A) = A^{-a}$, where A is the amplitude of the bursts, a is the exponent. We considered the exponent α, which characterizes the CDF slope, as a characteristic of the intermittency and state of the medium in which *Pi3* bursts are formed. In this work are presented the results of study of the effect of the *Bz* component direction of the interplanetary magnetic field (IMF), auroral activity and b plasma parameter (equal to the ratio of thermal pressure to magnetic pressure) reflecting solar wind turbulence on the intermittency regularities of the *Pi3* pulsation bursts. One-minute digital observations of the magnetic field from two observatories in the Arctic and Antarctic: Heiss Island (HIS, corrected geomagnetic coordinates Latitude 74.80°, Longitude 144.46°) and Mirny (MIR, corrected geomagnetic coordinates Latitude –76.93°, Longitude 122.92°) from the World Data Center for Solar-Terrestrial Physics (Moscow) (http://www.wdcb .ru/stp/data/geo_min.val/) were used. Hourly average parameters of the interplanetary medium and auroral activity (*AE*-index) were obtained from the OMNI 2 database (http://omniweb.gsfc.nasa.gov/ow.html). A total of 305 and 415 *Pi3* pulsation bursts were analyzed in HIS and MIR, respectively. Taking into account interplanetary conditions, all *Pi3* events at each of the observatories were divided into two clusters depending on the direction of the IMF *Bz* component: *Pi3* bursts observed at $Bz<0$ and $Bz>0$. In a similar way, all cases were divided into two clusters according to the value of the *AE* index: Pi3 bursts observed at *AE* <500 nT and *AE* >500 nT. According to the value of the b parameter, the events were divided into *Pi3*, observed at $0<\beta\leq1.3$ (solar wind plasma is highly turbulized) and $\beta>1.3$ (weakly turbulized). For each group, a separate study of the CDF character of the Pi3 pulsation amplitudes was performed and estimates of the power-law exponent a were obtained. It has been revealed that the bursts of *Pi3* pulsations observed in HIS and MIR are excited in a highly turbulent medium (the value of the exponent $\alpha > 1$). Regardless of the parameters considered (*Bz*, *AE* and β), in MIR the value of exponent α is significantly larger than HIS. For example, at Bz<0 and Bz>0 the value of α in HIS is 1.50 and 2.47, and in MIR 3.04 and 3.26, respectively. Similarly, at AE <500 nT and AE>500 nT, the α exponent in HIS is 1.60 and 1.52, in MIR 2.81 and 2.63, respectively. The distributions of *Pi3* burst amplitudes as a function of the parameter β (at $0<\beta\leq1.3$ and $\beta>1.3$) were also approximated by power functions with lower α exponents in HIS (1.44 and 1.65) compared to MIR (2.60 and 2.74). It should be noted that similar trends are observed in the behavior of the exponent α in the northern and southern hemispheres when dividing *Pi3* bursts into clusters according to the values of *Bz*, *AE* and β. So, the value of the exponent α in both HIS and MIR is greater at $Bz>0$, *AE* <500 nT and $\beta>1.3$ than at $Bz<0$, $AE>500$ and $0<\beta\leq1.3$. Thus, from the obtained results it follows that the level of turbulence in the region of excitation of *Pi3* pulsations (presumably in the magnetotail) is significantly higher in the absence of disturbances in the solar wind plasma, relatively moderate auroral activity and weak solar wind turbulence.