

## 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  $f(A) = A^{-\alpha}$ , where  $A$  is the amplitude of the bursts,  $\alpha$  is the exponent. We considered the exponent  $\alpha$ , 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  $B_z$  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/](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  $B_z$  component: *Pi3* bursts observed at  $B_z < 0$  and  $B_z > 0$ . 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  $0 < \beta \leq 1.3$  (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  $\alpha$  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 ( $B_z$ ,  $AE$  and  $\beta$ ), in MIR the value of exponent  $\alpha$  is significantly larger than HIS. For example, at  $B_z < 0$  and  $B_z > 0$  the value of  $\alpha$  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  $\alpha$  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  $\beta$  (at  $0 < \beta \leq 1.3$  and  $\beta > 1.3$ ) were also approximated by power functions with lower  $\alpha$  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  $\alpha$  in the northern and southern hemispheres when dividing *Pi3* bursts into clusters according to the values of  $B_z$ ,  $AE$  and  $\beta$ . So, the value of the exponent  $\alpha$  in both HIS and MIR is greater at  $B_z > 0$ ,  $AE < 500$  nT and  $\beta > 1.3$  than at  $B_z < 0$ ,  $AE > 500$  and  $0 < \beta \leq 1.3$ . 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.