



Variations of the interplanetary parameters and geomagnetic indices during magnetic storms induced by different types of solar wind

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We investigated the dynamics of mean values of the interplanetary parameters, as well as the main geomagnetic activity indices during the magnetic storms caused by different types of the solar wind. On the basis of the OMNI2 data archive for the period of 1995-2017, we selected 181 isolated storms with monotonous main phases with $Dst \leq -50$ nT initiated by different interplanetary sources: corotating interaction regions CIR (74 events); compression regions Sheath before the ICMEs (43 events); magnetic clouds MC (31 events), and “piston” Ejecta (33 events). The double superposed epoch method was used for the analysis, in which the times of the magnetic storm onset and the minimum of Dst index were taken as reference moments. This approach allowed us to investigate the dynamics of parameters for magnetic storms of different durations. It has shown that the strongest response in the magnetosphere occurred for Sheath- induced storms, while the weakest response was for Ejecta-induced storms. At the time, the temporal dynamics of geomagnetic indices was the same for storms induced by different sources: PC-index reached its maximum value 2-4 hours before the Dst minimum, AE index had maximum values ~ 1 hour later, and maximum times for $Kp(Ap)$ index coincided with Dst minimum times. During main phases of Sheath- and CIR- induced storms very high values of interplanetary magnetic field fluctuations were recorded while none of them were observed for MC- and Ejecta-induced storms. The study was supported by the RFBR, project no. 19-02-00177