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Dependence of efficiency of magnetic storm generation on the types of interplanetary drivers.

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To compare the coupling coefficients between the solar-wind electric field Ey and Dst (and corrected Dst*) index during the magnetic storms generated by different types of interplanetary drivers, we use the Kyoto Dst-index data, the OMNI data of solar wind plasma and magnetic field measurements, and our "Catalog of large scale phenomena during 1976-2000" (published in [1] and presented on websites: ftp://ftp.iki.rssi.ru/pub/omni/). Both indexes at the main phase of magnetic storms are approximated by the linear dependence on the following solar wind parameters: integrated electric field of solar wind (sumEy), solar wind dynamic pressure (Pd), and the level of magnetic field fluctuations (sB), and the fitting coefficients are determined by the technique of least squares. We present the results of the main phase modelling for magnetic storms with Dst<-50 nT induced by 4 types of the solar wind streams: MC (10 events), CIR (41), Sheath (26), Ejecta (45). Our analysis [2, 3] shows that the coefficients of coupling between Dst and Dst* indexes and integral electric field are significantly higher for Sheath (for Dst*and Dst they are -3.4 and -3.3 nT/V m-1 h, respectively) and CIR (-3.0 and -2.8) than for MC (-2.0 and -2.5) and Ejecta (-2.1 and -2.3). Thus we obtained additional confirmation of experimental fact that Sheath and CIR have higher efficiency in generation of magnetic storms than MC and Ejecta. This work was supported by the RFBR, project 13-02-00158a, and by the Program 9 of Presidium of Russian Academy of Sciences.

References

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