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Interplanetary shocks and geomagnetic activity in solar maximum (2000) and solar minimum (1995-1996)

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Plasma and magnetic field parameters variation through fast forward interplanetary shocks were correlated with the peak geomagnetic activity index Dst in a period from 0 to 3 days after the shock, in solar maximum (2000) and solar minimum (1995-1996). Solar wind speed (V) and total magnetic field (Bt) were the parameters with higher correlations with peak Dst index. The correlation coefficients were higher in solar minimum ($r = 0.73$ for V and 0.62 for Bt) than in solar maximum ($r = 0.40$ for V and 0.35 for Bt). A statistical distribution of geomagnetic activity levels following interplanetary shocks was obtained, by taking the Dst peak after the shock. It was observed that in solar maximum 36% and 28% of interplanetary shocks were followed by intense ($Dst \leq -100$ nT) and moderate ($-50 \leq Dst < -100$ nT) geomagnetic activity, whereas in solar minimum 13% and 33% of the shocks were followed by intense and moderate geomagnetic activity. We conclude that the upstream/downstream variations of V and Bt through the shocks were the parameters better correlated with geomagnetic activity level, and that in solar maximum a higher relative number of interplanetary shocks can be followed by intense geomagnetic activity than in solar minimum.

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