

Effect of solar wind streams on interplanetary features and on geomagnetic field

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Abstract. High speed solar wind streams are separated into two categories : (i) Corotating (ii) Flare-generated streams. Results based on this analysis indicate the occurrence of large geomagnetic and interplanetary disturbances during flare-generated streams in comparison to period of corotating streams.

Keywords : solar wind – geomagnetic activity – interplanetary disturbances

1. Introduction

It is well known that solar corona continuously emits plasma streams into interplanetary space, which are separated into two categories : coronal hole associated or corotating high speed solar wind streams (CS) and flare-generated high speed solar wind streams (FGS). These separations are done on the basis of their velocity variational profile, proton temperature, density and fluctuation in magnetic field (Mavromichalki *et al.* 1988). A number of investigations have been done to observe the influence of high speed solar wind streams on geomagnetic field, interplanetary features and cosmic rays (Shrivastava and Shukla, 1993, 94; Sabbah *et al.* 1996).

2. Results and discussion

We have selected two typical examples of high speed solar wind streams one for FGS and another for CS. Figure 1 shows the FGS event of August, 25 to September 2, 1989. Large fluctuation in daily values of Interplanetary magnetic field component Bz, Ap index and proton temperature are seen during the period of high solar wind velocity. Similarly, the plot for CS for the period of August 14-19, 1990 is shown in Figure 2. Proton density N and Interplanetary magnetic field Bz show smooth behaviour. The proton temperature is seen to be high during the event period. It can be concluded from the analysis that the FGS and CS

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both are found responsible for geomagnetic disturbances. FGS events are found more effective in producing geomagnetic as well as interplanetary disturbances in comparison to corotating streams.

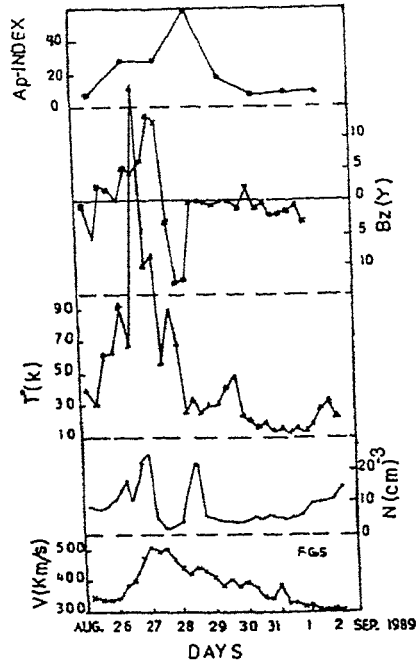


Figure 1. Shows a FGS event during August 25 to September 2, 1989, corresponding daily values of (i) SW velocity, (ii) Plasma density, (iii) Plasma temperature, (iv) IMF Bz, (v) Ap index and (vi) SSC.

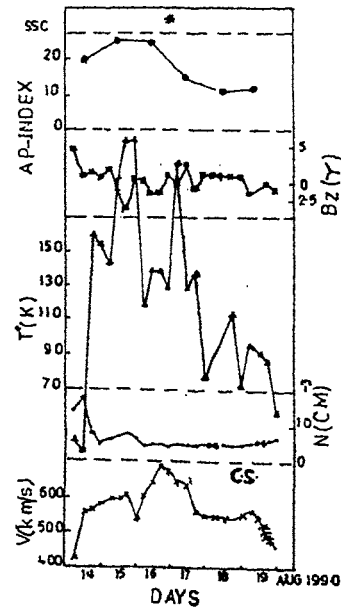


Figure 2. Daily values of (i) solar wind velocity, (ii) Plasma temperature, (iii) Plasma density, (iv) IMF Bz and (v) Ap index are plotted in different blocks for event period of a CS (August 14-19, 1990).

References

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