

Analysis of the Cosmic Ray Decrease with Solar Activity and Geomagnetic Indices in Solar Cycle-24

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Abstract: we have analysed the relation between cosmic ray decrease, solar activity and geomagnetic indices for the duration of solar cycle 24 in magnetic field of Sun. we used CR-FDs and SSN as most reliable parameter. In this studies we taken data of CR-FDs and SSN as a solar parameter for short-term of Solar cycle-24. We calculate the correlation FDs vs SSN and Fds-Dst and FDs-Ap for positive era of solar magnetic field. However, significant difference are found positive era then relation are found during the magnetic field of solar cycle-24.

Keyword: Forbush Decrease (FDs), Sunspot Numbers, Geomagnetic indices (Dst).

I. INTRODUCTION

Cosmic ray Decreases are short term decreases in cosmic rays intensity within periodically one to two days and that are continually followed by a slow recovery lasting several days. Which is affected role by interplanetary structure and their physical mechanism [1].

Sunspot numbers (Rz) is the most common parameter of the solar activity in cosmic rays variation in this period of solar cycle-24. Sunspot Numbers are most reliable other than solar indices, solar wind and coronal mass ejection also. It has been used to explain the characterization in short-term of solar cycle-24[2-3].

II. DATA SOURCE & METHODOLOGY

We used daily data of cosmic ray fourbush decreases (CR-FDs), sunspot number (SSN) and geomagnetic indices (Dst) from oulu neutron monitor (IZIRMAN) and Omni web dataset in worldwide network in the world. We take data form different rigidity of Neutron monitor available in website network but we choose and observed 0.81 GV rigidity for CR-FDs during the solar cycle-24.

These dataset used for calculate Dst. We have correlation of daily mean value of Dst verses daily mean value of sunspot numbers and cosmic ray for positive correlation at the solar magnetic field.

III. ANALYSIS AND DISCUSSION

Figure 1 are shows in year wise with solar activity parameters, interplanetary magnetic field and geomagnetic indices for solar cycle 24 as in periodical trends. Figure 2 are shows of correlation among CR-FDS and Sunspot number for duration 2008-2019.

CR-FDs and SSN both parameters shows moderate correlation for positive era of solar magnetic fields. Which is that Dst and Ap also reliable parameter and variable to CR- FDs. Further we have correlation CR-FDs verses Dst for positive era and Figure 3 & 4 is shows that CR-FDs verses Dst and CR-FDs verses Ap indices are week correlation in the solar cycle-24. It have changes cycle to cycle.

Now we see that the examined the correlation between CR-Fds verse SSN and CR-Fds verses Dst and CR-FDs verses Ap indices. This correlation analysis has been done for solar cycle 24. In this cycle we have opted duration of solar cycle 24 from 2012 to 2017 shows in figure 1. In this duration observed of solar cycle 24 on the basis of SSN. We observed similar correlation duration of this cycle.

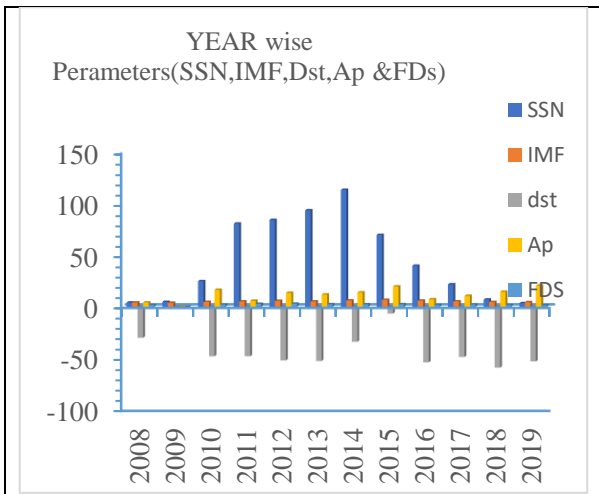


Figure 1

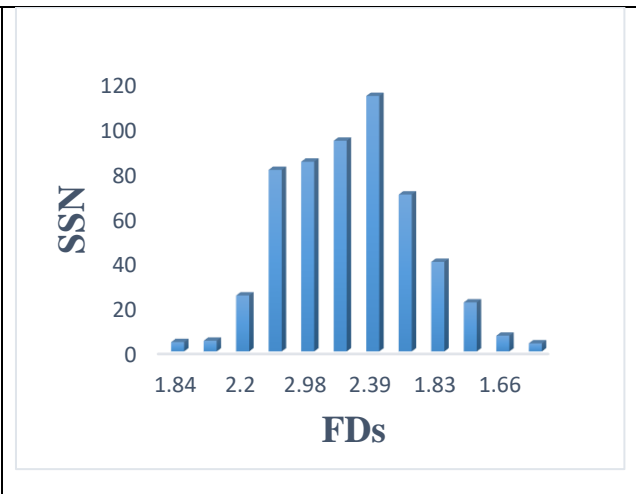


figure 2

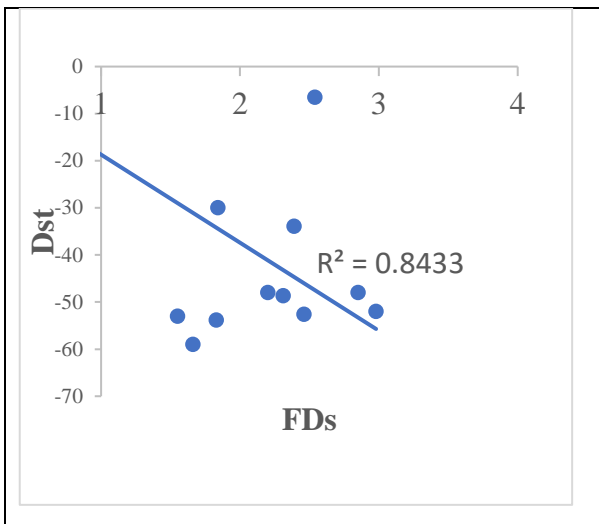


Figure 3

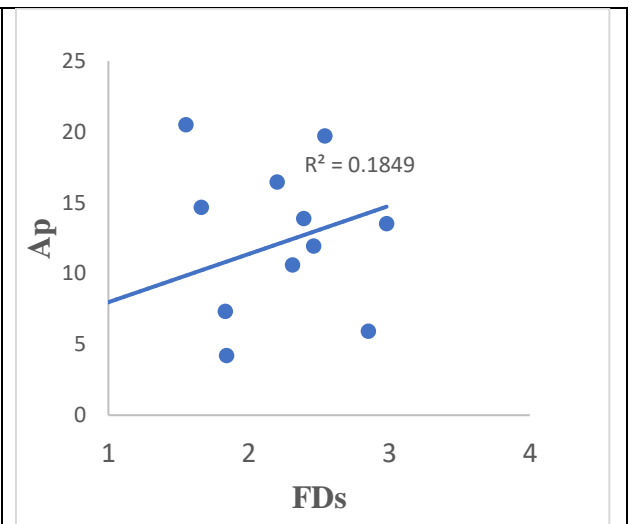


Figure 4

IV. CONCLUSION

Our studies based on analysis are correlation between of CR-Fds vs SSN and CR-Fds vs Dst we found that positive correlation in era of magnetic field during the solar cycle-24. In this cycle we have opted duration of solar cycle 24 from 2012 to 2017. we found the correlation are moderate positive and end of cycle correlation are poor of solar cycle 24. then we concluded that CR-Fds vs SSN and Dst and CR-Fds vs Ap indices is short-term Cosmic ray decreases is direct affected in interplanetary medium.

REFERENCES

- [1] Binod Adikari. et al., Analysis of solar, interplanetary and geomagnetic parameters during solar cycles 22, 23 and 24. 2019. Journal of earth science.ES000645.DOI
- [2].D.Lingri, et al., solar activity parameters and associated forrush decreases during the minimum between cycle 23 and 24 the ascending phase of cycle 24.2016, solar phys.1207.DOI.
- [3].Badruddinn kumar, A.:2015, solar phys. 1217.DOI.
- [4]. Shricastava, P.2005, In: Proc.29th ICRC, 1,355.
- [5].Shrivastava,P., et al.,2005,In Proc.29th ICRC,vol.1,335.