

Comparative study of tri - diurnal anisotropy of cosmic ray intensity on different types of days during minimum solar activity period

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ABSTRACT. A comparative study of tri-diurnal anisotropy of Cosmic Ray intensity data has been performed for Deep River neutron monitoring station on geomagnetically 60 quietest days, 120 quiet days and all days during minimum solar activity period 1985-87. Histogrammic plots of percentage of occurrence of Phase (hrs) in a definite interval reveals that in all the three cases it is maximum in the interval of 2 to 4 hours direction for the year 1985, however, the value of peak relative to its neighbours is quite large in case of quietest days. Somehow, for the year 1987, the Phase is maximum in the interval of 5 to 7 hours direction. The peak sharpening is equally noticeable in case of amplitude histogrammes as well. This brings out the fact that five most quietest days are better suited for study of daily variation on long term basis as well as short term basis.

data for the minimum solar activity period (1985-87) has been subjected for trend correction and then analysed to derive the amplitude (%) and phase (hrs) of tri-diurnal anisotropy on 60 Quietest days, 120 Quiet days and All days in a year.

3 RESULTS, DISCUSSIONS AND CONCLUSIONS

The percentage occurrence of days during the year 1985 for the amplitude (%) and phase (HRS) of tri-diurnal anisotropy of CR intensity on five most Quiet days (QD), Ten Quiet days and all days, have been plotted on histograms in figure 1 (a,b,c). Similar histograms have been plotted during the period 1986 and 1987. The period 1985-87 is selected because this is the period of minimum solar activity, so that interplanetary conditions are quite favourable for the said purpose. It is quite apparent from Fig. 1(a) that the peak of histogram is more sharper and scattering of the points away from the peak is not much larger for the five most quiet days in a month for the phase of tri-diurnal anisotropy of CR intensity. The peak becomes broader as one goes to Ten quiet days and furthermore broader for all days as shown in Figs. 1(b&c). Similar conclusions are drawn from the plots of histograms of the phases for above said three types of days during the year 1986 and 87.

Thus, three types of studies performed with different approaches lead to the same conclusions. However, this also brings out the fact that five most quiet days are better suited for study of daily variation of CR intensity on long term basis as well as short term basis because of the interplanetary condition is quite stable.

1 INTRODUCTION

The study of diurnal anisotropy in CR intensity using pressure corrected neutron monitor data has been performed by many workers (Venkatesan & Badruddin, 1990; Kumar et al, 1992, 1993, 1999 and references there in). The studies have been performed on these data by earlier workers either for all days or/and for 60 Quietest days. In the present investigations an attempt has been made to have a comparative study of not only these two groups of days but also for 120 Quiet days for third harmonics of daily variation.

2 DATA ANALYSIS

The pressure corrected Deep River neutron monitor
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Reference

1. Venkatesan, D. and Badruddin; Space Sci. Rev, 52, 121 (1990).

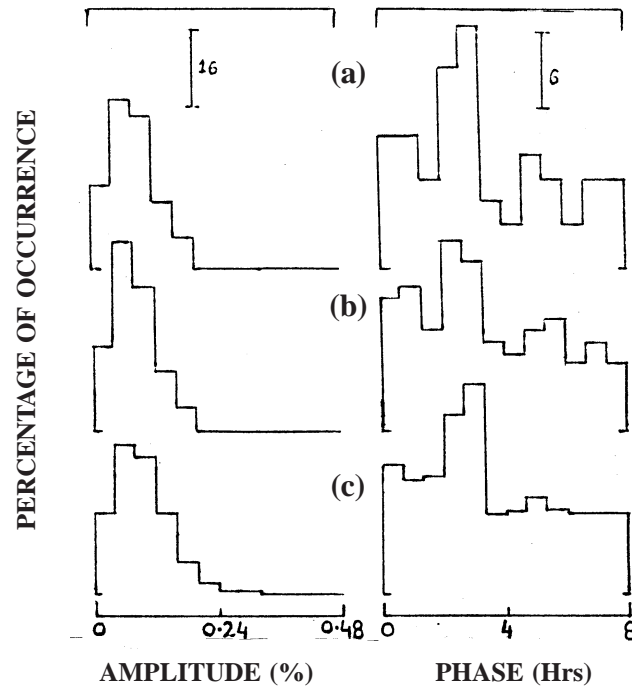


Fig.1 Histogrammic plots of tri-diurnal amplitude(%) and Phase (Hrs) of CR intensity and percentage of occurrence of days during the year 1985 for (a) 60 Quiet days, (b) 120 Quiet days and (c) All days for Deep River neutron monitoring station.

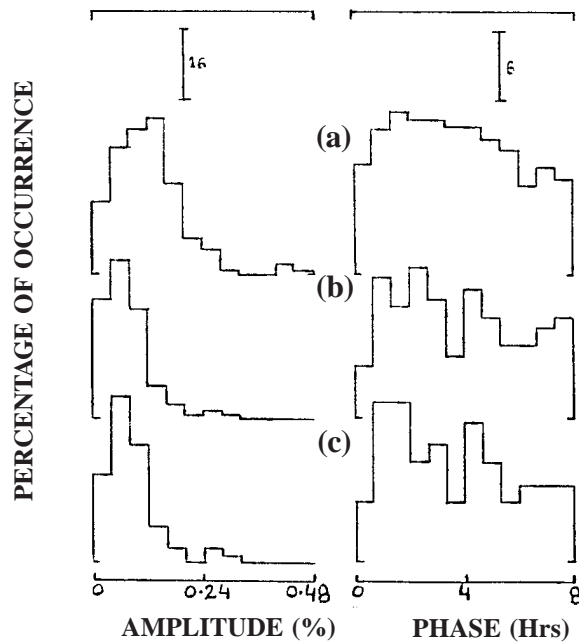


Fig.2 Histogrammic plots of tri-diurnal amplitude(%) and Phase (Hrs) of CR intensity and percentage of occurrence of days during the year 1986 for (a) 60 Quiet days, (b) 120 Quiet days and (c) All days for Deep River neutron monitoring station.

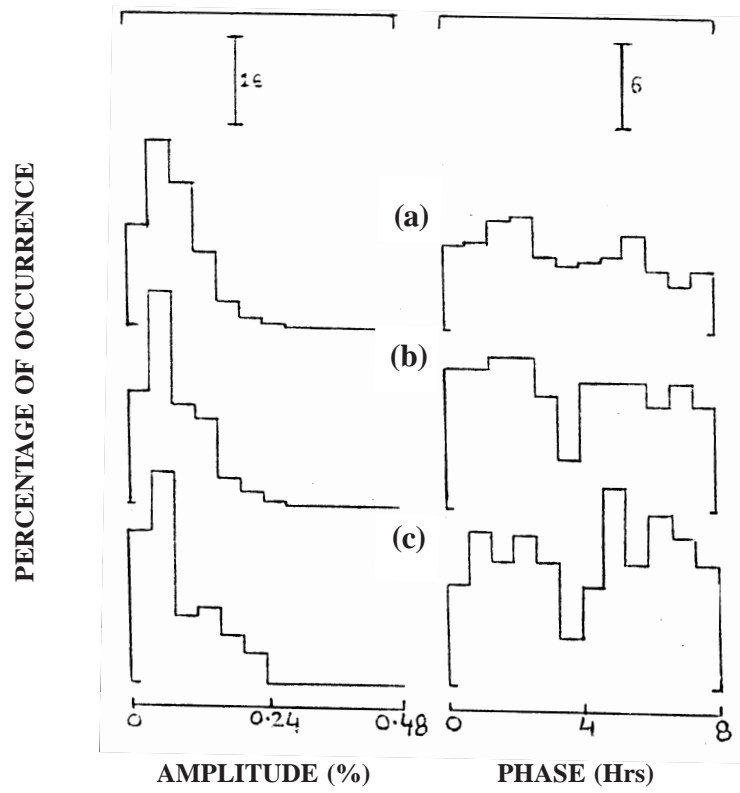


Fig.3 Histogrammic plots of tri-diurnal amplitude(%) and Phase (Hrs) of CR intensity and percentage of occurrence of days during the year 1987 for (a) 60 Quiet days, (b) 120 Quiet days and (c) All days for Deep River neutron monitoring station.