

DAILY IUE PEAK RADIATION LEVELS

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16 December 1982

Each day during the US2 observing shift the IUE satellite passes through the outer Van Allen radiation belts. The trapped particle radiation causes increased fogging on the cameras during the time period of this passage. This radiation background often limits the length of the exposures that can be obtained during the US2 shift.

The IUE Observatory has a program of monitoring the peak radiation levels encountered each day. These are recorded as a voltage on the Flux Particle Monitor (FPM), which may be converted to an equivalent exposure on the cameras in DN per hour. The approximate relation for the most sensitive portions of the cameras is

$$n \text{ DN/hr} = 10^{\text{FPM}}$$

Thus when the FPM reaches 2 volts, the fogging occurs at a rate of 100 DN/hr, attaining a 50% exposure level in one hour. In Figure 1 we present the peak radiation levels per day for 1982 through November 16. Please note that these are maximum levels only.

The radiation background typically varies during the US2 shift with two maxima. In Figure 2, typical FPM voltage variations with time are depicted. Perigee occurs roughly halfway through the US2 shift, depending upon time of the month. Note that the radiation often starts to rise near the end of the previous US1 shift. Recently, the second maximum has been higher than the first.

Finally, a long term variation in the radiation levels is seen since launch in 1978. Table 1 lists statistics on the peak radiation levels over the past 5 years. Equivalent fogging rates and the longest exposures obtainable at those rates (assuming a 50% background exposure level) are given. Radiation levels appear to have passed through a minimum near solar maximum. Levels during 1982 resemble those attained in 1978.

Figure #1

Peak Radiation Levels Attained Each Day during 1982 (through 16 November)

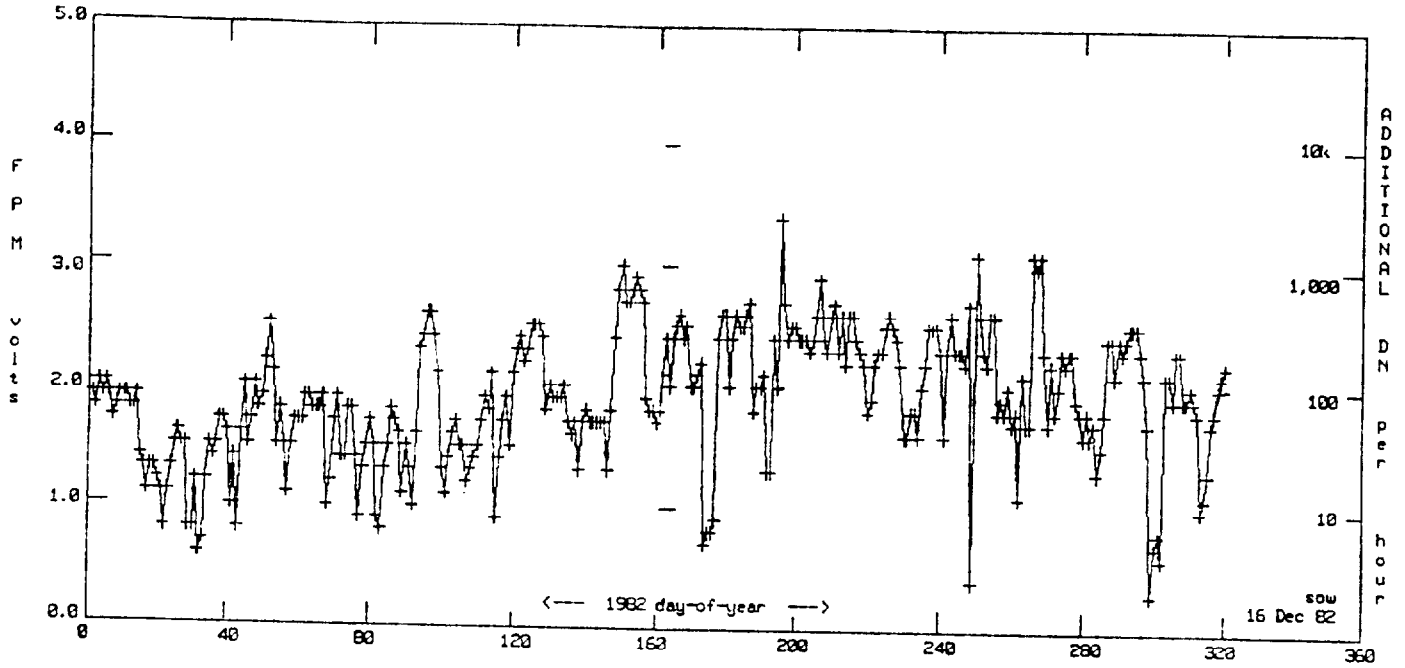


Figure #2

Typical Daily Variations of the Radiation Levels.

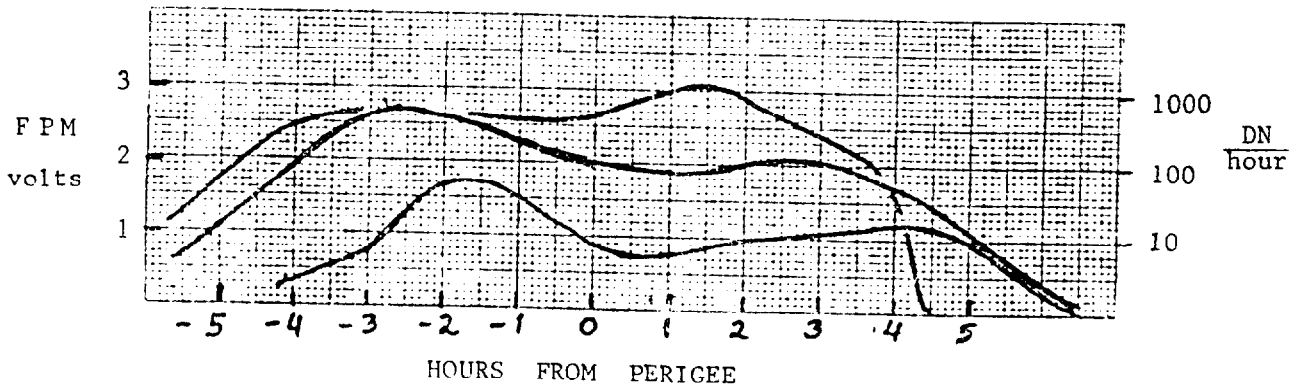


TABLE #1

STATISTICS FOR THE DAILY PEAK RADIATION LEVELS OBSERVED SINCE LAUNCH

PERCENTAGES OF DAYS AT GIVEN LEVELS:

	1978	1979	1980	1981	1982	FOGGING RATE (DN/HOUR)	LONGEST EXPOSURE
FPM < 1.0 V :	6.3	13.2	18.6	19.2	5.9	< 10	> 10 HOURS
1.0K = FPM < 1.7:	26.6	42.2	43.2	39.2	22.5	10 TO 50	2 - 10 HOURS
1.7K = FPM < 2.0:	14.8	16.2	18.3	21.4	26.9	50 TO 100	60 - 120 MIN.
2.0K = FPM < 2.4:	23.0	20.3	14.8	14.2	20.9	100 TO 250	30 - 60 MIN.
2.4K = FPM < 2.8:	20.2	7.4	4.1	4.7	20.3	250 TO 500	15 - 30 MIN.
2.8K = FPM < 3.0:	5.1	0.8	1.1	1.1	1.6	500 TO 1000	7 - 15 MIN.
FPM => 3.0 V :	3.9	0.0	0.0	0.3	1.9	> 1,000	< 7 MINUTES
TOTAL # DAYS :	331	365	366	365	320		

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