

MONTHLY COUNTS OF LDE FLARES (JANUARY 1969 - MARCH 1989)

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ABSTRACT. The monthly counts of LDE flares were determined from the Catalogue of LDE flares and its Supplements (Antalová 1987, 1988, 1989, 1990). Tables 1 (cycle 20), 2 (cycle 21) and 3 (part of cycle 22) give the distribution of the observed numbers of LDE flares in terms of three parameters: a) SXR importance of LDE flares, b) overall duration of the SXR flare emission, c) location of the LDE flare in the northern or southern solar hemisphere. The LDE flare index is given in the last column of all tables. The arrangement of Table 4 ( half-year numbers ) and Table 5 ( yearly numbers ) is identical with one of the Tables 1 - 3.

## 1. INTRODUCTION

The flares with a gradual SXR temporal profile (abbreviated LDE-type) only account for a few per cent (2% - 4%) of the total population of H-alpha optical flares. Nevertheless, they produce the most of the protons observed in interplanetary space and in the Earth's environment. This is caused by the different conditions for the particle acceleration into the flares of the impulsive and LDE type. The purpose of this paper is to report the monthly, semiannual and yearly counts of LDE flares observed in the course of the years 1969 - 1989.

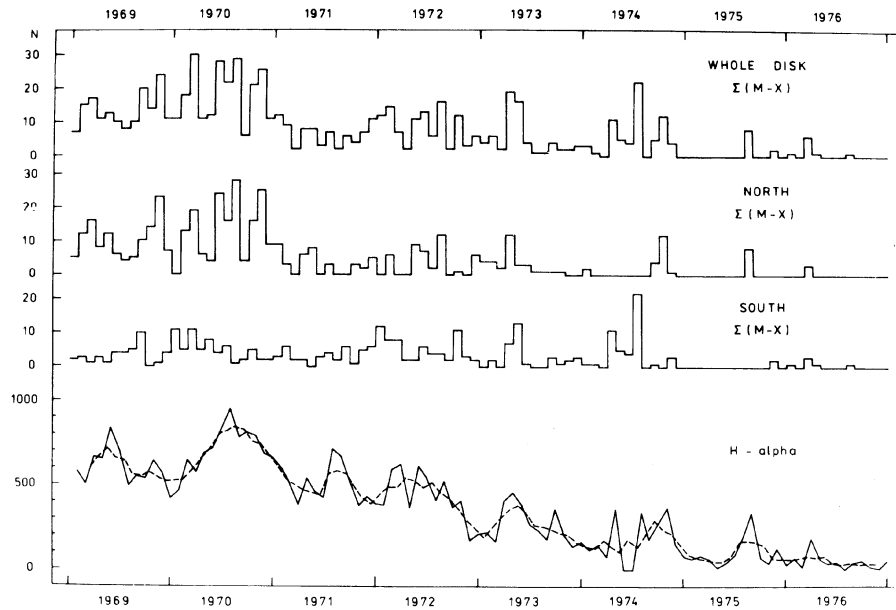


Fig. 1. The distribution of the monthly counts of LDE flares (classes from M1 to X12) during the 20th cycle. The H-alpha flare monthly numbers are shown in lower part.

## 2. MONTHLY COUNTS OF LDE FLARES (TABLES 1 - 3)

The basic list for determining the LDE flare monthly counts was the Catalogue of LDE flares and its Supplements (Antalová 1987, 1988, 1989 and 1990). The definition of the selection criteria, for the choosing of the LDE flares (with the SXR flare duration 2.0 or exceeding 2.0 hours), is published in the analysis of the 20th solar cycle (Antalová and Viktorínová 1990).

Tables 1 - 5 give the distribution of the LDE flares in terms of three parameters: a) SXR importances of LDE flares, b) overall duration of the SXR flare emission, c) location of the LDE flare in the northern or southern solar hemisphere.

Table 1 (cycle 20), 2 (cycle 21) and 3 (part of cycle 22) give the monthly counts of LDE flares.

Table 4 gives the semiannual values of the LDE flare occurrence.

Yearly numbers of LDE flares are given in Table 5.

In the last column of Tables 1 - 5 is given SXR flare index (SXR FI), which is calculated by the formula

$$\text{SXR FI}_{\text{LDE}} = N_C + 10 \times N_M + 100 \times N_X \quad (1)$$

where  $N_C$  is the number of SXR class C LDE flares,  $N_M$  is the number of class M

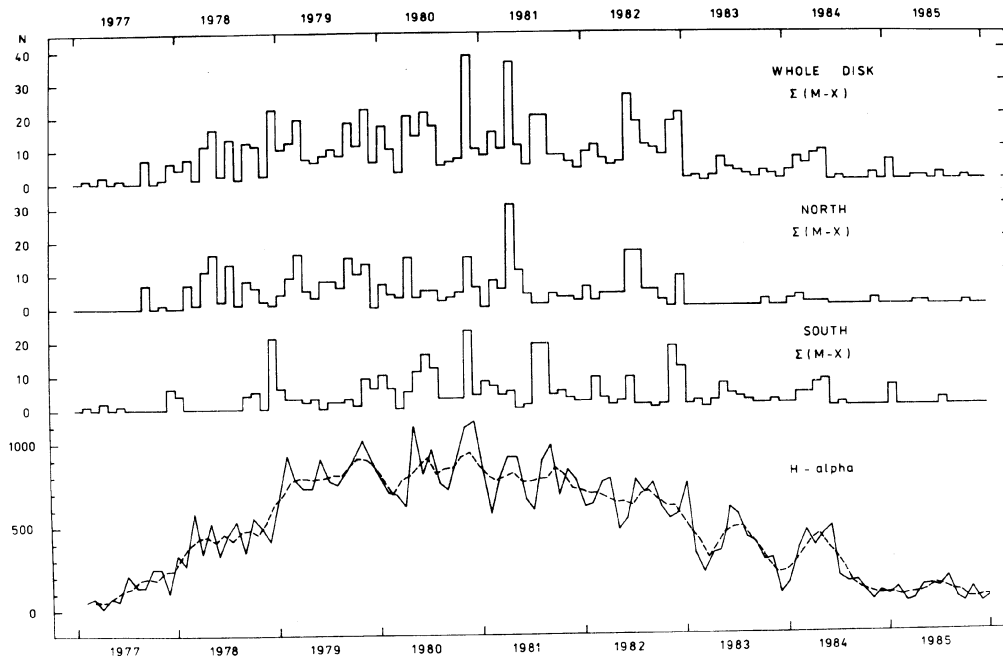


Fig. 2. The distribution of the monthly counts of LDE flares (SXR classes from M1 to X12) during the 21st cycle. The H-alpha flare monthly numbers are given in the lower part.

and  $N_X$  is number of SXR class X LDE flares.

### 3. DISCUSSION

Figure 1 (Table 1) shows the distribution of LDE flares observed during the years of cycle 20. This involves a total of 1891 type (C - X) LDE flares, of which 715, i.e. 38 %, were geoactive (LDE flares with SXR importance larger than C9). The geoactivity refers to SID.

The increased occurrence (monthly number larger than 20) of type (M - X) LDE flares was observed as follows:

	(M-X)	FI		(M-X)	FI		(M-X)	FI
Nov 1969	24	<u>1326</u>	Mar 1970	<u>30</u>	683	Jun 1970	28	832
Jul 1970	22	509	Aug 1970	29	573	Oct 1970	21	313
Nov 1970	26	1005	Jul 1974	22	1222			

The OSO 5 X-ray data (between 1969 July and 1971 December) show four periods of prolonged, intense SXR activity: 1970 June, 1970 August, 1970 October

TABLE 1

## MONTHLY COUNTS OF LDE FLARES IN THE 20TH CYCLE

Distribution due to their latitude, SXR class and SXR duration

Date	Flare		Disk	X	M	M	C	SXR duration (hrs)			Sum		SXR FI
	R <sub>10.7</sub>	Ha N cm						North South	1-9 I <sub>4</sub>	6-9 I <sub>3</sub>	1-5 I <sub>2</sub>	1-9 I <sub>1</sub>	
1 9 6 9													
Jan	104.4	581	W	1	3	3	7	1	6	7	14	7	167
			N	1	3	1	6	1	5	5	11	5	146
	147.8		S	0	0	2	1	0	1	2	3	2	21
Feb	120.5	504	W	3	3	9	16	0	6	25	31	15	436
			N	3	3	6	10	0	5	17	22	12	400
	151.5		S	0	0	3	6	0	1	8	9	3	36
Mar	135.8	669	W	7	3	7	12	0	13	16	29	17	812
			N	7	3	6	11	0	13	14	27	16	801
	170.6		S	0	0	1	1	0	0	2	2	1	11
Apr	106.8	655	W	2	2	7	11	4	11	7	22	11	301
			N	1	2	5	8	2	9	5	16	8	178
	156.5		S	1	0	2	3	2	2	2	6	3	123
May	120.0	839	W	2	3	8	23	3	9	24	36	13	333
			N	2	2	8	13	3	6	16	25	12	313
	148.7		S	0	1	0	10	0	3	8	11	1	20
Jun	106.0	694	W	4	2	4	6	3	9	4	16	10	466
			N	2	2	2	5	2	7	2	11	6	245
	167.3		S	2	0	2	1	1	2	2	5	4	221
Jul	96.8	489	W	1	1	6	15	0	6	17	23	8	185
			N	1	0	3	4	0	4	3	8	4	134
	141.1		S	0	1	3	11	0	2	14	15	4	51

## 1969

Aug	98.0	551	W	0	0	10	12	1	7	14	22	10	112
	146.8		N	0	0	5	5	1	4	5	10	5	55
			S	0	0	5	7	0	3	9	12	5	57
Sep	91.3	540	W	1	3	16	16	1	12	23	36	20	306
	138.7		N	1	0	9	10	1	9	10	20	10	200
			S	0	3	7	6	0	3	13	16	10	106
Oct	95.7	643	W	0	2	12	18	0	12	20	32	14	158
	152.9		N	0	2	12	13	0	9	18	27	14	153
			S	0	0	0	5	0	3	2	5	0	5
Nov	93.5	566	W	12	1	11	6	3	14	13	30	24	1326
	153.2		N	12	1	10	5	3	14	11	28	23	1315
			S	0	0	1	1	0	0	2	2	1	11
Dec	97.9	422	W	0	4	7	17	1	10	17	28	11	127
	139.1		N	0	2	5	11	1	8	9	18	7	81
			S	0	2	2	6	0	2	8	10	4	46

## 1970

Jan	111.5	466	W	2	1	8	15	1	9	16	26	11	305
	153.2		N	0	0	0	3	0	2	1	3	0	3
			S	2	1	8	12	1	7	15	23	11	302
Feb	127.5	646	W	7	3	8	17	1	16	18	35	18	827
	171.2		N	5	3	5	6	0	10	9	19	13	586
			S	2	0	3	11	1	6	9	16	5	241
Mar	102.9	579	W	4	6	20	23	3	15	35	53	30	683
	156.8		N	4	4	11	14	1	12	20	33	19	564
			S	0	2	9	2	2	3	15	20	11	119
Apr	109.5	688	W	1	3	7	10	1	10	11	21	11	210
	163.1		N	1	3	2	7	0	6	7	13	6	157
			S	0	0	5	3	1	4	4	8	5	53
May	127.5	722	W	0	4	8	11	1	6	16	23	12	131
	172.2		N	0	2	2	4	0	0	8	8	4	44
			S	0	2	6	7	1	6	8	15	8	87

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Jun	106.8	836	W	6	6	16	12	2	14	24	40	28	832
	159.9		N	6	6	12	11	1	13	21	35	24	791
			S	0	0	4	1	1	1	3	5	4	41
Jul	112.5	954	W	3	3	16	19	0	13	28	41	22	509
	157.0		N	3	3	10	11	0	9	18	27	16	441
			S	0	0	6	8	0	4	10	14	6	68
Aug	93.0	780	W	3	4	22	13	1	14	27	42	29	573
	141.6		N	3	4	21	11	1	13	25	39	28	561
			S	0	0	1	2	0	1	2	3	1	12
Sep	99.5	811	W	0	0	6	17	1	10	12	23	6	77
	144.6		N	0	0	4	12	0	9	7	16	4	52
			S	0	0	2	5	1	1	5	7	2	25
Oct	86.6	797	W	1	2	18	13	1	12	21	34	21	313
	147.3		N	1	2	13	11	1	10	16	27	16	261
			S	0	0	5	2	0	2	5	7	5	52
Nov	95.2	687	W	8	3	15	25	3	17	31	51	26	1005
	158.5		N	7	3	14	18	2	15	25	42	25	888
			S	1	0	1	7	1	2	6	9	2	117
Dec	83.5	667	W	1	4	6	12	1	7	15	23	11	212
	148.0		N	1	4	4	4	1	3	9	13	9	184
			S	0	0	2	8	0	4	6	10	2	28

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Jan	91.3	598	W	1	3	8	14	1	11	14	26	12	224
	157.4		N	1	2	6	7	1	9	6	16	9	187
			S	0	1	2	7	0	2	8	10	3	37
Feb	79.0	505	W	0	2	7	11	0	6	14	20	9	101
	134.4		N	0	1	2	7	0	5	5	10	3	37
			S	0	1	5	4	0	1	9	10	6	64
Mar	60.7	387	W	0	0	2	15	1	8	8	17	2	35
	110.8												

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Mar	60.7	387	W	0	0	2	15	1	8	8	17	2	35
	110.8		N	0	0	0	7	1	4	2	7	0	7
			S	0	0	2	8	0	4	6	10	2	28
Apr	71.8	546	W	1	1	6	19	4	8	15	27	8	189
	117.5		N	1	1	4	10	0	5	11	16	6	160
			S	0	0	2	9	4	3	4	11	2	29
May	57.5	461	W	0	4	4	8	2	6	8	16	8	88
	112.4		N	0	4	4	8	2	6	8	16	8	88
			S	0	0	0	0	0	0	0	0	0	0
Jun	49.8	430	W	0	0	3	13	0	7	9	16	3	43
	104.9		N	0	0	0	7	0	3	4	7	0	7
			S	0	0	3	6	0	4	5	9	3	36
JUL	81.0	713	W	0	1	6	13	0	5	15	20	7	83
	121.2		N	0	1	2	4	0	1	6	7	3	34
			S	0	0	4	9	0	4	9	13	4	49
Aug	61.4	673	W	0	0	2	12	0	4	10	14	2	32
	116.9		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	2	12	0	4	10	14	2	32
Sep	50.2	518	W	0	0	6	14	1	10	9	20	6	74
	105.1		N	0	0	0	5	1	2	2	5	0	5
			S	0	0	6	9	0	8	7	15	6	69
Oct	51.7	375	W	0	1	3	11	1	9	5	15	4	51
	106.4		N	0	1	2	6	1	5	3	9	3	36
			S	0	0	1	5	0	4	2	6	1	15
Nov	63.2	431	W	1	0	6	11	1	7	10	18	7	171
	111.5		N	1	0	1	4	0	2	4	6	2	114
			S	0	0	5	7	1	5	6	11	5	57
Dec	82.2	394	W	0	2	9	12	2	13	8	23	11	122
	120.7		N	0	0	5	5	0	6	4	10	5	55
			S	0	2	4	7	2	7	4	13	6	67

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Jan	61.5	384	W	0	3	9	16	3	4	21	28	12	136
	111.1		N	0	0	0	2	1	0	1	2	0	2
			S	0	3	9	14	2	4	20	26	12	134
Feb	88.4	399	W	2	3	9	16	3	11	16	30	14	336
	138.4		N	1	3	2	3	1	1	7	9	6	153
			S	1	0	7	13	2	10	9	21	8	183
Mar	80.1	621	W	1	0	6	28	1	8	26	35	7	188
	127.1		N	0	0	0	13	0	4	9	13	0	13
			S	1	0	6	15	1	4	17	22	8	175
Apr	63.2	361	W	0	0	2	13	1	5	9	15	2	33
	113.7		N	0	0	0	3	0	1	2	3	0	3
			S	0	0	2	10	1	4	7	12	2	30
May	80.5	614	W	2	1	8	29	6	14	20	40	11	319
	132.5		N	2	1	6	21	4	10	16	30	9	291
			S	0	0	2	8	2	4	4	10	2	28
Jun	88.0	541	W	3	2	8	36	2	17	30	49	13	436
	139.7		N	2	1	4	6	0	4	9	13	7	256
			S	1	1	4	30	1	13	21	36	6	180
Jul	76.5	404	W	0	0	6	31	2	12	23	37	6	91
	126.0		N	0	0	2	14	1	5	10	16	2	34
			S	0	0	4	17	1	7	13	21	4	57
Aug	76.8	515	W	3	1	12	40	9	21	26	56	16	470
	128.9		N	3	1	8	28	6	16	18	40	12	418
			S	0	0	4	12	3	5	8	16	4	52
Sep	64.0	371	W	0	0	2	57	0	19	40	59	2	77
	114.9		N	0	0	0	18	0	4	14	18	0	18
			S	0	0	2	39	0	15	26	41	2	59
Oct	61.3	408	W	2	0	10	38	7	19	24	50	12	338
	120.2		N	0	0	1	10	0	4	7	11	1	20
			S	2	0	9	28	7	15	17	39	11	218



## 1972

Nov	41.6	175	W	0	0	3	17	3	12	5	20	3	47
	99.7		N	0	0	0	2	1	1	0	2	0	2
			S	0	0	3	15	2	11	5	18	3	45
Dec	45.3	210	W	1	0	5	17	2	11	10	23	6	167
	99.7		N	1	0	3	15	2	8	9	19	6	145
			S	0	0	2	2	0	3	1	4	2	22

## 1973

Jan	43.4	221	W	0	0	4	15	2	3	14	19	4	55
	99.0		N	0	0	4	15	2	3	14	19	4	55
			S	0	0	0	0	0	0	0	0	0	0
Feb	42.9	171	W	0	2	4	16	2	4	16	22	6	56
	96.3		N	0	2	2	7	1	0	10	11	4	27
			S	0	0	2	9	1	4	6	11	2	29
Mar	46.0	410	W	0	0	2	27	1	11	17	29	2	47
	99.4		N	0	0	2	10	0	4	8	12	2	30
			S	0	0	0	17	1	7	9	17	0	17
Apr	57.7	453	W	2	4	13	25	0	11	33	44	19	395
	105.8		N	1	3	8	11	0	6	17	23	12	221
			S	1	1	5	14	0	5	16	21	7	174
May	42.4	388	W	4	1	11	22	2	11	25	38	16	542
	99.1		N	2	0	1	8	2	2	7	11	3	218
			S	2	1	10	14	0	9	18	27	13	324
Jun	39.5	270	W	0	1	3	12	1	8	7	16	4	52
	94.2		N	0	0	3	5	0	5	3	8	3	35
			S	0	1	0	7	1	3	4	8	1	17
JUL	23.1	232	W	0	1	0	10	2	1	8	11	1	20
	87.2		N	0	1	0	8	2	0	7	9	1	18
			S	0	0	0	2	0	1	1	2	0	2
Aug	25.6	182	W	0	0	1	9	0	5	5	10	1	19
	84.9												

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Aug	25.6	182	W	0	0	1	9	0	5	5	10	1	19
	84.9		N	0	0	1	8	0	4	5	9	1	18
			S	0	0	0	1	0	1	0	1	0	1
Sep	59.3	353	W	2	0	2	12	2	5	9	16	4	232
	106.8		N	1	0	0	2	0	2	1	3	1	102
			S	1	0	2	10	2	3	8	13	3	130
Oct	30.7	201	W	0	0	2	11	3	5	5	13	2	31
	87.1		N	0	0	1	2	1	0	2	3	1	12
			S	0	0	1	9	2	5	3	10	1	19
Nov	23.9	136	W	1	0	1	10	3	3	3	12	2	120
	79.7		N	0	0	0	0	0	0	0	0	0	0
			S	1	0	1	10	3	6	3	12	2	120
Dec	23.3	163	W	0	0	3	7	0	2	8	10	3	37
	81.5		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	3	7	0	2	8	10	3	37

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Jan	27.6	127	W	0	0	3	10	0	4	9	13	3	40
	80.4		N	0	0	2	3	0	2	3	5	2	23
			S	0	0	1	7	0	2	6	8	1	17
Feb	42.9	171	W	0	0	1	8	0	3	6	9	1	18
	78.9		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	1	8	0	3	6	9	1	18
Mar	46.0	410	W	0	0	0	9	0	0	9	9	0	9
	78.4		N	0	0	0	5	0	0	5	5	0	5
			S	0	0	0	4	0	0	4	4	0	4
Apr	40.3	364	W	1	1	9	13	0	3	21	24	11	213
	86.7		N	0	0	0	2	0	0	2	2	0	2
			S	1	1	9	11	0	3	19	22	11	211
May	39.5	255	W	0	0	5	30	0	1	34	35	5	80
	92.6		N	0	0	0	4	0	0	4	4	0	4
			S	0	0	5	26	0	1	30	31	5	76

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Jun	36.0	204	W	0	0	4	18	0	1	21	22	4	58
	89.0		N	0	0	0	3	0	0	3	3	0	3
			S	0	0	4	15	0	1	18	19	4	55
Jul	55.8	360	W	11	3	8	12	0	10	24	34	22	1222
	95.5		N	0	0	0	0	0	0	0	0	0	0
			S	11	3	8	12	0	10	24	34	22	1222
Aug	33.6	187	W	0	0	0	5	0	1	4	5	0	5
	85.1		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	5	0	1	4	5	0	5
Sep	40.2	270	W	2	2	1	7	9	3	0	12	5	237
	88.7		N	2	1	1	6	8	2	0	10	4	226
			S	0	1	0	1	1	1	0	2	1	11
Oct	47.1	366	W	0	2	10	12	1	7	16	24	12	132
	97.1		N	0	2	10	10	1	7	14	22	12	130
			S	0	0	0	2	0	0	2	2	0	002
Nov	25.0	153	W	1	0	3	4	0	2	6	8	4	134
	88.3		N	0	0	1	3	0	2	2	4	1	13
			S	1	0	2	1	0	0	4	4	3	121
Dec	20.5	81	W	0	0	0	3	0	0	3	3	0	3
	78.6		N	0	0	0	3	0	0	3	3	0	3
			S	0	0	0	0	0	0	0	0	0	0

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Jan	18.9	68	W	0	0	0	1	0	0	1	1	0	1
	75.0		N	0	0	0	1	0	0	1	1	0	1
			S	0	0	0	0	0	0	0	0	0	0
Feb	11.5	82	W	0	0	0	0	0	0	0	0	0	0
	72.4		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	0	0	0	0	0	0	0
Mar	11.5	69	W	0	0	0	2	0	0	2	2	0	2
	71.7		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	2	0	0	2	2	0	2

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Apr	5.1	19	W	0	0	0	0	0	0	0	0	0	0
	71.2		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	0	0	0	0	0	0	0
May	9.0	42	W	0	0	0	0	0	0	0	0	0	0
	71.6		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	0	0	0	0	0	0	0
Jun	11.4	85	W	0	0	0	0	0	0	0	0	0	0
	71.9		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	0	0	0	0	0	0	0
Jul	28.2	196	W	0	0	0	3	0	0	3	3	0	3
	79.7		N	0	0	0	3	0	0	3	3	0	3
			S	0	0	0	0	0	0	0	0	0	0
Aug	39.7	346	W	0	2	6	4	0	1	11	12	8	84
	92.7		N	0	2	6	4	0	1	11	12	8	84
			S	0	0	0	0	0	0	0	0	0	0
Sep	13.9	68	W	0	0	0	1	0	0	1	1	0	1
	80.4		N	0	0	0	1	0	0	1	1	0	1
			S	0	0	0	0	0	0	0	0	0	0
Oct	9.1	38	W	0	0	0	0	0	0	0	0	0	0
	75.3		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	0	0	0	0	0	0	0
Nov	19.4	127	W	0	0	2	7	0	4	5	9	2	27
	79.1		N	0	0	0	2	0	0	2	2	0	2
			S	0	0	2	5	0	4	5	7	2	25
Dec	7.8	25	W	0	0	0	1	0	0	1	1	0	1
	72.3		N	0	0	0	1	0	0	1	1	0	1
			S	0	0	0	0	0	0	0	0	0	0

1 9 7 6

Jan	8.1	69	W	0	0	1	3	0	0	4	4	1	13
	72.4		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	1	3	0	0	4	4	1	13

1 9 7 6

Feb.	4.3	18	W	0	0	0	0	0	0	0	0	0	0
	68.8		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	0	0	0	0	0	0	0
Mar	21.9	180	W	2	0	4	5	3	3	5	11	6	245
	75.9		N	0	0	3	1	0	0	4	4	3	31
			S	2	0	1	4	3	3	1	7	3	214
Apr	18.8	60	W	1	0	0	3	1	2	1	4	1	103
	76.8		N	0	0	0	1	0	1	0	1	0	1
			S	1	0	0	2	1	1	1	3	1	102
May	12.4	38	W	0	0	0	3	0	1	2	3	0	3
	72.2		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	3	0	1	2	3	0	3
Jun	12.2	48	W	0	0	0	0	0	0	0	0	0	0
	72.8		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	0	0	0	0	0	0	0

TABLE 2

MONTHLY COUNTS OF LDE FLARES IN THE 21ST CYCLE  
distribution due to their latitude, SXR class and SXR duration

Date	R <sub>10.7</sub> cm	Flares Ha	Disk North South	X				SXR duration (hrs)			Sum	SXR FI
				1-9 I <sub>4</sub>	6-9 I <sub>3</sub>	1-5 I <sub>2</sub>	1-9 I <sub>1</sub>	4.5 t <sub>3</sub>	2.5 t <sub>2</sub>	2.0 t <sub>1</sub>		

1 9 7 6

Jul	1.9	6	W	0	0	0	0	0	0	0	0	0	0
	69.8		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	0	0	0	0	0	0	0
Aug	16.4	47	W	0	0	1	0	0	0	1	1	1	10
	76.6		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	1	0	0	0	1	1	1	10

1 9 7 6

Sep	13.5	57	W	0	0	0	4	0	0	4	4	0	4
	73.9		N	0	0	0	4	0	0	4	4	0	4
			S	0	0	0	0	0	0	0	0	0	0
Oct	20.6	23	W	0	0	0	1	0	0	1	1	0	1
	75.4		N	0	0	0	1	0	0	1	1	0	1
			S	0	0	0	0	0	0	0	0	0	0
Nov	5.2	13	W	0	0	0	0	0	0	0	0	0	0
	71.3		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	0	0	0	0	0	0	0
Dec	15.3	55	W	0	0	0	4	0	0	4	4	0	4
	74.3		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	4	0	0	4	4	0	4

1 9 7 7

Jan	16.4	54	W	0	0	0	5	0	0	5	5	0	5
	74.9		N	0	0	0	2	0	0	2	2	0	2
			S	0	0	0	3	0	0	3	3	0	3
Feb	23.1	77	W	0	0	1	5	0	1	5	6	1	15
	80.3		N	0	0	0	3	0	0	3	3	0	3
			S	0	0	1	2	0	1	2	3	1	12
Mar	8.7	18	W	0	0	0	4	0	0	4	4	0	4
	75.8		N	0	0	0	3	0	0	3	3	0	3
			S	0	0	0	1	0	0	1	1	0	1
Apr	12.9	76	W	0	1	2	10	1	1	11	13	3	40
	78.2		N	0	0	0	2	0	0	2	2	0	2
			S	0	1	2	8	1	1	9	11	3	38
MAY	18.6	64	W	0	0	0	1	0	0	1	1	0	1
	81.4		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	0	1	0	0	1	1	0	1
Jun	38.5	210	W	0	0	1	4	1	1	3	5	1	14
	94.5		N	0	0	0	2	1	1	0	2	0	2
			S	0	0	1	2	0	0	3	3	1	12

1 9 7 7

Jul	21.4	140	W	0	0	0	1	0	1	0	1	0	1
	83.7		N	0	0	0	1	0	1	0	1	0	1
			S	0	0	0	0	0	0	0	0	0	0
Aug	30.1	140	W	0	0	0	1	0	0	1	1	0	1
	86.4		N	0	0	0	1	0	0	1	1	0	1
			S	0	0	0	0	0	0	0	0	0	0
Sep	44.0	250	W	3	1	3	4	7	2	2	11	7	344
	100.9		N	3	1	3	3	7	2	1	10	7	343
			S	0	0	0	1	0	0	1	1	0	1
Oct	43.8	252	W	0	0	0	4	0	0	4	4	0	4
	96.3		N	0	0	0	3	0	0	3	3	0	3
			S	0	0	0	1	0	0	1	1	0	1
Nov	29.1	107	W	1	0	0	1	0	1	1	2	1	101
	91.6		N	1	0	0	1	0	1	1	2	1	101
			S	0	0	0	0	0	0	0	0	0	0
Dec	43.2	336	W	0	0	6	3	0	2	7	9	6	63
	98.9		N	0	0	0	0	0	0	0	0	0	0
			S	0	0	6	3	0	2	7	9	6	63

1 9 7 8

Jan	51.9	274	W	0	0	4	4	1	3	4	8	4	44
	106.1		N	0	0	0	1	0	0	1	1	0	1
			S	0	0	4	3	1	3	3	7	4	43
FEB	93.6	588	W	0	1	6	7	2	0	12	14	7	77
	141.8		N	0	1	6	7	2	0	12	14	7	77
			S	0	0	0	0	0	0	0	0	0	0
Mar	76.5	338	W	0	0	1	8	2	3	4	9	1	18
	140.3		N	0	0	1	8	2	3	4	9	1	18
			S	0	0	0	0	0	0	0	0	0	0
Apr	99.7	526	W	4	2	5	7	6	5	7	18	11	477
	150.5		N	4	2	5	7	6	5	7	18	11	477
			S	0	0	0	0	0	0	0	0	0	0

1 9 7 8

<b>May</b>	82.7	330	W	2	4	10	5	4	9	8	21	16	345
	149.7		N	2	4	10	4	4	9	7	20	16	344
			S	0	0	0	1	0	0	1	1	0	1
<b>Jun</b>	95.1	460	W	0	0	2	1	2	1	0	3	2	21
	146.8		N	0	0	2	1	2	1	0	3	2	21
			S	0	0	0	0	0	0	0	0	0	0
<b>Jul</b>	70.4	533	W	4	3	6	4	3	11	3	17	13	494
	135.4		N	4	3	6	2	3	9	3	15	13	492
			S	0	0	0	2	0	2	0	2	0	2
<b>Aug</b>	58.1	346	W	0	0	1	3	1	1	2	4	1	13
	116.9		N	0	0	1	1	1	0	1	2	1	11
			S	0	0	0	2	0	1	1	2	0	2
<b>Sep</b>	138.2	554	W	1	1	10	13	1	3	21	25	12	223
	159.6		N	1	0	7	8	1	1	14	16	8	178
			S	0	1	3	5	0	2	7	9	4	45
<b>Oct</b>	125.1	499	W	0	3	8	24	5	7	23	35	11	134
	157.1		N	0	1	5	7	1	3	7	11	6	67
			S	0	2	3	17	4	4	16	24	5	67
<b>Nov</b>	97.9	418	W	0	0	2	9	2	3	6	11	2	29
	148.2		N	0	0	2	5	2	2	3	7	2	25
			S	0	0	0	4	0	1	3	4	0	4
<b>Dec</b>	122.7	648	W	5	5	12	6	2	11	15	28	22	676
	170.0		N	0	0	1	1	0	0	2	2	1	11
			S	5	5	11	5	2	11	13	26	21	665

1 9 7 9

<b>Jan</b>	166.6	926	W	0	1	9	10	0	3	17	20	10	110
	196.5		N	0	1	3	2	0	1	5	6	4	42
			S	0	0	6	8	0	2	12	14	6	68
<b>FEb</b>	137.5	781	W	3	2	7	28	2	9	29	40	12	418
	199.1		N	3	2	4	23	2	7	23	32	9	383
			S	0	0	3	5	0	2	6	8	3	35



1 9 7 9

Mar	138.0	731	W	1	6	12	11	2	11	17	30	19	291
	184.0		N	1	5	10	7	2	10	11	23	16	257
			S	0	1	2	4	0	1	6	7	3	34
Apr	101.5	731	W	1	0	6	18	1	6	18	25	7	178
	175.0		N	1	0	4	10	0	6	9	15	5	150
			S	0	0	2	8	1	0	9	10	2	28
May	134.4	907	W	0	1	5	9	1	5	8	15	6	69
	168.9		N	0	1	2	8	0	5	6	11	3	38
			S	0	0	3	1	1	1	2	4	3	31
Jun	149.5	772	W	2	1	5	8	2	7	7	16	8	268
	186.0		N	2	1	5	7	2	7	6	15	8	267
			S	0	0	0	1	0	0	1	1	0	1
Jul	159.4	750	W	0	0	10	12	2	7	13	22	10	112
	171.4		N	0	0	8	11	2	6	10	19	8	91
			S	0	0	2	1	0	1	3	3	2	21
Aug	142.2	821	W	2	1	5	10	6	7	5	18	8	270
	177.0		N	2	1	3	6	5	3	4	12	6	246
			S	0	0	2	4	1	4	1	6	2	24
Sep	188.4	901	W	4	1	13	8	1	6	19	26	18	548
	202.3		N	4	1	10	8	1	6	16	23	15	518
			S	0	0	3	0	0	0	3	3	3	30
Oct	186.2	1018	W	0	4	7	10	0	14	7	21	11	120
	216.4		N	0	4	6	7	0	13	4	17	10	107
			S	0	0	1	3	0	1	3	4	1	13
Nov	183.3	888	W	0	1	21	9	4	14	13	31	22	229
	226.8		N	0	1	12	4	3	6	8	17	13	134
			S	0	0	9	5	1	8	5	14	9	95
Dec	176.3	786	W	1	1	4	7	0	9	4	13	6	157
	197.2		N	0	0	0	2	0	2	0	2	0	2
			S	1	1	4	5	0	7	4	11	6	155

1 9 8 0

<b>Jan</b>	159.6	703	W	1	4	12	10	2	13	12	27	17	270
	199.6		N	1	0	6	5	0	6	6	12	7	165
			S	0	4	6	5	2	7	6	15	10	105
<b>Feb</b>	155.0	689	W	1	0	9	17	0	7	20	27	10	207
	195.1		N	1	0	3	6	0	5	5	10	4	136
			S	0	0	6	11	0	2	15	17	6	71
<b>Mar</b>	126.2	621	W	0	0	3	4	1	1	5	7	3	34
	166.5		N	0	0	3	1	1	0	3	4	3	31
			S	0	0	0	3	0	1	2	3	0	3
<b>Apr</b>	164.1	1092	W	1	2	17	17	3	8	26	37	20	307
	209.3		N	1	2	12	9	3	7	14	24	15	249
			S	0	0	5	8	0	1	12	13	5	58
<b>May</b>	179.9	811	W	1	3	10	10	3	6	15	24	14	240
	229.1		N	0	0	3	3	0	3	3	6	3	33
			S	1	3	7	7	3	3	12	18	11	207
<b>Jun</b>	157.3	956	W	0	1	20	22	4	12	27	43	21	232
	199.3		N	0	0	5	1	1	3	2	6	5	51
			S	0	1	15	21	3	9	25	37	16	181
<b>Jul</b>	136.3	763	W	0	5	12	14	0	11	20	31	17	184
	190.8		N	0	1	4	3	0	3	5	8	5	53
			S	0	4	8	11	0	8	15	23	12	131
<b>Aug</b>	135.4	720	W	0	0	5	25	0	12	18	30	5	75
	170.3		N	0	0	2	16	0	4	14	18	2	36
			S	0	0	3	9	0	8	4	12	3	39
<b>SEP</b>	155.0	924	W	0	2	4	15	0	8	13	21	6	75
	185.9		N	0	0	3	8	0	2	9	11	3	38
			S	0	2	1	7	0	6	4	10	3	37
<b>Oct</b>	164.7	988	W	1	2	4	10	2	5	10	17	7	170
	202.9		N	0	1	3	7	0	4	7	11	4	47
			S	1	1	1	3	2	1	3	6	3	123

1 9 8 0

Nov	147.9	1027	W	6	7	25	23	5	11	45	61	38	943
	213.4		N	3	4	8	15	0	5	25	30	15	435
			S	3	3	17	8	5	6	20	31	23	508
Dec	174.4	838	W	0	1	9	12	1	5	16	22	10	112
	218.8		N	0	0	6	5	1	3	7	11	6	065
			S	0	1	3	7	0	2	9	11	4	047

1 9 8 1

Jan	114.0	578	W	0	3	5	5	1	5	7	13	8	085
	169.0		N	0	0	0	4	0	2	2	4	0	004
			S	0	3	5	1	1	3	5	9	8	081
Feb	141.3	782	W	2	1	12	21	1	6	29	36	15	351
	199.5		N	0	0	8	9	0	1	16	17	8	089
			S	2	1	4	12	1	5	13	19	7	262
Mar	135.5	914	W	0	1	9	19	2	11	16	29	10	119
	203.2		N	0	1	5	11	1	6	10	17	6	071
			S	0	0	4	8	1	5	6	12	4	048
Apr	156.4	915	W	5	10	21	17	10	18	25	53	36	827
	224.7		N	4	9	18	17	8	17	23	48	31	687
			S	1	1	3	0	2	1	2	5	5	140
May	127.5	658	W	1	4	6	10	5	6	10	21	11	210
	198.9		N	1	4	6	8	4	6	9	19	11	208
			S	0	0	0	2	1	0	1	2	0	002
Jun	90.9	592	W	0	0	5	14	3	8	8	19	5	064
	161.9		N	0	0	4	10	1	6	7	14	4	050
			S	0	0	1	4	2	2	1	5	1	014
Jul	143.8	893	W	2	1	17	8	5	9	14	28	20	388
	198.2		N	0	0	1	3	2	1	1	4	1	013
			S	2	1	16	5	3	8	13	24	19	375
Aug	158.7	982	W	0	2	18	3	1	15	12	28	20	208
	226.0		N	0	0	1	2	0	2	1	3	1	012
			S	0	2	17	6	1	13	11	25	19	196

1 9 8 1

<b>Sep</b>	167.3	680	W	1	1	6	0	0	5	3	8	8	170
	221.9		N	1	0	3	0	0	2	2	4	4	130
			S	0	1	3	0	0	3	1	4	4	040
<b>Oct</b>	162.4	836	W	3	0	5	6	3	8	3	14	8	356
	222.8		N	0	0	3	2	0	3	2	5	3	032
			S	3	0	2	4	3	5	1	9	5	324
<b>Nov</b>	137.5	773	W	0	0	6	5	3	5	3	11	6	065
	203.3		N	0	0	3	2	1	3	1	5	3	032
			S	0	0	3	3	2	2	2	6	3	033
<b>Dec</b>	150.1	615	W	0	0	4	2	2	3	1	6	4	042
	201.4		N	0	0	2	0	1	0	1	2	2	020
			S	0	0	2	2	1	3	0	4	2	022

1 9 8 2

<b>Jan</b>	111.2	631	W	0	1	8	1	0	6	4	10	9	091
	173.4		N	0	0	6	0	0	2	4	6	6	060
			S	0	1	2	1	0	4	0	4	3	031
<b>Feb</b>	163.6	763	W	1	0	10	2	1	4	8	13	11	202
	208.9		N	0	0	2	1	0	1	2	3	2	021
			S	1	0	8	1	1	3	6	10	9	181
<b>Mar</b>	153.8	783	W	2	1	4	3	2	5	3	10	7	253
	208.3		N	2	1	1	3	2	4	1	7	4	223
			S	0	0	3	0	0	1	2	3	3	030
<b>Apr</b>	122.0	480	W	0	1	4	1	2	3	1	6	5	051
	162.9		N	0	1	3	1	2	2	1	5	4	041
			S	0	0	1	0	0	1	0	1	1	010
<b>May</b>	82.2	540	W	0	0	6	7	1	8	4	13	6	067
	147.9		N	0	0	4	4	0	6	2	8	4	044
			S	0	0	2	3	1	2	2	5	2	023
<b>Jun</b>	110.4	769	W	9	7	10	1	4	17	6	27	26	1071
	177.4		N	7	3	7	0	1	11	5	17	17	800
			S	2	4	3	1	3	6	1	10	9	271

## 1982

Jul	106.1	696	W	3	2	13	4	7	7	8	22	18	454
	164.8		N	3	2	12	2	7	5	7	19	17	442
			S	0	0	1	2	0	2	1	3	1	012
Aug	107.6	753	W	0	0	6	4	0	5	5	10	6	064
	172.1		N	0	0	5	1	0	3	3	6	5	051
			S	0	0	1	3	0	2	2	4	1	013
Sep	118.8	616	W	0	3	2	5	2	4	4	10	5	055
	167.1		N	0	3	2	1	1	2	3	6	5	051
			S	0	0	0	4	1	2	1	4	0	004
Oct	94.7	545	W	0	0	3	1	1	2	1	4	3	031
	160.9		N	0	0	2	1	1	1	1	3	2	021
			S	0	0	1	0	0	1	0	1	1	010
Nov	98.1	565	W	2	1	15	5	4	14	5	23	18	365
	163.7		N	0	0	0	1	0	0	1	1	0	001
			S	2	1	15	4	4	14	4	22	18	364
Dec	127.0	749	W	7	5	9	3	8	7	9	24	21	843
	193.2		N	1	3	5	0	5	0	4	9	9	180
			S	6	2	4	3	3	7	5	15	12	663

## 1983

Jan	84.3	332	W	0	0	1	2	0	1	2	3	1	012
	137.7		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	1	2	0	1	2	3	1	012
Feb	051.0	220	W	1	0	1	2	2	2	0	4	2	112
	119.6		N	0	0	0	1	0	1	0	1	0	001
			S	1	0	1	1	2	1	0	3	2	111
Mar	66.5	337	W	0	0	0	0	0	0	0	0	0	000
	117.3		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	0	0	0	0	0	0	000
Apr	80.7	346	W	0	1	1	2	1	3	0	4	2	022
	119.9		N	0	0	0	0	0	0	0	0	0	000
			S	0	1	1	2	1	3	0	4	2	022

1 9 8 3

May	99.2	609	W	2	0	5	2	2	4	3	9	7	252
	140.2		N	0	0	0	0	0	0	0	0	0	000
			S	2	0	5	2	2	4	3	9	7	252
Jun	91.1	561	W	1	2	4	5	3	9	0	12	7	165
	143.0		N	0	0	0	0	0	0	0	0	0	000
			S	1	2	4	5	3	9	0	12	7	165
Jul	82.2	427	W	0	0	4	7	0	5	6	11	4	047
	129.1		N	0	0	0	1	0	0	1	1	0	001
			S	0	0	4	6	0	5	5	10	4	046
Aug	71.8	395	W	0	1	12	9	1	7	14	22	13	139
	127.5		N	0	0	2	0	0	0	2	2	2	020
			S	0	1	10	9	1	7	12	20	11	119
Sep	50.3	289	W	0	0	1	2	0	3	0	3	1	012
	110.2		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	1	2	0	3	0	3	1	012
Oct	55.8	298	W	0	0	3	6	0	6	3	9	3	036
	111.7		N	0	0	2	6	0	5	3	8	2	026
			S	0	0	1	0	0	1	0	1	1	010
Nov	33.3	88	W	0	0	2	0	0	2	0	2	2	020
	90.4		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	2	0	0	2	0	2	2	020
Dec	33.4	152	W	0	0	1	1	0	1	1	2	1	011
	90.5		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	1	1	0	1	1	2	1	011

1 9 8 4

Jan	57.0	353	W	0	0	3	4	1	2	4	7	3	034
	112.4		N	0	0	2	2	1	0	3	4	2	022
			S	0	0	1	2	0	2	1	3	1	012
Feb	85.4	461	W	1	0	6	7	3	8	3	14	7	167
	137.2		N	1	0	2	5	2	4	2	8	3	125
			S	0	0	4	2	1	4	1	6	4	042

1 9 8 4

Mar	83.5	366	W	0	0	5	0	2	0	3	5	5	050
	120.8		N	0	0	1	0	0	0	1	1	1	010
			S	0	0	4	0	2	0	2	4	4	040
Apr	69.7	440	W	3	0	5	6	4	6	4	14	8	356
	129.7		N	0	0	1	2	0	2	1	3	1	012
			S	3	0	4	4	4	4	3	11	7	344
May	76.4	492	W	2	1	6	3	5	5	2	12	9	273
	131.1		N	0	0	1	1	2	0	0	2	1	011
			S	2	1	5	2	3	5	2	10	8	262
Jun	46.1	185	W	0	0	0	3	0	0	3	3	0	003
	103.5		N	0	0	0	1	0	0	1	1	0	001
			S	0	0	0	2	0	0	2	2	0	002
Jul	37.4	151	W	0	0	1	1	0	1	1	2	1	011
	92.2		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	1	1	0	1	1	2	1	011
Aug	25.5	161	W	0	0	0	0	0	0	0	0	0	000
	85.8		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	0	0	0	0	0	0	000
Sep	15.7	95	W	0	0	0	1	0	0	1	1	0	001
	78.9		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	1	0	0	1	1	0	001
Oct	12.0	36	W	0	0	0	0	0	0	0	0	0	000
	73.1		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	0	0	0	0	0	0	000
Nov	22.8	92	W	0	0	2	2	0	3	1	4	2	022
	74.6		N	0	0	2	2	0	3	1	4	2	022
			S	0	0	0	0	0	0	0	0	0	000
Dec	18.7	69	W	0	0	0	1	0	0	1	1	0	001
	73.5		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	1	0	0	1	1	0	001

1 9 8 5

<b>Jan</b>	16.5	104	W	1	0	5	3	1	5	3	9	6	153
	72.1		N	0	0	0	0	0	0	0	0	0	000
			S	1	0	5	3	1	5	3	9	6	153
<b>Feb</b>	15.9	29	W	0	0	0	0	0	0	0	0	0	000
	71.9		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	0	0	0	0	0	0	000
<b>Mar</b>	17.2	38	W	0	0	0	2	0	2	0	2	0	002
	72.5		N	0	0	0	2	0	2	0	2	0	002
			S	0	0	0	0	0	0	0	0	0	000
<b>Apr</b>	16.2	118	W	1	0	0	5	2	2	2	6	1	105
	75.7		N	1	0	0	5	2	2	2	6	1	105
			S	0	0	0	0	0	0	0	0	0	000
<b>May</b>	27.5	126	W	1	0	0	2	1	0	2	3	1	102
	82.0		N	1	0	0	1	1	0	1	2	1	101
			S	0	0	0	1	0	0	1	1	0	001
<b>Jun</b>	24.2	113	W	0	0	0	0	0	0	0	0	0	000
	78.5		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	0	0	0	0	0	0	000
<b>Jul</b>	30.7	177	W	0	0	2	2	2	1	1	4	2	022
	81.3		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	2	2	2	1	1	4	2	022
<b>Aug</b>	11.1	48	W	0	0	0	0	0	0	0	0	0	000
	73.3		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	0	0	0	0	0	0	000
<b>Sep</b>	3.9	22	W	0	0	0	2	0	0	2	2	0	002
	70.2		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	2	0	0	2	2	0	002
<b>Oct</b>	18.6	106	W	0	0	1	0	0	1	0	1	1	010
	74.2		N	0	0	1	0	0	1	0	1	1	010
			S	0	0	0	0	0	0	0	0	0	000



## 1985

Nov	16.2	19	W	0	0	0	0	0	0	0	0	000
	72.6		N	0	0	0	0	0	0	0	0	000
			S	0	0	0	0	0	0	0	0	000
Dec	17.3	50	W	0	0	0	1	0	0	1	1	001
	72.4		N	0	0	0	1	0	0	1	1	001
			S	0	0	0	0	0	0	0	0	000

## 1986

Jan	2.5	51	W	0	1	2	1	0	4	0	4	3	031
	70.9		N	0	0	0	0	0	0	0	0	0	000
			S	0	1	2	1	0	4	0	4	3	031
Feb	23.2	158	W	2	2	6	4	5	5	4	14	10	284
	81.5		N	0	1	2	1	2	1	1	4	3	031
			S	2	1	4	3	3	4	3	10	7	253
Mar	15.1	54	W	0	0	0	5	1	4	0	5	0	005
	76.2		N	0	0	0	3	1	2	0	3	0	003
			S	0	0	0	2	0	2	0	2	0	002
Apr	18.5	56	W	0	0	0	0	0	0	0	0	0	000
	75.6		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	0	0	0	0	0	0	000
May	13.7	68	W	0	0	0	0	0	0	0	0	0	000
	74.2		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	0	0	0	0	0	0	000
Jun	1.1	3	W	0	0	0	0	0	0	0	0	0	000
	69.7		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	0	0	0	0	0	0	000
Jul	18.1	71	W	0	0	0	0	0	0	0	0	0	000
	72.5		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	0	0	0	0	0	0	000
Aug	7.4	12	W	0	0	0	0	0	0	0	0	0	000
	70.1		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	0	0	0	0	0	0	000

1 9 8 6

Sep	3.8	14	W	0	0	0	0	0	0	0	0	0	000
	69.4		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	0	0	0	0	0	0	000

TABLE 3

MONTHLY COUNTS OF LDE FLARES IN THE 22ND CYCLE

Distribution due to their latitude, SXR class and SXR duration

Date	R	H-alpha flare Disk count	North South	X	M	M	C	SXR duration (hrs)			Sum of flares		SXR FI
				1-9	6-9	1-5	1-9	4.5	2.5	2.0	t <sub>3</sub>	t <sub>2</sub>	

1 9 8 6

Oct	35.4	174	W	0	0	1	2	0	0	3	3	1	012
	82.4		N	0	0	1	2	0	0	3	3	1	012
			S	0	0	0	0	0	0	0	0	0	000
Nov	15.2	56	W	0	0	0	3	0	0	3	3	0	003
	75.5		N	0	0	0	3	0	0	3	3	0	003
			S	0	0	0	0	0	0	0	0	0	000
Dec	6.8	13	W	0	0	0	1	0	0	1	1	0	001
	70.4		N	0	0	0	1	0	0	1	1	0	001
			S	0	0	0	0	0	0	0	0	0	000

1 9 8 7

Jan	10.4	36	W	0	0	0	1	0	0	1	1	0	001
	70.2		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	1	0	0	1	1	0	001
Feb	2.4	7	W	0	0	0	1	0	0	1	1	0	001
	69.8		N	0	0	0	1	0	0	1	1	0	001
			S	0	0	0	0	0	0	0	0	0	000

1 9 8 7

Mar	14.7	52	W	0	0	0	1	0	1	0	1	0	001
	73.3		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	1	0	1	0	1	0	001
Apr	39.6	192	W	0	0	1	2	0	2	1	3	1	012
	85.5		N	0	0	0	1	0	1	0	1	0	001
			S	0	0	1	1	0	1	1	2	1	011
May	33.0	205	W	0	0	0	6	0	4	2	6	0	006
	89.8		N	0	0	0	6	0	4	2	6	0	006
			S	0	0	0	0	0	0	0	0	0	000
Jun	17.4	61	W	0	0	0	1	0	0	1	1	0	001
	80.4		N	0	0	0	1	0	0	1	1	0	001
			S	0	0	0	0	0	0	0	0	0	000
Jul	33.0	132	W	0	0	1	4	0	0	5	5	1	014
	87.0		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	1	4	0	0	5	5	1	014
Aug	38.7	185	W	0	0	2	4	0	1	5	6	2	024
	92.2		N	0	0	1	0	0	0	1	1	1	010
			S	0	0	1	4	0	1	4	5	1	014
Sep	33.9	171	W	0	0	0	1	0	0	1	1	0	001
	87.0		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	0	1	0	0	1	1	0	001
Oct	60.6	198	W	0	0	0	3	0	2	1	3	0	003
	97.4		N	0	0	0	1	0	1	0	1	0	001
			S	0	0	0	2	0	1	1	2	0	002
Nov	39.9	273	W	0	0	5	3	1	1	6	8	5	053
	99.0		N	0	0	1	1	1	1	0	2	1	011
			S	0	0	4	2	0	0	6	6	4	042
Dec	27.1	114	W	0	0	1	6	1	4	2	7	1	016
	91.5		N	0	0	0	0	0	0	0	0	0	000
			S	0	0	1	6	1	4	2	7	1	016

1 9 8 8

<b>Jan</b>	59.0	217	W	1	0	0	4	1	2	2	5	1	104
	104.6		N	0	0	0	2	0	1	1	2	0	002
			S	1	0	0	2	1	1	1	3	1	102
<b>Feb</b>	40.0	412	W	0	0	1	2	0	1	2	3	1	012
	102.4		N	0	0	0	2	0	1	1	2	0	002
			S	0	0	1	0	0	0	1	1	1	010
<b>Mar</b>	76.2	412	W	0	2	4	16	1	2	19	22	6	076
	113.8		N	0	0	0	3	0	1	2	3	0	003
			S	0	2	4	13	1	1	17	19	6	073
<b>Apr</b>	88.0	328	W	0	0	7	15	0	2	20	22	7	085
	123.6		N	0	0	5	11	0	2	14	16	5	061
			S	0	0	2	4	0	0	6	6	2	024
<b>May</b>	60.1	272	W	0	1	1	10	2	3	7	12	2	030
	117.9		N	0	0	0	0	0	0	0	0	0	000
			S	0	1	1	10	2	3	7	12	2	030
<b>Jun</b>	101.8	544	W	4	3	9	11	1	9	17	27	16	531
	143.8		N	0	0	0	6	0	1	5	6	0	006
			S	4	3	9	5	1	8	12	21	16	525
<b>Jul</b>	113.8	499	W	0	0	6	12	3	5	10	18	6	072
	157.6		N	0	0	2	5	0	2	5	7	2	025
			S	0	0	4	7	3	3	5	11	4	047
<b>Aug</b>	111.6	331	W	0	0	6	11	2	3	12	17	6	071
	158.0		N	0	0	5	11	2	3	11	16	5	061
			S	0	0	1	0	0	0	1	1	1	010
<b>Sep</b>	120.1	390	W	0	1	4	11	1	2	13	16	5	061
	154.1		N	0	0	0	5	0	0	5	5	0	005
			S	0	1	4	6	1	2	8	11	5	056
<b>Oct</b>	125.1	421	W	2	0	9	22	2	11	20	33	11	312
	169.8		N	0	0	3	12	1	8	6	15	3	042
			S	2	0	6	10	1	3	14	18	8	270

1 9 8 8

<b>Nov</b>	125.1	508	W	0	3	19	32	0	14	40	54	22	252
	156.2		N	0	2	13	23	0	10	28	38	15	173
			S	0	1	6	9	0	4	12	16	7	079
<b>Dec</b>	179.2	584	W	4	1	17	16	2	16	20	37	22	596
	199.8		N	2	0	6	8	1	8	7	16	8	268
			S	2	1	11	8	1	8	13	22	14	328

1 9 8 9

<b>Jan</b>	161.3	689	W	7	11	50	22	3	39	48	90	68	1332
	235.4		N	0	1	12	16	0	13	16	29	13	146
			S	7	10	38	6	3	26	32	61	55	1186
<b>Feb</b>	165.1	539	W	3	2	23	32	3	21	36	60	28	582
	222.4		N	3	1	9	22	3	12	20	35	13	422
			S	0	1	14	10	0	9	16	25	15	160
<b>Mar</b>	131.4	658	W	10	6	42	27	8	27	45	85	58	1507
	205.1		N	10	6	34	22	7	28	37	72	50	1422
			S	0	0	8	5	1	4	8	13	8	85

TABLE 4

## THE SIX-MONTH COUNTS OF LDE FLARES (1969 - 1989)

Distribution due to their latitude, SXR class and SXR duration

Year	R	Number of H-alpha flares	Disk North South	SXR class				SXR duration (hrs)			Sum of LDE flares		SXR FI
				I <sub>4</sub>	I <sub>3</sub>	I <sub>2</sub>	I <sub>1</sub>	t <sub>3</sub>	t <sub>2</sub>	t <sub>1</sub>	C-X	M-X	
1969 <sub>1</sub>	116.6	3942	W	19	16	38	75	11	54	83	148	73	2515
			N	16	15	28	53	8	45	59	112	59	2083
			S	3	1	10	22	3	9	24	36	14	432
1969 <sub>2</sub>	95.5	3211	W	14	11	62	84	6	61	104	171	87	2214
			N	14	5	44	48	6	48	56	111	63	1938
			S	0	6	18	36	0	13	48	60	24	276
1970 <sub>1</sub>	114.3	3937	W	20	23	67	88	9	70	120	198	110	2988
			N	16	18	32	45	2	43	66	111	66	2145
			S	4	5	35	43	7	27	54	87	44	843
1970 <sub>2</sub>	95.0	4696	W	16	16	83	99	7	73	134	214	115	2689
			N	15	16	66	67	5	59	100	164	97	2387
			S	1	0	17	32	2	14	34	50	18	302
1971 <sub>1</sub>	68.4	2927	W	2	10	30	80	8	46	68	122	42	680
			N	2	8	16	46	4	32	36	72	26	486
			S	0	2	14	34	4	14	32	50	16	194
1971 <sub>2</sub>	65.0	3104	W	1	4	32	73	5	48	57	110	37	533
			N	1	2	10	24	2	16	19	37	13	244
			S	0	2	22	49	3	32	38	72	24	289
1972 <sub>1</sub>	77.0	3120	W	8	9	42	138	16	59	122	197	59	1448
			N	5	5	12	48	6	20	44	70	22	718
			S	3	4	30	90	6	39	78	127	37	730

1972 <sub>2</sub>	60.9	2083	W	6	1	38	200	23	94	128	245	45	1190
			N	4	1	14	87	10	38	58	106	19	637
			S	2	0	24	113	13	56	70	139	26	453
1973 <sub>1</sub>	45.3	1913	W	6	8	37	117	8	48	112	168	51	1147
			N	3	5	20	56	5	20	59	84	28	586
			S	3	3	17	61	3	28	53	84	23	561
1973 <sub>2</sub>	31.0	1267	W	3	1	9	59	10	21	38	72	13	459
			N	1	1	2	20	3	6	15	24	4	150
			S	2	0	7	39	7	15	23	48	9	309
1974 <sub>1</sub>	38.7	1531	W	1	1	22	88	0	12	100	112	24	418
			N	0	0	2	17	0	2	17	19	2	37
			S	1	1	20	71	0	10	83	93	22	381
1974 <sub>2</sub>	37.0	1417	W	14	7	22	43	10	23	53	86	43	1733
			N	2	3	12	22	9	11	19	39	17	372
			S	12	4	10	21	1	12	34	47	26	1361
1975 <sub>1</sub>	11.2	365	W	0	0	0	3	0	0	3	3	0	003
			N	0	0	0	1	0	0	1	1	0	001
			S	0	0	0	2	0	0	2	2	0	002
1975 <sub>2</sub>	19.7	800	W	0	2	8	16	0	5	21	26	10	116
			N	0	2	6	11	0	1	18	19	8	91
			S	0	0	2	5	0	4	3	7	2	25
1976 <sub>1</sub>	13.0	413	W	3	0	5	14	4	6	12	22	8	364
			N	0	0	3	2	0	1	4	5	3	032
			S	3	0	2	12	4	5	8	17	5	332

THE 21ST CYCLE

1976 <sub>2</sub>	12.2	201	W	0	0	1	9	0	0	10	10	1	019
			N	0	0	0	5	0	0	5	5	0	005
			S	0	0	1	4	0	0	5	5	1	014
1977 <sub>1</sub>	19.7	499	W	0	1	4	29	2	3	29	34	5	079
			N	0	0	0	12	1	1	10	12	0	012
			S	0	1	4	17	1	2	19	22	5	067

1977 <sub>2</sub>	35.3	1225	W	4	1	9	14	7	6	15	28	14	514
			N	4	1	3	9	7	4	6	17	8	449
			S	0	0	6	5	0	2	9	11	6	065
1978 <sub>1</sub>	83.3	2516	W	6	7	28	32	17	21	35	73	41	982
			N	6	7	24	28	16	18	31	65	37	938
			S	0	0	4	4	1	3	4	8	4	044
1978 <sub>2</sub>	102.1	2998	W	10	12	39	59	14	36	70	120	61	1569
			N	5	4	22	24	8	15	30	53	31	784
			S	5	8	17	35	6	21	40	67	30	785
1979 <sub>1</sub>	137.9	4848	W	7	11	44	84	8	42	96	146	62	1334
			N	7	10	28	57	6	36	60	102	45	1137
			S	0	1	16	27	2	6	36	44	17	197
1979 <sub>2</sub>	172.6	5164	W	7	8	60	56	13	57	61	131	75	1436
			N	6	7	39	38	11	36	42	90	52	1098
			S	1	1	21	18	2	21	19	41	23	338
1980 <sub>1</sub>	157.0	4872	W	4	10	71	80	13	47	105	165	85	1290
			N	3	2	32	25	5	24	33	62	37	665
			S	1	8	39	55	8	23	72	103	48	625
1980 <sub>2</sub>	152.3	5260	W	7	17	59	99	8	52	122	182	83	1559
			N	3	6	26	54	1	21	67	89	35	674
			S	4	11	33	45	7	31	55	93	48	885
1981 <sub>1</sub>	127.6	4439	W	8	19	58	86	22	54	95	171	85	1656
			N	5	14	41	59	14	38	67	119	60	1109
			S	3	5	17	27	8	16	28	52	25	547
1981 <sub>2</sub>	153.3	4779	W	6	4	56	29	14	45	36	95	66	1229
			N	1	0	13	9	4	11	8	23	14	239
			S	5	4	43	20	10	34	28	72	52	990
1982 <sub>1</sub>	123.9	3966	W	12	10	42	15	10	43	26	79	64	1735
			N	9	5	23	9	5	26	15	46	37	1189
			S	3	5	19	6	5	17	11	33	27	546
1982 <sub>2</sub>	108.7	3924	W	12	11	48	22	22	39	32	93	71	1812
			N	4	8	26	6	14	11	19	44	38	746
			S	8	3	22	16	8	28	13	49	33	1066



1983 <sub>1</sub>	78.8	2405	W	4	3	12	13	8	19	5	32	19	563
			N	0	0	9	1	0	1	0	1	0	001
			S	4	3	12	12	8	18	5	31	19	563
1983 <sub>2</sub>	54.5	1649	W	0	1	23	25	1	25	24	49	24	265
			N	0	0	4	7	0	5	6	11	4	047
			S	0	1	19	18	1	20	18	38	20	218
1984 <sub>1</sub>	69.7	2297	W	6	1	25	23	15	21	19	55	32	883
			N	1	0	7	11	5	6	8	19	8	181
			S	5	1	18	12	10	15	11	36	24	702
1984 <sub>2</sub>	22.0	604	W	0	0	3	5	0	4	4	8	3	035
			N	0	0	2	2	0	3	1	4	2	022
			S	0	0	1	3	0	1	3	4	1	013
1985 <sub>1</sub>	19.6	528	W	3	0	5	12	4	9	7	20	8	362
			N	2	0	0	8	3	4	3	10	2	208
			S	1	0	5	4	1	5	4	10	6	154
1985 <sub>2</sub>	16.3	422	W	0	0	3	5	2	2	4	8	3	035
			N	0	0	1	1	0	1	1	2	1	011
			S	0	0	2	4	2	1	3	6	2	024
1986 <sub>1</sub>	12.3	390	W	2	3	8	10	6	13	4	23	13	320
			N	0	1	2	3	3	3	1	7	3	034
			S	2	2	6	6	3	10	3	16	10	286
1986 <sub>2</sub>	14.4	340	W	0	0	1	6	0	0	7	7	1	016
			N	0	0	1	6	0	0	7	7	1	016
			S	0	0	0	0	0	0	0	0	0	000

THE 22ND CYCLE

1987 <sub>1</sub>	19.6	553	W	0	0	1	12	0	7	6	13	1	022
			N	0	0	0	9	0	5	4	9	0	009
			S	0	0	1	3	0	2	2	4	1	013
1987 <sub>2</sub>	38.0	1073	W	0	0	9	21	2	8	20	30	9	111
			N	0	0	2	2	1	2	1	4	2	022
			S	0	0	7	19	1	6	19	26	7	089

1988 <sub>1</sub>	70.9	1773	W	5	6	22	58	5	19	67	91	33	838
			N	0	0	5	24	0	6	23	29	5	074
			S	5	6	17	34	5	13	44	62	28	764
1988 <sub>2</sub>	129.2	2733	W	6	5	61	104	10	51	115	176	72	1364
			N	2	2	29	64	4	31	62	97	33	574
			S	4	3	32	40	6	20	53	79	39	790

TABLE 5

THE YEARLY COUNTS OF LDE FLARES (1969 - 1988)

Distribution due to their latitude, SXR class and SXR duration

Year	R	Disk Number of H-alpha flares	North South	SXR class				SXR duration (hrs)			Sum of LDE flares		SXR FI
				I 1-9	M 6-9	M 1-5	C 1-9	4.5	2.5	2.0	C - X	M - X	
				I <sub>4</sub>	I <sub>3</sub>	I <sub>2</sub>	I <sub>1</sub>	t <sub>3</sub>	t <sub>2</sub>	t <sub>1</sub>			
1969	105.6	7153	W	33	27	100	159	17	115	187	319	160	4729
	151.2		N	30	20	72	101	14	93	115	223	122	4021
			S	3	7	28	58	3	22	72	96	38	708
1970	104.7	8633	W	36	39	150	187	16	143	254	412	225	5677
	156.2		N	31	34	98	112	7	102	166	275	163	4532
			S	5	5	52	75	9	41	88	137	62	1145
1971	66.7	6031	W	3	14	62	153	13	94	125	232	79	1213
	118.5		N	3	10	26	70	6	48	55	109	39	730
			S	0	4	36	83	7	46	70	123	40	483

1972	68.9	5203	W	14	10	80	338	39	153	250	442	104	2638
	120.8		N	9	6	26	135	16	58	102	176	41	1355
			S	5	4	54	203	19	95	148	266	63	1283
1973	38.2	3180	W	9	9	46	176	18	69	150	240	64	1606
	93.4		N	4	6	22	76	8	26	64	108	32	736
			S	5	3	24	100	10	43	76	132	32	870
1974	37.9	2948	W	15	8	41	121	10	33	142	185	64	2111
	86.5		N	2	3	10	30	9	11	25	45	15	360
			S	13	5	31	91	1	22	117	140	49	1751
1975	15.5	1165	W	0	2	9	19	0	5	24	29	10	119
	76.1		N	0	2	6	12	0	1	19	20	8	092
			S	0	0	2	7	0	4	5	9	2	027
1976	12.6	614	W	3	0	6	23	4	6	22	32	9	383
	73.4		N	0	0	3	7	0	1	9	10	3	037
			S	3	0	3	16	4	5	13	22	6	346
1977	27.5	1724	W	4	2	13	43	9	9	44	62	19	593
	86.9		N	4	1	3	21	8	5	16	29	8	461
			S	0	1	10	22	1	4	28	33	11	132
1978	92.7	5514	W	16	19	67	91	31	57	105	193	102	2551
	143.6		N	11	11	46	52	24	33	61	118	68	1722
			S	5	8	21	39	7	24	44	75	34	829
1979	155.2	10012	W	14	19	104	140	21	99	157	277	137	2770
	192.0		N	13	17	67	95	17	72	102	192	97	2235
			S	1	2	37	45	4	27	55	85	40	535
1980	154.7	10132	W	11	27	130	179	21	99	227	347	168	2849
	198.5		N	6	8	58	79	6	45	100	151	72	1339
			S	5	19	72	100	15	54	127	196	96	1510
1981	140.4	9218	W	14	23	114	115	36	99	131	266	151	2885
	202.6		N	6	14	54	68	18	49	75	142	74	1348
			S	8	9	60	47	18	50	56	124	77	1537
1982	116.3	7890	W	24	21	90	37	32	82	58	172	135	3547
	175.3		N	13	13	49	15	19	37	34	90	75	1935
			S	11	8	41	22	13	45	24	82	60	1612

1983	66.6	4054	W	4	4	35	38	9	44	29	81	43	828
	119.6		N	0	0	4	8	0	6	6	12	4	048
			S	4	4	31	30	9	38	23	69	39	632
1984	45.9	2901	W	6	1	26	28	15	25	23	63	35	918
	101.1		N	1	0	7	13	5	9	9	23	10	203
			S	5	1	19	15	10	16	14	40	25	715
1985	18.0	950	W	3	0	8	17	6	11	11	28	11	397
	74.7		N	2	0	1	9	3	5	4	12	3	219
			S	1	0	7	8	3	6	7	16	8	178
1986	13.4	730	W	2	3	9	16	6	13	11	30	14	336
	74.1		N	0	1	3	10	3	3	8	14	4	050
			S	2	2	6	6	3	10	3	16	10	286
1987	29.3	1626	W	0	0	10	33	2	15	26	43	10	133
	85.3		N	0	0	2	11	1	7	5	13	2	031
			S	0	0	8	22	1	8	21	30	8	102
1988	100.0	4506	W	11	11	83	162	15	70	182	267	105	2202
	141.0		N	2	2	34	88	4	37	85	126	38	648
			S	9	9	49	74	11	33	97	141	67	1554

The largest values of the SXR Flare index (1969 - 1989)

Month	Disk FI	North FI	South FI	Note
Mar 1969	812	801	011	
Nov 1969	<u>1326</u>	1315	011	monthly maximum in the 20th cycle
Feb 1970	827	586	241	
Jun 1970	832	791	041	
Nov 1970	1005	888	117	
Jul 1974	1222	000	1222	
Nov 1980	943	435	408	
Apr 1981	827	687	140	
Jun 1982	1071	800	271	monthly maximum in the 21st cycle
Dec 1982	843	180	663	
Jan 1989	<u>1332</u>	146	1186	the largest observed value

THE LDE PARAMETERS OF SOLAR CYCLES

	LDE (C-X)		LDE (M-X)		SXR FI	
	Sum	Max <sub>year</sub>	Sum	Max <sub>year</sub>	Sum	Max <sub>year</sub>
THE 20TH CYCLE (1969-1976)						
Sum of all flares: 34927			Sum of LDE (M-X) flares: 715			
Yearly maximum: 1970 - 8633			Max 2800 MHz: 1970 - 156.2			
Disk	1891	442 <sub>1972</sub>	715	225 <sub>1970</sub>	18476	5677 <sub>1970</sub>
North	966	275 <sub>1970</sub>	423	163 <sub>1970</sub>	11863	4532 <sub>1970</sub>
South	925	266 <sub>1972</sub>	292	63 <sub>1972</sub>	6613	1751 <sub>1974</sub>
THE 21ST CYCLE (1977-1986)						
Sum of all flares: 53125			Sum of LDE (M-X) flares: 815			
Yearly maximum: 1980 - 10132			Max 2800 MHz: 1981 - 202.6			
Disk	1519	347 <sub>1980</sub>	815	168 <sub>1980</sub>	17505	3547 <sub>1982</sub>
North	783	192 <sub>1979</sub>	415	97 <sub>1979</sub>	9539	2235 <sub>1978</sub>
South	736	196 <sub>1980</sub>	400	96 <sub>1980</sub>	7966	1612 <sub>1982</sub>
THE 22ND CYCLE (1987-1988)						
Disk	310	267 <sub>1988</sub>	115	105 <sub>1988</sub>	2335	2202 <sub>1988</sub>
North	139	126 <sub>1988</sub>	40	38 <sub>1988</sub>	679	648 <sub>1988</sub>
South	171	141 <sub>1988</sub>	75	67 <sub>1988</sub>	1656	1554 <sub>1988</sub>
Max 2800 MHz: 1989 - 211.6 p						

and 1970 November (Simnett 1982).

Table 2 gives the LDE flare distribution for the years of cycle 21. There occurred 1519 type (C - X) LDE flares, of which 815, i.e. 54 %, were geoeffective (SID).

The increased occurrence (monthly number larger than 20) of type (M - X) LDE flares was observed as follows:

	(M-X)	FI		(M-X)	FI		(M-X)	FI
Dec 1978	22	676	Nov 1979	22	229	Apr 1980	20	307
Jun 1980	21	232	Nov 1980	<u>38</u>	943	Apr 1981	36	827
Jun 1982	26	<u>1071</u>	Dec 1982	21	843			

Table 3 gives the distribution of the monthly numbers of LDE flares for two years of cycle 22. The highest occurrence of type (M-X) LDE flares was observed in 1989 January.

	(M-X)	FI		(M-X)	FI
Dec 1988	22	596	Jan 1989	<u>68</u>	<u>1332</u>

A detailed time-space analysis of the occurrence of LDE flares will be published in instalment in the Bulletin of the Astronomical Institutes of Czechoslovakia (Viktorínová and Antalová 1990).

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