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AUGUST 1987
JULY 1987

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NUMBER 517

(Issued in Two Parts)

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ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

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AUG 1987

Summary of the Geoalert Messages

AUGUST 1987

Julian Day	Date of Issue	Date of Obser- vation	Wolf No.	10-cm Solar Flux	A- index	Location		Flares			Date of Forecast	Location		Region Forecast ¹	Geoalerts
						°Lat	°Long	Total	M	X		°Lat	°Long		
213	01	31	074	089	012	S21 W61		0	0	0	01	S21 W61	Q		Solquiet, Magquiet.
						N30 W25		1	0	0		N30 W25	Q		
						S28 W57		0	0	0		S28 W57	Q		
						N23 W32		0	0	0		N23 W32	Q		
						N16 W03		1	0	0		N16 W03	Q		
214	02	01	058	088	012	S21 W73		1	0	0	02	S21 W73	Q		Solquiet, Magquiet.
						N30 W37		0	0	0		N30 W37	Q		
						N16 W16		0	0	0		N16 W16	Q		
						S23 E59		0	0	0		S23 E59	Q		
215	03	02	060	087	005	N30 W56		1	0	0	03	N30 W56	Q		Solquiet, Magquiet.
						N17 W30		0	0	0		N17 W30	Q		
						S24 E46		5	0	0		S24 E46	Q		
						N22 E04		0	0	0		N22 E04	Q		
216	04	03	045	085	015	N31 W69		0	0	0	04	N31 W69	Q		Solquiet, Magquiet.
						N17 W43		0	0	0		N17 W43	Q		
						S24 E32		1	0	0		S24 E32	Q		
217	05	04	033	082	008	N16 W58		0	0	0	05	N16 W58	Q		Solquiet, Magquiet.
						S24 E18		0	0	0		S24 E18	Q		
218	06	05	032	079	015	N17 W73		0	0	0	06	N17 W73	Q		Solquiet, Magquiet.
						S23 E07		0	0	0		N23 E07	Q		
219	07	06	037	083	011	N16 W87		0	0	0	07	N16 W87	Q		Solquiet, Magquiet.
						S24 W08		2	0	0		S24 W08	E		
220	08	07	045	092	005	S24 W19		7	0	0	08	S24 W19	E		Solalert 08/10, Magquiet.
221	09	08	068	091	005	S24 W33		14	3	0	09	S24 W33	E		Solnil, Magquiet.
						N05 W45		0	0	0		N05 W45	Q		
						N58 E13		0	0	0		N58 E13	Q		
222	10	09	054	092	013	S25 W47		7	0	0	10	S25 W47	E		Solalert 11/25, Magquiet.
						N06 W60		0	0	0		N06 W60	Q		
						S27 E76		2	1	0		S27 E76	E		
223	11	10	053	092	007	S24 W60		2	0	0	11	S24 W60	E		Solalert 11/25, Magquiet.
						N06 W75		1	0	0		N06 W75	Q		
						S25 E61		5	0	0		S25 E61	E		
224	12	11	064	099	005	S23 W74		0	0	0	12	S23 W74	Q		Solnil, Magquiet.
						N06 W85		0	0	0		N06 W85	Q		
						S25 E47		6	0	0		S25 E47	E		
						N23 E27		0	0	0		N23 E27	Q		
225	13	12	075	097	015	S24 W88		0	0	0	13	S24 W88	Q		Solquiet, Magalert 13/13 Recurrence.
						S26 E36		0	0	0		S26 E36	Q		
						N23 E13		0	0	0		N23 E13	Q		
						S30 E69		0	0	0		S30 E69	Q		
						S23 E76		0	0	0		S23 E76	Q		

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AUG 1987

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

Summary of the Geoalert Messages

AUGUST 1987

Julian Day	Date of Issue	Date of Obser- vation	Wolf No.	10-cm Solar Flux	A- index	Location		Flares			Date of Forecast	Location		Region Forecast ¹	Geoalerts
						°Lat	°Long	Total	M	X		°Lat	°Long		
226	14	13	049	101	020	S26	E20	4	0	0	14	S26	E20	Q	Solquiet, Magnil.
						S32	E55	0	0	0		S32	E55	Q	
						S25	E64	3	1	0		S25	E64	Q	
227	15	14	062	100	015	S26	E09	1	0	0	15	S26	E09	Q	Solquiet, Magquiet.
						S30	E43	0	0	0		S30	E43	Q	
						S23	E53	2	0	0		S23	E53	Q	
						N18	E60	0	0	0		N18	E60	Q	
228	16	15	061	099	016	S25	W03	1	0	0	16	S25	W03	Q	Solquiet, Magquiet.
						S30	E31	0	0	0		S30	E31	Q	
						S23	E39	0	0	0		S23	E39	Q	
						N18	E47	0	0	0		N18	E47	Q	
229	17	16	064	100	016	S26	W18	0	0	0	17	S26	W18	Q	Solquiet, Magquiet.
						S30	E18	0	0	0		S30	E18	Q	
						S23	E27	3	0	0		S23	E27	Q	
						S24	W39	0	0	0		S24	W39	Q	
230	18	17	052	099	010	S27	W28	0	0	0	18	S27	W28	Q	Solquiet, Magquiet.
						S31	E04	1	0	0		S31	E04	Q	
						S23	E14	0	0	0		S23	E14	Q	
231	19	18	051	098	007	S26	W42	0	0	0	19	S26	W42	Q	Solquiet, Magquiet.
						S31	W09	1	0	0		S31	W09	Q	
						S23	W00	0	0	0		S23	W00	Q	
232	20	19	060	097	007	S25	W54	2	0	0	20	S25	W54	Q	Solquiet, Magquiet.
						S30	W18	1	0	0		S30	W18	Q	
						S23	W12	1	0	0		S23	W12	Q	
						N20	W03	0	0	0		N20	W03	Q	
233	21	20	053	099	008	S26	W68	2	0	0	21	S26	W68	Q	Solquiet, Magquiet.
						S31	W33	5	0	0		S31	W33	Q	
						S23	W25	0	0	0		S23	W25	Q	
234	22	21	061	094	007	S26	W81	0	0	0	22	S26	W81	Q	Solquiet, Magquiet.
						S31	W45	3	0	0		S31	W45	Q	
						S24	W36	0	0	0		S24	W36	Q	
						N16	E75	1	0	0		N16	E75	Q	
235	23	22	046	094	006	S31	W57	0	0	0	23	S31	W57	Q	Solquiet, Magquiet.
						S23	W48	0	0	0		S23	W48	Q	
						N15	E64	6	2	0		N15	E64	E	
236	24	23	043	090	011	S32	W70	0	0	0	24	S32	W70	Q	Solquiet, Magquiet.
						S25	W64	0	0	0		S25	W64	Q	
						N16	E50	3	1	0		N16	E50	E	
237	25	24	036	088	013	S31	W83	0	0	0	25	S31	W83	Q	Solquiet, Magquiet.
						N16	E36	4	0	0		N16	E36	E	

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

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AUG 1987

Summary of the Geoalert Messages

AUGUST 1987

Julian Day	Date of Issue	Date of Obser- vation	Wolf No.	10-cm Solar Flux	A- index	Location		Flares			Date of Forecast	Location		Region Forecast ¹	Geoalerts
						°Lat	°Long	Total	M	X		°Lat	°Long		
238	26	25	055	088	030	S29 W99		0	0	0	26	S29 W99	Q	Solquiet, Magalert 26.	
						N16 E22		2	0	0		N16 E22	E		
						N19 W61		2	0	0		N19 W61	Q		
			Presto: ² Kakioka Magstorm begins 25/07XX UT.												
239	27	26	039	086	040	N16 E10		1	0	0	27	N16 E10	Q	Solquiet, Magalert Minor 27/XX.	
						N18 W75		1	0	0		N18 W75	Q		
			Presto: Boulder Strong Magstorm in progress 26/0426 UT.												
240	28	27	028	083	020	N17 W02		1	0	0	28	N17 W02	Q	Solquiet, Magnil.	
						N19 W89		0	0	0		N19 W89	Q		
241	29	28	028	080	010	N16 W16		0	0	0	29	N16 W16	Q	Solquiet, Magalert 29/XX.	
						S23 E59		0	0	0		S23 E59	Q		
242	30	29	025	078	013	N16 W30		0	0	0	30	N16 W30	Q	Solquiet, Magnil.	
						S22 E45		1	0	0		S22 E45	Q		
243	31	30	011	077	014	S23 E31		0	0	0	31	S23 E31	Q	Solquiet, Magquiet.	
244	01	31	024	082	030	S23 E19		0	0	0	01	S23 E19	Q		
						S24 E63		0	0	0		S24 E63	Q	Solquiet, Magalert 01/XX.	
			Presto: Boulder Tenflare 540 flux units 31/1010 UT duration 7 minutes.												

¹Q = quiet, E = eruptive, A = active, P = proton.

²Presto message is a rapid report of a major event.

INTERNATIONAL RELATIVE SUNSPOT NUMBERS

Day	Final Sep 86	Oct	Nov	Dec	Final Jan 87	Feb	Mar	Apr	May	Jun	Prov Jul	Aug
01	9	12	44	0	19	0	13	14	39	15	0	45
02	9	14	35	0	15	0	23	12	40	11	0	47
03	8	23	37	0	13	0	15	10	27	0	0	39
04	8	24	37	0	12	0	16	13	23	0	0	33
05	0	24	35	0	11	0	24	28	24	10	13	31
06	11	22	31	0	10	0	23	47	27	0	0	32
07	13	27	24	0	11	0	24	56	34	0	9	38
08	12	20	15	0	0	0	22	64	25	0	12	45
09	10	32	10	12	0	0	14	69	23	0	13	39
10	8	29	9	20	0	7	11	77	25	0	11	47
11	8	23	9	23	0	0	9	80	26	11	0	56
12	0	26	0	22	0	0	0	80	23	21	0	48
13	0	22	14	24	0	0	0	79	22	14	0	47
14	0	0	12	13	8	8	10	77	13	10	0	49
15	0	0	12	0	9	7	11	78	39	11	11	49
16	0	11	12	11	0	0	11	60	50	12	17	55
17	0	16	12	9	13	0	22	41	68	14	12	46
18	0	22	12	0	13	0	21	36	54	24	17	43
19	0	31	12	0	9	0	12	29	65	13	23	45
20	0	39	12	0	9	0	12	12	46	22	33	51
21	0	47	11	11	14	7	15	19	41	29	67	48
22	0	57	10	16	20	7	17	26	38	38	87	34
23	0	71	18	16	23	0	19	25	40	37	102	39
24	0	76	12	13	14	0	19	35	38	38	92	35
25	0	68	0	9	13	7	16	25	37	38	88	35
26	0	60	0	0	14	9	12	21	37	41	85	34
27	0	65	13	0	13	8	11	11	35	33	77	24
28	0	61	0	0	20	8	12	14	21	41	60	23
29	8	63	8	0	15		13	20	17	25	60	11
30	9	62	0	0	14		15	30	15	14	62	10
31		50		11	11		15		12		73	20
Mean	3.8	35.4	15.2	6.8	10.4	2.4	14.7	39.6	30.0	17.4	33.0	38.6

The yearly mean sunspot number equaled 13.4 in 1986.

Algonquin Radio Observatory					OTTAWA 2800 MHZ (10.7 cm) SOLAR FLUX					Adjusted to 1 AU		
Day	Sep 86	Oct	Nov	Dec	Jan 87	Feb	Mar	Apr	May	Jun	Jul	Aug
01	69.8	71.2	87.6*	70.7	71.6	69.2	72.8	72.5	79.3	77.8	76.0	91.0
02	69.2	71.6	84.1	70.6	70.5	69.8	73.3	71.9	80.2	77.9	74.4	89.7
03	69.3	72.1	80.8	70.2	69.1	70.0	71.6	72.4	82.8	76.4	73.7	87.1
04	69.4	70.7	82.3	69.2	69.0	68.3	73.3	74.0	84.4	77.3	73.2	84.0
05	69.6	71.1	81.5	70.0	70.3	67.5	73.7	77.6	86.1	76.1	73.4	81.6
06	69.5	72.4	80.6	69.1	69.3	67.7	75.6	89.4	87.9	75.8	73.3	85.2
07	69.9	74.3	76.9	68.2	69.7	69.1	75.5	94.4	88.1	76.0	74.1	89.5*
08	69.4	74.8	73.5	69.1	68.2	68.9	76.9	94.8	89.1	77.0	76.1	93.8
09	69.4	74.6	71.9	70.8	68.0	69.2	73.6	100.5	87.3	76.8	76.3	94.8
10	69.3	73.3	70.4	72.3	67.4	69.3	71.4	100.0	89.5	78.1	76.3	94.0
11	68.8	73.2	69.9	73.0F	68.0	68.5	70.5	101.3	86.4	80.7	75.7	99.8*
12	68.8	75.3	71.4	71.1	68.9	67.8	69.5	98.6	85.4	82.1	75.5	100.0
13	69.0	75.1	76.0*	71.5	69.7	68.0	69.6	99.3	87.4	82.3	75.1	101.8*
14	70.0	75.0	74.1	71.4	71.1	68.3	71.1	97.7	91.2	80.6	76.6	102.4
15	71.5	71.8	75.1	70.9	71.5	69.3	70.5	97.8	93.6	80.4	78.8	101.3
16	70.5	79.1	75.0	70.8	70.7	68.4	71.0	95.3*	98.2	81.3	80.9	102.7
17	69.2	82.6	73.8	71.7	70.8	68.1	71.2	97.3	96.7	81.8	81.5	101.2
18	68.8	86.3	73.0	71.4	70.6	69.8	72.5	94.0	98.5	82.9	82.5	100.4
19	68.7	88.6	72.5	71.0	70.0	69.5	71.5	91.7	100.1	82.4	85.1	99.0
20	68.6	92.2	72.5	70.4	68.9	69.6	73.8	85.6	99.8	81.1	93.8	101.2
21	68.8	91.5	74.1	70.6	71.2*	70.7	74.2	78.3	99.9	82.6	95.6	96.6
22	68.3	94.4	74.5	71.4	73.6*	70.4	73.8	76.5	101.0	87.1	102.6*	94.4*
23	68.7	97.9	75.8	70.8	72.1	70.5	75.5	76.5	94.9	87.5	115.6	91.8
24	68.8	97.3	77.0	70.0	71.6	72.1	75.9	78.6	98.5	89.1	115.0	89.6
25	69.4	94.4	75.5	70.0	71.5	73.5	75.7	75.8	96.8	86.3	114.9	89.9
26	68.5	94.2	74.3	69.7	72.6	73.9	75.6	74.3	92.3	84.3	109.8*	87.3
27	68.9	94.3	73.6	69.4	69.9	74.0	75.4	74.8	87.5	78.9	105.4	85.1
28	70.3	93.6	73.1	69.2	70.8	72.7*	75.0	74.3	85.1	79.2	102.5	81.3
29	71.5	91.4	72.4	69.2	70.6		75.3	73.6E	79.3	76.6	97.3	79.9
30	71.6	89.8	70.9	69.6	69.8		74.6	76.8	77.9	75.9H	94.0	78.5
31		89.2		68.1	68.7		71.96		77.3		91.9	83.2
Mean	69.4	82.4	75.5	70.4	70.2	69.8	73.3	85.5	89.8	80.4H	87.0	92.2

* = corrected for burst in progress; E = corrected for snow on antenna; F = uncorrected for interference during calibration; G = corrected for ice on antenna; H = measured at Penticton.
The yearly mean 2800 MHz flux equaled 74.0 in 1986.

DAILY SOLAR INDICES

9
Aug 87

August 1987

----- Solar Flux Adjusted to 1 Astronomical Unit -----													
Julian	Bartels	Sunspot	Obs Flux										
Day	Day	Cycle	Numbers	Ottawa									
Day	Day	Day	Int Amer	(2800)	SGMR	SGMR	SGMR	Ottawa	SGMR	SGMR	SGMR	SGMR	SGMR
					(15400)	(8800)	(4995)	(2800)	(2695)	(1415)	(610)	(410)	(245)
01	213	7	45 60	88.4	504	256	129	91.0	83	69	43	24	10
02	214	8	47 47	87.1	493	258	128	89.7	82	67	41	24	10
03	215	9	39 37	84.6	471	249	132	87.1	84	63	43	23	10
04	216	10	33 32	81.6	489	238	123	84.0	84	62	42	23	9
05	217	11	31 29	79.3	473	262	122	81.6	81	61	39	22	9
06	218	12	32 34	82.8	499	250	132	85.2	83	62	39	22	9
07	219	13	38 40	87.1*	481	277	153	89.5*	92	64	36	21	8
08	220	14	45 42	91.3	494	256	139	93.8	93	66	40	23	11
09	221	15	39 41	92.3	492	266	137	94.8	90	66	41	25	14
10	222	16	47 52	91.5	493	257	141	94.0	96	66	44	26	12
11	223	17	56 52	97.2*	503	250	149	99.8*	102	72	58	27	20
12	224	18	48 47	97.4	501	265	144	100.0	98	71	48	25	12
13	225	19	47 47	99.2*	505	282	147	101.8*	100	72	42	25	11
14	226	20	49 47	99.8	503	278	147	102.4	98	73	39	25	14
15	227	21	49 49	98.8	493	270	142	101.3	99	71	42	24	13
16	228	22	55 49	100.2	485	249	141	102.7	99	73	45	26	13
17	229	23	46 47	98.8	480	246	136	101.2	99	74	46	25	12
18	230	24	43 45	98.0	488	243	136	100.4	96	74	46	25	11
19	231	25	45 49	96.7	487	253	135	99.0	101	76	44	25	12
20	232	26	51 51	98.9	495	258	143	101.2	110	77	45	26	12
21	233	27	48 48	94.4	490	251	133	96.6	86	69	43	24	14
22	234	1	34 33	92.3*	491	288	140	94.4*	91	69	44	27	12
23	235	2	39 36	89.8	491	270	130	91.8	90	68	48	26	11
24	236	3	35 36	87.7	497	259	128	89.6	88	67	47	25	11
25	237	4	35 35	88.0	500	262	129	89.9	96	66	42	26	13
26	238	5	34 34	85.5	484	247	128	87.3	89	64	41	25	11
27	239	6	24 27	83.4	430	239	117	85.1	75	51	29	23	12
28	240	7	23 23	79.7	---	---	---	81.3	---	---	---	---	---
29	241	8	11 10	78.4	462	238	113	79.9	77	60	40	21	11
30	242	9	10 11	77.0	494	235	120	78.5	79	61	37	21	10
31	243	10	20 18	81.7	496	251	123	83.2	80	62	40	24	9
Mean			38.6 39.0	90.0	488	256	133	92.2	90	67	42	24	11

The International numbers shown above are preliminary values; the American numbers are final.

The observed and the adjusted Ottawa fluxes tabulated here are the "Series C" daily values reported by the Algonquin Radio Observatory, Ottawa, Ontario, Canada. Numbers in parentheses in the column headings denote frequencies in MHz. Qualifiers after an entry have the following meaning:

* = corrected for burst in progress

Equipment problems produced any gaps shown above in the Air Weather Service's Sagamore Hill (SGMR) observations.

OBSERVED AND PREDICTED SOLAR ACTIVITY INDICES

AUGUST 1987

Date	RELATIVE SUNSPOT NUMBERS						2800 MHz RADIO FLUX Adjusted to 1 AU	
	International (R_i)		American (R_a)		Derived (R_s)		(S_a)	
	Monthly Mean	Smoothed	Monthly Mean	Smoothed	Monthly Mean	Smoothed	Monthly Mean	Smoothed
Oct 83	55.8	68	52.3	66	58.6	67	111.7	120
Nov	33.3	59	30.2	65	35.6	67	90.4	120
Dec	33.4	64	32.3	62	35.7	65	90.5	118
Jan 84	57.0	60	54.4	58	59.4	61	112.4	115
Feb	85.4	56	81.5	54	86.2	58	137.2	101
Mar	83.5	53	83.0	51	88.5	55	120.8	108
Apr	69.7	50	66.5	48	78.1	52	129.7	105
May	76.4	48	72.1	45	79.6	49	131.1	103
Jun	46.1	46	45.2	44	49.8	48	103.5	102
Jul	37.4	44	36.2	42	37.6	39	92.2	99
Aug	25.5	40	24.5	38	30.7	41	85.8	95
Sep	15.7	34	13.6	32	23.2	35	78.9	90
Oct	12.0	29	9.8	27	16.9	31	73.1	86
Nov	22.8	25	19.4	23	18.6	26	74.6	72
Dec	18.7	22	17.0	20	17.4	23	73.5	79
Jan 85	16.5	20	14.5	19	15.9	21	72.1	77
Feb	15.9	20	16.3	18	15.7	20	71.9	76
Mar	17.2	19	11.8	16	16.3	19	72.5	75
Apr	16.2	18	17.1	17	19.8	19	75.7	75
May	27.5	18	24.0	17	26.6	19	82.0	75
Jun	24.2	18	22.2	16	22.8	19	78.5	75
Jul	30.7	17	30.8	16	25.8	19	81.3	75
Aug	11.1	17	10.7	15	17.2	19	73.3	75
Sep	3.9	17	3.4	16	13.8	20	70.2	76
Oct	18.6	17	16.5	16	18.1	20	74.2	76
Nov	16.2	17	16.4	15	16.4	19	72.6	75
Dec	17.3	15	10.1	14	16.2	19	72.4	75
Jan 86	2.5	14	2.3	12	14.6	18	70.9	74
Feb	23.2	13	23.8	11	26.0	17	81.5	74
Mar	15.1	13	12.5	11	20.3	17	76.2	73
Apr	18.5	14	13.8	12	19.6	18	75.6	74
May	13.7	14	11.6	12	18.1	18	74.2	74
Jun	1.1	14	0.8	11	13.3	18	69.7	74
Jul	18.1	14	17.7	11	16.3	18	72.5	74
Aug	7.4	13	7.6	11	13.7	17	70.1	73
Sep	3.8	12	3.5	10	13.0	17	69.4	73
Oct	35.4	13	19.8	11	27.0	17	82.4	73
Nov	15.2	15	14.7	13	19.5	18	75.5	74
Dec	6.8	16	5.1	14	14.0	19	70.4	75
Jan 87	10.4	18*	9.4	16	13.8	20	70.2	76
Feb	2.4	20*	3.0	18	13.4	22	69.8	78
Mar	14.7	<u>21(2)</u> *	13.3	<u>19</u>	17.2	<u>23</u>	73.3	--
Apr	39.6	<u>22(3)</u> *	39.4	<u>21</u>	30.3	<u>25</u>	85.5	--
May	33.0	<u>24(5)</u> *	30.7	<u>22</u>	35.0	<u>26</u>	89.8	--
Jun	17.4	<u>26(6)</u> *	18.0	<u>25</u>	24.8	<u>29</u>	80.4	--
Jul	33.0*	<u>29(8)</u> *	34.3	<u>27</u>	32.0	<u>32</u>	87.0	--
Aug	38.6*	<u>30(10)</u> *	39.0	<u>28</u>	37.6	<u>33</u>	92.2	--
Sep	----	<u>33(12)</u> *	----	<u>31</u>	----	<u>36</u>	----	--
Oct	----	<u>36(15)</u> *	----	<u>34</u>	----	<u>40</u>	----	--
Nov	----	<u>42(18)</u> *	----	<u>39</u>	----	<u>46</u>	----	--
Dec	----	<u>48(21)</u> *	----	<u>45</u>	----	<u>52</u>	----	--
Jan 88	----	<u>53(24)</u> *	----	<u>50</u>	----	<u>58</u>	----	--
Feb	----	<u>56(28)</u> *	----	<u>53</u>	----	<u>61</u>	----	--

*An asterisk marks either a preliminary value or one based in part on preliminary observations.

Underlined entries indicate predicted values and parentheses enclose the absolute value of the 90% confidence limits. The two columns headed "Derived" represent a sunspot number computed from a linear regression equation between the 2800 MHz solar flux (adjusted to 1 astronomical unit) and the Zurich sunspot number.

SMOOTHED (OBSERVED AND PREDICTED) SUNSPOT NUMBERS: CYCLES 21 AND 22

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1980	164	163	161	159	156	155	153	150	150	150	148	143
1981	140	142	143	143	143	142	140	141	143	142	139	138
1982	137	133	129	124	120	117	115	109	101	96	95	95
1983	93	90	86	82	77	71	66	66	68	68	67	64
1984	60	56	53	50	48	47	44	40	34	29	25	22
1985	21	20	19	18	18	18	17	17	17	17	17	15
1986	14	13	13	14	14	14	14	13	12*	13	15	16
1987	18	20	21 (2)	22 (3)	24 (5)	26 (6)	29 (8)	30 (10)	33 (12)	36 (15)	42 (18)	48 (21)
1988	53 (24)	56 (28)	59 (32)	62 (36)	65 (40)	69 (43)	75 (47)	82 (52)	86 (56)	91 (60)	93 (64)	94 (67)
1989	96 (67)	101 (67)	108 (70)	116 (73)	124 (75)	131 (78)	135 (79)	138 (81)	142 (86)	145 (89)	147 (91)	147 (92)
1990	146 (93)	146 (93)	143 (92)	136 (88)	130 (81)	126 (74)	124 (71)	123 (70)	121 (64)	117 (57)	111 (49)	108 (43)

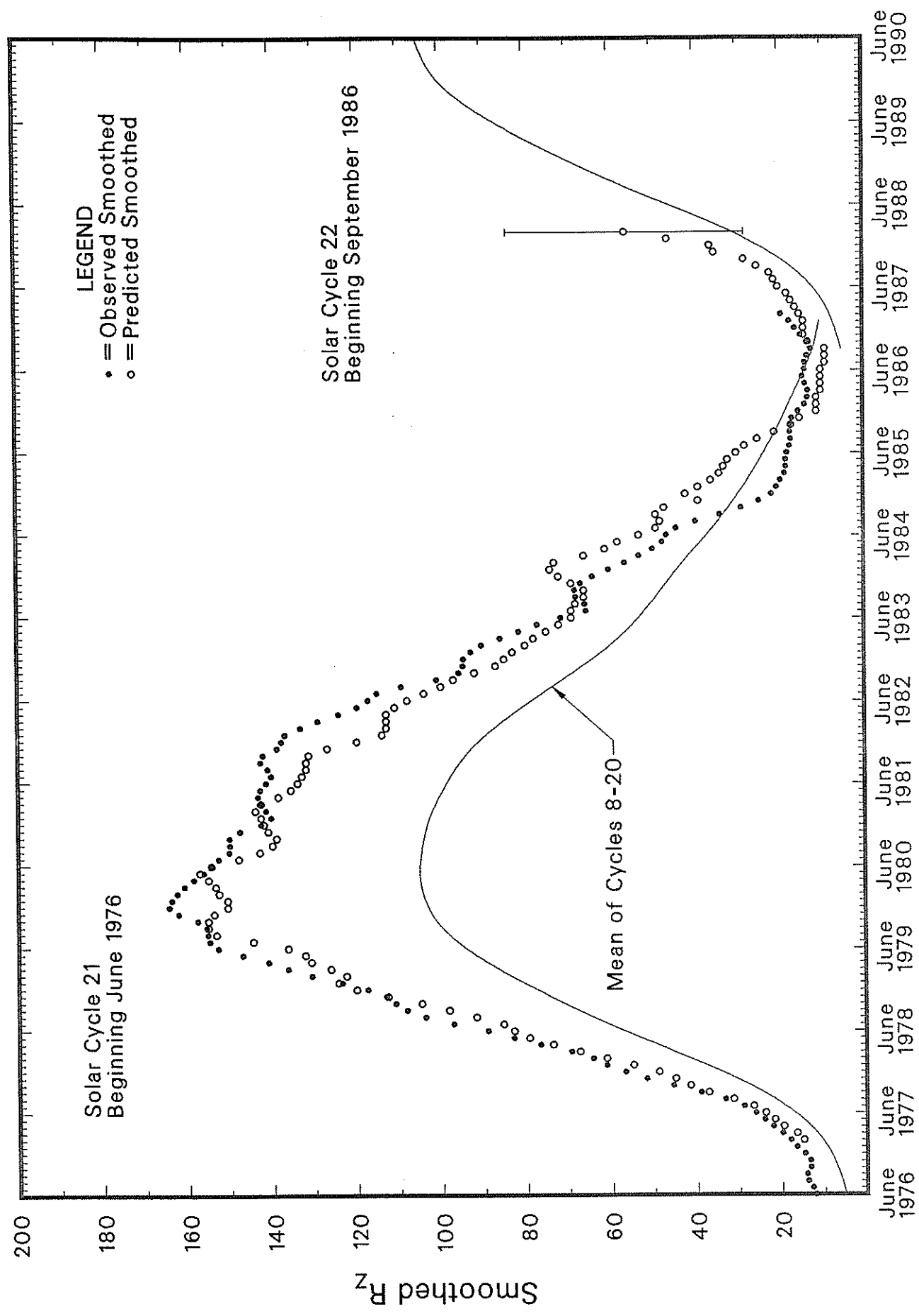
*September 1986 may be the onset of Sunspot Cycle 22.

For the end of Solar Cycle 21, and perhaps the beginning of Cycle 22, the table gives observed smoothed sunspot numbers up to the one calculated from the most recently measured monthly mean. These smoothed observed values are based on final, unsmoothed monthly means through June 1987 and on provisional numbers thereafter.

Table entries, with numbers in parentheses below them, denote predictions by the McNish-Lincoln method. (See page 9 in the July 1987 supplement to *Solar-Geophysical Data*.) Adding the number in parentheses to the predicted value generates the upper limit of the 90% confidence interval; subtracting the number from the predicted value generates the lower limit. Consider, for example, the February 1988 prediction. There exists a 90% chance that in February 1988 the actual smoothed sunspot number will fall somewhere between 28 and 84.

THE MCNISH-LINCOLN PREDICTION METHOD GENERATES USEFUL ESTIMATES OF SMOOTHED, MONTHLY MEAN SUNSPOT NUMBERS FOR NO MORE THAN 12 MONTHS AHEAD. Beyond a year the predictions regress rapidly toward the mean of all 14 cycles used in the computation. Moreover, the method is very sensitive to the date defined as the beginning of the current sunspot cycle, that is, to the date of the most recent sunspot minimum. The new-cycle predictions tabulated above are based on the assumption that the September 1986 value of 12.3 is the minimum. If a smoothed number lower than 12.3 occurs, the predictions will change.

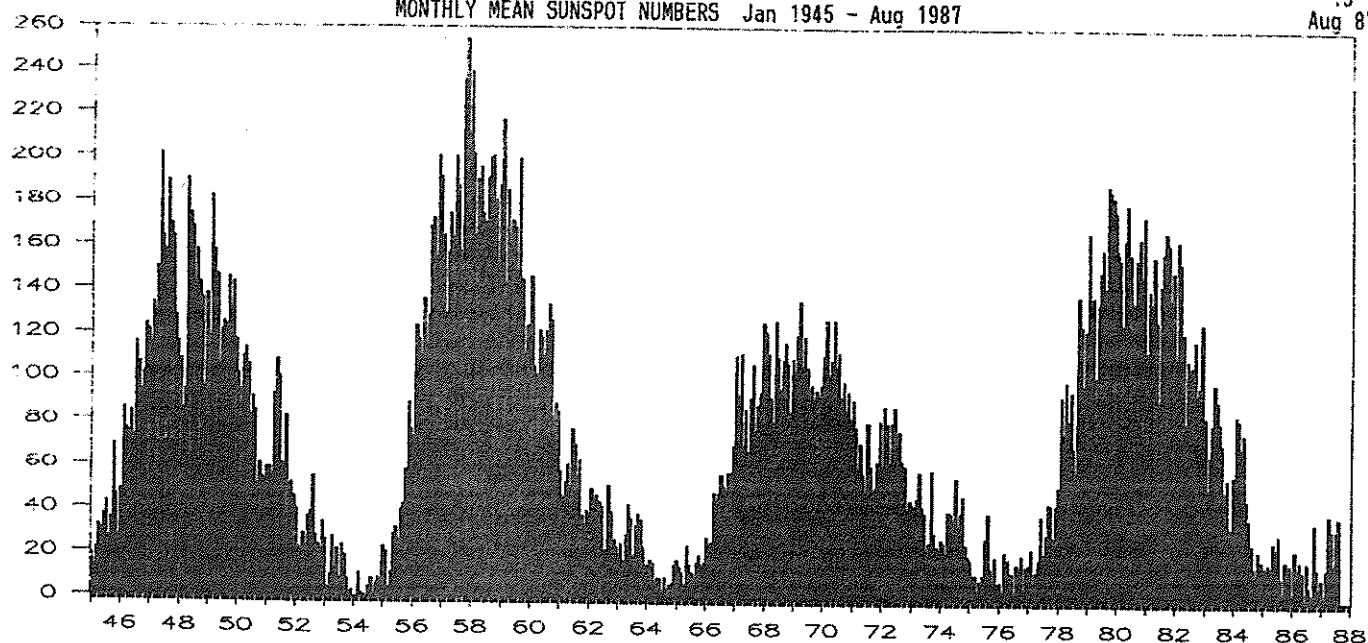
OBSERVED AND ONE-YEAR-AHEAD PREDICTED SUNSPOT NUMBERS



MONTHLY MEAN SUNSPOT NUMBERS Jan 1945 - Aug 1987

13
Aug 87

Sunspot Number



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1945	18.5	12.7	21.5	32.0	30.6	36.2	42.6	25.9	34.9	68.8	46.0	27.4	33.2
1946	47.6	86.2	76.6	75.7	84.9	73.5	116.2	107.2	94.4	102.3	123.8	121.7	92.6
1947	115.7	133.4	129.8	149.8	201.3	163.9	157.9	188.8	169.4	163.6	128.0	116.5	151.6 M
1948	108.5	86.1	94.8	189.7	174.0	167.8	142.2	157.9	143.3	136.3	95.8	138.0	136.3
1949	119.1	182.3	157.5	147.0	106.2	121.7	125.8	123.8	145.3	131.6	143.5	117.6	134.7
1950	101.6	94.8	109.7	113.4	106.2	83.6	91.0	85.2	51.3	61.4	54.8	54.1	83.9
1951	59.9	59.9	55.9	92.9	108.5	100.6	61.5	61.0	83.1	51.6	52.4	45.8	69.4
1952	40.7	22.7	22.0	29.1	23.4	36.4	39.3	54.9	28.2	23.8	22.1	34.3	31.5
1953	26.5	3.9	10.0	27.8	12.5	21.8	8.6	23.5	19.3	8.2	1.6	2.5	13.9
1954	0.2	0.5	10.9	1.8	0.8	0.2	4.8	8.4	1.5	7.0	9.2	7.6	4.4 m
1955	23.1	20.8	4.9	11.3	28.9	31.7	26.7	40.7	42.7	58.5	89.2	76.9	38.0
1956	73.6	124.0	118.4	110.7	136.6	116.6	129.1	169.6	173.2	155.3	201.3	192.1	141.7
1957	165.0	130.2	157.4	175.2	164.6	200.7	187.2	158.0	235.8	253.8	210.9	239.4	190.2 M
1958	202.5	164.9	190.7	196.0	175.3	171.5	191.4	200.2	201.2	181.5	152.3	187.6	184.8
1959	217.4	143.1	185.7	163.3	172.0	168.7	149.6	199.6	145.2	111.4	124.0	125.0	159.0
1960	146.3	106.0	102.2	122.0	119.6	110.2	121.7	134.1	127.2	82.8	89.6	85.6	112.3
1961	57.9	46.1	53.0	61.4	51.0	77.4	70.2	55.8	63.6	37.7	32.6	39.9	53.9
1962	38.7	50.3	45.6	46.4	43.7	42.0	21.8	21.8	51.3	39.5	26.9	23.2	37.6
1963	19.8	24.4	17.1	29.3	43.0	35.9	19.6	33.2	38.8	35.3	23.4	14.9	27.9
1964	15.3	17.7	16.5	8.6	9.5	9.1	3.1	9.3	4.7	6.1	7.4	15.1	10.2 m
1965	17.5	14.2	11.7	6.8	24.1	15.9	11.9	8.9	16.8	20.1	15.8	17.0	15.1
1966	28.2	24.4	25.3	48.7	45.3	47.7	56.7	51.2	50.2	57.2	57.2	70.4	47.0
1967	110.9	93.6	111.8	69.5	86.5	67.3	91.5	107.2	76.8	88.2	94.3	126.4	93.8
1968	121.8	111.9	92.2	81.2	127.2	110.3	96.1	109.3	117.2	107.7	86.0	109.8	105.9 M
1969	104.4	120.5	135.8	106.8	120.0	106.0	96.8	98.0	91.3	95.7	93.5	97.9	105.5
1970	111.5	127.8	102.9	109.5	127.5	106.8	112.5	93.0	99.5	86.6	95.2	83.5	104.5
1971	91.3	79.0	60.7	71.8	57.5	49.8	81.0	61.4	50.2	51.7	63.2	82.2	66.6
1972	61.5	88.4	80.1	63.2	80.5	88.0	76.5	76.8	64.0	61.3	41.6	45.3	68.9
1973	43.4	42.9	46.0	57.7	42.4	39.5	23.1	25.6	59.3	30.7	23.9	23.3	38.0
1974	27.6	26.0	21.3	40.3	39.5	36.0	55.8	33.6	40.2	47.1	25.0	20.5	34.5
1975	18.9	11.5	11.5	5.1	9.0	11.4	28.2	39.7	13.9	9.1	19.4	7.8	15.5
1976	8.1	4.3	21.9	18.8	12.4	12.2	1.9	16.4	13.5	20.6	5.2	15.3	12.6 m
1977	16.4	23.1	8.7	12.9	18.6	38.5	21.4	30.1	44.0	43.8	29.1	43.2	27.5
1978	51.9	93.6	76.5	99.7	82.7	95.1	70.4	58.1	138.2	125.1	97.9	122.7	92.5
1979	166.6	137.5	138.0	101.5	134.4	149.5	159.4	142.2	188.4	186.2	183.3	176.3	155.4 M
1980	159.6	155.0	126.2	164.1	179.9	157.3	136.3	135.4	155.0	164.7	147.9	174.4	154.6
1981	114.0	141.3	135.5	156.4	127.5	90.9	143.8	158.7	167.3	162.4	137.5	150.1	140.4
1982	111.2	163.6	153.8	122.0	82.2	110.4	106.1	107.6	118.8	94.7	98.1	127.0	115.9
1983	84.3	51.0	66.5	80.7	99.2	91.1	82.2	71.8	50.3	55.8	33.3	33.4	66.6
1984	57.0	85.4	83.5	69.7	76.4	46.1	37.4	25.5	15.7	12.0	22.8	18.7	45.9
1985	16.5	15.9	17.2	16.2	27.5	24.2	30.7	11.1	3.9	18.6	16.2	17.3	17.9
1986	2.5	23.2	15.1	18.5	13.7	1.1	18.1	7.4	3.8	35.4	15.2	6.8	13.4
1987	10.4	2.4	14.7	39.5	33.0	17.4	33.0*	38.6*					23.6*

*Preliminary

For the yearly means, each "M" marks a sunspot cycle maximum and each "m" a minimum.

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Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	CMP Mo	Day	Dur (Min)	Imp Opt	Xray	See	Obs Type	Time (UT)	Area Measurement		Remarks
																	Apparent (10 ⁻⁶ Disk)	Corr (Sq Deg)	
0001		01	18118	18191	1840	S22	W72	4827	07	27.3	29	SN	C 8.6				68		EFH
	RAMY	01	1811	1820U	1823D	S23	W66	4827	07	27.8	12D	SN	C 8.6	3	C		60		FH
	HOLL	01	1817	1819	1843	S21	W74	4827	07	27.2	26	SN	C 8.6	3	C		74		FE
	PALE	01	1819	1820	1838	S21	W77	4827	07	26.9	19	SN	C 8.6	3	C		69		
0002	LEAR	02	0013	0018	0031	S25	E59	4835	08	6.6	18	SF	C 3.6	3	C		12		
0003	LEAR	02	0049	0049	0055	S22	E59	4835	08	6.6	6	SF		3	C		11		
0004	LEAR	02	0140	0140	0143	S22	E59	4835	08	6.6	3	SF		3	C		11		
0005	LEAR	02	0231	0233	0236	S22	E58	4835	08	6.6	5	SF		3	C		16		
0006	LEAR	02	0342	0343	0349	S25	E58	4835	08	6.6	7	SF		3	C		17		
0007		02	1215*	1238	1246	N26	W46	4831	07	30.0	31	SF					12		
	RAMY	02	1215	1220U	1244D	N27	W46	4831	07	30.0	29D	SF		3	C		14		
	SVTO	02	1238	1238	1246	N26	W47	4831	07	30.0	8	SF		3	C		11		
0008		02	16516	16571	1712	S22	W88	4827	07	27.0	21	SF					28		
	HOLL	02	1651	1657	1717	S20	W88	4827	07	27.1	26	SF		3	C		43		
	RAMY	02	1657	1658	1706	S24	W87	4827	07	27.1	9	SF		3	C		12		
0009		02	1824	18341	1845	S21	W88	4827	07	27.1	21	SF					58		F
	RAMY	02	1824	1834	1844	S22	W88	4827	07	27.1	20	SF		3	C		52		
	HOLL	02	1824	1835	1846	S20	W88	4827	07	27.1	22	SF		3	C		63		F
0010	KAND	03	1207	1213	1217	S23	E40	4835	08	6.6	10	SF			P		16	.2	D
0011		03	12321	1234	1244	S22	E39	4835	08	6.5	12	SN					16	.3	D
	KAND	03	1232		1249	S23	E40	4835	08	6.6	17	SN			P		21	.3	D
	SVTO	03	1233	1234	1240	S22	E38	4835	08	6.4	7	SF		3	C		10		
0012	KAND	04	0710		0715	S27	E28	4835	08	6.5	5	SF			P		31	.4	E
0013		04	0830	0835	0846	N14	W50		07	31.6	16	SN					42	.6	DLT
	KAND	04	0830	0835	0845	N15	W50		07	31.6	15	SN			P		36	.6	DL
	URUM	04	0835E	0835U	0846	N14	W50		07	31.6	11D	SF			C		48		DT
0014	KAND	04	0845		0910	S27	E28	4835	08	6.5	25	SN			P		10	.1	D
0015	URUM	05	0220	0224	0240	N14	W58		07	31.7	20	SF			C		32		ET
0016	KAND	05	0810	0820	0835	S26	E17	4835	08	6.7	25	SN			P		21	.3	D
0017	YUNN	06	0236	0239	0252	S23	E04	4835	08	6.4	16	SN			C		31	.4	D
0018	HOLL	06	2220	2231	2233	S23	W05	4835	08	6.5	13	SF		3	C		11		
0019		06	23401	2350	2400	S24	W07	4835	08	6.4	20	SF					30		EF
	HOLL	06	2340	2350	2405	S23	W08	4835	08	6.4	25	SF		3	C		35		FE
	LEAR	06	2341	2350	2356	S24	W06	4835	08	6.5	15	SF		3	C		25		F
0020	LEAR	07	0243	0250	0253	S24	W08	4835	08	6.5	10	SF		3	C		20		FH
0021		07	05278	05483	0622	S25	W11	4835	08	6.4	55	SF	C 2.5				82		EFT
	SVTO	07	0527	0551	0627	S25	W09	4835	08	6.5	60	SF	C 2.5	3	C		59		
	LEAR	07	0530	0549	0628	S25	W10	4835	08	6.4	58	SF	C 2.5	3	C		27		F
	URUM	07	0535	0548	0610	S25	W13	4835	08	6.2	35	SN	C 2.5		C		161		ET
0022		07	07058	07058	0718	S26	W10	4835	08	6.5	13	SF					18		
	LEAR	07	0705	0705	0724	S25	W11	4835	08	6.4	19	SF		3	C		24		
	SVTO	07	0705	0706	0711	S26	W09	4835	08	6.6	6	SF		3	C		12		
	SVTO	07	0713	0713	0719	S26	W09	4835	08	6.6	6	SF		3	C		19		
0023		07	07343	0738	0800	S24	W10	4835	08	6.5	26	SF	C 1.6				20		F
	SVTO	07	0734	0738	0803	S25	W10	4835	08	6.5	29	SF	C 1.6	3	C		24		F
	LEAR	07	0737	0738	0758	S24	W10	4835	08	6.5	21	SF	C 1.6	3	C		17		
0024	KAND	07	0820		0830	S26	W11	4835	08	6.5	10	SN			P		26	.3	EIT

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Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	NOAA/ USAF Region			CMP Mo	Day	Dur (Min)	Imp Opt	Xray	See	Obs Type	Time (UT)	Area Measurement		Corr (Sq Deg)	Remarks
						Lat	CMD	Region									Apparent (10 ⁻⁶ Disk)			
0025		07	0832*	0834*	0901	S25	W10	4835	08	6.6	29	SN	C	3.7			45	.4	EFIT	
	SVTO	07	0832	0844	0910	S24	W11	4835	08	6.5	38	SN			3	C	81		F	
	LEAR	07	0834	0834	0912	S24	W12	4835	08	6.4	38	SN	C	3.7	3	C	30			
	KAND	07	0835	0836	0840	S27	W08	4835	08	6.7	5	SB	C	3.7		P	47	.6	EIT	
	KAND	07	0842	0845	0850D	S25	W10	4835	08	6.6	8D	SN				P	21	.3	EIT	
0026	SVTO	07	1000	1017	1025	S24	W12	4835	08	6.5	25	SF	C	2.5	3	C	28			
0027		07	12592	1301	1316	S24	W12	4835	08	6.6	17	SN					58		F	
	RAMY	07	1259	1301	1320	S24	W13	4835	08	6.5	21	SN			3	C	87		F	
	SVTO	07	1301	1301	1311	S25	W12	4835	08	6.6	10	SN			3	C	29		F	
0028	HOLL	07	1426	1427	1441D	S23	W14	4835	08	6.5	150	SF			3	C	14			
0029		07	15221	1525	1540	S25	W15	4835	08	6.5	18	SN	C	5.7			73		F	
	RAMY	07	1522	1525	1534	S24	W18	4835	08	6.2	12	SB	C	5.7	3	C	118		F	
	SVTO	07	1523	1525	1540	S25	W14	4835	08	6.5	17	SN	C	5.7	3	C	45		F	
	HOLL	07	1529E	1534U	1547	S26	W14	4835	08	6.5	180	SF	C	5.7	3	C	56		F	
0030		07	16502	16523	1715	S25	W16	4835	08	6.5	25	SN	C	8.9			48		EF	
	PALE	07	1650	1652	1716	S24	W17	4835	08	6.4	26	SN	C	8.9	2	C	32		FE	
	RAMY	07	1651	1653	1715	S25	W16	4835	08	6.5	24	SN	C	8.9	3	C	61		FE	
	SVTO	07	1651E	1655	1708D	S25	W15	4835	08	6.5	17D	SN	C	8.9	3	C	41		F	
	HOLL	07	1652	1653	1714	S25	W14	4835	08	6.6	22	SN	C	8.9	3	C	56		FE	
0031		07	17541	1758	1807	S24	W18	4835	08	6.3	13	SF					42		F	
	RAMY	07	1754	1758	1811	S24	W17	4835	08	6.4	17	SF			3	C	47		F	
	PALE	07	1755	1758	1803	S24	W19	4835	08	6.3	8	SF			3	C	38		F	
0032		07	1830*	1833*	1858	S24	W17	4835	08	6.4	28	SF	C	1.7			12		FH	
	RAMY	07	1830	1843	1905	S24	W17	4835	08	6.4	35	SF	C	1.7	3	C	11		F	
	PALE	07	1830	1844	1900	S24	W18	4835	08	6.4	30	SF	C	1.7	3	C	10		FH	
	HOLL	07	1832	1833	1836	S24	W16	4835	08	6.5	4	SF			3	C	11			
	HOLL	07	1852	1905	1909	S24	W17	4835	08	6.5	17	SF			3	C	15			
0033		07	19432	19451	2004	S25	W17	4835	08	6.5	21	SN	M	1.3			44		EFH	
	HOLL	07	1943	1945	2010	S24	W17	4835	08	6.5	27	SN	M	1.3	3	C	45		FE	
	RAMY	07	1943	1946	2009	S25	W17	4835	08	6.5	26	SN	M	1.3	3	C	45		FE	
	PALE	07	1945	1946	1954	S25	W17	4835	08	6.5	9	SF	M	1.3	3	C	41		FH	
0034	HOLL	07	2035	2036	2051	S24	W19	4835	08	6.4	16	SF			3	C	15			
0035	HOLL	07	2230	2230	2241	S24	W18	4835	08	6.5	11	SF	C	1.1	3	C	11			
0036		08	01203	01321	0155	S24	W20	4835	08	6.5	35	1B	M	1.3			162		EFT	
	LEAR	08	0120	0133	0208	S25	W20	4835	08	6.5	48	1N	M	1.3	3	C	132		F	
	URUM	08	0123	0132	0142	S24	W20	4835	08	6.5	19	1B	M	1.3		C	193		ET	
0037	LEAR	08	0334	0337	0402	S24	W21	4835	08	6.5	28	1N	M	1.3	3	C	113		FZ	
0038	LEAR	08	0604	0604	0606	S24	W23	4835	08	6.5	2	SF			3	C	11			
0039	LEAR	08	0624	0624	0634	S24	W22	4835	08	6.6	10	SF			3	C	13			
0040		08	1049E	1118U	1115	S24	W26	4835	08	6.4	26D	SN	C	9.5			36	.3	EFITZ	
	SVTO	08	1049E	1118U	1126D	S23	W25	4835	08	6.5	37D	SF	C	9.5	3	C	51		F	
	KAND	08	1050E		1115	S24	W28	4835	08	6.3	25D	SN	C	9.5		P	21	.3	EITZ	
0041	RAMY	08	1217	1232	1249	S26	W26	4835	08	6.5	32	SF	C	2.3	3	C	18		FU	
0042		08	13462	1351	1414	S26	W26	4835	08	6.5	28	SN	M	1.3			84		F	
	RAMY	08	1346	1351	1415	S26	W26	4835	08	6.5	29	SN	M	1.3	3	C	90		F	
	SVTO	08	1348	1351	1414	S26	W26	4835	08	6.5	26	SN	M	1.3	3	C	78		F	
0043	RAMY	08	1600	1603	1607	S23	W27	4835	08	6.6	7	SF			3	C	12			
0044	RAMY	08	1721	1725	1737	S26	W28	4835	08	6.5	16	SF			3	C	19		F	

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						Lat	CMD		Mo	Day							Apparent (10 ⁻⁶ Disk)	Corr (Sq Deg)		
0045		08	1828Z	1830Z	1837	S24	W30	4835	08	6.4	9	SF						24	F	
	RAMY	08	1828	1831	1839	S24	W31	4835	08	6.4	11	SF		3	C			39	F	
	PALE	08	1829	1830	1836	S23	W29	4835	08	6.5	7	SF		3	C			20		
	HOLL	08	1830	1833	1836	S24	W29	4835	08	6.5	6	SF		3	C			13		
0046	RAMY	08	1939	1939	1945	S24	W33	4835	08	6.3	6	SF		3	C			21	F	
0047	PALE	08	2016	2017	2018	S23	W30	4835	08	6.5	2	SF		3	C			13		
0048		08	2042Z	2043	2101	S23	W31	4835	08	6.5	19	SF						44	F	
	PALE	08	2042	2043	2059	S23	W30	4835	08	6.5	17	SF		3	C			76		
	RAMY	08	2042	2044U	2108	S23	W33	4835	08	6.3	26	SF		3	C			26	F	
	HOLL	08	2043	2043	2056	S24	W30	4835	08	6.5	13	SF		3	C			29	F	
0049		08	2220	2226	2250D	S24	W32	4835	08	6.4	30D	1F						128	EF	
	HOLL	08	2220	2226	2250D	S24	W31	4835	08	6.5	30D	SF		3	C			76	FE	
	PALE	08	2225E	2225U	2226D	S25	W33	4835	08	6.4	10	1F		3	C			180	F	
0050		09	0230	0231Z	0246	S24	W36	4835	08	6.3	16	SF						28		
	LEAR	09	0226E	0234	0246	S23	W35	4835	08	6.4	20D	SF		3	C			37		
	PALE	09	0230	0231	0236D	S24	W36	4835	08	6.3	6D	SF		2	C			20		
0051	LEAR	09	0302	0308	0320	S24	W36	4835	08	6.3	18	SF		3	C			26	F	
0052	PALE	09	0345	0357	0416	S24	W36	4835	08	6.4	31	SF		2	C			117	F	
0053		09	0609	0619	0634	S25	W36	4835	08	6.5	25	SF						36	FZ	
	LEAR	09	0609	0619	0638	S24	W37	4835	08	6.4	29	SF		3	C			51	ZF	
	SVTO	09	0610E	0622U	0629	S26	W35	4835	08	6.5	19D	SF		3	C			22	F	
0054		09	12476	1257*	1314	S25	W39	4835	08	6.5	27	SF						26		
	RAMY	09	1247	1312	1318	S24	W39	4835	08	6.5	31	SF		3	C			29		
	SVTO	09	1253	1257	1309	S26	W39	4835	08	6.5	16	SF		3	C			24		
0055	SVTO	09	1354	1355	1401	S23	E81	4839	08	15.8	7	SN		3	C			34		
0056	SVTO	09	1550	1551	1555	S25	W43	4835	08	6.3	5	SF		3	C			13	E	
0057		09	1954	2000Z	2016	S24	W43	4835	08	6.5	22	SF						22	F	
	HOLL	09	1954	2000	2016	S23	W44	4835	08	6.4	22	SF		4	C			20	F	
	RAMY	09	1954	2001	2015	S25	W42	4835	08	6.6	21	SF		3	C			25	F	
0058	PALE	09	2253	2255	2304	S23	E85	4839	08	16.5	11	SF		3	C			12		
0059	PALE	10	0300	0306	0309	S21	E65	4839	08	15.1	9	SF	C 8.3	3	C			10		
0060	RAMY	10	1131E	1131U	1150	S22	E55	4839	08	14.7	19D	SF		2	C			74	F	
0061	SVTO	10	1145	1147	1155	S22	E70	4839	08	15.9	10	SF		3	C			12	H	
0062		10	1238Z	1248	1259	S25	W54	4835	08	6.3	21	SF	C 1.8					43	.6	EF
	SVTO	10	1238	1248	1313	S26	W54	4835	08	6.3	35	SF	C 1.8	3	C			38	F	
	RAMY	10	1239	1248	1249	S25	W54	4835	08	6.3	10	SF	C 1.8	3	C			60		
	KAND	10	1245		1255	S25	W53	4835	08	6.4	10	SN	C 1.8		P			31	.6	E
0063	SVTO	10	1329	1330	1346	S25	W57	4835	08	6.1	17	SF		3	C			14		
0064	RAMY	10	1615	1628	1648	S23	E64	4839	08	15.6	33	SF		3	C			26		
0065		10	2107	2117*	2224	S22	E66	4839	08	15.9	77	SF	C 3.9					34		F
	HOLL	10	2107	2117	2147D	S22	E69	4839	08	16.2	40D	SF		3	C			23	F	
	PALE	10	2149E	2157	2224	S22	E63	4839	08	15.7	35D	SF	C 3.9	3	C			44	F	
0066	HOLL	10	2220	2223	2232	N05	W68	4837	08	5.8	12	SF		3	C			26		
0067	URUM	11	0152	0157	0217	N08	W72	4837	08	5.7	25	SN			C			64	DT	
0068	PALE	11	0209	0210	0212D	S25	E61	4839	08	15.8	3D	SF		3	C			21		
0069		11	0814Z	0816	0821	S22	E60	4839	08	15.9	7	SN						34	.5	DF
	SVTO	11	0814	0816	0824	S21	E60	4839	08	15.9	10	SN		3	C			48	F	
	KAND	11	0815	0816	0818	S24	E60	4839	08	16.0	3	SN			P			21	.5	D

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Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	NOAA/USAF			CMP Mo	Day	Dur (Min)	Imp Opt	Xray	Obs See	Type	Time (UT)	Area Measurement		Corr (Sq Deg)	Remarks
						Lat	CMD	Region									(10 ⁻⁶)	Apparent Disk		
0070		11	1107	1110	1146	S22	E56	4839	08	15.8	39	1N	C 3.1				96			F
	SVTO	11	1107	1110	1142	S22	E58	4839	08	15.9	35	1N	C 3.1	3	C		117			F
	RAMY	11	1131E	1131U	1150	S22	E55	4839	08	15.7	19D	SF		2	C		74			F
0071	RAMY	11	1500	1501	1507	S20	E52	4839	08	15.6	7	SF		3	C		17			
0072	RAMY	11	1754	1801	1815	S23	E55	4839	08	16.0	21	SF		3	C		29			
0073	PALE	11	2148	2151	2242	S20	E48	4839	08	15.6	54	SN	C 4.3	3	C		76			F
0074		13	0249S	0300E	0317	S24	E30	4839	08	15.4	28	SF	C 1.8				86			EFST
	URUM	13	0249	0300	0310	S25	E32	4839	08	15.6	21	SN	C 1.8		C		129			ET
	PALE	13	0254	0303	0314	S24	E27	4839	08	15.2	20	SF	C 1.8	2	C		34			FS
	URUM	13	0254	0306	0326	S24	E32	4839	08	15.6	32	SF	C 1.8		C		96			ET
0075		13	1123*	11321	1143	S23	E31	4839	08	15.9	20	SF					15		.2	DF
	RAMY	13	1123	1133	1146	S23	E30	4839	08	15.8	23	SF		3	C		18			F
	SVTO	13	1132	1132	1138	S22	E31	4839	08	15.9	6	SF		3	C		12			
	KAND	13	1135		1145	S24	E32	4839	08	15.9	10	SF			P		16		.2	D
0076	RAMY	13	1226	1226	1240	S25	E28	4839	08	15.7	14	SF		3	C		13			
0077	RAMY	13	1325	1328	1335	S24	E73	4842	08	19.2	10	SF		3	C		35			
0078		13	13384	1341*	1358	S22	E68	4842	08	18.8	20	SF	M 1.2				38			F
	SVTO	13	1338	1341	1355	S23	E71	4842	08	19.0	17	SF	M 1.2	3	C		11			F
	RAMY	13	1342	1351	1401	S20	E66	4842	08	18.6	19	SF	M 1.2	3	C		65			F
0079		13	15292	15331	1538	S24	E27	4839	08	15.7	9	SF					14			F
	HOLL	13	1529	1533	1539	S24	E27	4839	08	15.7	10	SF		3	C		10			F
	RAMY	13	1531	1534	1538	S24	E27	4839	08	15.7	7	SF		3	C		17			F
0080	RAMY	13	1551	1552	1554	S22	E71	4842	08	19.1	3	SF		3	C		15			
0081		13	15506	1558E	1629	S24	E27	4839	08	15.7	39	1B	C 4.9				99			EFH
	RAMY	13	1550	1558	1625	S25	E29	4839	08	15.9	35	1B		3	C		103			FH
	HOLL	13	1556	1558	1630	S23	E25	4839	08	15.6	34	SB		3	C		91			FE
	SVTO	13	1556	1604	1631	S24	E27	4839	08	15.7	35	1N	C 4.9	3	C		102			FE
0082	PALE	14	0125	0128	0140	S24	E22	4839	08	15.7	15	SF		3	C		39			
0083		14	16484	1649S	1700	S24	E57	4842	08	19.1	12	SF					25			F
	RAMY	14	1648	1649	1700	S25	E57	4842	08	19.1	12	SF		3	C		14			F
	HOLL	14	1649	1654	1700	S24	E56	4842	08	19.0	11	SF		3	C		34			
	SVTO	14	1652	1652	1659	S23	E57	4842	08	19.1	7	SF		3	C		26			
0084	RAMY	14	1728	1728	1733	S24	E55	4842	08	19.0	5	SF		3	C		13			
0085	YUNN	16	0400	0417U	0432	S29	W06	4839	08	15.7	32	SN			P		31		.4	
0086		16	18101	1815	1821	S24	E36	4842	08	19.5	11	SN					51			
	RAMY	16	1810	1815	1821	S23	E36	4842	08	19.5	11	SN		4	C		52			
	HOLL	16	1811	1815	1821	S24	E35	4842	08	19.5	10	SF		4	C		50			
0087	HOLL	16	2111	2112	2124	S24	E34	4842	08	19.5	13	SF		3	C		14			
0088	HOLL	16	2159	2202	2206	S24	E33	4842	08	19.5	7	SF		3	C		22			
0089	HOLL	17	2022	2024	2100	S29	E03	4841	08	18.1	38	SF		3	C		18			H
0090	LEAR	18	0114E	0115U	0136	S31	E04	4841	08	18.4	22D	SF		3	C		17			
0091	YUNN	18	0229	0231	0247	N17	E19		08	19.5	18	SN			C		8		.1	G
0092	YUNN	18	0720	0723	0728	S26	W56		08	13.9	8	SN			P		8		.2	G
0093	KAND	19	0717	0720	0724	S25	W45	4839	08	15.8	7	SF			P		21		.4	D
0094	KAND	19	1000	1005	1019	S29	W50	4839	08	15.5	19	SN			P		42		.8	D

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H - ALPHA SOLAR FLARES

AUGUST 1987

Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/USAF Region	CMP Mo	Day	Dur (Min)	Imp Opt	Xray	See	Obs Type	Time (UT)	Area Measurement		Corr (Sq Deg)	Remarks
																	(10 ⁻⁶)	(Disk)		
0095		19	1000*	1025	1102	S26	W47	4839	08	15.8	62	1N	C 9.4				62		.8	DZ
	SVTO	19	1000	1025	1124	S26	W48	4839	08	15.7	84	1F	C 9.4	3	C		81			Z
	KAND	19	1015	1025	1041	S27	W46	4839	08	15.8	26	SB	C 9.4		P		42		.8	DZ
0096	KAND	19	1027	1041	1053	S25	W41	4839	08	16.2	26	1B			P		125		2.3	K
0097	RAMY	19	1118E	1120U	1234	S28	W45	4839	08	15.9	76D	1F		3	C		113			Z
0098		19	1405	1408	1421	S22	W03	4842	08	19.3	16	SF					25			F
	SVTO	19	1405	1408	1419	S22	W03	4842	08	19.3	14	SF		3	C		24			F
	RAMY	19	1405	1409	1423	S22	W03	4842	08	19.3	18	SF		3	C		26			F
0099	HOLL	19	1848	1849	1900	S33	W16	4841	08	18.5	12	SF		3	C		20			
0100	ISTA	20	0650		0655	N18	E90	4845	08	27.1	5	SB								A
0101		20	08243	0830	0834	S32	W20	4841	08	18.8	10	SF					20			D
	KAND	20	0824		0834	S32	W21	4841	08	18.7	10	SF			P					D
	SVTO	20	0827	0830	0842D	S33	W19	4841	08	18.8	15D	SF		3	C		20			
0102	HOLL	20	1546	1548	1552	S28	W60	4839	08	16.0	6	SF		3	C		12			
0103	HOLL	20	1752	1752	1803	S28	W30	4841	08	18.4	11	SF		3	C		11			
0104		20	1822*	1823*	1855	S33	W28	4841	08	18.5	33	SF					18			
	HOLL	20	1822	1823	1850	S34	W30	4841	08	18.4	28	SF		3	C		19			
	HOLL	20	1852	1856	1900	S32	W27	4841	08	18.6	8	SF		3	C		16			
0105	HOLL	20	1854	1854	1905	S30	W62	4839	08	15.9	11	SF		3	C		10			F
0106		21	0528	0623	0627	S29	W39	4841	08	18.2	59	SN	C 1.3				34		.8	EFZ
	SVTO	21	0528	0530U	0622	S30	W40	4841	08	18.1	54	SN	C 1.3	2	C		29			E
	LEAR	21	0530E	0538U	0632	S29	W38	4841	08	18.2	62D	SN	C 1.3	3	C		26			ZF
	YUNN	21	0618E	0623	0628	S29	W39	4841	08	18.2	10D	SN			C		47		.8	E
0107		21	16081	16082	1623	S31	W42	4841	08	18.3	15	SF					14			FZ
	RAMY	21	1608	1608	1615	S32	W43	4841	08	18.3	7	SF		3	C		10			F
	HOLL	21	1608	1608	1628	S30	W41	4841	08	18.4	20	SF		3	C		20			F
	SVTO	21	1609	1610	1627	S32	W43	4841	08	18.3	18	SF		3	C		11			ZF
0108	HOLL	21	2156	2206	2216	N14	E79	4845	08	27.9	20	SF	C 1.3	4	C		30			
0109		22	0503*	05521	0622	N17	E76	4845	08	28.0	79	1N	C 9.2				101			
	SVTO	22	0503	0552	0552D	N16	E75	4845	08	27.9	49D	1N	C 9.2	3	C		55			
	LEAR	22	0550	0553	0620	N19	E77	4845	08	28.1	30	1B	C 9.2	3	C		106			
	YUNN	22	0603E	0603U	0623	N15	E75	4845	08	27.9	20D	SN	C 9.2		P	0603	141			
0110	LEAR	22	0930E		0944D	N19	E77	4845	08	28.3	14D	SN	M 1.4	1	C		95			
0111		22	1214	1218	1305	N16	E68	4845	08	27.7	51	SF	C 1.8				48			
	SVTO	22	1214	1218	1258	N17	E68	4845	08	27.7	44	SF	C 1.8	3	C		55			
	RAMY	22	1214	1219	1312	N16	E68	4845	08	27.7	58	SF	C 1.8	3	C		40			
0112	RAMY	22	1457	1459	1506	N15	E67	4845	08	27.7	9	SF		3	C		26			
0113		22	16382	16427	1711	N16	E66	4845	08	27.7	33	SN	M 1.3				75			EFH
	SVTO	22	1638	1642	1718	N18	E63	4845	08	27.5	40	SN	M 1.3	3	C		57			FH
	RAMY	22	1639	1648	1717	N15	E67	4845	08	27.8	38	SN	M 1.3	3	C		81			FE
	HOLL	22	1640	1648	1713	N13	E70	4845	08	28.0	33	SN	M 1.3	3	C		86			FE
	PALE	22	1646E	1649	1655	N18	E64	4845	08	27.6	9D	SF	M 1.3	2	C		75			E
0114	RAMY	22	2057	2104	2114	N15	E64	4845	08	27.7	17	SF		3	C		31			
0115		23	0237	0232*	0314	N14	E62	4845	08	27.8	37	SN	C 3.2				37		1.1	DF
	YUNN	23	0230E	0232	0311	N14	E64	4845	08	27.9	41D	SB			P		47		1.1	D
	LEAR	23	0237	0238	0307	N15	E62	4845	08	27.8	30	SB	C 3.2	3	C		31			F
	PALE	23	0241E	0243	0325	N14	E61	4845	08	27.7	44D	SF	C 3.2	3	C		32			
0116		23	12311	1251*	1336	N15	E57	4845	08	27.8	65	SF	C 1.9				48			FHS
	RAMY	23	1231	1251	1344	N15	E58	4845	08	27.9	73	SF	C 1.9	3	C		45			FH
	SVTO	23	1232	1301	1327	N15	E56	4845	08	27.8	55	SF	C 1.9	3	C		50			FS

H - ALPHA SOLAR FLARES

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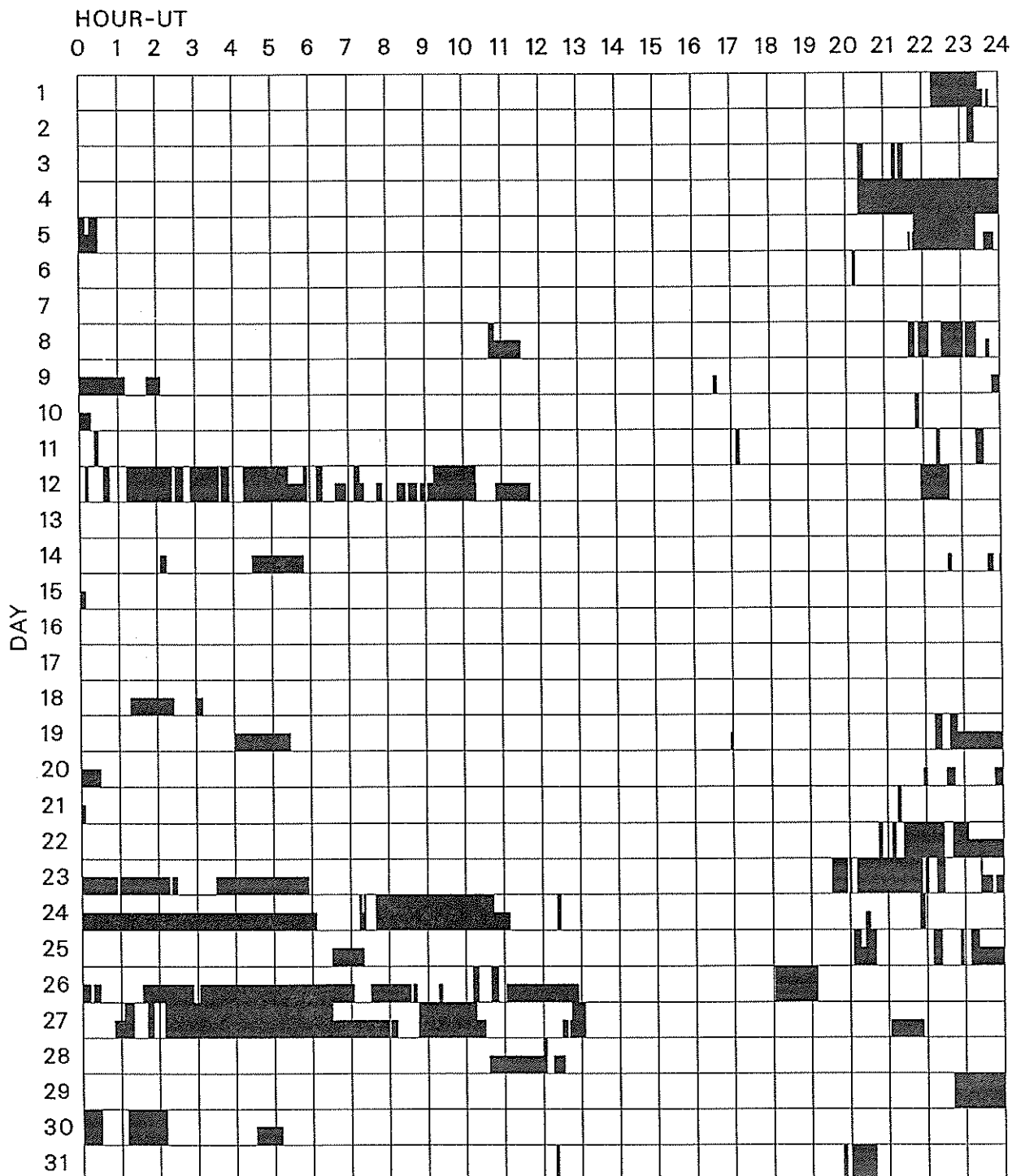
AUGUST 1987

Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	CMP Mo	Day	Dur (Min)	Imp Opt	Xray	See	Obs Type	Time (UT)	Area Measurement		Remarks
																	Apparent (10 ⁻⁶ Disk)	Corr (Sq Deg)	
0117	HOLL	23	2235	2257	2348D	N14	E52	4845	08	27.9	73D	1B	M	1.3	3	C	172		FU
0118	RAMY	24	1211	1211	1221	N16	E45	4845	08	27.9	10	SF			3	C	14		
0119	RAMY	24	1340	1343	1354	N15	E42	4845	08	27.7	14	SF			3	C	17		F
0120	RAMY	24	1448	1449	1456	N16	E43	4845	08	27.9	8	SF			3	C	10		
0121	PALE	24	2225	2232	2259	N15	E39	4845	08	27.9	34	SF	C	8.3	3	C	90		
0122		25	01411	01432	0204	N16	E36	4845	08	27.8	23	1B	C	1.8			100		EH
	PALE	25	0141	0145	0157	N17	E37	4845	08	27.9	16	SN	C	1.8	3	C	87		
	LEAR	25	0142	0143	0212	N16	E36	4845	08	27.8	30	1B	C	1.8	3	C	114		EH
0123		25	0540	0552	0658	N14	E34	4845	08	27.8	78	1N	C	1.6			230		ETU
	URUM	25	0540	0552	0615D	N13	E34	4845	08	27.8	35D	1N	C	1.6		C	321		UT
	LEAR	25	0610E		0658	N16	E33	4845	08	27.7	48D	1N	C	1.6	3	C	140		UE
0124		25	11271	1129	1138	N17	W55	4846	08	21.3	11	SN					23	.4	DFH
	RAMY	25	1127	1129	1145	N17	W54	4846	08	21.4	18	SF			3	C	25		FH
	KAND	25	1128	1129	1131	N17	W56	4846	08	21.2	3	SN				P	21	.4	D
0125		25	1250	1251	1258	N18	W56	4846	08	21.3	8	SF					16		DF
	KAND	25	1250	1251	1255	N17	W56	4846	08	21.3	5	SF				P			D
	RAMY	25	1250	1251	1300	N18	W55	4846	08	21.3	10	SF			3	C	16		F
0126	PALE	25	1714	1714	1726	N19	W60	4846	08	21.1	12	SF			3	C	15		
0127		26	00453	0051*	0150	N15	E23	4845	08	27.8	65	1N	C	2.0			87		EFU
	HOLL	26	0045	0051	0122D	N13	E22	4845	08	27.7	37D	1N	C	2.0	3	C	16		UF
	PALE	26	0046	0051	0055D	N17	E25	4845	08	27.9	9D	1N	C	2.0	3	C	112		
	LEAR	26	0048	0102	0150	N16	E22	4845	08	27.7	62	1B	C	2.0	3	C	132		UE
0128	YUNN	26	0254E	0258U	0302D	N18	W65	4846	08	21.2	8D	SN			P	0258	31	.7	D
0129	KAND	26	1154	1155	1157	N17	E16	4845	08	27.7	3	SF			P		31	.3	DEI
0130	KAND	26	1232	1232	1236	N17	E16	4845	08	27.7	4	SN			P		42	.5	D
0131		26	2358	2359	2401	N21	W74	4846	08	21.3	3	SF					30		
	HOLL	26	2358	2359	2401	N24	W75	4846	08	21.2	3	SF			3	C	18		
	PALE	26	2358	2359	2401	N18	W74	4846	08	21.4	3	SF			3	C	42		
0132	KAND	27	1030	1035	1040	S25	E90	4847	09	3.4	10	SN			P				AD
0133		27	14271	1430	1451	N14	E04	4845	08	27.9	24	SF					88		HU
	RAMY	27	1427	1430	1453	N14	E03	4845	08	27.8	26	SF			3	C	83		UH
	SVTO	27	1428	1430	1449	N14	E05	4845	08	28.0	21	SF			3	C	94		
0134	KAND	28	1249		1251	S26	E70	4847	09	3.0	2	SF			P				D
0135		29	1548	1549	1552	S21	E52	4847	09	2.6	4	SF					16		
	RAMY	29	1548	1549	1552	S21	E52	4847	09	2.6	4	SF			3	C	17		
	HOLL	29	1548	1549	1552	S21	E51	4847	09	2.6	4	SF			3	C	14		
0136	KAND	31	1037	1038	1044	S25	E69		09	5.8	7	SF			P		21		D
0137	KAND	31	1055	1056	1100	S26	E26	4847	09	2.5	5	SF			P				D
0138	KAND	31	1117	1118	1122	S25	E73		09	6.1	5	SF			P				D

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INTERVALS OF NO FLARE PATROL OBSERVATION FOR PRECEDING SOLAR FLARE TABLE

AUGUST 1987



Times of no flare patrol, shown here as shaded areas, combine reports from the observatories listed below. Portions of a panel completely shaded mark dates and times of no patrol of any kind, that is, of neither visual nor cinematographic; portions of a panel with only the bottom half shaded mark times of strictly visual patrol.

Holloman
Istanbul

Kandilli
Kodaikanal

Learmonth
Palehua

Peking
Ramey

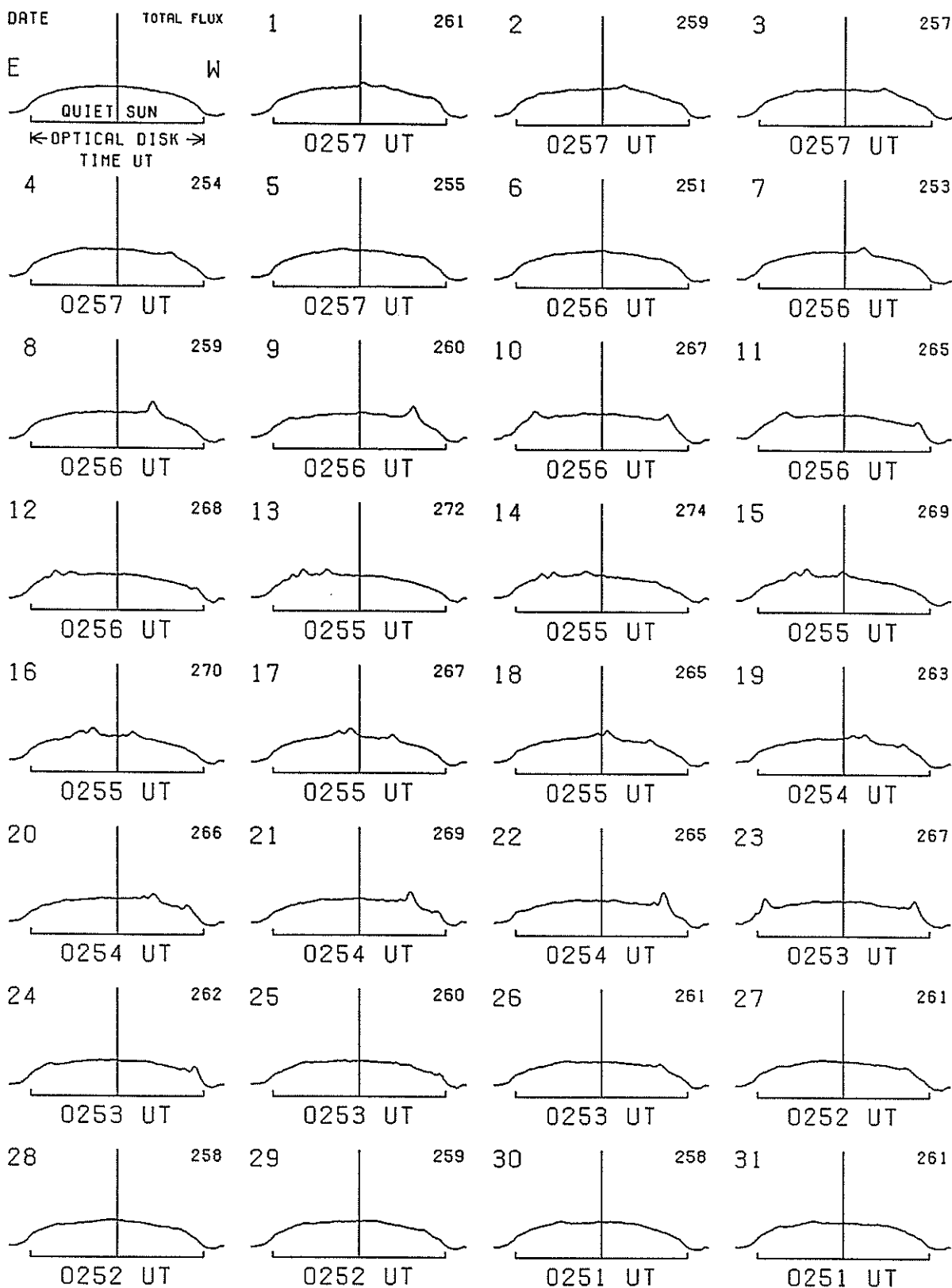
San Vito
Urumqi
Yunnan

EAST-WEST SOLAR SCANS

21
Aug 87

TOYOKAWA, JAPAN

3 CM
FAN BEAM WITH 1.1 MINUTES OF ARC

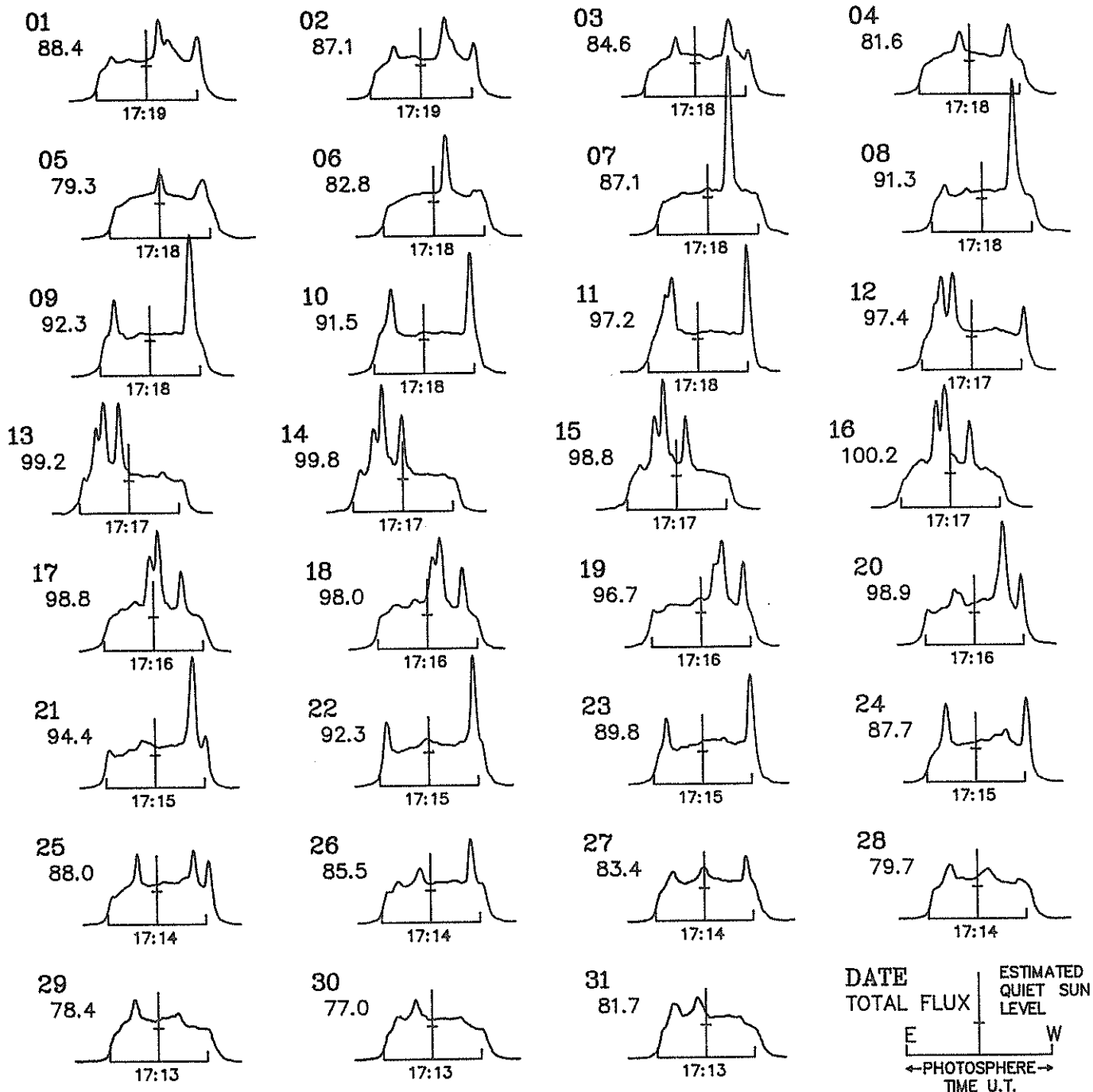


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EAST - WEST SOLAR SCANS AUGUST 1987

ALGONQUIN RADIO OBSERVATORY
CANADA

10.7 cm
Fan Beam with 1.5 minutes of arc
E - W Resolution

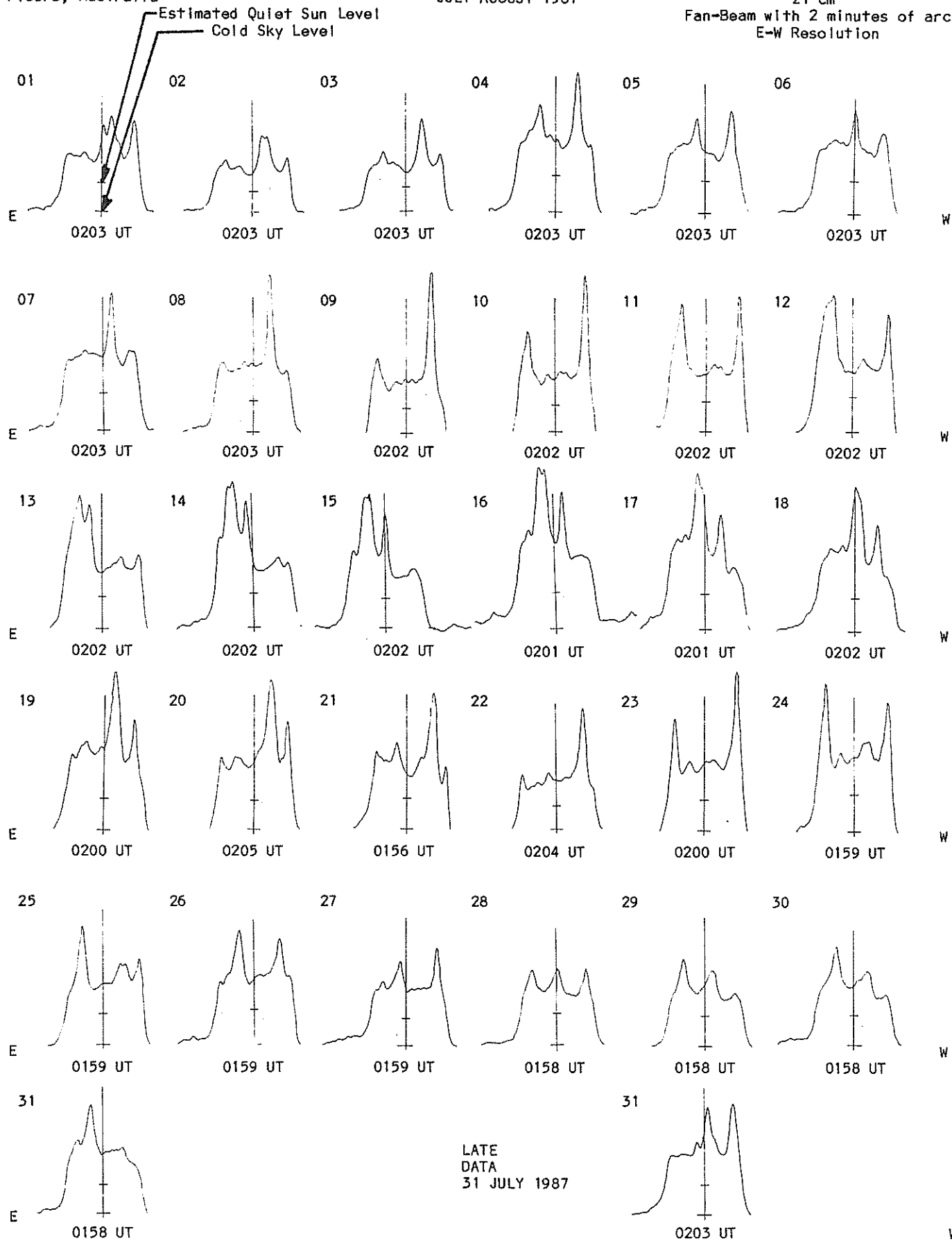


EAST - WEST SOLAR SCANS

Fleurs, Australia

JULY-AUGUST 1987

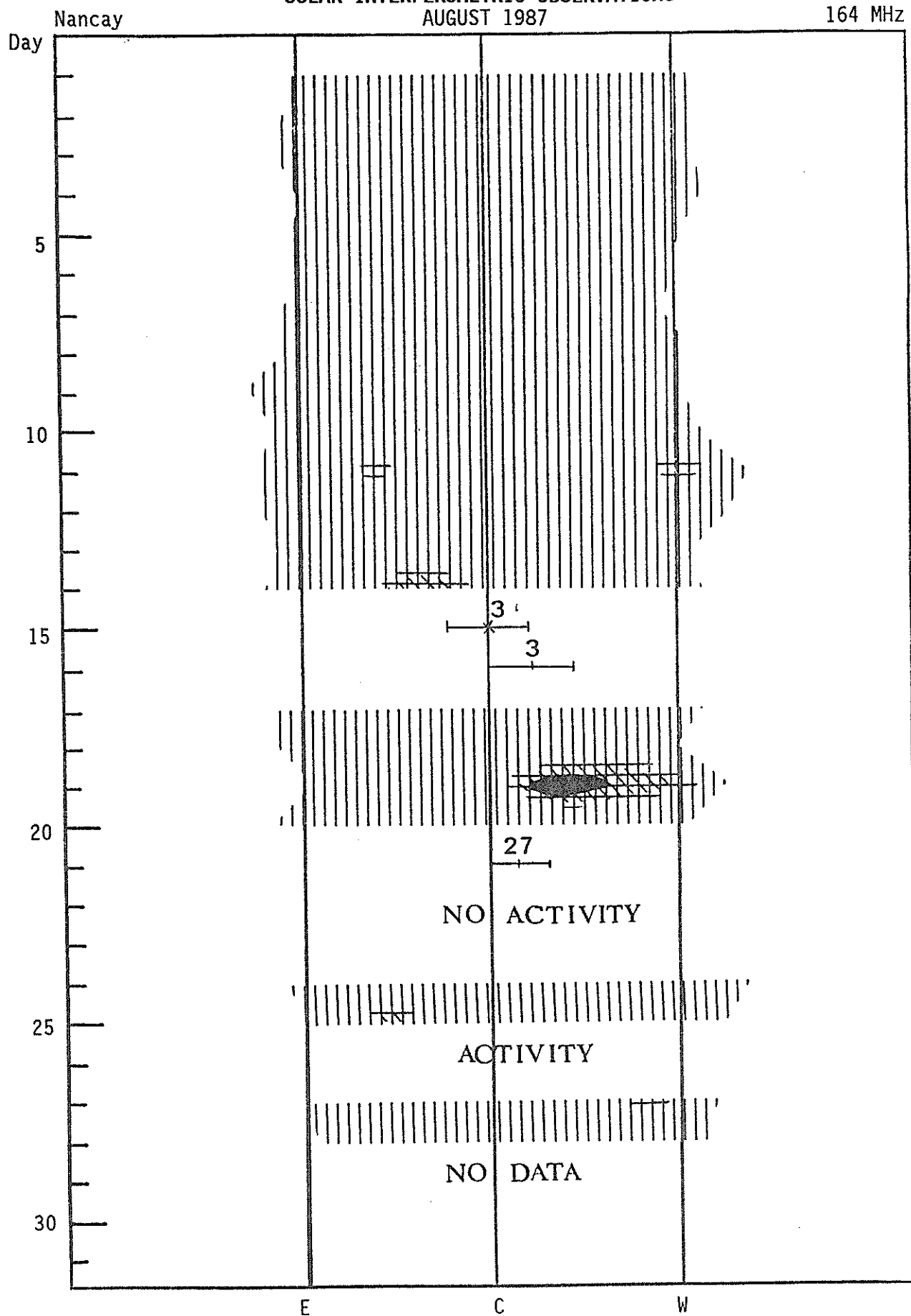
21 cm
Fan-Beam with 2 minutes of arc
E-W Resolution



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SOLAR INTERFEROMETRIC OBSERVATIONS
AUGUST 1987

164 MHz



SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

25
Aug 87

AUGUST 1987

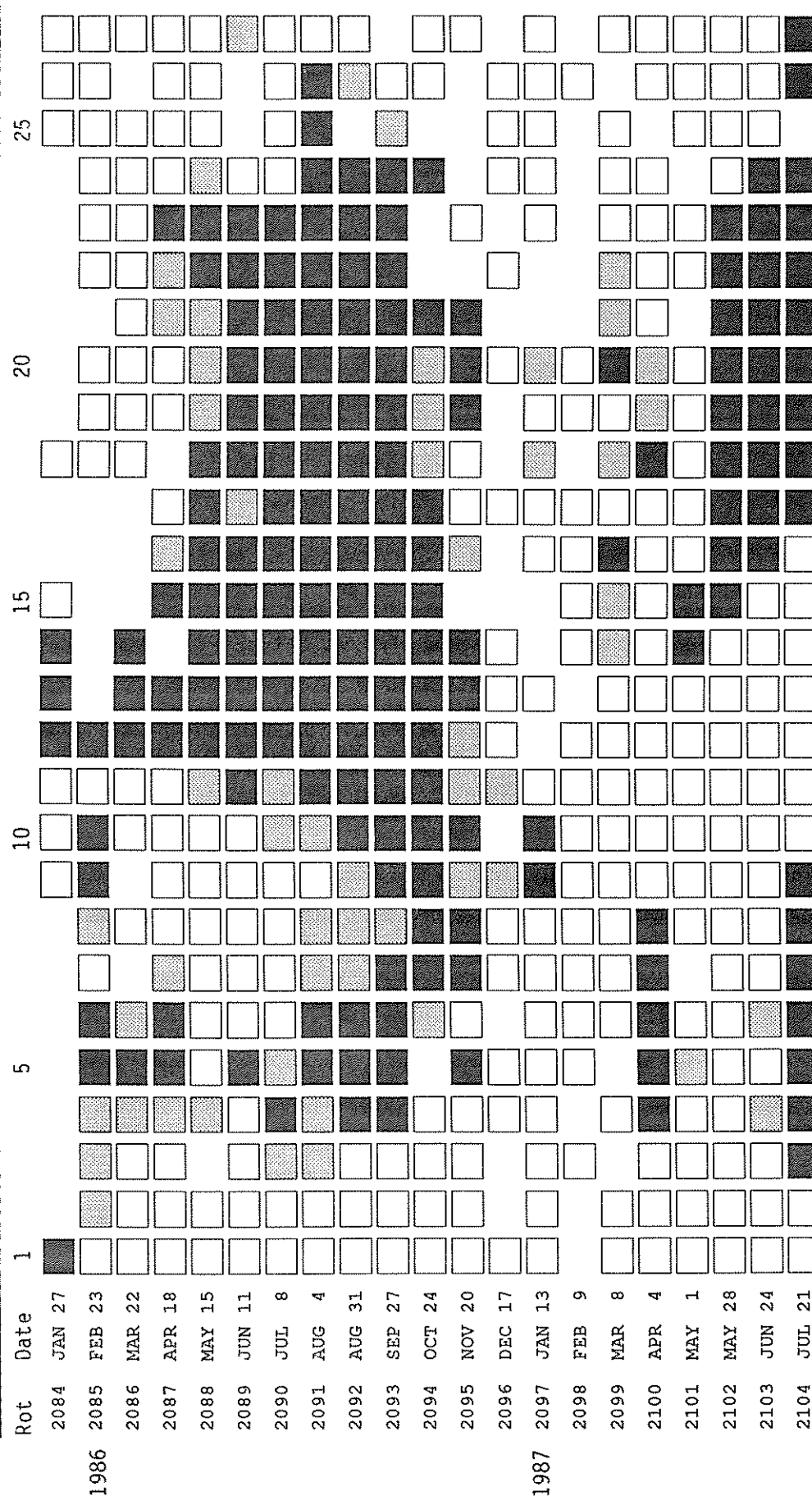
Day	Freq	Sta	Type	Start (UT)	Time of Maximum (UT)	Duration (Min)	Flux Density Peak (10 ⁻²² W/m ² Hz)	Int	Remarks
01	2695	SGMR	4 S/F	1818.0	1820.0	4.0	23.0		QL=5 ST=3 TYP=3
08	8800	PALE	47 GB	0334.0	0334.0		69.0		QL=5 ST=1 TYP=5
	8800	LEAR		0334.0	0335.0	16.0	81.0		QL=5 ST=3 TYP=8
	2695	PALE		0334.0	0335.0	1.0	26.0		QL=5 ST=2 TYP=8
	2695	LEAR	4 S/F	0334.0	0337.0	3.0	34.0		QL=5 ST=2 TYP=3
	8800	SVTO	8 S	1019.0	1020.0	2.0	31.0		QL=5 ST=2 TYP=3
	2695	SVTO	4 S/F	1019.0	1020.0	3.0	15.0		QL=5 ST=2 TYP=3
	8800	SVTO	4 S/F	1031.0	1032.0	5.0	33.0		QL=5 ST=2 TYP=3
	8800	SVTO	4 S/F	1348.0	1350.0	4.0	33.0		QL=5 ST=2 TYP=3
	2695	SGMR	4 S/F	2224.0	2224.0	3.0	22.0		QL=5 ST=3 TYP=3
	2695	SGMR	4 S/F	2224.0	2224.0	3.0	12.0		QL=5 ST=3 TYP=3
	8800	SGMR	47 GB	2224.0	2224.0	95.0	51.0		QL=5 ST=3 TYP=5
	8800	SGMR	47 GB	2224.0	2224.0	10.0	71.0		QL=5 ST=3 TYP=5
09	8800	SGMR	4 S/F	1355.0	1355.0	3.0	28.0		QL=5 ST=2 TYP=3
	2695	SGMR	4 S/F	1355.0	1355.0		11.0		QL=5 ST=1 TYP=3
	8800	SVTO	8 S	1355.0	1355.0	2.0	38.0		QL=5 ST=3 TYP=3
	2695	SVTO	8 S	1355.0	1355.0	2.0	18.0		QL=5 ST=3 TYP=3
	2695	SGMR		1356.0	1357.0	1.0	13.0		QL=5 ST=2 TYP=8
	8800	SGMR	8 S	2251.0	2252.0	1.0	12.0		QL=5 ST=3 TYP=3
	2695	SGMR	8 S	2251.0	2252.0	1.0	12.0		QL=5 ST=2 TYP=3
	2695	SGMR	8 S	2251.0	2252.0	1.0	12.0		QL=5 ST=3 TYP=3
10	2695	PALE	8 S	0306.0	0306.0	1.0	14.0		QL=5 ST=3 TYP=3
	2695	SGMR	4 S/F	2147.0	2151.0	7.0	16.0		QL=5 ST=2 TYP=3
	2695	PALE	8 S	2150.0	2151.0	1.0	27.0		QL=1 ST=2 TYP=3
	2695	PALE		2158.0	2202.0	8.0	22.0		QL=1 ST=2 TYP=8
11	8800	PALE	8 S	0436.0	0436.0	1.0	42.0		QL=3 ST=2 TYP=3
	2695	SGMR	8 S	2203.0	2204.0	2.0	11.0		QL=5 ST=2 TYP=3
13	2695	SVTO	4 S/F	1337.0	1340.0	7.0	25.0		QL=5 ST=2 TYP=3
	8800	SVTO	47 GB	1338.0	1340.0	5.0	100.0		QL=5 ST=2 TYP=5
	8800	SGMR		1339.0	1340.0	3.0	74.0		QL=5 ST=2 TYP=8
	2695	SGMR		1339.0	1341.0	2.0	17.0		QL=5 ST=2 TYP=8
19	8800	SVTO	4 S/F	1005.0	1021.0	37.0	47.0		QL=3 ST=2 TYP=3
	2695	SVTO	47 GB	1009.0	1021.0	32.0	91.0		QL=3 ST=2 TYP=5
	2695	SGMR		1027.0	1029.0	8.0	30.0		QL=1 ST=2 TYP=8
21	2695	SYDN	4 S/F	0524.0	0527.0	5.0	19.0		QL= ST= TYP=3
	8800	SVTO	47 GB	0528.0	0529.0	1.0	89.0		QL=5 ST=2 TYP=5
	2695	SVTO	8 S	0528.0	0529.0	2.0	28.0		QL=5 ST=2 TYP=3
	8800	LEAR	47 GB	0528.0	0529.0	3.0	62.0		QL=5 ST=2 TYP=5
	8800	SVTO	8 S	1607.0	1608.0	1.0	39.0		QL=5 ST=2 TYP=3
22	8800	LEAR	4 S/F	0549.0	0551.0	5.0	42.0		QL=5 ST=2 TYP=3
	2695	SVTO	47 GB	0549.0	0551.0	3.0	52.0		QL=5 ST=2 TYP=5
	2695	LEAR	4 S/F	0549.0	0551.0	5.0	40.0		QL=5 ST=2 TYP=3
	2695	LEAR	4 S/F	0549.0	0551.0	5.0	40.0		QL=5 ST=3 TYP=3
	8800	SVTO	47 GB	0550.0	0550.0	2.0	65.0		QL=5 ST=2 TYP=5
	2695	LEAR	4 S/F	0926.0	0928.0U	3.0	24.0		QL=3 ST=2 TYP=3
	8800	LEAR	8 S	0927.0	0928.0	2.0	21.0		QL=5 ST=2 TYP=3
	2695	SVTO		0927.0	0928.0	4.0	43.0		QL=5 ST=2 TYP=8
	8800	SVTO	8 S	0928.0	0928.0	2.0	38.0		QL=5 ST=2 TYP=3
	2695	SVTO	8 S	1639.0	1640.0	2.0	28.0		QL=5 ST=3 TYP=3
	2695	SVTO	8 S	1639.0	1640.0	2.0	28.0		QL=5 ST=2 TYP=3
	8800	SVTO	8 S	1639.0	1640.0	2.0	40.0		QL=5 ST=2 TYP=3
	2695	SGMR	4 S/F	1639.0	1641.0	14.0	16.0		QL=5 ST=2 TYP=3
	8800	SGMR	47 GB	1640.0	1641.0		50.0		QL=5 ST=3 TYP=5
	2695	PALE		1643.0	1645.0	5.0	45.0		QL=5 ST=2 TYP=8
23	2695	PALE		2257.0	2302.0	14.0	70.0		QL=5 ST=2 TYP=8
24	2695	SGMR		2224.0	2227.0	9.0	53.0		QL=5 ST=2 TYP=8
31	2695	SVTO	47 GB	0949.0	0950.0	3.0	50.0		QL=5 ST=2 TYP=5
	8800	SVTO	8 S	0950.0	0950.0	2.0	3.0		QL=5 ST=2 TYP=3
	8800	SVTO	8 S	0950.0	0950.0	2.0	31.0		QL=5 ST=2 TYP=3
	2695	SVTO		1010.0	1011.0	8.0	540.0		QL=5 ST=2 TYP=8
	8800	SVTO	4 S/F	1304.0	1304.0	850.0	27.0		QL=5 ST=2 TYP=3

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)

Day	1986				1987							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
1	4	-7	-11	-1	.	1	.	10	14	2	11	39
2	5	-7	-11	-10	11	.	.	.	17	3	20	43
3	-6	-6	-12	-11	.	.	.	8	11	12	26	27
4	-6	1	-5	.	.	9	.	13	5	23	33	14
5	-3	-7	-10	0	6	10	.	10	0	27	33	4
6	0	-6	-7	20	.	14	9	2	3	24	32	-10
7	-2	-12	-7	4	9	16	.	-5	.	29	17	-16
8	-1	-15	-5	-9	.	15	14	-14	6	38	2	-29
9	-9	-11	-4	-4	12	.	15	-13	6	31	-10	-37
10	-14	-15	-2	-5	13	.	.	-12	5	8	-13	-38
11	-16	-18	-2	.	16	10	10	-5	20	-8	-19	-36
12	-17	-10	-2	4	.	.	.	5	17	-17	-29	-43
13	-18	-8	-5	.	20	14	10	18	5	-19	-24	-32
14	-19	-9	.	.	25	8	23	30	-6	-21	-22	.
15	-15	-10	.	.	23	7	18	30	-4	-21	-18	-19
16	-10	-10	-21	14	17	15	22	25	2	-16	-15	-7
17	-11	-15	.	23	13	13	22	19	4	-12	-9	2
18	-11	-21	6	.	11	11	17	13	3	-16	4	6
19	-13	-10	13	.	15	12	13	6	4	-6	9	3
20	-14	-7	19	22	11	11	7	2	7	9	11	-13
21	-15	1	34	6	-6	.	-1	-3	.	13	7	-15
22	-13	7	29	.	-4	2	1	-2	19	12	11	-18
23	-9	.	15	9	9	2	-3	1	21	7	-5	-22
24	.	33	-3	8	.	5	2	2	.	7	-12	-25
25	1	14	3	0	7	4	0	6	3	11	-11	-18
26	4	11	-9	.	.	.	3	8	8	6	-10	-2
27	6	6	-8	1	.	4	-3	10	8	-1	-10	12
28	9	.	0	9	3	6	-2	.	12	4	-5	26
29	3	-1	-12	3	5	.	-1	12	17	-1	-10	33
30	-3	-6	-2	5	-2	.	7	12	16	5	6	22
31		-9		.	5		12		4		27	16

Dot symbol indicates no data available for the day.

STANFORD MEAN SOLAR MAGNETIC FIELD



Mean Solar Magnetic Field Polarity: ☐ = field > 2 microT; ☐ = -2 microT < field < 2 microT
☐ = field < -2 microT; No box = no data available

Observations are taken at 2000 UT. Rotation numbers given are the Bartels series, but the dates are not; these dates mark times of occurrence of phenomena on the Sun that affect the Earth during the given Bartels Rotation.

C O N T E N T S

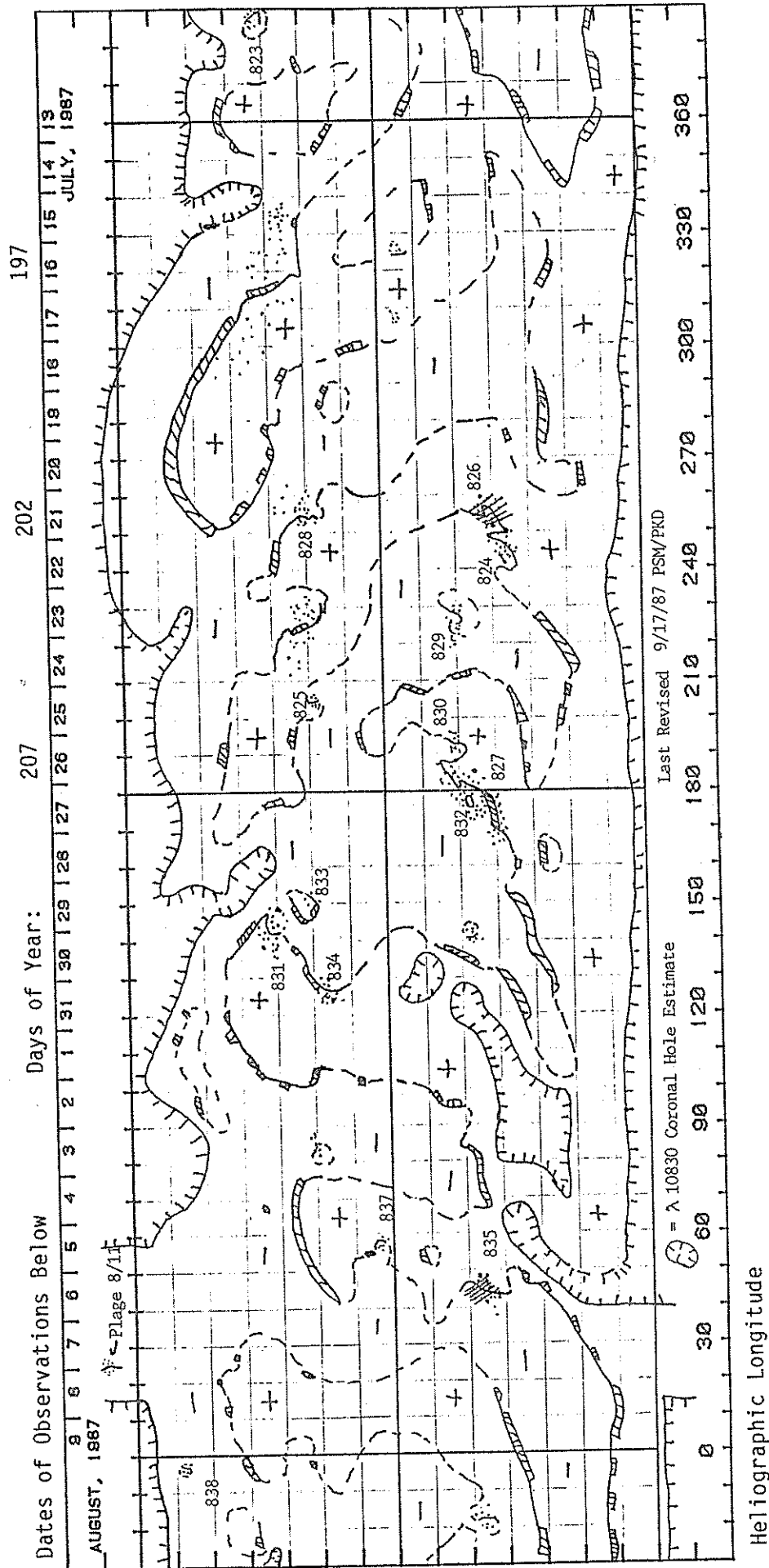
Prompt Reports

DATA FOR JULY 1987

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PRELIMINARY H-ALPHA SOLAR SYNOPTIC CHART
CARRINGTON ROTATION NUMBER 1791
(13 July to 9 August 1987)



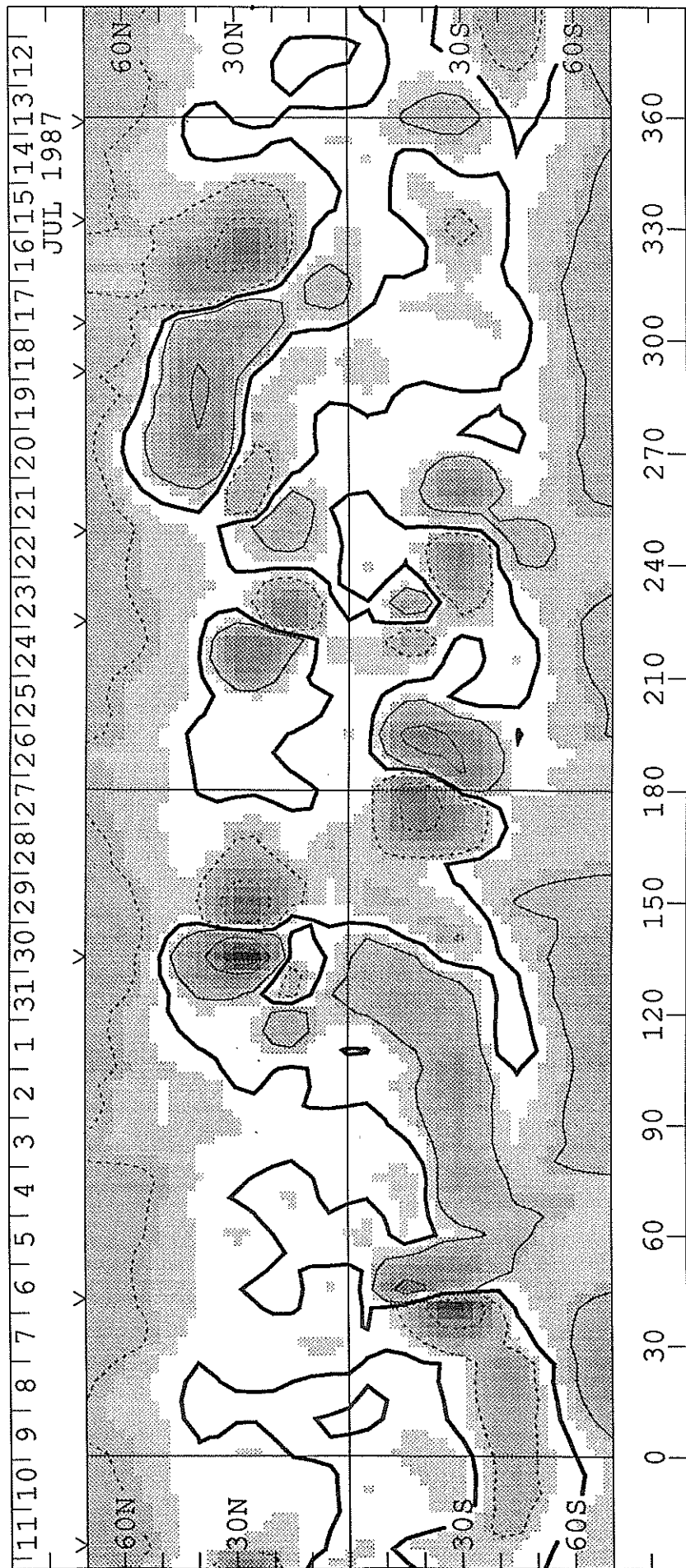
SOLAR MAGNETIC FIELD SYNOPSIS CHART CARRINGTON ROTATION NUMBER 1791 (13 July to 9 August 1987)

Stanford Solar Observatory

0, ±100, 500, 1000, 2000 microTesla

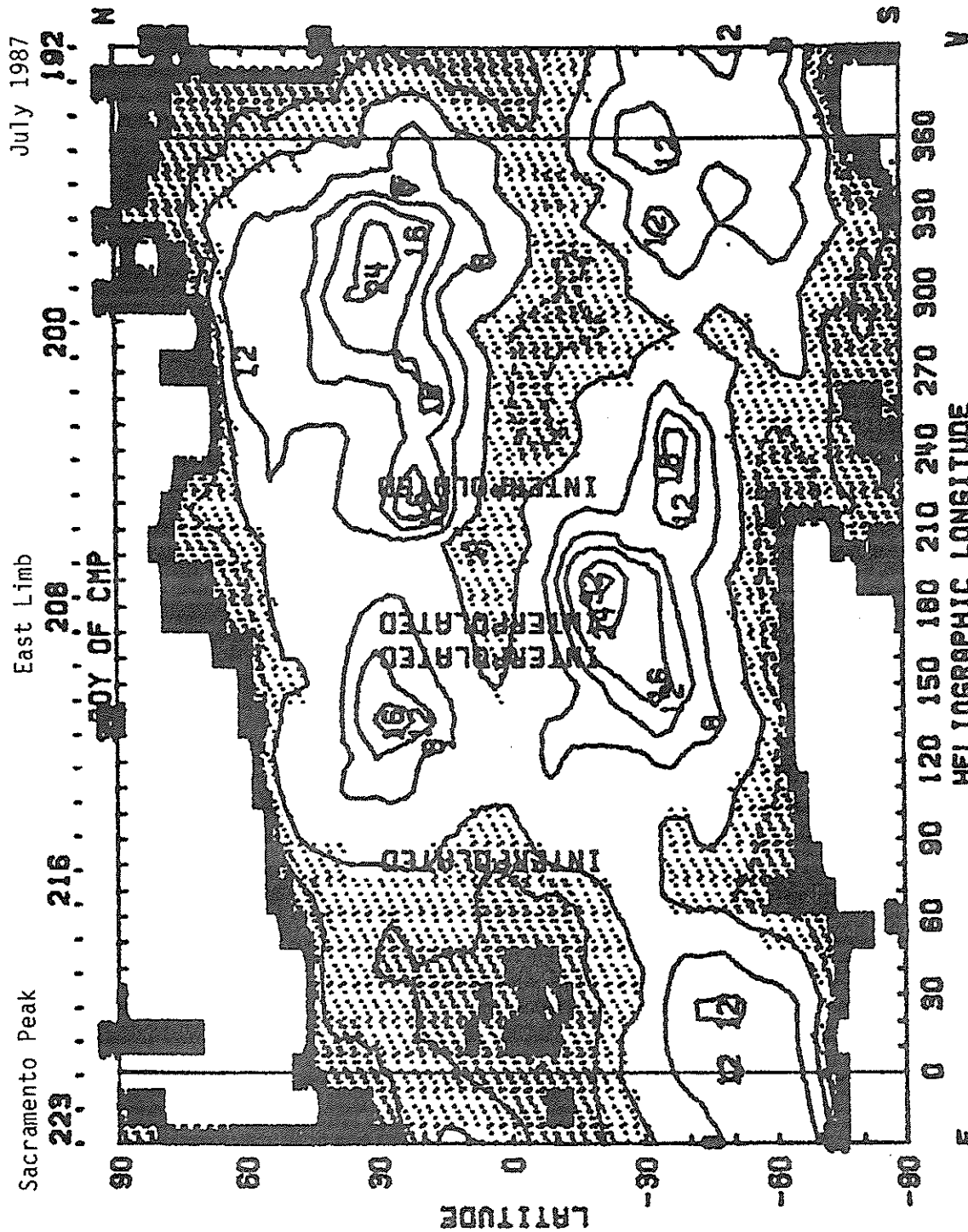
100

-100



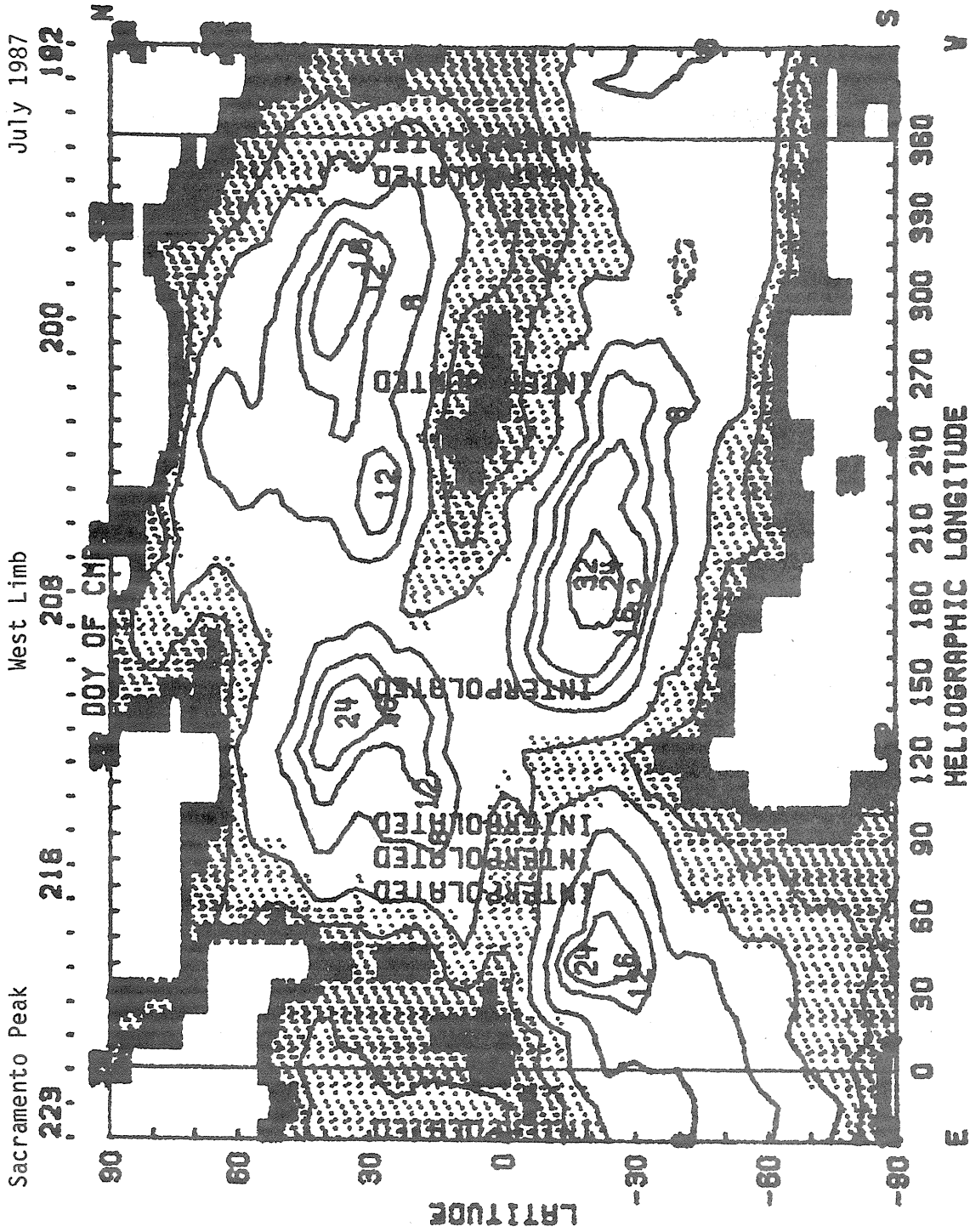
Heliographic Longitude

CORONAL GREEN LINE SYNOPSIS MAP
CARRINGTON ROTATION NUMBER 1791
(13 July to 9 August 1987)



E
1987 E LIME CONTOURS: .5, 1.2, 4.0, 12.16, 24.32 MILLIONTHS OF 10
CORONAL HOLES ARE SHOWN AS WHITE SURROUNDED BY BLACK

CORONAL GREEN LINE SYNOPTIC MAP
CARRINGTON ROTATION NUMBER 1791
(13 July to 9 August 1987)

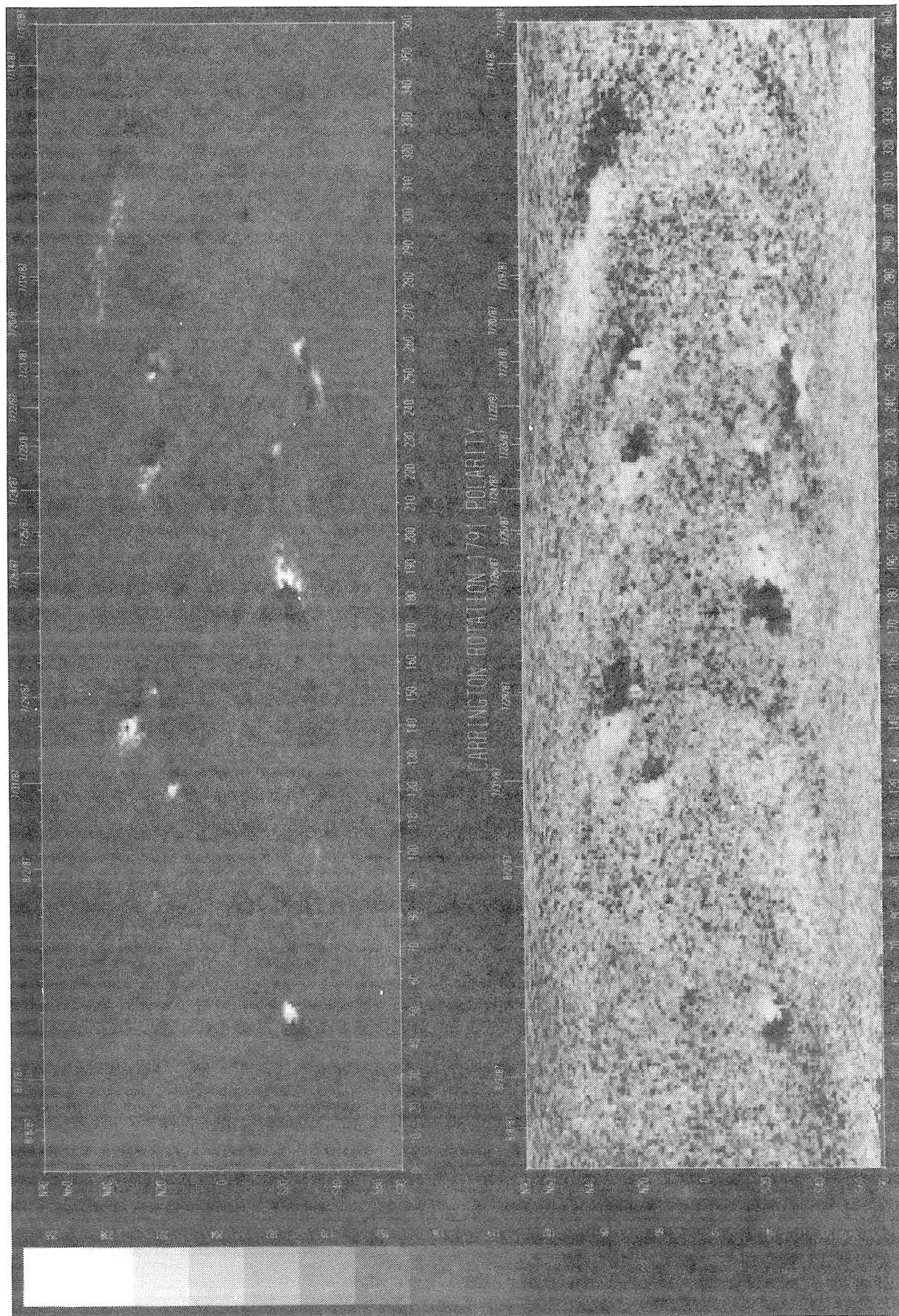


1987 V LIMB CONTOURS: .5, 1.2, 4.8, 12.16, 24.32 MILLIONTHS OF 10
CORONAL HOLES ARE SHOWN AS WHITE SURROUNDED BY BLACK

CARRINGTON ROTATION NUMBER 1791
(13 July to 9 August 1987)

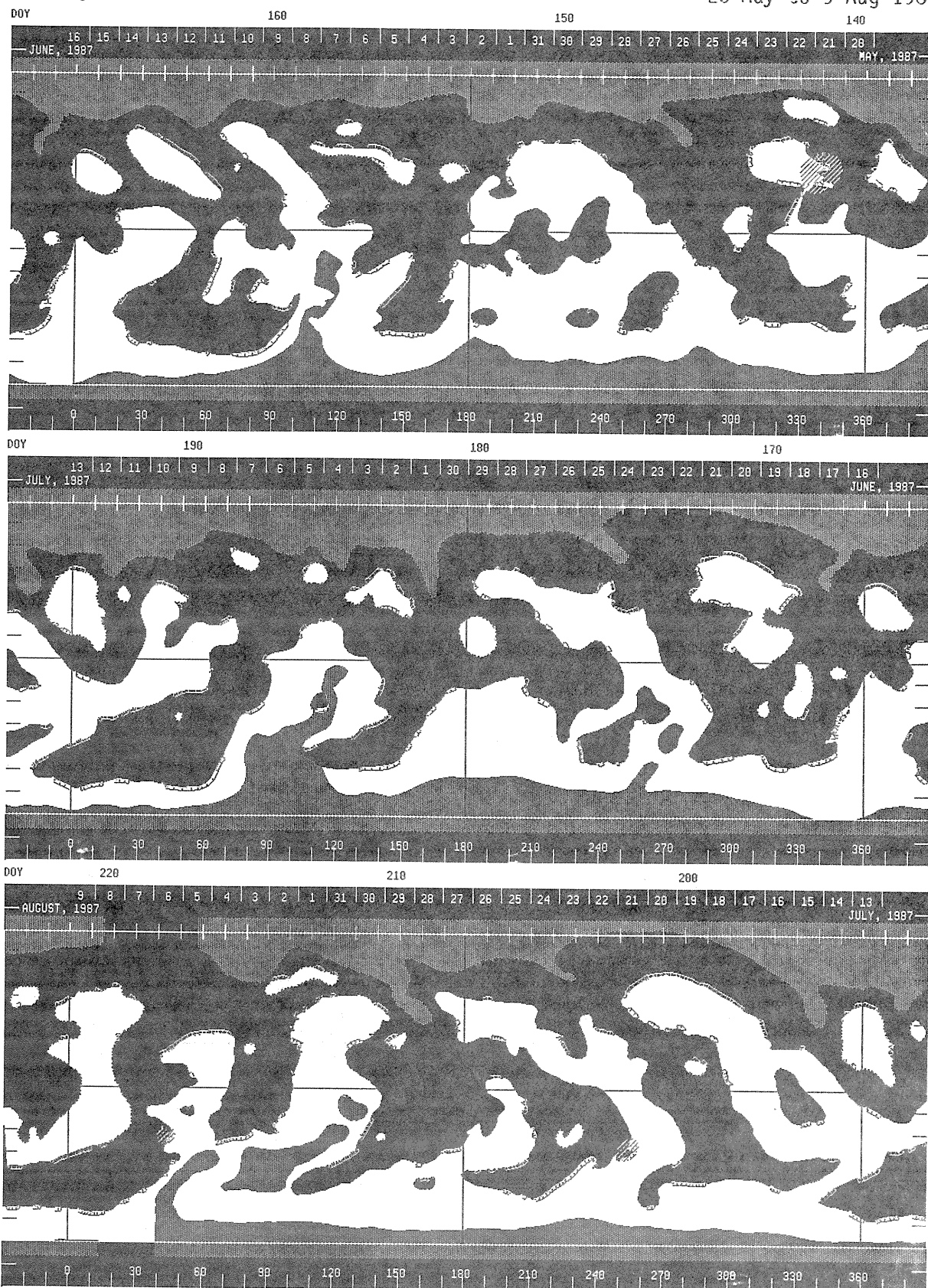
Kitt Peak National Observatory

Dates of Observations



SHADED H-ALPHA SOLAR SYNOPTIC CHARTS Carrington Rot. 1789-1791

20 May to 9 Aug 1987



= Positive Polarity
 = Negative Polarity
 = 10630 Coronal Hole Estimate

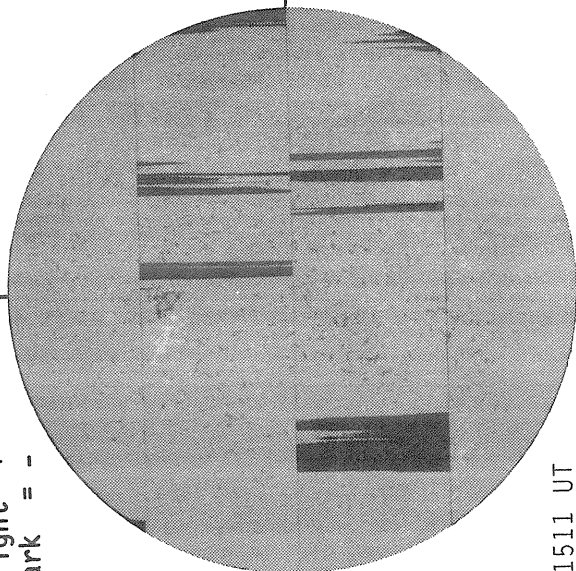
Heliographic Longitude

JULY 01, 1987 (P=-2.86, B₀=2.76, L₀=167.29)

KITT PEAK MAGNETOGRAM

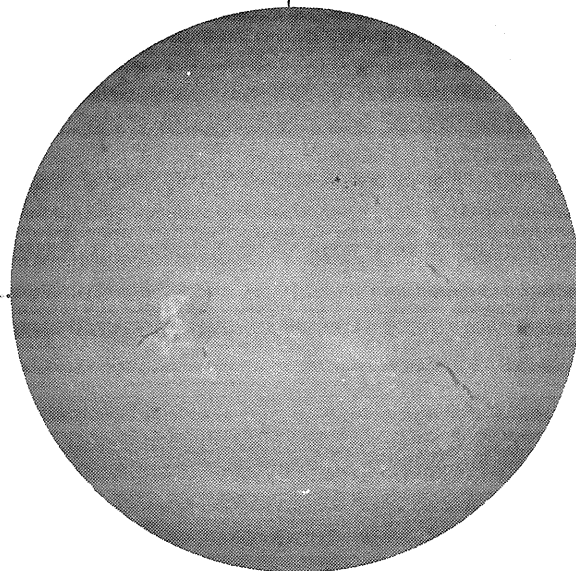
Bright = +
Dark = -

Np



1511 UT

SACRAMENTO PEAK H-ALPHA

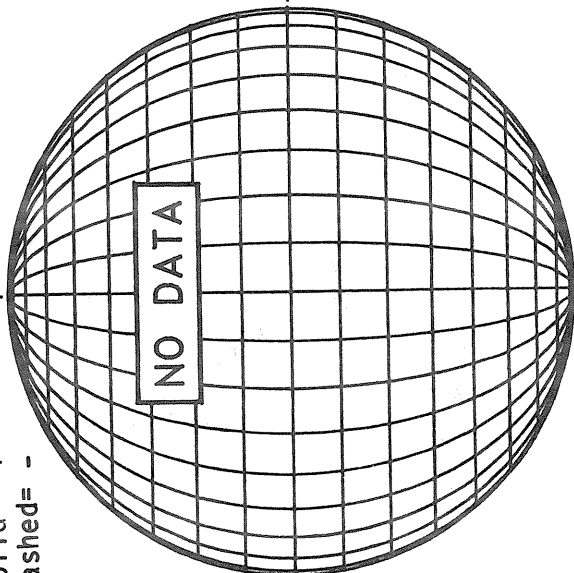


1406 UT

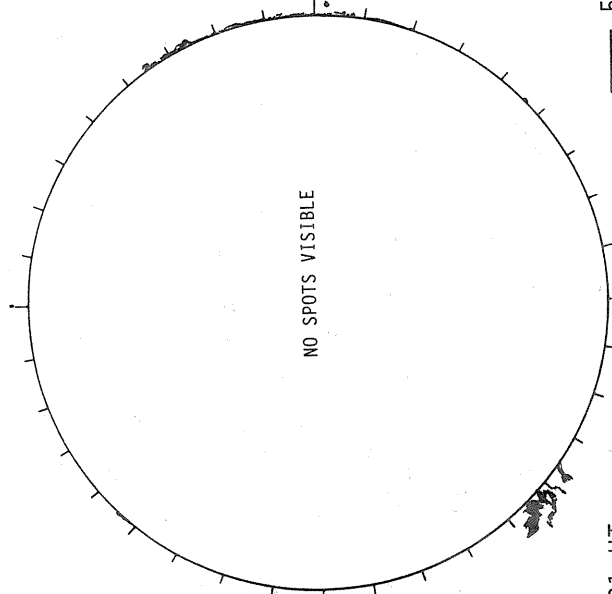
STANFORD MAGNETOGRAM

Solid = +
Dashed = -

Np



BOULDER SUNSPOTS



1321 UT

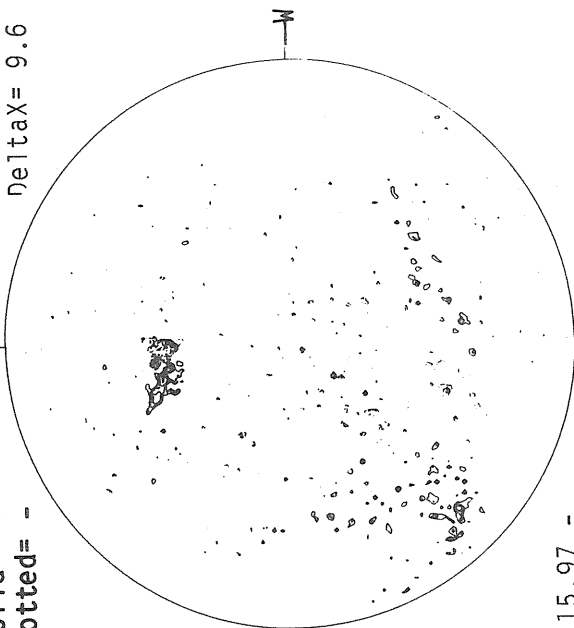
1405 UT BOUL Prom

Sp

MT. WILSON MAGNETOGRAM

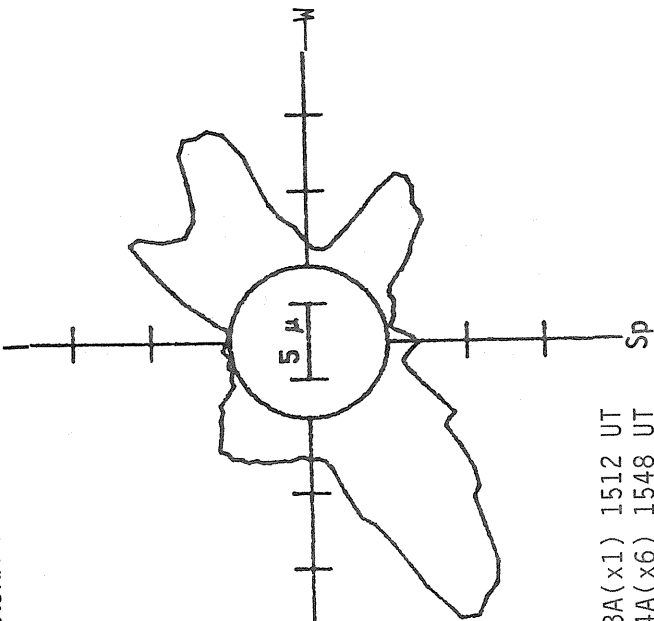
Solid = +
Dotted = -

Np



15.97 -
16.92 UT

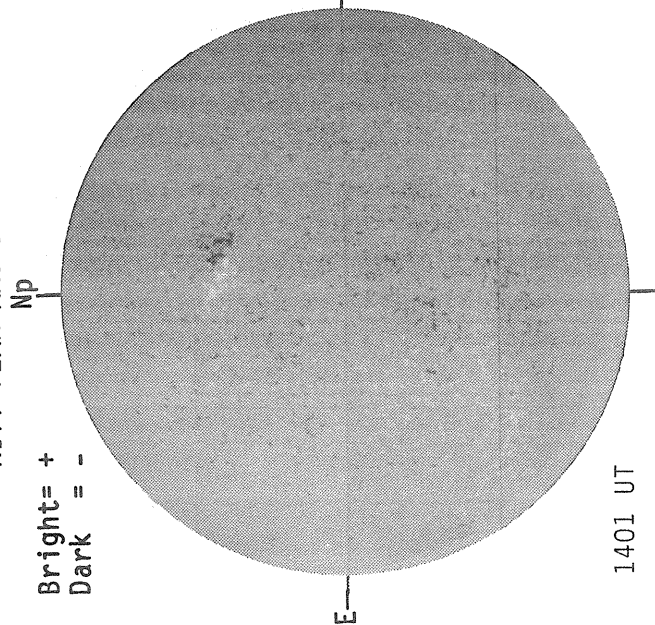
SACRAMENTO PEAK CORONA (1.15 Radii)



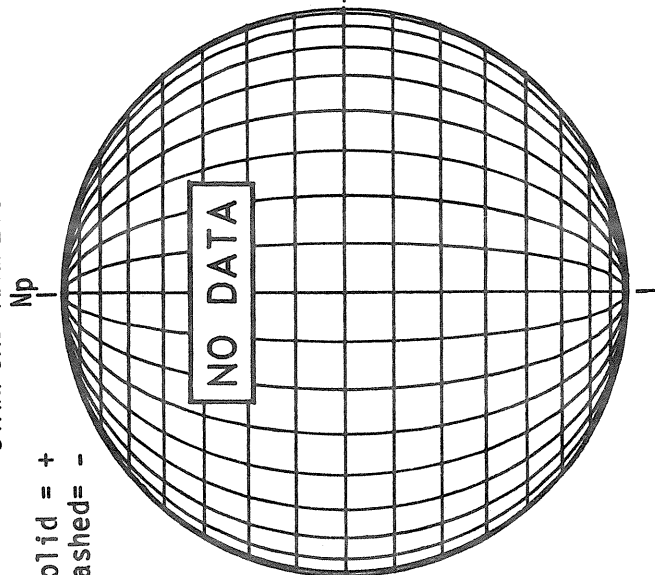
— 5303A(x1) 1512 UT
xxxx 5694A(x6) 1548 UT
NO 5694A ACTIVITY TODAY

JULY 02, 1987 (P=-2.41, B₀=2.86, L₀=154.06)

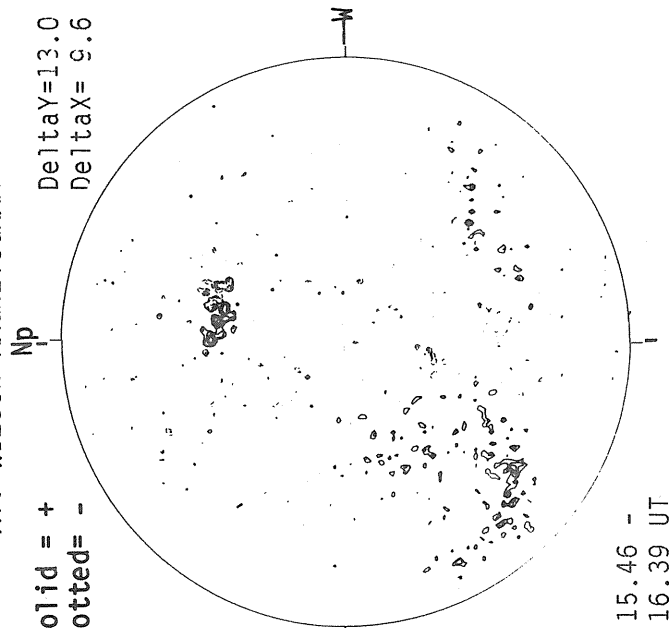
KITT PEAK MAGNETOGRAM



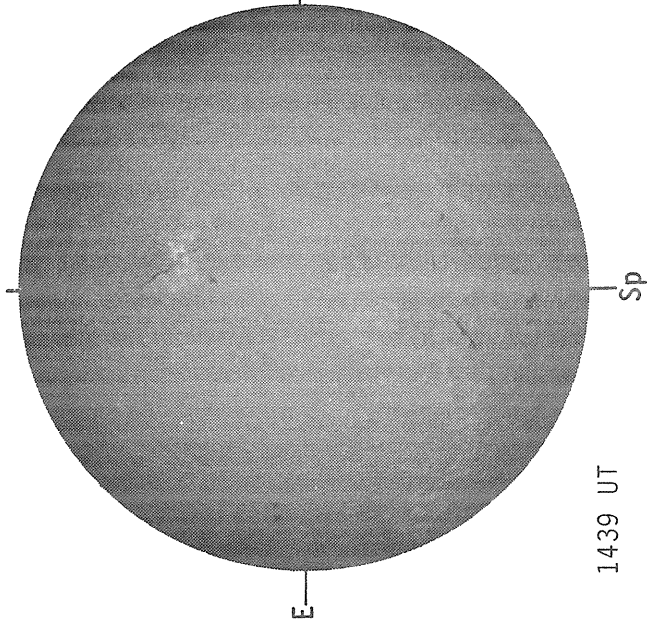
STANFORD MAGNETOGRAM



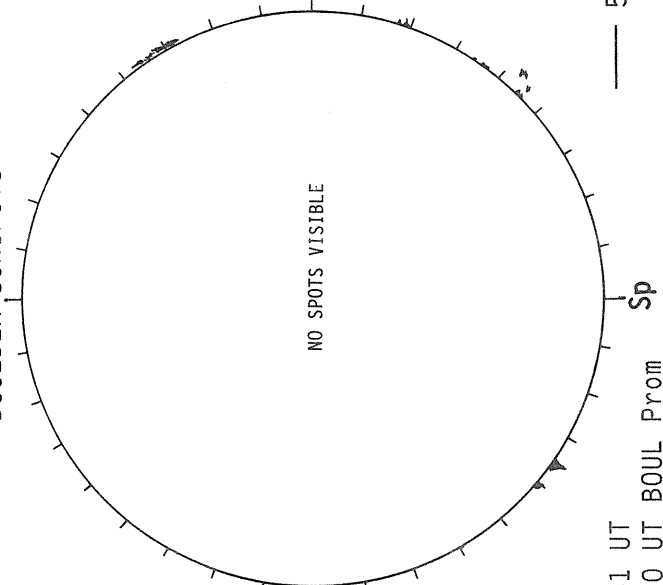
MT. WILSON MAGNETOGRAM



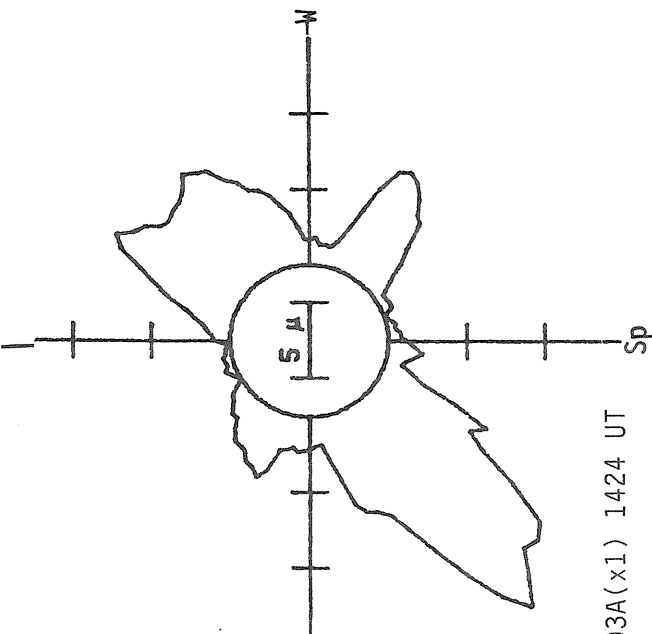
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)



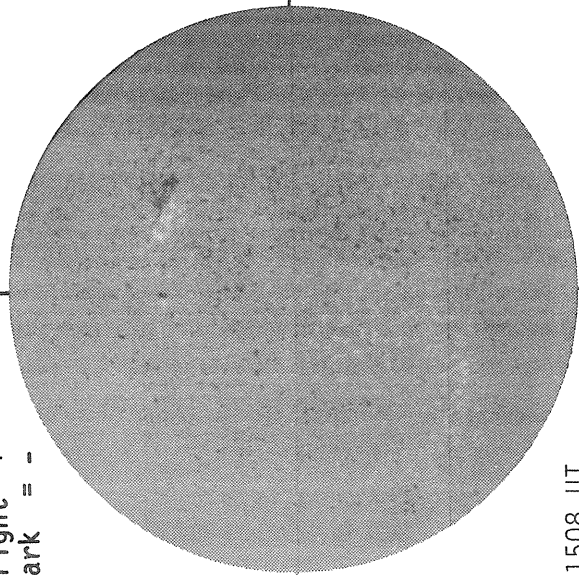
— 5303A(x1) 1424 UT

JULY 03, 1987 (P=-1.95, B₀=2.97, L₀=140.82)

KITT PEAK MAGNETOGRAM

Bright = +
Dark = -

Np

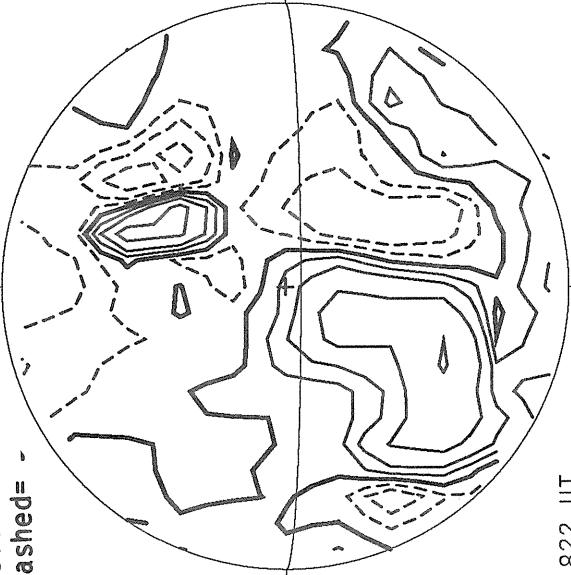


1508 UT

STANFORD MAGNETOGRAM

Solid = +
Dashed = -

Np



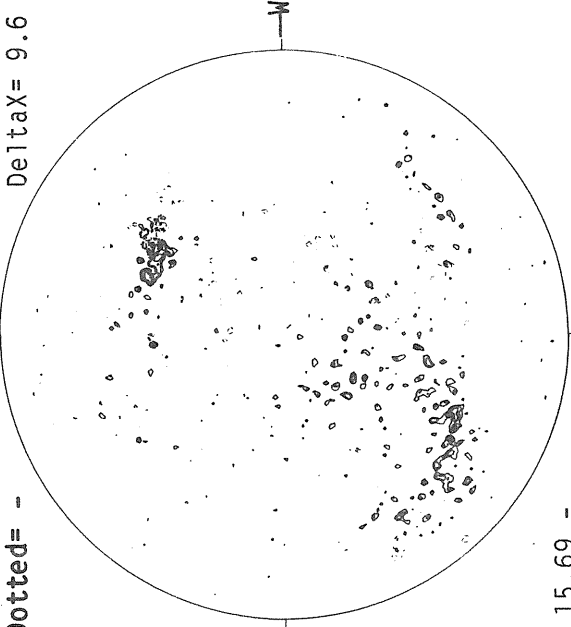
1822 UT

MT. WILSON MAGNETOGRAM

Solid = +
Dotted = -

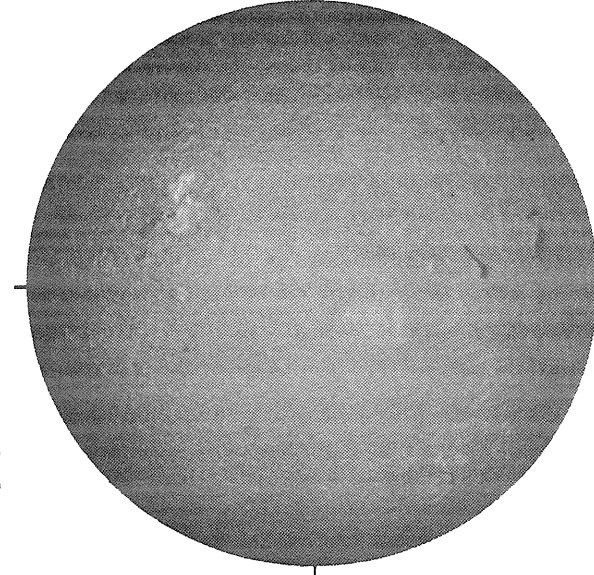
Np

Delta Y = 13.0
Delta X = 9.6



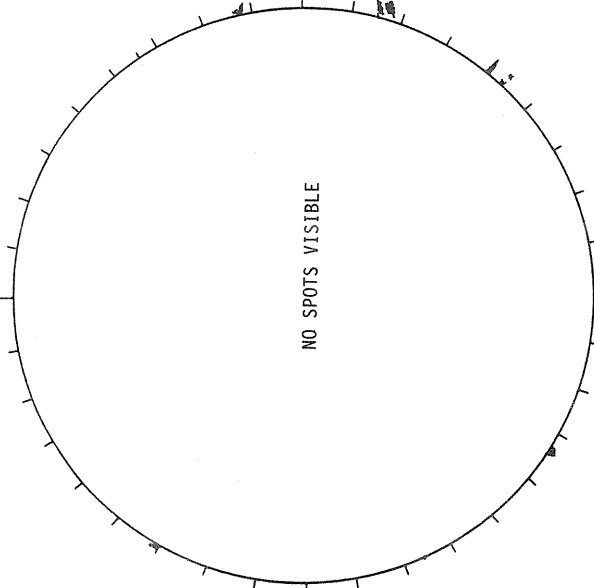
15.69 -
16.62 UT

SACRAMENTO PEAK H-ALPHA



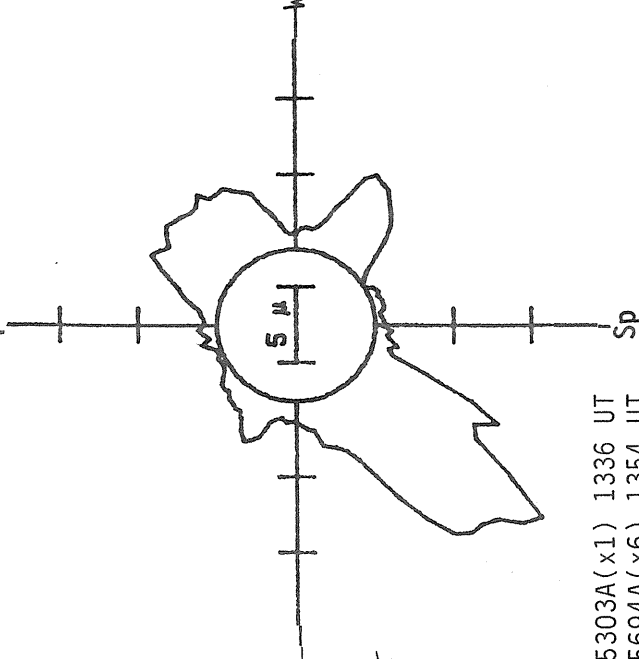
1418 UT

BOULDER SUNSPOTS



1325 UT
1340 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



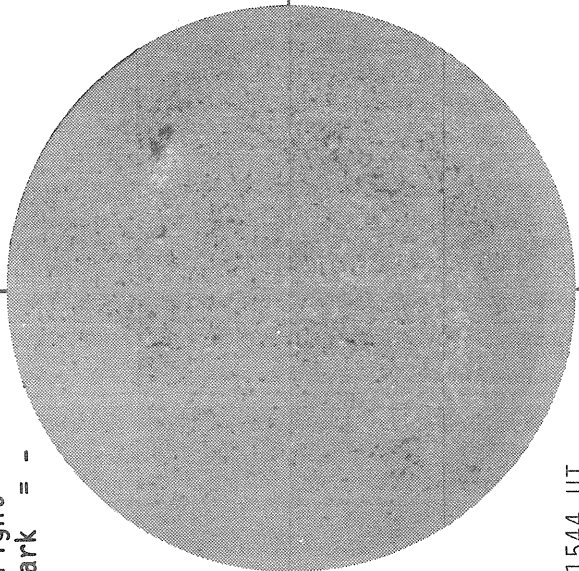
— 5303A(x1) 1336 UT
xxxx 5694A(x6) 1354 UT
NO 5694A ACTIVITY TODAY

JULY 04, 1987 (P=-1.50, B₀=3.08, L₀=127.59)

KITT PEAK MAGNETOGRAM

Bright = +
Dark = -

Np

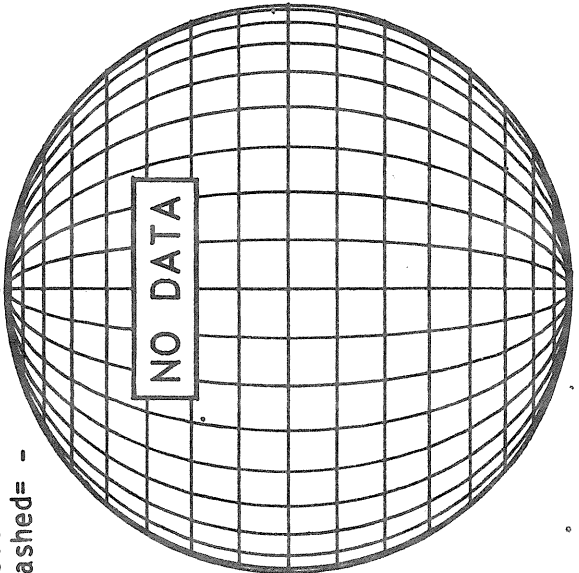


1544 UT

STANFORD MAGNETOGRAM

Solid = +
Dashed = -

Np

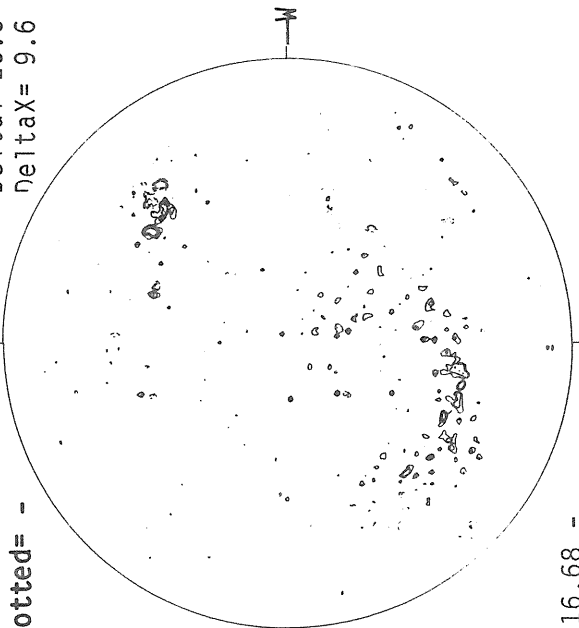


16.68 -
17.61 UT

MT. WILSON MAGNETOGRAM

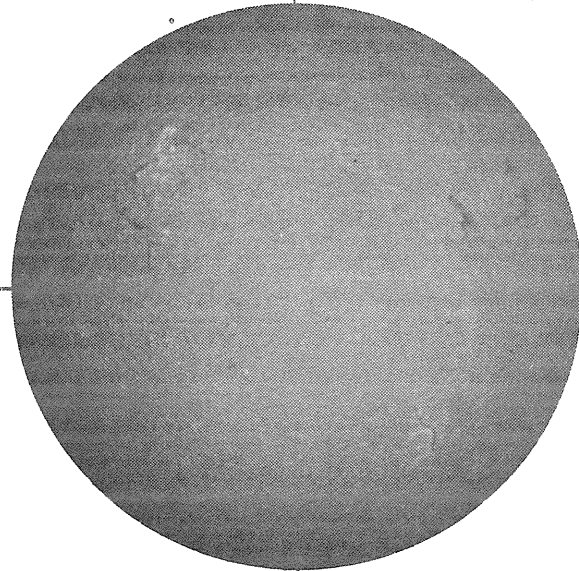
Solid = +
Dotted = -

Np



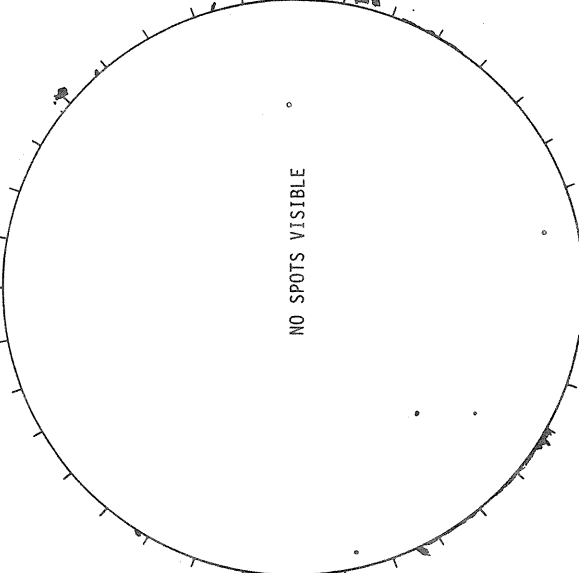
Delta Y = 13.0
Delta X = 9.6

SACRAMENTO PEAK H-ALPHA



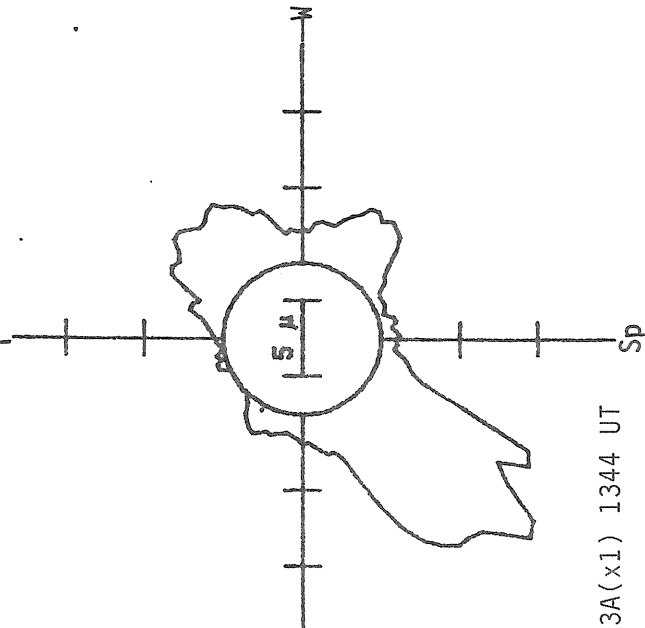
1428 UT

BOULDER SUNSPOTS



1310 UT
1320 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



5303A(x1) 1344 UT

1310 UT
1320 UT BOUL Prom

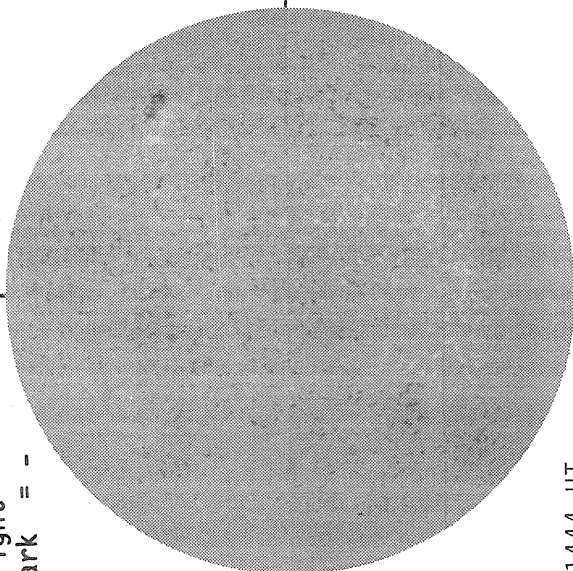
40
Jul 87

JULY 05, 1987 (P=-1.05, B₀=3.19, L₀=114.35)

KITT PEAK MAGNETOGRAM

Bright= +
Dark = -

Np

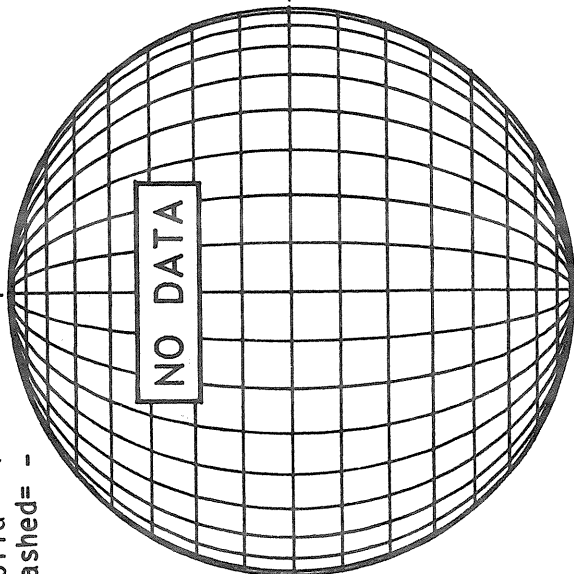


1444 UT

STANFORD MAGNETOGRAM

Solid = +
Dashed = -

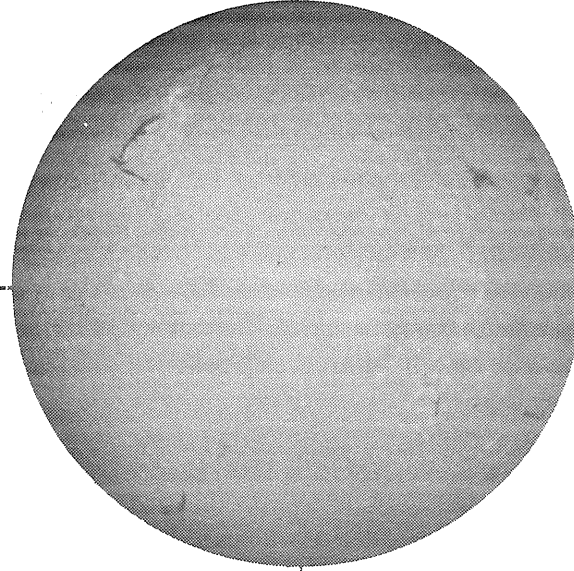
Np



NO DATA

SACRAMENTO PEAK H-ALPHA

1425 UT

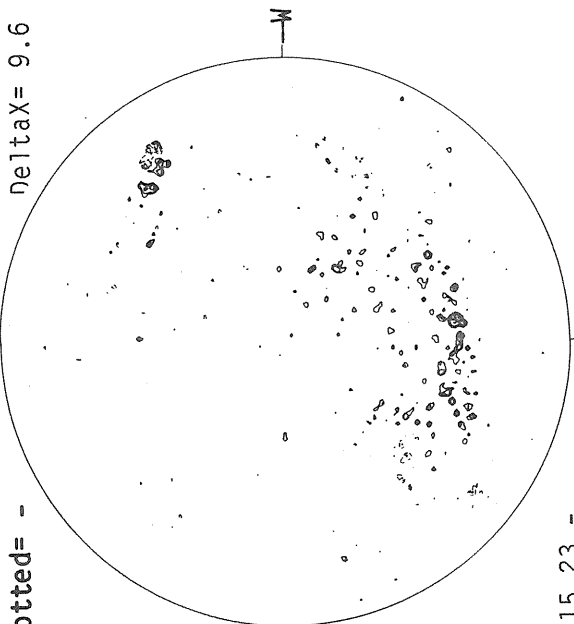


E

MT. WILSON MAGNETOGRAM

Solid = +
Dotted = -

Np



NO DATA

Delta Y=13.0
Delta X=9.6

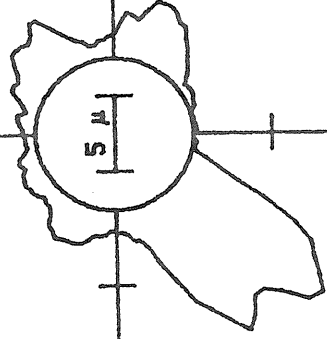
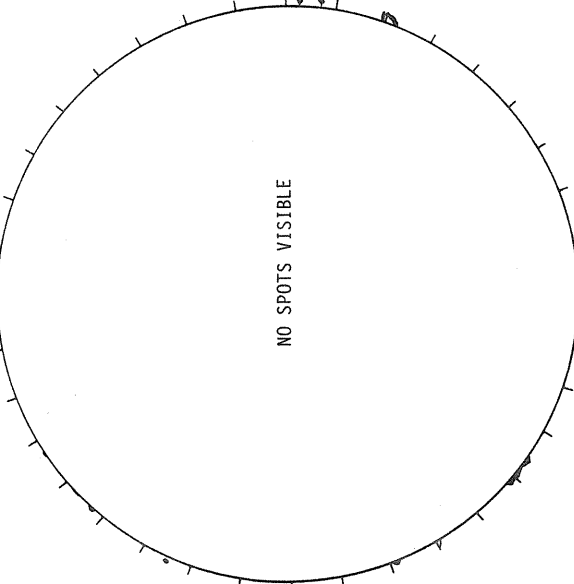
15.23 -
16.15 UT

SACRAMENTO PEAK CORONA (1.15 Radii)

BOULDER SUNSPOTS

NO SPOTS VISIBLE

1300 UT
1320 UT BOUL Prom



Np

— 5303A(x1) 1601 UT
xxxx 5694A(x6) 1637 UT
NO 5694A ACTIVITY TODAY

Sp

Sp

Sp

W

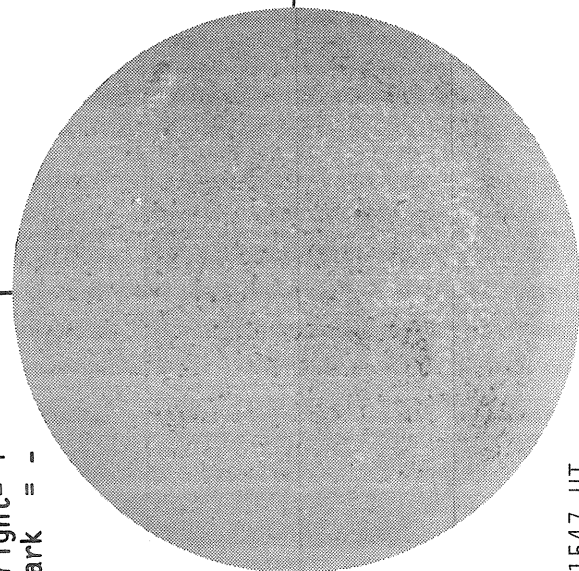
W

JULY 06, 1987 (P=-0.59, B₀=3.29, L₀=101.12)

KITT PEAK MAGNETOGRAM

Np

Bright= +
Dark = -

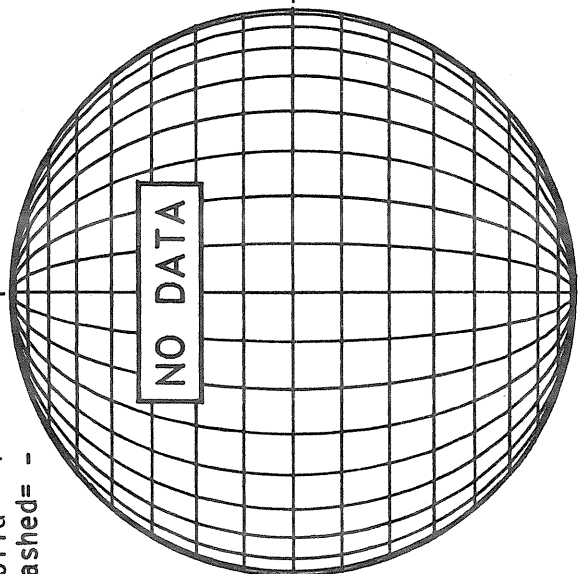


1547 UT

STANFORD MAGNETOGRAM

Np

Solid = +
Dashed = -

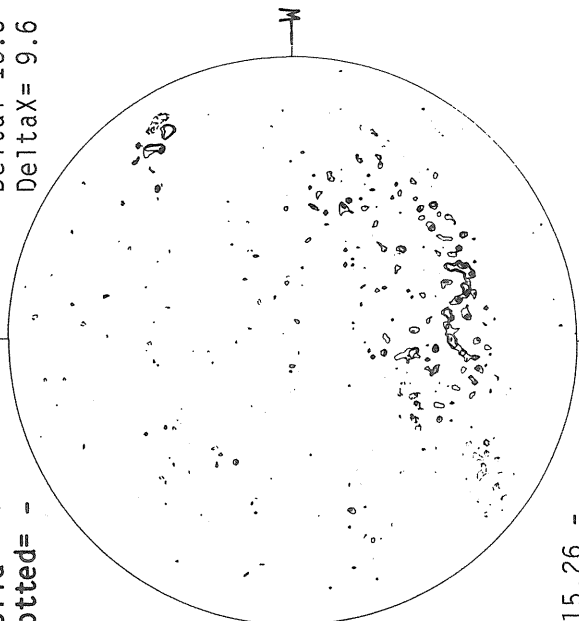


NO DATA

MT. WILSON MAGNETOGRAM

Np

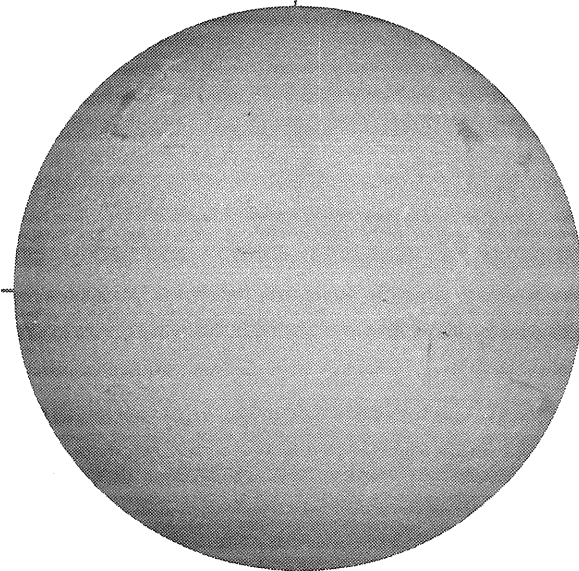
Solid = +
Dotted = -



Delta Y=13.0
Delta X=9.6

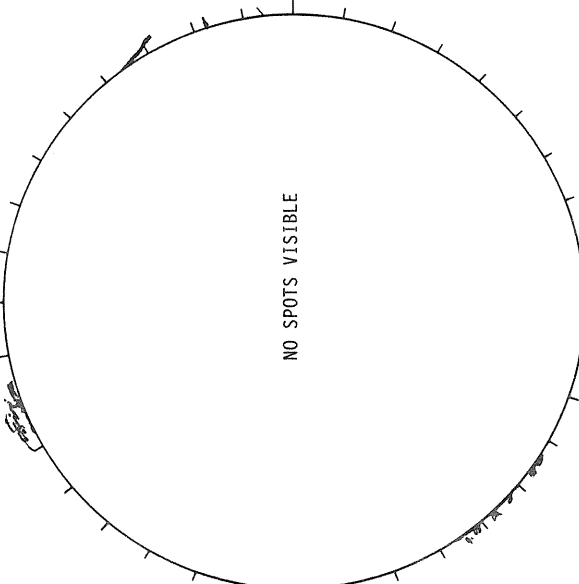
15.26 -
16.21 UT

SACRAMENTO PEAK H-ALPHA



1430 UT

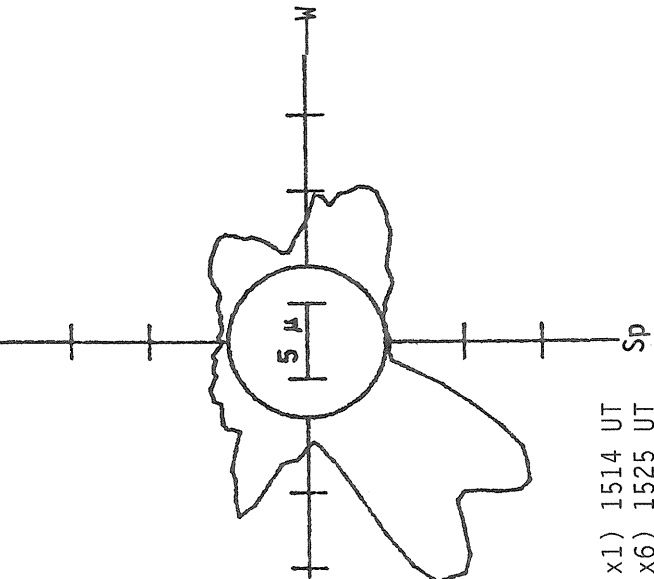
BOULDER SUNSPOTS



NO SPOTS VISIBLE

1320 UT
1423 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



15 μ

— 5303A(x1) 1514 UT
xxxx 5694A(x6) 1525 UT
NO 5694A ACTIVITY TODAY

Sp

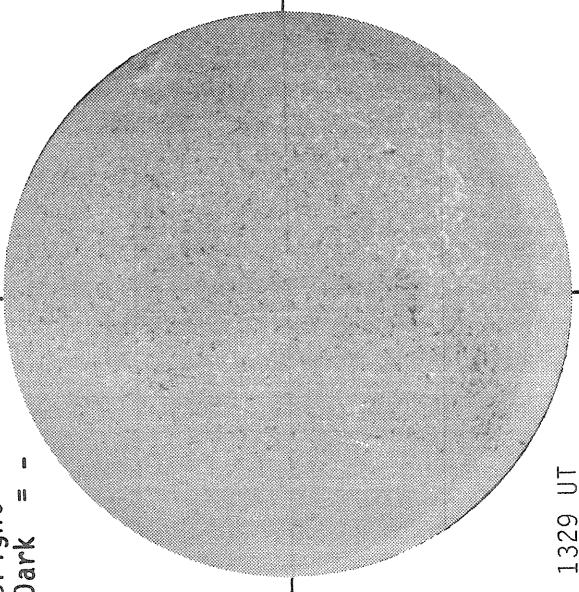
42
Jul 87

JULY 07, 1987 (P=-0.14, B₀=3.40, L₀=87.88)

KITT PEAK MAGNETOGRAM

Bright = +
Dark = -

Np



1329 UT

STANFORD MAGNETOGRAM

Solid = +
Dashed = -

Np

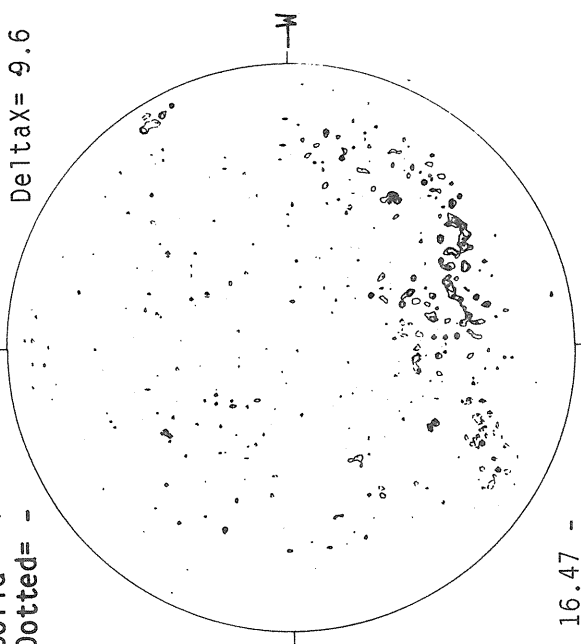


1811 UT

MT. WILSON MAGNETOGRAM

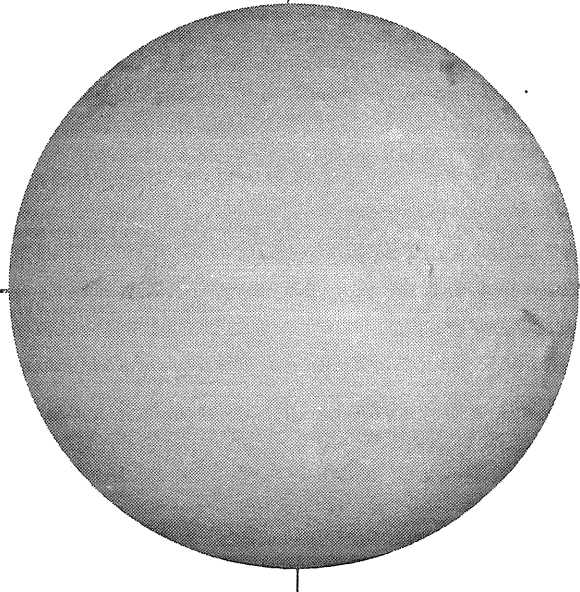
Solid = +
Dotted = -

Np



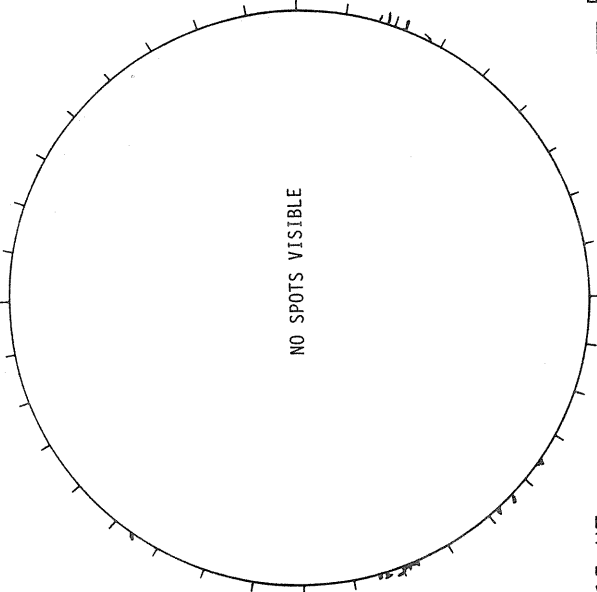
16.47 -
17.40 UT

SACRAMENTO PEAK H-ALPHA



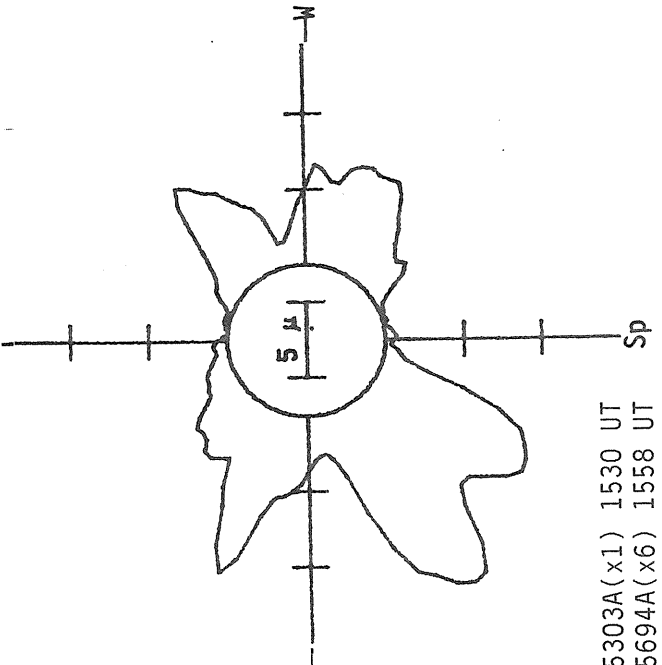
1513 UT

BOULDER SUNSPOTS



1315 UT
1320 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



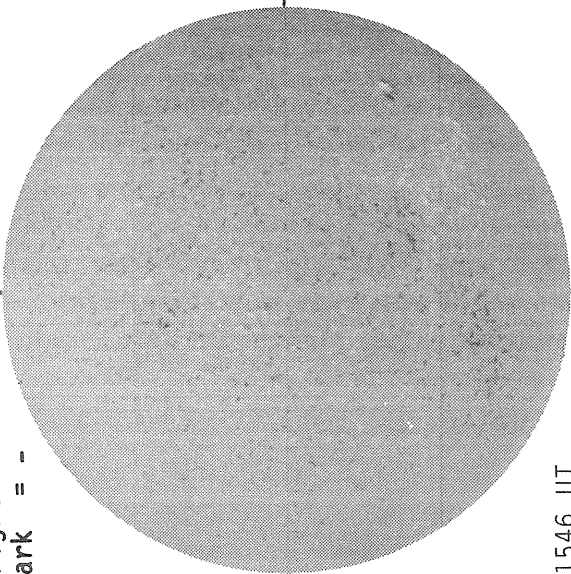
— 5303A(x1) 1530 UT
xxxx 5694A(x6) 1558 UT
NO 5694A ACTIVITY TODAY

JULY 08, 1987 (P= 0.31, B₀= 3.50, L₀= 74.64)

KITT PEAK MAGNETOGRAM

Bright= +
Dark = -

Np

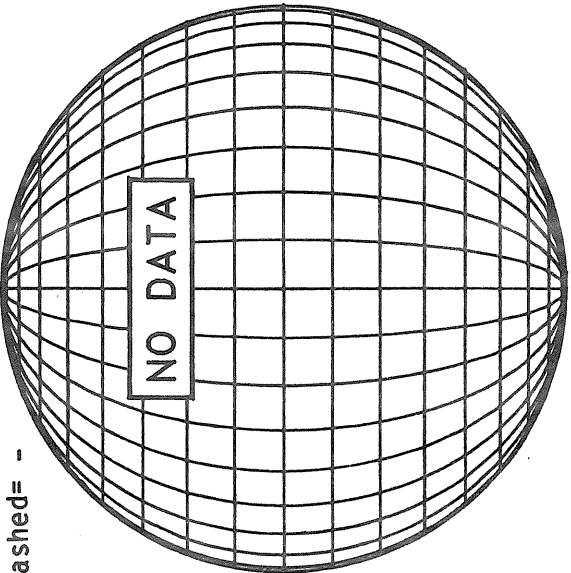


1546 UT

STANFORD MAGNETOGRAM

Solid = +
Dashed = -

Np



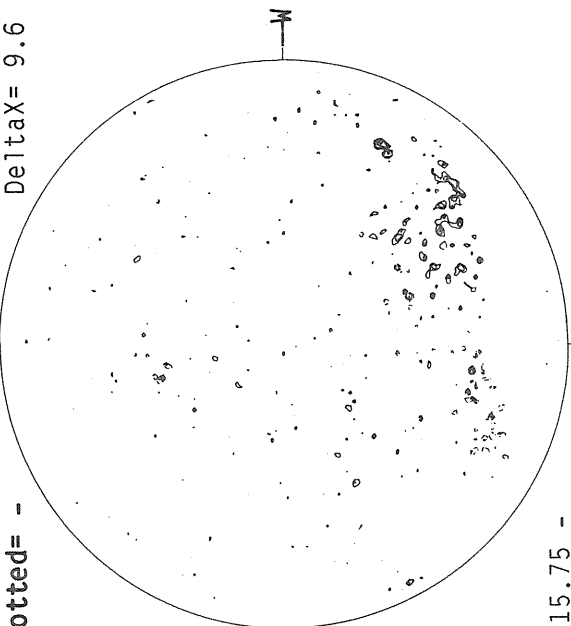
NO DATA

15.75 -
16.70 UT

MT. WILSON MAGNETOGRAM

Solid = +
Dotted = -

Np



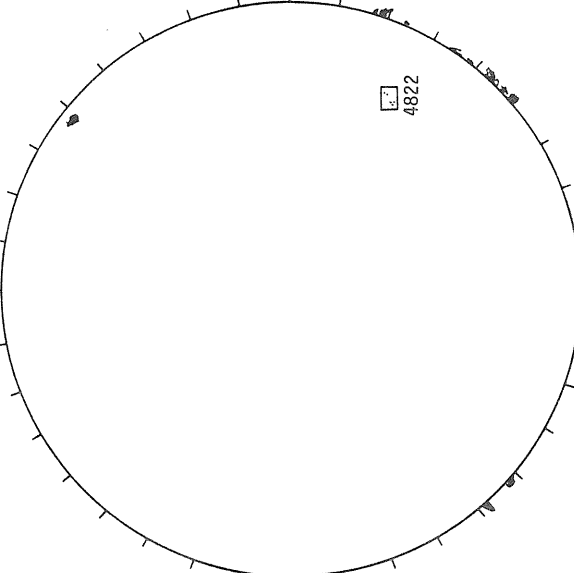
DeltaY=13.0
DeltaX= 9.6

SACRAMENTO PEAK H-ALPHA



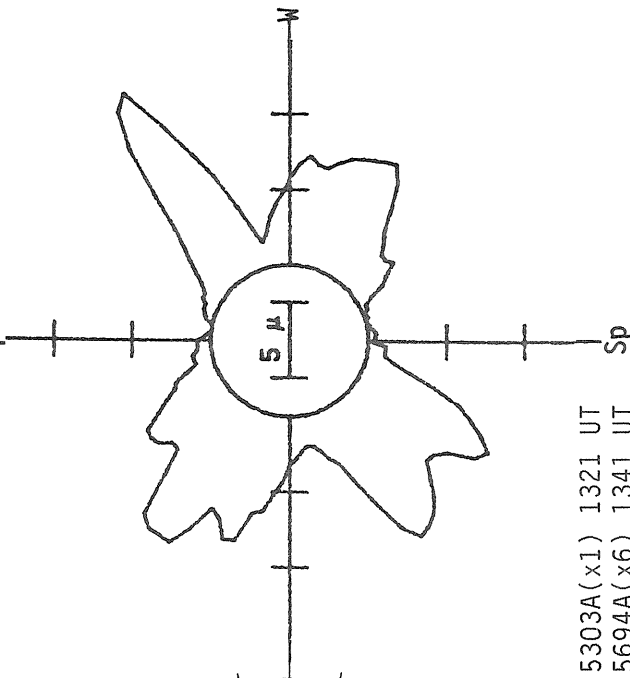
1441 UT

BOULDER SUNSPOTS



1332 UT
1400 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



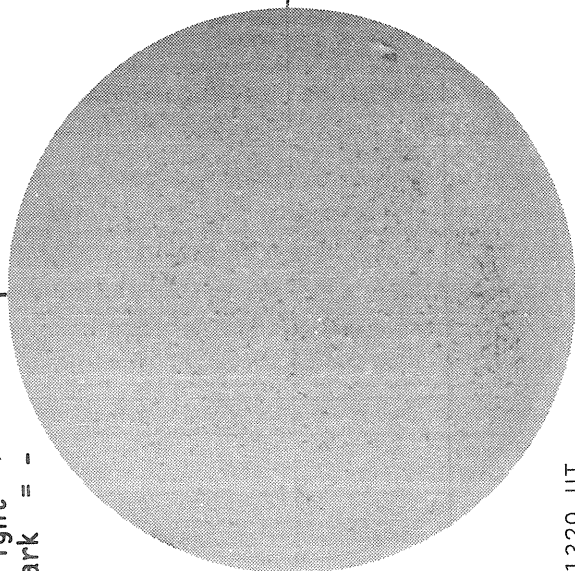
5 μ

— 5303A(x1) 1321 UT
xxx 5694A(x6) 1341 UT
NO 5694A ACTIVITY TODAY

JULY 09, 1987 (P= 0.76, B₀ = 3.61, L₀ = 61.41)

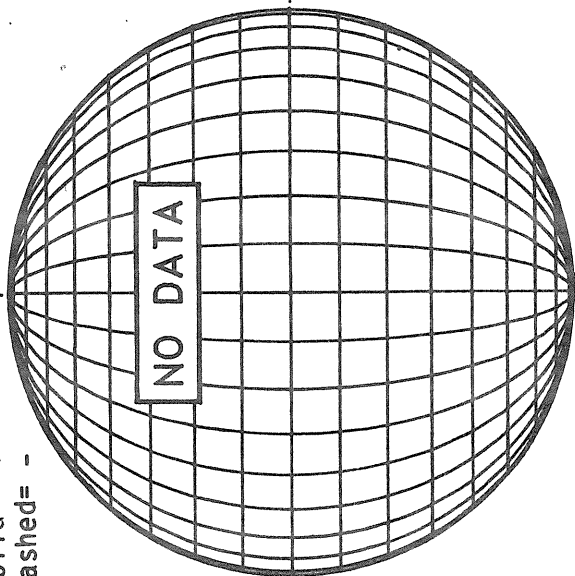
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



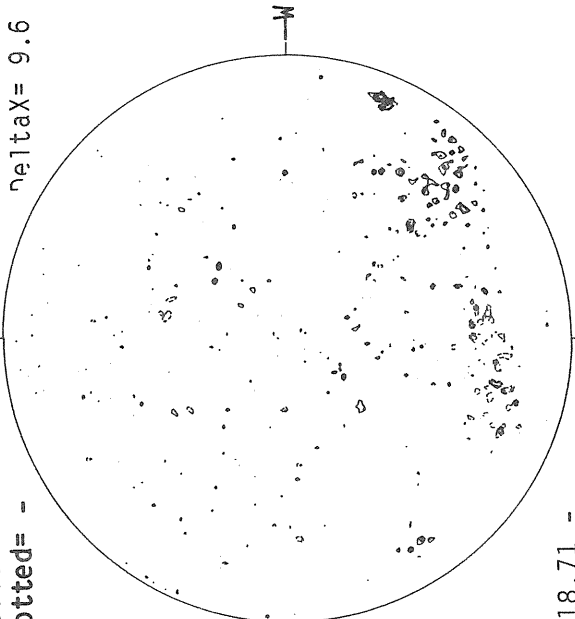
STANFORD MAGNETOGRAM

Solid = +
Dashed = -



MT. WILSON MAGNETOGRAM

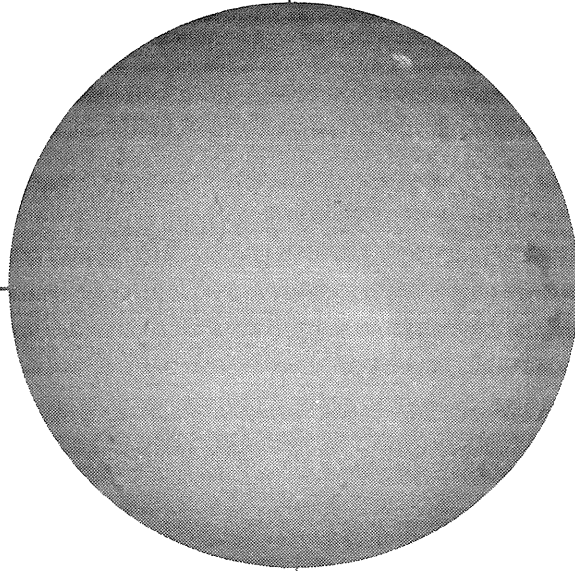
Solid = +
Dotted = -
Delta Y = 13.0
Delta X = 9.6



1329 UT

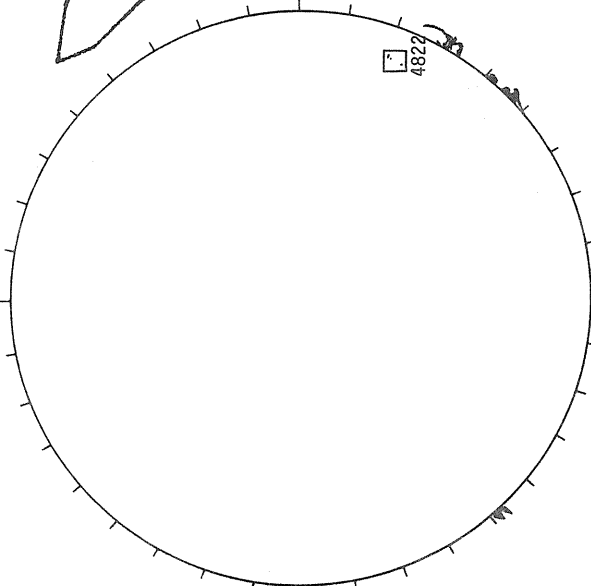
18.71 -
19.66 UT

SACRAMENTO PEAK H-ALPHA



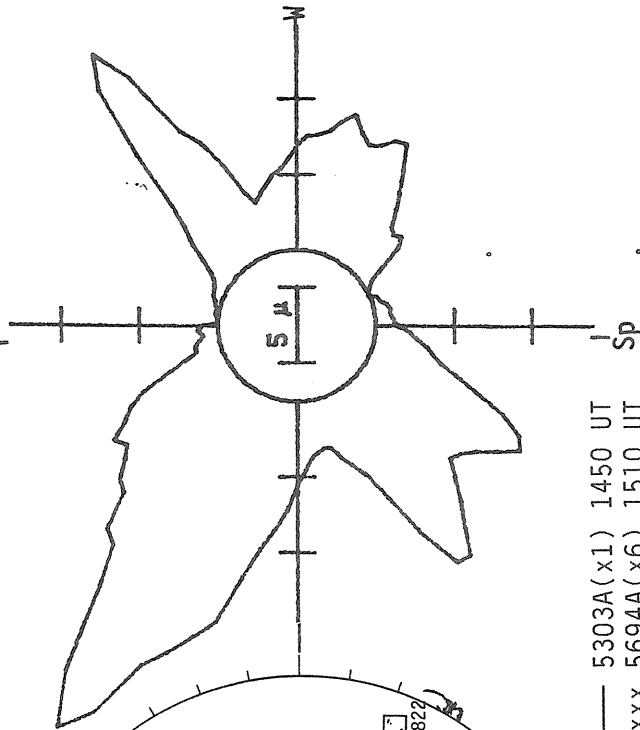
1443 UT

BOULDER SUNSPOTS



1320 UT
1430 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



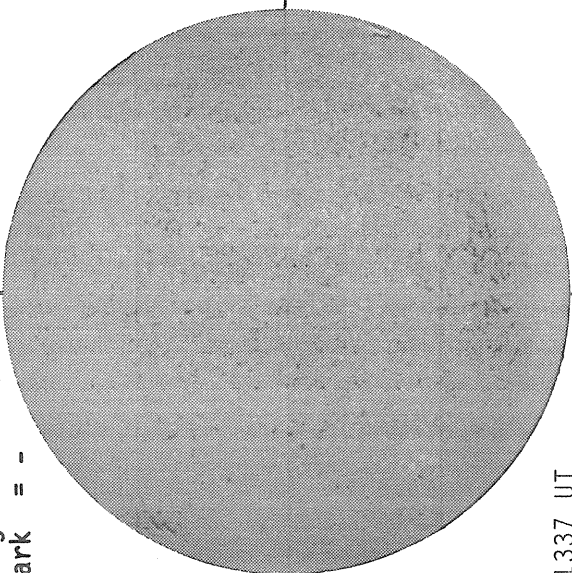
— 5303A(x1) 1450 UT
xxxx 5694A(x6) 1510 UT
NO 5694A ACTIVITY TODAY

JULY 10, 1987 (P= 1.21, B₀= 3.71, L₀= 48.17)

KITT PEAK MAGNETOGRAM

Bright= +
Dark = -

Np

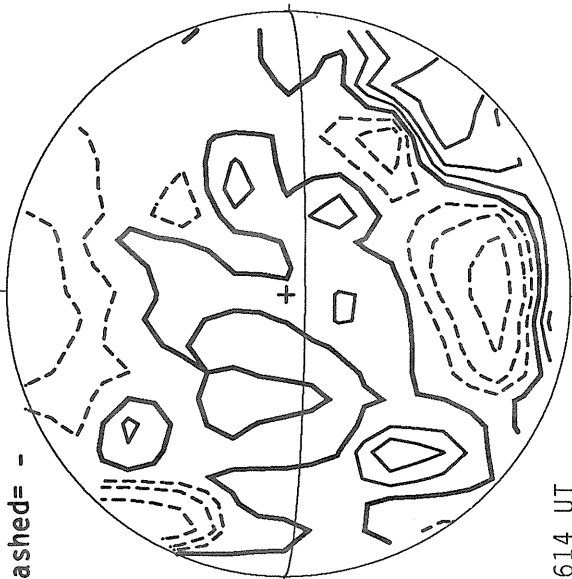


1337 UT

STANFORD MAGNETOGRAM

Solid = +
Dashed = -

Np

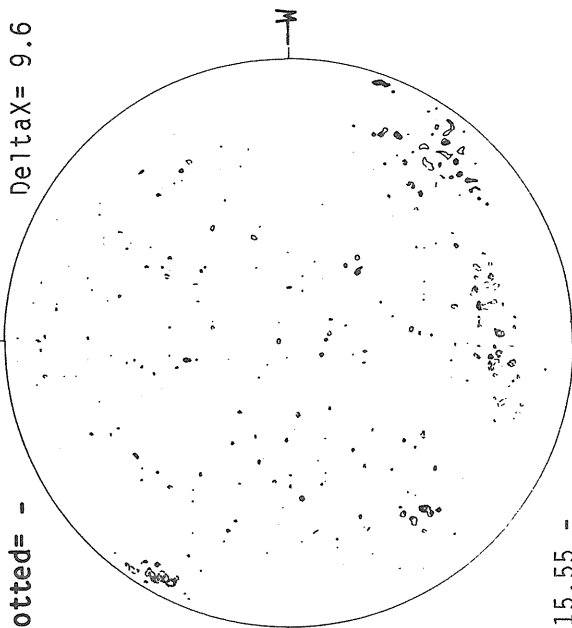


1614 UT

MT. WILSON MAGNETOGRAM

Solid = +
Dotted = -

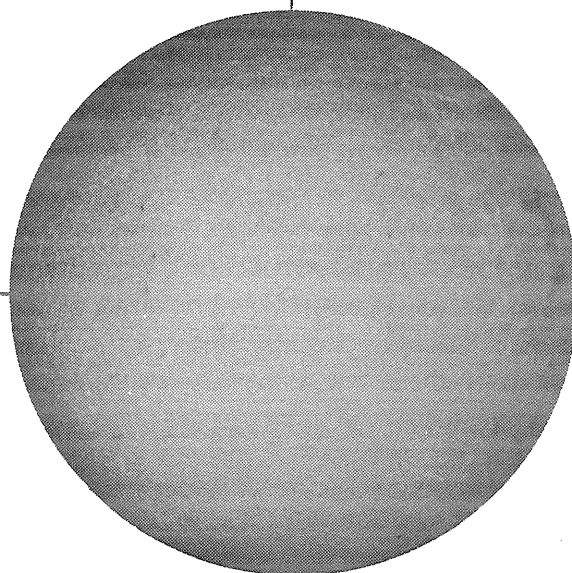
Np



15.55 -
16.50 UT

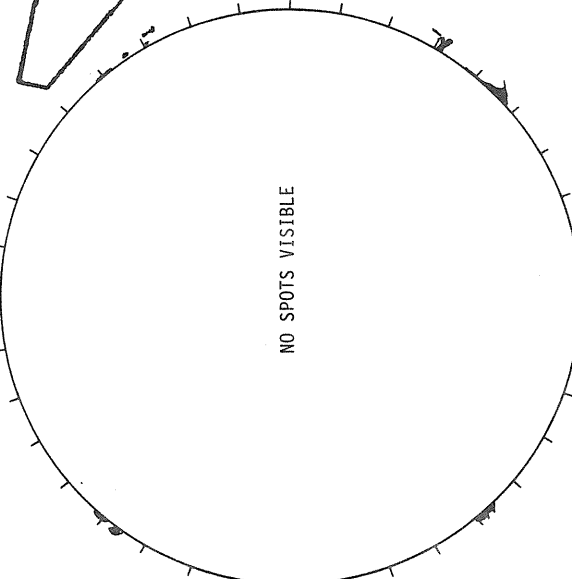
DeltaY=13.0
DeltaX= 9.6

SACRAMENTO PEAK H-ALPHA



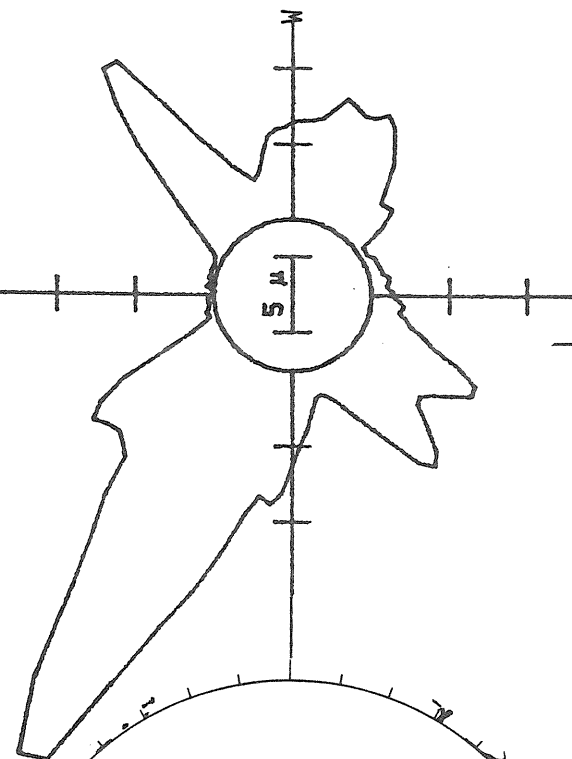
1408 UT

BOULDER SUNSPOTS



1315 UT

SACRAMENTO PEAK CORONA (1.15 Radii)



1500 UT

1330 UT BOUL Prom

Sp

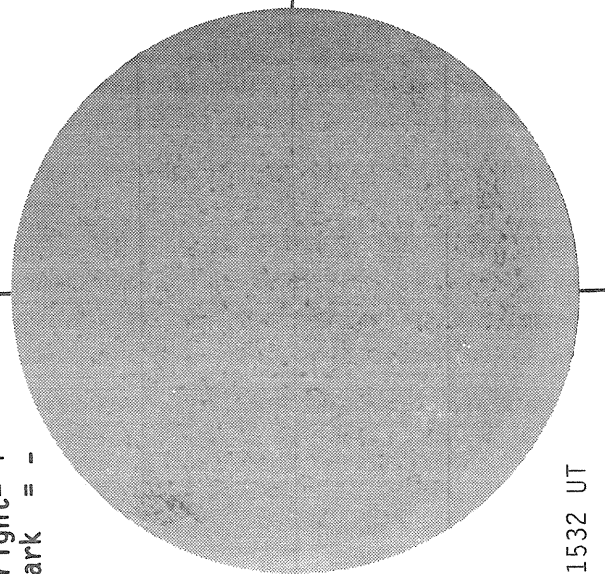
5303A(x1) 1440 UT
xxxx 5694A(x6) 1500 UT
NO 5694A ACTIVITY TODAY

JULY 11, 1987 (P= 1.66, B₀ = 3.81, L₀ = 34.94)

KITT PEAK MAGNETOGRAM

Bright = +
Dark = -

Np

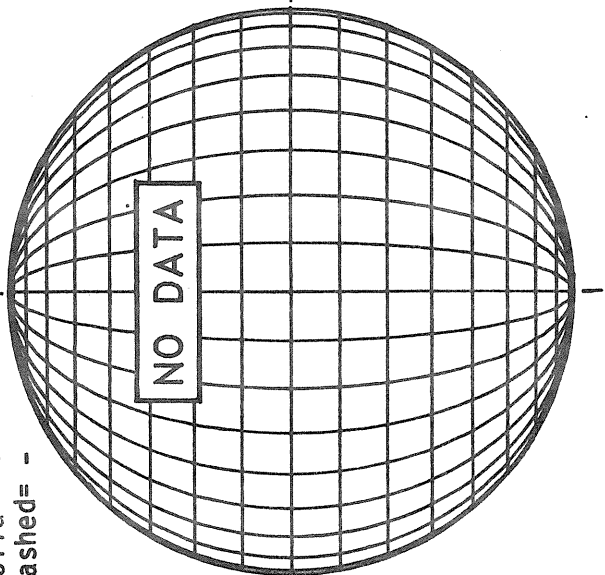


1532 UT

STANFORD MAGNETOGRAM

Solid = +
Dashed = -

Np

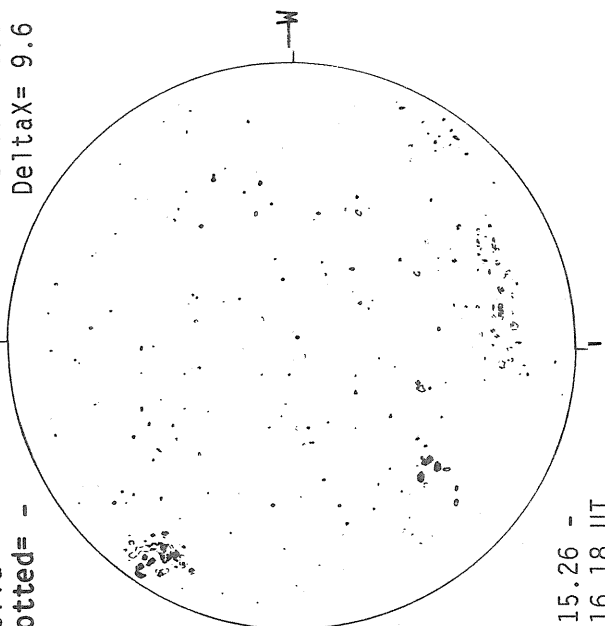


15.26 -
16.18 UT

MT. WILSON MAGNETOGRAM

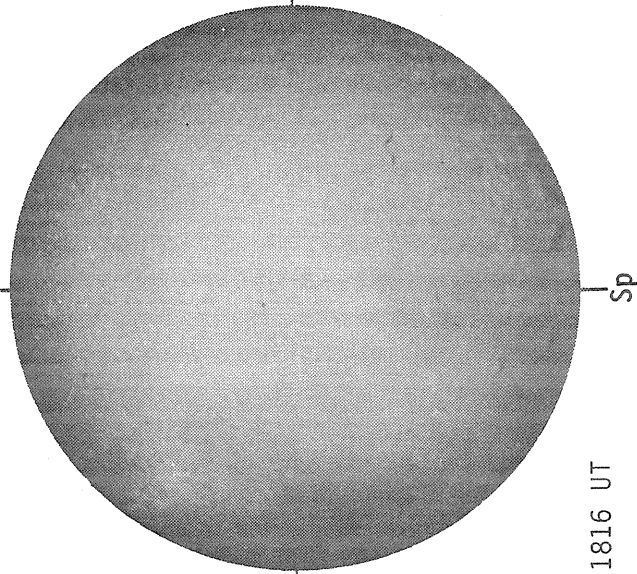
Solid = +
Dotted = -

Np



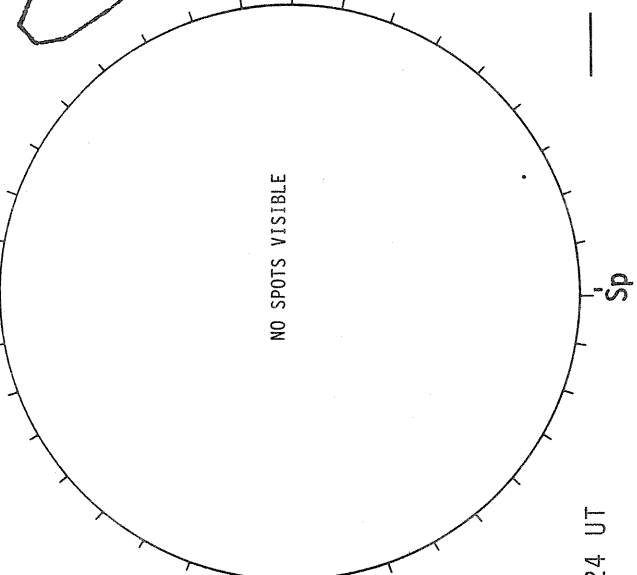
Delta Y = 13.0
Delta X = 9.6

SACRAMENTO PEAK H-ALPHA



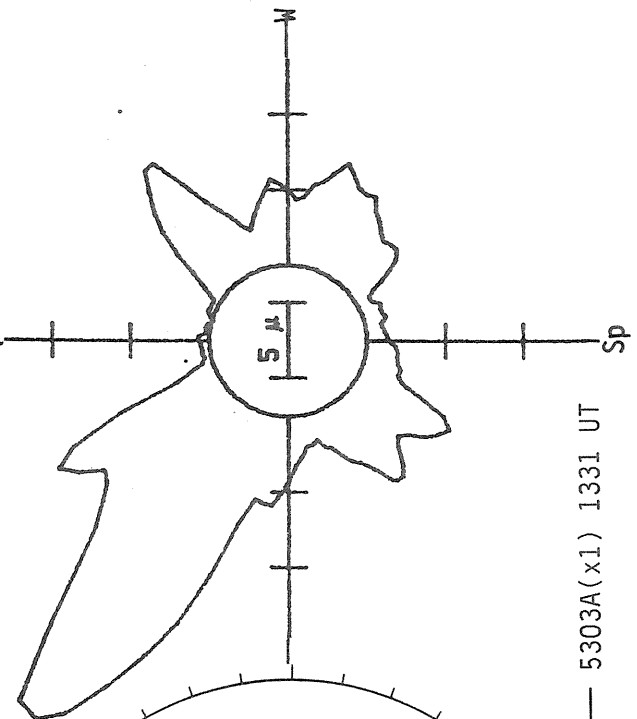
1816 UT

RAMEY SUNSPOTS



1224 UT

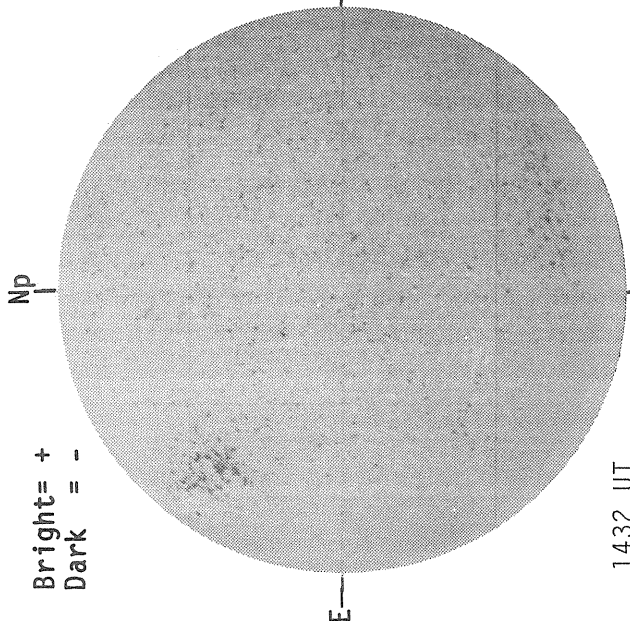
SACRAMENTO PEAK CORONA (1.15 Radii)



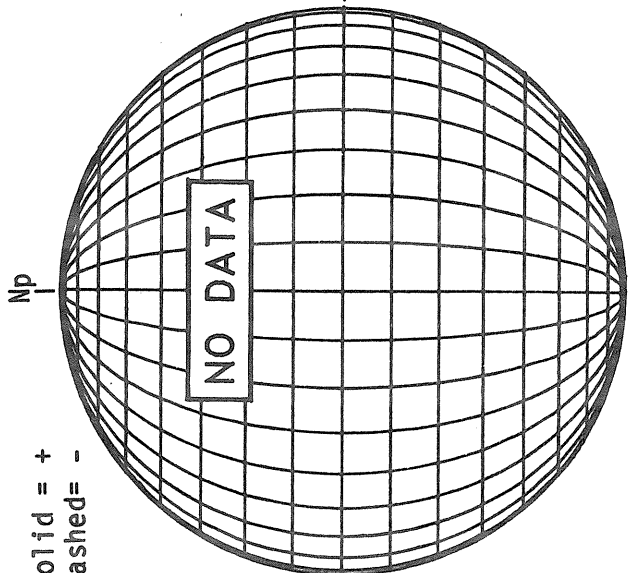
5303A(x1) 1331 UT

JULY 12, 1987 (P= 2.11, B₀= 3.91, L₀= 21.71)

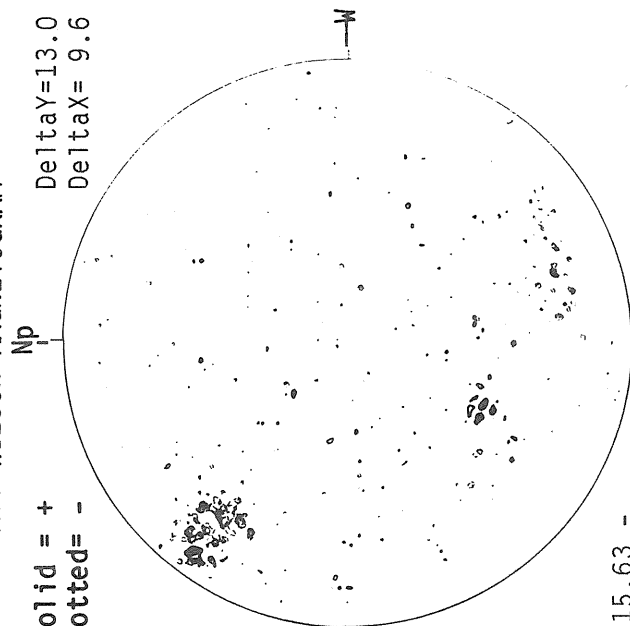
KITT PEAK MAGNETOGRAM



STANFORD MAGNETOGRAM

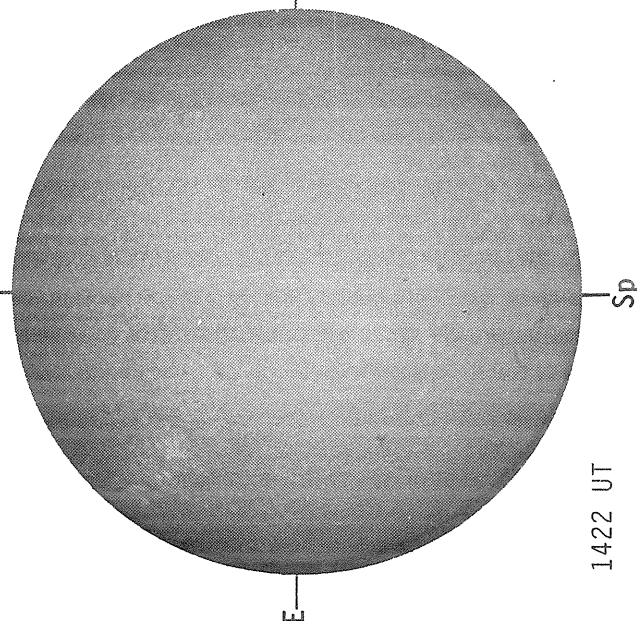


MT. WILSON MAGNETOGRAM

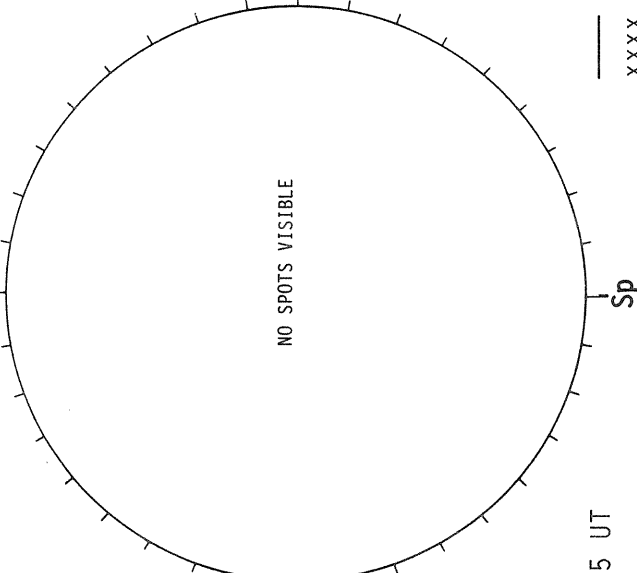


DeltaY=13.0
DeltaX= 9.6

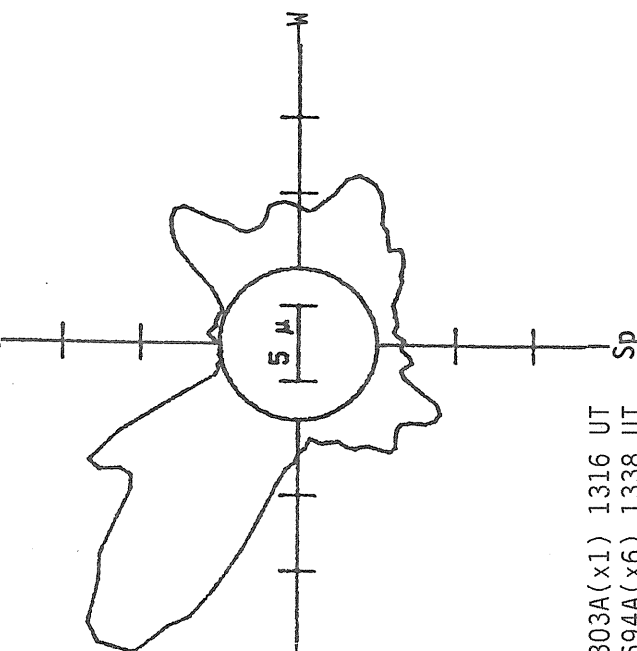
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)



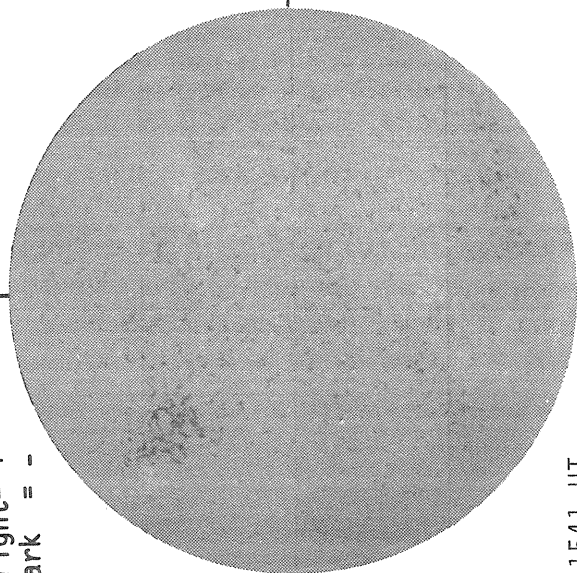
5303A(x1) 1316 UT
xxxx 5694A(x6) 1338 UT
NO 5694A ACTIVITY TODAY

JULY 13, 1987 (P= 2.56, B₀= 4.01, L₀= 8.47)

KITT PEAK MAGNETOGRAM

Bright= +
Dark = -

Np

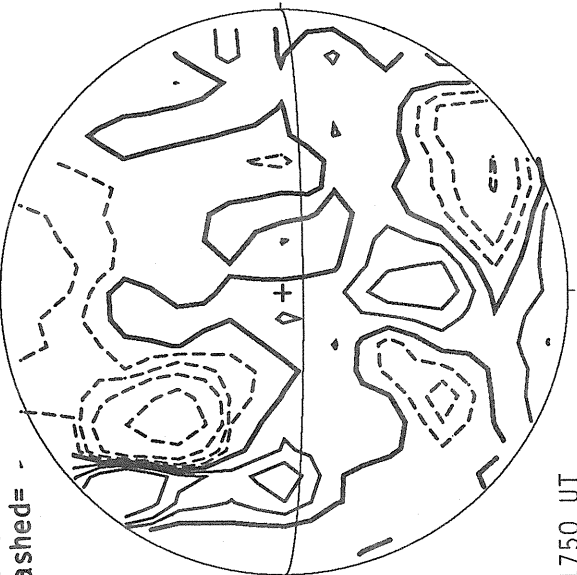


1541 UT

STANFORD MAGNETOGRAM

Solid = +
Dashed = -

Np

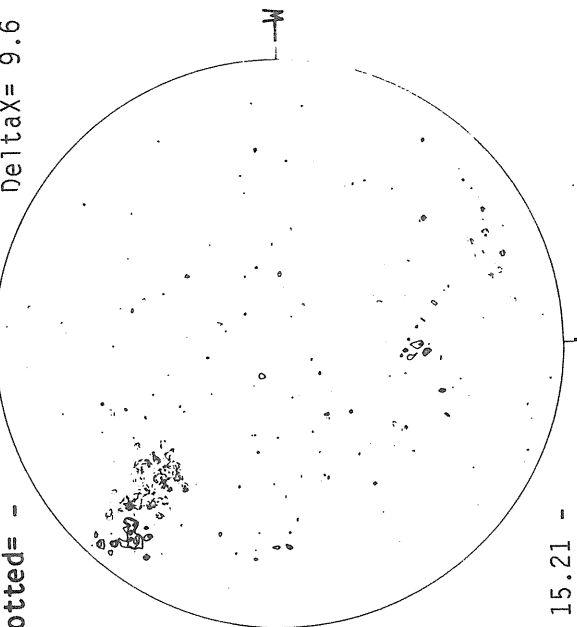


1750 UT

MT. WILSON MAGNETOGRAM

Solid = +
Dotted = -

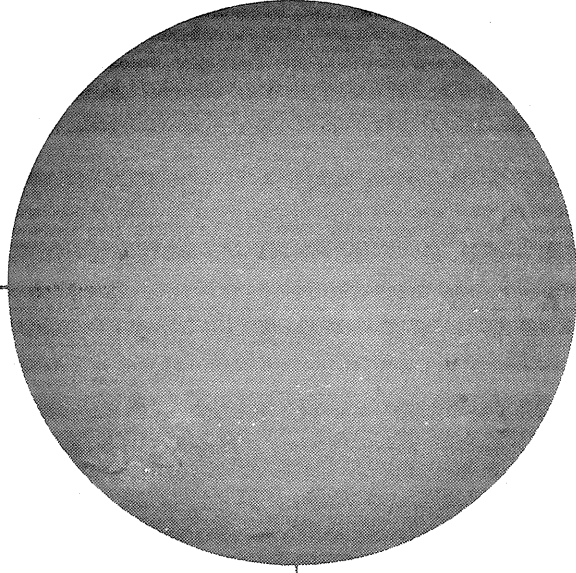
Np



15.21 -
16.13 UT

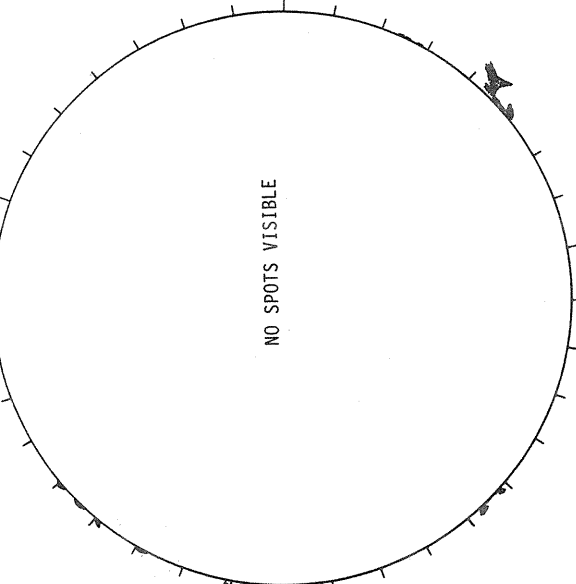
Delta Y=13.0
Delta X= 9.6

SACRAMENTO PEAK H-ALPHA



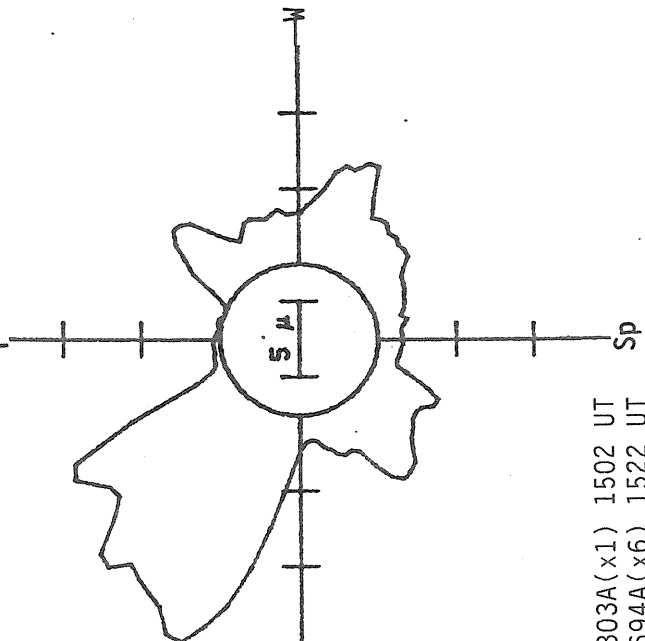
1452 UT

BOULDER SUNSPOTS



1331 UT
1348 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



5303A(x1) 1502 UT
xxxx 5694A(x6) 1522 UT
NO 5694A ACTIVITY TODAY

Sp

Sp

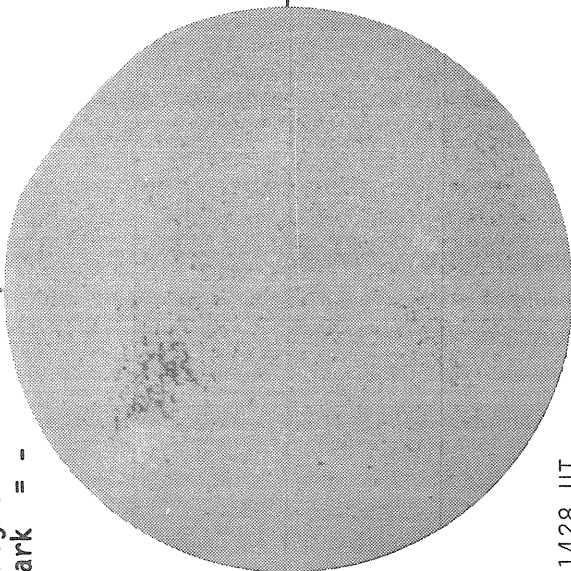
Sp

JULY 14, 1987 (P= 3.00, B₀ = 4.10, L₀ = 355.24)

KITT PEAK MAGNETOGRAM

Bright = +
Dark = -

Np

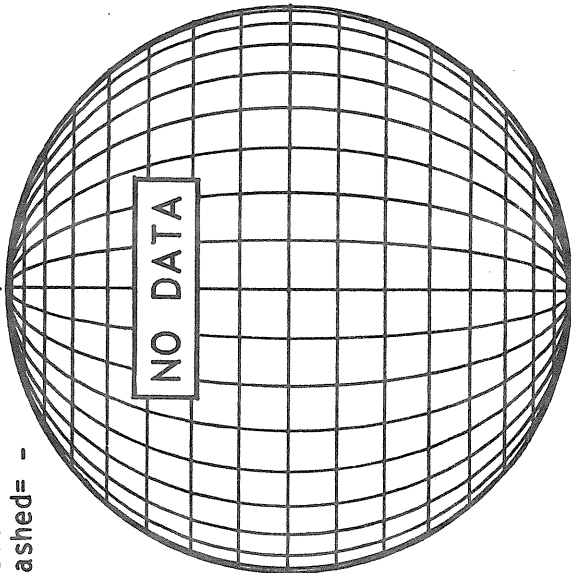


1428 UT

STANFORD MAGNETOGRAM

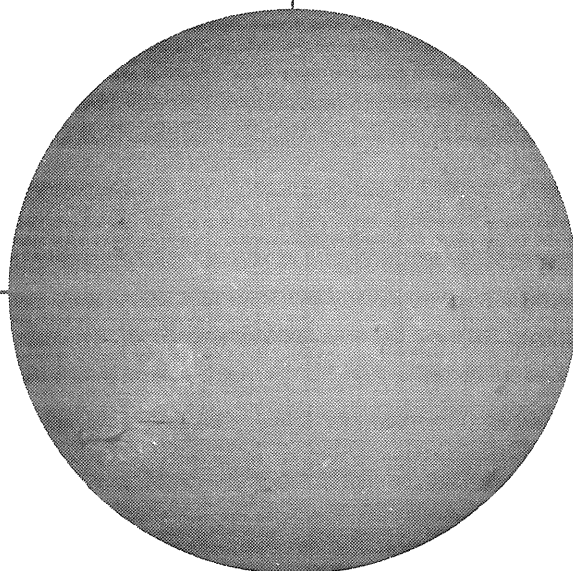
Solid = +
Dashed = -

Np



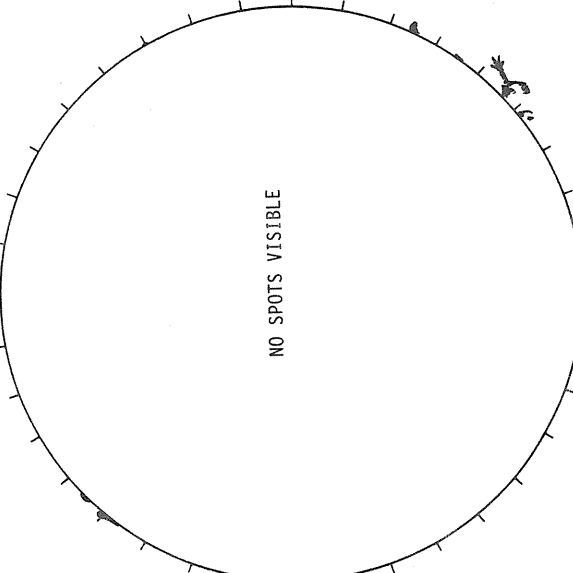
NO DATA

SACRAMENTO PEAK H-ALPHA



1408 UT

BOULDER SUNSPOTS



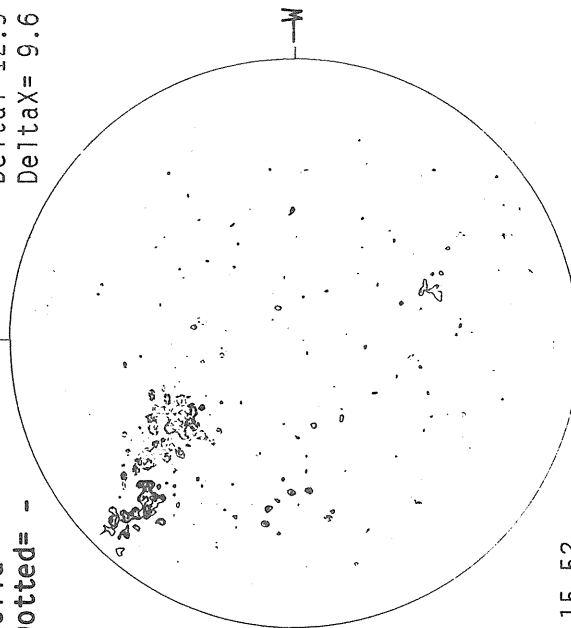
NO SPOTS VISIBLE

1341 UT
1353 UT BOUL Prom

MT. WILSON MAGNETOGRAM

Solid = +
Dotted = -

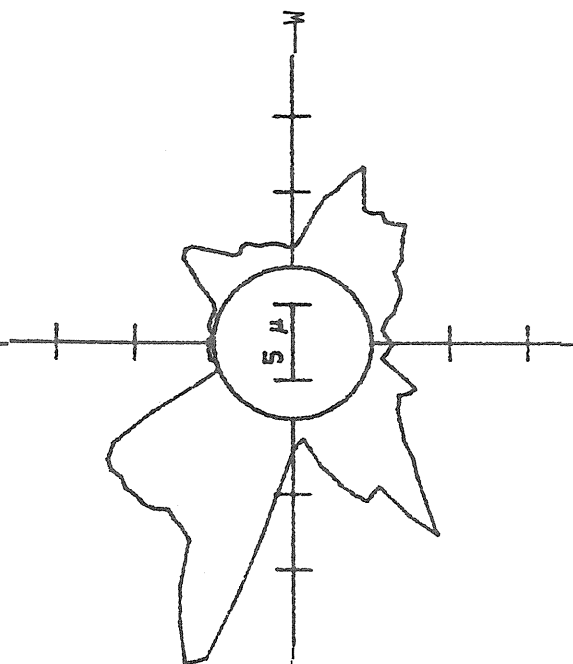
Np



Delta Y = 12.9
Delta X = 9.6

15.52 -
16.44 UT

SACRAMENTO PEAK CORONA (1.15 Radii)



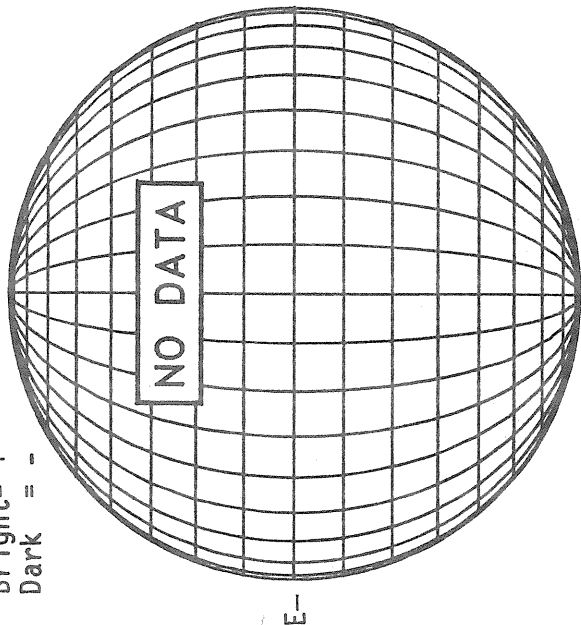
15 μ

5303A(x1) 1415 UT
xxxx 5694A(x6) 1441 UT
NO 5694A ACTIVITY TODAY

JULY 15, 1987 (P= 3.44, B₀ = 4.20, L₀ = 342.00)

KITT PEAK MAGNETOGRAM

Bright = +
Dark = -



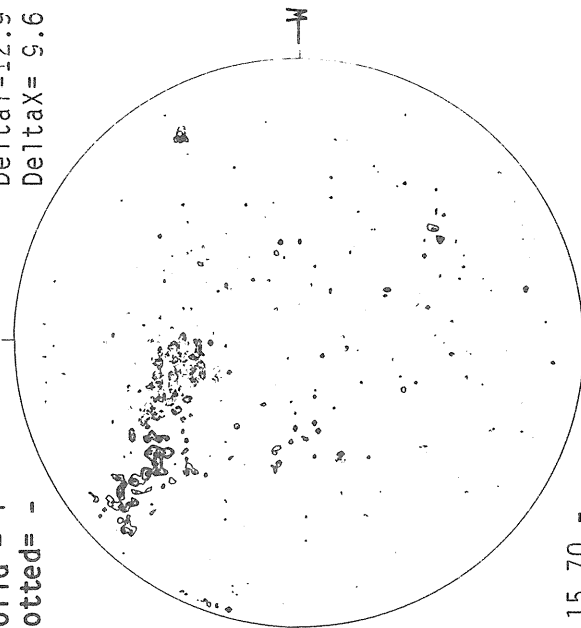
STANFORD MAGNETOGRAM

Solid = +
Dashed = -



MT. WILSON MAGNETOGRAM

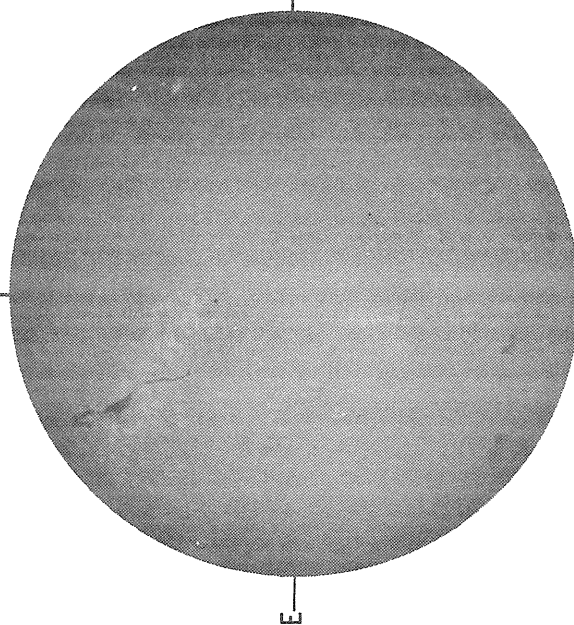
Solid = +
Dotted = -



Delta Y = 12.9
Delta X = 9.6

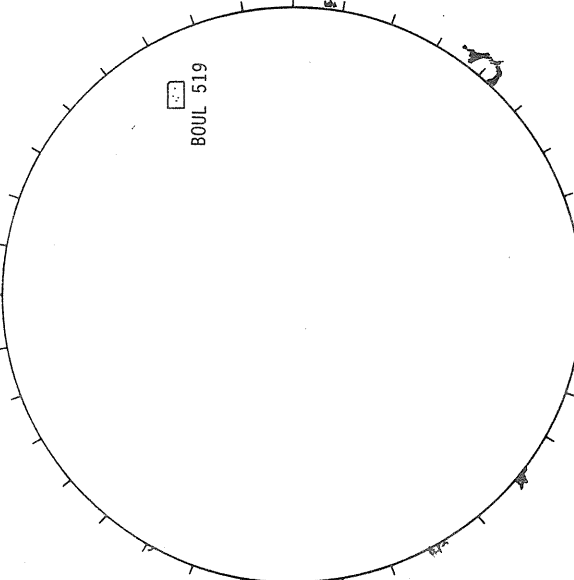
15.70 -
16.63 UT

SACRAMENTO PEAK H-ALPHA



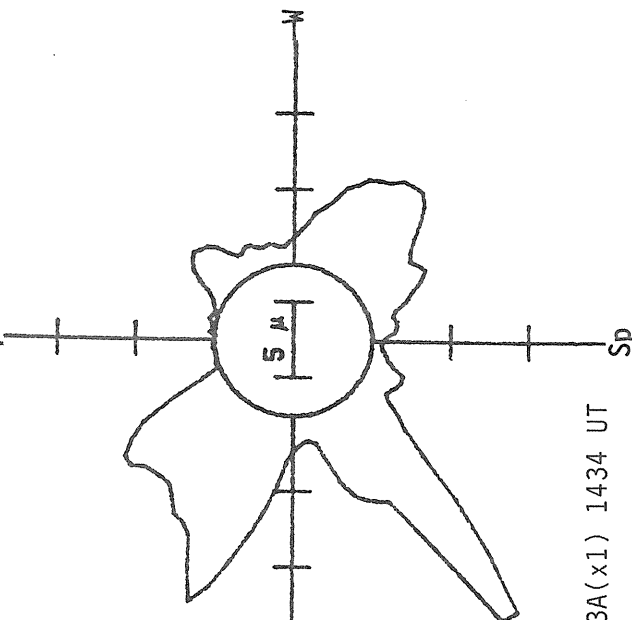
1409 UT

BOULDER SUNSPOTS



1315 UT
1527 UT BOUL Prom

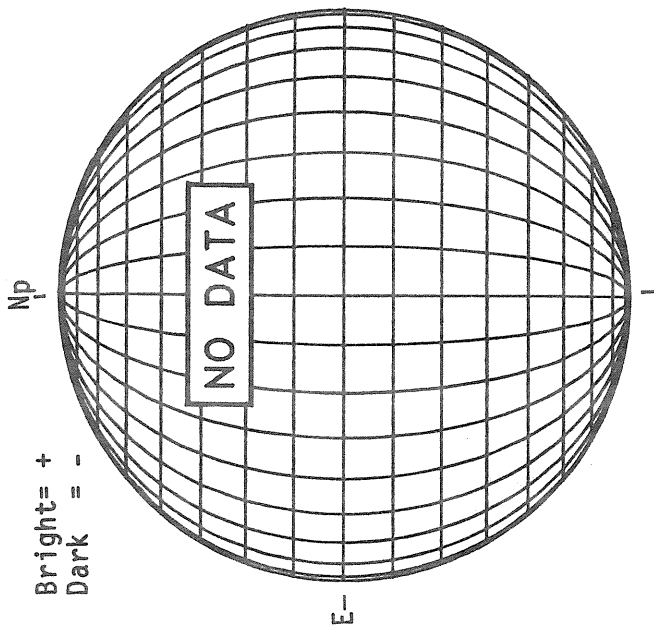
SACRAMENTO PEAK CORONA (1.15 Radii)



5303A(x1) 1434 UT

J U L Y 16, 1 9 8 7 (P= 3.89, B₀ = 4.30, L₀ = 328.77)

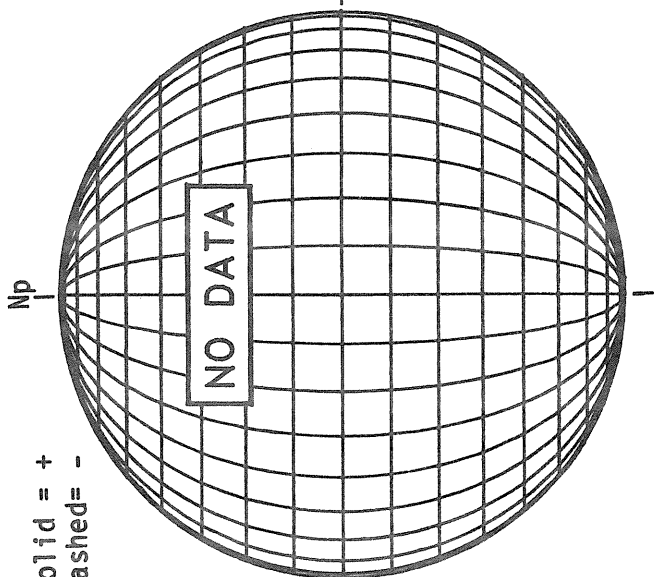
KITT PEAK MAGNETOGRAM



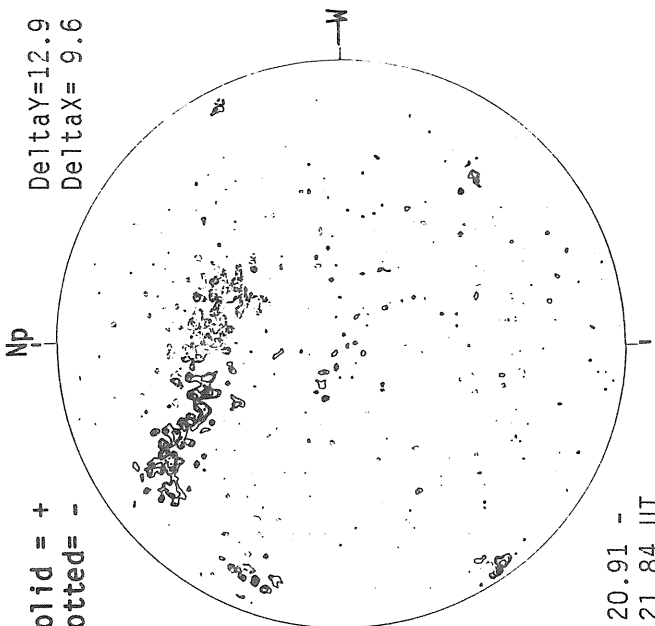
Bright= +
Dark = -

Solid = +
Dashed= -

STANFORD MAGNETOGRAM



MT. WILSON MAGNETOGRAM

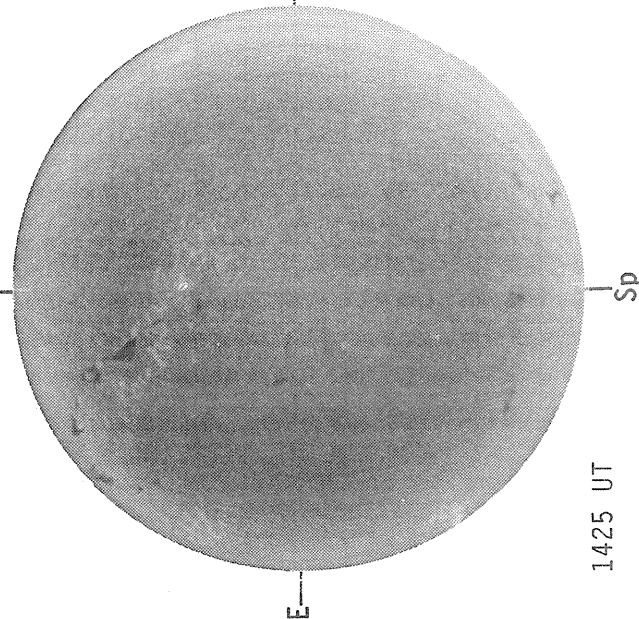


Solid = +
Dotted= -

DeltaY=12.9
DeltaX= 9.6

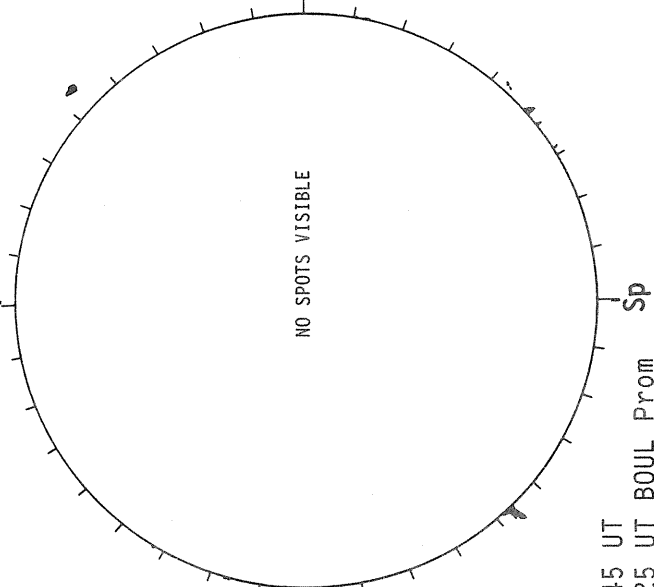
20.91 -
21.84 UT

BOULDER H-ALPHA



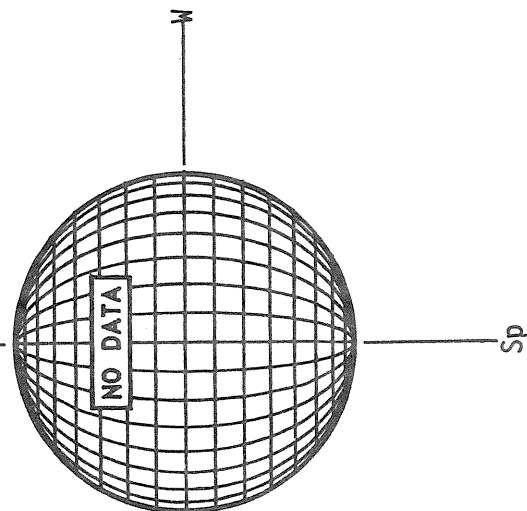
1425 UT

BOULDER SUNSPOTS



1345 UT
1425 UT BOUL Prom

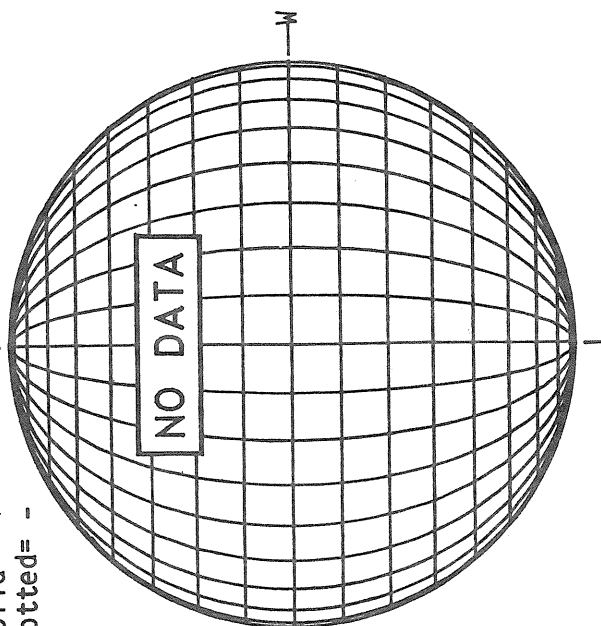
SACRAMENTO PEAK CORONA (1.15 Radii)



JULY 17, 1987 (P= 4.33, B₀ = 4.39, L₀ = 315.54)

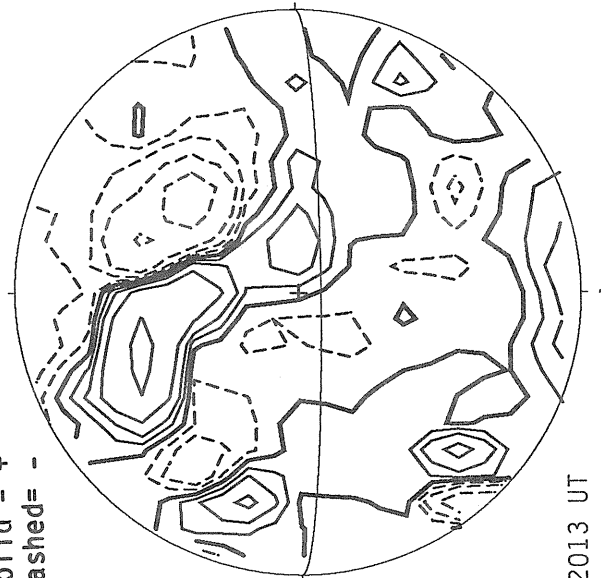
MT. WILSON MAGNETOGRAM

Np
Solid = +
Dotted = -



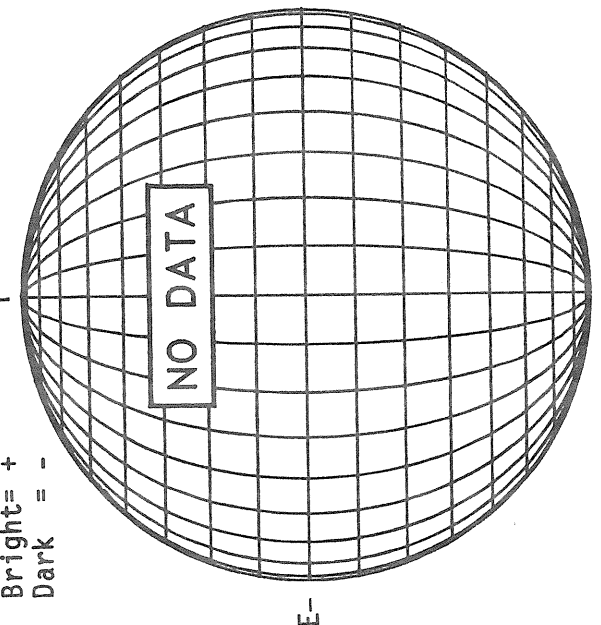
STANFORD MAGNETOGRAM

Np
Solid = +
Dashed = -

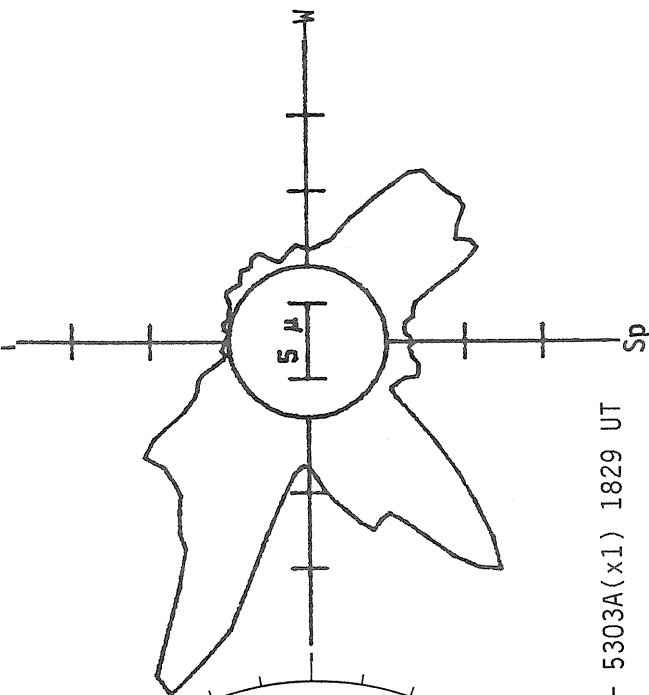


KITT PEAK MAGNETOGRAM

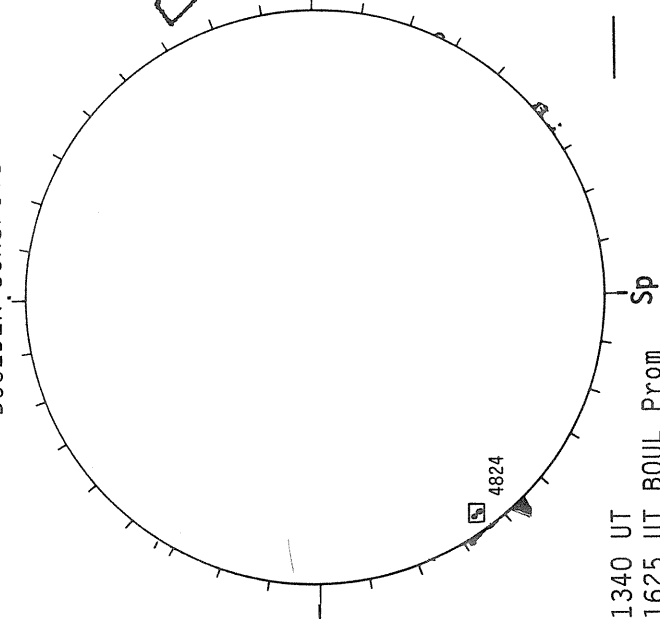
Np
Bright = +
Dark = -



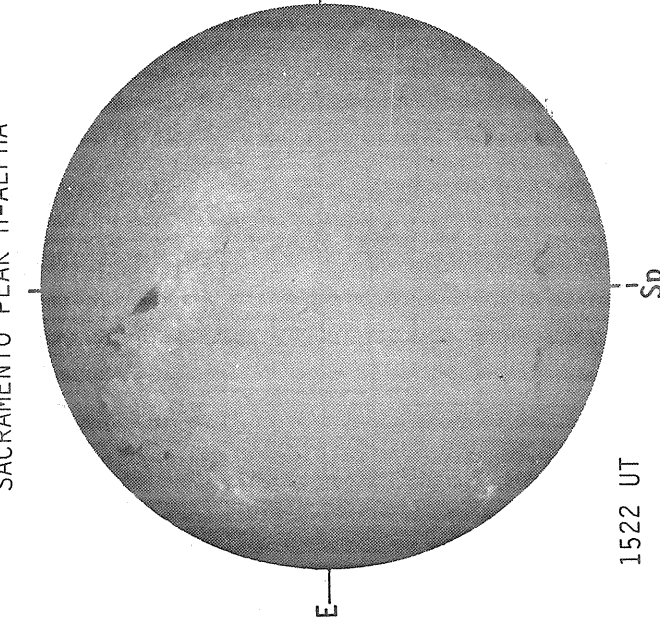
SACRAMENTO PEAK CORONA (1.15 Radii)



BOULDER SUNSPOTS



SACRAMENTO PEAK H-ALPHA



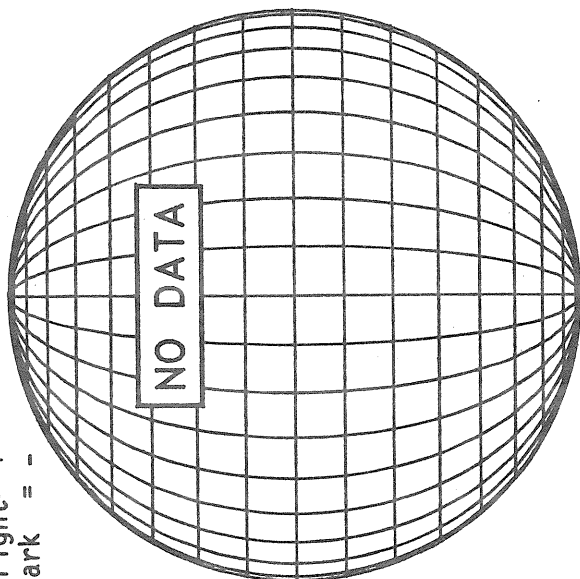
— 5303A(x1) 1829 UT

JULY 18, 1987 (P= 4.77, B₀= 4.48, L₀= 302.31)

KITT PEAK MAGNETOGRAM

Bright= +
Dark = -

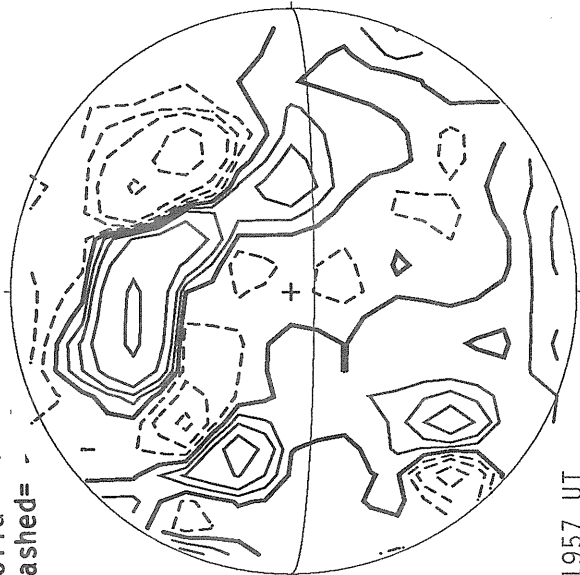
Np



STANFORD MAGNETOGRAM

Solid = +
Dashed = -

Np

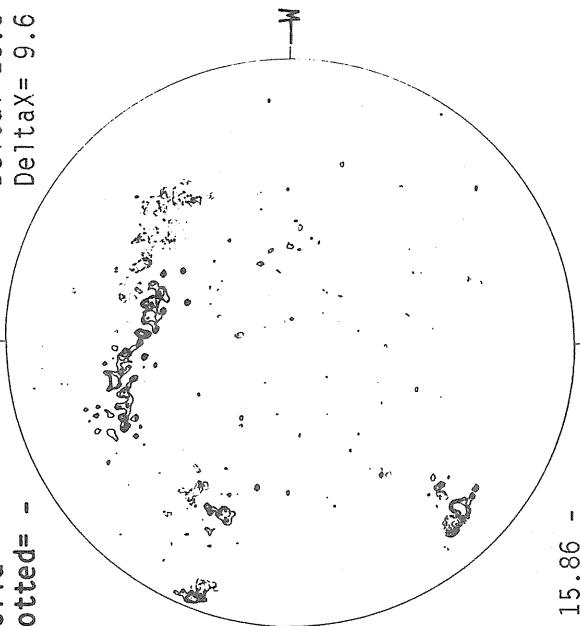


MT. WILSON MAGNETOGRAM

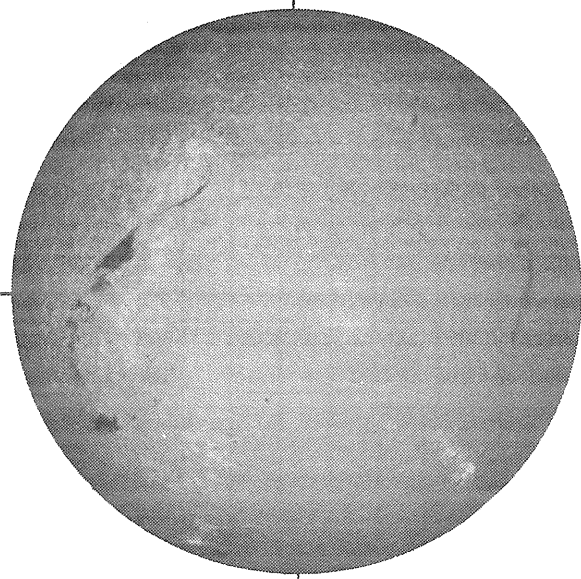
Solid = +
Dotted = -

Np

Delta Y=13.0
Delta X= 9.6



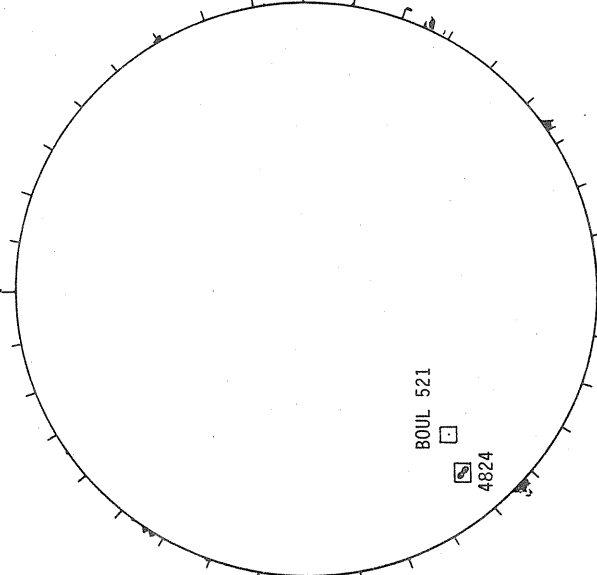
SACRAMENTO PEAK H-ALPHA



1530 UT

Sp

BOULDER SUNSPOTS

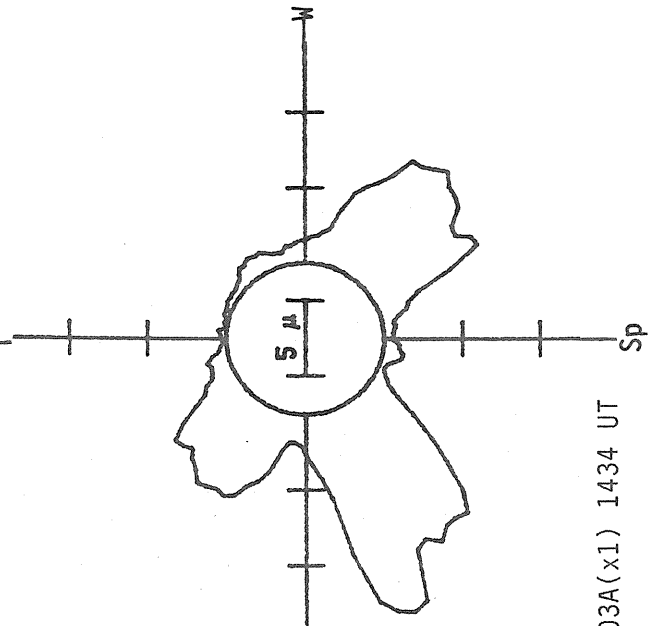


1420 UT

Sp

1450 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



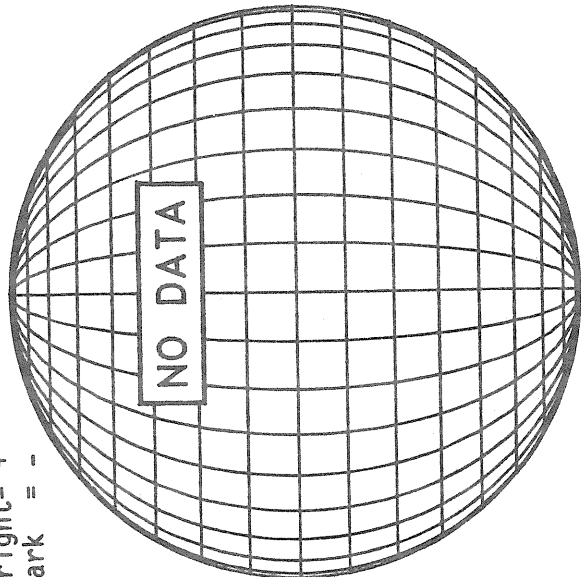
5303A(x1) 1434 UT

JULY 19, 1987 (P= 5.20, B₀ = 4.58, L₀ = 289.07)

54
Jul 87

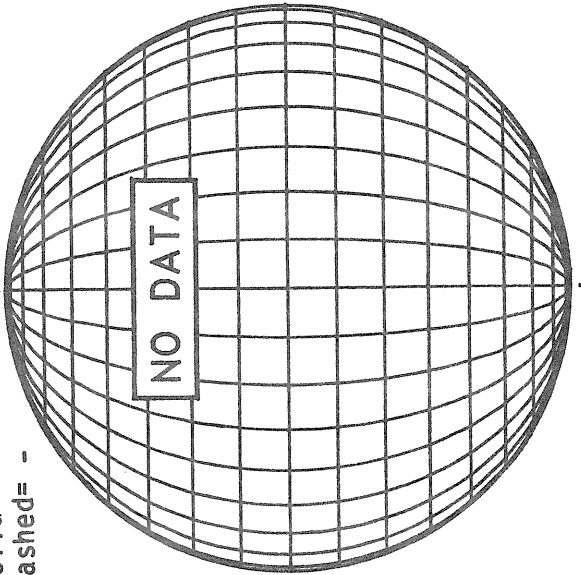
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

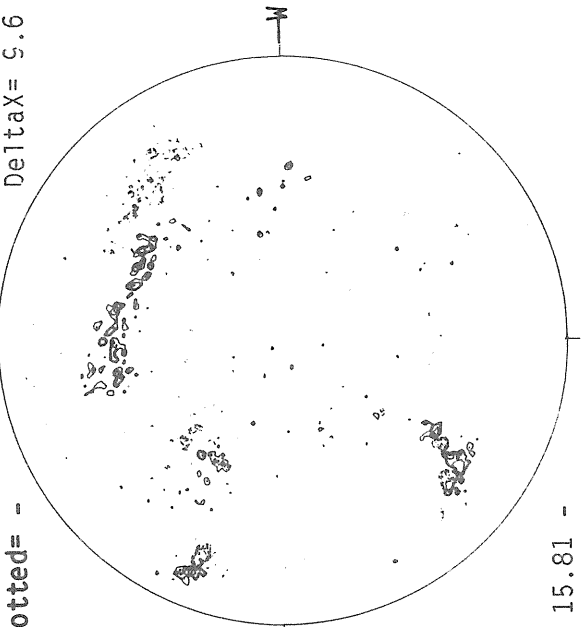
Solid = +
Dashed = -



MT. WILSON MAGNETOGRAM

Solid = +
Dotted = -

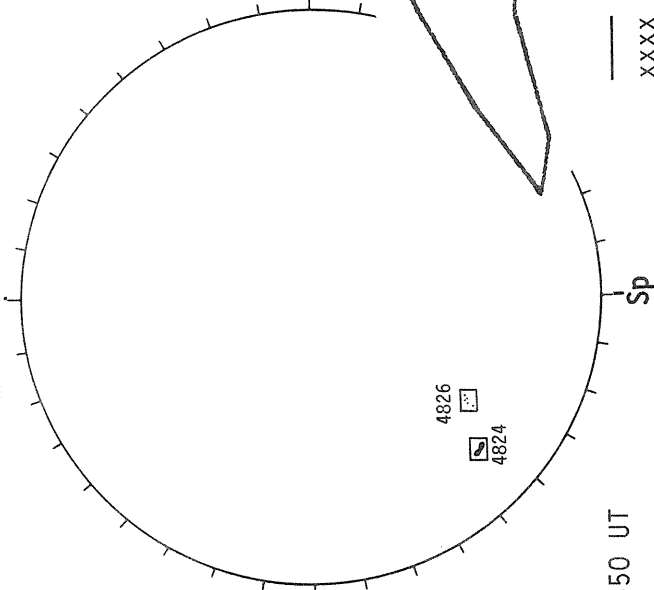
Delta Y = 13.0
Delta X = 5.6



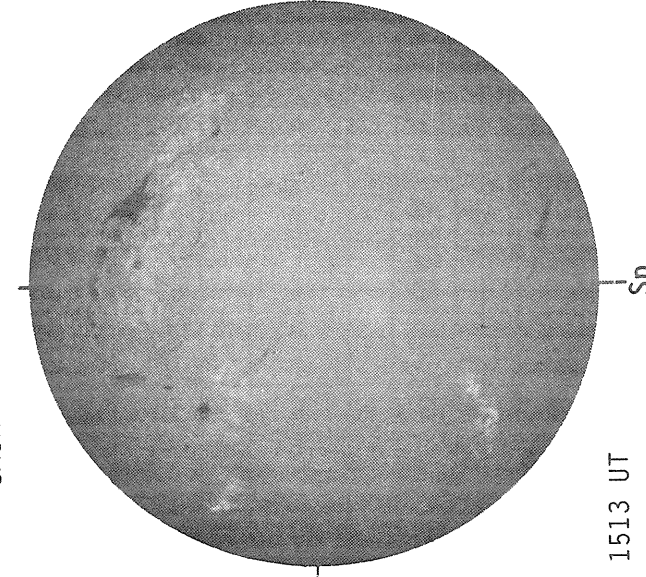
15.81 -
16.75 UT

SACRAMENTO PEAK CORONA (1.15 Radii)

RAMEY SUNSPOTS



SACRAMENTO PEAK H-ALPHA



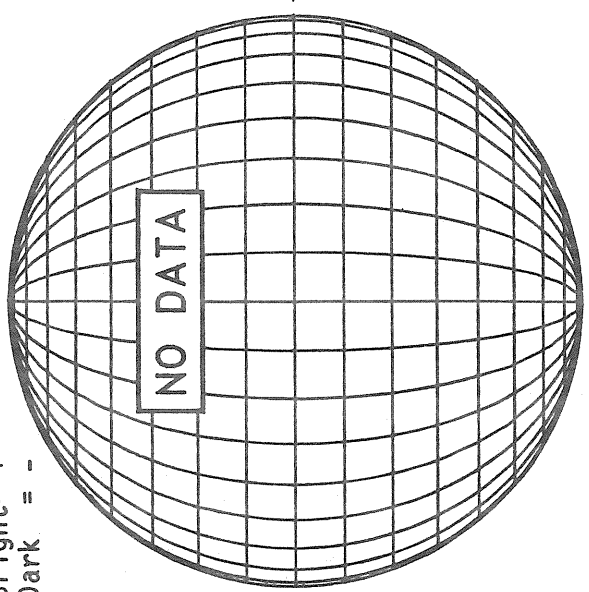
— 5303A(x1) 1600 UT
xxxx 5694A(x6) 1632 UT
NO 5694A ACTIVITY TODAY

J U L Y 20, 1 9 8 7 (P= 5.64, B₀ = 4.67, L₀ = 275.84)

KITT PEAK MAGNETOGRAM

Np

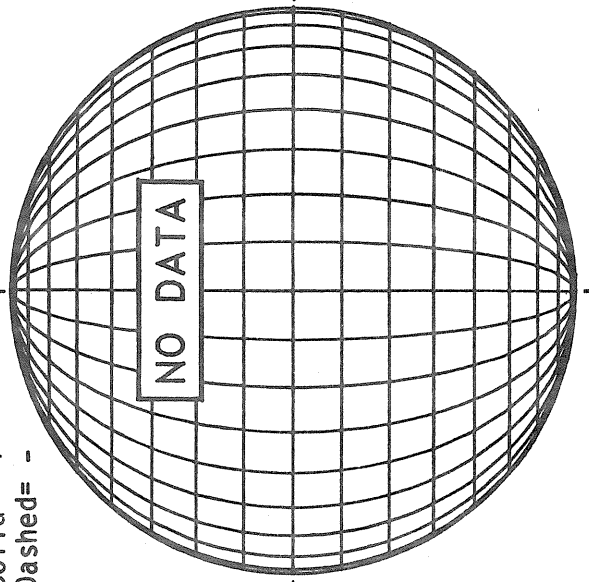
Bright= +
Dark = -



STANFORD MAGNETOGRAM

Np

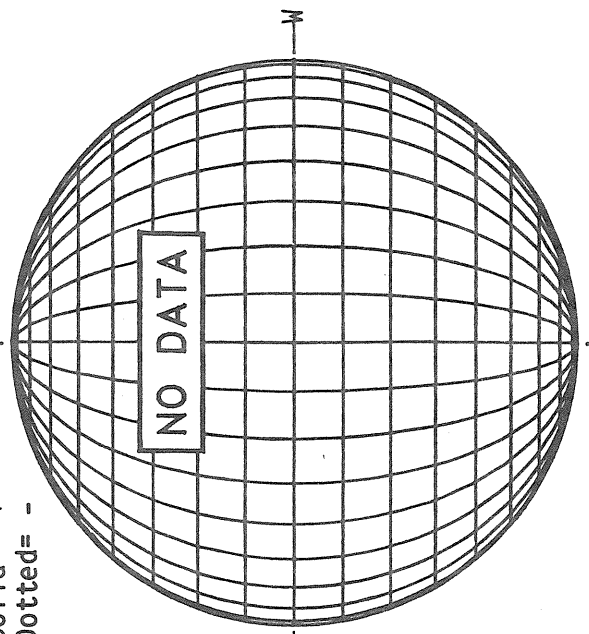
Solid = +
Dashed = -



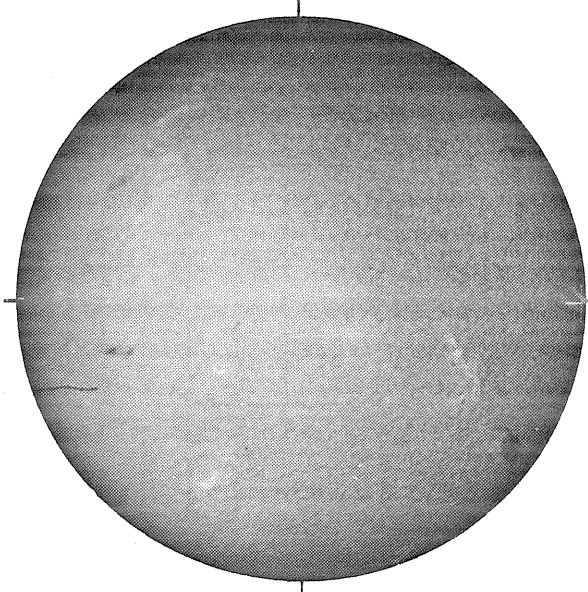
MT. WILSON MAGNETOGRAM

Np

Solid = +
Dotted = -

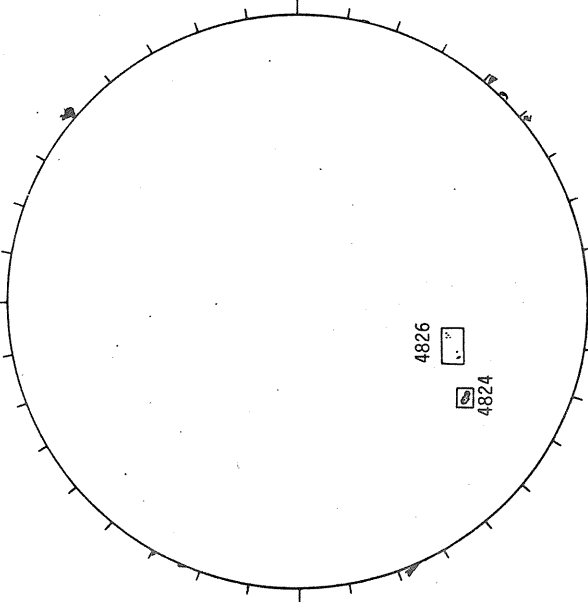


BOULDER H-ALPHA



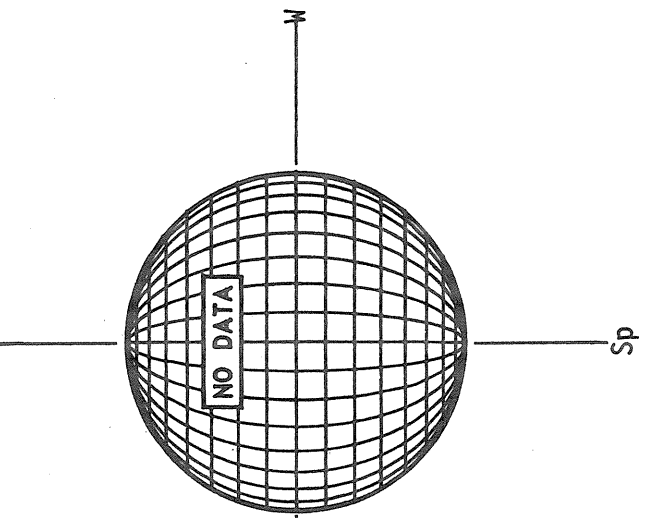
1705 UT

BOULDER SUNSPOTS



1645 UT
1705 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



1645 UT
1705 UT BOUL Prom

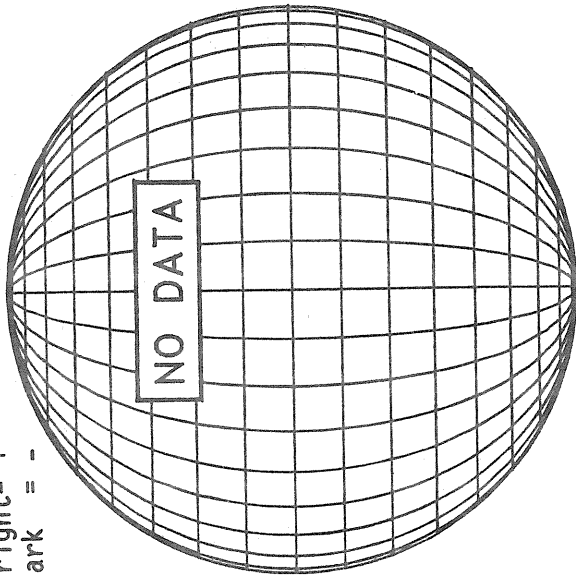
56
Jul 87

JULY 21, 1987 (P= 6.07, $B_0 = 4.76$, $L_0 = 262.61$)

KITT PEAK MAGNETOGRAM

Bright = +
Dark = -

Np

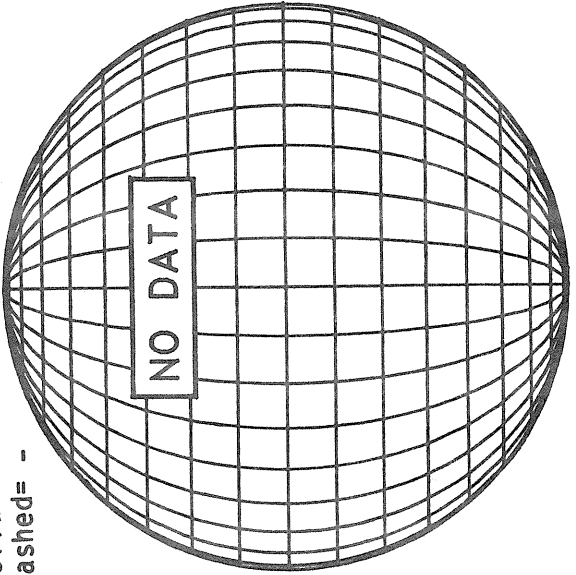


E-

STANFORD MAGNETOGRAM

Solid = +
Dashed = -

Np

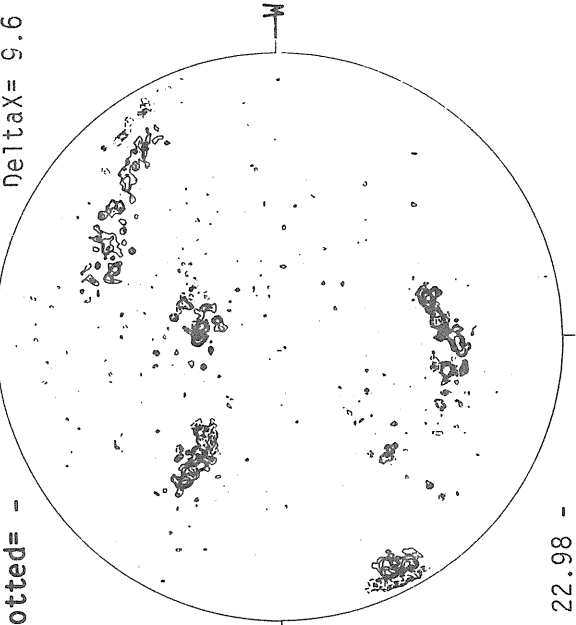


MT. WILSON MAGNETOGRAM

Solid = +
Dotted = -

Np

Delta Y = 13.0
Delta X = 9.6

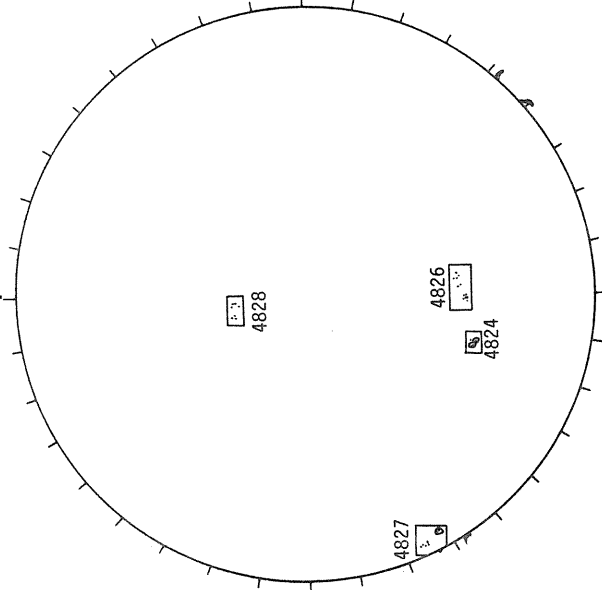


N

22.98 -
23.90 UT

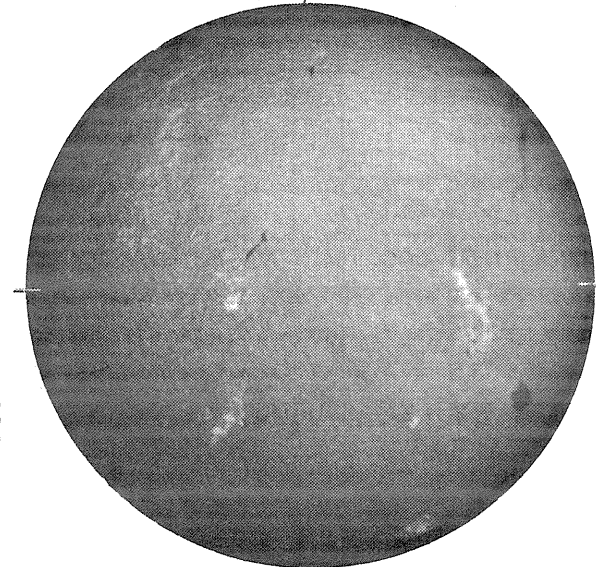
SACRAMENTO PEAK CORONA (1.15 Radii)

BOULDER SUNSPOTS



1323 UT
1338 UT BOUL Prom

BOULDER H-ALPHA



1338 UT

NO DATA

N

E

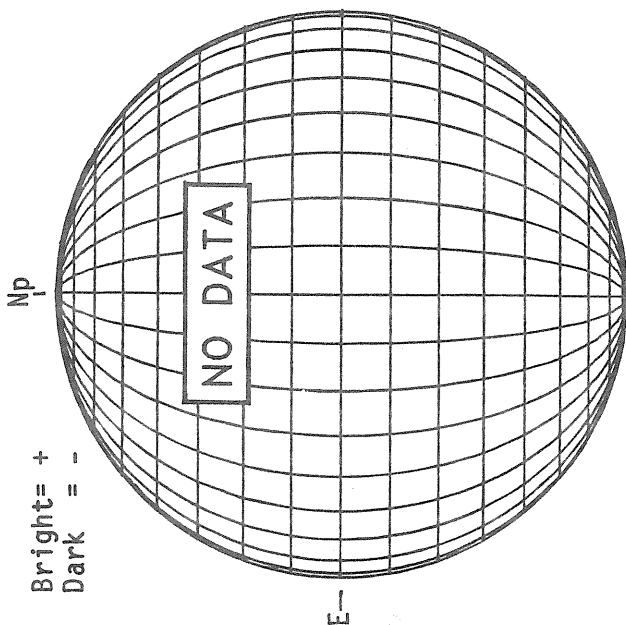
Sp

Sp

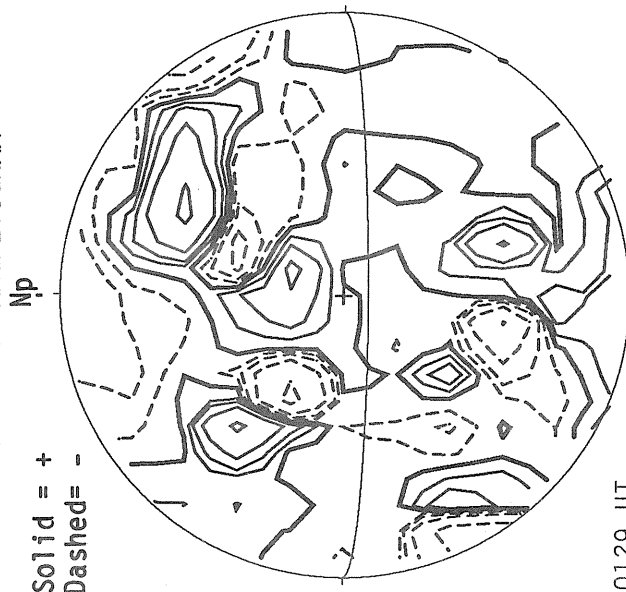
Sp

JULY 22, 1987 (P= 6.50, B₀ = 4.84, L₀ = 249.38)

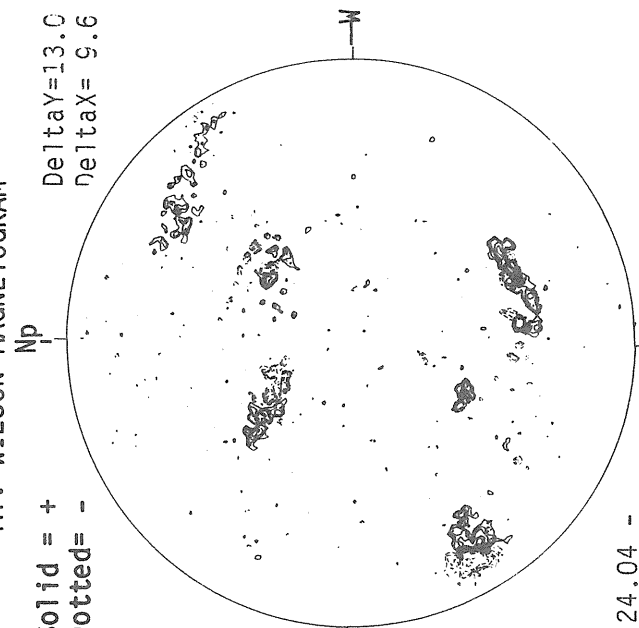
KITT PEAK MAGNETOGRAM



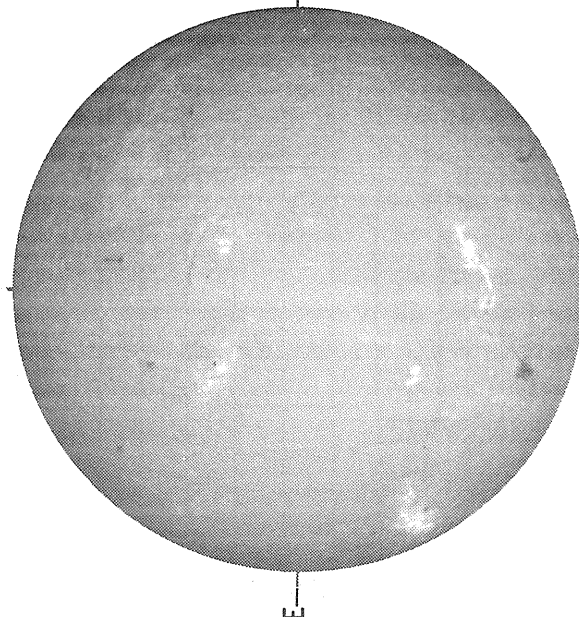
STANFORD MAGNETOGRAM



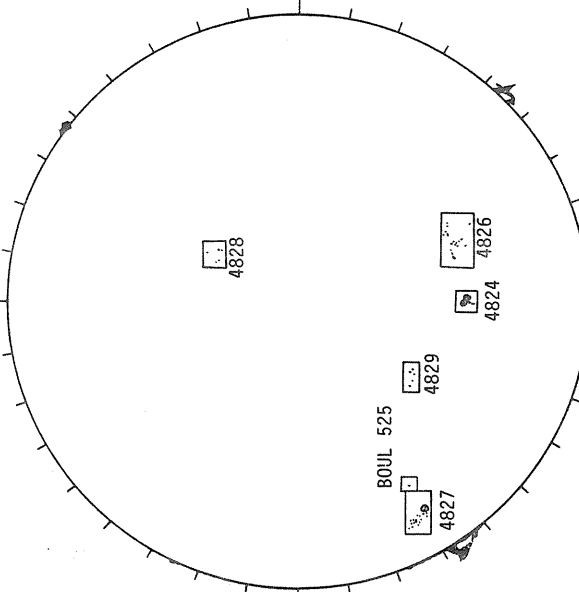
MT. WILSON MAGNETOGRAM



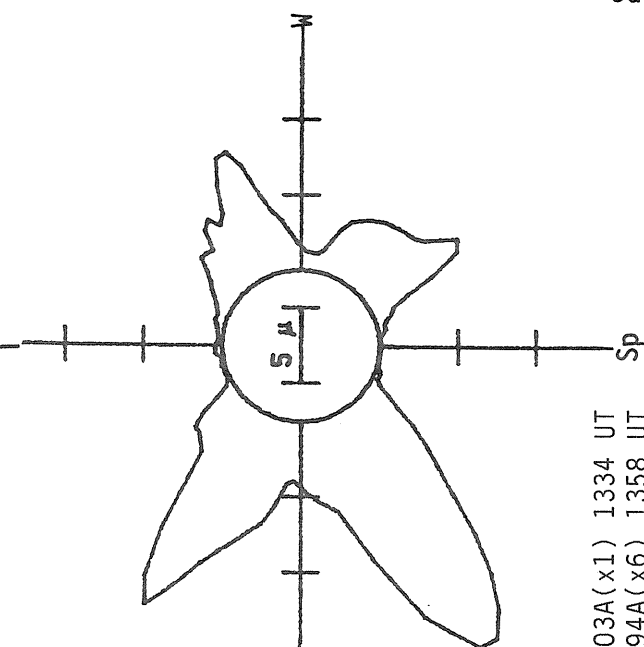
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)



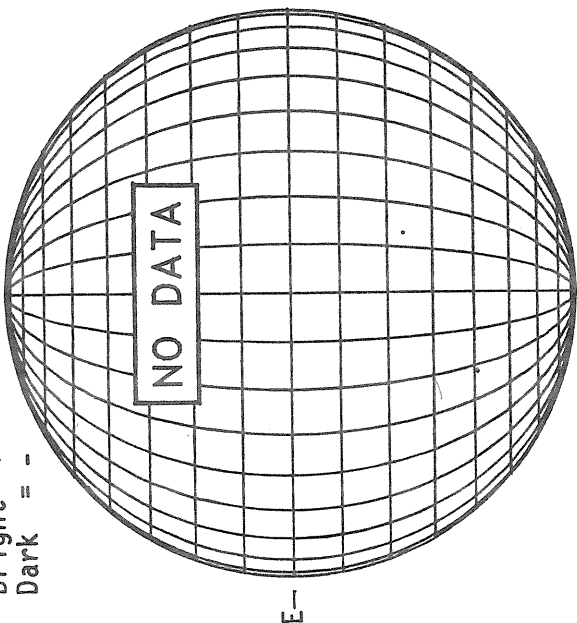
— 5303A(x1) 1334 UT
xxxx 5694A(x6) 1358 UT
NO 5694A ACTIVITY TODAY

58
Jul 87

JULY 23, 1987 (P= 6.93, B₀ = 4.93, L₀ = 236.15)

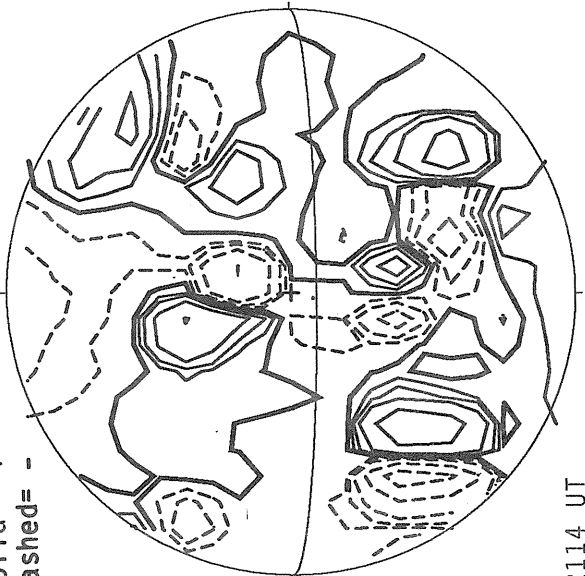
KITT PEAK MAGNETOGRAM

Bright = +
Dark = -



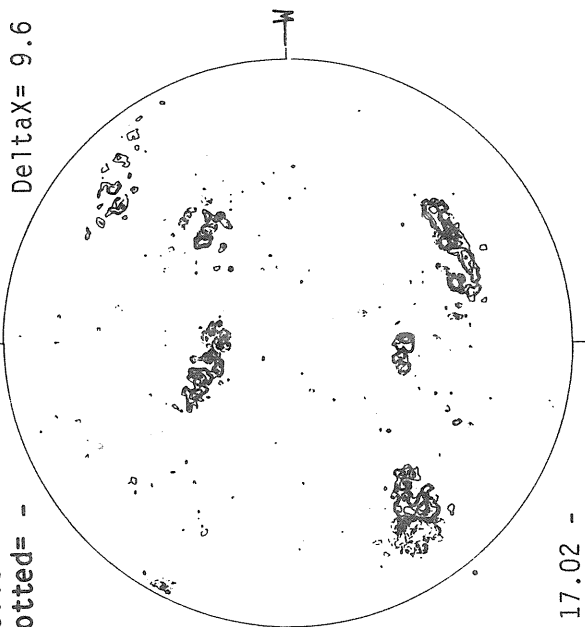
STANFORD MAGNETOGRAM

Solid = +
Dashed = -

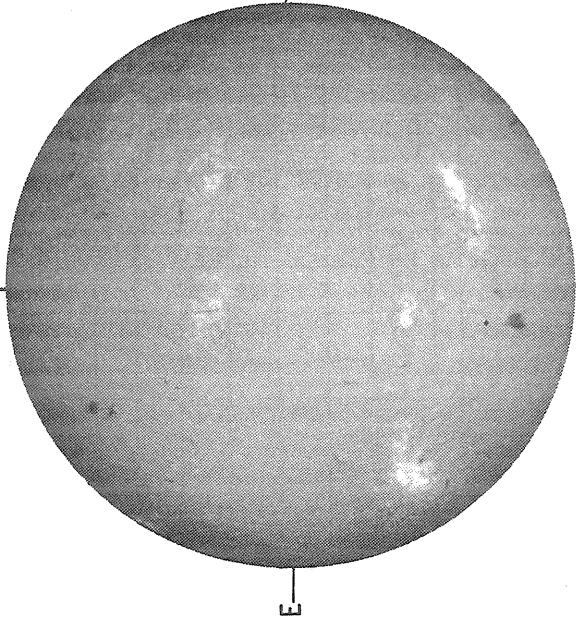


MT. WILSON MAGNETOGRAM

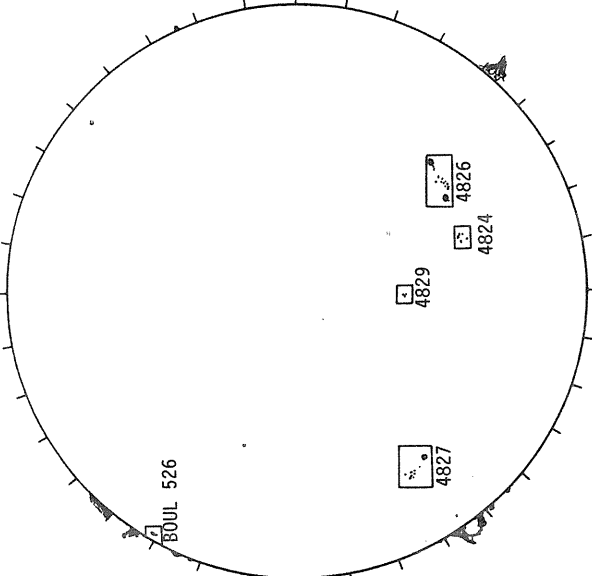
Solid = +
Dotted = -
Delta Y = 13.0
Delta X = 9.6



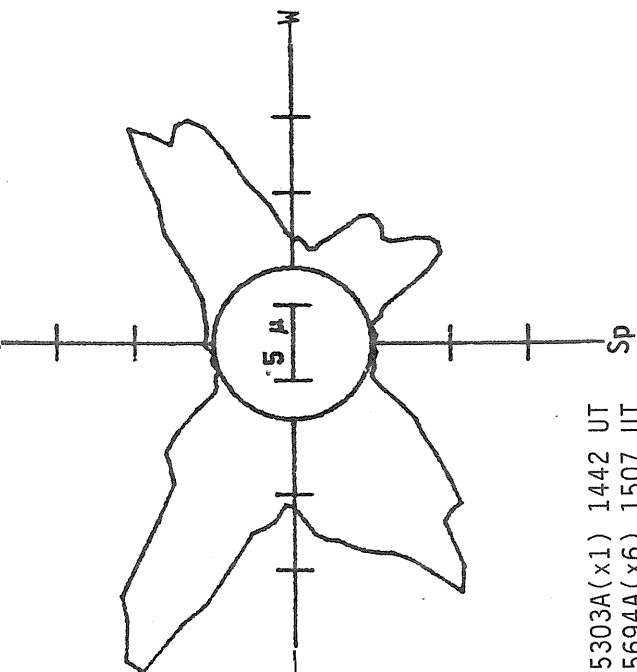
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)



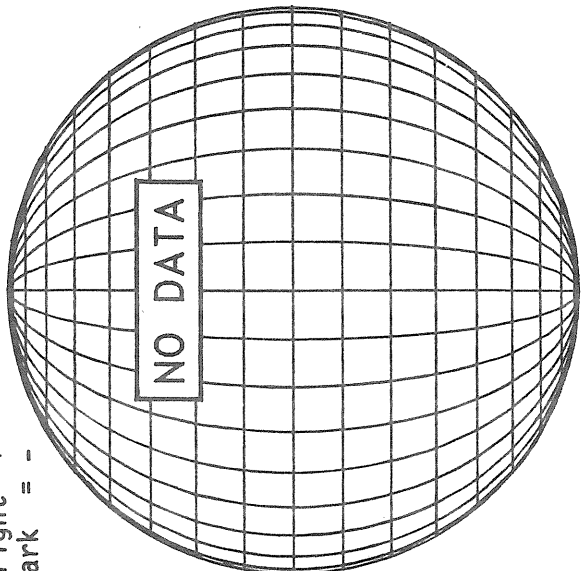
— 5303A(x1) 1442 UT
xxxx 5694A(x6) 1507 UT
NO 5694A ACTIVITY TODAY

JULY 24, 1987 (P= 7.35, $B_0 = 5.02$, $L_0 = 222.92$)

KITT PEAK MAGNETOGRAM

Bright= +
Dark = -

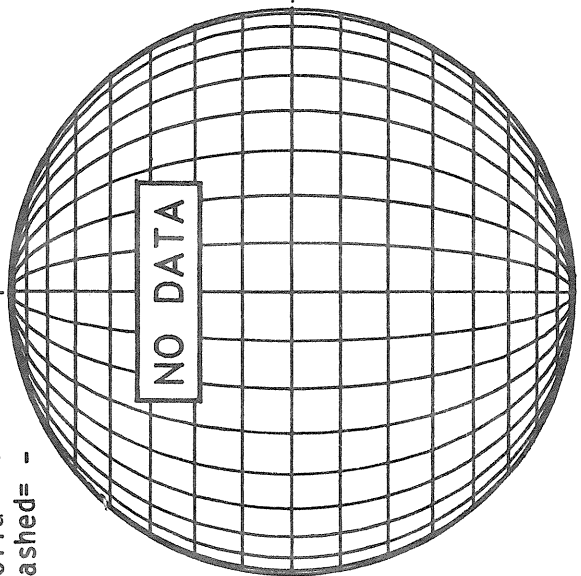
Np



STANFORD MAGNETOGRAM

Solid = +
Dashed = -

Np

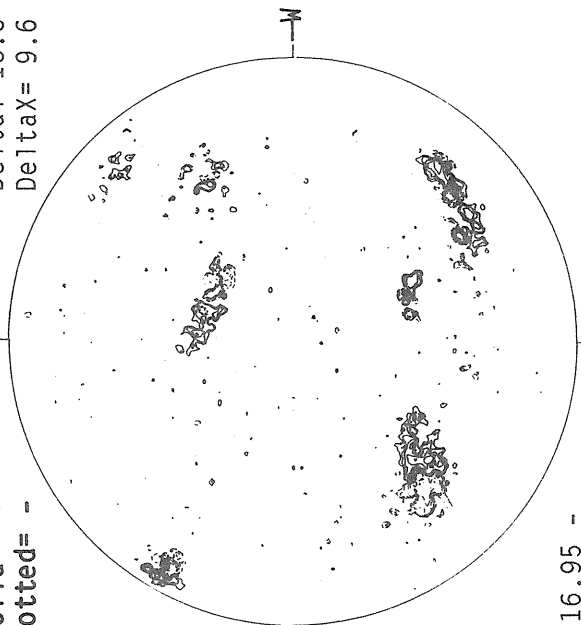


MT. WILSON MAGNETOGRAM

Solid = +
Dotted = -

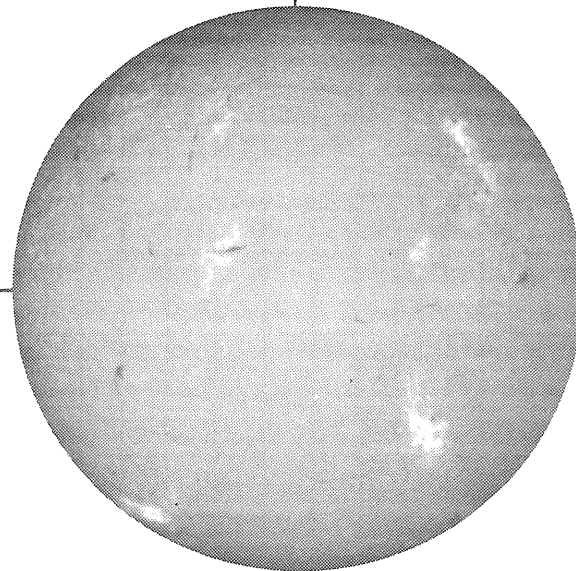
Np

DeltaY=13.0
DeltaX= 9.6



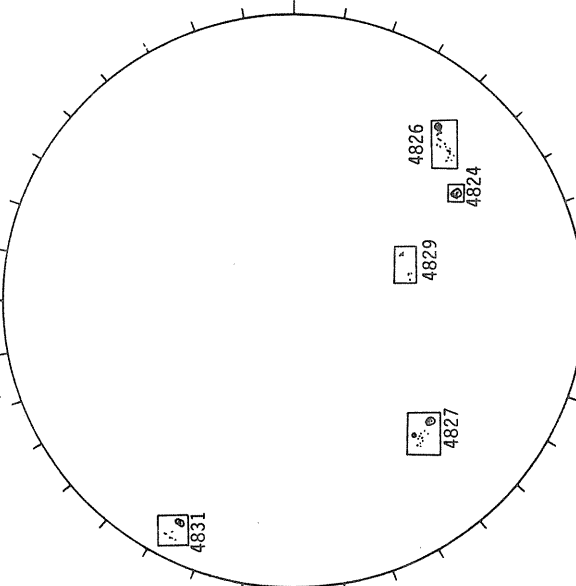
16.95 -
17.91 UT

SACRAMENTO PEAK H-ALPHA



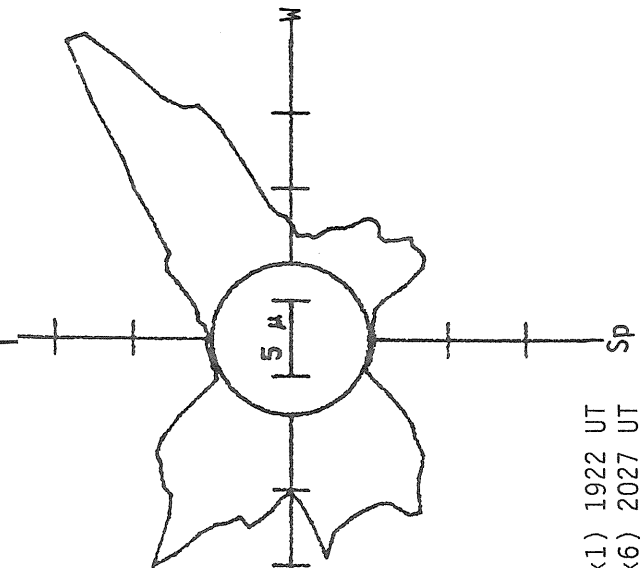
1455 UT

BOULDER SUNSPOTS



1400 UT

SACRAMENTO PEAK CORONA (1.15 Radii)



— 5303A(x1) 1922 UT
xxxx 5694A(x6) 2027 UT
NO 5694A ACTIVITY TODAY

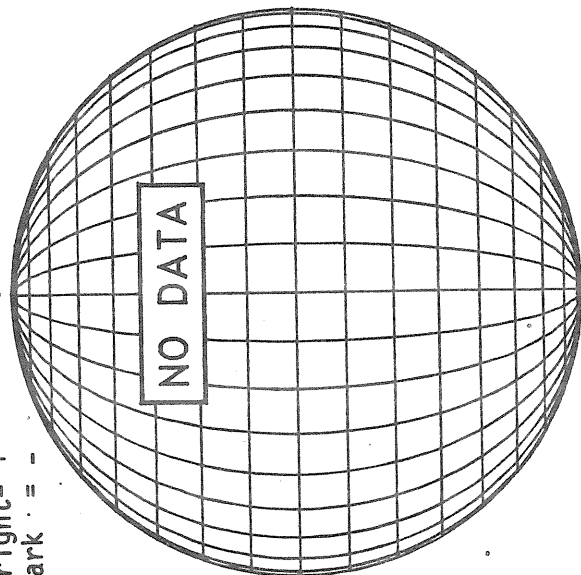
60
Jul 87

JULY 25, 1987 (P= 7.77, B₀ = 5.10, L₀ = 209.69)

KITT PEAK MAGNETOGRAM

Bright = +
Dark = -

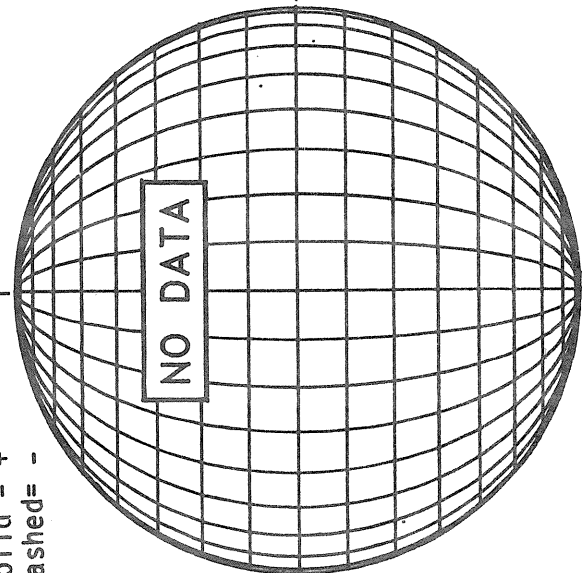
Np



STANFORD MAGNETOGRAM

Solid = +
Dashed = -

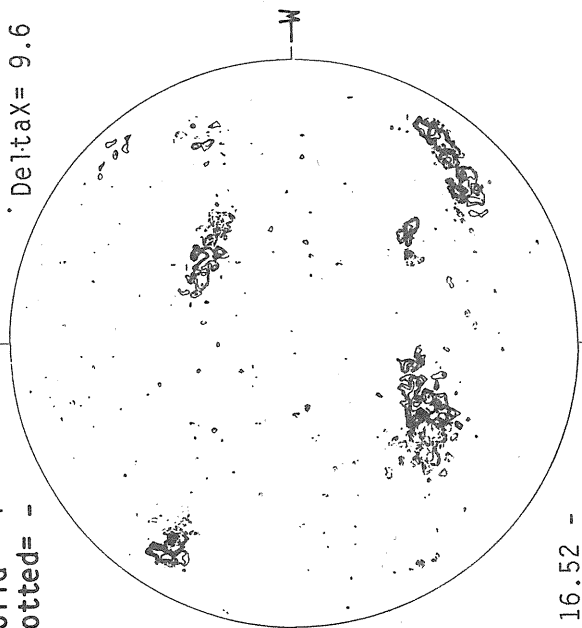
Np



MT. WILSON MAGNETOGRAM

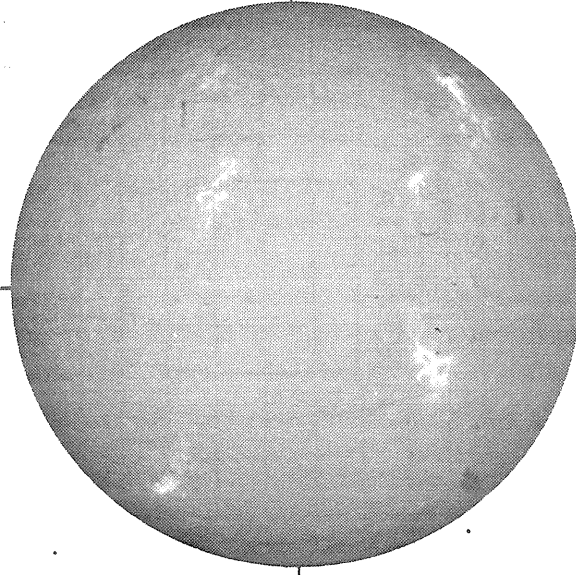
Solid = +
Dotted = -

Np



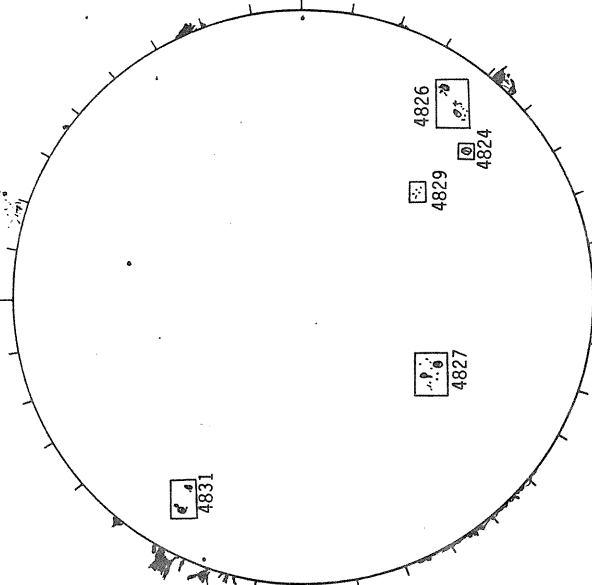
16.52 -
17.45 UT

SACRAMENTO PEAK H-ALPHA



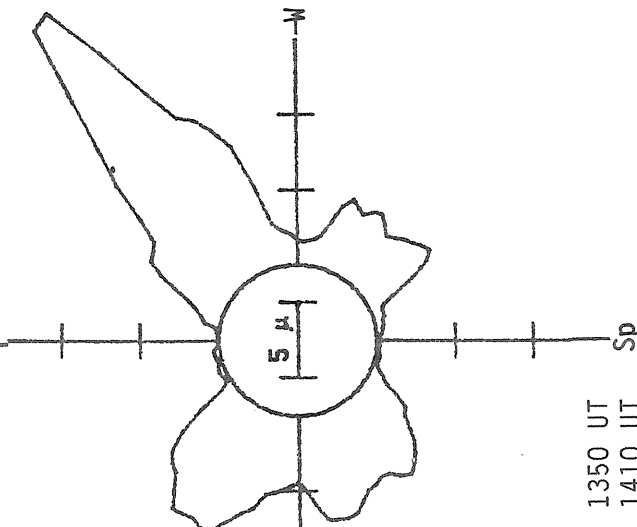
1516 UT

BOULDER SUNSPOTS



1317 UT
1623 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



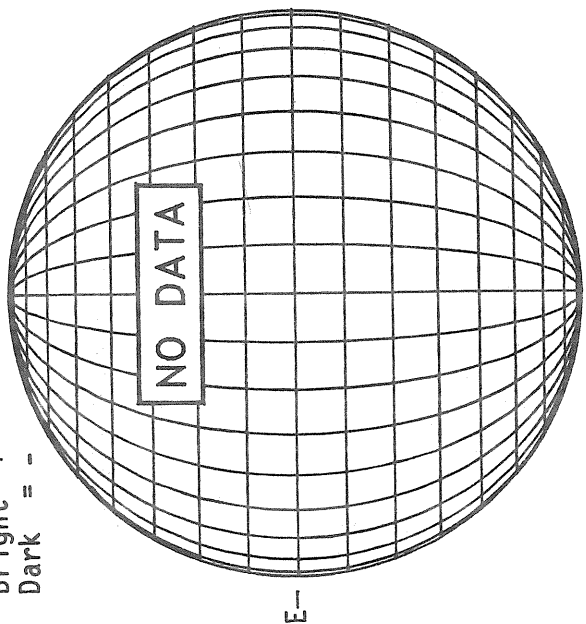
— 5303A(x1) 1350 UT
xxxx 5694A(x6) 1410 UT
NO 5694A ACTIVITY TODAY

JULY 26, 1987 (P= 8.19, B₀ = 5.18, L₀ = 196.46)

KITT PEAK MAGNETOGRAM

Np

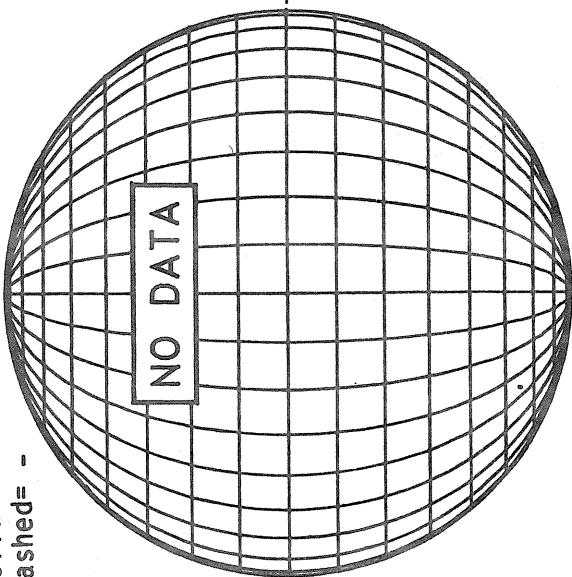
Bright= +
Dark = -



STANFORD MAGNETOGRAM

Np

Solid = +
Dashed = -

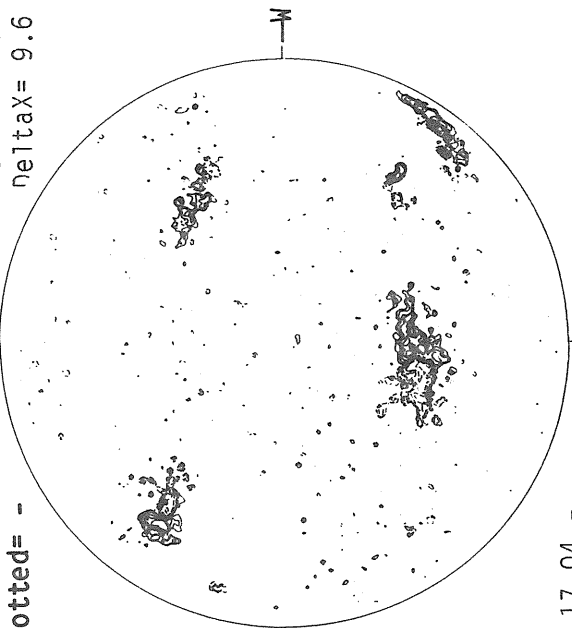


MT. WILSON MAGNETOGRAM

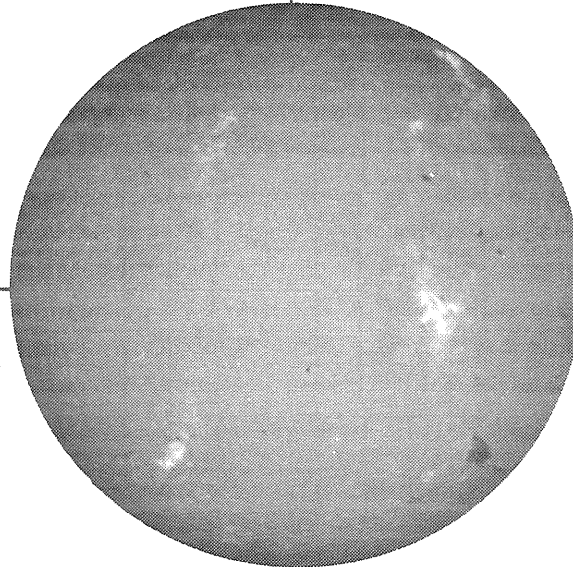
Np

Solid = +
Dotted = -

Delta Y = 13.0
Delta X = 9.6



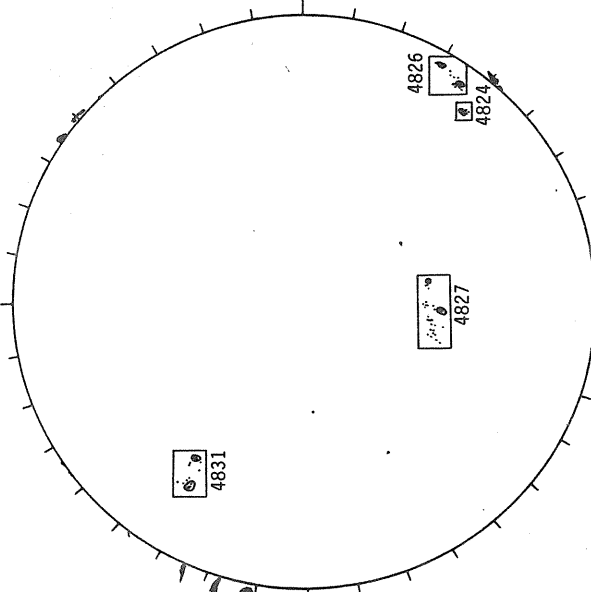
SACRAMENTO PEAK H-ALPHA



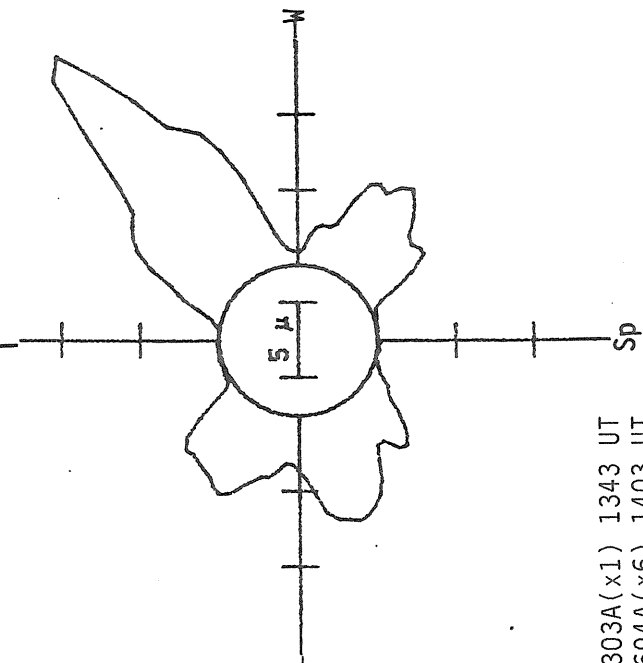
1509 UT

1308 UT
1323 UT BOUL Prom

BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

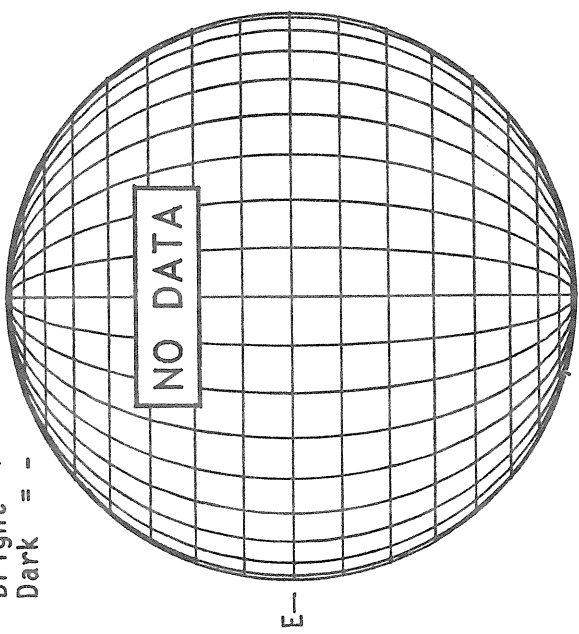


— 5303A(x1) 1343 UT
xxxx 5694A(x6) 1403 UT
NO 5694A ACTIVITY TODAY

JULY 27, 1987 (P= 8.61, B₀= 5.27, L₀= 183.24)

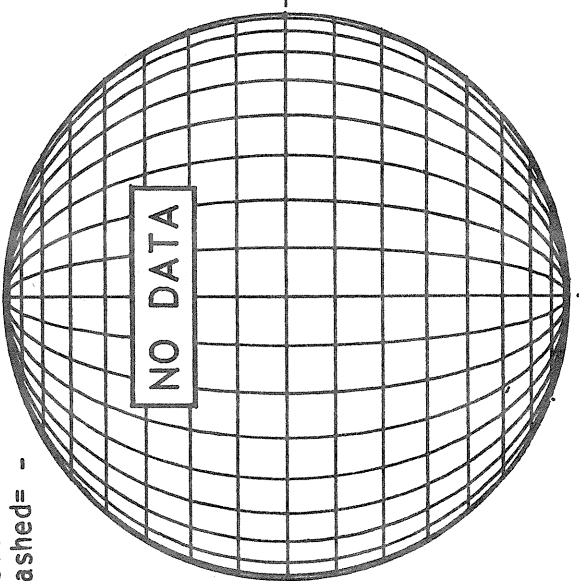
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



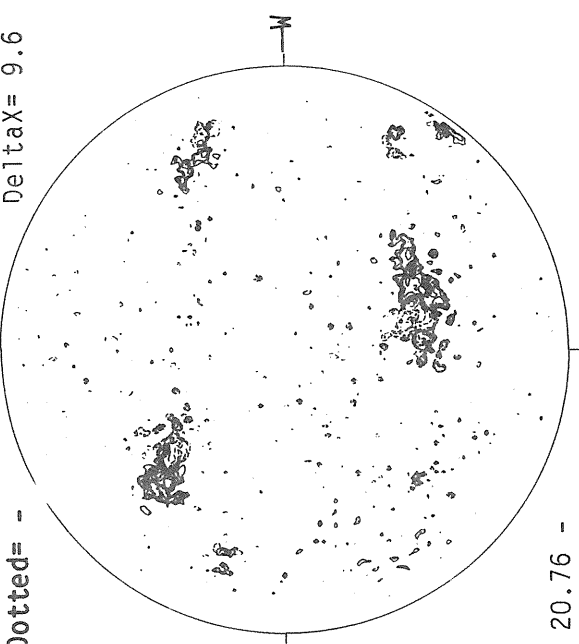
STANFORD MAGNETOGRAM

Solid = +
Dashed = -



MT. WILSON MAGNETOGRAM

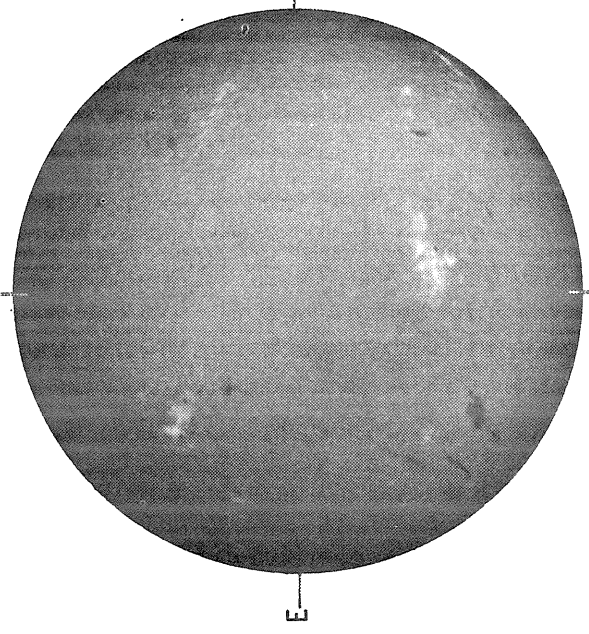
Solid = +
Dotted = -



DeltaY=13.0
DeltaX= 9.6

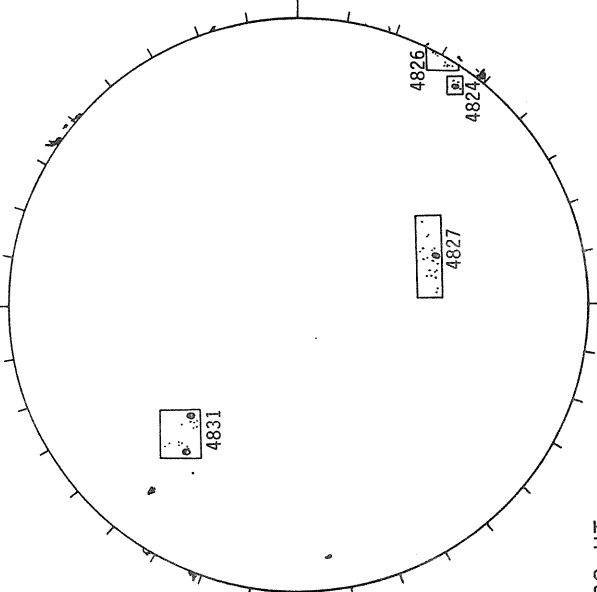
20.76 -
21.69 UT

BOULDER H-ALPHA



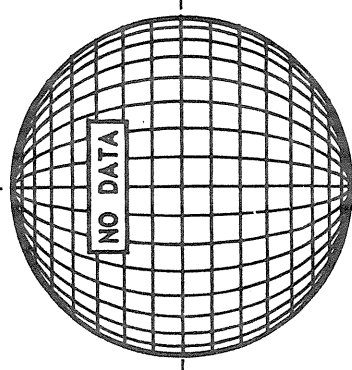
1335 UT

BOULDER SUNSPOTS



1322 UT
1335 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



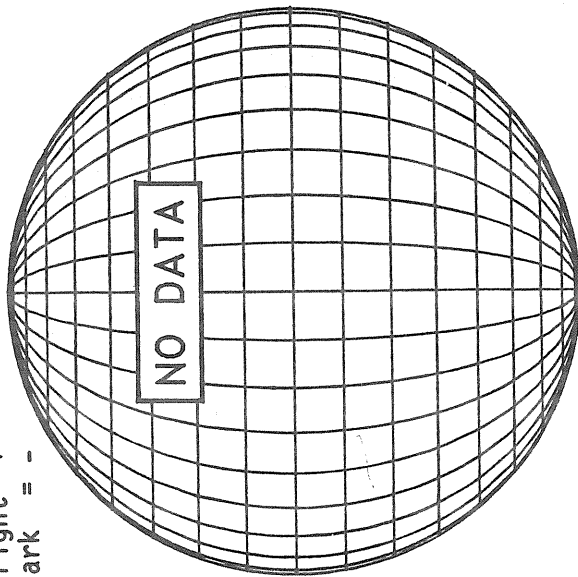
Sp

JULY 28, 1987 (P= 9.02, B₀ = 5.35, L₀ = 170.01)

KITT PEAK MAGNETOGRAM

Bright = +
Dark = -

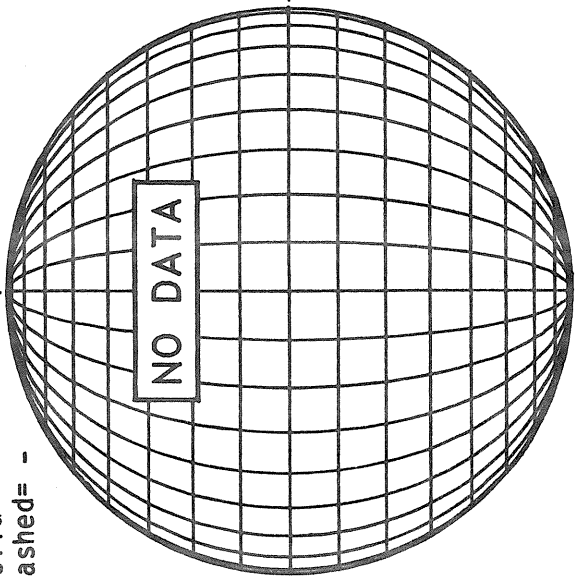
Np



STANFORD MAGNETOGRAM

Solid = +
Dashed = -

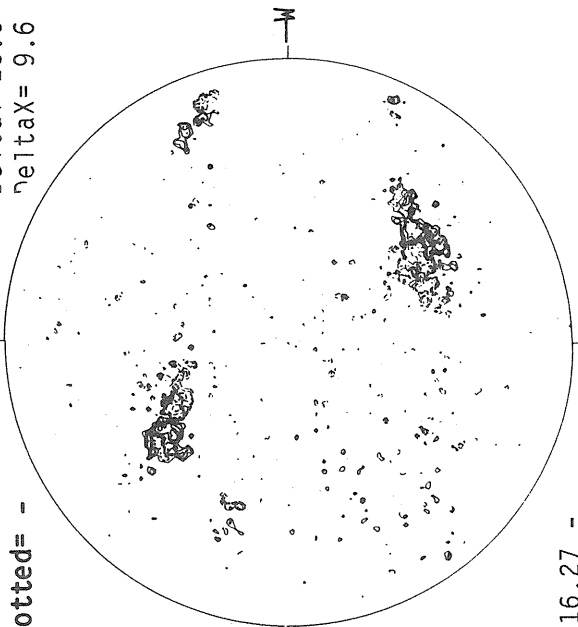
Np



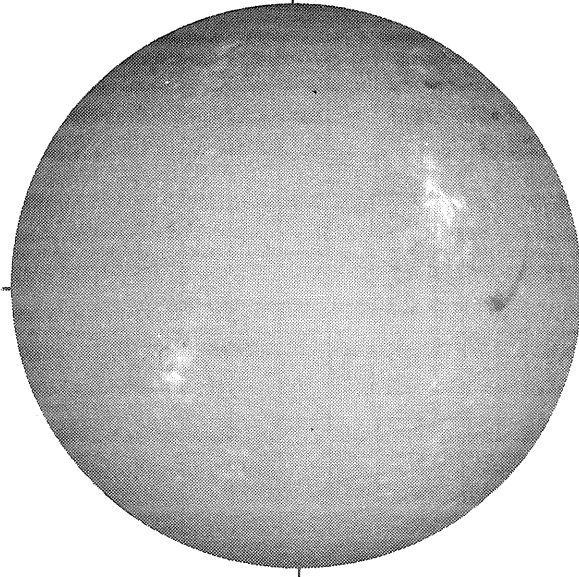
MT. WILSON MAGNETOGRAM

Solid = +
Dotted = -

Np

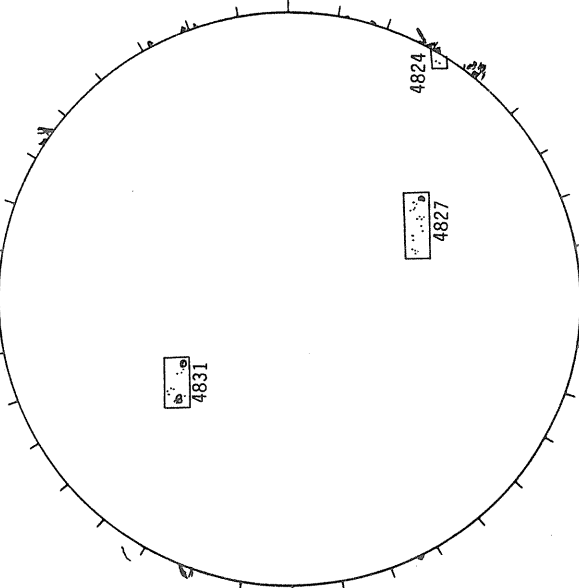


SACRAMENTO PEAK H-ALPHA



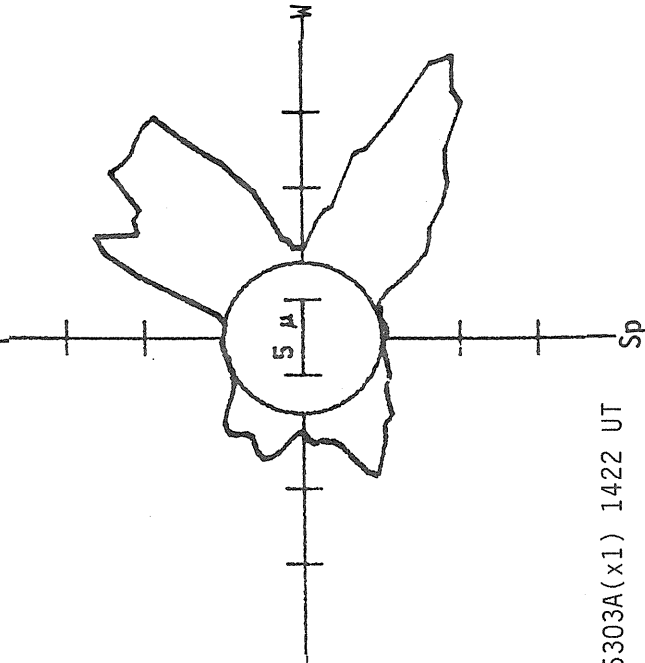
1426 UT

BOULDER SUNSPOTS



1323 UT
1338 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



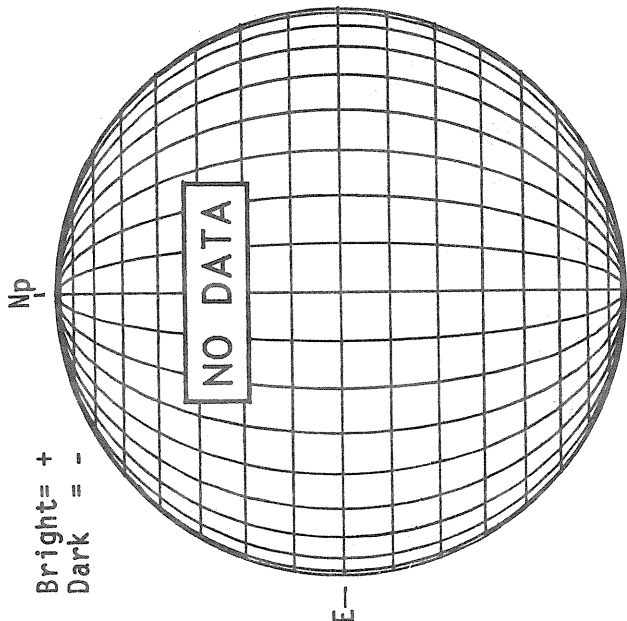
5303A(x1) 1422 UT

64
Jul 87

JULY 29, 1987 (P= 9.43, B₀ = 5.42, L₀ = 156.78)

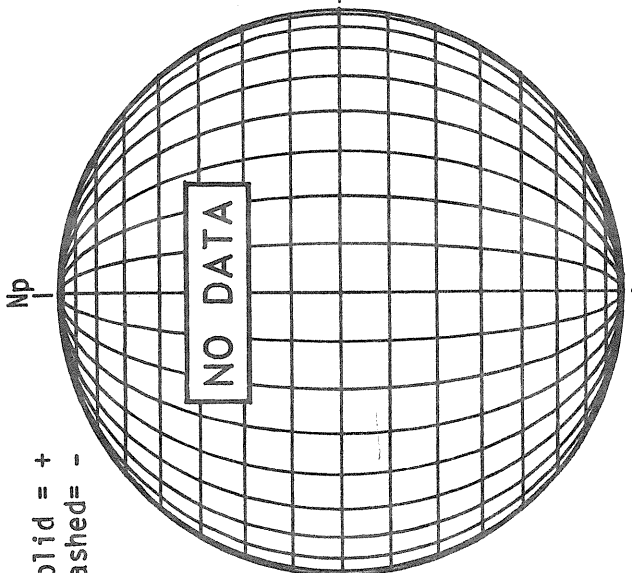
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



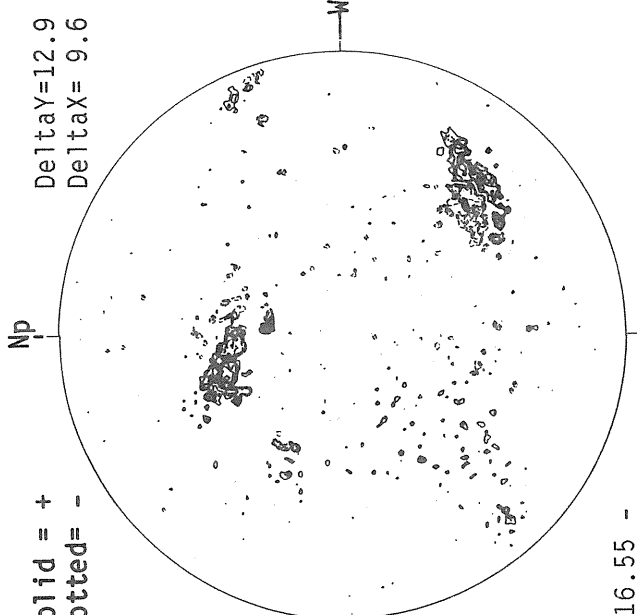
STANFORD MAGNETOGRAM

Solid = +
Dashed = -



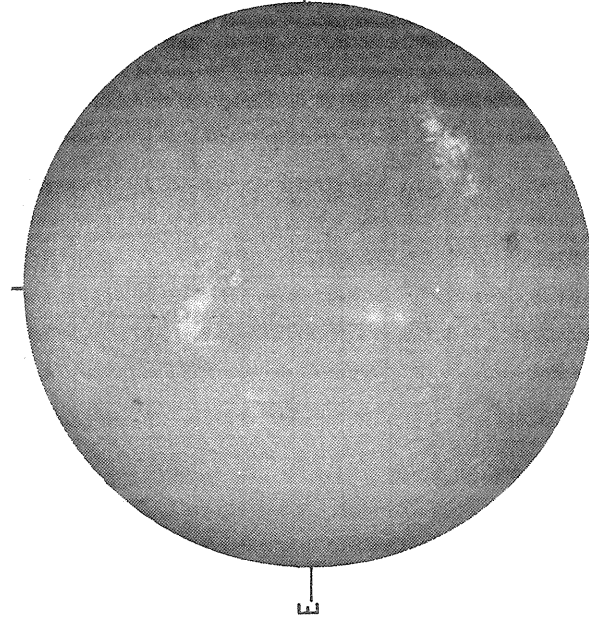
MT. WILSON MAGNETOGRAM

Solid = +
Dotted = -



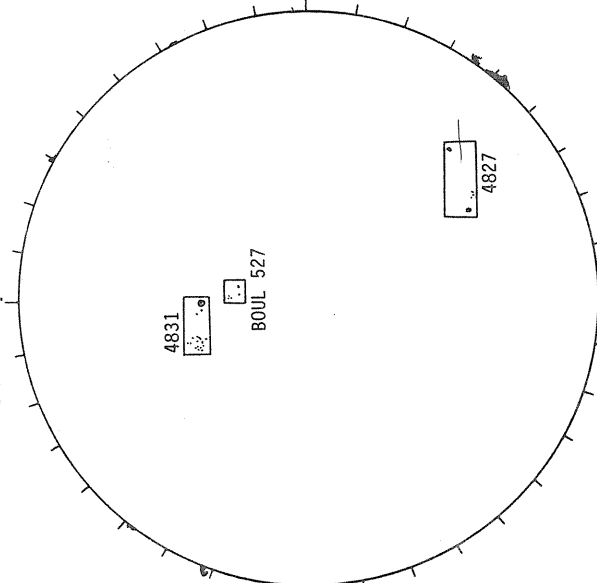
16.55 -
17.49 UT

SACRAMENTO PEAK H-ALPHA



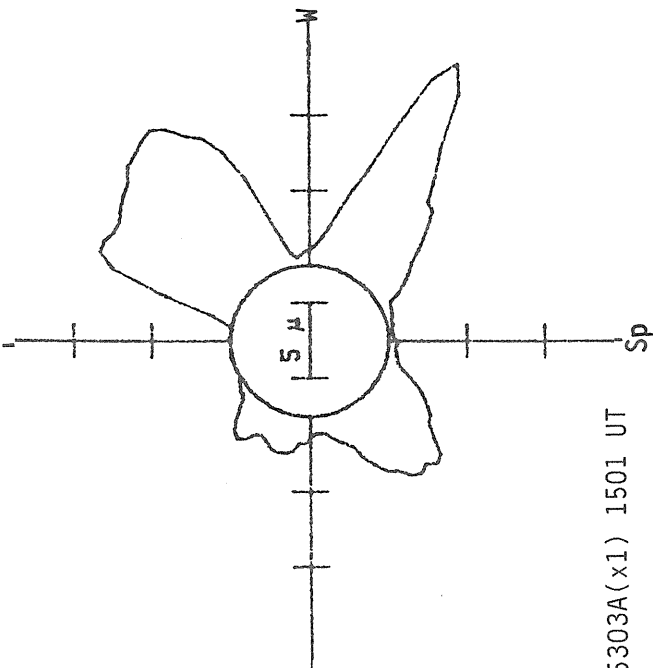
1408 UT

BOULDER SUNSPOTS



1335 UT
1445 UT BOUL Prom

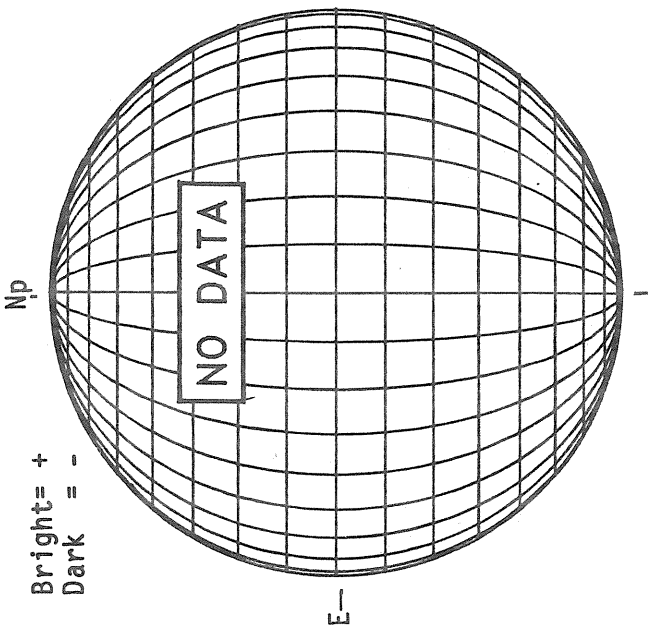
SACRAMENTO PEAK CORONA (1.15 Radii)



5303A(x1) 1501 UT

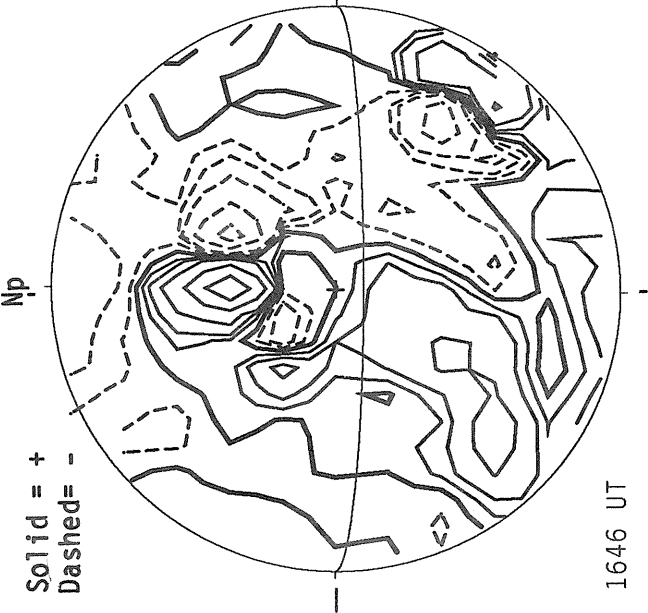
JULY 30, 1987 (P= 9.84, B₀ = 5.50, L₀ = 143.55)

KITT PEAK MAGNETOGRAM



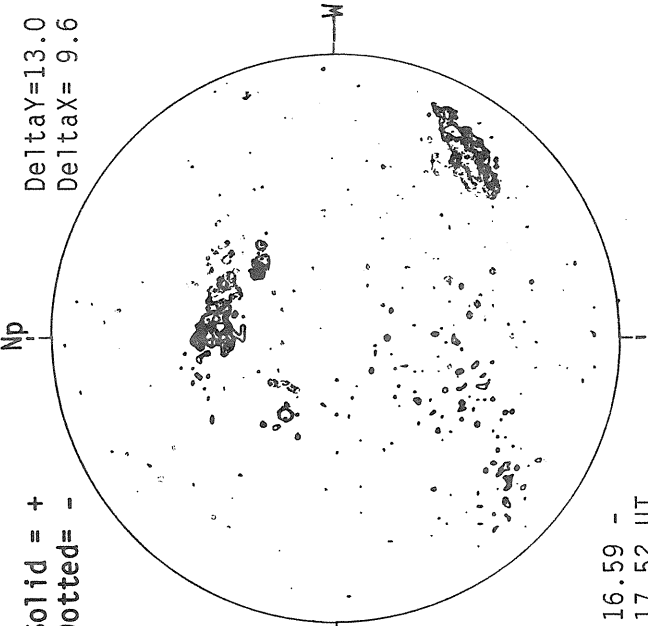
Bright= +
Dark = -

STANFORD MAGNETOGRAM



Solid = +
Dashed = -

MT. WILSON MAGNETOGRAM

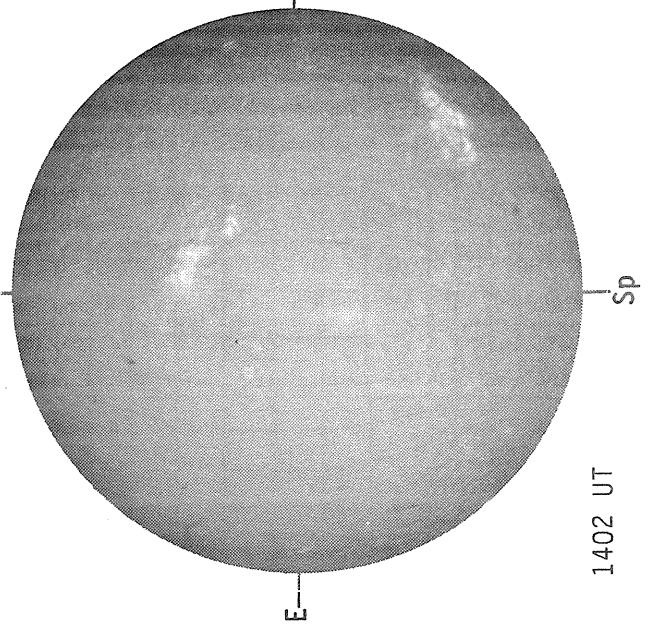


Solid = +
Dotted = -

Delta Y = 13.0
Delta X = 9.6

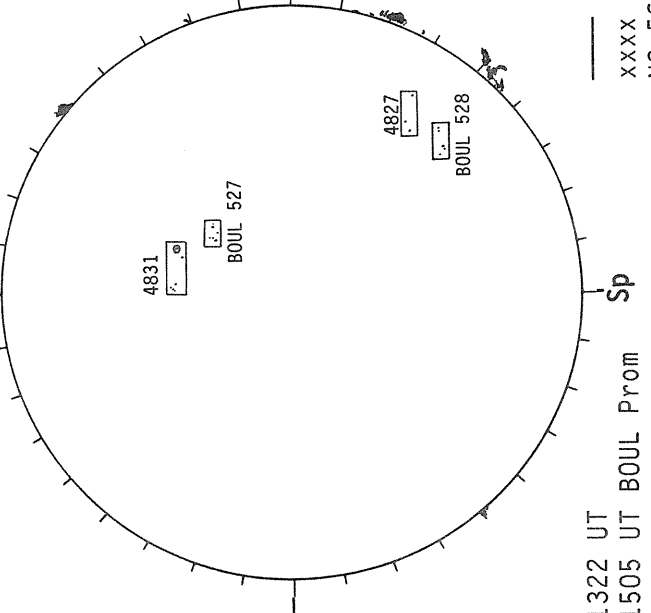
16.59 -
17.52 UT

SACRAMENTO PEAK H-ALPHA



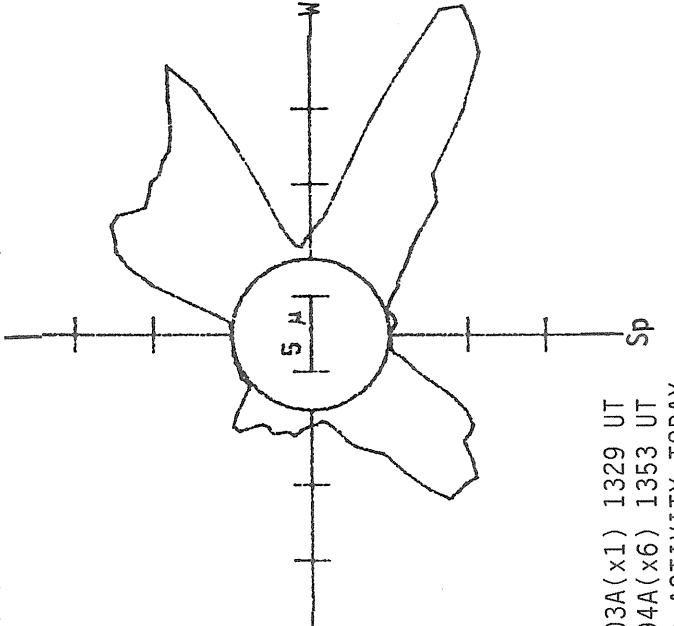
1402 UT

BOULDER SUNSPOTS



1322 UT
1505 UT

SACRAMENTO PEAK CORONA (1.15 Radii)



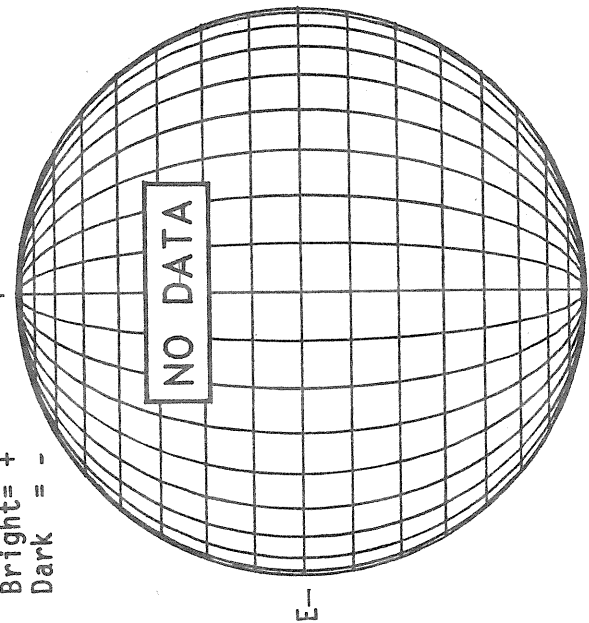
— 5303A(x1) 1329 UT
xxxx 5694A(x6) 1353 UT
NO 5694A ACTIVITY TODAY

JULY 31, 1987 (P= 10.24, B₀ = 5.58, L₀ = 130.33)

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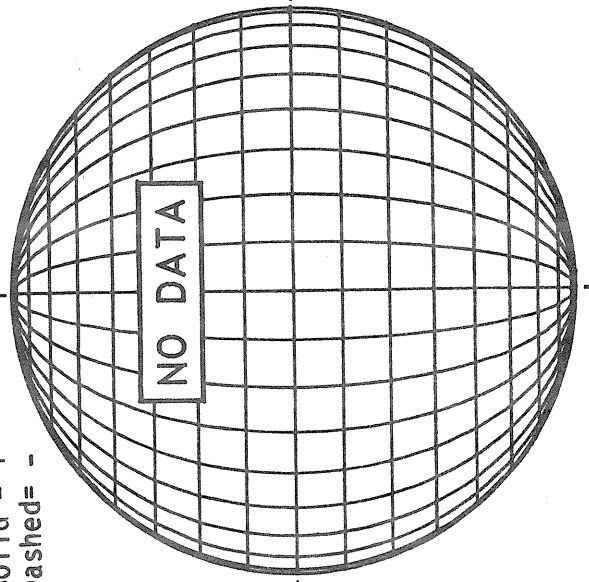
KITT PEAK MAGNETOGRAM

Bright = +
Dark = -



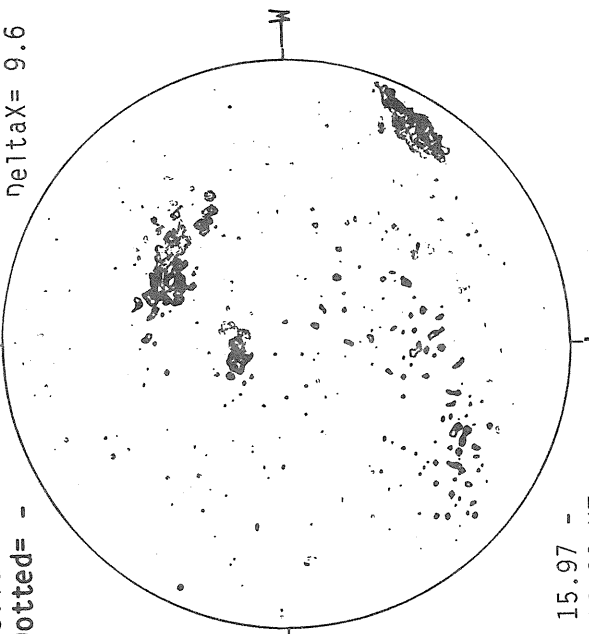
STANFORD MAGNETOGRAM

Solid = +
Dashed = -



MT. WILSON MAGNETOGRAM

Solid = +
Dotted = -

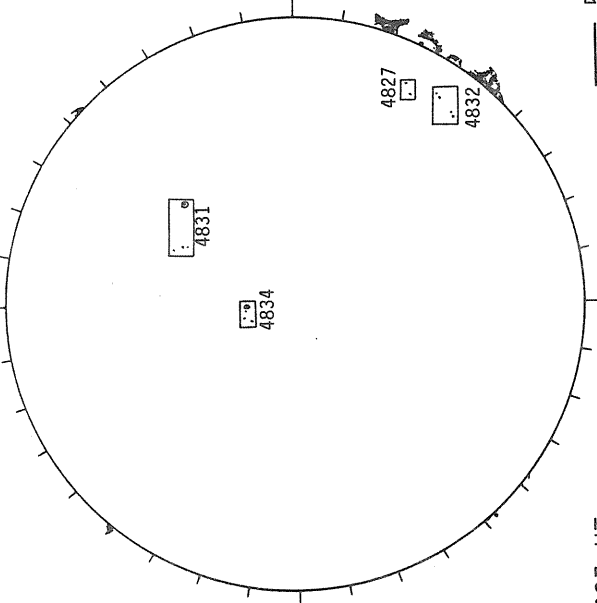


Delta Y = 12.9
Delta X = 9.6

15.97 -
16.90 UT

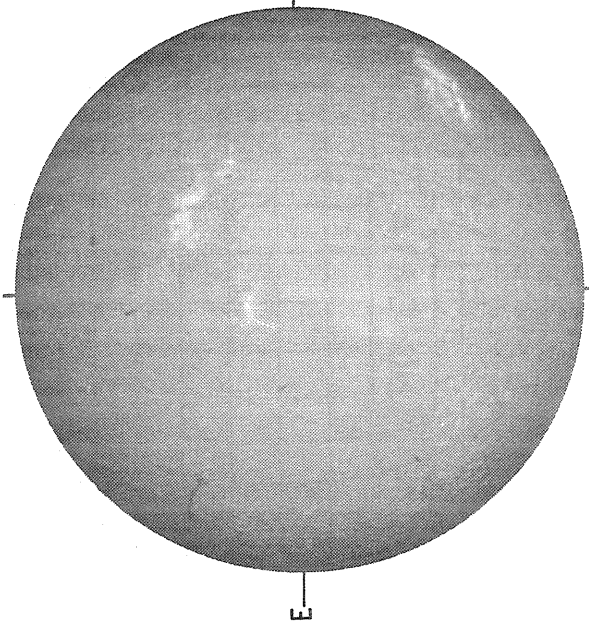
SACRAMENTO PEAK CORONA (1.15 Radii)

BOULDER SUNSPOTS

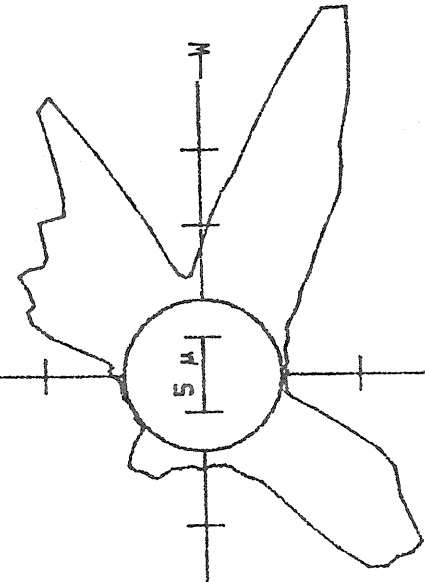


1337 UT
1455 UT BOUL Prom

SACRAMENTO PEAK H-ALPHA



1404 UT



— 5303A(x1) 1353 UT
xxx 5694A(x6) 1413 UT
NO 5694A ACTIVITY TODAY

SUNSPOT GROUPS
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

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JULY 1987

NOAA/ USAF Group	Mt Wilson Group	Sta	Mo	Day	Time (UT)	Lat	CMD	CMP Mo	Day	Max H	Mag Class	Spot Class	Corrected Area (10 ⁻⁶ Hemi)	Spot Count	Long. Extent (Deg)	Qual
4820		SVTO	06	25	0549	N29	E82	07	1.7		B	BX0		3	3	4
4820		BOUL	06	25	1343	N28	E73	07	1.3		A	HS	30	1	1	4
4820		RAMY	06	25	1445	N30	E79	07	1.8		A	HA	60	1	2	2
4820		HOLL	06	25	1520	N29	E77	07	1.7		A	HS	60	1	1	3
4820		PALE	06	25	1658	N28	E78	07	1.8		A	HS	60	1	1	4
4820		LEAR	06	26	0051	N29	E78	07	2.1		B	CHO	60	2	12	3
4820		CULG	06	26	0405	N31	E76	07	2.2		B	CSO	30	2	11	2
4820		SVTO	06	26	0545	N29	E72	07	1.9		B	CSO	60	2	9	4
4820		BOUL	06	26	1330	N28	E65	07	1.6		B	CSO	80	2	9	3
4820		RAMY	06	26	1340	N30	E69	07	2.0		B	DSO	60	2	10	3
4820	24411	MWIL	06	26	1345	N30	E70	07	2.1	5	(B)					
4820		HOLL	06	26	1745	N29	E70	07	2.2		B	DSO	90	2	9	2
4820		PALE	06	26	1850	N30	E65	07	1.9		B	DSO	60	2	8	3
4820		LEAR	06	27	0005	N30	E65	07	2.1		B	EHO	70	3	11	3
4820		CULG	06	27	0355	N28	E65	07	2.2		B	CSO	30	2	10	1
4820		BOUL	06	27	1302	N28	E57	07	2.0		B	CSO	20	2	9	1
4820	24411	MWIL	06	27	1345	N29	E58	07	2.1	5	(B)					
4820		RAMY	06	27	1415	N29	E57	07	2.1		B	ESO	30	2	11	4
4820		HOLL	06	27	1550	N30	E56	07	2.1		B	CSO	50	2	12	3
4820		PALE	06	27	1920	N26	E54	07	2.0		B	ERO	30	2	11	1
4820		LEAR	06	28	0008	N28	E52	07	2.1		B	BX0	30	2	12	2
4820		SVTO	06	28	0540	N28	E47	07	1.9		B	BX0	20	2	10	3
4820		BOUL	06	28	1310	N28	E43	07	1.9		B	CSO	40	4	11	2
4820	24411	MWIL	06	28	1345	N30	E45	07	2.1	4	(B)					
4820		RAMY	06	28	1430	N30	E44	07	2.1		B	BX0	20	5	12	4
4820		HOLL	06	28	1445	N29	E45	07	2.1		B	CRO	30	2	11	2
4820		PALE	06	28	1900	N30	E42	07	2.1		B	ERO	20	2	12	2
4820		LEAR	06	29	0135	N30	E39	07	2.1		B	CRO	20	6	12	3
4820		CULG	06	29	0525	N28	E37	07	2.1		B	CSO	30	2	11	2
4820		SVTO	06	29	0850	N30	E37	07	2.3		B	CSO	40	3	12	3
4820		HOLL	06	29	1315	N30	E33	07	2.1		B	CRO	20	5	11	4
4820	24411	MWIL	06	29	1345	N30	E32	07	2.1	4	(B)					
4820		RAMY	06	29	1400	N30	E33	07	2.2		A	AX	10	2	1	1
4820		PALE	06	29	1733	N30	E30	07	2.1		B	BX0	10	3	12	3
4820		LEAR	06	30	0350	N30	E30	07	2.5		B	BX0	10	2	3	2
4822		LEAR	07	07	0031	S18	W25	07	5.1		B	BX0	10	2	2	3
4822		SVTO	07	07	0710	S19	W29	07	5.1		B	BX0	10	2	3	3
4822		RAMY	07	07	1350	S17	W33	07	5.1		B	BX0	10	2	3	3
4822		HOLL	07	07	1601	S18	W33	07	5.1		A	AX		2	1	3
4822		LEAR	07	08	0150	S18	W40	07	5.0		B	BX0	10	3	3	4
4822		CULG	07	08	0405	S16	W42	07	5.0		B	BX0	10	2	3	3
4822		SVTO	07	08	0735	S17	W43	07	5.0		B	CRO	20	2	4	3
4822		BOUL	07	08	1332	S18	W43	07	5.3		B	BX0	20	5	4	3
4822	24413	MWIL	07	08	1345	S18	W45	07	5.1	5	(B)					
4822		RAMY	07	08	1351	S17	W45	07	5.1		B	BX0	30	6	5	4
4822		HOLL	07	08	1530	S17	W47	07	5.1		B	BX0	30	6	6	3
4822		PALE	07	08	1955	S18	W50	07	5.0		B	BX0	20	4	5	3
4822		LEAR	07	09	0010	S18	W52	07	5.0		B	BX0	10	3	6	3
4822		CULG	07	09	0540	S14	W57	07	4.9		B	BX0	10	3	4	3
4822		SVTO	07	09	1057	S17	W58	07	5.0		B	BX0	30	5	6	3
4822		BOUL	07	09	1320	S18	W60	07	5.0		B	CAO	80	3	3	3
4822		RAMY	07	09	1325	S18	W59	07	5.1		B	BX0	40	6	5	3
4822	24413	MWIL	07	09	1400	S18	W60	07	5.0	4	(B)					
4822		HOLL	07	09	1449	S19	W60	07	5.0		B	BX0	30	5	6	3
4822		PALE	07	09	1820	S15	W65	07	4.8		B	BX0	20	4	5	3
4822	24413	MWIL	07	10	1345	S17	W73	07	5.0	0	(B)					
4822		RAMY	07	10	1405	S18	W74	07	4.9		B	BX0	30	3	5	4
4822		HOLL	07	10	1515	S19	W75	07	4.9		B	BX0	30	3	7	3
4822		SVTO	07	10	1525	S16	W73	07	5.1		B	BX0	20	2	2	3
4822		PALE	07	10	2023	S15	W80	07	4.8		A	AX		1		2
4823		SVTO	07	15	1155	N27	W53	07	11.4		B	BX0	20	3	5	3
4823		BOUL	07	15	1315	N26	W50	07	11.7		B	BX0	20	4	5	2
4823		RAMY	07	15	1315	N26	W54	07	11.3		B	BX0	30	4	5	3
4823	24414	MWIL	07	15	1345	N27	W54	07	11.4	4	(B)					
4823		HOLL	07	15	1515	N28	W55	07	11.3		B	BX0	30	7	6	3
4823		PALE	07	15	1907	N27	W57	07	11.3		B	BX0	10	4	4	3
4823		LEAR	07	16	0053	N27	W60	07	11.4		B	BX0	30	3	2	4

SUNSPOT GROUPS
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

JULY 1987

NOAA/ USAF Group	Mt Wilson Group	Sta	Observation Time		Lat	CMD	CMP Mo Day	Max H	Mag Class	Spot Class	Corrected Area (10 ⁻⁶ Hemi)	Spot Count	Long. Extent (Deg)	Qual
4823		SVTO	07 16	0637	N27	W65	07 11.2		B	BXO	20	4	6	4
4823		RAMY	07 16	1515	N27	W69	07 11.2		A	AX	10	1	1	2
4823		PALE	07 16	1740	N27	W72	07 11.1		A	AX		1		3
4823	24414	MWIL	07 16	1900	N27	W70	07 11.3	3	(AP)					
4826	24416	MWIL	07 18	1400	S28	E37	07 21.5	3	(B)					
4826		HOLL	07 18	1414	S28	E36	07 21.4		A	AX	20	3	3	3
4826		BOUL	07 18	1420	S26	E34	07 21.2		A	AX	10	1	1	1
4826		RAMY	07 18	1526	S27	E37	07 21.5		A	AX	10	2	1	4
4826		PALE	07 18	1807	S28	E35	07 21.5		B	BXO	10	2	4	3
4826		LEAR	07 19	0635	S28	E28	07 21.5		B	BXO	10	3	5	3
4826		SVTO	07 19	0707	S28	E28	07 21.5		B	BXO	10	3	4	3
4826	24416	MWIL	07 19	1400	S28	E24	07 21.5	4	(BP)					
4826		HOLL	07 19	1406	S28	E24	07 21.5		B	BXO	20	5	4	3
4826		RAMY	07 19	1550	S28	E25	07 21.6		B	BXO	10	5	4	4
4826		PALE	07 19	1735	S29	E22	07 21.4		B	BXO	10	6	4	3
4826	24416	MWIL	07 20	0015	S27	E18	07 21.4	4	B					
4826		LEAR	07 20	0125	S28	E18	07 21.5		B	BXO	20	5	6	3
4826		CULG	07 20	0515	S28	E16	07 21.5		B	BXO	30	3	7	2
4826		RAMY	07 20	1555	S27	E12	07 21.6		B	CRO	20	9	7	4
4826		BOUL	07 20	1645	S28	E09	07 21.4		B	BXO	20	6	6	2
4826		PALE	07 20	1740	S28	E10	07 21.5		B	BXO	20	9	6	3
4826		LEAR	07 21	0213	S28	E05	07 21.5		B	DSO	70	13	7	4
4826		CULG	07 21	0500	S28	E04	07 21.5		B	CRO	50	10	7	3
4826		BOUL	07 21	1323	S28	W02	07 21.4		B	BXO	40	12	7	3
4826		RAMY	07 21	1325	S28	E00	07 21.5		B	DRO	50	8	7	1
4826		HOLL	07 21	1505	S26	W03	07 21.4		B	BXO	30	12	7	3
4826	24416	MWIL	07 21	1800	S28	W05	07 21.4	4	(B)					
4826		PALE	07 21	1825	S28	W04	07 21.4		B	BXO	50	11	7	2
4826		LEAR	07 22	0215	S28	W08	07 21.5		B	CRO	40	11	7	2
4826		RAMY	07 22	1307	S28	W13	07 21.5		B	DAO	60	15	8	4
4826		BOUL	07 22	1327	S28	W14	07 21.5		B	CAI	50	23	9	2
4826		HOLL	07 22	1428	S28	W15	07 21.4		BG	DSO	70	13	8	3
4826		SVTO	07 22	1640	S27	W15	07 21.5		B	CSO	60	19	8	3
4826		PALE	07 22	1950	S29	W16	07 21.6		BG	DSO	260	20	9	3
4826	24416	MWIL	07 22	2300	S28	W17	07 21.6	4	(B)					
4826		LEAR	07 23	0100	S28	W19	07 21.5		B	CSI	90	16	8	3
4826		CULG	07 23	0500	S28	W22	07 21.5		B	DAO	130	11	9	3
4826		SVTO	07 23	0810	S28	W24	07 21.5		B	DAI	200	23	8	3
4826		BOUL	07 23	1340	S27	W25	07 21.6		B	DSI	200	16	9	3
4826		RAMY	07 23	1348	S28	W25	07 21.6		B	DAI	230	22	10	4
4826	24416	MWIL	07 23	1430	S28	W27	07 21.5	6	(B)					
4826		HOLL	07 23	1530	S27	W27	07 21.5		B	DAI	210	26	9	3
4826		PALE	07 23	1840	S29	W29	07 21.5		B	DSO	210	18	10	3
4826		LEAR	07 24	0332	S28	W34	07 21.5		B	ESI	280	18	12	3
4826		CULG	07 24	0420	S30	W33	07 21.6		B	DAI	230	11	9	2
4826		SVTO	07 24	0730	S28	W35	07 21.6		B	EAI	250	27	11	4
4826		BOUL	07 24	1400	S27	W38	07 21.6		B	DAI	390	29	10	3
4826	24416	MWIL	07 24	1400	S28	W39	07 21.5	5	(B)					
4826		RAMY	07 24	1507	S28	W38	07 21.6		B	EAI	270	37	12	3
4826		HOLL	07 24	1515	S29	W40	07 21.5		B	DAI	270	27	10	3
4826		PALE	07 24	1735	S28	W41	07 21.5		B	ESO	270	20	12	3
4826		CULG	07 25	0440	S29	W50	07 21.3		B	DAI	230	10	10	2
4826		LEAR	07 25	0645	S28	W49	07 21.4		B	EAI	270	17	15	3
4826		SVTO	07 25	0700	S28	W49	07 21.5		B	EAI	280	16	11	2
4826		BOUL	07 25	1317	S30	W50	07 21.6		B	EAI	270	20	11	2
4826	24416	MWIL	07 25	1400	S28	W53	07 21.4	5	(B)					
4826		RAMY	07 25	1505	S29	W51	07 21.6		B	EAI	240	15	13	3
4826		HOLL	07 25	1508	S28	W52	07 21.6		B	EAI	190	21	13	3
4826		PALE	07 25	1817	S29	W56	07 21.4		B	ESO	210	22	11	3
4826		CULG	07 26	0430	S29	W63	07 21.2		B	EAI	310	12	11	2
4826		SVTO	07 26	0710	S28	W61	07 21.5		B	EKI	370	12	12	4
4826		LEAR	07 26	0736	S29	W62	07 21.4		B	DAO	120	11	10	3
4826		BOUL	07 26	1308	S30	W67	07 21.3		B	DAI	300	20	8	2
4826	24416	MWIL	07 26	1400	S28	W65	07 21.5	5	(B)					
4826		RAMY	07 26	1410	S29	W64	07 21.6		B	EKI	230	14	11	3
4826		HOLL	07 26	1545	S28	W65	07 21.6		B	EAO	310	12	14	4
4826		PALE	07 26	1935	S27	W66	07 21.7		B	EAO	150	6	12	1
4826		LEAR	07 27	0454	S28	W74	07 21.4		B	DAO	270	6	7	3

S U N S P O T G R O U P S
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

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NOAA/ USAF Group	Mt Wilson Group	Sta	Observation Time Mo Day (UT)	Lat	CMD	CMP Mo Day	Max H	Mag Class	Spot Class	Corrected Area (10 ⁻⁶ Hemi)	Spot Count	Long. Extent (Deg)	Qual
4826		CULG	07 27 0605	S29	W72	07 21.6			EAI	200	8	11	2
4826		SVTO	07 27 1315	S28	W76	07 21.6		B	DAO	150	6	10	2
4826		BOUL	07 27 1322	S29	W79	07 21.4		B	BX0	120	10	8	3
4826		RAMY	07 27 1327	S29	W78	07 21.4		B	DAI	250	10	10	3
4826	24416	MWIL	07 27 1400	S28	W76	07 21.6	3	B					
4826		HOLL	07 27 1525	S28	W80	07 21.4		B	ESO	130	5	15	4
4826		PALE	07 27 1840	S29	W81	07 21.4		B	CSO	40	6	8	3
4828	24417	MWIL	07 20 0015	N21	E22	07 21.7	4	B					
4828		RAMY	07 20 1555	N22	E15	07 21.8		B	BX0	10	2	1	4
4828		PALE	07 20 1740	N21	E16	07 22.0		B	BX0	10	3	3	3
4828		LEAR	07 21 0213	N22	E09	07 21.8		B	CSO	10	7	3	4
4828		CULG	07 21 0500	N21	E07	07 21.7		B	CRO	40	4	3	3
4828		BOUL	07 21 1323	N18	E03	07 21.8		B	BX0	20	7	4	3
4828		RAMY	07 21 1325	N21	E05	07 21.9		B	CAO	30	6	3	1
4828		HOLL	07 21 1505	N23	E03	07 21.8		B	BX0	20	11	3	3
4828	24417	MWIL	07 21 1800	N20	W00	07 21.8	3	(B)					
4828		PALE	07 21 1825	N21	E02	07 21.9		B	BX0	30	8	3	2
4828		LEAR	07 22 0215	N22	W03	07 21.9		B	CRO	10	5	3	2
4828		RAMY	07 22 1307	N21	W09	07 21.8		B	BX0	30	4	3	4
4828		BOUL	07 22 1327	N20	W10	07 21.8		B	BX0	20	5	3	2
4828		HOLL	07 22 1428	N22	W10	07 21.8		B	BX0	10	4	3	3
4828		SVTO	07 22 1640	N22	W12	07 21.8		B	BX0	10	3	2	3
4828		PALE	07 22 1950	N20	W16	07 21.6		B	AX	10	1	1	3
4828	24417	MWIL	07 22 2300	N21	W15	07 21.8	3	(AP)					
4828		LEAR	07 23 0100	N21	W18	07 21.7		A	AX	10	1	1	3
4828		CULG	07 23 0500	N21	W22	07 21.5		A	DR	20	1	1	3
4828		SVTO	07 23 0810	N22	W22	07 21.6		B	BX0	10	2	2	3
4828	24417	MWIL	07 23 1430	N22	W25	07 21.7	4	(AP)					
4828		HOLL	07 23 1530	N22	W25	07 21.7		A	AX		1		3
4824		LEAR	07 16 0053	S32	E79	07 22.3		A	AX	10	1	1	4
4824		SVTO	07 16 0637	S33	E78	07 22.5		B	BX0	10	2	4	4
4824		RAMY	07 16 1515	S30	E79	07 22.8		A	HA	120	1	2	2
4824		PALE	07 16 1740	S32	E70	07 22.3		B	CAO	100	4	12	3
4824	24415	MWIL	07 16 1900	S32	E72	07 22.5	2	(BF)					
4824		LEAR	07 17 0041	S33	E70	07 22.6		B	DHO	150	3	7	4
4824		CULG	07 17 0445	S29	E69	07 22.6		A	HA	40	1	1	2
4824		SVTO	07 17 0820	S32	E65	07 22.5		B	DSO	100	2	4	3
4824		BOUL	07 17 1340	S32	E62	07 22.5		B	DAO	120	4	3	2
4824		RAMY	07 17 1426	S30	E62	07 22.5		B	DAO	100	3	4	3
4824		HOLL	07 17 1600	S32	E62	07 22.6		B	DSO	110	4	4	3
4824		PALE	07 17 1754	S32	E63	07 22.7		A	HS	100	3	3	3
4824		LEAR	07 18 0038	S33	E56	07 22.5		B	DAO	150	3	7	3
4824		CULG	07 18 0550	S30	E55	07 22.6		A	HA	80	3	2	3
4824		SVTO	07 18 0920	S33	E54	07 22.7		B	DAO	150	5	5	3
4824	24415	MWIL	07 18 1400	S31	E50	07 22.5	4	(BF)					
4824		HOLL	07 18 1414	S32	E46	07 22.2		B	CSO	80	4	7	3
4824		BOUL	07 18 1420	S31	E47	07 22.3		B	DAO	100	3	3	1
4824		RAMY	07 18 1526	S31	E50	07 22.6		B	DAO	110	4	3	4
4824		PALE	07 18 1807	S32	E49	07 22.6		A	HS	80	3	3	3
4824		LEAR	07 19 0027	S33	E45	07 22.6		B	CSO	80	4	3	3
4824		SVTO	07 19 0707	S32	E40	07 22.5		B	CAO	100	4	3	3
4824	24415	MWIL	07 19 1400	S32	E38	07 22.6	4	(AF)					
4824		HOLL	07 19 1406	S32	E38	07 22.6		A	HA	90	3	3	3
4824		RAMY	07 19 1550	S31	E38	07 22.6		A	HA	100	3	3	4
4824		PALE	07 19 1735	S32	E36	07 22.6		A	HS	60	4	3	3
4824	24415	MWIL	07 20 0015	S32	E32	07 22.5	5	AF					
4824		LEAR	07 20 0125	S32	E32	07 22.6		A	HA	100	3	3	3
4824		CULG	07 20 0515	S31	E30	07 22.6		A	HA	110	2	2	2
4824		RAMY	07 20 1555	S31	E25	07 22.6		A	HA	100	4	3	4
4824		BOUL	07 20 1645	S32	E22	07 22.4		A	HA	80	5	3	2
4824		PALE	07 20 1740	S32	E23	07 22.5		A	HS	60	5	3	3
4824		LEAR	07 21 0213	S31	E19	07 22.6		B	DSO	120	6	4	4
4824		CULG	07 21 0500	S31	E18	07 22.6		B	DAC	100	5	2	3
4824		BOUL	07 21 1323	S31	E11	07 22.4		A	HA	100	7	2	3
4824		RAMY	07 21 1325	S31	E14	07 22.7		A	HA	120	5	2	1
4824		HOLL	07 21 1505	S30	E11	07 22.5		A	HS	100	4	2	3
4824	24415	MWIL	07 21 1800	S32	E09	07 22.5	4	(AF)					

SUNSPOT GROUPS
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

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NOAA/ USAF Group	Mt Wilson Group	Sta	Observation Time			CMD		CMP Mo Day	Max H	Mag Class	Spot Class	Corrected Area (10 ⁻⁶ Hemi)	Spot Count	Long. Extent (Deg)	Qual	
4824	24415	PALE	07	21	1825	S32	E11	07 22.6		A	HA	120	6	2	2	
4824		LEAR	07	22	0215	S32	E06	07 22.6		A	HA	100	5	2	2	
4824		RAMY	07	22	1307	S31	E02	07 22.7		A	HA	80	3	2	4	
4824		BOUL	07	22	1327	S31	E00	07 22.6		A	HA	80	9	3	2	
4824		HOLL	07	22	1428	S32	W02	07 22.4		B	CSO	80	8	3	3	
4824		SVTO	07	22	1640	S32	W02	07 22.5		B	CSO	100	6	3	3	
4824		PALE	07	22	1950	S32	W02	07 22.7		B	CSO	90	7	3	3	
4824		MWIL	07	22	2300	S32	W05	07 22.6	5	(BP)						
4824		LEAR	07	23	0100	S32	W06	07 22.6		B	CSO	50	8	2	3	
4824		CULG	07	23	0500	S32	W08	07 22.6		B	CAI	170	6	3	3	
4824	24415	SVTO	07	23	0810	S33	W09	07 22.6		B	CAO	110	7	3	3	
4824		BOUL	07	23	1340	S32	W13	07 22.5		B	CRO	60	5	3	3	
4824		RAMY	07	23	1348	S32	W12	07 22.6		B	CSO	90	5	3	4	
4824		MWIL	07	23	1430	S32	W14	07 22.5	5	(AF)						
4824		HOLL	07	23	1530	S32	W14	07 22.5		B	CAO	80	5	3	3	
4824		PALE	07	23	1840	S31	W16	07 22.5		B	CSO	120	3	3	3	
4824		LEAR	07	24	0332	S31	W20	07 22.6		A	HS	90	1	2	3	
4824		CULG	07	24	0420	S32	W19	07 22.7		A	HS	100	1	1	2	
4824		SVTO	07	24	0730	S31	W22	07 22.6		A	HS	80	2	2	4	
4824		BOUL	07	24	1400	S29	W26	07 22.5		A	HA	100	4	2	3	
4824	24415	MWIL	07	24	1400	S31	W25	07 22.6	5	(AF)						
4824		RAMY	07	24	1507	S31	W25	07 22.6		A	HA	90	2	2	3	
4824		HOLL	07	24	1515	S32	W26	07 22.6		A	HS	100	2	2	3	
4824		PALE	07	24	1735	S31	W28	07 22.5		A	HS	110	2	2	3	
4824		CULG	07	25	0440	S31	W35	07 22.4		A	HS	60	1	1	2	
4824		LEAR	07	25	0645	S31	W35	07 22.5		A	HA	120	3	2	3	
4824		SVTO	07	25	0700	S31	W35	07 22.5		A	HS	60	1	1	2	
4824		BOUL	07	25	1317	S30	W36	07 22.7		A	HA	90	2	2	2	
4824		MWIL	07	25	1400	S32	W38	07 22.6	5	(AF)						
4824		RAMY	07	25	1505	S32	W37	07 22.7		A	HA	70	1	3	3	
4824	24415	HOLL	07	25	1508	S31	W39	07 22.5		A	HS	80	2	2	3	
4824		PALE	07	25	1817	S32	W41	07 22.5		A	HS	130	1	2	3	
4824		CULG	07	26	0430	S31	W47	07 22.5		A	HS	70	1	1	2	
4824		SVTO	07	26	0710	S31	W47	07 22.6		A	HS	110	1	2	4	
4824		LEAR	07	26	0736	S31	W46	07 22.7		A	HS	50	2	2	3	
4824		BOUL	07	26	1308	S30	W50	07 22.6		A	HA	90	4	2	2	
4824		MWIL	07	26	1400	S32	W50	07 22.6	5	(AF)						
4824		RAMY	07	26	1410	S32	W51	07 22.5		A	HS	60	2	2	3	
4824		HOLL	07	26	1545	S31	W52	07 22.5		A	HS	80	2	2	4	
4824		PALE	07	26	1935	S30	W53	07 22.6		A	HS	40	1	2	1	
4824	24415	LEAR	07	27	0454	S32	W59	07 22.5		A	HS	100	2	2	3	
4824		SVTO	07	27	1315	S31	W64	07 22.5		A	HS	110	1	2	2	
4824		BOUL	07	27	1322	S31	W62	07 22.7		A	HA	130	4	4	3	
4824		RAMY	07	27	1327	S32	W63	07 22.6		A	HA	80	2	2	3	
4824		MWIL	07	27	1400	S32	W64	07 22.5	5	(AF)						
4824		HOLL	07	27	1525	S31	W66	07 22.4		A	HS	60	2	2	4	
4824		PALE	07	27	1840	S31	W69	07 22.3		A	HS	60	1	2	3	
4824		CULG	07	28	0440	S32	W72	07 22.5		A	HS	30	1	1	3	
4824		SVTO	07	28	0745	S32	W77	07 22.2		A	HS	30	1	2	2	
4824		BOUL	07	28	1323	S29	W77	07 22.5		B	BXO	30	2	3	2	
4824	24415	MWIL	07	28	1345	S32	W76	07 22.6	5	(AF)						
4824		RAMY	07	28	1345	S33	W77	07 22.4		A	HR	60	1	2	3	
4824		HOLL	07	28	1525	S31	W78	07 22.5		A	HR	30	1	1	3	
4824		PALE	07	28	1750	S32	W85	07 22.0		A	HR	10	1	1	3	
4829		24419	HOLL	07	21	1505	S18	E29	07 23.8		A	AX	10	2	1	3
4829			MWIL	07	21	1800	S19	E26	07 23.7	3	(BP)					
4829			PALE	07	21	1825	S19	E28	07 23.9		B	BXO	10	4	2	2
4829			LEAR	07	22	0215	S20	E23	07 23.9		A	AX	10	2	1	2
4829			RAMY	07	22	1307	S18	E18	07 23.9		B	BXO	20	6	4	4
4829			BOUL	07	22	1327	S19	E15	07 23.7		B	BXO	10	5	4	2
4829	HOLL		07	22	1428	S19	E16	07 23.8		B	BXO	10	5	4	3	
4829	SVTO		07	22	1640	S18	E15	07 23.8		B	BXO	20	5	4	3	
4829	PALE		07	22	1950	S20	E13	07 23.8		B	CRO	70	7	5	3	
4829	MWIL		07	22	2300	S19	E11	07 23.8	4	(B)						
4829	LEAR	07	23	0100	S20	E10	07 23.8		A	AX	10	6	4	3		
4829	CULG	07	23	0500	S18	E07	07 23.7		B	BXO	50	7	6	3		
4829	SVTO	07	23	0810	S18	E06	07 23.8		B	BXO	30	9	5	3		
4829	BOUL	07	23	1340	S19	E01	07 23.6		B	BXO	20	3	2	3		

S U N S P O T G R O U P S
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NOAA/ USAF Group	Mt Wilson Group	Sta	Mo	Day	Time (UT)	Lat	CMD	Mo	Day	CMP	Max H	Mag Class	Spot Class	Corrected Area (10 ⁻⁶ Hemi)	Spot Count	Long. Extent (Deg)	Qual
4829	24419	RAMY	07	23	1348	S18	E04	07	23.9			B	BXO	20	6	6	4
4829		MWIL	07	23	1430	S19	E01	07	23.7		4	(B)					
4829		HOLL	07	23	1530	S18	E03	07	23.9			B	CRO	40	10	7	3
4829		PALE	07	23	1840	S19	E00	07	23.8			B	BXO	20	8	5	3
4829	24419	LEAR	07	24	0332	S18	W03	07	23.9			B	CSO	60	9	8	3
4829		CULG	07	24	0420	S20	W02	07	24.0			B	CAO	70	5	6	2
4829		SVTO	07	24	0730	S17	W04	07	24.0			B	CSO	50	11	7	4
4829		MWIL	07	24	1400	S18	W07	07	24.1		4	(BP)					
4829	24419	BOUL	07	24	1400	S18	W08	07	24.0			B	BXO	60	7	6	3
4829		RAMY	07	24	1507	S19	W06	07	24.2			B	CAO	30	9	5	3
4829		HOLL	07	24	1515	S19	W07	07	24.1			B	CRO	40	8	5	3
4829		PALE	07	24	1735	S19	W09	07	24.0			B	CSO	30	8	5	3
4829	24419	CULG	07	25	0440	S20	W19	07	23.7			B	CSO	20	4	2	2
4829		LEAR	07	25	0645	S18	W19	07	23.8			B	CRO	20	7	3	3
4829		SVTO	07	25	0700	S18	W19	07	23.8			B	CRI	20	6	3	2
4829		BOUL	07	25	1317	S19	W22	07	23.9			B	BXO	20	6	4	2
4829	24419	MWIL	07	25	1400	S18	W23	07	23.8		4	(B)					
4829		RAMY	07	25	1505	S19	W22	07	23.9			B	BXO	10	5	3	3
4829		HOLL	07	25	1508	S18	W24	07	23.8			A	AX	10	6	3	3
4829		PALE	07	25	1817	S19	W26	07	23.8			B	BXO	20	8	4	3
4829	24419	CULG	07	26	0430	S20	W32	07	23.7			B	BXO	10	2	2	2
4829		SVTO	07	26	0710	S18	W39	07	23.3			B	BXO	10	4	3	4
4829		LEAR	07	26	0736	S19	W33	07	23.8			A	AX	10	3	2	3
4829		HOLL	07	26	1545	S18	W38	07	23.8			A	AX	10	2	2	4
4825		SVTO	07	23	0810	N22	E11	07	24.2			B	BXO	10	2	3	3
4825		SVTO	07	24	0730	N25	E03	07	24.5			A	AX		1	1	4
4830	24420	RAMY	07	22	1307	S19	E46	07	26.0			A	AX	10	1	1	4
4830		BOUL	07	22	1327	S19	E42	07	25.8			A	AX	10	1	1	2
4830		HOLL	07	22	1428	S21	E44	07	26.0			A	AX	10	1	1	3
4830		SVTO	07	22	1640	S19	E44	07	26.0			B	BXO	10	2	2	3
4830	24420	PALE	07	22	1950	S19	E42	07	26.0			A	AXO	10	2	1	3
4830		MWIL	07	22	2300	S19	E38	07	25.9		3	(AP)					
4830		LEAR	07	23	0100	S20	E39	07	26.0			A	AX	10	2	1	3
4830		CULG	07	23	0500	S18	E37	07	26.0			A	AX	10	1	1	3
4830	24420	SVTO	07	23	0810	S20	E34	07	25.9			B	BXO	10	2	2	3
4830		RAMY	07	23	1348	S18	E32	07	26.0			A	AX	10	1	1	4
4830		MWIL	07	23	1430	S20	E31	07	26.0		2	(AP)					
4830		HOLL	07	23	1530	S20	E30	07	25.9			A	AX		1		3
4830	24420	PALE	07	23	1840	S20	E29	07	26.0			A	AX		1		3
4830		SVTO	07	26	0710	S21	W00	07	26.3			B	BXO	10	4	2	4
4830		RAMY	07	26	1410	S21	W03	07	26.4			A	AX		2	1	3
4830		HOLL	07	26	1545	S21	W05	07	26.3			B	BXO	10	4	3	4
4830	24420	PALE	07	26	1935	S21	W05	07	26.4			B	BXO	20	3	4	1
4830		SVTO	07	27	1315	S21	W16	07	26.3			B	BXO	10	2	4	2
4830		RAMY	07	27	1327	S22	W15	07	26.4			A	AX	10	2	3	3
4830		HOLL	07	27	1525	S21	W18	07	26.3			B	BXO	10	3	4	4
4830	24420	PALE	07	27	1840	S22	W18	07	26.4			B	BXO	10	5	6	3
4830		SVTO	07	28	0745	S22	W25	07	26.4			A	AX	10	1	1	2
4830		RAMY	07	28	1345	S21	W26	07	26.6			A	AX	10	1	1	3
4830		HOLL	07	28	1525	S21	W27	07	26.6			A	AX	10	1	1	3
4830		PALE	07	28	1750	S20	W27	07	26.7			A	AX	10	1	1	3
4827	24418	MWIL	07	20	0015	S24	E83	07	26.4		4	B					
4827		LEAR	07	20	0714	S23	E81	07	26.5			A	HS	30	1	2	4
4827		RAMY	07	20	1555	S23	E77	07	26.6			A	HA	70	1	3	4
4827		PALE	07	20	1740	S24	E80	07	26.9			A	HS	60	1	2	3
4827	24418	LEAR	07	21	0213	S23	E76	07	26.9			B	FHO	150	8	16	4
4827		CULG	07	21	0500	S21	E73	07	26.8			B	CSO	120	3	8	3
4827		BOUL	07	21	1323	S23	E66	07	26.6			B	CAO	80	7	8	3
4827		RAMY	07	21	1325	S23	E66	07	26.6			B	DAO	200	6	10	1
4827	24418	HOLL	07	21	1505	S23	E69	07	26.9			B	DAO	220	10	10	3
4827		MWIL	07	21	1800	S23	E66	07	26.8		4	(B)					
4827		PALE	07	21	1825	S24	E70	07	27.2			B	DSO	210	10	8	2
4827		LEAR	07	22	0215	S22	E63	07	26.9			B	DAO	200	10	10	2
4827	24418	RAMY	07	22	1307	S23	E59	07	27.1			B	DSI	280	13	8	4
4827		BOUL	07	22	1327	S22	E55	07	26.8			B	CAI	150	16	8	2
4827		HOLL	07	22	1428	S23	E57	07	27.0			B	DSO	180	14	7	3

SUNSPOT GROUPS
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

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NOAA/ USAF Group	Mt Wilson Group	Sta	Observation Time		Lat CMD		CMP Mo Day	Max H	Mag Class	Spot Class	Corrected Area (10 ⁻⁶ Hemi)	Spot Count	Long. Extent (Deg)	Qual
4827		SVTO	07	22	1640	S24 E55	07 26.9		B	DSO	310	15	8	3
4827		PALE	07	22	1950	S24 E50	07 26.7		B	DSO	260	13	8	3
4827	24418	MWIL	07	22	2300	S23 E51	07 26.9	4	(B)					
4827		LEAR	07	23	0100	S24 E51	07 27.0		B	DSO	200	9	8	3
4827		CULG	07	23	0500	S22 E48	07 26.9		B	DSO	230	10	7	3
4827		SVTO	07	23	0810	S23 E46	07 26.9		B	DSI	260	19	7	3
4827		BOUL	07	23	1340	S23 E43	07 26.9		B	CSI	150	10	7	3
4827		RAMY	07	23	1348	S22 E46	07 27.1		B	DSI	220	15	10	4
4827	24418	MWIL	07	23	1430	S24 E43	07 26.9	5	(BG)					
4827		HOLL	07	23	1530	S23 E44	07 27.0		B	ESO	210	14	11	3
4827		PALE	07	23	1840	S23 E43	07 27.1		B	ESO	210	31	12	3
4827		LEAR	07	24	0332	S22 E36	07 26.9		B	DSO	170	13	8	3
4827		CULG	07	24	0420	S21 E36	07 26.9		B	DSO	260	9	5	2
4827		SVTO	07	24	0730	S23 E35	07 27.0		B	DSI	170	16	10	4
4827		BOUL	07	24	1400	S22 E30	07 26.9		B	DAI	250	16	8	3
4827	24418	MWIL	07	24	1400	S23 E30	07 26.9	5	(BG)					
4827		RAMY	07	24	1507	S21 E31	07 27.0		G	DAI	160	17	7	3
4827		HOLL	07	24	1515	S23 E31	07 27.0		B	DSO	180	17	7	3
4827		PALE	07	24	1735	S23 E30	07 27.0		B	DSO	170	18	10	3
4827		CULG	07	25	0440	S23 E22	07 26.9		B	DSO	220	7	6	2
4827		LEAR	07	25	0645	S22 E23	07 27.0		B	DAI	190	26	12	3
4827		SVTO	07	25	0700	S22 E22	07 27.0		B	DSI	150	8	7	2
4827		BOUL	07	25	1317	S22 E18	07 26.9		B	DAI	150	15	8	2
4827	24418	MWIL	07	25	1400	S23 E16	07 26.8	4	(B)					
4827		RAMY	07	25	1505	S21 E19	07 27.1		B	DAI	130	15	7	3
4827		HOLL	07	25	1508	S22 E19	07 27.1		B	DSO	200	17	9	3
4827		PALE	07	25	1817	S23 E17	07 27.1		B	DSO	120	13	6	3
4827		LEAR	07	26	0030	S22 E11	07 26.9		B	DSI	100	18	10	2
4827		CULG	07	26	0430	S23 E09	07 26.9		B	DSO	210	12	10	2
4827		SVTO	07	26	0710	S22 E08	07 26.9		B	ESI	140	27	11	4
4827		BOUL	07	26	1308	S21 E02	07 26.7		B	EAI	140	32	14	2
4827	24418	MWIL	07	26	1400	S23 E03	07 26.8	6	(BG)					
4827		RAMY	07	26	1410	S22 E06	07 27.0		B	DAI	120	19	8	3
4827		HOLL	07	26	1545	S22 E05	07 27.0		B	DSI	120	24	10	4
4827		PALE	07	26	1935	S23 E03	07 27.0		B	CSO	50	9	7	1
4827		LEAR	07	27	0454	S22 W06	07 26.7		B	CSO	90	19	14	3
4827		CULG	07	27	0605	S23 W05	07 26.9			CSI	50	14	16	2
4827		SVTO	07	27	1315	S22 W08	07 26.9		B	DSI	80	13	10	2
4827		BOUL	07	27	1322	S22 W09	07 26.9		B	CAO	50	21	14	3
4827		RAMY	07	27	1327	S22 W06	07 27.1		B	CAI	100	15	11	3
4827	24418	MWIL	07	27	1400	S23 W11	07 26.7	5	(BG)					
4827		HOLL	07	27	1525	S23 W08	07 27.0		B	CSO	50	8	10	4
4827		PALE	07	27	1840	S24 W09	07 27.1		B	CSO	60	8	14	3
4827		CULG	07	28	0440	S23 W13	07 27.2		BG	CSI	30	14	18	3
4827		SVTO	07	28	0745	S23 W13	07 27.3		B	ESI	120	16	13	2
4827		BOUL	07	28	1323	S22 W16	07 27.3		B	CAO	100	17	12	2
4827		RAMY	07	28	1345	S22 W17	07 27.3		B	CAI	80	11	12	3
4827	24418	MWIL	07	28	1345	S23 W22	07 26.9	5	(BG)					
4827		HOLL	07	28	1525	S23 W18	07 27.2		B	CAO	70	18	13	3
4827		PALE	07	28	1750	S22 W19	07 27.3		B	CAO	70	17	15	3
4827		CULG	07	29	0400	S27 W30	07 26.8		A	HS	30	1	1	3
4827		SVTO	07	29	0515	S22 W28	07 27.1		B	CAO	60	3	10	3
4827		BOUL	07	29	1335	S22 W30	07 27.3		B	CAO	70	8	15	2
4827		RAMY	07	29	1337	S27 W35	07 26.8		B	CAO	30	6	3	3
4827	24418	MWIL	07	29	1400	S24 W36	07 26.8	5	(BP)					
4827		HOLL	07	29	1500	S22 W36	07 26.8		B	CRO	20	4	3	4
4827		PALE	07	29	1825	S23 W35	07 27.1		B	CRO	40	3	12	4
4827		LEAR	07	30	0031	S22 W37	07 27.2		B	CRO	30	5	14	3
4827		SVTO	07	30	0423	S23 W39	07 27.2		B	CRO	40	4	10	4
4827		CULG	07	30	0500	S25 W41	07 27.0		B	CRO	40	5	13	3
4827		BOUL	07	30	1322	S20 W43	07 27.3		B	BXO	50	3	10	3
4827	24418	MWIL	07	30	1415	S22 W44	07 27.2	4	(BP)					
4827		RAMY	07	30	1445	S24 W48	07 26.9		B	BXO	10	3	2	3
4827		HOLL	07	30	1530	S22 W45	07 27.2		B	BXO	20	3	11	4
4827		PALE	07	30	1820	S23 W46	07 27.2		B	BXO	20	2	11	2
4827		LEAR	07	31	0100	S22 W50	07 27.2		B	BXO	20	7	10	3
4827		CULG	07	31	0500	S26 W52	07 27.2		B	BXO	50	6	12	3
4827		SVTO	07	31	0913	S21 W54	07 27.2		B	BXO	20	6	11	3
4827		BOUL	07	31	1337	S20 W53	07 27.5		B	BXO	40	2	4	4

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(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

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NOAA/ USAF Group	Mt Wilson Group	Sta	Mo	Day	Time (UT)	Lat	CMD	CMP Mo	Day	Max H	Mag Class	Spot Class	Corrected Area (10 ⁻⁶ Hemi)	Spot Count	Long. Extent (Deg)	Qual
4827	24418	MWIL	07	31	1400	S21	W53	07	27.5	4	(BP)					
4827		HOLL	07	31	1405	S22	W55	07	27.3		B	BXO	20	4	10	3
4827		RAMY	07	31	1445	S21	W56	07	27.3		B	BXO	20	5	10	3
4827		PALE	07	31	1835	S22	W56	07	27.5		B	BXO	10	2	5	2
4827		LEAR	08	01	0020	S23	W59	07	27.6		B	BXO	10	3	6	3
4827		SVTO	08	01	0627	S20	W64	07	27.5		A	AX		1		3
4827	24418	MWIL	08	01	1350	S20	W66	07	27.5	3	(B)					
4827		RAMY	08	01	1440	S21	W68	07	27.5		B	BXO		2	6	4
4832		CULG	07	29	0400	S31	W16	07	27.9		B	BXO	10	3	3	3
4832		SVTO	07	29	0515	S29	W18	07	27.8		B	BXO	20	4	4	3
4832		RAMY	07	29	1337	S28	W22	07	27.8		B	CRO	30	5	5	3
4832	24422	MWIL	07	29	1400	S28	W23	07	27.8	4	(B)					
4832		HOLL	07	29	1500	S29	W24	07	27.7		B	CRO	20	6	6	4
4832		PALE	07	29	1825	S29	W27	07	27.6		B	CRO	30	4	6	4
4832		LEAR	07	30	0031	S27	W30	07	27.7		B	CRO	30	5	6	3
4832		SVTO	07	30	0423	S28	W32	07	27.7		B	BXO	50	5	7	4
4832		CULG	07	30	0500	S32	W31	07	27.7		B	DRO	70	6	9	3
4832		BOUL	07	30	1322	S27	W36	07	27.7		B	BXO	60	5	7	3
4832	24422	MWIL	07	30	1415	S28	W38	07	27.6	5	(B)					
4832		RAMY	07	30	1445	S29	W36	07	27.8		B	BXI	30	9	8	3
4832		HOLL	07	30	1530	S29	W37	07	27.7		B	BXO	30	8	8	4
4832		PALE	07	30	1820	S28	W40	07	27.6		B	CAO	50	6	8	2
4832		LEAR	07	31	0100	S28	W45	07	27.5		B	BXO	30	5	8	3
4832		CULG	07	31	0500	S32	W47	07	27.5		B	BXO	30	2	7	3
4832		SVTO	07	31	0913	S28	W50	07	27.5		B	BXO	30	5	7	3
4832		BOUL	07	31	1337	S28	W52	07	27.5		B	BXO	80	4	7	4
4832	24422	MWIL	07	31	1400	S28	W52	07	27.5	3	(B)					
4832		HOLL	07	31	1405	S28	W52	07	27.5		A	AX	10	2	2	3
4832		RAMY	07	31	1445	S27	W47	07	27.9		B	BXO	10	4	13	3
4832		PALE	07	31	1835	S28	W49	07	27.9		A	AX		1		2
4832	24422	MWIL	08	01	1350	S30	W60	07	27.9	3	(AF)					
4833		SVTO	07	29	0515	N21	E03	07	29.4		A	AX	10	1	1	3
4833		BOUL	07	29	1335	N20	W02	07	29.4		B	BXO	40	5	3	2
4833		RAMY	07	29	1337	N22	W01	07	29.5		B	BXO	10	5	3	3
4833	24423	MWIL	07	29	1400	N22	W01	07	29.5	4	(B)					
4833		HOLL	07	29	1500	N21	W02	07	29.5		B	BXO	10	5	3	4
4833		PALE	07	29	1825	N22	W04	07	29.4		B	BX	20	4	4	4
4833		LEAR	07	30	0031	N21	W08	07	29.4		B	BXO	10	6	5	3
4833		SVTO	07	30	0423	N21	W11	07	29.3		B	BXO	20	6	6	4
4833		CULG	07	30	0500	N18	W12	07	29.3		B	BXO	30	5	7	3
4833		BOUL	07	30	1322	N22	W14	07	29.5		B	BXO	60	6	4	3
4833	24423	MWIL	07	30	1415	N22	W14	07	29.5	4	(BG)					
4833		RAMY	07	30	1445	N21	W15	07	29.5		B	BXI	20	8	6	3
4833		HOLL	07	30	1530	N21	W16	07	29.4		B	BXO	10	7	7	4
4833		PALE	07	30	1820	N22	W16	07	29.5		B	BXO	40	5	5	2
4833		LEAR	07	31	0100	N23	W21	07	29.4		B	BXO	10	3	3	3
4833		SVTO	07	31	0913	N22	W23	07	29.6		B	BXO		2	2	3
4833	24423	MWIL	07	31	1400	N22	W26	07	29.6	3	(AF)					
4833		HOLL	07	31	1405	N23	W28	07	29.4		A	AX	10	2	1	3
4833		RAMY	07	31	1445	N22	W26	07	29.6		A	AX		1	1	3
4833		LEAR	08	01	0020	N21	W34	07	29.5		A	AX	10	1	1	3
4831		LEAR	07	23	0100	N28	E86	07	29.8		A	HS	30	1	1	3
4831		SVTO	07	23	0810	N27	E83	07	29.8		A	HH	90	2	4	3
4831		BOUL	07	23	1340	N29	E86	07	30.3		A	HS	60	1	1	3
4831		RAMY	07	23	1348	N30	E85	07	30.2		B	DAO	180	2	10	4
4831	24421	MWIL	07	23	1430	N28	E79	07	29.8	5	(AP)					
4831		HOLL	07	23	1530	N28	E83	07	30.1		B	ESO	150	2	12	3
4831		PALE	07	23	1840	N28	E81	07	30.1		B	ESO	160	3	11	3
4831		LEAR	07	24	0332	N29	E78	07	30.3		B	ESO	180	3	14	3
4831		CULG	07	24	0420	N32	E76	07	30.2		B	ESO	240	2	11	2
4831		SVTO	07	24	0730	N29	E75	07	30.2		B	EHO	270	6	12	4
4831		BOUL	07	24	1400	N26	E69	07	29.9		B	DSO	330	7	10	3
4831	24421	MWIL	07	24	1400	N29	E69	07	30.0	5	(B)					
4831		RAMY	07	24	1507	N31	E69	07	30.1		B	DAO	180	7	9	3
4831		HOLL	07	24	1515	N29	E70	07	30.1		B	ESO	130	10	11	3
4831		PALE	07	24	1735	N29	E70	07	30.2		B	ESO	260	5	12	3

SUNSPOT GROUPS
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

JULY 1987

NOAA/ USAF Group	Mt Wilson Group	Sta	Observation Time		Lat	CMD	CMP Mo Day	Max H	Mag Class	Spot Class	Corrected Area (10 ⁻⁶ Hemi)	Spot Count	Long. Extent (Deg)	Qual
4831		CULG	07 25	0440	N28	E63	07 30.1		B	EAO	280	4	11	2
4831		LEAR	07 25	0645	N28	E60	07 30.0		B	EAO	290	11	13	3
4831		SVTO	07 25	0700	N29	E61	07 30.1		B	EKO	190	6	12	2
4831		BOUL	07 25	1317	N27	E54	07 29.8		B	EAO	240	7	11	2
4831	24421	MWIL	07 25	1400	N30	E55	07 29.9	6	(B)					
4831		RAMY	07 25	1505	N30	E58	07 30.2		B	EKO	160	7	11	3
4831		HOLL	07 25	1508	N30	E57	07 30.1		B	EAO	240	9	12	3
4831		PALE	07 25	1817	N28	E56	07 30.1		B	ESO	200	12	12	3
4831		LEAR	07 26	0030	N29	E51	07 30.0		B	ESO	170	9	14	2
4831		CULG	07 26	0430	N28	E50	07 30.1		B	EAO	190	6	11	2
4831		SVTO	07 26	0710	N29	E48	07 30.1		B	EHO	240	11	12	4
4831		LEAR	07 26	0736	N29	E47	07 30.0		B	ESO	170	9	11	3
4831		BOUL	07 26	1308	N26	E41	07 29.7		B	DAO	260	12	10	2
4831	24421	MWIL	07 26	1400	N28	E44	07 30.0	6	(B)					
4831		RAMY	07 26	1410	N30	E44	07 30.0		B	EHO	150	11	12	3
4831		HOLL	07 26	1545	N30	E43	07 30.0		B	ESO	150	13	12	4
4831		PALE	07 26	1935	N29	E43	07 30.2		B	ESO	170	10	12	1
4831		LEAR	07 27	0454	N28	E37	07 30.1		B	DSO	210	15	10	3
4831		CULG	07 27	0605	N29	E36	07 30.1		B	DAO	100	9	12	2
4831		SVTO	07 27	1315	N29	E32	07 30.1		B	ESO	180	21	12	2
4831		BOUL	07 27	1322	N28	E31	07 30.0		B	DAO	180	20	10	3
4831		RAMY	07 27	1327	N30	E31	07 30.0		B	ESO	160	14	12	3
4831	24421	MWIL	07 27	1400	N28	E32	07 30.1	5	(B)					
4831		HOLL	07 27	1525	N30	E31	07 30.1		B	ESO	110	14	12	4
4831		PALE	07 27	1840	N28	E29	07 30.0		B	ESO	120	16	12	3
4831		CULG	07 28	0440	N28	E23	07 30.0		B	EAO	60	7	11	3
4831		SVTO	07 28	0745	N29	E22	07 30.0		B	ESO	130	16	12	2
4831		BOUL	07 28	1323	N28	E19	07 30.0		B	DAO	150	19	10	2
4831	24421	MWIL	07 28	1345	N30	E17	07 29.9	6	(B)					
4831		RAMY	07 28	1345	N30	E19	07 30.1		B	ESO	120	15	11	3
4831		HOLL	07 28	1525	N30	E18	07 30.0		B	ESO	90	19	12	3
4831		PALE	07 28	1750	N28	E17	07 30.1		B	DSO	50	20	10	3
4831		CULG	07 29	0400	N29	E10	07 29.9		B	ESO	40	10	11	3
4831		SVTO	07 29	0515	N30	E11	07 30.1		B	CSO	100	13	12	3
4831		BOUL	07 29	1335	N27	E06	07 30.0		B	CSO	120	18	10	2
4831		RAMY	07 29	1337	N30	E07	07 30.1		B	ESO	80	26	12	3
4831	24421	MWIL	07 29	1400	N30	E04	07 29.9	6	(B)					
4831		HOLL	07 29	1500	N30	E06	07 30.1		B	CSO	70	22	11	4
4831		PALE	07 29	1825	N29	E04	07 30.1		B	ESO	100	10	12	4
4831		LEAR	07 30	0031	N29	E02	07 30.2		B	DSO	70	11	10	3
4831		SVTO	07 30	0423	N30	W02	07 30.0		B	CSO	90	7	11	4
4831		CULG	07 30	0500	N28	W04	07 29.9		B	ESO	100	10	11	3
4831		BOUL	07 30	1322	N30	W06	07 30.1		B	CSO	130	7	10	3
4831	24421	MWIL	07 30	1415	N30	W06	07 30.1	5	(B)					
4831		RAMY	07 30	1445	N30	W07	07 30.1		B	CSO	60	9	11	3
4831		HOLL	07 30	1530	N30	W07	07 30.1		B	CSO	60	8	11	4
4831		PALE	07 30	1820	N30	W10	07 30.0		B	CSO	70	9	12	2
4831		LEAR	07 31	0100	N30	W14	07 29.9		B	CSO	60	14	12	3
4831		CULG	07 31	0500	N29	W16	07 29.9		B	ESO	100	5	12	3
4831		SVTO	07 31	0913	N30	W17	07 30.0		B	CSO	90	7	13	3
4831		BOUL	07 31	1337	N29	W17	07 30.2		B	CSO	80	4	10	4
4831	24421	MWIL	07 31	1400	N30	W18	07 30.2	5	(B)					
4831		HOLL	07 31	1405	N30	W19	07 30.1		B	CSO	60	10	12	3
4831		RAMY	07 31	1445	N30	W20	07 30.0		B	CSO	80	6	11	3
4831		PALE	07 31	1835	N30	W21	07 30.1		B	CSO	60	6	12	2
4831		LEAR	08 01	0020	N33	W19	07 30.6		B	CSO	20	4	11	3
4831		CULG	08 01	0510	N31	W27	07 30.1		B	CSO	60	4	12	2
4831		SVTO	08 01	0627	N30	W28	07 30.2		B	ESO	40	5	11	3
4831	24421	MWIL	08 01	1350	N30	W30	07 30.2	5	(B)					
4831		HOLL	08 01	1352	N29	W32	07 30.2		B	CSO	20	2	11	3
4831		RAMY	08 01	1440	N30	W32	07 30.2		B	BSO	30	3	11	4
4831		PALE	08 01	1730	N30	W33	07 30.2		B	CSO	30	2	12	3
4831		LEAR	08 02	0030	N32	W35	07 30.3		B	CSO	40	4	11	3
4831		SVTO	08 02	0557	N33	W45	07 29.8		A	AR	10	2	2	3
4831		RAMY	08 02	1330	N28	W50	07 29.7		A	HR	30	1	1	3
4831	24421	MWIL	08 02	1350	N30	W50	07 29.6	3	(B)					
4831		HOLL	08 02	1500	N29	W52	07 29.5		A	AX	10	2	1	3
4831		LEAR	08 03	0020	N32	W56	07 29.7		A	AX	10	1	1	4
4831		SVTO	08 03	0640	N33	W59	07 29.7		A	AX	10	1		4

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NOAA/ USAF Group	Mt Wilson Group	Sta	Observation Time		Lat	CMD	CMP Mo Day	Max H	Mag Class	Spot Class	Corrected Area (10 ⁻⁶ Hemi)	Spot Count	Long. Extent (Deg)	Qual
4831		RAMY	08	03	1422	N29 W63	07 29.7		A	AX	10	1	1	4
4831		HOLL	08	03	1435	N29 W64	07 29.7		A	AX		1		4
4834		PALE	07	30	1820	N16 E14	07 31.8		B	BX0	10	2	1	2
4834		LEAR	07	31	0100	N16 E10	07 31.8		B	BX0	20	7	5	3
4834		CULG	07	31	0500	N17 E08	07 31.8		B	CA0	60	6	5	3
4834		SVTO	07	31	0913	N16 E05	07 31.8		B	CRD	40	4	6	3
4834		BOUL	07	31	1337	N16 E03	07 31.8		B	CA0	60	5	4	4
4834	24424	MWIL	07	31	1400	N16 E03	07 31.8	5	(B)					
4834		HOLL	07	31	1405	N16 E02	07 31.7		B	CA0	40	6	4	3
4834		RAMY	07	31	1445	N16 E04	07 31.9		B	CRI	40	7	5	3
4834		PALE	07	31	1835	N16 E00	07 31.8		B	CS0	60	10	5	2
4834		LEAR	08	01	0020	N16 W03	07 31.8		B	CS0	70	6	5	3
4834		CULG	08	01	0510	N16 W07	07 31.7		B	DSI	130	10	6	2
4834		SVTO	08	01	0627	N16 W07	07 31.7		B	DSI	140	10	6	3
4834	24424	MWIL	08	01	1350	N16 W10	07 31.8	5	(B)					
4834		HOLL	08	01	1352	N16 W10	07 31.8		B	DS0	160	16	6	3
4834		RAMY	08	01	1440	N17 W10	07 31.8		B	CSI	240	15	11	4
4834		PALE	08	01	1730	N16 W12	07 31.8		B	CS0	160	13	7	3
4834		LEAR	08	02	0030	N17 W16	07 31.8		B	DS0	190	20	7	3
4834		SVTO	08	02	0557	N18 W19	07 31.8		B	DS0	130	14	8	3
4834		RAMY	08	02	1330	N16 W24	07 31.7		B	DS0	200	8	8	3
4834	24424	MWIL	08	02	1350	N16 W24	07 31.8	5	(B)					
4834		HOLL	08	02	1500	N16 W25	07 31.7		B	DS0	180	11	7	3
4834		PALE	08	02	1948	N17 W28	07 31.7		B	DS0	130	8	8	3
4834		LEAR	08	03	0020	N18 W29	07 31.8		B	DA0	140	10	9	4
4834		CULG	08	03	0400	N14 W32	07 31.7		B	CS0	110	6	8	2
4834		SVTO	08	03	0640	N18 W33	07 31.8		B	DS0	180	8	9	4
4834		RAMY	08	03	1422	N16 W38	07 31.7		BG	CS0	150	6	8	4
4834		HOLL	08	03	1435	N16 W37	07 31.8		B	CS0	110	10	9	4
4834	24424	MWIL	08	03	1515	N16 W38	07 31.8	5	(B)					
4834		PALE	08	03	1803	N16 W41	07 31.6		B	CS0	140	6	8	3
4834		LEAR	08	04	0002	N18 W43	07 31.7		B	CS0	80	4	9	3
4834		CULG	08	04	0545	N13 W48	07 31.6		A	HS	60	1	2	4
4834		SVTO	08	04	0743	N17 W48	07 31.7		B	CS0	180	5	8	3
4834		HOLL	08	04	1332	N15 W52	07 31.6		B	CS0	110	5	7	3
4834	24424	MWIL	08	04	1345	N16 W52	07 31.6	5	(B)					
4834		PALE	08	04	1810	N16 W56	07 31.5		B	CS0	120	2	6	3
4834		SVTO	08	05	0534	N15 W63	07 31.5		A	HS	120	1	2	3
4834		LEAR	08	05	0730	N18 W66	07 31.3		A	HX	80	1	2	2
4834	24424	MWIL	08	05	1415	N15 W67	07 31.5	5	(BP)					
4834		RAMY	08	05	1446	N15 W65	07 31.7		B	CS0	10	2	8	3
4834		BOUL	08	05	1535	N16 W67	07 31.6		A	HS	90	1	1	3
4834		HOLL	08	05	1720	N14 W68	07 31.6		A	HS	50	1	1	3
4834		PALE	08	05	1745	N15 W71	07 31.4		A	HS	110	1	2	3
4834		LEAR	08	06	0108	N19 W75	07 31.3		A	HS	60	1	2	3
4834		CULG	08	06	0500	N16 W77	07 31.4		A	HS	60	1	1	3
4834		SVTO	08	06	0722	N16 W77	07 31.5		A	HS	80	1	2	3
4834		RAMY	08	06	1505	N15 W82	07 31.4		A	HH	110	1	3	3
4834	24424	MWIL	08	06	1545	N15 W82	07 31.4	5	(AP)					
4834		HOLL	08	06	1757	N16 W82	07 31.5		A	HS	40	1	2	3
4834		PALE	08	06	1815	N16 W84	07 31.4		A	HS	30	1	2	3
4834		LEAR	08	07	0121	N16 W88	07 31.4		A	HS	30	1	1	3

Stations reporting:

BOUL = Boulder
CULG = Culgoora

HOLL = Holloman
LEAR = Learmonth

MWIL = Mt. Wilson
PALE = Palehua

RAMY = Ramey
SVTO = San Vito

SUDDEN IONOSPHERIC DISTURBANCES

JULY 1987

Day	Start (UT)	Max (UT)	End (UT)	Imp	Wide- spread Index	Number of Station Reports by Type					Known Flare	X-ray Class	NOAA/SESC Region
						SWF	SEA	SPA	LF- SPA	SES			
03	0537	0543	0639	1	1		1				No flare		
03	1130	1147U	1210	1	1		1				No flare		
03	1318	1325	1335	1	1		1				No flare		
06	1605	1615U	1627	1	1		1				No flare		
09	1624	1643U	1726	1	1		1				No flare		
10	1156	1201	1206	1-	1		1				No flare		
11	1718	1727	1756	1	1			1		1	No flare		
12	1612	1623	1648	1	1			1		1	No flare		
15	0335	0340	0350	1-	1				1		No flare		
15	1417	1425	1445	1-	1			1		1	No flare		
16	0112	0121	0207	1-	3	1		1	1		0104 UT	C4.4	
19	0224	0229	0239U	1-	1				1		No flare		
19	1313	1319	1343	1-	1				1	1	No flare		
19	1849	1851	1915	1+	1					1	No flare		
21	1030	1032	1042	1-	1		1				1035 UT		No data
22	1525	1532	1601	2	1					1	1524 UT	C2.1	4826
22	1640	1645	1700	1	3			1		4	1641 UT	C2.8	4826
22	2057	2106	2132	1-	3			1		1	2054 UT	C1.9	4826
23	0021	0025	0104	1-	3			1	1		0013 UT		4827
23	0131	0135	0152	1-	3			1	1		0121 UT		4826
23	0313	0339	0420	1-	3			1	1		0310 UT	C1.6	
23	0455	0500	0557	1-	3			1	1		0454 UT	C1.8	4826
23	0637	0644	0700	1-	1			1			0638 UT	C1.2	
23	0711	0727	0755	1-	3		1	1	1		0715 UT	C2.3	4826
23	0923	0930	1003	1-	3	1		1		2	0920 UT	C3.1	4826
23	1815	1826	1850	1-	3			1		2	1814 UT	C2.6	4826
23	1918	1926	2007	1-	3			2		2	1916 UT	C3.7	4826
24	0035	0105	0154	1-	1			1			0035 UT		No data
24	0829	0837	0855	1-	1			1			0817 UT	C1.4	4826
24	0956	1010	1126	3	5	3	4	1	1	3	0956 UT	M3.0	4826
25	0616	0633	0727	1-	3			1	1		0620 UT	C1.6	4826
25	2111	2119	2156	1-	3			1		4	2107 UT	C5.5	4826
25	2207	2220	2245	1-	1			1			2206 UT	C2.4	No data
26	0330	0336	0451	1-	3			1	1		0328 UT	C1.8	No data
27	0220	0226	0258	1-	3			1	1		0224 E	C3.8	4826
27	1810	1816	1842	1-	5	1		2		10	No flare		
28	0236	0241	0248	1-	1			1			0235 UT	C1.3	
29	0145	0151	0249	1-	1			1			0139 UT	C2.0	
30	1117	1121U	1154U	1	1		1				1114 UT		4832

S U D D E N I O N O S P H E R I C D I S T U R B A N C E S

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JULY 1987

OBSERVATORIES REPORTING FOR JULY 1987**

Ayrshire, Scotland	SES	Lintong, China	SPA
Amherst, New Hampshire, USA	SES	Louisville, Kentucky, USA	SES
Darmstadt, German Federal Republic	SWF	Maul, Hawaii, USA	SWF
Edenville, Republic of South Africa	SES	Panska Ves, Czechoslovakia	SEA, SWF, SES
Farsta, Sweden	SES	Paterson, New Jersey, USA	SEA
Hiraiso, Japan	SWF	Sao Paulo, Brazil	SPA, SES
Houston, Texas, USA	SES	Sofia, Bulgaria	SEA
Inubo, Japan	SPA	Somersworth, New Hampshire, USA	SES
Juliusruh, German Democratic Rep.	SWF	Tavares, Florida, USA	SES
Kandilli, Turkey	SEA	Tucson, Arizona, USA	SES
Kuhlungsborn, German Democratic Rep.	SPA, SEA	Upice, Czechoslovakia	SEA
Latrobe, Pennsylvania, USA	SES	Valley Cottage, New York, USA	SES

**Observations are not necessarily continuous.

S I D s by N O A A / S E S C R E G I O N S

JULY 1987

Day:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Region No.	Number of events in active regions																														
4826																						3	6	2	2		1				
4827																							1								
4832																															1

	Number of events with X-ray flares																														
																1						3	7	2	3	1	1	1	1		

	Number of events with no flare reported																														
	3				1			1	1	1	1				2					3								1			

	Number of events with no flare patrol																														

	Number of events with flare but no active region reported																														
																						1		1	1	1	1				

Event																															
Totals	3				1			1	1	1	1				2	1				3	1	3	9	3	3	1	2	1	1	1	

SOLAR RADIO EMISSION--SPECTRAL OBSERVATIONS

JULY 1987

Day	Observation			Decimetric Band			Metric Band			Dekametric Band			Spectral Type
	Start (UT)	End (UT)	Sta	Start (UT)	End (UT)	Int (1-3)	Start (UT)	End (UT)	Int (1-3)	Start (UT)	End (UT)	Int (1-3)	
01	0413	1102	WEIS										
	1135	1858	WEIS										
02	0700	1856	WEIS										
03	0415	0500	WEIS										
	0634	1857	WEIS										
04	0414	1205	WEIS										
	1253	1856	WEIS										
05	0416	1857	WEIS										
06	0415	1811	WEIS				1858.0	1913.0	1				CONT
			PALE										
07	0417	0619	WEIS										
	0632	1856	WEIS										
08	0416	1854	WEIS										
09	0419	1352	WEIS										
	1402	1855	WEIS										
10	0418	1853	WEIS				2259.0	2259.0	1				III
			PALE										
11	0420	1854	WEIS										
12	0419	0705	WEIS										
	0857	1852	WEIS										
13	0423	1414	WEIS										
	1428	1852	WEIS										
14	0421	1851	WEIS										
15			SGMR				1607.0	1609.0	2				V
			SVTO				1607.0	1607.0	2				III
	0424	1851	WEIS				1607.4	1607.6	2				IIIB
16			LEAR				0111.0	0113.0	1				III
			PALE				0112.0	0115.0	1				V
	0545	0831	WEIS										
	1223	1308	WEIS										
	1321	1850	WEIS				1858.0	1920.0	1				S
			PALE										
17			LEAR				0428.0	0430.0	1				III
18	1429	1848	WEIS										
19	0427	1647	WEIS										
	1721	1848	WEIS										
20	0427	0540	WEIS				1532.7	1532.8	2				IIIB
	0720	1845	WEIS				2136.0	2136.0	1				V
			PALE				2136.0	2148.0	1				S
			PALE				2303.0	2303.0	1				V
			PALE				2326.0	2327.0	1				III
			LEAR				2326.0	2327.0	2				V
			PALE				2327.0	2327.0	1				III
			SGMR										
21			LEAR				0104.0	0105.0	1				III
			LEAR				0528.0	0531.0	3				III
	0429	1150	WEIS				0529.6	0531.3	3				IIIG
			SVTO				0530.0	0530.0	3				V
			SVTO				0644.0	0645.0	1				III
			WEIS				0644.7	0645.1	1				IIIG

SOLAR RADIO EMISSION--SPECTRAL OBSERVATIONS

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Observation			Decimetric Band			Metric Band			Dekametric Band			Spectral Type	
Day	Start (UT)	End (UT)	Sta	Start (UT)	End (UT)	Int (1-3)	Start (UT)	End (UT)	Int (1-3)	Start (UT)	End (UT)		Int (1-3)
21			LEAR				0900.0	0901.0	2				V
			SVTO				0900.0	0902.0	2				V
			WEIS				0900.3	0901.4	3				IIIG
			WEIS				1036.5	1036.7	2				IIIU
			SGMR				1037.0	1039.0	1				V
			SGMR				1151.0	1151.0	1				V
			SGMR				1335.0	1336.0	1				V
1209	1545		WEIS				1335.8	1336.4	2				IIIG
			SGMR				1338.0	1339.0	1				V
			WEIS				1338.3	1339.0	3				IIIB
			SGMR				1423.0	1426.0	1				V
			WEIS				1425.7	1427.2	3				IIIB
1601	1840		WEIS				1654.2	1654.5	2				IIIG
			WEIS				1656.9	1657.2	1				IIIG
			PALE				1832.0	1839.0	1				V
			SGMR				1836.0	1836.0	1				III
			WEIS				1836.5	1836.6	2				IIIB
			PALE				1936.0	2005.0	1				S
			SGMR				1937.0	1937.0	1				V
			SGMR				1948.0	1948.0	1				V
22			LEAR				0002.0	0002.0	2				V
			PALE				0002.0	0003.0	2				V
			PALE				0356.0	0357.0	2				V
			LEAR				0654.0	0654.0	2				III
0429	1147		WEIS				0654.6	0654.8	2				IIIG
			SVTO				0655.0	0655.0	2				III
1332	1844		WEIS										
23	0432	1121	WEIS										
			SVTO				1400.0	1400.0	2				III
			SGMR				1600.0	1601.0	2				V
1157	1844		WEIS				1600.3	1601.4	3				IIIG
24	0649	1219	WEIS										
			SVTO				1152.0	1423.0	2				CONT
			SGMR				1230.0	2340.0	1				CONT
1344	1842		WEIS										
			SGMR				1727.0	1751.0	2			II	
			PALE				1728.0	1748.0	2				CONT
25	0434	0751	WEIS										
	0818	1407	WEIS										
	1616	1832	WEIS										
			CULG				2244.0	2244.0	1				III
			PALE				2244.0	2244.0	1				V
26	0433	1836	WEIS				1425.2	1425.3	1				IIIB
27	0648	0815	WEIS										
	1056	1149	WEIS										
	1201	1839	WEIS										
			PALE				1824.0	1826.0	1				V
			SGMR				1825.0	1826.0	1				V
			PALE				1923.0	1940.0	1				S
			SGMR				1923.0	1923.0	1				V
			SGMR				2000.0	2001.0	1				V
28			SVTO				0716.0	0716.0	2				III
			LEAR				0720.0	0720.0	1				III
			SVTO				0720.0	0720.0	2				III
0645	1837		WEIS				0720.2	0720.3	1				IIIB
			SVTO				0836.0	0836.0	1				III
			WEIS				0836.1	0836.2	2				IIIB
29	0645	0943	WEIS										
	1335	1837	WEIS										
30			LEAR				0136.0	0138.0	2				V
			PALE				0136.0	0138.0	2				V

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SOLAR RADIO EMISSION--SPECTRAL OBSERVATIONS

JULY 1987

=====													
Observation				Decimetric Band			Metric Band			Dekametric Band			Spectral Type
Day	Start (UT)	End (UT)	Sta	Start (UT)	End (UT)	Int (1-3)	Start (UT)	End (UT)	Int (1-3)	Start (UT)	End (UT)	Int (1-3)	

30	0437	1116	WEIS										
	1153	1441	WEIS										
30	1708	1835	WEIS										
			PALE				1958.0	1959.0	1				V
			SGMR				1958.0	1959.0	1				V
			CULG				2255.0	2256.0	1				III
31			CULG				0057.0	0058.0	1				S
			PALE				0057.0	0057.0	1				III
			LEAR				0458.0	0458.0	1				III
			SVTO				0458.0	0458.0	1				III
	0440	1833	WEIS				0458.3	0458.5	2				U

The symbols used under the column heading SPECTRAL TYPE have the following definitions:

B = Single burst	RS = Reverse slope burst
G = Small group (< 10) of bursts	DP = Drifting pairs
GG = Large group (> 10) of bursts	DC = Drifting chains
C = Underlying continuum (particularly with Type I)	H = Herringbone
S = Storm in the sense of intermittent but apparently connected activity	W = Weak
N = Intermittent activity in this period	P = Pulsations
U = U-shaped burst of Type III	CONT = Continuum
	UNCLF = Unclassified activity
	DCIM = Fast drift

Stations Reporting:

CULG = Culgoora
LEAR = Learmonth

PALE = Palehua
SGMR = Sagamore Hill

SVTO = San Vito
WEIS = Weissenau

COSMIC RAY INDICES
(Neutron Monitor)

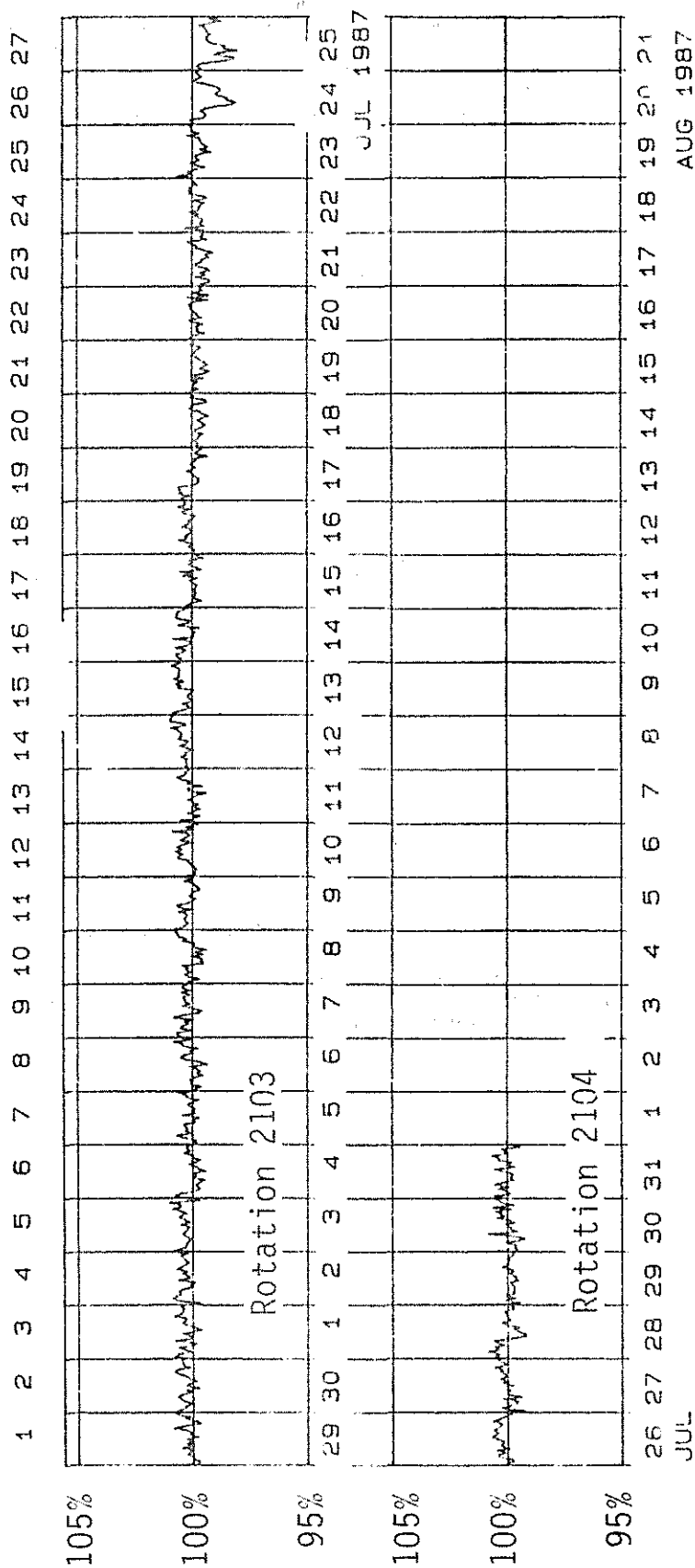
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Day	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	PREDIGTSTUHL Average (cts/h)/100	TOKYO Average (cts/h)/256	HUANCAYO Average (cts/h)/100
1	4539			6272.6				
2	4543			6275.1				
3	4542			6286.1				
4	4524			6282.2				
5	4531			6275.6				
6	4528			6274.9				
7	4538			6294.3				
8	4530			6293.4				
9	4534			6303.0				
10	4537			6302.6				
11	4528			6283.6				
12	4547			6300.9				
13	4545			6291.7				
14	4541			6286.1				
15	4523			6289.5				
16	4534			6297.3				
17	4525			6295.2				
18	4514			6270.5				
19	4515			6281.3				
20	4517			6282.3				
21	4506			6266.7				
22	4517			6271.1				
23	4518			6273.9				
24	4493			6255.4				
25	4485			6239.5				
26	4488			6228.4				
27	4478			6250.8				
28	4478			6248.3				
29	4468			6216.3				
30	4477			6230.1				
31	4480			6227.6				
Mean	4517			6272.4				

For less than 24-hour coverage, parentheses enclose the number of hours for which data are available.
For Climax and Huancayo, parentheses enclose the number of section hours whenever the sum of both sections falls below 40 hours.

THULE NEUTRON MONITOR



GEOMAGNETIC ACTIVITY INDICES

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July 1987

Day		Kp Three-Hourly Indices								Sum	Ap	Cp	Km Three-Hourly Indices								Am	aa Provisional					
		1	2	3	4	5	6	7	8				1	2	3	4	5	6	7	8		N	S	M			
1	Q1	0+	1-	0	0+	1-	1	1-	1-	4+	2	0.0	0+	0+	0+	0+	1-	1-	1-	1-	3	7	3	3	7	CC	
2	Q3	1-	1	0+	0+	0+	1-	2-	1+	6+	3	0.1	1	1	1-	1-	0+	1-	2-	1	6	8	4	4	8	CC	
3		1	1	1-	2-		1	1	4	3+	14-	9	0.5	1-	1+	1	2-	1	1	3+	3	14	22	9	9	23	
4		4-	2+	2	1		1-	1+	2+	1+	15-	8	0.4	3-	2+	2	0+	1-	1+	2+	2-	13	23	9	20	13	
5	Q10	2	2-	2	1+		2-	1	2-	2-	13	6	0.3	2	2-	2	2-	1+	1+	2-	2	13	16	9	14	11	CC
6	Q5	1+	2-	1	1		1+	1+	1+	2-	11-	5	0.2	2-	2-	1+	1+	2-	1+	2	2	11	15	7	9	13	CC
7	Q4	1-	1-	1-	1-		1	1-	2	1-	7	4	0.1	1	1-	1-	1-	1	1+	2-	1	7	9	5	6	8	CK
8		2	3-	2+	3		3-	2	2-	2+	19-	10	0.5	2-	2+	3-	3-	2	2-	2-	2	17	24	14	22	16	
9		2-	3-	3-	2-		1+	2+	2	3	17+	9	0.5	1+	2+	2+	2+	2-	2+	2-	3-	16	22	10	16	16	
10		3+	3-	2	3-		3+	2	2	1	19	11	0.6	3	3-	3-	3	3	2	2-	1+	21	30	21	33	17	
11		2	2+	2+	1		1+	1+	2	2	14+	7	0.3	1+	2+	3-	1+	1+	1+	2-	2-	13	21	10	16	15	
12		1-	2	2+	2+		2+	2-	2	2+	16-	7	0.4	1+	2-	2	3	2	2-	2-	2-	14	23	10	16	17	
13	Q6	1+	1-	1-	1-		1	0+	1	2+	8	4	0.1	1+	1	1	1-	1-	1-	1	2	7	21	4	11	14	CC
14	Q8	2	2	2-	1+		0+	1	2-	2-	12-	5	0.2	2-	2	2	1+	0+	1+	1+	2-	11	16	7	12	11	C
15	D3	2-	2-	3+	4-		5-	4	4+	5-	28	24	1.1	1+	1-	4	3+	4-	4-	3+	4	37	42	32	25	49	
16	D4	4	3+	3+	4-		2-	4	3	4	27	20	1.0	4+	3	3+	3+	2	3+	3-	3+	36	36	30	36	31	
17		3-	4-	3-	3		4-	2-	3-	3	23	14	0.8	3-	4-	3-	3	3+	2-	3-	3-	28	31	23	26	28	
18		3	3-	2	2+		2+	2	3	2+	20-	10	0.6	3	2+	2+	2+	2+	2+	3-	2+	21	26	20	22	24	
19		2+	2-	1-	2		2+	2	3-	3-	16+	8	0.4	2+	1+	1-	2+	3-	2	2+	2+	16	23	17	15	24	
20		2-	3-	1+	1		2	2	3-	4-	17	9	0.5	2-	2+	1+	1	2-	2	2	3	15	23	8	13	18	
21		2-	2-	2+	1+		1+	2-	1+	2-	13	6	0.3	1+	1+	2+	1+	1	1+	1	1+	10	15	7	11	11	C
22		2	2+	3-	2		1	1+	2+	2	16-	8	0.4	2-	2-	3-	2	1	1	2+	2-	14	20	9	16	13	C
23	Q9	1	1+	1-	1-		1+	1+	2	3-	11	6	0.2	1	1	1-	0+	2-	1+	2-	2+	9	14	6	5	15	CC
24		2-	1+	1	1-		2-	4	4	3	17+	12	0.7	1	1+	1-	0+	1	3	3+	3-	15	26	11	7	31	
25	D5*	3+	3-	3+	4+		4-	3-	3-	2+	25	17	0.9	3-	3-	3	4	3	3-	2+	2+	29	34	34	43	26	
26	Q2	1-	1-	2-	1		1-	1-	1	1-	7-	4	0.1	1	1-	1+	1	0+	1-	1-	0+	5	13	3	9	7	C
27	Q7	2	2-	2-	1		2-	1	1	1-	11-	5	0.2	2	1+	1+	1	1+	1	1+	1-	8	17	7	14	10	CK
28	D2	1+	2-	2+	4-		5	4+	4+	5+	28	26	1.2	1+	1+	3-	4-	4	4-	3+	4+	35	45	33	23	55	
29	D1	7-	7	5+	5		5	3-	1+	1	34	52	1.6	5	5+	5	5	4	3-	1+	1+	61	65	64	100	29	
30		3+	1+	1+	1+		2+	1+	2+	3	16+	9	0.5	3	1+	2-	2-	3-	2-	2+	3	18	23	13	16	20	
31		3+	5	3	2-		2	1	2	1+	19+	14	0.8	3	4+	3	2	2	2-	2	2-	23	26	20	33	14	
Mean												11	0.50									17.6	23.8	14.9	19.3		
Day		Kn Three-Hourly Indices								An	Ks Three-Hourly Indices								As	Sa	Prov						
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8			Ri	Ra	Rs	IMF			
1		0+	1	0+	1-		1	1+	1	1-	6	0	0	0	0	0	0+	1-	1	76.0	0	0	20				
2		1+	1	1+	1		1	1	2-	1+	8	1-	1	0+	0+	0	1+	1-	4	74.4	0	0	18				
3		1	2-	1+	2		2-	1+	4-	3+	18	1-	1+	1-	1	0+	0+	2+	3-	9	73.7	0	0	18			
4		3	3-	2	1		1+	2	3-	2-	17	3-	2	2-	0	0	1	2-	2-	10	73.2	0	0	17			
5		2-	2-	2+	2		2-	2-	2	2-	14	2	2-	2-	1+	1	1	1+	2	11	73.4	13	8	17			
6		2-	2-	2-	1+		2-	1+	2	2-	12	2-	1+	1+	1	1+	1	2	2	11	73.3	0	8	17			
7		1	0+	1	2-		1+	2-	2-	1+	9	1-	1-	0	0	0+	1-	2-	1-	4	74.1	9	9	18			
8		2	3-	3-	3		3-	2	2-	2+	20	1+	2+	2+	2-	2	2-	1+	2-	13	76.1	12	11	20			
9		2-	2+	2+	2+		2	3-	2+	3	20	1+	2+	2+	3-	1	2-	1	2	14	76.3	13	13	20			
10		3	3-	2+	3		3	2	2	1+	22	3+	2+	3-	3-	3-	2	2-	1+	20	76.3	11	11	20			
11		1+	2	3-	1+		2-	2-	2+	2	15	1+	2+	3-	1+	1	1+	1+	2-	12	75.7	0	0	20			
12		1+	2-	2+	3		2	2	2	2+	17	1+	2-	2-	3	2-	1	1	1+	12	75.5	0	0	20			
13		1+	1+	1+	1+		1+	1	1+	2+	10	1+	0+	0+	0	0	0+	0+	1+	4	75.1	0	0	19			
14		2	2+	2	2-		1	2-	2-	2-	13	2-	2-	2	1	0	1-	1	2	9	76.6	0	0	21			
15		2	2	4+	4-		4	4-	4-	4	42	1	1+	4-	3-	3+	4-	3	4	32	78.8	11	7	23			
16		4-	3	4-	4-		2+	3+	3-	4-	36	5-	3+	3	3+	2	3+	3	3+	37	80.9	17	11	25			
17		3-	4-	3-	3		3+	2	3-	3-	27	3	4-	3	3	3+	2-	3-	3-	28	81.5	12	13	26			
18		3-	3-	2	2+		2+	3-	3-	2+	21	3	2+	2+	3-	2+	2+	3-	2+	21	82.5	17	19	27			
19		2+	2-	1+	2		2+	2+	3-	3-	17	2+	1+	0+	2+	3-	2-	2	2	14	85.1	23	24	30			
20		1+	2+	1+	1+		2+	2+	2+	3-	16	2-	3-	1	0+	1	2-	1+	3+	14	93.8	33	40	39			
21		2-	2-	2+	2-		2-	2-	2-	2	13	1+	1	3-	1+	1-	1-	1-	1-	8	95.6	67	69	41			
22		2	2	3	2+		2	2-	2+	2	17	2-	2-	3-	2-	0	0	2-	2-	10	102.6#	87	93	49			
23		1	1	1+	1-		2-	2-	2	2+	11	1	1-	0+	0	1+	1	1+	2	7	115.6	102	107	63			
24		1+	2-	1	1-		1+	4	4-	3-	19	1-	1+	0+	0	0+	2+	3	3-	11	115.0	92	100	62			
25		3-	3-	3+	4+		3+	3-	3-	2+	31	3	3-	3	4	3-	3-	2+	2	26	114.9	88	96	62			
26		1	1-	1+	1+		1	1+	1	1-	7	1-	1-	1-	1-	0	0	0+	0+	3	109.8#	85	90	57			
27		2-	1	2-	1		2	1+	1+	1	10	2+	1+	1	1-	1-	0+	1	1-	7	105.4	77	78	52			
28		1+	1	3	4		4	4	4-	5-	42	1+	1+	2+	4	4-	3+	3-	3+	28	102.5	60	56	49			
29		5	6-	5-	5		4	3	2	1+	61	5	5+	5+	5	4	2	0+	1+	61	97.3	60	59	43			
30		3	2	2-	2-		3-	2-	2+	3-	18	3	1-	1+	1+	3-	2-	2	3+	18	94.0	62	74	40			
31		3	4	3	2+		2+	2-	2	2+	24	3	4+	3-	2	2-	1+	2	1+	23	91.9	73	66	37			
Mean											19.8									15.5	87.0	33.0	34.3	32.0			

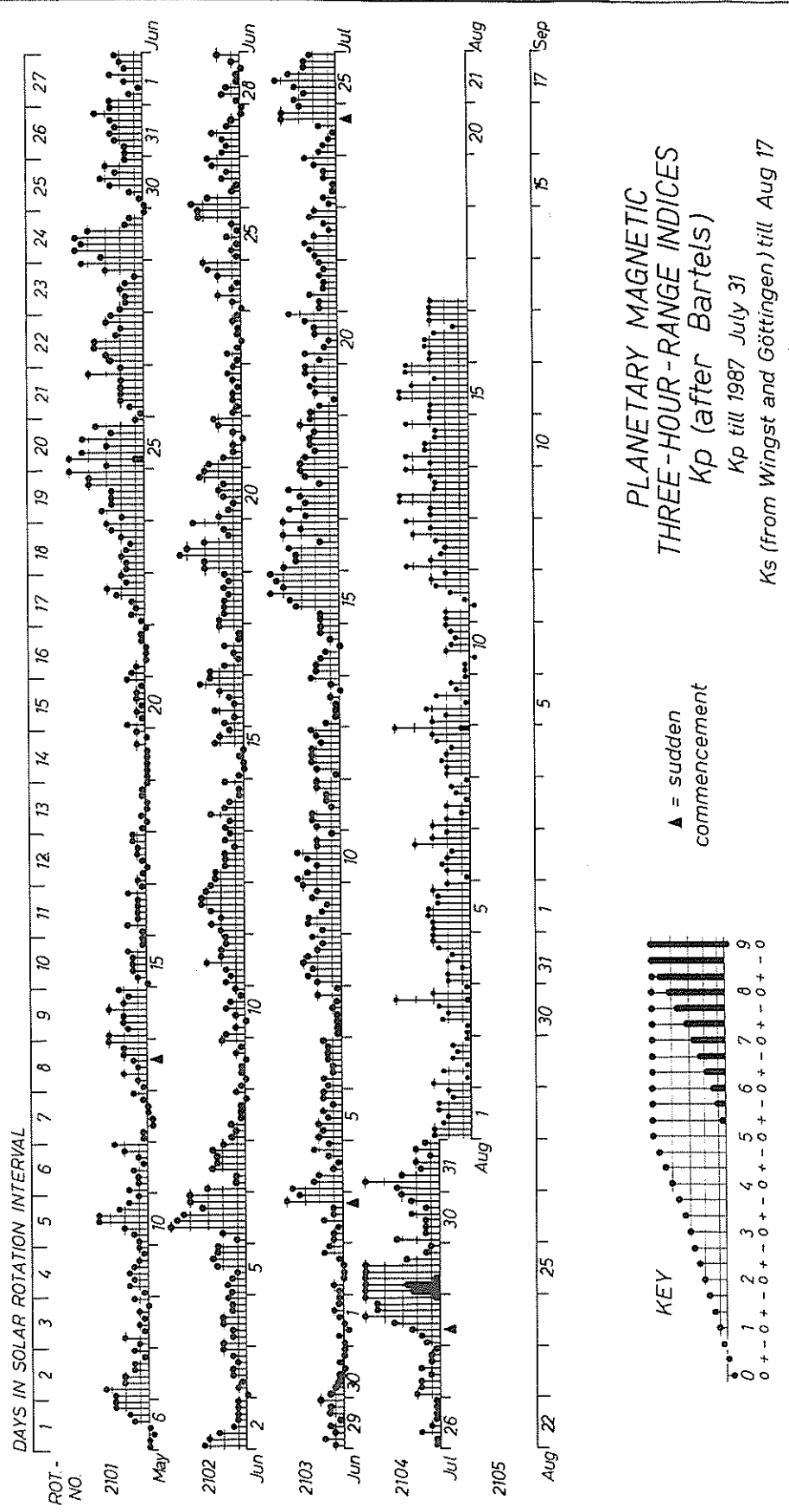
DAILY AVERAGE INDICES Ap

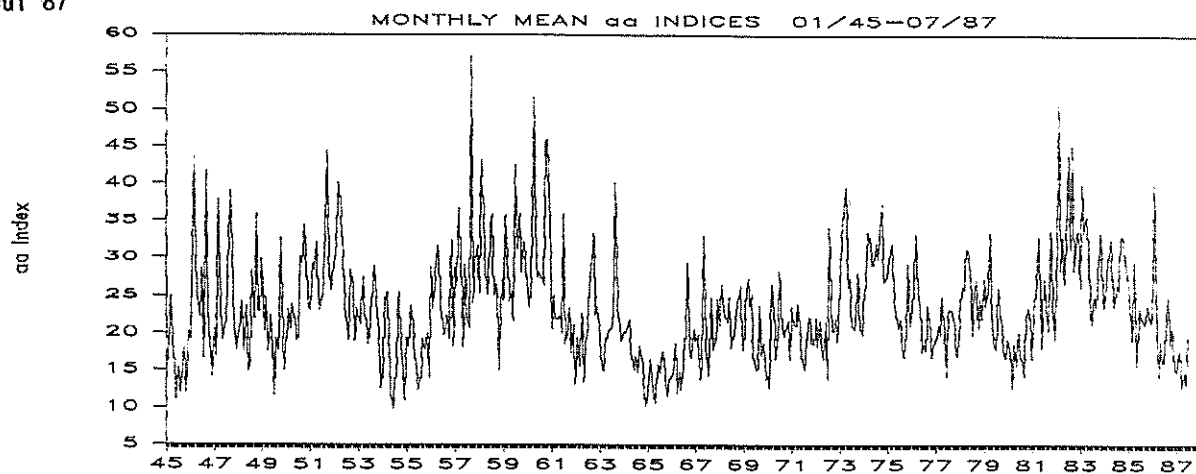
DAY	1986 AUG	SEP	OCT	NOV	DEC	1987 JAN	FEB	MAR	APR	MAY	JUN	JUL
1	6	9	7	13	13	18	7	9	10	7	8	2
2	5	16	23	6	8	10	4	3	4	6	8	3
3	19	7	9	16	6	6	4	6	2	6	4	9
4	20	7	7	67	7	3	4	10	16	5	6	8
5	9	9	19	20	4	3	4	21	12	4	7	6
6	6	8	12	12	4	3	7	10	7	5	25	5
7	4	5	5	6	6	5	9	21	13	8	9	4
8	7	5	6	4	4	7	14	12	11	4	4	10
9	10	6	6	3	6	10	11	9	8	4	3	9
10	6	6	3	5	12	6	8	11	10	10	4	11
11	7	16	4	14	8	5	7	8	7	6	7	7
12	10	89	2	9	4	10	18	14	5	2	13	7
13	10	22	28	5	12	6	4	8	12	6	6	4
14	5	12	31	5	20	5	5	8	6	9	6	5
15	6	18	14	12	4	5	6	10	6	4	4	24
16	4	7	6	11	12	12	12	12	4	4	8	20
17	5	14	6	8	5	10	9	10	5	4	6	14
18	3	20	13	6	6	8	7	12	4	2	6	10
19	4	21	21	4	6	7	5	11	8	2	17	8
20	15	18	14	5	7	18	29	4	12	4	8	9
21	29	11	11	3	11	10	19	18	3	3	6	6
22	29	4	6	2	14	10	18	15	4	7	4	8
23	25	43	5	12	22	11	14	6	4	8	3	6
24	22	22	2	46	10	7	12	5	9	20	7	12
25	17	26	4	49	11	7	7	6	4	25	7	17
26	12	27	3	17	14	7	6	13	4	9	9	4
27	13	20	16	9	9	7	12	26	9	14	5	5
28	12	13	9	5	3	11	13	12	2	10	4	26
29	22	13	15	10	3	10		5	4	21	5	52
30	27	5	14	14	4	4		4	4	9	3	9
31	16		6		7	8		4		11		14
MEAN	12	17	11	13	8	8	10	10	7	8	7	11

PLANETARY 3-HOUR-RANGE INDICES (Kp) BY 27-DAY SOLAR ROTATION INTERVAL

University of Gottingen

Kp through July 31, 1987





Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
1945	16.1	16.4	25.0	19.1	15.4	11.1	15.3	12.1	15.6	17.9	12.0	20.2	16.3
1946	19.2	30.2	43.5	25.0	24.1	22.3	28.6	16.7	41.7	19.6	19.3	14.3	25.4
1947	20.6	17.1	37.9	23.3	19.1	21.1	21.4	32.9	39.1	31.3	20.7	17.9	25.2
1948	20.8	21.0	24.2	17.7	23.7	15.0	16.2	28.3	22.0	36.1	23.1	23.0	22.6
1949	29.8	20.4	24.7	17.6	22.4	17.9	11.8	19.2	17.8	32.7	24.6	15.1	21.2
1950	19.5	23.2	20.6	23.8	21.7	19.0	19.5	30.2	29.3	34.5	28.0	24.0	24.4
1951	23.1	29.2	28.5	32.1	25.5	23.2	25.2	29.7	44.4	30.3	25.7	28.2	28.8
1952	28.5	34.3	40.1	38.0	33.1	23.8	20.7	19.0	28.5	26.4	18.9	23.4	27.9
1953	22.3	21.2	27.4	22.7	21.4	18.4	22.5	26.1	29.0	22.4	20.2	12.6	22.2
1954	13.9	24.5	25.5	20.6	12.0	9.7	13.1	16.5	25.4	21.1	14.5	10.9	17.3
1955	19.3	18.2	23.6	21.1	16.7	15.1	12.3	14.3	19.1	17.8	19.9	14.1	17.6
1956	28.7	23.3	27.6	31.7	29.3	23.5	19.8	20.7	22.4	19.3	32.3	18.2	24.7
1957	28.7	26.8	36.7	28.8	18.1	29.1	21.7	20.7	57.0	24.0	29.5	31.7	29.4
1958	25.5	43.2	36.1	27.6	25.2	29.7	36.0	25.1	26.5	24.7	15.0	27.2	28.5
1959	24.3	35.9	29.9	24.2	25.7	21.6	42.5	31.2	36.1	28.2	32.1	30.8	30.2
1960	25.2	23.5	27.6	51.5	31.6	27.6	28.1	27.2	26.4	45.6	45.9	34.5	32.9
1961	20.6	25.1	22.0	21.8	22.3	20.1	36.0	18.5	20.7	23.3	17.3	21.1	22.4
1962	13.2	19.2	15.5	22.6	13.4	18.1	21.0	26.2	29.8	33.3	22.5	23.5	21.5
1963	19.3	15.3	14.9	18.2	20.4	20.5	20.8	22.5	40.2	23.5	20.7	18.9	21.3
1964	20.1	20.1	21.0	21.7	17.5	15.1	16.9	14.8	18.2	16.9	13.8	10.3	17.2
1965	11.8	16.3	14.3	12.6	10.5	15.7	14.7	16.8	17.5	13.1	11.7	13.8	14.1
1966	14.2	14.8	18.6	12.0	14.8	12.5	17.1	20.0	29.4	17.5	16.8	20.5	17.3
1967	18.9	19.8	13.8	15.5	33.1	18.6	14.4	17.5	24.7	17.8	18.9	24.5	19.8
1968	21.1	26.5	23.3	22.2	21.4	24.9	18.0	20.1	22.0	24.8	26.2	20.3	22.6
1969	17.8	25.8	27.3	23.6	25.2	16.7	15.0	15.3	23.8	17.2	18.7	13.8	20.0
1970	14.4	12.7	26.4	23.1	16.6	18.3	28.4	21.0	19.7	20.6	21.6	16.5	19.9
1971	23.5	21.2	21.1	23.9	21.1	17.0	15.2	17.1	21.4	22.2	18.8	18.6	20.1
1972	21.9	18.3	21.5	18.1	16.6	21.5	14.0	34.2	20.4	20.4	21.8	18.9	20.6
1973	26.1	32.7	36.9	39.6	26.1	27.3	20.9	20.6	22.8	28.2	20.7	19.9	26.8
1974	25.8	26.4	33.7	32.9	29.2	29.2	32.0	30.2	33.7	37.3	26.8	27.5	30.4
1975	27.6	31.1	32.0	24.3	22.7	20.7	21.7	18.1	16.9	20.2	29.3	21.1	23.8
1976	23.3	28.5	33.4	25.4	23.7	17.5	18.4	17.7	23.7	20.4	16.9	18.6	22.3
1977	18.7	21.0	19.9	24.9	20.1	14.2	22.9	23.2	23.0	20.9	17.3	17.0	20.3
1978	24.6	26.2	25.9	31.3	31.2	28.3	19.9	25.6	27.0	20.8	24.6	22.0	25.6
1979	27.3	23.7	26.9	33.5	21.0	18.3	17.9	26.0	22.0	19.3	17.1	16.8	22.5
1980	19.0	17.3	12.7	18.4	15.6	20.0	17.0	15.9	14.2	21.9	23.3	21.7	18.1
1981	16.5	23.1	26.6	32.8	26.9	18.0	27.2	24.0	20.4	33.7	24.1	19.3	24.4
1982	24.2	50.6	28.5	32.9	26.7	32.1	43.9	31.4	45.1	28.5	33.0	33.8	34.2
1983	26.2	40.0	33.6	35.7	31.6	24.9	21.3	24.9	23.7	29.3	33.5	26.0	29.1
1984	23.5	26.7	30.7	32.5	27.2	23.7	26.4	25.8	32.6	33.1	31.0	29.0	28.5
1985	25.7	24.1	19.0	29.5	15.6	19.9	23.4	22.0	21.2	22.2	23.7	21.4	22.3
1986	22.4	40.0	21.1	14.3	18.8	15.9	16.3	22.3	24.7	18.6	21.2	15.3	20.9
1987	14.8	16.6	17.6	12.9	14.7	13.2	19.3						15.6

PRINCIPAL MAGNETIC STORMS

JULY 1987

Sta	Geomag Lat	Commencement			SC Amplitudes			Maximum 3-Hour K Index Day(3-Hour Periods)	D K (Min)	Ranges		Z (Gamma)	End	
		Day	Time (UT)	Type	D (Min)	H (Gamma)	Z (Gamma)			D H	(Gamma)		Day	Hour (UT)
FRD 49.6N	03	1916	SC		2	32	- 6	03(7)	4	10	65	7	04	08
JAI 17.3N	03	1915	SC		- 0.6	37	- 6		-	5	58	21	04	24
UJJ 13.5N	03	1915	SC		- 0.7	38	- 3		-	4	54	20	04	24
ABG 09.5N	03	1915	SC		- 0.5	33	- 4	03(7) 04(1)	4	5	53	27	04	24
HYB 07.6N	03	1916	SC		- 0.2	32	- 1	03(7) 04(1)	4	4	51	16	04	21
GUA 04.0N	03	1916	SC		0.2	18	- 6	04(1)	5	10	80	10	04	08
ETT 00.6S	03	0530	..		..	..	..		-	-4	118	46	04	14
ETT 00.6S	03	1916	SC		- 0.2	24	25		-	---	---	---	04	14
TRD 01.1S	03	1915	SC		0.3	31	41		-	3	86	63	04	24
WIT 54.2N	15	1000	..		..	..	..	15(5,6,8) 16(6,8)	5	20	115	55	17	06
FRD 49.6N	15	05--	..		..	..	..	15(6) 16(1)	5	18	92	48	18	--
BJI 28.5N	15	05--	..		..	..	..	15(3)	5	8	123	31	16	10
JAI 17.3N	15	0500	..		..	..	..		-	11	125	36	17	24
UJJ 13.5N	15	0500	..		..	..	..		-	9	124	36	17	24
ABG 09.5N	15	0500	..		..	..	..	15(3,6)	5	9	151	47	17	24
HYB 07.6N	15	0500	..		..	..	..	15(3,6)	5	7	156	27	17	17
ETT 00.6S	15	0200	..		..	..	..		-	-7	187	49	17	18
TRD 01.1S	15	0500	..		..	..	..		-	5	203	99	17	24
KGL 56.5S	15	0800	..		..	..	..	15(8)	5	---	---	---	16	09
FRD 49.6N	24	1636	SC*		3	35	- 8	24(6,7)	4	18	74	33	25	23
BJI 28.5N	24	1636	SC		0.6	36	- 3	25(4)	6	13	94	40	25	21
JAI 17.3N	24	1633	SC		- 1.1	31	- 5		-	7	99	40	25	24
UJJ 13.5N	24	1633	SC		- 0.7	32	- 8		-	7	103	30	25	24
ABG 09.5N	24	1633	SC		- 0.8	29	- 6	25(4)	5	6	111	31	25	24
HYB 07.6N	24	1636	SC		- 0.5	29	- 1	25(4)	5	6	126	20	25	23
GUA 04.0N	24	1636	SC		..	6	- 2	24(4)	5	10	140	10	25	14
ETT 00.6S	24	1636	SC		- 0.6	22	11		-	-6	---	54	25	24
COL 64.6N	28	0849	SC*		- 6	58	- 21	28(5) 29(2,4)	6	257	1330	1070	29	17
SIT 60.0N	28	0850	SC		1	- 3	- 1	29(2)	8	---	---	610	29	16
WIT 54.2N	28	0849	SC*		- 2	25	* 0	28(8)	6	31	180	85	29	18
FRD 49.6N	28	0849	SC		2	22	- 3	29(2)	6	25	158	65	30	02
BJI 28.5N	28	0850	SC		0.2	25	3	29(1)	6	16	168	43	29	19
JAI 17.3N	28	0848	SC		- 0.6	20	- 3		-	12	193	47	31	24
UJJ 13.5N	28	0848	SC		- 0.3	21	- 5		-	10	175	41	31	24
ABG 09.5N	28	0848	SC		- 0.6	19	- 5	28(4,8) 29(1)	5	11	186	52	31	24
HYB 07.6N	28	0850	SC		- 0.3	18	- 1	28(6,8) 29(1,2,5)	5	9	197	27	29	20
GUA 04.0N	28	0849	SC		..	5	- 2	28(4)	5	---	70	20	28	18
GUA 04.0N	28	2028	..		..	..	..	29(1)	6	10	190	20	29	18
ETT 00.6S	28	0850	SC*		- 0.6	33	21		-	-8	200	92	29	20
HER 33.7S	28	0849	SC		..	16	12	29(2)	6	34	145	89	29	17
GNA 43.2S	28	0850	SC*		1.1	10	* 4	29(4)	5	16	140	130	29	17
KGL 56.5S	28	0848	SC		2	16	8	29(1)	6	33	256	208	29	15
HER 33.7S	30	23--	..		..	..	..	31(2)	5	20	29	44	31	06

Stations Reporting:

ABG = ALIBAG
BJI = BEIJING
COL = COLLEGE
ETT = ETAIYAPURAM

FRD = FREDERICKSBURG
GNA = GNANGARA
GUA = GUAM
HER = HERMANUS

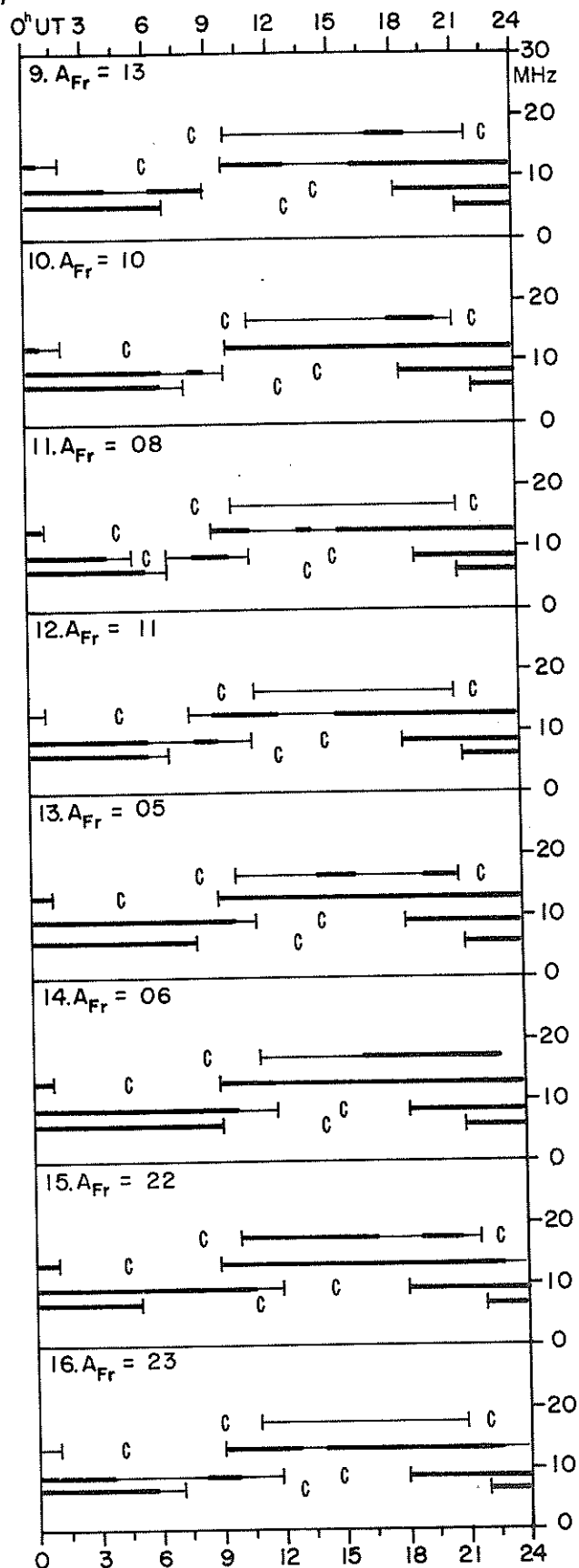
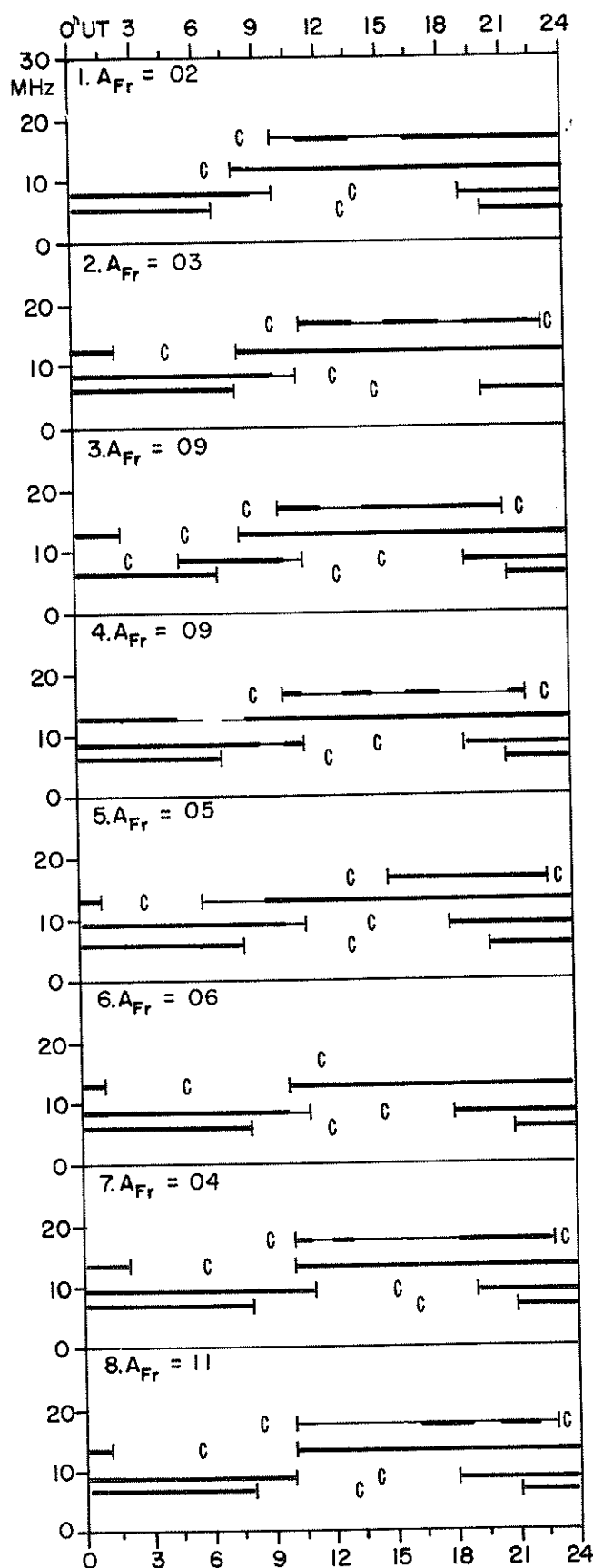
HYB = HYDERABAD
JAI = JAIPUR
KGL = KERGUELEN
SIT = SITKA

TRD = TRIVANDRUM
UJJ = UJJAIN
WIT = WITTEVEEN

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Jul 87

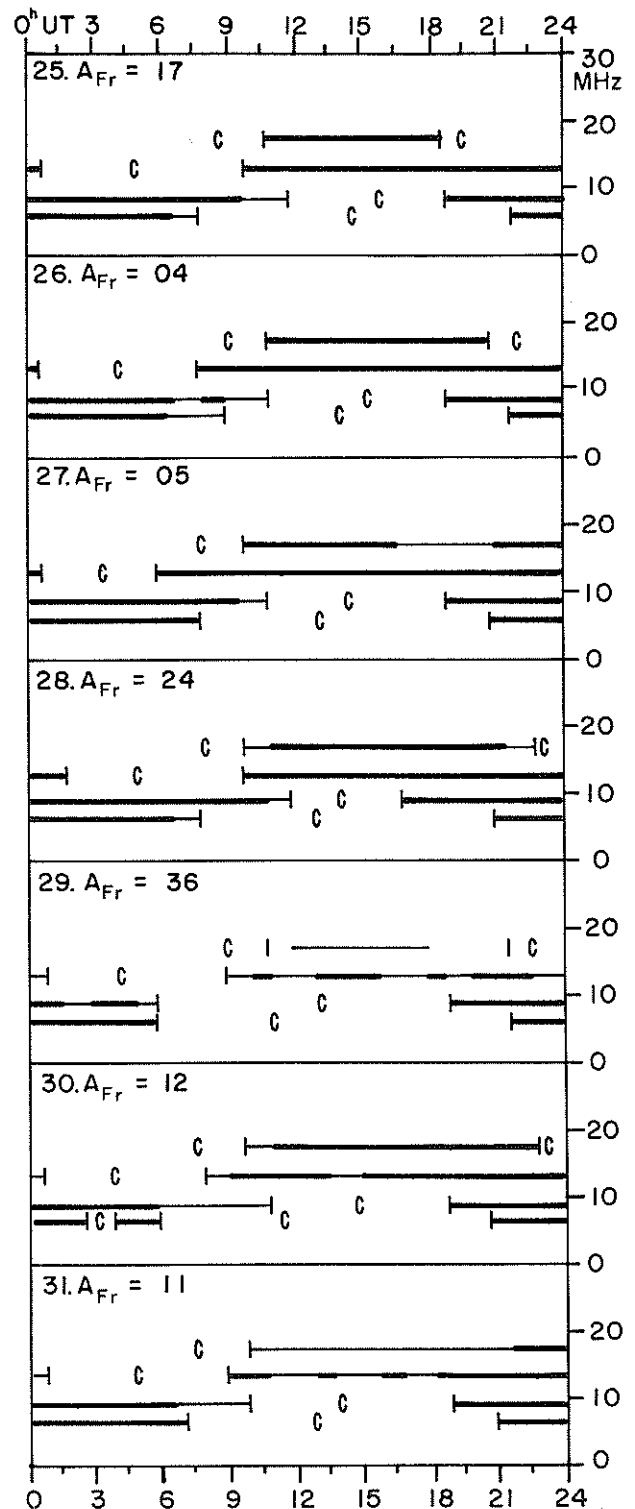
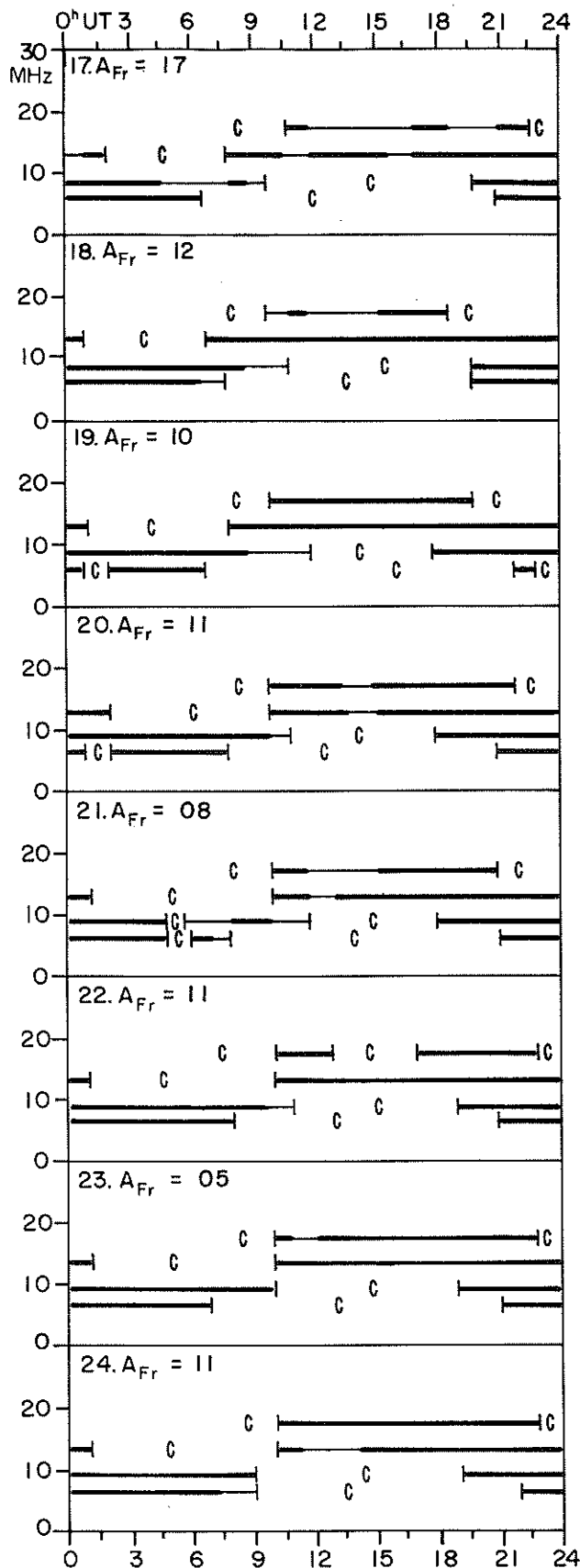
TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

JULY 1987



TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH
JULY 1987

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Jul 87



Field strengths from four frequencies, 6.4, 8.6, 13.0, and 17.0 MHz, observed on a Norddeich-New York circuit are represented above. Heavy solid lines represent field strengths ≥ -12 dB above $1 \mu\text{V/m}$ (transmitter power reduced to 1 kW). Observed field strengths between -12 dB and -40 dB above $1 \mu\text{V/m}$ are represented by the fine line.

RADIO PROPAGATION QUALITY INDICES

JULY 1987

Day	For Circuits from Norddeich to:					
	Bracknell	Teheran	New York	Tokyo	Johannesburg	Canberra
1	6.0	6.3	6.7	7.4	4.6	5.5
2	6.8	7.4	6.9	7.8	6.1	6.4
3	6.8	6.4	6.4	6.3	4.6	5.1
4	5.6	6.0	5.6	6.2	6.1	5.7
5	6.7	7.2	6.3	6.2	6.1	4.7
6	5.8	6.9	6.8	5.1	6.5	5.6
7	6.4	7.0	6.2	5.8	5.6	5.3
8	6.8	5.8	4.9	5.3	4.4	5.1
9	6.2	5.9	4.5	4.2	6.8	5.8
10	7.1	5.5	4.1	4.2	6.3	5.1
11	6.3	5.2	4.0	4.0	5.9	4.3
12	4.7	4.6	3.9	2.6	5.1	4.8
13	5.4	4.8	6.1	5.3	5.7	5.1
14	5.7	6.1	6.3	5.8	7.1	4.8
15	4.3	5.5	5.6	4.5	7.3	4.1
16	5.2	5.1	4.2	3.2	6.3	5.0
17	5.5	5.2	4.8	4.8	8.1	5.1
18	5.7	5.4	5.7	6.0	7.3	5.0
19	6.8	6.2	6.4	6.1	6.3	5.8
20	6.7	6.4	6.7	7.3	7.6	6.1
21	6.9	6.6	5.9	7.1	7.1	6.7
22	6.8	5.9	6.7	6.8	7.8	6.9
23	5.7	7.0	6.8	7.9	7.9	7.1
24	5.5	6.7	6.6	7.1	6.5	7.5
25	5.4	6.8	7.0	6.5	7.0	7.5
26	6.1	6.8	6.6	7.9	7.9	6.9
27	6.2	7.2	6.8	8.3	6.9	7.6
28	5.6	7.2	5.7	5.9	6.7	5.9
29	3.7	5.2	2.3	2.4	2.0	5.9
30	5.3	5.1	4.9	5.7	4.2	6.1
31	5.2	5.5	3.6	5.2	7.5	5.2
Mean	5.9	6.1	5.6	5.8	6.3	5.7

CALCULATION OF QUALITY INDICES (Q)

From all 24 hourly field strength values and from all frequencies of the same circuit a median field strength value is calculated (FD). This daily value is compared with the average value (FA) of the preceeding 27 days (1 sun rotation).

$$Q = 6.0 + 20 \log(FD/FA)/3.0$$

The quality indices vary from 0.0 to 9.9 where 6.0 is normal. Conditions are "normal" (index = 6.0), if they correspond to the average of the preceeding 27 days.

SCALE FOR QUALITY INDICES

- 0.0 - 1.0 = very poor
- 1.1 - 3.0 = poor
- 3.1 - 5.0 = fair
- 5.1 - 7.0 = normal
- 7.1 - 9.0 = good
- 9.1 - 9.9 = very good

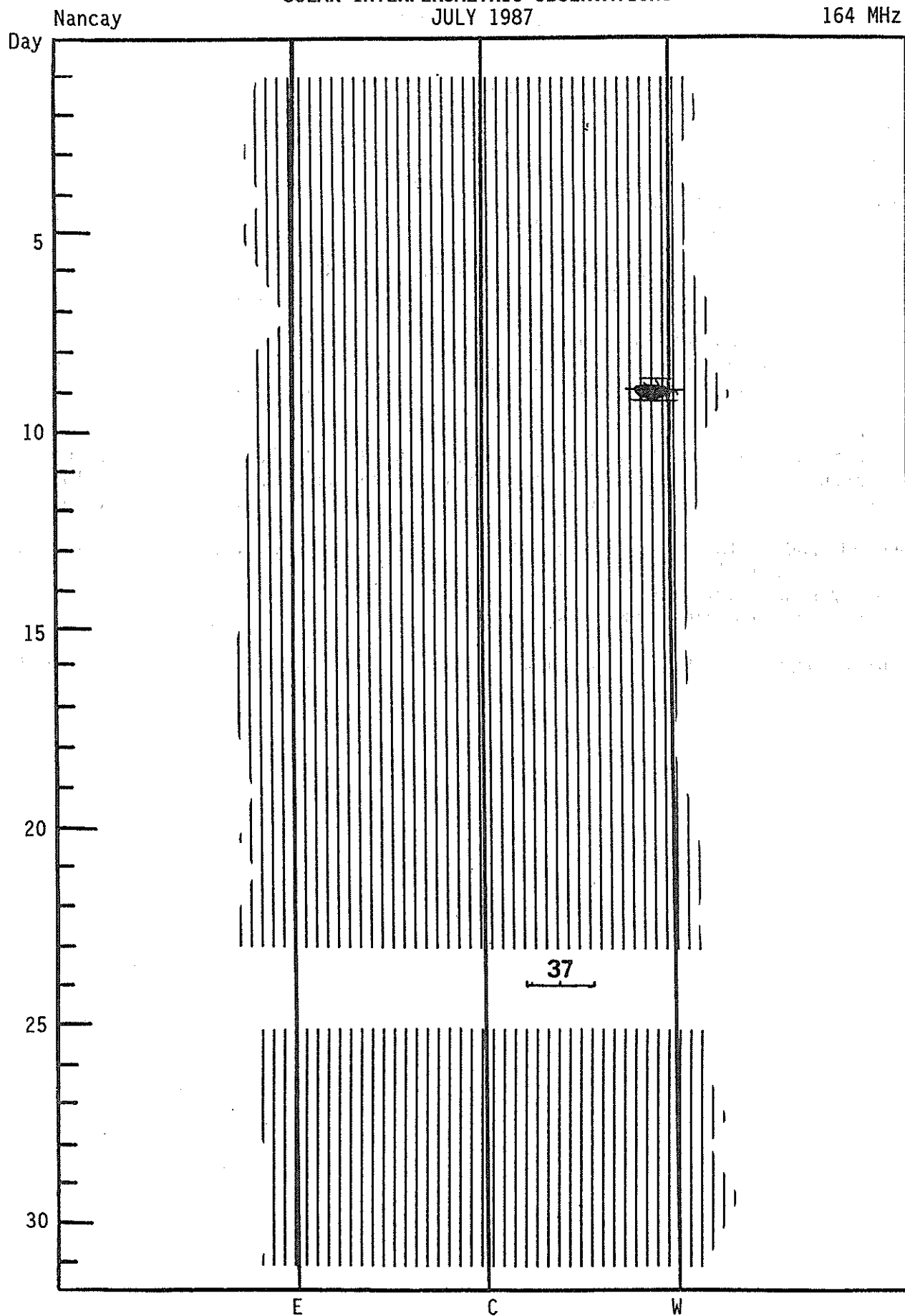
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Late
Jul 87

SOLAR INTERFEROMETRIC OBSERVATIONS
JULY 1987

164 MHz



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Late
Dec 86

PIONEER VENUS ORBITER
ONE HOUR MAGNETIC FIELD AVERAGES AT APOAPSIS
VENUS SOLAR ORBITAL COORDINATES

UNIVERSAL TIME				NANOTESLAS			REGION	
				BX _{vso}	BY _{vso}	BZ _{vso}	BT	W=WAKE
86	335	DEC	1	11:50:00	-8.88	7.84	2.62	12.60
86	336	DEC	2	11:50:00	-6.94	5.05	-1.79	9.15
86	337	DEC	3	11:50:00				
86	338	DEC	4	11:50:00	-6.69	.55	-3.42	7.56
86	339	DEC	5	11:50:00	6.82	-3.29	-2.37	8.30
86	340	DEC	6	11:50:00	-.23	-1.74	-.31	3.51
86	341	DEC	7	11:50:00				
86	342	DEC	8	11:50:00	3.60	-.37	-5.00	7.54
86	343	DEC	9	11:50:00	-4.28	.09	-2.30	7.45
86	344	DEC	10	11:50:00	-.05	-7.90	-6.58	11.00
86	345	DEC	11	11:50:00	-2.77	4.78	-1.40	7.58
86	346	DEC	12	11:50:00	2.81	-8.16	-2.84	9.43
86	347	DEC	13	11:50:00	4.44	-12.09	-5.99	15.98
86	348	DEC	14	11:50:00	9.59	-1.83	-2.98	10.41
86	349	DEC	15	11:50:00	.76	-5.06	3.12	7.70
86	350	DEC	16	11:50:00	-4.99	.76	3.85	6.88
86	351	DEC	17	11:50:00	.07	4.51	3.16	7.78
86	352	DEC	18	11:50:00	4.49	.55	.79	4.74
86	353	DEC	19	11:50:00	3.52	-9.87	2.75	11.22
86	354	DEC	20	11:50:00	5.68	.96	-.84	7.06
86	355	DEC	21	11:50:00	1.68	-4.27	7.62	10.83
86	356	DEC	22	11:50:00				
86	357	DEC	23	11:50:00	5.36	7.41	1.61	9.69
86	358	DEC	24	11:50:00	-9.15	4.24	-8.96	13.97
86	359	DEC	25	11:50:00				
86	360	DEC	26	11:50:00	-5.76	-1.66	-8.65	12.22
86	361	DEC	27	11:50:00	-11.74	-2.32	-.83	12.11
86	362	DEC	28	11:50:00	-6.50	-.17	.15	6.65
86	363	DEC	29	11:50:00				
86	364	DEC	30	11:50:00				
86	365	DEC	31	11:50:00				

Source: Institute of Geophysics and Planetary Physics, UCLA

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Late
Jan 87

PIONEER VENUS ORBITER
ONE HOUR MAGNETIC FIELD AVERAGES AT APOAPSIS
VENUS SOLAR ORBITAL COORDINATES

UNIVERSAL TIME				NANOTESLAS			BT	REGION W=WAKE
				BXvso	BYvso	BZvso		
87 001	JAN	1	11:50:00					
87 002	JAN	2	11:50:00	-6.40	-.46	-2.48	7.55	
87 003	JAN	3	11:50:00	-2.03	-1.19	-2.68	6.04	
87 004	JAN	4	11:50:00	-4.61	5.16	2.22	9.54	
87 005	JAN	5	11:50:00	-.14	-2.11	3.99	6.25	
87 006	JAN	6	11:50:00	7.03	-2.39	.95	7.83	
87 007	JAN	7	11:50:00	-4.81	-.60	1.98	5.41	
87 008	JAN	8	11:50:00					
87 009	JAN	9	11:50:00	-3.51	-2.19	-1.58	5.49	
87 010	JAN	10	11:50:00	-2.23	5.71	3.51	7.56	
87 011	JAN	11	11:50:00	-3.45	7.92	-.48	10.68	
87 012	JAN	12	11:50:00					
87 013	JAN	13	11:50:00	-8.12	1.17	-3.19	9.26	
87 014	JAN	14	11:50:00					
87 015	JAN	15	12:00:00					
87 016	JAN	16	12:00:00	.13	-1.37	-2.63	3.77	
87 017	JAN	17	12:00:00	-1.74	2.09	-3.22	4.42	
87 018	JAN	18	12:00:00	-1.87	-7.63	2.72	9.98	
87 019	JAN	19	12:00:00	1.40	-4.96	3.03	6.12	
87 020	JAN	20	12:00:00					
87 021	JAN	21	12:00:00	3.98	.30	-2.92	5.19	
87 022	JAN	22	12:00:00					
87 023	JAN	23	12:00:00	3.02	4.84	-.70	7.40	
87 024	JAN	24	12:00:00	-7.99	3.57	.04	9.32	
87 025	JAN	25	12:00:00	-7.66	.51	1.81	8.08	
87 026	JAN	26	12:00:00	-3.65	1.72	-5.62	9.14	
87 027	JAN	27	12:00:00	-4.05	4.41	-.00	6.22	
87 028	JAN	28	12:00:00	1.94	12.15	8.19	15.63	
87 029	JAN	29	12:00:00	-3.31	-5.21	-5.97	12.57	
87 030	JAN	30	12:00:00	3.03	3.18	4.48	6.49	
87 031	JAN	31	12:00:00	-.78	14.57	4.60	16.38	

Source: Institute of Geophysics and Planetary Physics, UCLA

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Late
Feb 87

PIONEER VENUS ORBITER
ONE HOUR MAGNETIC FIELD AVERAGES AT APOAPSIS
VENUS SOLAR ORBITAL COORDINATES

UNIVERSAL TIME					NANOTESLAS			REGION
					BXvso	BYvso	BZvso	W=WAKE
87	032	FEB	1	12:00:00	-5.81	2.82	-1.67	10.68
87	033	FEB	2	12:00:00				
87	034	FEB	3	12:00:00	-3.51	5.35	3.82	8.55
87	035	FEB	4	12:00:00	5.59	4.66	1.13	9.75
87	036	FEB	5	12:00:00	-3.05	4.40	-1.17	6.17
87	037	FEB	6	12:00:00				
87	038	FEB	7	12:00:00	2.17	7.47	.47	8.64
87	039	FEB	8	12:00:00	-3.64	7.27	-.91	9.04
87	040	FEB	9	12:00:00	2.91	-6.65	3.58	9.64
87	041	FEB	10	12:00:00	1.85	.58	-3.77	5.16
87	042	FEB	11	12:00:00	-9.19	1.41	-.27	9.32
87	043	FEB	12	12:00:00	-4.47	4.84	3.28	8.26
87	044	FEB	13	12:00:00	-8.91	4.05	-2.43	10.29
87	045	FEB	14	12:00:00	3.77	-7.29	-2.24	8.74
87	046	FEB	15	12:00:00	-1.31	-2.17	1.25	5.54
87	047	FEB	16	12:00:00	-5.20	4.05	-1.93	7.54
87	048	FEB	17	12:00:00	-9.35	3.89	-4.48	11.29
87	049	FEB	18	12:10:00	-5.00	.30	-1.01	5.65
87	050	FEB	19	12:10:00	-6.64	-.52	1.97	7.76
87	051	FEB	20	12:10:00	3.40	-2.98	-.02	4.99
87	052	FEB	21	12:10:00				
87	053	FEB	22	12:10:00	-3.33	3.19	2.40	5.37
87	054	FEB	23	12:10:00	-2.23	4.49	5.29	7.58
87	055	FEB	24	12:10:00	-3.10	7.24	5.92	10.19
87	056	FEB	25	12:10:00				
87	057	FEB	26	12:10:00	-5.40	4.64	-.34	7.40
87	058	FEB	27	12:10:00				
87	059	FEB	28	12:10:00	.84	5.44	1.28	6.76

Source: Institute of Geophysics and Planetary Physics, UCLA

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Late
Mar 87

PIONEER VENUS ORBITER
ONE HOUR MAGNETIC FIELD AVERAGES AT APOAPSIS
VENUS SOLAR ORBITAL COORDINATES

UNIVERSAL TIME				BXvso	NANOTESLAS		BT	REGION W=WAKE
					BYvso	BZvso		
87 060	MAR	1	12:10:00	-4.42	-.39	-.83	4.65	
87 061	MAR	2	12:10:00	1.01	10.00	1.68	10.96	
87 062	MAR	3	12:10:00	-5.70	2.43	-2.69	6.84	
87 063	MAR	4	12:10:00	-10.75	1.95	-.74	11.03	
87 064	MAR	5	12:10:00	-4.27	-2.42	-2.09	5.53	
87 065	MAR	6	12:10:00	-2.18	2.66	.28	3.61	
87 066	MAR	7	12:10:00					
87 067	MAR	8	12:10:00	6.27	-5.75	.76	10.45	
87 068	MAR	9	12:10:00	4.94	-1.02	-2.47	7.16	
87 069	MAR	10	12:10:00	3.09	-5.35	.74	6.99	
87 070	MAR	11	12:10:00	6.28	-5.15	-.05	8.48	
87 071	MAR	12	12:10:00	-3.01	-.63	4.03	6.52	
87 072	MAR	13	12:10:00	-.48	3.15	1.66	4.28	
87 073	MAR	14	12:10:00	-1.13	-3.19	-1.84	4.13	
87 074	MAR	15	12:10:00	-7.87	1.31	.10	8.06	
87 075	MAR	16	12:10:00	-.64	-4.58	-2.29	5.41	
87 076	MAR	17	12:10:00	.43	.78	.31	2.38	
87 077	MAR	18	12:10:00	2.58	-1.24	.74	3.55	
87 078	MAR	19	12:10:00	.78	2.02	2.04	6.74	
87 079	MAR	20	12:10:00	-.76	-.19	2.46	3.79	
87 080	MAR	21	12:10:00	3.75	1.40	2.81	6.32	
87 081	MAR	22	12:10:00	4.71	-2.88	1.88	5.92	
87 082	MAR	23	12:10:00	5.55	.21	-.74	6.10	
87 083	MAR	24	12:10:00	7.95	-.02	-2.89	9.24	
87 084	MAR	25	12:10:00	4.63	-11.49	-.24	13.10	
87 085	MAR	26	12:10:00	6.84	.61	-2.67	7.40	
87 086	MAR	27	12:10:00	-7.49	-.26	4.70	9.22	
87 087	MAR	28	12:10:00	2.10	.42	6.43	7.90	
87 088	MAR	29	12:10:00	8.77	5.16	-4.77	11.42	
87 089	MAR	30	12:10:00	6.77	-.15	4.22	8.10	
87 090	MAR	31	12:10:00	-3.75	7.44	-1.06	8.77	

Source: Institute of Geophysics and Planetary Physics, UCLA

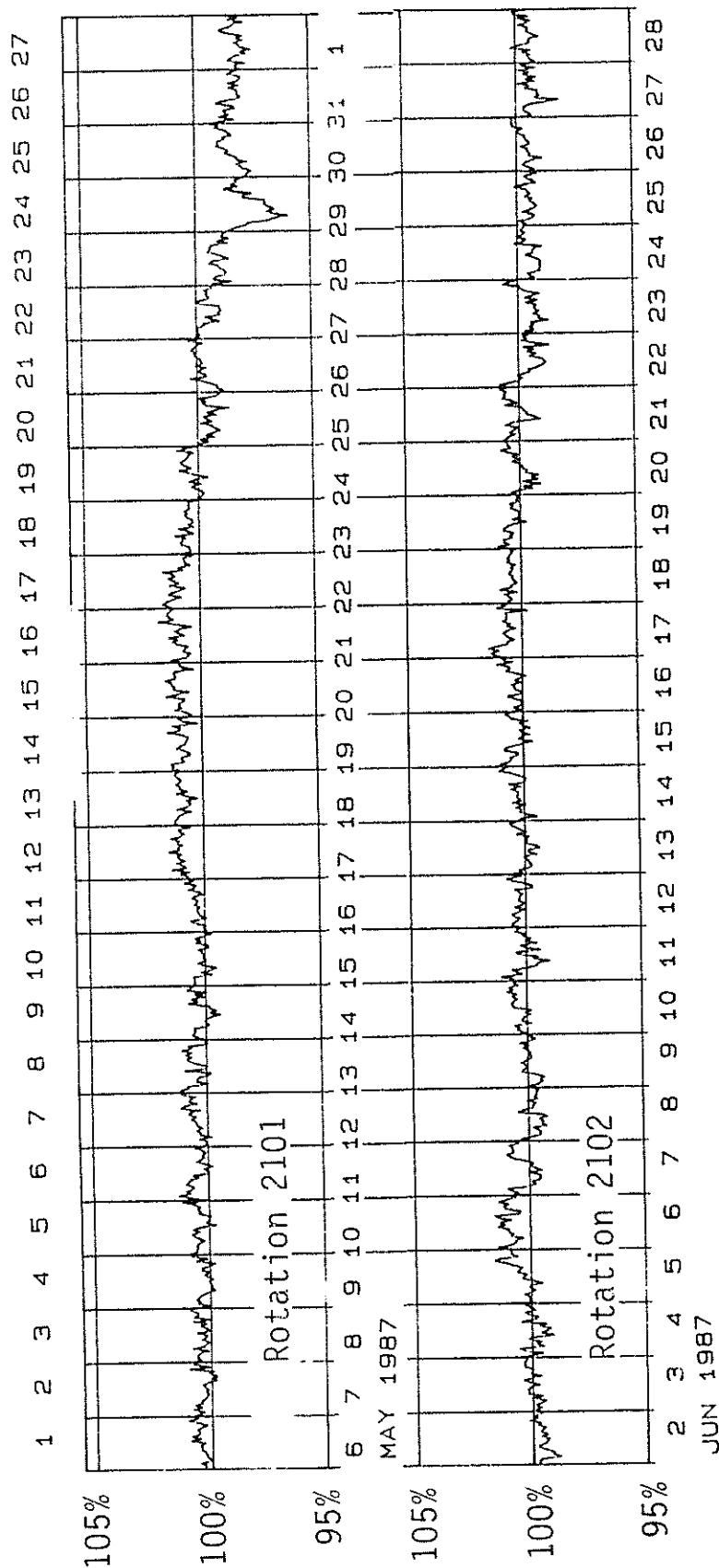
97
Late
Apr 87

PIONEER VENUS ORBITER
ONE HOUR MAGNETIC FIELD AVERAGES AT APOAPSIS
VENUS SOLAR ORBITAL COORDINATES

UNIVERSAL TIME				NANOTESLAS			BT	REGION W=WAKE
				BXvso	BYvso	BZvso		
87 091	APR	1	12:10:00	.42	.24	-.67	4.38	
87 092	APR	2	12:10:00	5.09	-3.31	.34	7.15	
87 093	APR	3	12:10:00	2.65	.74	-.85	3.01	
87 094	APR	4	12:10:00	.70	-1.52	-3.55	6.17	
87 095	APR	5	12:10:00	8.88	-.78	-3.49	12.36	
87 096	APR	6	12:10:00	9.71	.13	1.65	10.27	
87 097	APR	7	12:10:00	-2.97	1.54	1.06	4.40	
87 098	APR	8	12:10:00	4.60	-2.65	3.78	7.29	
87 099	APR	9	12:10:00	-4.87	8.98	1.90	10.85	
87 100	APR	10	12:10:00	-3.21	7.07	-1.11	8.49	
87 101	APR	11	12:10:00	6.80	-.13	2.02	7.18	
87 102	APR	12	12:10:00	.84	.30	-7.48	8.16	
87 103	APR	13	12:10:00	9.22	-3.13	-.57	9.86	
87 104	APR	14	12:10:00	-.81	-5.17	-.79	6.43	
87 105	APR	15	12:10:00	5.54	-3.73	-.63	7.15	
87 106	APR	16	12:10:00	5.05	-4.47	2.56	8.33	
87 107	APR	17	12:10:00	-1.01	-3.22	-.88	7.99	
87 108	APR	18	12:10:00	7.15	-4.27	-1.24	9.09	
87 109	APR	19	12:10:00	3.71	-3.79	1.72	7.77	
87 110	APR	20	12:10:00					
87 111	APR	21	12:10:00	5.17	-.36	-2.39	5.82	
87 112	APR	22	12:10:00	8.27	-.68	-2.98	9.70	
87 113	APR	23	12:10:00	3.40	-1.34	-1.47	7.96	
87 114	APR	24	12:10:00	-1.01	-5.48	.56	6.01	
87 115	APR	25	12:10:00	7.65	-1.10	1.07	7.94	
87 116	APR	26	12:10:00	7.12	.80	-1.15	7.28	
87 117	APR	27	12:10:00					
87 118	APR	28	12:10:00	-3.92	5.10	-.14	6.58	
87 119	APR	29	12:10:00	-5.79	-6.39	8.44	12.65	
87 120	APR	30	12:10:00	2.56	-3.22	2.82	5.55	

Source: Institute of Geophysics and Planetary Physics, UCLA

THULE NEUTRON MONITOR



COSMIC RAY INDICES
(Neutron Monitor)

99
Late
Jun 87

JUNE 1987

Day	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	PREDIGTSTUHL Average (cts/h)/100	TOKYO Average (cts/h)/256	HUANCAYO Average (cts/h)/100
1	4510			6299.3	4193.1			1781.7
2	4524			6309.1	4192.0			1783.3
3	4543			6327.9	4184.2			1779.0
4	4537			6321.1	4183.6			1778.1
5	4563			6347.3	4219.0			1786.8
6	4587			6385.4	4241.4			1788.7
7	4555			6358.0	4214.3			1783.7
8	4530			6341.4	4205.7			1780.4
9	4539			6336.7	4206.2			1782.9
10	4561			6338.3	4210.4			1784.3
11	4546			6314.0	4200.8			1777.3
12	4558			6332.4	4207.9			1778.9
13	4543			6337.3	4208.7			1778.8
14	4557			6347.6	4220.8			1783.7(32)
15	4558			6351.7	4217.8			1783.3
16	4561			6360.0	4228.7			1781.9
17	4578			6365.3	4233.3			1785.5
18	4565			6350.3	4225.0			1782.6
19	4560			6336.9	4225.2			1783.0
20	4544			6318.2	4208.5			1781.4
21	4554			6315.9	4217.9			1782.9
22	4523			6295.2	4202.3			1777.2
23	4521			6300.7	4194.4			1783.1
24	4518			6301.8	4172.5			1780.5
25	4520			6276.1	4171.6			1779.0
26	4529			6289.1	4189.8			1784.7
27	4514			6267.6	4178.7			1786.2
28	4523			6247.5	4183.0			1783.1
29	4532			6240.7	4180.7			1783.9
30	4540			6260.8	4184.0			1783.9
Mean	4543			6319.1	4203.5			1782.3

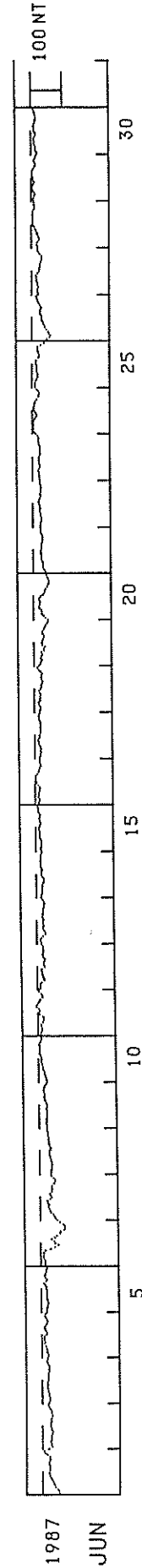
For less than 24-hour coverage, parentheses enclose the number of hours for which data are available.
For Climax and Huancayo, parentheses enclose the number of section hours whenever the sum of both sections falls below 40 hours.

100
Late
Jun 87

HOURLY EQUATORIAL DST VALUES (PROVISIONAL)

JUNE 1987

DAY	UNIT=NT				U.T.																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
1	-55	-52	-49	-43	-39	-38	-34	-30	-28	-23	-22	-22	-24	-23	-24	-22	-22	-24	-26	-24	-15	-8	-6	-6	-20
2	-33	-31	-29	-27	-30	-29	-29	-32	-34	-31	-30	-28	-28	-29	-29	-29	-32	-33	-31	-30	-26	-22	-18	-22	
3	-24	-25	-26	-22	-22	-20	-18	-18	-19	-18	-19	-20	-21	-21	-21	-21	-23	-22	-23	-22	-18	-16	-18	-19	
4	-22	-21	-17	-17	-16	-13	-9	-10	-9	-8	-8	-15	-17	-14	-11	-10	-13	-17	-18	-17	-13	-10	-13	-17	
5	-17	-18	-20	-22	-22	-21	-18	-18	-19	-19	-18	-17	-17	-13	-9	-15	-19	-14	-12	-14	-17	-17	-18	-18	
6	-16	-13	-13	-10	-9	-10	-10	-16	-32	-45	-58	-48	-44	-35	-45	-53	-63	-65	-76	-78	-78	-73	-63	-54	
7	-49	-45	-42	-36	-32	-29	-27	-29	-26	-24	-32	-37	-34	-32	-37	-39	-39	-39	-44	-47	-49	-44	-38	-36	
8	-37	-37	-39	-39	-41	-39	-37	-35	-34	-33	-32	-33	-35	-35	-33	-30	-30	-29	-30	-28	-28	-28	-26	-26	
9	-26	-24	-23	-23	-24	-25	-25	-25	-25	-24	-25	-26	-24	-21	-18	-17	-18	-18	-16	-15	-17	-19	-23	-27	
10	-26	-24	-22	-20	-18	-17	-14	-13	-12	-11	-9	-10	-9	-7	-4	-6	-5	-5	-3	-4	-7	-10	-10	-11	
11	-9	-10	-14	-13	-10	-11	-15	-19	-19	-17	-7	-3	-7	-3	3	4	-2	-6	-9	-15	-15	-12	-6	-6	
12	-11	-11	-10	-14	-22	-22	-18	-17	-16	-14	-16	-23	-22	-21	-24	-25	-20	-18	-18	-20	-21	-19	-18	-13	
13	-14	-11	-15	-20	-27	-27	-24	-21	-22	-22	-21	-22	-22	-18	-20	-21	-21	-21	-23	-23	-25	-23	-21	-16	
14	-15	-19	-19	-18	-19	-20	-20	-24	-25	-23	-18	-17	-17	-18	-18	-16	-15	-16	-13	-16	-16	-15	-19	-19	
15	-16	-17	-18	-19	-18	-17	-13	-13	-14	-14	-12	-11	-14	-15	-16	-14	-12	-14	-15	-11	-9	-8	-7	-10	
16	-12	-14	-13	-10	-12	-12	-13	-16	-15	-11	-6	-5	-2	-2	-4	-7	-12	-13	-16	-19	-18	-15	-15	-16	
17	-17	-18	-21	-19	-20	-18	-16	-13	-12	-12	-15	-16	-18	-19	-19	-19	-19	-19	-18	-16	-13	-14	-15	-17	
18	-18	-21	-19	-15	-13	-19	-18	-19	-21	-18	-16	-20	-22	-22	-25	-27	-24	-22	-24	-25	-21	-16	-10	-15	
19	-20	-22	-25	-22	-24	-28	-24	-32	-33	-35	-28	-26	-28	-31	-32	-32	-28	-27	-32	-35	-38	-43	-45	-46	
20	-39	-32	-28	-28	-25	-19	-19	-21	-22	-19	-19	-23	-30	-36	-38	-39	-44	-47	-49	-51	-48	-45	-42	-43	
21	-39	-35	-32	-32	-32	-30	-28	-28	-27	-25	-25	-26	-28	-28	-28	-29	-30	-31	-31	-29	-25	-26	-24	-23	
22	-23	-25	-27	-28	-27	-26	-25	-22	-24	-23	-22	-20	-19	-20	-24	-25	-24	-25	-25	-27	-27	-23	-24	-24	
23	-22	-22	-22	-21	-19	-21	-23	-24	-21	-21	-21	-21	-23	-25	-24	-24	-24	-24	-21	-20	-19	-20	-17	-10	
24	-6	-4	-3	-4	-5	-3	-5	-8	-13	-14	-10	-7	-5	-5	-7	-9	-11	-15	-20	-21	-23	-21	-15	-10	
25	-9	-11	-10	-13	-17	-19	-18	-16	-16	-16	-15	-14	-13	-14	-20	-22	-24	-21	-18	-19	-19	-28	-39	-45	
26	-50	-57	-59	-55	-52	-48	-43	-41	-37	-35	-32	-32	-32	-28	-28	-27	-30	-29	-26	-22	-19	-17	-13	-21	
27	-21	-19	-18	-22	-19	-18	-16	-16	-16	-13	-19	-24	-25	-25	-27	-28	-30	-33	-33	-32	-27	-22	-18	-19	
28	-18	-17	-19	-23	-25	-22	-19	-19	-16	-12	-8	-6	-5	-5	-5	-5	-4	-5	-6	-8	-10	-8	-8	-8	
29	-7	-9	-10	-12	-9	-6	-3	-6	-9	-10	-7	-7	-4	-1	-3	-5	-7	-12	-14	-12	-9	-12	-13	-17	
30	-18	-16	-14	-13	-10	-10	-10	-9	-12	-14	-13	-11	-10	-9	-9	-11	-13	-14	-15	-14	-12	-10	-9	-10	



MAGNETIC STORM SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS
(PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS)

101
Late
Jun 87

JUNE 1987

Storm Sudden Commencements (ssc)			Solar Flare Effects (sfe)		
Day	Time	Quality: Station Group*	Day	Begin-End	Station(s)
n o n e			14	0934-1006	MPO
			17	0457-0501	AQU
			22	0911-0917	AQU

Reporting Observatories:

SOD NUR WNG WIT NGK BDV CLF HRB NCK GCK MMB AQU EBR
COI SPT FRD KAK KNY TEN LNP MPO CAO AMS CZT KGL DUM

*Three-letter codes identify each observatory. Reporting stations have been grouped by the character of the observed event. The letter A means very remarkable; B means fair, ordinary, but unmistakable; and C means very poor, doubtful.

GEOMAGNETIC ACTIVITY INDICES

June 1987

Day	Kp Three-Hourly Indices								Sum	Km Three-Hourly Indices								aa Provisional			
	1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	Am	N	S	M
1	3-	1+	1-	2-	3-	2-	2	2+	15	8	0.4	3-	2-	1+	2	2+	1+	15	18	11	17
2	3+	3	2+	1+	1	1	1	1	14	8	0.4	3	3-	2	2+	1-	1	13	17	8	18
3	Q9	0+	1	1-	1+	1	1+	2	9	4	0.2	0+	1+	0+	1+	1+	1-	7	12	8	9
4		2	1+	1+	2	2	1+	1+	13	6	0.3	2	1+	1+	2+	2+	1+	12	17	9	14
5		1+	2-	1+	1	2+	3-	2+	15	7	0.4	1	2-	1+	1+	2+	2+	13	21	8	10
6	D1	1	2	5	5-	4+	3+	4	28+	25	1.2	1	2-	4	5-	5-	3	41	37	53	43
7	D5*	3	1	1	3-	2+	2+	3-	17	9	0.5	3	1	1+	3	2+	2	18	25	13	19
8	Q3	1+	1	1+	1-	1-	1-	0+	7	4	0.1	1+	1-	1+	1-	1-	0+	5	10	4	8
9	Q4	1-	0+	1-	1-	0+	1	1-	6+	3	0.1	1-	0+	0+	1-	0+	1-	4	7	4	4
10	Q6	2-	1	0+	1	2-	1+	1-	9-	4	0.1	2	1	0+	1-	1+	1+	7	12	4	7
11		2-	1+	2-	3	2	2	2-	15	7	0.4	2-	1+	2-	3-	2	2-	13	19	8	14
12	O3*	2	3-	2	3-	3+	3+	3	22-	13	0.7	2-	3-	2+	3-	3-	3-	19	29	15	19
13		2+	2+	2-	2-	2-	1	2-	14-	6	0.3	2+	2+	2-	2	2	1	13	13	8	12
14		2-	1+	3-	2-	1+	1-	1-	12-	6	0.3	1+	1+	3-	2	1	0+	10	14	10	16
15	Q8	1-	0+	0+	1-	0+	2+	2	8	4	0.1	1-	1-	0+	1-	0+	2-	5	16	5	6
16		2-	1	2+	1	1+	2	3+	15+	8	0.4	2-	1+	2	1+	1	2-	13	22	7	11
17		3-	2-	1-	1	2-	1-	1-	11	6	0.2	3-	2-	1-	1	2-	0+	9	15	7	12
18		2	2-	2-	2-	1+	2-	1+	13	6	0.3	2	2-	2-	2-	1	1+	11	17	6	13
19	D2*	3	3	4+	4	3	1+	2-	24	17	0.9	3-	3-	4	4	3+	1+	31	31	29	33
20		2	1+	1	2-	2	2-	3+	16	8	0.5	2	1+	1	2-	2+	2	18	20	13	11
21		3-	2-	1	1	0+	1	2	12	6	0.3	3-	2-	1-	1-	0+	1+	10	16	7	13
22	Q5	1	1-	1	1	1-	1	1+	8-	4	0.1	1	1-	1+	1	1-	0+	6	10	4	8
23	Q2	1-	1+	1-	0+	1-	1-	1	6	3	0.1	1-	1+	0+	0	0+	1-	4	11	3	6
24		0+	1	2	1	1-	2	3-	13-	7	0.3	1-	1	2+	1+	1-	2-	11	17	4	6
25		1-	1	1-	1+	1-	1	3+	12	7	0.4	0+	1	1	1-	1	1+	11	16	9	7
26	D4*	4-	3-	1	1-	2-	1+	2+	16	9	0.5	3+	2+	1	0+	1+	1+	14	20	8	15
27		2-	1+	2-	2+	1+	1	0+	10	5	0.2	1+	1+	2	2+	1+	1	9	11	7	11
28	Q7	1-	2-	1+	1-	1-	0+	1	8+	4	0.1	1-	2	1+	1	1-	0+	7	11	2	6
29	Q10	1	2-	1	1+	1-	1+	1+	10+	5	0.2	1+	2-	1+	2-	1-	1+	9	14	6	10
30	Q1	1+	1	1-	1-	0+	1-	0+	5+	3	0.1	1+	1+	1	1-	0	0+	4	6	4	6
Mean										7	0.34							12.5	16.8	9.5	13.2
Day	Kn Three-Hourly Indices								An	Ks Three-Hourly Indices								Prov			
	1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	As	Sa	Ri	Ra
1	2+	2-	2-	2+	3-	2-	2+	3-		3	1+	1-	2-	2-	1+	2	2		77.8	15	15
2	3+	3	3-	3-	1+	2-	1+	1+		3-	3-	1+	2-	0+	0	0+	0+		77.9	11	11
3	1-	1+	1-	2-	2-	1+	2-	2+		0+	1-	0+	1-	1-	0	1	1-		76.4	0	8
4	2+	2-	2-	2+	2+	2-	2	2		1+	1	1	2	2	1+	1	1		77.3	0	0
5	1+	2-	2-	2-	3-	3	2+	3		1	2-	1-	1	2	2	1	1		76.1	10	8
6	1	2+	4-	4+	4+	3+	4-	3+		1	1+	4+	5-	5-	3-	3	4-		75.8	0	0
7	3-	1+	2-	3+	3-	2+	2+	3-		3+	1-	1-	3-	2	2-	2-	3-		76.0	0	0
8	1+	1	1+	1	1	1-	1-	1+		1+	1-	1+	1-	0+	0	0+	1-		77.0	0	0
9	1	1-	1-	1	1-	1	1-	2-		1-	0+	0+	0+	0+	0	0+	1+		76.8	0	0
10	2+	1	1-	2-	2	2	2-	2		2-	1-	0	0	0+	0	0+	0+		78.1	0	0
11	2	2-	2-	3+	3-	2	2+	2+		1	1+	1+	2	1+	1	1+	1+		80.7	11	11
12	2	3	3-	3	3	3+	3-	3-		1	2+	2-	3-	2-	2-	2+	2-		82.1	21	24
13	2	3-	2+	2+	2+	1+	2+	2		2+	2+	1+	2-	2-	1-	0+	1-		82.3	14	10
14	2-	1+	3-	2	1+	1-	1	2		1+	1+	3	2-	1-	0	0	1+		80.6	10	9
15	1	1	0+	1+	1-	2+	2	2-		0+	0+	0	0	0	1+	1-	0+		80.4	11	10
16	2-	1+	2+	2-	1+	2	3	3		2	1-	2-	1-	1-	1	2	1+		81.3	12	11
17	3-	2	1	1+	2	1-	1-	2-		3	1	0	1-	2-	0	0+	2		81.8	14	19
18	2+	2	2-	2	2-	2	2-	2		2	2-	2	1+	0+	1-	1	1		82.9	24	25
19	3-	3-	4-	4-	3	2-	2-	3		3-	2+	5-	4	3+	1	1+	4-		82.4	13	15
20	2	2	1+	2-	3-	2	3-	3+		2	1-	1-	1+	2+	2	3-	4		81.1	22	22
21	3-	2	1-	1	1-	1+	2	2+		3	1+	1-	0+	0	1	1+	2		82.6	29	28
22	1+	1+	1+	1	1	1	2-	1+		1-	0	1	1-	0+	0	1+	1		87.1	38	40
23	1-	2-	1-	0+	1-	1	1+	1		1	1	0	0	0	0+	1	0		87.5	37	37
24	1	2-	3	2	1	3-	3-	2+		0+	0+	1+	0+	0	1-	1	3-		89.1	38	37
25	1-	2-	1	1+	2-	2	3	3+		0+	0+	0+	1-	0	1-	2-	3+		86.3	38	39
26	3+	2+	1+	1	2	2	2+	3-		3	2+	1-	0	0+	1	1+	2-		84.3	41	39
27	2-	2-	2+	3-	2-	2-	1	1		1	1	2-	2	1+	0+	0	0		78.9	33	40
28	1+	2	1+	2-	1+	1-	2-	2		0	2-	1+	0+	0	0	0	1+		79.2	41	40
29	1+	2-	1+	2-	1	2-	2-	2		1	2-	1	2-	0+	1	1	2-		76.6	25	25
30	2-	2-	1-	1+	0	1	0+	1-		1+	1	1	0+	0	0	0	0		75.9a	14	16
Mean																		80.4	17.4	18.0	24.8

CALCIUM PLAGE REGIONS
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

103
Late
Dec 86

DECEMBER 1986

Calcium Plage Region	Sta	Mo	Day	Observation Time (UT)	Lat	CMD	CMP Mo	Day	Intensity	Corrected Area (10-6 Hemi)	NOAA/USAF #1	Sunspot #2	Groups #3
19862	BIGB	11	28	2206	S07	E32	12	1.3	1.1	0180			
19869	BIGB	12	03	1751	S34	W29	12	1.4	2.1	0200			
19859	BIGB	11	27	2039	S01	E71	12	3.2	1.3	0140			
19859	BIGB	11	28	2206	S01	E57	12	3.2	.8	0120			
19859	BIGB	11	29	2041	S01	E44	12	3.1	1.1	0170			
19866	BIGB	12	01	2213	S10	E25	12	3.8	2.1	0180			
19866	BIGB	12	02	1837	S10	E13	12	3.7	.7	0080			
19867	BIGB	12	02	1837	N18	E15	12	3.9	1.5	0200			
19868	BIGB	12	02	1837	S12	E44	12	6.1	1.5	0260			
19870	BIGB	12	09	2237	N24	E25	12	11.9	2.3	0190			
19871	BIGB	12	09	2237	N25	E37	12	12.8	4.0	0490	4760		
19871	BIGB	12	10	1911	N25	E26	12	12.8	3.0	1390	4760		
19871	BIGB	12	12	2251	N25	W03	12	12.7	2.5	1090	4760		
19872	BIGB	12	10	1911	S29	E76	12	16.7	2.5	0470	4761		
19872	BIGB	12	12	2251	S29	E50	12	16.9	2.0	1190	4761		
19872	BIGB	12	18	1749	S29	W23	12	16.9	1.4	0820	4761		
19872	BIGB	12	19	1831	S29	W37	12	16.9	1.4	0730	4761		
19872	BIGB	12	21	2126	S29	W65	12	16.8	1.0	0440	4761		
19874	BIGB	12	18	1749	S26	E75	12	24.6	1.5	0490	4762		
19874	BIGB	12	19	1831	S26	E62	12	24.6	1.5	0420	4762		
19874	BIGB	12	21	2126	S26	E31	12	24.3	4.1	0520	4762		
19874	BIGB	12	22	2313	S26	E17	12	24.3	3.6	1200	4762		
19874	BIGB	12	23	1836	S26	E06	12	24.2	2.9	1240	4762		
19874	BIGB	12	26	1900	S26	W34	12	24.1	2.0	1070	4762		
19874	BIGB	12	27	1803	S26	W46	12	24.2	2.0	0810	4762		
19874	BIGB	12	28	1841	S26	W60	12	24.1	1.5	0590	4762		
19874	BIGB	12	29	1817	S26	W74	12	24.0	1.2	0390	4762		
19876	BIGB	12	26	1900	S14	W22	12	25.1	.9	0190			
19875	BIGB	12	21	2126	S05	E63	12	26.6	1.6	1470	4762A		
19875	BIGB	12	22	2313	S05	E43	12	26.2	1.8	2030	4762A		
19875	BIGB	12	23	1836	S05	E18	12	25.1	1.5	1470	4762A		
19875	BIGB	12	26	1900	S05	W07	12	26.3	1.5	1270	4762A		
19875	BIGB	12	27	1803	S05	W20	12	26.2	1.7	1060	4762A		
19875	BIGB	12	28	1841	S05	W33	12	26.3	1.3	0960	4762A		
19875	BIGB	12	29	1817	S05	W46	12	26.3	1.0	0810	4762A		
19875	BIGB	12	30	1750	S05	W60	12	26.2	1.0	0710	4762A		

BIG BEAR SOLAR OBSERVATORY
ACTIVE REGION SUMMARY

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DECEMBER 1986

Region Number	Return Of Region	Rotation Age	First Seen This Rotation	Duration This Rotation
19859	New	1	861127	3 days
19862	New	1	861128	1
19866	New	1	861201	2
19867	New	1	861202	1
19868	New	1	861202	1
19869	New	1	861203	>1
19870	New	1	861209	1
19871	New	1	861209	>4
19872	19856	2	861210	12
19874	New (vicinity of 19854)	1	861218	13
19875	19855	3	861221	12
19876	New	1	861223	1

1. No BBSO Calcium Data on December 4-7, 11, 13-17, 20, 25 and 26.
2. No KPNO Magnetograms on December 4-8, 10, 16, 17, 20, 24, 25, 28 and 31.
3. Contiguous Plages: None
4. Plageless days: December 8 and 31.

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Late
Jan 87

CALCIUM PLAGE REGIONS
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

JANUARY 1987

Calcium Plage Region	Sta	Observation Time Mo Day (UT)			Lat CMD	CMP Mo Day		Intensity	Corrected Area (10-6 Hemi)	NOAA/USAF #1	Sunspot #2	Groups #3
19878	BIGB	01	02	1731	N06 E03	01	2.9	3.3	1520	4763		
19878	BIGB	01	03	1807	N06 W11	01	2.9	3.5	1510	4763		
19878	BIGB	01	04	1453	N06 W23	01	2.9	3.5	1500	4763		
19878	BIGB	01	05	1641	N06 W36	01	3.0	3.0	1220	4763		
19878	BIGB	01	08	1706	N06 W78	01	2.9	3.0	0750	4763		
19877	BIGB	12	29	1817	N38 E66	01	4.1	1.5	0210			
19881	BIGB	01	05	1641	N34 W08	01	5.0	1.8	0200			
19879	BIGB	01	03	1807	S26 E27	01	5.8	1.2	0180			
19883	BIGB	01	08	1706	S37 W28	01	6.4	2.4	0290			
19880	BIGB	01	04	1453	N29 E60	01	9.3	1.0	0180			
19880	BIGB	01	05	1641	N28 E46	01	9.3	1.0	0240			
19882	BIGB	01	05	1641	N20 E67	01	10.8	1.5	0180			
19884	BIGB	01	14	1947	N41 E02	01	15.0	1.3	0220			
19885	BIGB	01	14	1947	S26 E69	01	20.2	2.7	1300	4764		
19885	BIGB	01	20	1956	S26 W00	01	20.8	2.5	1410	4764		
19885	BIGB	01	21	1916	S26 W13	01	20.8	2.3	0800	4764		
19885	BIGB	01	23	1619	S26 W38	01	20.7	1.5	0600	4764		
19885	BIGB	01	24	1848	S26 W52	01	20.7	1.0	0500	4764		
19885	BIGB	01	25	1451	S26 W63	01	20.7	.8	0420	4764		
19887	BIGB	01	20	1956	S27 E12	01	21.8	3.3	0930	4765		
19887	BIGB	01	21	1916	S27 W03	01	21.6	3.7	1410	4765		
19887	BIGB	01	23	1619	S27 W28	01	21.5	3.6	1570	4765		
19887	BIGB	01	24	1848	S27 W40	01	21.7	3.5	1360	4765		
19887	BIGB	01	25	1451	S27 W53	01	21.5	3.8	1340	4765		
19887	BIGB	01	26	1507	S27 W68	01	21.3	3.5	1380	4765		
19887	BIGB	01	27	2017	S27 W84	01	21.3	3.3	1300	4765		
19888	BIGB	01	20	1956	S03 E13	01	21.8	2.0	2080	4764B		
19888	BIGB	01	21	1916	S03 W00	01	21.8	2.0	2160	4764B		
19888	BIGB	01	23	1619	S03 W24	01	21.9	1.5	1920	4764B		
19888	BIGB	01	24	1848	S03 W39	01	21.9	1.0	1510	4764B		
19888	BIGB	01	25	1451	S03 W50	01	21.9	.7	1160	4764B		
19890	BIGB	01	20	1956	S24 E52	01	24.8	2.5	0880	4766		
19890	BIGB	01	21	1916	S23 E36	01	24.6	2.2	0620	4766		
19890	BIGB	01	23	1619	S22 E17	01	25.0	1.4	0350	4766		
19890	BIGB	01	24	1848	S22 E03	01	25.0	.8	0320	4766		
19890	BIGB	01	25	1451	S22 W09	01	24.9	.5	0410	4766		
19895	BIGB	01	30	1514	S24 W59	01	26.1	1.2	0300			
19896	BIGB	01	30	1514	N25 W36	01	27.8	1.4	0150			
19894	BIGB	01	27	2017	S03 E02	01	28.0	2.1	0170			
19891	BIGB	01	25	1451	N12 E45	01	29.0	2.1	0150			
19892	BIGB	01	25	1451	N14 E76	01	31.4	3.9	0510	4767		
19892	BIGB	01	26	1507	N14 E62	01	31.3	3.2	1040	4767		
19892	BIGB	01	27	2017	N14 E46	01	31.3	3.3	1260	4767		
19892	BIGB	01	29	1528	N14 E22	01	31.3	3.1	1420	4767		
19892	BIGB	01	30	1514	N14 E09	01	31.3	2.6	1210	4767		
19892	BIGB	02	01	1502	N15 W18	01	31.3	2.6	1120	4767		
19892	BIGB	02	02	1501	N15 W31	01	31.3	2.1	0600	4767		
19892	BIGB	02	03	1621	N15 W45	01	31.3	1.9	0480	4767		
19892	BIGB	02	04	1713	N15 W59	01	31.2	1.6	0400	4767		

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Day	Sta	Plage Index	Plage Count	Smallest Plage (Millionths of Solar Hemisphere)	Largest Plage	Total Area	Smallest Intensity	Largest Intensity
01	No Observations This DAY							
02	BIGB	5.0	1	1520	1520	1520	3.3	3.3
03	BIGB	5.3	2	180	1510	1690	1.2	3.5
04	BIGB	4.9	2	180	1500	1680	1.0	3.5
05	BIGB	3.4	4	180	1220	1840	1.0	3.0
06	No Observations This DAY							
07	No Observations This DAY							
08	BIGB	0.9	2	290	750	1040	2.4	3.0
09	No Observations This DAY							
10	No Observations This DAY							
11	No Observations This DAY							
12	No Observations This DAY							
13	No Observations This DAY							
14	BIGB	1.3	2	220	1300	1520	1.3	2.7
15	No Observations This DAY							
16	No Observations This DAY							
17	No Observations This DAY							
18	No Observations This DAY							
19	No Observations This DAY							
20	BIGB	11.1	4	880	2080	5300	2.0	3.3
21	BIGB	11.6	4	620	2160	4990	2.0	3.7
22	No Observations This DAY							
23	BIGB	8.1	4	350	1920	4440	1.4	3.6
24	BIGB	4.9	4	320	1510	3690	.8	3.5
25	BIGB	4.1	6	150	1340	3990	.5	3.9
26	BIGB	3.0	3	230	1380	2650	2.7	3.5
27	BIGB	3.7	4	170	1300	3260	2.1	3.3
28	No Observations This DAY							
29	BIGB	5.1	2	910	1420	2330	2.4	3.1
30	BIGB	4.4	4	150	1210	2500	1.2	2.6
31	No Observations This DAY							

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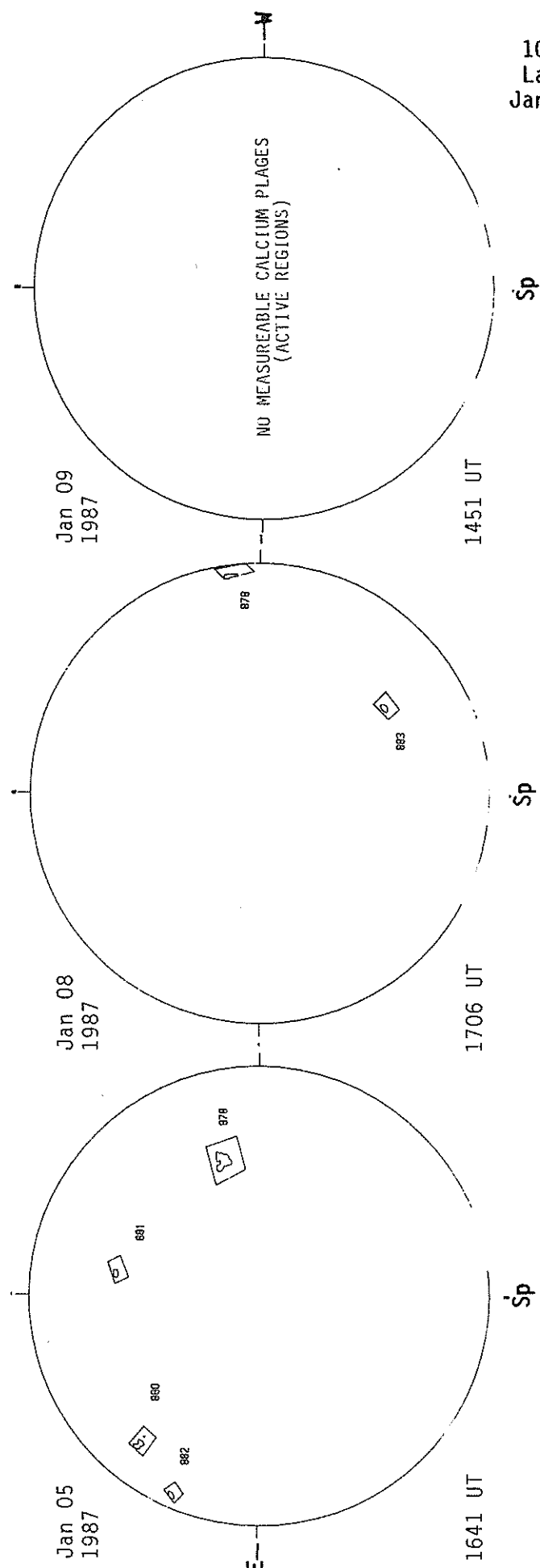
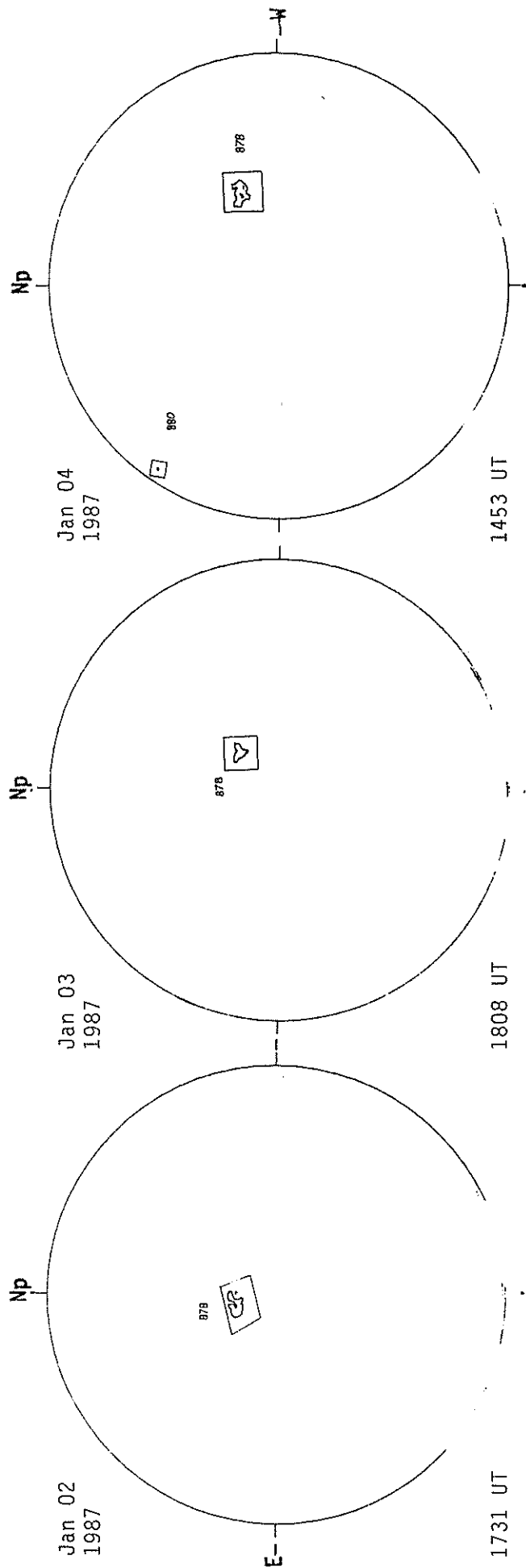
BIG BEAR SOLAR OBSERVATORY
ACTIVE REGION SUMMARY

JANUARY 1987

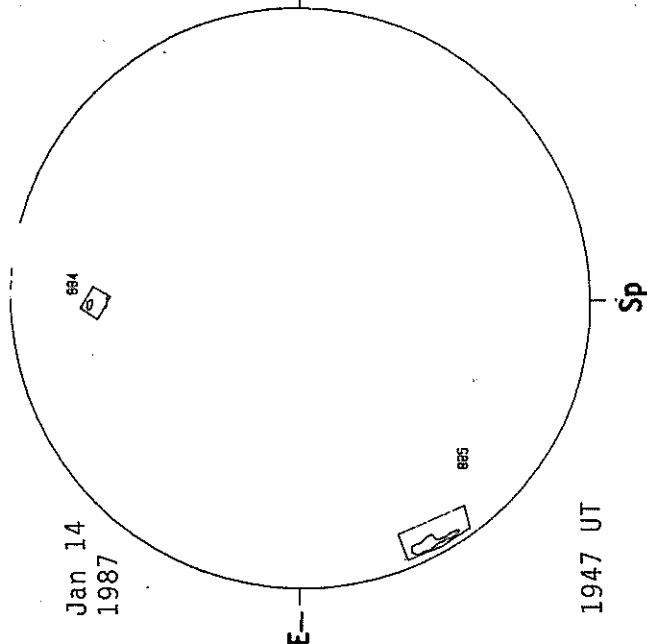
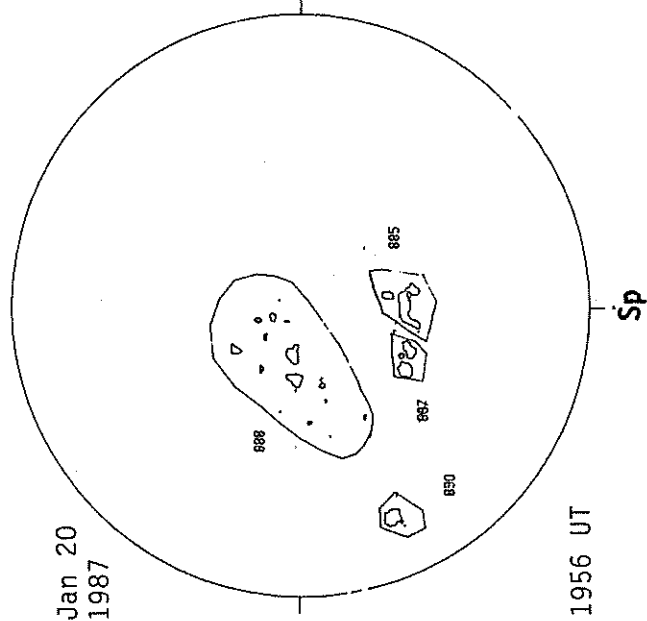
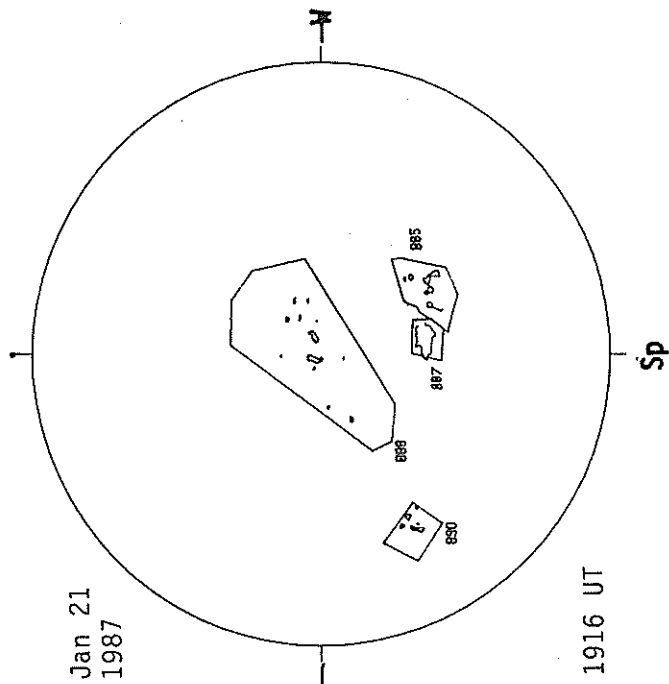
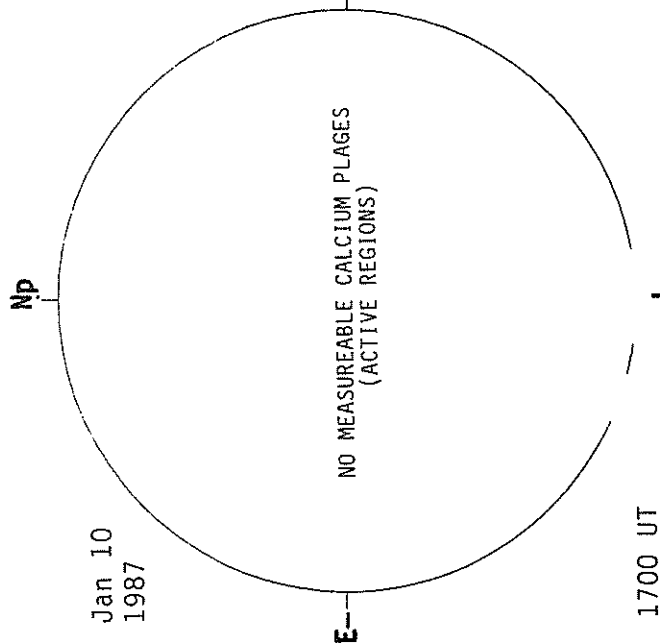
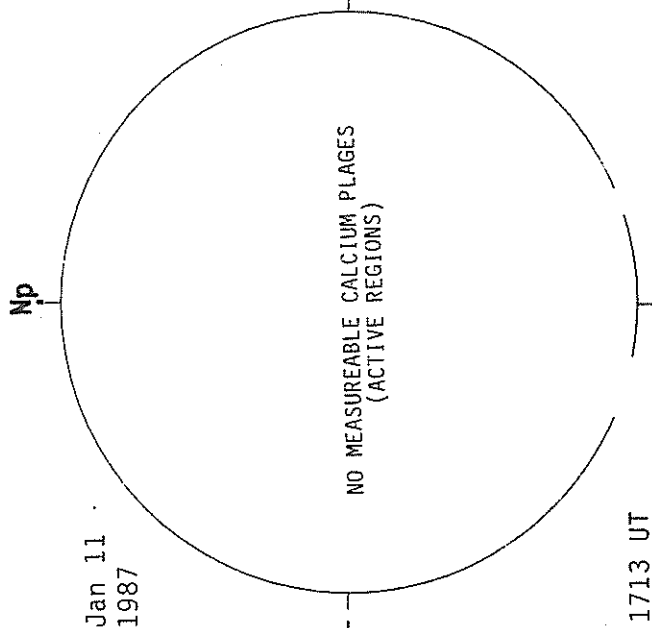
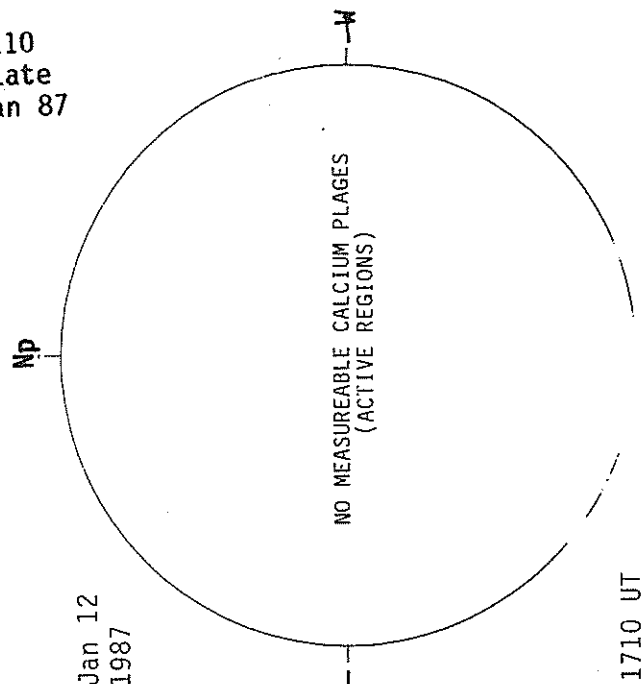
Region Number	Return Of Region	Rotation Age	First Seen This Rotation	Duration This Rotation
19878	New	1	870102	7 days
19879	New	1	870103	1
19880	19871	2	870104	2
19881	New	1	870105	1
19882	New	1	870105	1
19883	New	1	870108	1
19884	New	1	870114	1
19885	19874	2	870114	12
19887	New (vicinity of trailing portion of 19874)	1	870120	>7
19888	19875	4	870120	6
19890	New	1	870120	6
19891	New	1	870125	1
19892	New	1	870125	>11
19894	New	1	870127	>1
19895	New	1	870130	>1
19896	New	1	870130	>1

1. No BBSO Calcium Data on January 1, 6, 7, 13, 15-19, 22, 28 and 31.
2. No KPNO Magnetograms on January 5, 14-17, 20, 23, 28 and 31.
3. Contiguous Plages: 19885/19887
4. Plageless days: January 9-12.

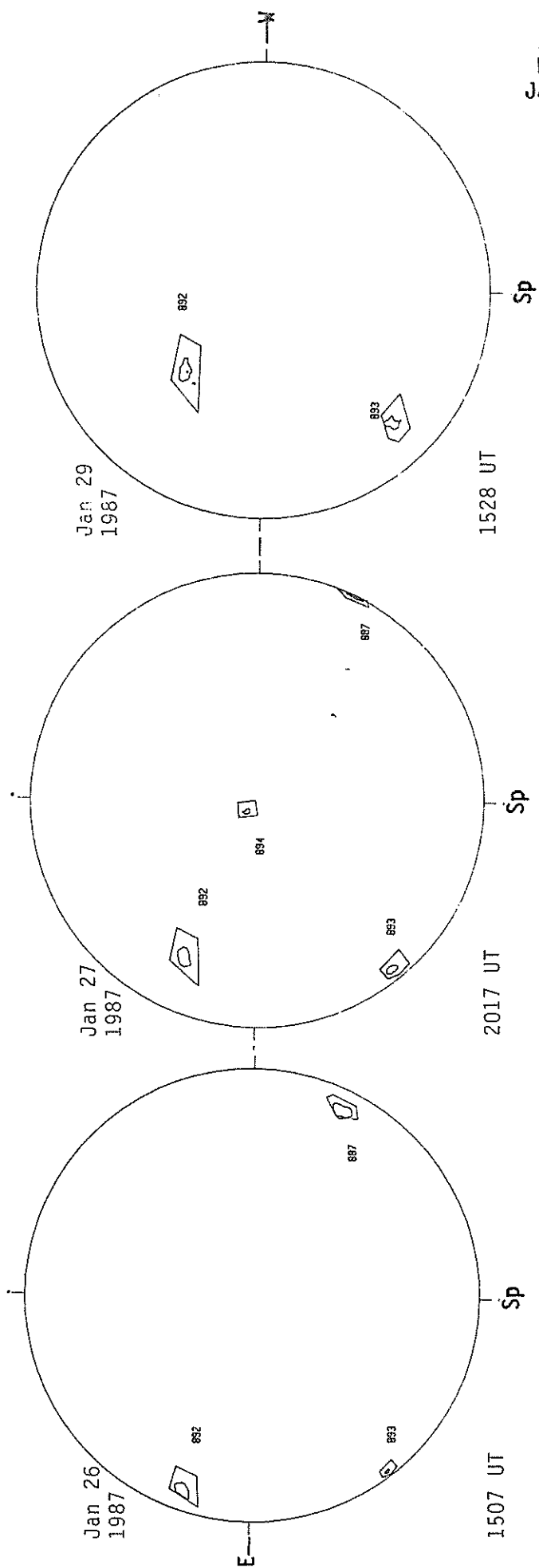
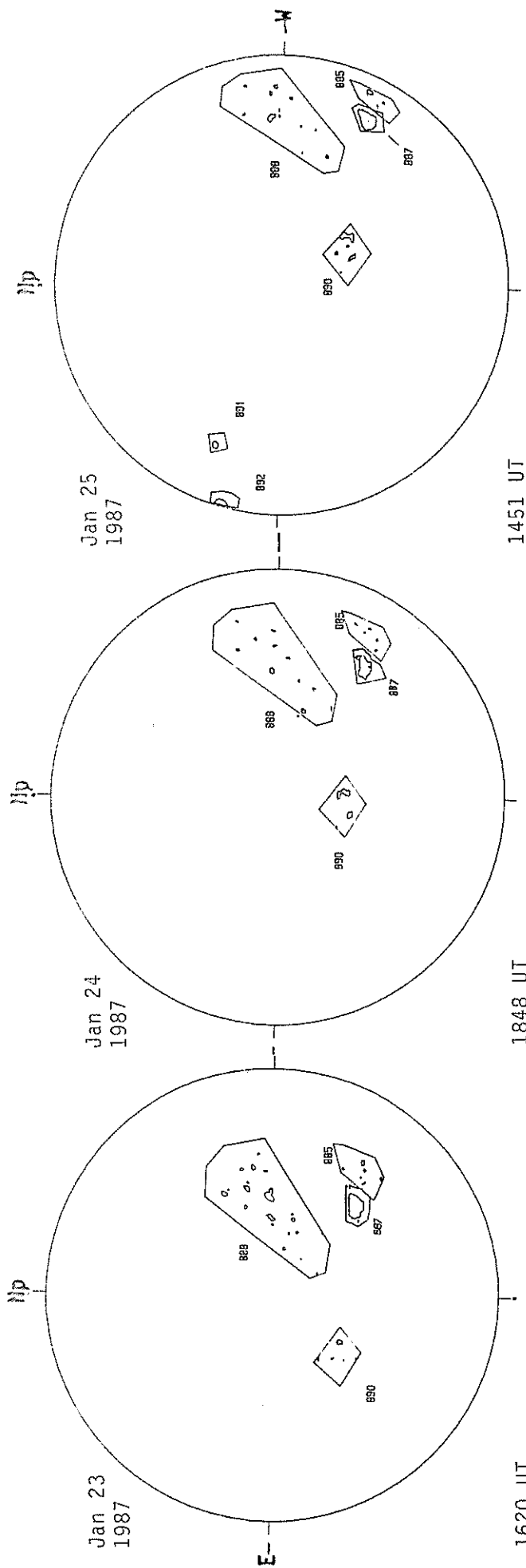
BIG BEAR SOLAR CALCIUM PLAGE REGIONS



BIG BEAR SOLAR CALCIUM PLAGE REGIONS

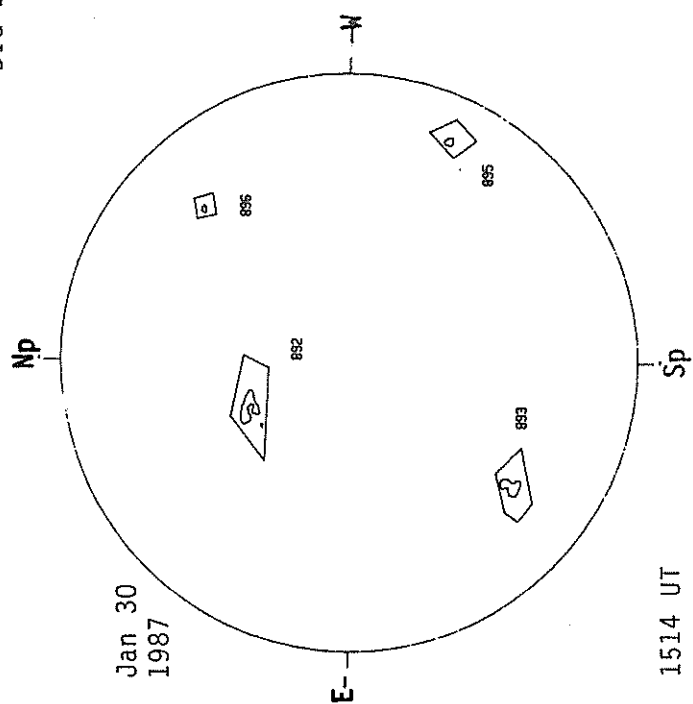


BIG BEAR SOLAR CALCIUM PLAGE REGIONS



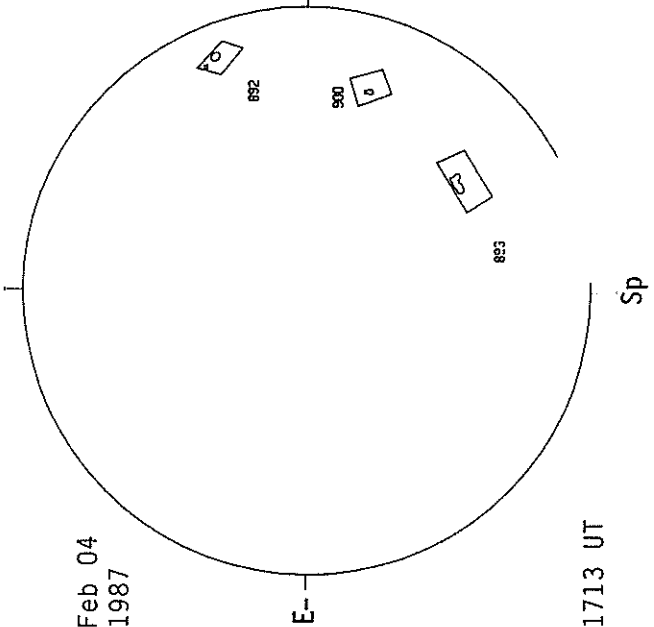
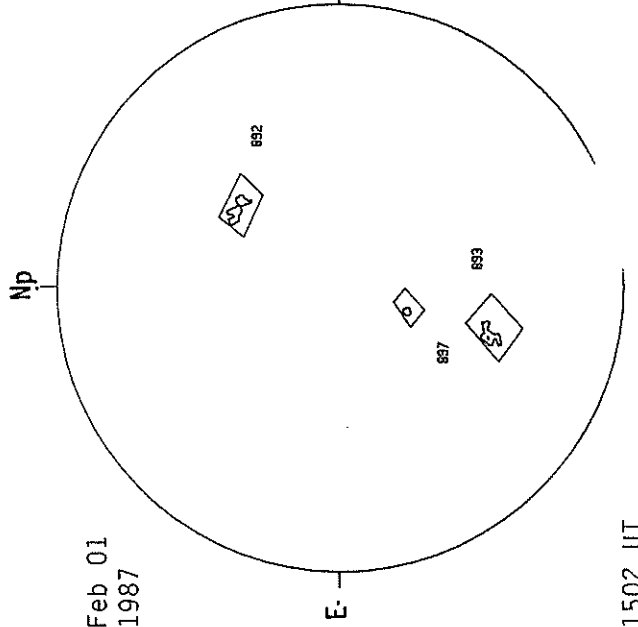
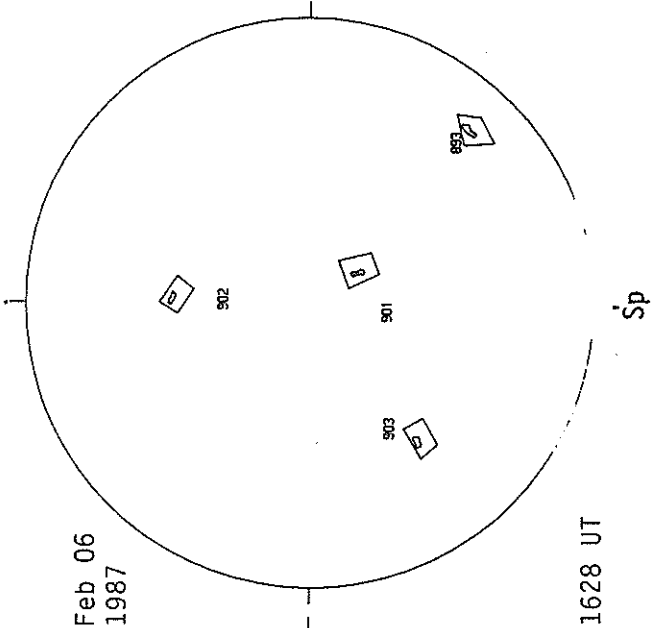
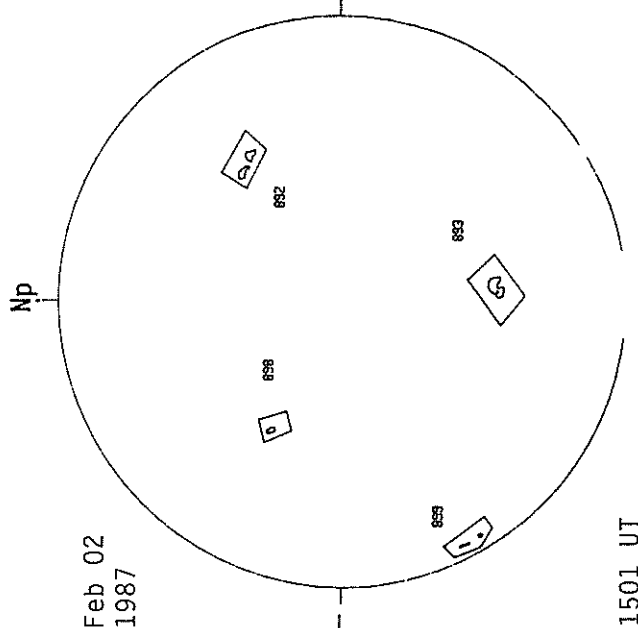
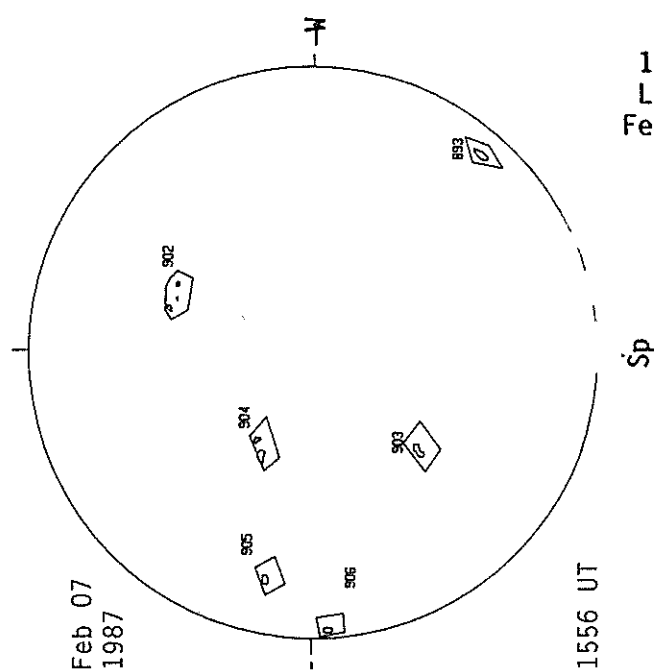
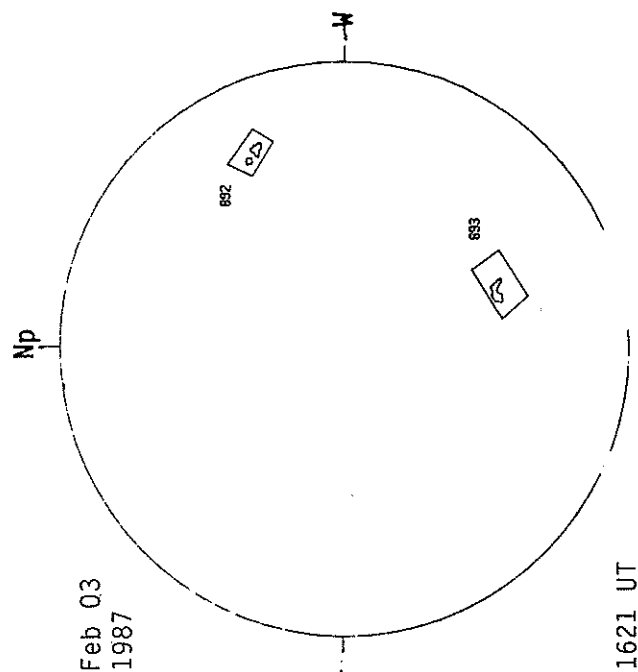
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BIG BEAR SOLAR CALCIUM PLAGE REGIONS

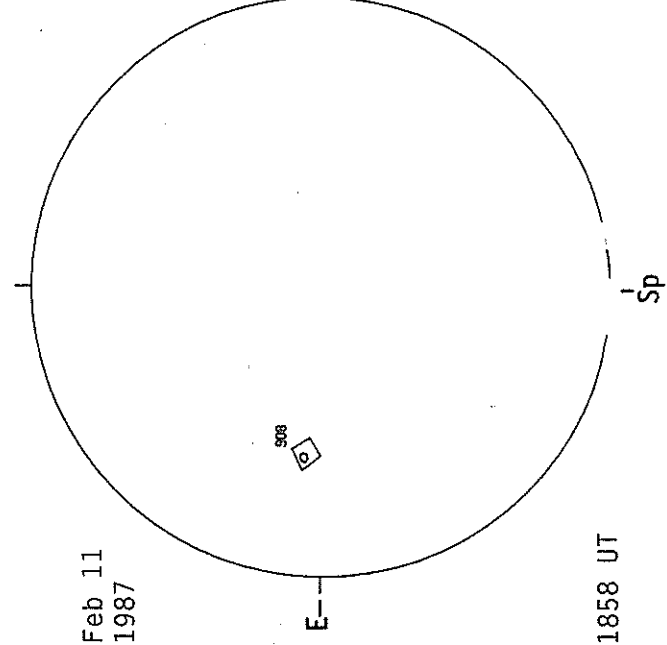
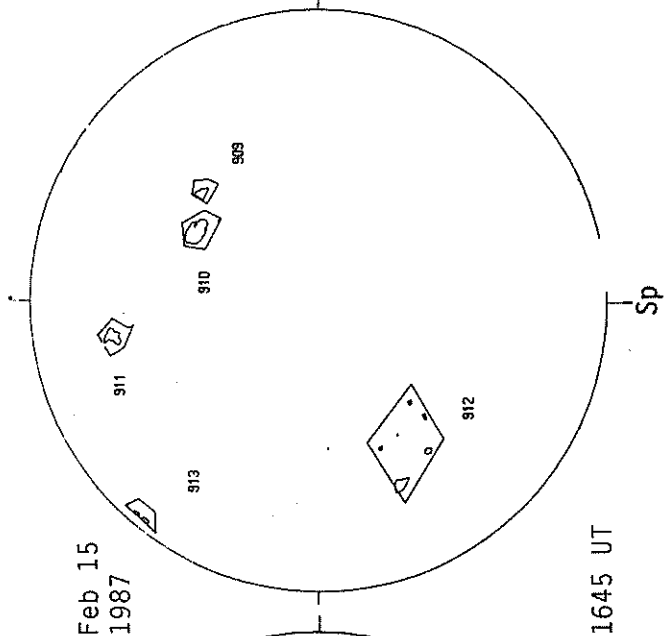
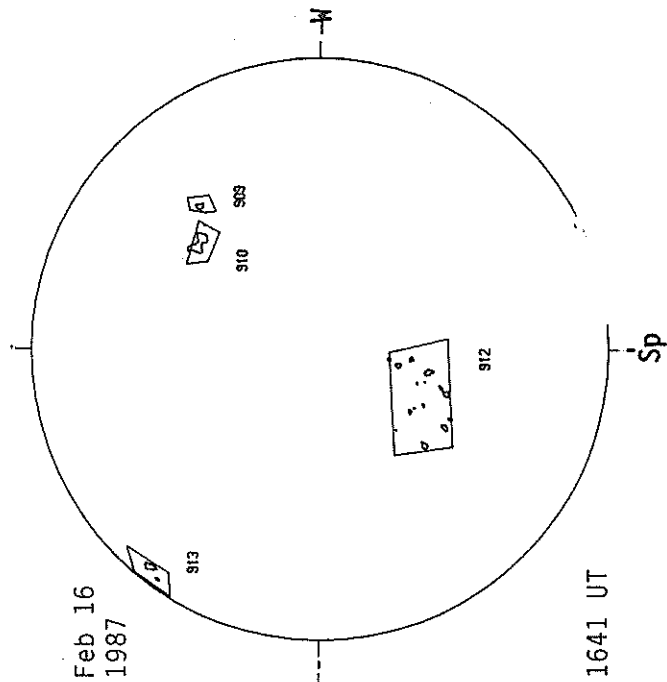
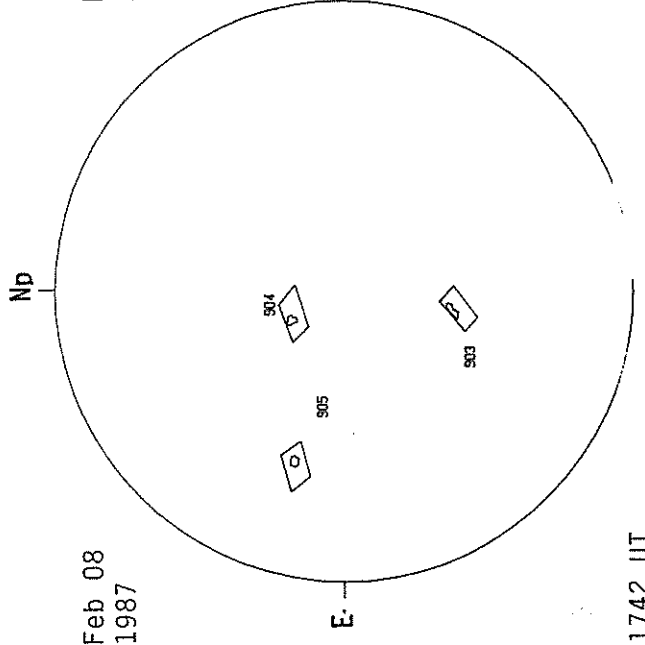
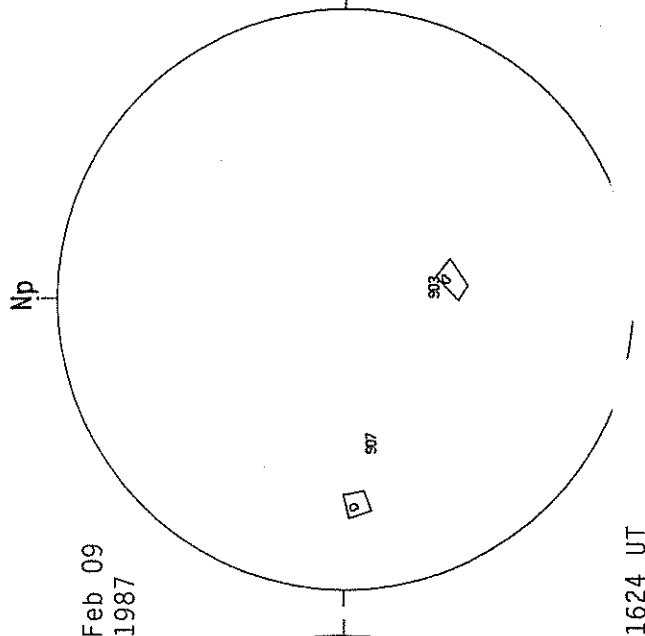
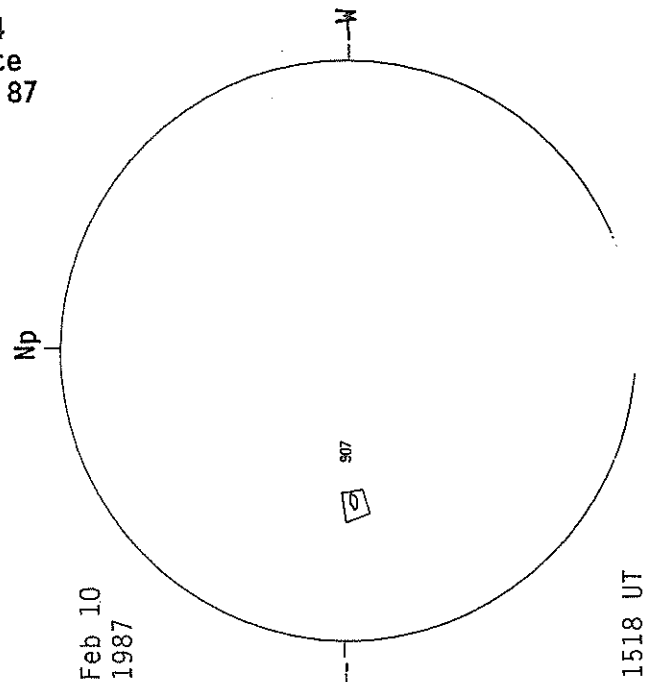


BIG BEAR SOLAR CALCIUM PLAGE REGIONS

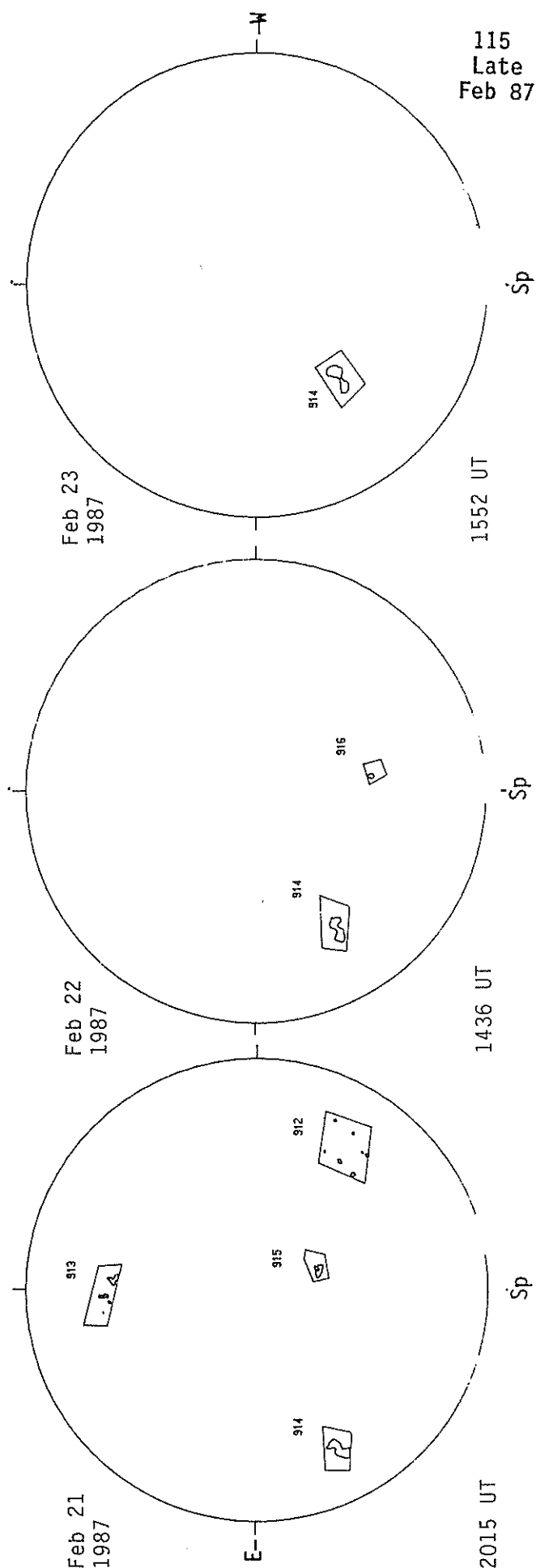
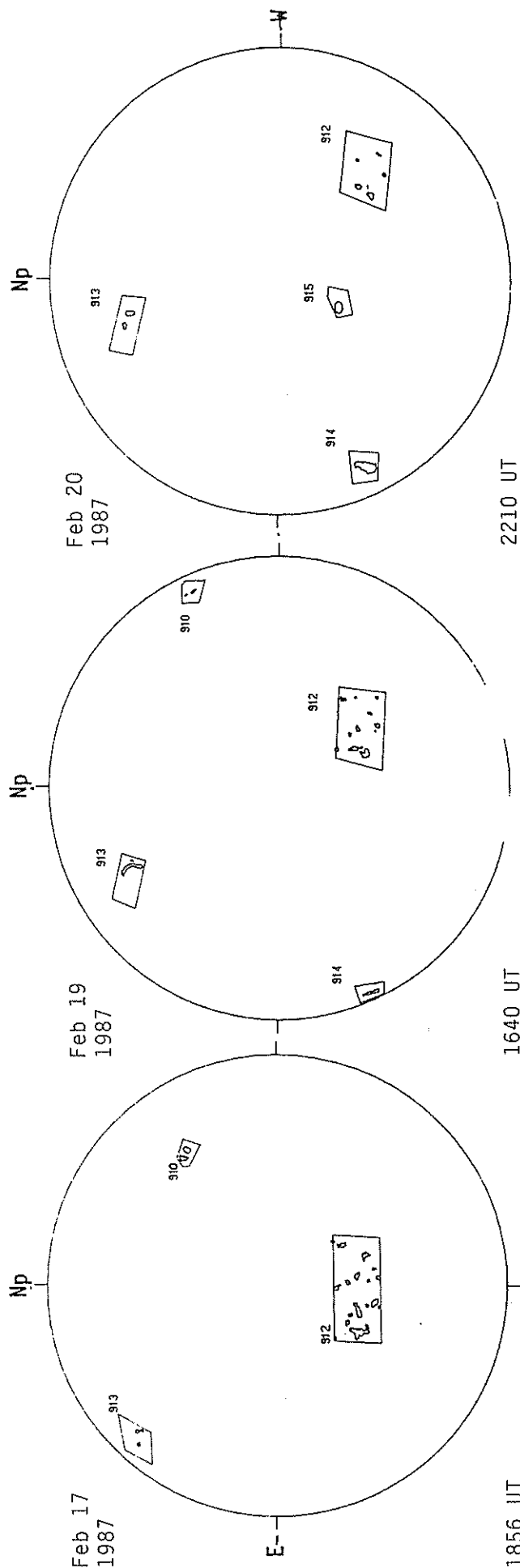
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BIG BEAR SOLAR CALCIUM PLAGE REGIONS

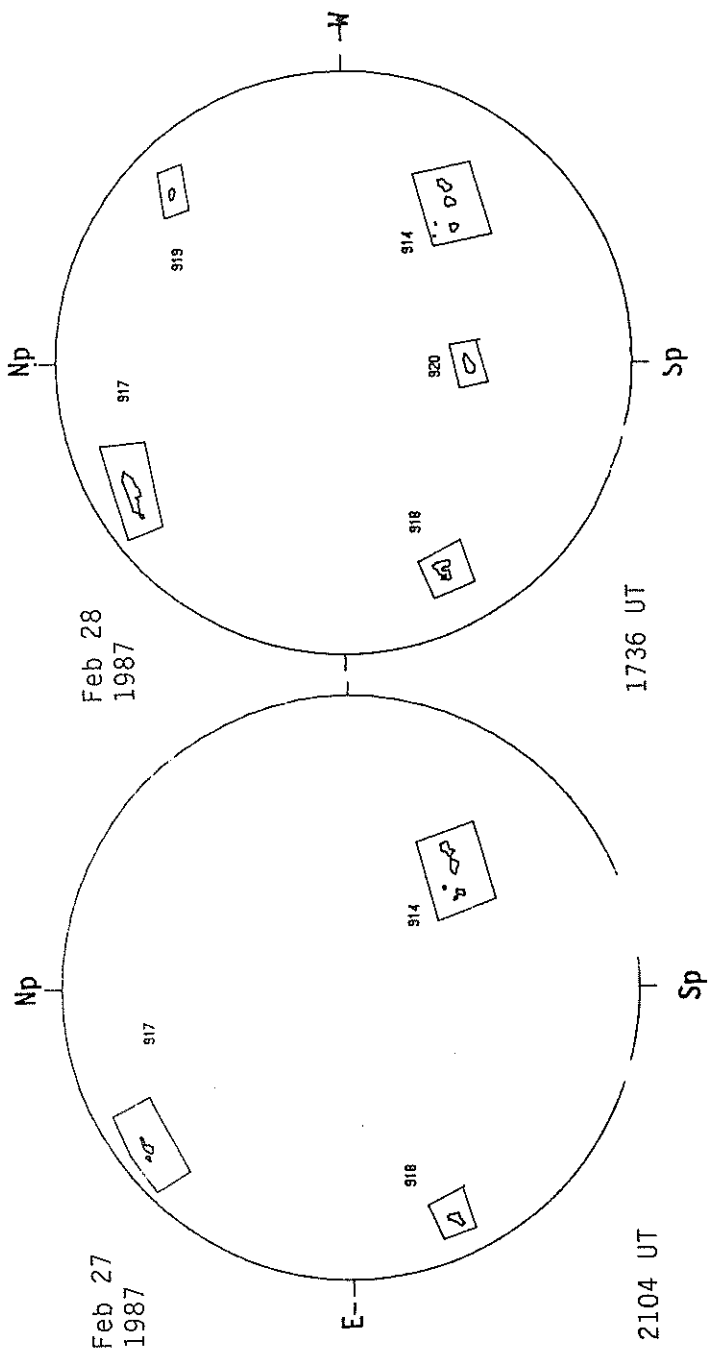


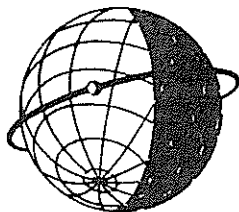
BIG BEAR SOLAR CALCIUM PLAGE REGIONS



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Late
Feb 87

BIG BEAR SOLAR CALCIUM PLAGE REGIONS

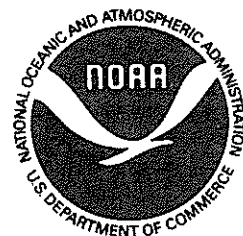




WORLD DATA CENTER A

FOR

SOLAR-TERRESTRIAL PHYSICS



The ICSU Panel on WDCs has recommended that it would be appropriate courtesy to acknowledge in publications that data were obtained from the originating station or investigator through the intermediary of the WDCs. The following statement is suggested:

"Data used in this study were provided by WDC-A for Solar-Terrestrial Physics, NOAA E/GC2, 325 Broadway, Boulder Colorado 80303, USA."