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Solar - Geophysical Data Part I (Prompt Reports)

NO. 523 MARCH 1988

DATA FOR
FEBRUARY 1988
JANUARY 1988

Michael A. Chinnery, Director
NATIONAL GEOPHYSICAL DATA CENTER
BOULDER, COLORADO

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S O L A R - G E O P H Y S I C A L D A T A

NUMBER 523

(Issued in Two Parts)

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C O N T E N T S

PART I (PROMPT REPORTS)

PART II (COMPREHENSIVE REPORTS)

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C O N T E N T S

Prompt Reports DATA FOR **FEBRUARY 1988** Number 523 Part I

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

Summary of the Geoalert Messages **FEBRUARY 1988**

Julian Day	Date of Issue	Date of Observation	Wolf No.	10-cm Solar Flux	A-index	Location °Lat °Long	Flares Total	M	X	Date of Forecast	Location °Lat °Long	Region Forecast[1]	Geoalerts
032	01	31	062	106	001	N18 W09	0	0	0	01	N18 W09	E	Solquiet, Magquiet.
						N18 E37	0	0	0		N18 E37	Q	
						N21 E54	1	0	0		N21 E54	E	
						S27 E51	0	0	0		S27 E51	Q	
033	02	01	084	109	001	N19 W23	1	0	0	02	N19 W23	E	Solquiet, Magalert
						N19 E23	0	0	0		N19 E23	Q	02/03 Recurrence.
						N23 E41	3	0	0		N23 E41	E	
						S24 E36	0	0	0		S24 E36	Q	
						N16 E43	0	0	0		N16 E43	Q	
						N28 E68	6	0	0		N28 E68	Q	
034	03	02	087	107	002	N19 W38	0	0	0	03	N19 W38	E	Solquiet, Magalert
						N19 E10	0	0	0		N19 E10	E	03/04 Recurrence.
						N21 E28	1	0	0		N21 E28	Q	
						S21 E22	0	0	0		S21 E22	Q	
						N17 E29	0	0	0		N17 E29	Q	
						N28 E54	1	0	0		N28 E54	Q	
035	04	03	093	107	003	N19 W50	0	0	0	04	N19 W50	Q	Solquiet, Magnil.
						N18 W02	0	0	0		N18 W02	Q	
						N21 E16	3	0	0		N21 E16	E	
						S21 E07	0	0	0		S21 E07	Q	
						N27 E40	0	0	0		N27 E40	E	
						S18 W24	0	0	0		S18 W24	Q	
						S24 W30	0	0	0		S24 W30	Q	
036	05	04	054	106	005	N19 W66	0	0	0	05	N19 W66	Q	Solquiet, Magquiet.
						N18 W16	0	0	0		N18 W16	Q	
						N21 E02	1	0	0		N21 E02	E	
						N28 E24	0	0	0		N28 E24	Q	
037	06	05	053	106	029	N18 W80	0	0	0	06	N18 W80	Q	Solquiet, Magalert
						N18 W29	0	0	0		N18 W29	Q	06/06.
						N21 W11	0	0	0		N21 W11	E	
						N28 E12	0	0	0		N28 E12	Q	
038	07	06	053	107	006	N18 W44	0	0	0	07	N18 W44	Q	Solquiet, Magnil.
						N21 W25	0	0	0		N21 W25	Q	
						N28 W06	1	0	0		N28 W06	E	
						N30 E04	0	0	0		N30 E04	Q	
039	08	07	053	108	003	N18 W56	0	0	0	08	N18 W56	Q	Solquiet, Magquiet.
						N21 W39	1	0	0		N21 W39	Q	
						N27 W18	1	0	0		N27 W18	Q	
						N28 W11	4	0	0		N28 W11	E	
040	09	08	052	105	002	N19 W70	0	0	0	09	N19 W70	Q	Solquiet, Magquiet.
						N21 W54	0	0	0		N21 W54	Q	
						N28 W31	0	0	0		N28 W31	Q	
						N29 W26	2	0	0		N29 W26	Q	

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

Summary of the Geoalert Messages **FEBRUARY 1988**

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		
041	10	09	065	104	007	N19 W82	0	0	0	10	N19 W82	Q	Solquiet, Magalert
						N21 W65	1	0	0		N21 W65	Q	10/11.
						N28 W45	0	0	0		N28 W45	Q	
						N28 W40	0	0	0		N28 W40	Q	
						S35 E71	1	0	0		S35 E71	Q	
042	11	10	051	103	012	N21 W79	0	0	0	11	N21 W79	Q	Solquiet, Magalert
						N27 W57	0	0	0		N27 W57	Q	Minor 11/11.
						N28 W53	0	0	0		N28 W53	Q	
						S35 E58	0	0	0		S35 E58	Q	
043	12	11	045	102	009	N20 W92	0	0	0	12	N20 W92	Q	Solquiet, Magnil.
						N27 W70	0	0	0		N27 W70	Q	
						N30 W65	1	0	0		N30 W65	Q	
						S35 E47	1	0	0		S35 E47	Q	
044	13	12	011	104	013	S34 E34	1	0	0	13	S34 E34	Q	Solquiet, Magalert 13/14.
045	14	13	024	106	013	S35 E21	0	0	0	14	S35 E21	Q	Solquiet, Magnil.
						N21 E70	0	0	0		N21 E70	Q	
046	15	14	027	105	004	N19 E62	0	0	0	15	N19 E62	E	Solquiet, Magquiet.
						S16 E68	2	0	0		S16 E68	Q	
047	16	15	026	103	018	N20 E50	0	0	0	16	N20 E50	E	Solquiet, Magquiet.
						S16 E55	0	0	0		S16 E55	Q	
048	17	16	039	104	012	N21 W46	0	0	0	17	N21 W46	Q	Solquiet, Magquiet.
						N20 E37	3	0	0		N20 E37	Q	
						S16 E42	0	0	0		S16 E42	Q	
049	18	17	034	109	011	N21 E24	1	0	0	18	N21 E24	E	Solquiet, Magquiet.
						S15 E29	1	0	0		S15 E29	Q	
050	19	18	049	115	016	N21 E11	0	0	0	19	N21 E11	Q	Solquiet, Magquiet.
						S14 E16	0	0	0		S14 E16	Q	
						S09 W57	4	0	0		S09 W57	E	
051	20	19	069	112	006	N21 W03	1	0	0	20	N21 W03	Q	Solquiet, Magquiet.
						S14 E02	0	0	0		S14 E02	Q	
						S09 W70	1	0	0		S09 W70	Q	
						N38 W24	0	0	0		N38 W24	Q	
052	21	20	065	109	003	N21 W17	0	0	0	21	N21 W17	Q	Solquiet, Magalert
						S14 W10	0	0	0		N14 W10	Q	22/22 Flare.
						S09 W84	1	1	0		S09 W84	E	
						N39 W39	0	0	0		N39 W39	Q	

Presto:[2] Culgoora A 2 Bright flare IP. Weak Type II burst commenced 20/0407 UT at 500 MHz. Intense Type II commenced 20/0422 UT within 120-22 MHz. M1.2 x-ray burst 20/0402 UT, maximum 20/0421 UT, end 20/0445 UT.

Toyokawa Tenflare 440 flux units 20/0400 UT duration 50 minutes.

Boulder Tenflare 430 flux units 20/0405 UT duration 46 minutes.

ALERT PERIODS
INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

Summary of the Geoalert Messages FEBRUARY 1988

Julian Day	Date of Issue	Date of Observation	Wolf No.	10-cm Solar Flux	A-index	Location °Lat °Long	Flares Total	M	X	Date of Forecast	Location °Lat °Long	Region Forecast[1]	Geoalerts
053	22	21	041	107	021	N21 W29	0	0	0	22	N21 W29	Q	Solquiet, Magalert
						S14 W23	0	0	0		S14 W23	Q	22/22 Flare.
						N40 W49	0	0	0		N40 W49	Q	
		Presto:[2] Kakioka Magstorm begins 21/0157 UT.											
054	23	22	024	105	066	N21 W47	3	0	0	23	N21 W47	Q	Solquiet, Magalert
						S15 W37	0	0	0		S15 W37	Q	23/23 Flare.
		Presto: Boulder Strong Magstorm in progress 22/1134 UT.											
055	24	23	012	102	024	N21 W59	0	0	0	24	N21 W59	Q	Solquiet, Magnil.
056	25	24	022	102	012	N24 W72	0	0	0	25	N24 W72	Q	Solquiet, Magquiet.
						S19 E63	0	0	0		S19 E63	Q	
057	26	25	025	098	009	N21 W82	0	0	0	26	N21 W82	Q	Solquiet, Magquiet.
						S18 E50	2	0	0		S18 E50	Q	
058	27	26	024	099	011	S19 E37	0	0	0	27	S19 E37	Q	Solquiet, Magquiet.
						N30 E58	0	0	0		N30 E58	Q	
059	28	27	052	098	006	S19 E22	0	0	0	28	S19 E22	Q	Solquiet, Magquiet.
						N30 E45	0	0	0		N30 E45	Q	
						N21 E61	0	0	0		N21 E61	Q	
						N17 E71	0	0	0		N17 E71	Q	
060	29	28	064	099	008	N29 E31	0	0	0	29	N29 E31	Q	Solquiet, Magquiet.
						N20 E48	0	0	0		N20 E48	Q	
						N17 E58	5	0	0		N17 E58	E	
						S20 E37	4	0	0		S20 E37	Q	
061	01	29	054	105	002	N20 E36	0	0	0	01	N20 E36	Q	Solquiet, Magquiet.
						N17 E44	1	0	0		N17 E44	E	
						S20 E24	3	0	0		S20 E24	E	

[1]Q = quiet, E = eruptive, A = active, P = proton.
[2]Presto message is a rapid report of a major event.

STRATWARM ALERTS

23 February Stratwarm exists. Intense warming over Siberia caused temperature increase of 55 degrees at 10 HPA within the last week. Warm region expands northward.

24 February Stratwarm exists. Intense warming over Siberia continues, warm air spreading northeastwards.

25 February Stratwarm exists. Intense warming over northeastern and central Siberia at the whole stratosphere continues.

26 February Stratwarm exists. Intense warming over Siberia continues, extending northeastwards. Temperature gradient between 60° N and the pole reversed in the upper stratosphere.

27 February Stratwarm exists. Intense warming over Siberia continues. In the upper stratosphere temperature gradient reversed between 60° N and the pole.

28 February Stratwarm exists. At 10 HPA level intensification of strong warming over Siberia, warm air slowly extending northeastwards. In the upper stratosphere temperature gradient reversed between 60° N and the pole.

29 February Stratwarm exists. Intense warming over Siberia continues. Intensifying and extending northeastwards. Temperature gradient reversed between 60° N and the pole only still in the uppermost stratosphere.

INTERNATIONAL RELATIVE SUNSPOT NUMBERS

Day	Mar 87	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec 87	Jan† 88	Feb†
01	13	14	39	15	13	45	33	34	56	17	47	70
02	23	12	40	11	0	47	38	25	57	16	31	68
03	15	10	27	0	0	39	37	31	57	16	25	68
04	16	13	23	0	0	33	38	58	46	15	26	74
05	24	28	24	10	0	31	39	54	47	19	32	60
06	23	47	27	0	0	32	44	48	27	24	40	43
07	24	56	34	0	9	38	56	39	31	34	58	44
08	22	64	25	0	12	45	67	55	43	36	57	46
09	14	69	23	0	13	39	64	50	42	41	59	50
10	11	77	25	0	11	47	59	51	30	34	68	38
11	9	80	26	11	0	56	58	63	28	22	75	26
12	0	80	23	21	0	48	44	53	25	13	71	12
13	0	79	22	14	0	47	25	74	18	20	81	21
14	10	77	13	10	0	49	20	92	23	26	97	28
15	11	78	39	11	13	49	21	101	22	42	90	30
16	11	60	50	12	17	55	24	101	33	40	83	42
17	22	41	68	14	14	46	25	91	46	39	72	35
18	21	36	54	24	17	43	30	86	48	39	68	55
19	12	29	65	13	23	45	35	82	51	28	73	66
20	12	12	46	22	38	51	38	79	49	26	78	59
21	15	19	41	29	67	48	32	61	51	14	84	22
22	17	26	38	38	87	34	23	50	70	24	66	15
23	19	25	40	37	102	39	26	33	83	17	47	12
24	19	35	38	38	92	35	25	22	56	13	44	23
25	16	25	37	38	88	35	12	29	42	25	40	19
26	12	21	37	41	85	34	12	40	47	27	44	15
27	11	11	35	33	77	24	19	70	21	29	54	34
28	12	14	21	41	60	23	22	79	11	28	67	40
29	13	20	17	25	60	13	26	82	20	30	59	50
30	15	30	15	14	62	10	26	85	16	42	56	
31	15		12		63	20		62		43	57	
Mean	14.7	39.6	33.0	17.4	33.0	38.7	33.9	60.6	39.9	27.1	59.6	40.2

† = preliminary. The yearly mean sunspot number equaled 29.2 in 1987.

Algonquin Radio Observatory — OTTAWA 2800 MHz (10.7 cm) SOLAR FLUX — Adjusted to 1 AU

Day	Mar 87	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 88	Feb
01	72.8	72.5	79.3	77.8	76.0	91.0	85.3*	84.2	99.1	87.6	100.1	105.5
02	73.3	71.9	80.2	77.9	74.4	89.7	85.5	84.8	105.0	86.5	93.7	104.3
03	71.6	72.4	82.8	76.4	73.7	87.1	87.5	85.6*	98.0	85.8	101.2	103.6
04	73.3	74.0	84.4	77.3	73.2	84.0	89.6	89.2	101.1*	85.1	98.2	103.1
05	73.7	77.6	86.1	76.1	73.4	81.6	93.5*	90.1	99.2	86.8	99.5	102.6
06	75.6	89.4	87.9	75.8	73.3	85.2	95.6*	89.5	94.9	85.7	101.7	103.6
07	75.5	94.4	88.1	76.0	74.1	89.5*	99.5*	90.9	94.4	85.3	102.1	105.3
08	76.9	94.8	89.1	77.0	76.1	93.8	101.9	95.0	92.7	88.7	105.6	102.5
09	73.6	100.5	87.3	76.8	76.3	94.8	100.9	92.7	90.3	91.2	100.6*	101.0
10	71.4	100.0	89.5	78.1	76.3	94.0	97.8	101.1	89.2	90.1	100.9	100.2
11	70.5	101.3	86.4	80.7	75.7	99.8*	95.4	100.8*	92.6	91.1	101.7*	99.6
12	69.5	98.6	85.4	82.1	75.5	100.0	91.1	102.2	92.6	91.5*	107.5*	101.3
13	69.6	99.3	87.4	82.3	75.1	101.8*	89.7	105.5	92.9	91.1	108.1*	102.9
14	71.1	97.7	91.2	80.6	76.6	102.4	86.8	113.3*	92.3	91.5	113.7	102.6
15	70.5	97.8	93.6	80.4	78.8	101.3	85.0	117.8I	93.7	92.0*	112.4	100.4
16	71.0	95.3*	98.2	81.3	80.9	102.7	83.5	111.1	95.0	93.4*	121.8*	101.0
17	71.2	97.3	96.7	81.8	81.5	101.2	84.0	106.0	96.8	92.2	116.4*	106.2
18	72.5	94.0	98.5	82.9	82.5	100.4	82.4	106.5	100.0	90.2	110.9	112.5
19	71.5	91.7	100.1	82.4	85.1	99.0	82.7	100.4	106.6	88.4	114.2	109.0
20	73.8	85.6	99.8	81.1	93.8	101.2	84.9	95.6	112.2	86.9	112.7	106.5
21	74.2	78.3	99.9	82.6	95.6	96.6	83.0	89.3	115.3	90.7	111.6	104.7
22	73.8	76.5	101.0	87.1	102.6*	94.4*	81.3	88.2	117.8	88.1	104.5	102.5
23	75.5	76.5	94.9	87.5	115.6	91.8	80.4	87.0	115.1	88.2	104.7	100.2
24	75.9	78.6	98.5	89.1	115.0	89.6	80.3	87.1	109.4	89.9	102.2	99.6
25	75.7	75.8	96.8	86.3	114.9	89.9	77.9	92.3	104.9	96.2*	94.9	96.4
26	75.6	74.3	92.3	84.3	109.8*	87.3	76.4	96.9	101.3	96.8*	93.5	96.7
27	75.4	74.8	87.5	78.9	105.4	85.1	80.2	105.9	94.9	101.4	101.6	96.3
28	75.0	74.3	85.1	79.2	102.5	81.3	82.3	106.2	92.3	102.5	103.0	97.1
29	75.3	73.6E	79.3	76.6	97.3	79.9	83.5	102.7	90.7	101.4	99.1	103.3
30	74.6	76.8	77.9	75.9H	94.0	78.5	81.9	104.2	89.1	99.2	100.1	
31	71.9G		77.3		91.9	83.2		97.8		99.7	103.1	
Mean	73.3	85.5	89.8	80.4	87.0	92.2	87.0	97.4	99.0	91.5	104.6	102.4

* = corrected for burst in progress; E = corrected for snow on antenna; G = corrected for ice on antenna; H = measured at Penticton; I = 1700 UT calibration taken at 1915 UT. The yearly mean flux equaled 85.3 in 1987.

D A I L Y S O L A R I N D I C E S

February 1988

Day	Julian Day	Bartels Cycle Day	Sunspot Numbers Int	Sunspot Numbers Amer	Obs Flux Ottawa (2800)	Solar Flux Adjusted to 1 Astronomical Unit ----- LEAR (15400)	LEAR (8800)	LEAR (4995)	Ottawa (2800)	LEAR (2695)	LEAR (1415)	LEAR (610)	LEAR (410)	LEAR (245)
01	32	2	70	58	108.7	551	247	125	105.5	104	90	51	29	21
02	33	3	68	69	107.4	554	244	126	104.3	108	89	46	27	14
03	34	4	68	62	106.6	546	250	119	103.6	105	84	48	25	13
04	35	5	74	50	106.1	546	243	134	103.1	104	95	50	26	13
05	36	6	60	47	105.6	541	240	115	102.6	105	97	48	26	14
06	37	7	43	42	106.5	543	246	122	103.6	101	90	49	26	12
07	38	8	44	42	108.3	544	229	120	105.3	106	101	50	26	40
08	39	9	46	44	105.3	540	245	122	102.5	104	90	46	24	13
09	40	10	50	49	103.8	549	243	120	101.0	99	87	49	25	13
10	41	11	38	36	102.9	553	242	119	100.2	100	95	50	26	14
11	42	12	26	30	102.2	554	249	118	99.6	101	91	49	26	13
12	43	13	12	11	104.0	543	242	117	101.3	107	84	48	26	13
13	44	14	21	18	105.6	551	247	125	102.9	107	85	50	26	14
14	45	15	28	24	105.2	550	252	122	102.6	109	83	48	26	14
15	46	16	30	28	102.9	547	248	124	100.4	105	92	51	26	13
16	47	17	42	30	103.5	548	241	120	101.0	103	83	49	26	13
17	48	18	35	33	108.8	553	232	117	106.2	105	86	50	26	14
18	49	19	55	51	115.2	554	243	118	112.5	108	90	50	26	14
19	50	20	66	55	111.5	550	244	130	109.0	117	117	50	26	16
20	51	21	59	46	108.9	552	255	---	106.5	108	99	49	26	15
21	52	22	22	24	107.0	548	255	---	104.7	108	101	49	26	20
22	53	23	15	15	104.7	538	251	---	102.5	103	83	49	26	13
23	54	24	12	11	102.4	546	250	---	100.2	105	87	51	38	23
24	55	25	23	19	101.7	550	232	---	99.6	99	77	49	28	16
25	56	26	19	17	98.4	553	223	---	96.4	100	82	51	28	14
26	57	27	15	20	98.6	553	246	---	96.7	98	78	50	28	13
27	58	1	34	31	98.2	553	242	---	96.3	96	73	45	25	13
28	59	2	40	47	99.0	555	242	---	97.1	95	77	40	23	12
29	60	3	50	58	105.2	540	243	---	103.3	112	80	47	27	18
Mean			40.2	36.8	105.0	548	244	122	102.4	104	88	49	27	15

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 Learmonth, Australia, observations.

OBSERVED AND PREDICTED SOLAR ACTIVITY INDICES

FEBRUARY 1988

Date	RELATIVE SUNSPOT NUMBERS International (R_i) Monthly Mean	International (R_i) Smoothed	American (R_a) Monthly Mean	American (R_a) Smoothed	Derived (R_s) Monthly Mean	Derived (R_s) Smoothed	2800 MHz RADIO FLUX Adjusted to 1 AU (S_a) Monthly Mean	2800 MHz RADIO FLUX Adjusted to 1 AU (S_a) Smoothed
Apr 84	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	22	13.3	20	17.2	24	73.3	80
Apr	39.6	24	39.4	23	30.3	25	85.5	81
May	33.0	26	30.7	26	35.0	27	89.8	83
Jun	17.4	28	18.0	28	24.8	29	80.4	84
Jul	33.0	31*	34.3	31	32.0	32	87.0	87
Aug	38.7	35*	39.0	34*	37.6	35	92.2	89
Sep	33.9	39(2)*	34.0	38	32.0	39	87.0	--
Oct	60.6	44(5)*	55.8	43	43.2	44	97.4	--
Nov	39.9	51(8)*	42.5	50	44.9	52	99.0	--
Dec	27.1	58(10)*	26.7	57	36.8	59	91.5	--
Jan 88	59.6*	64(13)*	56.8	63	51.0	65	104.6	--
Feb	40.2*	69(18)*	36.8*	68	48.6	70	102.4	--
Mar	----	74(22)*	----	72	----	74	----	--
Apr	----	79(26)*	----	77	----	79	----	--
May	----	84(30)*	----	82	----	84	----	--
Jun	----	89(33)*	----	87	----	89	----	--
Jul	----	96(37)*	----	94	----	96	----	--
Aug	----	103(42)*	----	102	----	104	----	--

*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

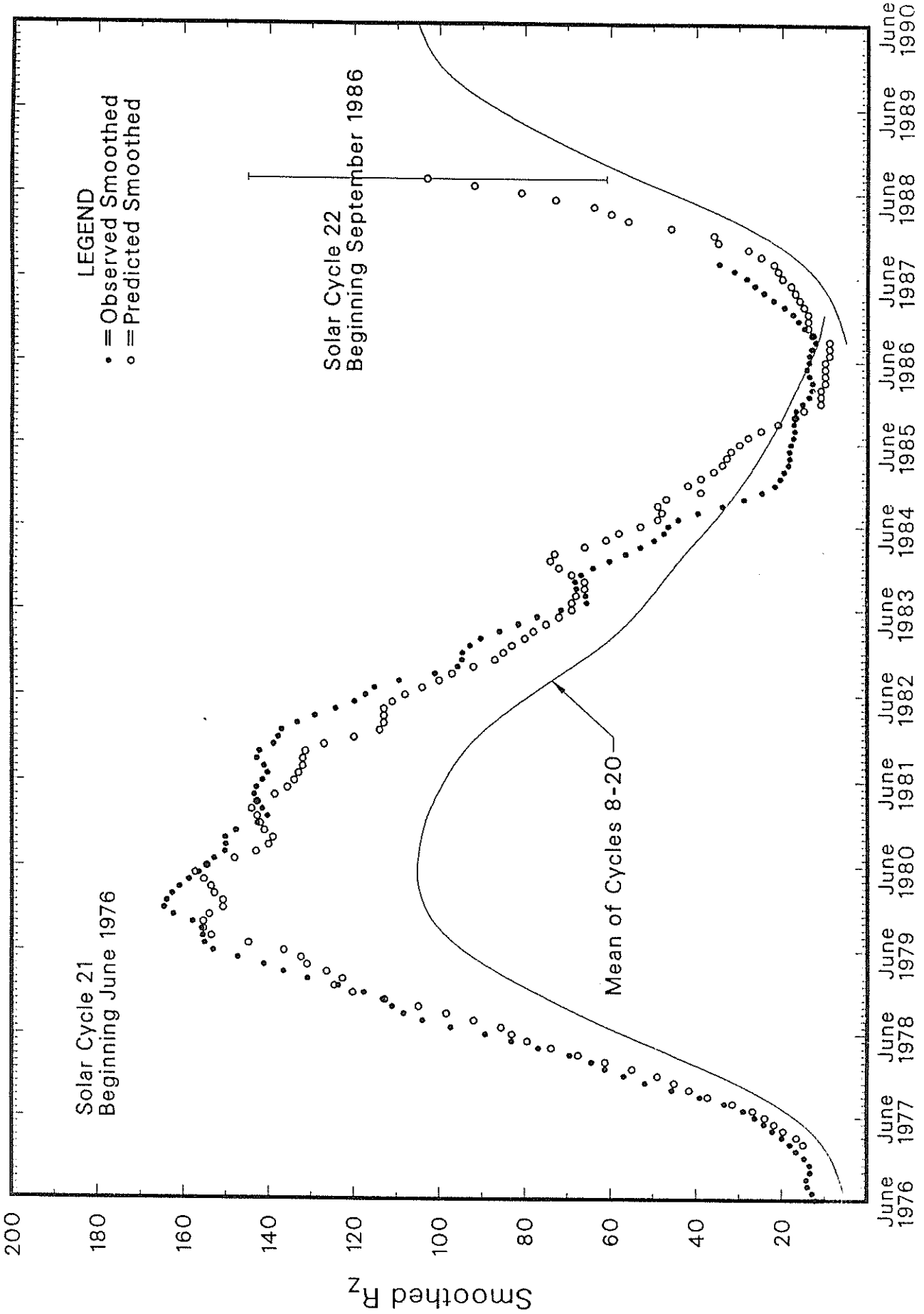
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1980	164	163	161	159	156	155	153	150	150	150	148	143
1981	140	142	143	143	143	142	140	141	143	142	139	138
1982	137	133	129	124	120	117	115	109	101	96	95	95
1983	93	90	86	82	77	71	66	66	68	68	67	64
1984	60	56	53	50	48	47	44	40	34	29	25	22
1985	21	20	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	22	24	27	28	31	35	39	44	51	58
									(2)	(5)	(8)	(10)
1988	64	69	74	79	84	89	96	103	110	116	120	122
	(13)	(18)	(22)	(26)	(30)	(33)	(37)	(42)	(45)	(49)	(54)	(57)
1989	125	131	141	151	159	166	171	176	183	189	192	193
	(57)	(56)	(57)	(58)	(59)	(61)	(61)	(62)	(67)	(68)	(69)	(71)
1990	191	189	184	174	164	157	152	147	138	127	117	112
	(73)	(76)	(77)	(76)	(72)	(67)	(65)	(65)	(61)	(56)	(49)	(43)

*September 1986 marks the onset of Sunspot Cycle 22.

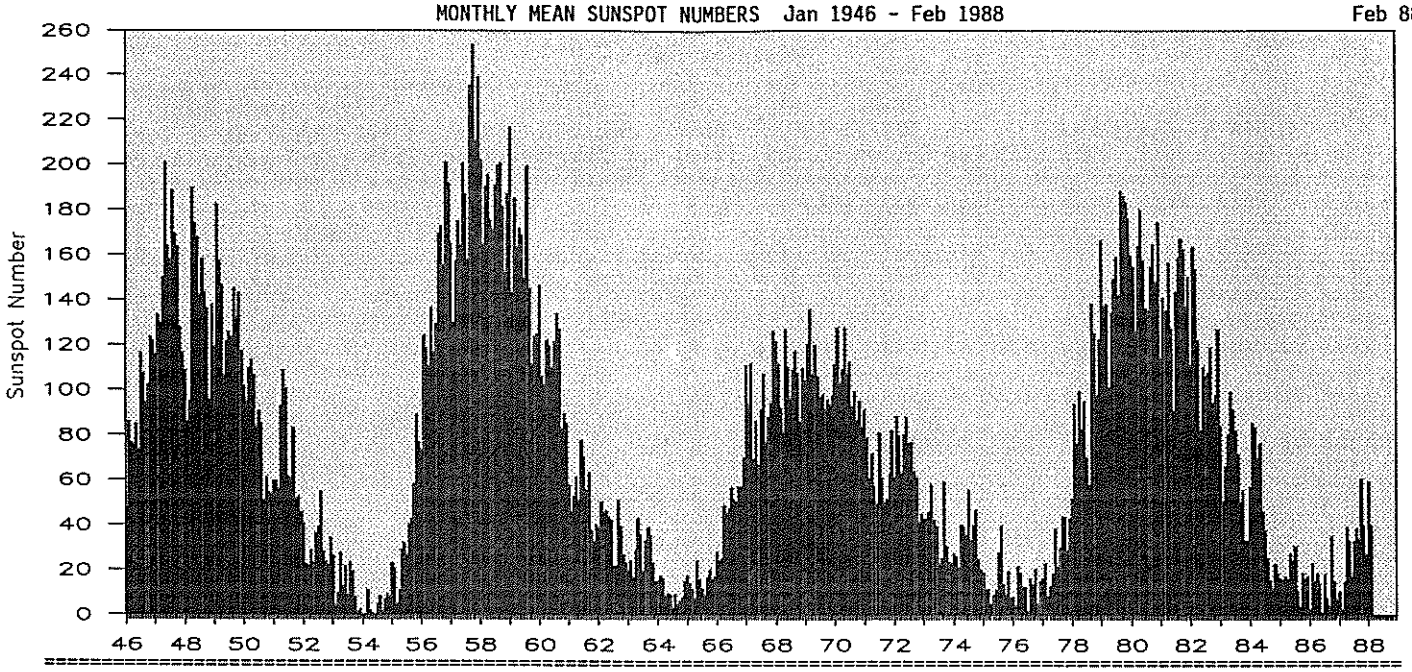
For the end of Solar Cycle 21, and the beginning of 22, the table gives observed smoothed sunspot numbers up to the one calculated from the most recently available monthly mean. These smoothed observed values are based on final, monthly means through December 1987 and on provisional numbers thereafter.

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 August 1988 prediction. There exists a 90% chance that in August 1988 the actual smoothed sunspot number will fall somewhere between 61 and 145.

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 data 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 minimum value of 12.3 that occurred in September 1986.


OBSERVED AND ONE-YEAR-AHEAD PREDICTED SUNSPOT NUMBERS
LEGEND
• = Observed Smoothed
○ = Predicted Smoothed
Solar Cycle 21
Beginning June 1976
Solar Cycle 22
Beginning September 1986
Mean of Cycles 8-20
Smoothed R_Z
200
180
160
140
120
100
80
60
40
20
June 1976
June 1977
June 1978
June 1979
June 1980
June 1981
June 1982
June 1983
June 1984
June 1985
June 1986
June 1987
June 1988
June 1989
June 1990

MONTHLY MEAN SUNSPOT NUMBERS Jan 1946 - Feb 1988



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean	
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	m
1987	10.4	2.4	14.7	39.6	33.0	17.4	33.0	38.7	33.9	60.6	39.9	27.1	29.2	
1988	59.6*	40.2*											49.9*	

*Preliminary

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

H - ALPHA S O L A R F L A R E S

FEBRUARY 1988

Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	CMP Mo	CMP Day	Dur (Min)	Imp Opt	Imp Xray	Imp See	Obs Type	Area Measurement Time (UT)	Area Measurement Apparent (10^{-6} Disk)	Area Measurement Corr (Sq Deg)	Remarks
0001	PALE	01	0214	0219	0233	N20	E60	4939	02	5.7	19	SF		3	C		14		
0002		01	0258	0301	0308	N19	W14	4937	01	31.0	10	SN					87	1.9	DHR
	LEAR	01	0258	0301	0307	N19	W14	4937	01	31.0	9	SF		3	C		13		H
	YUNN	01	0259E	0259U	0309	N19	W14	4937	01	31.0	10D	SB			P	0259	161	1.9	DR
0003	LEAR	01	0413	0413	0420	N22	E57	4939	02	5.5	7	SF		3	C		11		
0004	LEAR	01	0428	0441	0446	N22	E56	4939	02	5.5	18	SF	C 1.2	3	C		27		U
0005	LEAR	01	0822	0825	0831	N21	E55	4939	02	5.6	9	SF		3	C		12		
0006	PALE	01	2013	2013	2022	N27	E69	4943	02	7.2	9	SF		3	C		11		
0007	PALE	01	2029	2031	2044	N28	E72	4943	02	7.5	15	SF		3	C		13		H
0008	PALE	01	2132	2132	2137	N27	E70	4943	02	7.3	5	SF		3	C		16		
0009	PALE	01	2203	2208	2213	N27	E68	4943	02	7.2	10	SN		3	C		38		
0010	LEAR	01	2244	2254	2301	N27	E70	4943	02	7.4	17	SF		3	C		22		
0011	LEAR	01	2303	2333	2342	N28	E65	4943	02	7.0	39	SF		3	C		25		H
0012	PALE	02	0049	0051	0053	N27	E70	4943	02	7.5	4	SF		3	C		18		
0013	LEAR	02	0915	0917	0924	N18	E35	4939	02	5.0	9	SF		3	C		61		U
0014		03	0240	02421	0304	N20	E28	4939	02	5.2	24	SF	C 1.2				45		F
	LEAR	03	0240	0242	0300	N19	E27	4939	02	5.2	20	SF	C 1.2	3	C		38		F
	PALE	03	0240	0243	0307	N22	E30	4939	02	5.4	27	SF	C 1.2	3	C		52		F
0015		03	0900	0901	0910	N24	E26	4939	02	5.4	10	SF					17		F
	SVTO	03	0900	0901	0907	N24	E26	4939	02	5.4	7	SF		4	C		13		
	LEAR	03	0900	0901	0912	N23	E27	4939	02	5.4	12	SF		3	C		21		F
0016	SVTO	03	1301	1302	1335	N24	E24	4939	02	5.4	34	SF	C 3.0	3	C		15		
0017	KAND	04	0805	0810	0830	N18	W56	4937	01	31.1	25	SF			P	0810	52	1.0	E
0018		04	09151	09161	0930	N24	E13	4939	02	5.4	15	SN					28	.5	D
	KAND	04	0915	0917	0933	N24	E13	4939	02	5.4	18	SB			P	0917	42	.5	D
	LEAR	04	0916	0916	0927	N23	E13	4939	02	5.4	11	SF		3	C		14		
0019	KAND	04	1024	1025	1032	N25	E15	4939	02	5.6	8	SN			P	1025	31	.4	E
0020		06	0231	0235	0243	N26	E06	4943	02	6.6	12	SN					54	1.2	F
	YUNN	06	0231	0235	0243	N25	E06	4943	02	6.6	12	SN			C		96	1.2	
	PALE	06	0235E	0235U	0239D	N27	E06	4943	02	6.6	4D	SF		3	C		13		F
0021	SVTO	07	1147	1156	1200	N26	W08	4943	02	6.9	13	SF	C 1.0	3	C		10		F
0022	HOLL	07	1617	1617	1628	N25	W09	4946	02	7.0	11	SF		3	C		12		
0023	HOLL	07	1644	1659	1709D	N27	W10	4946	02	6.9	25D	SF		3	C		39		
0024		07	2018*	2048	2058	N28	W09	4946	02	7.1	40	SF					24		F
	HOLL	07	2018	2048	2059	N27	W07	4946	02	7.3	41	SF		3	C		37		
	PALE	07	2048	2048	2057	N28	W11	4946	02	7.0	9	SF		3	C		12		F
0025	HOLL	07	2156	2157	2207	S24	W77	4945	02	2.0	11	SF		3	C		21		
0026	HOLL	07	2221	2222	2234	N27	W12	4946	02	7.0	13	SF		3	C		12		
0027		07	2346	2347	2358	N22	W35	4939	02	5.3	12	SF					28		
	HOLL	07	2346	2347	2357	N22	W35	4939	02	5.3	11	SF		3	C		28		
	PALE	07	2346	2347	2358	N23	W35	4939	02	5.3	12	SF		3	C		29		
0028	PALE	08	0207	0209	0215	N28	W16	4946	02	6.8	8	SF		3	C		11		

H - ALPHA S O L A R F L A R E S

FEBRUARY 1988

Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	CMP Mo	CMP Day	Dur (Min)	Imp Opt	Imp Xray	Imp See	Obs Type	Area Measurement Time (UT)	Area Measurement Apparent (10^{-6} Disk)	Area Measurement Corr (Sq Deg)	Remarks
0029	KAND	08	0931	0931	0940	N29	W18	4946	02	7.0	9	SB			P	0931	83	1.1	EFJW
0030	KAND	08	1016	1022	1028	S18	W90		02	1.6	12	SN			P				A
0031	KAND	08	1240		1320D	S18	W90		02	1.7	40D	SN			P				A
0032	LEAR	09	0748	0748	0752	N24	W48	4939	02	5.6	4	SF		3	C		26		
0033	HOLL	09	1729	1729	1746	S36	E76	4947	02	15.8	17	SF		3	C		12		
0034	HOLL	10	1506	1509	1526	N17	E43		02	13.9	20	SF		3	C		16		
0035		11	02461	02501	0316	N28	W54	4946	02	6.9	30	SN	C 1.1				73		F
	PALE	11	0246	0250	0311	N29	W54	4946	02	6.9	25	SN	C 1.1	3	C		75		F
	LEAR	11	0247	0251	0321	N27	W54	4946	02	6.9	34	SF	C 1.1	3	C		71		F
0036	KAND	11	0935	0940	0953	S34	E30		02	13.8	18	SN			P	0940	21	.3	DG
0037		11	20431	2044	2058	S34	E44	4947	02	15.4	15	SF					24		
	PALE	11	2043	2044	2100	S35	E46	4947	02	15.5	17	SF		3	C		35		
	HOLL	11	2044	2044	2057	S33	E42	4947	02	15.2	13	SF		3	C		14		
0038	LEAR	14	0029	0029	0033	S34	E22	4947	02	15.8	4	SF		3	C		26		
0039	LEAR	14	0426	0440	0449	S15	E77	4950	02	20.0	23	SF		3	C		15		
0040	LEAR	14	0621	0627	0638	S15	E79	4950	02	20.2	17	SF		3	C		37		
0041	RAMY	14	1312	1318	1335	S37	E13	4947	02	15.6	23	SF		4	C		69		FH
0042		15	0109	01101	0120	S36	E08	4947	02	15.7	11	SF					48		
	LEAR	15	0109	0110	0116	S36	E07	4947	02	15.6	7	SF		3	C		33		
	PALE	15	0109	0111	0123	S36	E08	4947	02	15.7	14	SF		3	C		64		
0043	RAMY	16	1520	1521	1526	N20	E34	4949	02	19.2	6	SF		3	C		16		
0044		16	2253	2318	2327	N25	E34	4949	02	19.6	34	SF					14		
	PALE	16	2253	2318	2328	N25	E34	4949	02	19.6	35	SF		3	C		16		
	HOLL	16	2317E	2318U	2326	N25	E34	4949	02	19.6	9D	SF		2	C		11		
0045	PALE	17	0225	0231	0243	S17	E44	4950	02	20.4	18	SF		3	C		20		
0046	BUCA	17	0845	0845	0848	N23	E25	4949	02	19.3	3	SF			C	0845	43	.6	CD
0047	HOLL	17	2106E	2116U	2118D	N18	W58	4948	02	13.5	12D	SF		2	C		27		
0048	HOLL	17	2232E	2234	2236	N22	E24	4949	02	19.8	4D	SF		3	C		38		
0049	HOLL	18	1612E	1619	1620	S10	W54	4951	02	14.6	8D	SF		4	C		34		
0050	RAMY	18	1838	1839	1849	S09	W55	4951	02	14.6	11	SF		3	C		20		
0051	RAMY	18	1914	1915	1928	S09	W55	4951	02	14.7	14	SF		3	C		37		
0052		18	20083	2012	2025	S11	W56	4951	02	14.6	17	SF					56		
	HOLL	18	2008	2012	2027D	S13	W58	4951	02	14.5	19D	SF		3	C		75		
	RAMY	18	2011	2012	2025	S09	W55	4951	02	14.7	14	SF		3	C		38		
0053	LEAR	19	0049	0050	0100	S10	W57	4951	02	14.7	11	SF		3	C		28		
0054	LEAR	19	0108	0110	0113	S10	W57	4951	02	14.8	5	SF		3	C		23		
0055	LEAR	19	0814	0815	0819	N21	E11	4949	02	20.2	5	SF		3	C		18		
0056		20	0405	0414	0518	S08	W71	4951	02	14.8	73	1B	M 1.1				140		EUZ
	LEAR	20	0405	0414	0532	S08	W68	4951	02	15.1	87	1N	M 1.1	3	C		134		ZU
	PEKG	20	0413E	0416U	0505	S09	W74	4951	02	14.6	52D	1B	M 1.1		C	0416	147		E

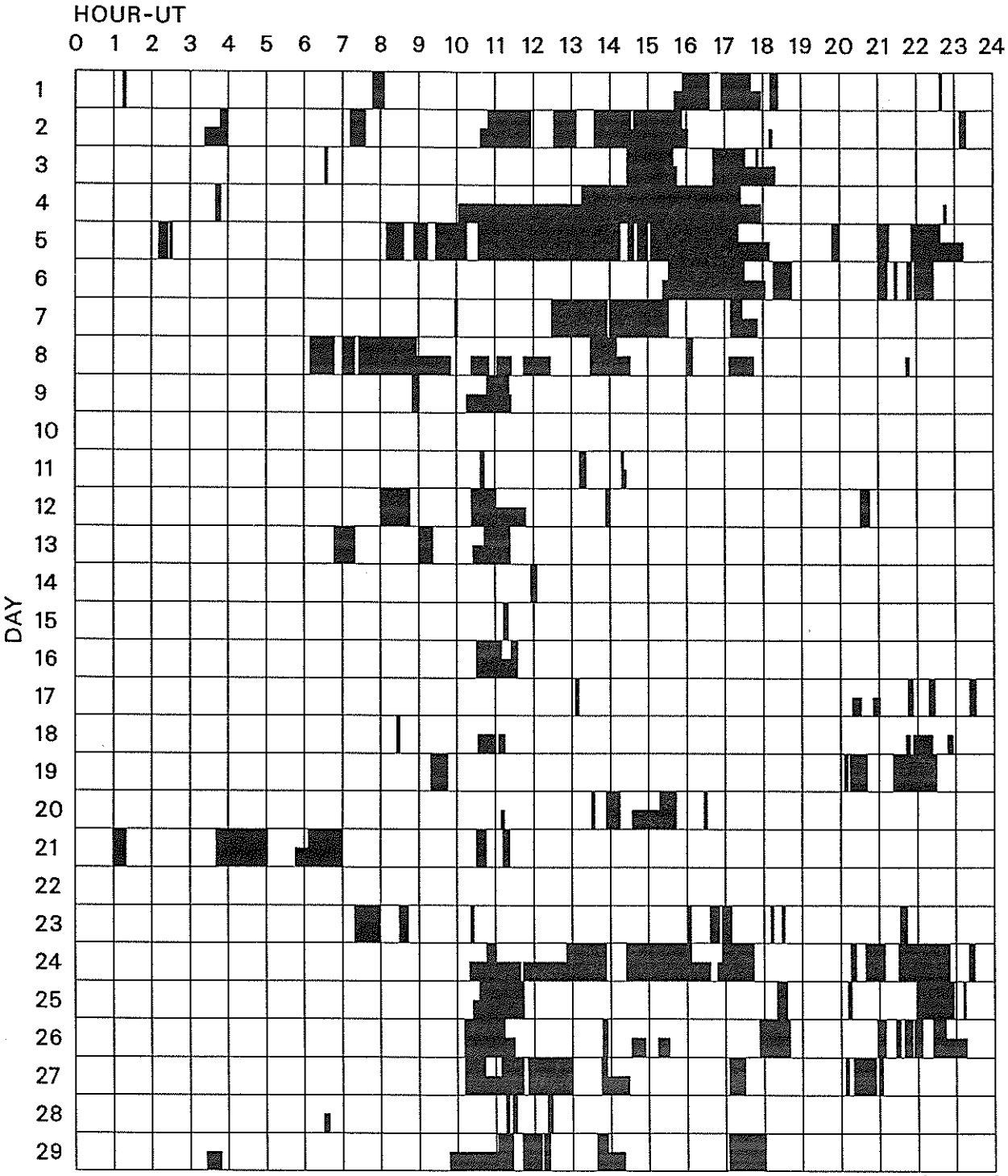
H - ALPHA S O L A R F L A R E S

FEBRUARY 1988

Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	CMP Mo	CMP Day	Dur (Min)	Imp Opt	Imp Xray	Obs See	Obs Type	Area Measurement Time (UT)	Area Measurement Apparent (10^{-6} Disk)	Area Measurement Corr (Sq Deg)	Remarks
0057		22	1442	1444	1458	S24	E25		02	24.5	16	SF					20		F
	SVTO	22	1442	1444	1455	S23	E25		02	24.5	13	SF		3	C		14		F
	RAMY	22	1444E	1444U	1500	S25	E25		02	24.5	16D	SF		1	C		25		
0058	RAMY	22	2102	2102	2109	N22	W42	4949	02	19.6	7	SF		4	C		12		
0059		22	21167	21195	2127	N21	W42	4949	02	19.7	11	SF					20		
	HOLL	22	2116	2119	2124	N21	W41	4949	02	19.7	8	SF		3	C		24		
	RAMY	22	2123	2124	2130	N21	W43	4949	02	19.6	7	SF		4	C		15		
0060	HOLL	23	1851	1853	1901	S18	E70	4954	02	29.1	10	SF		3	C		20		U
0061	LEAR	25	0411	0414	0419	S19	E52	4954	02	29.1	8	SF		3	C		21		F
0062	RAMY	25	1203	1205	1225	S19	E46	4954	02	29.0	22	SF		3	C		48		
0063	YUNN	27	0242	0246	0300	N17	E88	4957	03	4.8	18	1N			C		48		
0064	LEAR	28	0520	0521	0612	S20	E12	4954	02	29.1	52	SF		3	C		75		FU
0065	SVTO	28	0825	0830	0833	N17	E68	4957	03	4.5	8	SF		3	C		10		F
0066	RAMY	28	1527	1528	1537	N14	E63	4957	03	4.4	10	SF		3	C		12		
0067		28	15515	1559	1616	N18	E64	4957	03	4.5	25	SF	C 1.3				54		EFH
	RAMY	28	1551	1559	1618	N16	E63	4957	03	4.4	27	SF	C 1.3	3	C		70		H
	HOLL	28	1556	1559	1613	N20	E64	4957	03	4.5	17	SF	C 1.3	4	C		38		FE
0068		28	16363	16391	1646	N18	E62	4957	03	4.4	10	SF					14		
	RAMY	28	1636	1640	1643	N15	E62	4957	03	4.4	7	SF		3	C		16		
	HOLL	28	1639	1639	1649	N20	E63	4957	03	4.5	10	SF		4	C		11		
0069		28	17426	17491	1754	N18	E64	4957	03	4.6	12	SF					34		
	HOLL	28	1742	1750	1755	N18	E64	4957	03	4.6	13	SF		4	C		27		
	RAMY	28	1748	1749	1754	N18	E63	4957	03	4.5	6	SF		3	C		42		
0070	RAMY	28	1912	1919	1922	S22	E39	4958	03	2.8	10	SF		3	C		10		
0071		28	19337	1934*	1944	S21	E42	4958	03	3.0	11	SF					15		
	HOLL	28	1933	1934	1936	S21	E41	4958	03	2.9	3	SF		3	C		10		
	HOLL	28	1937	1944	1948	S21	E43	4958	03	3.1	11	SF		3	C		20		
	RAMY	28	1940	1944	1948	S22	E42	4958	03	3.0	8	SF		3	C		16		
0072		28	20351	20361	2042	S22	E42	4958	03	3.1	7	SF					20		
	HOLL	28	2035	2037	2041	S21	E43	4958	03	3.1	6	SF		3	C		12		
	RAMY	28	2036	2036	2043	S23	E42	4958	03	3.1	7	SF		3	C		29		
0073	KAND	29	0914	0933	1014	S21	E36	4958	03	3.1	60	SB			P	0933	83	1.0	EFJTV
0074	RAMY	29	1250	1251	1302	S21	E31	4958	03	2.9	12	SF		3	C		10		
0075	HOLL	29	1610	1611	1646	S22	E30	4958	03	3.0	36	SF		3	C		12		
0076	HOLL	29	2109	2113	2127	N17	E49	4957	03	4.6	18	SF		3	C		19		
0077	RAMY	29	2115	2118	2126	S22	E26	4958	03	2.9	11	SF		2	C		12		

INTERVALS OF NO FLARE PATROL OBSERVATION
FOR PRECEDING SOLAR FLARE TABLE

FEBRUARY 1988



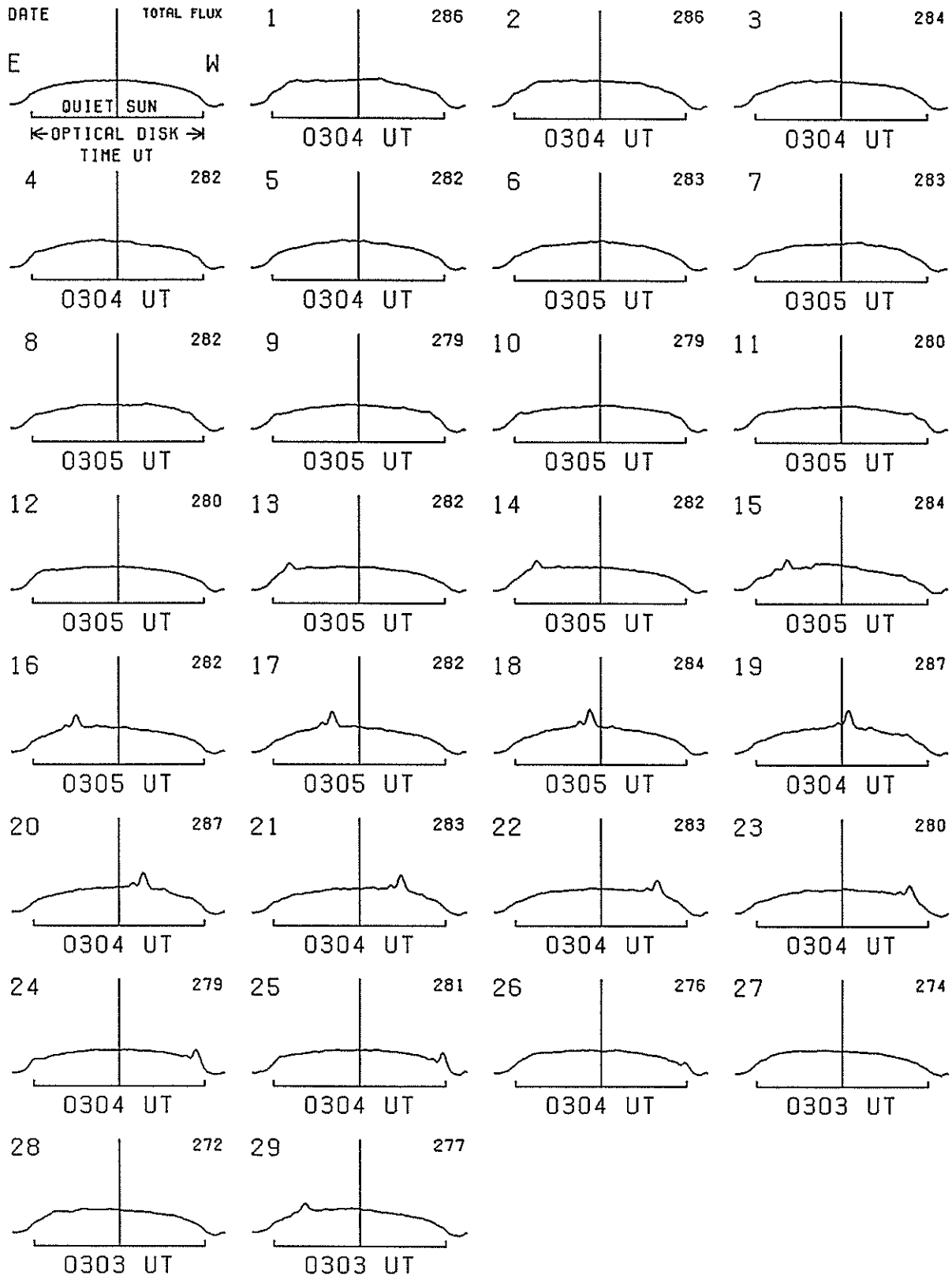
Times of no flare patrol, shown here as shaded areas, combine reports from the observatories listed below. Portions of a panel completely shaded mark dates and times of no patrol of any kind, that is, of neither visual nor cinematographic; portions of a panel with only the bottom half shaded mark times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

Bucharest	Istanbul	Learmonth	Peking	San Vito
Holloman	Kandilli	Palehua	Ramey	Yunnan

EAST-WEST SOLAR SCANS
FEBRUARY 1988

TOYOKAWA, JAPAN

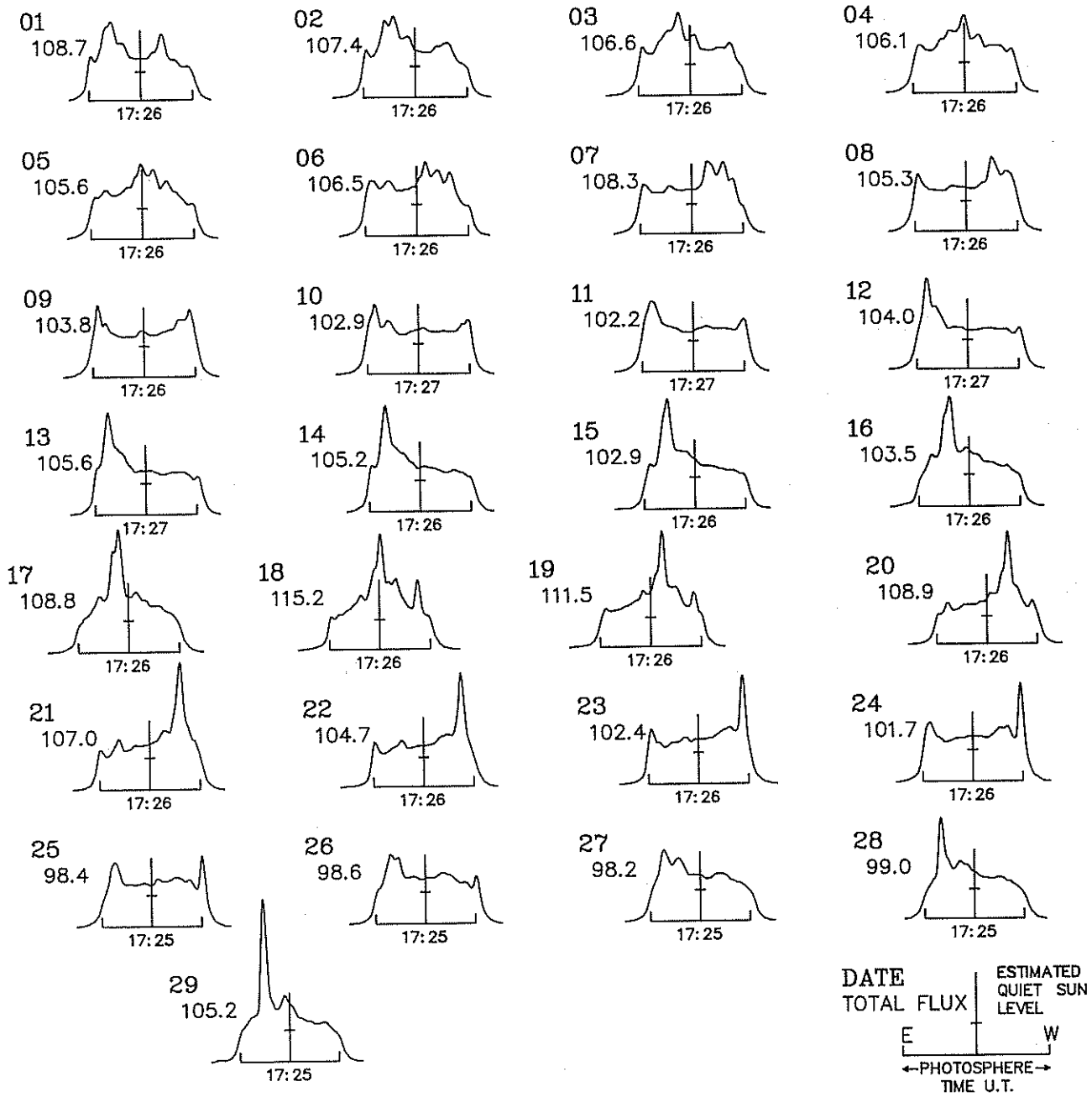
3 CM
FAN BEAM WITH 1.1 MINUTES OF ARC



EAST – WEST SOLAR SCANS
FEBRUARY 1988

ALGONQUIN RADIO OBSERVATORY
CANADA

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



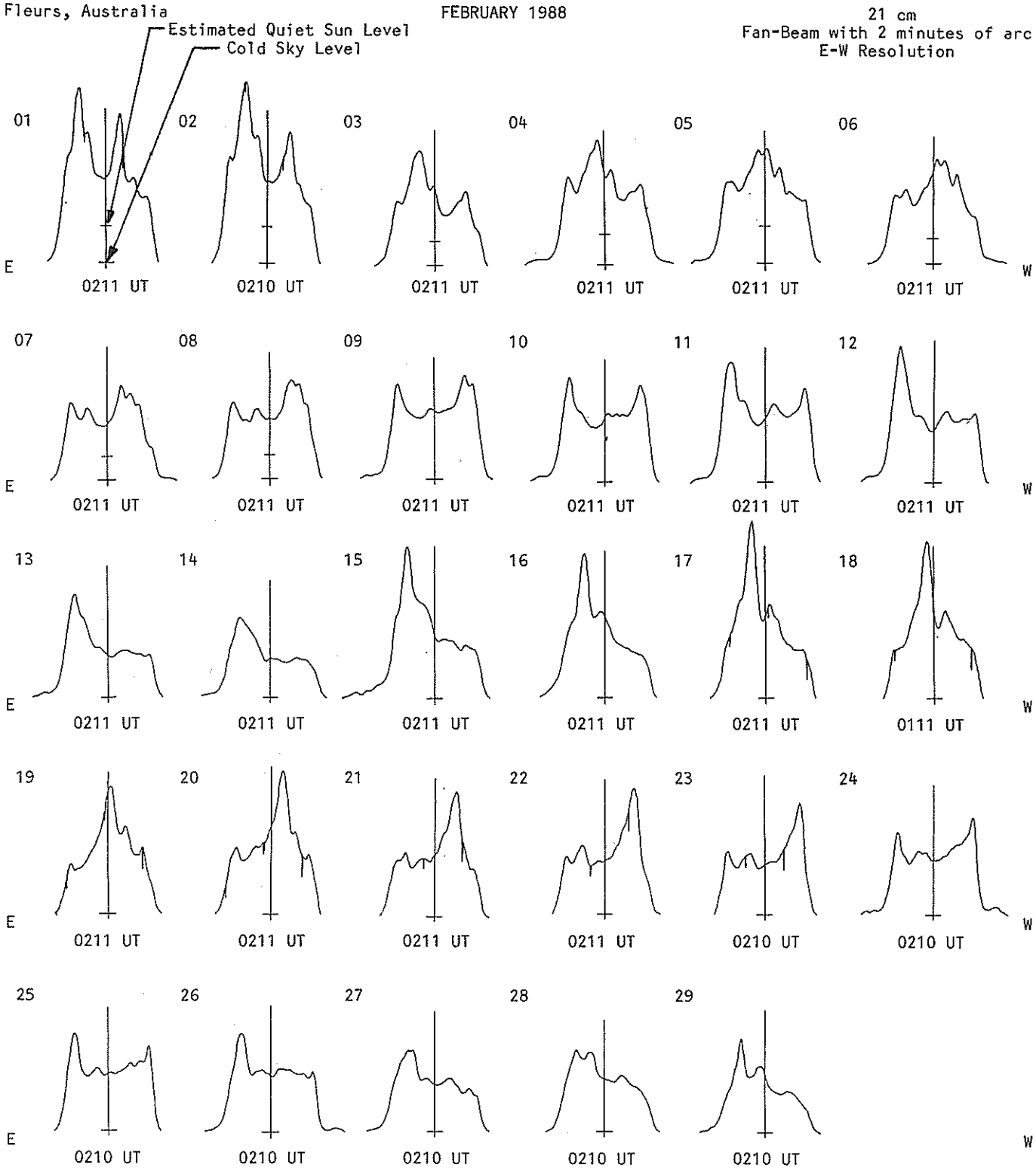
20
Feb 88

EAST-WEST SOLAR SCANS

Fleurs, Australia

FEBRUARY 1988

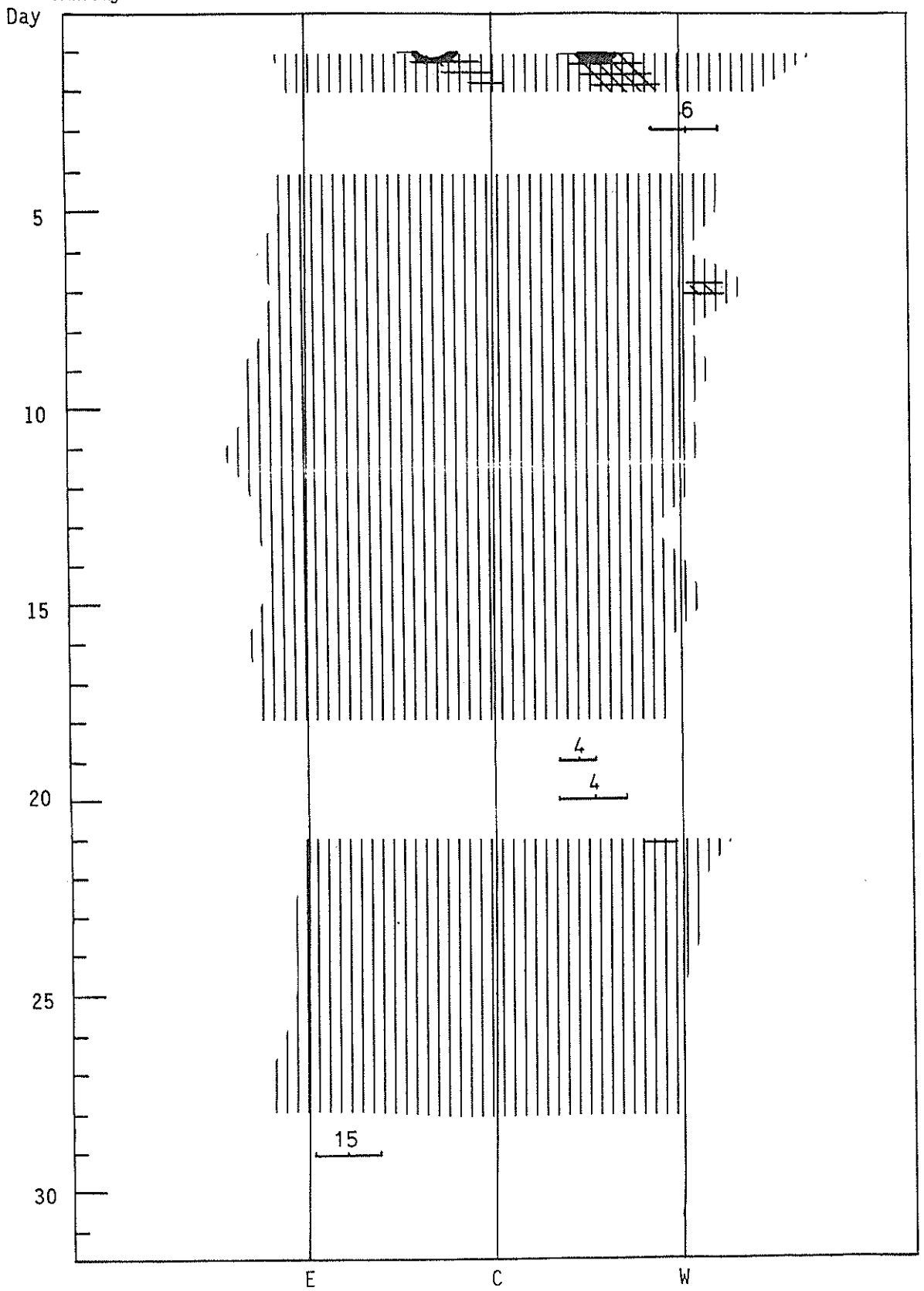
21 cm
Fan-Beam with 2 minutes of arc
E-W Resolution



SOLAR INTERFEROMETRIC OBSERVATIONS
FEBRUARY 1988

Nancay

164 MHz



SOLAR RADIO EMISSION--SELECTED FIXED FREQUENCY EVENTS

FEBRUARY 1988

Day	Freq	Sta	Type		Start (UT)	Time of Maximum (UT)	Duration (Min)	Flux Density Peak (10^{-22} W/m^2 Hz)	Flux Density Mean (10^{-22} W/m^2 Hz)	Int	Remarks
08	8800	SGMR	49	GB	1341.0	1342.0	2.0	690.0			QL=5 ST=3 TYP=6
11	8800	PALE	8	S	0157.0	0157.0	2.0	120.0			QL=5 ST=2 TYP=5
20	8800	PALE	8	S	0404.0	0404.0	2.0	15.0			QL=5 ST=2 TYP=3
	2695	PALE	49	GB	0404.0	0415.0	13.0	700.0			QL=5 ST=2 TYP=6
	2695	LEAR	20	GRF	0404.0	0423.0	46.0	430.0			QL=5 ST=2 TYP=2
	8800	LEAR	20	GRF	0410.0	0418.0	39.0	390.0			QL=5 ST=2 TYP=2
28	2800	OTTA	1	S	1556.0	1558.0	5.0	10.0	6.0		

Reports are received routinely from the following observatories:
LEAR = Learmonth OTTA = Ottawa PALE = Palehua SGMR = Sagamore Hill SVTO = San Vito

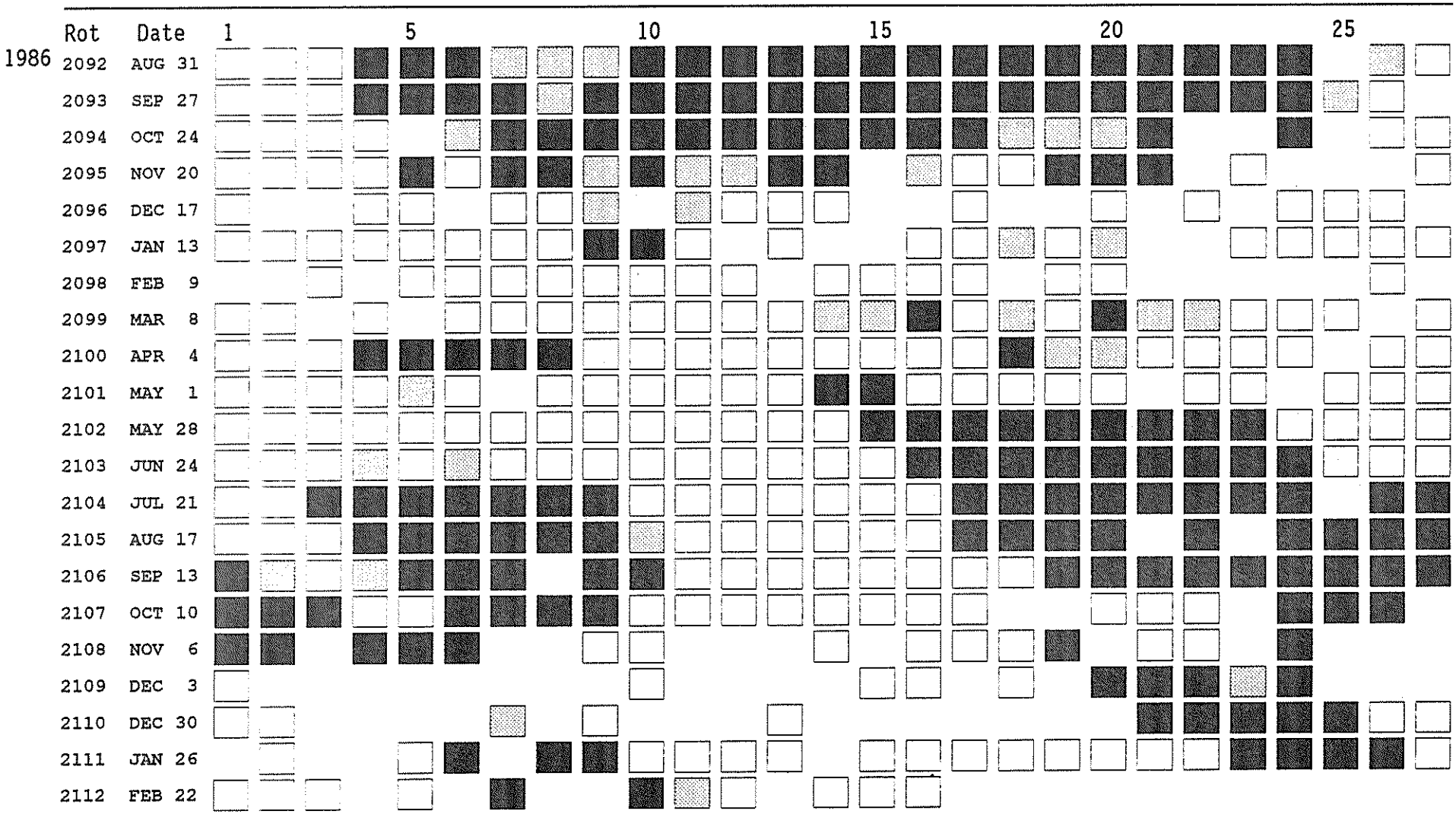
Explanation of Type Code:

1 Simple 1	7 Minor +	24 Rise	30 Post Burst Increase A	43 Onset of Noise Storm
2 Simple 1F	8 Spike	25 Rise A	31 Post Burst Decrease	44 Noise Storm in Progress
3 Simple 2	20 Simple 3	26 Fall	33 Absorption	45 Complex
4 Simple 2F	21 Simple 3A	27 Rise and Fall	40 Fluctuation	46 Complex F
5 Simple	22 Simple 3F	28 Precusor	41 Group of Bursts	47 Great Burst
6 Minor	23 Simple 3AF	29 Post Burst Increase	42 Series of Bursts	48 Major

1A Simple 1A	4A Simple 2AF	24PF Post Rise F	27F Rise and Fall F
3A Simple 2A	40 Rise Only	16A Fall A	27AF Rise and Fall AF
21A Simple 3A GRF	40F Rise Only F	260 Fall Only	31A Post Burst Decrease A
2A Simple 1AF	4P Post Rise	26F Fall F	32A Absorption A
			46F Complex F

RSTN Site Information: Beginning in April 1986, the RSTN sites LEAR, PALE, SGMR, and SVTO fixed frequency solar radio data are periodically adjusted to several world standard stations. These world standard stations include: Kislovodsk, USSR 15,500 MHz; Ottawa, Canada 2800 MHz; Hiraiso, Japan 500 and 200 MHz; and Toyokawa, Japan 9400, 3750, 2000 and 1000 MHz.

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.

23 Feb 88

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)

Day	1987 Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1988 Jan	Feb
1	.	10	14	2	11	39	12	-3	.	.	.	.
2	.	.	17	3	20	43	-3	-4	-20	.	.	-16
3	.	8	11	12	26	27	-16	-3	-19	2	.	-5
4	.	13	5	23	33	14	-19	-17	-24	.	.	16
5	.	10	0	27	33	4	-31	-28	.	.	0	25
6	9	2	3	24	32	-10	.	-35	-10	.	.	42
7	.	-5	.	29	17	-16	-49	-28	-12	.	20	40
8	14	-14	6	38	2	-29	.	-24	.	.	.	.
9	15	-13	6	31	-10	-37	-50	-20	-28	.	.	62
10	.	-12	5	8	-13	-38	-39	-16	-28	.	.	56
11	10	-5	20	-8	-19	-36	-24	-6	-20	.	29	58
12	.	5	17	-17	-29	-43	-18	-3	.	19	.	58
13	10	18	5	-19	-24	-32	-10	6	.	.	.	48
14	23	30	-6	-21	-22	.	-1	7	4	.	.	47
15	18	30	-4	-21	-18	-19	4	-11	5	.	.	23
16	22	25	2	-16	-15	-7	-1	-9	.	.	.	16
17	22	19	4	-12	-9	2	-5	-10	.	22	.	-13
18	17	13	3	-16	4	6	-5	-6	.	30	.	-22
19	13	6	4	-6	9	3	-8	5	18	.	-12	-25
20	7	2	7	9	11	-13	.	6	.	20	-22	-13
21	-1	-3	.	13	7	-15	-10	9	21	.	-35	11
22	1	-2	19	12	11	-18	-5	12	30	-10	-28	14
23	-3	1	21	7	-5	-22	7	23	3	-17	-15	35
24	2	2	.	7	-12	-25	14	25	-10	-18	4	37
25	0	6	3	11	-11	-18	19	21	.	-1	15	.
26	3	8	8	6	-10	-2	21	23	4	-3	.	17
27	-3	10	8	-1	-10	12	22	.	4	.	23	.
28	-2	.	12	4	-5	26	20	.	.	.	.	-14
29	-1	12	17	-1	-10	33	15	15	-5	.	.	.
30	7	12	16	5	6	22	5	2	.	24	3	
31	12		4		27	16		4		24	-15	

Dot symbol indicates no data available for the day.

VOSTOK INFERRED INTERPLANETARY MAGNETIC FIELD
PRELIMINARY DATA

1988

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1		T										
2		A										
3		A										
4		A										
5		T										
6		T										
7		A										
8		AT										
9		A										
10		A										
11		A										
12		A										
13		A										
14		A										
15		A										
16		A										
17		A										
18		A										
19		A										
20		A										
21		A										
22		A										
23		A										
24		A										
25		AT										
26		-										
27		-										
28		-										
29		-										
30												
31												

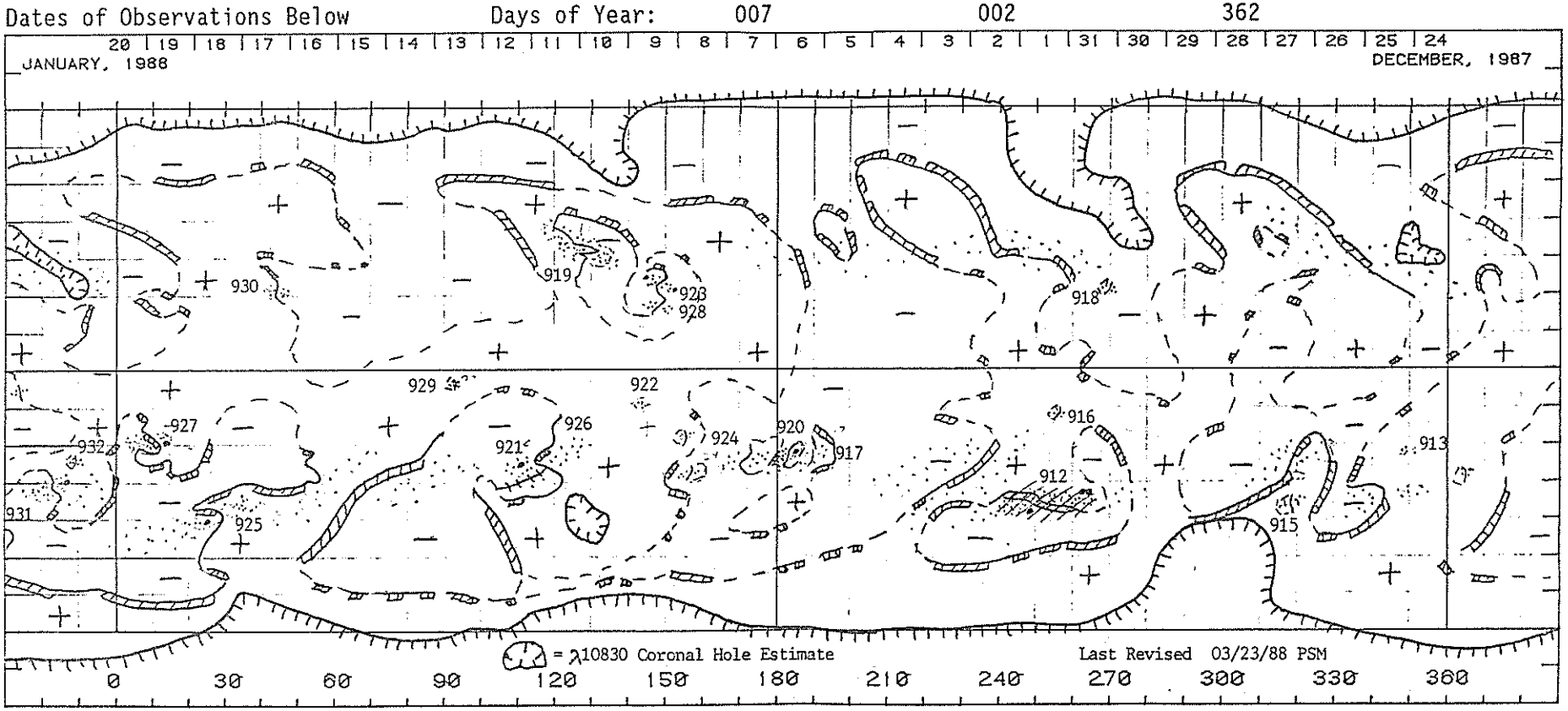
C O N T E N T S

Prompt Reports DATA FOR **JANUARY 1988** Number 523 Part I

P R E L I M I N A R Y H - ALPHA S O L A R S Y N O P T I C C H A R T

CARRINGTON ROTATION NUMBER 1797

(24 December 1987 to 20 January 1988)



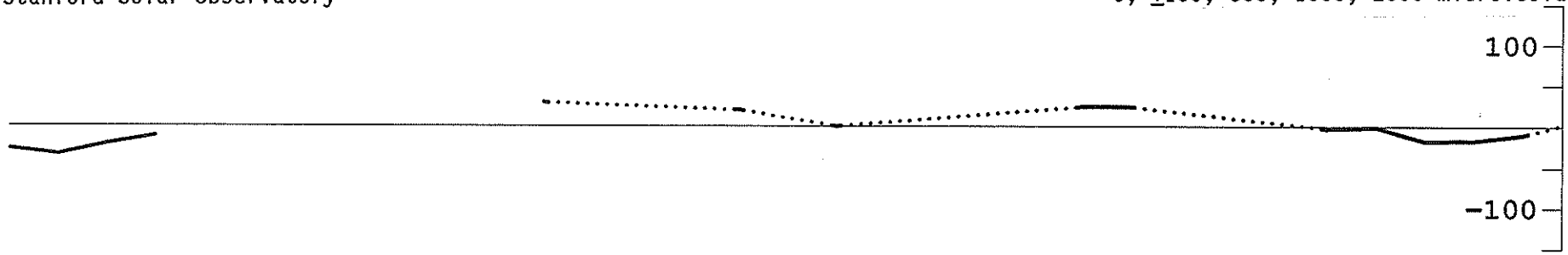
SOLAR MAGNETIC FIELD SYNOPTIC CHART

CARRINGTON ROTATION NUMBER 1797

(24 December 1987 to 20 January 1988)

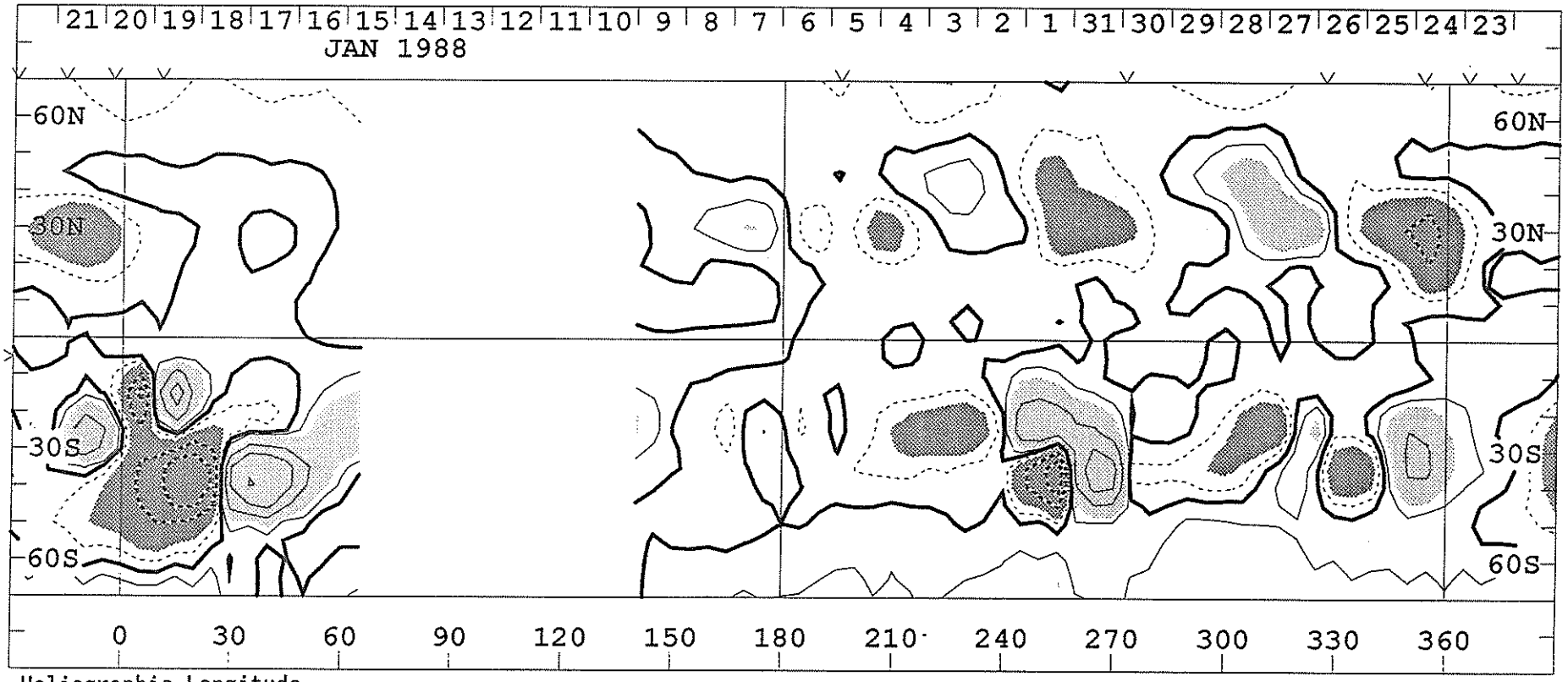
Stanford Solar Observatory

0, ±100, 500, 1000, 2000 microTesla

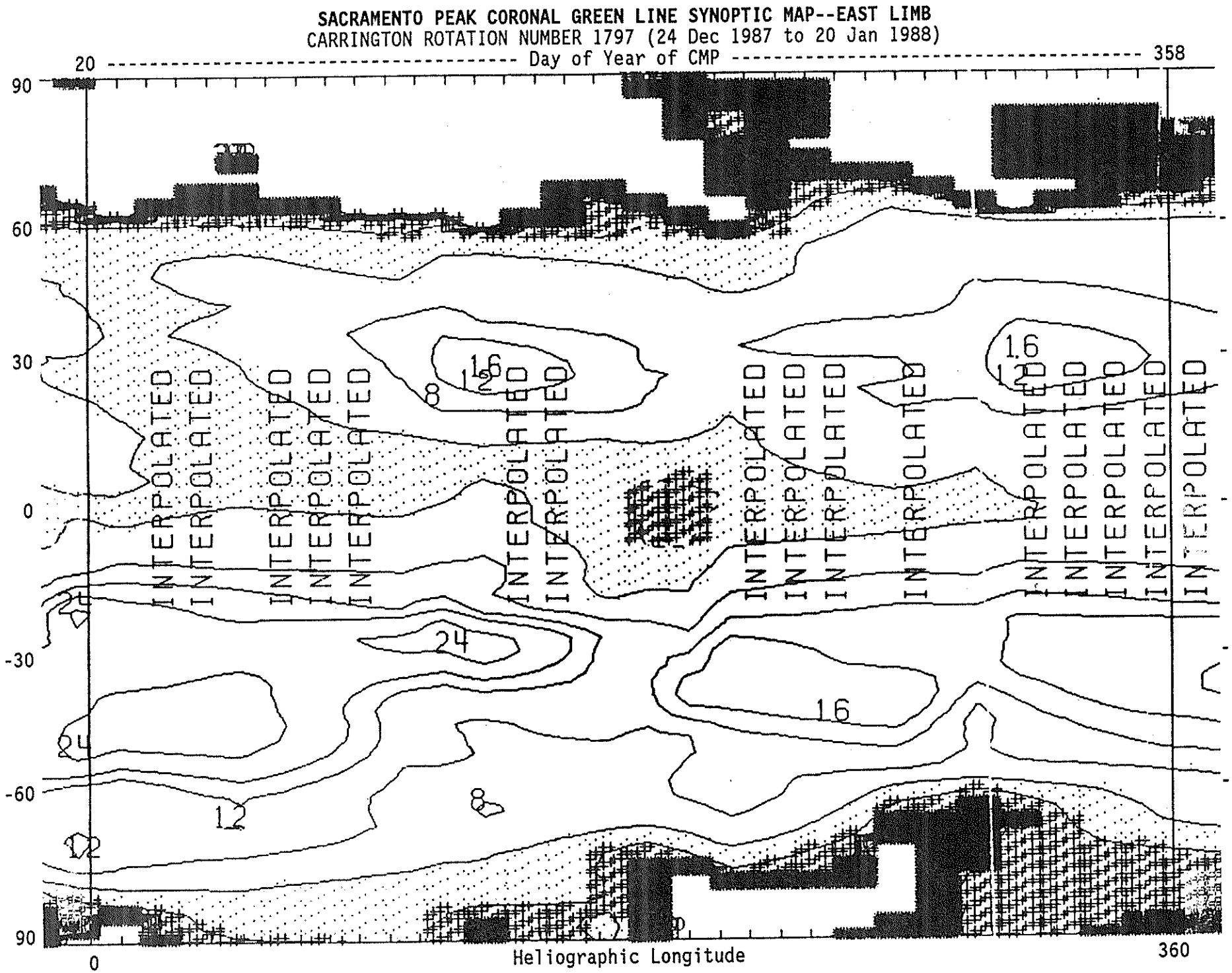


Photospheric Magnetic Field

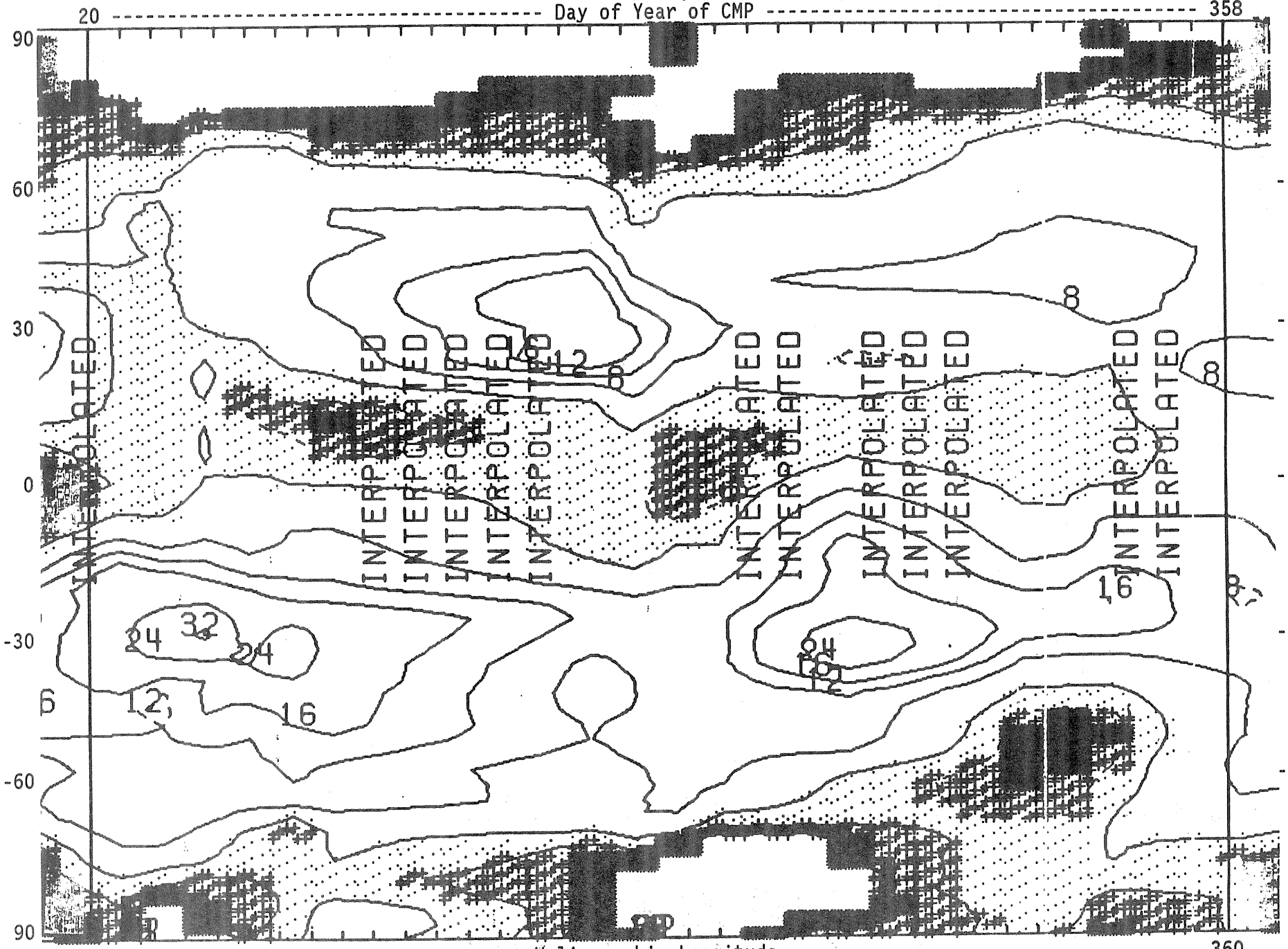
0, ±100, 500, 1000, 2000 MicroTesla



29 Jan 88


SACRAMENTO PEAK CORONAL GREEN LINE SYNOPTIC MAP--EAST LIMB
CARRINGTON ROTATION NUMBER 1797 (24 Dec 1987 to 20 Jan 1988)
20
Day of Year of CMP
358
30 Jan 88
90
60
30
0
-30
-60
90
0
Heliographic Longitude
360
INTERPOLATED
16
12
8
24
1.6

SACRAMENTO PEAK CORONAL GREEN LINE SYNOPTIC MAP--WEST LIMB
CARRINGTON ROTATION NUMBER 1797 (24 Dec 1987 to 20 Jan 1988)



31 Jan 88

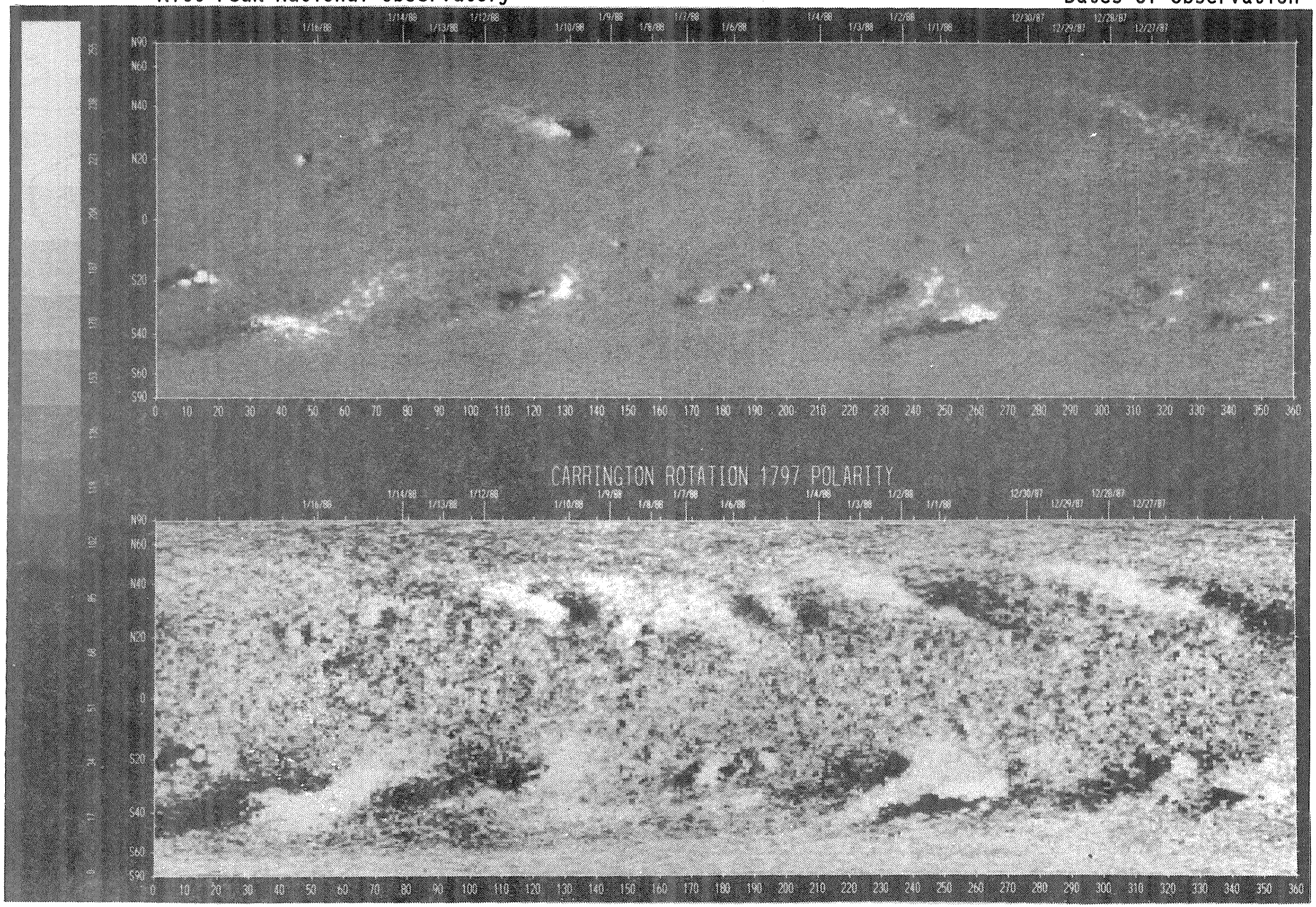
SOLAR MAGNETIC FIELD SYNOPTIC CHART

CARRINGTON ROTATION NUMBER 1797

(24 December 1987 to 20 January 1988)

Kitt Peak National Observatory

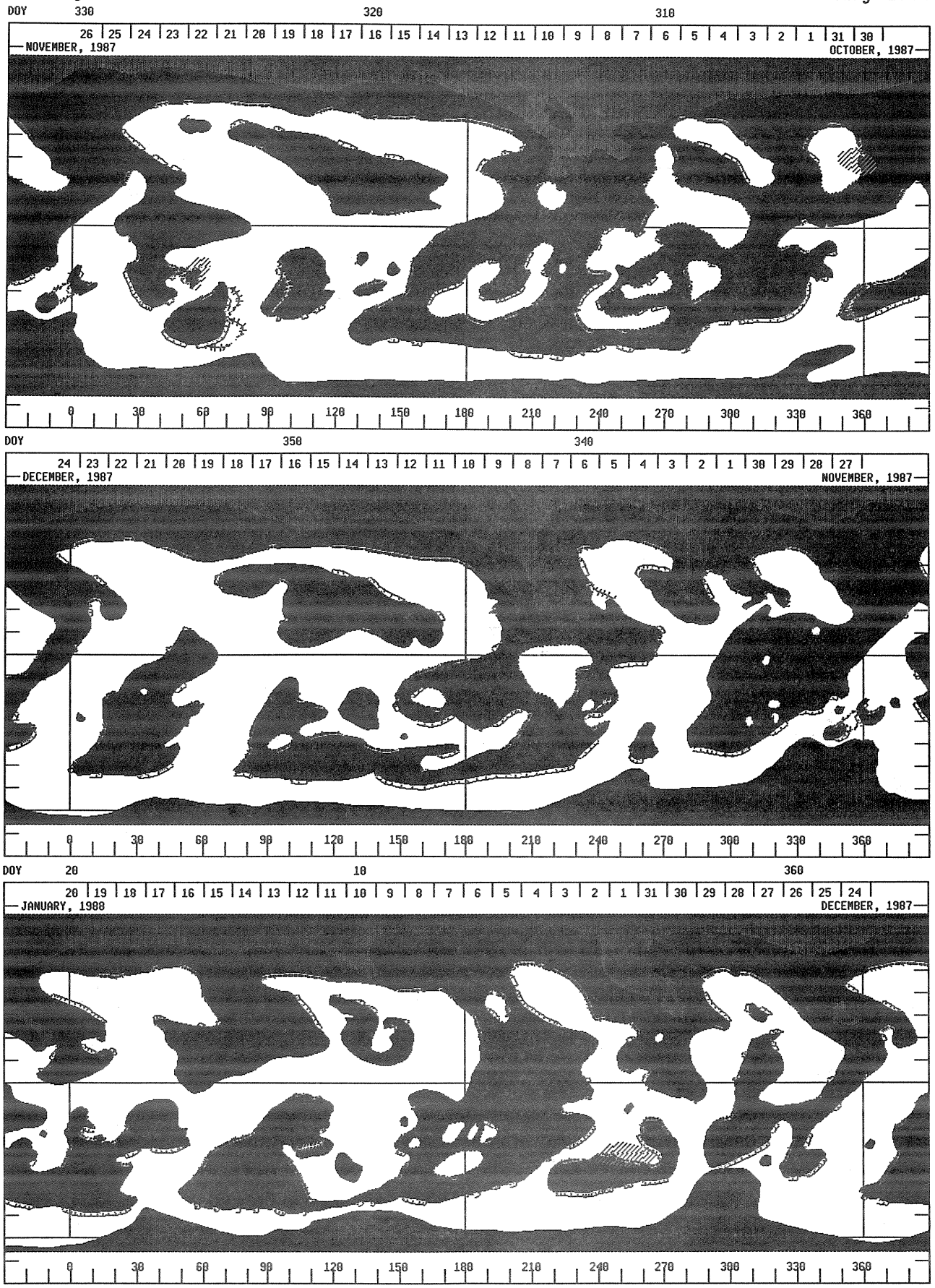
Dates of Observation



Heliographic Longitude

SHADED H-ALPHA SOLAR SYNOPTIC CHARTS

Carrington Rot. 1795-1797 30 October 1987 to 20 January 1988

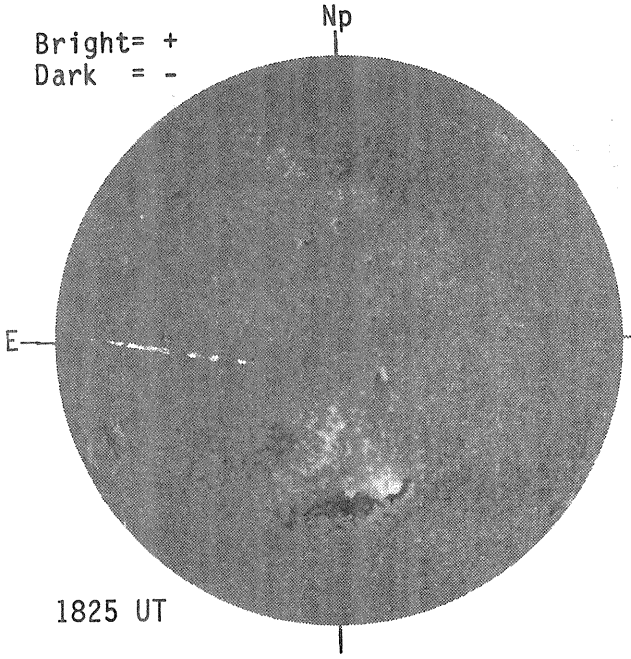


□ = Positive Polarity ■ = Negative Polarity ■ = 10830 Coronal Hole Estimate ▨ = X-Ray Flares > M1

Heliographic Longitude

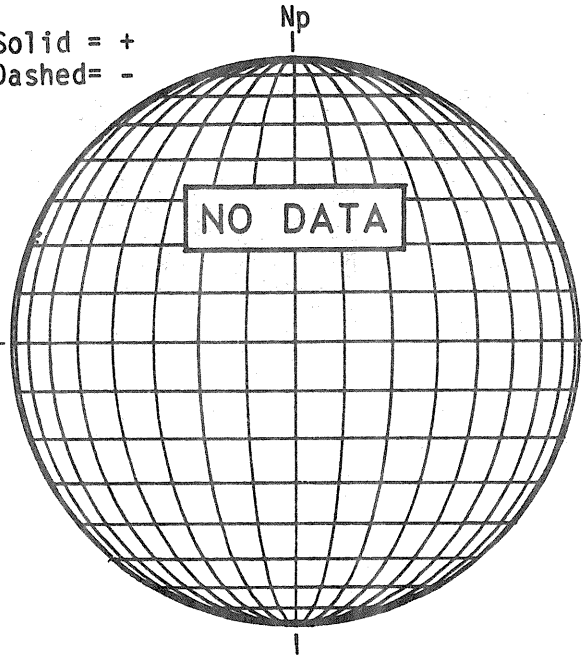
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

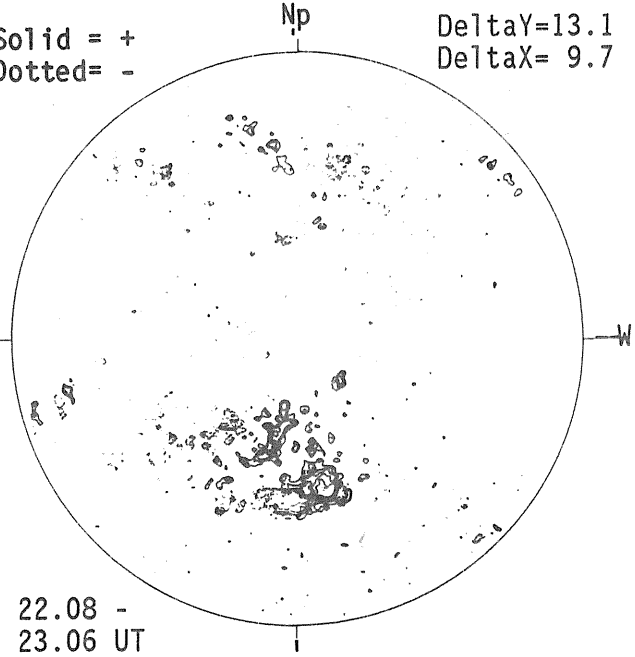
Solid = +
Dashed= -



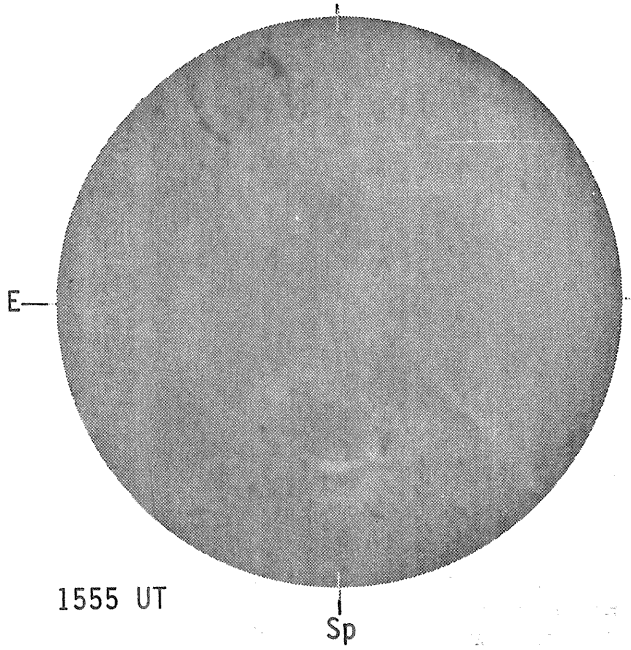
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

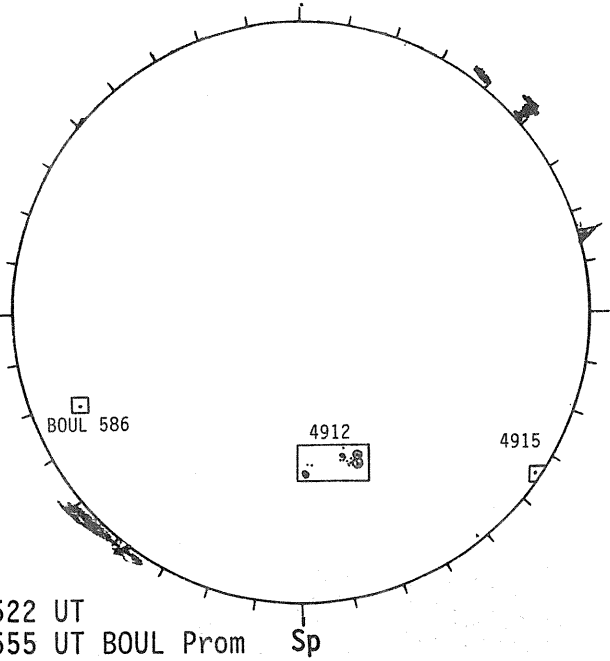
DeltaY=13.1
DeltaX= 9.7



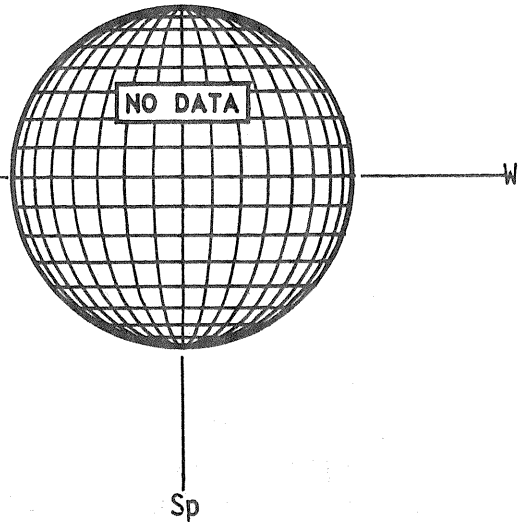
BOULDER H-ALPHA



BOULDER SUNSPOTS



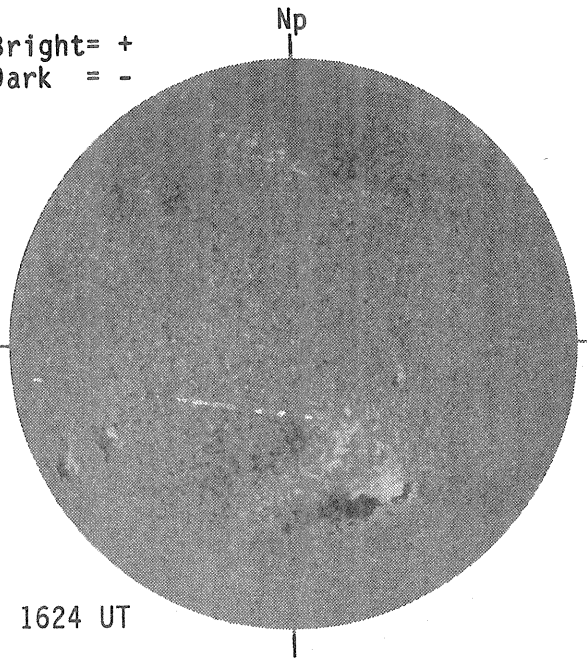
SACRAMENTO PEAK CORONA (1.15 Radii)



JANUARY 01, 1988 (P= 2.39, B_o=-2.95, L_o= 258.34)

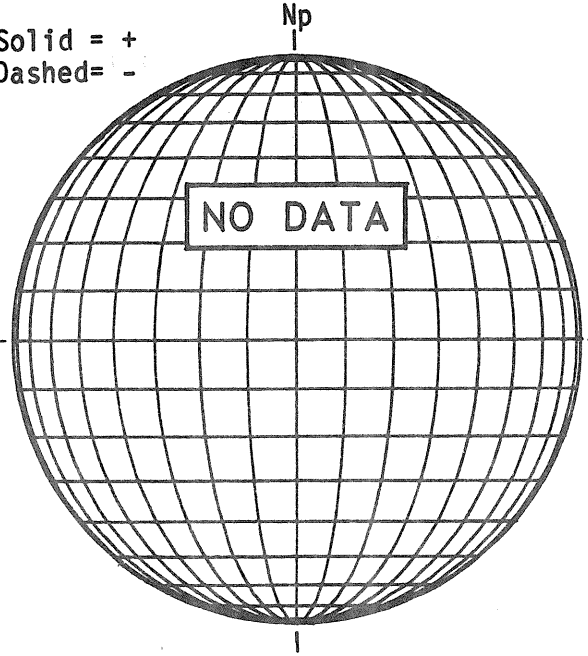
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



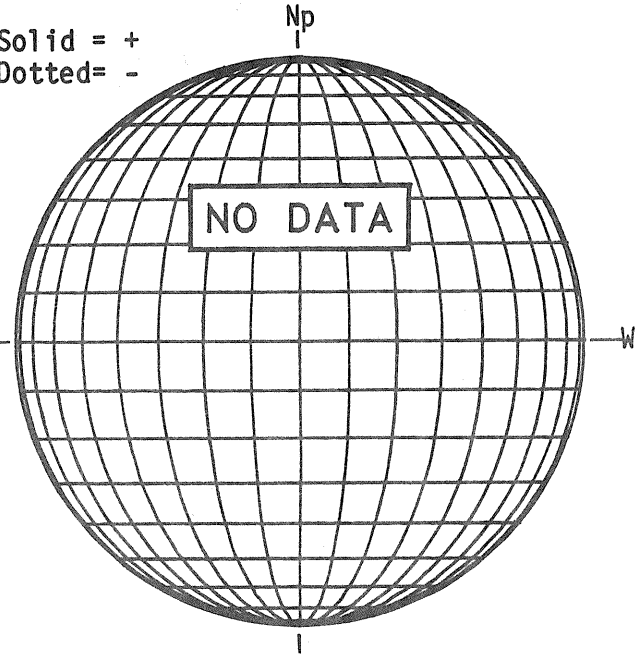
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

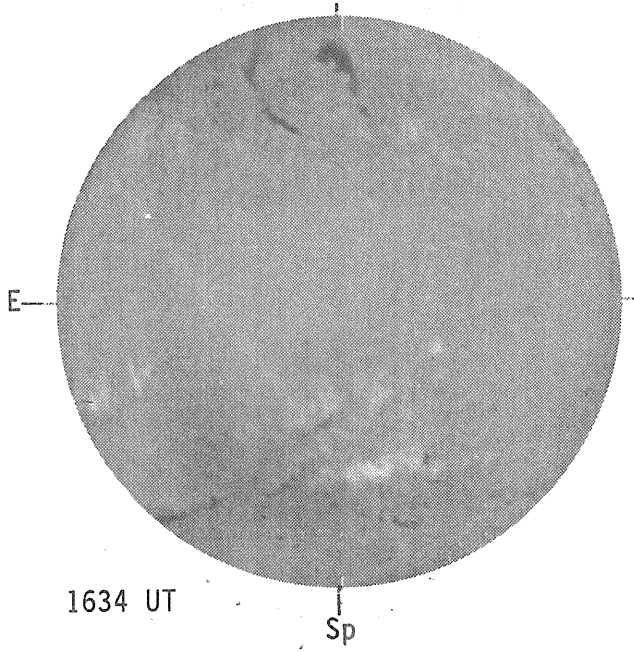


MT. WILSON MAGNETOGRAM

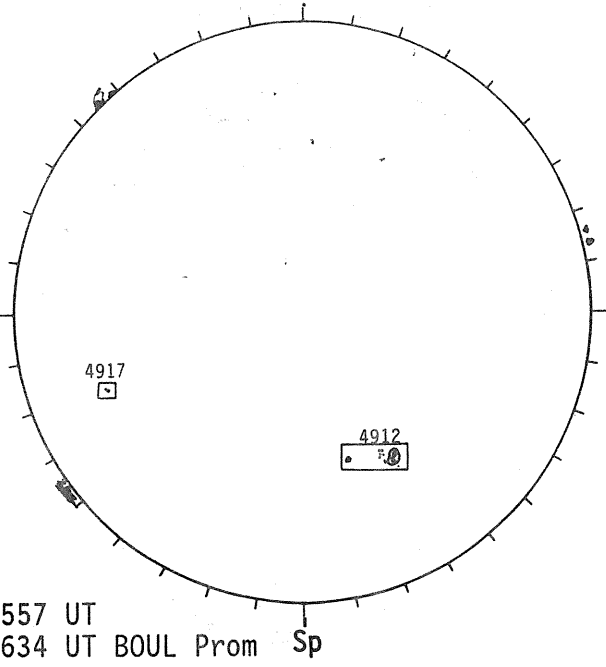
Solid = +
Dotted= -



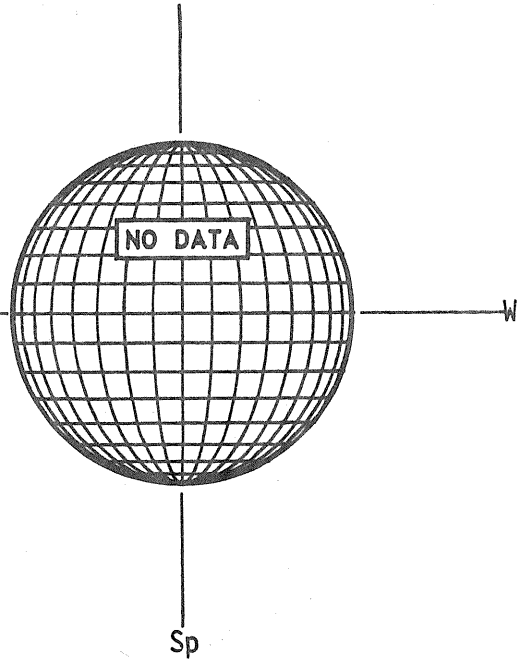
BOULDER H-ALPHA



BOULDER SUNSPOTS



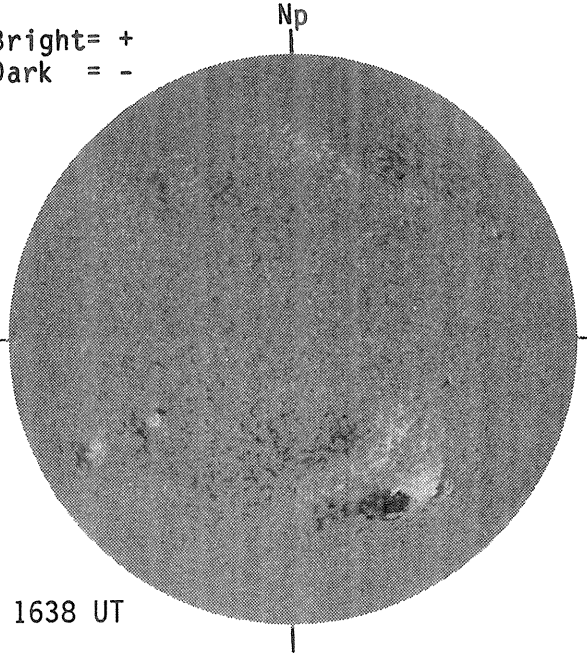
SACRAMENTO PEAK CORONA (1.15 Radii)



JANUARY 02, 1988 (P= 1.91, B_0=-3.07, L_0= 245.17)

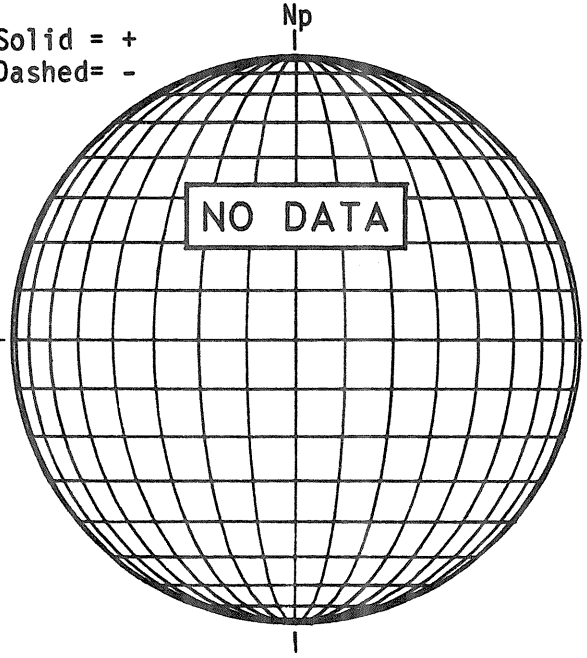
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



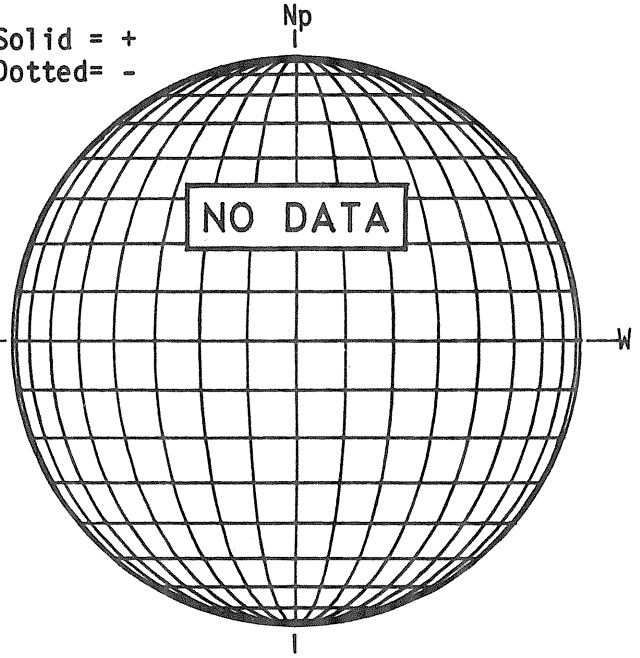
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

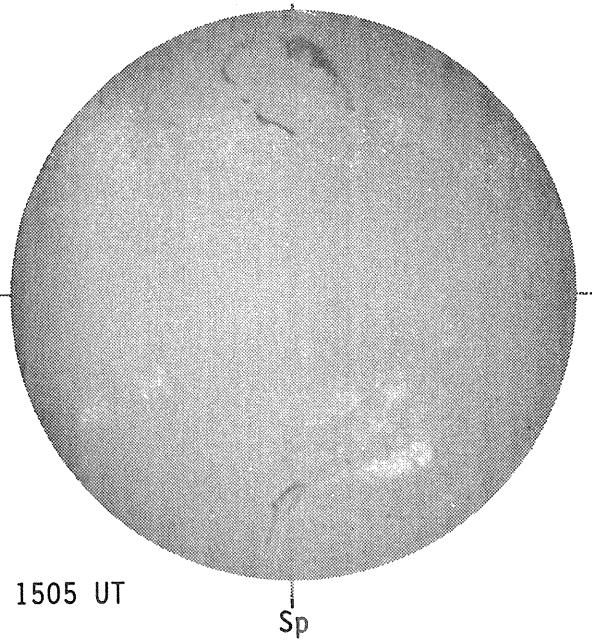


MT. WILSON MAGNETOGRAM

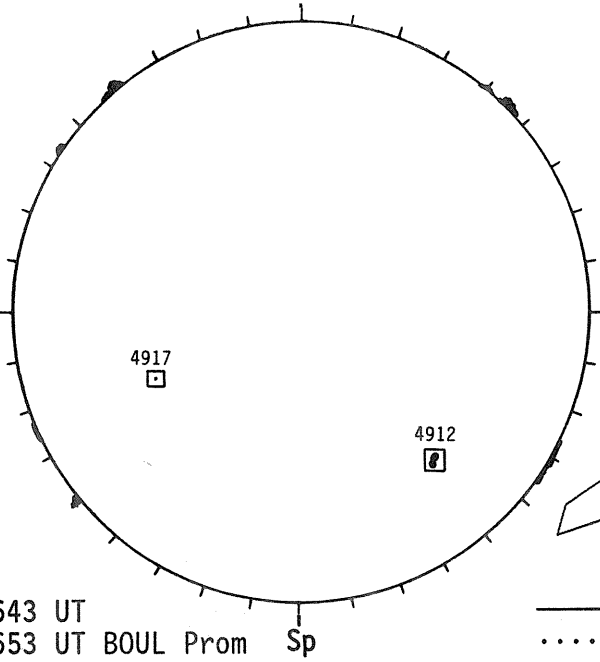
Solid = +
Dotted= -



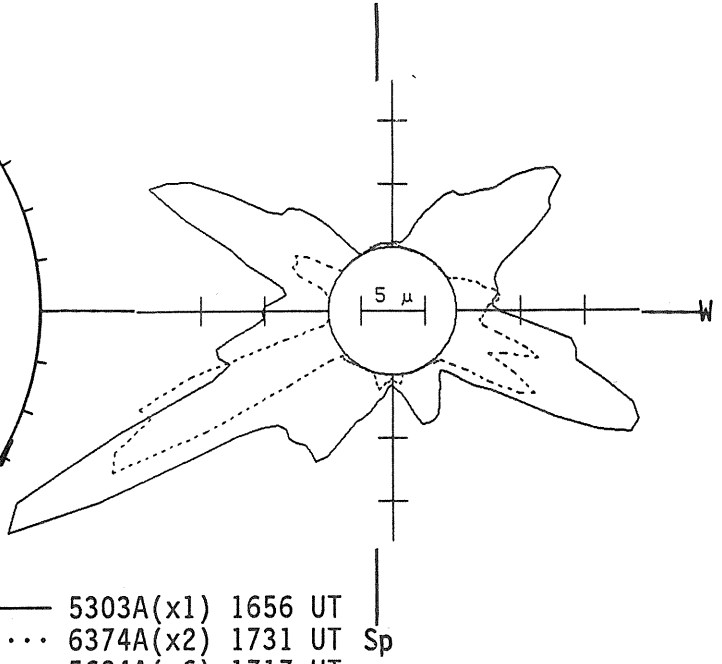
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

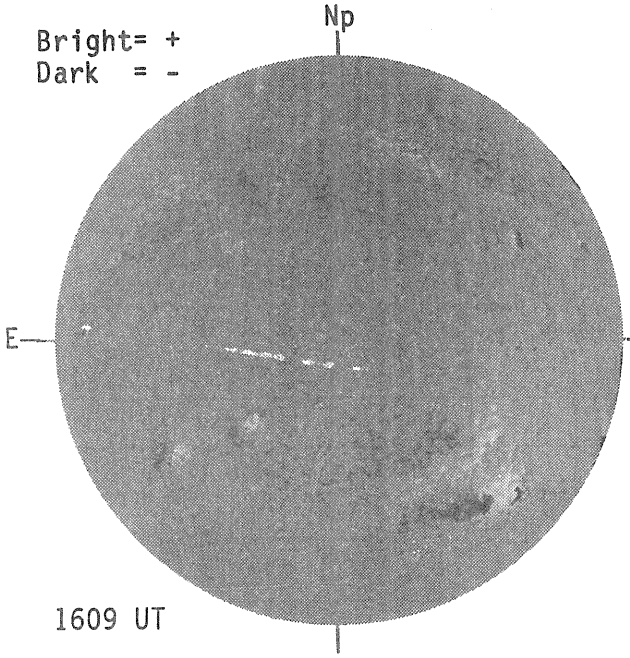


—— 5303A(x1) 1656 UT
···· 6374A(x2) 1731 UT
xxxx 5694A(x6) 1717 UT
NO 5694A ACTIVITY TODAY

JANUARY 03, 1988 (P= 1.42, B_o=-3.19, L_o= 232.00)

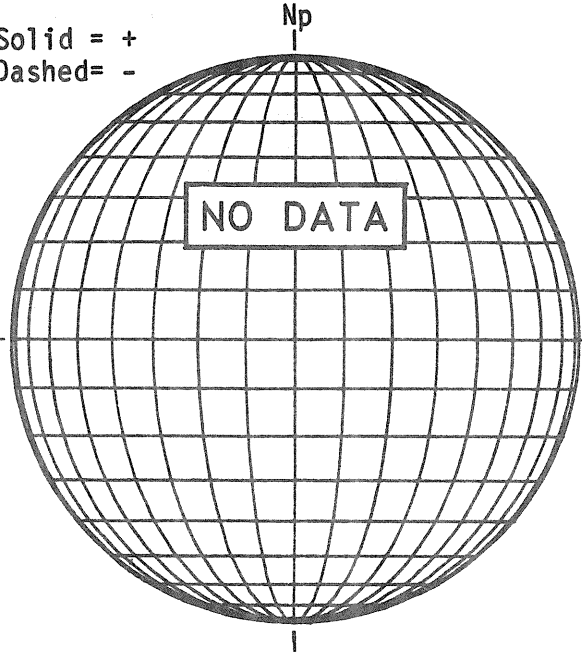
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



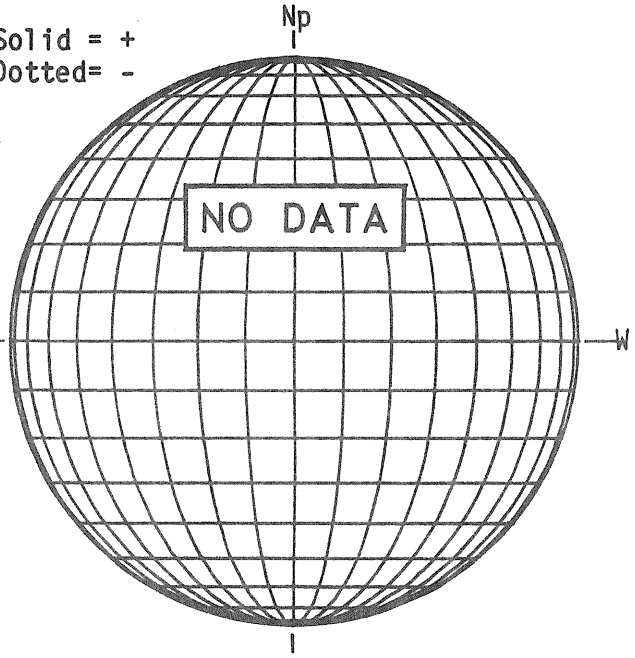
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

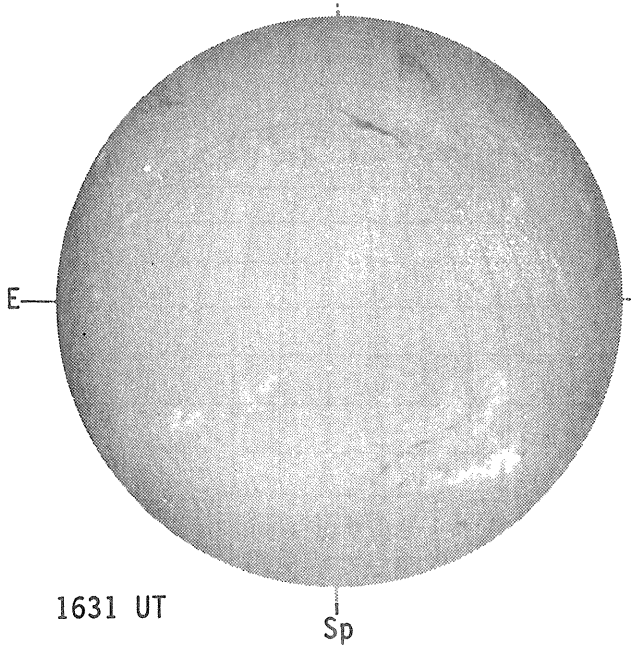


MT. WILSON MAGNETOGRAM

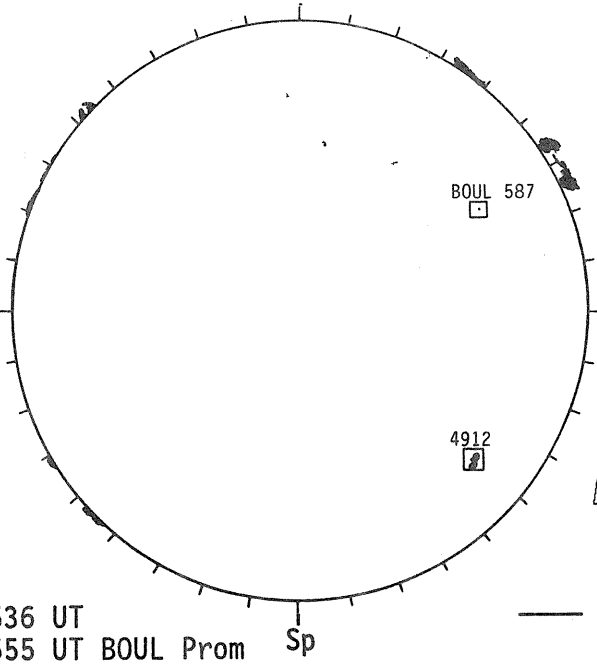
Solid = +
Dotted= -



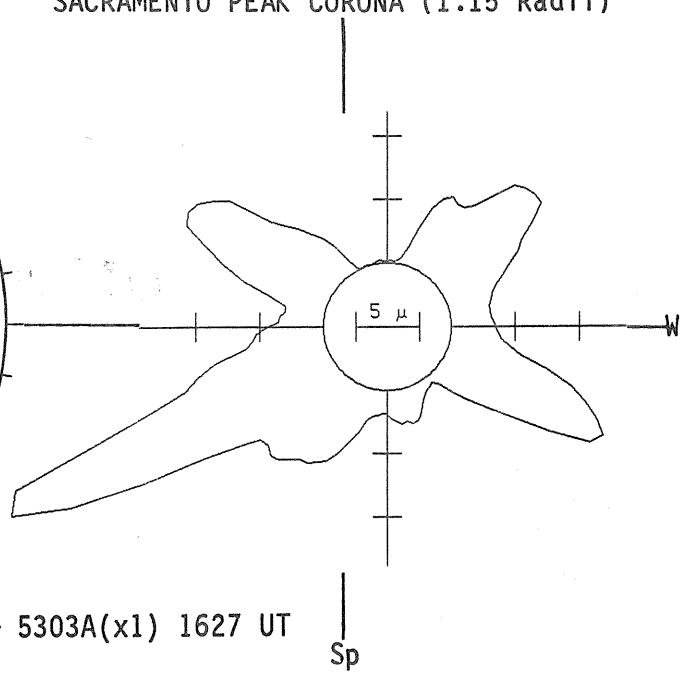
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



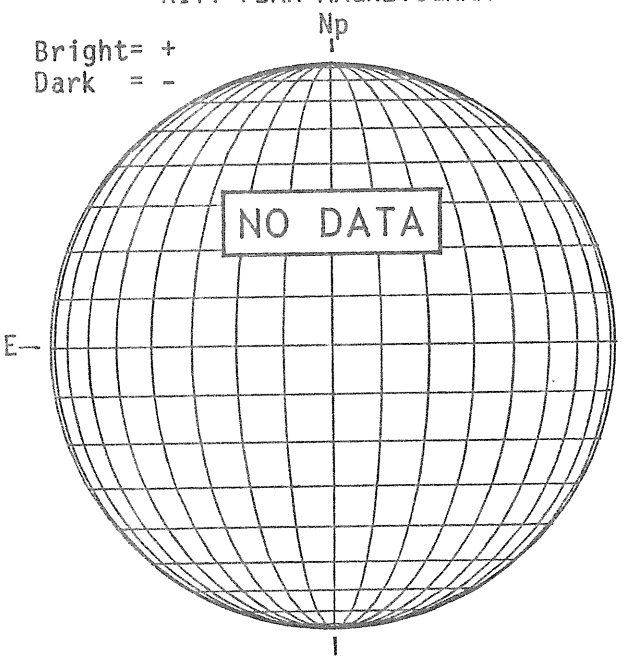
SACRAMENTO PEAK CORONA (1.15 Radii)



JANUARY 04, 1988 (P= 0.94, B_o=-3.30, L_o=218.83)

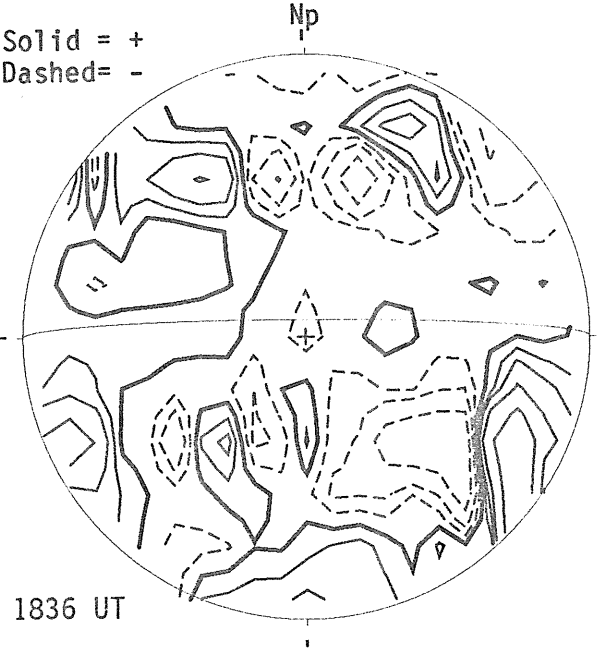
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



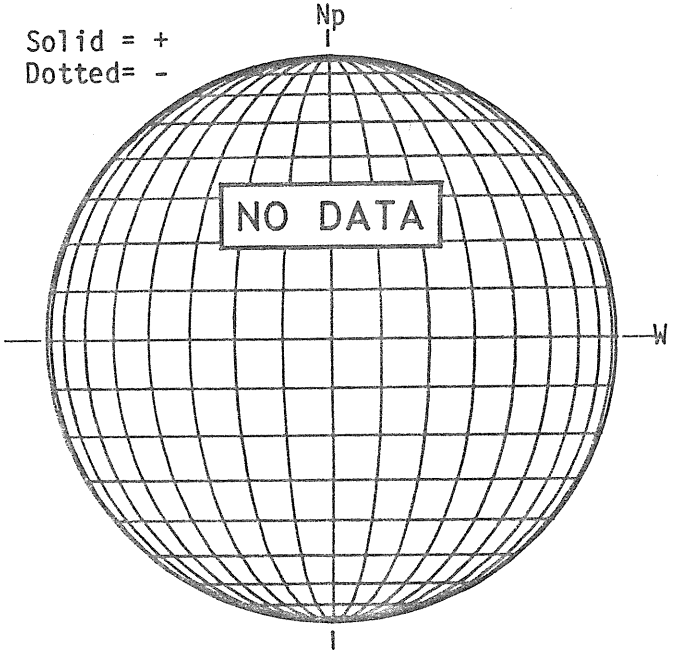
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

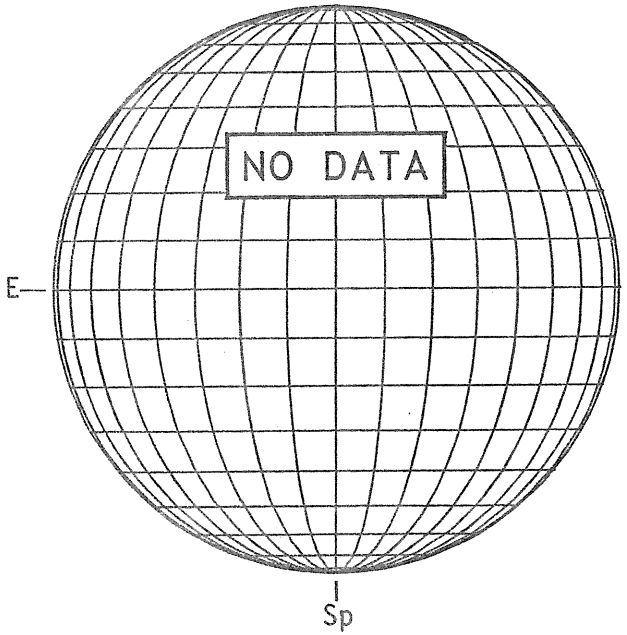


MT. WILSON MAGNETOGRAM

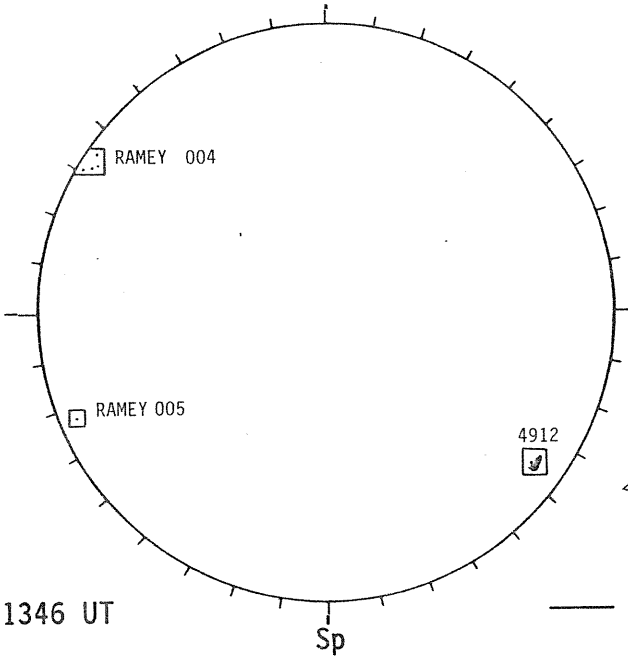
Solid = +
Dotted= -



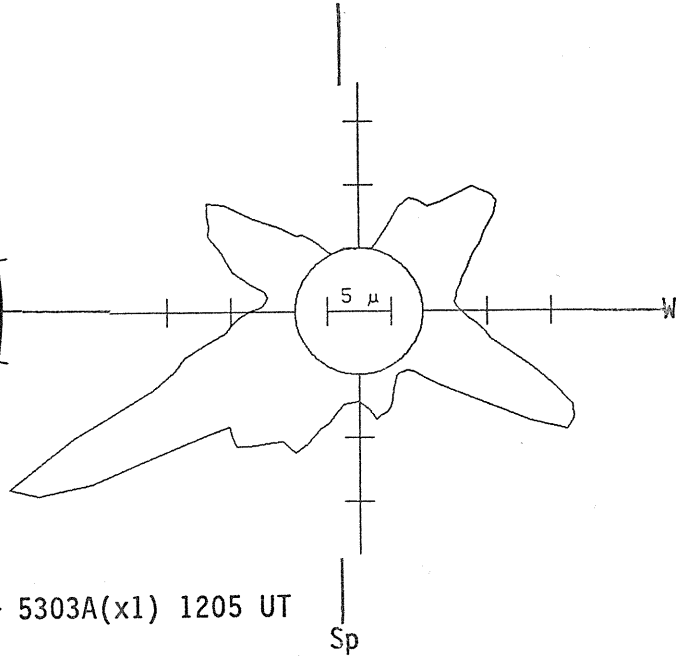
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

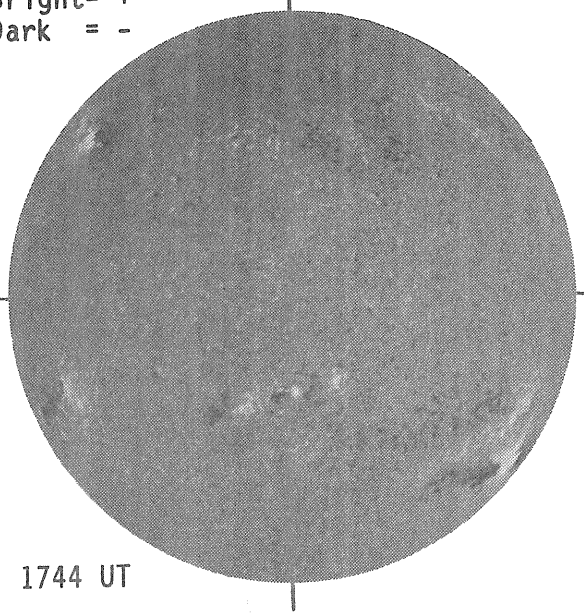


—— 5303A(x1) 1205 UT

JANUARY 05, 1988 (P= 0.45, B_0=-3.42, L_0=205.66)

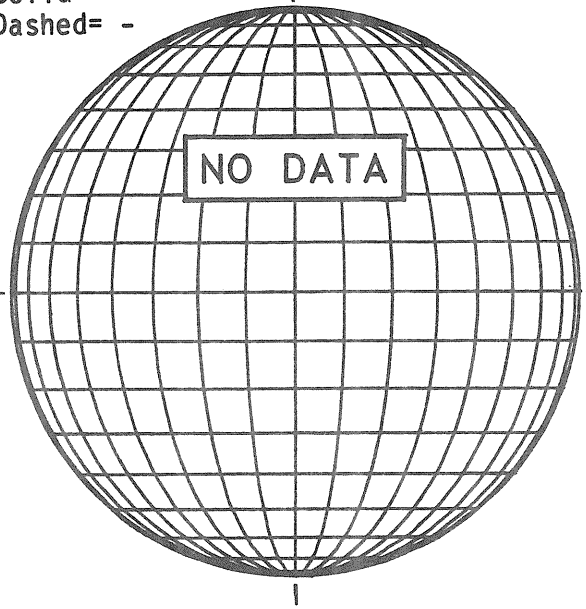
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

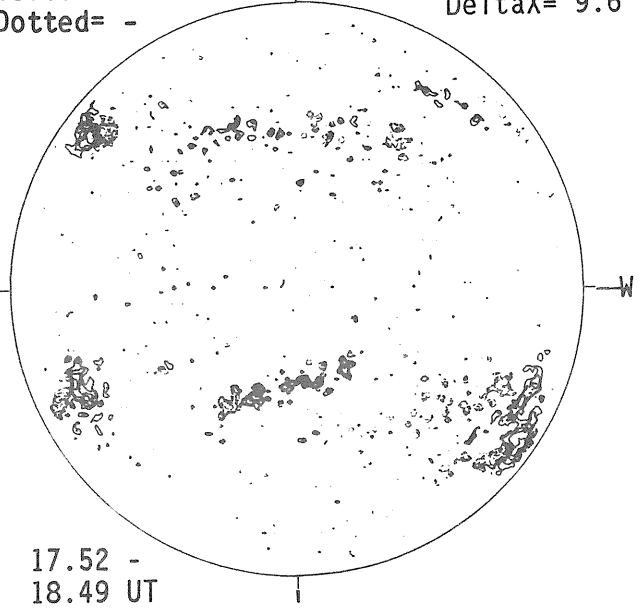
Solid = +
Dashed= -



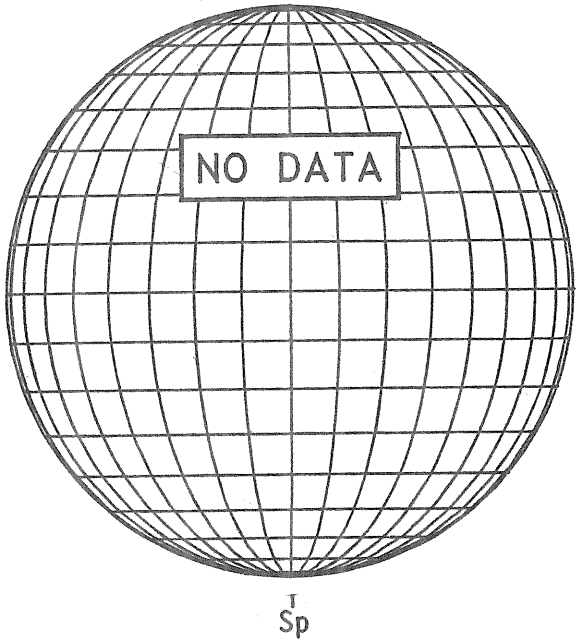
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

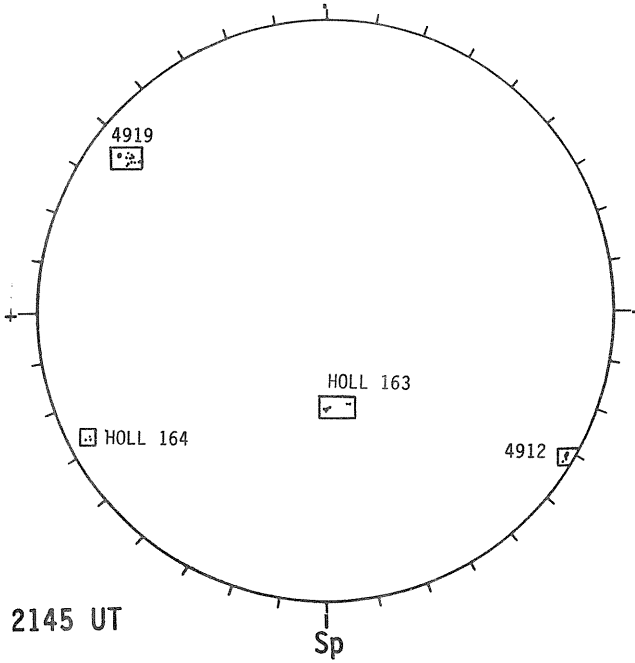
DeltaY=13.1
DeltaX= 9.6



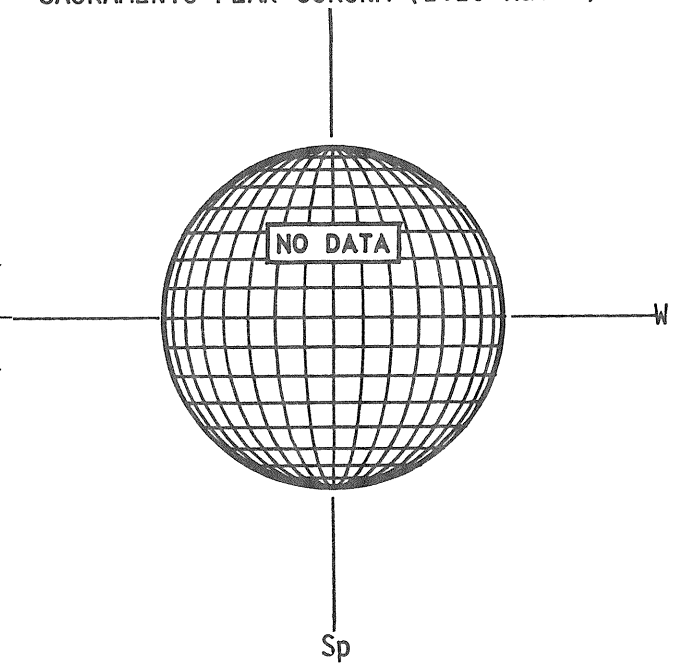
SACRAMENTO PEAK H-ALPHA



HOLLOMAN SUNSPOTS



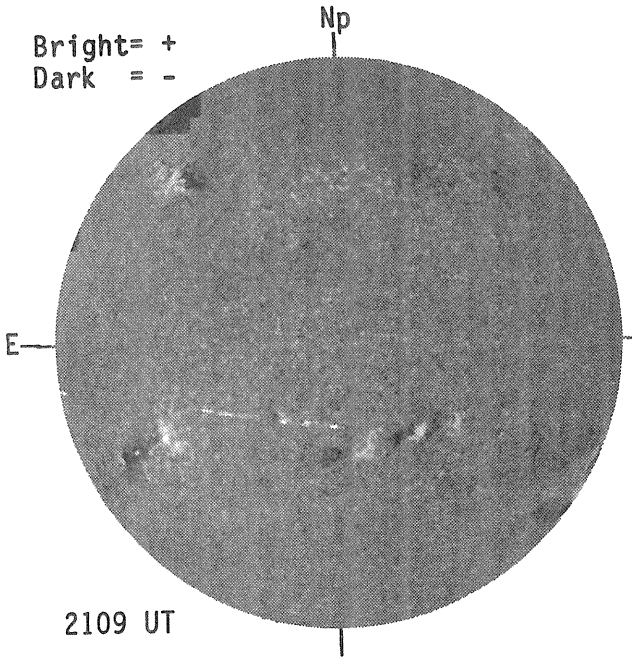
SACRAMENTO PEAK CORONA (1.15 Radii)



JANUARY 06, 1988 (P=- 0.03, B_o=-3.53, L_o= 192.49)

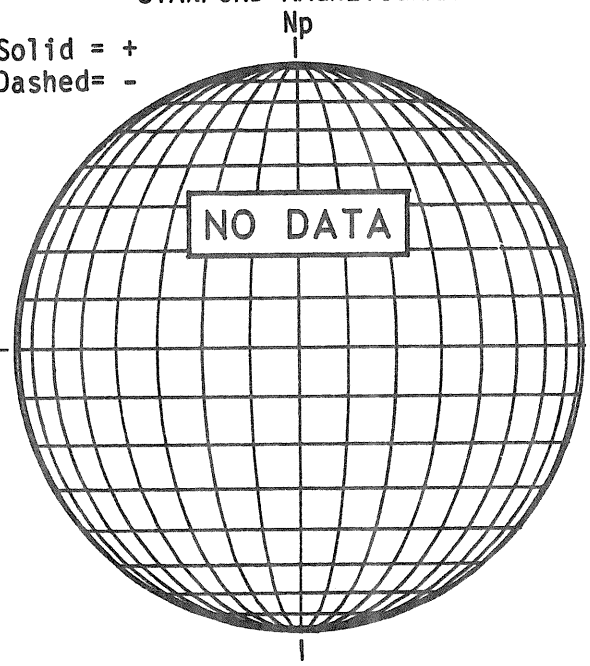
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



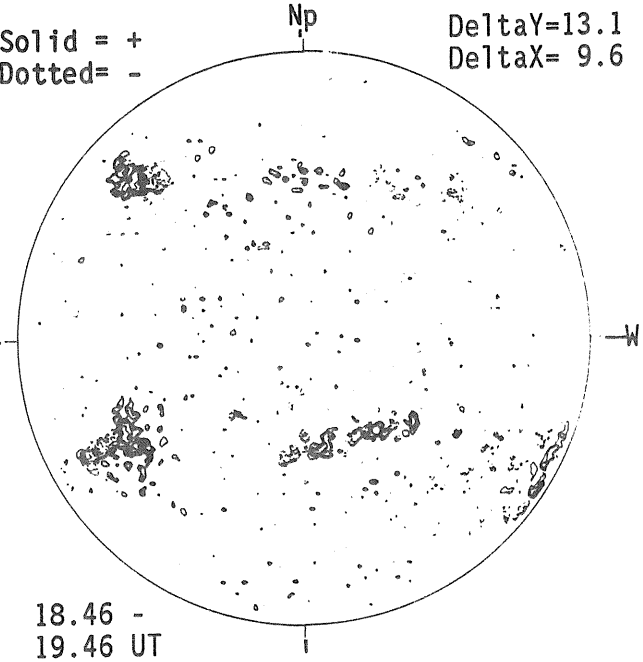
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

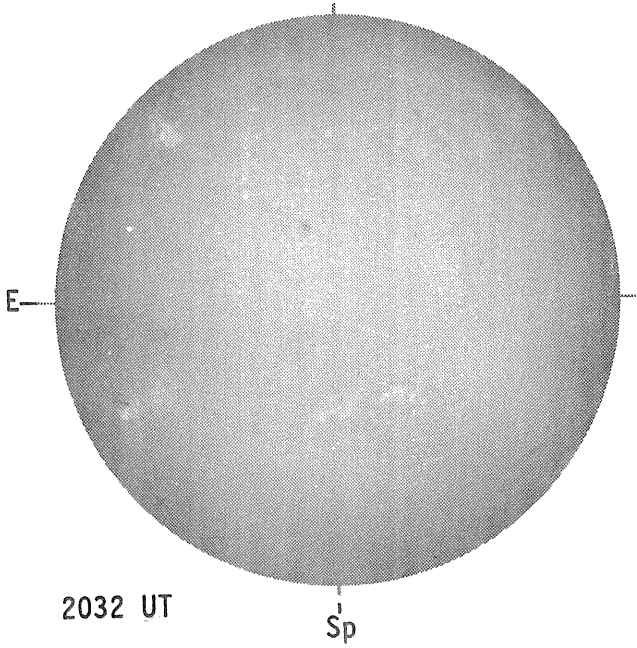


MT. WILSON MAGNETOGRAM

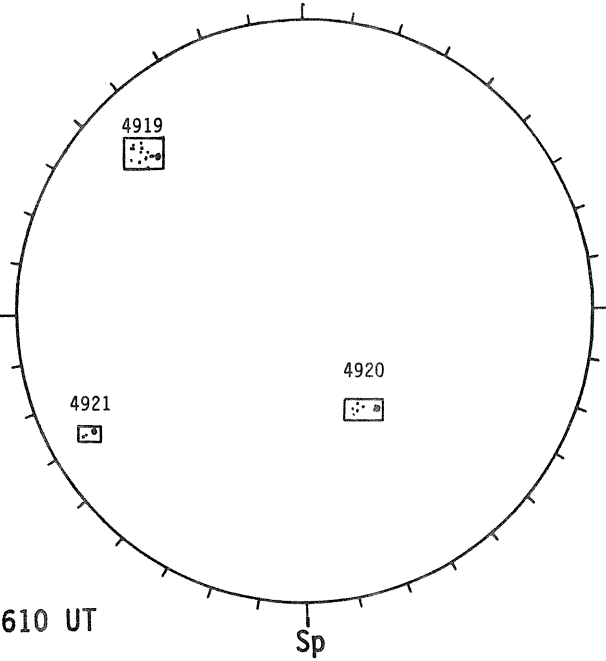
Solid = +
Dotted= -
DeltaY=13.1
DeltaX= 9.6



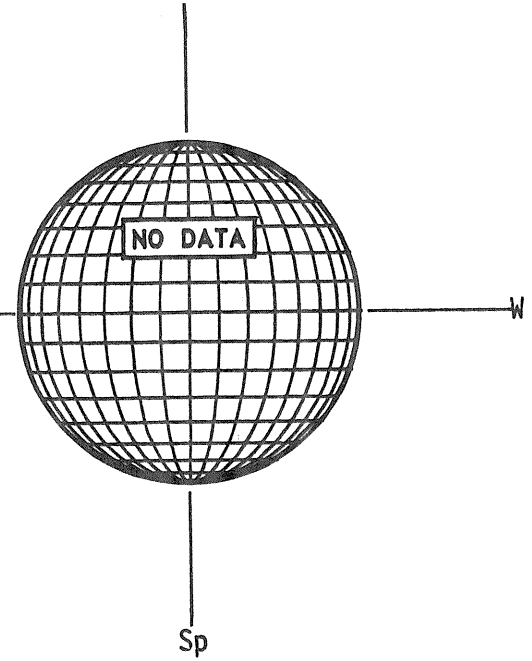
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



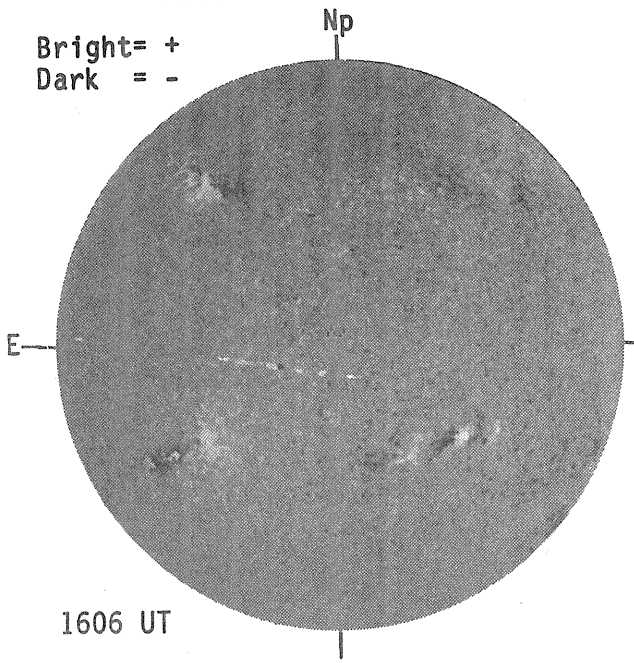
SACRAMENTO PEAK CORONA (1.15 Radii)



JANUARY 07, 1988 (P=- 0.52, B_o=-3.64, L_o= 179.32)

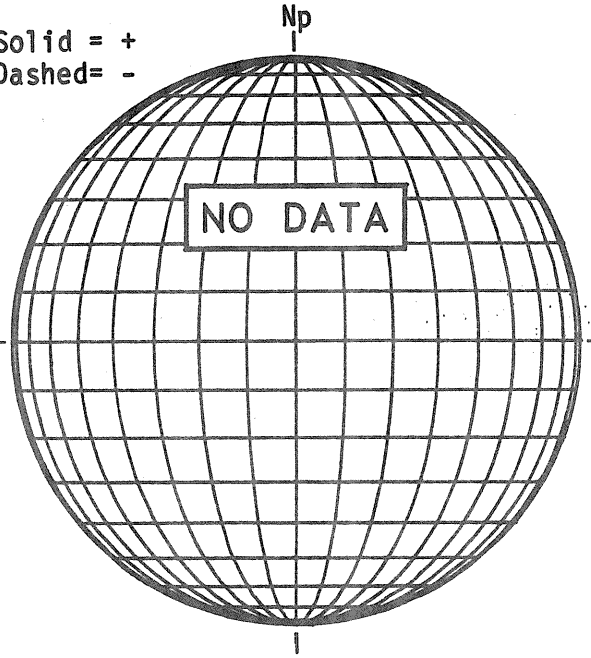
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

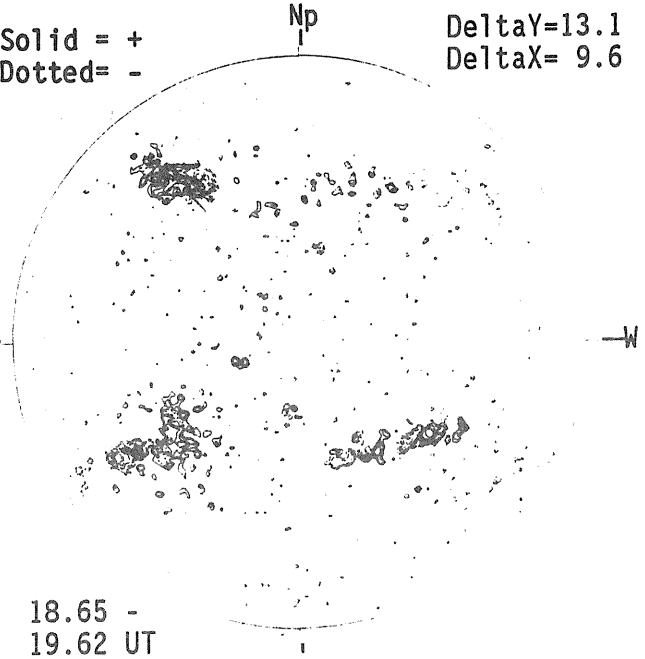
Solid = +
Dashed= -



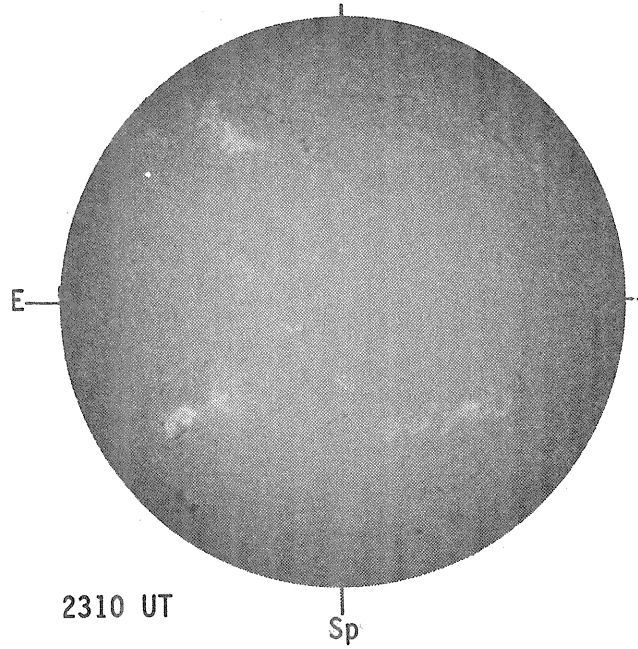
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

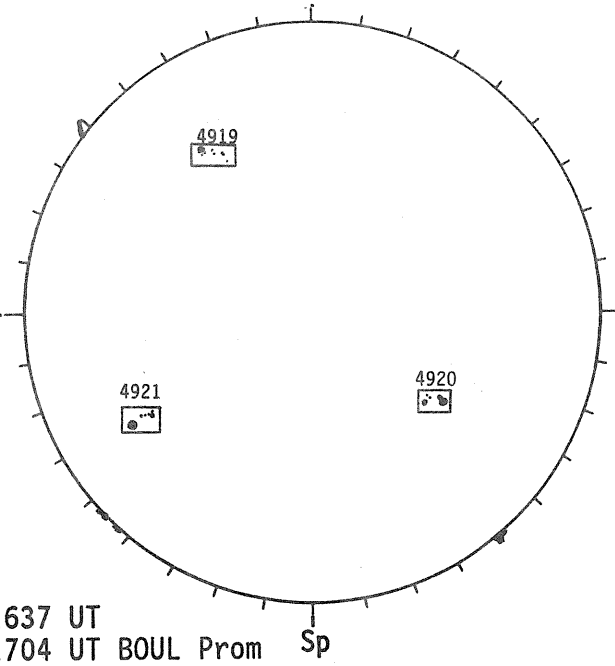
DeltaY=13.1
DeltaX= 9.6



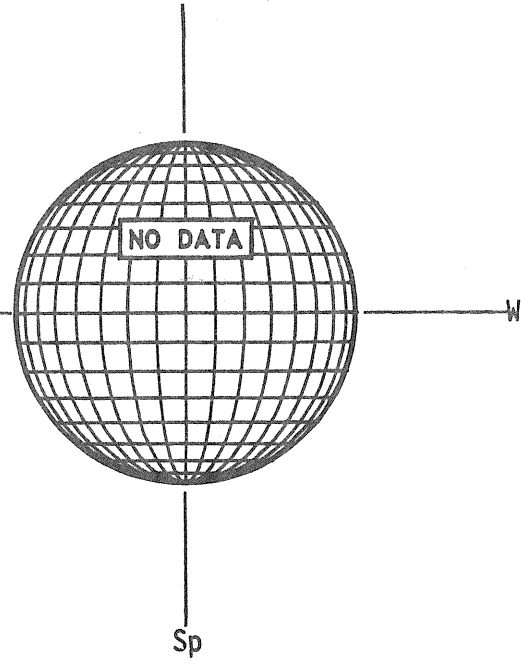
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS

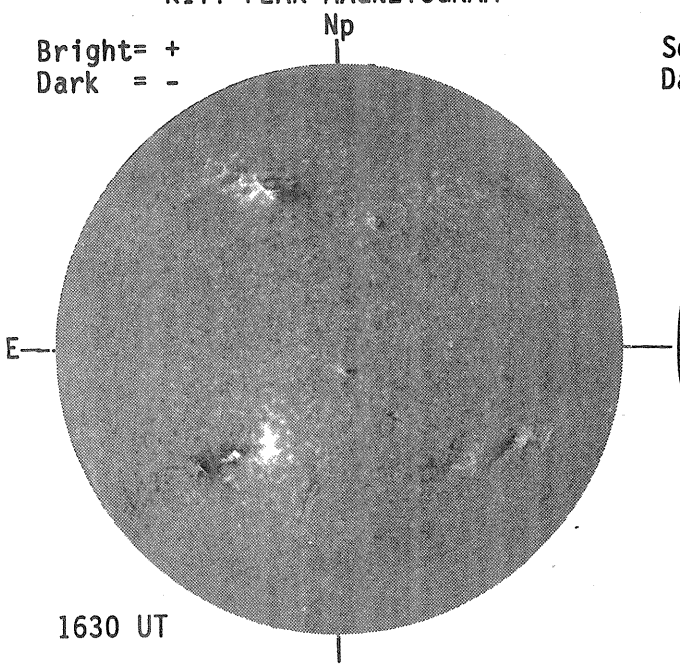


SACRAMENTO PEAK CORONA (1.15 Radii)

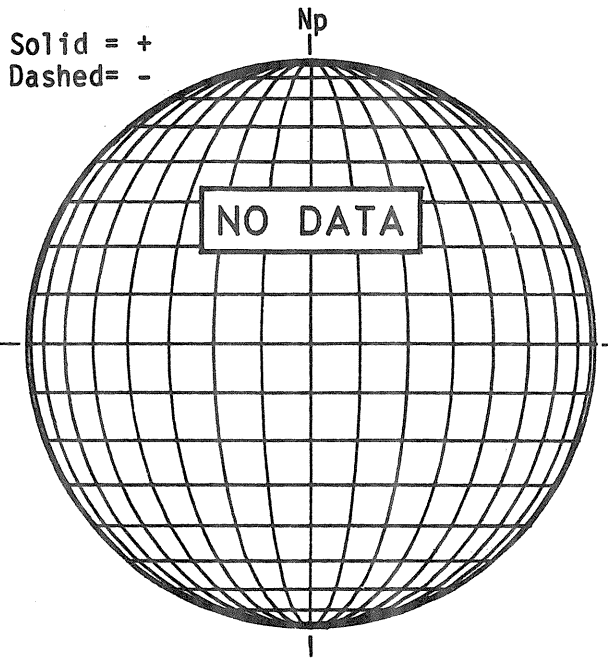


JANUARY 08, 1988 (P=- 1.00, B_o=-3.75, L_o= 166.15)

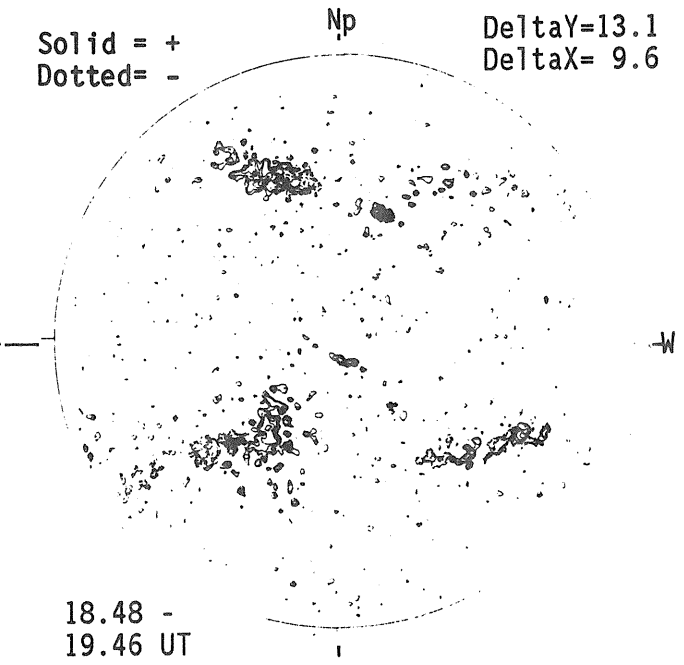
KITT PEAK MAGNETOGRAM



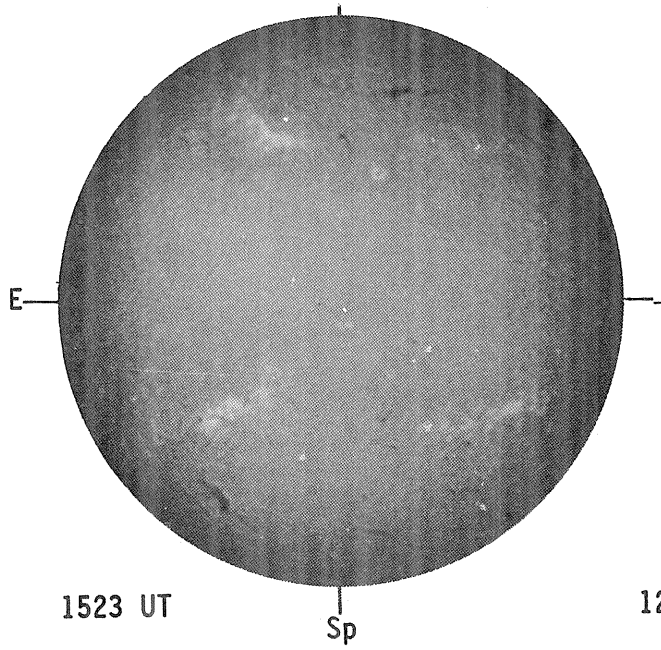
STANFORD MAGNETOGRAM



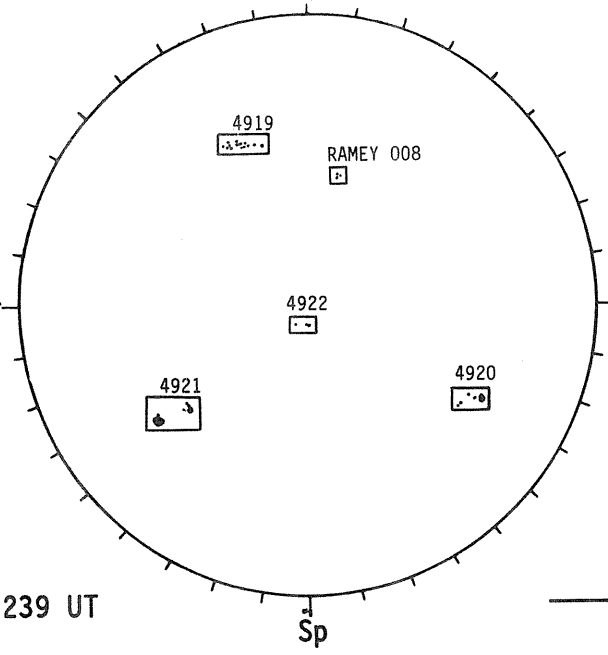
MT. WILSON MAGNETOGRAM



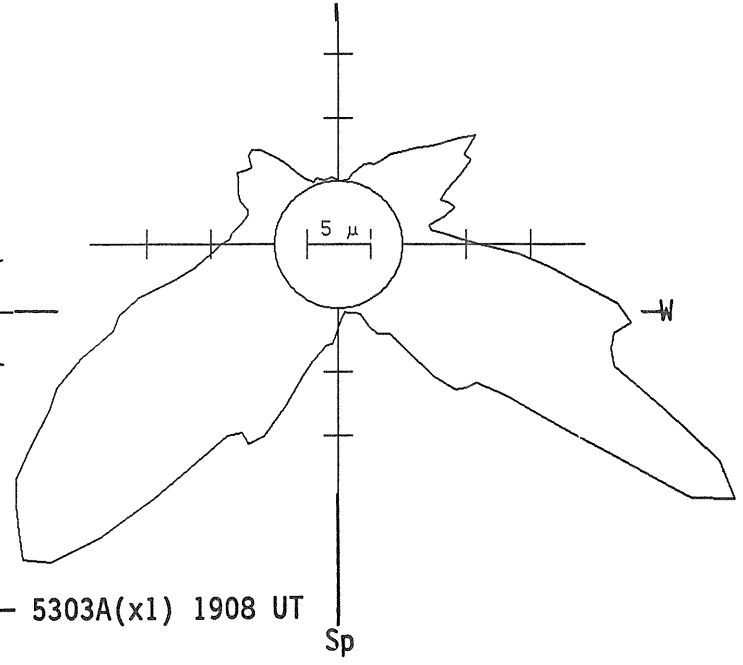
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



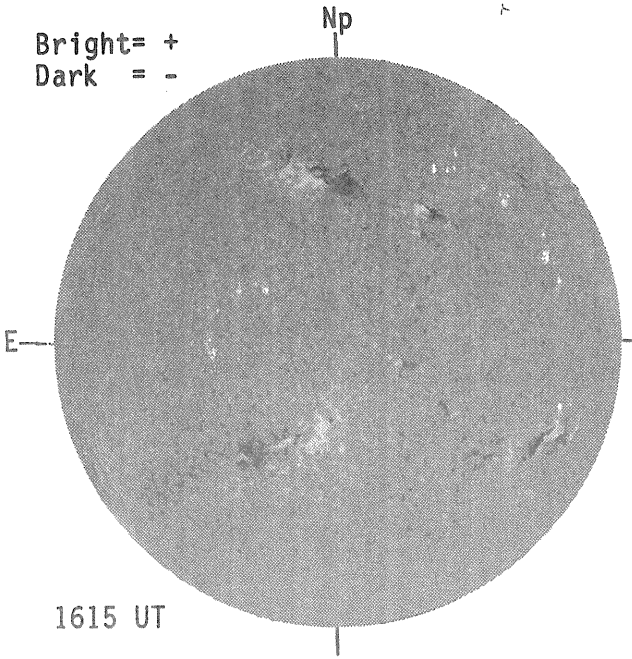
SACRAMENTO PEAK CORONA (1.15 Radii)



JANUARY 09, 1988 (P=- 1.48, B_o=-3.86, L_o= 152.98)

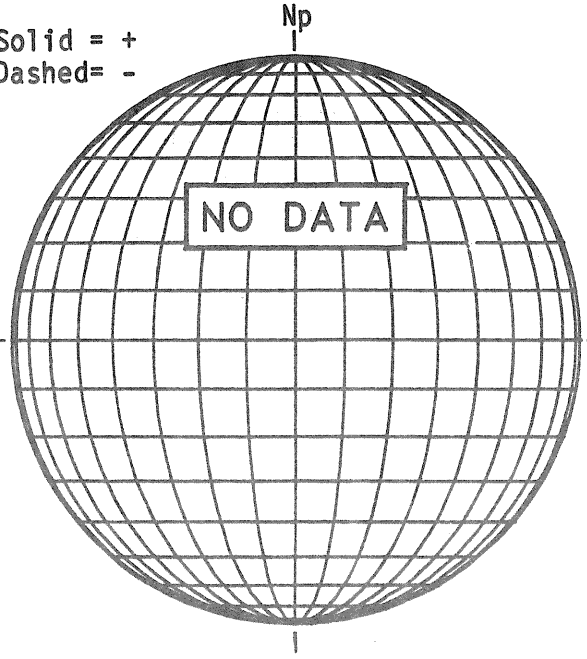
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



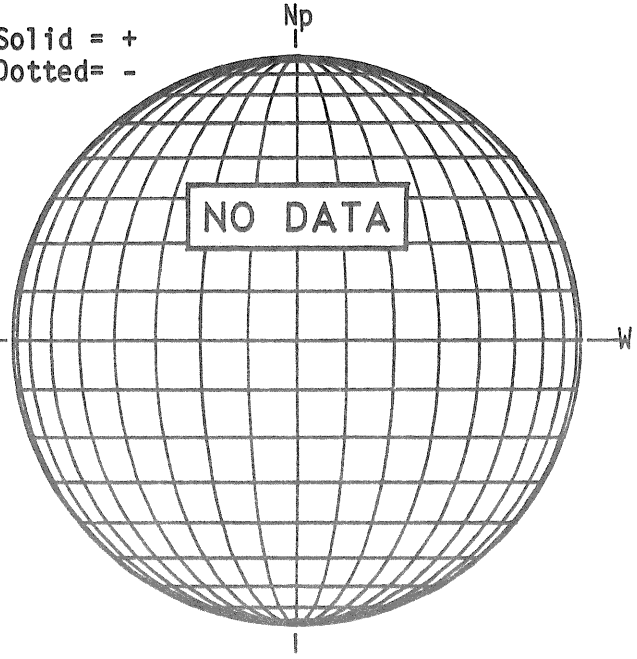
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

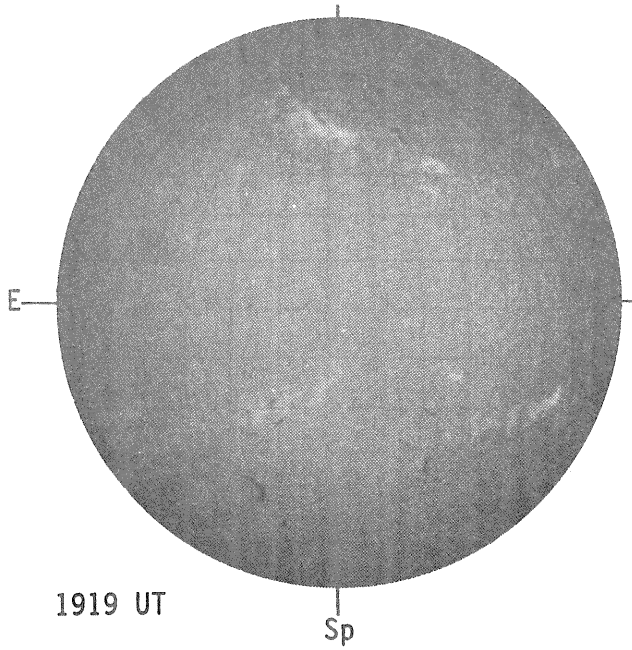


MT. WILSON MAGNETOGRAM

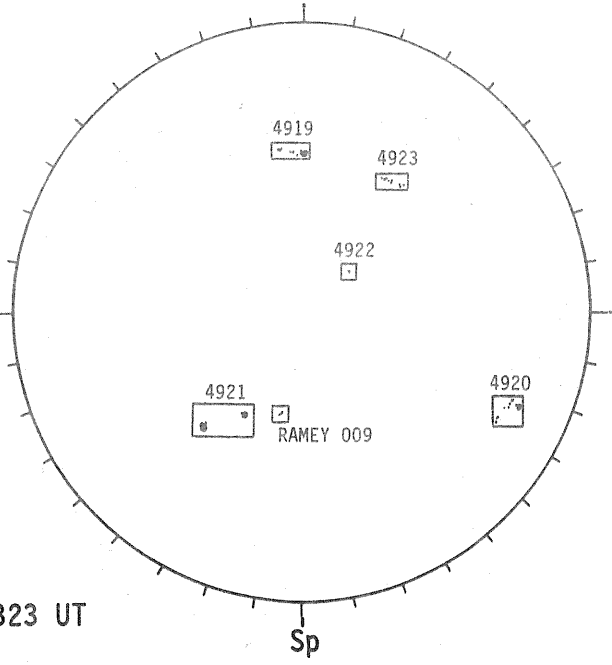
Solid = +
Dotted= -



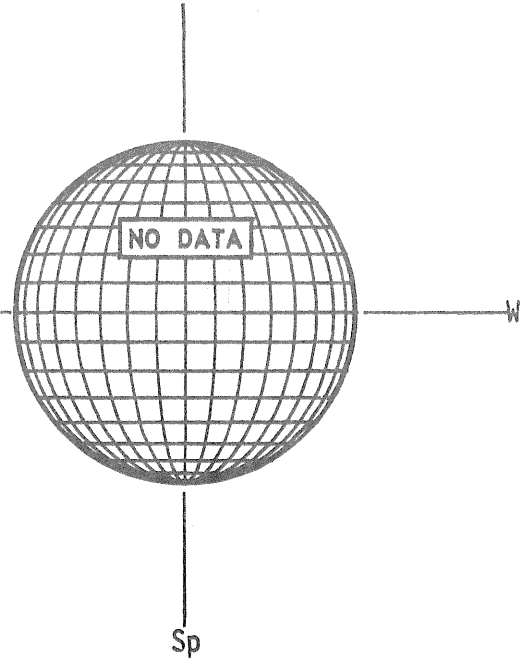
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



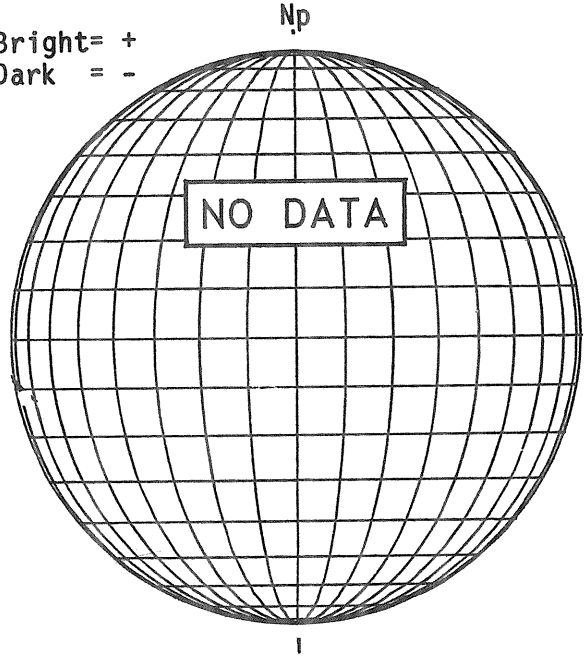
SACRAMENTO PEAK CORONA (1.15 Radii)



JANUARY 10, 1988 (P=- 1.96, B_o=-3.97, L_o= 139.81)

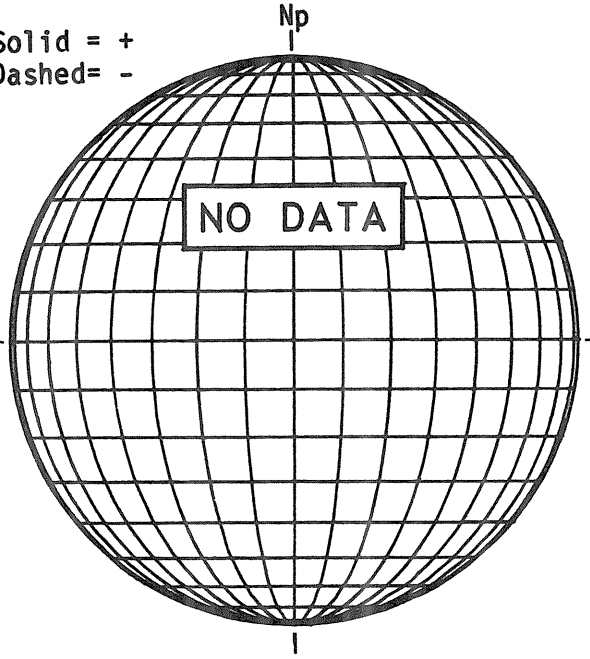
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

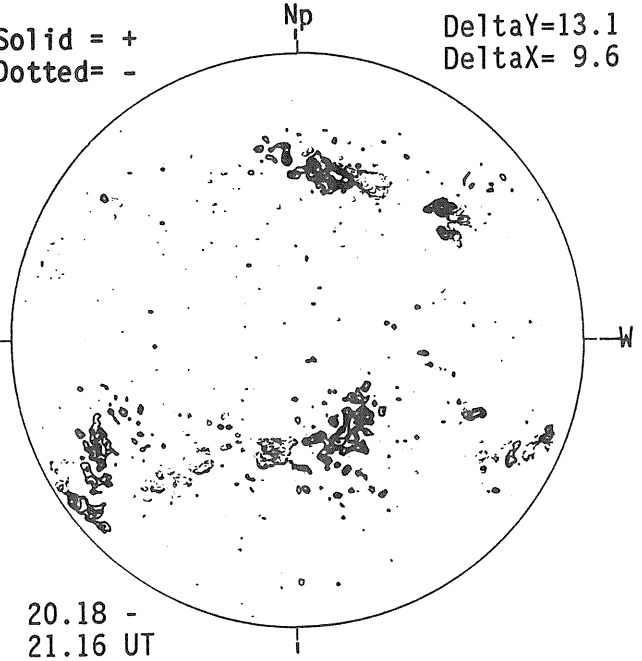
Solid = +
Dashed= -



MT. WILSON MAGNETOGRAM

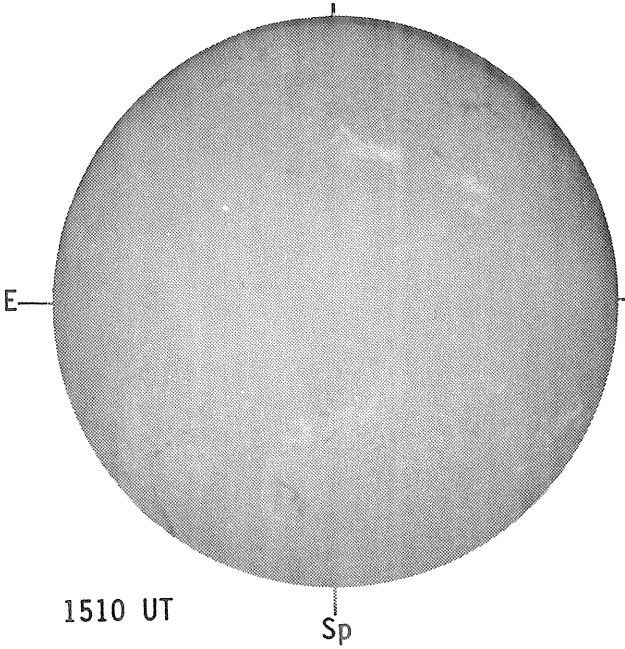
Solid = +
Dotted= -

DeltaY=13.1
DeltaX= 9.6



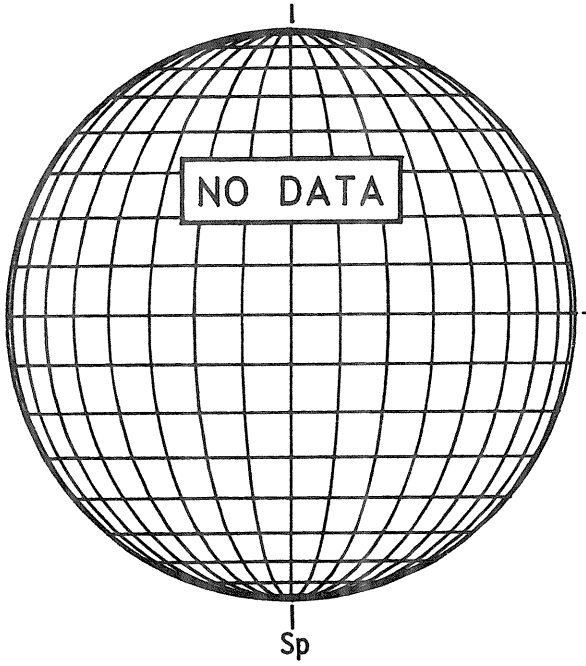
20.18 -
21.16 UT

SACRAMENTO PEAK H-ALPHA

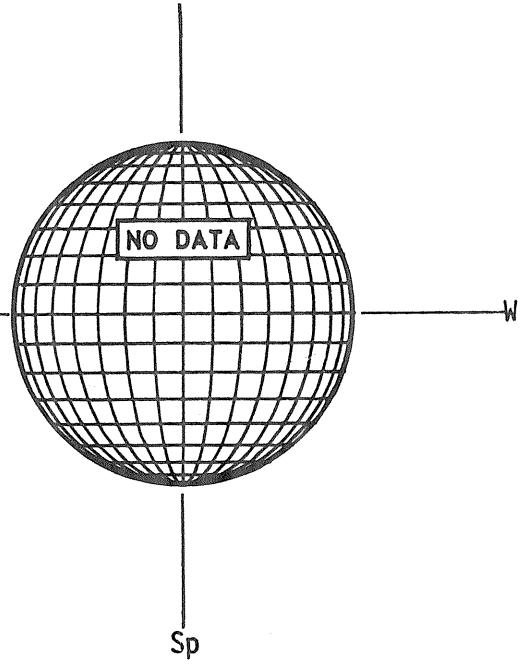


1510 UT

BOULDER SUNSPOTS



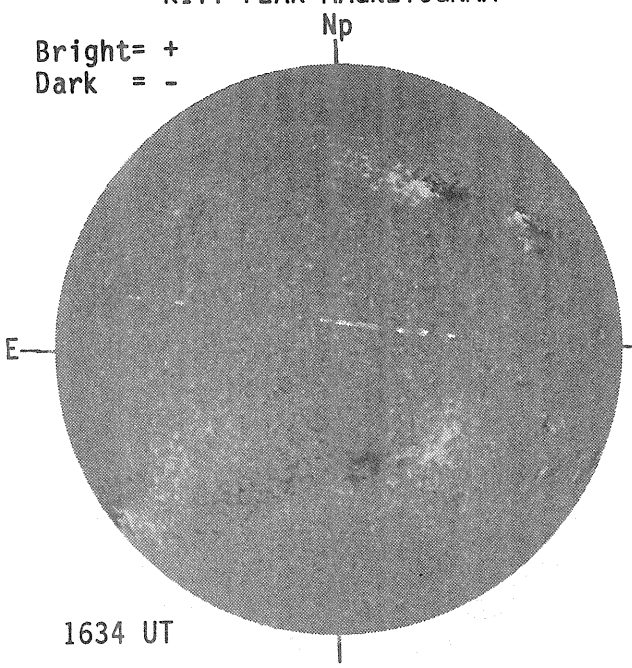
SACRAMENTO PEAK CORONA (1.15 Radii)



JANUARY 11, 1988 (P=- 2.44, B_o=-4.07, L_o= 126.64)

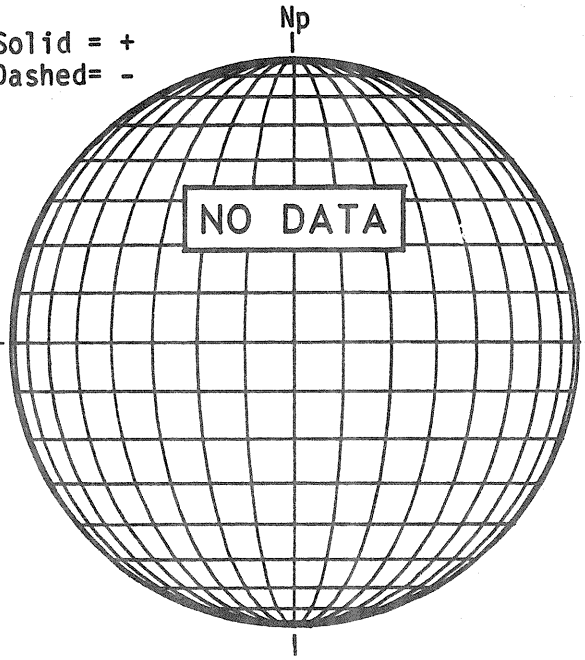
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



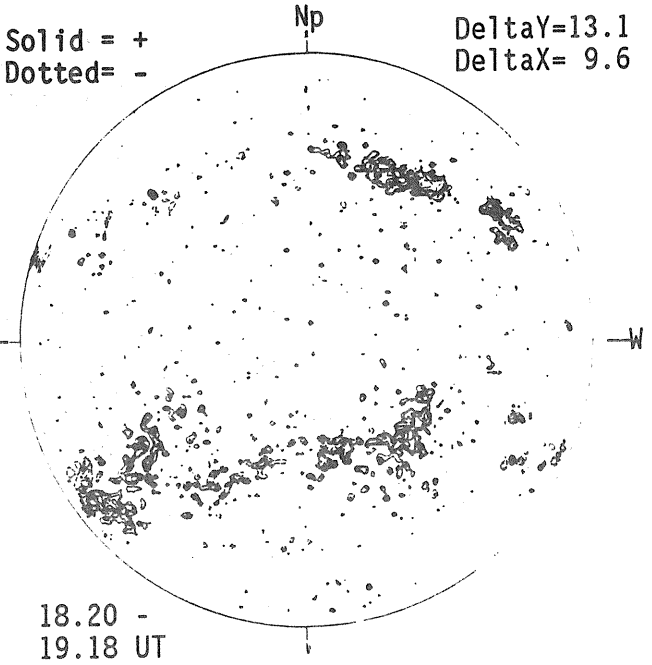
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

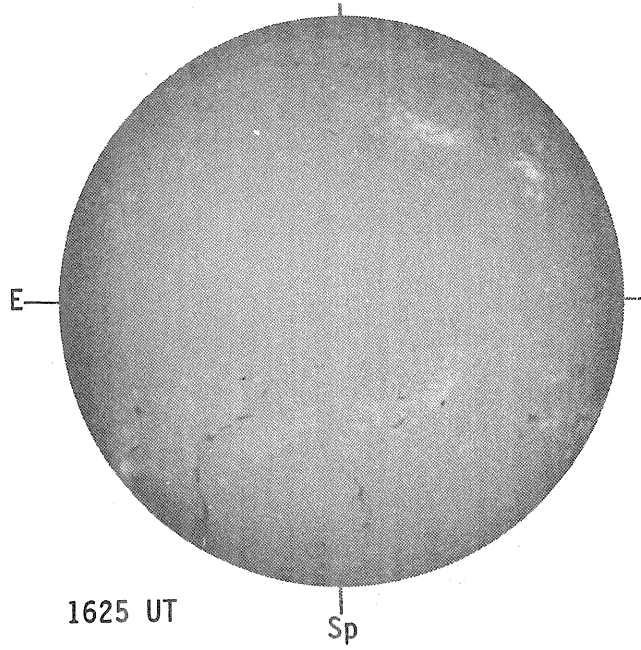


MT. WILSON MAGNETOGRAM

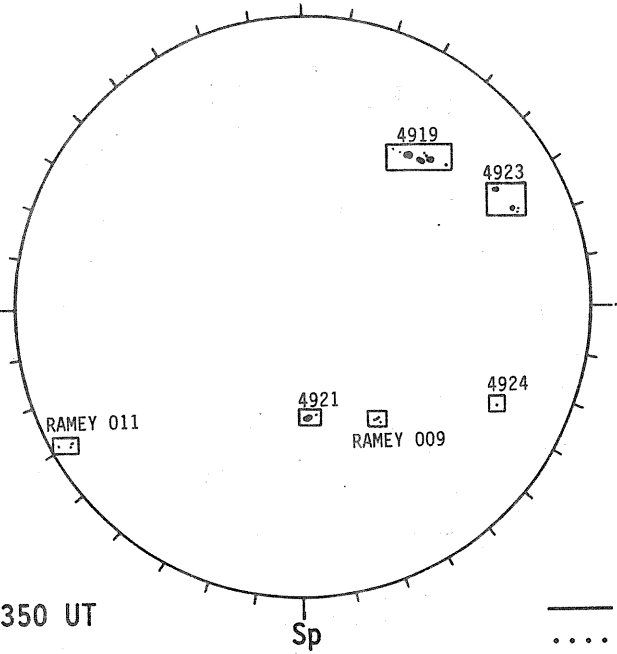
Solid = +
Dotted= -



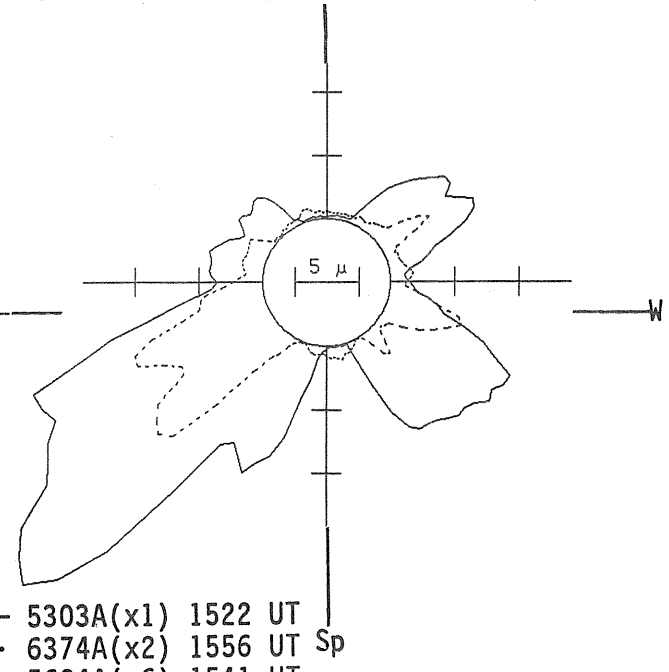
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)



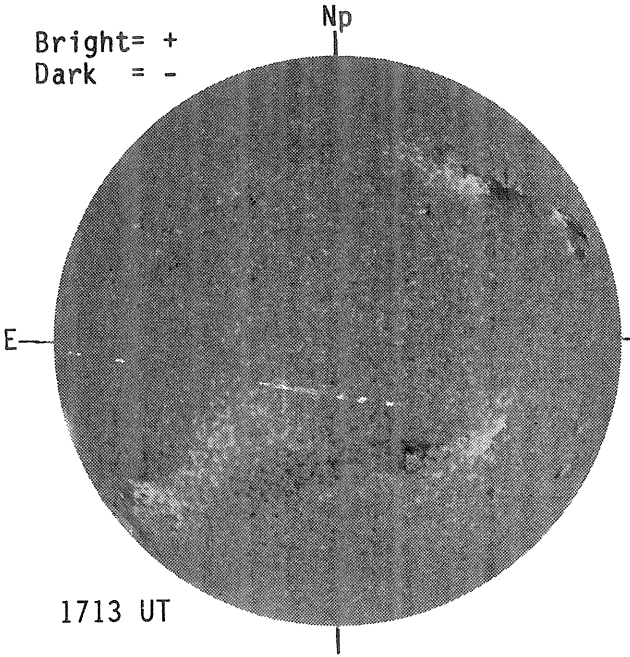
—— 5303A(x1) 1522 UT
···· 6374A(x2) 1556 UT
xxxx 5694A(x6) 1541 UT
NO 5694A ACTIVITY TODAY

JANUARY 12, 1988 (P=- 2.92, B_o=-4.18, L_o= 113.48)

45
Jan 88

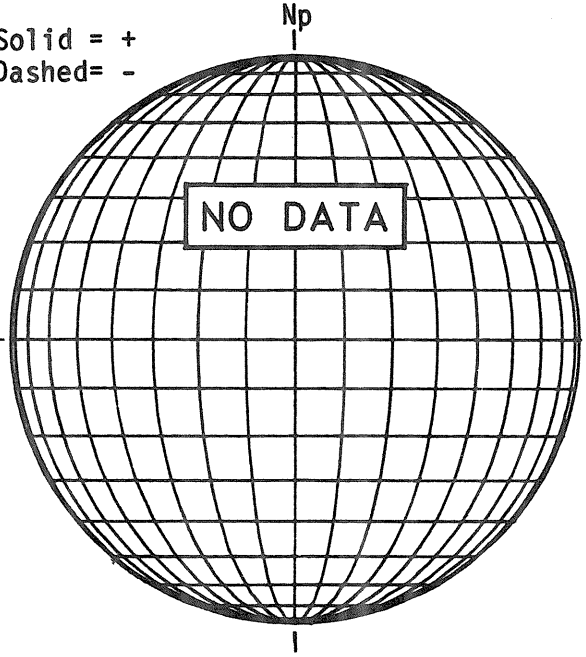
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

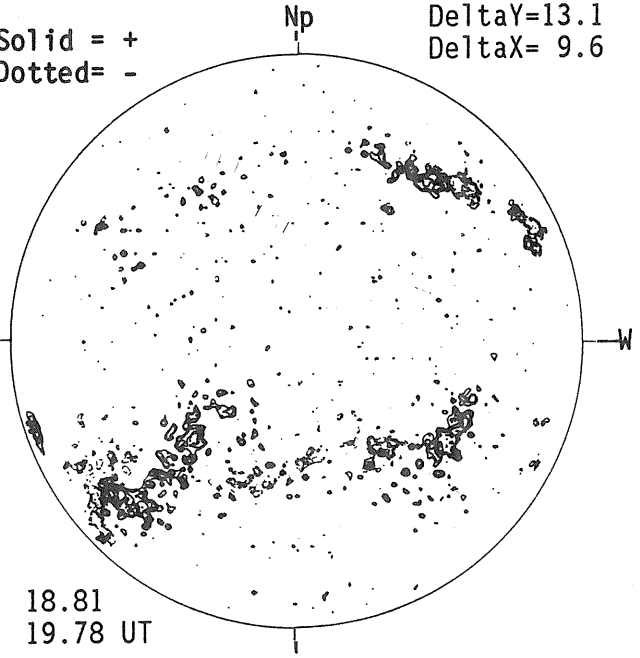
Solid = +
Dashed= -



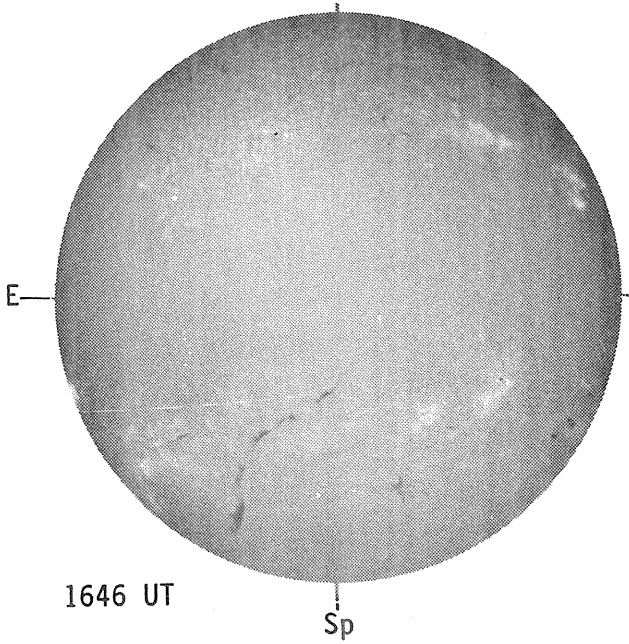
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

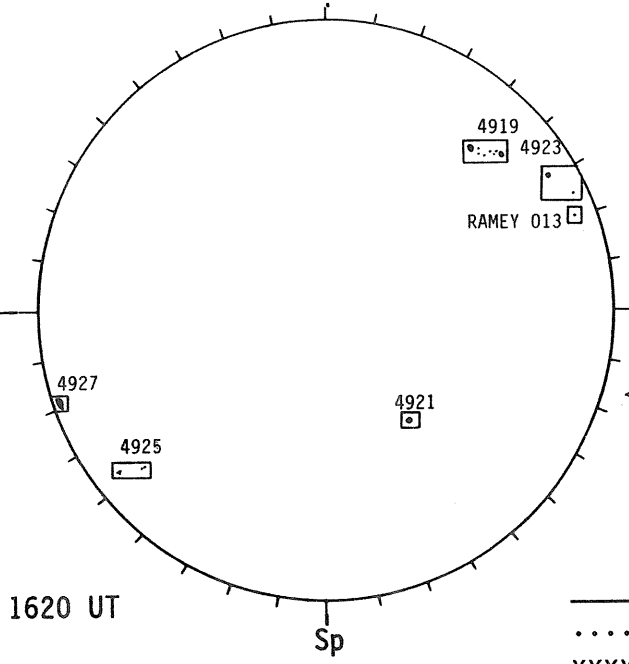
DeltaY=13.1
DeltaX= 9.6



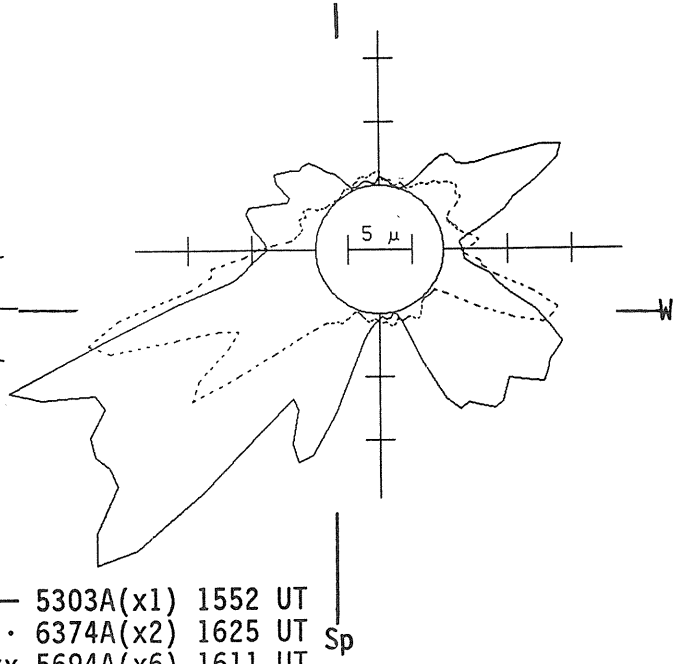
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

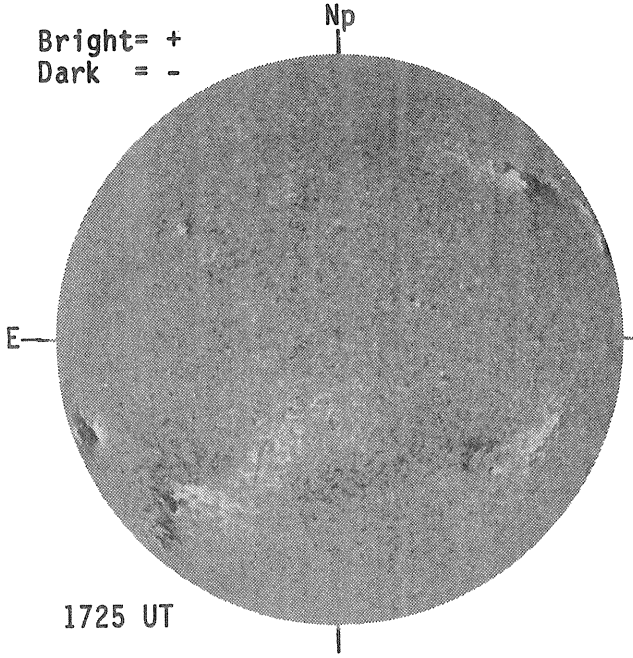


—— 5303A(x1) 1552 UT
···· 6374A(x2) 1625 UT
xxxx 5694A(x6) 1611 UT
NO 5694A ACTIVITY TODAY

JANUARY 13, 1988 (P=- 3.39, B_0=-4.28, L_0= 100.31)

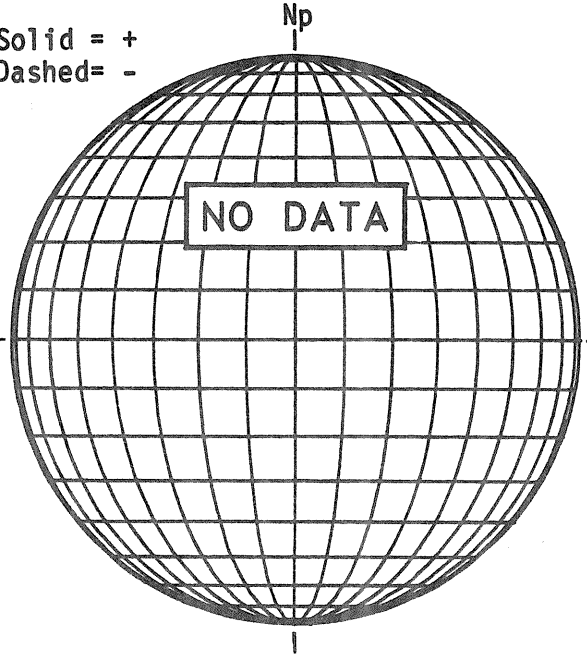
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



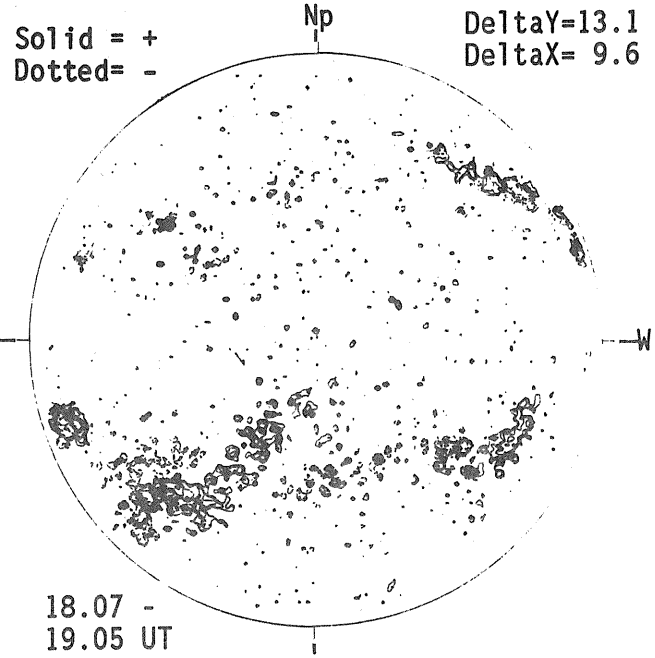
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

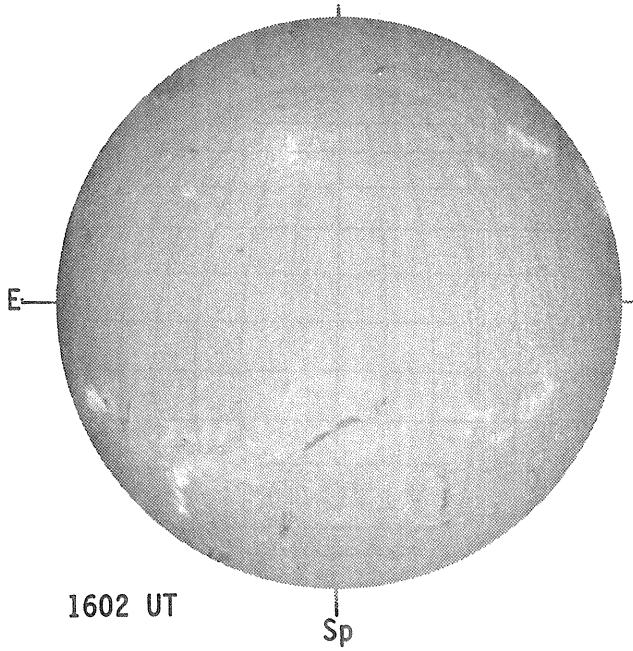


MT. WILSON MAGNETOGRAM

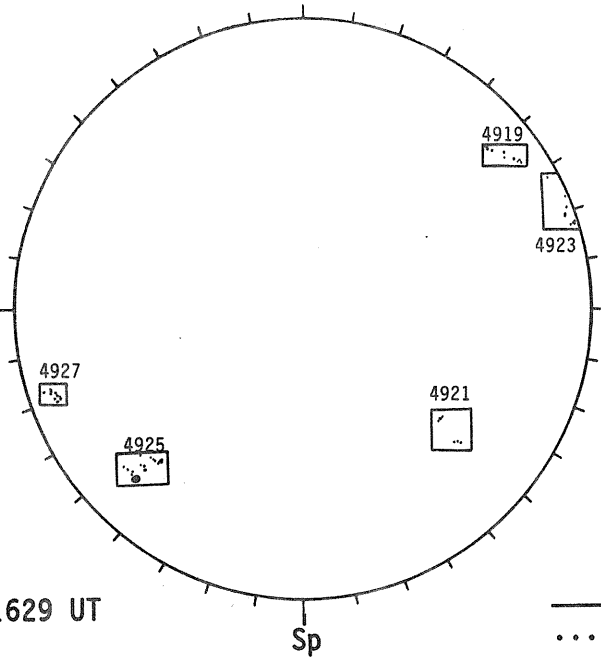
Solid = +
Dotted= -



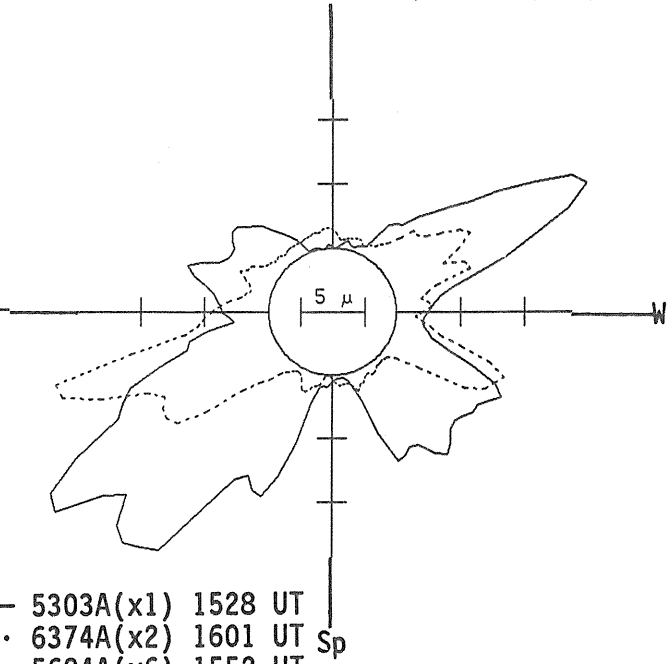
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

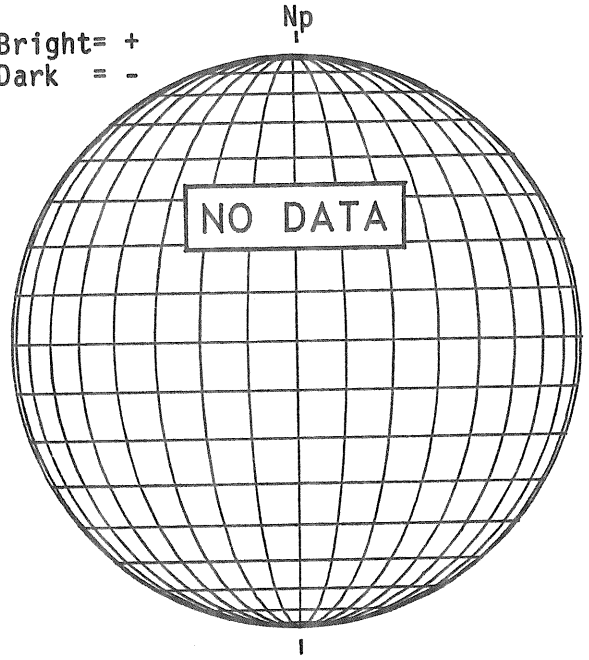


—— 5303A(x1) 1528 UT
···· 6374A(x2) 1601 UT
xxxx 5694A(x6) 1552 UT
NO 5694A ACTIVITY TODAY

JANUARY 14, 1988 (P=- 3.87, B_0=-4.39, L_0= 87.14)

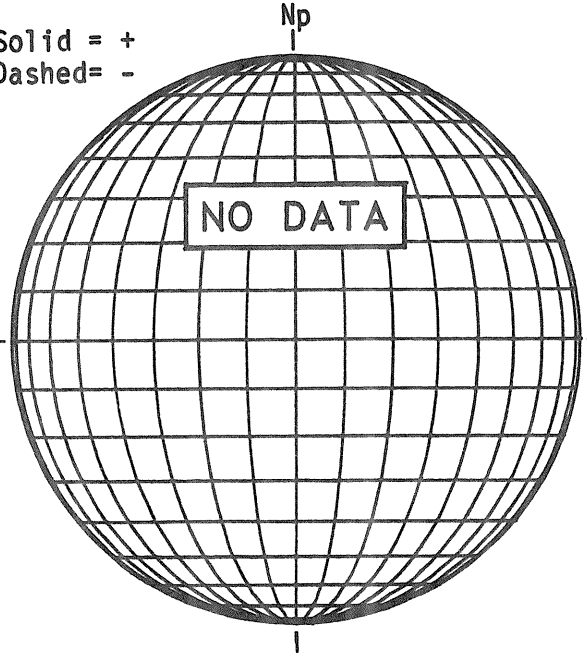
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



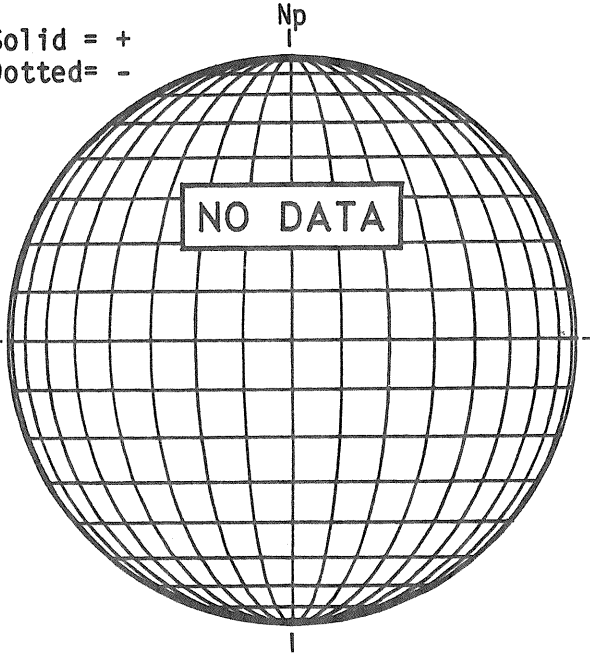
STANFORD MAGNETOGRAM

Solid = +
Dashed= -



MT. WILSON MAGNETOGRAM

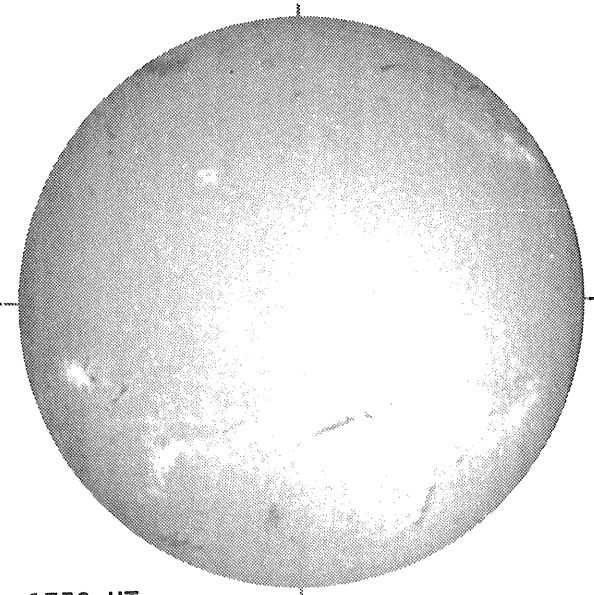
Solid = +
Dotted= -



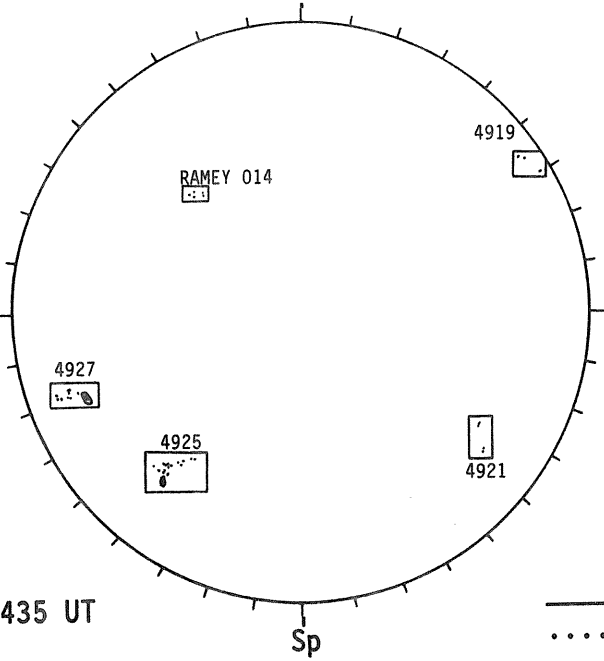
E—

—W

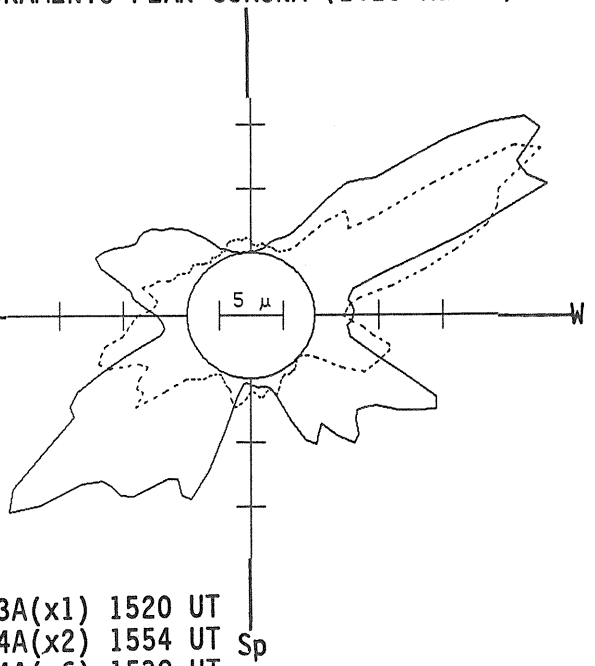
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

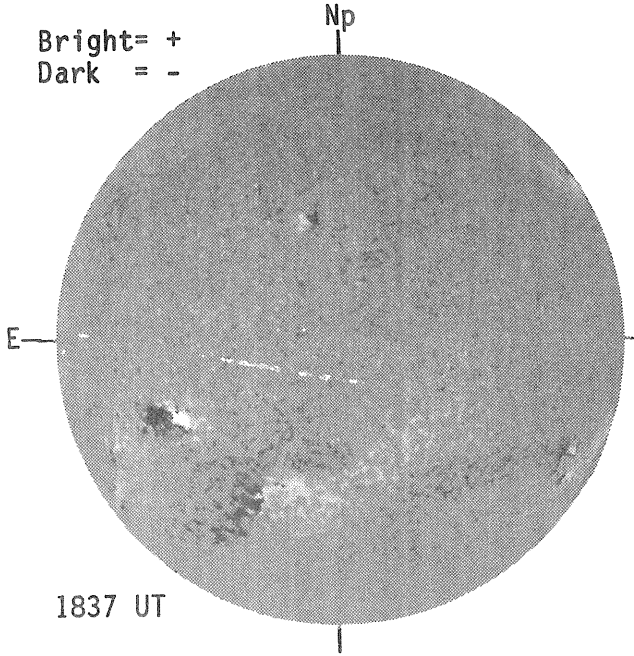


—— 5303A(x1) 1520 UT
···· 6374A(x2) 1554 UT
xxxx 5694A(x6) 1539 UT
NO 5694A ACTIVITY TODAY

JANUARY 15, 1988 (P=- 4.34, B_o=-4.49, L_o= 73.97)

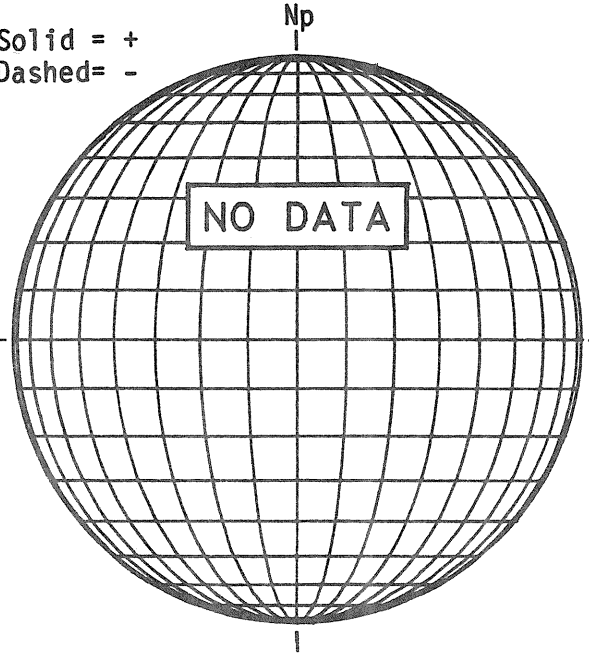
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

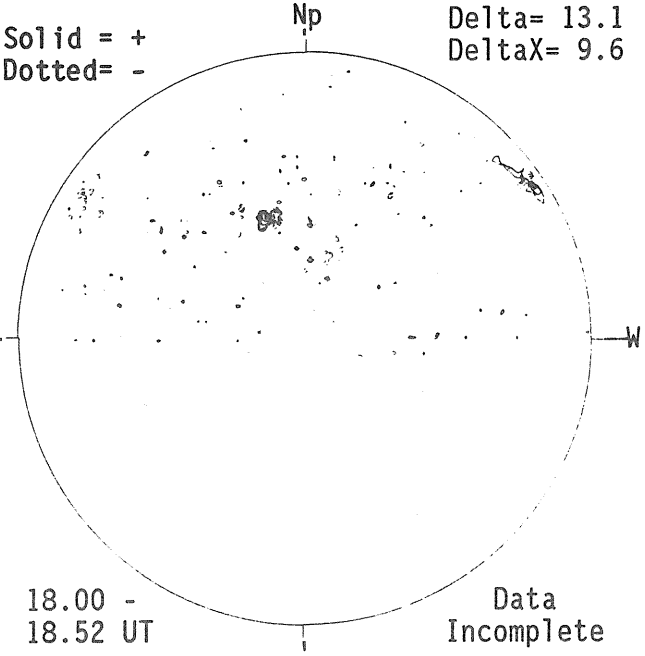
Solid = +
Dashed= -



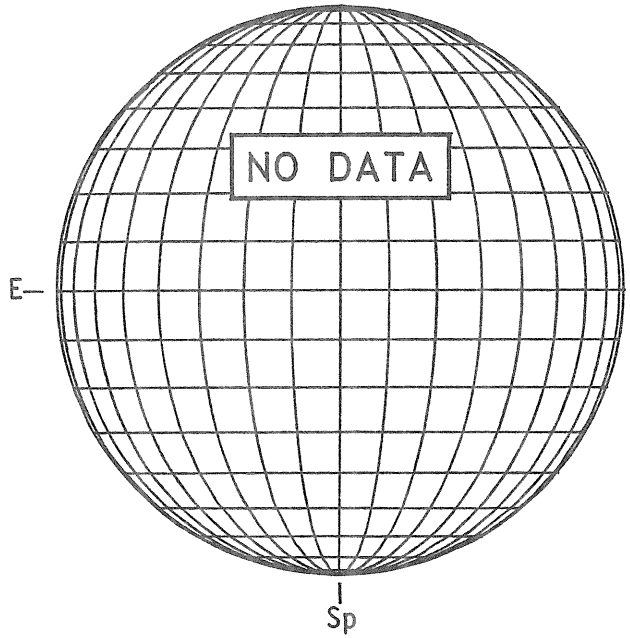
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

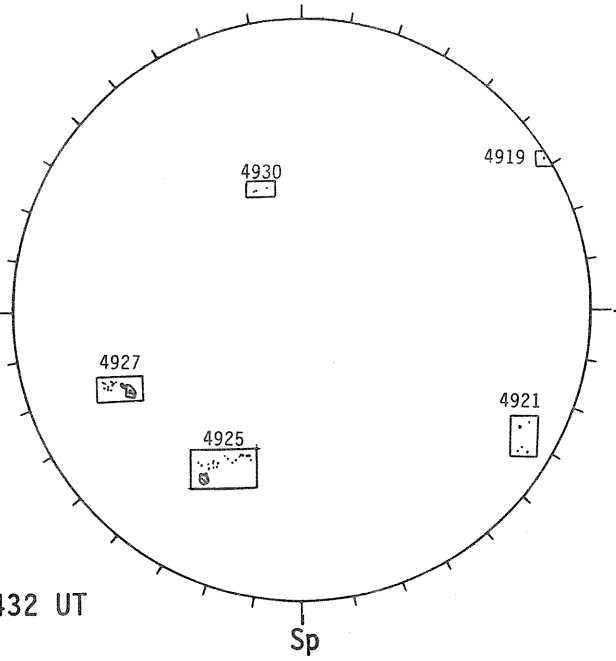
Delta= 13.1
DeltaX= 9.6



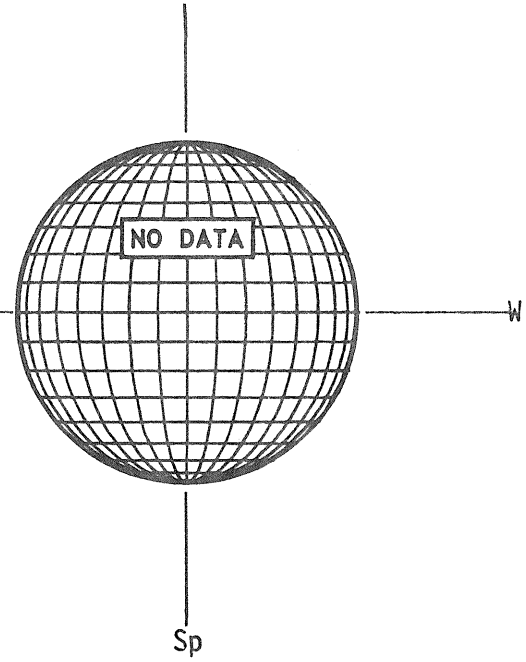
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



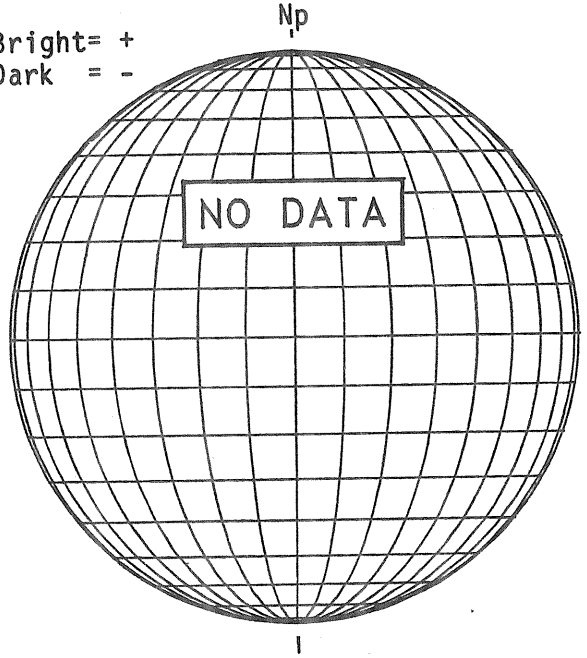
SACRAMENTO PEAK CORONA (1.15 Radii)



JANUARY 16, 1988 (P=- 4.81, B_0=-4.59, L_0= 60.81)

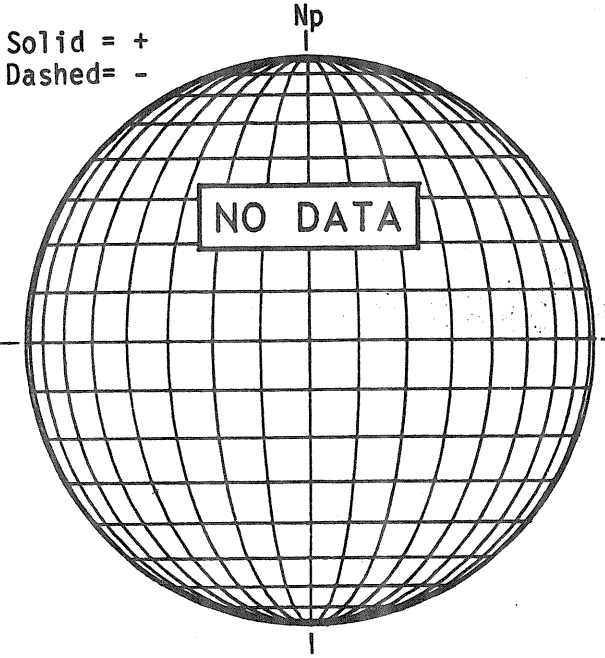
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



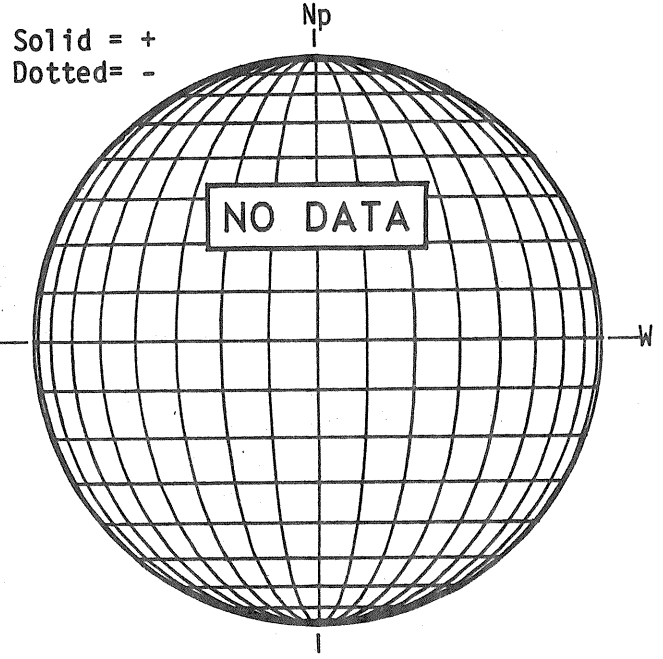
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

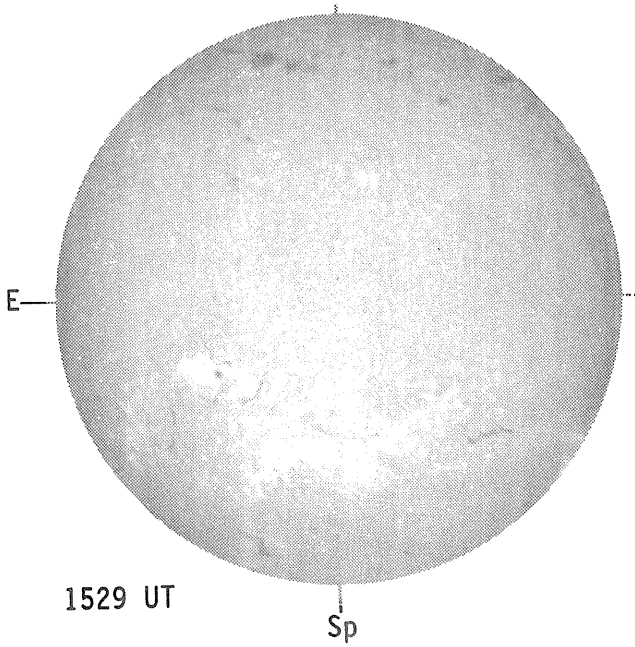


MT. WILSON MAGNETOGRAM

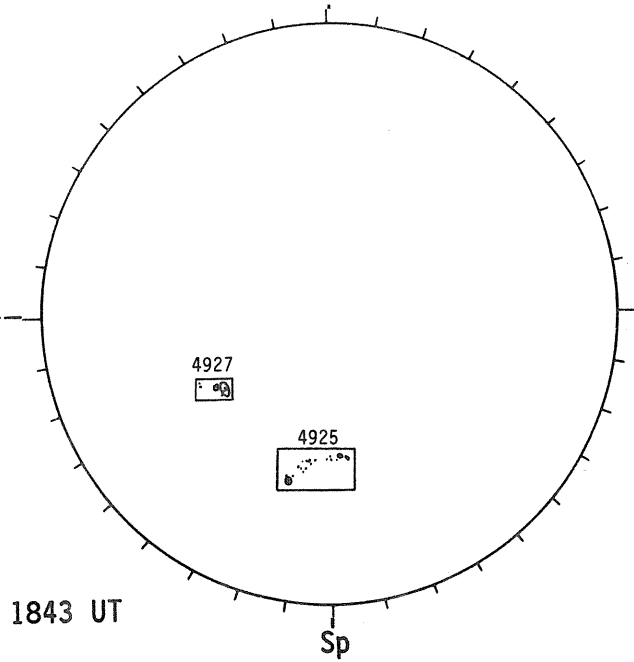
Solid = +
Dotted= -



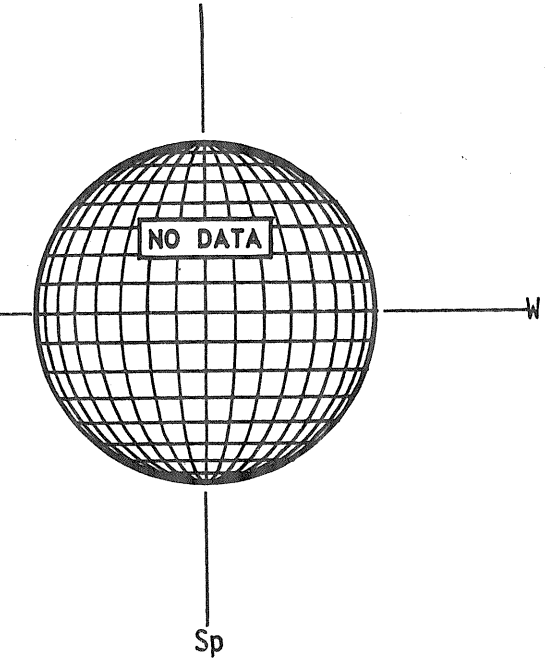
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS

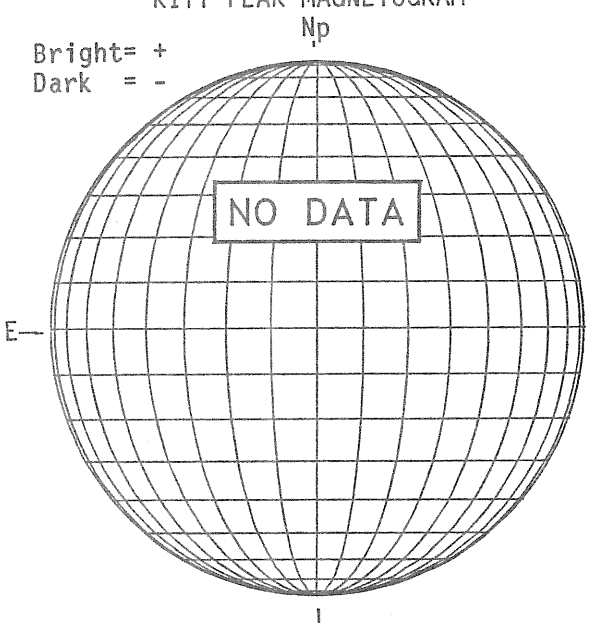


SACRAMENTO PEAK CORONA (1.15 Radii)

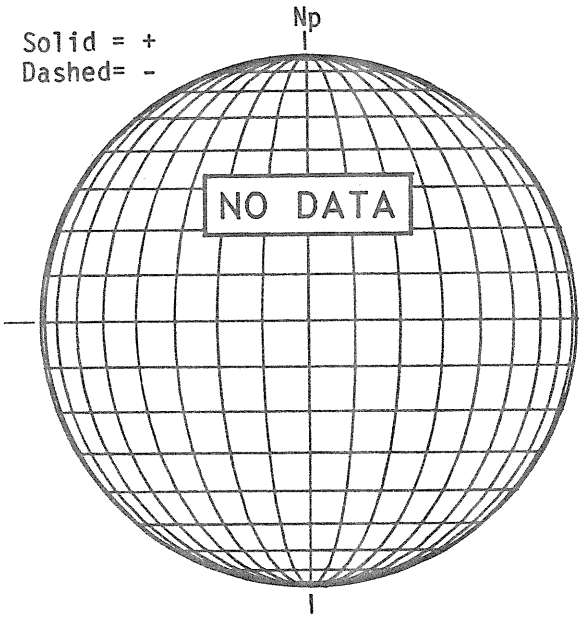


JANUARY 17, 1988 (P=- 5.28, B_o=-4.69, L_o= 47.64)

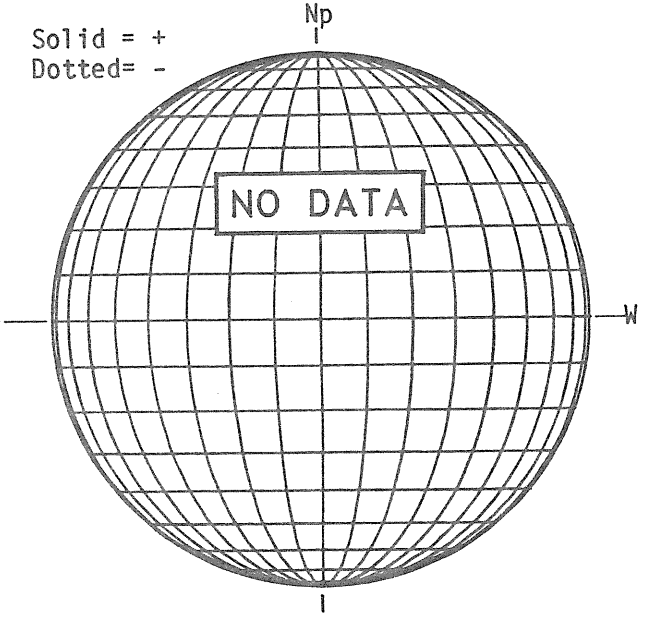
KITT PEAK MAGNETOGRAM



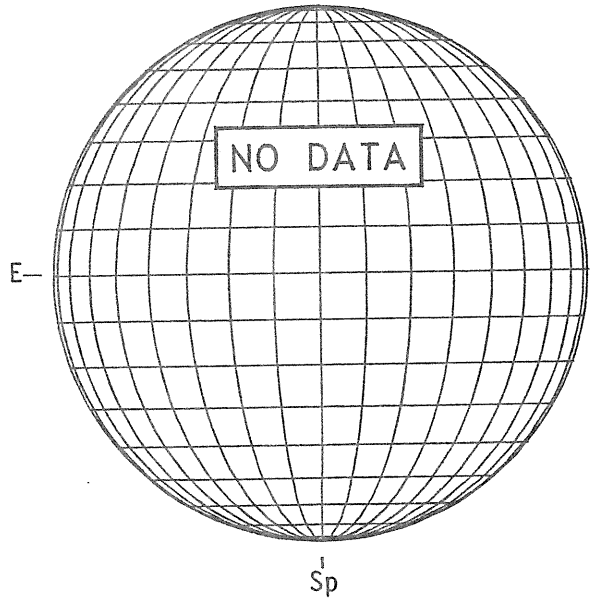
STANFORD MAGNETOGRAM



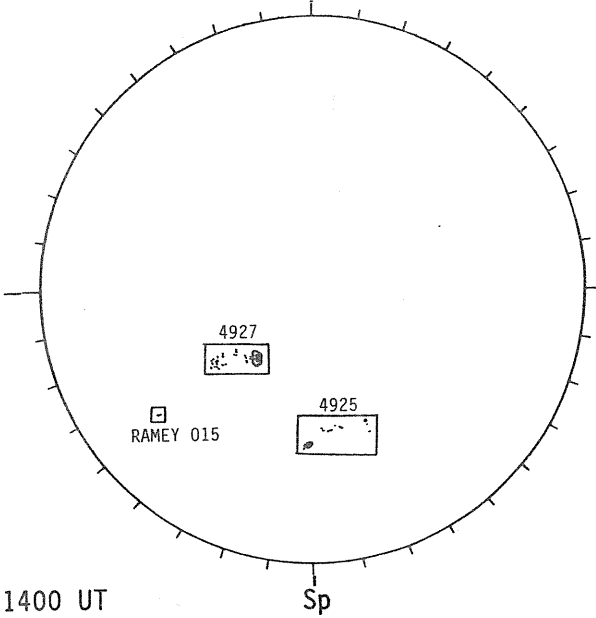
MT. WILSON MAGNETOGRAM



SACRAMENTO PEAK H-ALPHA

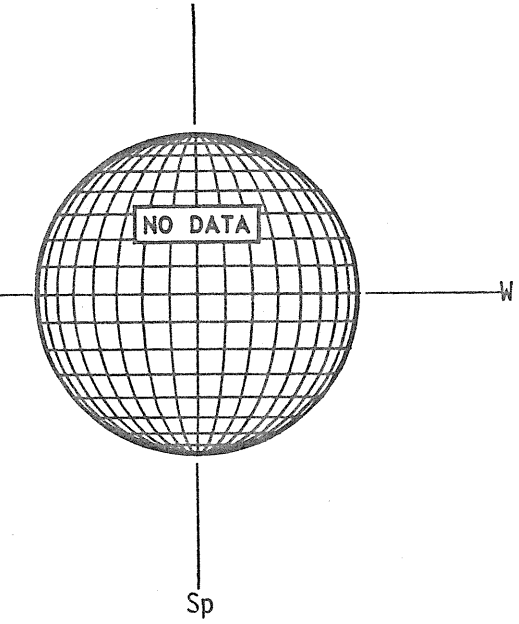


RAMEY SUNSPOTS



1400 UT

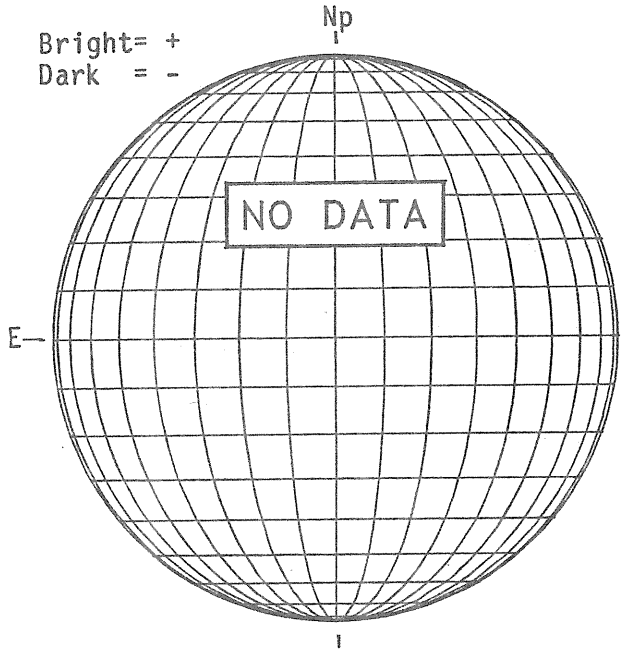
SACRAMENTO PEAK CORONA (1.15 Radii)



JANUARY 18, 1988 (P=- 5.74, B_o=-4.78, L_o= 34.47)

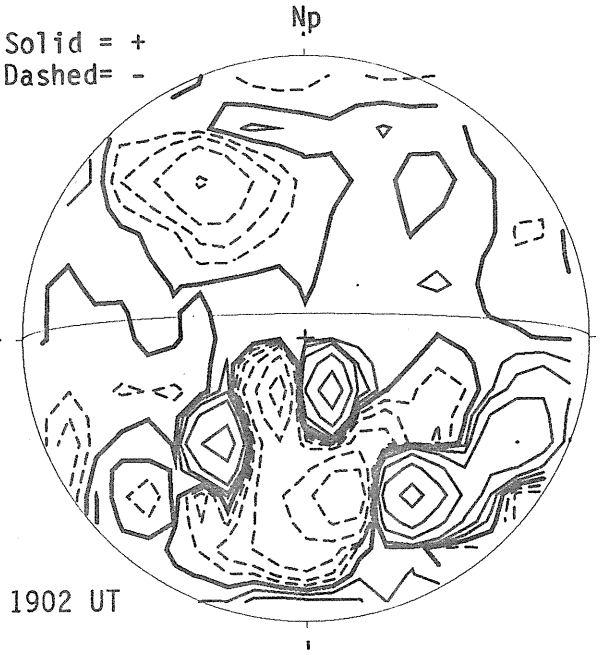
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

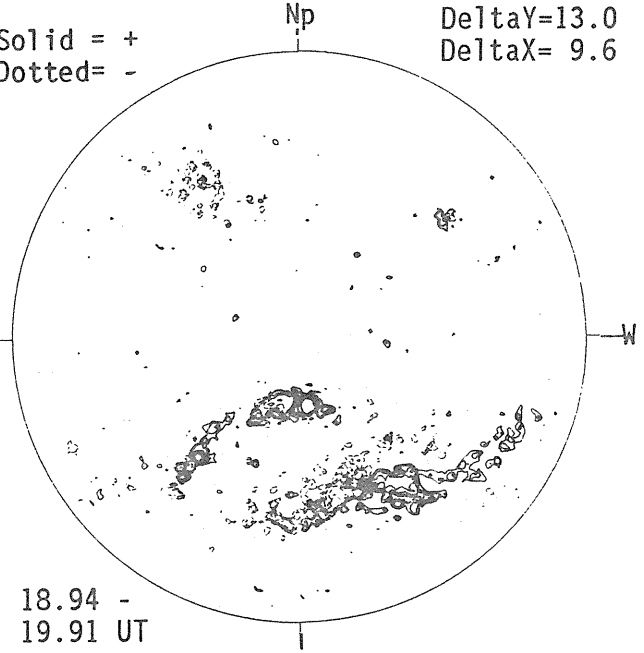
Solid = +
Dashed= -



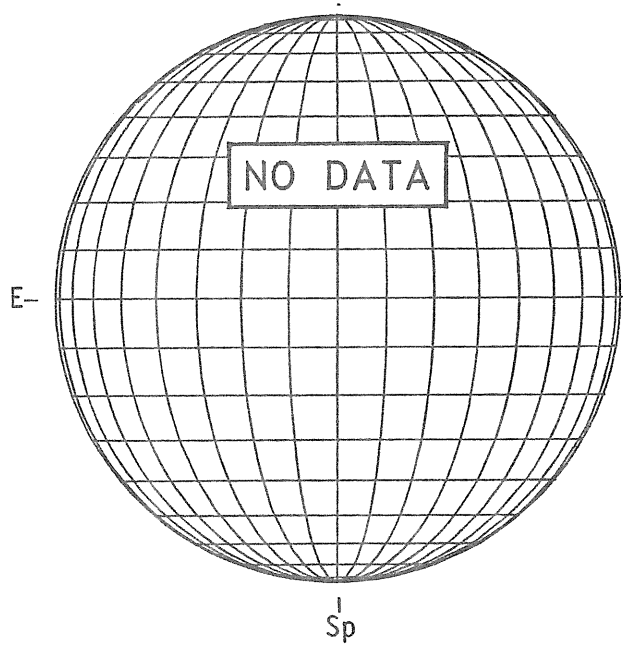
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

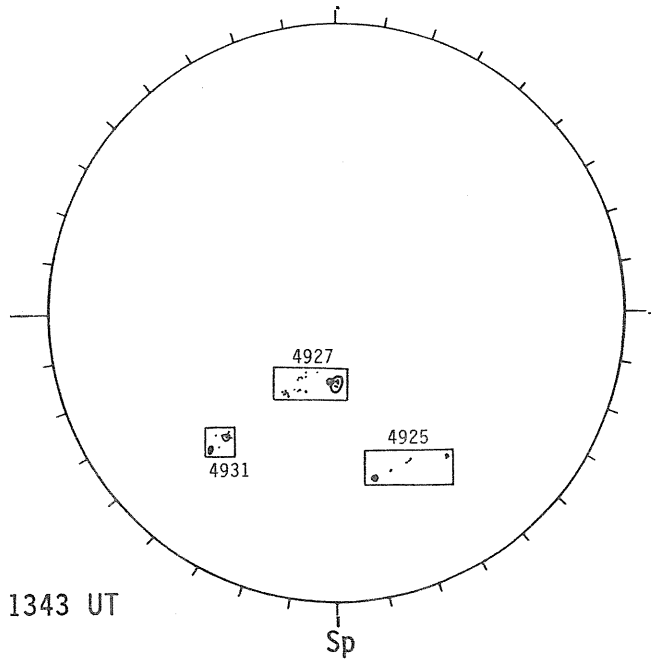
DeltaY=13.0
DeltaX= 9.6



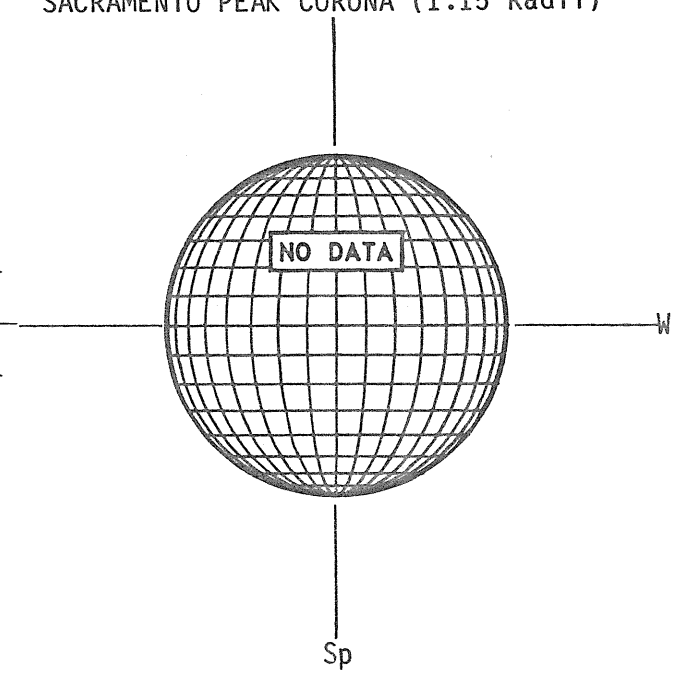
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS

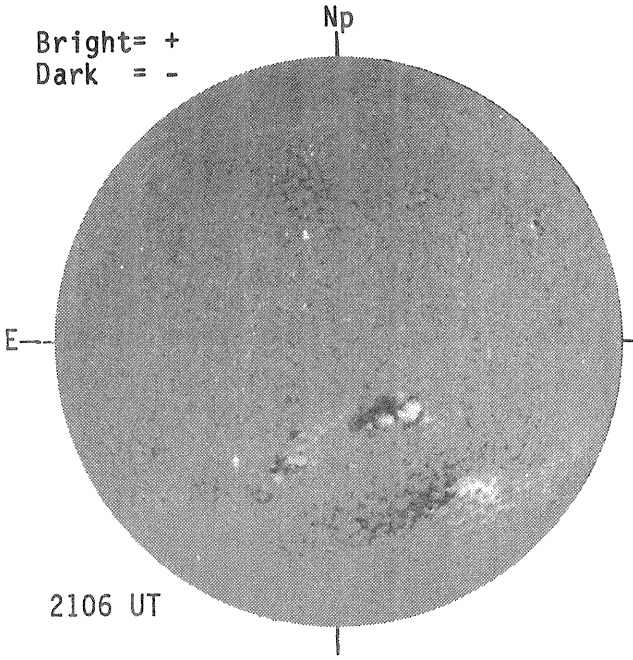


SACRAMENTO PEAK CORONA (1.15 Radii)

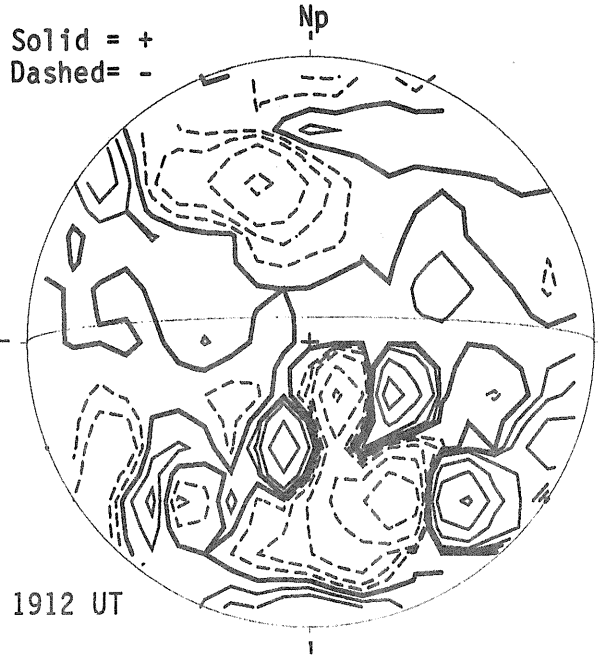


JANUARY 19, 1988 (P=- 6.20, B_o=-4.88, L_o= 21.31)

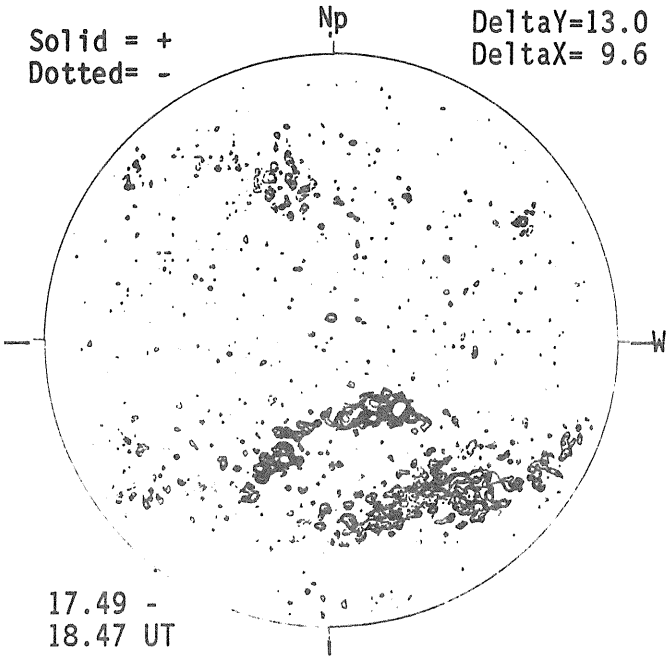
KITT PEAK MAGNETOGRAM



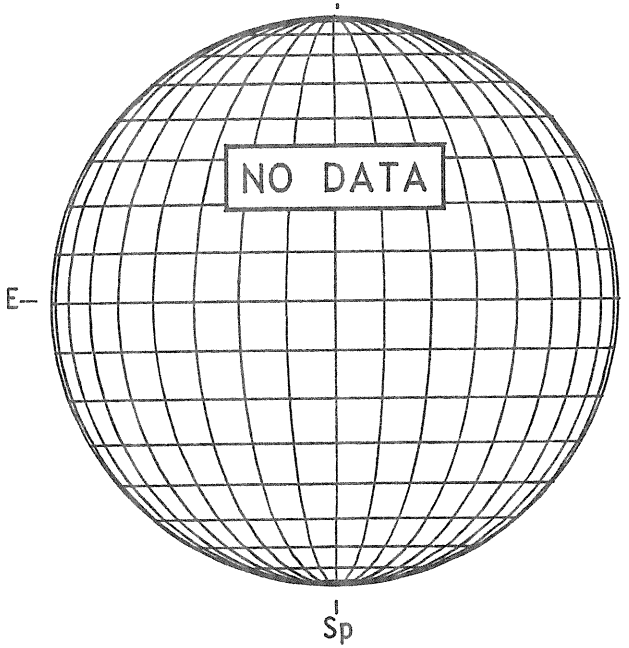
STANFORD MAGNETOGRAM



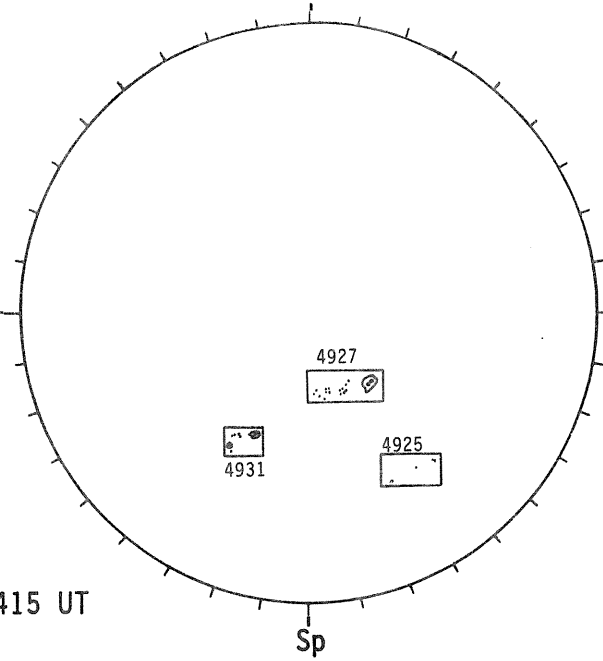
MT. WILSON MAGNETOGRAM



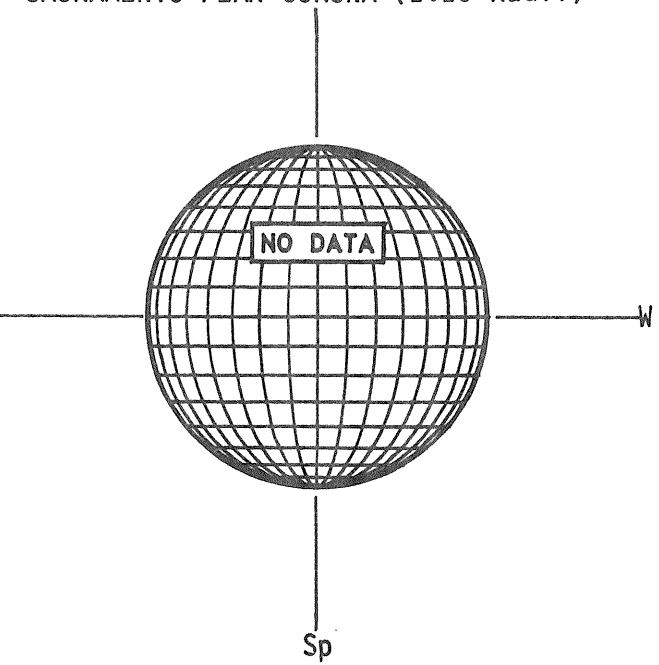
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS

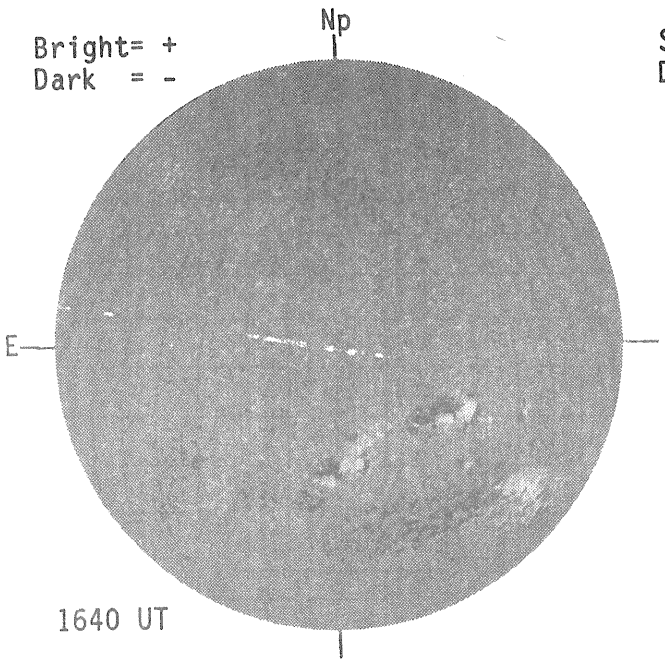


SACRAMENTO PEAK CORONA (1.15 Radii)

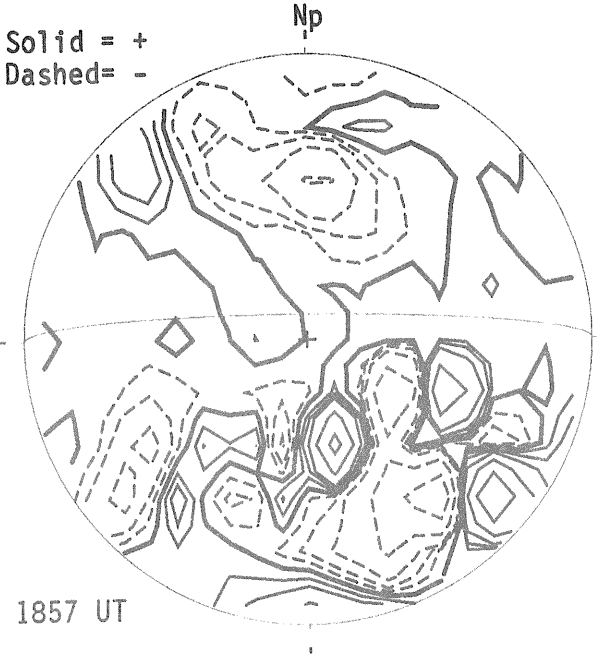


JANUARY 20, 1988 (P=- 6.66 B_o=-4.97, L_o= 8.14)

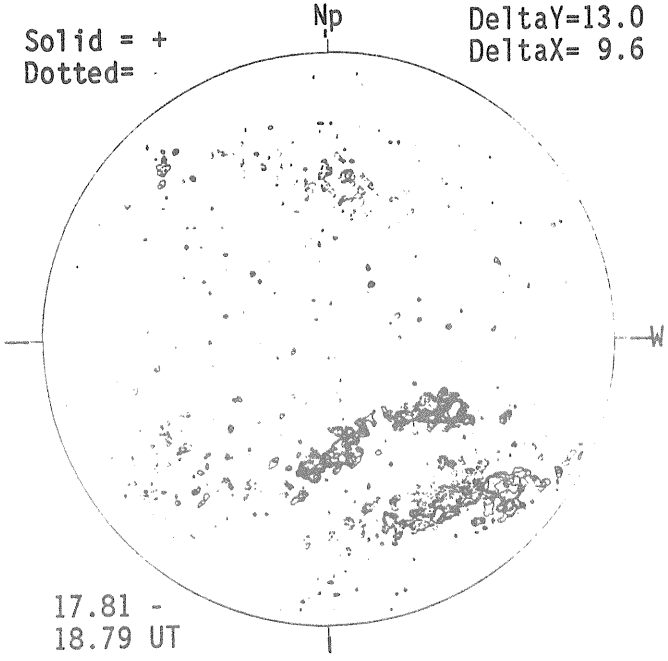
KITT PEAK MAGNETOGRAM



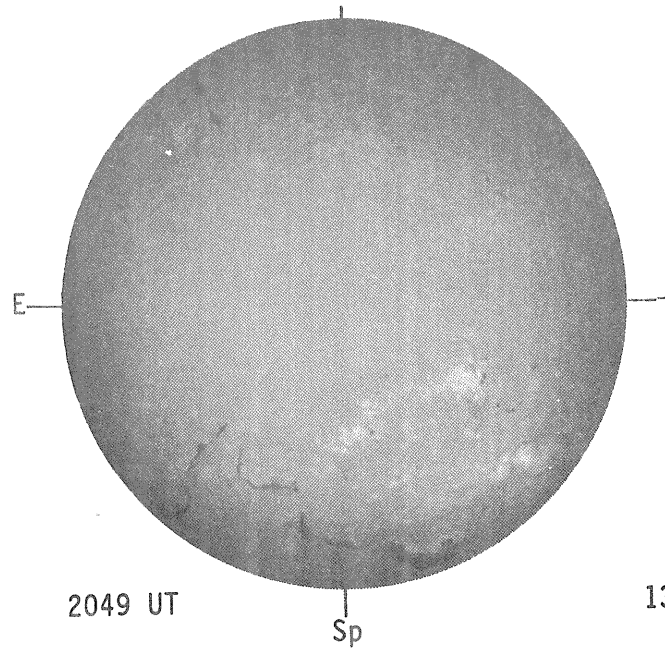
STANFORD MAGNETOGRAM



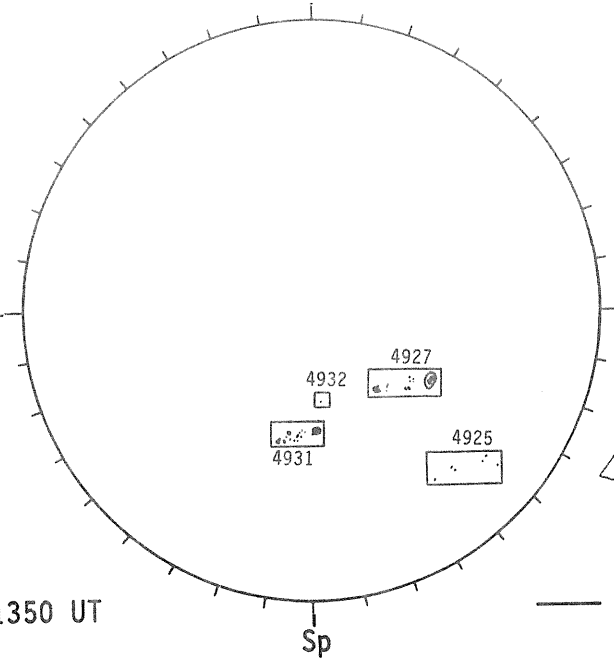
MT. WILSON MAGNETOGRAM



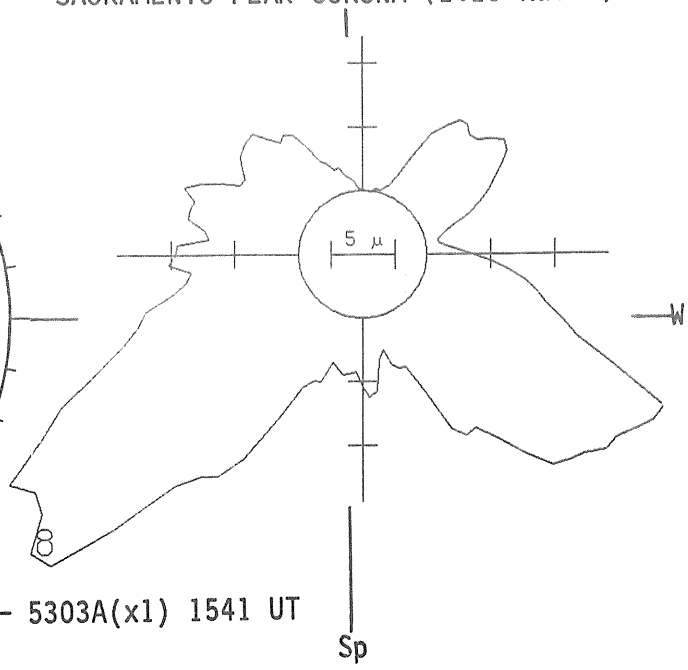
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS

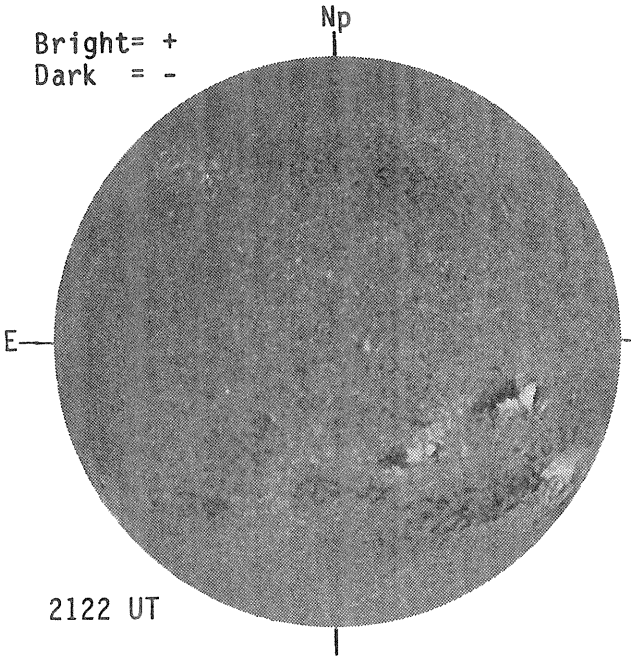


SACRAMENTO PEAK CORONA (1.15 Radii)

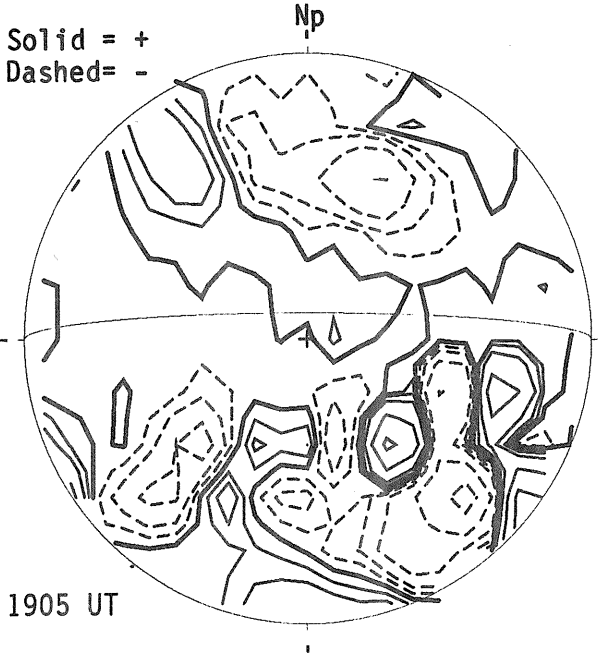


JANUARY 21, 1988 (P=- 7.12, B_o=-5.07, L_o=354.97)

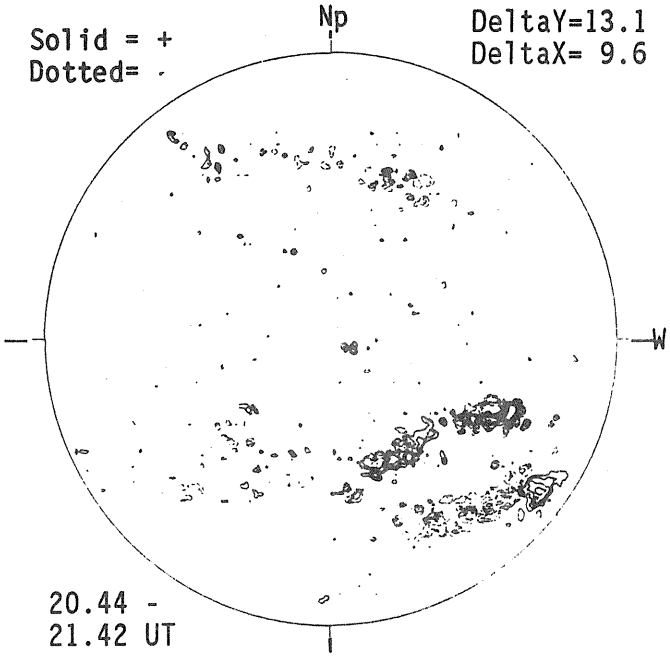
KITT PEAK MAGNETOGRAM



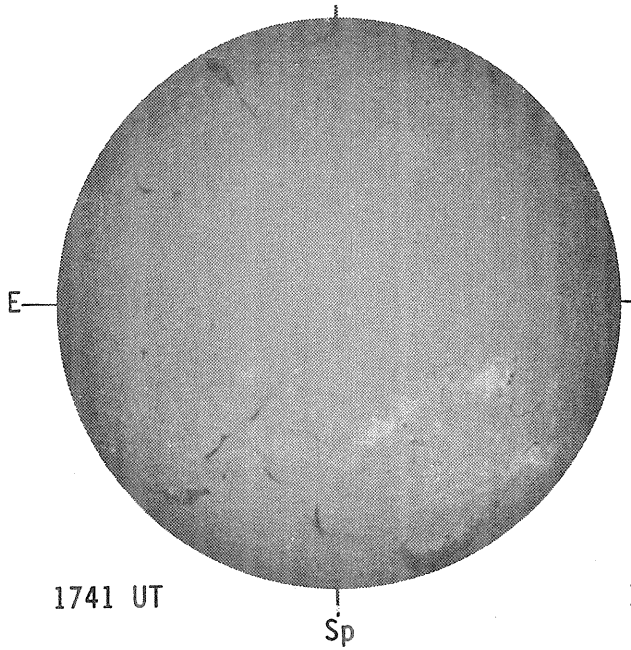
STANFORD MAGNETOGRAM



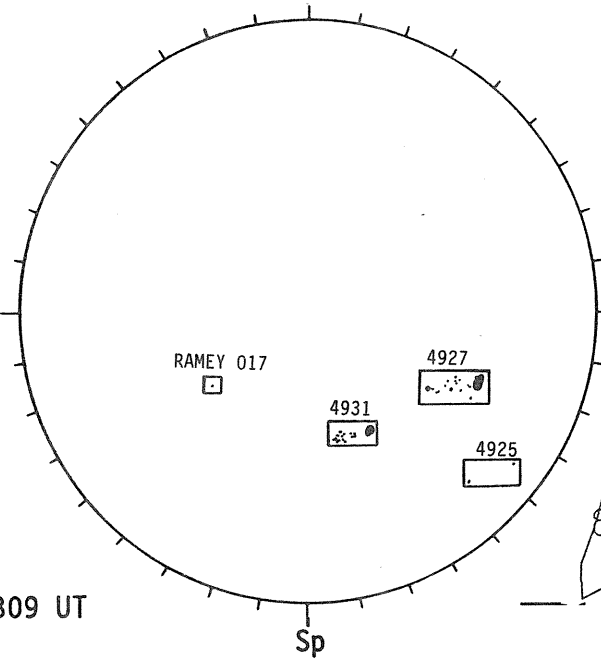
MT. WILSON MAGNETOGRAM



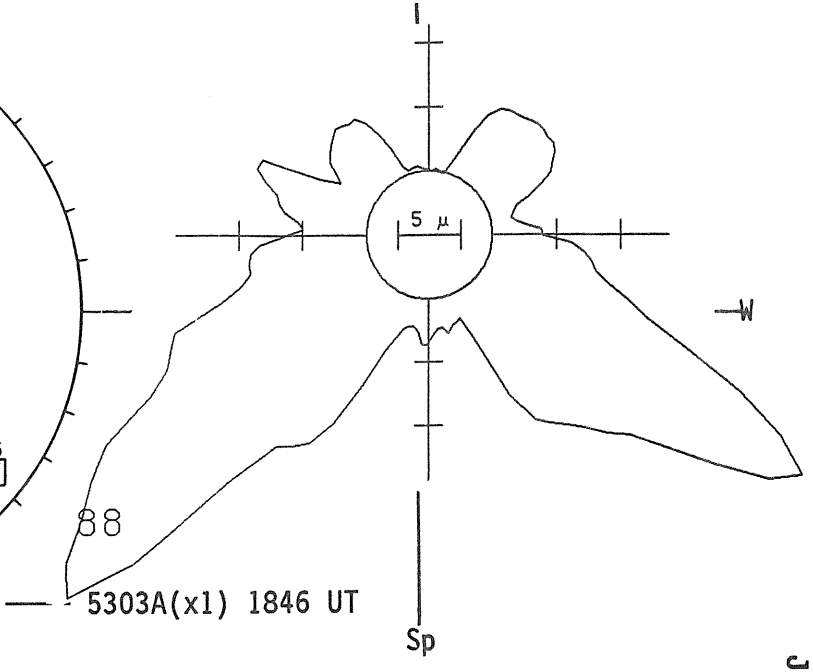
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

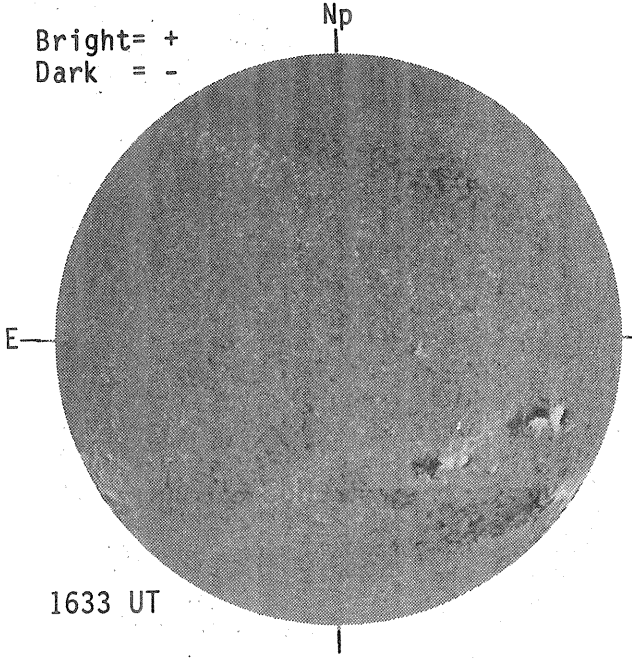


JANUARY 22, 1988 (P=- 7.57, B_o=-5.16, L_o=341.81)

55
Jan 88

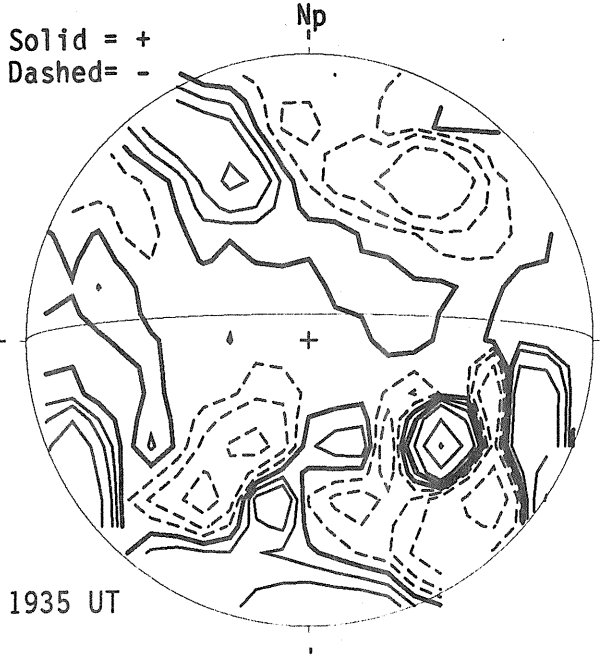
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

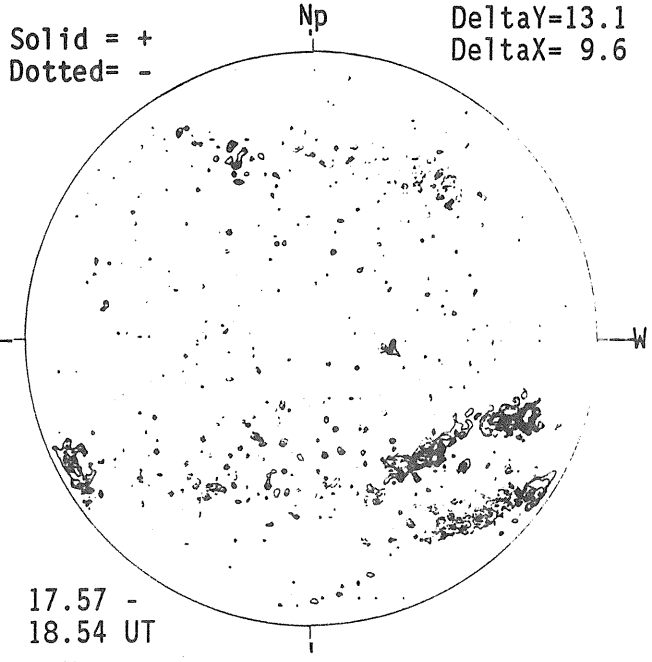
Solid = +
Dashed= -



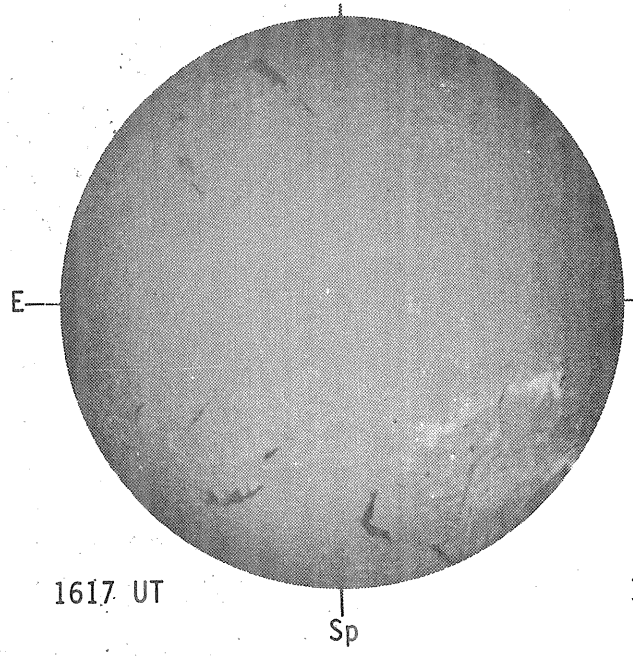
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

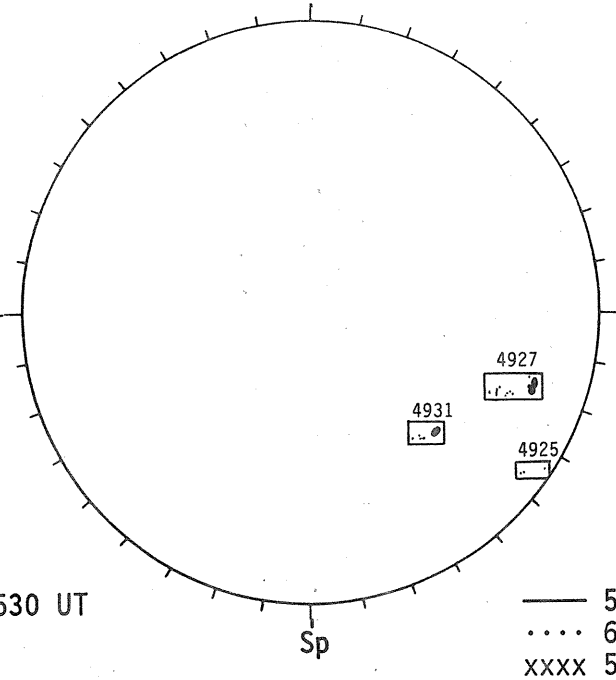
DeltaY=13.1
DeltaX= 9.6



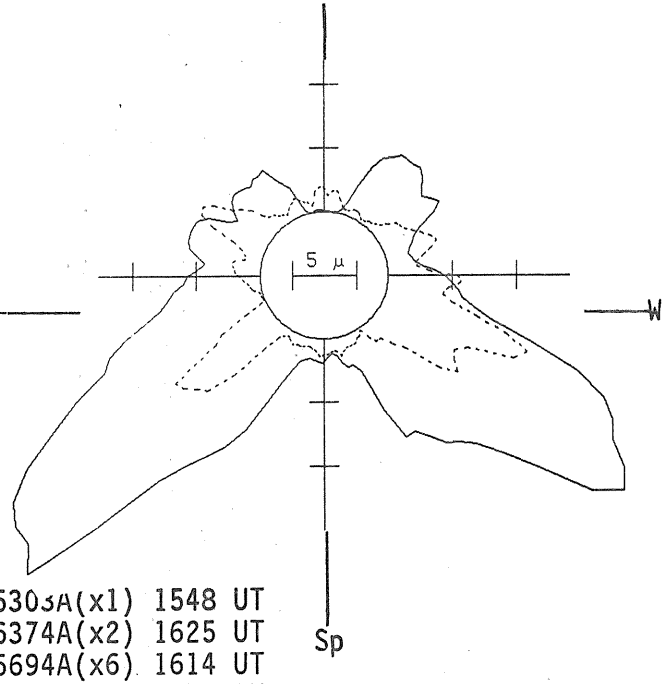
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



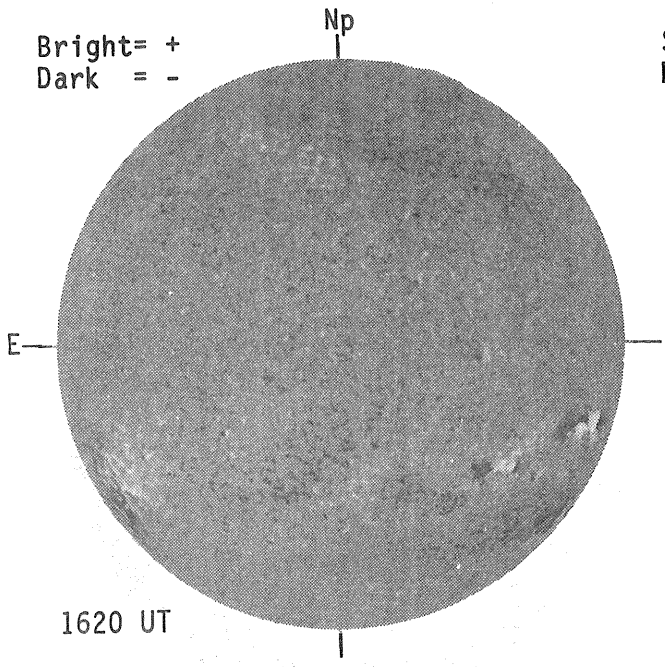
SACRAMENTO PEAK CORONA (1.15 Radii)



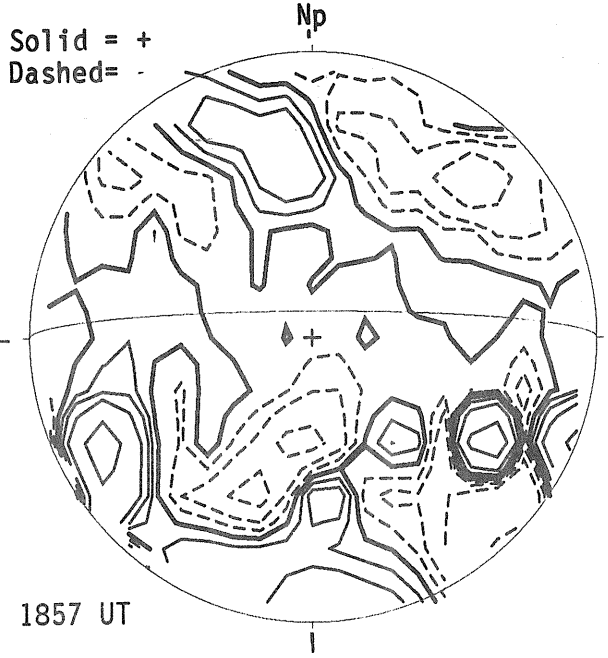
—— 5303A(x1) 1548 UT
···· 6374A(x2) 1625 UT
xxxx 5694A(x6) 1614 UT
NO 5694A ACTIVITY TODAY

JANUARY 23, 1988 (P=- 8.02, B_o=-5.25, L_o=328.64)

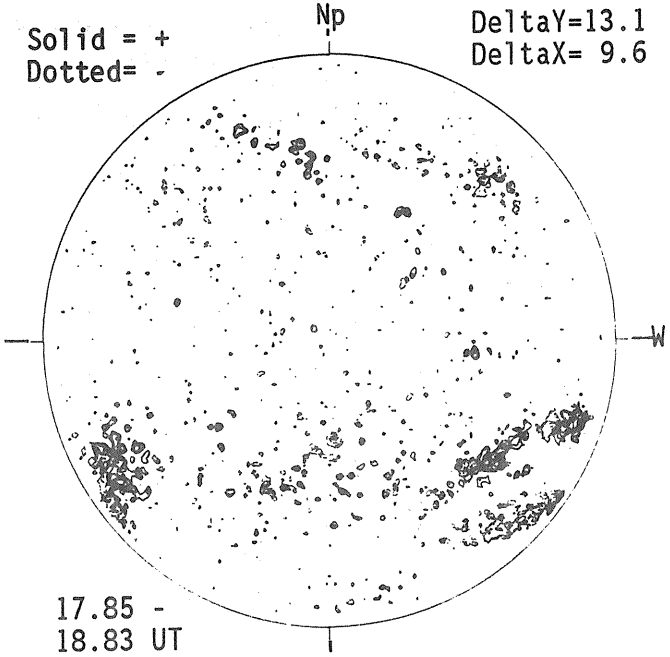
KITT PEAK MAGNETOGRAM



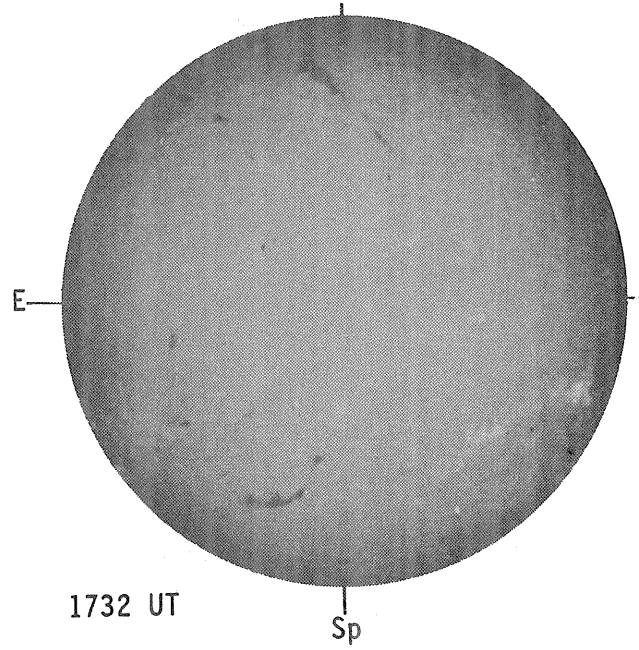
STANFORD MAGNETOGRAM



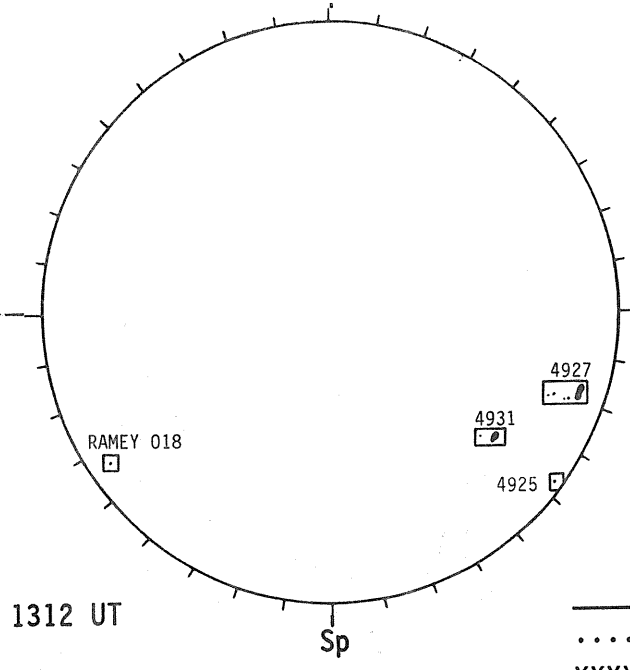
MT. WILSON MAGNETOGRAM



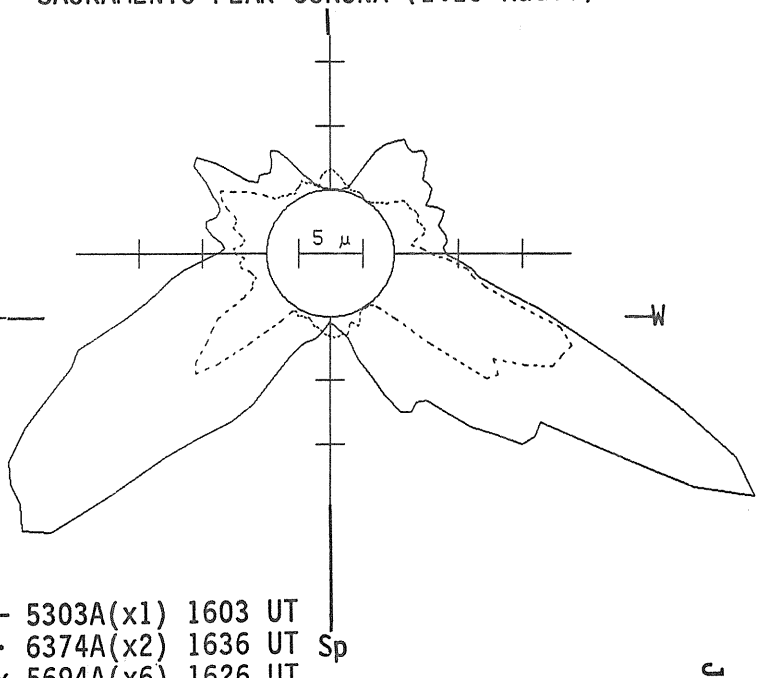
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

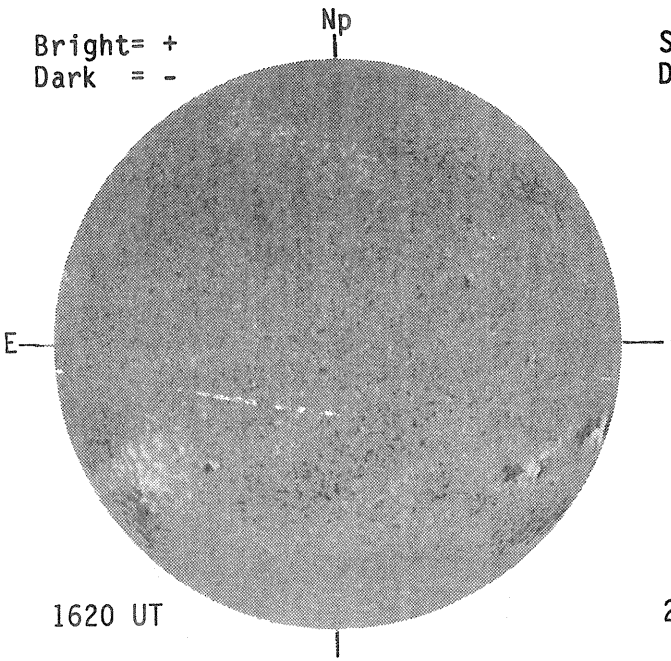


—— 5303A(x1) 1603 UT
···· 6374A(x2) 1636 UT
xxxx 5694A(x6) 1626 UT
NO 5694A ACTIVITY TODAY

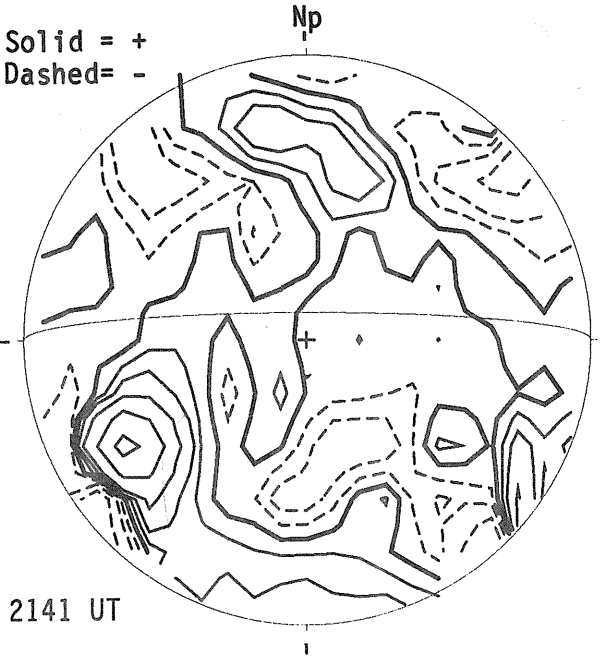
JANUARY 24, 1988 (P=- 8.47, B_o=-5.33, L_o=315.47)

57
Jan 88

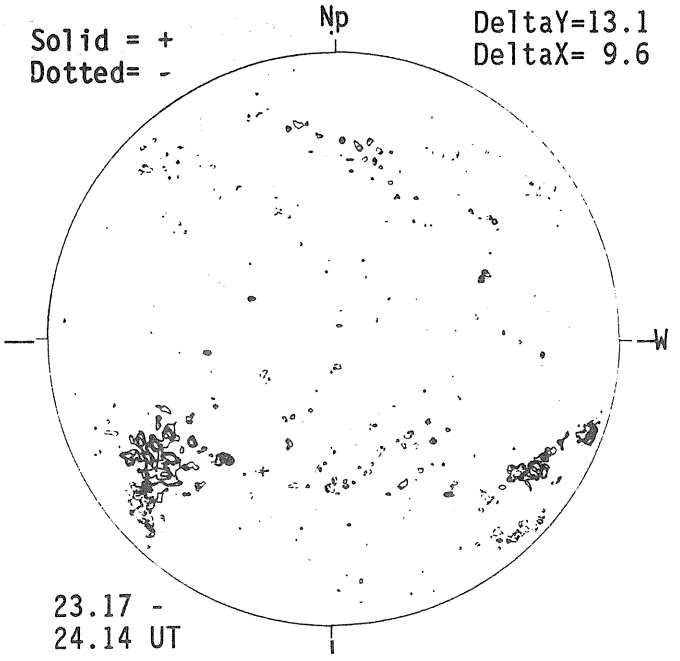
KITT PEAK MAGNETOGRAM



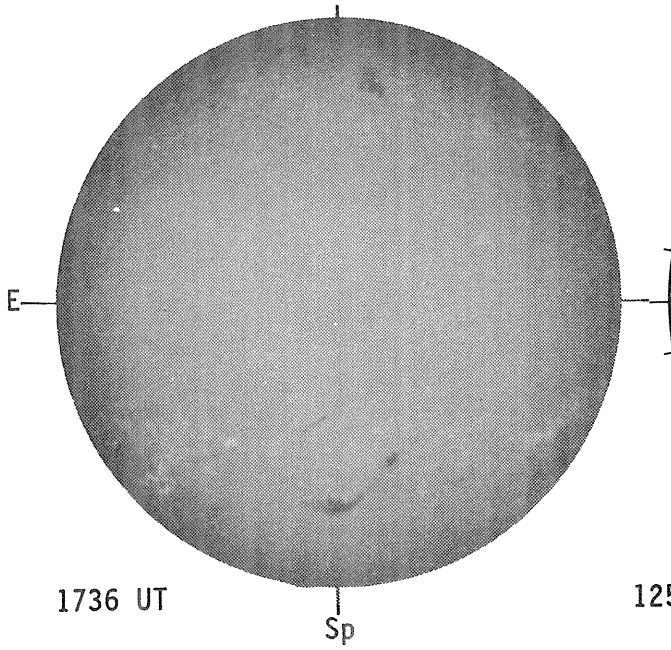
STANFORD MAGNETOGRAM



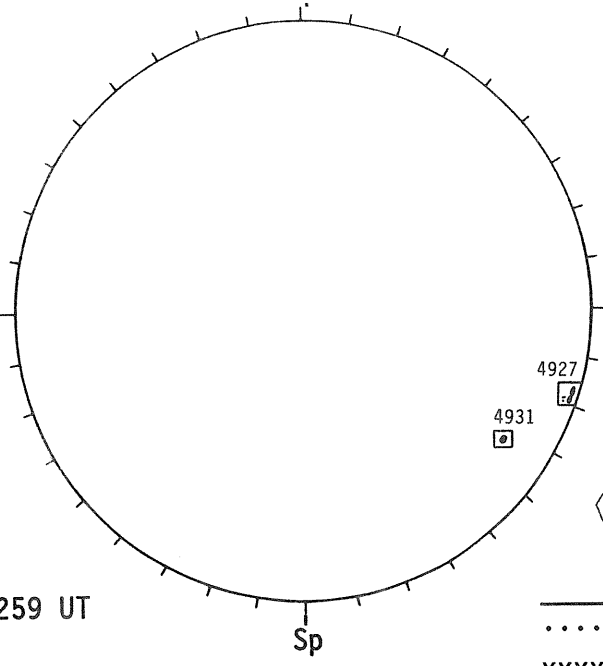
MT. WILSON MAGNETOGRAM



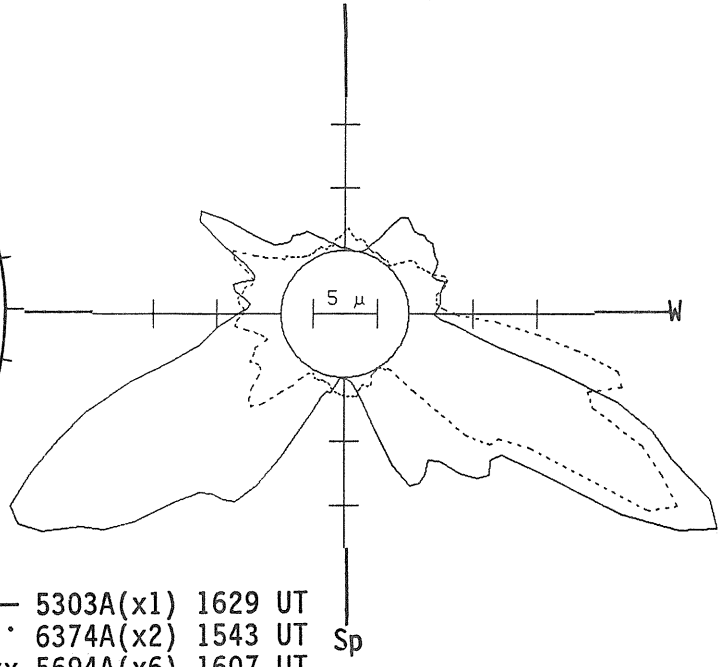
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

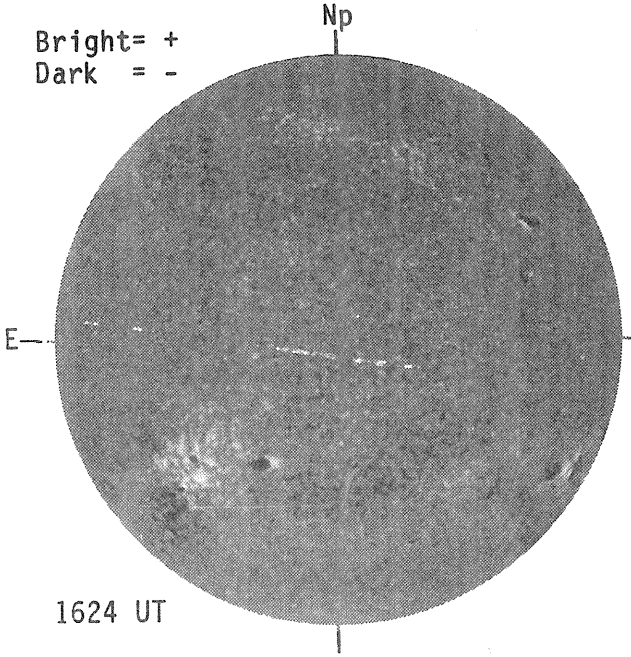


—— 5303A(x1) 1629 UT
···· 6374A(x2) 1543 UT
xxxx 5694A(x6) 1607 UT
NO 5694A ACTIVITY TODAY

JANUARY 25, 1988 (P=- 8.91, B_0=-5.42, L_0= 302.31)

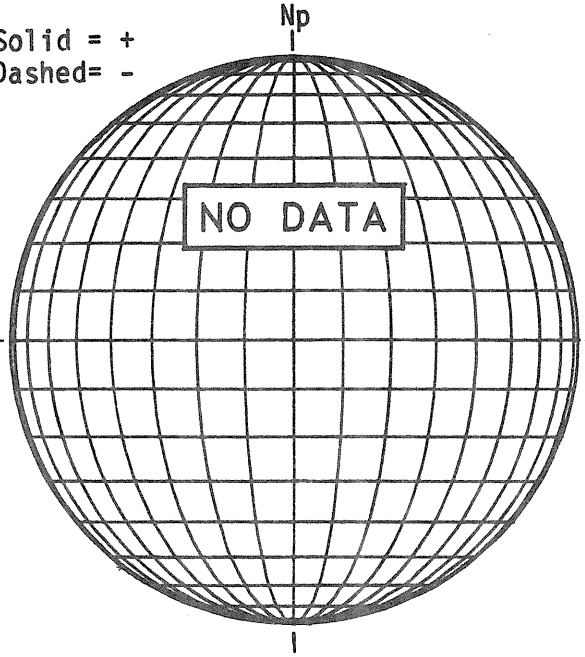
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

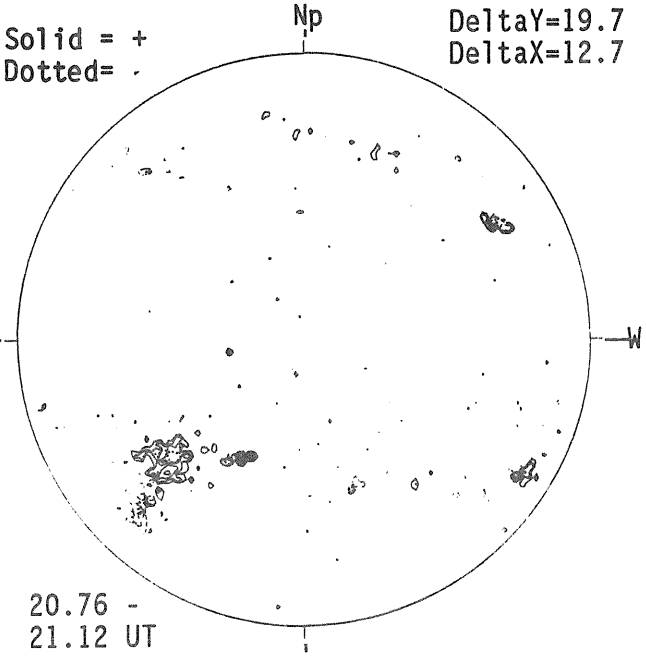
Solid = +
Dashed= -



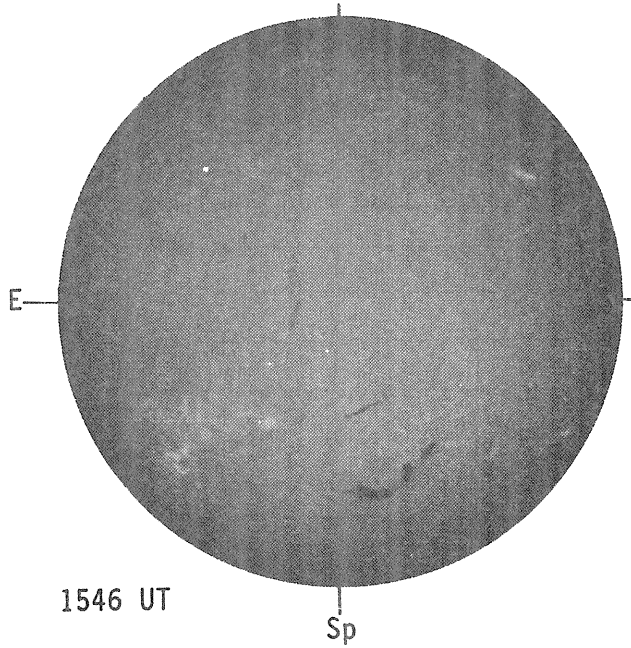
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

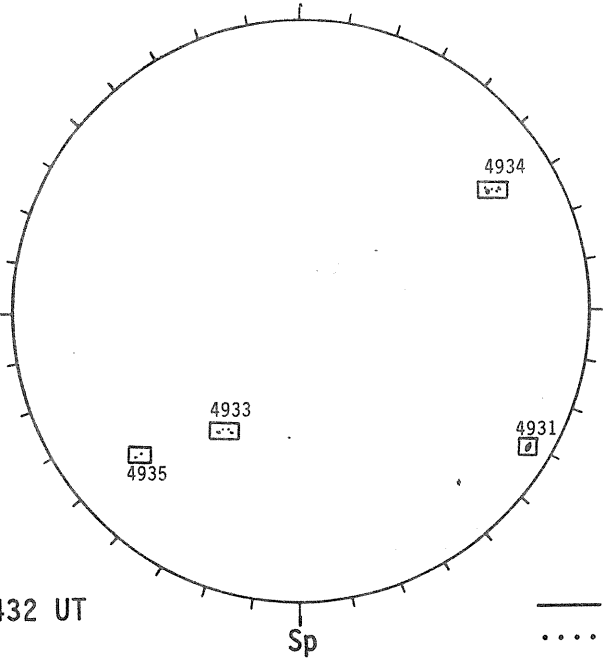
DeltaY=19.7
DeltaX=12.7



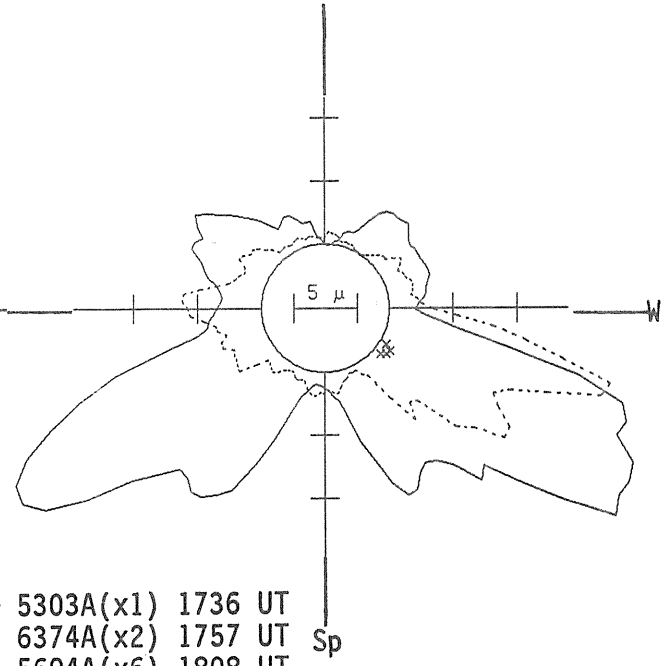
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

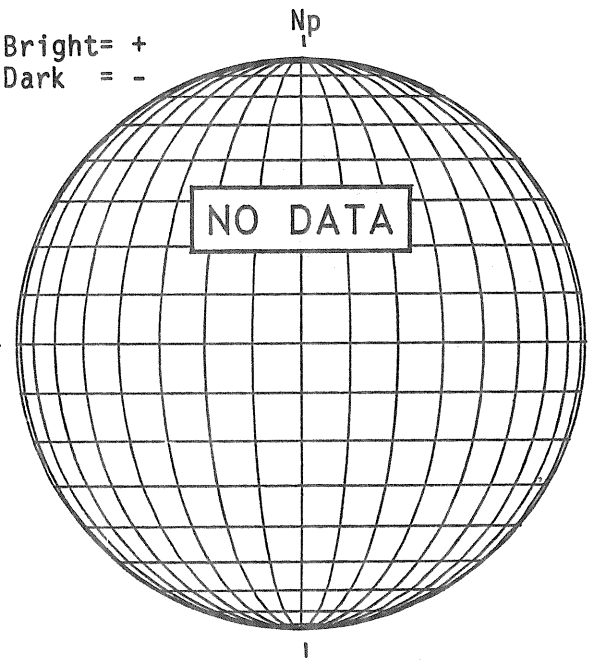


—— 5303A(x1) 1736 UT
···· 6374A(x2) 1757 UT
xxxx 5694A(x6) 1808 UT

JANUARY 26, 1988 (P=- 9.35, B_o=-5.50, L_o= 289.14)

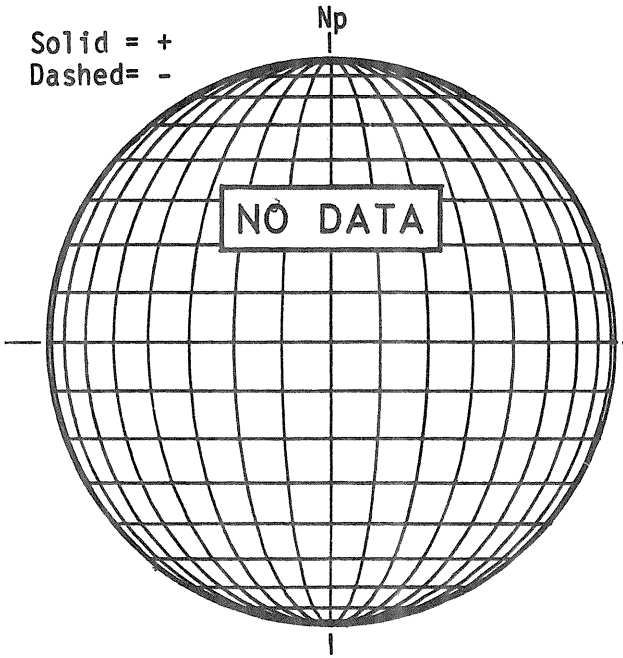
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



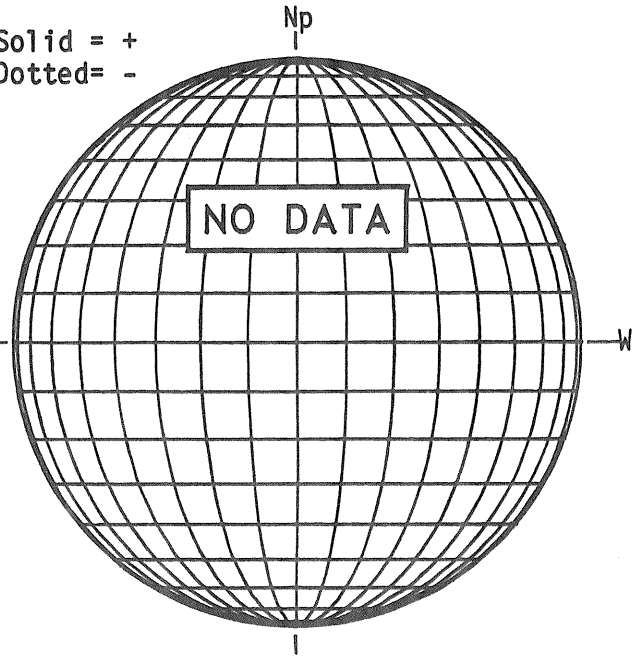
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

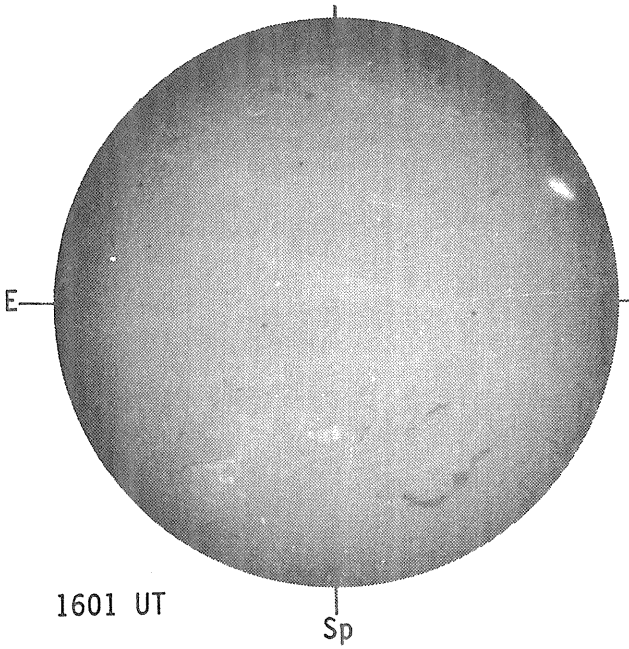


MT. WILSON MAGNETOGRAM

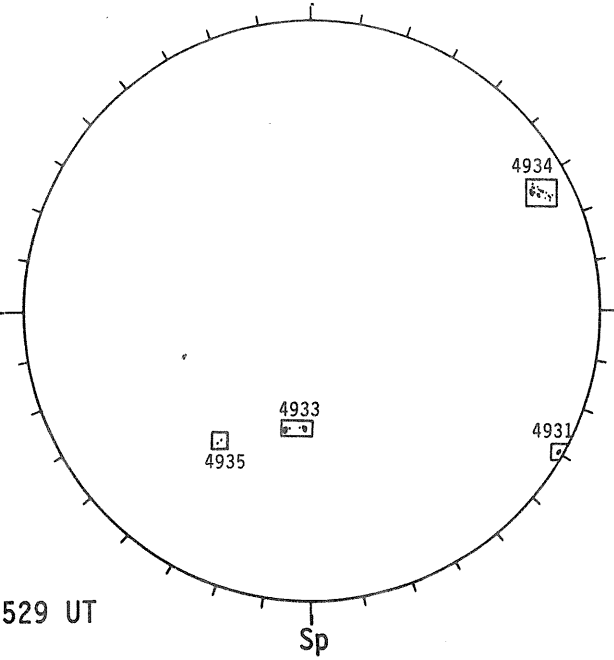
Solid = +
Dotted= -



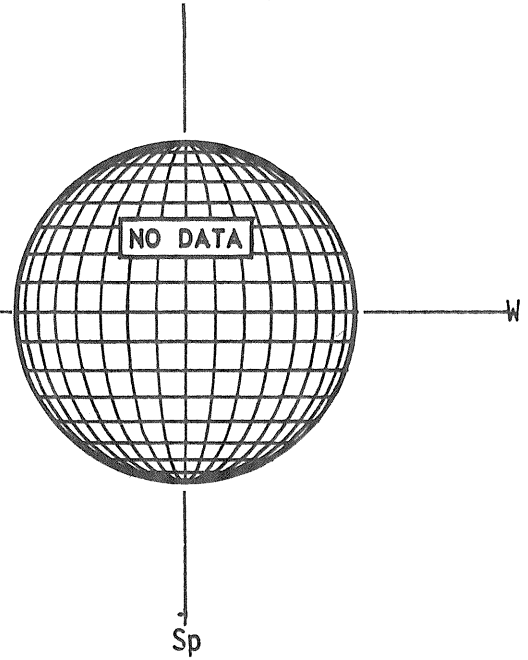
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



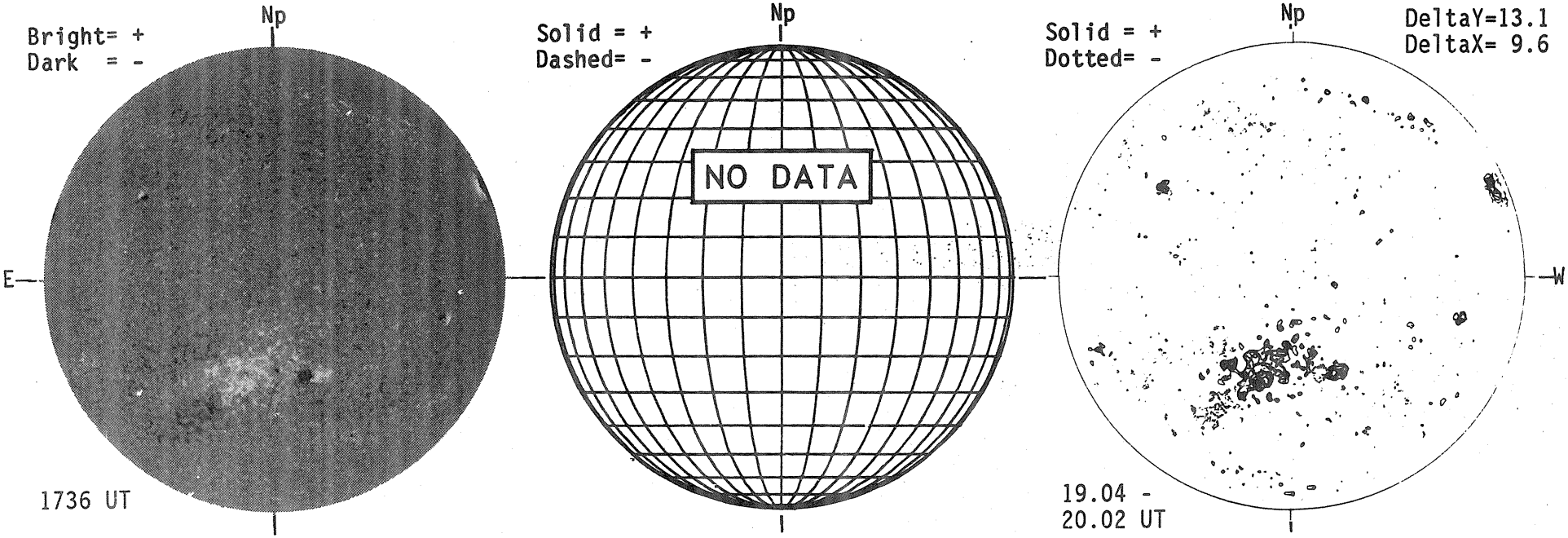
SACRAMENTO PEAK CORONA (1.15 Radii)



JANUARY 27, 1988 (P=- 9.78, B_o=-5.59, L_o= 275.97)

KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



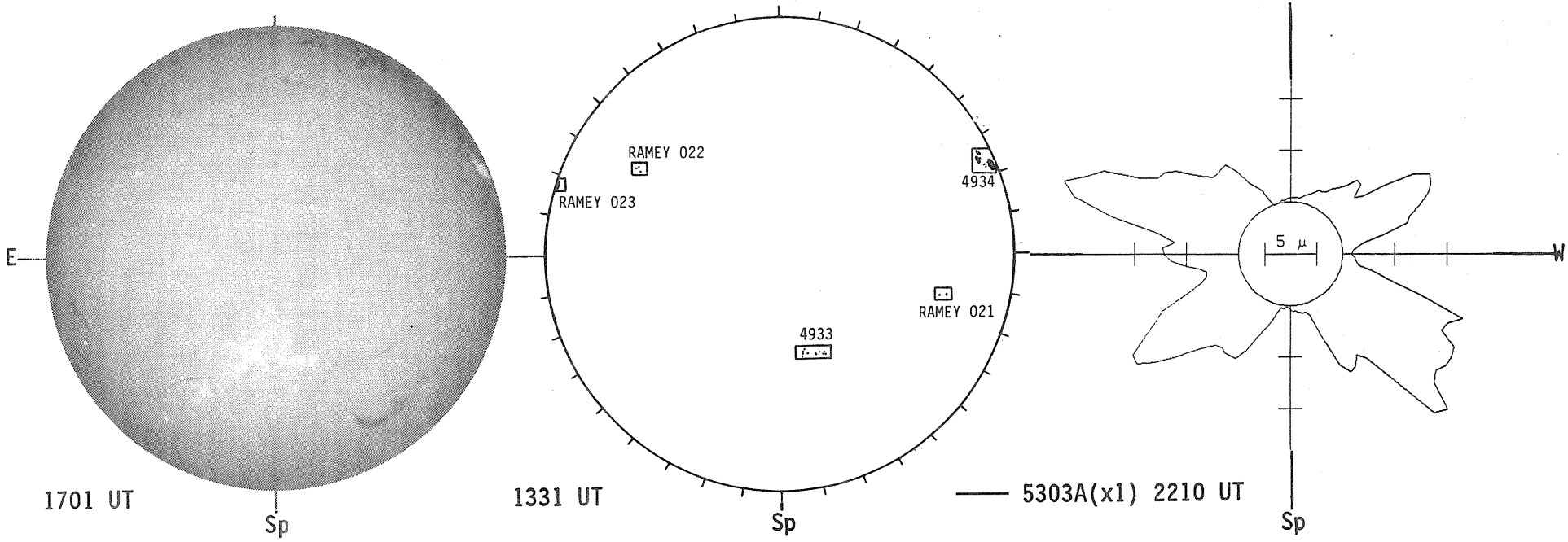
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -
DeltaY=13.1
DeltaX= 9.6

SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS

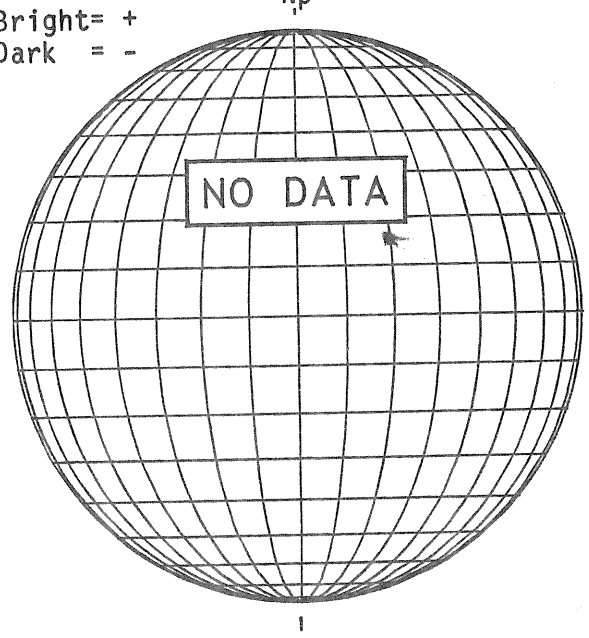
SACRAMENTO PEAK CORONA (1.15 Radii)

—— 5303A(x1) 2210 UT

JANUARY 28, 1988 (P=-10.21, B_o=-5.67, L_o= 262.81)

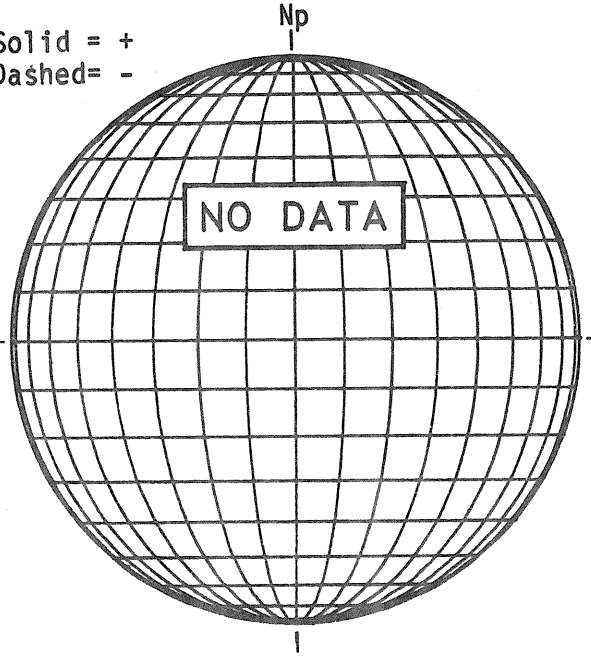
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



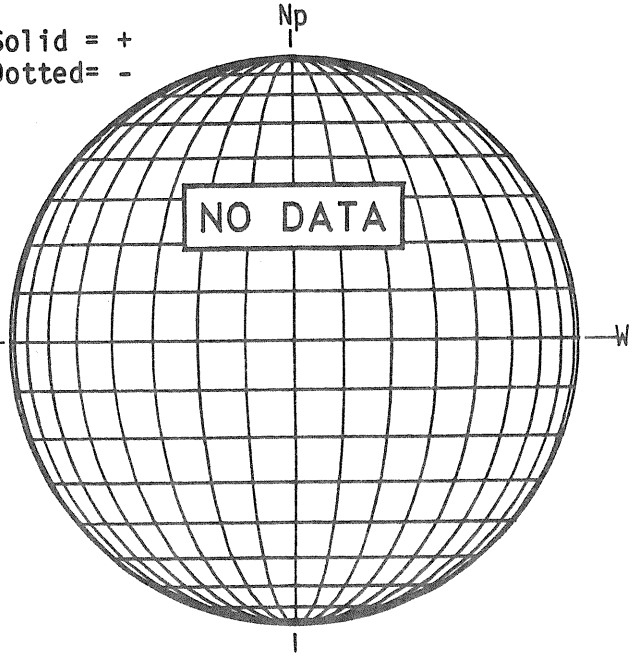
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

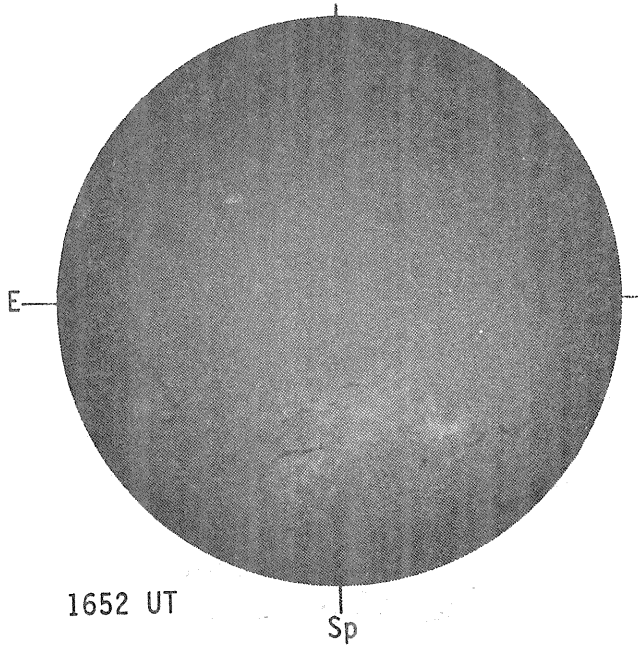


MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

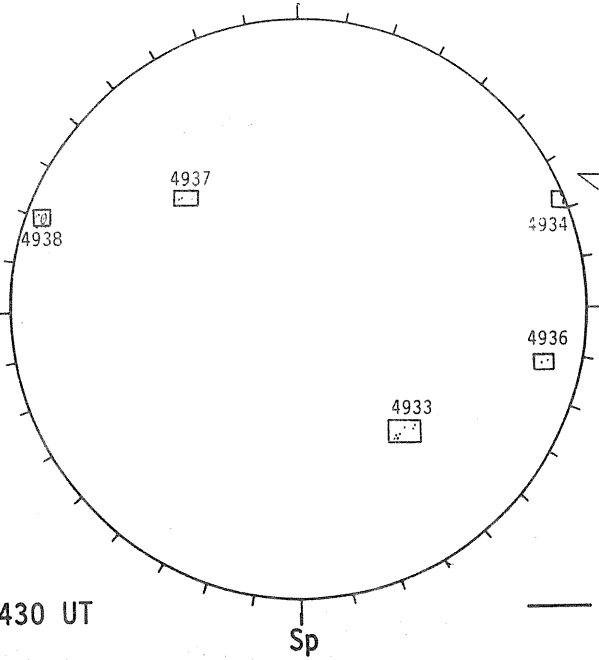


SACRAMENTO PEAK H-ALPHA



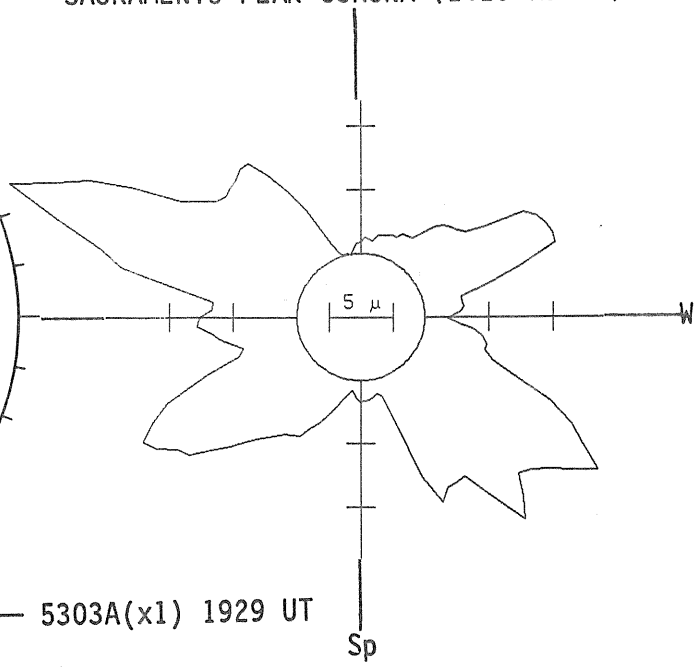
1652 UT

RAMEY SUNSPOTS



1430 UT

SACRAMENTO PEAK CORONA (1.15 Radii)

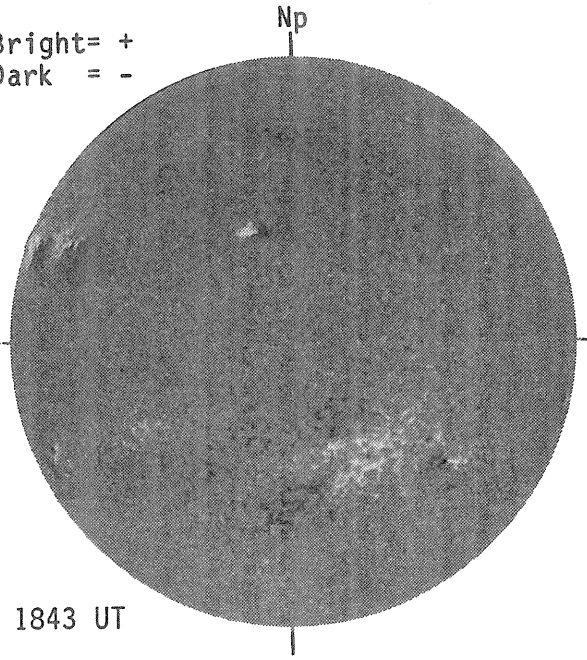


5303A(x1) 1929 UT

JANUARY 29, 1988 (P=-10.64, B_o=-5.75, L_o= 249.64)

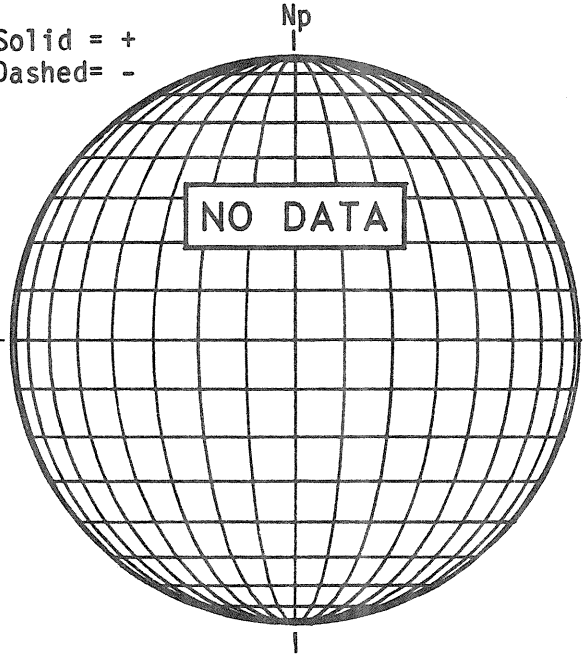
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



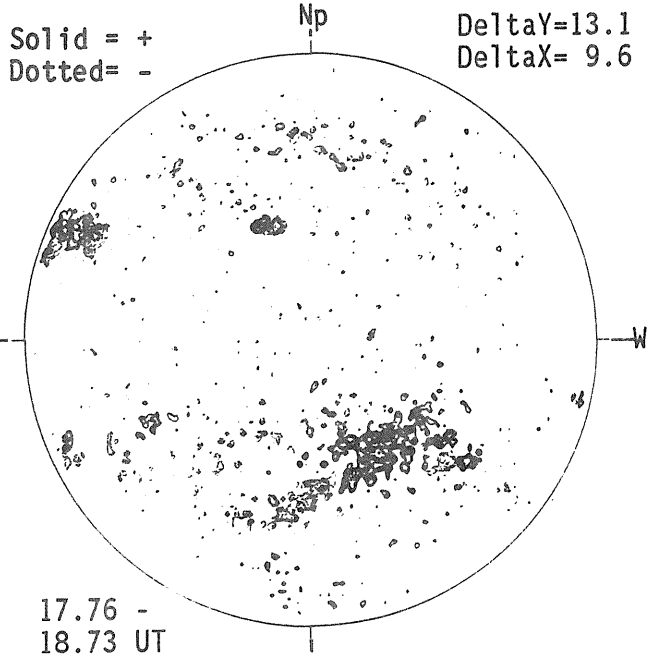
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

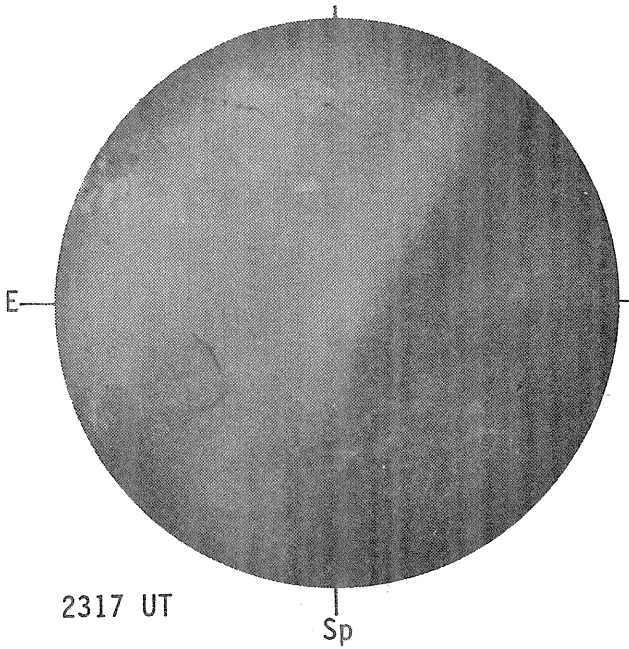


MT. WILSON MAGNETOGRAM

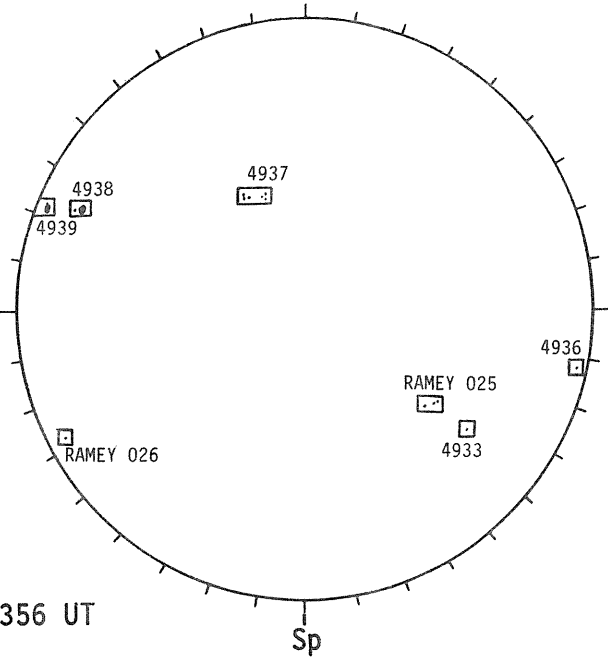
Solid = +
Dotted= -



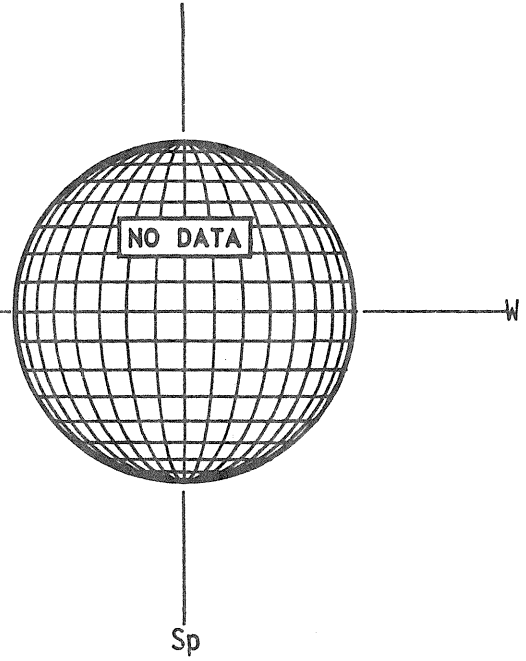
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



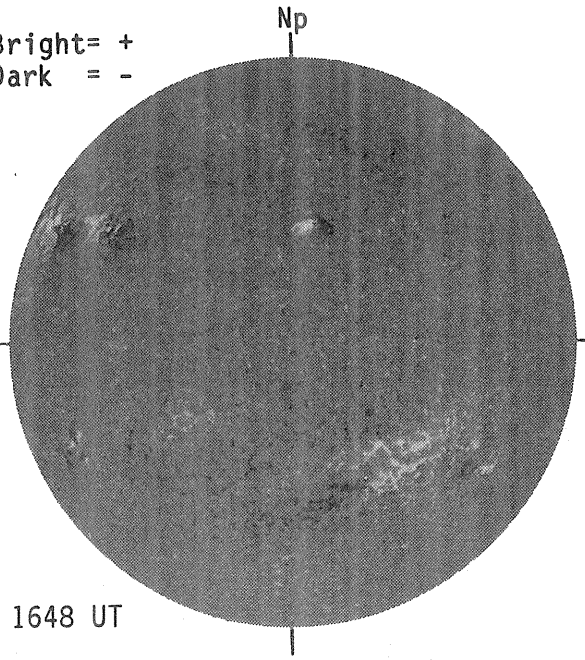
SACRAMENTO PEAK CORONA (1.15 Radii)



JANUARY 30, 1988 (P=-11.06, B_o=-5.82, L_o= 236.47)

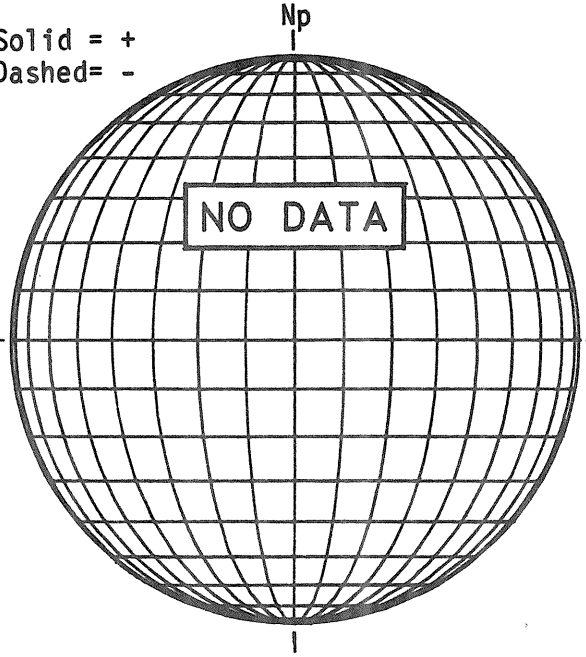
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



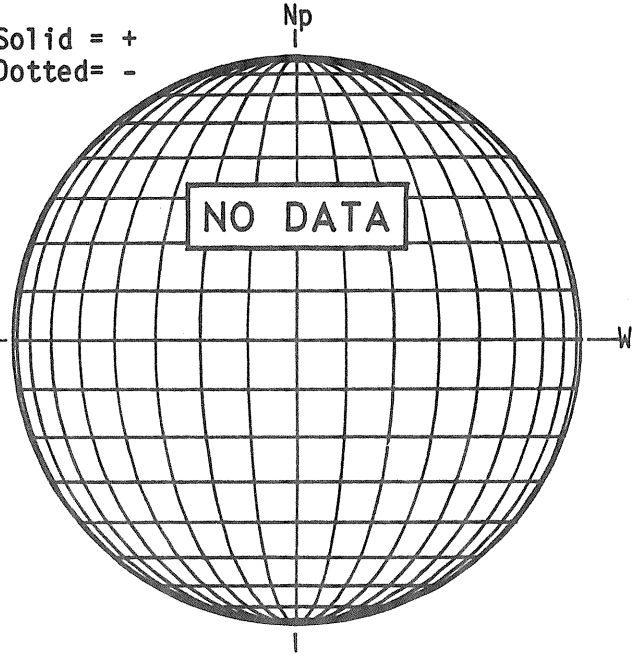
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

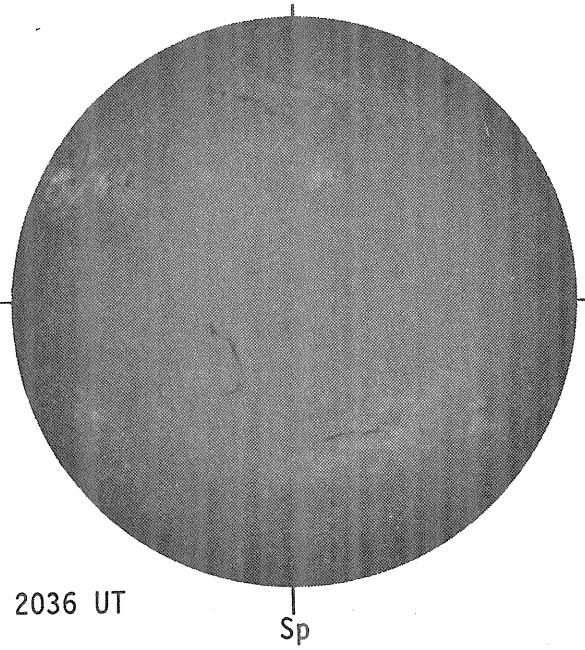


MT. WILSON MAGNETOGRAM

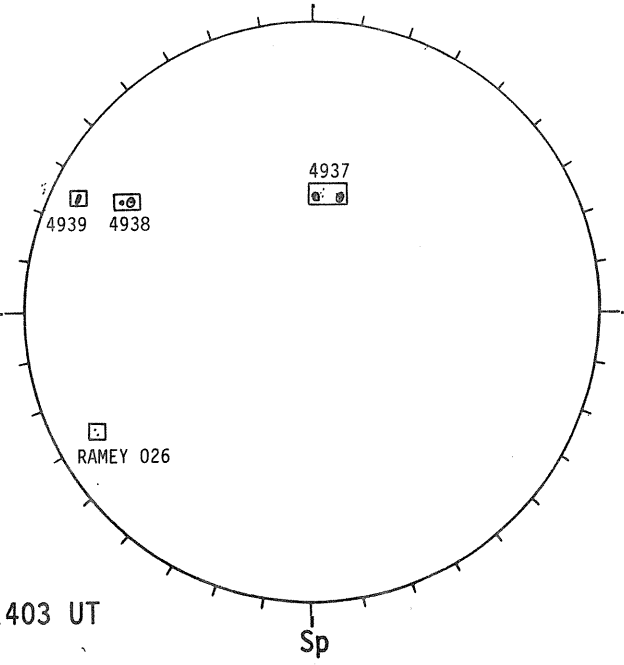
Solid = +
Dotted= -



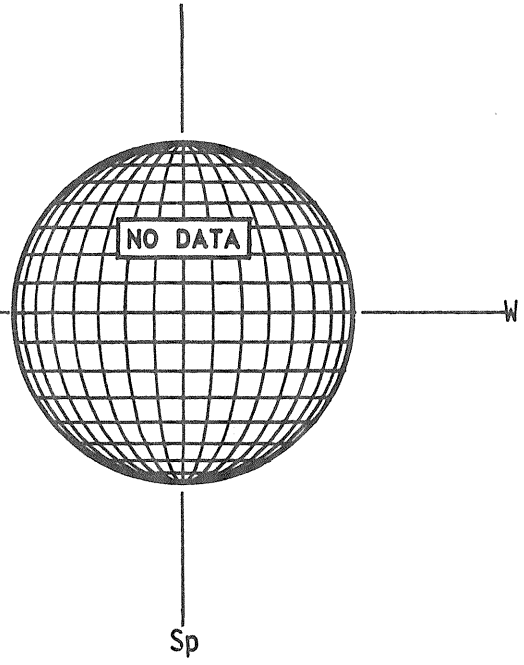
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)



JANUARY 31, 1988 (P=-11.48, B_o=-5.90, L_o= 223.31)

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

JANUARY 1988

NOAA/ USAF Group	Mt Wilson Group	Sta	Observation 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
4912		LEAR	12	25	0005	S32	E84	12	31.6		A	HA	120	1	2	3
4912		CULG	12	25	0440	S32	E81	12	31.6		A	HS	40	1	1	3
4912		SVTO	12	25	0810	S33	E78	12	31.5		A	HH	120	1	4	3
4912		RAMY	12	25	1350	S33	E78	12	31.8		A	HS	60	1	2	3
4912		BOUL	12	25	1515	S33	E82	01	1.1		A	HA	180	1	2	1
4912	24499	MWIL	12	25	1700	S33	E73	12	31.5	4	AP					
4912		PALE	12	25	1907	S34	E76	12	31.8		B	CSO	180	3	10	2
4912		LEAR	12	26	0004	S31	E70	12	31.5		B	CSO	330	6	8	3
4912		CULG	12	26	0440	S32	E71	12	31.8		B	DHO	200	10	10	2
4912		SVTO	12	26	0757	S33	E72	01	1.0		B	EAO	400	6	12	3
4912		RAMY	12	26	1405	S34	E70	01	1.2		B	EHI	470	12	14	3
4912	24499	MWIL	12	26	1615	S34	E62	12	31.6	5	(B)					
4912		HOLL	12	26	1948	S36	E65	01	1.0		B	EKO	420	12	13	3
4912		PALE	12	26	2105	S34	E68	01	1.3		B	EHO	320	11	15	3
4912		LEAR	12	27	0018	S33	E64	01	1.1		B	EHI	330	13	13	3
4912		CULG	12	27	0450	S33	E61	01	1.0		B	EHI	200	7	13	3
4912		SVTO	12	27	0818	S34	E58	01	1.0		B	EKI	640	18	14	3
4912		RAMY	12	27	1308	S34	E56	01	1.0		B	EHI	490	20	14	3
4912	24499	MWIL	12	27	1545	S34	E52	12	31.8	6	(BG)					
4912		HOLL	12	27	1735	S35	E52	12	31.9		B	EKO	630	22	15	3
4912		PALE	12	27	1820	S35	E54	01	1.1		B	EKO	460	27	15	4
4912		LEAR	12	28	0012	S33	E50	01	1.0		B	EHI	430	16	12	3
4912		SVTO	12	28	1238	S33	E45	01	1.1		B	EKI	640	27	13	2
4912		RAMY	12	28	1250	S34	E44	01	1.0		B	EKI	720	39	15	4
4912		BOUL	12	28	1536	S35	E42	01	1.0		B	EKI	410	10	14	2
4912	24499	MWIL	12	28	1700	S35	E42	01	1.1	6	(BG)					
4912		HOLL	12	28	1727	S34	E43	01	1.1		BG	EKO	400	27	15	3
4912		PALE	12	28	1909	S34	E42	01	1.1		B	EKI	500	27	15	3
4912		LEAR	12	29	0002	S34	E39	01	1.1		B	EKI	530	25	15	3
4912		SVTO	12	29	1010	S35	E34	01	1.1		B	EKO	360	11	13	1
4912		RAMY	12	29	1350	S34	E33	01	1.2		B	EKI	580	30	14	3
4912		BOUL	12	29	1507	S35	E30	01	1.0		B	EKI	270	10	14	2
4912		HOLL	12	29	1655	S35	E27	12	31.9		B	EKO	460	17	15	3
4912		PALE	12	29	1808	S33	E32	01	1.3		B	FKI	480	23	18	4
4912		LEAR	12	30	0025	S34	E27	01	1.2		B	EKO	450	22	14	3
4912		CULG	12	30	0340	S35	E22	12	31.9		B	EHI	470	12	14	2
4912		SVTO	12	30	0800	S35	E22	01	1.1		B	EKI	390	17	15	3
4912		RAMY	12	30	1530	S35	E18	01	1.1		B	FHI	410	31	17	4
4912		BOUL	12	30	1540	S34	E19	01	1.2		B	CKI	540	15	15	2
4912	24499	MWIL	12	30	1800	S34	E16	01	1.0	6	(BP)					
4912		HOLL	12	30	1815	S35	E15	01	1.0		B	CHI	400	25	18	2
4912		LEAR	12	31	0010	S35	E13	01	1.0		B	EKI	350	23	15	3
4912		CULG	12	31	0405	S36	E10	01	1.0		B	EHO	300	8	15	3
4912		RAMY	12	31	1420	S35	E07	01	1.2		B	EKO	420	18	14	2
4912	24499	MWIL	12	31	1630	S34	E05	01	1.1	5	(BG)					
4912		BOUL	12	31	1640	S35	E07	01	1.2		B	CHO	300	4	12	1
4912		HOLL	12	31	1747	S36	E03	01	1.0		B	FHI	720	23	17	4
4912		PALE	12	31	2150	S34	E03	01	1.1		B	FHO	340	16	16	1
4912		LEAR	01	01	0006	S35	E03	01	1.2		B	FKO	330	17	16	3
4912		CULG	01	01	0440	S34	W02	01	1.0		B	EHO	290	10	14	3
4912		RAMY	01	01	1457	S34	W04	01	1.3		B	EKO	330	20	15	2
4912		BOUL	01	01	1522	S35	W06	01	1.2		B	EHI	280	12	14	1
4912	24499	MWIL	01	01	1630	S34	W08	01	1.0	5	(BP)					
4912		LEAR	01	02	0030	S35	W09	01	1.3		B	CKO	250	16	15	3
4912		CULG	01	02	0530	S34	W16	12	31.9		B	CHO	190	9	11	3
4912		SVTO	01	02	0832	S34	W16	01	1.1		B	CKI	230	19	13	2
4912		RAMY	01	02	1302	S35	W17	01	1.2		B	CAO	260	18	13	3
4912		BOUL	01	02	1557	S32	W18	01	1.2		B	EHO	270	9	14	1
4912	24499	MWIL	01	02	1615	S33	W24	12	31.8	5	(BP)					
4912		HOLL	01	02	1814	S32	W22	01	1.0		B	CHO	220	15	12	3
4912		PALE	01	02	1950	S34	W25	12	31.8		B	CHO	240	11	6	2
4912		LEAR	01	03	0206	S33	W28	12	31.9		B	CHO	180	10	5	3
4912		CULG	01	03	0330	S32	W29	12	31.8		A	HH	180	4	5	3
4912		SVTO	01	03	1010	S34	W32	12	31.9		B	HK	180	9	4	3
4912		RAMY	01	03	1300	S34	W32	01	1.0		A	HK	230	11	6	3
4912		HOLL	01	03	1610	S32	W34	01	1.0		B	CKO	170	7	7	3
4912		BOUL	01	03	1643	S35	W34	01	1.0		A	HS	100	2	3	1
4912		PALE	01	03	2114	S34	W40	12	31.7		A	HS	340	3	3	1
4912		LEAR	01	04	0130	S33	W40	12	31.9		B	HKO	220	6	3	3

SUNSPOT GROUPS
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NOAA/ USAF Group	Mt Wilson Group	Sta	Observation 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
4912		CULG	01	04	0340	S32	W43	12	31.7		A	HS	170	2	2	2
4912		RAMY	01	04	1504	S33	W48	12	31.8		A	HS	170	4	3	2
4912		BOUL	01	04	1536	S34	W47	12	31.9		A	HS	130	5	5	2
4912		HOLL	01	04	1645	S31	W49	12	31.8		B	CAO	200	3	4	3
4912		PALE	01	04	2040	S34	W52	12	31.7		A	HS	70	3	4	2
4912		SVTO	01	05	0844	S34	W56	12	31.9		A	HS	200	3	3	2
4912		RAMY	01	05	1346	S33	W58	01	1.0		A	HS	140	5	4	3
4912		PALE	01	05	2145	S34	W67	12	31.6		A	HS	70	4	3	2
4912		LEAR	01	06	0026	S34	W67	12	31.7		B	CSO	100	4	4	3
4912		CULG	01	06	0500	S33	W70	12	31.6		A	HS	40	2	1	3
4912	24499	MWIL	01	06	1630	S33	W74	12	31.8	3	(AP)					
4912		PALE	01	06	1914	S34	W78	12	31.6		B	HS	70	4	4	3
4912		HOLL	01	06	2145	S32	W77	12	31.8		A	HA	70	4	2	3
4912		LEAR	01	07	0018	S34	W80	12	31.6		B	BSO	30	3	1	3
4912		CULG	01	07	0610	S33	W83	12	31.7		A	HS	40	2	1	3
4912		SVTO	01	07	0915	S34	W82	12	31.8		A	HR	70	1	2	2
4912		RAMY	01	07	1211	S33	W81	01	1.1		A	HS	30	1	2	2
4916		RAMY	01	01	1457	S09	W06	01	1.2		A	AX		1	1	2
4916	24502	MWIL	01	01	1630	S10	W08	01	1.1	3	(B)					
4916		LEAR	01	02	0030	S09	W12	01	1.1		A	AX	10	1	1	3
4918		RAMY	01	04	1504	N18	W42	01	1.4		A	AX	10	2	1	2
4918		BOUL	01	04	1536	N18	W42	01	1.4		A	AX		1	1	2
4918		HOLL	01	04	1645	N20	W42	01	1.5		A	AX	10	1	1	3
4918		PALE	01	04	2040	N19	W45	01	1.4		A	AX		1		2
4918A		CULG	01	07	0610	S23	W62	01	2.5		A	AX	10	1	1	3
4917	24501	MWIL	12	31	1630	S19	E69	01	6.0	3	(AP)					
4917		HOLL	12	31	1747	S22	E68	01	6.0		A	AX	10	1	1	4
4917		RAMY	01	01	1457	S16	E57	01	5.9		A	AX	10	1	1	2
4917		BOUL	01	01	1522	S19	E57	01	6.0		A	AX	10	1	1	1
4917	24501	MWIL	01	01	1630	S19	E56	01	6.0	4	(AP)					
4917		LEAR	01	02	0030	S18	E52	01	6.0		A	AX	20	1	1	3
4917		CULG	01	02	0530	S19	E48	01	5.9		A	AX		1		3
4917		RAMY	01	02	1302	S18	E45	01	6.0		A	AX	10	1	1	3
4917		BOUL	01	02	1557	S19	E44	01	6.0		A	AX	10	2	1	1
4917	24501	MWIL	01	02	1615	S19	E43	01	6.0	4	(AP)					
4917		HOLL	01	02	1814	S21	E42	01	6.0		A	AX	10	1	1	3
4917		PALE	01	02	1950	S20	E41	01	6.0		A	AX	10	1	1	2
4917		LEAR	01	03	0206	S18	E38	01	6.0		A	AX	10	1	1	3
4917		CULG	01	03	0330	S19	E37	01	6.0		A	AX	10	1	1	3
4917		SVTO	01	03	1010	S18	E34	01	6.0		A	AX		1		3
4917		RAMY	01	03	1300	S18	E31	01	5.9		A	AX	10	1	1	3
4917		HOLL	01	03	1610	S19	E30	01	6.0		A	AX	10	1	1	3
4917		BOUL	01	03	1643	S17	E31	01	6.0		A	AX	10	1	1	1
4917		LEAR	01	04	0130	S17	E25	01	6.0		A	AX	10	1	1	3
4917		CULG	01	04	0340	S18	E22	01	5.8		A	AX	10	1		2
4917		SVTO	01	05	0844	S18	E08	01	6.0		A	AX		1		2
4917		HOLL	01	07	1850	S21	W26	01	5.8		A	AX	10	1	1	3
4920		PALE	01	05	2145	S22	E11	01	6.7		B	BXO	10	2	3	2
4920		LEAR	01	06	0026	S23	E10	01	6.8		B	BXO	20	3	3	3
4920		CULG	01	06	0500	S22	E08	01	6.8		B	BXO	10	2	4	3
4920	24503	MWIL	01	06	1630	S23	E02	01	6.8	3	(B)					
4920		PALE	01	06	1914	S24	W01	01	6.7		B	BXO	30	6	4	3
4920		HOLL	01	06	2145	S24	W03	01	6.7		B	CRO	10	6	5	3
4920		LEAR	01	07	0018	S23	W04	01	6.7		B	BXO	10	5	6	3
4920		CULG	01	07	0610	S22	W07	01	6.7		B	BX	10	3	5	3
4920		SVTO	01	07	0915	S23	W09	01	6.7		B	CRO	30	4	5	2
4920		RAMY	01	07	1211	S22	W11	01	6.7		B	CRI	40	9	5	2
4920		BOUL	01	07	1610	S24	W13	01	6.7		B	CSI	90	8	6	2
4920	24503	MWIL	01	07	1630	S23	W13	01	6.7	5	(B)					
4920		HOLL	01	07	1850	S23	W14	01	6.7		B	CAO	60	7	6	3
4920		PALE	01	07	1945	S24	W15	01	6.7		B	CAO	40	6	6	2
4920		LEAR	01	08	0310	S24	W17	01	6.8		B	CAO	70	13	6	3
4920		CULG	01	08	0450	S21	W20	01	6.7		B	CAO	70	5	5	2
4920		RAMY	01	08	1425	S23	W24	01	6.7		B	CAI	90	9	7	3

SUNSPOT GROUPS
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4920	24503	MWIL	01	08	1600	S22	W27	01	6.6	5	(B)					
4920		BOUL	01	08	1637	S22	W27	01	6.6		B	DSI	100	6	7	1
4920		HOLL	01	08	1740	S21	W27	01	6.7		B	DAO	90	8	9	3
4920		PALE	01	08	1816	S23	W26	01	6.7		B	DSO	100	12	6	3
4920		LEAR	01	09	0130	S23	W30	01	6.7		B	CAO	100	9	7	3
4920		CULG	01	09	0430	S21	W34	01	6.6		B	DSO	70	5	7	2
4920		RAMY	01	09	1239	S23	W37	01	6.7		B	CAO	60	6	7	4
4920	24503	MWIL	01	09	1615	S22	W40	01	6.6	5	(BP)					
4920		HOLL	01	09	1623	S20	W39	01	6.7		B	CSO	60	5	6	3
4920		PALE	01	09	1909	S23	W41	01	6.6		B	CSO	50	5	7	3
4920		LEAR	01	10	0020	S25	W43	01	6.7		B	CAO	40	6	9	3
4920		CULG	01	10	0435	S22	W47	01	6.6		B	DSO	50	4	8	2
4920		SVTO	01	10	0802	S22	W48	01	6.6		B	CRO	60	10	7	3
4920		RAMY	01	10	1323	S24	W51	01	6.6		B	CSO	60	8	7	3
4920		HOLL	01	10	1600	S19	W53	01	6.6		B	CSO	50	5	6	3
4920	24503	MWIL	01	10	1700	S22	W55	01	6.5	5	(B)					
4920		PALE	01	10	1915	S22	W55	01	6.6		B	CSO	30	4	8	3
4920		LEAR	01	11	0120	S22	W57	01	6.7		B	CSO	80	3	4	3
4920		SVTO	01	11	0915	S22	W61	01	6.7		B	BXO	30	3	6	2
4920		LEAR	01	12	0020	S23	W70	01	6.6		B	BX	40	4	3	3
4920A		LEAR	01	13	0003	S35	W70	01	7.4		A	AX	10	1	1	3
4924		LEAR	01	11	0805	S16	W33	01	8.8		B	BXO	10	2	4	2
4924		SVTO	01	11	0915	S18	W33	01	8.9		B	BXO	20	2	4	2
4924		RAMY	01	12	1350	S23	W47	01	8.9		A	AX		1	1	3
4923		RAMY	01	09	1239	N22	W06	01	9.1		B	BXO	20	4	3	4
4923	24506	MWIL	01	09	1615	N23	W07	01	9.1	4	(B)					
4923		HOLL	01	09	1623	N23	W06	01	9.2		B	CAO	30	4	4	3
4923		PALE	01	09	1909	N23	W08	01	9.2		B	BXO	10	6	4	3
4923		LEAR	01	10	0020	N22	W14	01	8.9		B	BXO	10	6	5	3
4923		CULG	01	10	0435	N22	W17	01	8.9		B	BXO	50	2	5	2
4923		SVTO	01	10	0802	N23	W17	01	9.0		B	BXO	20	7	4	3
4923		RAMY	01	10	1323	N23	W20	01	9.0		B	BXO	50	12	5	3
4923		HOLL	01	10	1600	N24	W19	01	9.2		B	DAO	40	8	6	3
4923	24506	MWIL	01	10	1700	N24	W22	01	9.0	5	(B)					
4923		LEAR	01	11	0805	N26	W28	01	9.2		B	DRO	40	10	6	2
4923		SVTO	01	11	0915	N22	W28	01	9.2		B	CRO	70	14	7	2
4923	24506	MWIL	01	11	1615	N24	W33	01	9.1	4	(BF)					
4923		PALE	01	11	1928	N25	W35	01	9.1		B	CSO	70	8	8	3
4923		LEAR	01	12	0020	N22	W38	01	9.1		B	DAO	120	11	7	3
4923		CULG	01	12	0440	N22	W43	01	8.9		B	DSO	60	4	6	2
4923		SVTO	01	12	1040	N23	W42	01	9.2		B	CRO	70	6	7	3
4923		RAMY	01	12	1350	N24	W48	01	8.9		B	DAO	60	5	8	3
4923	24506	MWIL	01	12	1545	N25	W45	01	9.2	5	(B)					
4923		HOLL	01	12	1557	N26	W45	01	9.2		B	EAO	60	3	11	3
4923		PALE	01	12	1820	N24	W47	01	9.1		B	DSO	50	4	5	3
4923		LEAR	01	13	0003	N21	W51	01	9.1		B	DSO	80	6	9	3
4923		CULG	01	13	0430	N22	W55	01	9.0		B	CSO	70	4	8	3
4923		RAMY	01	13	1620	N25	W61	01	8.9		B	CRO	40	5	8	2
4923	24506	MWIL	01	13	1645	N25	W59	01	9.1	4	(B)					
4923		HOLL	01	13	1710	N23	W63	01	8.9		B	CAO	50	6	15	3
4923		PALE	01	13	1902	N24	W62	01	9.0		B	CRO	40	4	9	3
4923		LEAR	01	14	0015	N23	W63	01	9.1		B	CRO	50	2	7	4
4923		CULG	01	14	0500	N23	W66	01	9.1		B	CSO	20	2	8	3
4923		SVTO	01	14	1351	N26	W68	01	9.3		B	BXO	10	2	3	3
4923	24506	MWIL	01	14	1600	N24	W72	01	9.1	4	(B)					
4923		HOLL	01	14	1620	N22	W67	01	9.5		A	AX	30	1	1	3
4923		RAMY	01	14	1629	N22	W72	01	9.1		B	CRO	60	8	10	3
4923		PALE	01	14	1841	N24	W79	01	8.7		B	BXO	10	2	9	3
4923		LEAR	01	15	0018	N26	W74	01	9.3		B	BXO	10	2	1	3
4928		LEAR	01	11	0805	N21	W27	01	9.3		B	BXO	10	3	3	2
4928		PALE	01	12	1820	N17	W48	01	9.1		A	AX		1		3
4928		RAMY	01	13	1620	N18	W62	01	8.9		A	AX	10	1	1	2
4928	24509	MWIL	01	13	1645	N17	W61	01	9.1	4	(AP)					
4928		HOLL	01	13	1710	N13	W61	01	9.1		B	BXO	20	3	7	3
4928		PALE	01	13	1902	N17	W61	01	9.1		B	BXO		4	5	3

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4928		LEAR	01	14	0015	N16	W64	01	9.1		B	BXO	20	4	5	4
4928		CULG	01	14	0500	N18	W67	01	9.1		B	BXO	70	4	6	3
4928		SVTO	01	14	1351	N18	W73	01	9.0		B	CRO	80	6	10	3
4928	24509	MWIL	01	14	1600	N17	W72	01	9.2	4	(B)					
4928		HOLL	01	14	1620	N19	W70	01	9.3		B	BXO	60	4	5	3
4928		PALE	01	14	1841	N17	W77	01	8.9		B	CSO	60	4	6	3
4928		LEAR	01	15	0018	N17	W78	01	9.1		B	BXO	20	3	5	3
4922		LEAR	01	09	0130	S07	E08	01	9.7		B	BXO	10	2	3	3
4922		RAMY	01	09	1239	S07	E03	01	9.7		B	BXO	10	3	3	4
4922		HOLL	01	09	1623	S08	E01	01	9.7		A	AX		1	1	3
4922		PALE	01	09	1909	S08	W01	01	9.7		A	AX		1		3
4922		RAMY	01	10	1323	S08	W11	01	9.7		A	AX	10	1	1	3
4922A		RAMY	01	05	1346	S22	E68	01	10.8		A	AX	10	1	1	3
4922A		RAMY	01	10	1323	S24	E04	01	10.9		B	BXO	10	2	1	3
4922A		HOLL	01	10	1600	S19	W01	01	10.6		A	AX		1	1	3
4922A		LEAR	01	12	0020	S21	W15	01	10.9		A	AX	10	1	1	3
4922A	24507	MWIL	01	12	1545	S25	W22	01	11.0	3	(AP)					
4919		HOLL	01	04	1645	N27	E79	01	10.8		A	AX	10	1	1	3
4919		SVTO	01	05	0844	N32	E73	01	11.1		B	BXI	20	6	11	2
4919		RAMY	01	05	1346	N30	E69	01	11.0		B	BXO	30	5	9	3
4919		PALE	01	05	2145	N29	E68	01	11.2		B	BXO	20	4	6	2
4919		LEAR	01	06	0026	N30	E62	01	10.9		B	BXO	50	5	10	3
4919		CULG	01	06	0500	N30	E60	01	10.9		B	BXO	10	2	7	3
4919	24504	MWIL	01	06	1630	N30	E56	01	11.1	3	(BP)					
4919		PALE	01	06	1914	N32	E53	01	11.0		B	B	40	9	8	3
4919		HOLL	01	06	2145	N28	E53	01	11.0		B	CRO	50	11	8	3
4919		LEAR	01	07	0018	N30	E50	01	10.9		B	BXI	40	16	10	3
4919		CULG	01	07	0610	N32	E47	01	11.0		B	BXI	10	10	11	3
4919		SVTO	01	07	0915	N32	E47	01	11.1		B	CRI	50	12	14	2
4919		RAMY	01	07	1211	N30	E43	01	10.9		B	BXO	50	16	12	2
4919		BOUL	01	07	1610	N31	E40	01	10.8		B	CSO	220	12	9	2
4919	24504	MWIL	01	07	1630	N30	E41	01	10.9	4	BP					
4919		HOLL	01	07	1850	N28	E41	01	11.0		B	CAO	60	16	9	3
4919		PALE	01	07	1945	N30	E40	01	11.0		B	BXO	70	11	11	2
4919		LEAR	01	08	0310	N32	E35	01	10.9		B	EAI	80	16	12	3
4919		CULG	01	08	0450	N31	E32	01	10.7		B	CRI	50	8	9	2
4919		RAMY	01	08	1425	N30	E29	01	10.9		B	BXO	60	23	11	3
4919	24504	MWIL	01	08	1600	N30	E26	01	10.7	3	(BP)					
4919		BOUL	01	08	1637	N30	E24	01	10.6		B	DSO	80	8	10	1
4919		HOLL	01	08	1740	N27	E27	01	10.8		B	EAO	170	14	12	3
4919		PALE	01	08	1816	N32	E28	01	11.0		B	BXO	20	19	12	3
4919		LEAR	01	09	0130	N31	E18	01	10.5		B	CRI	20	9	6	3
4919		CULG	01	09	0430	N30	E20	01	10.8		B	CRI	70	8	9	2
4919		RAMY	01	09	1239	N30	E15	01	10.7		B	BXO	50	16	10	4
4919	24504	MWIL	01	09	1615	N30	E12	01	10.6	5	(BP)					
4919		HOLL	01	09	1623	N29	E15	01	10.8		B	CSI	60	15	9	3
4919		PALE	01	09	1909	N30	E11	01	10.7		B	CSO	40	12	9	3
4919		LEAR	01	10	0020	N31	E06	01	10.5		B	DAO	60	12	9	3
4919		CULG	01	10	0435	N30	E05	01	10.6		B	CAO	60	5	8	2
4919		SVTO	01	10	0802	N30	E05	01	10.7		B	CRI	70	13	9	3
4919		RAMY	01	10	1323	N30	E04	01	10.9		B	CRO	60	11	7	3
4919		HOLL	01	10	1600	N29	E04	01	11.0		B	CAO	40	13	8	3
4919	24504	MWIL	01	10	1700	N30	W00	01	10.7	5	(B)					
4919		PALE	01	10	1915	N29	W01	01	10.7		B	BXO	20	13	8	3
4919		LEAR	01	11	0120	N31	W05	01	10.7		B	CRO	60	9	9	3
4919		SVTO	01	11	0915	N31	W07	01	10.8		B	DRI	60	13	8	2
4919	24504	MWIL	01	11	1615	N30	W13	01	10.7	5	(B)					
4919		PALE	01	11	1928	N31	W14	01	10.7		B	EAO	80	9	10	3
4919		LEAR	01	12	0020	N30	W19	01	10.5		B	DAO	180	13	9	3
4919		CULG	01	12	0440	N30	W22	01	10.5		B	DSI	100	5	8	2
4919		SVTO	01	12	1040	N30	W22	01	10.7		B	ESO	120	7	11	3
4919		RAMY	01	12	1350	N27	W28	01	10.4		B	EAI	140	14	11	3
4919	24504	MWIL	01	12	1545	N30	W25	01	10.7	5	(BP)					
4919		HOLL	01	12	1557	N31	W23	01	10.8		B	EAI	110	11	12	3
4919		PALE	01	12	1820	N30	W27	01	10.6		B	ESI	130	14	11	3
4919		LEAR	01	13	0310	N30	W33	01	10.5		B	ESI	90	10	12	3

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4919		CULG	01	13	0430	N30	W34	01	10.5		B	DSI	140	7	9	3
4919		RAMY	01	13	1620	N30	W39	01	10.6		B	DAI	70	6	8	2
4919	24504	MWIL	01	13	1645	N30	W37	01	10.8	5	(BP)					
4919		HOLL	01	13	1710	N27	W42	01	10.4		B	FSO	80	8	16	3
4919		PALE	01	13	1902	N30	W40	01	10.6		B	DSO	140	7	12	3
4919		LEAR	01	14	0015	N29	W43	01	10.6		B	DRO	50	6	10	4
4919		CULG	01	14	0500	N30	W45	01	10.7		B	DSO	80	4	10	3
4919		SVTO	01	14	1351	N30	W50	01	10.6		B	CRI	60	9	11	3
4919	24504	MWIL	01	14	1600	N30	W51	01	10.7	4	(B)					
4919		HOLL	01	14	1620	N32	W50	01	10.7		B	CRO	40	7	12	3
4919		RAMY	01	14	1629	N30	W52	01	10.6		B	CRI	70	8	11	3
4919		PALE	01	14	1841	N30	W53	01	10.6		B	CSO	30	8	12	3
4919		LEAR	01	15	0018	N30	W58	01	10.4		B	BXO	40	5	16	3
4919		RAMY	01	15	1435	N29	W68	01	10.3		B	BXO	30	3	10	4
4919	24504	MWIL	01	15	1600	N29	W69	01	10.3	3	B					
4919		HOLL	01	15	2021	N33	W64	01	10.8		A	AX	10	2	2	3
4919		PALE	01	15	2035	N30	W67	01	10.6		B	BXO	20	3	9	3
4919		LEAR	01	16	0230	N29	W77	01	10.1		A	HS	30	1	1	3
4919		RAMY	01	16	1432	N30	W78	01	10.5		A	AX	10	1	1	4
4926		SVTO	01	12	1040	S25	W17	01	11.1		A	AX		2		3
4926		RAMY	01	12	1350	S26	W17	01	11.2		A	AX	10	5	2	3
4926		HOLL	01	12	1557	S24	W22	01	11.0		B	BXO	10	4	4	3
4926		HOLL	01	13	1710	S24	W31	01	11.3		A	AX	10	1	1	3
4926A	24511	MWIL	01	14	1600	S30	W38	01	11.7	3	(B)					
4926A		LEAR	01	15	0018	S30	W42	01	11.7		B	BXO	10	5	5	3
4926A	24511	MWIL	01	15	1600	S31	W49	01	11.8	4	AF					
4926A		LEAR	01	16	0230	S32	W55	01	11.7		B	BXO	10	2	2	3
4921		PALE	01	06	1914	S26	E70	01	12.2		A	AX	10	1	1	3
4921		HOLL	01	06	2145	S28	E68	01	12.2		B	BXO	10	3	2	3
4921		LEAR	01	07	0018	S26	E68	01	12.3		B	BXO	20	3	2	3
4921		SVTO	01	07	0915	S25	E63	01	12.3		B	CRO	40	2	6	2
4921		RAMY	01	07	1211	S26	E58	01	12.0		B	CRO	40	5	4	2
4921		BOUL	01	07	1610	S27	E57	01	12.1		B	BXO	80	3	5	2
4921	24505	MWIL	01	07	1630	S26	E56	01	12.0	5	(B)					
4921		HOLL	01	07	1850	S28	E53	01	11.9		B	DSO	70	6	6	3
4921		PALE	01	07	1945	S27	E55	01	12.1		B	DSO	110	6	7	2
4921		LEAR	01	08	0310	S23	E50	01	12.0		B	DAO	120	12	7	3
4921		CULG	01	08	0450	S26	E47	01	11.8		B	DSO	150	4	7	2
4921		RAMY	01	08	1425	S26	E44	01	12.0		B	DSO	110	8	8	3
4921	24505	MWIL	01	08	1600	S26	E44	01	12.1	5	(B)					
4921		BOUL	01	08	1637	S25	E41	01	11.9		B	DSI	140	9	9	1
4921		HOLL	01	08	1740	S26	E41	01	11.9		B	DAO	110	5	6	3
4921		PALE	01	08	1816	S25	E41	01	11.9		BG	DSO	160	11	7	3
4921		LEAR	01	09	0130	S23	E38	01	12.0		B	DAO	160	4	9	3
4921		CULG	01	09	0430	S26	E35	01	11.9		B	DSO	120	4	9	2
4921		RAMY	01	09	1239	S25	E31	01	11.9		B	DAO	140	7	9	4
4921	24505	MWIL	01	09	1615	S26	E28	01	11.9	5	(B)					
4921		HOLL	01	09	1623	S26	E28	01	11.8		B	EAO	80	7	11	3
4921		PALE	01	09	1909	S26	E28	01	12.0		B	DSO	70	7	10	3
4921		LEAR	01	10	0020	S23	E26	01	12.0		B	DAO	80	8	10	3
4921		CULG	01	10	0435	S25	E21	01	11.8		B	DSO	70	4	10	2
4921		SVTO	01	10	0802	S25	E20	01	11.9		B	DSO	80	7	10	3
4921		RAMY	01	10	1323	S25	E18	01	11.9		B	DAO	100	6	10	3
4921		HOLL	01	10	1600	S26	E15	01	11.8		B	EAO	60	3	11	3
4921	24505	MWIL	01	10	1700	S26	E17	01	12.0	5	(B)					
4921		PALE	01	10	1915	S26	E15	01	12.0		B	CSO	50	5	11	3
4921		LEAR	01	11	0805	S25	E12	01	12.3		A	HA	40	4	3	2
4921		SVTO	01	11	0915	S25	E08	01	12.0		B	CAO	70	5	13	2
4921	24505	MWIL	01	11	1615	S26	E08	01	12.3	5	(AF)					
4921		PALE	01	11	1928	S26	E05	01	12.2		B	CSO	30	4	2	3
4921		LEAR	01	12	0020	S26	W02	01	11.8		B	CAO	90	5	10	3
4921		CULG	01	12	0440	S25	W02	01	12.0		B	CSO	30	5	17	2
4921		SVTO	01	12	1040	S27	W01	01	12.4		A	HR	40	4	3	3
4921		RAMY	01	12	1350	S26	W02	01	12.4		A	HA	40	5	3	3
4921	24505	MWIL	01	12	1545	S26	W05	01	12.3	4	(AF)					
4921		HOLL	01	12	1557	S26	W07	01	12.1		A	HS	20	3	3	3

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4921		PALE	01 12 1820	S26 W07	01 12.2		B	CRO	10	3	3	3
4921		LEAR	01 13 0310	S26 W11	01 12.3		B	BXO	20	3	3	3
4921		CULG	01 13 0430	S26 W12	01 12.2		B	HS	30	1	1	3
4921		RAMY	01 13 1620	S26 W18	01 12.3		A	HR	20	3	1	2
4921	24505	MWIL	01 13 1645	S26 W17	01 12.4	5	(AF)					
4921		HOLL	01 13 1710	S28 W18	01 12.3		A	HS	30	3	2	3
4921		PALE	01 13 1902	S26 W20	01 12.2		B	CSO	20	3	3	3
4921		LEAR	01 14 0015	S27 W23	01 12.2		A	AX	10	5	2	4
4921		CULG	01 14 0500	S26 W27	01 12.1		A	HS	30	3	5	3
4921		SVTO	01 14 1351	S25 W29	01 12.3		A	HS	30	4	1	3
4921	24505	MWIL	01 14 1600	S26 W32	01 12.2	4	(BF)					
4921		HOLL	01 14 1620	S25 W35	01 12.0		B	CSO	30	4	7	3
4921		RAMY	01 14 1629	S27 W35	01 11.9		B	CAO	40	6	8	3
4921		PALE	01 14 1841	S29 W38	01 11.8		B	CSO	20	9	9	3
4921		LEAR	01 15 0018	S26 W36	01 12.2		B	BXO	10	3	2	3
4921		RAMY	01 15 1435	S28 W47	01 11.9		B	BXO	30	5	8	4
4921	24505	MWIL	01 15 1600	S26 W45	01 12.2	4	AF					
4921		HOLL	01 15 2021	S26 W48	01 12.1		B	CAO	30	8	6	3
4921		PALE	01 15 2035	S28 W50	01 11.9		B	BXO	20	6	6	3
4921		LEAR	01 16 0230	S26 W52	01 12.1		B	CSO	30	4	4	3
4921		SVTO	01 16 1147	S26 W56	01 12.1		B	CRO	40	2	4	2
4921		RAMY	01 16 1432	S29 W60	01 11.9		B	CRO	20	6	8	4
4921		PALE	01 16 2006	S25 W63	01 11.9		B	CSO	30	4	5	3
4921		LEAR	01 17 0004	S26 W62	01 12.2		B	BXO	20	4	7	3
4921		SVTO	01 17 0915	S26 W69	01 12.0		B	CRO	20	3	4	3
4921		LEAR	01 18 0015	S27 W75	01 12.2		B	BX	10	4	2	3
4921A		SVTO	01 14 1351	N05 W13	01 13.6		A	AX		2	2	3
4921A	24512	MWIL	01 14 1600	N04 W14	01 13.6	3	(B+)					
4921A		HOLL	01 14 1620	N05 W14	01 13.6		B	BXO	10	2	2	3
4921A		PALE	01 14 1841	N04 W16	01 13.6		B	BXO		2	3	3
4930		LEAR	01 15 0018	N20 E29	01 17.2		A	AX	10	2	2	3
4930		RAMY	01 15 1435	N20 E23	01 17.4		B	BXO	20	5	4	4
4930	24513	MWIL	01 15 1600	N20 E20	01 17.2	4	X					
4930		HOLL	01 15 2021	N19 E20	01 17.4		A	AX	10	4	3	3
4930		PALE	01 15 2035	N20 E18	01 17.2		B	BXO	10	6	4	3
4930		LEAR	01 16 0230	N20 E14	01 17.2		B	BXO	10	4	3	3
4930		SVTO	01 16 1147	N19 E08	01 17.1		B	BXO	20	2	2	2
4930		RAMY	01 16 1432	N20 E08	01 17.2		B	BXO	10	3	3	4
4930		PALE	01 16 2006	N20 E06	01 17.3		B	BXO		4	4	3
4930		LEAR	01 17 0004	N21 E06	01 17.5		B	BXO	10	4	3	3
4930		SVTO	01 17 0915	N20 E02	01 17.5		B	BXO	10	2	4	3
4930		LEAR	01 18 0015	N20 W08	01 17.4		B	BX	20	4	3	3
4930		SVTO	01 18 1132	N21 W14	01 17.4		A	AX	10	1		2
4930		LEAR	01 20 0012	N22 W38	01 17.1		B	BX	10	2	2	3
4925		LEAR	01 12 0020	S33 E78	01 18.2		B	BX	40	3	4	3
4925		SVTO	01 12 1040	S36 E73	01 18.3		B	BXO	30	3	12	3
4925		RAMY	01 12 1350	S36 E69	01 18.1		B	BXO	20	3	7	3
4925	24508	MWIL	01 12 1545	S35 E64	01 17.8	3	(AP)					
4925		HOLL	01 12 1557	S39 E63	01 17.8		A	AX		1	1	3
4925		PALE	01 12 1820	S35 E69	01 18.3		B	BXO	10	4	8	3
4925		LEAR	01 13 0003	S35 E65	01 18.2		B	BXO	20	4	10	3
4925		CULG	01 13 0430	S36 E64	01 18.3		B	CSO	40	3	10	3
4925		RAMY	01 13 1620	S35 E55	01 18.1		B	CRO	40	9	11	2
4925	24508	MWIL	01 13 1645	S35 E57	01 18.3	4	(B)					
4925		HOLL	01 13 1710	S36 E55	01 18.1		B	BXO	30	10	15	3
4925		PALE	01 13 1902	S36 E55	01 18.2		B	CSO	30	10	12	3
4925		LEAR	01 14 0015	S34 E51	01 18.1		B	CRO	40	8	11	4
4925		CULG	01 14 0500	S37 E47	01 18.0		B	ESO	140	6	12	3
4925		SVTO	01 14 1351	S36 E44	01 18.1		B	ESI	130	19	14	3
4925	24508	MWIL	01 14 1600	S36 E45	01 18.3	5	(B)					
4925		HOLL	01 14 1620	S38 E40	01 17.9		B	DSO	100	16	14	3
4925		RAMY	01 14 1629	S35 E42	01 18.0		B	CSO	110	17	13	3
4925		PALE	01 14 1841	S35 E42	01 18.1		B	CSI	120	24	14	3
4925		LEAR	01 15 0018	S35 E38	01 18.0		B	CRI	60	18	15	3
4925		RAMY	01 15 1435	S35 E34	01 18.3		B	CAI	190	22	13	4
4925	24508	MWIL	01 15 1600	S36 E31	01 18.2	5	B					

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4925		HOLL	01 15 2021	S37 E26	01 17.9		BG	EAI	150	22	13	3
4925		PALE	01 15 2035	S35 E29	01 18.2		BG	EKI	250	25	14	3
4925		LEAR	01 16 0230	S36 E26	01 18.2		B	EAI	120	19	11	3
4925		SVTO	01 16 1147	S34 E26	01 18.6		B	EAI	170	17	14	2
4925		RAMY	01 16 1432	S35 E19	01 18.1		B	CAI	200	22	15	4
4925		PALE	01 16 2006	S36 E16	01 18.1		BG	ESI	220	19	14	3
4925		LEAR	01 17 0004	S35 E15	01 18.2		B	FAI	130	26	16	3
4925		CULG	01 17 0500	S35 E11	01 18.1		B	ESI	190	10	14	3
4925		SVTO	01 17 0915	S33 E14	01 18.5		B	EAI	170	30	15	3
4925		HOLL	01 17 1836	S36 E10	01 18.6		BG	ESI	120	20	15	1
4925		RAMY	01 17 1843	S36 E04	01 18.1		B	EAI	200	21	14	1
4925		LEAR	01 18 0015	S36 E05	01 18.4		B	FAI	150	14	16	3
4925		CULG	01 18 0500	S34 E02	01 18.4		B	EAI	70	9	14	3
4925		SVTO	01 18 1132	S36 W04	01 18.1		B	FAO	90	14	17	2
4925		RAMY	01 18 1400	S36 W07	01 18.0		B	FAI	90	18	18	3
4925		PALE	01 18 2315	S35 W10	01 18.2		B	CSO	90	15	18	2
4925		LEAR	01 19 0038	S37 W09	01 18.3		B	CSO	50	12	19	2
4925		CULG	01 19 0430	S36 W12	01 18.2		B	FSI	40	9	17	3
4925		RAMY	01 19 1343	S36 W18	01 18.1		B	FAO	80	14	18	3
4925	24508	MWIL	01 19 1615	S36 W19	01 18.2	3	(BP)					
4925		PALE	01 19 1940	S35 W20	01 18.2		B	FSO	70	9	19	4
4925		LEAR	01 20 0012	S37 W23	01 18.1		B	FSO	100	8	21	3
4925		CULG	01 20 0450	S36 W25	01 18.2		B	FSO	70	4	18	2
4925		RAMY	01 20 1415	S37 W31	01 18.1		B	CRO	30	5	18	3
4925	24508	MWIL	01 20 1600	S37 W30	01 18.2	3	(B)					
4925		HOLL	01 20 1815	S35 W34	01 18.0		B	CRO	60	9	10	3
4925		PALE	01 20 1851	S36 W34	01 18.0		B	FRO	30	12	20	3
4925		LEAR	01 21 0005	S36 W33	01 18.3		B	CSO	40	5	22	2
4925		CULG	01 21 0350	S38 W39	01 18.0		B	FSO	70	6	20	2
4925		RAMY	01 21 1350	S36 W40	01 18.4		B	BXO	30	6	18	3
4925	24508	MWIL	01 21 1600	S37 W41	01 18.4	3	(B)					
4925		HOLL	01 21 1610	S36 W43	01 18.2		B	BXO	20	4	15	3
4925		PALE	01 21 1912	S34 W40	01 18.6		B	BXO	20	4	12	3
4925		LEAR	01 22 0003	S37 W46	01 18.3		B	FSO	50	7	20	3
4925		CULG	01 22 0500	S37 W50	01 18.2		B	CSO	40	5	16	3
4925		SVTO	01 22 1020	S37 W56	01 17.9		B	BXO	10	2	16	2
4925		HOLL	01 22 1612	S35 W57	01 18.1		B	BXO	30	2	10	3
4925		PALE	01 22 1828	S35 W54	01 18.4		B	BXO	20	2	13	3
4925		LEAR	01 23 0005	S38 W55	01 18.5		B	BX	40	4	14	2
4925		CULG	01 23 0420	S34 W60	01 18.4		A	AX	20	1	1	1
4925		RAMY	01 23 1530	S35 W69	01 18.1		B	BXO	20	3	10	2
4925		HOLL	01 23 1628	S34 W71	01 18.0		B	BXO	20	5	13	3
4925		PALE	01 23 1906	S35 W69	01 18.3		B	BXO	10	3	11	2
4925		LEAR	01 24 0255	S38 W70	01 18.5		B	BXO	10	2	1	2
4925		CULG	01 24 0450	S37 W74	01 18.2		A	AX	20	2	2	2
4925		SVTO	01 24 0901	S37 W73	01 18.5		A	AX	10	1	1	2
4925		RAMY	01 24 1312	S36 W79	01 18.2		B	BXO	20	3	12	4
4925		HOLL	01 24 1545	S35 W76	01 18.6		A	AX	10	1	1	3
4925	24508	MWIL	01 24 1600	S36 W78	01 18.4	4	(AF)					
4925		PALE	01 24 1930	S36 W81	01 18.3		A	AX	10	1	1	3
4925		LEAR	01 25 0018	S37 W81	01 18.5		A	AX	10	1	1	4
4925A		LEAR	01 18 0015	S05 E07	01 18.5		B	BX	10	2	2	3
4925B		LEAR	01 22 0003	S30 W30	01 19.6		A	AX	10	1	1	3
4927		LEAR	01 13 0310	S18 E88	01 19.8		A	HS	140	1	2	3
4927		CULG	01 13 0430	S20 E85	01 19.7		A	HS	40	1		3
4927		RAMY	01 13 1620	S19 E77	01 19.5		A	HR	180	3	2	2
4927	24510	MWIL	01 13 1645	S19 E78	01 19.7	4	(AP)					
4927		HOLL	01 13 1710	S18 E75	01 19.4		A	HH	230	2	3	3
4927		PALE	01 13 1902	S19 E77	01 19.7		A	HH	180	2	3	3
4927		LEAR	01 14 0015	S18 E74	01 19.6		A	HS	180	3	3	4
4927		CULG	01 14 0500	S19 E76	01 20.0		B	DHO	290	4	9	3
4927		SVTO	01 14 1351	S18 E66	01 19.6		B	CHI	260	10	10	3
4927	24510	MWIL	01 14 1600	S19 E65	01 19.6	5	(BP)					
4927		HOLL	01 14 1620	S22 E66	01 19.7		B	CKO	240	7	7	3
4927		RAMY	01 14 1629	S19 E68	01 19.9		B	CAI	330	10	14	3
4927		PALE	01 14 1841	S19 E66	01 19.8		B	CKO	280	9	7	3

SUNSPOT GROUPS
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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
4927		LEAR	01	15	0018	S18	E63	01	19.8		B	CAO	230	12	12	3
4927		RAMY	01	15	1435	S19	E58	01	20.0		B	DKI	400	14	12	4
4927	24510	MWIL	01	15	1600	S19	E52	01	19.6	5	BP					
4927		HOLL	01	15	2021	S21	E51	01	19.7		B	EKO	270	12	13	3
4927		PALE	01	15	2035	S19	E53	01	19.9		B	EKI	360	15	14	3
4927		LEAR	01	16	0230	S18	E49	01	19.8		B	EKI	310	13	10	3
4927		SVTO	01	16	1147	S19	E44	01	19.8		B	DKO	300	11	10	2
4927		RAMY	01	16	1432	S19	E42	01	19.8		B	CKI	360	13	10	4
4927		PALE	01	16	2006	S19	E38	01	19.7		B	DHI	300	15	8	3
4927		LEAR	01	17	0004	S18	E37	01	19.8		B	EAI	270	21	12	3
4927		CULG	01	17	0500	S18	E33	01	19.7		B	DAO	100	4	7	3
4927		SVTO	01	17	0915	S19	E33	01	19.9		B	EAO	310	23	12	3
4927		HOLL	01	17	1836	S21	E26	01	19.8		B	CKO	220	8	9	1
4927		RAMY	01	17	1843	S19	E27	01	19.8		B	CAI	360	12	8	1
4927		LEAR	01	18	0015	S19	E25	01	19.9		B	EAO	240	13	13	3
4927		CULG	01	18	0500	S17	E22	01	19.9		B	CKO	160	8	9	3
4927		SVTO	01	18	1132	S19	E20	01	20.0		B	EKI	360	19	12	2
4927		RAMY	01	18	1400	S19	E17	01	19.9		B	CKI	370	30	12	3
4927		PALE	01	18	2315	S19	E14	01	20.0		B	EKO	340	16	14	2
4927		LEAR	01	19	0038	S20	E13	01	20.0		B	CHO	400	13	12	2
4927		CULG	01	19	0430	S18	E10	01	19.9		B	EKI	170	17	12	3
4927		RAMY	01	19	1343	S18	E05	01	19.9		B	EAI	370	26	12	3
4927	24510	MWIL	01	19	1615	S19	E03	01	19.9	5	(BP)					
4927		PALE	01	19	1940	S20	E05	01	20.2		BG	EKI	360	22	14	4
4927		LEAR	01	20	0012	S20	E00	01	20.0		B	EAO	410	24	13	3
4927		CULG	01	20	0450	S19	W01	01	20.1		B	EHI	350	10	12	2
4927		RAMY	01	20	1415	S20	W07	01	20.0		B	EKO	390	22	14	3
4927	24510	MWIL	01	20	1600	S19	W08	01	20.1	5	(B)					
4927		HOLL	01	20	1815	S22	W10	01	20.0		B	EHO	250	13	12	3
4927		PALE	01	20	1851	S19	W10	01	20.0		BG	EKI	320	21	13	3
4927		LEAR	01	21	0005	S19	W12	01	20.1		B	EKO	330	19	14	2
4927		CULG	01	21	0350	S20	W15	01	20.0		B	EHI	320	11	12	2
4927		RAMY	01	21	1350	S20	W19	01	20.1		B	EKI	400	18	14	3
4927	24510	MWIL	01	21	1600	S19	W22	01	20.0	5	(BP)					
4927		HOLL	01	21	1610	S20	W22	01	20.0		B	EHO	280	6	15	3
4927		PALE	01	21	1912	S19	W23	01	20.0		B	EHO	240	9	14	3
4927		LEAR	01	22	0003	S20	W26	01	20.0		B	EKO	380	21	14	3
4927		CULG	01	22	0500	S20	W29	01	20.0		B	EHI	240	10	13	3
4927		SVTO	01	22	1020	S19	W30	01	20.1		B	EKO	250	9	15	2
4927	24510	MWIL	01	22	1600	S19	W37	01	19.8	5	(BP)					
4927		HOLL	01	22	1612	S17	W35	01	20.0		B	EKI	370	10	12	3
4927		PALE	01	22	1828	S20	W36	01	20.0		B	EKO	250	16	15	3
4927		LEAR	01	23	0005	S20	W39	01	20.0		B	EKO	350	16	12	2
4927		CULG	01	23	0420	S20	W43	01	19.9		B	EHI	300	8	15	1
4927		RAMY	01	23	1530	S18	W48	01	20.0		B	EKI	220	12	14	2
4927	24510	MWIL	01	23	1545	S19	W50	01	19.8	5	(BP)					
4927		HOLL	01	23	1628	S18	W48	01	20.0		B	EAI	140	12	13	3
4927		PALE	01	23	1906	S18	W49	01	20.1		B	EHI	260	12	13	2
4927		LEAR	01	24	0255	S20	W51	01	20.2		B	FKI	200	15	16	2
4927		CULG	01	24	0450	S19	W56	01	19.9		B	ESI	200	8	13	2
4927		SVTO	01	24	0901	S18	W56	01	20.1		B	CSO	130	6	14	2
4927		RAMY	01	24	1312	S18	W58	01	20.1		B	CKI	200	8	14	4
4927		HOLL	01	24	1545	S18	W60	01	20.1		B	CHO	90	6	15	3
4927	24510	MWIL	01	24	1600	S19	W65	01	19.7	5	(BP)					
4927		PALE	01	24	1930	S19	W65	01	19.8		B	CHO	260	6	13	3
4927		LEAR	01	25	0018	S21	W65	01	20.0		B	EKI	150	8	13	4
4927		CULG	01	25	0450	S19	W70	01	19.8		B	ESO	150	4	12	3
4927		SVTO	01	25	0845	S19	W76	01	19.6		B	CAO	120	5	9	3
4927		RAMY	01	25	1259	S19	W76	01	19.7		B	CAI	180	7	12	4
4927	24510	MWIL	01	25	1545	S19	W79	01	19.6	5	(BP)					
4927		HOLL	01	25	1600	S17	W77	01	19.8		B	CSO	110	6	11	4
4927		LEAR	01	26	0030	S20	W81	01	19.8		B	DSO	150	7	10	3
4927A		CULG	01	18	0500	S18	E29	01	20.4		B	BXO	10	2	3	3
4927B		PALE	01	23	1906	S30	W41	01	20.6		A	AX		1		2
4927B		LEAR	01	24	0255	S31	W43	01	20.7		A	AX	10	1	1	2
4932		CULG	01	20	0450	S21	E18	01	21.6		A	AX	10	1		2

SUNSPOT GROUPS
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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
4932		HOLL	01 20 1815	S26 E08	01 21.4		A	AX	10	3	1	3
4932		PALE	01 20 1851	S24 E09	01 21.5		B	BXO		3	3	3
4932		LEAR	01 21 0005	S23 E06	01 21.5		B	BXO	10	2	1	2
4932		CULG	01 21 0350	S22 E05	01 21.5		B	BXO	20	2	3	2
4932		RAMY	01 21 1350	S23 W03	01 21.3		A	AX	10	1	1	3
4931		LEAR	01 18 0015	S30 E50	01 21.9		A	AX	10	1	1	3
4931		SVTO	01 18 1132	S31 E43	01 21.9		A	AX	10	1	1	2
4931		RAMY	01 18 1400	S31 E41	01 21.8		A	AX	10	3	3	3
4931		PALE	01 18 2315	S32 E34	01 21.7		B	BXO	30	3	4	2
4931		LEAR	01 19 0038	S31 E37	01 21.9		B	BXO	20	3	4	2
4931		CULG	01 19 0430	S29 E33	01 21.8		B	DSO	20	2	5	3
4931		RAMY	01 19 1343	S31 E28	01 21.8		B	DAI	160	8	7	3
4931	24514	MWIL	01 19 1615	S31 E27	01 21.8	3	(B)					
4931		PALE	01 19 1940	S32 E25	01 21.8		BG	DSO	140	6	8	4
4931		LEAR	01 20 0012	S31 E25	01 22.0		B	DAO	200	8	8	3
4931		CULG	01 20 0450	S28 E20	01 21.8		B	DSO	140	5	7	2
4931		RAMY	01 20 1415	S30 E16	01 21.8		B	DAI	170	13	8	3
4931	24514	MWIL	01 20 1600	S31 E14	01 21.8	4	(B)					
4931		HOLL	01 20 1815	S32 E11	01 21.6		B	DSO	190	9	8	3
4931		PALE	01 20 1851	S31 E13	01 21.8		BG	DSI	210	10	8	3
4931		LEAR	01 21 0005	S30 E11	01 21.9		B	DSO	170	15	8	2
4931		CULG	01 21 0350	S30 E09	01 21.9		B	DSI	130	6	9	2
4931		RAMY	01 21 1350	S30 E04	01 21.9		B	DSI	200	22	10	3
4931	24514	MWIL	01 21 1600	S30 E01	01 21.7	5	(B)					
4931		HOLL	01 21 1610	S31 E00	01 21.7		B	DSI	130	12	9	3
4931		PALE	01 21 1912	S30 E00	01 21.8		B	DSI	230	21	10	3
4931		LEAR	01 22 0003	S33 W04	01 21.7		B	DAO	190	14	9	3
4931		CULG	01 22 0500	S30 W06	01 21.7		B	DSI	160	9	9	3
4931		SVTO	01 22 1020	S30 W10	01 21.6		B	CSI	100	16	8	2
4931	24514	MWIL	01 22 1600	S30 W14	01 21.6	5	(B)					
4931		HOLL	01 22 1612	S30 W14	01 21.6		B	CSI	160	13	8	3
4931		PALE	01 22 1828	S30 W14	01 21.7		B	CSO	220	14	10	3
4931		LEAR	01 23 0005	S31 W16	01 21.7		B	CSO	200	12	18	2
4931		CULG	01 23 0420	S30 W19	01 21.7		B	DSO	100	6	9	1
4931		RAMY	01 23 1530	S28 W26	01 21.6		B	CSO	80	15	7	2
4931	24514	MWIL	01 23 1545	S29 W29	01 21.4	4	(AP)					
4931		HOLL	01 23 1628	S29 W28	01 21.5		B	CAO	50	4	6	3
4931		PALE	01 23 1906	S30 W29	01 21.5		B	CSO	70	3	6	2
4931		LEAR	01 24 0255	S30 W31	01 21.7		B	CSO	70	3	6	2
4931		CULG	01 24 0450	S30 W35	01 21.4		B	CSO	80	3	5	2
4931		SVTO	01 24 0901	S29 W36	01 21.5		B	CSO	60	2	5	2
4931		RAMY	01 24 1312	S29 W38	01 21.6		B	CSO	100	2	7	4
4931		HOLL	01 24 1545	S28 W40	01 21.5		B	CSO	50	2	5	3
4931	24514	MWIL	01 24 1600	S29 W41	01 21.5	5	(BP)					
4931		PALE	01 24 1930	S29 W44	01 21.4		A	HS	90	1	2	3
4931		LEAR	01 25 0018	S30 W46	01 21.4		A	HS	50	1	2	4
4931		CULG	01 25 0450	S30 W49	01 21.3		A	HS	40	1	1	3
4931		SVTO	01 25 0845	S30 W51	01 21.3		A	HA	100	1	2	3
4931		RAMY	01 25 1259	S30 W53	01 21.4		A	HS	70	1	2	4
4931	24514	MWIL	01 25 1545	S30 W53	01 21.5	5	(BP)					
4931		HOLL	01 25 1600	S28 W54	01 21.4		A	HS	50	1	2	4
4931		LEAR	01 26 0030	S30 W60	01 21.3		B	CSO	80	2	4	3
4931		CULG	01 26 0510	S30 W62	01 21.3		A	HS	40	1	2	2
4931		SVTO	01 26 1000	S30 W64	01 21.4		A	HA	50	1	2	3
4931		RAMY	01 26 1432	S30 W67	01 21.3		A	HS	50	1	2	4
4931		HOLL	01 26 1519	S28 W66	01 21.5		A	HS	40	1	2	4
4931	24514	MWIL	01 26 1600	S30 W68	01 21.3	5	(AP)					
4931		PALE	01 26 2318	S30 W72	01 21.3		A	HS	60	1	2	1
4931		LEAR	01 27 0015	S32 W73	01 21.2		A	HA	120	1	2	3
4931		CULG	01 27 0430	S32 W75	01 21.2		A	HS	30	1	1	3
4931		RAMY	01 27 1529	S30 W79	01 21.4		A	HS	40	1	2	3
4931		PALE	01 27 1923	S30 W81	01 21.4		A	HR	30	1	1	2
4931		HOLL	01 27 2020	S28 W81	01 21.5		B	BSO	60	3	1	3
4931	24514	MWIL	01 27 2200	S31 W80	01 21.6	4	AP					
4931		LEAR	01 28 0022	S33 W83	01 21.4		A	HA	60	1	2	3
4931		CULG	01 28 0500	S30 W87	01 21.4		A	HS	30	1	1	3
4931		SVTO	01 28 0821	S31 W89	01 21.3		A	AX		1		3

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4931A		HOLL	01 22	1612	S06 W01	01 22.6		A	AX	10	1	1	3
4934		LEAR	01 24	0255	N22 W08	01 23.5		A	AX	10	1	1	2
4934		CULG	01 26	0510	N21 W41	01 23.1		B	BXO	20	2	3	2
4934		SVTO	01 26	1000	N21 W42	01 23.2		B	CRO	30	4	4	3
4934		RAMY	01 26	1432	N20 W44	01 23.2		B	CRO	50	5	6	4
4934		HOLL	01 26	1519	N21 W42	01 23.4		B	BXO	20	4	5	4
4934	24515	MWIL	01 26	1600	N20 W45	01 23.2	4	(B)					
4934		PALE	01 26	2318	N21 W50	01 23.1		B	BXO	70	7	8	1
4934		LEAR	01 27	0015	N19 W48	01 23.3		B	DSO	50	9	9	3
4934		CULG	01 27	0430	N20 W52	01 23.2		B	CRI	30	8	8	3
4934		RAMY	01 27	1529	N20 W57	01 23.3		B	DAI	240	16	10	3
4934		PALE	01 27	1923	N22 W59	01 23.3		B	DAI	180	19	8	2
4934		HOLL	01 27	2020	N22 W59	01 23.3		B	ESI	310	16	15	3
4934	24515	MWIL	01 27	2200	N20 W60	01 23.3	5	(BP)					
4934		LEAR	01 28	0022	N20 W61	01 23.3		B	EAI	340	22	12	3
4934		SVTO	01 28	0821	N20 W66	01 23.3		B	EAI	350	15	11	3
4934		RAMY	01 28	1331	N20 W69	01 23.3		B	EAI	420	11	12	4
4934	24515	MWIL	01 28	1600	N20 W70	01 23.3	5	(B)					
4934		HOLL	01 28	1745	N23 W70	01 23.3		B	EAI	280	12	12	2
4934		PALE	01 28	2358	N21 W79	01 22.9		B	FAO	270	6	18	2
4934		LEAR	01 29	0023	N18 W74	01 23.4		B	EAO	240	11	12	3
4934		CULG	01 29	0500	N19 W77	01 23.3		A	HS	50	2	2	3
4934		SVTO	01 29	1413	N22 W82	01 23.3		B	DAO	70	3	5	1
4934		RAMY	01 29	1430	N22 W80	01 23.4		B	DAO		2	3	2
4934	24515	MWIL	01 29	1600	N21 W77	01 23.8	4	AF					
4934		PALE	01 29	1830	N21 W79	01 23.7		B	BXO	30	5	2	2
4934		HOLL	01 29	1910	N23 W82	01 23.5		A	AX	70	4	3	3
4936		SVTO	01 28	0821	S14 W43	01 25.1		B	BXO	10	3	3	3
4936		RAMY	01 28	1331	S14 W45	01 25.2		B	BXO	20	2	3	4
4936	24518	MWIL	01 28	1600	S14 W46	01 25.2	4	(B)					
4936		HOLL	01 28	1745	S12 W48	01 25.1		A	AX	20	2	3	2
4936		PALE	01 28	2358	S14 W52	01 25.1		B	BXO	10	4	5	2
4936		LEAR	01 29	0023	S16 W49	01 25.3		B	CRO	50	5	5	3
4936		CULG	01 29	0500	S14 W57	01 24.9		A	AX	10	1	1	3
4936		SVTO	01 29	1413	S13 W62	01 24.9		A	AX	10	1		1
4936		RAMY	01 29	1430	S13 W60	01 25.1		B	BXO	10	2	3	2
4936	24518	MWIL	01 29	1600	S14 W62	01 25.0	3	(AP)					
4936		PALE	01 29	1830	S14 W65	01 24.8		A	AX		2	1	2
4936		HOLL	01 29	1910	S11 W63	01 25.0		A	AX	20	2	1	3
4936		LEAR	01 30	0041	S13 W67	01 25.0		A	AX	10	1	1	4
4936		SVTO	01 30	0655	S13 W73	01 24.8		A	AX	10	1		1
4936		RAMY	01 30	1356	S13 W74	01 25.0		A	AX	10	1	1	3
4936	24518	MWIL	01 30	1545	S14 W77	01 24.8	2	(AP)					
4933		LEAR	01 25	0018	S29 E38	01 28.0		B	BXO	10	2	3	4
4933		HOLL	01 25	1600	S31 E29	01 27.9		B	BXO	10	4	4	4
4933		LEAR	01 26	0030	S27 E27	01 28.1		B	BXO	10	10	4	3
4933		CULG	01 26	0510	S30 E23	01 28.0		B	BXO	20	3	4	2
4933		SVTO	01 26	1000	S30 E21	01 28.1		B	DRO	20	5	4	3
4933		RAMY	01 26	1432	S30 E19	01 28.1		B	BXO	20	6	4	4
4933		HOLL	01 26	1519	S31 E16	01 27.9		B	BXO	20	6	5	4
4933	24516	MWIL	01 26	1600	S30 E16	01 27.9	4	(BF)					
4933		PALE	01 26	2318	S30 E12	01 27.9		B	CSO	30	6	5	1
4933		LEAR	01 27	0015	S28 E14	01 28.1		B	DAO	40	7	6	3
4933		CULG	01 27	0430	S30 E12	01 28.1		B	DSO	30	5	4	3
4933		RAMY	01 27	1529	S30 E04	01 27.9		B	DAO	40	4	5	3
4933		PALE	01 27	1923	S31 E03	01 28.0		B	DRO	20	6	6	2
4933		HOLL	01 27	2020	S31 W01	01 27.8		B	CSI	60	10	7	3
4933	24516	MWIL	01 27	2200	S30 E01	01 28.0	4	(B)					
4933		LEAR	01 28	0022	S29 E00	01 28.0		B	CAO	30	13	7	3
4933		SVTO	01 28	0821	S29 W06	01 27.9		B	DRO	40	10	7	3
4933		RAMY	01 28	1331	S29 W08	01 27.9		B	BXO	40	12	7	4
4933	24516	MWIL	01 28	1600	S30 W10	01 27.9	4	(B)					
4933		HOLL	01 28	1745	S29 W12	01 27.8		B	BXO	30	9	8	2
4933		PALE	01 28	2358	S31 W15	01 27.8		B	CSO	20	4	8	2
4933		LEAR	01 29	0023	S29 W12	01 28.1		B	DAO	60	8	6	3
4933		CULG	01 29	0500	S30 W17	01 27.9		B	BXO	10	2	6	3

SUNSPOT GROUPS
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

JANUARY 1988

NOAA/ USAF Group	Mt Wilson Group	Sta	Observation 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
4933		SVTO	01	29	1413	S29	W26	01	27.5		A	HA	10	2	1	1
4933		RAMY	01	29	1430	S29	W24	01	27.7		B	BXO	20	6	7	2
4933	24516	MWIL	01	29	1600	S30	W27	01	27.5	3	(AP)					
4933		PALE	01	29	1830	S30	W28	01	27.6		A	AX	10	1	1	2
4933		HOLL	01	29	1910	S28	W29	01	27.5		A	AX	10	3	1	3
4933		LEAR	01	30	0041	S29	W32	01	27.5		A	HS	10	1	1	4
4933		SVTO	01	30	0655	S30	W36	01	27.4		A	AX	10	1		1
4933		RAMY	01	30	1356	S28	W39	01	27.5		A	AX		1	1	3
4933	24516	MWIL	01	30	1545	S30	W40	01	27.5	3	(AP)					
4933		PALE	01	30	1810	S30	W42	01	27.4		A	AX	10	1		3
4933		LEAR	01	31	0330	S29	W46	01	27.5		A	AX	10	2	1	3
4933A	24519	MWIL	01	28	1600	S25	W04	01	28.4	3	(AP)					
4933A		LEAR	01	30	0041	S25	W22	01	28.3		B	BXO	10	2	3	4
4933A		RAMY	01	30	1356	S24	W28	01	28.4		B	BXO	10	3	4	3
4933A	24519	MWIL	01	30	1545	S24	W30	01	28.3	2	(B)					
4935		RAMY	01	24	1312	S33	E65	01	29.7		A	AX	10	1	1	4
4935		LEAR	01	26	0030	S29	E51	01	30.0		B	BXO	10	2	3	3
4935		CULG	01	26	0510	S33	E48	01	30.0		A	AX	10	1	1	2
4935		SVTO	01	26	1000	S33	E45	01	30.0		A	AX	10	1	1	3
4935		RAMY	01	26	1432	S34	E43	01	30.0		B	BXO	20	2	3	4
4935		HOLL	01	26	1519	S33	E44	01	30.1		A	AX	10	1	1	4
4935		LEAR	01	27	0015	S33	E38	01	30.0		B	BXO	10	2	3	3
4935		RAMY	01	27	1529	S32	E23	01	29.5		A	AX	10	2	2	3
4935		PALE	01	27	1923	S33	E20	01	29.4		B	BXO	10	3	3	2
4935		HOLL	01	27	2020	S33	E18	01	29.3		A	AX	10	1	1	3
4935	24517	MWIL	01	27	2200	S33	E20	01	29.5	3	(AP)					
4935		LEAR	01	28	0022	S30	E19	01	29.5		B	BXO	10	2	2	3
4935		SVTO	01	28	0821	S33	E13	01	29.4		A	AX		2	1	3
4935	24517	MWIL	01	28	1600	S32	E08	01	29.3	3	(AP)					
4935		LEAR	01	31	0010	S28	W18	01	29.6		A	AX	10	1	1	3
4937		SVTO	01	28	0821	N18	E42	01	31.5		B	CRO	10	3	2	3
4937		RAMY	01	28	1331	N18	E38	01	31.4		B	BXO	20	3	2	4
4937	24520	MWIL	01	28	1600	N17	E37	01	31.5	5	(B)					
4937		HOLL	01	28	1745	N16	E38	01	31.6		A	AX	10	4	3	2
4937		PALE	01	28	2358	N17	E32	01	31.4		B	BXO	10	2	3	2
4937		LEAR	01	29	0023	N18	E32	01	31.4		B	BXO	10	2	3	3
4937		SVTO	01	29	1413	N18	E24	01	31.4		B	DAO	40	6	4	1
4937		RAMY	01	29	1430	N17	E24	01	31.4		B	BXO	20	7	5	2
4937	24520	MWIL	01	29	1600	N17	E24	01	31.5	3	(B)					
4937		PALE	01	29	1830	N18	E22	01	31.4		B	BXO	10	4	4	2
4937		HOLL	01	29	1910	N16	E24	01	31.6		B	BXO	20	8	4	3
4937		LEAR	01	30	0041	N18	E16	01	31.2		B	CRO	10	5	4	4
4937		CULG	01	30	0540	N18	E14	01	31.3		B	CRO	20	3	6	3
4937		SVTO	01	30	0655	N17	E15	01	31.4		B	BXO	20	5	5	1
4937		RAMY	01	30	1356	N17	E12	01	31.5		B	BXO	20	10	6	3
4937	24520	MWIL	01	30	1545	N18	E10	01	31.4	4	(B)					
4937		PALE	01	30	1810	N18	E08	01	31.4		B	BXO	20	10	6	3
4937		LEAR	01	31	0010	N18	E03	01	31.2		B	DRO	10	13	6	3
4937		CULG	01	31	0440	N18	W01	01	31.1		B	DRO	20	5	4	3
4937		SVTO	01	31	1050	N18	W02	01	31.3		B	DRO	40	22	6	4
4937		RAMY	01	31	1403	N18	W03	01	31.3		B	DAO	140	13	6	1
4937		HOLL	01	31	1617	N18	W03	01	31.4		B	DSO	50	5	7	2
4937	24520	MWIL	01	31	1730	N18	W05	01	31.3	4	(B)					
4937		PALE	01	31	1833	N18	W05	01	31.4		B	DAO	90	21	7	3
4937		LEAR	02	01	0005	N18	W09	01	31.3		B	DAO	170	22	7	3
4937		CULG	02	01	0350	N19	W13	01	31.2		B	DSO	70	3	7	3
4937		SVTO	02	01	0843	N18	W14	01	31.3		B	DAO	190	13	7	2
4937		PALE	02	01	1903	N19	W20	01	31.3		B	DSO	160	9	8	3
4937		LEAR	02	02	0022	N17	W25	01	31.1		B	DAO	190	15	9	3
4937		SVTO	02	02	1201	N18	W32	01	31.1		B	DAO	80	7	10	2
4937		HOLL	02	02	1619	N20	W35	01	31.0		B	CSO	120	7	7	3
4937		RAMY	02	02	2017	N19	W34	01	31.2		B	DSO	130	8	9	2
4937		PALE	02	02	2100	N19	W36	01	31.1		B	CSO	100	5	9	1
4937		LEAR	02	03	0010	N16	W37	01	31.2		B	DAO	150	6	8	2
4937		CULG	02	03	0425	N21	W39	01	31.2		B	DSO	30	2	8	3
4937		SVTO	02	03	0750	N18	W41	01	31.2		B	DSO	60	3	9	4

SUDDEN IONOSPHERIC DISTURBANCES

JANUARY 1988

Day	Start (UT)	Max (UT)	End (UT)	Imp	Wide Spread Index	Number of Station Reports by Type SWF	SEA	SPA	LF SPA	SES	Known Flare	X-ray Class	NOAA Region
01	0457	0502	0510	1-	1			1			0456 UT		4912
01	0559	0604	0626	1-	1			1			0558 UT		4912
01	0907	0921	0943	1-	1			1			0903 UT	C1.1	
02	1400	1415	1515	3	1		1				No flare patrol		
02	2119	2143	0421	2+	5	2		1		6	2131EUT	X1.4	4912
03	1335	1407	1435	1	3		3				No flare patrol		
03	2318	2320	2328	1-	1			1			2313 UT	C1.6	
05	0744	0746	0808	1-	1			1			No flare patrol		
06	0619	0628	0713	1-	1			1			No flare reported		
07	1733	1735	1800	1	3					3	1732 UT	C2.9	4919
07	2239	2242	2258	1-	1			1			2233 UT	C1.7	4919
08	0019	0025	0052	1-	1			1			0020EUT	C1.9	4921
08	0621	0629	0715	1-	1			1			0618 UT	C2.6	4921
08	1150	1200	1207	1	1		1				1200 UT		No data
08	1725	1730	1758	1+	1					1	1728EUT	C1.7	4921
09	0225	0230	0337	1-	1			1			0221 UT	C6.5	4921
09	1525	1537	1607	1-	5	1		1		7	1525 UT	C6.7	4921
09	2328	0006	0050	1-	1			1			2325 UT	C3.7	4919
11	2238	2252	0008	1-	1			1			2227 UT	C4.0	4919
13	0639	0645	0707	1-	1			1			0639 UT	C2.7	4923
13	0719	0733	0803	1-	1			1			0719 UT	C2.9	4919
13	1143	1208	1300	2	3	2	3	1	1	1	1151EUT	C8.3	4927
13	1301	1318U	1338	1	3		2				1253 UT		4927
13	1348	1351	1430	1+	3		1			1	1344 UT		4928
13	1604	1611	1652	1	3	1				2	1616EUT	C4.5	4919
13	1823	1833	1842	1	1	1					1809 UT		4927
13	2334	2335	2355	1-	1			1			No flare reported		
14	0614	0639	0708	1-	1			1			No flare reported		
14	0741	0748	0825	1	1			1			0741 UT	C5.6	4928
14	0848	0853	0916D	1-	1			1			0847 UT	C2.9	4925
14	0916E	0924	1030	2+	3	2	4	1	1	2	0905 UT	M1.3	4925
14	1140	1155	1205	1	1		2				1134 UT	C1.8	
14	1334	1345	1428	1	3	1	1	1			1334 UT	C5.6	
14	1501	1505	1555	2	3		1	1		4	1508EUT	M2.3	4925
14	1923	1939	1954	1	1	1					1932 UT		4927
14	2340	2346	2357	1-	1			1			2337 UT		4919
15	0009	0016	0100	1-	1			1			0006 UT	C3.3	4925
15	0705	0712	0746	1-	1			1			0659 UT	C1.1	4925
15	0950	1000	1030	1	3		2				No flare reported		
15	1402	1413	1427	1	1		1				1402 UT	C1.1	4927
15	1622	1626	1629	1-	1	1					1620 UT	C1.2	4925
15	1707	1714	1800	1+	3					3	1702 UT	C2.1	4925
16	1745	1747	1801	1	3					3	1754 UT		4927
16	1932	1934	1936	1-	1	1					1937 UT		4925
18	0029	0033	0051	1-	1			1			0029 UT	C1.4	No data
18	1208	1215	1255	1	1		2				No flare reported		
24	0034	0036	0056	1-	1			1			0035 UT	C1.7	4925
24	0337	0356	0438	1-	1			1			0317 UT	C2.2	
25	0257	0301	0317	1-	1			1			No flare reported		
26	0625	0637	0650	1-	1			1			No flare reported		
26	1059	1118	1158	1	3		2	1			1100 UT	C5.9	4927
27	1115	1152	1219	1	1		1				No flare reported		
27	1705	1711	1745	2	3					3	1704 UT	C3.2	
27	2020	2023	2047	1	3					3	2015 UT	C3.6	4934

SUDDEN IONOSPHERIC DISTURBANCES
JANUARY 1988

Day	Start (UT)	Max (UT)	End (UT)	Imp	Wide Spread Index	Number of Station Reports by Type SWF	SEA	SPA	LF SPA	SES	Known Flare	X-ray Class	NOAA Region
27	2300	2303	2317	1-	1			1			2304 UT	C4.3	4934
27	2325	2330	2350D	1-	1			1			2326 UT	C2.6	
28	0005E	0011	0037	1-	1			1			2356 UT	C1.9	4934
28	0154	0158	0212	1-	1			1			0154 UT	C1.3	
28	0241	0248	0308	1-	1			1			0237 UT	C1.7	4934
28	0426	0428	0435	1-	1			1			0426 UT	C1.2	
28	0444	0452	0513	1-	1			1			0442 UT	C2.0	
28	0604	0609	0616	2	3	1		1			0606 UT	C6.6	4934
28	0847	0850	0900	2	5	1		1	1	1	0847 UT	C9.6	4934
28	1821	1828	1851	1+	3					2	1814 UT		4934
29	0219	0230	0257	1-	1			1			No flare reported		
29	2326	2329	2340	1-	1			1			2324 UT	C1.1	
30	0515	0520	0637	1	1			1			0512 UT	C1.9	
30	1400	1440	1530	1+	3		2				No flare reported		
31	1003	1006	1026	1-	1			1			1001 UT	C1.2	4939
31	1043	1046	1111	1-	3		1	1			1040 UT	C3.1	
31	1545	1547	1605	1+	3					6	1541 UT	C3.1	

OBSERVATORIES REPORTING FOR JANUARY 1988:

Ayrshire, Scotland	SES	Louisville, Kentucky, USA	SES
Amherst, New Hampshire, USA	SES	Maui, Hawaii, USA	SWF
Darmstadt, German Federal Republic	SWF	Panska Ves, Czechoslovakia	SEA, SWF, SES
Hiraiso, Japan	SWF	Paterson, New Jersey, USA	SES
Houston, Texas, USA	SES	Rimavska Sobota, Czechoslovakia	SEA
Huancayo, Peru	SWF	Tavares, Florida, USA	SES
Inubo, Japan	SPA	Tucson, Arizona, USA	SES
Juliusruh, German Democratic Rep.	SWF	Upice, Czechoslovakia	SEA
Kuhlungsborn, German Democratic Rep.	SEA, SPA	Valley Cottage, New York, USA	SES
Latrobe, Pennsylvania, USA		Zilina, Czechoslovakia	SEA

SIDs BY NOAA/USAF REGIONS
January 1988

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
Reg	Number of events in active regions																														
4912	2	1																													
4919							2		1		1		2	1																	
4921								3	2																						
4923													1																		
4925														3	4	1								1							
4927													3	1	1	1										1					
4928													1	1																	
4934																											2				
4939																															1
	Number of events with X-Ray flares																														
	1	1	1				2	3	3		1		4	6	5			1						2		1	4		1	1	1
	Number of events with no flare reported																														
						1							1		1			1							1	1	1		1	1	
	Number of events with flare but no active region reported																														
								1						1				1													
	Number of events with no flare patrol																														
		1	1		1																										
Total	3	2	2		1	1	2	4	3		1		8	9	6	2		2						2	1	2	5	8	2	2	3

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JANUARY 1988

Day	Observation Start (UT)	Observation End (UT)	Sta	Decimetric Band Start (UT)	Decimetric Band End (UT)	Decimetric Band Int (1-3)	Metric Band Start (UT)	Metric Band End (UT)	Metric Band Int (1-3)	Dekametric Band Start (UT)	Dekametric Band End (UT)	Dekametric Band Int (1-3)	Spectral Type
01	0000	0735	CULG				0000.0	0735.0	1	0000.0	0735.0	1	IIIS
	0800	1514	WEIS				1006.0	1458.0	1				IIIN
			WEIS				1223.3	1223.7	3				IIIG
			WEIS				1229.2	1229.4	2				IIIB
			WEIS				1357.1	1357.3	3				IIIG
			PALE				1907.0	0155.0	1				CONT
	2035	2400	CULG				2035.0	2400.0	1	2035.0	2400.0	1	IIIS
			LEAR							2250.0	0000.0	1	CONT
			LEAR				2250.0	1053.0	1				CONT
02	0000	0735	CULG				0000.0	0528.0	1				IIIN
			LEAR				0411.0	0412.0	2				V
	0758	1515	WEIS										
	2035	2400	CULG				2125.5	2129.0	1				IIIG
			PALE				2128.0	2242.0	3				IV
			CULG				2129.0	2135.0	3	2129.0	2135.0	3	IIIG
			PALE				2132.0	2150.0	3				II
			CULG				2138.0	2147.0	3	2138.0	2147.0	3	II
			CULG							2147.5	2154.0	2	II
			CULG				2155.0	2205.0	1	2155.0	2205.0	1	II
			CULG				2212.0	2215.0	1				II
			LEAR				2216.0	0920.0	2				IV
			CULG				2220.0	2247.0	1				IV
			CULG				2220.5	2222.0	1				II
			CULG				2224.5	2226.0	1				II
			CULG				2227.5	2228.0	1				IIIB
			CULG				2233.0	2246.0	1	2223.0	2246.0	1	IIIN,B
			CULG				2237.0	2243.0	1				II
			CULG				2327.0	2329.5	1	2327.0	2329.5	1	IIIG
03	0000	0735	CULG				0000.0	0327.0	1				IIIN
			PALE				0039.0	0132.0	1				CONT
			LEAR				0947.0	0947.0	2				V
			SVTO				0947.0	0947.0	2				III
	0758	1515	WEIS				0947.4	0947.9	2				IIIG
			WEIS				1214.2	1215.2	2				IIIG
			PALE				1930.0	1931.0	2				III
			PALE				2117.0	2118.0	1				III
	2035	2400	CULG				2118.5	2119.0	1				IIIB
			LEAR				2315.0	2317.0	2				V
			CULG				2316.0	2317.0	3	2316.5	2318.0	3	III/V
			CULG				2324.0	2326.5	1				I
04			LEAR				0436.0	0437.0	1				III
			CULG				0437.0	0735.0	1				IIIN,B
			LEAR				0517.0	0518.0	2				III
			LEAR				0535.0	0535.0	1				III
			LEAR				0721.0	0721.0	1				III
	0800	1057	WEIS										
	1301	1517	WEIS										
	2035	2400	CULG										
05	0000	0735	CULG										
	0758	1518	WEIS										
	2035	2400	CULG										
06	0000	0736	CULG										
	0757	1519	WEIS										
	2036	2400	CULG				2239.0	2239.0	1	2239.0	2239.0	1	IIIB
07			LEAR				0546.0	0547.0	2				III
	0000	0737	CULG				0548.0	0548.0	1	0548.0	0548.5	1	III/V
	0759	1059	WEIS										
	1115	1521	WEIS										
			SGMR				1732.0	1737.0	2				V
	2036	2400	CULG				2148.5	2149.5	1	2149.0	2149.5	1	IIIB
			CULG				2230.0	2231.5	1	2230.0	2231.5	1	IIIG
			LEAR				2320.0	2320.0	1				III
			PALE				2320.0	2320.0	1				III

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07			CULG				2323.0	2327.0	1	2323.0	2327.0	1	IIIG
08			PALE				0019.0	0019.0	1				III
			LEAR				0025.0	0026.0	1				III
	0000	0739	CULG				0027.0	0034.0	2	0027.0	0034.0	2	IIIG
			LEAR				0031.0	0033.0	2				III
			PALE				0031.0	0033.0	1				III
			LEAR				0119.0	0119.0	2				III
			CULG				0120.0	0120.5	2	0120.0	0120.5	2	IIIB
			LEAR				0132.0	0134.0	2				III
			PALE				0132.0	0134.0	1				III
			CULG				0133.0	0135.0	2	0133.0	0135.0	2	IIIG
			LEAR				0146.0	0153.0	2				V
			CULG				0147.0	0153.5	2	0147.0	0153.5	2	IIIGG
			PALE				0147.0	0150.0	1				III
			LEAR				0217.0	0219.0	2				V
			PALE				0217.0	0217.0	1				III
			CULG				0217.5	0220.0	2	0217.0	0220.0	2	IIIG
			LEAR				0420.0	0423.0	2				III
			CULG	0422.0	0429.0	2	0422.0	0429.0	2	0422.0	0429.0	2	IIIGG
			LEAR				0426.0	0430.0	3				V
			LEAR				0454.0	0459.0	2				III
			CULG				0455.5	0459.0	2	0455.5	0459.0	2	IIIG
	0756	1522	WEIS				0939.9	0940.0	1				IIIB
			LEAR				1043.0	1043.0	1				III
			WEIS				1043.4	1043.7	3				IIIG
			SGMR				1549.0	1550.0	1				V
			PALE				2125.0	2127.0	2				V
	2039	2400	CULG				2126.0	2127.5	2	2126.0	2127.5	2	IIIG
			CULG				2251.0	2251.5	1	2251.0	2251.5	1	IIIB
09	0000	0740	CULG										
			LEAR				0054.0	1055.0	1				CONT
	0756	1522	WEIS				1136.7	1138.7	2				IIIG
			PALE				1956.0	2007.0	1				S
	2040	2400	CULG										
			LEAR				2354.0	1055.0	2				CONT
10	0000	0740	CULG										
	0758	0915	WEIS										
	1117	1525	WEIS										
	2040	2400	CULG										
11	0000	0741	CULG										
	0755	1526	WEIS										
	2041	2400	CULG				2133.0	2133.5	1				IIIB
			PALE				2142.0	2143.0	1				V
			CULG				2143.5	2144.5	2	2143.5	2144.5	2	IIIG
			CULG				2221.0	2222.5	2	2221.0	2222.5	2	IIIG
			LEAR				2225.0	2226.0	1				III
			LEAR				2244.0	2244.0	2				III
			CULG				2244.5	2245.0	2	2244.5	2245.0	2	IIIG
			LEAR				2327.0	0630.0	1				CONT
12			LEAR				0004.0	0005.0	2				III
	0000	0741	CULG				0005.5	0006.0	2	0005.5	0006.0	2	IIIB
			LEAR				0044.0	0046.0	2				III
			CULG				0046.0	0047.5	2	0046.0	0047.5	2	IIIG
			CULG				0214.0	0214.0	1				IIIB
			CULG				0547.5	0550.0	1	0547.5	0550.0	1	IIIG
	0754	1526	WEIS				1324.6	1325.4	2				IIIG
			PALE				1913.0	1914.0	2				III
	2041	2400	CULG										
13	0000	0741	CULG				0333.5	0334.0	1				IIIG
			CULG				0418.0	0423.0	2	0418.0	0423.0	2	IIIG
			LEAR				0420.0	0422.0	2				III
			CULG				0447.0	0448.0	2	0447.0	0448.0	2	IIIB
			LEAR				0447.0	0447.0	2				III

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13			LEAR				0505.0	0506.0	1				III
			CULG				0507.0	0507.0	1	0507.0	0507.0	1	IIIB
			LEAR				0517.0	0550.0	3				S
			CULG				0518.0	0529.5	2	0518.0	0529.5	2	IIIGG
			CULG				0535.0	0536.0	1	0535.0	0536.0	1	IIIB
			CULG				0551.0	0551.5	1	0551.0	0551.5	1	IIIB
			LEAR				0638.0	0648.0	3				III
			SVTO				0638.0	0640.0	2				V
			CULG				0639.5	0643.0	3	0639.5	0643.0	3	IIIGG,V
			CULG				0645.0	0649.0	2				II
			CULG				0646.5	0647.0	2	0646.5	0647.0	2	IIIB
	0755	0838	WEIS										
			LEAR				0852.0	0852.0	1				III
	0847	1529	WEIS				1109.4	1109.7	1				IIIG
			WEIS				1158.9	1159.1	1				IIIG
			WEIS				1238.7	1238.8	1				IIIG
			WEIS				1242.7	1243.0	2				IIIG
	2042	2400	CULG				2206.0	2208.5	2	2208.0	2208.5	2	IIIB
14	0000	0742	CULG				0106.5	0107.0	1	0106.5	0107.0	1	IIIB
			LEAR				0225.0	0227.0	1				III
			CULG				0226.0	0228.0	1	0226.0	0228.0	1	IIIB
			LEAR				0742.0	0746.0	3				III
			SVTO				0742.0	0745.0	2				V
			LEAR				0938.0	0938.0	2				III
	0753	1530	WEIS				0938.5	0938.8	2				IIIG
			PALE				1939.0	1939.0	1				III
	2042	2400	CULG										
15			LEAR				0556.0	0556.0	1				III
	0000	0742	CULG							0557.0	0557.0	1	IIIB
			CULG				0704.0	0704.0	1	0704.0	0704.5	1	IIIB
			LEAR				0708.0	0708.0	1				III
			CULG				0709.5	0709.5	1	0709.5	0709.5	1	IIIB
	0752	1320	WEIS				1127.4	1127.5	1				IIIB
	1348	1530	WEIS				1409.7	1410.6	1				IIIG
			SGMR				1647.0	1647.0	1				V
	2042	2400	CULG							2047.0	2047.5	1	IIIB
16			LEAR				0213.0	0214.0	1				III
	0000	0742	CULG				0214.0	0214.0	1				IIIB
	0753	1533	WEIS										
			PALE				2108.0	2109.0	1				III
	2042	2400	CULG				2110.0	2110.0	1	2110.0	2110.0	1	IIIB
			CULG				2119.0	2119.0	1	2119.0	2119.5	1	IIIB
			LEAR				2316.0	2318.0	3				III
			PALE				2316.0	2319.0	2				V
			CULG				2317.0	2319.5	3	2317.0	2320.0	3	IIIV,G
17			LEAR				0056.0	0057.0	3				III
			PALE				0056.0	0057.0	3				V
	0000	0742	CULG	0057.0	0057.0	1	0057.0	0057.0	3	0057.0	0057.5	2	IIIB
			LEAR				0157.0	0200.0	2				III
			PALE				0157.0	0203.0	2				V
			CULG				0158.5	0204.5	3	0158.5	0205.0	3	IIIG
			LEAR				0201.0	0204.0	3				III
			CULG				0620.5	0628.0	1				IIIN
			LEAR				0622.0	0624.0	3				III
			CULG				0624.0	0624.5	3	0624.0	0625.0	3	IIIB
			CULG				0637.0	0637.0	1				IIIB
	0750	1442	WEIS										
	2042	2400	CULG										
18	0000	0742	CULG				0245.0	0257.0	1				IIIGG
			LEAR				0434.0	0435.0	3				III
			CULG				0435.5	0436.0	2	0435.5	0436.5	2	IIIG
			LEAR				0506.0	0510.0	3				V
			CULG				0508.0	0510.5	3	0508.0	0511.0	3	IIIG
			LEAR				0639.0	0640.0	1				III

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18			SVTO				0821.0	0824.0	2				V
	0754	1535	WEIS				0821.1	0824.6	3				IIIGG/U/RS
			WEIS				1508.7	1509.5	1				IIIG/U
			SGMR				1704.0	1706.0	1				V
	2024	2400	CULG				2042.0	2113.0	1				IIIB,N
19	0000	0742	CULG				0118.0	0206.0	1	0120.5	0120.5	1	IIIB,N
			LEAR				0831.0	0831.0	1				III
	0750	1538	WEIS				0911.0	1453.0	2				IIIN
			WEIS				0933.2	0933.3	2				IIIB
			WEIS				1316.7	1317.7	2				IIIG
			SGMR				1741.0	1744.0	1				V
			SGMR				1818.0	1819.0	2				V
			PALE				1843.0	1843.0	1				III
			PALE				1844.0	1844.0	1				III
			SGMR				1844.0	1844.0	1				V
			PALE				1957.0	1959.0	2				III
			PALE				2052.0	2053.0	1				III
	2043	2400	CULG				2054.0	2054.0	1				IIIB
			PALE				2152.0	2153.0	1				III
			LEAR				2238.0	2252.0	2				S
			PALE				2238.0	2252.0	1				S
			CULG				2239.0	2254.5	1	2253.0	2254.5	1	IIIGG
20	0000	0743	CULG				0108.0	0108.0	1	0108.0	0108.0	1	IIIB
			LEAR				0108.0	0108.0	2				III
			PALE				0108.0	0108.0	1				III
			CULG				0128.5	0129.0	1				IIIG
			PALE				0138.0	0138.0	1				III
			LEAR				0150.0	0151.0	2				III
			PALE				0150.0	0150.0	1				III
			CULG				0150.5	0151.0	1				IIIB
			PALE				0221.0	0221.0	1				III
			CULG				0320.0	0321.0	1				IIIG
			CULG				0456.5	0501.5	1				IIIG
			CULG				0510.5	0510.5	2	0510.5	0511.0	2	IIIB
			LEAR				0511.0	0515.0	3				S
			CULG	0514.5	0514.5	1	0514.5	0514.5	1	0514.5	0515.0	1	IIIB
			CULG				0529.0	0529.0	1				IIIB
			LEAR				0529.0	0532.0	3				V
			CULG				0530.0	0531.0	2	0530.0	0531.5	2	III/V
			LEAR				0546.0	0547.0	3				V
			CULG				0547.0	0548.0	2	0547.0	0548.0	2	IIIG
			CULG				0654.0	0654.0	1				
			LEAR				0654.0	0654.0	2				III
	0747	1218	WEIS										
			LEAR				0831.0	0832.0	2				III
	1316	1539	WEIS										
	2043	2400	CULG										
21			LEAR				0239.0	0240.0	2				III
	0000	0743	CULG				0239.5	0241.0	2	0239.5	0241.0	2	IIIB
			CULG				0305.0	0309.0	1	0305.0	0309.0	1	IIIG
			LEAR				0308.0	0309.0	1				III
	0746	1540	WEIS				1238.3	1238.5	1				IIIB
	2043	2400	CULG										
22	0000	0743	CULG				0234.5	0325.0	2	0324.5	0325.0	2	IIIB
			LEAR				0253.0	0253.0	2				III
			CULG				0253.5	0254.0	1	0253.5	0254.0	1	IIIB
			LEAR				0324.0	0325.0	2				III
			CULG				0417.0	0427.0	2	0417.0	0427.0	2	IIIG
			LEAR				0654.0	0654.0	1				III
			LEAR				0705.0	0706.0	2				III
			CULG				0706.0	0706.5	1				IIIB
			LEAR				0735.0	0736.0	3				III
			CULG				0735.5	0736.0	2				IIIB
	0747	1542	WEIS										
	2043	2400	CULG										

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23	0000	0744	CULG										
	0744	0948	WEIS										
	1229	1340	WEIS										
	1410	1544	WEIS										
	2044	2400	CULG										
24	0000	0744	CULG				0554.0	0554.0	1				IIIB
	0743	1544	WEIS										
			PALE				1955.0	1956.0	2				III
	2044	2400	CULG										
25	0000	0744	CULG										
	0744	1348	WEIS										
	1406	1547	WEIS										
	2045	2400	CULG										
26	0000	0745	CULG				0501.0	0506.0	1				IIIG
	0741	1331	WEIS										
	1352	1549	WEIS										
	2045	2400	CULG										
27			LEAR				0518.0	0519.0	2				III
	0000	0745	CULG				0519.0	0519.0	1	0519.0	0519.5	1	IIIB
	0739		WEIS				1409.6	1409.9	1				IIIG
	2045	2400	CULG										
28	0000	0745	CULG										
	0740	0830	WEIS										
	0840	1552	WEIS										
	2045	2400	CULG										
29	0000	0745	CULG				0000.0	0745.0	1				IIIN
			LEAR				0014.0	0015.0	2				III
			CULG				0043.0	0700.0	1				IN
			PALE				0113.0	0114.0	1				III
			CULG				0116.0	0116.0	1	0116.0	0116.5	1	IIIB
	0737	1554	WEIS				1211.8	1211.9	2				IIIB
	2045	2400	CULG				2144.0	2144.5	1				IIIB
			CULG				2202.0	2202.0	1				IIIB
			CULG				2257.0	2257.0	1				IIIB
30	0000	0745	CULG				0102.0	0102.0	1	0102.0	0102.0	1	IIIB
			LEAR				0506.0	0655.0	1				CONT
			LEAR				0724.0	0725.0	1				III
			CULG				0725.5	0726.0	1	0725.5	0726.0	1	IIIG
			LEAR				0931.0	0931.0	1				III
	0735	1555	WEIS				0931.3	0931.6	1				IIIB
			LEAR				1001.0	1001.0	1				III
			LEAR				1015.0	1017.0	3				III
			SVTO				1015.0	1015.0	2				III
			WEIS				1015.3	1018.2	3				IIIGG
			WEIS				1100.2	1100.3	1				IIIB
			WEIS				1117.3	1117.8	2				IIIG
			WEIS				1143.7	1144.9	3				IIIG
			WEIS				1200.2	1200.4	2				IIIG
			SVTO				1213.0	1214.0	2				III
			WEIS				1213.8	1214.3	3				IIIG
			WEIS				1251.3	1251.4	1				IIIB
			SGMR				2037.0	2037.0	1				V
			PALE				2152.0	2152.0	1				III
	2045	2400	CULG				2153.0	2153.5	1	2153.0	2153.5	1	IIIG
			CULG				2155.0	2155.0	1				I
			LEAR				2354.0	2354.0	1				III
			CULG				2354.5	2354.5	1				IIIS
31	0000	0745	CULG				0000.0	0230.0	1				IIIS
			CULG				0000.0	0324.0	1				I
			LEAR				0229.0	0229.0	1				III
			CULG				0602.0	0602.0	1				IIIB

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31		CULG				0604.0	0604.0	1	0604.0	0604.0	1	IIIB
		LEAR				0805.0	0806.0	2				V
		LEAR				0832.0	0833.0	2				III
0735	1557	WEIS				0832.0	0832.4	3				IIIG
		WEIS				1050.9	1053.4	1				II
		WEIS				1127.3	1127.5	1				IIIB
		CULG				2237.0	2237.5	3	2237.0	2237.5	3	IIIB
		LEAR				2308.0	2309.0	2				III
2045	2400	CULG				2308.5	2310.0	1	2308.5	2310.0	1	IIIG
		PALE				2309.0	2309.0	2				III
		LEAR				2335.0	2335.0	1				III
		PALE				2335.0	2335.0	1				III
		CULG				2336.0	2336.0	1				IIIB
		LEAR				2346.0	2348.0	3				III
		PALE				2346.0	2347.0	3				V

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

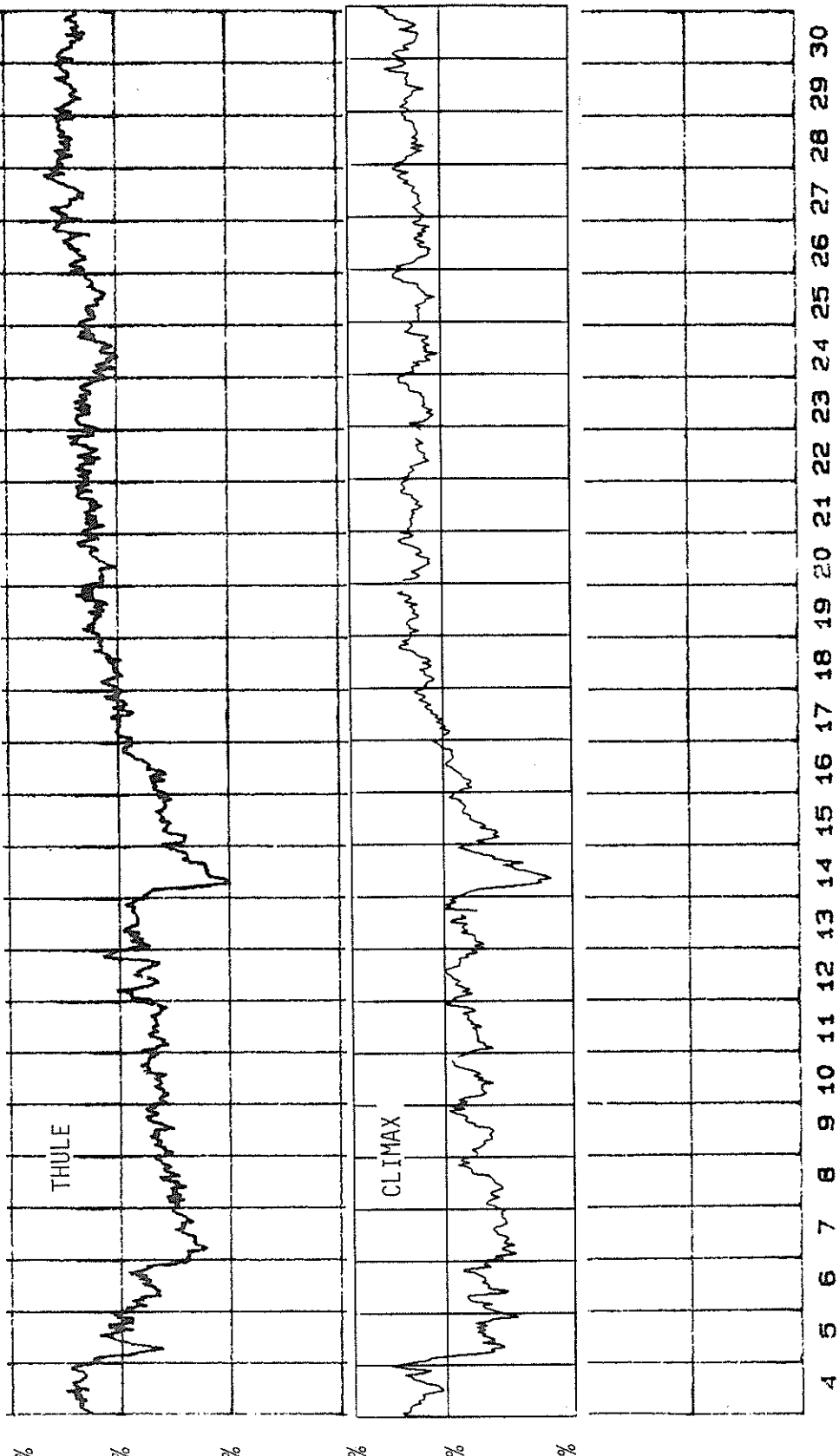
B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of burst
C = Underlying continuum (particularly with Type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III

RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity
DCIM = Fast drift

Stations Reporting:

BLEN = Bleien CULG = Culgoora LEAR = Learmonth PALE = Palehua SGMR = Sagamore Hill
SVTO = San Vito WEIS = Weissenau

COSMIC RAY INDICES
(Neutron Monitor)



COSMIC RAY INDICES
(Neutron Monitor)

JANUARY 1988

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
01	4390			6108.4	3987.1			
02	4307			6039.3	3953.0			
03	4350			6120.3	3992.3			
04	4365			6116.0	3974.3			
05	4282			5960.1	3850.2			
06	4229			5913.8	3835.0			
07	4154			5815.7	3793.9			
08	4187			5858.8	3831.2			
09	4211			5896.7	3850.5			
10	4214			5900.7	3858.8			
11	4214			5950.9	3854.7			
12	4249			5982.5	3881.8			
13	4253			5948.1	3870.6			
14	4146			5819.8	3790.5			
15	4189			5882.7	3849.3			
16	4232			5931.5	3888.7			
17	4280			5993.6	3932.7			
18	4302			6013.4	3960.9			
19	4331			6044.5	3979.6			
20	4325			6052.5	3968.7			
21	4340			6069.3	3978.2			
22	4345			6083.3	3963.2			
23	4344			6081.5	3961.2			
24	4316			6069.5	3957.5			
25	4330			6092.0	3965.8			
26	4368			6088.8	3957.8			
27	4381			6092.8	3973.5			
28	4385			6104.1	3972.3			
29	4376			6124.3	3984.0			
30	4368			6115.9	3989.3			
31	4364			6123.6	3997.2			
Mean	4294			6012.7	3922.3			

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.

GEOMAGNETIC ACTIVITY INDICES

January 1988

Day		Kp Three-Hourly Indices 1	2	3	4	5	6	7	8	Sum	Ap	Cp	Km Three-Hourly Indices 1	2	3	4	5	6	7	8	aa Provisional Am	N	S	M	
1	Q7	1-	1-	1-	1	2	1+	2	2-	10	5	0.2	1+	1-	1-	2-	2+	2-	2+	2	11	6	15	9	12	C
2	D4	2+	3-	2	5+	4+	5-	5	4+	31-	29	1.3	2+	2	2	5	5-	4+	5-	4	51	9	55	22	42	
3		2+	3-	2+	2	1+	1+	1	1	14	7	0.3	2-	3-	3-	3-	2-	2-	1	1+	15	45	16	27	35	
4		2+	2	1	1-	2-	2	3+	5+	18+	14	0.8	2-	1+	1	1	2	2	4-	5-	23	24	22	9	38	
5		3	4-	3+	2+	3+	1	2-	4-	22	14	0.8	3+	3+	3	2	3+	1+	2	3	26	27	28	32	24	
6	D3	3+	2+	4-	4+	3-	5	6	4	31+	31	1.3	3	3-	4	4	3	5	5	4-	54	50	69	46	74	
7	D5	6	4+	3	3-	2	2	3	4	27	24	1.2	4+	4-	2+	2+	2	2+	3	3+	31	39	24	36	27	
8		4-	4+	2	4-	4-	4-	3	2+	26+	19	1.0	3+	3+	2-	4-	3+	4-	2+	2+	31	34	30	35	29	
9		2+	3+	2+	2+	0+	0+	1	1	13	7	0.4	2	3-	2	2	0+	0+	1+	1+	11	13	12	19	6	K
10	Q6	1-	0	0+	0+	1	1-	2+	3-	8	4	0.2	0	0	0+	0+	1+	1	2	3-	8	13	6	4	15	CK
11		3+	4	4-	1	1	1	0+	1+	16-	11	0.6	3-	3+	3	1+	1	1+	0+	2-	16	17	13	22	9	
12		2	2-	3	5-	5	3+	4	1+	25	21	1.1	2+	2+	3-	4+	5-	3+	4-	1+	36	34	34	26	43	
13		0+	1	1+	1+	2	2-	2	4-	13+	7	0.4	0+	1	1	2-	2+	2	2	4	16	15	14	9	21	
14	D2	4	5	2+	2	3	5	6+	7	35-	48	1.6	4-	5-	3-	2	3	5	6-	6+	78	83	87	51	119	
15	D1	7+	7+	6	5	4-	3+	3-	3+	39-	63	1.7	6-	5+	5	4+	3+	3	3-	3	65	81	47	98	31	
16	Q8	2	0+	2-	1+	2+	1-	1-	2-	11-	5	0.2	2-	1-	1+	1+	3-	1-	1-	2-	10	11	10	9	12	C
17		0+	2-	2-	1+	1+	3-	2+	3-	14	7	0.4	1-	1	1	1	2-	3-	2+	3-	12	16	13	9	20	K
18		1+	1+	3-	2	1	3-	5-	2+	18	12	0.7	1+	1	2+	2	2-	2+	4+	2	19	28	15	14	30	
19		2	2+	4-	3-	2	2+	2	2-	19-	10	0.6	1+	2	3+	3-	2+	3-	2+	2-	20	17	16	18	15	
20		3	2+	3+	3-	3-	2+	2+	3	22-	12	0.7	2	1+	3-	2	3	2	2-	3-	18	24	17	22	19	
21		3+	3+	2-	1+	2-	1	2	2-	16	9	0.5	2+	3-	2-	1+	1+	1+	2-	2-	13	15	13	18	10	
22		2-	2	1	1+	2+	3-	2	1-	14-	7	0.3	1	2-	1	1+	3-	2+	2+	1+	13	16	13	9	20	K
23	Q1	1	0+	0+	1-	1	1-	0+	0	4+	2	0.0	1	0+	0+	1	1	1-	0+	0	4	7	5	8	4	CK
24	Q5	0+	0+	1+	1	2-	1+	2-	2	10-	5	0.2	0+	0+	1	1+	2	1+	1+	2-	8	11	7	5	13	CC
25	Q9	1	2-	2	1+	1+	2-	2-	2-	12+	6	0.3	1-	1+	2	1	2-	2	2-	2-	11	16	12	11	17	C
26		1	0+	1+	2-	2	2-	3+	3+	15-	8	0.4	1	0	1	2	2	2-	4-	3	16	20	11	9	23	
27		3	3	3	3+	2	2	3-	2	21	12	0.7	2	2	3-	3	2	2-	3-	2+	19	24	15	23	16	
28	Q10K	2-	3	2	2-	1-	1-	0+	1-	11-	6	0.3	1+	2+	2+	2-	1+	1	1-	1+	11	11	13	17	8	CC
29	Q4	1+	1+	0+	1	1-	2	1-	1	8+	4	0.1	1+	1	1-	1+	1-	2+	1-	1	8	11	8	10	9	CC
30	Q3	1-	0+	1-	0+	0	0+	1	1+	5-	3	0.0	0+	0+	1-	0+	0	1-	1	1+	4	7	5	7	6	CC
31	Q2	0	1	1-	0+	1	1	0+	0+	5-	3	0.0	0	1-	1-	1-	1+	1+	1-	0+	5	7	5	4	8	CC
Mean											13	0.59									21.4	23.7	21.1	22.4	

Day	Kn Three-Hourly Indices 1	2	3	4	5	6	7	8	An	Ks Three-Hourly Indices 1	2	3	4	5	6	7	8	As	Prov Sa	Ri	Ra	Rs	IMF
1	1+	1-	1-	1+	2	2-	2	1+	9	1+	1	1-	2-	3-	2-	3-	2+	13	100.1	47	43	46	
2	2	2-	2-	5	5-	4	4+	4-	48	3-	2	2+	5-	4+	4+	5-	4+	54	93.7	31	29	39	
3	2-	2	2+	2+	1+	2-	1+	1	13	2	3-	3	3-	2-	2-	1-	1+	16	101.2	25	21	47	
4	2-	1+	1	1-	2-	2	3+	5-	21	2-	2-	1+	1+	2+	2	4	5-	25	98.2	26	23	44	
5	3	3+	3-	2	3+	1+	2-	4-	25	3+	3+	3	2	4-	1+	2+	3-	27	99.5	32	24	45	
6	3-	2+	3+	4-	3-	5	5	4-	50	3	3	5-	4+	3	5-	5	4	58	101.7	40	44	48	
7	4+	4	2+	2	2-	2+	3-	4-	33	4	3+	2+	2+	2+	2+	3	3	29	102.1	58	57	48	
8	3+	3+	1+	4-	4-	4-	3-	2	32	3+	3	2	4-	3+	4-	2+	3-	30	105.6	57	59	52	
9	2-	2+	2-	2+	0+	0+	1+	1	10	2	3-	2+	2-	0+	0	1+	1+	11	100.6#	59	64	47	
10	0+	0	0	0+	1+	1+	2+	2+	8	0	0+	0+	1-	1+	1	2	3-	8	100.9	68	69	47	
11	3-	3+	3+	1	1	1+	0+	1+	16	3-	3	2+	1+	1+	2-	1-	2	15	101.7#	75	67	48	
12	2+	2	3-	4	5	4-	4-	1+	37	3-	2+	3	4+	4	3	3+	1+	34	107.5#	71	62	54	
13	0	1-	1	1+	2	2-	2	4-	13	1-	1	1+	2	2+	2+	2+	4	18	108.1#	81	82	55	
14	3+	5-	3-	2-	3	5	6	7-	80	4	5	3-	2+	3+	5	6-	6+	77	113.7	97	87	61	
15	5+	6-	5-	4+	3+	3+	3-	3	65	6-	5+	5	4	3	3-	3-	3	65	112.4#	90	97	59	
16	2-	0+	2-	1+	3+	1	1-	1+	11	1+	1-	1+	2-	2	1-	1	2-	9	121.8#	83	76	70	
17	0+	1	1	1-	2-	3	2+	3-	12	1	1-	1	2-	1+	3-	2	2+	12	116.4	72	67	64	
18	1-	1-	2+	2	1+	3-	4+	2	20	1+	1	2	2	2-	2	4	2	18	110.9	68	59	58	
19	1+	2-	4-	3-	2	3-	2	1+	19	2-	2	3	3-	3-	3-	3-	2	20	114.2	73	73	61	
20	2-	2-	3	2	3-	2	2-	3-	18	2	1	3-	2	3	2	2-	3-	18	112.7	78	65	60	
21	2+	2+	1+	1+	2-	1	2	2-	13	2+	3-	2-	2-	1	1+	2-	2	13	111.6	84	73	59	
22	1	2-	1-	1	3-	2+	2	1	12	1	2-	1	2-	2+	2+	3-	2-	14	104.5	66	63	51	
23	1-	0+	0+	1-	1	1	1-	0	4	1+	1-	1-	1	1	0+	0+	0	4	104.7	47	46	51	
24	0	0+	1	1+	2+	2-	1+	2	9	0+	1-	1-	2-	2	1	1+	2-	8	102.2	44	40	48	
25	1-	1+	2-	1-	2-	2+	2-	2-	11	1-	1+	2	1+	1+	2-	2	2-	10	94.9	40	39	40	
26	1-	0	1-	2+	2	2-	4-	3-	15	1+	0	1	2	2	1+	4-	3	17	93.5	44	39	39	
27	2	2+	3-	3+	2	2-	3	2	21	2	2-	3-	3	2	1+	3-	3-	18	101.6	54	55	48	
28	1+	2+	2-	2-	1+	1+	1-	1	10	2-	2+	3-	2	1+	1-	1-	2-	12	103.0	67	70	49	
29	1	1	0+	1	1	2+	1-	1	7	1+	1	1-	2-	1-	2	1-	1	8	99.1	59	51	45	
30	0+	0+	0+	0+	0	1-	1	1+	4	1-	1-	1	1-	0	1-	1-	1+	5	100.1	56	55	46	
31	0+	0+	1-	1-	1+	1	1-	0+	4	0	1-	0+	1-	1+	1+	1-	1-	5	103.1	57	49	49	
Mean									21.0									21.6	104.6	59.6	56.4	51.0	

D A I L Y A V E R A G E I N D I C E S Ap

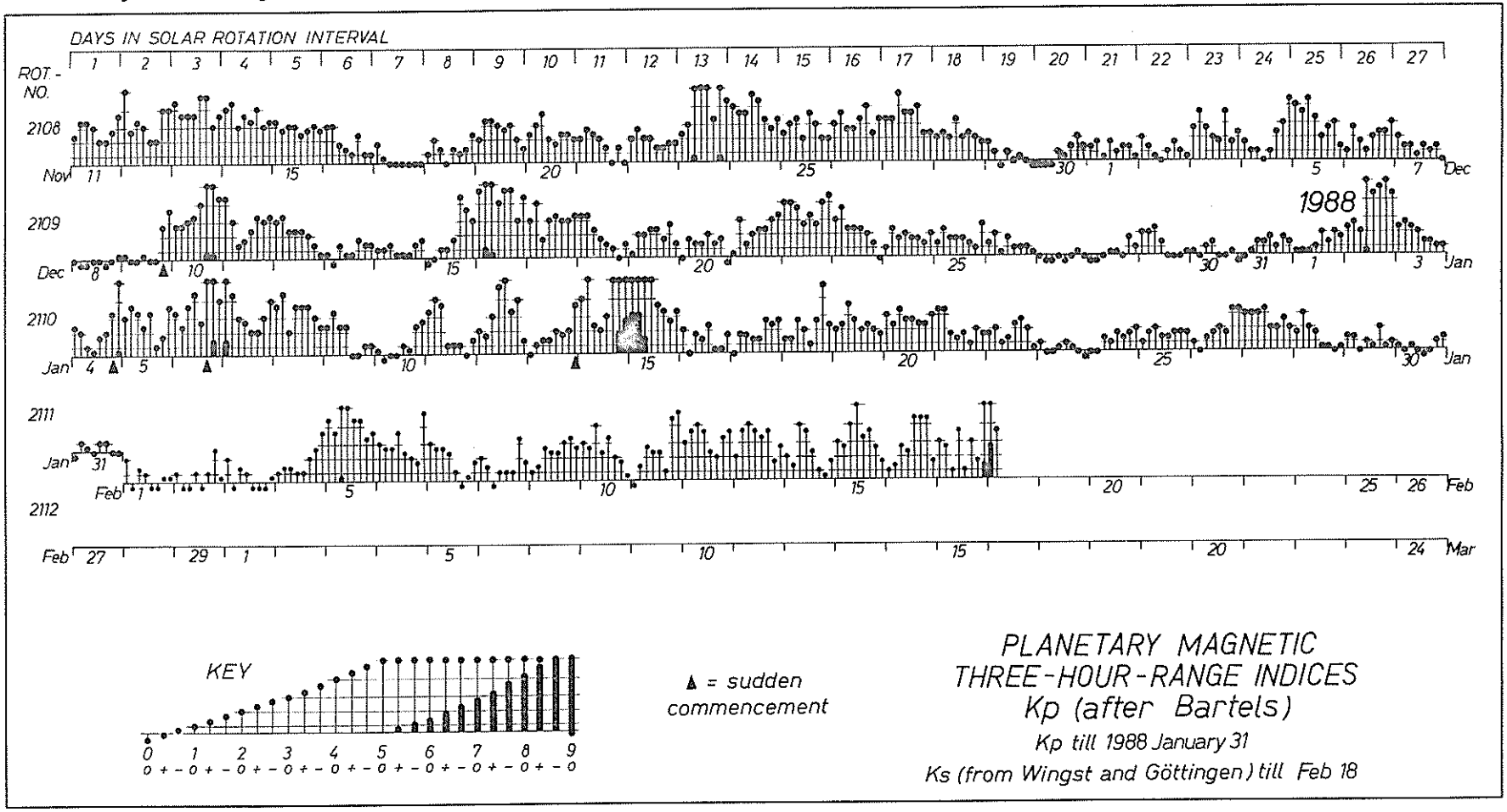
February 1987 to January 1988

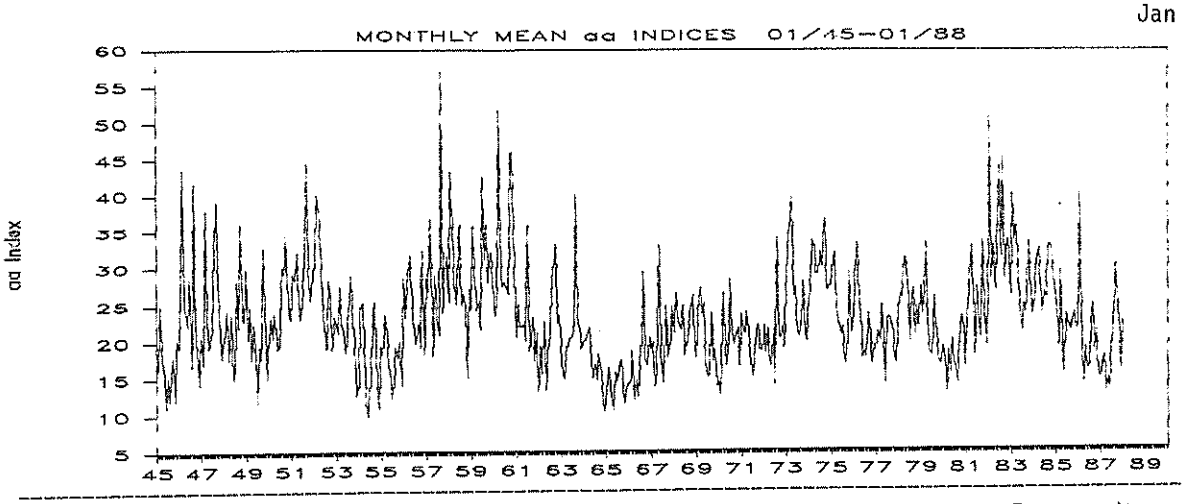
DAY	FEB 87	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
1	7	9	10	7	8	2	10	34	13	7	5	5
2	4	3	4	6	8	3	5	12	9	23	4	29
3	4	6	2	6	4	9	12	4	36	27	12	7
4	4	10	16	5	6	8	7	6	14	9	10	14
5	4	21	12	4	7	6	13	6	6	10	17	14
6	7	10	7	5	25	5	8	9	5	9	8	31
7	9	21	13	8	9	4	4	11	8	5	4	24
8	14	12	11	4	4	10	10	10	8	4	1	19
9	11	9	8	4	3	9	8	10	3	10	6	7
10	8	11	10	10	4	11	4	38	7	11	28	4
11	7	8	7	6	7	7	7	40	28	14	15	11
12	18	14	5	2	13	7	16	22	8	20	9	21
13	4	8	12	6	6	4	23	23	24	27	4	7
14	5	8	6	9	6	5	16	26	31	22	4	48
15	6	10	6	4	4	24	19	29	26	14	11	63
16	12	12	4	4	8	20	12	19	13	8	39	5
17	9	10	5	4	6	14	11	17	18	3	16	7
18	7	12	4	2	6	10	6	7	5	5	8	12
19	5	11	8	2	17	8	9	3	6	12	7	10
20	29	4	12	4	8	9	8	11	8	10	4	12
21	19	18	3	3	6	6	5	10	13	6	10	9
22	18	15	4	7	4	8	7	29	5	7	22	7
23	14	6	4	8	3	6	10	17	11	35	10	2
24	12	5	9	20	7	12	11	14	19	24	6	5
25	7	6	4	25	7	17	39	46	28	12	7	6
26	6	13	4	9	9	4	40	20	11	17	4	8
27	12	26	9	14	5	5	21	11	35	20	1	12
28	13	12	2	10	4	26	15	22	44	9	2	6
29		5	4	21	5	52	12	30	19	3	5	4
30		4	4	9	3	9	14	43	13	3	3	3
31		4		11		14	34		11		4	3
MEAN	10	10	7	8	7	11	14	19	16	13	9	13

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

University of Göttingen

Kp through January 31, 1988





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	46.1	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	28.3	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	18.6	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	24.3	30.3	25.8	22.4	16.0	19.0
1988	22.4												22.4

PRINCIPAL MAGNETIC STORMS

JANUARY 1988

Sta	Geomag Lat	Commencement Day	Time (UT)	Type	SC Amplitudes D (Min)	H (Gamma)	Z (Gamma)	Maximum 3-Hour K Index Day(3-Hour Periods)	K	Ranges D (Min)	H (Gamma)	Z (Gamma)	End Day	Hour (UT)
HYB	07.6N	01	0800	..	..	..	..	02(4,5)	7	4	189	33	03	10
ETT	00.6S	01	1800	..	..	..	..		-	5	218	65	02	23
GNA	43.2S	01	23--	..	..	..	..	02(4,5,7)	5	20	120	130	03	10
SIT	60.0N	02	09--	..	..	..	..	02(4)	7	--	420	380	02	23
FRD	49.6N	02	08--	..	..	..	..	02(4,8)	5	16	126	61	03	01
BJI	28.5N	02	08--	..	..	..	..	02(4)	7	7	157	19	03	12
JAI	17.3N	02	0500	..	..	..	..		-	4	156	18	03	10
SHL	14.7N	02	0500	..	..	..	..		-	4	160	28	03	10
UJJ	13.5N	02	0500	..	..	..	..		-	3	153	23	03	10
ABG	09.5N	02	0500	..	..	..	..	02(4)	6	5	170	23	03	10
GUA	04.0N	02	0910	..	..	..	..	02(4)	6	--	130	40	03	10
TRD	01.1S	02	0500	..	..	..	..		-	4	224	109	03	10
HER	33.7S	02	08--	..	..	..	..	02(4)	5	27	145	110	03	01
KGL	56.5S	02	0900	..	..	..	..	02(7)	7	43	528	284	03	01
BJI	28.5N	04	2011	SC	0.8	40	2	04(7)	5	4	88	12	05	17
HON	21.1N	04	2015	SC	1	26	6	04(8)	5	--	--	--	--	--
JAI	17.3N	04	2009	SC	- 0.6	33	- 7		-	6	115	23	08	00
SHL	14.7N	04	2009	SC	- 1.0	34	5		-	5	107	25	08	00
UJJ	13.5N	04	2009	SC	- 0.6	41	- 10		-	5	118	25	08	00
ABG	09.5N	04	2009	SC	- 0.8	37	- 7	04(7,8) 06(6,7)	5	4	122	29	08	00
HYB	07.6N	04	2012	SC	- 0.2	41	- 3	04(7)	5	3	81	23	06	12
GUA	04.0N	04	2012	SC	- .2	37	- 10	04(8)	5	--	80	20	05	17
ETT	00.6S	04	2013	SC	- 0.6	35	43		-	3	123	83	06	13
TRD	01.1S	04	2009	SC	- 0.4	38	49		-	3	183	130	08	00
HER	33.7S	04	2012	SC	3	36	26	04(8)	5	17	60	77	05	02
KGL	56.5S	04	2013	SC	6	48	4	04(8)	5	28	132	80	05	15
WIT	54.2N	06	1631	SC	- 1	30	0	06(6,7) 07(1)	6	33	186	77	07	06
FRD	49.6N	06	07--	..	..	..	..	06(6,7) 07(2)	5	22	110	41	08	06
BJI	28.5N	06	00--	..	..	..	..	06(6)	6	12	130	15	08	20
HYB	07.6N	06	1631	SC	- 0.5	27	- 1	06(6,7) 08(1)	5	4	108	18	08	21
GUA	04.0N	06	0031	..	..	..	..	06(4)	5	--	100	30	06	13
GUA	04.0N	06	1630	..	..	..	..	06(7)	5	10	80	40	07	08
ETT	00.6S	06	1632	SC	- 0.7	21	18		-	4	138	45	08	20
HER	33.7S	06	06--	..	..	..	..	06(6,7)	5	34	148	133	07	04
GNA	43.2S	06	00--	..	..	..	..	06(2,3,6,7)	5	15	130	90	08	19
CNB	43.9S	06	03--	..	..	..	..	06(3,4,6,7)	5	17	157	57	07	04
KGL	56.5S	06	1638	SC	- 1	40	16	06(7,8)	6	43	436	224	07	15
HYB	07.6N	10	2000	..	..	..	..	12(5)	6	4	131	22	12	21
JAI	17.3N	11	2200	..	..	..	..		-	6	117	23	13	00
SHL	14.7N	11	2200	..	..	..	..		-	3	110	15	13	00
UJJ	13.5N	11	2200	..	..	..	..		-	4	112	30	13	00
ABG	09.5N	11	2200	..	..	..	..	12(5)	5	5	123	36	13	00
ETT	00.6S	11	2100	..	..	..	..		-	5	164	53	12	21
TRD	01.1S	11	2200	..	..	..	..		-	3	163	87	13	00
FRD	49.6N	12	07--	..	..	..	..	12(4,5)	5	16	72	19	12	21
COL	64.6N	13	2329	SC*	23	- 80	40	14(6)	7	234	1550	810	15	21
SIT	60.0N	13	2330	SC*	11	- 27 *	- 9 *	15(2)	7	--	1150	480	15	17
WIT	54.2N	13	2330	SC*	- 4 *	43	2	14(8) 15(1)	7	70	218	128	15	12
FRD	49.6N	13	2330	SC*	4.6	41.5	- 10	15(2)	7	38	219	113	15	23
BJI	28.5N	13	2330	SC	0.9	27	1	14(7)	6	17	180	25	15	24
HON	21.1N	13	2330	SC	0.5	15	7	14(2)	6	--	--	--	--	--
JAI	17.3N	13	2327	SC	- 1.6	28	- 8		-	9	201	27	16	03
SHL	14.7N	13	2327	SC	- 1.0	23	5		-	7	209	21	16	03
UJJ	13.5N	13	2327	SC	- 1.0	32	- 9		-	7	202	30	16	03
ABG	09.5N	13	2327	SC	- 1.1	27	- 11	14(2)	6	8	211	42	16	03
HYB	07.6N	13	2330	SC	- 0.8	27	- 2	14(6,7)	6	6	235	17	15	24
ETT	00.6S	13	2330	SC	- 0.8	22	23			8	287	92	15	24
TRD	01.1S	13	2327	SC	- 0.5	25	33		-	5	287	156	16	03
HER	33.7S	13	2329	SC	3	37	24	14(8)	6	33	203	173	15	09
GNA	43.2S	13	2330	SC	0.5	12	6	14(7,8) 15(1)	6	27	260	160	16	00
CNB	43.9S	13	2330	SC*	- 4.1	13 *	14	14(2,6)	6	22	302	103	15	13
GUA	04.0N	14	0429	..	..	..	..	14(2)	6	10	240	50	15	13
KGL	56.5S	14	1939	SC	10	56	32	15(1)	9	149	1072	936	16	04

Stations Reporting:

ABG = ALIBAG
BJI = BEIJING
CNB = CANBERRA
COL = COLLEGE
ETT = ETAIYAPURAM
FRD = FREDERICKSBURG
GNA = GNANGARA
GUA = GUAM
HER = HERMANUS
HON = HONOLULU
HYB = HYDERABAD
JAI = JAIPUR
KGL = KERGUELEN
SHL = SHILLONG
SIT = SITKA
TRD = TRIVANDRUM
UJJ = UJJAIN
WIT = WITTEVEEN

RADIO PROPAGATION INDICES

JANUARY 1988

Day	For Circuits from Norddeich to: Bracknell	Rome	Teheran	New York	Tokyo	Canberra
1.	6.5	6.1	8.2	7.1	5.8	7.6
2.	6.3	5.4	5.9	4.7	6.0	5.8
3.	4.9	4.2	4.9	4.3	6.1	5.2
4.	6.2	5.8	4.3	5.5	6.9	5.6
5.	4.9	5.2	5.1	5.3	4.2	5.5
6.	5.4	4.7	5.6	4.8	6.6	5.7
7.	5.3	5.5	5.6	4.7	2.7	4.6
8.	4.1	5.7	4.9	4.3	4.0	5.0
9.	3.9	4.5	4.6	3.7	4.1	4.2
10.	4.5	5.2	4.8	5.0	7.2	5.4
11.	4.7	4.5	5.9	5.4	6.1	5.8
12.	6.4	6.0	7.7	6.2	6.5	6.1
13.	6.0	5.5	5.8	6.2	8.0	6.7
14.	5.7	6.2	6.6	4.8	8.1	6.6
15.	3.1	3.5	2.5	1.5	4.1	3.6
16.	4.1	4.9	3.4	3.3	5.0	4.9
17.	4.8	5.0	5.7	3.7	6.0	4.4
18.	5.1	5.3	6.2	4.9	5.5	5.8
19.	5.6	5.8	6.1	4.7	6.6	5.8
20.	5.0	5.3	5.8	4.7	6.4	5.3
21.	5.3	5.6	5.5	4.1	6.0	5.8
22.	5.6	6.0	6.8	5.4	7.4	6.4
23.	5.2	5.9	7.2	5.6	8.0	6.4
24.	6.4	6.3	7.6	6.7	8.7	7.3
25.	5.9	6.5	7.7	6.9	9.0	7.4
26.	6.1	6.8	8.3	7.4	9.0	7.6
27.	5.9	6.1	7.3	6.5	8.2	6.9
28.	6.5	6.1	6.8	6.3	8.0	6.6
29.	6.6	6.3	6.3	7.8	9.1	6.9
30.	6.1	5.7	6.3	7.9	8.8	7.2
31.	6.6	6.3	8.3	8.0	9.3	7.6
MEAN:	5.4	5.5	6.1	5.4	6.7	6.0

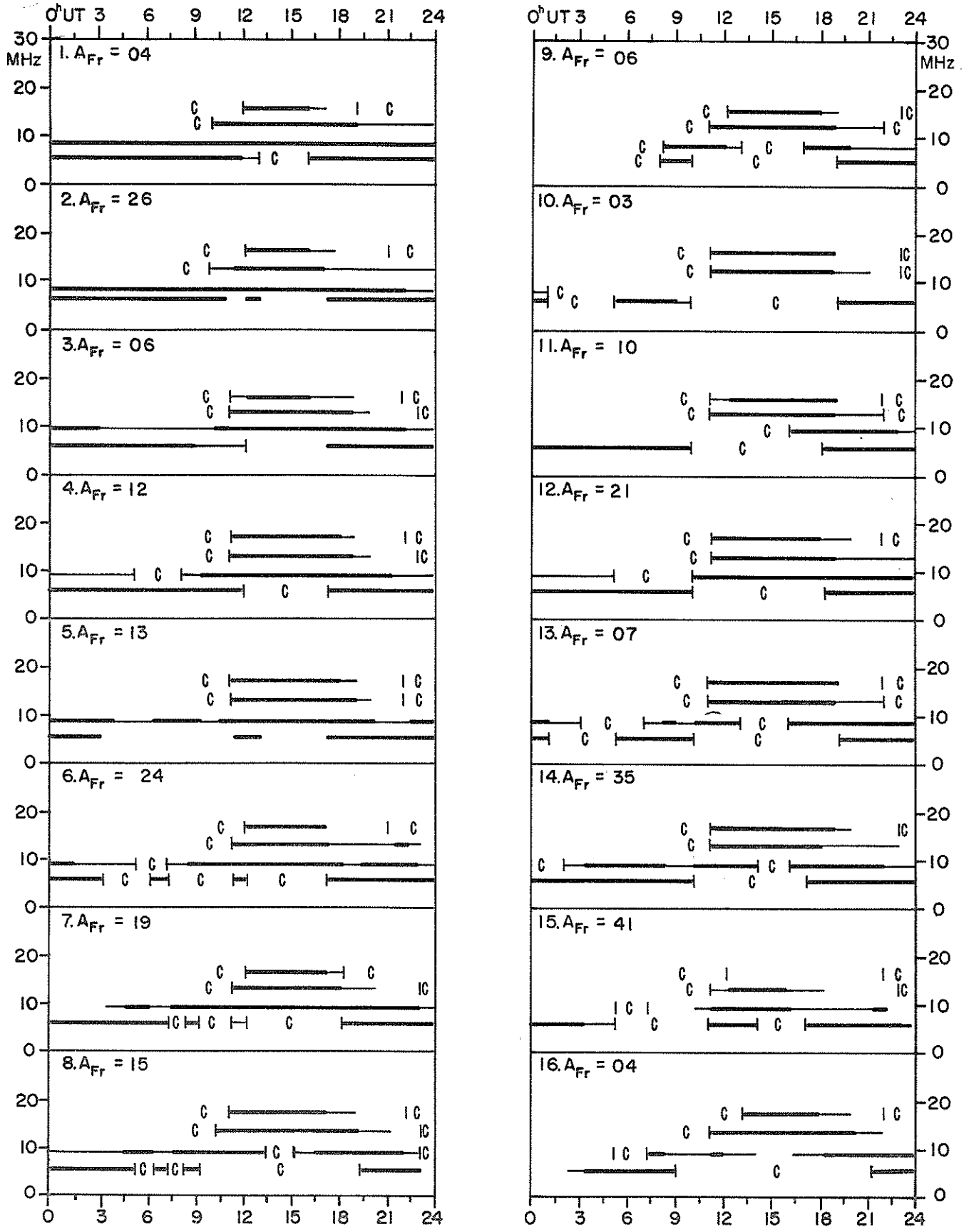
CALCULATION OF QUALITY INDICES (Q):
From all 24 hourly field strength values and from all frequencies of the same circuit a median field strength value is calculated (FD). This daily value is compared with the average value (FA) of the preceeding 27 days (1 sun rotation).

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

The quality indices vary from 0.1 to 9.9 where 6.0 is normal. Conditions are "normal" (index = 6.0), if they respond to the average of the preceeding 27 days.

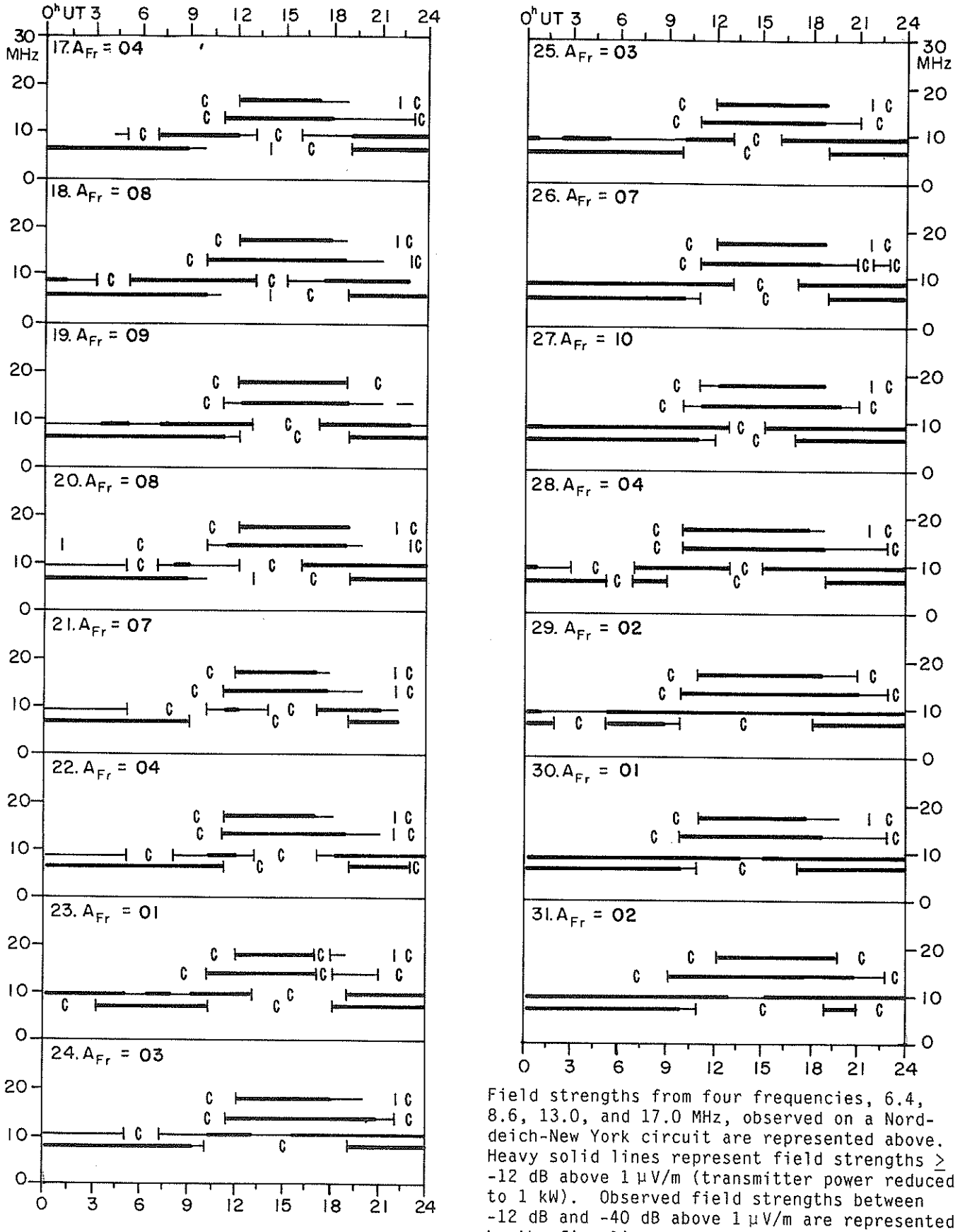
SCALE FOR QUALITY INDICES:
0.1 - 1.0 = very poor
1.1 - 3.0 = poor
3.1 - 5.0 = fair
5.1 - 7.0 = normal
7.1 - 9.0 = good
9.1 - 9.9 = very good

TRANSMISSION FREQUENCY RANGES--NORTH ATLANTIC PATH
JANUARY 1988



TRANSMISSION FREQUENCY RANGES--NORTH ATLANTIC PATH

JANUARY 1988



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 $\geq$ -12 dB above 1 µV/m (transmitter power reduced to 1 kW). Observed field strengths between -12 dB and -40 dB above 1 µV/m are represented by the fine line.

CONTENTS

Prompt Reports **LATE DATA** Number 523 Part I

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

UNIVERSAL TIME	BXvso	BYvso	BZvso	BT	REGION W=WAKE
	NANOTESLAS				
87 152 JUN 1 12:30:00	11.93	2.17	-5.84	14.09	W
87 153 JUN 2 12:40:00	-14.70	-15.47	6.49	23.36	W
87 154 JUN 3 12:40:00	3.28	-2.86	-6.73	10.93	W
87 155 JUN 4 12:40:00	-6.18	-3.45	-2.54	10.98	W
87 156 JUN 5 12:40:00					
87 157 JUN 6 12:40:00					
87 158 JUN 7 12:40:00					
87 159 JUN 8 12:40:00					
87 160 JUN 9 12:40:00					
87 161 JUN 10 12:40:00					
87 162 JUN 11 12:40:00	-4.17	-1.19	1.36	8.96	W
87 163 JUN 12 12:40:00	6.92	-.41	-.04	8.91	W
87 164 JUN 13 12:40:00	-9.19	1.63	-.44	11.09	W
87 165 JUN 14 12:40:00	5.15	-3.45	3.70	11.57	W
87 166 JUN 15 12:40:00	10.89	-1.78	-1.00	13.10	W
87 167 JUN 16 12:40:00	2.43	-1.74	2.05	9.84	W
87 168 JUN 17 12:40:00	3.14	-1.08	2.39	6.16	W
87 169 JUN 18 12:40:00	-6.72	2.89	-1.88	8.60	W
87 170 JUN 19 12:40:00	8.66	-8.25	2.84	16.89	W
87 171 JUN 20 12:40:00	-5.55	2.71	-6.48	10.95	W
87 172 JUN 21 12:40:00	-6.78	3.20	-2.84	9.42	W
87 173 JUN 22 12:50:00	-3.54	8.38	-2.69	9.94	W
87 174 JUN 23 12:50:00	-6.72	2.74	-2.54	8.25	W
87 175 JUN 24 12:50:00	7.77	-6.05	-1.40	10.18	W
87 176 JUN 25 12:50:00	9.15	-2.45	-1.68	10.11	W
87 177 JUN 26 12:50:00	9.30	-1.93	-2.35	9.97	W
87 178 JUN 27 12:50:00					
87 179 JUN 28 12:50:00	10.46	-3.25	-2.63	13.78	W
87 180 JUN 29 12:50:00	10.80	-7.60	-.58	14.27	W
87 181 JUN 30 12:50:00	5.95	-8.26	-1.26	10.95	W

Source: Institute of Geophysics and Planetary Physics, UCLA

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

OCTOBER 1987

Storm Sudden Commencements (ssc)			Solar Flare Effects (sfe)		
Day	Time	Quality: Station Group*	Day	Begin-End	Station(s)
03	0433	B: WNG SPT LNP MPO C: BDV MMB KAK KNY	11	0753-0800	NCK (ssc: C: WIT CLF)

Reporting Observatories:

SOD DOB NUR WNG WIT BDV CLF NCK GCK MMB AQU EBR COI SPT
KAK KNY QUE TEN LNP MPO GNA AMS CZT KGL

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.

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

NOVEMBER 1987

Storm Sudden Commencements (ssc)			Solar Flare Effects (sfe)		
Day	Time	Quality: Station Group*	Day	Begin-End	Station(s)
02	1553	A: NCK MPO	05	0456-0520	MMB KAK KNY
		B: WNG EBR SPT LNP GNA	06	0931-0948	NCK
		C: WIT NGK BDV CLF GCK TEN	18	0315-0330	MMB
03	1000	A: NCK	20	0414-0445	MMB
		B: SOD WNG TEN LNP MPO	30	1141-1207	TEN (ssc: WNG)
		C: BDV GCK EBR SPT KNY AMS CZT KGL			
07	0325	A: NCK			
		B: WNG LNP			
		C: WIT CLF EBR SPT			

Reporting Observatories:

SOD DOB WNG WIT NGK BDV CLF NCK GCK MMB AQU EBR SPT
KAK KNY TEN LNP MPO GNA CAA 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.

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

DECEMBER 1987

Storm Sudden Commencements (ssc)			Solar Flare Effects (sfe)		
Day	Time	Quality: Station Group*	Day	Begin-End	Station(s)
09	1941	A: HRB COI MPO GNA	02	1503-1537	NGK
		B: WNG WIT NGK VAL DOU CLF	14	0422-0435	MMB KAK KNY
		NCK GCK AQU SPT TEN LNP	15	0413-0422	QUE
		C: BDV EBR AMS CZT KGL COL			
		si: DOB			
15	1504	B: HRB			
		C: CLF			
28	2020	B: WNG VAL			

Reporting Observatories:

SOD COL DOB NUR WNG WIT NGK VAL DOU BDV CLF HRB NCK GCK MMB
AQU EBR COI SPT KAK HTY KNY QUE TEN LNP MPO GNA AMS CZT KGL

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.

CALCIUM PLAGE REGIONS
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

JUNE 1987

Calcium Plage Region	Sta	Observation Time Mo Day (UT)	Lat CMD	CMP Mo Day	Intensity	Corrected Area (10-6 Hemi)	NOAA/USAF Sunspot Groups #1	#2	#3
19987	BIGB	05 31 2351	N23 E12	06 1.9	1.3	0112			
19987	BIGB	06 01 1644	N23 E03	06 1.9	.7	0075			
19987	BIGB	06 02 1533	N23 W10	06 1.9	1.0	0050			
19986	BIGB	05 29 2355	S29 E64	06 4.0	.9	0678			
19986	BIGB	05 30 1759	S29 E50	06 3.7	.8	0610			
19986	BIGB	05 31 2351	S29 E33	06 3.6	1.0	0640			
19986	BIGB	06 01 1644	S26 E26	06 3.7	1.3	0533			
19986	BIGB	06 02 1533	S26 E12	06 3.6	1.2	0658			
19986	BIGB	06 03 1509	S26 W02	06 3.5	1.1	0875			
19986	BIGB	06 04 1729	S26 W16	06 3.5	1.2	0701			
19986	BIGB	06 05 1655	S26 W29	06 3.4	1.3	0611			
19986	BIGB	06 07 1451	S26 W55	06 3.3	1.2	0530			
19988	BIGB	06 02 1533	S31 E66	06 7.8	1.0	1223			
19988	BIGB	06 03 1509	S31 E52	06 7.7	.7	1328			
19988	BIGB	06 04 1729	S31 E52	06 8.8	1.2	1409			
19988	BIGB	06 05 1655	S31 E41	06 8.9	1.3	2059			
19988	BIGB	06 07 1451	S31 E16	06 8.9	1.5	2036			
19988	BIGB	06 08 1639	S34 E01	06 8.8	1.4	2090			
19988	BIGB	06 09 1526	S34 W12	06 8.7	1.2	1810			
19988	BIGB	06 10 1515	S34 W25	06 8.6	1.4	1640			
19988	BIGB	06 11 1847	S34 W40	06 8.6	1.3	1467			
19988	BIGB	06 12 1648	S34 W47	06 8.9	1.1	1432			
19988	BIGB	06 13 1902	S34 W54	06 9.5	1.1	1368			
19988	BIGB	06 14 2235	S34 W62	06 10.0	1.1	1038			
19988	BIGB	06 15 1735	S34 W67	06 10.4	.8	0887			
19989	BIGB	06 03 1509	S23 E78	06 9.6	1.2	0688	4814		
19989	BIGB	06 04 1729	S23 E72	06 10.3	1.5	1093	4814		
19989	BIGB	06 05 1655	S23 E59	06 10.2	1.5	0991	4814		
19989	BIGB	06 07 1451	S23 E30	06 9.9	1.8	1770	4814		
19989	BIGB	06 08 1639	S24 E16	06 9.9	1.4	1086	4814		
19989	BIGB	06 09 1526	S24 E04	06 9.9	1.3	1056	4814		
19989	BIGB	06 10 1515	S24 W10	06 9.9	2.0	1091	4814		
19989	BIGB	06 11 1847	S24 W25	06 9.8	1.9	1046	4814		
19989	BIGB	06 12 1648	S24 W37	06 9.8	1.6	0985	4814		
19989	BIGB	06 13 1902	S24 W52	06 9.8	1.5	0945	4814		
19989	BIGB	06 14 2235	S24 W68	06 9.7	1.5	0722	4814		
19989	BIGB	06 15 1735	S24 W77	06 9.8	1.7	0720	4814		
19991	BIGB	06 08 1639	S01 E26	06 10.6	1.6	0144			
19991	BIGB	06 09 1526	S01 E13	06 10.6	1.0	0107			
19991	BIGB	06 10 1515	S01 W01	06 10.6	1.8	0110			
19993	BIGB	06 09 1526	N29 E12	06 10.6	1.1	0076			
19994	BIGB	06 11 1847	S11 W01	06 11.7	1.9	0210	4813		
19994	BIGB	06 12 1648	S11 W13	06 11.7	1.3	0382	4813		
19994	BIGB	06 13 1902	S11 W30	06 11.5	1.0	0169	4813		
19994	BIGB	06 14 2235	S12 W43	06 11.7	.8	0061	4813		
19990	BIGB	06 07 1451	S27 E56	06 12.0	1.5	0133			
19990	BIGB	06 08 1639	S27 E42	06 12.0	1.2	0140			
19992	BIGB	06 08 1639	S13 E52	06 12.6	1.3	0274	4813A		
19992	BIGB	06 09 1526	S13 E39	06 12.6	1.2	0222	4813A		
19992	BIGB	06 10 1515	S13 E26	06 12.6	1.2	0183	4813A		
19996	BIGB	06 13 1902	S25 E47	06 17.4	.8	0300			
19996	BIGB	06 14 2235	S25 E32	06 17.4	.8	0269			
19996	BIGB	06 15 1735	S25 E21	06 17.3	1.0	0300			
19996	BIGB	06 16 1723	S25 E08	06 17.3	1.1	0222			
19996	BIGB	06 17 1510	S25 W04	06 17.3	.8	0185			
19996	BIGB	06 18 1555	S25 W18	06 17.3	1.0	0189			
19996	BIGB	06 19 1714	S25 W32	06 17.2	1.0	0200			
19997	BIGB	06 16 1723	S04 E08	06 17.3	1.8	0070	4816		
19997	BIGB	06 17 1510	S04 W04	06 17.3	2.7	0205	4816		
19997	BIGB	06 18 1555	S04 W21	06 17.1	2.0	0321	4816		
19997	BIGB	06 19 1714	S04 W35	06 17.1	1.1	0207	4816		

C A L C I U M P L A G E R E G I O N S
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

JUNE 1987

Calcium Plage Region	Sta	Observation Time Mo Day (UT)	Lat CMD	CMP Mo Day	Intensity	Corrected Area (10-6 Hemi)	NOAA/USAF Sunspot Groups #1	#2	#3
19999	BIGB	06 19 1714	S36 W26	06 17.6	1.4	0122			
20003	BIGB	06 19 1714	S05 W11	06 18.9	1.2	0061			
19995	BIGB	06 12 1648	N29 E73	06 18.4	1.0	2335	4815		
19995	BIGB	06 13 1902	N31 E64	06 18.8	1.8	2844	4815		
19995	BIGB	06 14 2235	N31 E51	06 19.0	2.5	3684	4815		
19995	BIGB	06 15 1735	N31 E41	06 19.0	2.0	3609	4815		
19995	BIGB	06 16 1723	N32 E31	06 19.2	2.4	3824	4815		
19995	BIGB	06 17 1510	N32 E18	06 19.0	2.7	3986	4815		
19995	BIGB	06 18 1555	N32 E04	06 19.0	2.3	4035	4815		
19995	BIGB	06 19 1714	N32 W10	06 18.9	2.1	3690	4815		
19995	BIGB	06 23 2023	N32 W57	06 19.3	2.0	3422	4815		
19995	BIGB	06 24 1647	N32 W63	06 19.7	2.0	3428	4815		
19995	BIGB	06 25 1822	N32 W70	06 20.2	1.5	2101	4815		
19995	BIGB	06 26 1819	N32 W77	06 20.7	.6	0858	4815		
20000	BIGB	06 19 1714	S21 E01	06 19.8	1.1	0085	4818		
20000	BIGB	06 23 2023	S21 W55	06 19.6	1.2	0086	4818		
20005	BIGB	06 24 1647	S38 W36	06 21.8	1.0	0037			
20007	BIGB	06 26 1819	S36 W39	06 23.6	1.2	0140			
20007	BIGB	06 27 1838	S36 W52	06 23.6	.4	0049			
20001	BIGB	06 19 1714	N18 E56	06 24.0	.5	0168			
20004	BIGB	06 23 2023	N19 E03	06 24.1	3.8	1596	4819		
20004	BIGB	06 24 1647	N19 W09	06 24.0	3.6	1533	4819		
20004	BIGB	06 25 1822	N19 W23	06 24.0	3.2	1553	4819		
20004	BIGB	06 26 1819	N19 W36	06 24.0	3.2	1585	4819		
20004	BIGB	06 27 1838	N19 W50	06 24.0	3.1	1374	4819		
20004	BIGB	06 28 1915	N19 W64	06 23.9	2.8	1187	4819		
20004	BIGB	06 29 1707	N19 W77	06 23.8	2.2	1000	4819		
19998	BIGB	06 18 1555	S32 E76	06 24.7	2.6	0841	4817		
19998	BIGB	06 19 1714	S32 E62	06 24.6	3.3	0989	4817		
19998	BIGB	06 23 2023	S32 E10	06 24.6	3.5	0910	4817		
19998	BIGB	06 24 1647	S32 W02	06 24.5	3.5	0930	4817		
19998	BIGB	06 25 1822	S32 W15	06 24.6	3.2	0845	4817		
19998	BIGB	06 26 1819	S32 W29	06 24.5	2.5	0715	4817		
19998	BIGB	06 27 1838	S32 W42	06 24.4	1.5	0700	4817		
19998	BIGB	06 28 1915	S33 W56	06 24.3	1.3	0608	4817		
19998	BIGB	06 29 1707	S32 W68	06 24.3	1.1	0570	4817		
20002	BIGB	06 19 1714	N24 E69	06 25.0	.5	0350	4819		
20002	BIGB	06 23 2023	N24 E15	06 25.0	.8	0273	4819		
20002	BIGB	06 24 1647	N24 E03	06 24.9	1.0	0270	4819		
20002	BIGB	06 25 1822	N24 W11	06 24.9	1.0	0208	4819		
20002	BIGB	06 26 1819	N24 W24	06 24.9	.8	0120	4819		
20002	BIGB	06 27 1838	N24 W38	06 24.8	.5	0108	4819		
20002	BIGB	06 28 1915	N24 W51	06 24.9	.8	0111	4819		
20008	BIGB	06 27 1838	S32 W15	06 26.6	1.7	0103	4821		
20008	BIGB	06 28 1915	S32 W29	06 26.5	2.0	0251	4821		
20008	BIGB	06 29 1707	S32 W41	06 26.5	1.3	0252	4821		
20008	BIGB	06 30 1737	S32 W55	06 26.4	.8	0122	4821		

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BIG BEAR SOLAR OBSERVATORY
ACTIVE REGION SUMMARY
Revised Version

JUNE 1987

Region Number	Return Of Region	Rotation Age	First Seen This Rotation	Duration This Rotation
19987	New	1	870531	3 days
19986	19968	3	870529	11
19988	19971/19972	3	870602	14
19989	19983	2	870603	13
19991	New	1	870608	3
19993	New	1	870609	1
19994	New	1	870611	4
19990	New	1	870607	2
19992	New	1	870608	3
19996	19979	2	870613	≥6
19997	New	1	870616	4
19999	New	1	870619	1
19995	19980	2	870612	15
20003	New	1	870619	1
20000	New	1	870619	1
20005	New	1	870624	1
20001	19985	2	870619	≥1
20004	New (in location of 19985	1	870623	≥7
20007	New	1	870626	2
19998	New	1	870618	12
20002	Trailing portion of 19985	2	870619	10
20008	New	1	870627	4
20006	New	1	870625	13

1. No BBSO Calcium Data on June 6, 20-22.

2. KPNO Magnetograms on every day in June.

3. Contiguous Plages: None

4. Plageless days: None

DAILY PLAGE SUMMARIES

JUNE 1987

Day	Sta	Plage Index	Plage Count	Smallest Plage (Millionths	Largest Plage of Solar	Total Area Hemisphere)	Smallest Intensity	Largest Intensity
01	BIGB	1.5	3	75	752	1360	.7	2.5
02	BIGB	1.5	4	50	1223	2706	1.0	1.7
03	BIGB	1.6	4	574	1328	3465	.7	1.3
04	BIGB	2.0	3	701	1409	3203	1.2	1.5
05	BIGB	3.0	3	611	2059	3661	1.3	1.5
06	No Observations This DAY							
07	BIGB	5.4	4	133	2036	4469	1.2	1.8
08	BIGB	4.3	5	140	2090	3734	1.2	1.6
09	BIGB	3.4	5	76	1810	3271	1.0	1.3
10	BIGB	4.1	4	110	1640	3024	1.2	2.0
11	BIGB	3.2	3	210	1467	2723	1.3	1.9
12	BIGB	3.0	4	382	2335	5134	1.0	1.6
13	BIGB	3.6	5	169	2844	5626	.8	1.8
14	BIGB	5.8	5	61	3684	5774	.8	2.5
15	BIGB	5.3	4	300	3609	5516	.8	2.0
16	BIGB	7.0	3	70	3824	4116	1.1	2.4
17	BIGB	9.4	3	185	3986	4376	.8	2.7
18	BIGB	9.0	4	189	4035	5386	1.0	2.6
19	BIGB	8.4	9	61	3690	5872	.5	3.3
20	No Observations This DAY							
21	No Observations This DAY							
22	No Observations This DAY							
23	BIGB	11.7	5	86	3422	6287	.8	3.8
24	BIGB	10.7	5	37	3428	6198	1.0	3.6
25	BIGB	7.9	5	208	2101	5720	1.0	3.2
26	BIGB	6.0	6	120	1585	4248	.6	3.2
27	BIGB	4.8	6	49	1374	3544	.4	3.1
28	BIGB	3.9	5	111	1187	3252	.8	2.8
29	BIGB	2.7	4	252	1236	3058	1.1	2.2
30	BIGB	1.7	2	122	1162	1284	.8	1.7

CALCIUM PLAGE REGIONS
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

JULY 1987

Calcium Plage Region	Sta	Observation Time Mo Day (UT)	Lat CMD	CMP Mo Day	Intensity	Corrected Area (10-6 Hemi)	NOAA/USAF Sunspot Groups #1	#2	#3
20006	BIGB	06 25 1822	N29 E77	07 1.8	1.9	1013	4820		
20006	BIGB	06 26 1819	N29 E64	07 1.8	2.0	0830	4820		
20006	BIGB	06 27 1838	N29 E52	07 1.8	2.3	1210	4820		
20006	BIGB	06 28 1915	N29 E39	07 1.8	2.5	1095	4820		
20006	BIGB	06 29 1707	N29 E27	07 1.8	2.0	1236	4820		
20006	BIGB	06 30 1737	N29 E14	07 1.8	1.7	1162	4820		
20006	BIGB	07 01 1722	N29 E06	07 2.2	1.5	0913	4820		
20006	BIGB	07 02 1957	N29 W09	07 2.1	1.4	0967	4820		
20006	BIGB	07 05 1733	N29 W48	07 2.0	1.2	0764	4820		
20009	BIGB	07 09 1930	S19 W63	07 5.0	2.5	0550	4822		
20009	BIGB	07 10 1529	S19 W76	07 4.8	2.7	0679	4822		
20011	BIGB	07 16 2258	N27 W71	07 11.4	1.7	0367	4823		
20010	BIGB	07 10 1529	N30 E72	07 16.3	1.1	0930			
20010	BIGB	07 11 1730	N30 E66	07 16.9	1.6	2130			
20010	BIGB	07 12 1821	N30 E61	07 17.6	1.4	2074			
20010	BIGB	07 13 1631	N30 E53	07 17.8	1.4	2510			
20010	BIGB	07 14 1630	N31 E40	07 17.8	1.1	2406			
20010	BIGB	07 16 2258	N31 E17	07 18.3	1.2	2553			
20010	BIGB	07 17 2122	N31 E05	07 18.3	1.5	2579			
20010	BIGB	07 18 1539	N31 W05	07 18.2	1.3	2475			
20010	BIGB	07 19 1757	N31 W20	07 18.2	1.4	2293			
20010	BIGB	07 22 1555	N31 W55	07 18.3	.8	1842			
20010	BIGB	07 23 1555	N31 W64	07 18.6	.9	1348			
20015	BIGB	07 18 1539	S16 E28	07 20.8	1.0	0124			
20015	BIGB	07 19 1757	S16 E14	07 20.8	1.4	0102			
20012	BIGB	07 16 2258	N21 E60	07 21.5	1.2	0600	4828		
20012	BIGB	07 17 2122	N21 E47	07 21.5	1.3	0521	4828		
20012	BIGB	07 18 1539	N21 E37	07 21.5	1.0	0344	4828		
20012	BIGB	07 19 1757	N21 E23	07 21.5	1.0	0244	4828		
20012	BIGB	07 22 1555	N21 W16	07 21.4	2.6	0472	4828		
20012	BIGB	07 23 1555	N21 W27	07 21.6	2.2	0648	4828		
20012	BIGB	07 26 1428	N23 W70	07 21.2	1.3	0489	4828		
20016	BIGB	07 18 1539	S28 E37	07 21.5	1.7	0275	4826		
20016	BIGB	07 19 1757	S28 E22	07 21.5	3.5	0486	4826		
20016	BIGB	07 22 1555	S29 W15	07 21.5	4.6	1021	4826		
20016	BIGB	07 23 1555	S28 W27	07 21.6	4.5	1694	4826		
20016	BIGB	07 26 1428	S28 W71	07 21.0	4.1	1840	4826		
20016	BIGB	07 27 1438	S29 W76	07 21.6	3.9	1554	4826		
20013	BIGB	07 16 2258	S33 E70	07 22.5	3.5	1050	4824		
20013	BIGB	07 17 2122	S33 E58	07 22.5	3.5	1102	4824		
20013	BIGB	07 18 1539	S33 E47	07 22.4	3.4	1011	4824		
20013	BIGB	07 19 1757	S33 E33	07 22.4	3.3	1049	4824		
20013	BIGB	07 22 1555	S33 W05	07 22.3	3.3	0958	4824		
20013	BIGB	07 23 1555	S34 W15	07 22.5	2.6	0807	4824		
20013	BIGB	07 26 1428	S33 W56	07 22.1	1.5	0751	4824		
20013	BIGB	07 27 1438	S34 W68	07 22.2	1.8	0606	4824		
20017	BIGB	07 22 1555	S19 E16	07 23.9	2.9	0431	4829		
20017	BIGB	07 23 1555	S19 E03	07 23.9	3.5	0836	4829		
20017	BIGB	07 26 1428	S20 W36	07 23.8	2.5	0655	4829		
20017	BIGB	07 27 1438	S20 W48	07 23.9	2.1	0445	4829		
20014	BIGB	07 17 2122	N20 E78	07 23.8	1.8	0807	4825		
20014	BIGB	07 18 1539	N20 E68	07 23.8	2.4	1038	4825		
20014	BIGB	07 19 1757	N20 E55	07 23.9	2.2	1179	4825		
20014	BIGB	07 22 1555	N21 E17	07 24.0	1.8	1083	4825		
20014	BIGB	07 23 1555	N21 E05	07 24.0	1.6	1048	4825		
20014	BIGB	07 26 1428	N21 W33	07 24.1	1.8	1008	4825		
20014	BIGB	07 27 1438	N22 W46	07 24.1	1.7	0907	4825		
20014	BIGB	07 30 1409	N20 W75	07 24.8	1.0	0404	4825		
20019	BIGB	07 22 1555	S20 E44	07 26.0	1.5	0263	4827	4830	
20019	BIGB	07 23 1555	S20 E31	07 26.0	1.4	0203	4827	4830	
20019	BIGB	07 26 1428	S20 W04	07 26.3	1.5	0200	4827	4830	

CALCIUM PLAGE REGIONS
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

JULY 1987

Calcium Plage Region	Sta	Observation Time Mo Day (UT)	Lat CMD	CMP Mo Day	Intensity	Corrected Area (10-6 Hemi)	NOAA/USAF Sunspot Groups #1	#2	#3
20019	BIGB	07 27 1438	S20 W17	07 26.3	1.6	0293	4827	4830	
20019	BIGB	07 30 1409	S21 W58	07 26.1	1.5	0217	4827	4830	
20019	BIGB	07 31 2330	S21 W76	07 26.1	1.5	0187	4827	4830	
20018	BIGB	07 22 1555	S22 E61	07 27.3	2.5	3019	4827		
20018	BIGB	07 23 1555	S23 E46	07 27.2	2.9	2962	4827		
20018	BIGB	07 26 1428	S24 E08	07 27.2	3.2	2590	4827		
20018	BIGB	07 27 1438	S24 W05	07 27.2	3.2	2433	4827		
20018	BIGB	07 30 1409	S24 W43	07 27.3	3.6	2491	4827		
20018	BIGB	07 31 2330	S24 W60	07 27.3	2.8	2484	4827		
20018	BIGB	08 02 1632	S24 W78	07 27.8	2.8	1163	4827		
20023	BIGB	07 30 1409	S30 W37	07 27.7	3.0	0508	4832		
20023	BIGB	07 31 2330	S30 W55	07 27.6	2.2	0440	4832		
20023	BIGB	08 02 1632	S32 W77	07 27.7	2.3	0279	4832		
20024	BIGB	07 30 1409	N20 W16	07 29.4	2.6	0442	4833		
20024	BIGB	07 31 2330	N20 W35	07 29.3	2.1	0434	4833		
20024	BIGB	08 02 1632	N20 W58	07 29.3	2.1	0547	4833		
20020	BIGB	07 23 1555	N28 E77	07 29.7	2.5	1012	4831		
20020	BIGB	07 26 1428	N29 E45	07 30.1	3.1	1066	4831		
20020	BIGB	07 27 1438	N29 E31	07 30.0	3.4	1131	4831		
20020	BIGB	07 30 1409	N29 W08	07 30.0	2.7	1165	4831		
20020	BIGB	07 31 2330	N29 W23	07 30.2	2.0	1203	4831		
20020	BIGB	08 02 1632	N30 W45	07 30.2	2.0	1242	4831		
20020	BIGB	08 04 1414	N30 W75	07 29.8	1.8	1233	4831		
20022	BIGB	07 27 1438	S23 E32	07 30.1	1.0	0088			
20021	BIGB	07 26 1428	N16 E67	07 31.7	1.2	0127			
20021	BIGB	07 27 1438	N16 E54	07 31.7	1.0	0150			
20021	BIGB	07 30 1409	N16 E14	07 31.6	1.1	0118			
20025	BIGB	07 30 1409	N15 E10	07 31.3	3.5	0300	4834		
20025	BIGB	07 31 2330	N15 W03	07 31.7	3.3	0771	4834		
20025	BIGB	08 02 1632	N15 W26	07 31.7	3.0	1030	4834		
20025	BIGB	08 04 1414	N15 W53	07 31.6	2.4	1567	4834		
20025	BIGB	08 06 1739	N15 W80	07 31.7	1.9	1158	4834		

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BIG BEAR SOLAR OBSERVATORY
ACTIVE REGION SUMMARY

JULY 1987

Region Number	Return Of Region	Rotation Age	First Seen This Rotation	Duration This Rotation
20009	New	1	870709	≥3 days
20011	New	1	870716	≥1
20010	19995	3	870710	15
20015	New	1	870718	≥2
20012	20004	2	870716	≥11
20016	New	1	870718	10
20013	19998	2	870716	12
20017	New	1	870722	≥6
20014	New	1	870717	14
20019	New	1	870722	≥10
20018	New	1	870722	≥12
20023	New	1	870730	≥4
20024	New	1	870730	≥4
20020	New (formed in the trailer of 20006)	1	870724	≥12
20022	New	1	870727	≥1
20005	New	1	870624	≥5
20025	New (formed in the trailer of 20021)	1	870730	≥8

1. No BBSO Calcium Data on July 3, 4, 6-8, 15, 20, 21, 23, 25, 28 and 29.

2. No full disk KPNO Magnetograms on July 15-18, 27-30.

3. Contiguous Plages: 20018/20019

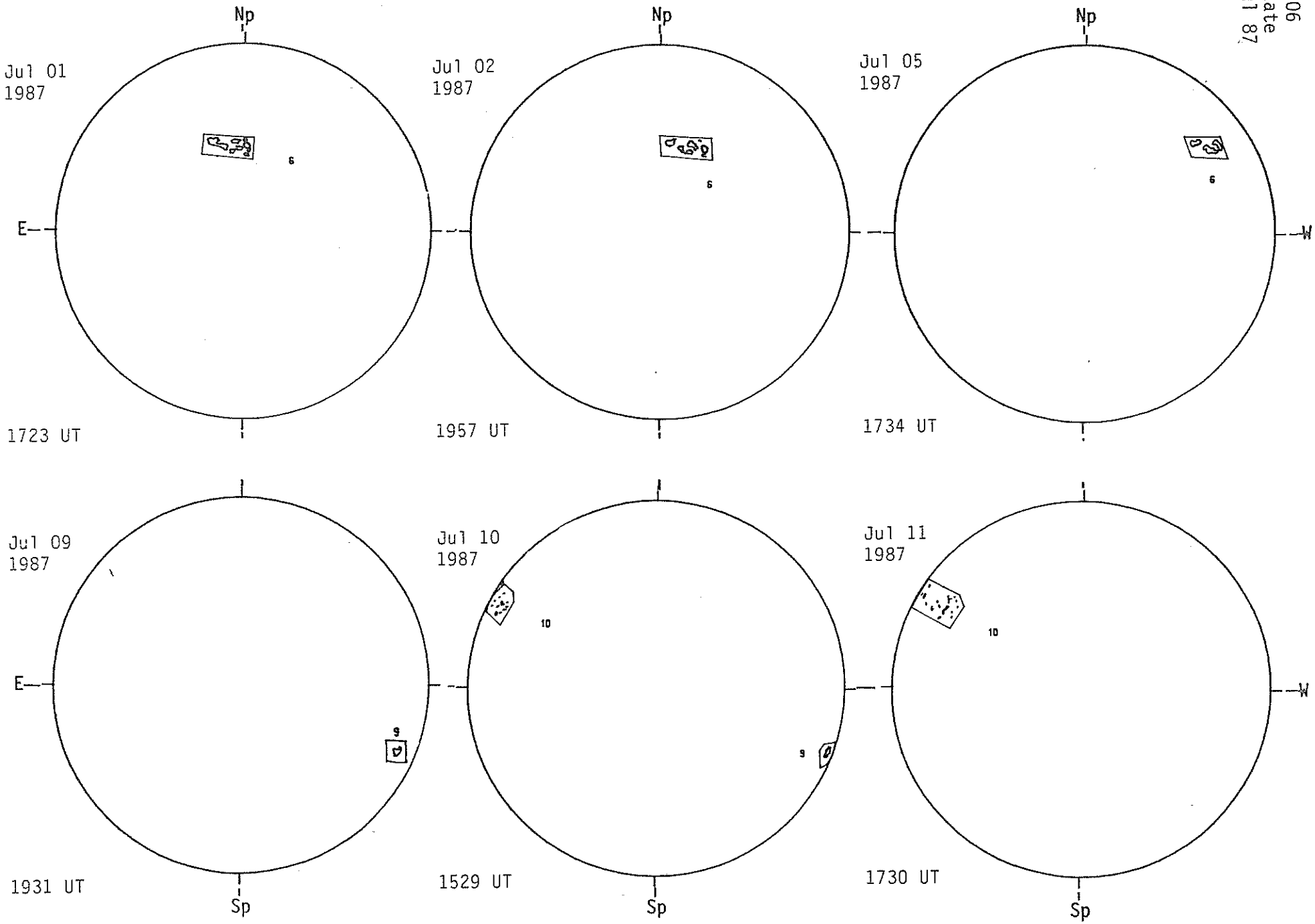
4. Plageless days: None

DAILY PLAGE SUMMARIES

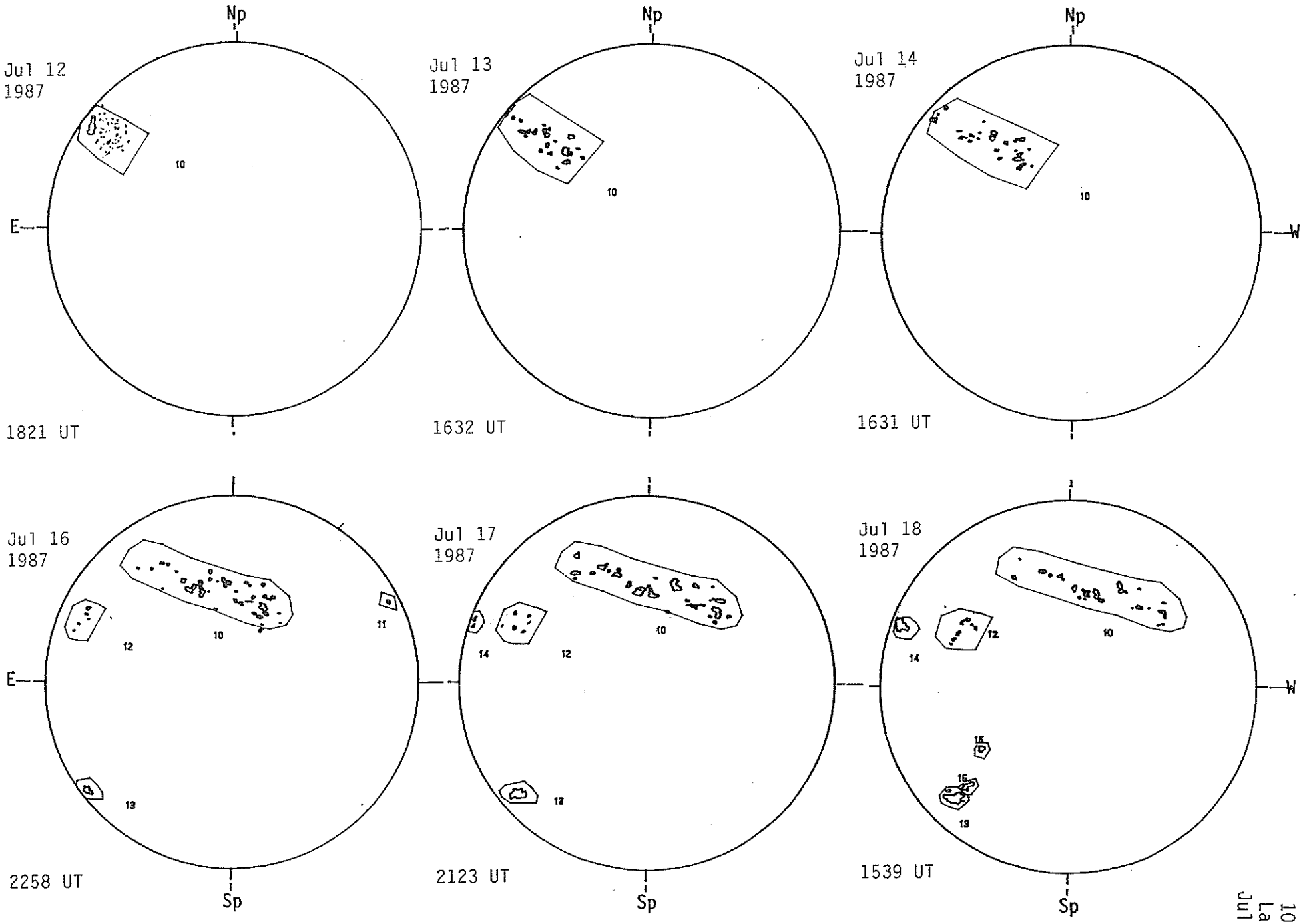
JULY 1987

Day	Sta	Plage Index	Plage Count	Smallest Plage (Millionths	Largest Plage of Solar	Total Area Hemisphere)	Smallest Intensity	Largest Intensity
01	BIGB	1.2	1	913	913	913	1.5	1.5
02	BIGB	1.2	1	967	967	967	1.4	1.4
03	No Observations This DAY							
04	No Observations This DAY							
05	BIGB	0.5	1	764	764	764	1.2	1.2
06	No Observations This DAY							
07	No Observations This DAY							
08	No Observations This DAY							
09	BIGB	0.6	1	550	550	550	2.5	2.5
10	BIGB	0.6	2	679	930	1609	1.1	2.7
11	BIGB	1.1	1	2130	2130	2130	1.6	1.6
12	BIGB	1.2	1	2074	2074	2074	1.4	1.4
13	BIGB	1.8	1	2510	2510	2510	1.4	1.4
14	BIGB	1.7	1	2406	2406	2406	1.1	1.1
15	No Observations This DAY							
16	BIGB	4.0	4	367	2553	4570	1.2	3.5
17	BIGB	5.6	4	521	2579	5009	1.3	3.5
18	BIGB	6.2	6	124	2475	5267	1.0	3.4
19	BIGB	8.1	6	102	2293	5353	1.0	3.5
20	No Observations This DAY							
21	No Observations This DAY							
22	BIGB	14.8	8	263	3019	9089	.8	4.6
23	BIGB	19.6	9	203	2962	10558	.9	4.5
24	No Observations This DAY							
25	No Observations This DAY							
26	BIGB	15.1	9	127	2590	8726	1.2	4.1
27	BIGB	13.5	9	88	2433	7607	1.0	3.9
28	No Observations This DAY							
29	No Observations This DAY							
30	BIGB	12.1	8	118	2491	5645	1.0	3.6
31	BIGB	8.6	6	187	2484	5519	1.5	3.3

BIG BEAR SOLAR CALCIUM PLAGE REGIONS



BIG BEAR SOLAR CALCIUM PLAGE REGIONS



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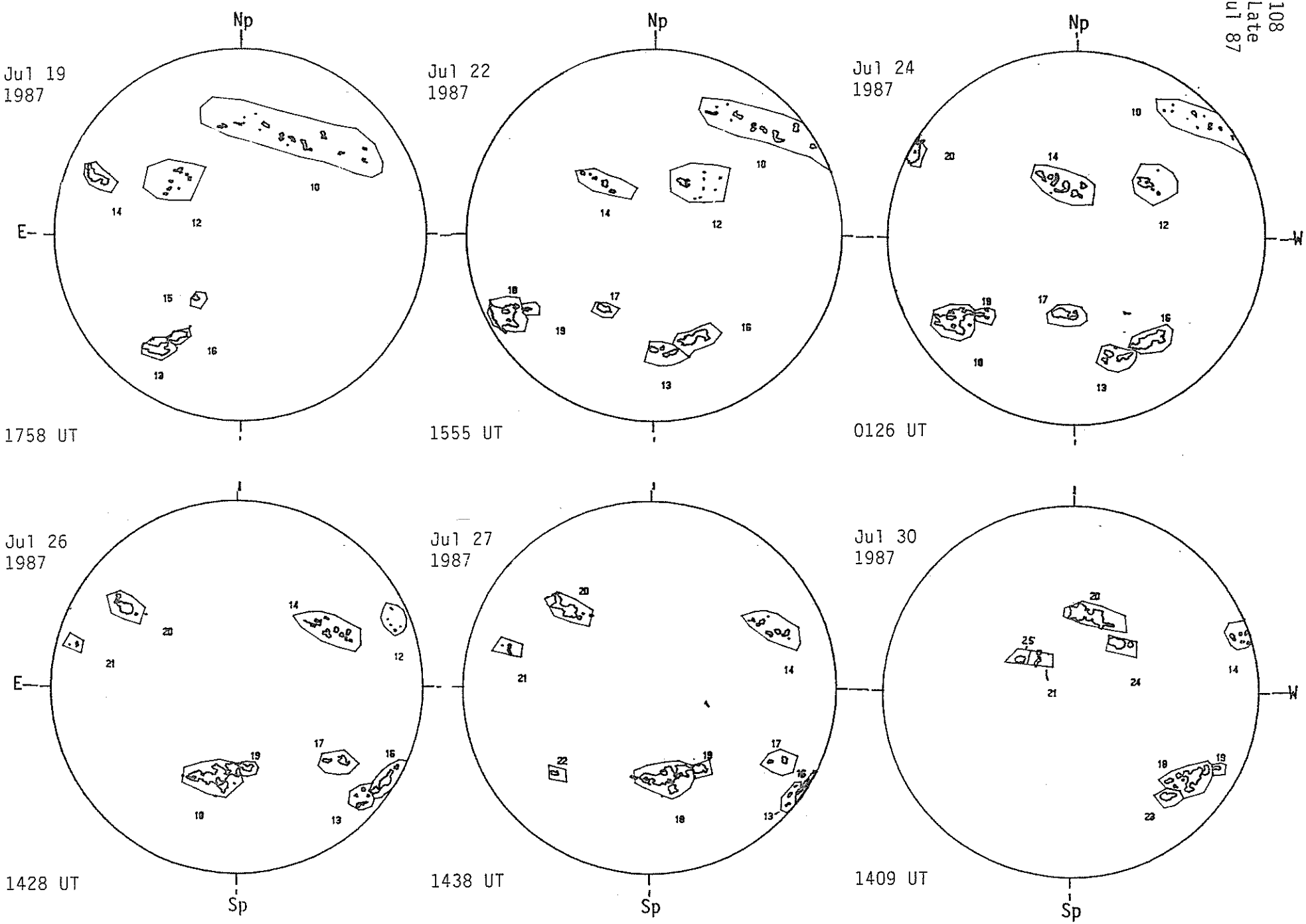
Late
Jul 87

BIG BEAR SOLAR CALCIUM PLAGE REGIONS



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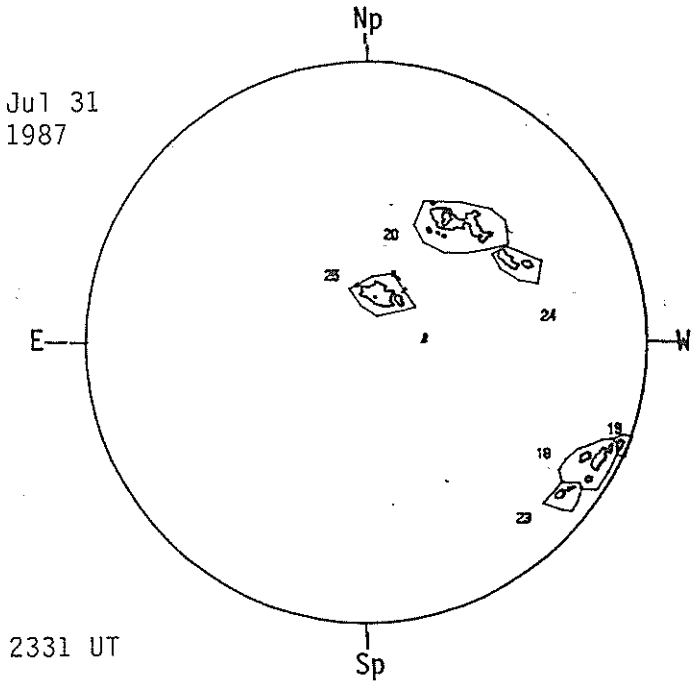
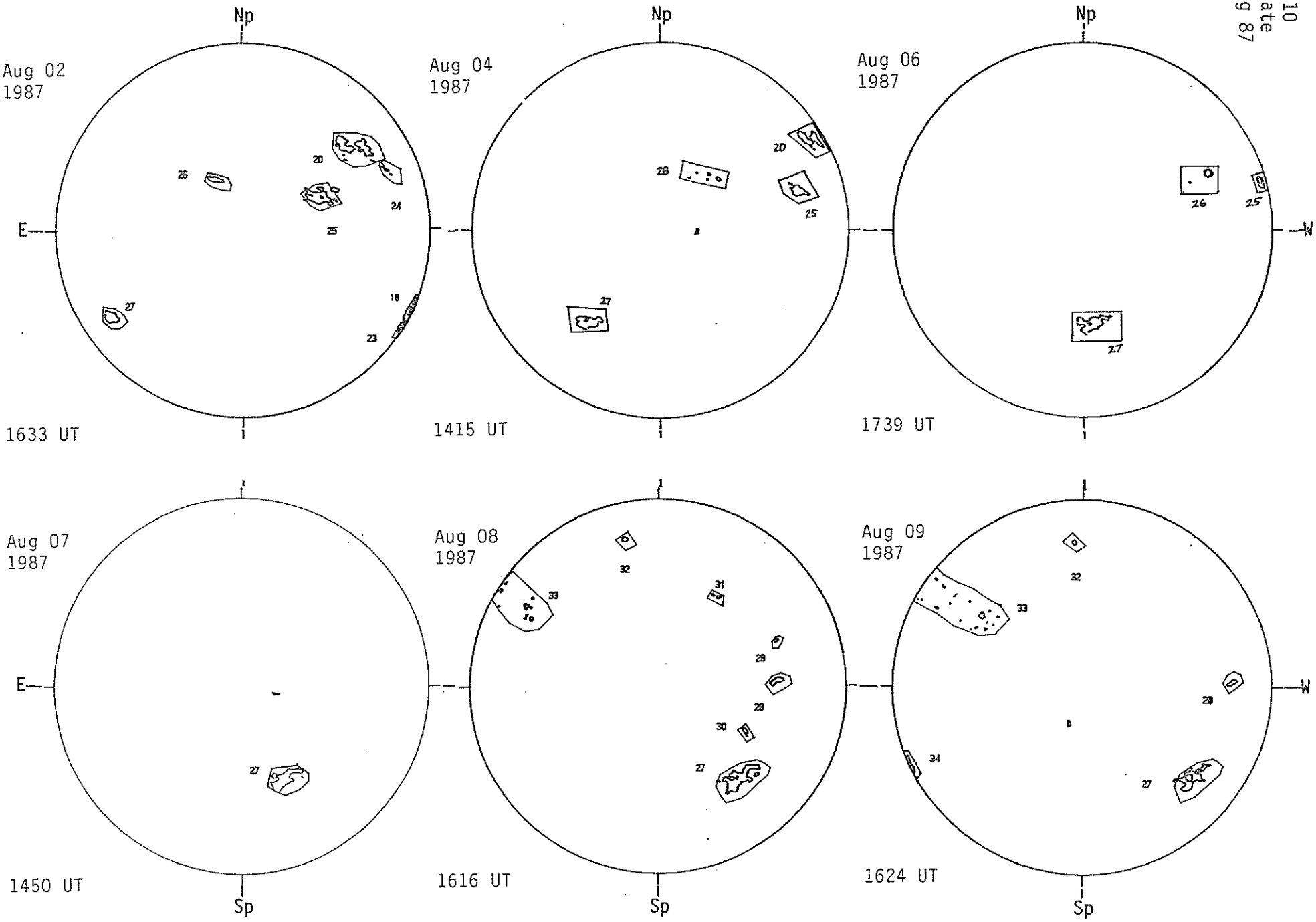


BIG BEAR SOLAR CALCIUM PLAGE REGIONS



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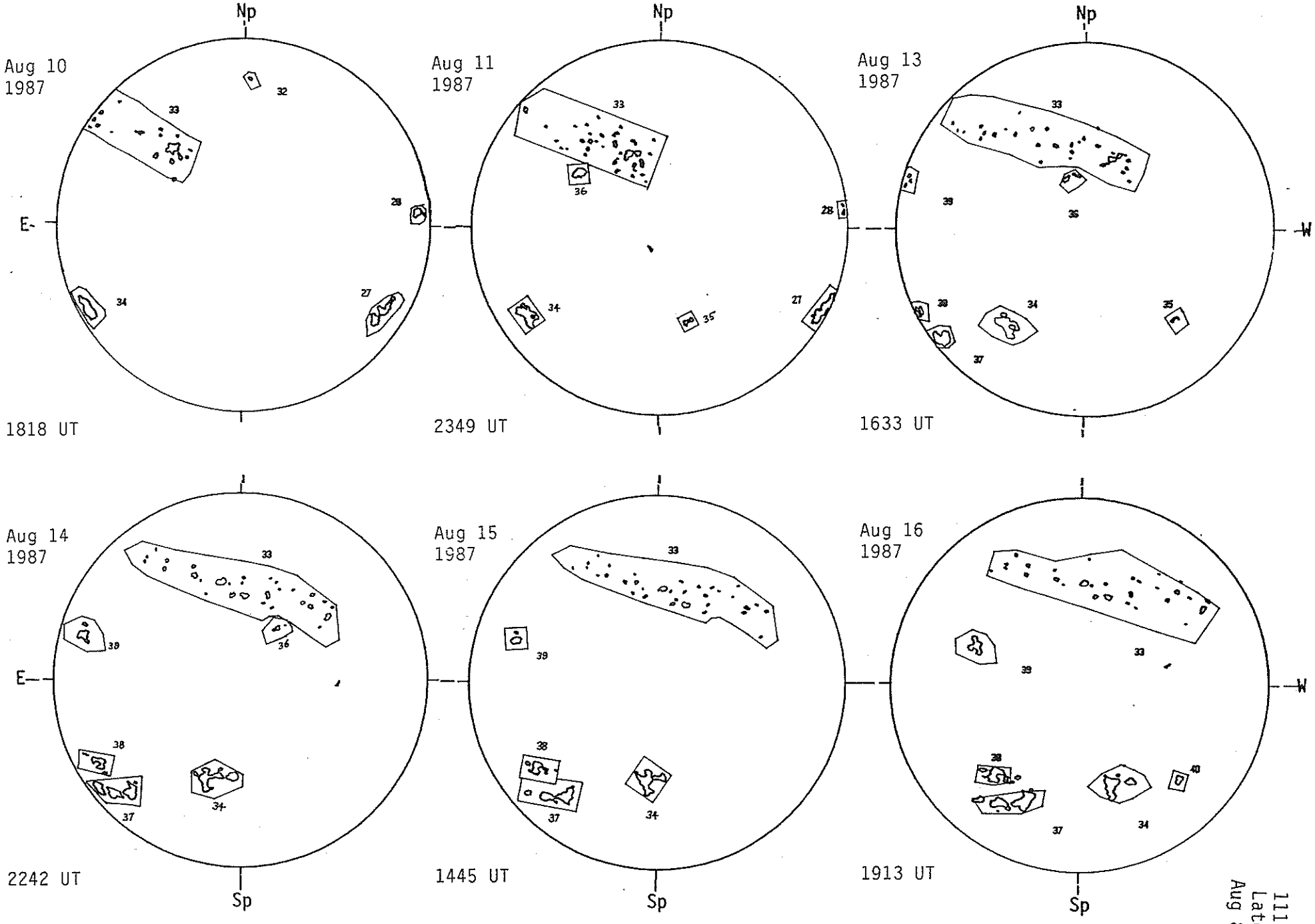
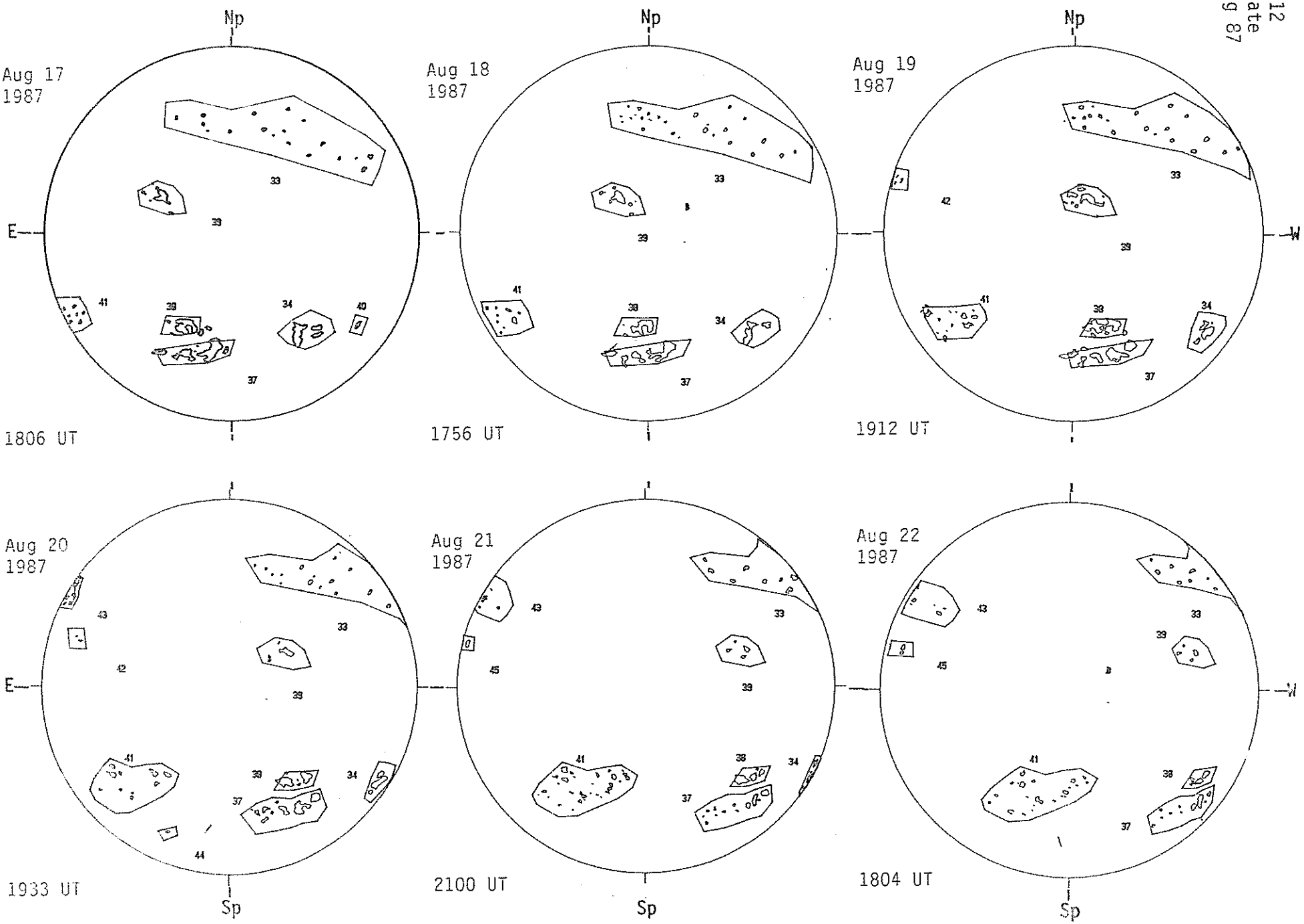
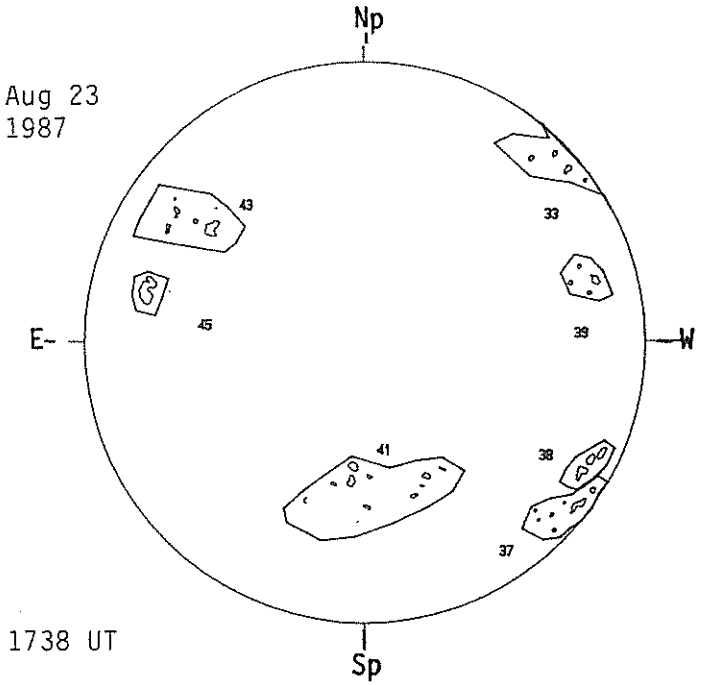


BIG BEAR SOLAR CALCIUM PLAGE REGIONS



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."