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Solar - Geophysical Data

Part I (Prompt Reports)

NO. 510 FEBRUARY 1987

DATA FOR
JANUARY 1987
DECEMBER 1986

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

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(Issued in Two Parts)

Editor: Helen E. Coffey

Chief: Joe H. Allen
Solar-Terrestrial Physics Division

Staff: John A. McKinnon
Daniel C. Wilkinson
Viola W. Miller
Carol Weathers
Charles T. Shanks

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 JANUARY 1987 Number 510 Part I

ALERT PERIODS
INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

Summary of the Geoalert Messages **JANUARY 1987**

Julian Day	Date of Issue	Date of Obser-vation	Wolf No.	10-cm Solar Flux	A-index	Location	Flares			Date of Forecast	Location	Region Forecast[1]	Geoalerts
						°Lat °Long	Total	M	X		°Lat °Long		
001	01	31	012	070	007	N07 E26	0	0	0	01	N07 E26	Q	Solquiet, Magquiet.
002	02	01	024	074	012	N06 E11	6	0	0	02	N06 E11	Q	Solquiet, Magquiet.
003	03	02	019	073	009	N06 W02	0	0	0	03	N06 W02	Q	Solquiet, Magquiet.
004	04	03	014	072	007	N06 W16	0	0	0	04	N06 W16	Q	Solquiet, Magquiet.
005	05	04	012	071	005	N06 W31	0	0	0	05	N06 W31	Q	Solquiet, Magquiet.
006	06	05	011	073	007	N06 W44	0	0	0	06	N06 W44	Q	Solquiet, Magquiet.
007	07	06	011	072	005	N05 W58	0	0	0	07	N05 W58	Q	Solquiet, Magquiet.
008	08	07	011	072	004	N05 W72	0	0	0	08	N05 W72	Q	Solquiet, Magquiet.
009	09	08	000	071	007	Spotnil				09	Spotnil		Solquiet, Magquiet.
010	10	09	000	070	014	Spotnil				10	Spotnil		Solquiet, Magquiet.
011	11	10	000	070	006	Spotnil				11	Spotnil		Solquiet, Magquiet.
012	12	11	000	070	003	Spotnil				12	Spotnil		Solquiet, Magquiet.
013	13	12	000	071	007	Spotnil				13	Spotnil		Solquiet, Magquiet.
014	14	13	000	072	005	Spotnil				14	Spotnil		Solquiet, Magquiet.
015	15	14	011	074	006	S24 E74	0	0	0	15	S24 E74	Q	Solquiet, Magquiet.
016	16	15	011	074	004	S24 E61	0	0	0	16	S24 E61	Q	Solquiet, Magquiet.
017	17	16	000	073	013	Spotnil				17	Spotnil		Solquiet, Magquiet.
018	18	17	022	073	007	S27 E36 S27 E45	0 0	0 0	0 0	18	S27 E36 S27 E45	Q Q	Solquiet, Magquiet.
019	19	18	034	073	008	S26 E32 S26 E35 S24 E76	2 0 0	0 0 0	0 0 0	19	S26 E32 S26 E35 S24 E76	Q Q Q	Solquiet, Magquiet.
020	20	19	011	072	008	S21 E60	0	0	0	20	S21 E60	Q	Solquiet, Magquiet.
021	21	20	011	071	015	S22 E47	0	0	0	21	S22 E47	Q	Solquiet, Magquiet.
022	22	21	016	075	010	S25 W06	5	0	0	22	S25 W06	Q	Solquiet, Magquiet.
023	23	22	022	076	008	S25 W18	5	0	0	23	S25 W18	Q	Soqluiet, Magquiet.
024	24	23	022	074	008	S25 W33	1	0	0	24	S25 W33	Q	Solquiet, Magquiet.
025	25	24	016	074	010	S25 W45	0	0	0	25	S25 W45	Q	Solquiet, Magquiet.
026	26	25	013	073	010	S25 W57	1	0	0	26	S25 W57	Q	Solquiet, Magquiet.
027	27	26	013	075	008	N13 E56	1	0	0	27	N13 E56	Q	Solquiet, Magquiet.

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

Summary of the Geoalert Messages JANUARY 1987

Julian Day	Date of Issue	Date of Observation	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		
028	28	27	014	072	007	N12 E42	0	0	0	28	N12 E42	Q	Solquiet, Magquiet.
029	29	28	026	073	007	N13 E30	0	0	0	29	N13 E30	Q	Solquiet, Magquiet.
						S38 E55	0	0	0		S38 E55	Q	
030	30	29	022	073	009	N14 E17	0	0	0	30	N14 E17	Q	Solquiet, Magquiet.
						S37 E44	0	0	0		S37 E44	Q	
031	31	30	000	072	002	Spotnil				31	Spotnil		Solquiet, Magquiet.
032	01	31	000	071	005	Spotnil				01	Spotnil		Solquiet, Magquiet.

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

STRATWARM ALERTS

21 January Stratwarm exists. Intense warming crossing the pole from northern Siberia towards Greenland in the middle stratosphere. Cold vortex over the Barents Sea.

22 January Stratwarm exists. Intense warming over Greenland slowly weakening, but a new warm region developed over Siberia intensifying. Cold vortex around Novaya Zemlya.

23 January Stratwarm exists. Intense warming over Siberia continuously intensifying, extending northwestwards. Cold vortex over Novaya Zemlya slowly weakening.

24 January Stratwarm exists. Indication of developing major warming. Reversed temperature gradient between 60° North and the pole, westward extending of warming over Siberia, further decreasing of weak zonal flow at 60° North and weakening of the vortex over northern Europe in the middle stratosphere.

25 January Stratwarm exists. Major warming in progress. Reversed temperature gradient in the middle and upper stratosphere between 60° North and the pole. Mean zonal flow north of 60° North at 10 HPA from east. Weakening vortex moving to the Baltic Sea.

26 January Stratwarm exists. Major warming established. Strong anticyclone sloping through the stratosphere from northern Alaska to the Siberian Arctic connected with a warm polar cap causing mean zonal flow north of 60° North from east.

27 January Stratwarm exists. Major warming continues. Strong anticyclone reached Canadian Arctic extending polewards. Mean zonal wind at 60° North is from east in the upper and middle stratosphere down to nearly 30 HPA.

28 January Stratwarm exists. Major warming continues. Strong anticyclone continues over the Canadian Arctic. Temperature gradient reversed between 60° North and the pole in the whole stratosphere and mean zonal wind at 60° North is from east from the upper stratosphere down to 30 HPA.

29 January Stratwarm exists. Major warming continues. New warm pulse developed over Siberia. Temperature gradient further reversed between 60° North and the pole from the lower stratosphere up to 4 HPA. Continuously mean zonal wind at 60° North from east from the upper stratosphere down to nearly 30 HPA.

30 January Stratwarm exists. Major warming continues. New warming over Siberia extending northeastwards. Continuously reversed temperature gradient between 60° North and the pole from the lower stratosphere up to 4 HPA. Mean zonal wind from east in nearly the whole stratosphere.

31 January Stratwarm exists. Major warming continues. Reversed temperature gradient between 60° North and the pole from the lower stratosphere up to about 4 HPA.

01 February Stratwarm exists. Major warming continues. Very intense warming in the lower and middle stratosphere over Siberia, strong intensification of the Siberian anticyclone at the 10-HP level. Continuously reversed temperature gradient between 60° North and the pole from the lower stratosphere up to about 5 HPA.

INTERNATIONAL RELATIVE SUNSPOT NUMBERS

Day	Final Feb 86	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Prov Jan 87
01	18	16	9	15	7	0	12	9	12	44	0	19
02	33	33	10	26	0	0	11	9	14	35	0	15
03	52	34	10	15	0	11	11	8	23	37	0	12
04	55	32	0	12	0	14	11	8	24	37	0	11
05	53	33	0	10	0	18	11	0	24	35	0	10
06	47	33	0	0	0	29	10	11	22	31	0	9
07	52	38	0	0	0	29	8	13	27	24	0	10
08	54	29	9	0	9	29	9	12	20	15	0	0
09	47	22	0	0	0	17	8	10	32	10	12	0
10	35	20	9	0	8	36	0	8	29	9	20	0
11	37	18	13	0	0	39	0	8	23	9	23	0
12	25	13	14	0	0	36	0	0	26	0	22	0
13	22	8	13	0	0	25	0	0	22	14	24	0
14	16	0	26	0	0	16	0	0	0	12	13	8
15	11	10	25	10	0	28	0	0	0	12	0	9
16	0	0	21	12	0	26	9	0	11	12	11	0
17	0	0	13	13	0	28	8	0	16	12	9	13
18	0	0	15	22	0	14	0	0	22	12	0	17
19	0	0	13	27	0	13	0	0	31	12	0	9
20	10	12	16	27	0	18	11	0	39	12	0	9
21	10	13	22	30	0	21	12	0	47	11	11	14
22	10	10	20	27	0	22	12	0	57	10	16	20
23	10	15	42	24	0	14	14	0	71	18	16	23
24	8	14	58	24	0	0	9	0	76	12	13	12
25	11	10	43	22	8	0	9	0	68	0	9	13
26	9	10	43	28	0	0	9	0	60	0	0	14
27	15	11	33	19	0	12	9	0	65	13	0	12
28	10	13	23	18	0	13	9	0	61	0	0	20
29		11	28	19	0	17	9	8	63	8	0	15
30		11	27	13	0	19	9	9	62	0	0	0
31		0		12		17	9		50		11	10
Mean	23.2	15.1	18.5	13.7	1.1	18.1	7.4	3.8	35.4	15.2	6.8	9.8

The yearly mean sunspot number equaled 13.4 in 1986.

OTTAWA 2800 MHz (10.7 cm) SOLAR FLUX

Algonquin Radio Observatory — Adjusted to 1 AU

Day	Feb 86	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec 86	Jan
01	81.8	84.1	71.8	72.5	71.1	68.9	72.8	69.8	71.2	87.6*	70.7	71.6
02	86.4*	89.2	70.6	74.3	69.8	68.7	72.3	69.2	71.6	84.1	70.6	70.5
03	96.0	91.1*	70.9	73.8	69.9	68.9	72.9	69.3	72.1	80.8	70.2	69.1
04	97.8*	91.4	71.7	71.6	69.3	69.3	71.6	69.4	70.7	82.3	69.2	69.0
05	99.8	90.5	71.9	70.8	69.3	71.1	71.7	69.6	71.1	81.5	70.0	70.3
06	99.0	89.7*	71.9	69.8	69.8	73.9	72.1	69.5	72.4	80.6	69.1	69.3
07	96.7	87.6	71.9	69.9	70.0	72.1	71.9	69.9	74.3	76.9	68.2	69.7
08	94.3*	85.1	71.8	69.5	70.2	71.6	71.3	69.4	74.8	73.5	69.1	68.2
09	92.5	84.3	72.0	69.8	71.1	72.5	71.3	69.4	74.6	71.9	70.8	68.0
10	93.4*	81.6	72.5	70.9	70.3	75.0	70.5	69.3	73.3	70.4	72.3	67.4
11	95.1	79.3	72.4	71.4	70.1	74.7	68.6	68.8	73.2	69.9	73.0a	68.0
12	88.4	76.9	73.1	70.9	70.5	73.5	68.4	68.8	75.3	71.4	71.1	68.9
13	86.4	74.3	74.2	71.7	70.4	74.2	67.9	69.0	75.1	76.0*	71.5	69.7
14	86.2*	71.9	76.0	71.6	72.1	74.6	68.2	70.0	75.0	74.1	71.4	71.1
15	79.6	69.7	76.0	72.7	71.3	74.0	69.5	71.5	71.8	75.1	70.9	71.5
16	71.2	68.9	75.8	74.3	70.7	74.4	69.4	70.5	79.1	75.0	70.8	70.7
17	68.3	68.9	75.3	75.3	69.8	74.9	68.9	69.2	82.6	73.8	71.7	70.8
18	68.7	68.9	74.4	78.7	69.9	74.6	69.1	68.8	86.3	73.0	71.4	70.6
19	68.1	68.8	74.9	78.7	69.6	73.3	69.3	68.7	88.6	72.5	71.0	70.0
20	68.1	68.4	75.0	79.6	69.6	73.2	70.7	68.6	92.2	72.5	70.4	68.9
21	66.0	68.5	74.2	79.2	69.2	72.5	70.5	68.8	91.5	74.1	70.6	71.2*
22	67.7	69.1	75.1	79.2	69.7	73.2	70.1	68.3	94.4	74.5	71.4	73.6*
23	67.7	69.8	82.1	78.8	69.6	71.6	69.6	68.7	97.9	75.8	70.8	72.1
24	68.6	69.5	87.4	79.5	68.4	71.2	69.1	68.8	97.3	77.0	70.0	71.6
25	70.1	69.6	85.7	81.1	68.5	70.9	69.3	69.4	94.4	75.5	70.0	71.5
26	72.0	70.8	84.2*	77.1	68.2	71.1	69.9	68.5	94.2	74.3	69.7	72.6
27	75.2	70.2	83.4	74.7	68.6	71.6	69.1	68.9	94.3	73.6	69.4	69.9
28	77.0	70.4	80.1	74.3	68.3	72.5	68.8	70.3	93.6	73.1	69.2	70.8
29		71.5	77.0	74.3	68.3	74.0	68.8	71.5	91.4	72.4	69.2	70.6
30		71.5	74.7	72.5	68.3	73.6	69.3	71.6	89.8	70.9	69.6	69.8
31		71.5		73.2		72.6	69.6		89.2		68.1	68.7
Mean	81.5	76.2	75.6	74.2	69.7	72.5	70.1	69.4	82.4	75.5	70.4	70.2

* = adjusted for burst in progress at time of measurement; a = uncorrected for interference during calibration.
The yearly mean 2800 MHz flux adjusted to 1 astronomical unit equaled 73.9 in 1986.

DAILY SOLAR INDICES

January 1987

Day	Julian Day	Bartels Cycle Day	Sunspot Numbers Int	Amer	Obs Flux Ottawa (2800)	Solar Flux Adjusted to 1 Astronomical Unit: SGMR (15400)	SGMR (8800)	SGMR (4995)	Ottawa (2800)	SGMR (2695)	SGMR (1415)	SGMR (610)	SGMR (410)	SGMR (245)
01	001	11	19	15	74.0	472	237	108	71.6	66	50	40	20	9
02	002	12	15	13	72.9	---	---	---	70.5	--	--	--	--	-
03	003	13	12	12	71.5	469	211	93	69.1	64	44	33	17	8
04	004	14	11	13	71.4	457	234	105	69.0	63	48	40	18	7
05	005	15	10	11	72.7	478	236	106	70.3	65	49	35	18	9
06	006	16	9	10	71.7	469	242	105	69.3	65	49	34	18	10
07	007	17	10	10	72.1	---	---	---	69.7	--	--	--	--	-
08	008	18	0	0	70.5	---	---	---	68.2	--	--	--	--	-
09	009	19	0	0	70.3	464	237	107	68.0	64	47	33	19	6
10	010	20	0	0	69.7	379	193	88	67.4	60	46	30	18	10
11	011	21	0	0	70.3	460	201	98	68.0	70	46	33	19	9
12	012	22	0	0	71.3	462	236	108	68.9	66	47	27	19	9
13	013	23	0	0	72.1	477	234	107	69.7	67	49	37	18	7
14	014	24	8	0	73.5	474	233	109	71.1	71	50	35	18	4
15	015	25	9	10	73.9	441	241	109	71.5	68	50	33	18	5
16	016	26	0	0	73.0	476	233	108	70.7	--	49	35	19	8
17	017	27	13	0	73.1	482	240	---	70.8	--	50	40	20	9
18	018	1	17	9	72.9	478	246	---	70.6	--	40	35	19	11
19	019	2	9	9	72.3	427	248	---	70.0	--	42	31	20	11
20	020	3	9	9	71.2	479	237	---	68.9	--	49	31	19	9
21	021	4	14	13	73.6*	489	238	---	71.2*	--	52	34	19	9
22	022	5	20	19	76.0*	485	247	---	73.6*	--	55	35	19	11
23	023	6	23	20	74.4	478	241	---	72.1	--	51	35	20	8
24	024	7	12	16	73.9	486	241	---	71.6	--	52	35	20	9
25	025	8	13	12	73.8	492	243	---	71.5	--	52	36	19	4
26	026	9	14	18	74.9	---	---	---	72.6	--	--	--	--	-
27	027	10	12	11	72.1	488	244	---	69.9	--	48	33	18	4
28	028	11	20	16	73.0	---	---	---	70.8	--	--	--	--	-
29	029	12	15	18	72.8	481	239	---	70.6	--	49	34	18	8
30	030	13	0	14	72.0	476	242	---	69.8	--	48	34	19	8
31	031	14	10	13	70.8	405	208	95	68.7	--	43	33	19	5
Mean			9.8	9.4	72.5	466	233	103	70.2	65	48	34	18	7

All sunspot numbers shown above are preliminary values. The American sunspot numbers were unavailable at time of publication.

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:

* = adjusted for burst in progress at time of measurement.
\# = uncorrected for interference during calibration.
A = interpolated

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

OBSERVED AND PREDICTED SOLAR ACTIVITY INDICES

JANUARY 1987

Date	RELATIVE SUNSPOT NUMBERS: International (Ri) Monthly Mean	International (Ri) Smoothed	American (Ra) Monthly Mean	American (Ra) Smoothed	Derived (Rs) Monthly Mean	Derived (Rs) Smoothed	2800 MHz RADIO FLUX Adjusted to 1 AU (Sa) Monthly Mean	2800 MHz RADIO FLUX Adjusted to 1 AU (Sa) Smoothed
Apr 83	80.7	82	74.5	81	67.5	85	119.9	136
May	99.2	77	97.7	77	86.1	80	137.1	131
Jun	91.1	70	93.1	69	92.4	72	143.0	124
Jul	82.2	66	82.2	63	77.4	66	129.1	118
Aug	71.8	66	69.2	63	75.7	66	127.5	118
Sep	50.3	68	47.4	66	57.0	67	110.2	119
Oct	55.8	68	52.3	66	58.6	67	111.7	120
Nov	33.3	59	30.2	65	35.6	67	90.4	120
Dec	33.4	64	32.3	62	35.7	65	90.5	118
Jan 84	57.0	60	54.4	58	59.4	61	112.4	115
Feb	85.4	56	81.5	54	86.2	58	137.2	101
Mar	83.5	53	83.0	51	68.5	55	120.8	108
Apr	69.7	50	66.5	48	78.1	52	129.7	105
May	76.4	48	72.1	45	79.6	49	131.1	103
Jun	46.1	46	45.2	44	49.8	48	103.5	102
Jul	37.4	44	36.2	42	37.6	39	92.2	99
Aug	25.5	40	24.5	38	30.7	41	85.8	95
Sep	15.7	34	13.6	32	23.2	35	78.9	90
Oct	12.0	29	9.8	27	16.9	31	73.1	86
Nov	22.8	25	19.4	23	18.6	26	74.6	72
Dec	18.7	22	17.0	20	17.4	23	73.5	79
Jan 85	16.5	20	14.5	19	15.9	21	72.1	77
Feb	15.9	20	16.3	18	15.7	20	71.9	76
Mar	17.2	19	11.8	16	16.3	19	72.5	75
Apr	16.2	18	17.1	17	19.8	19	75.7	75
May	27.5	18	24.0	17	26.6	19	82.0	75
Jun	24.2	18	22.2	16	22.8	19	78.5	75
Jul	30.7	17	30.8	16	25.8	19	81.3	75
Aug	11.1	17	10.7	15	17.2	19	73.3	75
Sep	3.9	17	3.4	16	13.8	20	70.2	76
Oct	18.6	17	16.5	16	18.1	20	74.2	76
Nov	16.2	17	16.4	15	16.4	19	72.6	75
Dec	17.3	15	10.1	14	16.2	19	72.4	75
Jan 86	2.5	14	2.3	12	14.6	18	70.9	74
Feb	23.2	13	23.8	11	26.0	17	81.5	74
Mar	15.1	13	12.5	11	20.3	17	76.2	73
Apr	18.5	14	13.8	12	19.6	18	75.6	74
May	13.7	14	11.6	12	18.1	18	74.2	74
Jun	1.1	14	0.8	11	13.3	18	69.7	74
Jul	18.1	14*	17.7	11	16.3	18	72.5	74
Aug	7.4	14(1)*	7.6	11	13.7	18	70.1	--
Sep	3.8	15(2)*	3.5	12	13.0	19	69.4	--
Oct	35.4	16(3)*	19.8	14	27.0	21	82.4	--
Nov	15.2	17(4)*	14.7	15	19.5	22	75.5	--
Dec	6.8	19(6)*	5.1	16	14.0	24	70.4	--
Jan 87	9.8†	21(7)*	9.4	18	13.8	26	70.2	--
Feb	----	23(9)*	----	20	----	27	----	--
Mar	----	25(10)*	----	22	----	29	----	--
Apr	----	28(13)*	----	25	----	32	----	--
May	----	31(16)*	----	28	----	37	----	--
Jun	----	36(18)*	----	32	----	42	----	--
Jul	----	40(20)*	----	36	----	47	----	--

*An asterisk marks either a value of the observed 12-month running mean or of a predicted 12-month average that is 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

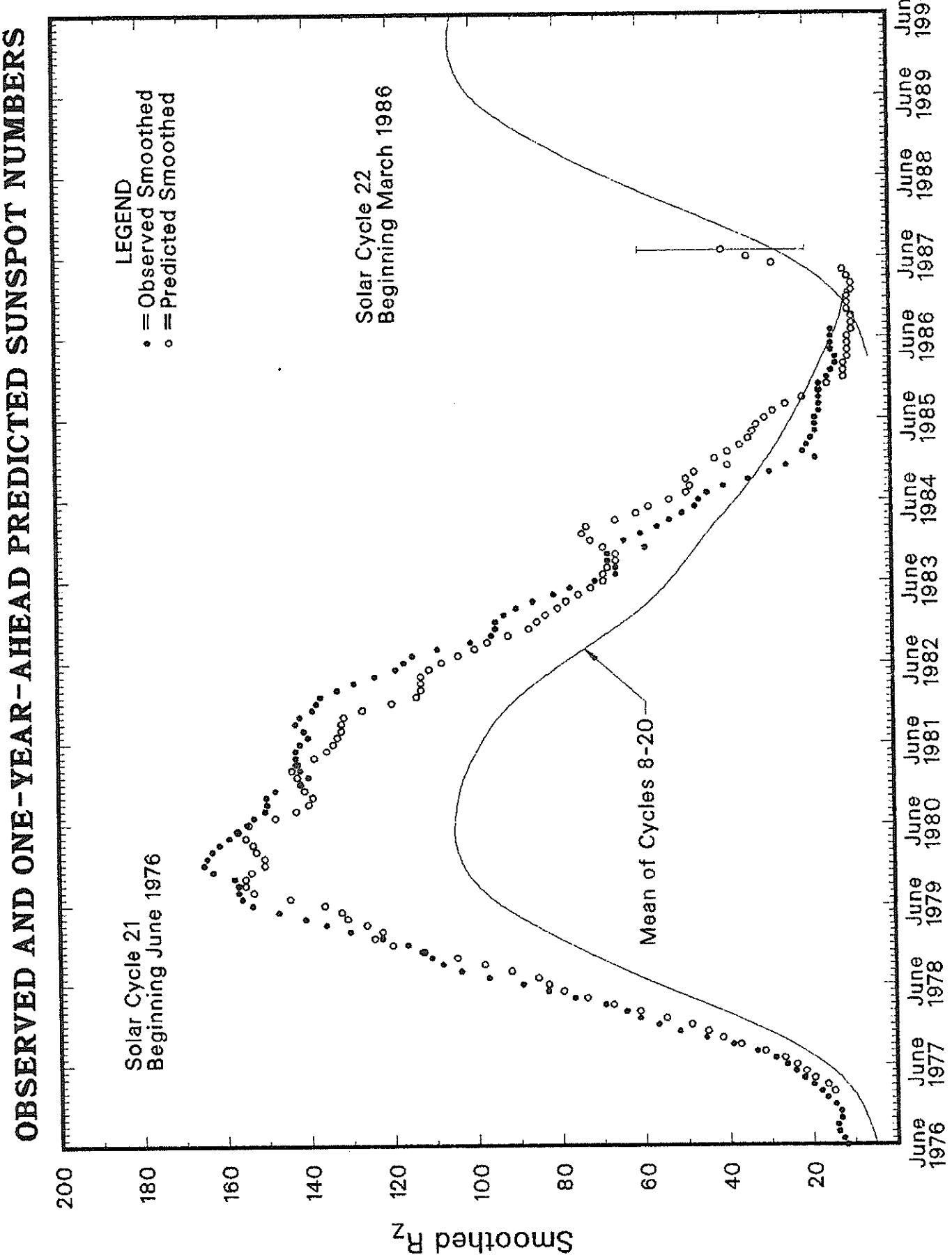
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1980	164	163	161	159	156	155	153	150	150	150	148	143
1981	140	142	143	143	143	142	140	141	143	142	139	138
1982	137	133	129	124	120	117	115	109	101	96	95	95
1983	93	90	86	82	77	71	66	66	68	68	67	64
1984	60	56	53	50	48	47	44	40	34	29	25	22
1985	21	20	19	18	18	18	17	17	17	17	17	15
1986	14	13	13*	14	14	14	14	14	15	16	17	19
								(1)	(2)	(3)	(4)	(6)
1987	21	23	25	28	31	36	40	44	47	50	53	57
	(7)	(9)	(10)	(13)	(16)	(18)	(20)	(23)	(26)	(29)	(32)	(34)
1988	63	68	73	77	80	83	85	89	94	99	106	111
	(38)	(42)	(45)	(48)	(51)	(53)	(54)	(53)	(56)	(59)	(60)	(63)
1989	115	118	121	124	126	126	127	128	127	125	123	122
	(63)	(65)	(69)	(72)	(73)	(74)	(74)	(74)	(74)	(69)	(64)	(58)

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

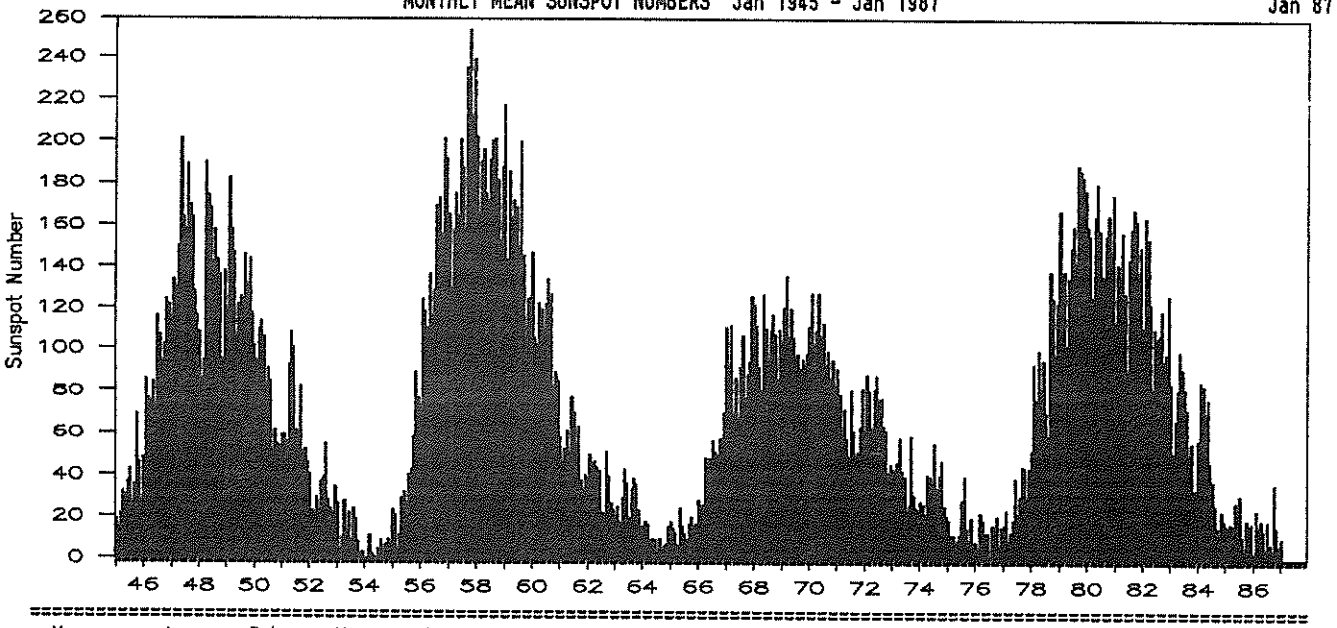
For the end of Solar Cycle 21, and perhaps the beginning of Cycle 22, the table gives observed smoothed sunspot numbers up to the one calculated from the most recently measured monthly mean. These smoothed observed values are based on final, unsmoothed monthly means through December 1986 and on provisional ones thereafter.

Table entries, with numbers in parentheses below them, denote predictions by the McNish-Lincoln method. (See page 9 in the March 1986 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 July 1987 prediction. There exists a 90% chance that in July 1987 the actual smoothed sunspot number will fall somewhere between 20 and 60.

THE MCNISH-LINCOLN PREDICTION METHOD GENERATES USEFUL ESTIMATES OF SMOOTHED, MONTHLY MEAN SUNSPOT NUMBERS FOR NO MORE THAN 12 MONTHS AHEAD. Beyond a year the predictions regress rapidly toward the mean of all 14 cycles used in the computation. Moreover, the method is very sensitive to the date defined as the beginning of the current sunspot cycle, that is, to the date of the most recent sunspot minimum. The new-cycle predictions tabulated above are based on the assumption that the March 1986 value of 13.0 is the minimum. If a smoothed number lower than 13.0 occurs, the predictions will change.


OBSERVED AND ONE-YEAR-AHEAD PREDICTED SUNSPOT NUMBERS
LEGEND
• = Observed Smoothed
o = Predicted Smoothed
Solar Cycle 21
Beginning June 1976
Solar Cycle 22
Beginning March 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 1945 - Jan 1987



Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean	
1945	18.5	12.7	21.5	32.0	30.6	36.2	42.6	25.9	34.9	68.8	46.0	27.4	33.2	
1946	47.6	86.2	76.6	75.7	84.9	73.5	116.2	107.2	94.4	102.3	123.8	121.7	92.6	
1947	115.7	133.4	129.8	149.8	201.3	163.9	157.9	188.8	169.4	163.6	128.0	116.5	151.6	M
1948	108.5	86.1	94.8	189.7	174.0	167.8	142.2	157.9	143.3	136.3	95.8	138.0	136.3	
1949	119.1	182.3	157.5	147.0	106.2	121.7	125.8	123.8	145.3	131.6	143.5	117.6	134.7	
1950	101.6	94.8	109.7	113.4	106.2	83.6	91.0	85.2	51.3	61.4	54.8	54.1	83.9	
1951	59.9	59.9	55.9	92.9	108.5	100.6	61.5	61.0	83.1	51.6	52.4	45.8	69.4	
1952	40.7	22.7	22.0	29.1	23.4	36.4	39.3	54.9	28.2	23.8	22.1	34.3	31.5	
1953	26.5	3.9	10.0	27.8	12.5	21.8	8.6	23.5	19.3	8.2	1.6	2.5	13.9	
1954	0.2	0.5	10.9	1.8	0.8	0.2	4.8	8.4	1.5	7.0	9.2	7.6	4.4	m
1955	23.1	20.8	4.9	11.3	28.9	31.7	26.7	40.7	42.7	58.5	89.2	76.9	38	
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	
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	
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	
1974	27.6	26.0	21.3	40.3	39.5	36.0	55.8	33.6	40.2	47.1	25.0	20.5	34.5	
1975	18.9	11.5	11.5	5.1	9.0	11.4	28.2	39.7	13.9	9.1	19.4	7.8	15.5	
1976	8.1	4.3	21.9	18.8	12.4	12.2	1.9	16.4	13.5	20.6	5.2	15.3	12.6	m
1977	16.4	23.1	8.7	12.9	18.6	38.5	21.4	30.1	44.0	43.8	29.1	43.2	27.5	
1978	51.9	93.6	76.5	99.7	82.7	95.1	70.4	58.1	138.2	125.1	97.9	122.7	92.5	
1979	166.6	137.5	138.0	101.5	134.4	149.5	159.4	142.2	188.4	186.2	183.3	176.3	155.4	M
1980	159.6	155.0	126.2	164.1	179.9	157.3	136.3	135.4	155.0	164.7	147.9	174.4	154.6	
1981	114.0	141.3	135.5	156.4	127.5	90.9	143.8	158.7	167.3	162.4	137.5	150.1	140.4	
1982	111.2	163.6	153.8	122.0	82.2	110.4	106.1	107.6	118.8	94.7	98.1	127.0	115.9	
1983	84.3	51.0	66.5	80.7	99.2	91.1	82.2	71.8	50.3	55.8	33.3	33.4	66.6	
1984	57.0	85.4	83.5	69.7	76.4	46.1	37.4	25.5	15.7	12.0	22.8	18.7	45.9	
1985	16.5	15.9	17.2	16.2	27.5	24.2	30.7	11.1	3.9	18.6	16.2	17.3	17.9	
1986	2.5	23.2	15.1	18.5	13.7	1.1	18.1	7.4	3.8	35.4	15.2	6.8	13.4	
1987	9.8													

*Preliminary

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

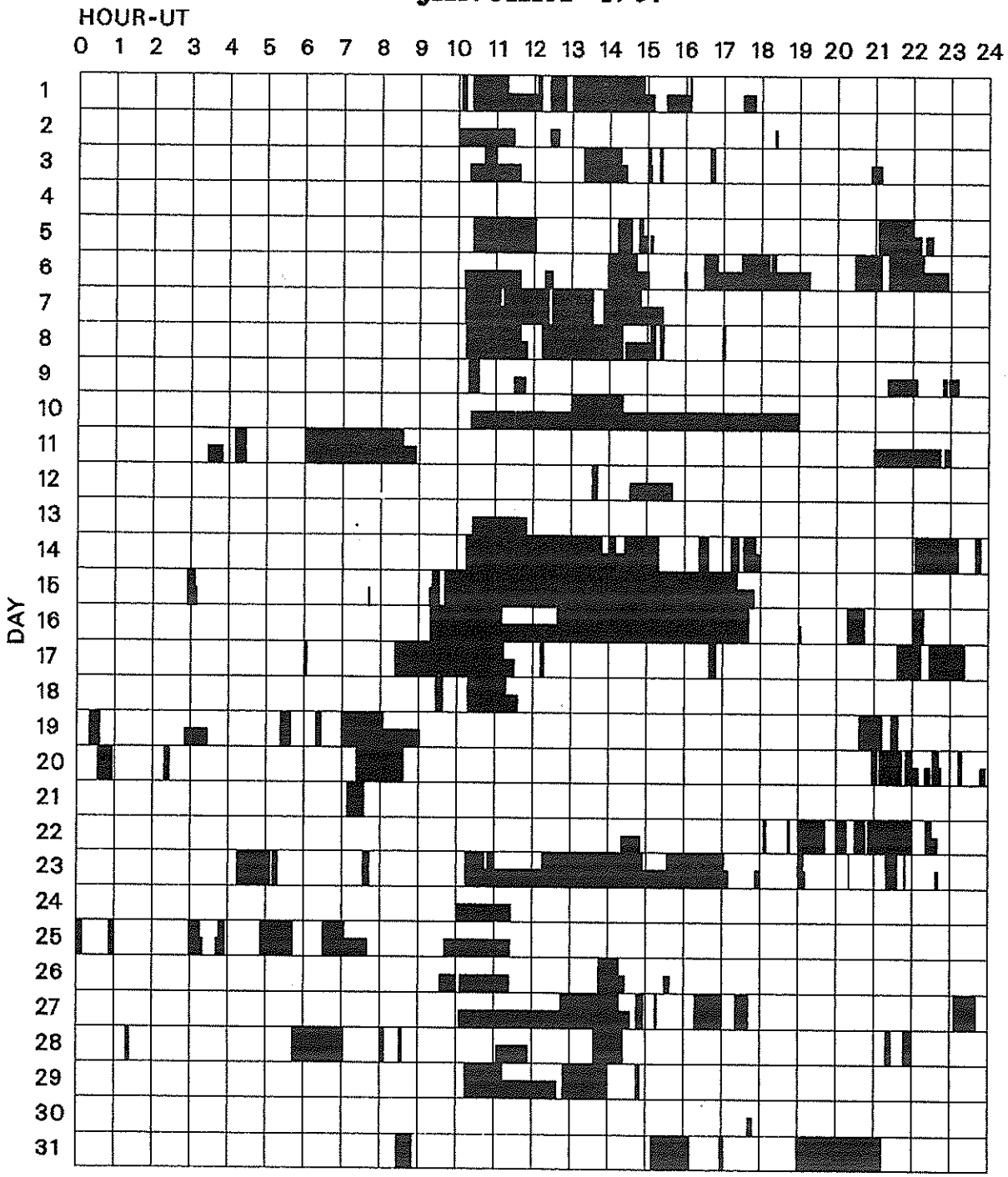
H - ALPHA SOLAR FLARES

JANUARY 1987

Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	CMP Mo	CMP Day	Dur (Min)	Imp	Opt	Xray	See	Obs Type	Area Measurement Time (UT)	Area Measurement Apparent (10^{-6} Disk)	Area Measurement Corr (Sq Deg)	Remarks
0001	RAMY	01	1137	1146	1157	N07	E19	4763	01	2.9	20	SF			3	C		41		
0002	RAMY	01	1455E	1455U	1513	N08	E16	4763	01	2.8	18D	SB			3	C		93		
0003	HOLL	01	1624	1627	1700	N05	E16	4763	01	2.9	36	SF			3	C		56		FH
0004	HOLL	01	1709	1711	1716	N05	E14	4763	01	2.8	7	SF			3	C		54		F
0005		01	17562	1758*	1811	N07	E14	4763	01	2.8	15	SF						39		F
	PALE	01	1756	1758	1806	N07	E14	4763	01	2.8	10	SF			3	C		28		F
	HOLL	01	1757	1818	1824	N07	E14	4763	01	2.8	27	SF			3	C		46		
	RAMY	01	1758	1759	1803	N07	E14	4763	01	2.8	5	SN			3	C		43		
0006		01	1825*	18561	1909	N06	E14	4763	01	2.8	44	SN						71		F
	HOLL	01	1825	1856	1911	N06	E14	4763	01	2.8	46	SF			3	C		69		F
	RAMY	01	1857	1857	1907	N07	E14	4763	01	2.8	10	SN			3	C		73		
0007	HOLL	01	1953	1955	2001	N07	E13	4763	01	2.8	8	SF			3	C		48		
0008		01	2021	2023	2032	N06	E13	4763	01	2.8	11	SN						23		
	HOLL	01	2021	2023	2035	N07	E13	4763	01	2.8	14	SF			3	C		22		
	RAMY	01	2024E	2024U	2030	N06	E13	4763	01	2.8	6D	SN			3	C		24		
0009	HOLL	01	2120	2124	2132	N07	E13	4763	01	2.9	12	SF			3	C		27		
0010	RAMY	18	1741	1741	1757	S26	E27	4764	01	20.8	16	SF			3	C		26		
0011	HOLL	18	1854	1854	1902	S28	E26	4764	01	20.8	8	SF			3	C		23		
0012	RAMY	21	1126E	1126U	1143	S26	W13	4765	01	20.5	17D	SB			3	C		21		F
0013	RAMY	21	1330	1331	1350	S26	W02	4765	01	21.4	20	SN			3	C		32		
0014	RAMY	21	1357	1402	1406	S26	W02	4765	01	21.4	9	SF			3	C		21		
0015	HOLL	21	1700	1702	1709	S26	W03	4765	01	21.5	9	SF			3	C		27		
0016		21	19582	20001	2009	S26	W04	4765	01	21.5	11	SN						32		
	RAMY	21	1958	2001	2001D	S26	W03	4765	01	21.6	3D	SN			3	C		38		
	HOLL	21	2000	2000	2009	S26	W06	4765	01	21.4	9	SF			3	C		26		
0017	HOLL	21	2237	2237	2242	S26	W05	4765	01	21.5	5	SF			3	C		30		
0018	LEAR	22	0804	0811	0828	S26	W10	4765	01	21.5	24	SF			3	C		49		F
0019	RAMY	22	1126E	1126U	1143	S26	W13	4765	01	21.5	17D	SB			3	C		21		F
0020		22	16491	1654	1719	S25	W17	4765	01	21.4	30	SB	C	2.5				165		EF
	HOLL	22	1649	1654	1718	S25	W16	4765	01	21.5	29	SB	C	2.5	3	C		187		FE
	RAMY	22	1650	1654	1720	S25	W18	4765	01	21.3	30	SB	C	2.5	3	C		143		FE
0021	HOLL	22	2024	2025	2027	S26	W17	4765	01	21.5	3	SF			3	C		28		F
0022	HOLL	22	2240	2242	2257	S25	W19	4765	01	21.5	17	SF			3	C		50		F
0023	LEAR	23	0843	0845	0857	S24	W24	4765	01	21.5	14	SF			2	C		113		F
0024		23	2344	2347	2351	S26	W34	4765	01	21.3	7	SN	C	1.4				68		F
	LEAR	23	2344	2347	2351	S26	W33	4765	01	21.4	7	SN	C	1.4	3	C		61		
	PALE	23	2345E	2347	2351	S25	W34	4765	01	21.3	6D	SN	C	1.4	3	C		74		F
0025	HOLL	25	1418E	1436U	1446	S25	W65	4765	01	20.6	28D	SF			3	C		51		
0026	HOLL	25	2119	2120	2127	S24	W56	4765	01	21.6	8	SF			3	C		21		
0027	RAMY	26	1425E	1432	1445	S26	W65	4765	01	21.5	20D	SF			3	C		66		
0028		26	1501	15092	1537	S24	W66	4765	01	21.5	36	SN	C	1.4				62		
	HOLL	26	1501E	1509	1537	S24	W68	4765	01	21.4	36D	SN	C	1.4	3	C		38		
	RAMY	26	1501	1511	1557D	S25	W65	4765	01	21.6	56D	SN	C	1.4	3	C		86		

INTERVALS OF NO FLARE PATROL OBSERVATION
FOR PRECEDING SOLAR FLARE TABLE

JANUARY 1987



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

Athens	Holloman	Mitaka	Purple Mt.	Urumqi
Bucharest	Learmonth	Palehua	Ramey	Wendelstein
			San Vito	Yunnan

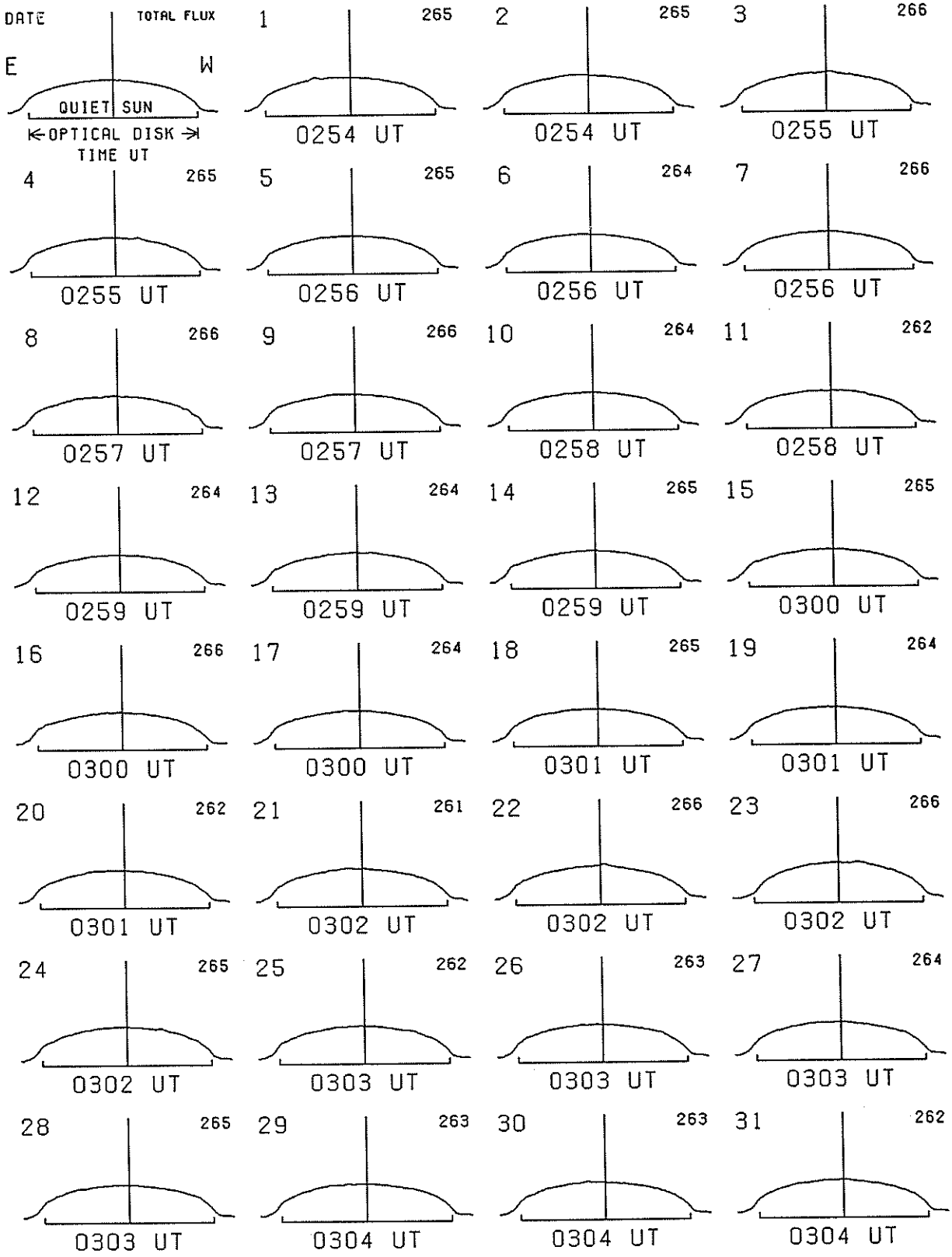
14
Jan 87

EAST-WEST SOLAR SCANS

JANUARY 1987

TOYOKAWA, JAPAN

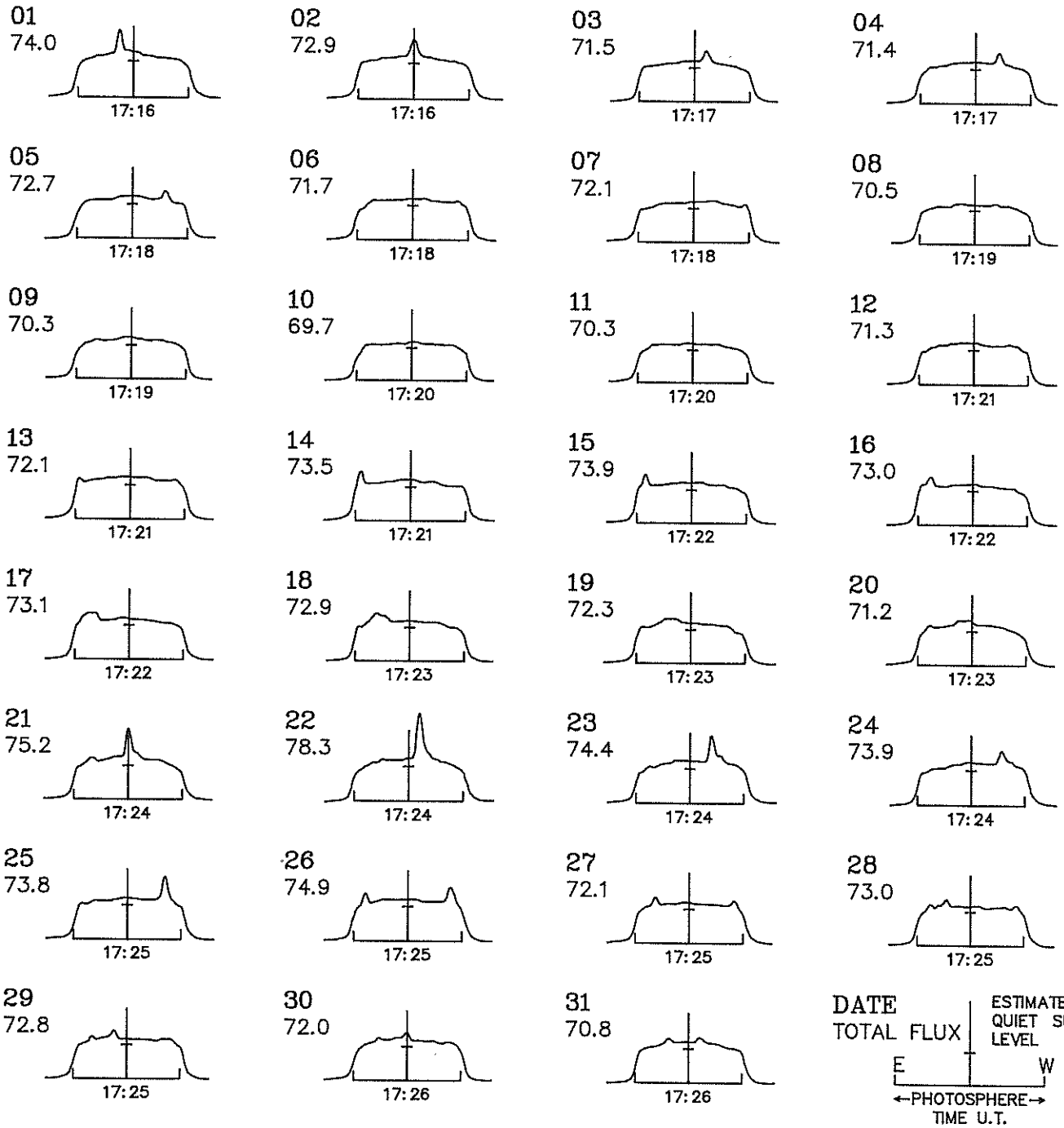
3 CM
FAN BEAM WITH 1.1 MINUTES OF ARC



EAST – WEST SOLAR SCANS
JANUARY 1987

ALGONQUIN RADIO OBSERVATORY
CANADA

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



E A S T - W E S T S O L A R S C A N S

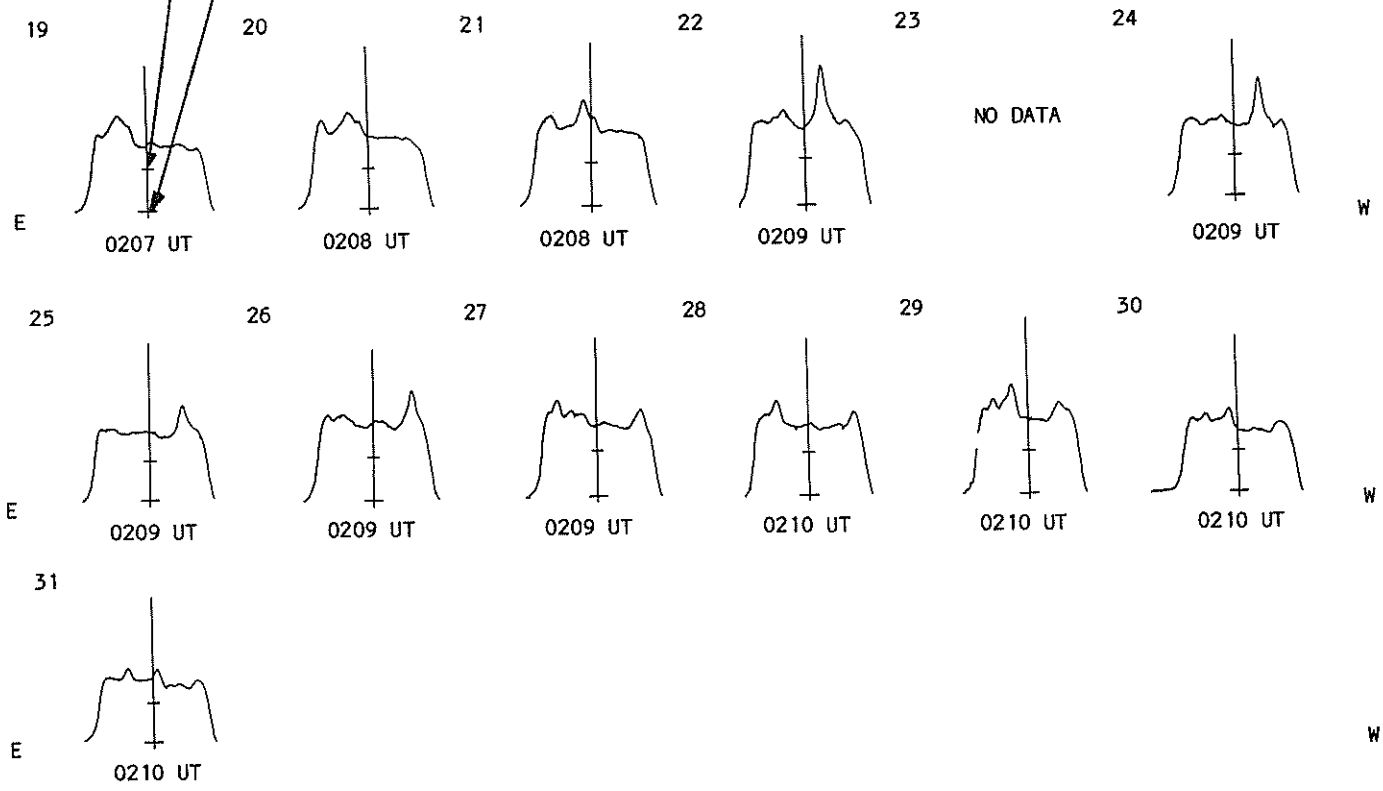
Fleurs, Australia

JANUARY 1987

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

Estimated Quiet Sun Level
Cold Sky Level

NO DATA JANUARY 1-18, 1987

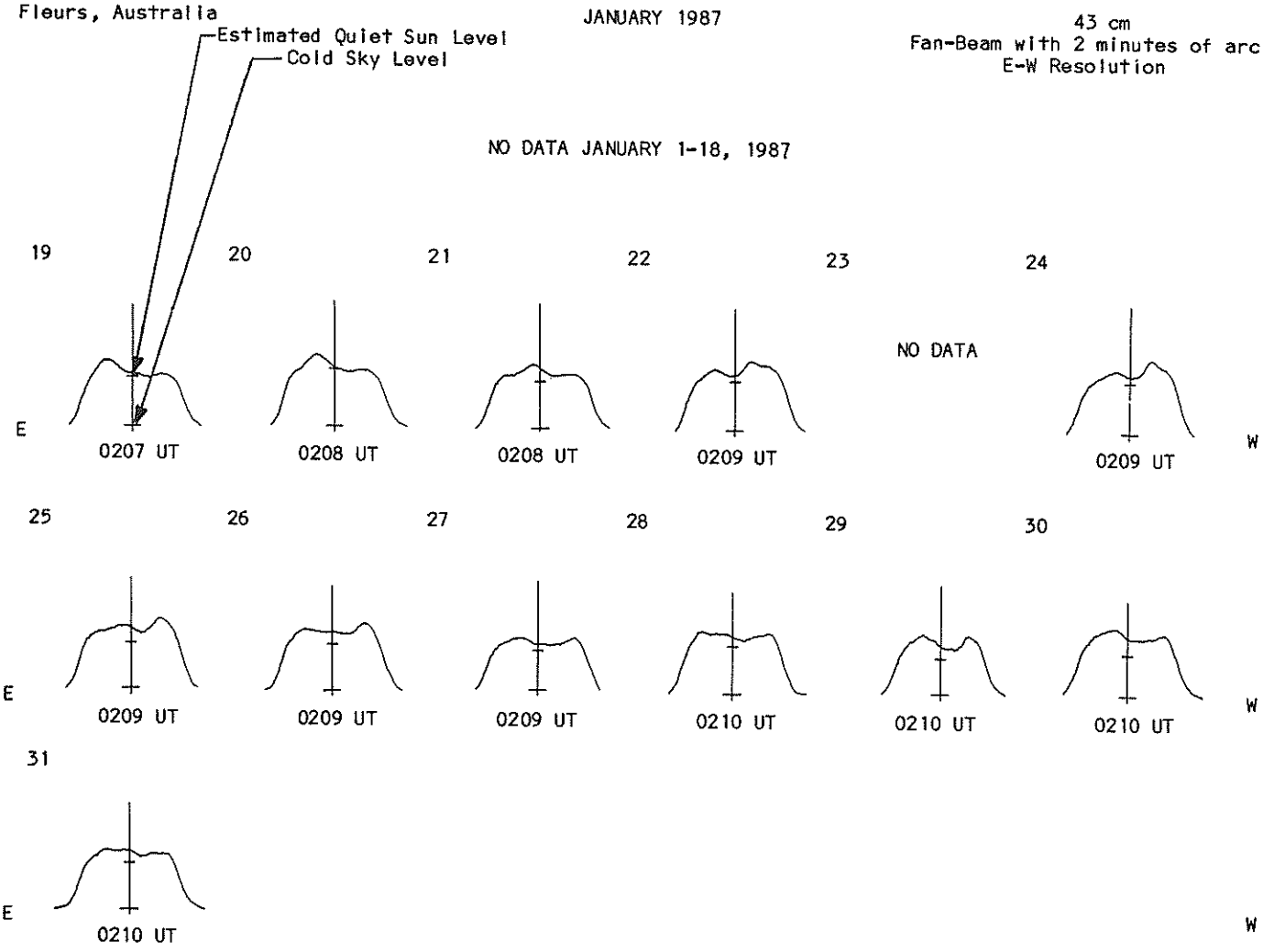


EAST-WEST SOLAR SCANS

Fleurs, Australia

JANUARY 1987

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



SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

JANUARY 1987

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
10	2800	OTTA	20 GRF	1740.0	1832.0	120.0	1.5	.7		
21	2800	OTTA	8 S	1700.3	1700.6	.9	1.6	.8		
22	2800	OTTA	20 GRF	1330.0E	1420.0	180.0D	1.5	.7		
	2800	OTTA	20 GRF	1643.8	1758.0	136.0	2.6	1.3		
	2800	OTTA	1 S	1652.3	1652.9	2.2	4.4	1.3		
25	2800	OTTA	240 R	1605.0	1630.0	25.0	1.5	.7		
26	2800	OTTA	240AR	1330.0	1715.0	225.0	4.1	3.1		
	2800	OTTA	20 GRF	1455.0	1527.0	79.0	2.3	1.5		
30	2800	OTTA	8 S	1947.8	1948.3	7.0	2.5	1.3		

Observatories

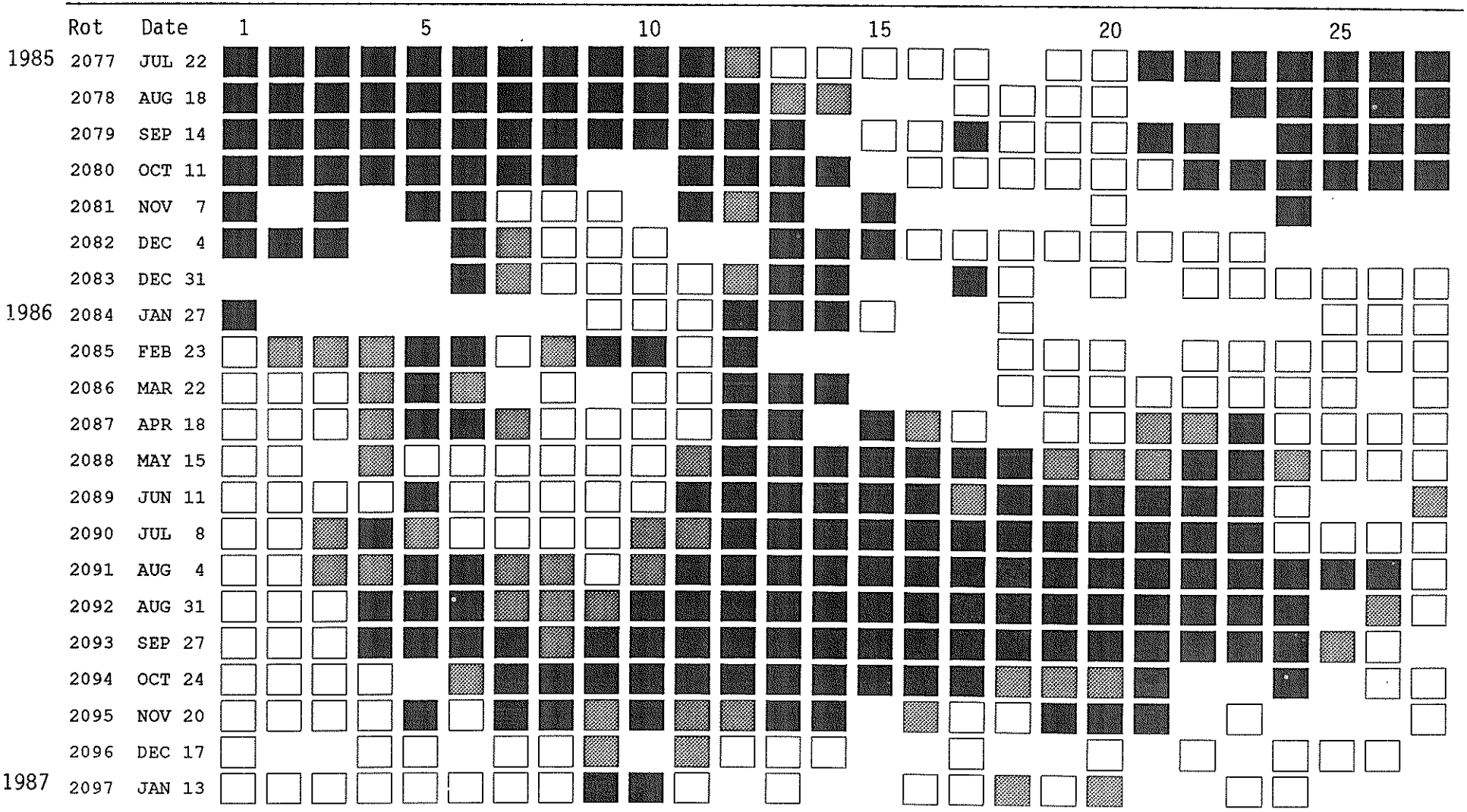
ATHN = Athens
BERN = Berne
LEAR = Learmonth
MANI = Manila
OTTA = Ottawa
PALE = Palehua
PENT = Penticton
SGMR = Sagamore Hill
SVTO = San Vito

Explanation of Type Code:

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

Remarks:
QL = Quality (1=poor to 6=excellent)
ST = Status (1=real time; 2=final; 3=correction; 4=deletion)
TYP= Type (1=noise storm;2=rise in base level;3=minor;4=group;5=major;6=major plus;7=Castelli U-type burst)

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.

19 Jan 87

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)

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

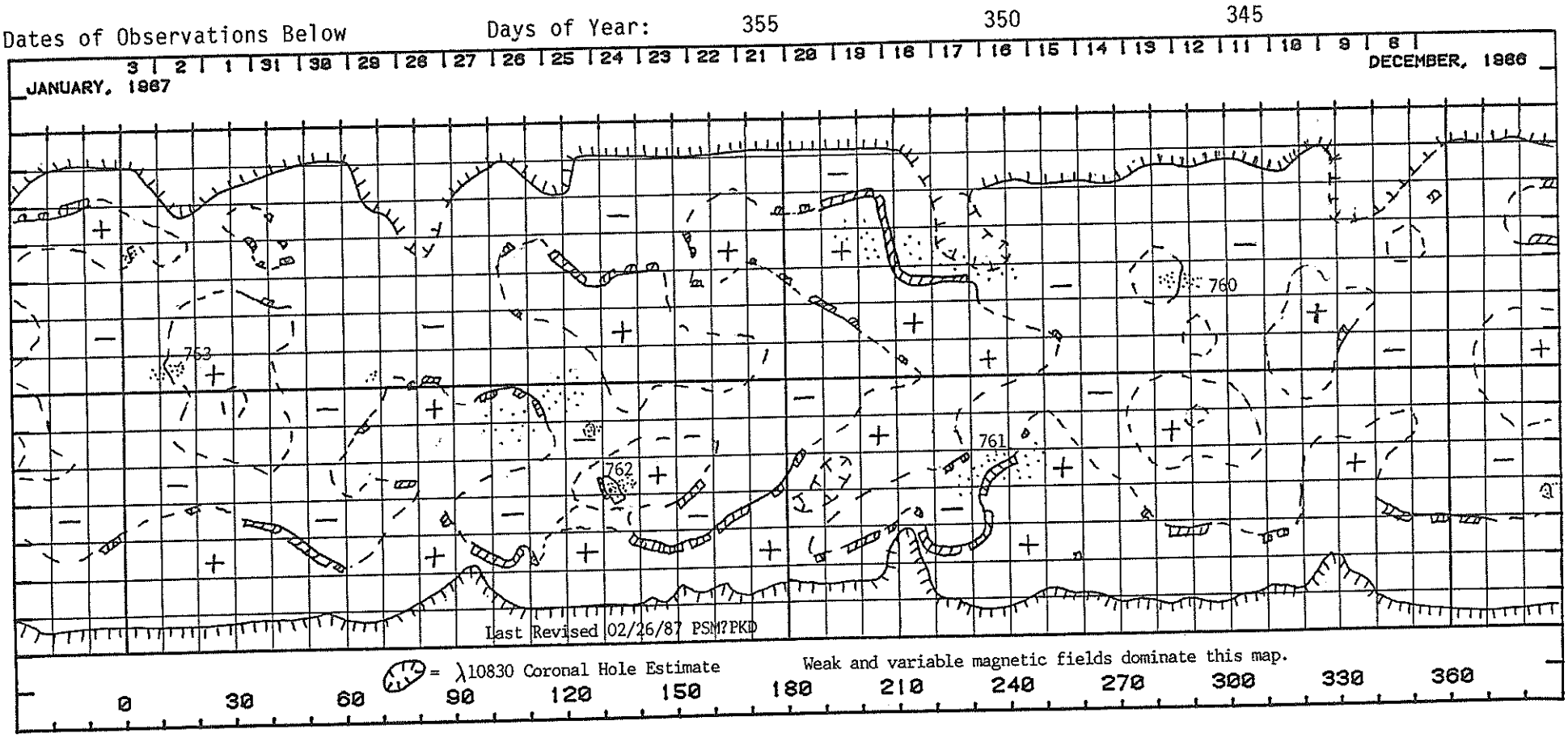
Dot symbol indicates no data available for the day.

C O N T E N T S

Prompt Reports DATA FOR DECEMBER 1986 Number 510 Part I

PRELIMINARY H-ALPHA SOLAR SYNOPTIC CHART

CARRINGTON ROTATION NUMBER 1783
(7 December 1986 to 3 January 1987)



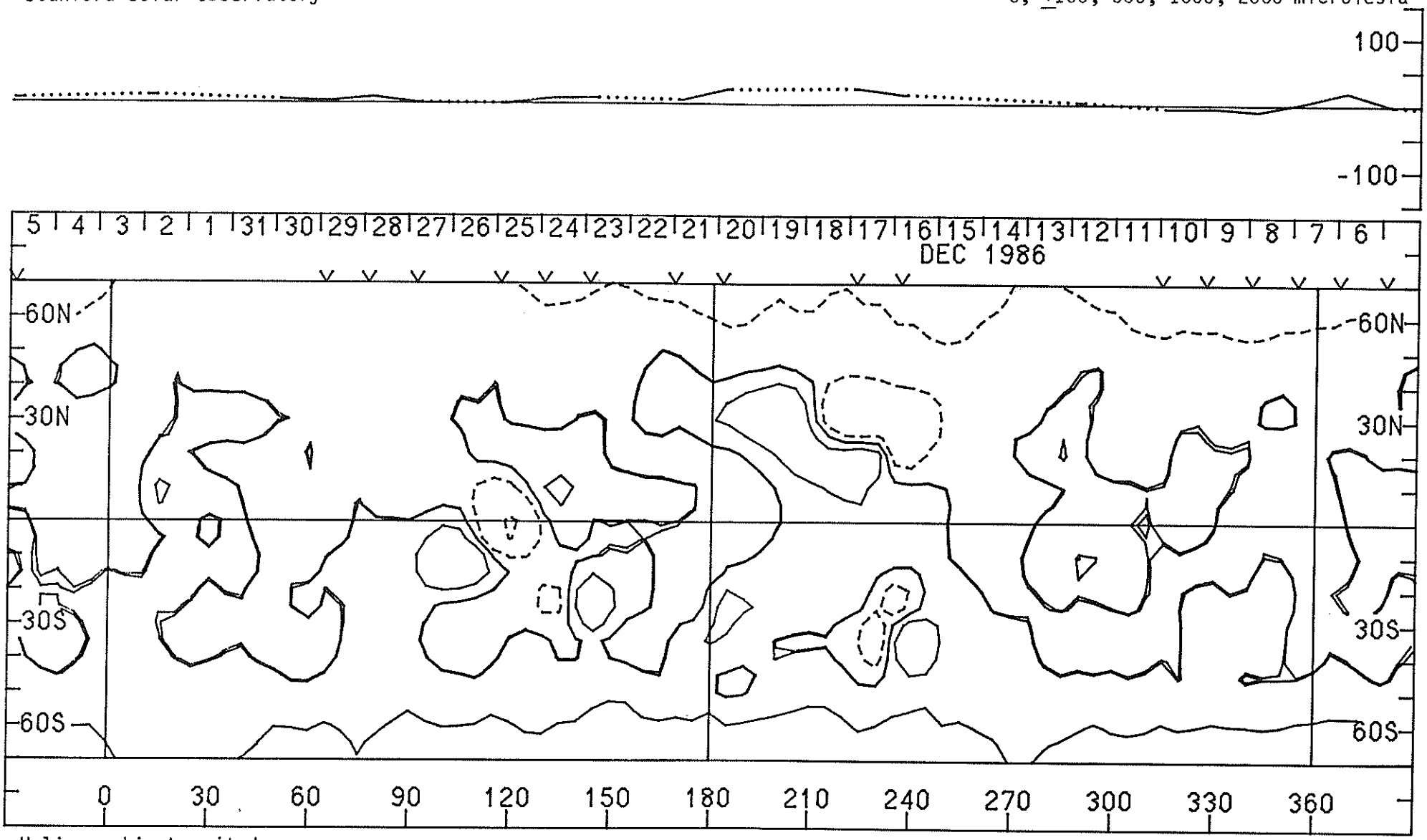
SOLAR MAGNETIC FIELD SYNOPTIC CHART

CARRINGTON ROTATION NUMBER 1783

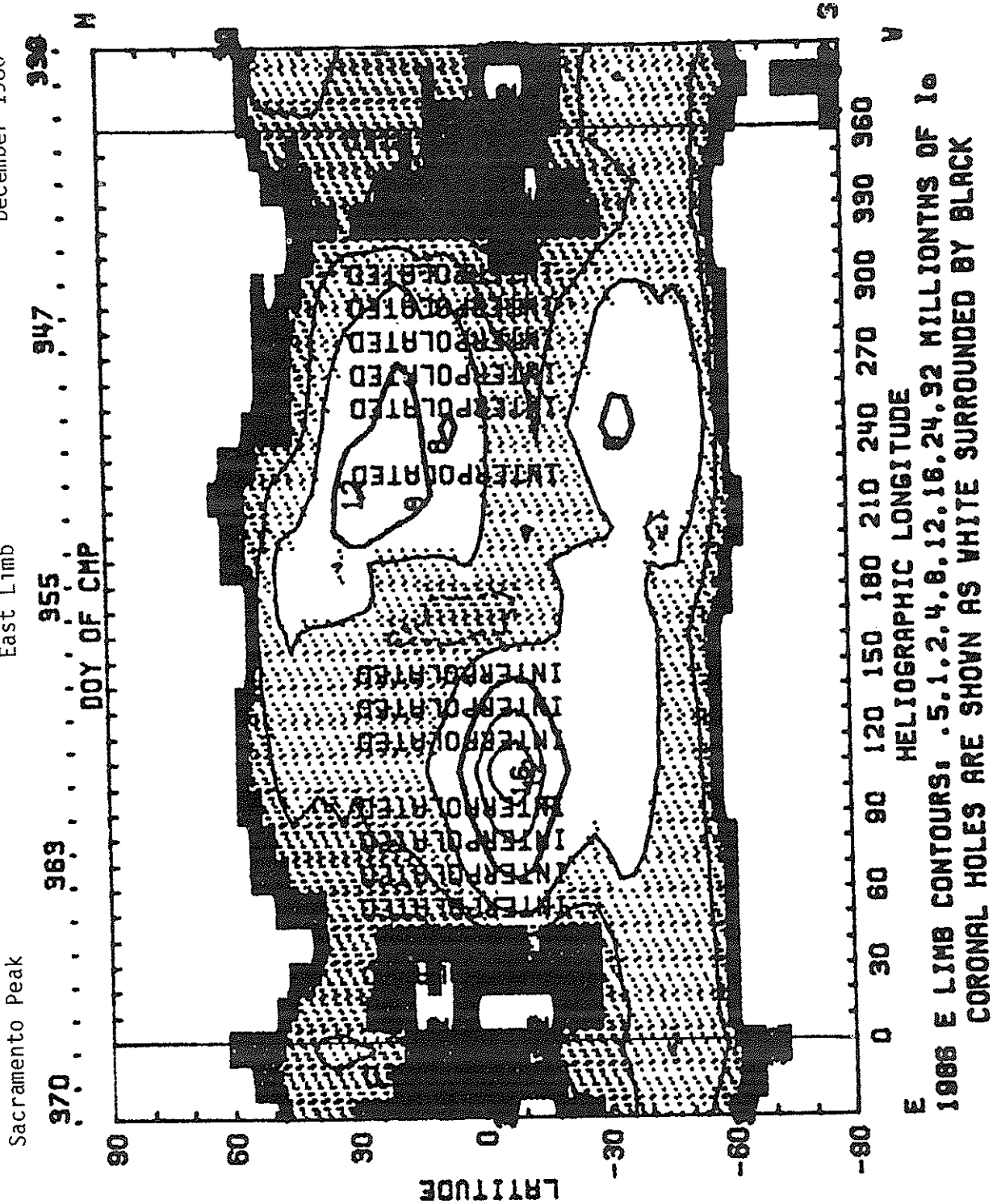
(7 December 1986 to 3 January 1987)

Stanford Solar Observatory

0, ±100, 500, 1000, 2000 microTesla



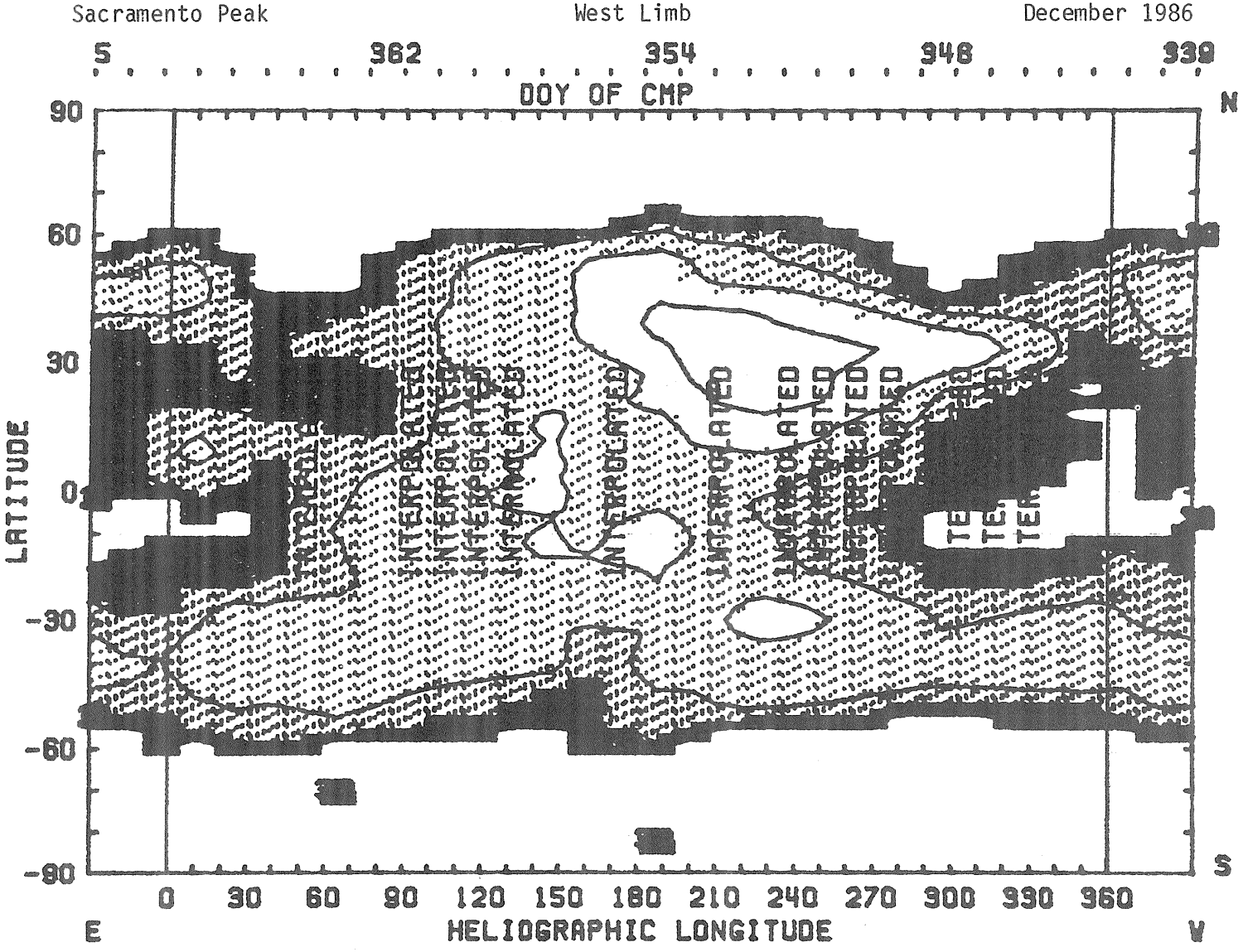
23 Dec 86


CORONAL GREEN LINE SYNOPTIC MAP
CARRINGTON ROTATION NUMBER 1783
(7 December 1986 to 3 January 1987)
Sacramento Peak
East Limb
December 1986
DOY OF CMP
370
963
955
947
939
LATITUDE
90
60
30
0
-30
-60
-90
E
0 30 60 90 120 150 180 210 240 270 300 330 360
W
HELIOGRAPHIC LONGITUDE
1986 E LIMB CONTOURS: .5,1,2,4,8,12,18,24,32 MILLIONTHS OF Io
CORONAL HOLES ARE SHOWN AS WHITE SURROUNDED BY BLACK

C O R O N A L G R E E N L I N E S Y N O P T I C M A P

CARRINGTON ROTATION NUMBER 1783

(7 December 1986 to 3 January 1987)



1986 W LIMB CONTOURS: .5,1,2,4,8,12,16,24,32 MILLIONTHS OF Io

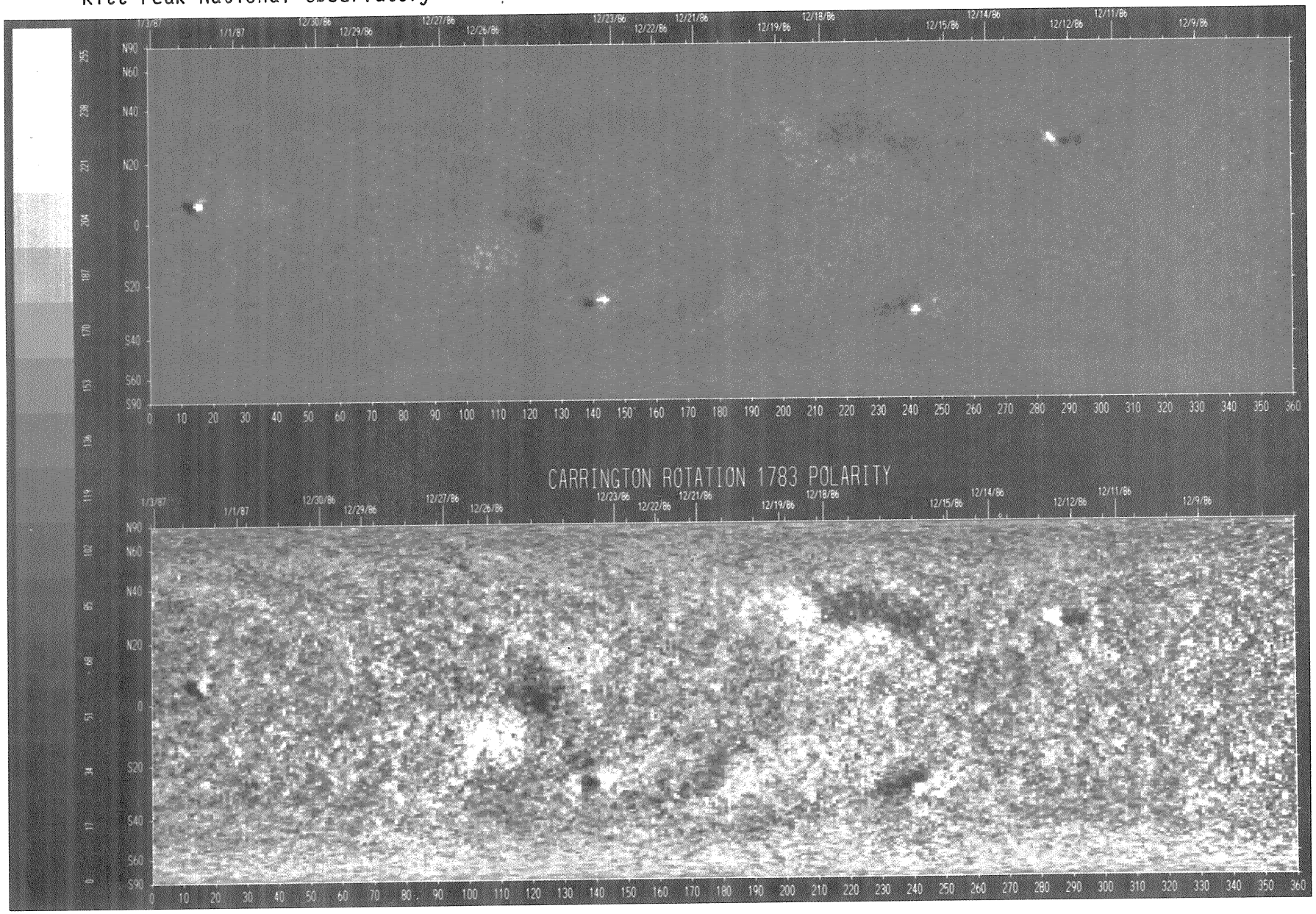
CORONAL HOLES ARE SHOWN AS WHITE SURROUNDED BY BLACK

SOLAR MAGNETIC FIELD SYNOPTIC CHART

CARRINGTON ROTATION NUMBER 1783
(December 7, 1986 to January 3, 1987)

Kitt Peak National Observatory

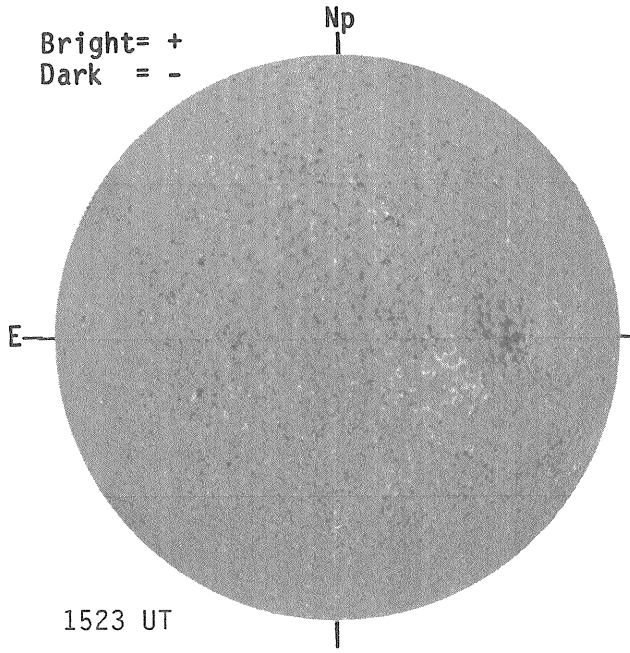
Dates of Observations



D E C E M B E R 01, 1 9 8 6 (P= 16.12, B_o= 0.92, L_o= 84.44)

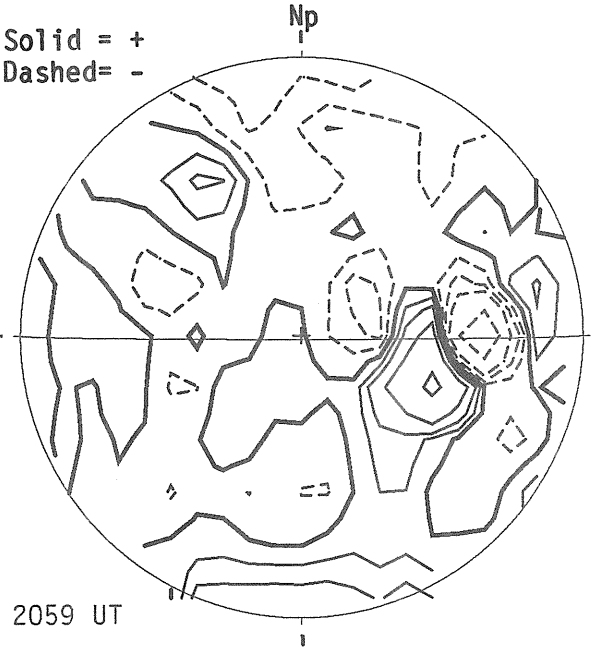
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

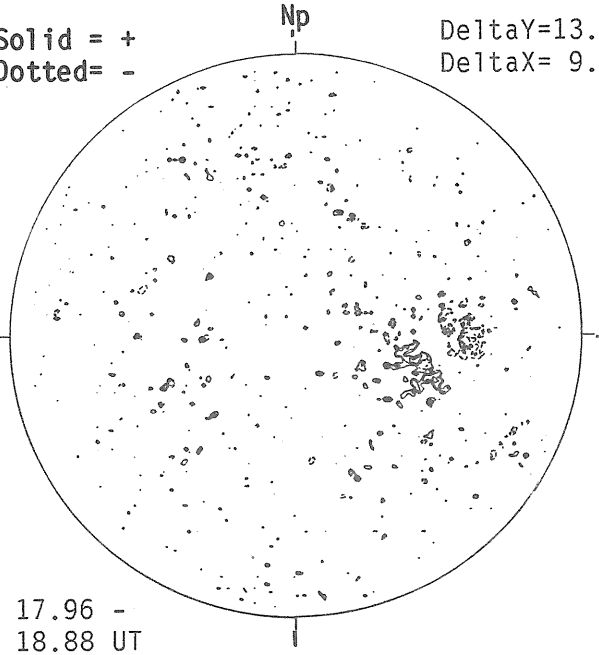
Solid = +
Dashed= -



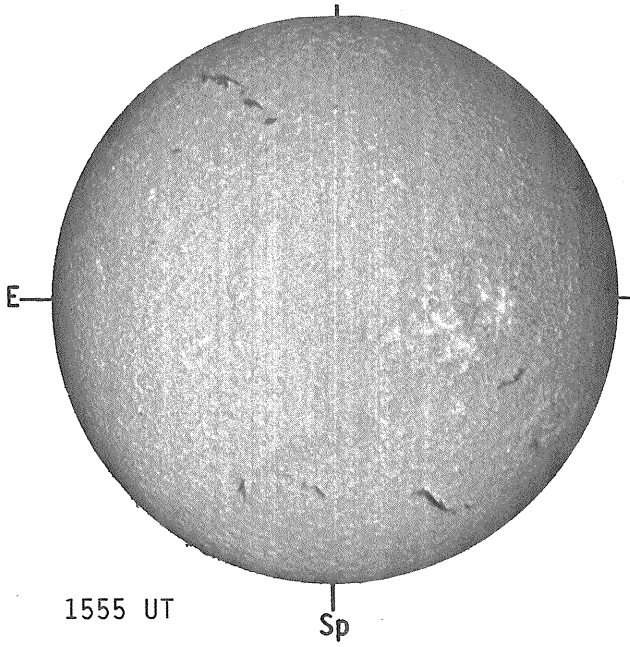
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

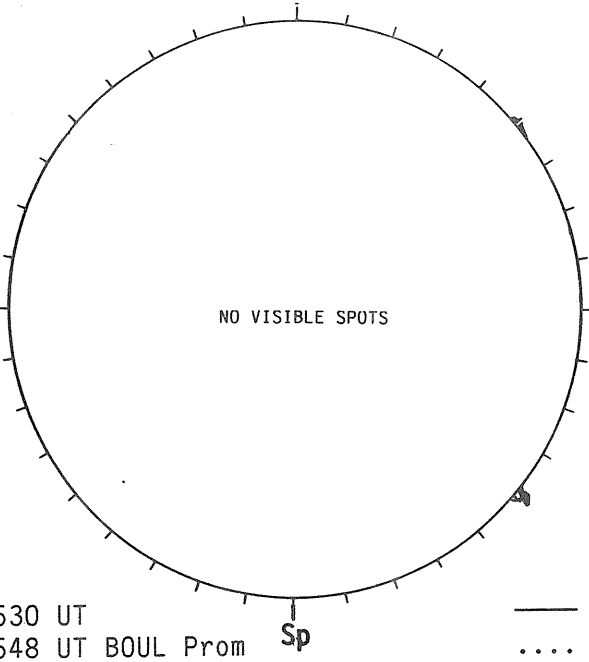
DeltaY=13.0
DeltaX= 9.7



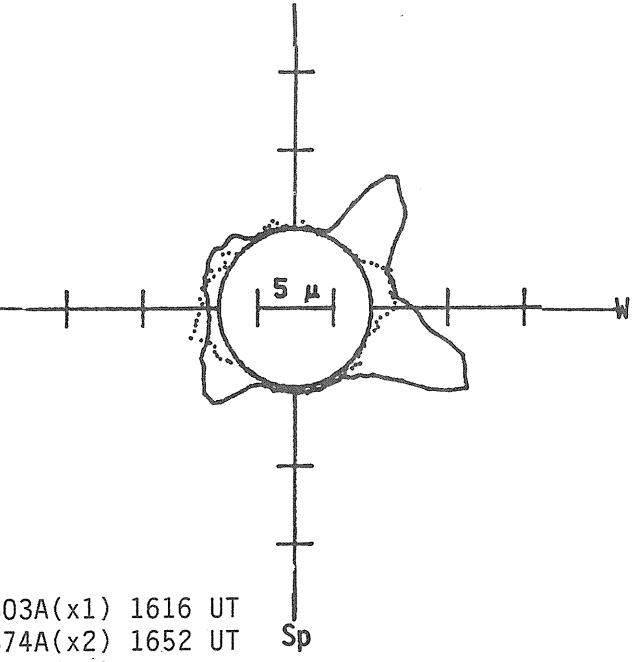
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)



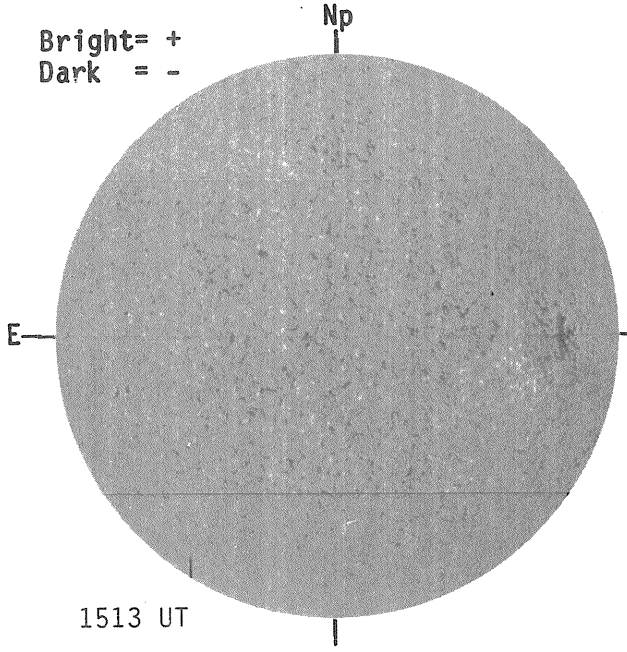
—— 5303A(x1) 1616 UT
.... 6374A(x2) 1652 UT
xxxx 5694A(x6) 1639 UT
NO 5694A ACTIVITY TODAY

27 Dec 86

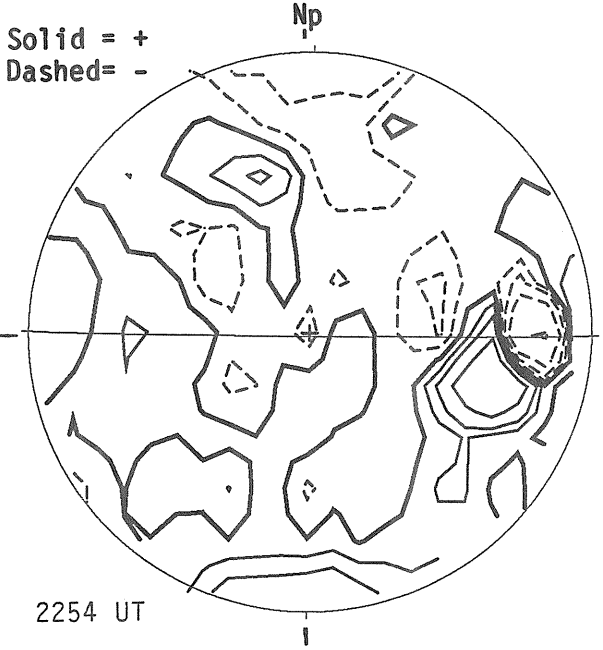
D E C E M B E R 02, 1 9 8 6 (P= 15.73, B_o= 0.80, L_o= 71.26)

28 Dec 86

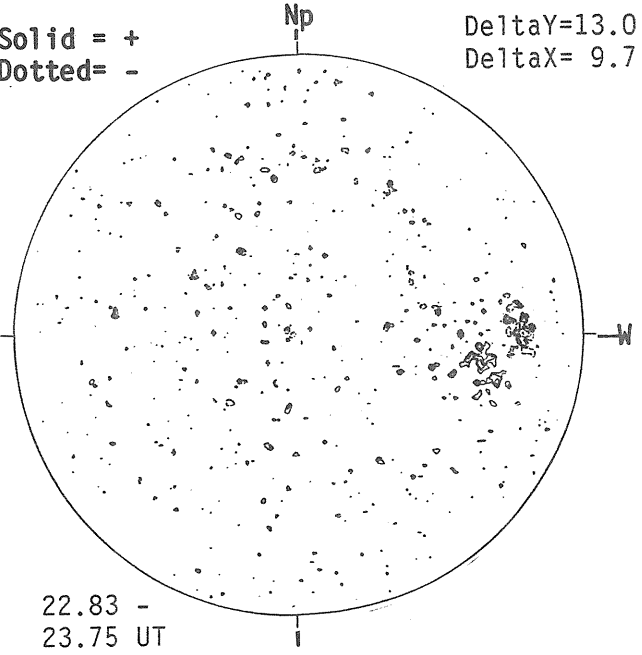
KITT PEAK MAGNETOGRAM



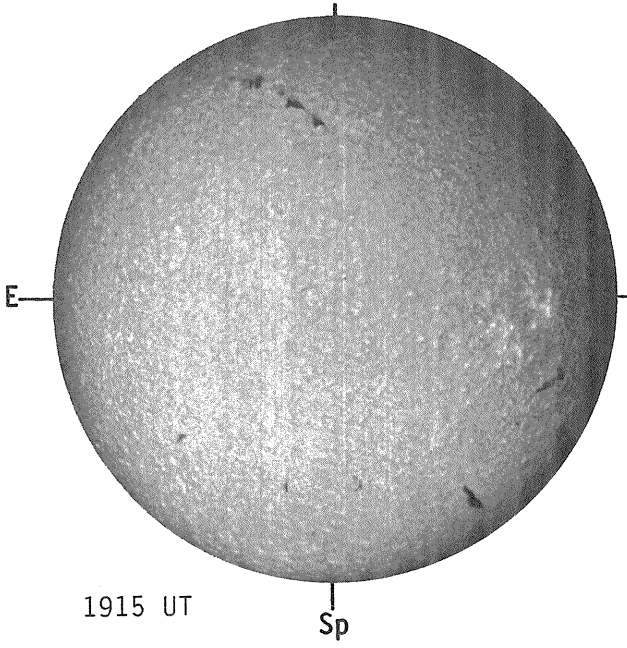
STANFORD MAGNETOGRAM



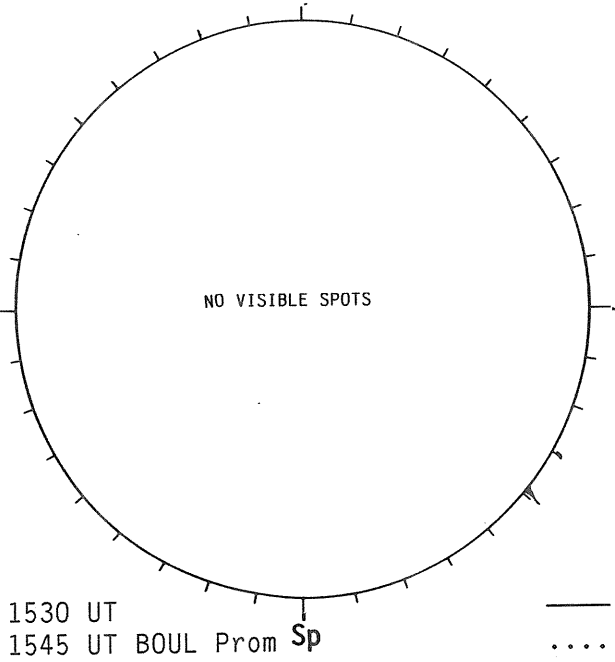
MT. WILSON MAGNETOGRAM



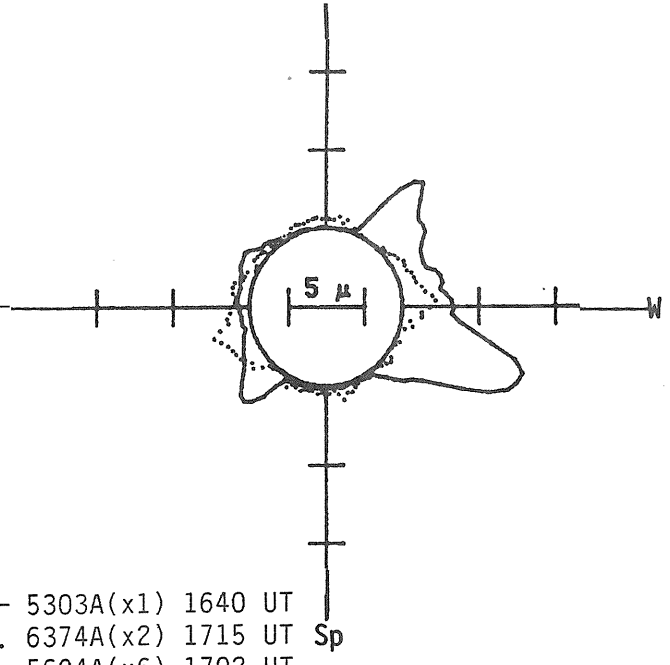
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



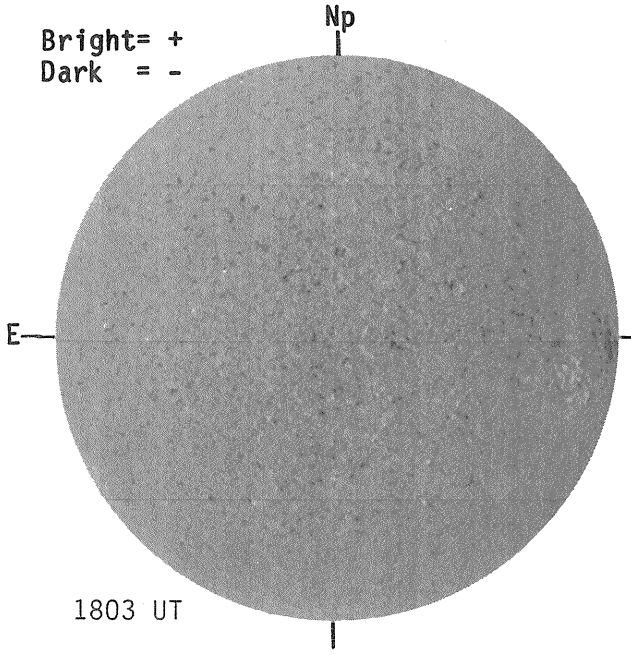
SACRAMENTO PEAK CORONA (1.15 Radii)



D E C E M B E R 03, 1 9 8 6 (P= 15.34, B_o= 0.67, L_o= 58.09)

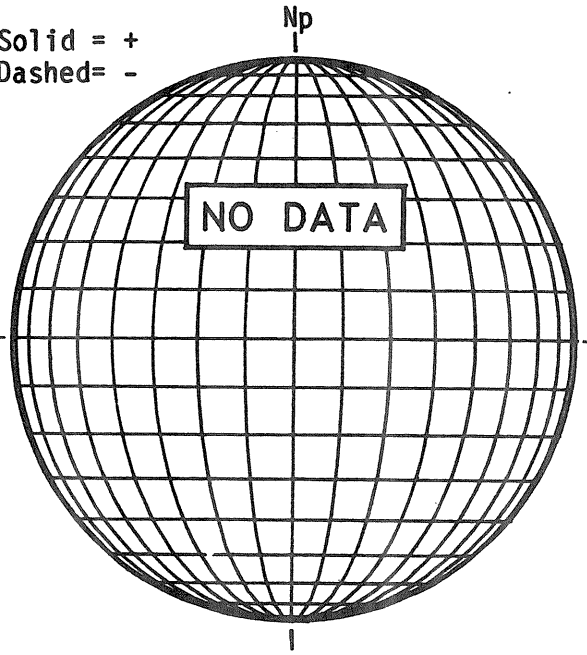
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

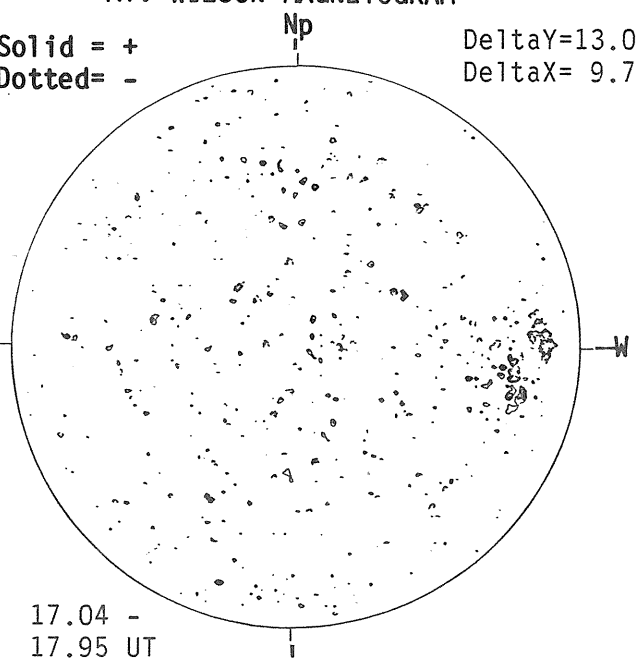
Solid = +
Dashed= -



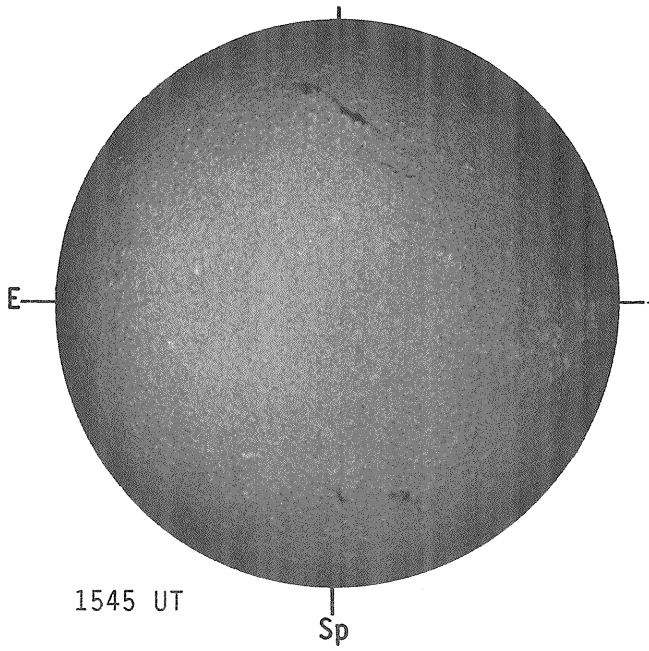
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

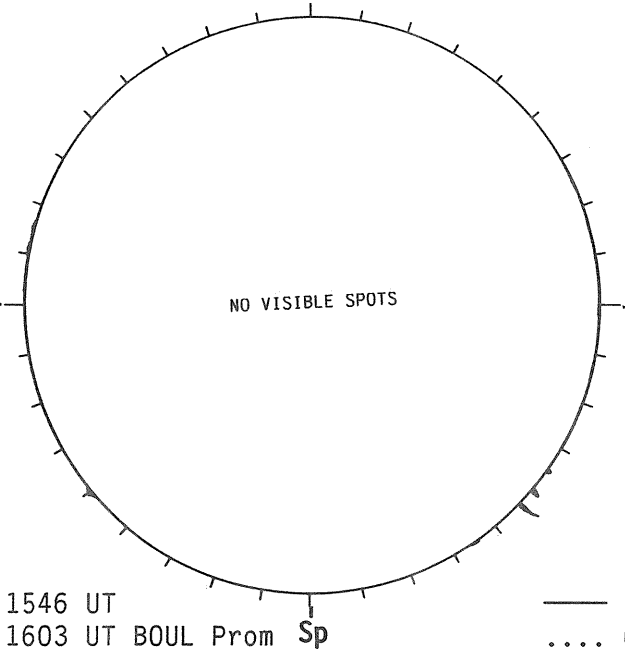
DeltaY=13.0
DeltaX= 9.7



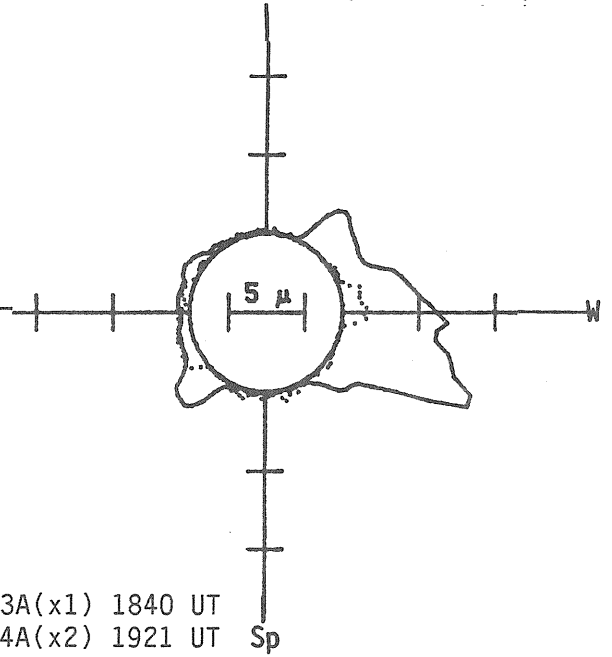
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

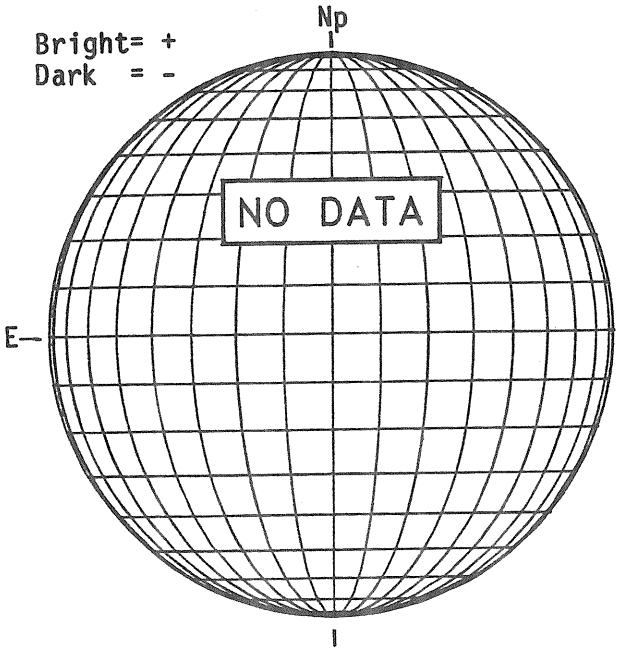


—— 5303A(x1) 1840 UT
.... 6374A(x2) 1921 UT
xxxx 5694A(x6) 1909 UT
NO 5694A ACTIVITY TODAY

D E C E M B E R 04, 1 9 8 6 (P= 14.95, B_0= 0.54, L_0= 44.91)

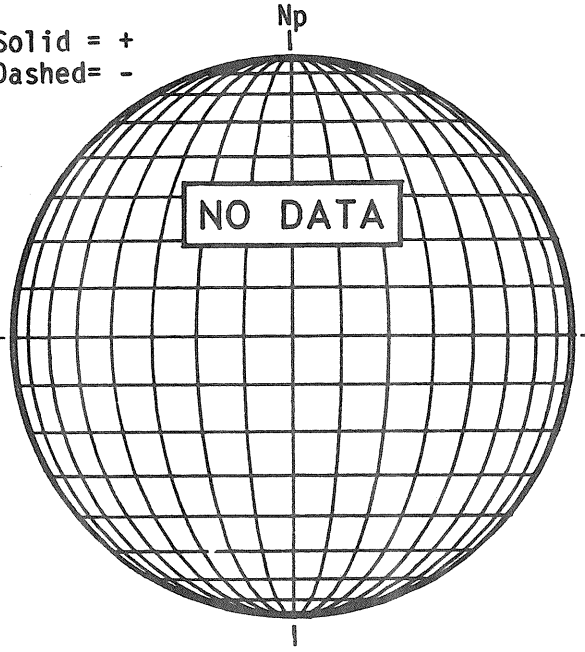
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



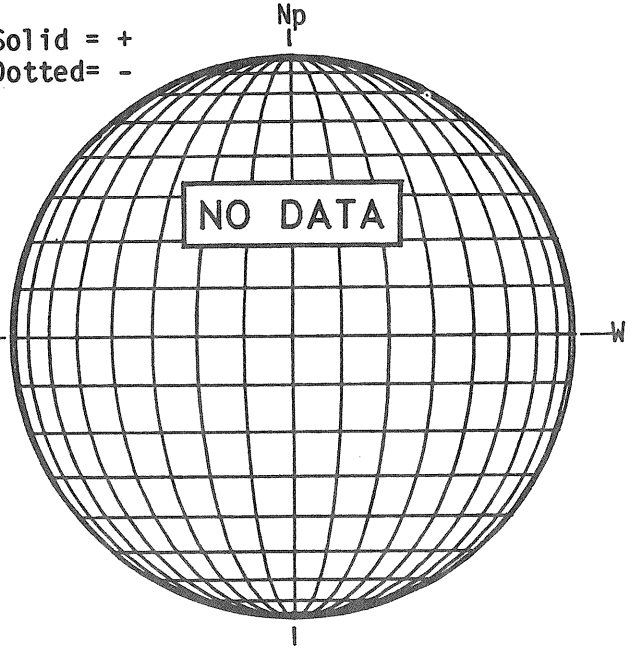
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

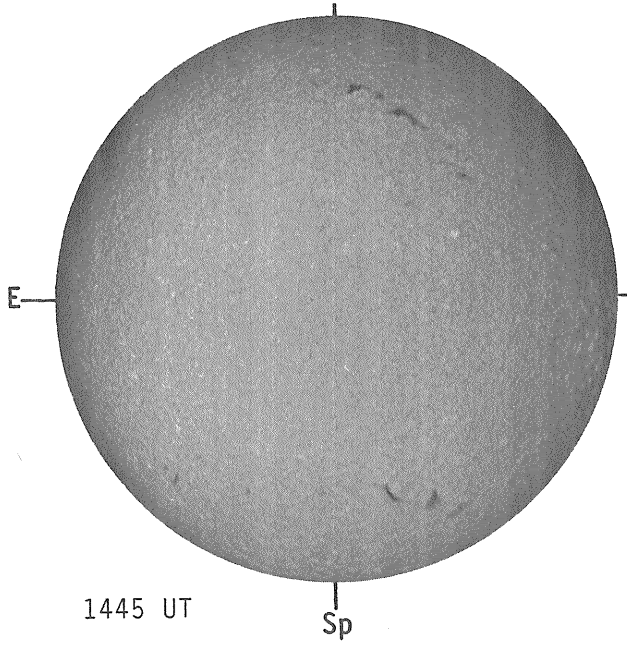


MT. WILSON MAGNETOGRAM

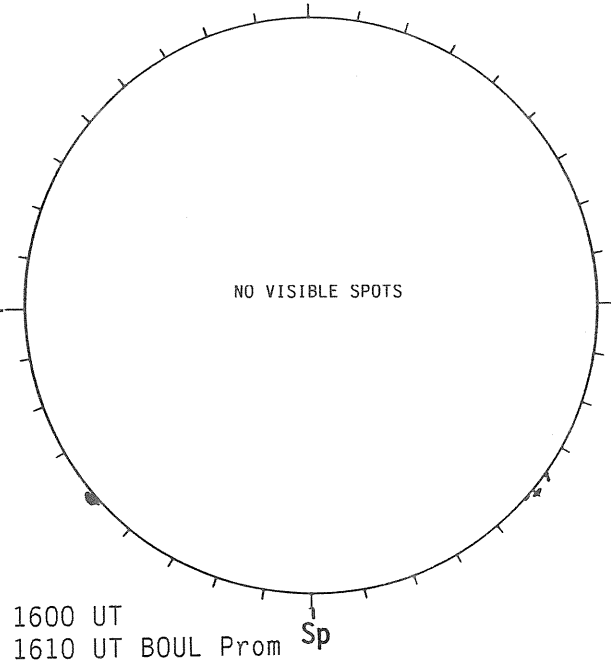
Solid = +
Dotted= -



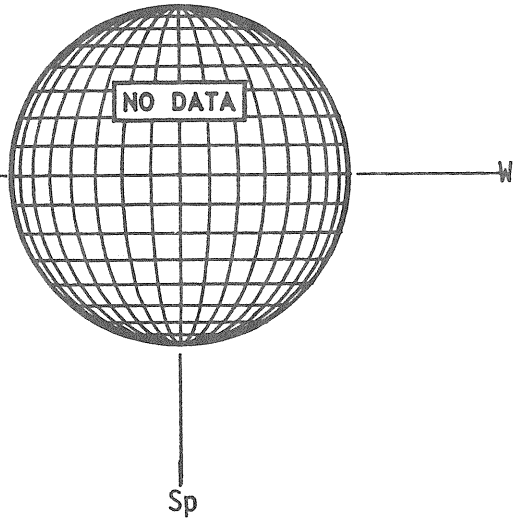
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS

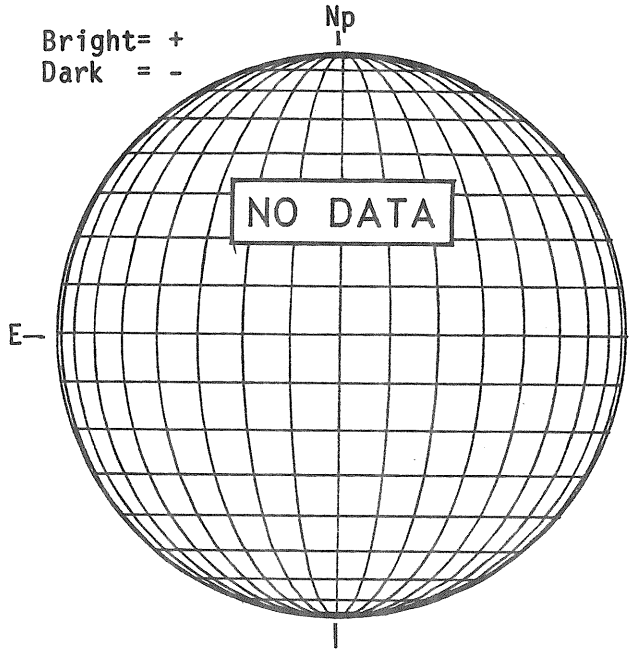


SACRAMENTO PEAK CORONA (1.15 Radii)

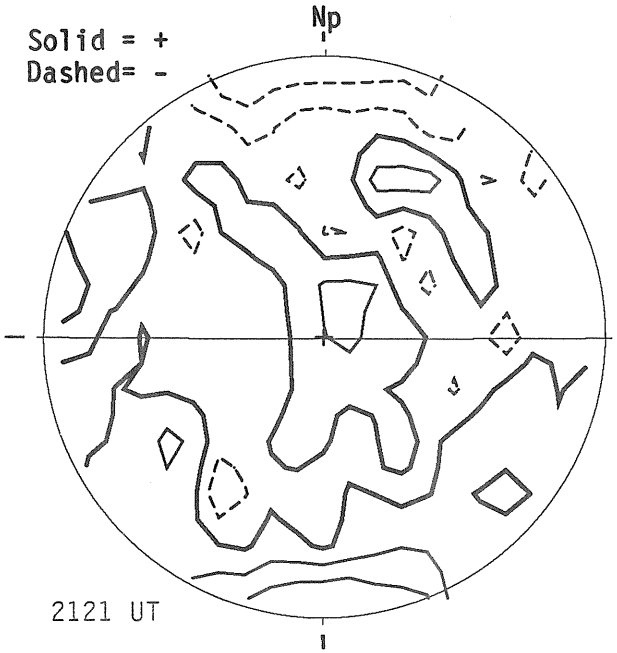


D E C E M B E R 05, 1 9 8 6 (P= 14.54, B_o= 0.42, L_o= 31.73)

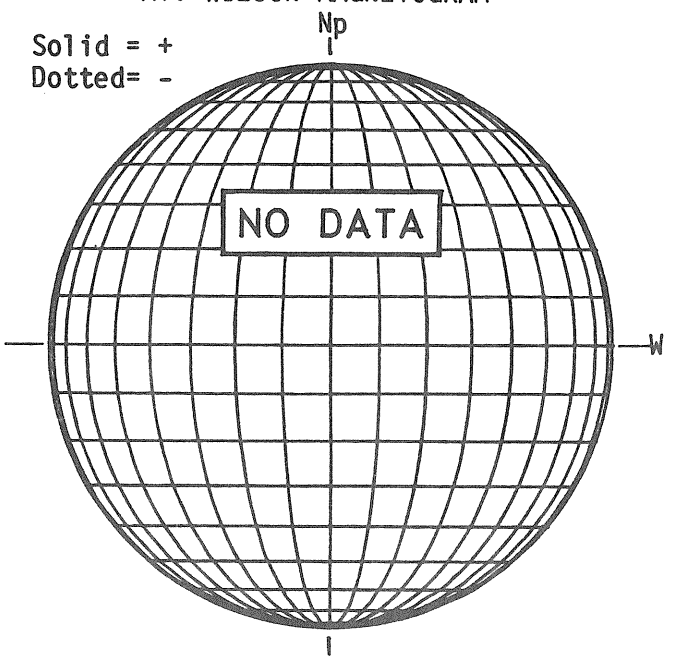
KITT PEAK MAGNETOGRAM



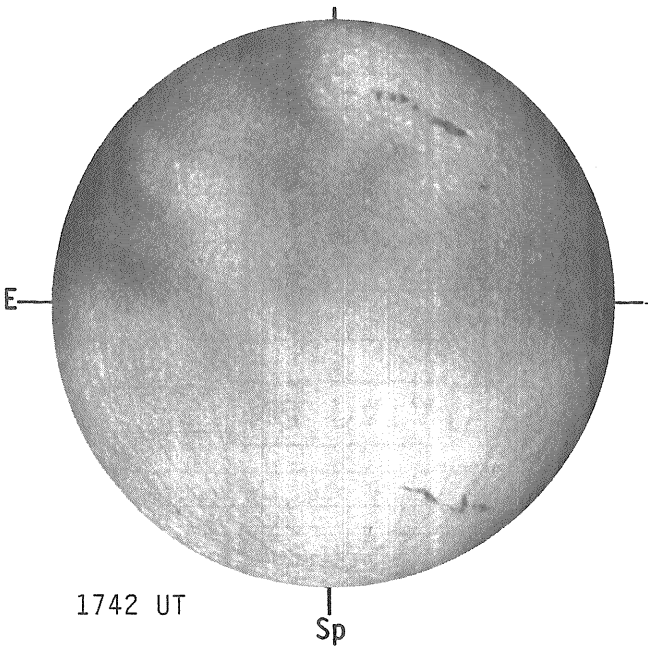
STANFORD MAGNETOGRAM



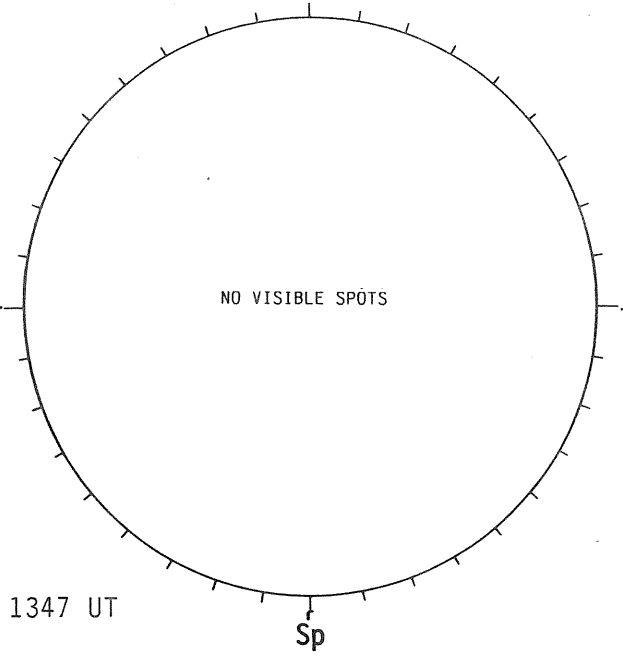
MT. WILSON MAGNETOGRAM



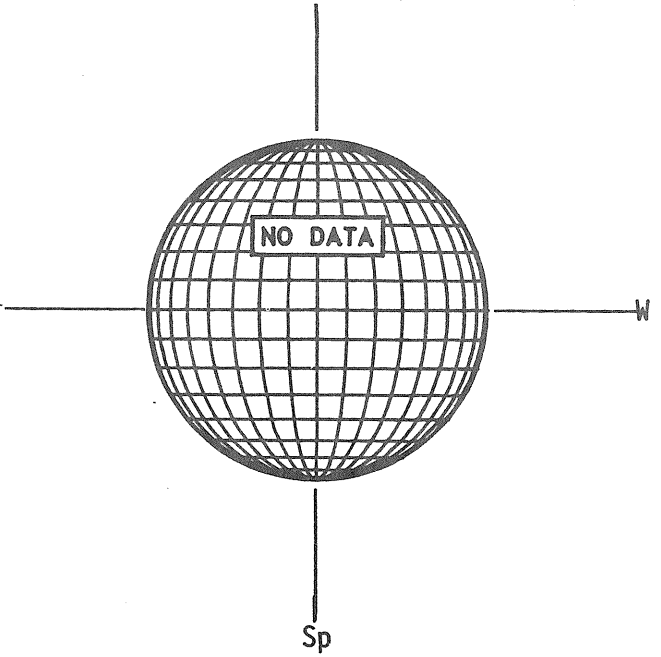
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



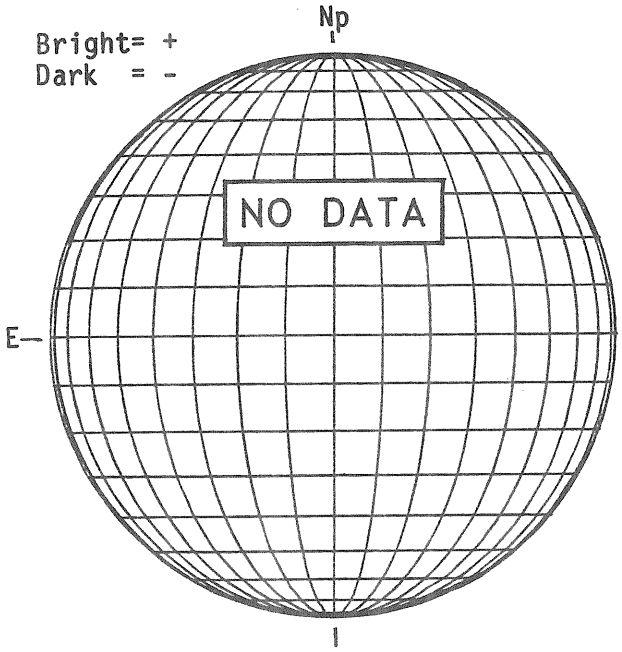
SACRAMENTO PEAK CORONA (1.15 Radii)



D E C E M B E R 06, 1 9 8 6 (P= 14.13, B_0= 0.29, L_0= 18.55)

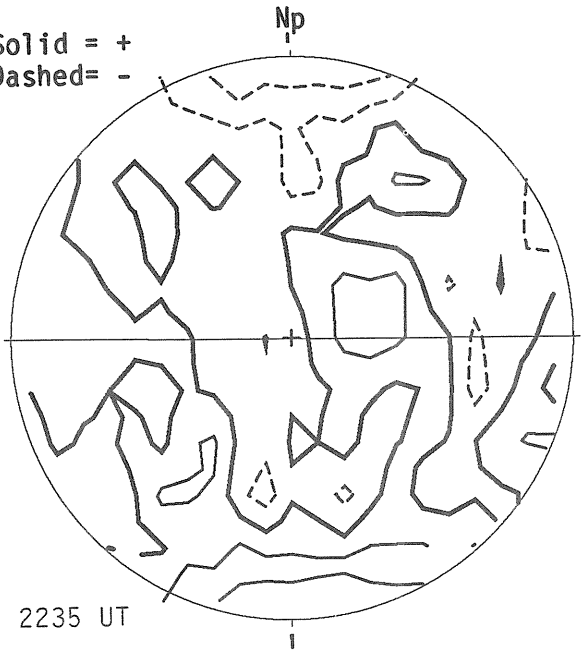
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



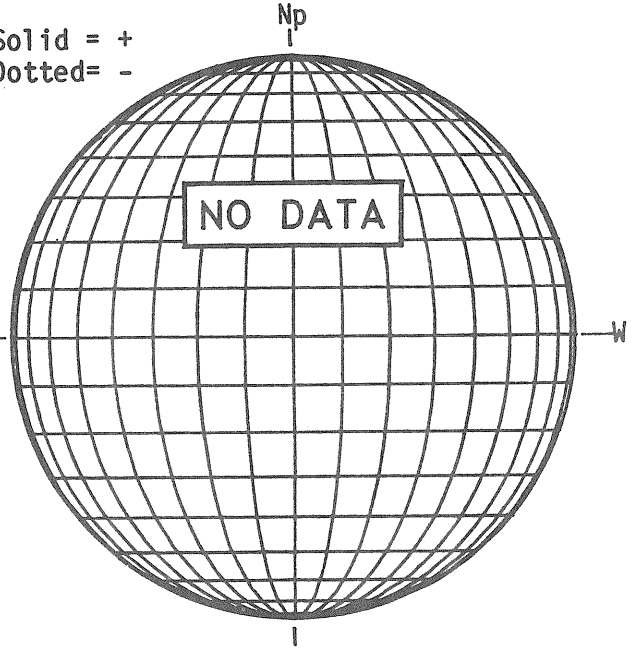
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

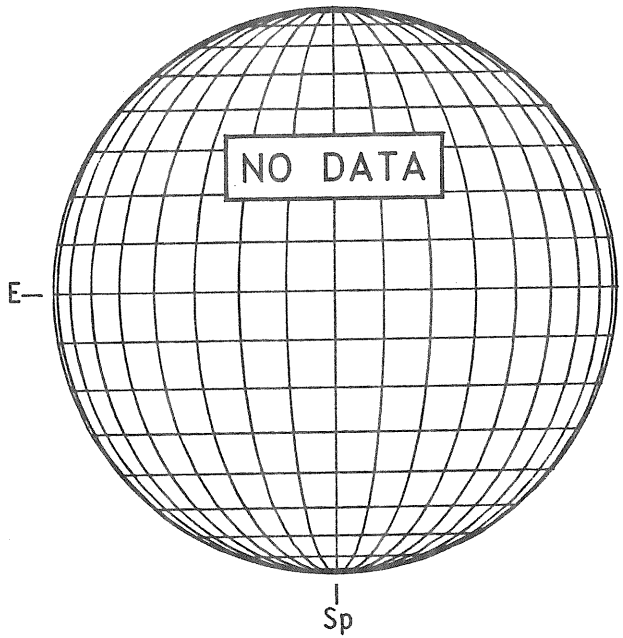


MT. WILSON MAGNETOGRAM

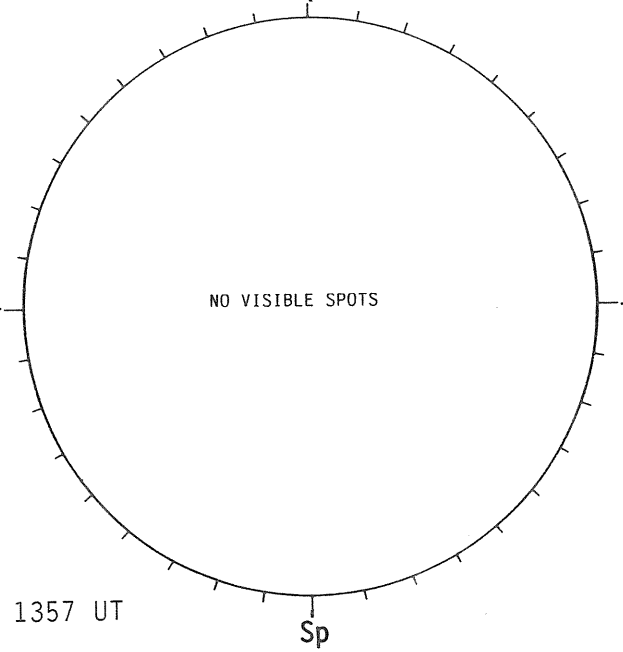
Solid = +
Dotted= -



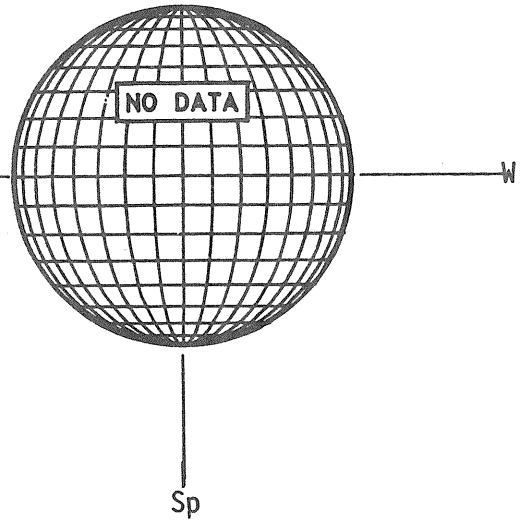
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS

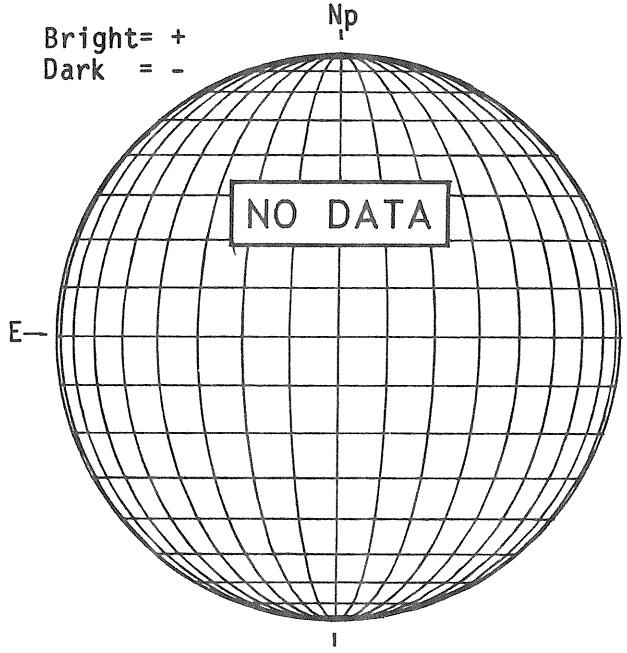


SACRAMENTO PEAK CORONA (1.15 Radii)

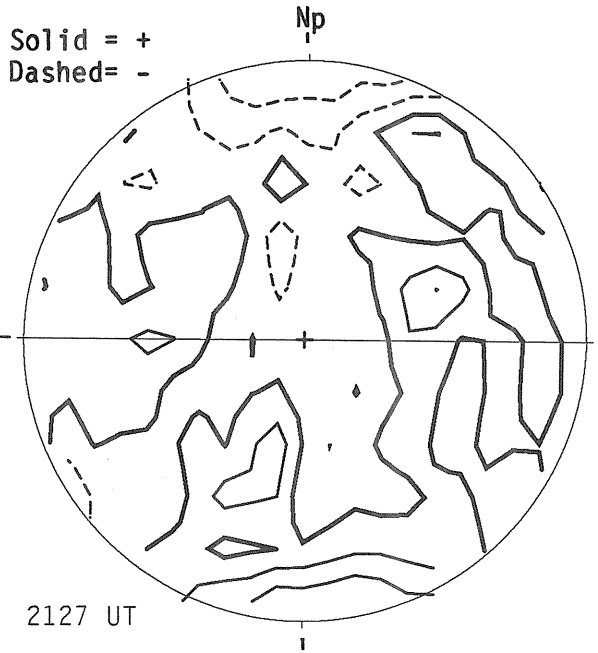


D E C E M B E R 07, 1 9 8 6 (P= 13.72, B_0= 0.17, L_0= 5.38)

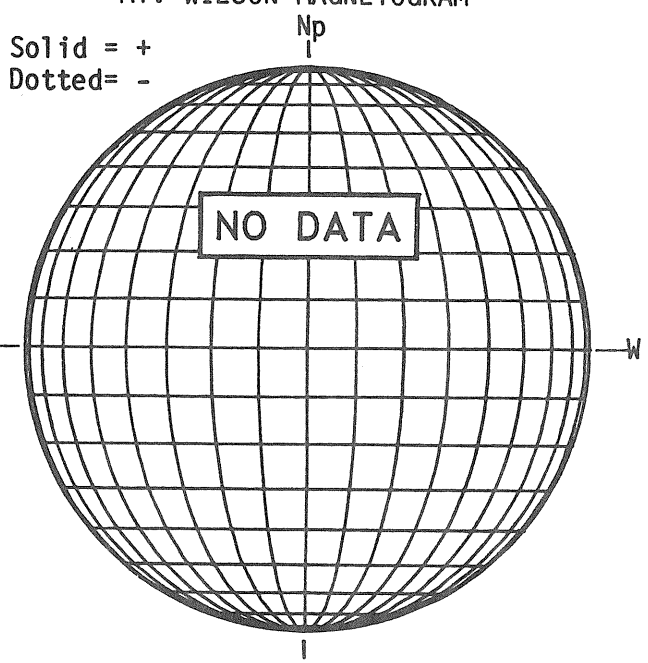
KITT PEAK MAGNETOGRAM



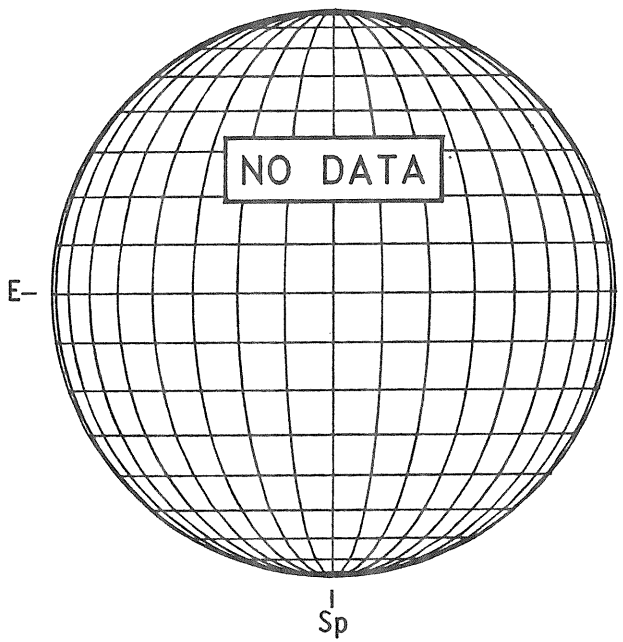
STANFORD MAGNETOGRAM



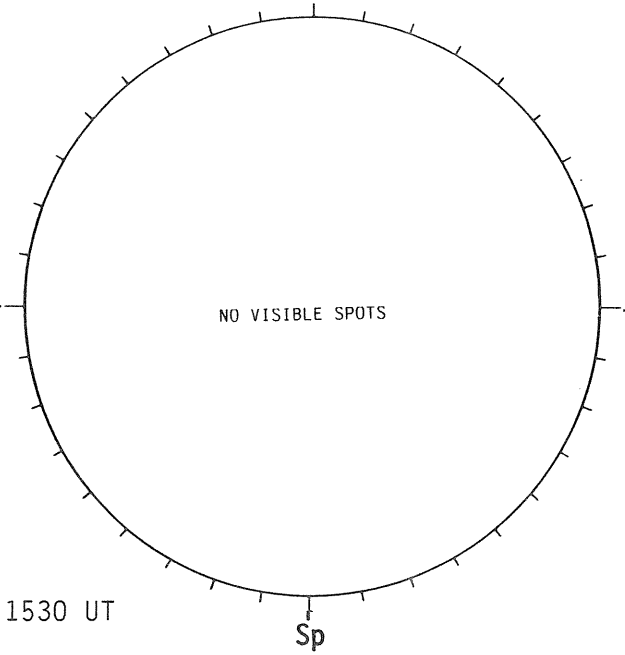
MT. WILSON MAGNETOGRAM



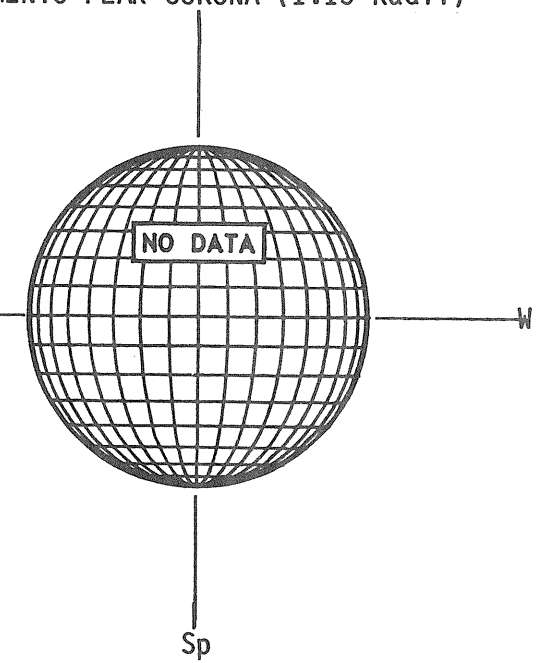
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



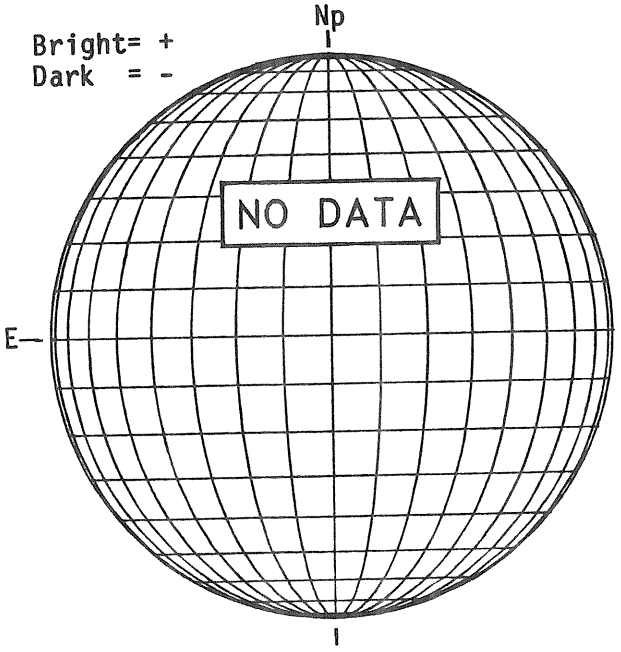
SACRAMENTO PEAK CORONA (1.15 Radii)



D E C E M B E R 08, 1 9 8 6 (P= 13.30, B_o= 0.04, L_o= 352.20)

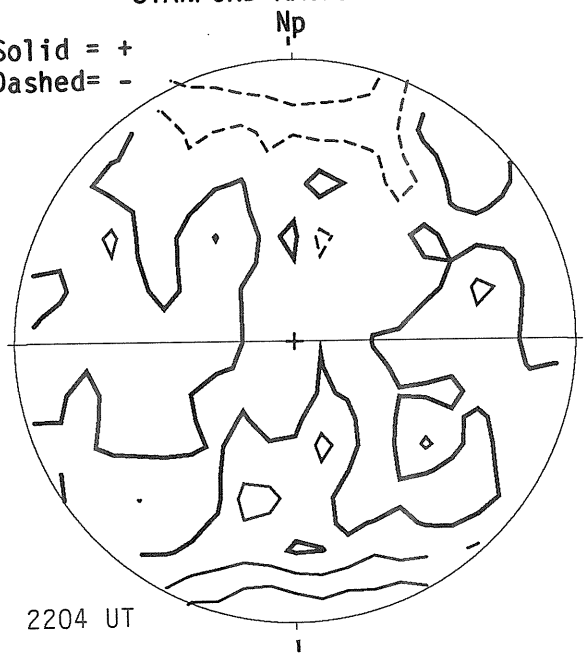
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



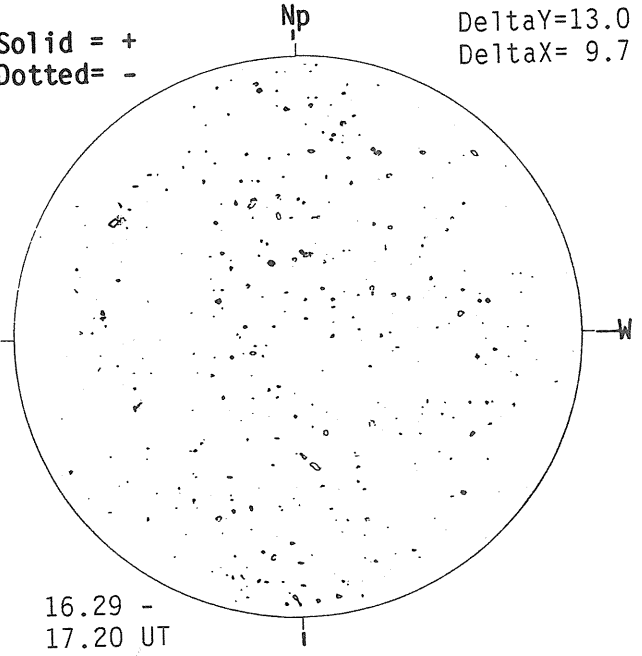
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

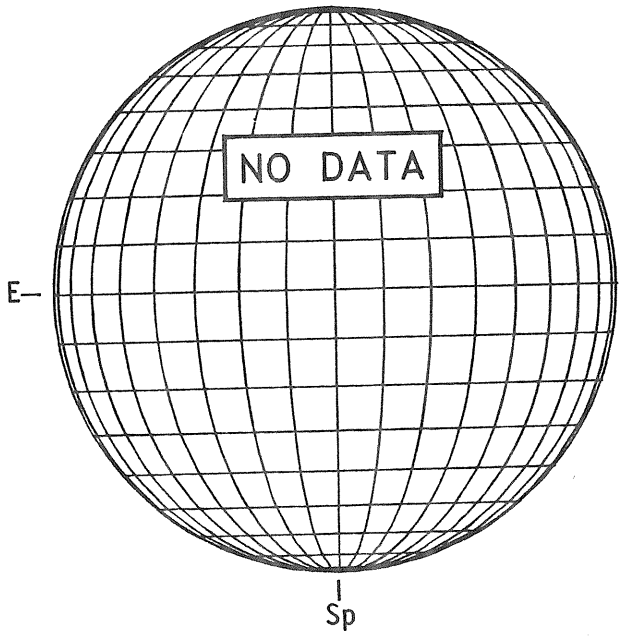


MT. WILSON MAGNETOGRAM

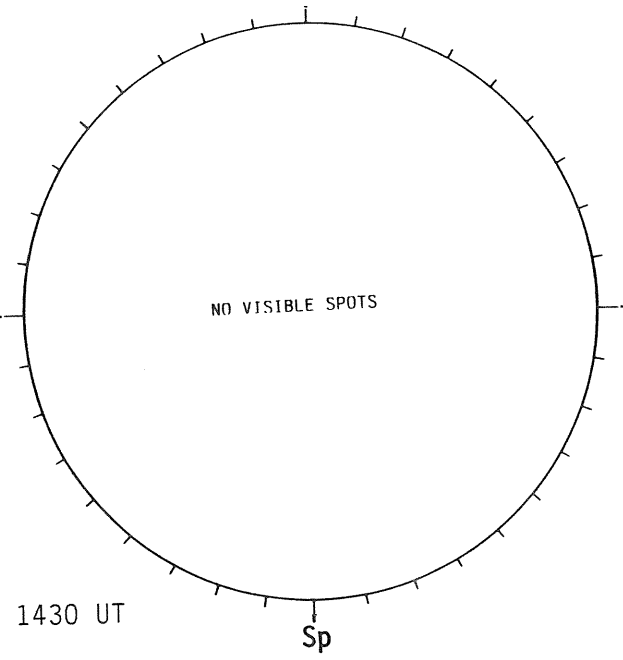
Solid = +
Dotted= -
DeltaY=13.0
DeltaX= 9.7



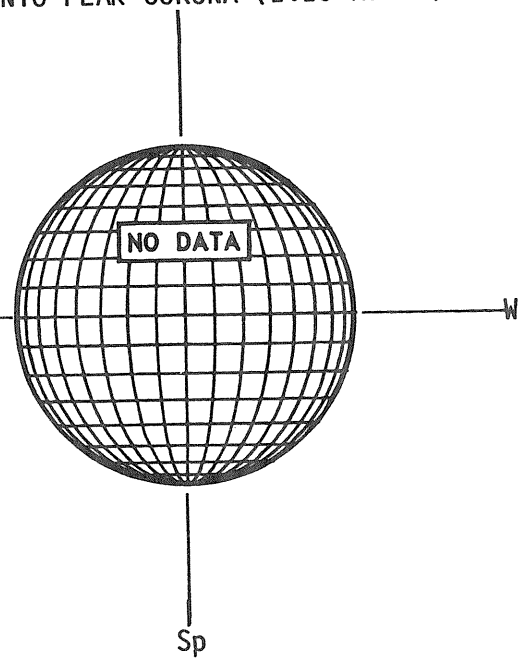
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



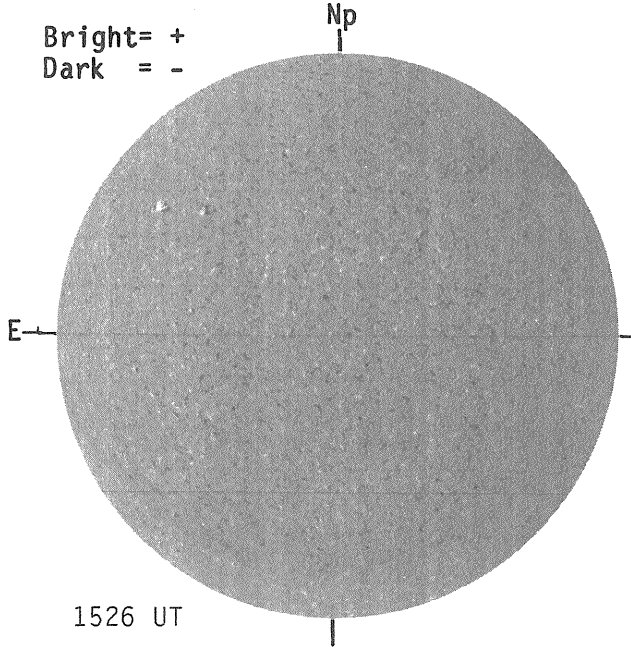
SACRAMENTO PEAK CORONA (1.15 Radii)



D E C E M B E R 09, 1 9 8 6 (P= 12.88, B_0=-0.09, L_0= 339.02)

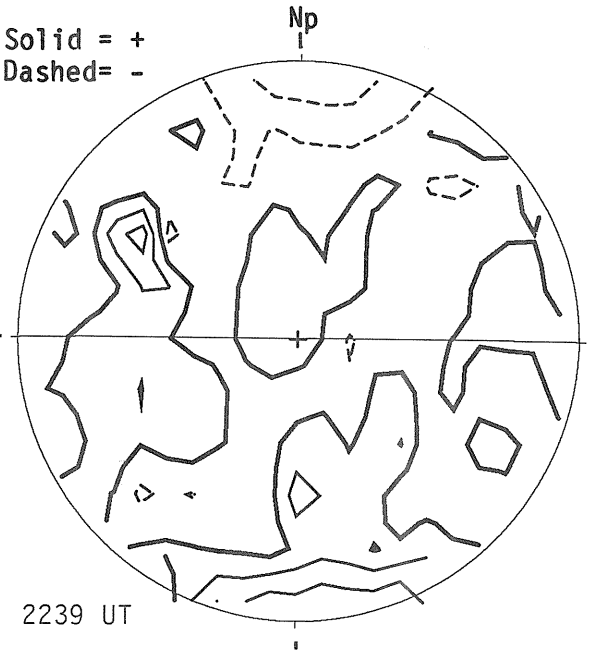
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

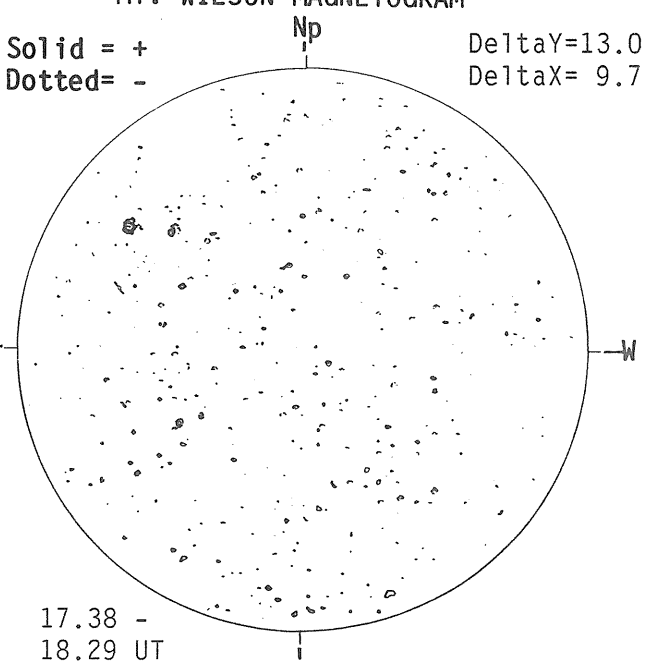
Solid = +
Dashed= -



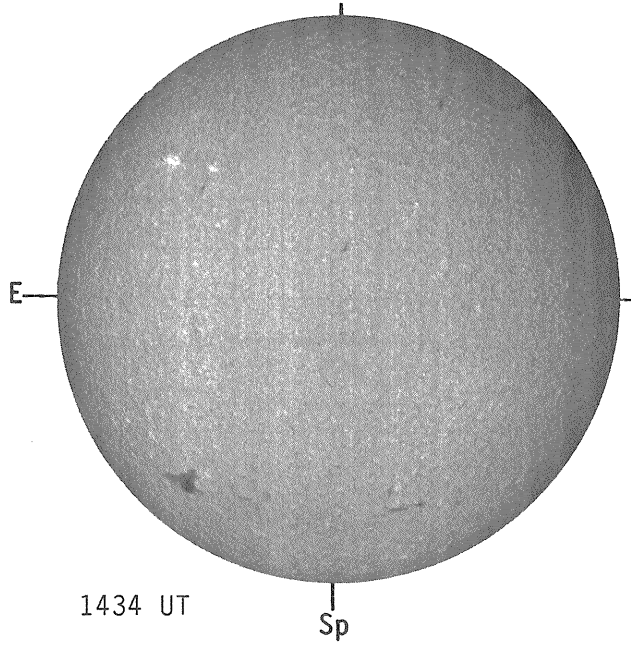
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

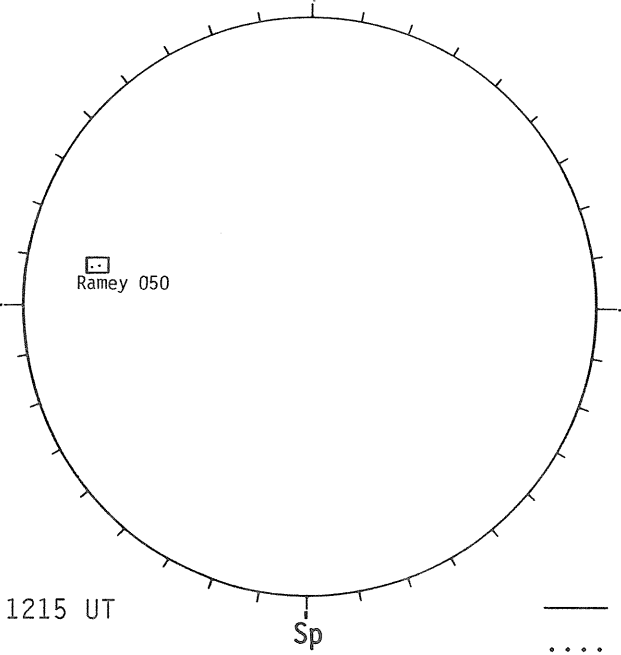
DeltaY=13.0
DeltaX= 9.7



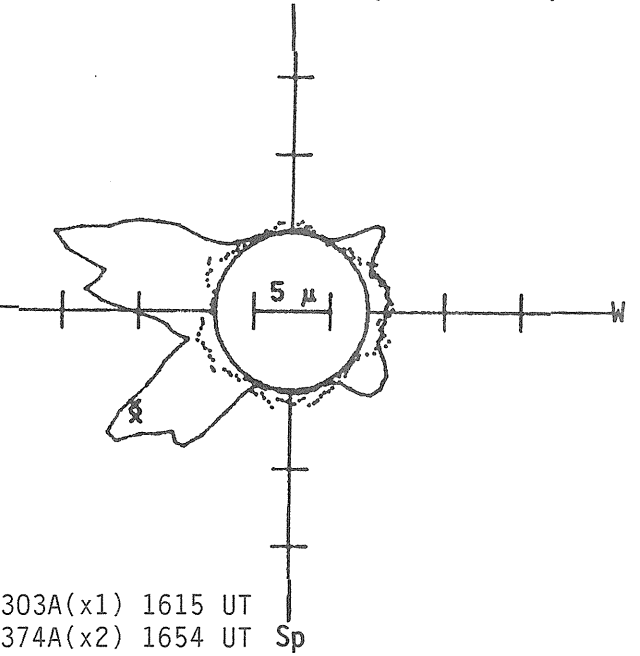
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

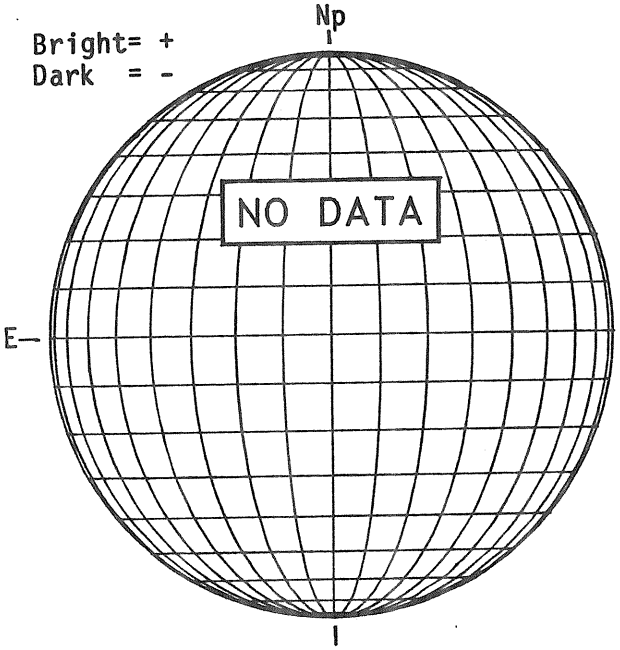


—— 5303A(x1) 1615 UT
.... 6374A(x2) 1654 UT
xxxx 5694A(x6) 1635 UT

D E C E M B E R 10, 1 9 8 6 (P= 12.45, B_0=-0.21, L_0= 325.85)

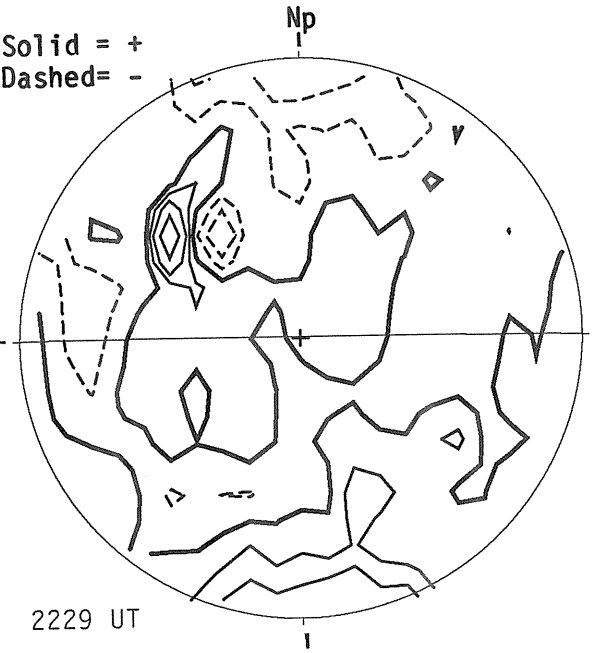
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

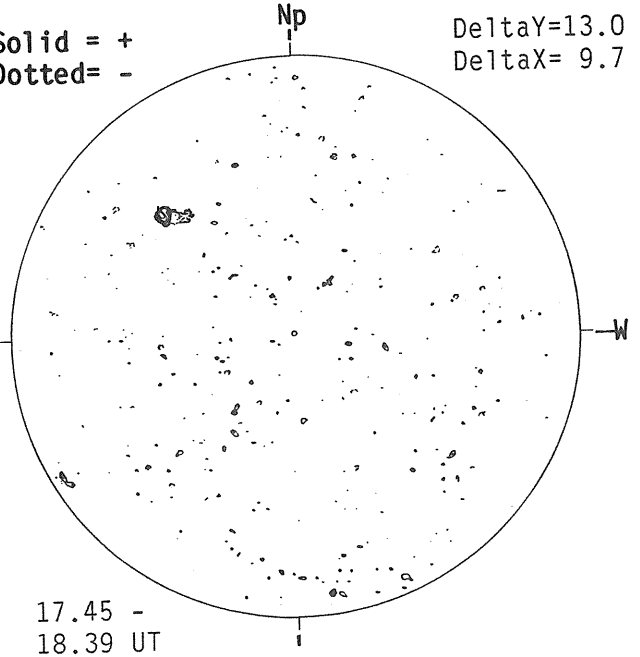
Solid = +
Dashed= -



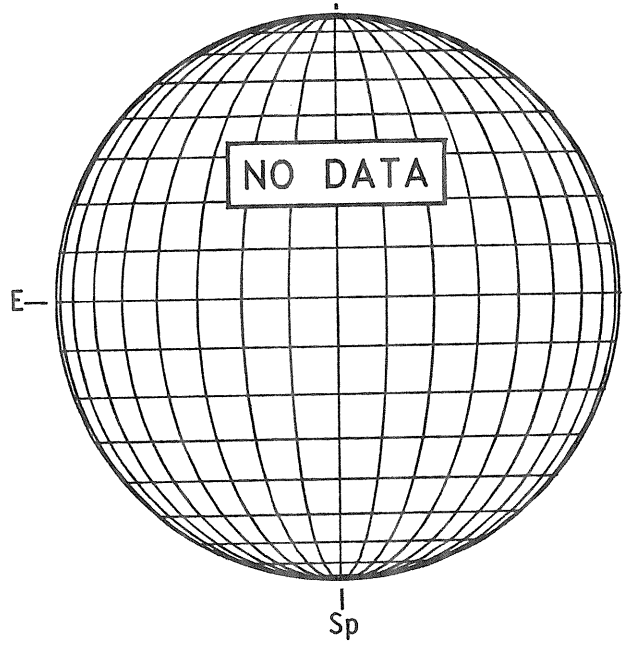
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

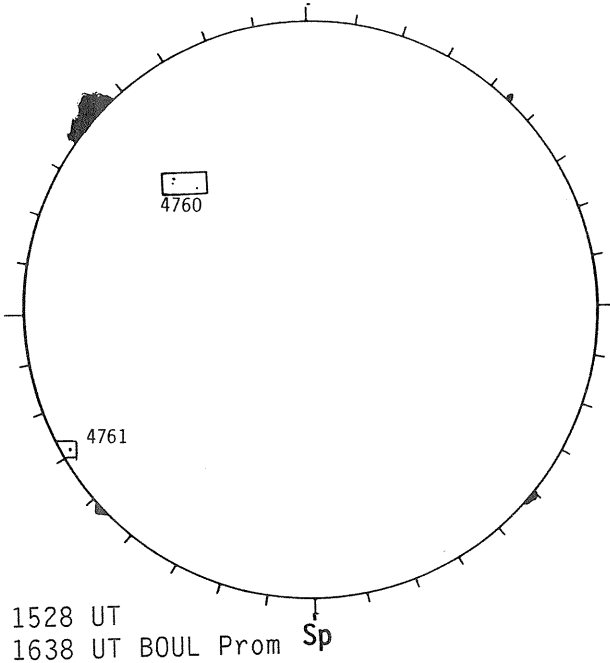
DeltaY=13.0
DeltaX= 9.7



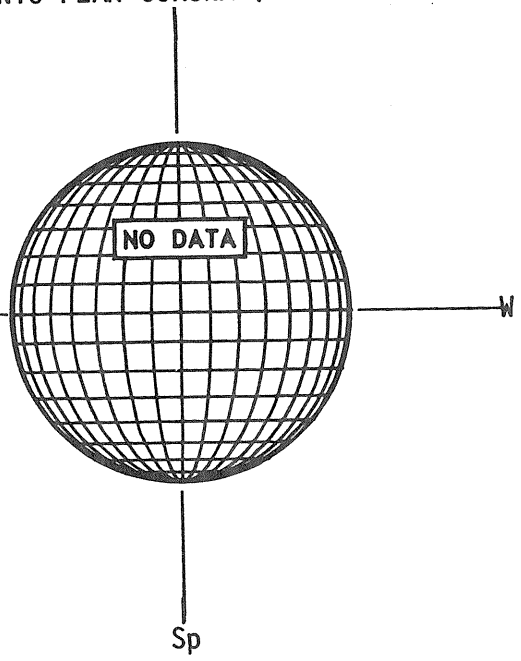
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



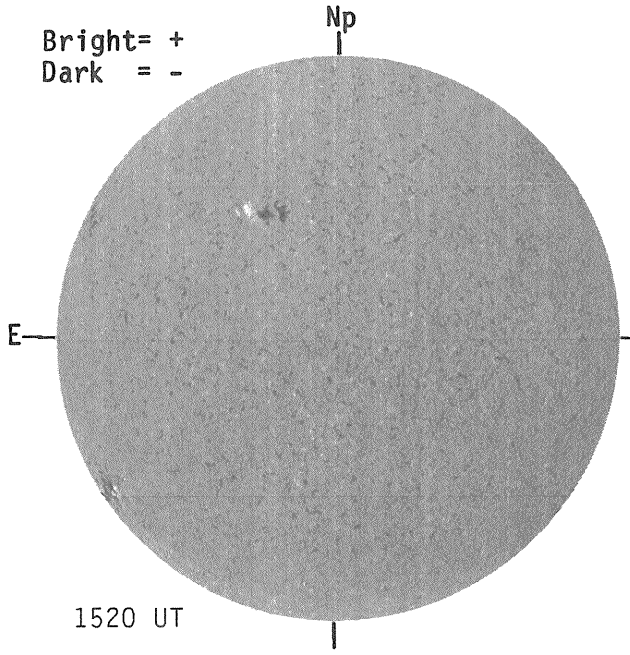
SACRAMENTO PEAK CORONA (1.15 Radii)



D E C E M B E R 11, 1 9 8 6 (P= 12.02, B_o=-0.34, L_o= 312.67)

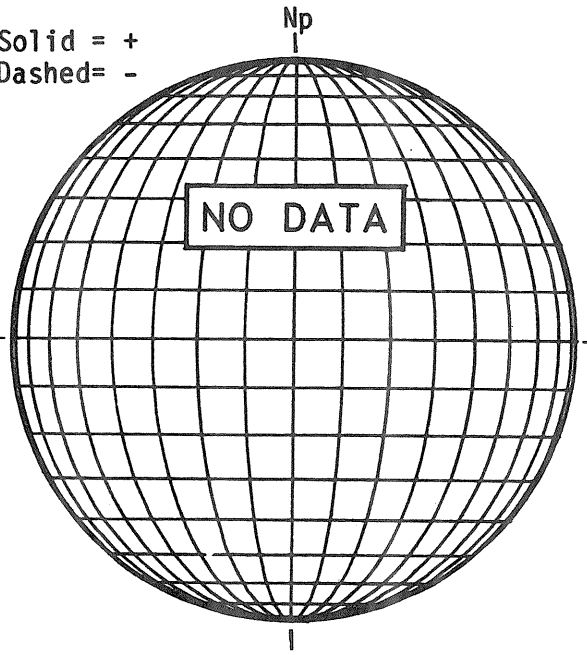
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



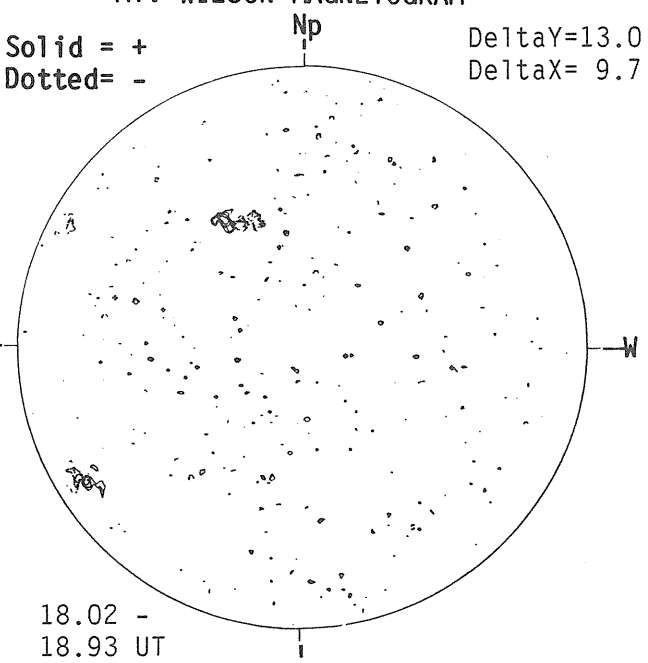
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

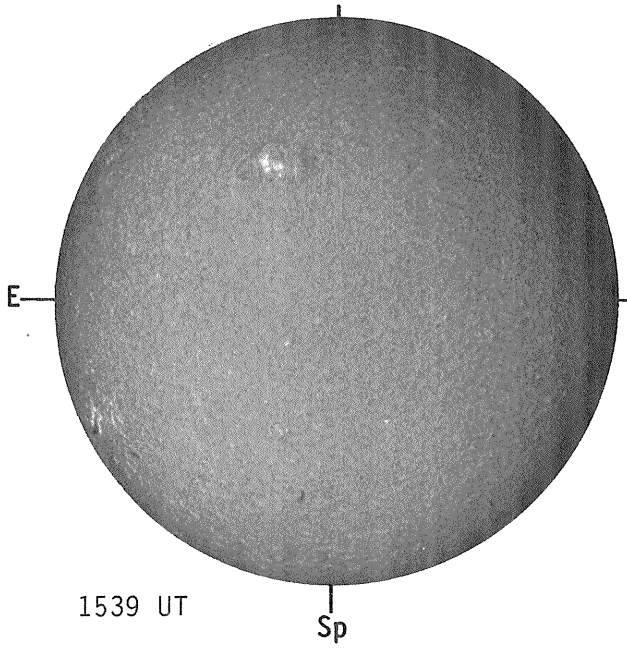


MT. WILSON MAGNETOGRAM

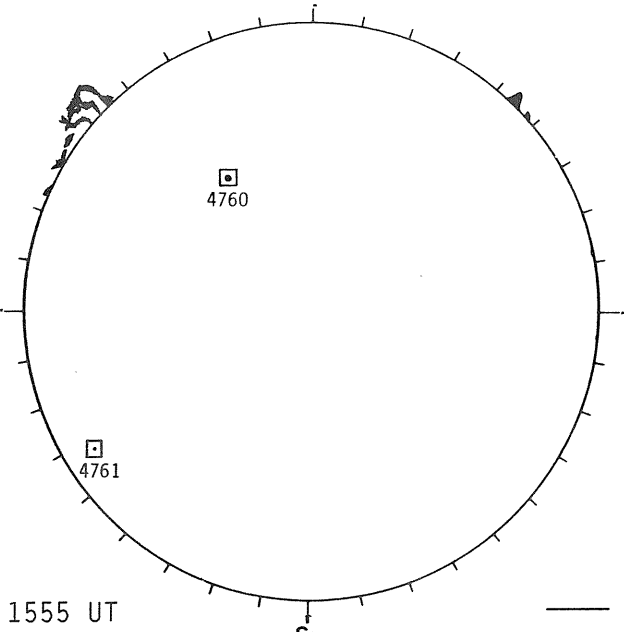
Solid = +
Dotted= -



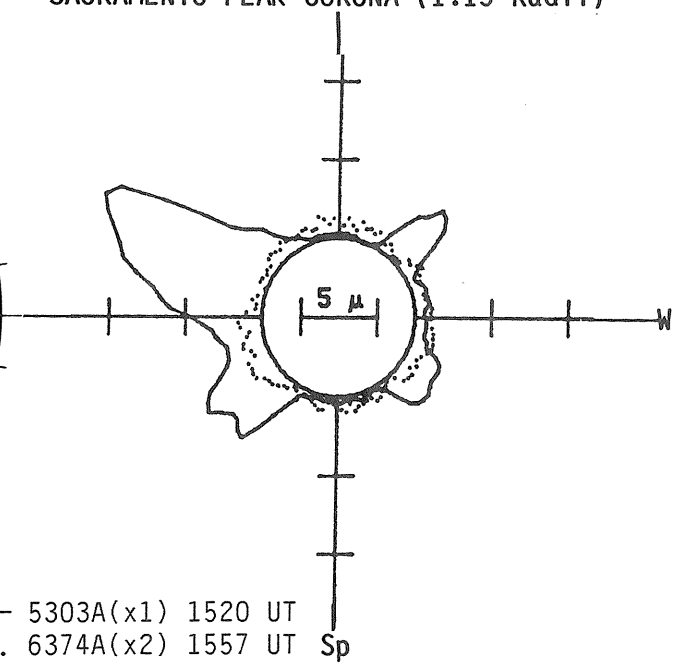
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

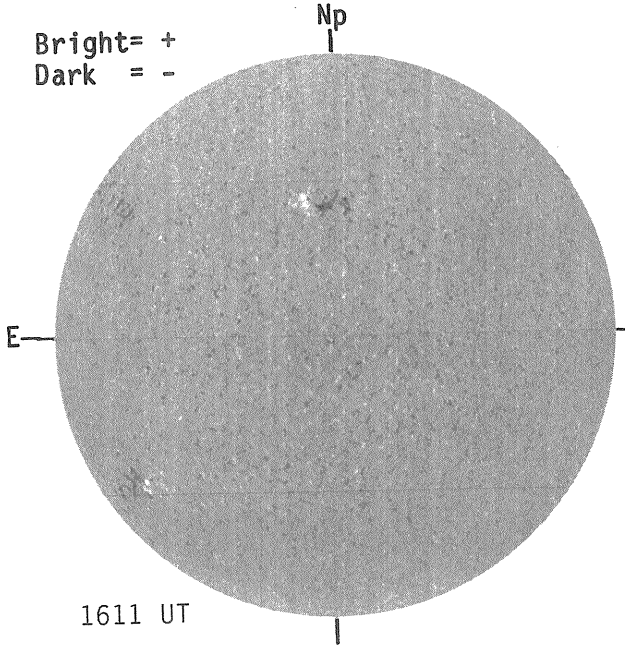


—— 5303A(x1) 1520 UT
.... 6374A(x2) 1557 UT
xxxx 5694A(x6) 1541 UT
NO 5694A ACTIVITY TODAY

D E C E M B E R 12, 1 9 8 6 (P= 11.58, B_o=-0.47, L_o= 299.49)

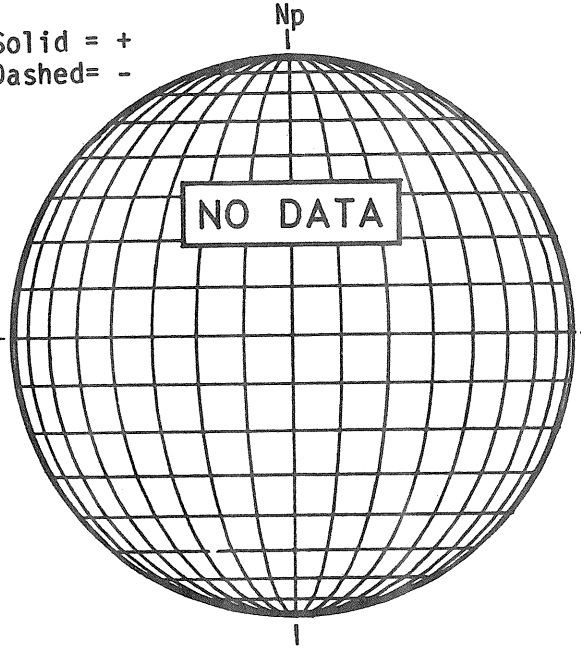
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

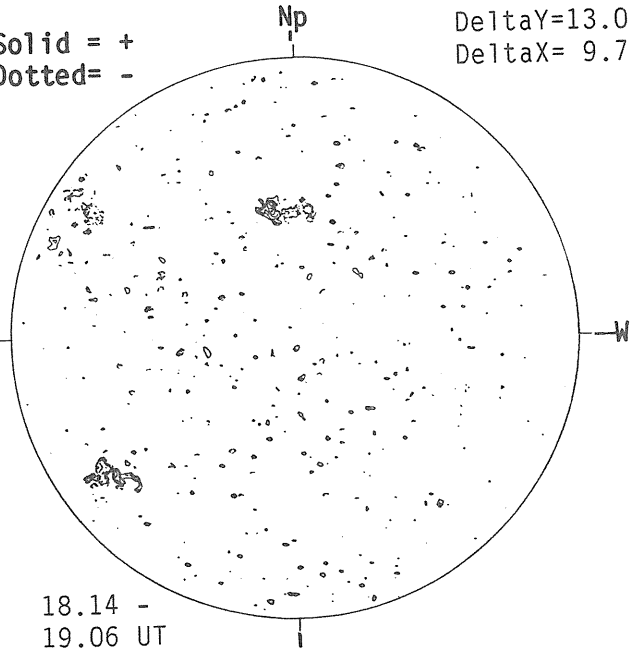
Solid = +
Dashed= -



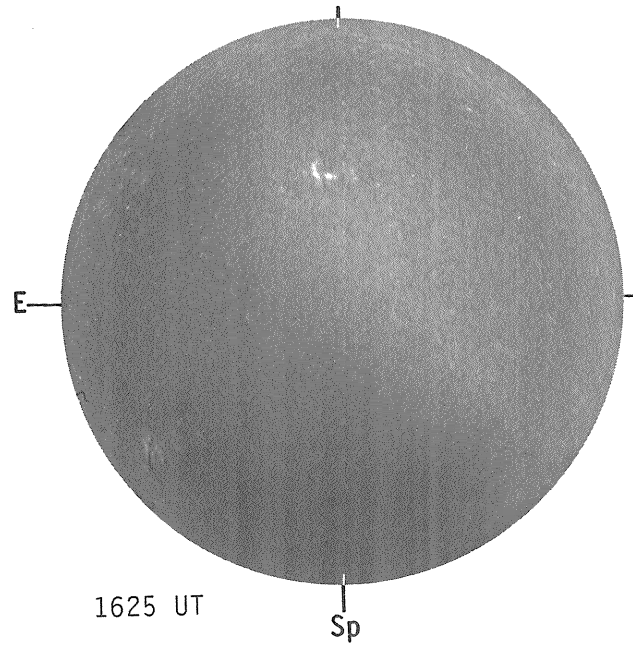
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

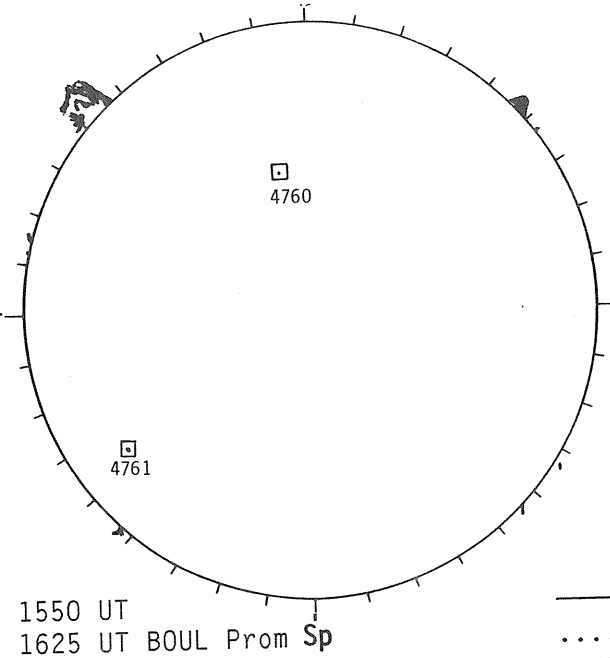
DeltaY=13.0
DeltaX= 9.7



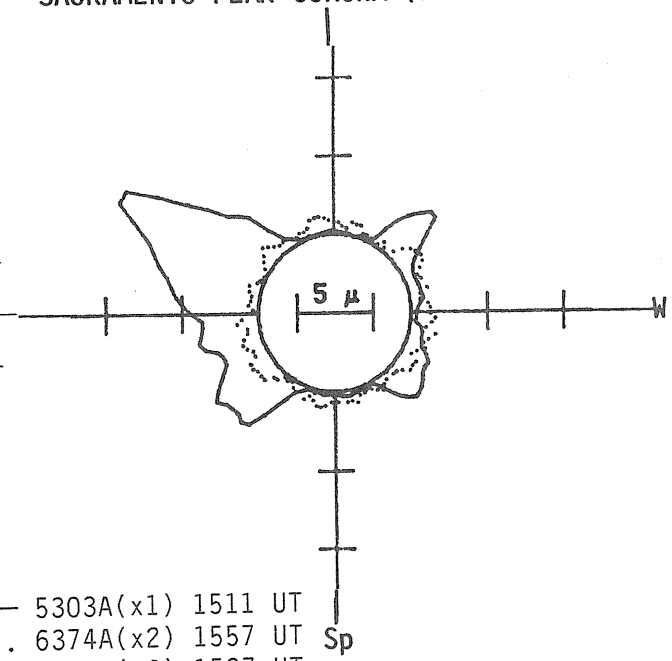
BOULDER H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

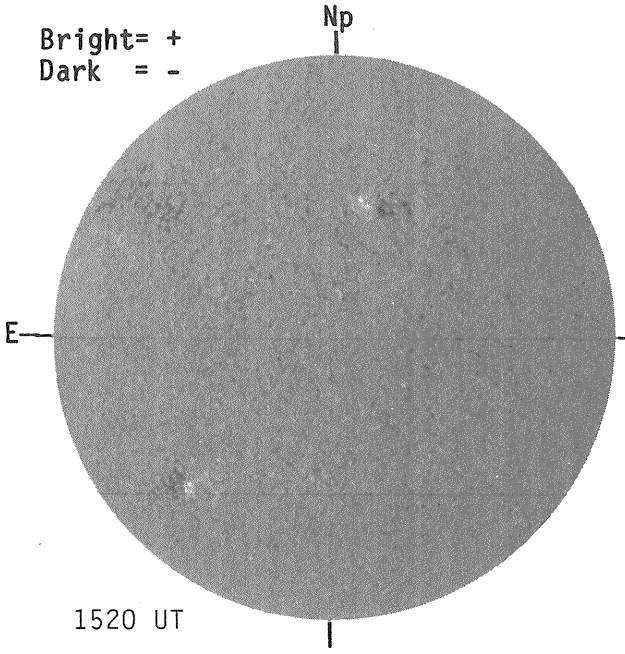


—— 5303A(x1) 1511 UT
.... 6374A(x2) 1557 UT
xxxx 5694A(x6) 1537 UT
NO 5694A ACTIVITY TODAY

D E C E M B E R 13, 1 9 8 6 (P= 11.14, B_0=-0.59, L_0= 286.32)

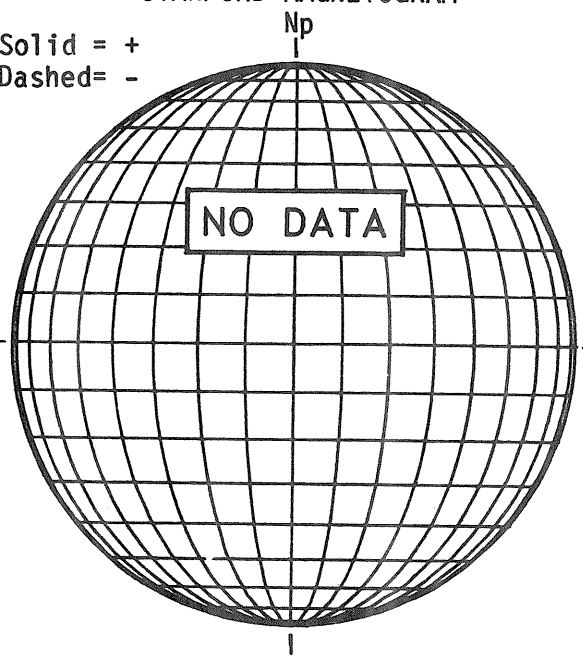
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



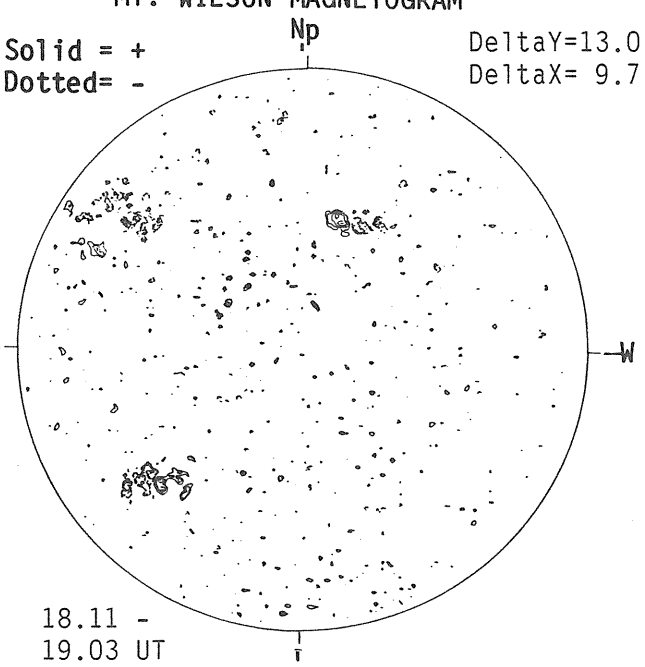
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

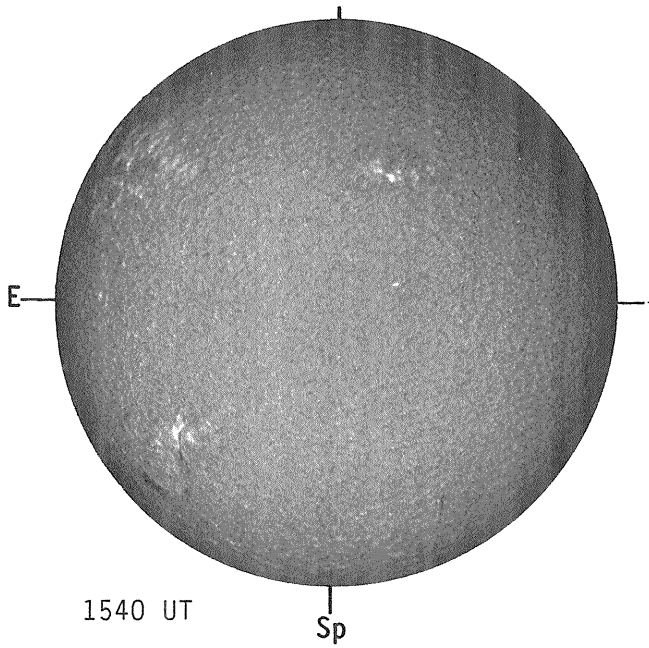


MT. WILSON MAGNETOGRAM

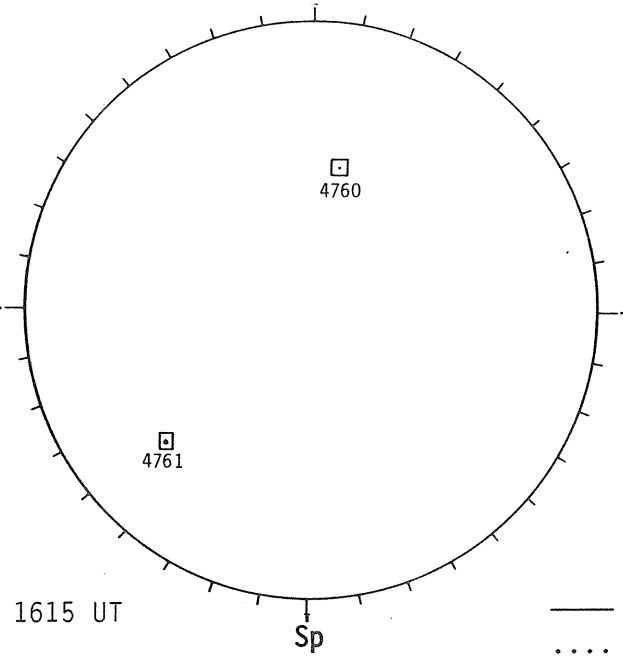
Solid = +
Dotted= -



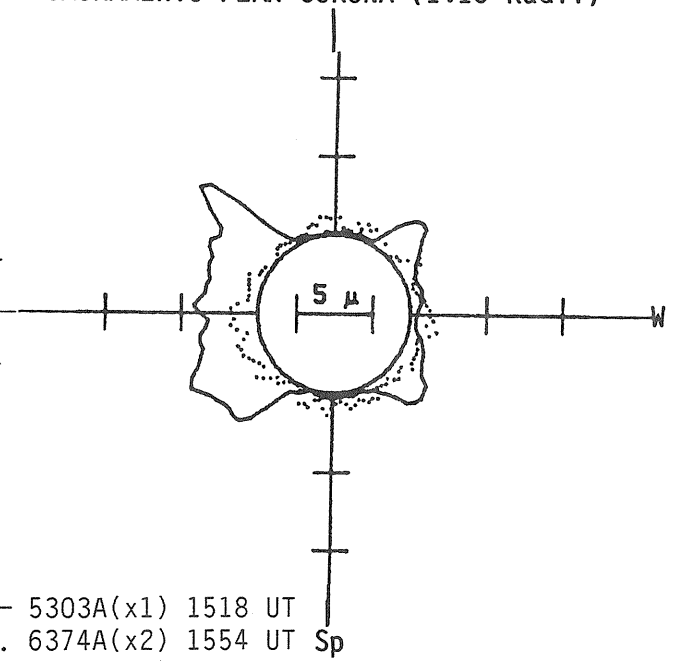
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

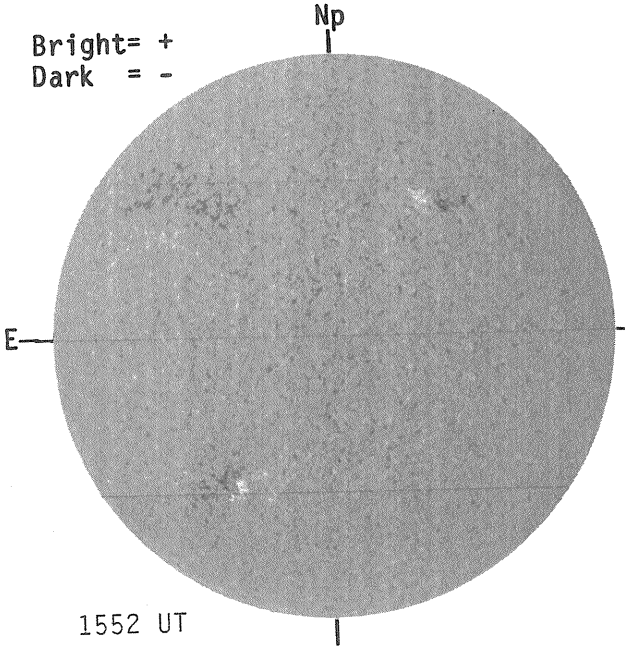


—— 5303A(x1) 1518 UT
.... 6374A(x2) 1554 UT
xxxx 5694A(x6) 1539 UT
NO 5694A ACTIVITY TODAY

D E C E M B E R 14, 1 9 8 6 (P= 10.69, B_o=-0.72, L_o= 273.14)

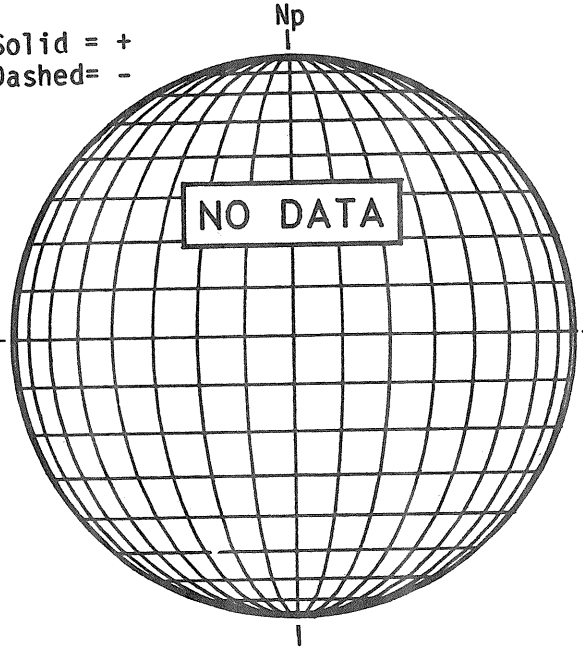
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



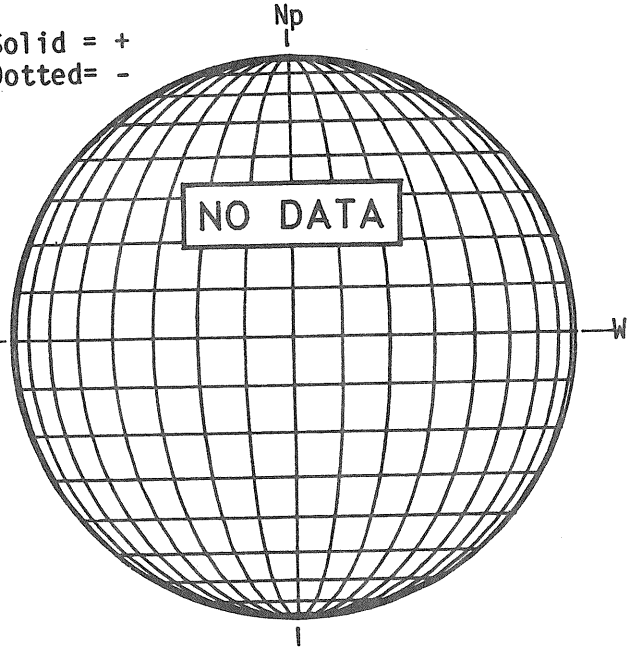
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

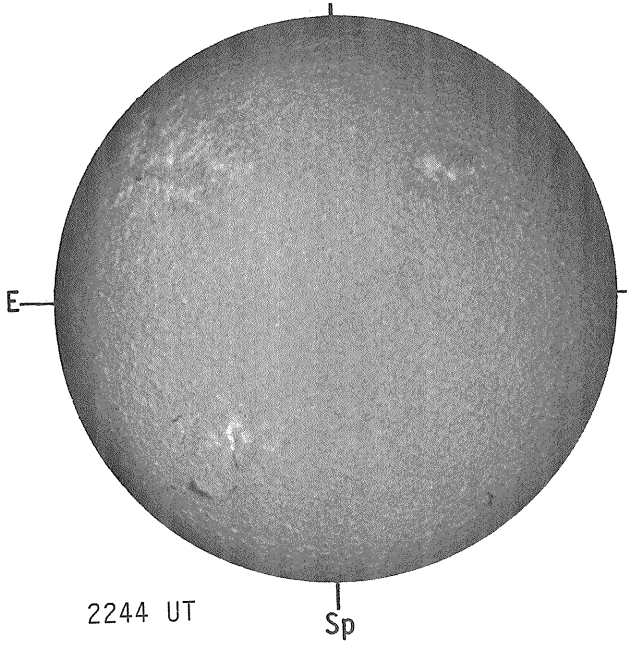


MT. WILSON MAGNETOGRAM

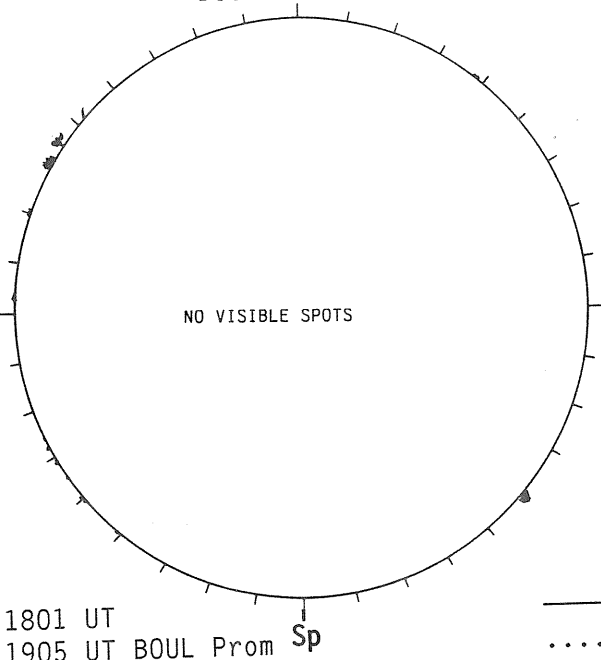
Solid = +
Dotted= -



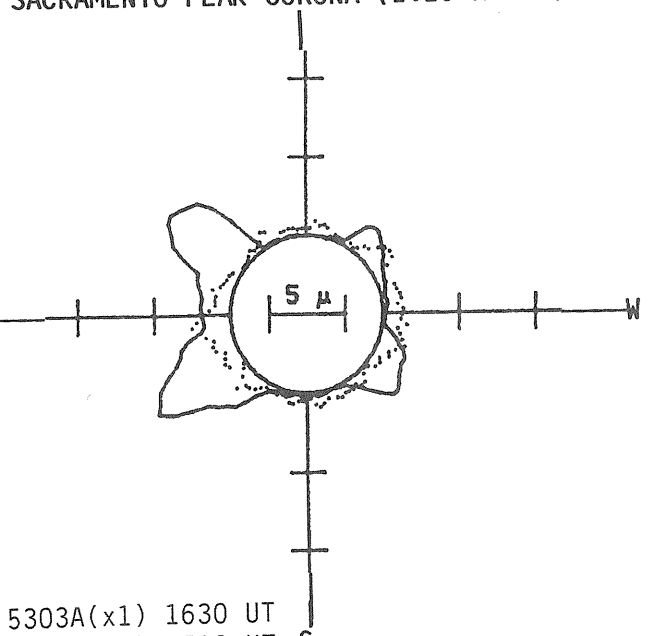
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

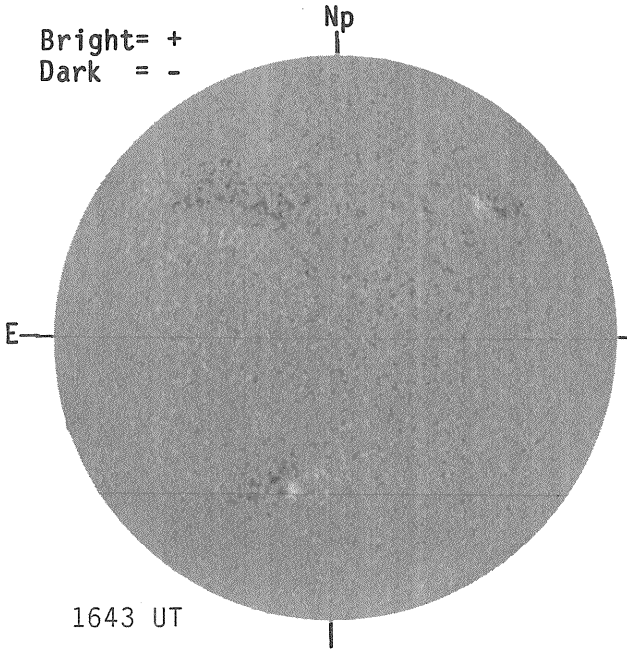


—— 5303A(x1) 1630 UT
.... 6374A(x2) 1713 UT
xxxx 5694A(x6) 1653 UT
NO 5694A ACTIVITY TODAY

D E C E M B E R 15, 1 9 8 6 (P= 10.25, B_o=-0.84, L_o= 259.97)

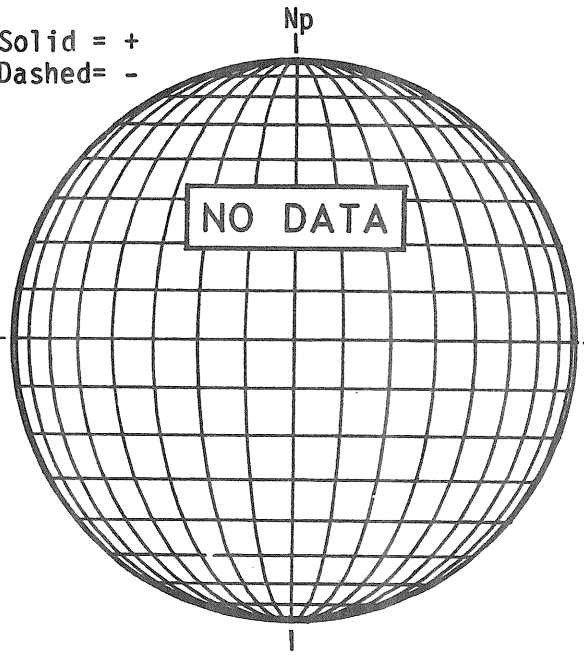
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

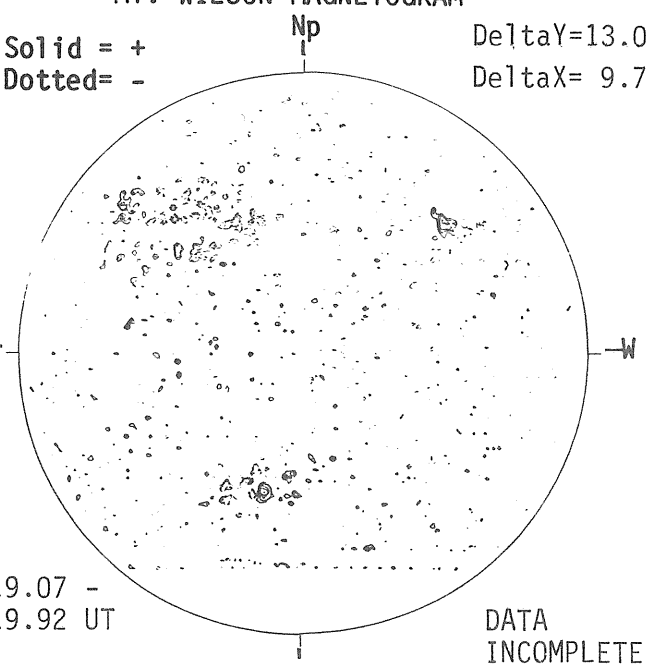
Solid = +
Dashed= -



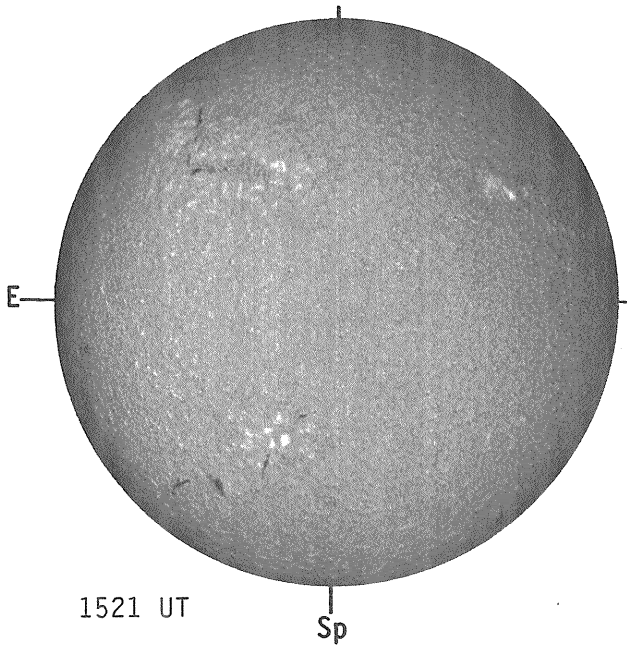
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

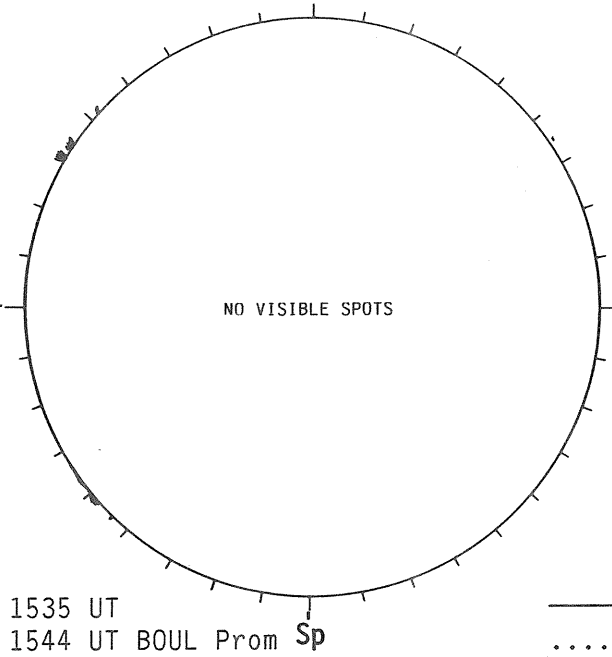
DeltaY=13.0
DeltaX= 9.7



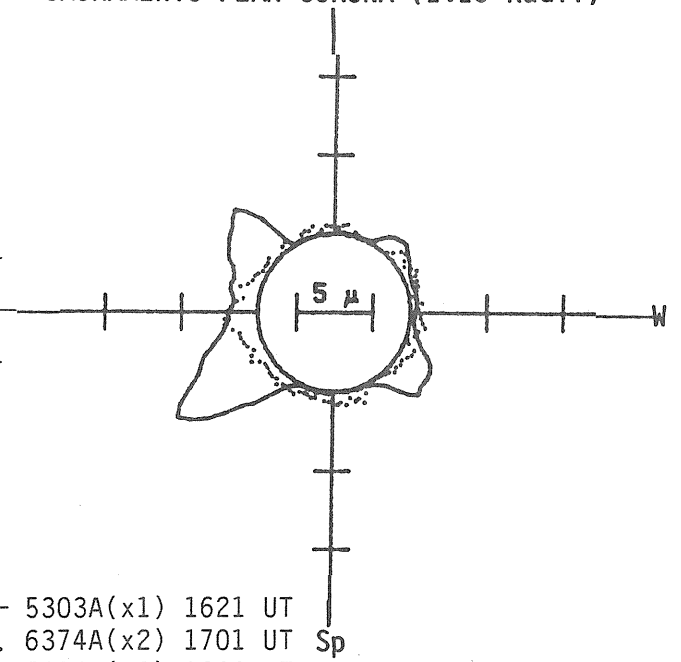
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS

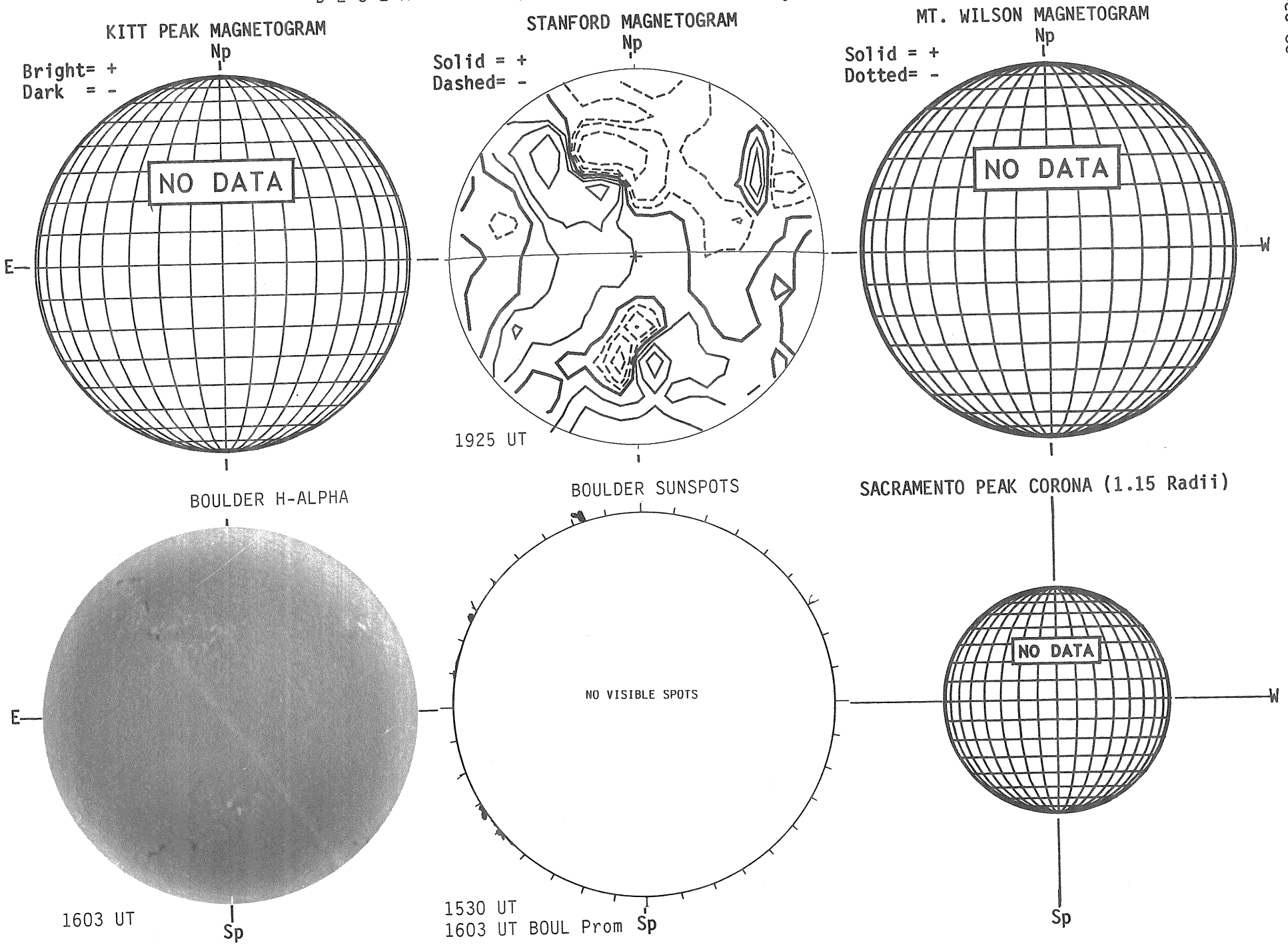


SACRAMENTO PEAK CORONA (1.15 Radii)



—— 5303A(x1) 1621 UT
.... 6374A(x2) 1701 UT
xxxx 5694A(x6) 1644 UT
NO 5694A ACTIVITY TODAY

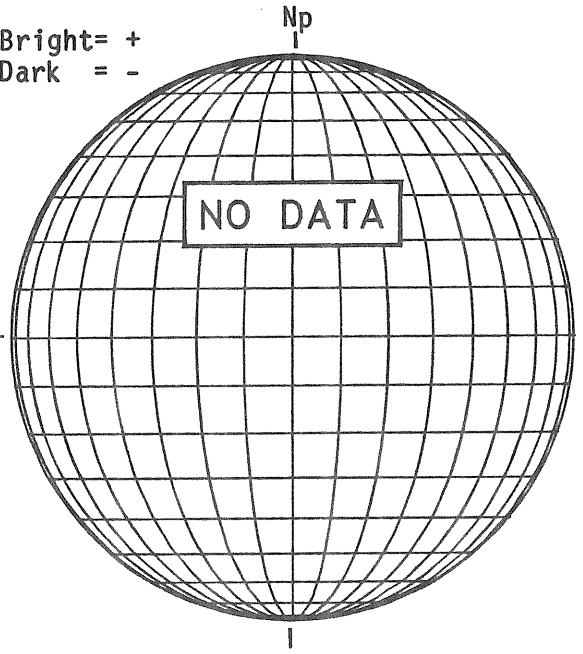
D E C E M B E R 16, 1 9 8 6 (P= 9.79, B_o=-0.97, L_o= 246.79)



D E C E M B E R 17, 1 9 8 6 (P= 9.34, B_o=-1.09, L_o= 233.62)

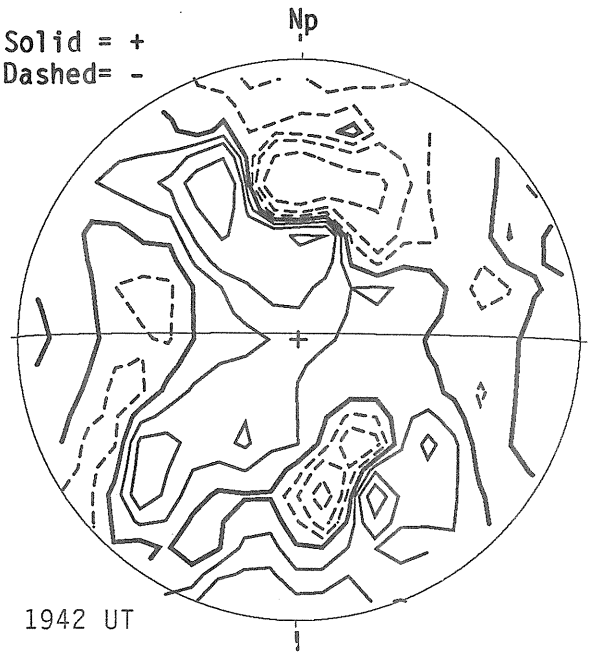
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

Solid = +
Dashed= -

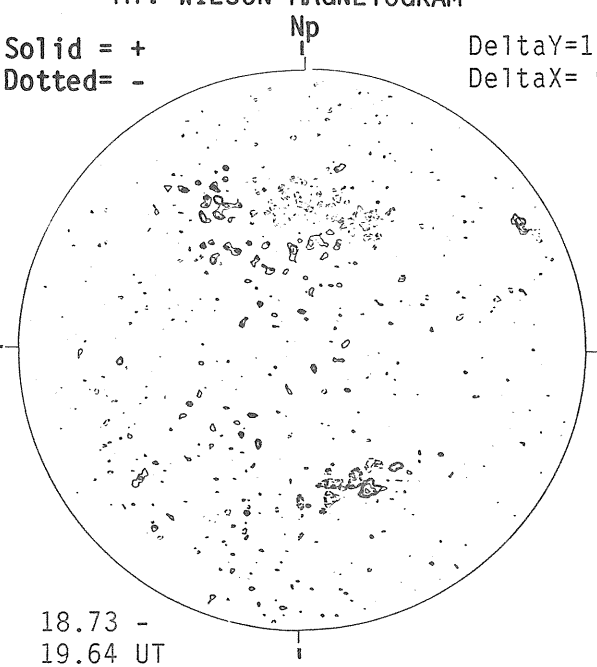


1942 UT

MT. WILSON MAGNETOGRAM

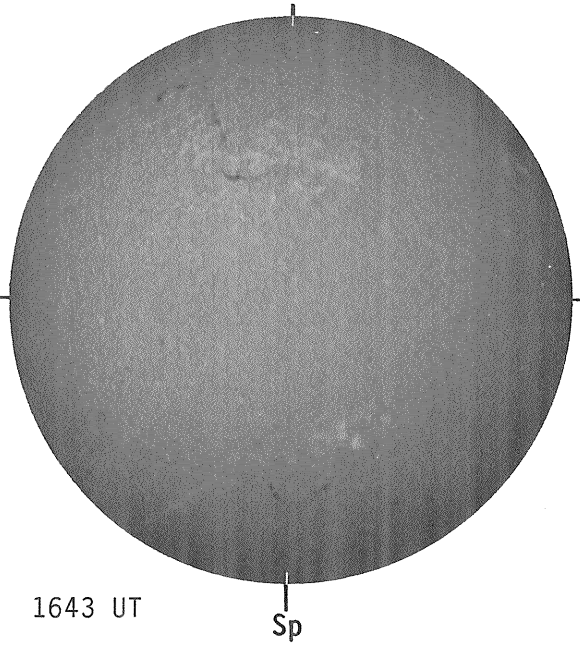
Solid = +
Dotted= -

DeltaY=13.0
DeltaX= 9.7



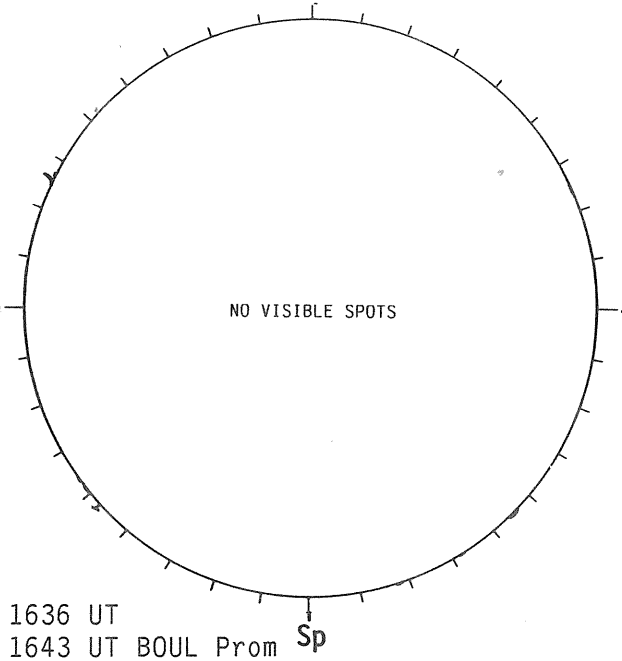
18.73 -
19.64 UT

BOULDER H-ALPHA



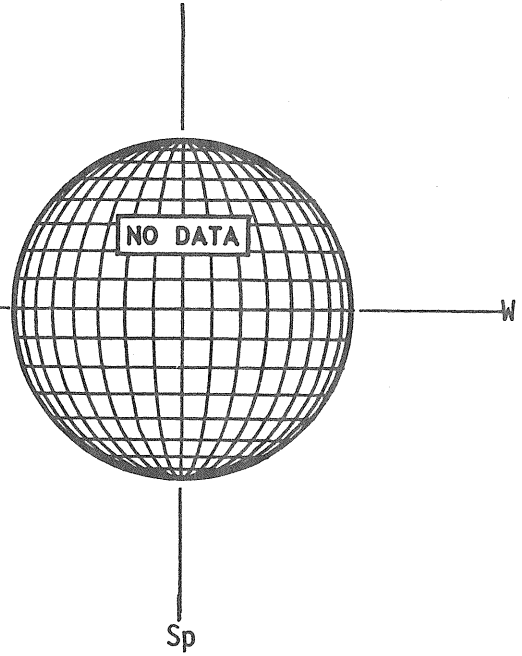
1643 UT

BOULDER SUNSPOTS



1636 UT
1643 UT BOUL Prom

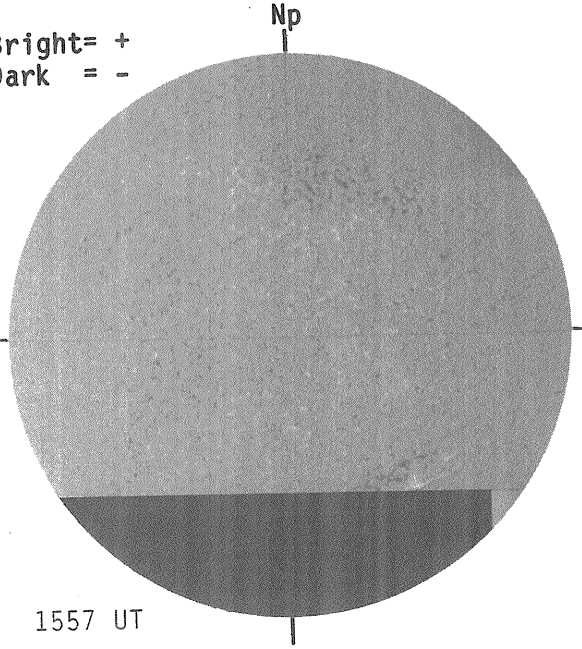
SACRAMENTO PEAK CORONA (1.15 Radii)



D E C E M B E R 18, 1 9 8 6 (P= 8.88, B_o=-1.22, L_o= 220.44)

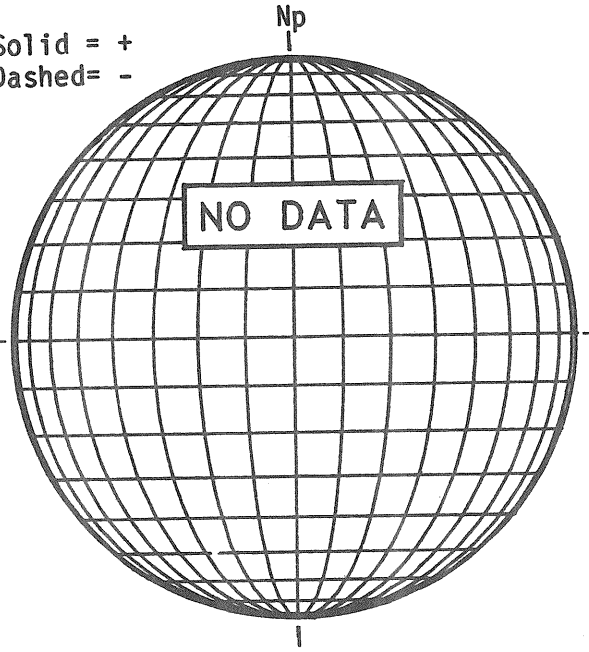
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



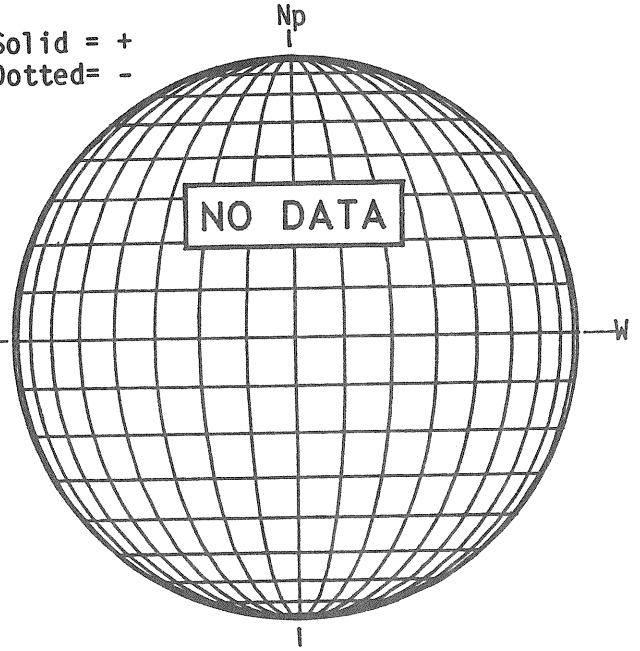
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

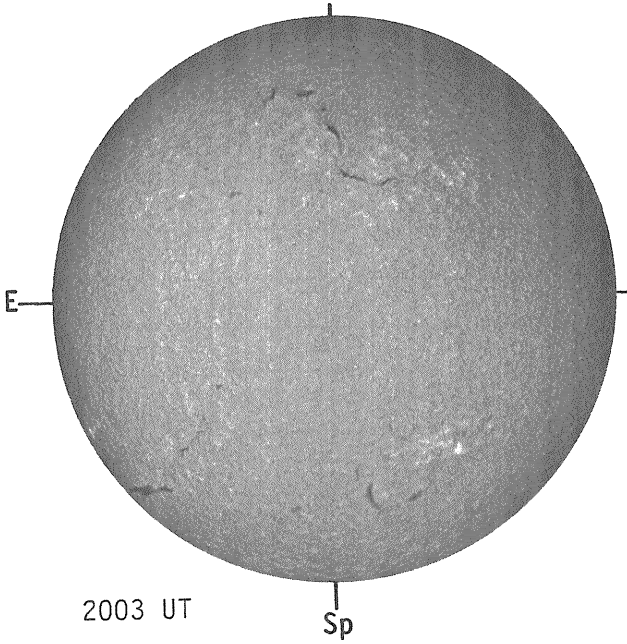


MT. WILSON MAGNETOGRAM

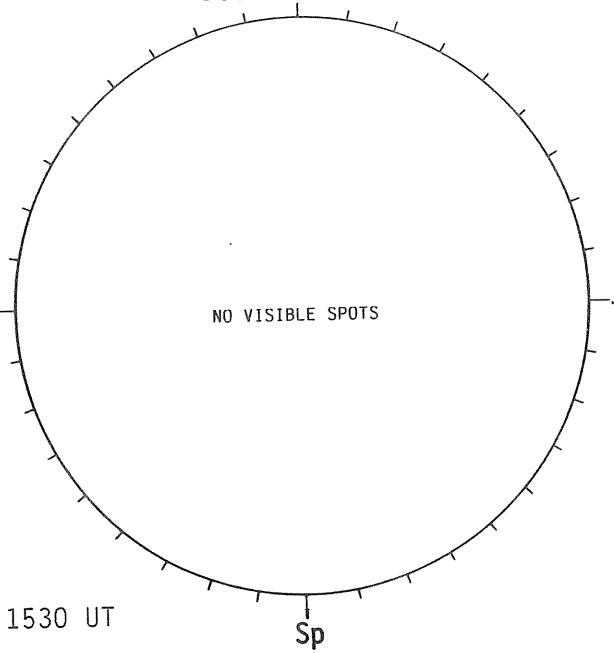
Solid = +
Dotted= -



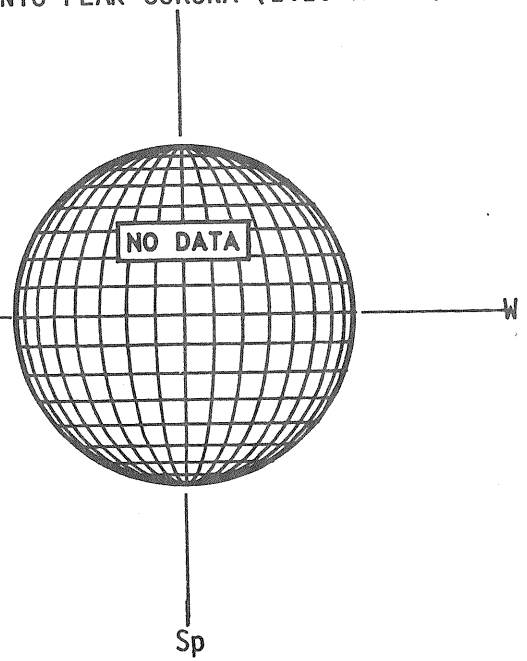
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



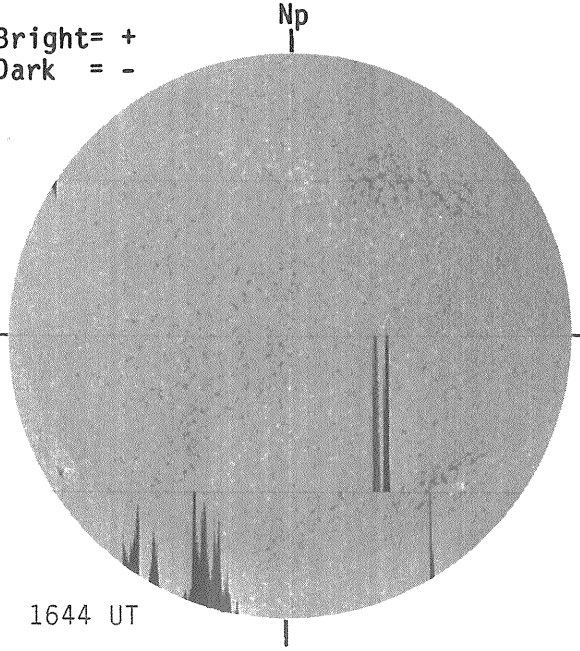
SACRAMENTO PEAK CORONA (1.15 Radii)



D E C E M B E R 19, 1 9 8 6 (P= 8.41, B_0=-1.34, L_0= 207.27)

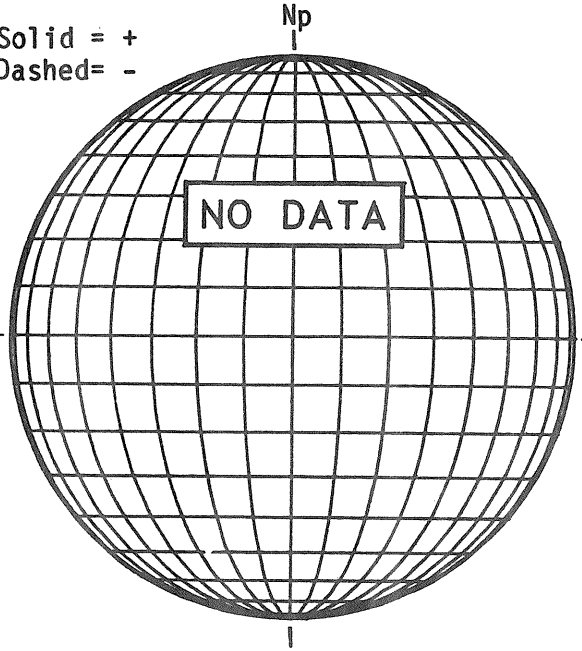
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



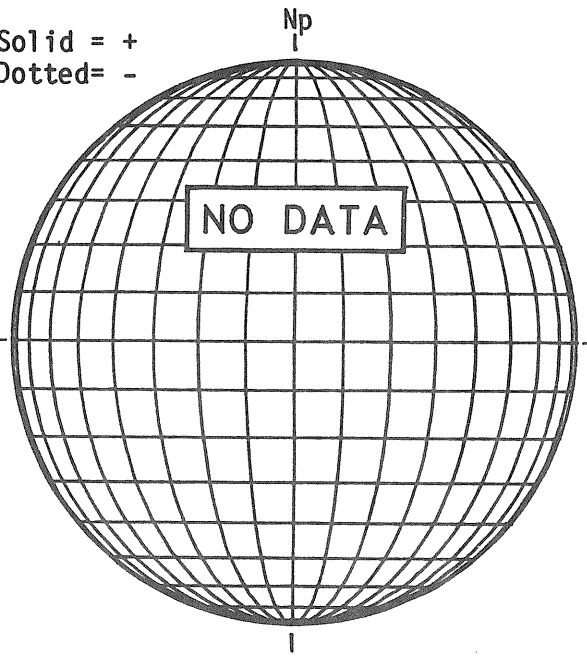
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

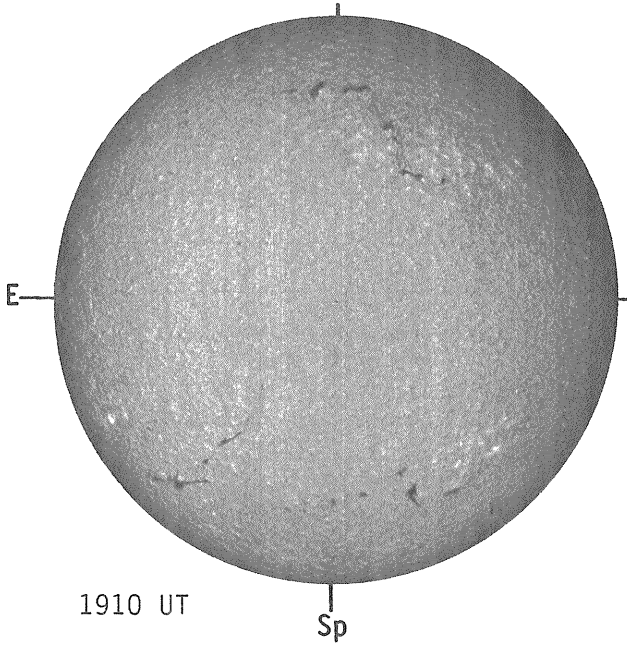


MT. WILSON MAGNETOGRAM

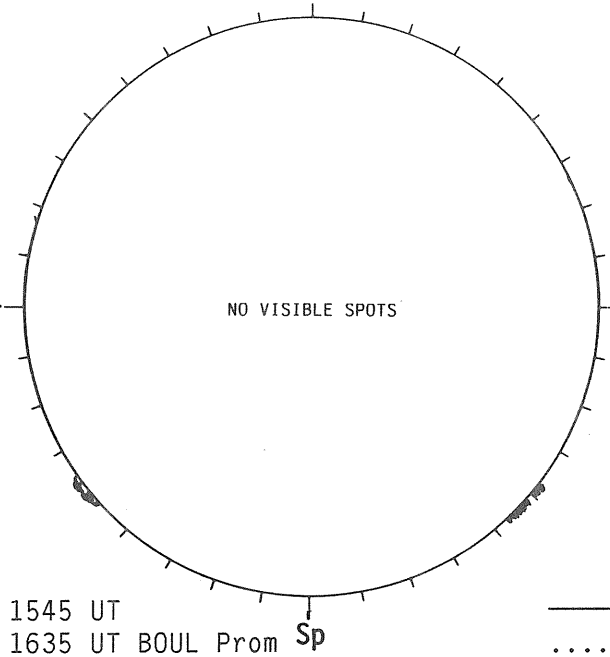
Solid = +
Dotted= -



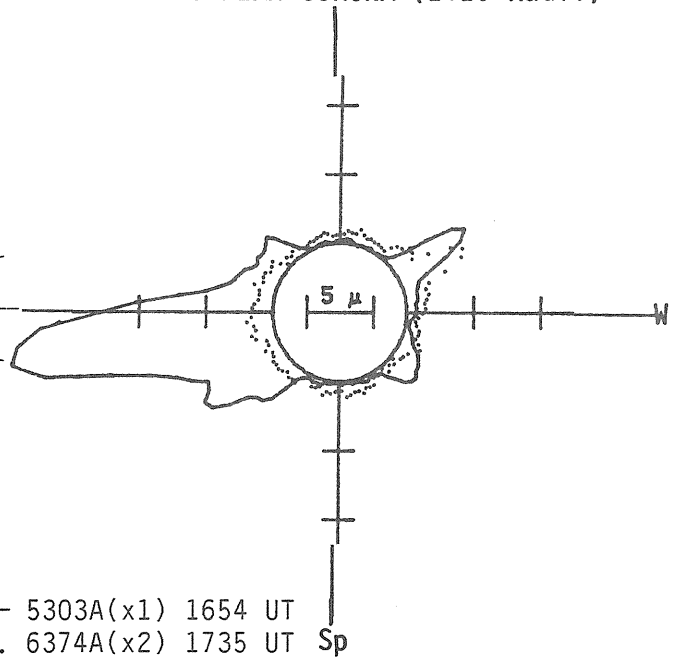
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



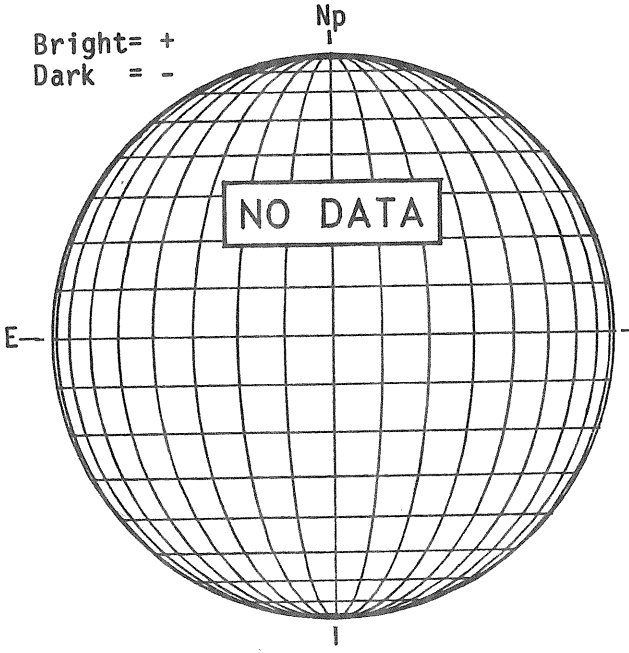
SACRAMENTO PEAK CORONA (1.15 Radii)



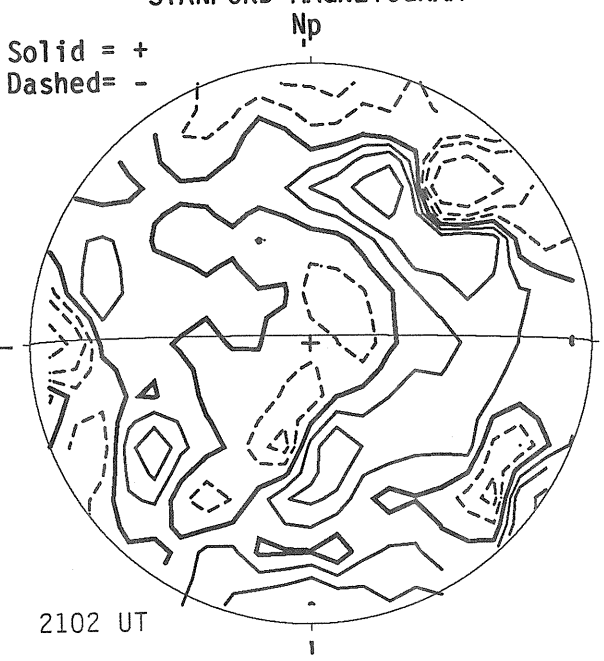
—— 5303A(x1) 1654 UT
.... 6374A(x2) 1735 UT
xxxx 5694A(x6) 1719 UT
NO 5694A ACTIVITY TODAY

D E C E M B E R 20, 1 9 8 6 (P= 7.95, B_0=-1.47, L_0= 194.10)

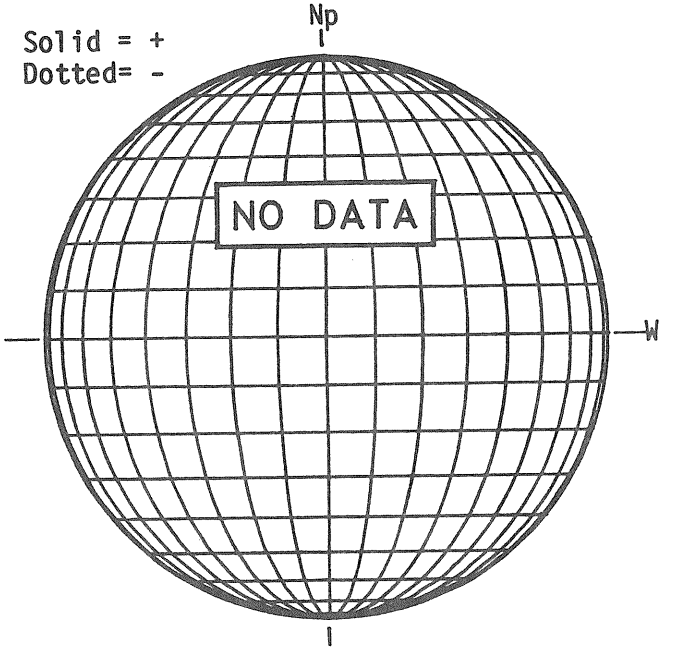
KITT PEAK MAGNETOGRAM



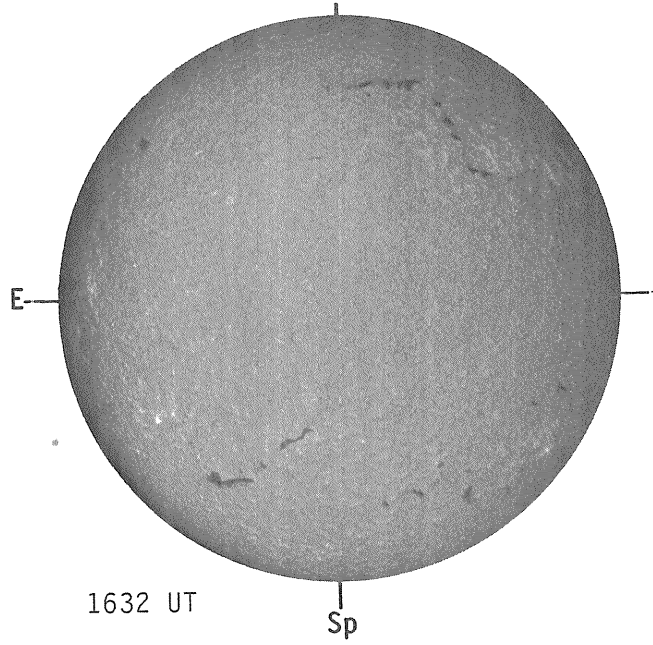
STANFORD MAGNETOGRAM



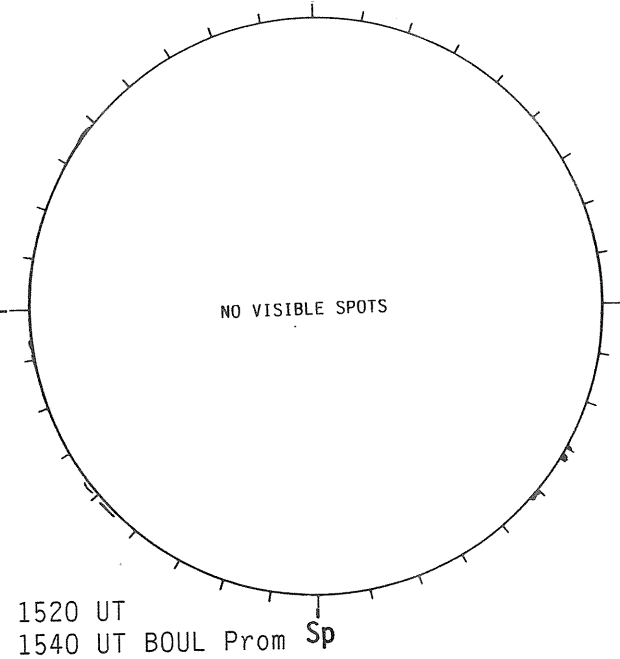
MT. WILSON MAGNETOGRAM



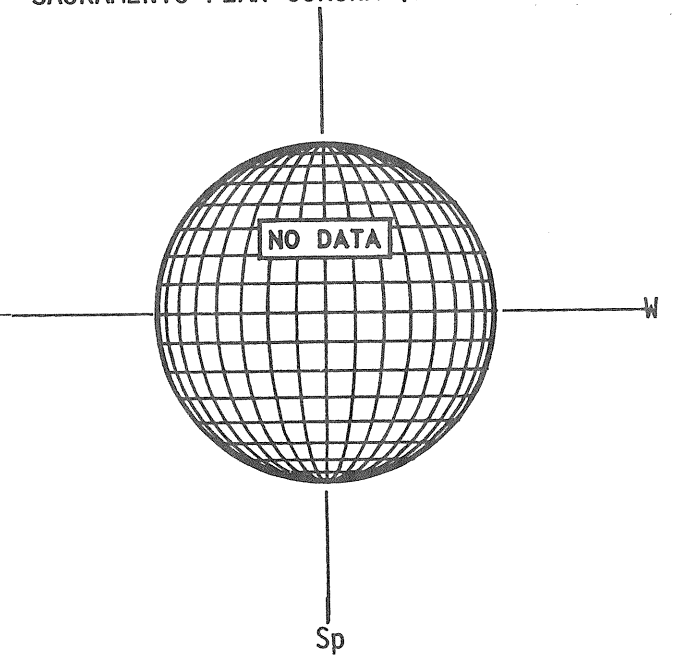
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



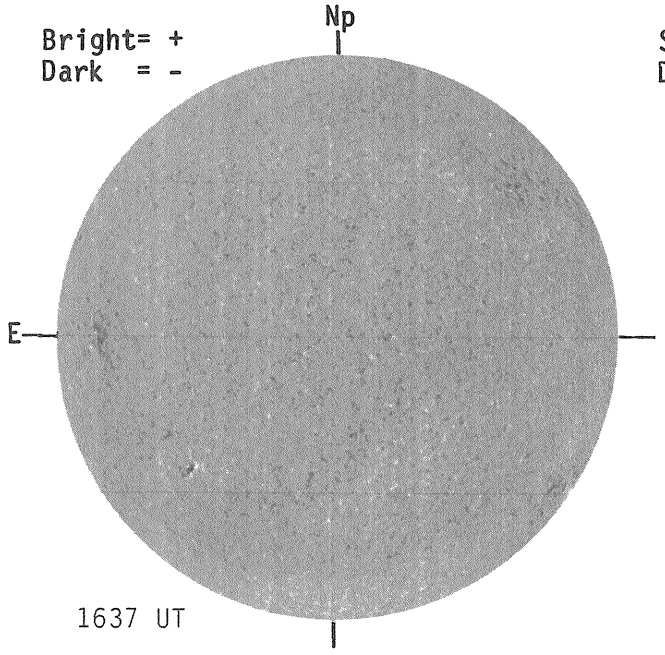
SACRAMENTO PEAK CORONA (1.15 Radii)



D E C E M B E R 21, 1 9 8 6 (P= 7.48, B_0=-1.59, L_0= 180.92)

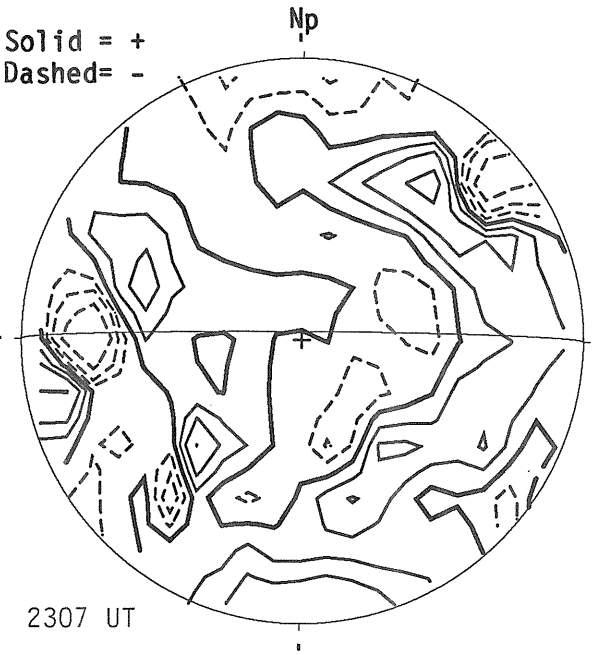
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



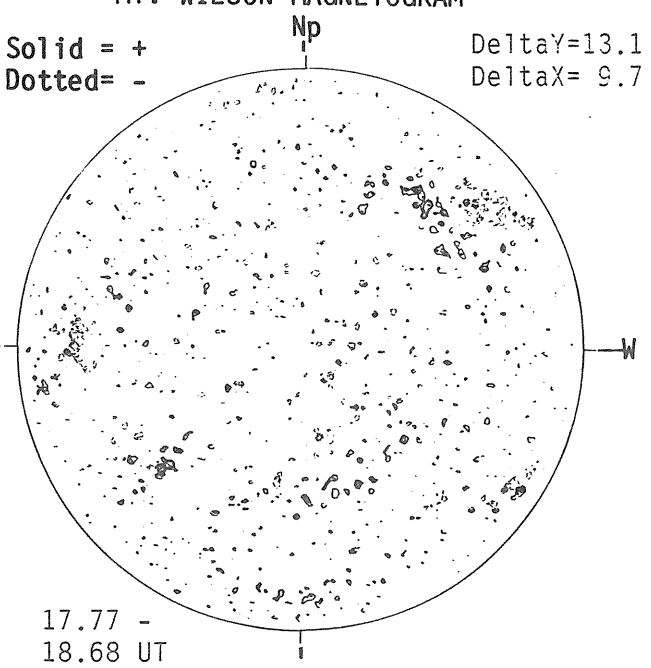
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

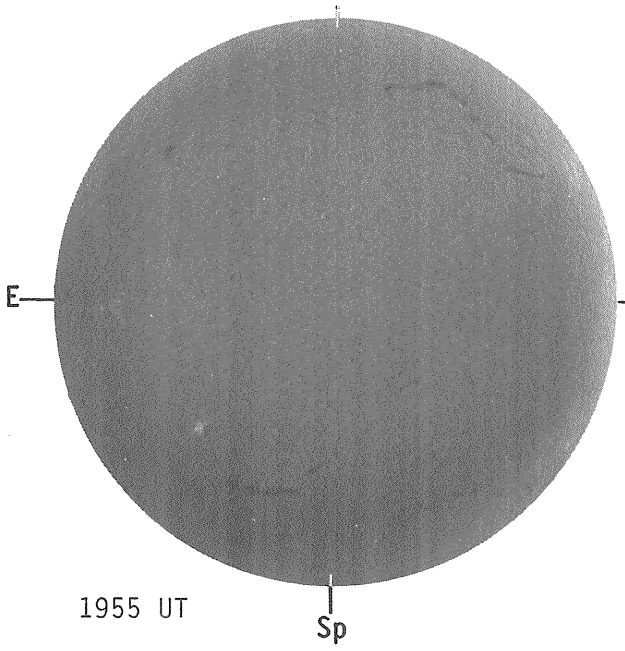


MT. WILSON MAGNETOGRAM

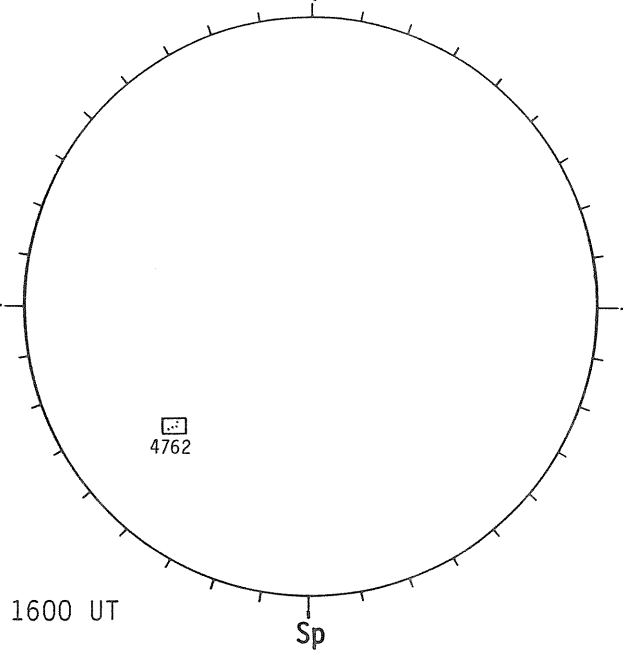
Solid = +
Dotted= -
DeltaY=13.1
DeltaX= 9.7



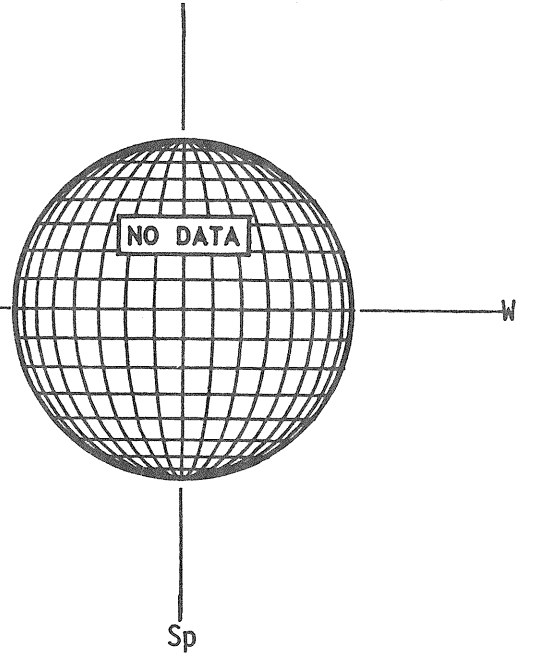
BOULDER H-ALPHA



BOULDER SUNSPOTS



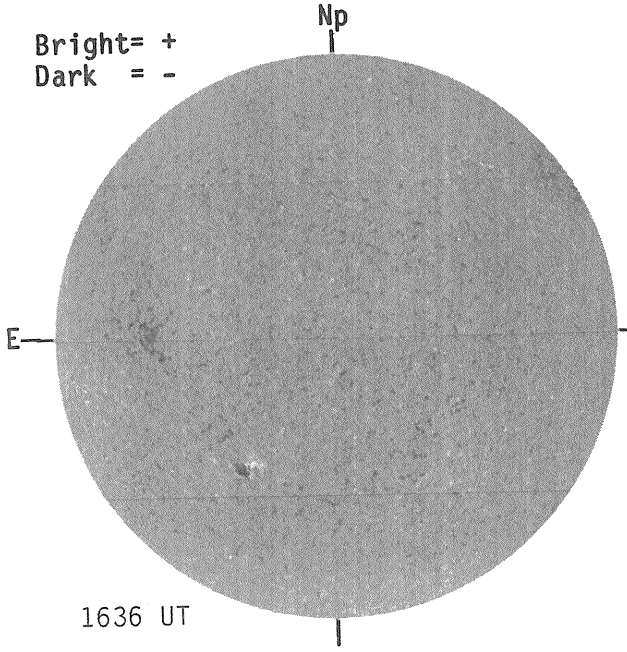
SACRAMENTO PEAK CORONA (1.15 Radii)



D E C E M B E R 22, 1 9 8 6 (P= 7.01, B_o=-1.71, L_o= 167.75)

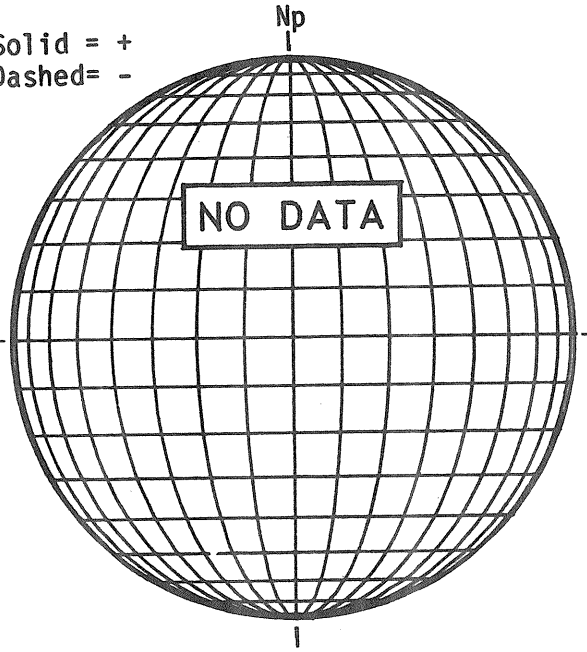
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

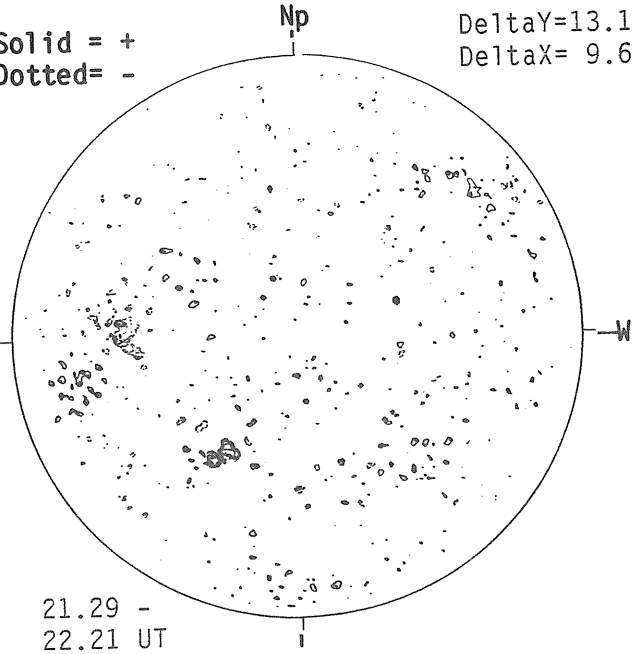
Solid = +
Dashed= -



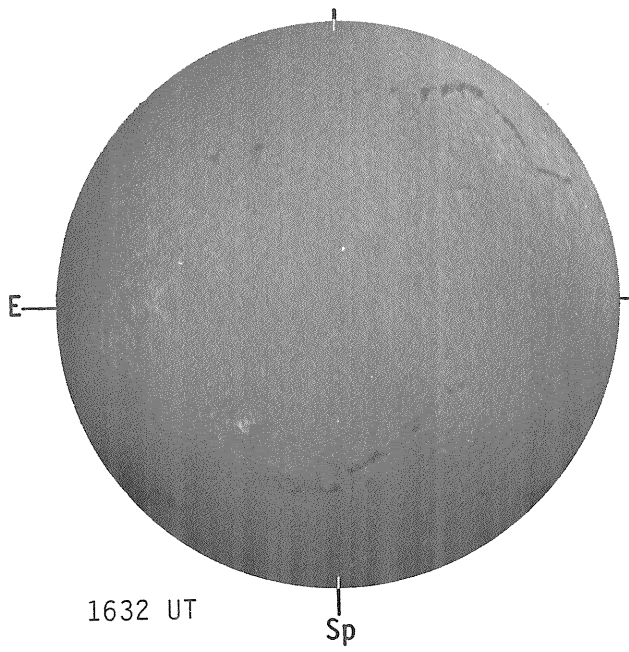
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

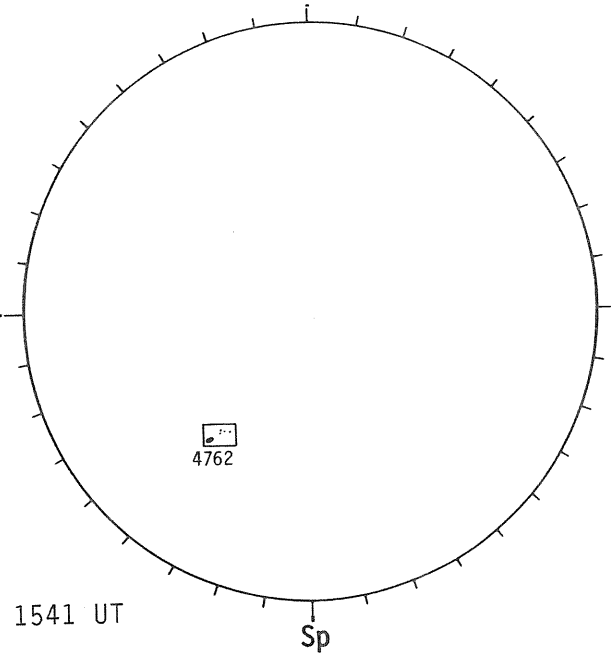
DeltaY=13.1
DeltaX= 9.6



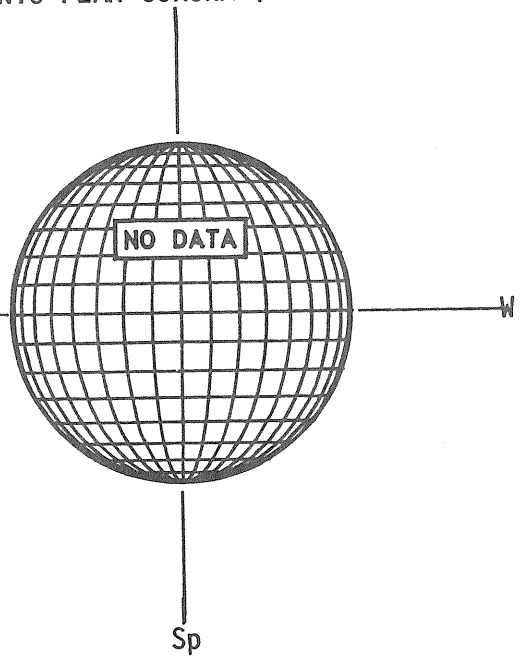
BOULDER H-ALPHA



BOULDER SUNSPOTS

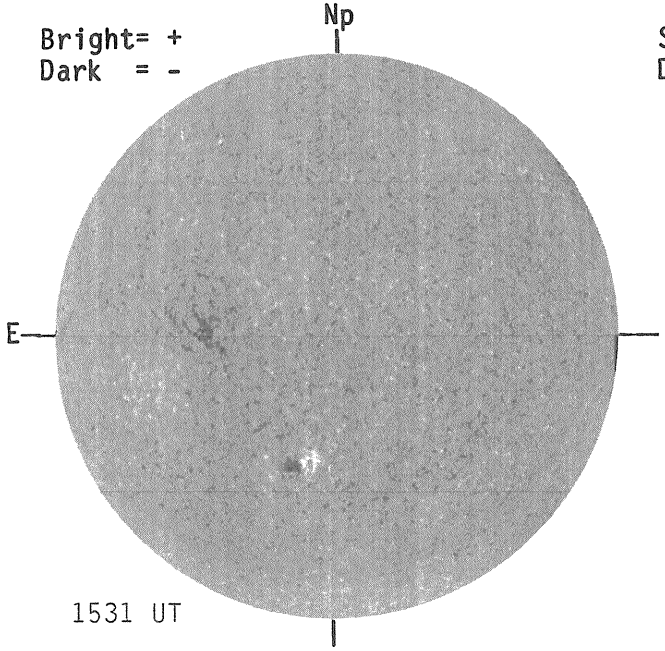


SACRAMENTO PEAK CORONA (1.15 Radii)

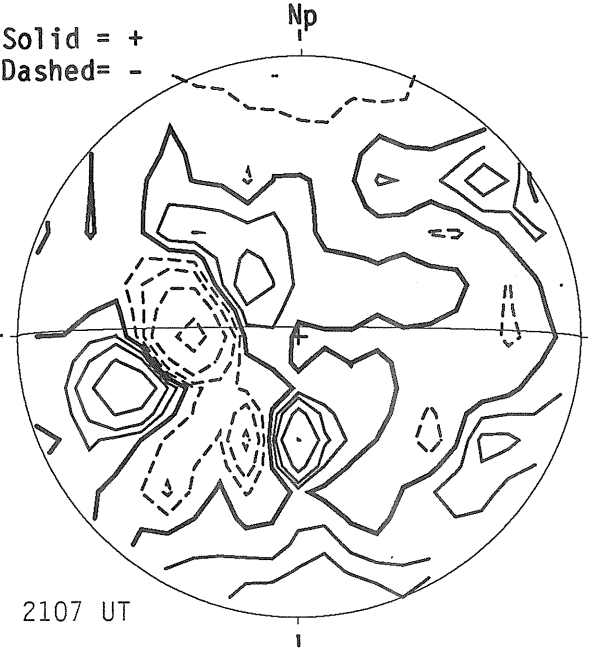


D E C E M B E R 23, 1 9 8 6 (P= 6.54, B_o=-1.84, L_o= 154.58)

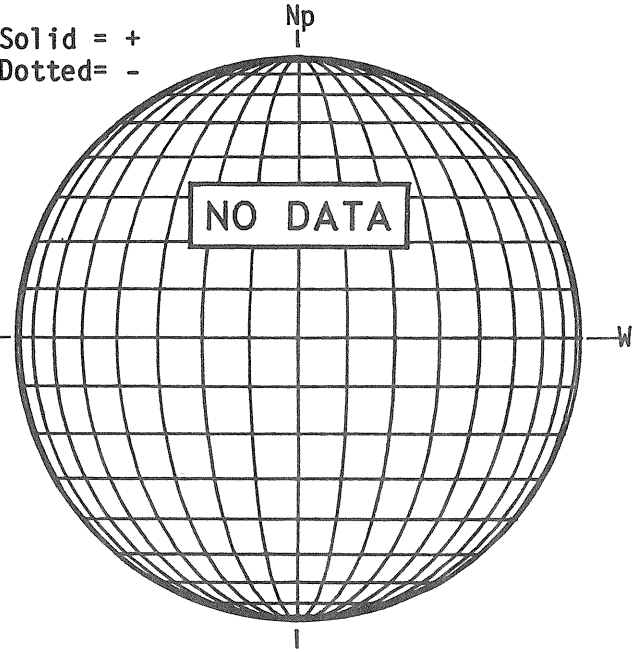
KITT PEAK MAGNETOGRAM



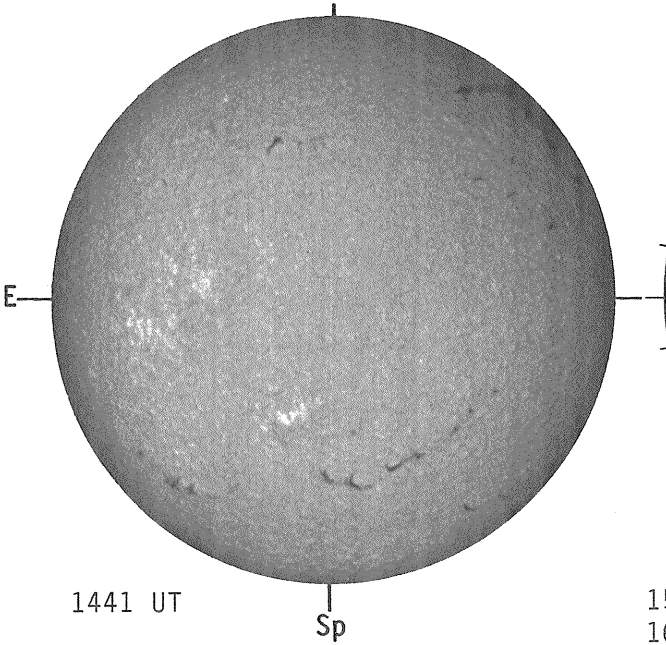
STANFORD MAGNETOGRAM



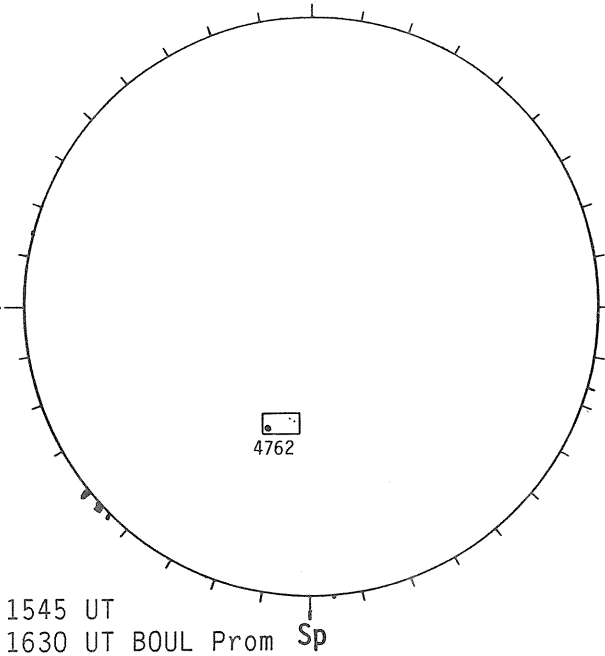
MT. WILSON MAGNETOGRAM



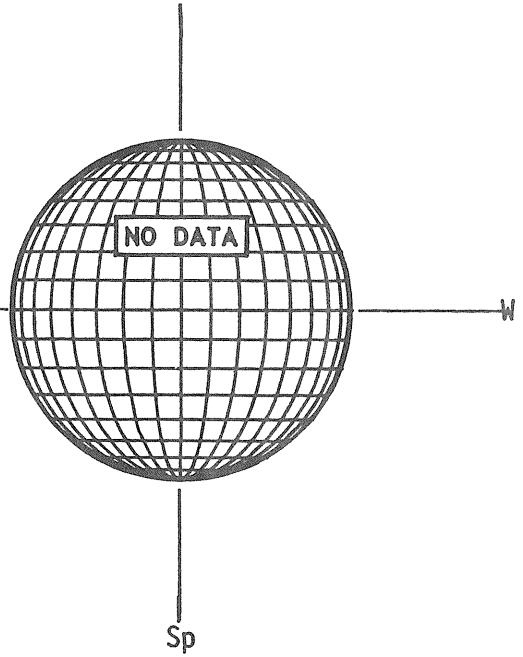
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

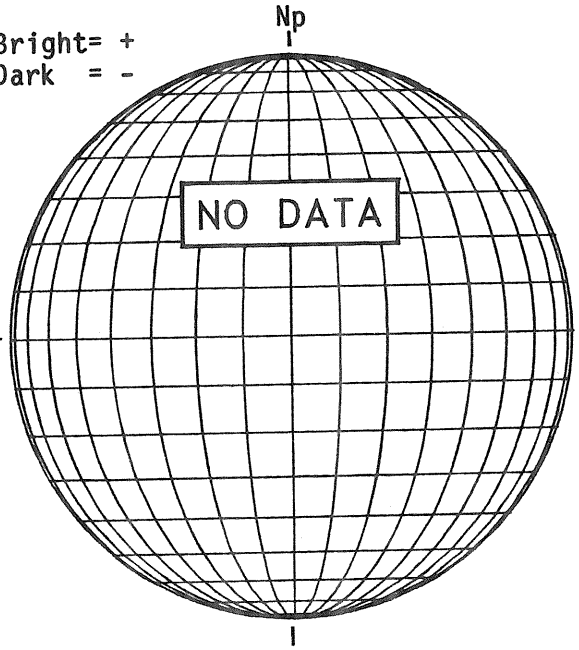


D E C E M B E R 24, 1 9 8 6 (P= 6.06, B_0=-1.96, L_0= 141.40)

50 Dec 86

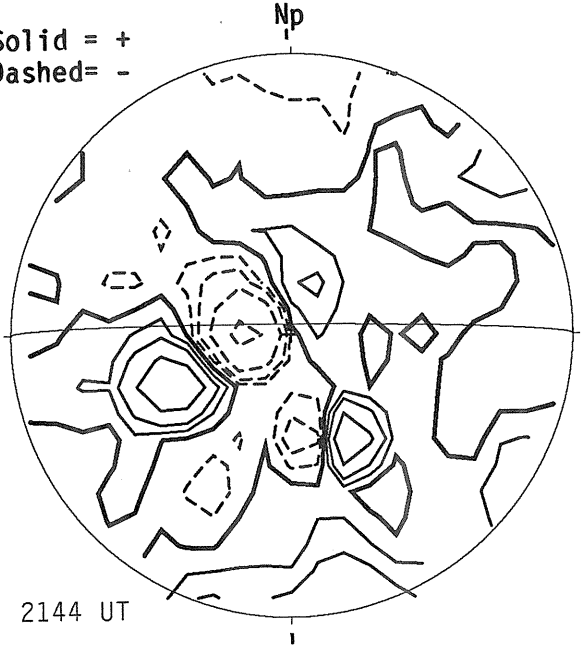
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

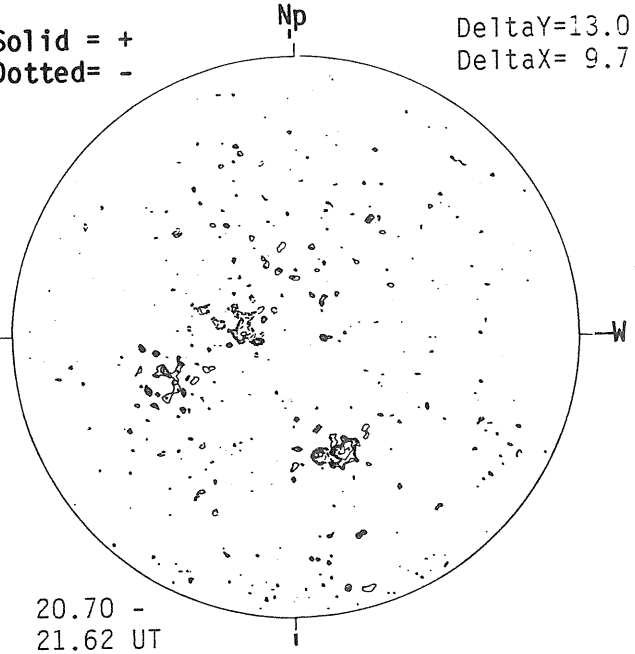
Solid = +
Dashed= -



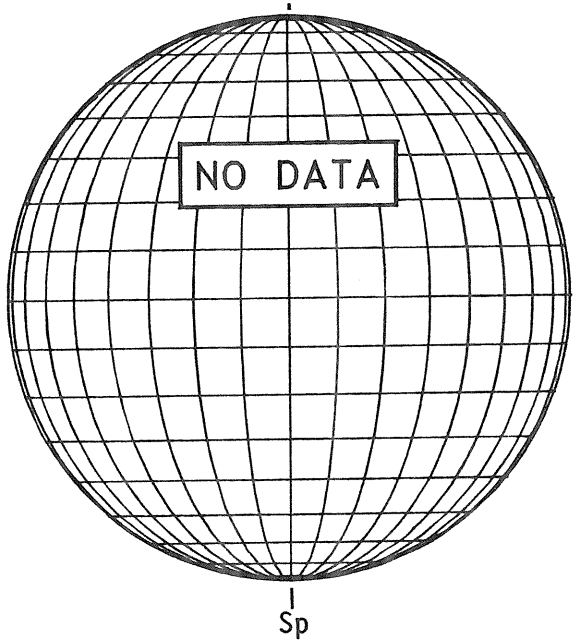
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

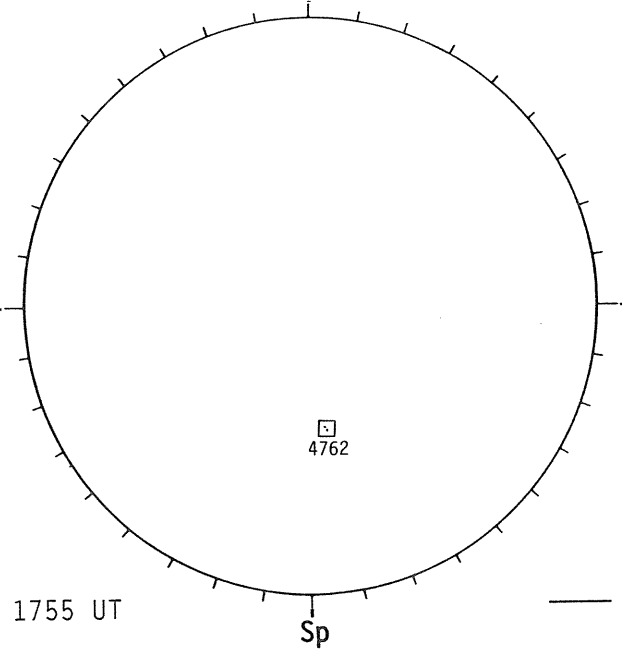
DeltaY=13.0
DeltaX= 9.7



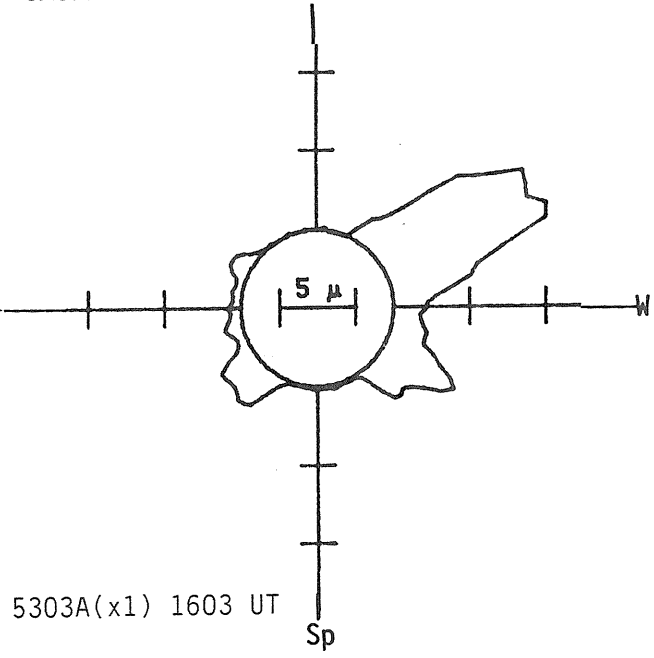
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

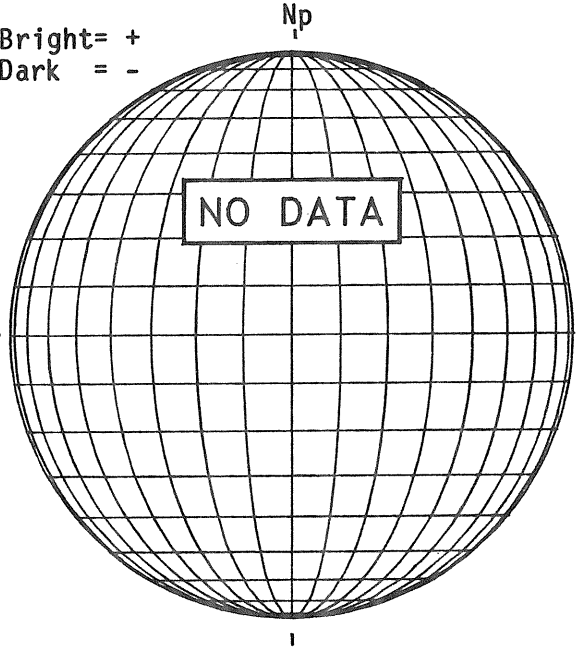


5303A(x1) 1603 UT

D E C E M B E R 25, 1 9 8 6 (P= 5.59, B_0=-2.08, L_0= 128.23)

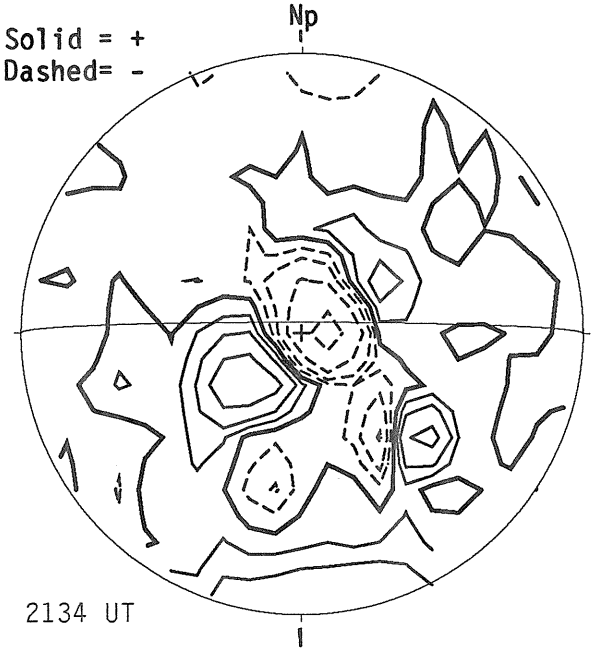
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

Solid = +
Dashed= -

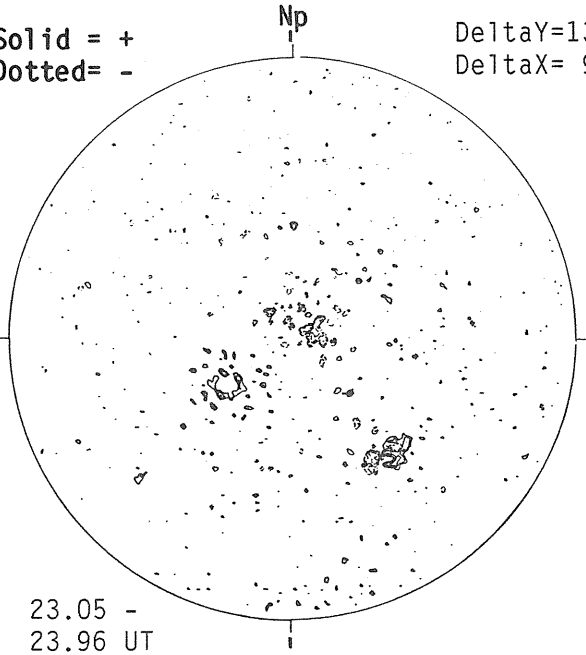


2134 UT

MT. WILSON MAGNETOGRAM

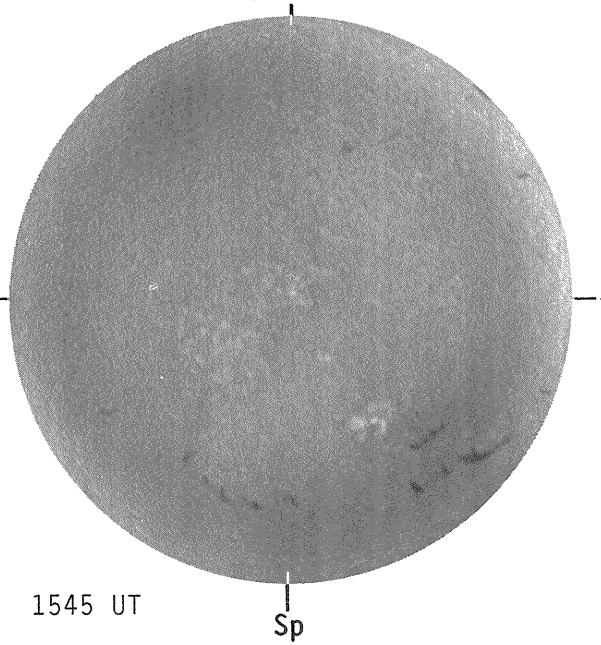
Solid = +
Dotted= -

DeltaY=13.1
DeltaX= 9.7



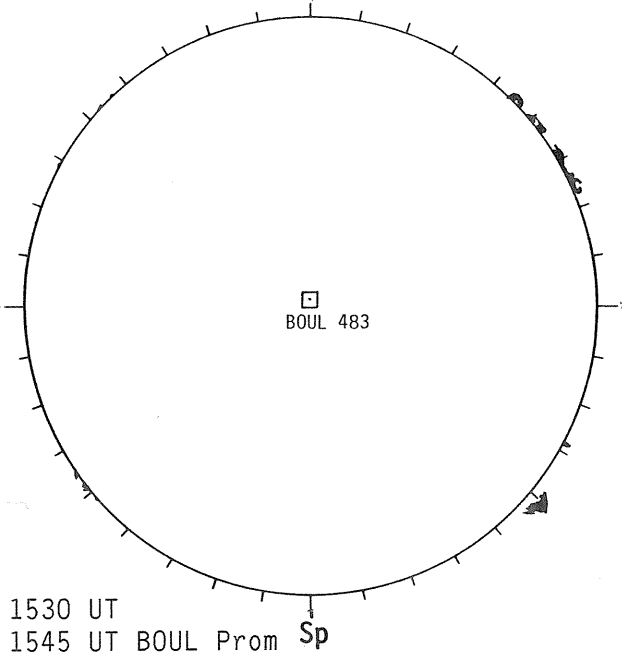
23.05 -
23.96 UT

BOULDER H-ALPHA



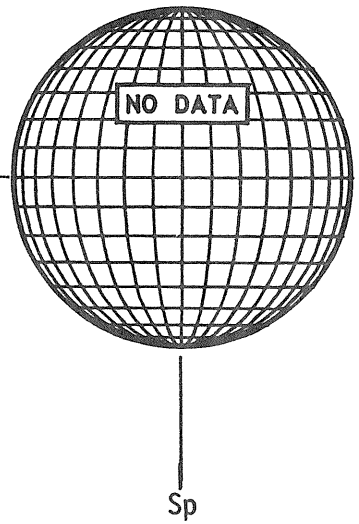
1545 UT

BOULDER SUNSPOTS



1530 UT
1545 UT BOUL Prom

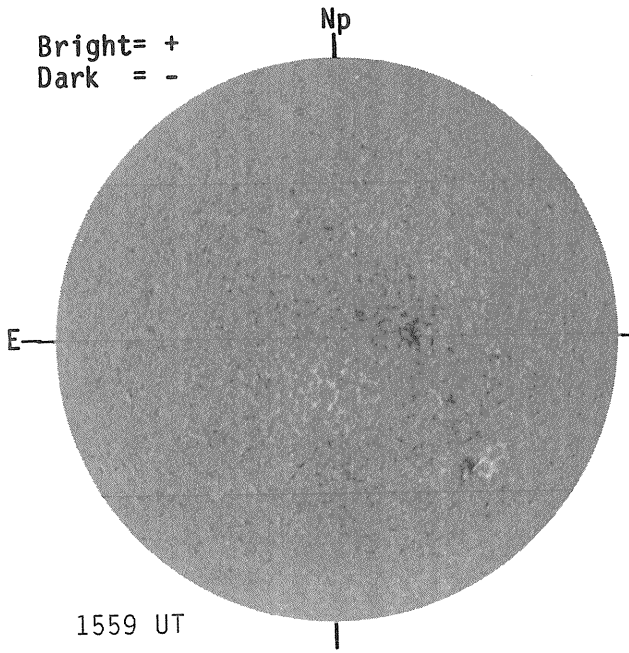
SACRAMENTO PEAK CORONA (1.15 Radii)



D E C E M B E R 26, 1 9 8 6 (P= 5.11, B_o=-2.20, L_o= 115.06)

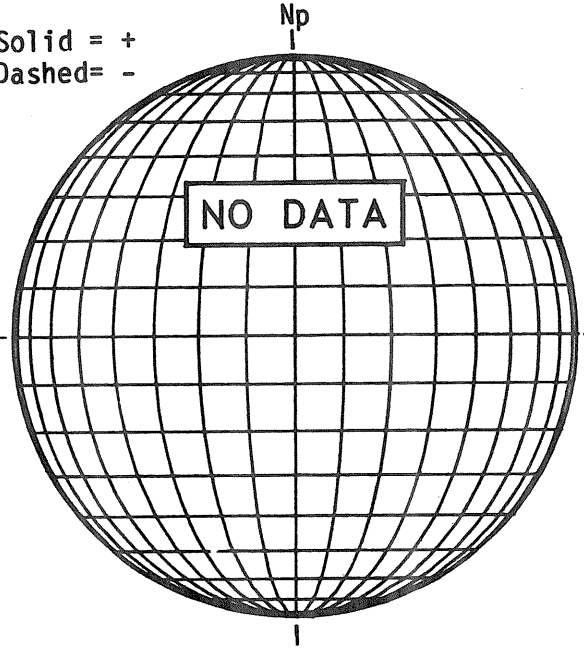
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

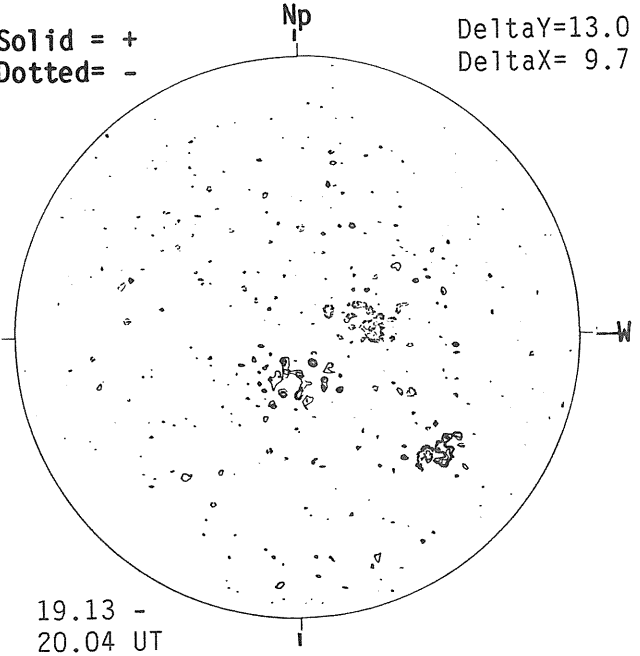
Solid = +
Dashed= -



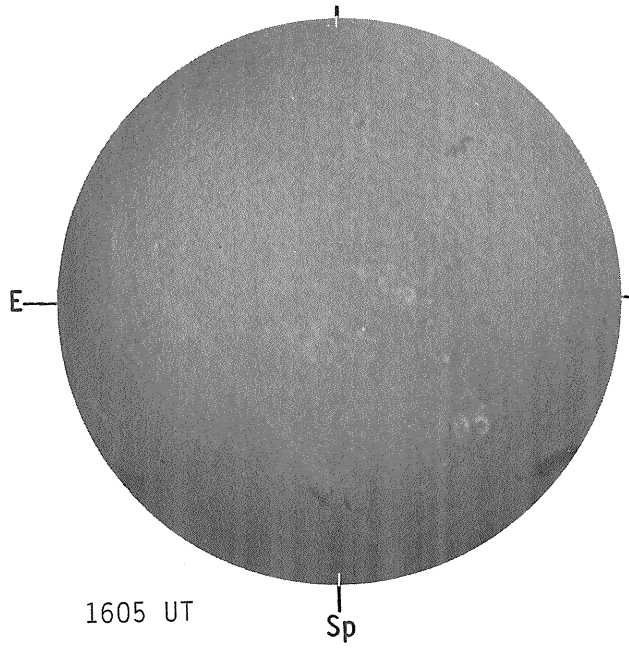
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

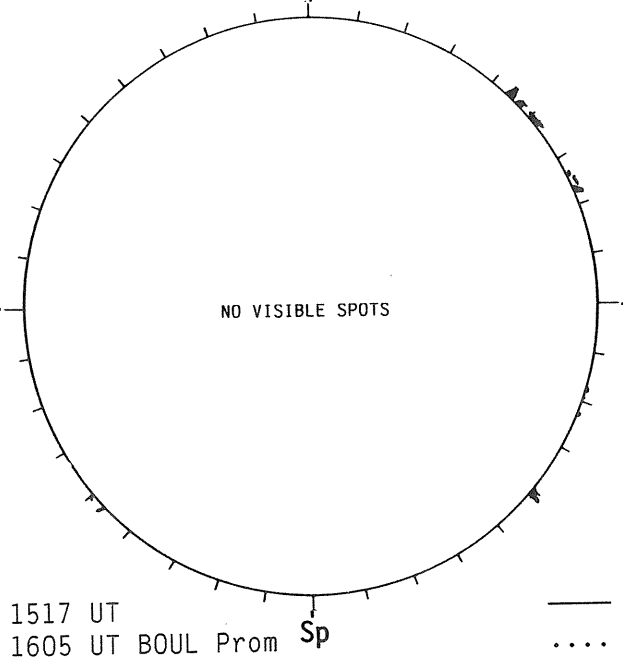
DeltaY=13.0
DeltaX= 9.7



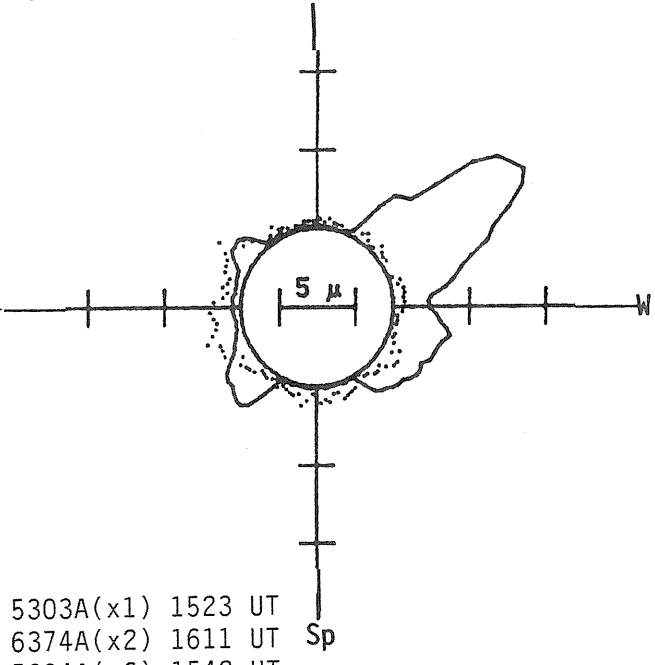
BOULDER H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

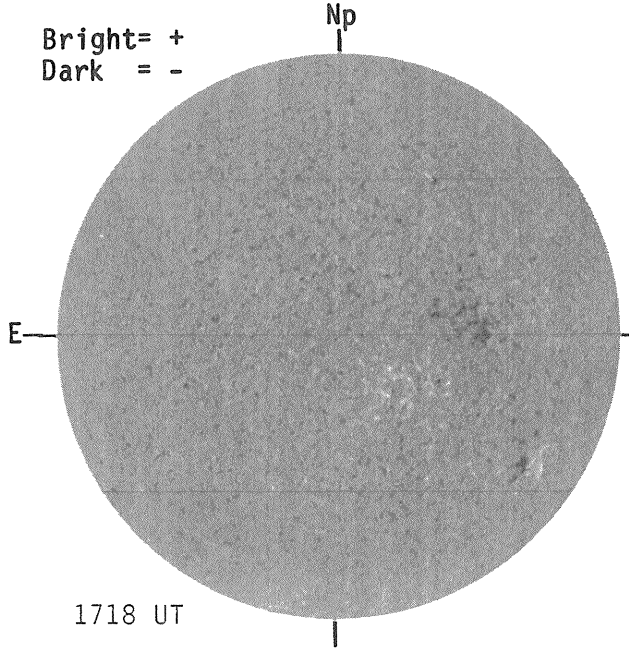


—— 5303A(x1) 1523 UT
.... 6374A(x2) 1611 UT
xxxx 5694A(x6) 1542 UT
NO 5694A ACTIVITY TODAY

D E C E M B E R 27, 1 9 8 6 (P= 4.63, B_0=-2.32, L_0= 101.89)

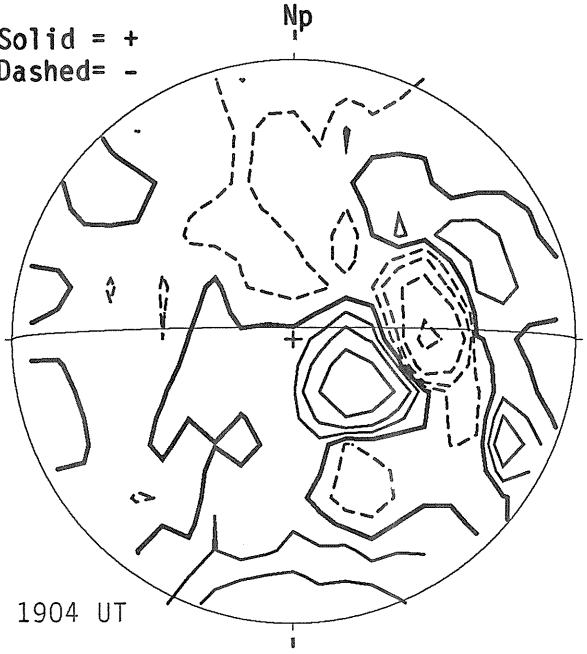
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

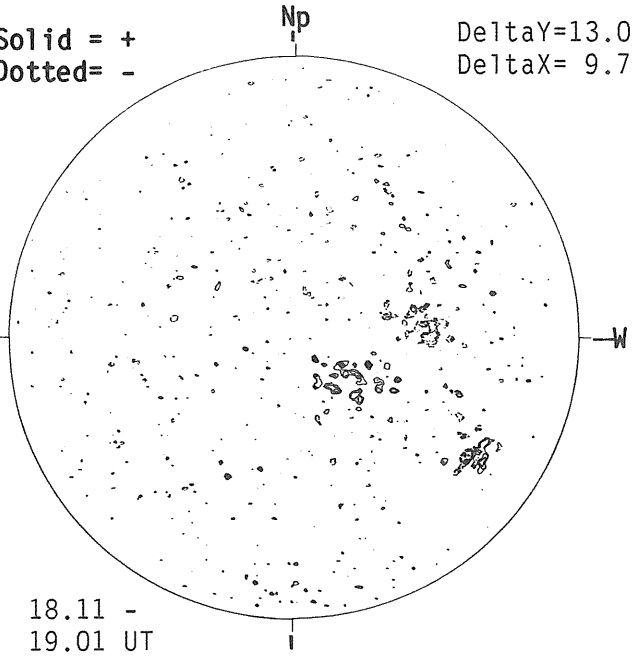
Solid = +
Dashed= -



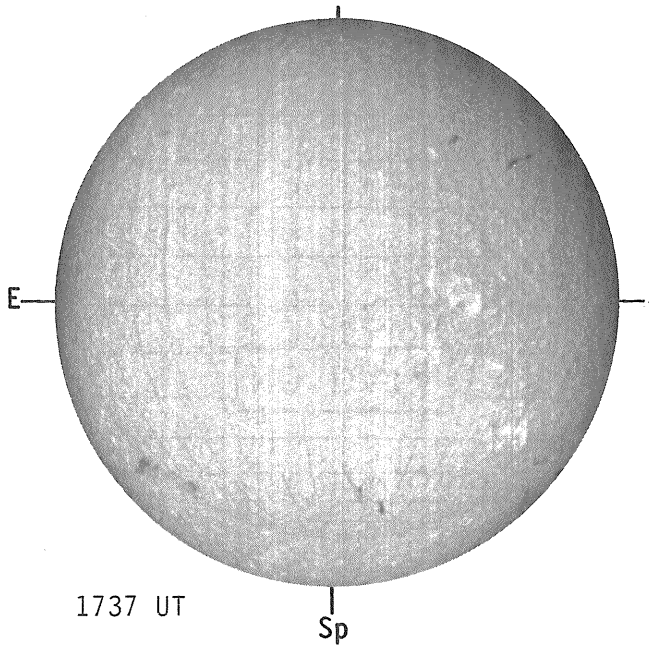
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

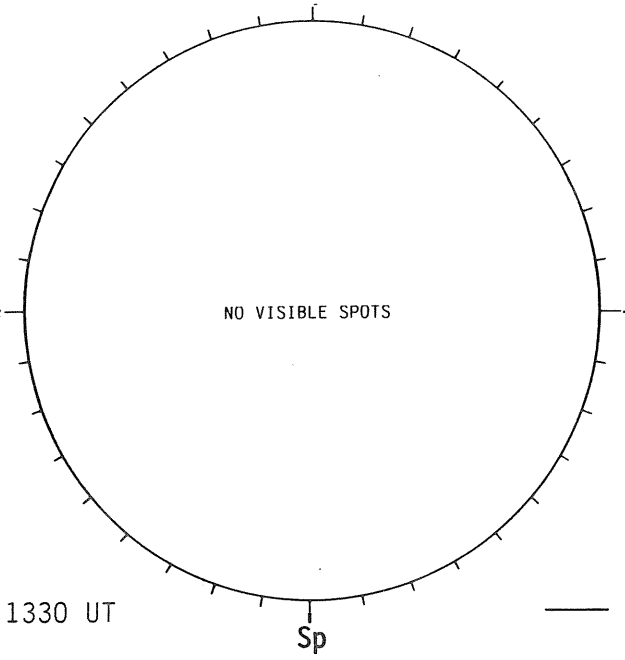
DeltaY=13.0
DeltaX= 9.7



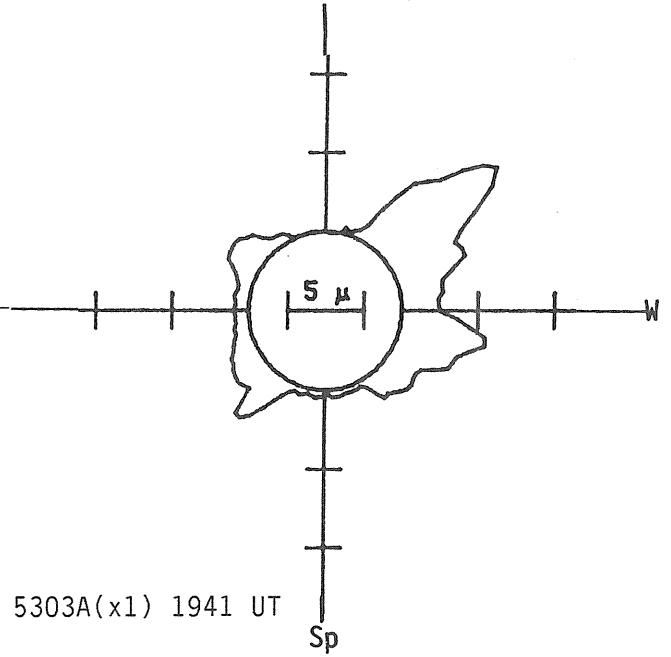
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)



—— 5303A(x1) 1941 UT

53
Dec 86

D E C E M B E R 28, 1 9 8 6 (P= 4.15, B_o=-2.44, L_o= 88.72)

KITT PEAK MAGNETOGRAM

Np

Bright= +
Dark = -

NO DATA

E

STANFORD MAGNETOGRAM

Np

Solid = +
Dashed= -

2124 UT

MT. WILSON MAGNETOGRAM

Np

Solid = +
Dotted= -

DeltaY=13.1
DeltaX= 9.7

W

17.74 -
18.64 UT

BOULDER H-ALPHA

E

1645 UT

Sp

BOULDER SUNSPOTS

NO VISIBLE SPOTS

1630 UT
1645 UT BOUL Prom

Sp

SACRAMENTO PEAK CORONA (1.15 Radii)

NO DATA

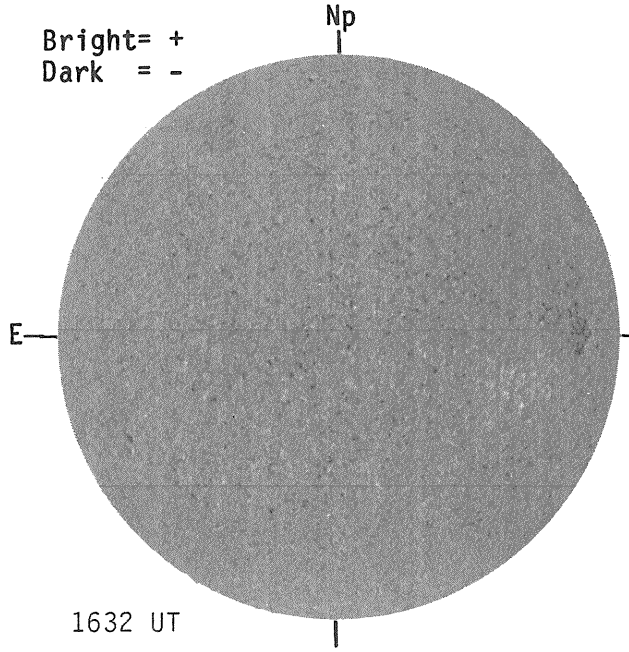
W

Sp

D E C E M B E R 29, 1 9 8 6 (P= 3.66, B_0=-2.56, L_0= 75.54)

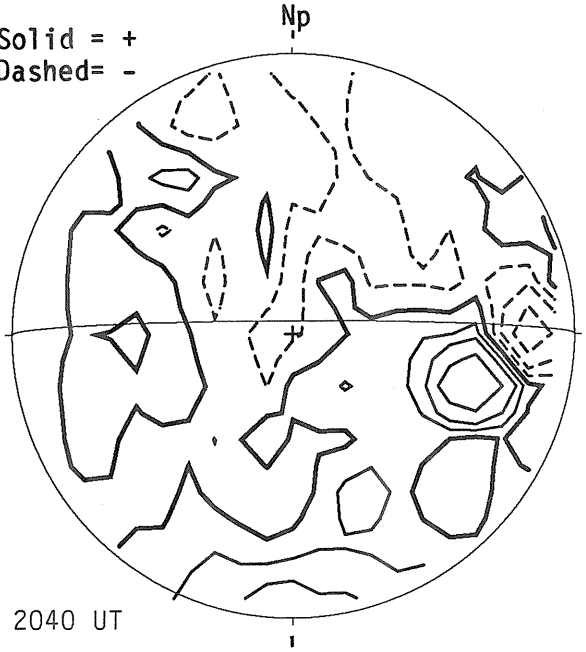
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



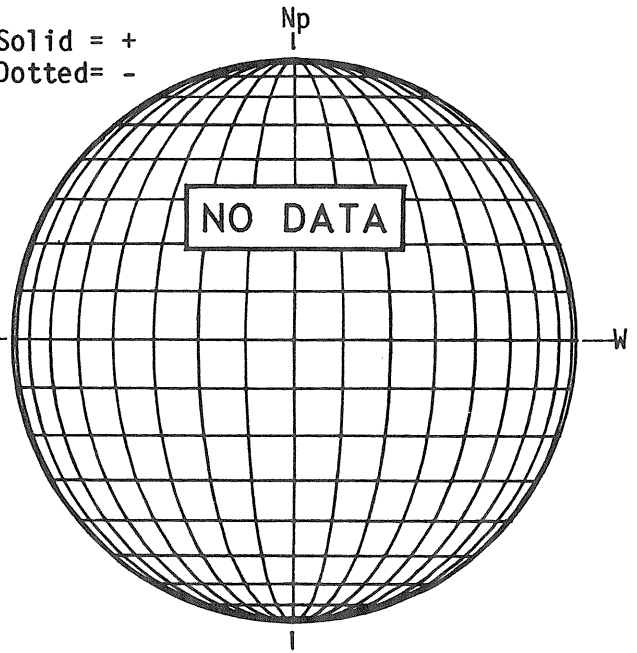
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

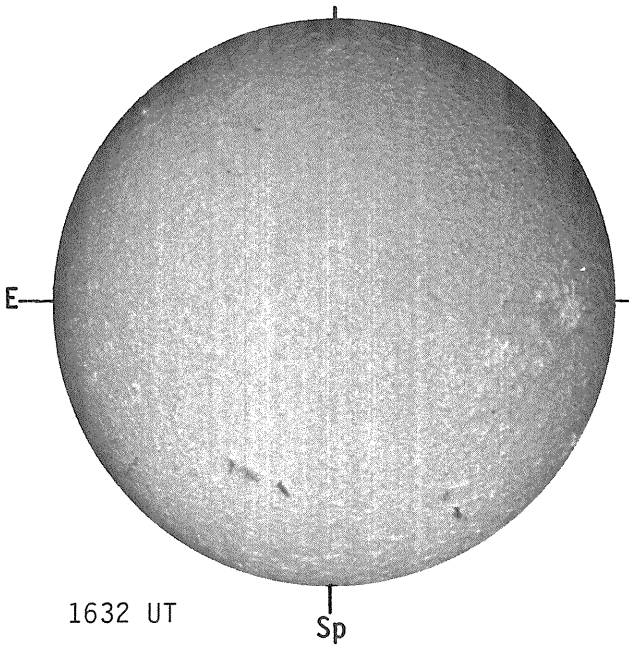


MT. WILSON MAGNETOGRAM

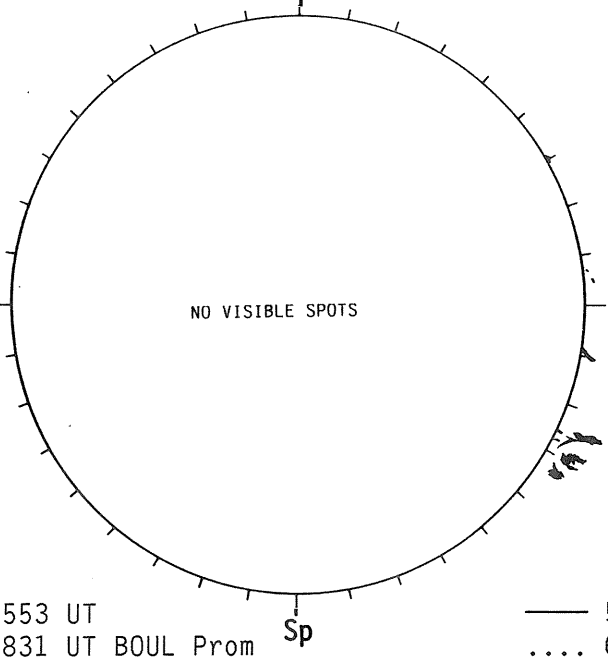
Solid = +
Dotted= -



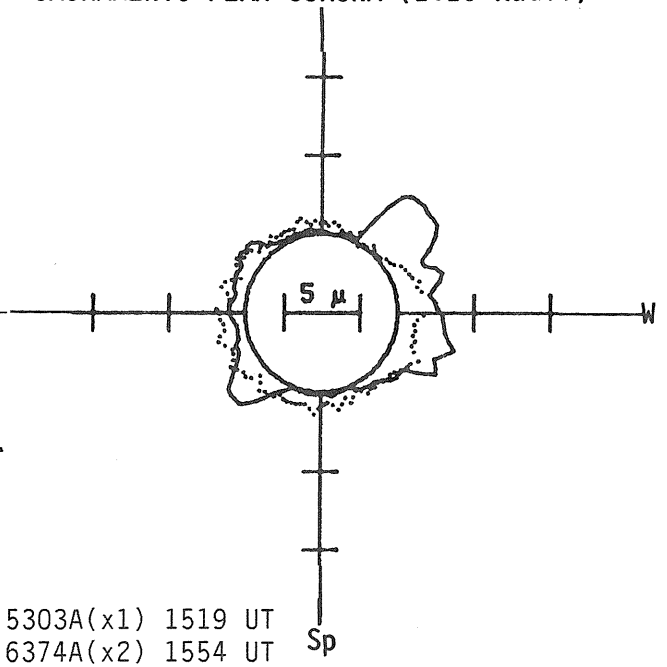
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

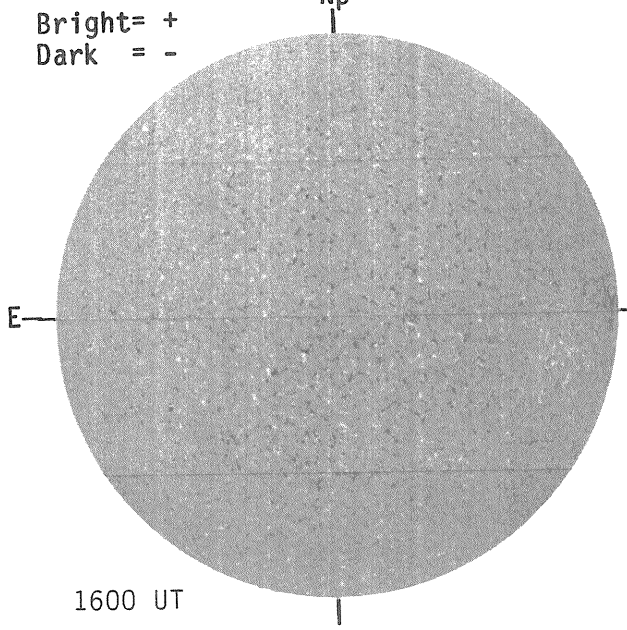


—— 5303A(x1) 1519 UT
.... 6374A(x2) 1554 UT
xxxx 5694A(x6) 1544 UT
NO 5694A ACTIVITY TODAY

D E C E M B E R 30, 1 9 8 6 (P= 3.18, B_0=-2.68, L_0= 62.37)

KITT PEAK MAGNETOGRAM

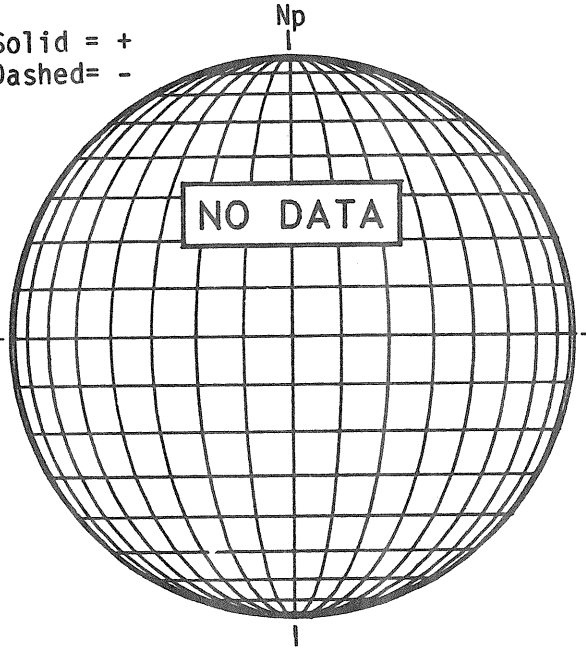
Bright= +
Dark = -



1600 UT

STANFORD MAGNETOGRAM

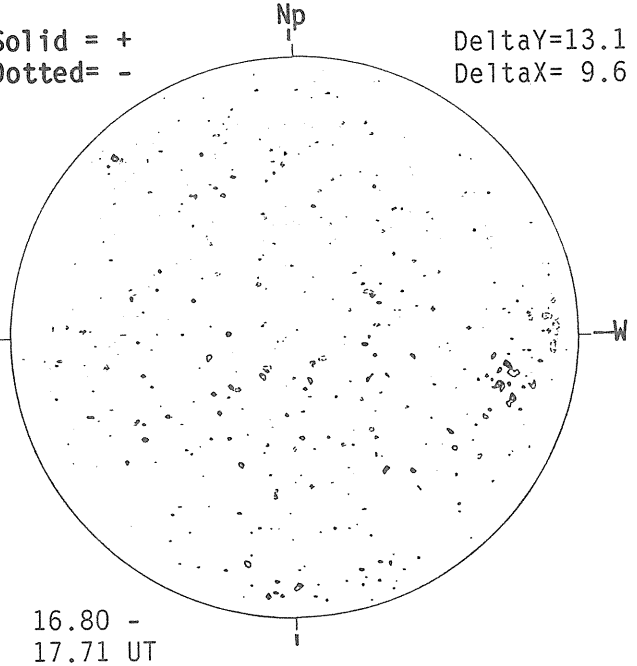
Solid = +
Dashed= -



MT. WILSON MAGNETOGRAM

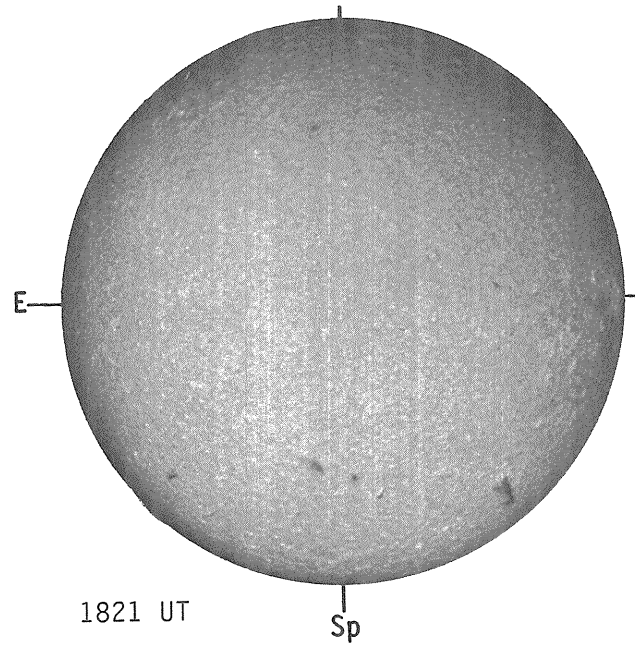
Solid = +
Dotted= -

DeltaY=13.1
DeltaX= 9.6



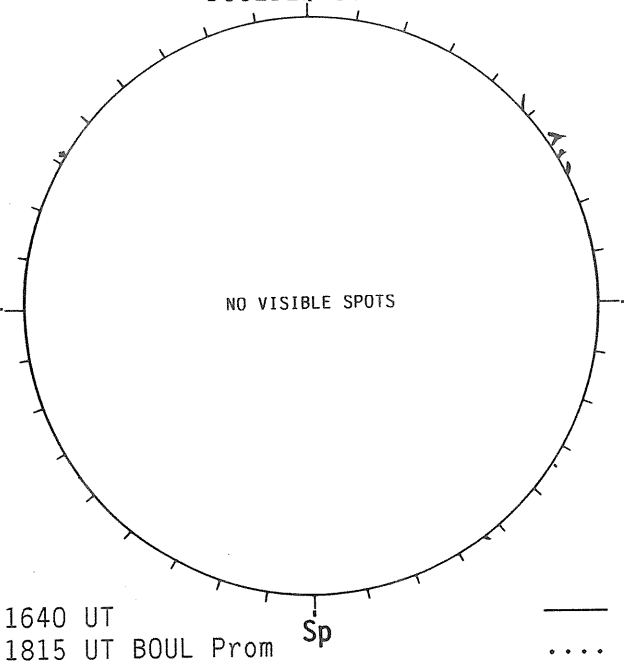
16.80 -
17.71 UT

SACRAMENTO PEAK H-ALPHA



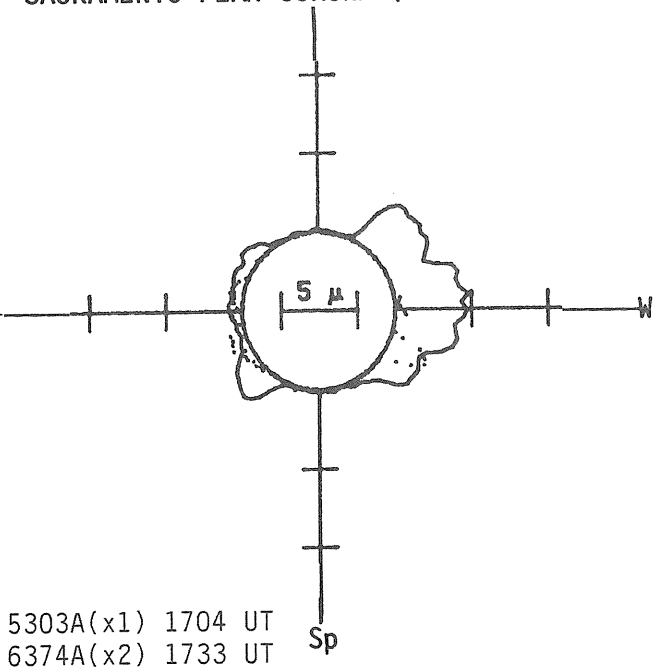
1821 UT

BOULDER SUNSPOTS



1640 UT
1815 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)

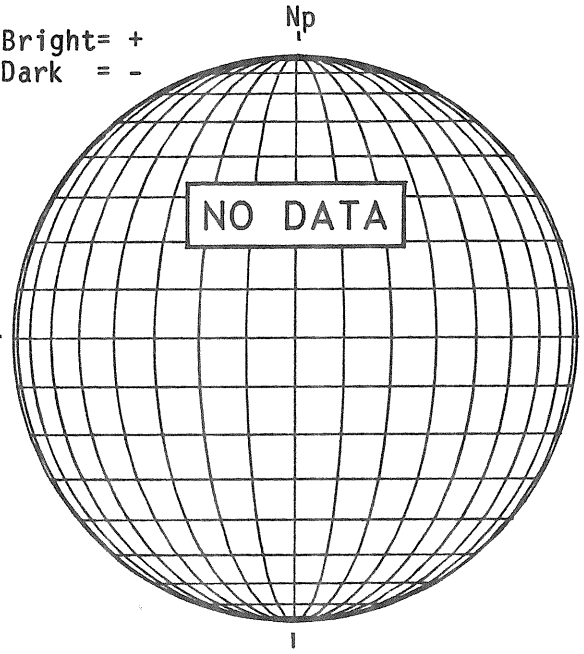


—— 5303A(x1) 1704 UT
.... 6374A(x2) 1733 UT
xxxx 5694A(x6) 1754 UT
NO 5694A ACTIVITY TODAY

D E C E M B E R 31, 1 9 8 6 (P= 2.70, B_0=-2.80, L_0= 49.20)

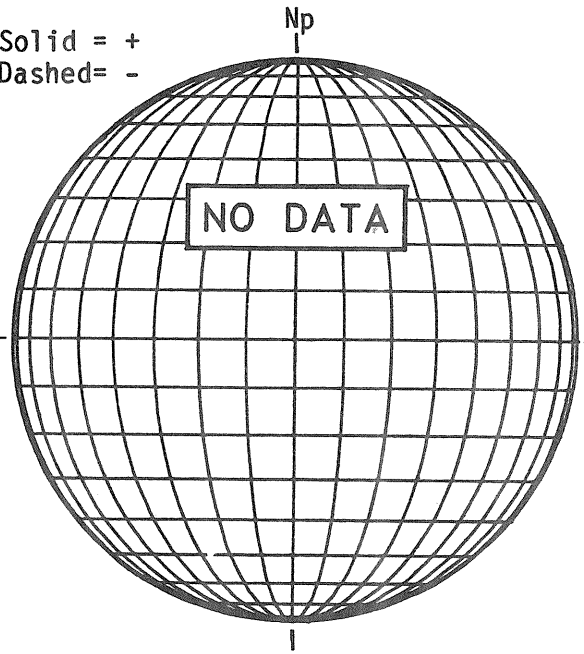
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



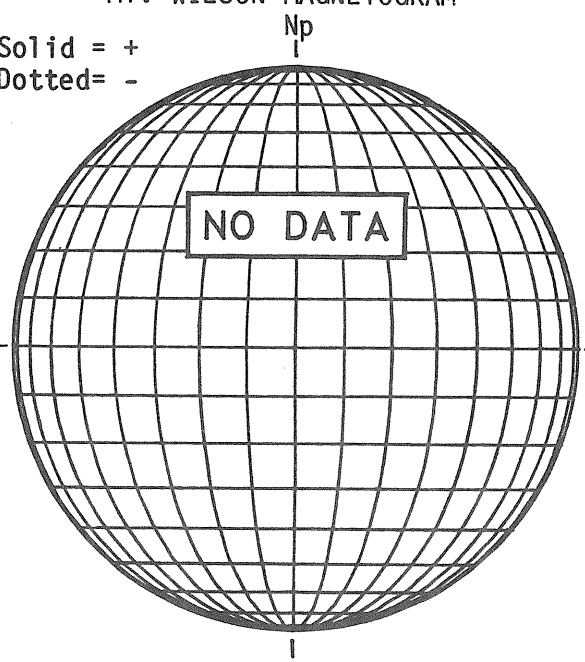
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

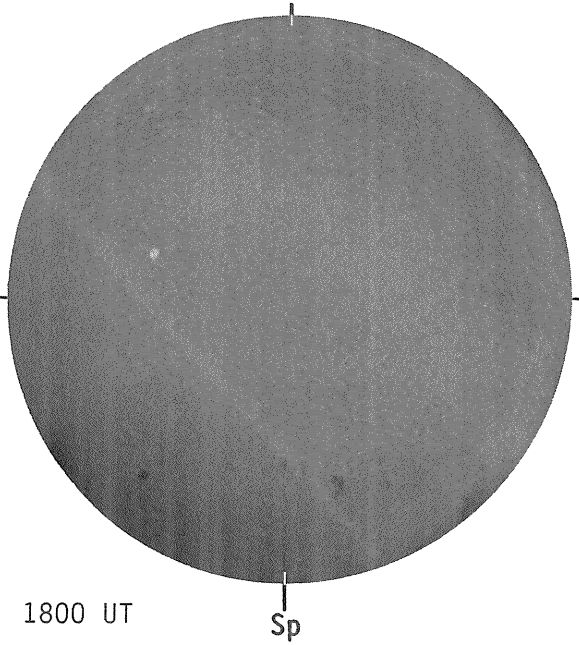


MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

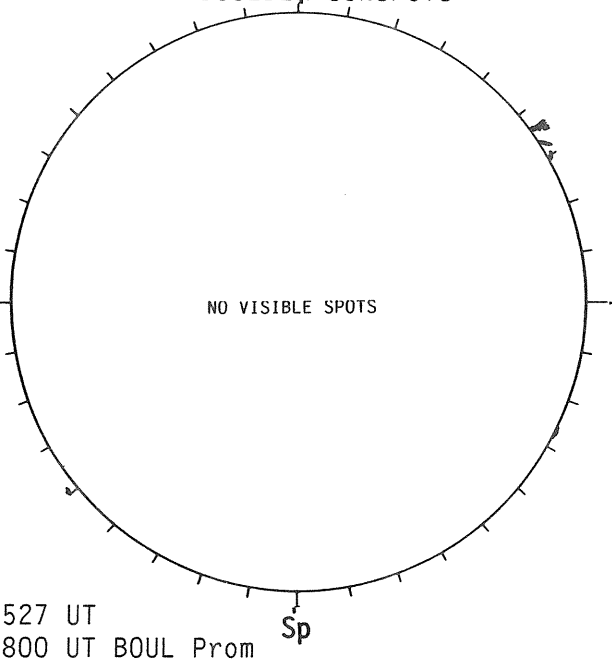


BOULDER H-ALPHA



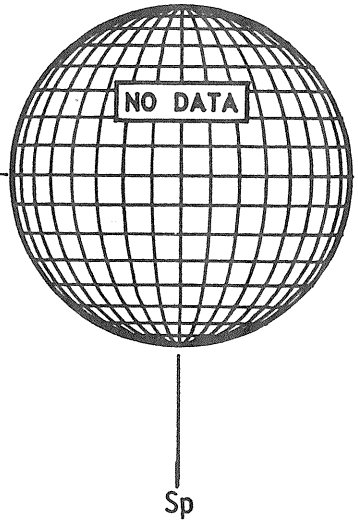
1800 UT

BOULDER SUNSPOTS



1527 UT
1800 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



SUNSPOT GROUPS
(ORDERED BY CENTRAL MERIDIAN PASSAGE DATE)

DECEMBER 1986

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
4760		SVTO	12 09 1235	N26 E48	12 13.2		A	AX	20	2	2	2
4760	24353	MWIL	12 09 1520	N26 E41	12 12.8	4	(B)					
4760		HOLL	12 09 1556	N26 E42	12 12.9		B	BXO	20	3	4	3
4760		RAMY	12 09 1800	N26 E40	12 12.8		B	BXO	10	4	4	3
4760		LEAR	12 10 0128	N27 E36	12 12.9		B	BXO	20	9	6	3
4760		CULG	12 10 0420	N26 E37	12 13.0		B	CRO	50	4	6	2
4760		SVTO	12 10 0905	N26 E34	12 13.0		B	BXO	30	9	7	3
4760		RAMY	12 10 1410	N26 E29	12 12.8		B	BXI	10	6	8	3
4760		BOUL	12 10 1528	N26 E29	12 12.9		B	BXO	30	3	7	1
4760	24353	MWIL	12 10 1530	N26 E28	12 12.8	4	(B)					
4760		PALE	12 10 1840	N26 E28	12 12.9		B	BXO	40	6	9	4
4760		LEAR	12 11 0010	N27 E24	12 12.9		B	BXO	20	6	8	3
4760		CULG	12 11 0440	N28 E21	12 12.8		B	CRO	20	4	9	2
4760		SVTO	12 11 1107	N27 E20	12 13.0		B	BXO	40	6	7	3
4760		RAMY	12 11 1422	N27 E18	12 13.0		B	BXO	10	4	5	3
4760	24353	MWIL	12 11 1530	N26 E17	12 13.0	4	(B)					
4760		BOUL	12 11 1555	N27 E18	12 13.1		A	HR	20	2	2	3
4760		HOLL	12 11 1640	N27 E17	12 13.0		B	CRO	20	3	6	3
4760		PALE	12 11 1822	N27 E17	12 13.1		B	CSO	20	4	5	3
4760		LEAR	12 12 0015	N27 E15	12 13.2		A	HR	20	3	2	3
4760		CULG	12 12 0455	N29 E12	12 13.1		A	AX		1		2
4760	24353	MWIL	12 12 1530	N27 E07	12 13.2	4	(AF)					
4760		RAMY	12 12 1531	N27 E06	12 13.1		A	HR	10	2	1	3
4760		BOUL	12 12 1550	N28 E07	12 13.2		A	HR	10	1	1	3
4760		HOLL	12 12 1600	N27 E06	12 13.1		A	HR	10	2	1	3
4760		PALE	12 12 2340	N29 E02	12 13.1		A	HR	10	2	1	3
4760		LEAR	12 13 0001	N28 E03	12 13.2		A	HR	20	2	1	3
4760		CULG	12 13 0450	N29 E00	12 13.2		A	HR		1		2
4760		SVTO	12 13 0925	N27 W04	12 13.1		B	BXO	10	5	4	4
4760		RAMY	12 13 1355	N28 W05	12 13.2		B	BXO	10	5	1	4
4760	24353	MWIL	12 13 1600	N27 W06	12 13.2	4	(AF)					
4760		BOUL	12 13 1615	N28 W06	12 13.2		A	AX	10	1	1	2
4760		HOLL	12 13 1643	N28 W07	12 13.1		A	HR	10	2	1	2
4760		PALE	12 13 2001	N27 W08	12 13.2		A	AX	10	2	1	2
4760		LEAR	12 14 0004	N28 W11	12 13.1		A	AX	10	1	1	3
4761		LEAR	12 10 0128	S28 E80	12 16.3		A	AX	10	1	1	3
4761		RAMY	12 10 1410	S27 E74	12 16.3		A	AX	10	1	1	3
4761		BOUL	12 10 1528	S28 E73	12 16.3		A	AX	20	1	1	1
4761		LEAR	12 11 0010	S28 E68	12 16.3		A	AX	30	1	2	3
4761		CULG	12 11 0440	S26 E70	12 16.6		A	HR	30	1	1	2
4761		SVTO	12 11 1107	S28 E62	12 16.3		A	AX	60	2	3	3
4761		RAMY	12 11 1422	S27 E61	12 16.3		A	AX	10	1	1	3
4761	24354	MWIL	12 11 1530	S29 E59	12 16.3	4	(AP)					
4761		BOUL	12 11 1555	S28 E59	12 16.3		A	AX	10	1	1	3
4761		HOLL	12 11 1640	S28 E59	12 16.3		A	AX	10	1	1	3
4761		PALE	12 11 1822	S28 E59	12 16.4		A	HR	20	1	1	3
4761		LEAR	12 12 0015	S29 E56	12 16.4		A	HR	20	1	2	3
4761		CULG	12 12 0455	S27 E56	12 16.6		A	AX		1		2
4761	24354	MWIL	12 12 1530	S29 E47	12 16.3	4	(AP)					
4761		RAMY	12 12 1531	S28 E48	12 16.4		A	AX	10	1	1	3
4761		BOUL	12 12 1550	S28 E47	12 16.3		A	AX	10	1	1	3
4761		HOLL	12 12 1600	S29 E47	12 16.3		A	AX		2	1	3
4761		PALE	12 12 2340	S30 E44	12 16.4		A	AX	20	2	1	3
4761		LEAR	12 13 0001	S29 E44	12 16.4		A	HA	20	2	1	3
4761		CULG	12 13 0450	S28 E42	12 16.5		A	AX		1		2
4761		SVTO	12 13 0925	S28 E38	12 16.4		A	AX	10	3	1	4
4761		RAMY	12 13 1355	S29 E37	12 16.5		A	AX	10	1	1	4
4761	24354	MWIL	12 13 1600	S29 E35	12 16.4	4	(AP)					
4761		BOUL	12 13 1615	S28 E36	12 16.5		A	AX	10	1	1	2
4761		HOLL	12 13 1643	S29 E34	12 16.4		A	AX	10	3	1	2
4761		PALE	12 13 2001	S30 E33	12 16.4		A	AX	10	2	1	2
4761		LEAR	12 14 0004	S29 E32	12 16.5		A	HR	10	2	1	3
4761		CULG	12 14 0455	S28 E28	12 16.4		A	AX		1		2
4761		SVTO	12 14 1025	S28 E25	12 16.4		A	AX	10	1	1	3
4761		LEAR	12 17 0548	S31 W09	12 16.5		A	AX	10	1	1	4

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

DECEMBER 1986

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
4762		RAMY	12	21	1305	S26	E35	12	24.3		B	BXO	10	2	2	3
4762		BOUL	12	21	1600	S25	E33	12	24.2		B	BXO	10	4	4	2
4762		HOLL	12	21	2008	S27	E31	12	24.2		B	CAO	40	6	4	1
4762		PALE	12	21	2200	S27	E29	12	24.2		B	BXO	20	4	4	3
4762		LEAR	12	22	0004	S26	E28	12	24.2		B	CAO	40	4	5	3
4762		CULG	12	22	0420	S26	E27	12	24.3		B	BXO	20	5	5	3
4762		SVTO	12	22	0916	S25	E23	12	24.2		B	BXO	40	10	5	3
4762		RAMY	12	22	1255	S27	E22	12	24.2		BG	CSI	70	8	6	4
4762	24355	MWIL	12	22	1430	S27	E20	12	24.2	5	(B)					
4762		BOUL	12	22	1541	S27	E23	12	24.4		B	CSO	40	8	6	3
4762		PALE	12	22	1813	S27	E19	12	24.2		BG	CSO	80	8	6	3
4762		LEAR	12	23	0012	S27	E17	12	24.3		B	DAO	50	8	7	3
4762		CULG	12	23	0430	S25	E14	12	24.3		B	CAO	30	5	7	2
4762		SVTO	12	23	0935	S27	E10	12	24.2		B	DRO	40	7	7	2
4762		RAMY	12	23	1343	S27	E09	12	24.3		B	CAO	30	6	7	3
4762		BOUL	12	23	1545	S27	E07	12	24.2		B	CAO	30	3	6	3
4762		PALE	12	23	1855	S27	E06	12	24.2		B	CRO	30	5	6	3
4762		HOLL	12	23	2004	S25	E05	12	24.2		B	CRO	30	5	7	3
4762	24355	MWIL	12	23	2330	S26	E03	12	24.2	4	(B)					
4762		LEAR	12	24	0116	S27	E03	12	24.3		B	CAO	20	4	8	3
4762		CULG	12	24	0450	S27	E01	12	24.3		A	AX	10	1	1	3
4762		HOLL	12	24	1450	S27	W06	12	24.1		B	CRO	20	4	8	3
4762	24355	MWIL	12	24	1530	S27	W05	12	24.3	3	(B)					
4762		RAMY	12	24	1750	S27	W06	12	24.3		B	BXO	10	4	7	3
4762		BOUL	12	24	1755	S27	W03	12	24.5		A	AX	10	2	1	2
4762		PALE	12	24	1950	S28	W04	12	24.5		B	BXO	10	2	2	3
4762		LEAR	12	25	0022	S27	W08	12	24.4		A	AX	10	2	1	3
4762A		BOUL	12	25	1530	S01	E00	12	25.6		A	AX	10	1	1	3

Stations reporting:

BOUL = Boulder
CULG = Culgoora
HOLL = Holloman
LEAR = Learmonth
MWIL = Mt. Wilson
PALE = Palehua
RAMY = Ramey
SVTO = San Vito

SUDDEN IONOSPHERIC DISTURBANCES

DECEMBER 1986

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/SESC Region

No SID events reported

* No flare patrol

Observatories Reporting for December 1986**

Ayrshire, Scotland	SES	Latrobe, Pennsylvania, USA	SES
Edenvale, Rep. of S. Africa	SES	Louisville, Kentucky, USA	SES
Darmstadt, German Fed. Rep	SWF	Maui, Hawaii, USA	SWF
Farsta, Sweden	SES	Panska Ves, Czechoslovakia	SWF, SES, SEA
Hiraiso, Japan	SWF	Paterson, New Jersey, USA	SES
Houston, Texas, USA	SES	Somesworth, New Hampshire, USA	SES
Inubo, Japan	SPA	Tucson, Arizona, USA	SES

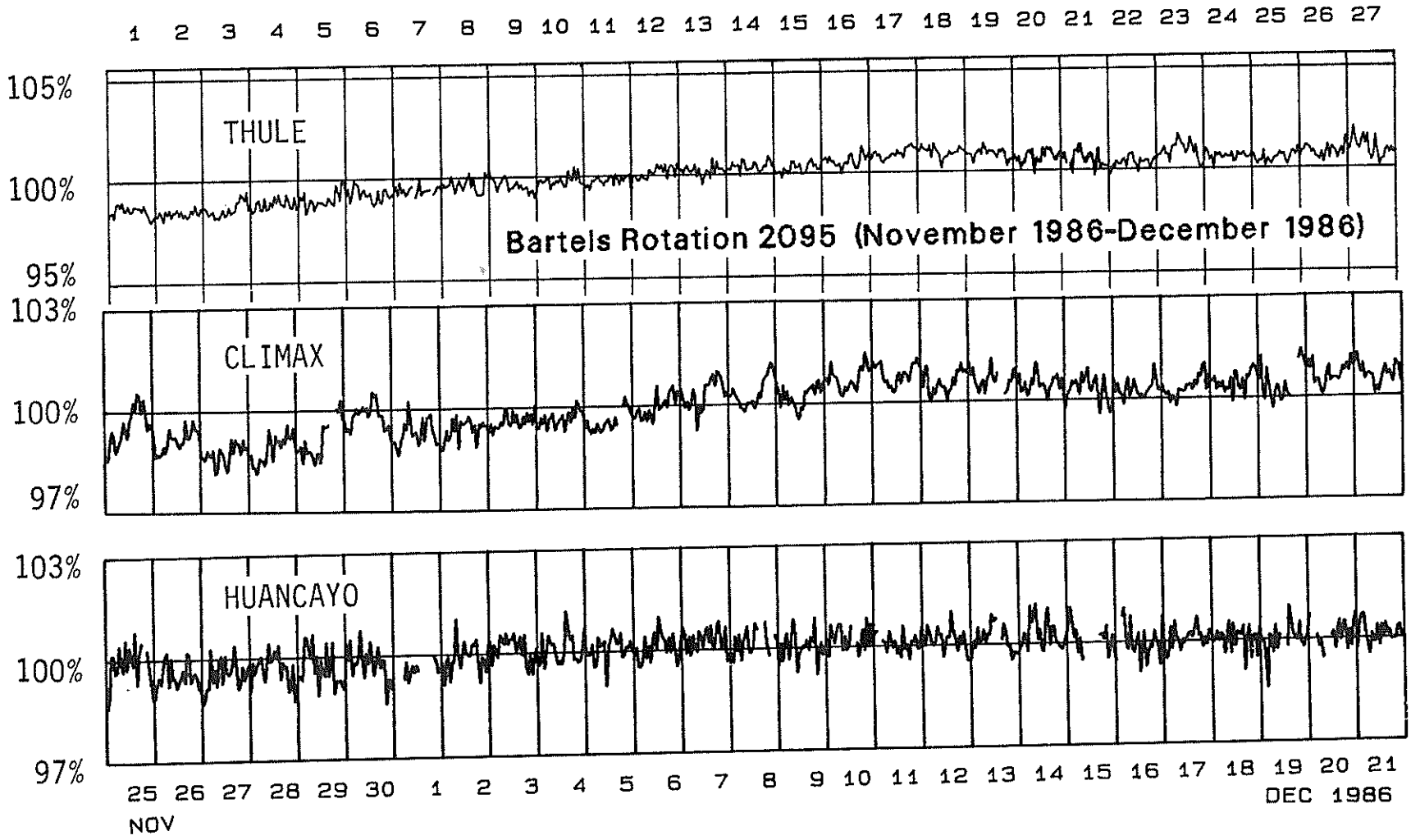
**Observations are not necessarily continuous.

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

DECEMBER 1986

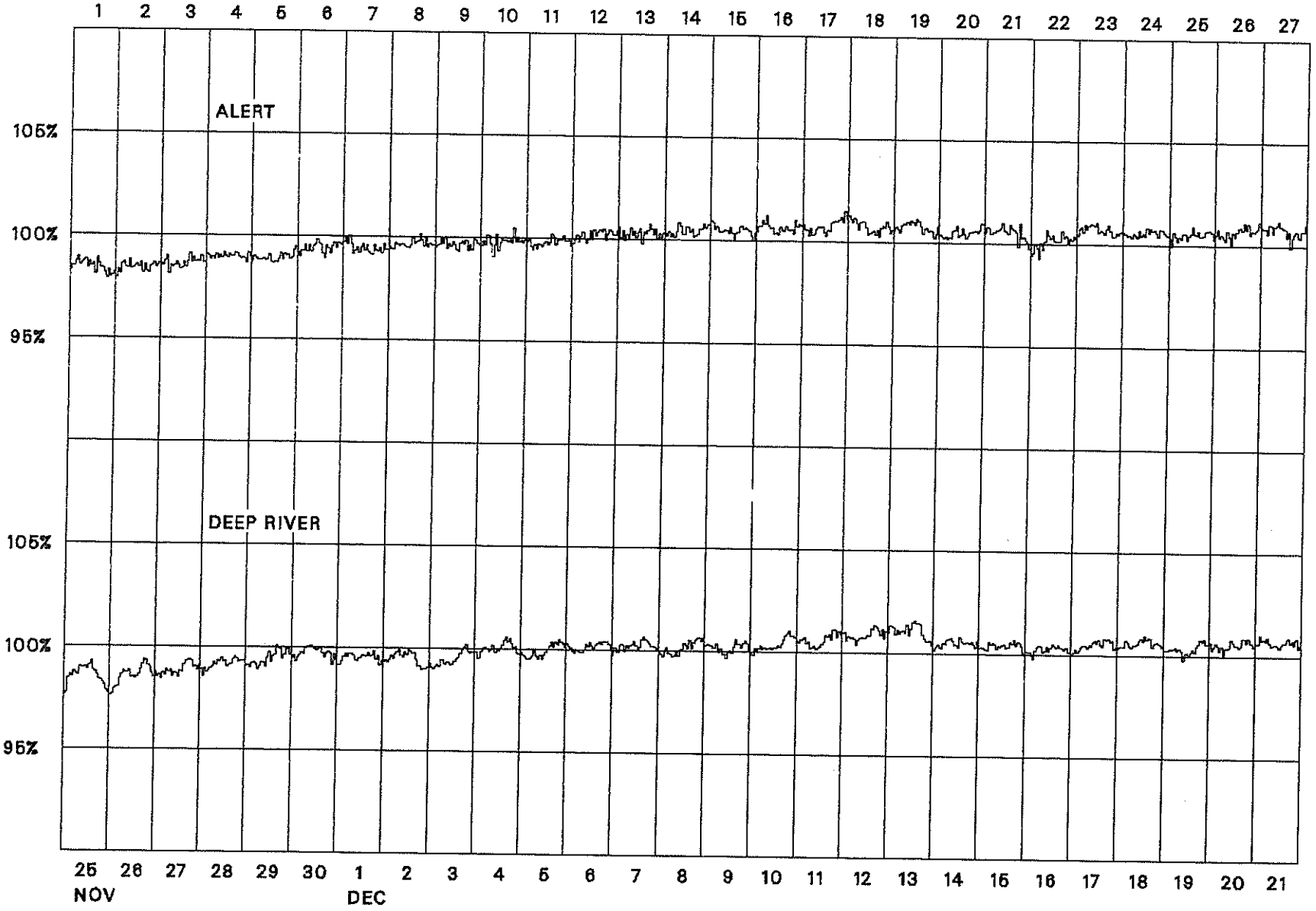
Day	Observation Start (UT)	Observation End (UT)	Sta	Decimetric Band Start (UT)	Decimetric Band End (UT)	Decimetric Band Int (1-3)	Metric Band Start (UT)	Metric Band End (UT)	Metric Band Int (1-3)	Dekametric Band Start (UT)	Dekametric Band End (UT)	Dekametric Band Int (1-3)	Spectral Type
01	0736	1505	WEIS										
02	0737	1241	WEIS										
	1348	1505	WEIS										
03	0741	1504	WEIS										
04	0747	1504	WEIS										
05	0741	1133	WEIS										
	1135	1504	WEIS										
06	0744	1503	WEIS										
07	0743	1503	WEIS										
08			LEAR				0449.0	0452.0	2				III
	0745	1502	WEIS										
09	0748	1502	WEIS										
10	0740	1141	WEIS										
	1200	1503	WEIS										
11	0748	1502	WEIS										
12			CULG							0640.0	0657.0	1	I
	0741	1111	WEIS										
	1143	1502	WEIS										
			CULG							2026.0	2200.0	1	I
13	0750	1503	WEIS										
14	0751	1503	WEIS										
15	0754	1207	WEIS										
	1210	1603	WEIS										
16	0753	1503	WEIS										
17	0831	1502	WEIS										
18			LEAR				0357.0	0402.0	1				III
	0756	1111	WEIS										
	1119	1504	WEIS										
19	0755	1504	WEIS										
20	0755	1206	WEIS										
21	0755	1505	WEIS										
22	0756	1505	WEIS										
23	0756	1258	WEIS										
	1309	1506	WEIS										
24	0759	1507	WEIS										
25	0758	1028	WEIS										
26	0758	1028	WEIS										
	1404	1507	WEIS										
27	0800	1509	WEIS										
28	0758	1510	WEIS										
29	0758	1235	WEIS										
	1321	1504	WEIS										
30	0800	1511	WEIS										
31	0758	1511	WEIS										

COSMIC RAY INDICES
(Neutron Monitor)

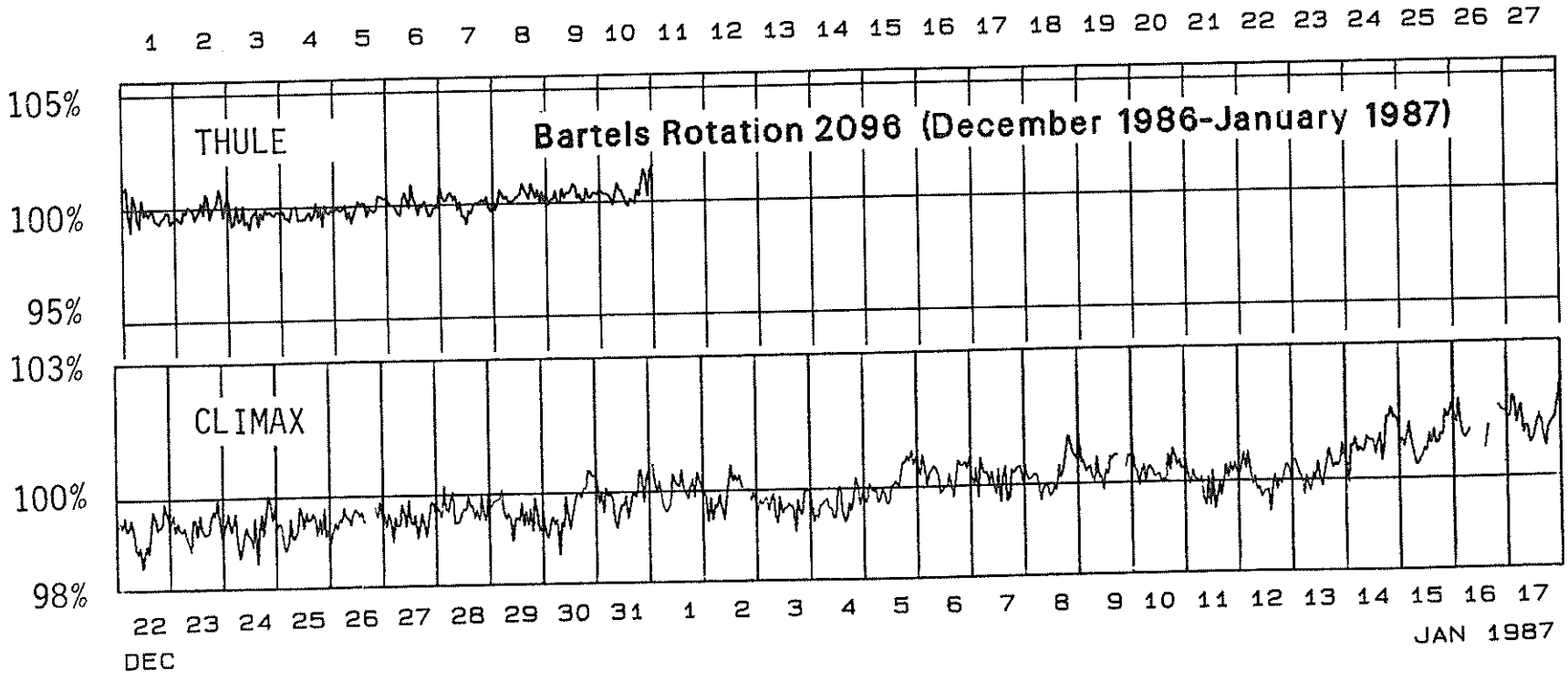


COSMIC RAY INDICES
(Neutron Monitor)

Bartels Rotation 2095 (November 1986-December 1986)

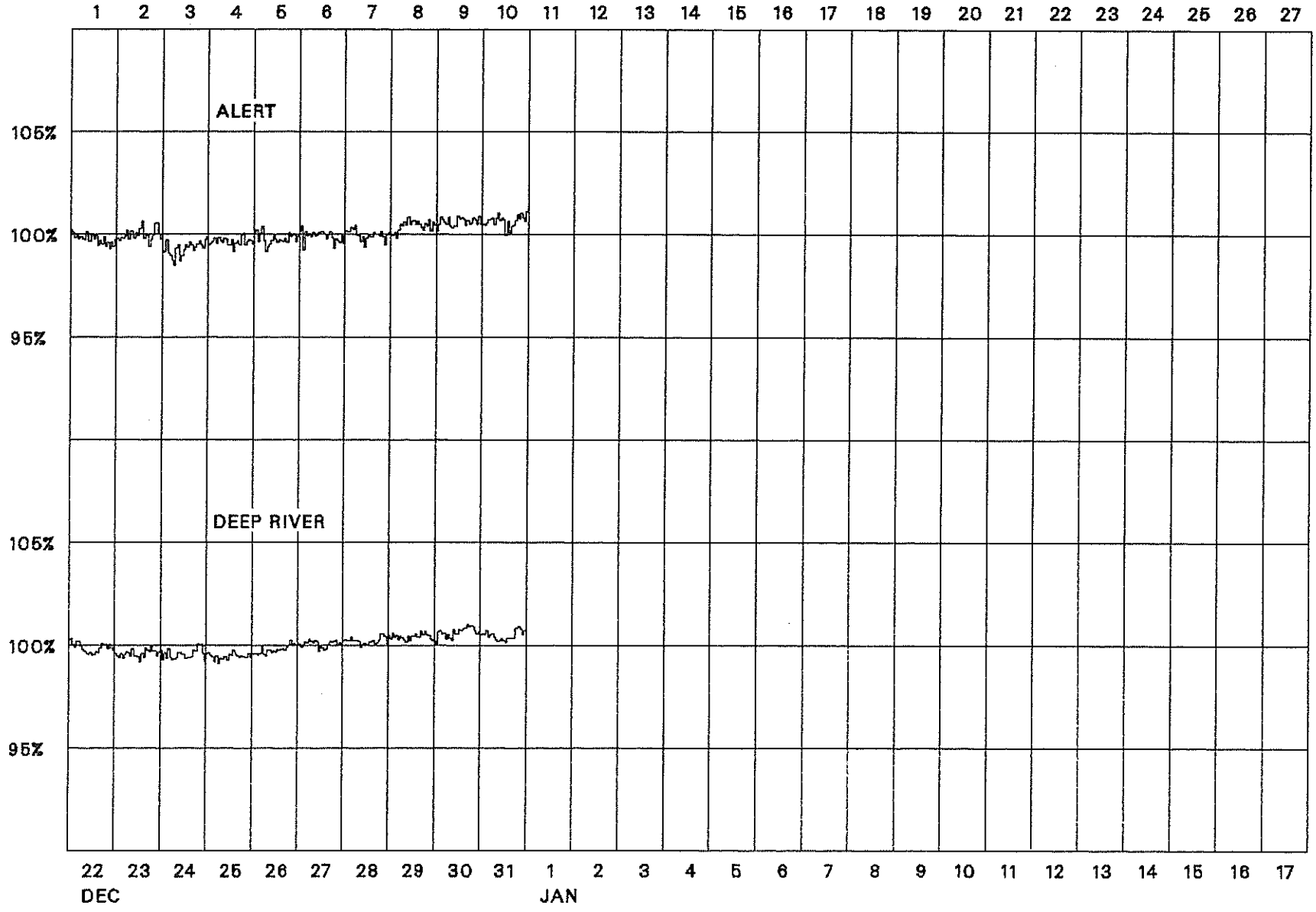


COSMIC RAY INDICES
(Neutron Monitor)



COSMIC RAY INDICES
(Neutron Monitor)

Bartels Rotation 2096 (December 1986-January 1987)



COSMIC RAY INDICES
(Neutron Monitor)

DECEMBER 1986

Day	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	PREDIGTSTUHL Average (cts/h)/100	TOKYO Average (cts/h)/256	HUANCAYO Average (cts/h)/100
1	4540	7409.6	7077.5	6278.0	4183.0			1785.9(24)
2	4550	7424.9	7074.9	6280.9	4185.5			1791.7
3	4545	7425.4	7074.5	6274.8	4195.1			1795.7
4	4557	7437.3	7113.0	6282.4	4197.7			1794.9
5	4555	7436.0	7104.9	6296.9	4193.0			1794.8
6	4572	7463.5	7121.7	6319.6	4210.6			1795.1
7	4574	7472.4	7125.7	6325.1	4225.3			1798.2
8	4583	7483.7	7121.4	6318.4	4225.4			1796.6(38)
9	4577	7487.0	7123.7	6343.6	4220.8			1793.8
10	4593	7499.2	7135.7	6352.3	4241.2			1797.7
11	4608	7505.5	7153.0	6346.7	4246.1			1795.0
12	4609	7505.7	7173.3	6370.2	4235.4			1796.0
13	4603	7506.2	7187.7	6379.7	4237.9			1796.0
14	4596	7486.8	7146.6	6378.6	4231.0			1798.3
15	4587	7490.1	7140.5	6372.5	4223.8			1796.0(32)
16	4581	7459.9	7128.5	6377.5	4223.3			1792.9
17	4606	7503.5	7145.2	6389.9	4224.9			1794.8
18	4593	7492.5	7153.7	6390.7	4230.8			1794.1
19	4589	7486.8	7136.4	6396.0	4229.0			1793.3
20	4602	7499.8	7149.9	6417.3	4239.3			1795.8(36)
21	4609	7506.1	7159.9	6411.3	4238.8			1795.5
22	4588	7472.1	7127.0	6380.8	4225.8			1796.0
23	4597	7490.2	7105.6	6374.5	4229.3			1796.5
24	4581	7439.0	7105.1	6345.3	4227.5			1794.1
25	4583	7464.7	7096.6	6348.4	4228.0			1793.8
26	4595	7475.7	7119.4	6389.9	4235.4			1794.0
27	4598	7483.3	7139.7	6396.7	4233.1			1793.2
28	4598	7488.6	7150.1	6392.5	4242.3			1800.2
29	4613	7520.8	7164.8	6393.8	4236.7			1802.3
30	4613	7535.6	7179.5	6396.4	4241.8			1799.6
31	4619	7540.5	7169.6	6416.1	4251.1			1799.0
Mean	4588	7483.6	7132.4	6358.6	4225.4			1795.6

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

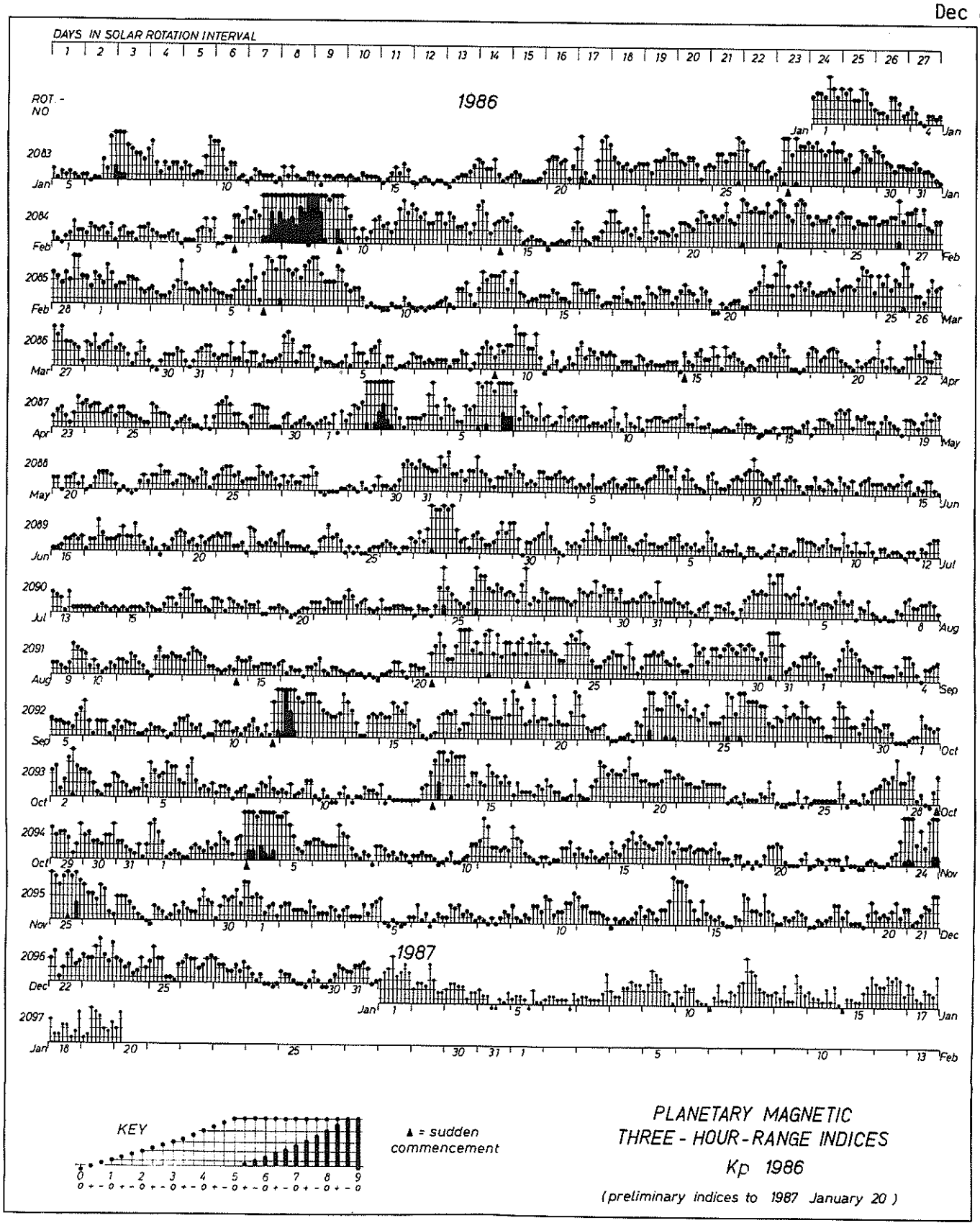
December 1986

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	D4*	4+	3	3+	3	1+	2	2+	1	20+	13	0.8	3+	3-	3	3-	2-	2+	3-	1+	21	21	21	27	16	
2		2	2+	2+	2-	2-	2-	1+	3-	16-	8	0.4	2-	1+	2-	2-	2+	1+	1+	2+	12	15	12	14	13	CC
3		2	1+	1+	1+	2	2-	1	2-	12+	6	0.3	2-	1-	1+	2-	2	2-	1+	1+	11	14	6	10	11	CC
4		2	1	1	1	2+	1+	2+	3-	14-	7	0.3	1+	1-	1+	2-	3-	2-	2+	3-	14	16	13	9	21	K
5	Q5K	3	0+	0	1-	0+	0	0+	1	6-	4	0.1	3-	0+	0+	0+	0+	0	0+	1+	6	7	6	9	4	CK
6	Q6	1	2+	1-	1+	0	1-	1+	1	8+	4	0.1	2	2	1-	1	0	1	1+	1+	9	8	9	10	8	CC
7		1	2+	2	2+	1+	2-	1+	1-	13-	6	0.3	1+	2	2	2+	2	2-	2-	1	13	11	12	12	11	CC
8	Q3	1	1-	0+	1	0+	1	2-	1+	7+	4	0.1	1-	1	1-	1	0+	1-	1+	2-	6	8	8	5	11	CC
9		2+	1	1-	1+	1	2+	2+	2-	13-	6	0.3	2	1+	1-	1+	1+	3-	3-	1+	12	12	17	12	18	
10		3+	3	1+	2-	2-	3-	3-	4-	20	12	0.7	3-	2	1+	2-	2-	3-	3-	3	18	24	13	15	22	
11		3+	2+	2+	2-	2-	2-	1+	1	15+	8	0.4	3-	2-	2	2-	2-	2-	2-	1-	13	12	10	15	8	KK
12	Q7	0	1	1-	1	1-	1	2-	2+	8+	4	0.1	1-	1-	1-	1	1+	1+	2-	2	8	10	9	5	14	CC
13		1+	2	2-	1	2	2	3	5	18	12	0.7	1	2	2-	1+	2	2	3+	4+	22	24	22	11	36	
14	D2	5-	5-	4+	3	2	1	3	2-	24+	20	1.0	4-	4+	4-	3	2	1	3-	2-	31	25	32	43	14	
15	Q2	1+	1	1+	1-	0+	0+	1+	1	7+	4	0.1	1+	1	1	1-	1-	1-	2	1+	8	6	7	7	7	CK
16		4-	3+	2	2	2-	4-	2	2-	20	12	0.7	3+	3	2	2+	2	4-	2	1+	24	22	23	23	22	
17	Q8	1-	1-	1+	1	1+	2	2-	1+	10	5	0.2	1-	1	1+	1+	2	2	2-	1+	10	10	11	7	16	CK
18	Q10K	0+	0+	1	1-	1	1+	3-	3-	10	6	0.2	1-	0+	1	1+	1+	2-	3-	2+	11	11	12	6	17	KK
19		1+	2	1-	1-	1-	0+	2-	3	10+	6	0.2	2-	2	1	1	1-	1-	2	2+	11	11	9	11	10	CK
20		2	1+	2-	1+	2	3	1+	2+	15	7	0.4	2	1+	2-	2-	2	3-	1	2	14	16	17	15	19	K
21		2+	1-	1	2-	3-	2+	4-	4-	18	11	0.6	2+	1-	1	2-	3	3-	3+	3+	21	25	17	10	32	
22	D5*	3	4-	1	2	3+	4-	2+	3-	22-	14	0.8	3-	3-	2-	2	3	4-	2+	2+	24	28	24	19	33	
23	D1	3+	3	3	4	5-	3+	3-	4+	28+	22	1.1	3-	2+	3	4-	4+	3	3-	4-	35	40	31	28	43	
24		3	3-	2	2+	1+	2-	3	2	18	10	0.5	3	3-	2-	2+	2-	2-	3-	2-	18	15	17	17	16	
25		3-	4	3	3	1	1	1-	2+	18-	11	0.6	2+	3	2+	3-	1+	1+	1-	3-	17	20	15	24	12	
26	D3*	3-	3+	3	3	2	2+	3	3+	23-	14	0.8	2+	2+	2+	3	2+	2+	3	3	22	32	21	25	29	
27		3	2+	2+	2-	2-	2+	2-	3-	18-	9	0.5	3-	2-	2	2-	1+	2	1+	2+	14	16	12	15	13	
28	Q4	2	1+	1-	1+	0+	0+	0	0+	6+	3	0.1	1+	1	1-	1	0+	0	0	1	5	6	4	8	3	CC
29	Q1	2-	1+	1+	1-	0+	0+	0	1-	6+	3	0.1	1+	1	1	1	1-	1-	0	1-	6	6	4	8	3	CC
30	Q9	2-	1-	0	0	1-	1+	2+	2	9-	4	0.1	1	1-	0+	0+	1	1+	2+	2+	8	13	12	6	17	KK
31		2-	2-	2+	2+	3-	2	0+	1-	14-	7	0.3	1	1	2+	2+	2+	2-	1-	1+	12	12	13	12	13	C
Mean											8	0.42									14.7	16.1	14.2	15.3	

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	S_a	Prov R_I	R_a	R_s	IMF	
1	3+	2+	3	3	2	2+	3-	1	22	3	3	3-	2+	1+	2+	2+	2-	21	70.7	0	0	14	D	-
2	2-	1+	2-	2-	2+	1+	1	2+	12	2-	1	2-	2	2	2-	1+	2+	13	70.6	0	0	14	A	-
3	1+	1-	2-	2-	2+	2-	1+	1+	11	2+	1-	1+	2-	2-	1+	1+	1+	10	70.2	0	0	14	T	-
4	1+	0+	1+	2	2+	2-	2+	3-	14	1	1-	1+	1+	3-	2-	2+	3-	14	69.2	0	0	13	A	-
5	2+	0+	0	0+	1-	0	0+	1+	5	3	1-	0+	0+	0+	0+	0+	2-	7	70.0	0	0	14		-
6	2-	2	0+	1	0	1	1+	1+	8	2+	2	1	1	0+	1	2-	1+	10	69.1	0	0	13	N O	-
7	1	2-	2	2+	2	2-	1+	1-	11	1+	2+	2	2+	2-	2-	2	1+	14	68.2	0	0	12	T	-
8	1	1-	0+	1	0+	1	1+	1+	6	1-	1+	1	1	0	1-	1+	2-	7	69.1	0	0	13		-
9	2	1	1-	1+	1+	2+	2+	2-	11	2-	1+	1	2-	1+	3-	3	1+	14	70.8	12	11	14	C	-
10	3	2+	1	2	2-	3-	3-	3	20	2	2	1+	2-	2-	2	3-	3-	15	72.3	20	29	16	U R	-
11	3	2-	2	2-	2-	2	1+	1-	14	3-	1+	2-	2-	2	1	2-	1-	11	73.0A	23	21	17	R	-
12	0+	1-	0+	1	1+	2-	2-	2+	8	1	1-	1-	1	1	1	2-	2-	8	71.1	22	18	15	E	-
13	1-	2-	2-	1	2	2	3+	5-	21	1	2	2-	1+	2	2-	3+	4+	22	71.5	24	19	15	N	-
14	4-	4+	4-	3	2+	1	3	2-	33	4-	4+	3+	3-	2-	1	2+	1+	29	71.4	13	0	15	T	-
15	1+	1	1-	1	1-	1-	2-	2-	7	2-	1-	1+	0+	1-	1-	2+	1+	8	70.9	0	0	15	L Y	-
16	3+	3-	2+	3-	2-	4	2	1+	25	3+	3	2	2	2+	4-	2-	1+	23	70.8	11	0	14		-
17	1-	1-	1+	1	2	2+	2-	1+	10	1	1+	1+	1+	2	2-	1+	1+	10	71.7	9	0	15	A	-
18	1-	0+	1-	1	1+	2-	3-	3-	10	1	0+	1+	1+	1+	1+	3-	2	11	71.4	0	0	15	V	-
19	1+	2	1	1	1-	1-	2-	2+	9	2+	2	1	1	1-	0+	2+	3-	12	71.0	0	0	15	A	-
20	2-	1	1	1+	2	3-	1	2	12	2	2-	2+	2-	2-	3	1+	2	15	70.4	0	0	14	I L	-
21	2	1-	1+	2-	3	2+	3+	4-	21	2+	1-	1-	2-	3	3	3+	3+	21	70.6	11	12	14	A	-
22	3-	3	1+	2	3+	4-	2+	3-	25	3-	2+	2-	2	3-	4-	2+	2+	22	71.4	16	17	15	B	-
23	3-	2	3-	4-	5-	3+	3-	4-	37	2+	2+	3	3+	4	3-	3-	4-	32	70.8	16	12	14	L	-
24	3	3-	2-	3-	2-	2-	3-	2-	17	3-	3-	2-	2	2-	2-	3	2-	18	70.0	13	9	14	E	-
25	2	3	3-	3	1+	1+	0+	3-	18	3-	3	2+	2+	1	1+	1-	3-	17	70.0	9	0	14		-
26	2+	2+	2+	3	2+	3-	3	3	24	2	2+	3-	3	2	2	3-	3-	21	69.7	0	0	13		-
27	3-	1+	2+	2-	2-	2+	1+	2+	15	3-	2-	1+	2-	1+	2-	1+	2+	13	69.4	0	0	13		-
28	1+	1-	0+	1+	0	0+	0	1-	4	1+	1	1	1	0+	0	0	1+	6	69.2	0	0	13		-
29	1+	1	1+	1	0+	1-	0	1-	5	1+	1	1-	1+	1	0+	0+	1	6	69.2	0	0	13		-
30	1	1-	0	1-	1+	1+	2	2	8	1-	1-	0+	0+	1	1+	3-	2+	9	69.6	0	0	13		-
31	1+	1	2+	3-	3-	2	1-	1	13	1	1+	2	2+	2+	2-	1	2-	12	68.1	11	10	12		-
Mean									14.7									14.5	70.4	6.8	5.1	14.0		

DAILY AVERAGE INDICES Ap

DAY	1986 JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	25	5	18	8	5	15	7	6	9	7	13	13
2	18	6	12	5	43	8	13	5	16	23	6	8
3	10	6	12	14	40	10	8	19	7	9	16	6
4	5	5	8	4	17	7	7	20	7	7	67	7
5	4	7	8	9	17	5	7	9	9	19	20	4
6	20	11	32	4	67	6	5	6	8	12	12	4
7	32	82	33	5	12	12	4	4	5	5	6	6
8	11	202	23	5	7	7	6	7	5	6	4	4
9	14	100	5	13	5	7	6	10	6	6	3	6
10	11	10	2	19	6	13	6	6	6	3	5	12
11	4	20	2	6	6	6	4	7	16	4	14	8
12	5	18	7	10	7	6	6	10	89	2	9	4
13	3	15	21	5	4	6	7	10	22	28	5	12
14	4	19	8	4	3	6	4	5	12	31	5	20
15	5	5	8	7	4	5	4	6	18	14	12	4
16	3	5	6	8	7	5	5	4	7	6	11	12
17	6	9	6	6	8	8	8	5	14	6	8	5
18	7	14	8	7	5	9	6	3	20	13	6	6
19	4	9	9	11	8	5	4	4	21	21	4	6
20	15	17	3	5	5	6	3	15	18	14	5	7
21	27	26	17	7	6	6	6	29	11	11	3	11
22	11	30	22	11	3	8	7	29	4	6	2	14
23	17	35	11	10	8	5	5	25	43	5	12	22
24	12	19	21	12	7	7	15	22	22	2	46	10
25	26	18	27	7	10	3	17	17	26	4	49	11
26	12	26	12	7	8	5	20	12	27	3	17	14
27	37	20	18	4	7	28	16	13	20	16	9	9
28	30	25	14	11	3	18	9	12	13	9	5	3
29	19		8	9	4	11	17	22	13	15	10	3
30	14		5	5	10	9	11	27	5	14	14	4
31	8		7		17		12	16		6		7
MEAN	14	27	13	8	12	8	8	12	17	11	13	8


DAYS IN SOLAR ROTATION INTERVAL
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
ROT. NO
1986
2083
2084
2085
2086
2087
2088
2089
2090
2091
2092
2093
2094
2095
2096
1987
2097
KEY
0 1 2 3 4 5 6 7 8 9
0 + - 0 + - 0 + - 0 + - 0 + - 0 + - 0 + - 0 + - 0
▲ = sudden commencement
PLANETARY MAGNETIC
THREE - HOUR - RANGE INDICES
Kp 1986
(preliminary indices to 1987 January 20)

R9	Rot-No.	1st day	C9
765 576 666	19	025	4 2 5 554 2 3 2 3 2 1 . . 2 573 5 2 2 566 644
556 765 3 2 2	83	J 21	3 2 2 543 3 2 4 533 1 2 7 877 555 566 666
2 3 4 666 5 4 2		F 17	443 765 44 1 1 2 2 576 663 2 1 2 1 67 664
565 544 445	2045	M 16	3 3 5 663 2 2 3 73 . 666 654 444 666 552
546 678 766	46	A 12	367 765 3 2 3 344 766 436 654 366 423
777 677 655	47	M 9	. 2 7 765 5 2 7 3 1 3 676 732 3 1 1 233 2 1 .
665 667 765	48	J 5	1 3 1 356 347 342 465 455 4 1 1 323 3 1 1
555 566 764	49	J 2	2 2 2 1 44 3 2 1 . 45 1 1 5 65 2 2 1 2 563 1 2 3
675 566 544	2050	J 29	45 2 1 64 1 1 1 573 1 1 663 2 3 1 . 1 2 3 6 465
444 555 333	51	A 25	66 1 2 45 64 1 1 1 . 1 54 433 3 2 1 566 375
344 356 775	52	S 21	3 3 . 2 66 4 3 2 . 3 5 572 5 3 4 1 2 1 . 65 5 3 7
3 2 2 1 2 3 553	53	D 18	72 1 455 5 1 . . 2 6 5 2 5 65 1 . . 3 676 675
3 3 1 . 1 2 2 3 5	54	N 14	656 665 62 1 . 34 524 554 2 1 1 466 3 . 5
5 4 3 2 2 1 1 1 2	2055	D 11	655 64 1 1 2 1 . 3 343 443 2 66 655 664
344 455 776	19	J 7	1 . . 43 1 2 1 1 1 2 1 5 2 3 3 1 1 2 4 2 556 545
567 654 676	84	F 3	574 2 2 2 2 55 367 5 1 2 4 1 4 4 2 4 2 2 4 623
544 567 666		M 1	666 2 . 6 663 4 2 3 5 1 2 455 3 1 2 553 645
675 4 2 2 455	2059	M 28	776 667 777 367 624 445 2 1 2 2 3 5 3 1 1
777 436 765	2060	A 24	. 68 645 2 54 336 3 1 . 562 3 2 3 2 1 6 356
565 532 235	61	M 21	766 644 2 2 2 4 2 1 3 66 533 354 3 1 1 . 57
544 334 554	62	J 17	3 66 4 1 . 3 5 3 2 3 5 3 3 4 3 3 3 3 2 3 2 4 3 3 7
2 2 2 3 1 1 2 2 3	63	J 14	666 754 3 2 2 2 3 2 1 45 3 2 4 764 4 2 1 . 44
3 2 2 1 2 3 3 3 4	64	A 10	2 3 4 2 5 5 4 3 1 4 2 1 . 2 5 5 2 6 654 3 3 3 77
2 1 1 1 1 1 1 1 .	65	S 6	2 1 3 3 6 4 4 3 4 2 2 1 1 . 65 3 5 8 777 643 3 1 3
1 1 2 2 2 1 1 1	66	D 3	5 1 2 5 7 5 5 6 6 6 4 4 4 5 . 777 776 654 2 2 2
1 1 1 2 2 1 1 1 3 4	67	D 30	1 1 6 3 5 5 3 4 5 5 3 5 5 2 2 4 78 655 554 3 2 3
3 2 2 2 2 2 2 1	68	N 26	2 1 1 3 6 4 656 555 2 1 2 546 2 66 642 1 4 2
2 2 1 . . . 1 2 2	2069	D 23	4 1 1 6 4 6 656 644 2 1 1 1 57 655 4 2 2 2 1
4 3 1 1 2 2 1 2 1	19	J 19	1 1 3 3 6 1 2 1 3 764 4 4 3 2 . 5 756 564 334
1 2 2 1 1 1 . 1 2	85	F 15	2 1 3 . 2 3 2 2 2 5 3 1 574 5 4 2 765 6 . 2 1 2 .
1 2 1 2 3 2 2 2 1		M 14	1 4 3 2 3 2 1 1 1 1 1 1 2 2 4 1 2 2 545 4 1 1 2 46
. . . 1 2 3 2 2 2	2073	A 10	3 3 1 1 2 1 2 1 . 578 3 3 4 566 747 26 1 2 2 3
3 3 3 3 3 3 1 1 1	74	M 7	2 2 2 1 1 3 3 2 4 3 2 2 2 1 2 1 1 1 2 2 1 . . . 5
2 3 4 3 2 1 1 1 1	75	J 3	. . . 1 664 563 2 1 . . 1 2 . . 4 1 1 1 3 5 3 5 4
2 3 5 5 2 1 1 1 1	76	J 30	2 4 . . 1 6 4 554 2 2 3 754 2 1 5 3 2 2 1 1 3 3 3 4
3 3 2 2 1 1 1 1 1	77	J 27	4 3 1 3 6 5 3 1 1 . . . 1 1 2 1 67 3 3 2 2 3 3 3 6
1 1 1 1 . . 1 1 1	78	A 23	4 2 5 4 4 4 4 3 6 1 . . . 1 2 2 3 3 2 1 1 6 5 6 3 1
1 1 1 1 1	79	S 19	665 3 2 4 554 1 1 1 . 1 3 3 77 64 1 1 4 3 5 2 5
2 3 5 3 1 . . 1 2 2	2080	D 16	4 4 5 4 1 4 4 4 3 2 2 1 . . 3 . 1 4 6 6 4 3 4 1 1 4 5 2
3 3 3 1 . . . 1 1 2	81	N 12	. 6 4 4 3 4 4 4 . 1 2 . . 1 1 5 2 6 7 4 4 2 3 2 1 . .
2 2 4 3 1 1	82	D 9	1 4 3 2 6 3 2 1 2 3 7 3 1 1 1 2 1 2 3 6 . 7 5 6 5 2 1
. . 1 1 . . . 1 1 1	19	J 5	. 5 6 3 4 3 1 . . 1 . . 2 . 4 6 3 4 3 6 3 6 6 5 4 2
3 4 4 3 2 . 1 1 1	86	F 1	1 1 1 2 3 7 8 8 3 5 5 4 5 1 1 2 4 2 4 6 6 6 5 5 6 5
2 3 3 2 1 1 1 1 1		F 28	6 5 3 3 2 2 6 6 5 1 . . 2 5 2 1 1 2 2 . 4 5 3 5 6 3
1 1 1 1 1 1 2 1 2	86	M 27	5 4 2 1 2 2 1 4 . 2 1 1 1 3 5 1 2 1 1 1 2 1 2 3 1 2 3
4 3 2 2 1 . . 1 2	87	A 23	3 3 2 2 . 3 2 1 1 . 774 473 2 1 1 1 2 . . . 2 2 1 2
2 2 2 1 1 . . 1 1	88	M 20	1 1 1 . 2 1 2 2 2 . . 3 4 4 2 3 2 1 1 3 2 1 3 1 1 1 1
1 1 1 . . 1 1 2 2 3	89	J 16	1 2 2 1 1 1 2 1 2 . . 6 5 3 2 2 4 2 2 2 1 1 1 1 1 1
2 2 2 1 1 2 1 1 1	2090	J 13	1 1 1 . 1 2 1 1 1 1 1 4 4 5 4 2 4 3 3 1 1 5 5 2 1 1 2
1 1 1 1 1 1 1 1 1	91	A 9	3 1 1 2 3 1 1 1 1 . . 1 4 6 6 6 5 4 3 4 3 5 6 4 2 4 1 2
1 1 1 1 1 . . . 1 1	92	S 5	2 2 1 1 1 1 4 7 5 3 5 1 4 5 5 5 3 . 7 5 6 6 5 3 4 1 2
2 2 2 1 2 4 5 5	93	D 2	5 2 1 5 3 1 1 1 . . . 6 6 4 1 1 4 5 4 3 1 . . . . 4 2
4 3 3 2 1 1 1 1 1	94	D 28	4 4 1 3 1 4 7 5 3 1 . . 1 4 2 1 1 3 3 2 1 . . . . 3 7
1 1 . . 1 1 2 1 1 1	95	N 25	7 4 2 1 3 4 4 2 1 . . . 1 . 1 3 2 . 3 5 . 3 1 1 1 2 3
1 1 1 .	96	D 22	4 5 2 3 4 2 1 . . . 1 6 3 2 . . . . 2 3 1 . 5 2 1 2 4 3
	19	J 18	preliminary
	87	F 14	2 3
		M 13	

Symbol		.	2	3	4	5	6	7	8	9
$\bar{R}$ =	0	1-15	16-30	31-45	46-60	61-80	81-100	101-130	131-170	171...
R9,C9 =	0	1	2	3	4	5	6	7	8	9
Cp =	a.0-a.1	a.2-a.3	a.4-a.5	a.6-a.7	a.8-a.9	1.0-1.1	1.2-1.4	1.5-1.8	1.9	2.0-2.5

DAILY GEOMAGNETIC CHARACTER FIGURES C9 AND 3-DAY MEAN SUNSPOT NUMBERS R9

(after Bartels)

Editor: Institut für Geophysik, Postfach 2341, D-3400 Göttingen, F.R. Germany

PRINCIPAL MAGNETIC STORMS

DECEMBER 1986

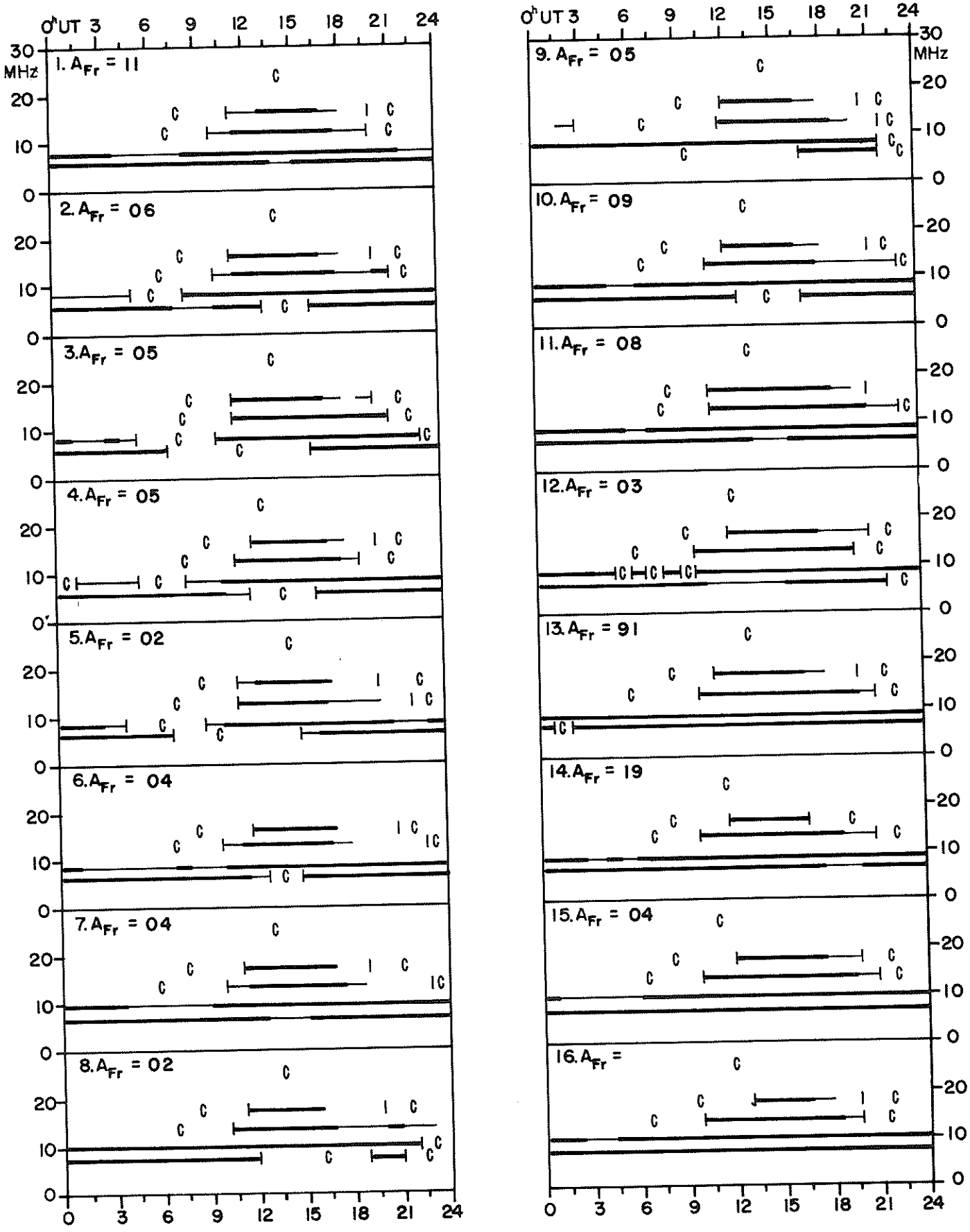
Sta	Geomag Lat	Commencement Time Day	(UT)	Type	SC Amplitudes D (Min)	H (Gamma)	Z (Gamma)	Maximum 3-Hour K Index Day(3-Hour Periods)	K	Ranges D (Min)	H (Gamma)	Z (Gamma)	End Day	Hour (UT)
FRD	49.6N	13	18--	..	..	..	..	14(2)	5	22	76	25	15	--
JAI	17.3N	13	1200	..	..	..	..		-	3	87	15	14	24
KRC	16.4N	13	12--	..	..	..	..	14(2)	6	5	90	47	15	09
SHL	14.7N	13	1200	..	..	..	..		-	3	75	22	14	24
UJJ	13.5N	13	1200	..	..	..	..		-	3	89	14	14	24
ABG	09.5N	13	1200	..	..	..	..	14(2,3)	5	3	94	20	14	24
HYB	07.6N	13	1150	..	..	..	..	14(2,3)	5	3	95	12	14	21
GUA	04.0N	13	2305	..	..	..	..	14(2)	5	--	50	20	14	10
ETT	00.6S	13	0230	..	..	..	..		-	-4	122	63	14	21
TRD	01.1S	13	1200	..	..	..	..		-	3	--	--	14	24
KRC	16.4N	21	03--	..	..	..	..	22(6) 23(5)	5	6	85	27	25	12
HYB	07.6N	21	1000	..	..	..	..	22(6)	5	3	93	19	23	23
ETT	00.6S	21	1311	SC-	0.1	6	5		-	-4	104	52	24	09
JAI	17.3N	23	0400	..	..	..	..		-	5	66	24	23	24
SHL	14.7N	23	0400	..	..	..	..		-	4	57	19	23	24
UJJ	13.5N	23	0400	..	..	..	..		-	4	76	23	23	24
ABG	09.5N	23	0400	..	..	..	..	23(4,5,6)	4	4	83	27	23	24
TRD	01.1S	23	0400	..	..	..	..		-	3	107	65	23	24
HYB	07.6N	31	1900	..	..	..	..	01(7)	5	3	104	9	01	23

Stations Reporting:

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

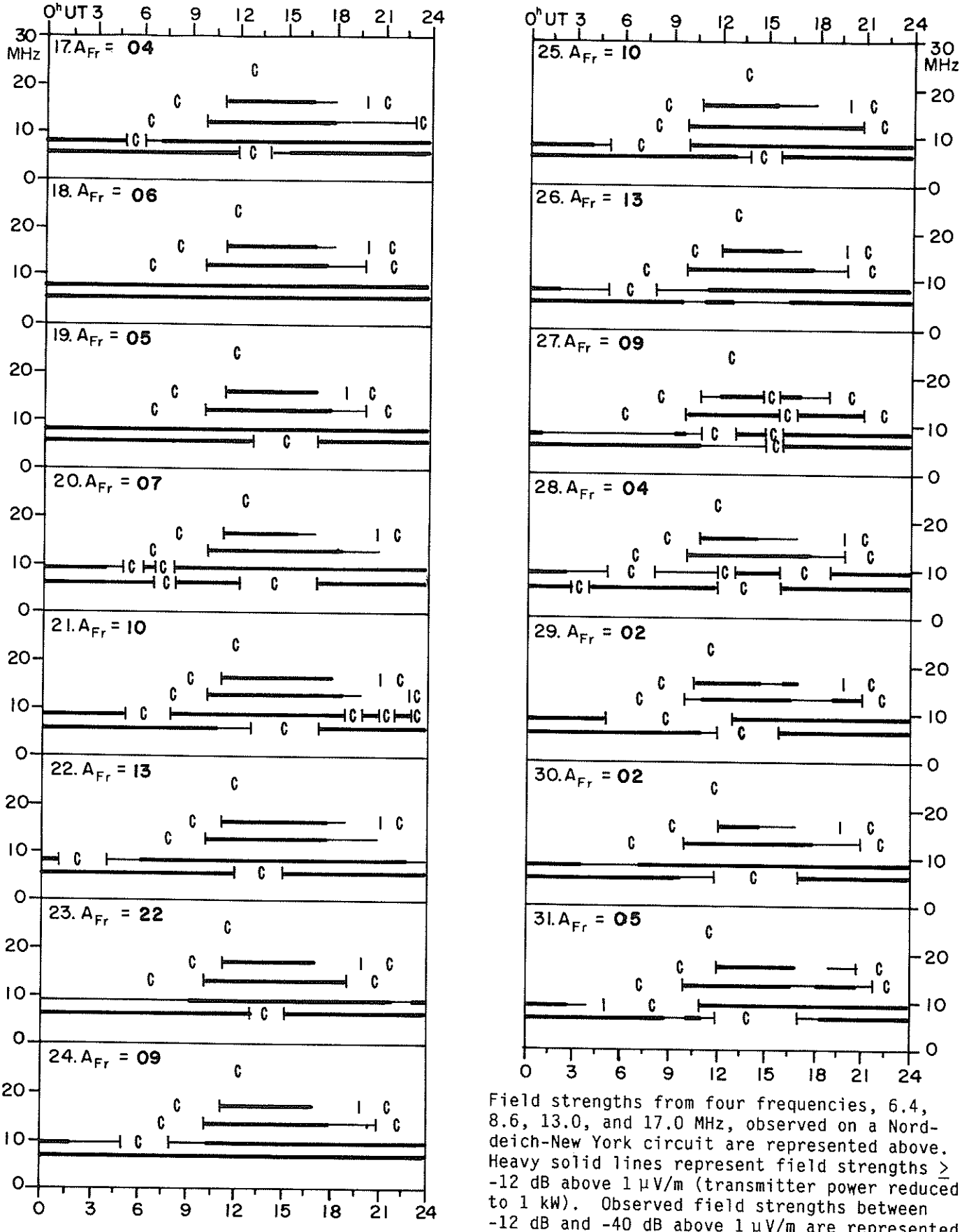
TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

DECEMBER 1986



TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

DECEMBER 1986



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.

RADIO PROPAGATION QUALITY INDICES

DECEMBER 1986

Day	For Circuits Norddeich to: Bracknell	Teheran	New York	Tokyo	Johannesburg	Canberra
1	4.9	5.0	4.3	4.6	5.1	4.5
2	5.8	6.7	5.2	5.1	6.5	5.1
3	5.7	6.3	6.5	4.7	6.3	4.8
4	5.4	5.8	6.3	5.5	3.8	4.7
5	4.7	3.1	4.9	3.8	3.2	4.4
6	5.3	5.1	4.8	7.8	4.0	3.9
7	5.7	7.1	5.5	5.2	4.5	4.2
8	5.7	1.8	6.9	6.5	4.2	6.0
9	5.6	6.0	6.9	4.1	5.1	6.2
10	5.9	4.0	6.8	9.4	6.1	7.1
11	7.0	8.1	7.8	8.1	6.4	7.0
12	7.0	7.4	7.5	8.3	6.4	6.7
13	7.1	4.6	8.0	9.1	6.7	7.2
14	7.1	6.6	6.7	8.7	6.1	7.3
15	6.7	6.3	7.3	8.5	5.7	6.5
16	6.3	8.5	7.1	8.5	6.1	7.6
17	5.7	5.6	7.1	8.4	5.4	4.4
18	5.9	3.8	7.0	8.3	4.9	6.6
19	4.8	3.0	6.3	8.1	3.9	6.7
20	5.4	4.9	6.8	8.8	5.1	6.4
21	4.9	3.1	7.1	7.4	4.9	5.9
22	4.3	3.1	5.3	8.6	3.9	5.5
23	5.2	4.5	5.5	8.2	4.4	5.8
24	5.7	5.5	5.8	8.8	3.7	6.2
25	5.7	6.4	5.8	8.6	4.6	6.7
26	5.4	5.0	4.7	8.5	5.5	6.6
27	4.7	5.9	6.1	8.6	5.7	6.2
28	5.6	3.5	5.1	8.1	4.7	5.4
29	4.5	3.7	5.8	6.3	5.1	5.3
30	5.3	5.2	5.4	7.8	4.8	5.1
31	5.3	4.0	5.9	8.1	5.0	5.1
MEAN	5.6	5.1	6.2	7.4	5.1	5.8

CALCULATION OF QUALITY INDICES (Q)

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

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

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

SCALE FOR QUALITY INDICES

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

C O N T E N T S

Prompt Reports LATE DATA Number 510 Part I

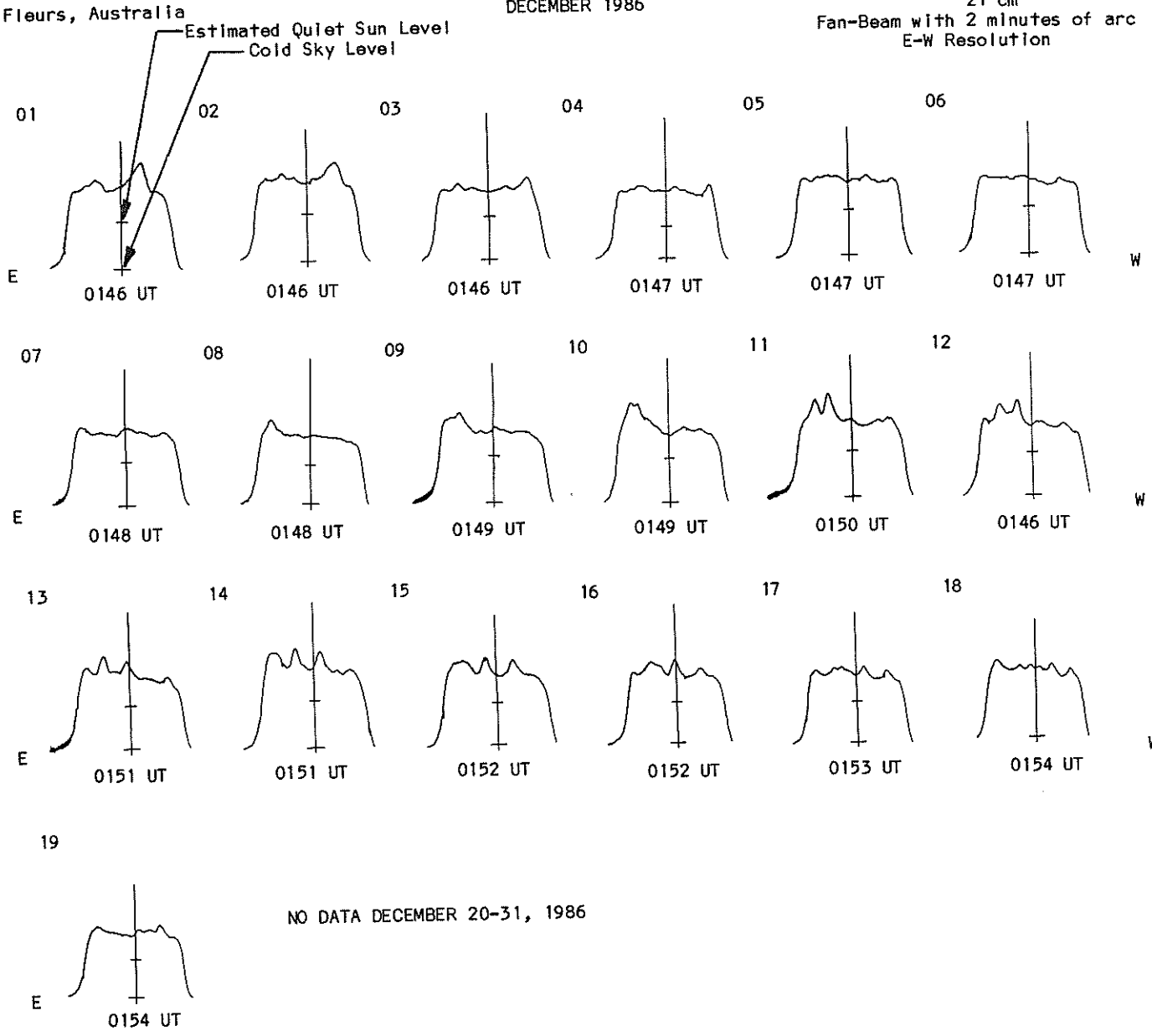
76
Late
Dec 86

EAST-WEST SOLAR SCANS

Fleurs, Australia

DECEMBER 1986

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



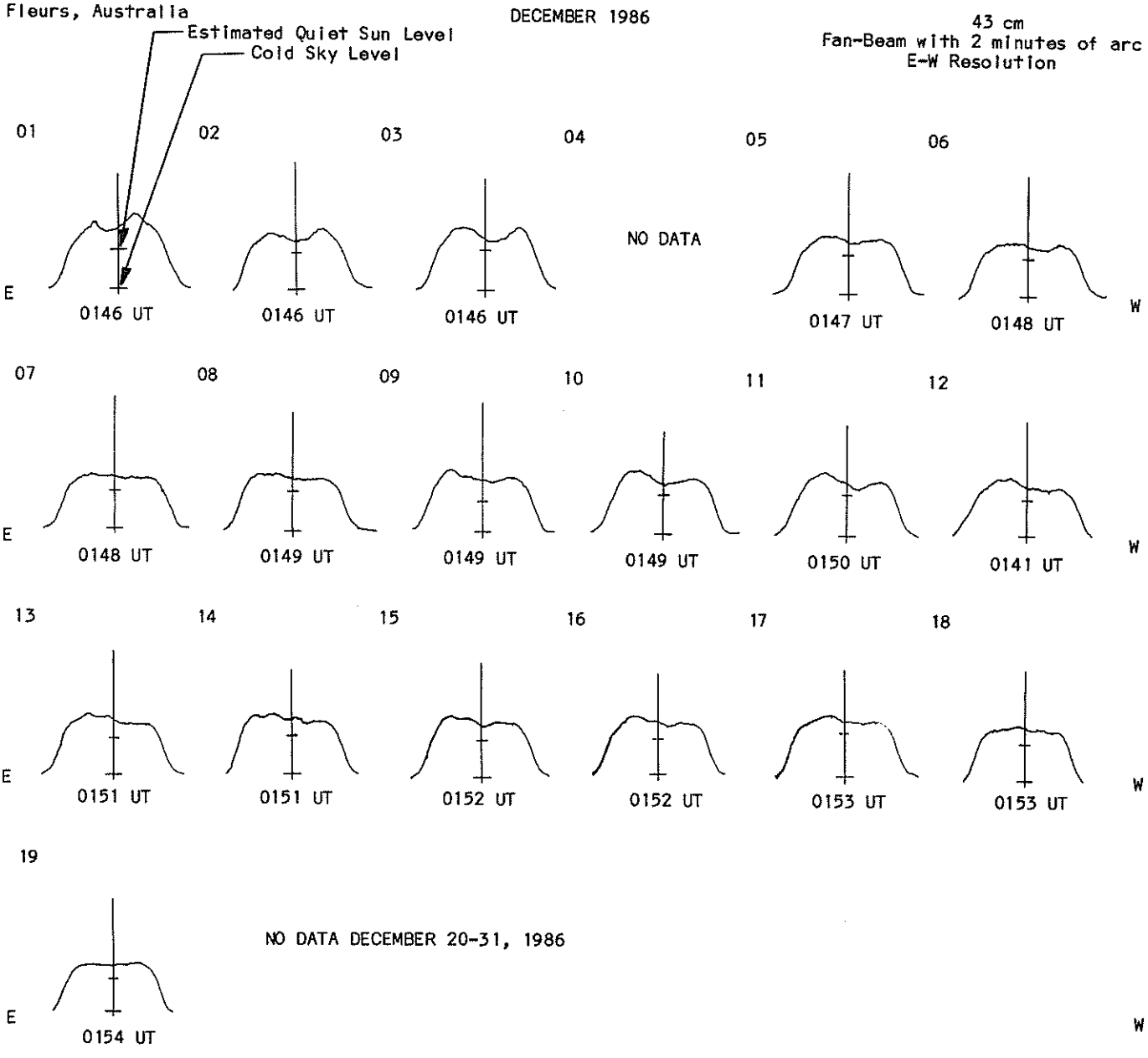
NO DATA DECEMBER 20-31, 1986

EAST-WEST SOLAR SCANS

Fleurs, Australia

DECEMBER 1986

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

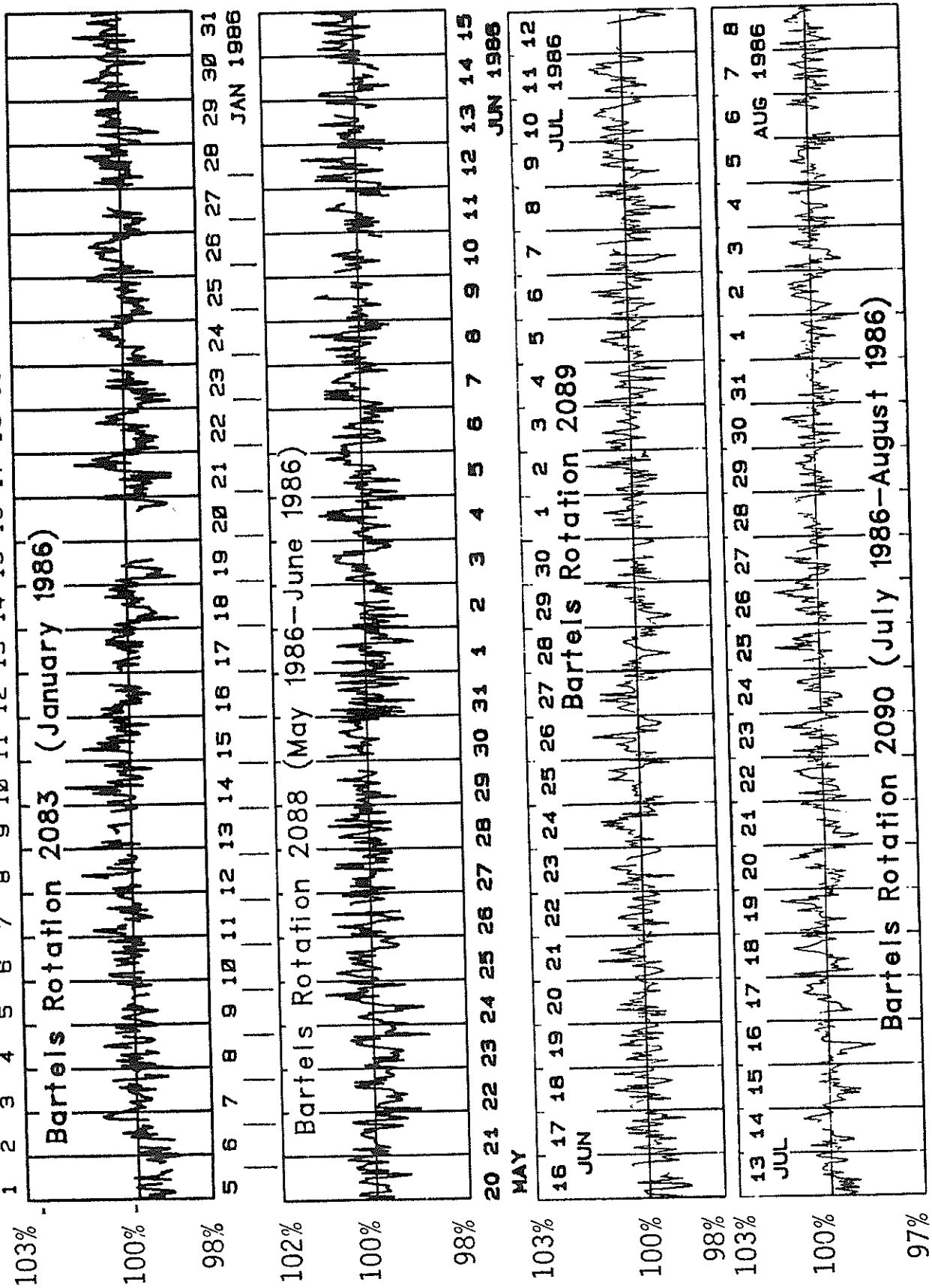


NO DATA DECEMBER 20-31, 1986

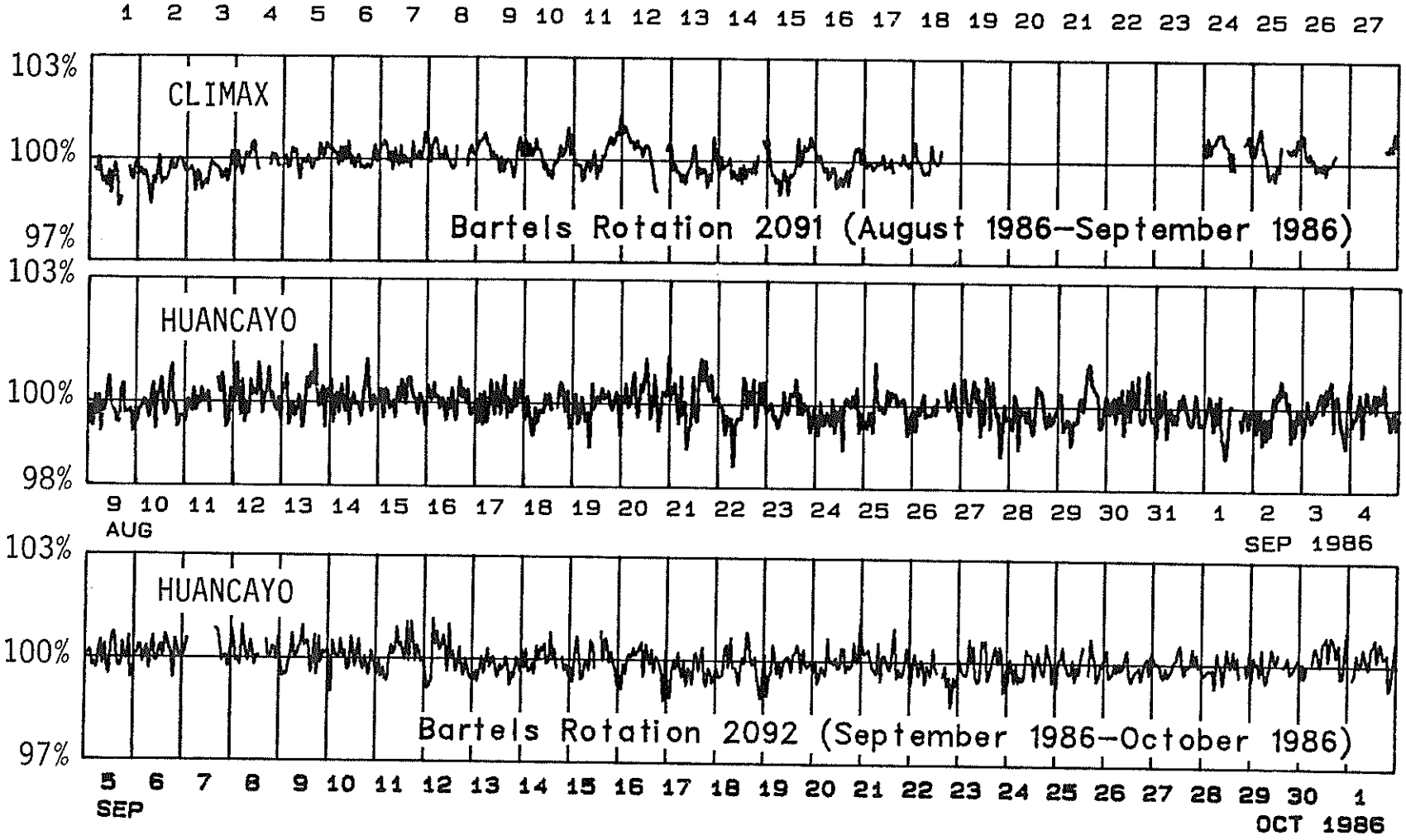
78
Late
Jan-Aug 86

COSMIC RAY INDICES
(Neutron Monitor)

HUANCAYO

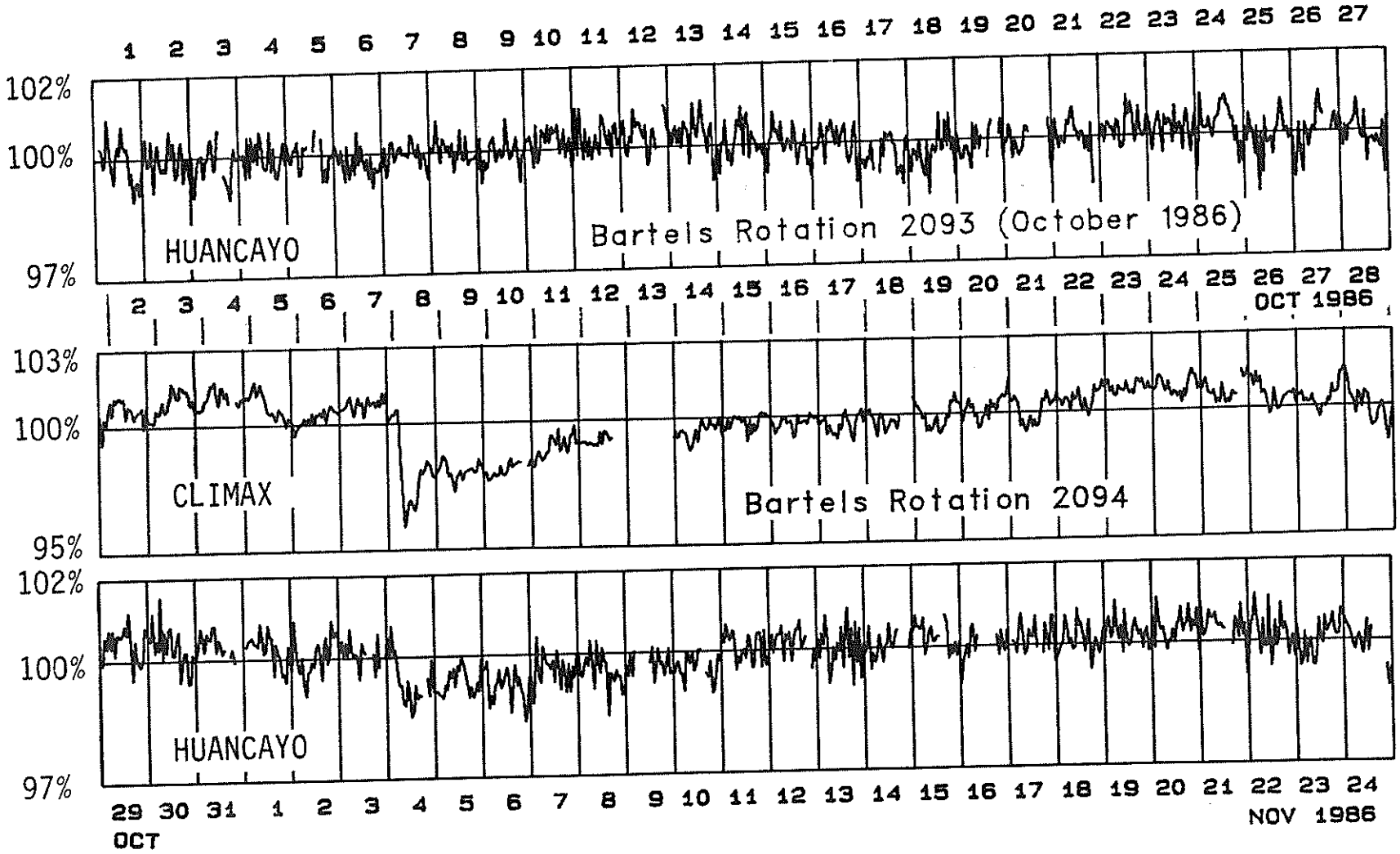


COSMIC RAY INDICES
(Neutron Monitor)



79
Late
Aug–Oct 86

COSMIC RAY INDICES
(Neutron Monitor)



COSMIC RAY INDICES
(Neutron Monitor)

JANUARY 1986

Day	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	PREDIGTSTUHL Average (cts/h)/100	TOKYO Average (cts/h)/256	HUANCAYO Average (cts/h)/100
1	4455	7242.1	6921.5	6227.5	4067.2(38)	1181	3640.9	1770.9(34)
2	4458	7242.6	6914.7	6237.4	4083.8	1187	3657.2	1771.9
3	4473	7269.0	6926.3	6226.4	4079.1	1188	3654.7	1773.0
4	4482	7291.5	6938.2	6232.7	4083.5	1190	3649.0	1774.3
5	4492	7285.7	6972.2	6242.6	4090.3	1186	3661.7	1771.1
6	4494	7290.7	6991.9	6230.3	4101.1	1195	3652.6	1778.5
7	4471	7256.4	6933.0	6193.1	4083.4	1186	3644.7	1779.2
8	4482	7276.6	6932.7	6196.4	4074.1	1185	3651.0	1779.7
9	4479	7273.5	6921.4	6188.8	4079.8	1185	3654.3	1779.1
10	4484	7246.9	6944.8	6191.3	4078.9	1184	3657.7	1782.1
11	4485	7229.2	6963.2	6243.9	4082.8	1175	3662.0	1782.6
12	4494	7238.5	6973.0	6266.7	4087.6	1165	3666.4	1784.2(34)
13	4506	7256.2	6996.0	6266.3	4095.5	1160	3667.2	1786.4(32)
14	4506	7275.8	7017.6	6295.2	4110.8	1144	3662.1	1784.2
15	4482	7267.0	6986.9	6285.3	4110.1	1144	3658.6	1784.3
16	4479	7265.7	6944.8	6264.9	4095.8	1144	3660.4	1782.1(36)
17	4479	7269.8	6932.5	6245.7	4074.6	1136	3644.5	1781.4
18	4477	7284.6	6905.7	6216.7	4070.5(38)	1137	3652.3	1776.3
19	4469	7259.3	6905.1	6224.6	4061.4	1129	3657.9	1772.3(28)
20	4428	7226.4	6872.7	6191.4	4052.5	1132	3640.0	1771.5(16)
21	4424	7191.9	6857.4	6195.2	4060.2	1144	3653.5	1778.3
22	4436	7210.7	6864.9	6197.9	4050.3	1147	3662.7	1775.8
23	4453	7209.4	6882.7	6216.8	4041.6	1144	3653.9	1774.1
24	4464	7231.4	6896.6	6230.7	4057.0	1149	3661.3	1779.2
25	4461	7211.7	6894.7	6180.3	4040.7(38)	1135	3648.5	1777.0
26	4481	7235.2	6929.2	6215.0	4067.4	1135	3656.8	1783.5
27	4485	7239.9	6951.0	6225.8	4083.0	1142	3662.0	1776.9(28)
28	4477	7262.7	6950.4	6234.2	4093.5	1144	3653.4	1781.7
29	4488	7308.4	6955.5	6246.8	4092.2	1144	3658.2	1779.8
30	4487	7298.1	6958.7	6243.3	4101.0	1150	3655.5	1783.9
31	4496	7310.2	6959.1	6237.0	4101.0	1169	3659.9	1784.3
Mean	4475	7256.7	6935.4	6228.7	4079.8	1159	3655.5	1778.9

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.

COSMIC RAY INDICES
(Neutron Monitor)

MAY 1986

Day	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	PREDIGTSTUHL Average (cts/h)/100	TOKYO Average (cts/h)/256	HUANCAYO Average (cts/h)/100
1	4510	7414.1	7090.6	6316.4	4180.1		3671.5	1793.4(18)
2	4476	7351.7	7065.5	6288.0	4179.1		3679.9	1793.6(22)
3	4453	7299.4	7043.1	6290.7	4163.1		3683.7	1791.4
4	4476	7363.5	7056.9	6301.8	4183.5		3688.2	1794.5
5	4464	7348.7	7033.6	6328.6	4191.3		3683.3	1796.0
6	4458	7343.7	7025.4	6327.1	4232.1		3692.3	1800.1(28)
7	4460	7314.8	6994.6	6299.4	4186.0		3696.4	1794.0
8	4467	7312.7	7015.6	6294.6	4183.3		3683.5	1791.5
9	4475	7339.2	7016.0	6297.7	4175.2		3689.0	1789.9
10	4488	7364.4	7042.0	6298.2	4182.1		3690.3	---
11	4496	7377.6	7051.5	6310.7	4173.7(38)		3684.5	---
12	4497	7385.0	7049.4	6302.5	4171.1		3691.6	---
13	4501	7395.0	7065.4	6306.8	4167.8		3683.6	1794.4(34)
14	4515	7404.3	7070.4	6307.1	4181.4		3672.7	1794.0
15	4522	7412.0	7046.5	6321.3	4178.3		3681.3	1793.5
16	4519	7379.3	7017.7	6302.9	4163.1		3675.5	1790.6
17	4523	7397.7	7054.2	6297.7	4196.4		3680.7	1794.8
18	4523	7408.9	7038.7	6293.9	4174.5		3672.0	1794.2
19	4526	7420.5	7045.8	6292.3	4175.4		3663.7	1792.2
20	4505	7381.9	7022.7	6301.5	4161.9		3663.4	1791.6
21	4503	7385.5	7052.8	6305.1	4178.1		3667.0	1789.8
22	4509	7390.9	7057.0	6300.4	4178.2		3677.6	1786.2
23	4509	7385.4	7046.3	6298.4	4173.4		3685.8	1786.5
24	4510	7393.5	7054.2	6311.4	4176.5		3675.8	1790.4
25	4503	7387.1	7045.7	6293.2	4177.8		3684.6	1791.2
26	4514	7391.2	7050.6	6302.0	4184.3		3687.6	1790.9
27	4509	7377.9	7053.8	6302.1	4178.3		3682.5	1790.8
28	4525	7413.0	7081.4	6338.6	4189.4		3683.0	1791.6
29	4526	7410.9	7082.7	6345.3	4195.8		3671.3	1791.4(38)
30	4527	7410.2	7079.2	6340.2	4191.0		3677.6	1794.5
31	4526	7413.2	7057.4	6336.9	4186.7		3673.7	1788.5
Mean	4500	7379.8	7048.6	6308.2	4181.1		3680.4	1792.0

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.

COSMIC RAY INDICES
(Neutron Monitor)

JUNE 1986

Day	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	PREDIGTSTUHL Average (cts/h)/100	TOKYO Average (cts/h)/256	HUANCAYO Average (cts/h)/100
1	4502	7366.1	7036.4	6321.1	4180.0		3669.2	1786.8
2	4503	7381.3	7041.8	6312.0	4172.0		3667.7	1785.5
3	4509	7377.0	7049.5	6323.9	4181.7		3668.8	1791.3
4	4505	7384.5	7033.1	6350.4	4183.3		3678.2	1790.6
5	4508	7406.9	7053.5	6354.8	4186.1(38)		3680.0	1790.8
6	4506	7403.1	7061.5	6352.1	4173.7(8)		3669.2	1789.5
7	4507	7378.2	7059.8	6346.7	4190.7		3670.2	1792.7
8	4501	7355.3	7026.2	6305.4	4178.6		3669.2	1791.6
9	4508	7367.1	7047.6	6301.4	4185.5		3671.6	1791.0(36)
10	4510	7373.0	7042.1	6308.4	4182.9		3680.2	1790.6(32)
11	4508	7366.6	7052.4	6325.3	4186.0		3684.2	1789.6
12	4524	7366.0	7065.0	6316.8	4182.3		3682.2	1791.3
13	4516	7358.2	7058.7	6308.0	4189.7		3679.9	1791.6
14	4517	7360.4	7069.1	6312.3	4193.1		3683.1	1789.3
15	4530	7390.1	7084.8	6324.1	4208.1		3683.4	1794.5
16	4537	7388.0	7080.2	6329.6	4196.7		3671.0	1787.8
17	4534	7385.3	7101.2	6342.6	4189.3		3659.6	1791.8
18	4529	7385.9	7096.3	6344.5	4195.0		3666.8	1795.9
19	4523	7394.7	7093.0	6337.2	4195.0		3672.2	1794.5
20	4535	7413.0	7095.5	6340.6	4198.4		3672.5	1794.5
21	4538	7436.3	7104.1	6350.2	4207.7		3672.3	1795.7
22	4538	7433.1	7078.6	6357.9	4199.0		3668.4	1794.0
23	4550	7449.7	7102.4	6368.2	4212.5		3673.9	1795.6
24	4544	7440.9	7114.9	6366.0	4205.0		3671.5	1797.2
25	4537	7440.3	7123.2	6347.5	4205.9		3670.8	1796.5
26	4540	7446.2	7092.5	6349.1	4200.7		3678.3	1794.9
27	4545	7448.0	7082.7	6360.7	4207.9		3678.7	1797.0
28	4506	7387.5	7042.2	6332.0	4186.9		3665.3	1792.5
29	4508	7389.0	7061.9	6339.5	4182.2		3658.2	1790.6
30	4507	7380.5	7064.7	6346.6	4186.0		3656.5	1790.4(38)
Mean	4521	7395.1	7070.5	6335.8	4192.0		3672.4	1792.3

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.

COSMIC RAY INDICES
(Neutron Monitor)

JULY 1986

Day	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	PREDIGTSTUHL Average (cts/h)/100	TOKYO Average (cts/h)/256	HUANCAYO Average (cts/h)/100
1	4517	7400.8	7070.2	6339.6	4186.6		3663.3	1794.7(38)
2	4509	7389.0	7076.0	6354.4	4185.3		3663.4	1793.1
3	4522	7421.5	7086.1	6355.7	4188.0		3665.6	1796.2
4	4510	7410.3	7073.2	6352.2	4192.7		3664.0	1792.3
5	4520	7400.6	7046.6	6368.6	4199.8		3657.4	1794.7
6	4522	7428.1	7041.7	6384.8	4196.4		3656.8	1793.4
7	4542	7450.1	7071.7	6394.7	4194.8		3660.2	1792.0
8	4534	7447.2	7083.3	6380.5	4186.4		3658.0	1791.5
9	4545	7465.2	7114.7	6383.1	4204.2		3663.5	1794.6
10	4531	7436.9	7112.8	6377.1	4205.5		3659.5	1796.8
11	4528	7446.2	7100.4	6364.6	4202.0		3655.9	1795.2
12	4519	7436.8	7096.1	6361.9	4199.3		3656.8	1768.9(22)
13	4535	7430.6	7083.4	6343.8	4193.1		3662.0	1785.4
14	4527	7419.1	7073.4	6340.5	4185.6		3659.8	1789.5
15	4527	7414.7	7078.5	6320.5	4187.8		3652.0	1785.2
16	4516	7389.0	7072.8	6314.3	4187.0		3649.3	1786.4
17	4528	7413.0	7060.3	6335.5	4194.0		3656.0	1791.4
18	4534	7411.7	7072.9	6348.9	4201.4		3666.9	1790.3
19	4533	7420.3	7065.7	6356.2	4188.0		3668.2	1792.7
20	4542	7422.6	7080.2	6370.3	4200.5		3667.7	1789.4
21	4525	7414.2	7057.6	6333.8	4162.3		3648.7	1784.9
22	4528	7416.1	7088.7	6353.7	4198.5		3661.1	1789.8
23	4541	7436.9	7072.2	6370.8	4193.4(34)		3659.8	1790.5
24	4547	7458.6	7069.5	6368.6	4184.9		3661.0	1787.8
25	4527	7425.3	7045.7	6351.3	4185.5		3664.7	1793.0
26	4518	7420.0	7035.2	6339.5	4191.1		3666.3	1794.3
27	4520	7411.7	7058.4	6321.5	4201.4		3667.7	1791.3
28	4526	7438.2	7064.9	6315.5	4200.2		3669.3	1790.3
29	4521	7415.9	7059.1	6318.3	4198.8		3670.7	1789.5
30	4519	7407.8	7046.6	6312.5	4184.2		3666.0	1789.8
31	4510	7380.5	7036.8	6300.1	4172.0		3667.7	1784.9
Mean	4527	7421.9	7070.8	6349.4	4192.0		3661.5	1790.9

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.

COSMIC RAY INDICES
(Neutron Monitor)

AUGUST 1986

Day	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	PREDIGTSTUHL Average (cts/h)/100	TOKYO Average (cts/h)/256	HUANCAYO Average (cts/h)/100
1	4513	7386.9	7049.1	6291.0	4179.4		3673.7	1787.3
2	4513	7418.5	7040.5	6300.5	4173.9		---	1789.5
3	4501	7417.1	7043.9	6281.9	4166.4		---	1785.8
4	4487	7387.0	7031.5	6279.8	4173.3		3663.1	1786.9
5	4506	7391.2	7033.7	6292.9	4171.5		3662.3	1788.2
6	4522	7416.5	7036.8	6291.1	4170.4		3654.8	1787.2(24)
7	4512	7410.0	7035.5	6297.5	4171.9		3651.7	1785.7
8	4513	7405.3	7048.5	6308.0	4180.8		3652.1	1788.7
9	4519	7407.7	7063.1	6307.6	4182.9(38)		3650.3	1785.1
10	4533	7421.6	7063.4	6319.2	4186.5		3657.9	1787.1
11	4529	7430.1	7083.1	6332.2	4187.2		3662.8	1788.8
12	4550	7463.8	7103.0	6336.1	4203.7(36)		3667.6	1790.9
13	4533	7433.0	7088.0	6337.7	4205.3		3669.6	1790.9
14	4519	7428.1	7084.9	6345.6	4204.9		3667.2	1789.6
15	4527	7439.8	7075.9	6352.3	4211.5		3661.9	1789.9
16	4534	7442.9	7097.7	6352.5	4210.8		3667.3	1789.3
17	4548	7458.3	7103.2	6362.5	4210.9		---	1789.1
18	4540	7463.6	7116.1	6364.7	4211.0		3658.5	1785.8
19	4548	7468.4	7122.7	6364.4	4209.3		3658.9	1787.2
20	4566	7492.7	7127.1	6382.1	4217.0		3666.2	1792.3
21	4543	7455.4	7070.4	6341.5	4195.3		3662.5	1791.1
22	4517	7451.7	7082.1	6334.5	4195.9		3658.2	1785.9
23	4544	7451.5	7077.3	6352.7	4199.1		3658.0	1786.6
24	4528	7424.4	7085.5	6332.4	4195.9		3657.3	1783.7
25	4532	7410.5	7095.9	6331.4	4201.1		3662.2	1787.4
26	4533	7411.7	7088.5	6351.1	4204.6(30)		3660.3	1786.9
27	4531	7425.3	7094.2	6346.1	----		3663.3	1787.8
28	4531	7451.4	7105.8	6343.2	----		3662.0	1784.7
29	4529	7445.5	7102.0	6340.7	----		3662.0	1788.4
30	4531	7448.5	7091.0	6332.5	----		3660.0	1789.0
31	4551	7454.7	7099.9	6342.2	----		3667.9	1785.7
Mean	4528	7432.7	7078.7	6330.6	4192.8		3661.1	1787.8

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.

86
Late
Sep 86

COSMIC RAY INDICES
(Neutron Monitor)

SEPTEMBER 1986

Day	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	PREDIGTSTUHL Average (cts/h)/100	TOKYO Average (cts/h)/256	HUANCAYO Average (cts/h)/100
1	4555	7476.1	7095.9	6330.3	4225.7(36)		3662.1	1783.2
2	4551	7440.0	7081.2	6332.0	4215.3		3648.7	1785.7
3	4541	7437.2	7079.9	6332.6	4209.3(36)		3648.7	1787.9
4	4546	7451.4	7091.4	6316.2	4226.5(12)		3661.5	1787.5
5	4545	7452.5	7096.0	6322.2	4216.0		3657.9	1789.8
6	4552	7462.2	7126.7	6344.5	4231.1		3664.0	1792.3
7	4555	7471.8	7141.0	6354.8	4221.1(38)		3666.1	1793.8(22)
8	4539	7457.9	7129.6	6346.8	4223.8		3660.5	1793.1
9	4549	7482.0	7124.8	6360.6	4236.9		3665.4	1791.1
10	4541	7455.9	7101.3	6339.3	4221.7		3652.5	1789.3
11	4470	7378.2	7104.8	6332.1	4234.7		3662.6	1791.1
12	4409	7331.6	6981.2	6277.8	4208.9		3661.7	1788.9
13	4458	7362.8	7029.2	6293.3	4201.8		3655.5	1784.4
14	4501	7397.2	7066.3	6299.5	4211.3		3660.1	1789.0
15	4518	7426.3	7081.3	6314.5	4213.0		3659.6	1789.0
16	4515	7406.6	7093.2	6301.7	4215.8		3657.5	1787.8
17	4519	7403.5	7061.4	6279.8	4204.9		3650.2	1783.2
18	4509	7405.0	7051.7	6284.0	4204.0		3649.5	1786.5
19	4511	7395.0	7064.4	6283.0	4221.3		3657.8	1787.7
20	4527	7432.5	7081.3	6286.2	4233.2		3656.6	1788.5
21	4539	7449.4	7100.9	6309.4	4233.7		3657.3	1789.4
22	4537	7440.0	7093.3	6295.4	4212.7		3663.5	1782.9
23	4534	7442.5	7078.0	6316.3	4232.1		3669.8	1788.5
24	4542	7454.7	7097.2	6322.3	4249.8		3674.5	1786.8
25	4534	7441.1	7092.5	6327.9	4256.4		3675.0	1787.8
26	4531	7443.6	7083.6	6326.7	4248.5		3683.6	1787.8
27	4549	7457.4	7096.4	6316.4	4235.5		3677.5	1786.8
28	4554	7463.1	7093.5	6295.9	4238.3		3676.8	1788.7
29	4561	7471.2	7091.4	6306.2	4240.9		3671.7	1787.4
30	4567	7475.5	7087.6	6312.2	4244.7		3670.5	1788.8
Mean	4529	7435.5	7086.6	6315.3	4225.8		3662.6	1816.6

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.

COSMIC RAY INDICES
(Neutron Monitor)

OCTOBER 1986

Day	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	PREDIGTSTUHL Average (cts/h)/100	TOKYO Average (cts/h)/256	HUANCAYO Average (cts/h)/100
1	4569	7472.7	7127.8	6325.2	4225.8			1792.2
2	4574	7478.3	7139.4	6343.7	4241.4			1791.7
3	4585	7507.6	7134.6	6351.3	4245.3			1792.1
4	4580	7515.1	7131.3	6344.6	4224.6			1789.5
5	4577	7504.0	7145.5	6341.6	4219.5			1792.5
6	4570	7500.0	7150.5	6335.5	4216.3			1792.7
7	4578	7506.7	7161.6	6342.0	4234.9			1789.2
8	4600	7540.2	7156.6	6365.5	4237.7			1792.0
9	4601	7546.9	7160.9	6367.9	4231.5			1793.6
10	4610	7543.2	7193.9	6371.7	4251.9			1791.6
11	4618	7551.0	7185.2	6375.6	4270.1			1796.5
12	4635	7562.5	7185.0	6383.7	4272.0			1797.2
13	4620	7551.3	7167.4	6385.0	4278.1			1799.2
14	4582	7486.9	7127.5	6351.2	4248.3			1798.1
15	4573	7465.2	7150.9	6336.5	4229.4			1794.5
16	4573	7475.1	7149.3	6334.9	4222.3			1792.8
17	4582	7480.4	7163.5	6354.9	4234.5			1793.5
18	4568	7473.2	7127.1	6354.7	4214.5			1787.4
19	4561	7465.7	7093.9(14)	6368.5	4213.3			1788.2
20	4563	7465.0	---	6385.8	4216.2			1791.2(38)
21	4572	7480.6	7140.2(8)	6372.4	4223.8			1791.4(34)
22	4572	7476.9	7132.6	6377.2	4226.3			1793.1
23	4589	7498.3	7154.8	6409.4	4231.2			1797.0
24	4607	7507.5	7173.4	6390.1	4239.2			1796.3
25	4588	7490.8	7154.1	6389.2	4216.8			1796.6
26	4551	7430.0(8)	7100.5	6304.8	4175.5			1792.0
27	4572	7466.7	7116.8	6318.0	4206.3			1793.3
28	4576	7467.8	7116.2	6320.5	4202.9			1792.0
29	4577	7456.0	7114.5	6333.0	4200.5			1794.7
30	4582	7469.3	7130.6	6340.1	4212.7			1793.1
31	4561	7443.4	7119.4	6342.5	4220.0			1794.0(38)
Mean	4583	7492.9	7143.5	6355.4	4228.3			1793.2

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.

COSMIC RAY INDICES
(Neutron Monitor)

NOVEMBER 1986

Day	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	PREDIGTSTUHL Average (cts/h)/100	TOKYO Average (cts/h)/256	HUANCAYO Average (cts/h)/100
1	4536	7399.2	7074.9	6311.2	4206.8			1791.7
2	4541	7405.0	7080.2	6297.6	4185.7			1788.7
3	4547	7430.0	7109.8	6293.5	4207.6			1789.4(38)
4	4390	7162.2	6892.2	6138.6	4100.8			1776.8
5	4404	7177.5	6907.8	6142.0	4096.1			1776.1
6	4427	7209.7	6909.5	6148.0	4095.8			1774.1
7	4448	7245.8	6928.9	6176.5	4132.4			1780.5
8	4473	7279.7	6956.6	6210.6	4140.7(34)			1780.1
9	4480	7293.6	6987.6	6220.1	4144.0(2)			1782.3(34)
10	4502	7339.5	7026.4	6230.3	4153.7			1780.6
11	4498	7342.0	7031.5	6255.3	4167.7			1789.0
12	4515	7365.5	7052.5	6250.5	4165.0			1790.8
13	4512	7355.7	7081.7	6266.9	4161.4			1788.0
14	4524	7377.4	7073.7	6273.5	4166.7(36)			1788.2
15	4535	7402.1	7076.0	6265.7	4172.5			1791.9
16	4538	7406.7	7078.0	6283.9	4184.2			1787.3(30)
17	4549	7421.6	7107.9	6300.9	4178.1			1790.8
18	4566	7436.8	7126.3	6311.3	4195.9			1789.5
19	4579	7457.3	7141.0	6313.3	4212.5			1792.2
20	4578	7458.6	7144.5	6330.7	4213.3			1794.0
21	4581	7471.0	7143.5	6350.3	4204.8			1794.2
22	4567	7438.1	7108.5	6341.4	4196.6			1790.6
23	4552	7433.2	7078.2	6316.1	4191.3			1788.8
24	4515	7463.7	7034.4	6265.8	4173.4			1786.0(34)
25	4501	7334.9	7007.7	6225.8	4193.4			1790.5
26	4495	7335.0	7010.8	6247.5	4176.7			1784.8
27	4503	7350.8	7030.0	6234.6	4158.8			1785.3
28	4513	7375.2	7051.9	6235.4	4165.0			1787.7
29	4522	7371.7	7071.2	6260.2	4174.7			1787.8
30	4531	7408.5	7092.0	6273.4	4203.8			1789.7
Mean	4514	7361.6	7047.2	6259.0	4172.0			1786.8

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.

WDC-C2 FOR GEOMAGNETISM, KYOTO UNIVERSITY

HOURLY EQUATORIAL DST VALUES(PROVISIONAL)

OCTOBER 1986

UNIT=NT

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	U.T. 24
1	-23	-20	-19	-21	-23	-21	-19	-11	-6	-5	-6	-5	-8	-16	-22	-19	-14	-14	-15	-20	-21	-24	-27	-27
2	-18	-19	-19	-24	-27	-25	-24	-23	-24	-28	-32	-29	-27	-30	-30	-33	-33	-21	-20	-32	-35	-29	-28	-30
3	-27	-21	-19	-23	-25	-29	-32	-31	-29	-29	-27	-27	-28	-26	-25	-24	-25	-18	-12	-11	-11	-19	-24	-29
4	-27	-29	-26	-26	-29	-27	-24	-24	-26	-26	-24	-22	-22	-20	-20	-16	-17	-15	-12	-11	-13	-14	-20	-21
5	-23	-27	-27	-28	-34	-27	-21	-20	-21	-20	-26	-40	-39	-42	-37	-31	-30	-30	-31	-32	-27	-27	-28	-28
6	-24	-20	-22	-26	-27	-31	-35	-39	-37	-32	-32	-32	-31	-31	-29	-27	-27	-22	-20	-22	-24	-27	-30	-27
7	-26	-29	-29	-25	-25	-24	-24	-22	-23	-22	-22	-24	-23	-21	-19	-18	-18	-16	-14	-13	-14	-16	-20	-19
8	-15	-14	-14	-13	-11	-9	-10	-12	-15	-19	-15	-7	-9	-8	-10	-12	-11	-12	-9	-11	-12	-16	-21	-22
9	-18	-14	-14	-16	-16	-13	-14	-16	-16	-17	-16	-15	-10	-10	-10	-13	-13	-15	-18	-22	-24	-24	-29	-28
10	-24	-23	-23	-20	-18	-17	-17	-15	-12	-12	-10	-8	-6	-5	-4	-5	-7	-9	-9	-10	-11	-13	-14	-14
11	-13	-12	-10	-9	-10	-10	-11	-12	-14	-14	-14	-14	-14	-15	-17	-17	-14	-12	-12	-13	-13	-13	-14	-12
12	-15	-15	-16	-14	-13	-13	-14	-14	-13	-12	-12	-11	-10	-9	-10	-10	-11	-11	-11	-11	-10	-7	-6	-7
13	-3	-2	-3	-6	-6	-5	-7	-7	-8	-11	-12	-6	-8	-9	-1	8	2	3	-4	-45	-95	-109	-88	-79
14	-74	-74	-68	-84	-88	-86	-84	-73	-71	-64	-66	-62	-58	-56	-54	-52	-51	-52	-52	-46	-41	-41	-38	-34
15	-30	-33	-35	-36	-36	-34	-37	-40	-54	-49	-48	-42	-40	-41	-41	-40	-40	-39	-36	-38	-35	-34	-36	-35
16	-34	-33	-32	-30	-29	-30	-31	-30	-28	-30	-29	-30	-31	-31	-28	-29	-32	-32	-29	-27	-23	-21	-23	-24
17	-24	-24	-23	-21	-21	-23	-23	-26	-25	-25	-29	-28	-26	-25	-23	-22	-20	-18	-18	-17	-12	-12	-9	-8
18	-6	-9	-11	-10	-11	-10	-10	-8	-10	-12	-16	-18	-20	-25	-25	-25	-24	-9	-2	-6	-15	-12	-13	-19
19	-24	-21	-22	-19	-26	-33	-29	-27	-32	-32	-29	-31	-42	-44	-45	-39	-35	-30	-26	-26	-25	-24	-25	-24
20	-22	-23	-23	-20	-22	-23	-22	-22	-24	-27	-30	-28	-23	-21	-21	-26	-22	-19	-14	-17	-20	-24	-25	-29
21	-26	-22	-20	-23	-21	-23	-20	-17	-21	-24	-29	-36	-34	-30	-26	-24	-20	-21	-26	-26	-23	-20	-22	-24
22	-24	-24	-27	-30	-29	-24	-24	-24	-25	-27	-27	-28	-31	-29	-27	-24	-24	-22	-21	-20	-18	-15	-16	-18
23	-18	-16	-18	-19	-17	-12	-10	-7	-10	-12	-12	-13	-17	-17	-14	-11	-10	-11	-16	-20	-20	-19	-14	-14
24	-14	-16	-16	-16	-16	-17	-17	-17	-18	-19	-20	-21	-22	-20	-20	-22	-21	-20	-19	-18	-18	-16	-14	-15
25	-12	-11	-10	-13	-14	-12	-9	-7	-8	-12	-12	-13	-13	-10	-8	-7	-6	-4	-3	-2	-3	-4	-9	-12
26	-12	-11	-10	-10	-11	-10	-7	-5	-5	-7	-7	-9	-12	-13	-13	-11	-13	-14	-14	-13	-10	-9	-9	-11
27	-14	-16	-13	-13	-11	-10	-15	-21	-21	-23	-23	-37	-50	-54	-56	-64	-74	-73	-67	-60	-53	-48	-49	-48
28	-40	-35	-39	-39	-36	-35	-37	-37	-37	-38	-34	-33	-30	-29	-27	-28	-30	-27	-25	-26	-20	-22	-25	-31
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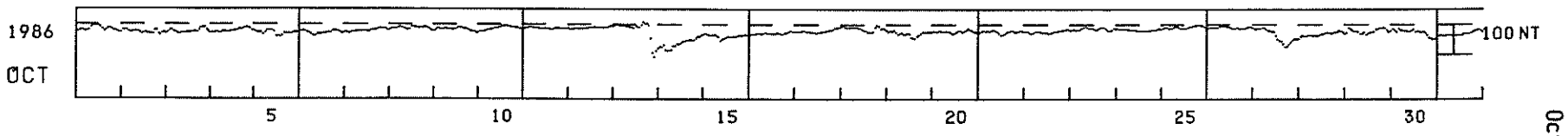
31	-38	-36	-37	-38	-36	-35	-35	-38	-38	-38	-36	-35	-35	-33	-30	-30	-31	-27	-24	-21	-18	-17	-20	-25



Late Oct 86

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UAG-92 INTERNATIONAL CATALOG OF GEOMAGNETIC DATA, compiled by C.C. Abston, National Geophysical Data Center, NOAA, Boulder, CO; N.E. Papitashvili, Academy of Sciences of the USSR, World Data Center B2, Moscow, USSR; and V.O. Papitashvili, IZMIRAN, Moscow Region, USSR, August 1985, 291 pp. Supersedes UAG-35, 49, and 86.

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UAG-95 SUNSPOT NUMBERS: 1610-1985, (based on THE SUNSPOT-ACTIVITY IN THE YEARS 1610-1960, by Prof. M. Waldmeier, Copyright 1961, Swiss Federal Observatory, Zurich, Switzerland), revised by John A. McKinnon, National Geophysical Data Center, NOAA, Boulder, CO, January 1987, 112 pp, $10.00.

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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."