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Solar - Geophysical Data

Part I (Prompt Reports)

NO. 520 DECEMBER 1987

DATA FOR
NOVEMBER 1987
OCTOBER 1987

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

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NUMBER 520

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INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

Summary of the Geoalert Messages NOVEMBER 1987

Julian Day	Date of Issue	Date of Observation	Wolf No.	10-cm Solar Flux	A-index	Location °Lat °Long	Flares Total	M	X	Date of Forecast	Location °Lat °Long	Region Forecast[1]	Geoalerts
305	01	31	077	099	007	N31 W15	0	0	0	01	N31 W15	E	Solquiet, Magquiet.
						S21 W02	0	0	0		S21 W02	Q	
						S22 W69	1	0	0		S22 W69	Q	
306	02	01	075	101	008	N30 W28	0	0	0	02	N30 W28	E	Solquiet, Magalert 02/04.
						S20 W15	0	0	0		S20 W15	Q	
						S22 W82	3	0	0		S22 W82	Q	
						S23 E70	3	0	0		S23 E70	E	
307	03	02	072	107	016	N29 W42	5	0	0	03	N29 W42	Q	Solquiet, Magalert 03/04.
						S21 W28	0	0	0		S21 W28	Q	
						S24 E56	3	0	0		S24 E56	E	
						S22 E66	4	0	0		S22 E66	Q	
		Presto:[2] Kakioka Magstorm began 02/11XX UT.											
308	04	03	066	100	019	N29 W55	10	0	0	04	N29 W55	E	Solquiet, Magalert 04.
						S21 W40	1	0	0		S21 W40	Q	
						S25 E41	0	0	0		S25 E41	Q	
						S23 E52	3	0	0		S23 E52	Q	
309	05	04	061	105	004	N29 W67	6	2	0	05	N29 W67	E	Solquiet, Magalert 05.
						S25 E28	0	0	0		S25 E28	Q	
						S22 E39	2	0	0		S22 E39	E	
						N18 E71	2	0	0		N18 E71	Q	
310	06	05	059	101	007	N28 W80	2	2	0	06	N28 W80	E	Solquiet, Magnil.
						S25 E16	1	0	0		S25 E16	Q	
						S22 E25	4	0	0		S22 E25	E	
						N15 E54	0	0	0		N15 E54	Q	
		Presto:[2] Sydney M3/1B flare maximum 05/0503 UT. Type II burst started 05/0502 UT. Shortwave fade started 05/0500 UT.											
311	07	06	043	097	007	S22 E13	4	0	0	07	S22 E13	E	Solquiet, Magalert 07/08.
						N16 E40	1	0	0		N16 E40	Q	
						N32 W11	0	0	0		N32 W11	Q	
312	08	07	043	096	004	S23 W01	0	0	0	08	S23 W01	Q	Solquiet, Magnil.
						N16 E25	0	0	0		N16 E25	Q	
						S19 E29	0	0	0		S19 E29	Q	
		Presto:[2] Boulder Proton event began 08/0200 UT, 30 particles/cm^2-s-ster at greater than 10 MeV 08/0330 UT.											
313	09	08	079	095	003	S24 W14	0	0	0	09	S24 W14	Q	Solquiet, Magalert 09/11.
						N17 E11	0	0	0		N17 E11	Q	
						N31 W37	0	0	0		N31 W37	Q	
						S20 E15	0	0	0		S20 E15	Q	
						S26 W03	0	0	0		S26 W03	Q	
						N17 E73	0	0	0		N17 E73	Q	
		Presto:[2] Boulder Proton event began 08/0200 UT, maximum of 120 particles/cm^2-s-ster at greater than 10 MeV 08/0940 UT, ended 08/2255 UT.											

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

Summary of the Geoalert Messages **NOVEMBER 1987**

Julian Day	Date of Issue	Date of Observation	Wolf No.	10-cm Solar Flux	A-index	Location °Lat °Long	Flares Total	M	X	Date of Forecast	Location °Lat °Long	Region Forecast[1]	Geoalerts
314	10	09	054	092	007	S22 W27	0	0	0	10	S22 W27	Q	Solquiet, Magalert 10/12.
						N17 W01	0	0	0		N17 W01	Q	
						S26 W16	0	0	0		S26 W16	Q	
						N17 E58	0	0	0		N17 E58	Q	
315	11	10	059	091	011	S22 W41	0	0	0	11	S22 W41	Q	Solquiet, Magalert 11/12.
						N15 W17	1	0	0		N15 W17	Q	
						N30 W63	0	0	0		N30 W63	Q	
						S27 W32	0	0	0		S27 W32	Q	
						N17 E44	0	0	0		N17 E44	Q	
316	12	11	051	095	011	S23 W54	0	0	0	12	S23 W54	Q	Solquiet, Magalert 12/12.
						N32 W76	4	0	0		N32 W76	Q	
						N17 E31	0	0	0		N17 E31	Q	
						S26 E78	7	0	0		S26 E78	E	
317	13	12	030	095	020	N32 W87	4	0	0	13	N32 W87	Q	Solquiet, Magnil.
						S25 E68	6	0	0		S25 E68	E	
318	14	13	018	095	018	S25 E54	5	0	0	14	S25 E54	E	Solquiet, Magquiet.
319	15	14	021	094	016	S25 E40	0	0	0	15	S25 E40	E	Solquiet, Magquiet.
320	16	15	023	096	011	S25 E28	0	0	0	16	S25 E28	E	Solquiet, Magquiet.
321	17	16	046	097	007	S25 E14	6	0	0	17	S25 E14	E	Solquiet, Magquiet.
						S21 E76	0	0	0		S21 E76	Q	
322	18	17	073	099	002	S25 E02	3	0	0	18	S25 E02	E	Solquiet, Magquiet.
						S21 E61	0	0	0		S21 E61	Q	
						S19 E44	0	0	0		S19 E44	Q	
						S17 W14	0	0	0		S17 W14	Q	
323	19	18	068	102	001	S25 W13	5	1	0	19	S25 W13	E	Solquiet, Magquiet.
						S21 E48	7	0	0		S21 E48	E	
						S17 W27	0	0	0		S17 W27	Q	
						S16 E01	0	0	0		S16 E01	Q	
324	20	19	062	109	012	S25 W26	8	0	0	20	S25 W26	E	Solquiet, Magquiet.
						S22 E34	11	1	0		S22 E34	E	
						S17 W41	1	0	0		S17 W41	Q	
		Presto:[2] Boulder Tenflare 110 flux units 19/0742 UT duration 3 minutes.											
325	21	20	058	115	010	S24 W39	5	0	0	21	S24 W39	E	Solquiet, Magalert 21/22.
						S22 E20	8	2	0		S22 E20	E	
		Presto:[2] Sydney Weak Type II 20/0415–0423 UT. Weak Type IV began 20/0417 UT, still in progress.											
		Sydney Strong Type II embedded with Type III 20/2341–2351 UT, frequency 25–160 MHz.											
326	22	21	062	118	007	S24 W52	1	0	0	22	S24 W52	E	Solquiet, Magnil.
						S21 E08	6	1	0		S21 E08	E	

ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

Summary of the Geoalert Messages NOVEMBER 1987

Julian Day	Date of Issue	Date of Observation	Wolf No.	10-cm Solar Flux	A-index	Location °Lat °Long	Flares Total	Flares M	Flares X	Date of Forecast	Location °Lat °Long	Region Forecast[1]	Geoalerts
327	23	22	100	121	006	S25 W66	0	0	0	23	S25 W66	E	Solquiet, Magquiet.
						S21 W07	8	0	0		S21 W07	E	
						N27 E61	0	0	0		N27 E61	E	
						S34 W20	0	0	0		S34 W20	Q	
328	24	23	123	118	027	S25 W79	0	0	0	24	S25 W79	E	Solquiet, Magalert
						S21 W19	1	0	0		S21 W19	E	Minor 24/25.
						N29 E49	1	0	0		N29 E49	Q	
						S33 W32	2	0	0		S33 W32	Q	
						S23 E49	0	0	0		S23 E49	Q	
		Presto:[2] Kakioka Magstorm began 23/05XX UT.											
329	25	24	071	112	029	S25 W92	0	0	0	25	S25 W92	E	Solquiet, Magalert
						S21 W33	1	0	0		S21 W33	E	Minor 25.
						S34 W45	4	0	0		S34 W45	E	
330	26	25	048	107	013	S21 W46	0	0	0	26	S21 W46	E	Solquiet, Magnil.
						S33 W58	1	0	0		S33 W58	E	
						S23 E19	0	0	0		S23 E19	Q	
331	27	26	045	104	020	S21 W58	2	0	0	27	S21 W58	E	Solquiet, Magquiet.
						S33 W71	1	0	0		S33 W71	E	
						S23 E08	0	0	0		S23 E08	Q	
332	28	27	057	098	022	S21 W70	1	0	0	28	S21 W70	Q	Solquiet, Magquiet.
						S33 W82	0	0	0		S33 W82	Q	
						S22 W06	0	0	0		S22 W06	Q	
						S31 E27	0	0	0		S31 E27	Q	
333	29	28	038	095	008	S21 W83	1	0	0	29	S21 W83	Q	Solquiet, Magquiet.
						S33 W93	0	0	0		S33 W93	Q	
						S28 E12	0	0	0		S28 E12	Q	
334	30	29	028	093	002	S26 E02	0	0	0	30	S26 E02	Q	Solquiet, Magquiet.
						N28 E57	0	0	0		N28 E57	Q	
335	01	30	026	092	002	S22 W12	0	0	0	01	S22 W12	Q	Solquiet, Magquiet.
						N24 W10	0	0	0		N24 W10	Q	

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

INTERNATIONAL RELATIVE SUNSPOT NUMBERS

Day	Final Dec 86	Jan 87	Feb	Mar	Apr	May	Jun	Prov Jul	Aug	Sep	Oct	Nov
01	0	19	0	13	14	39	15	0	45	33	34	56
02	0	15	0	23	12	40	11	0	47	38	26	57
03	0	13	0	15	10	27	0	0	39	37	37	57
04	0	12	0	16	13	23	0	0	33	38	58	46
05	0	11	0	24	28	24	10	13	31	39	48	47
06	0	10	0	23	47	27	0	0	32	44	48	27
07	0	11	0	24	56	34	0	9	38	56	39	31
08	0	0	0	22	64	25	0	12	45	67	55	43
09	12	0	0	14	69	23	0	13	39	64	50	42
10	20	0	7	11	77	25	0	11	47	59	51	30
11	23	0	0	9	80	26	11	0	56	58	63	28
12	22	0	0	0	80	23	21	0	48	44	53	22
13	24	0	0	0	79	22	14	0	47	25	74	15
14	13	8	8	10	77	13	10	0	49	18	92	23
15	0	9	7	11	78	39	11	11	49	21	101	19
16	11	0	0	11	60	50	12	17	55	14	101	33
17	9	13	0	22	41	68	14	12	46	25	91	46
18	0	13	0	21	36	54	24	17	43	32	86	48
19	0	9	0	12	29	65	13	23	45	35	82	51
20	0	9	0	12	12	46	22	33	51	38	79	49
21	11	14	7	15	19	41	29	67	48	32	61	51
22	16	20	7	17	26	38	38	87	34	23	50	70
23	16	23	0	19	25	40	37	102	39	26	33	89
24	13	14	0	19	35	38	38	92	35	25	22	71
25	9	13	7	16	25	37	38	88	35	11	29	42
26	0	14	9	12	21	37	41	85	34	10	40	50
27	0	13	8	11	11	35	33	77	24	19	70	27
28	0	20	8	12	14	21	41	60	23	22	79	20
29	0	15		13	20	17	25	60	11	26	78	20
30	0	14		15	30	15	14	62	10	26	85	20
31	11	11		15		12		73	20		78	
Mean	6.8	10.4	2.4	14.7	39.6	33.0	17.4	33.0	38.6	33.5	61.1	40.9

The yearly mean sunspot number equaled 13.4 in 1986.

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

Day	Dec 86	Jan 87	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
01	70.7	71.6	69.2	72.8	72.5	79.3	77.8	76.0	91.0	85.3*	84.2	99.1
02	70.6	70.5	69.8	73.3	71.9	80.2	77.9	74.4	89.7	85.5	84.8	105.0
03	70.2	69.1	70.0	71.6	72.4	82.8	76.4	73.7	87.1	87.5	85.6*	98.0
04	69.2	69.0	68.3	73.3	74.0	84.4	77.3	73.2	84.0	89.6	89.2	101.1*
05	70.0	70.3	67.5	73.7	77.6	86.1	76.1	73.4	81.6	93.5*	90.1	99.2
06	69.1	69.3	67.7	75.6	89.4	87.9	75.8	73.3	85.2	95.6*	89.5	94.9
07	68.2	69.7	69.1	75.5	94.4	88.1	76.0	74.1	89.5*	99.5*	90.9	94.4
08	69.1	68.2	68.9	76.9	94.8	89.1	77.0	76.1	93.8	101.9	95.0	92.7
09	70.8	68.0	69.2	73.6	100.5	87.3	76.8	76.3	94.8	100.9	92.7	90.3
10	72.3	67.4	69.3	71.4	100.0	89.5	78.1	76.3	94.0	97.8	101.1	89.2
11	73.0F	68.0	68.5	70.5	101.3	86.4	80.7	75.7	99.8*	95.4	100.8*	92.6
12	71.1	68.9	67.8	69.5	98.6	85.4	82.1	75.5	100.0	91.1	102.2	92.6
13	71.5	69.7	68.0	69.6	99.3	87.4	82.3	75.1	101.8*	89.7	105.5	92.9
14	71.4	71.1	68.3	71.1	97.7	91.2	80.6	76.6	102.4	86.8	113.3*	92.3
15	70.9	71.5	69.3	70.5	97.8	93.6	80.4	78.8	101.3	85.0	117.8I	93.7
16	70.8	70.7	68.4	71.0	95.3*	98.2	81.3	80.9	102.7	83.5	111.1	95.0
17	71.7	70.8	68.1	71.2	97.3	96.7	81.8	81.5	101.2	84.0	106.0	96.8
18	71.4	70.6	69.8	72.5	94.0	98.5	82.9	82.5	100.4	82.4	106.5	100.0
19	71.0	70.0	69.5	71.5	91.7	100.1	82.4	85.1	99.0	82.7	100.4	106.6
20	70.4	68.9	69.6	73.8	85.6	99.8	81.1	93.8	101.2	84.9	95.6	112.2
21	70.6	71.2*	70.7	74.2	78.3	99.9	82.6	95.6	96.6	83.0	89.3	115.3
22	71.4	73.6*	70.4	73.8	76.5	101.0	87.1	102.6*	94.4*	81.3	88.2	117.8
23	70.8	72.1	70.5	75.5	76.5	94.9	87.5	115.6	91.8	80.4	87.0	115.1
24	70.0	71.6	72.1	75.9	78.6	98.5	89.1	115.0	89.6	80.3	87.1	109.4
25	70.0	71.5	73.5	75.7	75.8	96.8	86.3	114.9	89.9	77.9	92.3	104.9
26	69.7	72.6	73.9	75.6	74.3	92.3	84.3	109.8*	87.3	76.4	96.9	101.3
27	69.4	69.9	74.0	75.4	74.8	87.5	78.9	105.4	85.1	80.2	105.9	94.9
28	69.2	70.8	72.7*	75.0	74.3	85.1	79.2	102.5	81.3	82.3	106.2	92.3
29	69.2	70.6		75.3	73.6E	79.3	76.6	97.3	79.9	83.5	102.7	90.7
30	69.6	69.8		74.6	76.8	77.9	75.9H	94.0	78.5	81.9	104.2	89.1
31	68.1	68.7		71.9G		77.3		91.9	83.2		97.8	
Mean	70.4	70.2	69.8	73.3	85.5	89.8	80.4H	87.0	92.2	87.0	97.4	99.0

* = corrected for burst in progress; E = corrected for snow on antenna; F = uncorrected for interference during calibration; G = corrected for ice on antenna; H = measured at Penticton; I = 1700 UT calibration taken at 1915 UT. The yearly mean 2800 MHz flux equaled 74.0 in 1986.

DAILY SOLAR INDICES

November 1987

Day	Julian Day	Bartels Cycle Day	Sunspot Numbers Int	Sunspot Numbers 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	305	18	56	60	100.7	500	256	111	99.1	102	77	47	26	20
02	306	19	57	52	106.7	503	268	154	105.0	100	82	49	27	32
03	307	20	57	53	99.7	501	---	---	98.0	--	--	48	28	14
04	308	21	46	49	102.9*	525	251	125	101.1*	99	78	46	28	11
05	309	22	47	39	101.0	517	256	136	99.2	92	78	45	26	11
06	310	23	27	30	96.6	---	---	---	94.9	--	--	--	--	--
07	311	24	31	27	96.2	531	268	126	94.4	84	75	49	27	11
08	312	25	43	39	94.5	496	255	130	92.7	90	50	41	23	10
09	313	26	42	41	92.1	491	250	130	90.3	87	56	38	24	9
10	314	27	30	22	91.0	469	252	122	89.2	83	69	47	27	10
11	315	1	28	28	94.5	499	268	122	92.6	86	70	45	27	11
12	316	2	22	24	94.6	492	262	122	92.6	83	70	45	27	10
13	317	3	15	20	94.9	517	263	126	92.9	89	70	44	27	11
14	318	4	23	21	94.3	514	263	128	92.3	84	69	44	26	10
15	319	5	19	22	95.8	524	267	132	93.7	85	71	45	27	12
16	320	6	33	37	97.2	519	262	134	95.0	90	70	46	27	11
17	321	7	46	44	99.1	510	245	126	96.8	88	72	46	27	11
18	322	8	48	53	102.4	522	253	130	100.0	85	74	44	21	11
19	323	9	51	50	109.2	526	268	139	106.6	98	77	47	27	11
20	324	10	49	48	115.0	458	276	159	112.2	101	81	50	26	12
21	325	11	51	58	118.2	535	295	152	115.3	104	80	49	27	11
22	326	12	70	78	120.8	533	278	147	117.8	106	83	50	27	12
23	327	13	89	88	118.1	524	279	145	115.1	99	81	49	26	11
24	328	14	71	76	112.3	523	264	138	109.4	100	86	47	26	11
25	329	15	42	47	107.7	514	269	130	104.9	98	81	48	26	11
26	330	16	50	46	104.1	446	243	124	101.3	92	77	48	27	12
27	331	17	27	27	97.5	519	285	127	94.9	91	74	48	26	12
28	332	18	20	31	94.9	516	270	123	92.3	84	71	--	--	--
29	334	19	20	17	93.3	512	276	126	90.7	88	73	20	10	9
30	335	20	20	18	91.6	420	237	117	89.1	81	69	--	--	--
Mean			40.9	41.5	101.2	505	263	131	99.0	91	73	45	25	12

All sunspot numbers shown above are preliminary values.

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

* = corrected for burst in progress

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

OBSERVED AND PREDICTED SOLAR ACTIVITY INDICES

NOVEMBER 1987

Date	RELATIVE SUNSPOT NUMBERS International (R_i) Monthly Mean	International (R_i) Smoothed	American (R_a) Monthly Mean	American (R_a) Smoothed	Derived (R_s) Monthly Mean	Derived (R_s) Smoothed	2800 MHz RADIO FLUX Adjusted to 1 AU (S_a) Monthly Mean	Adjusted to 1 AU (S_a) Smoothed
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	13	7.6	11	13.7	17	70.1	73
Sep	3.8	12	3.5	10	13.0	17	69.4	73
Oct	35.4	13	19.8	11	27.0	17	82.4	73
Nov	15.2	15	14.7	13	19.5	18	75.5	74
Dec	6.8	16	5.1	14	14.0	19	70.4	75
Jan 87	10.4	18*	9.4	16	13.8	20	70.2	76
Feb	2.4	20*	3.0	18	13.4	22	69.8	78
Mar	14.7	22*	13.3	20	17.2	24	73.3	80
Apr	39.6	24*	39.4	23	30.3	25	85.5	81
May	33.0	26*	30.7	26*	35.0	27	89.8	83
Jun	17.4	30(2)*	18.0	29	24.8	30	80.4	--
Jul	33.0*	32(5)*	34.3	32	32.0	33	87.0	--
Aug	38.6*	35(7)*	39.0	34	37.6	35	92.2	--
Sep	33.5*	38(9)*	34.0	37	32.0	39	87.0	--
Oct	61.1*	43(12)*	55.8	42	43.2	43	97.4	--
Nov	40.9*	49(16)*	41.5*	48	44.9	50	99.0	--
Dec	----	55(18)*	----	54	----	56	----	--
Jan 88	----	61(22)*	----	60	----	62	----	--
Feb	----	65(26)*	----	64	----	66	----	--
Mar	----	67(31)*	----	66	----	68	----	--
Apr	----	70(36)*	----	69	----	71	----	--
May	----	73(39)*	----	72	----	74	----	--

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

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

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

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1980	164	163	161	159	156	155	153	150	150	150	148	143
1981	140	142	143	143	143	142	140	141	143	142	139	138
1982	137	133	129	124	120	117	115	109	101	96	95	95
1983	93	90	86	82	77	71	66	66	68	68	67	64
1984	60	56	53	50	48	47	44	40	34	29	25	22
1985	21	20	19	18	18	18	17	17	17	17	17	15
1986	14	13	13	14	14	14	14	13	12*	13	15	16
1987	18	20	22	24	27	30	32	35	38	43	49	55
						(2)	(5)	(7)	(9)	(12)	(16)	(18)
1988	61	65	67	70	73	77	83	90	95	100	103	104
	(22)	(26)	(31)	(36)	(39)	(43)	(48)	(53)	(56)	(61)	(65)	(69)
1989	106	111	119	128	136	143	148	152	157	162	165	165
	(69)	(69)	(71)	(74)	(76)	(79)	(80)	(82)	(87)	(90)	(91)	(93)
1990	164	163	159	150	142	136	132	129	123	117	108	104
	(94)	(95)	(94)	(90)	(84)	(77)	(74)	(73)	(67)	(60)	(52)	(45)

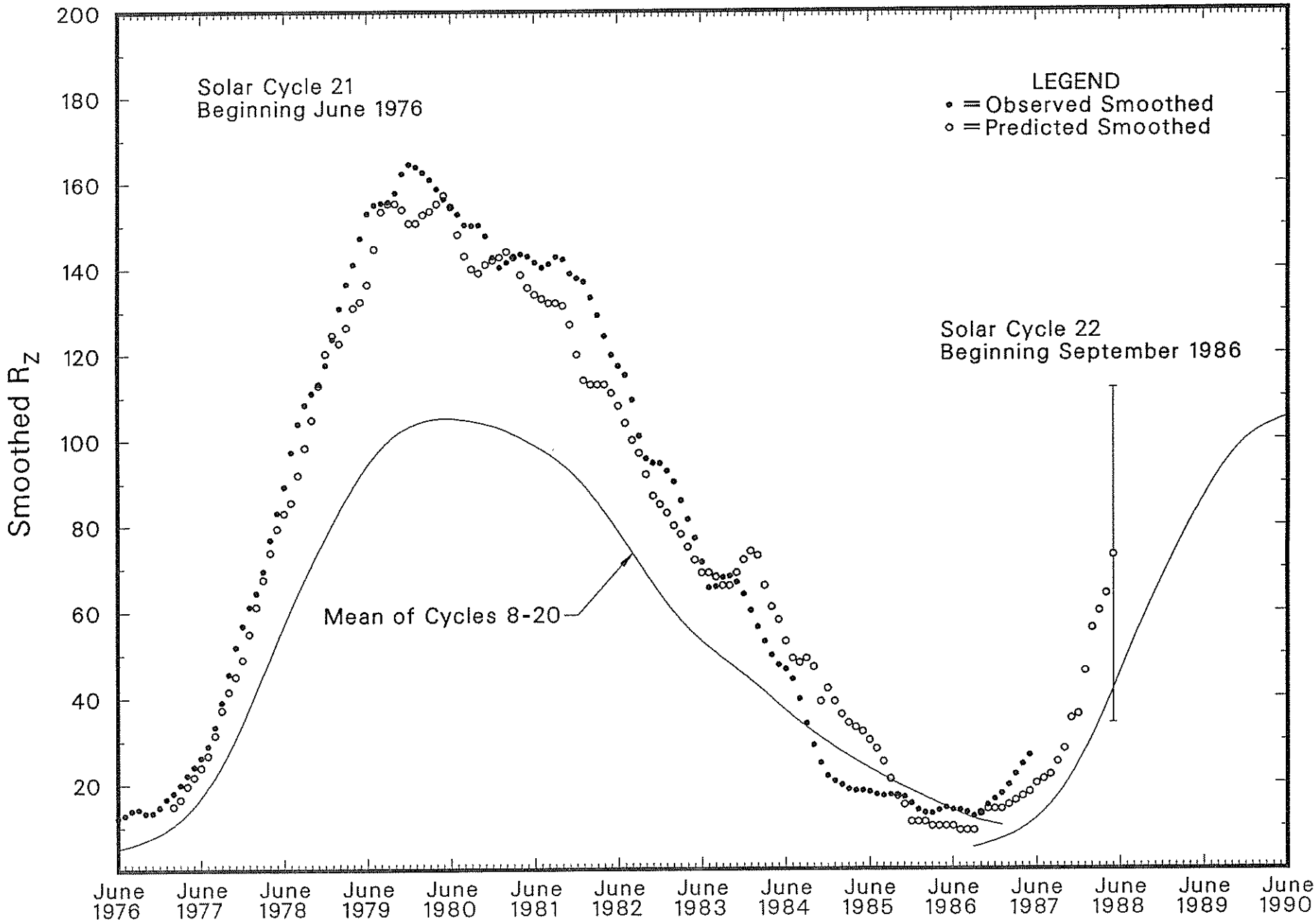
*September 1986 marks the onset of Sunspot Cycle 22.

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

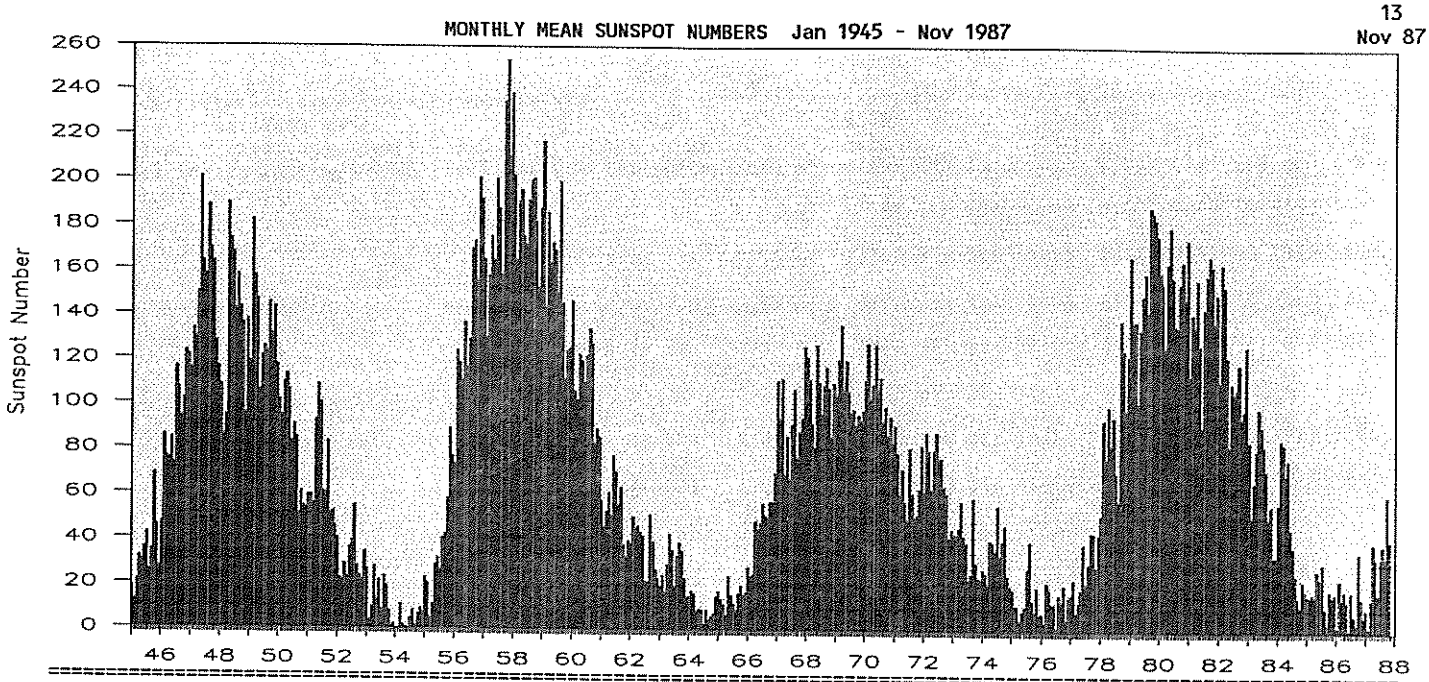
Table entries, with numbers in parentheses below them, denote predictions by the McNish-Lincoln method. (See page 9 in the July 1987 supplement to *Solar-Geophysical Data*.) Adding the number in parentheses to the predicted value generates the upper limit of the 90% confidence interval; subtracting the number from the predicted value generates the lower limit. Consider, for example, the May 1988 prediction. There exists a 90% chance that in May 1988 the actual smoothed sunspot number will fall somewhere between 34 and 112.

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 minimum value of 12.3 that occurred in September 1986.

OBSERVED AND ONE-YEAR-AHEAD PREDICTED SUNSPOT NUMBERS



MONTHLY MEAN SUNSPOT NUMBERS Jan 1945 - Nov 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	38.0
1956	73.6	124.0	118.4	110.7	136.6	116.6	129.1	169.6	173.2	155.3	201.3	192.1	141.7
1957	165.0	130.2	157.4	175.2	164.6	200.7	187.2	158.0	235.8	253.8	210.9	239.4	190.2 M
1958	202.5	164.9	190.7	196.0	175.3	171.5	191.4	200.2	201.2	181.5	152.3	187.6	184.8
1959	217.4	143.1	185.7	163.3	172.0	168.7	149.6	199.6	145.2	111.4	124.0	125.0	159.0
1960	146.3	106.0	102.2	122.0	119.6	110.2	121.7	134.1	127.2	82.8	89.6	85.6	112.3
1961	57.9	46.1	53.0	61.4	51.0	77.4	70.2	55.8	63.6	37.7	32.6	39.9	53.9
1962	38.7	50.3	45.6	46.4	43.7	42.0	21.8	21.8	51.3	39.5	26.9	23.2	37.6
1963	19.8	24.4	17.1	29.3	43.0	35.9	19.6	33.2	38.8	35.3	23.4	14.9	27.9
1964	15.3	17.7	16.5	8.6	9.5	9.1	3.1	9.3	4.7	6.1	7.4	15.1	10.2 m
1965	17.5	14.2	11.7	6.8	24.1	15.9	11.9	8.9	16.8	20.1	15.8	17.0	15.1
1966	28.2	24.4	25.3	48.7	45.3	47.7	56.7	51.2	50.2	57.2	57.2	70.4	47.0
1967	110.9	93.6	111.8	69.5	86.5	67.3	91.5	107.2	76.8	88.2	94.3	126.4	93.8
1968	121.8	111.9	92.2	81.2	127.2	110.3	96.1	109.3	117.2	107.7	86.0	109.8	105.9 M
1969	104.4	120.5	135.8	106.8	120.0	106.0	96.8	98.0	91.3	95.7	93.5	97.9	105.5
1970	111.5	127.8	102.9	109.5	127.5	106.8	112.5	93.0	99.5	86.6	95.2	83.5	104.5
1971	91.3	79.0	60.7	71.8	57.5	49.8	81.0	61.4	50.2	51.7	63.2	82.2	66.6
1972	61.5	88.4	80.1	63.2	80.5	88.0	76.5	76.8	64.0	61.3	41.6	45.3	68.9
1973	43.4	42.9	46.0	57.7	42.4	39.5	23.1	25.6	59.3	30.7	23.9	23.3	38.0
1974	27.6	26.0	21.3	40.3	39.5	36.0	55.8	33.6	40.2	47.1	25.0	20.5	34.5
1975	18.9	11.5	11.5	5.1	9.0	11.4	28.2	39.7	13.9	9.1	19.4	7.8	15.5
1976	8.1	4.3	21.9	18.8	12.4	12.2	1.9	16.4	13.5	20.6	5.2	15.3	12.6 m
1977	16.4	23.1	8.7	12.9	18.6	38.5	21.4	30.1	44.0	43.8	29.1	43.2	27.5
1978	51.9	93.6	76.5	99.7	82.7	95.1	70.4	58.1	138.2	125.1	97.9	122.7	92.5
1979	166.6	137.5	138.0	101.5	134.4	149.5	159.4	142.2	188.4	186.2	183.3	176.3	155.4 M
1980	159.6	155.0	126.2	164.1	179.9	157.3	136.3	135.4	155.0	164.7	147.9	174.4	154.6
1981	114.0	141.3	135.5	156.4	127.5	90.9	143.8	158.7	167.3	162.4	137.5	150.1	140.4
1982	111.2	163.6	153.8	122.0	82.2	110.4	106.1	107.6	118.8	94.7	98.1	127.0	115.9
1983	84.3	51.0	66.5	80.7	99.2	91.1	82.2	71.8	50.3	55.8	33.3	33.4	66.6
1984	57.0	85.4	83.5	69.7	76.4	46.1	37.4	25.5	15.7	12.0	22.8	18.7	45.9
1985	16.5	15.9	17.2	16.2	27.5	24.2	30.7	11.1	3.9	18.6	16.2	17.3	17.9
1986	2.5	23.2	15.1	18.5	13.7	1.1	18.1	7.4	3.8	35.4	15.2	6.8	13.4
1987	10.4	2.4	14.7	39.6	33.0	17.4	33.0*	38.6*	33.5*	61.1*	40.9*		29.5*

*Preliminary

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

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Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	CMP Mo	CMP Day	Dur (Min)	Imp Opt	Imp Xray	Imp See	Obs Type	Time (UT)	Area Measurement Apparent (10^{-6} Disk)	Area Measurement Corr (Sq Deg)	Remarks
0001	LEAR	01	0904	0910	0912	S21	W73	4881	10	26.9	8	SF		3	C		18		
0002	RAMY	01	1726E	1728	1746	S22	W76	4881	10	27.0	20D	SF	C 1.2	3	C				
0003	RAMY	01	1845	1849	1855	S22	W75	4881	10	27.1	10	SF		3	C				
0004	RAMY	01	1938	1939	1946	S22	E81	4882	11	8.0	8	SF	C 1.7	3	C				
0005	LEAR	02	0120	0124	0128	N31	W26	4875	10	31.0	8	SF		3	C		12		
0006	RAMY	02	1317E	1319U	1324	N30	W43	4875	10	30.3	7D	SF		2	C		13		
0007	RAMY	02	1317E	1317U	1342	S22	E72	4882	11	8.1	25D	SF	C 1.0	2	C		32		FH
0008	RAMY	02	1347	1356	1435	N27	W38	4875	10	30.7	48	SF		3	C		66		F
0009	RAMY	02	1355	1356	1421	S23	E65	4882	11	7.6	26	SB	C 7.0	3	C		57		
0010	RAMY	02	1459	1459	1510	S19	E70	4882	11	8.0	11	SF	C 1.0	3	C		23		
0011	RAMY	02	1655	1656	1702	N30	W45	4875	10	30.3	7	SN		3	C		31		
0012	RAMY	02	1813	1819	1840	S23	E57	4882	11	7.1	27	1B	C 7.8	3	C		133		FR
0013		02	2032*	20424	2108	N30	W37	4875	10	31.0	36	SF	C 1.5				32		F
	HOLL	02	2032	2046	2111	N29	W38	4875	10	31.0	39	SF	C 1.5	3	C		42		F
	PALE	02	2042	2042	2104	N30	W36	4875	10	31.0	22	SF	C 1.5	3	C		23		F
0014	HOLL	02	2212	2213	2217	S21	E66	4883	11	8.0	5	SF		3	C		20		
0015	LEAR	03	0509	0510	0521	N28	W43	4875	10	30.9	12	SF		3	C		21		
0016	LEAR	03	0705	0705	0725	N30	W43	4875	10	31.0	20	SF	C 1.0	3	C		28		
0017	LEAR	03	0727	0745	0753	N30	W43	4875	10	31.0	26	SF		3	C		24		
0018		03	09062	09103	0942	N30	W44	4875	10	31.0	36	SN	C 4.1				66	1.0	EI
	LEAR	03	0906	0910	0953	N30	W44	4875	10	31.0	47	SF	C 4.1	3	C		70		
	KANZ	03	0908	0913	0930	N30	W45	4875	10	30.9	22	SN	C 4.1		P	0908	62	1.0	EI
0019	RAMY	03	1311	1312	1333	N30	W47	4875	10	30.9	22	SF		3	C		22		
0020	RAMY	03	1355	1356	1400	N28	W56	4875	10	30.3	5	SF		3	C		46		
0021		03	16215	1626	1628	N29	W48	4875	10	31.0	7	SF					20		F
	RAMY	03	1621	1626	1627	N28	W48	4875	10	31.0	6	SF		3	C		27		
	HOLL	03	1626	1626	1629	N30	W49	4875	10	30.9	3	SF		3	C		14		F
0022	RAMY	03	1637	1639	1644	S19	E55	4883	11	7.9	7	SF		3	C		11		
0023		03	1701*	17119	1726	N28	W53	4875	10	30.7	25	SN					33		F
	RAMY	03	1701	1711	1717	N29	W55	4875	10	30.5	16	SF		3	C		29		
	RAMY	03	1718	1720	1736	N28	W51	4875	10	30.8	18	SN		3	C		37		F
0024	HOLL	03	1746	1749	1754	S21	E63	4883	11	8.6	8	SF		3	C		14		F
0025		03	1703*	1817*	1838	N29	W51	4875	10	30.8	95	SF	C 1.0				20		F
	HOLL	03	1703	1818	1825	N28	W52	4875	10	30.7	82	SF		3	C		23		F
	PALE	03	1817	1817	1830	N29	W51	4875	10	30.9	13	SF		3	C		11		
	HOLL	03	1826	1830	1859	N30	W50	4875	10	30.9	33	SF	C 1.0	3	C		26		F
0026	HOLL	03	1946	1959	2008	S22	W43	4878	10	31.5	22	SF		3	C		30		H
0027	HOLL	03	2112	2118	2121	S19	E51	4883	11	7.8	9	SF		3	C		17		
0028	HOLL	03	2203	2204	2211	N30	W59	4875	10	30.4	8	SF		3	C		37		H
0029	LEAR	04	0536	0536	0540	N30	W63	4875	10	30.4	4	SF		3	C		14		
0030		04	0804	0804	0810	N30	W66	4875	10	30.2	6	SF					18		F
	SVTO	04	0800E	0802U	0811	N30	W66	4875	10	30.2	11D	SF		3	C		24		
	LEAR	04	0804	0804	0809	N31	W66	4875	10	30.2	5	SF		3	C		13		F

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Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	CMP Mo	CMP Day	Dur (Min)	Imp Opt	Imp Xray	Imp See	Obs Type	Time (UT)	Area Measurement Apparent (10^{-6} Disk)	Area Measurement Corr (Sq Deg)	Remarks
0031	RAMY	04	1217	1224	1228	S20	E49	4883	11	8.2	11	SF		2	C		20		
0032	RAMY	04	1308	1309	1312	N18	E75		11	10.2	4	SF		3	C		11		H
0033	RAMY	04	1349	1352	1359	N17	E73		11	10.1	10	SF		3	C		20		H
0034		04	1713	1715*	1746	N28	W68	4875	10	30.5	33	SF	M 1.3				58		F
	RAMY	04	1713	1715	1741	N28	W67	4875	10	30.6	28	SF	M 1.3	3	C		59		
	HOLL	04	1714E	1716	1751	N28	W69	4875	10	30.4	37D	SF	M 1.3	3	C		96		F
	PALE	04	1725E	1730	1746	N28	W67	4875	10	30.6	21D	SF		3	C		19		F
0035	PALE	04	1912	1914	1925	S22	E46	4883	11	8.3	13	SF	C 1.1	3	C		22		F
0036	HOLL	04	2103	2105	2119	N30	W72	4875	10	30.3	16	SF		3	C		31		F
0037	LEAR	04	2323	2325	2332	N27	W62	4875	10	31.1	9	SF	M 1.5	3	C		54		F
0038	PALE	05	0014	0015	0035	S21	E40	4883	11	8.1	21	SN	C 3.0	3	C		35		EF
0039	LEAR	05	0456	0458	0512	N30	W73	4875	10	30.6	16	SF	M 3.1	3	C		97		F
0040	LEAR	05	0823	0824	0829	S20	E31	4883	11	7.7	6	SF		3	C		23		
0041	LEAR	05	0943	0943	0946	S21	E36	4883	11	8.2	3	SF		3	C		25		U
0042	LEAR	05	0956	1000	1028	S21	E35	4883	11	8.1	32	SF	C 6.5	3	C		39		U
0043	RAMY	05	1518	1520	1526	S23	E20	4882	11	7.2	8	SF		3	C		19		
0044	LEAR	05	2334	2335	2339	N29	W75	4875	10	31.1	5	SF	M 2.1	3	C		25		
0045	LEAR	06	0211	0216	0217	S23	E25	4883	11	8.0	6	SF		3	C		12		
0046	LEAR	06	0534	0534	0539	S23	E24	4883	11	8.1	5	SF		3	C		21		F
0047	LEAR	06	0758	0758	0809	S23	E22	4883	11	8.0	11	SF	C 1.4	3	C		11		
0048	SVTO	06	1305E	1307	1319	S22	E19	4883	11	8.0	14D	SN	C 1.1	3	C		24		
0049	HOLL	06	1750	1803	1813	S26	E05	4882	11	7.1	23	SF		3	C		17		H
0050		06	19495	20029	2206	S27	E60	4886	11	11.5	137	2N	C 4.3				193		ESU
	HOLL	06	1949	2011	2206	S27	E61	4886	11	11.6	137	2N	C 4.3	3	C		277		UE
	PALE	06	1954	2002	2100D	S27	E60	4886	11	11.5	66D	1F	C 4.3	3	C		109		US
0051	HOLL	06	2005	2011	2014	N17	E43	4884	11	10.1	9	SF		3	C		15		
0052	SVTO	07	1146	1147	1152	S23	E50	4886	11	11.3	6	SF		3	C		17		
0053		07	14591	1503	1536	S24	E48	4886	11	11.3	37	1N	C 1.0				103		FH
	RAMY	07	1459	1503	1537	S23	E49	4886	11	11.4	38	1N	C 1.0	3	C		127		FH
	SVTO	07	1459E	1504U	1510D	S25	E48	4886	11	11.3	11D	SF	C 1.0	2	C		50		
	HOLL	07	1500	1503	1536	S23	E47	4886	11	11.2	36	1N		3	C		132		F
0054	HOLL	07	2028	2030U	2045	N31	W90	4875	10	31.7	17	1N	M 1.2	3	C		165		
0055	HOLL	07	2144	2149	2201	S30	E50	4886	11	11.8	17	SF		3	C		22		H
0056	RAMY	10	1427	1428	1435	N17	W10	4884	11	9.8	8	SF		3	C		15		H
0057		11	0528*	0530*	0540	N32	W64	4885	11	6.2	12	SF					22		
	LEAR	11	0528	0530	0533	N31	W65	4885	11	6.1	5	SF		3	C		20		
	LEAR	11	0538	0542	0546	N32	W63	4885	11	6.2	8	SF		3	C		23		
0058	LEAR	11	0624	0632	0637	N32	W64	4885	11	6.2	13	SF		3	C		20		
0059	RAMY	11	1229	1240	1330	N23	E12		11	12.4	61	SF		3	C		70		F
0060	HOLL	11	1606	1610	1617	N31	W69	4885	11	6.2	11	SF		3	C		30		

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0061		11	17201	17211	1725	S25	E87	4890	11	18.5	5	SF					20		
	PALE	11	1720	1721	1726	S26	E88	4890	11	18.5	6	SF		2	C				
	RAMY	11	1720	1722	1725	S25	E86	4890	11	18.4	5	SF		3	C		22		
	HOLL	11	1721	1721	1725	S25	E88	4890	11	18.5	4	SF		3	C		18		
0062		11	18221	1822*	1845	S25	E86	4890	11	18.4	23	SF					48		
	PALE	11	1822	1822	1838	S26	E88	4890	11	18.6	16	SF		3	C				
	RAMY	11	1822	1830	1849	S25	E84	4890	11	18.3	27	SF		3	C		42		
	HOLL	11	1823	1835	1847	S25	E86	4890	11	18.4	24	SF		3	C		55		
0063		11	1938	1939	1942	S26	E84	4890	11	18.3	4	SF					26		
	RAMY	11	1938	1939	1942	S26	E84	4890	11	18.3	4	SF		3	C		22		
	HOLL	11	1938	1939	1942	S25	E85	4890	11	18.4	4	SF		3	C		31		
0064	HOLL	11	1953	1953	2010	S25	E88	4890	11	18.6	17	SF		3	C		11		
0065		11	20177	20206	2029	S25	E84	4890	11	18.3	12	SF					12		
	HOLL	11	2017	2020	2025	S24	E84	4890	11	18.3	8	SF		3	C		11		
	PALE	11	2023	2026	2029	S26	E85	4890	11	18.4	6	SF		3	C				
	RAMY	11	2024	2026	2032	S25	E84	4890	11	18.3	8	SF		3	C		14		
0066	HOLL	11	2209	2213	2222	S25	E84	4890	11	18.4	13	SF		3	C		34		
0067	LEAR	11	2352	2353	2356	S26	E88	4890	11	18.8	4	SF		3	C		19		
0068	RAMY	12	1303	1303	1319	S22	E74	4890	11	18.2	16	SF		3	C		19		
0069		12	1504*	1536	1548	N29	W82	4885	11	6.2	44	SF					16		
	RAMY	12	1504	1536	1550	N29	W83	4885	11	6.1	46	SF		3	C		20		
	HOLL	12	1534	1536	1545	N29	W81	4885	11	6.3	11	SF		3	C		12		
0070	HOLL	12	1552	1600	1624	N30	W76	4885	11	6.7	32	SF		3	C		22		
0071	RAMY	12	1641	1641	1645	S24	E72	4890	11	18.2	4	SF	C 1.2	3	C		15		F
0072		12	1717*	17237	1742	N30	W79	4885	11	6.5	25	SN					19		
	RAMY	12	1717	1723	1740	N29	W84	4885	11	6.1	23	SF		3	C		11		
	HOLL	12	1724	1726	1742	N31	W72	4885	11	7.0	18	SF		3	C		13		
	PALE	12	1728	1730	1744	N30	W82	4885	11	6.3	16	SB		2	C		34		
0073		12	17501	17512	1800	S25	E72	4890	11	18.3	10	SF	C 1.4				37		F
	RAMY	12	1750	1752	1801	S24	E72	4890	11	18.3	11	SF	C 1.4	3	C		47		
	PALE	12	1751	1751	1758	S26	E70	4890	11	18.2	7	SF	C 1.4	3	C		17		F
	HOLL	12	1751	1753	1800	S24	E73	4890	11	18.4	9	SF		3	C		47		
0074	HOLL	12	1855	1903	1914	S24	E72	4890	11	18.3	19	SF	C 1.9	3	C		29		
0075		12	19276	19333	1956	S25	E70	4890	11	18.2	29	SF	C 1.6				15		
	HOLL	12	1927	1933	2002	S24	E71	4890	11	18.3	35	SF	C 1.6	3	C		14		
	RAMY	12	1933E	1933U	1959	S24	E70	4890	11	18.2	26D	SF	C 1.6	3	C		12		
	PALE	12	1933	1936	1946	S26	E69	4890	11	18.2	13	SF		3	C		19		
0076	HOLL	12	2031	2033	2054	S25	E69	4890	11	18.2	23	SF	C 2.4	3	C		38		F
0077	HOLL	12	2133	2133	2141	N29	W86	4885	11	6.1	8	SF		3	C		11		
0078	LEAR	13	0032	0033	0038	S23	E66	4890	11	18.1	6	SF	C 2.1	3	C		19		
0079		13	0156	01582	0216	S26	E65	4890	11	18.1	20	SF	C 2.4				34		F
	LEAR	13	0156	0158	0216	S26	E65	4890	11	18.1	20	SF	C 2.4	3	C		34		F
	PALE	13	0156	0200	0217	S26	E65	4890	11	18.1	21	SF	C 2.4	3	C		34		F
0080	LEAR	13	0624	0624	0629	S23	E66	4890	11	18.3	5	SF		3	C		11		
0081	RAMY	13	1447	1449	1512	S25	E61	4890	11	18.3	25	SF		3	C		19		
0082		13	19034	19081	1947	S26	E59	4890	11	18.4	44	SF	C 1.7				36		F
	HOLL	13	1903	1909	1959	S25	E56	4890	11	18.1	56	SF	C 1.7	3	C		55		F
	RAMY	13	1905	1909	1944	S26	E61	4890	11	18.5	39	SF	C 1.7	3	C		30		F
	PALE	13	1907	1908	1937	S27	E60	4890	11	18.5	30	SF	C 1.7	2	C		24		F

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0083		16	00251	00314	0050	S24	E29	4890	11	18.2	25	SN	C 1.1				77	1.4	EF
	PEKG	16	0025	0035	0050	S24	E29	4890	11	18.2	25	SN			P	0035	105	1.4	E
	PALE	16	0026	0031	0050	S24	E30	4890	11	18.3	24	SN	C 1.1	3	C		67		FE
	LEAR	16	0034E		0050	S25	E29	4890	11	18.3	16D	SF	C 1.1	1	C		59		
0084		16	0526*	05289	0539	S25	E28	4890	11	18.4	13	SF					18		
	LEAR	16	0526	0528	0535	S25	E28	4890	11	18.4	9	SF		3	C		19		
	LEAR	16	0537	0537	0543	S25	E28	4890	11	18.4	6	SF		3	C		16		
0085	LEAR	16	0557	0601	0602	S25	E28	4890	11	18.4	5	SF		3	C		16		
0086	HOLL	16	1901	1903	1909	S24	E19	4890	11	18.3	8	SF		3	C		34		
0087	PALE	16	2054	2059	2104	S27	E15	4890	11	18.0	10	SF		3	C		23		F
0088	PALE	17	0045	0048	0057	S27	E13	4890	11	18.0	12	SF		3	C		11		F
0089	LEAR	17	0210	0210	0213	S25	E16	4890	11	18.3	3	SF		3	C		38		
0090	PALE	17	0318	0320	0323	S20	W08	4890	11	16.5	5	SB		3	C		60		
0091		17	21354	2140	2150	S26	E04	4890	11	18.2	15	SF					18		
	HOLL	17	2135	2140	2152	S24	E05	4890	11	18.3	17	SF		3	C		26		
	PALE	17	2139	2140	2148	S27	E04	4890	11	18.2	9	SF		2	C		11		
0092		18	03162	03173	0326	S22	W06	4890	11	17.7	10	SN	M 1.0				58		
	LEAR	18	0316	0317	0330	S24	W05	4890	11	17.7	14	SF	M 1.0	3	C		57		
	PALE	18	0318	0320	0323	S20	W08	4890	11	17.5	5	SB	M 1.0	3	C		60		
0093	LEAR	18	0648	0654	0714	S25	E00	4890	11	18.3	26	SF		3	C		33		
0094		18	1328*	1331*	1333	S22	E53	4891	11	22.6	5	SF					44		
	RAMY	18	1328	1331	1333	S21	E53	4891	11	22.6	5	SF		2	C		20		
	RAMY	18	1338	1439	1512D	S22	E53	4891	11	22.6	94D	SF		3	C		69		
0095	RAMY	18	1558E	1601	1631	S21	E54	4891	11	22.8	33D	SF		3	C		46		
0096	HOLL	18	1611	1611	1705	S24	W05	4890	11	18.3	54	SF		3	C		22		FH
0097		18	1428	1712	1732	S22	E48	4891	11	22.3	184	SN					36		FZ
	HOLL	18	1428	1712	1732	S22	E45	4891	11	22.1	184	SN		3	C		57		ZF
	PALE	18	1717E	1717U	1732	S22	E50	4891	11	22.6	15D	SF		2	C		15		
0098		18	1717	1725	1732	S24	W10	4890	11	17.9	15	SF					18		
	HOLL	18	1717	1725	1726	S25	W09	4890	11	18.0	9	SF		3	C		11		
	PALE	18	1725E	1725U	1737	S23	W11	4890	11	17.9	12D	SF		2	C		26		
0099	PALE	18	1747	1800	1835	S22	E51	4891	11	22.7	48	SF		3	C		25		
0100		18	19046	19151	1918	S24	W10	4890	11	18.0	14	SF					24		
	HOLL	18	1904	1916	1917	S25	W08	4890	11	18.2	13	SF		3	C		22		
	PALE	18	1910	1915	1918	S24	W11	4890	11	17.9	8	SF		3	C		26		
0101	HOLL	18	1930	2002	2041D	S20	E51	4891	11	22.7	71D	SF		3	C		31		
0102	HOLL	18	2046	2134	2230	S19	E49	4891	11	22.6	104	SF		3	C		37		
0103		18	21238	2132	2140	S26	W10	4890	11	18.1	17	SF					30		
	HOLL	18	2123	2132	2143	S26	W08	4890	11	18.3	20	SF		3	C		38		
	PALE	18	2131	2132	2136	S25	W11	4890	11	18.0	5	SF		3	C		22		
0104	HOLL	18	2158	2159	2205	S25	W12	4890	11	18.0	7	SF		3	C		22		
0105		18	22272	22282	2233	S25	W15	4890	11	17.8	6	SF					25		H
	HOLL	18	2227	2228	2233	S26	W16	4890	11	17.7	6	SF		3	C		28		
	PALE	18	2227	2229	2232	S25	W17	4890	11	17.6	5	SF		3	C		32		H
	LEAR	18	2229	2230	2233	S25	W12	4890	11	18.0	4	SF		3	C		14		
0106		18	22333	22346	2250	S20	E48	4891	11	22.6	17	SF					14		Z
	HOLL	18	2233	2234	2251	S19	E49	4891	11	22.7	18	SF		3	C		12		Z
	LEAR	18	2236	2240	2248	S22	E46	4891	11	22.5	12	SF		3	C		15		

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Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	CMP Mo	CMP Day	Dur (Min)	Imp Opt	Imp Xray	Imp See	Obs Type	Time (UT)	Area Measurement Apparent (10^{-6} Disk)	Area Measurement Corr (Sq Deg)	Remarks
0107		19	01082	01114	0121	S23	W18	4890	11	17.7	13	SN	C 2.4				78	.2	EH
	PEKG	19	0108	0112	0119	S22	W19	4890	11	17.6	11	SB	C 2.4		C	0112	168	2.0	E
	LEAR	19	0109	0111	0122	S24	W18	4890	11	17.6	13	SF	C 2.4	3	C		19		H
	PALE	19	0110	0115	0123	S23	W18	4890	11	17.7	13	SF	C 2.4	2	C		46		H
0108	LEAR	19	0216	0218	0221	S25	W16	4890	11	17.8	5	SF		3	C		22		H
0109		19	04131	04194	0439	S21	E44	4891	11	22.5	26	1N	C 2.7				142	.4	E
	PEKG	19	0413	0419	0432	S20	E45	4891	11	22.6	19	1B	C 2.7		C	0419	252	4.0	E
	LEAR	19	0414	0423	0446	S22	E44	4891	11	22.5	32	SF	C 2.7	3	C		33		E
0110	LEAR	19	0600	0604	0605	S21	E42	4891	11	22.5	5	SF		3	C		13		
0111		19	07401	07442	0830	S21	E42	4891	11	22.5	50	1N	M 1.1				106		F
	SVTO	19	0740	0744	0801	S21	E42	4891	11	22.5	21	SN	M 1.1	3	C		97		F
	LEAR	19	0741	0746	0859	S21	E42	4891	11	22.5	78	1N	M 1.1	3	C		114		
0112	LEAR	19	0903	0905	0916	S25	W18	4890	11	18.0	13	SF	C 2.9	3	C		96		
0113	LEAR	19	0913	0932	0940	S21	E41	4891	11	22.5	27	SF		3	C		25		
0114	HOLL	19	1441	1508	1551	S20	E40	4891	11	22.7	70	SN	C 2.6	3	C		42		F
0115		19	1503*	1506*	1534	S26	W20	4890	11	18.1	31	SF	C 2.6				13		H
	HOLL	19	1503	1506	1523	S25	W20	4890	11	18.1	20	SF	C 2.6	3	C		11		
	HOLL	19	1528	1528	1534	S26	W21	4890	11	18.0	6	SF		3	C		10		
	HOLL	19	1538	1540	1546	S26	W20	4890	11	18.1	8	SF		3	C		17		H
0116		19	1612	16151	1639	S18	E40	4891	11	22.7	27	SN	C 2.1				66		F
	RAMY	19	1602E	1615	1645	S17	E40	4891	11	22.7	43D	SN	C 2.1	2	C		69		
	HOLL	19	1612	1616	1633	S19	E40	4891	11	22.7	21	SN	C 2.1	3	C		64		F
0117		19	16185	1624	1628	S26	W20	4890	11	18.1	10	SF					17		
	HOLL	19	1618	1624	1630	S26	W21	4890	11	18.0	12	SF		3	C		22		
	RAMY	19	1623	1624	1627	S27	W20	4890	11	18.1	4	SF		2	C		12		
0118	HOLL	19	1636	1642	1653	S28	W21	4890	11	18.0	17	SF		3	C		23		F
0119	PALE	19	1826	1828	1857	S22	E38	4891	11	22.7	31	SF		3	C		16		H
0120	PALE	19	1938	1940	1957	S21	E37	4891	11	22.6	19	SF		3	C		12		
0121	PALE	19	1938	1939	1953	S25	W22	4890	11	18.1	15	SF		3	C		24		
0122		19	20361	20391	2053	S20	E39	4891	11	22.8	17	SF					23		F
	PALE	19	2036	2039	2055	S21	E35	4891	11	22.5	19	SF		3	C		32		
	RAMY	19	2037	2039	2100	S20	E43	4891	11	23.1	23	SF		2	C		21		
	HOLL	19	2037	2040	2044	S20	E38	4891	11	22.8	7	SF		4	C		15		F
0123	PALE	19	2120	2120	2126	S21	E36	4891	11	22.6	6	SF		3	C		18		
0124	HOLL	19	2135	2140	2203	S18	W37	4893	11	17.1	28	SF		3	C		23		U
0125	HOLL	19	2223	2224	2233	S20	E37	4891	11	22.8	10	SF		3	C		20		
0126	HOLL	19	2254	2256	2301	S22	E35	4891	11	22.6	7	SF		3	C		20		
0127	LEAR	20	0026	0027	0030	S25	W27	4890	11	17.9	4	SF		3	C		11		
0128		20	00525	00535	0100	S25	W26	4890	11	18.0	8	SF	C 1.1				26		
	LEAR	20	0052	0053	0100	S25	W27	4890	11	17.9	8	SF	C 1.1	3	C		21		
	PALE	20	0057	0058	0101	S25	W24	4890	11	18.2	4	SF	C 1.1	3	C		30		
0129		20	0146*	01591	0208	S25	W28	4890	11	17.9	22	SF					52		F
	PALE	20	0146	0200	0210	S25	W29	4890	11	17.8	24	SF		3	C		80		F
	LEAR	20	0158	0159	0207	S25	W27	4890	11	18.0	9	SF		3	C		23		
0130	LEAR	20	0159	0210	0211	S21	E37	4891	11	22.9	12	SF		3	C		26		
0131	LEAR	20	0313	0314	0317	S21	E36	4891	11	22.9	4	SF		3	C		21		E

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Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	CMP Mo	CMP Day	Dur (Min)	Imp Opt	Imp Xray	See	Obs Type	Time (UT)	Area Measurement Apparent (10^{-6} Disk)	Area Measurement Corr (Sq Deg)	Remarks
0132		20	0412*	0418*	0515	S22	E35	4891	11	22.9	63	1B	M 1.3				236	4.9	U
	LEAR	20	0412	0418	0535	S21	E35	4891	11	22.8	83	1N	M 1.3	3	C		116		
	PEKG	20	0425	0430	0455	S22	E35	4891	11	22.9	30	1B			C	0430	357	4.9	U
0133	LEAR	20	0628	0638	0643	S21	E34	4891	11	22.9	15	SF		3	C		20		
0134	LEAR	20	0744	0747	0805	S21	E34	4891	11	22.9	21	SF		3	C		15		
0135	LEAR	20	0808	0810	0832	S25	W31	4890	11	17.9	24	SF		3	C		20		
0136	PALE	20	1741	1746	1756	S22	E28	4891	11	22.9	15	SF	C 1.5	2	C		44		
0137		20	19413	19441	1957	S22	E27	4891	11	22.9	16	SF	C 1.3				24		FM
	HOLL	20	1941	1945	1957	S22	E26	4891	11	22.8	16	SF	C 1.3	3	C		25		
	RAMY	20	1941	1945	2000	S23	E29	4891	11	23.0	19	SF	C 1.3	3	C		25		FM
	PALE	20	1944	1944	1954	S22	E25	4891	11	22.7	10	SF	C 1.3	3	C		22		
0138	HOLL	20	2308	2316	2343D	S26	W36	4890	11	18.2	35D	SF		3	C		60		
0139	LEAR	20	2314	2314	2320	S21	E25	4891	11	22.9	6	SF		3	C		11		
0140		20	2331	23371	2511	S22	E26	4891	11	23.0	100	1N	M 1.3				112		
	LEAR	20	2331	2337	2511	S21	E25	4891	11	22.9	100	1N	M 1.3	3	C		127		
	HOLL	20	2331	2338	2343D	S22	E26	4891	11	23.0	12D	1N	M 1.3	3	C		96		
0141	LEAR	21	0233	0235	0240	S25	W41	4890	11	17.9	7	SF		3	C		39		
0142	LEAR	21	0405	0417	0427	S21	E22	4891	11	22.8	22	SF		3	C		12		
0143	LEAR	21	0725	0725	0733	S21	E21	4891	11	22.9	8	SF		3	C		11		
0144	RAMY	21	1205	1205	1213	N28	E79		11	27.7	8	SF		3	C		14		
0145	RAMY	21	1410	1411	1425	S22	E63		11	26.4	15	SF		3	C		42		
0146	HOLL	21	1500	1504	1524	S20	E17	4891	11	22.9	24	SF		3	C		16		
0147		21	15322	1535*	1618	S22	E16	4891	11	22.9	46	SF					21		
	RAMY	21	1532	1549	1637	S21	E16	4891	11	22.9	65	SF		3	C		27		
	HOLL	21	1534	1535	1558	S23	E17	4891	11	22.9	24	SF		3	C		15		
0148		21	17551	1805	1902	S22	E16	4891	11	23.0	67	2B	M 3.5				248		FU
	HOLL	21	1755	1805	1901	S23	E16	4891	11	23.0	66	2B	M 3.5	3	C		273		UF
	RAMY	21	1756	1805U	1903	S21	E15	4891	11	22.9	67	1B	M 3.5	3	C		222		F
0149	HOLL	21	2150	2151	2158	S20	E11	4891	11	22.7	8	SF		3	C		18		
0150		22	0212	0239	0306	S22	E10	4891	11	22.9	54	SF	C 2.2				42		F
	LEAR	22	0212	0239	0323	S21	E08	4891	11	22.7	71	SF	C 2.2	3	C		61		F
	PALE	22	0242E	0242U	0250	S22	E13	4891	11	23.1	8D	SF	C 2.2	2	C		24		F
0151	LEAR	22	0521	0543	0601	S21	E07	4891	11	22.7	40	SF	C 2.0	3	C		61		F
0152	LEAR	22	0715	0718	0759	S21	E05	4891	11	22.7	44	SF	C 1.2	3	C		56		F
0153	RAMY	22	1211	1233	1250	S20	E01	4891	11	22.6	39	SF		3	C		21		
0154	RAMY	22	1359	1402	1431	S22	E02	4891	11	22.7	32	SF	C 1.1	3	C		23		F
0155	PALE	22	2200	2201	2209	S21	W07	4891	11	22.4	9	SF		3	C		19		F
0156		22	23103	23134	2320	S22	W03	4891	11	22.7	10	SF					14		F
	PALE	22	2310	2313	2322	S22	W05	4891	11	22.6	12	SF		2	C		16		F
	HOLL	22	2313	2314	2321	S21	W03	4891	11	22.7	8	SF		3	C		14		
	LEAR	22	2313	2317	2318	S23	W02	4891	11	22.8	5	SF		3	C		11		
0157		23	05069	0506*	0532	S22	W03	4891	11	23.0	26	1N	C 1.3				157	3.3	EF
	LEAR	23	0506	0506	0531	S23	W03	4891	11	23.0	25	SF	C 1.3	3	C		20		F
	PEKG	23	0515	0518	0534	S22	W03	4891	11	23.0	19	1N	C 1.3		C	0518	294	3.3	E
0158	KANZ	23	0849		0850D	S23	W13	4891	11	22.4	1D	SN			P	0850	21	.2	D

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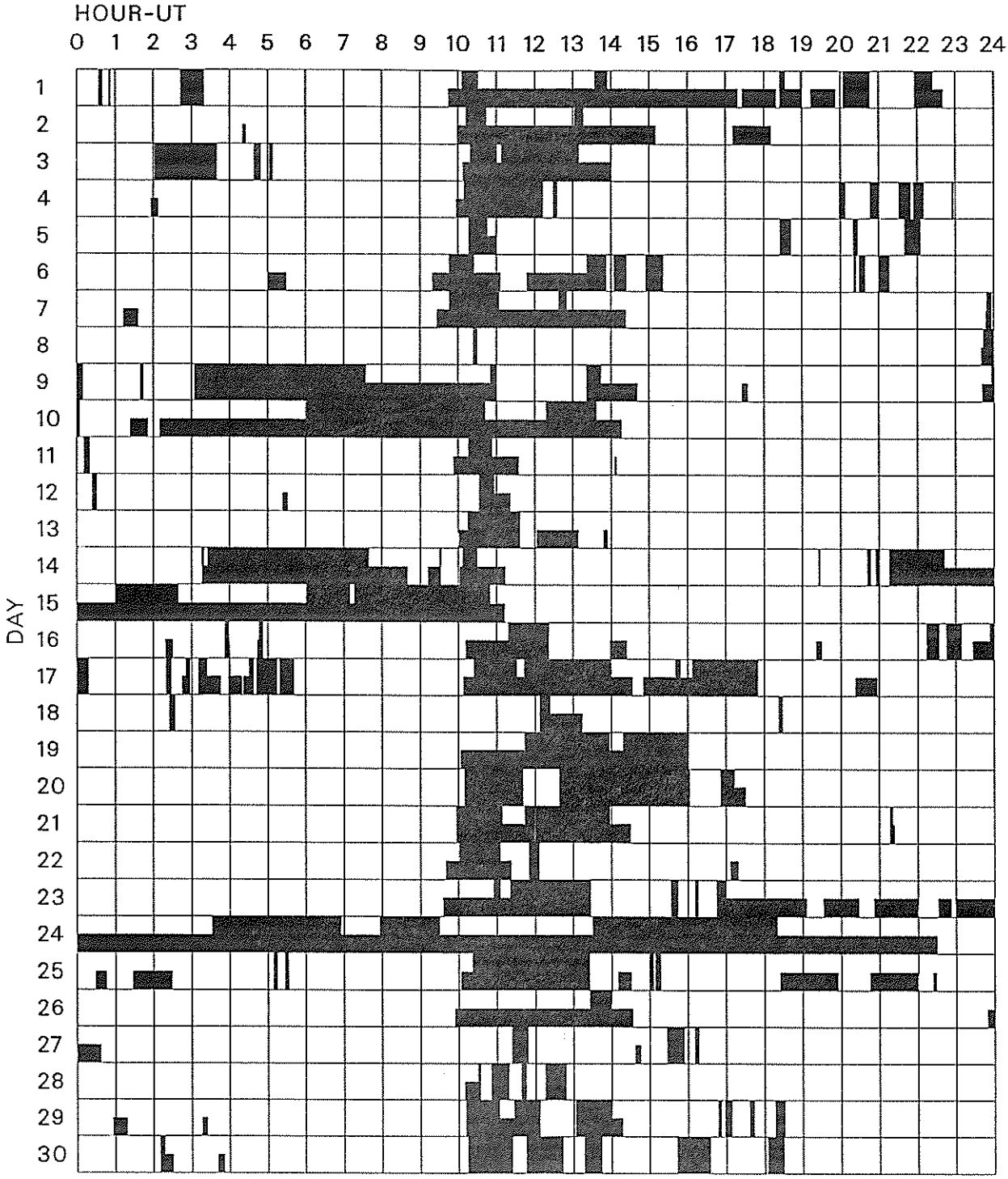
Grp #	Sta	Day	Start (UT)	Max (UT)	End (UT)	Lat	CMD	NOAA/ USAF Region	CMP Mo Day	Dur (Min)	Imp Opt	Xray	See	Obs Type	Area Measurement Time (UT)	Apparent (10^{-6} Disk)	Corr (Sq Deg)	Remarks
0159	HOLL	23	1433E	1433U	1446D	S34	W23	4896	11 21.8	13D	SF		3	C		28		
0160	HOLL	23	1921	1924	1928	S35	W26	4896	11 21.7	7	SF		3	C		12		
0161	PALE	23	1949	1952	2014	S21	E31		11 26.2	25	SF		4	C		17		FH
0162		23	2024	2027	2046	N33	E54	4895	11 28.1	22	SF					14		F
	PALE	23	2024	2027	2046	N33	E54	4895	11 28.1	22	SF		3	C		12		F
	HOLL	23	2029E	2029U	2035D	N33	E54	4895	11 28.1	6D	SF		2	C		16		F
0163		24	0008*	0018*	0035	S34	W32	4896	11 21.4	27	SF					21		F
	LEAR	24	0008	0018	0032	S33	W34	4896	11 21.3	24	SF		3	C		20		F
	PALE	24	0012	0020	0036	S33	W32	4896	11 21.5	24	SF		3	C		19		F
	LEAR	24	0033	0035	0038	S35	W29	4896	11 21.7	5	SF		3	C		23		
0164	PALE	24	0304	0307U	0314	S21	E28		11 26.3	10	SF		2	C		16		F
0165	LEAR	24	0323	0324	0327	N31	E46	4895	11 27.8	4	SF		3	C		13		
0166	KANZ	24	0959	1003	1009	S22	E27		11 26.5	10	SN			P	1003	52	.6	EH
0167	HOLL	24	1441	1456	1511	S22	W23	4891	11 22.8	30	SF		3	C		55		F
0168	HOLL	24	1447	1447	1455	S35	W39	4896	11 21.5	8	SF		2	C		17		
0169	HOLL	24	1455	1455	1459	N32	E41	4895	11 27.9	4	SF		2	C		15		
0170	HOLL	24	1914	1929	2012	N38	E41	4895	11 28.1	58	1F	C 1.2	3	C		116		FU
0171	HOLL	24	1940	1953	2001	S36	W39	4896	11 21.7	21	SF		3	C		14		
0172	HOLL	24	2056	2058	2059	S22	W27	4891	11 22.8	3	SF		3	C		11		
0173	HOLL	24	2215	2215	2224	S36	W40	4896	11 21.7	9	SF		3	C		12		
0174		24	22463	2249	2308	N34	E38	4895	11 28.0	22	SF					19		
	HOLL	24	2246	2249	2311	N30	E35	4895	11 27.7	25	SF		3	C		24		
	LEAR	24	2249	2249	2306	N39	E40	4895	11 28.2	17	SF		3	C		14		
0175	LEAR	25	0949	0951	0957	S22	E13		11 26.4	8	SF		2	C		20		
0176	HOLL	25	1713	1717	1726	S34	W61	4896	11 20.8	13	SF		3	C		55		
0177	LEAR	26	0308	0311	0312	N33	E25	4895	11 28.1	4	SF		3	C		12		
0178	LEAR	26	0311	0325	0346	S21	W48	4891	11 22.4	35	SF	C 3.3	3	C		50		
0179	LEAR	26	0332	0332	0345	N31	E23	4895	11 28.0	13	SF		3	C		21		
0180	KANZ	26	0857	0858	0904	S22	W48	4891	11 22.7	7	SN			P	0858	62	1.0	E
0181	KANZ	26	1110	1121	1126	S33	W67	4896	11 21.1	16	SN			P			1.4	D
0182	KANZ	26	1128	1143	1215	S22	W46	4891	11 22.9	47	SN			P	1143	83	1.3	EF
0183	HOLL	26	1555	1556	1609	S24	W44	4891	11 23.3	14	SF		3	C		20		
0184	LEAR	26	2243	2243	2251	S34	W70	4896	11 21.4	8	SF		3	C		17		
0185	PALE	26	2345	2350	2403	S33	W75	4896	11 21.0	18	SF		3	C		19		
0186	SVTO	27	1331	1332	1337	S28	W61	4891	11 22.8	6	SF		3	C		17		F
0187	HOLL	28	1750	1751	1801	S21	W78	4891	11 22.8	11	SF		3	C		14		FH
0188		29	16029	16131	1628	N30	W24	4895	11 27.8	26	SF	C 1.5				28		FU
	RAMY	29	1602	1614	1632D	N30	W23	4895	11 27.8	30D	SF	C 1.5	3	C		26		UF
	HOLL	29	1611	1613	1628	N30	W24	4895	11 27.8	17	SF	C 1.5	3	C		29		UF
0189	HOLL	29	1940	1942	1952	N28	W26	4895	11 27.8	12	SF		3	C		35		F

INTERVALS OF NO FLARE PATROL OBSERVATION
FOR PRECEDING SOLAR FLARE TABLE

NOVEMBER 1987



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

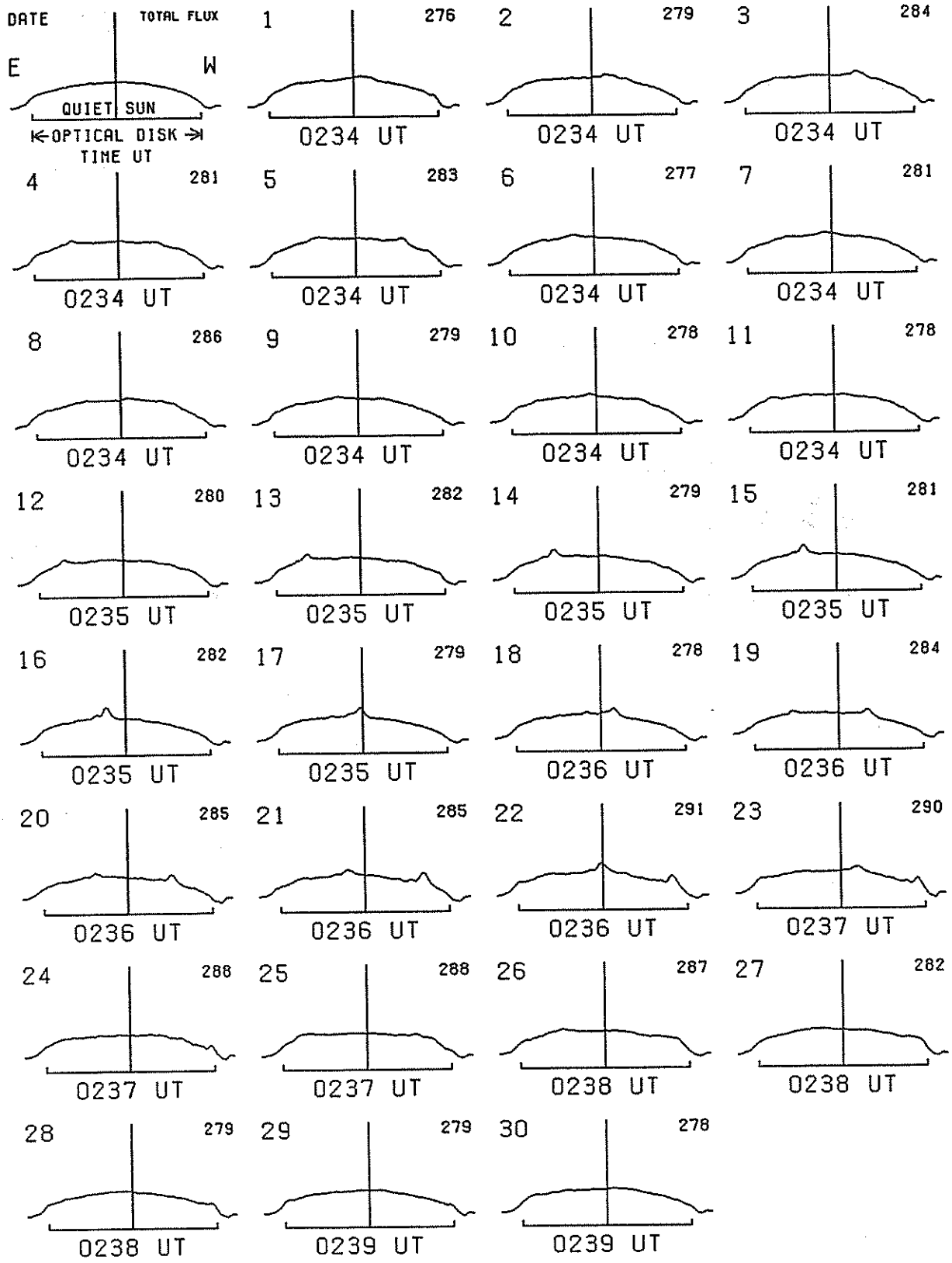
Holloman	Istanbul	Kodaikanal	Palehua	Ramey
	Kandilli	Learmonth	Peking	San Vito

22
Nov 87

EAST-WEST SOLAR SCANS
NOVEMBER 1987

TOYOKAWA, JAPAN

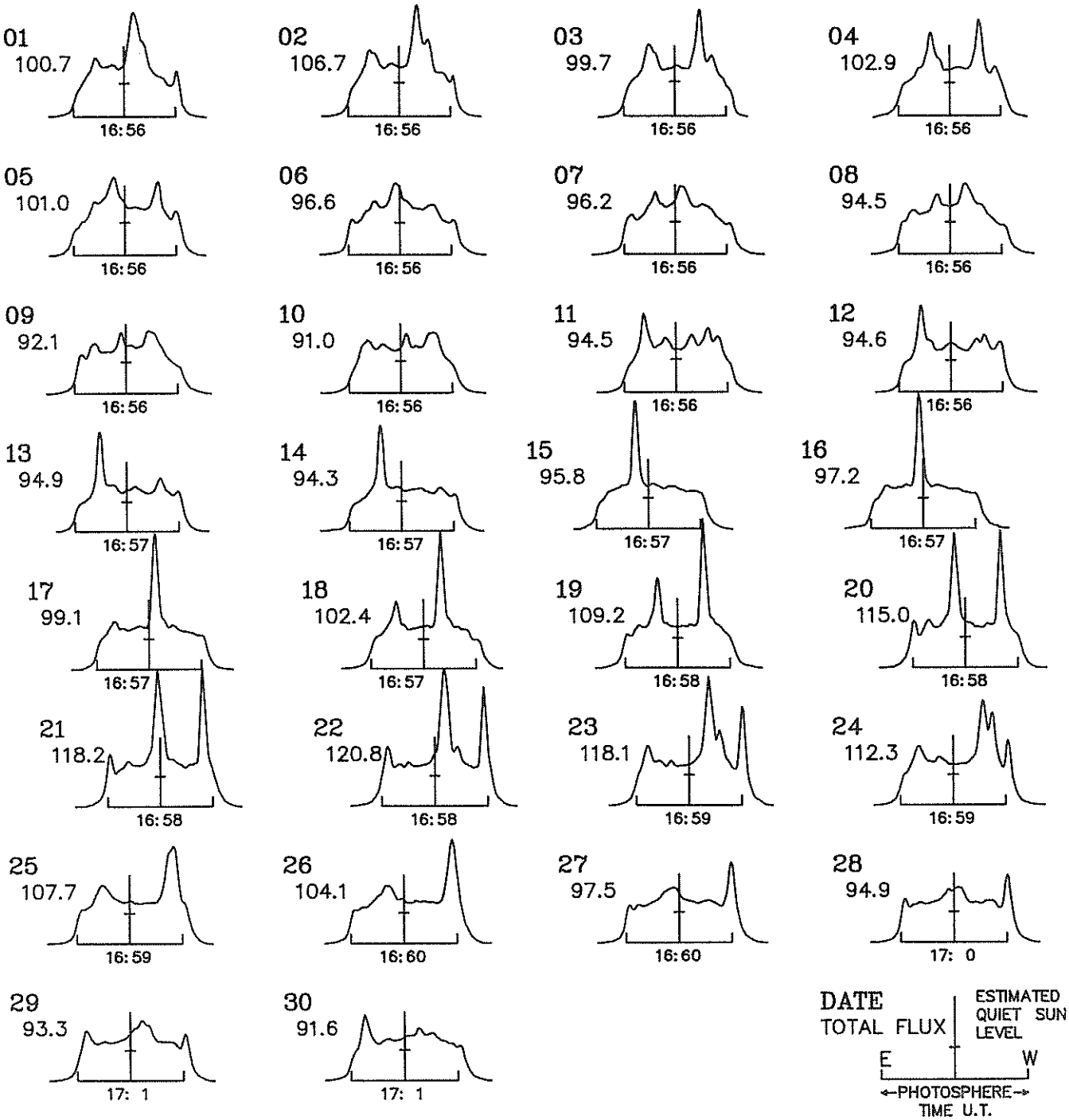
3 CM
FAN BEAM WITH 1.1 MINUTES OF ARC



EAST – WEST SOLAR SCANS
NOVEMBER 1987

ALGONQUIN RADIO OBSERVATORY
CANADA

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



24
Nov 87

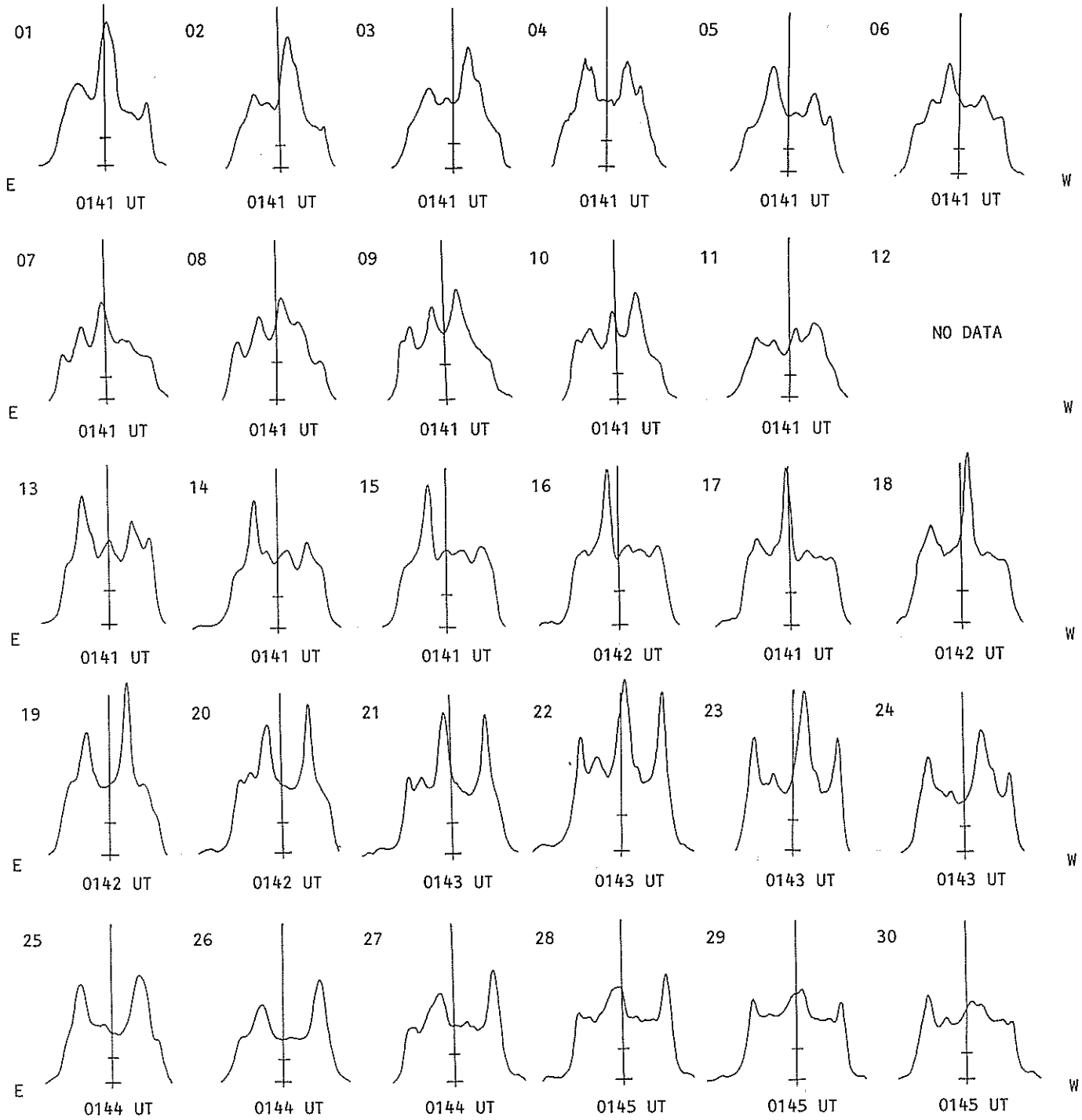
EAST-WEST SOLAR SCANS

Fleurs, Australia

NOVEMBER 1987

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

Estimated Quiet Sun Level
Cold Sky Level

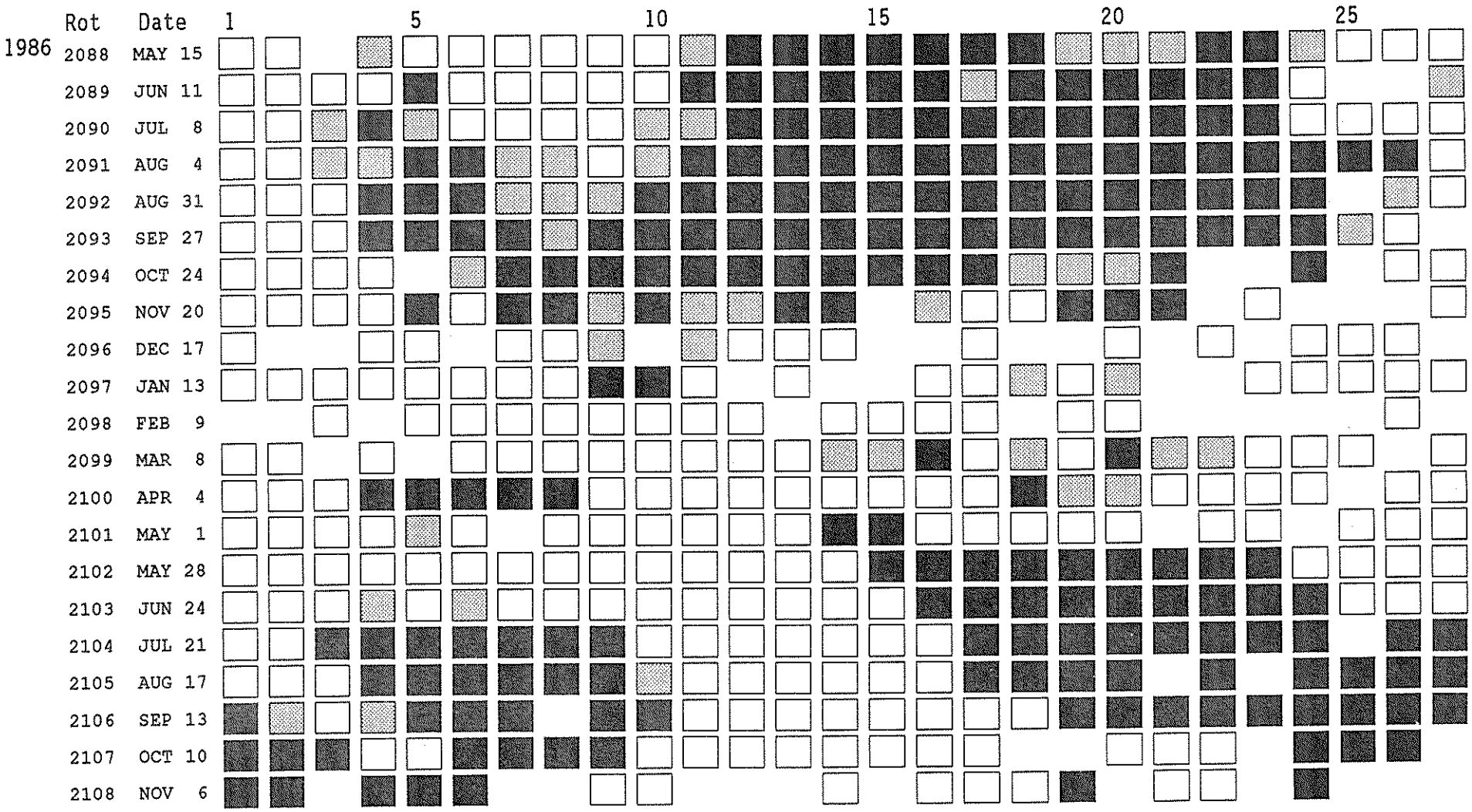


SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

NOVEMBER 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
02	2800	OTTA	20	GRF	1304.5	1305.6	6.0	4.6	1.9		
	2800	OTTA	20	GRF	1348.8	1357.1		10.6			
	2800	OTTA	32	ABS	1415.0	1428.0	75.0	-2.8	-1.4		
	2695	PALE	8	S	1811.0	1811.0	1.0	57.0			QL=5 ST=2 TYP=5
	8800	PALE	8	S	1811.0	1811.0	1.0	36.0			QL=5 ST=2 TYP=3
	2800	OTTA	3	S	1811.3	1812.5	2.3	62.6	15.6		
	2800	OTTA	30	PBI	1813.6	1814.6	57.0	6.3	1.7		
03	8800	PALE	8	S	0055.0	0055.0	1.0	13.0			QL=5 ST=3 TYP=3
	2695	LEAR	8	S	0216.0	0216.0	1.0	42.0			QL=5 ST=2 TYP=3
	2695	PALE	8	S	0216.0	0216.0	1.0	36.0			QL=5 ST=2 TYP=3
	2800	OTTA	40	F	1343.0		155.0				
	2800	OTTA	22	GRF	1719.5E	1719.5	120.0D	4.8			
04	2800	OTTA	22	GRF	1345.0		90.0				
	2800	OTTA	22	GRF	1545.0		150.0				
	2800	OTTA	42	SER	1705.0	1713.5	10.0	11.0			
	8800	PALE	4	S/F	2322.0	2323.0	13.0	26.0			QL=5 ST=2 TYP=3
	8800	LEAR	4	S/F	2323.0	2323.0	8.0	19.0			QL=5 ST=2 TYP=3
05	8800	LEAR	4	S/F	0455.0	0456.0		74.0			QL=5 ST=1 TYP=5
	8800	LEAR	4	S/F	0456.0	0456.0	12.0D	74.0			QL=5 ST=2 TYP=5
	2695	LEAR	4	S/F	0456.0	0456.0		26.0			QL=5 ST=1 TYP=3
	8800	PALE	8	S	2334.0	2336.0	2.0	29.0			QL=5 ST=2 TYP=3
	8800	LEAR	4	S/F	2336.0	2336.0	12.0	12.0			QL=5 ST=2 TYP=3
06	2800	OTTA	20	GRF	1950.0	2050.0	170.0D	8.8	5.2		
07	2800	OTTA	42	SER	1948.5	1955.0	45.5D	52.0	17.0		
	2695	PALE	4	S/F	1953.0	1955.0	34.0	52.0			QL=5 ST=2 TYP=5
	2800	OTTA	30	PBI	2033.0	2033.0	90.0D				
13	8800	LEAR	4	S/F	0032.0	0032.0	12.0	17.0			QL=5 ST=3 TYP=3
	2800	OTTA	20	GRF	1851.0	1908.0	80.0	6.3			
15	8800	SVTO	8	S	1037.0	1037.0	1.0	350.0			QL=1 ST=2 TYP=5
16	8800	LEAR	8	S	0030.0	0030.0	1.0	22.0			QL=5 ST=2 TYP=3
18	8800	LEAR	4	S/F	0235.0	0235.0		26.0			QL=5 ST=2 TYP=3
	8800	LEAR	4	S/F	0316.0	0318.0	5.0	34.0			QL=5 ST=2 TYP=5
	2800	OTTA	1	S	1606.0	1607.0	6.5	6.5	1.3		
19	2695	LEAR	4	S/F	0742.0	0743.0	10.0	110.0			QL=5 ST=3 TYP=5
	2695	SVTO	4	S/F	0742.0	0743.0	3.0	110.0			QL=5 ST=2 TYP=5
	8800	SVTO	8	S	0742.0	0743.0	2.0	130.0			QL=5 ST=2 TYP=5
	8800	LEAR	8	S	0743.0	0743.0	2.0	130.0			QL=5 ST=3 TYP=5
	2800	OTTA	22	GRF	1440.0	1505.0	70.0	4.3			
	2800	OTTA	1	S	1738.3	1739.1	3.5	4.3	1.3		
20	2695	LEAR	48	C	0412.0	0417.0		69.0			QL=5 ST=1 TYP=8
	8800	LEAR	4	S/F	0416.0	0418.0	26.0	31.0			QL=5 ST=2 TYP=3
	2695	PALE	4	S/F	2330.0	2333.0	30.0	38.0			QL=5 ST=1 TYP=3
	2695	LEAR	4	S/F	2330.0	2334.0	30.0	33.0			QL=5 ST=1 TYP=3
	8800	PALE	8	S	2331.0	2331.0	2.0	16.0			QL=5 ST=2 TYP=3
	2695	LEAR	4	S/F	2331.0	2339.0	23.0	49.0			QL=5 ST=2 TYP=3
	8800	LEAR	4	S/F	2331.0	2348.0	20.0	32.0			QL=5 ST=2 TYP=3
21	2695	PALE	4	S/F	0004.0	0005.0	4.0	59.0			QL=5 ST=3 TYP=5
	8800	PALE	8	S	0005.0	0005.0	2.0	23.0			QL=5 ST=3 TYP=3
	2800	OTTA	45	C	1755.4	1803.5	12.3	94.2	37.0		
	8800	SGMR	48	C	1800.0	1801.0	5.0	270.0			QL=5 ST=2 TYP=8
	2695	SGMR	48	C	1801.0	1803.0	3.0	80.0			QL=5 ST=2 TYP=8
	2800	OTTA	29	PBI	1807.6	1807.6	60.0	21.5			
25	8800	PALE	8	S	1738.0	1738.0	2.0	15.0			QL=5 ST=2 TYP=3

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.

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)

Day	1986 Dec	Jan	Feb	1987 Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
1	-1	.	1	.	10	14	2	11	39	12	-3	.
2	-10	11	.	.	.	17	3	20	43	-3	-4	-20
3	-11	.	.	.	8	11	12	26	27	-16	-3	-19
4	.	.	9	.	13	5	23	33	14	-19	-17	-24
5	0	6	10	.	10	0	27	33	4	-31	-28	.
6	20	.	14	9	2	3	24	32	-10	.	-35	-10
7	4	9	16	.	-5	.	29	17	-16	-49	-28	-12
8	-9	.	15	14	-14	6	38	2	-29	.	-24	.
9	-4	12	.	15	-13	6	31	-10	-37	-50	-20	-28
10	-5	13	.	.	-12	5	8	-13	-38	-39	-16	-28
11	.	16	10	10	-5	20	-8	-19	-36	-24	-6	-20
12	4	.	.	.	5	17	-17	-29	-43	-18	-3	.
13	.	20	14	10	18	5	-19	-24	-32	-10	6	.
14	.	25	8	23	30	-6	-21	-22	.	-1	7	4
15	.	23	7	18	30	-4	-21	-18	-19	4	-11	5
16	14	17	15	22	25	2	-16	-15	-7	-1	-9	.
17	23	13	13	22	19	4	-12	-9	2	-5	-10	.
18	.	11	11	17	13	3	-16	4	6	-5	-6	.
19	.	15	12	13	6	4	-6	9	3	-8	5	18
20	22	11	11	7	2	7	9	11	-13	.	6	.
21	6	-6	.	-1	-3	.	13	7	-15	-10	9	21
22	.	-4	2	1	-2	19	12	11	-18	-5	12	30
23	9	9	2	-3	1	21	7	-5	-22	7	23	3
24	8	.	5	2	2	.	7	-12	-25	14	25	-10
25	0	7	4	0	6	3	11	-11	-18	19	21	.
26	.	.	.	3	8	8	6	-10	-2	21	23	4
27	1	.	4	-3	10	8	-1	-10	12	22	.	4
28	9	3	6	-2	.	12	4	-5	26	20	.	.
29	3	5		-1	12	17	-1	-10	33	15	15	-5
30	5	-2		7	12	16	5	6	22	5	2	.
31	.	5		12		4		27	16		4	

Dot symbol indicates no data available for the day.

C O N T E N T S

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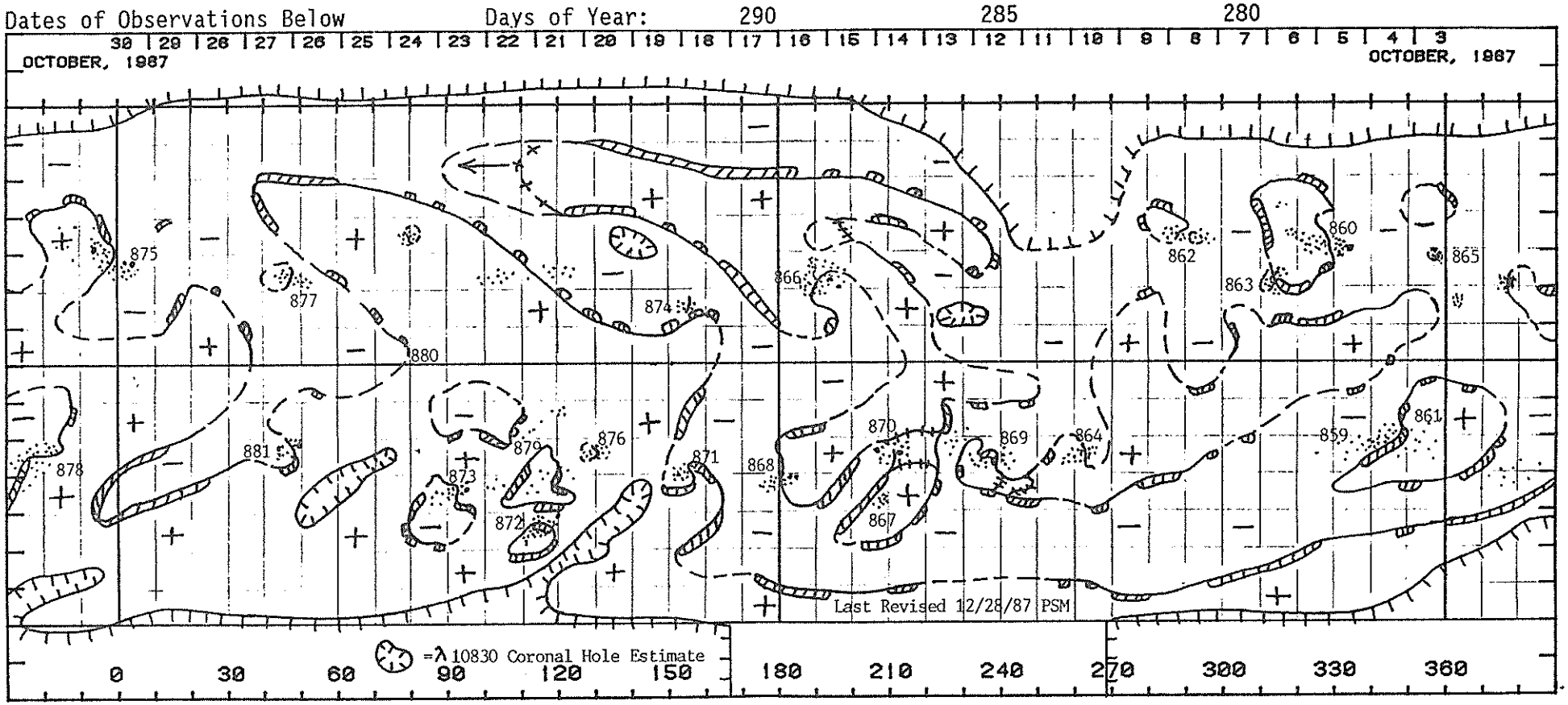
PRELIMINARY H-ALPHA SOLAR SYNOPTIC CHART

CARRINGTON ROTATION NUMBER 1794
(3 October to 30 October 1987)

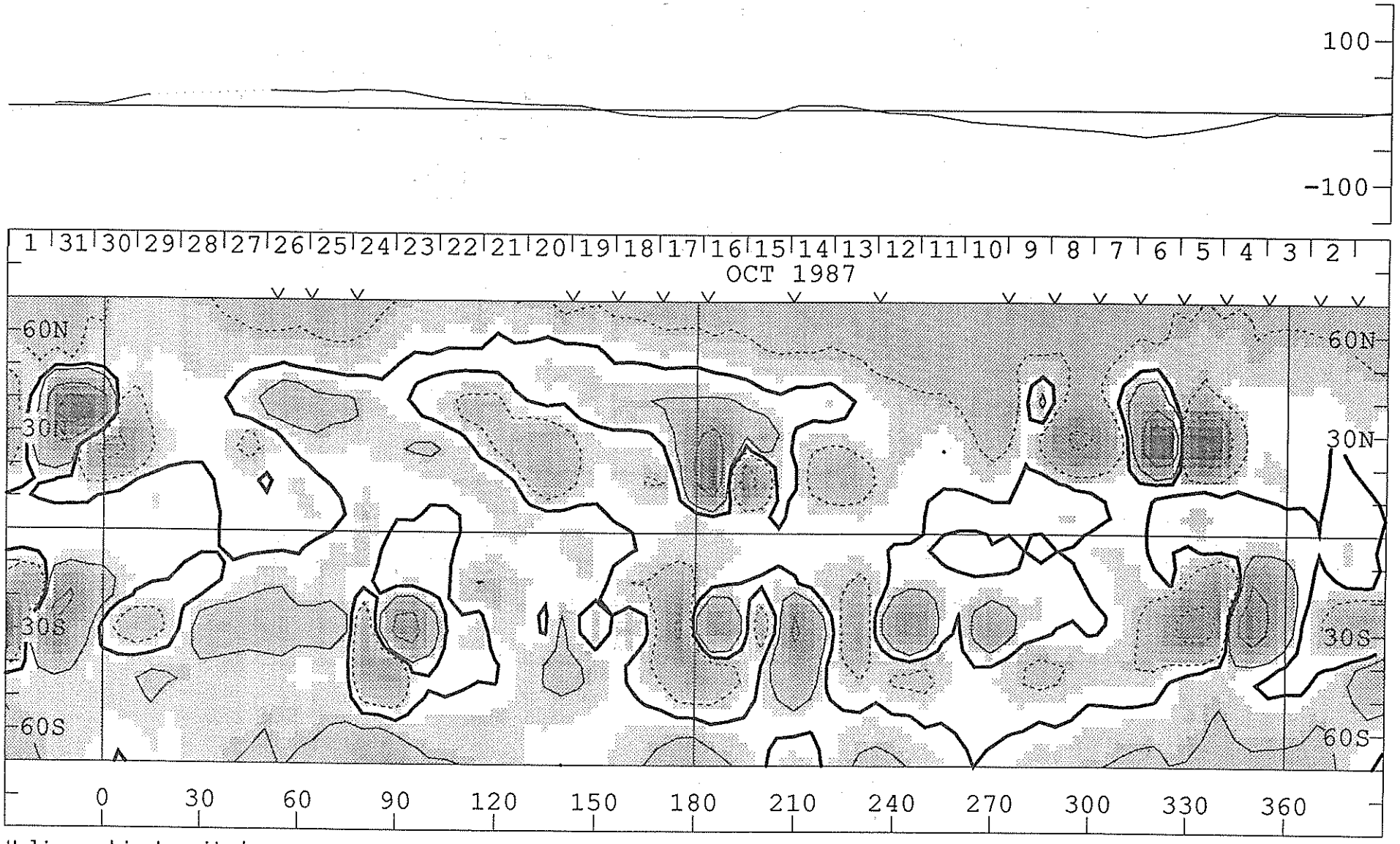


SOLAR MAGNETIC FIELD SYNOPTIC CHART

CARRINGTON ROTATION NUMBER 1794
(3 October to 30 October 1987)

Stanford Solar Observatory

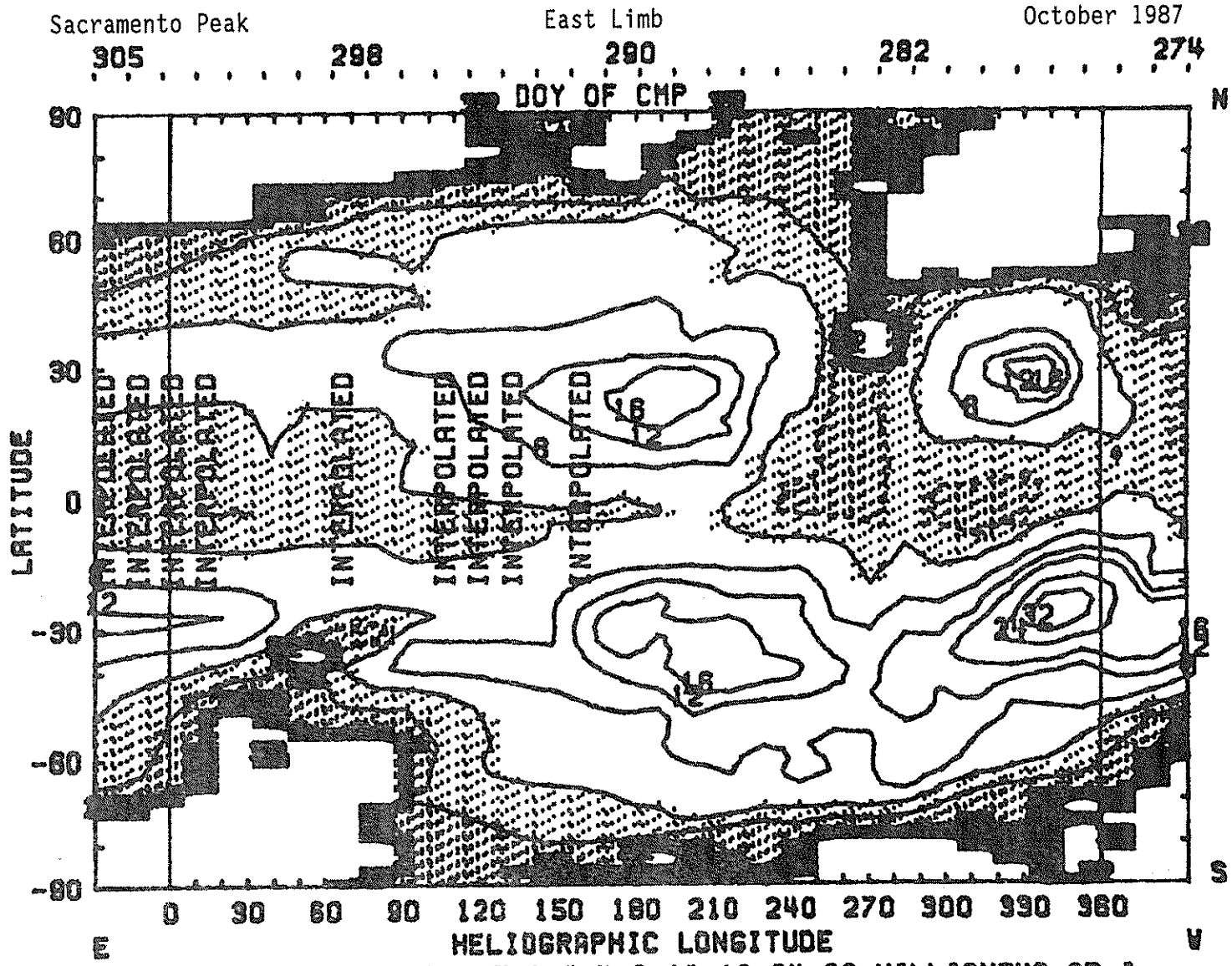
0, ±100, 500, 1000, 2000 microTesla



31
Oct 87

CORONAL GREEN LINE SYNOPTIC MAP

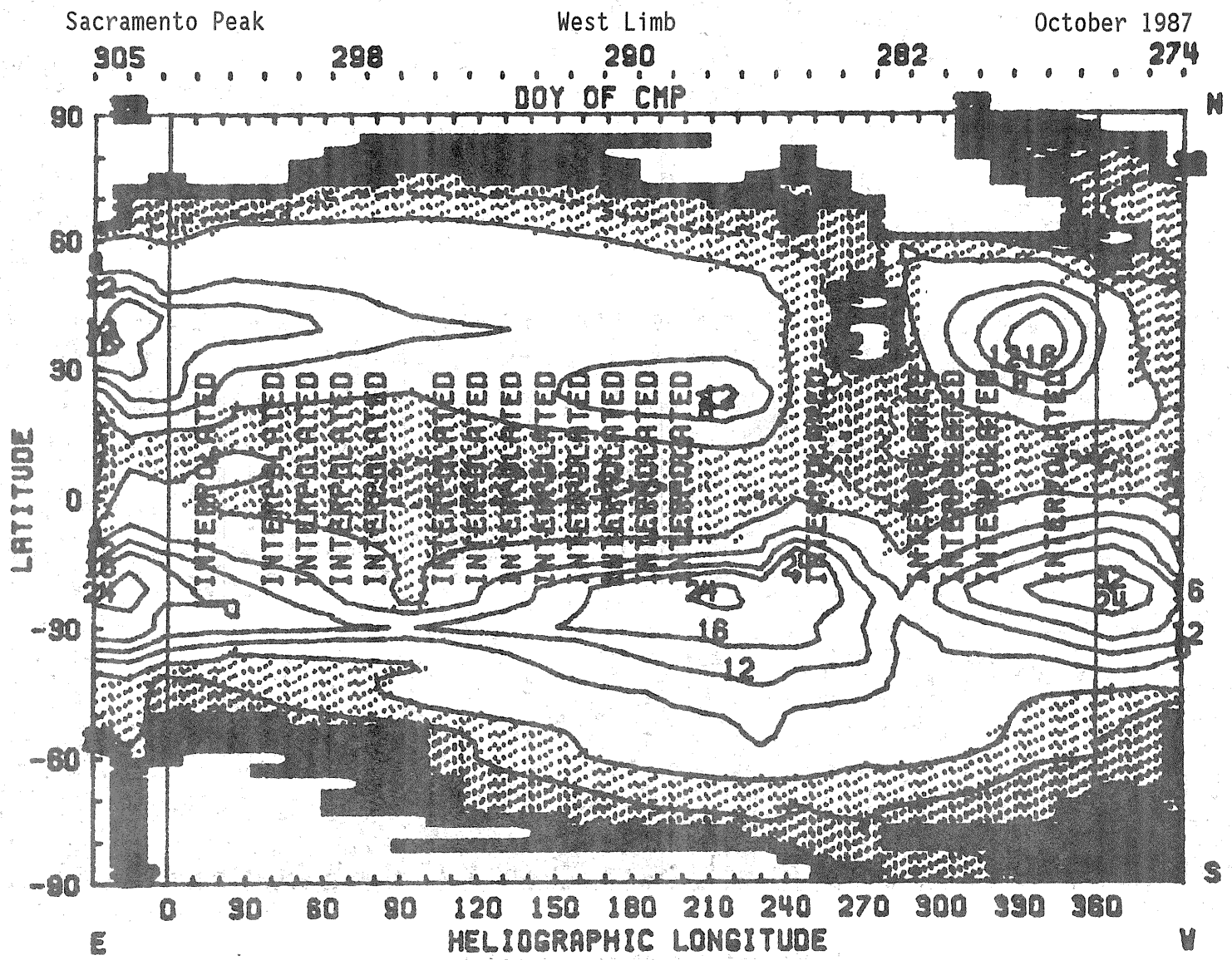
CARRINGTON ROTATION NUMBER 1794
(3 October to 30 October 1987)



1987 E LIMB CONTOURS: .5,1,2,4,8,12,16,24,92 MILLIONTHS OF Io
CORONAL HOLES ARE SHOWN AS WHITE SURROUNDED BY BLACK

CORONAL GREEN LINE SYNOPTIC MAP

CARRINGTON ROTATION NUMBER 1794
(3 October to 30 October 1987)



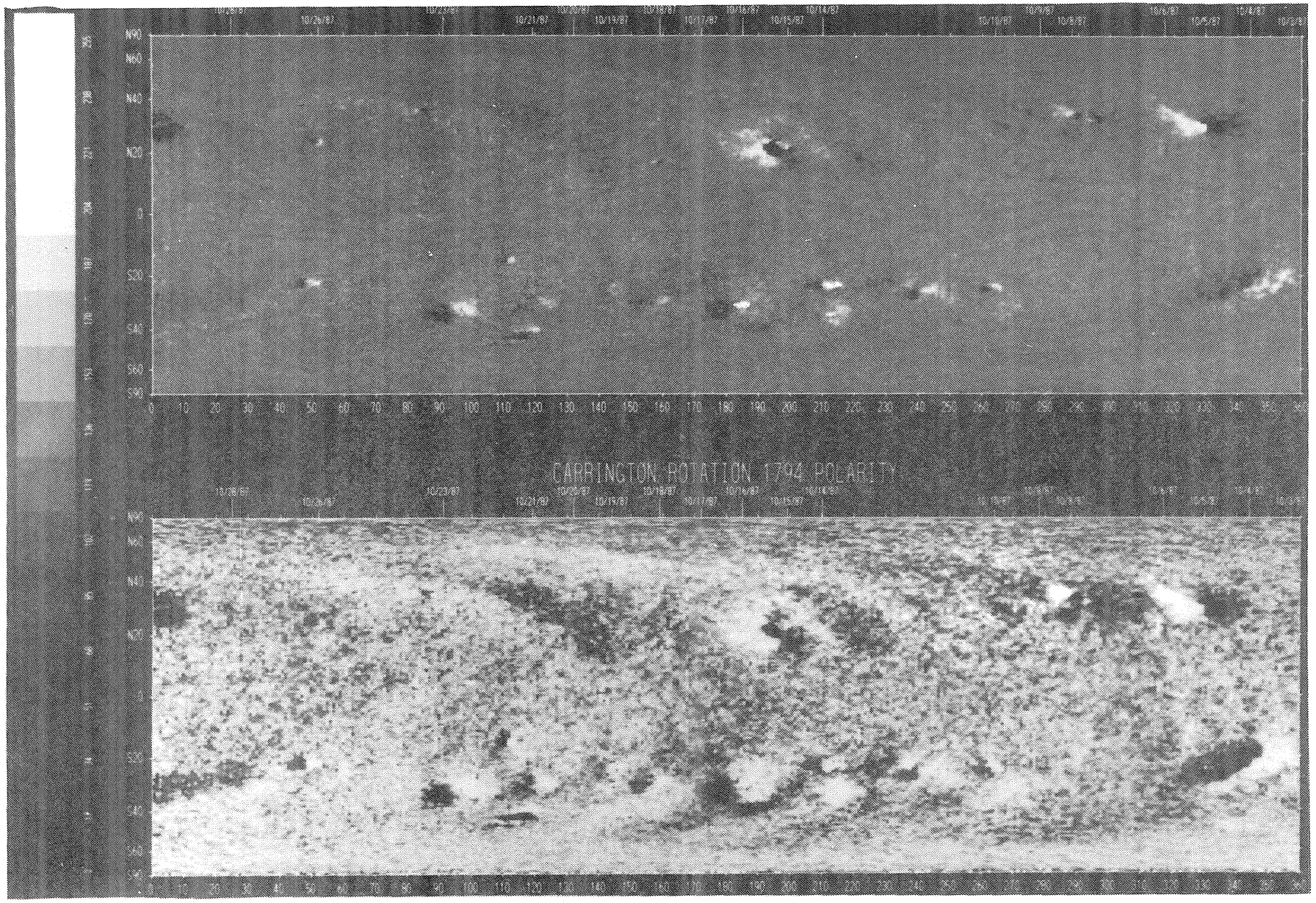
1987 V LIMB CONTOURS: .5,1,2,4,8,12,16,24,32 MILLIONTHS OF Io
CORONAL HOLES ARE SHOWN AS WHITE SURROUNDED BY BLACK

SOLAR MAGNETIC FIELD SYNOPTIC CHART

CARRINGTON ROTATION NUMBER 1794
(3 October to 30 October 1987)

Kitt Peak National Observatory

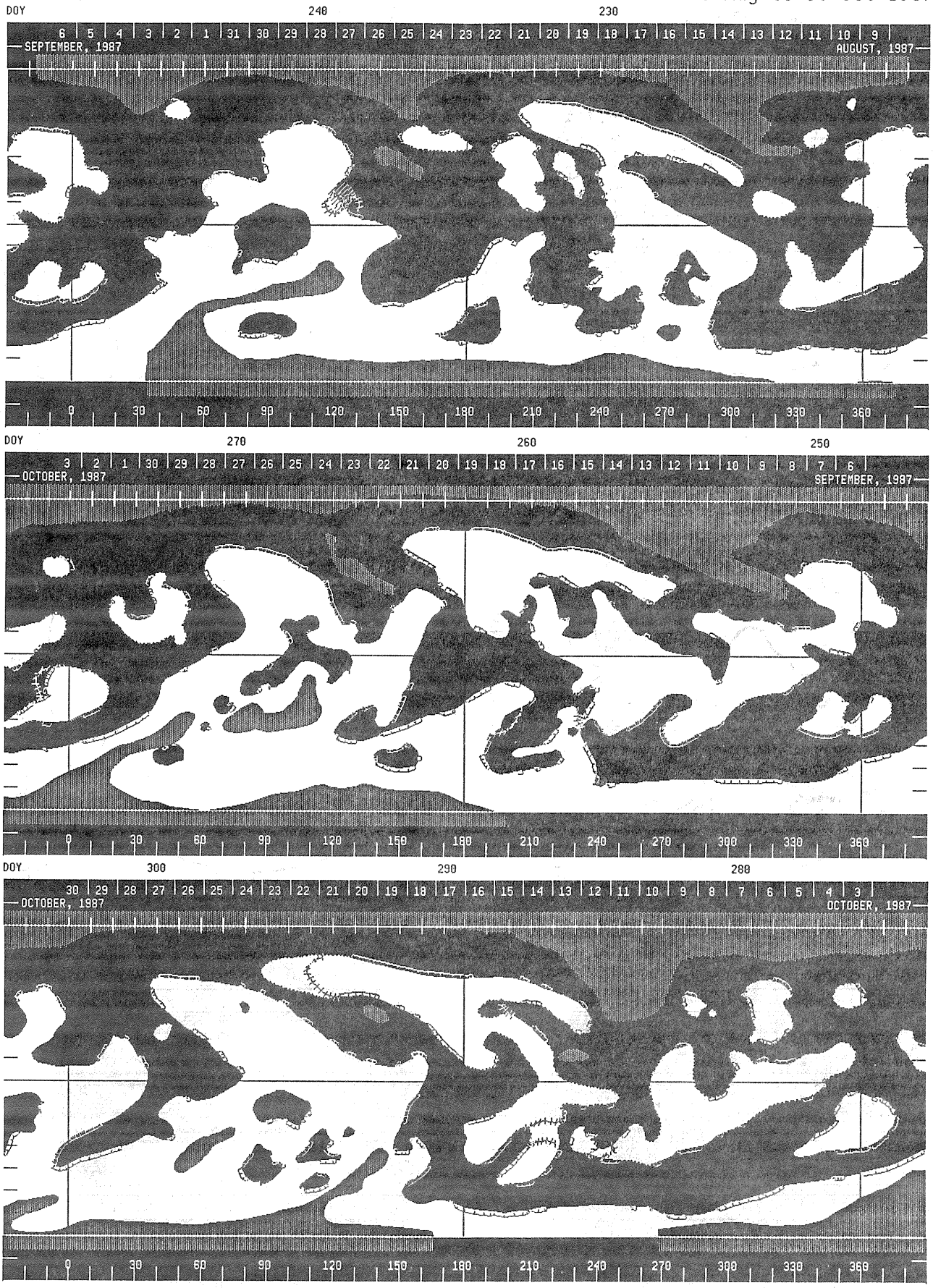
Dates of Observation



Heliographic Longitude

SHADED H-ALPHA SOLAR SYNOPTIC CHARTS

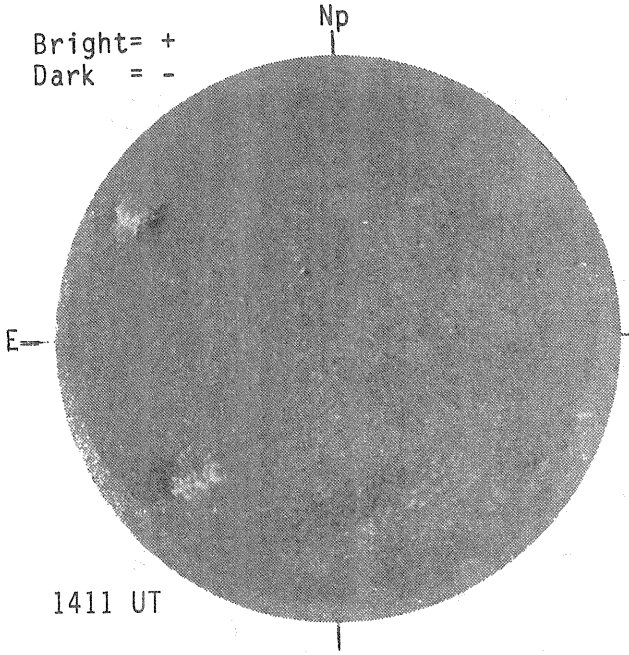
Carrington Rot. 1792-1794 9 Aug to 30 Oct 1987



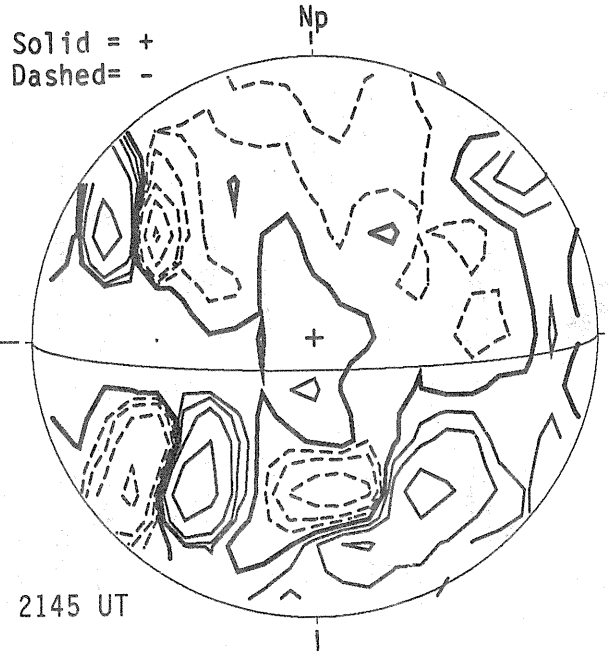
□ = *Positive Polarity* ■ = *Negative Polarity* ▒ = *10830 Coronal Hole Estimate* ▨ = *X-Ray Flares > M1*

Heliographic Longitude

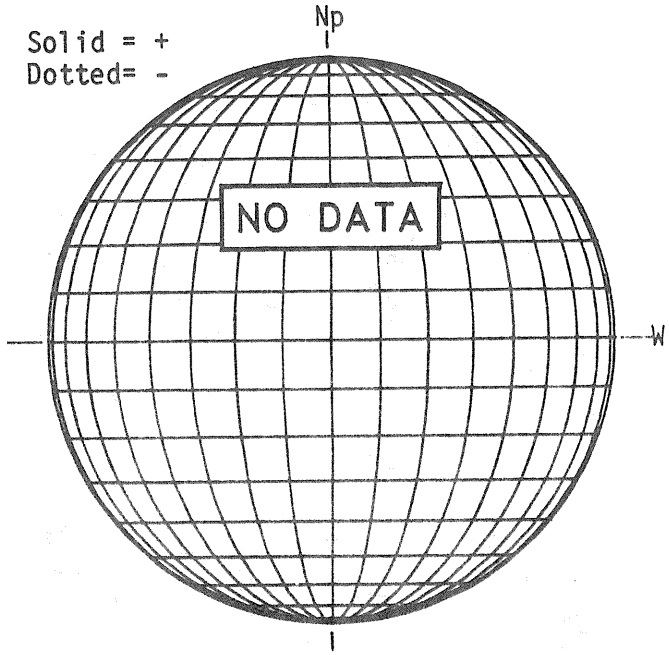
KITT PEAK MAGNETOGRAM



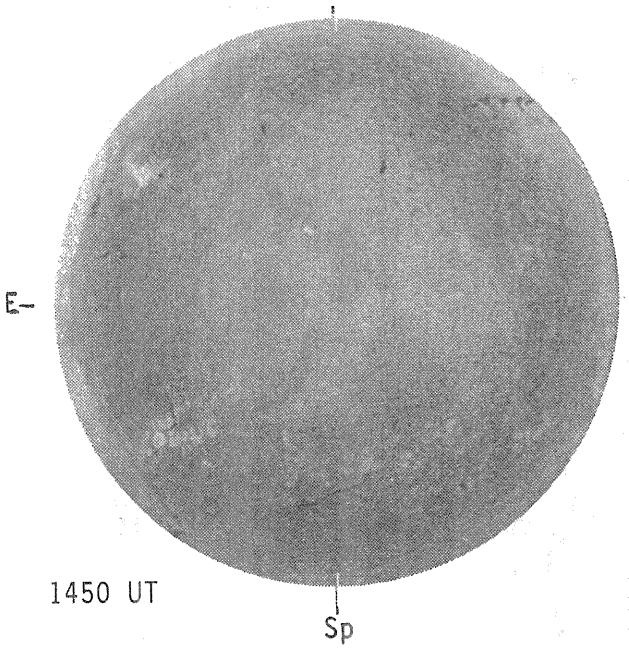
STANFORD MAGNETOGRAM



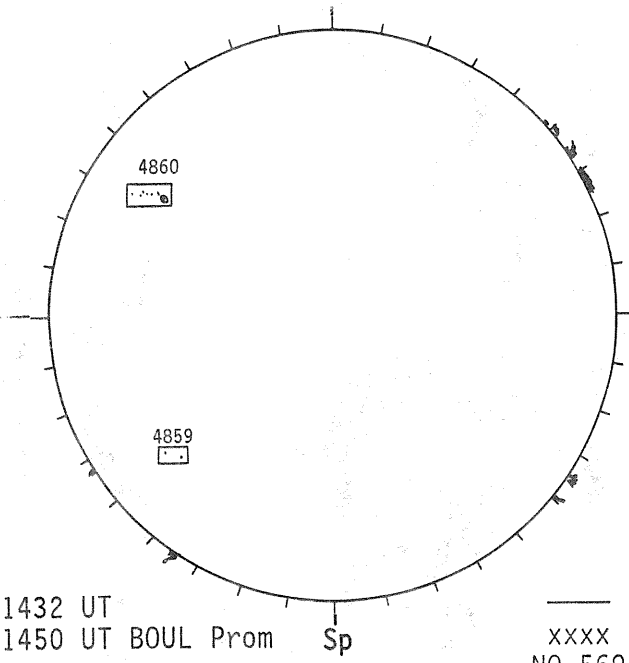
MT. WILSON MAGNETOGRAM



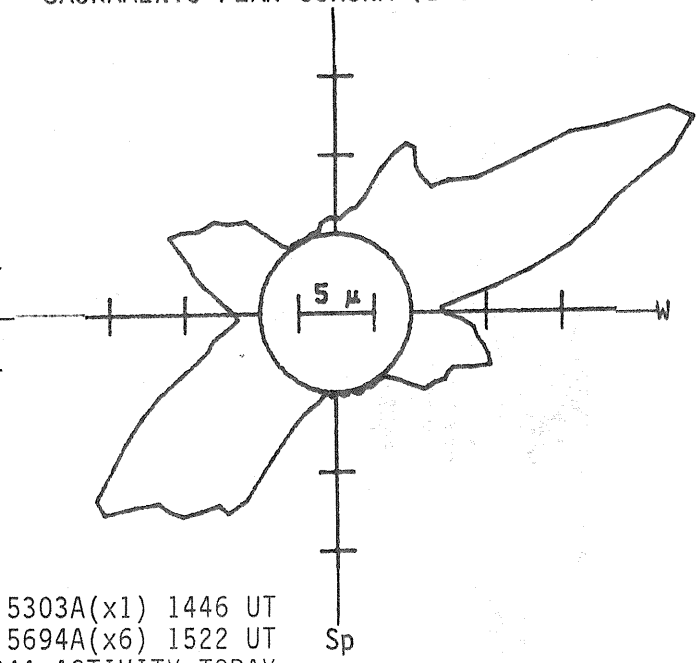
BOULDER H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

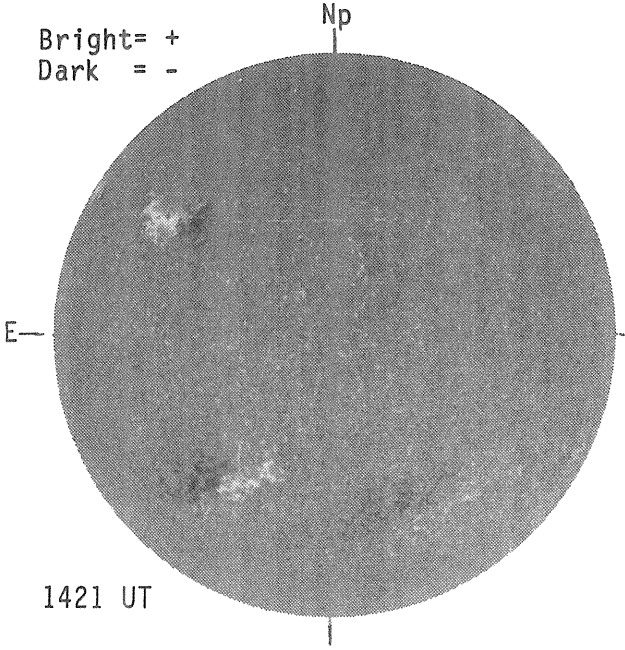


—— 5303A(x1) 1446 UT
xxxx 5694A(x6) 1522 UT
NO 5694A ACTIVITY TODAY

OCTOBER 01, 1987 (P= 25.89, B_o= 6.65, L_o= 31.26)

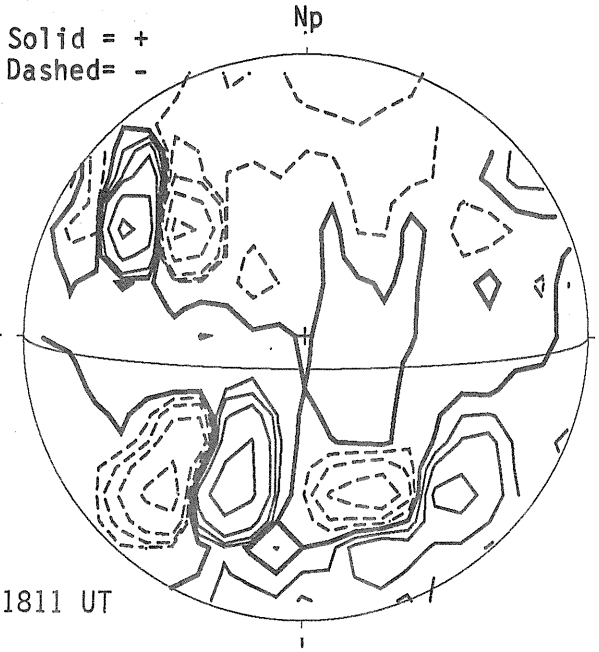
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

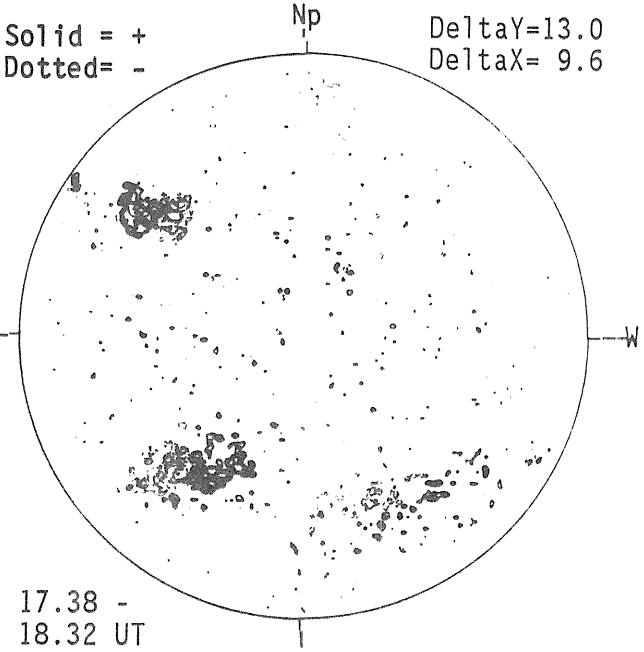
Solid = +
Dashed= -



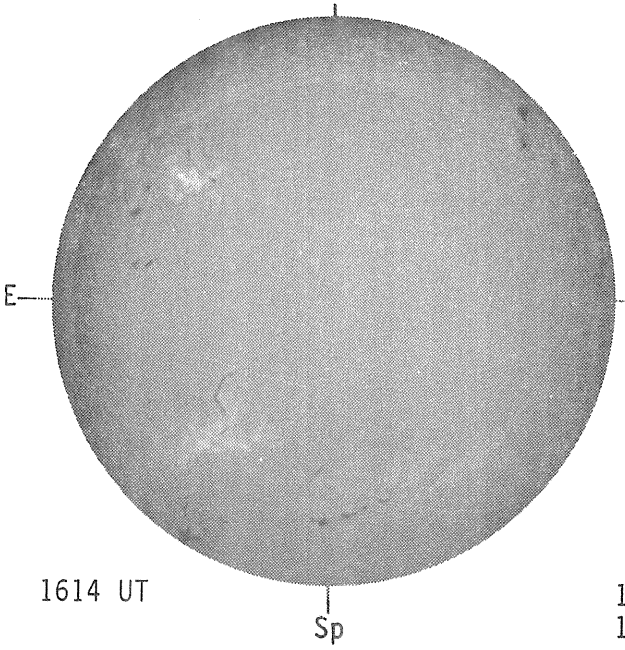
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

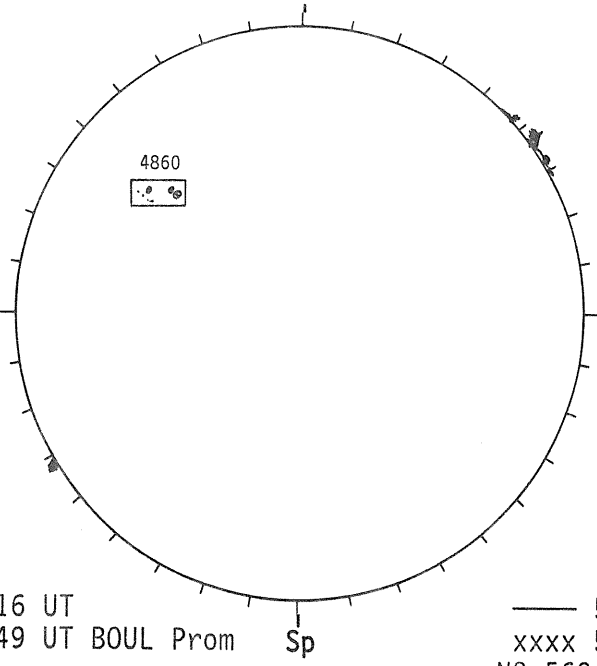
DeltaY=13.0
DeltaX= 9.6



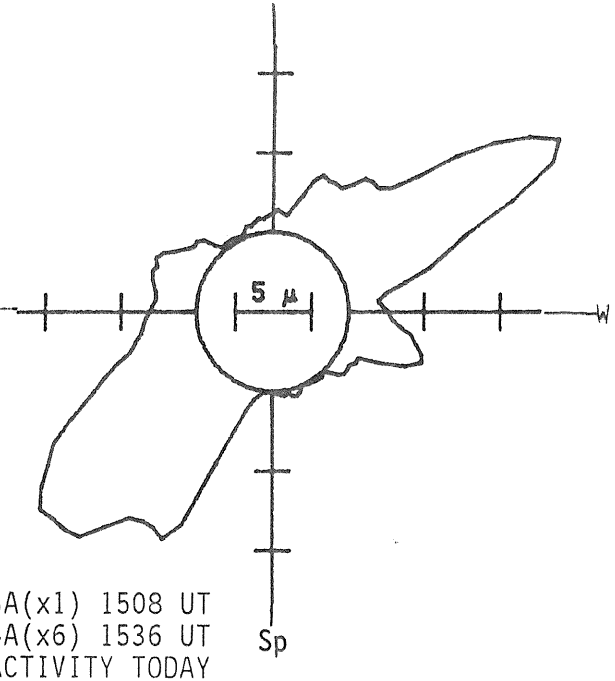
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

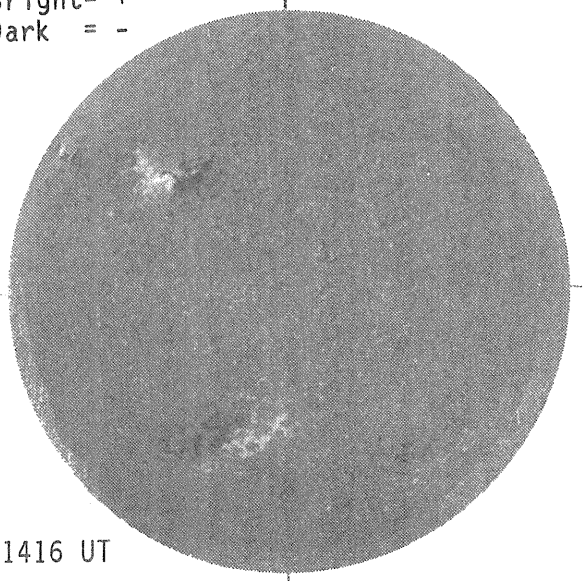


—— 5303A(x1) 1508 UT
xxxx 5694A(x6) 1536 UT
NO 5694A ACTIVITY TODAY

OCTOBER 02, 1987 (P= 25.95, B_o= 6.61, L_o= 18.07)

KITT PEAK MAGNETOGRAM

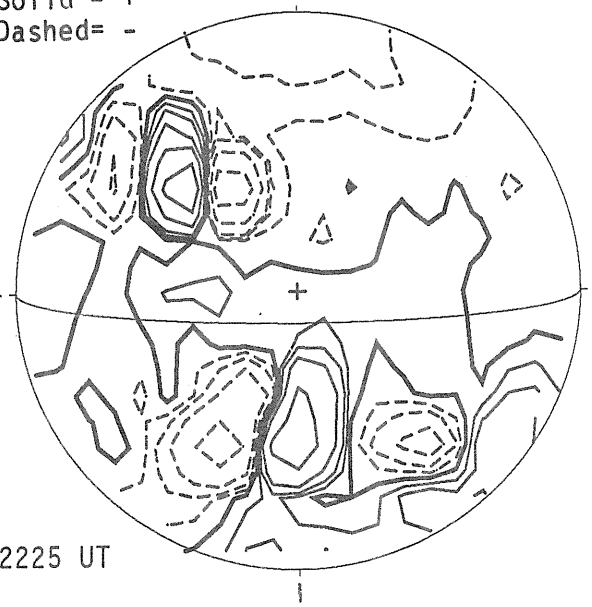
Bright= +
Dark = -



1416 UT

STANFORD MAGNETOGRAM

Solid = +
Dashed= -

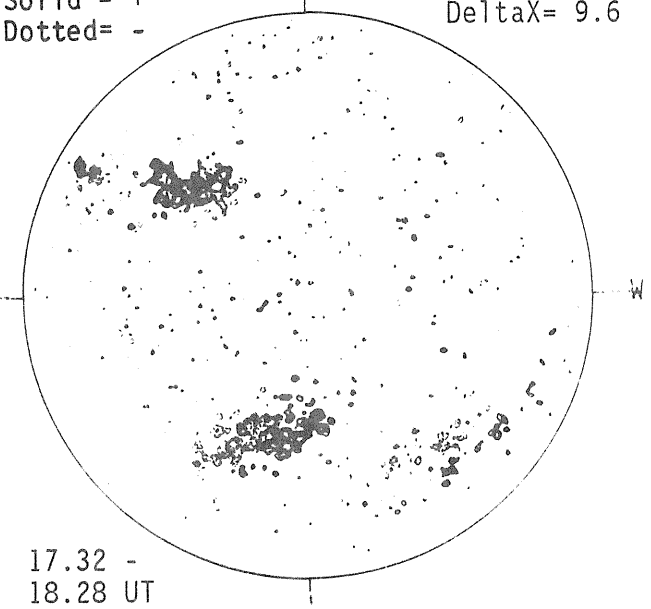


2225 UT

MT. WILSON MAGNETOGRAM

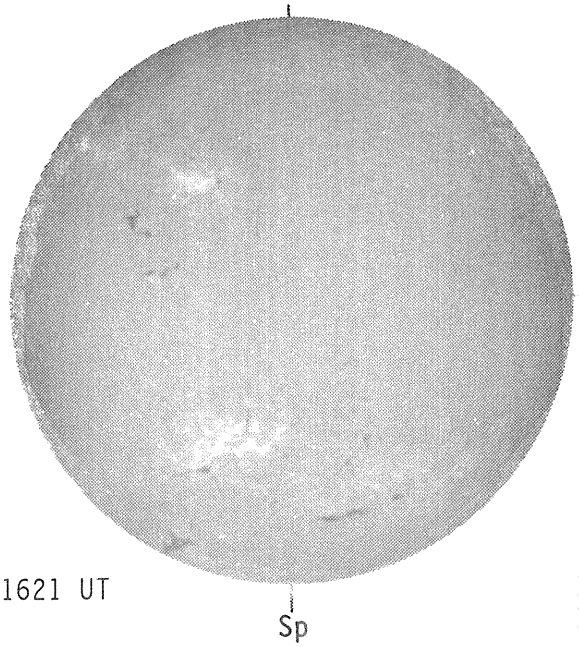
Solid = +
Dotted= -

DeltaY=13.0
DeltaX= 9.6



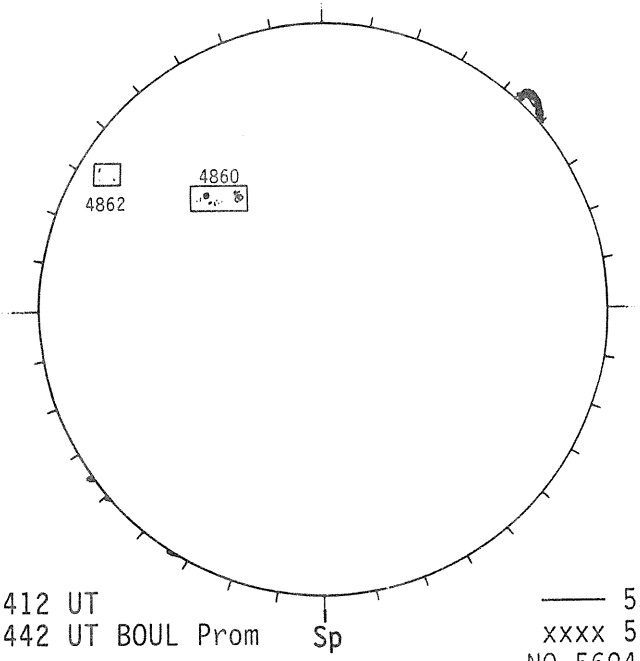
17.32 -
18.28 UT

SACRAMENTO PEAK H-ALPHA



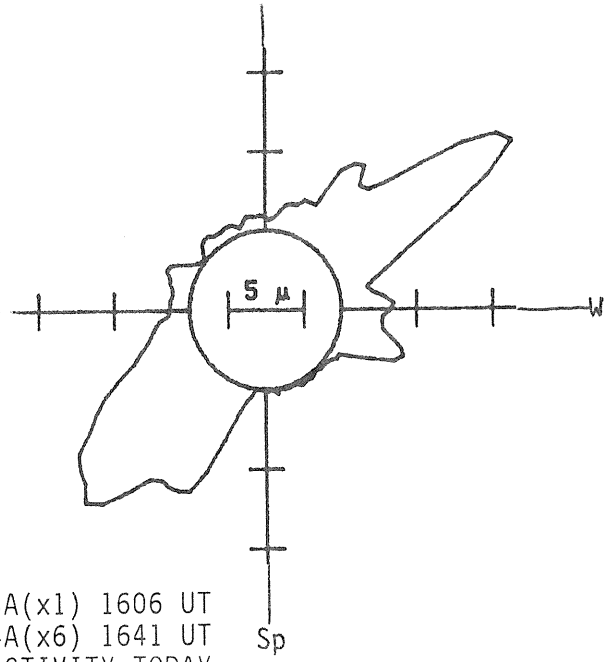
1621 UT

BOULDER SUNSPOTS



1412 UT
1442 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)

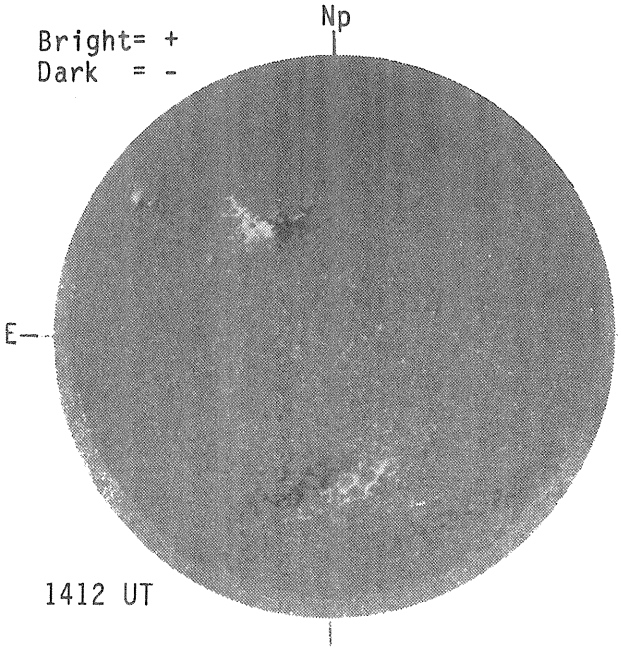


—— 5303A(x1) 1606 UT
xxxx 5694A(x6) 1641 UT
NO 5694A ACTIVITY TODAY

OCTOBER 03, 1987 (P= 26.01, B_o= 6.56, L_o= 4.87)

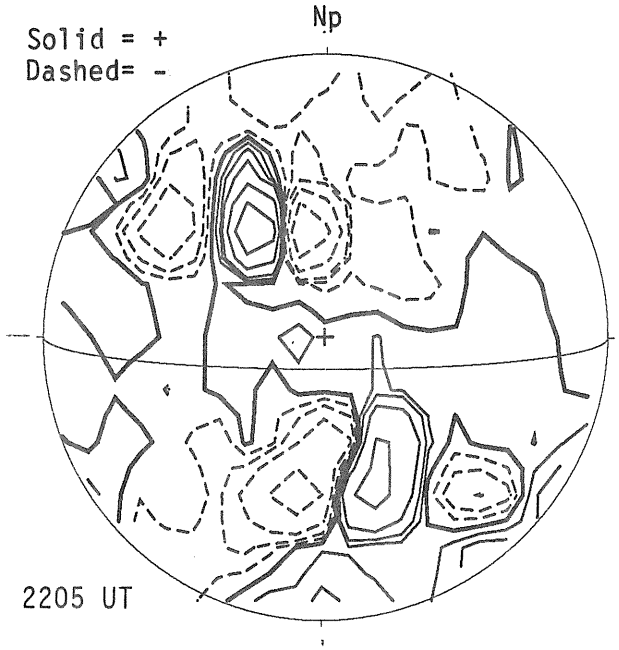
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

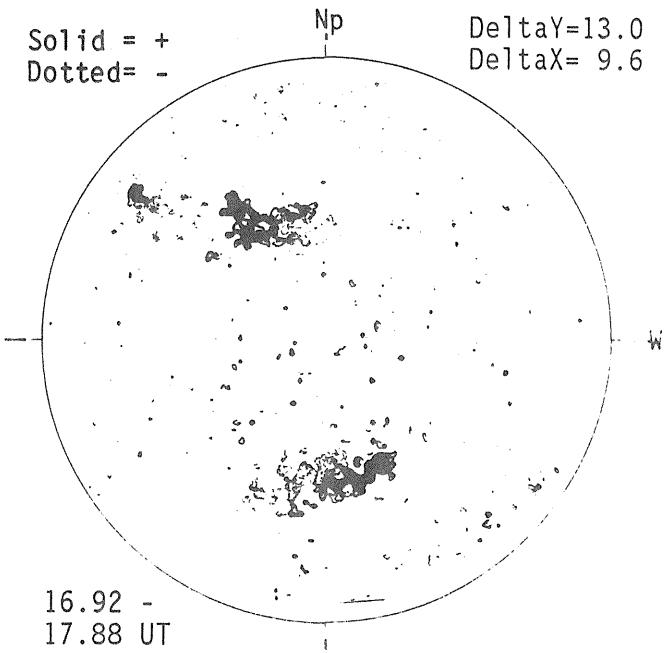
Solid = +
Dashed= -



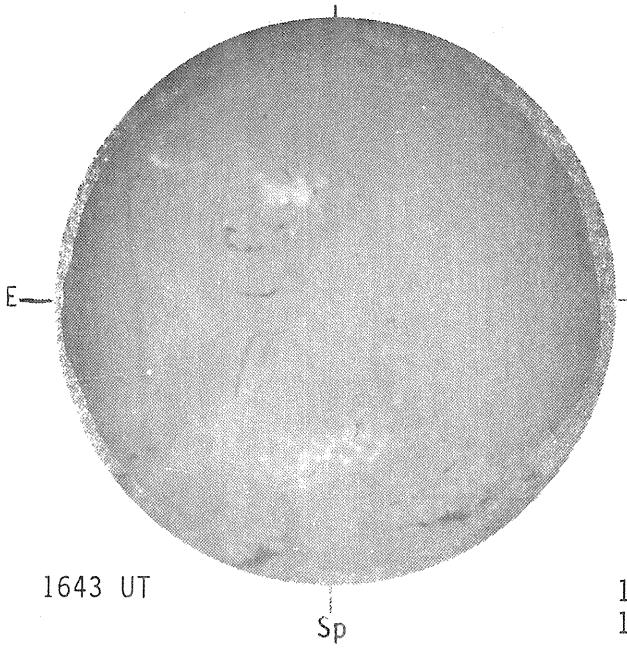
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

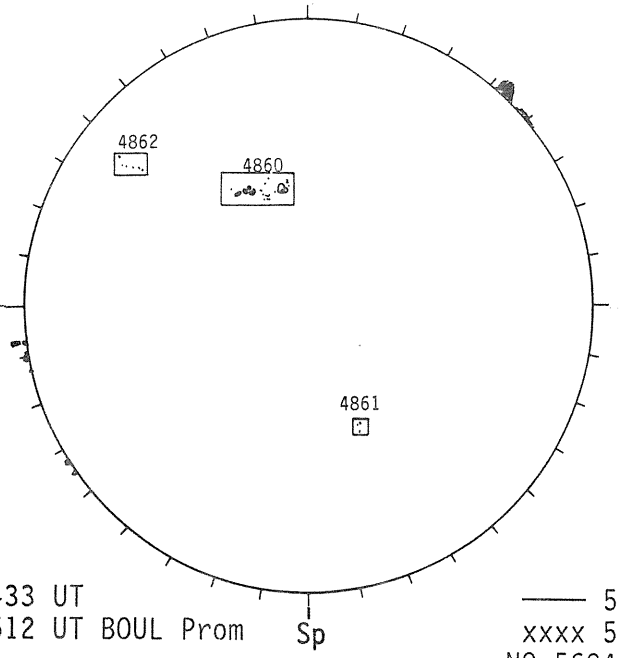
DeltaY=13.0
DeltaX= 9.6



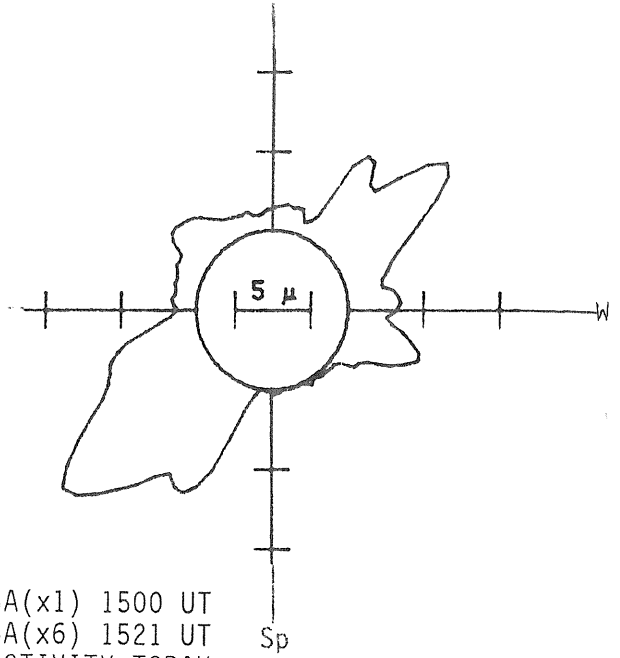
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

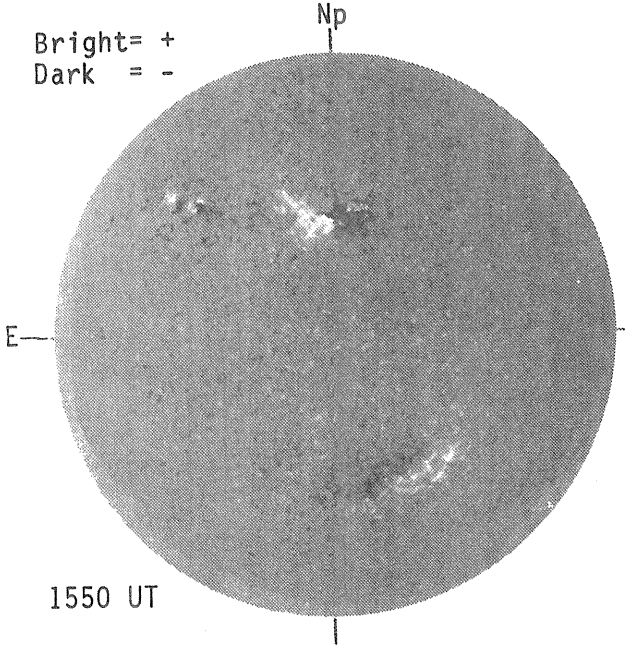


—— 5303A(x1) 1500 UT
xxxx 5694A(x6) 1521 UT
NO 5694A ACTIVITY TODAY

OCTOBER 04, 1987 (P= 26.06, B_o= 6.51, L_o=351.68)

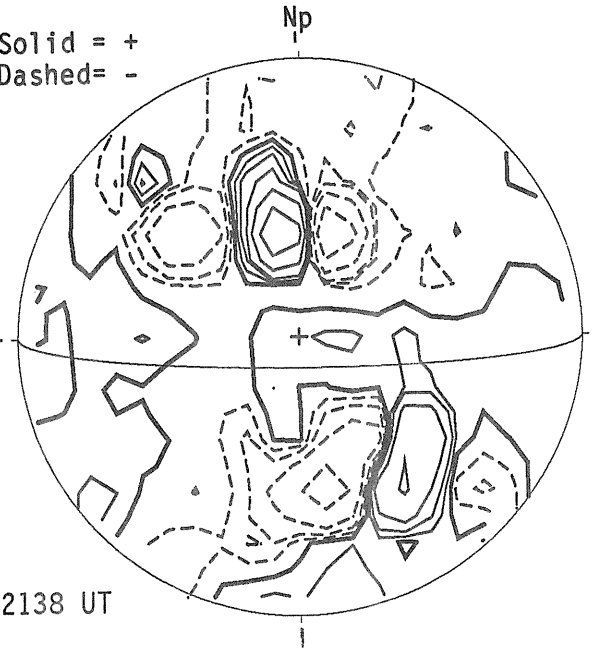
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

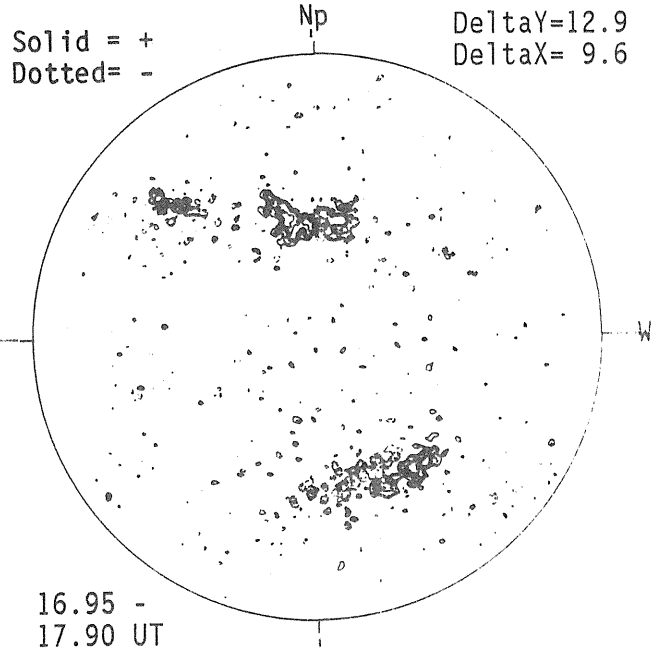
Solid = +
Dashed= -



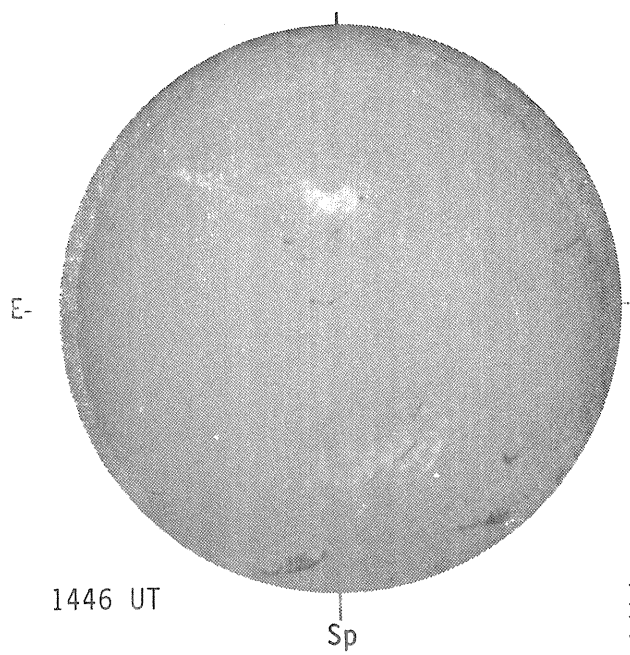
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

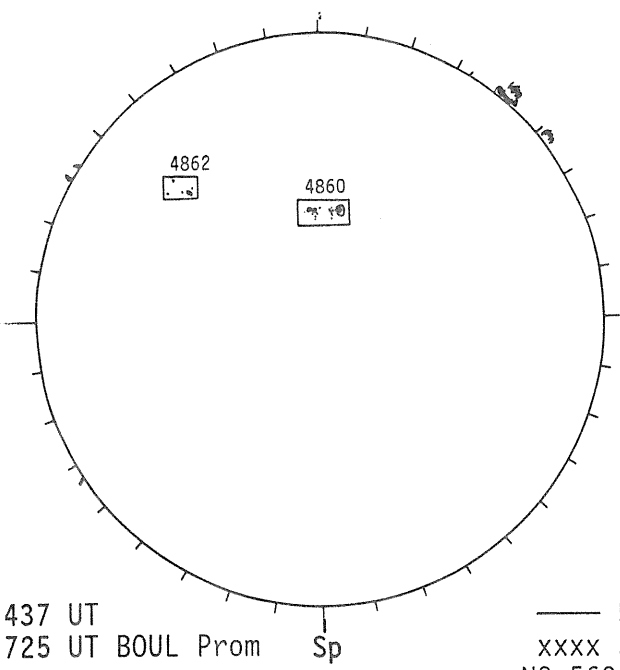
DeltaY=12.9
DeltaX= 9.6



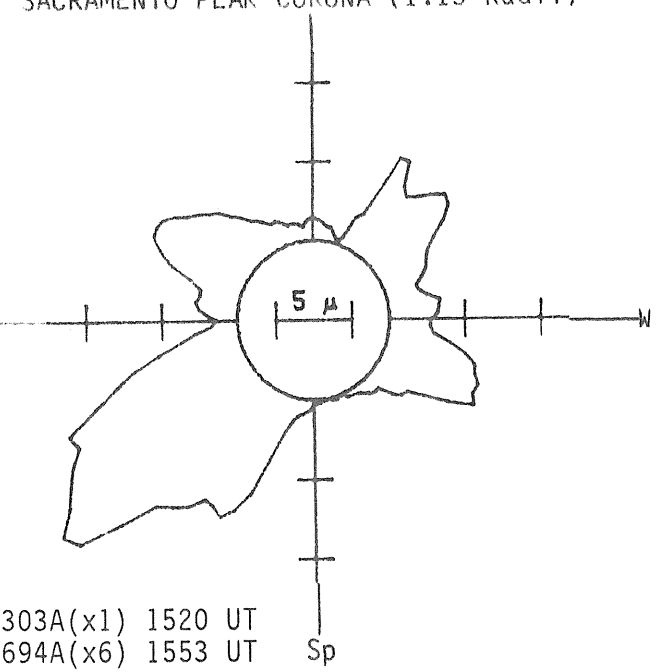
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

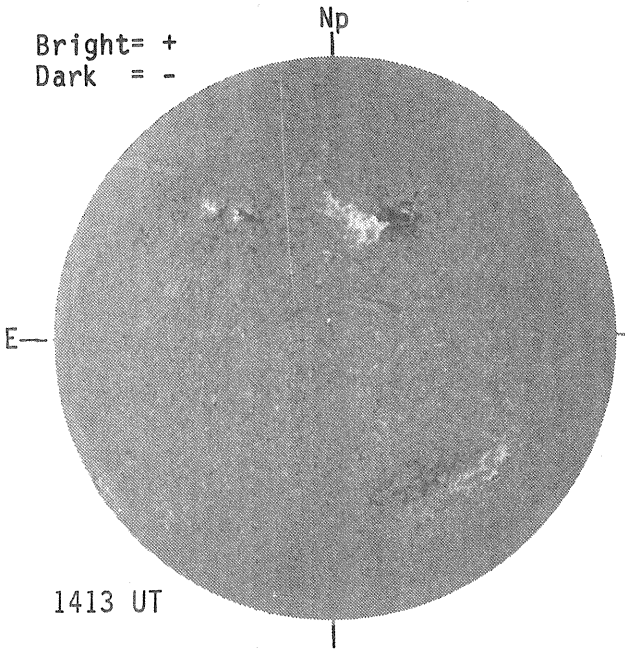


—— 5303A(x1) 1520 UT
xxxx 5694A(x6) 1553 UT
NO 5694A ACTIVITY TODAY

OCTOBER 05, 1987 (P= 26.11, B_o= 6.46, L_o=338.48)

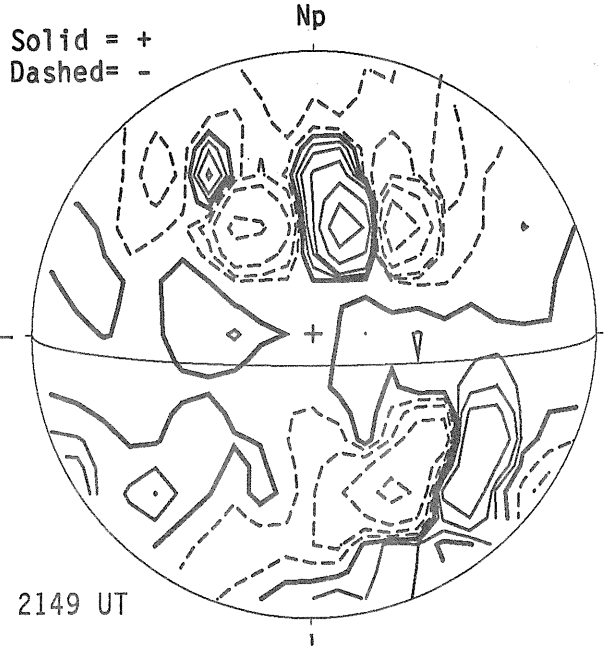
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



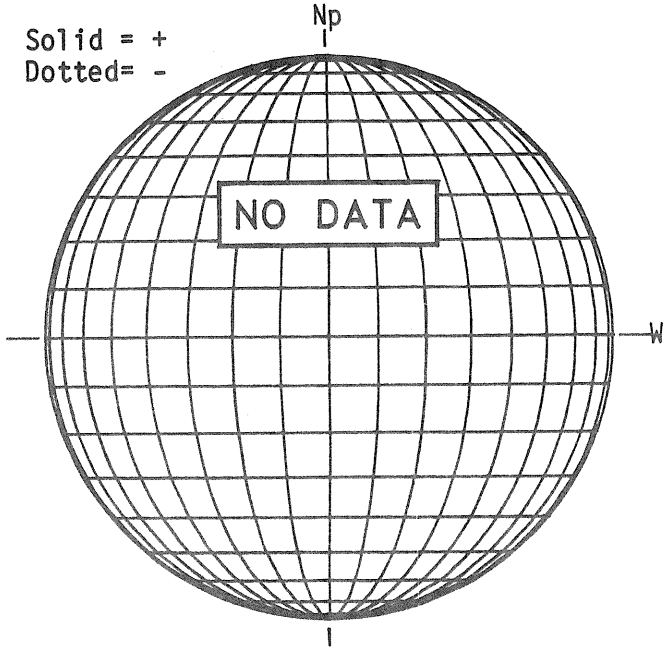
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

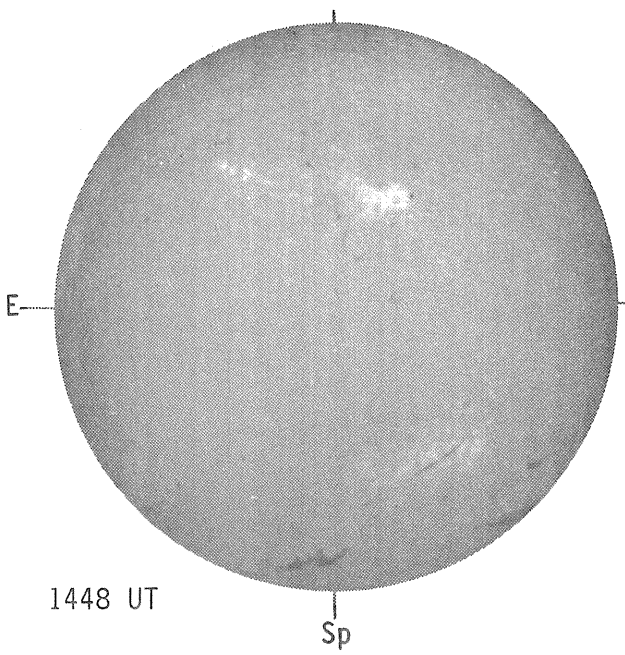


MT. WILSON MAGNETOGRAM

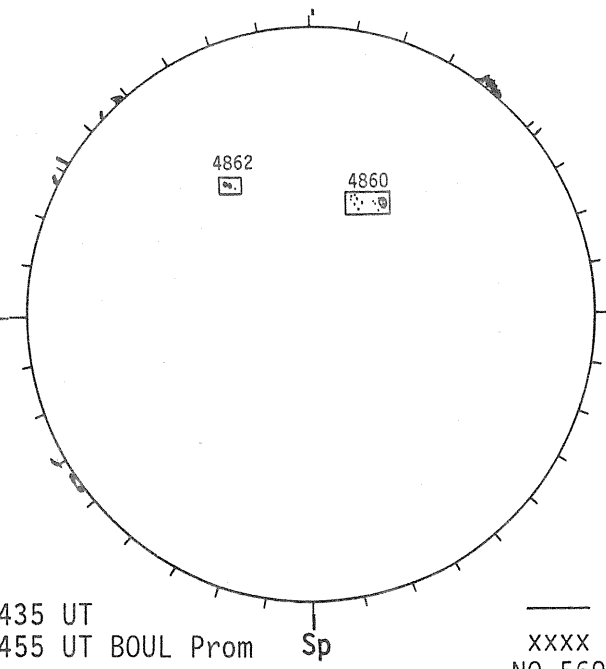
Solid = +
Dotted= -



SACRAMENTO PEAK H-ALPHA

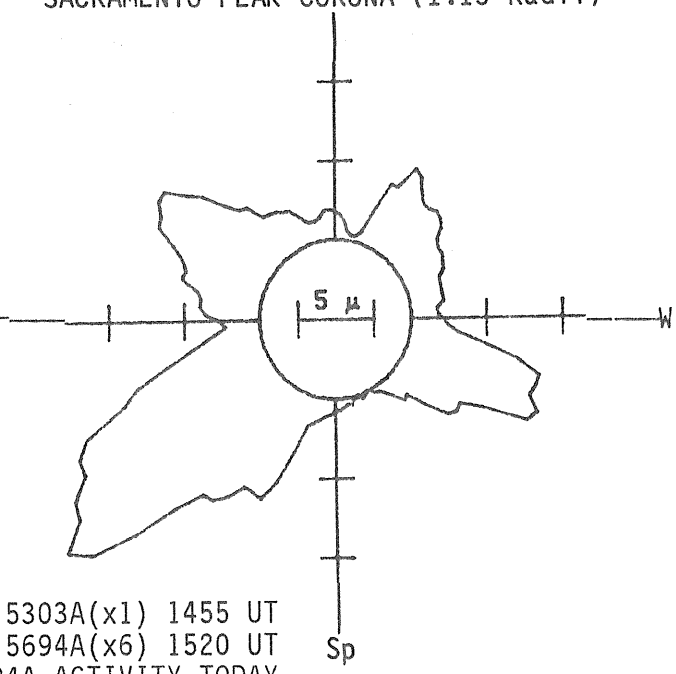


BOULDER SUNSPOTS



1435 UT
1455 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)

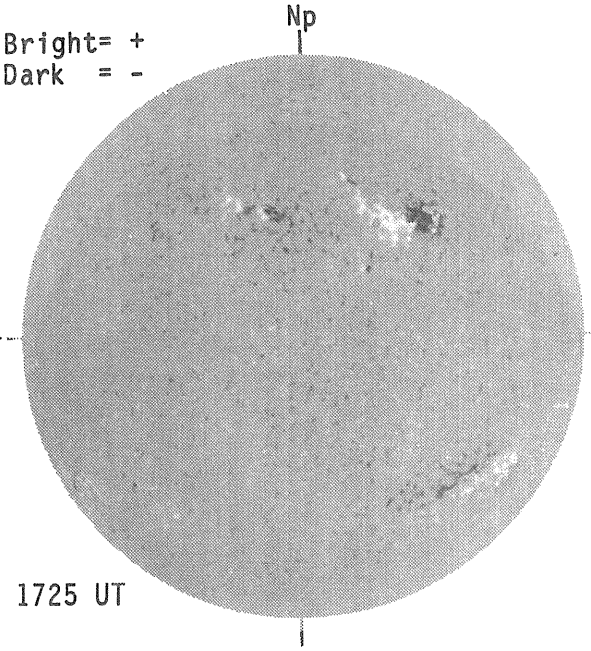


—— 5303A(x1) 1455 UT
xxxx 5694A(x6) 1520 UT
NO 5694A ACTIVITY TODAY

OCTOBER 06, 1987 (P= 26.15, B_o= 6.40, L_o= 325.29)

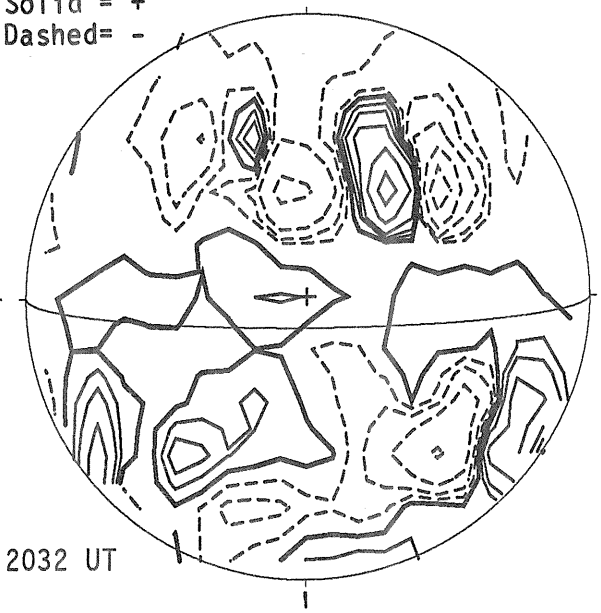
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

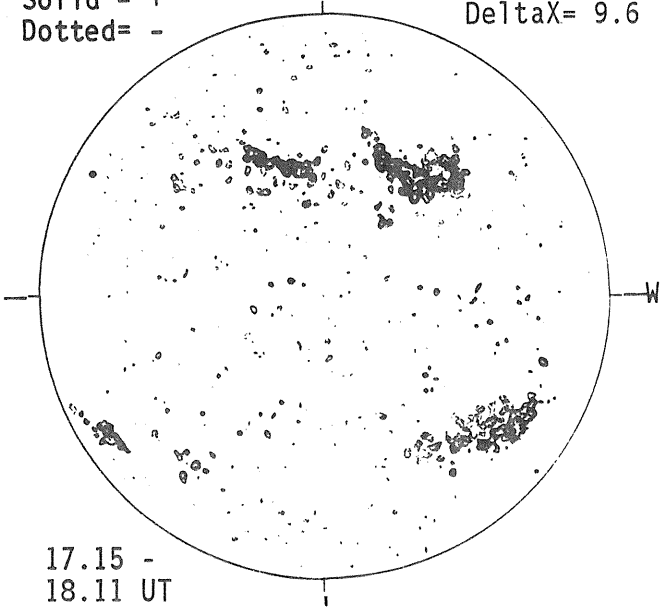
Solid = +
Dashed= -



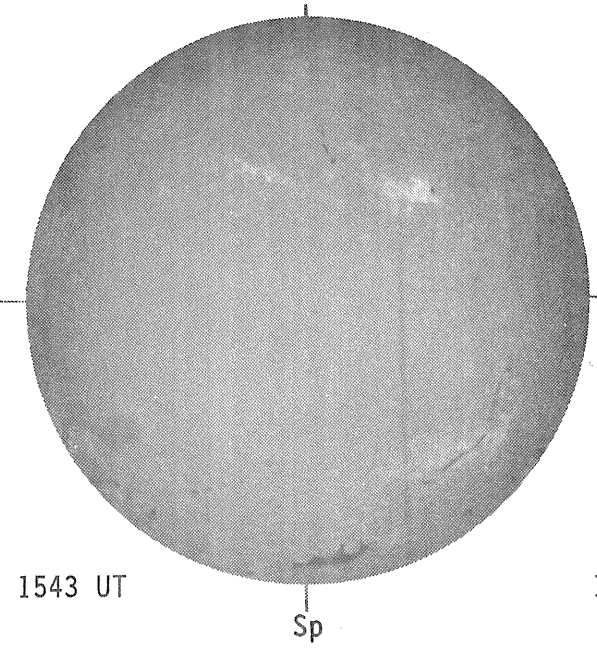
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

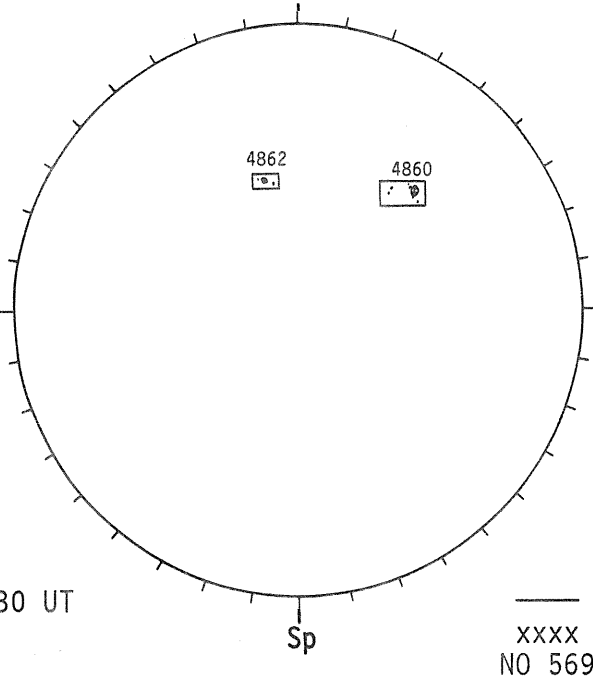
DeltaY=12.9
DeltaX= 9.6



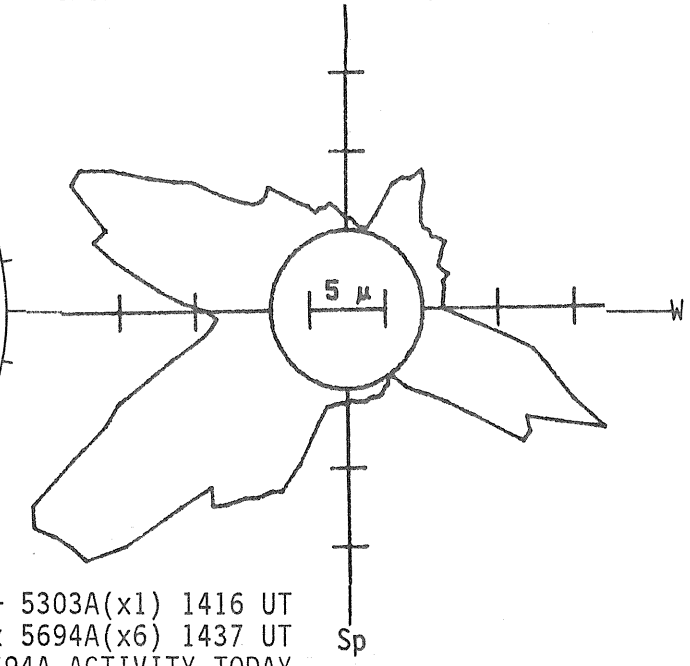
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

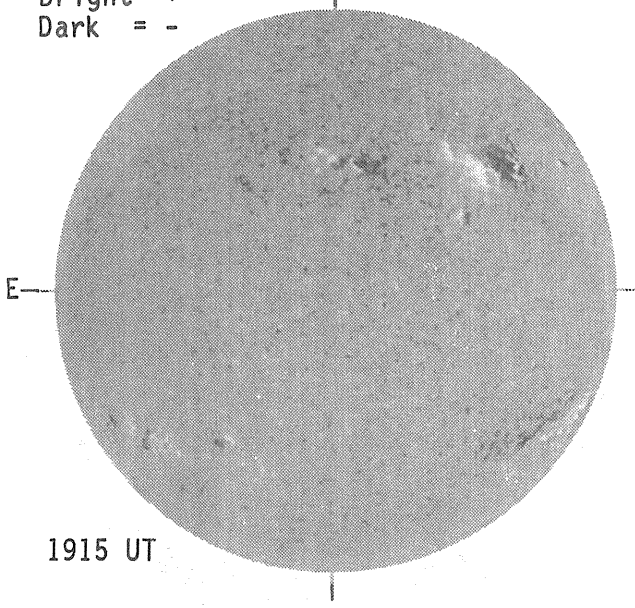


—— 5303A(x1) 1416 UT
xxxx 5694A(x6) 1437 UT
NO 5694A ACTIVITY TODAY

OCTOBER 07, 1987 (P= 26.18, B_0= 6.35, L_0= 312.09)

KITT PEAK MAGNETOGRAM

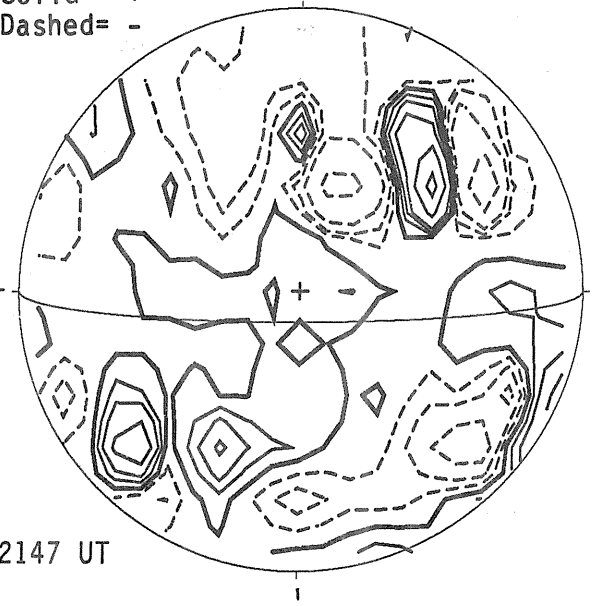
Bright= +
Dark = -



1915 UT

STANFORD MAGNETOGRAM

Solid = +
Dashed= -

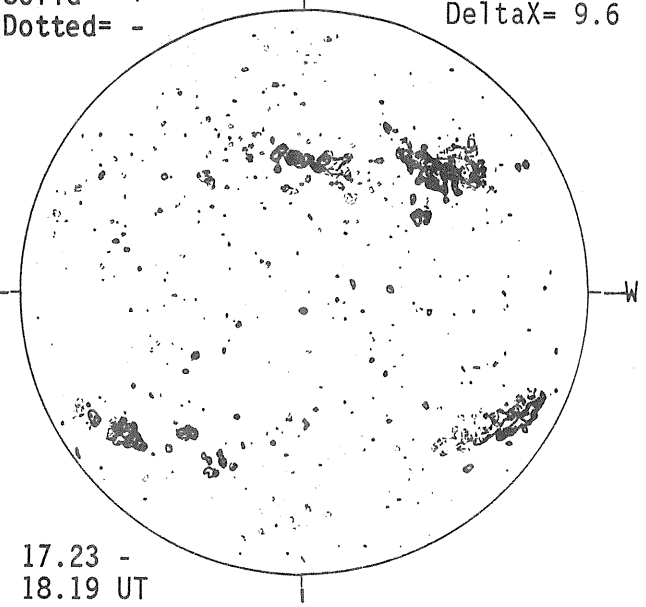


2147 UT

MT. WILSON MAGNETOGRAM

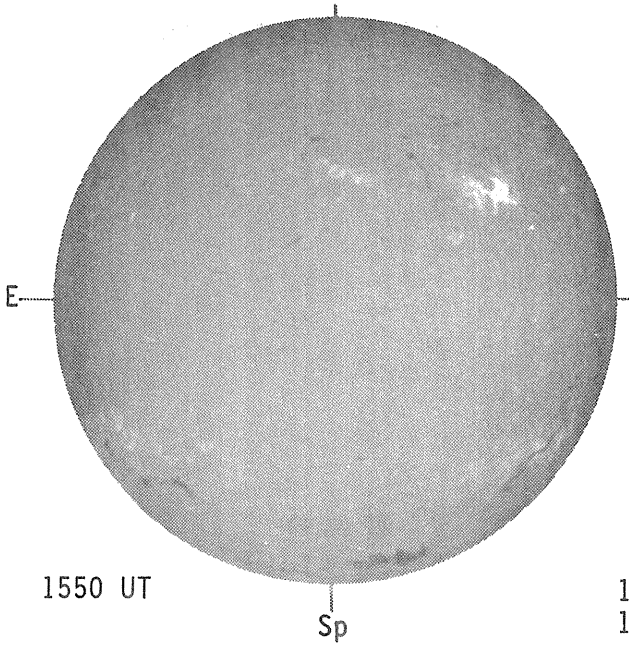
Solid = +
Dotted= -

DeltaY=12.9
DeltaX= 9.6



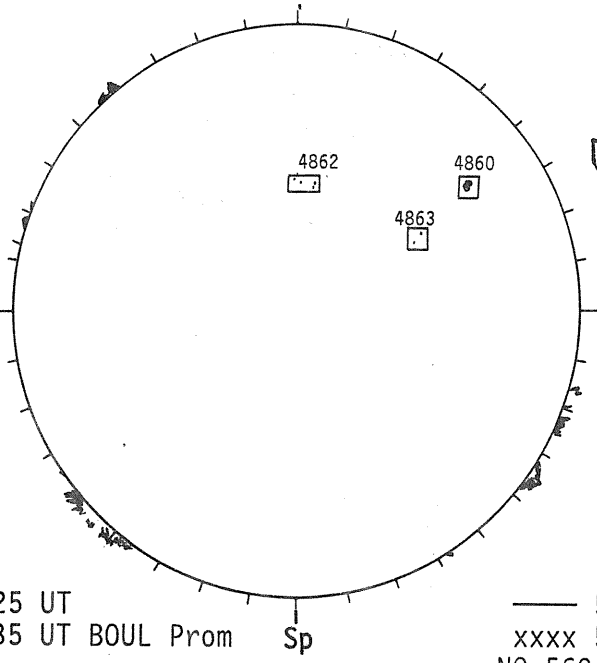
17.23 -
18.19 UT

SACRAMENTO PEAK H-ALPHA



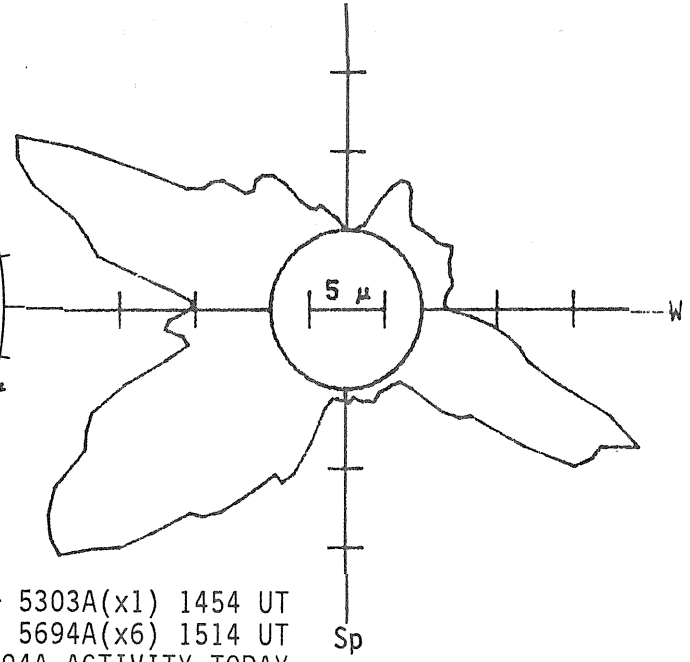
1550 UT

BOULDER SUNSPOTS



1625 UT
1635 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)

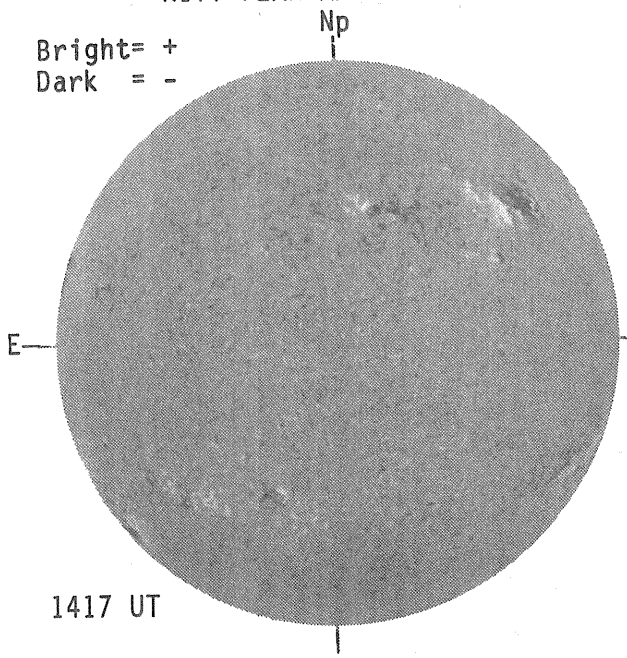


—— 5303A(x1) 1454 UT
xxxx 5694A(x6) 1514 UT
NO 5694A ACTIVITY TODAY

OCTOBER 08, 1987 (P= 26.20, B_0= 6.29, L_0= 298.90)

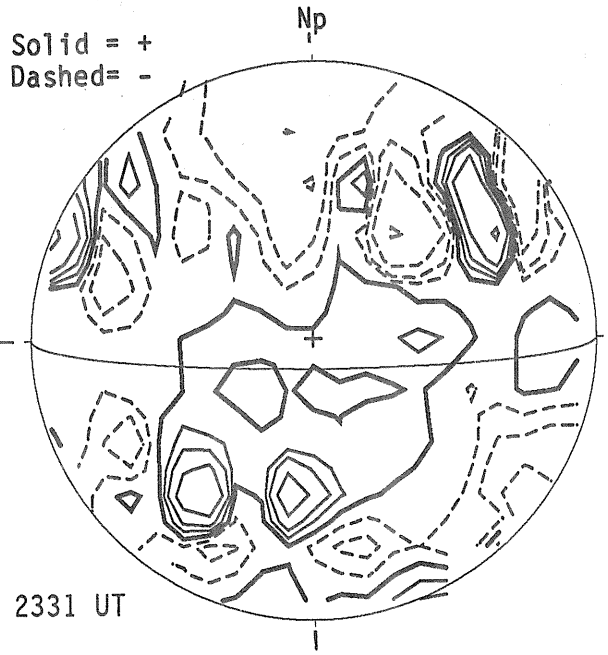
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

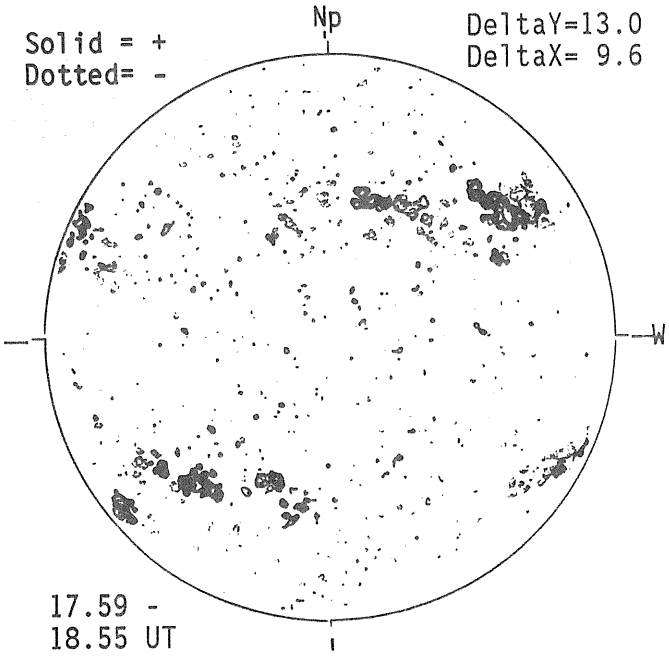
Solid = +
Dashed= -



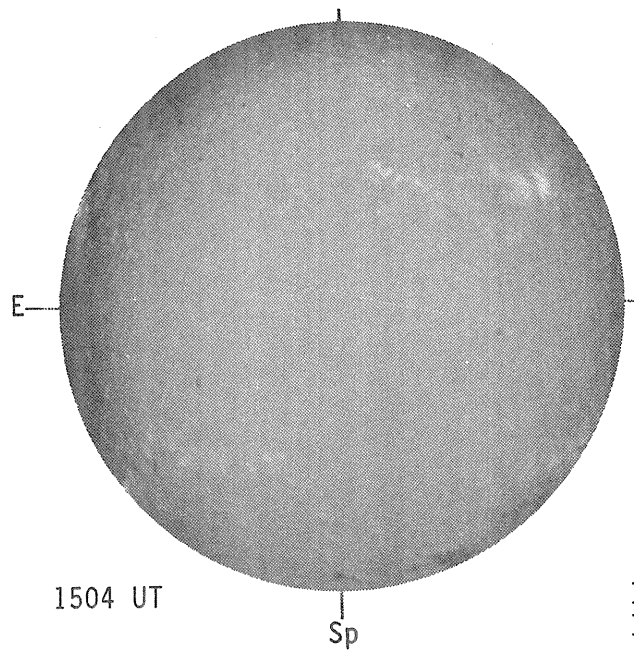
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

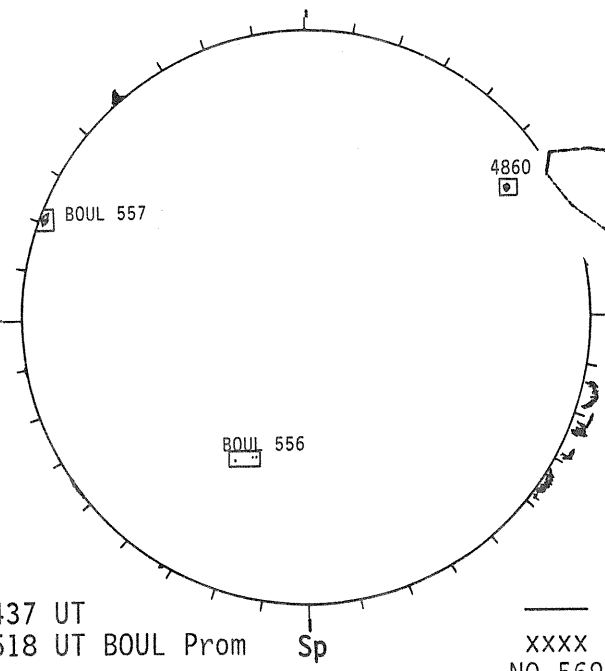
DeltaY=13.0
DeltaX= 9.6



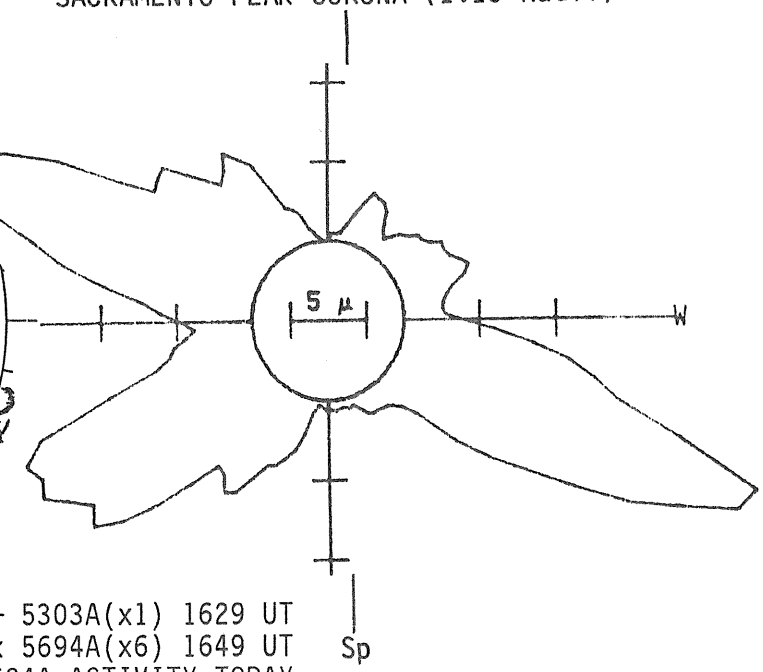
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

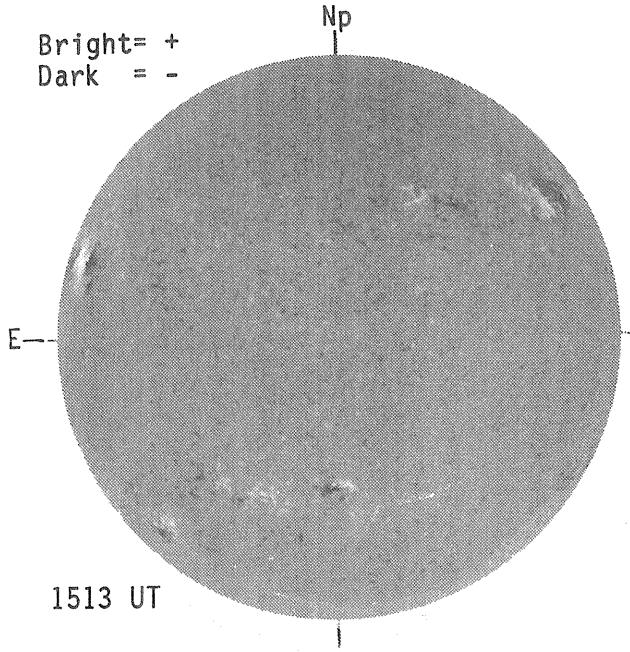


—— 5303A(x1) 1629 UT
xxxx 5694A(x6) 1649 UT
NO 5694A ACTIVITY TODAY

OCTOBER 09, 1987 (P= 26.22, B_o= 6.23, L_o= 285.71)

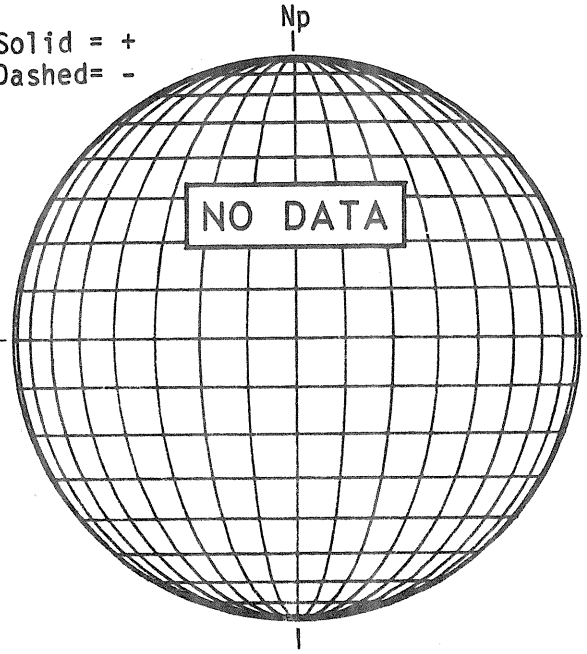
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

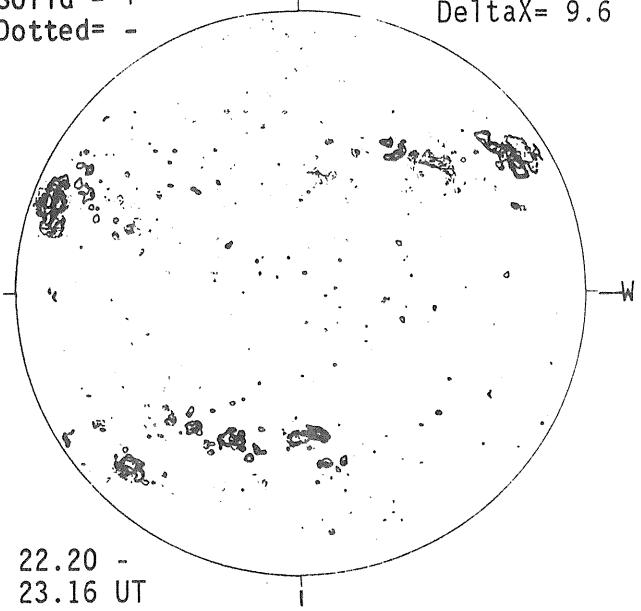
Solid = +
Dashed= -



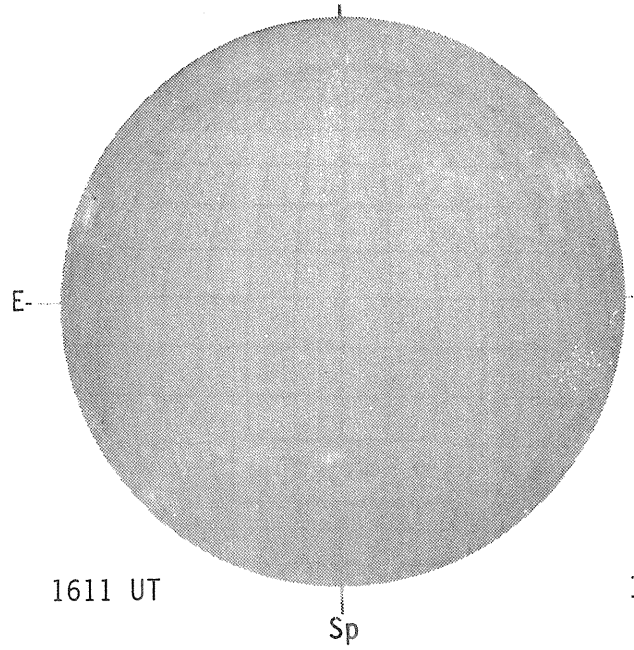
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

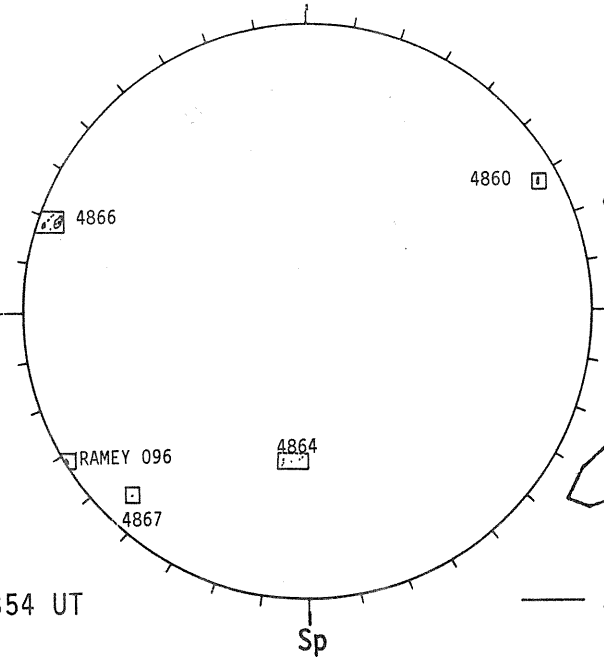
DeltaY=13.0
DeltaX= 9.6



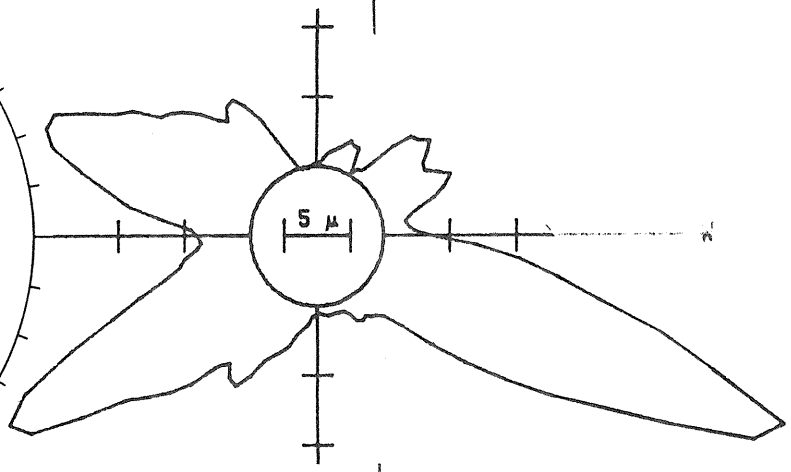
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



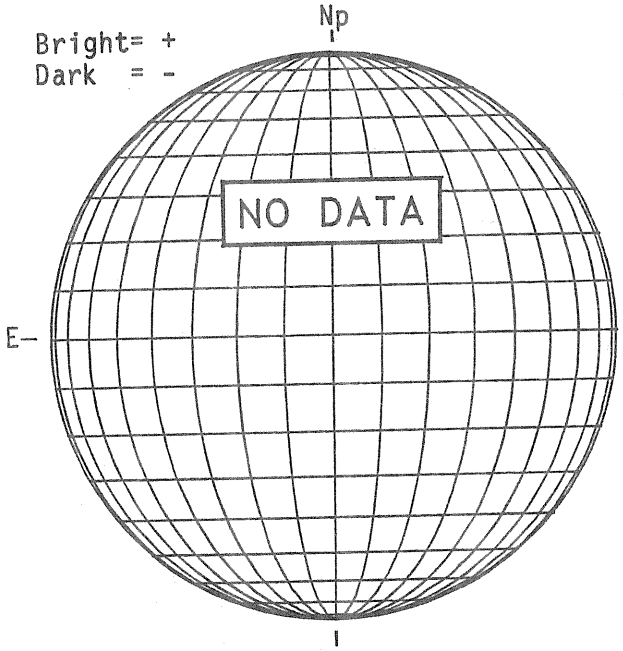
SACRAMENTO PEAK CORONA (1.15 Radii)



OCTOBER 10, 1987 (P= 26.22, B_0= 6.17, L_0= 272.51)

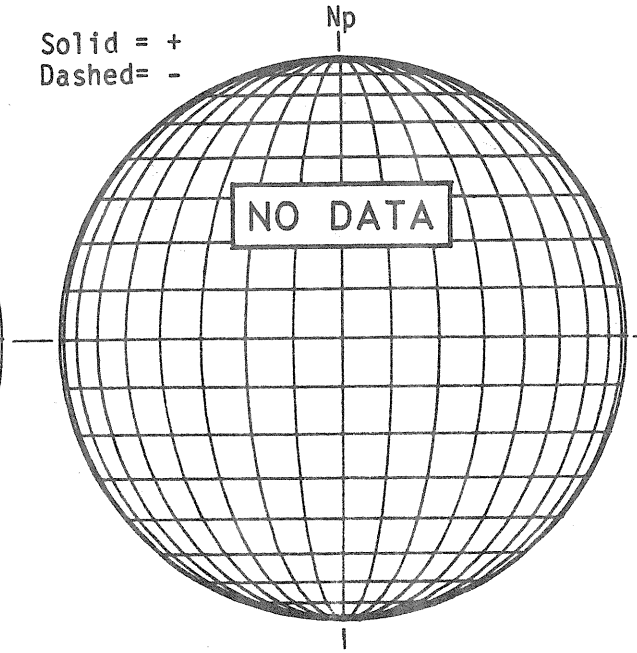
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

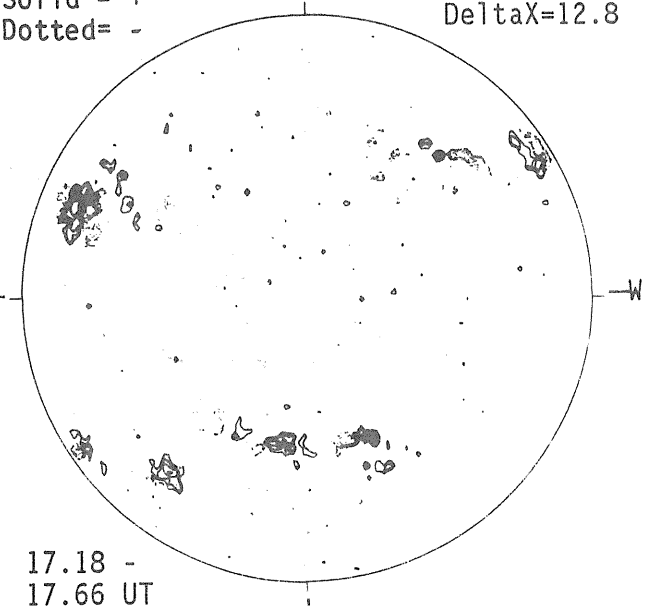
Solid = +
Dashed= -



MT. WILSON MAGNETOGRAM

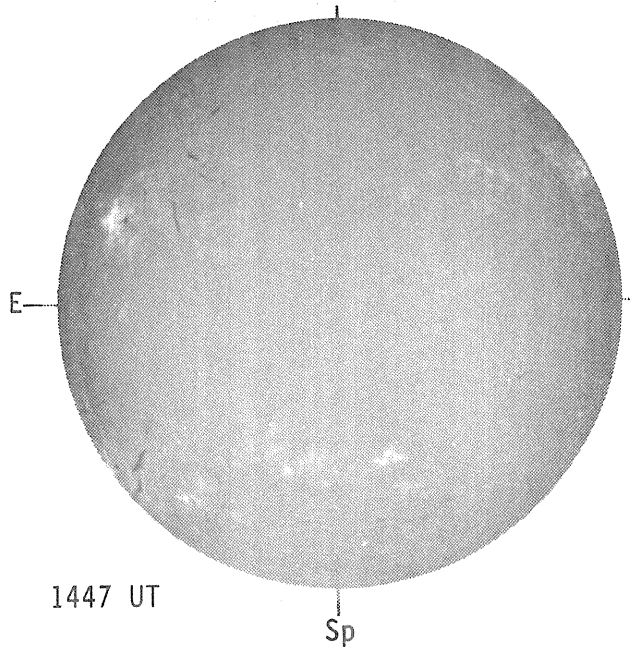
Solid = +
Dotted= -

DeltaY=20.2
DeltaX=12.8



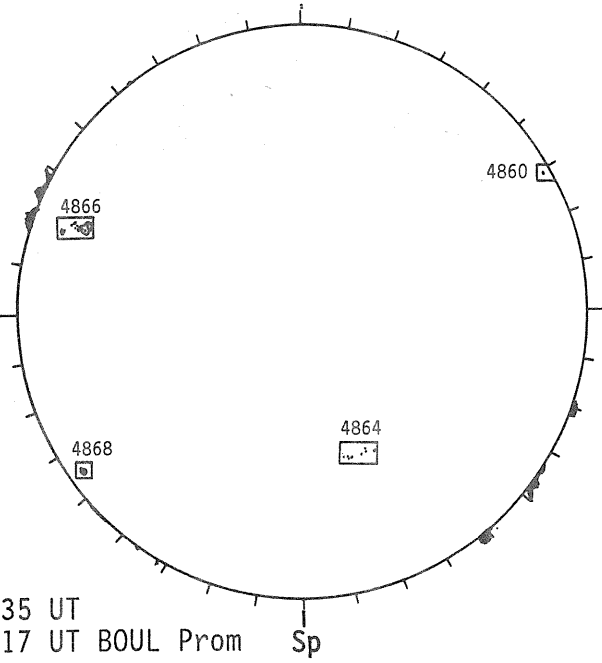
17.18 -
17.66 UT

SACRAMENTO PEAK H-ALPHA



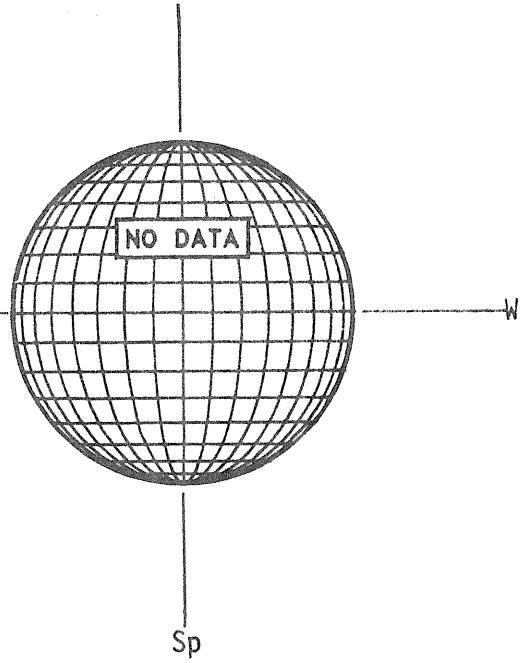
1447 UT

BOULDER SUNSPOTS



1435 UT
1517 UT BOUL Prom

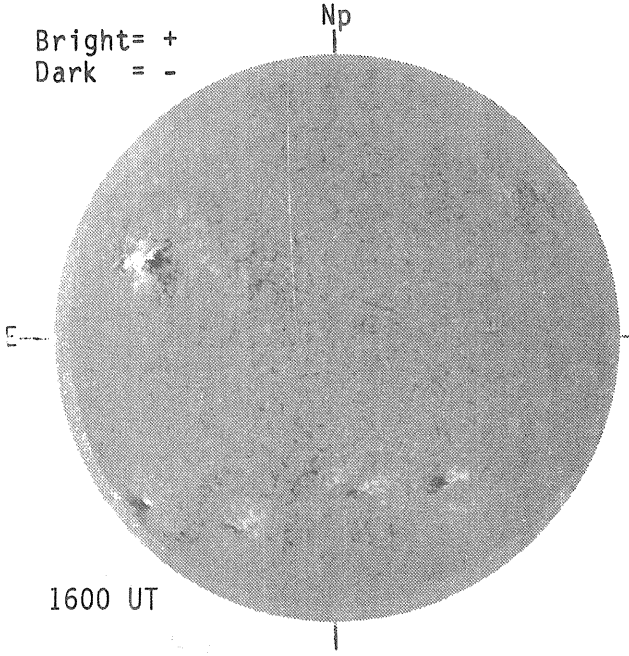
SACRAMENTO PEAK CORONA (1.15 Radii)



OCTOBER 11, 1987 (P= 26.22, B_0= 6.11, L_0= 259.32)

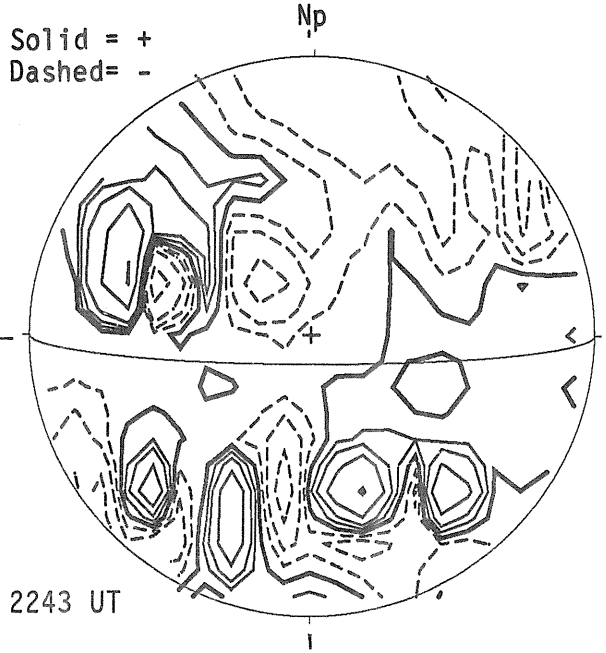
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



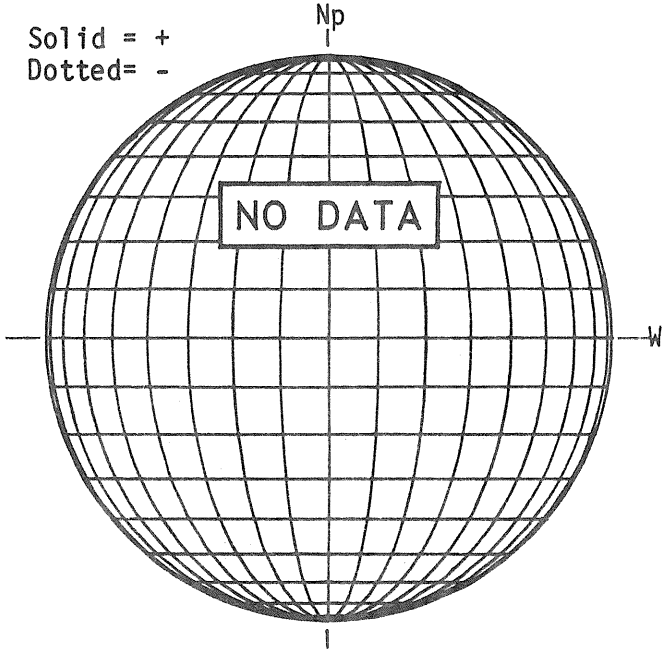
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

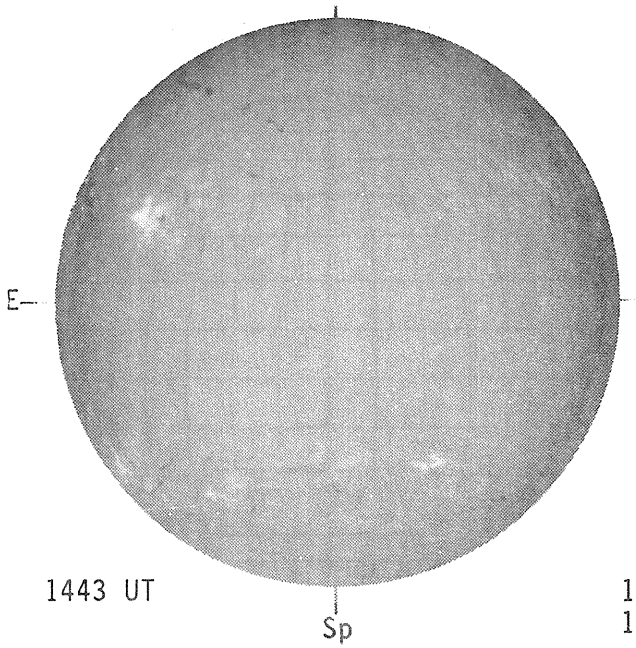


MT. WILSON MAGNETOGRAM

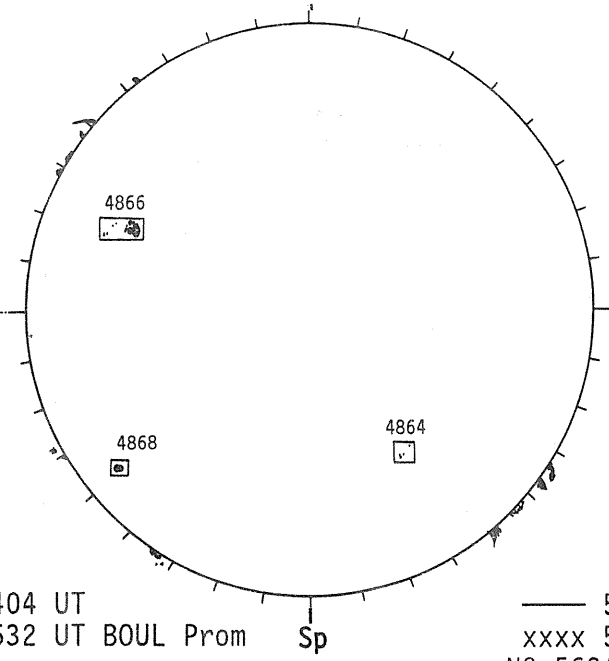
Solid = +
Dotted= -



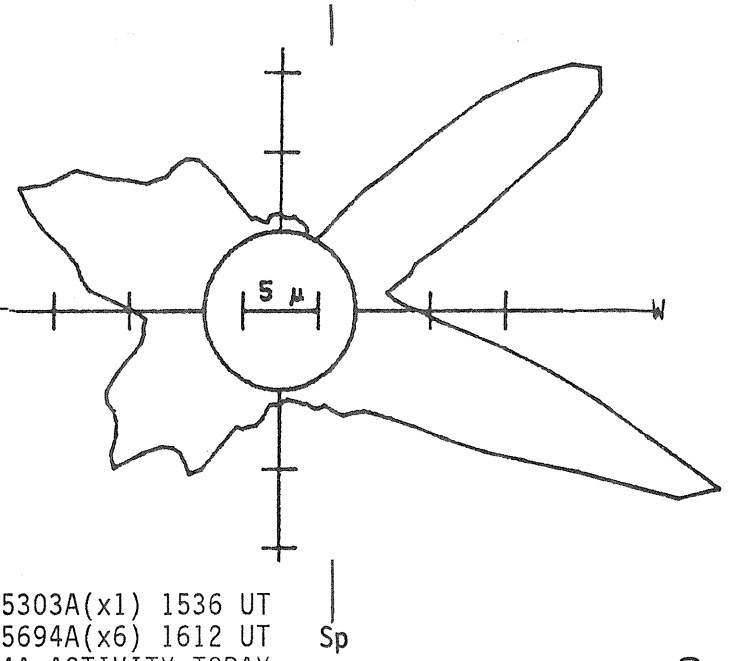
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

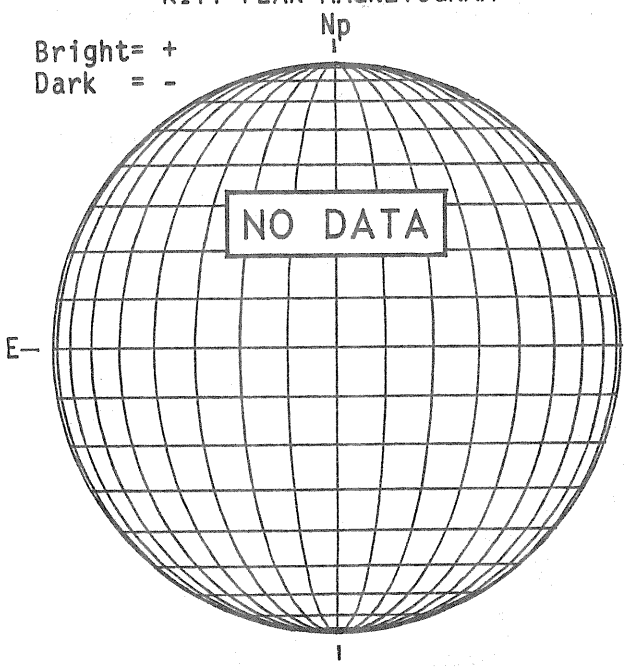


—— 5303A(x1) 1536 UT
xxxx 5694A(x6) 1612 UT
NO 5694A ACTIVITY TODAY

OCTOBER 12, 1987 (P= 26.22, B_0= 6.04, L_0= 246.13)

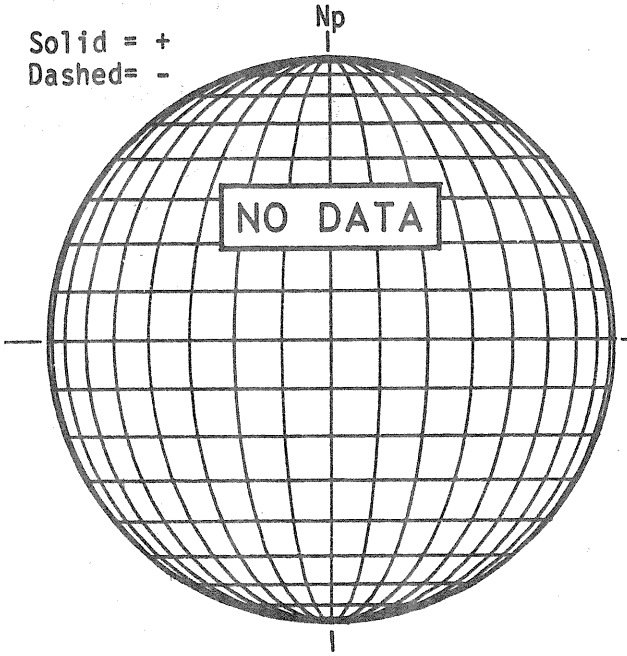
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

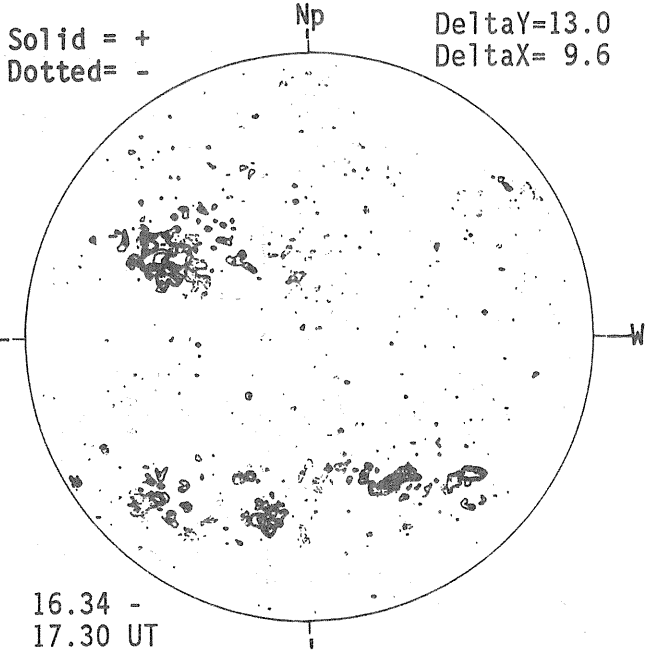
Solid = +
Dashed= -



MT. WILSON MAGNETOGRAM

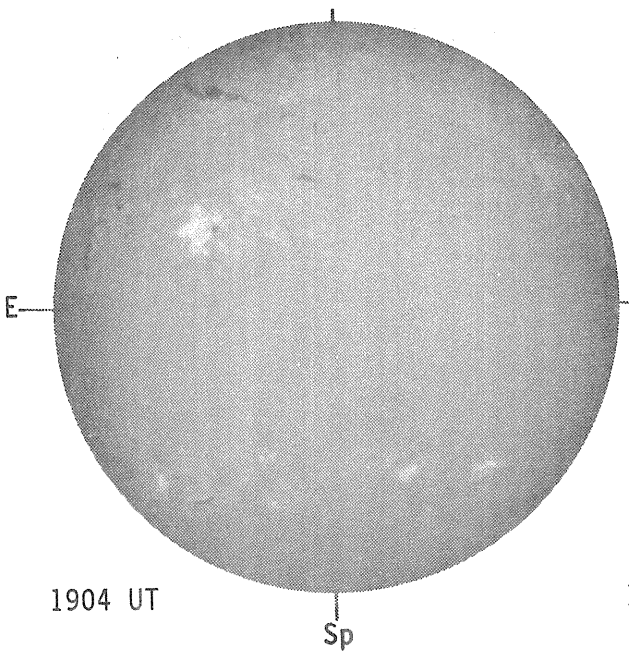
Solid = +
Dotted= -

DeltaY=13.0
DeltaX= 9.6



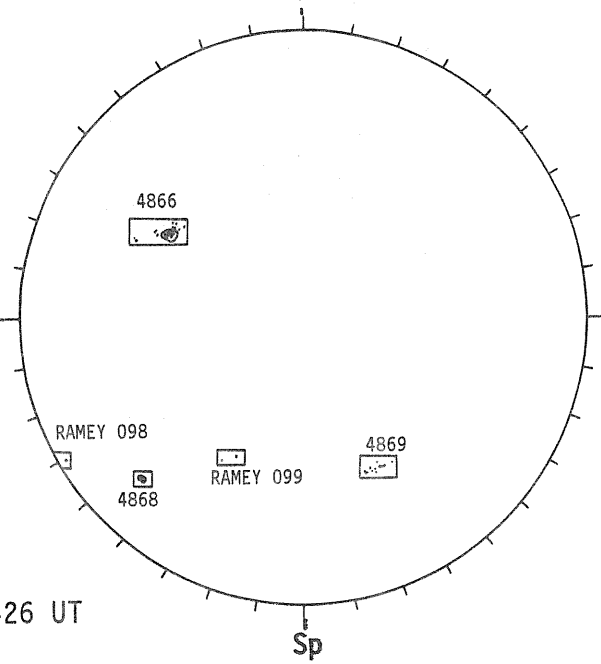
16.34 -
17.30 UT

SACRAMENTO PEAK H-ALPHA



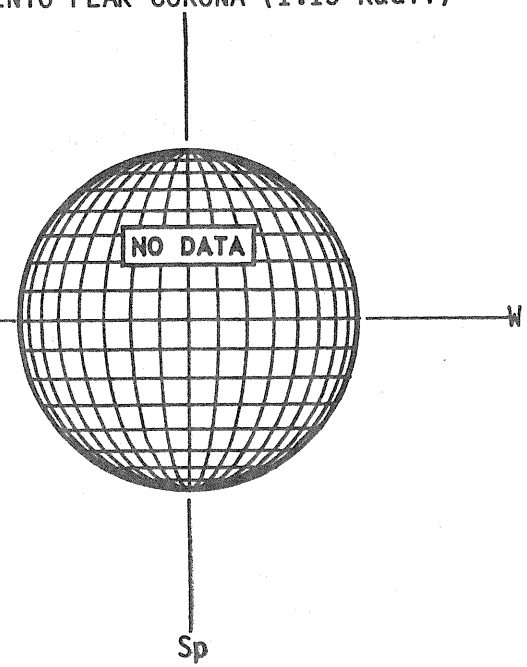
1904 UT

RAMEY SUNSPOTS



1426 UT

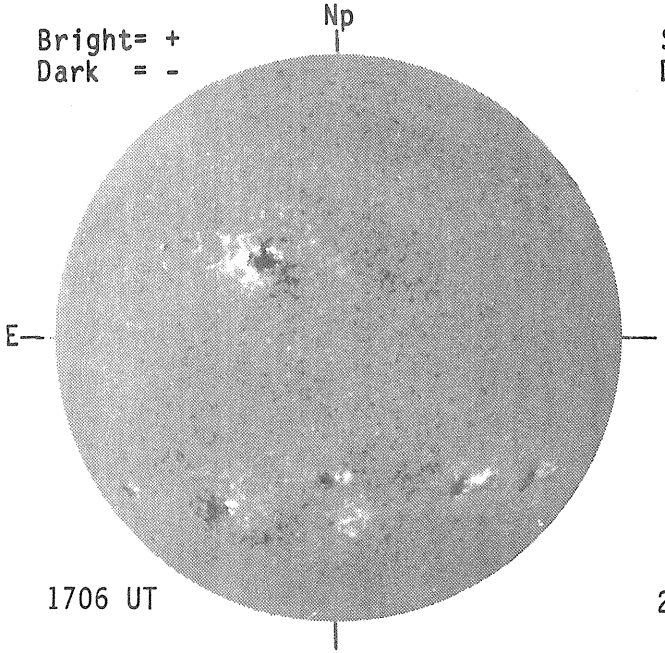
SACRAMENTO PEAK CORONA (1.15 Radii)



OCTOBER 13, 1987 (P= 26.21, B_0= 5.98, L_0= 232.94)

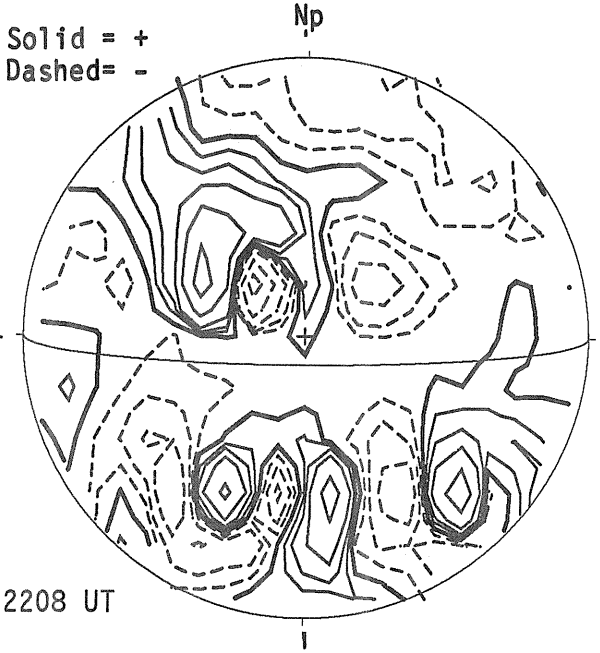
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

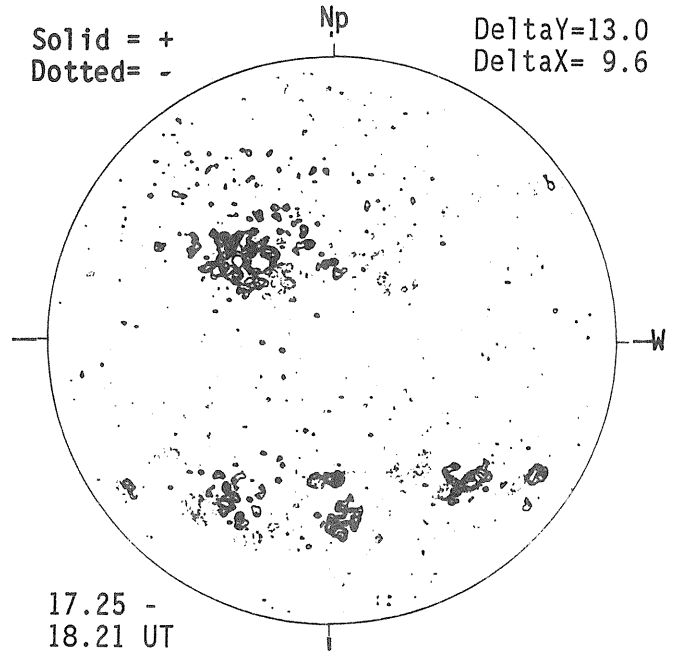
Solid = +
Dashed= -



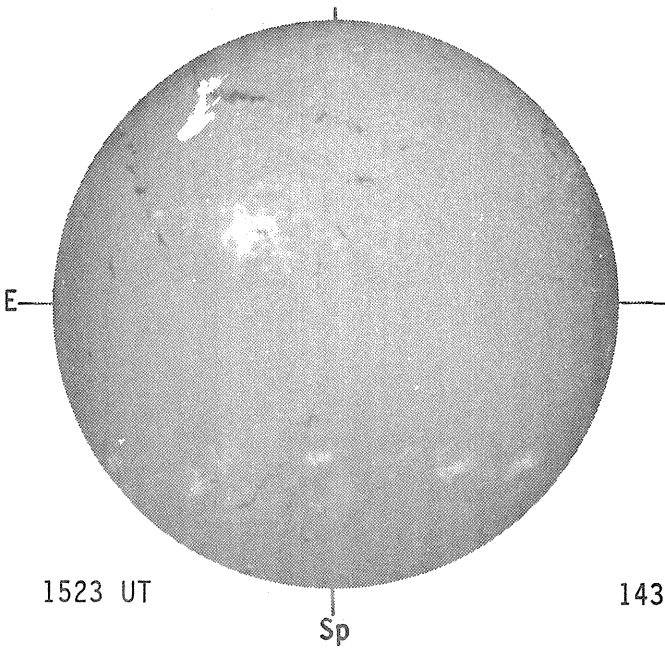
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

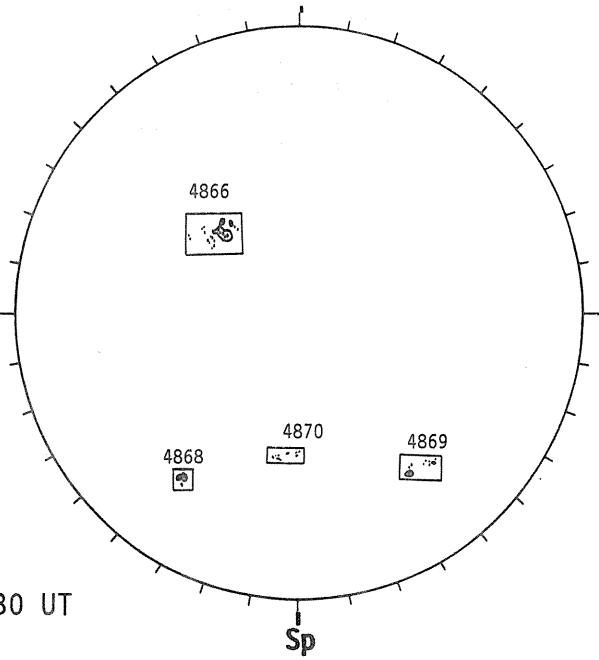
DeltaY=13.0
DeltaX= 9.6



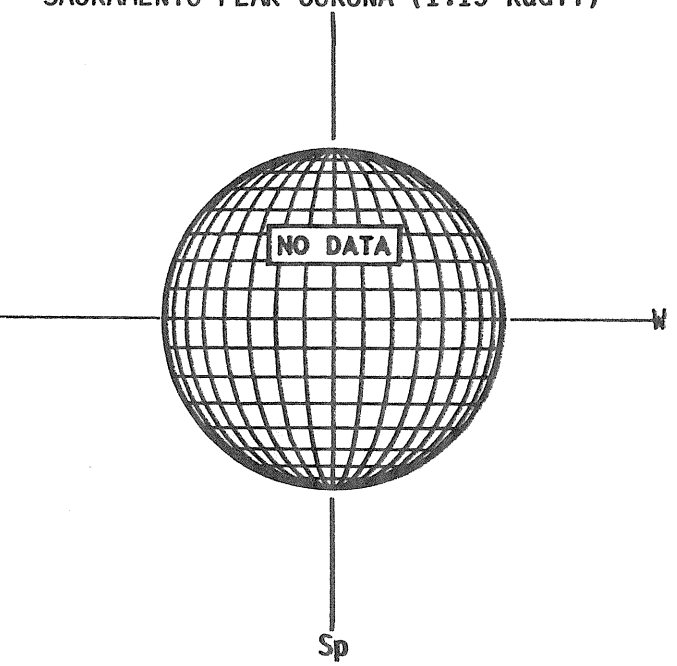
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



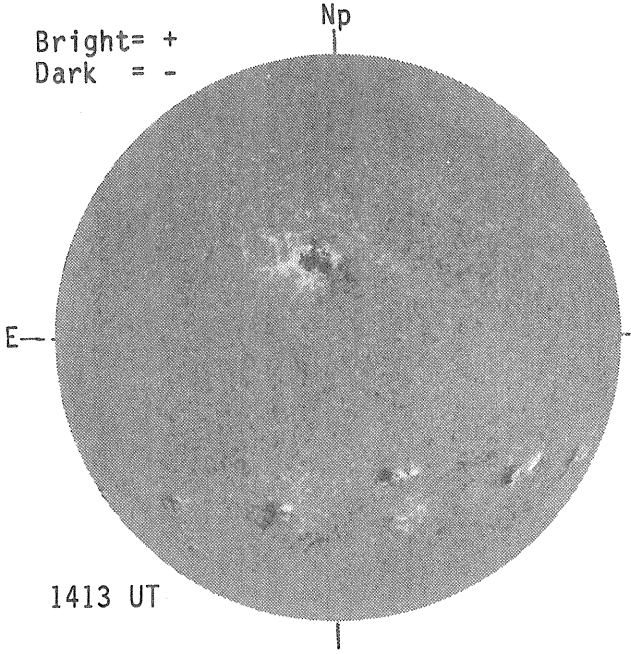
SACRAMENTO PEAK CORONA (1.15 Radii)



OCTOBER 14, 1987 (P= 26.18, B_0= 5.91, L_0= 219.74)

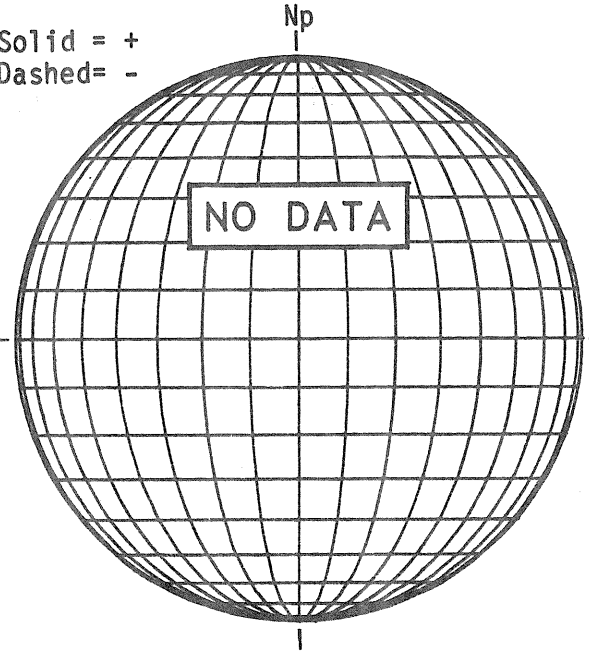
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

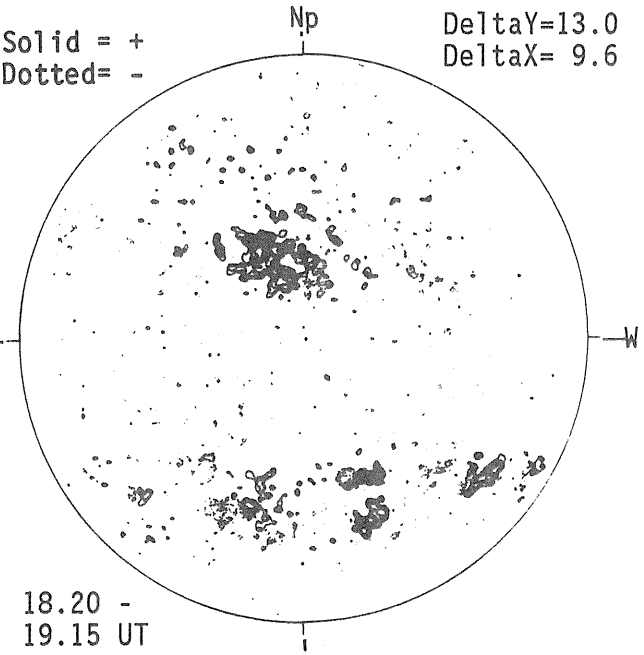
Solid = +
Dashed= -



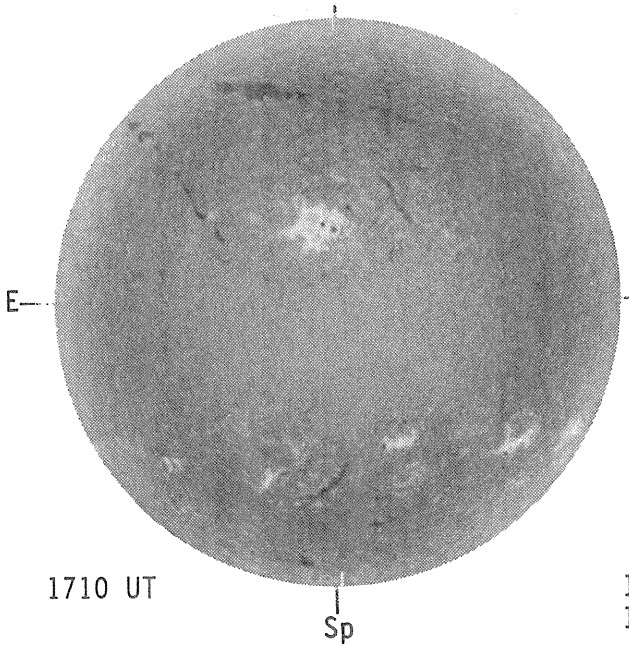
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

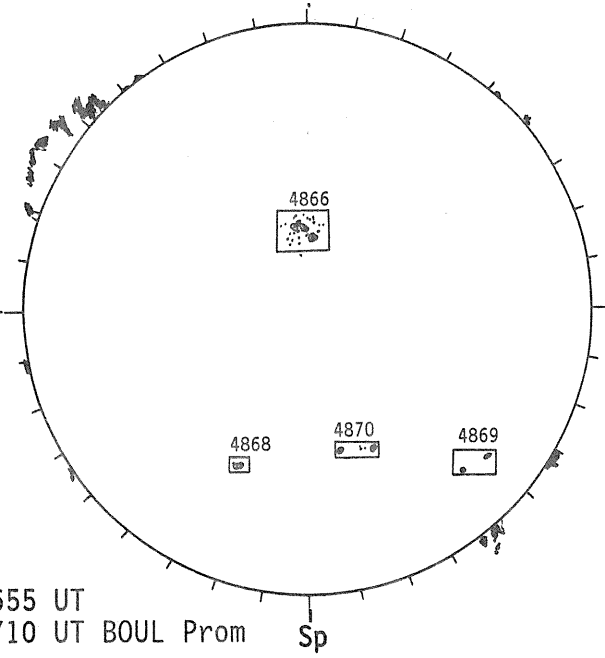
DeltaY=13.0
DeltaX= 9.6



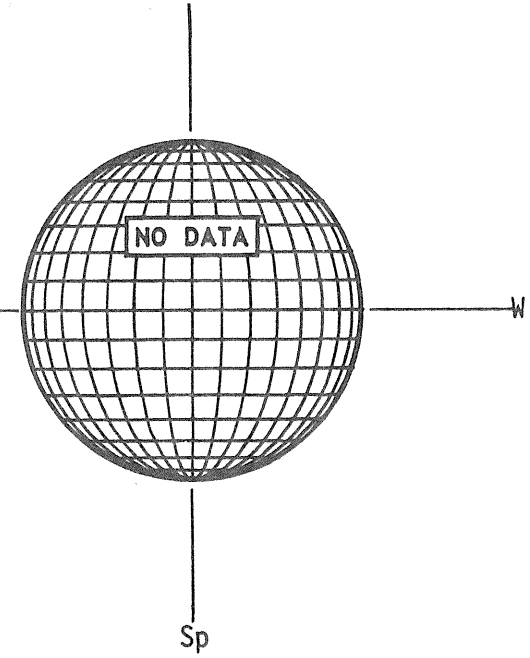
BOULDER H-ALPHA



BOULDER SUNSPOTS



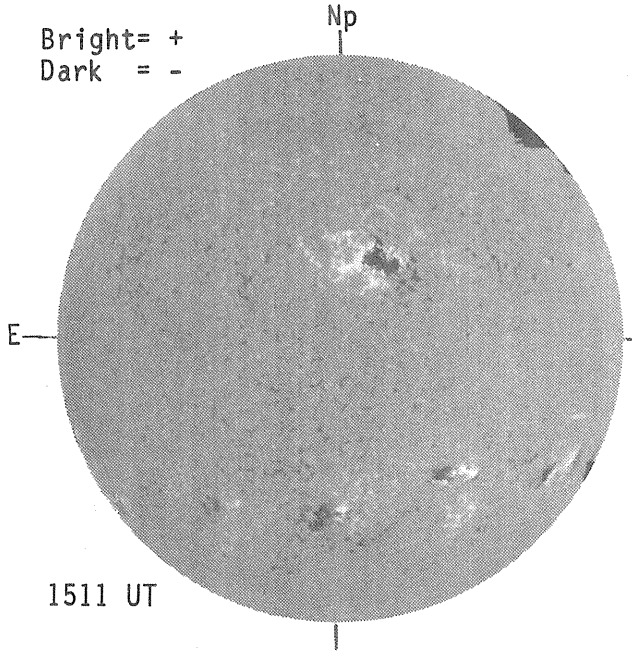
SACRAMENTO PEAK CORONA (1.15 Radii)



OCTOBER 15, 1987 (P= 26.16, B_o= 5.84, L_o= 206.55)

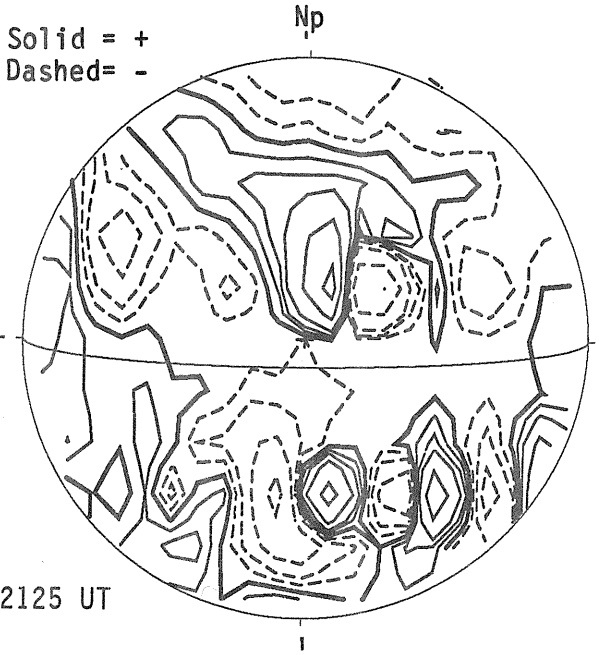
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

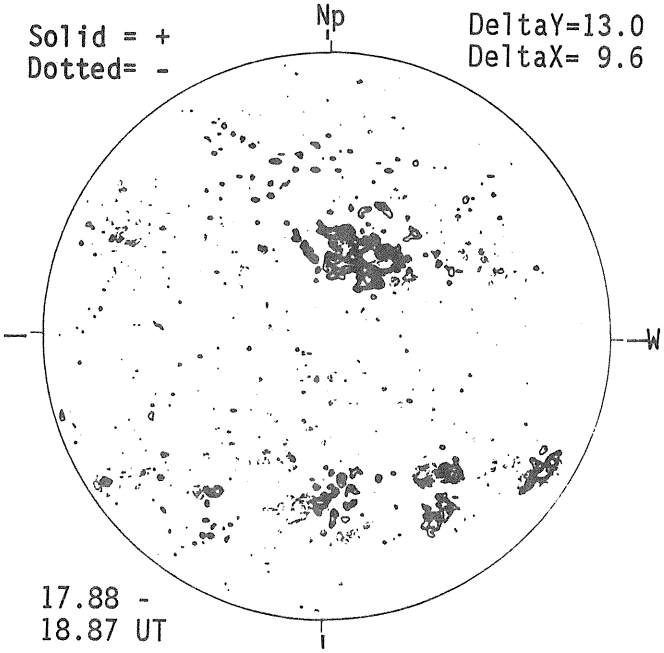
Solid = +
Dashed= -



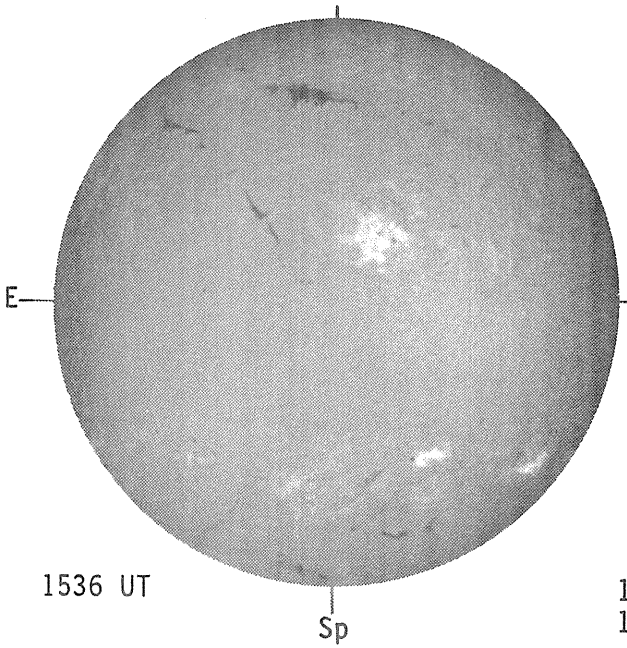
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

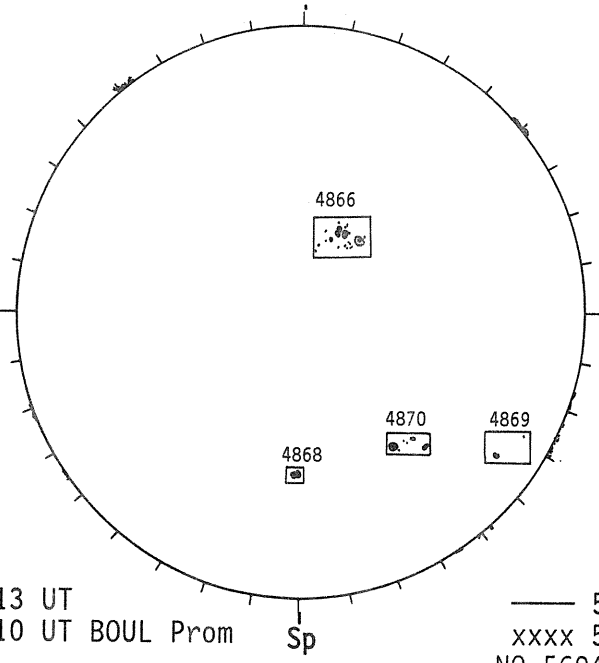
DeltaY=13.0
DeltaX= 9.6



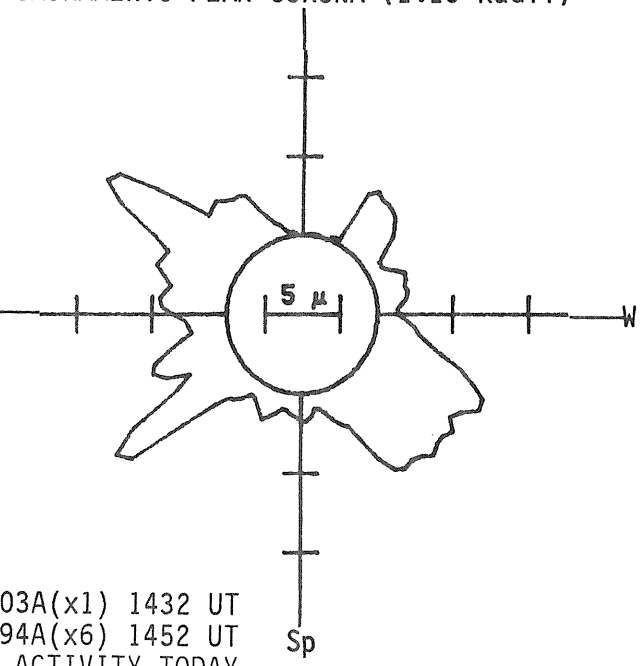
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

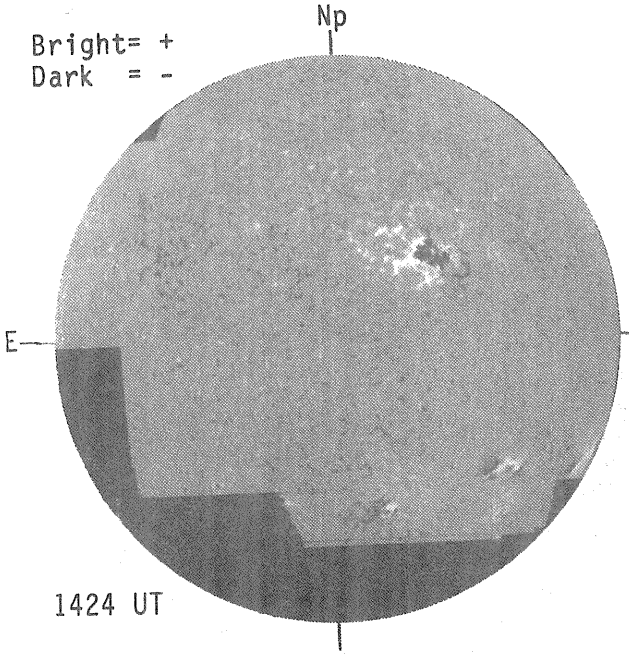


—— 5303A(x1) 1432 UT
xxxx 5694A(x6) 1452 UT
NO 5694A ACTIVITY TODAY

OCTOBER 16, 1987 (P= 26.12, B_0= 5.76, L_0= 193.36)

KITT PEAK MAGNETOGRAM

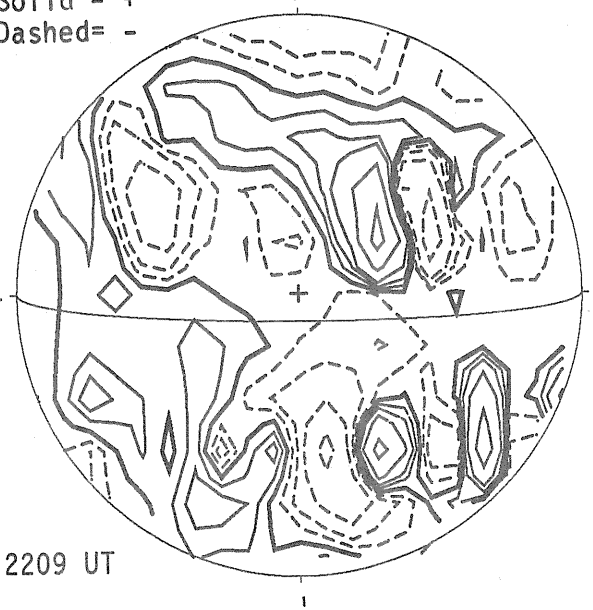
Bright= +
Dark = -



1424 UT

STANFORD MAGNETOGRAM

Solid = +
Dashed= -

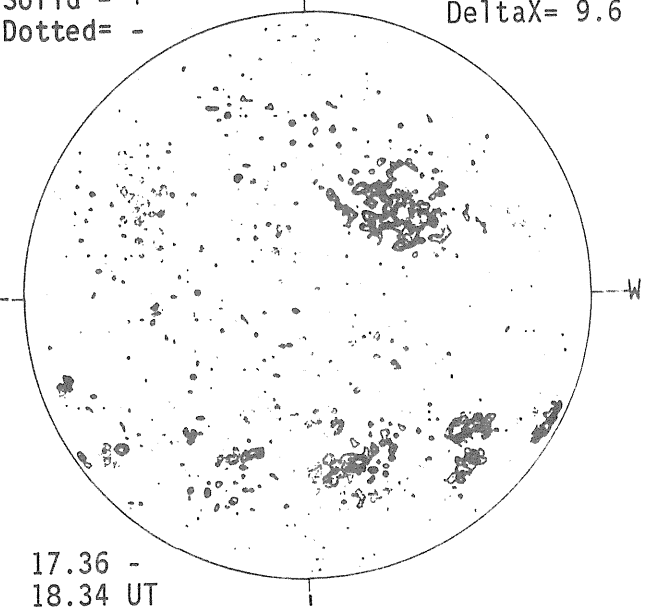


2209 UT

MT. WILSON MAGNETOGRAM

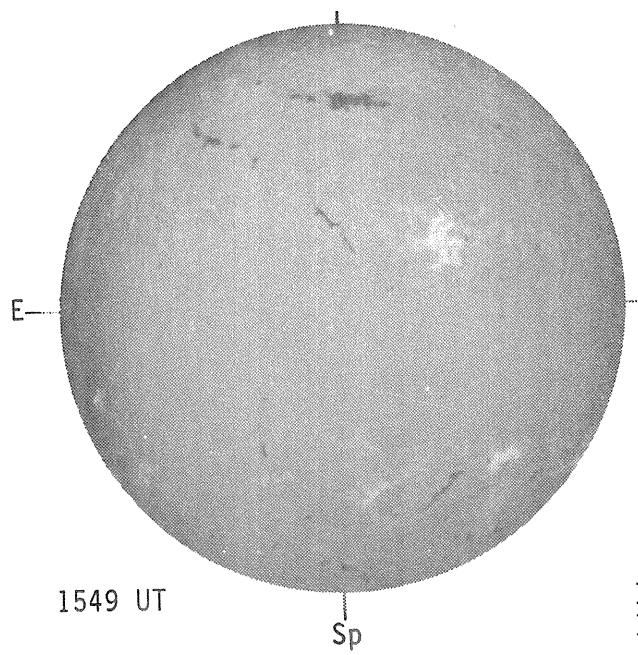
Solid = +
Dotted= -

DeltaY=13.0
DeltaX= 9.6



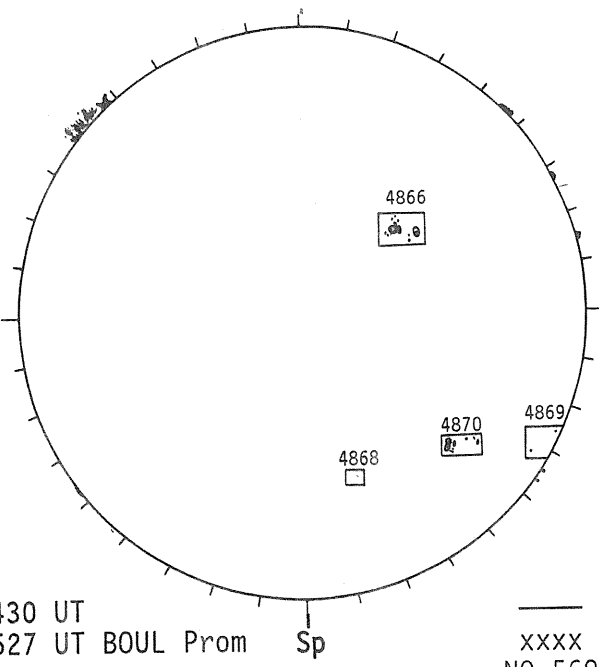
17.36 -
18.34 UT

SACRAMENTO PEAK H-ALPHA



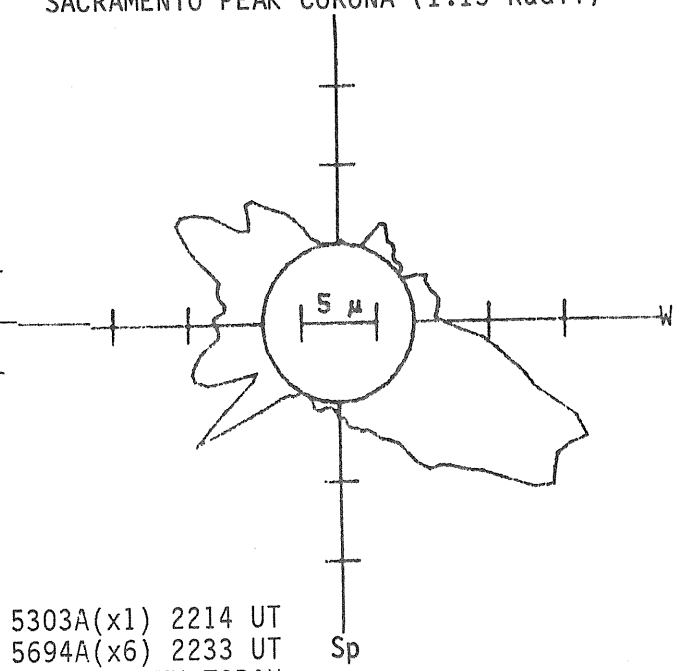
1549 UT

BOULDER SUNSPOTS



1430 UT
1527 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)

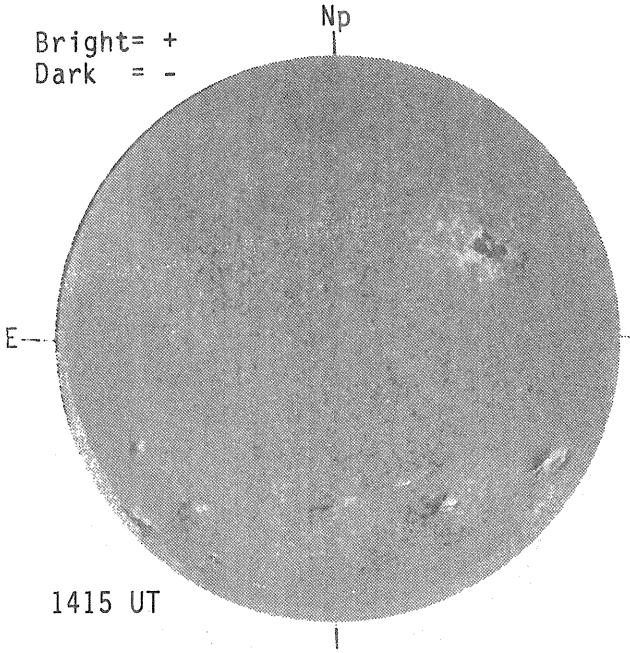


—— 5303A(x1) 2214 UT
xxxx 5694A(x6) 2233 UT
NO 5694A ACTIVITY TODAY

OCTOBER 17, 1987 (P= 26.08, B_o= 5.69, L_o= 180.17)

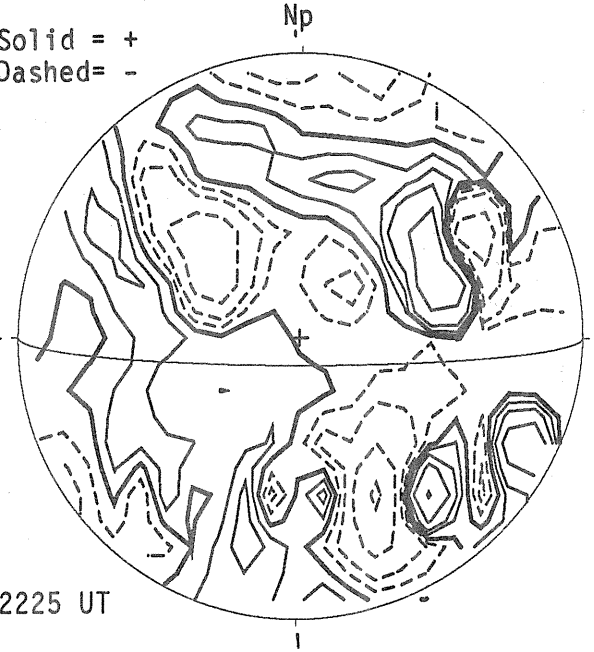
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

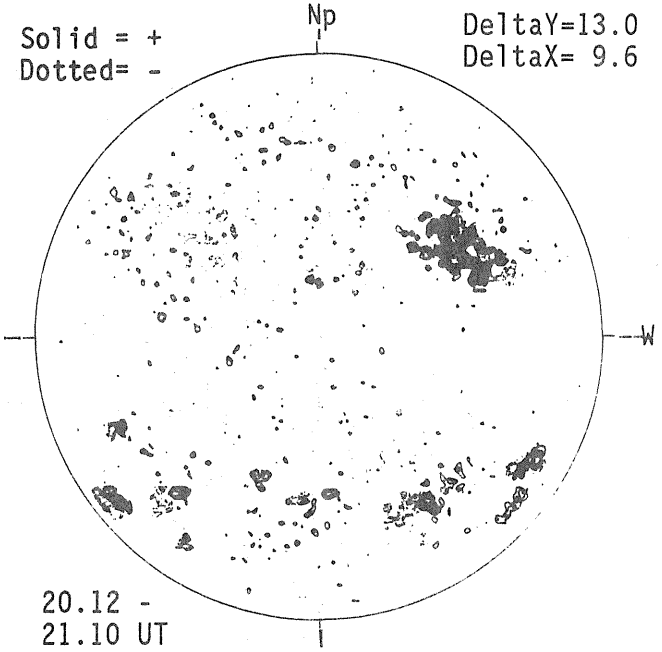
Solid = +
Dashed= -



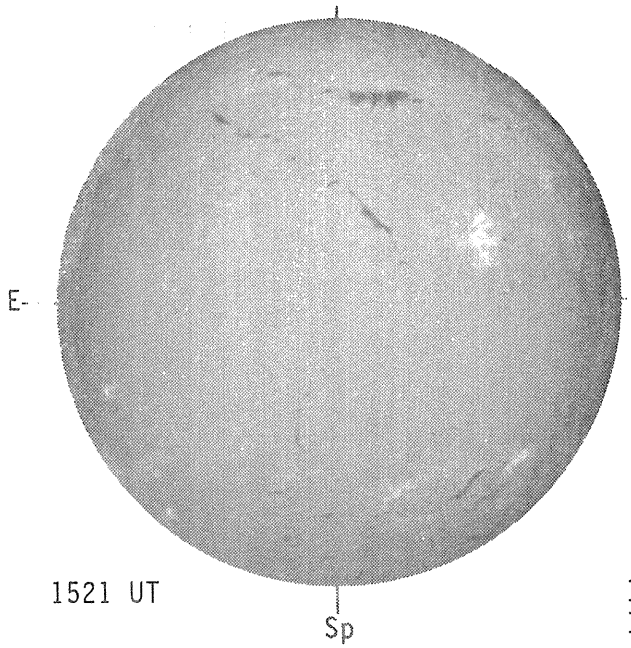
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

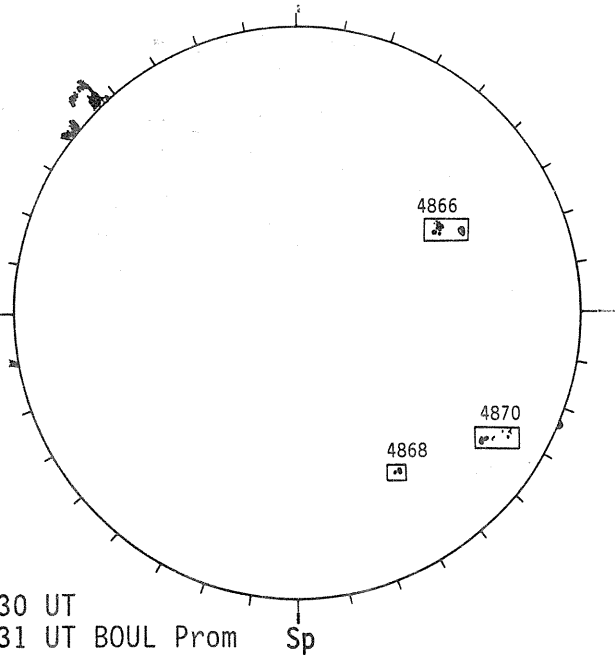
DeltaY=13.0
DeltaX= 9.6



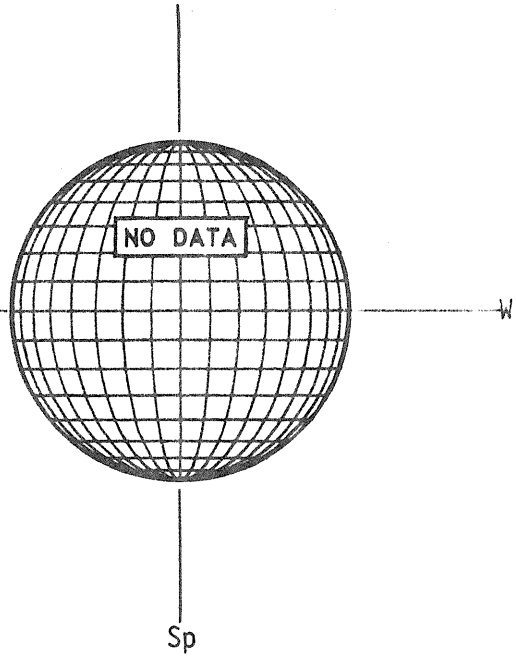
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



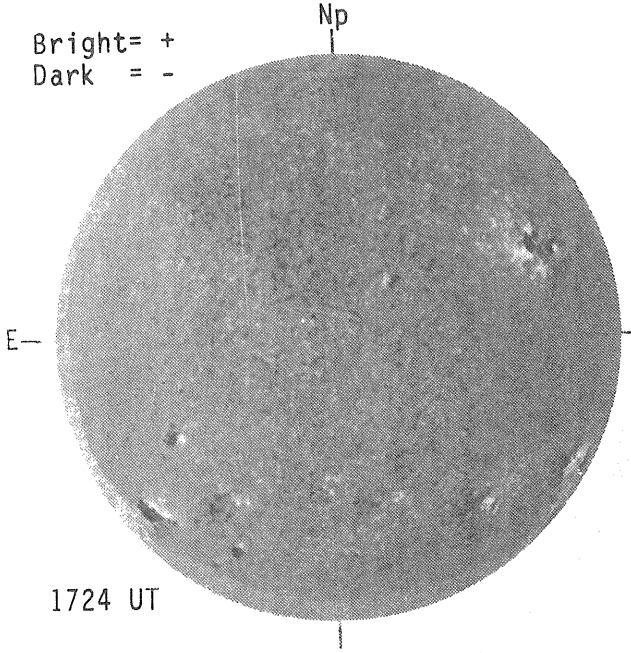
SACRAMENTO PEAK CORONA (1.15 Radii)



OCTOBER 18, 1987 (P= 26.03, B_0= 5.61, L_0= 166.98)

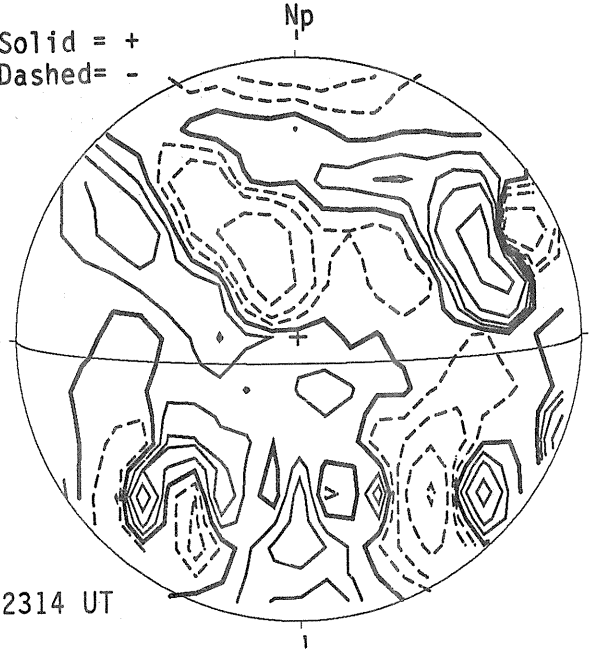
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

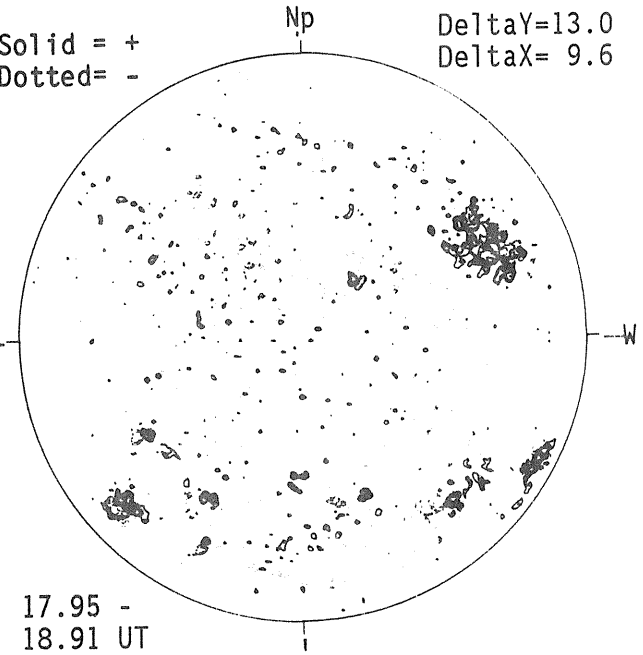
Solid = +
Dashed= -



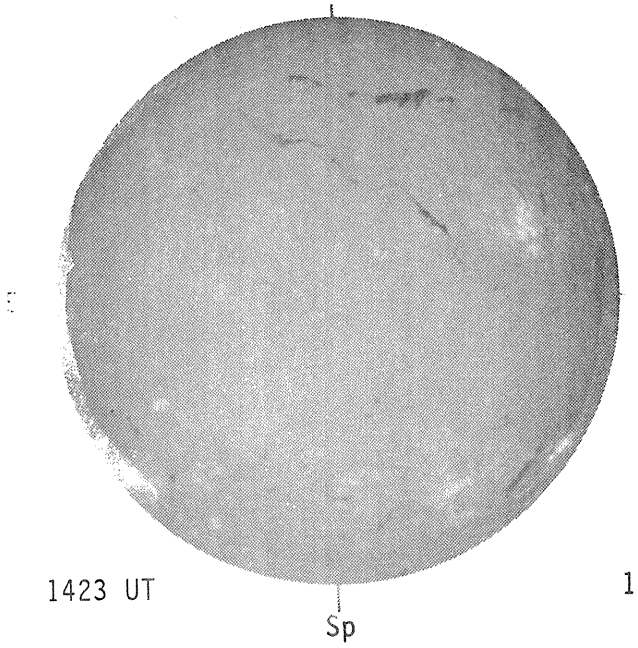
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

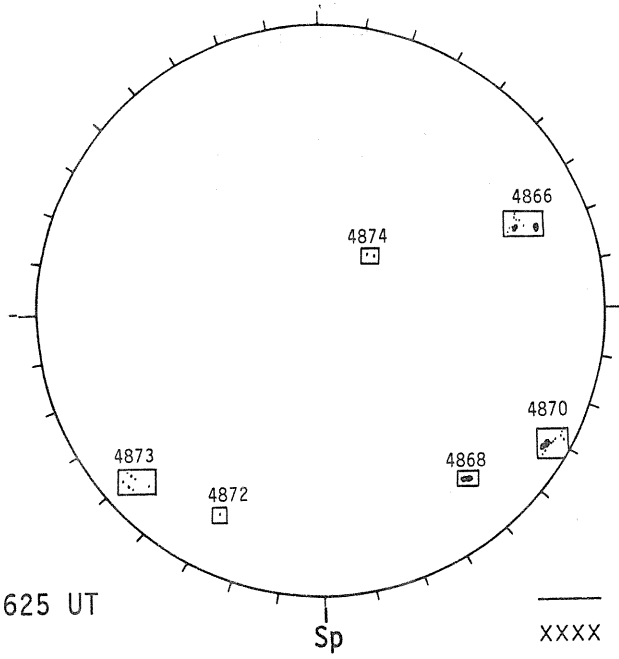
DeltaY=13.0
DeltaX= 9.6



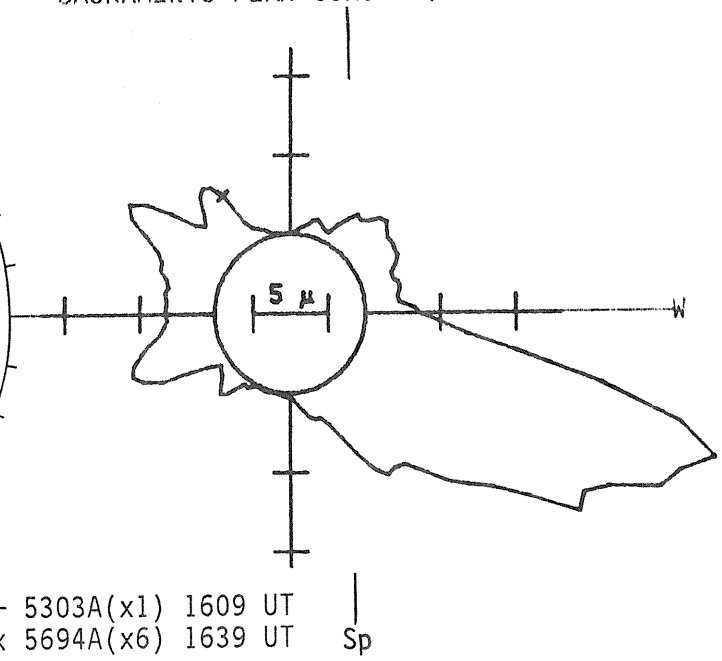
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

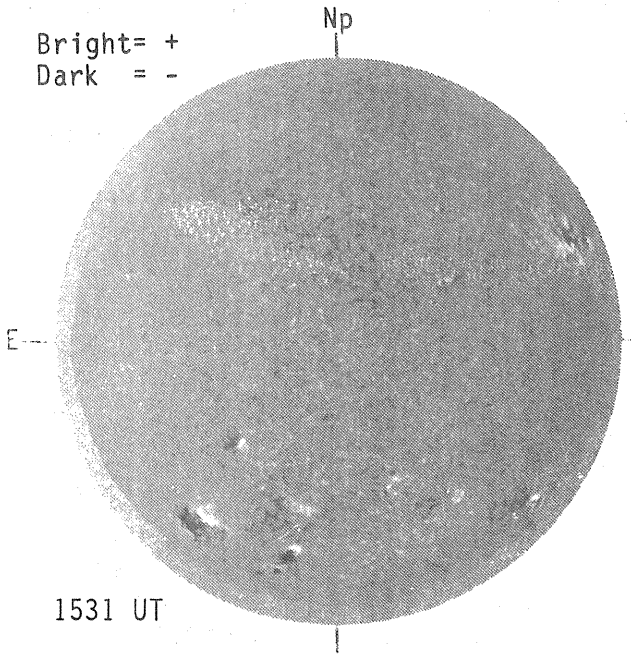


—— 5303A(x1) 1609 UT
xxxx 5694A(x6) 1639 UT

OCTOBER 19, 1987 (P= 25.97, B_0= 5.54, L_0= 153.79)

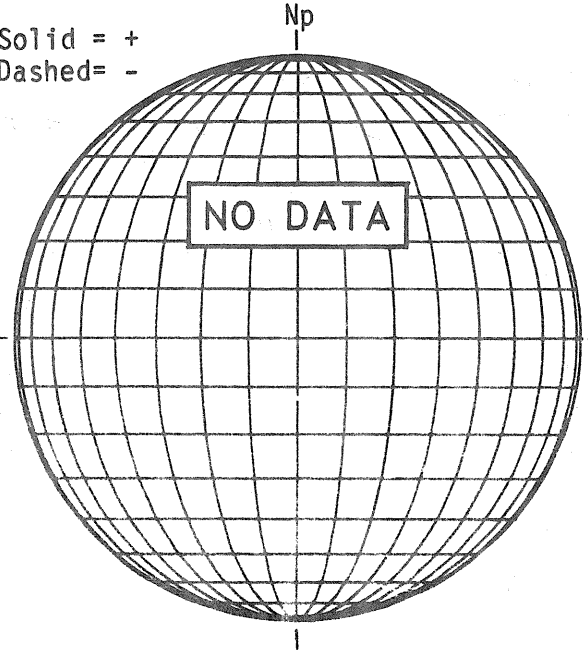
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



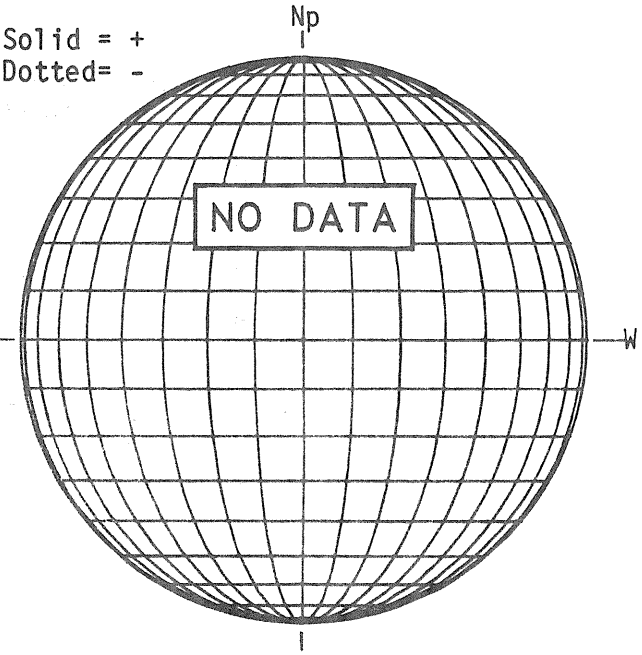
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

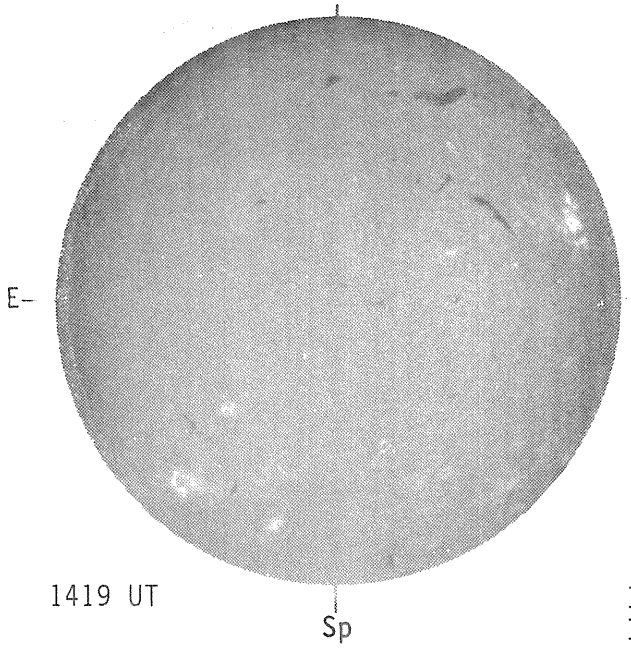


MT. WILSON MAGNETOGRAM

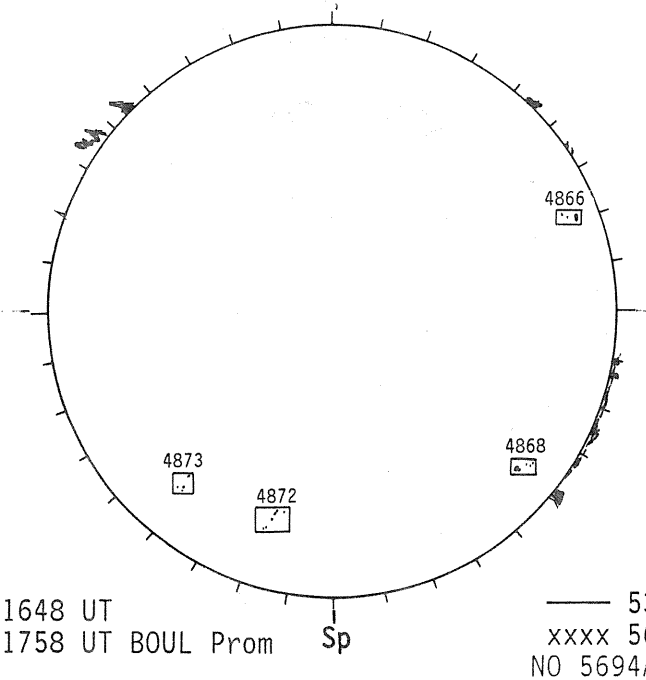
Solid = +
Dotted= -



SACRAMENTO PEAK H-ALPHA

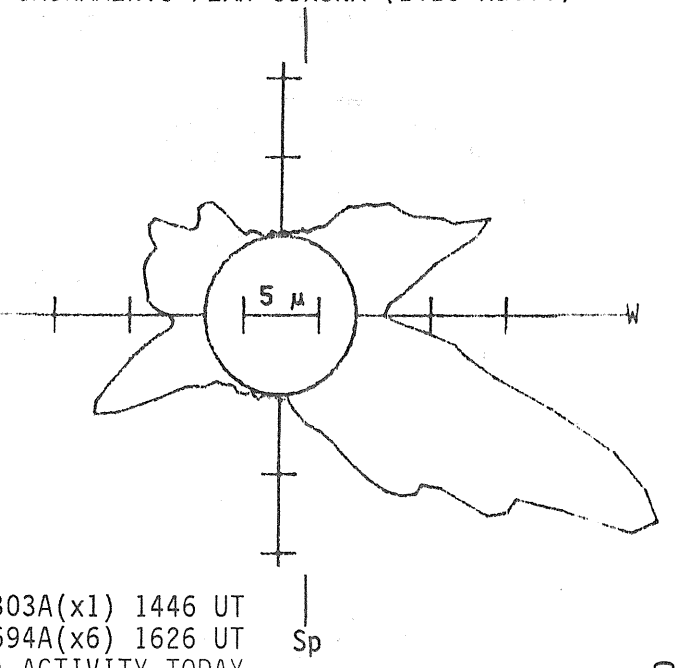


BOULDER SUNSPOTS



1648 UT
1758 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)

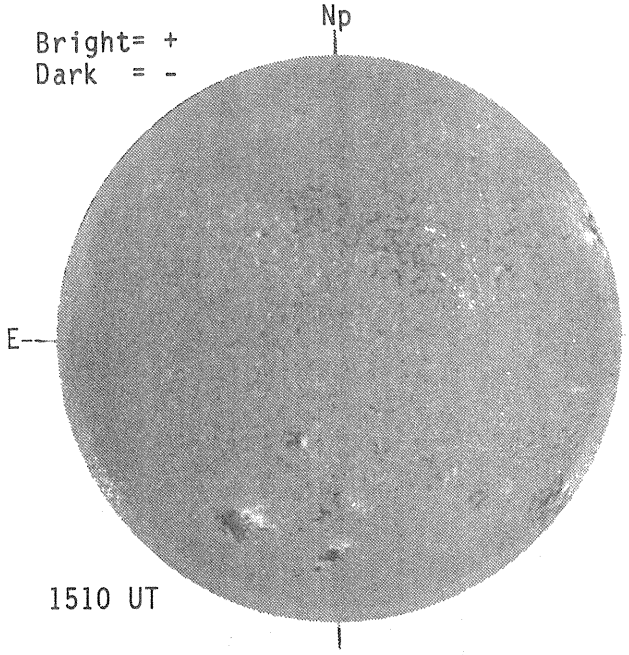


—— 5303A(x1) 1446 UT
xxxx 5694A(x6) 1626 UT
NO 5694A ACTIVITY TODAY

OCTOBER 20, 1987 (P= 25.90, B_o= 5.46, L_o= 140.60)

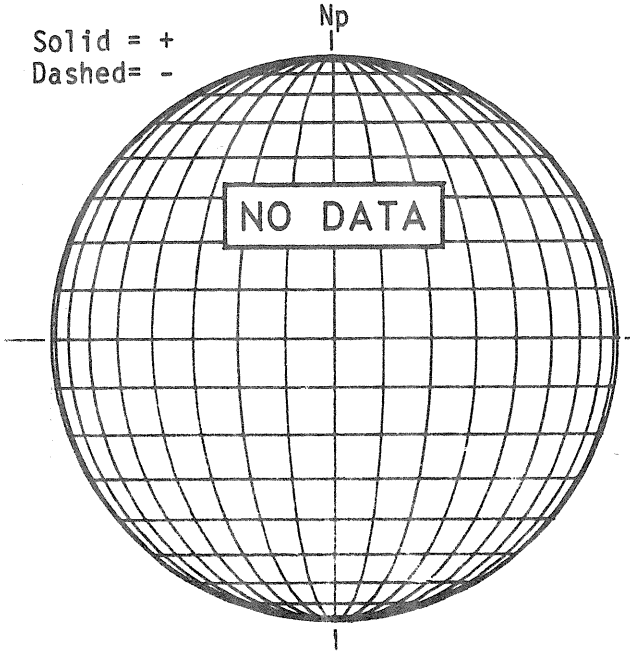
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



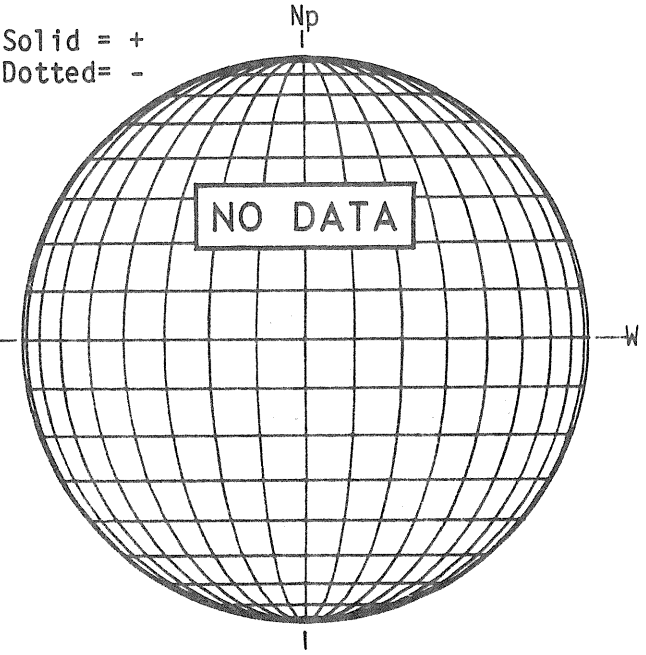
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

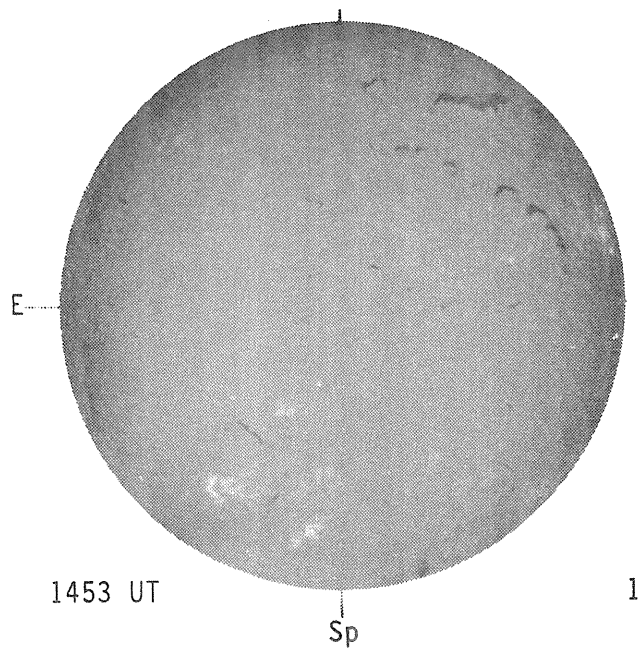


MT. WILSON MAGNETOGRAM

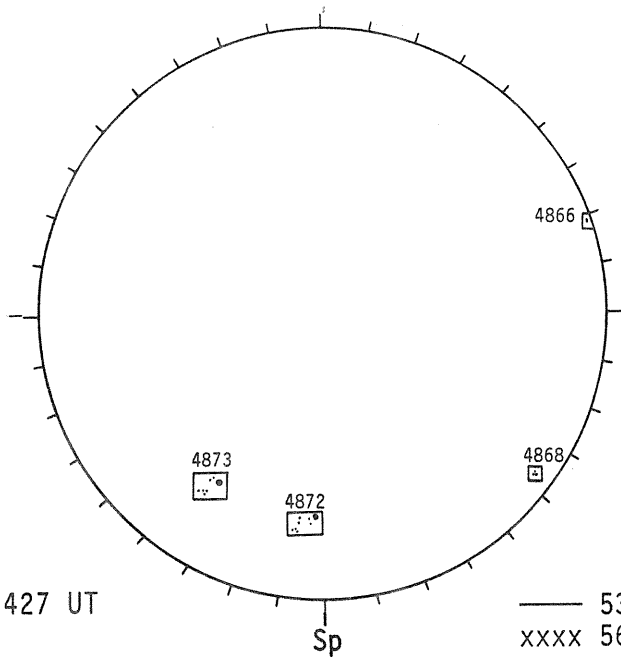
Solid = +
Dotted= -



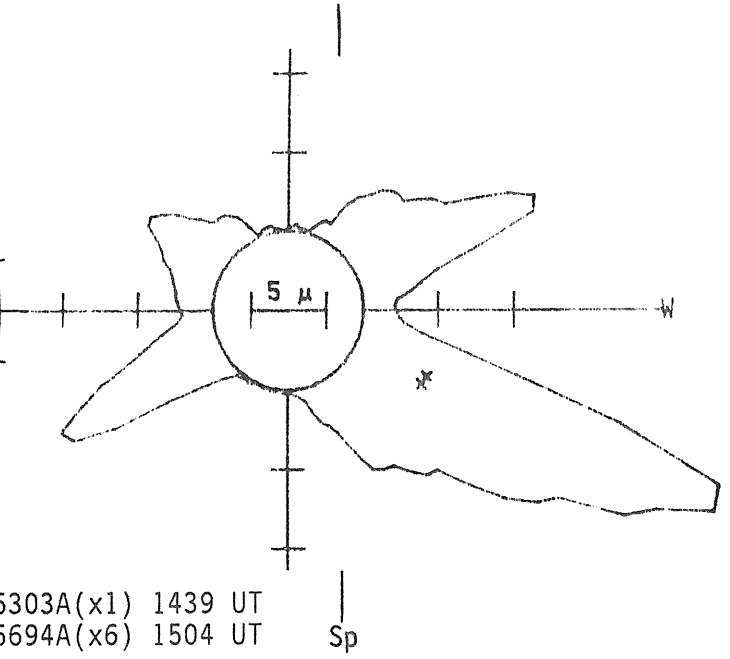
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

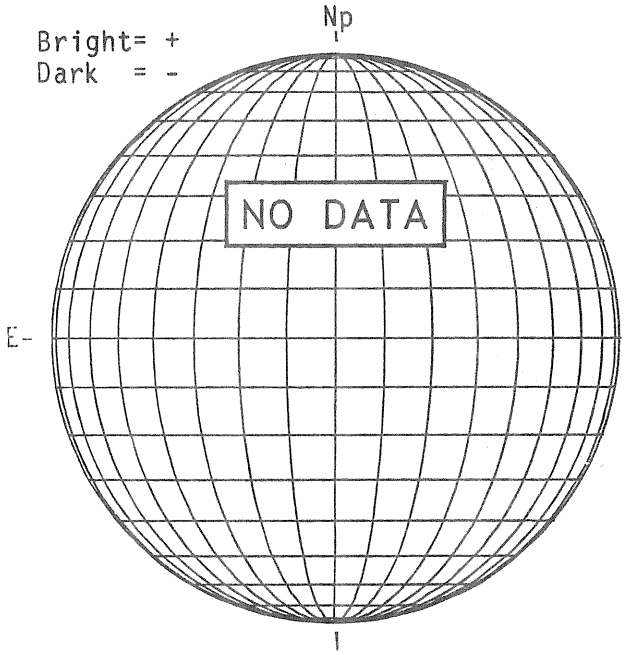


—— 5303A(x1) 1439 UT
xxxx 5694A(x6) 1504 UT

OCTOBER 21, 1987 (P= 25.83, B_o= 5.38, L_o= 127.41)

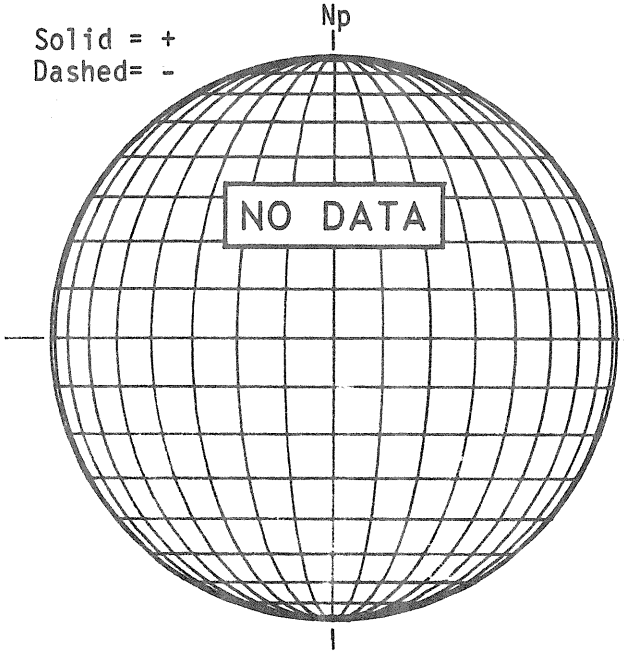
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



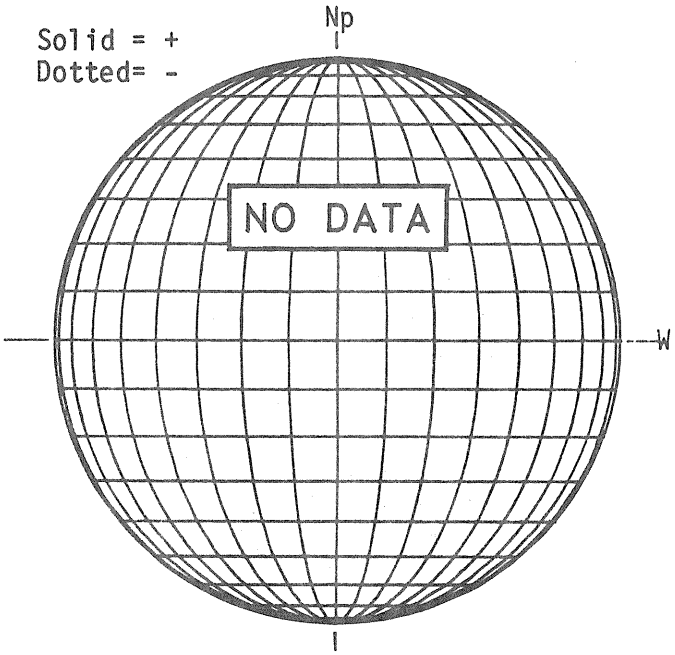
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

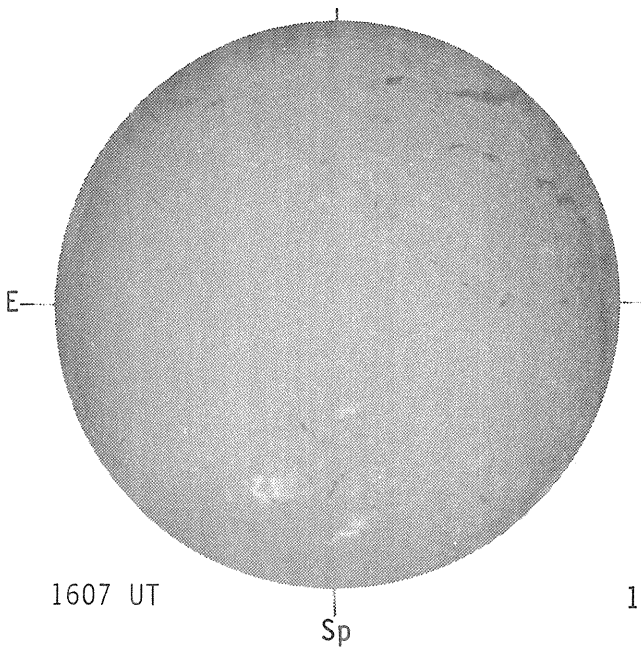


MT. WILSON MAGNETOGRAM

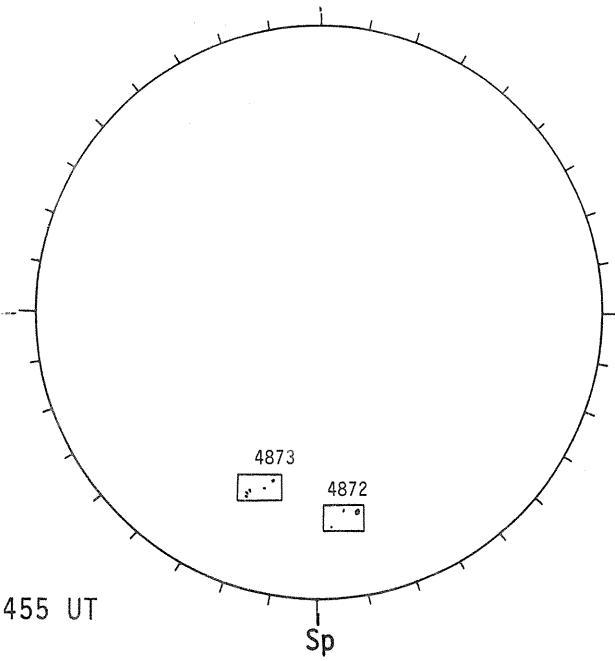
Solid = +
Dotted= -



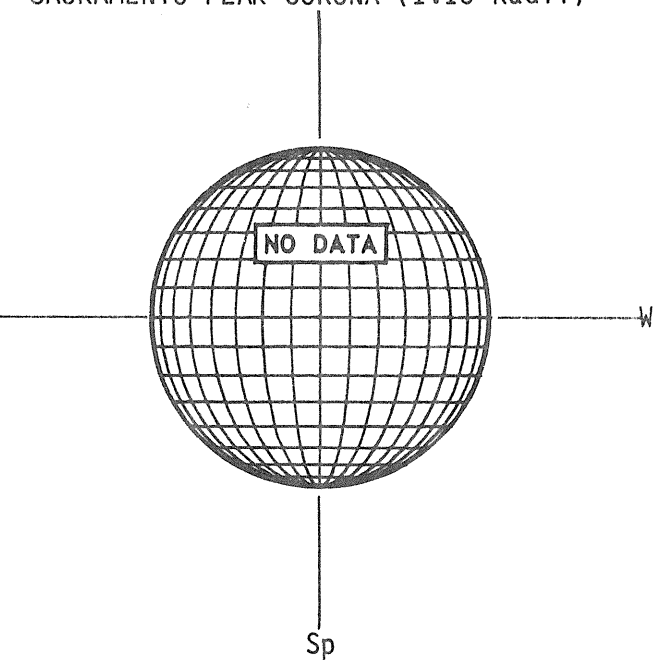
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



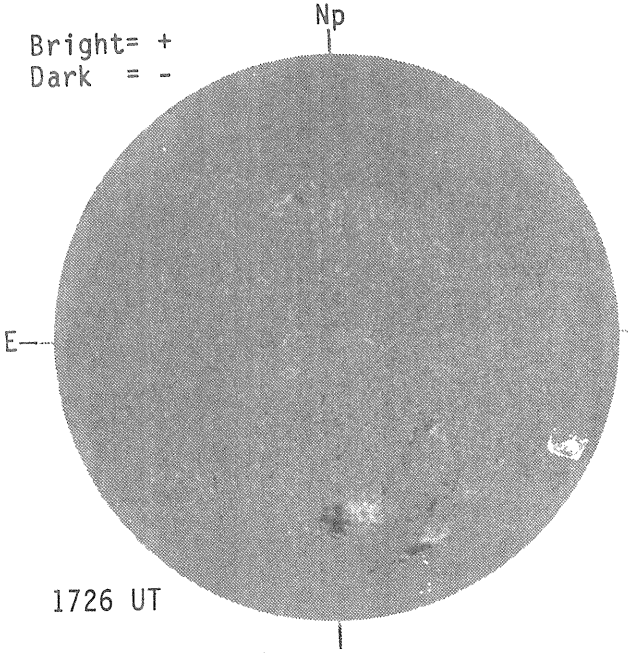
SACRAMENTO PEAK CORONA (1.15 Radii)



OCTOBER 22, 1987 (P= 25.75, B_o= 5.29, L_o= 114.23)

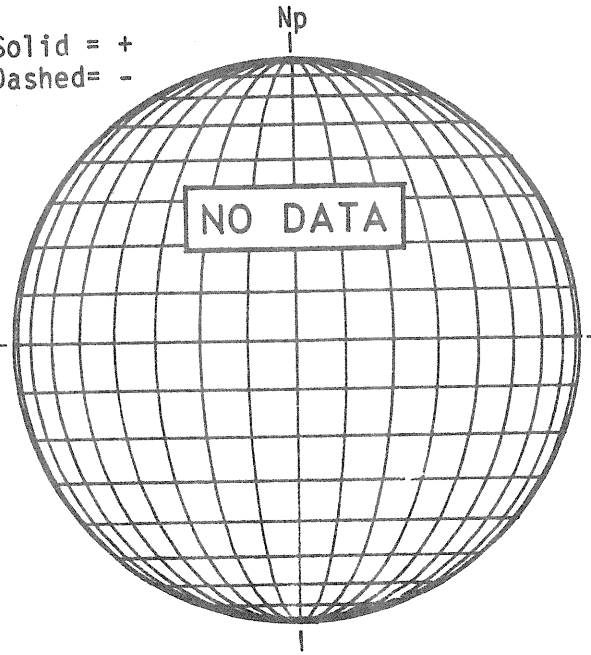
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



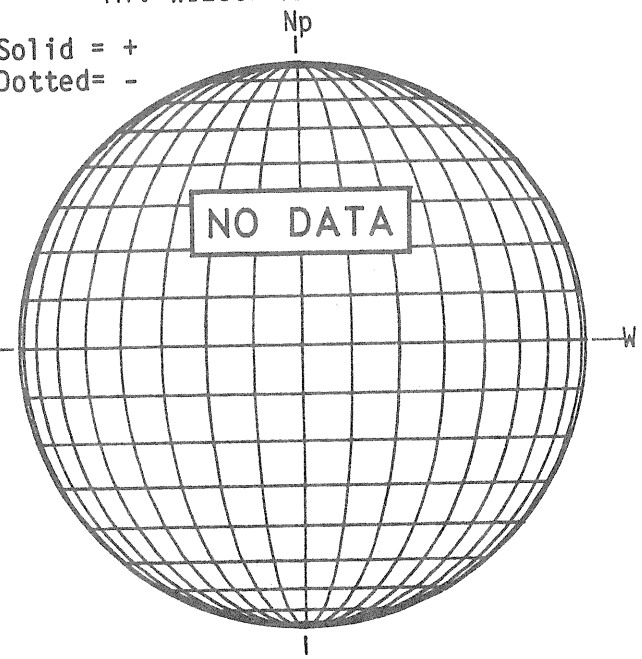
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

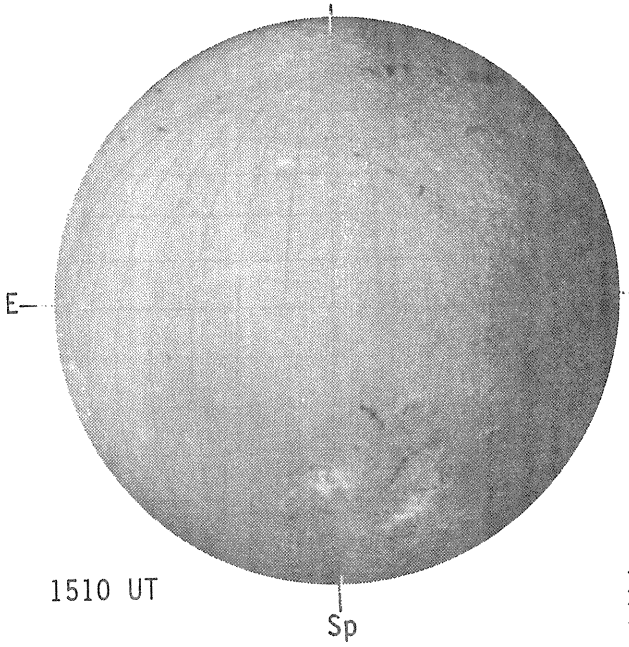


MT. WILSON MAGNETOGRAM

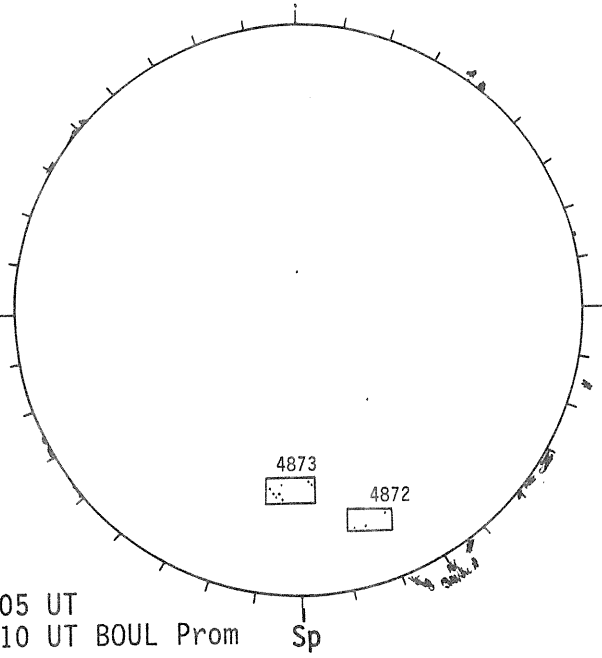
Solid = +
Dotted= -



BOULDER H-ALPHA

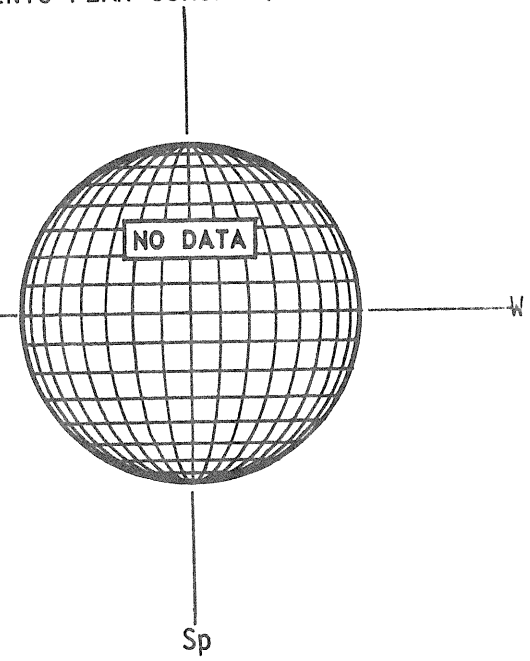


RAMEY SUNSPOTS

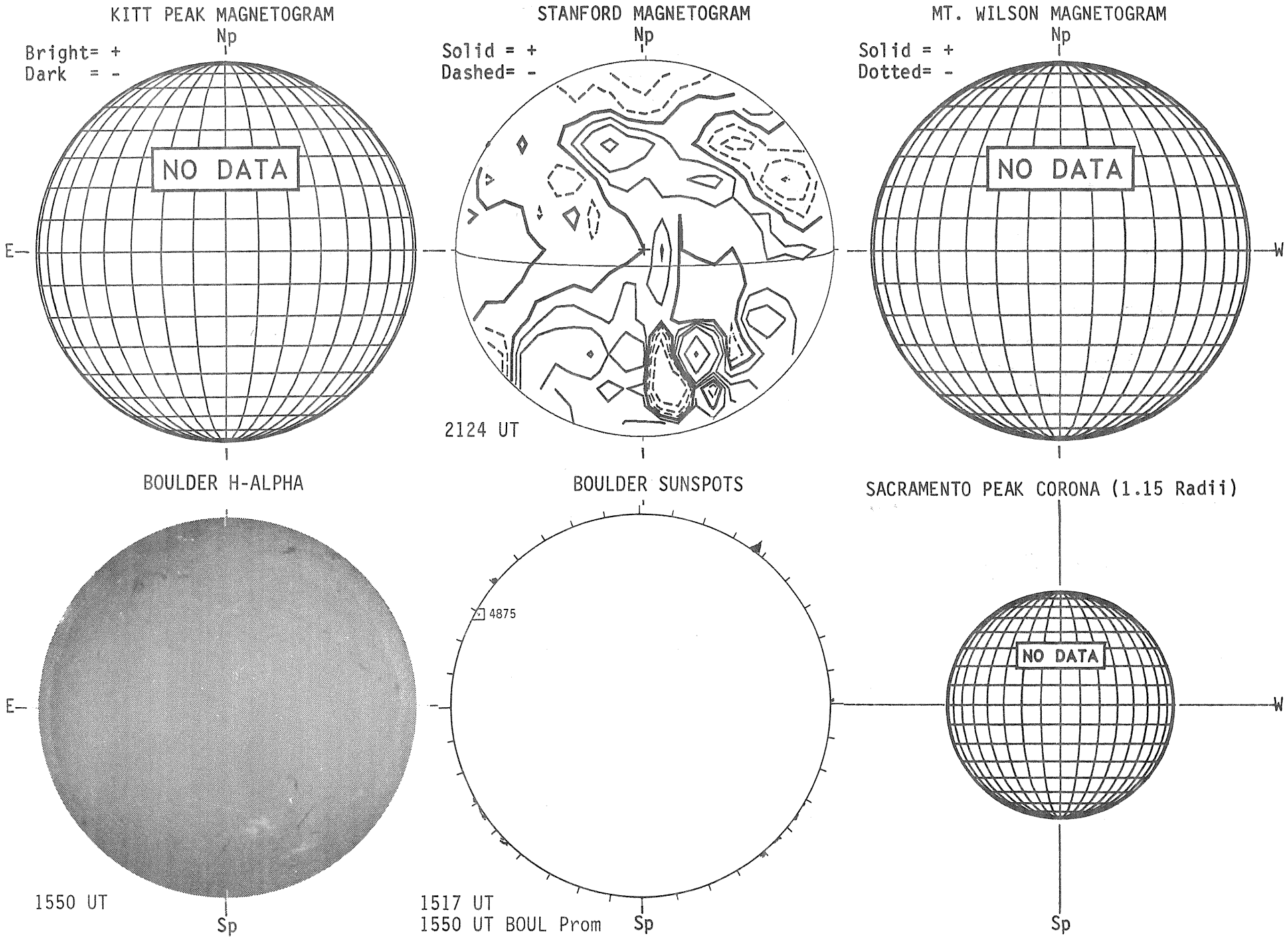


1305 UT
1510 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



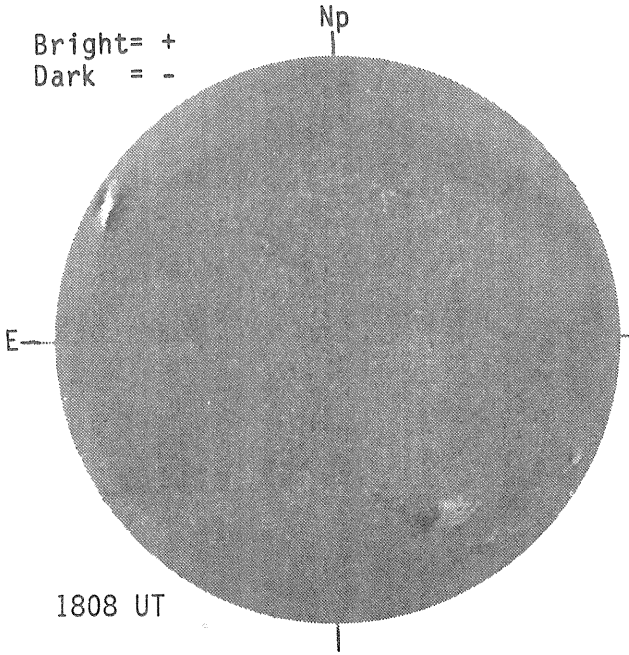
OCTOBER 23, 1987 (P= 25.66, B_0= 5.21, L_0= 101.04)



OCTOBER 24, 1987 (P= 25.56, B_0= 5.12, L_0= 87.85)

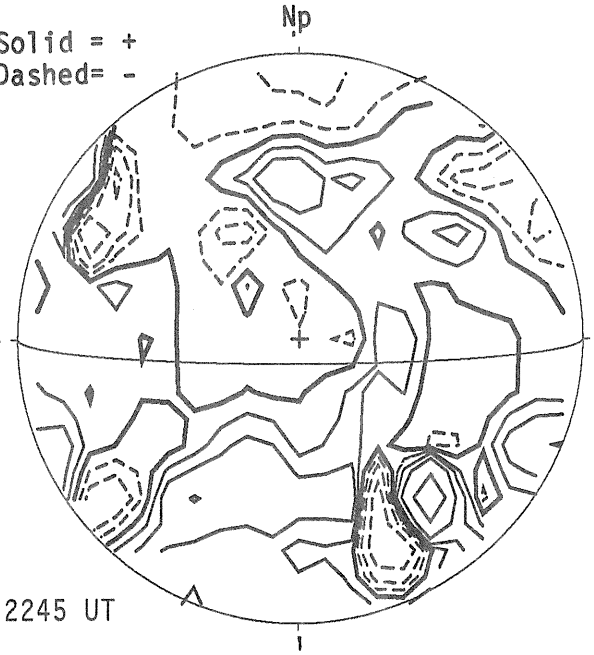
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



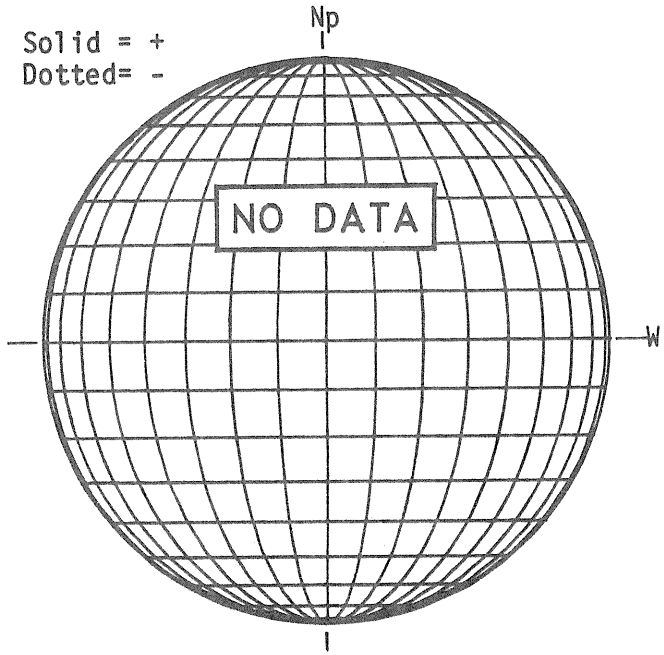
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

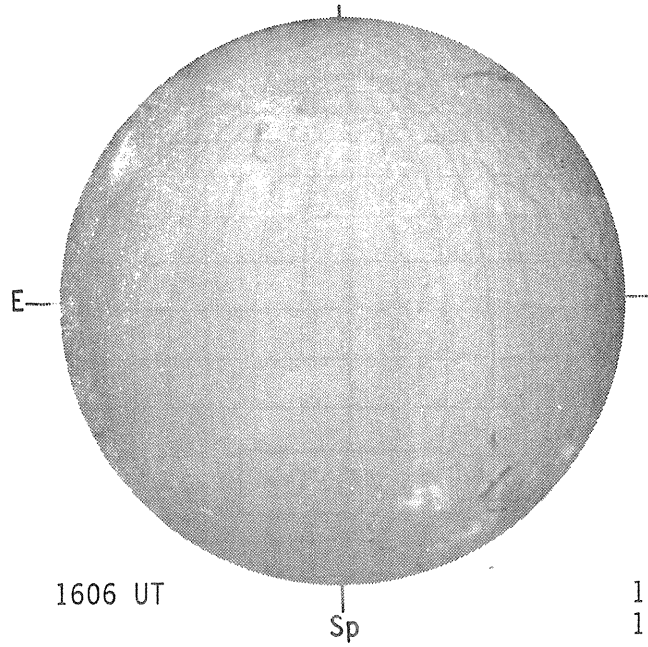


MT. WILSON MAGNETOGRAM

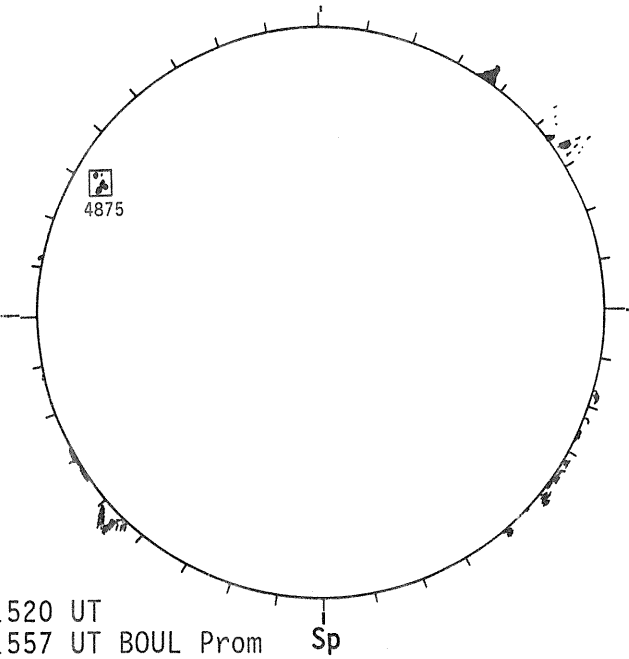
Solid = +
Dotted= -



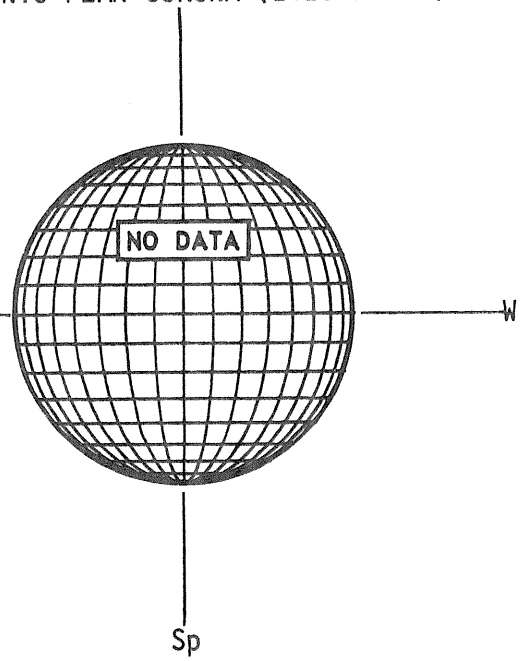
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



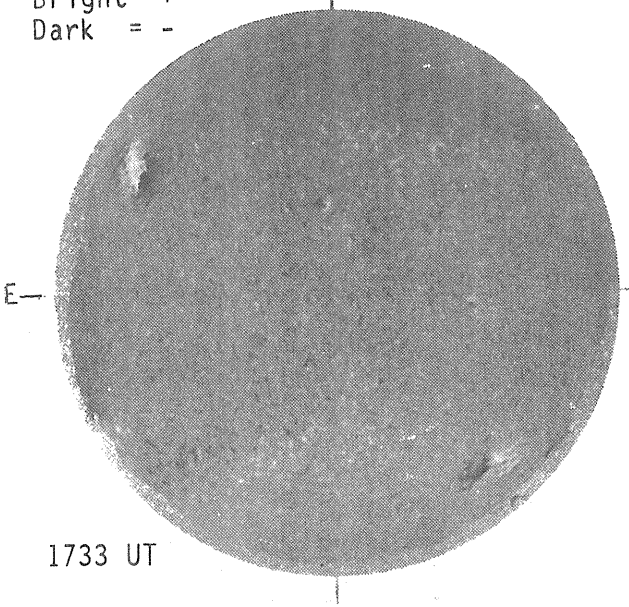
SACRAMENTO PEAK CORONA (1.15 Radii)



OCTOBER 25, 1987 (P= 25.46, B_o= 5.04, L_o= 74.66)

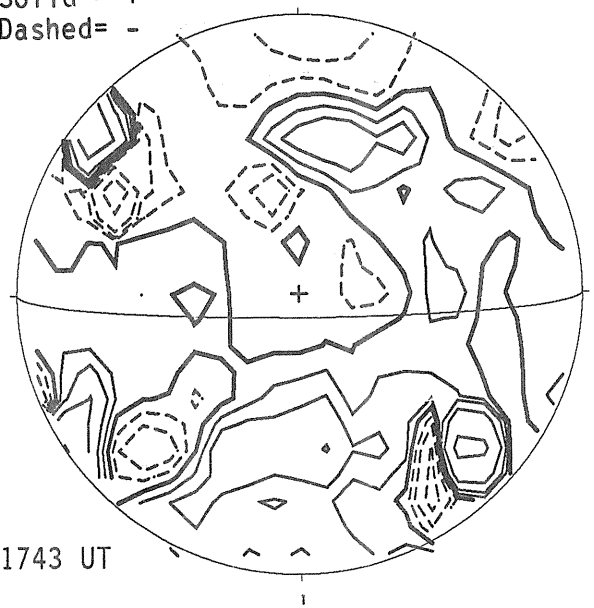
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



STANFORD MAGNETOGRAM

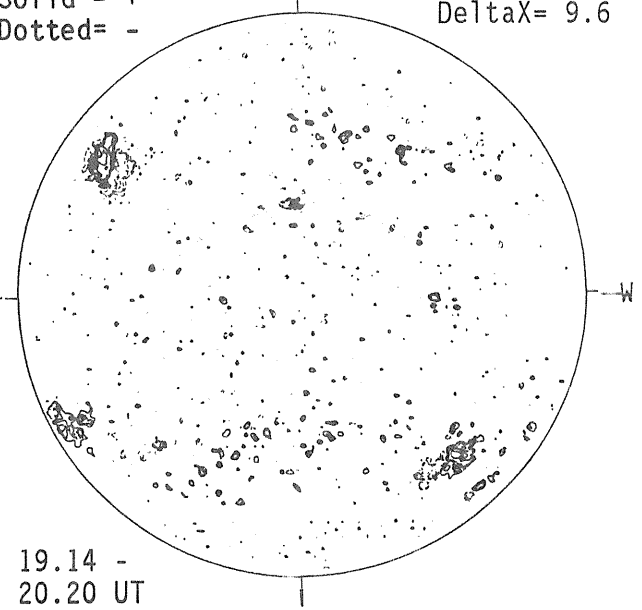
Solid = +
Dashed= -



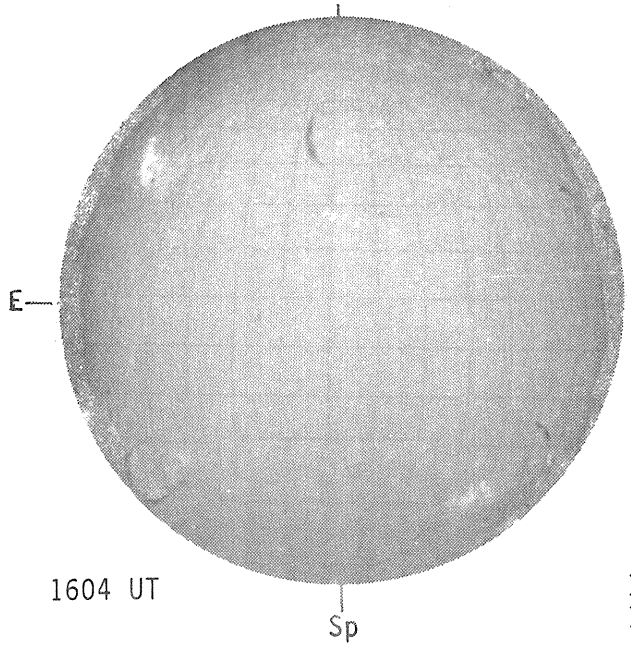
MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

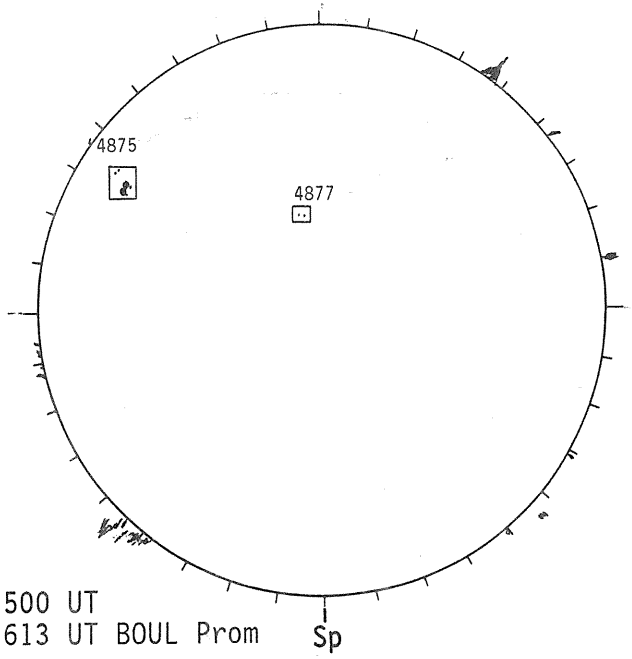
DeltaY=13.0
DeltaX= 9.6



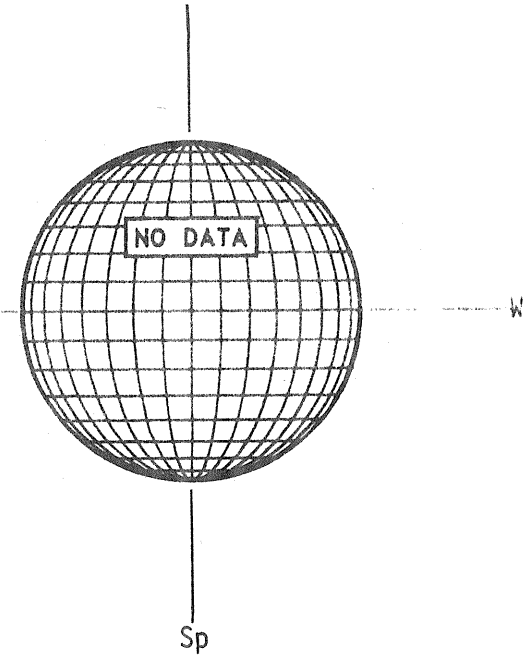
SACRAMENTO PEAK H-ALPHA



BOULDER SUNSPOTS



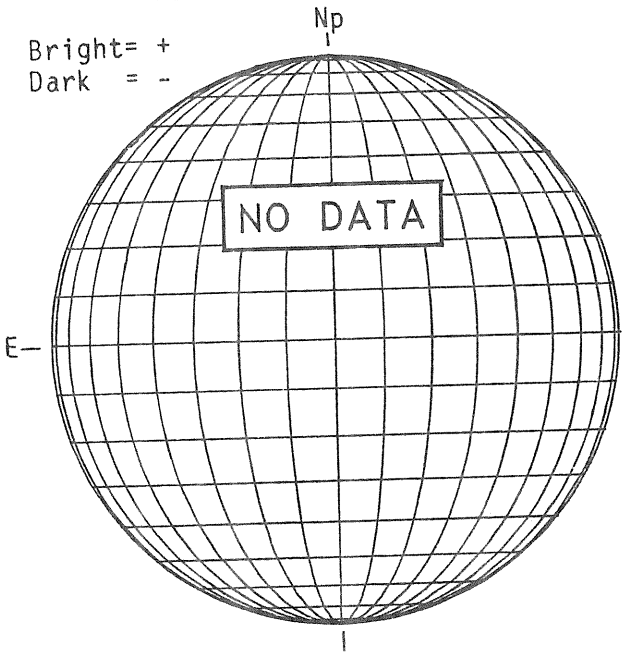
SACRAMENTO PEAK CORONA (1.15 Radii)



OCTOBER 26, 1987 (P= 25.35, B_o= 4.95, L_o= 61.47)

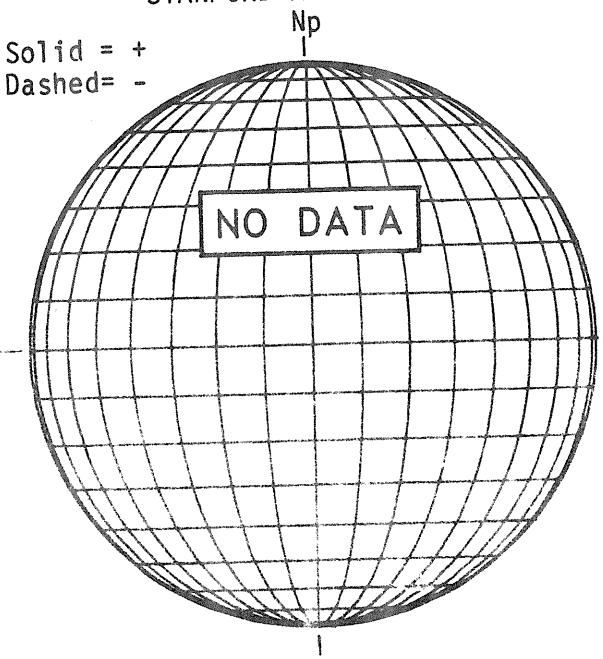
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



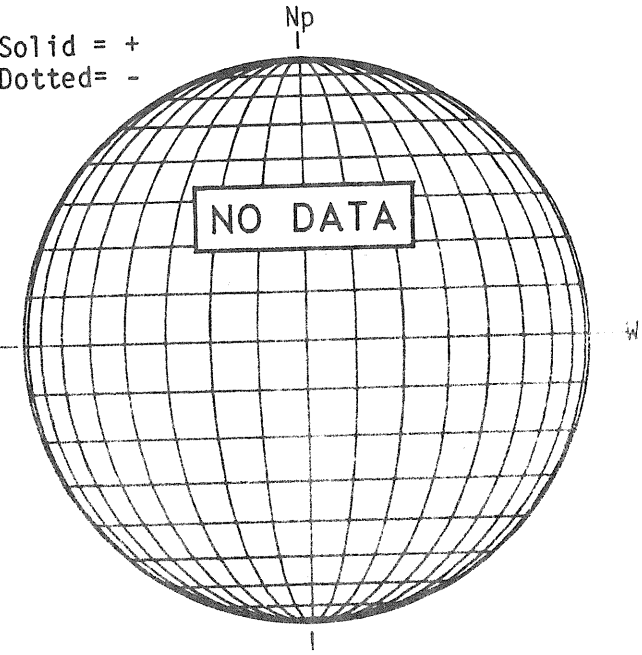
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

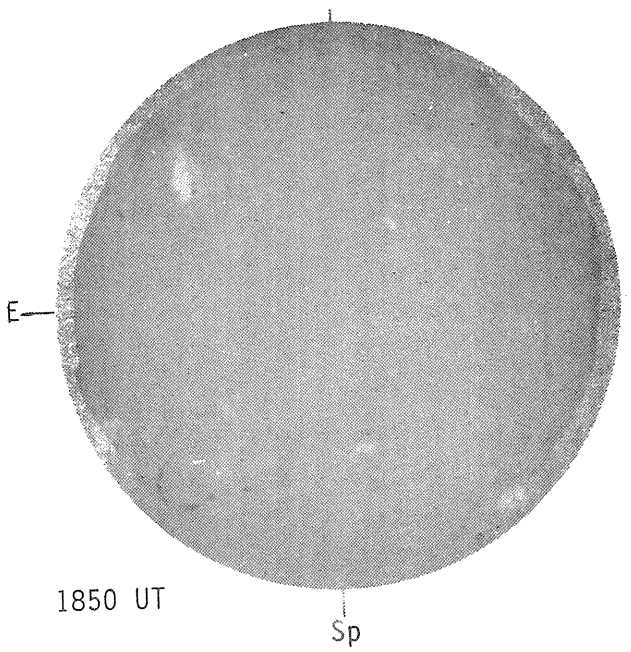


MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

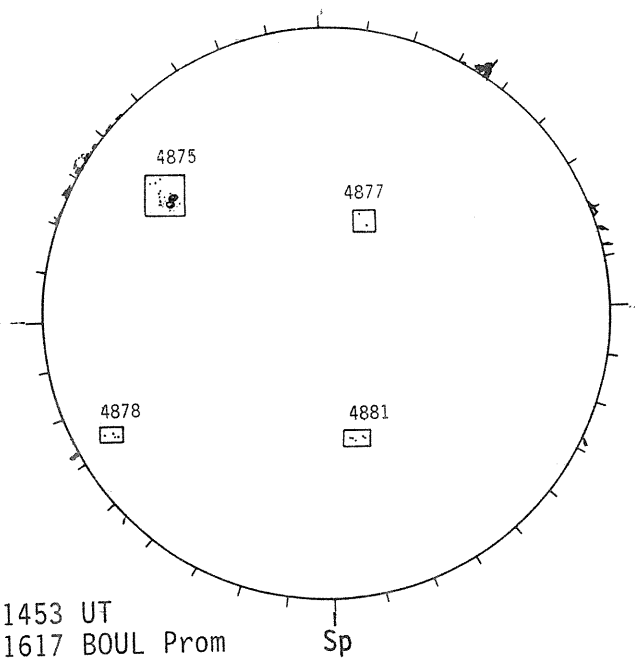


SACRAMENTO PEAK H-ALPHA



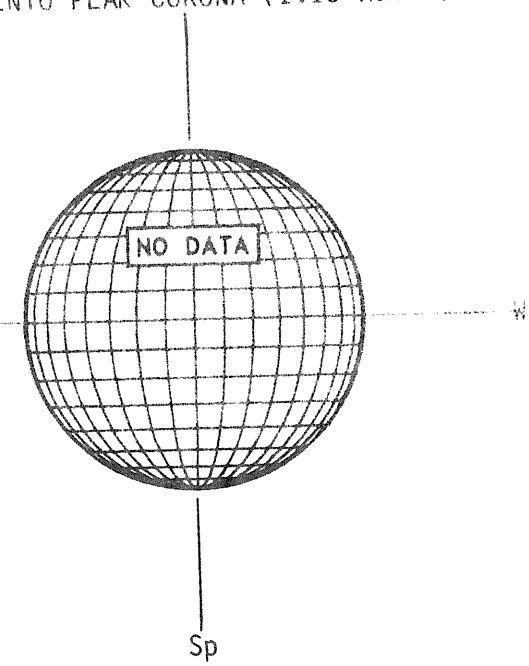
1850 UT

BOULDER SUNSPOTS



1453 UT
1617 BOUL Prom

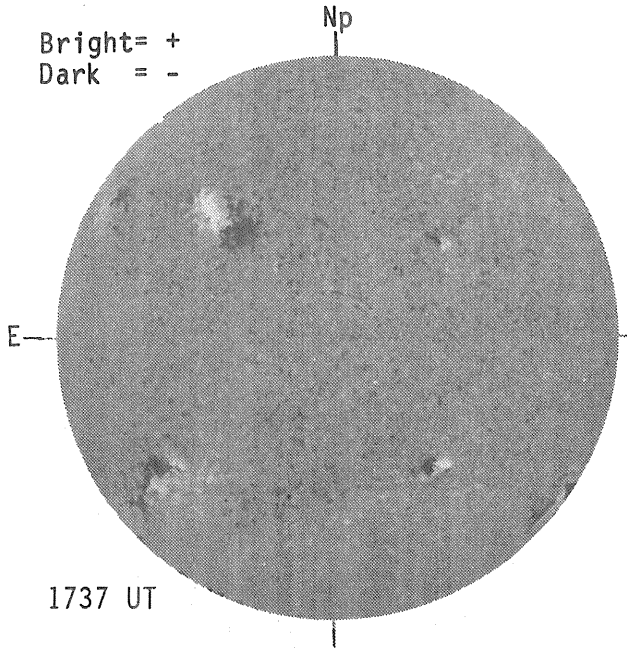
SACRAMENTO PEAK CORONA (1.15 Radii)



OCTOBER 27, 1987 (P= 25.23, B_o= 4.86, L_o= 48.29)

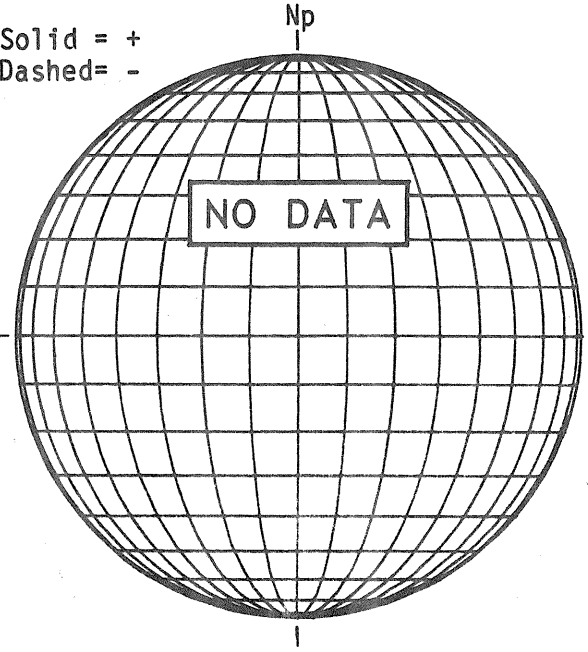
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



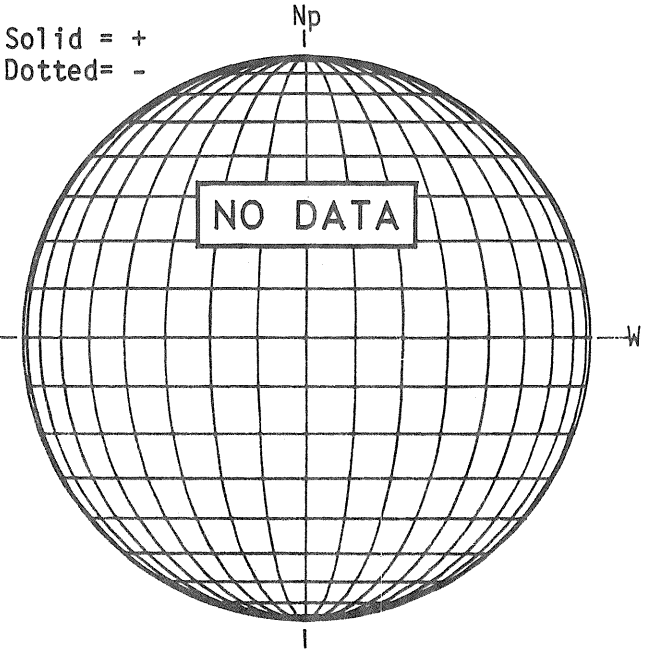
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

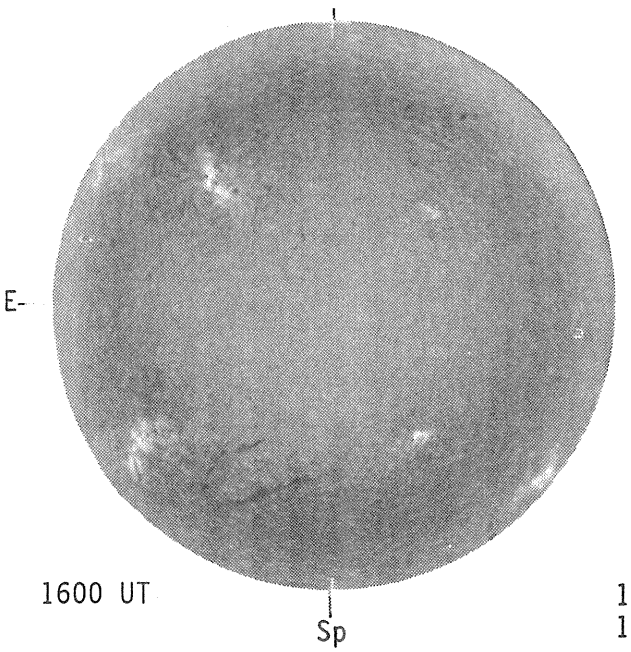


MT. WILSON MAGNETOGRAM

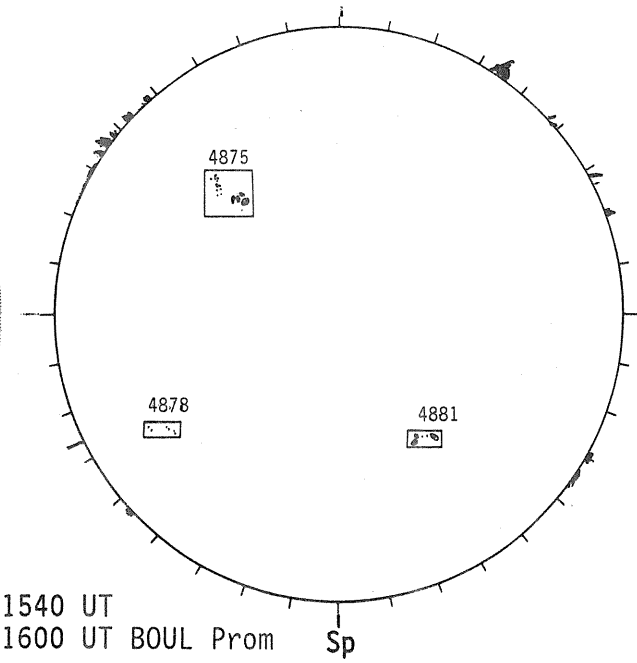
Solid = +
Dotted= -



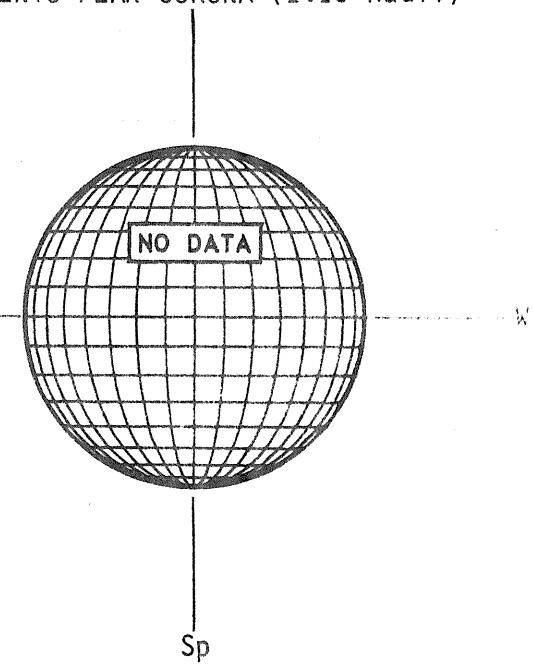
BOULDER H-ALPHA



BOULDER SUNSPOTS



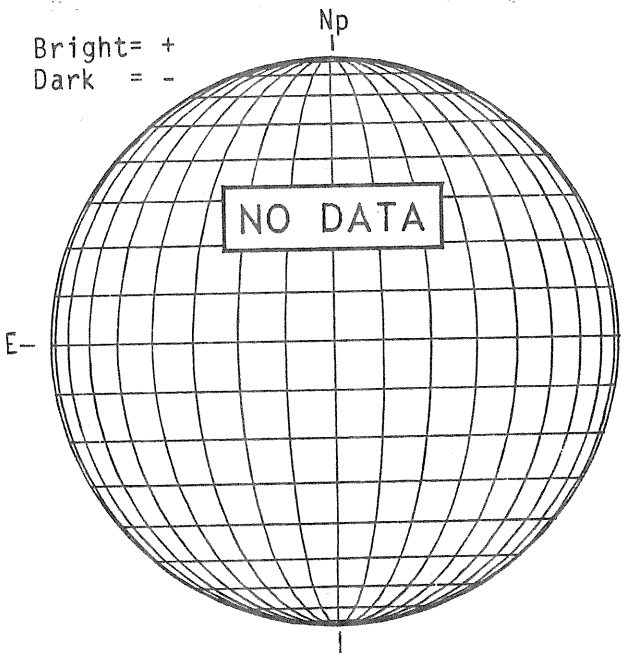
SACRAMENTO PEAK CORONA (1.15 Radii)



OCTOBER 28, 1987 (P= 25.10, B_o= 4.77, L_o= 35.10)

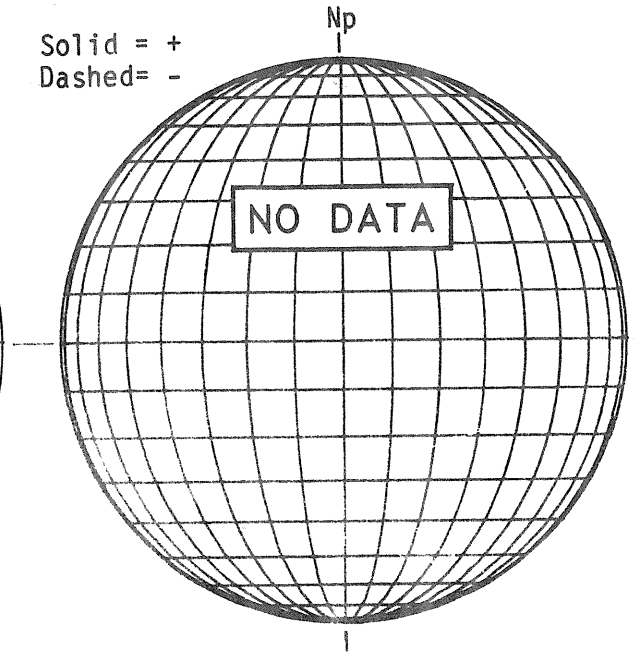
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



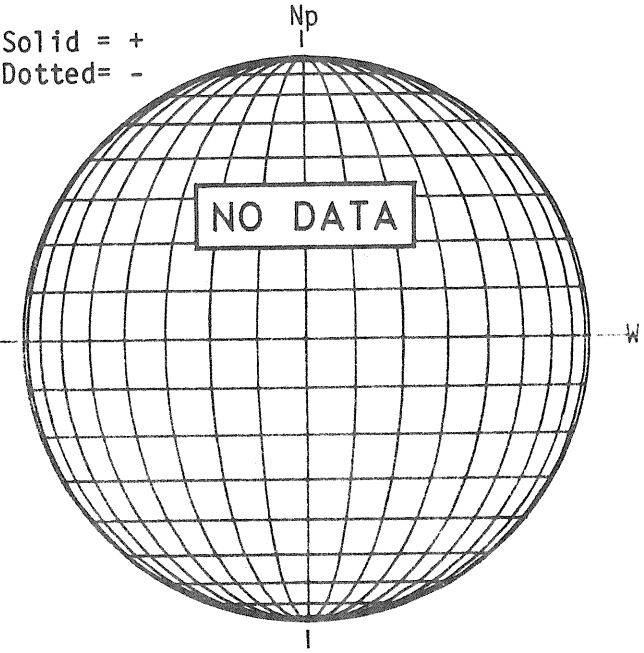
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

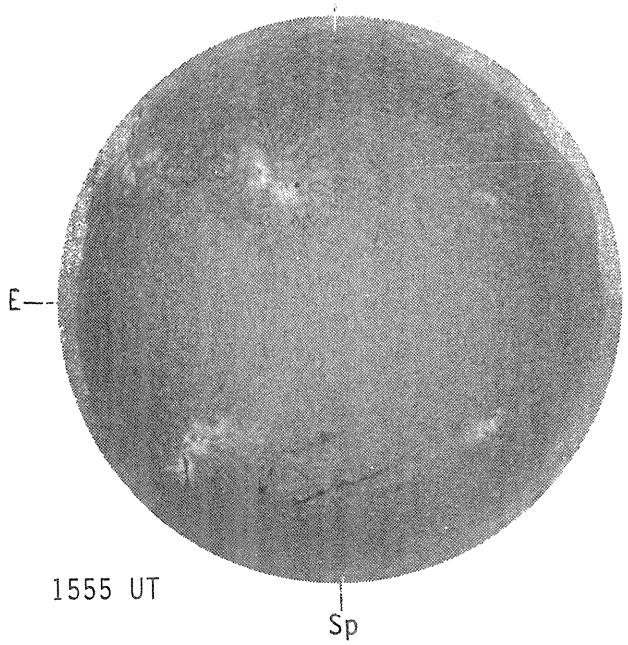


MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

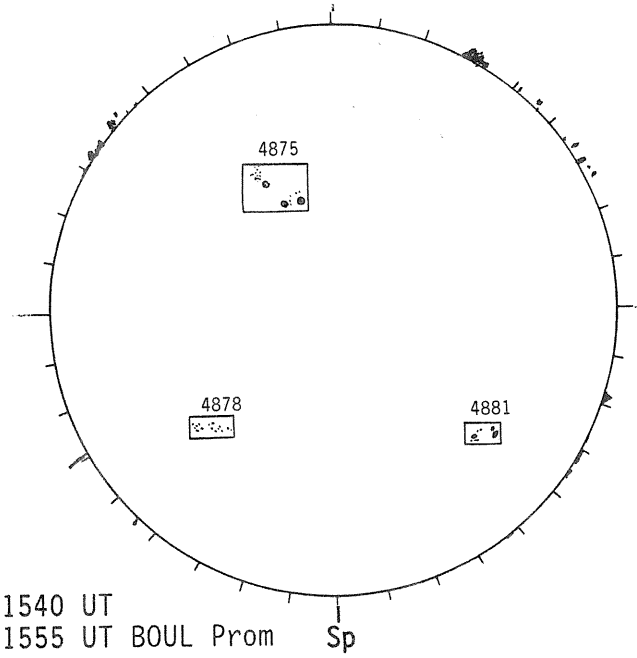


BOULDER H-ALPHA



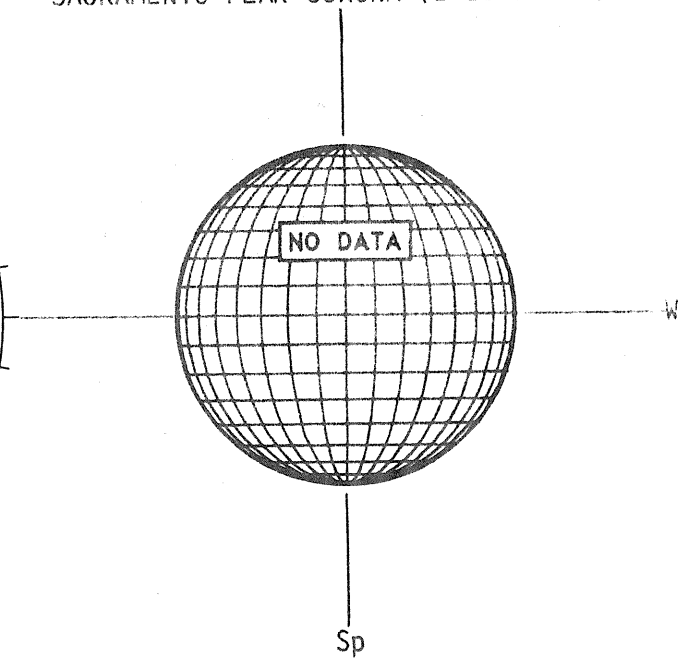
1555 UT

BOULDER SUNSPOTS



1540 UT
1555 UT BOUL Prom

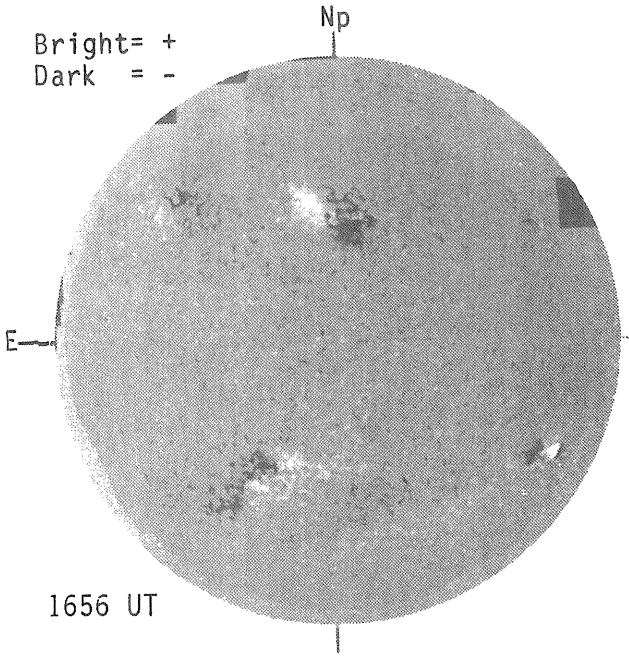
SACRAMENTO PEAK CORONA (1.15 Radii)



OCTOBER 29, 1987 (P= 24.96, B_o= 4.67, L_o= 21.91)

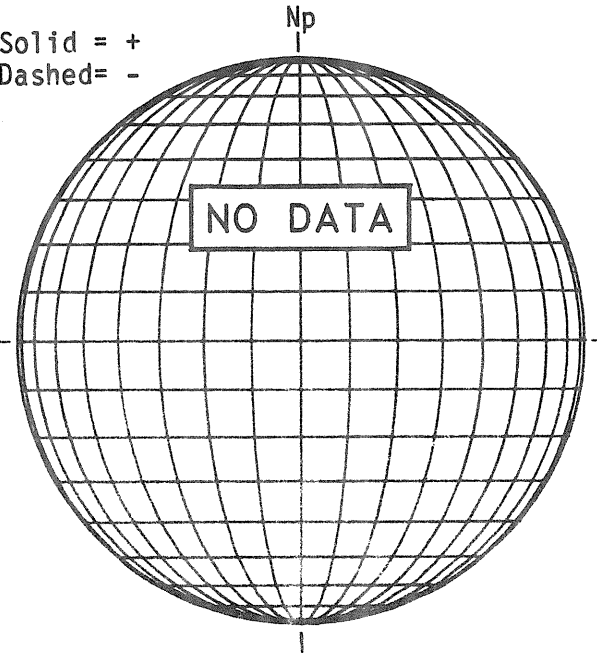
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



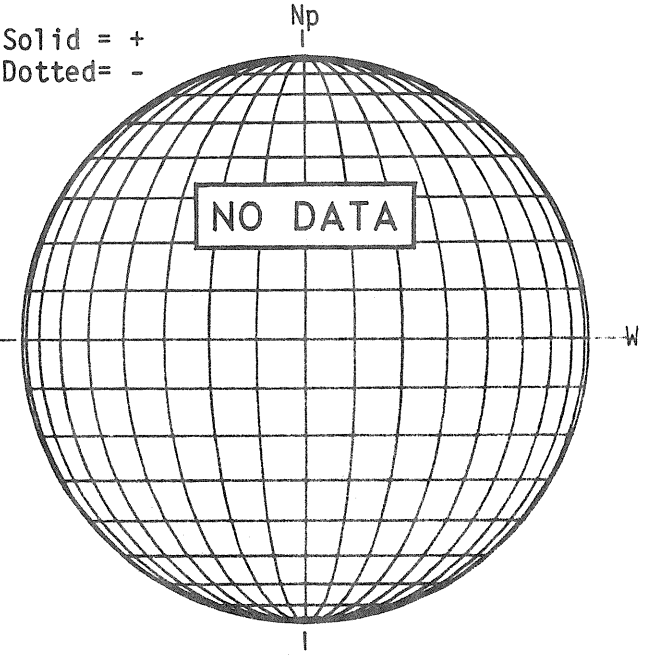
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

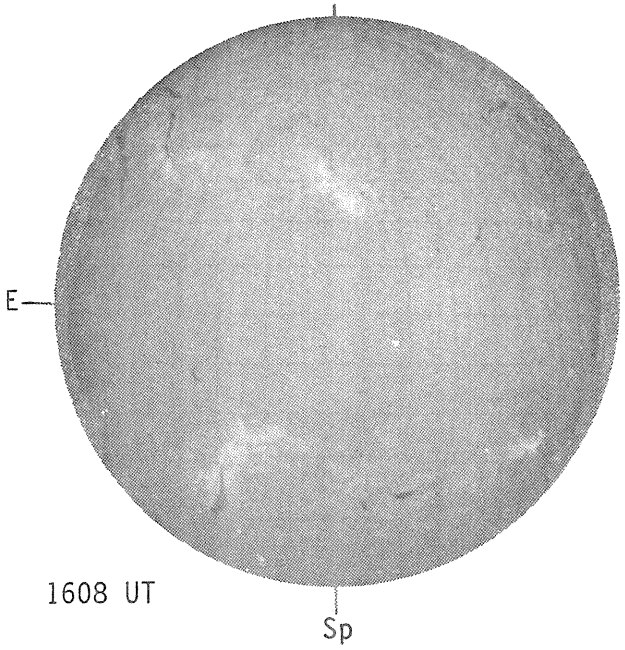


MT. WILSON MAGNETOGRAM

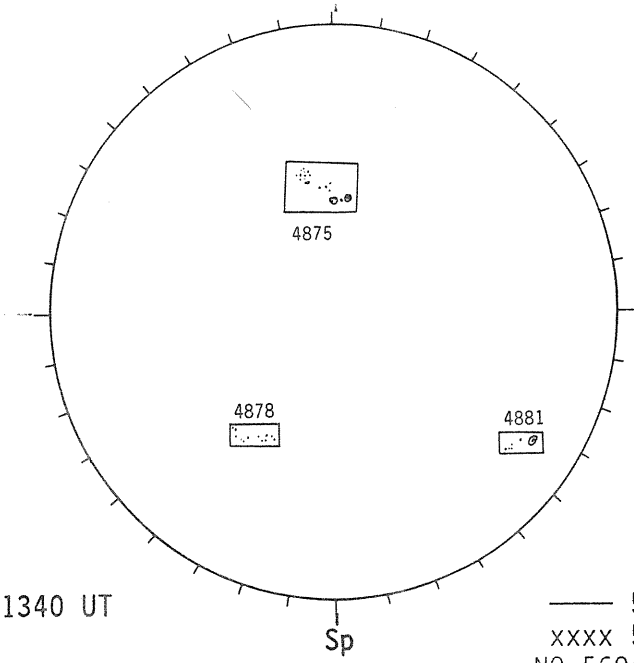
Solid = +
Dotted= -



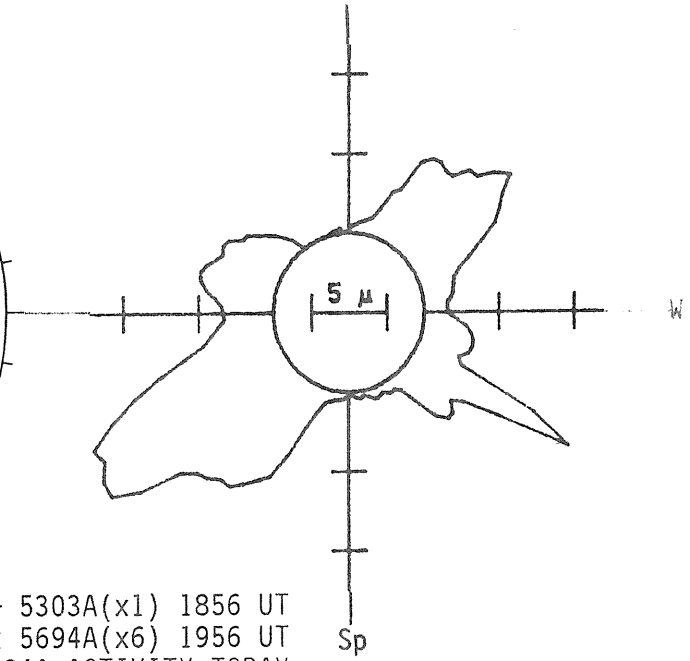
SACRAMENTO PEAK H-ALPHA



RAMEY SUNSPOTS



SACRAMENTO PEAK CORONA (1.15 Radii)

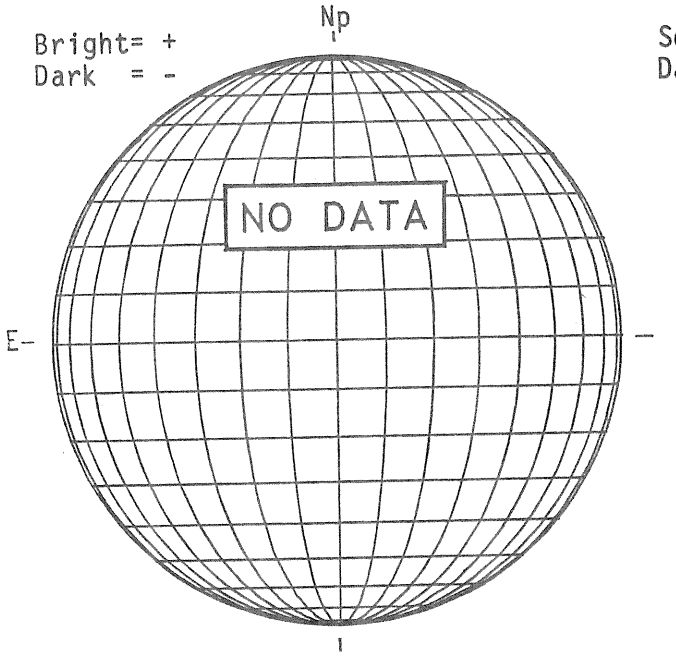


—— 5303A(x1) 1856 UT
xxxx 5694A(x6) 1956 UT
NO 5694A ACTIVITY TODAY

OCTOBER 30, 1987 (P= 24.82, B_o= 4.58, L_o= 8.72)

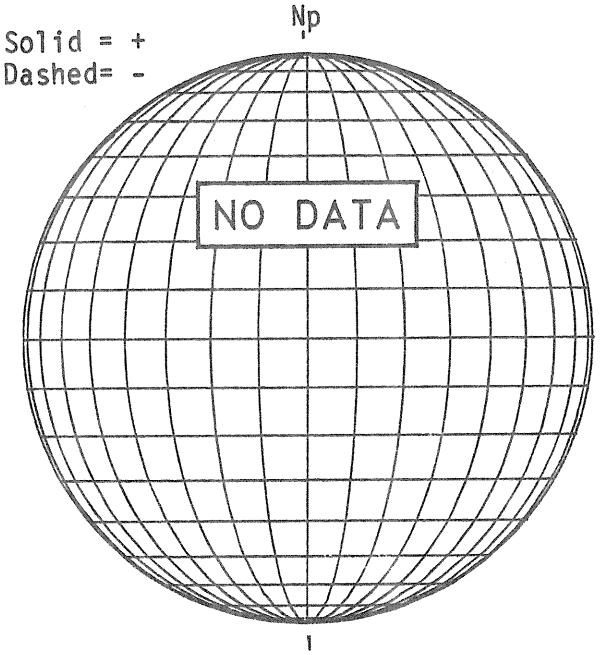
KITT PEAK MAGNETOGRAM

Bright= +
Dark = -



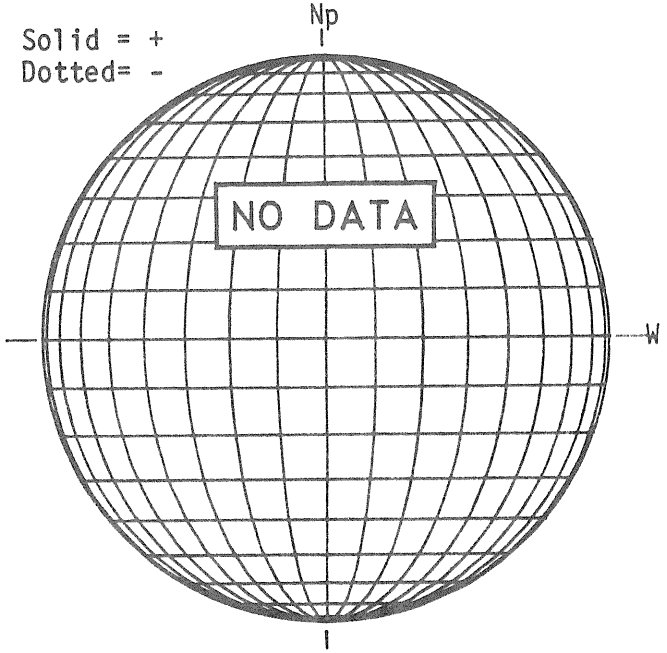
STANFORD MAGNETOGRAM

Solid = +
Dashed= -

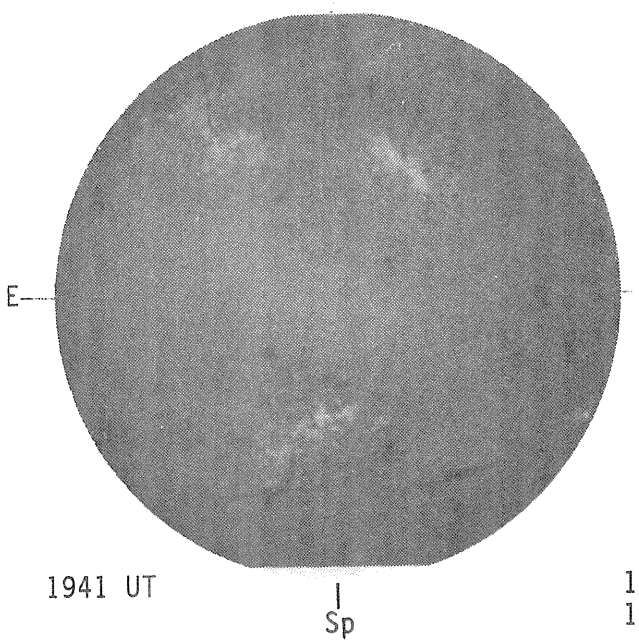


MT. WILSON MAGNETOGRAM

Solid = +
Dotted= -

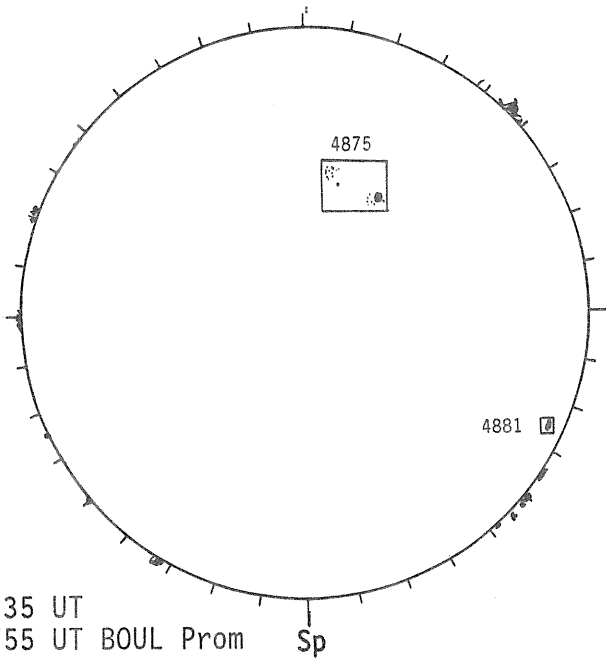


PALEHUA H-ALPHA



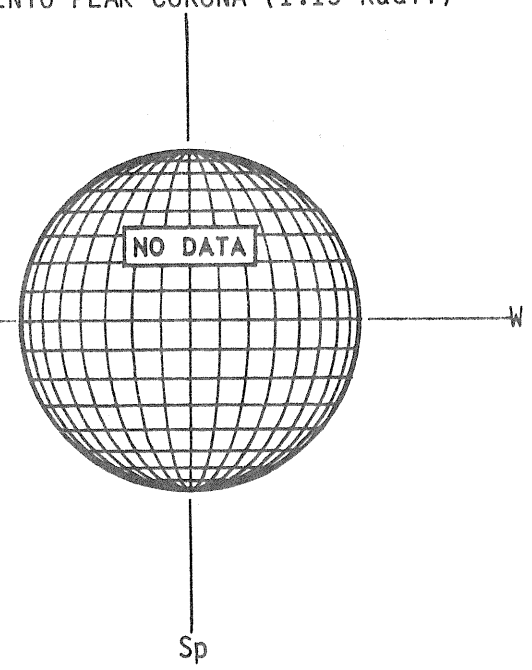
1941 UT

BOULDER SUNSPOTS



1735 UT
1755 UT BOUL Prom

SACRAMENTO PEAK CORONA (1.15 Radii)



OCTOBER 31, 1987 (P= 24.67, B_o= 4.48, L_o= 355.54)

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

OCTOBER 1987

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
4858A		BOUL	09	29	1407	N19	E31	10	1.9		A	AX	10	3	3	2
4858A		HOLL	09	29	1526	N22	E32	10	2.1		A	AX	10	1		3
4865	24450	MWIL	10	08	1440	N30	W61	10	3.8	2	(B)					
4865		PALE	10	08	1750	N30	W64	10	3.7		A	AX		1		3
4861		SVTO	10	01	0847	S21	E31	10	3.7		A	AX	10	2	2	2
4861		RAMY	10	01	1300	S21	E29	10	3.8		A	AX	10	2	1	4
4861		HOLL	10	01	1515	S22	E28	10	3.8		A	AX	10	2	1	4
4861		PALE	10	01	1822	S22	E25	10	3.7		B	BXO		2	3	3
4861		RAMY	10	04	1213	S19	W08	10	3.9		A	AX	10	4	2	4
4861		BOUL	10	04	1433	S19	W11	10	3.8		A	AX	10	3	2	1
4861	24449	MWIL	10	04	1500	S18	W11	10	3.8	3	(AP)					
4861		HOLL	10	04	1523	S19	W11	10	3.8		A	AX	10	4	2	3
4861		PALE	10	04	1833	S19	W12	10	3.8		A	AX	10	3	2	3
4861		LEAR	10	05	0006	S20	W16	10	3.8		B	BXO	10	6	3	4
4861		LEAR	10	06	0003	S22	W28	10	3.8		B	BXO	10	2	1	3
4861		RAMY	10	06	1300	S21	W35	10	3.8		A	AX	10	2	3	4
4859		SVTO	09	28	1055	S20	E74	10	4.1		A	AX	10	1	1	2
4859		RAMY	09	28	1313	S20	E71	10	4.0		A	AX	10	1	1	3
4859		HOLL	09	28	1510	S19	E70	10	4.0		A	AX	10	1	1	3
4859	24446	MWIL	09	28	1745	S23	E71	10	4.2	3	(AP)					
4859		LEAR	09	29	0001	S23	E69	10	4.3		B	BXO	10	3	5	3
4859		SVTO	09	29	0638	S23	E68	10	4.5		A	HS	20	1	1	3
4859		RAMY	09	29	1238	S27	E66	10	4.7		B	CAO	30	6	14	4
4859		BOUL	09	29	1407	S22	E60	10	4.2		B	BXO	20	5	10	2
4859		HOLL	09	29	1526	S23	E59	10	4.2		B	BXO	20	7	10	3
4859	24446	MWIL	09	29	1730	S22	E57	10	4.1	4	(BP)					
4859		PALE	09	29	1815	S25	E56	10	4.1		A	AX	20	3	2	3
4859		LEAR	09	30	0004	S25	E58	10	4.5		B	BXO	20	4	4	3
4859		RAMY	09	30	1340	S22	E47	10	4.2		B	CAO	30	9	11	3
4859		BOUL	09	30	1433	S25	E51	10	4.5		B	BXO	50	3	1	4
4859	24446	MWIL	09	30	1445	S23	E47	10	4.2	5	(AP)					
4859		HOLL	09	30	1615	S23	E46	10	4.2		B	BXO	20	5	9	3
4859		PALE	09	30	2110	S28	E39	10	3.9		B	BXO	20	6	16	3
4859		LEAR	10	01	0055	S24	E41	10	4.2		B	BXO	30	5	11	3
4859		CULG	10	01	0500	S26	E43	10	4.5		B	BXO	10	2	4	3
4859		SVTO	10	01	0847	S23	E43	10	4.7		B	BXO	10	2	5	2
4859		RAMY	10	01	1300	S23	E42	10	4.8		B	BXO	20	2	4	4
4859	24446	MWIL	10	01	1430	S23	E42	10	4.8	3	(BP)					
4859		BOUL	10	01	1432	S23	E38	10	4.5		B	BXO	30	2	4	3
4859		HOLL	10	01	1515	S24	E39	10	4.6		B	BXO	20	2	5	4
4859		PALE	10	01	1822	S24	E37	10	4.6		B	BXO	10	2	5	3
4859		LEAR	10	02	0056	S24	E34	10	4.7		B	BXO	10	2	5	3
4859		SVTO	10	03	0735	S24	E16	10	4.5		A	AX		1	1	3
4859		SVTO	10	04	0830	S19	E06	10	4.8		A	AX		1	1	2
4860		HOLL	09	28	1655	N32	E87	10	5.6		B	BXO	20	3	6	3
4860		PALE	09	28	1950	N32	E90	10	5.9		A	AX	10	2	1	2
4860		LEAR	09	29	0001	N31	E81	10	5.4		A	HS	50	1	2	3
4860		SVTO	09	29	0638	N31	E79	10	5.5		B	CSO	120	2	8	3
4860		RAMY	09	29	1238	N28	E73	10	5.2		B	BXO	90	6	10	4
4860		BOUL	09	29	1407	N28	E73	10	5.3		B	CAO	110	5	10	2
4860		HOLL	09	29	1526	N32	E77	10	5.7		B	CAO	130	3	9	3
4860	24447	MWIL	09	29	1730	N32	E75	10	5.7	4	(BP)					
4860		PALE	09	29	1815	N29	E76	10	5.7		B	CSO	80	3	15	3
4860		LEAR	09	30	0004	N30	E71	10	5.6		B	CSO	70	4	11	3
4860		RAMY	09	30	1340	N32	E66	10	5.8		B	CAI	140	9	15	3
4860		BOUL	09	30	1433	N29	E64	10	5.6		B	CSO	260	5	11	4
4860	24447	MWIL	09	30	1445	N31	E62	10	5.5	6	(B)					
4860		HOLL	09	30	1615	N31	E66	10	5.9		B	CSO	100	8	13	3
4860		PALE	09	30	2110	N30	E64	10	5.9		B	CSO	80	5	11	3
4860		LEAR	10	01	0055	N30	E60	10	5.7		B	CSO	160	10	6	3
4860		CULG	10	01	0500	N28	E56	10	5.6		B	CSO	50	3	3	3
4860		SVTO	10	01	0847	N33	E55	10	5.7		B	CHI	150	14	17	2
4860		RAMY	10	01	1300	N31	E52	10	5.6		B	CAI	180	8	14	4
4860	24447	MWIL	10	01	1430	N31	E50	10	5.5	6	(B)					
4860		BOUL	10	01	1432	N30	E50	10	5.5		B	CAI	220	10	12	3

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

OCTOBER 1987

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
4860		HOLL	10	01	1515	N31	E52	10	5.7		B	ESI	170	14	12	4
4860		PALE	10	01	1822	N30	E48	10	5.5		B	DSO	130	11	9	3
4860		LEAR	10	02	0056	N31	E44	10	5.5		B	CSO	90	15	10	3
4860		CULG	10	02	0600	N30	E41	10	5.5		B	EAI	230	10	14	3
4860		RAMY	10	02	1330	N32	E39	10	5.6		B	EAI	200	10	14	4
4860		BOUL	10	02	1416	N30	E35	10	5.3		B	EAI	250	12	12	2
4860	24447	MWIL	10	02	1500	N31	E35	10	5.4	6	(B)					
4860		HOLL	10	02	1630	N31	E37	10	5.6		B	EAI	160	7	12	2
4860		PALE	10	02	2110	N30	E35	10	5.6		B	ESO	140	5	12	1
4860		LEAR	10	03	0055	N31	E32	10	5.6		B	ESI	130	19	12	3
4860		SVTO	10	03	0735	N32	E28	10	5.5		B	EHI	150	12	12	3
4860		RAMY	10	03	1300	N32	E25	10	5.5		B	DSI	170	17	10	3
4860		BOUL	10	03	1412	N30	E24	10	5.5		B	EAI	250	19	11	1
4860	24447	MWIL	10	03	1430	N31	E23	10	5.4	6	(B)					
4860		HOLL	10	03	1514	N31	E25	10	5.6		B	EAI	130	17	10	3
4860		PALE	10	03	1756	N31	E23	10	5.6		B	ESI	170	23	11	3
4860		CULG	10	04	0530	N31	E18	10	5.6		B	EAI	250	21	13	1
4860		SVTO	10	04	0830	N31	E16	10	5.6		B	EH	150	27	13	2
4860		RAMY	10	04	1213	N31	E15	10	5.7		B	ESI	290	46	14	4
4860		BOUL	10	04	1433	N31	E11	10	5.5		B	EAI	260	29	14	1
4860	24447	MWIL	10	04	1500	N31	E10	10	5.4	6	(B)					
4860		HOLL	10	04	1523	N31	E13	10	5.7		B	EAI	200	38	13	3
4860		PALE	10	04	1833	N32	E12	10	5.7		B	ESI	180	36	13	3
4860		LEAR	10	04	2309	N31	E21	10	5.6		B	EAI	190	28	12	4
4860		LEAR	10	05	0006	N30	E08	10	5.6		B	EAI	250	38	15	4
4860		CULG	10	05	0430	N30	E05	10	5.6		B	EAI	240	16	12	3
4860		SVTO	10	05	0942	N32	E02	10	5.6		B	EAI	60	23	11	3
4860		RAMY	10	05	1325	N32	E00	10	5.5		B	ESI	180	28	11	4
4860		BOUL	10	05	1437	N28	W01	10	5.5		B	DAI	260	24	9	2
4860	24447	MWIL	10	05	1515	N31	W03	10	5.4	5	(BP)					
4860		PALE	10	05	2106	N30	W03	10	5.6		B	ESO	190	27	11	2
4860		HOLL	10	05	2115	N31	W04	10	5.6		B	ESO	200	24	16	3
4860		LEAR	10	06	0003	N30	W06	10	5.5		B	ESO	210	30	11	3
4860		CULG	10	06	0440	N31	W07	10	5.6		B	DSO	90	17	9	3
4860		SVTO	10	06	1040	N31	W12	10	5.5		B	DSO	140	16	9	2
4860		RAMY	10	06	1300	N32	W12	10	5.6		B	CSO	200	22	10	4
4860		BOUL	10	06	1435	N29	W15	10	5.4		B	DAI	250	12	8	3
4860	24447	MWIL	10	06	1500	N31	W14	10	5.5	6	(BP)					
4860		PALE	10	06	1815	N31	W16	10	5.5		B	CSO	130	15	9	4
4860		HOLL	10	06	1901	N31	W16	10	5.5		B	CAO	140	17	7	3
4860		LEAR	10	07	0007	N32	W18	10	5.6		B	CAO	150	8	8	4
4860		CULG	10	07	0425	N31	W21	10	5.5		B	CAO	70	5	7	2
4860		SVTO	10	07	0930	N31	W23	10	5.6		B	CSO	120	9	9	2
4860		RAMY	10	07	1315	N30	W25	10	5.6		B	CSO	180	11	8	4
4860		BOUL	10	07	1430	N29	W25	10	5.6		B	CAO	190	9	8	2
4860		HOLL	10	07	1452	N31	W30	10	5.2		B	CAO	150	10	7	3
4860	24447	MWIL	10	07	1515	N31	W28	10	5.4	6	(BP)					
4860		PALE	10	07	1830	N31	W27	10	5.6		B	CSO	140	16	12	4
4860		LEAR	10	08	0001	N32	W32	10	5.5		B	CAO	120	11	9	4
4860		CULG	10	08	0300	N31	W36	10	5.3		A	HX	70	2	2	2
4860		SVTO	10	08	0825	N30	W36	10	5.5		B	CSO	80	7	8	4
4860		RAMY	10	08	1235	N30	W38	10	5.5		B	CAO	130	7	8	4
4860		HOLL	10	08	1440	N30	W43	10	5.2		B	CAO	140	4	2	2
4860	24447	MWIL	10	08	1440	N31	W42	10	5.3	5	(AP)					
4860		BOUL	10	08	1625	N31	W44	10	5.2		B	CAO	100	4	3	3
4860		PALE	10	08	1750	N31	W43	10	5.3		B	CSO	90	6	6	3
4860		LEAR	10	09	0040	N31	W48	10	5.2		A	HS	80	2	2	3
4860		SVTO	10	09	0730	N32	W52	10	5.2		B	CAO	50	4	3	4
4860		RAMY	10	09	1249	N30	W55	10	5.2		B	CAO	70	5	3	3
4860		BOUL	10	09	1437	N31	W56	10	5.2		B	DAO	100	2	4	1
4860	24447	MWIL	10	09	1500	N30	W54	10	5.4	5	(AP)					
4860		HOLL	10	09	1609	N30	W56	10	5.3		B	CSO	80	2	1	3
4860		PALE	10	09	1920	N31	W59	10	5.1		B	CSO	40	3	3	2
4860		LEAR	10	10	0025	N30	W61	10	5.2		A	HS	40	3	3	3
4860		CULG	10	10	0430	N32	W63	10	5.2		A	HS	20	1	1	2
4860		SVTO	10	10	0740	N31	W62	10	5.4		B	CHO	90	3	4	3
4860		RAMY	10	10	1354	N29	W69	10	5.2		B	CAO	50	2	4	3
4860	24447	MWIL	10	10	1430	N30	W67	10	5.3	3	(AP)					
4860		HOLL	10	10	1605	N30	W68	10	5.3		A	HS	50	1	2	3

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4860		PALE	10	10	1835	N31	W70	10	5.2		A	HS	50	1	2	3
4860		LEAR	10	11	0022	N30	W74	10	5.2		A	HS	30	1	2	3
4860		CULG	10	11	0455	N31	W73	10	5.4		A	HS	20	1	1	3
4860		RAMY	10	11	1310	N29	W78	10	5.4		A	HS	60	1	2	3
4860		BOUL	10	11	1435	N30	W77	10	5.5		A	AX	30	1	1	2
4860		HOLL	10	11	1500	N30	W79	10	5.4		A	HS	60	1	2	3
4860	24447	MWIL	10	11	1530	N30	W79	10	5.4	3	(AP)					
4860		PALE	10	11	1751	N31	W82	10	5.3		A	HS	30	1	2	3
4863		PALE	10	07	1830	N21	W15	10	6.6		A	AX		1		4
4863		LEAR	10	08	0001	N21	W17	10	6.7		B	BXO	20	3	2	4
4863		CULG	10	08	0300	N23	W18	10	6.7		B	BXO	10	3	3	2
4863		SVTO	10	08	0825	N21	W22	10	6.7		B	BXO	10	3	3	4
4863		RAMY	10	08	1235	N20	W24	10	6.7		B	BXO	20	2	2	4
4863	24451	MWIL	10	08	1440	N20	W26	10	6.6	4	(B)					
4863		HOLL	10	08	1440	N21	W26	10	6.6		B	BXO	20	2	2	2
4863		BOUL	10	08	1625	N20	W26	10	6.7		B	BXO	20	2	3	3
4863		PALE	10	08	1750	N21	W28	10	6.6		B	BXO		2	3	3
4863		LEAR	10	09	0040	N20	W31	10	6.6		A	AX	10	1	1	3
4862		LEAR	10	02	0056	N34	E81	10	8.5		A	AX	10	1	1	3
4862		RAMY	10	02	1330	N35	E80	10	9.0		B	BXO	30	3	5	4
4862		HOLL	10	02	1630	N33	E78	10	8.9		B	BXO	10	3	7	2
4862		PALE	10	02	2110	N33	E72	10	8.6		A	AX		1		1
4862		LEAR	10	03	0055	N34	E72	10	8.8		B	BXO	10	3	5	3
4862		SVTO	10	03	0735	N35	E66	10	8.6		A	AX	10	1	1	3
4862		RAMY	10	03	1300	N35	E67	10	8.9		B	BXO		3	8	3
4862		BOUL	10	03	1412	N32	E65	10	8.7		B	BXO	20	6	10	1
4862	24448	MWIL	10	03	1430	N34	E66	10	8.9	3	(B)					
4862		HOLL	10	03	1514	N34	E65	10	8.8		B	BXO	20	5	9	3
4862		PALE	10	03	1756	N33	E65	10	8.9		B	BXO	10	4	8	3
4862		SVTO	10	04	0830	N35	E55	10	8.7		B	BXO	10	3	9	2
4862		RAMY	10	04	1213	N35	E52	10	8.7		B	BXI	20	8	10	4
4862		BOUL	10	04	1433	N35	E50	10	8.6		B	BXO	20	6	11	1
4862	24448	MWIL	10	04	1500	N34	E52	10	8.8	3	(BP)					
4862		HOLL	10	04	1523	N34	E53	10	8.9		B	BXO	20	7	9	3
4862		PALE	10	04	1833	N35	E51	10	8.8		B	BXO	20	6	11	3
4862		LEAR	10	04	2309	N35	E62	10	8.9		B	BXO	20	4	4	4
4862		LEAR	10	05	0006	N33	E46	10	8.6		B	BXO	20	6	11	4
4862		CULG	10	05	0430	N31	E43	10	8.6		B	CAO	40	2	2	3
4862		SVTO	10	05	0942	N35	E38	10	8.4		B	CAI	20	6	3	3
4862		RAMY	10	05	1325	N35	E36	10	8.4		B	CAO	40	3	3	4
4862		BOUL	10	05	1437	N33	E33	10	8.2		A	CAO	80	4	2	2
4862	24448	MWIL	10	05	1515	N33	E34	10	8.3	5	(BP)					
4862		PALE	10	05	2106	N32	E33	10	8.5		B	CSO	50	5	4	2
4862		HOLL	10	05	2115	N34	E34	10	8.6		B	CAO	40	5	5	3
4862		LEAR	10	06	0003	N33	E29	10	8.3		B	CSO	30	5	3	3
4862		CULG	10	06	0440	N32	E28	10	8.4		B	BXI	20	6	3	3
4862		SVTO	10	06	1040	N34	E23	10	8.3		A	HR	30	2	2	2
4862		RAMY	10	06	1300	N34	E23	10	8.4		A	AX	20	4	3	4
4862		BOUL	10	06	1435	N33	E19	10	8.1		B	CRO	60	3	3	3
4862	24448	MWIL	10	06	1500	N33	E21	10	8.3	5	(BP)					
4862		PALE	10	06	1815	N34	E20	10	8.3		B	BXO	20	4	5	4
4862		HOLL	10	06	1901	N33	E20	10	8.4		B	BXO	30	6	4	3
4862		LEAR	10	07	0007	N33	E16	10	8.3		B	CSO	40	6	6	4
4862		CULG	10	07	0425	N33	E17	10	8.5		B	BXO	10	4	5	2
4862		SVTO	10	07	0930	N34	E12	10	8.3		B	BXO	30	4	5	2
4862		RAMY	10	07	1315	N32	E09	10	8.3		B	BXO	30	4	5	4
4862		BOUL	10	07	1430	N33	E07	10	8.2		B	CAO	40	4	4	2
4862		HOLL	10	07	1452	N34	E09	10	8.3		B	BXO	20	4	4	3
4862	24448	MWIL	10	07	1515	N33	E08	10	8.3	5	(BP)					
4862		PALE	10	07	1830	N33	E07	10	8.3		B	BXO	20	4	4	4
4862		LEAR	10	08	0001	N34	E04	10	8.3		B	BXO	20	4	3	4
4862		CULG	10	08	0300	N33	E04	10	8.4		B	BXO	10	2	4	2
4862		SVTO	10	08	0825	N33	E02	10	8.5		B	BXO	20	6	9	4
4862		RAMY	10	08	1235	N32	E00	10	8.5		B	BXO	30	4	5	4
4862		HOLL	10	08	1440	N33	W01	10	8.5		B	BXO	30	4	5	2
4862	24448	MWIL	10	08	1440	N33	W02	10	8.5	4	(B)					
4862		BOUL	10	08	1625	N33	E02	10	8.8		B	BXO	40	4	5	3

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4862		PALE	10	08	1750	N33	W02	10	8.6		B	BXO	10	4	5	3
4862		LEAR	10	09	0040	N33	W05	10	8.6		B	BXO	10	5	7	3
4864		LEAR	10	08	0001	S24	E37	10	10.8		B	BXO	10	3	2	4
4864		CULG	10	08	0300	S26	E36	10	10.9		B	BXO	10	2	3	2
4864		SVTO	10	08	0825	S24	E32	10	10.8		B	BXO	10	2	3	4
4864		RAMY	10	08	1235	S24	E30	10	10.8		B	BXO	20	3	2	4
4864		HOLL	10	08	1440	S24	E28	10	10.8		B	BXO	20	2	2	2
4864	24453	MWIL	10	08	1440	S25	E28	10	10.8	3	(B)					
4864		PALE	10	08	1750	S25	E29	10	11.0		A	AX		1		3
4864		SVTO	10	09	0730	S23	E17	10	10.6		B	BXO	10	5	6	4
4864		RAMY	10	09	1249	S24	E16	10	10.8		B	BXO	10	3	4	3
4864		BOUL	10	09	1437	S23	E13	10	10.6		B	CAO	10	3	6	1
4864	24453	MWIL	10	09	1500	S25	E14	10	10.7	4	(B)					
4864		HOLL	10	09	1609	S24	E15	10	10.8		B	BXO	10	2	3	3
4864		PALE	10	09	1920	S25	E13	10	10.8		B	BXO	10	5	5	2
4864		LEAR	10	10	0025	S25	E10	10	10.8		B	BXO	10	7	5	3
4864		CULG	10	10	0430	S29	E08	10	10.8		B	BXO	10	4	2	2
4864		SVTO	10	10	0740	S25	E08	10	10.9		B	BXO	10	5	2	3
4864		RAMY	10	10	1354	S25	E03	10	10.8		B	BXO	10	9	5	3
4864	24453	MWIL	10	10	1430	S24	E02	10	10.8	4	(B)					
4864		HOLL	10	10	1605	S24	E03	10	10.9		B	BXO	10	9	6	3
4864		PALE	10	10	1835	S25	E00	10	10.8		B	BXO	20	9	6	3
4864		LEAR	10	11	0022	S25	W04	10	10.7		B	BXO	20	11	6	3
4864		CULG	10	11	0455	S24	W07	10	10.7		B	CRI	60	9	8	3
4864		RAMY	10	11	1310	S24	W10	10	10.8		B	CRI	40	13	8	3
4864		BOUL	10	11	1435	S24	W12	10	10.7		B	CAO	30	9	7	2
4864		HOLL	10	11	1500	S25	W11	10	10.8		B	CRO	20	7	5	3
4864	24453	MWIL	10	11	1530	S25	W10	10	10.9	5	(B)					
4864		PALE	10	11	1751	S25	W13	10	10.7		B	CRO	20	9	6	3
4864		LEAR	10	12	0452	S26	W16	10	10.9		A	AX	10	3	2	3
4864		SVTO	10	12	1049	S25	W19	10	11.0		B	BXO	10	4	3	2
4864		RAMY	10	12	1240	S25	W22	10	10.8		B	BXO	10	8	7	3
4864		BOUL	10	12	1404	S24	W22	10	10.9		B	BXO	10	4	3	2
4864		HOLL	10	12	1708	S26	W22	10	11.0		A	AX	50	1	1	3
4864		PALE	10	12	1755	S25	W25	10	10.8		B	BXO	10	4	4	3
4864		LEAR	10	13	0045	S27	W27	10	10.9		B	BXO	10	5	3	4
4864		HOLL	10	13	2021	S25	W40	10	10.7		B	DAO	80	14	9	2
4869		HOLL	10	12	1708	S26	W06	10	12.2		A	AX	10	1	1	3
4869		PALE	10	12	1755	S26	W06	10	12.3		A	AX		1		3
4869		LEAR	10	13	0045	S26	W10	10	12.2		B	BXO	10	5	5	4
4869		RAMY	10	13	1426	S25	W15	10	12.4		B	CRO	50	8	7	3
4869	24457	MWIL	10	13	1515	S26	W17	10	12.3	6	(B)					
4869		PALE	10	13	1745	S26	W19	10	12.3		B	CRO	30	9	7	3
4869		HOLL	10	13	2021	S25	W20	10	12.3		B	DAO	80	14	9	2
4869		LEAR	10	14	0001	S27	W22	10	12.3		B	CAO	60	12	8	3
4869		SVTO	10	14	0730	S26	W26	10	12.3		B	CRI	90	13	8	4
4869		RAMY	10	14	1430	S26	W28	10	12.4		B	CSO	140	9	7	3
4869	24457	MWIL	10	14	1500	S26	W28	10	12.4	5	(B)					
4869		PALE	10	14	1805	S27	W31	10	12.3		B	DSO	80	9	7	3
4869		HOLL	10	14	1826	S26	W30	10	12.4		B	DAO	120	7	9	2
4869		LEAR	10	15	0001	S26	W35	10	12.3		B	DAO	130	7	10	3
4869		CULG	10	15	0400	S24	W37	10	12.3		B	DSO	100	4	7	1
4869		SVTO	10	15	0720	S23	W36	10	12.5		B	DSO	120	5	8	3
4869		RAMY	10	15	1343	S26	W40	10	12.5		B	DAO	110	17	7	3
4869	24457	MWIL	10	15	1515	S26	W42	10	12.4	5	(B)					
4869		HOLL	10	15	1515	S26	W43	10	12.3		B	EAO	140	9	11	3
4869		BOUL	10	15	1655	S29	W43	10	12.3		B	DAO	120	4	7	1
4869		LEAR	10	16	0020	S26	W48	10	12.3		B	EAO	70	7	14	3
4869		RAMY	10	16	1448	S26	W55	10	12.3		B	DRO	60	8	10	4
4869		BOUL	10	16	1513	S28	W56	10	12.2		B	EAO	80	3	12	1
4869		HOLL	10	16	1600	S26	W55	10	12.4		B	EAO	60	5	14	2
4869	24457	MWIL	10	16	1645	S26	W58	10	12.2	4	(B)					
4869		LEAR	10	17	0007	S26	W60	10	12.3		B	CSO	30	2	15	2
4869		CULG	10	17	0500	S25	W61	10	12.5		A	AX	10	1	1	2
4869		SVTO	10	17	0753	S28	W60	10	12.6		A	AX	20	2	2	2
4869		RAMY	10	17	1215	S27	W63	10	12.6		A	AX	10	1	1	3
4869		BOUL	10	17	1430	S28	W69	10	12.2		B	EAO	60	2	12	1

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4869	24457	MWIL	10	17	1500	S27	W65	10	12.6	5	(AF)					
4869		HOLL	10	17	1630	S29	W66	10	12.5		A	AX	30	1	1	3
4869		LEAR	10	18	0024	S28	W69	10	12.6		A	HX	10	1	1	2
4869		SVTO	10	18	1005	S27	W75	10	12.6		B	BXO		2	7	2
4869		RAMY	10	18	1430	S23	W78	10	12.6		A	AX	10	1	1	2
4869		HOLL	10	18	1515	S28	W80	10	12.4		A	AX	10	1	1	4
4869A		PALE	10	08	1750	S23	E59	10	13.3		A	AX		1		3
4870		RAMY	10	13	1426	S24	E17	10	14.9		B	BXO	20	4	4	3
4870	24458	MWIL	10	13	1515	S24	E15	10	14.8	4	(B)					
4870		PALE	10	13	1745	S24	E13	10	14.7		B	BXO	10	4	4	3
4870		HOLL	10	13	2021	S24	E12	10	14.8		B	BXO	10	4	5	2
4870		LEAR	10	14	0001	S24	E10	10	14.8		B	BXO	20	6	5	3
4870		SVTO	10	14	0730	S24	E06	10	14.8		B	BXI	20	11	6	4
4870		RAMY	10	14	1430	S23	E04	10	14.9		B	BXO	50	11	6	3
4870	24458	MWIL	10	14	1500	S24	E03	10	14.9	5	(B)					
4870		PALE	10	14	1805	S24	E00	10	14.7		B	DSO	30	17	7	3
4870		HOLL	10	14	1826	S23	E00	10	14.8		B	CAO	50	12	6	2
4870		LEAR	10	15	0001	S24	W04	10	14.7		B	DAO	80	12	7	3
4870		CULG	10	15	0400	S22	W08	10	14.5		B	DSO	90	7	8	1
4870		SVTO	10	15	0720	S23	W07	10	14.8		B	DSO	80	6	7	3
4870		RAMY	10	15	1343	S23	W10	10	14.8		B	DAO	130	16	9	3
4870		HOLL	10	15	1515	S24	W11	10	14.8		B	DSO	160	9	9	3
4870	24458	MWIL	10	15	1515	S24	W12	10	14.7	6	(B)					
4870		BOUL	10	15	1655	S24	W12	10	14.8		B	DSO	170	7	8	1
4870		LEAR	10	16	0020	S24	W17	10	14.7		B	DSO	200	10	10	3
4870		RAMY	10	16	1448	S24	W25	10	14.7		B	DAO	190	11	10	4
4870		BOUL	10	16	1513	S23	W25	10	14.7		B	DAO	170	7	9	1
4870		HOLL	10	16	1600	S24	W24	10	14.8		B	ESO	150	13	10	2
4870	24458	MWIL	10	16	1645	S24	W25	10	14.8	5	(B)					
4870		LEAR	10	17	0007	S24	W31	10	14.6		B	DSO	100	11	10	2
4870		CULG	10	17	0500	S22	W34	10	14.6		B	DAI	170	9	8	2
4870		SVTO	10	17	0753	S24	W34	10	14.7		B	EAI	180	16	11	2
4870		RAMY	10	17	1215	S25	W36	10	14.7		B	DAO	270	20	10	3
4870		BOUL	10	17	1430	S23	W38	10	14.7		B	DAI	230	10	9	1
4870	24458	MWIL	10	17	1500	S24	W38	10	14.7	5	(B)					
4870		HOLL	10	17	1630	S25	W37	10	14.8		B	DSI	190	16	9	3
4870		LEAR	10	18	0024	S24	W42	10	14.8		B	DSI	150	9	10	2
4870		CULG	10	18	0400	S23	W47	10	14.5		B	DAO	70	6	9	4
4870		SVTO	10	18	1005	S23	W47	10	14.8		B	DAI	240	13	11	2
4870		RAMY	10	18	1430	S24	W50	10	14.7		B	DAI	170	13	10	2
4870	24458	MWIL	10	18	1500	S24	W50	10	14.8	5	(B)					
4870		HOLL	10	18	1515	S25	W49	10	14.8		B	DAI	210	16	9	4
4870		BOUL	10	18	1530	S23	W50	10	14.8		B	DAI	190	10	10	1
4870		PALE	10	18	1754	S24	W52	10	14.7		B	EAI	170	13	12	4
4870		LEAR	10	19	0202	S24	W56	10	14.7		B	DAO	150	9	10	3
4870		SVTO	10	19	0823	S24	W60	10	14.7		B	DSI	250	12	9	2
4870	24458	MWIL	10	19	1500	S24	W62	10	14.8	4	(BF)					
4870		HOLL	10	19	1510	S23	W63	10	14.8		B	CAO	130	11	11	4
4870		RAMY	10	19	1625	S25	W64	10	14.7		B	CAI	200	12	11	2
4870		PALE	10	19	1955	S25	W68	10	14.6		B	CSO	130	10	12	2
4870		LEAR	10	20	0135	S24	W69	10	14.7		B	CAO	130	7	10	4
4870		SVTO	10	20	0740	S26	W69	10	14.9		B	CSO	80	5	4	3
4870	24458	MWIL	10	20	1515	S25	W72	10	15.1	3	(AF)					
4870		HOLL	10	20	1547	S23	W75	10	14.9		B	BXO	40	6	4	4
4870		RAMY	10	20	1614	S26	W72	10	15.1		B	BXO	30	7	5	3
4870		LEAR	10	21	0004	S24	W76	10	15.1		B	CAO	30	2	5	3
4867		SVTO	10	09	0730	S35	E68	10	14.7		A	AX	10	1	1	4
4867		RAMY	10	09	1249	S34	E64	10	14.6		A	AX	10	1	1	3
4867	24454	MWIL	10	09	1500	S36	E61	10	14.5	3	(AP)					
4867		HOLL	10	09	1609	S35	E62	10	14.6		A	AX	10	1	1	3
4867		PALE	10	09	1920	S37	E61	10	14.7		A	AX		1		2
4867		LEAR	10	10	0025	S35	E58	10	14.6		A	AX	10	1	1	3
4867		CULG	10	10	0430	S36	E53	10	14.4		A	AX	10	1	1	2
4867		SVTO	10	10	0740	S35	E55	10	14.7		A	AX	10	1	1	3
4867		RAMY	10	10	1354	S34	E50	10	14.6		A	AX	10	1	1	3
4867	24454	MWIL	10	10	1430	S34	E49	10	14.5	3	(AP)					

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NOAA/ USAF Group	Mt Wilson Group	Sta	Observation Mo	Day	Time (UT)	Lat	CMD	CMP Mo	Day	Max H	Mag Class	Spot Class	Corrected Area (10^{-6} Hemi)	Spot Count	Long. Extent (Deg)	Qual
4867		HOLL	10	10	1605	S35	E50	10	14.7		A	AX	10	1	1	3
4867		PALE	10	10	1835	S36	E49	10	14.7		A	AX		1		3
4867	24454	MWIL	10	11	1530	S37	E41	10	14.9	3	(AF)					
4866		SVTO	10	09	0730	N22	E84	10	15.8		B	DHO	120	1	7	4
4866		RAMY	10	09	1249	N23	E82	10	15.8		B	CAI	180	5	6	3
4866		BOUL	10	09	1437	N21	E80	10	15.7		A	HK	240	2	3	1
4866	24455	MWIL	10	09	1500	N21	E80	10	15.8	4	(AP)					
4866		HOLL	10	09	1609	N22	E85	10	16.2		A	HS	180	2	2	3
4866		PALE	10	09	1920	N21	E84	10	16.2		B	DHO	90	3	10	2
4866		LEAR	10	10	0025	N21	E82	10	16.3		B	DHO	150	5	9	3
4866		CULG	10	10	0430	N20	E78	10	16.1		B	DAO	200	4	9	2
4866		SVTO	10	10	0740	N22	E78	10	16.3		B	EKO	420	8	15	3
4866		RAMY	10	10	1354	N23	E74	10	16.3		B	EAI	360	13	12	3
4866	24455	MWIL	10	10	1430	N21	E70	10	16.0	5	(B)					
4866		HOLL	10	10	1605	N22	E75	10	16.4		B	EKI	280	12	14	3
4866		PALE	10	10	1835	N21	E71	10	16.2		B	CHO	460	10	12	3
4866		LEAR	10	11	0022	N21	E68	10	16.2		B	EKO	360	7	12	3
4866		CULG	10	11	0455	N20	E64	10	16.1		B	DHI	280	7	9	3
4866		RAMY	10	11	1310	N22	E59	10	16.1		B	EKI	520	23	13	3
4866		BOUL	10	11	1435	N21	E59	10	16.1		B	EKI	380	17	11	2
4866		HOLL	10	11	1500	N22	E60	10	16.2		B	EKI	460	12	12	3
4866	24455	MWIL	10	11	1530	N20	E58	10	16.1	5	(BG)					
4866		PALE	10	11	1751	N22	E59	10	16.3		B	EKI	320	17	12	3
4866		LEAR	10	12	0452	N22	E53	10	16.3		B	EKO	420	9	12	3
4866		SVTO	10	12	1049	N21	E47	10	16.0		B	CHI	350	19	11	2
4866		RAMY	10	12	1240	N22	E49	10	16.3		B	CKI	390	22	10	3
4866		BOUL	10	12	1404	N21	E44	10	15.9		B	CKI	310	14	11	2
4866		HOLL	10	12	1708	N21	E46	10	16.2		B	CKO	350	19	11	3
4866		PALE	10	12	1755	N22	E45	10	16.2		B	EKO	340	22	12	3
4866		LEAR	10	13	0045	N22	E41	10	16.2		B	EKI	410	28	12	4
4866		RAMY	10	13	1426	N22	E37	10	16.4		B	EKI	440	21	14	3
4866	24455	MWIL	10	13	1515	N22	E30	10	15.9	6	(BP)					
4866		PALE	10	13	1745	N22	E32	10	16.2		B	CHO	370	25	12	3
4866		HOLL	10	13	2021	N24	E31	10	16.2		B	CKI	380	30	11	2
4866		LEAR	10	14	0001	N22	E28	10	16.1		B	CKI	340	26	12	3
4866		SVTO	10	14	0730	N22	E24	10	16.1		B	CKI	350	49	13	4
4866		RAMY	10	14	1430	N22	E19	10	16.1		B	EKI	450	28	12	3
4866	24455	MWIL	10	14	1500	N22	E17	10	15.9	6	(BG)					
4866		PALE	10	14	1805	N23	E17	10	16.1		BG	EKI	420	32	13	3
4866		HOLL	10	14	1826	N22	E16	10	16.0		B	CKO	490	16	7	2
4866		LEAR	10	15	0001	N23	E13	10	16.0		B	DKO	360	21	8	3
4866		CULG	10	15	0400	N22	E13	10	16.2		B	EKC	280	28	12	1
4866		SVTO	10	15	0720	N22	E10	10	16.1		BG	EKI	350	33	12	3
4866		RAMY	10	15	1343	N22	E06	10	16.0		B	EKI	450	77	12	3
4866	24455	MWIL	10	15	1515	N22	E04	10	15.9	5	(BG)					
4866		HOLL	10	15	1515	N22	E06	10	16.1		BG	EKI	420	45	14	3
4866		BOUL	10	15	1655	N23	E01	10	15.8		B	DKI	560	35	10	1
4866		LEAR	10	16	0020	N23	W01	10	15.9		BG	DKI	320	50	10	3
4866		RAMY	10	16	1448	N22	W10	10	15.8		B	DAI	320	50	8	4
4866		BOUL	10	16	1513	N21	W09	10	15.9		B	EKI	350	21	12	1
4866		HOLL	10	16	1600	N22	W11	10	15.8		BG	CKI	230	34	9	2
4866	24455	MWIL	10	16	1645	N22	W10	10	15.9	5	(BG)					
4866		LEAR	10	17	0007	N23	W15	10	15.8		BG	DSI	420	43	10	2
4866		CULG	10	17	0500	N23	W16	10	16.0		B	DSO	290	22	9	2
4866		SVTO	10	17	0753	N22	W18	10	15.9		BG	EKI	350	31	11	2
4866		RAMY	10	17	1215	N23	W21	10	15.9		B	DAI	390	43	10	3
4866		BOUL	10	17	1430	N22	W22	10	15.9		B	DKI	270	19	9	1
4866	24455	MWIL	10	17	1500	N23	W23	10	15.9	5	(BG)					
4866		HOLL	10	17	1630	N22	W24	10	15.8		B	EAI	230	21	10	3
4866		LEAR	10	18	0024	N22	W25	10	16.1		B	DSI	150	19	10	2
4866		CULG	10	18	0400	N23	W29	10	15.9		B	DSI	90	17	9	4
4866		SVTO	10	18	1005	N22	W33	10	15.9		B	DSI	280	26	10	2
4866		RAMY	10	18	1430	N23	W35	10	15.9		B	DSO	220	19	10	2
4866	24455	MWIL	10	18	1500	N23	W37	10	15.8	5	(BP)					
4866		HOLL	10	18	1515	N23	W35	10	15.9		B	DSO	180	17	9	4
4866		BOUL	10	18	1530	N22	W35	10	15.9		B	DAI	180	10	9	1
4866		PALE	10	18	1754	N23	W37	10	15.9		B	ESO	190	17	11	4
4866		LEAR	10	19	0202	N22	W42	10	15.8		B	DAO	100	13	10	3

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4866		SVTO	10	19	0823	N23	W46	10	15.8		B	ESI	140	18	11	2
4866	24455	MWIL	10	19	1500	N20	W48	10	16.0	5	(BP)					
4866		HOLL	10	19	1510	N23	W49	10	15.8		B	ESO	100	16	11	4
4866		RAMY	10	19	1625	N22	W49	10	15.9		B	DAI	130	13	10	2
4866		PALE	10	19	1955	N23	W53	10	15.7		B	ESO	110	10	11	2
4866		LEAR	10	20	0135	N22	W56	10	15.8		B	DAO	80	7	8	4
4866		SVTO	10	20	0740	N22	W57	10	15.9		B	CSO	110	9	8	3
4866	24455	MWIL	10	20	1515	N20	W63	10	15.8	4	(BP)					
4866		HOLL	10	20	1547	N23	W64	10	15.7		B	CSO	60	10	10	4
4866		RAMY	10	20	1614	N21	W63	10	15.8		B	CAO	90	7	9	3
4866		BOUL	10	20	1648	N22	W65	10	15.7		B	CAO	60	3	7	1
4866		LEAR	10	21	0004	N21	W68	10	15.8		B	CAO	50	6	9	3
4866		CULG	10	21	0440	N25	W67	10	16.0		B	ESO	90	2	12	3
4866		SVTO	10	21	0841	N20	W69	10	16.1		B	CRO	30	2	2	2
4866		RAMY	10	21	1427	N20	W78	10	15.6		B	CAO	40	3	6	3
4866		HOLL	10	21	1510	N22	W77	10	15.7		B	CAO	40	3	9	3
4866		LEAR	10	22	0010	N21	W84	10	15.6		A	HS	30	1	3	3
4866		RAMY	10	22	1323	N22	W86	10	15.9		A	AX	10	1	1	3
4866A		SVTO	10	17	0753	S08	W13	10	16.3		A	AX		1		2
4868		RAMY	10	10	1354	S29	E79	10	16.8		A	HA	60	1	2	3
4868	24456	MWIL	10	10	1430	S29	E77	10	16.6	3	AP					
4868		HOLL	10	10	1605	S29	E79	10	16.9		A	HA	60	2	1	3
4868		PALE	10	10	1835	S31	E83	10	17.3		B	CSO	30	2	4	3
4868		LEAR	10	11	0022	S31	E72	10	16.7		A	HS	40	2	3	3
4868		CULG	10	11	0455	S33	E71	10	16.8		B	DSO	60	2	4	3
4868		RAMY	10	11	1310	S29	E67	10	16.8		A	HA	120	2	3	3
4868		BOUL	10	11	1435	S31	E65	10	16.7		A	HA	100	2	4	2
4868		HOLL	10	11	1500	S29	E66	10	16.8		A	HA	150	2	3	3
4868	24456	MWIL	10	11	1530	S30	E65	10	16.8	4	(AP)					
4868		PALE	10	11	1751	S32	E66	10	17.0		A	HS	120	2	4	3
4868		LEAR	10	12	0452	S30	E58	10	16.8		A	HK	140	2	3	3
4868		SVTO	10	12	1049	S29	E52	10	16.5		A	HH	120	2	3	2
4868		RAMY	10	12	1240	S29	E54	10	16.8		A	HA	140	2	2	3
4868		BOUL	10	12	1404	S30	E51	10	16.6		A	HA	150	2	3	2
4868		HOLL	10	12	1708	S30	E51	10	16.7		A	HK	120	2	3	3
4868		PALE	10	12	1755	S31	E52	10	16.8		A	HS	120	2	2	3
4868		LEAR	10	13	0045	S30	E47	10	16.7		A	HS	110	2	3	4
4868		RAMY	10	13	1426	S29	E40	10	16.7		A	HA	120	2	3	3
4868	24456	MWIL	10	13	1515	S30	E38	10	16.6	5	(AP)					
4868		PALE	10	13	1745	S31	E39	10	16.8		A	HS	120	2	2	3
4868		HOLL	10	13	2021	S30	E35	10	16.6		A	HK	110	2	3	2
4868		LEAR	10	14	0001	S31	E35	10	16.8		A	HK	120	2	3	3
4868		SVTO	10	14	0730	S30	E31	10	16.7		A	HH	80	2	3	4
4868		RAMY	10	14	1430	S30	E28	10	16.8		A	HA	140	3	3	3
4868	24456	MWIL	10	14	1500	S30	E26	10	16.7	5	(AP)					
4868		PALE	10	14	1805	S32	E27	10	16.9		B	CSO	110	3	3	3
4868		HOLL	10	14	1826	S30	E26	10	16.8		A	HK	80	2	3	2
4868		LEAR	10	15	0001	S31	E22	10	16.7		A	HK	100	2	2	3
4868		CULG	10	15	0400	S30	E19	10	16.7		A	HA	80	3	2	1
4868		SVTO	10	15	0720	S29	E17	10	16.6		A	HA	50	2	2	3
4868		RAMY	10	15	1343	S30	E16	10	16.8		A	HA	100	3	2	3
4868	24456	MWIL	10	15	1515	S30	E14	10	16.7	5	(AP)					
4868		HOLL	10	15	1515	S30	E15	10	16.8		A	HK	90	3	3	3
4868		BOUL	10	15	1655	S27	E15	10	16.9		B	CSO	110	3	3	1
4868		LEAR	10	16	0020	S31	E09	10	16.7		A	HK	80	2	3	3
4868		RAMY	10	16	1448	S30	E02	10	16.8		A	HA	70	6	2	4
4868		BOUL	10	16	1513	S29	E01	10	16.7		A	HS	90	2	3	1
4868		HOLL	10	16	1600	S30	E02	10	16.8		A	HK	80	4	3	2
4868	24456	MWIL	10	16	1645	S30	E02	10	16.9	5	(AP)					
4868		LEAR	10	17	0007	S31	W04	10	16.7		A	HA	40	2	3	2
4868		CULG	10	17	0500	S30	W08	10	16.6		A	HA	50	1	2	2
4868		SVTO	10	17	0753	S31	W07	10	16.8		A	HAC	80	4	3	2
4868		RAMY	10	17	1215	S31	W09	10	16.8		A	HA	100	2	4	3
4868		BOUL	10	17	1430	S30	W11	10	16.7		A	HA	90	2	3	1
4868	24456	MWIL	10	17	1500	S30	W12	10	16.7	5	(AP)					
4868		HOLL	10	17	1630	S31	W11	10	16.8		A	HA	70	2	3	3
4868		LEAR	10	18	0024	S30	W15	10	16.8		B	DSO	50	3	3	2

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4868		CULG	10	18	0400	S31	W21	10	16.5		A	HA	40	2	2	4
4868		SVTO	10	18	1005	S30	W20	10	16.8		A	HA	110	5	3	2
4868		RAMY	10	18	1430	S30	W23	10	16.8		A	HA	90	3	3	2
4868	24456	MWIL	10	18	1500	S30	W24	10	16.7	5	(AP)					
4868		HOLL	10	18	1515	S31	W24	10	16.7		A	HA	40	4	4	4
4868		BOUL	10	18	1530	S29	W24	10	16.8		A	HA	60	2	3	1
4868		PALE	10	18	1754	S31	W27	10	16.6		A	HS	60	2	2	4
4868		LEAR	10	19	0202	S30	W31	10	16.6		A	HA	40	2	2	3
4868		SVTO	10	19	0823	S31	W33	10	16.7		A	HR	90	2	3	2
4868	24456	MWIL	10	19	1500	S32	W36	10	16.8	5	(AP)					
4868		HOLL	10	19	1510	S30	W37	10	16.7		A	HS	60	2	3	4
4868		RAMY	10	19	1625	S32	W37	10	16.7		A	HA	100	2	3	2
4868		PALE	10	19	1955	S32	W40	10	16.7		A	HS	60	2	3	2
4868		LEAR	10	20	0135	S32	W43	10	16.7		A	HA	60	2	3	4
4868		SVTO	10	20	0740	S33	W45	10	16.7		B	DSO	60	2	3	3
4868	24456	MWIL	10	20	1515	S31	W50	10	16.7	5	(AP)					
4868		HOLL	10	20	1547	S31	W50	10	16.7		A	HS	40	2	3	4
4868		RAMY	10	20	1614	S32	W49	10	16.8		A	HA	40	2	2	3
4868		BOUL	10	20	1648	S31	W50	10	16.7		A	HA	80	2	2	1
4868		LEAR	10	21	0004	S31	W54	10	16.7		A	HA	40	2	3	3
4868		CULG	10	21	0440	S27	W60	10	16.5		A	HA	60	2	2	3
4868		SVTO	10	21	0841	S32	W60	10	16.6		B	DAO	70	2	3	2
4868		RAMY	10	21	1427	S32	W61	10	16.8		A	HA	40	3	2	3
4868		HOLL	10	21	1510	S31	W62	10	16.7		A	HA	40	2	3	3
4868		LEAR	10	22	0010	S31	W67	10	16.7		A	HS	30	2	3	3
4868		SVTO	10	22	0722	S34	W77	10	16.2		A	HR	30	1	2	3
4868		RAMY	10	22	1323	S32	W74	10	16.7		A	AX	10	1	1	3
4868		HOLL	10	22	1455	S32	W75	10	16.7		A	HS	30	1	2	4
4871		LEAR	10	13	0045	S29	E80	10	19.3		A	AX	20	1	1	4
4871		RAMY	10	13	1426	S27	E70	10	19.0		A	AX	20	2	1	3
4871		PALE	10	13	1745	S29	E69	10	19.1		A	AX	10	2	1	3
4871		HOLL	10	13	2021	S28	E65	10	18.9		A	AX	10	2	2	2
4871		LEAR	10	14	0001	S28	E63	10	18.9		A	AX	30	2	2	3
4871		SVTO	10	14	0730	S27	E58	10	18.8		A	AX	10	3	3	4
4874		HOLL	10	18	1515	N17	E04	10	18.9		A	AX		2	2	4
4874		PALE	10	18	1754	N17	E02	10	18.9		B	BXO		2	3	4
4874		HOLL	10	19	1510	N17	W10	10	18.9		B	BXO	10	2	3	4
4874		RAMY	10	19	1625	N17	W11	10	18.8		B	BXO	10	2	2	2
4874		PALE	10	19	1955	N17	W13	10	18.8		A	AX	10	1	1	2
4874		LEAR	10	20	0135	N17	W15	10	18.9		A	AX	10	1	1	4
4874		SVTO	10	20	0740	N16	W17	10	19.0		A	AX	10	1	1	3
4874	24461	MWIL	10	20	1515	N17	W23	10	18.9	3	(B)					
4874		HOLL	10	20	1547	N17	W23	10	18.9		B	BXO		2	3	4
4874		LEAR	10	21	0004	N18	W27	10	18.9		A	AX	10	2	2	3
4876		RAMY	10	24	1246	S24	W47	10	20.9		B	BXO	10	4	3	3
4876		HOLL	10	24	2030	S24	W51	10	20.9		B	BXO	10	2	2	3
4876		PALE	10	24	2120	S24	W55	10	20.6		A	AX	10	1	1	2
4876		LEAR	10	25	0015	S23	W54	10	20.8		B	BXO	10	2	3	3
4876		SVTO	10	25	0838	S24	W58	10	20.9		B	BXO	10	2	4	1
4876		RAMY	10	25	1408	S24	W62	10	20.8		B	BXO	10	2	5	4
4876		HOLL	10	25	1450	S24	W62	10	20.8		B	BXO	10	2	5	3
4876		LEAR	10	26	0004	S23	W70	10	20.6		B	BXO	10	2	4	3
4876		SVTO	10	26	0834	S24	W75	10	20.6		A	AX		1		3
4876		RAMY	10	26	1400	S25	W80	10	20.4		A	AX	10	1	1	4
4871A		SVTO	10	26	0834	S26	W58	10	21.8		A	AX	10	1		3
4871A		RAMY	10	26	1400	S28	W62	10	21.7		A	AX		1		4
4872	24459	MWIL	10	18	1500	S42	E40	10	21.9	3	(AP)					
4872		HOLL	10	18	1515	S42	E42	10	22.1		A	AX	10	2	1	4
4872		PALE	10	18	1754	S42	E41	10	22.1		A	AX		1		4
4872		LEAR	10	19	0202	S43	E36	10	22.0		A	AX	10	1	1	3
4872		SVTO	10	19	0823	S41	E31	10	21.9		A	AX		1	1	2
4872	24459	MWIL	10	19	1500	S40	E28	10	21.9	2	(AP)					
4872		HOLL	10	19	1510	S41	E27	10	21.8		A	AX	10	2	2	4
4872		RAMY	10	19	1625	S38	E28	10	21.9		A	AX	10	1	1	2

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4872		PALE	10	19	1955	S41	E26	10	21.9		B	BXO	20	2	1	2
4872		LEAR	10	20	0135	S42	E24	10	22.0		B	CRO	20	6	5	4
4872		SVTO	10	20	0740	S43	E22	10	22.1		B	BXO	20	8	5	3
4872	24459	MWIL	10	20	1515	S42	E17	10	22.0	4	(BG)					
4872		HOLL	10	20	1547	S41	E17	10	22.0		B	BXO	30	9	8	4
4872		RAMY	10	20	1614	S40	E16	10	22.0		B	CRO	50	5	5	3
4872		BOUL	10	20	1648	S42	E15	10	21.9		B	BXO	30	5	7	1
4872		LEAR	10	21	0004	S42	E12	10	22.0		B	CSO	40	6	9	3
4872		CULG	10	21	0440	S42	E04	10	21.5		B	CSO	60	3	7	3
4872		SVTO	10	21	0841	S42	E08	10	22.0		B	CAO	50	8	7	2
4872		RAMY	10	21	1427	S41	E06	10	22.1		B	CAI	40	7	5	3
4872		HOLL	10	21	1510	S41	E04	10	21.9		B	BXO	30	5	8	3
4872		LEAR	10	22	0010	S41	W01	10	21.9		B	CSO	40	9	9	3
4872		CULG	10	22	0450	S42	W06	10	21.7		B	DAO	100	7	8	3
4872		SVTO	10	22	0722	S42	W04	10	22.0		B	DRO	40	7	10	3
4872		RAMY	10	22	1323	S43	W05	10	22.1		B	BXO	20	8	7	3
4872		BOUL	10	22	1455	S41	W07	10	22.0		B	DSO	60	4	8	2
4872		HOLL	10	22	1455	S42	W06	10	22.1		B	BXO	40	8	9	4
4872		LEAR	10	23	0019	S42	W11	10	22.1		B	BXO	30	6	9	3
4872		SVTO	10	23	0804	S43	W16	10	22.0		B	BXO	10	3	7	2
4872		RAMY	10	23	1305	S43	W19	10	22.0		B	BXO	20	6	8	4
4872		HOLL	10	23	2308	S43	W22	10	22.1		A	AX	10	1	1	3
4873		SVTO	10	18	1005	S33	E66	10	23.7		B	BXO	20	6	7	2
4873		RAMY	10	18	1430	S33	E63	10	23.6		B	BXO	40	6	10	2
4873	24460	MWIL	10	18	1500	S33	E60	10	23.4	3	(BF)					
4873		HOLL	10	18	1515	S33	E64	10	23.7		B	BXO	40	6	9	4
4873		PALE	10	18	1754	S34	E65	10	23.9		B	BXO	20	8	10	4
4873		LEAR	10	19	0202	S36	E60	10	23.9		B	CRO	70	5	7	3
4873		SVTO	10	19	0823	S33	E54	10	23.6		B	CSI	40	13	6	2
4873	24460	MWIL	10	19	1500	S33	E52	10	23.8	4	(B)					
4873		HOLL	10	19	1510	S32	E48	10	23.4		B	CAO	40	9	10	4
4873		RAMY	10	19	1625	S32	E51	10	23.7		B	BXO	40	8	10	2
4873		PALE	10	19	1955	S33	E50	10	23.8		B	CSO	50	6	11	2
4873		LEAR	10	20	0135	S34	E47	10	23.8		B	DRO	60	5	7	4
4873		SVTO	10	20	0740	S33	E44	10	23.8		B	BXO	40	10	7	3
4873	24460	MWIL	10	20	1515	S33	E40	10	23.8	3	(B)					
4873		HOLL	10	20	1547	S32	E39	10	23.7		B	BXO	20	7	5	4
4873		RAMY	10	20	1614	S32	E39	10	23.8		B	CAO	60	6	6	3
4873		BOUL	10	20	1648	S33	E39	10	23.8		B	BXO	50	4	6	1
4873		LEAR	10	21	0004	S33	E35	10	23.8		B	CSO	20	4	6	3
4873		CULG	10	21	0440	S36	E28	10	23.4		B	CSO	50	4	6	3
4873		SVTO	10	21	0841	S33	E31	10	23.8		B	CRO	30	6	7	2
4873		RAMY	10	21	1427	S32	E28	10	23.8		B	CRO	30	10	7	3
4873		HOLL	10	21	1510	S33	E28	10	23.8		B	CSO	20	6	8	3
4873		LEAR	10	22	0010	S33	E21	10	23.7		B	CSO	30	8	8	3
4873		SVTO	10	22	0722	S32	E22	10	24.0		B	CRO	30	11	9	3
4873		RAMY	10	22	1323	S33	E15	10	23.7		B	CRO	40	9	8	3
4873		BOUL	10	22	1455	S33	E13	10	23.6		B	DRO	100	6	7	2
4873		HOLL	10	22	1455	S33	E14	10	23.7		B	BXO	30	10	8	4
4873		LEAR	10	23	0019	S33	E09	10	23.7		B	BXO	20	9	7	3
4873		SVTO	10	23	0804	S33	E07	10	23.9		B	BXO	10	12	10	2
4873		RAMY	10	23	1305	S33	E02	10	23.7		B	BXO	30	10	10	4
4873		PALE	10	23	1805	S33	W01	10	23.7		B	BXO	20	5	9	2
4873	24460	MWIL	10	26	1500	S35	W32	10	24.1	3	(AF)					
4873		HOLL	10	26	1522	S36	W32	10	24.1		A	AX	10	1	1	3
4873		PALE	10	26	1815	S35	W36	10	23.9		A	AX		1		3
4873		LEAR	10	27	0050	S35	W39	10	23.9		A	AX	10	1	1	4
4873		SVTO	10	27	0925	S36	W43	10	23.9		A	AX		2	1	4
4873		HOLL	10	27	1535	S36	W46	10	23.9		A	AX	10	2	1	4
4873A		HOLL	10	24	2030	S25	W07	10	24.3		B	BXO	10	2	4	3
4880		PALE	10	26	1815	N02	W28	10	24.7		A	AX		1		3
4880		LEAR	10	27	0050	N03	W32	10	24.6		A	AX	10	1	1	4
4877		LEAR	10	26	0004	N25	E13	10	27.0		B	BXO	10	2	3	3
4877		SVTO	10	26	0834	N25	E08	10	27.0		B	BXO	10	3	3	3
4877		BOUL	10	26	1500	N24	E04	10	26.9		A	AX	10	2	2	2

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4877	24463	MWIL	10	26	1500	N24	E04	10	26.9	3	(B)					
4877		PALE	10	26	1815	N24	E03	10	27.0		B	BXO	10	3	3	3
4877		LEAR	10	27	0050	N24	W03	10	26.8		B	CAO	20	5	3	4
4877		CULG	10	27	0515	N27	W03	10	27.0		B	CRO	30	2	3	3
4877		SVTO	10	27	0925	N24	W06	10	26.9		B	BXO	20	6	4	4
4877		BOUL	10	27	1453	N24	W08	10	27.0		B	BXO	10	2	3	2
4877		HOLL	10	27	1535	N25	W10	10	26.9		B	BXO	10	4	4	4
4877		LEAR	10	28	0015	N24	W14	10	26.9		B	BXO	10	3	2	3
4881		SVTO	10	27	0925	S22	W02	10	27.2		A	AX	10	3	3	4
4881		BOUL	10	27	1453	S21	W06	10	27.2		B	BXO	10	4	4	2
4881		HOLL	10	27	1535	S22	W05	10	27.3		B	BXO	20	5	4	4
4881		PALE	10	27	1845	S23	W07	10	27.2		B	BXO	20	5	4	3
4881		LEAR	10	28	0015	S22	W11	10	27.2		B	CRO	30	8	6	3
4881		CULG	10	28	0450	S21	W17	10	26.9		B	DSO	70	4	6	4
4881		SVTO	10	28	0845	S22	W16	10	27.1		B	DAO	90	17	6	3
4881		RAMY	10	28	1425	S22	W18	10	27.2		B	DAO	90	11	6	1
4881		BOUL	10	28	1540	S21	W19	10	27.2		B	DAO	170	10	6	1
4881		HOLL	10	28	1800	S22	W20	10	27.2		B	DAO	130	16	6	3
4881		LEAR	10	29	0034	S22	W26	10	27.0		B	DAO	130	15	7	3
4881		CULG	10	29	0430	S20	W30	10	26.9		B	DAO	160	5	7	2
4881		SVTO	10	29	0917	S23	W35	10	26.7		B	DSO	190	14	9	2
4881		RAMY	10	29	1520	S22	W33	10	27.1		B	DAO	130	10	8	1
4881		BOUL	10	29	1540	S22	W34	10	27.0		B	DAO	200	13	7	3
4881		PALE	10	29	1738	S23	W35	10	27.0		B	DSO	150	10	8	4
4881		LEAR	10	30	0020	S21	W39	10	27.0		B	CAO	90	10	9	3
4881		CULG	10	30	0430	S18	W44	10	26.8		B	DAI	180	12	8	3
4881		SVTO	10	30	1150	S23	W45	10	27.0		B	CAO	140	6	7	1
4881		RAMY	10	30	1340	S23	W46	10	27.0		B	CAO	180	14	9	3
4881		HOLL	10	30	1515	S23	W46	10	27.1		B	DAO	140	9	9	3
4881	24466	MWIL	10	30	1530	S22	W42	10	27.4	5	(B)					
4881		PALE	10	30	1807	S23	W49	10	27.0		B	CAO	140	6	7	3
4881		LEAR	10	31	0015	S21	W52	10	27.0		B	CSO	100	7	9	3
4881		CULG	10	31	0430	S18	W59	10	26.7		B	CKO	160	5	7	3
4881		SVTO	10	31	0851	S22	W59	10	26.8		B	BXO	130	5	8	3
4881		RAMY	10	31	1225	S23	W58	10	27.0		B	CAO	180	5	9	3
4881		BOUL	10	31	1735	S24	W61	10	27.0		A	HK	250	1	3	3
4881		PALE	10	31	2015	S23	W60	10	27.2		B	CHO	120	2	7	2
4881		LEAR	11	01	0110	S21	W70	10	26.8		B	CSO	120	2	5	3
4881		CULG	11	01	0515	S19	W75	10	26.6		B	CHO	160	2	8	3
4881		SVTO	11	01	1035	S22	W76	10	26.7		B	CHO	130	4	10	2
4881		RAMY	11	01	1245	S24	W78	10	26.5		B	CAO	140	3	10	3
4881		BOUL	11	01	1600	S23	W82	10	26.4		A	HS	130	1	3	3
4881		PALE	11	01	1905	S22	W80	10	26.6		A	HS	60	1	2	3
4881		HOLL	11	01	2110	S22	W76	10	27.1		B	CSO	50	2	8	3
4875		HOLL	10	23	2308	N31	E85	10	30.7		A	HS	60	1	1	3
4875		SVTO	10	24	0740	N31	E80	10	30.6		A	AX	10	1	1	2
4875		LEAR	10	24	0743	N31	E83	10	30.9		A	HS	30	1	2	2
4875		RAMY	10	24	1246	N32	E80	10	30.9		B	CSO	60	6	10	3
4875		BOUL	10	24	1517	N31	E79	10	30.9		B	BXO	30	2	4	1
4875		HOLL	10	24	2030	N31	E74	10	30.7		B	DAO	110	6	9	3
4875		PALE	10	24	2120	N30	E79	10	31.1		B	DSO	90	5	9	2
4875		LEAR	10	25	0015	N30	E75	10	30.9		B	DSO	80	6	8	3
4875		CULG	10	25	0420	N27	E75	10	31.0		B	DSO	150	6	10	3
4875		SVTO	10	25	0838	N31	E70	10	30.9		B	DAO	250	5	9	1
4875		RAMY	10	25	1408	N33	E69	10	31.1		B	EKO	400	15	13	4
4875		HOLL	10	25	1450	N33	E67	10	30.9		B	EKO	450	13	15	3
4875		BOUL	10	25	1520	N31	E66	10	30.8		B	EAO	220	6	11	1
4875		LEAR	10	26	0004	N31	E61	10	30.8		B	EAO	330	11	14	3
4875		CULG	10	26	0410	N27	E64	10	31.2		B	DAO	110	5	9	3
4875		SVTO	10	26	0834	N32	E58	10	30.9		B	DKO	300	13	10	3
4875		RAMY	10	26	1400	N33	E55	10	30.9		B	EAO	330	16	11	4
4875	24464	MWIL	10	26	1500	N30	E55	10	31.0	4	(BP)					
4875		BOUL	10	26	1500	N31	E53	10	30.8		B	CAO	190	8	8	2
4875		HOLL	10	26	1522	N33	E55	10	31.0		B	ESO	280	18	14	3
4875		PALE	10	26	1815	N30	E55	10	31.1		B	ESO	190	14	10	3
4875		LEAR	10	27	0050	N31	E50	10	31.0		B	DKO	240	13	10	4
4875		CULG	10	27	0515	N30	E46	10	30.8		B	EAO	220	8	11	3

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4875		SVTO	10	27	0925	N30	E45	10	30.9		B	EKI	300	34	13	4
4875		BOUL	10	27	1453	N31	E42	10	30.9		B	CAI	280	24	10	2
4875		HOLL	10	27	1535	N32	E41	10	30.9		B	EAI	290	33	14	4
4875		PALE	10	27	1845	N29	E38	10	30.8		B	ESI	260	27	12	3
4875		LEAR	10	28	0015	N31	E36	10	30.8		B	EAI	330	44	13	3
4875		CULG	10	28	0450	N29	E33	10	30.8		B	EAI	270	16	11	4
4875		SVTO	10	28	0845	N31	E33	10	31.0		B	ESI	200	41	13	3
4875		RAMY	10	28	1425	N31	E29	10	30.9		B	EAI	190	34	12	1
4875		BOUL	10	28	1540	N30	E27	10	30.8		B	DAI	380	26	11	1
4875		HOLL	10	28	1800	N32	E26	10	30.8		B	EAI	310	36	15	3
4875		LEAR	10	29	0034	N32	E23	10	30.8		B	EAI	240	37	12	3
4875		CULG	10	29	0430	N30	E21	10	30.8		B	EAO	290	16	11	2
4875		SVTO	10	29	0917	N31	E17	10	30.7		B	EAO	240	33	13	2
4875		RAMY	10	29	1520	N32	E13	10	30.7		B	ESO	280	24	12	1
4875		BOUL	10	29	1540	N33	E14	10	30.8		B	EAI	580	34	14	3
4875		PALE	10	29	1738	N31	E15	10	30.9		B	ESO	350	29	13	4
4875		LEAR	10	30	0020	N32	E11	10	30.9		B	EAI	270	37	13	3
4875		CULG	10	30	0430	N31	E09	10	30.9		B	EAI	270	28	13	3
4875		SVTO	10	30	1150	N31	E02	10	30.6		B	CSI	100	18	11	1
4875		RAMY	10	30	1340	N32	E03	10	30.8		B	EAO	240	39	13	3
4875		HOLL	10	30	1515	N32	E01	10	30.7		B	ESO	160	27	12	3
4875	24464	MWIL	10	30	1530	N30	E02	10	30.8	5	(B)					
4875		PALE	10	30	1807	N31	E01	10	30.8		B	ESO	200	35	14	3
4875		LEAR	10	31	0015	N32	E00	10	31.0		B	EAI	150	53	14	3
4875		CULG	10	31	0430	N31	W03	10	30.9		B	EKO	260	25	13	3
4875		SVTO	10	31	0851	N32	W08	10	30.7		B	DSO	160	34	13	3
4875		RAMY	10	31	1225	N31	W09	10	30.8		B	EAO	200	33	13	3
4875		BOUL	10	31	1735	N29	W12	10	30.8		B	FAI	200	28	17	3
4875		PALE	10	31	2015	N30	W14	10	30.7		B	ESI	100	18	14	2
4875		LEAR	11	01	0110	N31	W12	10	31.1		B	EAO	130	31	14	3
4875		CULG	11	01	0515	N31	W17	10	31.0		B	EKO	260	18	14	3
4875		SVTO	11	01	1035	N30	W24	10	30.6		B	CKI	150	30	15	2
4875		RAMY	11	01	1245	N30	W22	10	30.9		B	EAO	200	20	13	3
4875		BOUL	11	01	1600	N28	W25	10	30.8		B	EAI	230	22	12	3
4875		PALE	11	01	1905	N29	W26	10	30.8		B	ESO	160	19	11	3
4875		HOLL	11	01	2110	N31	W26	10	30.9		B	FHO	250	23	17	3
4875		LEAR	11	02	0015	N29	W30	10	30.7		B	ESO	170	28	11	3
4875		CULG	11	02	0455	N30	W29	10	31.0		B	EAI	140	18	13	3
4875		SVTO	11	02	0740	N29	W35	10	30.7		B	EKI	240	16	11	3
4875		RAMY	11	02	1504	N28	W38	10	30.7		B	DAI	240	28	10	3
4875		HOLL	11	02	1607	N28	W37	10	30.9		B	FAI	170	30	17	3
4875		BOUL	11	02	1728	N28	W38	10	30.8		B	EAI	200	16	11	1
4875		PALE	11	02	1950	N29	W40	10	30.8		B	ESO	170	15	11	2
4875		LEAR	11	03	0020	N29	W43	10	30.7		B	EAI	120	18	11	3
4875		CULG	11	03	0430	N31	W42	10	31.0		B	DAO	70	12	9	3
4875		RAMY	11	03	1441	N28	W51	10	30.7		B	DAI	160	23	9	4
4875		BOUL	11	03	1444	N28	W49	10	30.9		B	EAI	220	13	11	1
4875	24464	MWIL	11	03	1530	N29	W50	10	30.7	5	(BG)					
4875		HOLL	11	03	1613	N28	W50	10	30.9		B	EAI	140	24	15	2
4875		PALE	11	03	1820	N30	W52	10	30.8		B	ESI	180	19	11	3
4875		LEAR	11	04	0006	N31	W51	10	31.0		B	FAI	220	16	18	3
4875		CULG	11	04	0410	N29	W56	10	30.9		B	DAO	80	10	9	3
4875		SVTO	11	04	0659	N30	W58	10	30.8		B	EKI	280	9	13	3
4875		RAMY	11	04	1415	N28	W62	10	30.8		B	DAI	170	9	10	3
4875		BOUL	11	04	1451	N30	W60	10	31.0		B	CAO	210	8	9	1
4875		HOLL	11	04	1515	N28	W64	10	30.7		B	EKI	270	12	11	4
4875		PALE	11	04	1813	N30	W65	10	30.7		B	EKO	150	9	11	3
4875		LEAR	11	05	0130	N29	W68	10	30.8		B	EAO	210	8	13	3
4875		CULG	11	05	0450	N30	W66	10	31.0		B	DAO	250	4	10	2
4875		SVTO	11	05	0730	N29	W75	10	30.5		B	CAO	120	6	7	2
4875		RAMY	11	05	1323	N27	W78	10	30.6		A	HA	100	4	4	4
4875		BOUL	11	05	1540	N28	W79	10	30.6		B	CSO	90	2	3	2
4875		PALE	11	05	1902	N28	W86	10	30.2		A	HS	120	3	3	3
4875		LEAR	11	06	0104	N30	W81	10	30.8		B	HA	60	1	8	3
4875		CULG	11	06	0415	N32	W85	10	30.5		A	HS	40	1		2

Stations reporting:

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

SUDDEN IONOSPHERIC DISTURBANCES

OCTOBER 1987

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
02	1111	1222	1234	1	1		2				No flare reported		
03	1657	1725	1830	1-	1			1			1635E		4859
05	1356	1407	1452U	1	1		3				No flare reported		
05	2135	2137	2157	1-	1			1			2133 UT	C1.5	4862
06	0946	1004	1026	1	1		3				No flare reported		
06	1315	1407	1500	1	1		1				1318 UT		No region number
07	0248	0255	0324	1-	1			1			No flare reported		
07	1155	1210	1230	1	1		2				1157 UT		4862
11	1148	1200	1226	1	1		2				No flare patrol		
15	0904	0912	0929	1-	3			1		1	0906 UT	C113	4866
15	1108	1111	1140	1+	3	1	2	1		2	1108 UT	C4.5	4866
16	0917	0922	0935	1-	3		1		1	1	0916 UT	C2.1	4870
16	0957	1009	1053	2	5	3	5	2		3	0955 UT		No region number
17	1223	1232	1327	1+	5	3	5	2		5	1221 UT	M1.4	4870
17	2237E	2243	2357	1-	3			1		2	2235E	C7.7	4870
18	0521	0540	0612	1-	1			1	1		0525 UT	C1.1	4866
20	0011	0014	0115	1-	1			1	1		0005 UT	C2.3	4870
20	0359	0400	0423	1-	1			1			0356 UT	C1.2	
20	0845	0847	0855	1-	3				1	2	0843 UT	C1.2	
22	0851	0854	0910	1	1		1				No flare reported		
26	1201	1205	1220	1	1					1	No flare reported		
28	0123	0146	0241	1-	1			1			0125 UT	C2.3	4878
30	1319	1332	1357	1	1		1				1320 UT		No region number

OBSERVATORIES REPORTING FOR OCTOBER 1987*

Ayrshire, Scotlad	SES	Louisville, Kentucky, USA	SES
Darmstadt, German Federal Republic	SWF	Maui, Hawaii, USA	SWF
Edenvale, Republic of South Africa	SES	Panska Ves, Czechoslovakia	SEA, SWF, SES
Farsta, Sweden	SES	Rimavska Sobota, Czechoslovakia	SEA
Houston, Texas, USA	SES	Sao Paulo, Brasil	SES, SPA
Huancayo, Peru	SWF	Somesworth, New Hampshire, USA	SES
Inubo, Japan	SPA	Tavares, Florida, USA	SES
Juliusruh, German Democratic Republic	SWF	Tucson, Arizona, USA	SES
Kandilli, Turkey	SEA	Upice, Czechoslovakia	SEA
Kuhlungsborn, German Democratic Rep.	SPA, SEA	Valley Cottage, New York, USA	SES
Latrobe, Pennsylvania, USA	SES	Vlasin, Czechoslovakia	SEA
Lintong, Peoples Republic of China	SPA	Zilina, Czechoslovakia	SEA

*Obervations are not necessarily continuous.

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

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

OCTOBER 1987

Day:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Region No.															Number of events in active regions																
4859			1																												
4862					1		1																								
4866															2			1													
4870																1	2			1											
4878																												1			
															Number of events with X-ray flares																
					1										2	1	2	1		3								1			
															Number of events with no flare reported																
		1			1	1	1															1				1					
															Number of events with no flare patrol																
											1																				
															Number of events with flare but no active region reported																
						1										1														1	
Event Totals		1	1		2	2	2				1				2	2	2	1		3		1				1		1		1	

SOLAR RADIO EMISSION--SPECTRAL OBSERVATIONS

OCTOBER 1987

Observation				Decimetric Band			Metric Band			Dekametric Band			
Day	Start (UT)	End (UT)	Sta	Start (UT)	End (UT)	Int (1-3)	Start (UT)	End (UT)	Int (1-3)	Start (UT)	End (UT)	Int (1-3)	Spectral Type
01	0559	1245	WEIS										
	1304	1444	WEIS										
	1543	1638	WEIS										
02	0600	1638	WEIS										
			CULG				2027.0	2027.0	1				III
			CULG				2028.0	2028.0	1				III
03	0601	1634	WEIS										
04	0605	1633	WEIS										
			SGMR				1517.0	1517.0	1				V
			SGMR				1522.0	1522.0	1				V
05			LEAR				0212.0	0357.0	2				S
			PALE				0212.0	0212.0	1				III
			CULG				0245.0	0650.0	2				S
			PALE				0245.0	0245.0	1				III
			LEAR				0419.0	0444.0	2				S
			LEAR				0529.0	0530.0	2				III
			LEAR				0547.0	0555.0	1				III
			LEAR				0607.0	0618.0	2				S
			LEAR				0641.0	0646.0	2				V
	0604	0819	WEIS				0641.0	1605.0	2				III
			LEAR				0804.0	0810.0	3				III
	0824	1631	WEIS										
			LEAR				0903.0	0908.0	2				III
			LEAR				0949.0	0950.0	2				III
			SGMR				1220.0	1220.0	1				V
			SGMR				1246.0	1247.0	1				V
			SGMR				1256.0	1259.0	1				V
			SGMR				1318.0	2158.0	1				CONT
			SGMR				1600.0	1603.0	2				V
			CULG				2042.0	2051.0	1				
			PALE				2123.0	2135.0	1				S
			CULG				2124.0	2124.0	2				III
			CULG				2131.0	2141.0	3				III
			PALE				2136.0	2138.0	2				V
			LEAR				2303.0	2308.0	1				III
			PALE				2303.0	2308.0	1				III
			LEAR				2355.0	2356.0	2				III
			PALE				2355.0	2356.0	1				V
06			LEAR				0045.0	0045.0	1				III
			LEAR				0045.0	0049.0	1				III
			LEAR				0055.0	0101.0	1				III
			LEAR				0120.0	0121.0	2				III
			PALE				0120.0	0121.0	1				III
			LEAR				0143.0	0144.0	2				III
			LEAR				0222.0	0228.0	2				III
			LEAR				0355.0	0410.0	1				CONT
			LEAR				0429.0	0430.0	2				III
			LEAR				0450.0	0451.0	2				III
			LEAR				0515.0	0515.0	2				III
			LEAR				0540.0	1006.0	1				CONT
	0606	1628	WEIS				0629.0	1512.0	2				III N
			LEAR				0630.0	0632.0	2				III
			LEAR				0731.0	0742.0	3				S
			SVTO				0734.0	0735.0	2				III
			LEAR				0821.0	0821.0	2				III
			SGMR				1508.0	1511.0	1				V
			PALE				1730.0	1734.0	1				III
			PALE				1820.0	1841.0	1				S
			SGMR				1820.0	1822.0	1				V
			SGMR				1829.0	1830.0	1				V
			SGMR				1840.0	1842.0	1				V
			CULG				2050.0	2124.0	3				III
			PALE				2052.0	2123.0	2				CONT
			CULG				2204.0	2211.0	2				III
			PALE				2206.0	2211.0	2				V

SOLAR RADIO EMISSION--SPECTRAL OBSERVATIONS

OCTOBER 1987

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
06			PALE				2231.0	2232.0	1				V
			CULG				2232.0	0000.0D	1				S
			PALE				2244.0	0000.0	1				CONT
			PALE				2244.0	2334.0	1				CONT
			LEAR				2245.0	2246.0	1				III
			LEAR				2302.0	2305.0	2				III
			LEAR				2333.0	2334.0	2				III
07			LEAR				0010.0	0010.0	1				III
			CULG				0041.0	0121.0	3				III
			LEAR				0041.0	0108.0	3				S
			PALE				0041.0	0100.0	2				IV
			PALE				0100.0	0246.0	1				CONT
			LEAR				0112.0	0121.0	2				V
			LEAR				0121.0	0323.0	1				CONT
			CULG				0142.0	0142.0	1				III
			CULG				0143.0	0143.0	1				III
			LEAR				0206.0	0210.0	2				V
			CULG				0207.0	0210.0	1				III
			LEAR				0237.0	0252.0	2				S
			CULG				0238.0	0255.0	2				III
			LEAR				0530.0	0532.0	2				III
			LEAR				0622.0	0642.0	3				S
	0610	0748	WEIS				0622.6	0625.7	1				III GG
			CULG				0623.0	0626.0	2				III
			CULG							0632.0	0635.0	3	V
			CULG				0632.0	0643.0	3				III
	0815	1627	WEIS				0632.3	0635.3	3				III GG
			SVTO				0633.0	0633.0	2				V
			LEAR				0755.0	0800.0	2				III
			LEAR				0850.0	0857.0	2				III
			WEIS				0852.0	0854.6	1				III G
			WEIS				0856.6	0856.9	2				III G
			WEIS				1155.8	1215.1	3				III GG
			SGMR				1156.0	0000.0	1				CONT
			WEIS				1247.2	1248.7	2				III G
			WEIS				1257.2	1257.5	3				III G
08			CULG				0359.0	0359.0	1				III
	0609	1520	WEIS				1146.8	1146.9	1				III B
	1543	1625	WEIS				1147.9	1148.1	1				III B
			SGMR				1442.0	1443.0	1				III
			WEIS				1442.7	1442.9	2				III G
			SGMR				1729.0	1737.0	1				V
			SGMR				1734.0	1734.0	2				V
			SGMR				1843.0	1845.0	1				V
			PALE				2017.0	2017.0	1				V
			SGMR				2017.0	2017.0	1				V
			PALE				2055.0	2101.0	1				III
			CULG				2056.0	2056.0	1				III
			CULG				2101.0	2101.0	1				III
			CULG							2116.0	2116.0	1	III
			CULG				2210.0	2218.0	1				III
			PALE				2217.0	2217.0	1				III
			CULG				2308.0	2308.0	1				III
			CULG				2324.0	2333.0	2				III
			LEAR				2325.0	2331.0	3				III
			PALE				2325.0	2327.0	3				V
09			CULG							0014.0	0017.0	1	III
			LEAR				0014.0	0016.0	1				III
			PALE				0014.0	0014.0	1				III
			LEAR				0209.0	0209.0	2				III
			LEAR				0223.0	0230.0	3				III
			PALE				0224.0	0229.0	1				CONT
			LEAR				0536.0	0538.0	2				III
			LEAR				0623.0	0631.0	2				III
	0610	0807	WEIS				0631.1	0631.3	1				III B
			LEAR				0924.0	0925.0	1				III
	0830	1623	WEIS				0924.8	0925.4	2				III G

SOLAR RADIO EMISSION--SPECTRAL OBSERVATIONS

OCTOBER 1987

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
09			PALE				1802.0	1803.0	1				III
			PALE				1802.0	1820.0	2				S
			SGMR				1803.0	1803.0	1				V
			PALE				1819.0	1820.0	2				V
			SGMR				1819.0	1820.0	1				V
10			LEAR				0248.0	0249.0	2				III
			CULG				0249.0	0249.0	1				III
			CULG				0504.0	0504.0	1				III
			LEAR				0512.0	0512.0	1				III
			CULG				0513.0	0513.0	1				III
	0614	1621	WEIS										
			CULG				0646.0	0648.0	1				III
			LEAR				0646.0	0648.0	2				III
11	1321	1513	WEIS										
12	0645	1616	WEIS										
13			CULG				0051.0		1				S
			LEAR				0205.0	0206.0	1				III
			LEAR				0244.0	0249.0	1				III
			LEAR				0919.0	0919.0	1				III
	0619	1615	WEIS				0919.3	0919.6	1				III G
			CULG				2242.0	2243.0	1				III
14			CULG				0610.0	0610.0	1				III
	0618	0726	WEIS				0829.3	0829.4	1				III B
	0735	1613	WEIS				0936.9	0941.2	1				III G
			WEIS				1123.4	1126.9	1				III G
			WEIS				1133.8	1134.1	1				III G
			WEIS				1136.7	1137.4	1				III G
			WEIS				1343.4	1345.1	1				III G
			SGMR				1452.0	1452.0	1				III
	0735	1613	WEIS				1452.3	1452.5	1				III G
			SGMR				1519.0	1520.0	1				V
			SGMR				2151.0	1520.0	1				V
			LEAR				2322.0		1				CONT
			LEAR				2322.0	0250.0	1				CONT
15			CULG				0530.0		1				S
			LEAR				0551.0	0558.0	2				III
			LEAR				0650.0	0707.0	2				S
	0619	1610	WEIS				0703.8	0703.9	1				III G
			WEIS				0705.9	0706.2	1				III G
			LEAR				0720.0	0721.0	3				III
			WEIS				0720.9	0721.4	3				III G
			SVTO				0721.0	0721.0	2				III
			LEAR				0853.0	0853.0	1				III
			WEIS				0853.1	0853.4	2				III B
			LEAR				0927.0	0938.0	3				S
			WEIS				0927.1	0928.1	3				III G
			WEIS				0934.4	0935.0	3				III G
			SVTO				0937.0	0937.0	3				III
			WEIS				0937.4	0938.7	3				III G
			WEIS				1213.6	1213.7	2				III G
			WEIS				1227.7	1228.3	2				III G
	0619	1610	WEIS				1406.4	1408.0	2				III G
			SGMR				1407.0	1408.0	1				III
			PALE				1836.0	1837.0	1				V
			PALE				1855.0	1855.0	1				V
			PALE				1910.0	1911.0	2				V
			PALE				1916.0	1917.0	2				V
			PALE				1942.0	1942.0	1				III
			PALE				2014.0	0211.0	1				CONT
			CULG				2100.0		2				I
			CULG				2100.0		2				S
			SGMR				2102.0	2102.0	1				V
			PALE				2133.0	2134.0	2				V
			SGMR				2133.0	2134.0	1				V

OCTOBER 1987

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
15			LEAR				2210.0	2322.0	1				CONT
			LEAR				2308.0	2320.0	2				S
			LEAR				2345.0		3				S
			PALE				2345.0	2347.0	2				V
16			LEAR				0021.0	0028.0	3				III
			PALE				0021.0	0022.0	2				III
			LEAR				0049.0	0109.0	3				S
			PALE				0105.0	0106.0	3				III
			LEAR				0124.0	0134.0	3				S
			PALE				0131.0	0133.0	2				III
			LEAR				0140.0	0154.0	1				S
			LEAR				0206.0	0213.0	3				III
			LEAR				0224.0	0224.0	1				III
			LEAR				0239.0	0243.0	2				III
			LEAR				0254.0	0255.0	3				III
			LEAR				0308.0	0309.0	1				III
			LEAR				0322.0	0324.0	2				III
			LEAR				0428.0	0428.0	3				III
			LEAR				0509.0	0517.0	3				III
			LEAR				0559.0	0559.0	2				III
			SVTO				0600.0	0600.0	2				III
			LEAR				0634.0	0647.0	3				S
			SVTO				0634.0	0634.0	2				III
	0623	0900	WEIS				0634.0	1227.0	3				III N
			LEAR				0708.0	0728.0	1				S
			SVTO				0717.0	0717.0	3				III
			LEAR				0738.0	0758.0	2				S
			SVTO				0743.0	0743.0	2				III
			LEAR				0802.0	0839.0	3				CONT
			SVTO				0802.0	0819.0	3				S
	0905	1610	WEIS				0818.0	0819.3	3				III GG
			WEIS				0955.9	1009.0	3				III GG/VII
			SVTO				0956.0	1012.0	3				IV
			LEAR				0957.0	1010.0	3				II
			LEAR				0959.0	1010.0	3				IV
			SVTO				1001.0	1008.0	3				II
			WEIS				1102.9	1103.5	3				III G
			SGMR				1212.0	1216.0	1				V
			SGMR				1431.0	1431.0	1				V
			WEIS				1431.3	1431.7	1				III G
			SGMR				1505.0	1505.0	1				V
			WEIS				1505.7	1505.8	1				III B
			PALE				1835.0	1835.0	1				III
			PALE				2005.0	2006.0	2				V
			SGMR				2005.0	2006.0	1				V
17			CULG				0426.0		1				S
			LEAR				0428.0	0708.0	1				CONT
			CULG				0436.0		1				I
			LEAR				0438.0	0708.0	1				CONT
	0622	1608	WEIS										
			SGMR				1423.0	1423.0	1				V
			PALE				1954.0	2000.0	1				V
			SGMR				1959.0	1959.0	1				V
			PALE				2024.0	2048.0	1				CONT
			CULG				2037.0	2050.0	1				III
			PALE				2125.0	2126.0	1				III
18			LEAR				0018.0	0019.0	2				III
			CULG				0049.0	0051.0	1				III
			LEAR				0049.0	0049.0	2				III
			PALE				0049.0	0049.0	1				V
			LEAR				0118.0	0119.0	2				III
			CULG				0119.0	0120.0	1				III
			SVTO				0645.0	0646.0	2				III
	0624	1606	WEIS				1047.1	1047.2	1				III B
			WEIS				1108.2	1112.6	2				III GG
			PALE							1807.0	1807.0	1	III
			PALE				1910.0	1910.0	1				III

SOLAR RADIO EMISSION--SPECTRAL OBSERVATIONS

OCTOBER 1987

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
18			SGMR				1910.0	1910.0	1				III
			PALE				1913.0	1917.0	1				III
19	0628	1604	WEIS										
20	0627	0653	WEIS										
	0704	1602	WEIS										
			LEAR				0918.0	0919.0	1				III
21	0629	1759	WEIS										
			PALE				1742.0	1742.0	1				III
22			PALE				0331.0	0331.0	1				III
	0633	0800	WEIS										
	0809	1758	WEIS										
			PALE				1703.0	1759.0	1				S
			PALE				2014.0	2042.0	2				CONT
			PALE				2322.0	2343.0	1				S
23	0632	1756	WEIS										
24	0634	1553	WEIS										
			PALE				1833.0	1851.0	1				S
25	0638	1552	WEIS										
			PALE				1802.0	1802.0	2				III
			PALE				1821.0	1823.0	2				III
			PALE				1911.0	1911.0	2				III
			PALE				1932.0	1933.0	1				III
26			LEAR				0345.0	0345.0	1				III
	0637	0716	WEIS										
	0807	1551	WEIS										
27	0639	1549	WEIS										
28			LEAR				0134.0	0136.0	1				III
	0643	0946	WEIS										
	0956	1547	WEIS										
29			PALE				0319.0	0319.0	1				III
			LEAR				0941.0	0942.0	1				III
	0642	1540	WEIS				0941.6	0942.6	1				III G
			SGMR				1246.0	1247.0	2				V
			WEIS				1246.8	1247.9	3				III G
30			CULG				0149.0	0149.0	1				III
			LEAR				0149.0	0150.0	1				III
			CULG				0604.0	0604.0	1				III
	0644	1151	WEIS										
	1157	1544	WEIS										
			CULG				2118.0	2300.0	1				S
			CULG				2130.0		1				CONT
			PALE				2205.0		2				CONT
			LEAR				2314.0		2				CONT
			LEAR				2314.0		3				CONT
			LEAR				2314.0	1016.0	3				CONT
31			SVTO				0613.0	1214.0	1				CONT
	0648	1542	WEIS				0736.0	1530.0	2				III N
			LEAR				2229.0	1018.0	2				CONT

COSMIC RAY INDICES
(Neutron Monitor)

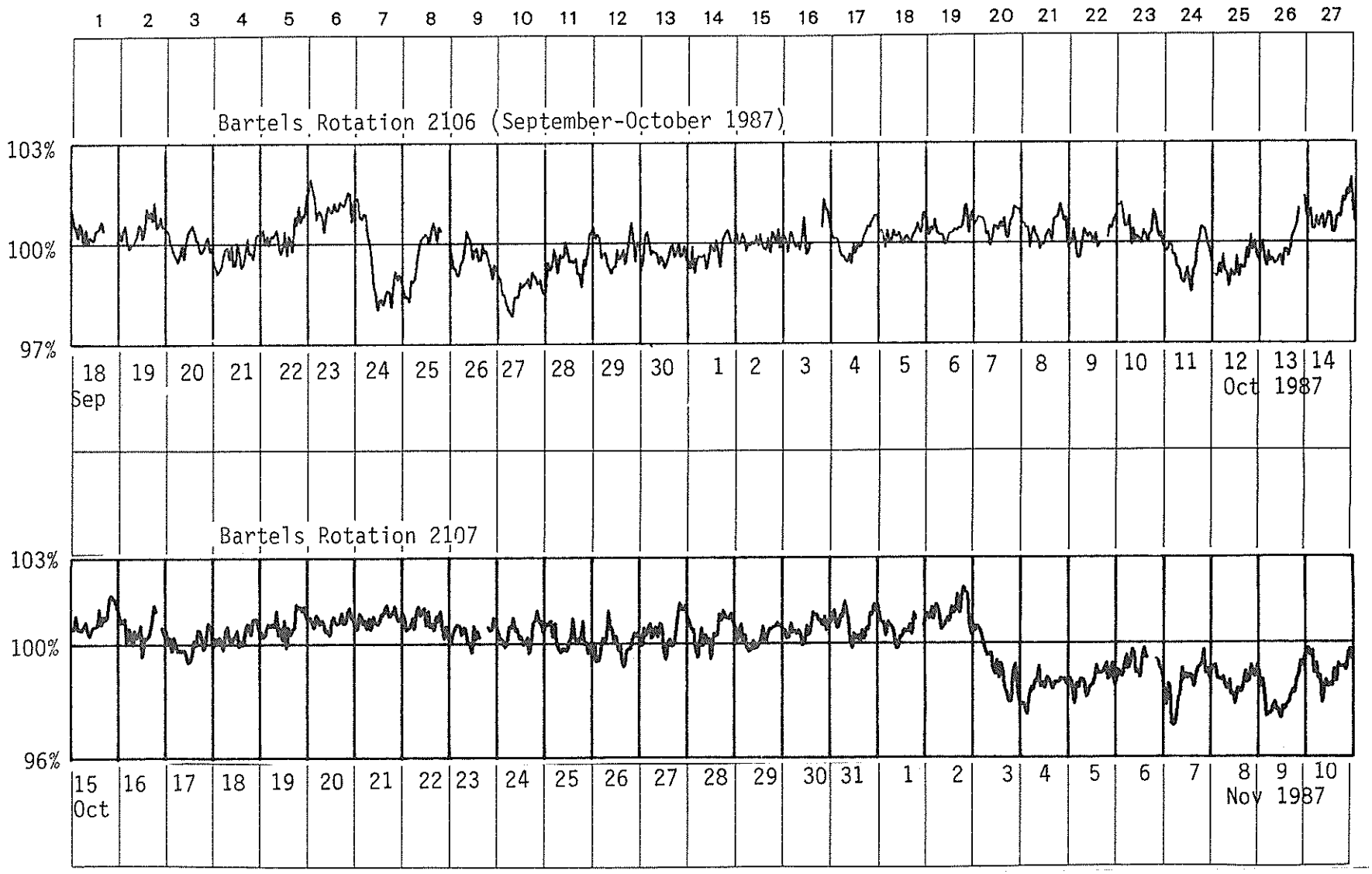
OCTOBER 1987

Day	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	PREDIGTSTUHL Average (cts/h)/100	TOKYO Average (cts/h)/256	HUANCAYO Average (cts/h)/100
1				6151.3	4065.4			
2				6175.4	4077.7			
3				6185.0	4085.2			
4				6188.7	4077.6			
5				6209.4	4086.1			
6				6236.4	4093.5			
7				6240.6	4098.4			
8				6246.5	4091.4			
9				6204.9	4081.3			
10				6217.8	4093.0			
11				6196.1	4057.8			
12				6164.7	4048.5			
13				6189.2	4071.3			
14				6224.6	4109.8			
15				6227.5	4110.7			
16				6200.5	4096.6			
17				6179.4	4077.3			
18				6179.3	4088.4			
19				6204.2	4103.4			
20				6222.6	4107.9			
21				6232.5	4111.6			
22				6233.6	4108.5			
23				6193.3	4090.9			
24				6195.8	4090.6			
25				6161.9	4083.3			
26				6156.3	4074.8			
27				6177.2	4093.8			
28				6178.1	4093.8			
29				6186.1	4086.5			
30				6181.3	4097.2			
31				6204.0	4103.2			
Mean				6198.2	4088.9			

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)

CLIMAX



GEOMAGNETIC ACTIVITY INDICES

October 1987

Day		Kp Three-Hourly Indices 1	2	3	4	5	6	7	8	Sum	Ap	Km Three-Hourly Indices Cp	1	2	3	4	5	6	7	8	aa Provisional Am	N	S	M	
1		4-	2+	3	2+	2	3	3	2+	22-	13	0.7	3	2-	3-	3-	2+	3-	3-	2	21	26	19	18	27	
2		3	2	2+	4-	2	1-	1+	0+	15+	9	0.5	2+	2-	2-	3	2	1-	2-	1-	14	17	16	24	10	
3	D3	0+	2+	4+	5-	6	5	5+	4-	32-	36	1.4	0+	2+	4	4+	5+	4+	5	3+	56	44	44	30	58	
4		3	3	3-	4-	4	2+	1	1	21-	14	0.8	3-	2	3-	4-	4-	2	1	1	22	19	23	23	20	
5	Q5	1	2	1+	2+	2-	1+	1	1+	12	6	0.3	1-	1+	1+	2+	2-	2-	1+	1+	10	12	11	11	11	CK
6	Q2	1	1+	1+	1+	1-	1	2	2	11-	5	0.2	1-	1+	2-	2-	1-	1	2	2-	9	15	7	8	14	CC
7	Q10A	0+	1+	2-	2+	4	2-	1	1+	14-	8	0.4	0+	1	2-	2+	4	1+	1	1+	15	8	15	7	16	K
8		3	2	2	3	2	1+	2	1-	16	8	0.4	3-	2+	2	3-	2	2-	2	1+	16	21	14	22	13	
9	Q1	0+	1-	1-	0+	0	0	2-	2	6-	3	0.1	1-	1	1-	0+	0	0+	2	2	6	10	6	6	11	CC
10	Q7A	3	3-	1+	1-	1	1+	2	1+	13+	7	0.4	3-	2+	1+	1-	1	2-	2	2-	12	14	8	12	10	C
11	D5	3-	3	4	3	4-	6-	5	4-	31-	28	1.2	3-	3	3+	3	4-	5+	5-	3+	49	48	55	26	77	
12	Q9A	2	2	1	1-	3-	3	2	2+	16-	8	0.4	2-	2	1	0+	3-	3-	2	3-	15	15	18	9	23	
13		3	3	3	3	4	4+	5-	4+	29+	24	1.1	3-	2	3-	3	4	4	4+	4	38	50	30	24	56	
14	D4	4+	4	4+	4	4-	6-	4+	3-	33	31	1.3	4	3	4-	4-	3	4+	4-	3-	44	47	37	40	43	
15		3	5-	4+	5-	4-	4+	4-	2+	31-	26	1.2	3-	4-	3+	4+	4-	4-	3+	2	38	40	42	42	40	
16		2+	3+	4-	2+	3-	3+	2+	2-	22-	13	0.7	2-	2+	3	2-	3-	3+	2+	2	21	24	18	18	24	
17		2+	1+	2	4	5-	4-	3+	3	24+	18	1.0	2-	1	1+	3	5-	4-	3+	3-	30	31	33	19	46	
18	Q3	2	1+	1+	2	2-	1+	1-	0+	11-	5	0.2	2-	1+	1	2-	1+	1	1-	0+	7	10	8	11	7	C
19	Q6	1+	1+	1-	2	3-	2+	1+	1+	13	6	0.3	1	1-	0+	2+	3-	2	1+	2-	11	15	14	11	17	K
20	Q8A	1	1	1	1	1+	2	2+	4	14-	8	0.4	1-	1-	1-	1+	2-	2	2	4-	14	20	13	9	24	
21		3+	3	2-	2+	2	3+	4	2	22-	13	0.8	3-	2-	2-	2+	3-	3+	4	1+	23	33	19	17	35	
22	Q4	1	1+	1	1	1	1	2	2+	11-	5	0.2	1+	1+	1+	1	1-	1	2+	3-	11	14	11	10	15	C
23		4-	3+	2	2+	2	3+	1	1-	18+	11	0.6	3-	3-	2-	2+	2	3+	1	1-	18	23	15	20	18	
24		2+	2	2+	3+	2	2+	5+	5-	24+	19	1.0	2	2-	2+	3	2+	3-	5-	4	31	36	23	17	41	
25		5-	5+	5	4+	4-	2	2+	3	30+	28	1.2	4	4	4-	4	4-	2-	2+	3-	38	40	32	51	21	
26		1+	3-	3	3+	3	3	1	2-	19	11	0.6	1+	2+	3	3	3	3-	1+	2	20	23	19	22	19	
27	D2	4+	3+	5-	4	4+	5-	5-	5+	35+	35	1.4	3+	3-	4	4+	4+	5-	4+	4+	55	52	60	42	70	
28	D1	6-	5	5	5+	4+	5	5-	3+	38+	44	1.5	5+	5-	4+	5-	4	5-	4	3-	67	81	62	89	54	
29		4	4-	3+	3+	4-	3	3	3	27	19	1.0	3+	3	3-	3	4-	3-	3	3-	28	30	26	26	30	
30		2+	3+	3+	4-	2+	1+	3-	2+	21+	13	0.7	2+	3-	3	3+	3-	1+	2+	2+	22	25	19	26	17	
31		1+	3-	3-	3-	2+	3-	3+	2	20-	11	0.6	1+	2	3-	3-	3-	2+	3	2	19	23	20	18	24	
Mean											16	0.73									25.2	27.9	23.6	25.8	

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	Sa	Prov Ri	Ra	Rs	IMF
1	3	2-	3-	3-	2+	3	3	2	22	3	2	3-	3-	2+	3-	2+	2	20	84.2	34	34	29	
2	2+	2-	2	3	2+	1	2-	1-	15	3-	2-	2-	3	2-	1-	1+	0+	13	84.8	26	26	30	
3	0+	2	4+	5-	5	4	4+	3+	52	0+	3-	4-	4	6-	5-	5+	3+	60	85.6#	37	31	30	
4	3-	2+	3	4-	4-	2+	1+	1	25	3-	2-	2+	3+	4-	2-	1	1	20	89.2	58	52	34	
5	1	2-	1+	3-	2-	2	1+	1+	12	1-	1+	1	2	1+	1+	1+	1+	9	90.1	48	49	35	
6	1-	1+	2-	2-	1	1+	2	2-	10	1-	1+	2-	2-	0+	1	2	2	9	89.5	48	40	35	
7	1-	1-	2-	2+	4	2	1	1+	15	0+	1	1+	2+	4	1	1	1+	15	90.9	39	34	36	
8	3-	2-	2-	2+	2	2-	2	1	14	3	3-	2+	3	2	2-	2	1+	18	95.0	55	48	41	
9	0+	1-	1	0+	0	0+	2+	2+	7	1-	1	1-	0+	0	0	2	2	6	92.7	50	46	38	
10	3-	3-	2-	1-	1+	2-	2	2	14	3-	2	1	1-	1	1+	2	1+	11	101.1	51	52	47	
11	2+	3	4-	3-	4-	5+	4+	4-	49	3-	3	3	3	4-	5+	5-	3+	49	100.8#	63	60	47	
12	2	2-	1	1-	3-	3	2	2+	15	2-	2	1	0+	3-	3-	2	3	15	102.2	53	53	48	
13	3-	2	3-	3	4-	4	4+	4-	37	3-	2	3-	3	4	4	4+	4	40	105.5	74	65	52	
14	4-	3	4-	3+	3+	5-	4-	3-	42	5-	3	4-	4	3	4+	4-	3	45	113.3#	92	86	60	
15	3-	4-	4-	4+	4-	4-	3+	2+	39	3	3+	3	4	4	4-	3+	2	38	117.8A	101	96	65	
16	2	3-	3+	2-	3-	3	3-	2+	22	2-	2+	3-	2	2+	4-	2+	2-	20	111.1	101	90	58	
17	2	1+	2-	3+	5-	4-	3+	3-	32	2-	1-	1	3	5-	4-	3+	3-	29	106.0	91	80	52	
18	2-	1+	1	2	1+	1+	1-	0+	8	2-	1	1	1+	1+	1	0+	0	6	106.5	86	81	53	
19	1-	1	0+	2	3-	2	1	1+	10	1	1-	0	2+	2+	2-	1+	2-	11	100.4	82	79	46	
20	1-	1-	1-	1	2	2+	2	4-	14	1	1	1-	2-	2-	2-	2-	4-	14	95.6	79	68	41	
21	3-	2+	1+	2+	3-	3+	4	2-	25	2+	1+	2-	2+	2+	3	4	1+	22	89.3	61	58	34	
22	1	1	1-	1	1	1+	2+	3-	10	1+	1+	2-	1	1-	1	3-	3-	12	88.2	50	47	33	
23	3	3-	2-	2+	2+	4-	1+	1-	20	2+	2+	2-	2+	1+	3	1-	1-	15	87.0	33	29	32	
24	2-	2-	3-	3	2+	3-	5-	4-	31	2	2	2	3-	3-	3-	5-	4	31	87.1	22	27	32	
25	4-	4	4	4+	4	2	3-	3-	41	5-	4-	3	4-	3+	1+	2+	3-	36	92.3	29	25	38	
26	1+	2+	3-	3	3-	3-	1+	2	20	1	2+	3	3	3	2+	1+	2	20	96.9	40	37	43	
27	4-	3-	4+	4	4+	5	5-	4	58	3+	2+	4-	4+	4	4	4+	5-	52	105.9	70	58	52	
28	5-	5-	5-	5-	4+	5-	4	3-	67	6-	4+	4-	5-	4	5-	4+	2+	68	106.2	79	72	53	
29	3+	3	3-	3+	4-	3-	3	2+	31	3	3-	2+	3-	3+	2+	3-	3-	25	102.7	78	74	49	
30	2+	3	3	4-	3	1+	2+	2+	24	3-	2+	3	3	2+	1	2+	2+	20	104.2	85	72	51	
31	1+	2-	3-	3-	3-	3-	3+	2	20	1+	2	3-	3-	3	2-	3	2	18	97.8	78	61	44	
Mean									25.8									24.7	97.4	61.1	55.8	43.2	

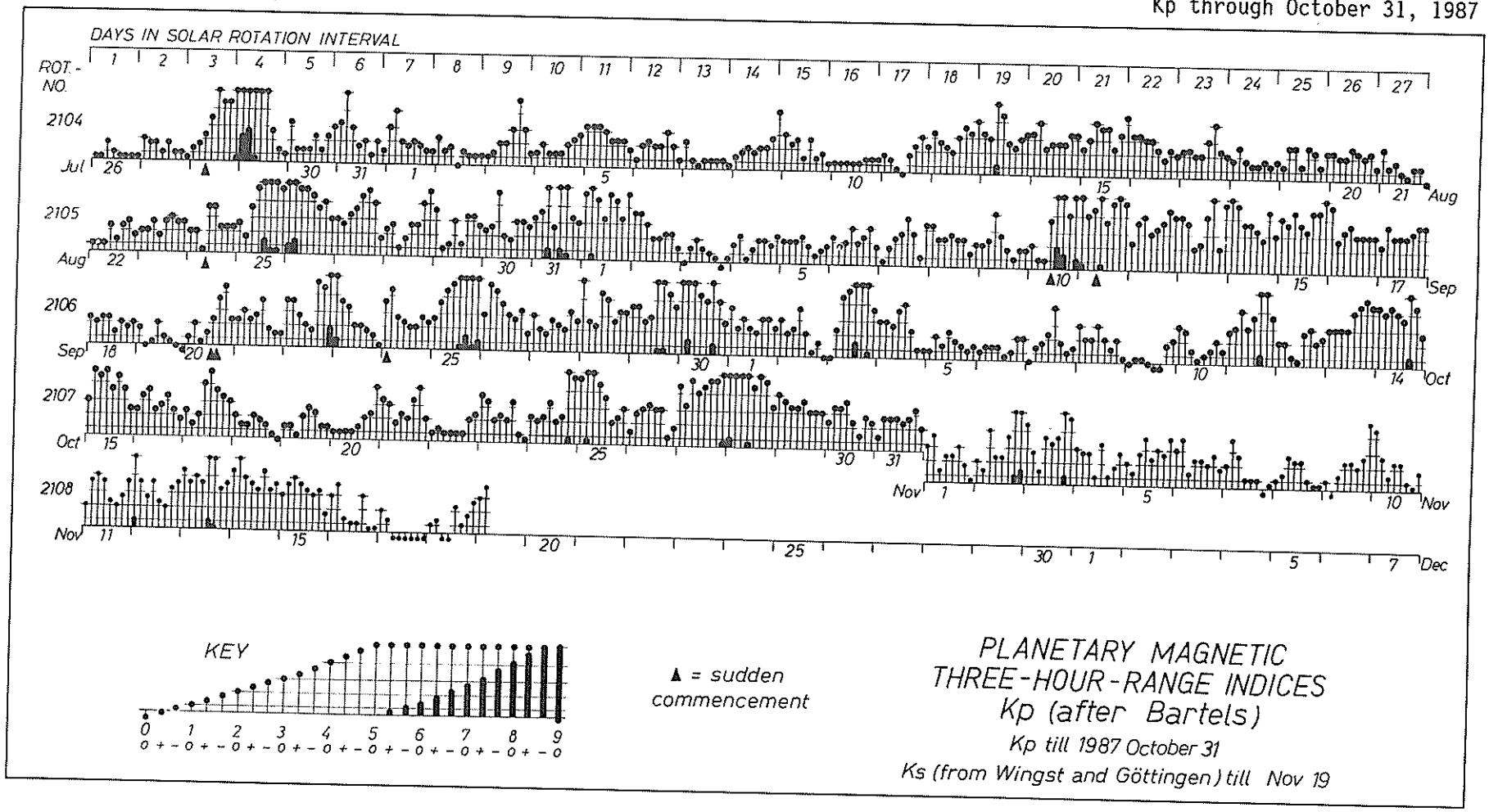
DAILY AVERAGE INDICES Ap

DAY	1986 NOV	DEC	1987 JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
1	13	13	18	7	9	10	7	8	2	10	34	13
2	6	8	10	4	3	4	6	8	3	5	12	9
3	16	6	6	4	6	2	6	4	9	12	4	36
4	67	7	3	4	10	16	5	6	8	7	6	14
5	20	4	3	4	21	12	4	7	6	13	6	6
6	12	4	3	7	10	7	5	25	5	8	9	5
7	6	6	5	9	21	13	8	9	4	4	11	8
8	4	4	7	14	12	11	4	4	10	10	10	8
9	3	6	10	11	9	8	4	3	9	8	10	3
10	5	12	6	8	11	10	10	4	11	4	38	7
11	14	8	5	7	8	7	6	7	7	7	40	28
12	9	4	10	18	14	5	2	13	7	16	22	8
13	5	12	6	4	8	12	6	6	4	23	23	24
14	5	20	5	5	8	6	9	6	5	16	26	31
15	12	4	5	6	10	6	4	4	24	19	29	26
16	11	12	12	12	12	4	4	8	20	12	19	13
17	8	5	10	9	10	5	4	6	14	11	17	18
18	6	6	8	7	12	4	2	6	10	6	7	5
19	4	6	7	5	11	8	2	17	8	9	3	6
20	5	7	18	29	4	12	4	8	9	8	11	8
21	3	11	10	19	18	3	3	6	6	5	10	13
22	2	14	10	18	15	4	7	4	8	7	29	5
23	12	22	11	14	6	4	8	3	6	10	17	11
24	46	10	7	12	5	9	20	7	12	11	14	19
25	49	11	7	7	6	4	25	7	17	39	46	28
26	17	14	7	6	13	4	9	9	4	40	20	11
27	9	9	7	12	26	9	14	5	5	21	11	35
28	5	3	11	13	12	2	10	4	26	15	22	44
29	10	3	10		5	4	21	5	52	12	30	19
30	14	4	4		4	4	9	3	9	14	43	13
31		7	8		4		11		14	34		11
MEAN	13	8	8	10	10	7	8	7	11	14	19	16

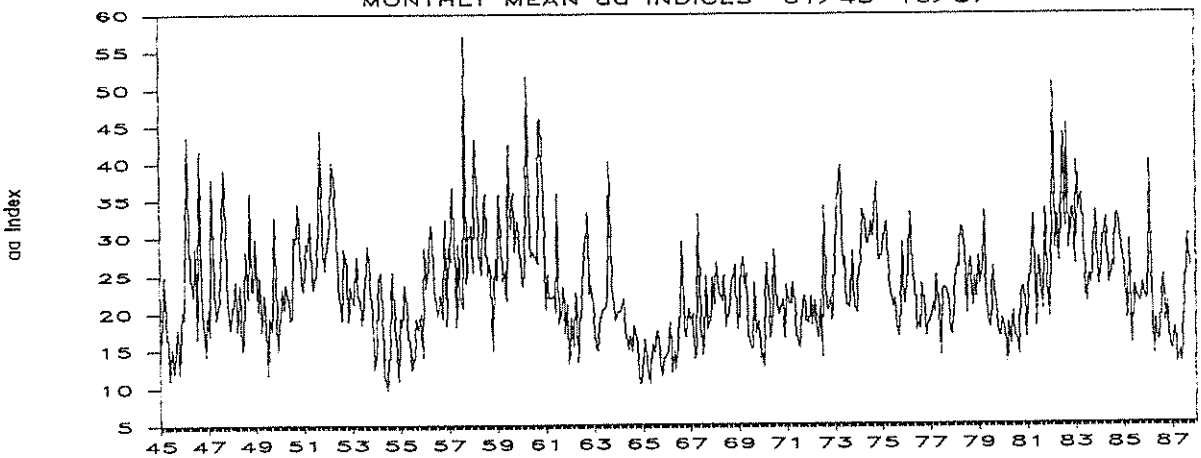
PLANETARY 3-HOUR-RANGE INDICES (Kp) BY 27-DAY SOLAR ROTATION INTERVAL

University of Göttingen

Kp through October 31, 1987



MONTHLY MEAN aa INDICES 01/45–10/87



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

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

OCTOBER 1987

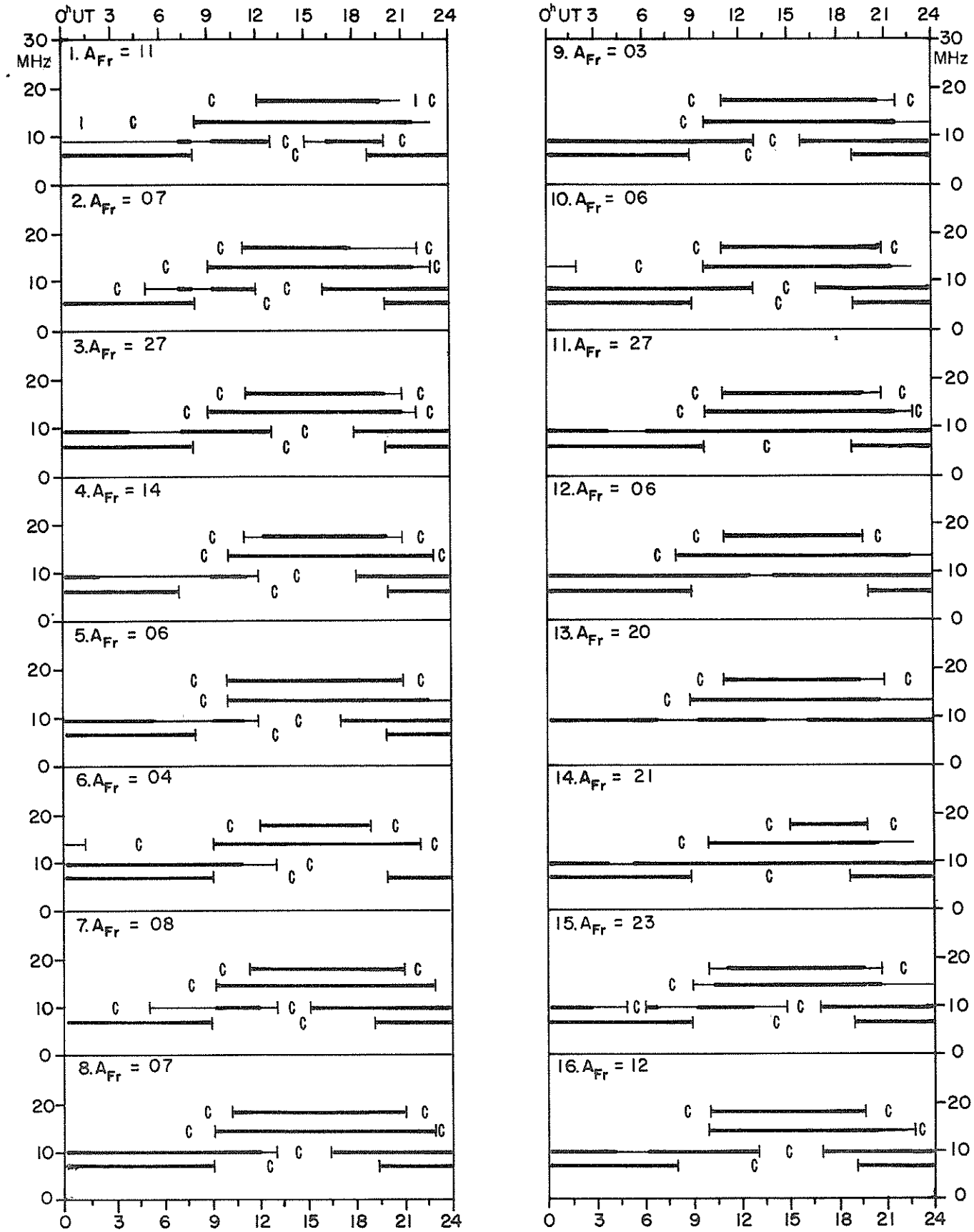
Sta	Geomag Lat	Commencement Day	Commencement Time (UT)	Commencement Type	SC Amplitudes D (Min)	SC Amplitudes H (Gamma)	SC Amplitudes Z (Gamma)	Maximum 3-Hour K Index Day(3-Hour Periods)	K	Ranges D (Min)	Ranges H (Gamma)	Ranges Z (Gamma)	End Day	End Hour (UT)
COL	64.6N	03	06--	..	..	..	..	03(5,6)	7	260	1390	1380	03	23
SIT	60.0N	03	07--	..	..	..	..	03(5)	7	--	--	--	04	15
WIT	54.2N	03	1250	SC	5	- 11	0	03(5,6,7)	5	30	150	80	03	24
FRD	49.6N	03	05--	..	..	..	..	03(4,5)	5	24	114	47	04	--
BJI	28.5N	03	0432	SC	0.4	12	..	03(5)	5	10	127	28	04	18
JAI	17.3N	03	0400	..	..	..	..		-	7	161	41	04	04
SHL	14.7N	03	0400	..	..	..	..		-	7	159	32	04	04
UJJ	13.5N	03	0400	..	..	..	..		-	5	168	35	04	04
ABG	09.5N	03	0400	..	..	..	..	03(5,7)	5	5	192	41	04	04
HYB	07.6N	03	0300	..	..	..	..	03(5,6)	6	5	207	32	03	23
GUA	04.0N	03	0434	..	..	..	..	03(5)	5	--	110	20	03	19
TRD	01.1S	03	0400	..	..	..	..		-	3	274	104	04	04
PMG	18.6S	03	0432	SC	0.5	6	7	03(4,5)	5	5	70	60	04	00
HER	33.7S	03	04--	..	..	..	..	03(7)	6	36	153	88	04	01
KGL	56.5S	03	1308	SC	- 12	-360	- 40	03(6,7)	7	92	688	400	03	23
HYB	07.6N	10	1100	..	..	..	..	11(5,6,7)	5	4	122	22	12	08
WIT	54.2N	11	0753	SC	- 2	4	0	11(6)	6	24	121	63	11	24
JAI	17.3N	11	0400	..	..	..	..		-	6	80	28	12	10
SHL	14.7N	11	0400	..	..	..	..		-	6	88	21	12	10
UJJ	13.5N	11	0400	..	..	..	..		-	4	87	28	12	10
ABG	09.5N	11	0400	..	..	..	..	11(5,6)	5	5	105	38	12	10
ETT	00.6S	11	0146	SC	- 0.5	16	5		-	-6	196	49	12	11
TRD	01.1S	11	0400	..	..	..	..		-	3	203	74	12	10
HER	33.7S	11	14--	..	..	..	..	11(6,7)	5	24	71	97	11	22
KGL	56.5S	11	1537	SC	- 8	-280	- 40	11(6)	7	39	384	144	11	21
WIT	54.2N	13	1200	..	..	..	..	14(6)	6	30	170	51	14	24
HYB	07.6N	13	0600	..	..	..	..	14(6)	5	4	98	26	15	21
ETT	00.6S	13	0100	..	..	..	..		-	-5	142	55	15	21
COL	64.6N	15	03--	..	..	..	..	15(4)	7	161	1525	640	15	21
GUA	04.0N	17	0834	..	..	..	..	17(4)	5	--	50	10	17	19
HER	33.7S	21	17--	..	..	..	..	21(7)	5	12	58	43	21	21
GNA	43.2S	21	01--	..	..	..	..	28(4)	6	21	90	120	29	16
SIT	60.0N	24	06--	..	..	..	..	25(4)	7	--	--	530	25	14
FRD	49.6N	24	18--	..	..	..	..	28(1,3,5)	5	24	116	62	29	--
JAI	17.3N	24	0230	..	..	..	..		-	4	127	18	26	04
SHL	14.7N	24	0230	..	..	..	..		-	--	--	--	--	--
UJJ	13.5N	24	0230	..	..	..	..		-	4	123	20	26	04
ABG	09.5N	24	0230	..	..	..	..	24(7)	5	6	133	32	26	04
HYB	07.6N	24	0230	SC	- 0.2	10	0	24(7) 25(4,5)	5	4	155	16	25	21
GUA	04.0N	24	1900	..	..	..	..	25(5)	5	--	120	30	25	15
TRD	01.1S	24	0230	..	..	..	..		-	5	174	77	26	04
HER	33.7S	24	17--	..	..	..	..	24(7)	5	19	85	98	25	14
KGL	56.5S	24	1730	..	..	..	..	24(7)	7	36	440	136	24	22
COL	64.6N	25	03--	..	..	..	..	25(4)	7	237	1725	870	25	15
HYB	07.6N	26	2300	..	..	..	..	27(4,5,7) 28(4,5,6)	5	5	116	19	28	22
ETT	00.6S	26	2330	..	..	..	..		-	-4	140	53	28	21
COL	64.6N	27	04--	..	..	..	..	27(3,4) 28(4)	7	284	1700	1090	28	20
SIT	60.0N	27	05--	..	..	..	..	27(3)	7	--	--	560	28	19
WIT	54.2N	27	1200	..	..	..	..	27(8) 28(1,6)	6	30	263	74	28	22
BJI	28.5N	27	06--	..	..	..	..	28(2)	6	12	99	28	28	21
JAI	17.3N	27	0500	..	..	..	..		-	6	86	33	30	03
SHL	14.7N	27	0500	..	..	..	..		-	--	--	--	--	--
UJJ	13.5N	27	0500	..	..	..	..		-	6	92	29	30	03
ABG	09.5N	27	0500	..	..	..	..	25(5) 27(7) 28(5,6)	5	6	104	31	30	03
GUA	04.0N	27	0615	..	..	..	..	27(4)	5	--	80	20	27	20
TRD	01.1S	27	0500	..	..	..	..		-	3	143	74	30	03
PMG	18.6S	27	05--	..	..	..	..	27(4,6) 28(2,4)	5	8	90	70	29	00
HER	33.7S	27	12--	..	..	..	..	27(8) 28(1,6)	5	26	142	128	28	22
GNA	43.2S	27	01--	..	..	..	..	28(4)	6	21	90	120	29	16

Stations Reporting:

ABG = ALIBAG
BJI = BEIJING
COL = COLLEGE
ETT = ETTIYAPURAM
FRD = FREDERICKSBURG
GNA = GNANGARA
GUA = GUAM
HER = HERMANUS
HYB = HYDERABAD
JAI = JAIPUR
KGL = KERGUELEN
PMG = PORT MORESBY
SHL = SHILLONG
SIT = SITKA
TRD = TRIVANDRUM
UJJ = UJJAIN
WIT = WITTEVEEN

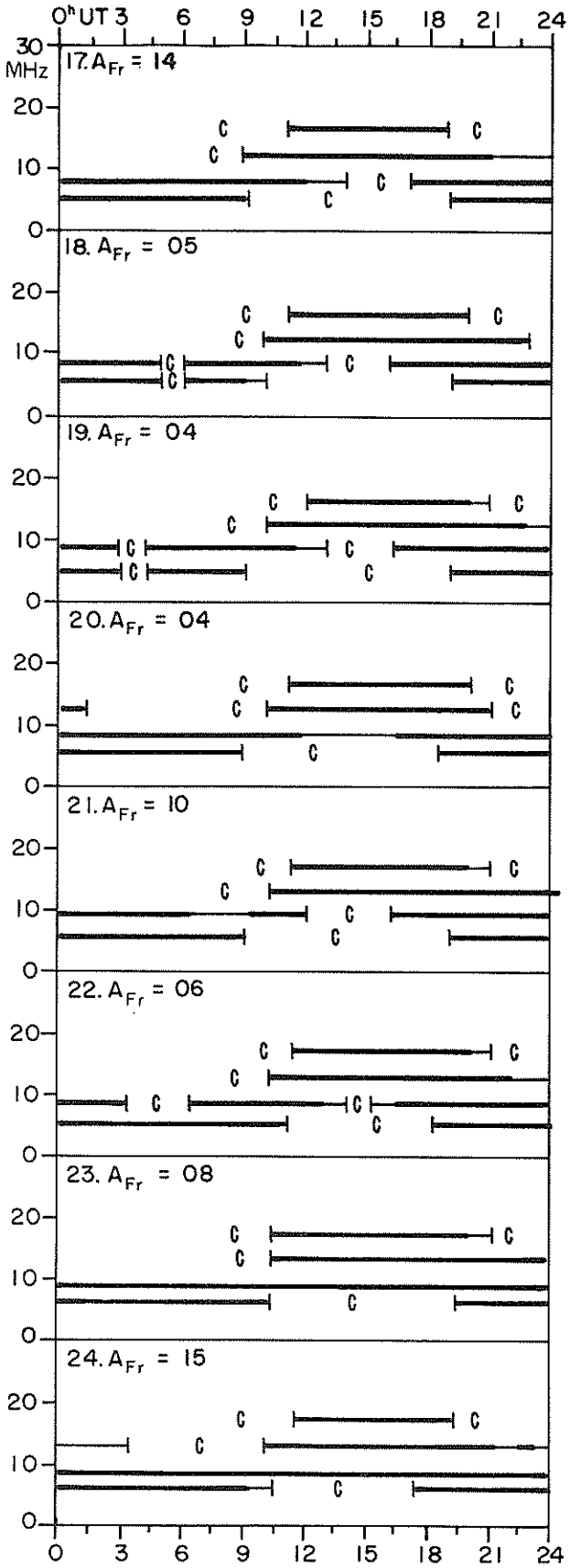
TRANSMISSION FREQUENCY RANGES--NORTH ATLANTIC PATH

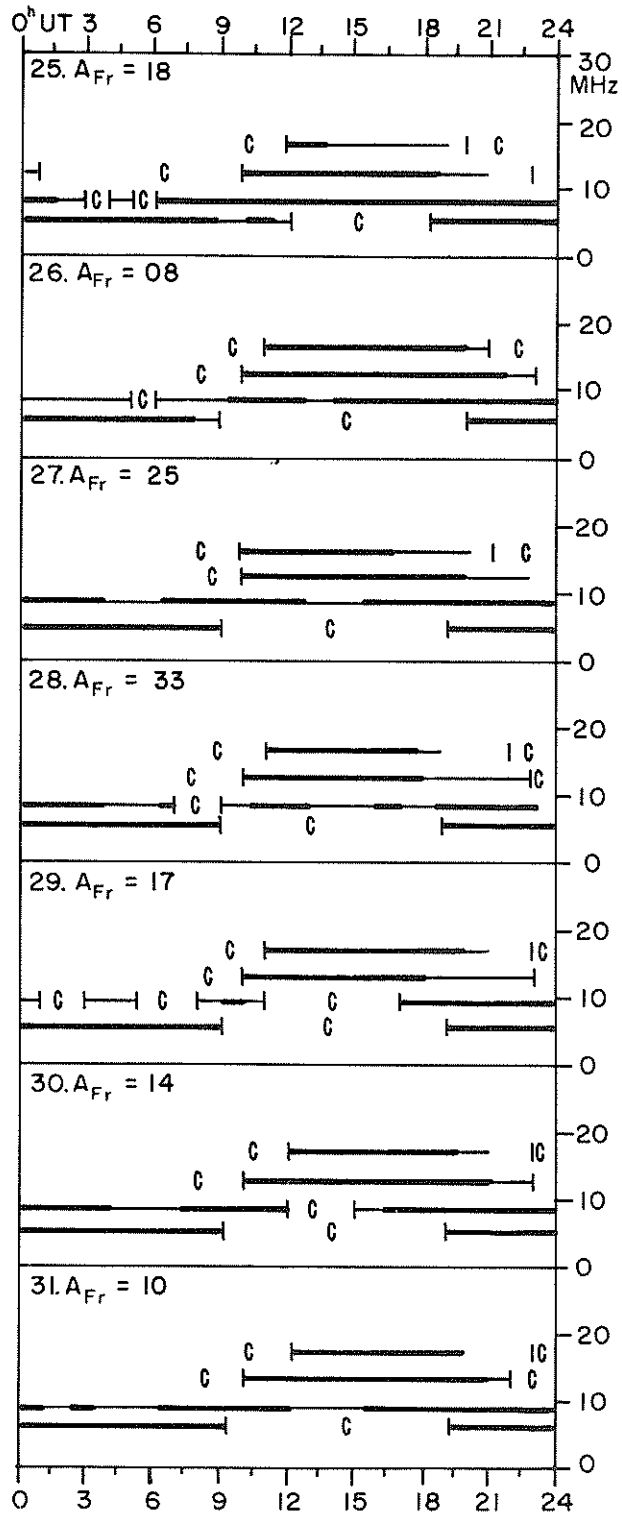
OCTOBER 1987



TRANSMISSION FREQUENCY RANGES--NORTH ATLANTIC PATH

OCTOBER 1987





Field strengths from four frequencies, 6.4, 8.6, 13.0, and 17.0 MHz, observed on a Norddeich-New York circuit are represented above. Heavy solid lines represent field strengths ≥ -12 dB above 1 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
OCTOBER 1987

Day	Bracknell	Teheran	New York	Tokyo	Johannesburg	Canberra
	For Circuits from Norddeich to:					
1	6.4	5.1	6.3	6.4	8.0	4.4
2	6.1	5.4	5.8	6.8	7.4	5.2
3	7.1	7.4	5.2	8.4	7.5	7.4
4	5.8	7.1	5.6	6.2	6.8	5.5
5	7.0	5.2	6.8	8.0	7.4	6.5
6	7.6	5.7	7.8	8.4	6.8	7.7
7	7.6	6.4	7.9	8.2	7.6	7.4
8	8.0	6.3	8.4	7.9	7.7	7.2
9	7.9	6.0	8.5	9.1	7.1	7.0
10	7.8	7.0	7.8	8.6	7.4	7.6
11	8.0	6.7	7.2	8.7	7.6	8.1
12	7.7	5.8	8.2	8.7	6.7	7.4
13	7.8	7.3	7.3	8.7	6.9	7.5
14	6.9	6.1	5.9	6.7	6.7	6.7
15	5.9	6.2	6.0	6.4	6.6	6.7
16	6.9	6.6	6.8	8.2	6.5	6.4
17	6.8	7.5	6.9	8.3	6.7	7.7
18	6.8	5.6	7.5	8.2	5.6	7.5
19	6.9	6.7	8.2	8.7	6.4	7.6
20	7.0	5.0	7.6	9.0	6.6	8.2
21	6.1	7.6	6.5	8.7	7.2	6.4
22	5.7	6.3	6.8	8.5	5.6	6.4
23	5.5	6.3	6.6	7.4	5.9	7.7
24	5.5	4.7	6.4	7.8	5.3	6.4
25	3.6	4.7	3.4	4.6	4.8	3.2
26	5.1	6.6	4.6	5.6	5.1	5.6
27	4.8	5.4	4.4	4.7	5.5	5.1
28	4.7	4.9	3.0	3.9	4.9	4.1
29	4.3	3.5	3.3	4.1	5.1	4.3
30	5.4	4.8	4.7	4.7	5.1	5.7
31	5.4	6.2	5.3	6.6	5.8	5.6
MEAN:	6.4	6.0	6.3	7.3	6.5	6.5

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

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

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

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

C O N T E N T S

Prompt Reports **LATE DATA** Number 520 Part I

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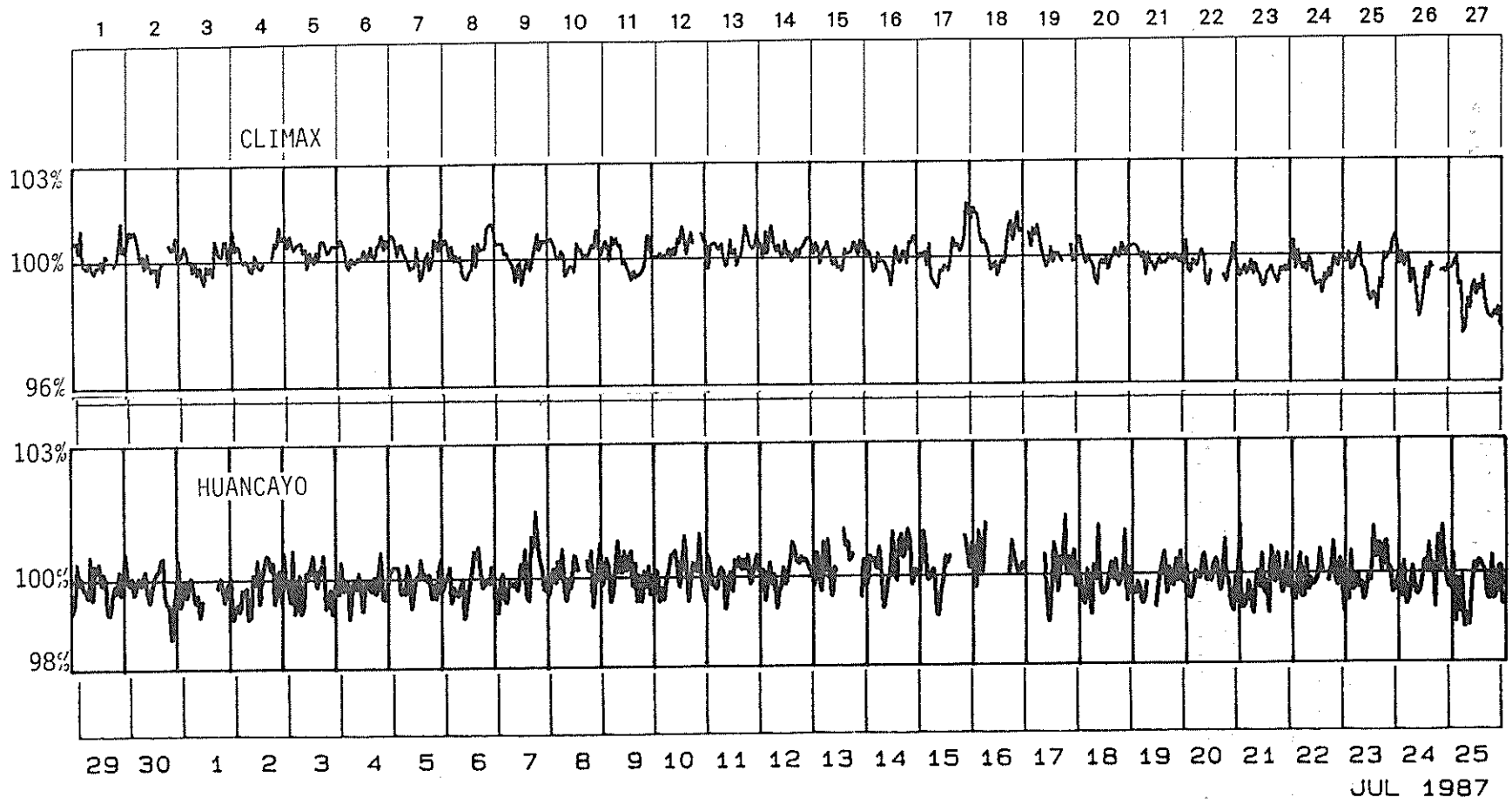
COSMIC RAY NEUTRON MONITOR Huancayo July 1987
Chart of Variations. 96
Daily Count Rates. 97

GEOMAGNETIC INDICES August-September 1987
Sudden Commencements/Solar Flare Effects. 98

COSMIC RAY INDICES
(Neutron Monitor)

BARTELS ROTATION 2103



COSMIC RAY INDICES
(Neutron Monitor)

JULY 1987

Day	THULE Average (cts/h)/100	ALERT Average (cts/h)/100	DEEP RIVER Average (cts/h)/300	KIEL Average (cts/h)/100	CLIMAX Average (cts/h)/100	PREDIGTSTUHL Average (cts/h)/100	TOKYO Average (cts/h)/256	HUANCAYO Average (cts/h)/100
1	4539			6272.6	4175.5		3638.4	1781.1(34)
2	4543			6275.1	4183.0		3643.8	1783.0
3	4542			6286.1	4189.7		3640.8	1784.5
4	4524			6282.2	4184.3		3645.9	1783.3
5	4531			6275.6	4181.8		3648.2	1786.1
6	4528			6274.9	4183.7		3647.9	1785.1
7	4538			6294.3	4178.2		3647.5	1786.9
8	4530			6293.4	4181.2		3640.4	1788.0
9	4534			6303.0	4175.8		3637.7	1787.2
10	4537			6302.6	4188.3		3643.1	1788.0
11	4528			6283.6	4186.2		3644.5	1787.9
12	4547			6300.9	4187.8		3644.8	1788.3
13	4545			6291.7	4179.8		3639.5	1791.2(38)
14	4541			6286.1	4173.7		3638.7	1791.0
15	4523			6289.5	4175.3		3638.0	1789.4(36)
16	4534			6297.3	4195.0		3654.7	1792.3(28)
17	4525			6295.2	4181.8(38)		3648.6	1788.2(32)
18	4514			6270.5	4171.8		3639.9	1784.5
19	4515			6281.3	4170.4		3638.7	1783.5
20	4517			6282.3	4161.4(38)		3640.3	1784.7
21	4506			6266.7	4151.4		3639.1	1783.5
22	4517			6271.1	4157.4		3638.8	1784.3
23	4518			6273.9	4156.0		3646.1	1786.7
24	4493			6255.4	4149.7		3656.2	1785.3
25	4485			6239.5	4118.7		---	1780.6
26	4488			6228.4	4103.5		---	1780.0
27	4478			6250.8	4125.5		---	1781.0
28	4478			6248.3	4137.7		---	1782.2
29	4468			6216.3	4145.0		---	1783.4
30	4477			6230.1	4132.2		3641.2	1783.2
31	4480			6227.6	4136.4		---	1784.4
Mean	4517			6272.4	4164.9		3642.8	1785.3

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.

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

AUGUST 1987

Storm Sudden Commencements (ssc)			Solar Flare Effects (sfe)		
Day	Time	Quality: Station Group*	Day	Begin-End	Station(s)
22	0938	A: MPO;	07	1530-1550	QUE
		B: WNG CLF SPT QUE;	08	0334-0400	MMB KAK KNY
		C: WIT GCK TEN (see sfe)	09	1354-1406	WNG
24	0938	A: SOD DOB WIT NCK COI QUE TEN MPO;	22	0936-1010	NGK NCK EBR (see ssc)
		B: WNG NGK CLF GCK MMB SPT KAK KNY;	24	2225-2233	KNY
		C: EBR AMS CZT DUM	29	1106-1124	NCK EBR MPO (see ssc)
25	0658	A: MPO;	31	0654-0724	MPO
		C: SPT AMS CZT			
29	1107	B: SOD WNG CLF COI TEN;			
		C: NGK SPT (see sfe)			

Reporting Observatories:

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

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

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

SEPTEMBER 1987

Storm Sudden Commencements (ssc)			Solar Flare Effects (sfe)		
Day	Time	Quality: Station Group*	Day	Begin-End	Station(s)
10	1134	A: PEN QUE MPO;	07	1228-1312	MPO
		B: WNG* NGK* CLF* HRB* NCK* GCK* MMB*	08	0736-0742	MPO
		EBR* SPT* LNP KGL*;	10	1049-1103	QUE
		C: WIT* BDV* KAK CZT*	19	1022-1027	NCK
20	1311	B: WNG* DOU HRB*;	21	0157-0220	MMB KAK KNY
		C: WIT* BDV*			
20	1524	A: MPO;			
		B: WNG* WIT* LNP QUE CZT* KGL*;			
		C: NGK* CLF*			
24	0157	A: SOD NUR WNG* WIT* DOU HRB NCK			
		SPT* LNP;			
		B: DOB NGK BDV* CLF* GCK MMB* EBR*			
		AQU* PEN KAK KNY* GNA*;			
28	0903	B: DOU HRB;			
		C: BDV* AMS* (si: PEN MPO)			

Reporting Observatories:

SOD DOB NUR WNG WIT NGK DOU BDV CLF HRB NCK GCK MMB AQU
EBR SPT PEN KAK KNY QUE LNP MPO GNA CAA AMS CZT KGL DUM

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

WORLD DATA CENTER A
FOR
SOLAR-TERRESTRIAL PHYSICS

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

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