

NOV 6 1964

CRPL-F 242 PART B

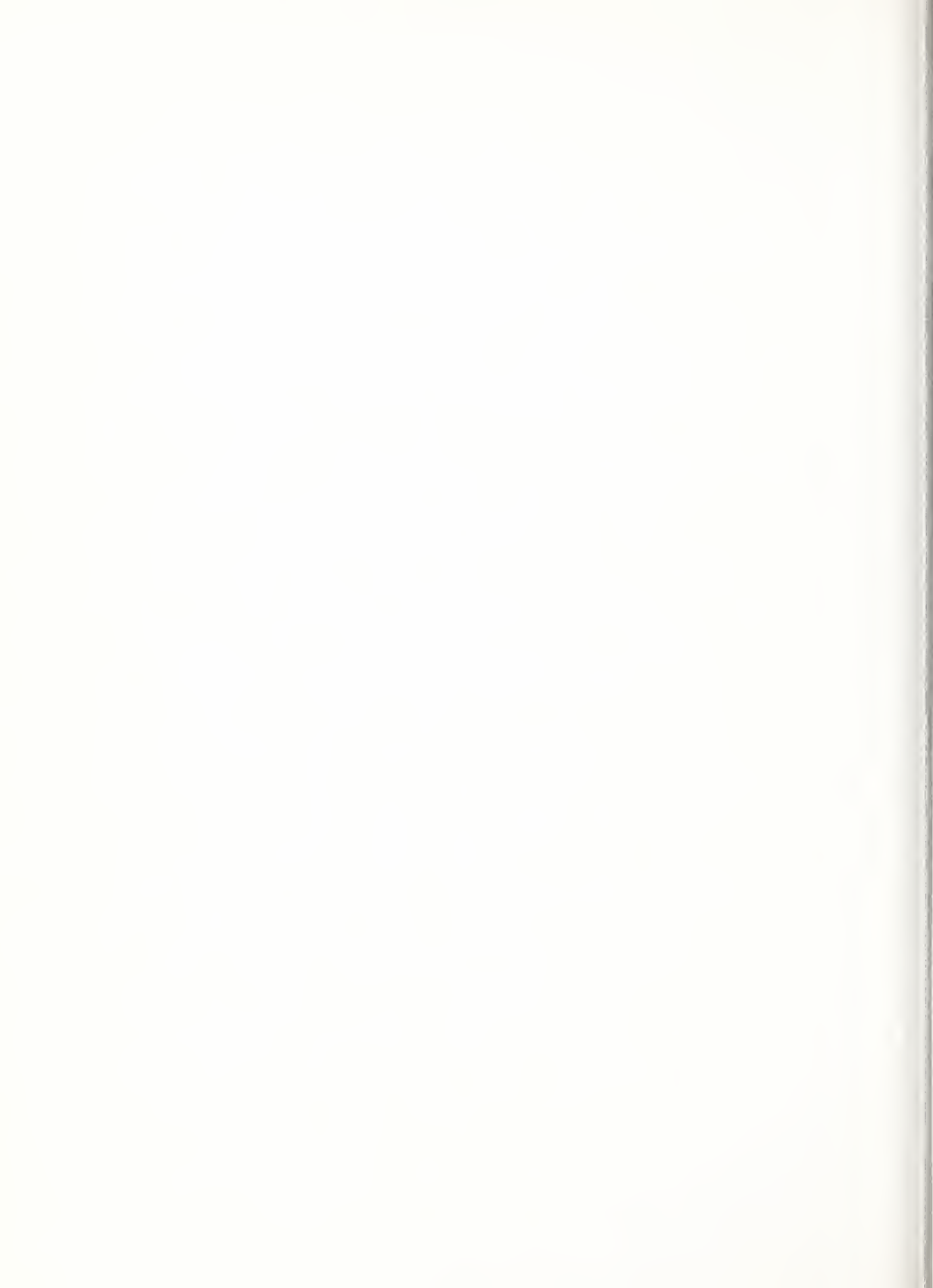
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PART B  
SOLAR - GEOPHYSICAL DATA

ISSUED  
OCTOBER 1964

U. S. DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS  
CENTRAL RADIO PROPAGATION LABORATORY  
BOULDER, COLORADO



## SOLAR - GEOPHYSICAL DATA

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The descriptive text was republished November 1963.

Addenda to the text were published August and September 1964.



## The Present Sunspot Minimum And Short-Term Predictions For The New Cycle

by R. G. Giovanelli, C.S.I.R.O., Sydney, Australia

A method of analyzing sunspot minima, based on the rate of appearance of new spot groups, has recently been described by R. G. Giovanelli (Observatory, 84, 57 (1964), who finds that time-plots for the decaying cycles are very reproducible from one minimum to another. The curves for the new cycles are almost as reproducible, the main difference between the various minima being the phase of onset of the new cycle.

Giovanelli and Miss McCabe believe that there is now just sufficient data on which to base a prediction for the new cycle. In Fig. 1 they have plotted the rates of appearance of new spot groups of both old and new cycles against solar rotation. The continuous curves are the mean decay and rise curves for previous minima this century, fitted to current observations. Old cycle points are indicated by dots, new by crosses. The broken lines are the theoretical quartile curves which, because of statistical fluctuations, should divide the observed points into four sets containing equal numbers.

The cross-over of the two curves, which is close to solar minimum, is believed to be about rotation No. 1483, which commenced on July 12, 1964. The height of the cross-over point is greater than at any previous minimum this century, suggesting that the sun will not be as quiet as during the previous minima. On their prediction, the new cycle is now dominant over the old.

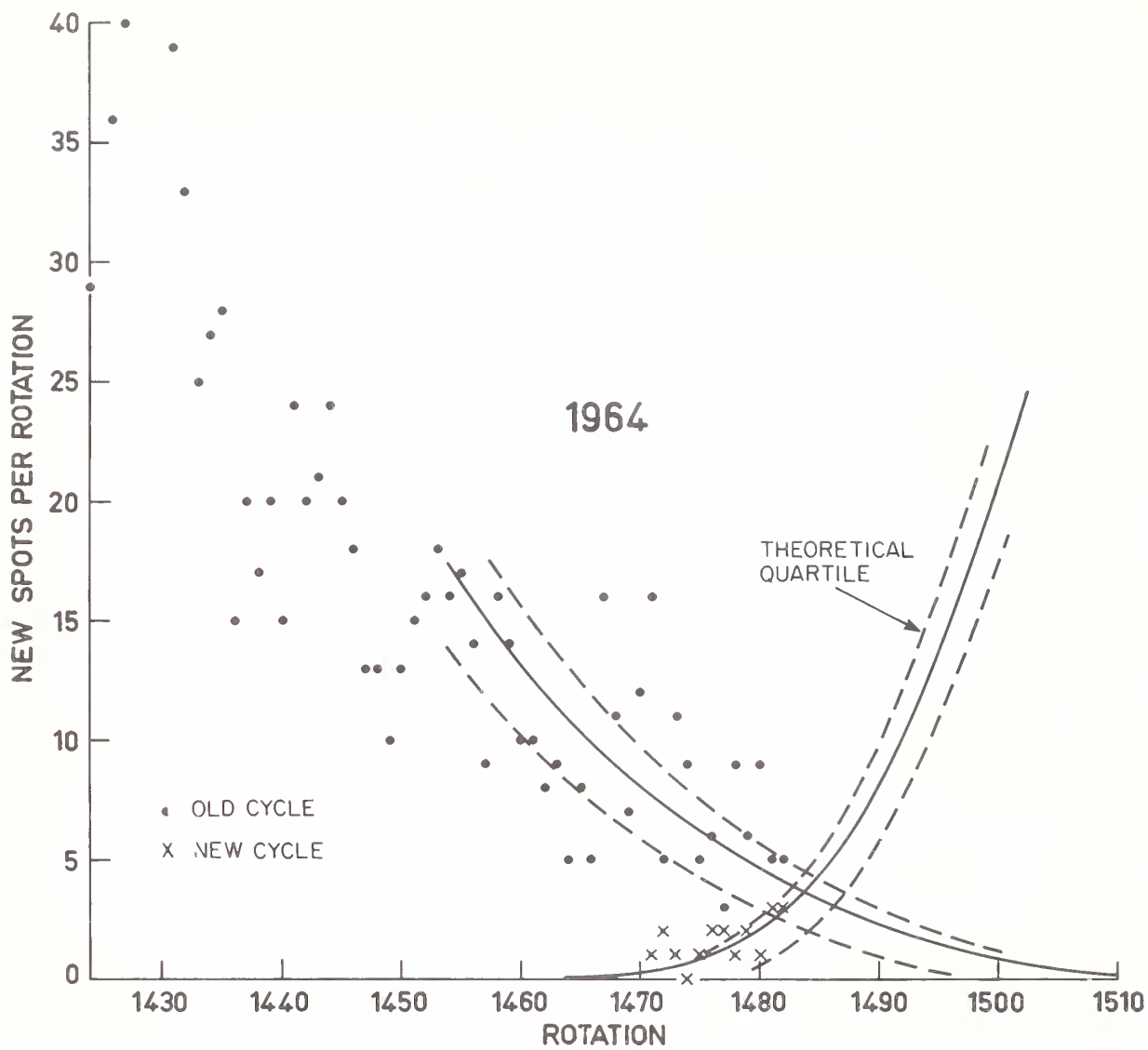


Figure 1

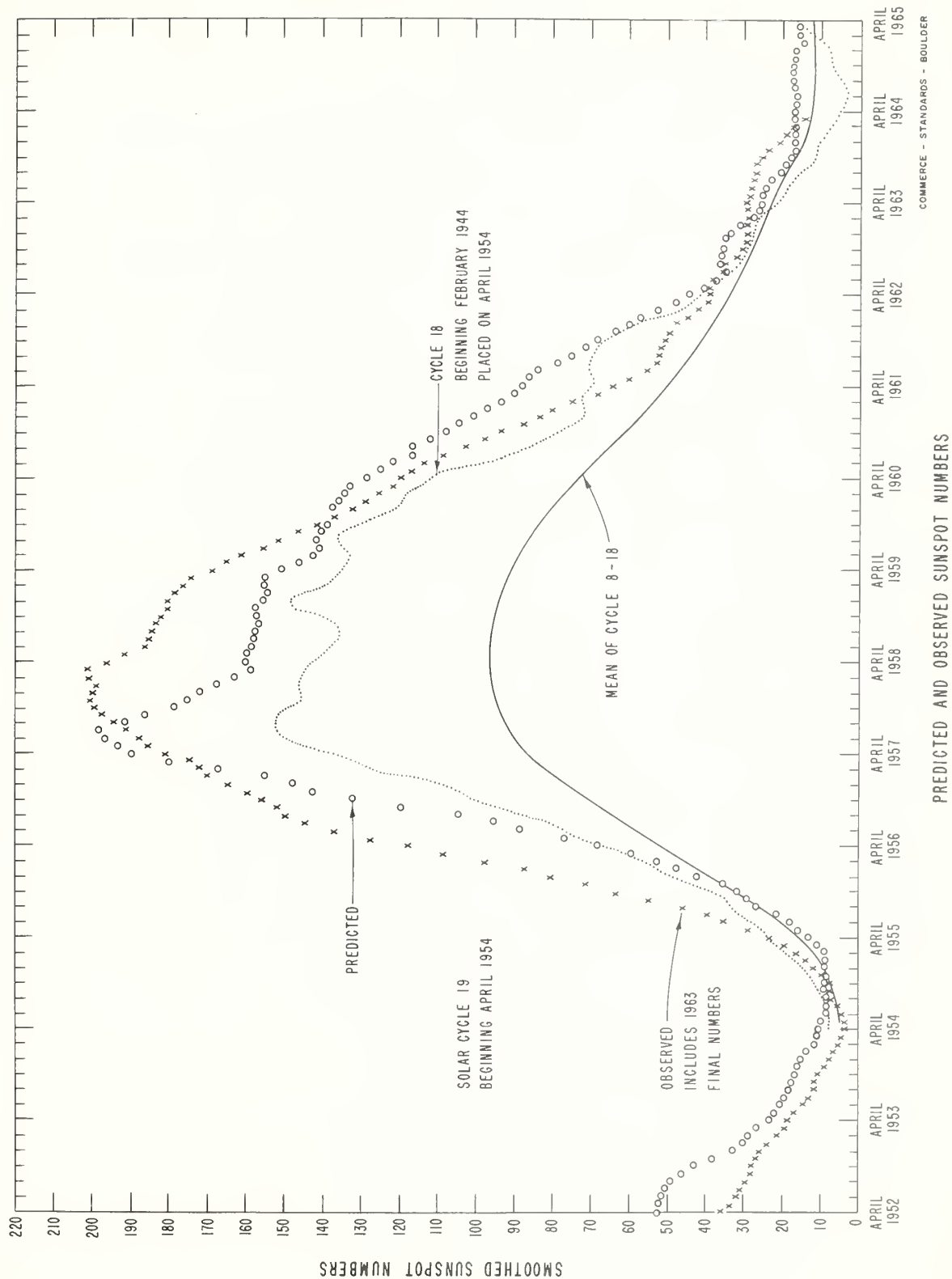




## DAILY SOLAR INDICES

Aug. 1964	American Relative Sunspot Numbers $R_A'$
1	10
2	18
3	8
4	4
5	3
6	1
7	2
8	0
9	0
10	4
11	6
12	15
13	23
14	36
15	38
16	27
17	13
18	11
19	11
20	7
21	3
22	1
23	0
24	0
25	0
26	0
27	0
28	0
29	0
30	0
31	1
Mean:	7.8

Sept. 1964	Zürich Provisional Relative Sunspot Numbers $R_Z$	Daily Values Solar Flux at 2800 Mc, Ottawa, Canada Flux S $S_A$	
1	7	70.0	71.3
2	8	69.2	70.4
3	8	69.6	70.8
4	0	69.8	71.0
5	0	69.7	70.8
6	0	70.4	71.5
7	7	70.7	71.8
8	20	70.8	71.9
9	11	71.4	72.4
10	10	71.8	72.8
11	10	72.1	73.0
12	20	72.3	73.2
13	14	72.0	72.9
14	11	71.6	72.5
15	0	71.1	71.9
16	0	69.5	70.2
17	0	68.4	69.0
18	0	68.4	69.0
19	0	68.8	69.4
20	0	68.9	69.5
21	0	68.6	69.1
22	0	68.7	69.1
23	0	68.5	69.0
24	0	68.0	68.4
25	0	67.8	68.1
26	0	69.4	69.7
27	0	69.7	70.0
28	0	70.2	70.5
29	0	70.7	70.9
30	7	71.4	71.6
Mean:	4.4	70.0	70.7



## CALCIUM PLAGE AND SUNSPOT REGIONS

SEPTEMBER 1964

Sept. 1964	LAT.	MCMATH PLAGE NUMBER	RETURN OF REGION	CALCIUM PLAGE DATA						SUNSPOT DATA		
				CMP VALUES		HISTORY	AGE (ROTA- TIONS)	DATE FIRST SEEN (1)	DURA- TION (DAYS) (1)	CMP VALUES		HISTORY
				AREA	INT.					AREA	COUNT	
2.5	S06	7473	New	(300)	(1.5)	b \ d	1	Sept. 5	2	(121) (36)	(2) (1)	b \ d l \ d
2.9	S14	7475 (2)	New	(100)	(2)	b — d	1	Sept. 6	1			
5.9	S35	7471	New	100	1.5	b — d	1	Sept. 4	2			
6.3	N38	7470	New	300	2.5	b / l	1	Sept. 3	11			
6.8	N23	7468	7430	600	2.5	l — l	2	Aug. 30	14			
8.3	N05	7479 (2)	New	(100)	(1.5)	b — d	1	Sept. 10	1			
9.3	N33	7469	New	300	1.5	l — d	1	Sept. 2	8			
9.6	N17	7472 (2)	New	(100)	(1.5)	b — d	1	Sept. 4	1			
10.0	N07	7480	New	(300)	(3)	b / l	1	Sept. 12	4			
10.1	S11	7477	New	200	2	b — d	1	Sept. 7	2			
12.1	N29	7474	7437	300	1.5	l — d	3	Sept. 5	12			
12.4	N10	7476	7443	500	1.5	l — d	2	Sept. 6	11			
14.1	S10	7481	New	100	1	b \ d	1	Sept. 12	2			
14.4	N05	7478 (3)	New	500	2.5	l \ d	1	Sept. 8	10			
14.9	N32	7482 (2)	New	100	1.5	b — d	1	Sept. 15	1			
16.3	S17	7483 (2)	New	300	1.5	b — d	1	Sept. 17	1			
19.6	S11	7484 (2)	New	100	1	b — d	1	Sept. 20	1			
20.3	S23	7489 (2)	New	(100)	(2.5)	b — d	1	Sept. 23	1			
20.7	N19	7486 (2)	New	100	1.5	b — d	1	Sept. 22	1			
21.0	S02	7490	New	(100)	(1)	b / d	1	Sept. 23	2			
22.3	N07	7487	New	200	1	b — d	1	Sept. 22	2			
22.4	N22	7495 (2)	New	(100)	(1.5)	b — d	1	Sept. 26	1			
24.4	N06	7485	New	400	1	b — l	1	Sept. 21	9			
25.4	S47	7496 (2)	New	100	1	b — d	1	Sept. 26	1			
25.5	N00	7501 (2)	New	(200)	(2)	b — d	1	Sept. 28	1			
26.2	S06	7491 (2)	New	(100)	(1)	b — d	1	Sept. 23	1			
26.3	S10	7488 (2)	New	(300)	(1)	b — d	1	Sept. 22	1			
26.5	N21	7504 (4)	New	(100)	(1.5)	b / l	1	Sept. 30	3			
26.7	N22	7498 (2)	New	200	2	b — d	1	Sept. 27	1			
26.9	N02	7494	New	200	1.5	b — d	1	Sept. 25	2			
27.8	N19	7492 (2)	New	(100)	(1)	b — d	1	Sept. 23	1			
28.7	N26	7499	New	200	1	b — d	1	Sept. 27	3			
28.9	S08	7502 (2)	New	200	1.5	b — d	1	Sept. 29	1			
29.0	N08	7505	New	200	2	b — d	1	Sept. 30	2			
29.1	N29	7493	New	(200)	(1)	b — d	1	Sept. 24	2			
29.7	S08	7508 (5)	New	400	3	b / l	1	Oct. 1	5			
30.3	N09	7497	New	(200)	(1)	b — d	1	Sept. 26	1			

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- (1) No calcium plage observations were secured at the McMath-Hulbert Observatory on Sept. 18-19, 1964.  
 (2) These very small and ephemeral plages last for only one day.  
 (3) Plage 7478 is in the same position as the short-lived plage 7446 of the preceding rotation.  
 (4) Plage 7504 is new, in the same position as ephemeral plage 7498.  
 (5) Plage 7508 is new, in the same position as ephemeral plage 7502.

# MT. WILSON MAGNETIC CLASSIFICATIONS OF SUNSPOTS

11b

SEPTEMBER 1964

SEPT. 1964	TIME MEAS. UT	LAT.	MER. DIST.	TYPE	SEPT. 1964	TIME MEAS. UT	LAT	MER. DIST	TYPE
1	1645	N22	E64	$\alpha p$	9	1925	N38	W45	$\beta \gamma$
2	1915	N22	E52	$\alpha p$	10	1725	N38	W52	$\alpha f$
3	1615	N21	E40	$\alpha p$	11	1825	N38	W69	$\beta f$
4	No Spots				12	1645	N37 N07	W80 W36	$\alpha p$ $\beta p^*$
5	1715	N22	E16	$\alpha p$	13	1845	N07	W50	$\beta \gamma^*$
6	No Obs				14-15	No Obs			
7	1850	N39 N22	W17 W12	$\beta p$ $\alpha p$	16-30	No Spots			
8	1530	N38	W30	$\beta \gamma$					

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\* Old cycle designation.

## PROVISIONAL CORONAL LINE EMISSION INDICES

SEPTEMBER 1964

CMP Sep 1964	North East Quadrant (observed 7 days earlier)					South East Quadrant (observed 7 days earlier)					South West Quadrant (observed 7 days later)					North West Quadrant (observed 7 days later)				
	G <sub>6</sub>	G <sub>1</sub>	R <sub>6</sub>	R <sub>1</sub>		G <sub>6</sub>	G <sub>1</sub>	R <sub>6</sub>	R <sub>1</sub>		G <sub>6</sub>	G <sub>1</sub>	R <sub>6</sub>	R <sub>1</sub>		G <sub>6</sub>	G <sub>1</sub>	R <sub>6</sub>	R <sub>1</sub>	
1	x	x	x	x		x	x	x	x		x	x	x	x		x	x	x	x	
2	x	x	x	x		x	x	x	x		x	8	16	20		5	8	18	30	
3	x	x	x	x		x	x	x	x		6	6	13	19		4	5	12	21	
4	x	x	x	x		x	x	x	x		4	17	14a	28a		3	17	17a	26a	
5	14	32	x	x		3	6	x	x		0	0	16	26		26	53	19	43	
6	x	x	x	x		x	x	x	x		0	0	11	15		50	102	26	46	
7	21a	48a	x	x		0a	0a	x	x		x	x	x	x		x	x	x	x	
8	x	x	x	x		x	x	x	x		x	6	15	28		14	18	14	33	
9	15a	28a	x	x		0a	0a	x	x		1	0	12	20		10	17	19	26	
10	1a	6a	11a	15a		0a	0a	10a	12a		0	0	20	24		17	45	16	20	
11	x	x	13	22		x	x	11	13		4	6	20	28		10	13	16	24	
12	12	34	x	x		0	0	x	x		x	17	x	x		x	8	x	x	
13	x	25	12	18		0	0	13	18		3	12	19	21		21	26	15	23	
14	6	x	x	x		x	x	x	x		x	x	x	x		x	x	x	x	
15	x	x	x	x		x	x	x	x		x	x	x	x		x	x	x	x	
16	6	9	15	17		4	5	13	18		2a	6a	9	10		7a	11a	11	18	
17	4	4	17	20		4	4	14	15		x	x	17	18		x	x	13	14	
18	0	0	15a	24a		0	0	11a	18a		x	x	x	x		x	x	x	x	
19	0	0	13	20		0	0	16	24		x	x	x	x		x	x	x	x	
20	0	0	17	22		0	0	12	16		3	4	x	x		4	4	x	x	
21	x	x	x	x		x	x	x	x		3	3	13	16		2	5	9	12	
22	10	12	13	20		x	x	13	18		3	9	12	16		8	10	13	19	
23	0	0	21	30		3	6	8	16		x	x	x	x		x	x	x	x	
24	1	3	17	21		1	3	10	14		x	x	x	x		x	x	x	x	
25	6	7	16	24		3	6	16	25		2a	11a	18	22		0a	0a	15	22	
26	x	x	x	x		x	x	x	x		8a	43a	15	24		0a	0a	16	24	
27	6	8	x	x		0	0	x	x		2	8	12	14		0	0	16	20	
28	13	16	14	20		12	16	17	25		x	x	x	x		x	x	x	x	
29	x	x	x	x		x	x	x	x		20	64	19	26		4	8	22	28	
30	15a	20a	10	13		6a	8a	10	12		x	x	x	x		x	x	x	x	

x = no observations

\* = yellow line emission

a = index computed from low weight data

CONVERSION - STATIONARY - 1964.08.01

## SOLAR FLARES

SEPTEMBER 1964

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		MAX. PHASE	LOCATION			DURA- TION — MINUTES	IM- POR- TANCE	OBS. COND.	TIME — U T	MEASUREMENTS			PROVISIONAL IONOSPHERIC EFFECT	
		START	END		APPROX.	MATH- PLACE REGION	MEAS. AREA Sq. Deg.					CORR. AREA Sq. Deg.	MAX. WIDTH H <sub>g</sub>	MAX. INT. %		
																LAT.
[ OTTAWA LOCKHEED LOCKHEED	SEP 1964															
	01	0205	0220	NO FLARE	PATROL											
	01	0240	0305	NO FLARE	PATROL											
	01	0315	0320	NO FLARE	PATROL											
	01	0730	0800	NO FLARE	PATROL											
	01	1000	1040	NO FLARE	PATROL											
	01	1045	1220	NO FLARE	PATROL											
	01	1710	1715	NO FLARE	PATROL											
	01	2115	2250	NO FLARE	PATROL											
	02	0340	0415	NO FLARE	PATROL											
	02	0520	0525	NO FLARE	PATROL											
	02	0740	0755	NO FLARE	PATROL											
	02	0805	0850	NO FLARE	PATROL											
	02	0900	0955	NO FLARE	PATROL											
	02	1000	1030	NO FLARE	PATROL											
	02	1035	1045	NO FLARE	PATROL											
[ OTTAWA OTTAWA LOCKHEED LOCKHEED	02	1050	1135	NO FLARE	PATROL											
	02	1140	1200	NO FLARE	PATROL											
	02	1215	1220	NO FLARE	PATROL											
	02	1555 E	1734	1557	N33 E90				1-	P	1557	•17				
	02	1659	1659	1659	N33 E90											
	02	1945	2030	NO FLARE	PATROL											
	02	2323 U	2335 U	2328 U	N20 E11				1-	2	2328	•20	•20		10	
	02	2335 U	2345 U	2338 U	N10 E49				1-	2	2338	•20	•30		10	
	03	0435	0448	0439	N21 E44				1-	C	0439	•60	•84			
	03	0500	0507	0503	N21 E44				1-	C	0503	•40	•56			
[ SYDNEY SYDNEY SYDNEY	03	0501	0505	0503	N20 E45				1-	C	0503	•40	•56			
	03	0530	0535	NO FLARE	PATROL				1-	C	0503	•40	•56			
	03	0645	0710	NO FLARE	PATROL											
	03	0720	0815	NO FLARE	PATROL											
	03	1005	1020	NO FLARE	PATROL											
	03	1025	1030	NO FLARE	PATROL											
	03	1040	1100	NO FLARE	PATROL											
	03	1150	1200	NO FLARE	PATROL											
	03	1846 U	1906 U	1851 U	S06 E10				1-	2	1851	•30	•30		10	
	03	2015 U	2026 U	2018 U	S05 E09				1-	2	2018	•20	•20		10	
LOCKHEED LOCKHEED	04	0155	0230	NO FLARE	PATROL											
	04	0500	0505	NO FLARE	PATROL											
	04	0550	0625	NO FLARE	PATROL											
	04	0800	0810	NO FLARE	PATROL											
	04	1000	1040	NO FLARE	PATROL											
	04	1045	1125	NO FLARE	PATROL											
	04	1235	1310	NO FLARE	PATROL											
	04	1643	1651 D	1644	N33 E61				1-	C	1644	•20	•40			
	05	0205	0215	NO FLARE	PATROL											
	05	0335	0415	NO FLARE	PATROL											
MCMATH	05	0420	0455	NO FLARE	PATROL											
	05	0545	0640	NO FLARE	PATROL											

COMMENCE - STANISLAUS - BOULDER

# SOLAR FLARES

SEPTEMBER 1964

OBSERVATORY	DATE SEP	OBSERVED UNIVERSAL TIME		LOCATION			DURA- TION — MINUTES	IM- POR- TANCE	OBS. COND.	MEASUREMENTS				PROVISIONAL IONOSPHERIC EFFECT	
		START	END	APPROX. LAT.	MEMATH PLACE REGION					TIME — U T	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH H <sub>3000</sub>		MAX. INT. f <sub>o</sub> F <sub>2</sub>
					HER DIST										
LOCKHEED	1964														
	05	0810	0920	NO FLARE	PATROL										
	05	1000	1020	NO FLARE	PATROL										
	05	1030	1140	NO FLARE	PATROL										
	05	1220	1225	NO FLARE	PATROL										
	05	1245	1250	NO FLARE	PATROL										
SAC PEAK LOCKHEED	05	2125	2200	2140	S14 W40			1-	2	2140	.20	.30		10	
	06	0355	0405	NO FLARE	PATROL										
	06	0420	0545	NO FLARE	PATROL										
	06	0635	0645	NO FLARE	PATROL										
	06	0745	0810	NO FLARE	PATROL										
	06	0915	1115	NO FLARE	PATROL										
ARCETRI	06	1140	1145	NO FLARE	PATROL										
	06	1200	1255	NO FLARE	PATROL										
	07	0047 E	0056 0	0050	N20 W09			1-	C		.21	.21		18	
	07	0048	0059	0053	N20 W10			1-	2	0053	.30	.30		20	
	07	0120	0430	NO FLARE	PATROL										
	07	0510	0525	NO FLARE	PATROL										
LOCKHEED MCMATH SAC PEAK	07	0600	0605	NO FLARE	PATROL										
	07	0615	0640	NO FLARE	PATROL										
	07	0750	0825	NO FLARE	PATROL										
	07	0835	0900	NO FLARE	PATROL										
	07	0900 E	0910 0	0910	N38 W14			1-	3	0900	.52	.62			
	07	1000	1020	NO FLARE	PATROL										
CAPRI-S	07	1025	1115	NO FLARE	PATROL										
	07	1135	1255	NO FLARE	PATROL										
	07	2055	2119	2104	N21 E39			1-	2	2104	.20	.30		10	
	07	2057	2110	2100	N32 E41			1-	C	2100	.20	.30			
	07	2058 E	2115 0	2102	N32 E40			1-	C		.29	.33		17	
	08	0400	0405	NO FLARE	PATROL										
CAPRI-S	08	0425	0435	NO FLARE	PATROL										
	08	0455	0635	NO FLARE	PATROL										
	08	0710 E	0725	NO FLARE	N38 W24			1	3	0722	1.50	2.00			
	08	0750	0830	NO FLARE	PATROL										
	08	0851 E	0905	NO FLARE	N38 W26			1-	3	0855	.50	.60			
	08	1000	1205	NO FLARE	PATROL										
LOCKHEED	08	2000	2040	2020	N28 W68			1-	2	2020	.20	.40		10	
	08	2250	2330	2257	S15 E15			1-	2	2257	.30	.30		10	
	09	0020	0035	NO FLARE	N38 W34			1-	V	0020	1.20	1.70			
	09	0310	0325	NO FLARE	PATROL										
	09	0410	0415	NO FLARE	PATROL										
	09	0430	0450	NO FLARE	PATROL										
CAPRI-S ARCETRI CAPRI-S	09	0500	0525	NO FLARE	PATROL										
	09	0605	0825	NO FLARE	PATROL										
	09	0805 E	0817	NO FLARE	N37 W32			1-	3	0812	.30	.40			
	09	0825 E	0838 0	N37 W38				1-	3	0838	.46	.66			
	09	0830	0846	N37 W35				1-	3	0836	.30	.40			

SEPTEMBER 1964



# SOLAR FLARES

SEPTEMBER 1964

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		LOCATION		DURA- TION — MINUTES	IM- POR- TANCE	OBS. COND.	MEASUREMENTS			PROVISIONAL IONOSPHERIC EFFECT		
		START	END	MAX. PHASE	APPROX. LAT.				MER. DIST.	MCMATH PLAGE REGION	TIME — U T		MEAS. AREA Sq. Deg.	COBR. AREA Sq. Deg.
LOCKHEED	SEP 1 1964													
	09	1000	1100	NO FLARE	PATROL									
	09	1110	1225	NO FLARE	PATROL									
	09	1230	1305	NO FLARE	PATROL									
	09	1925	1952	1935	S21 W60		1-	2	1935	.20	.30		10	
	10	0500	0515	NO FLARE	PATROL									
	10	0540	0550	NO FLARE	PATROL									
	10	0555	0610	NO FLARE	PATROL									
	10	0615	0645	NO FLARE	PATROL									
	10	0650	0810	NO FLARE	PATROL									
LOCKHEED	10	0835	0845	NO FLARE	PATROL									
	10	1010	1025	NO FLARE	PATROL									
	10	1030	1140	NO FLARE	PATROL									
	10	1200	1210	NO FLARE	PATROL									
	10	1220	1230	NO FLARE	PATROL									
	10	1805	1817	1810	S12 E40		1-	2	1810	.20	.30		10	
	11	0145	0635	NO FLARE	PATROL									
	11	0845	0855	NO FLARE	PATROL									
	11	0905	1015	NO FLARE	PATROL									
	11	1020	1135	NO FLARE	PATROL									
HUANCAYO SYDNEY	11	1225	1250	NO FLARE	PATROL									
	11	1650 E	1920 D		N37 W73		1-	S	1650	.40	1.30			
	11	2209	2221	2213	N38 W72		1	C	2213	1.00	4.00			
	12	0445	0455	NO FLARE	PATROL									
	12	0521	0535	0524	N06 W28		1-	C	0524	.80	.92			
SYDNEY	12	0624	0633	0627	N07 W28		1-	C	0627	1.20	1.32			
	12	0750	0800	NO FLARE	PATROL									
	12	0835	0855	NO FLARE	PATROL									
	12	0915	0955	NO FLARE	PATROL									
	12	1005	1120	NO FLARE	PATROL									
MCMATH OTTAWA	12	1710	1729	1715	N37 W85		1-	C	1715	.30	.30			
	12	1712	1735	1718	N37 W84		1-	2	1718	.20	.60		10	
	12	1715 E	1722		N38 W82		1-	C	1716	.47	1.30			
	12	1928	1946	1935	N37 W84		1-	2	1935	.40	1.00		10	
	12	1929	1939	1932	N37 W87		1-	C	1932	.30	.30			
MCMATH	12	2015	2026	2018	N06 W39		1-	C	2018	.30	.40			
	12	2100	2111	2102	N37 W88		1-	C	2102	.30	.30			
	12	2100	2115	2104	N37 W84		1-	2	2104	.20	.60		10	
	13	0120	0200	NO FLARE	PATROL									
	13	0250	0435	NO FLARE	PATROL									
CAPRI-S	13	0510	0535	NO FLARE	PATROL									
	13	0702	0724	NO FLARE	N38 W85		1-	2	0712	.80				
	13	0750	0805	NO FLARE	PATROL									
	13	0810	0840	NO FLARE	PATROL									
	13	0925	0935	NO FLARE	PATROL									
ARCTRI	13	0952 E	1000 D		N37 W88		8 D	1	0952	.49	2.40			
	13	1000	1045	NO FLARE	PATROL									
	13	1055	1120	NO FLARE	PATROL									
	13	1055	1120	NO FLARE	PATROL									
	13	1055	1120	NO FLARE	PATROL									

# SOLAR FLARES

SEPTEMBER 1964

OBSERVATORY	DATE SEP 1964	OBSERVED UNIVERSAL TIME		LOCATION			DURA- TION — MINUTES	IN- POR- TANCE	OBS COND.	MEASUREMENTS				MAX INT. % <sub>s</sub>	PROVISIONAL IONOSPHERIC EFFECT	
		START	END	MAX. PHASE	APPROX.					MEMATH PLACE REGION						
					LAT.	MER DIST.										
LOCKHEED	13	1240	1245	NO FLARE	PATROL	N38 W90		1-	2	1650	.10	.50		10		
	13	1638	1730	1650	N38 W90		1-	2	1915	.10	.50		10			
	13	1905	1930	1915												
	14	0435	0440	NO FLARE	PATROL											
CAPRI-S	14	0708 E	0725 D	NO FLARE	PATROL	S04 E33		1-	3	0710	1.00	1.30				
	14	0800	0845	NO FLARE	PATROL											
	14	1010	1100	NO FLARE	PATROL											
	14	1110	1120	NO FLARE	PATROL											
LOCKHEED	14	2055	2110	2100	S09 W68		1-	2	2100	.10	.30		10			
	15	0100	0115	NO FLARE	PATROL											
	15	0745	0830	NO FLARE	PATROL											
	15	1000	1055	NO FLARE	PATROL											
LOCKHEED	15	1105	1120	NO FLARE	PATROL											
	16	0345	0400	NO FLARE	PATROL											
	16	0805	0850	NO FLARE	PATROL											
	16	0855	0900	NO FLARE	PATROL											
	16	0905	0945	NO FLARE	PATROL											
	16	1005	1045	NO FLARE	PATROL											
	16	1050	1105	NO FLARE	PATROL											
	16	1110	1125	NO FLARE	PATROL											
	16	1730	1805	NO FLARE	PATROL											
	16	2100	2120	2106	N35 W55		1-	2	2106	.10	.20		10			
	17	0120	0230	NO FLARE	PATROL											
	17	0645	0805	NO FLARE	PATROL											
	17	0810	0900	NO FLARE	PATROL											
	17	0935	1005	NO FLARE	PATROL											
	17	1010	1025	NO FLARE	PATROL											
	17	1045	1055	NO FLARE	PATROL											
17	1105	1150	NO FLARE	PATROL												
17	1200	1215	NO FLARE	PATROL												
SYDNEY	18	0100	0235	NO FLARE	PATROL											
	18	0315	0330	NO FLARE	PATROL											
	18	0631	0656	0637	N07 E50		1-	C	0637	.30	.45					
	18	0805	0825	NO FLARE	PATROL											
	18	0830	0840	NO FLARE	PATROL											
	18	0855	0915	NO FLARE	PATROL											
	18	0925	0950	NO FLARE	PATROL											
	18	0955	1030	NO FLARE	PATROL											
	18	1105	1120	NO FLARE	PATROL											
	18	1125	1215	NO FLARE	PATROL											
18	1240	1300	NO FLARE	PATROL												
18	1855	1905	NO FLARE	PATROL												
19	0155	0215	NO FLARE	PATROL												
19	0245	0315	NO FLARE	PATROL												
19	0345	0400	NO FLARE	PATROL												

## SOLAR FLARES

SEPTEMBER 1964

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		LOCATION			DURA- TION — MINUTES	IM- POR- TANCE	OBS. COND.	MEASUREMENTS				PROVISIONAL IONOSPHERIC EFFECT	
		START	END	MAX. PHASE	APPROX. LAT.	MER. DIST.				McMATH PLAGE REGION	TIME U T	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.		MAX. WIDTH Ha
LOCKHEED F SAC PEAK E SYDNEY	SEP 1964														
	19	0605	0610	NO FLARE	PATROL										
	19	0655	0805	NO FLARE	PATROL										
	19	0925	0930	NO FLARE	PATROL										
	19	1000	1125	NO FLARE	PATROL										
	19	2039	2052	2043	N26 E06			1-	2	2043	.20	.20		10	
	19	2218	2248	2222	N09 E28			1-	2	2218	.60	.60		20	
	19	2220 E	2245 D	2222	N08 E28			1-	C	2218	.55	.57		17	
	19	2220	2252 D	2223	N08 E28		7487	1	P	2223	1.80	2.07			
	20	0415	0645	NO FLARE	PATROL										
LOCKHEED	20	0745	0805	NO FLARE	PATROL										
	20	1005	1330	NO FLARE	PATROL										
	20	1335	1340	NO FLARE	PATROL										
	20	1355	1400	NO FLARE	PATROL										
	20	1545 E	1604	1548	N01 W62			1-	2	1548	.20	.30		10	
	21	0017	0030	0022	N02 W56			1-	2	0022	.30	.50		10	
	21	0105	0140	NO FLARE	PATROL										
	21	0155	0455	NO FLARE	PATROL										
	21	0505	0625	NO FLARE	PATROL										
	21	0730	0935	NO FLARE	PATROL										
McMATH SYDNEY	21	0945	0955	NO FLARE	PATROL										
	21	1000	1035	NO FLARE	PATROL										
	21	1040	1240	NO FLARE	PATROL										
	21	2056	2112	2101	N05 E35		7485	1-	C	2101	.10	.10			
	21	2231	2235	2232	N02 E34			1-	C	2232	.40	.48			
	22	0130	0140	NO FLARE	PATROL										
	22	0235	0255	NO FLARE	PATROL										
	22	0330	0630	NO FLARE	PATROL										
	22	0730	0820	NO FLARE	PATROL										
	22	1000	1100	NO FLARE	PATROL										
CAPRI-S	22	1105	1235	NO FLARE	PATROL										
	22	1240	1520	NO FLARE	PATROL										
	22	1525	1550	NO FLARE	PATROL										
	23	0110	0225	NO FLARE	PATROL										
	23	0555	0600	NO FLARE	PATROL										
	23	0700	0810	NO FLARE	PATROL										
	23	0835	0840	NO FLARE	PATROL										
	23	1000	1050	NO FLARE	PATROL										
	23	1055	1115	NO FLARE	PATROL										
	23	1120	1140	NO FLARE	PATROL										
CAPRI-S	23	1145	1240	NO FLARE	PATROL										
	24	0005	0020	NO FLARE	PATROL										
	24	0030	0235	NO FLARE	PATROL										
	24	0535	0540	NO FLARE	PATROL										
	24	0626 E	0705 D	NO FLARE	N42 W90			1-	3	0645	1.00				
	24	0700	0815	NO FLARE	PATROL										
	24	1000	1055	NO FLARE	PATROL										
	24														
	24														
	24														

COMMERCE - STANDARDS - BOULDER

SEPTEMBER 1964

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		LOCATION			DURA- TION — MINUTES	IM- POR- TANCE	OBS. COND.	TIME — U T	MEASUREMENTS			MAX. INT. % H <sub>o</sub>	PROVISIONAL IONOSPHERIC EFFECT	
		START	END	MAX. PHASE	APPROX.						MATH- PLAGE REGION	MEAS. AREA Sq Deg	CORR. AREA Sq Deg			MAX. WIDTH H <sub>o</sub>
					LAT	MER. DIST										
SCP 1 OBSERVATORY	1964															
	24	1105	1300	NO FLARE	PATROL											
	24	1305	1405	NO FLARE	PATROL											
	24	1440	1615	NO FLARE	PATROL											
	24	1630	1730	NO FLARE	PATROL											
	24	1745	1810	NO FLARE	PATROL											
	24	1820	1950	NO FLARE	PATROL											
	24	2005	2035	NO FLARE	PATROL											
	24	2050	2100	NO FLARE	PATROL											
	24	2250	2400	NO FLARE	PATROL											
	25	0000	0400	NO FLARE	PATROL											
	25	0500	0610	NO FLARE	PATROL											
	25	0620	0630	NO FLARE	PATROL											
	25	0730	0815	NO FLARE	PATROL											
	25	0950	1005	NO FLARE	PATROL											
	25	1020	1050	NO FLARE	PATROL											
	25	1055	1150	NO FLARE	PATROL											
	25	1155	1255	NO FLARE	PATROL											
	25	1305	1350	NO FLARE	PATROL											
	25	1355	1430	NO FLARE	PATROL											
	25	1435	1455	NO FLARE	PATROL											
	25	1500	1505	NO FLARE	PATROL											
	25	1510	1515	NO FLARE	PATROL											
	25	1600	1610	NO FLARE	PATROL											
	25	1620	1645	NO FLARE	PATROL											
	25	1750	1805	NO FLARE	PATROL											
	25	2040	2050	NO FLARE	PATROL											
	25	2125	2350	NO FLARE	PATROL											
25	2355	2400	NO FLARE	PATROL												
26	0040	0200	NO FLARE	PATROL												
26	0235	0325	NO FLARE	PATROL												
26	0355	0405	NO FLARE	PATROL												
26	0510	0530	NO FLARE	PATROL												
26	0655	0715	NO FLARE	PATROL												
26	0725	0800	NO FLARE	PATROL												
26	1000	1005	NO FLARE	PATROL												
26	1015	1110	NO FLARE	PATROL												
26	1120	1210	NO FLARE	PATROL												
26	1225	1310	NO FLARE	PATROL												
26	1415	1420	NO FLARE	PATROL												
26	1435	1525	NO FLARE	PATROL												
26	1530	1710	NO FLARE	PATROL												
26	1800	1840	NO FLARE	PATROL												
26	1845	2005	NO FLARE	PATROL												
26	2015	2145	NO FLARE	PATROL												
27	0050	0535	NO FLARE	PATROL												
27	0550	0650	NO FLARE	PATROL												
27	0655	0745	NO FLARE	PATROL												
27	0755	0825	NO FLARE	PATROL												

# SOLAR FLARES

SEPTEMBER 1964

OBSERVATORY	DATE SEP 1964	OBSERVED UNIVERSAL TIME		LOCATION		DURA- TION — MINUTES	IM- POR- TANCE	OBS COND.	MEASUREMENTS				PROVISIONAL IONOSPHERIC EFFECT	
		START	END	APPROX. LAT.	MEATH- PLAGE REGION				TIME — U T	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX WIDTH He		MAX INT. %
	27	0900	0915	NO FLARE	PATROL									
	27	0940	1130	NO FLARE	PATROL									
	27	1230	1330	NO FLARE	PATROL									
	27	1605	1635	NO FLARE	PATROL									
	28	0050	0210	NO FLARE	PATROL									
	28	0255	0700	NO FLARE	PATROL									
	28	0825	0845	NO FLARE	PATROL									
	28	0910	1010	NO FLARE	PATROL									
	28	1020	1030	NO FLARE	PATROL									
	28	1035	1100	NO FLARE	PATROL									
	29	0610	0635	NO FLARE	PATROL									
	29	0735	0805	NO FLARE	PATROL									
	29	0815	0840	NO FLARE	PATROL									
	29	0845	0850	NO FLARE	PATROL									
	29	0930	0940	NO FLARE	PATROL									
	29	1000	1010	NO FLARE	PATROL									
	29	1020	1055	NO FLARE	PATROL									
	29	1105	1115	NO FLARE	PATROL									
	30	0145	0155	NO FLARE	PATROL									
	30	0535	0540	NO FLARE	PATROL									
	30	0720	0800	NO FLARE	PATROL									
	30	1000	1055	NO FLARE	PATROL									
	30	1110	1130	NO FLARE	PATROL									
	30	1135	1225	NO FLARE	PATROL									
LOCKHFFD	30	1855	1922	1908	S07 W38		1-	2	1908	*20	*20	*20	10	
	30	2032	2044	2039	S07 W38		1-	2	2039	*20	*20	*20	10	
	30	2115	2135	2122	S23 F42		1-	2	2122	*20	*30	*30	10	
	30	2345	2400	NO FLARE	PATROL									

CONTINUED - STANDARD - BULLETIN

ATHENS GREECE  
 BAKOU USSR  
 CAFETOWN ROYAL OBSERVATORY,  
 CAPE OF GOOD HOPE  
 CAPRI F CAPRI, ITALY (GERMAN)  
 CAPRI S CAPRI, ITALY (SWEDISH)  
 CRIMEE SIMEIZ, USSR  
 HERSTONCEU ROYAL GREENWICH OBSERVATORY,  
 HERSTONCEUX, ENGLAND  
 HTE-PROVEN HAUTE-PROVENCE  
 NEW SCHAVIN FREIGURG, GFR  
 HONOLULU HAWAII, USA  
 IKOMASAN KYOTO, JAPAN  
 KIEV MO KIEV GAO, USSR  
 KIEV KY KIEV UNIVERSITY, USSR  
 LOCKHEED LOS ANGELES, CALIF., USA  
 MCWATH MCWATH-HULBERT  
 MOSCOW MOSCOW-GAISH, USSR  
 NEDERHORST den BERGH, NETHERLANDS  
 KHRASNAVA PAKHRA, USSR  
 SAC PEAK SACRAMENTO PEAK, N.MEX. USA  
 STOCKHOLM, SWEDEN  
 SCHAUTINS SCHAUTINS  
 TASHKENT TASHKENT, USSR  
 WENDEL WENDELSTEIN, GFR

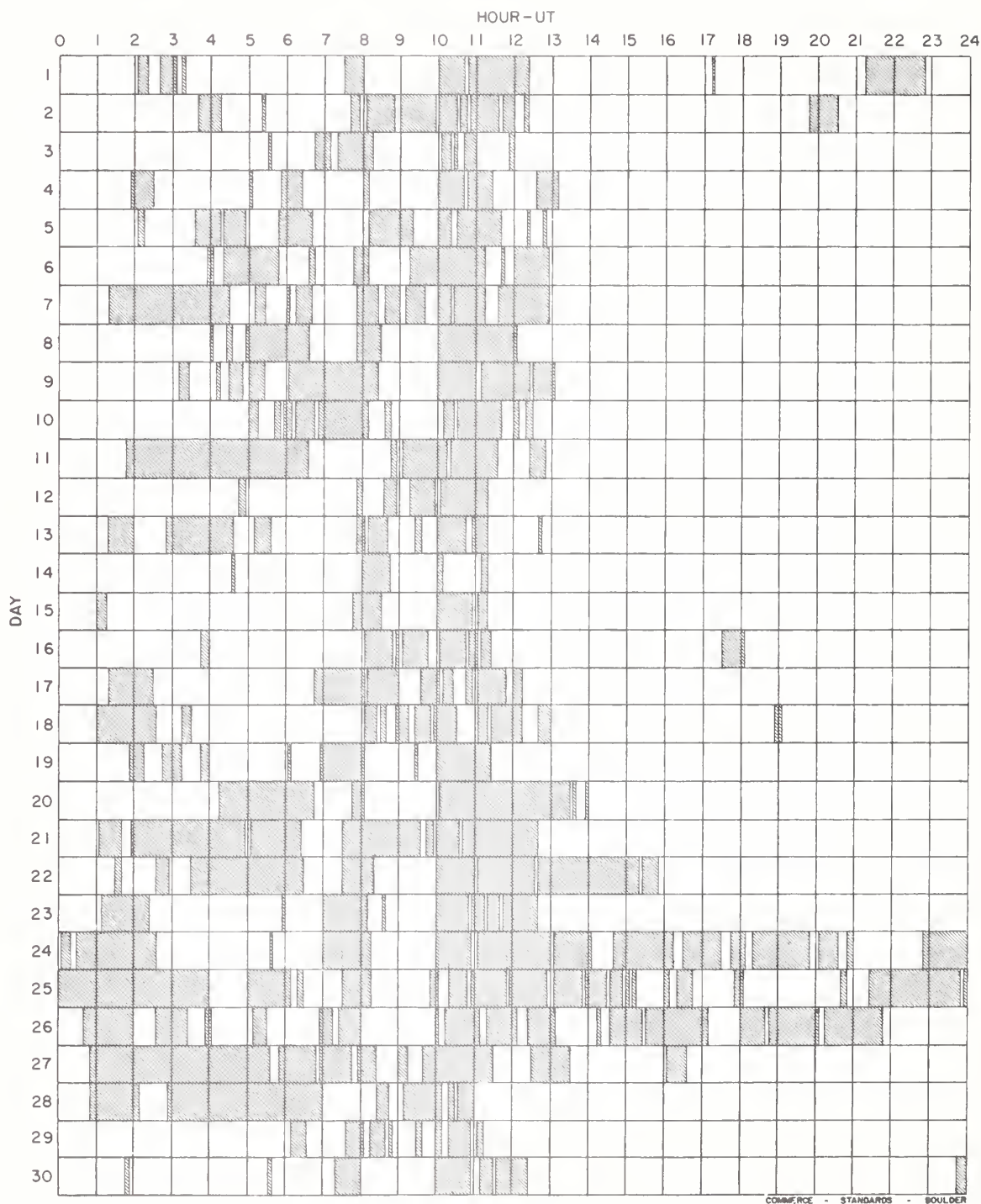
ALL VALUES IN THE MAXIMUM INTENSITY COLUMN FOR SAC PEAK ARE ARBITRARY UNITS (0-40) AND FOR LOCKHEED ARE ARBITRARY UNITS (10-40), NOT PERCENT OF CONTINUOUS SPECTRUM.

SEE DESCRIPTIVE TEXT PUBLISHED NOVEMBER 1961 FOR DEFINITION OF CORRECTED AREA VALUES LISTED FOR CLIMAX, HAWAII, LOCKHEED AND SACRAMENTO PEAK.

E = LESS THAN D = GREATER THAN U = APPROXIMATE □ = NOT REPORTED.

# INTERVALS OF NO FLARE PATROL OBSERVATIONS PROVISIONAL

SEPTEMBER 1964



## Observatories Included:

Arcetri	Huancayo	McMath-Hulbert	Ondrejov	Sydney
Dunsink	Istanbul	Mitaka	Ottawa	
Herstmonceux	Lockheed	Manila	Sacramento Peak	



# SOLAR FLARES

JUNE 1964

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		LOCATION			DURA- TION — MINUTES	IM- POR- TANCE	OBS. COND.	MEASUREMENTS				PROVISIONAL IONOSPHERIC EFFECT		
		START	END	MAX. PHASE	APPROX.					MATH- PLAGE REGION	TIME — U T	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.		MAX. WIDTH H <sub>fo</sub>	MAX. INT. % <sub>o</sub>
					LAT.	MER. DIST										
SYDNEY UCCLE	JUNE 1964															
	02	0145	0155	NO FLARE	PATROL			1-	C	0320	.40	.40				
	02	0319	0322	0320	N07 W09			1-	4							
	02	1427	1439		N06 W14											
CAPRI F UCCLE	03	1051 E	1056 D		N06 W23			1-	3	1051	.25	.26				
	03	1558	1603	1600	N09 W25			1-	3							
	03	1558 E	1607 D		N06 W25			1-	2	1558	.25	.26				
SYDNEY SYDNEY	04	0529 E	0549 D	0542	S07 E34			1-	P	0542	.20	.20				
	04	0532	0549 D	0542	N10 W26			1-	P	0542	.40	.50				
UCCLE	06	0200	0245	NO FLARE	PATROL			1-	3							
	06	0943 E	0945	0943	N09 W50											
UCCLE	08	0955	0957		N34 E43			1-	4							
	08	1355	1400	1357	N33 E41			1-	2							
UCCLE	09	0915	0919		S01 E15			1-	4							
	09	0950	1001	0958	N25 E75		7348	1-	4	0958	1.00	3.50				
	09	1023	1026		N25 E75			1-	4							
	09	1037	1111		N25 E75			1-	4							
UCCLE	09	1714	1727		N29 E77			1-	3							
	10	0853	0857	0855	N25 E61			1-	4							
UCCLE	10	0905	0911	0909	N25 E61			1-	4							
	10	0946	0950	0948	N06 E53			1-	4							
UCCLE	10	0959	1003		N25 E60			1-	3							
	10	1033	1051		N29 W52			1-	4							
UCCLE	10	1055	1101		N05 E52			1-	4							
	10	1106	1126		N05 E52			1-	4							
UCCLE	10	1144	1155		N33 W66			1-	4							
	10	1158	1202 D	1202 U	N33 W66		7349	1	4	1202	1.00	3.50				
CAPRI F CAPETOWN	10	1200 E	1212 D		N33 W65			1-	3	1200	.50	1.16				
	10	1204	1233	1212	N25 E59			1-	C	1212	.80	1.60				
UCCLE	10	1341	1344		N24 E58			1-	3							
	10	1431 E	1451		N29 W55			1-	2							
UCCLE	10	1431 E	1453		N24 E57			1-	2							
	11	0245	0250	NO FLARE	PATROL											
HALEAKALA UCCLE	11	0411	0421	0415	N15 E49			1-	C	1415	.20	.30				
	11	1456	1500		N03 E38			1-	2							
CAPRI F	11	1712 E	1727 D		N23 E38			1-	2	1712	.30	.42				
	12	0215	0230	NO FLARE	PATROL			1-	2							
UCCLE	12	1432	1436		N03 E23											
	13	0823 E	0909		N03 E13			1-	3							
UCCLE	13	0908	0909		N26 E24			1-	3							
	14	0036	0050	0041	N29 E66			1-	C	0041	.20	.40				
HALEAKALA HALEAKALA	14	0314	0335	0329	N27 E66			1-	C	0329	.30	.50				

COMMENTS - STANDARDS - BOULDER

# SOLAR FLARES

JUNE 1964

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		LOCATION		DURA- TION — MINUTES	IM- POR- TANCE	OBS. COND.	MEASUREMENTS				PROVISIONAL IONOSPHERIC EFFECT
		START	END	APPROX. LAT.	MAGNITUDE PLACE REGION				TIME — U T	MEAS. AREA Sq Deg	CORR AREA Sq Deg	MAX WIDTH He	
TACHKENT	JUNE 14	0316 E	0338 D				1-	C	0330	.50	1.20	3.10	85
	14			N28 E63									
	14	0408 E	0415 D	N28 E63			1-						
	14	0419 E	0428 D	N28 E63			1-						
	14	0825 E	0842 D	N04 E01			1-	3	0825	.25			
	14	2353	0006	N26 E54			1-	3	2357	.30	.40		
KANZELHOHE	15	0645 E	0800 D			75 D	1						
	15	1146	1340	N27 E49	7361	114	1	C	1326	3.00	4.62	1.30	72
	15			N27 E45	7361								
	15	1316	1341	N27 E45			1-						
	15	1450	1508	N26 W57			1-	4	1327	1.20	1.60		
	15	1457 E	1527	N25 E55			1-	4	1455	.20	.20		
	15	1601	1606	N24 E42	7361	30 D	1-	3	1467	1.50	2.25		
	15	1809	1831 D	N21 E46			1-	2					
	15	1809	1831 D	N25 E52			1-	4	1817	1.00	1.20		
	15	1955	2015	NO FLARE									
	15	2115	2125	PATROL									
	15	2135	2146 D	N25 E50			1-	3	2139	.50	.60		
SYDNEY	16	0237	0250				1-	C	0245	.80	1.00		
	16	0500 E	0511 D	N27 E41			1-	P	0508	1.40	1.80		
	16	0858	0906	N27 E36			1-						
	16	0959	1003 D	N25 E35			1-	3					
	16	2145	2212	N25 E35			1-						
	16	2145	2212	N25 E26			1-	C	2155	.20	.20		
UCCLE	17	0520	0530				1-						
	17	1140	1146	PATROL			1-	3					
	17	1451	1453	N24 E19			1-						
	17	1451	1453	N24 E20			1-						
CAPETOWN	20	0824	0839	N04 W76			1-	C	0827	.50			
	20	1108	1114	N14 W75			1-						
CLIMAX	21	2334	2343 D	N26 W38	7361	9 D	1	4	2341	2.10	2.50		
	21	2334	2343 D	N26 W38	7361								
VOROSHILOV	22	0245	0300										
	22	0420	0445	NO FLARE	PATROL								
	22	2358 E	0013	NO FLARE	N27 W40	15 D	1	C	2359	1.44	2.07		78
	22	2358 E	0013	NO FLARE	N27 W40								
SYDNEY	23	0400	0415	NO FLARE	PATROL								
	23	0455	0505	NO FLARE	PATROL								
	25	0157	0208	0202	N26 W66		1-	C	0202	.20	.50		
	25	0936	0940	N29 W70			1-						
UCCLE	29	0105	0115	NO FLARE	PATROL								
	29	0405	0420	NO FLARE	PATROL								
	29	0515	0525	NO FLARE	PATROL								
	29	1736	1740	S06 E67			1-	3					
UCCLE	30	0215	0345	NO FLARE	PATROL								
	30	0215	0345	NO FLARE	PATROL								



# SOLAR FLARES

JUNE 1964

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		MAX. PHASE	LOCATION			DURA- TION — MINUTES	IM- POR- TANCE	OBS. COND.	MEASUREMENTS				PROVISIONAL IONOSPHERIC EFFECT	
		START	END		APPROX. LAT.	MER DIST	M-MATH PLACE REGION				TIME	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX WIDTH H <sub>o</sub>		MAX INT °
UCCLE	JUNE 1964															
	30	0405	0435	NO FLARE	PATROL											
	30	0440	0505	NO FLARE	PATROL											
	30	1104	1107		503 E57				1-	2						

COMMENCE - STANDARDS - BOULDER

These flares are addenda to the June 1964 flares published in GRPL-F Part B-239 for July 1964.

ATHENES	ATHENS, GREECE	HONOLULU	HAWAII, USA	NERA	NEDERHORST den BERGH,
BAKOU	PIRCULI, USSR	IKOMASAN	KYOTO, JAPAN		NETHERLANDS
GAPETOWN	ROYAL OBSERVATORY, CAPE OF GOOD HOPE	KIEV KO	KIEV GAO, USSR	NIZMIR	KRASNAVA PAKHRA, USSR
CAPRI F	CAPRI, ITALY (GERMAN)	KIEV KY	KIEV UNIVERSITY, USSR	SAG PEAK	SACRAMENTO PEAK, N.MEX. USA
CAPRI S	CAPRI, ITALY (SWEDISH)	LOCKHEED	LOS ANGELES, CALIF., USA	SALTSJÖBÄDEN	STOCKHOLM, SWEDEN
GRINÉE	STREIZ, USSR	MCWATH	MCWATH-HULBERT	SCHAUINS	SCHAUINSLAND, GFR
HERSTMONCEU	ROYAL GREENWICH OBSERVATORY, HERSTMONCEUX, ENGLAND	MOSCOU	PONTIAC, MICH., USA	TACHKENT	TASHKENT, USSR
HTE-PROVEN	HAUTE-PROVENCE	NEW SCHAUIN FREIBURG, GFR	MOSCOM-CAISH, USSR	WENDEL	WENDELSTEIN, GFR

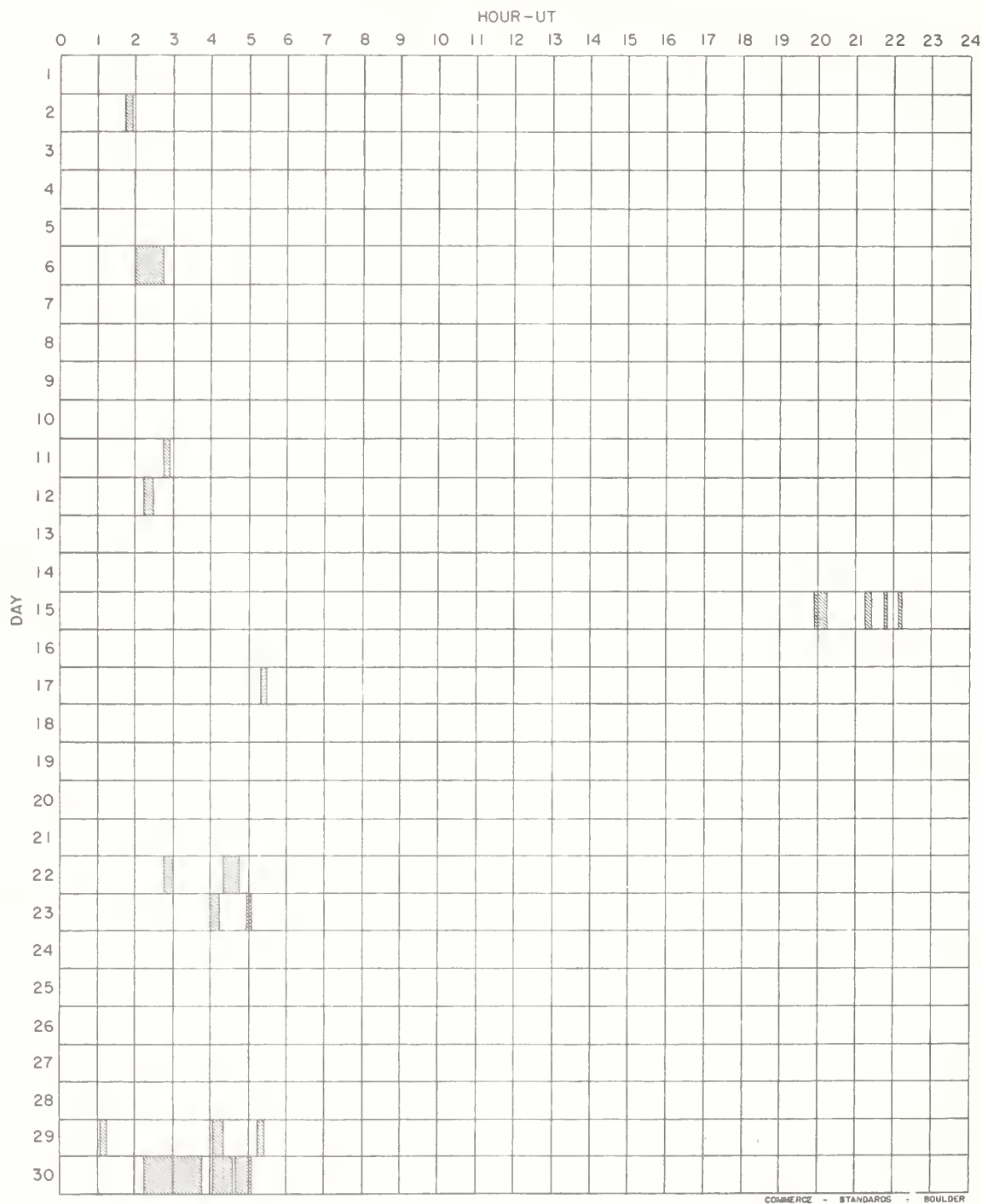
ALL VALUES IN THE MAXIMUM INTENSITY COLUMN FOR SAG PEAK ARE ARBITRARY UNITS (0-40) AND FOR LOCKHEED ARE ARBITRARY UNITS (10-40), NOT PERCENT OF CONTINUOUS SPECTRUM.

SEE DESCRIPTIVE TEXT PUBLISHED NOVEMBER 1961 FOR DEFINITION OF CORRECTED AREA VALUES LISTED FOR CLIPAX, HAWAII, LOCKHEED AND SACRAMENTO PEAK.

E = LESS THAN D = GREATER THAN U = APPROXIMATE □ = NOT REPORTED.

## INTERVALS OF NO FLARE PATROL OBSERVATIONS

JUNE 1964



## Observatories Included:

Abastumani	Catania	Huancayo	Locarno	Ondrejov	Wendelstein
Arcetri	Climax	Ikomasan	Lockheed	Ottawa	Wroclaw
Athens	Crimee	Irkutsk	Lvov	Sacramento Peak	Zurich
Bucharest	Dunsink	Istanbul	Manila	Sydney	
Capetown	Haleakala	Kanzelhoehe	McMath-Hulbert	Tachkent	
Capri-F (German)	Haute-Provence	Kiev-KO	Mitaka	Uccle	
Capri-S (Swedish)	Herstmonceux	Kodaikanal	Nizmir	Voroshilov	

# IONOSPHERIC EFFECTS OF SOLAR FLARES

IIIIm

SHORT WAVE RADIO FADEOUTS      SUDDEN PHASE ANOMALIES  
 SUDDEN COSMIC NOISE ABSORPTION      SUDDEN ENHANCEMENTS OF SIGNAL  
 SUDDEN ENHANCEMENTS OF ATMOSPHERICS      SUDDEN FREQUENCY DEVIATIONS  
 SOLAR NOISE BURSTS AT 18 Mc/s

AUGUST 1964

AUG. 1964	UNIVERSAL TIME			TYPE SWF IMP	IMPORTANCE						BUR	WIDE SPREAD INDEX	STATIONS	KNOWN FLARE
	START	END	MAX		ABS	SCNA	SEA	SPA	SES	SFD				
2	2105	2107									1	5	<u>BO</u> HA	

COMMENCE - STANDARDS - SOLIDER

Footnote:

Errata: In CRPL-F 232B, December 1963, in Table IIIIm, the October 1963 events given on October 14 beginning at 1853, 1932, 2052 and 2321 UT and on October 17 at 1342 UT are SFD not SES.

## RIOMETER EVENTS

(Provisional)

AUGUST 1964

South Pole

26 Mc/s

AUG 1964	START UT	END UT	MAX. UT	MAX. ABSORP. db, (tenths)	NO. OF PEAKS	AUG 1964	START UT	END UT	MAX. UT	MAX. ABSORP. db, (tenths)	NO. OF PEAKS
1	0009	0357	0214	42	1	18	1254	1425	1312	5	1
1	1153	1758	1437	8	4	19	0858	1407	1147	11	1
2	0021	0356	0211	5	1	19	1949	2039	1951	3	2
2	0757	0822	0801	6	1	20	*				
3	*					21	1153	2146	1443	6	3
4	0217	0622	0307	21	2	22	0150	0650	0209	16	1
4	1140	1752	1530	9	5	22	1112	**	1757	4	6
4	2258	0028	2337	7	2	23	*				
5	1011	2356	1329	40	6	24	*				
6	0222	0405	0315	25	1	25	1550	2023	1757	3	3
6	2328	1700	0216	48	1	26	0056	0239	0147	11	1
7	2145	2256	2148	3	1	26	2205	0121	2214	22	1
8	0151	0258	0221	7	2	27	0920	1720	1343	9	3
8	0544	0643	0555	9	2	28	*				
9	*					29	0037	0147	0042	45	1
10	*					29	1347	1747	1647	4	2
11	2240	0255	2250	69	2	29	2126	2230	2204	7	1
12	**	2021	1029	8	1	30	0039	0242	0136	8	2
13	0014	0214	0152	13	3	31	0150	0335	0154	14	1
13	1312	1604	1342	5	1	31	1056	1834	1344	10	2
13	2129	0246	2246	51	2						
14	1002	0206	0112	9	1						
16	0157	0219	0200	4	1						
17	0125	0458	0403	12	1						
18	0301	0346	0314	7	3						

COMMERCE - STANDARDS - BOULDER

\* No event.

\*\* Uncertain.

## IVa

ARO - OTTAWA

2800 Mc/s

SEPT. 1964	U R A N E	DESCRIPTIVE TYPE	START UT	DURATION HRS. MIN.	MEAN FLUX	MAXIMUM		REMARKS
						TIME	FLUX	
None observed.								

COMMERCE - STANDARDS - BOULDER

## OBSERVING PERIOD:

With the following exceptions:

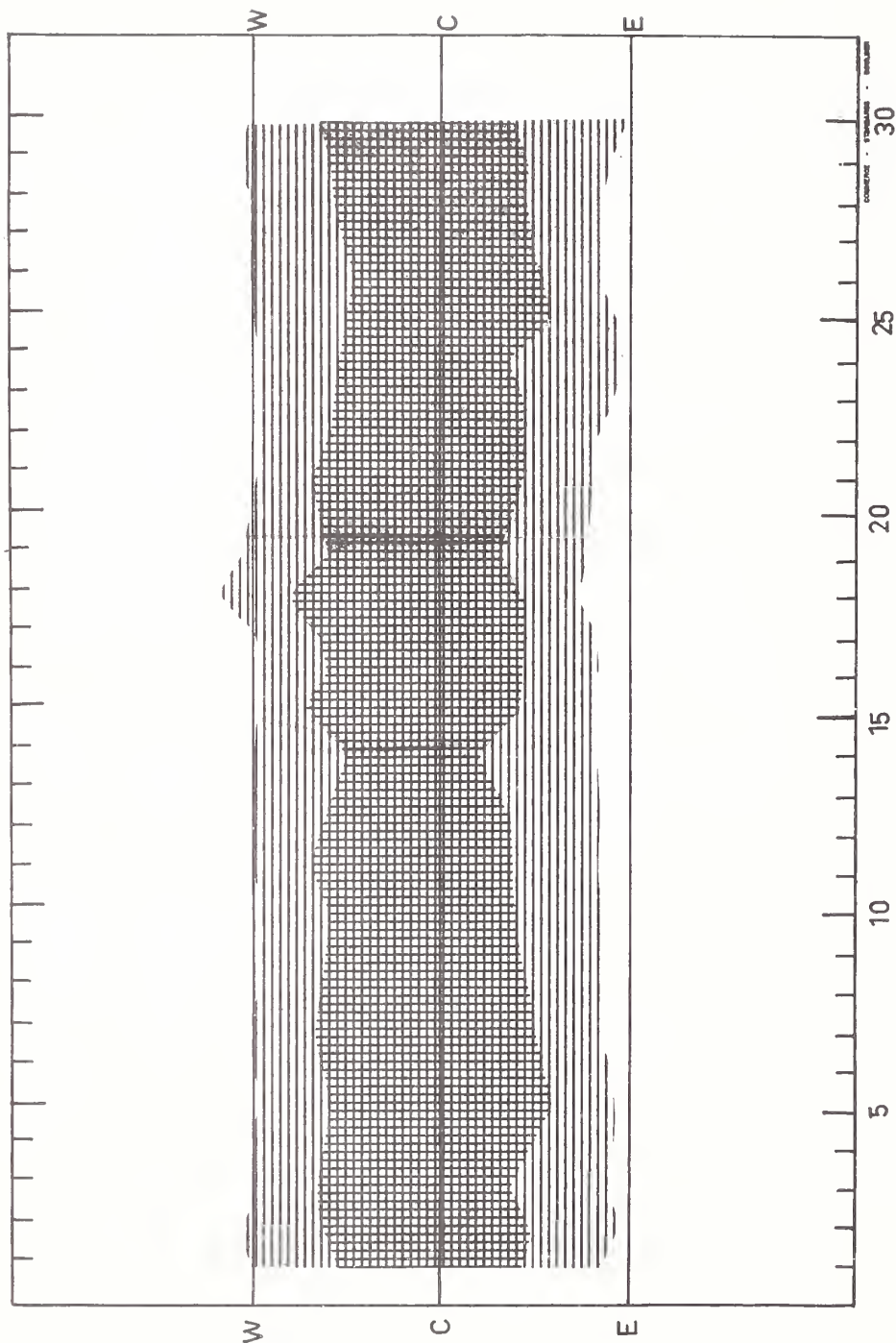
- (1) Observations commenced: July 22 at 12:10 UT  
Aug. 1 at 13:20 UT  
3 at 12:25 UT  
5 at 12:10 UT  
22 at 13:00 UT  
24 at 12:30 UT  
27 at 12:10 UT  
28 at 12:20 UT  
29 at 12:10 UT  
Sep. 4 at 13:50 UT  
5 at 12:10 UT  
11 at 12:15 UT
- (2) Observations ended: July 3 at 00:30 UT  
Aug. 18 at 22:50 UT  
Sep. 6 at 22:50 UT  
8 at 00:20 UT  
27 at 22:20 UT
- (3) Interruption of observations, approximately 20 minutes in duration,  
for calibration purposes:  
In the period 14:00 - 15:00 UT  
July 21 & 22  
Aug. 25 to 31 inclusive  
Sep. 1 to 30 inclusive
- (4) Interference or set trouble obscuring records on:  
July 31 13:35 to 15:15 UT  
Aug. 26 12:50 to 14:00 UT  
Sep. 14 12:20 to 14:45 UT

# SOLAR RADIO EMISSION INTERFEROMETRIC OBSERVATIONS

SEPTEMBER 1964

NANÇAY

169 Mc/s



SEPTEMBER 1964

# SOLAR RADIO EMISSION OUTSTANDING OCCURRENCES

IVc

SEPTEMBER 1964

NBS BOULDER

108 Mc/s

None observed.

## NOMINAL TIMES OF OBSERVATION

SEPTEMBER 1964

NBS BOULDER

108 Mc/s

Sept. 1964	HOURS OF OBSERVATION U.T.	HOURS OF INTERFERENCE U.T.	Sept. 1964	HOURS OF OBSERVATION U.T.	HOURS OF INTERFERENCE U.T.
1	1232-0116		16	1247-1605; 2004-2250	
2	1233-1615; 2227-0114		17	1605-0051	
3	1234-2300; 2308-0112	1234-1510	18	1640-2121; 2219-0049	
4	1235-1614; 1957-0110	1235-1415	19	1249-0048	
5	1236-1709; 1904-2130	1236-1315	20	1250-0046	
6	No record		21	1251-0044	0015-0044
7	1634-0106	2351-2355; 2400-0007	22	1252-0043	1926-2003
8	1239-0105	1417-1428	23	1253-0041	1832-1845
9	1600-0104		24	1254-0039	
10	1241-0103		25	1255-0038	
11	1614-0101		26	1256-0036	1753-1757; 1821-1823; 2034-2038
12	1245-0059		27	1345-0034	1857-1955
13	1244-0058		28	1258-0033	
14	1245-0056		29	1259-2002; 2227-0031	1729-2002
15	1246-1549; 1620-0054		30	1300-0030	

COMMERCE - STANDARDS - BOULDER

Equipment operating erratically Sept. 1-19.

# SOLAR RADIO EMISSION SPECTRAL OBSERVATIONS

SEPTEMBER 1964

High Altitude Observatory  
Boulder

7.6-41 Mc/s

Date Sep 1964	Bursts			Frequency Range (Mc/s)
	Type	Time (U.T.)	Intensity	
11 Sep	No Observ.	1646-2226		
15	No Observ.	1535-1724, 2018-2224		
16	No Observ.	2215-2400		
17	No Observ.	0000-0130		
19	III	2217:15-2217:45	1-	27-41
	III	2218:30-2219	1-	24-41
	III	2220:30-2220:45	1	25-41
25	No Observ.	0000-0130		
26	No Observ.	1745-2000		
27	No Observ.	1800-1855		
28	No Observ.	1805-2042, 2146-2230		
29	No Observ.	0027-0130		

COMMERCE - STANDARDS - BOULDER

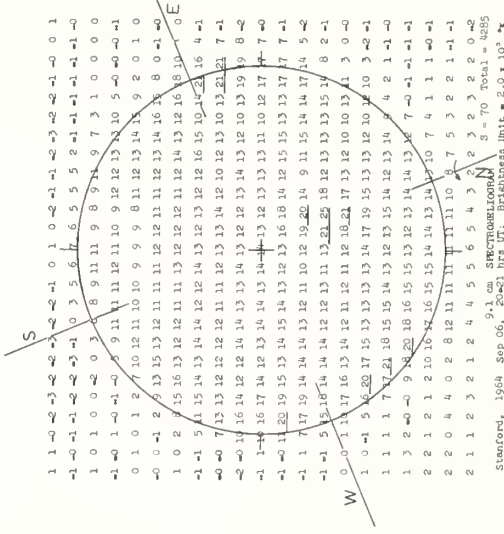
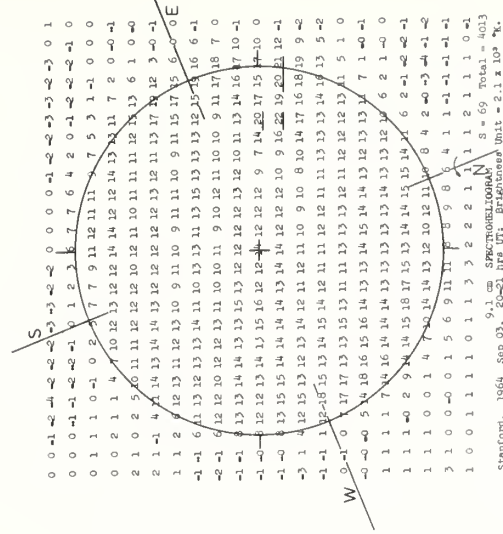
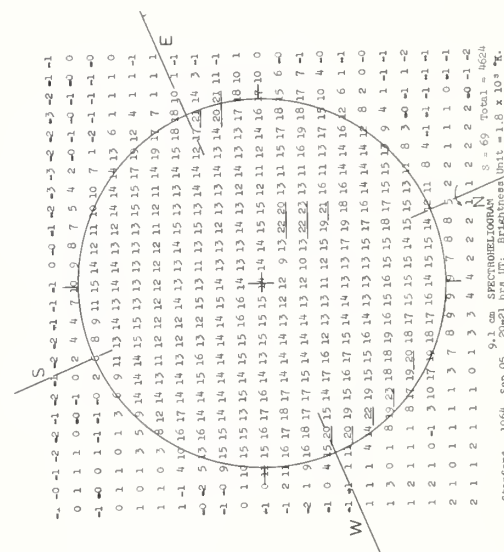
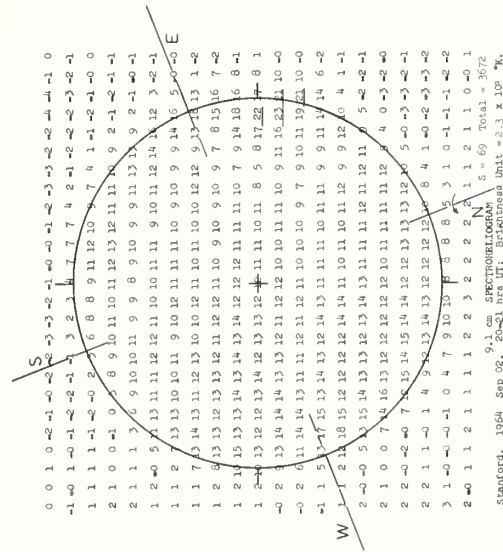
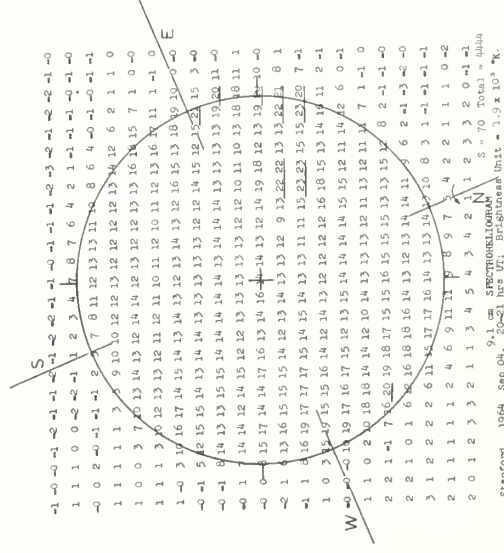
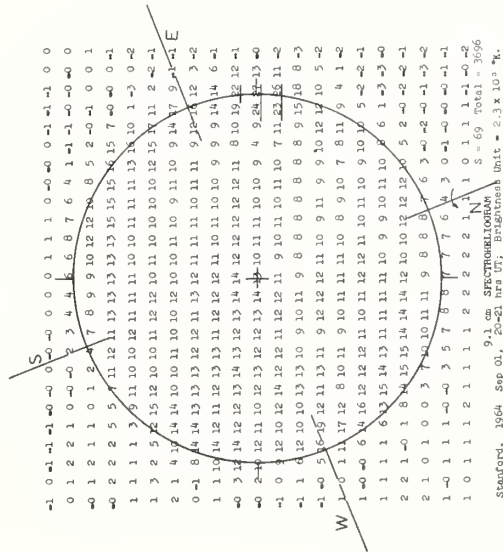


# SOLAR RADIO EMISSION SPECTROHELIOGRAMS

SEPTEMBER 1964

STANFORD

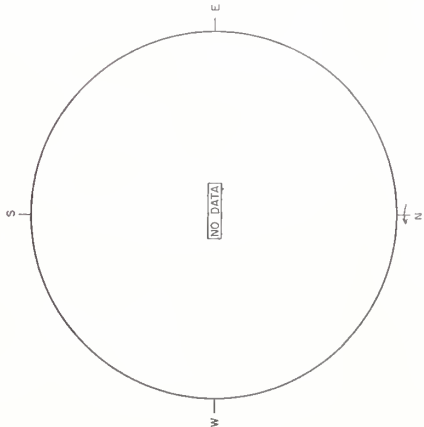
9.1 cm



# SOLAR RADIO EMISSION SPECTROHELIOGRAMS

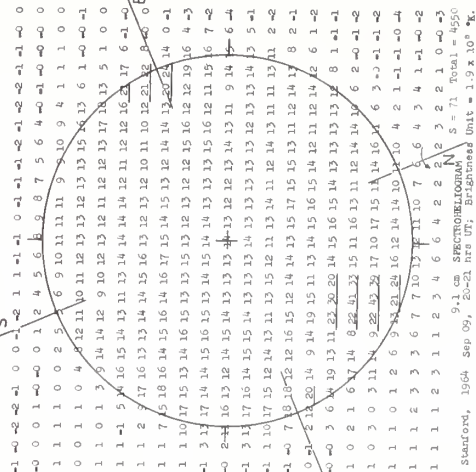
SEPTEMBER 1964

STANFORD



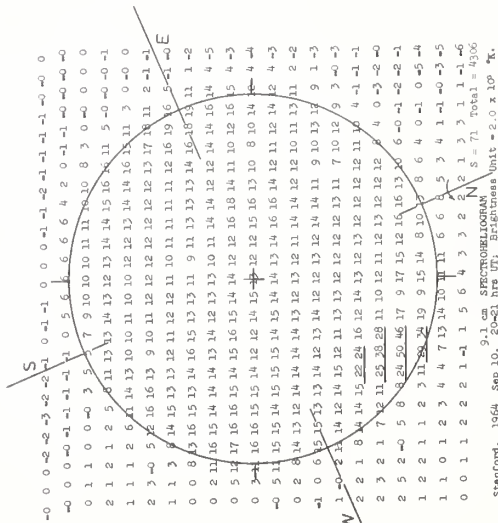
1964 SEPTEMBER 07

9.1 cm

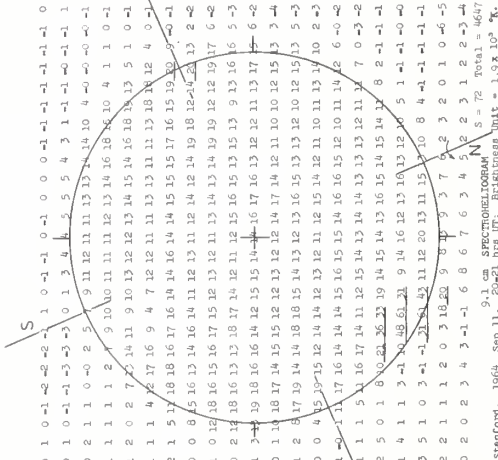


1964 SEP 08, 20-21 hrs UT, Brightness Unit =  $2.5 \times 10^{-4}$  W.

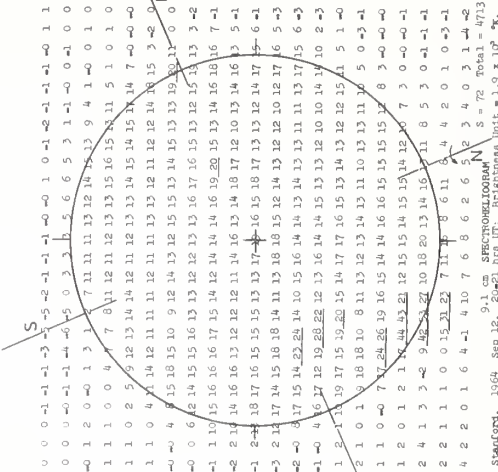
1964 SEP 09, 20-21 hrs UT, Brightness Unit =  $1.9 \times 10^{-4}$  W.



Stanford, 1964 Sep 10, 20-21 hrs UT, Brightness Unit =  $2.0 \times 10^{-4}$  W.



Stanford, 1964 Sep 11, 20-21 hrs UT, Brightness Unit =  $1.9 \times 10^{-4}$  W.



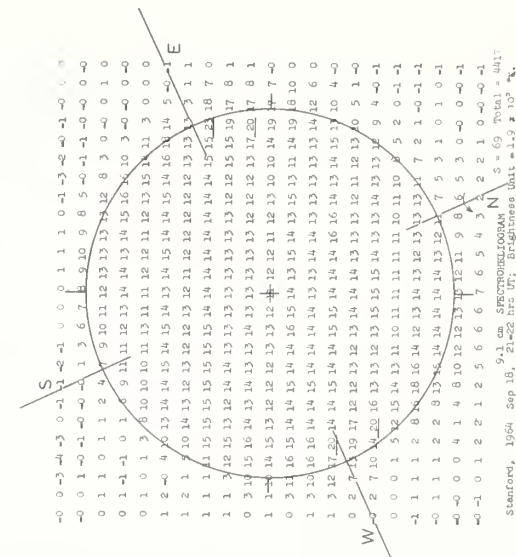
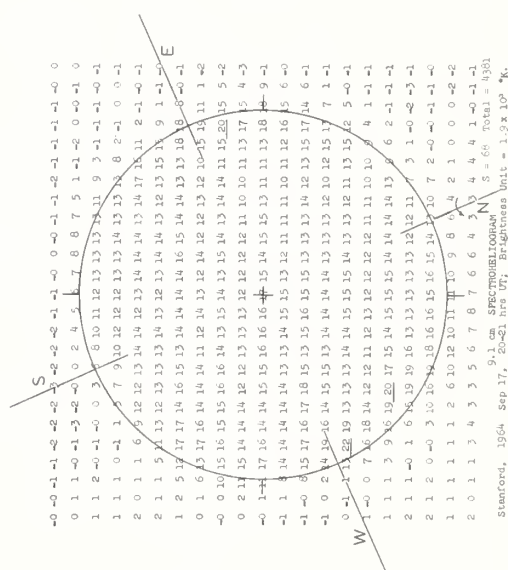
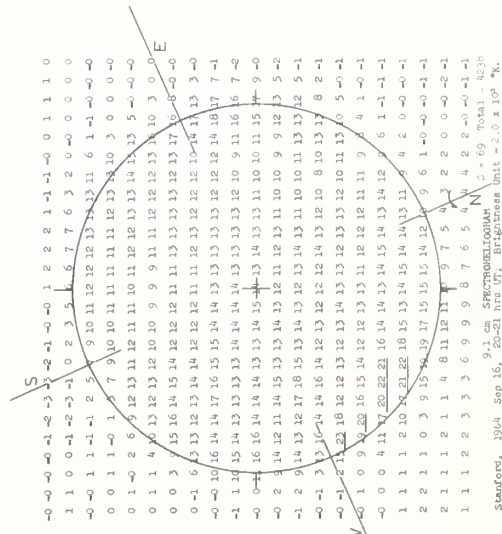
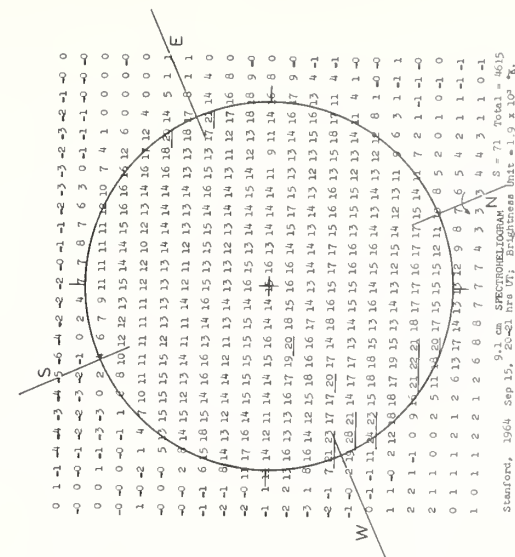
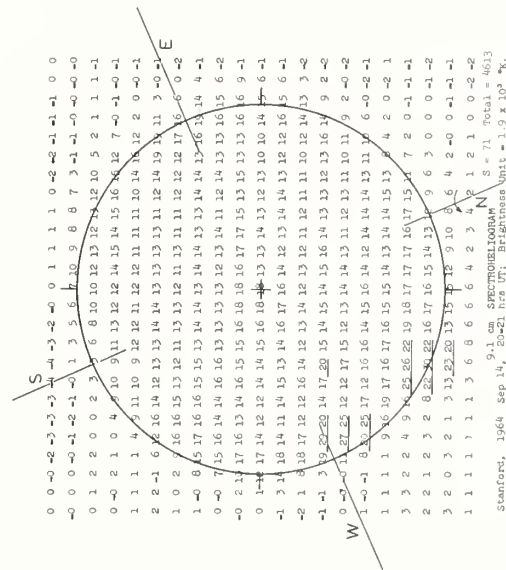
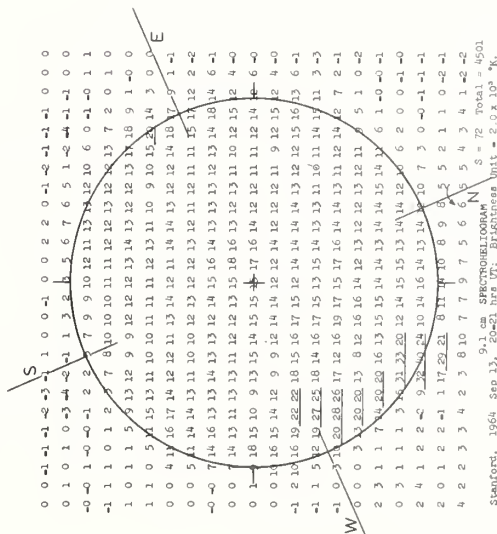
Stanford, 1964 Sep 12, 20-21 hrs UT, Brightness Unit =  $1.9 \times 10^{-4}$  W.

# SOLAR RADIO EMISSION SPECTROHELIOGRAMS

SEPTEMBER 1964

STANFORD

9.1 cm

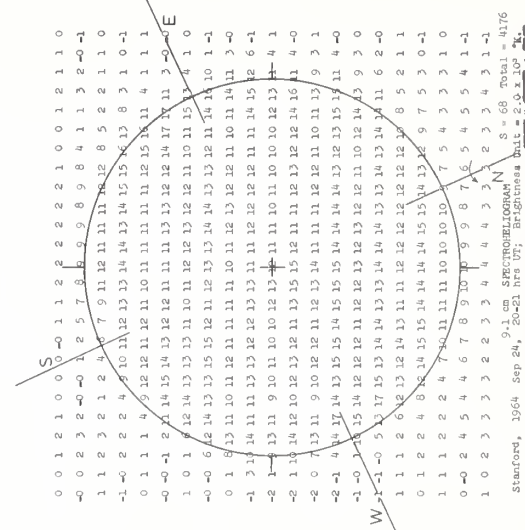
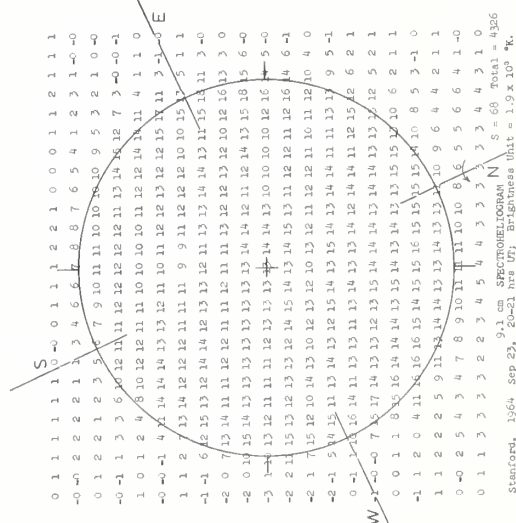
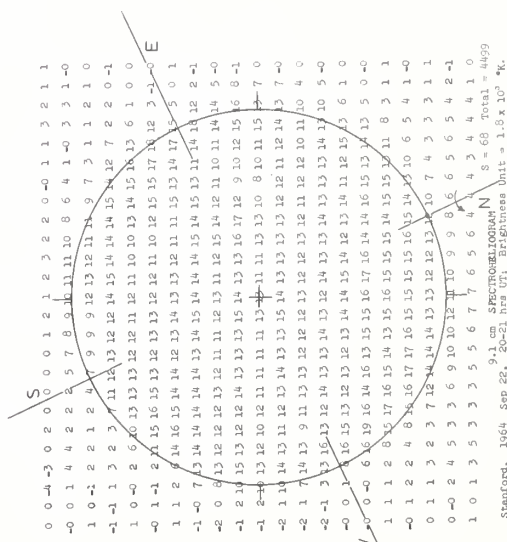
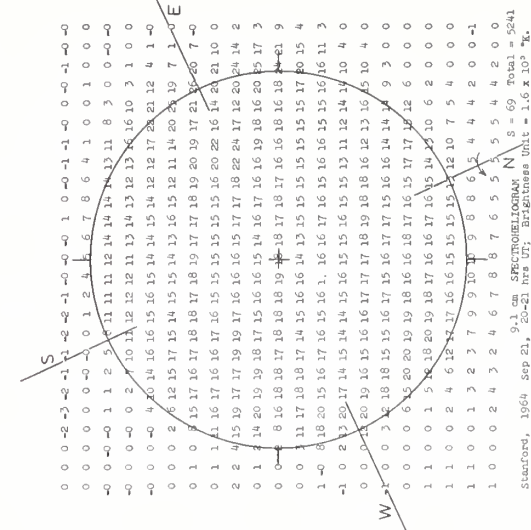
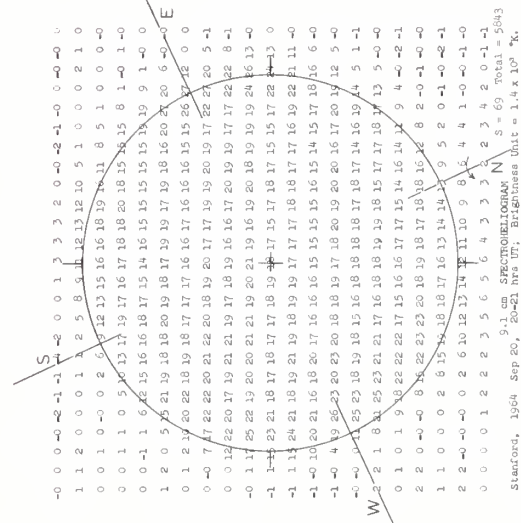
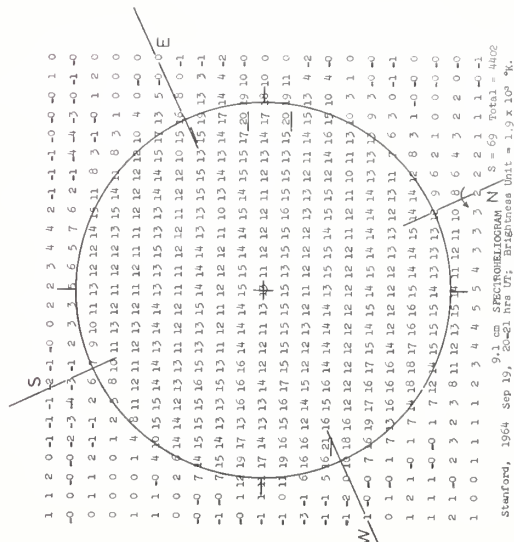


# SOLAR RADIO EMISSION SPECTROHELIOGRAMS

SEPTEMBER 1964

STANFORD

9.1 cm



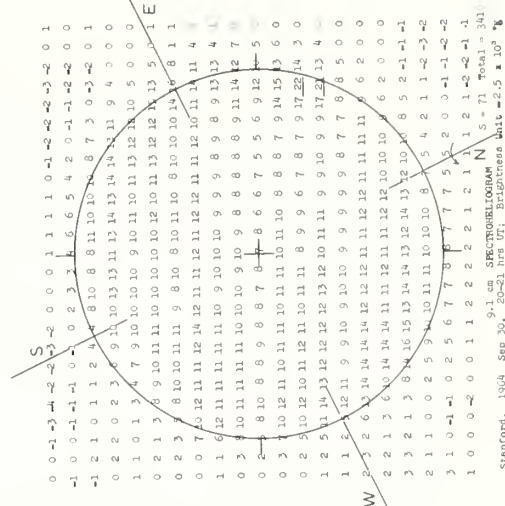
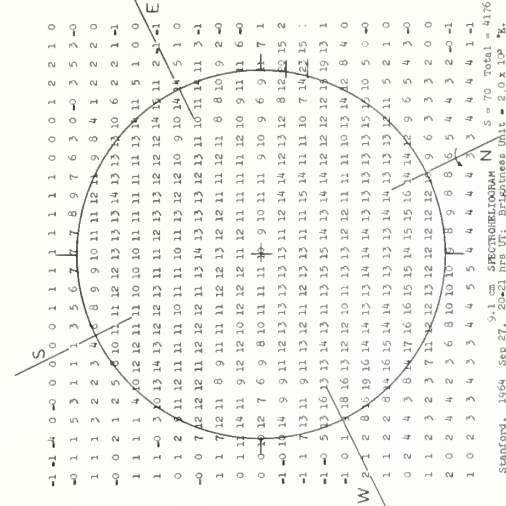
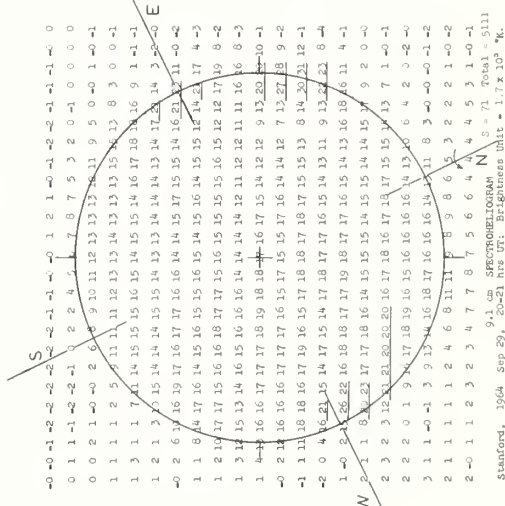
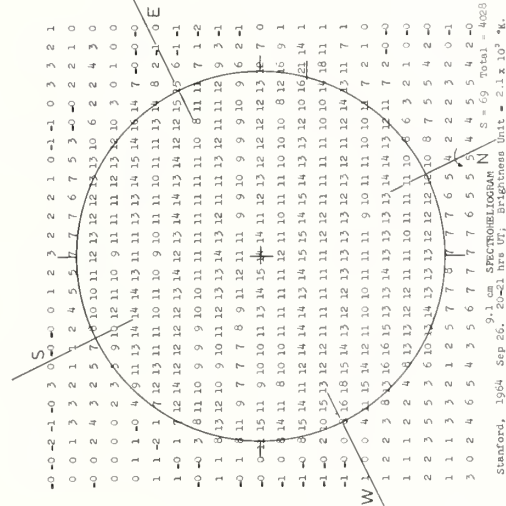
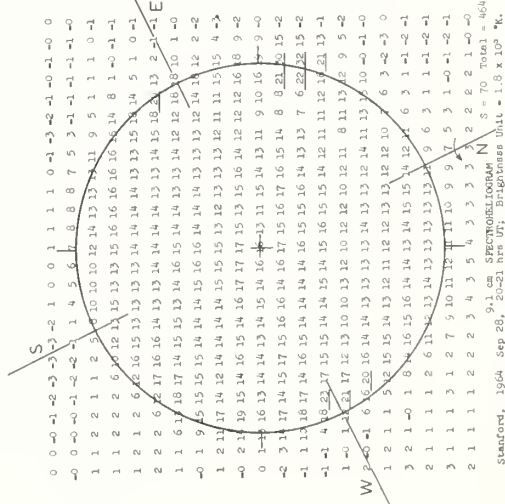
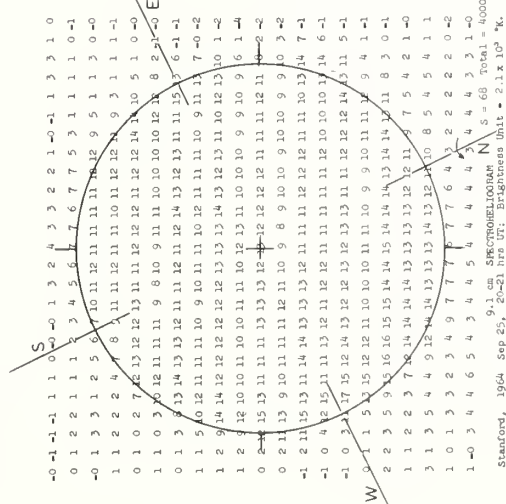


# SOLAR RADIO EMISSION SPECTROHELIOGRAMS

SEPTEMBER 1964

STANFORD

9.1 cm



COSMIC RAY INDICES  
(Climax Neutron Monitor)  
IGC Station B 305

AUGUST 1964

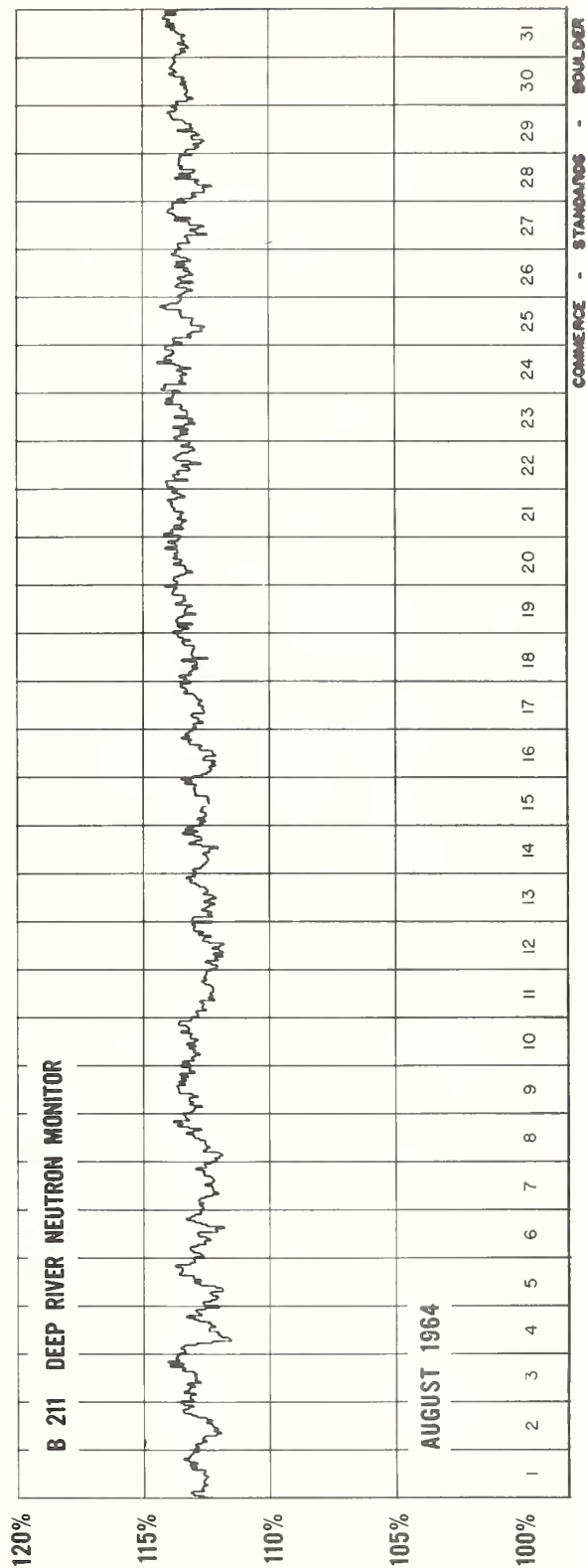
Aug. 1964	DAILY AVERAGE COUNTS / HOUR *	Aug. 1964	DAILY AVERAGE COUNTS / HOUR *
1	3289.6	17	3278.7 ** 34
2	3283.1	18	3285.8 ** 14
3	3285.4	19	3299.0
4	3285.5	20	3298.4
5	3275.0	21	3319.9
6	3278.1	22	3318.4
7	3273.6	23	3315.0
8	3268.0	24	3314.2
9	3280.9	25	3301.9
10	3286.2	26	3314.5
11	3281.6	27	3318.4
12	3264.2	28	3308.5
13	3259.9	29	3313.4
14	3269.5	30	3310.8
15	3273.6	31	3319.8 ** 10
16	3275.2		

COMMERCE - STANDARDS - BOULDER

\* Scaling Factor 128.

\*\* No. of Section Hours Indicated with Asterisk If Sum of Both Sections is Less Than 40 Hours.

# **COSMIC RAY INDICES** (Pressure Corrected Hourly Totals)



## GEOMAGNETIC ACTIVITY INDICES

AUGUST 1964

Aug. 1964	C	Values Kp								Sum	Ap	Final Selected Days	
		Three hour Gr. interval											
		1	2	3	4	5	6	7	8				
1	0.3	3o	2o	1o	1-	1+	1o	1o	1+	11+	6	Five Quiet	
2	0.2	0+	1-	1-	0+	0+	1-	1+	2+	7-	4		
3	0.3	2-	1o	1o	1-	1+	2-	1o	2-	10o	5		
4	1.3	5-	6+	5+	4-	3+	3+	2+	3o	32o	34		10
5	1.0	2o	2+	2-	3+	4-	4-	4o	3+	24o	16		15
												24	
6	0.3	3o	3+	1+	1o	0+	0+	0+	2-	11+	7	28	
7	0.6	4-	3o	3-	3o	3+	2o	2-	2-	21o	13	30	
8	0.2	2-	1o	1o	0+	0+	1-	1+	2o	8+	4		
9	0.5	2-	3-	1-	1+	3-	2o	3o	2-	16-	8		
10	0.0	1o	1-	2-	1-	0+	0+	1-	1-	6o	3		
11	1.3	4-	4o	3+	3-	4+	4+	5-	4+	31+	27	Five Disturbed	
12	0.8	4-	2o	4-	3o	3-	2+	3o	2+	23-	14		
13	0.4	3-	2o	2-	1+	1+	1o	2o	2o	14o	7		
14	0.2	1o	1-	0+	2-	1-	1o	2-	2-	9-	4		4
15	0.1	1+	1o	0o	0+	0o	0+	1o	1+	5+	3		5
												11	
16	0.3	2o	2-	2-	1o	1o	2o	1+	2+	13o	6	12	
17	0.3	3o	2-	1-	1-	1o	2-	1o	0+	10o	5	31	
18	0.3	2-	2o	2o	2-	2-	1+	2o	1+	14-	6		
19	0.3	0o	0+	2-	2o	2o	1+	1o	2o	10+	5		
20	0.2	1+	1-	0+	0+	1-	1o	2o	2o	8+	4		
21	0.2	0+	1+	1o	1o	1+	2-	1o	1-	8+	4	Ten Quiet	
22	0.4	3-	2o	2-	2+	2o	1o	1+	1o	14o	7		
23	0.2	2-	1-	1-	1+	1o	1+	1-	0+	8-	4		
24	0.1	0+	0+	1o	0+	0+	1o	1+	1+	6o	3		2
25	0.6	1o	2-	1o	0+	2+	3o	3o	3-	15o	8		8
												10	
26	0.7	3+	3-	3-	1o	2+	1o	1+	3+	18-	10	14	
27	0.4	2+	3-	2o	2o	2+	2o	2-	1o	16o	8	15	
28	0.1	1-	0+	0+	0+	0+	0+	2-	1-	5-	3	21	
29	0.2	2-	0+	1-	2o	1-	1+	1+	2-	10-	5	23	
30	0.0	1-	1-	1-	1o	1-	1o	1-	1o	6+	3	24	
31	0.8	2o	2o	2-	2+	3o	2-	3-	5-	20o	13	28	
												30	
Mean:	0.41									Mean:	8		





## CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS

AUGUST 1964

NORTH ATLANTIC										NORTH PACIFIC																								
AUG 1964	NORTH ATLANTIC 6-HOURLY QUALITY FIGURES				SHORT-TERM FORECASTS ISSUED ABOUT ONE HOUR IN ADVANCE OF:				WHOLE DAY INDEX	ADVANCE FORECASTS (J-REPORTS) FOR WHOLE DAY, ISSUED IN ADVANCE BY:				GEOMAGNETIC K <sub>p</sub>		NORTH PACIFIC B-HOURLY QUALITY FIGURES				SHORT-TERM FORECASTS ISSUED AT:		WHOLE DAY INDEX	ADVANCE FORECASTS (J-REPORTS) FOR WHOLE DAY, ISSUED IN ADVANCE BY:				GEOMAGNETIC K <sub>p</sub>							
	00	06	12	18	00	06	12	18		1-7 GRAT DAYS FINAL J <sub>s</sub>	1-7 GRAT DAYS FINAL J <sub>s</sub>	HALF (1)	DAY (2)	03	11	19	02	09	18	1-7 GRAT DAYS FINAL J <sub>s</sub>	1-7 GRAT DAYS FINAL J <sub>s</sub>		HALF (1)	DAY (2)	03	11	19	02	09	18	1-7 GRAT DAYS FINAL J <sub>s</sub>	1-7 GRAT DAYS FINAL J <sub>s</sub>	HALF (1)	DAY (2)
	TO	TO	TO	TO	TO	TO	TO	TO		TO	TO	TO	TO	TO	TO	TO	TO	TO	TO	TO	TO		TO	TO	TO	TO	TO	TO	TO	TO	TO	TO	TO	TO
01	6+	6+	7-	7-	6	6	7	7	6+	6	2	1	6	6	7	7	7	6	6	6	6	2	0	0	0	0	0	0	0	0	0	0	0	0
02	6+	7-	7-	7-	6	6	7	7	7-	6	1	1	6	6	6	7	7	7	6	6	6	0	1	1	1	1	1	1	1	1	1	1	1	1
03	6+	6+	7-	7-	6	5	7	7	6+	5	2	1	6	6	7	7	7	7	6	6	6	(5)	3	3	(5)	3	3	3	3	3	3	3	3	3
04	6+	5+	6+	6+	6	3	6	6	6+	5	3	3	5	4	6	6	6	6	6	6	6	6	2	3	2	2	2	2	2	2	2	2	2	2
05	6-	4+	7-	6+	6	5	7	6	6-	5	3	3	5	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
06	5+	5+	6+	7-	6	5	7	6	6+	5	2	1	5	5	5	6	6	5	6	6	6	2	0	0	2	0	0	0	0	0	0	0	0	0
07	6-	5-	7-	6+	6	5	7	6	6-	6	3	2	6	4	6	6	6	6	6	6	6	3	2	2	3	2	2	2	2	2	2	2	2	2
08	4+	5+	6+	6+	6	5	7	7	6-	6	2	1	5	5	7	6	6	6	6	6	6	2	1	1	0	1	0	0	0	0	0	0	0	0
09	6-	5+	6+	7-	6	5	7	7	6+	6	2	2	6	5	6	6	6	6	6	6	6	7	1	2	1	0	2	0	0	0	0	0	0	0
10	6+	6+	7-	7-	6	5	7	7	6+	7	2	0	6	5	6	6	6	7	7	7	6	7	2	0	2	0	0	0	0	0	0	0	0	0
11	6+	4+	6+	7-	6	6	6	6	6-	7	3	(4)	6	6	6	6	6	6	6	6	6	7	3	3	3	3	3	3	3	3	3	3	3	3
12	6-	6-	6+	6+	5	5	7	7	6+	7	3	3	5	5	6	5	6	5	6	5	6	5	5	5	5	5	5	5	5	5	5	5	5	5
13	6-	6+	7-	7-	6	6	7	7	6+	6	2	2	5	5	6	6	6	6	6	6	6	5	5	2	2	1	1	1	1	1	1	1	1	1
14	6+	6-	7-	6+	6	6	7	7	6+	6	1	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
15	6+	6-	7-	7-	6	6	7	7	6+	6	1	1	6	6	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
16	6+	6+	7+	7+	6	6	7	7	7-	6	2	2	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
17	6+	6+	7+	7-	6	6	7	7	7-	7	2	1	6	5	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
18	6+	6-	7+	7-	6	6	7	7	6+	7	2	2	6	5	7	7	6	7	6	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6
19	6+	6-	7+	7-	6	6	7	7	6+	7	2	2	6	5	6	7	6	7	6	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6
20	6+	4+	7-	7+	6	6	7	7	6+	7	1	2	6	6	7	7	6	7	7	6	7	6	6	6	6	6	6	6	6	6	6	6	6	6
21	6+	6+	7+	7-	6	6	7	7	7-	7	1	2	7	6	7	6	7	7	7	6	7	6	6	6	6	6	6	6	6	6	6	6	6	6
22	6+	5+	6+	7-	6	6	7	6	6+	7	3	2	6	6	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	6	6	6	6
23	5+	5-	7+	7-	6	6	6	7	6+	7	2	1	6	6	7	7	7	7	6	6	7	6	6	6	6	6	6	6	6	6	6	6	6	6
24	6+	6-	7+	7-	6	6	7	7	6+	7	1	1	6	6	7	7	7	6	7	6	7	6	6	6	6	6	6	6	6	6	6	6	6	6
25	5+	6-	7+	7+	6	5	7	7	6+	6	1	3	6	5	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	6	6	6	6
26	6-	6-	7+	7-	6	5	7	7	6+	6	3	2	6	6	7	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
27	6+	5+	7+	7+	6	6	7	6	6+	6	2	2	6	6	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	6	6	6	6
28	7-	6-	7+	7-	6	6	7	7	7-	7	1	1	7	5	7	7	6	7	6	7	6	7	7	7	7	7	7	7	7	7	7	7	7	7
29	6+	5+	7+	7+	6	6	7	7	6+	7	1	2	6	6	6	7	6	6	6	7	6	6	6	6	6	6	6	6	6	6	6	6	6	6
30	6+	6-	7-	7-	6	5	7	7	6+	6	1	1	6	6	8	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
31	6+	5+	6+	7-	6	5	7	6	6+	5	2	3	6	5	6	6	5	6	6	5	6	5	4	4	4	4	4	4	4	4	4	4	4	4
Score: Quiet Periods										25	16	24	23	14	14											15								
										5	11	7	8	17	17											13								
										0	1	0	0	0	0											2								
										0	0	0	0	0	0											0								
Disturbed Periods:										0	0	0	0		0											0								
										0	1	0	0		0											0								
										0	0	0	0		0											0								
										1	2	0	0		0											1								

CONVERSION - STANDARDS - SOLAR

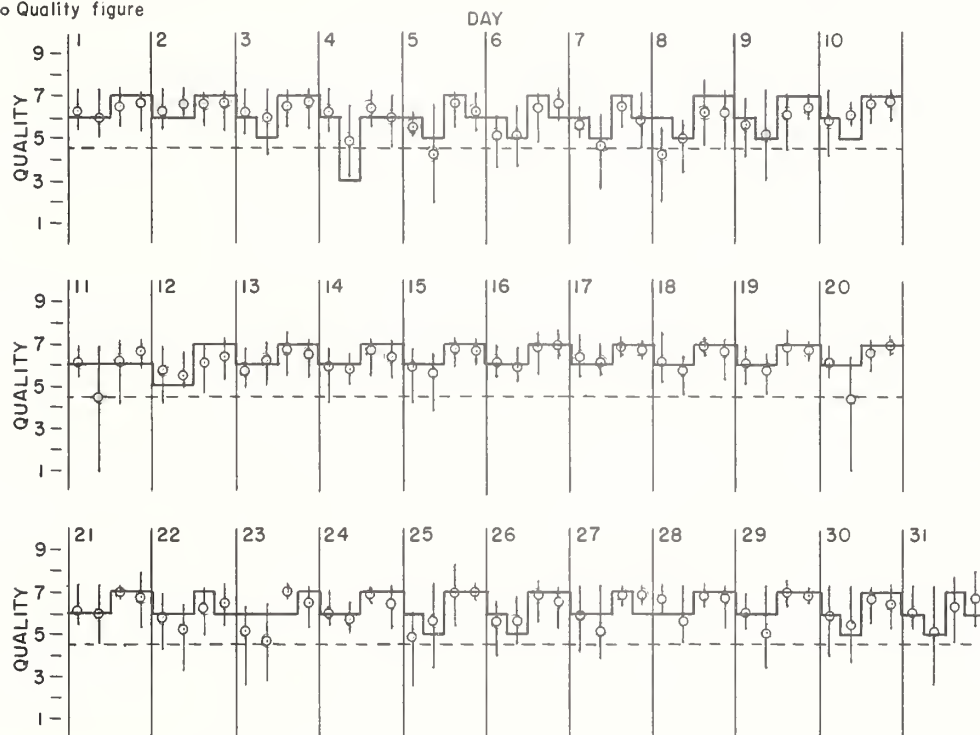
## NORTH ATLANTIC

AUGUST 1964

— Short-term forecast

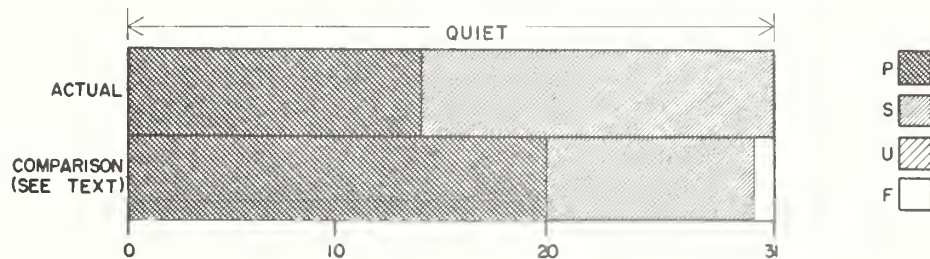
o Quality figure

| Range of reports

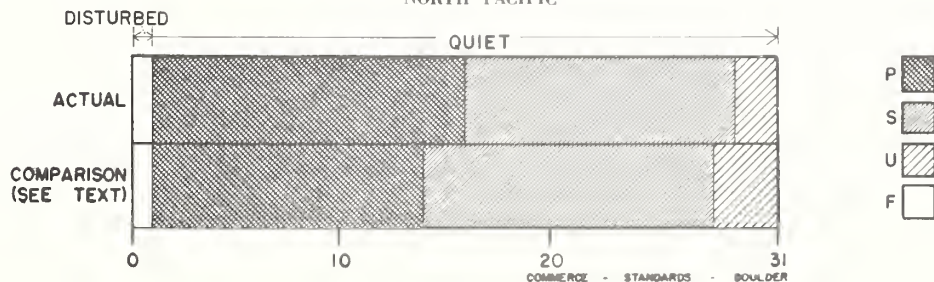


OUTCOME OF ADVANCE FORECASTS -- FINAL ESTIMATES (1 TO 7 DAYS AHEAD)

## NORTH ATLANTIC

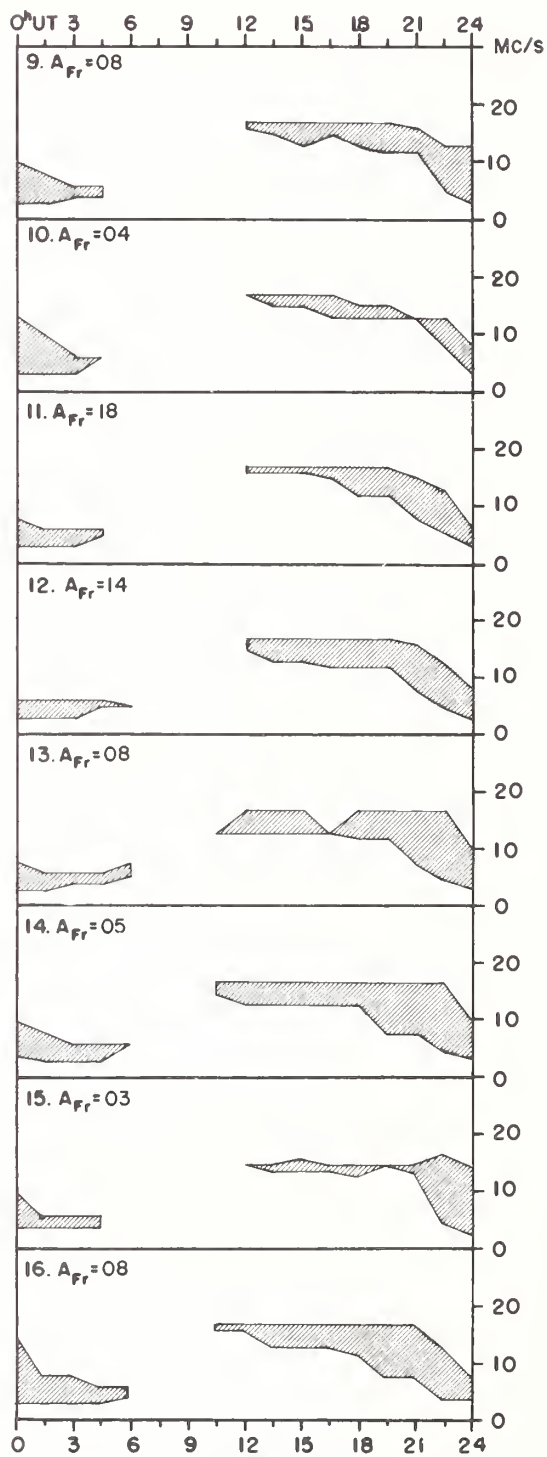
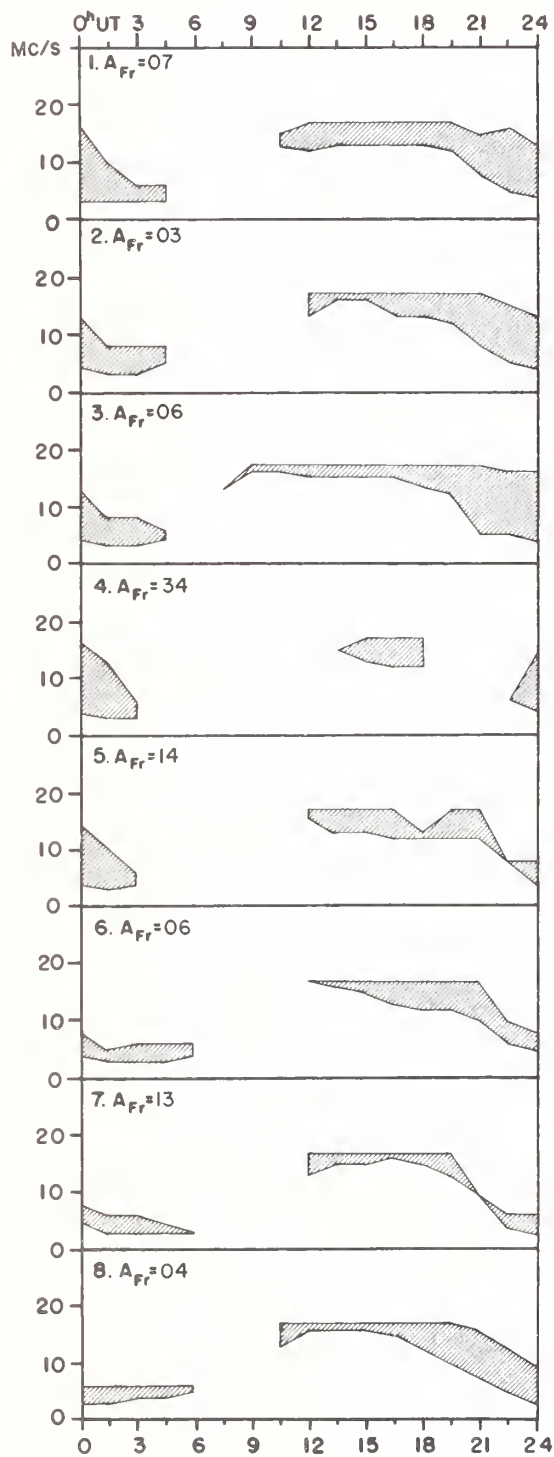


## NORTH PACIFIC



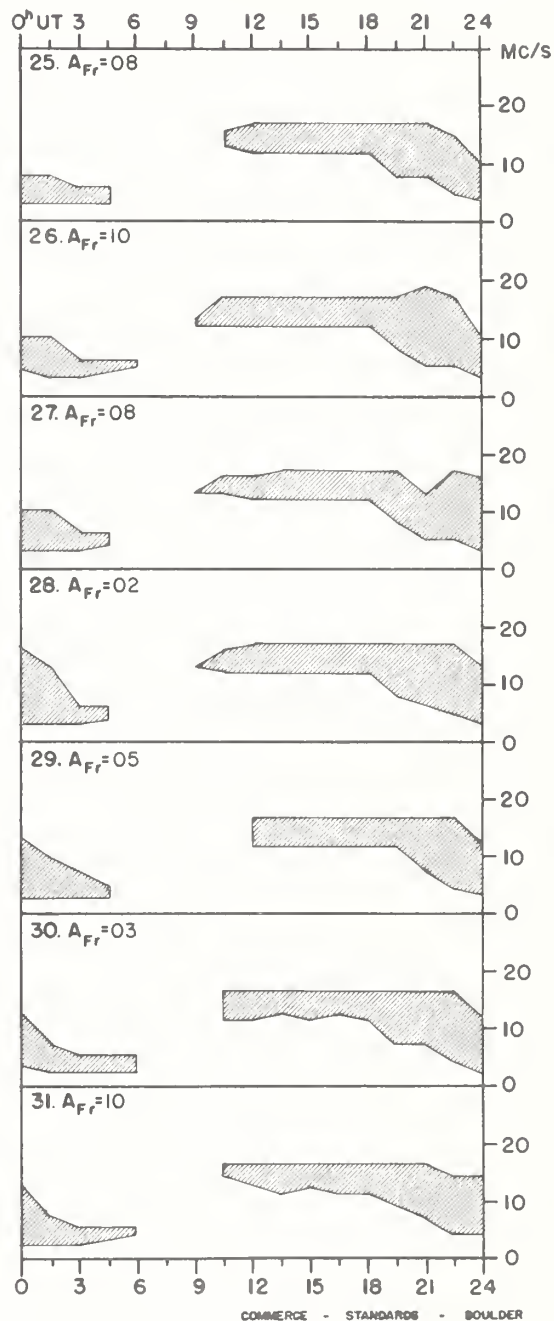
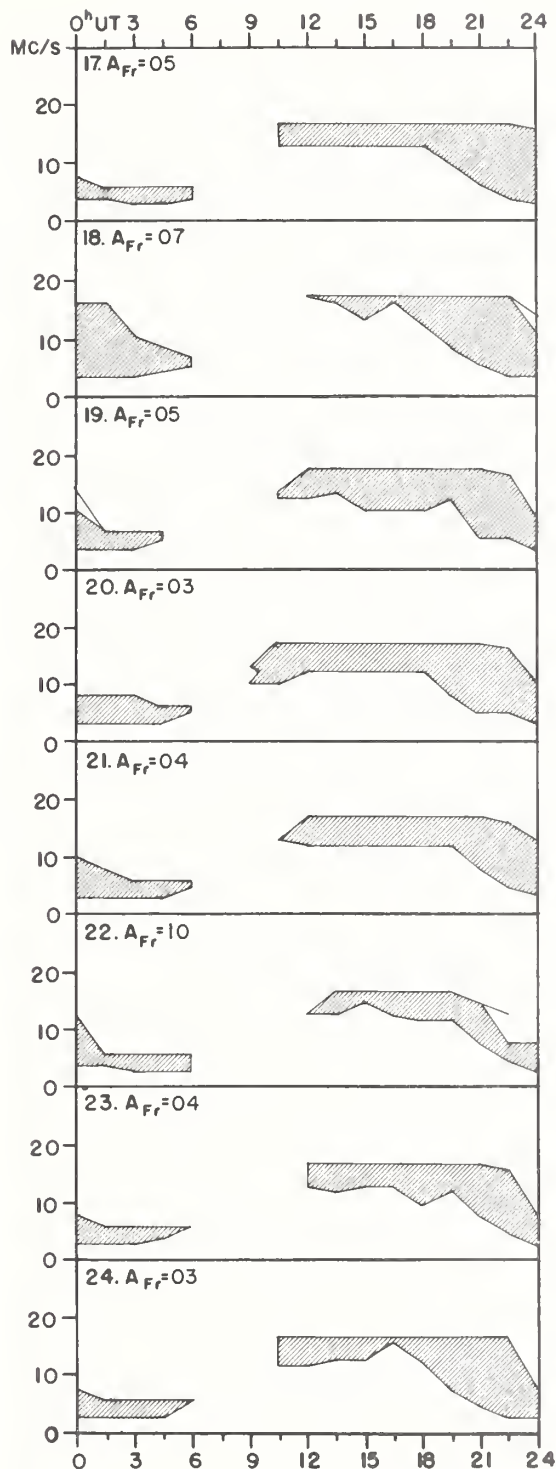
## USEFUL FREQUENCY RANGES -- NORTH ATLANTIC PATH

AUGUST 1964



COMMERCE - STANDARDS - BOULDER

AUGUST 1964



Adapted from Observations by Deutsches Bundespost



## IQSY ALERT PERIODS

INTERNATIONAL URSIGRAM  
AND WORLD DAYS SERVICE

SEPTEMBER 1964

SEPT. 1964	TIME OF ISSUE UT	ADVANCE GEOPHYSICAL ALERT	WORLDWIDE GEOPHYSICAL ALERT			
			NO.	TYPE	TIMING	ELABORATION
3	0400		100	Solar Activity	Exists	East Limb
13	0400		101	Magnetic Calm	Exists	
14	0400		102	Magnetic Calm	Exists	
18	0400		103	Solar Calm Stratospheric Warming	Exists Exists	Over McMurdo Sound region Movement unknown
19	0400		104	Solar Calm Stratospheric Warming	Exists Exists	McMurdo Sound Eastward movement suspected
20	0400		105	Solar Calm Stratospheric Warming	Exists Exists	Ross Sea region Eastward movement suspected
21	0400		106	Solar Calm	Exists Exists	Ross Sea Eastward movement suspected
22	0400		107	Magnetic Storm Stratospheric Warming	22/0245Z Exists	Over Ross Ice Shelf Southeastward movement suspected
23	0400		108	Stratospheric Warming	Exists	Over Ross Ice Shelf weakening
24	0400		109	Stratospheric Warming	Exists	Over McMurdo Vostok region weakening
25	0400		110	Stratospheric Warming	Exists	Over Vostok region West- ward movement suspected
26	0400		111	Stratospheric Warming	Exists	Over Amundsen-Scott Vostok region Southwestward move- ment suspected
27	0400		112	Stratospheric Warming	Exists	Over South Pole region
28	0400		113	Stratospheric Warming	Exists	Near South Pole region
29	0400		114	Stratospheric Warming	Exists	Near South Pole region
30	0400		115	Stratospheric Warming	Exists	Near South Pole spreading to West Antarctica

COMMERCE - STANDARDS - SOULDER



