

PART B
SOLAR - GEOPHYSICAL DATA

ISSUED
JULY 1964

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

SOLAR - GEOPHYSICAL DATA

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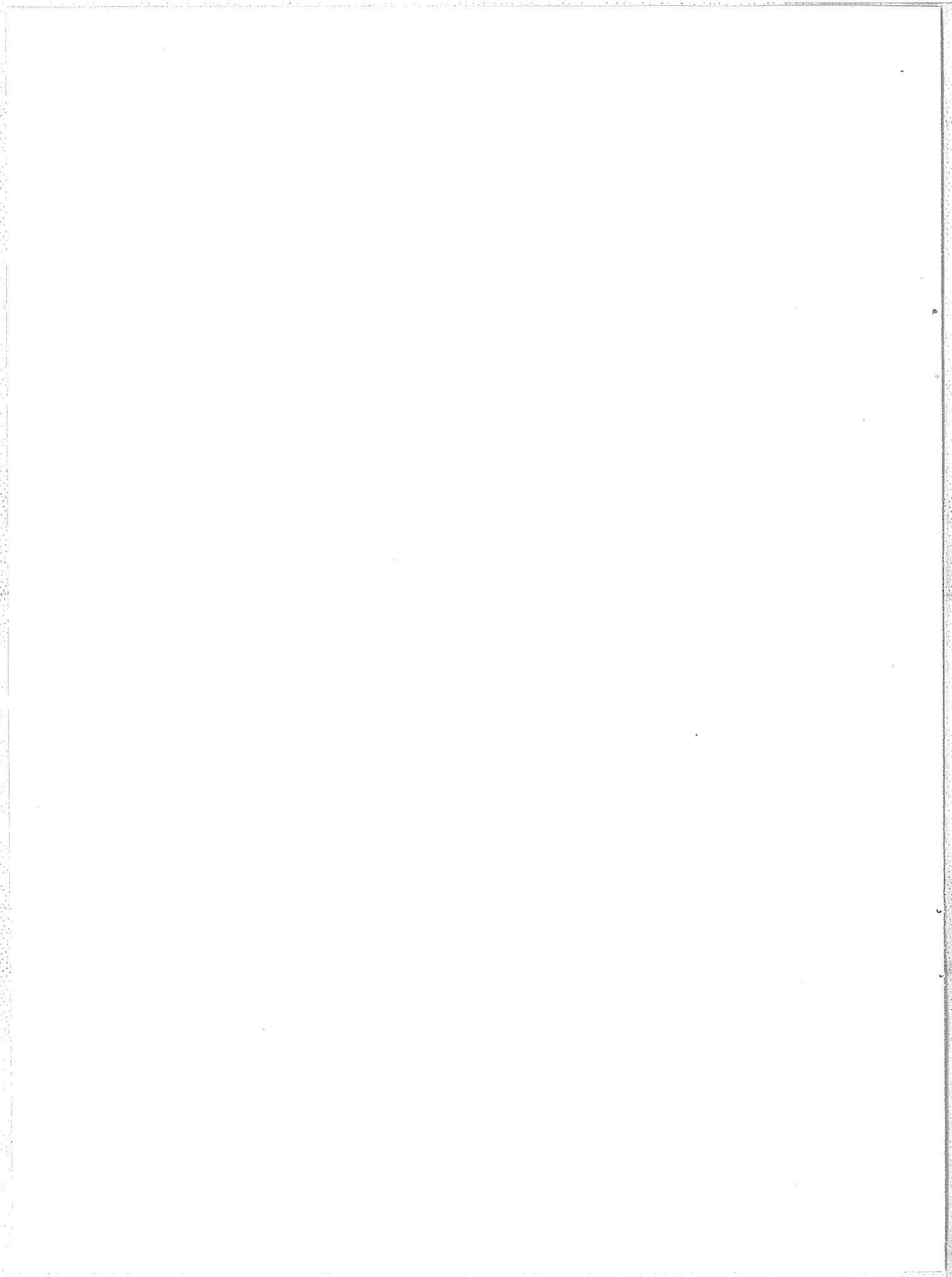
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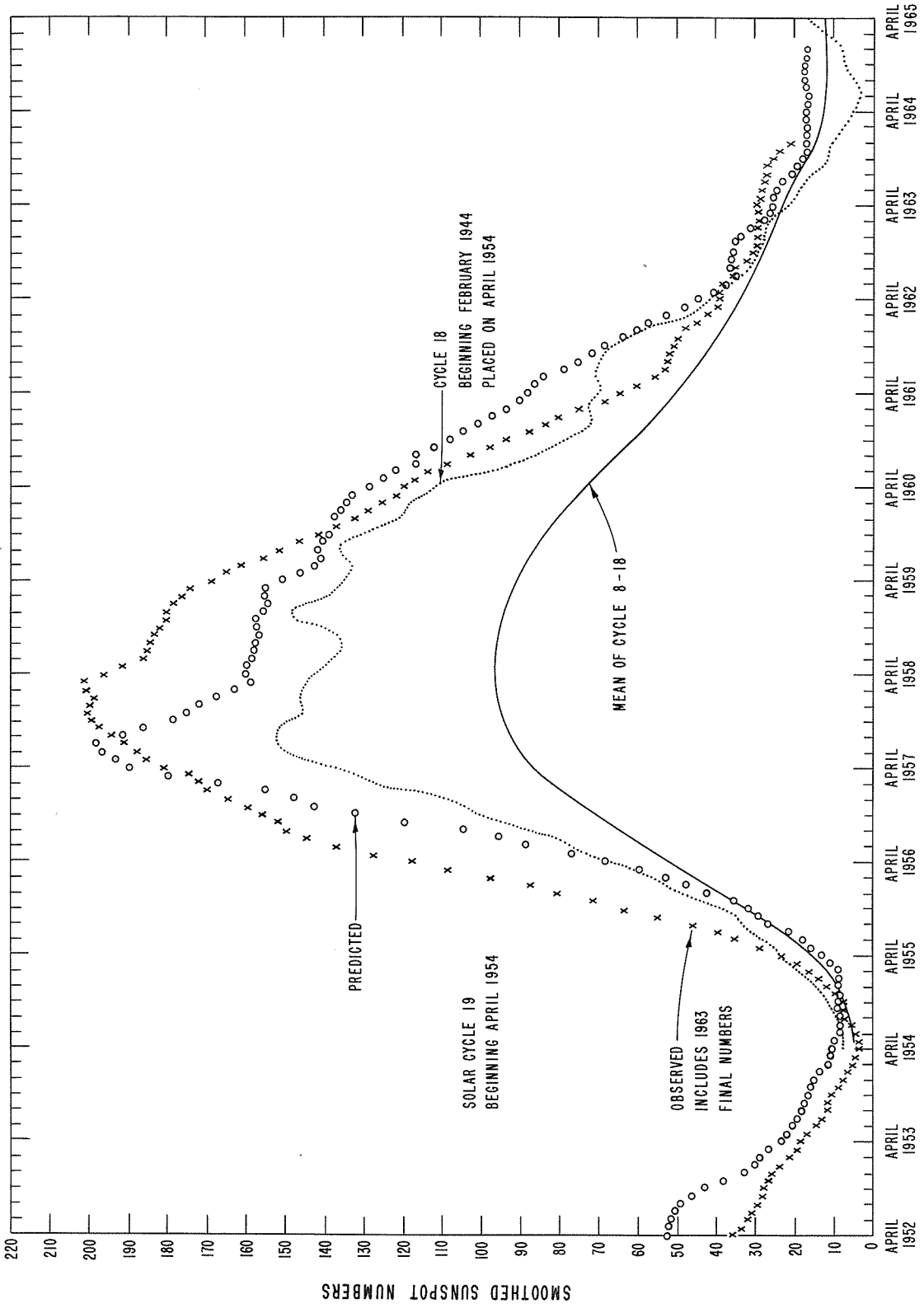


The descriptive text was republished November 1963.

DAILY SOLAR INDICES

May 1964	American Relative Sunspot Numbers R _A '
1	0
2	0
3	0
4	11
5	14
6	9
7	10
8	10
9	9
10	4
11	0
12	0
13	0
14	0
15	5
16	16
17	14
18	9
19	3
20	3
21	1
22	10
23	13
24	10
25	3
26	1
27	10
28	11
29	11
30	11
31	12
Mean:	6.8

June 1964	Zürich Provisional Relative Sunspot Numbers R _Z	Daily Values Solar Flux at 2800 Mc, Ottawa, Canada Flux
1	8	67.7
2	8	68.0
3	8	68.2
4	8	68.2
5	7	67.8
6	0	68.4
7	14	69.6
8	0	69.8
9	7	69.0
10	7	70.3
11	14	70.3
12	23	68.9
13	11	70.2
14	18	70.5
15	24	71.6
16	23	70.6
17	11	71.1
18	22	71.7
19	23	70.1
20	19	70.4
21	9	69.7
22	0	69.5
23	0	67.4
24	0	68.0
25	0	67.7
26	0	67.6
27	0	67.4
28	0	67.3
29	7	67.1
30	7	67.2
Mean:	9.3	69.0



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PREDICTED AND OBSERVED SUNSPOT NUMBERS

CALCIUM PLAGE AND SUNSPOT REGIONS

JUNE 1964

June 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)	CMP VALUES		HISTORY
				AREA	INT.					AREA	COUNT	
0.5	N08	7341 (2)	New	(200)	(2.5)	b - d	1	6/5	1			
1.5	N36	7331 (2)	New	100	1.5	b - d	1	6/2	1			
1.6	S05	7324	New	400	1.5	b - d	1	5/29	7			
1.8	N05	7316	New	1400	3	l ^ l	1	5/26	13	30	1	l - d
2.5	N31	7328 (2)	New	100	2	b - d	1	6/1	1			
2.6	S30	7329 (2)	New	100	1.5	b - d	1	6/1	1			
2.7	N28	7332	New	100	1.5	b - d	1	6/2	2			
3.3	S17	7333 (2)	New	100	1.5	b - d	1	6/2	1			
3.6	N06	7346	New	(300)	(2.5)	b - l	1	6/8	2			
3.7	N06	7330	New	200	2	b - d	1	6/1	6			
4.5	S12	7342 (2)	New	(200)	(1.5)	b - d	1	6/7	1			
4.8	N07	7336	New	100	1	b - d	1	6/3	3			
5.2	N35	7338	New	300	1	b - d	1	6/4	2			
5.5	N32	7349	New	(200)	(2.5)	b - l	1	6/10	2			
6.3	S23	7339	New	200	1	b - d	1	6/4	2			
7.1	S08	7334	New	(200)	(1.5)	b - d	1	6/2	3			
7.7	N25	7335	7273	600	1.5	l - d	3	6/2	8			
8.2	N28	7350	New	(200)	(3)	b - d	1	6/10	2			
8.2	N06	7354 (2)	New	(200)	(1.5)	b - d	1	6/11	1			
8.1	N08	7340 (2)	New	(200)	(1)	b - d	1	6/4	1			
9.5	S02	7358	New	(200)	(1.5)	b - l	1	6/12	3			
11.0	N24	7362 (2)	New	(300)	(3)	b - d	1	6/14	1			
11.2	N08	7359 (2)	New	200	1.5	b - d	1	6/12	1			
11.5	N01	7344 (2)	New	(100)	(2)	b - d	1	6/7	1			
11.7	N32	7343	New	300	2.5	b - l	1	6/7	10			
12.0	N47	7355 (2)	New	100	1	b - l	1	6/11	1			
12.7	N15	7351	New	100	1.5	b - d	1	6/10	4			
13.1	N21	7367	New	(100)	(1.5)	b - d	1	6/16	1			
13.1	N45	7356	New	200	1	b - d	1	6/11	2			
13.5	N26	7345 (2)	New	(400)	(1)	l - d	1	6/7	1			
13.7	N34	7352 (2)	New	(200)	(1.5)	b - d	1	6/10	1			
13.9	N12	7363	New	100	1.5	b - d	1	6/14	1			
14.2	N04	7357	New	800	3	b - l	1	6/11	10	190	4	b - d
14.5	S43	7364	New	200	1.5	b - d	1	6/14	1			
15.1	N27	7348	New	1200	2.5	l - l	1	6/8	13	10	2	b - d
15.1	N37	7365	New	100	1.5	b - d	1	6/14	1			
15.3	N06	7347	7286	900	2.5	l - l	2	6/8	13			
15.9	N29	7353	New	(100)	(1)	l - d	1	6/10	4			
16.3	S21	7368	New	200	2	b - d	1	6/16	1			
16.4	N15	7360	New	(100)	(1.5)	b - d	1	6/12	2			
17.2	S34	7374	New	(400)	(2)	b - l	1	6/22	1			
17.9	N20	7370	New	200	1.5	b - d	1	6/17	2			
18.1	S22	7375	New	(100)	(1.5)	b - d	1	6/22	1			
18.1	N10	7366	New	(200)	(1)	b - d	1	6/14	1			
19.1	N26	7361	New	1000	3.5	l - l	1	6/12	14	100	1	b - d
19.8	S10	7372	New	200	2	b - d	1	6/18	2			
19.3	N24	7371	New	600	3.5	b - l	1	6/17	9	150	7	b - d
21.4	N08	7373	New	200	1.5	b - d	1	6/20	1			
21.6	N03	7377	New	(200)	(1.5)	b - d	1	6/24	1			
21.8	N11	7369	New	(200)	(1)	l - d	1	6/16	1			
27.3	N23	7381	New	500	1.5	b - d	1	6/28	1			
28.6	N07	7376	New	(400)	(1)	l - d	1	6/24	1			
30.5	N49	7379	New	(200)	(1)	b - d	1	6/27	1			
30.5	N10	7380	New	200	2	b - d	1	6/27	2			
30.9	N06	7378	New	(300)	(1.5)	l - d	1	6/24	1			

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(1) No calcium plage data were secured at the McMath-Hulbert Observatory on June 15 and 23, 1964.

(2) These very small and ephemeral plages last for only one day.

It is worthy of note that, for the first time during the declining phase of the cycle, there were no reportable calcium plages on the sun on June 26, 1964.

MT. WILSON MAGNETIC CLASSIFICATIONS OF SUNSPOTS

IIb

JUNE 1964

June 1964	TIME MEAS. UT	LAT.	MER. DIST.	TYPE	June 1964	TIME MEAS. UT	LAT.	MER. DIST.	TYPE
1	1420	E02	N07	α_p	13	1915	E07 E67	N05 N25	β_f α_p^*
2	2255	W17	N07	α_p	14	1735	W05 E55	N05 N25	β β_p^*
3	2310	W30	N07	α_p	15	No Obs.			
4-7	No Spots				16	2220	E26	N25	β_f^*
8	No Obs.				17	2335	E07 E14 E27	N27 N26 N26	α_f^* β_γ^* β^*
9	No Spots				18-20	No Obs.			
10	No Obs.				21-28	No Spots			
11	2215	E30 E37	N04 N24	β_f β_p^*	29 July 1	2235	E61	S04	α_p
12	2345	E18	N05	α_f		0005	E46	S05	α_p

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* New cycle

PROVISIONAL CORONAL LINE EMISSION INDICES

JUNE 1964

CMP June 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 ₆	G ₁	R ₆	R ₁	G ₆	G ₁	R ₆	R ₁	G ₆	G ₁	R ₆	R ₁	G ₆	G ₁	R ₆	R ₁
1	x	x	x	x	x	x	x	x	18	28	14	25	19	22	15	20
2	x	x	x	x	x	x	x	8	8	9	10	12	9	12	10	13
3	x	x	x	x	x	x	11	12	7	8	12	18	7	11	16	20
4	x	x	12	17	x	x	x	x	0	0	x	x	0	0	x	x
5	7	9	x	x	x	x	x	19	x	x	15	x	x	x	14	18
6	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
7	x	x	x	x	x	x	x	x	x	x	14a	22a	x	x	15a	24a
8	x	x	x	x	x	x	x	x	0	0	19	28	8	9	14	20
9	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
10	x	x	x	x	x	x	x	x	1	3	15	20	9	14	12	16
11	x	x	15	30	x	13	16	16	5	7	12	18	5	7	11	14
12	x	x	x	x	x	x	x	x	8	14	27	43	14	25	19	28
13	x	x	x	x	x	x	x	x	11	12	17	20	14	12	13	22
14	13	20	24	28	15	15	20	20	x	x	19	40	x	x	14	30
15	18	22	29	50	10	14	33	33	8	13	11	15	13	18	10	14
16	14	24	13	24	6	7	12	12	9	31	13	19	9	11	12	15
17	13	20	13	18	0	0	20	20	0	0	14	21	8	17	14	20
18	2	8	x	x	0	0	x	x	x	x	x	x	x	x	x	x
19	x	x	15	18	x	13	14	14	x	x	x	x	x	x	x	x
20	x	x	x	x	x	x	x	x	x	x	14	24	x	x	13	20
21	x	20a	20a	26a	x	13a	16a	16a	x	x	12	15	x	x	11	15
22	5	15	15	20	2	6	18	18	1	3	x	x	2	8	x	x
23	x	x	x	x	x	x	x	x	x	x	11	13	x	x	9	11
24	7	12	12	16	4	6	22	22	x	x	x	x	x	x	x	x
25	6	8	8	10	4	5	12	12	3	6	x	x	6	11	x	x
26	8	15	15	26	5	14	24	24	x	x	x	x	x	x	x	x
27	12	14	14	18	12	13	20	20	x	x	x	x	x	x	x	x
28	x	9	9	21	x	7	26	26	x	x	7	8	x	x	8	12
29	10	13	20	26	6	7	25	25	x	x	x	x	x	x	x	x
30	9	20	12	16	3	6	15	15	x	x	x	x	x	x	x	x

x = no observations

* = yellow line

a = index computed from low weight data

COMMERCE - STANDARDS - BOULDER

SOLAR FLARES

JUNE 1964

OBSERVATORY	DATE JUNE 1964	OBSERVED UNIVERSAL TIME		LOCATION		DUR. TION MINUTES	IR. POR. TANCE	OBS. COND.	MEASUREMENTS			PROVISIONAL IONOSPHERIC EFFECT
		START	END	APPROX. LAT.	APPROX. MER. DIST.				MCMATH PLAGE REGION	TIME U T	MEAS. AREA Sq. Deg.	
SAC PEAK	01	0545	0605	NO FLARE	PATROL		1-	C	.63	.61		17
	01	2054	2119	2100	N06 W04							
CAPRI-S	02	0145	0155	NO FLARE	PATROL		1-	2	.50	.50		
	02	0245	0305	NO FLARE	PATROL		1-	2	.70	.70		
	02	0805	0808	NO FLARE	N05 W10		1-	2	.20	.40		10
	02	1631	1650	D	N06 W10	7316	1-	2	.20	.70		10
MCMATH	02	1930	1939	1926	N14 E58		1-	2	.20	.20		
	02	1931	1942	1938	N63 E70		1-	2	.70	.70		
MCMATH	03	0135	0200	NO FLARE	PATROL		1-	2	.70	.70		
	03	0230	0325	NO FLARE	PATROL		1-	2	.70	.70		
	03	0435	0605	NO FLARE	PATROL		1-	2	.70	.70		
	03	1556	1615	D	N07 W23	7316	1-	2	.70	.70		
MCMATH	03	1706	1720	1709	N07 W24		1-	2	.70	.70		
	04	0155	0400	NO FLARE	PATROL		1-	2	.70	.70		
SAC PEAK	04	0450	0500	NO FLARE	PATROL		1-	1	.16	.40		18
	05	0215	0250	NO FLARE	PATROL		1-	1	.30	.30		
CAPRI-S	05	0330	0420	NO FLARE	PATROL		1-	3	.30	.30		
	05	1508	1521	1510	N05 W49		1-	3	.40	.40		
	05	1509	1518	1510	N07 W48	7316	1-	1	1.50	1.50		
	06	0200	0450	NO FLARE	PATROL		1-	3	.17	.17		
CAPRI-S	06	1305	1320	NO FLARE	N25 E90		1-	3	.30	.30		
	06	1414	1427		N25 E90		1-	3	.30	.30		
	06	1430	1505		N25 E90		1-	3	.40	.40		
	07	0814	0820	NO FLARE	N05 E90	7347	1	3	1.50	1.50		
CAPRI-S	07	0853	0910	D	N03 E90		1-	2	.17	.17		
	07	0857	0902		N02 E87		1-	3	.60	.60		
	07	0900	0915		N05 E85		1-	3	.50	.50		
	07	0932	0940		N05 E85		1-	3	.40	.40		
SAC PEAK	07	0956	1005	NO FLARE	N05 E85		1-	3	.28	.72		17
	07	1155	1215		PATROL							
	08	0315	0335	NO FLARE	PATROL							
	08	1125	1200	NO FLARE	PATROL							
OTTAWA	08	1422	1444	D	N28 E90	7348	1	C	1.09	2.00		
	08	1425	1430	1430	N28 E90		1+	3	2.00	2.00		
	08	1425	1435	D	N32 E90	7348	10	C	.28	.72		
	08	1820	1830	NO FLARE	PATROL		1-	C	.49	.51		
SAC PEAK	08	1843	1850	1846	N22 E79		1-	3	.40	1.60		
	08	2350	2400	NO FLARE	PATROL		1-	3	.65	1.78		
	09	0330	0405	NO FLARE	PATROL		1-	3	.51	.51		
	09	0910	1003	NO FLARE	N01 E15		1-	3	.40	.40		
ARCETRI	09	0953	1003		N27 E73		1-	3	.65	.65		
	09	1000	1000	NO FLARE	N28 E75		1-	3	.65	.65		
SAC PEAK	09	2340	2400	NO FLARE	PATROL		1-	3	.65	.65		
	10	0350	0425	NO FLARE	PATROL		1-	3	.65	.65		

COMMERCIAL - STANDARDS - BOULDER

SOLAR FLARES

JUNE 1964

OBSERVATORY	DATE JUNE 1964	OBSERVED UNIVERSAL TIME		LOCATION			DURATION MINUTES	IM- POR- TANCE	OBS. COND.	TIME - U T	MEASUREMENTS		MAX. WIDTH H _g	MAX. INT. %	PROVISIONAL IONOSPHERIC EFFECT
		START	END	APPROX. LAT.	MER. DST.	MATH PLACE REGION					MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.			
ONDREJOV MANILA	10	0708	0735	N26 E60			1-1	3	0710	.33	.33	2.10			
ARCETRI	10	0709	0716	N26 E65			1-1	2	0711	.49	.63				
HTE-PROVEN	10	1035 E	1044 D	N27 W31			1-1	3	1035	.60	1.00				
MCMAH	10	1048	1255	N05 E49			1-1	1	1205	.30	.40				
WENDEL	10	1225 E	1241 D	N05 E50	7357		1-1	1	1228	3.00	3.00				
MCMATH	10	1204	1228	N23 E53	7348		1-1	2	1212	.60	1.30		17		
SAC PEAK	10	1207	1221	N24 E58	7348		1-1	C	1215	.30	.47				
HTE-PROVEN	10	1212 E	1224	N24 E55			1-1	1	1215	.60	1.00				
MCMATH	10	1212	1234	N29 W32	7350		1-1	1	1420	.50	.60				
MCMATH	10	1419	1432 D	N24 E56	7348		1-1	1	1430	.50	1.00				
MCMATH	10	1428	1432 D	N23 E51			1-1	C	1430	.28	.43		17		
SAC PEAK	10	1638	1650	N23 E51	7348		1-1	1	3.00	3.00	3.00				
WENDEL	10	1639	1651	N23 E55			1-1	C	1641	.43	.62		17		
SAC PEAK	10	1640	1648	N24 E52			1-1	C	1641	.90	1.40		10		
HTE-PROVEN	10	1928	1958	N29 W36			1-1	2	1937	.30	.30		10		
LOCKHEED	10	1930	1935	N28 W35			1-1	C	1937	.14	.16		17		
SAC PEAK	10	2127	2140	N35 W70			1-1	C	2132	1.00	1.00		20		
LOCKHEED	10	2202	2235	N24 E52			1-1	2	2211	.60	.70		10		
LOCKHEED	10	2204	2211	N24 E54			1-1	C	2211	1.00	1.44		18		
SAC PEAK	10	2222	2245	N35 W70			1-1	2	2230	.20	.40		10		
LOCKHEED	10	2355	0038	N04 E45			1-1	2	0006	.40	.50		10		
MANILA	11	0142	0151	N25 E51			1-1	2	0144	.33	.33				
SAC PEAK	11	0245	0320	NO FLARE PATROL			1-1	C	1456	.29	.29		18		
OTTAWA	11	1445	1510	N33 W81			1-1	C	1505	.24	.29				
OTTAWA	11	1501 E	1512	N26 E42			1-1	C	1506	.50	.80				
MCMATH	11	1503	1517	N25 E43	7348		1-1	2	1506	.24	.29				
HTE-PROVEN	11	1505	1515	N25 E43			1-1	3	1637	.92	1.32				
ARCETRI	11	1637 E	1720	N27 E41			1-1	2	1709	.30	.30		10		
LOCKHEED	11	1706	1718	N06 E30			1-1	C	1713	.18	.53				
OTTAWA	11	1710	2050	N32 W83			1-1	C	2039	.60	.60		17		
MCMATH	11	2037	2050	N26 E40	7348		1-1	C	2039	.27	.31		18		
SAC PEAK	11	2038	2048	N25 E39			1-1	C	2039	.31	.39		17		
SAC PEAK	11	2309	2329	N24 E38			1-1	C	2329	.35	.39		18		
WENDEL	12	0215	0355	NO FLARE PATROL			1-1	3	0850	.75	.98		10		
ARCETRI	12	0516 E	0524 D	N33 W06			1-1	2	2257	.20	.20				
LOCKHEED	12	0850 E	0920 D	N27 E32			1-1	2	0331	.17	.17				
MANILA	13	0329	0336	N28 E28			1-1	3	1340	.80	.80				
CAPRI-S	13	1328	1400 D	N04 E10			1-1	3	1618	.30	.50	1.90	10		
HTE-PROVEN	13	1551	1620	N05 E15			1-1	2	2100	.40	.70		20		
ONDREJOV	13	1617 E	1628	N05 E07			1-1	2	2256	.33	.50				
LOCKHEED	13	2042	2130	N24 E65			1-1	2	0211	.33	.33				
LOCKHEED	13	2253	2310	N24 E65			1-1	2	0235	.50	.50				
MANILA	14	0209	0214	N06 E03			1-1	2							
MANILA	14	0230	0246	N25 E62			1-1	2							

COMMERCE - STANDARDS - BOULDER

SOLAR FLARES

JUNE 1964

OBSERVATORY	DATE JUNE 1964	OBSERVED TIME		LOCATION			DURA- TION — MINUTES	IM- POR- TANCE	OBS. COND.	MEASUREMENTS		MAX. WIDTH H _g	MAX. INT. %	PROVISIONAL IONOSPHERIC EFFECT
		START	END	APPROX. LAT. MER. DIST.	McMATH FLARE REGION	MEAS. AREA Sq. Deg.				CORR. AREA Sq. Deg.				
MANILA	14	0248	0256	N25 E62				2	0251	.20	.20			
MANILA	14	0330	0342	N25 E61				2	0333	.40	.40	2.00		
ONDREJOV	14	0402	0429	N25 E65			27 D	3	0412					
CATANIA	14	0818	0855	N07 W00			37 D	1	0820					
CATANIA	14	0930	0948	N07 W00			18 D	1	0930					
	14	1155	1200	NO FLARE										
	14	1320	1325	NO FLARE										
CAPRI-S	14	1335	1349	N28 E56				3	1339	.80	1.60			
SAC PEAK	14	2230	2325	N26 E53				C	2250	.45	.63		18	
LOCKHEED	14	2238	2310	N25 E52				C	2250	.40	.40		10	
LOCKHEED	14	2353	2400	N10 E52				2	2356	.30	.40		10	
	15	0145	0215	NO FLARE										
MANILA	15	0248	0255	PATROL				1	0249	.33	.33			
MANILA	15	0256	0309	N25 E50				2	0259	.17	.17			
BUCHARREST	15	0640	0711	N26 E47			31 D	2	0655	2.50	2.50			
HTE-PROVEN	15	0642	0710	N27 E50				1	0655	1.00	1.70			
CATANIA	15	0648	0725	N26 E47			37 D	1	0655	.33	.33			
MANILA	15	0652	0713	N25 E48				2	0655	.33	.33			
MANILA	15	1040	1045	N07 W20				2	1042					
CATANIA	15	1145	1148	N26 E47			3 D	1	1144					
	15	1200	1210	NO FLARE										
CAPRI-S	15	1257	1434	PATROL			97	2	1333	1.80	3.10		28	
SAC PEAK	15	1317	1348	N27 E46				C	1455	1.40	1.90			
CAPRI-S	15	1446	1550	N26 E46			64	2	1455	1.40	2.40		24	
CAPRI-S	15	1450	1510	N27 E43				C	1458	.59	.74			
SAC PEAK	15	1450	1525	N26 E45				1	1458	.90	1.40			
HTE-PROVEN	15	1453	1505	N26 E43			12	V	1619	.70	1.10			
ZURICH	15	1611	1629	N27 E45										
HTE-PROVEN	15	1702	1738	N26 E42										
HTE-PROVEN	15	1805	1815	NO FLARE										
	15	1955	2015	NO FLARE										
	15	2040	2400	NO FLARE										
	16	0000	0025	NO FLARE										
MANILA	16	0119	0128	PATROL				2	0121	.13	.13			
MANILA	16	0220	0230	N24 E40				1	0222	.17	.17			
MANILA	16	0337	0340	N26 E34				2	0338	.17	.17			
	16	0505	0510	NO FLARE										
MANILA	16	0505	0510	NO FLARE				1	0507	.20	.20			
HTE-PROVEN	16	0510	0604	N27 E35			54 D	1	0516	1.60	2.20			
MANILA	16	0536	0542	N26 E33				2	0538	.13	.13			
HTE-PROVEN	16	0700	0745	N27 E34				1	0712	.60	.80			
ARCETRI	16	0905	0920	N27 E30				3	0912	.39	.52			
MANILA	16	1845	1915	N27 E28				1	1853	.60	.80			
MCMATH	16	1900	1915	N25 E27				C	1853	.87	.92		17	
SAC PEAK	16	2145	2220	NO FLARE										
MCMATH	16	2153	2235	PATROL				2	2205	1.00	1.20			
	17	0505	0530	NO FLARE										
OTTAWA	17	1222	1230	PATROL				C	1224	.42	.44			
			1230	N27 E20										

CONCORDANCE - STANDARDS - INDULDER

SOLAR FLARES

JUNE 1964

OBSERVATORY	DATE JUNE 1964	OBSERVED UNIVERSAL TIME			LOCATION		DURA- TION MINUTES	IM- POR- TANCE	OBS. COND.	TIME UT	MEASUREMENTS			PROVISIONAL IONOSPHERIC EFFECT
		START	END	MAX. PHASE	APPROX. LAT.	MER. DIST.					MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH Rg	
SAC PEAK HTE-PROVEN	17	1223	1230	1224	N26 E21		1-	C	1228	.29	.30	.30	18	
	17	1227	1230	1228	N27 E20		1-			.30	.40			
	17	2145	2200	NO FLARE	PATROL									
	17	2210	2220	NO FLARE	PATROL									
CATANIA WENDEL WENDEL CATANIA	19	0450	0515	NO FLARE	PATROL									
	19	0550	0605	NO FLARE	PATROL									
	20	0430	0440	NO FLARE	PATROL									
	20	0510	0515	NO FLARE	PATROL									
CATANIA WENDEL WENDEL CATANIA	20	0800	0845	D	N28 W05		1-		0810		3.00			
	20	0842	0912	D	N26 W06	7371	30 D							
	20	0856	0906	D	N28 W15		10 D							
	20	0842	0937	D	N05 W71	7357	55 D				4.00			
LOCKHEED LOCKHEED	20	0854	0915	D	N07 W73	7357	21 D		0855					
	20	1200	1210	NO FLARE	PATROL									
	21	0010	0045	0030	N06 W80		1-	2	0030	.20	.60	.60	10	
	21	0114	0138	0120	N06 W80		1-	2	0120	.30	.60	.60	10	
CAPRI-S CAPRI-S LOCKHEED MANILA	21	0315	0535	NO FLARE	PATROL		1-	3	0710	.60	.60	.60	10	
	21	0707	0726	D	S01 W90		1-	3	1254	.50	.50	.50	10	
	21	1249	1258	1955	S00 W90		1-	2	1955	.20	.30	.30	20	
	21	1945	2006	2341	N32 W71	7361	30 D	2	2341	2.10	2.52	2.52	20	
LOCKHEED SAC PEAK SAC PEAK	21	2330	0030	2340	N25 W38	7361	56	2	2340	2.60	3.30	3.30	20	
	21	2334	2400	2340	N28 W39	7361	15	2	2340	2.16	2.47	2.47	20	
	21	2335	2350	2340	N27 W39	7361	15	2	2340	2.16	2.47	2.47	20	
	21	2356	2359	2358	N28 W39	7361	3 D	2	2356	2.88	3.40	3.40	21	
CAPRI-S CAPRI-S LOCKHEED LOCKHEED	22	0245	0300	NO FLARE	PATROL		1-	3	0746	.50	.80	.80	10	
	22	0410	0445	NO FLARE	PATROL		1-	3	0756	.30	.40	.40	10	
	22	0530	0550	NO FLARE	PATROL		1-	3					10	
	22	0742	0751	NO FLARE	N26 W42		1-	2	2127	.20	.20	.20	10	
LOCKHEED LOCKHEED	22	0754	0759	NO FLARE	N27 W41		1-	2	2218	.20	.20	.20	10	
	22	1205	1210	NO FLARE	PATROL		1-	2	2314	.20	.20	.20	10	
	22	2124	2134	2127	N27 W43		1-	2					10	
	22	2212	2225	2218	N27 W43		1-	2					10	
LOCKHEED LOCKHEED LOCKHEED	22	2309	2325	2314	N27 W43		1-	2	2314	.20	.20	.20	10	
	23	0310	0430	NO FLARE	PATROL		1-	2	1745	.20	.40	.40	10	
	23	0455	0505	NO FLARE	PATROL		1-	2	2122	.20	.20	.20	10	
	24	0245	0335	NO FLARE	PATROL		1-	2	2206	.30	.50	.50	10	
LOCKHEED LOCKHEED LOCKHEED	24	0400	0500	NO FLARE	PATROL		1-	2	1745	.20	.40	.40	10	
	25	0150	0400	NO FLARE	PATROL		1-	2	2122	.20	.20	.20	10	
	25	0405	0430	NO FLARE	PATROL		1-	2	2206	.30	.50	.50	10	
	25	0445	0505	NO FLARE	PATROL		1-	2					10	
LOCKHEED LOCKHEED	27	1730	1758	1745	S60 E34		1-	2	1745	.20	.40	.40	10	
	27	2118	2127	2122	N75 E70		1-	2	2122	.20	.20	.20	10	
LOCKHEED	27	2200	2214	2206	S40 E59		1-	2	2206	.30	.50	.50	10	

COMMENCE - STANDARDS - 10 - 1000000

SOLAR FLARES

JUNE 1964

OBSERVATORY	DATE JUNE 1964	OBSERVED UNIVERSAL TIME		MAX. PHASE	LOCATION		DURA- TION - MINUTES	IM- POR- TANCE	OBS. COND.	TIME - U T	MEASUREMENTS			PROVISIONAL IONOSPHERIC EFFECT
		START	END		APPROX. LAT. MER. DIST.	McMATH FLAGE REGION					MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH H _z	
LOCKHEED	28	1915	1955	1936	N57 E36	HONOLULU		1-	2	1936	*20	*30	10	
LOCKHEED	28	2130	2230	2150	S05 E76	IKOMASAN		1-	2	2150	*30	*70	10	
LOCKHEED	28	2240	2310	2250	S05 E76	KYOTO, JAPAN		1-	2	2250	*30	*70	10	
LOCKHEED	28	2320	2335	2325	S05 E76	KIEV KV		1-	2	2325	*30	*70	10	
LOCKHEED	28	2355	0105 D	0005	S05 E76	LOCKHEED		1-	2	0005	*30	*70	10	
LOCKHEED	28	2355	0105 D	0045	S05 E76	LOCKHEED		1-	2	0005	*30	*70	10	
LOCKHEED	29	0105	0540	NO FLARE	PATROL	LOCKHEED								
LOCKHEED	30	0215	0530	NO FLARE	PATROL	LOCKHEED								

COMMERCIAL - STANDARDS - BOULDER

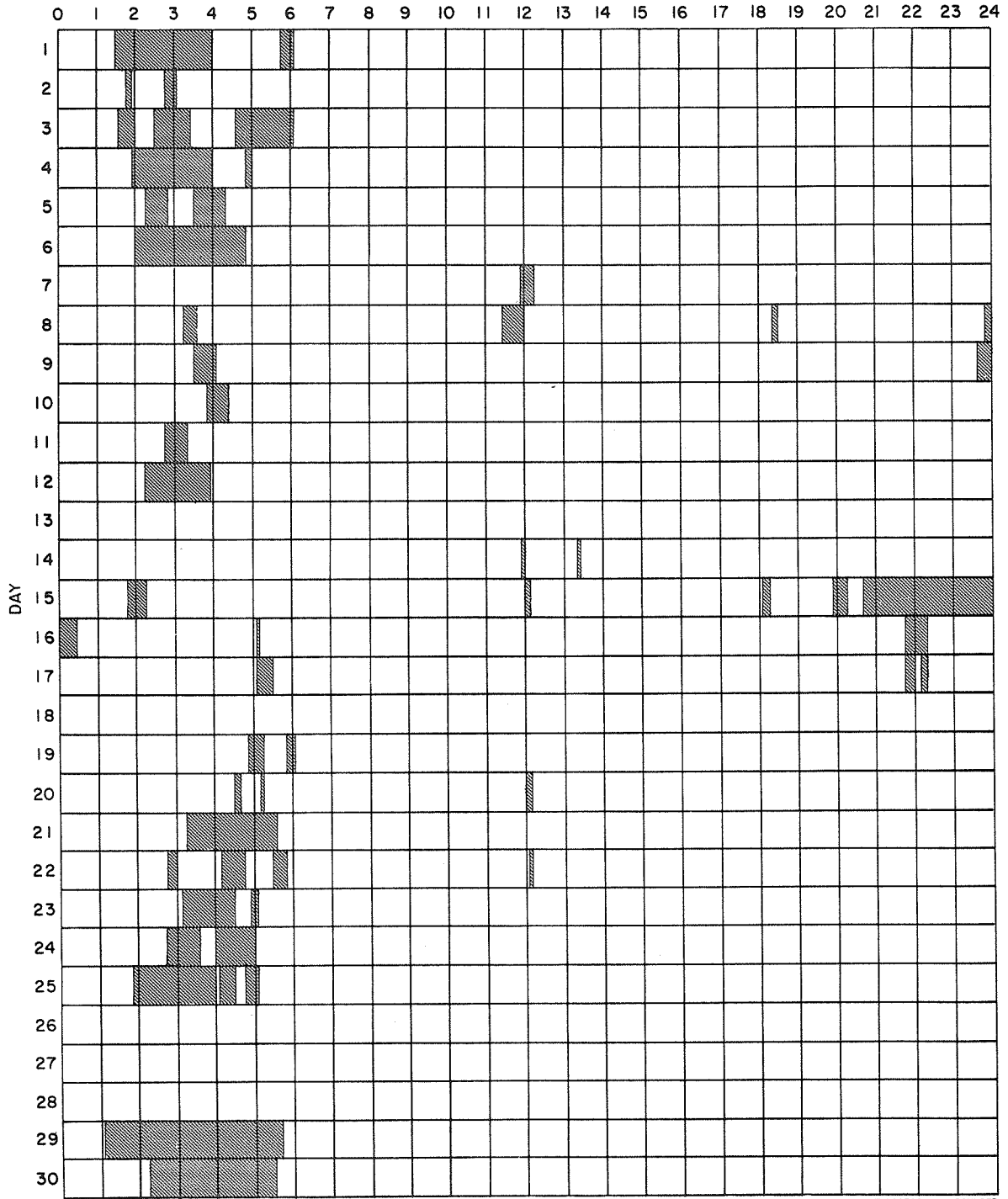
ATHENS, GREECE
 BAKOU, USSR
 CAPETOWN, S. AFRICA
 CAPE OF GOOD HOPE
 CAPRI F, ITALY (GERMAN)
 CAPRI S, ITALY (SWEDISH)
 CRIMEE, USSR
 HERSTMONCEU, ENGLAND
 HTE-PROVEN, FRANCE
 HONOLULU, USA
 IKOMASAN, JAPAN
 KIEV KV, USSR
 LOCKHEED, USA
 McMATH, USA
 MOSCOW, USSR
 NEW SCHAUIN FREIBURG, GFR
 NEDERHORST den BERGH, NETHERLANDS
 NIZMIR, USSR
 KRASNAYA PAKHRA, USSR
 SAC PEAK, SACRAMENTO PEAK, N. MEX., USA
 SALTSJÖBADEN, SWEDEN
 SCHAUBINS, GFR
 TASHKENT, USSR
 WENDEL, 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)

JUNE 1964

HOUR-UT



COMMERCE - STANDARDS - BOULDER

Observatories included:

- | | | | |
|-----------|----------------|----------|-----------------|
| Arcetri | Haute-Provence | Lockheed | Sacramento Peak |
| Athens | Huancayo | Manila | Wendelstein |
| Bucharest | Istanbul | Ondrejov | Wroclaw |
| Catania | Locarno | Ottawa | Zurich |

SOLAR FLARES

MARCH 1964

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		LOCATION		DURATION MINUTES	IM. POR. RANGE	OBS. COND.	TIME U T	MEASUREMENTS			PROVISIONAL IONOSPHERIC EFFECT	
		START	END	APPROX. LAT.	APPROX. LONG. PLAGE REGION					MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH Hz		MAX. INT. %
	MAR 1964													
IRKUTSK	01	0330	0335											
	02	0610	0620											
	02	2235	2300											
	03	2220	2335											
	04	0010	0040											
	04	0120	0200											
	04	0254 E	0312			7171	18 D				2.25	1.60		
	04	1005	1035											
NIZAMIAH NIZAMIAH	04	1100	1120											
	04	1125	1200											
	04	1600	1630											
	07	0120	0150											
	07	2240	2300											
	08	0040	0200											
	11	0506	0518			7180	12				1.82	1.50		
	11	1039	1045			7180	6				1.82	1.40		
	SYDNEY SYDNEY SYDNEY IRKUTSK SYDNEY SYDNEY THESSALONIK CLIMAX	12	0057	0105										
		12	0230	0245										
		12	0240	0258										
		12	0243	0336										
12		0313 E	0344											
12		0408	0420											
12		0426	0440											
12		1412 E	1420 D			7180	8 D							
12		1512	1521 D											
13		0055	0100											
13		0150	0155											
SYDNEY SYDNEY SYDNEY SYDNEY SYDNEY CAPETOWN		13	0205	0225										
	13	0409	0417											
	13	0441	0445											
	13	0445	0503											
	13	0454	0511											
	13	0747	0756											
14	0105	0350												
15	0745	0810												
15	0900	0905												
15	0925	0935												
15	0940	0945												
IRKUTSK SYDNEY	16	0201 E	0222			7182	21 D							
	16	0359	0409			7182	10							

COMMERCE - STANDARDS - BOULOGET

SOLAR FLARES

MARCH 1964

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		LOCATION			DURA- TION MINUTES	IM- POR- TANCE	SBS COORD.	TIME — U T	MEASUREMENTS			PROVISIONAL IONOSPHERIC EFFECT
		START	END	APPROX. LAT.	APPROX. MER. DIST.	MGMATH FLAGE REGION					MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH Rg	
	MAR 1964													
IRKUTSK	16	0431	0456	N05 W68		7182	25	V	0447	1.86	1.60	1.51	100	S-SWF
KODAIKIN	16	0447	0452	N04 W67				C	0719	.50	1.60	1.60		
CAPETOWN	16	0717	0730	N05 W70		7182	41	C	0816	.80	2.60	2.60		
CAPETOWN	16	0811	0852	N05 W70				C	1137	.30				
CAPETOWN	16	1132	1151	N07 W75				C	1214	.80	2.60	2.60		
CAPETOWN	16	1212	1227	N05 W70					1608	1.50	3.20	3.20		SI-S-SWF
CLIMAX	16	1555	1656	N05 W75		7182	61 D							
SYDNEY	18	0019	0030	N10 E60		7187	11	C	0025	1.00	2.30	2.30		
NIZAMIAH	20	0951	1101	N09 E29		7187	70	2	1056	1.82	2.18	2.18		
	21	0710	0720	NO FLARE										
	21	0725	0830	NO FLARE										
ABASTUMANI	22	0420	0500	NO FLARE										
	22	0542	0555	NO FLARE										
	22	1140	1150	NO FLARE										
	22	1200	1210	NO FLARE										
	22	1215	1225	NO FLARE										
	22	1300	1310	NO FLARE										
CLIMAX	22	1521	1532	N10 W30				3	1523	.20	.20	.20		
CLIMAX	22	1601	1614	N10 W28				3	1605	.40	.40	.40		
CLIMAX	22	1839	1851	N10 W29				3	1843	.60	.70	.70		
SYDNEY	22	2200	2230	NO FLARE										
	22	2354	0004 D	N12 E46				P	2358	1.00	1.60	1.60		
SYDNEY	23	0018	0045	N12 E45				P	0018	.80	1.30	1.30		
SYDNEY	23	0445	0451	N09 W38										
SYDNEY	23	0445	0452	N10 W40										
SYDNEY	23	0445	0520	N08 W40										
NIZAMIAH	23	0948	1000	N12 W39		7189	12	C	0952	.60	.80	.80		
THESSALONIK	23	1034	1038 D	N07 W34				G	0952	1.82	2.48	2.48		
CLIMAX	23	1441	1444	N14 W45				3	1442	.40	.50	.50		
NIZAMIAH	24	0504	0510	N11 W33		7189	6	2	0506	1.22	2.16	2.16		
SYDNEY	24	0523	0530	N05 W48				C	0526	.10	.20	.20		
CAPETOWN	24	0809	0857	N09 E52				C	0817	1.10	1.90	1.90		
BUCHAREST	24	0812	0913 D	N08 E48		7192	61 D	2	0817					
BUCHAREST	24	0834	0837 D	N08 W25				2						
BUCHAREST	24	2120	2200	NO FLARE				2						
CAPETOWN	25	0703	0737	N08 E39		7192	34	C	0708	2.00	2.60	2.60		
	25	1730	1735	NO FLARE										
	26	0610	0635	NO FLARE										
	27	0200	0225	NO FLARE										
CAPETOWN	28	0110	0145	NO FLARE										
CAPETOWN	28	1406	1433	NO FLARE										

SOLAR FLARES

MARCH 1964

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		MAX. PHASE	LOCATION			DURA- TION — MINUTES	HOR. POR. TANGE	OBS. COND.	TIME — U T	MEASUREMENTS			PROVISIONAL IONOSPHERIC EFFECT	
		START	END		APPROX. LAT.	APPROX. LONG.	MATH. REGION					MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH R _z		MAX. INT. %
	MAR 1964															
	29	0430	0500	NO FLARE	HONOLULU	HAWAII, USA										
	29	0510	0525	NO FLARE	IKOMASAN	KYOTO, JAPAN										
	31	1915	1925	NO FLARE	KIEV KO	KIEV GAO, USSR										
	31	2005	2035	NO FLARE	KIEV KY	KIEV UNIVERSITY, USSR										
	31	2110	2130	NO FLARE	LOCKHEED	LOS ANGELES, CALIF., USA										
	31	2205	2330	NO FLARE	MCWATH	MCWATH-HULBERT										

COMMERCE - STANDARDS - BOULDER.

These flare reports are addenda to the March 1964 flares published in CRPL-F 236 for April 1964.

ATHENS, GREECE	HONOLULU	HAWAII, USA	NERA	NEDERHORST den BERGH,
BAKOU	IKOMASAN	KYOTO, JAPAN	NIZMIR	NETHERLANDS
CAPETOWN	KIEV KO	KIEV GAO, USSR	SAC PEAK	KRASNAYA PAKHRA, USSR
CAPRI F	CAPE OF GOOD HOPE	KIEV KY	SALTSJOBADEN	SACRAMENTO PEAK, N. MEX. USA
CAPRI S	CAPRI, ITALY (GERMAN)	LOCKHEED	SCHAUNINS	STOCKHOLM, SWEDEN
CRIBEE	CAPRI, ITALY (SWEDISH)	MCWATH	TACHKENT	SCHAUNINSLAND, GFR
HERSTHONGEU	SIMEIZ, USSR	PONTIAC, MICH., USA	WENDEL	TASHKENT, USSR
	ROYAL GREENWICH OBSERVATORY,	MOSCOW		WENDELSTEIN, GFR
	HERSTHONGEU, ENGLAND			
HTE-PROVEN	HAUTE-PROVENCE	NEW SCHAUN FREIBURG, 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.

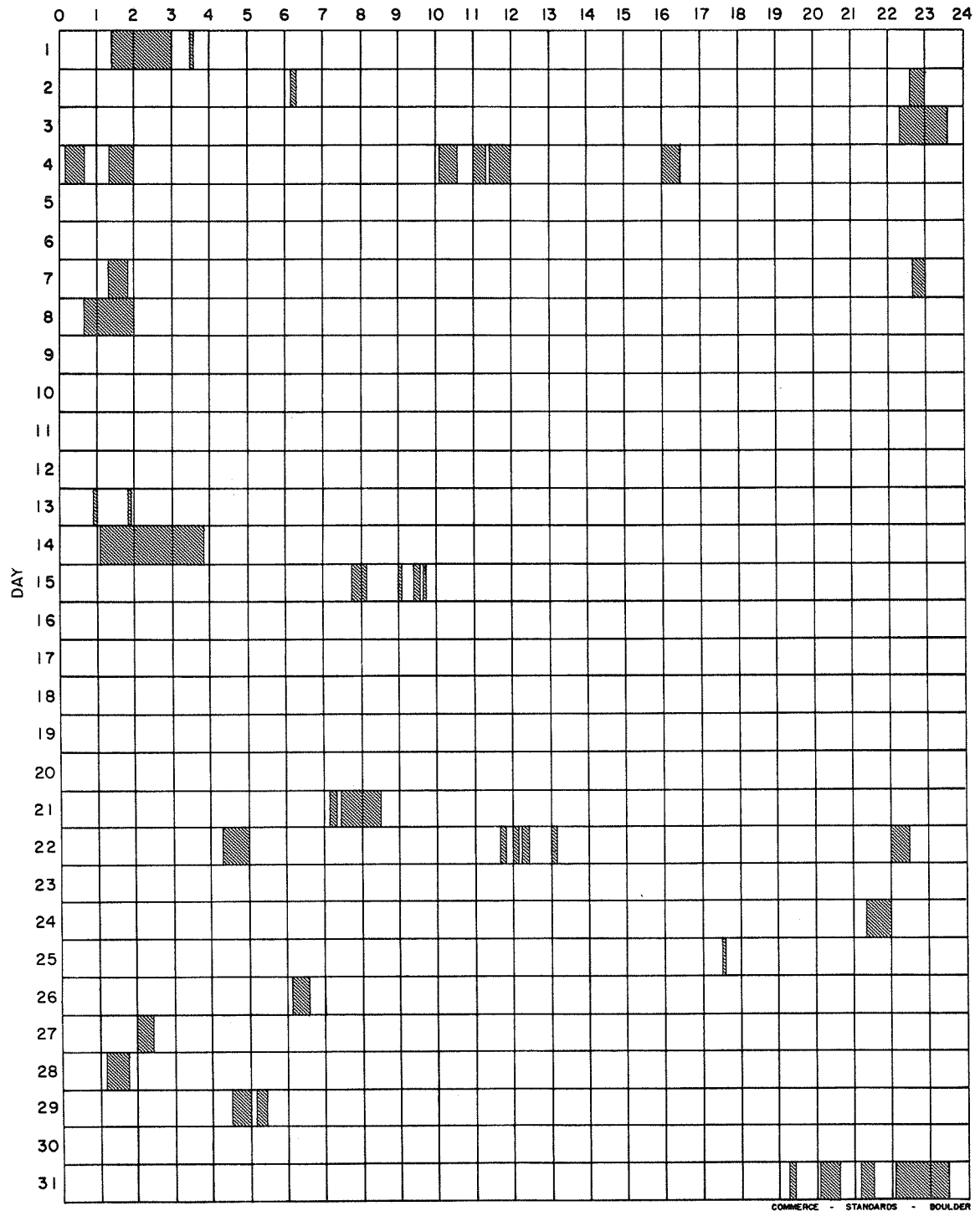
E = LESS THAN D = GREATER THAN U = APPROXIMATE □ = NOT REPORTED.

Erratum: In CRPL-F 238B page IIIa, the coordinates for the flare reported by Ottawa for May 7, 1964 which began at 1428 and ended at 1439 UT at S01 and E31 should read S01 and W31. The McMath plage region number is 7269.

INTERVALS OF NO FLARE PATROL OBSERVATIONS

MARCH 1964

HOUR-UT



COMMERCE - STANDARDS - BOULDER

Observatories include:

- | | | | | | |
|------------------|-------------------|----------|----------------|-----------------|--------------|
| Abastumani | Capri-S (Swedish) | Huancayo | Kodaikanal | Nizamiah | Thessaloniki |
| Arcetri | Climax | Ikomasan | Locarno | Ondrejov | Uccle |
| Arosa | Crimee | Irkutsk | Lockheed | Ottawa | Voroshilov |
| Bucharest | Dunsink | Istanbul | Manila | Sacramento Peak | Wendelstein |
| Capetown | Haute-Provence | Izmiran | McMath-Hulbert | Sydney | Wroclaw |
| Capri-F (German) | Herstmonceux | Kiev-KO | Mitaka | Taehkent | Zurich |

IONOSPHERIC EFFECTS OF SOLAR FLARES

IIIk

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

MAY 1964

MAY 1964	UNIVERSAL TIME			TYPE SWF IMP	IMPORTANCE						BUR	WIDE SPREAD INDEX	STATIONS	KNOWN FLARE
	START	END	MAX		ABS	SCNA	SEA	SPA	SES	SFD				
24	1932	1935	1932D							04		1	80(WWV10-0.4, WWV15-0.2)	

COMMERCE - STANDARDS - BOULDER

Addendum

On March 17, 1962 a short wave fadeout should be added to the events published in CRPL-F 213 B issued May 1962.

Mar. 1962	Start	End	Max	Type SWF IMP	Wide spread index	Stations
17	0330	0355U	0335	SL 1+	1	OK
17	0355U	0530	0410	S 2+	5	OK, CW+

RIOMETER EVENTS

(Provisional)

MAY 1964

South Pole

26 Mc/s

MAY 1964	START UT	END UT	MAX. UT	MAX. ABSORP. db, (tenths)	NO. OF PEAKS	MAY 1964	START UT	END UT	MAX. UT	MAX. ABSORP. db, (tenths)	NO. OF PEAKS
1	0800	2011	1227	47	1	18	2047	2108	2105	4	3
2	0059	0430	0353	6	2	19	0405	1608	0417	7	3
2	0654	1708	0818	21	3	20	0207	0417	0149	11	3
2	2153	0514	0039	30	5	20	1646	2134	1700	4	5
3	0942	1857	1413	8	2	21	0406	0421	0411	3	1
4	0144	0233	0206	22	2	21	1007	1716	1213	12	2
4	1007	1151	1042	4	3	22	1321	1815	1700	3	2
5	0021	0223	0038	17	3	23	0343	0442	0408	8	1
5	0547	2347	1204	7	12	23	0529	0610	0540	3	1
6	0210	0355	0324	5	5	23	2234	0010	2326	5	2
7	0331	0458	0426	6	3	24	0406	1528	0417	11	5
7	0826	0850	0844	3	2	24	2035	0134	2231	46	2
8	*					25	0924	1331	0951	88	1
9	1409	1545	1429	3	3	25	1548	1643	1552	4	1
10	0426	0504	0445	3	2	25	2017	0600	2350	68	4
10	1234	1700	1346	6	2	26	1159	**	1314	3	17
11	2358	0008	0001	5	1	27	**	1625	0712	31	4
12	2004	2105	2037	5	2	27	2217	2316	2235	10	2
13	1514	1817	1701	7	1	28	0248	0531	0308	20	2
14	0914	1433	0926	13	3	28	0945	1434	1301	4	7
15	0342	1737	0402	85	2	28	2211	2303	2217	18	2
15	2339	0635	2347	96	3	29	0316	0644	0322	15	2
16	0830	2110	1508	30	4	29	1115	1640	1345	7	1
17	0638	1838	1549	26	3	30	0016	0354	0028	15	3
18	1001	1757	1306	10	5	30	0655	1732	1148	7	2
						30	2244	0053	2254	47	1
						31	1002	1613	1428	4	11

COMMERCE - STANDARDS - BOULDER

* No Data
 ** No Event
 *** Uncertain

SOLAR RADIO EMISSION
OUTSTANDING OCCURRENCES

IVa

JUNE 1964

ARO - OTTAWA

2800 Mc/s

JUNE 1964	U R A N E	DESCRIPTIVE TYPE	START UT	DURATION HRS. MIN.	MEAN FLUX	MAXIMUM		REMARKS
						TIME	FLUX	
16	1	Simple 1 f	1757	1.5	1757.1	2.7	0.7	

COMMERCE - STANDARDS - BOULDER

HOURS OF OBSERVATION, APRIL, MAY, JUNE, 1964

OBSERVING PERIOD:

April 11:10 - 23:05 UT
 May 10:55 - 23:20 UT
 June 10:55 - 23:25 UT

With the following exceptions:

- (1) Observations commenced: Apr. 20 at 13:25 UT
 May 5 at 12:20 UT
 9 at 14:10 UT
 10 at 12:15 UT
 June 6 at 12:25 UT
 12 at 12:25 UT

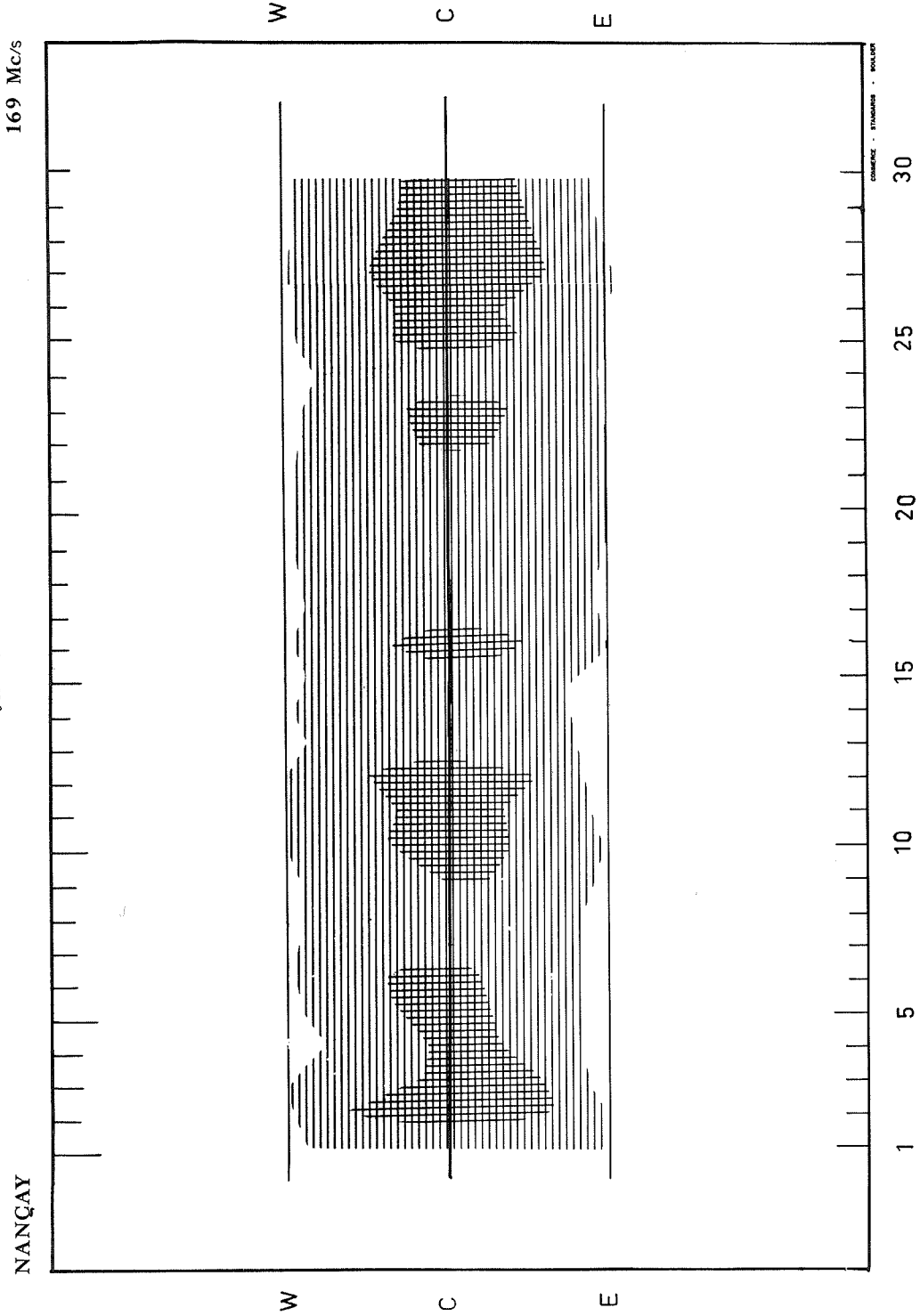
- (2) Interruption of observations, approximately 20 minutes in duration,
 for calibration purposes:
 Daily - In the period 20:00 - 21:00 UT
 Apr. 1-26, inclusive - In the period 16:00 - 17:00 UT
 Apr. 28 - June 11, inclusive - In the period 15:00 - 16:00 UT
 June 12 - 30, inclusive - In the periods 14:00 - 15:00 UT and
 17:00 - 18:00 UT

- (3) No observations: Apr. 21 18:30 - 19:50 UT
 27 14:10 - 14:35 UT
 May 9 21:10 - 22:30 UT
 June 24 14:45 - 15:45 and 17:55 - 18:20 UT

- (4) Interference obscuring portions of the records on:
 Apr. 22
 May 4, 6, 11, 28
 June 5, 8, 9, 10, 19, 23, 25, 26, 30.

SOLAR RADIO EMISSION INTERFEROMETRIC OBSERVATIONS

JUNE 1964



JUNE 1964

SOLAR RADIO EMISSION OUTSTANDING OCCURRENCES

IVc

JUNE 1964

NBS BOULDER

108 Mc/s

1964 June	TYPE	START UT	TIME OF MAXIMUM UT	DURATION MINUTES	INTENSITY
7	8	1629.5	1630.0	3.8	3

COMMERCE - STANDARDS - BOULDER

NOMINAL TIMES OF OBSERVATION

JUNE 1964

NBS BOULDER

108 Mc/s

1964 June	HOURS OF OBSERVATION U.T.	HOURS OF INTERFERENCE U.T.	1964 June	HOURS OF OBSERVATION U.T.	HOURS OF INTERFERENCE U.T.
1	1138-0200		16	1136-1540	
2	1138-0201	2320-0010;	17	2135-0208	
		0100-0150	18	1601-1650;	
3	1138-0201	0038-0042		1745-2000;	
4	1512-0202			2356-0208	
5	1137-0202		19	1136-2101;	
				2117-0209	
6	1137-0203	2005-2100	20	1136-0209	1810-1812;
7	1136-0204				1817-1820;
8	1136-0204	1210-1325;			2312-0209
		1533-1539;			
		1600-1845	21	1136-0209	1617-1629;
9	1136-0205				0009-0209
10	1136-0205		22	1136-0209	
			23	1200-0210	1730-1828
11	1136-1745;		24	1137-0210	
	1800-0206		25	1137-0210	
12	1136-0206	2045-0206			
13	1135-0207	1135-1500;	26	1137-2049;	
		1735-2330;		2118-0210	2356-0210
		0128-0207	27	1138-0210	
14	1135-0207	1340-1640	28	1138-0210	1710-0146
15	1135-0207		29	1139-0210	1800-0210
			30	1139-1540;	2001-2308
				2001-0210	

COMMERCE - STANDARDS - BOULDER

Note: Most of the interference is due to atmospherics.

SOLAR RADIO EMISSION SPECTRAL OBSERVATIONS

JUNE 1964

**High Altitude Observatory
Boulder**

7.6-41 Mc/s

Date June 1964	Bursts			Frequency Range (Mc/s)	Date June 1964	Bursts			Frequency Range (Mc/s)
	Type	Time (U.T.)	Inten- sity			Type	Time (U.T.)	Inten- sity	
10 Jun 13	III	2150-2150:30	1	12-36	15 Jun	III	2144:15-2145:15	1	16-41
	III	1535:30-1537:45	1+	12-41		III	2147-2148:30	1+	13-41
	III	1539:15-1539:30	1-	18-30		III	2150-2150:30	1-	16-41
	III	1551-1551:45	2	8-41		III	2338:30-2338:45	1-	18-41
	III	1726:30-1726:45	1-	16-38		III	2340:45-2341	2	7-41
15	III	1729:30-1729:45	1-	23-41	16	III	2342-2342:15	1-	11-41
	III	1800:15-1801:15	1+	7-41		III	2343-2343:15	1-	11-41
	III	1802-1802:15	1-	20-41		III	0007-0008	1-	14-41
	III	1833:15-1833:30	1	18-41		III	0045:30-0048:30	1-	14-41
	III	1906:15-1906:30	1-	18-41		III	0102-0103	1	15-41
	III	1907:15-1907:45	1	15-41	III	1240:45-1241	1-	16-41	
	III	1923:15-1924:45	1	17-41	III	1345-1345:30	1-	18-41	
	III	1942:45-1943	1-	18-39	III	1346-1346:30	1	18-41	
	III	1950:15-1950:30	1-	18-36	III	d 1432:45-1433:15	2	11-41	
	III	1957-1958	1	20-41	III	1818-1818:30	1-	18-41	
	III	2033:45-2034	1	20-41	III	1938:30-1938:45	1	17-41	
	III	2037:15-2037:30	1-	25-39	III	1958:45-1959	1-	20-41	
	III	2106:15-2106:45	1	16-41	III	2000:15-2001	1	16-41	
	III	2108:15-2109	1+	7-41	21	No Observ.	1400-2311		
	III	2136:45-2137:15	1-	18-41					

d = harmonic structure

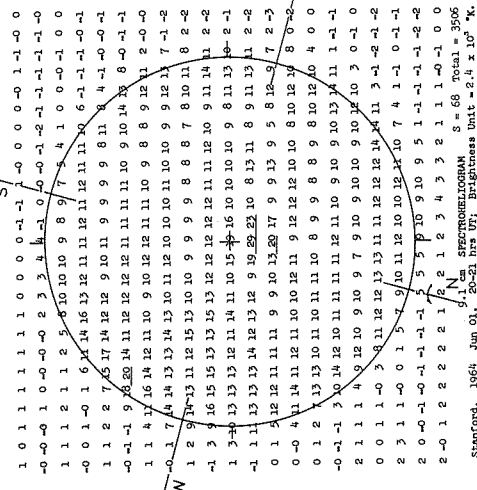
COMMERCE - STANDARDS - BOULDER

SOLAR RADIO EMISSION SPECTROHELIOGRAMS

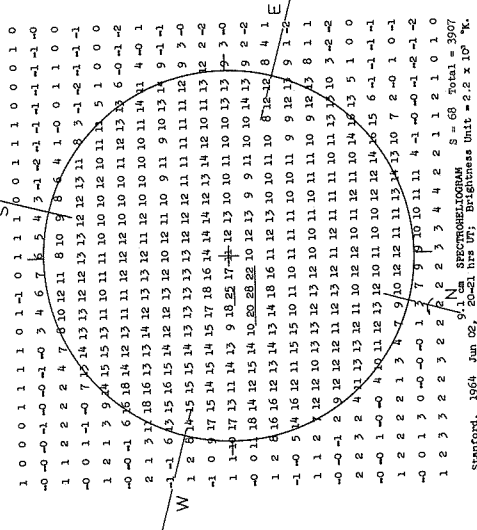
JUNE 1964

STANFORD

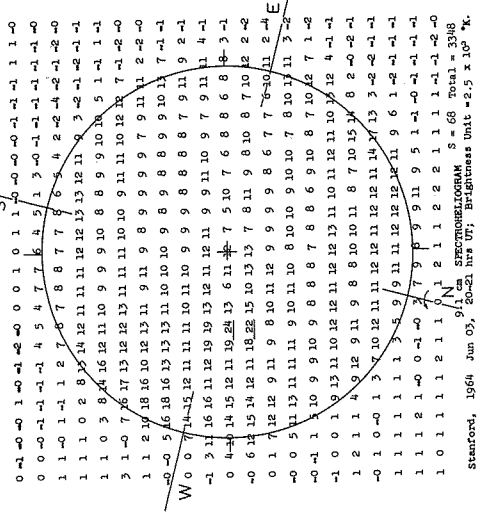
9.1 cm



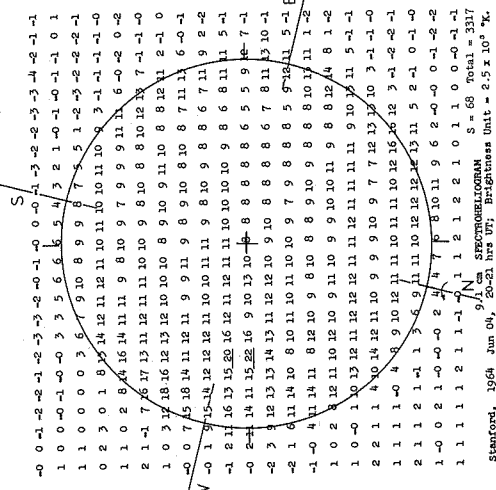
Stanford, 1964 Jun 01, 20:21 hrs UT; Brightness Unit = 2.4×10^3 K.



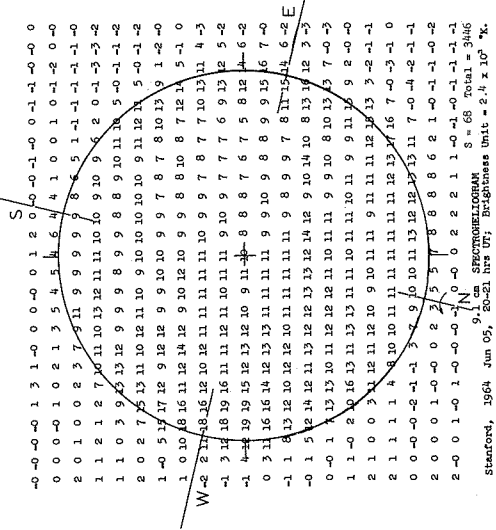
Stanford, 1964 Jun 02, 20:21 hrs UT; Brightness Unit = 2.2×10^3 K.



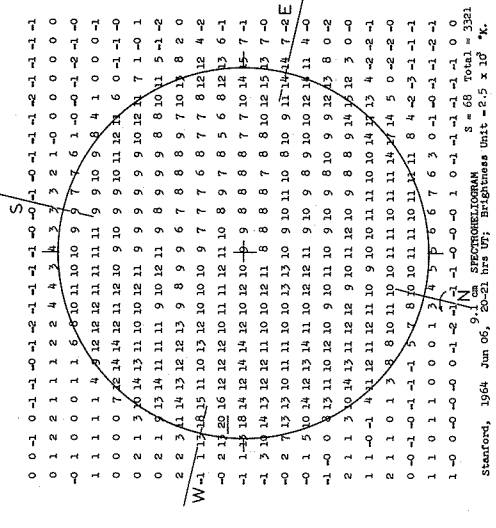
Stanford, 1964 Jun 03, 20:21 hrs UT; Brightness Unit = 2.5×10^3 K.



Stanford, 1964 Jun 04, 20:21 hrs UT; Brightness Unit = 2.5×10^3 K.



Stanford, 1964 Jun 05, 20:21 hrs UT; Brightness Unit = 2.4×10^3 K.



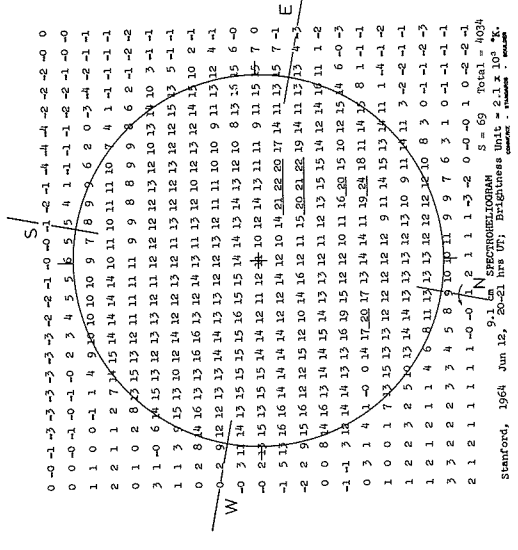
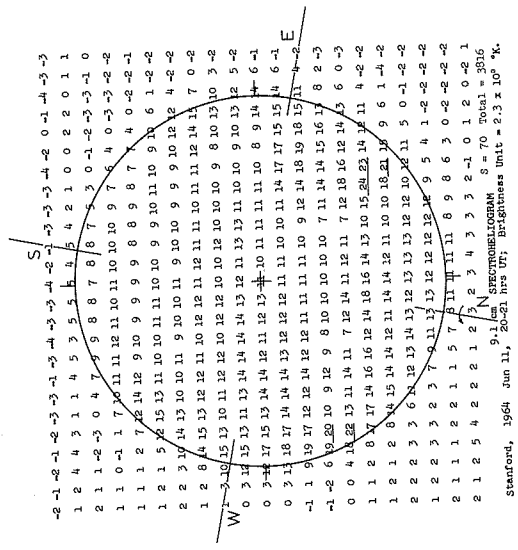
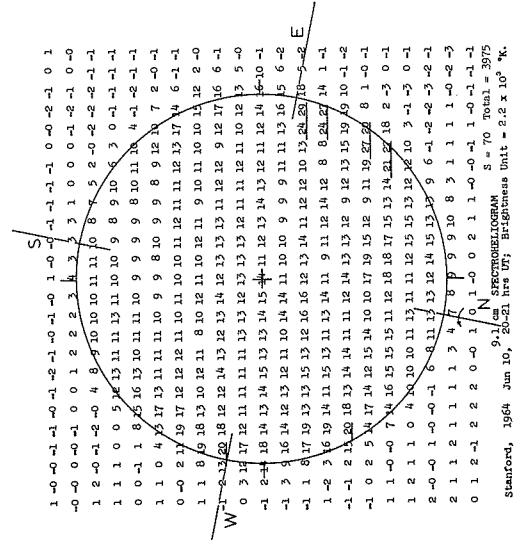
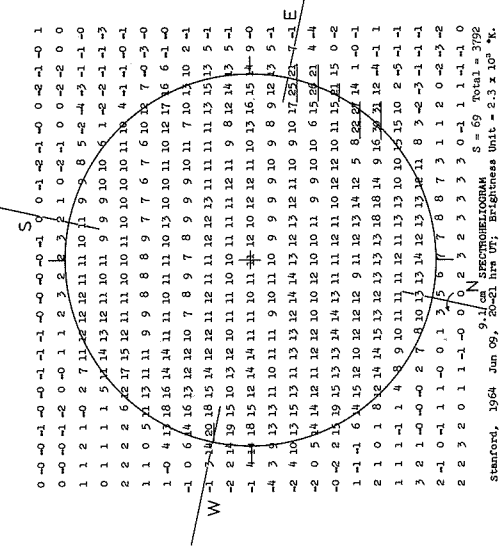
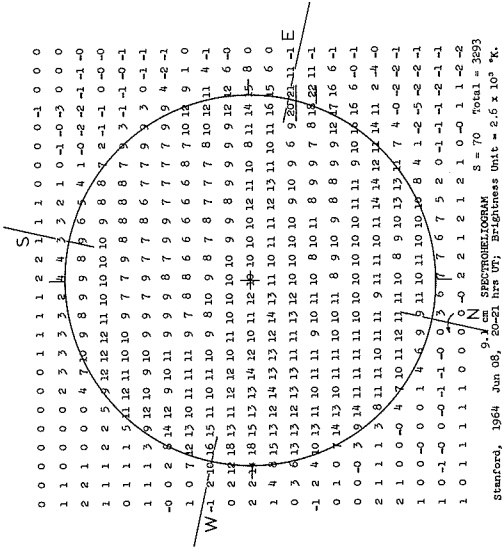
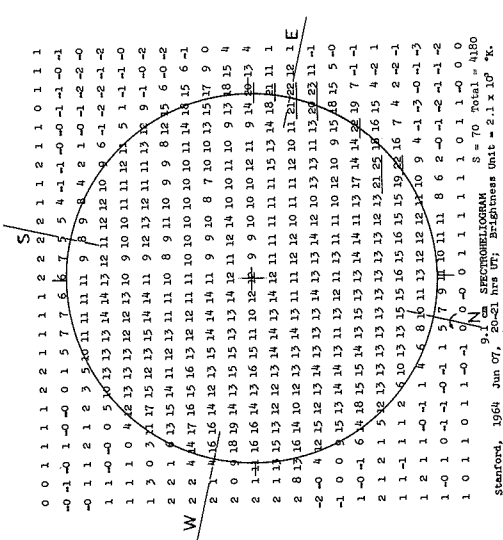
Stanford, 1964 Jun 06, 20:21 hrs UT; Brightness Unit = 2.5×10^3 K.

SOLAR RADIO EMISSION SPECTROHELIOGRAMS

JUNE 1964

STANFORD

9.1 cm

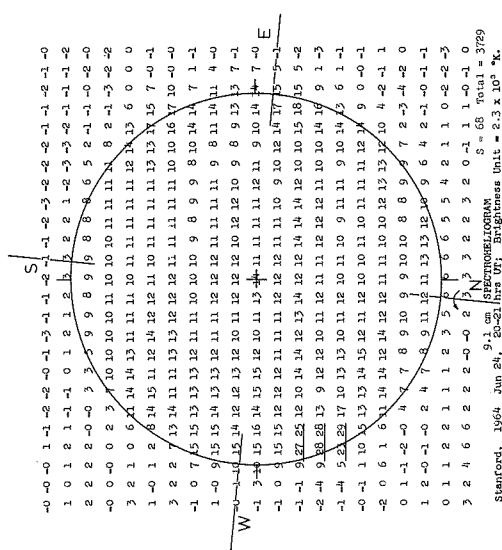
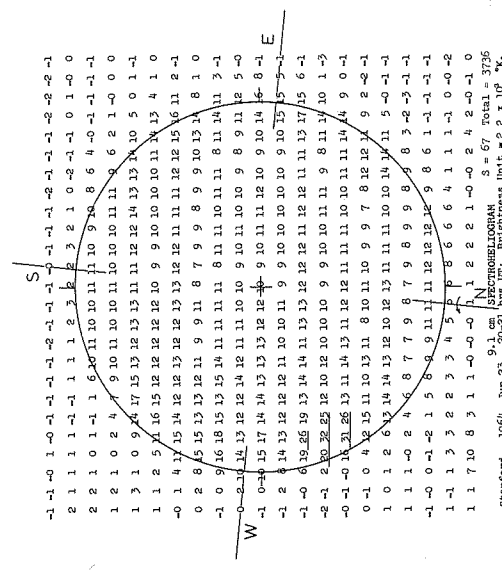
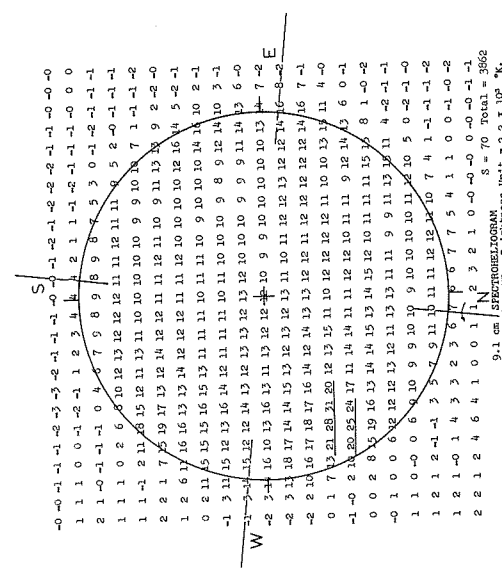
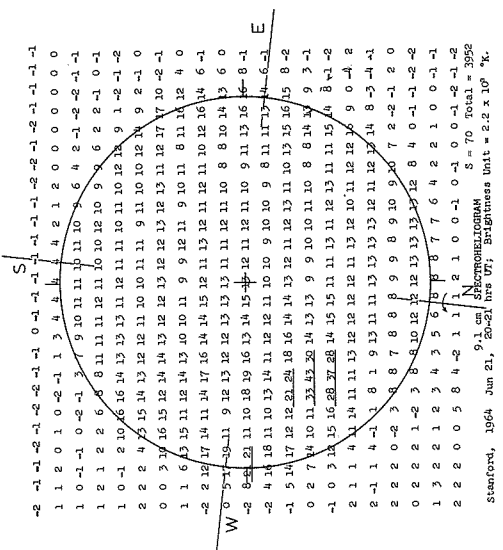
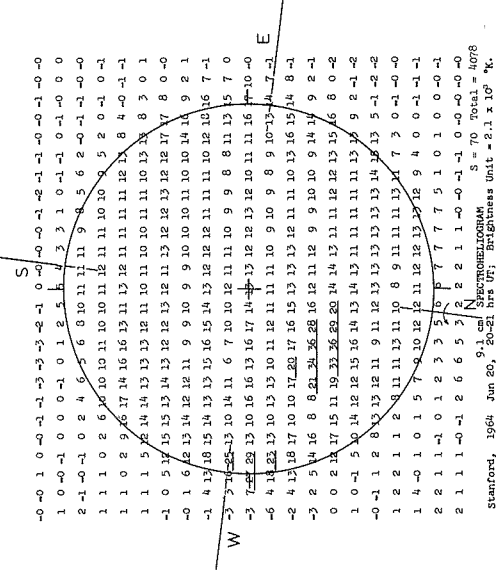
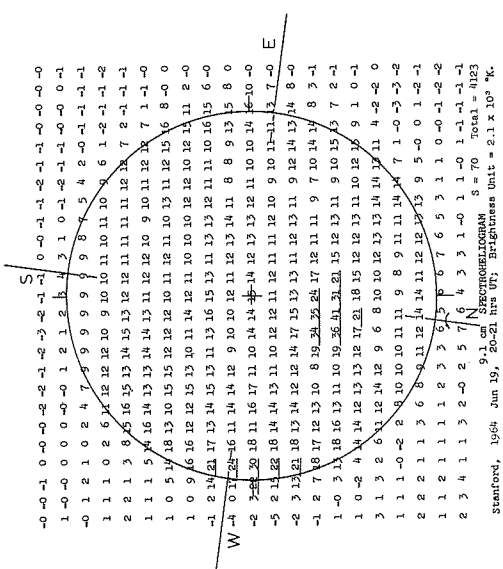


SOLAR RADIO EMISSION SPECTROHELIOGRAMS

JUNE 1964

STANFORD

9.1 cm

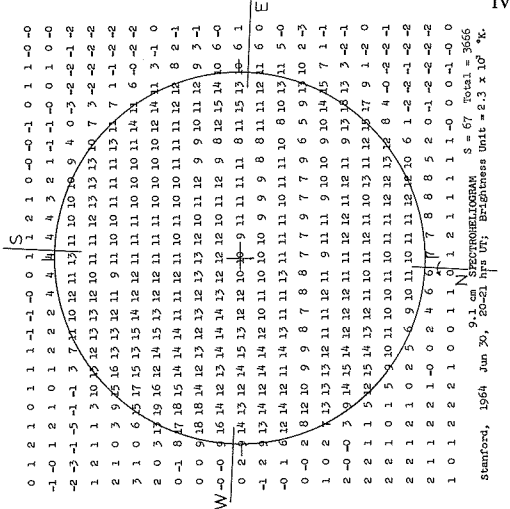
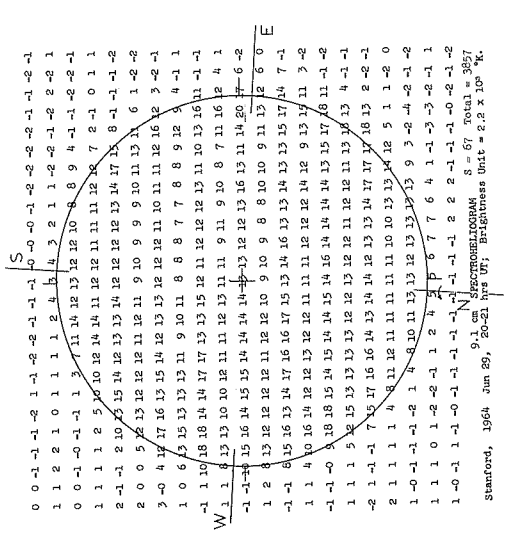
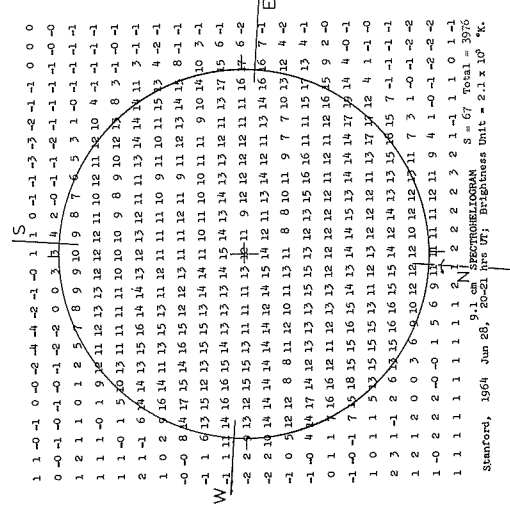
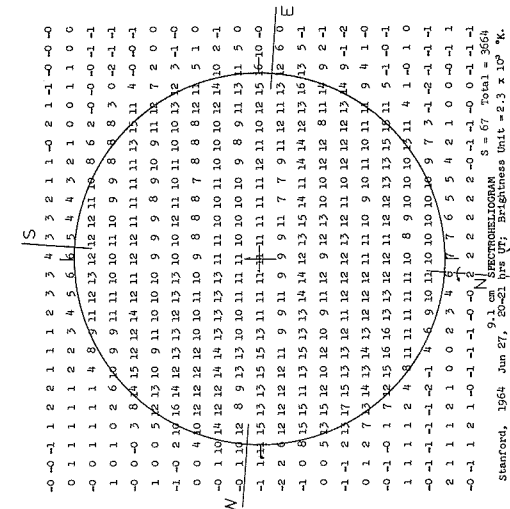
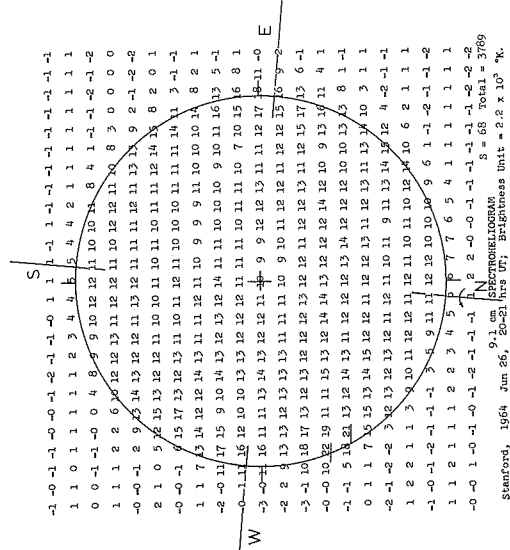
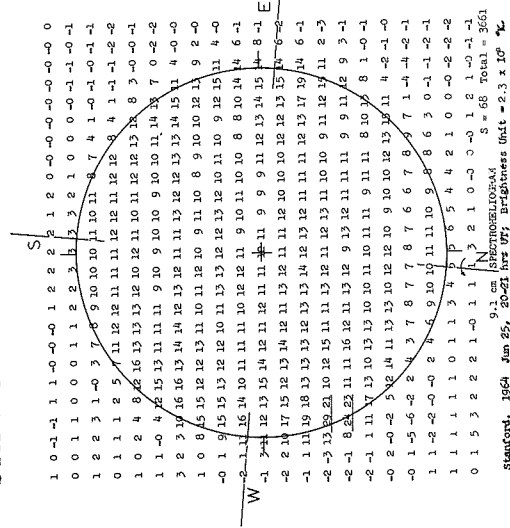


SOLAR RADIO EMISSION SPECTROHELIOGRAMS

JUNE 1964

STANFORD

9.1 cm



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

MAY 1964

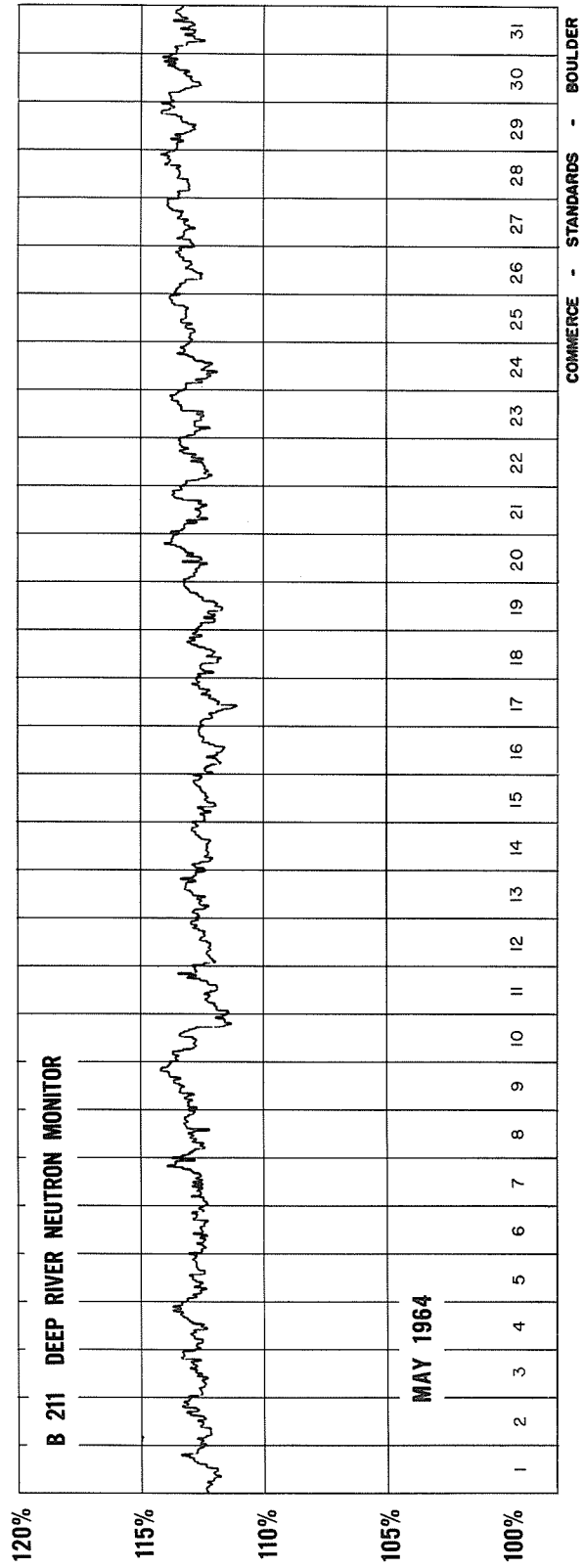
May 1964	DAILY AVERAGE COUNTS / HOUR *	May 1964	DAILY AVERAGE COUNTS / HOUR *
1	3729.6	16	3260.3
2	3288.2** *	17	3258.9
3	3294.0	18	3262.7** *
4	3287.3	19	3260.9
5	3289.1	20	3270.8
6	3287.8	21	3271.9
7	3287.5	22	3279.4
8	3285.1* *	23	3290.7
9	3289.2	24	3286.5
10	3274.3	25	3280.9** *
11	3284.9** *	26	3285.9
12	3260.4	27	3295.8
13	3266.2	28	3300.8** *
14	3259.2	29	3305.3
15	3262.7	30	3304.9
		31	3291.5** *

COMMERCE - STANDARDS - BOULDER

*Scaling Factor 128.

** No. of Section Hours Less Than 40

COSMIC RAY INDICES
(Pressure Corrected Hourly Totals)

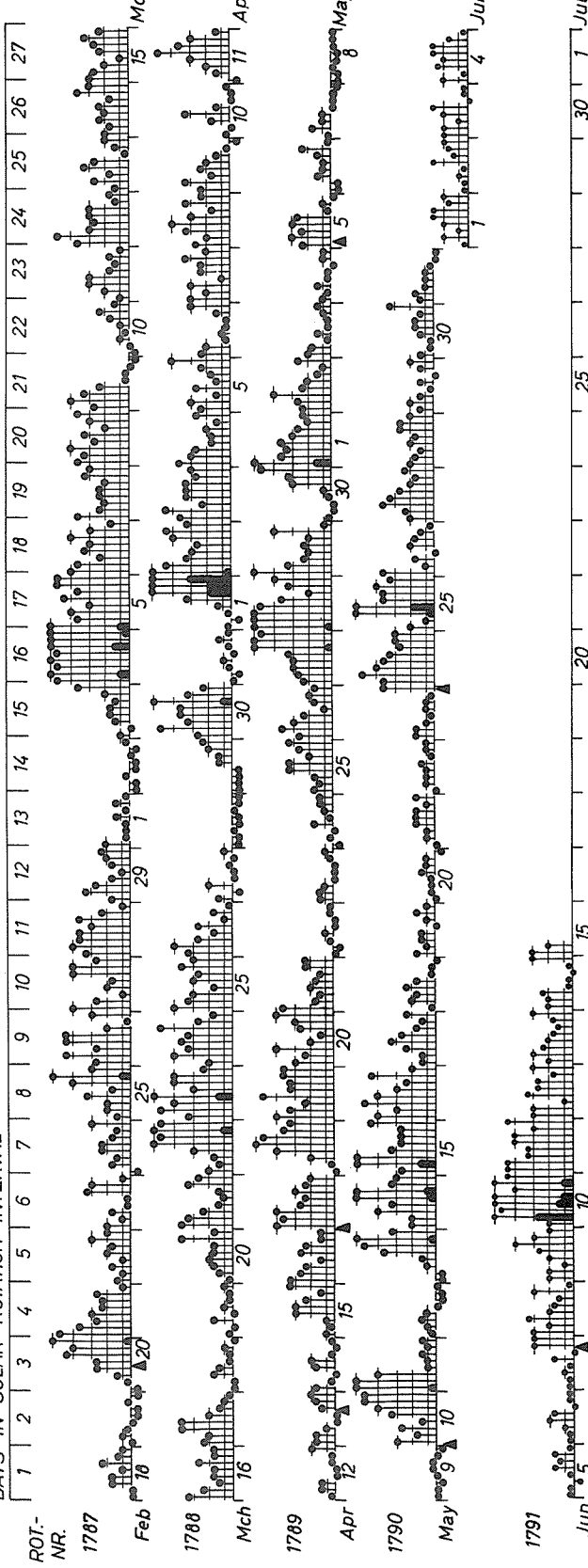


GEOMAGNETIC ACTIVITY INDICES

MAY 1964

May 1964	C	Values Kp								Sum	Ap	Final Selected Days
		Three hour Gr. interval										
		1	2	3	4	5	6	7	8			
1	1.3	6o	4-	3+	4-	3o	3-	2o	2+	27-	23	Five Quiet
2	0.6	2+	3-	4o	2+	2o	1+	1o	3-	18+	11	
3	0.3	2o	2-	1-	1+	1-	1-	1o	1+	9+	4	
4	0.0	1o	1-	1+	1-	1-	0+	1o	1o	7-	4	
5	0.6	2+	3o	2+	3o	3-	1-	1o	0+	15+	9	
6	0.2	0o	0o	1+	1o	1o	1+	2+	1-	8-	4	
7	0.1	1-	2-	1o	1o	0+	0+	0+	0o	5+	3	
8	0.0	0o	0o	0+	0o	0o	0+	0+	0+	1+	1	
9	0.0	0+	0+	0o	0+	1-	1-	0+	0o	3-	2	
10	1.2	3o	2-	3-	1+	3+	4o	5-	5-	25+	20	
11	0.9	5+	5o	4o	1o	1o	1+	1o	1+	20o	19	Five Disturbed
12	0.0	1-	1o	1+	1o	0+	0o	0o	0+	5-	2	
13	1.1	0o	0o	1o	1+	4-	5-	5+	3+	19+	18	
14	1.2	2o	2o	4o	3+	5+	6-	3+	3o	29-	27	
15	1.3	3-	6o	5o	3+	3-	3-	3-	4+	29+	28	
16	1.2	4o	3o	5-	4o	3o	2+	4+	2o	27+	21	
17	0.7	1+	1+	2+	3+	3-	2-	1+	2+	16+	9	
18	0.3	1-	2o	2-	2+	2-	1-	1-	0+	10o	5	
19	0.3	2-	1o	1+	1+	0+	1o	2-	1o	9+	4	
20	0.2	0+	1-	1-	1-	1+	1o	1o	0o	6-	3	
21	0.3	0+	1o	1o	2-	2-	2-	1o	2-	10o	5	Ten Quiet
22	0.2	0+	1o	1o	1o	1+	1-	1o	1o	7+	4	
23	0.6	2-	2-	1o	1-	1o	1o	1-	4+	11+	6	
24	1.2	4-	5-	4o	4-	3+	3-	3o	3o	28o	21	
25	1.4	2o	1o	5+	6+	4-	4-	4o	3+	29+	31	
26	0.5	4-	1o	2-	0+	2o	2-	1+	1-	12+	7	
27	0.8	2o	2+	4-	3+	3-	2o	2-	2+	20o	11	
28	0.5	2o	2-	1+	2o	2-	3-	3-	2o	16o	8	
29	0.3	1+	2o	1+	1-	1+	0+	1+	2o	10+	5	
30	0.5	1+	1-	1-	1+	2-	2-	1+	3+	12o	6	
31	0.1	1+	2-	1o	1o	1o	1-	0+	0+	7+	4	
Mean:	0.58									Mean:	10	

DAYS IN SOLAR ROTATION INTERVAL



PLANETARY MAGNETIC
THREE - HOUR - RANGE INDICES

Kp till 1964 May 31
(Ks from Wingst and Göttingen till June 15)

KEY
▲ = sudden commencement

0
0
+ - 0 + - 2 + - 3 + - 4 + - 5 + - 6 + - 7 + - 8 + - 9

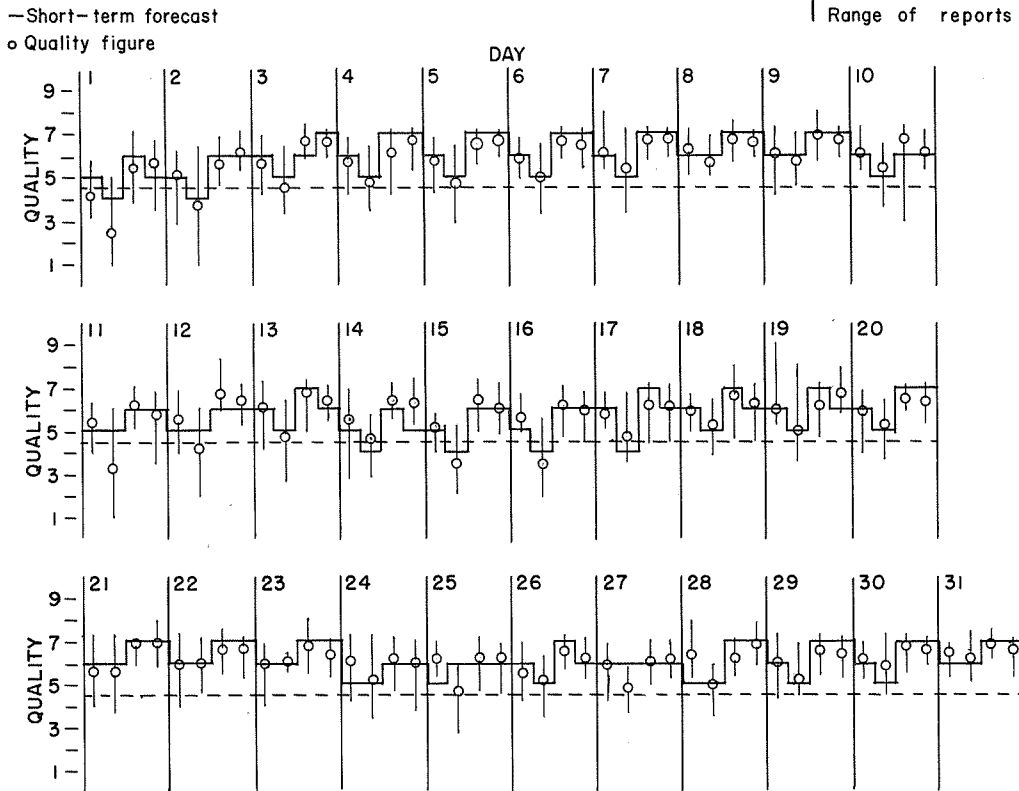
CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS

MAY 1964

NORTH ATLANTIC				NORTH PACIFIC													
MAY 1964	NORTH ATLANTIC 6-HOURLY QUALITY FIGURES				NORTH PACIFIC 8-HOURLY QUALITY FIGURES												
	00 TO 06	06 TO 12	12 TO 18	18 TO 24	03 TO 11	11 TO 19	19 TO 03	03 TO 18									
	SHORT-TERM FORECASTS ISSUED ABOUT ONE HOUR IN ADVANCE OF:				SHORT-TERM FORECASTS ISSUED AT:												
	00	06	12	18	02	09	18										
	WHOLE DAY INDEX				WHOLE DAY INDEX												
	ADVANCE FORECASTS (L-R) REPORTS FOR WHOLE DAY, ISSUED IN ADVANCE BY:				ADVANCE FORECASTS (L-R) REPORTS FOR WHOLE DAY, ISSUED IN ADVANCE BY:												
	DAYS 1-7 DAYS 8-14 DAYS 15-21 FINAL 24 SPN J				DAYS 1-7 DAYS 8-14 DAYS 15-21 FINAL 24 SPN J												
				GEOMAGNETIC Kp1													
				GEOMAGNETIC Kp2													
01	4+ 2+	5+ 6-	5 4	6 5	(4+)	5	5	5	6	5	5	6	6	(4)	3		
02	5+ 4-	6- 6+	5 4	6 6	5+	5	5	5	6	6	6	6	6	6	3		
03	6- 4+	7- 7-	6 5	6 7	6 0	6	6	6	7	6	6	6	6	7	1		
04	6- 5-	6+ 7-	6 5	7 7	6-	6	6	6	7	6	6	6	6	7	1		
05	6- 5-	7- 7-	6 5	7 7	6 0	6	6	6	7	6	6	6	6	7	3		
06	6 0	5 0	7- 7-	6 5	7 7	6 0	6	6	7	6	6	6	6	7	0		
07	6 0	5+ 7-	7-	6 5	7 7	6+	6	6	7	6	6	6	6	7	1		
08	6+ 6-	7- 7-	6 6	7 7	6+	6	6	6	7	6	6	6	6	7	0		
09	6 0	6- 7 0	7-	6 6	7 7	6+	6	6	7	6	6	6	6	7	0		
10	6 0	5+ 7-	6+	6 5	6 6	6 0	7	7	3	(4)	7	5	4	7	2		
11	5+ 3+	6 0	6-	5 5	6 6	5 0	7	7	3	1	5	5	5	6	(4)		
12	6- 4+	7- 6+	5 5	6 6	6-	6	6	6	2	1	7	6	6	6	2		
13	6 0	5- 7-	6+	6 5	7 6	6 0	5	5	1	(4)	7	6	6	6	0		
14	6- 5-	6+ 6+	5 4	6 5	6-	5	5	5	3	(4)	6	4	5	6	3		
15	5+ 3+	6+ 6 0	5 4	6 6	5+	5	5	5	5	5	5	5	6	6	(5)		
16	6- 3+	6+ 6 0	5 4	6 6	5+	5	5	5	5	5	4	5	4	6	(4)		
17	6- 5-	6+ 6+	6 4	7 6	6-	6	6	6	6	2	6	5	5	6	3		
18	6 0	5+ 7-	6+	6 5	7 6	6 0	6	6	2	1	6	6	6	6	2		
19	6 0	5 0	6+ 7-	6 5	7 6	6 0	7	7	2	2	7	6	6	7	2		
20	6 0	5+ 7-	6+	6 5	7 7	6 0	7	7	1	1	7	6	6	7	1		
21	6- 6-	7 0	7 0	6 6	7 7	6+	7	7	2	1	7	6	6	7	1		
22	6 0	6 0	7- 7-	6 6	7 7	6+	7	7	1	1	7	6	6	7	1		
23	6 0	6 0	7- 6+	6 6	7 7	6+	6	6	2	2	6	6	6	7	2		
24	6+ 5+	6+ 6 0	5 5	6 6	6 0	5	5	5	(4)	3	6	6	5	5	(4)		
25	6+ 5-	6+ 6+	5 6	6 6	6 0	6	6	6	4	4	6	5	5	6	(4)		
26	6- 5+	7- 6+	6 5	7 6	6 0	4	4	4	1	1	6	6	6	6	2		
27	6 0	5 0	6+ 6+	6 6	6 6	6-	4	4	3	2	6	6	6	6	3		
28	6+ 5 0	6+ 7 0	5 5	7 7	6+	6	6	6	6	2	7	6	6	6	2		
29	6 0	5+ 7-	7-	6 5	7 7	6 0	6	6	2	1	6	5	6	6	2		
30	6+ 6 0	7- 7-	6 5	7 7	6+	6	6	6	1	2	6	6	5	6	1		
31	7- 6+	7 0	7-	6 6	7 7	7-	6	6	1	1	7	6	6	7	1		
Score: Quiet Periods				P	23	19	23	26	16	16	9	17	16	9	17	14	
				S	7	5	8	5	10	10	19	12	14	19	12	13	
				U	0	0	0	0	1	1	0	0	0	2	0	1	1
				F	0	0	0	0	3	3	0	0	0	0	0	2	2
Disturbed Periods:				P	0	1	0	0	0	0	0	0	0	0	0	0	0
				S	1	4	0	0	1	1	1	1	0	0	0	0	0
				U	0	2	0	0	0	0	0	0	0	0	0	0	0
				F	0	0	0	0	0	0	1	1	1	1	1	1	1

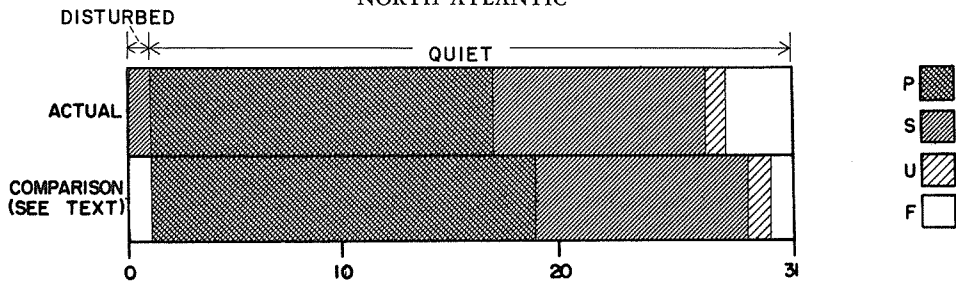
NORTH ATLANTIC

MAY 1964

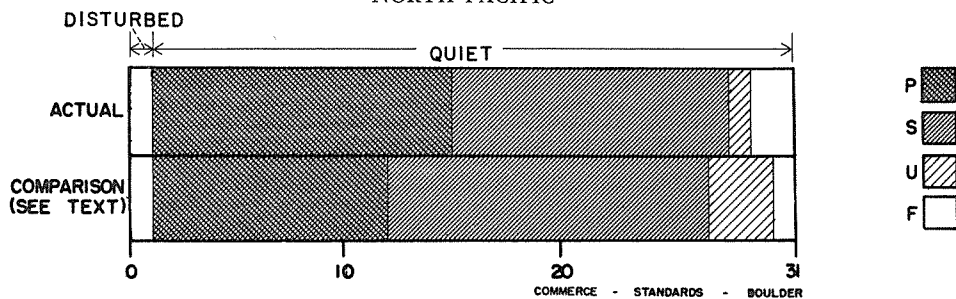


OUTCOME OF ADVANCE FORECASTS--FINAL ESTIMATES (1 TO 7 DAYS AHEAD)

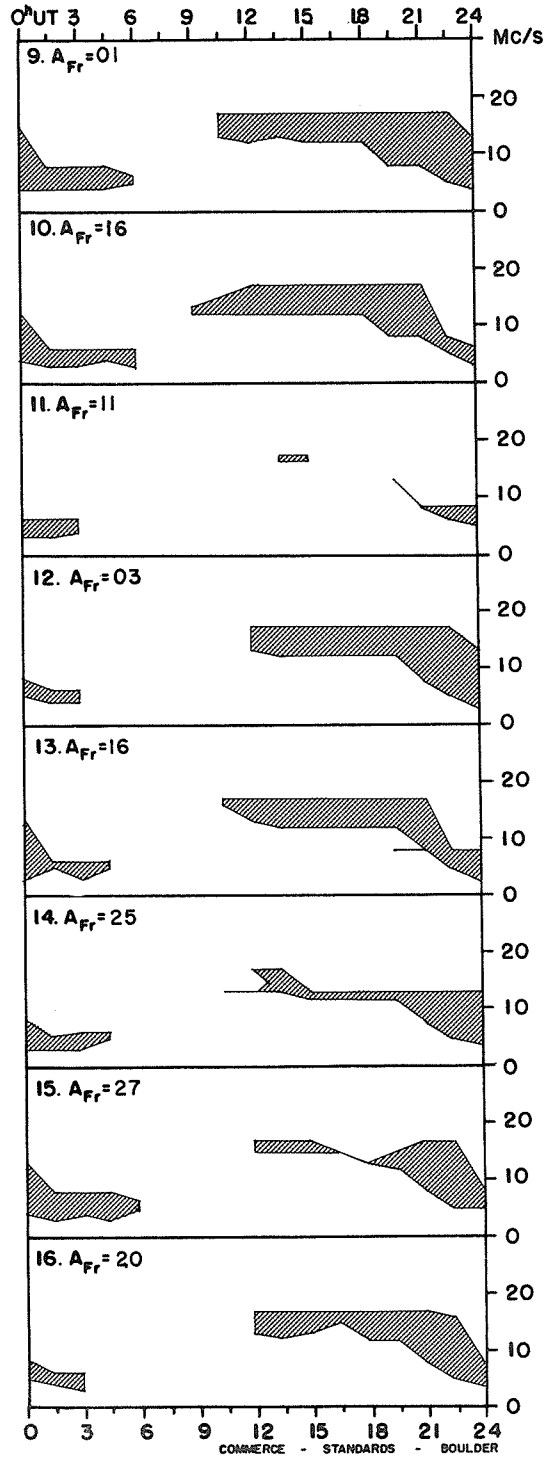
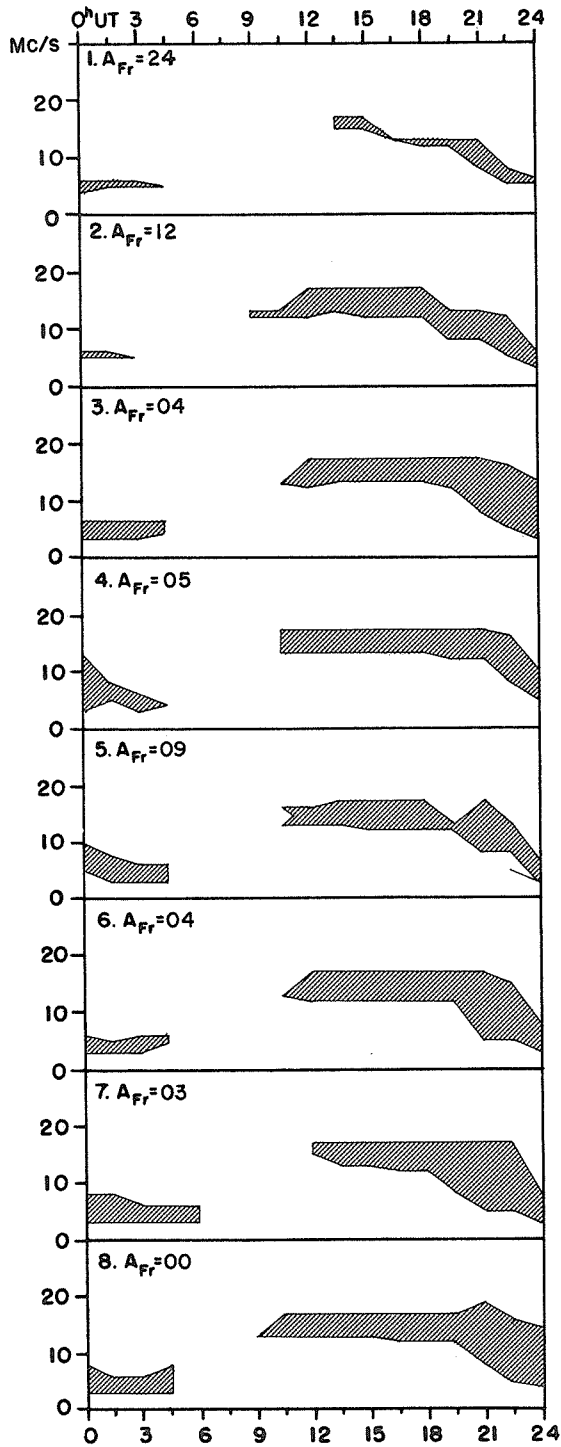
NORTH ATLANTIC



NORTH PACIFIC



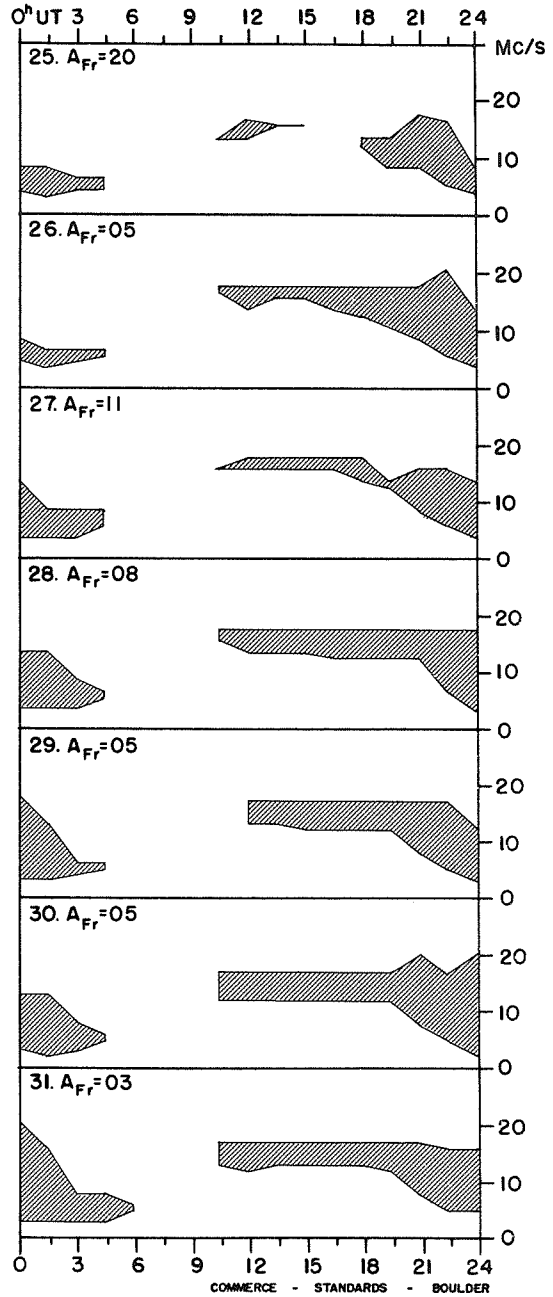
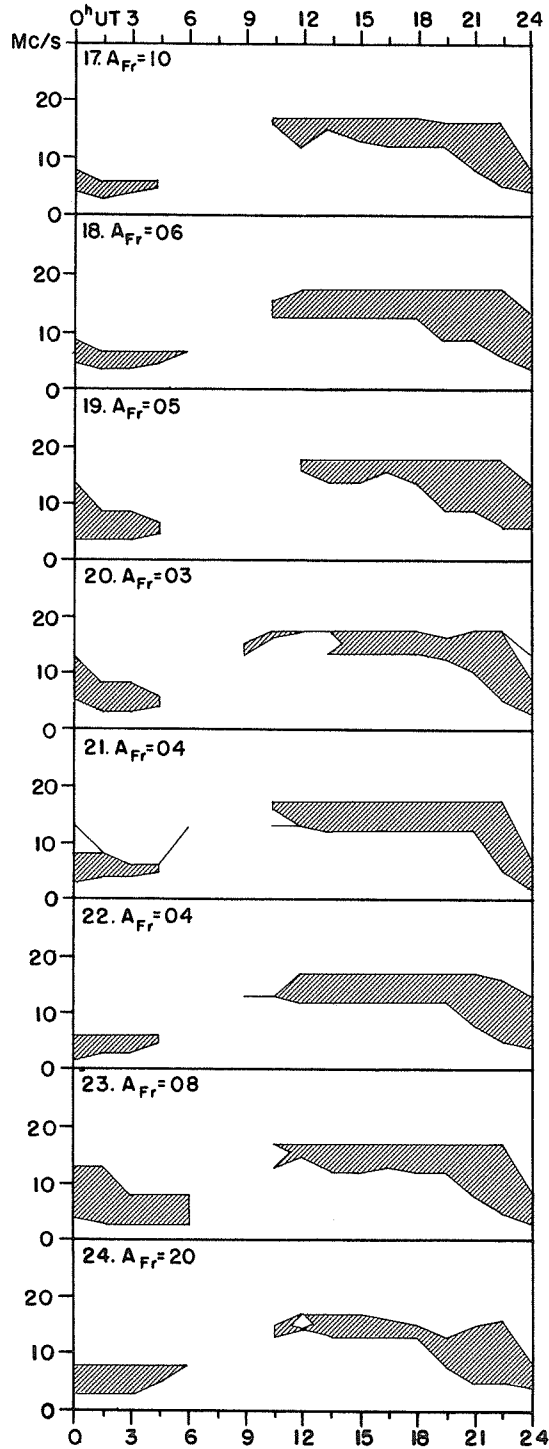
MAY 1964



USEFUL FREQUENCY RANGES -- NORTH ATLANTIC PATH

VII d

MAY 1964



Adapted from Observations by Deutsches Bundespost

IQSY ALERT PERIODS

INTERNATIONAL URSIGRAM
AND WORLD DAYS SERVICE

JUNE 1964

JUNE 1964	TIME OF ISSUE UT	ADVANCE GEOPHYSICAL ALERT	WORLDWIDE GEOPHYSICAL ALERT			
			NO.	TYPE	TIMING	ELABORATION
10	1305	Ft. Belvoir, Magnetic Storm 09/15XXXZ				
11	0400		73	Magnetic Storm	Exists	
15	1755	Anacapri, Solar Flare 15/1446Z				
16	0400		74	Solar Activity	Exists	Flares
17	0400		75	Solar Activity	Exists	
18	0400		76	Solar Activity	Exists	
26	0400		77	Solar Calme	Exists	
27	0400		78	Solar Calme	Exists	
28	0400		79	Solar Calme	Exists	
29	0400		80	Solar Calme	Exists	