Library, N.W. Bldg
MAR 9 1964

Reference book not to be
taken from the library.

CRPL-F 234 PART B

FOR OFFICIAL USE

PART B
SOLAR - GEOPHYSICAL DATA

ISSUED
FEBRUARY 1964

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

SOLAR - GEOPHYSICAL DATA

CONTENTS

I DAILY SOLAR INDICES

- (a) Relative Sunspot Numbers and 2800 Mc/s Solar Flux - December 1963 - January 1964
- (b) Graph of Sunspot Cycle

II SOLAR CENTERS OF ACTIVITY

- (a) Calcium Plage and Sunspot Regions - January 1964
- (b) Magnetic Classifications of Sunspots (Mt. Wilson) - January 1964
- (c-e) Final Coronal Line Emission Indices - October - November - December 1963
- (f) Provisional Coronal Line Emission Indices - January 1964

III SOLAR FLARES

- (a-d) Optical Observations - January 1964
- (e) Flare Patrol Observations - January 1964
- (f-j) Optical Observations - October 1963
- (k) Flare Patrol Observations - October 1963
- (l) Ionospheric Effects (SWF-SEA-SCNA-SPA SES-SFD-Bursts) - December 1963
- (m) 26 Mc/s - Riometer Events (South Pole) - December 1963

IV SOLAR RADIO WAVES

- (a) 2800 Mc/s Outstanding Occurrences (ARO-Ottawa) - January 1964
- (b) 169 Mc/s Interferometric Occurrences (Nancay) - January 1964
- (c) 108 Mc/s Outstanding Occurrences (NBS-Boulder) - January 1964
- (d-f) 50-320 Mc/s (Fort Davis) - October - November - December 1963
- (g) 7.6-41 Mc/s Spectral Observations (HAO-Boulder) - January 1964
- (h-m) 9.1 cm Spectroheliograms (Stanford) - January 1964

V COSMIC RAY INDICES

- (a) Climax Neutron Monitor - September 1963 (Revisions) - November 1963
- (b) Climax Neutron Monitor - December 1963
- (c) Deep River Neutron Monitor - December 1963

VI GEOMAGNETIC ACTIVITY INDICES

- (a) C, Kp, Ap and Selected Quiet and Disturbed Days - December 1963
- (b) Chart of Kp by Solar Rotations - 1963-1964

VII RADIO PROPAGATION QUALITY INDICES

- (a) CRPL Quality Figures and Forecasts - North Atlantic and North Pacific - December 1963
- (b) Graphs Comparing Forecasts and Observed Quality - North Atlantic and North Pacific - December 1963
- (c-d) Graphs of Useful Frequency Ranges - December 1963

VIII ALERT PERIODS AND SPECIAL WORLD INTERVALS

- (a) IQSY Alert Periods - January 1964

The descriptive text was republished November, 1963.

DAILY SOLAR INDICES

Dec. 1963	American Relative Sunspot Numbers R_A
1	21
2	26
3	18
4	15
5	17
6	15
7	17
8	12
9	11
10	16
11	9
12	4
13	0
14	0
15	0
16	0
17	1
18	8
19	0
20	13
21	13
22	11
23	8
24	11
25	7
26	1
27	0
28	0
29	0
30	0
31	1
Mean:	8.2

Jan. 1964	Zürich Provisional Relative Sunspot Numbers R_Z	Daily Values Solar Flux at 2800 Mc, Ottawa, Canada Flux
1	0	-
2	14	71
3	8	73
4	7	73
5	8	74
6	17	75
7	20	75
8	16	73
9	13	73
10	15	73
11	18	75
12	7	76
13	27	76
14	23	76
15	22	75
16	18	74
17	20	72
18	7	74
19	15	75
20	10	76
21	10	75
22	10	75
23	10	75
24	18	74
25	17	73
26	10	74
27	9	73
28	24	77
29	27	78
30	22	75
31	11	74
Mean:	14.6	74

FIG. A. PREDICTED AND OBSERVED SUNSPOT NUMBERS

CALCIUM PLAGE AND SUNSPOT REGIONS

JANUARY 1964

Jan. 1964	LAT.	MCMATH PLAGE NUMBER	RETURN OF REGION	CALCIUM PLAGE DATA						SUNSPOT DATA		
				CMP VALUES		HISTORY	AGE (ROTA- TIONS)	DATE FIRST SEEN	DURA- TION (DAYS)	CMP VALUES		HISTORY
				AREA	INT.					AREA	COUNT	
01.0	N02	7092	New	(600)	(3)	b $\nearrow$ ℓ	1	~1/2	≥ 5	-	4	b - d
02.2	N14	7091	New(2)	700	2.5	b $\wedge$ d	1	12/31	4			
03.0	S12	7084	7053	800	2.5	ℓ $\searrow$ ℓ	2	12/27	13			
03.5	N09	7093 (3)	New	400	3	b $\nearrow$ ℓ	1	~1/2	≥ 7	100	2	b $\wedge$ d
04.0	N18	7088 (4)	New	(500)	(1.5)	b - d	1	12/30	1			
04.3	S13	7094	New	700	1.5	b $\searrow$ d	1	~1/2	≥ 6			
07.2	N18	7095	7061	600	1	b $\searrow$ d	7	1/2	≥ 9			
08.3	S07	7096	New	400	3	b $\searrow$ ℓ	1	1/3	12	60	5	b $\searrow$ d
08.5	S02	7097	New	200	2	b $\nearrow$ ℓ	1	1/6	9	10	1	b $\nearrow$ ℓ
09.0	S04	7098	New	100	1.5	b $\searrow$ d	1	1/6	2			
12.5	N29	7099	7065	600	1.5	ℓ $\searrow$ d	3	1/6	12			
12.7	N41	7103 (4)	New	100	2	b - d	1	1/13	1			
13.0	S16	7101	New	200	2	b $\nearrow$ d	1	1/10	≥ 6			
14.1	S11	7100	7073	300	1	ℓ $\searrow$ d	4	1/7	≥ 9			
15.1	N14	7102	7068	1400	3	ℓ $\nearrow$ ℓ	5	1/10	> 12	240	2	b $\wedge$ d
17.0	N15	7104	7068	1100	2.0	ℓ $\wedge$ ℓ	5	1/13	> 10			
17.6	S11	7109 (4)	New	(200)	(1.5)	b - d	1	1/21	1			
18.1	N01	7105	7077	300	1	b $\searrow$ d	4	1/14	9			
18.9	N01	7107	(5)	100	1.5	b $\searrow$ d	-	-	-			
19.9	N05	7106	7080	500	1.5	ℓ $\nearrow$ d	3	1/14	≥ 9			
23.1	N09	7110 (4)	New	600	1.5	b - d	1	1/21	1			
24.5	N01	7111 (4)	New	(300)	(2)	b - d	1	1/22	1			
24.7	S04	7113	New(6)	(300)	(2.5)	b $\searrow$ ℓ	1	~1/27	≥ 4	(250)	(4)	b $\nearrow$ ℓ
25.8	N10	7108	New	1700	3	ℓ $\nearrow$ ℓ	1	1/19	≥ 12	190	1	ℓ $\nearrow$ d
26.9	N09	7112	(7)	(300)	(3.5)	b - d	-	-	-			
27.2	S26	7117 (4)	New	(100)	(1)	b - d	1	1/29	1			
27.7	N21	7114	New	300	1.5	b $\searrow$ d	1	1/27	2			
28.5	N08	7115	New(8)	300	2.5	b $\nearrow$ ℓ	1	1/27	8			
29.8	N14	7118	New	200	1	b - d	1	1/29	1			
30.4	S09	7119	7084	200	1.5	b $\searrow$ d	3	1/29	≥ 2			
31.3	S02	7123	New	(300)	(1)	b $\nearrow$ ℓ	1	1/30	6			

COMMERCE * STANDARDS - BOULDER

(1) Due to inclement weather conditions, no calcium plage data were secured at the McMath-Hulbert Observatory on January 1, 9, 11, 12, 16, 20, 23, 24, 25, 26 and 31.

(2) New - in position of 7057.

(3) New in position of 7063.

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

(5) Same as 7105

(6) New - in position of 7085.

(7) Part of 7108.

(8) New - in position of part of 7091.

Errata:

In CRPL-F 230 B page IIa, the plage reported for September 2.6 the "Date First Seen" should have been 8/29 instead of 8/9.

MT. WILSON MAGNETIC CLASSIFICATIONS OF SUNSPOTS

11b

JANUARY 1964

Jan. 1964	TIME MEAS. UT	LAT.	MER DIST	TYPE	Jan. 1964	TIME MEAS. UT	LAT	MER DIST	TYPE
1-3	No Spots				13	1615	N11	E23	βp^{**}
4	No Obs.				14-15	No Obs.			
5	2300	S07	E32	β^{**}	16	1830	N12 N10	W30 W20	αp^{**} β^{**}
6	1615	S07 S02	E23 E24	β^{**} αp^{**}	17	No Spots			
7-10	No Obs.				18-30	No Obs.			
11	1650	N01	W46	β^{*}	31	No Spots			
12	1625	N01 N12	W60 E37	β^{*} βp^{**}					

COMMERCE - STANDARDS - BOULDER

* Polarities correct for new cycle

** In reference to old cycle.

FINAL CORONAL LINE EMISSION INDICES

OCTOBER 1963

CMP Oct 1963	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	18	31	20	28	3	6	29	35	8	11	11	12	10	18	9	12
2	7	11	25	30	2	6	28	36	6	6	10	16	8	12	12	15
3	5	6	10	13	3	4	9	10	9	12	18	20	4	6	13	16
4	14	16	14	20	14	19	23	28	11	15	x	x	13	14	x	x
5	7	8	13	36	2	3	11	14	x	x	21	24	x	x	27	36
6	6	6	27	32	1	3	30	42	4	6	13	18	5	14	15	17
7	9	11	19	28	4	6	16	20	4	6	24	32	11	20	23	32
8	25	73	18	28	4	6	15	28	12	16	5	7	16	27	8	13
9	16	33	10	20	2	4	9	10	15	25	12	14	15	17	8	9
10	16	21	13	20	19	33	10	12	29	42	15	17	23	27	14	16
11	13	21	9	12	22	34	11	16	x	x	x	x	x	x	x	x
12	16	32	10	20	21	33	12	19	x	x	x	x	x	x	x	x
13	40	92	13	30	29	48	15	32	32	80	15	25	20	41	12	15
14	4	7	8	9	4	8	15	28	25	56	20	24	42	78	35	72
15	29	39	22	34	14	24	13	18	14	28	16	20	46	87	25	43
16	36	49	26	61	14	18	12	12	24	36	x	x	100	144	x	x
17	68	126	41	114	14	20	20	40	9	20	x	x	30	50	12	18
18	86	150	x	x	30	49	x	x	5	8	24	33	37	67	33	44
19	x	x	29	32	x	x	22	28	7	11	x	x	18	25	x	x
20	14	17	15	21	5	6	15	27	19	50	45	70	13	17	24	32
21	15	20	31	40	4	6	32	40	57	92	36	66	27	33	22	28
22	17	20	5	7	12	16	8	13	70	123	x	x	32	42	x	x
23	10	11	10	12	3	6	13	17	14	31	29	48	13	17	15	18
24	6	11	15	20	x	x	17	19	x	x	x	x	x	x	x	x
25	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
26	x	x	x	x	x	x	x	x	6	17	18	22	51	84	17	28
27	19	43	22	39	5	12	15	20	9	16	11	14	42	66	10	18
28	12	17	19	24	4	6	22	27	13	28	11	19	22	33	6	10
29	8	8	23	28	3	6	27	30	18	35	23	37	12	17	10	12
30	18	26	x	x	23	25	x	x	8	24	13	18	8	18	16	38
31	6	11	x	x	4	4	x	x	6	12	13	22	8	21	14	31

x = no observations

* = yellow line emission

a = index computed from low weight data

COMMERCE - STANDARDS - BOULDER

FINAL CORONAL LINE EMISSION INDICES

NOVEMBER 1963

CME Nov 1963	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	12	28	28	32	3	3	28	32	3	5	17	31	8	18	19	28
2	8	11	x	x	3	3	x	x	6	10	15	19	7	9	14	21
3	7	11	26	30	4	6	21	31	2	4	18	22	6	6	16	21
4	19	22	12	16	16	19	15	22	x	x	15	20	x	x	17	17
5	17	19	x	x	13	14	x	x	8	9	14	18	8	14	9	12
6	13	17	12	17	12	17	13	16	x	x	x	x	x	x	x	x
7	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
8	x	x	26	50	x	x	x	x	28	42	15	20	24	39	10	16
9	21	25	15	36	36	56	12	16	x	x	x	x	x	x	x	x
10	35	54	6	10	44	74	5	7	20	26	19	26	26	25	14	18
11	37	42	7	12	23	35	13	29	14	17	9	13	24	27	9	18
12	38	56	16	28	7	11	13	16	11	20	17	22	36	50	16	20
13	21	38	17	34	4	7	12	16	11	12	6	8	27	42	6	11
14	16	25	9	15	4	6	9	12	12	15	10	13	36	50	6	10
15	8	12	10	15	3	4	15	20	3	5	10	12	5	6	8	10
16	15	18	14	20	18	42	15	25	12	21	27	47	13	15	25	32
17	11	17	17	20	24	53	27	60	19	36	25	40	9	14	19	22
18	x	x	18	20	x	x	23	30	x	x	13 ^a	24 ^a	x	x	7 ^a	16 ^a
19	11	14	10	15	19	42	16	36	26	50	29	79	12	14	16	28
20	x	x	x	x	x	x	x	x	24	39	33	46	28	40	22	32
21	x	x	x	x	x	x	x	x	19	32	28	36	40	59	24	40
22	74	128	27	56	10	22	22	28	10	16	26	32	40	57	27	67
23	55	87	x	x	19	23	x	x	8	17	28	36	28	42	34	83
24	49	81	30	50	10	19	23	30	16	28	26	30	21	26	26	31
25	32	36	23	30	13	18	19	22	28	59	25	28	25	53	26	40
26	47	76	24	36	8	17	15	16	30	82	20	28	23	80	35	82
27	37	58	16	27	17	30	8	13	10	20	12	15	26	80	13	16
28	30	61	23	37	19	35	10	12	12	17	21	26	17	28	18	22
29	8	18	11	14	2	5	11	12	7	9	13	15	8	9	8	11
30	10	11	18	20	7	9	26	30	4	4	18	24	6	12	11	15

x = no observations

* = yellow line emission

a = index computed from low weight data

COMMERCE - STANDARDS - BOWLING

FINAL CORONAL LINE EMISSION INDICES

DECEMBER 1963

CMP Dec 1963	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	14	18	17	25	3	4	21	25	x	x	x	x	x	x	x	x
2	x	x	17a	21a	x	x	15a	19a	x	x	x	x	x	x	x	x
3	8	10	19	23	8	10	23	30	11	16	37	49	9	12	17	23
4	16	22	16	21	12	21	20	20	10	17	11	16	12	17	3	6
5	29	34	15	20	22	44	19	24	22	27	x	x	19	20	x	x
6	18	24	20	36	25	59	24	36	26	56	9	12	11	17	6	6
7	15	18	18	24	24	53	26	56	10	15	10	15	7	8	7	8
8	19	24	16	20	13	24	18	24	4	6	19	25	6	7	15	19
9	26	34	20	24	17	31	26	32	7	9	6	8	13	15	6	6
10	17	27	14	16	6	6	15	22	3	5	16	20	8	12	12	16
11	14	20	9	12	4	6	7	8	6	8	12	16	16	20	10	12
12	20	28	14	18	7	11	14	22	4	4	12	15	15	20	10	12
13	15	25	16	20	9	20	13	16	8	8	18	24	19	23	20	34
14	19	38	24	30	16	30	15	17	x	x	x	x	x	x	x	x
15	x	x	x	x	x	x	x	x	10	15	12	20	19	37	16	32
16	x	x	x	x	x	x	x	x	12	20	x	x	18	30	x	x
17	25	28	28	56	22	38	26	33	15	25	18	23	27	34	16	30
18	26	34	7	12	22	31	7	11	11	14	19	21	33	50	18	24
19	37	49	x	x	13	16	x	x	11	25	19	24	49	90	19	36
20	44	62	9	12	5	6	11	12	8	13	15	23	33	43	8	11
21	15	21	14	20	5	11	20	25	11	25	17	25	24	31	8	12
22	13	18	18	24	4	6	22	25	17	45	12	13	26	39	13	22
23	31	51	8	10	6	16	8	10	12	34	20	23	11	31	14	16
24	15	27	22	38	3	7	21	28	6	10	14	17	24	36	8	8
25	16	28	13	15	3	6	13	22	8	17	18	20	9	14	18	22
26	9	14	18	25	3	4	14	15	5	6	11	12	7	9	10	16
27	10	13	22	27	7	9	17	28	4	8	12	25	8	11	10	15
28	x	x	x	x	x	x	x	x	4	5	11	15	7	8	10	12
29	6	9	8	11	4	7	9	14	x	x	x	x	x	x	x	x
30	6	8	x	x	4	6	x	x	5	6	16	20	7	8	15	19
31	11	14	17	31	10	14	20	22	x	x	x	x	x	x	x	x

x = no observations

* = yellow line emission

a = index computed from low weight data

CONFERENCE - STANDARDS - BOULDER

PROVISIONAL CORONAL LINE EMISSION INDICES

JANUARY 1964

CMP Jan 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	9	11	20	22	16	20	20	24	x	x	x	x	x	x	x	x
2	14	17	15	20	20	56	19	22	x	18	x	x	11	15	x	x
3	x	x	x	x	x	x	x	x	10	14	10	13	10	12	11	13
4	10	14	9	11	11	14	10	12	8	12	9	11	9	10	7	8
5	15	18	11	15	11	18	14	18	7	8	x	x	10	14	x	x
6	7	11	9	11	3	6	12	15	6	8	30	36	13	14	18	28
7	10	18	8	12	7	9	11	16	24	73	36	50	13	17	18	24
8	12	17	15	24	4	6	17	19	16	34	21	36	13	20	14	20
9	12	16	12	15	6	7	11	13	6	8	7	9	12	14	4	6
10	19	25	12	19	10	11	10	15	x	x	x	x	x	x	x	x
11	23	34	11	13	9	17	12	16	x	x	x	x	x	x	x	x
12	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
13	18	32	21	30	10	18	18	20	10	11	17	26	26	42	13	20
14	x	x	x	x	x	x	x	x	5	8	13a	16a	31	53	14a	30a
15	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
16	29	41	x	x	5	9	x	x	x	x	19a	34a	x	x	10a	12a
17	25	34	10	20	8	10	16	20	x	x	x	x	x	x	x	x
18	20	24	7	10	8	10	15	24	x	x	x	x	x	x	x	x
19	22	31	18	26	5	8	20	22	9	17	16	20	10	21	13	17
20	21	42	22	35	7	11	14	24	13	22	14	18	5	8	10	12
21	14	20	19	20	4	8	22	28	x	x	18a	21a	x	x	16a	21a
22	7	8	14	16	3	3	16	20	4	6	26	28	8	11	23	28
23	8	9	10	15	5	7	6	8	x	x	x	x	x	x	x	x
24	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
25	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
26	x	x	x	x	x	x	x	x	6	9	10	12	17	32	16	22
27	22	31	22	28	7	8	17	20	x	x	x	x	x	x	x	x
28	11a	11a	17a	24a	6a	8a	16a	18a	5	8	x	x	6	8	x	x
29	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
30	x	x	15a	16a	x	x	9a	16a	x	x	x	x	x	x	x	x
31	x	x	x	x	x	x	x	x	6	8	11a	12a	6	7	16a	17a

x = no observations * = yellow line emission a = index computed from low weight data COMMERCE - STANDARDS - BOULDER

SOLAR FLARES

JANUARY 1964

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		LOCATION			DURA- TION — MINUTES	IM- POR- TANCE	OBS. COND.	TIME U T	MEASUREMENTS			PROVISIONAL IONOSPHERIC EFFECT
		START	END	APPROX. LAT.	MER DIST.	MC-MATH FLARE REGION					MEAS. AREA Sq. Deg.	CONR. AREA Sq. Deg.	MAX WIDTH R _g	MAX INT. %
	JAN 1964													
	01	0000	0750			NO FLARE								
	01	0800	0900			NO FLARE								
	01	0940	0950			NO FLARE								
	01	1040	1055			NO FLARE								
	01	1110	1120			NO FLARE								
	01	1220	1230			NO FLARE								
	01	1245	1345			NO FLARE								
	01	1400	1415			NO FLARE								
	02	0035	0750			NO FLARE								
	02	0915	0928			NO FLARE								
WENDEL	02	0946	0958			NO8 E16		1-						
WENDEL	02	1157	1200			NO8 E16		1-						
UCCLE	02	1157	1200			NO1 W22		1-						
SAC PEAK	02	2250	2306			NO0 W27		1-			.29	.29		17
LOCKHEED	02	2252	2315			NO1 W27		1-		2256	.40	.40		10
	03	0015	0800			NO FLARE								
SAC PEAK	03	1540	1554			NO8 W04		1-			.83	.78		18
MC-MATH	03	1541	1555			NO8 W03	7093	1-		1544	.50	.50		
	04	0015	0750			NO FLARE								
	04	1440	1450			NO FLARE								
	05	0015	0755			NO FLARE								
HTE-PROVEN	05	0755	0911			NO FLARE		1-						
HTE-PROVEN	05	1054	1102			S06 E42		1-		0810	.30	1.20		
HTE-PROVEN	05	1113	1126			S06 E42		1-		1059	.30	.40		
WENDEL	05	1114	1135			S06 E42		1-		1120	.40	.50		
HTE-PROVEN	05	1129	1158			S07 E40		1-						
WENDEL	05	1139	1212			S06 E42		1-		1142	.50	.40		
	05	1210	1225			S07 E41	7096	1				3.00		
HTE-PROVEN	05	1226	1309			NO FLARE		1-						
WENDEL	05	1329	1322			S06 E42		1-		1226	.60	.80		
	05	1310	1320			S07 E41	7095	1				3.00		
	05	1345	1410			NO FLARE								
LOCKHEED	05	2330	0002			NO FLARE		1-		2342	.20	.20		10
	06	0020	1415			NO FLARE								
	07	0010	1035			NO FLARE								
	07	1240	1250			NO FLARE								
	07	1300	1345			NO FLARE								
MC-MATH	07	1623	1640			NO FLARE								
OTTAWA	07	1624	1640			1627	7095	1-		1627	.20	.20		
LOCKHEED	07	1905	1916			S07 E10		1-		1626	.14	.14		
LOCKHEED	07	2305	2330			S54 W11		1-		1909	.30	.30		10
	08	0045	0800			N68 W11		1-		2312	.20	.40		10
LOCKHEED	08	1904	1910			NO FLARE		1-		1906	.10	.20		10
LOCKHEED	08	2106	2245			S56 W30		1-		2155	.60	.60		10
LOCKHEED	08		2155			S04 W07								

SOLAR FLARES

JANUARY 1964

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		LOCATION			DURA- TION — MINUTES	IM- POR- TANCE	OBS COND.	MEASUREMENTS				PROVISIONAL IONOSPHERIC EFFECT	
		START	END	MAX. PHASE	APPROX.					TIME — U T	MEAS AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX. WIDTH He		MAX. INT %
					LAT.	MER. DIST.									
LOCKHEED	JAN 1954														
	08	2344	0014	2353	N47 W39		1-	2	2353	.40	.60		10		
	09	0045	0805	NO FLARE	PATROL										
LOCKHEED	09	1555	1640	NO FLARE	PATROL										
	09	1712	1740	1725	S13 E27		1-	2	1725	.10	.10		10		
	10	0040	0755	NO FLARE	PATROL										
MCMATH LOCKHEED	10	0815	0935	NO FLARE	PATROL										
	10	1025	1415	NO FLARE	PATROL										
	10	1542	1547	1543	S01 W32	7097	1-	1	1543	.10	.10				
SAC PEAK LOCKHEED	10	1812	1827	1815	N01 W32		1-	1	1815	.20	.20		10		
	11	0030	1320	NO FLARE	PATROL										
	12	0015	0915	NO FLARE	PATROL										
SAC PEAK LOCKHEED	12	0925	1330	NO FLARE	PATROL										
	12	1908	1924	1914	S08 W60		1-	2	2329	.27	.39		17		
	12	2321	2344	2329	N12 E22		1-		2329	.30	.30		10		
LOCKHEED SAC PEAK	13	0000	1415	NO FLARE	PATROL										
	14	0035	1330	NO FLARE	PATROL										
	15	0020	0805	NO FLARE	PATROL										
CAPRI-S	15	1025	1325	NO FLARE	PATROL										
	16	0040	0835	NO FLARE	PATROL										
	17	0014	0025	0019	N11 W21		1-	1	0019	.30	.30		10		
CAPRI-S	17	0016	0018	0016	N11 W22		1-								
	17	0025	0815	NO FLARE	PATROL										
	17	0840	0843	NO FLARE	PATROL										
CAPRI-S	17	0850	0905	NO FLARE	PATROL										
	17	1125	1140	NO FLARE	PATROL										
	18	0020	0755	NO FLARE	PATROL										
CAPRI-S	18	0906	0911	0911	N07 E90	7103	2	2	0909	2.00					
	18	1715	2400	NO FLARE	PATROL										
	19	0000	0905	NO FLARE	PATROL										
CAPRI-S	19	0930	1050	NO FLARE	PATROL										
	19	1055	1250	NO FLARE	PATROL										
	19	1310	1345	NO FLARE	PATROL										
CAPRI-S	19	1350	1430	NO FLARE	PATROL										
	19	1440	1515	NO FLARE	PATROL										
	19	1525	1615	NO FLARE	PATROL										
CAPRI-S	19	1635	1645	NO FLARE	PATROL										
	19	1800	1840	NO FLARE	PATROL										
	19	2355	2400	NO FLARE	PATROL										
CAPRI-S	20	0020	0750	NO FLARE	PATROL										

COMMERCE • STAGGERS • BOULDER

SOLAR FLARES

JANUARY 1964

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		LOCATION			DURA- TION — MINUTES	IM- POR- TANCE	OBS. COND.	TIME — U T	MEASUREMENTS			MAX WIDTH He	MAX INT °	PROVISIONAL IONOSPHERIC EFFECT
		START	END	APPROX LAT	MER DIST	McMATH PLAGE REGION					MEAS. AREA Sq. Deg	CORR. AREA Sq. Deg				
HTE-PROVEN	JAN 20 1964															
	20	0825	0840					1-		0827	1.20					
	20	1250	1320													
	20	1447 E	1453					1-		1450	.50				18	
	20	1635	1653					1-			.68	1.36			18	
	20	1701	1711					1-			.14	.29			17	
	20	1737	1751					1-			.21	.39				
	20	2355	2400													
HTE-PROVEN ARCETRI	21	0015	0740													
	21	1150	1410													
	21	2355	2400													
	22	0025	0740													
	22	0742 E	0930					108 D	2	0750	2.70	3.90				
	22	0805						1-		0805	1.10	1.60				
	22	1410	1415													
	22	2355	2400													
LOCKHEED	23	0020	0725													
	23	0745	0755													
	23	1610	1800													
	24	0025	0030													
	24	0035	0755													
	24	0935	1055													
	24	1235	1320													
	24	1550	1630													
HTE-PROVEN CAPRI-S SAC PEAK SAC PEAK SAC PEAK	25	0030	0745					1-			.30	.30		10		
	25	1320	1405													
	25	2240	2300					1-	1	2247						
	26	0030	0820													
	26	1241	1515 D					2		1330	8.20	8.60				
	26	1241	1549 D					2	3	1414	7.60	7.90			20	
	26	1411 E	1550 U					1-			2.58	2.54			19	
	26	1632	1641					1-			.39	.47			17	
LOCKHEED	26	2320	2350					1-			.25	.25				
	26	2355	2400													
	27	0030	0740					1-	1	2252	.20	.20		10		
	27	2249	2258													
	28	0000	0005													
	28	0015	0820													
	28	0804 E	0946 D					1	2	0809	2.10	2.60				
	28	0830	0850													
CAPRI-S	28	0925	1005													
	28	1030	1040													
	28	1110	1155													
	28	1200	1210													

COMMERCE - STANDARDS - BOULDER

SOLAR FLARES

JANUARY 1961

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME			LOCATION			DURA- TION — MINUTES	IM- POR- TANCE	OBS. COND.	TIME — UT	MEASUREMENTS			PROVISIONAL IONOSPHERIC EFFECT	
		START	END	MAX. PHASE	LAT.	APPROX. MER. DIST.	MC-MATH PLACE REGION					MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX WIDTH Ha		MAX INT. %
[OTTAWA [MCMATH [OTTAWA [MCMATH [MCMATH [MCMATH	JAN 1964	28	1215	1320	NO FLARE	PATROL			1-	4	1400	.19	.23			
	28	1355 E	1412			S06 W48			1-	2	1433	.50	.80			
	28	1358 E	1630 D			S04 W50	7113		1-	4	1447	.23	.28			
	28	1443 E	1452 D			S05 W49			1-	2	1712	.63	.90			
	28	1710 E	1830 D			S04 W51	7113		1-	2						
	28		1742			S04 W51			1-	2	1925	.20	.40			
UCCLE ONDREJOV [OTTAWA [ONDREJOV MCMATH		29	0050	1020	NO FLARE	PATROL			1-	2						
	29	0838 E	0840 D			S04 W64		84 D	1	3	1100			2.00		
	29	1039 E	1203 D			S04 W58	7113		1-	3		.47	.67			
	29	1315	1420	NO FLARE		PATROL			1-	3	1343			1.40		
	29	1336 E	1356			S04 W58			1-	3	1340					
	29	1340 E	1355			S03 W58			1-	3						
SAC PEAK SAC PEAK LOCKHEED		29	1425	1435	NO FLARE	PATROL			1-	2	1736	.80	1.80			
	29	1733	1746	1736		S04 W64	7113		1-	2						
	29	1845	2400	NO FLARE		PATROL			1-	2						
	30	0000	1335	NO FLARE		PATROL			1-	2						
	30	1542 E	1610	1546		S04 W72			1-	2		.27	.52	17		
	30	1639	1652	1641		S04 W72			1-	2		.33	.62	18		
		30	2220	2244	2230		S05 W80		1-	2	2230	.10	.30	10		
	31	0035	0730	NO FLARE		PATROL			1-	2						
	31	0745	0755	NO FLARE		PATROL			1-	2						
	31	0835	1405	NO FLARE		PATROL			1-	2						

COMMERCE - STANDARDS - BOULDER

ATHENS	GREECE	HONOLULU	HAWAII, USA	NERA	NEDERHORST den BERGH,
ATLANTA	USA	KOMASAN	KYOTO, JAPAN		NETHERLANDS
BRAKOU	PICULI, USSR	KIEV KY	KIEV GAO, USSR	NIZMIR	KRASNOYA PAKHRA, USSR
CAPETOWN	ROYAL OBSERVATORY,	KIEV KY	KIEV UNIVERSITY, USSR	SAC PEAK	SACRAMENTO PEAK, N. MEX., USA
	CAPE OF GOOD HOPE	LOCKHEED	MCMATH-HILBERT	SALTJÖRÅDEN	STOCKHOLM, SWEDEN
CAPRI F	CAPRI, ITALY (GERMAN)	MCMATH	MOSCOW-GAISH, USSR	SCHAUINS	SCHAUTISLAND, GFR
CAPRI S	CAPRI, ITALY (SWEDISH)		PONTIAC, MICH.	TACKENT	WÄSKELSTEIN, GFR
CRIVÉE	SIMEZ, USSR	MOSCOW		WENDEL	
HERFSTROMCII	ROYAL GREENWATCH OBSERVATORY,				

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.

Errata: In CRPL-F-233B page IIIe for January 1964 a flare reported by Ottawa for December 30, 1963 observed at N13 W78 the times should have been 1617-1654 instead of 1617-1645.

INTERVALS OF NO FLARE PATROL OBSERVATIONS

JANUARY 1961

Observatories Included:

Arcetri
Haute-Provence
Ikomasan

Lockheed
McMath-Hulbert
Ondrejov

Ottawa
Sacramento Peak
Uccle

SOLAR FLARES

OCTOBER 1963

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		LOCATION			DURATION — 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 H α	
	OCT 1963													
	01	0035	0150	NO FLARE	PATROL									
	01	0155	0210	NO FLARE	PATROL									
	01	0220	0235	NO FLARE	PATROL									
	01	0400	0500	NO FLARE	PATROL									
	02	0205	0220	NO FLARE	PATROL									
	02	0320	0325	NO FLARE	PATROL									
	02	0330	0335	NO FLARE	PATROL									
	02	0340	0355	NO FLARE	PATROL									
	02	0415	0420	NO FLARE	PATROL									
	02	0435	0440	NO FLARE	PATROL									
	04	0140	0145	NO FLARE	PATROL									
	04	0150	0205	NO FLARE	PATROL									
	04	0215	0230	NO FLARE	PATROL									
	04	0235	0500	NO FLARE	PATROL									
	04	0525	0530	NO FLARE	PATROL									
	04	0910	0915	NO FLARE	PATROL									
	04	1015	1025	NO FLARE	PATROL									
	04	1030	1045	NO FLARE	PATROL									
	05	0355	0400	NO FLARE	PATROL									
	05	0430	0500	NO FLARE	PATROL									
	05	1010	1055	NO FLARE	PATROL									
	05	1105	1140	NO FLARE	PATROL									
	05	1145	1220	NO FLARE	PATROL									
	05	1631	1659	1640	N08 E90		6986	1			.70	3.50		
CLIMAX	05	2301	2308	2306	N05 E90		6986	1			.60	.30		
CLIMAX	06	0210	0215	NO FLARE	PATROL									
	06	0400	0450	NO FLARE	PATROL									
	06	0455	0500	NO FLARE	PATROL									
CLIMAX	06	2201	2250	2227	N08 E25		6979	1			3.10	3.10		
	07	1020	1025	NO FLARE	PATROL									
	07	1110	1115	NO FLARE	PATROL									
	07	1225	1230	NO FLARE	PATROL									
CLIMAX	07	1648	1703	1653	N36 E55			1-			.30	.40		
CLIMAX	07	2017	2102	2102	N34 E56			1-		2034	.30	.50		
VOROSHILOV	07	2342	0018	2353	N34 E54			1-	2	2353	1.08		62	
	08	0250	0255	NO FLARE	PATROL									
	08	0300	0305	NO FLARE	PATROL									
	08	0310	0315	NO FLARE	PATROL									
	08	0330	0335	0330	N35 E51			1-	2	0330			1.28	100
KODAIKUN	08	2355	2400	NO FLARE	PATROL									
	09	0035	0225	NO FLARE	PATROL									
	09	0320	0325	NO FLARE	PATROL									
	09	0345	0350	NO FLARE	PATROL									
	09	0355	0405	NO FLARE	PATROL									

COMMENCE - STANDARDS - BOULDER

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		LOCATION			DURATION — MINUTES	IM. POR. TANCE	OBS. COND.	MEASUREMENTS				PROVISIONAL IONOSPHERIC EFFECT	
		START	END	MAX PHASE	APPROX. LAT.	MER. DIST.				TIME — U T	MEAS. AREA Sq. Deg.	CORR. AREA Sq. Deg.	MAX WIDTH Hr.		MAX INT "
VOROSHILOV CLIMAX	OCT 1963														
	10	0110	0240	NO FLARE	PATROL										
	10	1125	1130	NO FLARE	PATROL										
	10	1240	1245	NO FLARE	PATROL										
	11	0200	0405	NO FLARE	PATROL										
	11	0425	0440	NO FLARE	PATROL										
	11	0445	0500	NO FLARE	PATROL										
	11	1655	1700	NO FLARE	PATROL										
	11	2115	2145	NO FLARE	PATROL										
	11	2200	2215	NO FLARE	PATROL										
VOROSHILOV CLIMAX	11	2225	2230	NO FLARE	PATROL										
	13	0115	0200	NO FLARE	PATROL										
	13	0455	0500	NO FLARE	PATROL										
	13	2326	0037 D	2344	N35 W23										
	13	2334	2354 D	2341	N36 W22	6990	20 D	1-	2	2344	1.86 2.20	2.40		52	
	14	0100	0210	NO FLARE	PATROL										
	14	0220	0240	NO FLARE	PATROL										
	14	0651	0653		N32 W30							.30	.40		
	14	0830	0945 D		N04 E04							.60	.60		
	14	1145	1223	1151	N36 W32							.80	1.00		
CAPETOWN CLIMAX	14	1147 E	1202 D		N35 W33										
	14	1657	1715	1700	N04 W01							1.20	1.20		
	14	1738	1800	1742	N04 W01							.50	.90		
	14	1931	1945	1936	N04 W01							1.60	1.60		
	14	1956	2007	1959	N04 W01							.90	.90		
	14	2052	2104	2057	N02 W04							1.00	1.00		
	14	2255	2314	2300	N04 W06							1.60	1.60		
	14	2320	2330	2324	N04 W06							1.90	1.90		
	15	0220	0225	NO FLARE	PATROL										
	15	0225	0240		N02 W05								1.40		
CAPETOWN CLIMAX	15	0250	0300	NO FLARE	PATROL										
	15	0305	0330	NO FLARE	PATROL										
	15	0335	0420	NO FLARE	PATROL										
	15	0450	0520	NO FLARE	PATROL										
	15	0835	0840	NO FLARE	PATROL										
	15	0833	0843	0835	N03 W10								1.00	1.00	
	15	0840 E	0915 D		N03 W10								1.00	1.00	
	15	1040	1055	1044	N03 W11								1.00	1.00	
	15	1147	1156	1150	N04 W12								1.30	1.30	
	15	2055	2115	NO FLARE	PATROL										
CAPETOWN CLIMAX	15	2220	2255	NO FLARE	PATROL										
	16	0025	0450	NO FLARE	PATROL										
	16	0455	0500	NO FLARE	PATROL										
	16	0709	0723	0711	N04 W22								1.10	1.10	
	16	0710	0800 D	0740	N03 E22								.36	.40	
	16	0930	0955	0942	N04 W22	6997	25	1-	2	0711 0740 0950	1.00 1.70 1.20	1.10 2.10 1.30		55	
	16	0937	0956	0942	N03 W24										

SOLAR FLARES

OCTOBER 1963

OBSERVATORY	DATE	OBSERVED UNIVERSAL TIME		LOCATION			DURA- TION — MINUTES	IM- POR- TANCE	OBS. COND.	MEASUREMENTS				PROVISIONAL IONOSPHERIC EFFECT
		START	END	APPROX. LAT.	MER DIST	MAGNITUDE PLACE REGION				TIME U T	MEAS. AREA Sq Deg.	CORR. AREA Sq Deg.	MAX WIDTH Ha	
CAPETOWN CAPRI-F IKOMASAN	16 OCT 1963													S-SWF
	16	1221	1312	N04 W25		6997	1		1228	3.20	3.50			
	16	1245 E	1332 D	N04 W24		6997	1	3	1257	4.00	4.40			
	16	1920	1935	NO FLARE										
UCCLE	16	2330	0024	N07 W15		6997	1	3	2350	4.40	4.60	1.10	100	S-SWF
	17	0120	0155	PATROL										
	17	0205	0215	PATROL										
	17	0225	0230	NO FLARE										
IKOMASAN VOROSHILOV	17	0310	0410	PATROL										Slow-S-SWF
	17	0415	0425	NO FLARE										
	17	0445	0505	NO FLARE			1-	2						
	17	1346 E	1350 D	N03 W42										
VOROSHILOV	18	0525	0550	NO FLARE										S-SWF
	18	2100	2130	PATROL										
	18	2145	2250	PATROL			1	3	2400	1.07		3.78	80	
	18	2318	0025 D	N12 E90		7003	1-	2					85	
VOROSHILOV	18	2340	2346	N14 E90										S-SWF
	19	0120	0133	N12 E90			1-	2		.54			47	
	19	0210	0224	N14 E90			2+	2	0219	1.79		13.75	117	
	19	0214	0308	N10 E90		7003	1	2	0342			3.60	154	
VOROSHILOV	19	0342	0403 D	N10 E90		7003	1	1	0342			5.75	114	S-SWF
	19	0439 E	0520	N10 E90		7003	2	1	0449				135	
	19	1600	1625	NO FLARE										
	19	1725	1730	PATROL										
VOROSHILOV	19	1740	1745	NO FLARE										S-SWF
	19	1745	1745	NO FLARE										
	19	1755	1905	PATROL										
	19	1940	2040	NO FLARE										
VOROSHILOV	19	2050	2245	NO FLARE										S-SWF
	19	2050	2245	NO FLARE										
	19	2322	2334	N18 E85		7003	1+	1		1.07			83	
	20	0205	0320	NO FLARE										
ARCETRI	20	0330	0335	PATROL										G-SWF
	20	0425	0430	NO FLARE										
	20	0808 E	0839 D	N12 E85		7003	1	3	0839	.50	2.00			
	20	0900	0953 D	N12 E85		7003	1	2	0930	.60	2.40			
ARCETRI	20	1805	1820	NO FLARE										G-SWF
	20	1805	1820	NO FLARE										
	20	1830	1840	NO FLARE										
	21	0315	0450	PATROL										
CAPETOWN CAPRI-F	21	0820 E	0825 D	NO FLARE										G-SWF
	21	1325	1400	N11 E65		7003	1	3	0820	1.10	2.20			
	21	1325	1427 D	N14 E72		7003	1	3	1329	1.20				
	21	1335 E	1427 D	N11 E69		7003	2	3	1342	2.50	5.82			
CAPETOWN UCCLE CAPRI-F CLIMAX	22	0230	0410	NO FLARE										Slow-S-SWF
	22	0455	0500	PATROL										
	22	1331	1500 D	N12 E55		7003	2	2	1341	3.60	6.20			
	22	1333 E	1421 D	N10 E59		7003	1+	2	1357	4.00	6.80			
CAPRI-F	22	1344 E	1515 D	N09 E57		7003	1	3	1356	4.00	6.52			Slow-S-SWF
	22	1344 E	1515 D	N09 E57		7003	1	3	1356	4.00	6.52			
	22	1409 E	1531	N10 E55		7003	2	3	1356	6.00	7.80			
	22	1409 E	1531	N10 E55		7003	2	3	1356	6.00	7.80			

COMMERCE • STANDARDS • BOULDER

SOLAR FLARES

OCTOBER 1963

OBSERVATORY	DATE OCT 1963	OBSERVED UNIVERSAL TIME		LOCATION APPROX LAT LONG	REMARKS TIME REGION	DURATION MINUTES	IM- PORTANCE	OBS CODE	TIME U.T.	MEASUREMENTS		MAX WAVE- LENGTH nm	MAX FLUX 10 ⁻¹¹ W/m ²	PROVISIONAL IONOSPHERIC EFFECT
		START	END							MEAN Sd Day	CORR Sd Day			
UCCLE	27	0927	0929	N11 W12			1-	3						
	28	0125	0135	NO FLARE										
	28	0135	0301	N12 W25	7003	86 D	3	2	0205	14.00	15.40	1.26	130	Slow-S-SUF
	28	0230	0316	N11 W25	7003	48 D	2	2	0231	6.40	6.30	2.12	122	
	28	0325	0405	NO FLARE										
IKOMASAN	28	0445	0520	NO FLARE										
	28	0535	0645	NO FLARE										
	28	0535	0645	NO FLARE										
	28	0535	0645	NO FLARE										
	28	0535	0645	NO FLARE										
	28	0535	0645	NO FLARE										
	28	0535	0645	NO FLARE										
	28	0535	0645	NO FLARE										
	28	0535	0645	NO FLARE										
	28	0535	0645	NO FLARE										
	28	0535	0645	NO FLARE										
IKOMASAN	28	2125	2345	N01 E24	7013	26 D	1	3	2337	1.60	1.70	.70	80	
	28	2319	2400	NO FLARE										
	28	2350	2400	NO FLARE										
	29	0210	0210	NO FLARE										
	29	0205	0210	NO FLARE										
KODAIKNL	29	0235	0257	S13 W52			1-	3	0249			1.60	100	
	29	0410	0620	S11 W62	7010	130	1	2	0425	4.00	4.50	.78	50	
	29	0455	0540	NO FLARE										
	29	0533	0625	N02 E20	7013	147 D	1	2	0701	2.83	3.00	1.80	70	
	29	0610	0625	N01 E20			1-	2	0610	1.00	1.10		80	
TASHKENT	29	0941	1002	S09 W57	7010	21	1		0943	1.00	2.60			
	29	1119	1146	S09 W57			1-		1127	.70	1.80			
	29	1155	1217	S09 W57	7010	22	1		1156	1.10	2.80			
	29	1851	1859	N10 W57			1-			.50	.70			
	30	0645	0850	NO FLARE										
NIZMIR	30	0410	0500	NO FLARE										
	30	0541	1036	N07 E34	7013	25 D	1		1.07				50	
	31	0330	0135	NO FLARE										
	31	0145	0150	NO FLARE										
	31	0245	0250	NO FLARE										
CAPETOWN	31	0300	0305	NO FLARE										
	31	0900	0905	NO FLARE										
	31	1615	1625	NO FLARE										
	31	1630	1650	NO FLARE										
	31	1735	1840	NO FLARE										

These flare reports are addenda to the October 1963 flares published in CRPL-F 231 for November 1963.

ATHENS	ATHENS, GREECE	HONOLULU	HAWAII, USA	NEHA	NEDERBURST den BERGH, NETHERLANDS
BAKOU	PRICULT, USSR	IKOMASAN	KYOTO, JAPAN		KRASNOYA PAKHRA, USSR
CAPETOWN	ROYAL OBSERVATORY, CAPE OF GOOD HOPE	KIEV KY	KIEV KY	NIZMIR	SACRAMENTO PEAK, N.MEX. USA
CAPRI F	CAPRI, ITALY (GERMAN)	LOCKHEED	LOS ANGELES, CALIF., USA	SAC PEAK	STOCKHOLM, SWEDEN
CAPRI S	CAPRI, ITALY (SWEDISH)	MCMATH	MCMATH-HILBERT	SALTSJÖBADEN	SCHAUINSLAND, CFR
CRIMEE	SHREVE OBSERVATORY, HERSHONCEU	MOSCOW	PONTIAC, MICH., USA	SCHAUIS	TASHKENT, USSR
HERSHONCEU	ROBERTSON OBSERVATORY, HERSTMANCEUX, ENGLAND	MOSCOW-GAISH, USSR		TACHKENT	WENDELSTEIN, CFR
HTE-PROVEN	HAUTE-PROVENCE	NEW SCHAUIS FREIBURG, CFR		WENDEL	

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.

Errata: In CRPL-F 231 p page 11 b, November 1963 a flare reported by Mendelstein for October 29, 1963 which began at 0724 and ended at 0913, 801 and 819, the region number should have been 7013 instead of 7913.

INTERVALS OF NO FLARE PATROL OBSERVATIONS

OCTOBER 1963

HOUR-UT

Observatories Include:

Abastumani
Arcetri
Athenes
Bakou
Bucharest

Capetown
Capri-F (German)
Capri-S (Swedish)
Climax
Crimee

Haute-Provence
Herstmonceux
Huancayo
Ikomasan
Istanbul

Kiev-KO
Kodaikanal
Lockheed
McMath-Hulbert
Mitaka

Nizmir
Ondrejov
Ottawa
Sacramento Peak
Tachkent

Uccle
Voroshilov

IONOSPHERIC EFFECTS OF SOLAR FLARES

IIII

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

DECEMBER 1963

DEC. 1963	UNIVERSAL TIME			TYPE SWF IMP	IMPORTANCE						BUR	WIDE SPREAD INDEX	STATIONS	KNOWN FLARE
	START	END	MAX		ABS	SCNA	SEA	SPA	SES	SFD				
03	1525	1555	1540	SL 1								4	HU BE BO MC	

COMMERCE - STANDARDS - BOULDER

RIOMETER EVENTS

(PROVISIONAL)

DECEMBER 1963

South Pole

26 Mc/s

DEC. 1963	START UT	END UT	MAX. UT	MAX. ABSORP., tenths,db	NO. OF PEAKS	DEC. 1963	START UT	END UT	MAX. UT	MAX. ABSORP., tenths,db	NO. OF PEAKS
1	0010	0106	0017	5	3	19	**				
2	1530	1745	1548	3	1	20	0710	1402	0712	8	2
3	0214	0332	0218	6	2	21	*				
3	0527	1900	0809	32	5	22	0731	1207	1021	4	4
3	2109	2205	2123	3	1	22	1343	1836	1438	8	2
4	0259	0343	0303	26	1	23	0752	1222	0900	7	2
4	0814	0138	2353	20	5	23	2328	0227	2343	8	2
5	0807	2009	1415	19	5	24	1410	1606	1456	6	1
6	0018	0203	0024	30	2	25	*				
6	0527	2037	1309	14	9	26	*				
6	2222	2333	2225	10	2	27	0608	0716	0611	6	1
7	0225	0316	0241	7	2	28	1843	2018	1931	3	2
8	0517	0732	0522	13	1	29	0954	1229	1029	4	1
8	0930	2213	1301	9	4	29	2257	0120	2308	7	5
9	0519	1913	0532	20	6	30	0232	0303	0241	3	1
10	*					30	1508	1749	1557	6	1
11	*					31	*				
12	*										
13	*										
14	0334	0455	0337	9	2						
14	1426	1638	1543	5	1						
15	*										
16	*										
17	0024	0104	0027	26	2						
18	**										

* No Event.

COMMERCE - STANDARDS - BOULDER

** No Data.

SOLAR RADIO EMISSION OUTSTANDING OCCURRENCES

JANUARY 1961

ARO - OTTAWA

2800 Mc/s

JAN. 1964	U R A N E	DESCRIPTIVE TYPE	START UT	DURATION HRS. MIN.	MEAN FLUX	MAXIMUM		REMARKS
						TIME	FLUX	
20	3	Simple 3	1650	2 50	Indet.	1	0.5	
26	3	Simple 3	1305	>6 00	1345	9	4.5	
28	1	Simple 1	1505	1	1503.3	2.4	1.2	
29	1	Simple 1	1736	1	1736.2	2	1	

COMMERCE - STANDARDS - BOULDER

SOLAR RADIO EMISSION
INTERFEROMETRIC OBSERVATIONS

JANUARY 1964

NANÇAY

169 Mc/s

JANUARY 1964

SOLAR RADIO EMISSION OUTSTANDING OCCURRENCES

JANUARY 1964

NO OUTSTANDING OCCURRENCES WERE OBSERVED DURING JANUARY 1964

NOMINAL TIMES OF OBSERVATION

JANUARY 1964

NBS BOULDER

108 Mcs

Jan. 1964	HOURS OF OBSERVATION	UT	Jan. 1964	HOURS OF OBSERVATION	UT
1	1427-2330		16	1425-2345	
2	1427-2331		17	1424-2346	
3	1427-2332		18	1424-2347	
4	1427-2333		19	1423-2349	
5	1427-2334		20	1423-2350	
6	1427-2335		21	1422-2351	
7	1427-2336		22	1422-2352	
8	1427-2337		23	1421-2353	
9	1427-2338		24	1420-2354	
10	1427-2339		25	1420-2356	
11	1427-2340		26	1419-2010;	
12	1426-2341			2109-2357	
13	1426-1758;		27	1418-1603;	
	1903-2342			1856-2358	
14	1426-2343		28	1600-2359	
15	1425-1810;		29	1417-2400	
	1825-2344		30	1416-0002	
			31	1415-1459;	
				1932-0003	

SOLAR RADIO EMISSION SPECTRAL OBSERVATIONS

IVd

OCTOBER 1963

Fort Davis

50 - 320 Mc/s

1963 <small>VOLUME 487-18</small>	OBSERVING HOURS	IMPORTANT BURSTS			FREQUENCY RANGE MC	REMARKS
		TYPE	TIMES U.T	INT		
Oct. 1	1332-2330					
Oct. 2	1332-2330					
Oct. 3	1332-2330					
Oct. 4	1331-2329					
Oct. 5	1332-2330					
Oct. 6	1332-2333					
Oct. 7	1332-2330					
Oct. 8	1332-2330					
Oct. 9	1332-2330					
Oct. 10	1332-2330					
Oct. 11	1331-2330					
Oct. 12	1331-2330					
Oct. 13	1331-2330	I	~ 1700-2330	1-2	280-<50	Weak I throughout day
Oct. 14	1331-2330	I	1900-2330	1	200-<50	2120-2200: Many type III bursts 100-<50 Mc/s Weak I during day
Oct. 15	1331-2330					Weak I during day
Oct. 16	1331-2330					Weak I during day
Oct. 17	1332-2330					
Oct. 18	1331-2330	IIIG II IIIG II	1558-1600 1600.6-1613 2043-2047 2046-2100	3 3 3 3	280-<50 250-<50 320-<50 200-<50	1602-1613: Type III's in type II structure
Oct. 19	1331-2330	Uncl. IIIG	1655-1658 1701-1703	1 2	300-<75 150-<50	1655-1658: Uncl. burst has harmonic
Oct. 20	1331-2330					
Oct. 21	1332-2330	I	1750-2000	1	75-<50	Weak I throughout day
Oct. 22	1332-2330	II	1356.3-1404	3	175-<50	Weak I during day
Oct. 23	1331-2330					Weak I throughout day 1836-1840: Drifting structure in noise storm, 200-140 Mc/s.
Oct. 24	1330-2329	I	2200-2329	1	200-100	
Oct. 25	1331-2330					Weak I during day
Oct. 26	1331-2330	I	1954-2330	1	240-<50	
Oct. 27	1332-2330					
Oct. 28	1331-2330					
Oct. 29	1331-2330					
Oct. 30	1331-2330	IIIG	2058-2059	1	200-100	
Oct. 31	1331-2330					

IVe

SOLAR RADIO EMISSION SPECTRAL OBSERVATIONS

NOVEMBER 1963

Fort Davis

50-320 Mc/s

1963	OBSERVING HOURS	IMPORTANT BURSTS			FREQUENCY RANGE MC	REMARKS
		TYPE	TIMES U.T	INT		
Nov. 1	1716-2340					Weak I during day
Nov. 2	1401-2340					
Nov. 3	1400-2340					
Nov. 4	1401-2340					
Nov. 5	1401-2340					
Nov. 6	1401-2340					
Nov. 7	1401-2335					
Nov. 8	1401-2335					
Nov. 9	1401-2335					
Nov. 10	1400-2335					
Nov. 11	1400-2335					
Nov. 12	1401-2335					
Nov. 13	1400-2335					
Nov. 14	1401-2335					
Nov. 15	1400-2335					
Nov. 16	1400-2335					Weak I with continuum background 100-<50 Mc/s throughout day
Nov. 17	1401-2335					
Nov. 18	1400-2335					
Nov. 19	1400-2335					
Nov. 20	1400-2335					Weak I with continuum background 100-<50 Mc/s throughout day
Nov. 21	1400-2335					
Nov. 22	1401-2335					
Nov. 23	1400-2335					
Nov. 24	1400-2335	I IIIG	1514-2330 1557-1558	2 2	100-<50 280-<50	1514-2330: Noise storm has continuum background
Nov. 25	1401-2335	I	1640-2330	1	90-<50	1640-2330: Noise storm has continuum background
Nov. 26	1400-2335					
Nov. 27	1400-2335	I	1614-2100	2	90-<50	1614-2100: Noise storm has strong continuum background
Nov. 28	1400-2335					Weak I with continuum background 100-<50 Mc/s throughout day
Nov. 29	1400-2335					
Nov. 30	1400-2335					

COMMENCE - STANDARD - BOARD

SOLAR RADIO EMISSION SPECTRAL OBSERVATIONS

IVf

DECEMBER 1963

Fort Davis

50-320 Mc s

1963 <small>VOLUME NO. 10</small>	OBSERVING HOURS	IMPORTANT BURSTS			FREQUENCY RANGE MC	REMARKS
		TYPE	TIMES U T	INT		
Dec. 1	1400-2335					Weak I during day
Dec. 2	1400-2335					
Dec. 3	1400-2335					
Dec. 4	1400-2335					Weak I during day
Dec. 5	1400-2335					
Dec. 6	1400-2335					
Dec. 7	1400-2335					
Dec. 8	1400-2335					
Dec. 9	1400-2335					
Dec. 10	1400-2335					
Dec. 11	1400-2340					
Dec. 12	1400-2340					
Dec. 13	1400-2340					
Dec. 14	1400-2340					
Dec. 15	1415-2340					
Dec. 16	1415-2340					
Dec. 17	1415-2340					
Dec. 18	1415-2340					
Dec. 19	1415-2340					
Dec. 20	1415-2340					
Dec. 21	1415-2345					
Dec. 22	1415-2114					
Dec. 23	1519-2345					
Dec. 24	1415-2345					
Dec. 25	1415-2345					
Dec. 26	1415-2345					
Dec. 27	1415-2345					
Dec. 28	1415-2345					
Dec. 29	1415-2345					
Dec. 30	1415-2350					
Dec. 31	1415-2350					

SOLAR RADIO EMISSION SPECTRAL OBSERVATIONS

JANUARY 1964

High Altitude Observatory
Boulder

7.6-41 Mc/s

Date JAN. 1964	Bursts			Frequency Range (Mc/s)	Date JAN. 1964	Bursts			Frequency Range (Mc/s)
	Type	Time (U.T.)	Inten- sity			Type	Time (U.T.)	Inten- sity	
1 Jan	No Observ.	1500-2400			Cont				
2	III	1941.50-1941.75	1-	19-41	24 Jan	III	1836-1836.25	1-	24-41
	III	1946-1946.25	1-	19-41		III	2133-2133.50	1-	24-33
	III	1947.50-1947.75	1-	19-41		III	2222-2222.25	1-	23-41
	III	1951.50-1951.75	1-	19-41	25	III	1924.50-1924.75	1-	18-42
						III	1942-1942.25	1-	32-42
	III	2007.50-2007.75	1-	23-41		III	2052-2052.50	1-	33-42
13	III	1608-1608.25	1-	32-41		III	2134.50-2134.75	1-	30-42
	III	1613.50-1613.75	1-	23-41	26	continuum	1530-1737	1-	19-41
	III	1614-1614.50	1-	20-41	27	III	1756.25-1756.50	1-	19-42
14	III	2054.25-2054.50	1-	19-41		III	1857.75-1858	1-	21-28
16	III	1611-1611.50	1-	21-41		III	2121.75-2122	1-	21-42
18	III	1723-1723.75	2	22-41		III	2222.50-2222.75	1-	20-42
19	III	1756.50-1756.75	1-	23-41		III	2248.50-2248.75	1-	20-42
20	III	1727-1727.50	1	12-41	29	III	1536.75-1537.25	1-	21-31
	III	1728-1728.25	1-	15-41		III	1615.25-1615.50	1-	22-42
	III	1802.25-1802.75	1	15-41		III	1703.75-1704	1-	20-42
	III	1815.25-1815.50	1-	19-33		III	1730.50-1731	1	18-42
	III	1843-1843.50	1-	23-41		III	1732.25-1733.75	1	20-42
	III	2051.25-2051.50	1-	20-41		III	1734.25-1735.25	1+	12-42
	III	2244.50-2245	1-	19-41		III	1736-1736.50	1	21-41
23	III	1921.25-1921.50	1-	22-41		III	1737.25-1737.50	1-	19-42
	III	1922-1922.25	1-	33-41		III	1856.50-1856.75	1-	21-28
	III	1937.25-1937.50	1-	24-41		III	1900.25-1900.50	1-	20-42
	III	1938.25-1938.50	1-	18-41		III	1911.25-1911.50	1-	29-42
	III	1946.75-1947	1-	18-28		III	1924.75-1925	1-	20-42
24	III	1738.25-1738.50	1-	22-34	30	III	1549.50-1550	2	20-42
	III	1748-1748.25	1-	18-30		III	2112.75-2113	1-	21-42
	III	1755.75-1756	1-	21-28		III	2114-2115	1	19-42
	III	1758-1758.25	1-	26-34		III	2239.25-2240	1-	21-42
	III	1828.25-1828.50	1-	21-41					

COMMERCE - STANDARDS - BOULDER

Starting with January 1964, the Boulder spectrographic data times are given in hours, minutes and decimal fractions of a minute. Prior to January 1964, they were reported in hours, minutes and a decimal which was actually the number of seconds beyond the tabulated minute.

SOLAR RADIO EMISSION SPECTROHELIOGRAMS

JANUARY 1964

STANFORD

9.1 cm

SOLAR RADIO EMISSION SPECTROHELIOGRAMS

JANUARY 1961

STANFORD

9.1 cm

1964 JANUARY 12

SOLAR RADIO EMISSION SPECTROHELIOGRAMS

JANUARY 1961

STANFORD

9.1 cm

SOLAR RADIO EMISSION SPECTROHELIOGRAMS

STANFORD

JANUARY 1964

9.1 cm

SOLAR RADIO EMISSION SPECTROHELIOGRAMS

JANUARY 1961

STANFORD

9.1 cm

SOLAR RADIO EMISSION SPECTROHELIOGRAMS

JANUARY 1964

STANFORD

COSMIC RAY INDICES
(Climax Neutron Monitor)

Va

IGC Station B 305

SEPTEMBER 1963
REVISED

Sept. 1963	Daily average counts/hr*	Sept. 1963	Daily average counts/hr*
27	3077.1 #	29	3100.2
28	3078.5 +16	30	3148.8 +30

COMMERCE - STANDARDS - BOULDER

* Scaling Factor 128.

+ Number of Section Hours.

A-section estimated from average of immediate
surrounding A/B daily ratios.

NOVEMBER 1963

Nov. 1963	Daily average counts/hr*	Nov. 1963	Daily average counts/hr*
1	3122.0	16	3232.1
2	3161.0	17	3194.3
3	3192.5	18	3188.0
4	3199.4 +34	19	3169.6
5	3212.9 +16	20	3171.8
6	3191.3	21	3187.2
7	3219.2	22	3199.3
8	3216.9	23	3202.3
9	3202.6	24	3227.9
10	3188.7	25	3218.7 +38
11	3194.6 +38	26	3207.0 +10
12	3207.2	27	3196.1
13	3217.1	28	3198.1 +34
14	3225.6	29	3200.6 #
15	3211.1	30	3206.9 #

COMMERCE - STANDARDS - BOULDER

* Scaling Factor 128.

+ Number of Section Hours.

B-section estimated from average of immediate
surrounding A/B daily ratios.

COSMIC RAY INDICES

(Climax Neutron Monitor)

IGC Station B 305

DECEMBER 1963

Dec. 1963	Daily average counts/hr*	Dec. 1964	Daily average counts/hr*
1	3219.1	16	3220.7
2	3202.8 +18	17	3227.7
3	3180.3 +16	18	3219.7
4	3161.7	19	3230.2
5	3149.6	20	3228.4
6	3140.1	21	3233.3
7	3148.5	22	3259.8 +12
8	3171.9	23	3221.0
9	3189.3	24	3223.8
10	3210.3	25	3236.8
11	3221.2	26	3247.4
12	3227.2	27	3241.7
13	3243.4	28	3228.8
14	3238.1	29	3230.3
15	3216.0	30	3219.8
		31	3232.9

COMMERCE - STANDARDS - BOULDER

* Scaling Factor 128.

+ Number of Section Hours.

COSMIC RAY INDICES (Pressure Corrected Hourly Totals)

GEOMAGNETIC ACTIVITY INDICES

DECEMBER 1963

Dec. 1963	C	Values Kp								Sum	Ap	Final Selected Days	
		Three hour Gr. interval											
		1	2	3	4	5	6	7	8				
1	0.2	1+	1-	1o	1-	1-	2+	1o	2+	10o	5	Five Quiet	
2	0.9	2o	3-	2+	1+	3+	3+	3-	3o	21-	12		
3	1.4	4-	4+	6-	4+	5-	4o	4+	5-	36-	36		
4	1.2	3+	4+	4o	3-	4-	4-	4-	5o	30+	25		10
5	1.3	5-	4o	3o	3+	4+	4o	5-	4o	32o	28		11
6	1.2	4-	4o	4-	3-	4+	4o	4-	4-	30-	23	18	
7	0.8	3+	3o	3o	3o	4-	3o	3-	2o	24-	15	25	
8	0.8	3-	4-	3+	3-	3+	3o	3-	2o	23+	14	31	
9	0.3	1o	2o	3-	3o	3-	2o	0+	0o	14-	7		
10	0.0	0o	0o	0+	0o	0o	0o	0o	0o	0+	0		
11	0.0	0o	1-	0o	0+	1-	0+	0+	0+	3-	2	Five Disturbed	
12	0.1	1o	0+	0+	1-	0+	0o	1-	3-	6o	4		
13	0.3	3o	3+	1o	1+	1o	1-	2-	1+	13+	8		
14	0.7	1o	1+	2-	1+	3+	4-	3o	3o	18+	11		3
15	0.3	2o	2-	2+	2+	2-	2+	2o	1o	15+	7		4
16	0.3	3-	2-	1-	1o	1+	3-	1+	2-	13o	7	5	
17	0.1	2+	0o	1o	0o	0+	1o	1+	1o	7o	4	6	
18	0.0	1-	0o	1-	1o	0+	0o	0o	1-	3+	2	20	
19	0.3	0o	0o	0o	0o	1-	2-	1+	4-	7+	4		
20	1.2	3+	3+	5-	3o	3+	3-	4o	3o	27+	20		
21	0.8	1o	1+	3-	2-	2+	3+	2-	4o	18o	11	Ten Quiet	
22	0.8	2-	3-	3o	2+	4-	2o	3+	3-	21+	13		
23	0.9	1+	1+	4-	3+	0+	3+	3+	3+	20o	13		
24	0.6	3+	2-	1-	0+	2o	3o	3o	3-	17-	10		1
25	0.0	0o	0o	1o	3-	1-	0+	0+	0o	5o	3		10
26	0.1	0+	2o	1-	1o	1-	1-	1-	2-	8-	4	11	
27	0.1	1+	1+	2+	0+	2-	1-	1-	0+	9-	4	12	
28	0.7	2-	2-	3+	2-	1+	2o	4-	3+	19-	11	17	
29	1.0	3o	2o	2o	4o	4-	4-	3+	2+	24o	16	18	
30	0.3	2+	1+	0+	1-	2o	2o	1-	2-	11o	5	25	
31	0.1	1o	0+	1-	1-	1-	0+	0o	1+	5o	3	26	
												27	
												31	
Mean:	0.53									Mean:	11		

DAYS IN SOLAR ROTATION INTERVAL

ROT. NR.

1782

Oct

1783

Nov

1784

Nov

1785

Dec

1786

Jan

1787

▲ = sudden commencement

PLANETARY MAGNETIC
THREE-HOUR-RANGE INDICES
Kp till 1964 January 31
(Ks from Wingst and Gottingen till Febr. 13)

J.B.
COMMENCE - STANDARDS - BOULDER

CRPL RADIO PROPAGATION QUALITY FIGURES AND FORECASTS

DECEMBER 1963

NORTH ATLANTIC

NORTH PACIFIC

[illegible]

NORTH ATLANTIC

DECEMBER 1963

— Short-term forecast

| Range of reports

o Quality figure

Outcome of advance forecasts--final estimates (1 to 7 days ahead)

COMMERCE - STANDARDS - BOULDER

NORTH ATLANTIC

NORTH PACIFIC

COMMERCE - STANDARDS - BOULDER

DECEMBER 1963

DECEMBER 1963

Adapted from Observations by Deutsches Bundespost

IQSY ALERT PERIODS
INTERNATIONAL URSIGRAM
AND WORLD DAYS SERVICE

JANUARY 1961

Jan. 1964	TIME OF ISSUE, UT	ADVANCE GEOPHYSICAL ALERT	WORLDWIDE GEOPHYSICAL ALERT			
			NO.	TYPE	TIMING	ELABORATION
1	0400	Ft. Belvoir, Magnetic Storm Aurora Probable 02/03Z	25	"IQSY FORMALLY BEGINS TODAY"		
2	1357					
3	0400		26	Magnetic Storm	Exists	Aurora Probable
16	1935	Ft. Belvoir, Magnetic Storm 16/09Z				
19	0400		27	Solar Activity	Exists	East Limb
20	0400		28	Solar Activity	Exists	
21	0400		29	Solar Activity	Exists	
26	0400		30	Magnetic Storm Cosmic Event**	Expected Exists	Polar Cap Absorption
26	1648	Sac Peak, Solar Flare 26/1411Z				
27	0400		31	Magnetic Storm Solar Activity	Expected Exists	
28	0400		32	Magnetic Storm	Expected	
29	0400		33	Magnetic Storm Solar Activity	Expected Exists	
31	1929	Ft. Belvoir, Magnetic Storm 31/08XXZ				

COMMERCE - STANDARDS BOWLDER

Note: On dates not listed above the World-Wide Alert message was "IQSY GEOALERT NIL".

** A special message was sent January 30 to direct (not WMO) recipients of GEOALERT messages advising them to disregard this cosmic event report.