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ENVIRONMENTAL DATA SERVICE
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Solar - Geophysical Data

NO. 404 APRIL 1978

Part I (Prompt Reports)

DATA FOR
MARCH 1978
FEBRUARY 1978

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

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Solar-Geophysical Data, 390 Part I (or Part II), pages, February 1977, U.S. Department of Commerce, (Boulder, Colorado, U.S.A. 80303).

SOLAR-GEOPHYSICAL DATA

No. 404

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Director
Solar-Terrestrial Data Services Division

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SGD 404 Part I (Prompt)

MARCH 1978 DATA

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ALERT PERIODS

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE

MARCH 1978

PRESTO MESSAGES (the RAPID report of major events).

BOULDER 09/1905Z SOFLARE M1 S35E90 09/1842Z BRIGHT EJECTA BEHIND LIMB. TENFLARE 480 F.U. 09/1941Z 16 MINUTES DURATION.

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	Active Regions: No. of Flares Total	Active Regions: No. of Flares M	Active Regions: No. of Flares X	Outstanding events	Forecasts: Date	Forecasts: Location Lat-Long	Forecasts: Desc*	Alert Situations
060	1	28	178	138	28	N20W61	2	0	0		28	N20W61	Q	SOLNIL MAGALERT MINOR 01
						S20W22	0	0	0			S20W22	Q	
						N38W28	2	0	0			N38W28	Q	
						S23W00	0	0	0			S23W00	Q	
						S24E23	0	0	0			S24E23	Q	
						N20W16	0	0	0			N20W16	Q	
						N23W51	0	0	0			N23W51	Q	
						N13W04	0	0	0			N13W04	Q	
						S26E09	0	0	0			S26E09	Q	
061	2	1	190	139	20	N19W79	0	0	0		1	N19W79	Q	SOLQUIET MAGALERT MINOR 02
						S20W35	0	0	0			S20W35	Q	
						N38W40	0	0	0			N38W40	Q	
						S22E11	0	0	0			S22E11	Q	
						S24E12	0	0	0			S24E12	Q	
						N20E03	0	0	0			N20E03	Q	
						N23W67	0	0	0			N23W67	Q	
						S26W00	0	0	0			S26W00	Q	
						N20E69	0	0	0			N20E69	E	
						N17E74	0	0	0			N17E74	E	
062	3	2	250	144	22	N21W89	2	0	0		2	N21W89	Q	SOLALERT 03/06 MAGNIL
						S19W47	1	0	0			S19W47	Q	
						N38W53	17	0	0			N38W53	E	
						S22W23	0	0	0			S22W23	Q	
						S23W00	1	0	0			S23W00	Q	
						N19W09	0	0	0			N19W09	Q	
						S28W14	0	0	0			S28W14	Q	
						N21E57	3	0	0			N21E57	E	
						N16E60	3	0	0			N16E60	E	
						S18W31	0	0	0			S18W31	Q	
						N30E70	0	0	0			N30E70	Q	
063	4	3	213	149	12	S16W65	0	0	0		3	S16W65	Q	SOLALERT 04/06 MAGQUIET
						N38W63	2	0	0			N38W63	E	
						S17W38	0	0	0			S17W38	Q	
						S24W15	0	0	0			S24W15	Q	
						N19W21	0	0	0			N19W21	Q	
						S28W31	0	0	0			S28W31	Q	
						N17E45	1	0	0			N17E45	E	
						N11E45	0	0	0			N11E45	Q	
						S27E28	0	0	0			S27E28	Q	
						N29E56	1	0	0			N29E56	Q	
064	5	4	195	151	02	S17W76	2	0	0		4	S17W76	E	SOLALERT 05/06 MAGQUIET
						N36W78	4	0	0			N36W78	E	
						S18W48	0	0	0			S18W48	Q	
						S25W26	0	0	0			S25W26	Q	
						N18W34	0	0	0			N18W34	Q	
						N20E31	2	2	0			N20E31	E	
						N15E31	0	0	0			N15E31	Q	
						S25E16	0	0	0			S25E16	Q	
						N29E44	1	0	0			N29E44	Q	
						N16E70	0	0	0			N16E70	Q	
065	6	5	167	157	07	S20W85	1	0	0		5	S20W85	Q	SOLALERT MAGQUIET
						S18W63	1	0	0			S18W63	Q	
						S25W37	0	0	0			S25W37	Q	
						N18W48	0	0	0			N18W48	Q	
						N20E17	1	0	0			N20E17	E	
						N15E20	0	0	0			N15E20	E	
						S23E03	0	0	0			S23E03	Q	
						N28E29	1	0	0			N28E29	Q	
						N17E59	1	0	0			N17E59	E	
066	7	6	109	165	06	N17W58	1	0	0		6	N17W58	Q	SOLALERT MAGQUIET
						N21E06	1	1	0			N21E06	E	
						N13E04	3	0	0			N13E04	Q	
						S23W07	0	0	0			S23W07	Q	
						N27E18	0	0	0			N27E18	Q	
						N17E45	0	0	0			N17E45	Q	
067	8	7	148	168	06	N19W71	0	0	0		7	N19W71	Q	SOLNIL MAGQUIET
						S23W78	0	0	0			S23W78	Q	
						N21W05	0	0	0			N21W05	E	
						N13W09	0	0	0			N13W09	Q	
						N26E04	0	0	0			N26E04	Q	
						N16E34	1	0	0			N16E34	Q	
						N15E72	0	0	0			N15E72	E	
068	9	8	173	171	12	N19W85	0	0	0		8	N19W85	Q	SOLQUIET MAGQUIET
						N21W21	0	0	0			N21W21	Q	
						N21W22	1	0	0			N21W22	Q	
						N26W10	0	0	0			N26W10	Q	
						N16E20	0	0	0			N16E20	Q	
						N15E59	0	0	0			N15E59	Q	
						S03E65	0	0	0			S03E65	Q	

ALERT PERIODS

INTERNATIONAL URSIGRAM
AND WORLD DAYS SERVICE

MARCH 1978

SUMMARY OF THE GEOALERT WWA MESSAGES

Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	No. of Flares: Total	M	X	Outstanding events	Forecasts: Date	Location Lat-Long	Desc*	Alert Situations
069	10	9	143	186	12	N21W31	2	0	0	SOFLARE M1 S35E90	9	N21W31	Q	SOLQUIET MAGQUIET
						N13W35	0	0	0	09/1842Z BRIGHT		N13W35	Q	
						N27W22	0	0	0	EJECTA BEHIND LIMB		N27W22	Q	
						N16E06	2	0	0	TENFLARE 480 F.U.		N16E06	Q	
						N16E46	1	0	0	09/1941Z 16 MINUTES		N16E46	Q	
						S04E50	0	0	0	DURATION		S04E50	Q	
						S29E76	1	0	0			S29E76	Q	
070	11	10	142	180	13	N21W48	0	0	0		10	N21W48	Q	SOLQUIET MAGQUIET
						N14W51	0	0	0			N14W51	Q	
						N27W35	2	0	0			N27W35	E	
						N15W04	2	0	0			N15W04	E	
						N16E35	2	0	0			N16E35	E	
						S04E36	0	0	0			S04E36	Q	
						S30E68	3	0	0			S30E68	E	
						S33E82	0	0	0			S33E82	E	
071	12	11	134	177	07	N21W60	2	0	0		11	N21W60	E	SOLQUIET MAGQUIET
						N14W66	0	0	0			N14W66	Q	
						N27W48	2	0	0			N27W48	Q	
						N16W20	1	0	0			N16W20	E	
						N16E22	0	0	0			N16E22	E	
						S03E24	0	0	0			S03E24	Q	
						S30E55	4	0	0			S30E55	E	
						S33E67	1	0	0			S33E67	E	
072	13	12	138	172	02	N18W74	2	0	0		12	N18W74	Q	SOLQUIET MAGQUIET
						N26W58	0	0	0			N26W58	Q	
						N15W32	1	0	0			N15W32	Q	
						N16E11	2	0	0			N16E11	E	
						S02E09	0	0	0			S02E09	Q	
						S28E42	0	0	0			S28E42	E	
						S32E53	7	0	0			S32E53	E	
						S29E26	0	0	0			S29E26	Q	
073	14	13	129	162	08	N28W73	2	0	0		13	N28W73	Q	SOLQUIET MAGQUIET
						N18W46	1	0	0			N18W46	Q	
						N15W02	1	0	0			N15W02	E	
						S03W04	0	0	0			S03W04	Q	
						S30E29	0	0	0			S30E29	E	
						S32E40	1	0	0			S32E40	E	
						S29E13	0	0	0			S29E13	Q	
074	15	14	141	162	10	N14W57	0	0	0		14	N14W57	Q	SOLQUIET MAGQUIET STRATWARM ALERT
						N15W15	1	0	0			N15W15	E	/WEDNESDAY/ STRATWARM EXISTS ARCTIC
						S02W17	0	0	0			S02W17	Q	REGION. WARM ANTICYCLONE PROGRESS-
						S28E17	2	0	0			S28E17	E	ING OVER POLE IN MIDSTRATOSPHERE.
						S32E29	0	0	0			S32E29	Q	SPRINGTIME REVERSAL EXPECTED AT ALL
						S29E03	0	0	0			S29E03	Q	STRATOSPHERIC LEVELS DURING NEXT
						N32E65	0	0	0			N32E65	Q	FEW WEEKS.
						N18E71	8	0	0			N18E71	E	
075	16	15	118	156	12	N13W69	0	0	0		15	N13W69	Q	SOLQUIET MAGQUIET
						N15W30	1	0	0			N15W30	Q	
						S02W31	0	0	0			S02W31	Q	
						S28E04	2	0	0			S28E04	E	
						S33E16	0	0	0			S33E16	Q	
						N33E52	0	0	0			N33E52	Q	
						N19E56	3	0	0			N19E56	E	
076	17	16	118	138	14	N12W80	0	0	0		16	N12W80	Q	SOLQUIET MAGQUIET
						N16W43	0	0	0			N16W43	Q	
						S02W46	0	0	0			S02W46	Q	
						S30W05	2	0	0			S30W05	E	
						S32E05	0	0	0			S32E05	Q	
						N32E40	0	0	0			N32E40	Q	
						N20E45	0	0	0			N20E45	Q	
077	18	17	104	136	16	N15W55	0	0	0		17	N15W55	Q	SOLQUIET MAGQUIET
						S01W59	0	0	0			S01W59	Q	
						S32W08	0	0	0			S32W08	Q	
						N32E28	0	0	0			N32E28	Q	
						N18E30	1	0	0			N18E30	Q	
						N20E64	0	0	0			N20E64	Q	
						N28W37	0	0	0			N28W37	Q	
078	19	18	112	134	15	S03W74	0	0	0		18	S03W74	Q	SOLQUIET MAGQUIET
						N15W68	1	0	0			N15W68	Q	
						S33W25	0	0	0			S33W25	Q	
						N32E17	0	0	0			N32E17	Q	
						N19E21	5	0	0			N19E21	Q	
						S33E32	0	0	0			S33E32	Q	
						N20E53	0	0	0			N20E53	Q	
079	20	19	119	131	12	N24W82	1	0	0		19	N24W82	Q	SOLQUIET MAGQUIET
						S33W36	1	0	0			S33W36	Q	
						N32E04	0	0	0			N32E04	Q	
						N19E07	0	0	0			N19E07	Q	
						N21E41	1	0	0			N21E41	Q	
						S33E19	0	0	0			S33E19	Q	

ALERT PERIODS

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Message serial number	Date of issue	Date of observation	Wolf number	10 cm solar flux	A index	Active Regions: Location Lat-Long	Active Regions: No. of Flares Total	Active Regions: No. of Flares M	Active Regions: No. of Flares X	Outstanding events	Forecasts: Date	Forecasts: Location Lat-Long	Forecasts: Desc*	Alert Situations
080	21	20	79	126	05	S32W49	0	0	0		20	S32W49	Q	SOLQUIET MAGQUIET
						N30W06	0	0	0			N30W06	Q	
						N19W02	0	0	0			N19W02	Q	
						N19E28	0	0	0			N19E28	Q	
						S22E74	0	0	0			S22E74	Q	
081	22	21	114	119	08	S32W63	0	0	0		21	S32W63	Q	SOLQUIET MAGQUIET
						N31W18	0	0	0			N31W18	Q	
						N20W16	3	0	0			N20W16	Q	
						N18E16	0	0	0			N18E16	Q	
						S23E63	0	0	0			S23E63	Q	
						N13E67	4	0	0			N13E67	Q	
						N11W12	0	0	0			N11W12	Q	
						N37E73	0	0	0			N37E73	Q	
082	23	22	138	118	07	S23W76	1	0	0		22	S23W76	Q	SOLQUIET MAGQUIET
						N31W30	0	0	0			N31W30	Q	
						N20W29	3	0	0			N20W29	Q	
						N19E04	0	0	0			N19E04	Q	
						S24E52	0	0	0			S24E52	Q	
						N13E54	0	0	0			N13E54	Q	
						N36E57	0	0	0			N36E57	Q	
						S41W46	2	0	0			S41W46	Q	
						S32E09	0	0	0			S32E09	Q	
						N19W50	0	0	0			N19W50	Q	
083	24	23	157	117	14	S33W88	1	0	0		23	S33W88	Q	SOLQUIET MAGQUIET
						N17W63	0	0	0			N17W63	Q	
						S42W57	0	0	0			S42W57	Q	
						N31W44	0	0	0			N31W44	Q	
						N20W43	0	0	0			N20W43	Q	
						N19W10	0	0	0			N19W10	Q	
						S32W01	0	0	0			S32W01	Q	
						S22E38	0	0	0			S22E38	Q	
						N15E40	0	0	0			N15E40	Q	
						N37E42	0	0	0			N37E42	Q	
						S28E79	0	0	0			S28E79	Q	
084	25	24	160	118	04	N17W75	0	0	0		24	N17W75	Q	SOLQUIET MAGQUIET
						S40W40	0	0	0			S40W40	Q	
						N20W58	6	0	0			N20W58	Q	
						N31W56	0	0	0			N31W56	Q	
						N19W22	0	0	0			N19W22	Q	
						S32W13	0	0	0			S32W13	Q	
						S31E13	0	0	0			S31E13	Q	
						S22E24	0	0	0			S22E24	Q	
						N14E40	0	0	0			N14E40	Q	
						N38E34	1	0	0			N38E34	Q	
						S24E60	0	0	0			S24E60	Q	
085	26	25	156	119	04	S42W81	1	0	0		25	S42W81	Q	SOLQUIET MAGQUIET
						N29W71	0	0	0			N28W71	Q	
						N18W71	1	0	0			N18W71	Q	
						N19W36	0	0	0			N19W36	Q	
						S31W07	0	0	0			S31W07	Q	
						S31E02	2	0	0			S31E02	Q	
						S22E12	0	0	0			S22E12	Q	
						N16E17	0	0	0			N16E17	Q	
						N37E20	1	0	0			N37E20	Q	
086	27	26	70	113	27	S21W03	0	0	0		26	S21W03	Q	SOLQUIET MAGALERT 27/29
						N15E02	0	0	0			N15E02	Q	
						N37E08	0	0	0			N37E08	Q	
						S32W10	3	0	0			S32W10	Q	
087	28	27	85	115	40	N15W17	1	0	0	MAGSTORM (GRADUAL)	27	N15W17	Q	SOLQUIET MAGALERT 28/29
						N38W00	0	0	0	BEGAN 26/0013Z		N38W00	Q	
						S25E18	0	0	0			S25E18	Q	
						S31W25	0	0	0			S31W25	Q	
						S24E09	0	0	0			S24E09	Q	
						S17E07	0	0	0			S17E07	Q	
088	29	28	102	113	22	N16W30	1	0	0		28	N16W30	Q	SOLQUIET MAGNIL
						N37W14	0	0	0			N37W14	Q	
						S25E07	0	0	0			S25E07	Q	
						S32W37	1	0	0			S32W37	Q	
						S27W04	0	0	0			S27W04	Q	
						S18W05	0	0	0			S18W05	Q	
						S30E17	0	0	0			S30E17	Q	
089	30	29	120	111	12	S21W39	0	0	0		29	S21W39	Q	SOLQUIET MAGQUIET
						N14W43	0	0	0			N14W43	Q	
						S25W06	0	0	0			S25W06	Q	
						S30W53	0	0	0			S30W53	Q	
						S28W14	0	0	0			S28W14	Q	
						S18W20	0	0	0			S18W20	Q	
						S32E06	0	0	0			S32E06	Q	
						N20E55	0	0	0			N20E55	Q	
						S15E71	0	0	0			S15E71	Q	
						S17E62	0	0	0			S17E62	Q	

ALERT PERIODS

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090	31	30	122	117	13	N14W55	0	0	0		30	N14W55	Q	SOLQUIET MAGQUIET
						S24W17	0	0	0			S24W17	Q	
						S30W64	0	0	0			S30W64	Q	
						S20W33	0	0	0			S20W33	Q	
						N24E39	0	0	0			N24E39	Q	
						S14E59	0	0	0			S14E59	Q	
						S17E49	0	0	0			S17E49	Q	
						N12W11	0	0	0			N12W11	Q	
						N32E64	0	0	0			N32E64	Q	
091	1	31	65	125	05	S26W80	0	0	0		31	S26W80	Q	SOLQUIET MAGQUIET
						S17E47	0	0	0			S17E47	Q	
						S19E39	0	0	0			S19E39	Q	
						N28E53	1	0	0			N28E53	Q	
						N21E72	0	0	0			N21E72	Q	

* Q=Quiet E=Eruptive A=Active P=Proton C=Caution D=Doubtful O.G.=Other Groups MF=Major Flare

RELATIVE SUNSPOT NUMBERS

ZURICH, R_z

	1977 FINAL												1978 PROVISIONAL		
DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
1	20	15	0	7	15	44	42	17	22	43	44	20	84	128	93
2	32	19	8	11	14	43	45	15	29	37	40	20	88	120	83
3	25	19	8	10	22	43	42	24	29	47	25	31	102	131	95
4	25	16	8	7	23	49	39	19	25	47	22	47	102	138	103
5	24	18	8	7	18	40	40	23	20	48	25	58	73	137	76
6	13	7	9	8	16	39	40	26	26	55	27	58	69	129	67
7	0	7	8	7	12	41	25	28	25	57	34	55	42	121	90
8	0	26	20	0	19	38	20	25	18	52	27	45	36	89	99
9	0	21	20	0	25	33	17	30	30	47	31	58	35	94	85
10	0	25	19	0	29	29	23	25	40	38	25	75	15	96	92
11	14	28	19	8	34	27	9	23	45	28	26	71	18	95	85
12	22	48	14	12	35	22	8	29	51	33	27	62	26	92	78
13	23	68	8	16	26	20	10	40	48	53	28	44	26	93	65
14	22	61	7	22	33	25	7	40	47	48	31	37	36	82	62
15	24	45	0	29	26	8	0	42	53	54	39	41	30	59	72
16	18	49	0	31	25	8	0	38	56	53	49	39	23	64	70
17	30	47	8	32	20	8	0	36	53	51	51	29	24	56	66
18	26	37	0	29	12	21	0	40	60	50	54	33	14	55	72
19	7	25	0	22	0	33	7	35	59	54	52	40	8	53	64
20	0	14	0	12	11	21	8	33	60	54	38	23	7	52	51
21	15	9	0	20	14	28	8	33	58	42	32	23	20	63	77
22	24	9	10	19	7	40	23	38	42	35	28	17	30	74	82
23	34	9	9	18	7	57	30	15	41	30	24	23	43	69	85
24	35	8	7	8	7	60	38	19	48	29	18	31	37	78	82
25	20	8	14	0	0	74	42	25	46	28	10	35	32	94	70
26	14	8	8	14	7	71	42	34	49	30	9	41	47	86	53
27	0	0	9	8	13	74	37	38	54	38	14	50	69	79	50
28	13	0	16	11	16	65	26	36	61	37	9	45	79	88	49
29	11		16	10	20	50	16	40	64	42	10	58	90		48
30	8		8	9	30	45	10	36	60	45	23	64	104		44
31	10		8		40		8	31		52		67	118		70
MEAN	16.4	23.1	8.7	12.9	18.6	38.5	21.4	30.1	44.0	43.8	29.1	43.2	49.3	89.8	73.5

1977 yearly mean = 27.5

DAILY SOLAR FLUX AT 2800 MHz
OTTAWA ARO

FLUX ADJUSTED TO 1 A.U., S_a

	1977									1978		
DAY	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
1	74.8	77.2	88.9	102.0	83.0*	83.1	93.8*	94.4	88.4	126.9*	139.1	136.3
2	76.3	78.5	90.9*	100.7	82.8	84.2	93.2	93.6	91.2	133.9	152.6	141.1
3	76.6	81.9	93.0*	97.4	82.3	87.2	97.4	90.4	93.7	130.2	156.6*	146.6
4	76.8	81.4*	94.2	94.0	82.9*	84.2	98.8	89.4	95.9	124.8	154.0	148.4
5	75.5	79.6	90.2*	88.0*	86.4	85.6	104.0*	90.6	96.9	119.2	159.0	154.5
6	76.1	78.5	90.6	90.2	88.2	84.9	103.5	91.1	102.0*	118.7*	156.1	162.8
7	75.5*	77.1*	92.0	85.2	86.9	89.3	105.5	90.2	105.5	111.6	157.3	165.2
8	74.3	77.9	91.9*	82.1	85.1	91.6	103.8	90.3	106.7	102.8	157.0*	168.7
9	74.8	83.6	90.9	79.0	85.9	95.9	100.7	91.1	112.6*	97.0	155.2	183.7
10	76.5	80.8	89.2*	76.9	87.2	99.8	96.4	93.1	114.7	93.5	148.7	179.1
11	79.2	80.8	87.2	76.2	87.6	104.6	95.3	94.9	107.4	93.1	154.2	175.2
12	80.2	79.7	83.3	75.8	86.5	107.8	100.8	91.4	111.0	92.1	159.0	169.8
13	82.7	81.5	84.2	77.8	89.0	112.9	98.5	94.0	100.6	90.3	151.2	160.9
14	83.4	84.8	82.3	76.8	87.5	118.2	98.9	97.9	93.7*	88.6	148.4	160.5
15	86.8	85.0	82.3	76.0	86.9	120.7	98.2	97.9	92.5	89.6	136.8	154.2
16	83.7	85.1	81.4	76.9	87.3	120.4	96.8	95.9	92.5	86.4	130.2	143.3
17	83.6	84.1	82.4	76.5	87.1	120.6	94.9	100.4	91.1	83.8	125.9	135.4
18	80.8	82.9	84.3	76.9	88.6	120.5	95.4	102.0*	93.6	84.7	124.9	132.3
19	79.8*	82.1	85.2	76.9	87.0	104.5	105.0	99.2	91.0	85.4	119.1	128.1
20	80.4*	81.3	88.9	80.1	88.7	108.8	99.6*	95.7*	88.7	87.0	122.2	125.3
21	80.8	81.4	92.4	81.7	90.8	104.9*	98.6*	92.8	87.8	91.4	122.2	118.2
22	80.1	82.9	98.8*	83.1	89.6	102.4	93.9	89.3	89.9	96.9	127.7	117.0
23	77.5	82.4	99.4	85.0	86.0	99.3	87.3	88.0	91.2	99.6	131.8	116.4
24	76.5	79.2	107.4	84.0	86.0	100.6	88.3	86.7	93.9	100.4	135.6	117.5
25	76.4	77.4	113.8	86.0	87.7	98.8	88.1	84.7	96.3	103.3	139.3	118.2
26	75.4	76.8	120.7	86.0	86.4	99.4	88.6	84.1	99.3	112.7	134.8	112.5
27	74.9	77.9	115.9*	85.4	85.4	100.0	88.5	83.8	98.3	116.4	137.5	114.1
28	74.2	79.1	113.4	87.5	82.4	100.0	90.3*	85.6	98.9	127.7*	135.4	112.7
29	74.8	81.7	111.9	86.7	86.1	99.4	90.3	85.6	105.6*	132.2*		111.1
30	76.6	89.9	106.9	84.1	85.5	97.7	94.9	85.3	114.7	134.9		115.4*
31		92.0		80.4	84.7		95.9		120.2	133.3*		124.5
MEAN	78.2	81.4	94.5	83.7	86.4	100.9	96.3	91.6	98.9	106.1	141.8	140.3

* adjusted for burst

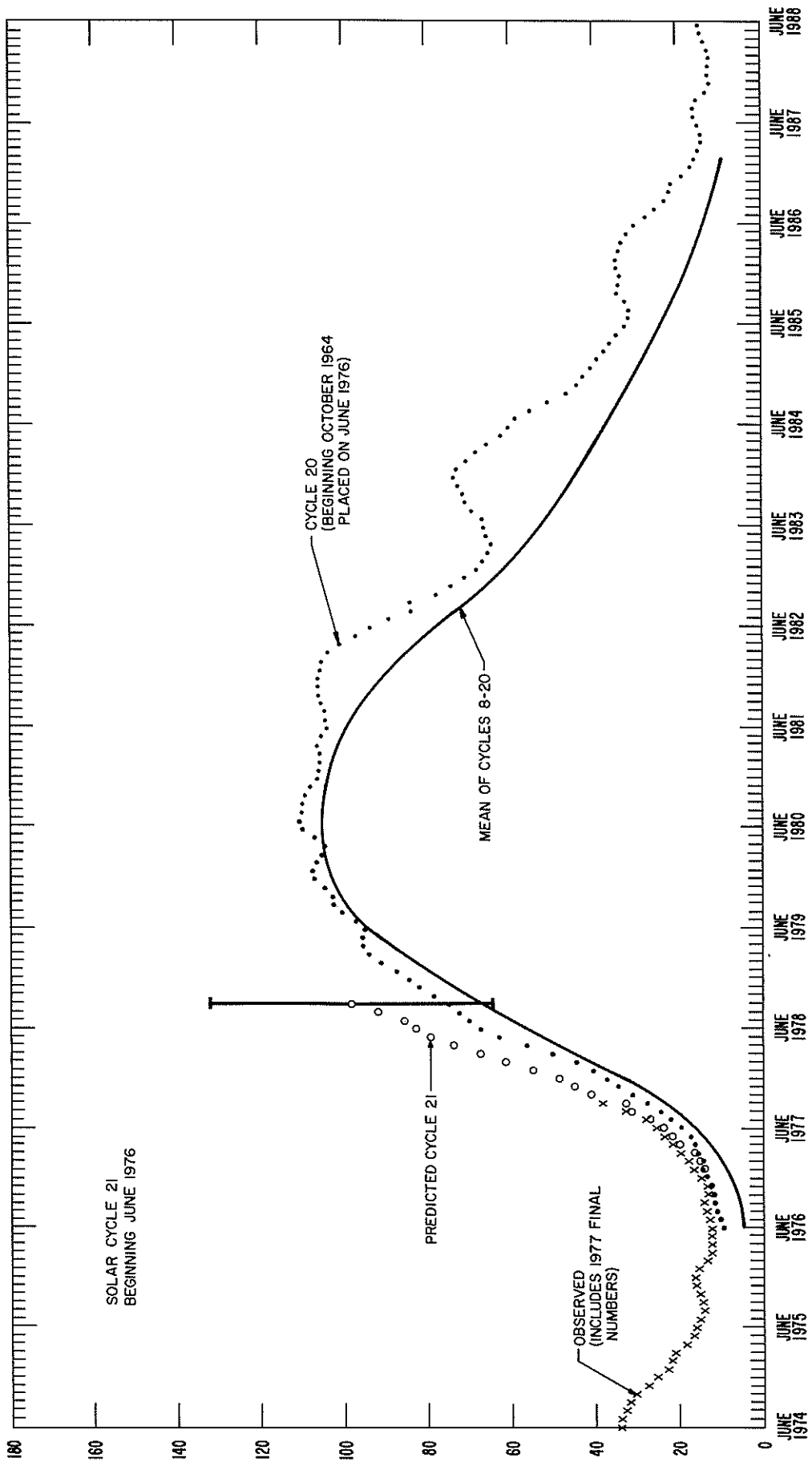
DAILY SOLAR INDICES

MARCH 1978

MAR 1978	YEAR DAY	BARTELS 27-DAY CYCLE NUMBER	SUNSPOT NUMBERS		OBSERVED FLUX OTTAWA 2800	SOLAR FLUX ADJUSTED TO 1 A.U.								
			R_Z	$R_{A'}$		AFGL 15400	AFGL 8800	AFGL 4995	OTTAWA 2800	AFGL 2695	AFGL 1415	AFGL 606	AFGL 410	AFGL 245
1	60	23	93	104	138.8	580	339	174	136.3	154.2	102.8	67.6	29.1	10.6
2	61	24	83	93	143.5	583	353	182	141.1	156.6	103.4	69.7	31.4	11.1
3	62	25	95	87	149.1	581	349	190	146.6	160.1	111.4	67.0	34.9	11.0
4	63	26	103	83	150.8	587	360	188	148.4	159.3	111.2	73.5	35.6	11.3
5	64	27	76	86	157.0	587	358	190	154.5	166.6	115.3	74.7	34.9	13.0
6	65	1	67	75	165.3	592	359	199	162.8	177.9	120.5	89.3	70.4	61.2
7	66	2	90	78	167.7	588	362	200	165.2	182.3	121.5	75.9	43.7	28.3
8	67	3	99	92	171.1	590	370	206	168.7	186.8	117.6	72.4	38.6	23.2
9	68	4	85	91	186.3	593	375	216	183.7	197.3	125.1	75.0	39.2	18.4
10	69	5	92	84	181.5	583	365	216	179.1	199.1	125.3	73.8	38.7	21.0
11	70	6	85	85	177.5	580	365	213	175.2	191.8	124.3	78.9	48.9	52.9
12	71	7	78	80	171.9	568	352	202	169.8	181.5	115.9	72.0	39.8	16.1
13	72	8	65	71	162.9	574	344	194	160.9	171.6	112.5	73.6	46.3	18.3
14	73	9	62	71	162.3	581	338	194	160.5	169.0	121.7	72.2	39.8	20.0
15	74	10	72	74	155.9	570	331	186	154.2	168.2	113.8	68.8	39.9	19.2
16	75	11	70	72	144.7	573	325	179	143.3	156.5	108.2	64.9	37.2	13.2
17	76	12	66	73	136.8	567	328	166	135.4	144.1	97.4	61.7	36.9	13.3
18	77	13	72	75	133.5	570	326	164	132.3	140.9	94.7	63.8	37.1	12.4
19	78	14	64	66	129.1	566	316	163	128.1	134.0	91.2		37.1	17.8
20	79	15	51	58	126.3	572	320	162	125.3	138.4	91.0	63.2	36.7	12.7
21	80	16	77	76	119.0	556	306	153	118.2	124.9	88.4	61.2	37.1	12.4
22	81	17	82	86	117.8	559	309	152	117.0	124.1	90.0	63.9	40.5	12.6
23	82	18	85	90	117.1	558	306	152	116.4	122.6	87.9	60.5	28.8	10.7
24	83	19	82	88	118.2	563	311	157	117.5	126.6	90.0	66.3	34.9	12.3
25	84	20	70	76	118.8	564	313	154	118.2	125.2	88.3	65.7	28.7	12.3
26	85	21	53	54	113.0	574	308	147	112.5	118.4	89.3	64.9	30.2	11.2
27	86	22	50	52	114.6	572	305	146	114.1	117.0	89.9	65.4	35.5	28.0
28	87	23	49	31	113.0	564	303	148	112.7	116.8	85.9	65.6	31.9	10.8
29	88	24	48	47	111.4	560	303	147	111.1	115.1	85.3	62.9	33.9	11.5
30	89	25	44	42	115.6*	565	312	152	115.4*	125.9	91.5	64.5	31.2	10.7
31	90	26	70	51	124.7	576		161	124.5	128.5	95.0	67.7	33.1	11.7
MEAN			73.5	73.9	141.8	574	334	176	140.3	151.0	103.4	68.9	37.5	17.7

* Adjusted for burst.

Note: Data gaps in AFGL Sagamore Hill are due to equipment problems.



OBSERVED AND PREDICTED SUNSPOT NUMBERS

SMOOTHED OBSERVED AND PREDICTED SUNSPOT NUMBERS
CYCLE 21

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1976	15.2	13.2	12.2	12.6	12.5	12.2	12.9	14.0	14.3	13.4	13.5	14.8
1977	16.7	18.1	20.0	22.2	24.2	26.3	28.8	33.0	38.5]	42.9 (2)	47.5 (5)	52.1 (8)
1978	57.3 (11)	63.0 (13)	68.5 (15)	74.3 (18)	80.6 (22)	86.3 (25)	90.8 (28)	94.6 (31)	98.4 (34)	102.1 (35)	106.9 (34)	113.3 (34)
1979	118.7 (33)	123.2 (34)	127.4 (36)	130.7 (37)	133.4 (38)	137.6 (41)	142.1 (42)	145.0 (44)	146.6 (46)	147.0 (49)	146.6 (52)	145.5 (54)
1980	143.7 (54)	142.1 (54)	141.4 (52)	141.5 (52)	140.6 (54)	137.4 (54)	134.1 (54)	131.3 (54)	129.8 (54)	129.0 (54)	127.6 (55)	126.4 (57)
1981	126.5 (59)	125.8 (59)	123.4 (57)	120.4 (55)	118.2 (54)	116.6 (53)	116.1 (51)	116.5 (49)	116.2 (48)	115.1 (48)	113.3 (45)	110.3 (43)
1982	106.9 (41)	103.7 (40)	101.3 (39)	99.6 (38)	97.4 (36)	94.5 (35)	90.3 (33)	85.8 (31)	81.9 (29)	77.6 (25)	74.5 (24)	71.2 (23)
1983	67.5 (22)	65.0 (22)	63.3 (23)	61.5 (23)	59.5 (23)	57.4 (23)	55.7 (24)	54.1 (26)	52.5 (27)	51.3 (29)	50.3 (30)	49.6 (30)
1984	48.4 (31)	46.5 (30)	43.8 (29)	40.5 (29)	38.0 (30)	36.7 (31)	35.5 (31)	33.7 (31)	32.2 (30)	31.3 (29)	30.3 (28)	28.9 (27)
1985	27.8 (27)	27.0 (26)	26.1 (26)	25.5 (26)	24.8 (26)	23.8 (24)	23.0 (23)	22.2 (22)	21.5 (22)	20.7 (23)	19.7 (24)	19.2 (24)
1986	19.1 (24)	18.7 (24)	18.2 (23)	17.3 (22)	16.3 (21)	15.3 (20)	14.5 (19)	14.0 (18)	13.6 (17)	13.2 (16)	13.0 (15)	12.7 (13)
1987	12.8 (11)	13.1 (11)	13.7 (11)	14.6 (11)	15.5 (12)							

The table gives observed Zürich smoothed sunspot numbers for Cycle 21 up to the one calculated from the latest observed data, marked by a vertical bar. They are based on final Zürich numbers through 1977 and provisional Zürich numbers thereafter. Some of these data after the June 1976 value will change slightly when final data for 1978 are received. The numbers after the vertical bar are predictions by the McNish-Lincoln method (see *Explanation of Data Reports*, February 1978). Shown in parentheses are the corresponding absolute values of the 90% confidence interval, an indication of the uncertainty above and below the predicted number.

The McNish-Lincoln method is very sensitive to the identification of a minimum epoch. In SGD 390-401 issues, the Cycle 21 predictions were based on March 1976 as the minimum epoch. Latest studies, including one published by Waldmeier, show that June 1976 is the more appropriate epoch of minimum. Thus, we have adopted a June 1976 mimimum.

*Prediction of Sunspot Maximum -- The McNish-Lincoln prediction method is recommended for predictions up to only one year ahead. From that point, the predictions regress rapidly towards the mean value. Combining this McNish-Lincoln prediction of sunspot maximum with the Ohl method (as done by Sargent, see *Explanation of Data Reports*, February 1978) indicates that the most probable value for sunspot maximum is 151 ± 38.

Hα SOLAR FLARES

MARCH 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE MAR	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
MCMA	01	1426	1432	1501	N18	E85	.999	15172	8.0	35	SF		C	1432			D
MCMA	01	1546	1548	1551	N37	W35	.814	15162	30.0	5	SN		C	1548	25	.5	D
MCMA	01	1816	1817	1825	S22	E16	.372	15170	3.0	9	SN		C	1817	50	.5	EH
MCMA	01	1855	1907	1912D	N19	E82	.996	15172	7.9	17D	SF		C	1907			E
MCMA	01	1948	1951	1958	N19	E80	.992	15172	7.8	10	SN		C	1951			D
MITK	02	0401	0404	0420	N22	E76	.984	15172	7.9	19	1N		C	0404	80		E
MCMA	02	1322E	1329	1358D	N35	W48	.877	15162	30.0	36D	1N		C	1329	100	2.7	F
MANI	02	2328	2330	2336	N34	W49	.879		30.3	8	SN		V		50		
MITK	03	0446	0449	0500	S23	W03	.289		3.0	14	SN		C	0449	90	1.0	
MONT	03	1132	1148	1226	S25	W04	.325		3.2	54	SN		C	1148	80		
CATA	03	1140	1140	1235	S27	W05	.249	15170	3.1	55	1B	2	C	1140	196	2.1	
MCMA	03	1925E		1959D	N18	E48	.802	15172	7.4	34D	SN		P	1925	80	1.4	E
MCMA	03	2103E		2111D	N36	W63	.954	15162	30.2	8D	SN		P	2106	25	.9	D
MITK	04	0046	0052	0114	N17	E43	.749	15172	7.3	28	1N		C	0052	220	3.4	E
MANI	04	0053	0055	0100D	N18	E44	.764	15172	7.3	7D	1N		V		180	2.8	F
MANI	04	0258E	0258U	0304D	N26	E49	.843	15172	7.8	6D	1N		P		200	3.6	F
CATA	04	1215	1225	1230D	N18	E39	.714	15172	7.4	15D	1B	2	P	1225	224	3.3	
WEND	04	1229E		1353	N17	E39	.708	15172	7.4	84D	1N		P		500	7.2	FT
MCMA	04	1306E		1430D	N18	E39	.714	15172	7.5	84D	1N		C	1322	135	2.0	F
MCMA	04	1310	1317	1329	N38	W72	.985	15162	30.1	19	SN		C	1317			D
MCMA	04	1320	1340	1430D	S18	W75	.960	15163	29.9	70D	SN		C	1340	30	1.2	D
MCMA	04	1540	1545	1555	N38	W70	.980	15162	30.4	15	SB		C	1545			DH
WEND	04	1546E		1553D	N37	W73	.986	15162	30.2	7D	1N		V		500	25.0	D
CATA	04	1550E	1550	1550D	N38	W66	.968		30.7		SB	1	P	1550	56		
MCMA	04	1618		1637	N38	W80	.998	15162	29.7	19	SF		C	1620			D
MCMA	04	1642E	1645	1648D	N38	W70	.980	15162	30.4	6D	SN		C	1645			D
MCMA	04	1743	1755	1826D	N18	E36	.683	15172	7.4	43D	SN		C	1755	40	.5	E
MITK	05	0532	0534	0538	N17	E27	.580		7.3	6	SN		C	0534	80	1.0	
MCMA	05	1248	1250	1252	N28	E33	.729	15172	8.0	4	SF		C	1250	25	.4	D
MCMA	05	1259	1300	1303	N24	E25	.628	15172	7.4	4	SN		C	1300	30	.5	D
MCMA	05	1430	1445	1520	N23	E28	.644	15172	7.7	50	SN		C	1445	25	.4	D
MANI	06	0149	0156	0207	N13	E19	.453		7.5	18	SF		P		150	1.7	F
MITK	06	0150	0156	0227	N13	E18	.443	15172	7.4	37	1N		C	0156	180	2.1	E
CATA	06	0745	0745	0750	S20	W65	.902		1.4	5	SN	2	C	0745	56	1.3	
MONT	06	1127	1159	1413D	N28	E22	.647	15172	8.1	166D	2B		C	1159	1000		F
CATA	06	1135	1215	1230D	N25	E18	.585	15172	7.8	55D	3B	2	P	1215	1405	18.0	
MCMA	06	1343E		1630D	N26	E14	.574	15172	7.6	167D	1N		P	1415	350	4.4	BFU
MANI	07	0601E	0602	0607D	N15	E47	.779		10.8	6D	SF		V		30	.4	
MANI	08	0058	0104	0331	N13	W09	.360	15172	7.4	153	1F		P		320	3.5	F
MCMA	08	1330	1334	1338D	N28	W06	.568	15172	8.1	8D	SF		C	1334	25	.3	D
MCMA	08	1621	1622	1626	S05	E71	.943	15177	14.0	5	SF		C	1922	20	.6	D
MCMA	08	1917	1920	1926	N18	E20	.518	15175	10.3	9	SN		C	1920	25	.3	DH
MCMA	08	1942	1943	1948	N18	E20	.518	15175	10.3	6	SN		C	1943	35	.4	E
MANI	09	0810E	0810U	0824	N18	E14	.466		10.4	14D	SN		V		80	.9	
CATA	09	0810E	0815	0820D	N18	E14	.466		10.4	10D	SB	2	P	0815	56	.6	
MANI	09	0828E	0830	0905D	N23	W13	.526		8.4	37D	SN		V		150	1.8	
CATA	09	0830E	0840	0900D	N30	W10	.606	15172	8.6	30D	2B	2	P	0840	393	5.1	
CATA	09	0950	1000	1000D	N12	E53	.826		13.4	10D	SB	2	P	1000	39	.7	
MCMA	09	1252	1254	1301	N19	E12	.465	15175	10.4	9	SN		C	1254	50	.6	D
MCMA	09	1840		1844D	S35	E90	.998	15178	16.5	4D	SF		C	1840			EH
MCMA	09	1913	1915	1935	S35	E90	.998	15178	16.6	22	SF		C	1915			H
MCMA	09	1928	1933	1938	N26	W26	.653	15172	7.9	10	SN		C	1933	15	.2	D
MCMA	09	2103	2108	2120	N17	E05	.400	15175	10.3	17	SB		C	2108	50	.6	E
MANI	10	0051	0107	0134D	N13	E46	.760		13.5	43D	SN		P		130	2.0	F
MONT	10	0753	0756	0807	S33	E82	.985		16.5	14	SN		C	0756	60		E
MONT	10	0830	0833	0845	N16	W01	.375		10.3	15	SN		C	0833	150		D
CATA	10	0835	0835	0845	N16	W02	.376		10.2	10	SB	2	C	0835	140	1.5	
MONT	10	0854	0857	0902	S34	E85	.991		16.7	8	SF		C	0857	20		D
CATA	10	0925	0930	0930D	N13	E47	.771		13.9	5D	SB	2	P	0930	56	.9	
MONT	10	1053	1055	1057D	S34	E83	.987		16.7	4D	SN		C	1055	60		
MONT	10	1150	1152	1158	S30	E85	.992		16.9	8	SF		C	1152	40		E
MONT	10	1200	1202	1213	N16	W03	.378		10.3	13	SF		C	1202	40		D
RAMY	10	1201	1202	1213	N17	W 1	.391		10.4	12	SB	3	C		29		F

Hα SOLAR FLARES

MARCH 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE MAR	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	McMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mil. of Disk	CORR. AREA Sq. Deg.	
RAMY	10	1216	1218	1234	N26	W24	.637		8.7	18	SB	3	C		18		F
RAMY	10	1239	1242	1246	N26	W24	.637		8.7	7	SN	3	C		31		F
MCMA	10	1358	1407	1417D	N12	E39	.679	15176	13.5	19D	SN		C	1407	25	.3	D
RAMY	10	1505	1505	1517	S26	E78	.973		16.5	12	SN	3	C		14		
RAMY	10	1519	1522	1528	S31	E78	.973		16.5	9	SN	3	C		45		
RAMY	10	1637	1719	1749	S31	E77	.969		16.5	72	SB	2	C		33		
MCMA	10	1641	1643	1655	S33	E77	.970	15178	16.5	14	SB		C	1643	40	1.8	E
MCMA	10	1705	1715	1717D	S33	E77	.970	15178	16.5	12D	SN		C	1715	25	1.0	E
MCMA	10	1658	1700	1717D	N27	E60	.918	15179	15.2	19D	SF		C	1700	20	.7	E
MCMA	10	1915	1917	1920	S33	E76	.966	15178	16.5	5	SN		C	1917	30	1.2	E
MCMA	10	1915E	1926	1950	N13	W05	.336	15175	10.4	35D	SN		C	1926	30	.3	EL
PALE	10	1923E	1926U	1958D	N15	W 4	.364		10.5	35D	SN	3	C		40		F
MITK	10	2329	2330	2337	N26	W35	.727		8.4	8	SF		C	2330	110	1.7	
MITK	11	0409	0414	0450	N24	W38	.739	15172	8.3	41	1B		C	0414	220	3.4	E
MITK	11	0733	0737	0754	S33	E67	.924		16.3	21	SF		C	0737	70		E
CATA	11	0735	0740	0755	S34	E68	.930	15181	16.4	20	1B	2	C	0740	140		
RAMY	11	1153	1155	1237	S31	E67	.922		16.5	44	SN	3	C		22		
RAMY	11	1228	1229	1238	N15	W14	.424		10.5	10	SB	3	C		71		
RAMY	11	1301	1306	1320	N26	W44	.802		8.2	19	SB	3	C		67		
RAMY	11	1328	1332	1339	S31	E66	.917		16.5	11	SB	3	C		41		
RAMY	11	1356	1403	1410	S31	E66	.917		16.5	14	SN	3	C		50		
RAMY	11	1403	1404	1416	N20	W55	.866		7.5	13	SB	3	C		52		
RAMY	11	1628	1629	1636	N26	W46	.818		8.2	8	SB	3	C		30		
RAMY	11	1713	1715	1722	N14	E27	.550		13.7	9	SB	3	C		33		FDE
PALE	11	2136E	2142U	2151D	S31	E59	.870		16.3	15D	SN	3	C		42		F
PALE	11	2346E	2353	0002	S35	E70	.941		17.2	16D	SN	3	C		44		F
PALE	12	0151	0153	0207	S35	E69	.937		17.3	16	SN	3	C		39		F
PALE	12	0353	0355	0403	S35	E68	.932		17.3	10	SN	3	C		72		
RAMY	12	1235	1235	1237	N14	E17	.439		13.8	2	SN	3	C		24		
RAMY	12	1244	1245	1258	S33	E61	.888		17.1	14	SB	3	C		52		
RAMY	12	1421	1423	1527	S33	E61	.888		17.2	66	SB	3	C		63		
RAMY	12	1421	1510	1527	S33	E61	.888		17.2	66	SF	3	C		14		
RAMY	12	1519	1522	1525	N19	W76	.981		6.9	6	SN	3	C		16		
PALE	12	1813	1814	1815	S32	E57	.858		17.0	2	SN	3	C		22		
PALE	12	1815	1835	1838	S32	E57	.858		17.0	23	SN	3	C		19		
RAMY	12	1817E	1819	1821D	N14	E13	.402		13.7	4D	SN	3	C		31		
MCMA	12	1818	1819	1920	N20	E18	.520	15176	14.1	62	SN		C	1819	30	.4	E
RAMY	12	1931	1948	2013	N20	W81	.994		6.7	42	SN	3	C		21		FDE
RAMY	12	2103	2108	2114	S33	E57	.860		17.2	11	SB	3	C		23		
RAMY	12	2114	2115	2119	N15	W33	.626		10.4	5	SB	3	C		29		
PALE	13	0224	0225	0229	N25	W76	.984		7.4	5	SN	3	C		39		F
RAMY	13	1356	1402	1452	N25	W76	.984	15172	7.9	56	1B	3	C		0		FDE
RAMY	13	1659	1702	1720	N23	W84	.998		7.4	21	SB	3	C		0		F
RAMY	13	1906	1908	1920D	N13	W 7	.342		13.3	14D	SB	3	C		64		F H
MCMA	13	1907	1913	1923	N12	W06	.322	15176	13.3	16	SF		C	1913	50	.5	EL
PALE	13	1912	1916	1924	N11	W 8	.319		13.2	12	SN	3	C		34		F
RAMY	13	1915	1918	1925D	N22	W87	1.000		7.3	10D	SB	3	C		0		
PALE	13	2006E	2008U	2015D	N27	W81	.996		7.8	9D	SN	3	C		0		F
PALE	13	2328	2330	2340	N19	W48	.802		10.4	12	SN	3	C		25		F
MITK	13	2330	2333	2345	N20	W41	.741	15175	10.9	15	1F		C	2333	170	2.6	
PALE	14	0001	0003	0007	N25	W83	.998		7.8	6	SN	3	C		0		F
MANI	14	0340E	0340U	0343D	S27	E27	.550		16.2	3D	SB		V		120	1.4	F
CATA	14	0835	0835	0845	S38	E36	.719		17.1	10	SB	2	C	0835	112	1.6	
CATA	14	0850	0850	0905	N25	W90	1.001	15172	7.6	15	1F	2	C	0850	56		
RAMY	14	1422	1423	1428	N18	E79	.989		20.5	6	SF	3	C		0		
RAMY	14	1516	1517	1520D	N18	E78	.986		20.5	4D	SN	3	C		21		
MCMA	14	1555E		1557D	N18	E81	.993	15184	20.7	2D	SN		P	1557			D
RAMY	14	1655	1658	1703	N13	W17	.426		13.4	8	SN	3	C		18		
RAMY	14	1702	1704	1707	S30	E21	.520		16.3	5	SN	3	C		19		F
RAMY	14	1729	1729	1736	N18	E77	.983		20.5	7	SF	3	C		8		
RAMY	14	1744	1746	1804	N18	E77	.983		20.5	20	SF	3	C		13		
RAMY	14	1744	1752	1804	N18	E77	.983		20.5	20	SF	3	C		11		
RAMY	14	1834	1837	1854	N19	E75	.977		20.4	20	SN	3	C		54		FDE
PALE	14	1836	1838	1841	N17	E73	.968		20.3	5	SF	3	C		41		DE
RAMY	14	1934	1936	1940	N19	E74	.974		20.4	6	SN	3	C		51		F
MANI	15	0012E	0013	0022	N17	E76	.979		20.7	10D	SF		P		40	1.0	
MANI	15	0440	0442	0447	N16	E70	.954		20.4	7	SF		P		30	.7	F

Hα SOLAR FLARES

MARCH 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE MAR	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
RAMY	15	1235E	1246	1315	N19	W65	.931	15175	10.6	40D	1B	2	C		168		U F
RAMY	15	1235E	1246	1315	N19	E65	.931	15184	20.4	40D	1B	2	C		168		U F
RAMY	15	1703	1705	1714	S27	E 6	.377		16.2	11	SB	3	C		74		
PALE	15	2334	2340U	0030D	S31	E 4	.433		16.3	56D	SN	3	C		83		F
CATA	16	0755	0805	0915D	N21	W29	.628		14.2	80D	SN	2	P	0805	84	1.1	
RAMY	16	1834	1835	1850	S33	W 1	.461		16.7	16	SN	3	C		32		
RAMY	17	1150	1154	1230	N18	E42	.739		20.6	40	SN	2	C		98		
RAMY	17	1533	1550	1636	N18	E40	.718		20.6	63	SB	2	C		137		DE
RAMY	17	1533	1603	1636	N18	E40	.718		20.6	63	SN	2	C		98		DE
CATA	17	1540E	1550	1600D	N18	E38	.698	15185	20.5	20D	1B	2	P	1550	168	2.4	
PALE	18	0329	0330	0331D	N16	E32	.619		20.5	2D	SN	3	C		35		F
MITK	18	0337	0343	0349	N18	E31	.622		20.5	12	SN		C	0343	90	1.2	5
MANI	18	0340	0342	0401	N18	E30	.612	15184	20.4	21	1N		P		200	2.5	F
RAMY	18	1419	1421	1425	N18	E27	.580		20.6	6	SN	3	C		25		
MCMA	18	1420	1423	1428	S32	W28	.606	15178	16.5	8	SN		C	1423	30	.4	DH
RAMY	18	1434	1436	1452	N14	W64	.916		13.8	18	SN	3	C		22		
RAMY	18	1440	1443	1454	N18	E27	.580		20.6	14	SB	3	C		70		
MCMA	18	1440	1442	1452	N20	E25	.578	15184	20.5	12	SN		C	1442	40	.5	E
MCMA	18	1628	1630	1638	N20	E24	.569	15184	20.5	10	SF		C	1630	50	.6	E
RAMY	18	1628	1629	1636	N18	E26	.569		20.6	8	SB	3	C		62		FDE
RAMY	18	1801	1802	1808	N18	E25	.559		20.6	7	SN	3	C		46		DE
MANI	19	0437	0440	0459	N30	E12	.604	15183	20.1	22	1N		P		200	2.7	F
TEHR	19	0443E	0444U	0459	N31	E14	.625		20.2	16D	SB	1	C		190		U F
MANI	19	0456	0506	0527D	S29	W44	.741		15.9	31D	SF		P		110	1.6	F
RAMY	19	1328	1329	1346	S33	W33	.661		17.1	18	SN	2	C		19		
RAMY	19	1527	1531	1547	N14	W79	.987		13.7	20	SN	3	C		0		
RAMY	19	1714	1715	1715D	N17	E43	.743		22.9	1D	SN	3	C		20		F S
MCMA	19	1714	1717	1724	N17	E44	.753	15187	23.0	10	SF		C	1717	40	.6	EH
MANI	20	0653	0703	0736	N23	E59	.900	15188	24.7	43	1N		P		250	5.0	F
CATA	20	0710E	0710	0715D	N22	E59	.897	15188	24.7	5D	2B	2	P	0710	28	06.7	
MCMA	20	1630	1634	1645	N15	E90	1.000	15198	27.4	15	SF		C	1634			E
MANI	21	0021	0025	0027	N15	E85	.998		27.4	6	SF		P		40	1.2	
PALE	21	0023	0025	0027	N14	E77	.981		26.8	4	SF	3	C		0		
RAMY	21	1413	1414	1419	N14	E71	.956		26.9	6	SF	4	C		0		F
RAMY	21	1420	1421	1429	N19	E39	.711		24.5	9	SF	4	C		23		U F
RAMY	21	1528	1529	1545	N22	E42	.758		24.8	17	SN	3	C		20		U F
PALE	21	2009E	2019U	2026D	N14	E70	.951		27.1	17D	SN	3	C		17		DE
PALE	21	2204E	2204U	2206D	N17	W16	.457		20.7	2D	SB	3	C		135		F
PALE	22	0203	0205	0213	N17	W18	.474		20.7	10	SN	3	C		61		F
MANI	22	0435E	0435U	0441	S35	W61	.895		17.6	6D	SF		V		50	1.0	
MANI	22	0833E	0837	0904D	N23	E36	.707		25.1	31D	SF		V		100	1.5	F
RAMY	22	1246	1250	1259	S42	W40	.780		19.5	13	SF	2	C		30		F
RAMY	22	1310	1320	1349	N20	W25	.575		20.7	39	SN	3	C		94		U F
RAMY	22	1310	1315	1349	N20	W25	.575		20.7	39	SB	3	C		118		U F
RAMY	22	1312	1320	1325	S42	W40	.780		19.6	13	SF	3	C		19		F
MCMA	22	1357E		1436D	S42	W41	.787	15201	19.5	39D	SN		C	1409	40	.6	E
MCMA	22	1357E		1410	N22	W22	.567	15184	20.9	13D	SN		C	1358	30	.4	BD
MCMA	23	1454	1520	1610D	S42	W54	.870	15201	19.6	76D	SN		C	1520	40	.8	EK
MCMA	23	1605	1608	1612	S32	W87	.996	15178	17.1	7	SN		C	1608			D
MCMA	23	1624	1629	1635	S33	W85	.993	15178	17.3	11	SF		C	1629			D
MCMA	23	1719	1723	1728	S25	E81	.984	15205	29.8	9	SN		C	1723			E
MCMA	23	2012	2014	2025D	S32	W87	.996	15178	17.3	13D	SF		C	2014			D
MANI	24	2314E	2327	2344	N18	W59	.887	15184	20.5	30D	1N		P		190	3.8	FU
MANI	26	0820E	0822	0906D	N25	W46	.805		22.9	46D	SN		P		120	2.0	FE
CATA	26	0835E	0835	0840D	N22	W50	.826	15187	22.6	5D	1B	2	P	0835	168	3.1	
MANI	28	0037	0041	0050	N15	W16	.424		26.8	13	SN		P		150	1.7	
PALE	28	0039E	0039U	0039D	N14	W10	.358		27.3		SB	3	C		104		U F
MANI	28	0710	0714	0735	S28	E10	.428		29.0	25	SF		P		40	.4	
RAMY	28	1950	1951	1958	S30	W35	.666		26.2	8	SN	3	C		19		
CATA	29	0835E	0835	0900	S33	W45	.774		26.0	25D	SN	2	P	0835	112	1.7	

Hα SOLAR FLARES

MARCH 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE 1 MAR	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		COND.	TYPE	TIME UT	MEAS. AREA Mill. of Disk	CORR. AREA Sq. Deg.	
MCMA	30	1428E		1433D	N32	E80	.994	15220	6.6	50	SN		P	1428			D
RAMY	30	2048	2051	2102	S26	W27	.556		28.8	14	SB	3	C		184		

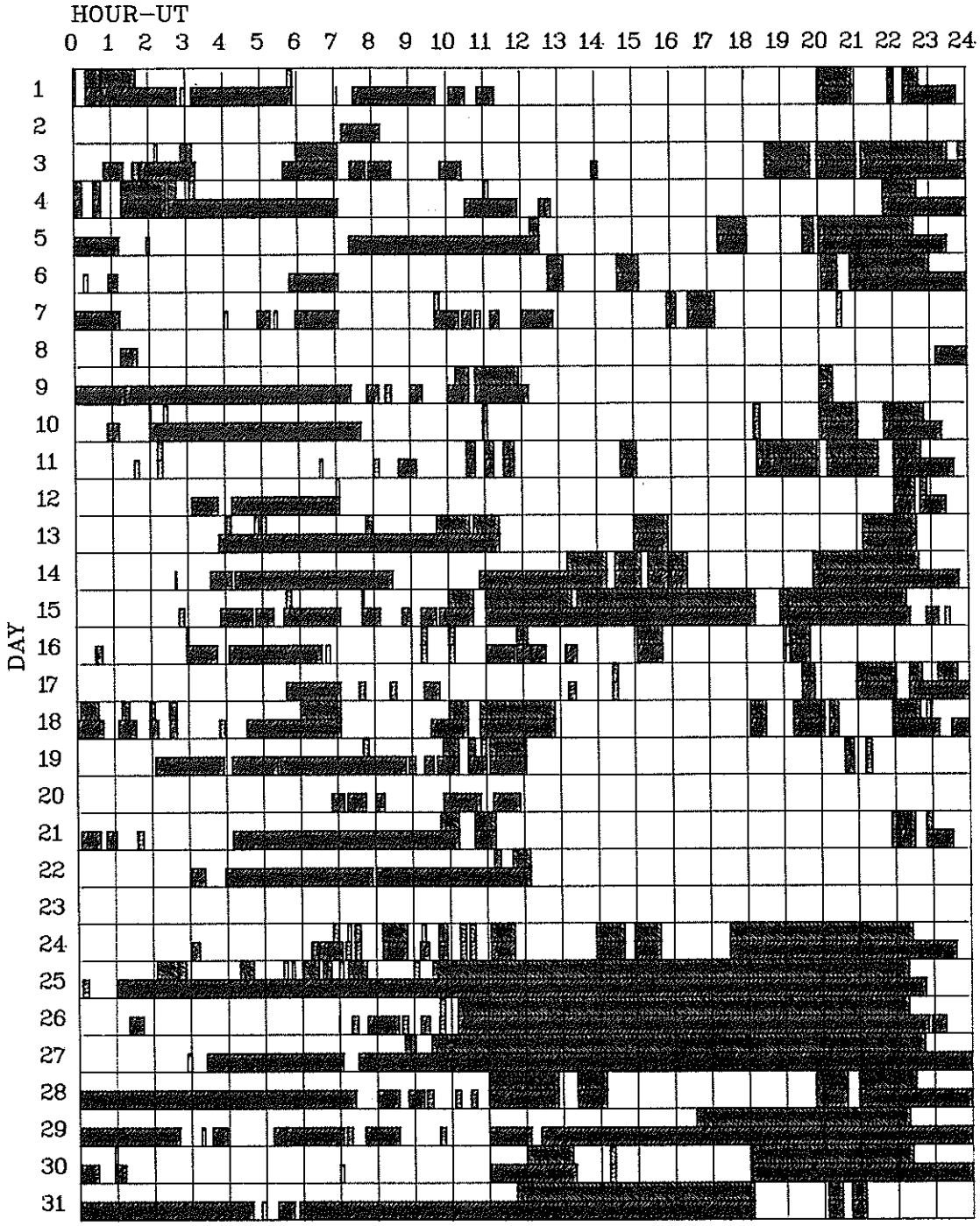
"Remarks":

A = Eruptive prominence whose base is less than 90° from central meridian.
B = Probably the end of a more important flare.
C = Invisible 10 minutes before.
D = Brilliant point.
E = Two or more brilliant points.
F = Several eruptive centers.
G = No visible spots in the neighborhood.
H = Flare accompanied by a high speed dark filament.
I = Active region very extended.
J = Distinct variations of plage intensity before or after the flare.
K = Several intensity maxima.
L = Existing filaments show signs of sudden activity.
M = White-light flare.
N = Continuous spectrum shows effects of polarization.
O = Observations have been made in the calcium II lines H and K.
P = Flare shows helium D_3 in emission.
Q = Flare shows the Balmer continuum in emission.
R = Marked asymmetry in Hα line suggests ejection of high velocity material.
S = Brightness follows disappearance of filament (same position).
T = Region active all day.
U = Two bright branches, parallel (||) or converging (Y).
V = Occurrence of an explosive phase: important and abrupt expansion in about a minute with or without important intensity increase.
W = Great increase in area after time of maximum intensity.
X = Unusually wide Hα line.
Y = System of loop-type prominences.
Z = Major sunspot umbra covered by flare.

INTERVALS OF NO FLARE PATROL OBSERVATION

FOR PRECEDING SOLAR FLARE TABLE

MARCH 1978



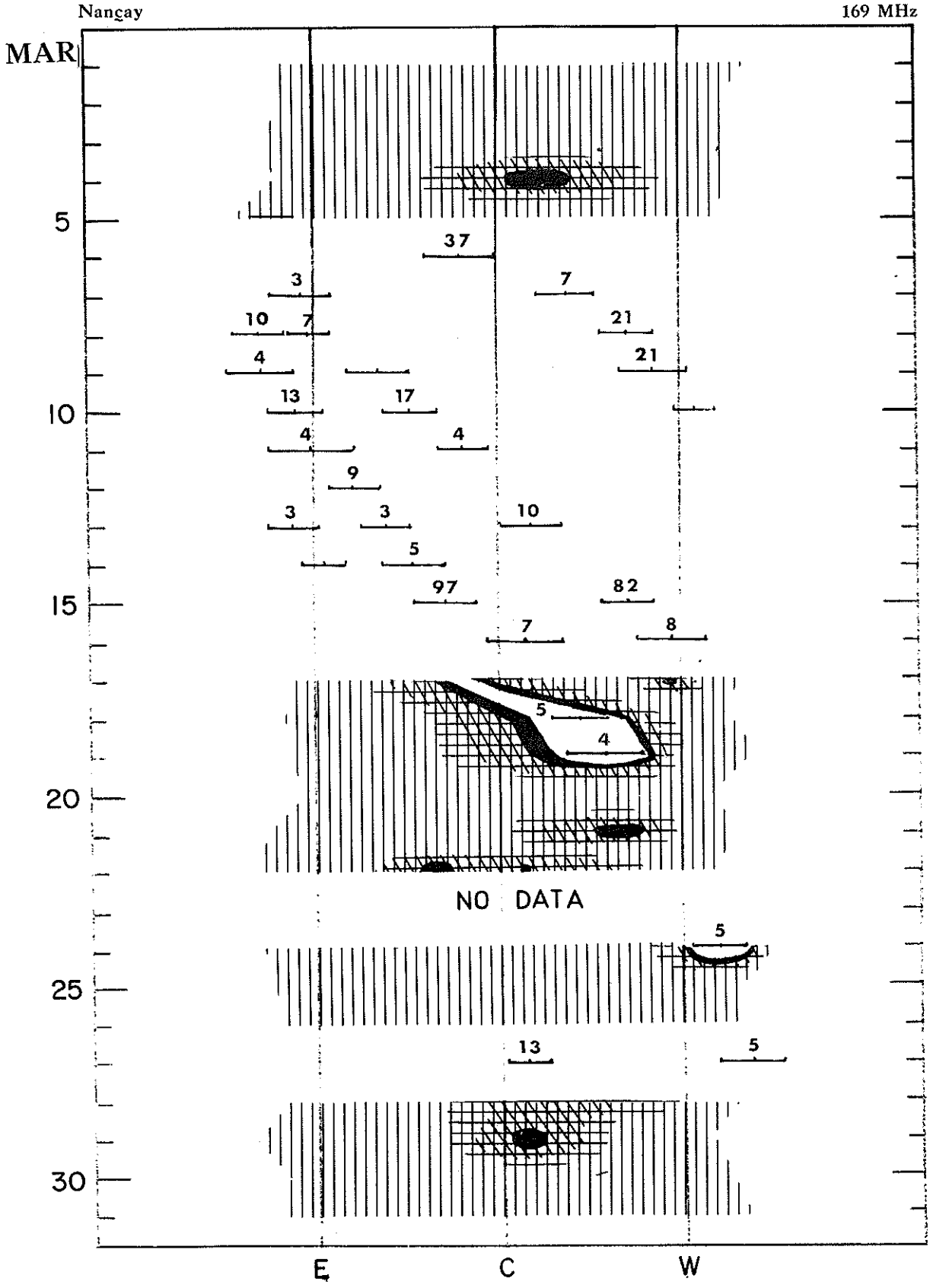
Observatories included in total patrol:

Bucharest	Istanboul	Manila	Monte Mario	Tehran
Catania	Kandilli	McMath-Hulbert	Palehua	Upice
Herstmonceux	Kodaikanal	Mitaka	Ramey	Wendelstein

Times of no flare patrol are shown by the shaded area for each day divided into times of no cinematographic patrol (bottom half of day) and times of neither visual nor cinematographic patrol (top half of day).

SOLAR RADIO EMISSION
INTERFEROMETRIC OBSERVATION

MARCH 1978



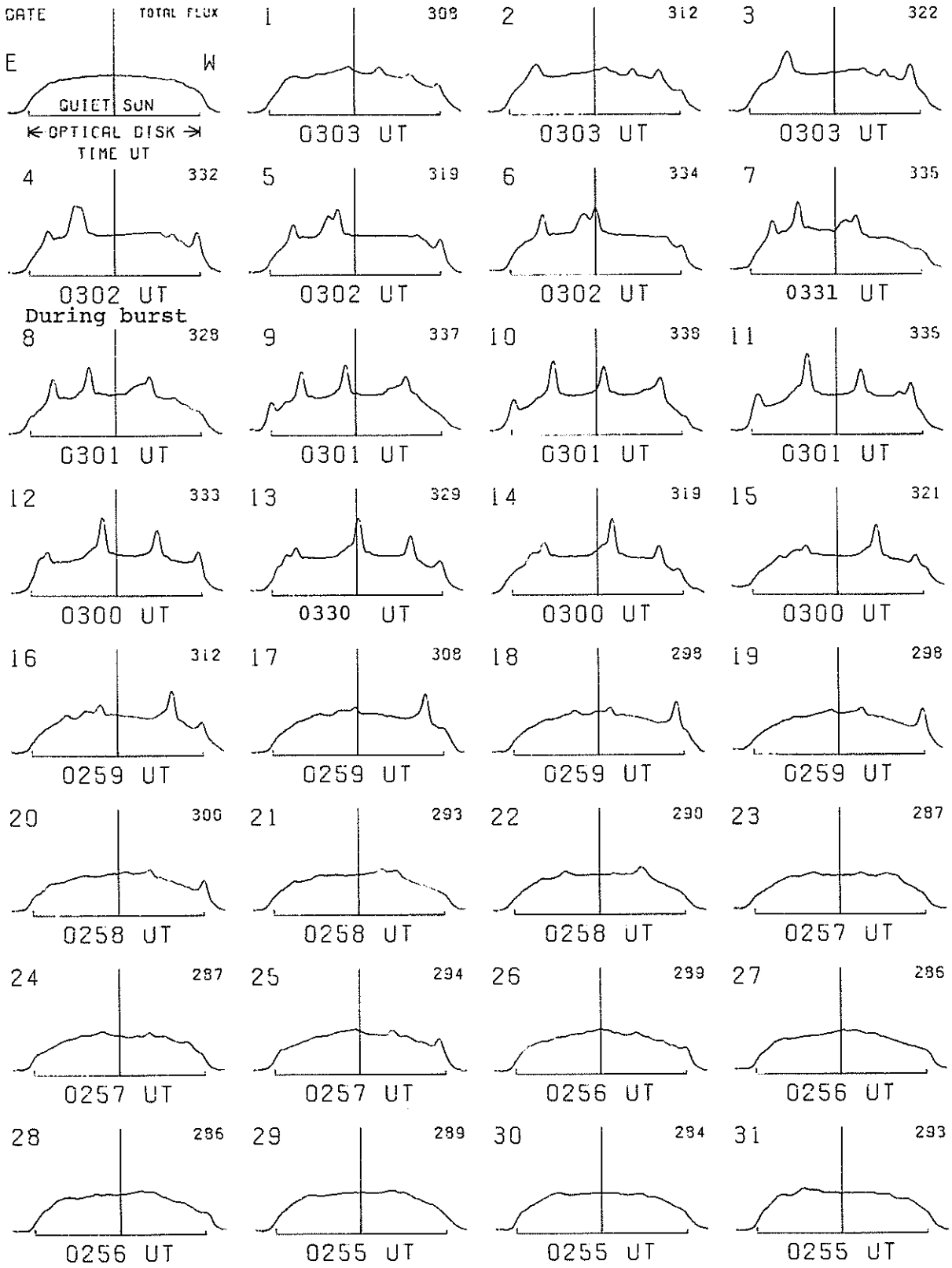
18
Mar 78

EAST-WEST SOLAR SCANS

MARCH 1978

TOYOKAWA, JAPAN

3 CM
FAN BEAM WITH 1.1 MINUTES OF ARC

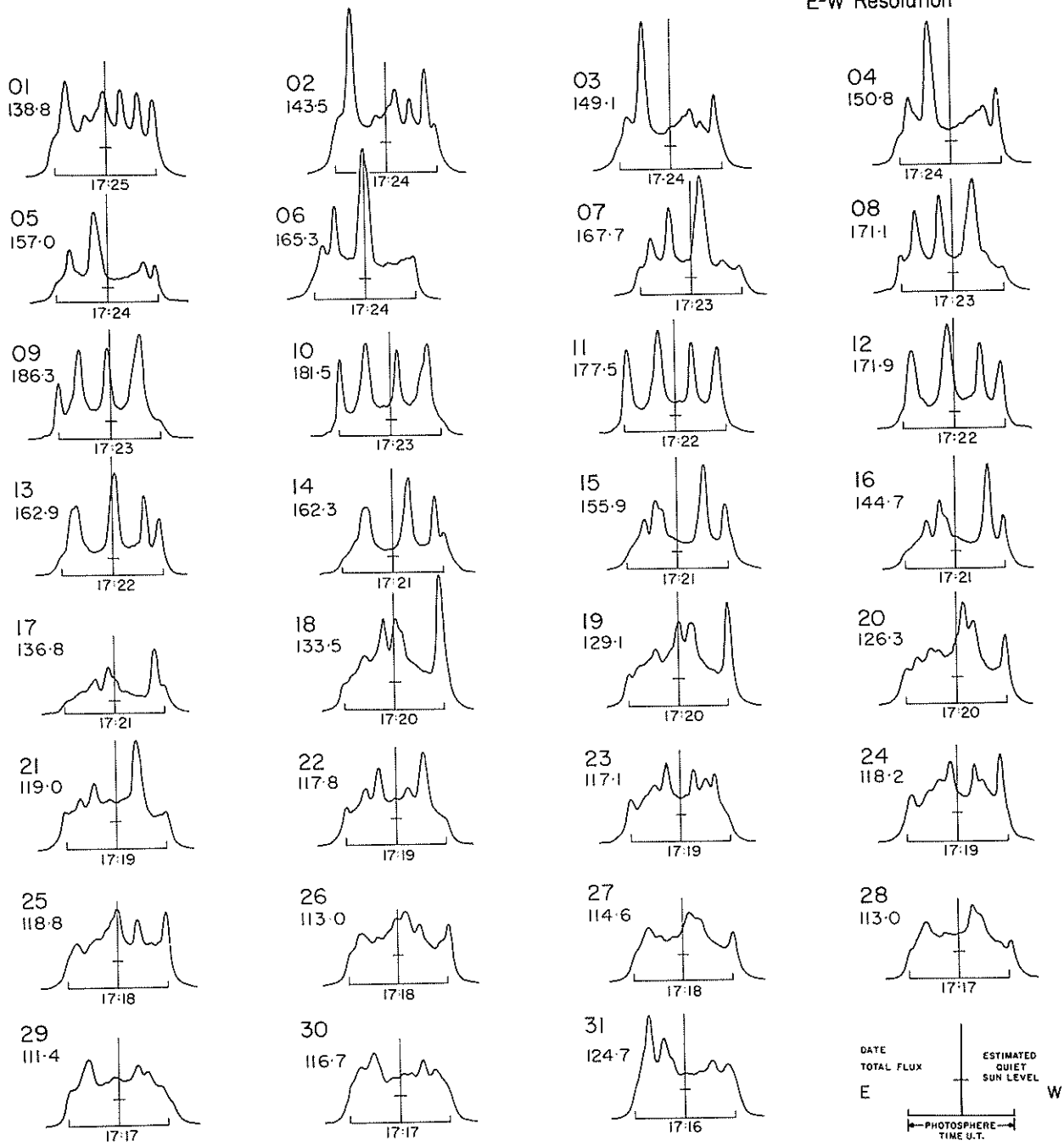


EAST-WEST SOLAR SCANS

MARCH 1978

ALGONQUIN RADIO OBSERVATORY
CANADA

10·7cm
Fan Beam with 1·5 minutes of arc
E-W Resolution



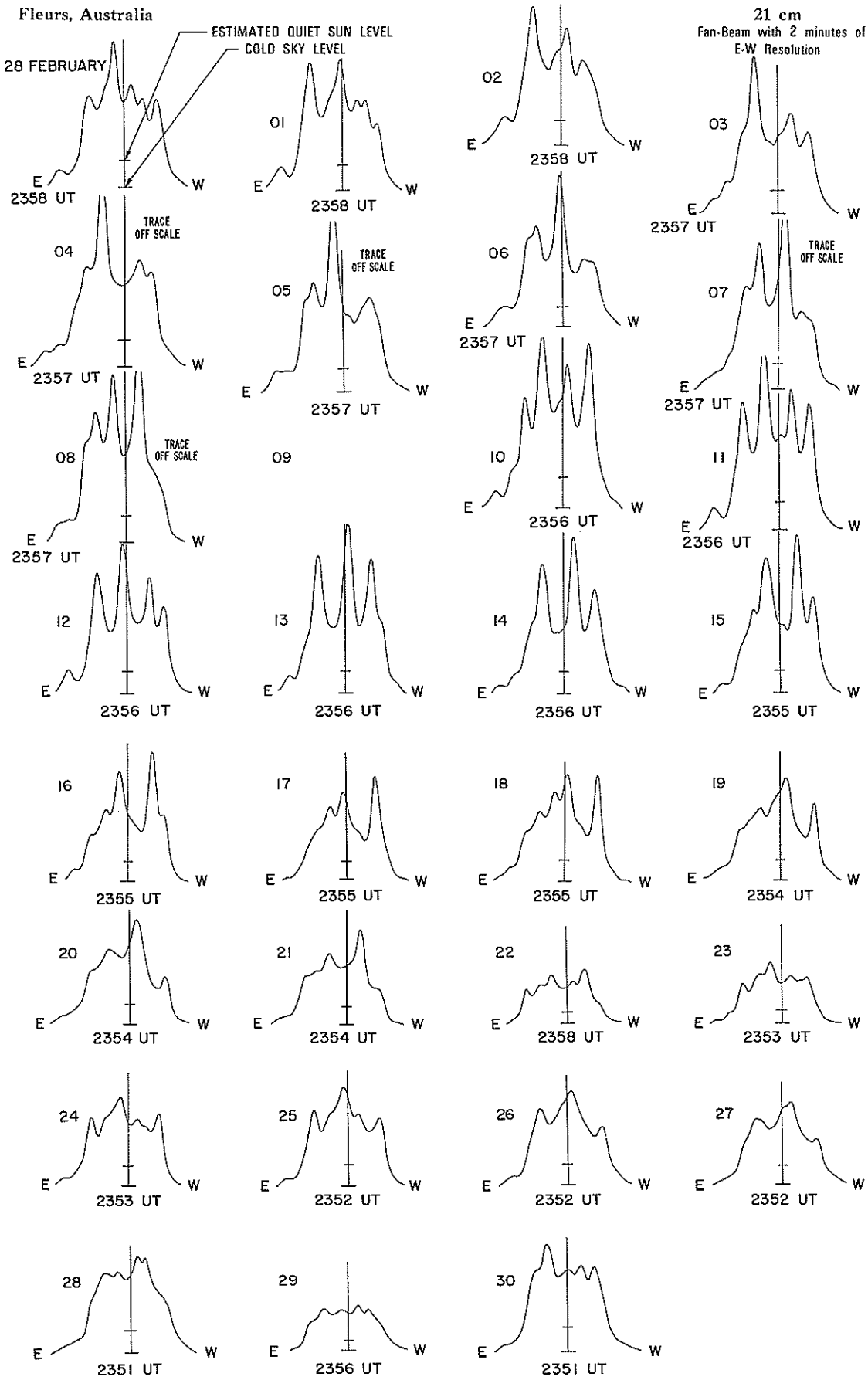
20
Mar 78

EAST-WEST SOLAR SCANS

MARCH 1978

Fleurs, Australia

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

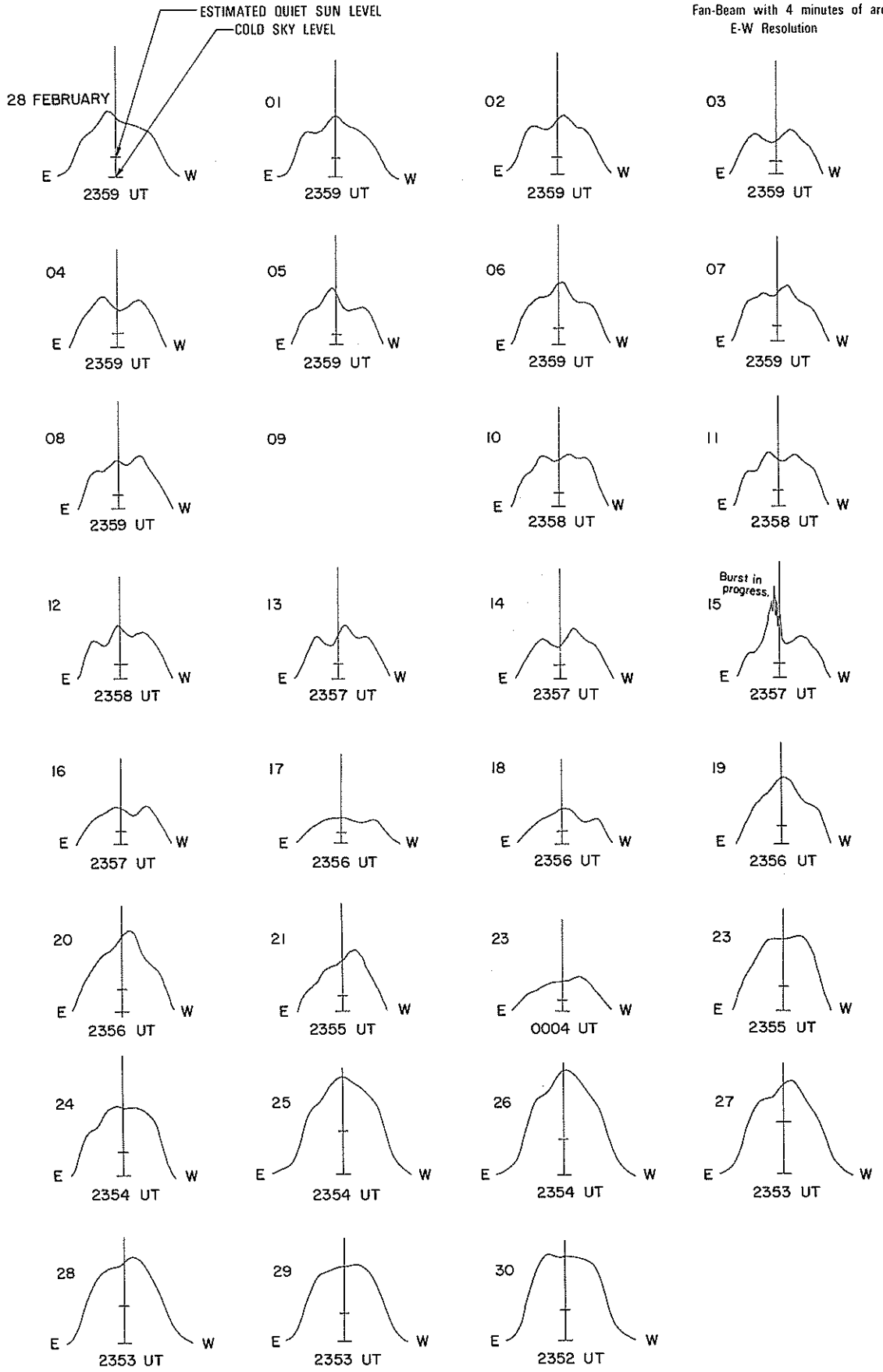


EAST-WEST SOLAR SCANS

MARCH 1978

Fleurs, Australia

43 cm
Fan-Beam with 4 minutes of arc
E-W Resolution



SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

MARCH 1978

MAR 1978	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY $10^{-22} Wm^{-2} Hz^{-1}$ PEAK	MEAN	INT	REMARKS
1	2800	OTTA	1	S	1555.2	1555.5	2	1.4	.7		
	2800	OTTA	23	GRF	1800	1930	240	4.6	2.3		
	2695	BOUL	23	GRF	1816.5	1819	13	5	2		
	2695	SGHR	1	S	1817	1818.9	3.7	3.6	1.4		
	2800	OTTA	2	S/F	1817	1819	4	2.8	1.4		
2	2800	OTTA	20	GRF	1625	1645	30	2.8	1.3		
	2800	OTTA	24	R	1715	1737	22	2.8	1.4		
	2800	OTTA	27	RF	1715		68	2.8	2		
	2800	OTTA	24P	R	1737		31	2.8			
	2800	OTTA	26	FAL	1808	1823	15	-5	-3		
	2800	OTTA	24	R	1825	1905	40	7.4	3.7		
	2800	OTTA	27A	RF	1825		325	7.4	6.7		
	2800	OTTA	3	S	1828	1830.5	7	14.8	7		
	8800	SGHR	3	S	1828.2	1830.9	5.8	41.4	16.5		BEFORE
	2695	SGHR	3	S	1828.3	1830.6	7.7	18.2	7.3		EVENT.
	2695	BOUL	3	S	1829.5	1831	5.5	13	4		
	2800	OTTA	24P	R	1905		267	7.4			
	2800	OTTA	20	GRF	1907	1913	13	2.2	1.1		
	2800	OTTA	21	GRF	1938	1940	25	2.4			
	2800	OTTA	8	S	1944.8	1945	.8	4.2			
	2800	OTTA			2020		60	2.4			
	2695	PENT	40	F	2204	2211	15	1.8			
	2695	MANI	3	S	2328.5	2329.3	1.8	41.7	27.8		I
	2695	PENT	3	S	2328.9	2329.2	2	36	9		
	2695	BOUL	8	S	2329.5	2330.5	1.5	34	11		
	2695	PENT	26	FAL	2332	2350	18	-7.4	-2		
3	2695	MANI	3	S	0236.7	0237.3	1.9	10.8	7.2		
	2695	SGHR	20	GRF	1228.5	1243	53	6.5	3.3		SWF
	8800	SGHR	20	GRF	1238.3	1250.4	35.1	10.5	5.3		SWF
	2800	OTTA	1	S	1450	1452	4	2.8	1.2		
	2800	OTTA	21	GRF	1837	1940	170	7.6	3.8		
	2800	OTTA	20	GRF	1842	1846	30	4.8	2.4		
	2800	OTTA	1	S	2204	2204.1	2	6.4	2.2		
	2695	BOUL	8	S	2204	2204.5	1.5	6	2		
4	2800	OTTA	20	GRF	1230	1303	140 D	15.6			
	2800	OTTA	20	GRF	1705	1717	30	2.2	1.1		
	2800	OTTA	21	GRF	1740	1752.5	93	6.4	3.2		
	2800	OTTA	1	S	1743	1747.5	7	5.6	2.8		
	2695	SGHR	1	S	1743.5	1745.6	10	8.4	2.5		
	2800	OTTA	21	GRF	1937	2000	73	2.8	1.4		
	2800	OTTA	1	S	2025	2030	10	1.4	.7		
5	2800	OTTA	20	GRF	1620	1710	120	2.8	1.4		
	2800	OTTA	20	GRF	1825	1831	35	4.2	2.1		
6	2695	SGHR	20	GRF	1135	1204.5	82	79	47.4		2,CONT
	2800	OTTA			1210	1232	280 D	45			
	2800	OTTA	22	GRF	2028	2043	40	5.6	1.4		
7	2800	OTTA	240	R	1500	1507	7	3	1.5		
	2800	OTTA	20	GRF	2112	2116	30	2.2	1.1		
	2695	PENT	21	GRF	2318	2330	40	6.2	3.1		
	2695	PENT	1	S	2321	2324	8	7.6	2.8		
8	2800	OTTA	22	GRF	1410	1416	70	2.8	1.6		
	2800	OTTA	240	R	1715	1835	80	4.2	2.1		
	2800	OTTA	1	S	1853	1854	3	1.4	.7		
	2800	OTTA	1	S	2103.5	2104.5	2	1.4	.7		
	2800	OTTA	20	GRF	2134	2136	14	2.8	1.8		
	2800	OTTA	8	S	2204.7	2204.8	.2	2.8			
	2695	PENT	21	GRF	2300	2325	105	6	3		
	2695	PENT	1	S	2331.5	2332.1	2	4.6	2		
	2695	PENT	1	S	2358.5	2359	1	1.4	.7		
9	8800	SGHR	47	GB	1839.6	1840.7	31.2	800	240		SWF
	2695	SGHR	3	S	1839.6	1841.2	40.1	468	140		SWF
	2695	PENT	3	S	1839.8	1841	10.2	440	108		
	2695	BOUL	49	GB	1841	1842	11	473	164		
	2800	OTTA	29	PBI	1900	1900	55	22	4		
	2695	PENT	22	GRF	2005	2025	42	5.4	2.4		
	2800	OTTA	21	GRF	2053	2120	57	4.8	2.4		
	2800	OTTA	1	S	2113	2114.2	3	4.6	2.3		
10	2695	MANI	3	S	0103.9	0105.4	3.6	21.7	14.5		
	2695	PENT	4	S/F	0104.7	0105.5	2	18.2			
	2800	OTTA	1	S	1440	1441	3.5	3	2.2		
	2800	OTTA	8	S	1501	1501.2	.5	1.2	.6		
	2695	PENT	20	GRF	1910	1925	25	2.4	1.2		
11	2800	OTTA	20	GRF	1803	1810	40	2.4	1.2		
	2800	OTTA	22	GRF	1902	1916	45	5	2.2		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

MARCH 1978

MAR 1978	FREQUENCY	STATION	TYPE		STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY $10^{-22}Wm^{-2}Hz^{-1}$ PEAK	MEAN	INT	REMARKS
	2800	OTTA	20	GRF	2100	2135	60	2.4	1.2		
	2695	PENT	1	S	2352	2356	8	5.2	3		
12	8800	SGMR	3	S	1415.5	1422.1	8	14.6	5.8		
	2695	SGMR	3	S	1417.9	1422.3	6.1	10.5	4.2		
	2800	OTTA	1	S	1422.2	1422.5	1	5.8	2.9		
	2800	OTTA	29	PBI	1423.2	1423.2	8.8	1.8	1.6		
	2800	OTTA	1A	S	1817	1819	6	3.6	1.6		
	2800	OTTA	8	S	1818.5	1818.5	.1E	33			
	2800	OTTA	20	GRF	2107	2109.5	20	3.8	1.6		
13	2800	OTTA			1355	1402	95	7.4			
	2800	OTTA	20	GRF	1723	1726	17	4.6	2.2		
	2800	OTTA	1A	S	1905.5	1911	10	2.6	1.3		
	2800	OTTA	1	S	1906.5	1907	1.5	3	1.5		
	2800	OTTA	32A	ABS	1920	1955	70	-3.8	-1.9		
	2800	OTTA	1	S	1955.5	1957	4	3	1.5		
	2695	PENT	21	GRF	2325	2335	30	6	3		
	2695	PENT	40	F	2330	2333	3	26			
14	2695	MANI	3	S	0339.8	0341.3	3.7	17.4	10.4		
	2695	SGMR	20	GRF	1207.9	1211.6	13	7.9	2.4		
	8800	SGMR	20	GRF	1208.7	1212.8	13.1	20.9	6.3		
15	2800	OTTA	22	GRF	1240	1255	45	3	2		
	2800	OTTA	20	GRF	1520	1525	25	2.2	1.1		
	2695	SGMR	3	S	1702.8	1703.3	1.9	15.1	6		5
	2800	OTTA	3	S	1702.9	1703.2	2	14	4		
	2695	PENT	20	GRF	2325	2355	80 D	4.6			
16	2800	OTTA	22	GRF	1820	1835	60	5.4	2.5		
17	2800	OTTA	22	GRF	1545	1600	35	2.4	1.2		
18	2800	OTTA	22	GRF	1425	1436	30	3.8	1.9		
	2695	BOUL	1	S	1816	1818	1.5	3	1		
19	2800	OTTA	20	GRF	1500	1505	25	1.6	.8		
	2800	OTTA	1	S	1953	1955	4	1	.5		
	2800	OTTA	20	GRF	2100	2105	30	1.6	.8		
20	2695	PENT	1	S	2320.5	2320.6	2	1.8	.9		
	2695	BOUL	3	S	2320.5	2321.5	2.5	3	1		
21	2800	OTTA	1	S	1834.5	1836.6	3.5	2.2	1.1		
	2800	OTTA	20	GRF	2158	2201	20	2.4	1.2		
22	2695	MANI	1	S	0420.6	0421	.9	7.4	3.7		
	2800	OTTA	24	R	1300	1313	13	1.6	.6		
	2800	OTTA	27F	RF	1300		55	1.6	1.2		
	2800	OTTA	24P	R	1313		34	1.6			
	2800	OTTA	26	FAL	1347	1355	8	-1.6	-0.7		
	2800	OTTA	20	GRF	1422		70 D	2			
	2800	OTTA	20	GRF	1810	1915	80	1.6	.8		
	2695	PENT	24	R	2235	2250	15	2	1		
	2695	PENT	27	RF	2235		105	2	1.6		
	2695	PENT	24P	R	2250		64	2			
	2695	PENT	26	FAL	2354	2420	26	-2	-1		
24	2695	MANI	1	S	0824.2	0824.8	1.4	5.5	2.7		
	2800	OTTA	20	GRF	1330		60	2.4	1.2		
	2800	OTTA	24OAR		1500	1520	20	2.4	1.2		
	2800	OTTA	1	S	1518.2	1518.9	1	2.2	1.1		
	2800	OTTA	24	R	1710	1730	20	2	1		
	2800	OTTA	27	RF	1710		105	2	1.6		
	2800	OTTA	24P	R	1730		66	2			
	2800	OTTA	26	FAL	1836	1855	19	-2	-1		
	2695	PENT	20	GRF	2310	2320	90	4.6	2.8		
27	2800	OTTA	20	GRF	1420	1426	17 D	1.4			
	2800	OTTA	24O	R	1515	1605	50	2	1		
28	2800	OTTA	1	S	1949	1950.2	3	3.2	1.4		
	2695	BOUL	1	S	1950	1951	2	4	1		
30	2800	OTTA	24	R	1605	1612	7	1			
	2800	OTTA	27	RF	1605		59	1	.9		
	2800	OTTA	24P	R	1612		43	1			
	2800	OTTA	26	FAL	1655	1704	9	-1	-0.5		
	2800	OTTA	20	GRF	2040	2052	30	.8	.4		
	2695	PENT	24O	R	2305	2335	30	3.4	1.7		
31	2800	OTTA	24	R	1320	1350	30	2.2	1.1		
	2800	OTTA	27	RF	1320		340	2.2	1.5		
	2800	OTTA	24P	R	1350		120	2.2			
	2800	OTTA	26	FAL	1550	1900	190	-2.2	-1.1		

Observatories:

BOUL = Boulder MANI = Manila OTTA = Ottawa ARO PENT = Penticton SGMR = Sagamore Hill

Explanation of Type Code:

1 Simple 1	6 Minor	22 Simple 3F	27 Rise and Fall	32 Absorption	44 Noise Storm in Progress
2 Simple 1F	7 Minor +	23 Simple 3AF	28 Precursor	40 Fluctuation	45 Complex
3 Simple 2	8 Spike	24 Rise	29 Post Burst Increase	41 Group of Bursts	46 Complex F
4 Simple 2F	20 Simple 3	25 Rise A	30 Post Burst Increase A	42 Series of Bursts	47 Great Burst
5 Simple	21 Simple 3A	26 Fall	31 Post Burst Decrease	43 Onset of Noise Storm	48 Major
					49 Major +

SOLAR X-RAYS BY SATELLITE
SMS GOES
MARCH 1978

.5 - 4Å Hourly Averages (10^{-5} watts/m^2)

MO DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean
3/ 1	B	B	B	B	B	.004	.001	B	B	.001	B	B	B	B	B	.010	B	.001	.003	.002	.002	.001	.001	.003	.002
3/ 2	.002	.001	.002	.002	.002	.002	.001	.002	.001	B	B	.002	.001	.002	B	.001	.002	.002	.016	.006	.004	.007	.047	M	.005
3/ 3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	.004	.058	.002	B	.016
3/ 4	.028	.011	.014	.008	.002	.002	.001	B	.002	.002	.002	.002	.032	.037	.002	M	M	M	.003	B	B	B	B	B	.007
3/ 5	.002	.001	.001	.002	.001	M	.001	B	B	B	B	B	B	.001	B	B	B	.002	.001	B	.004	.001	B	B	.001
3/ 6	B	.003	.004	B	.001	M	B	.002	.001	.001	B	.031	.148	.070	.023	.012	.006	.011	.002	B	B	.001	.001	.001	.014
3/ 7	.002	B	B	B	B	M	B	B	B	B	B	.001	.001	B	B	B	B	.018	.005	1.31	.001	B	.004	.002	.058
3/ 8	.002	.002	B	B	.001	M	.004	.003	.002	.002	.002	.002	.002	.003	.008	.002	.001	.002	.002	.005	.001	B	B	.005	.003
3/ 9	.001	.001	.002	.002	.003	M	.007	.002	.005	B	.003	.003	.004	.001	B	.001	.001	B	.016	.002	.014	.002	.001	.001	.003
3/10	.001	.002	.004	.015	.005	M	.002	.003	.001	B	.019	.008	.002	.001	B	B	.001	.001	.001	.001	B	B	.004	.002	.003
3/11	.002	.001	.003	.003	.003	M	B	.001	.002	.002	.001	.002	.013	B	B	B	B	.001	.002	.515	.001	.002	B	.001	.024
3/12	B	B	B	B	B	M	B	B	B	B	B	B	B	B	.001	B	B	B	B	.001	B	B	B	B	B
3/13	B	B	.002	B	B	M	B	B	B	B	.001	B	B	B	.010	B	.001	.002	.045	.002	B	.001	B	.002	.003
3/14	.007	B	B	.009	.003	M	.002	.022	.035	.050	.026	.010	.005	.001	.001	.001	.002	.002	.002	.002	.002	.004	.007	.001	.009
3/15	B	.002	.001	.003	.002	M	.002	.002	B	B	.011	B	.009	.005	B	B	.002	.002	B	B	B	B	B	B	.002
3/16	B	B	B	B	B	M	.002	.003	.003	.001	B	B	B	B	B	B	B	B	B	.048	B	B	B	B	.003
3/17	B	B	B	.004	B	M	B	B	B	B	B	B	B	B	B	.004	B	B	B	B	B	.113	B	B	.006
3/18	B	B	B	.005	.002	M	.002	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
3/19	B	B	B	B	B	M	B	B	B	B	B	.002	.002	B	B	B	B	B	.002	.001	B	.019	B	B	.001
3/20	B	B	B	B	B	M	B	.003	B	B	B	B	B	B	B	.002	.002	.001	.001	.001	B	B	B	.001	B
3/21	.076	B	B	B	B	M	B	.002	.001	B	B	B	B	B	B	B	B	B	B	B	.002	B	.002	B	.004
3/22	.038	B	B	B	.008	M	B	B	B	B	B	.001	B	.004	B	B	B	B	B	B	B	B	B	B	.003
3/23	B	B	B	B	.001	M	B	B	B	B	M	B	B	M	B	B	B	B	B	B	B	B	B	B	B
3/24	B	B	B	B	B	M	B	.001	.002	B	B	B	B	B	B	B	B	.002	B	B	B	B	B	.009	B
3/25	B	B	B	B	B	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
3/26	.004	.004	B	B	B	M	B	B	.002	.001	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
3/27	B	B	B	B	B	M	B	B	B	B	M	M	M	M	B	B	.001	B	B	.250	B	.001	.004	.001	.013
3/28	B	.001	B	B	B	M	B	B	B	B	B	B	B	B	B	B	.002	.001	.001	B	B	.013	B	B	.001
3/29	B	B	B	B	B	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	.101	B	B	B	.005
3/30	B	B	B	B	B	M	B	B	B	B	B	B	B	B	B	B	B	B	B	B	.001	B	.002	.001	B
3/31	B	B	B	B	B	M	B	B	B	B	B	B	B	.002	.001	B	B	B	B	.367	B	B	B	.005	.016

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

SOLAR X-RAYS BY SATELLITE
SMS GOES
MARCH 1978

1 - 8Å Hourly Averages (10^{-4} watts/m^2)

MO DA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Mean
3/ 1	.007	.008	.008	.006	.006	.007	.009	.008	.009	.010	.010	.009	.009	.008	.007	.009	.009	.009	.013	.012	.011	.010	.010	.011	.010
3/ 2	.012	.011	.011	.012	.013	.014	.011	.012	.011	.010	.010	.013	.012	.013	.012	.013	.015	.016	.033	.027	.021	.025	.065	M	.023
3/ 3	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	.022	.011	.012	.008	.013
3/ 4	.031	.031	.029	.033	.013	.010	.010	.010	.011	.012	.014	.016	.048	.073	.019	M	M	M	.015	.010	.010	.009	.009	.008	.022
3/ 5	.010	.010	.010	.011	.009	M	.012	.010	.009	.009	.010	.010	.010	.012	.010	.010	.010	.011	.011	.010	.016	.011	.010	.010	.011
3/ 6	.011	.013	.021	.011	.011	M	.010	.013	.011	.011	.010	.043	.178	.113	.070	.043	.034	.031	.023	.017	.016	.015	.013	.013	.047
3/ 7	.013	.011	.011	.011	.010	M	.010	.010	.010	.010	.010	.012	.011	.010	.010	.010	.009	.017	.010	.020	.010	.010	.013	.011	.012
3/ 8	.011	.011	.010	.010	.011	M	.014	.022	.014	.015	.014	.013	.012	.014	.026	.015	.012	.012	.014	.021	.012	.010	.011	.019	.015
3/ 9	.013	.013	.014	.013	.020	M	.026	.020	.022	.016	.017	.018	.019	.015	.012	.013	.012	.011	.024	.015	.017	.014	.011	.011	.015
3/10	.012	.014	.015	.043	.027	M	.015	.016	.013	.011	.022	.021	.014	.012	.011	.011	.029	.011	.010	.011	.010	.010	.013	.011	.013
3/11	.009	.011	.018	.020	.019	M	.011	.011	.013	.013	.011	.013	.018	.011	.009	.009	.009	.010	.012	.079	.010	.011	.009	.010	.016
3/12	.009	.009	.009	.009	.008	M	.009	.009	.008	.008	.009	.009	.008	.007	.009	.008	.007	.008	.009	.010	.008	.009	.009	.009	.008
3/13	.008	.008	.011	.009	.008	M	.007	.007	.009	.010	.010	.010	.009	.008	.027	.017	.008	.012	.029	.010	.009	.009	.008	.010	.013
3/14	.020	.009	.009	.017	.013	M	.011	.038	.059	.089	.067	.037	.025	.016	.013	.012	.015	.016	.015	.014	.012	.015	.026	.015	.016
3/15	.011	.012	.010	.014	.011	M	.011	.012	.010	.010	.026	.010	.021	.019	.010	.009	.023	.013	.009	.008	.008	.007	.006	.007	.011
3/16	.008	.007	.008	.007	.007	M	.011	.013	.014	.012	.008	.007	.006	.005	.005	.006	.006	.006	.006	.010	.005	.005	.005	.005	.006
3/17	.004	.004	.004	.007	.004	M	.005	.005	.005	.005	.005	.005	.005	.004	.005	.010	.009	.006	.005	.005	.005	.049	.004	.004	.009
3/18	.005	.005	.005	.013	.010	M	.009	.005	.005	.005	.004	.006	.004	.004	.008	.005	.006	.006	.007	.006	.006	.006	.006	.005	.006
3/19	.005	.005	.004	.004	.005	M	.005	.004	.004	.004	.005	.009	.011	.009	.007	.006	.006	.006	.008	.008	.007	.006	.005	.005	.007
3/20	.005	.004	.004	.005	.005	M	.005	.010	.005	.008	.006	.005	.005	.005	.007	.010	.012	.010	.008	.007	.007	.007	.007	.009	.008
3/21	.216	.005	.006	.006	.005	M	.004	.006	.007	.007	.005	.005	.004	.005	.005	.004	.004	.004	.005	.005	.007	.005	.010	.005	.005
3/22	.096	.004	.006	.005	.013	M	.004	.004	.005	.004	.004	.005	.004	.013	.006	.004	.004	.004	.006	.005	.004	.004	.006	.005	.006
3/23	.004	.004	.004	.004	.007	M	.004	.004	.004	.004	M	.005	.004	M	.003	.003	.003	.004	.004	.004	.004	.004	.004	.004	.004
3/24	.004	.004	.004	.004	.004	M	.005	.007	.010	.005	.006	.005	.005	.004	.004	.005	.006	.010	.006	.005	.004	.004	.004	.020	.007
3/25	.007	.006	.006	.005	.005	M	.005	.004	.004	.004	.004	.005	.004	.005	.004	.004	.005	.004	.004	.004	.004	.004	.004	.003	.004
3/26	.011	.017	.007	.003	.003	M	.003	.003	.010	.010	.007	.005	.004	.003	.004	.003	.003	.004	.003	.003	.004	.003	.003	.003	.003
3/27	.004	.004	.004	.004	.004	M	.004	.004	.004	.005	M	M	M	M	.004	.004	.005	.005	.005	.030	.005	.005	.010	.008	.008
3/28	.006	.005	.004	.003	.005	M	.004	.004	.004	.004	.005	.004	.003	.004	.003	.003	.007	.007	.005	.004	.004	.003	.003	.003	.004
3/29	.002	.002	.003	.002	.003	M	.003	.003	.004	.003	.003	.002	.002	.002	.003	.004	.004	.005	.005	.005	.189	.004	.003	.003	.019
3/30	.003	.003	.003	.003	.003	M	.003	.003	.003	.003	.003	.004	.004	.006	.008	.008	.008	.008	.007	.007	.007	.006	.009	.009	.007
3/31	.007	.006	.006	.007	.006	M	.006	.006	.006	.005	.006	.006	.005	.009	.010	.007	.006	.005	.005	.070	.005	.006	.006	.014	.012

Note: "B" indicates the flux was below the cut-off levels.
"M" denotes periods of missing data.

SOLAR X-RAYS BY SATELLITE

GOES

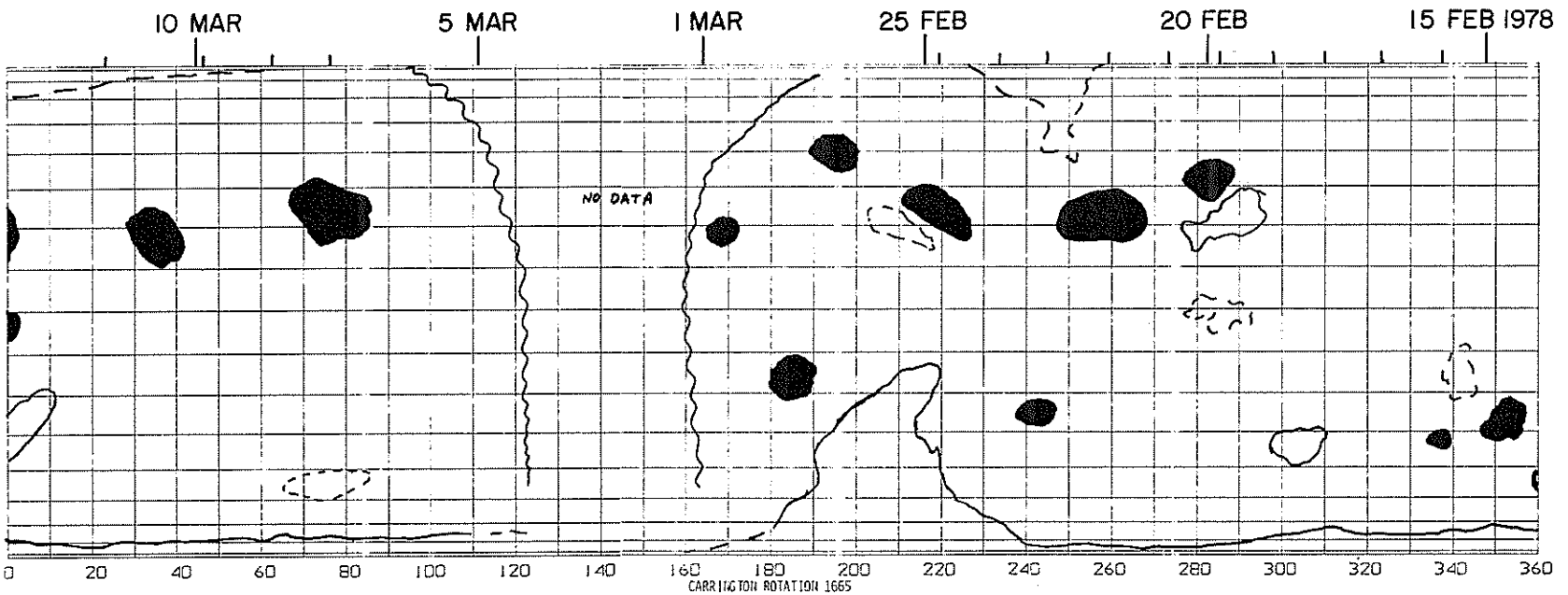
MARCH 1978

DAY	BEGIN TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	MAX TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}	1/2P TIME	.5-4A Wm^{-2}	1-8A Wm^{-2}
1	0503	8.6E-09	5.5E-08	0518	1.7E-07	1.6E-06	0520	5.1E-09	4.7E-08
1	2015	2.2E-08	1.2E-06	2018	3.8E-08	1.8E-06	2025	3.0E-08	1.5E-06
2	0325	1.1E-08	1.1E-06	0328	4.8E-08	1.8E-06	0338	2.3E-08	1.4E-06
2	0358	2.1E-08	1.2E-06	0403	8.7E-08	2.2E-06	0412	8.5E-09	1.6E-06
2	0530	1.4E-08	3.7E-07	0537	3.2E-08	1.8E-06	0633	1.2E-08	1.1E-06
2	1410	5.4E-09	1.1E-06	1413	4.7E-08	1.5E-06	1415	1.2E-08	1.2E-06
2	1523	1.6E-08	1.4E-06	1526	3.6E-08	2.2E-06	1528	2.5E-08	1.5E-06
2	1829	1.3E-07	2.7E-06	1835	5.3E-07	6.0E-06	1852	1.5E-07	4.3E-06
3	2202	1.2E-08	1.0E-06	2206	1.3E-07	2.7E-06	2211	3.1E-08	1.8E-06
4	0029	2.9E-08	1.3E-06	0054	1.3E-06	9.9E-06	0108	2.4E-07	5.5E-06
4	0233	3.9E-08	1.5E-06	0248	4.1E-07	6.3E-06	0319	1.0E-07	3.9E-06
4	0811	7.5E-09	9.6E-07	0814	3.5E-08	1.3E-06	0816	1.5E-08	1.1E-06
4	1747	4.3E-08	1.3E-06	1801	1.1E-07	2.6E-06	1814	2.5E-08	1.9E-06
5	0029	8.6E-09	9.2E-07	0034	6.7E-08	1.5E-06	0047	2.0E-08	1.2E-06
5	1257	4.5E-09	9.7E-07	1300	4.9E-08	2.0E-06	1307	2.2E-08	1.4E-06
5	1742	4.9E-08	1.3E-06	1745	5.6E-08	2.1E-06	1747	4.9E-08	1.5E-06
5	1830	1.4E-08	1.1E-06	1833	4.8E-08	1.9E-06	1837	3.3E-08	1.4E-06
5	1959	9.3E-09	1.0E-06	2002	6.9E-08	2.0E-06	2010	3.0E-08	1.5E-06
5	2019	1.7E-08	1.1E-06	2026	1.7E-07	3.3E-06	2032	2.9E-08	2.1E-06
6	0147	2.1E-08	1.2E-06	0200	1.3E-07	3.3E-06	0230	2.6E-08	2.1E-06
6	0707	9.3E-09	1.1E-06	0710	5.2E-08	2.1E-06	0714	3.5E-08	1.6E-06
6	0954	2.0E-08	1.2E-06	0957	4.7E-08	2.2E-06	0959	3.7E-08	1.4E-06
6	1125	2.2E-08	1.3E-06	1213	2.3E-06	2.3E-05	1258	8.7E-07	1.2E-05
8	0059	3.3E-08	1.5E-06	0103	1.1E-07	2.5E-06	0106	3.5E-08	1.9E-06
8	0648	2.3E-08	1.2E-06	0702	1.6E-07	2.6E-06	0751	2.9E-08	1.9E-06
8	1845	2.9E-08	1.4E-06	1849	3.7E-08	2.2E-06	1858	3.3E-08	1.8E-06
9	1201	1.7E-08	1.4E-06	1207	2.2E-07	3.7E-06	1214	6.4E-08	2.6E-06
9	1837	9.3E-09	1.1E-06	1843	1.6E-06	1.2E-05	1847	3.5E-07	6.5E-06
10	0104	2.0E-08	1.3E-06	0110	1.2E-07	2.9E-06	0116	2.7E-08	2.1E-06
10	0216	6.8E-09	1.0E-06	0219	5.3E-08	1.8E-06	0226	2.4E-08	1.4E-06
10	0752	1.7E-08	1.6E-06	0756	1.9E-07	3.3E-06	0759	5.4E-08	2.3E-06
10	1037	8.5E-09	1.1E-06	1058	2.1E-06	1.4E-05	1102	5.5E-07	7.5E-06
10	2211	1.8E-08	1.1E-06	2218	1.5E-07	3.2E-06	2220	6.2E-08	2.2E-06
11	0057	1.3E-07	1.3E-07	0416	1.0E-07	2.9E-06	0439	1.5E-08	1.3E-06
11	0542	1.5E-09	3.4E-07	0736	6.1E-08	2.2E-06	0743	1.7E-08	1.2E-06
12	1415	2.9E-09	7.3E-07	1422	6.1E-08	1.9E-06	1425	2.5E-08	1.2E-06
13	1356	9.3E-09	9.0E-07	1415	2.1E-07	3.8E-06	1447	4.6E-08	2.3E-06
13	2359	1.2E-08	1.1E-06	0022	1.5E-07	3.0E-06	0034	3.7E-08	2.0E-06
14	0337	6.5E-09	8.5E-07	0345	7.6E-07	7.8E-06	0349	1.5E-07	3.8E-06
15	0545	2.8E-09	5.5E-07	0552	1.5E-07	2.7E-06	0556	2.6E-08	1.6E-06
15	1002	2.3E-08	1.2E-06	1016	3.3E-07	5.1E-06	1032	1.0E-07	3.0E-06
15	1237	1.2E-08	1.1E-06	1253	3.2E-07	5.9E-06	1305	1.3E-07	3.5E-06
21	0739	2.9E-09	3.8E-07	0745	8.6E-08	1.2E-06	0800	1.3E-08	8.0E-07
21	0950	2.6E-09	5.8E-07	0955	4.1E-08	1.1E-06	1001	1.1E-08	8.5E-07
21	2159	9.8E-09	6.0E-07	2203	8.9E-08	2.1E-06	2212	3.9E-08	1.2E-06
22	0419	7.0E-09	4.5E-07	0425	4.2E-07	4.8E-06	0432	8.1E-08	2.2E-06
22	1144	1.5E-10	3.5E-07	1155	1.6E-07	2.4E-06	1158	5.4E-08	1.3E-06
22	1306	8.7E-09	6.1E-07	1318	8.7E-08	2.2E-06	1338	3.8E-08	1.4E-06
22	2243	6.7E-09	5.2E-07	2252	3.8E-08	1.2E-06	2258	1.2E-08	8.5E-07
24	0812	3.7E-08	1.2E-06	0815	5.8E-08	2.1E-06	0823	3.3E-08	1.6E-06
24	2313	7.5E-09	6.0E-07	2323	3.9E-07	5.0E-06	2337	7.9E-08	2.7E-06
26	0003	4.8E-09	4.1E-07	0055	1.2E-07	2.8E-06	0131	2.8E-08	1.6E-06
26	0542	0.0E+00	1.8E-07	0853	2.2E-08	1.3E-06	1012	6.2E-09	7.5E-07
28	0030	3.9E-09	4.5E-07	0038	2.4E-08	1.0E-06	0041	9.0E-09	6.9E-07

HELIUM 10830Å SYNOPTIC MAPS

CARRINGTON ROTATION 1665

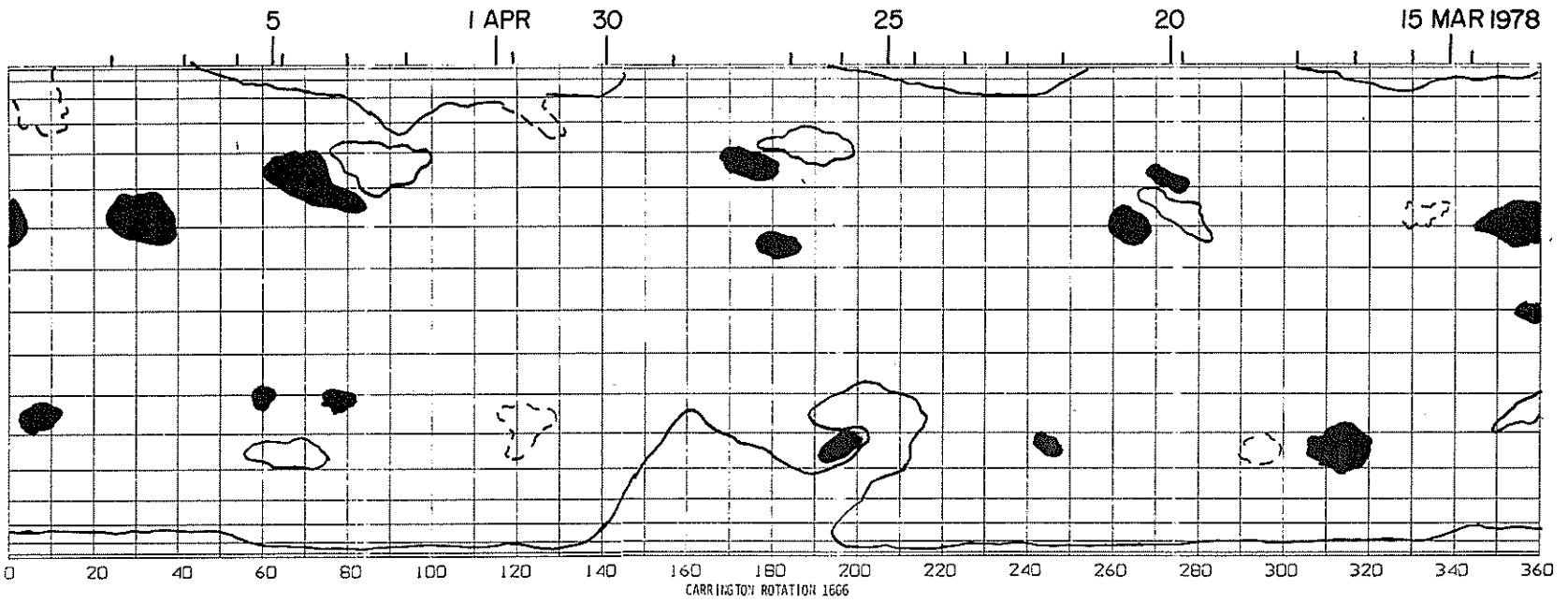
KITT PEAK NATIONAL OBSERVATORY



HELIUM 10830Å SYNOPTIC MAPS

CARRINGTON ROTATION 1666

KITT PEAK NATIONAL OBSERVATORY



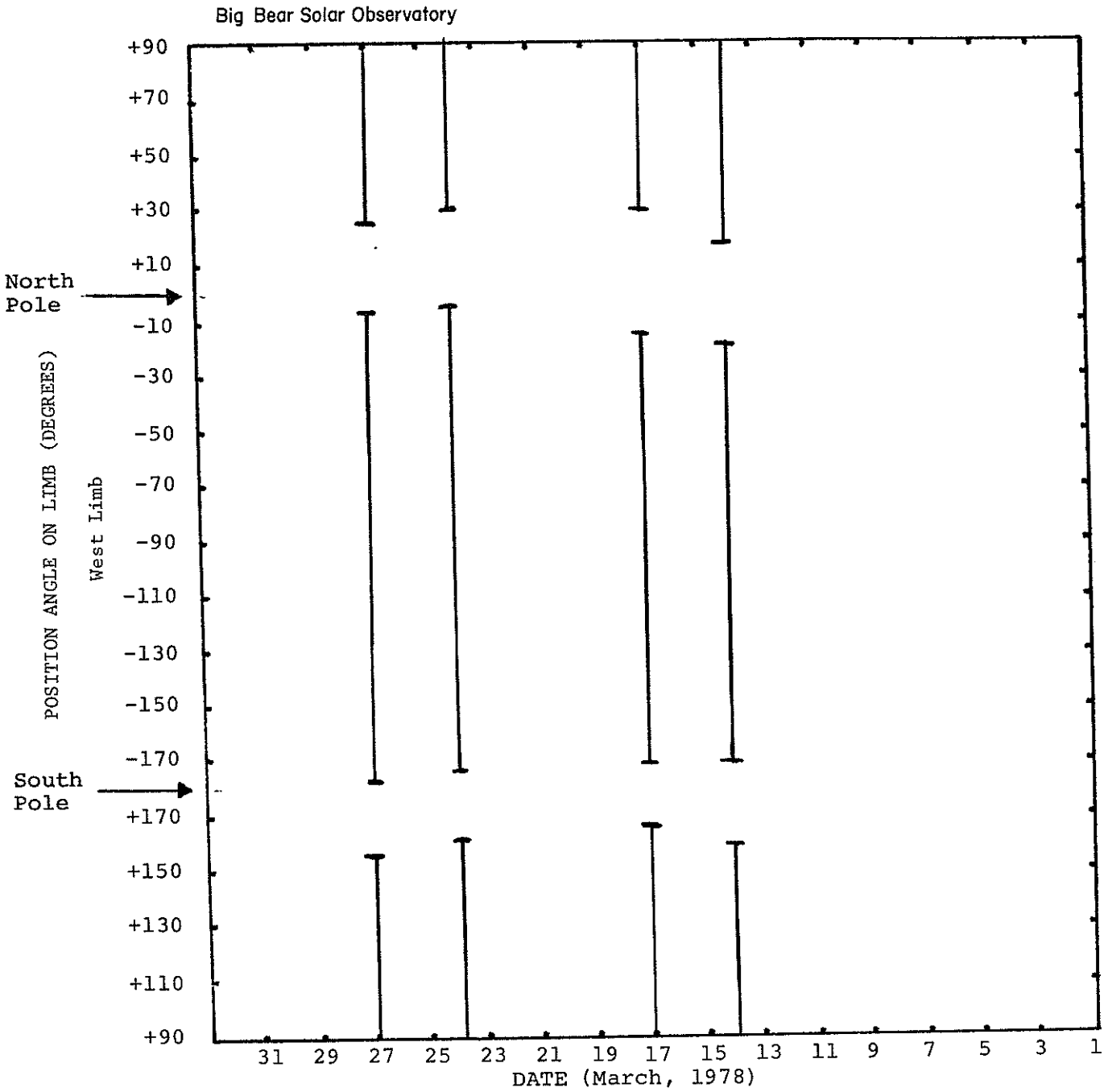
29
Mar 78

30
Mar 78

CORONAL HOLES

Helium D3 Chromosphere at Solar Limb

MARCH 1978



SOLAR WIND

Interplanetary Scintillations

MARCH 1978

DAY	3C48 VEL	3C48 ERR	3C144 VEL	3C144 ERR	3C147 VEL	3C147 ERR	3C161 VEL	3C161 ERR	3C237 VEL	3C237 ERR	3C273 VEL	3C273 ERR	3C298 VEL	3C298 ERR	3C459 VEL	3C459 ERR
1	427	16	554	5									431	75		
2	387	1	603	10			754	176					787	61		
3	363	43	478	5												
4	339	4	358	28												
5	394	7	318										397	14		
6	433	2	292	26									333	13		
7	830	16	349	2			341	42								
8			350	4	389	41	333	24					639	210		
9	601	7														
10	540	10	284	28			284	47								
11			296	13			324									
12	370	4	451	32			271	30								
13	354	*	413	14			257	18								
14	314	3	376	2			287	33								
15	293	13	465	10	544	15	434	37								
16	390	122	461	9			311	18								
17	310	44					221	48								
18	470	*														
19	361	*														
20	545	*														
21			278	32												
23	376	*														
24	365	9	457	46			324	6								
25	389	8	408	13	372	79	322	9								
26	432	18	502	31			436									
27	312	*														
28	444	*														
29	392	*														
30			531	40												
31			200	*												

MARCH	5 UT	5 LAT	5 DIST	5 DLON	15 UT	15 LAT	15 DIST	15 DLON	25 UT	25 LAT	25 DIST	25 DLON
3C48	23.	9.	0.80	-33.	22.	15.	0.70	-40.	22.	23.	0.59	-46.
3C144	3.	-7.	1.09	-16.	2.	-7.	1.04	-17.	1.	-7.	0.99	-17.
3C147	2.	0.	1.09	-14.	1.	0.	1.05	-15.	1.	0.	1.00	-16.
3C161	4.	-14.	1.13	-13.	3.	-14.	1.10	-14.	3.	-15.	1.05	-15.
3C237	8.	-8.	1.29	-3.	7.	-8.	1.28	-6.	6.	-7.	1.26	-8.
3C273	10.	-6.	1.28	5.	9.	-5.	1.30	2.	8.	-5.	1.30	0.
3C298	11.	-2.	1.22	9.	11.	-2.	1.25	7.	10.	-2.	1.27	5.
3C459	20.	49.	0.17	-66.	19.	60.	0.15	57.	19.	29.	0.27	67.

*Indicates data for which no error estimates are available since only two antennas were operating.

INFERRED IP MAGNETIC FIELD

BARTELS ROTATION	DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1961	DEC 29	. -	AT -	*	*	*			AT				*			*	A*		*	*			*					AT
1962	1977 JAN 25			-			-	-	TA -		A*			AT -			*	-			*	-				TA		
1963	FEB 21	AT	-	-	-	-	TA		TA			*									-			-				
1964	MAR 20		TA		AT					*			-	-						A*					-				
1965	APR 16			TA		TA	AT	TA		TA		AT				-	-	TA		AT	AT			TA				AT
1966	MAY 13	TA	-	-		TA			TA											AT	- -	AT	T* -	T*			AT	AT -
1967	JUN 9								TA		-			TA						AT	A*				AT	*	A*	TA TA
1968	JUL 6										A*			T*	TA	TA		T*			AT			-	AT		-	
1969	AUG 2		TA						TA	-			TA	*								AT	TA					
1970	AUG 29			-	-	-		TA										AT	AT			AT	TA	TA -	AT	AT		
1971	SEP 25						-	-	-	-	-	-					TA				TA							
1972	OCT 22					-	AT														AT	AT				*		
1973	NOV 18			TA	AT						-		AT							*			*		*			
1974	DEC 15				-	-	-		AT -		AT				AT	AT		AT		TA		TA		TA			*	
1975	1978 JAN 11		*	*						*	*	*						*			TA	-	AT			-		-
1976	FEB 7						*	TA				-			-						-		*			TA	A*	TA
1977	MAR 6	TA		-					AT			T*	*					TA			AT	AT	AT	AT	*	TA		

▒ = definitely towards the sun □ = definitely away from the sun

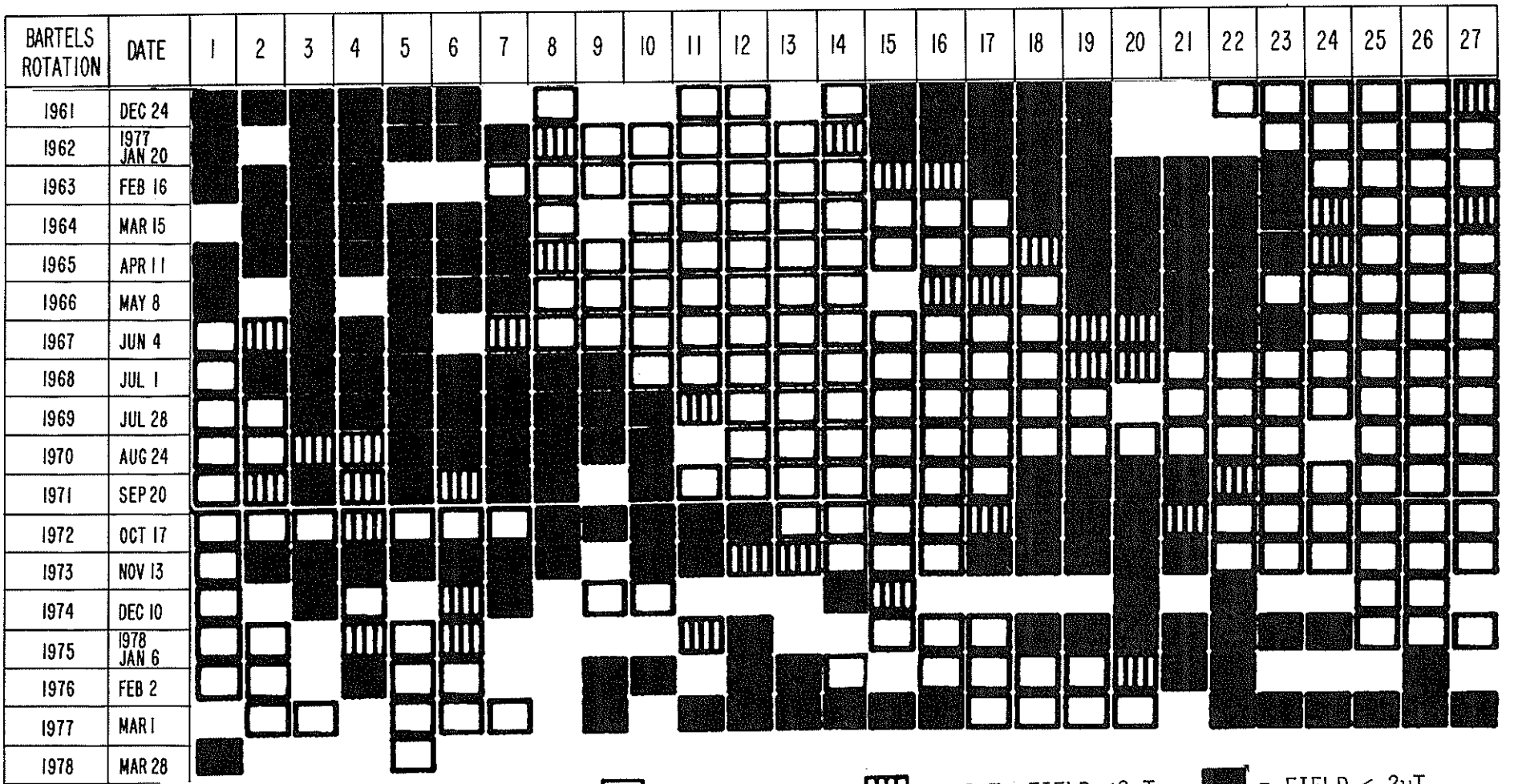
T = towards the sun A = away from the sun * = effect doubtful or not discernible - = missing data

The table shows daily inferences of the polarity of the interplanetary magnetic field. The first half of the day is based principally on magnetograms produced by the magnetometer at the Vostok Antarctic Station of the USSR. The magnetometer of the U.S. Air Weather Service now operated at Thule by the Danish Meteorological Institute is used for the second half of the day.

Note: The Bartels Rotation numbers after Rotation number 1955 were incorrect in this Table in SGD issues 385 Part I through 389 Part I.

Errata: Thule data for December 5, 6, 10, 11, 12 and 19, 1976 have been corrected.

STANFORD MEAN SOLAR MAGNETIC FIELD



POLARITY OF THE MEAN SOLAR MAGNETIC FIELD: = FIELD >2μT, = -2μT ≤FIELD ≤2μT, = FIELD <-2μT

No box visible indicates no data available for that day.

Note: Data are taken daily at 2000 UT. Dates given are not Bartels Rotation dates. These earlier dates correspond to the occurrence of phenomena on the sun which affect the Earth during the given Bartels Rotation.

STANFORD MEAN SOLAR MAGNETIC FIELD (MICROTESLA)

1977 1978

DAY	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH
01	-7	-13	13	2	-16	-9	9	6	-14	.	16	.
02	-17	-6	15	-12	-23	-13	6	1	-10	.	31	22
03	-16	-5	15	-18	-25	.	3	-14	-7	14	26	12
04	-12	1	13	-26	-23	3	13	-16	8	31	.	.
05	-9	7	0	-31	-16	12	13	-11	26	.	-5	8
06	-4	11	-19	-33	-5	18	11	-1	46	27	4	11
07	0	7	-32	-26	-1	22	-6	11	55	15	9	4
08	5	-5	-31	-14	11	17	-13	31	53	.	.	.
09	8	.	.	-7	25	8	-13	46	46	-1	.	-31
10	2	-22	0	3	20	4	-4	48	26	11	-28	.
11	-4	.	7	20	17	6	2	51	.	0	-43	-70
12	-7	-29	17	29	12	13	12	32	-2	.	.	-78
13	-14	-20	28	30	11	19	28	14	10	.	-41	-56
14	-8	-5	38	24	5	23	35	-4	.	.	-23	-49
15	-8	4	40	26	7	40	46	-10	1	.	3	-28
16	-11	12	31	18	.	.	39	-18	-6	0	.	-3
17	-9	20	24	13	5	38	20	-24	.	-3	31	18
18	1	29	18	4	13	41	6	-5	6	.	22	54
19	13	27	19	1	19	31	6	-11	8	.	37	48
20	18	19	16	-1	23	17	1	-12	.	18	22	24
21	21	12	10	6	24	2	3	.	.	39	-1	.
22	13	.	2	9	22	-3	7	-7	.	10	-18	-23
23	17	1	-2	22	18	-2	3	-4	-5	-4	-49	-49
24	9	-1	-7	25	8	-6	-3	0	-1	-15	.	-69
25	6	4	-15	31	4	-1	-9	2	.	-17	.	-79
26	9	-10	-10	30	0	-3	-5	4	.	-36	.	-73
27	7	-10	4	24	2	-8	-5	7	.	-48	-34	-53
28	2	-10	15	6	-2	.	-6	5	.	-33	.	-28
29	-10	-4	19	4	-6	-8	5	-2	-9	-15		.
30	-11	3	14	-4	-6	3	6	-11	.	14		.
31		6		-10	-11		8		-20	10		.

Dot symbol entry indicates no data available for the day.

Boulder Geomagnetic Substorm Log

This is a tabulation of substorm occurrences as observed in Boulder. A substorm is a localized geomagnetic disturbance which usually occurs near local midnight and is restricted in longitude. However, the current systems developed during a substorm affect ground magnetometers in the entire nightime sector. Additionally, individual substorms may occur at local times, away from midnight, and may be as large as 24 hours (global) in longitudinal extent. By noting the time, location and scale of a substorm, one may estimate the effect of a substorm at a specific location. Among the many substorm effects are ionospheric effects (which influence radio communications) and telluric effects (which may disturb long distance electric power and communications systems). The familiar aurora is a visible manifestation of the geomagnetic substorm.

Currently, the Log provides the date, onset time (in UT) and direction (from Boulder) of each substorm. The direction is listed as "East", "West" or "Centered" (over Boulder). The comment section further describes the geomagnetic field for a particular day. Future issues will carry additional descriptive text, as the substorm analysis broadens in scope.

BOULDER GEOMAGNETIC SUBSTORM LOG

MARCH 1978

DATE	TIME OF ONSET	DIRECTION	COMMENTS
1	0110	East	
	0245	East	
	0845	West	
	1330	West	
	1605	West	
2	0020	East	
	0050	East	
	0205	East	
	0410	East	
	0445	East	
	0500	East	
	0550	East	
	0615	East	
	0655	East	
	0715	East	Electrojet near Boulder 0715-1000
	0805	East	
	0925	East	
	1000	East	
3	0000	East	
	0110	East	
	0150	East	
	0530	East	Substorm lasted until 0630
4			Quiet day
5			General disturbance 0900-1900 UT; no distinct onsets
6	1125	West	
7	0520	East	
	1320	West	
8	1440	ssc	Global disturbance until 2200 UT
9	0315	East	
	0910	West	Substorm lasted until 1100
10	0705		Global disturbance until 1525 UT
11	0940	West	
12			Quiet day
13	0410	East	
	0540	East	
	0710	East	
	0850	Near center	
	1030	West	
14	0230	East	
	0600	Near center	
	1035	West	
	1215	West	
15	0115	East	
	0415	East	Moderate intensity
	0810	East	
	0930	Near center	
	2335	East	
16	0055	East	
	0325	East	
	0400	East	Moderate intensity
	0505	East	
	0620	East	Moderate intensity
	0715	Near center	1330-1840 General disturbance
	2305	East	
17	0040	East	
	0225	East	Series of substorms through 0540
	0725	Centered	Moderately intense
	1415	West	Substorm intense through 1700, entire north American sector affected
18	0105	East	
	0230	East	
	0850	West	Auroral stations have series of substorms through 1800
19	0120	East	
	0215	East	
	0330	East	
	1140	West	Auroral stations have series of substorms through 1730
	1400	West	
20			Low level activity, no distinct onsets
21	0230	East	
	0500	East	
	0825	West	
22	0410	East	1st onset of double onset SS - weak
	0500	East	2nd onset of double onset SS - major
	0900	Centered	Central meridian passed over Boulder from west to east
	2210	East	Boulder on dayside; Alaska chain shows high latitude disturbance
23	0015	East	Boulder sees partial ring current enhancement
	0500	East	1st of double onset SS - weak
	0530	East	2nd of double onset SS - major
	1055	West	Continuous activity until 1600 UT
24	0555	East	Very weak; Boulder sees D perturbation only
25			Quiet day
26	0315	East	Boulder sees partial ring current injection
	0645	Centered	
	1335		SSC - Mag storm begins; persists through end of day
27			Mag storm continues through approximately 2000 UT
28	0145	East	1st of double-onset SS - weak
	0250	East	2nd of double-onset SS - major
	0745	West	
			1310-1645 - Auroral zone activity west; Boulder disturbed, no distinct onset
29	0645	West	1st of multiple onset SS lasting to approximately 1700 UT
	0845	West	
	1045	West	
	1250	West	
	1600	West	
30	0245	East	
	0340	East	
	0505	East	
	0610	East	
	0735	Centered	Boulder crossed central meridian
	0815	West	Multiple onsets continue until 1725 UT
31	1100	West	1st of series of 4 SS detected network-wide
	1300	West	
	1410	West	
	1455	West	Auroral zone disturbance continued until 1650

SGD 404 Part I (Prompt)

FEBRUARY 1978 DATA

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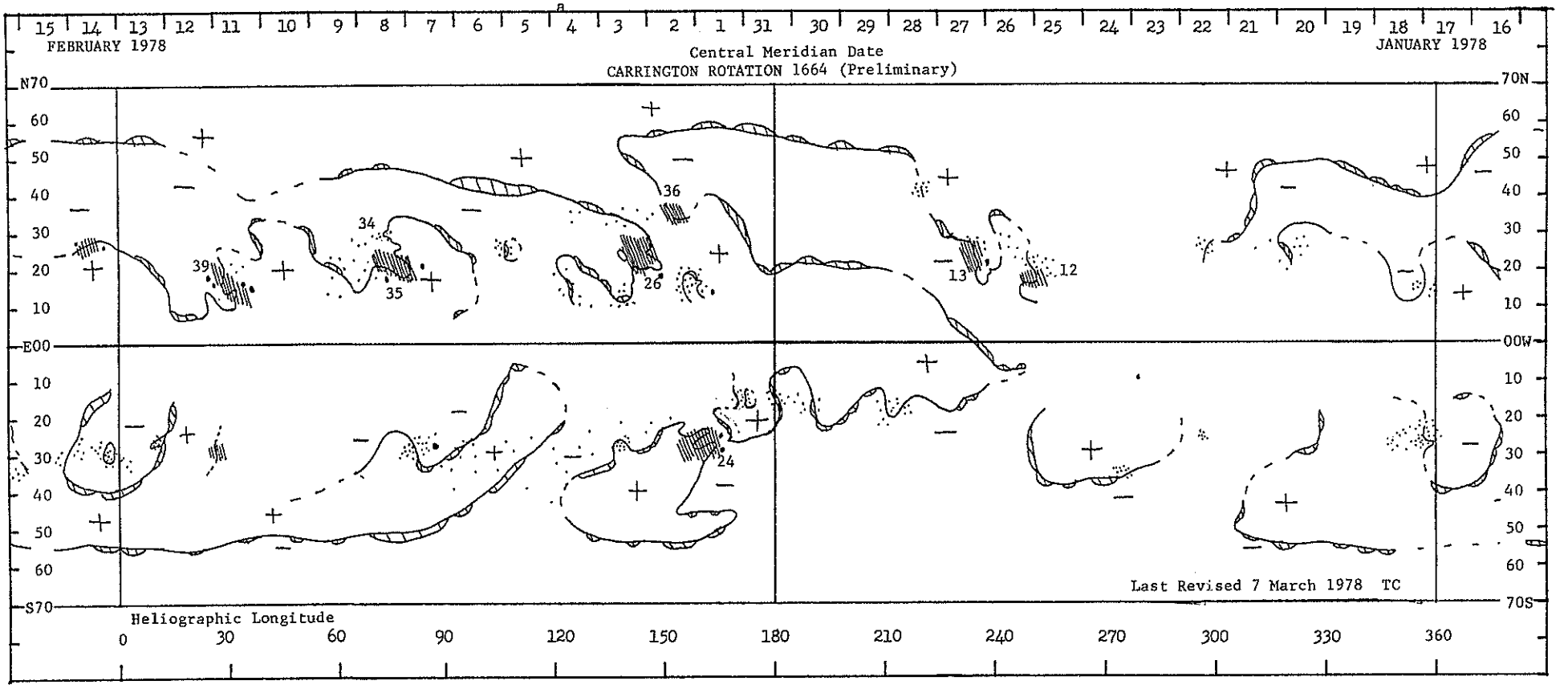
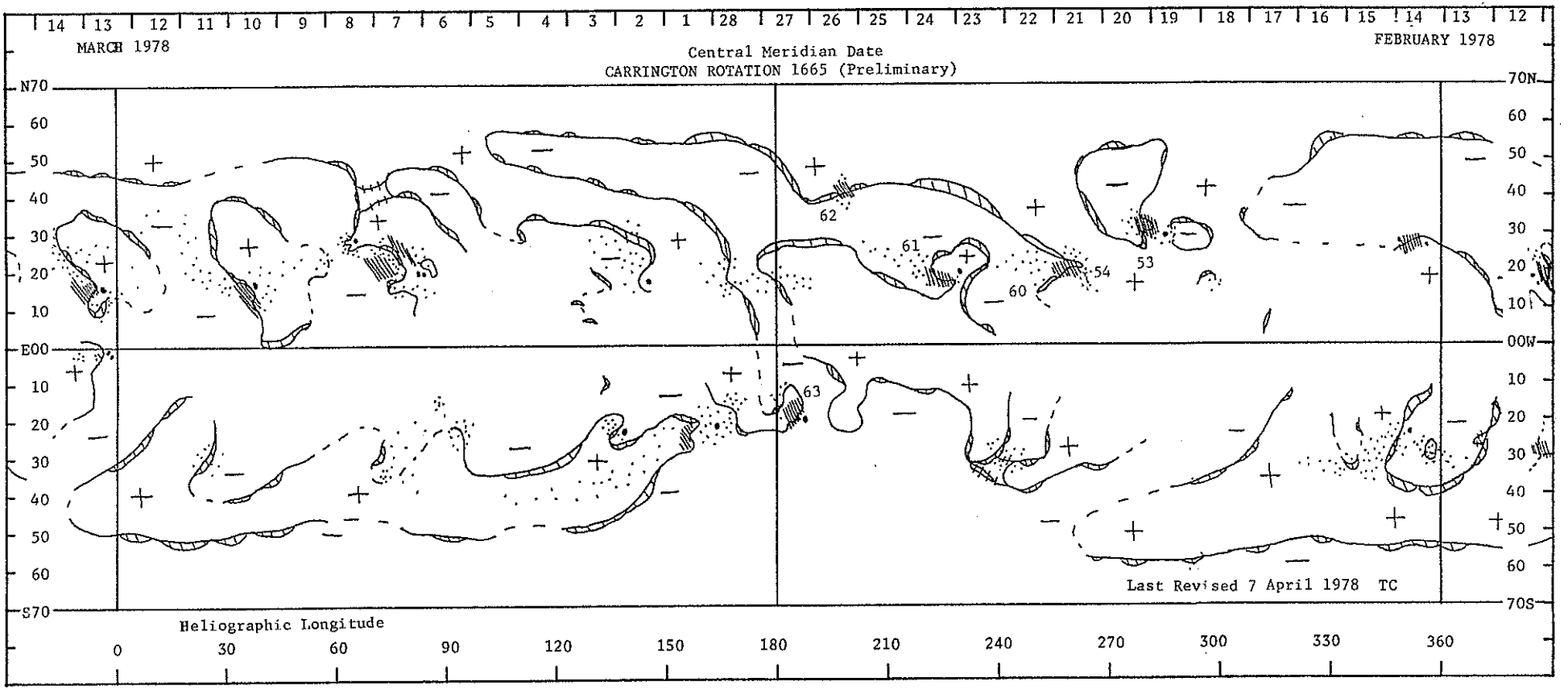
Hα SYNOPTIC CHART
JANUARY - FEBRUARY 1978

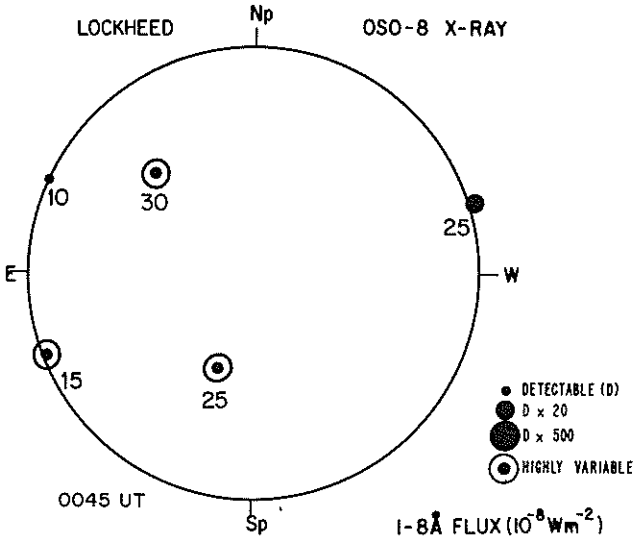


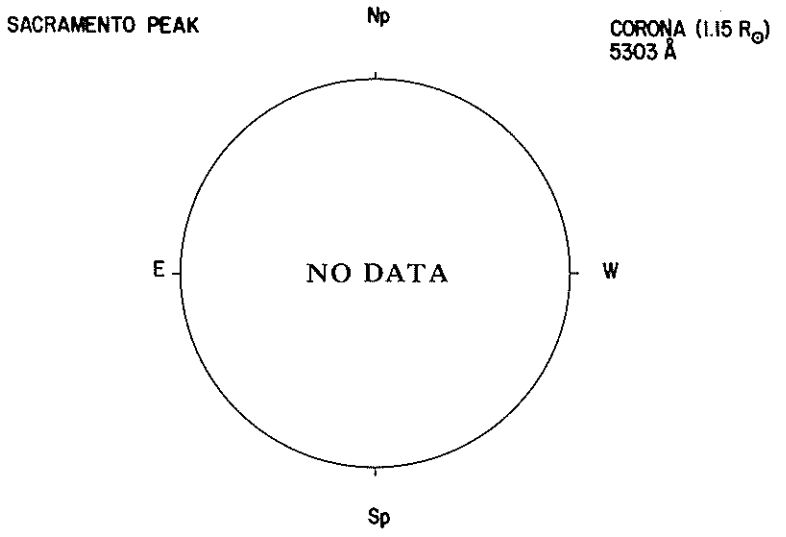
Hα SYNOPTIC CHART

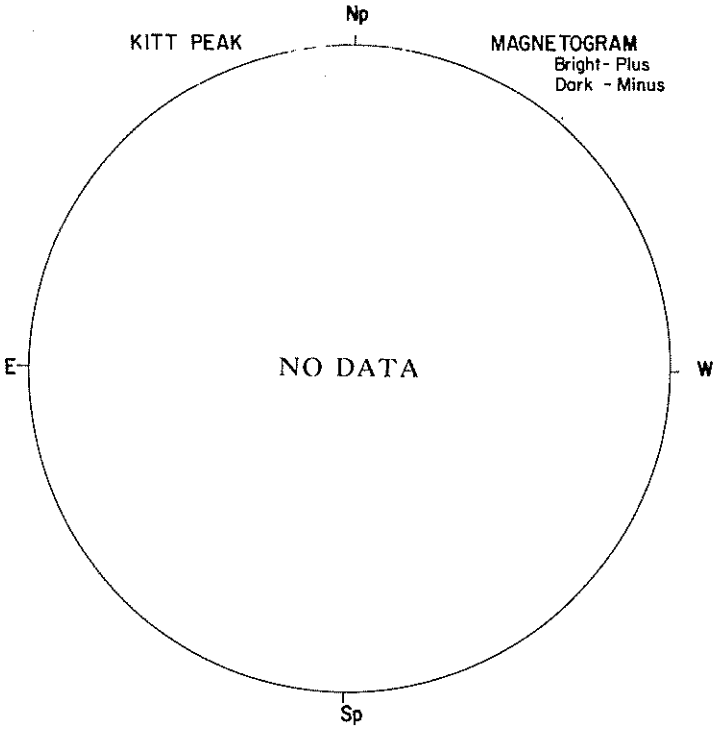
CARRINGTON ROTATION 1665 (PRELIMINARY)

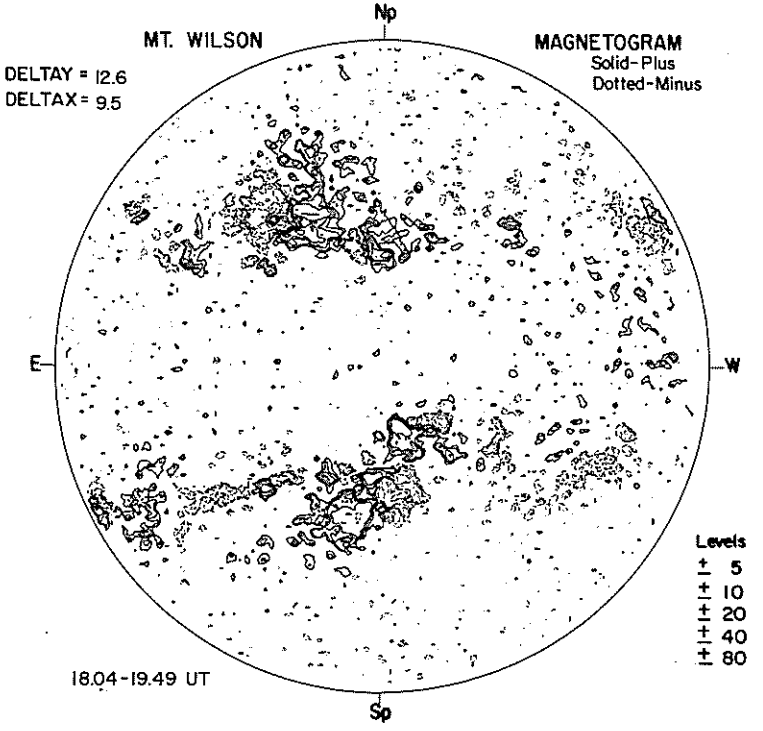


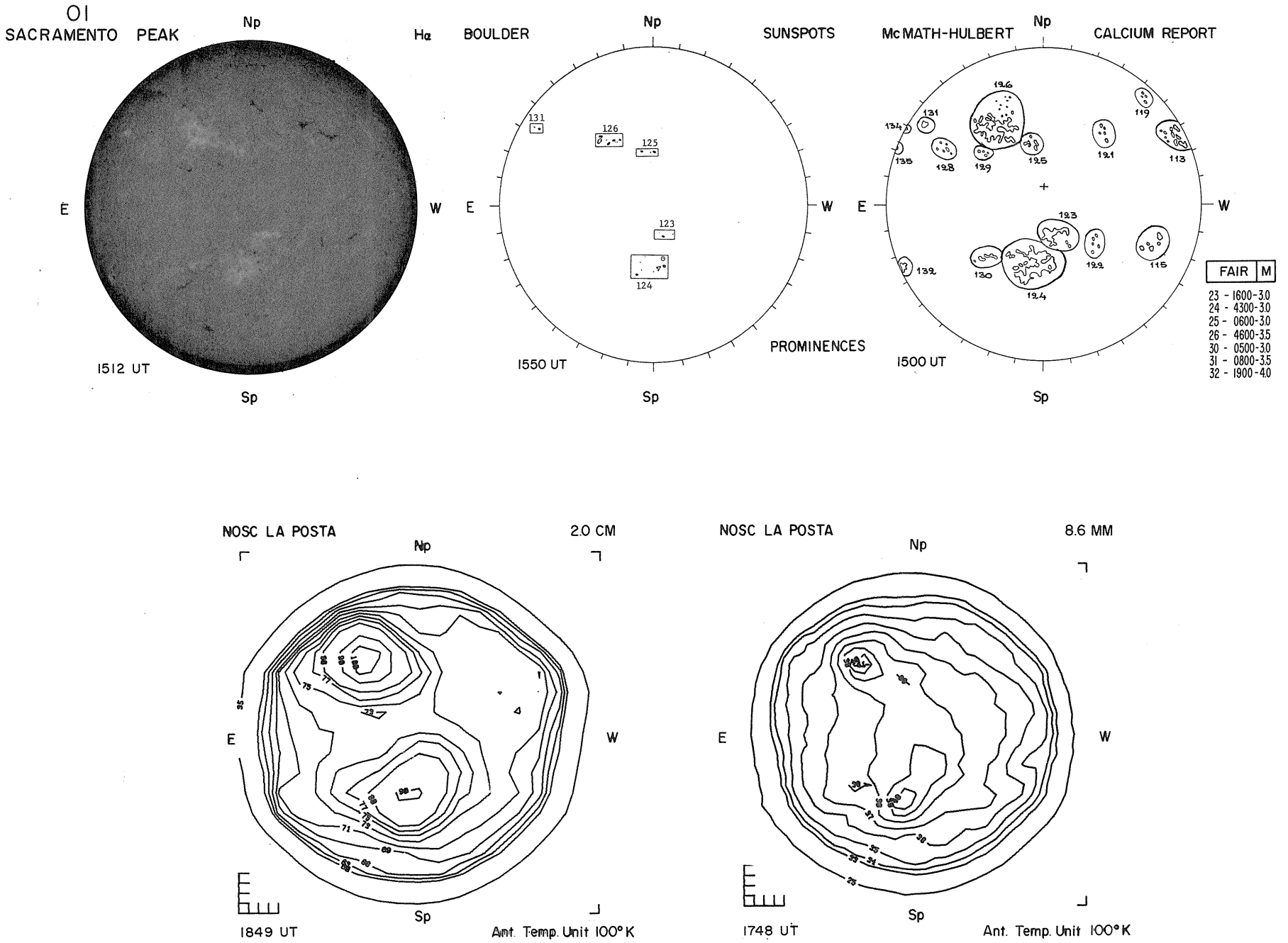
FEBRUARY 1, 1978 (P =-12.07, B_o =-6.03, L_o =172.12)



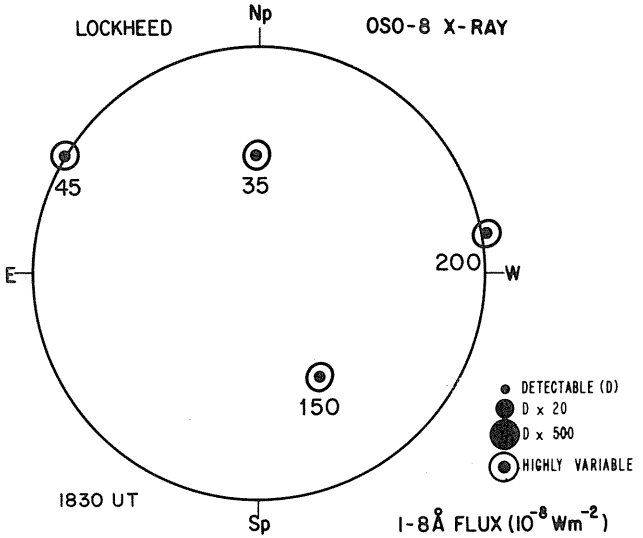


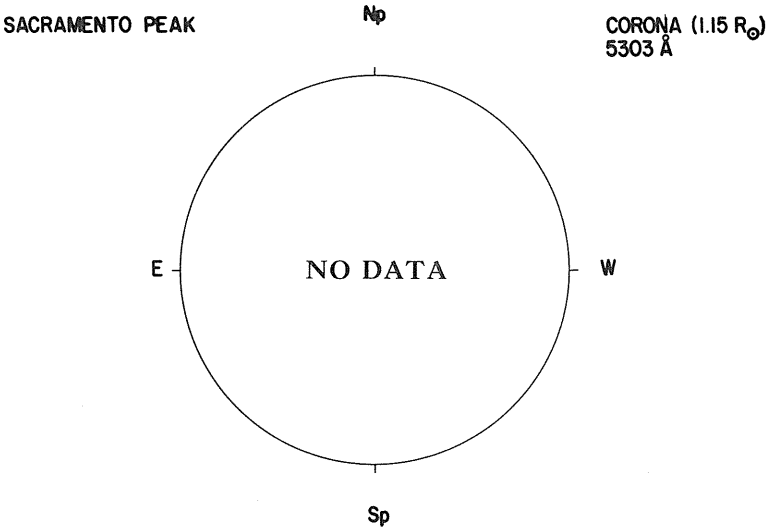


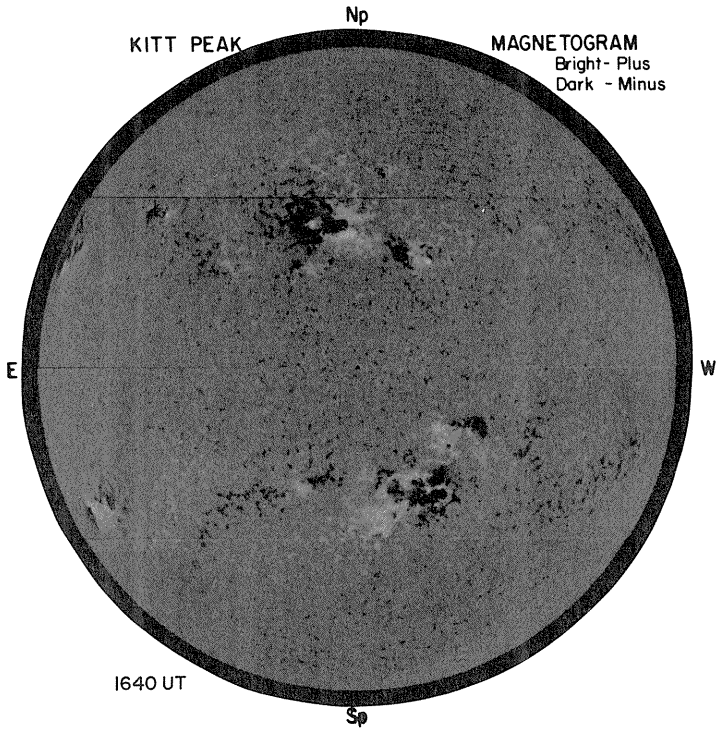


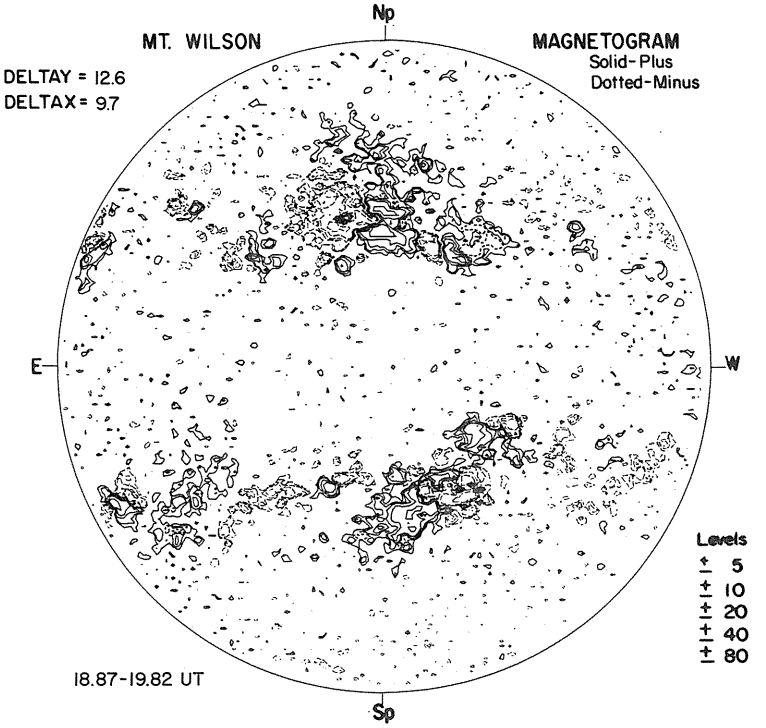

01
SACRAMENTO PEAK
Np
Hα
E
W
Sp
1512 UT
BOULDER
SUNSPOTS
PROMINENCES
1550 UT
McMATH-HULBERT
CALCIUM REPORT
1500 UT
FAIR M
23 - 1600-3.0
24 - 4300-3.0
25 - 0600-3.0
26 - 4600-3.5
30 - 0500-3.0
31 - 0800-3.5
32 - 1900-4.0
NOSC LA POSTA
2.0 CM
1849 UT
Ant. Temp. Unit 100°K
NOSC LA POSTA
8.6 MM
1748 UT
Ant. Temp. Unit 100°K

FEBRUARY 2, 1978 (P =-12.48, B_o =-6.10, L_o =158.95)



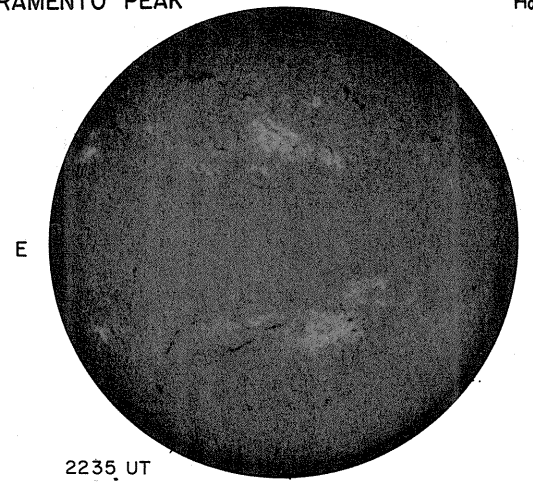






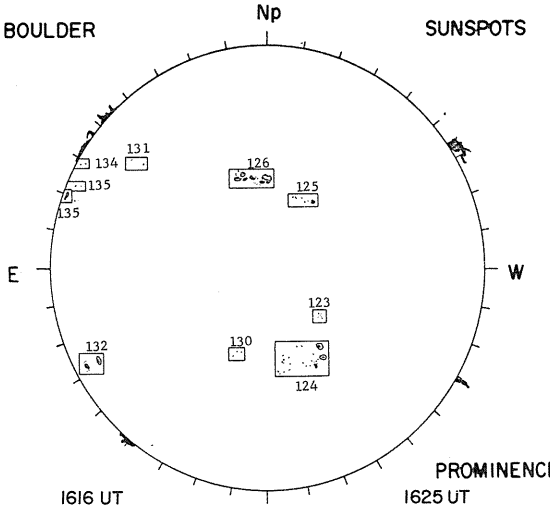
02

SACRAMENTO PEAK Hα



2235 UT

BOULDER SUNSPOTS

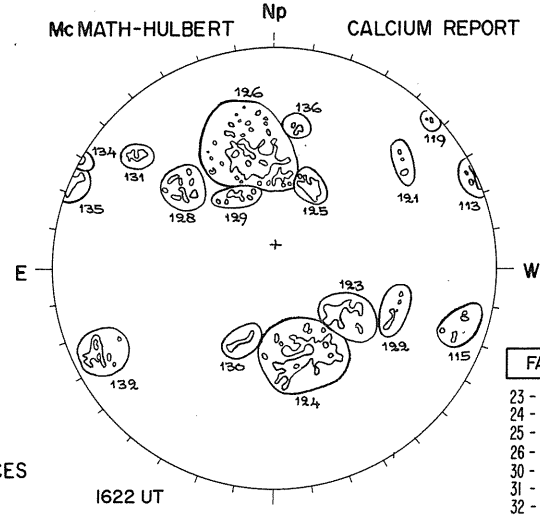


1616 UT

PROMINENCES

1625 UT

McMATH-HULBERT CALCIUM REPORT

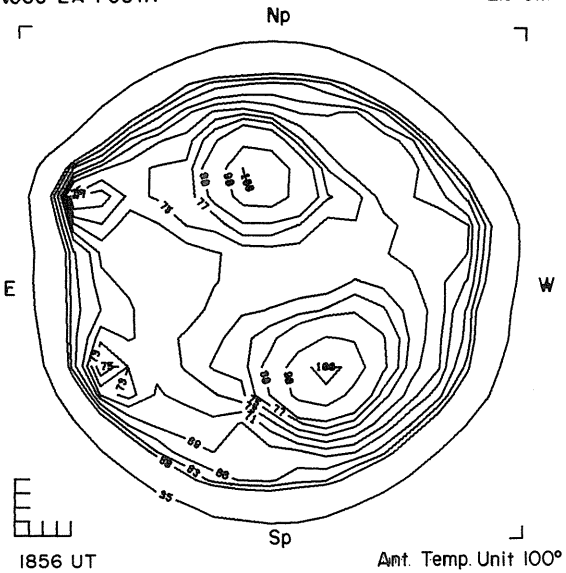


1622 UT

FAIR	S

23 - 1800 - 3.0
24 - 4500 - 3.0
25 - 0800 - 2.5
26 - 4600 - 3.5
30 - 0500 - 3.0
31 - 0600 - 3.0
32 - 1600 - 3.5
34 - 0500 - 3.5
35 - 1700 - 3.5
36 - 0300 - 2.5

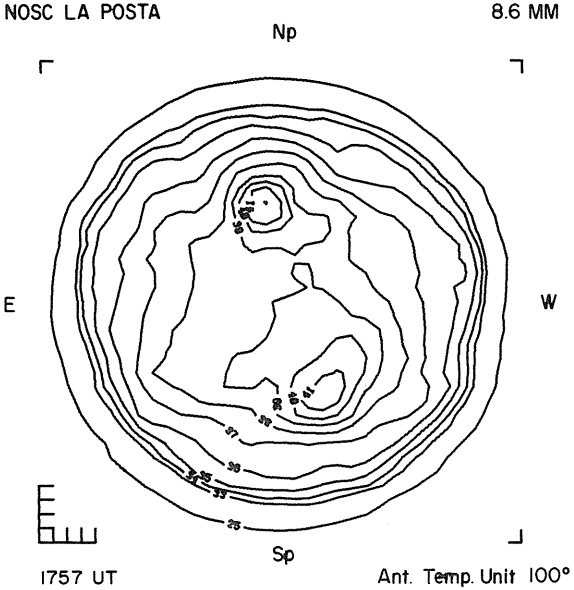
NOSC LA POSTA 2.0 CM



1856 UT

Ant. Temp. Unit 100°K

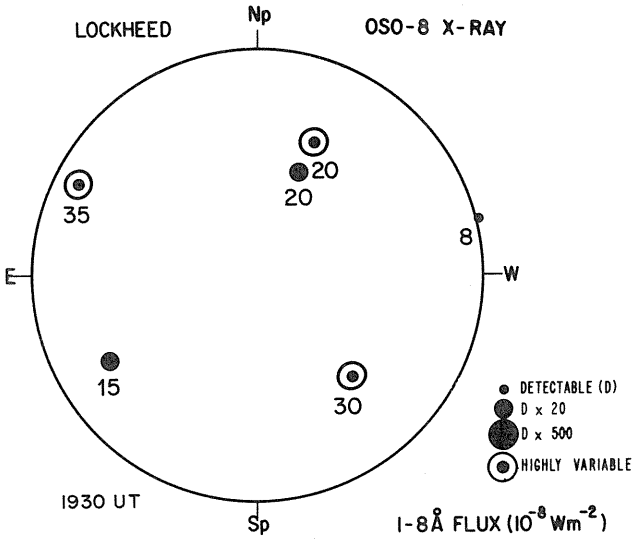
NOSC LA POSTA 8.6 MM

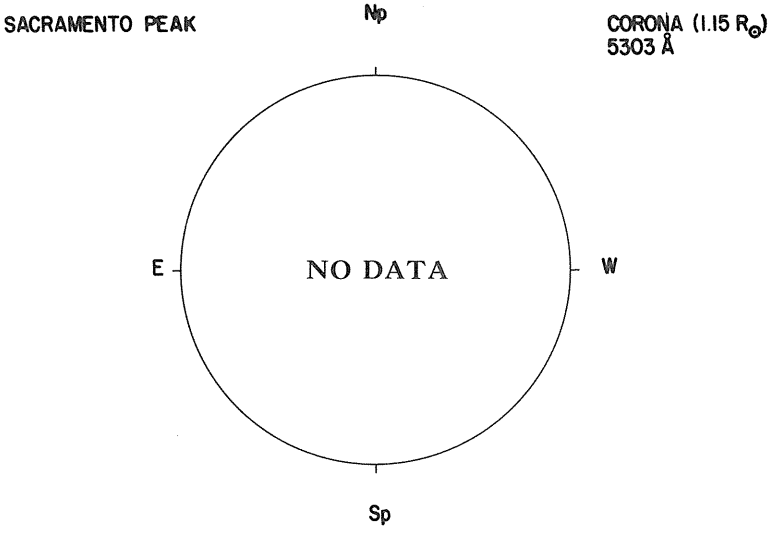


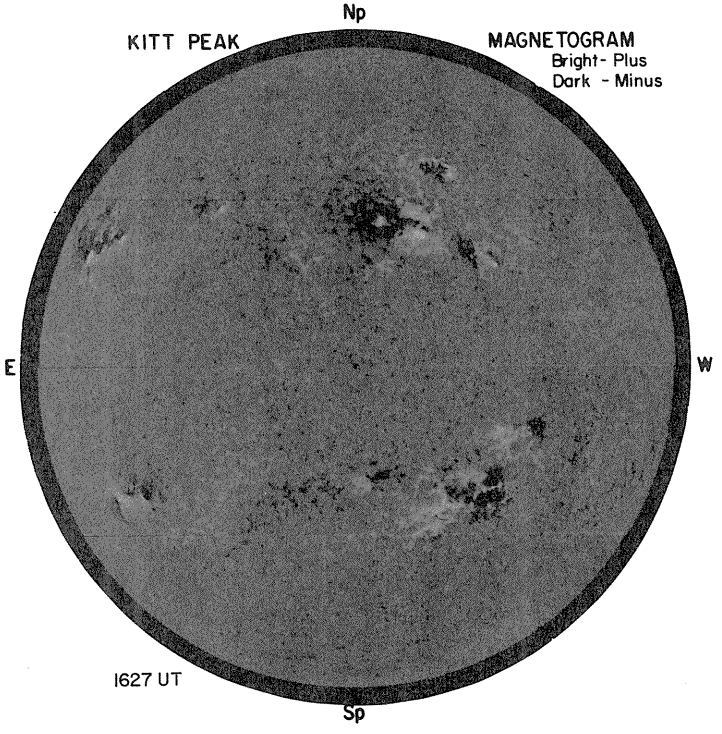
1757 UT

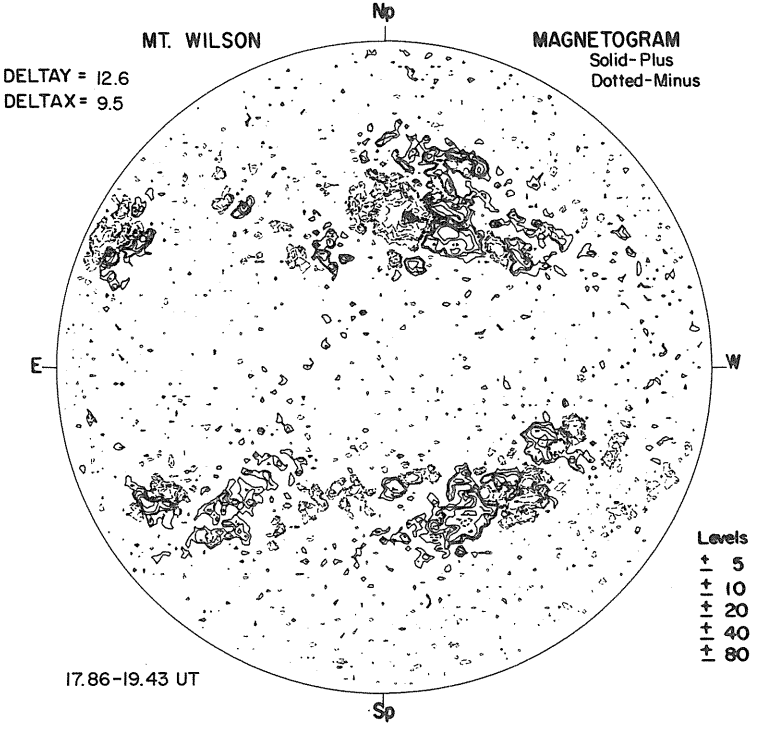
Ant. Temp. Unit 100°K

FEBRUARY 3, 1978 (P =-12.88, B_o =-6.17, L_o =145.79)



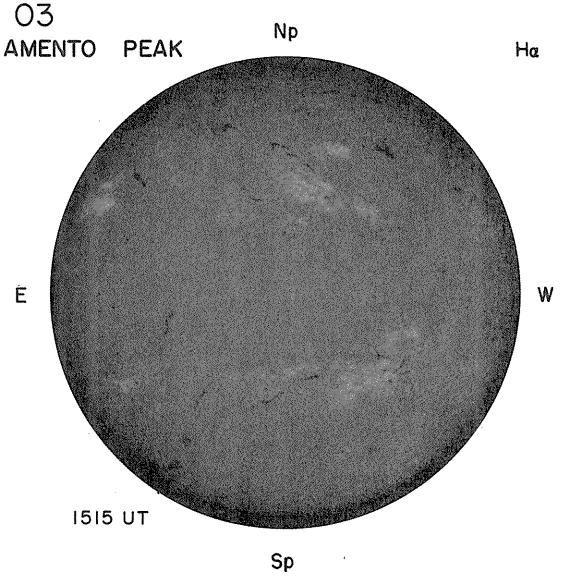






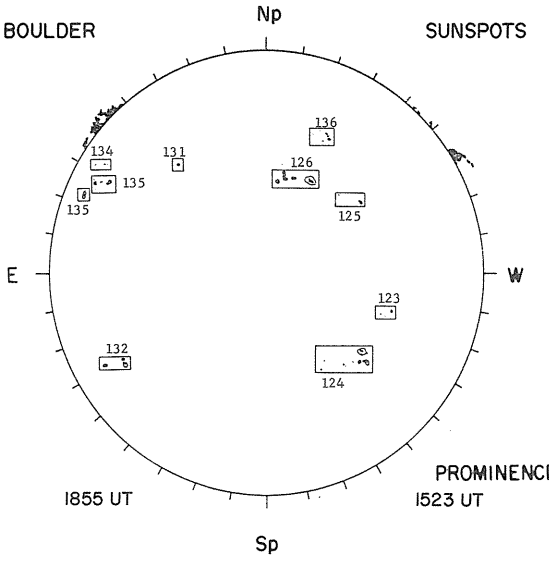
03

SACRAMENTO PEAK Hα



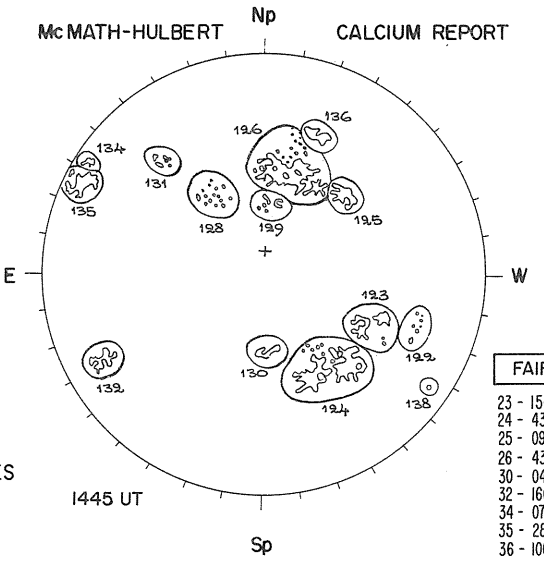
1515 UT

BOULDER SUNSPOTS



1855 UT

McMATH-HULBERT CALCIUM REPORT



PROMINENCES

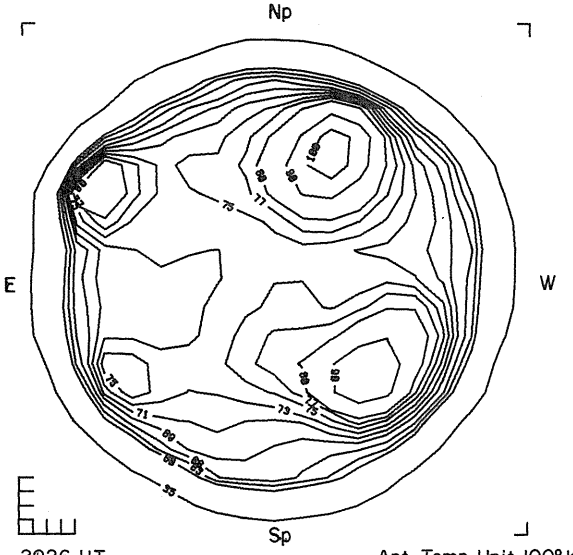
1523 UT

1445 UT

FAIR	M

23 - 1500 - 3.0
24 - 4300 - 3.0
25 - 0900 - 2.5
26 - 4300 - 3.5
30 - 0400 - 3.0
32 - 1600 - 3.5
34 - 0700 - 3.5
35 - 2800 - 3.5
36 - 1000 - 4.0

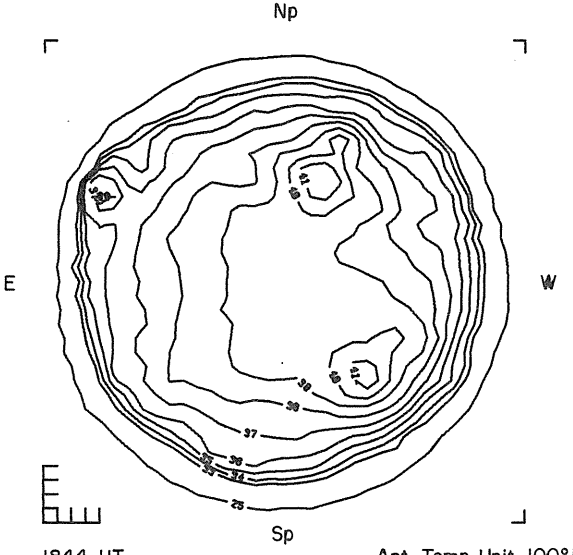
NOSC LA POSTA 2.0 CM



2026 UT

Ant. Temp. Unit 100° K

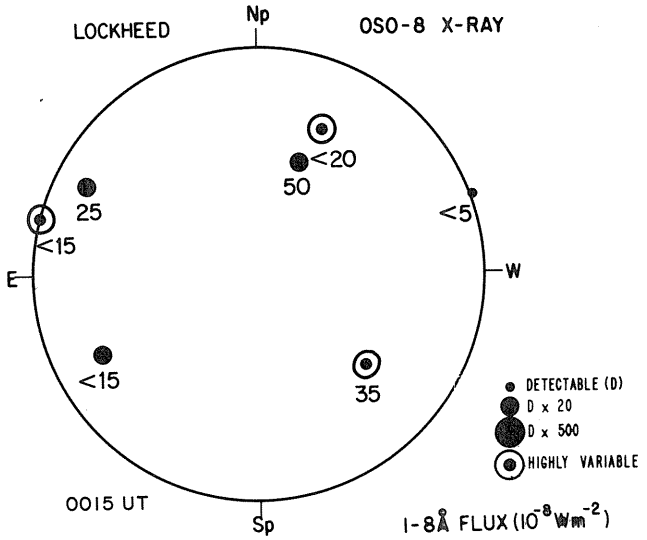
NOSC LA POSTA 8.6 MM

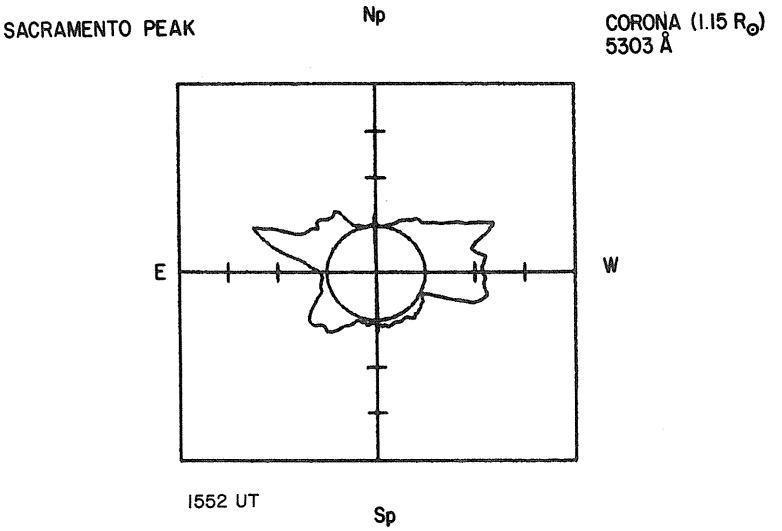


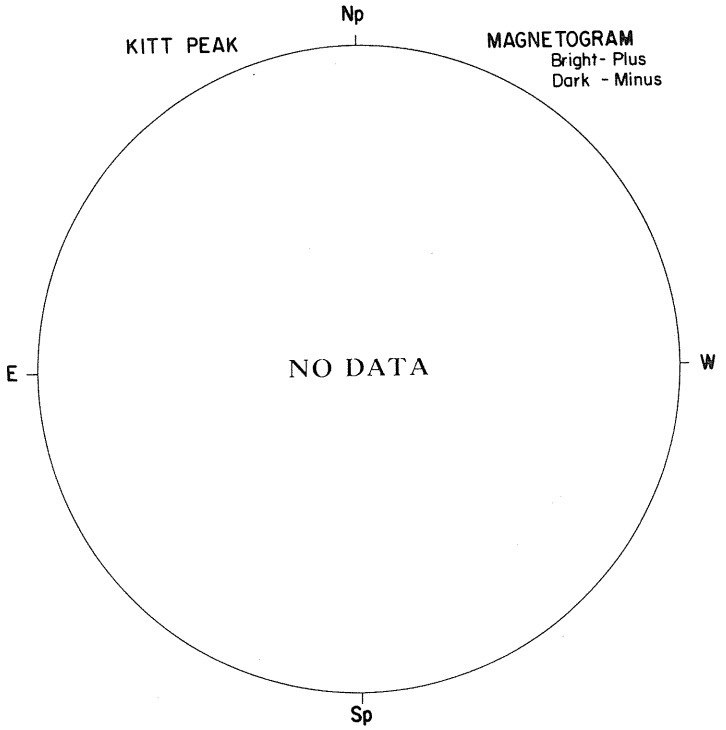
1844 UT

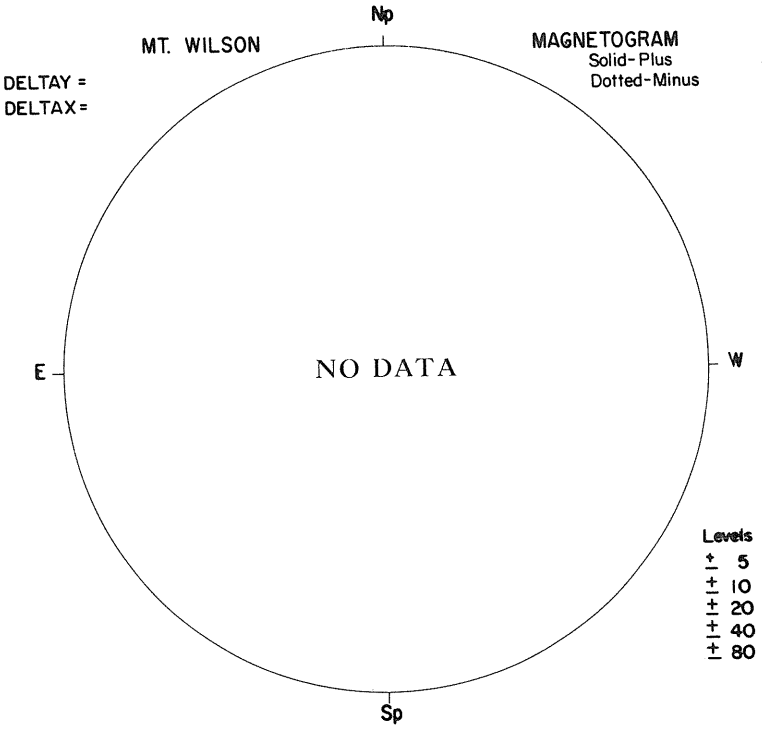
Ant. Temp. Unit 100° K

FEBRUARY 4, 1978 (P =-13.28, B_o =-6.23 L_o =132.62)



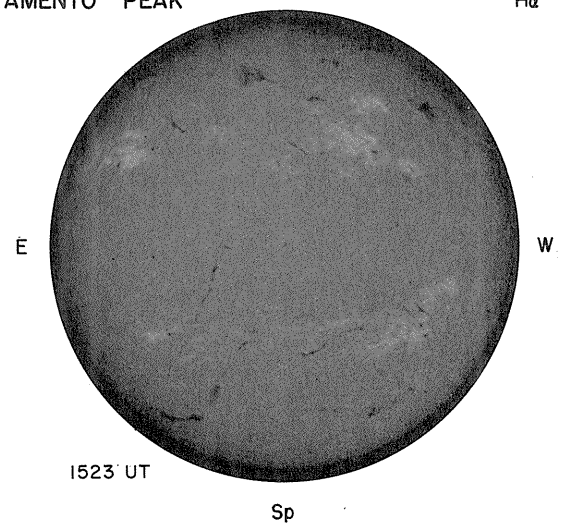






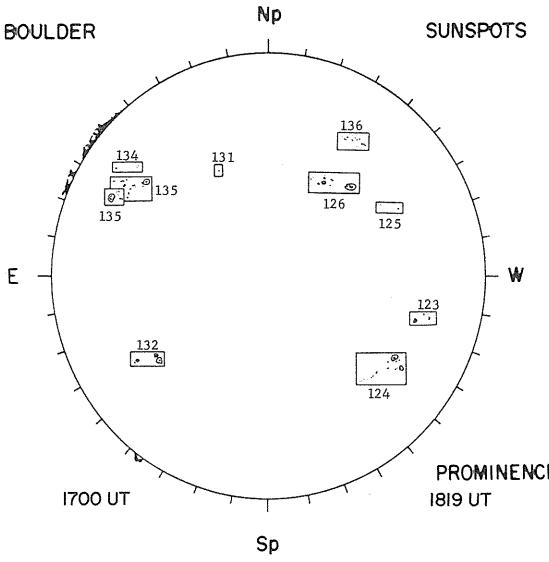
04

SACRAMENTO PEAK Hα



1523 UT

BOULDER SUNSPOTS

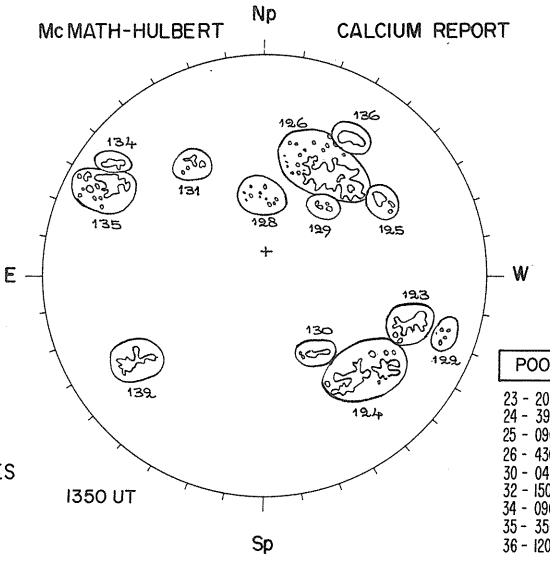


1700 UT

PROMINENCES

1819 UT

McMATH-HULBERT CALCIUM REPORT

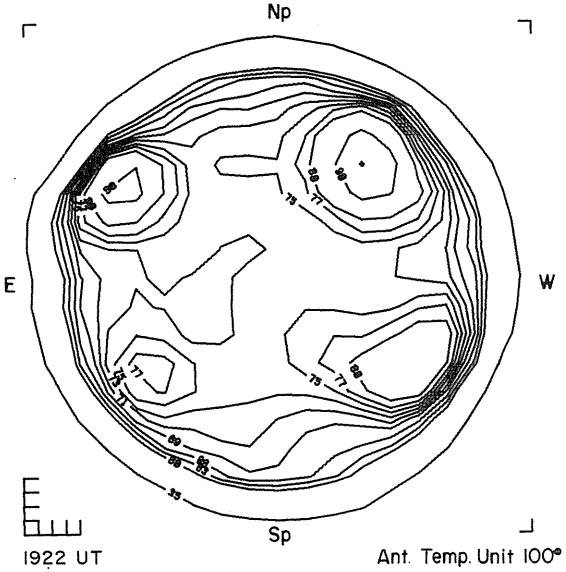


1350 UT

POOR	M

23 - 2000 - 30
24 - 3900 - 30
25 - 0900 - 25
26 - 4300 - 35
30 - 0400 - 25
32 - 1500 - 30
34 - 0900 - 30
35 - 3500 - 35
36 - 1200 - 35

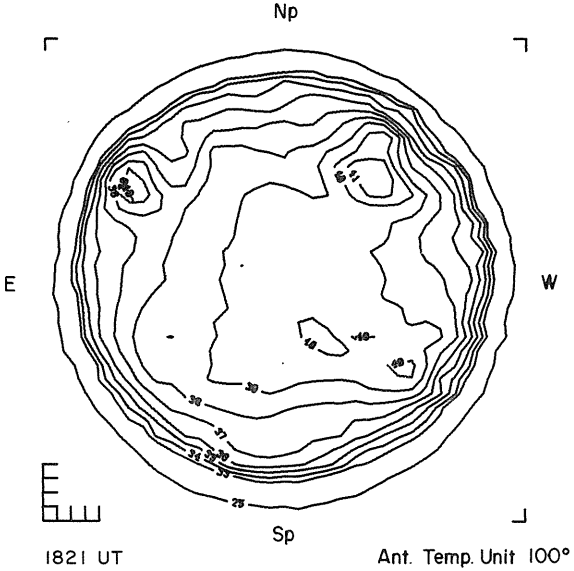
NOSC LA POSTA 2.0 CM



1922 UT

Ant. Temp. Unit 100° K

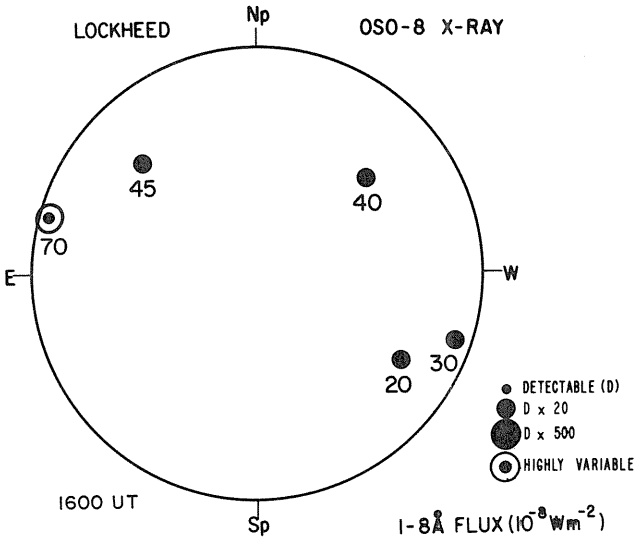
NOSC LA POSTA 8.6 MM

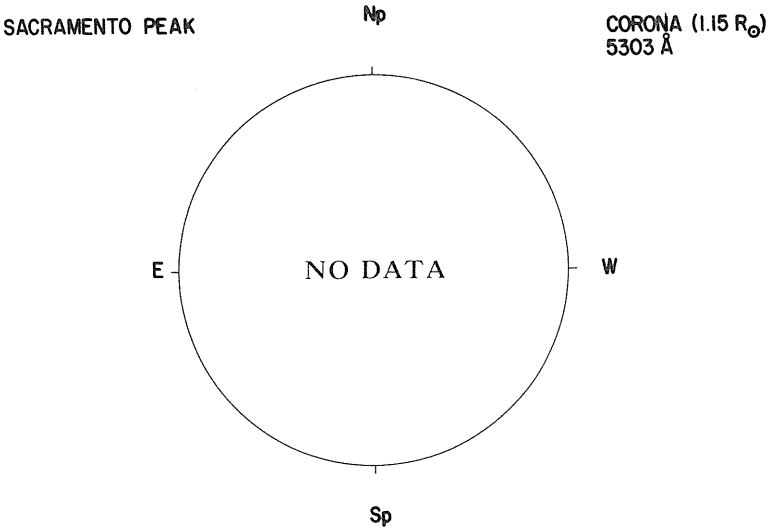


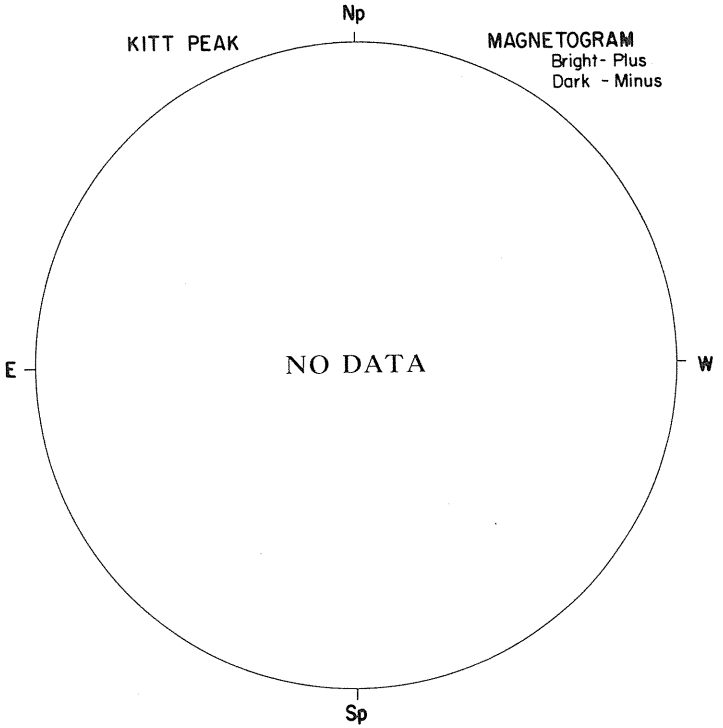
1821 UT

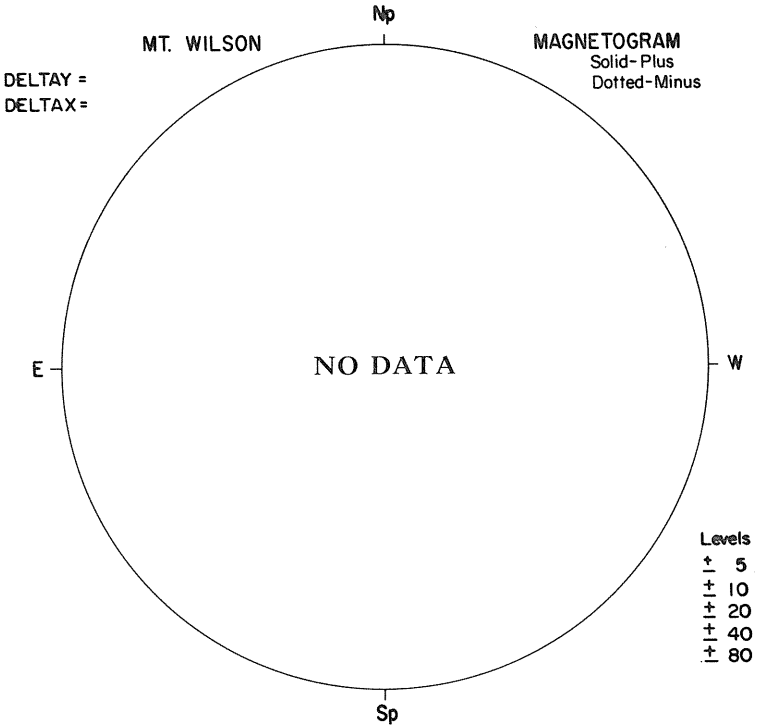
Ant. Temp. Unit 100° K

FEBRUARY 5, 1978 (P =-13.67, B_o =-6.30, L_o =119.45)





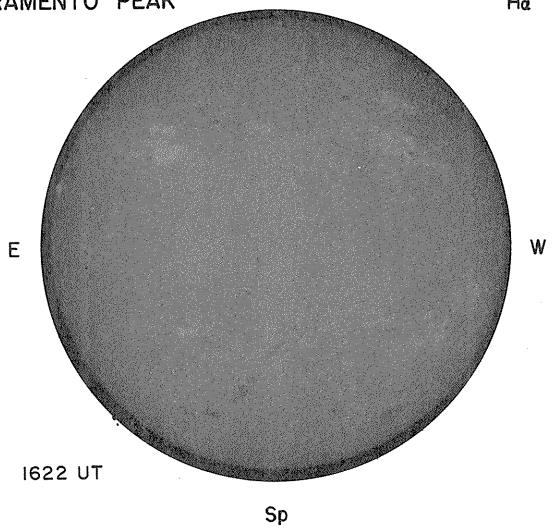




05

SACRAMENTO PEAK

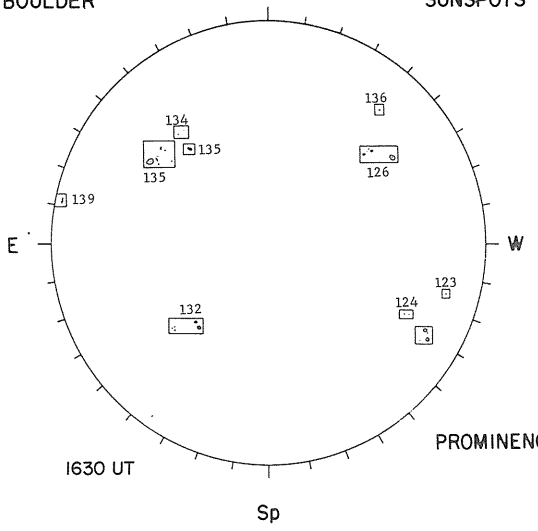
Hα



1622 UT

BOULDER

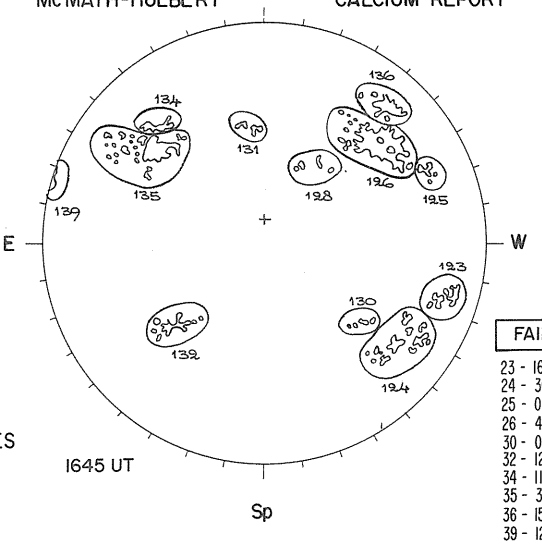
SUNSPOTS



1630 UT

McMATH-HULBERT

CALCIUM REPORT



1645 UT

FAIR	D

23 - 1600 - 30
24 - 3000 - 35
25 - 0600 - 25
26 - 4300 - 35
30 - 0300 - 25
32 - 1200 - 35
34 - 1100 - 35
35 - 3200 - 35
36 - 1500 - 30
39 - 1200 - 40

PROMINENCES

NOSC LA POSTA

Np

2.0 CM

NO DATA

E

WEATHER

W

Sp

---- UT

Ant. Temp. Unit 100° K

NOSC LA POSTA

Np

8.6 MM

NO DATA

E

WEATHER

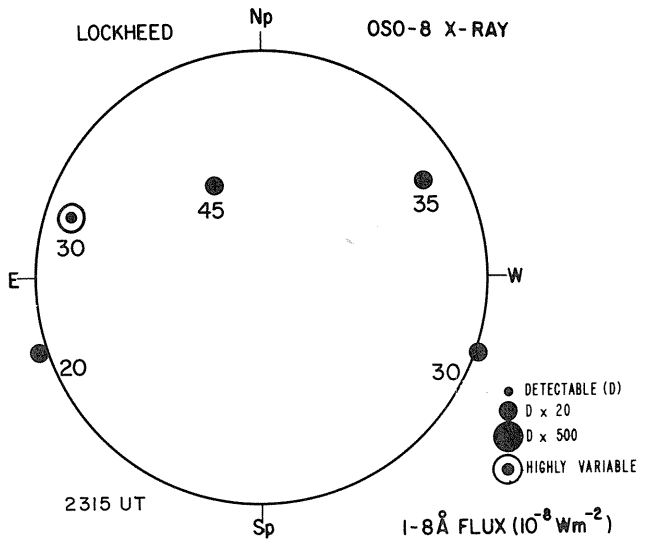
W

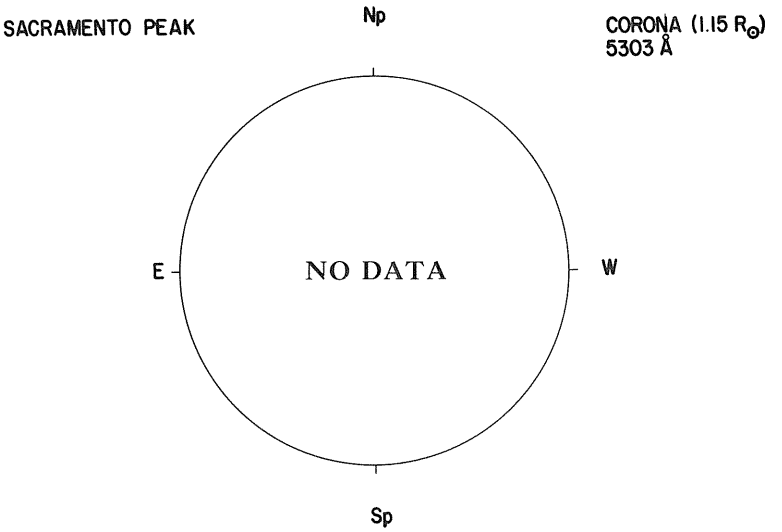
Sp

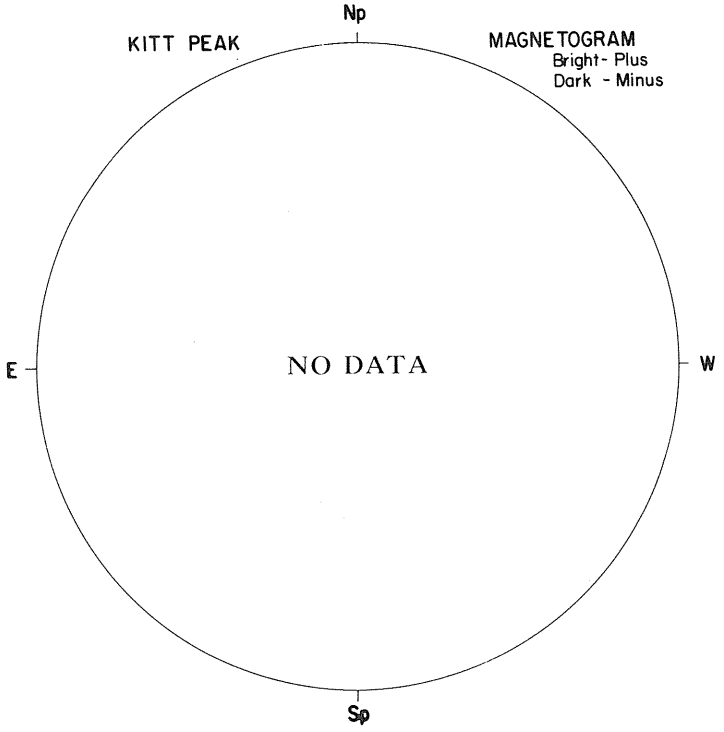
---- UT

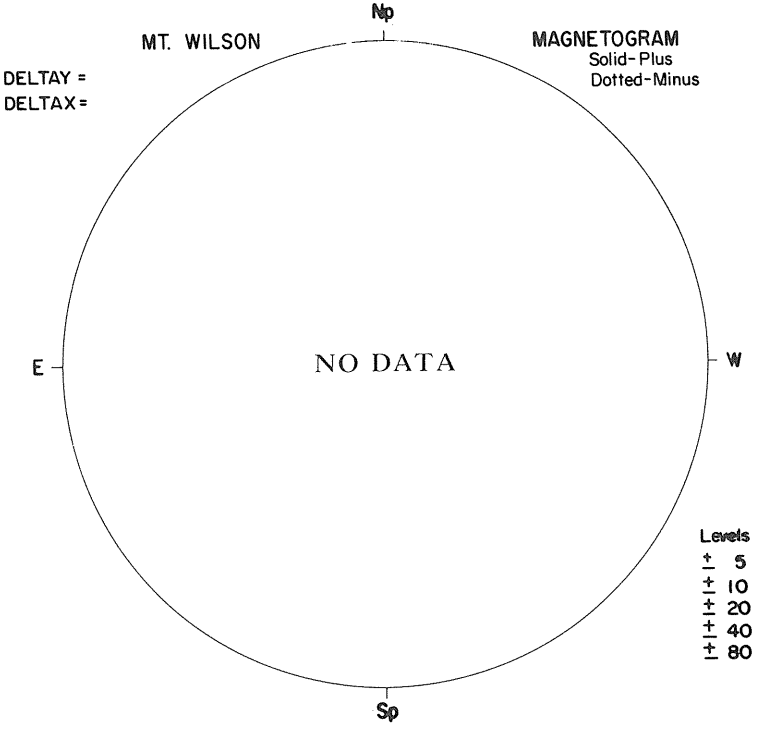
Ant. Temp. Unit 100° K

FEBRUARY 6, 1978 (P =-14.06, B_o =-6.36, L_o =106.29)



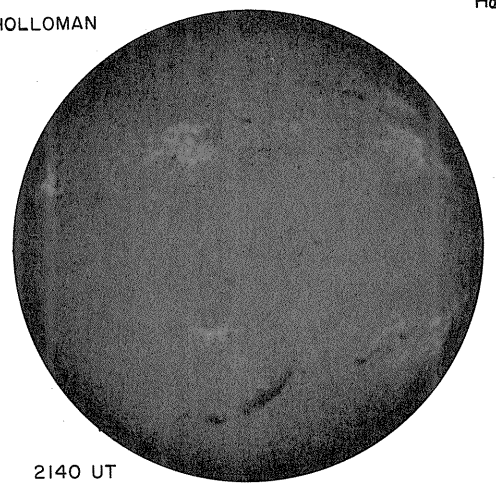






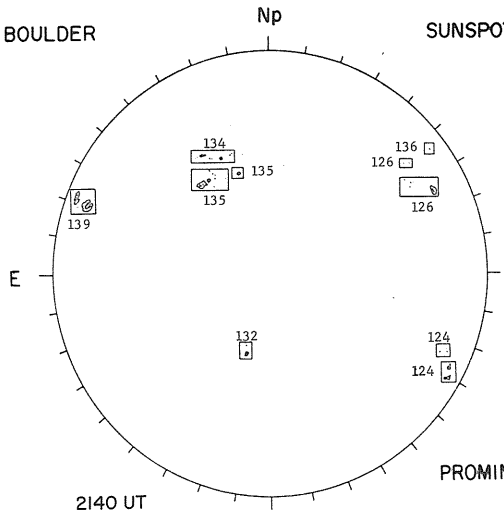
06

HOLLOMAN



2140 UT

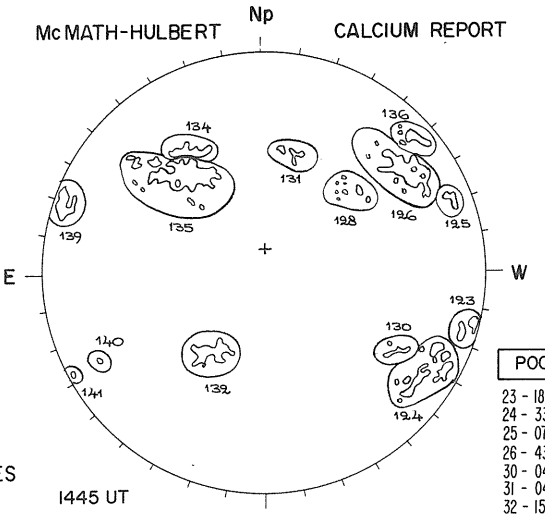
Hα BOULDER



2140 UT

SUNSPOTS

McMATH-HULBERT



1445 UT

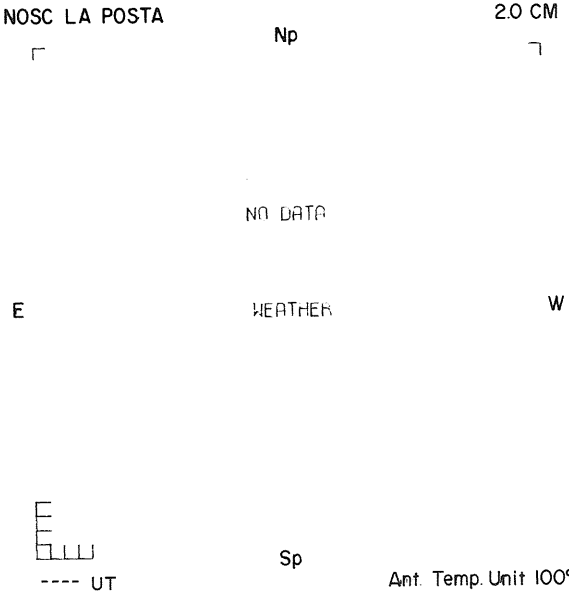
CALCIUM REPORT

POOR	S

23 - 1800 - 3.0
24 - 3300 - 3.0
25 - 0700 - 2.5
26 - 4300 - 3.0
30 - 0400 - 2.5
31 - 0400 - 2.5
32 - 1500 - 3.0
34 - 1200 - 3.0
35 - 3500 - 3.0
36 - 1500 - 3.0
39 - 2800 - 4.0

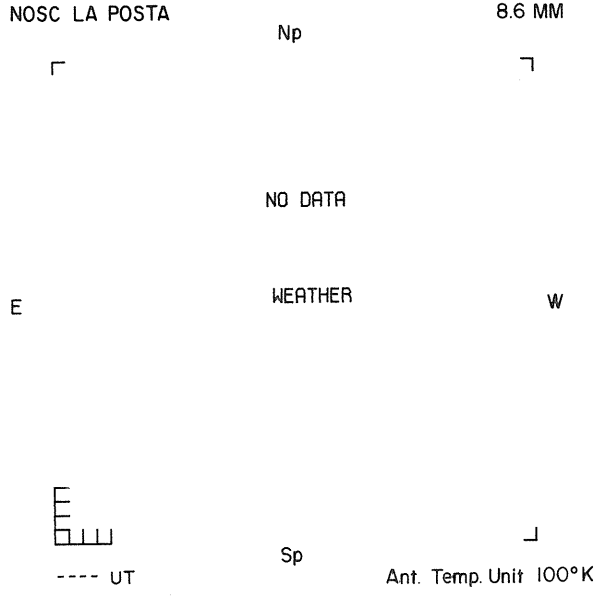
PROMINENCES

NOSC LA POSTA



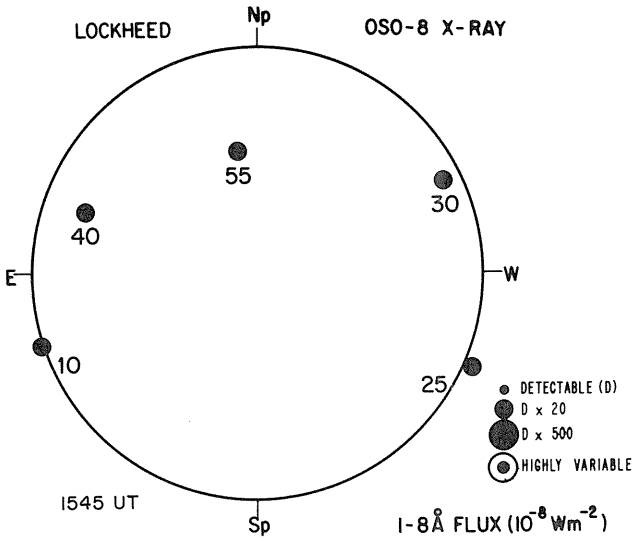
2.0 CM

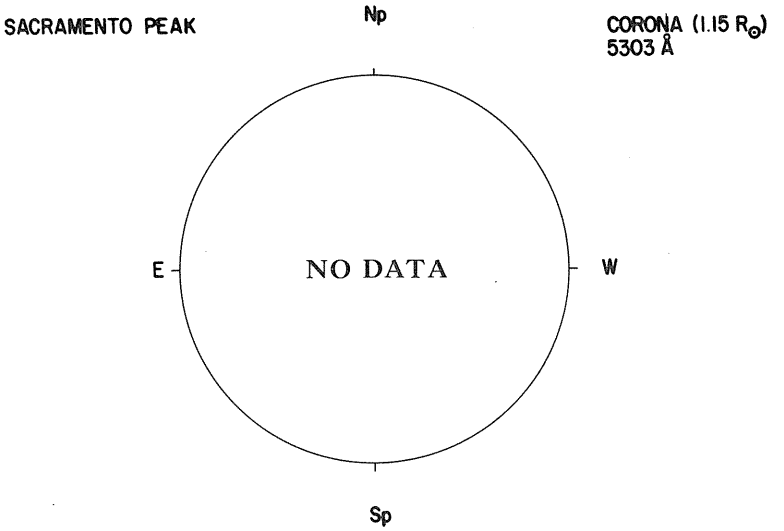
NOSC LA POSTA

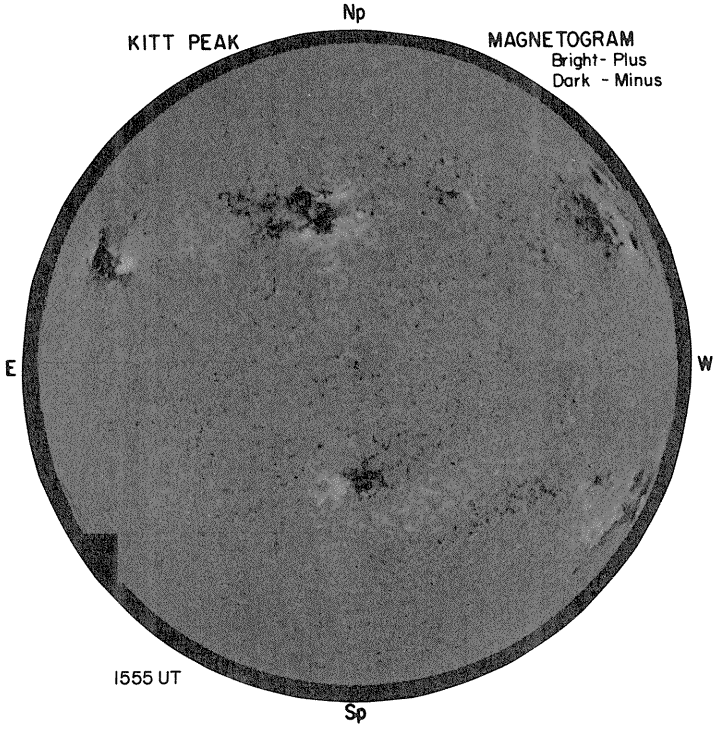


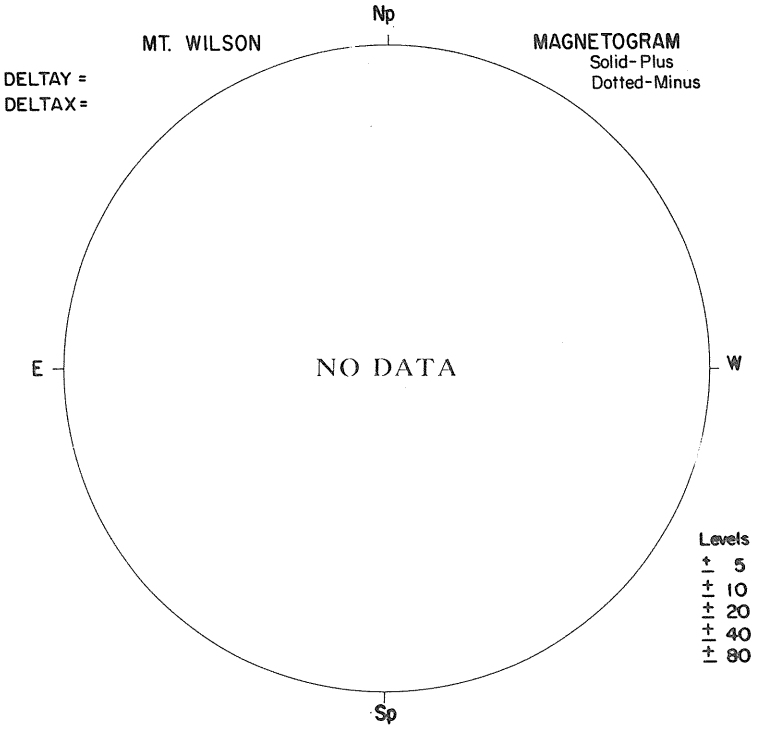
8.6 MM

FEBRUARY 7, 1978 (P =-14.45, B_o =-6.42, L_o =93.12)



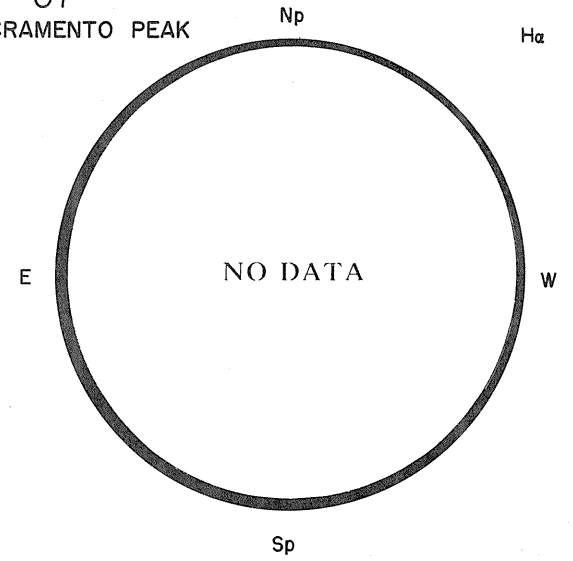




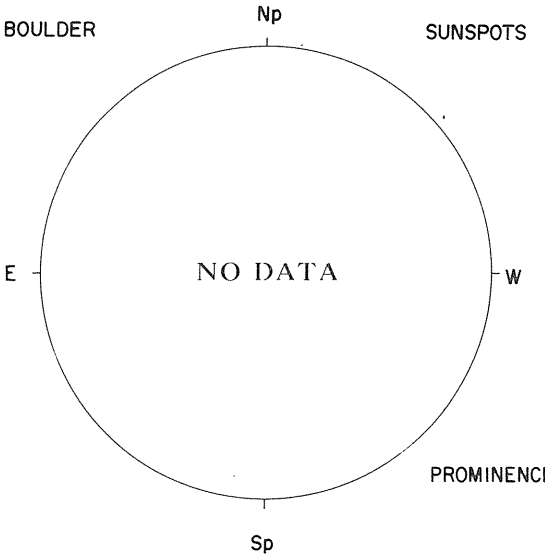


07

SACRAMENTO PEAK

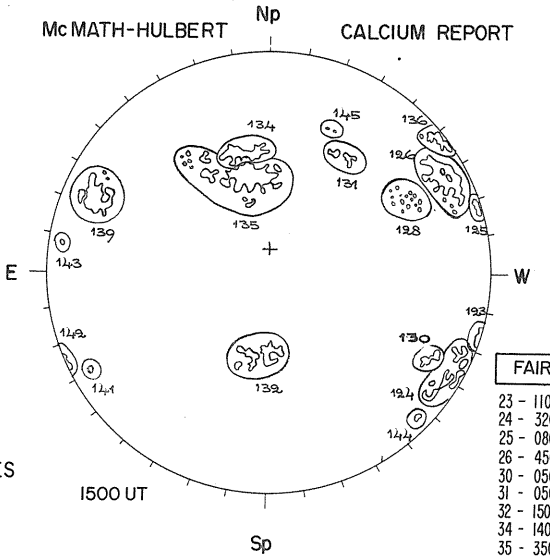


Hα BOULDER



SUNSPOTS

McMATH-HULBERT



1500 UT

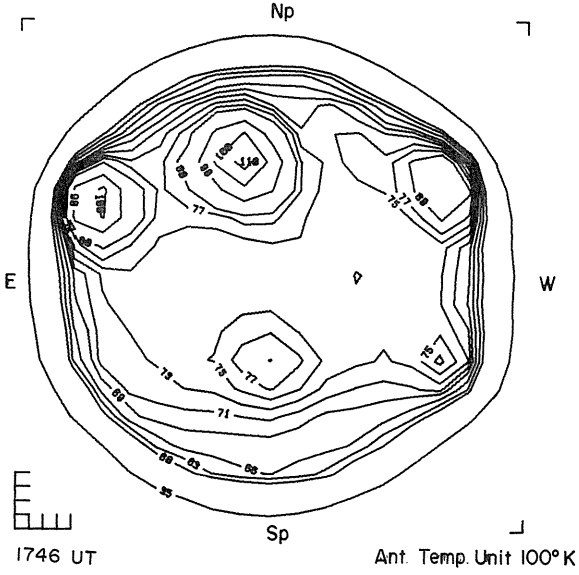
CALCIUM REPORT

FAIR	M

23 - 1100 - 2.5
24 - 3200 - 3.0
25 - 0800 - 2.5
26 - 4500 - 3.0
30 - 0500 - 2.5
31 - 0500 - 2.5
32 - 1500 - 3.0
34 - 1400 - 3.0
35 - 3500 - 3.5
36 - 1500 - 3.0
39 - 3700 - 3.5

PROMINENCES

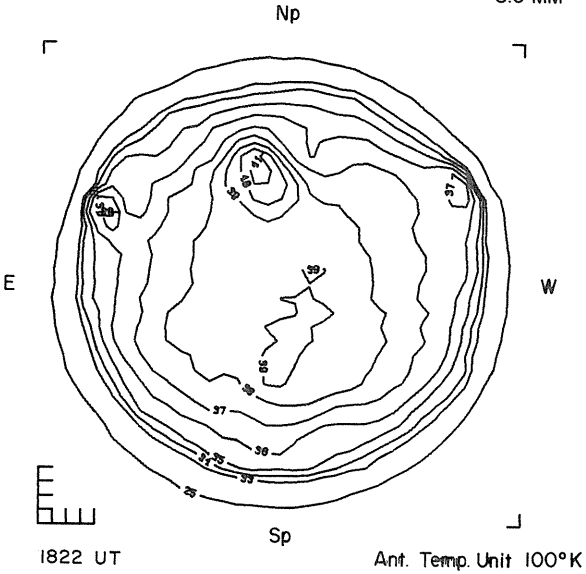
NOSC LA POSTA 2.0 CM



1746 UT

Ant. Temp. Unit 100° K

NOSC LA POSTA 8.6 MM

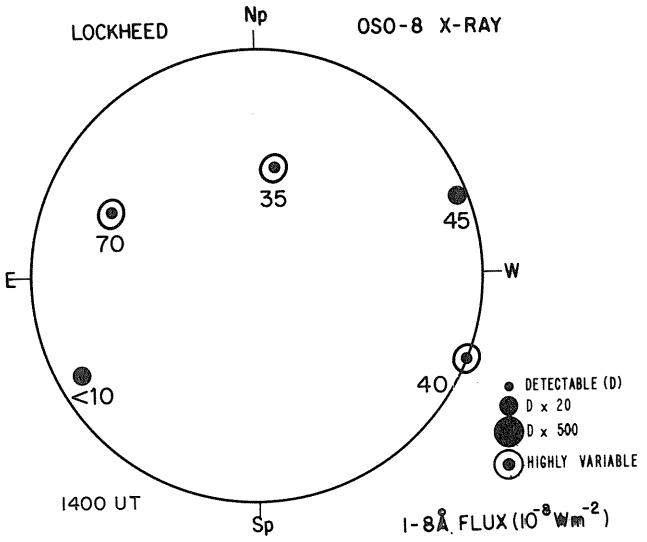


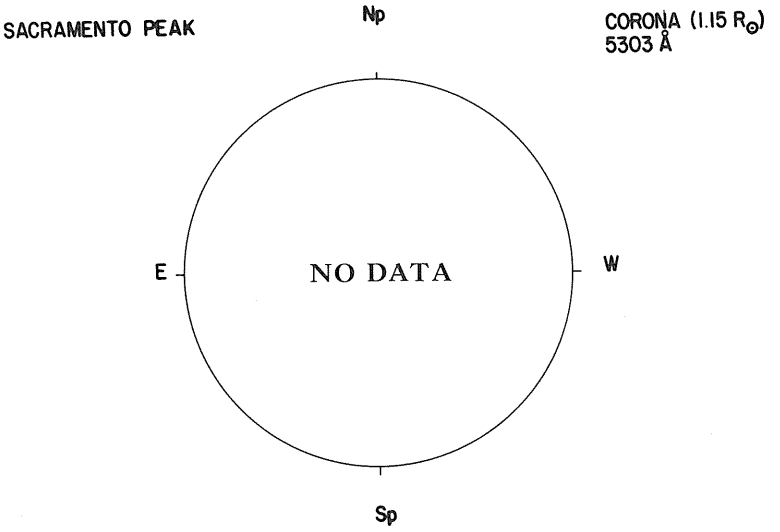
1822 UT

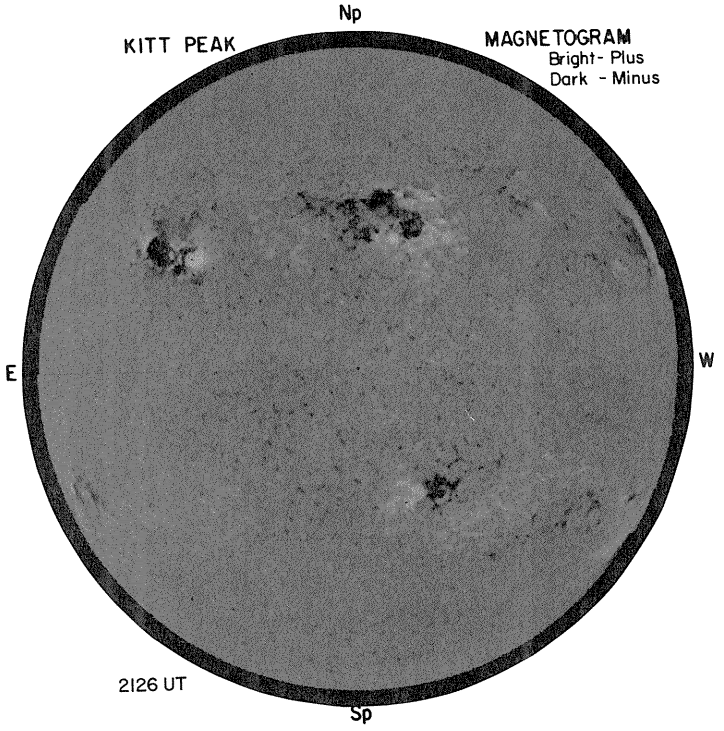
Ant. Temp. Unit 100° K

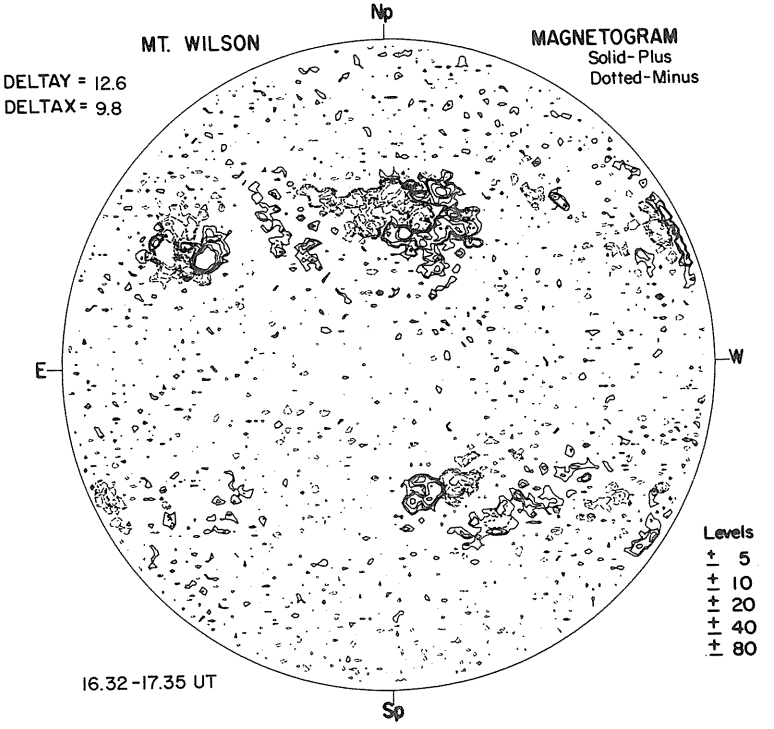
53
Feb 78

FEBRUARY 8, 1978 (P =-14.83, B_o =-6.48, L_o =79.96)



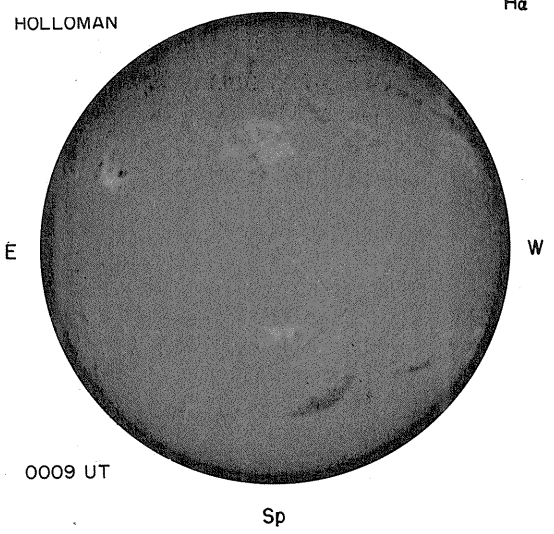






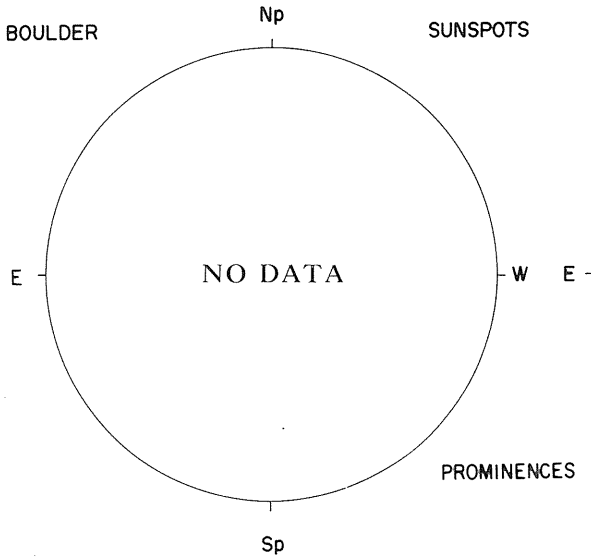
08

HOLLOMAN



0009 UT

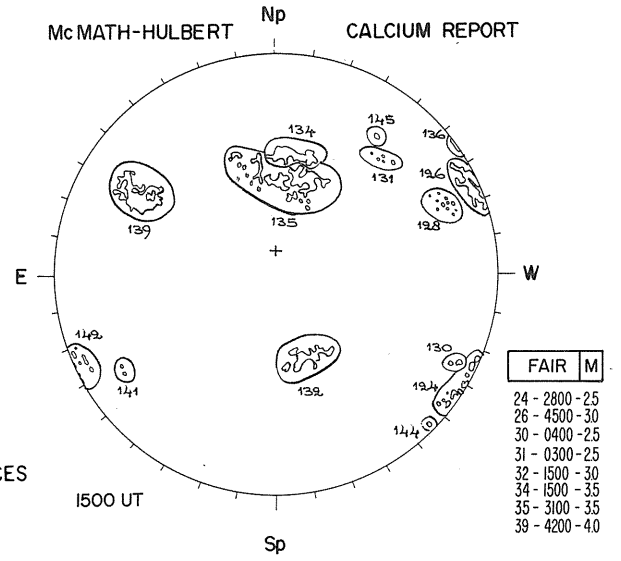
Hα BOULDER



SUNSPOTS

McMATH-HULBERT

CALCIUM REPORT



FAIR	M

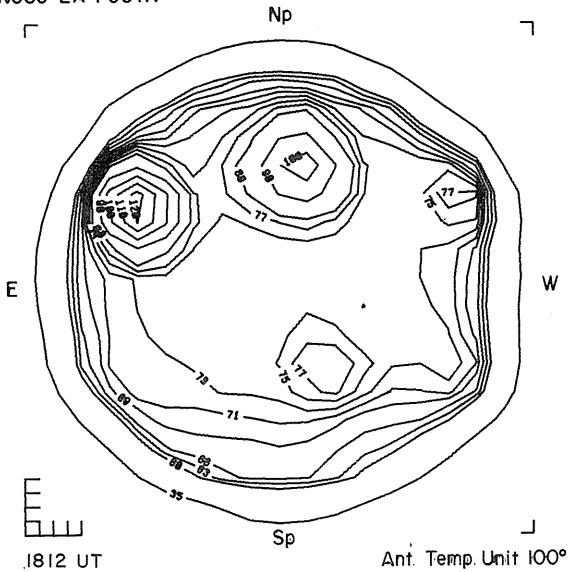
24 - 2800 - 2.5
26 - 4500 - 3.0
30 - 0400 - 2.5
31 - 0300 - 2.5
32 - 1500 - 3.0
34 - 1500 - 3.5
35 - 3100 - 3.5
39 - 4200 - 4.0

PROMINENCES

1500 UT

NOSC LA POSTA

2.0 CM

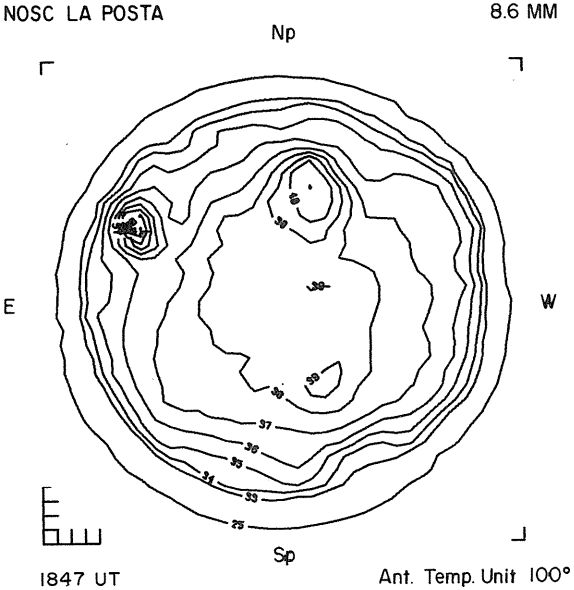


1812 UT

Ant. Temp. Unit 100° K

NOSC LA POSTA

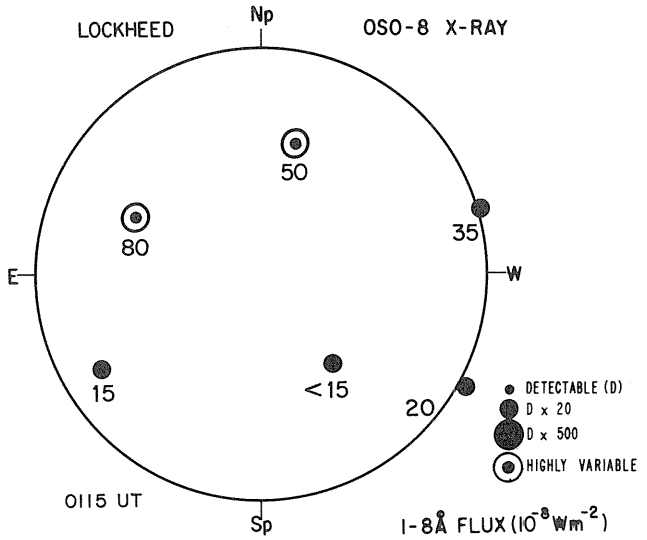
8.6 MM

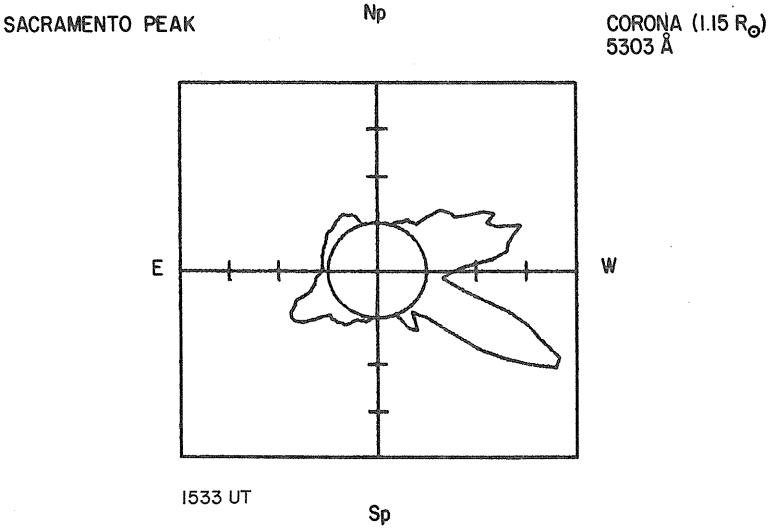


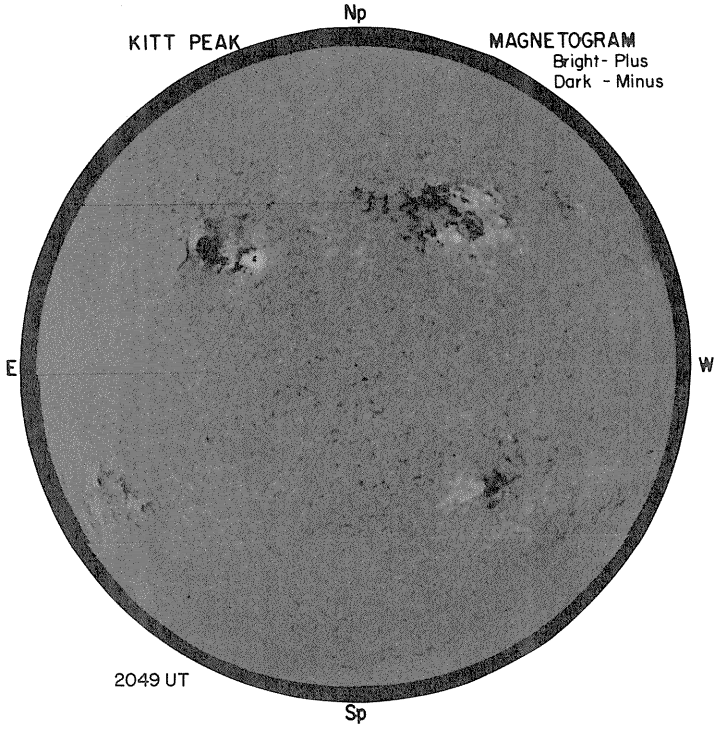
1847 UT

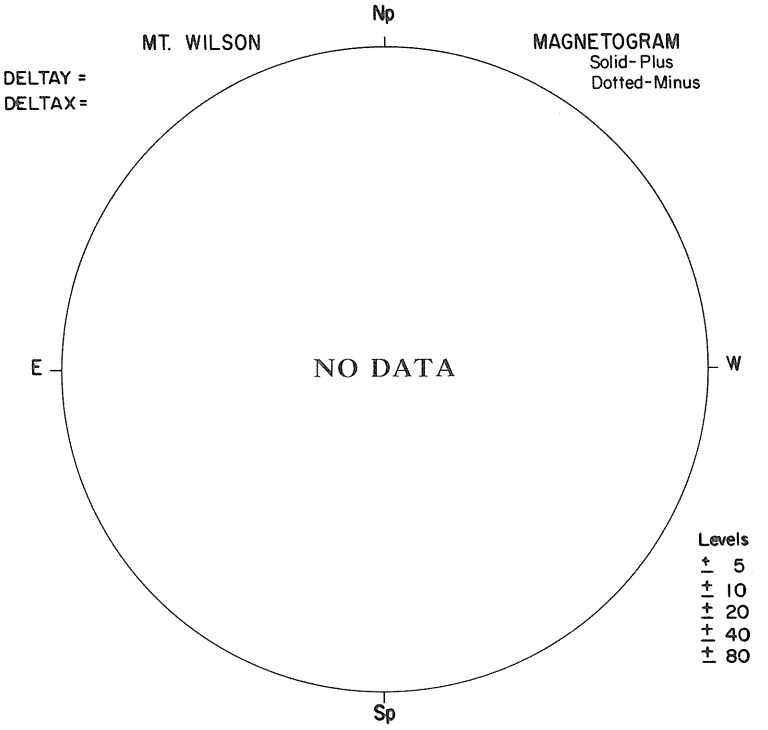
Ant. Temp. Unit 100° K

FEBRUARY 9, 1978 (P =-15.20, B_o =-6.54, L_o =66.79)



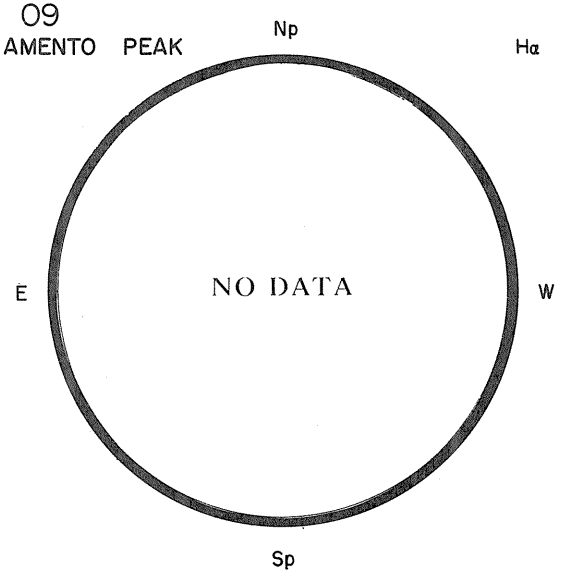






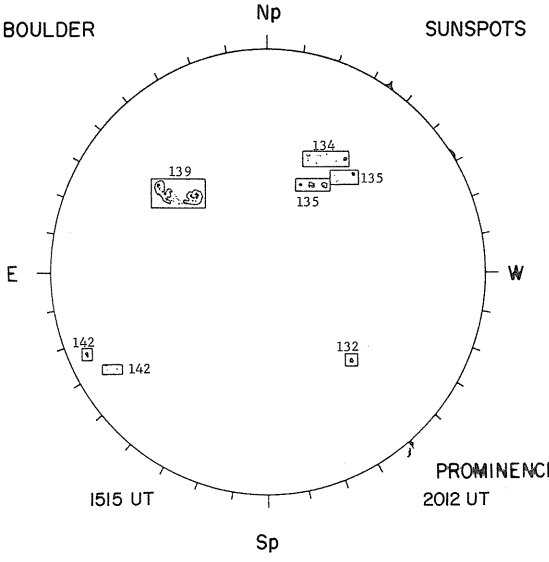
09

SACRAMENTO PEAK



Hα

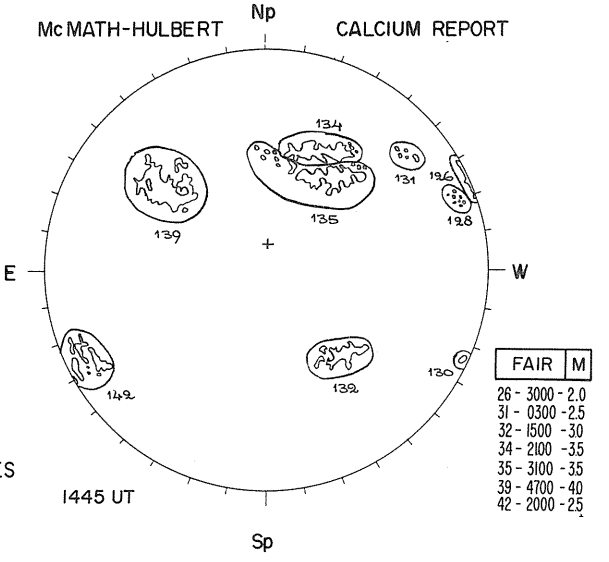
BOULDER



1515 UT

SUNSPOTS

McMATH-HULBERT



1445 UT

CALCIUM REPORT

PROMINENCES

2012 UT

NOSC LA POSTA

Np

E

W

Sp

---- UT

2.0 CM

Ant. Temp. Unit 100°K

NOSC LA POSTA

Np

E

W

Sp

---- UT

8.6 MM

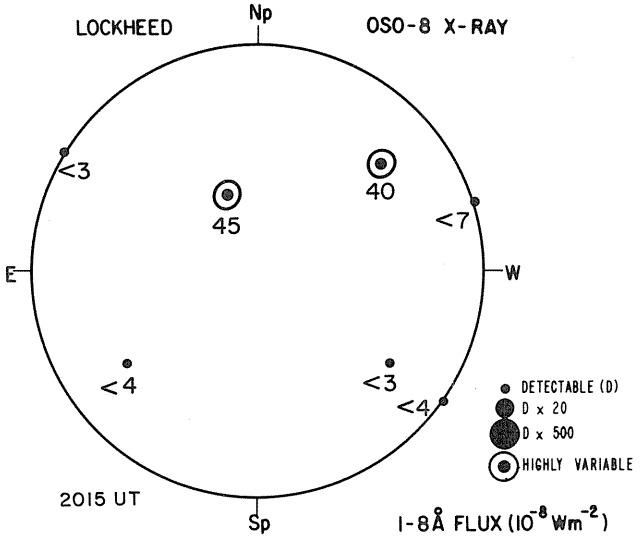
NO DATA

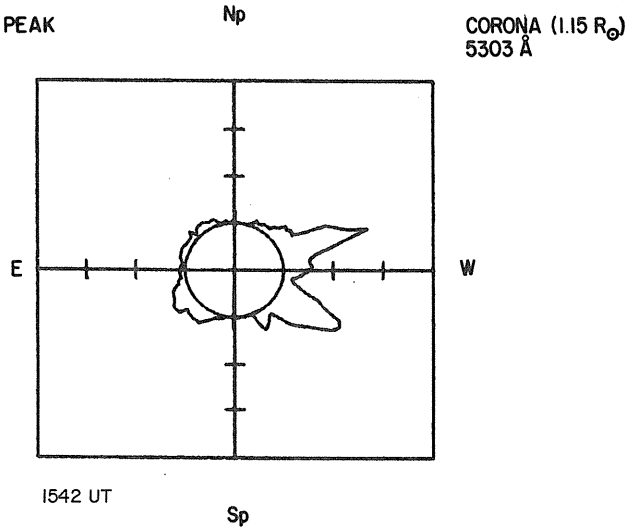
WEATHER

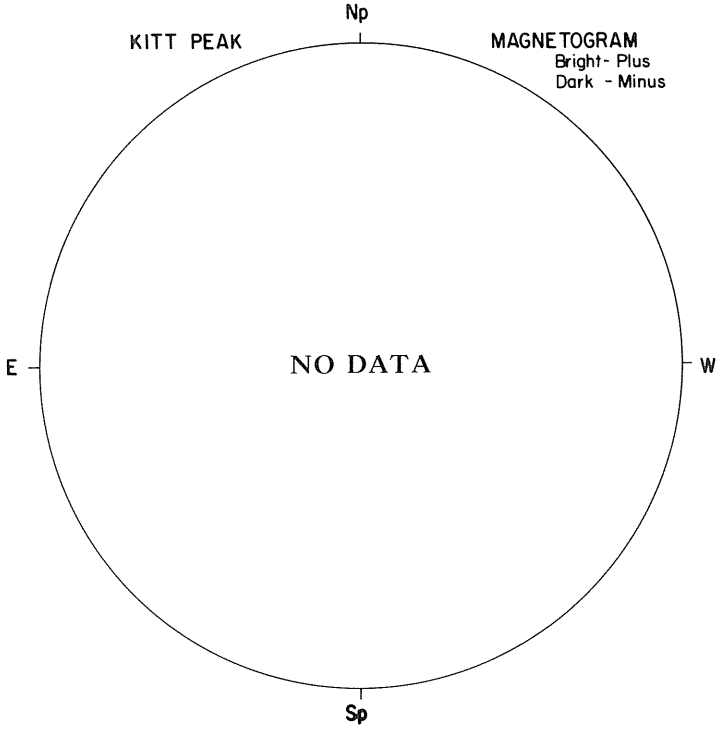
Ant. Temp. Unit 100°K

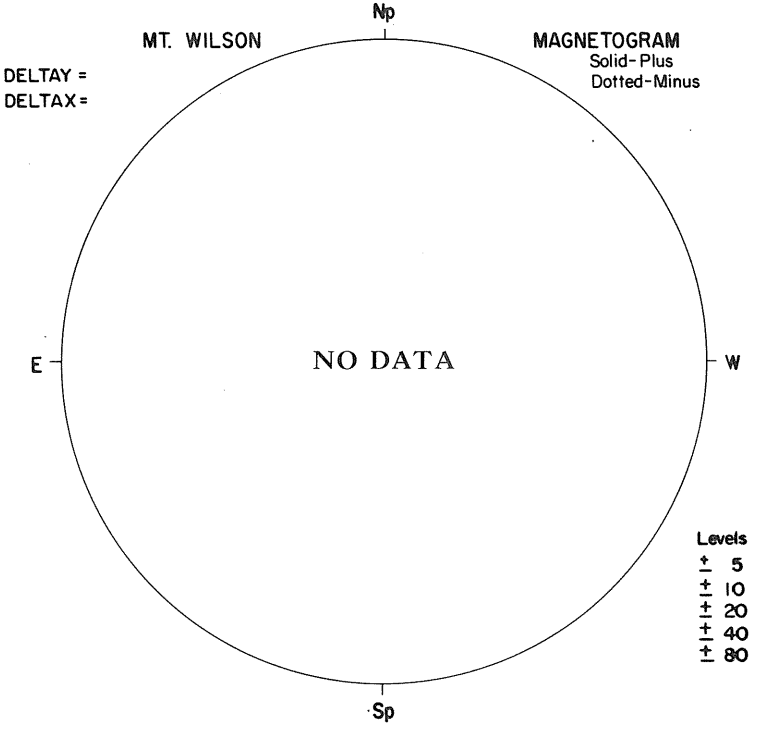
57
Feb 78

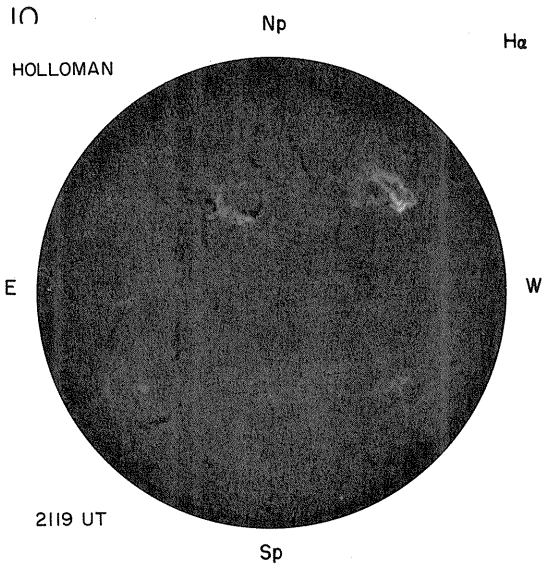
FEBRUARY 10, 1978 (P =-15.57, B_o =-6.59, L_o =53.62)

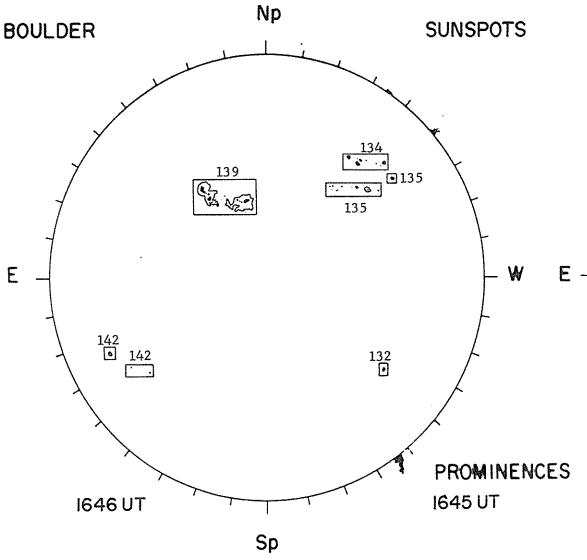


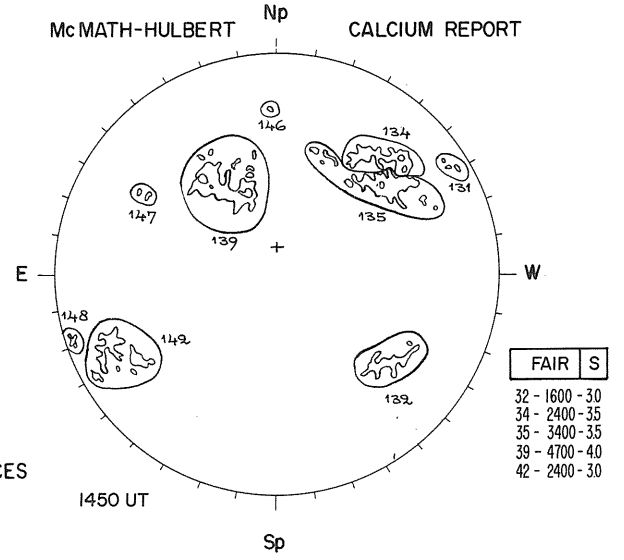


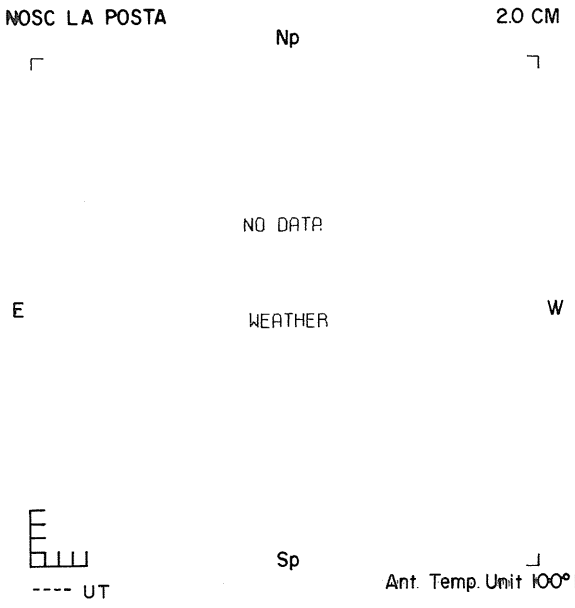


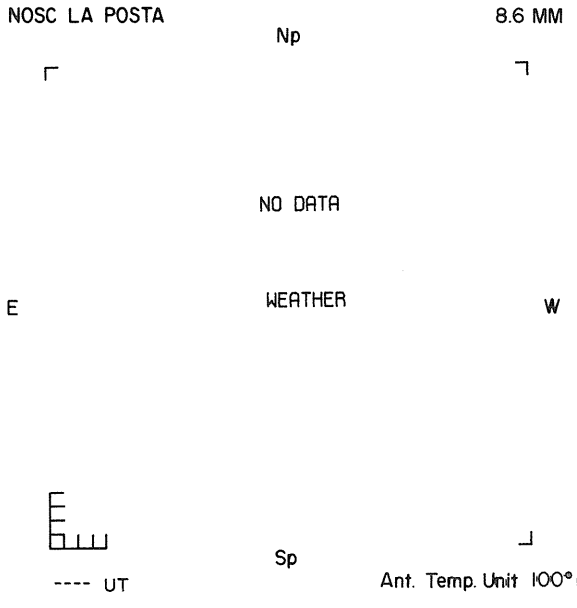



10
HOLLOMAN
Np
Hα
E
W
2119 UT
Sp

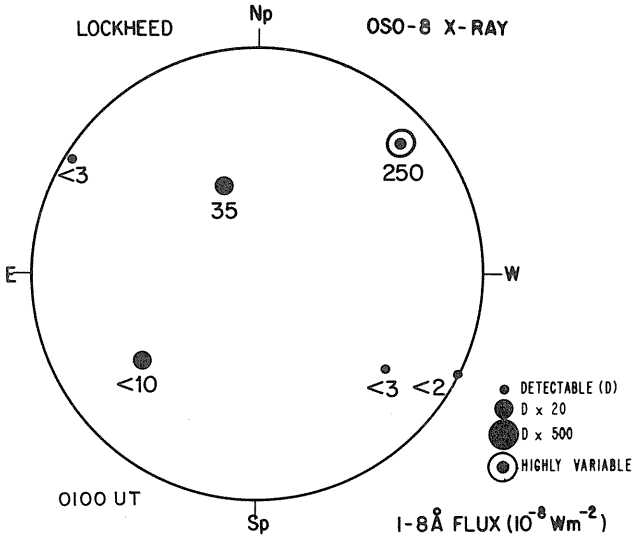

BOULDER
Np
SUNSPOTS
139
134
135
135
142
142
132
E
W
1646 UT
Sp
PROMINENCES
1645 UT

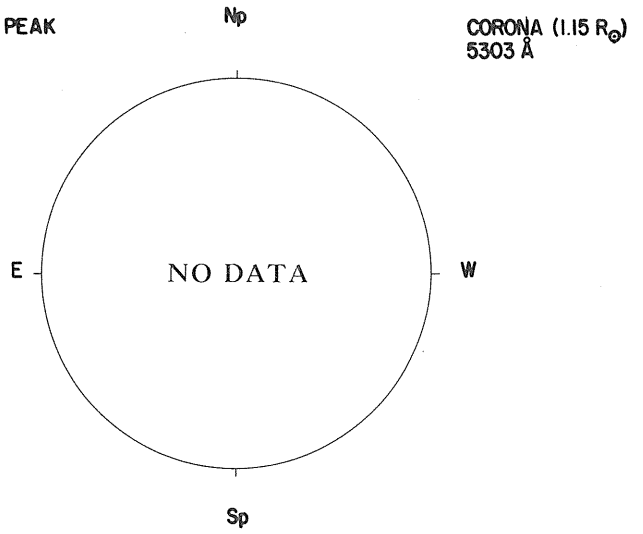

McMATH-HULBERT
Np
CALCIUM REPORT
146
134
131
147
139
135
148
142
132
E
W
1450 UT
Sp
FAIR S
32 - 1600 - 3.0
34 - 2400 - 3.5
35 - 3400 - 3.5
39 - 4700 - 4.0
42 - 2400 - 3.0

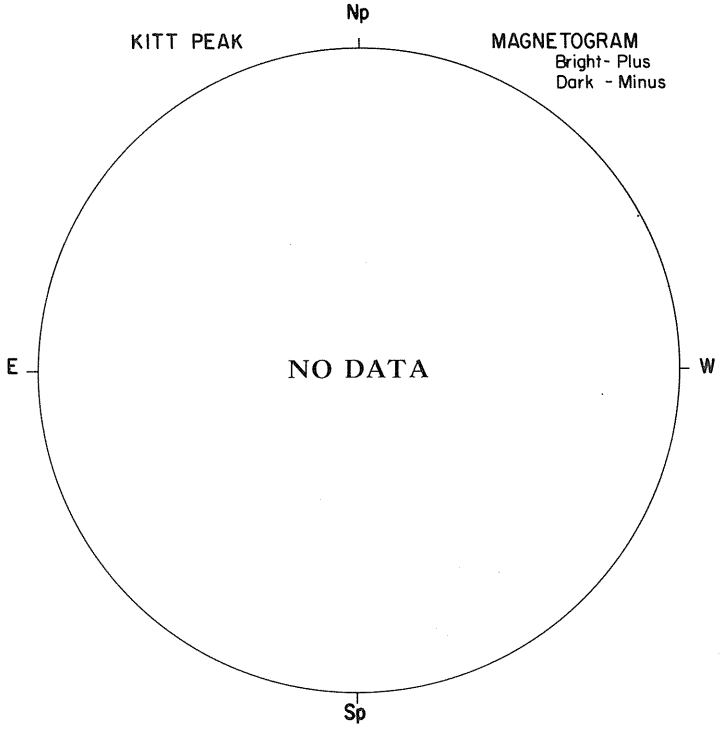

NOSC LA POSTA
Np
2.0 CM
NO DATA
E
WEATHER
W
Sp
---- UT
Ant. Temp. Unit 100° K

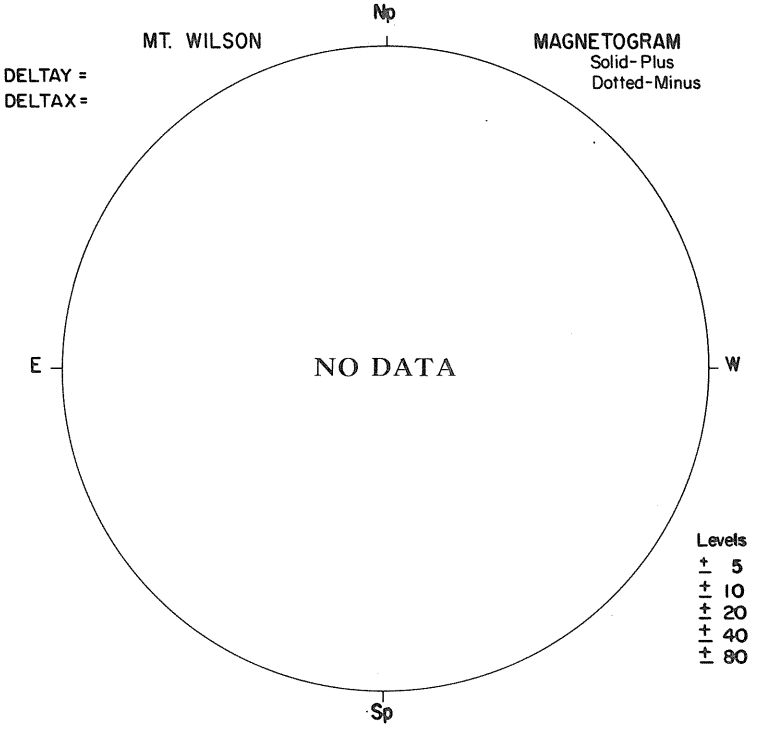

NOSC LA POSTA
Np
8.6 MM
NO DATA
E
WEATHER
W
Sp
---- UT
Ant. Temp. Unit 100° K

FEBRUARY 11, 1978 (P =-15.93, B_o =-6.64, L_o =40.46)

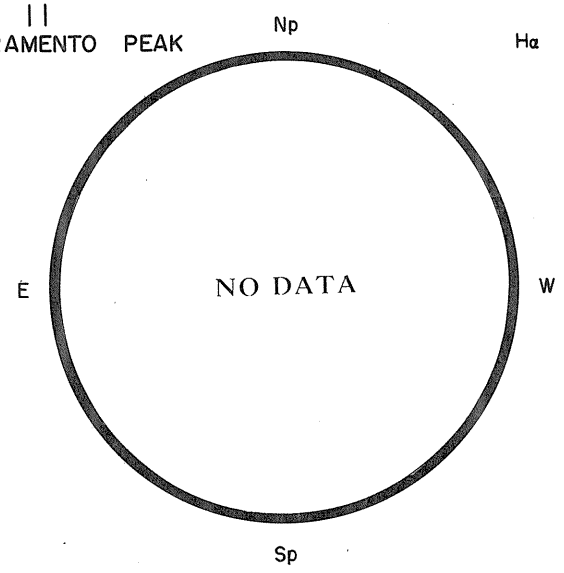




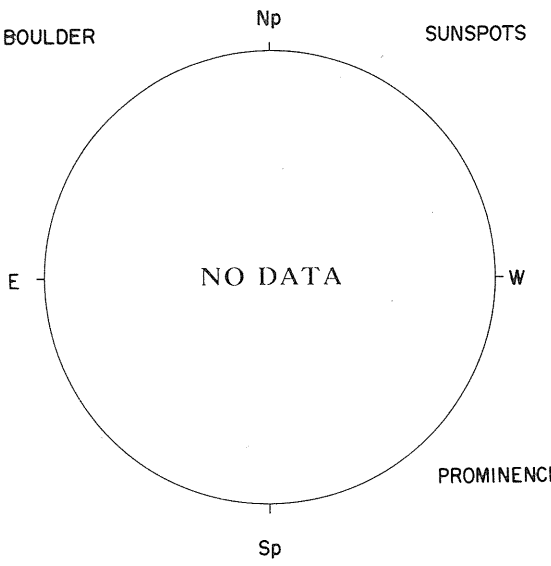




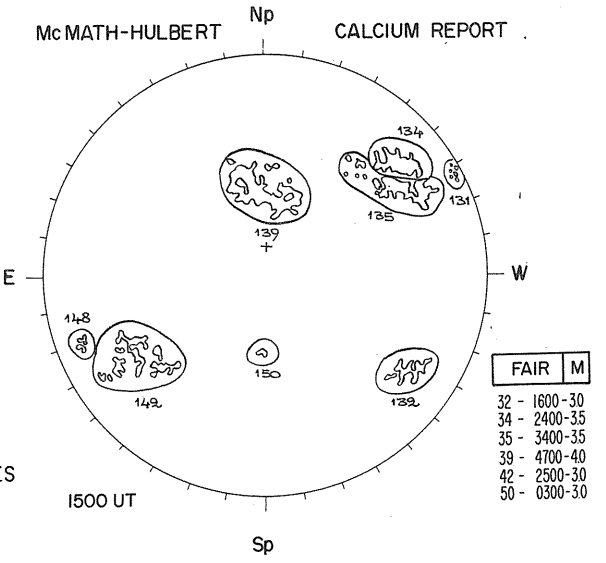
SACRAMENTO PEAK



Hα BOULDER



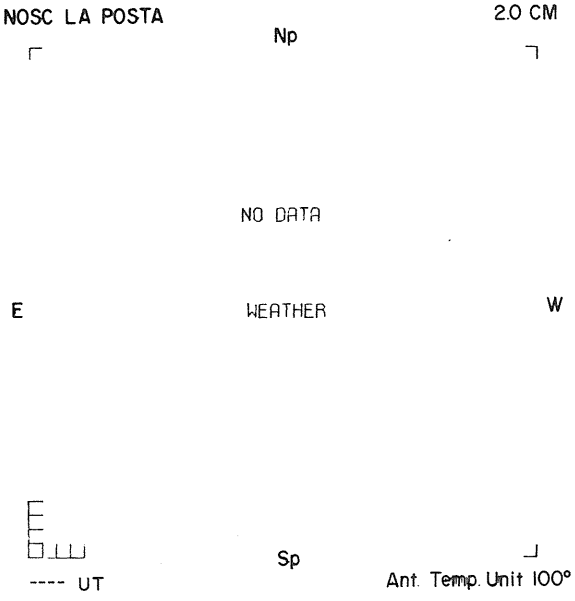
SUNSPOTS McMATH-HULBERT CALCIUM REPORT



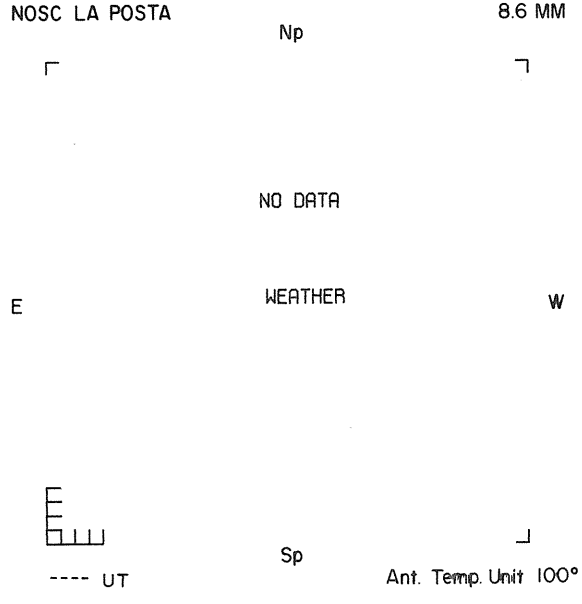
PROMINENCES

1500 UT

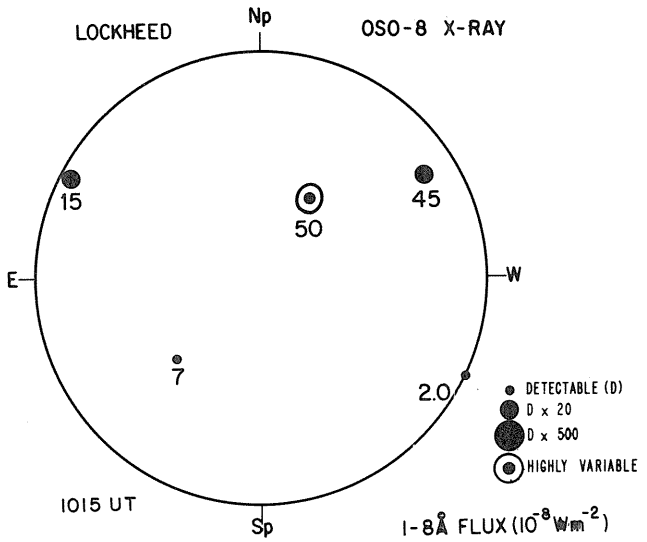
NOSC LA POSTA

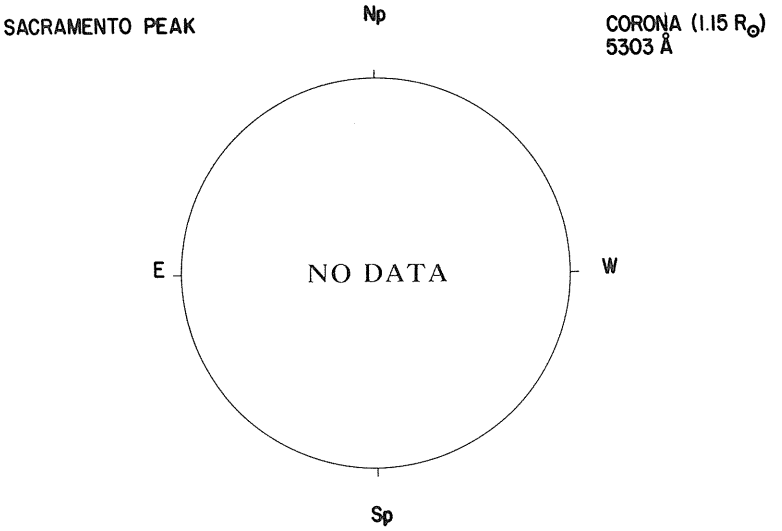


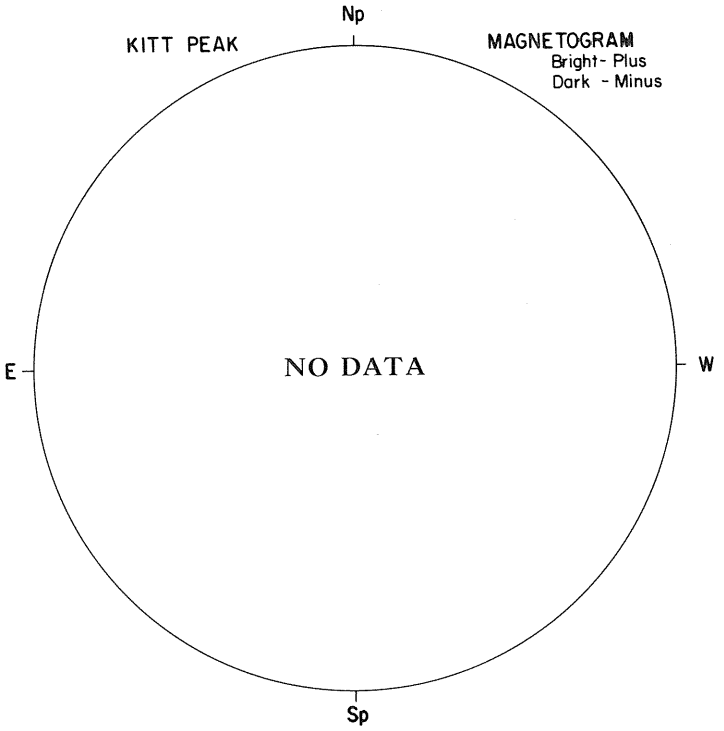
NOSC LA POSTA

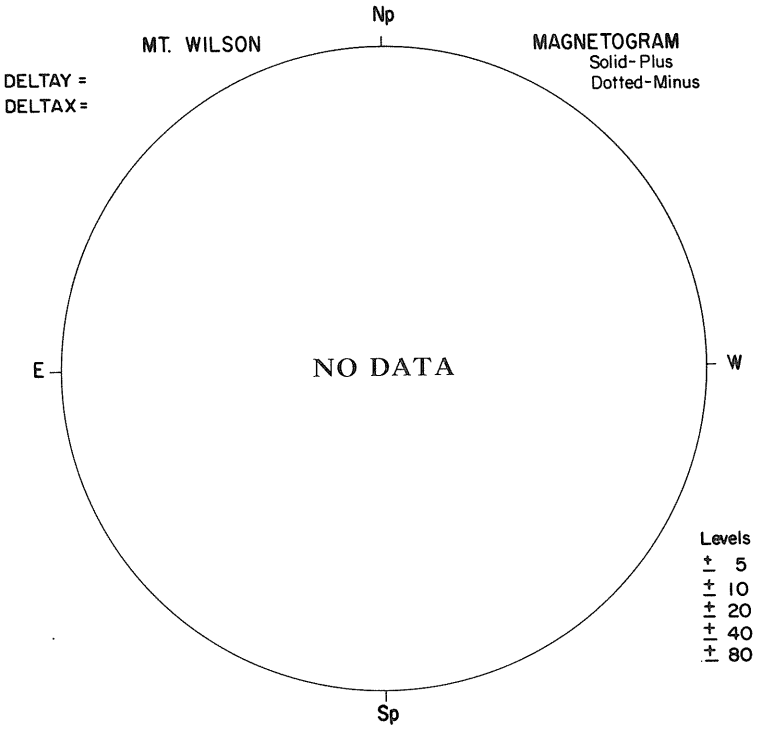


FEBRUARY 12, 1978 (P =-16.29, B_o =-6.69, L_o =27.29)



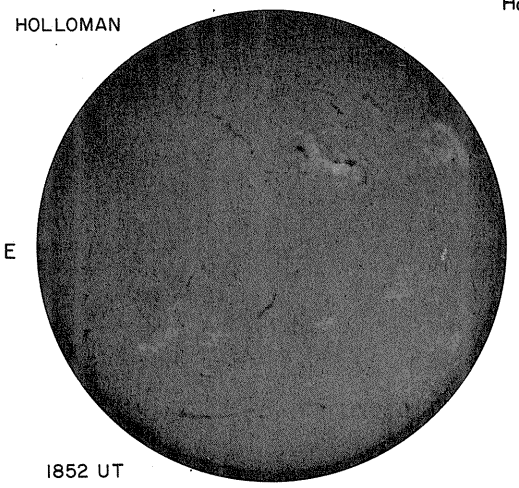






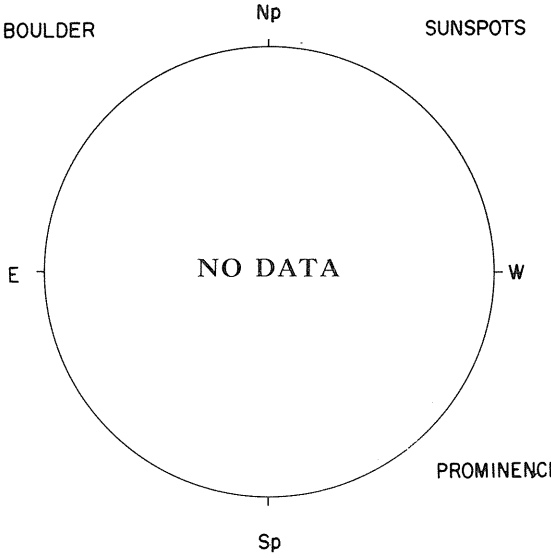
12

HOLLOMAN



1852 UT

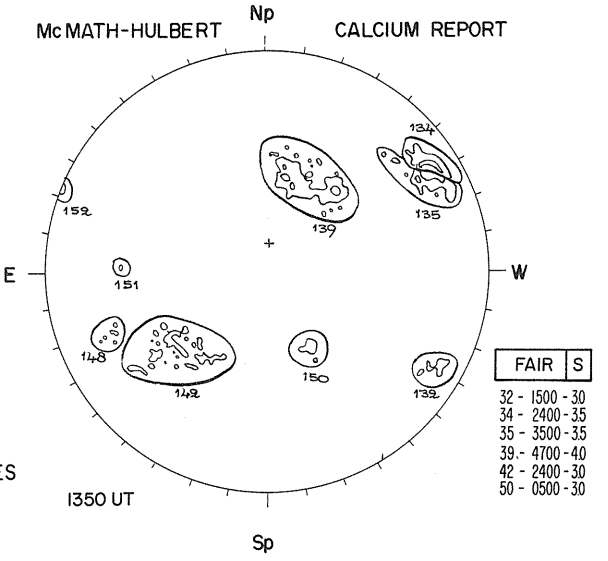
Hα BOULDER



SUNSPOTS

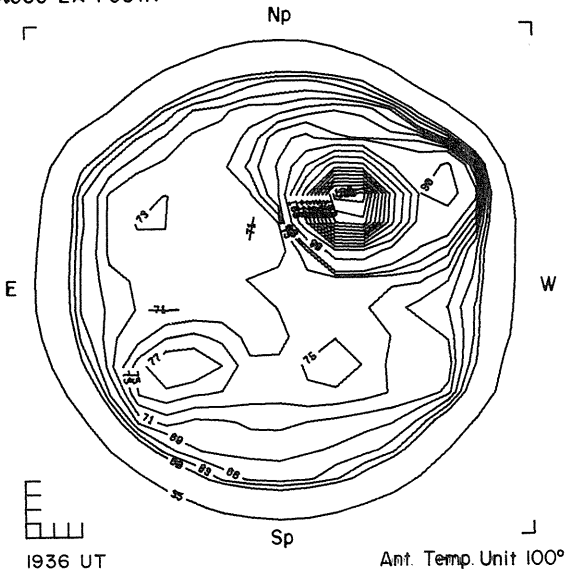
PROMINENCES

McMATH-HULBERT CALCIUM REPORT



1350 UT

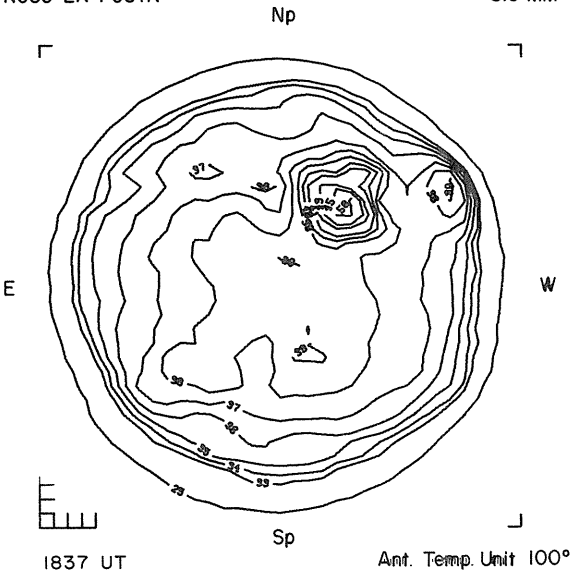
NOSC LA POSTA 2.0 CM



1936 UT

Ant. Temp. Unit 100°K

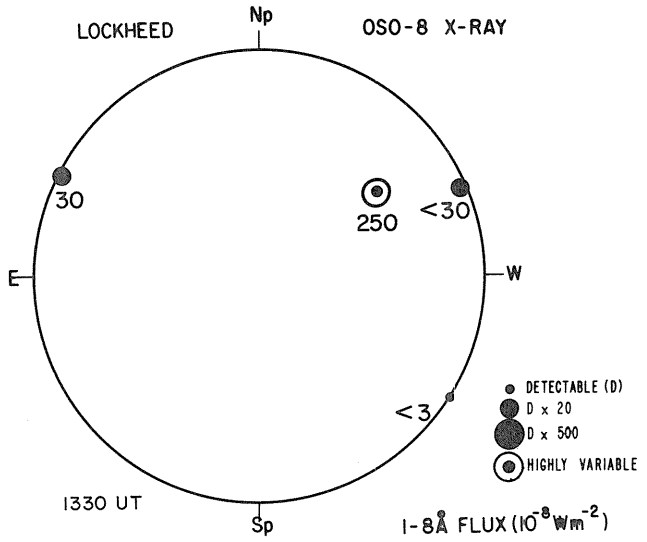
NOSC LA POSTA 8.6 MM

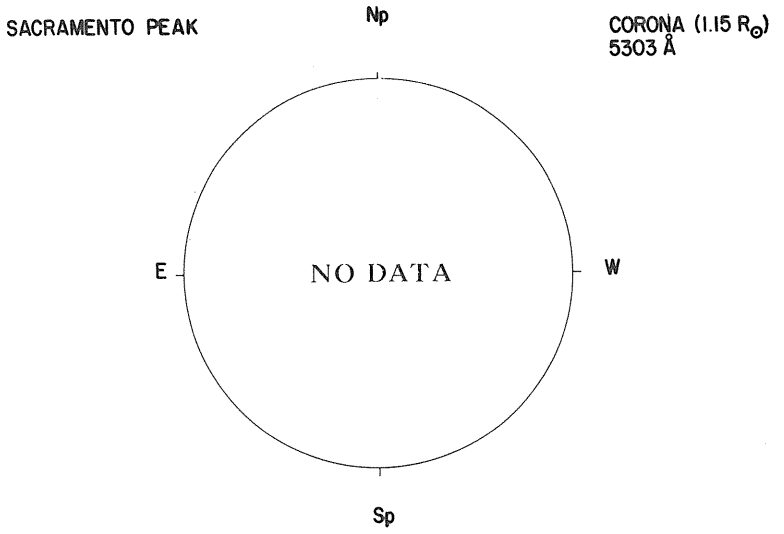


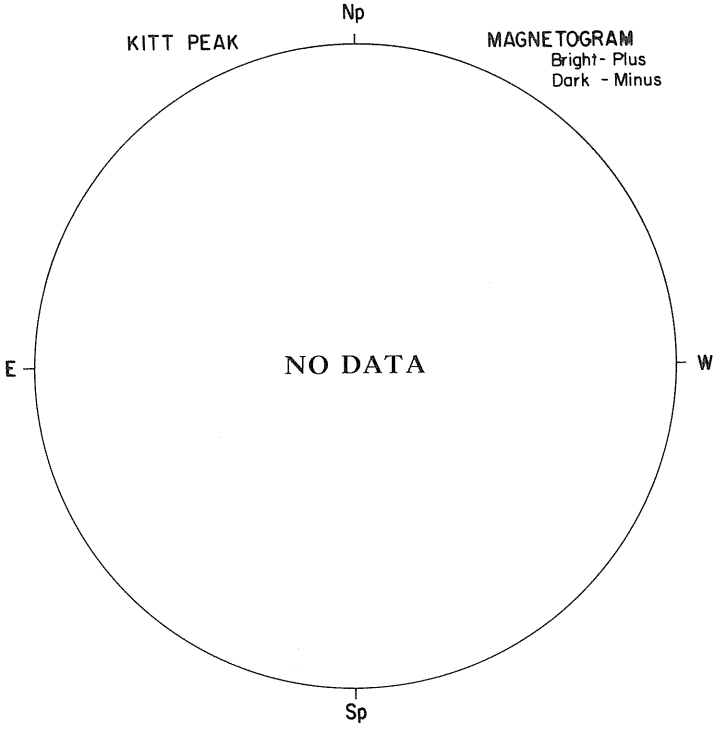
1837 UT

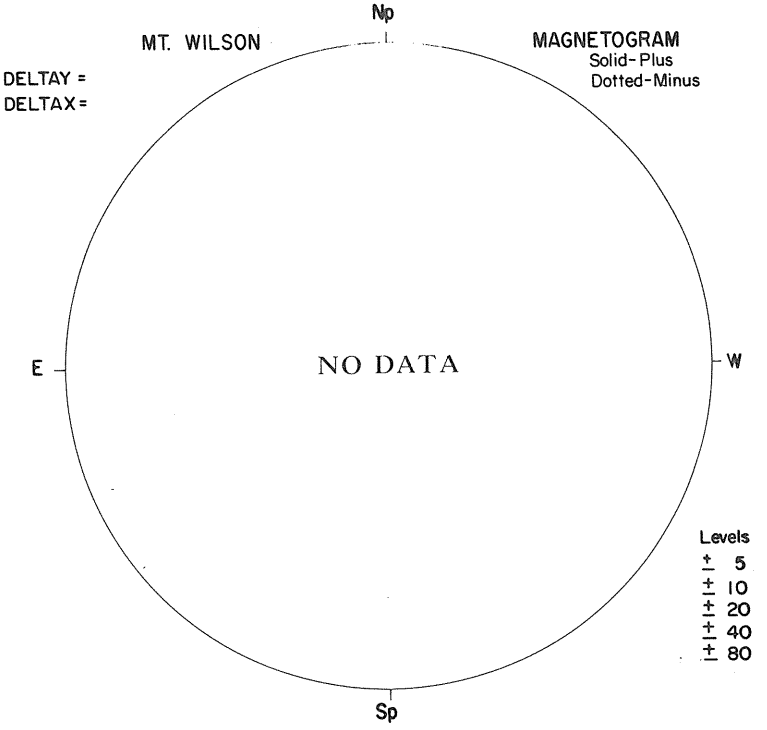
Ant. Temp. Unit 100°K

FEBRUARY 13, 1978 (P =-16.64, B_o =-6.74, L_o =14.12)



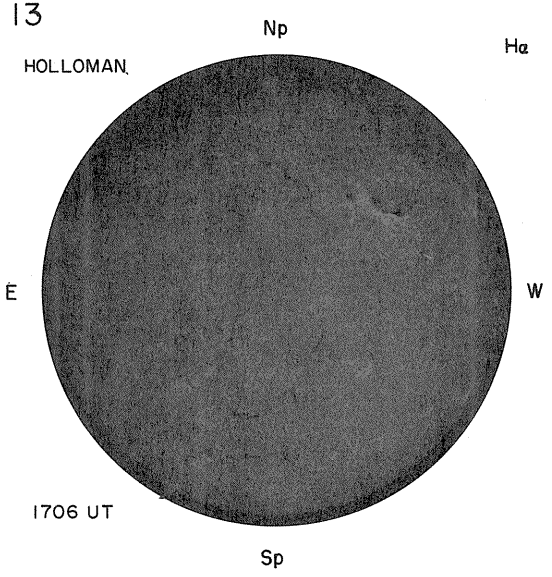




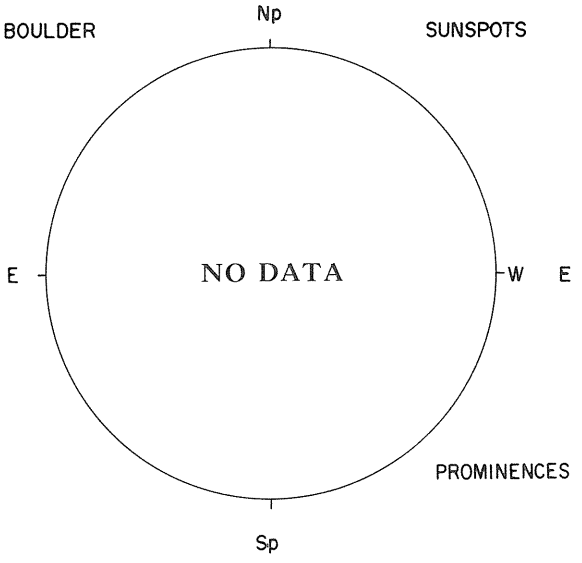


13

HOLLOMAN



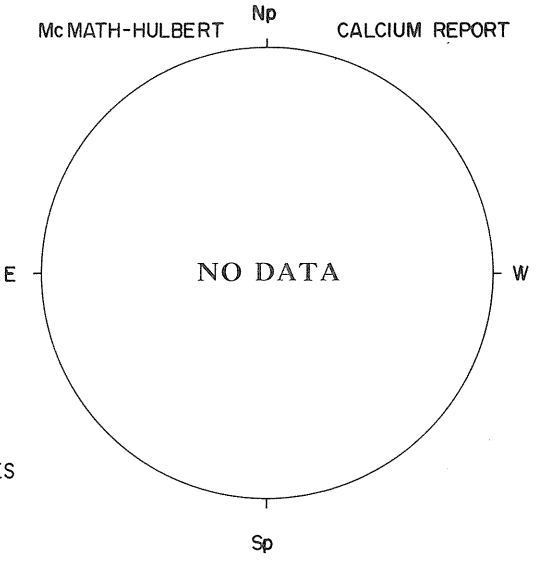
Hα BOULDER



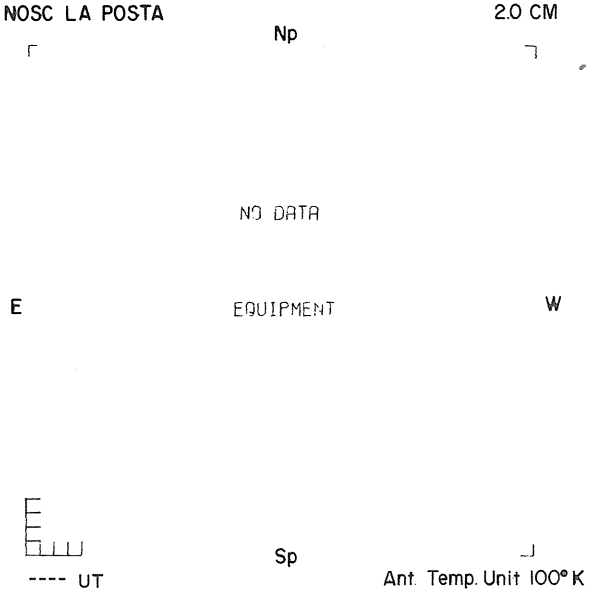
SUNSPOTS

PROMINENCES

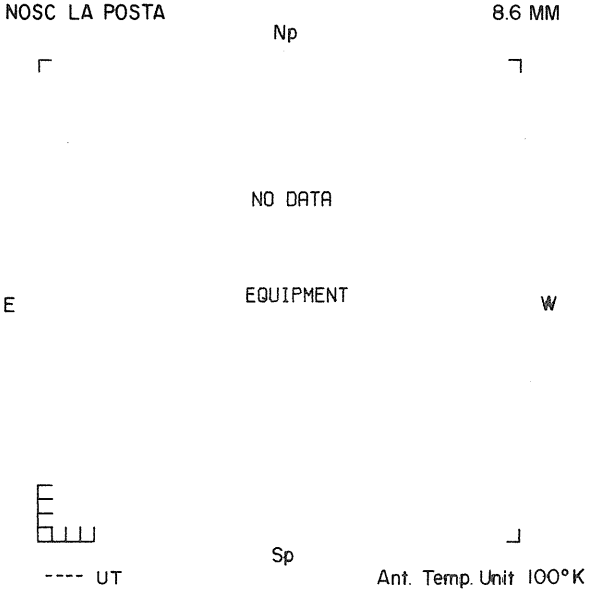
McMATH-HULBERT CALCIUM REPORT



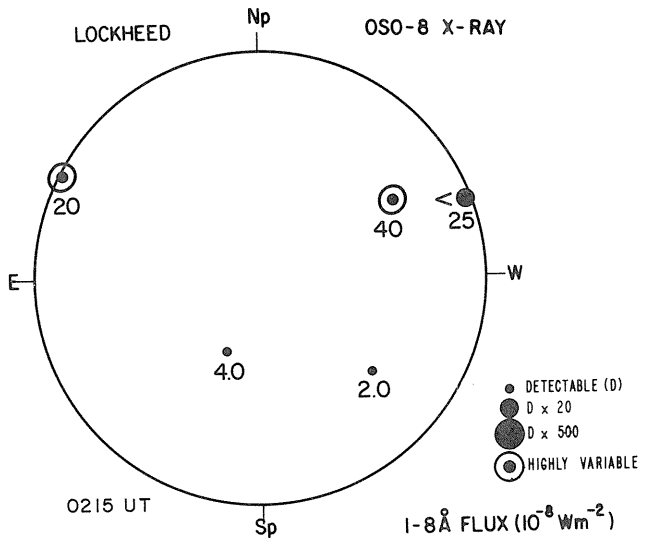
NOSC LA POSTA 2.0 CM

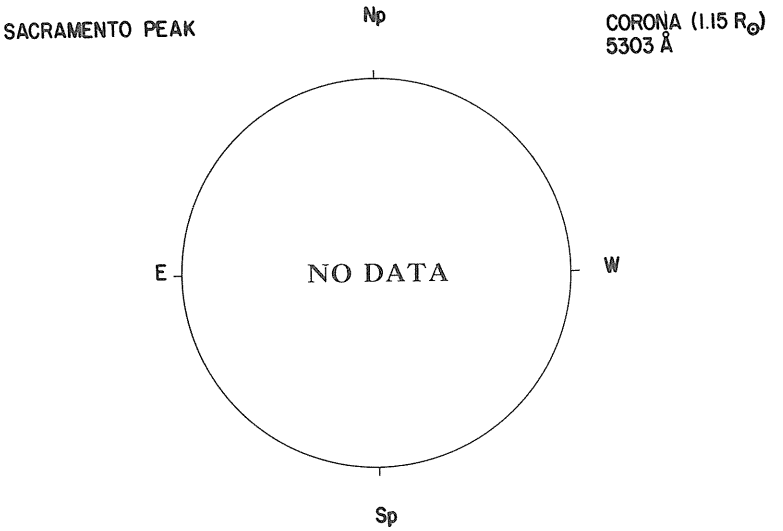


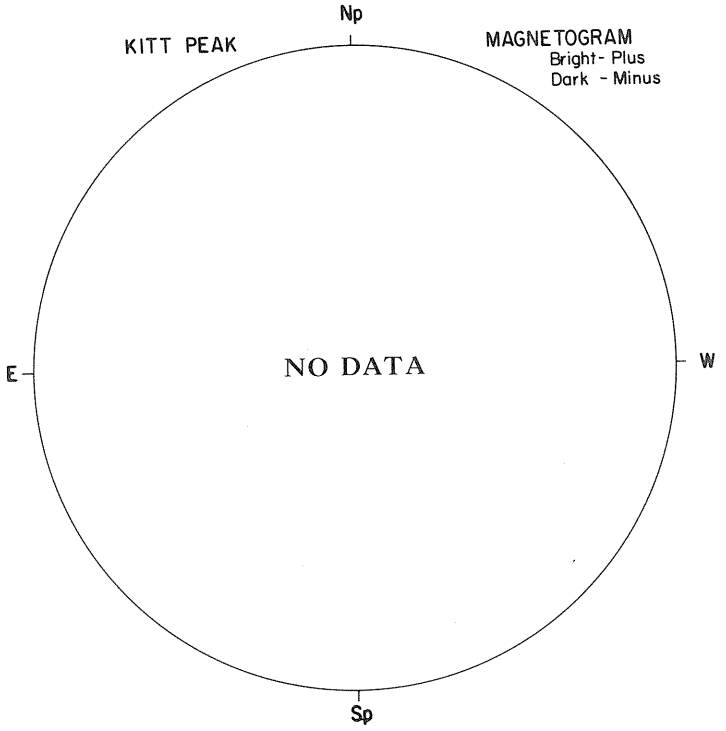
NOSC LA POSTA 8.6 MM

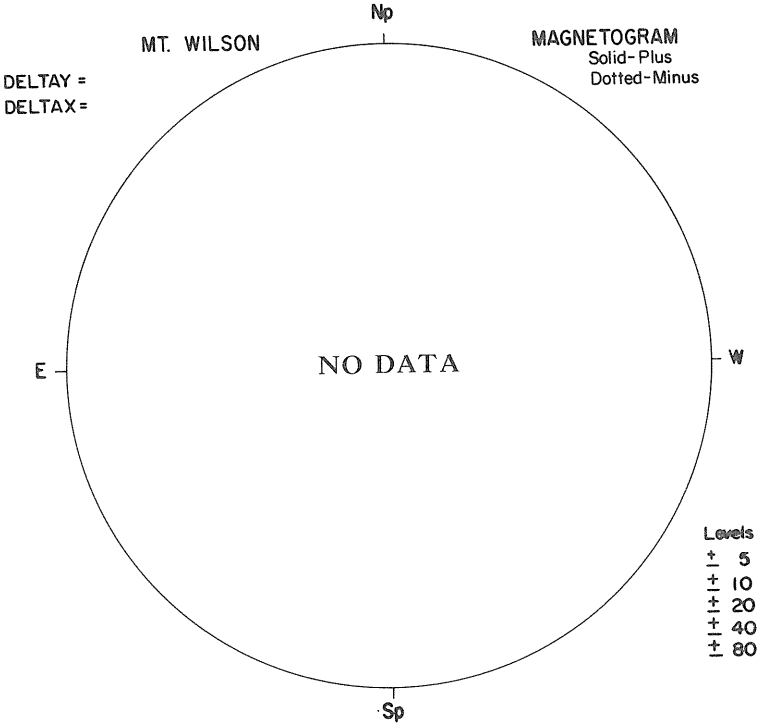


FEBRUARY 14, 1978 (P =-16.99, B_o =-6.79, L_o =0.95)

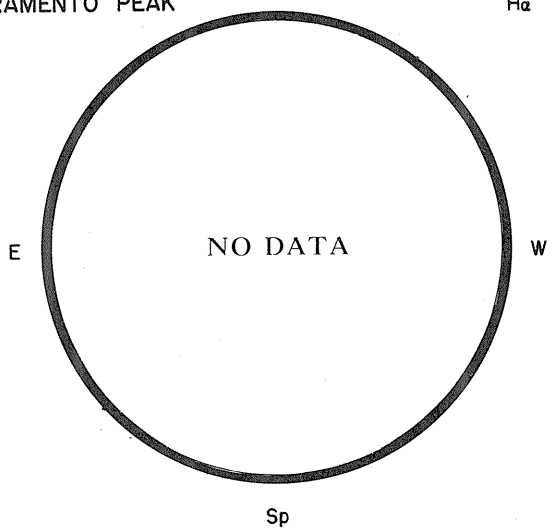




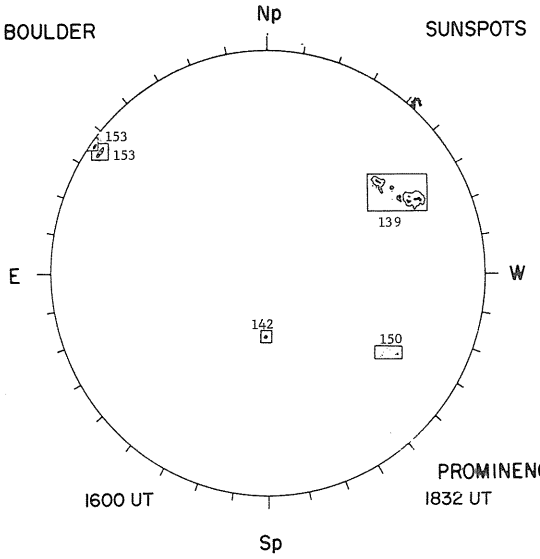




SACRAMENTO PEAK Hα

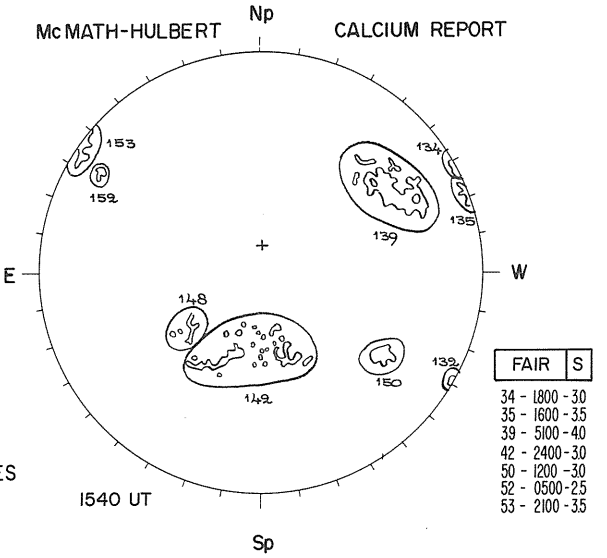


BOULDER SUNSPOTS



1600 UT

McMATH-HULBERT CALCIUM REPORT

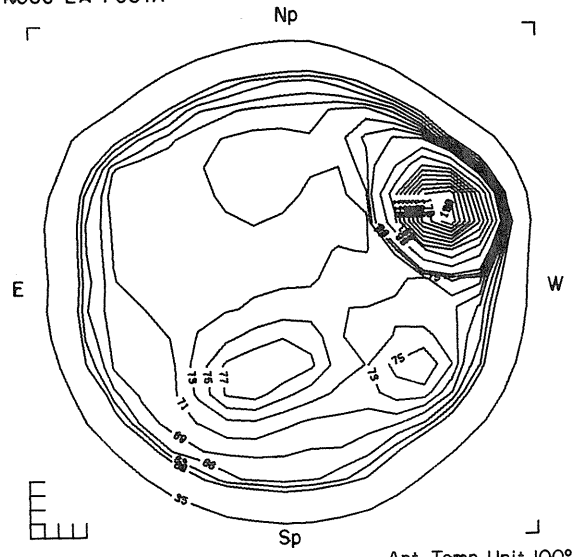


PROMINENCES

1832 UT

1540 UT

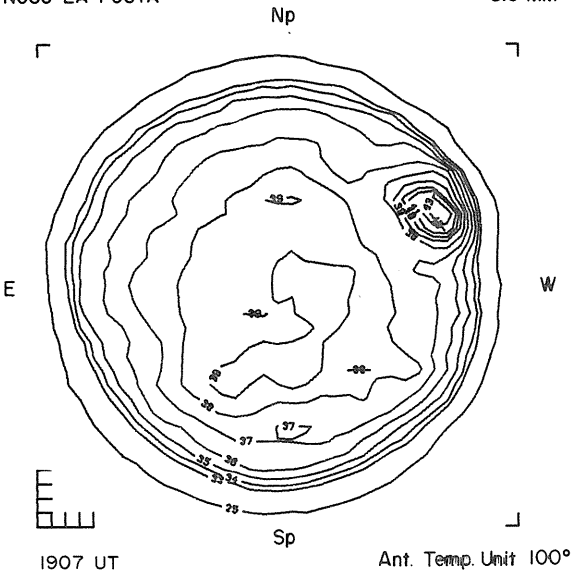
NOSC LA POSTA 2.0 CM



1827 UT

Ant. Temp. Unit 100° K

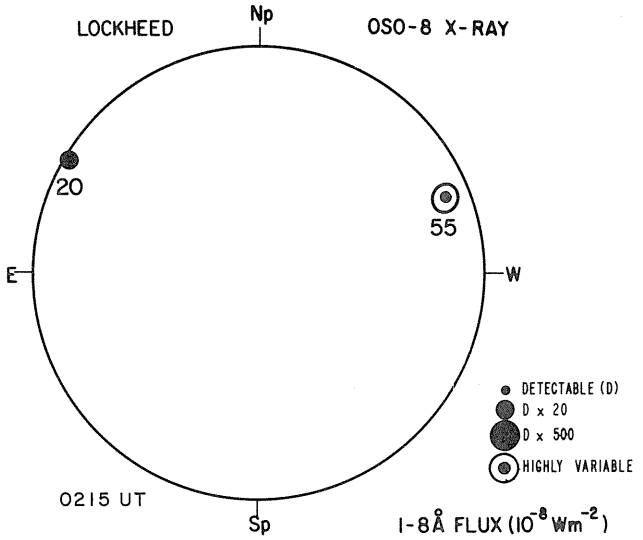
NOSC LA POSTA 8.6 MM

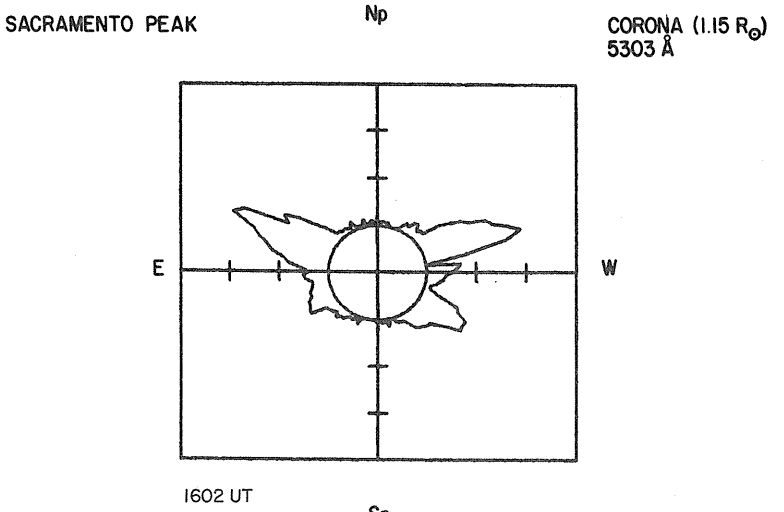


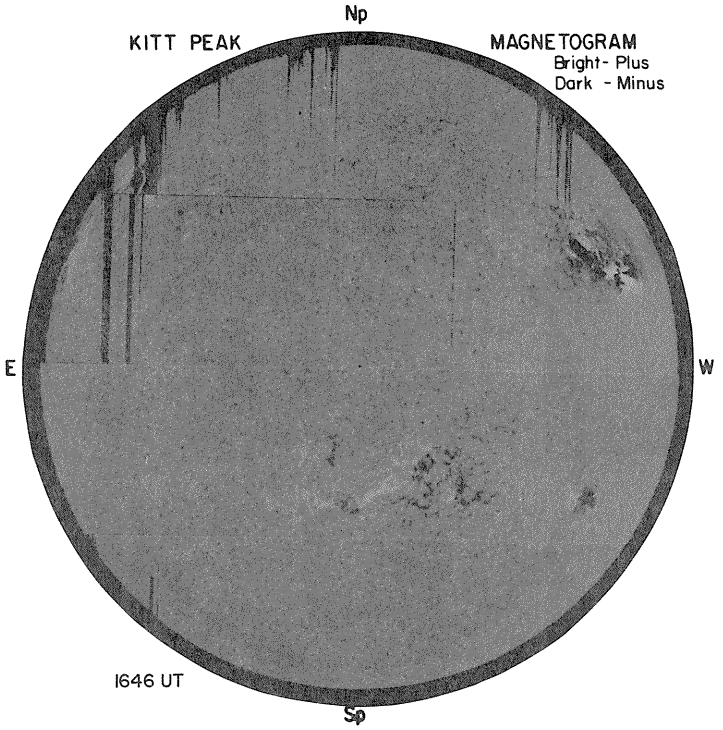
1907 UT

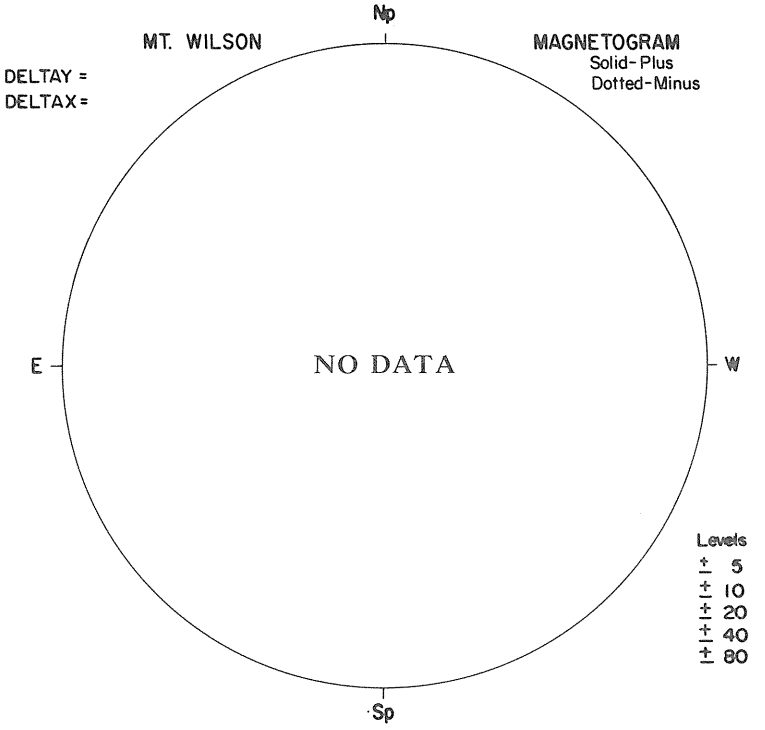
Ant. Temp. Unit 100° K

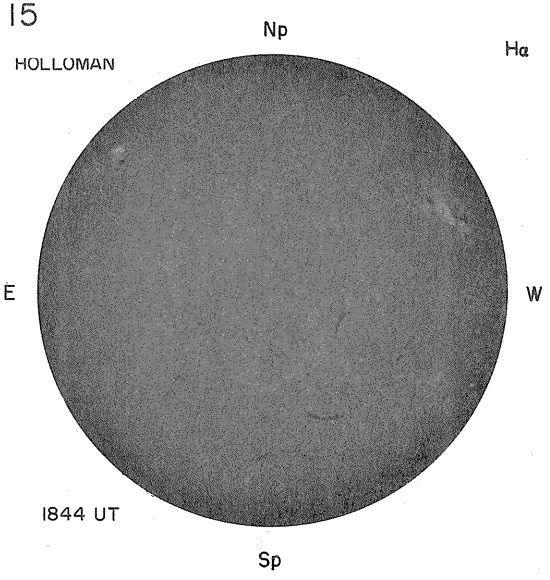
FEBRUARY 15, 1978 (P =-17.33, B_o =-6.83, L_o =347.79)

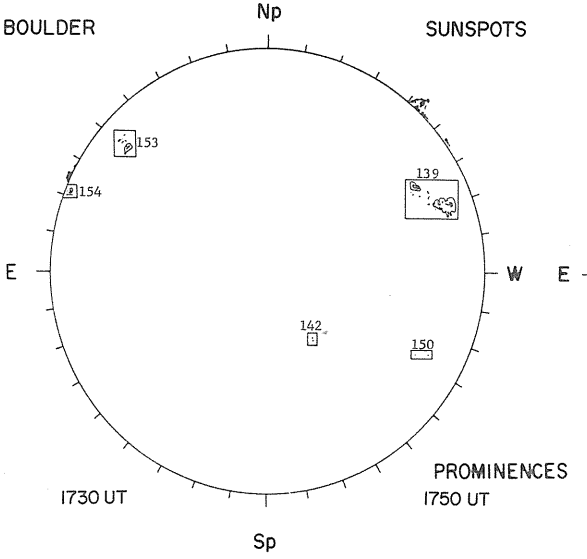


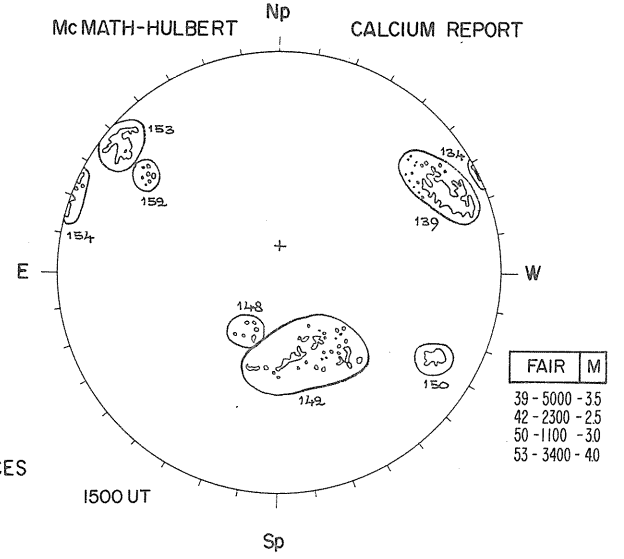


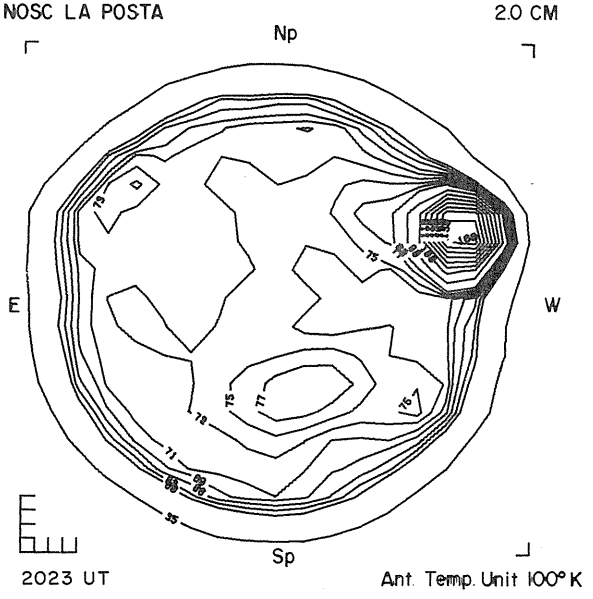


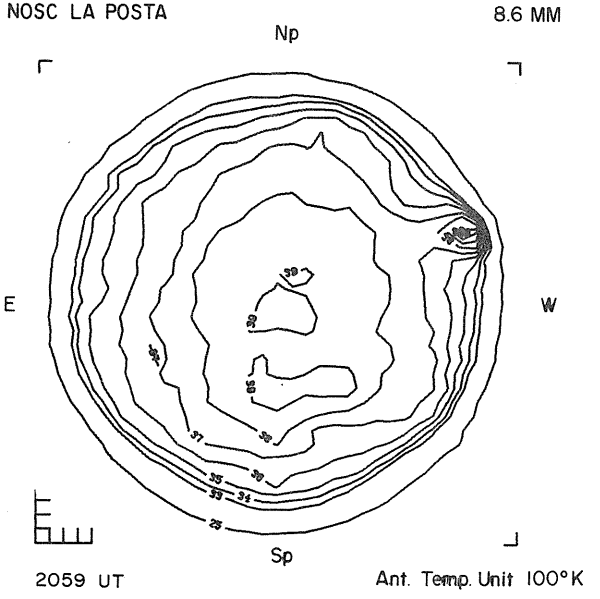



HOLLOMAN
Np
Hα
E
W
1844 UT
Sp

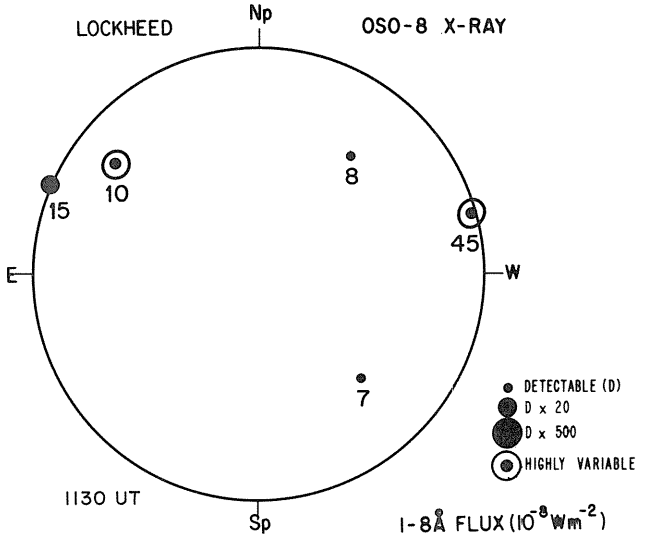

BOULDER
Np
SUNSPOTS
153
154
139
142
150
E
W
1730 UT
Sp

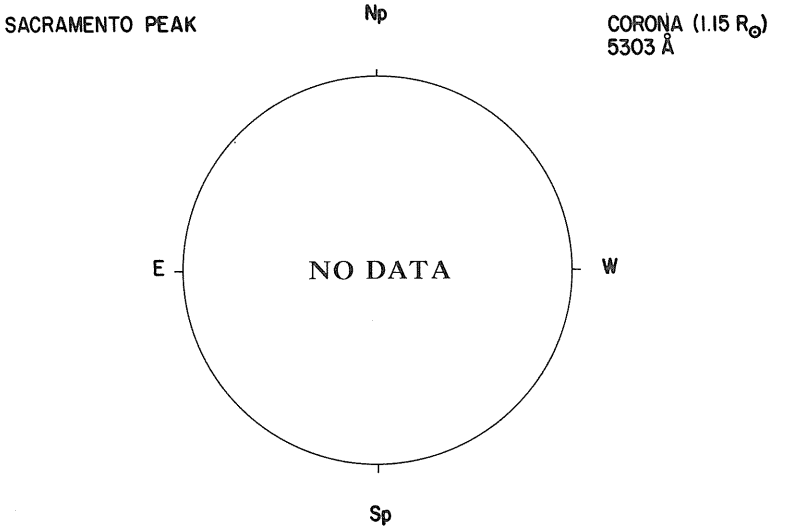

McMATH-HULBERT
Np
CALCIUM REPORT
153
152
154
134
139
148
142
150
E
W
FAIR | M
39 - 5000 - 3.5
42 - 2300 - 2.5
50 - 1100 - 3.0
53 - 3400 - 4.0
PROMINENCES
1750 UT
1500 UT
Sp

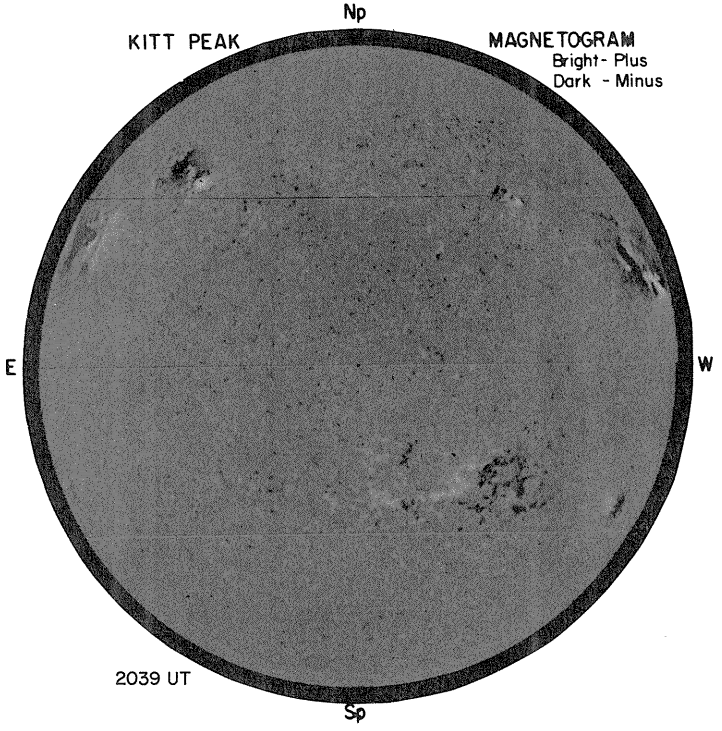

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
2023 UT
Ant. Temp. Unit 100° K

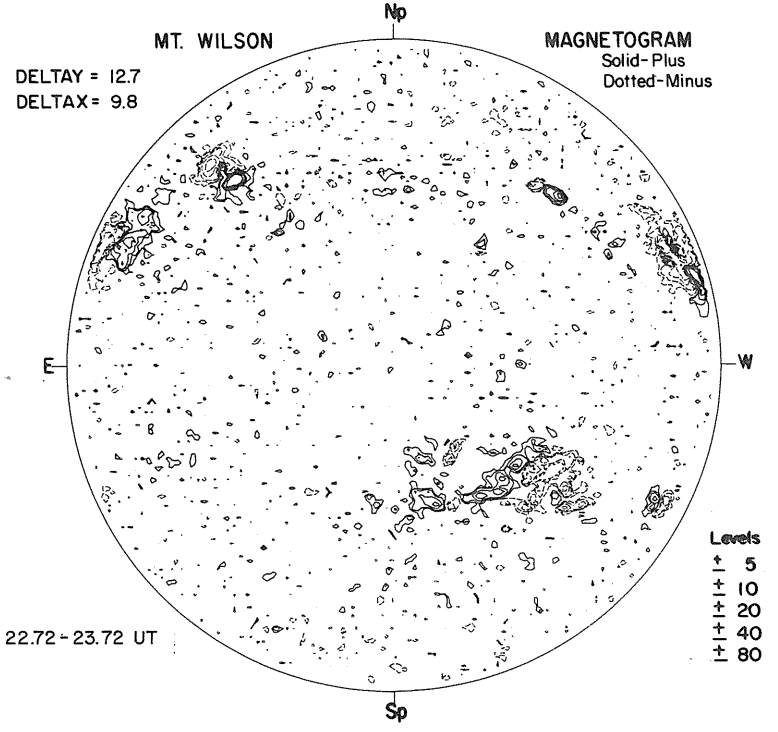

NOSC LA POSTA
8.6 MM
Np
E
W
Sp
2059 UT
Ant. Temp. Unit 100° K

FEBRUARY 16, 1978 (P =-17.66, B_o =-6.87, L_o =334.62)



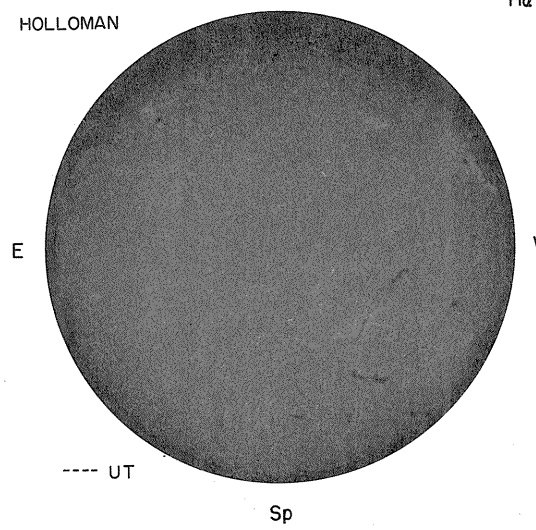




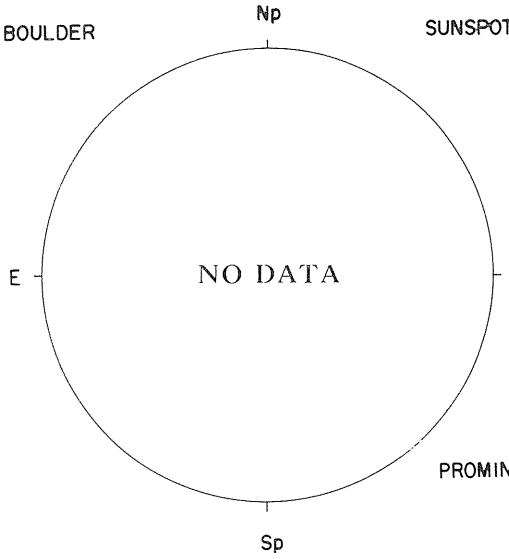


16

HOLLOMAN



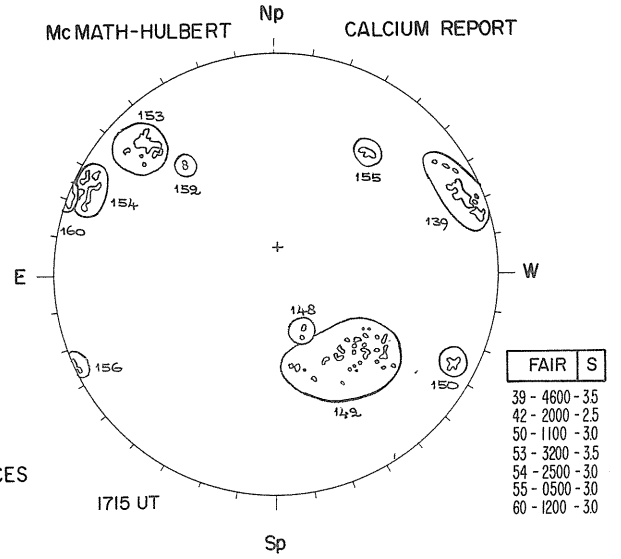
Hα BOULDER



SUNSPOTS

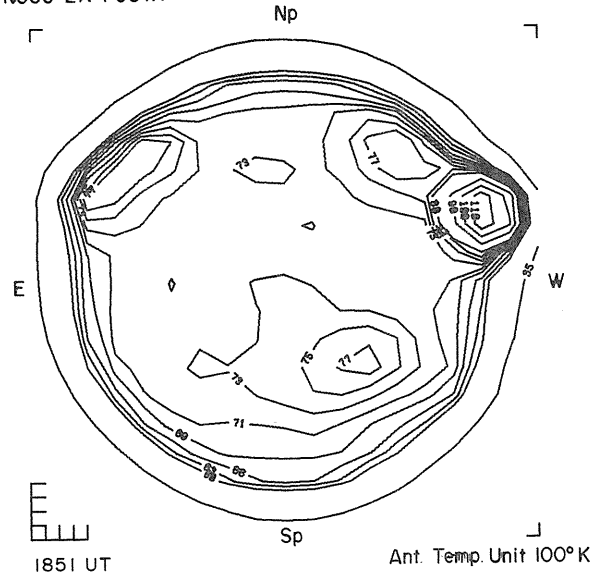
McMATH-HULBERT

CALCIUM REPORT

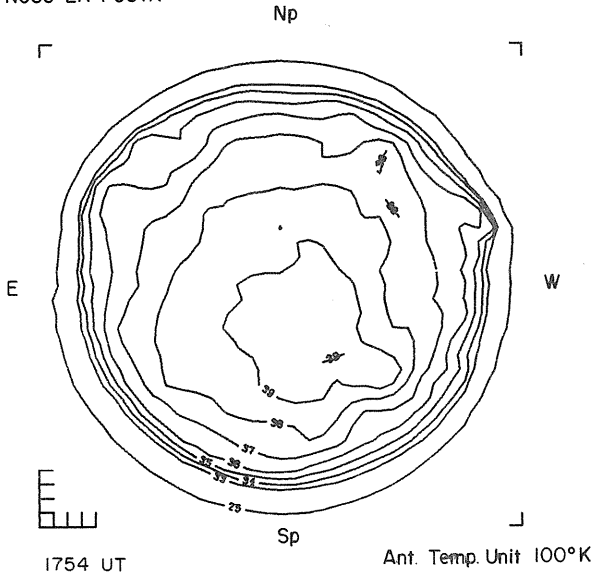


PROMINENCES

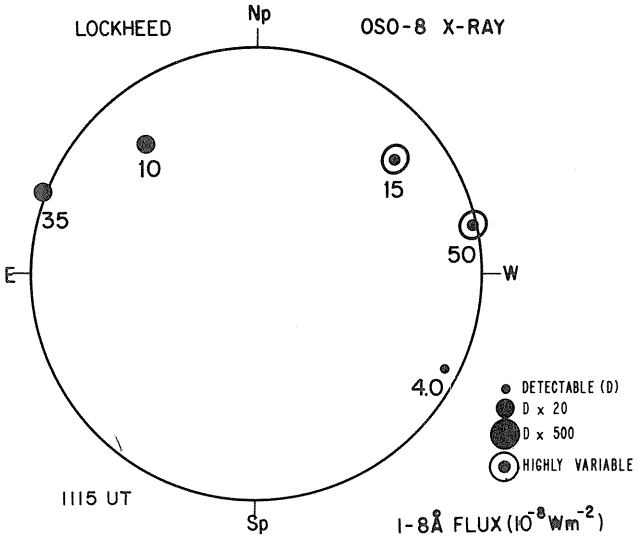
NOSC LA POSTA 2.0 CM

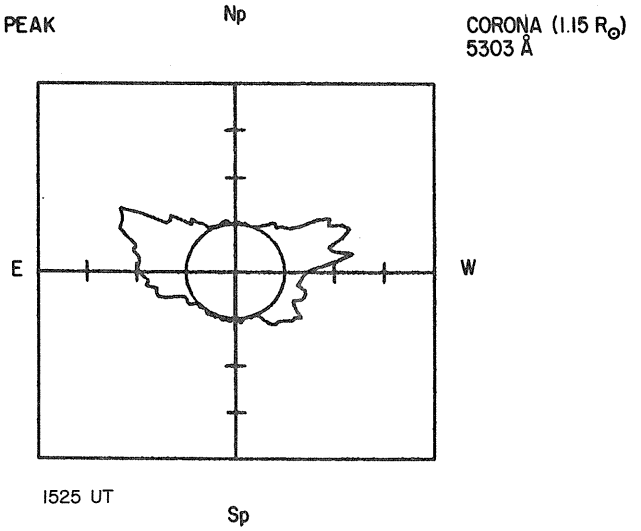


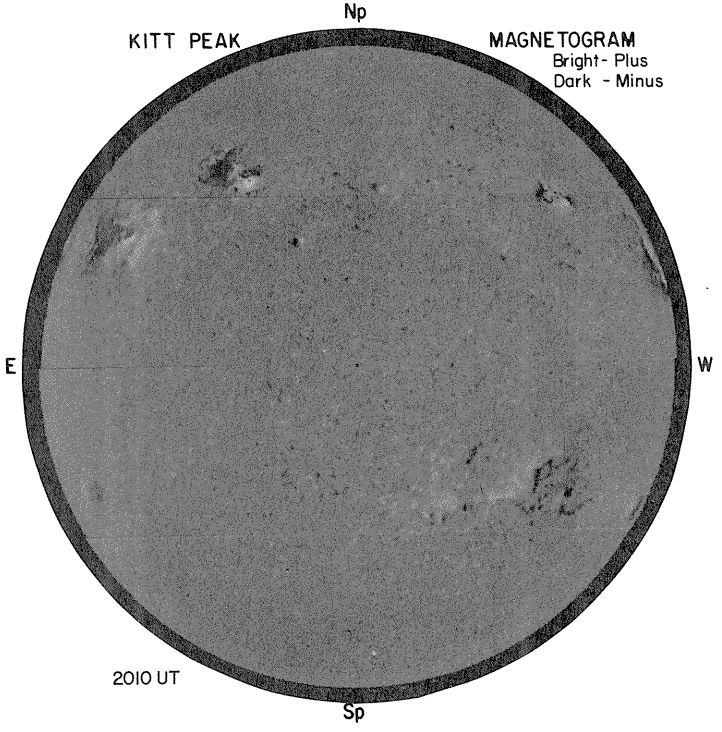
NOSC LA POSTA 8.6 MM

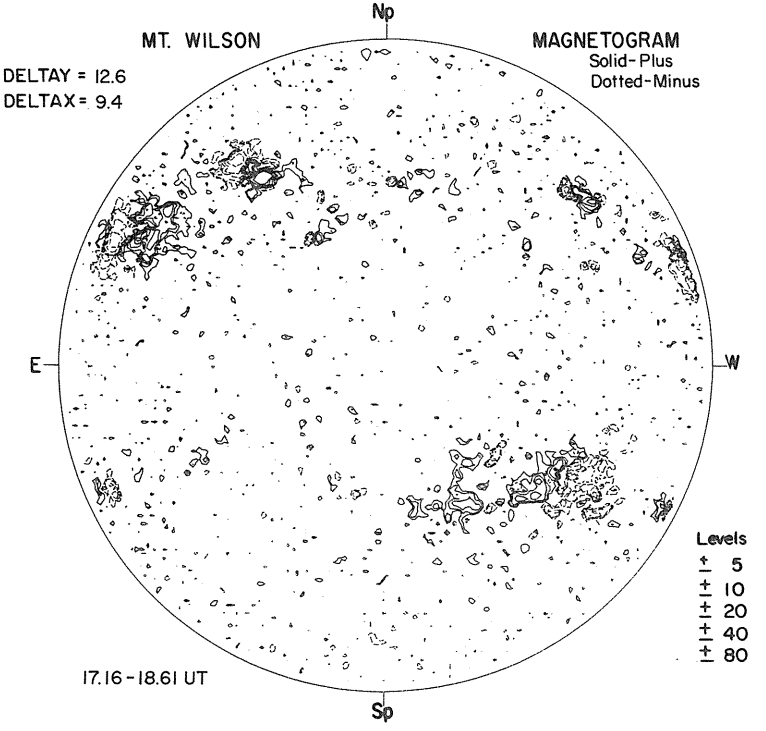


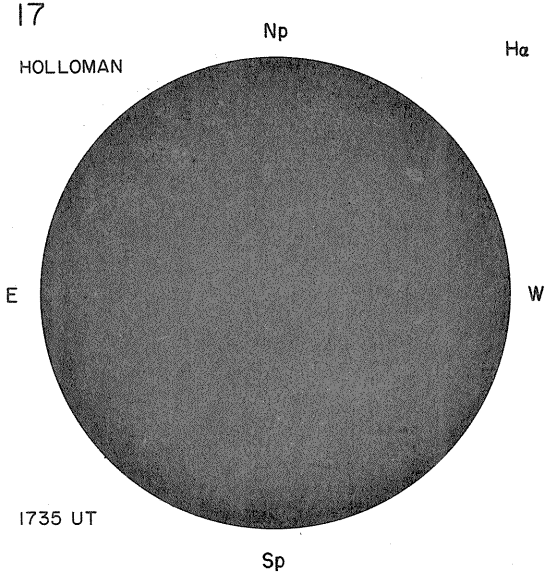
FEBRUARY 17, 1978 (P =-17.99, B_o =-6.91, L_o =321.45)

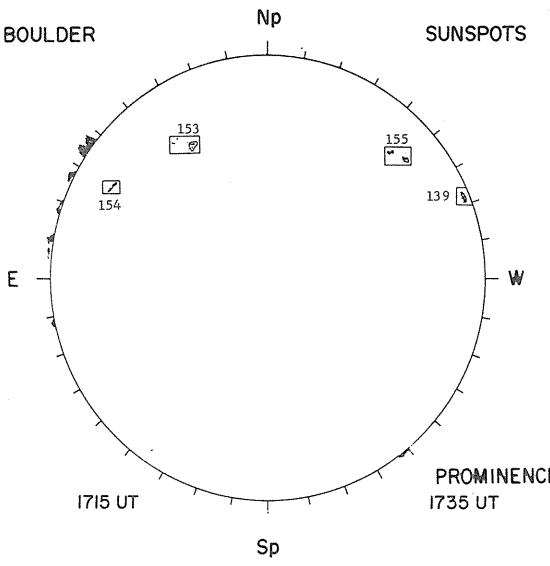


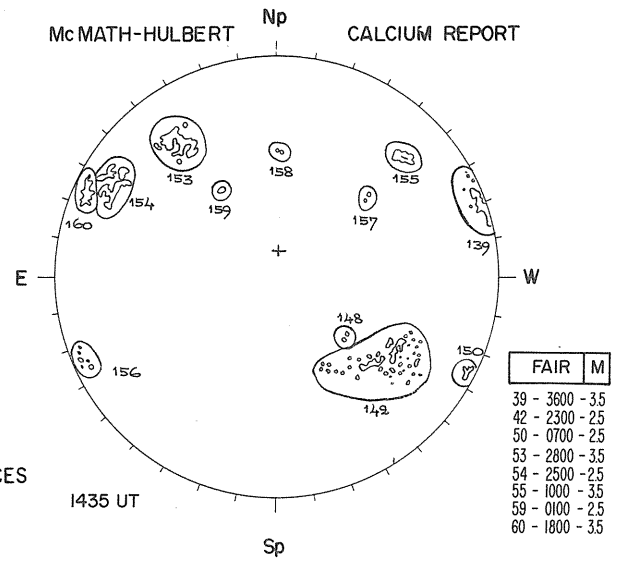


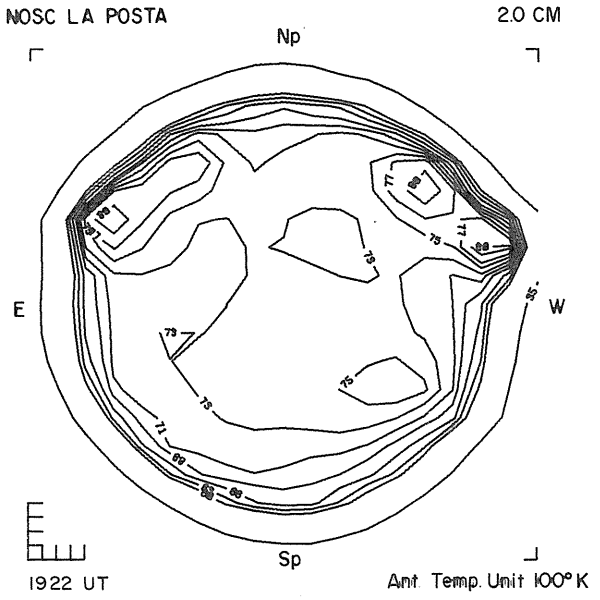


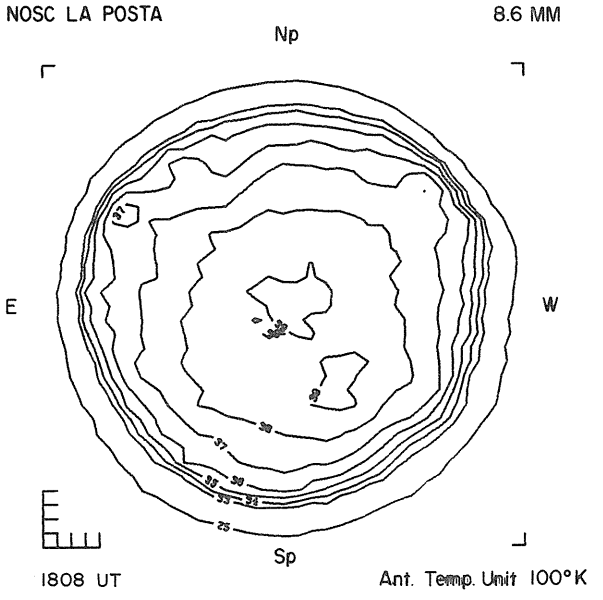



HOLLOMAN
Hα
Np
E
W
Sp
1735 UT

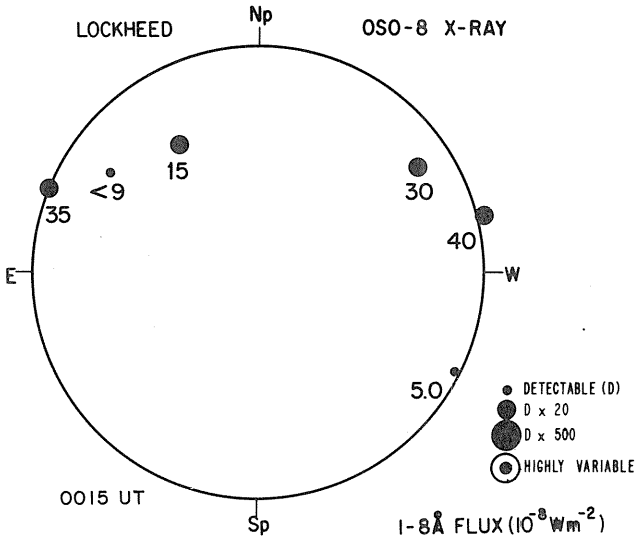

BOULDER
SUNSPOTS
Np
E
W
Sp
153
155
154
139
1715 UT
PROMINENCES
1735 UT

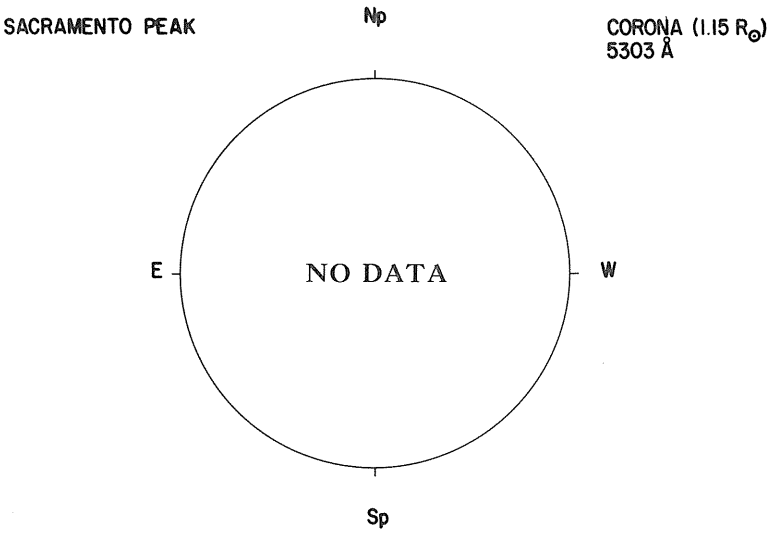

McMATH-HULBERT
CALCIUM REPORT
Np
E
W
Sp
153
158
155
154
159
157
160
139
148
150
156
142
1435 UT
FAIR M
39 - 3600 - 3.5
42 - 2300 - 2.5
50 - 0700 - 2.5
53 - 2800 - 3.5
54 - 2500 - 2.5
55 - 1000 - 3.5
59 - 0100 - 2.5
60 - 1800 - 3.5

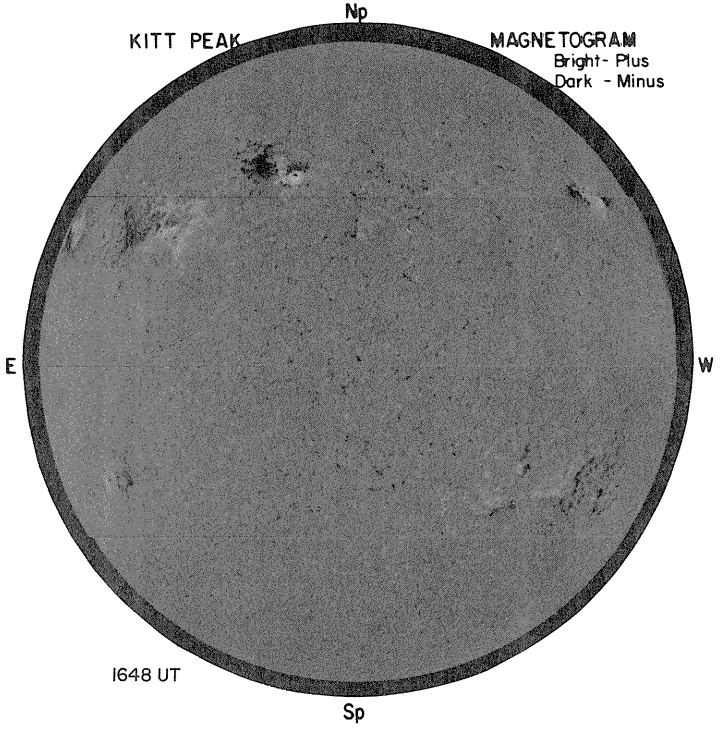

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1922 UT
Ant. Temp. Unit 100° K

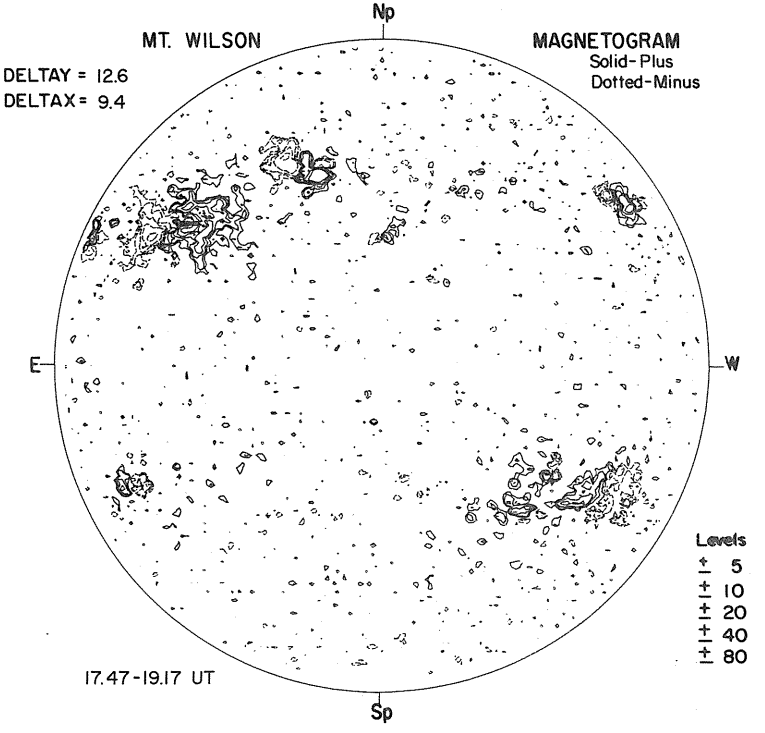

NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1808 UT
Ant. Temp. Unit 100° K

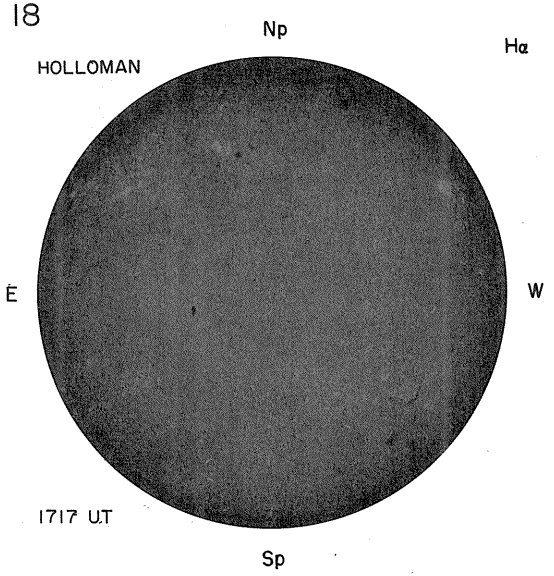
FEBRUARY 18, 1978 (P =-18.32, B_o =-6.95, L_o =308.28)

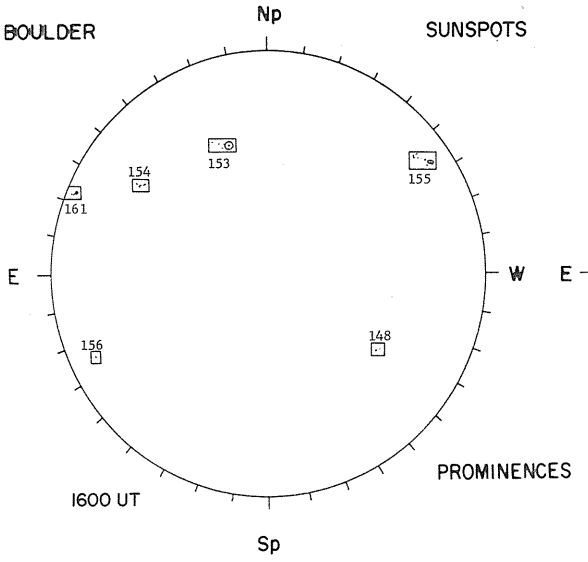


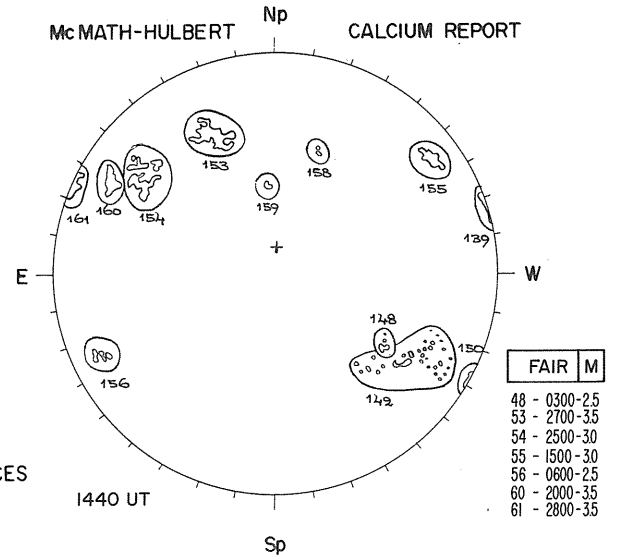




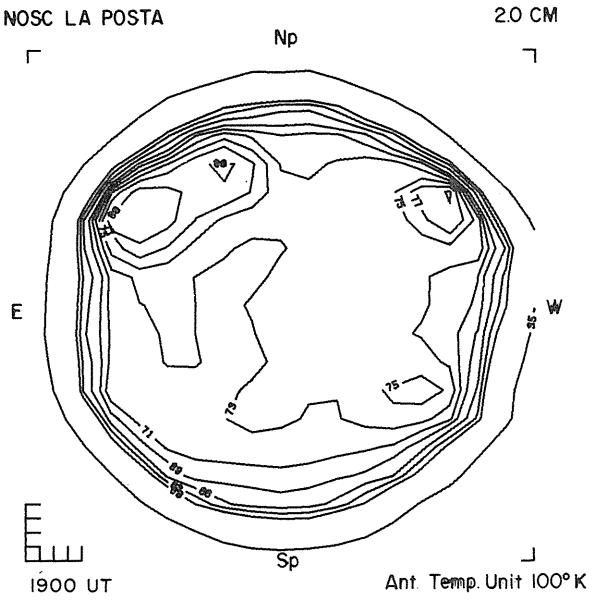


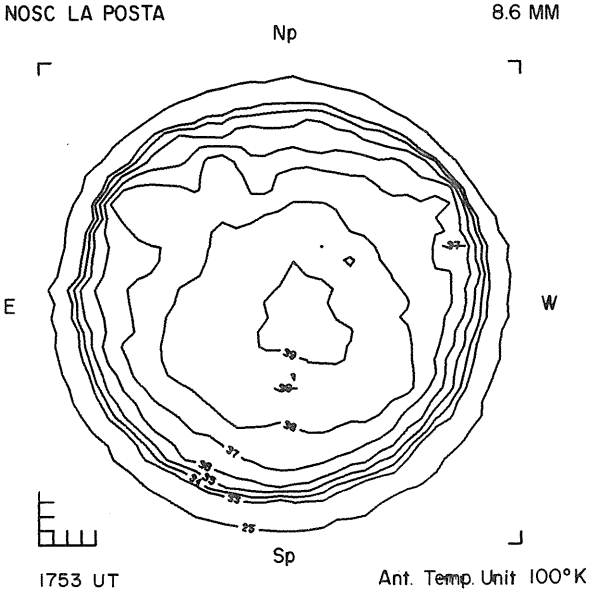




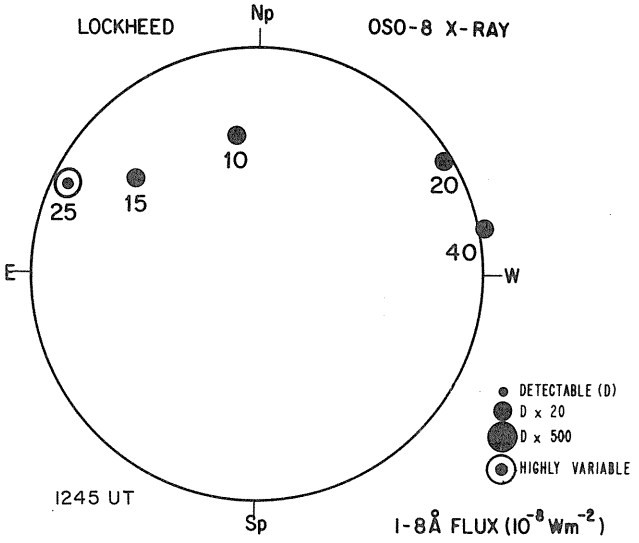


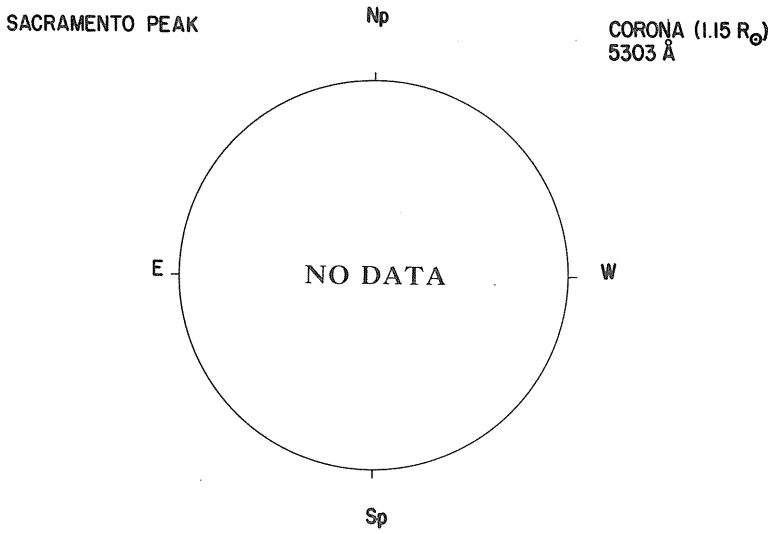
PROMINENCES

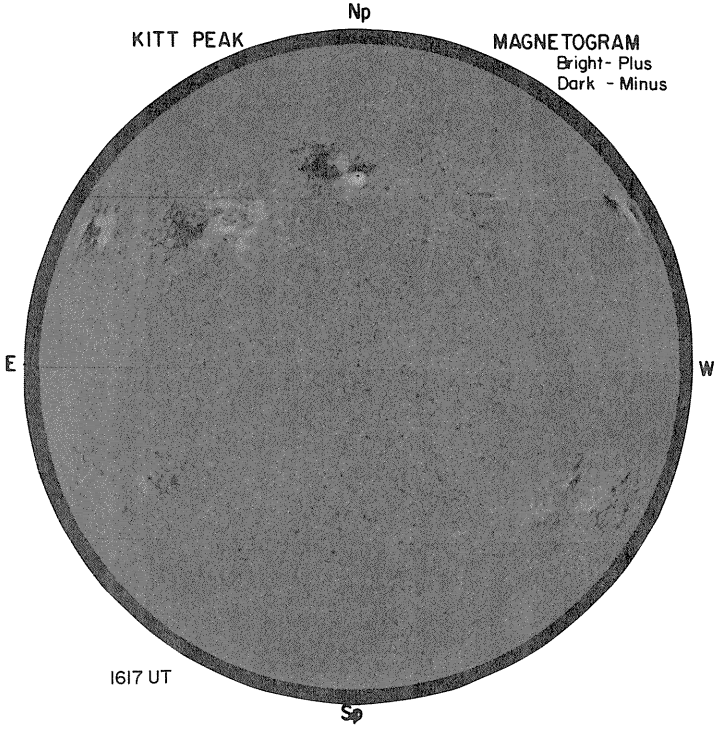


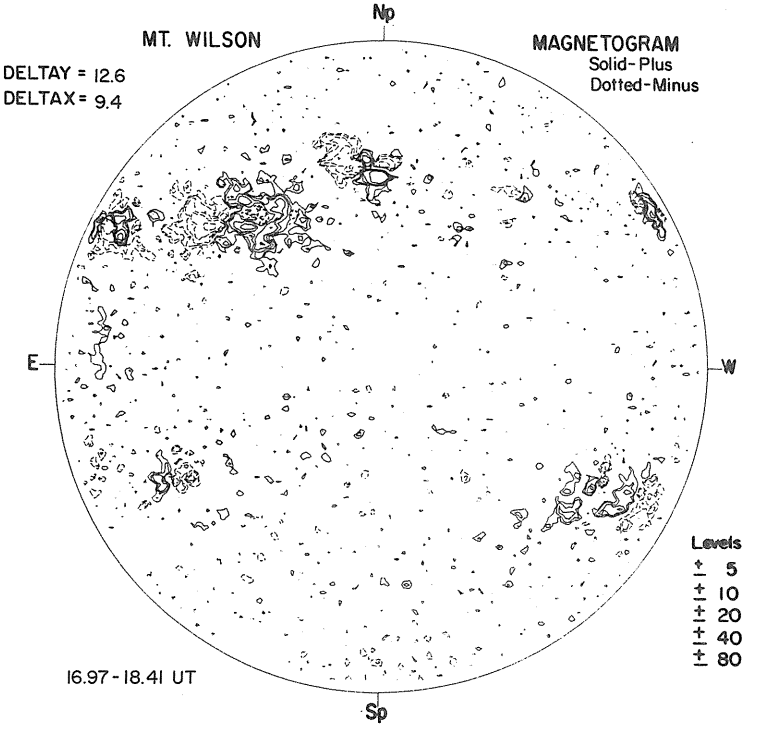


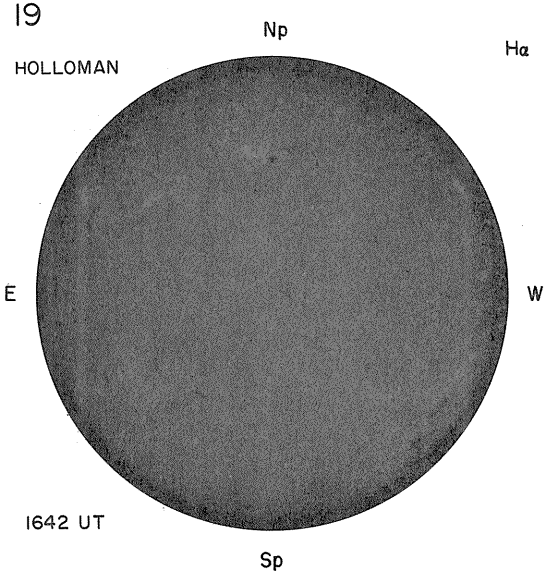
FEBRUARY 19, 1978 (P =-18.63, B_o =-6.99, L_o =295.11)

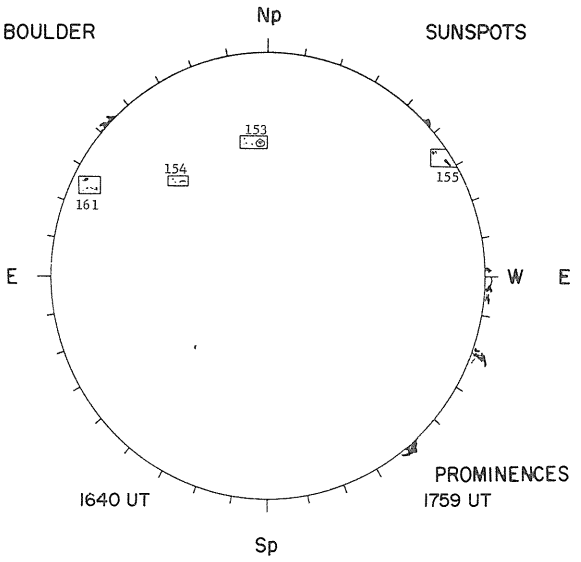


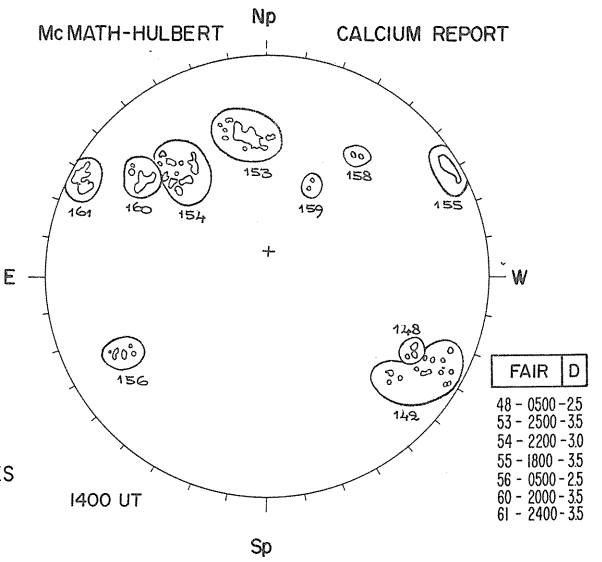


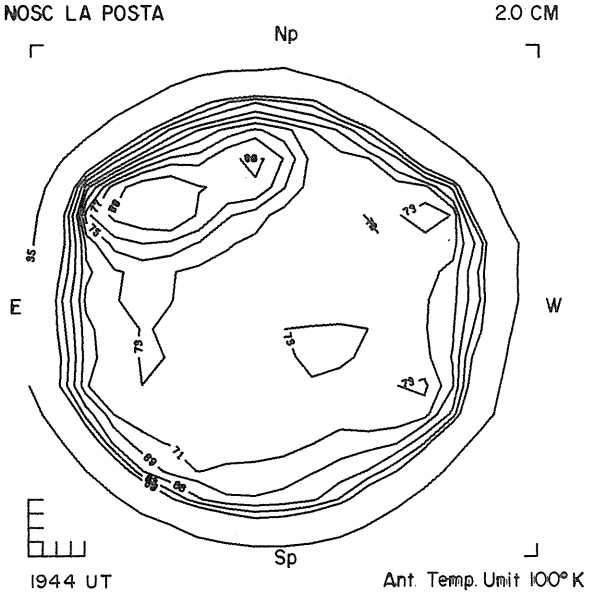


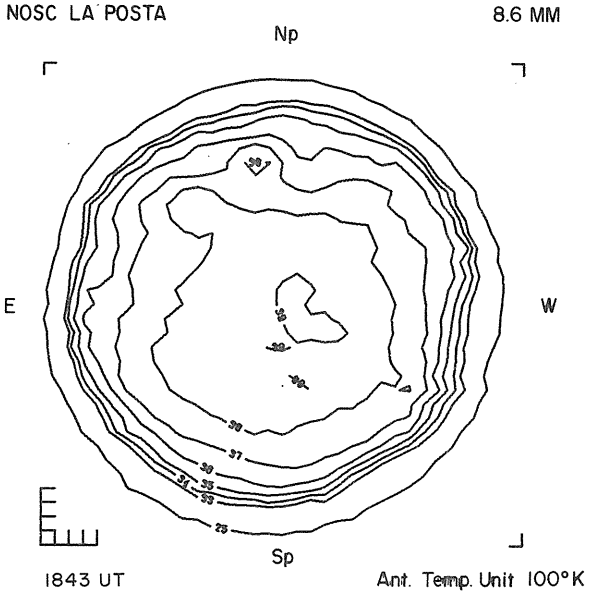



HOLLOMAN
Np
Hα
E
W
1642 UT
Sp

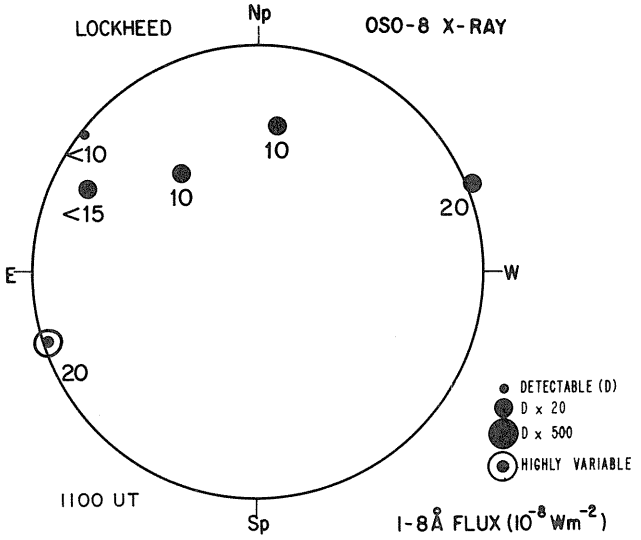

BOULDER
Np
SUNSPOTS
153
154
155
161
E
W
PROMINENCES
1640 UT
1759 UT
Sp

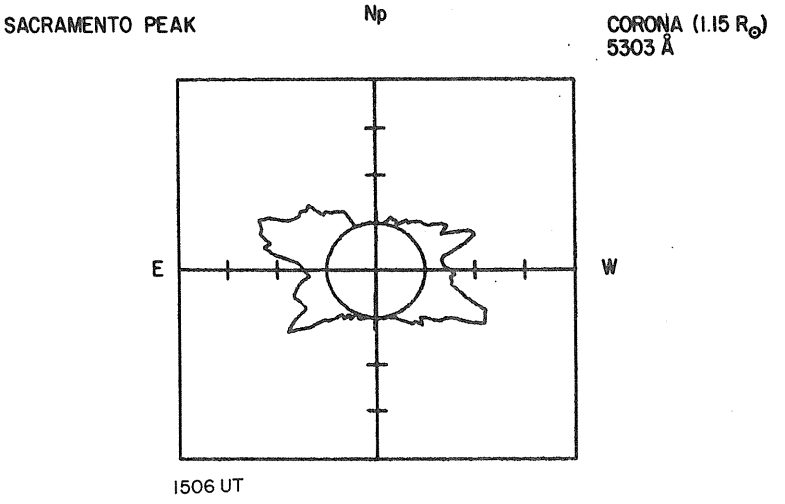

McMATH-HULBERT
Np
CALCIUM REPORT
161
160
154
153
159
158
155
156
148
142
E
W
FAIR D
48 - 0500 - 2.5
53 - 2500 - 3.5
54 - 2200 - 3.0
55 - 1800 - 3.5
56 - 0500 - 2.5
60 - 2000 - 3.5
61 - 2400 - 3.5
1400 UT
Sp

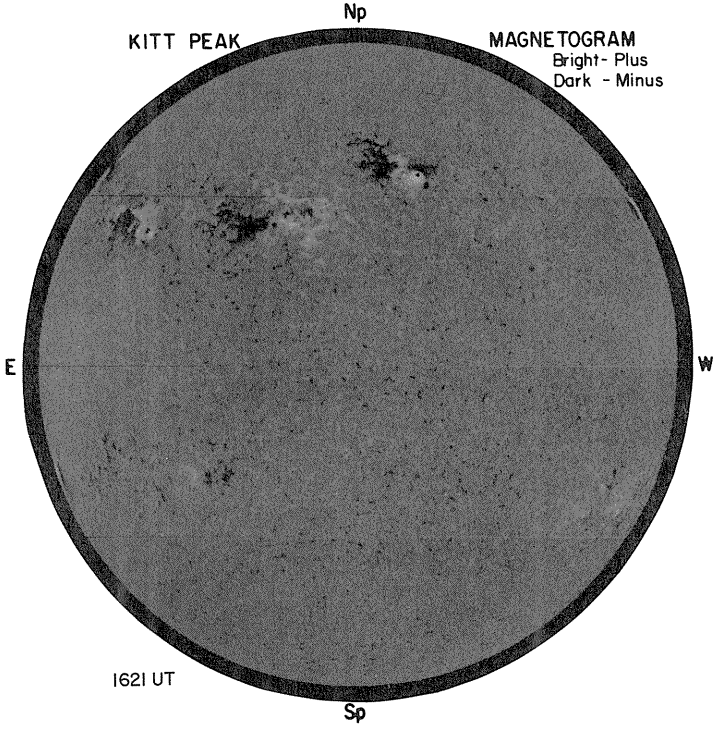

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1944 UT
Ant. Temp. Unit 100° K

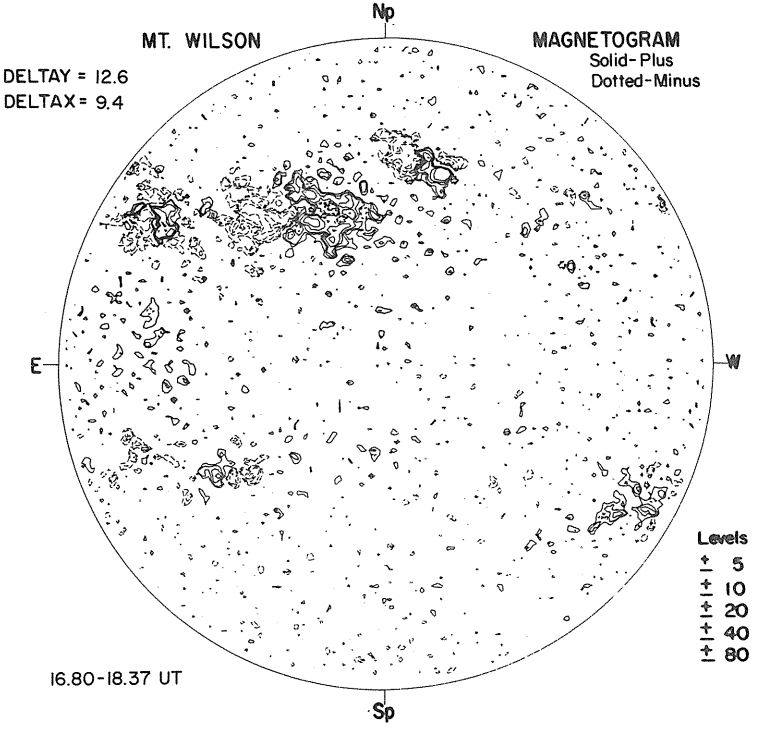

NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1843 UT
Ant. Temp. Unit 100° K

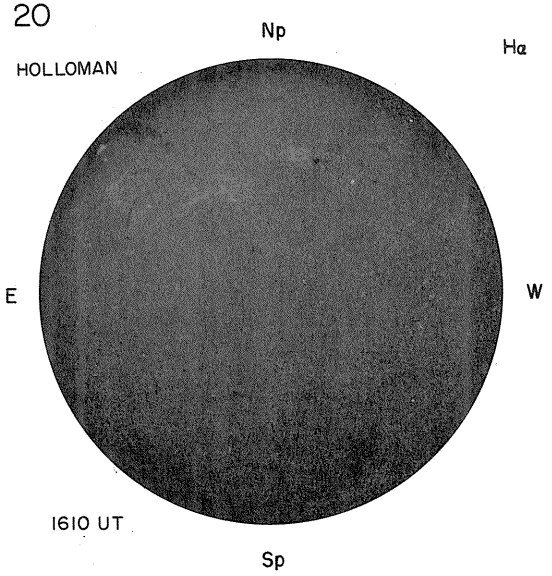
FEBRUARY 20, 1978 (P =-18.95, B_o =-7.02, L_o =281.94)

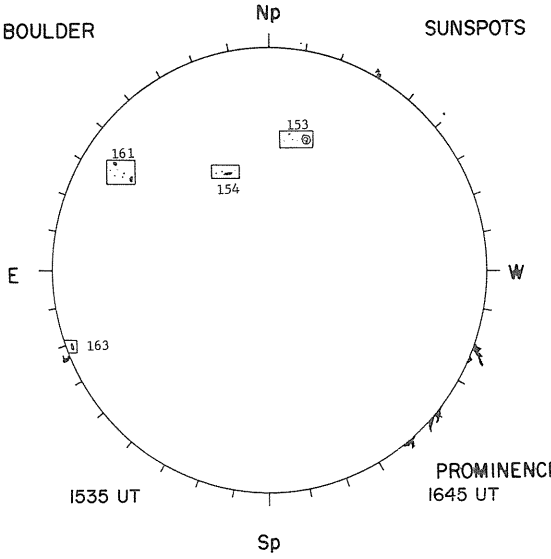


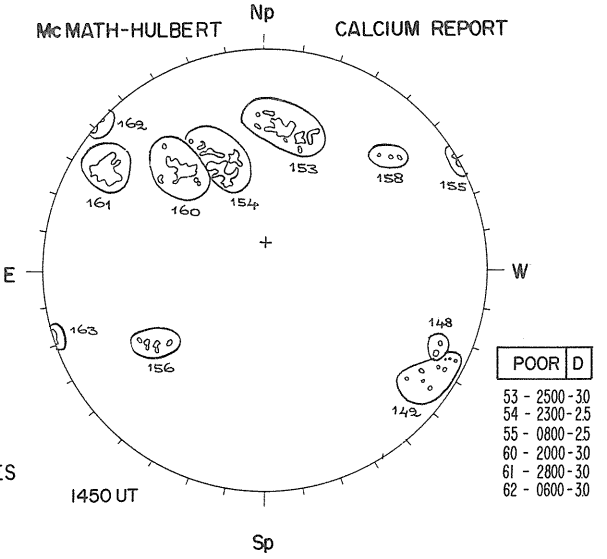


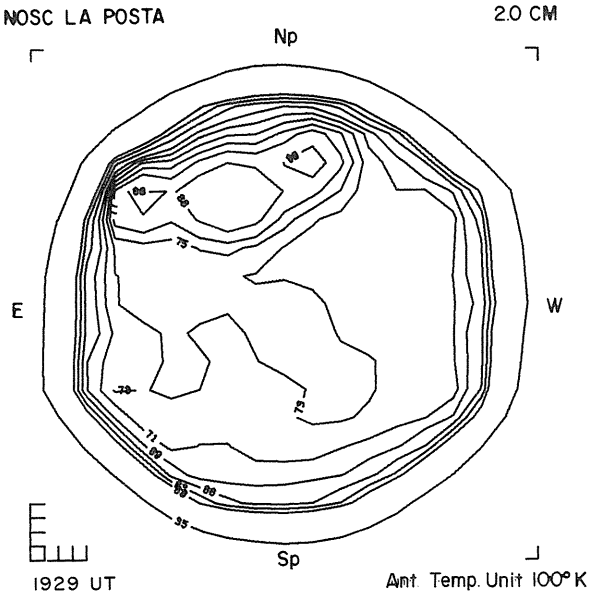


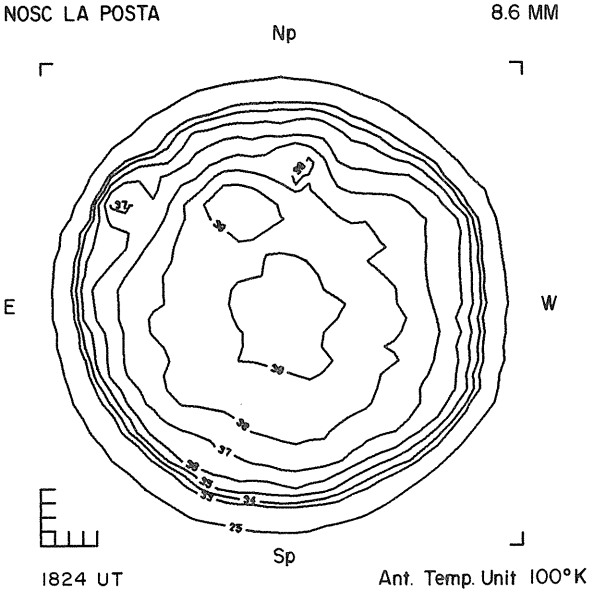



HOLLOMAN
Hα
Np
E
W
Sp
1610 UT

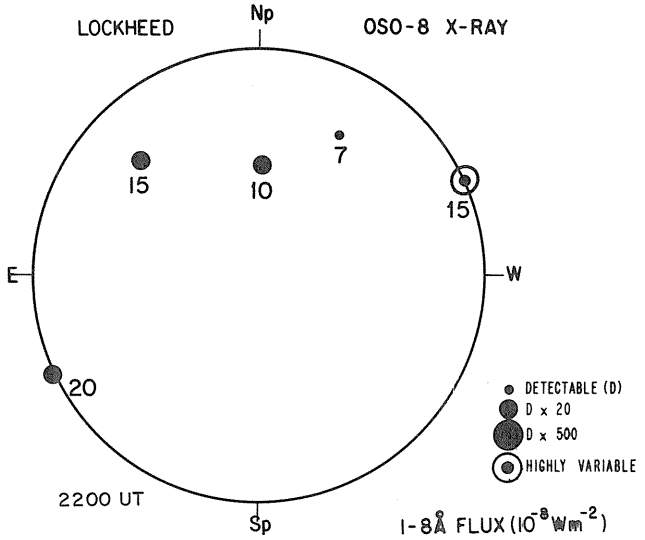

BOULDER
SUNSPOTS
Np
E
W
Sp
153
161
154
163
1535 UT
PROMINENCES
1645 UT

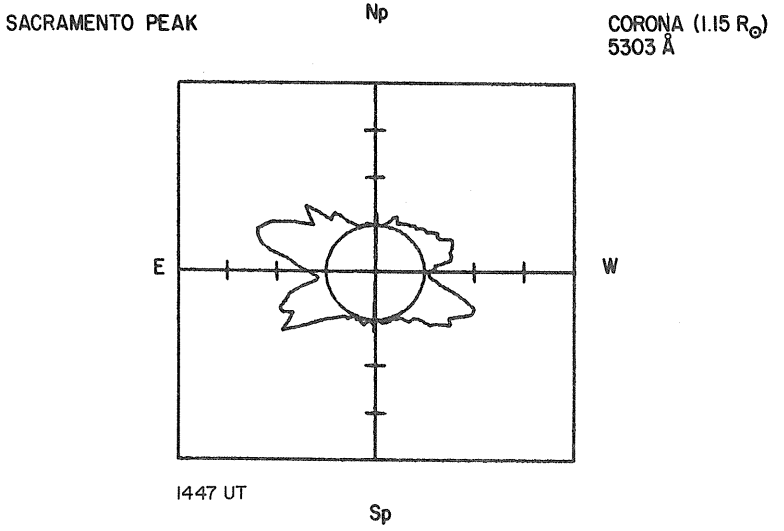

McMATH-HULBERT
CALCIUM REPORT
Np
E
W
Sp
162
161
160
154
153
158
155
163
156
148
142
1450 UT
POOR D
53 - 2500-30
54 - 2300-25
55 - 0800-25
60 - 2000-30
61 - 2800-30
62 - 0600-30

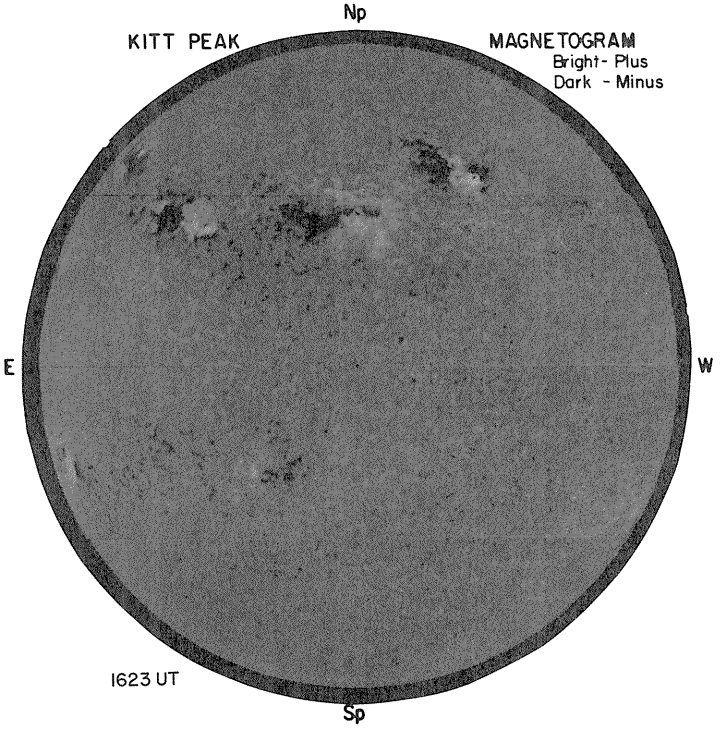

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1929 UT
Ant. Temp. Unit 100° K

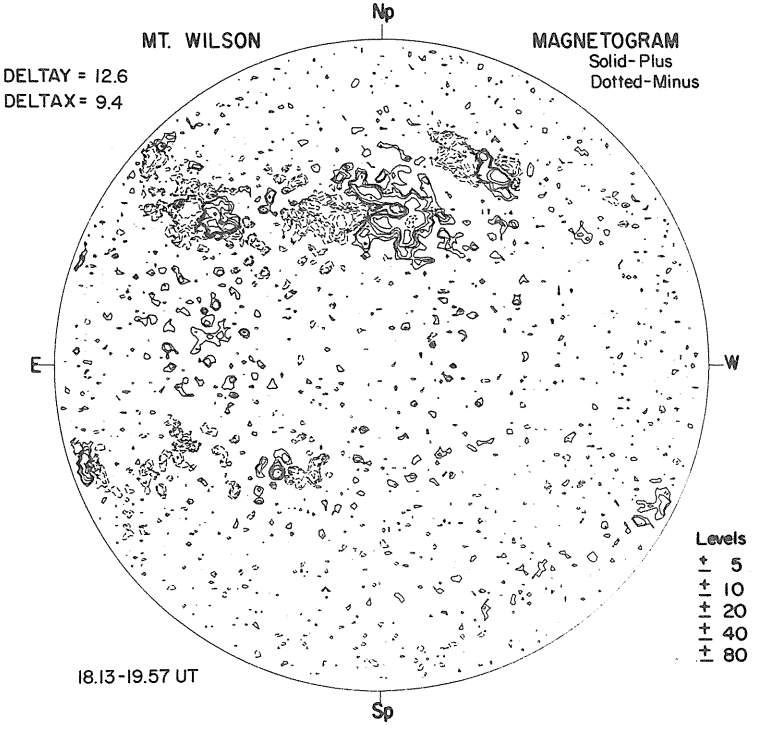

NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1824 UT
Ant. Temp. Unit 100° K

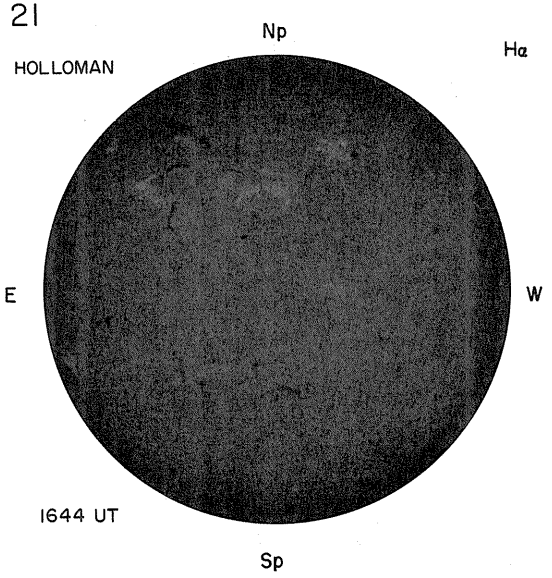
FEBRUARY 21, 1978 (P =-19.25, B_0 =-7.05, L_0 =268.77)

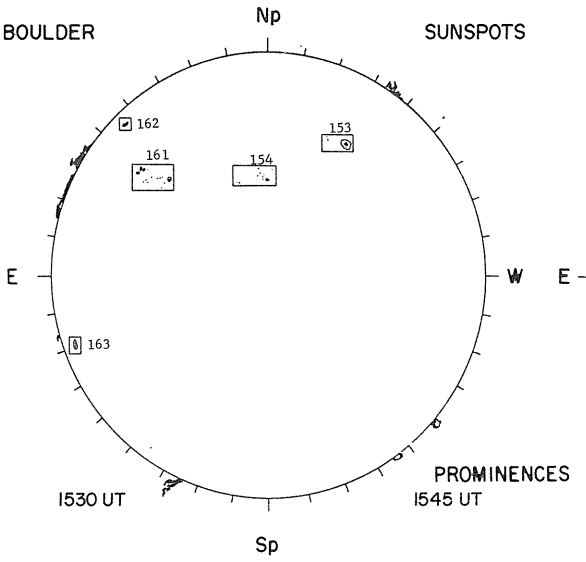


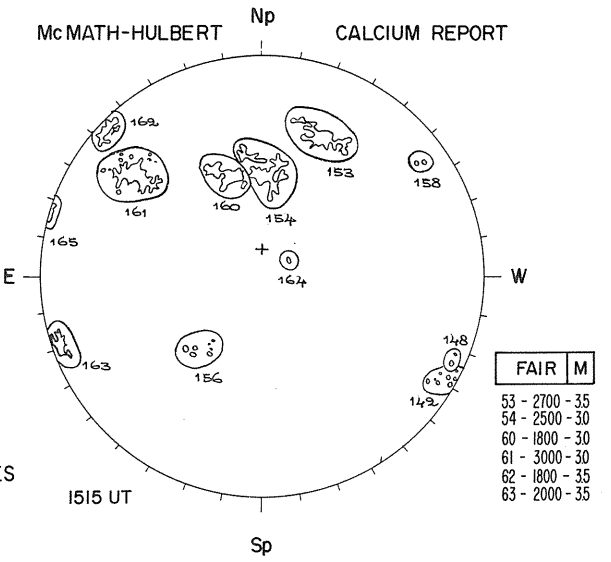


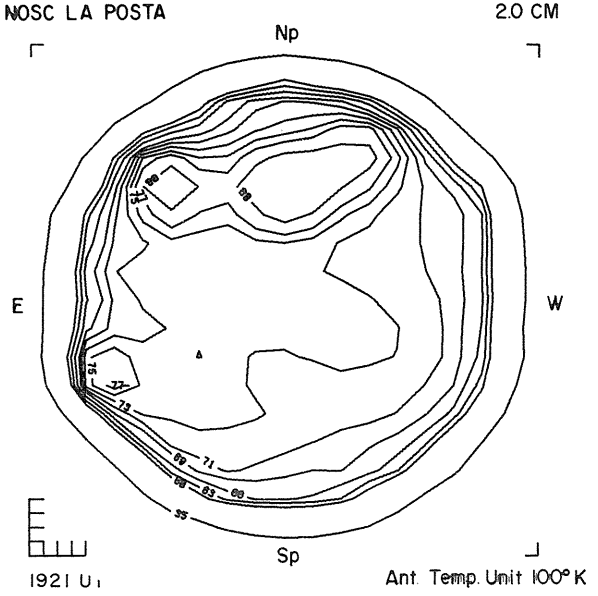


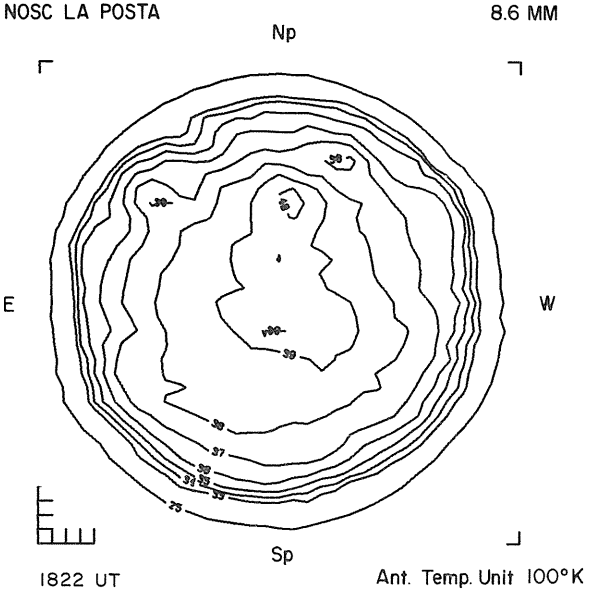



HOLLOMAN
Hα
Np
E
W
Sp
1644 UT

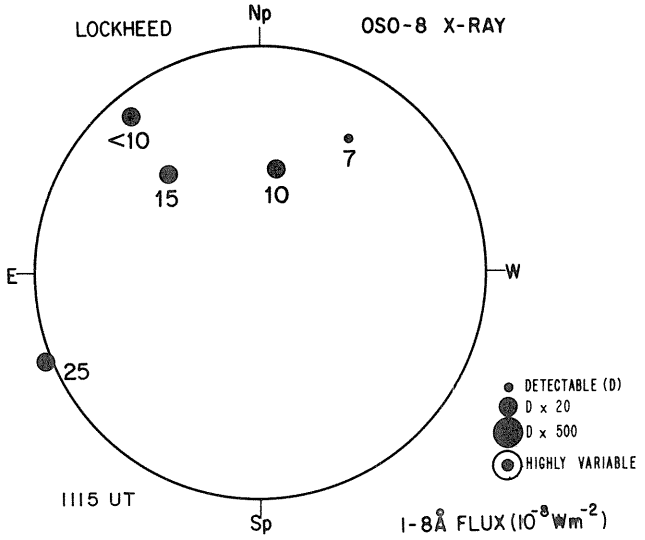

BOULDER
SUNSPOTS
Np
E
W
Sp
162
161
154
153
163
PROMINENCES
1530 UT
1545 UT

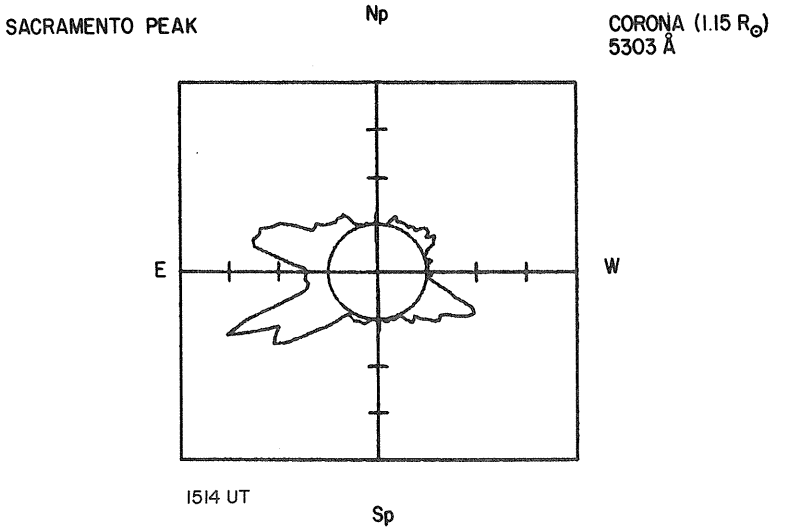

McMATH-HULBERT
CALCIUM REPORT
Np
E
W
Sp
169
161
160
154
153
158
165
164
163
156
148
149
1515 UT
FAIR M
53 - 2700 - 35
54 - 2500 - 30
60 - 1800 - 30
61 - 3000 - 30
62 - 1800 - 35
63 - 2000 - 35

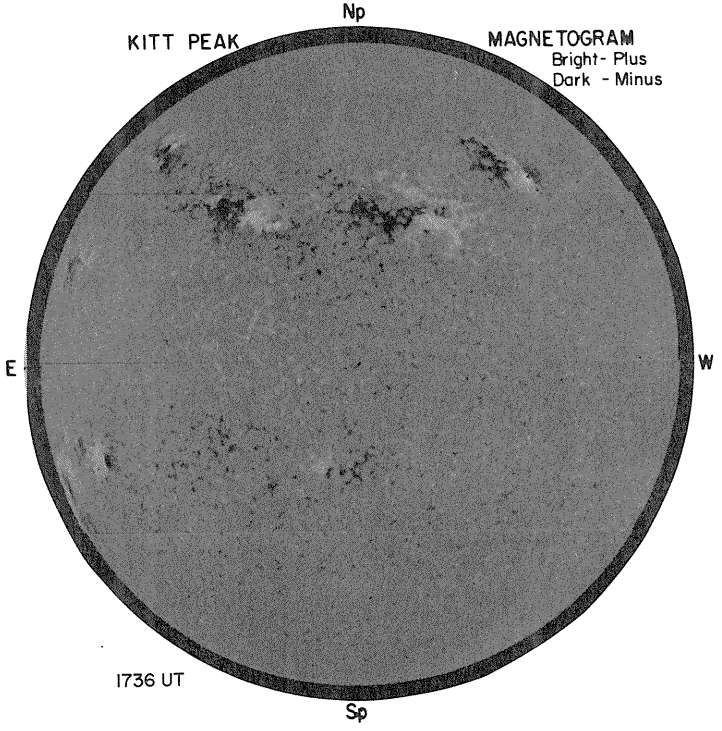

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1921 UT
Ant. Temp. Unit 100° K

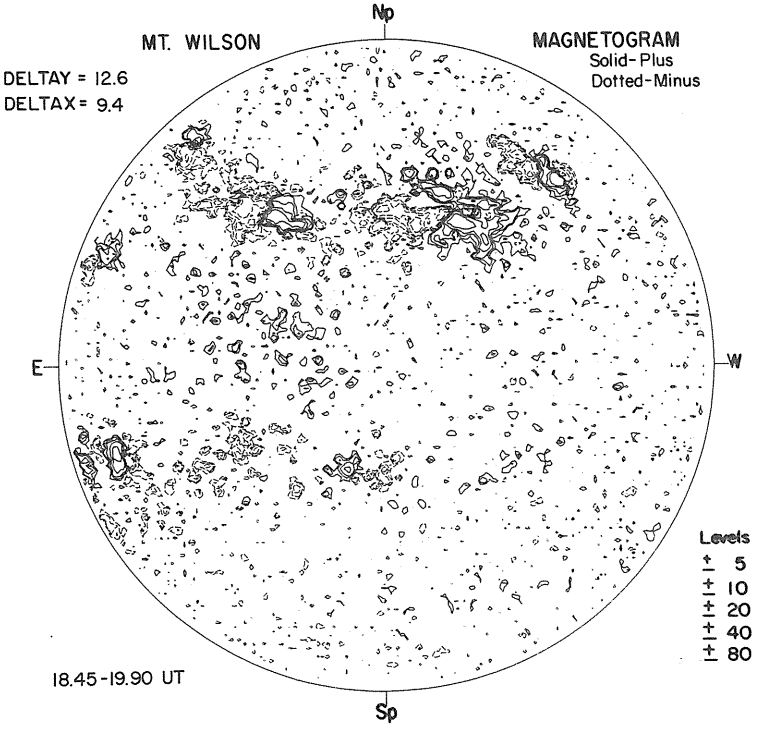

NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1822 UT
Ant. Temp. Unit 100° K

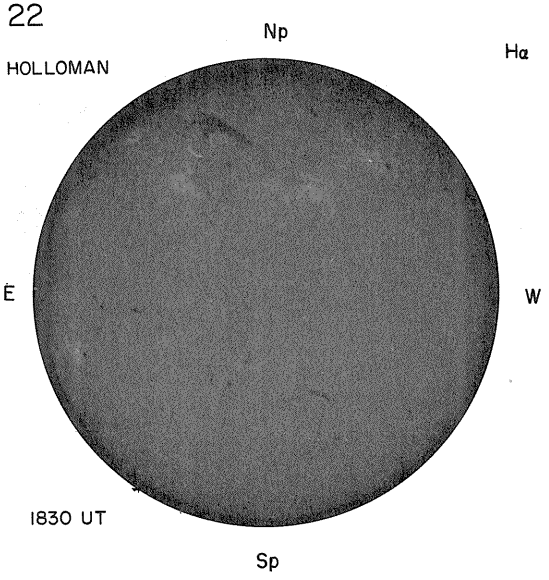
FEBRUARY 22, 1978 (P =-19.55, B_o =-7.08, L_o =255.60)

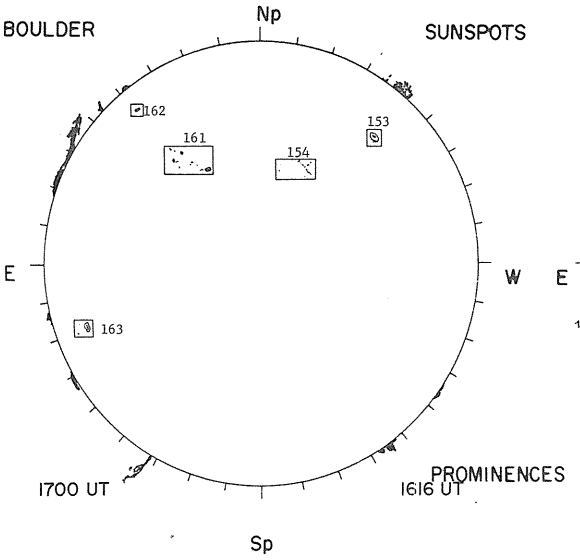


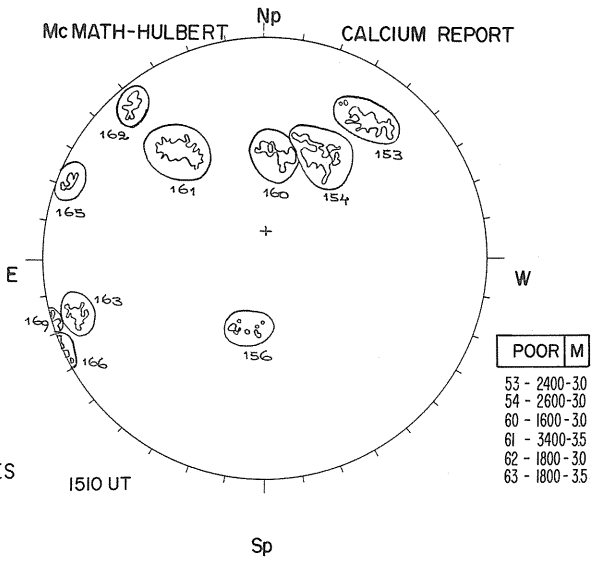




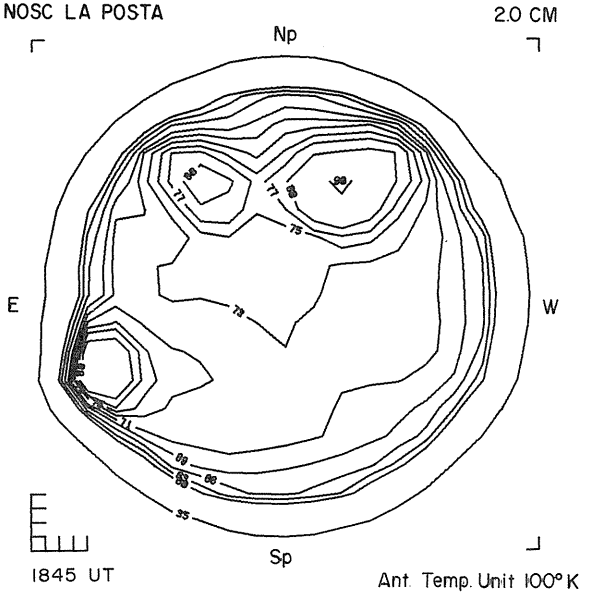


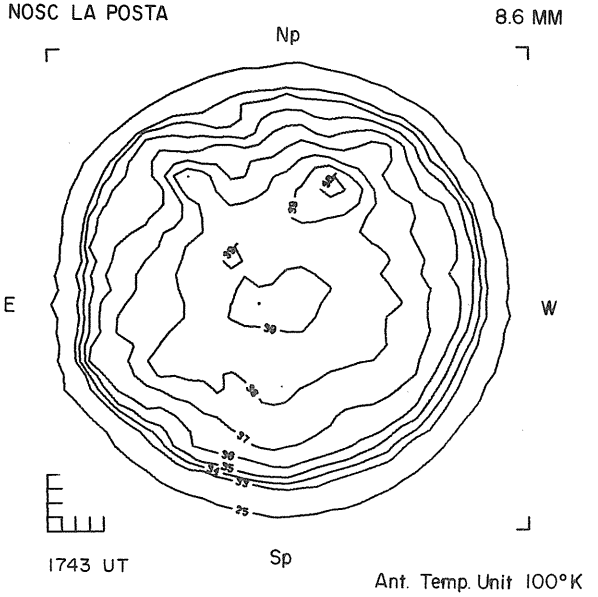




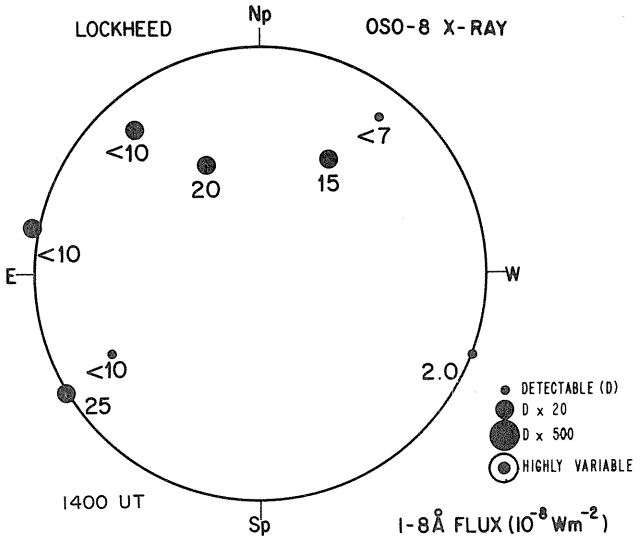


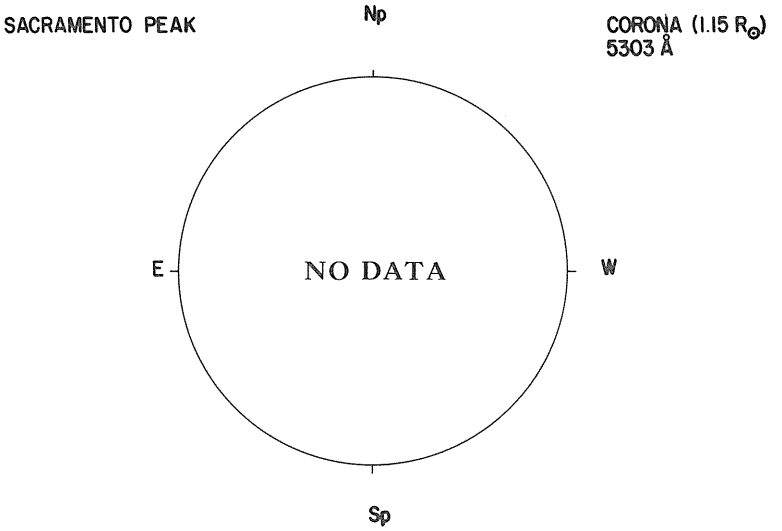
PROMINENCES

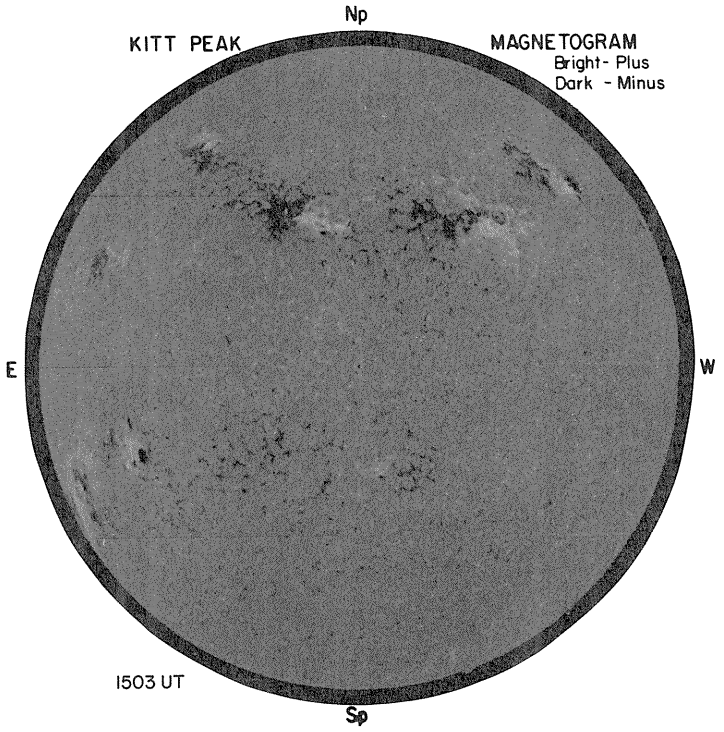


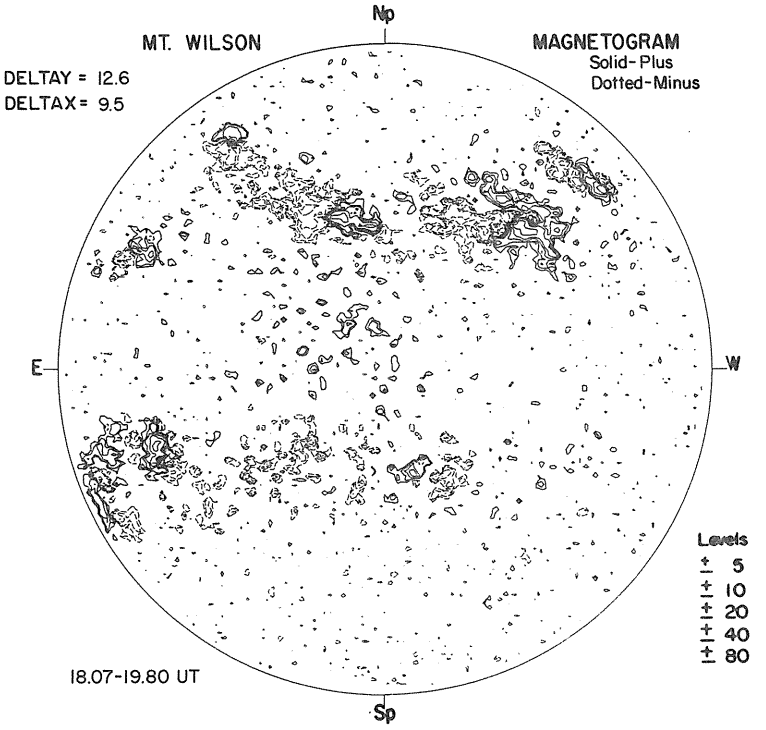


FEBRUARY 23, 1978 (P =-19.85, B_o =-7.11, L_o =242.43)

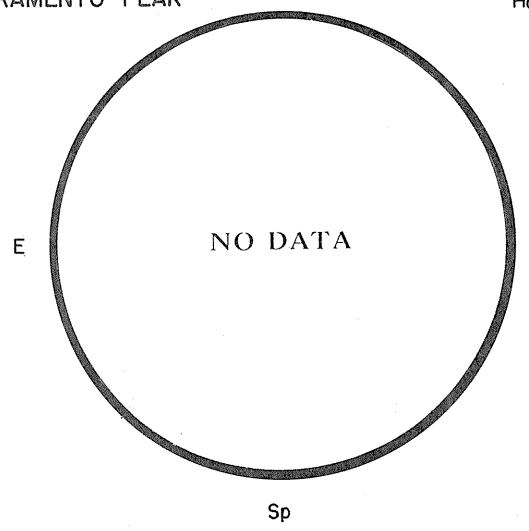




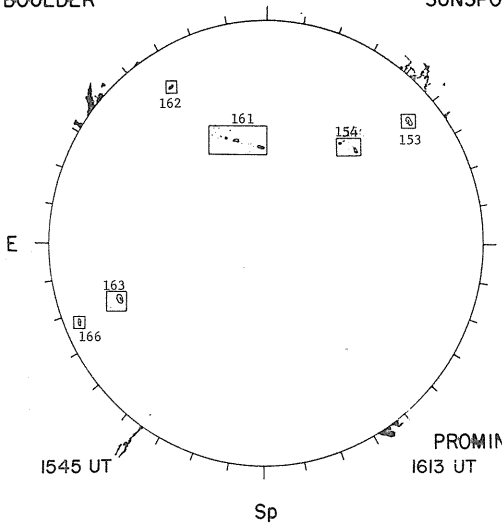




SACRAMENTO PEAK Hα

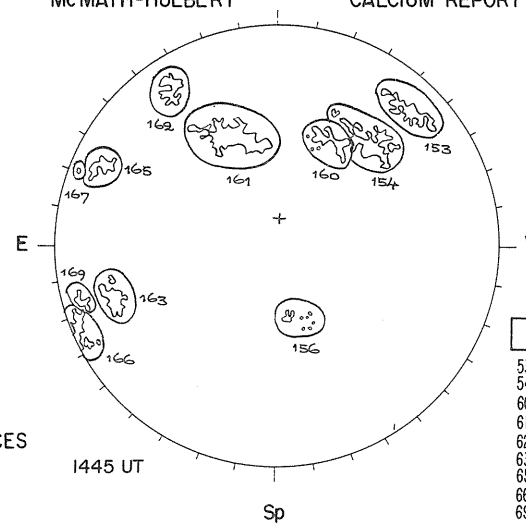


BOULDER SUNSPOTS



1545 UT

McMATH-HULBERT CALCIUM REPORT



PROMINENCES

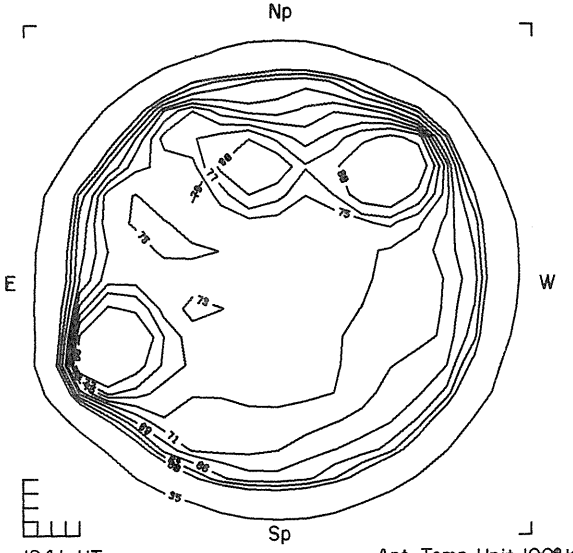
1613 UT

1445 UT

FAIR	M

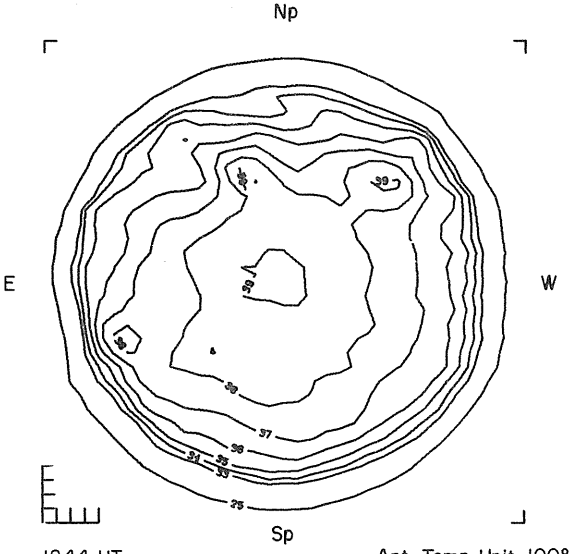
53 - 2400 - 3.0
54 - 2500 - 3.0
60 - 1700 - 3.0
61 - 3400 - 3.5
62 - 2000 - 3.0
63 - 2000 - 3.5
65 - 1300 - 2.5
66 - 2800 - 3.0
69 - 0800 - 2.5

NOSC LA POSTA 2.0 CM



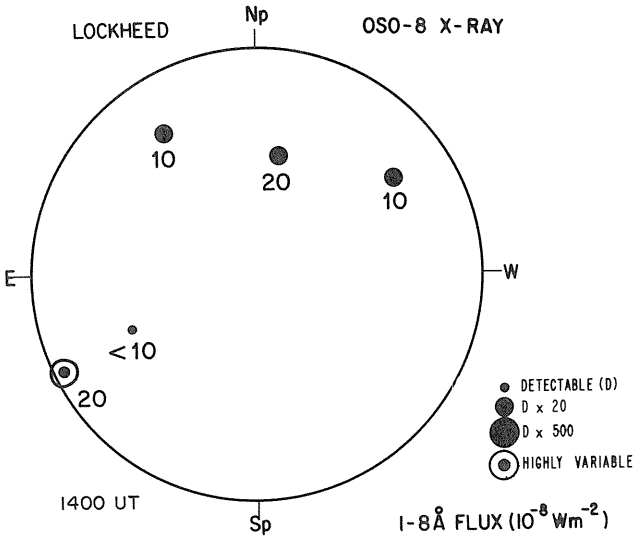
1941 UT Ant. Temp. Unit 100° K

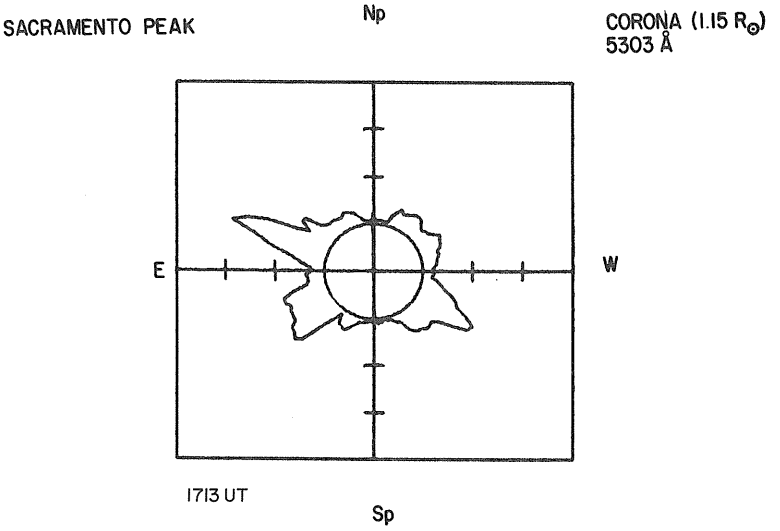
NOSC LA POSTA 8.6 MM

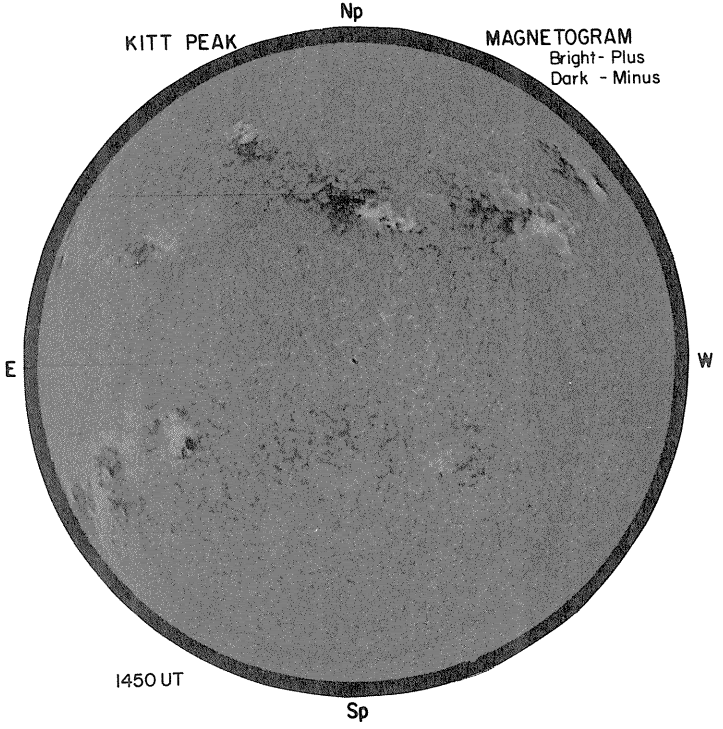


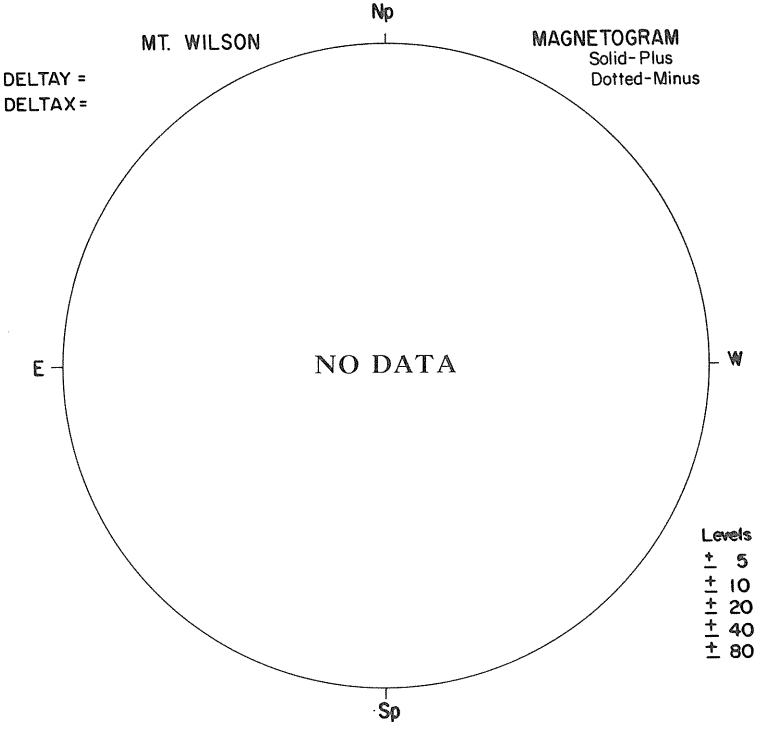
1844 UT Ant. Temp. Unit 100° K

FEBRUARY 24, 1978 (P =-20.13, B_o =-7.13, L_o =229.26)





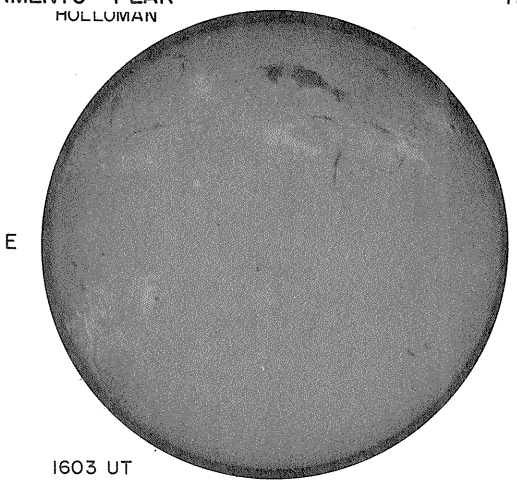




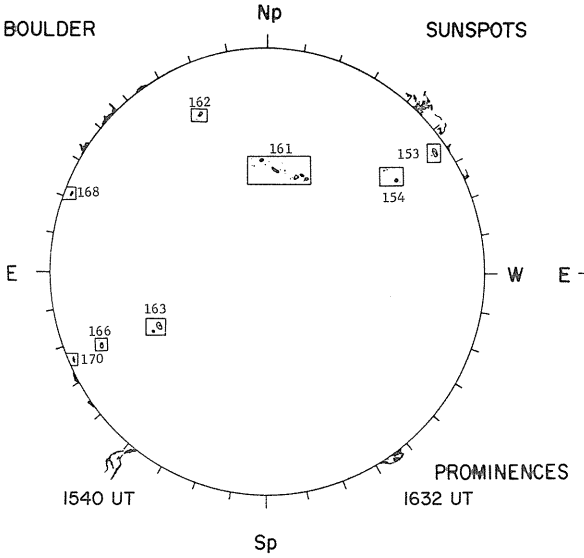
24

SACRAMENTO PEAK

HOLLOMAN

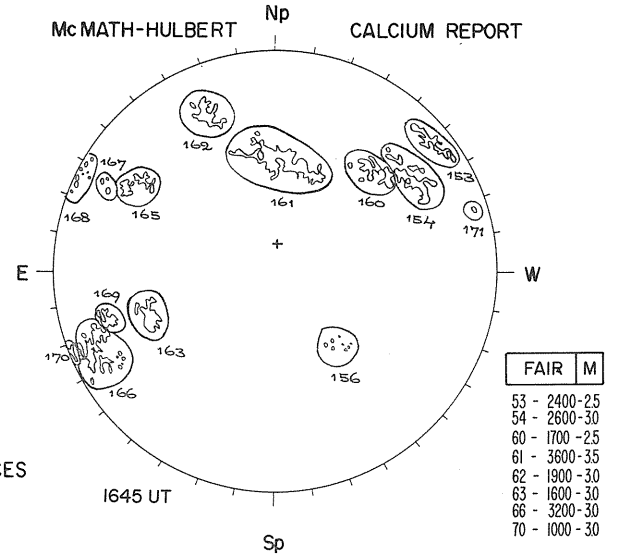


BOULDER



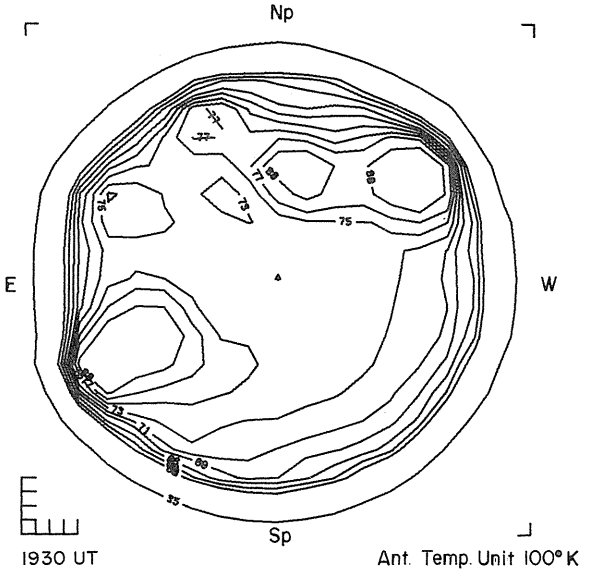
McMATH-HULBERT

CALCIUM REPORT



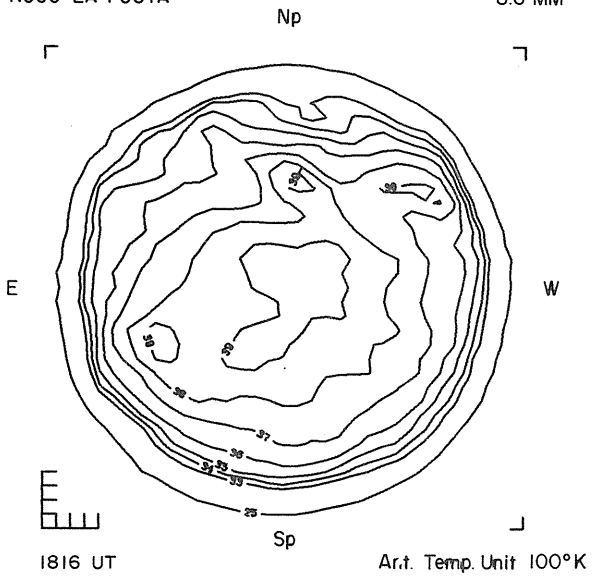
NOSC LA POSTA

2.0 CM

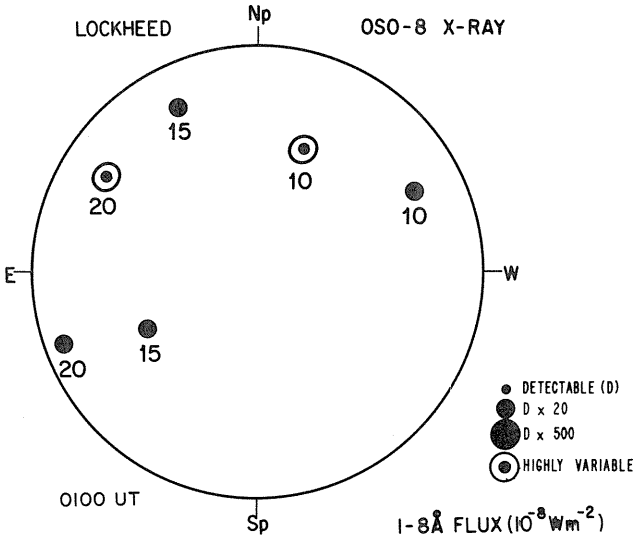


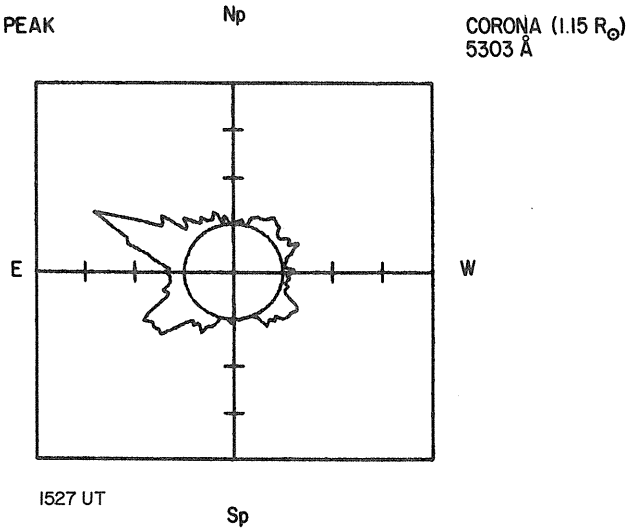
NOSC LA POSTA

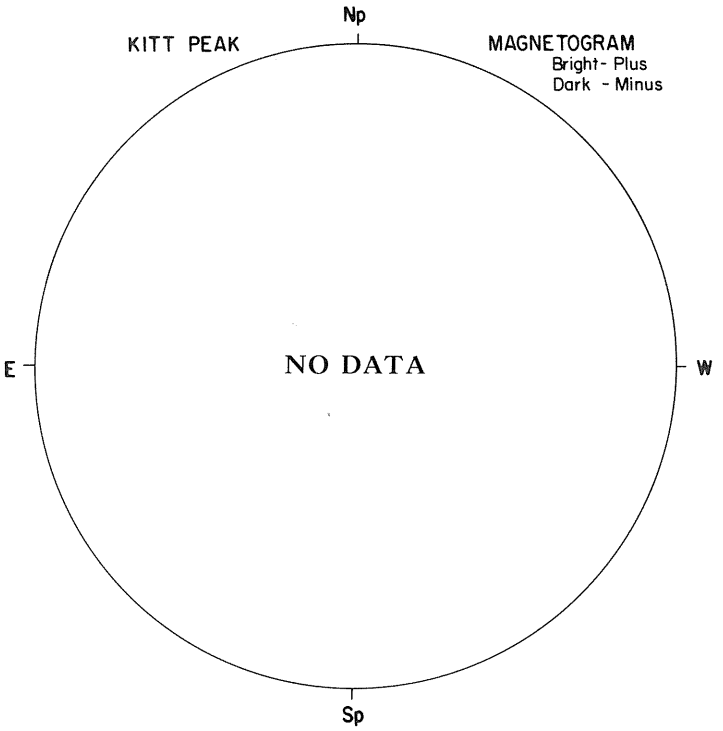
8.6 MM

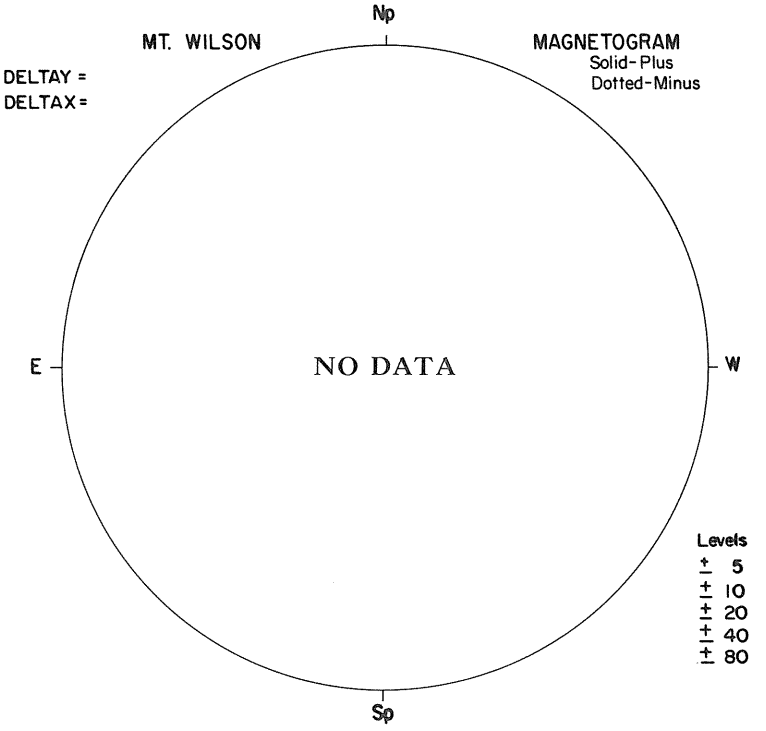


FEBRUARY 25, 1978 (P =-20.42, B_o =-7.15, L_o =216.09)

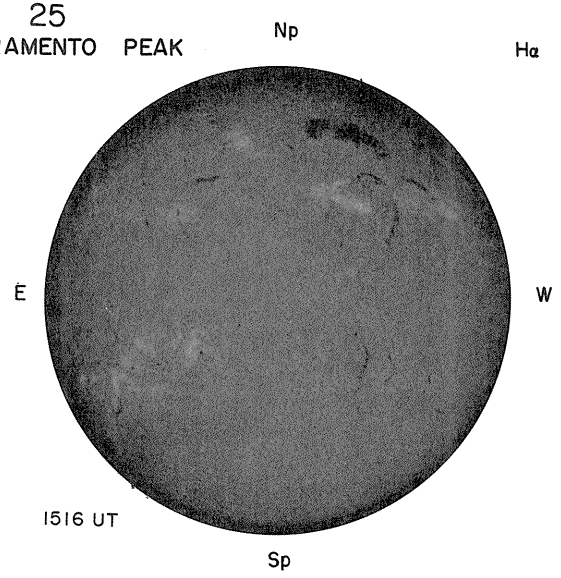




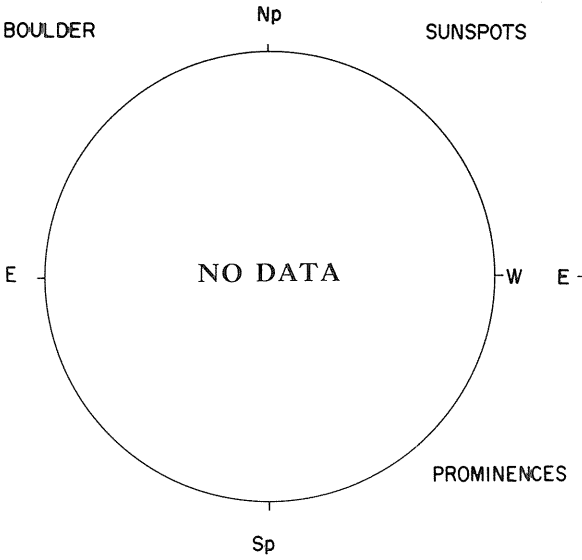




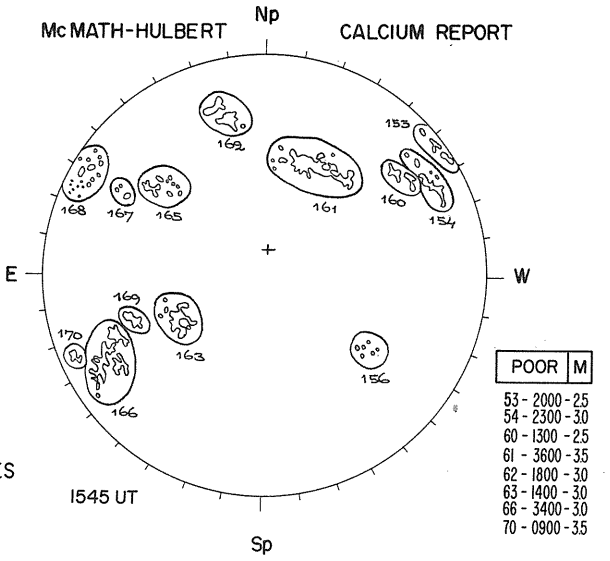
SACRAMENTO PEAK Hα



BOULDER SUNSPOTS

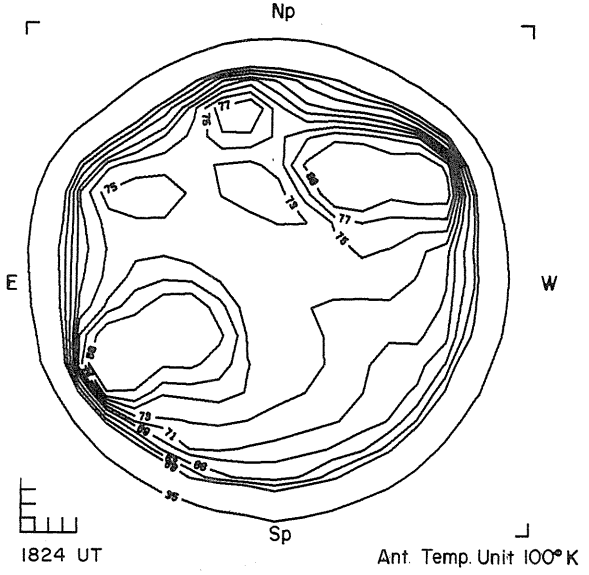


McMATH-HULBERT CALCIUM REPORT

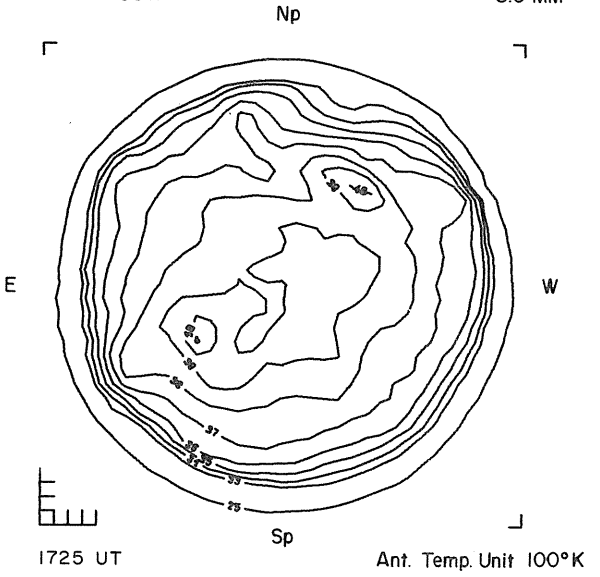


PROMINENCES

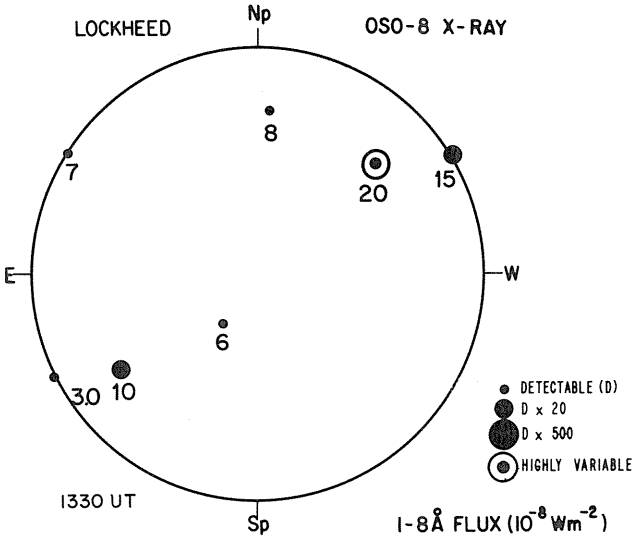
NOSC LA POSTA 2.0 CM

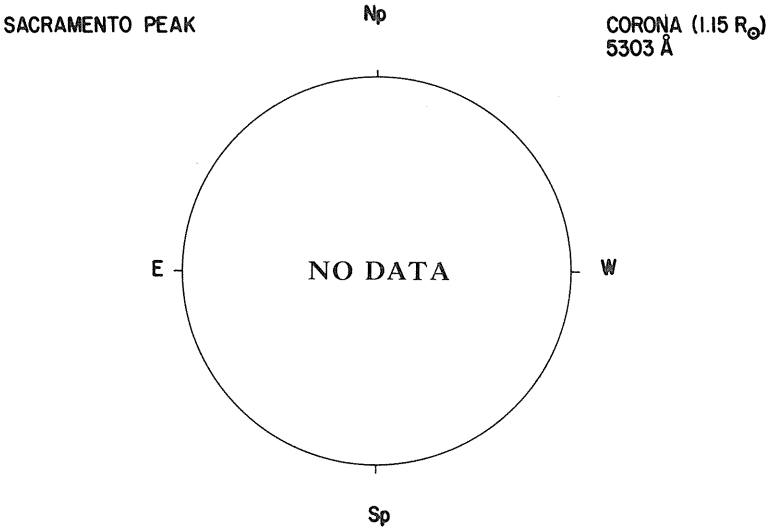


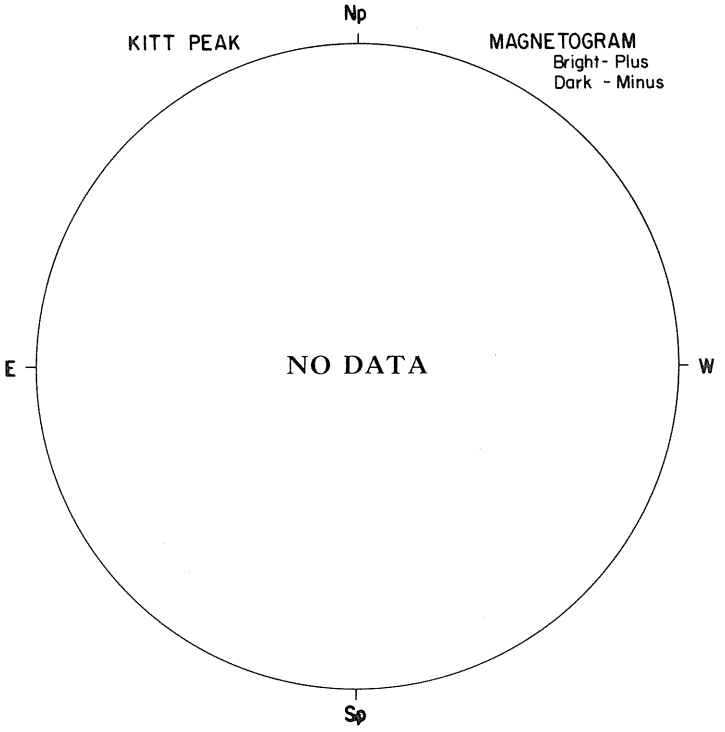
NOSC LA POSTA 8.6 MM

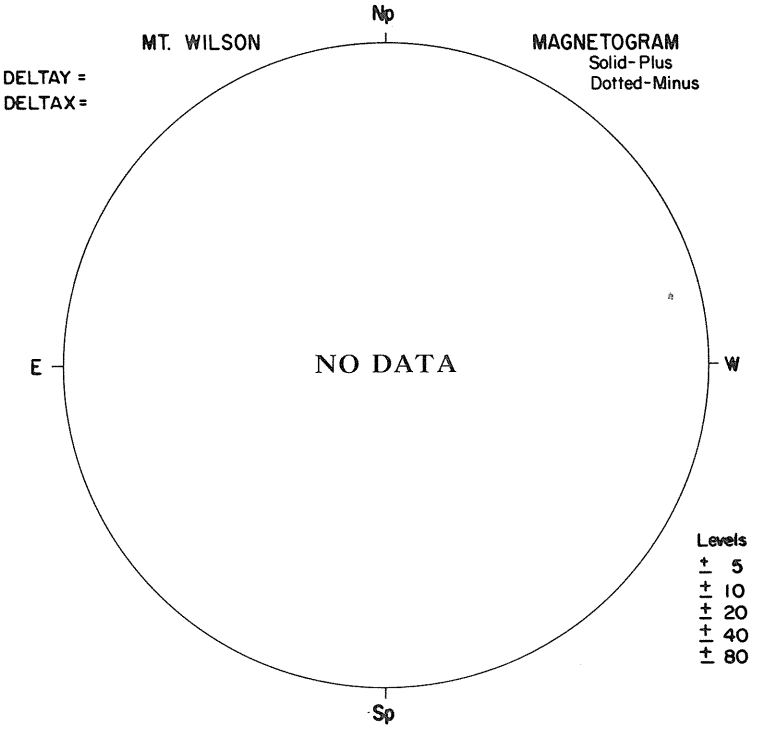


FEBRUARY 26, 1978 (P =-20.69, B_o =-7.17, L_o =202.92)

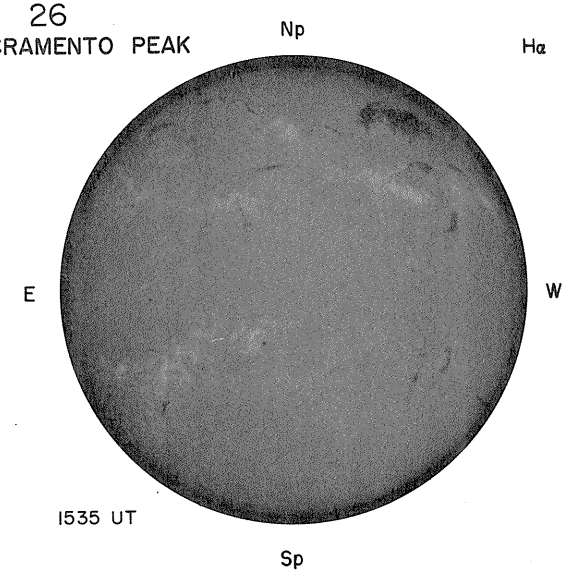




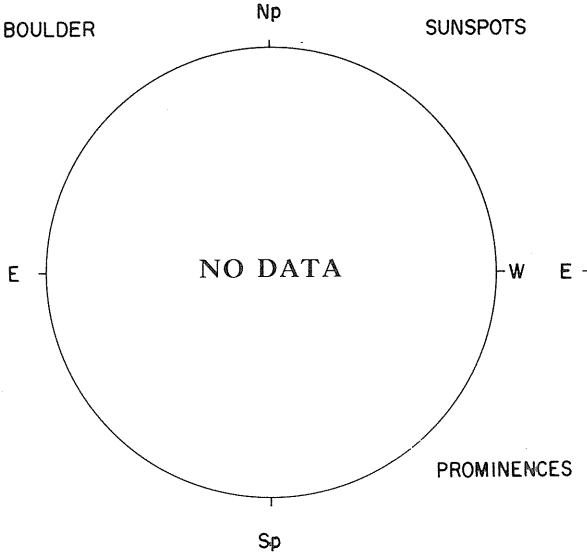




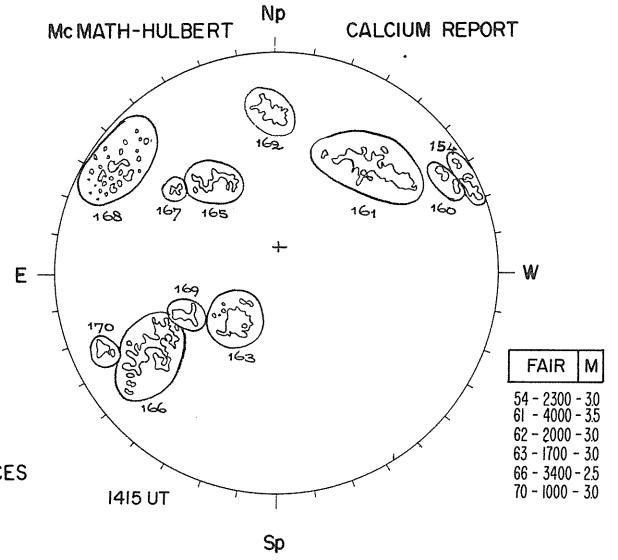
SACRAMENTO PEAK



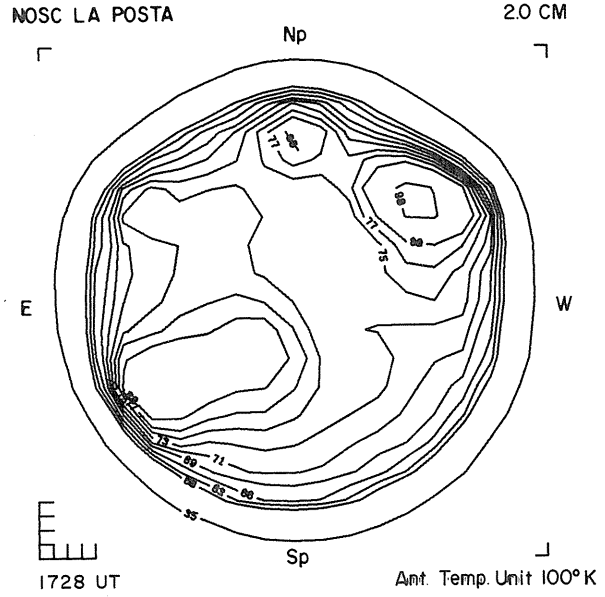
BOULDER



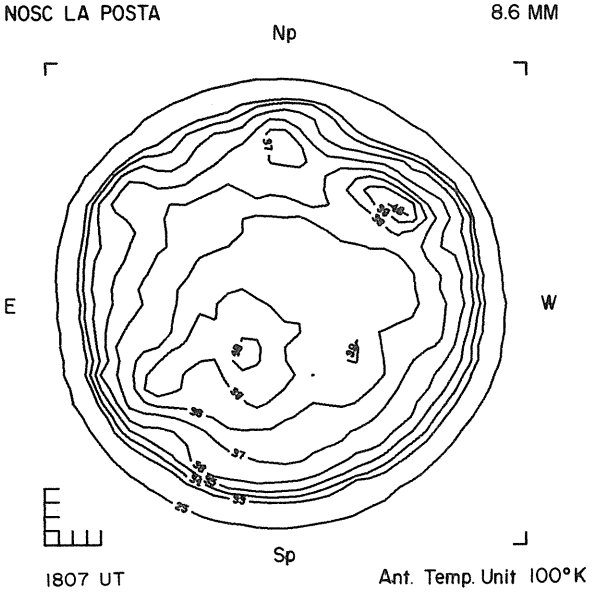
McMATH-HULBERT



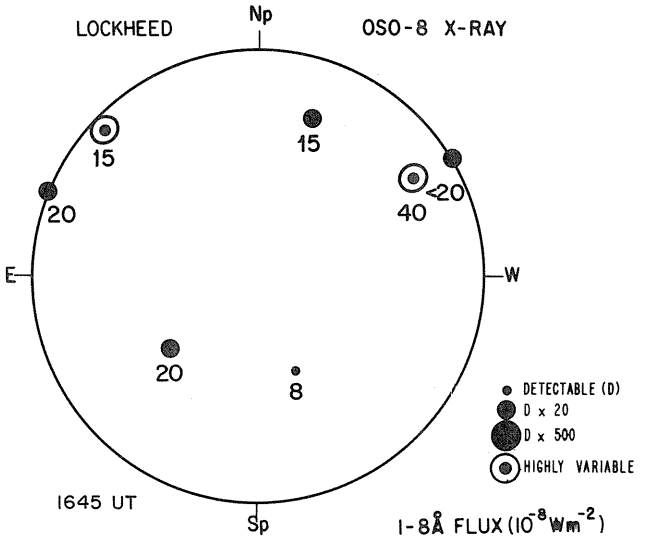
NOSC LA POSTA

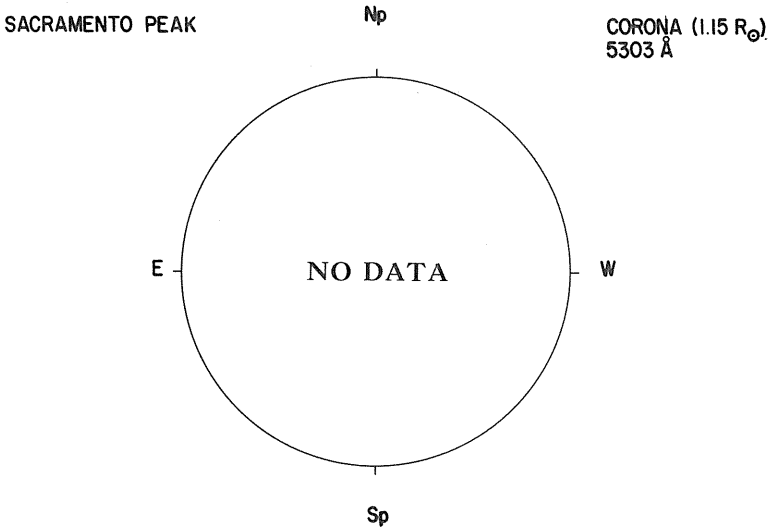


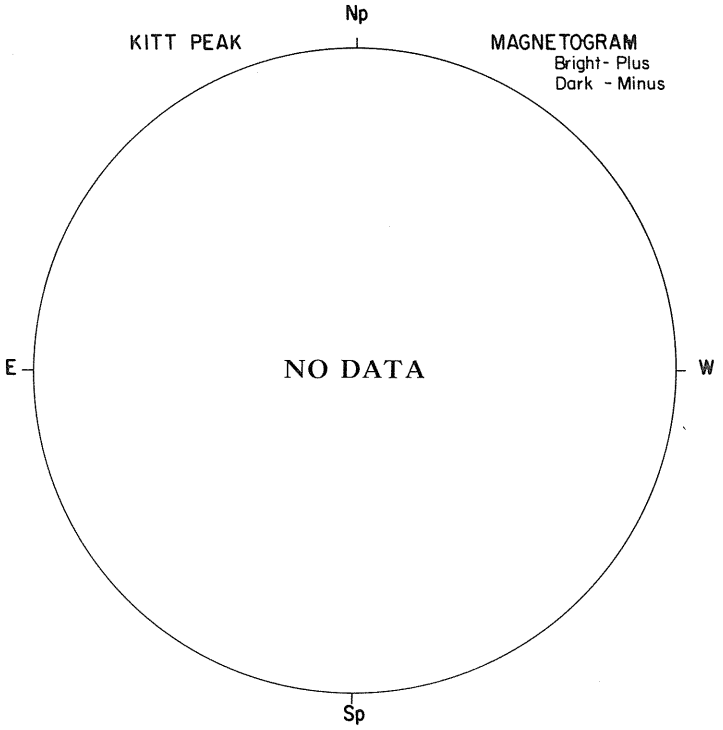
NOSC LA POSTA

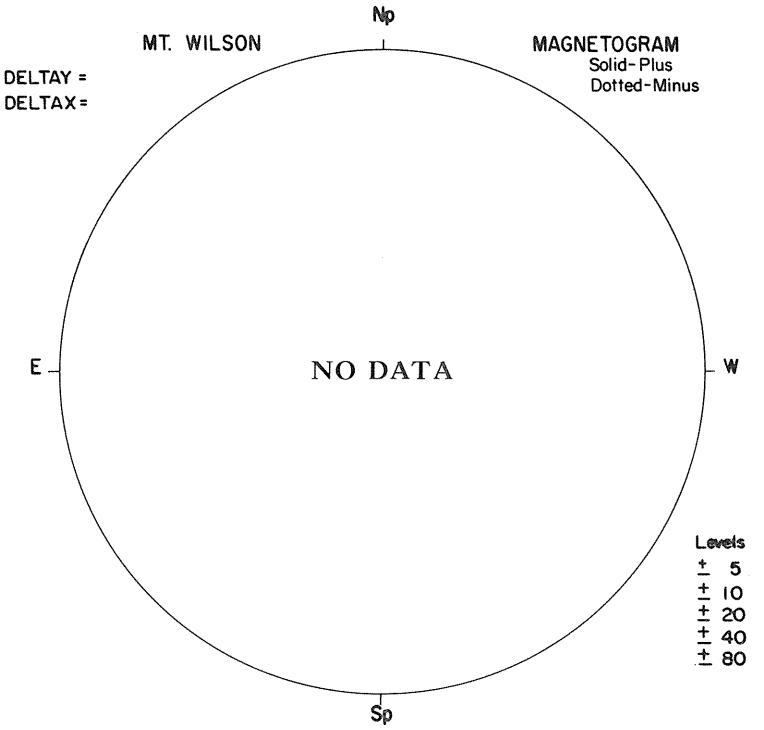


FEBRUARY 27, 1978 (P =-20.96, B_o =-7.19, L_o =189.75)



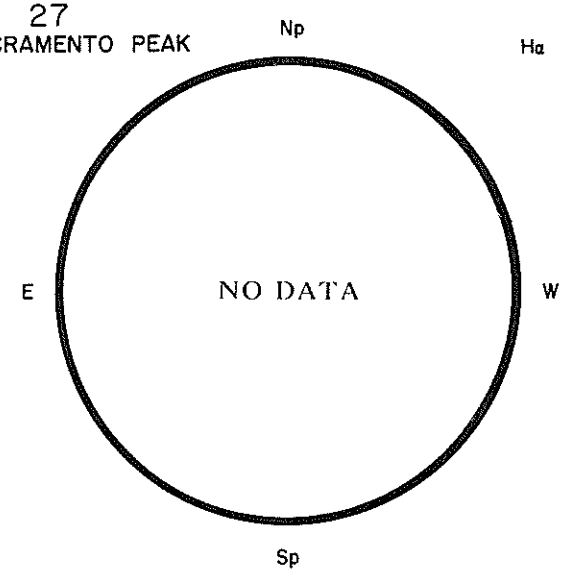






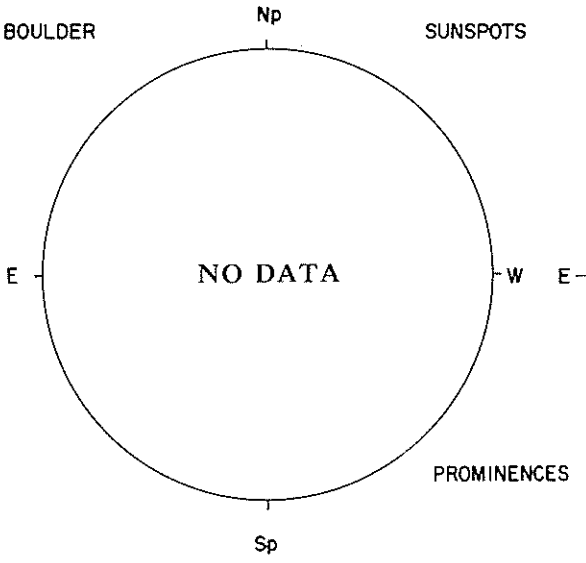
27

SACRAMENTO PEAK



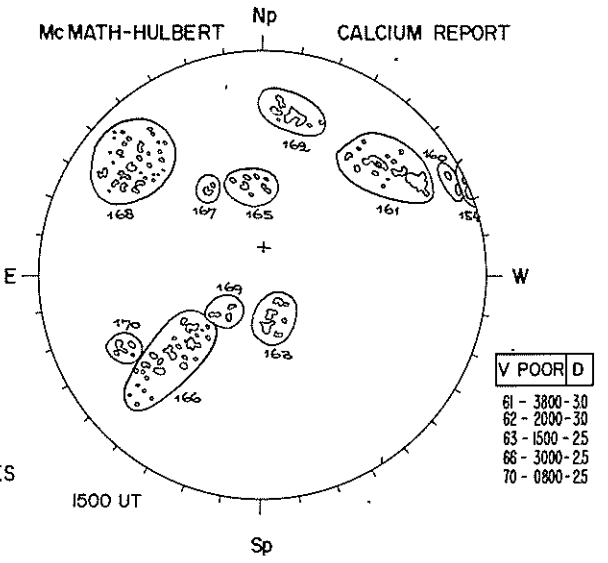
Hα

BOULDER



SUNSPOTS

McMATH-HULBERT

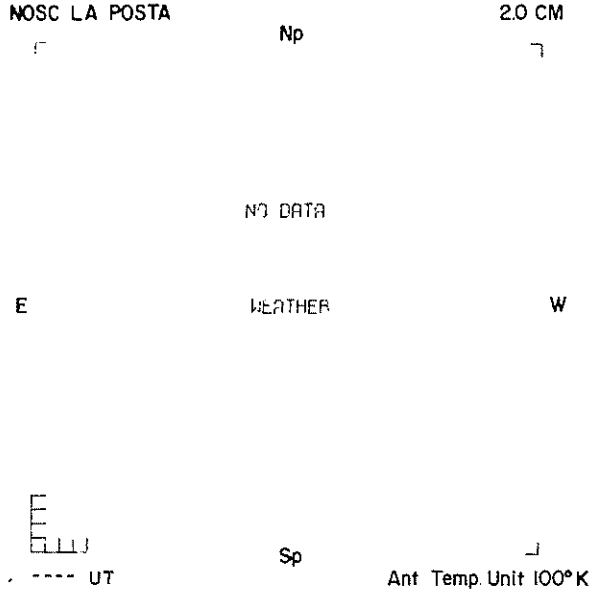


CALCIUM REPORT

PROMINENCES

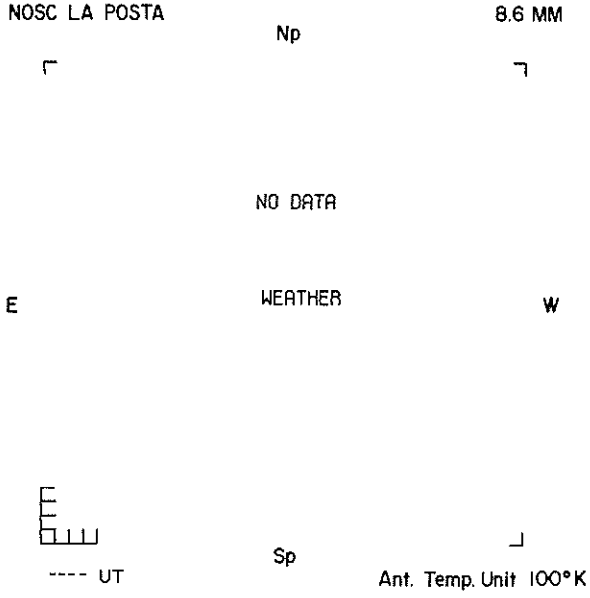
1500 UT

NOSC LA POSTA



2.0 CM

NOSC LA POSTA



8.6 MM

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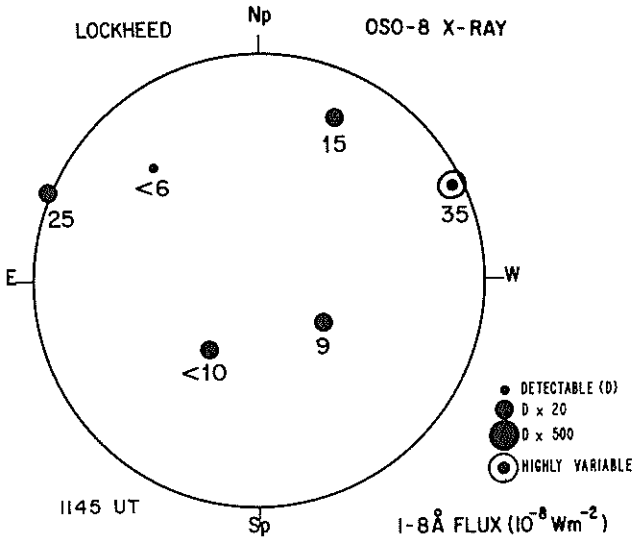
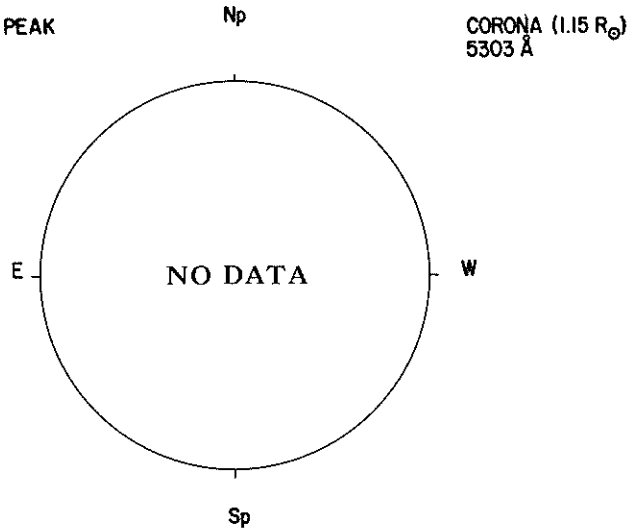
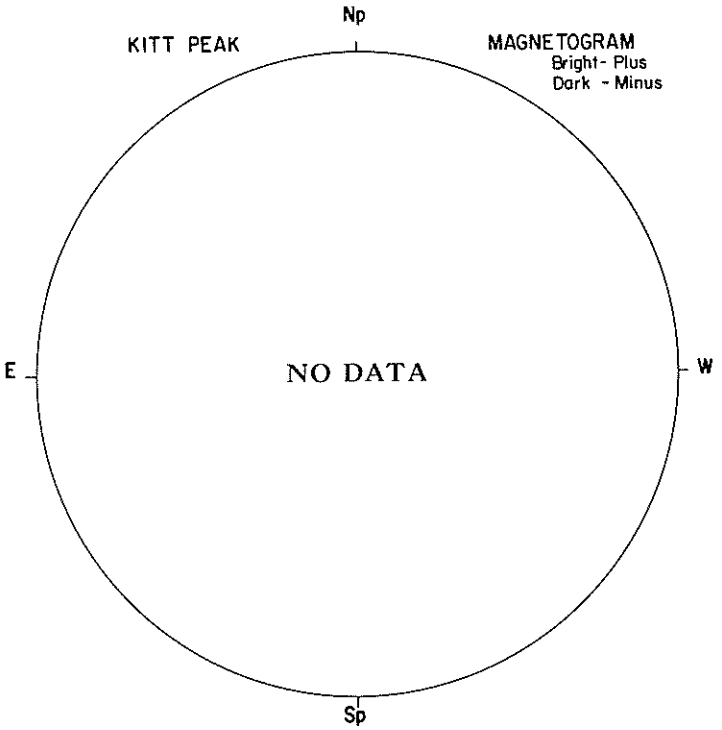
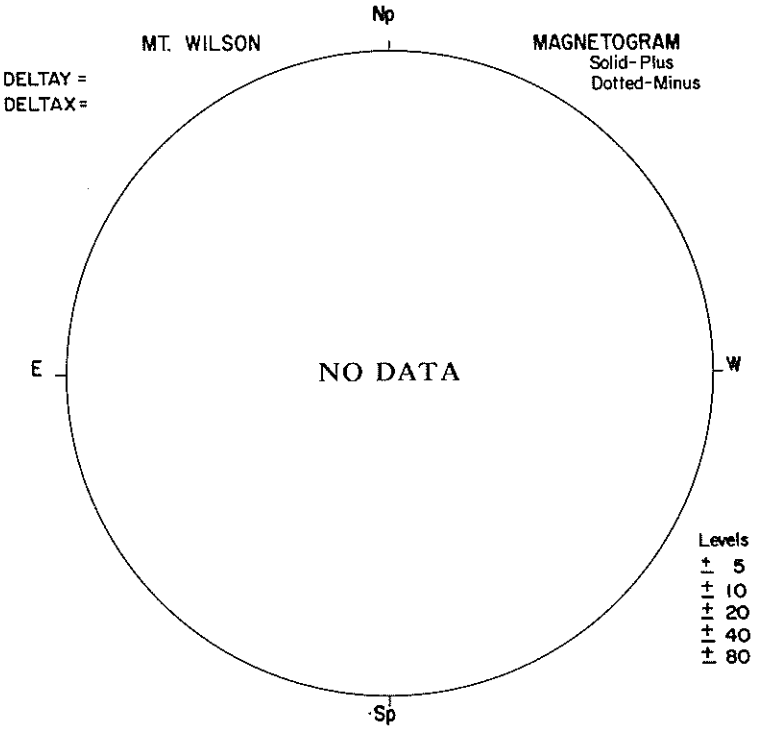
Feb 78

FEBRUARY 28, 1978 (P =-21.23, B_o =-7.20, L_o =176.57)









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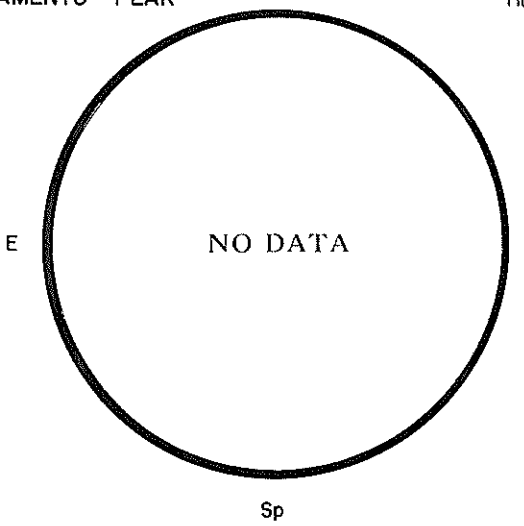
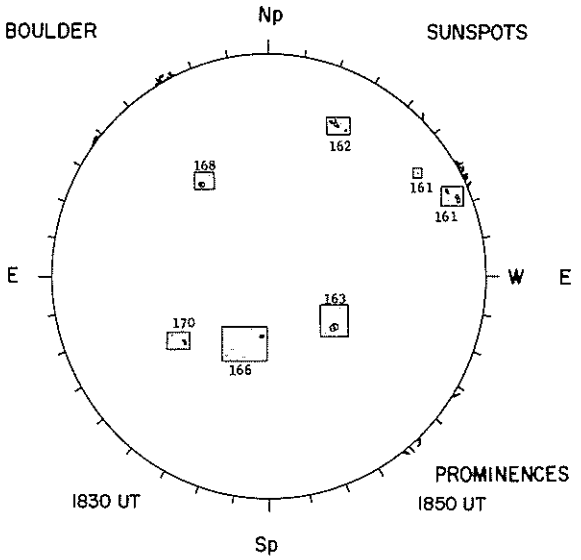
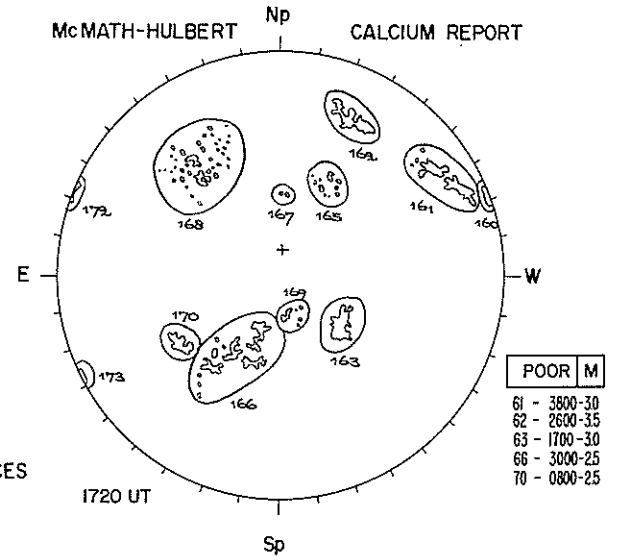
SACRAMENTO PEAK Hα



BOULDER SUNSPOTS

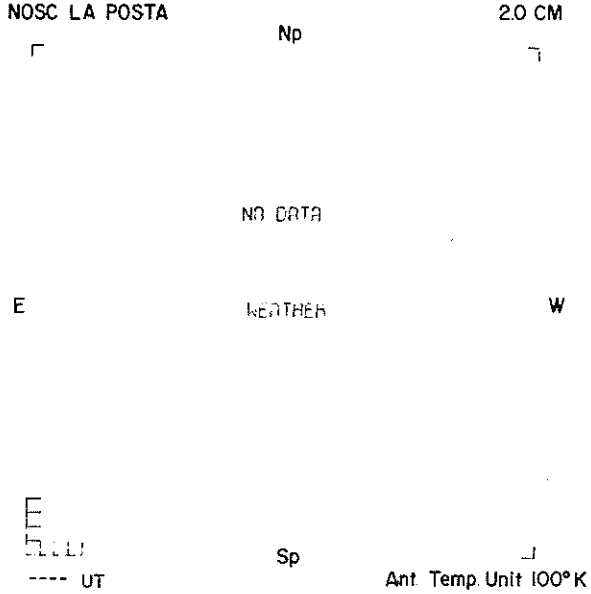


McMATH-HULBERT CALCIUM REPORT

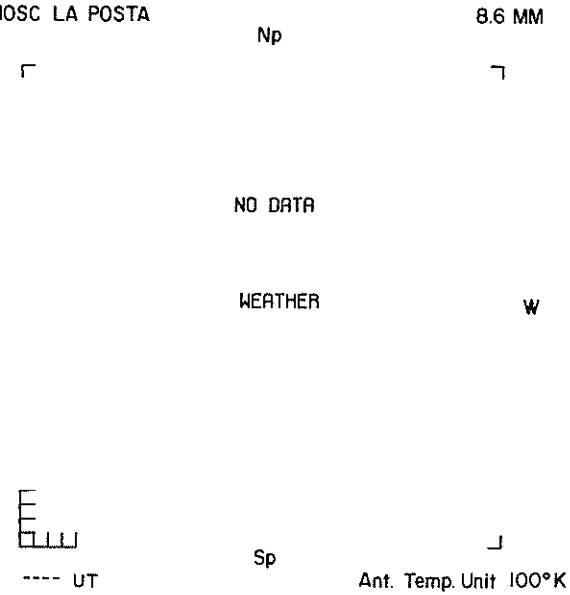


PROMINENCES

NOSC LA POSTA 2.0 CM



NOSC LA POSTA 8.6 MM



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Feb 78

REGIONS OF SOLAR ACTIVITY

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MCMATH REGION 15123 CMP DATE 1.2 RETURN OF NEW PART OF REGION 15Ø83 ROTATION 2

CALCIUM PLAGE DATA									SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	1	28	15123	S17 E48	166	900	3.5		19941	S17 E48	166	(BF)	3	B	40	4	CSO
78	1	29	15123	S17 E35	167	1200	3.0		19941	S17 E34	167	(BF)	4	B	50	2	CSO
78	1	30	15123	S17 E19	167	1500	3.0			S17 E17				M	80	12	DSO
78	1	31	15123	S17 E08	168	2000	3.5										
78	2	1	15123	S17 W05	168	1600	3.0		19941	S18 W04	166	(BF)	3				
78	2	2	15123	S17 W18	167	1800	3.0		19941	S16 W19	167	(B)	2	B	20	6	BXI
78	2	3	15123	S17 W31	167	1500	3.0		19941	S17 W32	168	(B)	2	M	10	2	BXO
78	2	4	15123	S17 W44	168	2000	3.0			S15 W48				B	150	5	DSO
78	2	5	15123	S17 W57	166	1600	3.0			S16 W59				B	10	1	AXX
78	2	6	15123	S17 W71	168	1800	3.0										
78	2	7	15123	S17 W84	167	1100	2.5			S17 W78				M	20	2	BXO

MCMATH REGION 15124 CMP DATE 1.9

CALCIUM PLAGE DATA									SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	1	26	15124						19939	S28 E76	165	(AP)	4	M	140	1	HSX
78	1	27	15124						19939	S28 E61	166	AP	3	M	200	10	DSO
78	1	28	15124	S29 E57	157	4300	3.5		19939	S27 E50	164	(B)	4				
78	1		15124						19940	S31 E55	159	(B)	4	B	390	12	ESI
78	1	29	15124	S28 E44	158	4500	3.5		19939	S27 E37	164	(B)	4	B	180	5	ESI
78	1		15124						19940	S32 E40	161	(B)	4				
78	1	30	15124	S29 E26	160	4500	3.5										
78	1	31	15124	S29 E16	160	4500	3.5			S29 E23				M	290	29	ESI
78	2	1	15124	S29 E04	159	4300	3.0		19939	S26 W03	165	(BP)	5				
78	2		15124						19940	S30 W02	164	(BP)	4				
78	2	2	15124	S29 W10	159	4500	3.0		19939	S26 W16	164	(D)	5				
78	2		15124						19940	S29 W16	164	(BP)	4	B	220	27	ESI
78	2	3	15124	S30 W22	158	4300	3.0		19939	S26 W28	164	(BP)	4				
78	2		15124						19940	S29 W28	164	(BP)	4	M	360	33	ESI
78	2	4	15124	S30 W34	158	3900	3.0			S27 W40				B	280	17	FKI
78	2	5	15124	S30 W47	156	3000	3.5			S22 W43				B	10	2	BXX
78	2		15124							S27 W55				B	120	4	DSO
78	2	6	15124	S30 W60	157	3300	3.0			S25 W57				R	30	6	BXO
78	2		15124							S30 W68				R	170	10	DSO
78	2	7	15124	S30 W73	156	3200	3.0			S29 W73				M	180	4	DSO
78	2	8	15124	S30 W85	155	2800	2.5										

MCMATH REGION 15125 CMP DATE 2.0 RETURN OF REGION 15087 ROTATION 2 OR 3

CALCIUM PLAGE DATA									SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	1	28	15125	N17 E58	156	400	3.5										
78	1	29	15125	N17 E45	157	700	3.5		19943	N15 E44	157	(B)	4	B	40	2	BXO
78	1	30	15125	N15 E28	158	800	2.5			N15 E25				M	30	5	CAO
78	1	31	15125	N16 E18	158	800	3.0										
78	2	1	15125	N16 E05	158	600	3.0		19943	N14 E02	160	(BP)	4				
78	2	2	15125	N15 W10	159	800	2.5		19943	N14 W11	159	(B)	4	B	30	10	CSO
78	2	3	15125	N15 W23	159	900	2.5		19943	N14 W23	159	(B)	4	M	60	5	DSO
78	2	4	15125	N15 W35	159	900	2.5			N13 W36				B	10	2	BXO
78	2	5	15125	N15 W48	157	600	2.5										
78	2	6	15125	N15 W61	158	700	2.5										
78	2	7	15125	N16 W75	158	800	2.5										

MCMATH REGION 15136 CMP DATE 2.1

CALCIUM PLAGE DATA									SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	2	15136	N32 W07	156	300	2.5		19947	N32 W07	155	(AP)	3				
78	2	3	15136	N33 W16	152	1000	4.0		19947	N32 W17	153	(BY)	3	M	20	2	CRO
78	2	4	15136	N33 W28	152	1200	3.5			N32 W29				B	90	12	CRI
78	2	5	15136	N33 W42	151	1500	3.0			N32 W39				B	10	1	AXX
78	2	6	15136	N34 W55	152	1500	3.0			N30 W56				R	10	1	AXX
78	2	7	15136	N34 W68	151	1500	3.0			N32 W61				M	10	1	AXX
78	2	8	15136	N34 W81	151	1000	2.0										

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MCMATH REGION 15144 CMP DATE 2.5

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	7	15144	S43 W68	151	300	2.0									
78	2	8	15144	S43 W79	149	100	1.0									

MCMATH REGION 15126 CMP DATE 3.1 RETURN OF REGION 15089 ROTATION 2

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	1	28	15126	N25 E72	142	3000	3.5	19942	N19 E69	145	(B	3	B	120	2	DSO
78	1	29	15126	N25 E59	143	4800	3.5	19942	N18 E56	145	(B)	4	B	80	3	CSI
78	1	30	15126	N24 E42	144	4500	3.0		N20 E44				M	120	11	ESO
78	1	31	15126	N25 E32	144	4900	3.5									
78	2	1	15126	N25 E20	143	4600	3.5	19942	N19 E19	143	(Y)	4				
78	2	2	15126	N24 E05	144	4600	3.5	19942	N20 E05	143	(BY)	4	B	300	38	EAI
78	2	3	15126	N23 W08	144	4300	3.5	19942	N19 W08	144	(BY)	4				
78	2	4	15126	N23 W20	144	4300	3.5		N18 W20				B	280	12	EKI
78	2	5	15126	N23 W32	141	4300	3.5		N18 W34				B	120	5	DHO
78	2	6	15126	N23 W45	142	4300	3.0		N18 W47				R	140	13	DAO
78	2	7	15126	N23 W59	142	4500	3.0		N20 W56				M	190	4	DSO
78	2	8	15126	N23 W72	142	4500	3.0	19942	N18 W78	147	(AP)	3	M	60	1	HSX
78	2	9	15126	N24 W85	142	3000	2.0									

MCMATH REGION 15130 CMP DATE 3.4

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	1	30	15130	S28 E51	135	300	3.5									
78	1	31	15130	S26 E36	140	600	3.0									
78	2	1	15130	S26 E23	140	500	3.0	19944	S27 E21	141	(B)	3				
78	2	2	15130	S26 E09	140	500	3.0	19944	S27 E10	138	(B)	2	B	10	3	BXO
78	2	3	15130	S27 W03	139	400	3.0									
78	2	4	15130	S26 W16	140	400	2.5									
78	2	5	15130	S26 W29	138	300	2.5									
78	2	6	15130	S26 W41	138	400	2.5									
78	2	7	15130	S26 W54	137	500	2.5									
78	2	8	15130	S26 W66	136	400	2.5									
78	2	9	15130	S25 W79	136	400	2.0									

MCMATH REGION 15129 CMP DATE 3.5

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	1	29	15129	N13 E65	137	200	1.0									
78	1	30	15129	N12 E50	136	200	1.0									
78	1	31	15129	N13 E38	138	200	1.5									
78	2	1	15129	N13 E24	139	200	1.5									
78	2	2	15129	N13 E11	138	400	2.0	19948	N14 E11	137	(AF)	2				
78	2	3	15129	N13 W02	138	300	1.5		N20 E01				M	190	30	EAI
78	2	4	15129	N13 W15	139	300	1.5									

MCMATH REGION 15128 CMP DATE 4.6 RETURN OF REMNANTS OF REGION 15Ø92 ROTATION 2

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	1	29	15128	N15 E80	122	400	2.0									
78	1	30	15128	N14 E64	122	400	1.0		N14 E66				M	10	1	AXX
78	2	1	15128	N16 E41	122	400	1.0									
78	2	2	15128	N15 E25	124	600	1.5									
78	2	3	15128	N15 E13	123	500	1.0		N13 E07				M	10	1	AXX
78	2	4	15128	N15 E00	124	400	1.0									
78	2	5	15128	N15 W13	122	300	1.5									
78	2	6	15128	N15 W26	123	300	1.0									
78	2	7	15128	N15 W39	122	300	1.0									
78	2	8	15128	N15 W52	122	300	1.0									
78	2	9	15128	N15 W65	122	300	1.0									

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MCMATH REGION 15133 CMP DATE 5.1

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	1	31	15133	S13 E59	117	100	1.5									

MCMATH REGION 15145 CMP DATE 6.1

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	7	15145	N34 W20	103	100	1.0									
78	2	8	15145	N34 W33	103	100	2.0									

MCMATH REGION 15131 CMP DATE 6.2

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	1	31	15131	N27 E77	99	500	2.5									
78	2	1	15131	N28 E60	103	800	3.5	19945	N24 E56	106	(B)	3				
78	2	2	15131	N27 E44	105	600	3.0	19945	N25 E42	106	(B)	4	B	20	2	CSO
78	2	3	15131	N26 E31	105	400	2.0	19945	N25 E30	106	(B)	4	M	20	2	CAO
78	2	4	15131	N26 E19	105	400	2.0		N23 E15				B	0	1	AXX
78	2	5	15131	N26 E06	103	400	2.0									
78	2	6	15131	N27 W08	105	400	2.5									
78	2	7	15131	N27 W21	104	500	2.5									
78	2	8	15131	N27 W33	103	300	2.5									
78	2	9	15131	N27 W46	103	300	2.5									
78	2	10	15131	N27 W60	104	300	1.5									
78	2	11	15131	N27 W73	104	300	1.0									

MCMATH REGION 15132 CMP DATE 7.9 RETURN OF REGION 15104 ROTATION 2

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	1	31	15132	S25 E85	91	600	2.0									
78	2	1	15132	S25 E79	84	1900	4.0	19946	S27 E77	85	(B)	4				
78	2	2	15132	S26 E65	84	1600	3.5	19946	S28 E65	83	(B)	4	B	200	10	ESO
78	2	3	15132	S27 E54	82	1600	3.5	19946	S27 E51	85	(B)	4	M	160	5	ESO
78	2	4	15132	S27 E41	83	1500	3.0		S27 E40				B	180	6	DSO
78	2	5	15132	S27 E27	82	1200	3.5		S27 E34				B	80	5	DSO
78	2	6	15132	S27 E16	81	1500	3.0		S27 E14				R	70	11	CSO
78	2	7	15132	S27 E03	80	1500	3.0		S28 E08				M	100	5	CSO
78	2	8	15132	S27 W10	80	1500	3.0	19946	S28 W15	84	(AP)	4	M	60	1	HSX
78	2	9	15132	S28 W23	80	1500	3.0									
78	2	10	15132	S29 W36	80	1600	3.0									
78	2	11	15132	S29 W49	80	1600	3.0									
78	2	12	15132	S29 W63	81	1500	3.0									
78	2	14	15132	S30 W88	79	800	1.5									

MCMATH REGION 15134 CMP DATE 8.3

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	1	15134	N29 E90	73	300	1.0									
78	2	2	15134	N27 E72	77	500	3.5	19949	N26 E70	78	(AP)	2	B	30	2	BXO
78	2	3	15134	N28 E65	71	700	3.5	19949	N26 E60	76	(B)	3	M	50	2	BXO
78	2	4	15134	N28 E51	73	900	3.0		N26 E45				B	30	3	BXO
78	2	5	15134	N28 E36	73	1100	3.5		N25 E28				B	10	2	BXO
78	2	6	15134	N28 E22	75	1200	3.0		N28 E20				R	100	16	DRI
78	2	7	15134	N27 E09	74	1400	3.0		N27 E15				M	70	13	DAO
78	2	8	15134	N27 W04	74	1500	3.5	19949	N27 W08	77	(D)	4	M	180	15	ESO
78	2	9	15134	N27 W16	73	2100	3.5									
78	2	10	15134	N27 W30	74	2400	3.5									
78	2	11	15134	N27 W43	74	2400	3.5									
78	2	12	15134	N27 W55	73	2400	3.5									
78	2	13	15134						N25 W66				R	120	2	DSO
78	2	14	15134	N27 W83	74	1800	3.0		N25 W78				R	60	1	HSX
78	2	15	15134	N27 W90	69	500	1.0									

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MCMATH REGION 15135 CMP DATE 8.4 RETURN OF REGION 15097 ROTATION 2

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	1	15135	N21 E90	73	400	2.0										
78	2	2	15135	N20 E77	72	1700	3.5		19950	N20 E68	80	(B)	3	B	130	4	CAO
78	2		15135						19951	N17 E76	72	(AP)	3	B	130	1	HSX
78	2	3	15135	N21 E63	73	2800	3.5		19950	N20 E56	80	(B)	4				
78	2		15135						19951	N18 E63	73	(BF)	4	M	130	1	HSX
78	2	4	15135	N20 E49	75	3500	3.5			N17 E48				B	210	6	CHO
78	2		15135							N20 E40				B	240	13	ESI
78	2	5	15135	N20 E35	74	3200	3.5			N18 E27				B	60	4	DSI
78	2		15135							N18 E34				B	120	4	DHO
78	2	6	15135	N20 E23	74	3500	3.0			N21 E12				R	70	9	CAO
78	2		15135							N20 E21				R	190	24	DAI
78	2	7	15135	N19 E10	73	3500	3.5			N20 E09				M	40	4	CSO
78	2		15135							N19 E15				M	110	15	DSO
78	2	8	15135	N19 W03	73	3100	3.5		19950	N22 W14	83	(AP)	3	M	130	11	DSO
78	2		15135						19951	N18 W04	73	(BF)	4				
78	2	9	15135	N19 W16	73	3100	3.5										
78	2	10	15135	N19 W30	74	3400	3.5										
78	2	11	15135	N19 W43	74	3400	3.5										
78	2	12	15135	N19 W55	73	3500	3.5										
78	2	13	15135							N17 W68				R	80	2	CSO
78	2	14	15135	N19 W83	74	1600	3.5			N16 W81				R	60	1	HSX

MCMATH REGION 15146 CMP DATE 10.8

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	10	15146	N40 E03	41	100	1.5										

MCMATH REGION 15140 CMP DATE 10.9

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	6	15140	S26 E57	40	100	1.0										

MCMATH REGION 15150 CMP DATE 11.7

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	11	15150	S28 E01	30	300	3.0										
78	2	12	15150	S27 W12	30	500	3.0										
78	2	13	15150							S28 W25				R	60	12	CRO
78	2	14	15150	S27 W39	30	1200	3.0			S28 W38				R	40	13	DRO
78	2	15	15150	S27 W52	31	1100	3.0		19954	S27 W52	30	(BF)	2	B	10	2	BXO
78	2	16	15150	S27 W65	30	1100	3.0			S30 W63				R	20	3	BXO
78	2	17	15150	S27 W77	30	700	2.5										
78	2	18	15150	S28 W90	29	400	1.0										

MCMATH REGION 15139 CMP DATE 11.9

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT		MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	5	15139	N17 E86	23	1200	4.0			N11 E76				B	120	1	HSX
78	2	6	15139	N17 E71	26	2800	4.0			N18 E67				R	310	13	EKO
78	2	7	15139	N17 E56	27	3700	3.5			N15 E61				M	770	6	EAO
78	2	8	15139	N17 E43	27	4200	4.0		19952	N16 E40	29	(D)	5	M	1010	18	EKI
78	2	9	15139	N17 E30	27	4700	4.0										
78	2	10	15139	N17 E16	28	4700	4.0										
78	2	11	15139	N17 E03	28	4700	4.0										
78	2	12	15139	N16 W13	31	4700	4.0										
78	2	13	15139							N14 W25				R	1750	62	FKC
78	2	14	15139	N16 W40	31	5100	4.0			N15 W37				R	1920	58	FKC
78	2	15	15139	N16 W53	32	5000	3.5		19952	N16 W51	29	(BY)	5	B	1920	24	FAI
78	2	16	15139	N17 W66	31	4600	3.5		19952	N17 W65	31	(BP)	4	R	970	48	FKI
78	2	17	15139	N17 W78	31	3600	3.5		19952	N19 W73	25	(AF)	2	B	200	3	HKX
78	2	18	15139	N17 W90	29	1200	1.5										

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MCMATH REGION 15141 CMP DATE 12.6

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	6	15141	S28 E80	17	100	1.0									
78	2	7	15141	S29 E67	16	100	1.5									
78	2	8	15141	S29 E53	17	100	1.5									

MCMATH REGION 15143 CMP DATE 12.9

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	7	15143	N06 E70	13	100	1.0									

MCMATH REGION 15147 CMP DATE 13.5

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	10	15147	N16 E38	6	200	1.5									

MCMATH REGION 15155 CMP DATE 14.6

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	16	15155	N27 W28	353	500	3.0	19957	N28 W29	355	(B)	2	R	50	8	DRO
78	2	17	15155	N27 W40	353	1000	3.5	19957	N28 W43	355	(B)	3	B	120	7	DAO
78	2	18	15155	N27 W53	352	1500	3.0	19957	N28 W55	354	(B)	3	B	190	7	DHI
78	2	19	15155	N27 W66	353	1800	3.5	19957	N28 W70	356	(BP)	3	B	200	4	CSO
78	2	20	15155	N28 W80	353	800	2.5	19957	N28 W80	353	(AF)	3				

MCMATH REGION 15142 CMP DATE 14.7 RETURN OF REGION 15100 ROTATION 2

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	7	15142	S24 E85	359	900	1.0									
78	2	8	15142	S25 E76	355	900	2.0	19953	S24 E78	352	(AP)	3	M	70	1	HSX
78	2	9	15142	S25 E65	353	2000	2.5									
78	2	10	15142	S25 E54	351	2400	3.0									
78	2	11	15142	S26 E42	350	2500	3.0									
78	2	12	15142	S26 E28	351	2400	3.0									
78	2		15142						S24 E16				R	60	1	HAX
78	2	14	15142	S27 E01	350	2400	3.0		S24 E02				R	30	4	HAX
78	2	15	15142	S27 W11	350	2300	2.5	19953	S25 W13	351	(AP)	3	B	10	2	AXX
78	2	16	15142	S27 W24	349	2000	2.5		S25 W19				R	20	4	BXO
78	2	17	15142	S27 W35	348	2300	2.5									
78	2	18	15142	S27 W48	347	1700	2.0									
78	2	19	15142	S27 W58	345	1500	2.0									
78	2	20	15142	S27 W70	343	800	1.5									
78	2	21	15142	S28 W83	343	600	1.0									

MCMATH REGION 15151 CMP DATE 15.6

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	12	15151	S04 E40	339	100	1.5									

MCMATH REGION 15157 CMP DATE 15.7

			CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	17	15157	N15 W25	338	100	1.0									

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MCMATH REGION 15148 CMP DATE 16.2

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	10	15148	S20 E77	328	500	2.0									
78	2	11	15148	S21 E63	329	500	2.0									
78	2	12	15148	S21 E50	329	400	1.5									
78	2	14	15148	S21 E20	331	500	1.5									
78	2	15	15148	S22 E08	331	300	1.0									
78	2	16	15148	S22 W06	331	200	1.0									
78	2	17	15148	S22 W19	332	100	1.0									
78	2	18	15148	S24 W32	331	300	2.5		S27 W33				B	10	2	BXO
78	2	19	15148	S24 W46	333	500	2.5									
78	2	20	15148	S24 W59	332	300	2.0									
78	2	21	15148	S24 W72	332	200	1.0									

MCMATH REGION 15158 CMP DATE 17.5

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	17	15158	N29 W01	314	100	1.5									
78	2	18	15158	N28 W13	312	100	1.0									
78	2	19	15158	N28 W26	313	200	2.0									
78	2	20	15158	N28 W39	312	200	1.0									
78	2	21	15158	N28 W52	312	200	1.0									

MCMATH REGION 15152 CMP DATE 18.6

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	12	15152	N22 E85	294	500	1.5									
78	2	13	15152						N31 E78				R	80	1	HSX
78	2	14	15152	N22 E50	301	500	2.5									
78	2	15	15152	N21 E38	301	300	1.0									
78	2	16	15152	N22 E25	300	200	1.0									

MCMATH REGION 15159 CMP DATE 18.8

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	17	15159	N18 E15	298	100	2.5									
78	2	18	15159	N18 E02	297	100	2.0									
78	2	19	15159	N18 W11	298	100	1.0									

MCMATH REGION 15171 CMP DATE 19.5

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	24	15171	N14 W68	287	100	1.0									

MCMATH REGION 15153 CMP DATE 20.0

				CALCIUM PLAGE DATA					SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	14	15153	N30 E70	281	2100	3.5		N31 E66				R	250	6	DKO
78	2	15	15153	N30 E58	281	3400	4.0	19955	N30 E55	283	(BP)	4	B	240	12	CAI
78	2	16	15153	N30 E44	281	3200	3.5	19955	N31 E43	283	(BP)	4	R	270	11	DKO
78	2	17	15153	N30 E32	281	2800	3.5	19955	N31 E30	282	(BP)	4	B	240	11	CSO
78	2	18	15153	N31 E19	280	2700	3.5	19955	N29 E14	285	(AP)	5	B	190	5	CHO
78	2	19	15153	N31 E06	281	2500	3.5	19955	N30 E03	283	(BP)	4	B	180	4	CHI
78	2	20	15153	N31 W07	280	2500	3.0	19955	N30 W11	284	(BP)	5	B	1220	6	DHO
78	2	21	15153	N32 W19	279	2700	3.5	19955	N30 W24	283	(BP)	5	B	220	4	CSO
78	2	22	15153	N32 W33	279	2400	3.0	19955	N30 W38	283	(AP)	5	B	220	4	HSI
78	2	23	15153	N32 W45	278	2400	3.0	19955	N29 W50	282	(AP)	4	B	120	3	HSX
78	2	24	15153	N32 W58	277	2400	2.5	19955	N30 W64	283	(AP)	5	B	160	1	HSX
78	2	25	15153	N33 W71	278	2000	2.5	19955	N30 W77	284	(AP)	3	M	260	1	HSX

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MCMATH REGION 15164 CMP DATE 21.0

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	21	15164	S01	W08	268	100	1.5										

MCMATH REGION 15154 CMP DATE 21.6 RETURN OF PART OF REGION 15112 ROTATION 5

CALCIUM PLAGE DATA									SUNSPOT DATA									
YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	15	15154	N19	E84	255	2500	2.0	19956	N20	E80	258	AP	3	B	130	6	CSI
78	2	16	15154	N20	E70	255	2500	3.0	19956	N19	E66	260	(AP)	3	R	120	7	DAI
78	2	17	15154	N20	E54	259	2500	2.5	19956	N20	E53	259	(AP)	3	B	80	6	DAO
78	2	18	15154	N20	E41	258	2500	3.0	19956	N20	E40	259	(AP)	3	B	50	4	CRO
78	2	19	15154	N20	E26	261	2200	3.0	19956	N19	E26	260	(AP)	2	B	40	4	CRI
78	2	20	15154	N20	E13	260	2300	2.5	19956	N19	E14	259	(BP)	3	B	4050	6	CSO
78	2	21	15154	N20	E00	260	2500	3.0	19956	N20	E01	258	(BP)	3	B	50	12	CSI
78	2	22	15154	N20	W13	259	2600	3.0	19956	N20	W11	256	(BP)	4	B	60	17	CSO
78	2	23	15154	N20	W25	258	2500	3.0	19956	N21	W23	255	(B)	4	B	60	13	DAO
78	2	24	15154	N20	W40	259	2600	3.0	19956	N21	W38	257	(BP)	4	B	30	4	DSO
78	2	25	15154	N20	W53	260	2300	3.0	19956	N20	W52	259	(AP)	3				
78	2	26	15154	N20	W65	260	2300	3.0										
78	2	27	15154	N21	W78	258	1000	2.0										

MCMATH REGION 15160 CMP DATE 22.5 RETURN OF PART OF REGION 15112 ROTATION 5

CALCIUM PLAGE DATA									SUNSPOT DATA									
YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	16	15160	N20	E80	245	1200	3.0										
78	2	17	15160	N20	E65	248	1800	3.5	19958	N20	E63	249	AF	2				
78	2	18	15160	N20	E52	247	2000	3.5										
78	2	19	15160	N20	E37	250	2000	3.5										
78	2	20	15160	N20	E24	249	2000	3.0										
78	2	21	15160	N20	E11	249	1800	3.0										
78	2	22	15160	N20	W02	248	1600	3.0										
78	2	23	15160	N20	W15	248	1700	3.0										
78	2	24	15160	N20	W29	248	1700	2.5										
78	2	25	15160	N21	W42	249	1300	2.5		N20	W43				M	40	5	CRO
78	2	26	15160	N20	W54	249	1200	2.0		N20	W55				M	10	1	AXX
78	2	27	15160	N20	W65	245	800	1.5										
78	2	28	15160	N22	W80	246	800	1.5										

MCMATH REGION 15156 CMP DATE 23.1

CALCIUM PLAGE DATA									SUNSPOT DATA									
YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	16	15156	S24	E85	240	700	2.0										
78	2	17	15156	S24	E73	240	400	1.5										
78	2	18	15156	S25	E60	239	600	2.5		S24	E60				B	20	1	AXX
78	2	19	15156	S25	E46	241	500	2.5										
78	2	20	15156	S25	E33	240	500	2.0										
78	2	21	15156	S25	E19	241	300	2.0										
78	2	22	15156	S25	E06	240	300	2.0										
78	2	23	15156	S25	W06	239	200	2.0										
78	2	24	15156	S25	W19	238	200	1.0										
78	2	25	15156	S25	W32	239	200	1.0										

MCMATH REGION 15161 CMP DATE 24.6 RETURN OF REMNANTS OF REGION 15123 ROTATION 3

CALCIUM PLAGE DATA									SUNSPOT DATA									
YR	MO	DA	MC NO.	LAT	CMD	L	AREA	INT	MW NO.	LAT	CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	18	15161	N23	E78	221	2800	3.5	19959	N21	E76	223	(AP)	2	B	60	3	CRO
78	2	19	15161	N23	E64	223	2400	3.5	19959	N22	E64	222	(B)	2	B	120	7	ESI
78	2	20	15161	N23	E51	222	2800	3.0	19959	N23	E50	223	(B)	4	B	80	7	DSI
78	2	21	15161	N23	E38	222	3000	3.0	19959	N21	E37	222	(BF)	4	B	120	15	ESI
78	2		15161						19962	N19	E31	228	(AP)	4				
78	2	22	15161	N23	E25	221	3400	3.5	19959	N22	E23	222	(BF)	4				
78	2		15161						19962	N19	E17	228	(AP)	4	B	170	26	ESI
78	2	23	15161	N23	E13	220	3400	3.5	19959	N22	E09	223	(B)	4	B	120	21	EAI
78	2		15161						19962	N19	E03	229	(BP)	4				
78	2	24	15161	N23	W01	220	3600	3.5	19959	N22	W05	224	(B)	4	B	130	23	FSI
78	2		15161						19962	N18	W11	230	(AP)	4				
78	2	25	15161	N23	W14	221	3600	3.5	19959	N23	W15	222	(BF)	4	M	170	36	FSI
78	2		15161						19962	N19	W23	230	(B)	4				

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MCMATH REGION 15161 (CONT) CMP DATE 24.6 RETURN OF REGION 15113 ROTATION 3

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	26	15161	N23 W26	221	4000	3.5		N21 W34				M	190	20	FAI
78	2	27	15161	N23 W37	217	3800	3.0									
78	2	28	15161	N23 W52	218	3800	3.0		N20 W55				R	320	30	FAO
78	3	01	15161	N23 W65		3800	3.0		N19 W79				B	100	8	D
78	3	01	15161						N23 W67				B	20	4	H
78	3	02	15161	N24 W78		2600	2.5		N21 W89				B	160	4	D
78	3	03	15161	N25 W90		500	1.0									

MCMATH REGION 15162 CMP DATE 26.8 RETURN OF REGION 15119 ROTATION 2

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	20	15162	N38 E85	188	600	3.0	19960	N39 E80	193	(AP)	2				
78	2	21	15162	N37 E65	195	1800	3.5	19960	N38 E65	194	(AP)	4	B	80	2	DAC
78	2	22	15162	N38 E53	193	1800	3.0	19960	N39 E52	193	(AP)	4	B	60	3	HAX
78	2	23	15162	N38 E40	193	2000	3.0	19960	N40 E39	193	(AP)	4	B	30	2	HAX
78	2	24	15162	N38 E27	192	1900	3.0	19960	N39 E26	193	(AP)	4	B	30	3	CAO
78	2	25	15162	N39 E15	192	1800	3.0	19960	N40 E14	193	(AP)	3	M	50	3	HAX
78	2	26	15162	N39 E03	192	2000	3.0		N39 W03				M	60	6	DRO
78	2	27	15162	N38 W10	190	2000	3.0									
78	2	28	15162	N38 W24	190	2600	3.5		N38 W22				R	150	26	CAI
78	3	01	15162	N38 W36		3400	3.5		N38 W40				B	210	31	D
78	3	02	15162	N38 W47		3400	3.5		N38 W53				B	240	41	D
78	3	03	15162	N38 W60		3400	3.5		N38 W63				B	400	26	E
78	3	04	15162	N39 W73		2800	3.5		N36 W78				B	310	7	E
78	3	05	15162	N39 W85		1000	1.0									

MCMATH REGION 15163 CMP DATE 27.5

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	20	15163	S18 E86	187	500	2.0	19961	S21 E85	188	(AP)	3	B	2060	1	HSX
78	2	21	15163	S19 E73	187	2000	3.5	19961	S22 E72	187	(AP)	5	B	160	1	HSX
78	2	22	15163	S19 E63	183	1800	3.5	19961	S21 E58	187	(BP)	5	B	200	2	CSO
78	2	23	15163	S19 E51	182	2000	3.5	19961	S20 E47	185	(BP)	5	B	140	3	CSO
78	2	24	15163	S19 E37	182	1600	3.0	19961	S20 E34	185	(BP)	5	B	120	3	DSO
78	2	25	15163	S19 E24	183	1400	3.0	19961	S20 E22	185	(BP)	5	M	170	12	CSO
78	2	26	15163	S19 E12	183	1700	3.0		S20 E06				M	150	8	CSO
78	2	27	15163	S19 W02	182	1500	2.5									
78	2	28	15163	S19 W16	182	1700	3.0		S20 W16				R	160	7	CSO
78	3	01	15163	S19 W29		1600	3.0		S20 W35				B	160	6	B
78	3	02	15163	S19 W41		1600	3.0		S19 W47				B	180	11	C
78	3	03	15163	S19 W56		1500	3.0		S16 W63				B	150	9	D
78	3	04	15163	S17 W70		1900	2.5		S17 W76				B	200	4	D
78	3	05	15163	S17 W83		1200	2.5		S20 W85				B	140	1	H

MCMATH REGION 15165 CMP DATE 27.9

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	21	15165	N17 E85	175	1200	1.5									
78	2	22	15165	N18 E69	177	1100	2.0	19963	N18 E64	181	(AP)	3				
78	2	23	15165	N17 E56	177	1300	2.5									
78	2	24	15165	N17 E43	176	1200	2.0									
78	2	25	15165	N17 E30	177	900	2.0									
78	2	26	15165	N17 E17	178	900	2.0									
78	2	27	15165	N17 E04	176	700	2.0									
78	2	28	15165	N17 W12	178	500	2.0									
78	3	01	15165	N17 W35		400	1.5									
78	3	02	15165	N17 W37		400	1.5									
78	3	03	15165	N17 W52		300	1.0									
78	3	04	15165	N18 W65		300	1.0									

MCMATH REGION 15169 CMP DATE 28.6 RETURN OF REGION 15123 ROTATION 3

CALCIUM PLAGE DATA								SUNSPOT DATA								
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	22	15169	S18 E82	164	800	2.0	19964	S23 E83	162	(AP)	4				
78	2	23	15169	S18 E70	163	800	2.5	19964	S23 E70	162	(AP)	4	B	50	1	HSX
78	2	24	15169	S17 E54	165	900	2.0	19964	S23 E57	162	(AP)	4	B	80	1	HSX
78	2	25	15169	S18 E39	168	800	2.0	19964	S23 E45	162	(AP)	3				

(con't)

REGIONS OF SOLAR ACTIVITY

FEBRUARY 1978

MCMATH REGION 15169 (CONT) CMP DATE 28.6 RETURN OF REGION 15123 ROTATION 3

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	26	15169	S18 E27	168	800	2.0		S23 E29				M	70	4	CSO
78	2	27	15169	S18 E13	167	500	2.0									
78	2	28	15169	S18 W01	167	500	2.0									
78	3	01	15169	S18 W13		400	2.0		S22 W11				B	40	4	C
78	3	02	15169	S17 W26		400	2.0		S22 W23				B	20	12	B
78	3	03	15169	S17 W41		400	1.5		S17 W38				B	10	4	A
78	3	04	15169	S17 W54		300	1.5		S18 W48				B	10	3	B
78	3	05	15169	S17 W67		400	1.5		S18 W63				B	20	4	B
78	3	06	15169	S17 W81		300	1.0									

MCMATH REGION 15167 CMP DATE 28.7

				CALCIUM PLAGE DATA					SUNSPOT DATA							
YR	MO	DA	MC NO.	LAT CMD	L	AREA	INT	MW NO.	LAT CMD	L	MAG.	H	STA	AREA	CNT	CLASS
78	2	23	15167	N18 E70	163	300	2.0									
78	2	24	15167	N18 E56	163	300	2.0									
78	2	25	15167	N18 E43	164	300	1.5									
78	2	26	15167	N18 E29	166	300	2.0		N16 E34				M	10	3	BXO
78	2	27	15167	N18 E15	165	300	1.5									
78	2	28	15167	N17 E00	166	100	1.5									
78	3	01	15167	N17 W13		200	2.0									
78	3	02	15167	N16 W26		200	2.0									
78	3	03	15167	N16 W40		200	1.0									
78	3	04	15167	N16 W53		200	1.0									

DAILY CALCIUM PLAGE INDEX

FEBRUARY 1978

YR	MO	DAY	INDEX	YR	MO	DAY	INDEX	YR	MO	DAY	INDEX
78	2	1	37.8	78	2	11	40.3	78	2	21	30.7
78	2	2	42.5	78	2	12	37.3	78	2	22	33.1
78	2	3	43.4	78	2	13	*	78	2	23	37.8
78	2	4	44.5	78	2	14	27.9	78	2	24	37.8
78	2	5	40.3	78	2	15	23.4	78	2	25	36.6
78	2	6	37.6	78	2	16	22.2	78	2	26	37.5
78	2	7	38.2	78	2	17	22.4	78	2	27	30.2
78	2	8	36.0	78	2	18	24.3	78	2	28	31.5
78	2	9	38.0	78	2	19	26.8				
78	2	10	41.1	78	2	20	23.3				

* NO OBSERVATIONS

Note: No calcium spectroheliograms were secured at the McMath-Hulbert Observatory on February 13, 1978. No sunspot observations were made at Mt. Wilson on February 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 26, 27 and 28, 1978.

SUDDEN IONOSPHERIC DISTURBANCES

FEBRUARY 1978

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
01	0146	0240	0154	1-	1				1				0141	15126
01	2351	0103	0005	1-	1				1				2359	15126
02	0126	0157	0136	1-	1				1				0128	X-RAY
02	0425	0614	0453	1-	1				1				0421	X-RAY
02	0844	0910	0849	1-	1						1		0842	15126
02	1135	1300	1143	2	5	2		3	4		3		1133	15126
02	2331	0006	2340	1-	1				1				2336E	15126
03	0055	0132	0107	1-	1				1				0053	X-RAY
03	0217	0404	0320	1+	1				1				0216E	15135
03	0257	0307	0300	1-	1	1							0256	15124
03	0444	0657	0452	1	3	1			1				0441	X-RAY
03	0807	0840	0815	2	5				2		1		0805	15124
03	1030	1045	1035	1-	3				1		1		1021	15135
03	1512	1603	1522	1	5						8		1522	15126
03	1608	1715	1615	2	5	2			2	1	11		1605	15135
03	2018	2042	2020	1	5	1			1	1	6		2015E	15136
04	0900	0912	0903	1+	3				1		1		0859	15124
05	0126	0205	0133	1-	1				1				0116	15135
05	0249	0341	0251	1-	1				1				0245	X-RAY
05	0656	0734	0713	1-	1				1				0657	X-RAY
06	0418	0509	0433	1-	1				1				*	
06	0657	0723	0706	1-	1				1				*	
07	1713	1810	1723	1-	5	1			1	1	8		1707	15134
07	2107	2152	2114	1-	5	1			2	1	8		2109	X-RAY
08	0012	0100	0030	1-	1				1				0019	X-RAY
08	0153	0208	0157	1-	1				1				0156	15139
08	0310	0350D	0340	1-	1				1				0312	15139
08	0352	0547	0401	1+	3	1			1				0355E	15139
08	0446E	0517	0454	1-	3	1			1				0449E	15139
08	0547	0711D	0600	1-	1				1				0545	X-RAY
08	0711E	0837	0719	1+	1				1				0712	15134
08	1114	1215	1134	1-	5			1	4		2		1111	15134
08	1421	1530	1435	1-	1				1		1		1418	15139
08	1633	1739	1639	1-	3					1	3		1629	15134
08	1958	2058	2008	1-	5				1	1	9		1958	15139
09	0026	0057	0036	1-	1				1				0025	X-RAY
09	0336	0439D	0346	1-	1				1				0338	X-RAY
09	0439E	0720	0545	1-	1				1				0449	15139
09	0806	0832	0810	1-	1				1				0804	X-RAY
09	0917	0930	0920	1-	3			1	1		1		0917	15139
09	0940	1037	0955	1-	5				4		1		0947	15139
09	1111	1123D	1123	2	5	1		4	4		3		1111	15134
09	1155	1300	1200	1	5			4	3		3		1115	15139
09	1359	1410D	1410	1	5			3	3		2		1400E	15139
09	1444	1457D	1457	1+	5	1		3	4		7		1436	15139
09	1520	1600	1527	1+	5			4	4		10		1511	15135
09	1602	1630	1606	2	5	2	1	6	4	1	11		1559	X-RAY
09	1828	1908	1839	1-	5	1		1	4	1	10		1823	15135
09	2104	2139	2112	1-	5	1			2	1	6		2102	X-RAY
09	2154	2249D	2210	1	3				2				2156	X-RAY
09	2249	0005	2300	2-	5	1		1	2		3		2256E	15139
10	0014	0149	0030	2	5	1		1	1		1		0019	15139
10	0148	0326D	0223	1+	5	1		1	1		1		NF	
10	0658	0820	0704	1-	1				1				0659	15139
10	1202	1217	1206	1-	1				1				1158	X-RAY
10	1713	1830	1735	1	5	2		1	2	1	11		1716E	15139
10	2103	2243	2116	1+	5	3			2	1	7		2100	X-RAY
11	0100	0150	0116	1-	1				1				0110	15134
11	0156	0237	0210	1-	1				1				0203	15139
11	0321	0400	0326	1-	1				1				0320	15139
11	0507	0551	0522	1-	1				1				0507	X-RAY
11	0749	0914	0823	1-	3				1		1		0753	15139
11	0816	0838	0823	1	3			1	1		1		0815	15139
11	1425	1530	1431	1+	5	1		5	3		7		1425	15139
11	1702	1750	1708	1-	5	1			1	1	7		1701	15139
11	1829	1929	1840	1-	5				1	1	7		1831	X-RAY
11	1940	2052	2003	1	5	1			1	1	7		1940	15139
11	2342	0245	0018	2	3	1			1		1		2350E	15139
12	0316	0401	0320	1-	1				1				0312	X-RAY
12	0905	0920	0908	1-	1						1		*	
12	0942	1000	0946	1-	5				3		1		0939	X-RAY
12	1059	1247	1111	1	5	1		3	4		3		1103	15139
12	1131	1215	1145	1-	5			1	3		1		NF	
12	1309	1400	1319	1-	5			2	3		2		1302	15139
12	1604	1700	1614	1-	5				1		4		1603	15139
12	1848	2000	1907	1	5	3			1		9		1846	15139
12	2240	2318	2252	1-	1				1				*	

SUDDEN IONOSPHERIC DISTURBANCES

FEBRUARY 1978

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TYPE SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
13	0130	0530	0300	3	3	1			1				0129	15139
13	0232	0324	0256	1-	1				1				0251	15139
13	0408	0435	0414	1-	1				1				0408	15139
13	0544	0632	0604	1-	1				1				0551	15139
13	0820	0911	0827	1-	5			1	2		1		0818E	15139
13	1038	1100	1041	1	3			1	1		1		1036	15139
13	1730	1800	1734	1-	5	1					8		1727	X-RAY
13	1900	2015	1913	1+	5	2			1		12		1858	X-RAY
13	2141	2155	2143	1-	5	1			2		5		2136	X-RAY
13	2154	2238	2209	1-	1				1				*	
13	2324	0126	2332	1-	1				1				2325E	15139
14	0620	0644	0624	1-	1				1				0618	X-RAY
14	0702	0707D	0707	1-	3				1		1		0657	X-RAY
14	0802E	0840	0805	1-	1				1				0804	X-RAY
14	1109	1145	1116	1-	3				2		1		1110	15139
14	1218	1240	1222	1-	1						1		1225	15139
14	1622	1636	1625	1-	3						2		1620	15139
14	1721	1810	1727	1-	5				1	1	4		1720	15139
14	2316	2354	2324	1	5				1		3		2312	X-RAY
15	0105	0200	0111	1-	1				1				0100	X-RAY
15	0303	0400D	0331	1-	1				1				0254	X-RAY
15	0358E	0712D	0448	1-	3	1			1				0405E	15139
15	0441E	0514	0447	1-	3	1			1				0439	X-RAY
15	0712E	0904D	0756	1+	1				1				0715	X-RAY
15	0721	0727D	0727	1	1						1		0720E	15139
15	0747	0825	0752	1-	3	1		2	2		2		0746	15139
15	0905	0914	0909	1	3				2				0906	15139
15	1010	1026	1014	1	5				2		1		1005	15139
15	1113	1144	1115	1	1			1	1				1110	15139
15	1330	1337D	1337	1-	1			1	1				1334	15139
15	1345	1430	1349	1-	5	1		5	2		5		1345	15139
15	1842	1854	1844	1-	5	1			1	1	4		1838	15153
15	1859	1940	1904	1-	5						3		1858	15139
15	2015	2115	2021	1-	3						2		2011	X-RAY
15	2153	2230	2200	1-	5				3	1	3		2151	X-RAY
15	2229	2319	2242	1-	5	1			2	1	2		2217E	15139
15	2332	0017D	2337	1-	5				2		1		2330E	15139
16	0017E	0042	0022	1-	1				1				0014	X-RAY
16	0135	0248	0145	1-	1				1				0139	X-RAY
16	0437	0456	0442	1-	1				1				0435	X-RAY
16	0609	0822	0618	1	3	1			1				0610	15139
16	0930	0943	0932	1	3				1		1		0924	X-RAY
16	1212	1225	1215	1-	1				1		1		*	
16	1231	1253	1236	1	3			1	1		1		1228	X-RAY
16	1331	1340	1334	1-	1				1				1329	15153
16	1819	1824D	1824	1-	1	1							1822	15155
16	1836	1915	1839	1-	1	1							1836	15155
16	2115	2140	2121	1-	5				2	1	5		NF	
17	0132	0306D	0147	2-	5	1			1		1		0141	15139
17	0306E	0422	0320	1+	5	1		1	1		1		0303	X-RAY
17	0525E	0646	0537	1-	1				1				0525E	15139
17	1248	1300	1252	1	3			1	1		1		1246	X-RAY
17	1800	1824	1810	1-	5						6		1758	15155
17	2210	2239	2223	1-	1				1				2215E	15155
18	0046	0130	0052	1-	1				1				0040	15155
18	0210	0307	0213	1-	5	1			1		1		0211	15155
18	1806	1835	1819	1	3						3		NF	
18	2201	2307	2211	1	5	1			2	1	8		2158	X-RAY
19	2333	0030	2351	1-	1				1				*	
19	2357	0026	0001	1-	1				1				*	
20	1609	1645	1614	1-	3						3		1609	15162
21	0406	0508	0410	1-	1				1				*	
21	0454	0546	0531	1-	1				1				*	
21	0843	0910	0850	1-	1				1				0842	X-RAY
21	1135	1300	1148	1-	1						1		1133	X-RAY
21	1516	1615	1525	1	5	1		1	1		8		1518	15161
21	2224	2315	2232	1-	5				1		2		2220	X-RAY
21	2254E	2355	2303	1-	5				1		2		2252	15162
22	1834	1911	1842	1-	5					1	6		1826	15154
23	0226	0314D	0233	1-	1				1				0225	15160
23	0314E	0356	0320	1-	1				1				0311	X-RAY
24	0241	0337	0246	1-	3	1			1				0241	15161
24	0735	0800	0738	1-	1						1		0739E	15161
25	0808	0911	0817	1+	5			2	3		2		0805	X-RAY
25	1448	1700	1456	2	5	4	1	6	4	1	14		1449	15161

SUDDEN IONOSPHERIC DISTURBANCES

FEBRUARY 1978

DAY	UNIVERSAL TIME START	END	MAX	IMP	WIDE SPREAD INDEX	NUMBER OF STATION REPORTS BY TIME SWF	SCNA	SEA	SPA	LF-SPA	SES	SFD	KNOWN FLARE	McMATH REGION
26	0114	0146	0118	1-	1				1				0104	15161
26	0229	0316	0233	1-	3	1			1				0231E	15161
26	0618	0810	0626	1	1				1				0616	X-RAY
26	0750	0820	0752	1-	1						1		*	
26	1413	1515	1415	1-	5			3	4	1	6		1412	15161
26	2322	0037	0007	1-	1				1				2331E	15161
27	1225	1255	1230	1-	3			1	1		1		NF	
28	0735	0800	0740	1-	5			1	2		1		0740E	15161
28	2005	2045	2014	1	1	1							NF	

PERIODS OF NO OBSERVATIONS:

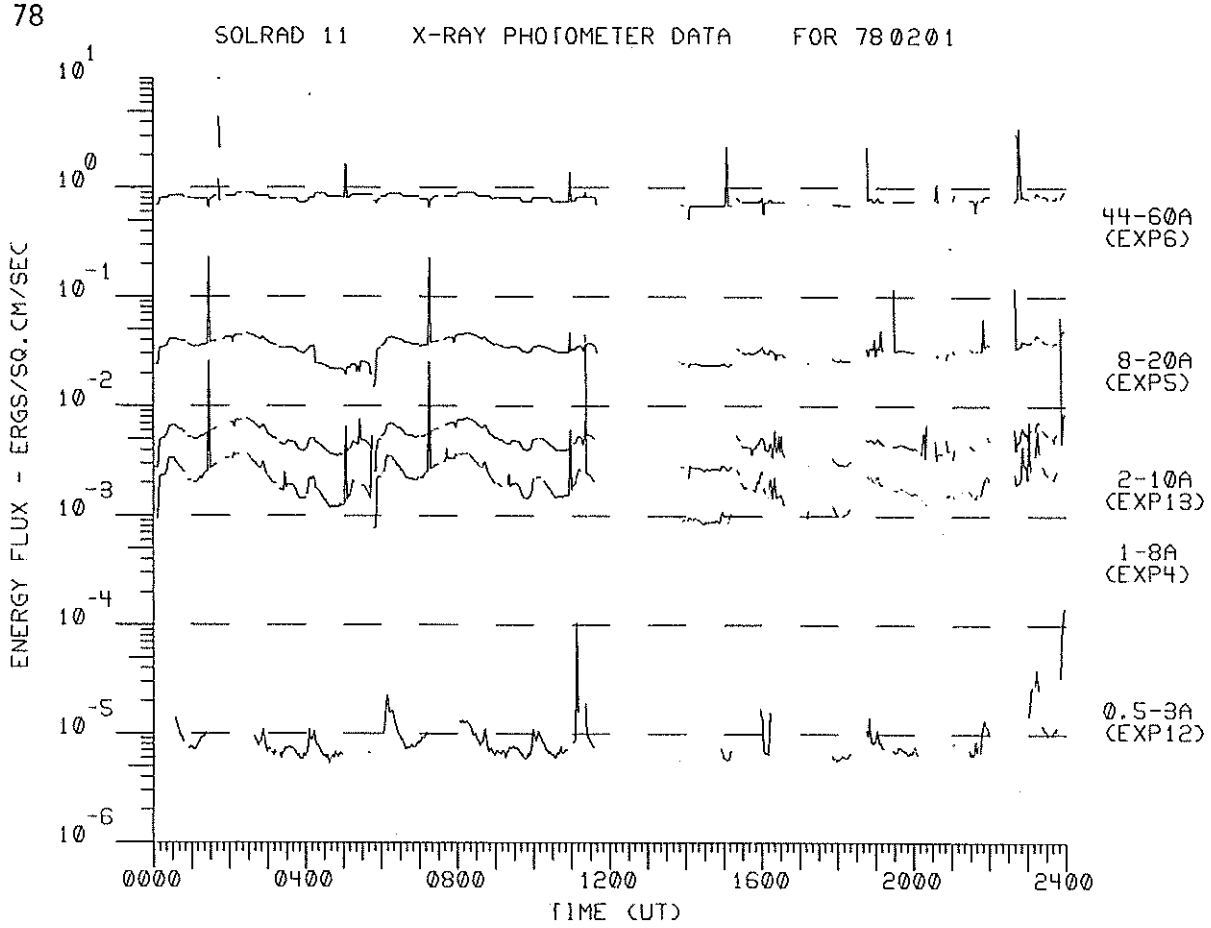
DATE	TIME (UT) and STATION
01-16	0000-2400 A37
01-03	0000-2400 A40
01	0000-2400 A34
07	0000-2400 TN, 1007-1356 UM (16 kHz)
08	0000-2400 A40
09-12	0000-2400 A28
11	0620-0749 UM (13 kHz), 1715-1912 UM (13 kHz), 2018-2045 UM (13 kHz)
12	1606-2100 TM
17	0235-0525 UM (13 kHz), 2100-2130 UM (13 kHz) 2050-2120 UM(13 kHz)
21	0000-2400 A40, 1114-1343 UM (16 kHz)
23	0000-2400 TN, 2058-2124 TM
28	1030-1345 UM (16 kHz)

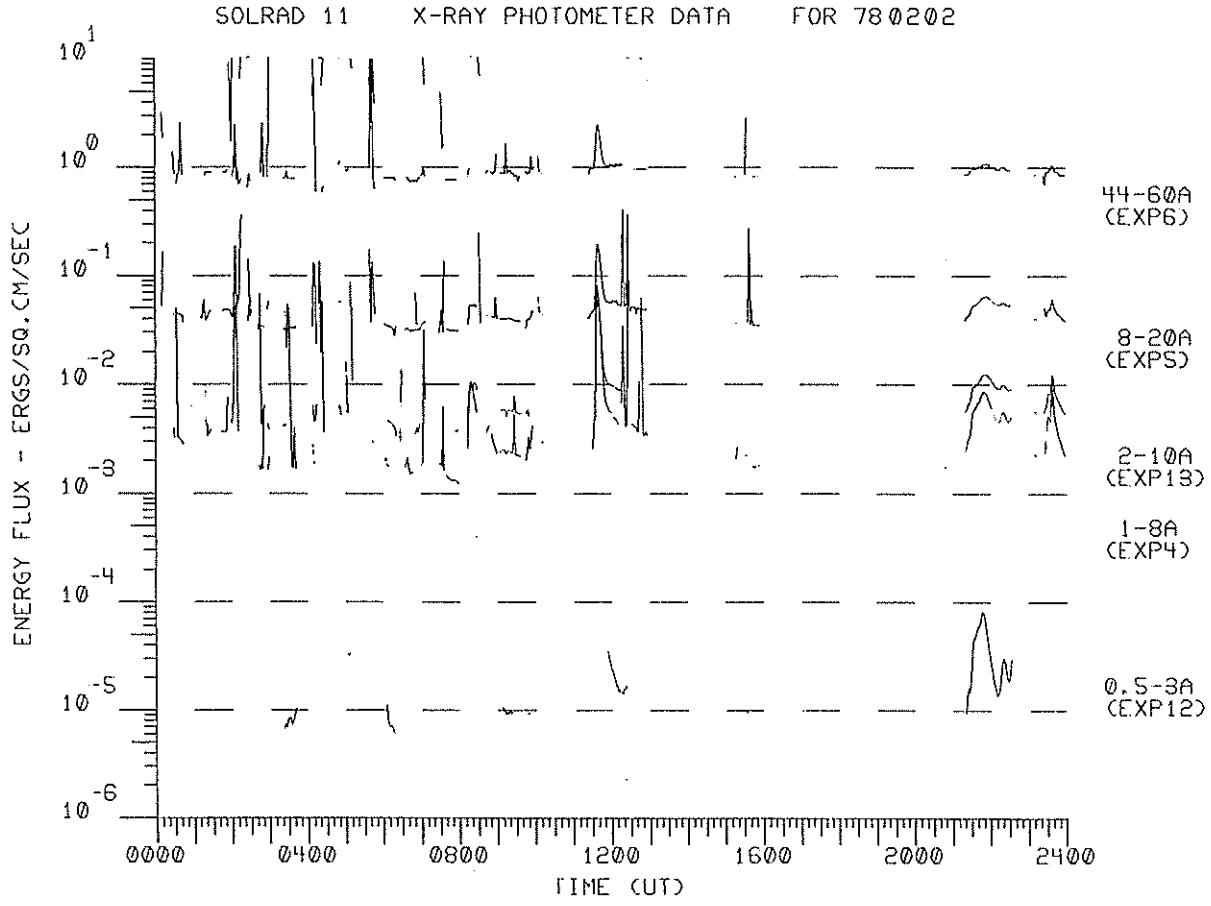
STATIONS REPORTING FOR FEBRUARY 1978

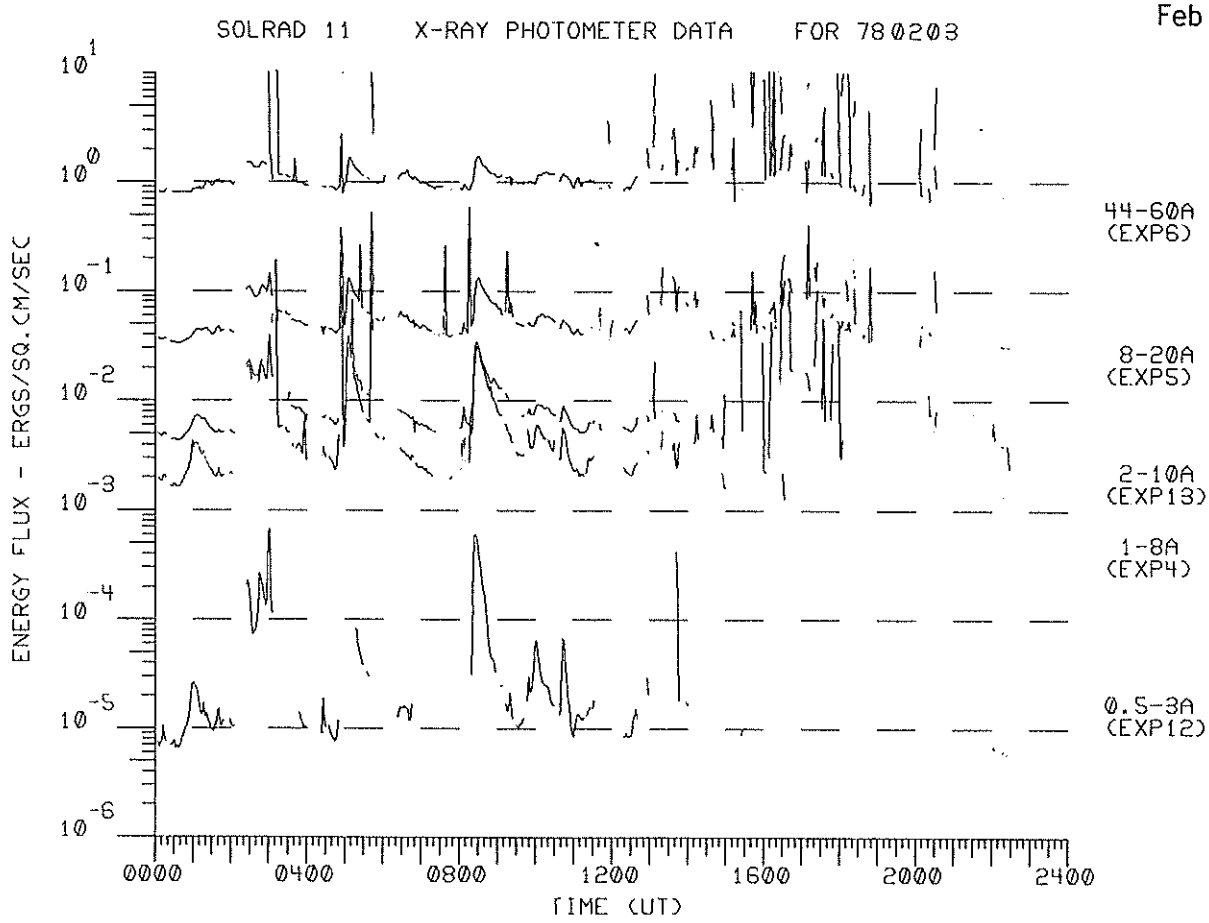
AAVSO (A1, A5, A19, A21, A28, A30,
A31, A34, A35, A37, A40, A45)
(SES) (A1, A31) (SEA) (A31) (SWF)
DARMSTADT (DA) (SWF)
HERSTMONCEUX (HC) (SEA)
HIRAISO (HI) (SWF)
HUANCAYO (HU) (SWF)
INUBO (IN) (SPA)
KUHLUNGSBORN (KU) (SEA, SPA)
MC MATH (MC) (SWF, SCNA)
NEW JERSEY (NJ) (SES)
PANSKA VES (PU) (SWF, SEA, SES)
PRESTON (LO) (SEA)
SAO PAULO (UM) (SES, SPA)
SOFIA (SF) (SES)
ST CLOUD (SC) (SES)
TABLE MOUNTAIN (SPA, LF-SPA)
TORINO (TN) (SPA)
NOTE; A5 is now reporting from Mahwah, New Jersey
A45 is a new observer reporting from Tarentum, Pennsylvania

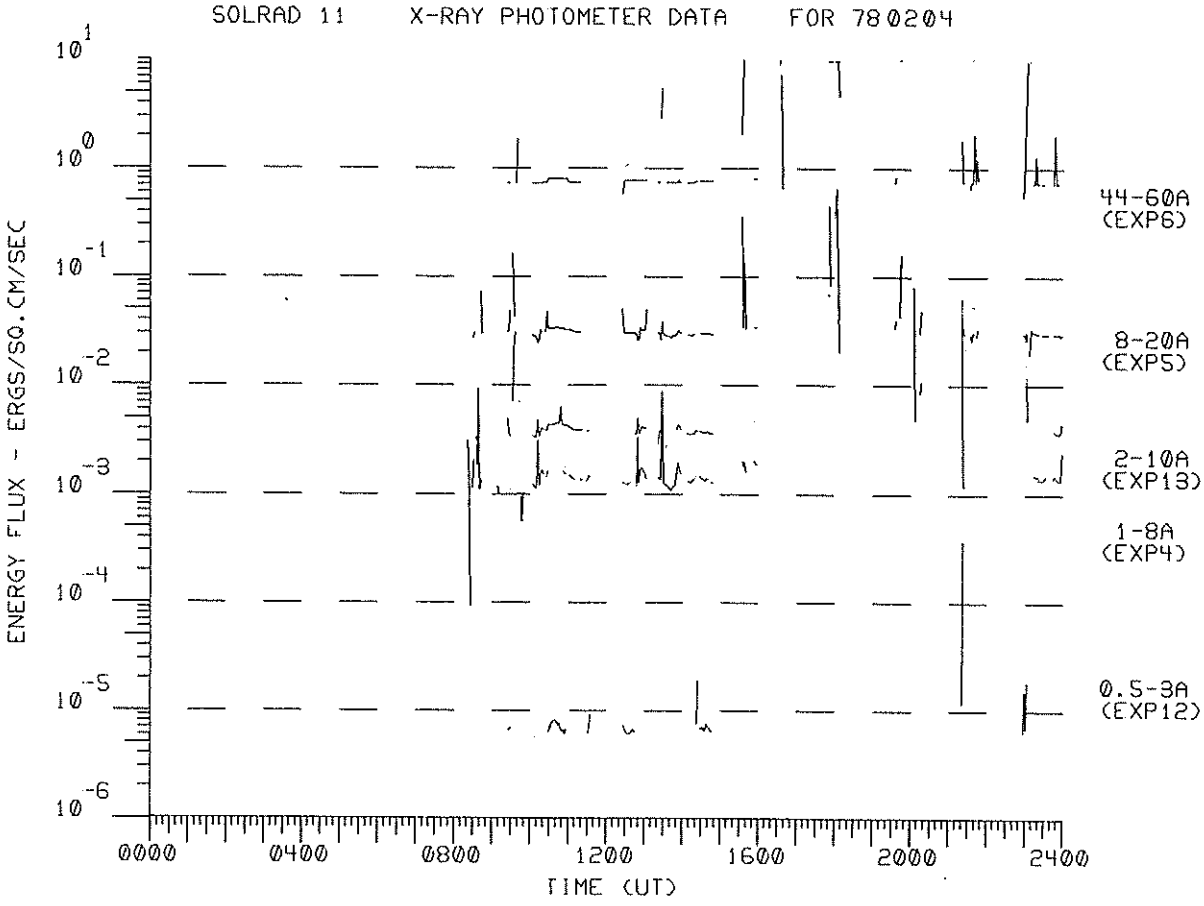
SID's BY McMATH REGION

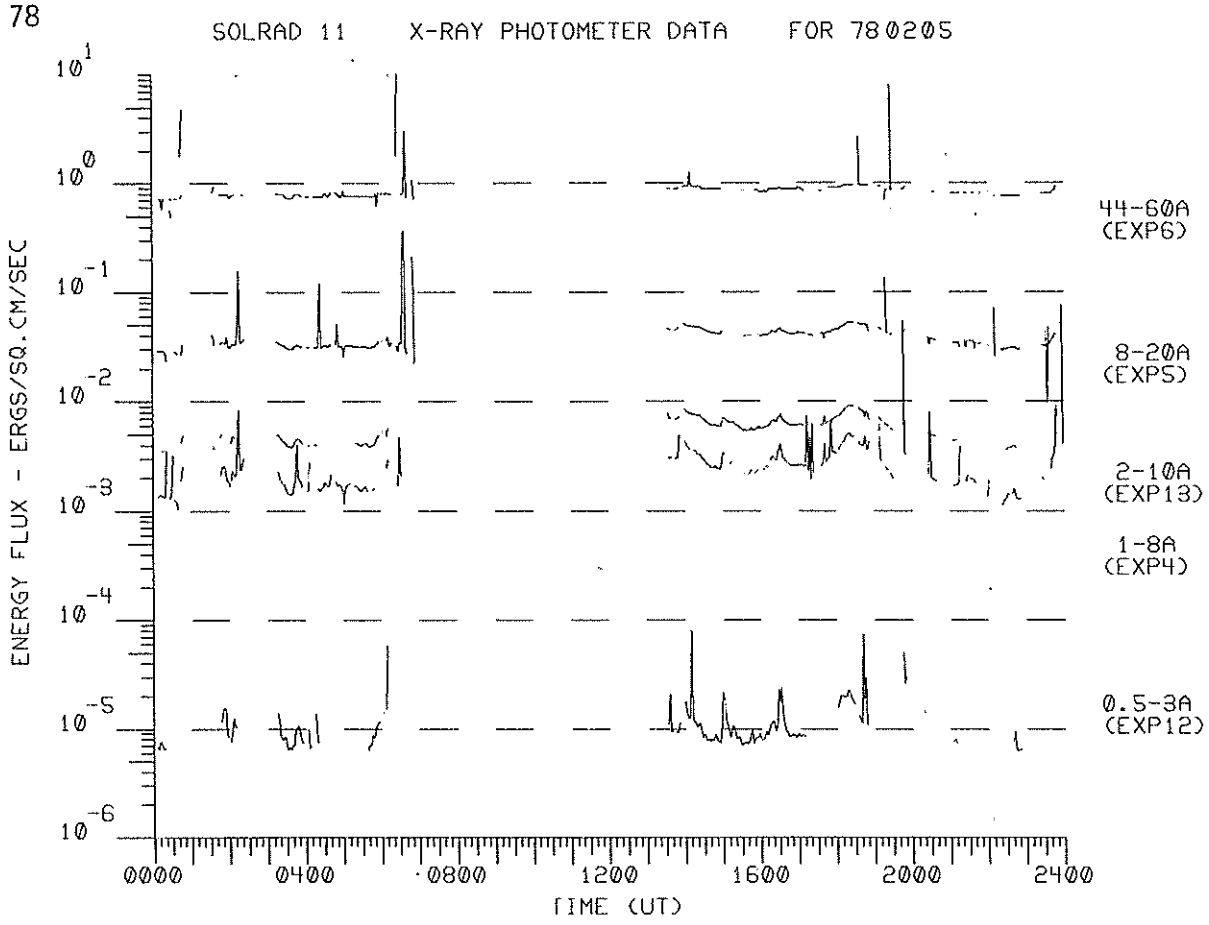
DAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
REGION																												
15124			2	1																								
15126	2	3	1																									
15134							1	3	1		1																	
15135			3		1				2																			
15136			1																									
15139								6	7	3	8	4	7	4	11	1	2											
15153															1	1												
15154																						1						
15155																	2	2	2									
15160																							1					
15161																					1			2	1	4		1
15162																				1	1							
X-RAY		2	2		2		1	2	6	2	2	2	3	4	6	5	2	1			3		1		1	1		
UNKNOWN												1				1	1										1	1
NO FP						2				1		2	1			1			2		2					1		

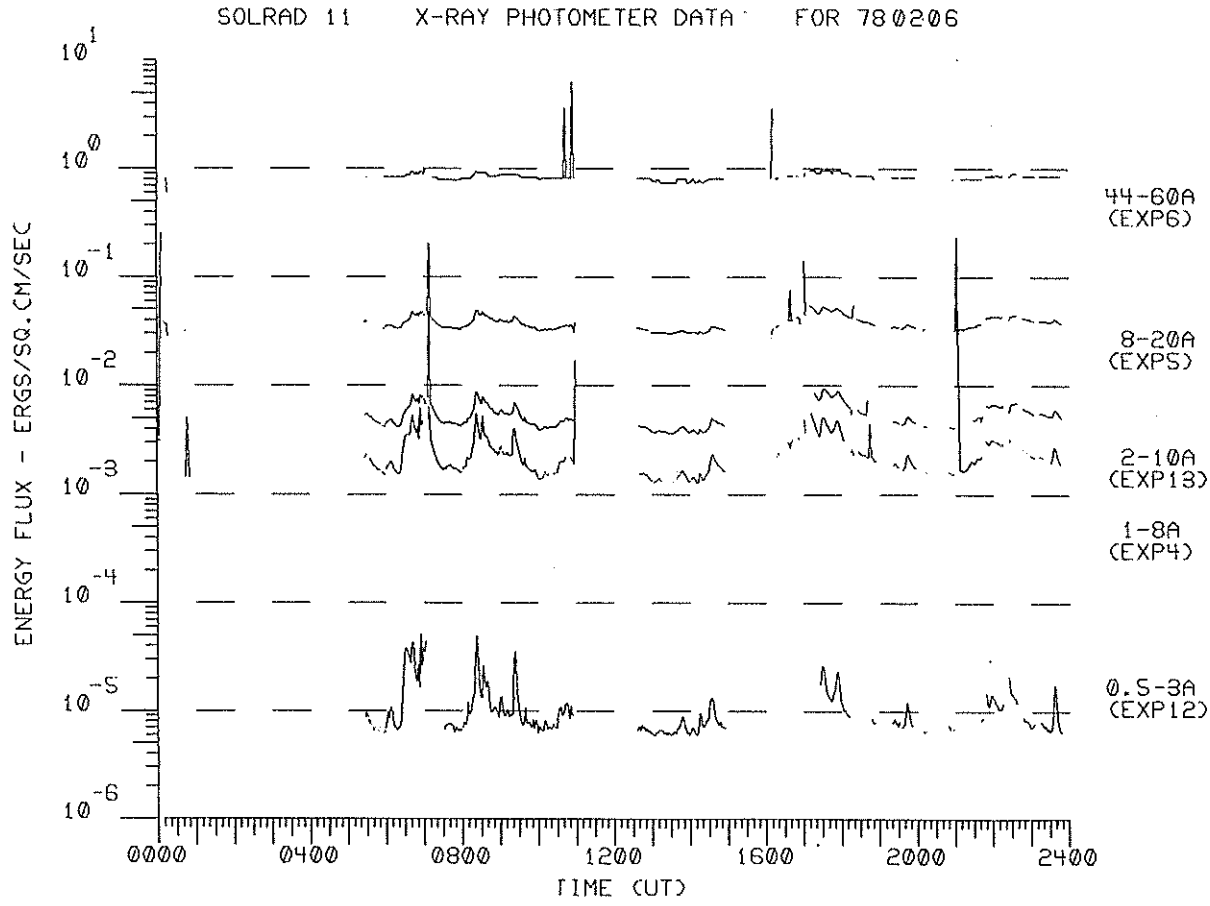

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780201
ENERGY FLUX - ERGS/SQ.CM/SEC
44-60A (EXP6)
8-20A (EXPS)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

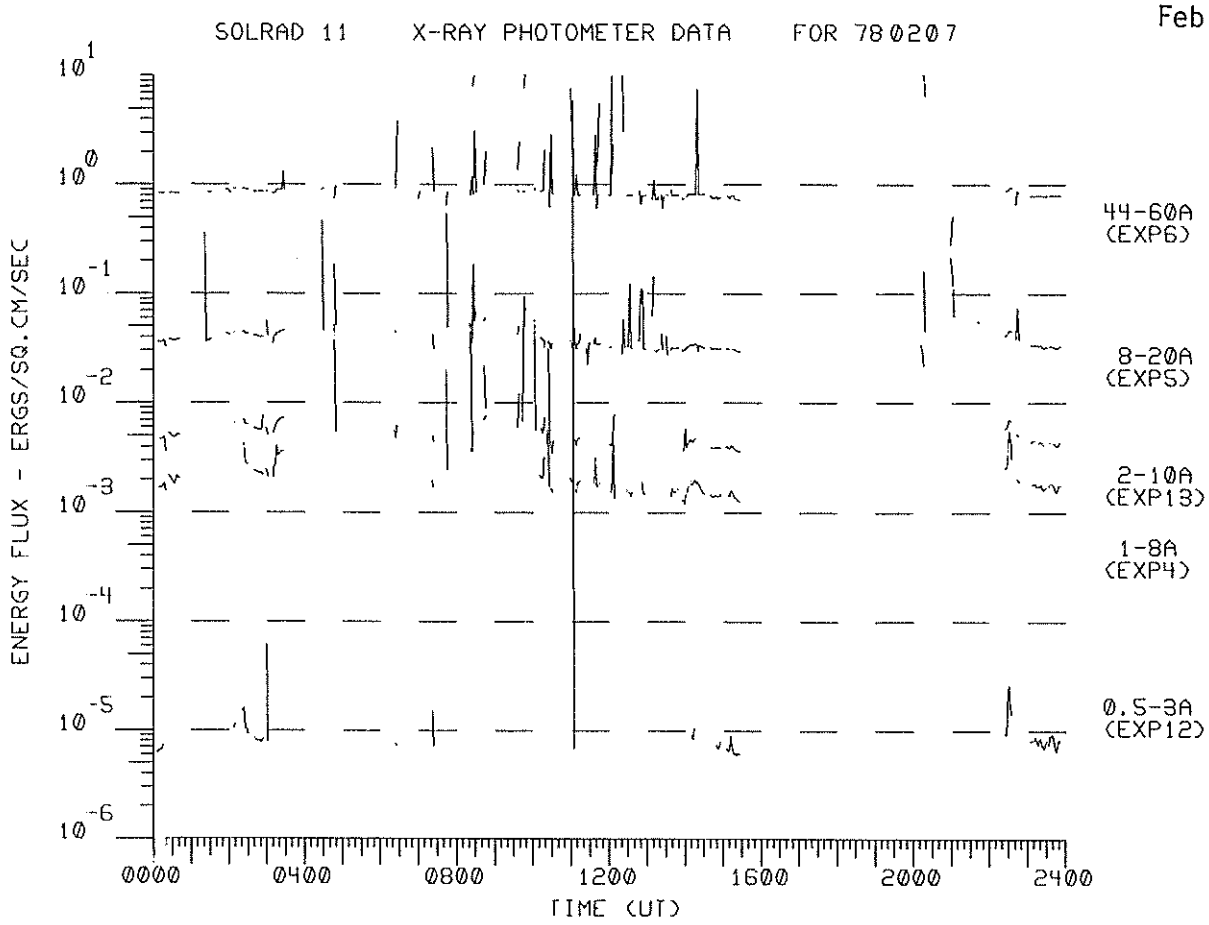

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780202
ENERGY FLUX - ERGS/SQ.CM/SEC
44-60A (EXP6)
8-20A (EXPS)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

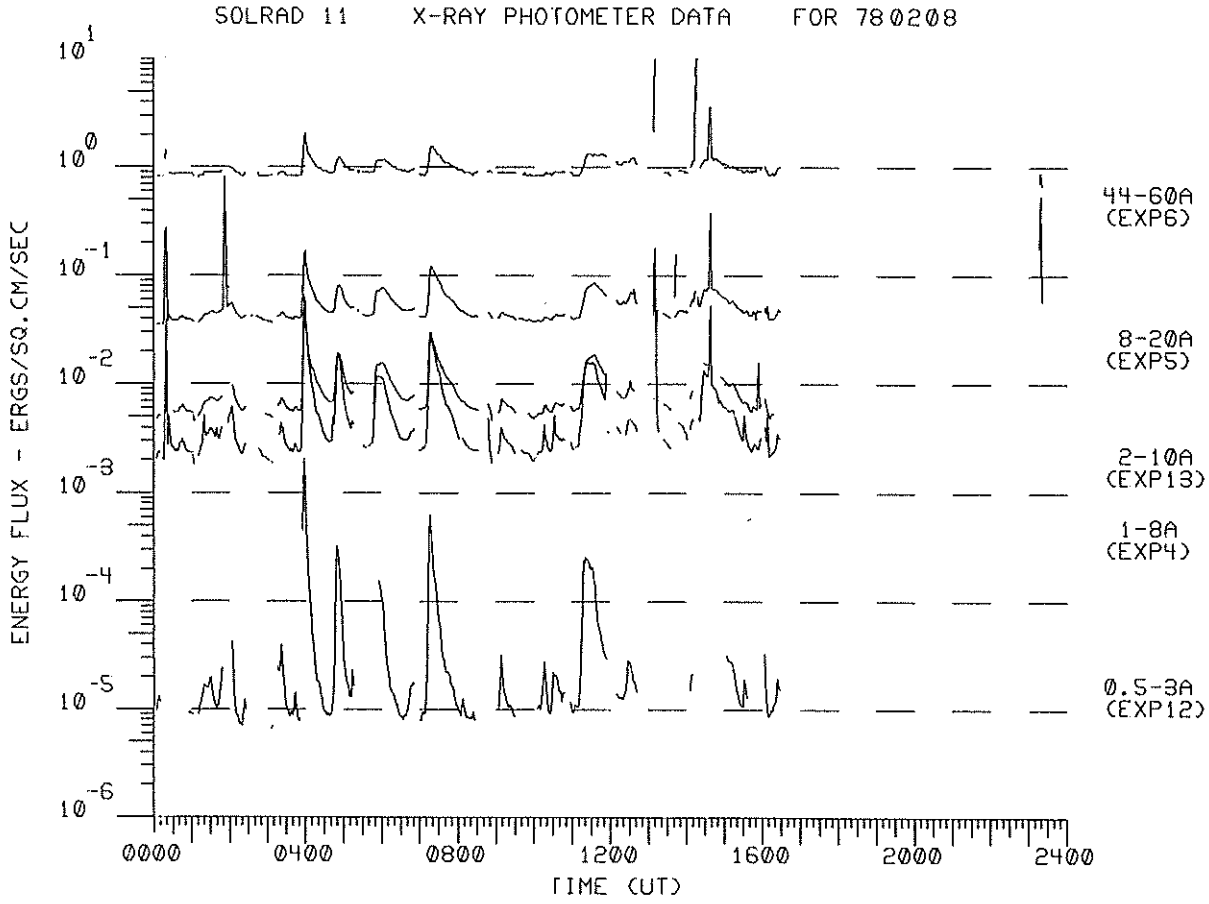

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780203
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

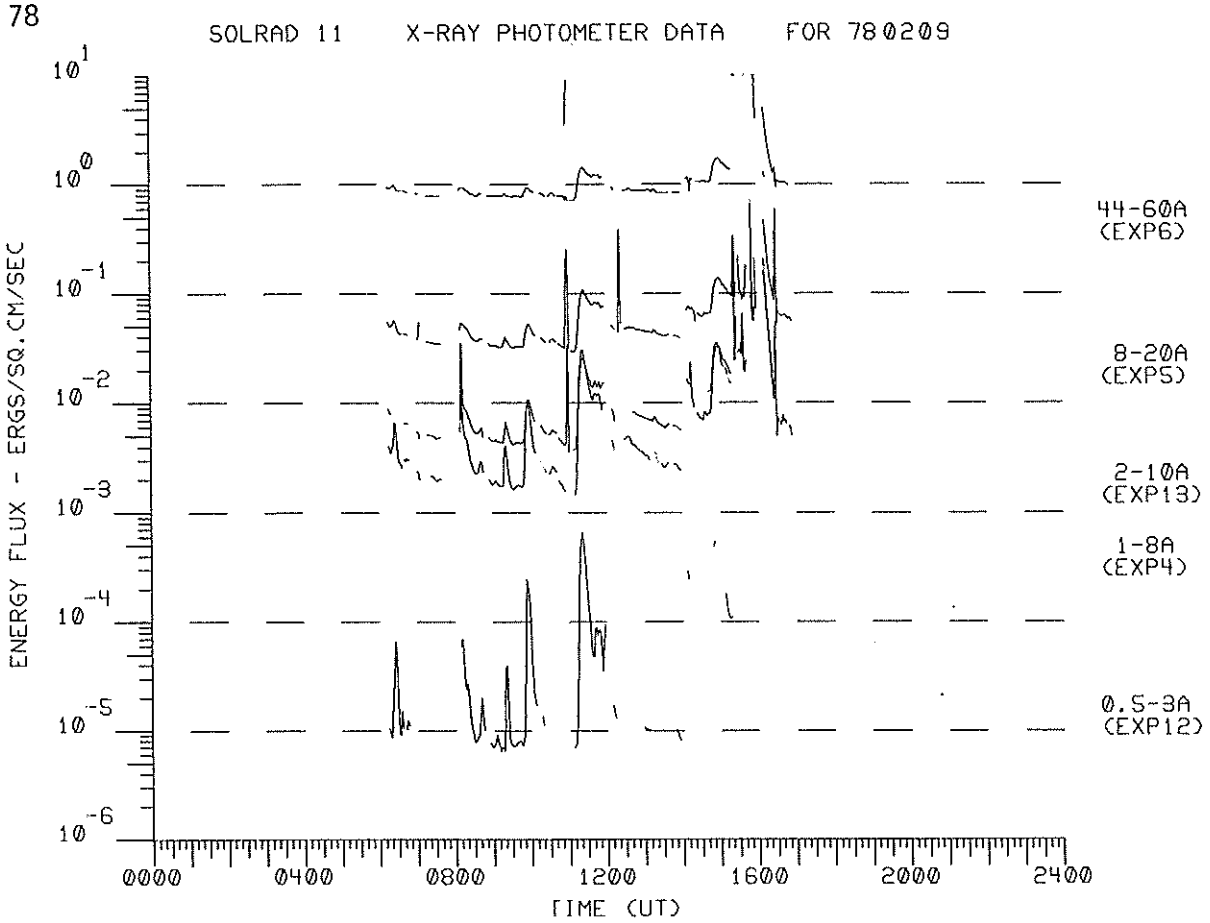

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780204
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

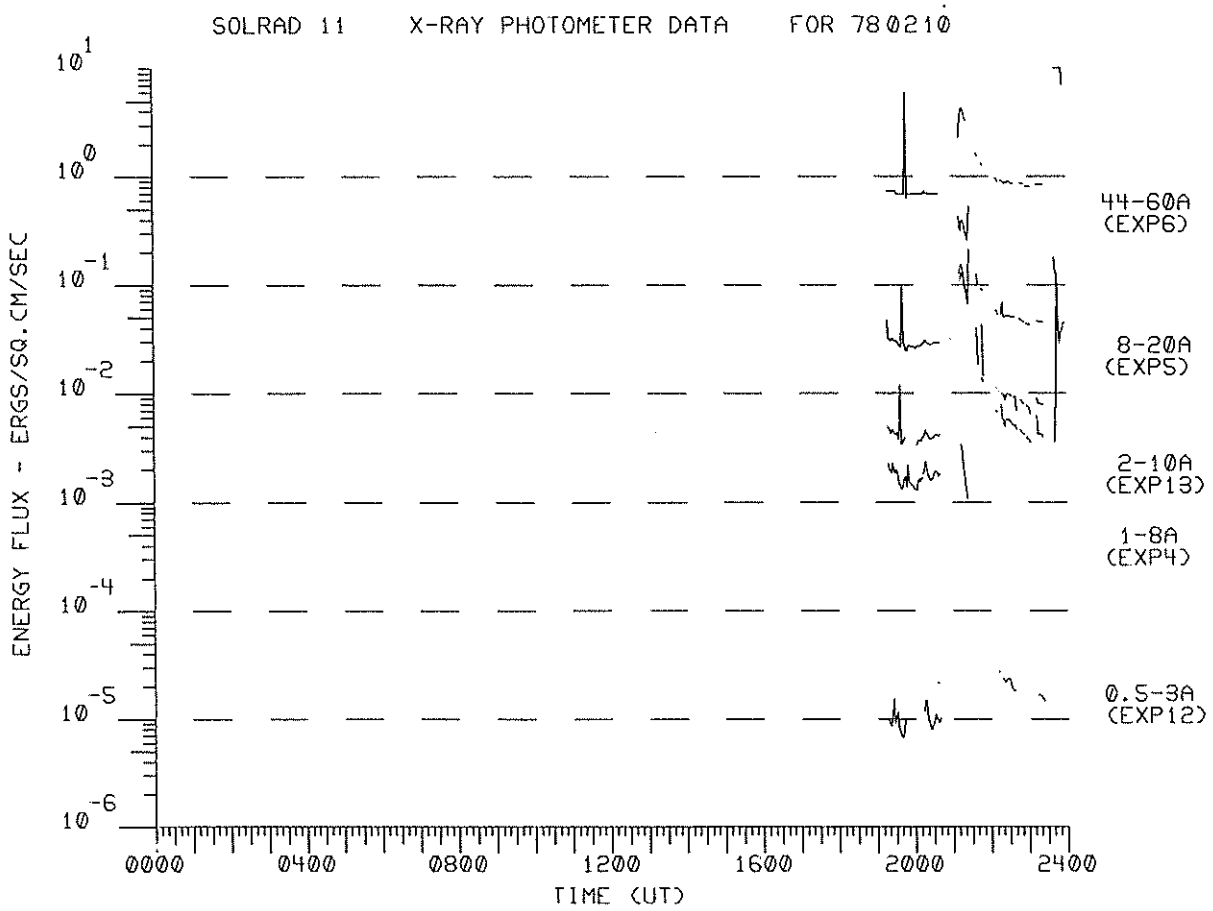

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780205
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXPS)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

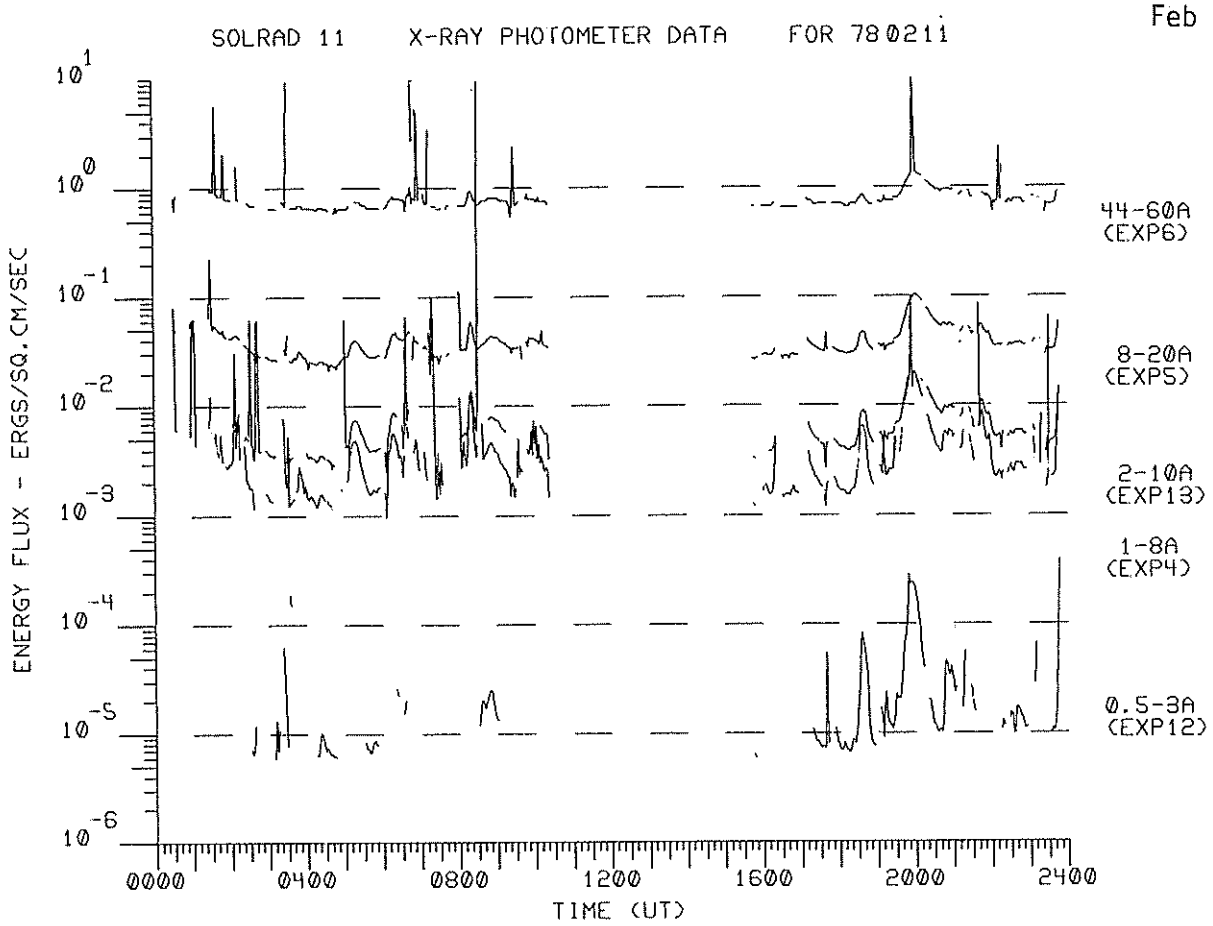

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780206
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXPS)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

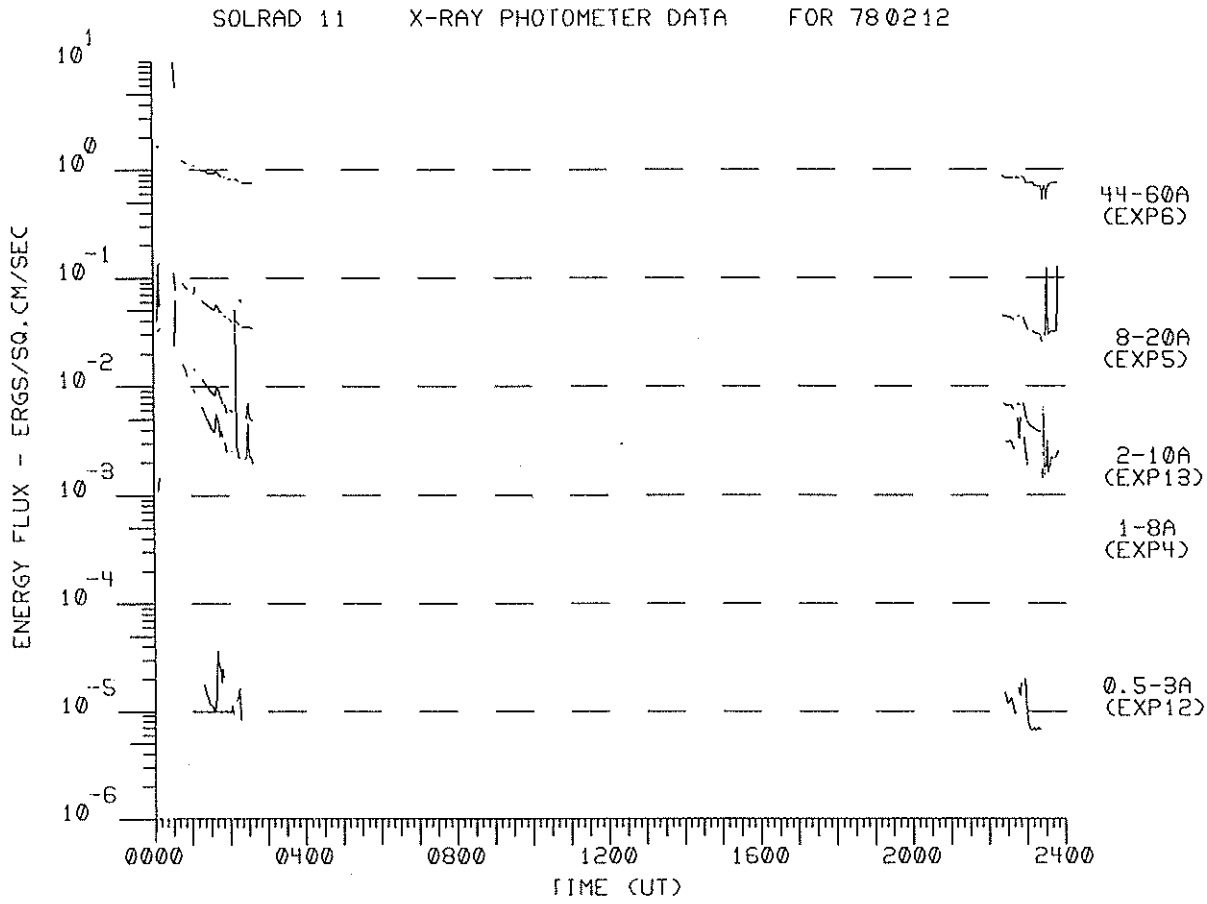

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780207
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

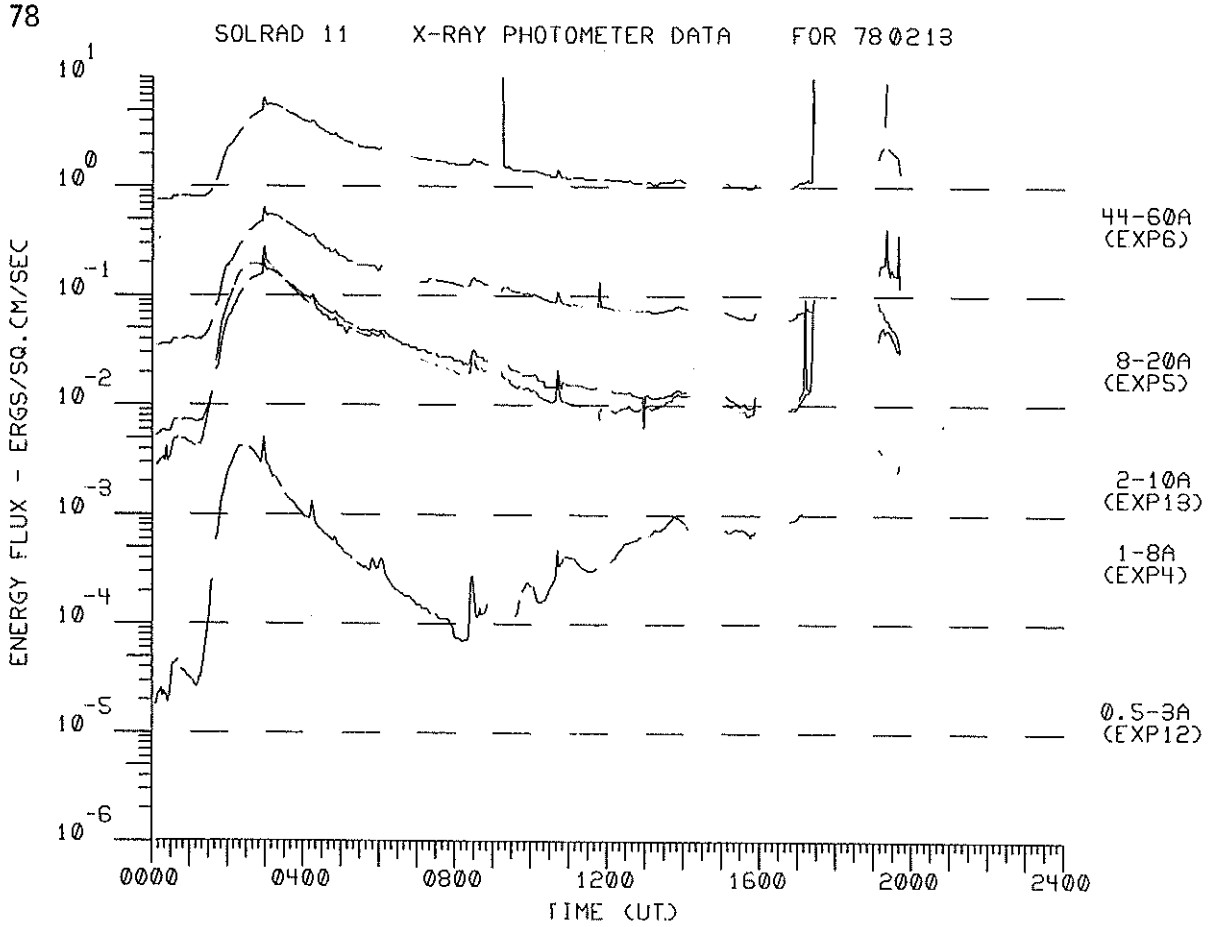

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780208
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

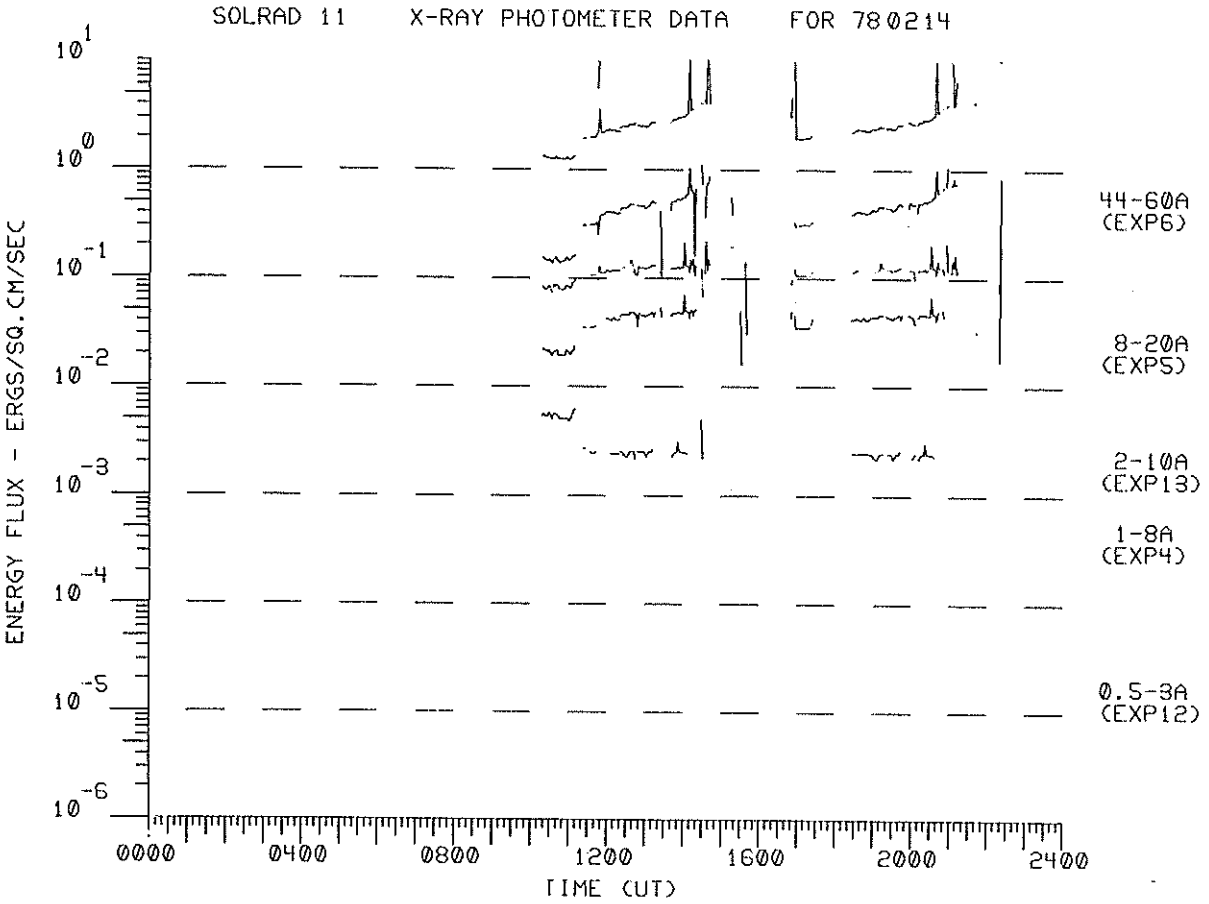

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780209
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780210
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

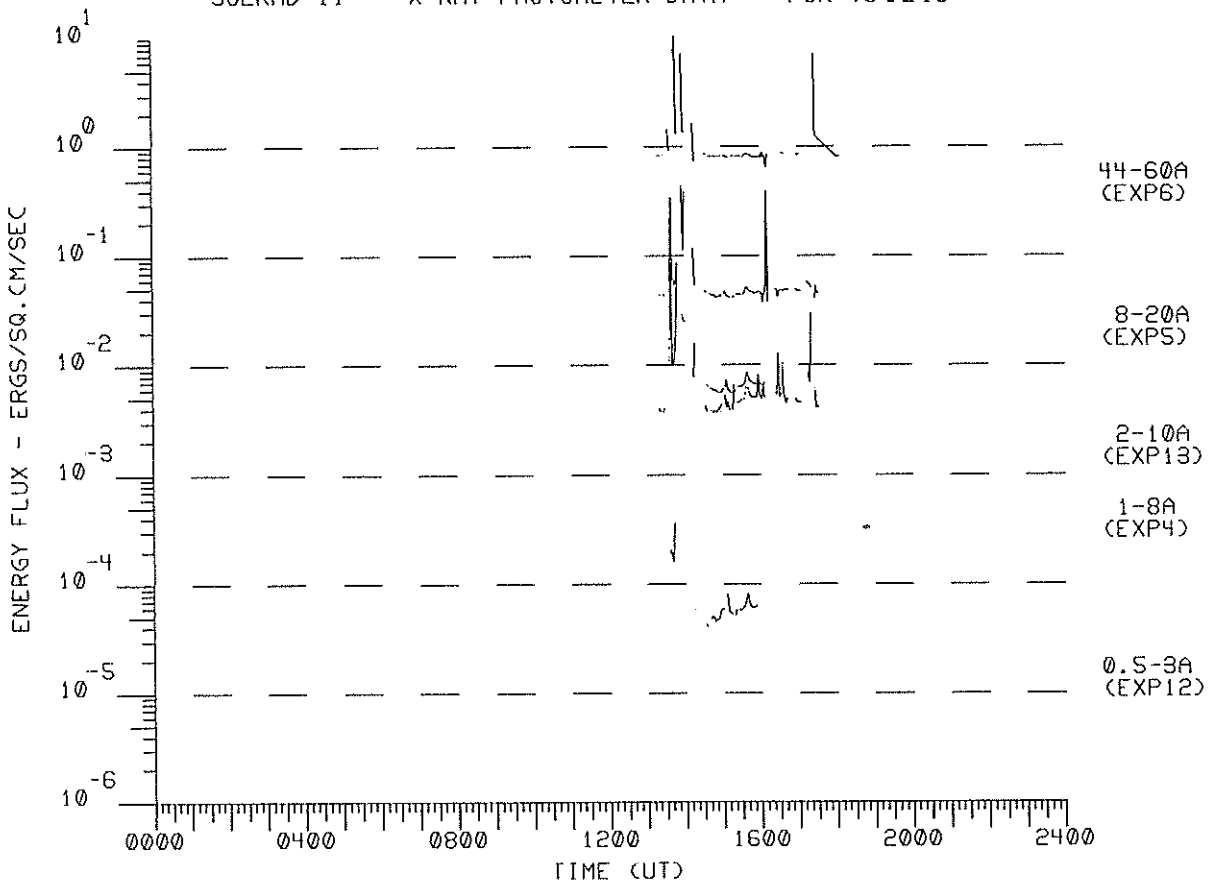

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780211
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780212
ENERGY FLUX - ERGS/SQ.CM/SEC
10^{1}
10^{0}
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

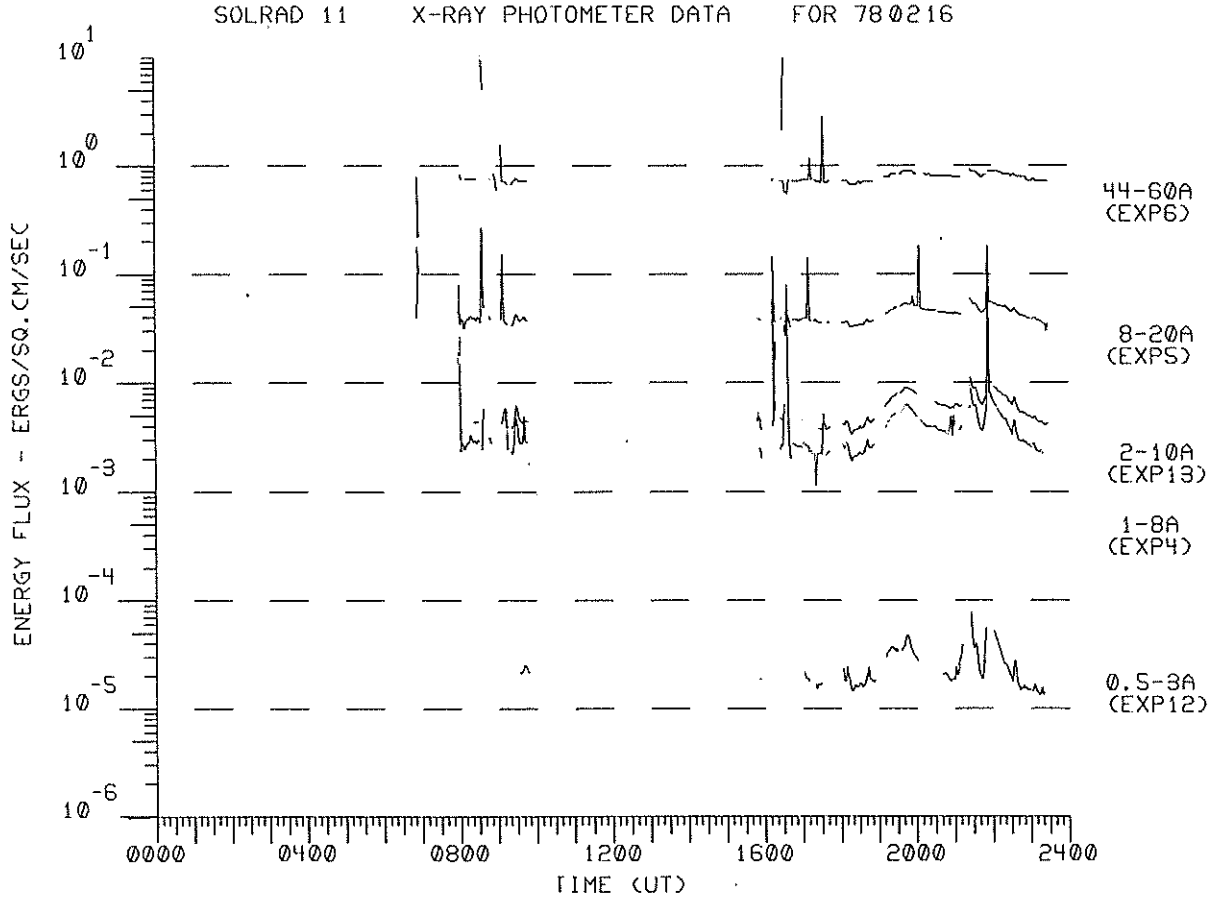

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780213
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

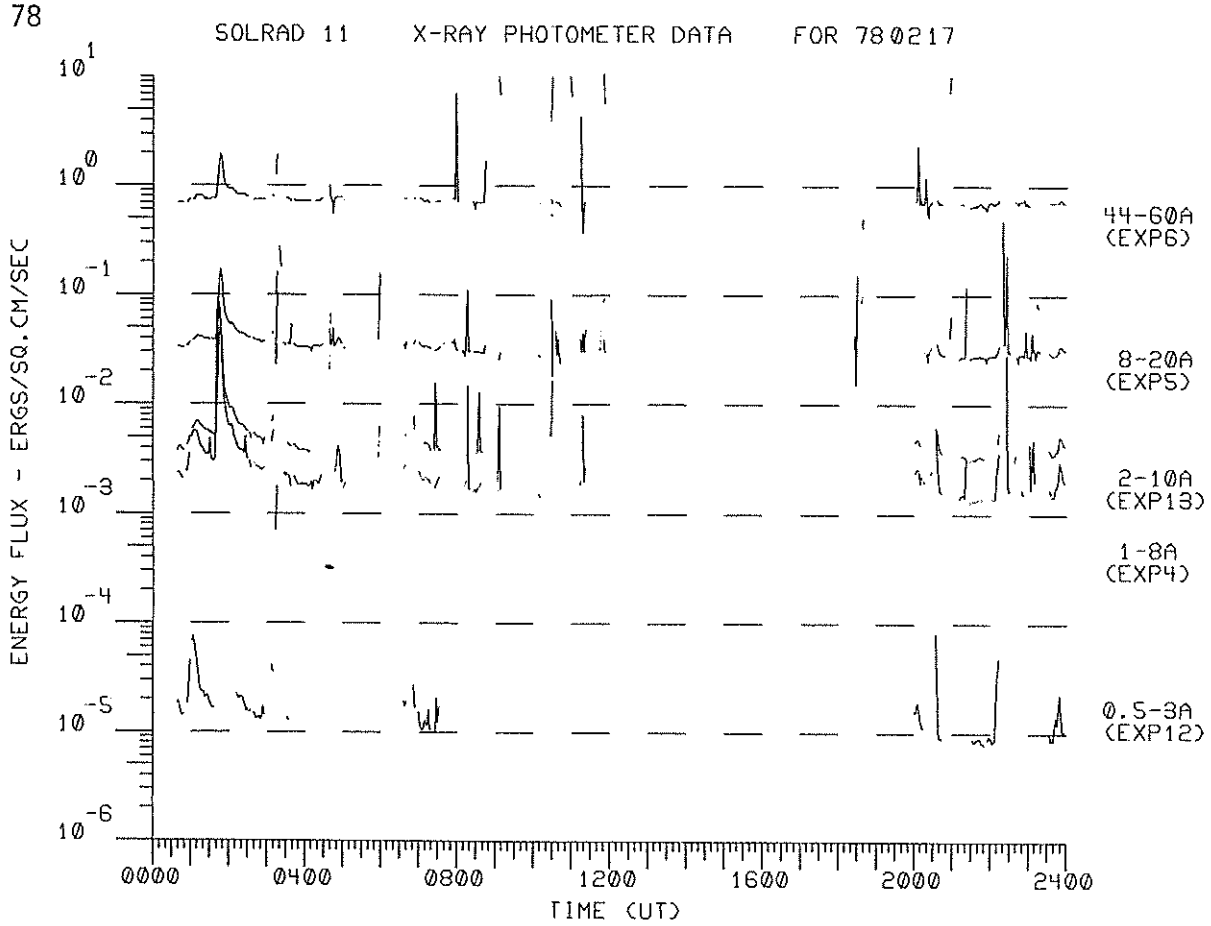

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780214
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

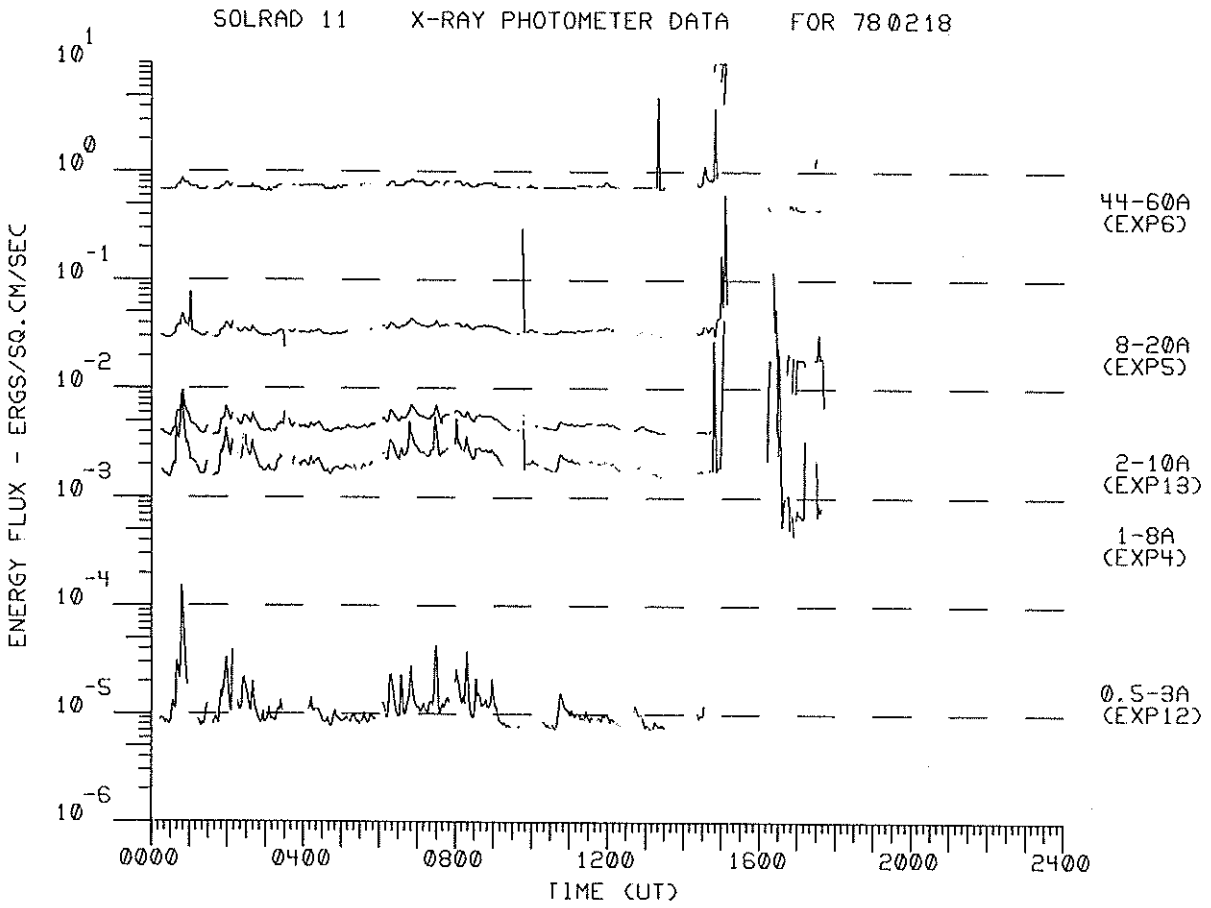
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780215

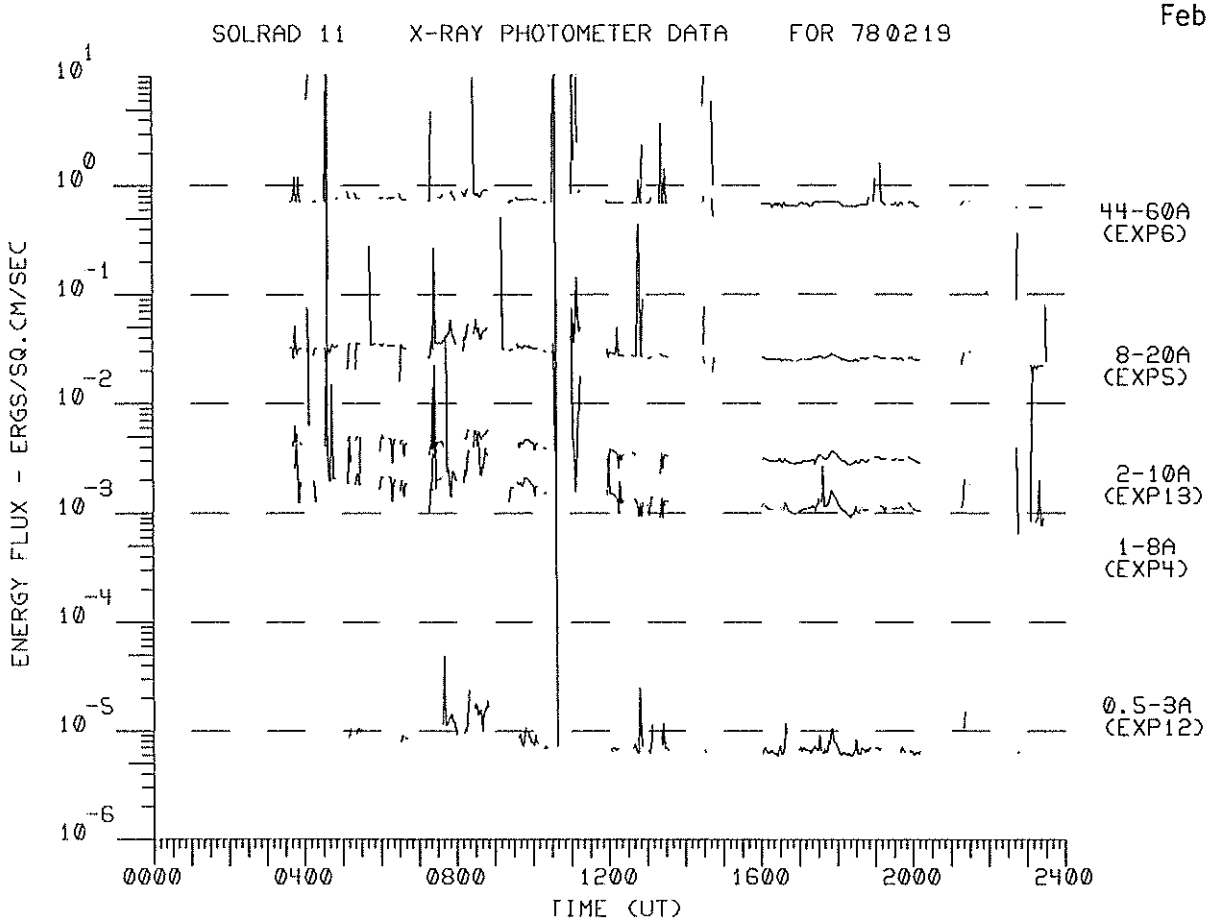


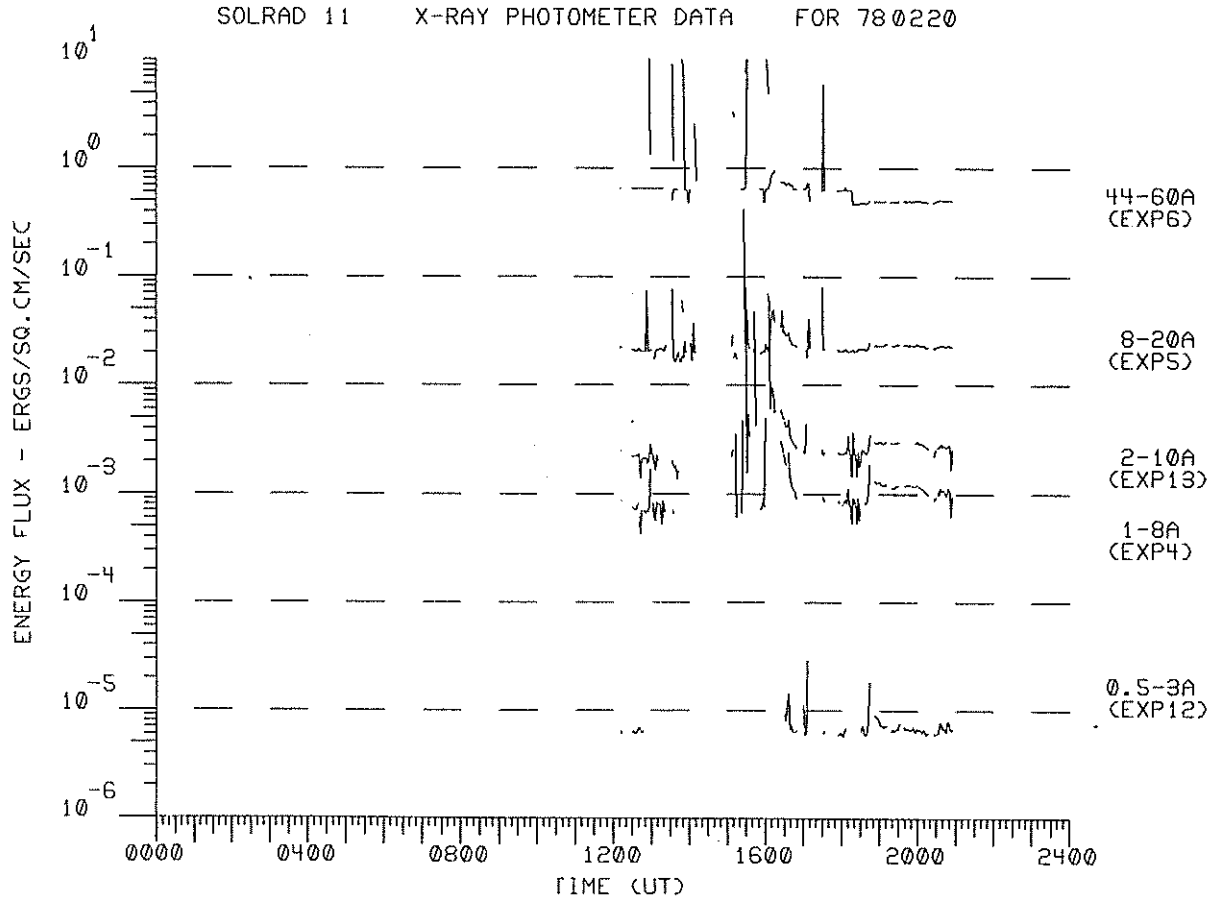
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780216



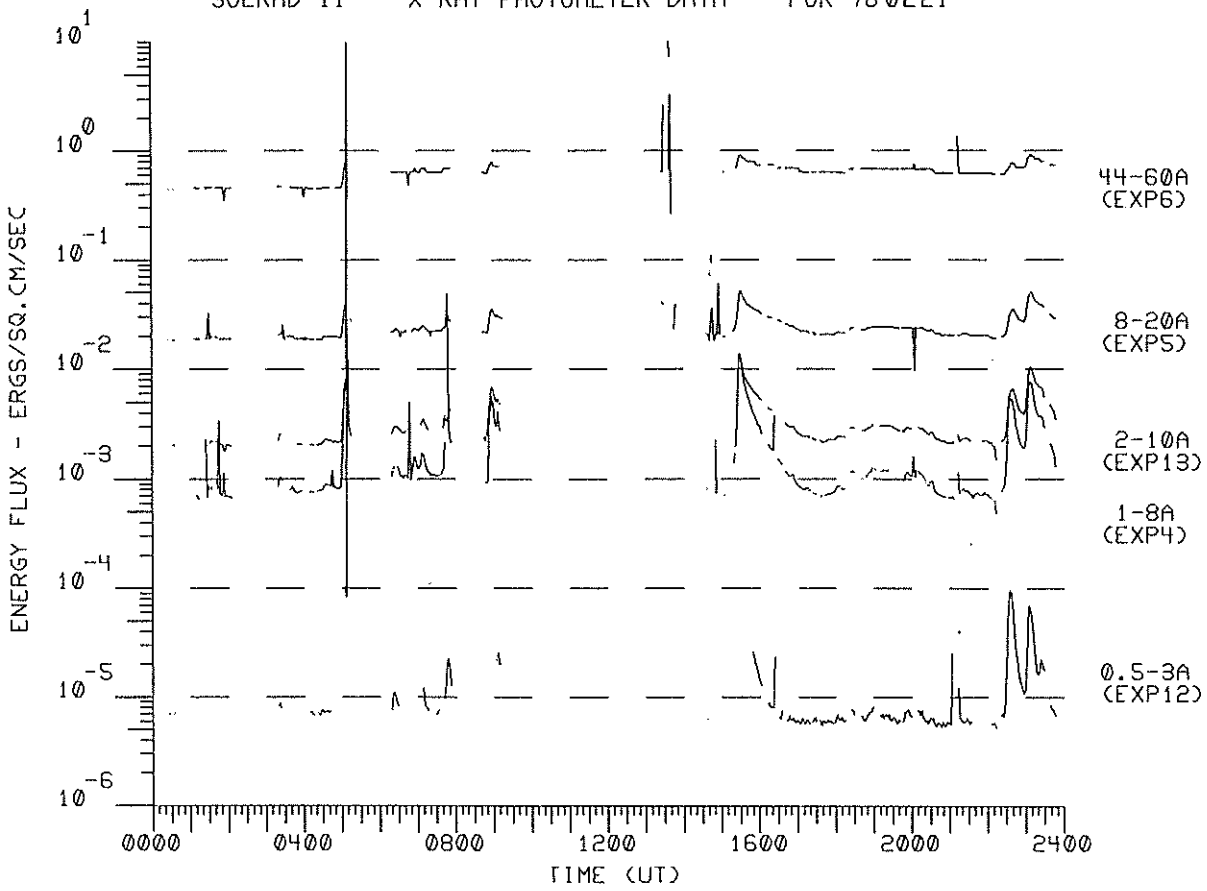

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780217
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780218
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

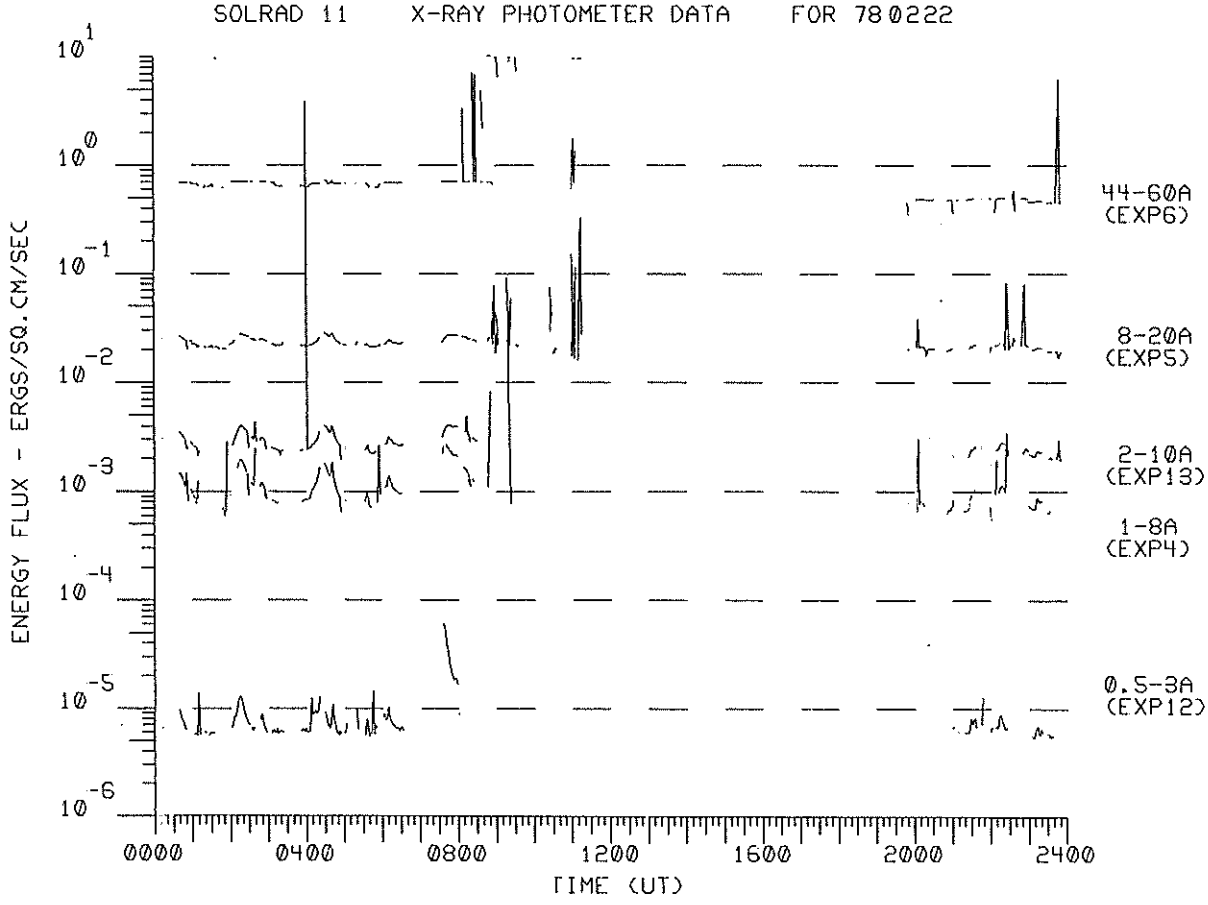

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780219
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

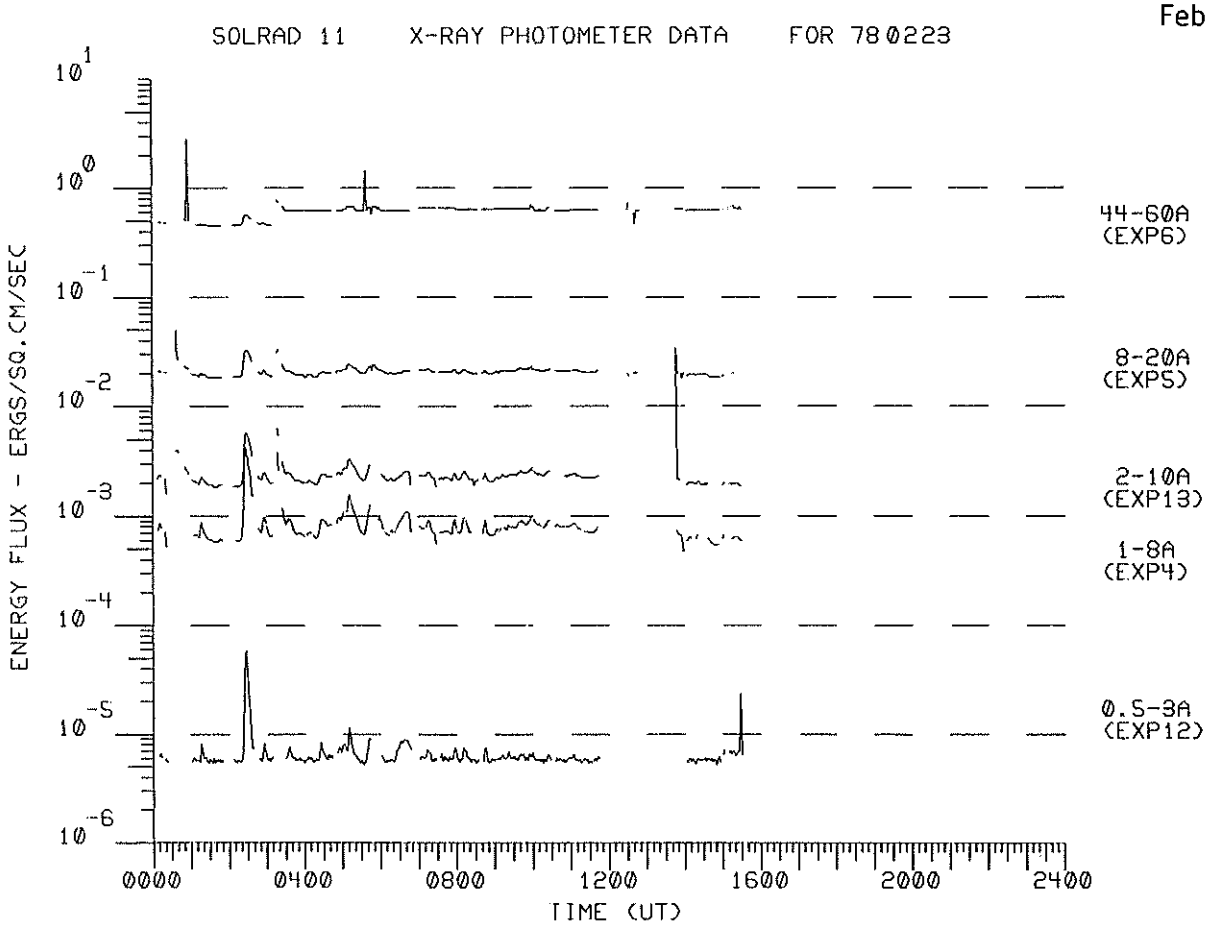

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780220
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

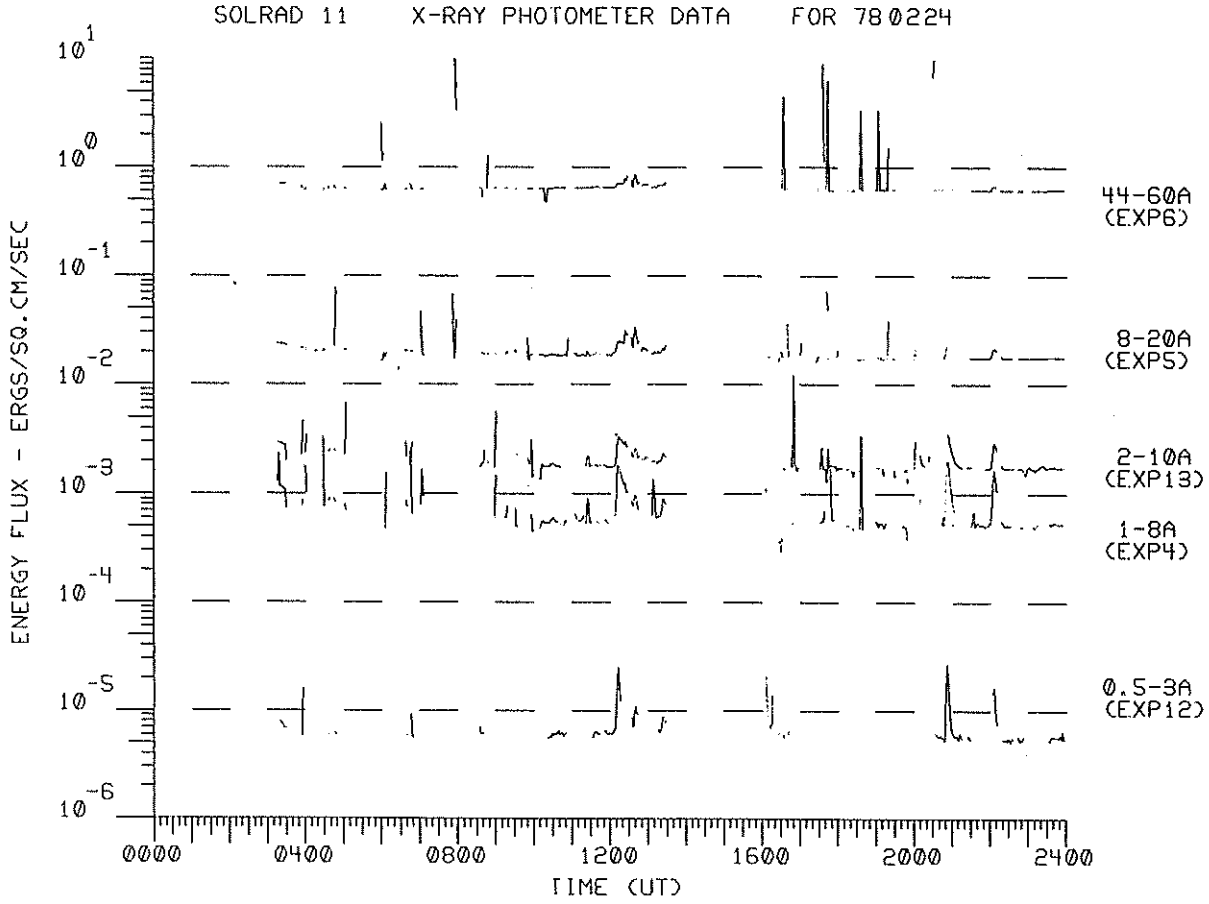
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780221

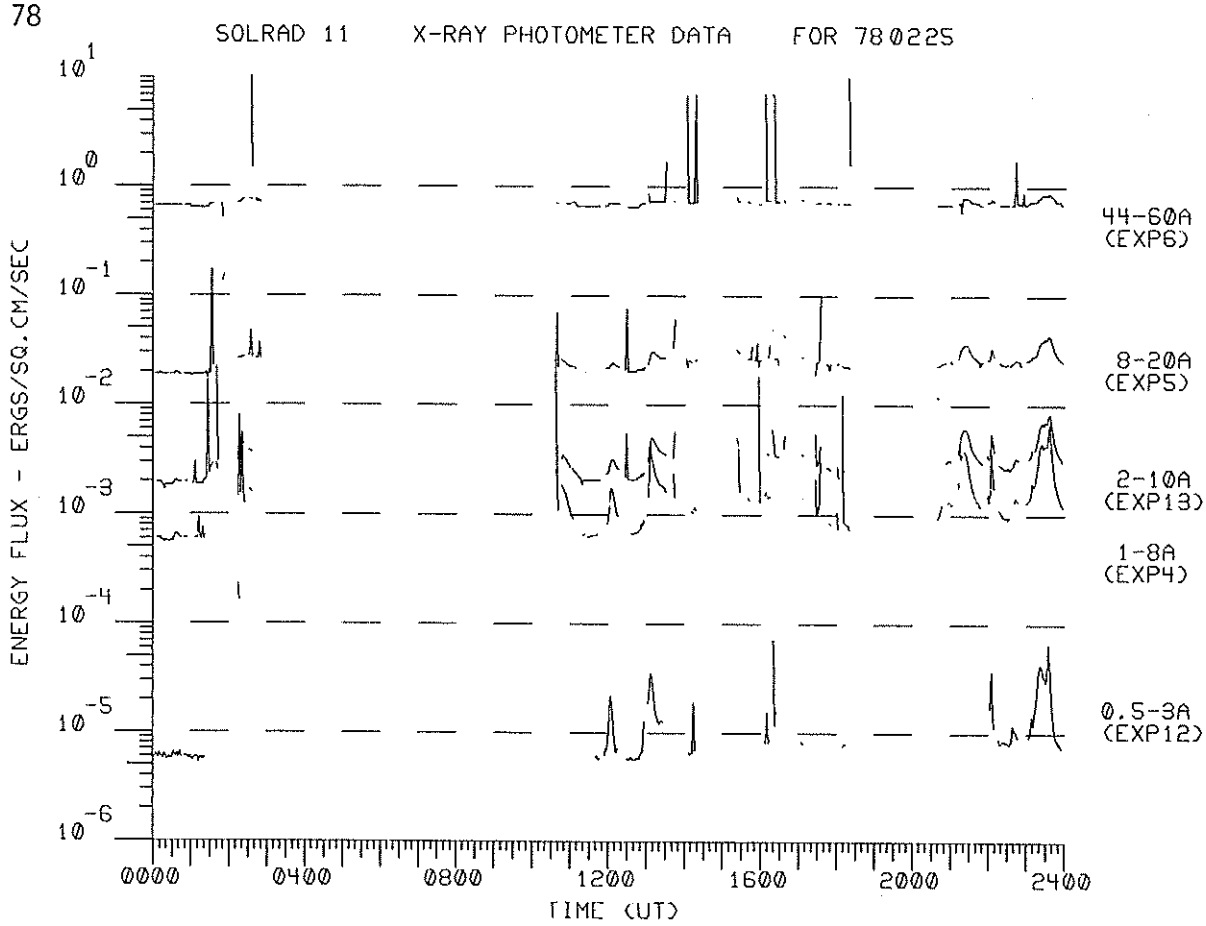


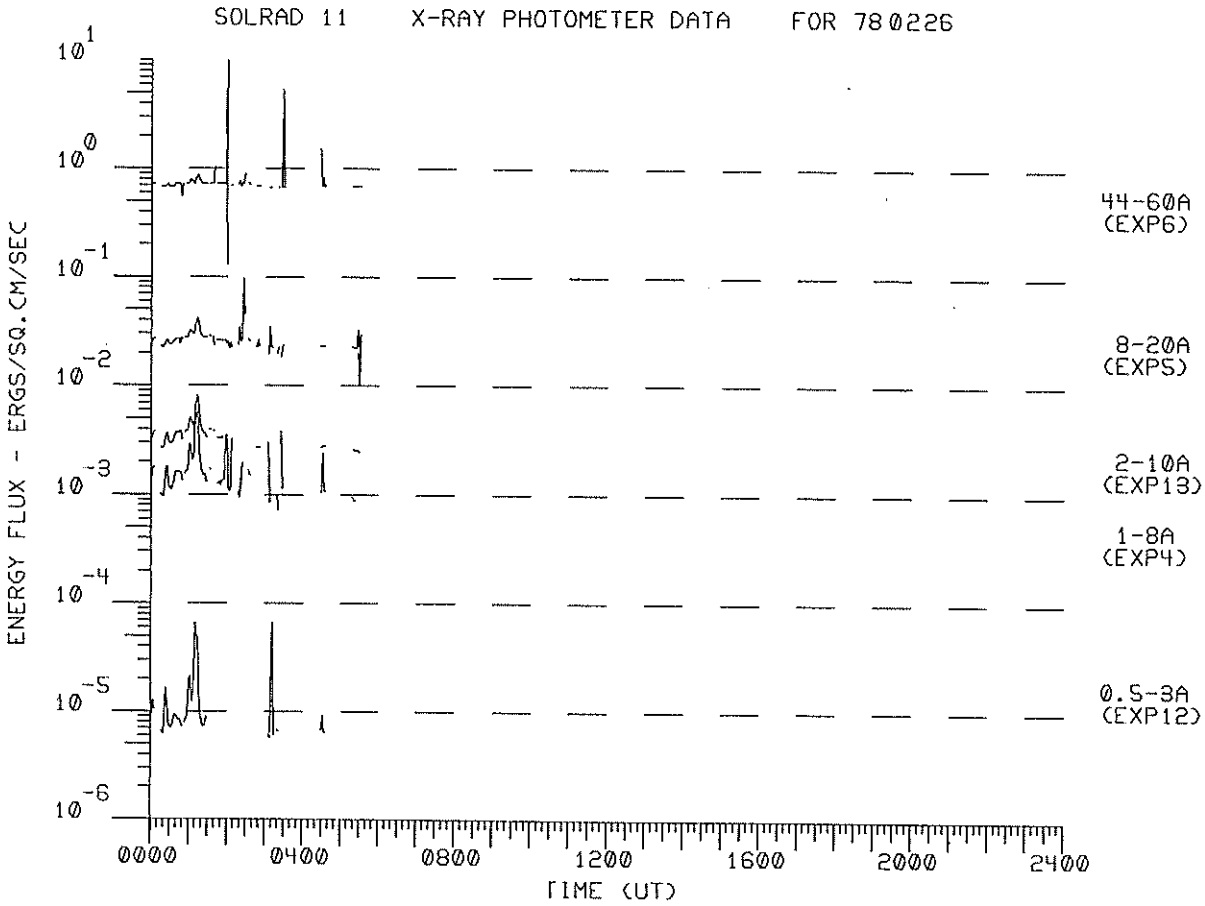
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780222

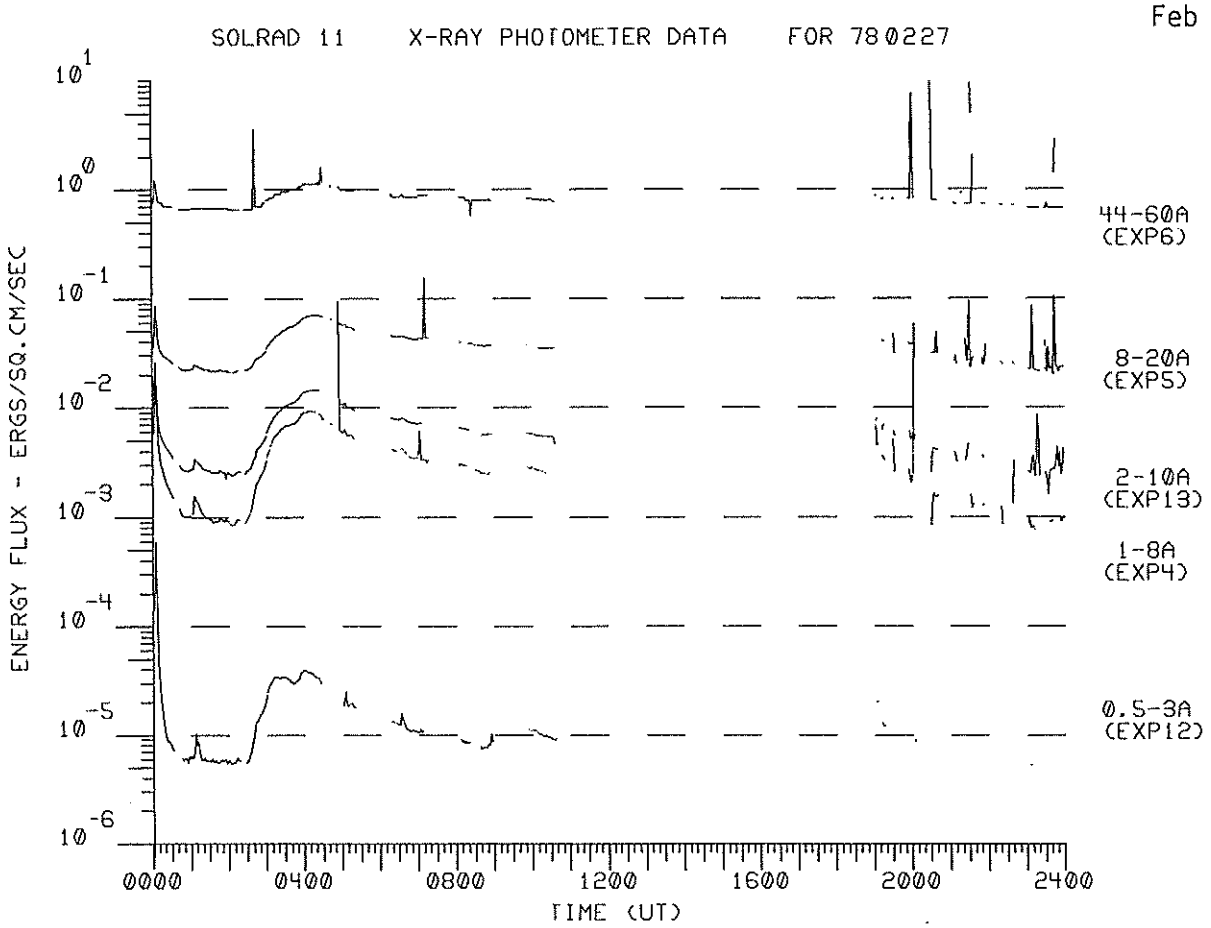


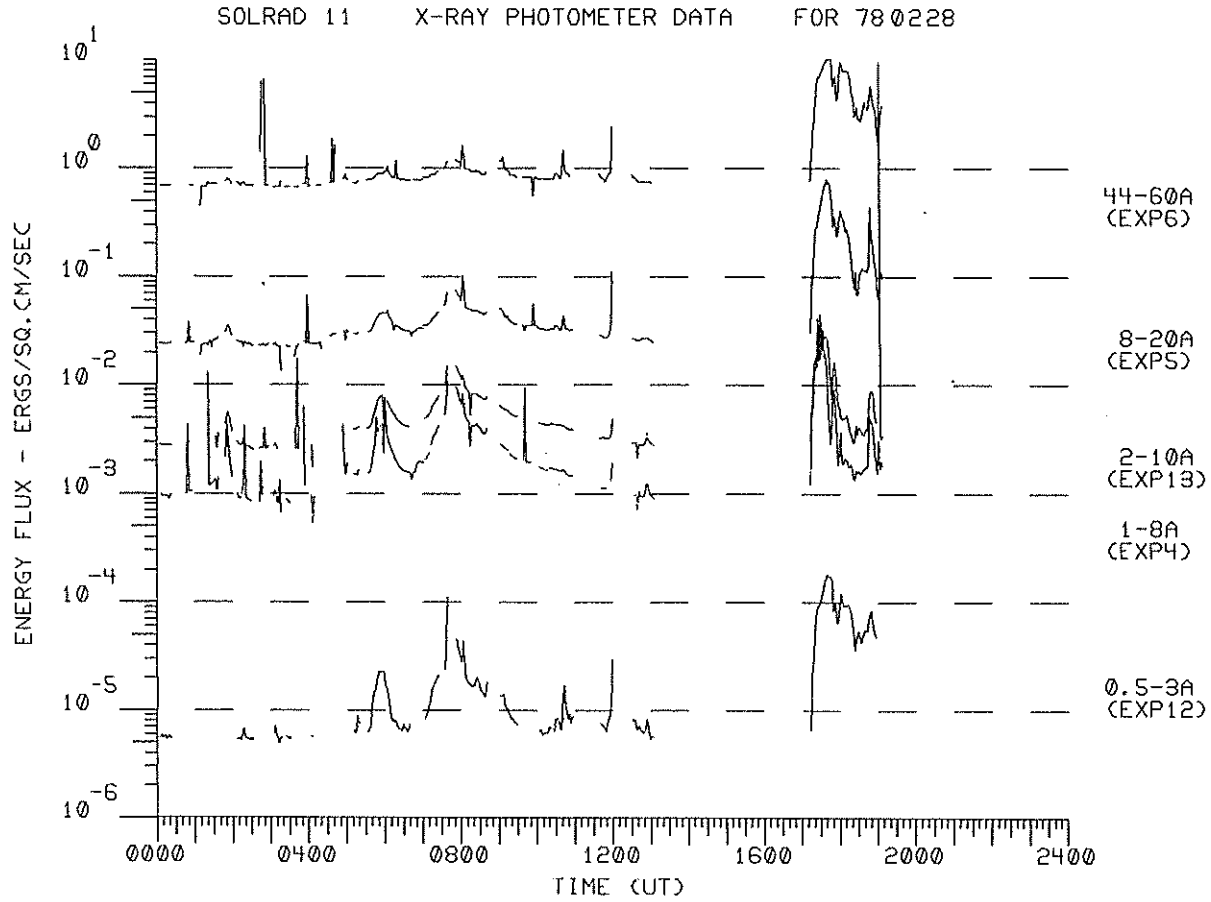

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780223
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780224
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780225
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780226
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780227
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780228
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

FEBRUARY 1978

FEB 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
01	0000	0905	MANI										
	0716	1555	DURN				0753.8	0753.8	1				IIIB
	0747	1541	WEIS				1120.0	1120.8	1				IIIG
	1202	2152	SGMR										
			WEIS				1358.5	1359.4	1				IIIG
			WEIS				1507.0	1507.1	1				IIIB
	2142	2400	MANI										
	1400	2345	HARV				2208	2210	2				IIIG
02	0000	0940	MANI										
	0730	1505	WEIS				0812.5	0813.0	2				IIIG
			WEIS				0814.4	0819.0	3				IIIG
	0714	1604	DURN	0815.6	0818.3		0815.6	0818.8					IIIGG,DCIM
			WEIS				0822.3	0822.5	3				IIIB
			WEIS				0830.7	0830.9	1				IIIG
			DURN	0830	1604 D	1	0830	1604 D	1				IS,DC
			WEIS				0838.7	0841.0	2				IIIB
			WEIS				0852.9	0853.0	1				IIIB
			WEIS				0904.1	0904.5	2				IIIG
			WEIS				0925.2	0925.6	2				IIIG
			DURN	0925.2	0925.6	2	0925.2	0925.6	2				IIIG,U
			WEIS				0930.0	1532.0	3				IS
			WEIS				1009.5	1009.8	2				IIIG
			WEIS				1018.2	1018.3	1				IIIB
	1112	1505	DWIN				1112	1505	2				IC
			WEIS				1129.1	1133.5	2				IIIG
			DWIN				1130.3	1130.5	2				IIIG
			DWIN				1131.4	1131.6	2				IIIG
			DURN	1131.4	1133.5	3	1131.4	1133.5	3				IIIG
			DWIN				1132.2	1132.4	2				IIIG
			DWIN				1135.0	1135.5	3				IIIG
			DURN	1135.2	1140.0	3							DCIM
			WEIS				1135.2	1141.0	3				IV
			DWIN				1135.3	1139	3				CONT
			DWIN				1137.3	1138.3	3				IV
			WEIS				1149.8	1149.9	2				IIIG
			WEIS				1155.3	1155.5	2				IIIG
	1201	2153	SGMR										
			WEIS				1236.4	1236.6	2				IIIG
			DWIN				1236.4	1236.5	2				IIIG
			DURN	1236.4	1236.7	1	1236.4	1236.7	1				IIIG
			DURN	1312.2	1313.8	3	1312.2	1313.8	3				IIIG
			DWIN				1312.2	1312.4	2				IIIG
			WEIS				1312.2	1313.7	3				IIIG
			DWIN				1313.5	1313.7	3				IIIG
			WEIS				1358.5	1358.7	1				IIIB
			DWIN				1358.8		2				IIIB
			WEIS				1412.0	1413.4	2				IIIG
			WEIS				1434.5	1435.4	2				IIIG
			DURN	1516.1	1549.2	3	1516.1	1549.2	3				IIIG,N
	1518	1543	WEIS				1518.9	1519.0	2				IIIG
			WEIS				1520.8	1521.0	2				IIIG
			WEIS				1522.4	1522.7	1				IIIG
			WEIS				1530.0	1530.4	2				IIIG
			WEIS				1533.8	1535.2	3				IIIG
	1400	2345	HARV				1534	1535	2	1534	1535	2	IIIG
			HARV	1549	1550	1	1549	1550	1				IIIG
			HARV				1600		1				IIIB,W
			HARV				1609	2345	1				IN
			HARV				1640	1641	3	1640	1641	3	IIIG
	2206	2400	MANI										
			HARV				2233		3	2233		3	IIIG
03	0000	0420	MANI										
	0426	0937	MANI							0535.3	0535.7	1	III
	0712	1611	DURN	0712 E	1611 D	3	0712 E	1611 D	3				IC,S,DC
	0728	1545	WEIS				0731.0	1436.0	3				IS
			WEIS				0731.0	1533.8	3				IIIS
			DURN	0742.1	0758.2	3							DCIM,N
			DURN	0748.6	0749.6	3	0748.6	0749.6	3				IIIG

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FEB 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
03			MANI							0749.5	0749.8	1	III
	0805	1210	DWIN				0805	1210	2				IC
			DURN	0810.2	0913.6	2							IIIG,N
			DURN	0945.8	0952.4	3							IIIG,N
			DWIN				1036.5	1036.2	2				IIIG
			DURN	1045.2	1045.7	2							IIIG,RS
			DWIN				1106.1	1106.5	2				IIIG
			DURN	1109.6	1111.7	2	1110.4	1110.7	1				IIIG
			DWIN				1138.3	1138.5	2				IIIG
			DURN	1142.6	1143.4	1							IIIG
			DURN	1153.4	1218.9	2							IIIG,N
			DURN	1251.8	1251.9	3							IIIG
			DURN	1314.7	1314.7	2							IIIG
	1200	2155	SGMR				1322.0	1323.0	2				V
			SGMR				1322.0	2155.0	1				CONT
			WEIS				1339.5	1340.8	3				
			DURN	1347.1	1347.4	3							IIIG
			DURN	1349.5	1350.4	1	1349.5	1350.5	3				IIIGG
			DURN	1351.4	1351.4	1							IIIG
			DURN	1355.3	1355.4	1	1355.3	1355.4	3				IIIG
	1400	2345	HARV				1409	1514	1				IN,W
			WEIS				1454.4	1458.4	3				IIIG
			HARV				1454	1458	2	1454	1458	2	IIIGG
			WEIS				1535.4	1535.6	3				IIIG
			DURN	1536.2	1546.9	3	1535.5	1547.0	3				IIIG,N
			HARV	1537	1538	3	1534	1541	3	1534	1541	3	IIIGG
			HARV				1546		3	1546		3	IIIG
			DURN				1608.8	1608.9	3				IIIG
			HARV				1609	1611	3	1609	1611	3	IIIGG
			HARV				1638		1	1638		1	IIIB
			HARV				1643	1656	3	1643	1656	3	IIIGG
			HARV				1700	1711	3	1700	1711	3	IIIGG
			HARV				1750	1756	1	1750	1756	1	IIIG
			SGMR				1802.0	1815.6	2				IIIG
			HARV	1806	1815	2	1759	1819	3	1759	1819	3	IIIGG,V
			HARV				1826	1837	3	1826	1837	3	IIIG
			HARV				1842	1858	3	1842	1858	3	IIIGG,V
			HARV				1914	1920	3	1914	1920	3	IIIGG,V
			HARV				2016	2021	3	2016	2021	3	IIIGG
			HARV				2026	2037	3	2026	2037	3	IIIGG
			HARV				2047	2051	3	2047	2051	3	IIIG
			HARV				2101	2108	3	2101	2108	3	IIIGG
			HARV				2114	2115	3	2114	2115	3	IIIG
			HARV				2128	2129	1	2128	2129	1	IIIG
			HARV	2147	2148	1	2145	2148	3	2145	2148	3	IIIGG,V
			HARV				2210	2216	3	2210	2216	3	IIIGG
	2141	2400	MANI							2238.6	2238.8	2	III
			HARV	2238	2239	2	2238	2239	3	2238	2239	3	IIIG
			HARV				2302	2306	3	2302	2306	3	IIIGG
			HARV				2302	2312	1				I
			MANI							2304.0	2305.3	2	IIIG
04	0000	0944	MANI							0210.1	0210.5	1	III
			MANI							0250.7	0255.6	2	IIIG
			MANI							0359.8	0400.1	1	III
			MANI							0409.2	0409.6	2	III
			MANI							0414.3	0415.0	1	IIIG
			MANI							0433.3	0433.7	2	III
			MANI							0435.7	0437.3	2	IIIG
			MANI							0610.8	0611.2	1	III
	0711	1612	DURN	0711 0	1321	1	0711 0	1321	1		.		IS,DC
			DURN	0721.7	0722.2	3	0721.7	0722.2	3				IIIGG
	0725	1546	WEIS				0740.4	0740.7	2				IIIG
			WEIS				0830.6	0925.2	1				IIIN
			DURN	1352.1	1352.2	1							IIIG
			WEIS				1353.8	1353.9	2				IIIB
			WEIS				1410.4	1410.6	2				IIIU
	1400	2345	HARV				1411		2				IIIB
			WEIS				1434.4	1435.8	2				IIIG
	1159	2156	SGMR				1434.8	1435.2	1				IIIG

SOLAR RADIO EMISSION
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FEB 1978	TIMES OF OBSERVATION		STATION	EVENTS									SPECTRAL TYPE
				DECIMETRIC BAND			METRIC BAND			DEKAMETRIC BAND			
	START UT	END UT		START UT	END UT	INT	START UT	END UT	INT	START UT	END UT	INT	
04			HARV				1435		1	1435		1	IIIB
			WEIS				1517.7	1517.8	2				IIIG
			WEIS				1524.3	1524.7	1				IIIG
			WEIS				1529.2	1529.4	1				IIIB
			HARV				1550	1552	3	1550	1552	3	IIIG
			DURN				1552.2	1552.3	3				IIIG
			HARV				1622	1623	2	1622	1623	2	IIIG
			SGMR				1650.0	2156.0	1				CONT
			HARV				1707		1	1707		1	IIIG
			HARV				1745		2	1745		2	IIIB
			HARV				1908		3	1908		3	IIIB,V
	2212	2400	MANI										
05	0000	0937	MANI										
	0709	1506	DURN	0709 E	1506 D	2	0709 E	1506 D	2				IS,C,DC
	0725	1001	WEIS				0728.0	1537.0	3				IN,DC,C
			WEIS				0729.0	1520.0	3				IIIN
			DURN	0744.4	0744.4	1	0744.4	0744.4	1				III
	1400	2122	HARV				1404	1513	2				I
	1023	1548	WEIS				1526.2	1528.3	2				IIIG
			WEIS				1542.0	1542.6	2				IIIG
			WEIS				1545.2	1545.5	3				IIIB
	1158	2157	SGMR				1545.4	1545.5	1				III
			HARV				1545		3				IIIG
			HARV				1732		1	1732		1	IIIB
			SGMR				1806.6	1806.8	1				III
			HARV				1806	1807	3	1806	1807	3	IIIG
			HARV				1835		1	1835		1	IIIB
			HARV				1856		1	1856		1	IIIB
			HARV				1931		1	1931		1	IIIG
			SGMR				1954.2	1954.5	2				III
			HARV				1954		3	1954		3	IIIG
			HARV				1959		1	1959		1	IIIG
			HARV				2044	2049	2	2044	2049	2	IIIG
	2149	2400	MANI										
	2311	2345	HARV										
06	0000	0943	MANI										
			WEIS				0726.1	1547.0	1				IIIN
	0723	1549	WEIS				0729.3	1530.0	1				IN
	1157	2159	SGMR										
	1400	2345	HARV				1407	1526	1				IN
			HARV				2001		1	2001		1	IIIB
	2138	2400	MANI										
07	0000	0849	MANI										
	0721	1429	WEIS				0725.0	1429.0	2				IS
			WEIS				0833.5	1429.0	1				IIIN
	1400	2345	HARV				1410	1604	1				IN,W
			HARV				1818		1	1818		1	IIIB
			HARV				1903		1	1903		1	IIIB
			HARV				1914	2059	1	1914	2059	1	IIIN
	2127	2400	MANI										
			HARV				2150		1	2150		1	IIIB
			SGMR										
08	0000	0943	MANI							0323.9	0324.2	1	III
	0706	1614	DURN	0706 E	1614 D	2	0706 E	1614 D	2				I,DC
			DURN	0727.3	0728.9	1	0728.2	0728.9	2				IIIGG
	0729	1553	WEIS				0728.0	1527.0	1				IIIN
			WEIS				0729.0	1545.0	2				IS
			DURN	0847.0	0847.3	2							IIIG
			DURN	0848.5	0848.7	2	0848.5	0848.7	2				IIIG
			DURN	0850.2	0850.2	1	0850.2	0850.2	1				III
	1402	2350	HARV				1437		1				IIIB
			WEIS				1448.0	1449.3	3				IIIG
			HARV				1448	1449	2	1448	1449	2	IIIG
			WEIS				1453.5	1457.8	3				IIIG
			HARV				1453	1456	2	1453	1456	2	IIIG
			HARV				1612		1	1612		1	IIIB

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FEB 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
08			HARV				1619	1625	3	1619	1625	3	IIIG
			HARV				1652		2	1652		2	IIIB
			HARV				1713	1714	3	1713	1714	3	IIIG,V
			HARV				1720	1722	2	1720	1722	2	IIIG
			HARV				1758	1800	2	1758	1800	2	IIIG
			HARV				1834		1	1834		1	IIIG
			HARV				1909		2	1909		2	IIIG
			HARV	1956	1957	2	1956	1957	2				IIIG
			HARV				2012		2	2012		2	IIIG
	2147	2400	MANI										
			HARV				2225		1	2225		1	IIIG
			HARV	2253	2350	2	2253	2350	2				I
			SGMR										
09	0000	0939	MANI										
	0705	1615	DURN	0705 E	1615 D	2	0705 E	1615 D	2				I,DC
	0718	1553	WEIS				0721.0	1516.0	1				IIIN
			DURN	0842.9	0842.9	1							III
			WEIS				0947.0	0947.0	3				IIIG
			DURN				0947.1	0947.5	3				IIIG
			WEIS				0951.6	1248.0	2				IS,DC
			WEIS				1028.0	1029.7	2				IIIG
			WEIS				1122.3	1123.0	3				IIIG
			DURN	1151.8	1159.4	2	1152.9	1157.3	3				IIIGG
			WEIS				1152.0	1153.6	3				IIIG
			WEIS	1156.0	1159.0	3							IIIG
	0718	1553	WEIS				1205.3	1207.1	2				IIR S
			DURN	1251.2	1251.2	1							IIIG
	1153	2203	SGMR				1305.5	1306.0	1				IIIG
			DURN	1312.2	1314.2	3	1313.5	1313.6	3				IIIGG
			DURN	1405.1	1405.6	2	1405.1	1405.6	2				IIIG
	1404	2345	HARV				1405		2				IIIG
			HARV				1405	2345	1				I
			SGMR				1511.9	1515.9	1				IIIG
			DURN	1600.4	1601.9	3							IIIG
			DURN	1601.8	1605.0	1							DCIM
			HARV	1602	1603	2							IIIG
			DURN	1603.1	1606.5	3	1603.1	1607.5	3				II
			HARV	1604	1605	1	1604	1612	2				II
			HARV				1751		2	1751		2	IIIB
			HARV				1906	1943	1	1913	1943	1	IIIN
			SGMR				1958.4	1959.6	1				V
			HARV				1958	2004	2	1958	2004	2	IIIGG
			SGMR				2003.9	2004.0	1				III
			HARV				2054		2	2054		2	IIIG
			HARV				2127	2132	2	2131	2132	2	IIIG
			HARV				2141		2	2141		2	IIIB
	2142	2400	MANI										
			HARV				2209		2	2209		2	IIIB
10	0000	0940	MANI							0043.5	0045.8	2	IIIG
			MANI							0333.6	0334.3	1	IIIG
			MANI							0542.9	0543.2	1	III
			MANI							0546.7	0546.9	1	III
	0804	1630	DURN	0704 E	1630 D	2	0704 E	1630 D	2				I,DC
			DURN	0755.6	0758.3	3	0755.6	0758.3	3				IIIGG
	0718	1557	WEIS				0757.0	1536.0	3				IS
			DURN	0806.1	0808.4	1	0806.1	0808.4	3				IIIG
			WEIS				0807.0	1557.0	1				IIIN
	1152	2204	SGMR				1314.8	1315.0	1				III
			SGMR				1350.0	2204.0	1				CONT
			SGMR				1400.2	1401.0	1				V
	1405	2345	HARV				1406	2341	1				IN
			DURN	1444.3	1446.4	1	1444.3	1446.4	2				IIIG
			HARV				1444		1				IIIG
			SGMR				1514.8	1515.0	1				III
			DURN				1622.4	1627.0	3				IIIG,N
			HARV				1624	1627	1				IIIG
			SGMR				1745.2	1746.8	2				V
			HARV	1745	1746	2	1738	1751	2	1738	1751	2	IIIGG

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FEB 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
10			HARV				1842	1843	1	1842	1843	1	IIIG
			HARV				1948	1955	2	1951	1955	2	IIIG
			HARV				2045		2				IIIG
			HARV				2112	2113	1	2112	2113	1	IIIG,W
			HARV				2118	2127	3	2118	2127	3	II
			HARV	2128	2136	2	2124	2136	3	2129	2136	3	IIIGG
	2155	2400	MANI										
			HARV				2256	2258	2	2256	2258	2	IIIG
			HARV				2306		2				IIIB
			HARV				2339		2				IIIG
11	0000	0947	MANI							0015.9	0016.5	2	III
			MANI							0053.0	0053.3	1	III
			MANI							0211.8	0213.5	1	IIIG
			MANI							0242.5	0243.7	2	IIIG
			MANI							0303.4	0304.0	1	III
			MANI							0319.7	0322.5	3	IIIG
			MANI							0504.0	0504.3	1	III
			MANI							0510.3	0514.3	1	IIIG
			MANI							0524.8	0525.2	1	III
	0702	1515	DURN	0702 E	1515 D	2	0702 E	1515 D	2				IC,DC
	0715	0728	WEIS										
			MANI							0752.5	0805.8	2	IIIG
			DURN	0752.5	0821.0		0752.5	0821.0					IIIGG,N
			MANI							0814.0	0820.5	1	III
			DURN	0814.3	0822.0	1							DCIM
	0852	1559	WEIS				0853.0	1559.0	3				IS
			WEIS				0934.0	1458.0	2				IIIN
			DURN	0936.3	0936.7	1	0936.3	0936.7	1				IIIG
			WEIS				1040.4	1042.2	3				IIIGG
	1150	2205	SGMR										
			WEIS				1157.9	1159.2	3				IIIGG
			DURN	1201.5	1319.3	3	1158.1	1319.3	3				IIIG,N
			WEIS				1231.9	1234.3	3				IIIGG,V
	1400	2345	HARV				1403	2345	2				IN
			DURN	1406.4	1408.4	2	1406.4	1408.4	2				IIIGG
			HARV				1406	1408	2				IIIG
			DURN	1417.0	1417.7	2	1417.0	1417.7	2				IIIG
			WEIS				1424.3	1431.1	3				IIIGG,V
			DURN	1424.5	1429.2	3	1424.5	1429.2	3				IIIGG,DCIM
			HARV	1427	1429	2	1425	1429	3	1425	1429	3	IIIGG,V
			DURN	1457.1	1458.4	3	1457.1	1458.4	3				IIIGG
			HARV				1642		1	1642		1	IIIG
			HARV	1839	1842	2	1830	1842	2	1830	1842	2	IIIGG
			HARV				1916	1923	3	1916	1923	3	IIIGG
			HARV				1928	1937	3	1928	1937	3	IIIGG
			HARV				2021	2037	1	2021	2037	1	IIIN
			HARV				2058		3	2058		3	IIIG
			HARV				2120	2122	3	2120	2122	3	IIIGG,V
			HARV	2135	2148	2	2135	2148	3	2135	2148	3	IIIGG
			HARV	2157		2	2155	2202	2	2155	2202	2	IIIGG
	2202	2400	MANI										
			HARV				2210	2213	2	2210		1	IIIG
			HARV				2229		2				IIIB
			HARV				2245		1				IIIB
			HARV	2300		2	2300	2302	2				IIIG
			HARV				2319		2				IIIB
			HARV				2334	2336	2				IIIG
12	0000	0940	MANI							0047.3	0047.6	1	III
			MANI							0131.9	0140.1	2	IIIG
			MANI							0245.8	0246.0	1	III
			MANI							0248.6	0248.8	1	III
			MANI							0348.5	0349.0	1	III
			MANI							0402.2	0411.0	2	IIIG
			MANI							0417.8	0418.2	2	III
			MANI							0523.1	0525.0	1	IIIG
			MANI							0640.8	0641.1	1	III
	0713	1600	WEIS				0724.5	1600.0	3				IS,DC,C
			WEIS				0816.8	1554.0	2				IIIN

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12	0837	1631	DURN	0837 E	1631 D	3	0837 E	1631 D	3				I,DC
			DURN	0837 E	1017	3	0837 E	1017	3				IIIG,N
			WEIS				1151.7	1153.2	3				IIIG
			DURN	1154.2	1154.2	1	1154.2	1154.2	1				III
			DURN	1159.9	1200.0	1	1159.9	1200.0	3				IIIG
			WEIS				1305.0	1331.0	3				IIIG
	1149	2207	SGMR				1305.0	1323.3	3				CONT
			DURN	1307.2	1320.4	3	1307.2	1320.4	3				IIIGG
			SGMR				1323.3	2206.0	1				CONT
	1400	2345	HARV	1400	1523	2	1401	2257	2				I
			DURN	1501.7	1501.9	3	1501.7	1501.9	3				IIIG
			HARV	1502		2	1502		2				IIIG
			DURN	1603.1	1603.7	2							IIIGG
			HARV				1639		1	1639		1	IIIB
			HARV				1812	2119	2	1813	2119	2	IIIS
			HARV	2121	2319	2							I
			HARV				2141		2	2141		2	IIIB
	2143	2400	MANI										
			HARV				2248	2249	2	2248	2249	2	IIIG
13	0000	0409	MANI							0144.8	0314.2	1	CONT
	0427	0941	MANI							0434.2	0435.1	2	IIIG
			MANI							0442.5	0442.9	2	IIIG
			MANI							0520.6	0520.7	1	III
			MANI							0541.3	0542.8	1	IIIG
			MANI							0545.8	0546.2	2	III
	0655	1632	DURN	0655 E	0930	3	0655 E	0930	3				IV
	1111	1602	WEIS				0716.0	1602.0	3				IS,C
	0711	1055	WEIS				0716.0	1602.0	2				IIIS
			DURN	0803.1	0841.4	3	0803.1	0841.4	3				IIIGG,N
			MANI							0803.2	0803.7	1	III
			MANI							0812.7	0813.0	1	III
			MANI							0819.0	0827.6	1	IIIG
			MANI							0833.7	0835.9	1	IIIG
			MANI							0841.0	0842.3	1	IIIG
			DURN	0930	1632 D	3	0930	1632 D	3				IC,DC
			DURN	0938.9	0939.1	3							IIIG
			DURN	1000.5	1000.7	1							IIIG
			DURN	1119.9	1120.2	1							IIIG
	1148	2208	SGMR										
			DURN	1333.5	1333.6	3	1333.5	1333.6	3				IIIG,RS
			DURN	1342.1	1347.4	2							IIIG,N
	1400	2345	HARV				1402	2345	2				I
			DURN	1443.1	1443.6	3							IIIGG
			HARV	1443	1444	3							I
			DURN	1445.3	1445.3	3	1445.3	1445.3	3				III
			HARV				1452		2	1452		2	IIIG
			HARV				1505		2				IIIB
			HARV				1611	2215	2	1611	2215	2	IIIS
	2143	2400	MANI										
			HARV				2329	2331	2				IIIG
14	0000	0944	MANI							0454.4	0455.5	1	IIIG
			MANI							0551.8	0552.6	1	III
	0653	1633	DURN	0653 E	1633 D	1	0653 E	1633 D	1				IC,DC
			WEIS				0712.0	1556.0	2				IIIS
	0710	1604	WEIS				0712.0	1551.0	2				IS
			MANI							0723.5	0729.1	1	III
			MANI							0735.0	0735.1	1	III
			MANI							0742.2	0742.4	1	III
			MANI							0806.5	0807.5	1	III
			MANI							0834.0	0834.1	1	III
			WEIS				1027.9	1029.8	3				IIIG
			DURN	1028.3	1028.7	3	1028.3	1028.7	3				IIIG
	1146	2209	SGMR				1146.0	2209.0	1				CONT
	1400	2345	HARV				1400	2340	1				I
			DURN	1434.4	1436.5	3	1434.4	1436.5	3				IIIGG
			WEIS				1434.5	1437.4	3				IIIG
			SGMR				1434.6	1437.5	2				V
			HARV				1434	1437	2	1435		1	IIIG

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14			WEIS				1456.8	1457.1	2				IIIG
			HARV				1457		1				IIIB
			WEIS				1507.5	1509.5	3				IIIG
			DURN	1507.6	1508.1	3	1507.6	1508.1	3				IIIGG
			SGMR				1507.8	1509.4	3				V
			HARV	1508			1508		3	1508		3	IIIG,V
			WEIS				1521.1	1531.3	3				IIIG
			SGMR				1522.7	1523.1	2				III
			HARV				1522	1532	2	1522	1532	2	IIIGG
			HARV				1721	1935	1	1721	1935	1	IIIS
			HARV				1956		3	1956		3	IIIB
			HARV				2028	2039	1	2028	2039	1	IIIG
			HARV				2109	2110	2	2109	2110	2	IIIG
			HARV				2117		2	2117		2	IIIB
			HARV	2126		1							IIIB
	2142	2400	MANI										
			HARV				2212		1	2212		1	IIIB
15	0000	0941	MANI							0127.7	0127.9	1	III
			MANI							0210.6	0211.8	1	III
			MANI							0232.4	0232.5	1	III
			MANI							0239.5	0239.6	1	III
			MANI							0315.1	0315.3	2	III
			MANI							0353.1	0353.3	2	III
			MANI							0402.1	0402.4	2	III
			MANI							0412.8	0413.0	1	III
			MANI							0443.4	0443.6	1	III
			MANI							0459.2	0501.5	2	IIIG
			MANI							0528.8	0530.0	2	IIIG
			MANI							0537.8	0538.3	1	IIIG
			MANI							0544.2	0545.1	2	IIIG
			MANI							0608.5	0608.7	1	III
	0651	1634	DURN	0651 E	1634 O	2	0651 E	1634 O	2				IC,DC
			MANI							0657.0	0659.2	1	IIIG
			DURN	0658.1	0658.3	1							III
			WEIS				0709.0	1559.3	3				IIIS
			DURN	0709.5	0713.2	3	0709.5	0713.2	3				IIIGG
			MANI							0710.0	0712.0	1	IIIG
	0708	1345	WEIS				0713.0	1314.5	3				IDC
			DURN	0750.6	0751.6	1	0751.2	0751.8	2				IIIG
			MANI							0751.0	0751.7	1	III
			MANI							0809.2	0809.3	1	III
			DURN	0850.3	0850.4	3	0850.3	0850.4	1				IIIG
			MANI							0854.6	0855.5	1	IIIG
			DURN	0855.6	0856.1	2	0855.6	0856.1	2				IIIG
			DURN	0921.8	0930.6	3	0921.8	0930.6	3				IIIGG
			WEIS				1041.8	1042.2	3				IIIB
			WEIS				1045.5	1046.1	3				IIIB
			WEIS				1053.2	1113.3	3				IIIGG
			DURN	1109.5	1112.3	3	1109.5	1112.3	3				IIIGG
			SGMR				1145.1	2211.0	2				CONT
			WEIS				1232.0	1232.6	2				IIIG
	1145	2211	SGMR				1232.2	1232.6	1				V
			WEIS				1257.7	1258.4	2				IIIG
			SGMR				1257.8	1258.5	2				V
			WEIS				1324.2	1324.7	2				IIIG
			SGMR				1324.3	1426.7	2				V
	1355	1605	WEIS				1356.0	1400.3	3				IIIG
	1400	2345	HARV				1400	2345	1				I
			WEIS				1403.5	1404.6	3				IIIG
			HARV				1404	1405	2				IIIG
			WEIS				1418.5	1426.4	3				IIIGG
			DURN	1424.9	1426.2	1	1424.9	1426.2	2				IIIG
			HARV	1425	1426	1	1420	1426	2				IIIGG
			HARV				1550		1	1550		1	IIIB
			WEIS				1555.0	1557.5	2				IIIG
			DURN	1555.5	1555.6	1							IIIG
			HARV	1555		1	1555	1600	3	1555	1600	3	IIIGG
			SGMR				1556.8	1557.4	3				V
			SGMR				1612.0	1612.7	2				V

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15			HARV	1612	1618	1	1608	1624	3	1608	1624	3	IIIGG
			HARV				1656	1709	2	1656	1709	2	IIIGG
			HARV				1721		1	1721		1	IIIB
			HARV				1738		1	1738		1	IIIB
			HARV				1751	1756	3	1751	1756	3	IIIGG,V
			HARV				1758	1822	2	1758	1822	2	IIIGG
			SGMR				1827.8	1828.7	3				V
			HARV				1828		3	1828		3	IIIG,V
			HARV				1839	1846	2	1839	1846	2	IIIG
			HARV				1931	1935	1	1931	1935	1	IIIG
			HARV				1940	1943	2	1940	1943	2	IIIG
			HARV				2004	2040	2	2004	2040	2	IIIGG
			HARV				2047	2055	2	2047	2055	2	IIIG
			HARV				2106	2115	1	2106	2115	1	IIIG
			HARV				2127	2128	2	2127	2128	2	IIIG
			HARV				2135	2144	3	2135	2144	3	IIIGG
			HARV				2204	2205	2	2204	2205	2	IIIG
			HARV				2216		1	2216		1	IIIG
			HARV	2226	2238	2	2224	2239	3	2224	2239	3	IIIGG
	2144	2400	MANI							2229.5	2229.6	1	III
			MANI							2236.4	2238.0	1	III
			HARV				2250		1	2250		1	IIIG
			HARV				2258	2300	2	2258	2300	2	IIIG
16	0000	0941	MANI							0016.5	0018.3	2	III
			MANI							0101.8	0102.0	1	III
			MANI							0133.9	0135.0	1	IIIG
			MANI							0308.7	0308.9	1	III
			MANI							0313.6	0313.9	1	III
			MANI							0335.3	0335.4	1	III
			MANI							0605.8	0618.5	1	IIIG
			MANI							0624.5	0637.4	1	IIIG
	0649	1635	DURN	0649 E	1635 D	3	0649 E	1635 D	3				IC,DC
	0655	0750	WEIS				0658.0	1621.9	3				IIIS
			DURN	0710.7	0736.7	2	0730.4	0736.7	2				IIIGG,N
			MANI							0842.1-	0842.2	1	III
			DURN	0900.6	0900.9	3	0900.6	0900.9	3				IIIG
			DURN	1015.0	1016.0	3	1015.0	1016.0	3				IIIGG
			DURN	1137.9	1138.3	2							IIIG
			SGMR				1143.0	2212.0	1				CONT
			DURN	1206.8	1213.4	3							IIIG,N
	1143	2212	SGMR				1211.0	1211.2	1				III
			SGMR				1301.9	1306.3	2				V
			DURN	1302.8	1303.5	2							IIIGG
			DURN	1305.4	1307.3	3	1305.4	1307.3	3				IIIGG
			DURN	1347.4	1347.6	2	1347.4	1347.6	2				IIIG
	1400	2345	HARV				1400	2341	2				I
			HARV				1431		1				IIIB
			HARV				1443	1444	2				IIIG
			HARV				1457		1				IIIG
	0802	1607	WEIS				1520.0	1526.8	3				III,V
			HARV				1520	1534	3	1520	1534	3	IIIGG
			SGMR				1522.0	1524.5	3				V
			DURN	1522.3	1528.8	3	1522.3	1528.8	3				IIIGG
			HARV	1542	1543	2	1540	1547	2	1540	1547	2	IIIG
			HARV				1601	1602	2	1601	1602	2	IIIG
			HARV				1614		1	1614		1	IIIG
			HARV	1630	1633	1	1626	1637	2	1626	1637	2	IIIGG
			HARV				1649	1704	2	1649	1704	2	IIIG
			HARV	1927	1929	1	1718	2114	2	1718	2114	2	IIIN
			HARV				2117	2122	3	2117	2122	3	IIIGG
			HARV				2129	2141	2	2129	2141	2	IIIGG
			HARV	2129	2136	3							IVP
	2148	2400	MANI										
			HARV	2209	2216	1							IIIN
			HARV				2213	2214	1	2213	2214	1	IIIG
			HARV	2225	2227	3	2223	2227	2	2223	2227	2	IIIGG
			HARV				2248	2300	3	2248	2300	3	IIIGG
			HARV	2306	2310	1	2305	2315	2	2310		2	IIIG
			HARV				2334	2335	1				IIIG

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17	0000	0941	MANI							0003.2	0003.4	1	III
			MANI							0011.9	0012.0	1	III
			MANI							0050.0	0050.6	1	III
			MANI							0134.5	0134.6	1	III
			MANI							0259.3	0303.5	1	IIIG
			MANI							0310.0	0314.9	2	IIIG
			MANI							0326.1	0326.7	1	III
			MANI							0332.6	0332.8	1	III
			MANI							0513.5	0515.0	1	IIIG
			MANI							0646.6	0647.2	1	III
	0640	1250	DURN	0650 E	1250 D	1	0650 E	1250 D	1				I,DC
			DURN	0652.7	0659.2	3	0652.7	0659.2	3				IIIGG,N
			MANI							0653.0	0653.6	1	III
	0704	1609	WEIS				0707.4	1607.3	3				IIIN
			DURN	1103.2	1103.6	3	1103.2	1103.6	3				IIIGG
			DURN	1109.6	1109.9	2	1109.6	1109.9	2				IIIGG
	1142	2213	SGMR				1248.1	1248.8	1				III
			SGMR				1258.0	2213.0	2				CONT
			SGMR				1336.0	1343.8	2				IIIG
			WEIS				1338.5	1343.3	3				IIIGG
	1400	2345	HARV				1400	2137	1				IN
			HARV				1512	1515	1				IIIG
			SGMR				1539.7	1540.5	2				III
			HARV				1540		3	1540		3	IIIG
			HARV				1557	1607	3	1557	1607	3	IIIGG
			HARV				1614	1735	1	1614	1735	1	IIIN
			SGMR				1618.5	1619.0	3				V
			HARV				1618	1619	3	1618	1619	3	IIIG,V
			HARV				1716		2	1716		2	IIIG
			HARV				1738	1751	3	1738	1751	3	IIIGG
			SGMR				1743.0	1748.0	2				V
			HARV				1755		2	1755		2	IIIB
			HARV				1801	2201	2	1801	2201	2	IIIS
			HARV				1812	1813	3	1812	1813	3	IIIGG
			HARV				2045	2051	3	2045	2051	3	IIIGG
			SGMR				2046.5	2050.2	2				IIIG
	2153	2400	MANI										
			HARV				2221		1				IIIB
18	0000	0948	MANI							0018.6	0019.0	1	III
			MANI							0207.7	0208.6	2	III
	0647	1636	DURN	0647 E	1540	1	0647 E	1540	1				I,DC
	0723	1551	WEIS				0740.0	1540.6	2				IIIN
			DURN	0936.3	0936.6	3							IIIG
			DURN	1021.3	1021.9	3	1021.3	1021.9	3				IIIG
			DURN	1148.4	1148.4	1	1148.4	1148.4	3				IIIG
	1141	2215	SGMR				1303.5	2215.0	1				CONT
			DURN	1357.9	1359.3	3							IIIGG
			DURN	1402.7	1403.5	3							IIIG
			DURN	1442.2	1442.3	3							IIIG
	1400	2345	HARV				1512		1				IIIB
			HARV	1518		2	1518		2				IIIB
			DURN	1531.4	1531.4	3	1531.4	1531.4	1				III
			HARV				1535	1541	2	1535	1541	2	IIIG
			DURN				1540.5	1540.7	3				IIIG
			HARV				1645	1658	2	1648	1650	2	II
			HARV				1710	1714	1	1710	1714	1	IIIG,W
			HARV	1729	1734	3							IIIGG
			HARV				1803		1	1803		1	IIIB
			HARV				1826	1836	1	1826	1836	1	IIIG,W
			HARV	1841	1846	2	1843	1846	3	1843	1846	3	IIIGG
			SGMR				1845.8	1846.8	2				IIIG
			HARV				1901	1903	1	1901	1903	1	IIIG,W
			HARV	1909		2	1909	1910	2				IIIG
			HARV	2004		1	2004		2				IIIG
			HARV				2046	2053	2	2050	2053	2	IIIN
			HARV				2105		2				IIIB
			HARV				2110	2118	1				IIIN
			HARV				2123		3	2123		3	IIIB
			HARV				2141		2	2141		2	IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

FEBRUARY 1978

FEB 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
18			HARV				2149	2150	2				IIIG
	2156	2400	MANI										
			HARV				2226	2237	2				IIIN
			HARV				2246	2253	3	2249		2	IIIN
19	0000	0943	MANI							0007.8	0010.7	1	IIIG
			MANI							0440.5	0440.7	1	III
	0650	1637	DURN	0650 E	1637 D	1	0650 E	1637 D	1				I
	0913	1401	WEIS				0938.5	1554.8	2				IIIN
	1139	2216	SGMR				1333.8	1352.8	2				IIIG
	1429	1612	WEIS										
			SGMR				1554.0	1554.7	2				V
	1400	2345	HARV				1554		3	1554		3	IIIG
			HARV				1635	1638	1				IIIG,W
			SGMR				1910.8	2010.0	1				IIIS
			HARV				1911		1				IIIG
			HARV				1926		2	1926		2	IIIG
			HARV				1941		3	1941		3	IIIB
			HARV				2043		1	2043		1	IIIB
			HARV				2054	2055	2	2054	2055	2	IIIG
	2148	2400	MANI										
20	0000	0945	MANI							0007.4	0008.0	1	III
	0648	1638	DURN	0648 D	1638 E	1	0648 D	1638 E	1				IS
			DURN	0740.8	0740.9	1	0740.8	0740.9	2				IIIG
	0659	1254	WEIS				0747.8	1502.3	2				IIIN
			DURN	0751.0	0751.2	3	0751.0	0751.2	3				IIIG
			DURN	0813.4	0813.5	1	0813.4	0813.5	1				IIIG
	1138	2217	SGMR				1242.8	1243.4	2				V
			SGMR				1359.5	1400.0	1				V
	1345	2345	HARV				1400		1				IIIB
	1450	1604	WEIS										
			SGMR				1454.3	1454.6	1				V
			HARV				1454		1	1454		1	IIIG
			SGMR				1519.4	1519.9	1				V
			SGMR				1524.8	1525.9	1				V
			HARV				1601	1602	2	1602		2	IIIG
			HARV				1657	1700	2	1657	1700	2	IIIGG
			SGMR				1658.5	2217.0	1				CONT
			HARV				1708	1709	2	1708	1709	2	IIIG
			HARV				1715		2	1715		2	IIIB
			HARV				1805	1810	2	1805	1810	2	IIIG
			HARV				1845	1851	2	1845	1851	2	IIIG
			HARV				1925	1929	1	1925	1929	1	IIIG
			HARV				2006		1				IIIB
			HARV				2131		1				IIIB
			HARV				2147		1				IIIB
	2153	2400	MANI										
			HARV				2344		1				IIIG
21	0000	0944	MANI							0047.6-	0047.8	1	III
	0647	1639	DURN	0806.2	0806.2	2	0806.2	0806.2	2				III
	0657	1147	WEIS				1011.4	1436.6	1				IIIN
	1208	1616	WEIS										
	1136	2218	SGMR				1815.7	1821.3	1				IIIG
	1345	2345	HARV				1816		2	1816		2	IIIB
			HARV				1821	1822	3	1821	1822	3	IIIG
			HARV				1944	1946	3	1944	1946	3	IIIG
			SGMR				1945.2	2103.0	2				IIIS
			HARV				2129		2	2129		2	IIIG
			HARV				2135		1	2135		1	IIIB
	2141	2400	MANI										
			HARV				2200		1				IIIB
22	0000	0939	MANI										
	0654	1617	WEIS				0831.0	1602.3	1				IIIN
	0646	1640	DURN	1206.5	1206.9	2							IIIG
	1135	2220	SGMR				1339.4	1339.6	2				III
			SGMR				1352.2	1352.4	1				III
			SGMR				1601.6	1601.9	1				III

SOLAR RADIO EMISSION
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FEB 1978	TIMES OF OBSERVATION START UT	TIMES OF OBSERVATION END UT	STATION	EVENTS DECIMETRIC BAND START UT	DECIMETRIC BAND END UT	DECIMETRIC BAND INT	METRIC BAND START UT	METRIC BAND END UT	METRIC BAND INT	DEKAMETRIC BAND START UT	DEKAMETRIC BAND END UT	DEKAMETRIC BAND INT	SPECTRAL TYPE
22	1345	2345	HARV				1602		1	1602		1	IIIG
			HARV				1626		1	1626		1	IIIB
			SGMR				2118.9	2127.3	2				IIIG
	2150	2400	MANI										
			HARV				2153		3	2153		3	IIIG
			HARV				2254	2258	1	2254	2258	1	IIIG
			HARV				2305		1				IIIB
23	0000	0938	MANI										
	0643	1641	DURN										
	0653	1425	WEIS										
	1133	2221	SGMR										
	1345	2340	HARV										
	1610	1619	WEIS										
	2134	2400	MANI										
24	0000	0938	MANI							0056.9	0103.5	1	IIIG
			MANI							0426.8	0427.0	1	III
	0642	1642	DURN	0735.2	0740.4	3	0735.2	0740.4	3				IIIGG,RS,U
	0650	1621	WEIS				0735.7	0737.7	3				IIIG
			DURN	0855.6	0855.6	1	0855.6	0855.6	1				III
			WEIS				0930.4	0930.9	1				IIIG
			WEIS				1005.0	1433.0	1				IN
			DURN	1125.7	1125.7	3							III,RS
			DURN	1128.1	1128.1	1							III
	1131	2222	SGMR										
			DURN	1150.7	1150.7	2							III,RS
	1345	2345	HARV				1356	1408	1				I
			HARV	1644		2							IIIG
			HARV	2004	2005	1							IIIG
			HARV	2024	2027	1							IIIG
	2150	2400	MANI										
25	0000	0928	MANI										
	0639	1643	DURN	0808.3	0810.0	3	0808.3	0810.0	3				III,GG
			WEIS				0809.8	0835.0	3				II
			DURN	0810.3	0813.0	3	0810.3	0814.2	3				II
	0648	1622	WEIS				0828.3	0835.0	2				IIIG
	1130	2224	SGMR										
			DURN	1159.0	1159.1	2							IIIG
			WEIS				1449.0	1451.0	2				IIIGRS
			DURN	1449.1	1451.3	3	1449.1	1451.3	3				IIIGG,U,DC
	1345	2345	HARV	1449	1451	3	1450		2				IIIG
			DURN	1451.5	1456.2	3	1451.5	1456.2	3				II
			WEIS				1451.6	1524.0	3				II
			HARV	1452	1454	3	1452	1521	3				II
			DURN	1501.0	1512.0	1	1501.0	1512.0	2				IV
	2152	2400	MANI										
26	0000	0006	MANI										
	0043	0651	MANI										
	0647	0655	WEIS				0652.7	0655.0	1				II
	0709	0941	MANI										
	0727	1619	WEIS				0746.3	0747.0	3				IIIG
	0637	1644	DURN	0746.4	0746.9	3	0746.4	0746.9	3				IIIGG
			WEIS				0749.0	0750.4	2				IIIG
			DURN	0749.7	0751.6	2	0749.7	0751.6	2				IIIGG
			DURN	0820.9	0820.9	2							III,RS
			DURN	0953.3	0954.6	2	0953.3	0954.6	2				IIIG
			WEIS				0953.3	0955.2	2				IIIG
			WEIS				1002.4	1002.6	1				IIIB
			WEIS				1005.7	1006.6	2				IIIG
			DURN	1005.9	1006.7	3	1005.9	1006.7	3				IIIG,RS
			WEIS				1035.1	1036.2	3				IIIG
	1128	2225	SGMR										
			DURN	1135.2	1136.3	3	1135.2	1136.3	3				IIIGG,U,RS
			WEIS				1249.5	1259.0	2				IIIG
			DURN				1256.0	1256.3	1				IIIG
			WEIS				1410.5	1415.3	3				IIIG
			DURN	1410.6	1414.9	1	1410.6	1415.3	3				IIIGG,RS

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26	1345	2345	HARV	1415		2	1412	1415	2				IIIG
			WEIS				1445.1	1445.2	2				IIIB
			HARV				1445		2				IIIB
			OURN	1621.8	1621.8	3	1621.8	1621.8	3				III
			HARV				1622		2				IIIB
	2134	2400	MANI							2227.3-	2228.3	1	III
			HARV	2327	2328	2							IIIG
27	0000	0942	MANI										
	0636	1645	OURN										
	0645	1031	WEIS				0659.4	0659.6	2				IIIG
			WEIS				0713.8	0714.5	2				IIIG
			WEIS				0804.5	0817.0	1				II
			WEIS				0845.8	0848.3	1				IIIGRS
			WEIS				0942.5	0942.8	1				IIIG
	1127	2226	SGMR				1127.1	2130.0	1				CONT
	1600	1625	WEIS										
	1345	2345	HARV				1837	1838	1				IIIG
			HARV				1912	1913	1	1912	1913	1	IIIG
	2134	2400	MANI										
28	0000	0941	MANI										
	0635	1646	OURN										
	0643	1250	WEIS										
	1125	2227	SGMR										
	1304	1627	WEIS										
	1345	2345	HARV										
	2138	2400	MANI										

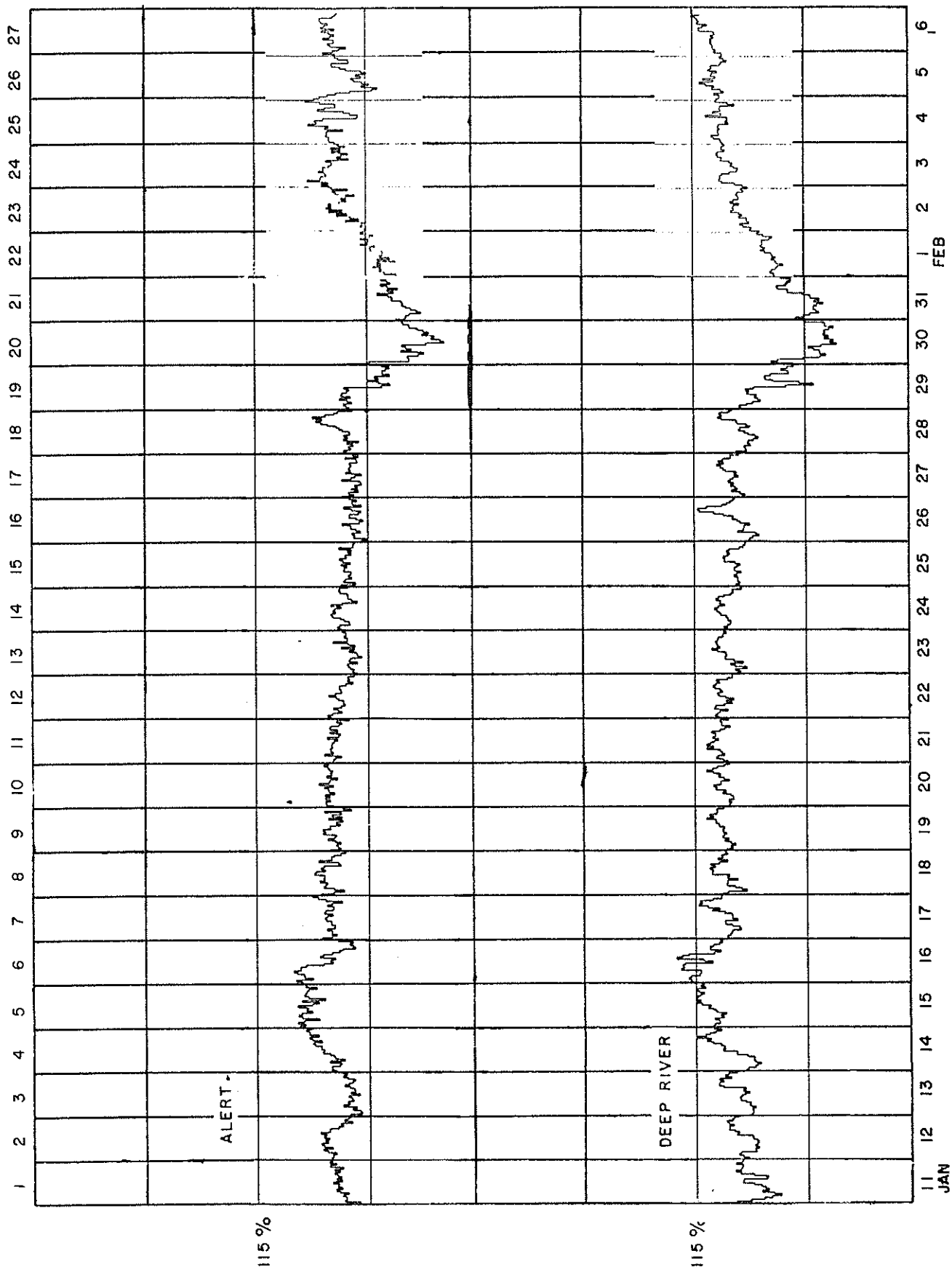
The symbols used in connection with the spectral type in describing the important bursts are as follows:

B = Single burst
G = Small group (< 10) of bursts
GG = Large group (> 10) of bursts
C = Underlying continuum (particularly with type I)
S = Storm in the sense of intermittent but apparently connected activity
N = Intermittent activity in this period
U = U-shaped burst of Type III

RS = Reverse slope burst
DP = Drifting pairs
DC = Drifting Chains
H = Herringbone
W = Weak
P = Pulsations
CONT = Continuum
UNCLF = Unclassified activity

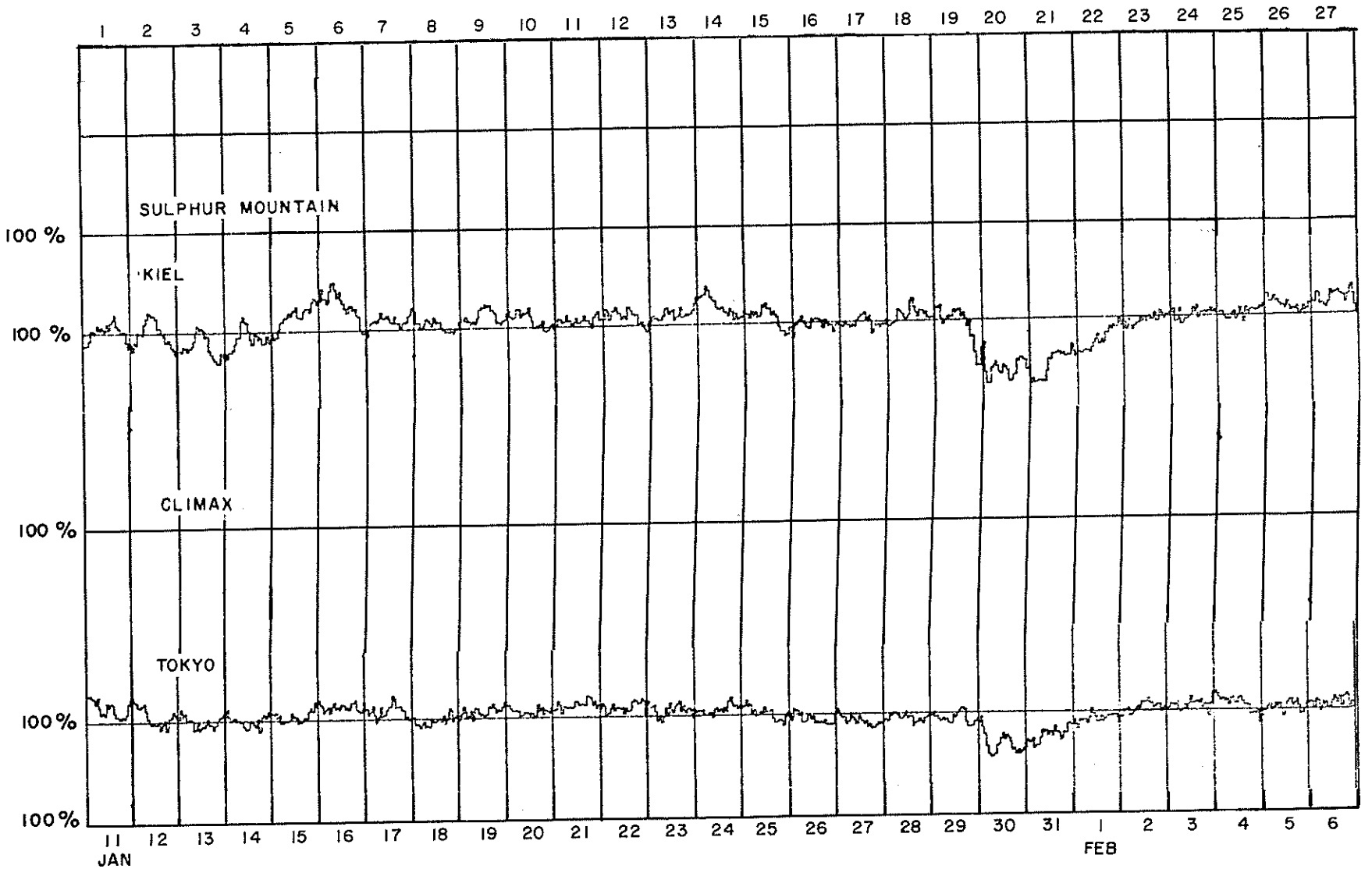
COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1975 (January-February 1978)

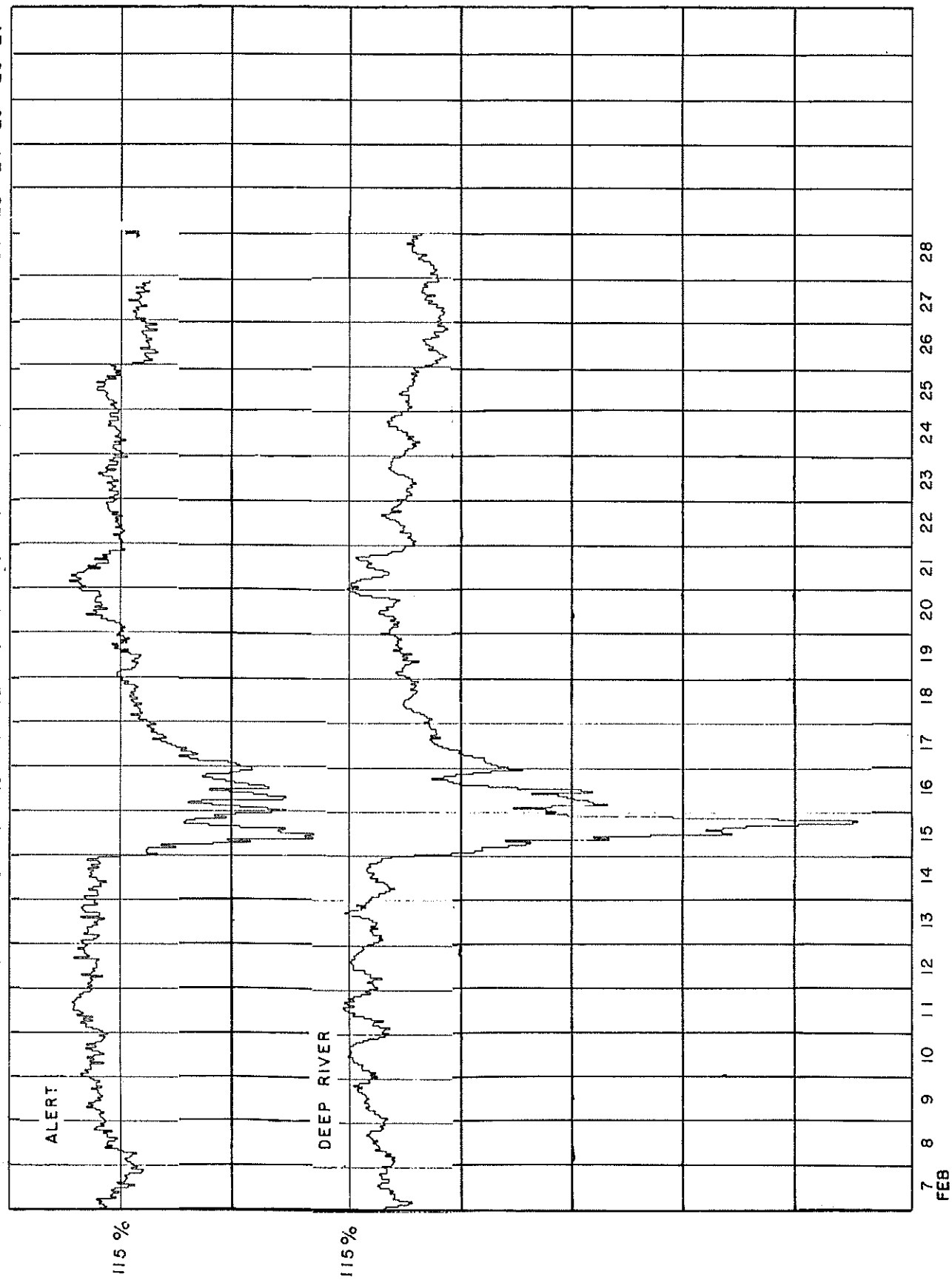


COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1975 (January - February 1978)

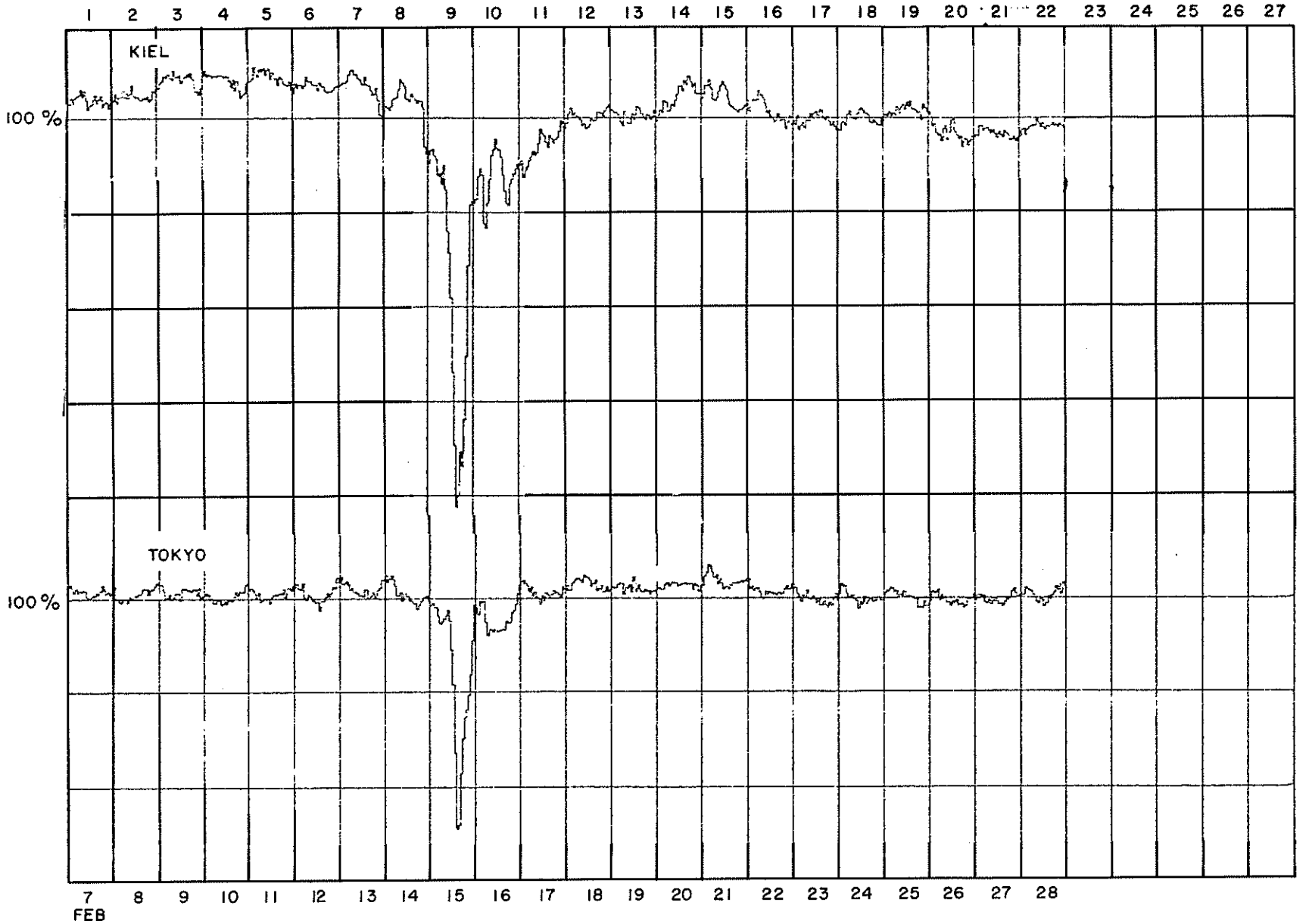


COSMIC RAY INDICES
(Neutron Monitors)
Bartels Rotation 1976 (February 1978)



COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1976 (February 1978)



COSMIC RAY INDICES

(Neutron Monitors)

FEBRUARY 1978

February 1978	THULE Average cts/hr	ALERT Average cts/hr	DEEP RIVER Average cts/hr	CALGARY Average cts/hr	SULPHUR MT Average cts/hr	KIEL Average cts/hr	CLIMAX Average cts/hr	TOKYO Average cts/hr	KULA Average cts/hr
1	Data not available at time of publication.	7315.3	6860.9	Data not available at time of publication.	Data not available at time of publication.	6226.3	Data not available at time of publication.	3616.2	Data not available at time of publication.
2		7407.4	6941.4			6284.4		3636.1	
3		7454.2	6979.0			6300.3		3639.8	
4		7455.5	6997.2			6302.1		3640.8	
5		7398.0	7012.4			6325.0		3634.5	
6		7454.0	7033.0			6346.5		3642.4	
7		7351.2	6968.0			6285.7		3625.5	
8		7364.5	6988.8			6298.4		3622.0	
9		7416.0	7022.1			6350.7		3624.4	
10		7425.3	7043.3			6350.0		3615.9	
11		7456.4	7035.9			6361.3		3621.2	
12		7436.8	7037.2			6330.8		3621.1	
13		7432.7	7021.8			6332.4		3629.3	
14		7419.5	6995.7			6273.6		3620.2	
15		7036.0	6321.8			5702.8		3478.0	
16		6986.7	6596.5			6024.7		3574.4	
17		7176.0	6786.5			6131.2		3622.8	
18		7304.0	6895.4			6227.0		3638.2	
19		7329.6	6929.3			6233.4		3631.1	
20		7399.2	6976.1			6295.1		3636.3	
21		7419.1	7008.8			6293.4		3646.1	
22		7358.8	6932.9			6247.9		3625.5	
23		7371.3	6929.2			6218.9		3610.3	
24		7360.2	6927.3			6223.6		3612.2	
25		7380.6	6907.8			6250.1		3613.1	
26		7267.6	6838.0			6178.4		3608.5	
27		7289.7(21)	6844.8			6174.3		3609.9	
28		7305.5(4)	6874.0			6197.0		3618.5	
MEAN		7349.0	6918.0			6241.6		3618.4	

( ) Number of hours for which data are available if less than 24. Number of Section Hours at Climax if sum of both sections is less than 40 hours.

Notes: Tokyo neutron monitor counting rate increased by 2.0/1.5 since the beginning of September 1977. The number of counters changed from 27 to 36. Since the scaling factor has been changed, the listed figures are nearly the same as those in and before May 1977. The level in June, July, and August, 1977 is slightly lower than before. The level in September 1977 has been adjusted, so that direct comparison with the data in and before May, 1977 is possible.

Thule, Alert, Calgary, Sulphur Mountain, Kiel, Climax and Kula Scaling Factors = 100. Deep River Scaling Factor = 300. Tokyo Scaling Factor = 256.

Kula data are available on magnetic tape from the World Data Center A for Solar-Terrestrial Physics. These data include the periods July 1967-December 1970 and October 1975 to the present.

GEOMAGNETIC ACTIVITY INDICES

FEBRUARY 1978

Day		Three-Hourly Indices Kp									Three-Hourly Indices Km								Ap	aa *					Cp
		1	2	3	4	5	6	7	8	Sum	1	2	3	4	5	6	7	8		N	S	M			
1		4	3+	2+	2	3	3	2+	4-	24-	4-	3-	2	2-	3+	3+	2+	3+	15	27	22	19	30		0.9
2		4-	3+	2+	3+	2+	1	2-	4-	21+	3+	3-	2+	3	2	1+	2-	3	14	22	23	29	17		0.8
3		3+	2+	2+	3	3	3	3	3	23	3-	2	2+	3	3	3+	3-	3-	14	26	31	22	35		0.8
4	Q9A	4	3-	3-	2	2-	2+	2-	2-	19-	3	2	2	2	2-	2	1+	1+	11	16	14	18	12		0.6
5		3+	4-	4-	3	3-	3+	4-	2-	25	3-	3	3+	3	3	3+	4-	2	17	30	33	29	35		0.9
6		3-	2-	3-	3-	3+	3	4-	3-	22+	2	1+	3-	2+	3+	3+	4-	3-	14	23	31	16	39		0.8
7	Q4A	2+	2	1	1+	1	2	2+	2+	14+	3-	2-	1	2-	1	2	2+	3-	7	10	13	10	13	C	0.3
8	Q0A	3-	2	2	2-	3	3	3-	2+	19+	2+	1+	2+	2-	3	2+	3-	2+	10	22	15	13	24		0.6
9		2-	2-	3	3	4+	3	3+	3+	23+	2-	1	3-	3	4	3	3+	3+	16	27	24	17	34		0.9
10	Q5A	2+	2+	2	2-	2	2	2+	1+	16	2-	2+	2	2-	2-	2+	3-	1+	7	13	17	17	14		0.4
11	Q2	2	1+	2+	2+	0+	1+	0+	1-	11-	1+	1+	2-	2+	1-	2-	1-	1-	5	8	10	13	5	CC	0.2
12	Q8A	1	2-	3-	1-	1+	2+	3-	4+	17-	2-	2	2+	0+	1	2	2+	4-	10	22	18	13	28		0.6
13	Q6A	3	3	2	2-	1-	2+	2	1	16-	3-	2+	2-	2-	0+	2	2	1	8	16	13	20	10		0.4
14		2+	1	1	3	3-	2+	1+	4+	18	2-	1	1-	3-	3-	2+	2-	5-	11	17	15	12	21		0.6
15	D3	4	5+	7-	7+	4-	2+	1+	1	32-	4-	5-	6-	7	3+	2	2-	1	48	58	85	128	15		1.6
16		2-	2-	2-	3+	3	2	3	3+	20-	2-	1+	2	3	3+	2	3-	3-	11	24	25	16	33		0.7
17	Q7A	4+	3	1-	1-	2-	1+	2	2	16-	4-	3-	1-	0+	1+	2-	2-	2-	10	17	7	13	11	K	0.5
18		3-	3-	3-	2	3-	2	3-	2+	20-	2+	2	2	2-	2+	2+	3-	2+	10	20	14	14	21		0.6
19		3	4-	2-	1+	2+	2	2	4-	20-	2+	3	1+	2-	3-	2-	1+	3+	12	20	20	18	23		0.7
20		4-	3-	3+	2	3-	2	2+	3-	21+	3	2	3	2	3-	2	2+	3-	12	22	19	20	22		0.7
21		2-	2+	1	2+	2+	4+	3	3	20	2-	2	1	2	3-	4	3	3	12	22	22	10	34		0.7
22	D5	4	4+	4-	2-	2+	4	3	5-	28-	3	3	3	2-	2+	5-	3	4	22	41	28	28	42		1.1
23	Q3	3-	1+	2	1+	2-	1-	1	2	13-	2+	1+	1+	1+	2-	1-	1	2-	6	11	13	13	11	C	0.3
24	Q1	2	1-	1+	2	2-	1+	1-	0+	10	2-	1-	1+	2-	2	2-	1-	0	5	6	9	8	7	CC	0.2
25		1-	2-	1+	2	1	1-	4	5-	16	1	1+	2-	2	2-	1-	4-	4	12	25	24	11	38		0.7
26	D4	5	5-	3+	4-	5-	5	5	4+	36-	5-	4-	3-	3+	5-	4	5-	4-	37	62	46	46	62		1.4
27	D2	4+	4+	3+	4-	6-	5+	5+	5+	37+	4-	3+	3	3	5+	5	5-	5-	42	62	63	33	92		1.5
28	D1	4-	5+	4+	3+	4	5+	6+	6-	38	3+	5-	3+	3+	4-	4+	5+	5	46	66	64	40	89		1.5
																			16	26.3	25.7	26.1			0.75

Day	Three-Hourly Indices Kn								Three-Hourly Indices Ks							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
1	3+	3-	2-	2-	3	3+	3-	4-	4	3-	2+	2	3+	3+	2+	3+
2	3	3-	3-	3+	2	1	2-	3	3+	3-	2	3	2-	1+	2-	3
3	3-	2	2+	3-	3	3+	3	2+	3	2-	2	3+	3	3+	3-	3-
4	3	2	2	2	2-	2	2-	1+	3	2	2-	2	2	2-	1+	1+
5	3	3	3+	3	3	3+	4-	2-	3-	3	3+	3+	3+	3	4	2+
6	2	1	3-	2	3	3+	3	2	2	1+	2+	2+	4-	3+	4-	3+
7	2	1+	1-	2-	1	2-	2	3-	3	2	1	2-	1+	2	3-	3-
8	2	1+	2	1+	3	2+	3-	3-	2+	1+	3-	2	3	2+	2+	2+
9	2-	1	3+	3+	4	3	3+	3+	2	1	2+	3-	4+	3+	3+	3+
10	2	2	2-	1+	2-	2	3-	1+	2-	2+	2+	2	2-	3-	3-	1+
11	1+	1+	2	3-	0+	2-	0+	0+	1+	2-	1+	2	1+	2	1-	1
12	1+	2-	2+	0	1	2	2+	4-	2-	2+	2+	1-	1	2	3-	4-
13	2+	2+	2-	2-	0+	2+	2	1	3-	2+	2	2-	1-	2	2+	1+
14	2-	1	1	3-	2+	3-	2-	4	2-	1+	1-	3-	3-	2	2-	5
15	3+	4+	6-	7	3+	2	1+	1	4	5	6-	7	3	2	2-	1
16	2-	1+	2	3	3	2-	3	3	2-	1+	2	3	4-	3-	3-	3-
17	4-	2	1-	0	1+	1+	2	2	4-	3	1-	0+	1+	2-	2-	2-
18	2	2	2	2-	2+	2+	3-	2	3-	2-	2	2-	3-	3-	3	2+
19	2+	3+	1+	2-	3-	2-	2-	3	3-	3	1+	2-	3-	2-	1+	4-
20	3	2	3	2+	3	2	2	2+	3	2-	3-	2	3-	2+	2+	3-
21	1+	2	1	2	2+	4	3-	3	2	2	1	2	3-	4	3	3-
22	3	3	3	1+	2	5-	3	4	3-	3	3	2	2+	4+	3+	4+
23	2	1+	1+	1	2-	1-	1	2-	3	2-	1+	2-	1+	1-	1+	2
24	2-	0+	1+	2-	2-	2-	1-	0	1+	1	1	2	2	2-	1-	0+
25	0+	1	2-	2	2-	1	4-	4-	1+	2	1+	2	2-	1-	4-	4+
26	4+	4-	3-	3+	4+	4	4+	4-	5	4-	3	3+	5-	4-	5-	4
27	4	3+	3	3+	5+	5-	5-	5-	4-	3+	3	3-	5	5	5	5
28	4-	5-	3+	3	4-	5-	5+	5	3+	5-	3+	3+	4	4	5+	5-

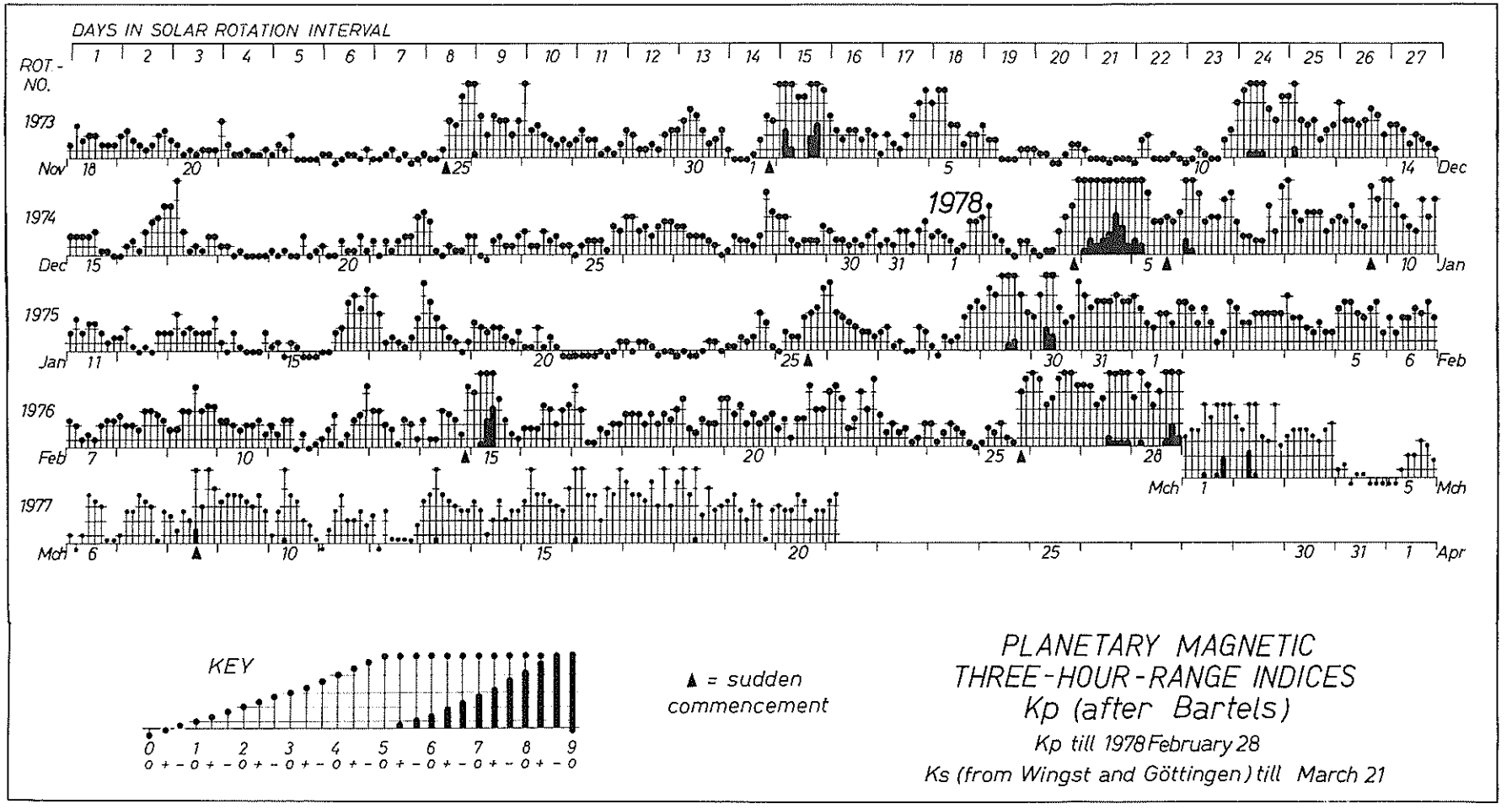
Quiet days (Q) and disturbed days (D), geomagnetic planetary three-hour-range indices (Kp) (integers alone are equivalent to those normally given with a small zero), magnetic character figures (Cp), and average amplitude (Ap) (unit 2γ) prepared by Geophysikalisches Institut at the University of Göttingen, F.R. of Germany for the International Service of Geomagnetic Indices. Ten most quiet days [Q1-Q0(10)] and five most disturbed days [D1-D5] are ordered from most quiet or disturbed, respectively. A or K means "not really quiet" (A = "Ap>6", K = "Ap ≤6 but one Kp ≥3o or two Kp values ≥3-"). An * means "not really disturbed" (Ap<20).

Geomagnetic three-hourly indices (Kn), (Ks) and (Km) as in IAGA-Bulletin No. 32 and indices (aa), "antipodal", as in IAGA-Bulletin No. 33 prepared by P. N. Mayaud of the Institut de Physique du Globe, Paris, France. Really quiet (C) and quiet but slightly disturbed three-hourly intervals (K) are given for 24-hour and 48-hour intervals centered on 12 UT.

DAILY AVERAGE INDICES Ap

	1977										1978	
DAY	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
1	11	4	13	9	15	6	4	4	5	6	7	15
2	5	5	66	14	11	4	6	5	6	69	8	14
3	4	12	15	6	9	7	8	10	4	9	13	14
4	3	24	19	5	8	9	6	7	8	14	89	11
5	4	12	11	7	5	40	3	8	10	18	31	17
6	6	49	10	5	28	21	4	8	7	5	34	14
7	5	48	6	6	15	17	6	3	5	3	13	7
8	12	27	3	6	14	12	8	6	3	2	19	10
9	38	22	7	6	16	20	11	2	3	3	23	16
10	19	13	9	8	14	12	13	4	9	4	21	7
11	18	14	24	4	10	28	19	12	6	38	7	5
12	22	8	19	4	4	11	6	28	18	21	4	10
13	13	5	6	6	9	11	28	14	26	16	8	8
14	12	12	8	9	18	12	10	13	42	8	3	11
15	5	10	14	3	12	11	9	19	25	5	2	48
16	6	17	22	10	27	9	7	8	14	9	14	11
17	9	9	18	8	14	29	10	12	8	12	9	10
18	11	8	11	10	7	13	6	22	6	3	12	10
19	5	48	5	10	23	24	42	28	6	3	6	12
20	13	28	10	11	29	8	44	7	4	4	3	12
21	10	12	4	6	10	5	64	5	5	6	1	12
22	7	6	7	10	11	5	63	22	3	6	3	22
23	14	5	7	10	6	6	21	6	2	4	2	6
24	12	11	8	7	7	10	12	6	2	5	6	5
25	12	22	5	5	5	27	10	4	15	5	12	12
26	16	4	2	6	3	13	18	6	19	11	12	37
27	8	4	4	7	3	14	24	62	12	6	5	42
28	15	4	7	12	4	7	9	47	5	10	9	46
29	14	18	2	7	61	6	3	9	6	8	36	
30	5	8	5	9	17	5	4	9	12	5	36	
31	4		7		8	4		6		6	23	
MEAN	11	16	11	8	14	13	16	13	10	10	15	16

GEOMAGNETIC ACTIVITY INDICES



R9	Rot.-No.	1st day	C9
222 322 22	19	D31	42 . 266676 2 . . .66456533 123 3 . . 43 . 246
. 2 22 . . .	75	J27	43 . 246533424 236666656443 222 645 2 . 3
. . . 2 22 .		F23	645 2 . 3 533 265 . . 2776665644 34 . . 34 246
. . . . .	1937	M22	. 34 246652 32 . . 22 466766665 2 . . . 6546
. . 223 . . .	38	A18	. . 6546422 . . . . 4 546654 45 . . 4 . 64 245
. . . . .	39	M15	. 64 245 332 . 45 3 . 3 . . 5 633 33 . . . 464 234
. . . 23 222	40	J11	464 234 333 . 2 . . . . . 653 . . . . 3 664 5 . 2
233 322 223	41	J8	664 5 . 2 443 442 . . . . 6533 . . . 2 . . 6 2 . 44
665 322 . . .	42	A4	. 6 2 . 44 4 . . . 45 . 2 . . 44 32 . 2 . . 64 . . . . .
222 . 2 . 22 .	43	A31	. . . . . 3 . . 566543 2 . 3 42 . . . . . 4 42 . . .
. . . . 2 2 . .	44	S27	42 . . . . 32 . 667662 322 . 22 23
. . . 22 223	45	O24	. . . . 23 252 677533 . 654 2 . . . . 4 . 2 257 244
2 . . 22 . . .	46	N20	257 244 4 . 2 666633 2 . . 542 . . . . 24 2 . . . 23
. . . . .	1947	D17	2 . . . 23 2 . 5664 43 . . . 4 324 3 . . 774 23 . 342
22	19	J13	23 . 342 235655 3 . . . 2 665 432 256 663 455
. . . . .		F9	663 455 2 . 4 565 44 . . . 2 656566 346 676666
. 2 242 332	76	M7	676666 344 554 32 . . . . 6 443 284 766664
2 . . 222 222	1951	A3	766664 433 234 . 2 . . . . 52 42 . 334 32 7 854
22 . 22 2 . .	52	A30	32 7 854 222 . . 3 2 . . . . . 35 334 . 2 . . 45 42 .
. 222	53	M27	. 45 42 . . 35 523 2 . . 62 . . . . 45 . . . . 45 2 . .
2	54	J23	. 45 2 . . . 65 234 . . 2 43 . . . . 54 2
. 222	55	J20	. . . . . 2 . 24 552 222 . . . . 3 2 . . . . .
22 . . 2 . . 2	56	A16	. . . . . 2 . 6665 3 3 . . . 35 342 222 . . . 2 . 3 2 . 3
2 . . . 2 222	57	S12	2 . 3 2 . 3 657 543 . 53 3 . 3 245 2 . 4 3 . . . . 2 422
. 22 222 2 . .	58	O9	. . 2 422 666 522 2 . . . . . 2 . . 463 2 25
. . . 2 . . .	59	N5	. . . . 25 566 42 . 2 . 2 2 . . . . 3 22 . . 3 . . . 4 . . 3
. . 2 232 . 22	1960	D2	. . 4 . . 3 543 342 . . 2 362 . . 2 . . 2 . . . 733 4 . .
222 . . 2 2 . 3	19	D29	733 4 . . 343 2 . . . 43 . 53 . . 3 23 . 2 . 2 2 . . 446
. . . 2 . 2 442		J25	2 . . 446525 3 . 2 455634 233 2 . 2 4 . . . 25 432
. . . . 2 . . .	77	F21	. 25 432 . 23 . . . . . 365 553 3 . . 23 . 33 . 433
. 2	1964	M20	33 . 433 424 4 . . . 3 637765 442 . 33 4 22 763
32 . . . 2 223	65	A16	422 763 . . 3 5 . . 52 474 533 . . . 255 . 24 553
22 . . . 2 333	66	M13	. 24 553 . 2 . 2 . 2 . . . 2 . . 224 . . 2 . . . . 2 . . 2
22 . 235533	67	J9	. 2 . . . 2 . 22 323 . 33 2 . . . 3 . 243 22 . 644 442
22 . . . 2 32 .	68	J6	644 442 . 25364 256 33 . . . . . 7 42 . . . 2 654
222 333 323	69	A2	. . 2 654 353 633 332 636 2 . . . 36342 2
322 244 443	1970	A29	. . . . 2 . . . 2 35 . 632 22 . 7777 53 355 2 . .
453 443 444	71	S25	355 2 . . . . 2 222 . . . . 3 6445 235 6 . . 5 . . . 7
333 422 224	72	O22	5 . . . 77 22 . . . . 22 . . . . 2 . 567 642 . . . . .
42 . . 24 454	73	N18	. . . . . 45 3 . . 3 . 7 245 . . . . . 652 . 23 . . .
332 345 652	1974	D15	. 23 . . . . . 3 . 32 . . . 23 7663 555 2 . 2 . . 4
222 235 778	19	J11	2 . 2 . . 4 23 . . . . . 3 3 . 2 665 444 344 . 34 2 . 3
765 445 6		F7	. 34 2 . 3 237 323 333 5 . . 3 677 765 . . 236542
	78	M6	236542 . 53 566644 preliminary
	1978	A2	

Symbol	.	,	2	3	4	5	6	7	8	9
$\overline{R}$ =	0	1-15	16-30	31-45	46-60	61-80	81-100	101-130	131-170	171...
R9,C9 =	0	1	2	3	4	5	6	7	8	9
Cp =	0.0-0.1	0.2-0.3	0.4-0.5	0.6-0.7	0.8-0.9	1.0-1.1	1.2-1.4	1.5-1.8	1.9	2.0-2.5

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

For explanation and previous years see J. Bartels, Abhandlungen der Akademie der Wissenschaften zu Göttingen, Beiträge zum I.G.J., Heft 3 (1958) (may be requested from Institut für Geophysik, Postfach 876, 34 Göttingen, Germany).

PRINCIPAL MAGNETIC STORMS

FEBRUARY 1978

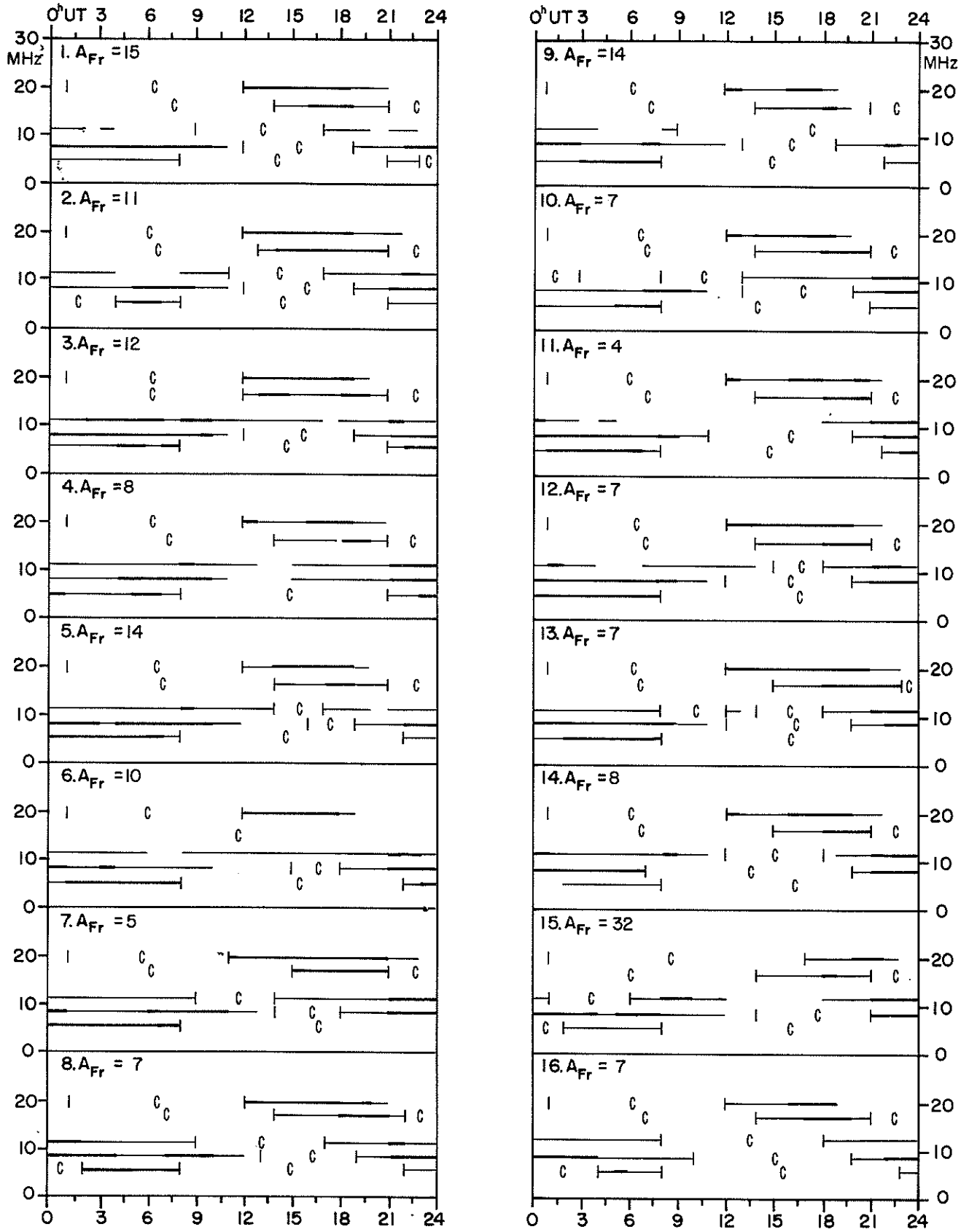
OBS. 2 letter IAGA code	GEOMAGNETIC LATITUDE	COMMENCEMENT DAY	hr min (UT)	TYPE	SC - AMPLITUDES D(')	H(γ)	Z(γ)	MAXIMUM 3 HOUR - INDEX K DAY(3 HOUR PERIOD)	K	RANGES D(')	H(γ)	Z(γ)	UT END DAY	HOUR
HU	00.6S	3	1150	..	..	..	..	03(6)	5	5	204	47	03	24
CO	64.6N	5	03--	..	..	..	..	05(4)	6	130	970	460	05	21
NE	55.1N	5	01--	..	..	..	..	05(3)	5	20	84	97	05	22
KG	56.5S	5	0727	SC*	--	--	--	05(5,6)	4	--	--	--	05	21
GM	24.5N	9	0400	..	..	..	..	--	-	3	154	34	09	22
JP	17.3N	9	0400	..	..	..	..	--	-	3	138	25	09	22
SH	14.6N	9	0400	..	..	..	..	--	-	3	143	27	09	22
UJ	13.5N	9	0400	..	..	..	..	--	-	3	134	21	09	22
AL	09.5N	9	0400	..	..	..	..	--	-	2	140	21	09	22
HD	07.6N	9	0500	..	..	..	..	09(5)	5	3	175	25	10	22
AN	01.5N	9	0400	..	..	..	..	--	-	3	196	69	09	22
HU	00.6S	9	1058	..	..	..	..	09(5,6)	5	11	315	44	09	23
TV	01.1S	9	0400	..	..	..	..	--	-	3	221	101	09	22
KG	56.5S	9	0900	..	..	..	..	09(5)	5	--	--	--	10	01
CO	64.6N	14	2146	SC*	--	--	--	15(4)	9	310	3090	830	15	19
SI	60.0N	14	2147	SC*	+13 *	-33 *	-27 *	15(4)	8	--	--	770	15	20
NE	55.1N	14	2146	SC	5	44	--	15(4)	9	47	740	742	15	21
HI	54.2N	14	2147	SC*	- 5	+72	+ 3	15(3,4)	6	20	235	45	15	14
FR	49.6N	14	2147	SC*	+ 4	+55	-11	15(4)	7	40	151	125	15	15
BD	48.9N	14	2148	SC	- 1	+31	- 8	15(3)	6	26	150	145	15	16
IR	41.0N	14	2145	SC*	- 7.6	36	6	15(3)	7	28	238	86	15	21
TU	40.4N	14	2145	SC	- 2	+45	+ 3	15(3,4)	7	14	165	35	15	17
SJ	29.9N	14	2145	SC	+ 1.5	+31	+ 7	15(4)	6	16	96	22	15	19
GM	24.5N	14	2145	SC	- 2.1	41	- 4	--	-	10	--	29	16	03
HO	21.1N	14	2147	SC	02	13	06	15(4)	7	10	33	09	17	09
JP	17.3N	14	2145	SC	- 1.9	42	-11	--	-	10	271	28	16	03
SH	14.6N	14	2145	SC	- 1.3	32	7	--	-	6	318	22	16	03
UJ	13.5N	14	2145	SC	- 1.3	49	-12	--	-	8	294	26	16	03
AL	09.5N	14	2145	SC	- 1.5	41	-14	15(4)	7	10	267	37	16	03
HD	07.6N	14	2145	SC	- 1.0	+41	- 3	15(4)	8	8	308	28	16	14
GU	04.0N	14	2147	SC	-01	38	-09	15(3)	7	--	300	30	15	16
AN	01.5N	14	2145	SC	- 2.2	52	20	--	-	9	312	121	16	03
HU	00.6S	14	2147	SC	3	100	12	15(4,5)	6	13	338	41	15	20
TV	01.1S	14	2145	SC	- 0.8	41	53	--	-	5	333	194	16	03
PM	18.7S	14	2145	SC	- 2.8	+36	+24	15(3,4)	6	9	290	130	15	19
HR	33.7S	14	2148	SC	+ 5	+55	+41	15(4)	6	23	198	152	15	15
GN	43.3S	14	2147	SC	+ 3.9	+24	+17	15(3)	7	10	190	240	15	19
TO	46.7S	14	2145	SC	- 6	+ 8.0	0	15(2)	6	37	285	119	15	15
KG	56.5S	14	2147	SC*	--	--	--	15(4)	8	--	--	--	15	18
GM	24.5N	21	0800	..	..	..	..	--	-	7	82	42	22	23
JP	17.3N	21	0800	..	..	..	..	--	-	6	79	22	22	23
SH	14.6N	21	0800	..	..	..	..	--	-	4	72	18	22	23
UJ	13.5N	21	0800	..	..	..	..	--	-	5	88	24	22	23
AL	09.5N	21	0800	..	..	..	..	--	-	4	91	27	22	23
HO	07.6N	21	0800	..	..	..	..	21(6) 22(6)	5	4	99	16	23	04
AN	01.5N	21	0800	..	..	..	..	--	-	3	96	39	22	23
TV	01.1S	21	0800	..	..	..	..	--	-	3	124	90	22	23
HR	33.7S	22	15--	..	..	..	..	22(6,8)	5	13	83	42	23	01
KG	56.5S	22	1506	SC*	--	--	--	22(6,8)	5	--	--	--	23	02
CO	64.6N	25	1926	SC*	-14	+31	-16	27(5,6) 01(4)	7	326	1830	1390	03	23
SI	60.0N	25	1929	SC*	+11 *	-53 *	- 7 *	27(5)	7	80	--	560	03	13
NE	55.1N	25	1927	SC*	2	18	--	27(5) 28(2)	6	57	195	219	04	01
HI	54.2N	25	1929	SC	- 3	+61	+ 3	28(7)	7	46	200	80	28	23
FR	49.6N	25	1928	SC	+ 1	+20	- 3	26(1) 27(5,6,8) 28(2,6,7,8) 01(5,8)	5	23	167	70	03	03
BD	48.9N	25	1928	SC	- 1	+10	- 3	27(5)	6	31	170	62	03	08
IR	41.0N	25	0927	SC*	- 1.8	75	12	27(5) 28(7)	6	30	201	38	01	03
TU	40.4N	25	1927	SC	- 1	+35	+ 2	26(1)	6	18	155	40	03	14
SJ	29.9N	25	1927	SC	- 0.5	+27	+ 7	26(1)	6	8	141	33	28	05
GM	24.5N	25	1927	SC	- 0.8	54	- 3	--	-	8	163	46	28	23
HO	21.1N	25	1927	SC	04	12	04	26(1)	6	03	38	06	--	--
JP	17.3N	25	1927	SC	- 1.5	47	-10	--	-	7	138	37	28	23
SH	14.6N	25	1927	SC	- 0.2	40	7	--	-	6	146	30	28	23
UJ	13.5N	25	1927	SC	- 0.7	54	-11	--	-	6	149	29	28	23
AL	09.5N	25	1927	SC	- 1.2	42	- 8	26(1,5,6)	5	6	140	30	28	23
HD	07.6N	25	1927	SC	- 0.5	+45	- 2	25(7) 26(5,6)	5	2	133	20	26	22
GU	04.0N	25	1928	SC	--	31	-09	26(1)	6	--	170	40	01	18
AN	01.5N	25	1927	SC	- 2.0	50	26	--	-	4	171	95	28	23
HU	00.6S	25	1938	SC	3	173	11	26(5)	6	12	287	38	26	22
TV	01.1S	25	1927	SC	- 0.1	41	53	--	-	3	206	101	28	23
PM	18.7S	25	1925	SC*	+ 0.9	+35 *	+32 *	26(1)	6	10	140	70	02	00
HR	33.7S	25	1928	SC	+ 2	+27	+16	25(8) 26(5,7) 27(5,6,7,8) 28(6,7)	5	37	127	122	28	24
GN	43.3S	25	1927	SC*	+ 5.0*	+35 *	+30 *	26(1,5) 28(7)	6	20	130	130	01	06
TO	46.7S	25	1925	SC*	+41	+ 4.7*	- 7.8	27(5)	6	21	177	49	01	00
KG	56.5S	25	1928	SC*	--	--	--	25(8) 26(1)	5	--	--	--	26	12
HD	07.6N	27	0130	..	..	..	..	27(5,6,7) 28(7,8)	5	5	139	17	28	23
HU	00.6S	27	1120	..	..	..	..	27(6)	6	12	308	72	28	23

Reports were received from the following observatories:

Alibag Annamalainagar Boulder College Fredericksburg Gnangara Guam Gulmarg Hermanus Honolulu Huancayo Hyderabad Irkutsk Jaipur Kerguelen Newport Port Moresby San Juan Shillong Sitka Toolangi Trivandrum Tucson Ujjain Witteveen

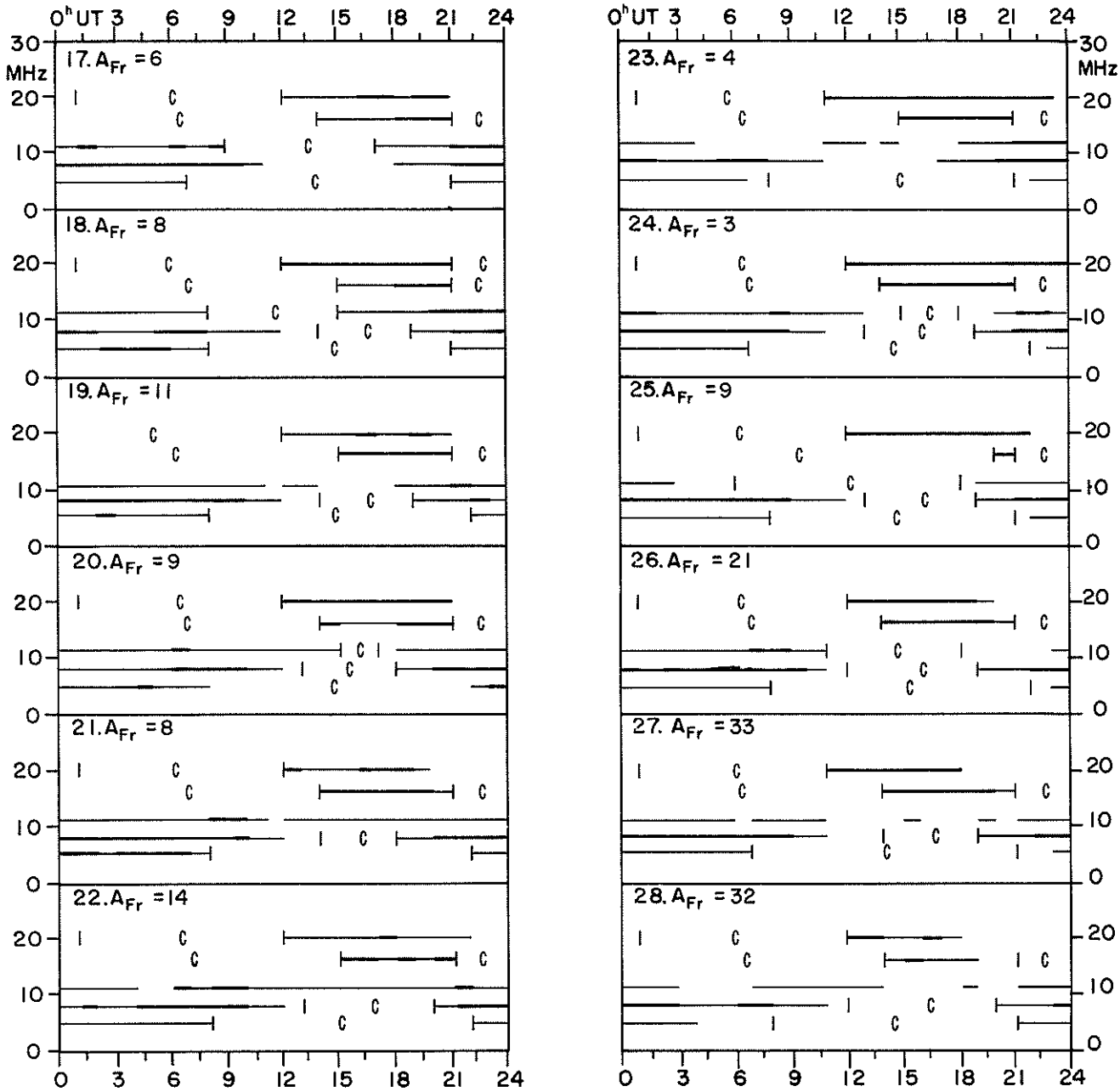
TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

FEBRUARY 1978



TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

FEBRUARY 1978



Field strengths from five frequencies, 5.0, 8.1, 10.9, 16.4 and 20.0 MHz, observed on a Lüchow - Norfolk circuit are represented above. Heavy solid lines represent field strengths ≥-12 dB above 1 μv/m (transmitter power reduced to 1 kW). Observed field strengths between -12 dB above 1 μv/m and -40 dB above 1 μv/m are represented by the fine line.

Adapted from Observations by Deutsche Bundespost

RADIO PROPAGATION QUALITY INDICES

FEBRUARY 1978

Quality indices calculated for reception at Lüchow

DAY	TOKYO	NORFOLK	MOSCOW	CANBERRA	BRACKNELL
1	5.0	6.5	12.0	3.8	12.6
2	5.8	6.7	11.8	4.0	12.3
3	5.3	6.4	11.7	4.5	12.6
4	4.9	5.6	11.7	4.6	12.9
5	5.8	5.9	11.9	4.9	13.0
6	4.8	6.1	12.2	4.5	13.2
7	4.3	7.5	12.4	4.6	13.1
8	4.4	6.6	12.2	4.1	12.9
9	4.3	5.7	12.8	4.2	12.3
10	5.2	6.6	12.6	4.4	12.9
11	4.2	6.0	12.2	3.9	13.0
12	6.1	6.8	12.2	4.5	13.0
13	6.1	7.0	12.8	5.2	12.9
14	6.0	6.3	11.9	4.4	12.8
15	4.5	5.1	12.7	4.8	12.6
16	5.9	4.9	11.7	4.2	13.1
17	5.1	5.4	12.2	3.6	13.2
18	3.5	6.2	12.7	4.3	13.4
19	4.4	5.4	12.5	4.2	13.1
20	4.3	6.2	12.2	4.3	13.0
21	4.5	5.9	12.4	4.4	12.9
22	4.0	5.4	13.3	4.5	12.5
23	3.9	7.9	13.3	4.2	13.4
24	4.6	8.2	12.8	4.9	13.6
25	7.2	8.0	12.4	5.3	13.5
26	6.0	6.6	12.5	4.8	13.5
27	4.4	5.6	12.5	4.4	12.3
28	4.3	4.4	12.3	4.2	11.3
MEAN	5.0	6.2	12.4	4.4	12.9

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SOLAR-TERRESTRIAL PHYSICS

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

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