U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Richard A. Frank, Administrator
ENVIRONMENTAL DATA AND INFORMATION SERVICE
Thomas S. Austin, Director

Solar - Geophysical Data

NO. 408 AUGUST 1978

Part I (Prompt Reports)

DATA FOR
JULY 1978
JUNE 1978

NATIONAL GEOPHYSICAL AND SOLAR - TERRESTRIAL DATA CENTER
BOULDER, COLORADO

For obtaining bulletins on a data exchange basis, send request to: World Data Center A for Solar-Terrestrial Physics, NOAA, Boulder, Colorado 80303.

For sale through the National Geophysical and Solar-Terrestrial Data Center, NOAA, Boulder, CO 80303. Subscription Price: $34.00 annually for both part I (Prompt Reports) and part II (Comprehensive Reports) or $18.00 annually for either part. Annual supplement containing explanation is included. For foreign mailing add $32.00 for both parts or $16.00 for either part. Single issue price is $1.50 for either part and $1.40 for the extra issue. Make checks and money orders payable to: Department of Commerce, NOAA/NGSDC.

To standardize referencing these reports in the open literature, the following format is recommended:

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. 408

Issued in two parts

Helen E. Coffey, Editor

J. Virginia Lincoln, Chief
Solar-Terrestrial Physics Division

CONTENTS

PAGE

Part I (Prompt Reports)

Index for 1977 and 1978 — 2

Data for July 1978 — 3-45

Data for June 1978 — 47-170

Part II (Comprehensive Reports)

Index for 1977 and 1978 — 2

Data for February 1978 — 3-66

Data for January 1978 — 67-77

Miscellaneous Data — 79-83

Geomagnetic Indices
Equatorial Indices Dst, May 1978 corrected data

Energetic Solar Particles and Plasma
IMP 7 and 8 Solar Wind Plasma data
November 1977 - January 1978

INDEX FOR 1977 AND 1978 DATA PUBLISHED IN "SOLAR-GEOPHYSICAL DATA"

		1977 Aug	Sep	Oct	Nov	Dec	1978 Jan	Feb	Mar	Apr	May	Jun	Jul
A.	SOLAR AND INTERPLANETARY PHENOMENA												
A.1	Sunspot Drawings	398A 36	399A 34	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	407A 46	408A 50	
A.2a	Zurich Provisional Relative Sunspot Numbers Rz	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9	407A 9	408A 9
A.2b	Zurich Final Sunspot Numbers Rz	404A 7	404A 8	404A 8	404A 8	404A 8							
A.2c	American Relative Sunspot Numbers RA°	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9	407A 9	408A 9
A.3a	Mt. Wilson Magnetograms	398A 36	399A 34	400A 30	401A 36	402A 38	403A 46	404A 40	405A 48	406A 54	407A 46	408A 50	
A.3b	Mt. Wilson Magnetic Characteristics of Sunspots	398A 98	399A 94	400A 92	401A 96	402A100	403A108	404A 96	405A110	406A114	407A108	408A110	
A.3c	Kitt Peak Magnetograms	398A 36	399A 34	400A 30	401A 36	402A 38	403A 46	404A 40	405A 48	406A 54	407A 46	408A 50	
A.3d	Mean Solar Magnetic Field (Stanford)	397A 25	398A 29	399A 29	400A 24	401A 31	402A 33	404A 33	404A 33	405A 36	406A 40	407A 40	408A 41
A.4	H-alpha Filtergrams	398A 36	399A 34	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	407A 46	408A 50	
A.5	Calcium Plage Drawings - McMath (or Catania)	398A 36	399A 34	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	407A 46	408A 50	
A.5a	Calcium Plage (McMath) and Sunspot Regions	398A 98	399A 94	400A 92	401A 96	402A100	403A108	404A 96	405A110	406A114	407A108	408A110	
A.5b	McMath Daily Calcium Plage Indices	398A105	399A 99	400A 99	401A100	402A105	403A114	404A104	405A119	406A124	407A118	408A119	
A.6	H-alpha Synoptic Charts	398A 34	399A 32	400A 28	401A 35	402A 36	403A 44	404A 38	405A 46	406A 52	407A 44	408A 48	
A.6b	Synoptic Chart and Active Regions (Paris)	402B 4	403B 4	404B 4	405B 4	406B 4	407B 4	408B 4					
A.7f	Helium D3 Chromosphere (Big Bear)	397A 19	398A 24	399A 24	400A 21	401A 28	402A 29	403A 36	404A 29	405A 31	406A 35	407A 34	408A 37
A.7g	Helium Synoptic Maps (KPNO)	397A 20	398A 22	399A 23	400A 20	401A 27	402A 28	403A 35	404A 27	405A 32	406A 36	407A 36	408A 38
A.7h	Coronal Line Emission (Sac Peak)	398A 36	399A 34	400A 30	401A 36	402A 38	403A 46	404A 40	405A 48	406A 54	407A 46	408A 50	
A.8aa	2800 MHz - Daily Values of Solar Flux (ARO-Ottawa)	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9	407A 9	408A 9
A.8ac	2800 MHz - Daily Values of Adj. Solar Flux (ARO-Ott	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9	407A 9	408A 9
A.8g	Daily Values of Adjusted Solar Flux (AFGL)	397A 7	398A 7	399A 7	400A 7	401A 7	402A 9	403A 9	404A 9	405A 9	406A 9	407A 9	408A 9
A.9cb	8.6 mm Radio Maps of the Sun (NOSC - La Posta)	398A 36	400B 57	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	407A 46	408A 50	
A.9d	2 cm Radio Maps of the Sun (NOSC - La Posta)	398A 36	400B 52	400A 30	401A 36	402A 38	403A 47	404A 40	405A 48	406A 54	407A 46	408A 50	
A.10a	169 MHz - Interferometric Observations (Nancay)	397A 13	398A 14	399A 14	400A 12	401A 15	402A 16	403A 20	404A 17	405A 17	406A 19	407A 20	408A 19
A.10c	21 cm East-West Solar Scans (Fleurs)	397A 15	398A 16	399A 16	400A 14	401A 17	402A 19	403A 23	404A 20	405A 20	406A 22	407A 23	408A 22
A.10d	43 cm East-West Solar Scans (Fleurs)	397A 16	398A 17	399A 17	400A 15	401A 18	402A 20	403A 24	404A 21	405A 21	406A 23	407A 24	408A 23
A.10e	10.7 cm East-West Solar Scans (Ottawa-ARO)	397A 14	398A 15	399A 15	400A 13	401A 16	402A 18	403A 22	404A 19	405A 19	406A 21	407A 22	408A 21
A.10f	3 cm East-West Solar Scans (Toyokawa)					403B 68	402A 17	403A 21	404A 18	405A 18	406A 20	407A 21	408A 20
A.11k	Solar X-ray Radiation (SOLRAD 11)						403A116	404A108	405A122	406A129	407A123	408A123	
A.11g	Solar X-ray (SMS/GOES)	---	398A 25	399A 20	400A 17	401A 22	402A 24	403A 29	404A 24	405A 29	406A 30	407A 29	408A 31
A.11h	Solar X-ray (OSO-8; 1975-057A)	398A 36	399A 34	400A 30	401A 36	402A 38	403A 46	404A 40	405A 48	406A 54	407A 46	408A 50	
A.11i	Solar X-ray (Columbia U.)	404B 65	404B 68	404B 40									
A.12ba	Cosmic Ray Protons (Pioneers 6 & 7)	397A 23	---	399A 26	---	---	402A 30	---	---	---	---	---	---
A.12bb	Cosmic Ray Protons (Pioneers 8 & 9)	---	---	399A 27	---	---	402A 31	---	---	---	---	---	408A 43
A.12e	Energetic Solar Particles (IMP H & J)	402B 24	403B 37	404B 35	405B 22	406B 43	407B 33	408B 62					
A.12f	Energetic Solar Particles (GMS/SEM)	---	406B 78	---	---	---	---	---	---	---	406A 44	---	408A 45
A.13a	Solar Wind (Pioneers 6 & 7)	397A 23	---	399A 26	---	---	402A 30	---	---	---	---	---	---
A.13ab	Solar Wind (Pioneers 8 & 9)	---	---	399A 27	---	---	402A 31	---	---	---	---	---	408A 43
A.13d	Solar Wind from IPS Measurements	397A 27	398A 27	399A 25	400A 25	401A 29	402A 34	403A 37	404A 31	405A 37	406A 41	407A 35	408A 39
A.13e	Solar Plasma (IMP H & J)	402B 23	403B 22	404B 34	408B 81	408B 82	408B 83	408B 61					
A.17	Interplanetary Magnetic Field (Pioneer 8)	---	---	---	---	---	---	---	---	---	---	---	---
A.17	Interplanetary Magnetic Field (Pioneer 9)	---	---	---	---	---	402A 31	---	---	---	---	---	408A 43
A.17c	Inferred IP Magnetic Field	397A 24	398A 28	400A 22	400A 22	401A 30	402A 32	403A 38	404A 32	406A 38	406A 38	407A 38	408A 40
A.18	Interplanetary Electric Field (Pioneer 8)	---	---	399A 27	---	---	---	---	---	---	---	---	---
A.18	Interplanetary Electric Field (Pioneer 9)	---	---	---	---	---	402A 31	---	---	---	---	---	---
B.	IONOSPHERIC (AND RADIO WAVE PROPAGATION) PHENOMENA												
B.52	Graphs of Transmission Frequency Range	398A124	399A128	400A120	401A116	402A132	403A148	404A144	405A158	406A171	407A168	408A168	
B.53	Quality Figures Based on Frequency Ranges	398A126	399A127	400A122	401A118	402A131	403A150	404A146	405A157	406A170	407A167	408A170	
C.	FLARE-ASSOCIATED EVENTS												
C.1a	Optical Observations Flares	397A 10	398A 10	399A 10	400A 10	401A 10	402A 12	403A 12	404A 12	405A 12	406A 12	407A 12	408A 12
C.1ba	Optical Observations Flares (Standardized Data)	402B 8	403B 8	404B 8	405B 8	406B 8	407B 8	408B 8					
C.1d	Flare Patrol Observations	397A 12	398A 13	399A 13	400A 11	401A 14	402A 15	403A 19	404A 16	405A 16	406A 18	407A 19	408A 18
C.1d	Flare Patrol Observations	402B 17	403B 21	404B 22	405B 16	406B 25	407A 22	408B 35					
C.1e	Flare Indices (by day)	402B 16	403B 20	404B 21	405B 15	406B 24	407A 21	408B 34					
C.1f	Flare Indices (by Region)	403B 53	404B 53	405B 38	406B 59	407B 49	408B 77						
C.3	Solar Radio Waves - Outstanding Occurrences	402B 18	403B 22	404B 23	405B 17	406B 26	407B 23	408B 36					
	Solar Radio Waves - Fixed Frequencies - Selected	397A 17	398A 18	399A 18	400A 16	401A 19	402A 21	403A 25	404A 22	405A 22	406A 24	407A 25	408A 24
C.3t	43.25, 80 and 160 MHz Selected Bursts (Culgoora)	399B 36	399A113	401B 44	403B 64	403B 65	405B 45	405B 48	406B 62	407B 67	407A151	408A152	
C.4a	Solar Radio Spectral Obs. (Fort Davis)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	407B 52	408A138	
C.4d	Solar Radio Spectral Obs. (Culgoora)	400B 62	399A102	401B 38	403B 56	403B 59	404B 56	405B 40	406B 64	407B 59	407A139	408A138	
C.4e	Solar Radio Spectral Obs. (Weissenau)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	407A139	408A138	
C.4f	Solar Radio Spectral Obs. (Sagamore Hill)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	407B 52	408A138	
C.4h	Solar Radio Spectral Obs. (Dwingeloo)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	---	---	---	
C.4i	Solar Radio Spectral Obs. (Durnten)	398A107	399A102	400A101	401A102	402A108	403A132	404A122	405A138	406A144	407A139	408A138	
C.4j	Solar Radio Spectral Obs. (Manila)		399A102	400A101	401A102	402A108	406B 70	404A122	405A138	406A144	407B 52	408A138	
C.5e	Solar X-ray (SMS/GOES)	397A 22	399B 37	399A 22	400A 19	401A 24	402A 26	403A 29	404A 26	---	406A 32	407A 29	408A 33
C.5f	Solar X-ray (Columbia U.)												
C.6	Sudden Ionospheric Disturbances	398A106	399A100	400A100	401A101	402A106	403A115	404A105	405A120	406A125	407A119	408A120	
D.	GEOMAGNETIC AND MAGNETOSPHERIC PHENOMENA												
D.1a	Geomagnetic Indices Kp, Kn, Ks, Km, Ap, aa, Cp	398A117	399A120	400A113	401A109	402A125	403A142	404A139	405A151	406A162	407A160	408A160	
D.1ba	27-day Chart of Kp Indices	398A119	399A122	400A115	401A111	402A127	403A144	404A141	405A153	406A164	407A162	408A161	
D.1c	27-day Chart of C9	404A142	404A142	404A142	404A142	404A142							
D.1d	Principal Magnetic Storms	398A122	399A125	400A118	401A114	402A130	403A145	404A143	405A156	406A167	407A165	408A165	
D.1e	Reduced Magnetograms								405A 39				
D.1f	Sudden Commencement and Solar Flare Effects	398A123	399A126	400A119	401A115	403B 69	403A147	405B 55	406B 72	406A169	407A166	408A167	
D.1g	Equatorial Indices Dst	398A121	399A124	400A117	401A113	402A129	405B 53	405B 54	405A155	406A166	408B 80	408A164	
D.1h	Geomagnetic Substorm Log (Boulder)								404A 35	405A 38	406A 42	407A 41	408A 44
F.	COSMIC RAYS												
F.1a	Cosmic Ray Neutron Counts (Deep River)	398A116	399A115	400A112	402B 47	402A124	403A138	404A138	405A150	407B 70	407A155	408A155	
F.1b	Cosmic Ray Neutron Counts (Climax)	398A116	399A115	400A112	401A108	406B 73	406B 73	406B 73	406B 73	406A161			
F.1e	Cosmic Ray Neutron Counts (Alert)	398A116	399A115	400A112	402B 47	402A124	403A138	404A138	405A150	407B 70	407A155	408A155	
F.1f	Cosmic Ray Neutron Counts (Calgary)	400B 70	400B 70	402B 47									
F.1g	Cosmic Ray Neutron Counts (Sulphur Mountain)	400B 70	---	402B 47									
F.1h	Cosmic Ray Neutron Counts (Thule)												
F.1i	Cosmic Ray Neutron Counts (Kiel)	398A116	399A115	400A112	401A108	402A124	403A138	404A138	405A150	406A161	407A155	408A155	
F.1j	Cosmic Ray Neutron Counts (Tokyo)	398A116	399A115	400A112	401A108	402A124	403A138	404A138	405A150	406A161	407A155	408A155	
F.1k	Cosmic Ray Neutron Counts (Kula)	398A116											
H.	MISCELLANEOUS												
H.60	IUWDS Alert Decisions	397A 4	398A 4	399A 4	400A 4	401A 4	402A 5	403A 5	404A 4	405A 4	406A 4	407A 4	408A 5
H.62	Abbreviated Calendar Record	403B 46	404B 46	405B 30	406B 52	407B 42	408B 70						

Notes:

"398A 36" listed under 1977 Aug means that data for August 1977 were contained in *Solar-Geophysical Data* Number 398 - Part I, beginning on page 36.

A = Part I, B = Part II.

----- = no data available.
blank = data not yet received.

JULY 1978 DATA

Contents

	Page
Alert Period	
IUWDS Alert Periods (Advance and Worldwide)	5-7
Daily Solar Indices	
12-Month Tables Sunspot Numbers, R_z, and 2800 MHz Flux Adjusted to 1 A.U.	8
Combined Table Sunspot Numbers and Solar Fluxes	9
Graph of Sunspot Cycles	10
Zürich Smoothed Observed and Predicted Sunspot Numbers	11
Solar Flares	
Hα Solar Flares	12-17
No-Flare-Patrol Chart	18
Solar Radio Waves	
169 MHz Solar Interferometric Chart - Nancay	19
3 cm East-West Solar Scans - Toyokawa	20
10.7 cm East-West Solar Scans - ARO, Ottawa	21
21 cm East-West Solar Scans - Fleurs	22
43 cm East-West Solar Scans - Fleurs	23
Selected Fixed-Frequency Occurrences	24-28
Selected Solar Noise Burst	29-30
Solar X-ray Radiation	
SMS-2 GOES	31-36
Coronal Holes	
Helium D3 Chromosphere	37
Helium 10830 Å Synoptic Map	38
Solar Wind Measurements	
Scintillation Observations	39
Inferred IP Magnetic Field Polarities	40
Mean Solar Magnetic Field	
Stanford Mean Solar Magnetic Field Map	41
Stanford Mean Solar Magnetic Field Table	42
Spacecraft Observations	
Pioneer IX	43
Geomagnetic	
Boulder Geomagnetic Substorm Log	44
Energetic Solar Particles	
GMS/SEM 13-14 July 1978 Event	45

ALERT PERIODS

INTERNATIONAL URSIGRAM
AND WORLD DAYS SERVICE
JULY 1978

PRESTO MESSAGES (the RAPID report of major events).

BOULDER 08/2145Z SOFLARE M3/1B N18E79 08/1943Z DURATION 27 MINUTES. TENFLARE 230 FLUX UNITS 10/1959Z DURATION 47 MINUTES.
BOULDER 09/2200Z SOFLARE X3/2B N19E68 09/1804Z DURATION 31 MINUTES. TENFLARE 490 FLUX UNITS 09/1828Z DURATION 71 MINUTES. UMBRAL COVERAGE, PARALLEL RIBBONS.
BOULDER 10/1352Z SOFLARE X8/2B N18E60 10/0620Z DURATION 32 MINUTES. TENFLARE 2000 FLUX UNITS 10/0603Z DURATION 74 MINUTES.
BOULDER 11/0441Z SOFLARE M8/2B N17E49 11/0426Z IN PROGRESS 11/0441Z.
BOULDER 11/1300Z SOFLARE X15/2B N20E46 11/1043Z DURATION 157 MINUTES.
BOULDER 13/1300Z PROTON EVENT BEGAN AT 13/0330Z. 23 PROTONS/cm²/sec/ster AT GREATER THAN 10 MEV at 13/1000Z. PROBABLE MAXIMUM AT 13/1000Z.
BOULDER 18/1645Z TENFLARE 880 FLUX UNITS 18/0016Z DURATION 4 MINUTES.
BOULDER 18/2156Z SOFLARE M5/2B N17W51 18/1922Z DURATION 37 MINUTES.
BOULDER 21/2049Z SOFLARE M8/1B N17W90 21/1857Z DURATION 34 MINUTES. TENFLARE 140 FLUX UNITS 21/1853Z DURATION 17 MINUTES.

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
182	1	30	121	151	30	N19W74	4	0	0		30	N19W74	C.A.	SOLALERT 01/03
						N26W62	0	0	0			N26W62	Q	MAGALERT MINOR 01/02
						S18W57	0	0	0			S18W57	Q	
						N24W40	10	0	0			N24W40	A	
						N16E06	4	0	0			N16E06	Q	
						N18E18	4	0	0			N18E18	Q	
						S17E35	1	0	0			S17E35	Q	
						N20E66	3	0	0			N20E66	C.E.	
183	2	1	172	138	05	N18W87	4	1	0		1	N18W87	C.A.	SOLALERT
						N25W76	0	0	0			N25W76	Q	MAGNIL
						S20W72	2	0	0			S20W72	D.A.	
						N24W53	3	0	0			N24W53	C.A.	
						N18W05	1	0	0			N18W05	Q	
						N19E07	2	0	0			N19E07	Q	
						S16E24	0	0	0			S16E24	Q	
						N19E55	5	0	0			N19E55	E	
						S19E45	0	0	0			S19E45	Q	
						N15E14	0	0	0			N15E14	Q	
184	3	2	120	123	07	S19W85	2	1	0		2	S19W85	A	SOLALERT 03
						N22W66	2	0	0			N22W66	D.A.	MAGQUIET
						N14W01	2	0	0			N14W01	E	
						N19E43	1	0	0			N19E43	Q	
						S19E31	1	0	0			S19E31	Q	
						N27W01	0	0	0			N27W01	Q	
						N34E33	0	0	0			N34E33	Q	
						S25E03	0	0	0			S25E03	Q	
185	4	3	105	113	06	N21W82	0	0	0	AN SC WAS OBSERVED	3	N21W82	Q	SOLNIL
						N18W12	1	0	0	AT 03/2305Z		N18W12	Q	MAGQUIET
						N19E29	0	0	0			N19E29	Q	
						S19E16	0	0	0			S19E16	Q	
						N26W15	0	0	0			N26W15	Q	
						S24W11	0	0	0			S24W11	Q	
						N20E07	0	0	0			N20E07	Q	
186	5	4	50	114	33	N19E14	0	0	0	MAGSTORM MINOR	4	N19E14	Q	SOLQUIET
						N26W28	3	0	0	BEGAN WITH SC AT		N26W28	Q	MAGALERT MINOR 05
						S25W23	4	0	0	03/2305Z		S25W23	Q	
187	6	5	114	115	30	N19E04	0	0	0		5	N19E04	Q	SOLQUIET
						N25W41	1	0	0			N25W41	E	MAGALERT 06/07
						S27W36	5	0	0			S27W36	D.A.	
						N21W18	0	0	0			N21W18	Q	
						N08W51	0	0	0			N08W51	Q	
						N15W61	0	0	0			N15W61	Q	
						N20E21	0	0	0			N20E21	Q	
188	7	6	131	117	10	N27W54	0	0	0		6	N27W54	Q	SOLQUIET
						S26W50	4	1	0			S26W50	D.A.	MAGNIL
						N19W09	0	0	0			N19W09	Q	
						S12E11	0	0	0			S12E11	Q	
						S24E14	0	0	0			S24E14	Q	
						S20E32	0	0	0			S20E32	Q	
						S17E70	2	0	0			S17E70	Q	
						N17E74	0	0	0			N17E74	Q	
189	8	7	149	125	12	N27W66	0	0	0		7	N27W66	Q	SOLALERT
						S27W63	5	0	0			S27W63	C.A.	MAGQUIET
						S16W53	7	1	0			S16W53	D.A.	
						N18W41	0	0	0			N18W41	Q	
						N19W22	0	0	0			N19W22	Q	
						S23W00	1	0	0			S23W00	Q	
						S19E18	0	0	0			S19E18	Q	
						S18E60	4	1	0			S18E60	D.A.	
						N27E60	0	0	0			N27E60	Q	
190	9	8	210	132	13	N28W80	0	0	0	PRESTO SOFLARE	8	N28W80	Q	SOLALERT
						S26W75	3	0	0	M3/1B N18E79		S26W75	D.A.	MAGQUIET
						S15W66	10	0	0	08/1943Z 27 MINUTE		S16W66	E	
						N18W54	0	0	0	DURATION. TENFLARE		N18W54	Q	
						N20W36	0	0	0	230 FLUX UNITS		N20W36	Q	
						S20E05	1	0	0	08/1949Z DURATION		S20E05	E	
						N27E46	0	0	0	57 MINUTES.		N27E46	Q	
						S18E47	1	0	0			S18E47	E	
						S28E67	0	0	0			S28E67	Q	
						N16E76	2	1	0			N16E76	C.A.	
191	10	9	214	146	06	N18E62	13	2	1	SOFLARE X3/2B	9	N18E62	P	SOLALERT
						S17W82	1	0	0	N19E68, 09/1804		S17W82	Q	MAGQUIET
						N19W49	0	0	0	DURATION 31 MINUTES		N19W49	Q	
						S27W87	1	1	0	TENFLARE 490 FLUX		S27W87	E	
						S19E32	2	1	0	UNITS, 09/1828Z		S19E32	E	
						N27E33	0	0	0	DURATION 71 MINUTES		N27E33	Q	
						S20W07	2	0	0	UMBRAL COVERAGE,		S20W07	Q	
						S29E50	0	0	0	PARALLEL RIBBONS		S29E50	Q	
						S21E20	0	0	0			S21E20	Q	
						S30W25	0	0	0			S30W25	Q	
						S31E51	0	0	0			S31E51	Q	

ALERT PERIODS

INTERNATIONAL URSIGRAM
AND WORLD DAYS SERVICE

JULY 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	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
192	11	10	154	153	10	N20W63	1	0	0	SOFLARE X8/2B	10	N20W63	Q	SOALERT 11/XX
						N20W45	1	0	0	DURATION 32		N20W45	Q	MAGALERT 12/13
						S22E17	3	1	0	MINUTES.		S22E17	E	
						S19W20	0	0	0	TENFLARE 2000 FLUX		S19W20	Q	
						S25E37	0	0	0	UNITS 10/0603Z		S25E37	Q	
						N20E50	12	2	1	DURATION 74		N20E50	A	
						S30W36	0	0	0	MINUTES.		S30W36	Q	
						N27E49	0	0	0			N27E49	Q	
						N17E84	0	0	0			N17E84	Q	
193	12	11	210	164	07	N20W75	0	0	0	SOFLARE MB/2B	11	N20W75	Q	SOLALERT 12/XX
						N20W59	4	0	0	N17E49, 11/0426Z		N20W59	E	MAGALERT 12/XX
						S18E06	0	0	0	IN PROGRESS		S18E06	Q	
						S20W34	1	0	0	11/0441Z. SOFLARE		S20W34	Q	
						N18E36	22	4	2	X15/2B N20E46,		N18E36	A	
						S21W48	0	0	0	11/1043Z. TENFLARE		S21W48	Q	
						N26E36	0	0	0	4900 FLUX UNITS		N26E36	Q	
						N16E64	1	1	0	11/1050Z. DURATION		N16E64	Q	
						S12E52	0	0	0	104 MINUTES.		S12E52	Q	
										LARGEST X-RAY				
										FLARE RECORDED.				
										SATELLITE SENSORS				
										SATURATED FOR 10				
										MINUTES.				
194	13	12	159	175	03	N20W74	9	0	0		12	N20W74	E	SOLALERT 13/XX
						N19W07	0	0	0			N19W07	Q	MAGALERT 13/XX
						S21W46	3	0	0			S21W46	E	
						N18E23	16	5	0			N18E23	P	
						S20W61	0	0	0			S20W61	Q	
						N25E23	0	0	0			N25E23	Q	
						N17E52	1	0	0			N17E52	Q	
						N11E38	0	0	0			N11E38	Q	
195	14	13	135	160	11	N21W81	1	0	0	PRESTO BOULDER	13	N21W81	C.A.	SOLALERT 14/XX
						S17W18	0	0	0	PROTON EVENT BEGAN		S17W18	Q	MAGALERT 14/XX
						S20W59	0	0	0	13/0300Z. 23		S20W59	E	
						N18E10	7	0	0	PROTONS /cm²/sec/		N18E10	P	
						N23E08	0	0	0	ster AT >10MEV		N23E08	Q	
						N15E38	0	0	0	AT 13/1000Z.		N15E38	Q	
						N20E73	0	0	0	PROBABLE MAX AT		N20E73	Q	
										13/1000Z. PRESTO				
										MEUDON MAGSTORM				
										SSC 13/0014Z.				
196	15	14	176	154	45	S19W33	0	0	0		14	S19W33	Q	SOLALERT 15/XX
						S19E74	1	0	0			S19E74	E	MAGALERT 15/XX
						N18W04	6	0	0			N18W04	P	
						N23W03	0	0	0			N23W03	Q	
						N15E23	0	0	0			N15E23	Q	
						N20E57	1	0	0			N20E57	Q	
						S24E45	3	0	0			S24E45	E	
						S28W05	0	0	0			S28W05	Q	
						N22W10	0	0	0			N22W10	Q	
197	16	15	168	164	05	S18W45	0	0	0		15	S18W45	Q	SOLALERT 16/XX
						S21W84	0	0	0			S21W84	Q	MAGNIL
						N16W14	9	2	0			N16W14	P	
						N16E11	0	0	0			N16E11	Q	
						N19E43	2	0	0			N19E43	E	
						S24E30	2	0	0			S24E30	D.A.	
						S28W25	0	0	0			S28W25	Q	
						N31E09	0	0	0			N31E09	Q	
						N13E29	0	0	0			N13E29	Q	
198	17	16	145	158	06	N17W27	6	0	0		16	N17W27	C.P.	SOLALERT 17/XX
						N15W00	0	0	0			N15W00	Q	MAGQUIET
						N18E31	1	0	0			N18E31	E	
						S23E18	1	0	0			S23E18	E	
						N12E16	0	0	0			N12E16	Q	
199	18	17	170	156	07	N18W41	6	0	0		17	N18W41	C.P.	SOLALERT 18/XX
						N15W14	3	0	0			N15W14	E	MAGALERT 18/XX
						N18E16	3	0	0			N18E16	E	
						S23E04	0	0	0			S23E04	Q	
						N12E03	0	0	0			N12E03	Q	
						N12W12	0	0	0			N12W12	Q	
						S26E52	0	0	0			S26E52	Q	
						N23E52	0	0	0			N23E52	Q	
						N13E23	0	0	0			N13E23	Q	
200	19	18	145	152	11	N19W53	7	1	0	SOFLARE M5/2B	18	N19W53	C.P.	SOLALERT 19/XX
						N15W29	1	0	0	N17W51, 18/1922Z		N15W29	E	MAGALERT 19/XX
						N19E03	0	0	0	DURATION 37 MINUTES		N19E03	Q	
						S23W11	0	0	0	TENFLARE 880 FLUX		S23W11	Q	
						N13W11	0	0	0	UNITS 18/0016Z		N13W11	Q	
						N12W22	0	0	0	DURATION 4 MINUTES		N12W22	Q	
						S26E43	0	0	0	MINOR GEOMAGNETIC		S26E43	Q	
						N20E52	0	0	0	STORM STARTED		N20E52	Q	
										18/2230 Z.				

ALERT PERIODS

INTERNATIONAL URSIGRAM
AND WORLD DAYS SERVICE

JULY 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	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
201	20	19	141	144	16	N17W66	2	0	0		19	N17W66	P	PROTON FLARE ALERT 20/XX
						N16W40	0	0	0			N16W40	Q	MAGALERT MINOR 20
						N19W10	5	0	0			N19W10	E	
						S22W23	0	0	0			S22W23	Q	
						N13W23	0	0	0			N13W23	Q	
						N11W33	0	0	0			N11W33	Q	
						S27E29	0	0	0			S27E29	Q	
						N16W04	0	0	0			N16W04	Q	
						S38W21	0	0	0			S38W21	Q	
						S17E28	0	0	0			S17E28	Q	
202	21	20	81	141	10	N17W81	7	1	0		20	N17W81	P	PROTON FLARE ALERT PIANO 21
						N18W23	1	0	0			N18W23	E	MAGALERT MINOR 21/XX
						N17W53	1	0	0			N17W53	Q	
						S23W35	1	0	0			S23W35	Q	
						N11W45	0	0	0			N11W45	Q	
						S38W33	0	0	0			S38W33	Q	
203	22	21	104	136	05	N18W90	4	1	0	SOFLARE M8/1B	21	N18W90	Q	SOLNIL
						N20W38	0	0	0	N18W90, 21/1852Z		N20W38	E	MAGALERT MINOR 22/23
						S23W49	0	0	0	DURATION 34 MINUTES		S23W49	Q	
						N11W62	2	0	0	TENFLARE 140 FLUX		N11W62	E	
						N17W66	3	0	0	UNITS 21/1853Z		N17W66	Q	
						N14W28	0	0	0	LASTED 17 MINUTES.		N14W28	Q	
						S19W00	0	0	0			S19W00	Q	
						S38W48	0	0	0			S38W48	Q	
204	23	22	101	123	10	N19W52	0	0	0		22	N19W52	E	SOLQUIET
						S23W61	1	1	0			S23W61	Q	MAGNIL
						N16W76	0	0	0			N16W76	Q	
						N13W47	0	0	0			N13W47	A	
						S39W60	0	0	0			S39W60	Q	
						S19W14	0	0	0			S19W14	E	
						N18E35	0	0	0			N18E35	Q	
						N26E47	0	0	0			N26E47	Q	
205	24	23	75	120	10	N19W64	1	0	0		23	N19W64	E	SOLQUIET
						S22W76	0	0	0			S22W76	Q	MAGQUIET
						N13W59	0	0	0			N13W59	E	
						N18E19	0	0	0			N18E19	Q	
						N26E34	0	0	0			N26E34	Q	
206	25	24	39	115	05	N18W80	0	0	0		24	N18W80	Q	SOLQUIET
						N13W73	0	0	0			N13W73	Q	MAGQUIET
						N25E21	0	0	0			N25E21	Q	
207	26	25	48	110	05	N18W07	0	0	0		25	N18W07	Q	SOLQUIET
						N17E07	0	0	0			N17E07	Q	MAGQUIET
						S26W80	2	0	0			S26W80	E	
						S12E46	0	0	0			S12E46	Q	
208	27	26	23	109	05	N27W06	0	0	0		26	N27W06	Q	SOLQUIET
						N13W64	0	0	0			N13W64	Q	MAGQUIET
209	28	27	38	107	04	N27W17	0	0	0	TENFLARE TORUN	27	N27W17	Q	SOLQUIET
						N36E77	2	0	0	27/0608Z 140 FLUX		N36E77	Q	MAGQUIET
						N20E18	0	0	0	UNITS, DURATION		N20E18	Q	
										4 MINUTES.				
210	29	28	60	107	10	N27W30	0	0	0		28	N27W30	Q	SOLQUIET
						N36E63	0	0	0			N36E63	Q	MAGQUIET
						N20E67	0	0	0			N20E67	Q	
						N18E50	0	0	0			N18E50	Q	
						S21E78	0	0	0			S21E78	Q	
211	30	29	73	106	06	N27W41	0	0	0		29	N27W41	Q	SOLQUIET
						N36E51	0	0	0			N36E51	Q	MAGQUIET
						N19E54	2	0	0			N19E54	Q	
						N18E35	0	0	0			N18E35	Q	
						S19E64	0	0	0			S19E64	Q	
212	31	30	62	106	03	N36E40	1	0	0		30	N36E40	Q	SOLQUIET
						N18E38	0	0	0			N18E38	Q	MAGQUIET
						N18E18	0	0	0			N18E18	Q	
						S21E49	2	0	0			S21E49	Q	
213	01	31	47	106	02	N37E27	0	0	0		31	N37E27	Q	SOLQUIET
						N21E27	0	0	0			N21E27	Q	MAGQUIET
						S22E35	0	0	0			S22E35	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	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
1	17	22	43	44	20	84	128	93	70	77	119	46
2	15	29	37	40	20	88	120	83	68	85	93	61
3	24	29	47	25	31	102	131	95	71	91	74	47
4	19	25	47	22	47	102	138	103	75	76	60	34
5	23	20	48	25	58	73	137	76	94	74	51	54
6	26	26	55	27	58	69	129	67	92	73	29	57
7	28	25	57	34	55	42	121	90	88	70	39	84
8	25	18	52	27	45	36	89	99	105	56	45	105
9	30	30	47	31	58	36	94	85	126	59	36	108
10	25	40	38	25	75	15	96	92	111	57	29	115
11	23	45	28	26	71	18	95	85	109	63	57	127
12	29	51	33	27	62	26	92	78	107	65	62	111
13	40	48	53	28	44	26	93	65	93	72	56	114
14	40	47	48	31	37	36	82	62	75	72	62	109
15	42	53	54	39	41	30	59	72	61	78	89	102
16	38	56	53	49	39	23	64	70	85	91	97	110
17	36	53	51	51	29	24	56	66	99	79	103	98
18	40	60	50	54	33	14	55	72	100	85	115	78
19	35	59	54	52	40	8	53	64	107	84	109	74
20	33	60	54	38	23	7	52	51	115	74	109	76
21	33	58	42	32	23	20	63	77	112	73	154	77
22	38	42	35	28	17	38	74	82	109	73	158	48
23	15	41	30	24	23	43	69	85	105	72	158	33
24	19	48	29	18	31	37	78	82	102	82	154	38
25	25	46	28	10	35	32	94	70	139	86	135	30
26	34	49	30	9	41	47	86	53	115	84	152	13
27	38	54	38	14	50	69	79	50	90	97	134	21
28	36	61	37	9	45	79	88	49	75	90	130	31
29	40	64	42	10	58	90		48	72	103	115	48
30	36	60	45	23	64	104		44	70	107	99	35
31	31		52		67	118		70		109		36
MEAN	30.1	44.0	43.8	29.1	43.2	49.3	89.8	73.5	94.7	79.3	94.1	68.4

1976 yearly mean = 12.6

DAILY SOLAR FLUX AT 2800 MHz
OTTAWA ARO

FLUX ADJUSTED TO 1 A.U., S_a

	1977					1978						
DAY	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
1	83.0*	83.1	93.8*	94.4	88.4	126.9*	139.1	136.3	130.0	181.4	149.1	142.9
2	82.8	84.2	93.2	93.6	91.2	133.9	152.6	141.1	129.8	183.0	147.0*	127.6
3	82.3	87.2	97.4	90.4	93.7	130.2	156.6*	146.6	134.5	182.2A	130.8	116.5
4	82.9*	84.2	98.8	89.4	95.9	124.8	154.0	148.4	143.3*	178.4	118.6	117.4
5	86.4	85.6	104.0*	90.6	96.9	119.2	159.0	154.5	146.7*	173.9*	116.9	118.9
6	88.2	84.9	103.5	91.1	102.0*	118.7*	156.1	162.8	145.3*	173.1	109.8	119.3*
7	86.9	89.3	105.5	90.2	105.5	111.6	157.3	165.2	146.9	162.6*	110.6	128.9
8	85.1	91.6	103.8	90.3	106.7	102.8	157.0*	168.7	148.6	143.4	109.3	135.9
9	85.9	95.9	100.7	91.1	112.6*	97.0	155.2	183.7	156.1	135.1	106.5	147.1*
10	87.2	99.8	96.4	93.1	114.7	93.5	148.7	179.1	155.4	129.5	108.4	156.0*
11	87.6	104.6	95.3	94.9	107.4	93.1	154.2	175.2	162.8*	133.8	113.2	163.2*
12	86.5	107.8	100.8	91.4	111.0	92.1	159.0	169.8	156.2	138.2	116.4*	174.2*
13	89.0	112.9	98.5	94.0	100.6	90.3	151.2	160.9	145.6	140.2	120.3*	165.5
14	87.5	118.2	98.9	97.9	93.7*	88.6	148.4	160.5	139.1	143.7	126.4*	163.1
15	86.9	120.7	98.2	97.9	92.5	89.6	136.8	154.2	141.4	146.1	132.5	169.5
16	87.3	120.4	96.8	95.9	92.5	86.4	130.2	143.3	137.6	147.8*	139.5*	163.4
17	87.1	120.6	94.9	100.4	91.1	83.8	125.9	135.4	133.4	143.8	149.0	159.5
18	88.6	120.5	95.4	102.0*	93.6	84.7	124.9	132.3	134.1	135.6	153.5*	154.1*
19	87.0	104.5	105.0	99.2	91.0	85.4	119.1	128.1	139.5*	133.6	162.0*	148.6
20	88.7	108.8	99.6*	95.7*	88.7	87.0	122.2	125.3	138.1	132.3*	174.2	142.9*
21	90.8	104.9*	98.6*	92.8	87.8	91.4	122.2	118.2	138.4*	132.7	185.4*	140.2
22	89.6	102.4	93.9	89.3	89.9	96.9	127.7	117.0	146.4	135.7*	190.3	127.0
23	86.0	99.3	87.3	88.0	91.2	99.6	131.8	116.4	162.9	142.9*	196.7	123.4*
24	86.0	100.6	88.3	86.7	93.9	100.4	135.6	117.5	159.8	146.5*	194.8	118.5
25	87.7	98.8	88.1	84.7	96.3	103.3	139.3	118.2	159.1*	147.6	183.5	113.7
26	86.4	99.4	88.6	84.1	99.3	112.7	134.8	112.5	166.7	152.8	182.4*	112.2
27	85.4	100.0	88.5	83.8	98.3	116.4	137.5	114.1	172.8	150.6*	179.5	110.8
28	82.4	100.0	90.3*	85.6	98.9	127.7*	135.4	112.7	176.6*	147.1*	174.1	109.9
29	86.1	99.4	90.3	85.6	105.6*	132.2*		111.1	185.2	148.6	167.4	109.2
30	85.5	97.7	94.9	85.3	114.7	134.9		115.4*	182.1*	147.2*	154.6*	109.2
31	84.7		95.9		120.2	133.3*		124.5		152.6		108.8
MEAN	86.4	100.9	96.3	91.6	98.9	106.1	141.8	140.3	150.5	149.7	146.8	135.4

* adjusted for burst
A = interpolated data point

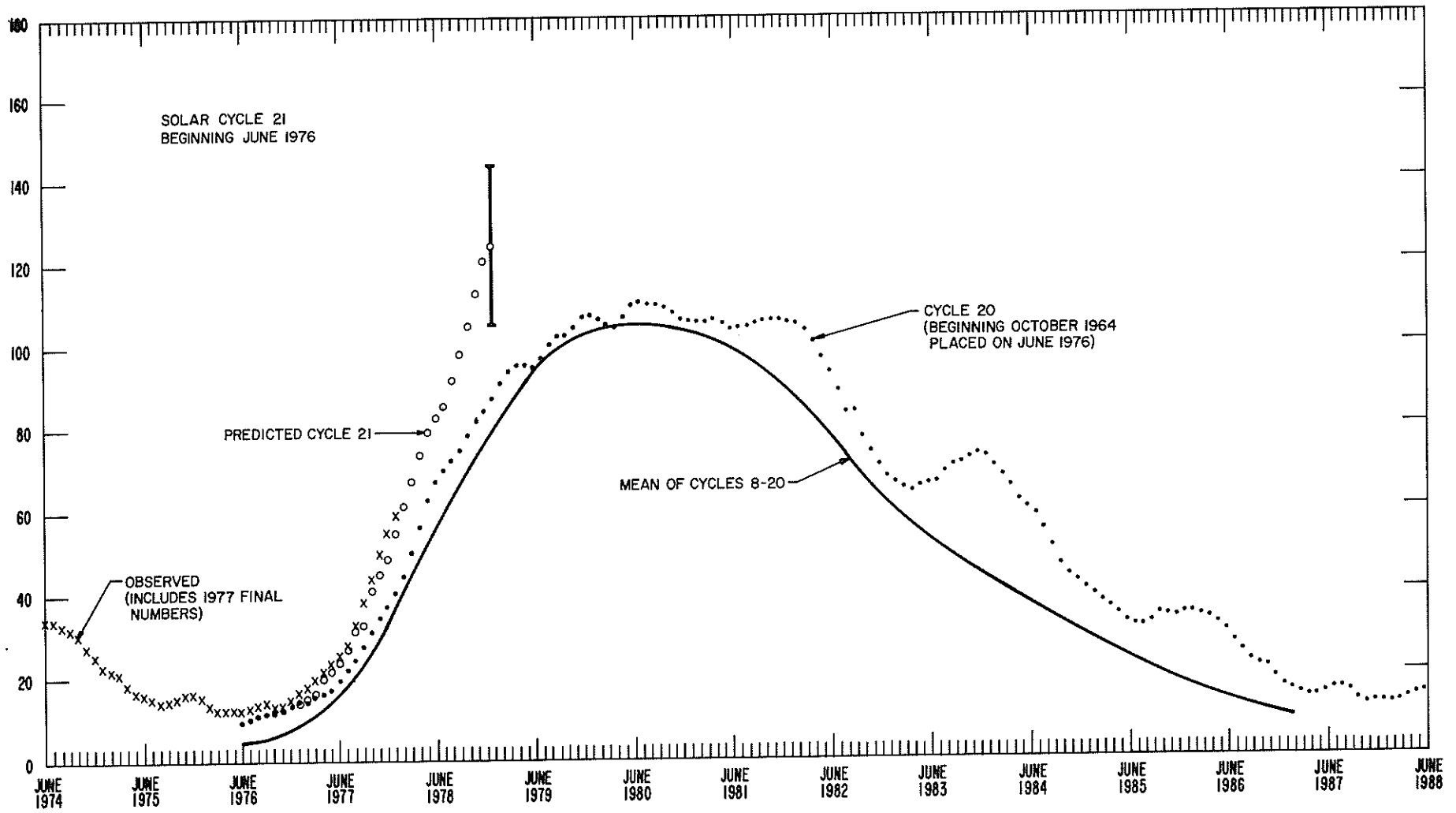
DAILY SOLAR INDICES

JULY 1978

JUL 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	182	10	46	49	138.2	592	336	173	142.9	144.9	97.9	62.7	28.1	11.4
2	183	11	61	39	123.4	584	317	157	127.6	127.0	88.3	65.4	27.3	11.7
3	184	12	47	51	112.7	571	308	149	116.5	116.6	86.2	67.3	28.2	11.1
4	185	13	34	40	113.5	574	310	148	117.4	114.4	90.5	63.2	29.9	11.8
5	186	14	54	48	115.0	577	312	149	118.9	119.8	86.0	63.6	27.8	12.1
6	187	15	57	58	115.4*	582	315	153	119.3*	120.0	84.9	61.2	29.2	12.3
7	188	16	84	76	124.7	580	314	160	128.9	125.5	88.1	63.9	28.3	12.4
8	189	17	105	91	131.4	576	332	169	135.9	133.7	91.7	67.8	34.2	18.7
9	190	18	108	96	142.3*	594	355	184	147.1*	147.2	101.3	70.2	33.4	14.0
10	191	19	115	101	150.9*	610	379	203	156.0*	156.4	107.0	68.1	45.0	73.9
11	192	20	127	109	157.8*	621	381	213	163.2*	165.2	108.3	71.1	30.7	31.5
12	193	21	111	90	168.6*	623	399	225	174.2*	175.0	112.2	73.5	33.2	21.2
13	194	22	114	94	160.2	600	376	213	165.5	161.0	109.2	72.3	33.1	13.6
14	195	23	109	94	157.9	595	370	208	163.1	163.3	111.6	70.2	27.6	13.7
15	196	24	102	85	164.1	593	365	199	169.5	166.3	122.3	70.8	32.3	13.5
16	197	25	110	87	158.2	590	358	196	163.4	165.0	117.8	69.8	29.2	12.0
17	198	26	98	79	154.4	587	353	185	159.5	154.0	119.9	70.8	29.0	13.2
18	199	27	78	68	149.2*	599	355	188	154.1*	155.6	112.7	70.7	32.5	14.7
19	200	1	74	61	143.9	592	344	179	148.6	145.8	110.3	76.4	33.0	14.1
20	201	2	76	63	138.3*	579	337	176	142.9*	141.2	107.5	74.0	33.2	13.9
21	202	3	77	56	135.9	584	333	171	140.2	133.7	105.8	71.4	26.8	12.4
22	203	4	48	36	123.1	575	313	155	127.0	124.0	97.2	69.4	28.7	11.9
23	204	5	33	30	119.6*	572	311	152	123.4*	119.4	93.9	70.5	31.3	13.4
24	205	6	38	28	114.8	567	304	148	118.5	115.4	90.5	72.9	28.9	13.2
25	206	7	30	22	110.2	564	303	146	113.7	111.8	89.9	67.7	32.2	12.4
26	207	8	13	0	108.7	563	310	144	112.2	107.4	86.2	65.6	27.9	11.6
27	208	9	21	15	107.5	556	300	141	110.8	106.3	84.0	63.2	28.4	11.5
28	209	10	31	31	106.6	560	308	143	109.9	105.4	82.5	68.8		11.2
29	210	11	48	36	105.9	564		142	109.2	105.4	80.9	65.0	28.5	11.4
30	211	12	35	36	105.9	563	299	141	109.2	107.8	80.7	61.9	26.9	11.6
31	212	13	36	33	105.6	561	304	142	108.8	106.7	83.5	66.3	26.8	11.0
MEAN			68.4	58.1	131.1	582	333	169	135.4	133.6	97.7	68.2	30.4	12.7

* 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	44.6	50.5	55.4
1978	59.6	65.6	71.6	77.9	84.9	91.0	96.0	100.5	104.7	108.5	113.0	119.3
		(2)	(5)	(7)	(9)	(11)	(14)	(17)	(20)	(21)	(20)	(19)
1979	124.6	129.1	133.3	136.2	138.8	143.3	147.7	150.5	152.1	152.7	152.7	151.8
	(19)	(20)	(22)	(26)	(29)	(31)	(33)	(35)	(38)	(41)	(43)	(45)
1980	150.2	148.6	147.9	148.4	147.6	144.3	140.6	137.6	136.0	135.1	133.6	132.1
	(45)	(45)	(43)	(42)	(44)	(45)	(47)	(47)	(47)	(48)	(49)	(52)
1981	131.9	131.2	128.7	125.6	123.2	121.0	120.1	120.2	119.5	118.1	115.9	112.7
	(54)	(54)	(52)	(51)	(50)	(49)	(48)	(46)	(46)	(46)	(44)	(42)
1982	109.4	106.2	103.7	101.9	99.6	96.9	93.0	88.5	84.5	80.1	76.9	73.4
	(40)	(39)	(38)	(36)	(34)	(33)	(31)	(29)	(27)	(24)	(22)	(22)
1983	69.5	66.7	64.6	62.4	60.2	57.9	55.9	53.9	52.1	50.8	49.9	49.2
	(21)	(21)	(22)	(22)	(23)	(23)	(24)	(26)	(27)	(29)	(31)	(31)
1984	48.0	46.2	43.5	40.3	37.7	36.4	35.3	33.7	32.3	31.4	30.2	28.7
	(31)	(30)	(29)	(29)	(30)	(31)	(32)	(31)	(30)	(29)	(28)	(27)
1985	27.7	27.0	26.1	25.7	25.0	24.1	23.4	22.6	21.8	20.9	20.0	19.5
	(27)	(26)	(26)	(26)	(26)	(25)	(23)	(22)	(22)	(23)	(24)	(24)
1986	19.1	18.5	17.9	17.0	15.8	14.7	13.8	13.3	13.1	12.8	12.6	12.4
	(24)	(24)	(24)	(23)	(22)	(21)	(20)	(19)	(17)	(16)	(15)	(13)
1987	12.7	13.2	14.0	14.9	15.9							
	(12)	(11)	(11)	(11)	(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 153 ± 35.

Errata: A slight error crept into the initial calculations for the smoothed (running average) Zürich sunspot numbers for October - December 1977. Incorrect values first began appearing in SGD, 405 Part I, page 11, May 1978 issue. The October 1977 incorrect number of "44.0" should be "44.6," for November 1977 "49.9" should be "50.5," and for December 1977 "54.8" should be "55.4."

Hα SOLAR FLARES

JULY 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE JUL	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.	
MANI	01	0304	0306	0316	N25	W40	.763		29.1	12	SN		P		120	1.7	
MITK	04	0534E	0538	0600D	N27	W19	.615		2.8	26D	SB		C	0538			D
MANI	04	0537E	0539	0557D	N26	W17	.591		3.0	20D	SF		V		110	1.2	
BUCA	04	0730E		0800	N28	W19	.627		2.9	30D	SN		C	0740	107	1.3	
MANI	04	2321E	2321U	2332	S25	W23	.484		3.2	11D	SF		V		20	.2	
MANI	04	2223E	2223U	2229	S25	W24	.495		3.1	6D	SF		V		15	1.6	
RAMY	05	1118	1140	1409	S26	W28	.547		3.4	171	SB	4	C		113		Z F
MCMA	05	1211E		1305	S27	W29	.566	15389	3.3	54D	SB		P	1211	80	1.1	E
MCMA	05	1307	1328	1345	N27	W37	.753	15388	2.8	38	SB		C	1328	45	.6	EL
RAMY	05	1311	1329	1339	N27	W36	.745		2.8	28	SB	4	C		46		
RAMY	05	1311	1312	1339	N27	W36	.745		2.8	28	SN	4	C		26		
RAMY	05	1507	1508	1522	N27	W37	.753		2.9	15	SB	4	C		52		F
MCMA	05	1508E		1530D	N27	W37	.753	15388	2.9	22D	SN		C	1508	80	1.2	E
MCMA	05	1614	1619	1624	N27	W38	.762	15388	2.8	10	SN		C	1619	70	1.0	E
RAMY	05	1617	1618	1631	N27	W37	.753		2.9	14	SB	4	C		26		
RAMY	05	1635	1637	1710	S26	W31	.581		3.4	35	SB	3	C		20		F
MCMA	05	1700E		1708D	S27	W33	.610	15389	3.2	8D	SN		C	1708	40	.6	E
MCMA	05	1733E		1800	S21	W02	.256	15386	5.6	27D	SF		C	1736	60	.7	E
PALE	05	1748	1808	1959	S27	W33	.610		3.3	131	SB	3	C		188		DE F
MCMA	05	1750E	1803	2028D	S27	W33	.610	15389	3.3	158D	SB		C	1803	90	1.4	FH
PALE	05	2021	2022	2028	S27	W33	.610		3.4	7	SN	3	C		51		H F
PALE	05	2039	2043	2046	S27	W33	.610		3.4	7	SN	3	C		22		F
PALE	05	2058	2102	2107	S27	W33	.610		3.4	9	SN	3	C		51		DE
MCMA	05	2112	2117	2128	N27	W40	.778	15388	2.9	16	SN		C	2117	25	.4	D
PALE	05	2114	2123	2133	N26	W40	.771		2.9	19	SN	3	C		48		DE
BUCA	06	0735		0746	S26	W39	.670		3.4	11	SF		C	0740	64	1.0	
MCMA	06	1131E		1140	S28	W42	.710	15389	3.3	9D	SF		C	1131	25	.4	D
MCMA	06	1206	1209	1235	S28	W42	.710	15389	3.4	29	SN		C	1209	35	.5	E
RAMY	06	1214	1215	1409	S26	W42	.702		3.4	115	SN	3	C		51		
MCMA	06	1258	1300	1304	S28	W42	.710	15389	3.4	6	SN		C	1300	30	.5	E
RAMY	06	1414	1414	1419	S26	W42	.702		3.4	5	SN	3	C		16		
MCMA	06	1439	1442	1455	S21	E38	.637	15391	9.5	16	SF		C	1442	20	.3	D
RAMY	06	1502	1512	1612	S26	W43	.712		3.4	70	SN	3	C		152		FDE
MCMA	06	1510	1513	1514D	S28	W43	.720	15389	3.4	4D	SN		C	1513	35	.5	E
MCMA	06	1550	1555	1625	S21	E38	.637	15391	9.5	35	SN		C	1551	30	.4	E
RAMY	06	1639	1640	1644	N 9	W62	.896		2.0	5	SN	3	C		16		F
MCMA	06	1716	1724	1735	S28	W43	.720	15389	3.5	19	SF		C	1724	30	.5	E
RAMY	06	1730	1740	1805D	S27	W46	.747		3.3	35D	SN	3	C		25		F
RAMY	06	1730	1731	1805D	S27	W46	.747		3.3	35D	SF	3	C		20		F
MCMA	06	1742	1746	1814	S27	W47	.756	15389	3.2	32	SF		C	1746	35	.6	D
MCMA	06	1753	1754	1815	S21	E36	.613	15391	9.4	22	SF		C	1754	30	.4	E
MCMA	06	1855E	1907	1940	S20	E88	.998	15397	13.4	45D	SN		C	1907			D
MCMA	06	1934	1935	1938	S21	E35	.600	15391	9.4	4	SN		C	1935	15	.2	D
MCMA	06	2028	2035	2050	S27	W48	.766	15389	3.3	22	SN		C	2035	40	.7	E
MCMA	06	2110	2115	2125	S19	E77	.969	15397	12.7	15	SN		C	2115			E
PALE	07	0109E	0109U	0132	S17	E71	.940		12.4	23D	SN	3	C		31		DE
BUCA	07	0650	0654	0705	S20	E70	.934		12.5	15	SN		C	0654	53		
TEHR	07	1112	1115	1131	S26	W56	.836		3.3	19	SN	2	C		64		F
TEHR	07	1212E	1215	1231D	N18	E64	.925	15398	12.3	19D	18	2	C		159		F
MCMA	07	1312	1315	1325	N24	W62	.925	15388	2.9	13	SF		C	1315	50	1.2	E
MCMA	07	1424	1426	1432	S16	W49	.753	15384	3.9	8	SF		C	1426	50	.9	E
MCMA	07	1437	1443	1535	S27	W57	.846	15389	3.3	58	SB		C	1443	60	1.5	E
MCMA	07	1526	1535	1546	S16	W49	.753	15384	4.0	20	SN		C	1535	50	.9	E
MCMA	07	1552	1604	1635	S27	W57	.846	15389	3.4	43	SF		C	1604	25	.6	DK
MCMA	07	1619	1622	1632	S21	E23	.448	15391	9.4	13	SN		C	1622	30	.4	E
MCMA	07	1620		1800	S16	W50	.764	15384	3.9	100	SN		C	1700	60	1.1	E
MCMA	07	1622	1626	1640	S22	E66	.909	15397	12.6	18	SN		C	1626	30	.9	E
MCMA	07	1636	1643	1710	S27	W58	.854	15389	3.3	34	SN		C	1643	70	1.7	E
PALE	07	1647E	1659	1709	S27	W61	.877		3.1	22D	SN	3	C		51		DE
MCMA	07	1656	1700	1706	S22	E66	.909	15397	12.7	10	SN		C	1700	15	.5	D
PALE	07	1710	1717	1722	S16	W51	.775		3.9	12	SN	3	C		25		DE
PALE	07	1728	1804U	1804D	S16	W51	.775		3.9	36D	SN	3	C		37		DE
RAMY	07	1748	1802	1830	S17	W54	.807		3.7	42	SN	3	C		80		
RAMY	07	1802	1827	1830	S27	W59	.862		3.3	28	SB	3	C		63		
MCMA	07	1823		1850	N16	E90	1.000	15403	14.5	27	SN		C				
PALE	08	0210	0219	0229	S16	W56	.825		3.9	19	SN	3	C		65		FDE
RAMY	08	1225	1227	1251	S16	W61	.869		3.9	26	SN	3	C		55		F

Hα SOLAR FLARES

JULY 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS'			REMARKS
	DATE JUL	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		CORD.	TYPE	TIME UT	MEAS. AREA Mill of Disk	CORR. AREA Sq. Deg.	
MCMA	08	1251	1255	1310	S16	W62	.878	15384	3.9	19	SF		C	1255	50	1.2	E
RAMY	08	1302	1303	1314	S16	W62	.878		3.9	12	SN	3	C		78		F
RAMY	08	1301	1304	1314	S26	W70	.935		3.3	13	SN	3	C		22		F
RAMY	08	1334	1335	1353	S16	W62	.878		3.9	19	SN	3	C		32		F
MCMA	08	1407E		1419	N15	E85	.999	15403	15.0	12D	SN		C	1410			D
RAMY	08	1434	1435	1438	S16	W62	.878		4.0	4	SN	3	C		33		F
RAMY	08	1444	1445	1448	S19	E53	.798		12.6	4	SN	3	C		20		
MCMA	08	1444E	1446	1451	S19	E49	.757	15397	12.3	7D	SN		C	1446	25	.4	D
RAMY	08	1449	1450	1454	S26	W71	.940		3.3	5	SN	3	C		14		
RAMY	08	1458	1500	1509	S26	W71	.940		3.3	11	SN	3	C		21		
PALE	08	1947E	1951U	2024	N18	E79	.989	15403	14.7	37D	2B	3	C		230		FDE
PALE	08	2003	2008	2044	S16	W65	.901		4.0	41	SB	3	C		41		DE
MCMA	09	1133E	1145	1411D	N18	E72	.966	15403	14.9	158D	1B		C	1145	70	2.1	EKZ
TEHR	09	1141	1145	1203	N18	E71	.962		14.8	22	SB	2	C		102		FDE
TEHR	09	1212	1245	1302D	N18	E70	.958		14.8	50D	SN	2	V		152		FDE
TEHR	09	1212	1214	1302D	N18	E70	.958		14.8	50D	SB	2	V		102		FDE
RAMY	09	1252E	1300	1634D	N19	E70	.959	15403	14.8	222D	2B	3	C		306		DE
RAMY	09	1252E	1424	1634D	N19	E70	.959	15403	14.8	222D	1B	3	C		115		DE
MCMA	09	1139	1142	1210	S21	W03	.255	15400	9.3	31	SN		C	1142	80	1.2	EH
RAMY	09	1349	1351	1356	S16	W75	.960		4.0	7	SN	3	C		9		
RAMY	09	1500	1510	1545	S19	E39	.642		12.6	45	SB	3	C		54		
MCMA	09	1544E		1646D	N18	E70	.958	15403	14.9	62D	1N		P	1645	100	2.7	EFT
PALE	09	1640E	1841U	2123	N17	E67	.941	15403	14.7	283D	2B	3	C		408		FDE
PALE	09	1737	1740	1816D	S19	E36	.604	15397	12.4	39D	1B	3	C		363		FDE
PALE	09	1801	1802	1805	S20	W 6	.253		9.3	4	SN	3	C		45		FDE
MCMA	09	1811E	1822	2200D	N20	E70	.960	15403	15.0	229D	2B		C	1822	280	.3	EFKLXY
PALE	09	2204	2226	2254	N18	E65	.931		14.8	50	SB	3	C		46		F
PALE	09	2301	0015	0017	N18	E64	.925		14.8	76	SB	3	C		65		F
PALE	10	0137	0143	0258	N18	E63	.919	15403	14.8	81	1B	3	C		188		FDE
MANI	10	0150E	0150U	0224D	N20	E65	.935	15403	15.0	34D	1B		P		180	3.6	
PALE	10	0219	0221	0242	N20	W35	.688	15409	7.5	23	1B	3	C		157		F
MANI	10	0225	0226	0235	N20	W34	.678		7.6	10	SN		V		150	16.5	
PALE	10	0312	0314	0414	N18	E62	.913	15403	14.8	62	1B	3	C		218		Z F
BUCA	10	0618E		0759	N19	E58	.888	15403	14.6	101D	2B		C	0626	537	10.7	U
ISTA	10	0630E		0710	N20	E65	.935	15403	15.1	40D	1N						
RAMY	10	1128	1143	1217	N19	E57	.880		14.8	49	SB	4	C		112		
RAMY	10	1241	1344	1434	N19	E56	.873	15403	14.7	113	1B	4	C		226		F
RAMY	10	1241	1252	1434	N19	E56	.873		14.7	113	SB	4	C		78		F
MCMA	10	1312		1415	N20	E60	.904	15403	15.1	63	1B		C	1320	100	2.2	E
MCMA	10	1436	1438	1441D	N14	E88	1.000	15410	17.2	5D	SF		C	1438			D
RAMY	10	1452	1503	1538	N19	E55	.865		14.7	46	SB	4	C		23		F
MCMA	10	1453		1515	N18	E56	.870	15403	14.8	22	SN		C	1500	25	.5	D
MCMA	10	1546	1558	1615	N15	E56	.862	15403	14.9	29	1N		C	1558	125	2.2	EK
RAMY	10	1550	1552	1647	N19	E55	.865		14.8	57	SN	3	C		45		FDE
RAMY	10	1655	1734	1737D	N19	E54	.857	15403	14.8	42D	2B	3	C		438		FDE
RAMY	10	1655	1707	1908D	N19	E54	.857		14.8	133D	SB	3	C		69		FDE
MCMA	10	1700	1735	1907D	N16	E55	.857	15403	14.8	127D	1B		C	1735	225	4.0	FHKVZ
PALE	10	1729E	1734	1806	N18	E55	.862	15403	14.9	37D	2B	3	C		445		UDE
PALE	10	1819	1825	2123	N17	E54	.851	15403	14.8	184	1N	3	C		164		UDE
PALE	10	1819	1920	2123	N17	E54	.851	15403	14.8	184	1B	3	C		338		UDE
RAMY	10	1702	1726	1810	S19	E25	.459		12.6	68	SB	3	C		23		
MCMA	10	1913E		2025D	N16	E55	.857	15403	14.9	72D	1B		C	1918	150	2.7	F
MCMA	10	2028	2040	2105D	N17	E52	.834	15403	14.8	37D	1B		C	2040	125	2.1	F
PALE	10	2125	2136	2222	N17	E53	.843		14.9	57	SN	3	C		123		F
PALE	10	2246	2248	2252D	N17	E52	.834	15403	14.8	6D	1B	3	C		175		FDE
MANI	10	2248	2250	2255	N17	E48	.798		14.6	7	SN		V		100	1.5	F
MANI	11	0054	0055	0105	N17	E47	.789		14.6	11	SN		V		120	1.8	
PALE	11	0304E	0340U	0352D	N17	E49	.808		14.8	48D	SB	3	C		110		F
PALE	11	0353	0400U	0418D	N17	E49	.808	15403	14.8	25D	2B	3	C		505		U F
MANI	11	0359E	0402	0406D	N18	E55	.862	15403	15.3	7D	1N		V		170	2.9	FE
BUCA	11	0705E		0728	N18	E45	.775		14.7	23D	SN		C	0705	85	1.3	
TEHR	11	0942E	0944U	0953	N20	E46	.793		14.9	11D	SB	2	C		127		
HERS	11	0943E	0943	1002	N18	E45	.775	15403	14.8	19D	1N		P	0949	187	2.7	E
MCMA	11	1037E	1056	1415	N18	E47	.793	15403	15.0	218D	2B		C	1056	700	10.9	HILRUX
TEHR	11	1037E	1040U	1046	N20	E46	.793		14.9	9D	SB	2	C		127		
WEND	11	1049	1057	1128D	N18	E43	.755	15403	14.7	39D	2N		P		800	11.5	
TEHR	11	1054E	1058U	1150	N20	E46	.793	15403	14.9	56D	1B	2	C		382		
HERS	11	1104E	1104	1253D	N18	E45	.775	15403	14.8	109D	1B		P	1106	230	3.3	E
MCMA	11	1135	1139	1147	S30	E33	.627	15401	14.0	12	SN		C	1139	60	.9	E

Hα SOLAR FLARES

JULY 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE JUL	START	MAX. PHASE	END	APPROX. LAT.	APPROX. MER. DIST.	CENTRAL DISTANCE	MCMATH PLAGE REGION	CMP DAY	MIN.		CORD.	TYPE	TIME UT	MEAS. AREA Mill of Disk	CORR. AREA Sq. Deg.	
RAMY	11	1154E	1157U	1411	N19	E44	.770	15403	14.8	137D	1B	2	C		205		FDE
RAMY	11	1215	1301	1314D	N19	W55	.865		7.4	59D	SB	2	C		67		
RAMY	11	1219	1254	1314D	S19	W28	.499		9.4	55D	SN	2	C		25		
MCMA	11	1328	1336	1344	N15	E70	.954	15410	16.8	16	SF		C	1336	15	.5	D
MCMA	11	1415	1419	1445	S23	W26	.498	15400	9.6	30	SN		C	1419	40	.5	E
RAMY	11	1419	1419	1439	S19	W28	.499		9.5	20	SN	3	C		69		FDE
UPIC	11	1419E	1425U	1432	S22	W27	.504		9.6	13D	SF		P	1425	102	64.0	
RAMY	11	1424	1431	1454	N19	W55	.865		7.5	30	SN	3	C		31		
UPIC	11	1425	1428U	1441	N19	W57	.881	15409	7.3	16	1F		P	1428	143	32.0	F
UPIC	11	1425	1428	1445	S18	E13	.293		12.6	20	SN		P	1428	163	90.0	
RAMY	11	1427	1427	1430	S19	E13	.304		12.6	3	SB	3	C		27		
MCMA	11	1427	1431	1439	S20	E14	.327	15397	12.7	12	SF		C	1431	40	.5	E
TEHR	11	1425E	1425U	1431	S19	W28	.499		9.5	6D	SN	2	C		64		
MCMA	11	1455E		1612D	N18	E45	.775	15403	15.0	77D	SB		C	1458	60	.9	EK
UPIC	11	1500	1506	1520	N19	E40	.731	15403	14.6	20	1N		P	1506	224	51.0	T
RAMY	11	1529	1613	1627	N19	E42	.751		14.8	58	SN	3	C		66		FDE
RAMY	11	1529	1533	1627	N19	E42	.751		14.8	58	SN	3	C		28		FDE
UPIC	11	1537	1551	1556	N18	E39	.716	15403	14.6	19	1N		P	1551	204	35.0	T
MCMA	11	1613	1619	1644D	N17	E40	.720	15403	14.7	31D	SB		C	1619	90	1.2	EW
UPIC	11	1615	1616	1626	N16	E38	.693		14.5	11	SN		P	1616	82	52.0	T
RAMY	11	1642	1650	1706	N18	E41	.736		14.8	24	SN	3	C		141		FDE
UPIC	11	1645	1653	1700D	N18	E39	.716	15403	14.6	15D	1N		P	1653	184	22.0	
PALE	11	1646E	1650U	1651D	N17	E42	.740		14.8	5D	SB	1	C		75		F
MCMA	11	1647E		1736D	N18	E42	.746	15403	14.8	49D	SB		C	1653	125	1.7	E
RAMY	11	1713	1715	1724	N18	E41	.736		14.8	11	SB	3	C		34		F
RAMY	11	1645	1649	1659	N19	W56	.873		7.5	14	SN	3	C		24		F
PALE	11	1907	2026U	2106	N17	E41	.730	15403	14.9	119	1B	3	C		212		U F
MCMA	11	2006	2007	2010	N16	E42	.735	15403	15.0	4	SF		C	2007	35	.5	E
MCMA	11	2017	2025	2111D	N18	E38	.705	15403	14.7	54D	SB		C	2025	110	1.5	E
PALE	11	2159	2232	2325	N20	E38	.718	15403	14.8	86	2B	3	C		878		U F
MANI	11	2242E	2242U	2255	N18	E38	.705	15403	14.8	13D	2F		V		400	5.4	
PALE	11	2226	2235	2236	N20	W60	.904		7.4	10	SN	3	C		60		FDE
PALE	11	2228	2228	2230D	N20	W38	.718	15392	9.1	2D	2B	3	C		761		UDE
PALE	12	0030E	0048U	0144	N18	E36	.685		14.7	74D	SB	3	C		148		FDE
PALE	12	0238	0259	0340	N18	E35	.675	15403	14.7	62	2B	3	C		510		U F
MANI	12	0249E	0251U	0251D	N18	E36	.685	15403	14.8	2D	1N		V		200	2.6	
TEHR	12	0253E	0255U	0300D	N18	E36	.685	15403	14.8	7D	1B	2	V		222		DE
MITK	12	0515E		0534D	N17	E33	.647	15403	14.7	19D	1N		P	0534	240	3.1	
TEHR	12	0529E	0533U	0545	N18	E36	.685		14.9	16D	SB	2	C		127		DE
BUCA	12	0810	0811	0835	N18	E31	.634		14.7	25	SN		C	0811	31	.4	E
UPIC	12	0815E		0825	N19	E30	.631		14.6	10D	SN		P	0815	102	61.0	
BUCA	12	0902	0911	0920	N17	E30	.615		14.6	18	SN		C	0911	95	1.2	
UPIC	12	0905	0908	0931	N19	E30	.631	15403	14.6	26	1N		P	0908	224	34.0	F
BUCA	12	0922	0923	0950	N18	E31	.634		14.7	28	SN		C	0923	47	.6	E
TEHR	12	1001	1005U	1026	N11	E28	.545		14.5	25	SF	2	C		64		F
BUCA	12	1013	1018	1041	N17	E30	.615		14.7	28	SB		C	1018	95	1.2	E
WEND	12	1017		1027	N18	E30	.623		14.7	10	SF		P				U
MCMA	12	1039E		1110	N18	E31	.634	15403	14.8	31D	SN		C	1045	125	1.5	E
MCMA	12	1050	1056	1059	N15	E56	.862	15410	16.7	9	SN		C	1056	40	.7	E
MCMA	12	1117	1118	1138	N20	E35	.689	15403	15.1	21	SN		C	1118	30	.4	D
MCMA	12	1141	1145	1148	N15	E56	.862	15410	16.7	7	SF		C	1145	25	.4	D
RAMY	12	1144	1145	1147	N16	E59	.888		16.9	3	SN	3	C		25		
RAMY	12	1145	1152	1217	N17	E30	.615		14.7	32	SN	3	C		57		
MCMA	12	1146	1155	1225	N20	E35	.689	15403	15.1	39	SN		C	1155	110	1.2	E
BUCA	12	1150	1153	1210	N17	E31	.626		14.8	20	SF		C	1153	40	.5	
RAMY	12	1148	1200	1222	N19	W67	.944		7.5	34	SB	3	C		96		
RAMY	12	1149	1152	1203	N16	E59	.888		16.9	14	SN	3	C		23		
MCMA	12	1213	1215	1219	S24	W41	.681	15400	9.4	6	SF		C	1215	35	.5	E
RAMY	12	1217	1218	1222	S21	W41	.671		9.4	5	SN	3	C		24		
RAMY	12	1223	1228	1230	N19	W67	.944		7.5	7	SB	3	C		43		
RAMY	12	1247	1248	1256	N19	W67	.944		7.5	9	SB	3	C		26		
MCMA	12	1300	1327	1410	N18	E29	.613	15403	14.7	70	SB		C	1327	90	1.1	EH
RAMY	12	1319	1327	1411	N17	E29	.604		14.7	52	SN	3	C		81		FDE
TEHR	12	1321	1328	1408	N18	E28	.603		14.7	47	SN	2	C		95		F
RAMY	12	1303	1309	1323	N19	W68	.949		7.4	20	SB	3	C		49		
RAMY	12	1324	1336	1444	N19	W68	.949		7.5	80	SN	3	C		48		
MCMA	12	1353	1356	1400	N18	W72	.967	15409	7.2	7	SB		C	1356	25	.8	D
HERS	12	1354E	1354	1403	N21	W65	.937	15409	7.7	9D	1N		P	1356	72	2.3	E
TEHR	12	1356	1359	1416	N20	W68	.951		7.5	20	SN	2	C		64		
MCMA	12	1435	1439	1500	N18	E29	.613	15403	14.8	25	SB		C	1439	40	.5	EL
RAMY	12	1435	1438	1445	N17	E28	.594		14.7	10	SB	3	C		28		

Hα SOLAR FLARES

JULY 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE JUL	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	12	1523	1525	1530	S32	E19	.514	15401	14.1	7	SF		C	1525	40	.5	E
MCMA	12	1546	1547	1553	N18	W73	.971	15409	7.2	7	SN		C	1547	25	.8	EHLV
MCMA	12	1553	1609	1630D	N17	E28	.594	15403	14.8	37D	SB		C	1609	150	1.8	EKLJ
RAMY	12	1555E	1555U	1559	N16	E27	.574		14.7	4D	SN	3	C		22		F H
RAMY	12	1601	1606	1639	N16	E27	.574		14.7	38	SN	3	C		100		F H
RAMY	12	1644	1646	1650	N19	W69	.954		7.5	6	SN	2	C		21		F
RAMY	12	1658	1701	1713	N19	W70	.959		7.5	15	SN	2	C		25		F
MCMA	12	1713	1719	1727	N18	W74	.974	15409	7.2	14	SF		C	1719	30	1.2	D
MCMA	12	1700	1703	1711	S24	W44	.714	15400	9.4	11	SN		C	1703	50	.7	EV
RAMY	12	1702	1707	1711	S21	W42	.683		9.6	9	SN	2	C		66		F
RAMY	12	1756	1800	1811	N16	E26	.564		14.7	15	SN	3	C		53		F
PALE	12	1759	1802	1850	N17	E29	.604		14.9	51	SN	3	V		88		FDE
MCMA	12	1757	1802	1825	N12	E58	.871	15410	17.1	28	SF		C	1802	25	.5	D
PALE	12	2049	2058	2120	N17	E27	.583	15403	14.9	31	1B	3	C		288		UDE
MCMA	12	2050	2055	2130	N17	E24	.552	15403	14.7	40	1B		C	2055	175	2.1	EX
PALE	12	2052	2052	2107	S20	W45	.714		9.5	15	SN	3	C		47		FDE
MCMA	12	2147	2150	2215	N14	E28	.568	15403	15.0	28	SN		C	2150	100	1.2	E
PALE	12	2148	2152	2207	N17	E27	.583		14.9	19	SB	3	C		86		FDE
PALE	12	2328	2330	2334	N17	E26	.573		14.9	6	SB	3	C		175		FDE
MANI	12	2330E	2330U	2335	N17	E24	.552		14.8	5D	SN		V		120	1.3	F
MANI	13	0025	0027	0032	N16	W78	.986		7.2	7	SF		P		20	.5	
TEHR	13	1018	1020	1051	N14	E22	.502		15.1	33	SN	2	C		64		
TEHR	13	1022	1025	1036	N18	E50	.821		17.2	14	SN	2	C		95		
PALE	13	2004E	2005U	2044D	N17	E14	.461		14.9	40D	SN	3	C		51		F
MANI	14	0527	0529	0540	N15	E10	.406		15.0	13	SN		P		50	.5	F
TEHR	14	0858	0900	0905	N18	E 4	.424		14.7	7	SN	3	C		32		
TEHR	14	0915	0916	0924	S22	W63	.887		9.7	9	SN	3	C		64		
MCMA	14	1100	1110	1225D	N14	E07	.373	15403	15.0	85D	SB		C	1110	100	1.1	E
TEHR	14	1103	1105	1124	N16	E 3	.390		14.7	21	SN	3	C		95		F
UPIC	14	1112E		1125D	N14	E06	.368	15403	14.9	13D	1N		P	1112	245	25.0	
MCMA	14	1123	1127	1140D	S25	E55	.824	15413	18.6	17D	SF		C	1127	20	.4	D
MCMA	14	1133	1138	1156	N15	E72	.964	15415	19.9	23	SB		C	1138	30	1.0	E
TEHR	14	1134E	1136	1142	N17	E68	.947		19.6	8D	SN	2	C		64		
MCMA	14	1143	1203	1240D	S25	E55	.824	15413	18.6	57D	SN		C	1203	20	.4	DH
MCMA	14	1342	1345	1400	S25	E54	.815	15413	18.6	18	SN		C	1345	20	.4	DH
RAMY	14	1404	1408	1417	N18	E 3	.422		14.8	13	SN	3	C		26		
MCMA	14	1411		1447	S25	E54	.815	15413	18.6	36	SB		C	1439	20	.4	DHK
RAMY	14	1436E	1438	1445	S23	E52	.793		18.5	9D	SN	3	C		24		H
TEHR	14	1437E	1440	1447	S23	E48	.753		18.2	10D	SF	1	C		32		
RAMY	14	1557	1600	1702	N15	E 2	.373		14.8	65	SN	3	C		89		
MCMA	14	1625E	1631	1718D	N14	E04	.361	15403	15.0	53D	1N		C	1631	200	2.0	E
RAMY	14	1604	1606	1612	S23	E52	.793		18.6	8	SN	3	C		26		
MCMA	14	1604	1606	1612	S25	E53	.806	15413	18.6	8	SN		C	1606	25	.5	D
MCMA	14	1650	1657	1702D	S25	E53	.806	15413	18.7	12D	SN		C	1657	25	.5	D
RAMY	14	1733	1733	1737	N18	E 1	.419		14.8	4	SN	3	C		73		
PALE	14	1733	1733	1738	N17	E 3	.406		15.0	5	SN	3	C		133		F
MCMA	14	1733	1734	1737	N15	W03	.374	15403	14.5	4	SB		C	1734	40	.4	D
MCMA	14	1800	1806	1815	S25	E51	.788	15413	18.6	15	SN		C	1806	40	.7	DH
RAMY	14	1806	1807	1811	S23	E51	.784		18.6	5	SF	3	C		26		H
MITK	15	0036E	0101	0127D	N14	W01	.356	15403	15.0	51D	1B		C	0101	280	2.9	
PALE	15	0046E	0135U	0140	N17	W 3	.407		14.8	54D	SN	3	C		29		FDE
MANI	15	0053E	0055	0115	N22	E02	.483	15403	15.2	22D	1B		V		200	2.1	ZE
PALE	15	0405E	0405U	0418	N17	W 4	.409		14.9	13D	SB	3	C		26		FDE
TEHR	15	0405	0409	0423	N18	W 5	.427		14.8	18	SB	2	C		64		
PALE	15	0407	0413	0418	S23	E44	.710		18.5	11	SN	3	C		133		
TEHR	15	0536E	0537	0551	S24	E41	.680		18.3	15D	SN	3	C		95		F
TEHR	15	0725	0729	0737	N28	W 2	.572		15.2	12	SF	3	C		95		F
BUCA	15	0730E		0742	N28	W02	.572		15.2	12D	SF		C	0731	15	.2	E
MCMA	15	1055E		1205D	N17	E23	.544	15410	17.2	70D	SN		P	1120	120	1.3	E
MCMA	15	1055E		1115	N15	W10	.406	15403	14.7	20D	SF		P	1056	40	.4	E
RAMY	15	1318	1322	1346	N19	E52	.842		19.5	28	SN	4	C		33		
RAMY	15	1344	1345	1355	N18	W10	.449		14.8	11	SN	4	C		69		H
MCMA	15	1344	1345	1350D	N14	W07	.374	15403	15.0	6D	SN		C	1345	50	.5	E
MCMA	15	1424	1425	1500	N18	W12	.462	15403	14.7	36	1B		C	1425	200	2.1	E
RAMY	15	1425	1425	1428D	N18	W10	.449	15403	14.9	3D	1B	4	V		310		F
TEHR	15	1425	1431U	1443	N19	W10	.464	15403	14.9	18	1B	1	C		300		F
PALE	16	0433	0434	0435D	N20	E41	.748		19.3	2D	SN	3	C		56		FDE
MCMA	16	1221	1230	1246	N28	W19	.635	15403	15.1	25	SN		C	1230	60	.7	E

Hα SOLAR FLARES

JULY 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE JUL	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	16	1254	1256	1314	N18	W22	.545		14.9	20	SB	3	C		98		F
RAMY	16	1602	1602	1609	N18	W24	.564		14.9	7	SN	3	C		21		
RAMY	16	1613	1613	1634	N18	W24	.564		14.9	21	SB	3	C		49		
RAMY	16	1647	1647	1650	N18	W24	.564		14.9	3	SN	3	C		30		
RAMY	16	1947	1948	1953	N18	W26	.584		14.9	6	SB	3	C		90		
PALE	16	1948	1948	1950	N17	W25	.564		15.0	2	SB	3	C		68		FDE
MITK	17	0018E	0023	0036D	S26	E20	.454	15403	18.5	18D	1F		C	0023	230	2.9	E
PALE	17	0022	0022	0033	S23	E20	.424		18.5	11	SN	3	C		29		FDE
PALE	17	0156	0157	0218	N17	W29	.606		14.9	22	SB	3	C		66		FDE
MITK	17	0157E		0230D	N14	W30	.593		14.8	33D	SN		C	0157			E
MITK	17	0246E	0253	0309D	N14	W30	.593		14.9	23D	SN		C	0253			EH
PALE	17	0246	0249	0307	N17	W29	.606		14.9	21	SN	3	C		97		FDE
TEHR	17	0939	0943	0957	S18	W63	.885	15397	12.7	18	1B	2	C		127		
WEND	17	1030		1048	N14	W30	.593		15.2	18	SN						
TEHR	17	1038E	1041	1043D	N18	W34	.666	15426	14.9	5D	1B	2	V		222		
MCMA	17	1040E		1055	N14	W34	.639	15403	14.9	15D	SN		C	1041	60	.7	E
MCMA	17	1120	1126	1245	N21	W30	.650	15403	15.2	85	SN		C	1126	30	.4	DK
MCMA	17	1256	1258	1320	N14	W35	.650	15403	14.9	24	SF		C	1258	40	.5	E
RAMY	17	1301E	1301U	1310	N16	W 7	.406		17.0	9D	SN	3	C		23		
MCMA	17	1350	1356	1420D	N14	W37	.672	15403	14.8	30D	SN		C	1356	75	1.0	EL
RAMY	17	1352	1410	1450	N17	W36	.680		14.9	58	SB	3	C		47		FDE
RAMY	17	1352	1427	1450	N17	W36	.680		14.9	58	SN	3	C		106		FDE
MCMA	17	1425	1428	1500	N14	W37	.672	15403	14.8	35	SB		C	1428	80	1.1	EL
WEND	17	1426		1448	N14	W33	.627		15.1	22	SN		V				
TEHR	17	1435	1438U	1445	N17	W35	.670		15.0	10	SB	2	C		63		
RAMY	17	1558	1600	1608	N19	E25	.584		19.5	10	SN	3	C		20		
RAMY	17	1623	1628	1645	N19	E25	.584		19.6	22	SF	3	C		167		F
RAMY	17	1623	1625	1645	N19	E25	.584		19.6	22	SB	3	C		100		F
MCMA	17	1623	1627	1640	N16	E27	.576	15415	19.7	17	SN		C	1627	50	.6	EH
RAMY	17	1800	1802	1814	N18	E23	.555		19.5	14	SB	3	C		66		F
MCMA	17	1835	1840	1855	N17	W10	.436	15410	17.0	20	SN		C	1840	40	.4	E
RAMY	17	1839	1840	1851	N14	W11	.400		17.0	12	SN	3	C		88		F
PALE	17	1839	1840	1849	N15	W12	.422		16.9	10	SB	3	C		75		FDE
RAMY	17	1949	1951	2011	N14	W12	.408		16.9	22	SB	3	C		69		F
MCMA	17	1950	1953	2005	N17	W10	.436	15410	17.1	15	SN		C	1953	50	.5	E
PALE	17	1951	1951	1957	N15	W13	.429		16.9	6	SN	3	C		23		DE
RAMY	17	2028	2035	2056D	N17	W40	.722		14.9	28D	SB	3	C		45		F
MCMA	17	2028	2035	2110	N21	W31	.660	15403	15.5	42	SN		C	2035	40	.5	E
PALE	17	2035	2037	2057	N17	W39	.712		14.9	22	SB	3	C		23		DE
MCMA	17	2115	2123	2150	N14	W40	.705	15403	14.9	35	SB		C	2123	50	.7	E
PALE	17	2120	2120	2130	N17	W39	.712		15.0	10	SN	3	C		32		DE
PALE	17	2133	2134	2223	N17	W40	.722		14.9	50	SN	3	C		118		FDE
MCMA	17	2133	2135	2206D	N20	W38	.720	15403	15.0	33D	SB		C	2135	75	1.0	E
MCMA	17	2159		2206D	N17	W12	.449	15410	17.0	7D	SN		C	2206	80	.9	E
PALE	17	2201	2202	2214	N15	W14	.437		16.9	13	SB	3	C		26		FDE
PALE	18	0018	0020	0111	N17	W42	.742		14.9	53	SN	3	C		137		FDE
BUCA	18	0800	0803	0812	N14	W44	.748		15.0	12	SF		C	0803	15	.2	E
BUCA	18	0820		0832	N19	W44	.772		15.0	12	SF		C	0823	15	.2	
BUCA	18	0845		0923	N19	W44	.772		15.1	38	SN		C	0900	63	.9	
TEHR	18	0903E	0906	0919	N18	W44	.767	15403	15.1	16D	1B	2	C		222		U
BUCA	18	0927		0957	N15	W46	.773		14.9	30	SN		C	0929	47	.7	E
MCMA	18	1306		1309D	N20	W46	.795	15403	15.1	3D	SB		C	1308	50	.8	E
RAMY	18	1311E	1313	1324	N17	W49	.809		14.9	13D	SB	3	C		33		FDE
TEHR	18	1314E	1316	1324	N18	W46	.786		15.1	10D	SB	2	C		95		U
RAMY	18	1421	1428	1451	N14	W22	.504	15410	16.9	30	1B	3	C		241		FDE
TEHR	18	1430E	1432	1445	N15	W22	.514	15410	17.0	15D	1B	2	C		254		F
MCMA	18	1432E		1455	N19	W19	.530	15410	17.2	23D	SN		C	1432	100	1.1	E
RAMY	18	1534	1534	1543	N19	E12	.477		19.5	9	SN	3	C		55		FDE
RAMY	18	1535	1538	1552D	N17	W51	.827		14.8	17D	SB	3	C		34		FDE
RAMY	18	1719	1724	1737D	N17	W51	.827		14.9	18D	SN	3	C		95		Z F
PALE	18	1722	1726	1851	N17	W51	.827		14.9	89	SN	3	C		118		FDE
PALE	18	1927	1959	2010D	N17	W53	.844	15403	14.8	43D	2B	3	C		520		
RAMY	18	1948E	1957	2000D	N17	W52	.836	15403	14.9	12D	2B	3	V		388		FDE
PALE	19	0324	0326	0332	N20	E 2	.455		19.3	8	SB	3	C		110		FDE
TEHR	19	0325E	0326	0330	N19	W 1	.438		19.1	5D	SN	3	C		95		U
MITK	19	0513E	0515	0526D	N18	W63	.920	15403	14.5	13D	1N		C	0515	100	2.1	E
TEHR	19	0515E	0518	0535	N17	W56	.869		15.0	20D	SB	2	C		95		DE
BUCA	19	0945		1005	N10	W30	.564		17.2	20	SF		C	0946	71	.8	
RAMY	19	1221	1222	1236	N18	W 1	.423		19.4	15	SN	3	C		20		F

Hα SOLAR FLARES

JULY 1978

OBSERVATORY	OBSERVED UT				LOCATION					DURATION	IMPORTANCE	OBS.		MEASUREMENTS			REMARKS
	DATE JUL	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	19	1321	1322	1405	N15	W63	.915		14.8	44	SN	3	C		61		F
TEHR	19	1323E	1327	1342D	N18	W60	.901		15.1	19D	SB	2	C		127		DE
RAMY	19	1337	1340	1405	N18	W 5	.430		19.2	28	SN	3	C		55		F
RAMY	19	1428	1429	1436	N18	W 5	.430		19.2	8	SN	3	C		45		F
RAMY	19	1540	1541	1547	N18	W 6	.433		19.2	7	SN	3	C		36		F
MITK	20	0006E	0016	0057D	N17	W71	.962	15403	14.7	51D	1N		C	0016	190		EH
PALE	20	0009	0012	0042	N17	W68	.947		14.9	33	SN	3	C		38		FDE
MANI	20	0011E	0014	0019D	N17	W70	.957		14.8	8D	SN		V		90	1.9	F
TEHR	20	0329E	0333	0344	S16	W 4	.170	15416	19.8	15D	1B	2	C		222		F
MONT	20	0808	0812	0814	N17	E67	.942		25.4	6	SF		C	0812	70		D
MONT	20	0912	0924	0935	S20	E90	.999		27.1	23	SF		C	0924	50		E
RAMY	20	1200	1221	1312	N18	W75	.978		14.9	72	SB	3	C		22		
MCMA	20	1215E	1221	1315	N22	W80	.993	15403	14.5	60D	SN		C	1221			D
MCMA	20	1304	1308	1318	N18	W46	.786	15410	17.1	14	SB		C	1308	70	1.0	E
RAMY	20	1306	1307	1316	N16	W47	.787		17.0	10	SN	3	C		67		F
TEHR	20	1308E	1311	1314	N18	W47	.795		17.0	6D	SB	2	C		64		F
TEHR	20	1308E	1311	1315	N21	W73	.974		15.1	7D	SB	2	C		64		
RAMY	20	1321	1324	1341	N18	W75	.978		14.9	20	SN	3	C		49		F
MCMA	20	1321	1324	1345	N22	W80	.993	15403	14.6	24	SB		C	1324			D
TEHR	20	1322	1324	1335	N21	W73	.974		15.1	13	SN	2	C		64		
MCMA	20	1433	1435	1441	N22	W81	.995	15403	14.5	8	SF		C	1435			D
MCMA	20	1510E	1514	1535D	N21	W83	.998	15403	14.4	25D	SN		C	1514			E
RAMY	20	1606	1610	1617	N18	W76	.982		15.0	11	SB	3	C		42		
MCMA	20	1607E	1608	1616	N22	W83	.998	15403	14.4	9D	SB		C	1608			D
MCMA	20	1705E	1712	1718D	N18	W48	.805	15410	17.1	13D	SF		C	1712	25	.4	D
TEHR	21	0451E	0453	0510	N17	W83	.997		15.0	19D	SN	2	C		64		DE
RAMY	21	1123	1124	1128	N27	W88	1.000		14.9	5	SN	3	C		20		
RAMY	21	1200	1203	1248	N14	W61	.899		16.9	48	SN	3	C		28		
RAMY	21	1237	1237	1249	N17	W89	1.000		14.9	12	SN	3	C		7		
RAMY	21	1307	1307	1354	N14	W61	.899		17.0	47	SN	3	C		22		
RAMY	21	1507	1507	1513	N14	W62	.906		17.0	6	SN	3	C		29		
RAMY	21	1717	1717	1720	N11	W64	.915		16.9	3	SN	3	C		16		
RAMY	21	1843	1845	1856	N11	W65	.922		16.9	13	SB	3	C		33		
RAMY	21	1857	1900	1926D	N17	W90	1.001	15403	15.0	29D	1B	3	C		0		
MCMA	22	1742	1747	1758	S15	W08	.193	15423	22.1	16	SN		C	1747	45	.5	E
MCMA	22	1941E		1951D	N27	E33	.728	15428	25.3	10D	SN		C	1942	30	.4	E
MONT	23	0735	0744	0829	N26	E29	.688	15428	25.5	54	1N		C	0744	500		
RAMY	23	1448	1454	1525	N17	W61	.906		19.0	37	SB	3	C		55		F S
RAMY	25	1359	1400	1405	S25	W71	.938		20.3	6	SF	3	C		23		
ISTA	26	0813E		0821D	N10	W15	.387		25.2	8D	SF						
RAMY	26	1942E	1944	1949	N39	E90	1.003		5.6	7D	SF	3	C		0		
MONT	27	0939	0941	0946	N15	E70	.955		4.7	7	SF		C	0941	50		
RAMY	27	1428	1432	1456	N37	E83	1.000		5.8	28	SF	3	C		0		
RAMY	27	1543	1545	1552	N37	E82	.999		5.8	9	SN	3	C		0		
MCMA	27	1820E		1847	N36	E86	1.000	15441	6.2	27D	SF		C	1820			D
MONT	28	0838	0841	0859	N15	E58	.880		4.7	21	SN		C	0841	60		E
MCMA	28	1411	1414	1420	N27	W27	.683	15428	26.6	9	SF		C	1414	25	.3	DH
MITK	29	0135E	0141	0158D	N27	W32	.721		26.7	23D	SF		C	0141			
TEHR	29	1045E	1049	1102	N19	E65	.935		6.3	17D	SB	2	C		127		DE
WEND	29	1047E		1108D	N22	E71	.968	15443	6.8	21D	2N		P		300		F
RAMY	29	1832	1836	1842	N23	E68	.956		6.9	10	SN	3	C		67		F
MONT	30	0910	0923	0944	N23	W35	.715		27.8	34	SN		C	0923	180		
RAMY	30	1159	1202	1211	N37	E46	.880		5.9	12	SN	2	C		43		
RAMY	30	1559	1559	1605	S20	E52	.787		6.6	6	SN	3	C		19		
RAMY	30	1633	1634	1657	S21	E50	.768		6.4	24	SN	3	C		23		F
MCMA	31	1125	1126	1148	N17	E32	.641	15443	5.9	23	SF		C	1126	40	.5	E

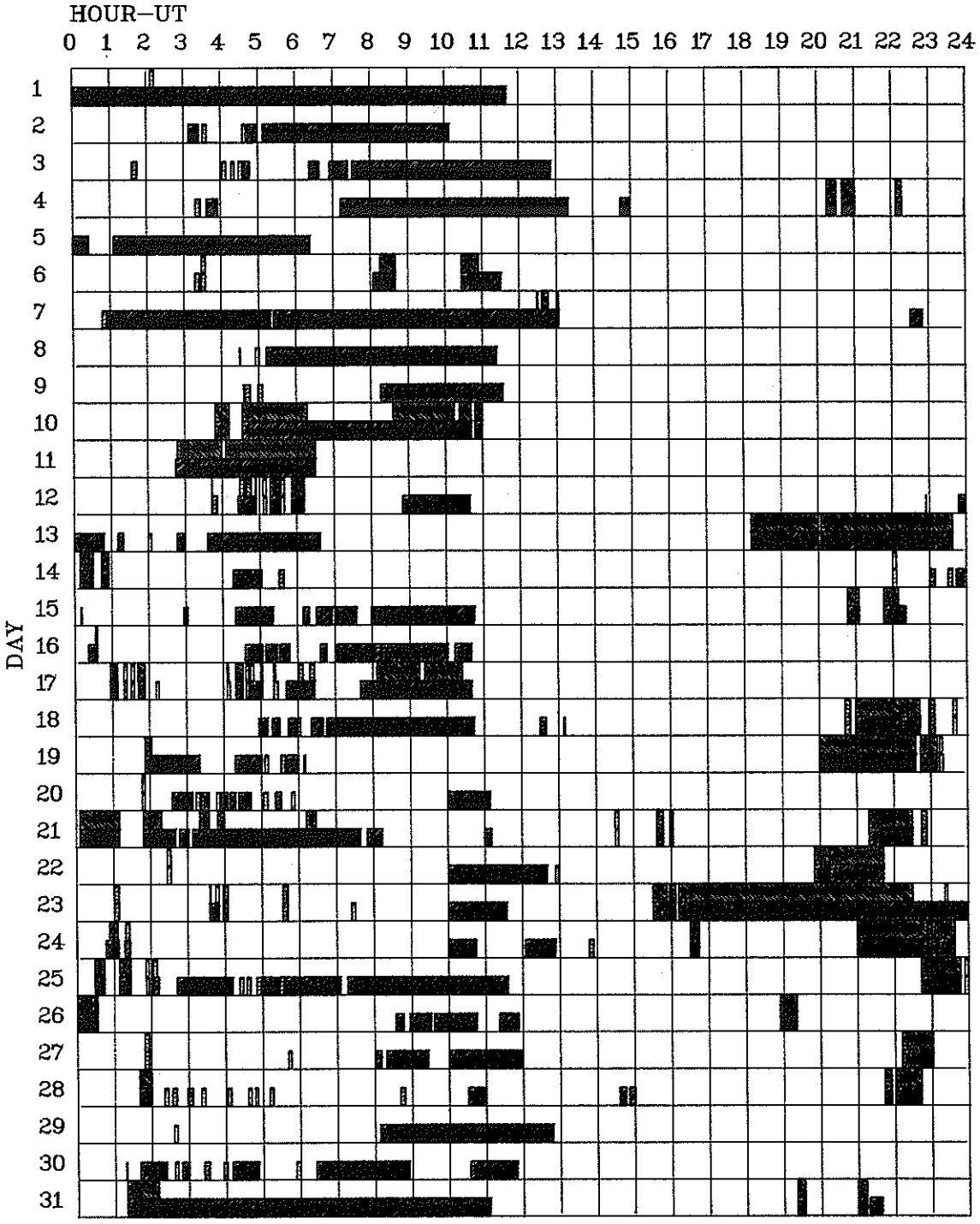
"Remarks":

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

JULY 1978



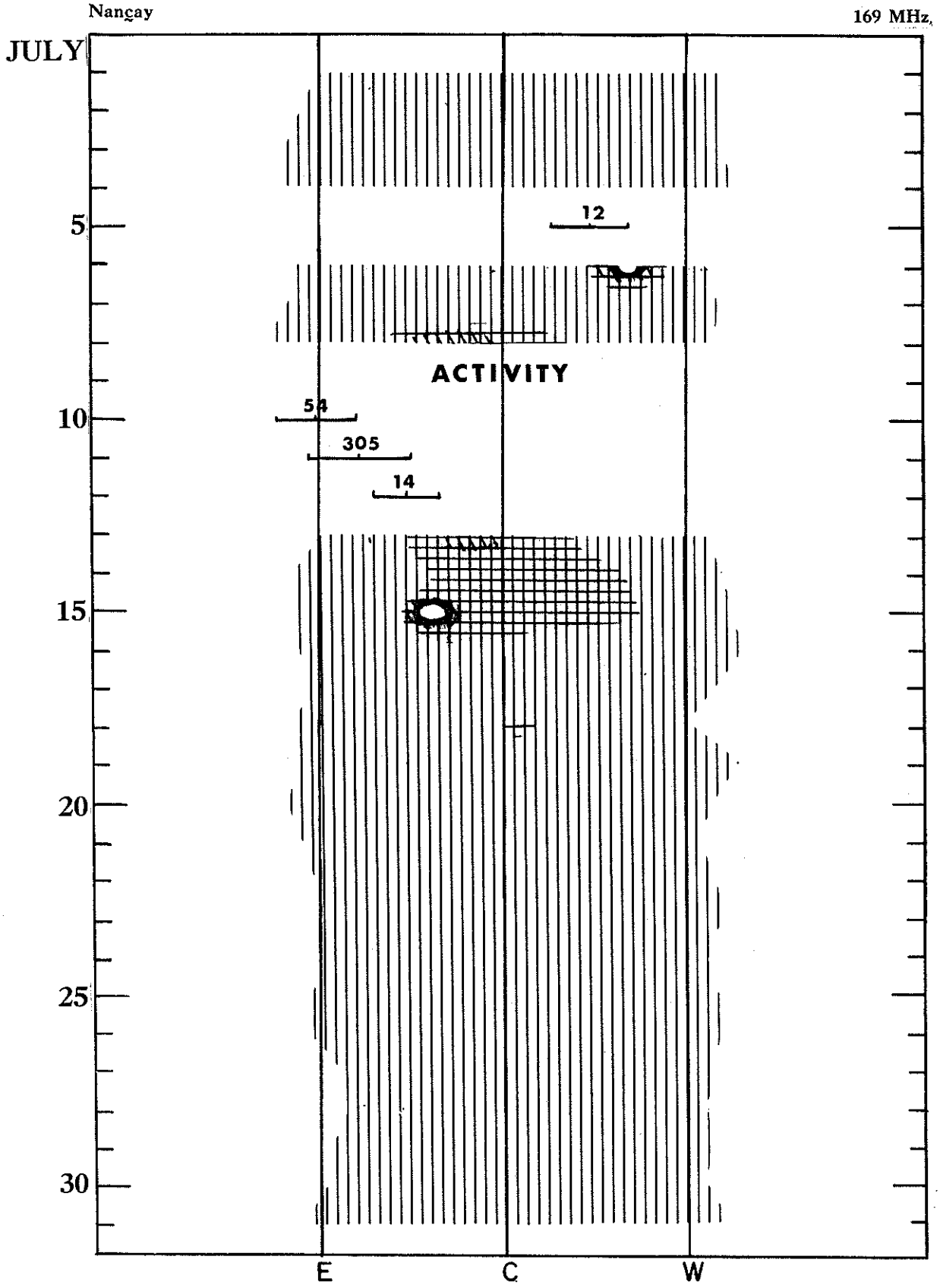
Observatories included in total patrol:

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

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

JULY 1978

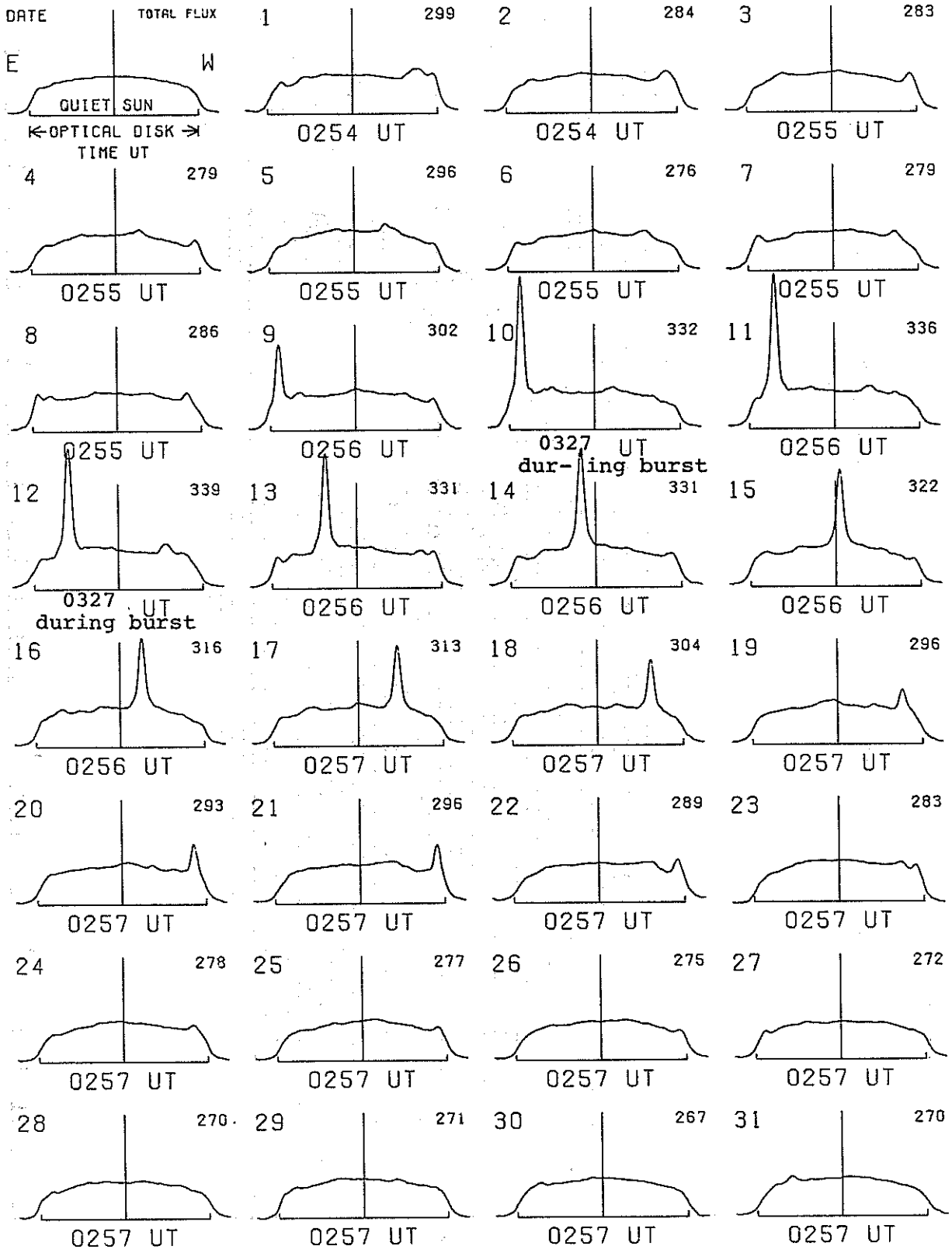


20
Jul 78

EAST-WEST SOLAR SCANS
JULY 1978

TOYOKAWA, JAPAN

3 CM
FAN BEAM WITH 1.1 MINUTES OF ARC

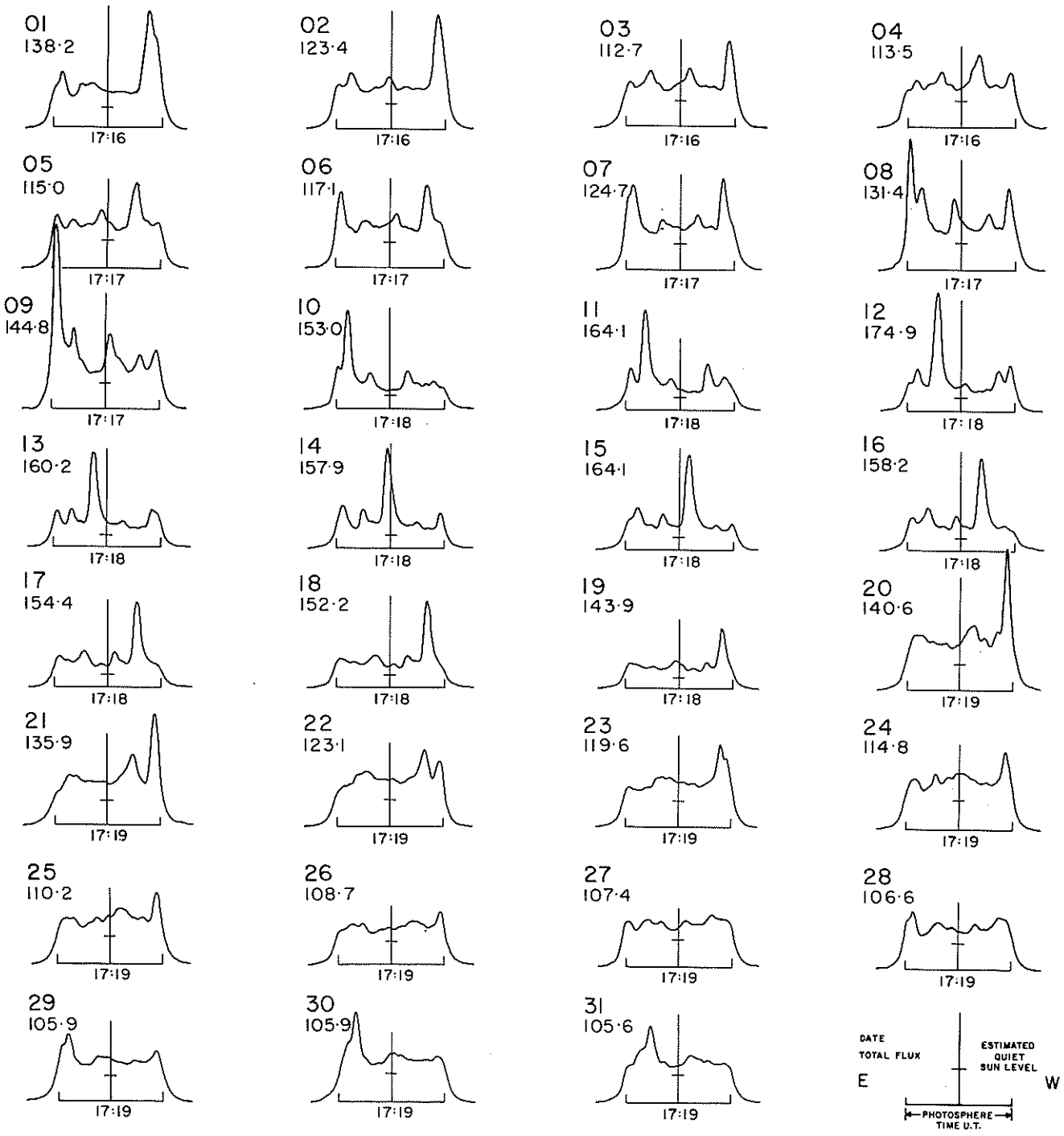


EAST-WEST SOLAR SCANS

JULY 1978

ALGONQUIN RADIO OBSERVATORY
CANADA

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

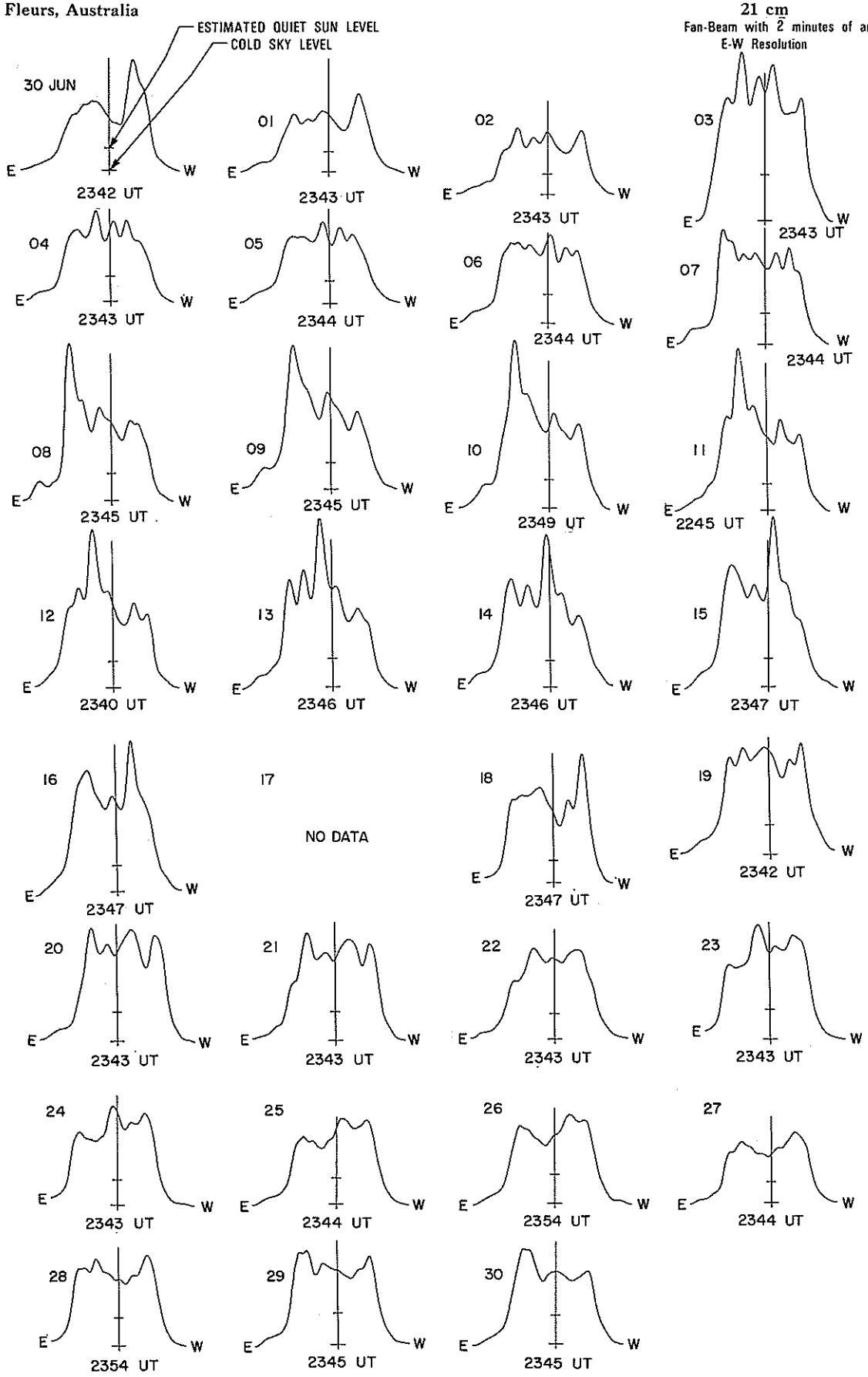


EAST-WEST SOLAR SCANS

JULY 1978

Fleurs, Australia

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

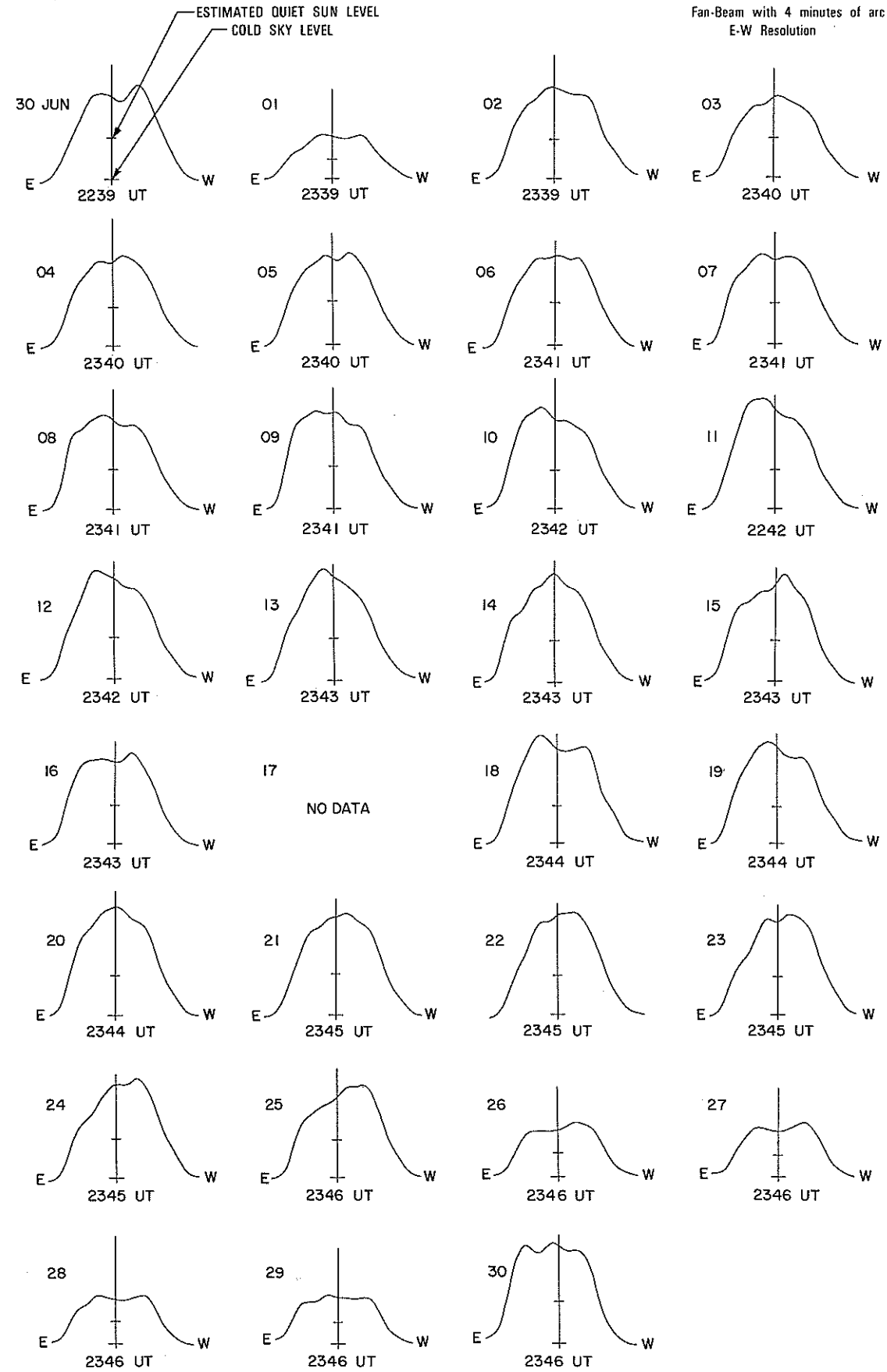


EAST-WEST SOLAR SCANS

JULY 1978

Fleurs, Australia

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



SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

JULY 1978

JUL 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	21 GRF	1410	1520	230	9.8	4.9		
	2695 BOUL	4 SF	1413	1417.5	6	22	7		
	2695 PENT	4 S/F	1414	1416.5	9	23.8	7		
2	2695 BOUL	4 SF	1402.5	1406.5	10	37	12		
	2695 SGMR	3 S	1404	1405.8	6	37.8	15.1		
	2800 OTTA	1 S	1458	1501	5	2.8	1.4		
	2695 BOUL	45 C	1458.5	1502	4.5	5	2		
	2800 OTTA	21 GRF	1510	1525	50	2.2	1.1		
	2800 OTTA	1 S	1550	1550.2	2	1.4	.7		
	2800 OTTA	27A RF	1720		310	2.2	1.9		
	2800 OTTA	24 R	1720	1830	70	2.2	1.1		
	2800 OTTA	24P R	1830		215	2.2			
	2800 OTTA	1 S	2032	2033	3	2	1		
	8800 SGMR	3 S	2148.9	2149.4	1.9	23.8	7.1		CONT
	2800 OTTA	4 S/F	2149	2149.1	3	18.4	5		
	8800 MANI	8 S	2149	2149.3	.6	33.4	11		
	2695 SGMR	3 S	2149	2149.4	2	13.8	4.1		CONT
	2695 BOUL	4 SF	2149.5	2150.5	2	8	3		
	2800 OTTA	26 FAL	2205	2230	25	-2.2	-1.1		
3	2800 OTTA	20 GRF	1255	1330	145	4	2.1		
	2800 OTTA	20 GRF	1820	1830	45	1.6	.8		
4	2800 OTTA	20 GRF	1530		60	1.4	1		
	2800 OTTA	20 GRF	1905	2000	115	1.8	1.2		
5	2800 OTTA	28 PRE	1134	1147.5	20	13.2			
	2800 OTTA	4 S/F	1154	1206.5	36	96	36.8		
	2695 SGMR	3 S	1156	1206.8	39	105	41.9		CONT
	8800 SGMR	20 GRF	1202.5	1207	32.5	26.4	7.9		CONT
	2800 OTTA	29 PBI	1230	1230	170	9.6	3		
	2800 OTTA	240AR	1610	1900	170	6			
	2800 OTTA	40 F	1745	1800	45	26			
	2695 BOUL	41 F	1748.5	1801	43.5	26	9		
	2695 SGMR	4 S/F	1754.7	1803.3	34.6	33.3	10		2,CONT
6	2800 OTTA	21 GRF	1500	1600	150	4.2	2.1		
	8800 SGMR	3 S	1510.2	1511.8	4.3	19.1	5.7		5,SWF
	2695 SGMR	3 S	1510.9	1512.2	4.1	13.4	4		5,SWF
	2800 OTTA	4 S/F	1511	1512	4	13	3.7		
	2695 BOUL	45 C	1511.5	1513	6.5	11	4		
	2695 BOUL	3 S	1520 E	1520.5	4.5D	45	15		
	2695 SGMR	3 S	1527.4	1530	6.9	67.9	20.4		4,SWF
	2800 OTTA	3 S	1628	1530	7	51	15.2		
7	2695 MANI	4 S/F	0535	0537.1	4.5	25.1	8.4		
	2800 OTTA	240AR	1205	1223	18	2	1		
	2800 OTTA	4 S/F	1210	1213	12	14.2	5.6		
	2695 SGMR	3 S	1210.4	1213.4	5.2	16	6.4		CONT,SWF
	8800 SGMR	3 S	1211	1213.2	4	48.5	19.4		CONT,SWF
	2695 SGMR	3 S	1438.4	1441.2	6.8	15	4.5		CONT,SWF
	2800 OTTA	21 GRF	1439	1530	76	2.4	1.4		
	2800 OTTA	3 S	1439.5	1441	4	11.8	8.4		
	8800 SGMR	3 S	1439.7	1441	4.2	16.4	4.9		CONT,SWF
	2695 BOUL	4 SF	1440	1442.5	4.5	12	4		
	2695 SGMR	3 S	1641	1643.1	3.1	10.5	5.3		CONT,SWF
	8800 SGMR	1 S	1641.3	1642.8	2.9	6	3.1		CONT,SWF
	2800 OTTA	240 R	1758	1800	2	1.2	.6		
	2800 OTTA	20 GRF	1810	1900	160	4.8	2.4		
8	2800 OTTA	1 S	1050	1051	5	6.8	2.4		
	2800 OTTA	8 S	1241	1241.1	.5	2	1		
	2800 OTTA	20 GRF	1500	1600	100	2.6	1.3		
	2800 OTTA	21 GRF	1705		530 D	16			
	2695 SGMR	45 C	1942.3	2000.5	61.7	105	152		3G,5,CONT,
	2695 SGMR	45 C		2016.4		381			SWF
	2695 BOUL	45 C	1942.5E	2018	87 D	356	119		
	2800 OTTA		1943	1951	14.5	79			
	2800 OTTA	46F C	1943	2016.5	72	420	73		
	8800 SGMR	45 C	1946.5	1950.9	53.2	298	119		3G,5,CONT,
	8800 SGMR	45 C		2016.5		152			SWF
	2800 OTTA		1957.5	2000.5	6.5	98			
	2800 OTTA		2004	2016.5	51	420			
	2800 OTTA	30 PBI	2055	2055	65	5.2	2.4		
	2695 SGMR	1 S	2059.4	2101	1.4	8.4	3.4		CONT
	2800 OTTA	45 C	2100	2100.2	9	4.4	1.8		
	2695 PENT	1 S	2500	2501.5	4	5.8	2.2		
9	2695 BOUL	2 SF	0100.5	0102	4	5	2		
	2695 MANI	1 S	0100.8	0101.6	1.9	5.8	1.9		
	2695 MANI	4 S/F	0710.5	0712.4	5.3	106.2	35.4		
	8800 SGMR	3 S	1009.3	1012.7	5.2	203	60.9		3G,SWF
	2695 SGMR	3 S	1009.6	1010.3	3.7	29.2	8.8		3G,SWF

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

JULY 1978

JUL 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
	8800	SGMR	3	S	1133.4	1153.2	22.6	178	53.4		5,SWF
	2695	SGMR	3	S	1136.4	1146.4	20.9	118	35.4		5,SWF
	2800	OTTA			1206	1221	39 D	74			
	8800	SGMR	3	S	1207	1212.7	56.3	158	63.3		2,SWF
	2695	SGMR	3	S	1207	1221.1	47	64.3	25.7		2,SWF
	2800	OTTA	29	PBI	1245	1245	75	13.4	4.4		
	2800	OTTA	20	GRF	1415	1515	100	2.6	1.3		
	2800	OTTA	21	GRF	1625		275	17.8			
	2800	OTTA	3	S	1647	1648.3	4	121	22		
	2695	BOUL	3	S	1647	1649	3.5	103	34		
	2695	SGMR	3	S	1648.8	1649.2	2.2	140	56		5,SWF
	8800	SGMR	3	S	1648.9	1649.3	2.1	75	30		5,SWF
	2800	OTTA	1	S	1737	1740	5	5.6	2.6		
	2800	OTTA	4	S/F	1800.8	1801.2	1.2	12.8			
	2695	BOUL	8	S	1801	1801.5	1.5	14	5		
	8800	SGMR	47	GB	1805	1828.2	85	1660	660		4,SWF
	2800	OTTA	46F	C	1818	1828.5	30	450	73		
	2800	OTTA			1818	1819.8	6	130			
	2695	BOUL	45	C	1818	1829	69.5D	450	150		
	2695	SGMR	3	S	1819.4	1828.2	70.6	486	190		4,SWF
	2800	OTTA			1824	1826	3.5	110			
	2800	OTTA			1827.5	1828.5	20.5	450			
	2800	OTTA	2	S/F	1852	1853.9	3	6.6	3.6		
10	2695	PENT	1	S	0107	0108.3	5	6	3		
	2695	MANI	4	S/F	0520.9	0523.1	3.5	29.8	9.9		
	2695	MANI	47	GB	0609.8	0614.8	52.7	835	264.8		
	2800	OTTA	20	GRF	1240	1335	140	4.4	2.6		
	8800	SGMR	3	S	1316.7	1318.7	6.3	36.4	10.9		SWF
	2800	OTTA	21	GRF	1510	1600	135	5.2	2.4		
	8800	SGMR	3	S	1549.9	1551.1	3.4	31.9	9.6		SWF
	2800	OTTA	1	S	1550.5	1551	1	1	.5		
	2800	OTTA	1	S	1555	1556.5	3	2	1		
	8800	SGMR	3	S	1706.5	1706.9	11.5	75.6	30.2		
	8800	SGMR	3	S	1726.2	1730.1	26.5	170	52.8		4,SWF
	2695	SGMR	3	S	1727.5	1732.2	13.2	34	12.3		4,SWF
	2800	OTTA	46F	C	1728	1732	14	28.6	7.6		
	2800	OTTA	23	GRF	1750	1930	120	3.6			
	2695	SGMR	1	S	1819.9	1820.6	7.1	8.9	3.6		
	2800	OTTA	1	S	1820	1820.5	1	5.2	2.6		
	8800	SGMR	3	S	1820	1820.8	7	26.5	10.6		
	8800	SGMR	21	GRF	1835	1836.3	515	18.9	7.6		
	2695	SGMR	20	GRF	1835	1849.5	515	7.5	3		
	2800	OTTA	1	S	1848.5	1849	2	1.8	.9		
	2800	OTTA	1	S	1915.9	1916	1	3.2	1.4		
	2800	OTTA	23	GRF	2020	2225	250	4.6	2.2		
	8800	SGMR	3	S	2247.4	2248	2.6	91.4	36.6		
	2695	PENT	1	S	2327.8	2328	2	9.2	2.8		
11	2695	PENT	4	S/F	0122.9	0123	7	10	3.4		
	2695	SGMR	47	GB	1043.5	1053	155.2	4790	1437		4,5,SWF
	2695	SGMR	47	GB		1105.3		1790			4,5,SWF
	2695	SGMR	47	GB		1121.5		1760			4,5,SWF
	2695	SGMR	47	GB		1154.6		1160			4,5,SWF
	8800	SGMR	47	GB	1048	1052.4	142.5	18900	5670		4,5,SWF
	8800	SGMR	47	GB		1105.4		5410			4,5,SWF
	8800	SGMR	47	GB		1121.5		1970			4,5,SWF
	8800	SGMR	47	GB		1153.2		1260			4,5,SWF
	2800	OTTA	47	GB	1050	1052.5	95	2800	370		
	2800	OTTA	30	PBI	1225	1225	365	15.8	7.9		
	2800	OTTA	1	S	1238.5	1239	3.5	3.2	1.6		
	2800	OTTA	3	S	1246	1247.1	3	12	3		
	2800	OTTA	1	S	1312	1313	4	2.2	1.1		
	2800	OTTA	8	S	1351.9	1352	.7	5	1.7		
	2695	PENT	1	S	1416	1418	5	4.2	2		
	2800	OTTA	4	S/F	1611	1612.5	3	110	38		
	2695	SGMR	3	S	1611	1612.7	3	129.9	52		4,5
	8800	SGMR	3	S	1611.7	1612.5	3.3	276.9	110.8		4,5
	2695	BOUL	4	SF	1612	1613.5	2.5	108	36		
	2800	OTTA	2	S/F	1617	1618.5	2	7.2	3.4		
	2800	OTTA	1	S	1658.5	1659	1	7.2	3.6		
	2800	OTTA	8	S	1842.9	1842.9	.1	9.4			
	2695	PENT	23	GRF	2215	2231	210	8.2	4.1		
	8800	SGMR	47	GB	2225	2230.7	12	831.6	332.6		
	2695	SGMR	3	S	2226	2227.6	4	29.6	11.8		
	2695	MANI	4	S/F	2226.6	2227.5	1.1	73.7	24.7		
	2800	OTTA	3	S	2226.7	2227.5	2	25.8	12.9		
	2695	BOUL	3	S	2228	2229	2.5D	25	8		
	2695	PENT	8	S	2358	2358	.1	2.4			
	2695	PENT	8	S	2359	2359	.1	6			
	2695	PENT	3	S	2413	2413.1	2	44	11		
	2695	PENT	8	S	2420.1	2420.5	.5	4.2	2.1		
	2695	PENT	8	S	2448.8	2448.8	.1	5.4			
12	2695	MANI	3	S	0012.9	0013.1	2.1	132.6	44.2		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

JULY 1978

JUL 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	1	S	1050	1050.9	2	3	1.4		
	2800	OTTA	1	S	1145.5	1146	1	1.6	1		
	2800	OTTA	1	S	1210	1210.8	3.5	1.6	.7		
	2800	OTTA	1	S	1301.5	1302.7	3.5	3.4	1.2		
	2800	OTTA	21	GRF	1310	1334	125	7.2	3		
	2800	OTTA	1	S	1320.5	1321	2	2.8	1.4		
	2800	OTTA	8	S	1335.7	1336	.7	1.8	1		
	2800	OTTA	4	S/F	1352	1353.6	6	10.2	4		
	2695	SGMR	3	S	1352.4	1354.6	6.1	22	8.8		
	2800	OTTA	23	GRF	1550	1840	310	10.4	5.5		
	2800	OTTA	4	S/F	1559.5	1600.7	5	15.2	7.4		
	2695	SGMR	3	S	1559.7	1605.8	10.3	149	47		3G,SHF
	8800	SGMR	47	GB	1600	1605.8	10	761	228		3G,SHF
	2695	BOUL	45	C	1600.5	1603	4	16	5		
	2800	OTTA	3	S	1605	1605.9	5	118	28.2		
	2695	BOUL	3	S	1606	1606.5	5 D	117	39		
	2800	OTTA	8	S	1658	1658.2	.5	6.4			
	8800	SGMR	3	S	1759.5	1800	2.5	284	113		3G
	2695	SGMR	1	S	1759.7	1800	1.3	4.2	1.7		3G
	2800	OTTA	1	S	1759.9	1800	1	6.4			
	2800	OTTA	46F	C	2049	2051	4	25.2	11.4		
	8800	SGMR	3	S	2049	2055	11	347	139		CONT,SHF
	2695	BOUL	2	SF	2050	2050.5U	1 D	16	5		
	2695	SGMR	3	S	2050.1	2051.1	9.9	22	8.8		CONT,SHF
	2695	BOUL	45	C	2051.5	2052	3.5D	16	5		
	2800	CTTA	3	S	2117.1	2117.5	2	18	9		
	2695	BOUL	4	SF	2118	2118.5U	2 D	16	5		
13	2695	MANI	3	S	0019.2	0019.4	1	19.7	6.5		
	2695	PENT	8	S	0019.7	0019.7	.2	7.6			
	2800	OTTA	20	GRF	1100	1115	105	4.6	2.3		
	2800	OTTA	23	GRF	1340	1450	180	6	3		
	2800	OTTA	8	S	1456.5	1456.5	.2	5			
	2800	OTTA	1A	S	1626	1626.9	1.5	3	1.5		
	2800	OTTA	8	S	1626.9	1626.9	.1	9.4			
	2695	PENT	1	S	2001.8	2003	2.5	3.4	1.5		
	2695	SGMR	3	S	2005	2006.1	3	18.9	7.6		
	2695	PENT	4	S/F	2005.2	2006	3.5	17.6	7.8		
	2800	OTTA	2	S/F	2022	2022.8	6	5.4	2.6		
14	2800	OTTA	1	S	1331.5	1331.8	1	2.8	1.2		
	2800	OTTA	1	S	1535	1535.5	3	2.2	.8		
	2800	OTTA	2	S/F	1559	1559.1	1	9.8	2.5		
	2800	OTTA	20	GRF	1613	1631	40	7.4	2.5		
	2695	SGMR	3	S	1731.5	1732.8	8.2	13.5	5.4		2,5
	2800	OTTA	3	S	1732.5	1732.9	3	11.6	5.8		
	2800	OTTA	20	GRF	2133	2140	30	3.4	1.7		
	2800	OTTA	21	GRF	2216	2230	45	3.4	2		
	2800	OTTA	1	S	2223	2223.5	1.5	1.6	.8		
15	2695	PENT	3	S	0053.5	0054.7	2.5	31.8	8		
	2695	MANI	1	S	0054	0054.5	.6	9.2	3.1		
	2695	PENT	29	PBI	0056	0056	20	4.8	2.4		
	2695	PENT	21	GRF	0124	0140	30 D	5.8			
	2695	PENT	4	S/F	0130	0134	9	26.4	11		
	2695	BOUL	4	SF	0132.5E	0135.5U	4 D	22	7		
	2695	MANI	3	S	0404.2	0404.7	1.3	26.3	8.8		
	2800	OTTA	20	GRF	1100	1113	90	13.6	4.6		
	2800	OTTA	1	S	1305.2	1306	1.8	6.6	3.3		
	8800	SGMR	3	S	1305.5	1305.8	1.6	19.7	5.9		
	2695	SGMR	1	S	1305.5	1305.9	1.5	8.7	2.6		
	8800	SGMR	47	GB	1423.5	1425.2	11.5	1830	549		5,SHF
	2800	OTTA	3	S	1423.8	1425	16.2	450	48		
	2695	SGMR	47	GB	1423.9	1425.4	13.5	600	180		5,SHF
	2695	BOUL	47	GB	1424.5	1426	15 D	537	179		
	2800	OTTA	29	PBI	1440	1440	50	6.8	3.4		
	2800	OTTA	4	S/F	1948.5	1950	3.5	32	15		
	2695	BOUL	4	SF	1949.5	1951	8.5D	28	9		
	2800	OTTA	30	PBI	1952	1952	15	4.4	2		
	2800	OTTA	1	S	1954	1954.4	1.5	7.6	3.8		
	2695	PENT	20	GRF	2310	2440	160	2.8	1.4		
	2695	BOUL	3	S	2455	2455.5	4 U	22	7		
16	8800	SGMR	3	S	1249.4	1249.8	3.1	65.7	13.1		
	2800	OTTA	1	S	1555.8	1556	1.2	3.6			
	2800	OTTA	29	PBI	1557	1557	10	1.8	.9		
	2800	OTTA	1A	S	1610.8	1611.5	1.5	3.6	1.8		
	2800	OTTA	8	S	1611.5	1611.5	.1E	3.6			
	2800	OTTA	29	PBI	1612.3	1612.3	18	1.8	.9		
	2800	OTTA	1	S	1822	1823	2	1.8	.9		
17	2695	PENT	20	GRF	0020	0030	50	3	1.5		
	2800	OTTA	21	GRF	1340		80	3.2			
	2800	OTTA	40	F	1341	1352	21	3.6			
	2800	OTTA	21	GRF	1424	1427	12	6	2.6		

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

JULY 1978

JUL 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	8	S	1428.6	1428.6	.1E	12			
	2800	OTTA	21	GRF	1620	1626	30	4.4	1.6		
	2800	OTTA	1	S	1624	1624.5	1	2.6	1.3		
	2800	OTTA	20	GRF	1730	1800	80	3.2	1.6		
	2800	OTTA	20	GRF	2113	2120	16	3	1.4		
	8800	SGMR	3	S	2133	2134	5	323	129		3G,SWF
	2800	OTTA	20	GRF	2135	2139	20	5	2.4		
18	2695	PENT	47	GB	0017	0018.6	3	1000	85		
	2695	MANI	47	GB	0017.7	0018.2	1.9	895	296.6		IKES
	2695	PENT	29	PBI	0020	0020	40	6	3		
	2800	OTTA	3	S	1219	1219.5	1	20.6	9		
	2800	OTTA	20	GRF	1305	1315	35	1.8	1		
	2800	OTTA	23	GRF	1410	2135	585	10.6	6		
	2800	OTTA	20	GRF	1500	1538	65	6	2.4		
	8800	SGMR	45	C	1719.2	1723.7	20.4	83.8	33.5		SWF
	8800	SGMR	45	C		1724.4		88.4			SWF
	2800	OTTA	20	GRF	1815	1820	30	3	1.5		
	2800	OTTA	23	GRF	1935	2005	90	19	6.6		
	8800	SGMR	45	C	1941.4	1958	67.6	165	77.4		SWF
	8800	SGMR	45	C		2021.7		258			SWF
	2695	BOUL	40	F	1945.5	1959	44.5D	51	17		
	2695	SGMR	45	C	1947.5	1958.1	58.5	52.7	21.1		SWF
	2695	SGMR	45	C		2019.6		37.7			SWF
	2800	OTTA	4	S/F	1951	1958	13	47.6	23.4		
	2800	OTTA	4	S/F	2017	2022	9	33.8	17.2		
	2695	PENT	26	FAL	2355	2418	23	-3	-1.5		
	2695	BOUL	4	SF	2417.5	2419.5	3.5D				
19	2800	OTTA	1	S	1320	1321.2	6.5	5.8	2		
	2800	OTTA	8	S	1647	1647	.5	5			
	2800	OTTA	20	GRF	2050	2155	125	3	1.5		
20	2695	PENT	21	GRF	0009	0020	100 D	8.4			
	2695	PENT	1	S	0011.5	0013	5	6.6	3.3		
	2800	OTTA	1	S	1306.9	1307.1	1	2.8	1.4		
	2800	OTTA	27	RF	1500		170	2.8	2.4		
	2800	OTTA	24	R	1500	1520	20	2.8	1.4		
	2800	OTTA	24P	R	1520		120	2.8			
	2800	OTTA	26	FAL	1720	1750	30	-2.8	-1.4		
	2695	PENT	240	R	1955	2023	28	2.6	1.3		
	2695	PENT	1	S	2142.9	2143.5	2	3	1.8		
	2695	BOUL	2	SF	2143 E	2144	2 D	4	1		
21	2800	OTTA	21	GRF	1535	1543	155	11.4	2.8		
	2800	OTTA	4	S/F	1538	1540	4	430			
	8800	SGMR	3	S	1538	1540	4	47.5	14.3		SWF
	2695	SGMR	3	S	1538.1	1539.9	7.3	102	30.6		SWF
	2695	BOUL	45	C	1538.5	1540.5	9.5U	332 U	111		
	2800	OTTA	8	S	1643.6	1643.6	.1E	22			
	2800	OTTA	2	S/F	1827	1827.1	1.2	2.2	1.1		
	2800	OTTA	21	GRF	1835	2000	385	13.6	8.2		
	2800	OTTA	3	S	1843.9	1843.9	1.2	15.8	2.6		
	2800	OTTA	3	S	1852.5	1857	10	126	43		
	2695	SGMR	3	S	1853.2	1856	16.8	140	56.1		SWF
	8800	SGMR	3	S	1854.5	1856.8	15.5	140	55		SWF
	2695	BOUL	3	S	1854.5	1857.5	16.5D	103	34		
	2800	OTTA	29	PBI	1902.5	1902.5	14	8.6	3.8		
22	2800	OTTA	2	S/F	1250	1251	3	9.6	4.8		
	2695	SGMR	3	S	1250.6	1257	7.4	35.9	10.8		
	2800	OTTA	4	S/F	1255.8	1257	3.2	14.6	4.8		
	2800	OTTA	29	PBI	1259	1259	9	2.4	1.2		
	2800	OTTA	27A	RF	1310		150	3	2.5		
	2800	OTTA	24	R	1310	1330	20	3	1.6		
	2800	OTTA	1	S	1318	1319	1.2	1.2	.8		
	2800	OTTA	24P	R	1330		100	3			
	2800	OTTA	26	FAL	1510	1540	30	-3	-1.5		
23	2800	OTTA	20	GRF	1447	1510	50	2.2	1.1		
	2800	OTTA	4	S/F	1654	1700	9	11.4	5.7		
	2800	OTTA	30	PBI	1703	1703	27	4.2	2.1		
	2800	OTTA	2	S/F	1721	1724	6	4.6	.8		
	2695	SGMR	1	S	1721.2	1724.2	5.2	6.4	1.9		3
	2800	OTTA	20	GRF	1745	1752	22	2.8	1.4		
	2800	OTTA	27	RF	1835		205	2.8	2.3		
	2800	OTTA	24	R	1835	1910	35	2.8	1.4		
	2800	OTTA	24P	R	1910		140	2.8			
	2800	OTTA	26	FAL	2130	2200	30	-2.8	-1.4		
25	2800	OTTA	240	R	2140	2200	20	2.2	1.1		
28	2695	SGMR	3	S	1425.5	1425.7	.5	20.4	8.2		
29	2800	OTTA	20	GRF	1050	1115	260 D	7.4			

SOLAR RADIO EMISSION
SELECTED FIXED FREQUENCY EVENTS

JULY 1978

JUL 1978	FREQUENCY	STATION	TYPE	STARTING TIME UT	TIME OF MAXIMUM UT	DURATION MINUTES	FLUX DENSITY $10^{-22} Wm^{-2} Hz^{-1}$ PEAK	FLUX DENSITY $10^{-22} Wm^{-2} Hz^{-1}$ MEAN	INT	REMARKS
	2800	OTTA	20 GRF	1830	1850	50	2.2	1.2		
30	2800	OTTA	20 GRF	1827	1900	205	3	1.5		

Observatories:

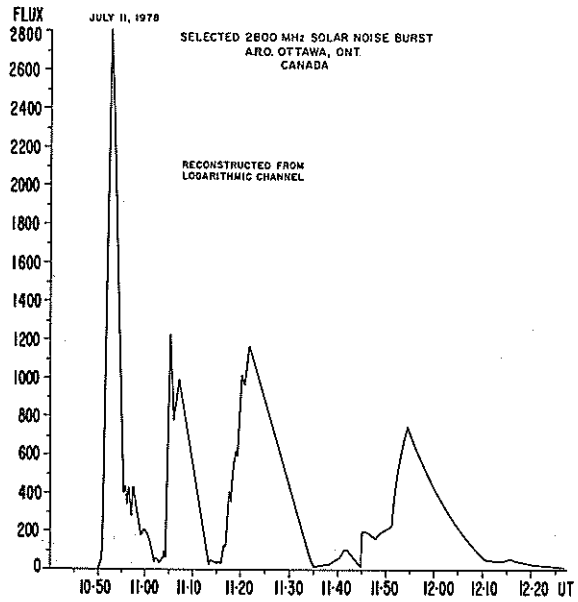
BOUL = Boulder MANI = Manila OTTA = Ottawa ARO PENT = Penticton SGMR = Sagamore Hill

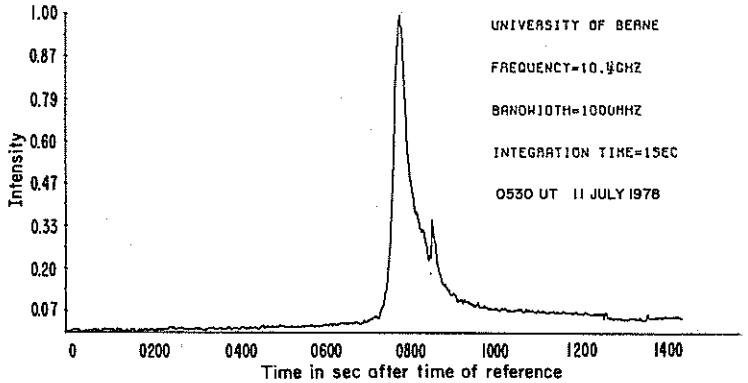
Explanation of Type Code:

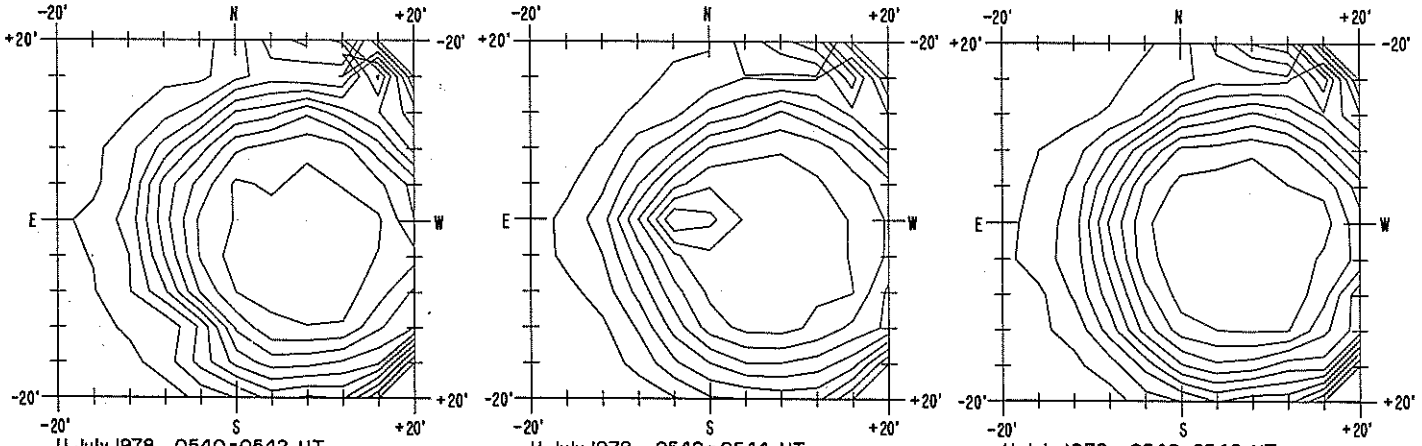
1 Simple 1
2 Simple 1F
3 Simple 2
4 Simple 2F
5 Simple
6 Minor
7 Minor +
8 Spike
20 Simple 3
21 Simple 3A
22 Simple 3F
23 Simple 3AF
24 Rise
25 Rise A
26 Fall
27 Rise and Fall
28 Precursor
29 Post Burst Increase
30 Post Burst Increase A
31 Post Burst Decrease
32 Absorption
40 Fluctuation
41 Group of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

SELECTED SOLAR NOISE BURST

JULY 11, 1978





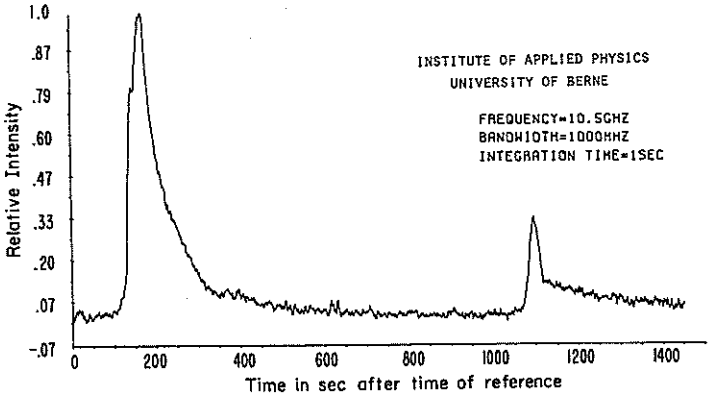


SUN AT 92.5 GHZ BW=1 GHZ, TAU=1 S 1 AVER. PICTS.

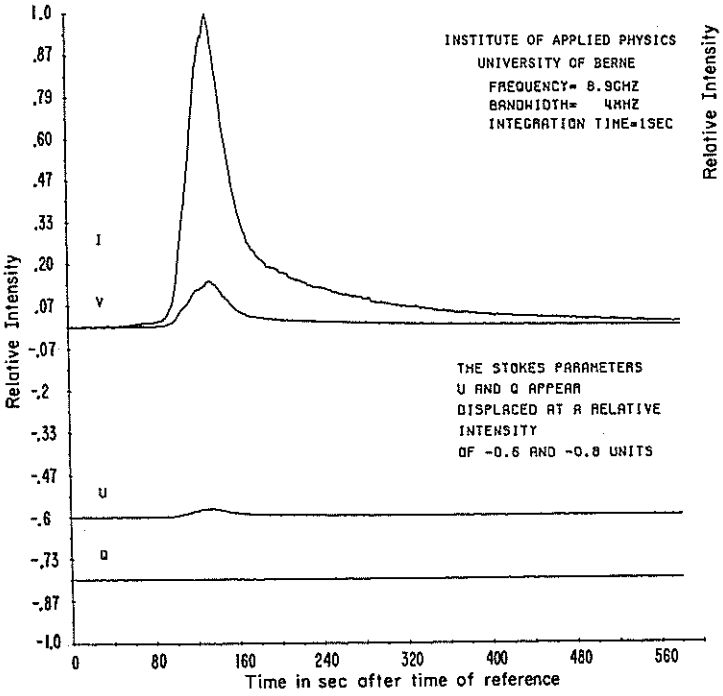
Note: These are preliminary solar radio maps from Berne Observatory taken prior to, during, and after the burst of 0542 UT 11 July 1978.

SELECTED SOLAR NOISE BURSTS

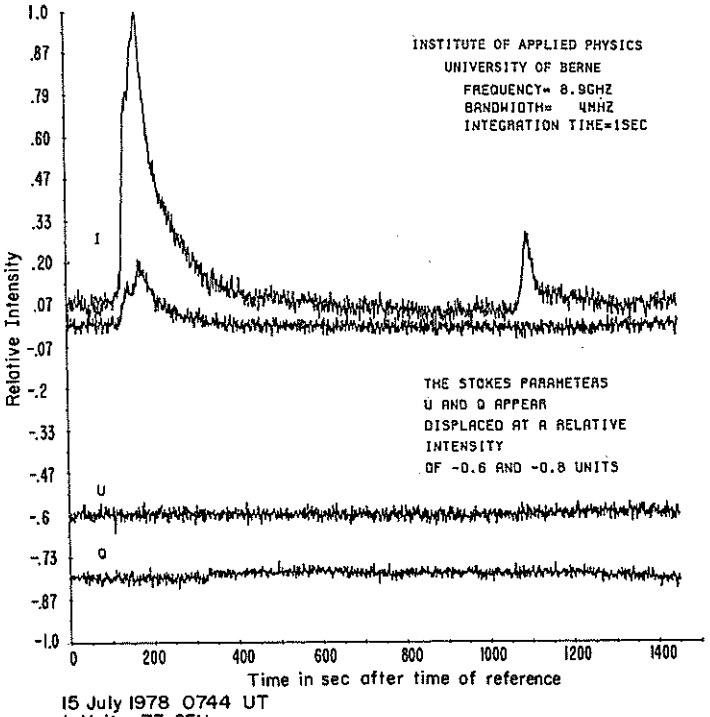
15 JULY 1978



15 July 1978 0744 UT
1 Unit = 76 SFU



15 July 1978 1423 UT
1 Unit = 1353 SFU



15 July 1978 0744 UT
1 Unit = 73 SFU

Note: The two bursts of 15 July 1978 at 0744 UT exhibit circular polarization of 12% at 10.5 and 8.9 GHz. The burst at 1423 UT has a flux of 1346 sfu and a circular polarization of 13%.

SOLAR X-RAYS BY SATELLITE
SMS GOES
JULY 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
7/ 1	.002	.002	.001	.004	B	.003	.002	B	.001	.001	.003	.001	.001	.042	.010	.012	B	B	.001	.001	B	B	B	B	.004
7/ 2	B	.004	B	B	B	B	.001	B	B	B	B	B	B	B	.046	.003	.004	.002	B	B	.009	.006	.001	B	.004
7/ 3	.002	B	B	B	B	B	.008	B	B	B	B	B	B	.001	B	B	B	B	B	B	B	B	.001	.001	B
7/ 4	B	B	B	B	B	.001	B	.001	B	.004	B	.001	B	B	B	.002	B	B	B	B	B	B	B	B	B
7/ 5	B	B	B	B	B	B	B	B	B	B	B	.006	.031	.002	B	B	B	.003	.011	.005	.002	.001	B	M	.003
7/ 6	M	M	B	B	B	B	B	.003	B	B	.001	B	.005	B	B	.022	B	B	B	B	.003	B	B	B	.002
7/ 7	.002	.001	B	B	.009	.122	.006	.002	.004	.184	.017	.003	.031	.004	.009	.003	.007	.004	.049	.002	.002	.001	B	.001	.019
7/ 8	B	.002	B	.003	B	.001	.001	.001	.001	B	.001	.001	.001	.001	B	B	B	.002	.003	.092	.156	.067	.032	.013	.016
7/ 9	.005	.005	.003	.003	.003	.008	.006	.021	.013	.009	.022	.021	.354	.223	.037	.010	.042	.037	3.55	.398	.063	.021	.015	.020	.204
7/10	.008	.223	.086	.076	.015	.046	6.74	.420	.121	.062	.016	.012	.010	.129	.010	.011	.008	.515	.208	.282	.131	.043	.021	.012	.384
7/11	.031	.064	.003	.013	.345	.364	.059	.021	.005	.019	2.37	7.94	.405	.094	.038	.033	.035	.012	.005	.003	.049	.004	.698	.026	.526
7/12	.027	.010	.122	.099	.002	.008	.003	.002	.006	.028	.035	.003	.003	.034	.005	.005	.046	.010	.014	.005	.050	.029	.002	.002	.023
7/13	.002	.001	.005	.002	.004	.001	.001	.002	.002	.001	.002	.003	B	B	.002	.001	.002	B	B	B	.002	B	B	.001	.002
7/14	B	.001	B	B	B	.002	B	B	.001	.001	B	.004	B	B	B	B	.004	.002	.001	B	B	.001	.002	.001	.001
7/15	.029	.014	.002	B	.003	.002	B	B	B	B	.001	.005	.002	.001	.030	.007	M	.002	B	.002	B	B	B	B	.005
7/16	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	.001	B	B	B	B	B	B	B	B
7/17	.001	.001	.002	B	B	B	B	B	B	.001	.001	B	B	B	.006	B	B	B	B	B	.002	.031	.002	B	.002
7/18	.017	B	B	B	B	B	B	B	.009	.016	B	B	B	.005	.002	.006	.002	.044	.004	.095	.591	.040	.015	.008	.035
7/19	.003	.002	.001	.002	B	.004	B	B	B	B	B	B	B	.005	B	B	B	B	B	B	.002	.005	B	B	.001
7/20	.075	.002	B	.001	B	.002	.001	.001	B	.001	B	.002	B	.003	.002	.008	.013	.004	.001	.002	.001	.003	.002	.003	.006
7/21	.001	.003	.002	.001	.014	.002	.003	.002	.006	.002	.004	.010	.004	.003	.003	.048	.026	.002	.119	.588	.033	.007	.001	.002	.037
7/22	B	B	.002	B	.001	.001	.002	.006	M	M	M	M	.003	.127	.015	.001	B	B	B	B	B	B	B	B	.008
7/23	B	B	.001	B	B	.003	B	B	B	B	B	.002	.003	.002	.001	.002	.017	.033	.041	.023	.013	.006	.003	.003	.007
7/24	.002	.002	.001	.001	B	B	B	B	B	B	B	B	.001	.001	B	B	B	B	B	B	B	B	.002	B	B
7/25	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	.001	B	B	B
7/26	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
7/27	B	B	B	B	B	B	B	B	B	B	B	B	B	B	.001	B	B	B	B	.001	B	B	B	B	B
7/28	B	B	B	B	B	.001	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
7/29	B	B	B	B	B	B	B	B	B	B	.005	.008	B	B	B	B	B	B	B	M	B	B	B	B	B
7/30	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
7/31	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B

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

SOLAR X-RAYS BY SATELLITE
SMS GOES
JULY 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
7/ 1	.012	.012	.010	.015	.010	.013	.012	.008	.009	.010	.012	.010	.009	.051	.028	.035	.009	.007	.009	.010	.008	.008	.007	.006	.015
7/ 2	.007	.013	.007	.005	.005	.006	.008	.006	.007	.006	.006	.006	.006	.006	.051	.013	.017	.013	.009	.007	.019	.021	.010	.007	.015
7/ 3	.009	.006	.005	.005	.005	.005	.016	.005	.004	.005	.006	.004	.004	.007	.005	.005	.004	.004	.004	.004	.004	.004	.007	.008	.005
7/ 4	.007	.005	.004	.003	.004	.005	.004	.005	.005	.008	.004	.006	.004	.004	.004	.007	.005	.004	.004	.005	.004	.003	.004	.003	.004
7/ 5	.003	.003	.003	.004	.004	.004	.003	.003	.004	.003	.003	.010	.043	.010	.005	.004	.004	.008	.024	.015	.009	.006	.005	M	.012
7/ 6	M	M	.004	.003	.003	.003	.005	.010	.007	.006	.006	.004	.010	.004	.003	.023	.006	.005	.004	.004	.007	.004	.004	.004	.007
7/ 7	.006	.005	.005	.004	.018	.073	.016	.010	.011	.104	.029	.013	.039	.014	.017	.013	.015	.013	.061	.013	.012	.010	.008	.009	.018
7/ 8	.008	.009	.008	.012	.008	.008	.009	.009	.008	.006	.008	.008	.007	.008	.007	.006	.007	.010	.012	.065	.143	.089	.062	.036	.038
7/ 9	.023	.020	.013	.013	.014	.019	.015	.030	.023	.024	.033	.036	.243	.205	.064	.032	.053	.057	1.50	.327	.083	.044	.031	.033	.222
7/10	.022	.131	.101	.083	.031	.062	2.87	.351	.131	.088	.039	.031	.027	.106	.030	.028	.025	.309	.162	.200	.112	.065	.038	.029	.094
7/11	.033	.063	.017	.027	.263	.254	.100	.044	.021	.030	1.86	4.58	.343	.120	.070	.059	.054	.033	.022	.017	.052	.018	.360	.047	.099
7/12	.042	.022	.069	.085	.013	.019	.012	.013	.019	.036	.041	.018	.016	.046	.023	.021	.054	.032	.036	.024	.043	.043	.012	.012	.030
7/13	.012	.010	.016	.012	.014	.010	.008	.010	.010	.009	.011	.014	.008	.008	.010	.010	.020	.008	.007	.008	.010	.008	.008	.009	.009
7/14	.008	.010	.009	.007	.007	.009	.007	.006	.009	.010	.009	.013	.007	.007	.007	.008	.015	.011	.009	.007	.007	.008	.010	.009	.009
7/15	.025	.027	.011	.006	.010	.009	.008	.007	.007	.007	.009	.020	.011	.010	.033	.020	M	.009	.007	.008	.007	.006	.006	.007	.011
7/16	.009	.007	.006	.006	.007	.006	.006	.007	.006	.006	.006	.007	.007	.007	.007	.007	.009	.006	.006	.006	.006	.006	.005	.006	.007
7/17	.009	.008	.009	.007	.007	.007	.006	.006	.006	.009	.009	.007	.007	.007	.014	.006	.007	.006	.008	.007	.008	.029	.011	.007	.010
7/18	.023	.006	.005	.005	.005	.005	.005	.005	.011	.022	.007	.005	.005	.010	.009	.014	.010	.040	.015	.055	.367	.070	.044	.026	.055
7/19	.016	.013	.010	.011	.008	.014	.009	.008	.007	.007	.007	.008	.006	.014	.007	.006	.006	.005	.005	.005	.007	.014	.006	.005	.007
7/20	.071	.013	.007	.008	.006	.008	.007	.006	.005	.006	.007	.008	.007	.010	.009	.019	.021	.013	.008	.010	.008	.011	.009	.010	.011
7/21	.008	.011	.009	.008	.018	.009	.010	.010	.017	.010	.012	.017	.014	.012	.010	.040	.048	.016	.068	.450	.096	.036	.017	.013	.068
7/22	.009	.007	.008	.007	.007	.007	.007	.011	M	M	M	M	.006	.103	.040	.010	.005	.004	.005	.004	.003	.003	.004	.004	.016
7/23	.003	.004	.006	.006	.004	.007	.003	.003	.006	.003	.003	.007	.009	.009	.006	.008	.012	.029	.054	.052	.036	.023	.016	.012	.022
7/24	.010	.009	.008	.007	.006	.005	.005	.004	.004	.004	.004	.004	.005	.005	.004	.004	.004	.003	.003	.003	.003	.003	.007	.003	.004
7/25	.003	.003	.002	.002	.002	.002	.002	.002	.004	.003	.002	.003	.002	.002	.002	.002	.002	.002	.002	.002	.002	.005	.005	.003	.003
7/26	.002	.002	.002	.002	.002	.003	.003	.002	.002	.002	.002	.003	.003	.003	.002	.002	.002	.002	.004	.003	.002	.004	.003	.002	.003
7/27	.003	.003	.004	.004	.003	.002	.002	.002	.002	.002	.002	.002	.002	.002	.005	.004	.002	.002	.003	.006	.005	.004	.003	.003	.003
7/28	.002	.002	.002	.002	.004	.006	.004	.002	.003	.003	.002	.004	.003	.002	.002	.002	.002	.002	.002	.002	.002	.002	.002	.002	.002
7/29	.002	.007	.002	.002	.003	.002	.002	.002	.002	.002	.011	.025	.008	.004	.002	.003	.003	.002	.004	M	.002	.002	.001	.002	.003
7/30	.002	.002	.002	.002	.002	.001	.001	.001	.001	.002	.002	.002	.002	.002	.002	.002	.002	.002	.004	.003	.002	.002	.001	.001	.002
7/31	.001	.002	.001	.001	.001	.001	.002	.001	.002	.001	.002	.002	.004	.003	.003	.004	.002	.002	.002	.002	.002	.001	.001	.001	.002

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

SOLAR X-RAYS BY SATELLITE

GOES

JULY 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	0300	1.2E-08	1.1E-06	0306	3.8E-07	4.6E-06	0309	8.2E-08	2.5E-06
1	0532	1.0E-08	1.0E-06	0536	5.3E-08	2.1E-06	0553	3.3E-08	1.5E-06
1	0638	2.0E-08	1.2E-06	0641	5.2E-08	2.0E-06	0643	3.4E-08	1.4E-06
1	1033	1.6E-08	1.0E-06	1040	9.5E-08	2.2E-06	1046	3.3E-08	1.6E-06
1	1123	5.4E-09	7.5E-07	1130	5.0E-08	1.4E-06	1139	1.2E-08	1.0E-06
1	1255	7.3E-09	8.6E-07	1259	9.2E-08	1.7E-06	1304	2.1E-08	1.2E-06
1	1330	2.7E-08	1.3E-06	1347	2.0E-06	1.8E-05	1356	4.5E-07	9.5E-06
2	0129	1.5E-08	8.3E-07	0144	1.2E-07	2.6E-06	0156	2.1E-08	1.7E-06
2	0800	5.3E-09	6.4E-07	0804	3.3E-08	1.0E-06	0816	1.1E-08	8.5E-07
2	1400	2.8E-09	5.1E-07	1411	1.7E-06	1.4E-05	1424	6.4E-07	7.3E-06
2	1458	3.3E-08	1.3E-06	1504	7.1E-08	2.0E-06	1510	3.1E-08	1.6E-06
2	2024	8.7E-09	7.5E-07	2040	2.2E-07	3.6E-06	2128	4.8E-08	2.2E-06
2	2146	2.4E-08	1.5E-06	2151	1.6E-07	3.3E-06	2154	8.6E-08	2.3E-06
2	2251	8.6E-09	8.1E-07	2256	3.9E-08	1.3E-06	2303	1.5E-08	1.0E-06
3	0034	7.5E-09	5.9E-07	0043	1.0E-07	2.0E-06	0052	3.1E-08	1.2E-06
3	0612	3.1E-09	4.8E-07	0622	3.2E-07	4.1E-06	0633	9.5E-08	2.2E-06
3	0721	2.3E-09	4.0E-07	0724	1.6E-08	6.1E-07	0726	5.9E-09	5.0E-07
3	2315	1.1E-08	8.4E-07	2319	3.1E-08	1.2E-06	2322	1.5E-08	9.7E-07
4	0005	7.9E-09	7.0E-07	0009	8.1E-08	1.8E-06	0012	2.8E-08	1.1E-06
4	0531	2.3E-09	3.2E-07	0537	8.7E-08	1.4E-06	0543	1.6E-08	8.0E-07
4	0730	3.1E-09	3.8E-07	0735	5.5E-08	1.0E-06	0746	1.3E-08	7.0E-07
4	1525	3.3E-09	4.2E-07	1539	7.5E-08	1.4E-06	1551	1.7E-08	9.0E-07
5	1136	9.5E-09	4.8E-07	1213	7.2E-07	7.4E-06	1232	1.6E-07	3.8E-06
5	1746	2.5E-08	7.6E-07	1803	1.5E-07	2.9E-06	1910	5.5E-08	1.8E-06
6	1007	8.2E-10	4.5E-07	1013	6.4E-08	1.2E-06	1024	1.6E-08	8.0E-07
6	1204	4.8E-09	4.3E-07	1211	2.7E-07	2.7E-06	1219	6.4E-08	1.4E-06
6	2025	5.4E-09	3.9E-07	2033	1.0E-07	1.9E-06	2041	4.9E-08	1.1E-06
7	0150	6.2E-09	4.1E-07	0155	1.0E-07	1.3E-06	0201	2.6E-08	8.4E-07
7	0359	2.6E-09	3.8E-07	0407	3.0E-07	3.3E-06	0433	6.2E-08	1.8E-06
7	0528	7.6E-09	6.2E-07	0541	5.5E-06	2.8E-05	0550	1.6E-06	1.3E-05
7	0756	1.6E-08	8.5E-07	0803	2.0E-07	3.1E-06	0808	4.9E-08	1.7E-06
7	0928	2.2E-08	7.4E-07	0942	6.8E-06	3.2E-05	0955	1.8E-06	1.6E-05
7	1206	1.5E-08	9.3E-07	1213	2.1E-06	1.7E-05	1220	6.7E-07	8.6E-06
7	1437	3.7E-09	6.5E-07	1445	5.7E-07	5.5E-06	1453	1.3E-07	3.0E-06
7	1636	1.5E-08	8.9E-07	1641	3.1E-07	3.5E-06	1646	7.0E-08	2.0E-06
7	1651	5.6E-08	1.7E-06	1657	1.9E-07	3.5E-06	1703	8.5E-08	2.4E-06
7	1755	1.7E-08	1.0E-06	1805	1.7E-06	1.2E-05	1825	3.1E-07	6.6E-06
8	0822	9.7E-09	7.1E-07	0826	4.7E-08	1.3E-06	0828	1.9E-08	9.9E-07
8	1239	5.1E-09	5.9E-07	1246	4.7E-08	1.1E-06	1304	9.3E-09	8.6E-07
8	1943	3.3E-08	1.6E-06	1957	6.0E-06	3.6E-05	2010	2.1E-06	1.8E-05
9	0059	2.5E-08	1.9E-06	0103	1.9E-07	3.3E-06	0110	7.1E-08	2.5E-06
9	0506	4.1E-08	1.5E-06	0510	1.3E-07	2.6E-06	0513	5.1E-08	2.0E-06
9	0551	6.1E-08	1.9E-06	0559	3.9E-07	3.9E-06	0603	1.4E-07	2.9E-06
9	0707	1.1E-07	1.8E-06	0714	1.6E-06	1.2E-05	0717	3.9E-07	6.0E-06
9	0848	4.7E-08	1.5E-06	0854	6.2E-07	5.1E-06	0900	1.4E-07	3.2E-06
9	1007	6.0E-08	2.1E-06	1012	2.0E-06	1.4E-05	1016	5.5E-07	6.8E-06
9	1211	9.5E-07	8.0E-06	1249	5.9E-06	3.8E-05	1322	2.5E-06	2.3E-05
9	1635	8.1E-08	2.7E-06	1650	3.6E-06	2.5E-05	1652	1.3E-06	1.2E-05
9	1736	1.5E-07	3.9E-06	1742	1.2E-06	1.1E-05	1750	3.5E-07	7.0E-06
9	1804	1.6E-07	4.6E-06	1832	9.1E-05	3.4E-04	1847	3.1E-05	1.7E-04
9	2223	9.3E-08	2.6E-06	2227	4.1E-07	4.5E-06	2235	1.5E-07	3.4E-06
9	2306	3.7E-08	1.9E-06	2312	1.2E-06	8.9E-06	2317	3.6E-07	5.4E-06
10	0012	5.5E-08	1.9E-06	0020	1.6E-07	3.0E-06	0030	8.4E-08	2.4E-06
10	0134	9.3E-08	2.2E-06	0146	1.2E-05	5.3E-05	0156	2.9E-06	2.7E-05
10	0233	4.5E-07	5.7E-06	0242	1.3E-06	1.1E-05	0252	5.5E-07	8.2E-06
10	0307	3.6E-07	5.7E-06	0314	1.9E-06	2.0E-05	0321	1.2E-06	1.3E-05
10	0520	1.5E-07	3.8E-06	0523	2.8E-06	2.3E-05	0525	1.0E-06	1.2E-05
10	0531	3.6E-07	6.0E-06	0534	9.3E-07	8.6E-06	0538	4.9E-07	7.0E-06
10	0600	9.0E-08	2.6E-06	0623	1.8E-04	8.1E-04	0632	9.3E-05	4.0E-04
10	0922	6.1E-07	8.9E-06	0925	1.7E-06	1.4E-05	0929	7.4E-07	1.0E-05

SOLAR X-RAYS BY SATELLITE

GOES

JULY 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}
10	1314	2.6E-07	4.3E-06	1321	5.6E-06	2.9E-05	1332	2.0E-06	1.6E-05
10	1549	1.4E-07	2.9E-06	1553	3.1E-07	4.4E-06	1559	1.3E-07	3.5E-06
10	1725	1.8E-06	1.5E-05	1735	1.3E-05	7.9E-05	1741	7.4E-06	4.7E-05
10	1913	2.0E-06	1.5E-05	1921	9.6E-06	4.5E-05	1933	3.4E-06	2.8E-05
10	2025	1.8E-07	2.9E-06	2039	2.0E-06	2.2E-05	2042	1.6E-06	1.2E-05
10	2131	1.6E-07	4.0E-06	2137	1.1E-06	9.6E-06	2146	4.4E-07	6.6E-06
11	0049	3.6E-08	1.8E-06	0102	3.5E-06	2.0E-05	0111	1.0E-06	1.0E-05
11	0122	1.6E-07	3.8E-06	0128	6.3E-07	7.5E-06	0130	3.0E-07	5.6E-06
11	0300	3.3E-08	1.6E-06	0312	1.0E-07	2.4E-06	0318	4.2E-08	2.0E-06
11	0335	2.4E-08	1.6E-06	0341	3.3E-07	4.6E-06	0348	1.3E-07	3.0E-06
11	0352	4.8E-08	2.0E-06	0401	2.4E-06	1.8E-05	0406	6.2E-07	1.0E-05
11	0421	2.9E-08	1.9E-06	0433	1.4E-05	8.2E-05	0444	3.8E-06	3.9E-05
11	0539	1.0E-06	1.3E-05	0546	2.0E-05	8.7E-05	0552	5.7E-06	4.8E-05
11	0703	2.9E-07	5.7E-06	0708	7.2E-07	8.4E-06	0713	3.9E-07	7.0E-06
11	0933	3.0E-08	1.8E-06	0939	1.0E-06	7.0E-06	0947	2.4E-07	4.4E-06
11	1007	1.4E-07	2.7E-06	1014	3.1E-07	4.2E-06	1019	1.6E-07	3.5E-06
11	1031	2.6E-07	3.9E-06	1034	6.8E-07	5.9E-06	1036	3.2E-07	4.7E-06
11	1043	2.3E-07	3.9E-06	1104	1.8E-04	1.5E-03	1112	1.8E-04	7.8E-04
11	1645	1.4E-07	3.7E-06	1651	1.5E-06	1.2E-05	1657	4.6E-07	7.1E-06
11	2018	2.8E-08	1.3E-06	2035	2.0E-06	1.4E-05	2043	5.3E-07	7.4E-06
11	2224	8.8E-08	2.4E-06	2229	4.4E-05	2.3E-04	2235	1.9E-05	1.0E-04
12	0010	9.9E-08	2.5E-06	0021	1.0E-06	1.0E-05	0027	3.1E-07	6.1E-06
12	0108	4.4E-08	2.0E-06	0114	4.3E-07	4.6E-06	0123	1.3E-07	3.1E-06
12	0241	5.3E-08	1.7E-06	0300	1.0E-05	4.8E-05	0305	2.9E-06	2.3E-05
12	0521	5.9E-08	1.9E-06	0529	4.2E-07	4.8E-06	0532	1.4E-07	3.2E-06
12	0807	3.7E-08	1.4E-06	0813	2.5E-07	3.2E-06	0821	7.3E-08	2.2E-06
12	0859	3.2E-08	1.6E-06	0909	1.7E-06	1.2E-05	0913	3.2E-07	5.8E-06
12	1011	4.1E-08	1.9E-06	1019	1.7E-06	1.2E-05	1026	4.8E-07	6.8E-06
12	1053	1.9E-08	1.8E-06	1057	1.4E-07	2.8E-06	1101	4.7E-08	2.2E-06
12	1301	3.5E-08	1.7E-06	1304	1.2E-07	2.5E-06	1308	5.3E-08	2.1E-06
12	1321	2.0E-07	2.8E-06	1328	1.4E-06	9.5E-06	1336	3.4E-07	6.0E-06
12	1530	4.0E-08	1.9E-06	1535	1.3E-07	3.2E-06	1540	5.8E-08	2.5E-06
12	1559	1.0E-07	2.8E-06	1614	1.6E-06	1.1E-05	1621	5.3E-07	7.1E-06
12	1757	7.2 E-08	2.6E-06	1802	4.4E-07	5.7E-06	1808	1.5E-07	4.1E-06
12	2048	3.2E-08	1.8E-06	2058	5.8E-06	3.1E-05	2103	1.2E-06	1.4E-05
12	2114	2.1E-07	3.7E-06	2118	5.9E-07	5.8E-06	2120	3.1E-07	4.7E-06
13	0221	1.2E-08	1.0E-06	0228	2.6E-07	3.7E-06	0237	5.1E-08	2.3E-06
13	0425	2.2E-08	1.1E-06	0428	4.7E-08	2.0E-06	0430	5.1E-08	1.5E-06
13	0444	1.4E-08	1.0E-06	0454	1.3E-07	2.5E-06	0500	2.3E-08	1.7E-06
13	0538	6.8E-09	8.2E-07	0541	8.9E-08	1.8E-06	0544	2.8E-08	1.2E-06
13	0622	5.4E-09	7.0E-07	0626	6.5E-08	1.3E-06	0630	1.5E-08	9.6E-07
13	0741	2.0E-08	9.8E-07	0746	9.1E-08	1.9E-06	0749	2.9E-08	1.3E-06
13	0809	7.2E-09	7.4E-07	0812	3.6E-08	1.1E-06	0814	1.4E-08	9.3E-07
13	0831	1.4E-08	9.6E-07	0834	1.6E-07	2.1E-06	0837	4.2E-08	1.4E-06
13	1013	7.2E-09	8.3E-07	1017	1.2E-07	1.8E-06	1020	3.3E-08	1.3E-06
13	1102	3.9E-08	1.2E-06	1116	5.6E-08	1.8E-06	1130	3.0E-08	1.5E-06
13	1456	1.4E-08	1.0E-06	1459	1.3E-07	2.0E-06	1502	3.2E-08	1.3E-06
13	1624	6.1E-09	8.0E-07	1634	5.1E-08	1.3E-06	1639	1.5E-08	1.0E-06
13	2003	1.3E-08	8.2E-07	2006	7.5E-08	1.9E-06	2011	3.0E-08	1.2E-06
13	2305	9.2E-09	8.3E-07	2310	6.7E-08	1.9E-06	2313	3.4E-08	1.3E-06
14	0524	5.9E-09	7.5E-07	0528	1.0E-07	2.1E-06	0534	2.8E-08	1.3E-06
14	1059	6.9E-09	7.9E-07	1106	3.1E-07	3.8E-06	1111	6.4E-08	2.0E-06
14	1132	8.7E-09	8.5E-07	1137	3.7E-08	1.4E-06	1142	1.2E-08	1.0E-06

SOLAR X-RAYS BY SATELLITE

GOES

JULY 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}
14	1557	4.9E-09	7.8E-07	1601	3.5E-08	1.1E-06	1607	8.3E-09	9.3E-07
14	1623	3.7E-08	1.2E-06	1632	1.9E-07	3.3E-06	1638	5.7E-08	2.2E-06
14	1730	1.3E-08	1.1E-06	1733	1.4E-07	2.6E-06	1735	2.1E-08	1.2E-06
15	0050	1.9E-08	1.0E-06	0055	3.5E-06	2.2E-05	0102	7.4E-07	1.0E-05
15	0130	2.9E-08	1.0E-06	0144	1.3E-07	2.3E-06	0200	3.9E-08	1.6E-06
15	0402	3.1E-09	5.8E-07	0410	1.5E-07	2.3E-06	0416	3.9E-08	1.3E-06
15	1049	3.8E-08	1.4E-06	1052	4.4E-08	2.1E-06	1059	2.7E-08	1.7E-06
15	1422	8.9E-09	8.4E-07	1428	1.6E-06	1.0E-05	1438	4.1E-07	5.4E-06
15	1516	3.3E-08	1.5E-06	1520	3.3E-07	3.4E-06	1524	5.5E-08	2.1E-06
15	1720	9.7E-09	7.6E-07	1723	4.1E-08	1.0E-06	1726	1.5E-08	8.9E-07
15	1947	4.3E-09	6.2E-07	1954	1.2E-07	2.1E-06	1959	3.6E-08	1.2E-06
16	1610	5.0E-09	7.0E-07	1616	4.4E-08	1.3E-06	1625	1.4E-08	1.0E-06
16	1944	4.6E-09	5.9E-07	1948	6.7E-08	1.1E-06	1952	1.7E-08	8.2E-07
17	0154	1.0E-03	7.6E-07	0159	6.3E-08	2.2E-06	0203	3.7E-08	1.4E-06
17	0244	8.1E-09	7.5E-07	0250	4.3E-08	1.3E-06	0258	1.5E-08	1.0E-06
17	1029	1.5E-08	9.4E-07	1033	7.9E-08	2.0E-06	1035	4.7E-08	1.4E-06
17	1340	4.1E-09	5.5E-07	1409	1.5E-07	2.2E-06	1418	4.0E-08	1.3E-06
17	1836	6.8E-09	7.6E-07	1840	6.5E-08	1.4E-06	1843	1.5E-08	1.0E-06
17	2115	1.2E-08	7.0E-07	2122	4.2E-08	1.2E-06	2128	1.2E-08	9.1E-07
17	2131	9.3E-09	8.1E-07	2136	1.3E-06	8.7E-06	2150	2.9E-07	4.5E-06
18	0015	1.0E-08	6.5E-07	0025	7.7E-07	6.8E-06	0035	1.5E-07	3.7E-06
18	0852	2.1E-08	9.5E-07	0900	1.6E-06	8.5E-06	0908	2.5E-07	4.2E-06
18	1303	1.7E-08	6.2E-07	1309	3.6E-07	3.0E-06	1316	8.3E-08	1.7E-06
18	1426	1.7E-08	9.6E-07	1429	5.8E-08	2.0E-06	1435	3.4E-08	1.4E-06
18	1529	3.3E-08	1.0E-06	1539	2.3E-07	2.7E-06	1551	5.3E-08	1.8E-06
18	1717	2.6E-08	1.1E-06	1725	3.7E-06	2.1E-05	1730	1.3E-06	1.0E-05
18	1944	2.4E-07	3.2E-06	2023	1.1E-05	6.0E-05	2034	3.0E-06	3.1E-05
19	0458	1.1E-08	8.5E-07	0502	3.5E-08	1.2E-06	0508	1.5E-08	1.0E-06
19	0510	1.7E-08	1.0E-06	0518	1.5E-07	2.6E-06	0528	2.9E-08	1.8E-06
19	1318	6.5E-09	6.6E-07	1336	1.8E-07	2.9E-06	1344	3.2E-08	1.7E-06
19	2046	5.4E-09	5.1E-07	2123	1.1E-07	2.2E-06	2136	2.8E-08	1.3E-06
20	0001	4.0E-09	5.4E-07	0018	2.2E-06	1.4E-05	0038	4.4E-07	7.4E-06
20	0313	1.2E-08	7.5E-07	0318	6.7E-08	1.9E-06	0323	3.6E-08	1.3E-06
20	0550	2.6E-08	8.4E-07	0556	1.3E-07	2.0E-06	0600	7.7E-08	1.4E-06
20	0737	2.4E-08	7.8E-07	0741	9.4E-08	1.9E-06	0743	4.1E-08	1.2E-06
20	1129	1.5E-08	6.4E-07	1135	7.3E-08	1.1E-06	1143	2.2E-08	8.9E-07
20	1320	5.1E-09	6.2E-07	1329	1.4E-07	2.3E-06	1333	3.3E-08	1.2E-06
20	1427	1.1E-03	7.0E-07	1434	7.0E-08	2.2E-06	1438	5.6E-08	1.4E-06
20	1516	1.4E-07	2.5E-06	1520	3.5E-07	4.2E-06	1525	1.3E-07	3.1E-06
20	1604	2.0E-08	1.0E-06	1610	7.7E-07	5.3E-06	1621	1.5E-07	3.0E-06
20	1702	2.7E-08	1.2E-06	1707	1.5E-07	2.4E-06	1712	4.4E-08	1.7E-06
20	1728	4.6E-08	1.2E-06	1731	7.6E-08	2.0E-06	1733	6.8E-08	1.5E-06
20	1854	1.0E-08	8.0E-07	1904	1.0E-07	1.7E-06	1913	3.5E-08	1.2E-06
20	2126	2.2E-08	1.0E-06	2131	1.4E-07	2.3E-06	2135	4.2E-08	1.6E-06
21	0109	6.4E-09	6.8E-07	0116	1.6E-07	2.4E-06	0123	5.5E-08	1.5E-06
21	0428	1.6E-08	8.2E-07	0433	8.0E-08	1.2E-06	0437	3.3E-08	1.0E-06
21	0445	1.2E-08	8.0E-07	0452	1.3E-06	1.0E-05	0456	2.3E-07	4.9E-06
21	0604	1.9E-08	9.4E-07	0608	1.0E-07	2.0E-06	0615	5.7E-08	1.4E-06
21	0748	1.8E-08	9.7E-07	0751	1.0E-07	1.8E-06	0759	3.8E-08	1.3E-06
21	0810	1.8E-08	9.9E-07	0813	7.5E-08	1.5E-06	0817	2.6E-08	1.2E-06
21	0824	2.1E-08	1.0E-06	0835	1.5E-07	2.8E-06	0850	4.6E-08	1.9E-06
21	1041	4.0E-08	1.2E-06	1046	3.2E-07	3.3E-06	1048	9.7E-08	1.9E-06
21	1117	4.7E-08	1.2E-06	1123	2.2E-07	2.4E-06	1131	6.2E-08	1.7E-06
21	1146	1.5E-08	9.2E-07	1155	3.4E-07	3.8E-06	1206	5.6E-08	2.2E-06

SOLAR X-RAYS BY SATELLITE

GOES

JULY 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}
21	1258	1.3E-08	9.3E-07	1303	1.3E-07	2.0E-06	1306	4.1E-08	1.4E-06
21	1323	2.5E-08	1.1E-06	1326	6.4E-08	2.2E-06	1330	4.4E-08	1.5E-06
21	1420	2.0E-08	9.4E-07	1425	7.2E-08	1.8E-06	1431	3.8E-08	1.3E-06
21	1449	1.0E-08	8.3E-07	1452	4.6E-08	1.2E-06	1455	1.6E-08	9.6E-07
21	1517	7.2E-08	1.5E-06	1522	3.4E-07	3.5E-06	1526	1.0E-07	2.3E-06
21	1538	6.6E-08	1.6E-06	1555	1.4E-06	1.1E-05	1614	3.4E-07	6.4E-06
21	1822	3.7E-08	1.2E-06	1909	1.4E-05	8.0E-05	1931	3.8E-06	4.0E-05
21	2335	1.0E-08	1.1E-06	2338	1.2E-07	2.0E-06	2340	6.5E-08	1.6E-06
22	0226	8.6E-09	7.0E-07	0230	6.3E-08	1.1E-06	0233	1.7E-08	8.8E-07
22	1250	5.9E-09	4.3E-07	1336	2.0E-06	1.5E-05	1403	4.5E-07	7.7E-06
23	0511	5.9E-09	4.2E-07	0523	9.3E-08	1.4E-06	0532	2.0E-08	8.7E-07
23	1445	3.6E-09	4.4E-07	1500	5.3E-08	2.1E-06	1510	3.4E-08	1.2E-06
23	1639	8.9E-09	4.8E-07	1702	1.8E-06	9.8E-06	1711	3.7E-07	4.7E-06
25	2141	9.7E-09	4.5E-07	2150	3.8E-08	1.1E-06	2207	1.6E-08	7.9E-07
28	1142	1.4E-09	2.4E-07	1148	8.6E-08	1.3E-06	1153	1.8E-08	7.5E-07
29	1041	5.9E-08	1.3E-06	1058	2.4E-07	4.3E-06	1119	1.0E-07	2.8E-06

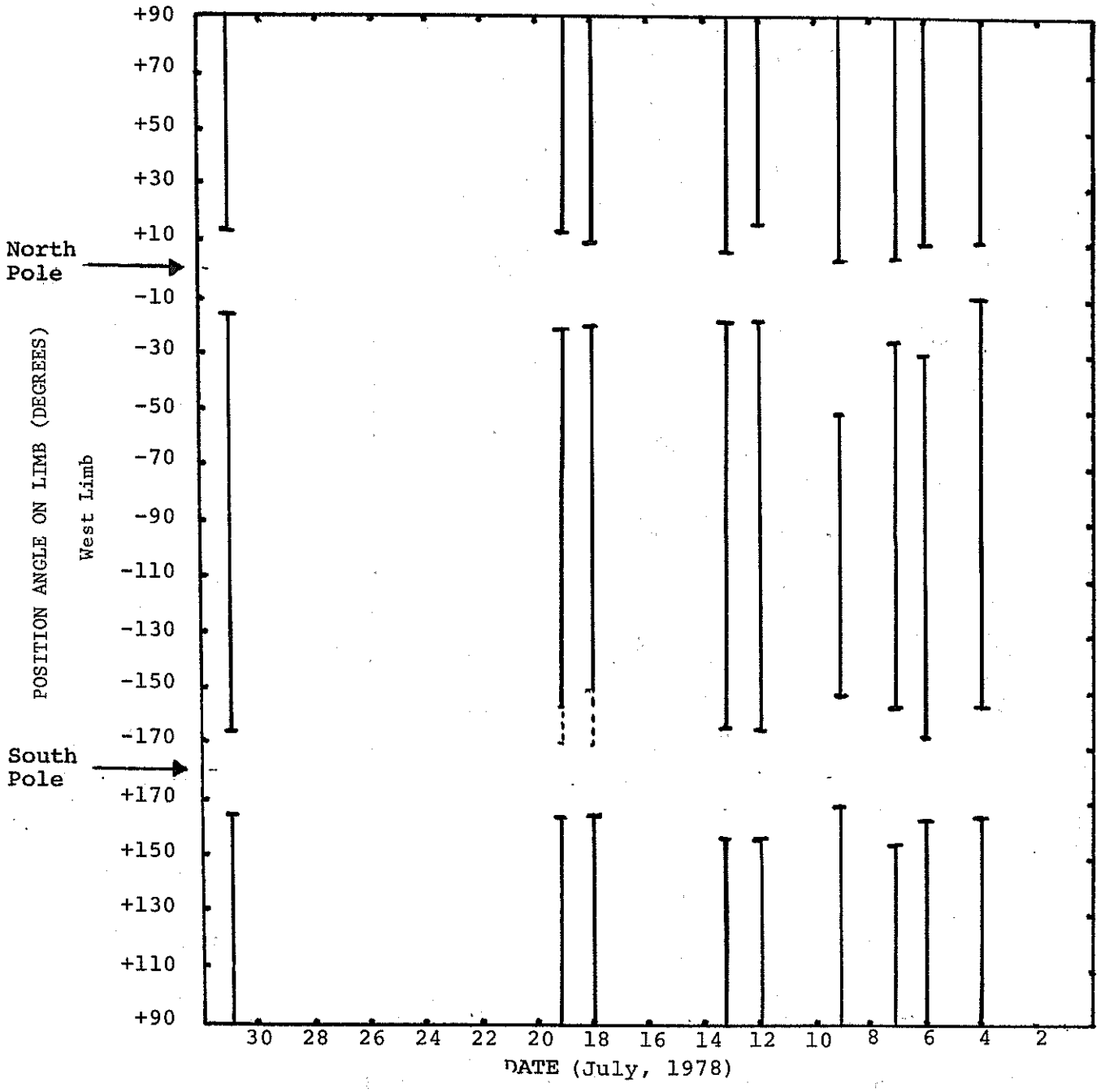
CORONAL HOLES

Helium D3 Chromosphere at Solar Limb

JULY 1978

Big Bear Solar Observatory

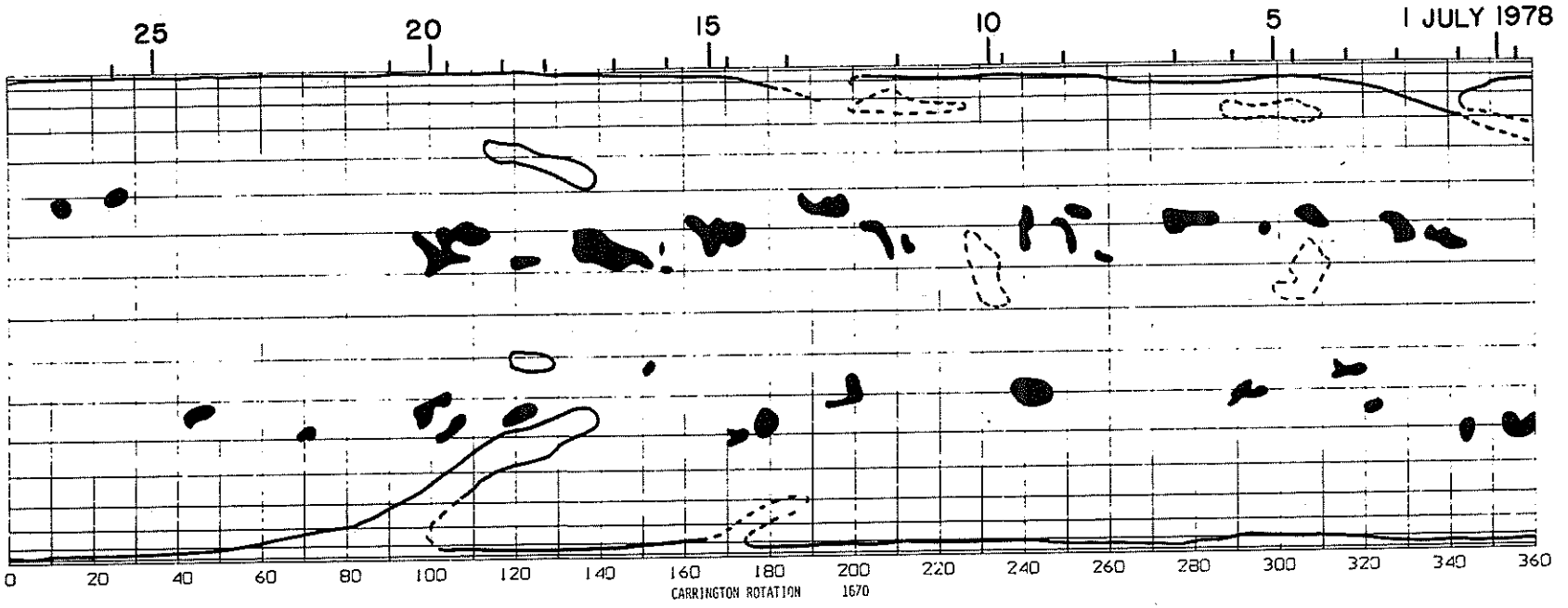
OBSERVATIONS OF D3 CHROMOSPHERE AT SOLAR LIMB



HELIUM 10830Å SYNOPTIC MAPS

CARRINGTON ROTATION 1670

KITT PEAK NATIONAL OBSERVATORY



SOLAR WIND

Interplanetary Scintillations

JULY 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	456	6	430	26	371	36	392	59			389	12			514	65
2	340	6			479	58	337	11	464	31	330	57	306	44		
3	359	37			328	4	334	5	412	22	367	8	433	23		
4	358	7	306	25	444	9	400	5	412	69	449	4	495	3	520	4
5	369	13					416	42	335	49	426	6	458	11	331	37
6	477	4	298	5	417	33	391	5	400	10	353	41	293	33	443	11
7	415	7			557	41	394	14	363	29	477	5	458	10		
8	487	7	516	116	491	7	426	38			439	22	458	6	211	36
9	437	10							279	13			451	20	446	7
10											381	6	366	38		
11			518	52												
12			450	23					536	15	361	69	370	58		
13	424	5	471	16	469	45	391	6	433	9	451	8	451	4		
14	438	21	365	11	443	9	451	8	402	6	561	8	557	14		
15	642	*					334	*	349	29	472	19	467	5		
16	358	15	333	12	367	23	376	31			447	15	377	26		
17			309	6	415	40	351	29	278	6			467	39		
18	404	9					338	*			387	4	463	19		
19	413	5	349	6	418	27	391	5	289	9			437	14		
20	370	7	354	8	329	9	421	6	460	15						
21	371	65			314	*			307	12	318	15	295	17		
22	373	33	360	7	408	48	430	81			433	12				
23	420	30					362	30	317	56	369	7	404	41		
24			357	14	483	53	383	11			335	23	324	4		
25	458	19	455	18	300	7	369	5			310	8	339	14		
26	244	34	366	9	323	22	422	*			344	20	289	4		
27	351	27	277	27									257	7		
28	365	53	269	7	229	24	478	24			245	10	283	5		
29	283	3	312	14			332	66			230	29				
30									350	10						
31			253	82			336	11	500	95	254	9	274	6		

JULY	5 UT	LAT	DIST	DLON	15 UT	LAT	DIST	DLON	25 UT	LAT	DIST	DLON
3C48	15.	12.	0.94	17.	14.	12.	0.99	16.	13.	12.	1.04	15.
3C144	19.	3.	0.34	70.	18.	4.	0.49	61.	17.	5.	0.63	51.
3C147	18.	53.	0.52	37.	17.	43.	0.60	41.	16.	34.	0.69	39.
3C161	20.	-52.	0.50	26.	19.	-41.	0.54	37.	19.	-31.	0.61	39.
3C237	24.	-5.	0.73	-42.	23.	-6.	0.61	-51.	22.	-8.	0.47	-60.
3C273	2.	2.	1.00	-17.	1.	4.	0.95	-18.	0.	4.	0.89	-27.
3C298	4.	6.	1.12	-15.	3.	8.	1.07	-16.	2.	9.	1.03	-17.
3C459	12.	6.	1.15	14.	11.	7.	1.19	12.	11.	8.	1.22	10.

*Indicates data for which no error estimate is available since only two antennas were operating.

Note: 3C237 observed at 24 hr. UT before July 8 and at 0 hr. UT after July 8.

INFERRED IP MAGNETIC FIELD

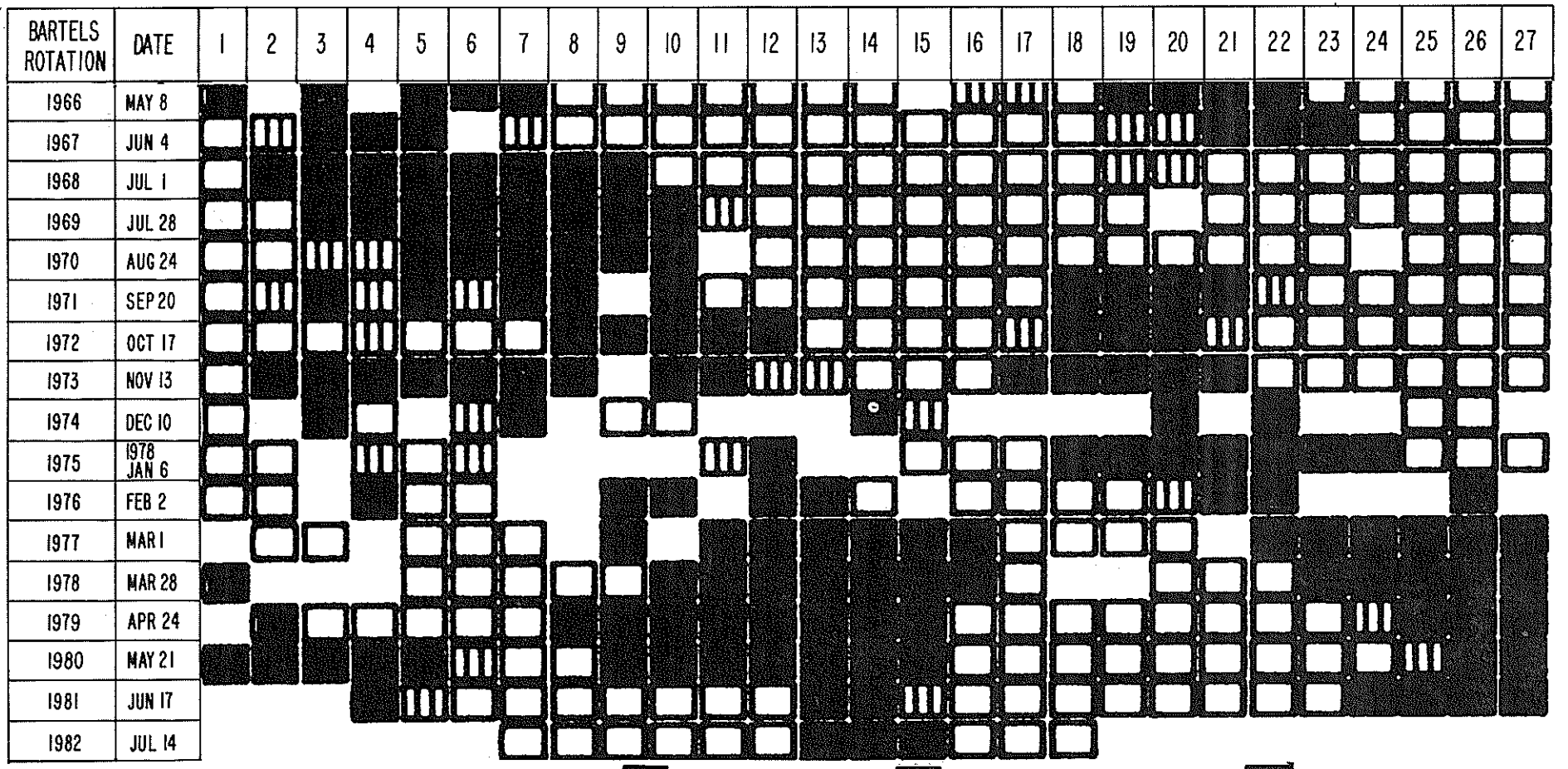
BARTELS ROTATION	DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1966	MAY 13	TA	-	-		TA			TA											AT	-	-	AT	T*	-	T*	AT	AT	-
1967	JUN 9								TA		-			TA						AT	A*				AT	*	A*	TA	TA
1968	JUL 6										A*			T*	TA	TA		T*			AT			-	AT		-		
1969	AUG 2		TA						TA	-			TA	*								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			
1978	APR 2							*		-	AT											AT	AT						
1979	APR 29		TA		*		TA	AT	AT	TA		-	T*							TA	TA		AT						
1980	MAY 26				TA		AT	AT				-				AT	TA				-					-	-	-
1981	JUN 22	TA					A*					-	TA	TA	TA	AT			*				*	AT	AT	-	AT		
1982	JUL 19									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						
	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY
DAY												
01	-16	-9	9	6	-14	.	16	.	52	-12	-28	1
02	-23	-13	6	1	-10	.	31	22	46	-34	-22	13
03	-25	.	3	-14	-7	14	26	12	43	-27	-12	15
04	-23	3	13	-16	8	31	.	.	13	-27	-5	18
05	-16	12	13	-11	26	.	-5	8	4	-29	6	24
06	-5	18	11	-1	46	27	4	11	-15	-27	5	43
07	-1	22	-6	11	55	15	9	4	-32	-23	21	42
08	11	17	-13	31	53	.	.	.	-53	-12	33	36
09	25	8	-13	46	46	-1	.	-31	-52	3	41	16
10	20	4	-4	48	26	11	-28	.	-41	24	40	-11
11	17	6	2	51	.	0	-43	-70	-32	41	23	-17
12	12	13	12	32	-2	.	.	-78	-4	50	12	-12
13	11	19	28	14	10	.	-41	-56	22	47	8	-38
14	5	23	35	-4	.	.	-23	-49	.	30	0	.
15	7	40	46	-10	1	.	3	-28	.	16	-24	.
16	.	.	39	-18	-6	0	.	-3	58	5	-38	.
17	5	38	20	-24	.	-3	31	18	37	1	.	.
18	13	41	6	-5	6	.	22	54	11	-29	.	.
19	19	31	6	-11	8	.	37	48	-9	-49	.	.
20	23	17	1	-12	.	18	22	24	-30	-75	-16	23
21	24	2	3	.	.	39	-1	.	-49	-79	0	21
22	22	-3	7	-7	.	10	-18	-23	-50	-59	24	16
23	18	-2	3	-4	-5	-4	-49	-49	-62	-37	51	6
24	8	-6	-3	0	-1	-15	.	-69	.	-21	52	3
25	4	-1	-9	2	.	-17	.	-79	-13	-9	48	3
26	0	-3	-5	4	.	-36	.	-73	10	1	30	-7
27	2	-8	-5	7	.	-48	-34	-53	13	27	12	-13
28	-2	.	-6	5	.	-33	.	-28	6	14	3	-6
29	-6	-8	5	-2	-9	-15		.	13	-10	-5	14
30	-6	3	6	-11	.	14		.	18	-20	-10	27
31	-11		8		-20	10		.		-27		33

Dot symbol entry indicates no data available for the day.

PIONEER IX

JULY 1978

Date July 1978	DSN Coverage (UT)	Data Time (UT)	ESP (°)	SOLAR WIND[1]				IP E-FIELD[2]	IMF[3]		COSMIC RAY PROTONS[4] (particles/sec)	
				U_{H^+} (km/sec)	N_{H^+} (H^+/cc)	T_{H^+} (x10^6°K)	TAU (days)	400 Hz (mv)	|B| (γ)	φ (°)	>13.9 Mev	>40 Mev
9	2011-2229	2000	-080.2	325.			-5.57	0.12	5.8	189.	5.7	0.76
		2100		338.				.14	5.9	154.	5.8	.65
		2200		350.				.14	6.6	094.	5.7	.75

1 Wolfe - NASA/ARC
2 Scarf - TRW, Inc.
3 Sonett and Colburn - NASA/ARC
4 Webber - Univ. of N.H.

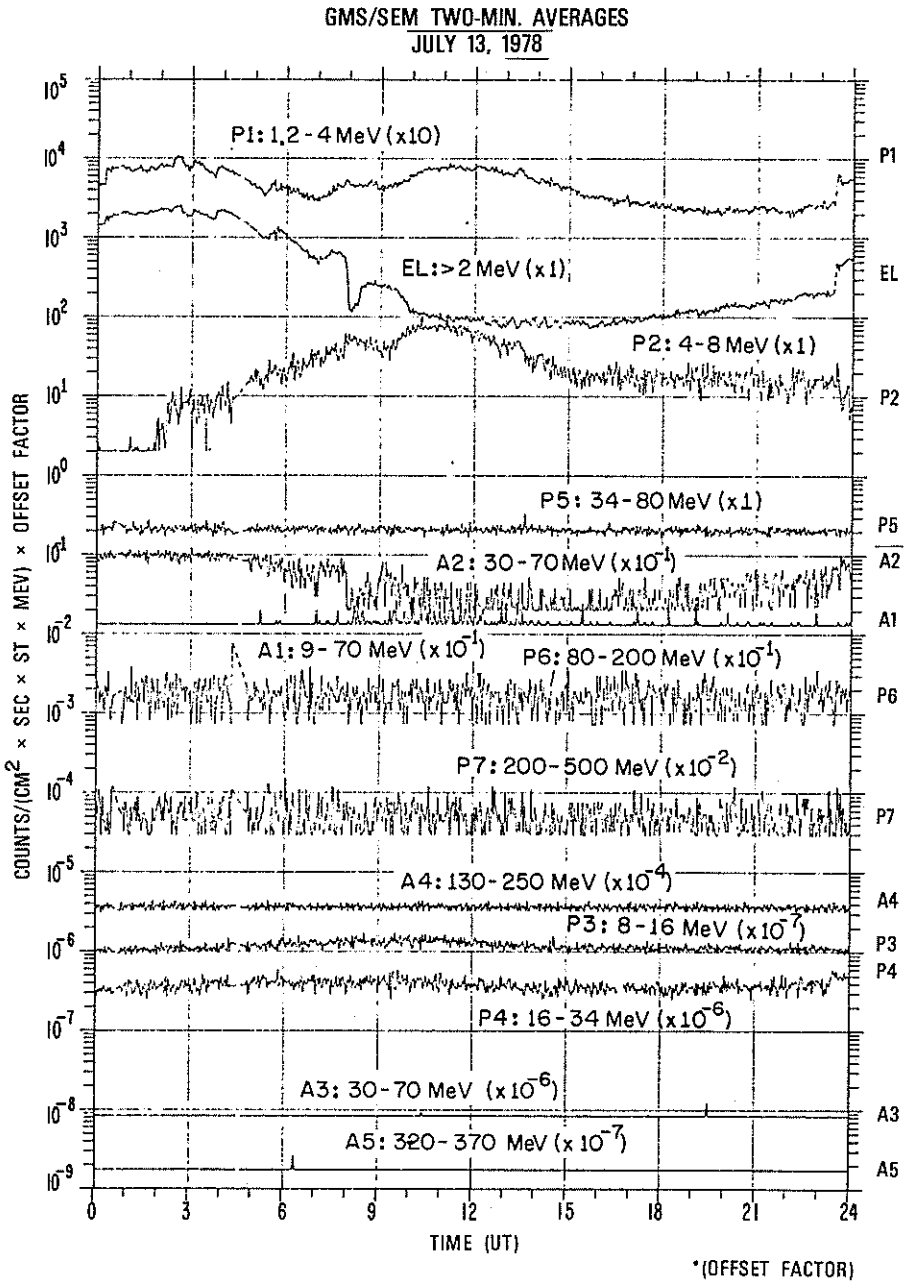
ESP = Earth-Sun Probe Angle.

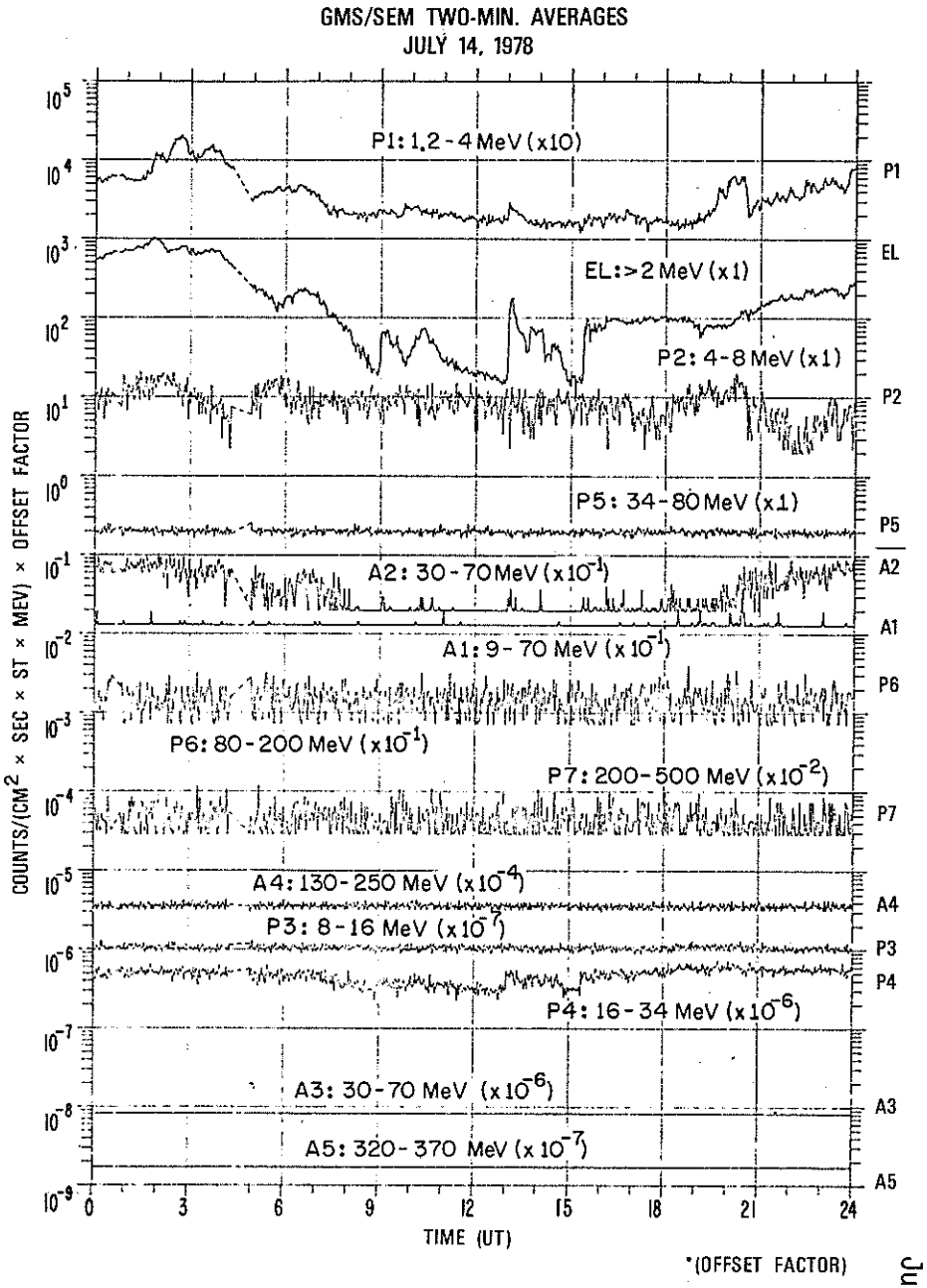
Note: Data sampled hourly unless otherwise noted.

BOULDER GEOMAGNETIC SUBSTORM LOG

JULY 1978

DATE	TIME OF ONSET	DIRECTION	COMMENTS
1			Quiet day; mild activity at Fort Churchill and east-west chains 0900-1500 UT.
2	0715	East	
3	2250		SSC - Mag storm begins
4			Mag storm continues- Very strong response throughout network 1335-1755 UT.
5			Mag storm continues through 1600 UT - Strong responses throughout network 0330-0820 UT.
6	1510		Network in daylight
7	0840	West	Field continues disturbed through 2140 UT with no distinct onset
8	0540		Minor SS activity along auroral oval
	0625		Minor SS activity along auroral oval
	0645		Minor SS activity along auroral oval
	0710		Minor SS activity along auroral oval
	1445	West	Moderately strong response Fort Simpson to College, also Boulder and Tucson at mid-latitude and Pelly Bay and Rankin inlet on Ft. Churchill chain.
9	1300		Minor SS centered near Norman Wells
	1505		Network in daylight
10	0800	East	SS centered Lynn Lake - Island Lake
	1205		SS along oval stations; Lynn Lake - College
11			Unsettled periods; no distinct onset
12	1020		SS along oval stations; Lynn Lake - Norman Wells - Inuvik
13	0015		Weak SSC
	0750	Near Center	
	1310		1st of multiple onset
	1410		2nd of multiple onset
	1500		3rd of multiple onset
	2325		Moderate SSC seen throughout network
14			Mag storm
15			Quiet - 20 gamma pulsation at mid-latitude chain 0400-0600 UT
16			Quiet day
17	0954	West	1st of double onset - centered near Fort Simpson
	1010	West	2nd of double onset - centered near Fort Simpson
18	1155	West	
	1550		Network in daylight
	2045		SS evident in network from Fort Smith eastward. Stations north of oval and mid - low latitude stations disturbed 12-24 UT.
19	0500	East	Moderate H-component response mid - low latitude. Minimal or no response in rest of network.
	0550	≈Center	Minimal or no response in rest of network
	0610	≈Center	Minimal or no response in rest of network
20	0620	East	SS centered near Lynn Lake - Back.
21	0820	West	
22	0410	East	1st of double onset
	0455	East	Moderate activity until 0800
23	0450	East	
24			Quiet day
25			Quiet day
26			Quiet day
27			Quiet day
28	0400	East	
	0620	East	
	0700	East	
29			Quiet day
30			Quiet day
31			Quiet day





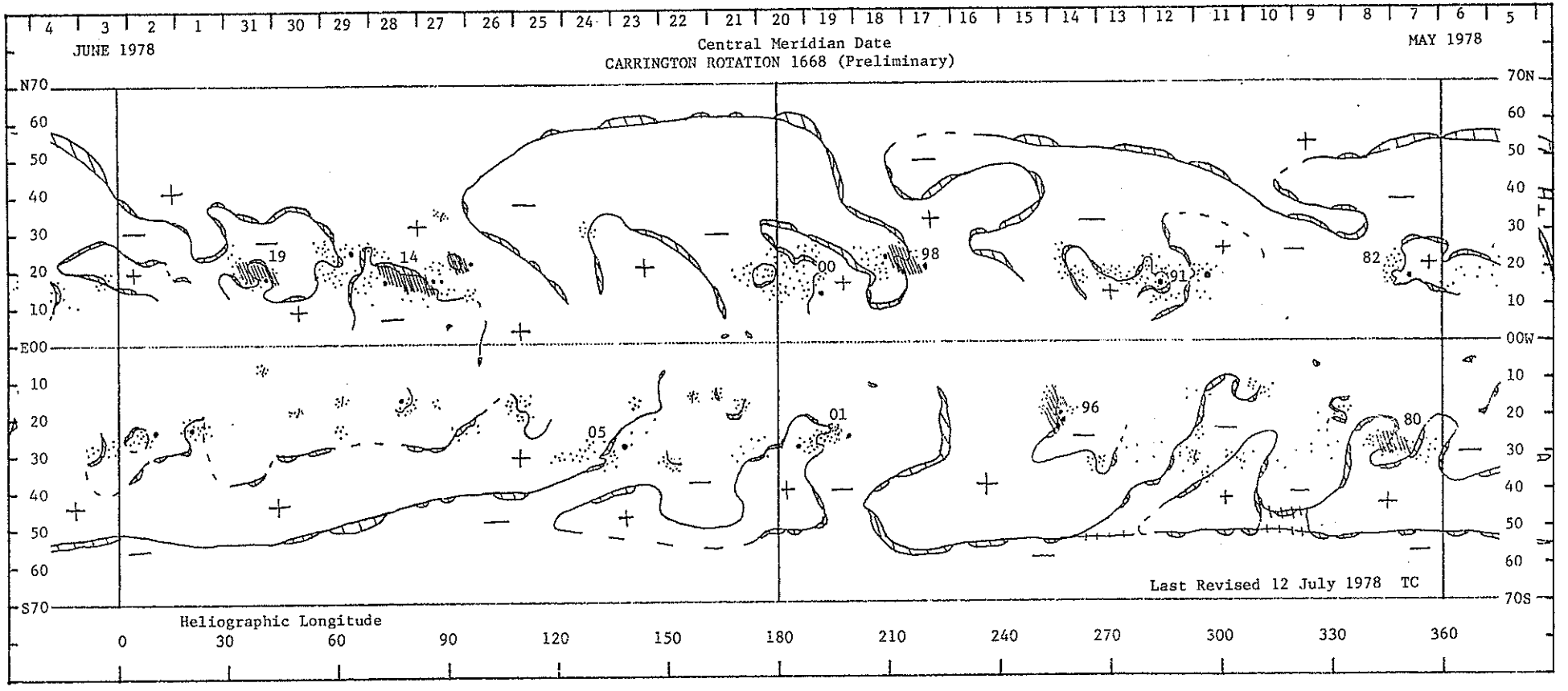
ERRATA: In SGD 406 Part I, page 44, fourth paragraph, sixth line -- the P2 undisturbed counting rate of 80 counts/cm²·sec·sterad refers to unpublished February 1978 data. For each event the noise level is measured by the quiet day level before the event. For September 1977 and April 1978 data, the noise level was about 1 count/cm²·sec·sterad.

JUNE 1978 DATA

Contents

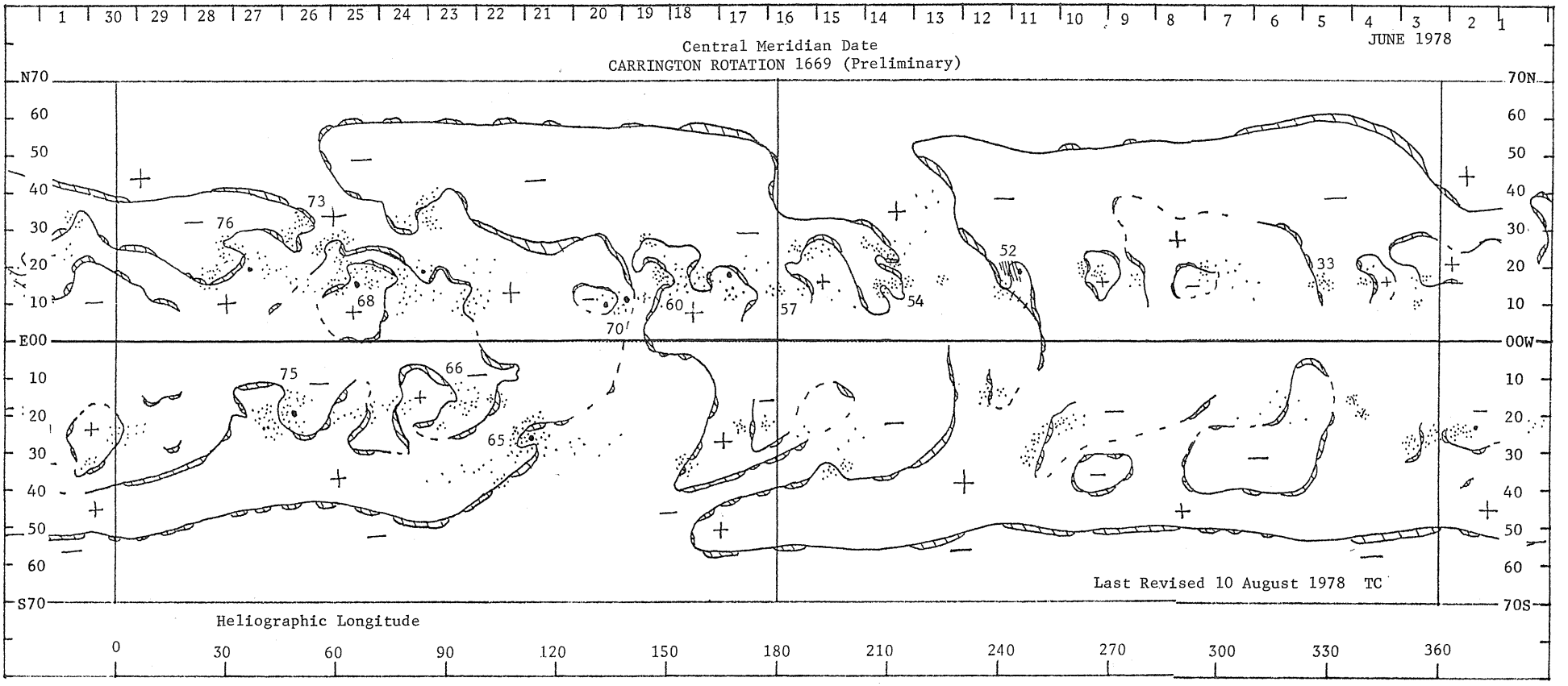
	Page
Daily Solar Activity Center	
Hα Synoptic Chart	48-49
X-ray, Magnetograms, Calcium Plages, Hα Filtergrams, Sunspots, Corona and 2 cm and 8.6 mm Spectroheliograms	50-109
Individual Regions of Solar Activity	110-119
Daily Calcium Indices	119
Sudden Ionospheric Disturbances	
Table of Events	120-122
Solar X-Ray Radiation	
Solrad 11	123-137
Solar Radio Waves	
Spectral Observations	138-151
Selected Events by Radioheliograph	152-154
Cosmic Rays	
Neutron Monitors Daily Values	155
Chart of Variations	156-159
Geomagnetic Indices	
Table of Indices Kp, Kn, Ks, Km, Cp, Ap, aa	160
12-Month Table of Daily Averages Ap	161
Chart of Kp by Bartels 27-day Rotation	162
Chart of Dst by Bartels Rotation	163
Equatorial Indices Dst	164
Principal Magnetic Storms	165-166
Sudden Commencements and Solar Flare Effects	167
Radio Propagation Indices	
Transmission Frequency Ranges - North Atlantic Path	168-169
Quality Indices on Paths to Germany	170

Hα SYNOPTIC CHART
MAY - JUNE 1978

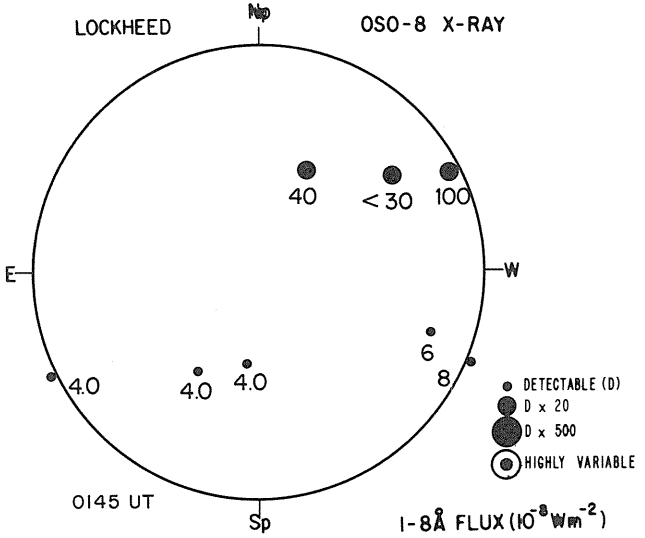


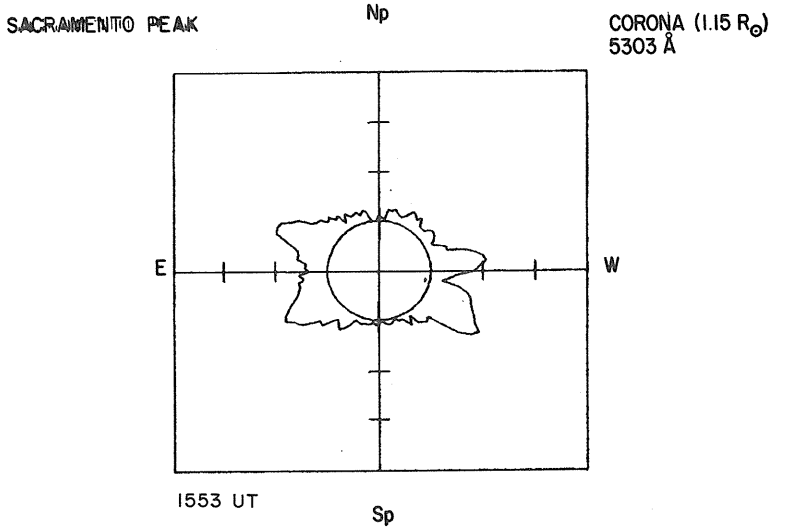
Hα SYNOPTIC CHART

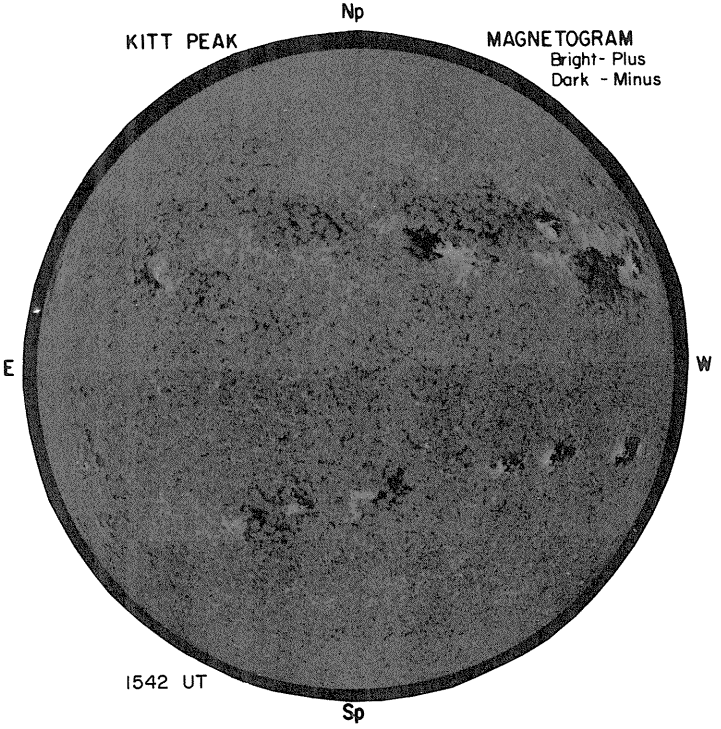
CARRINGTON ROTATION 1669 (PRELIMINARY)

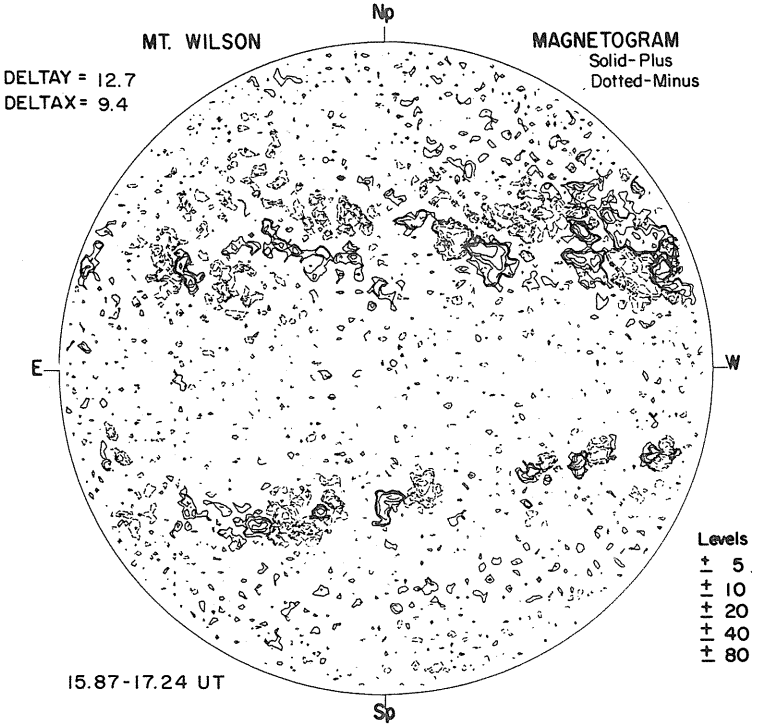


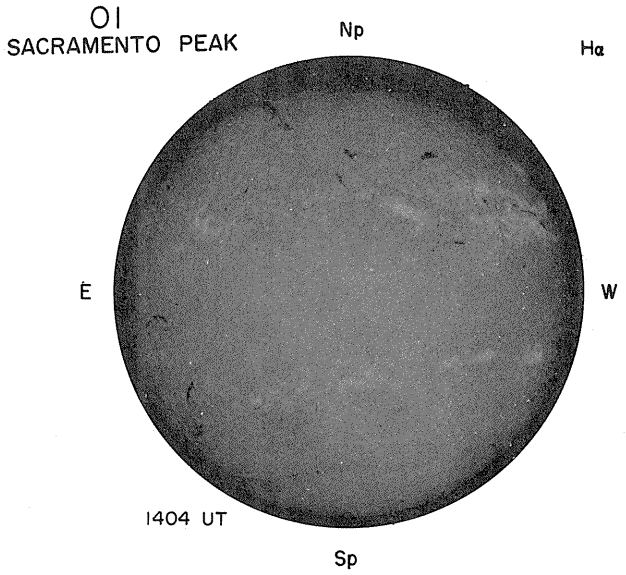
JUNE 1, 1978 (P =-15.59, B_o =-0.67, L_o = 28.63)

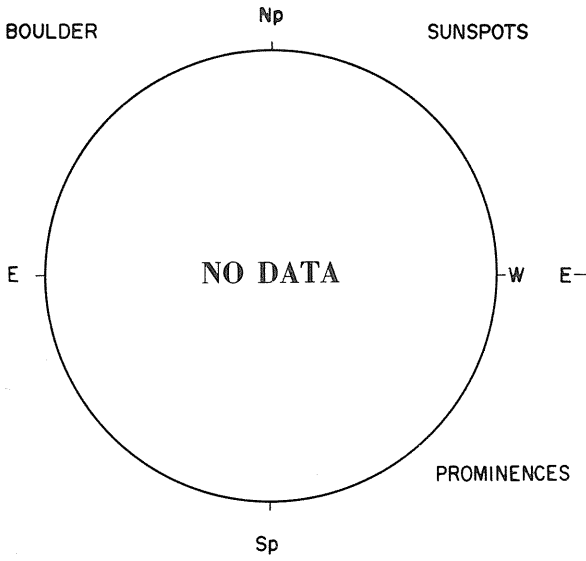


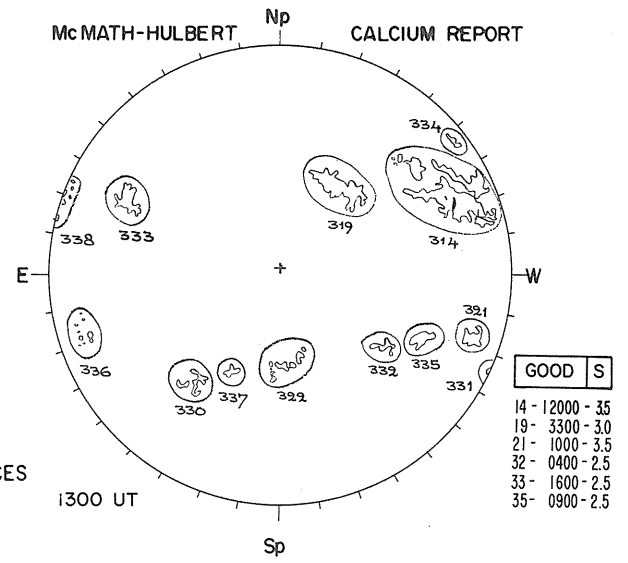


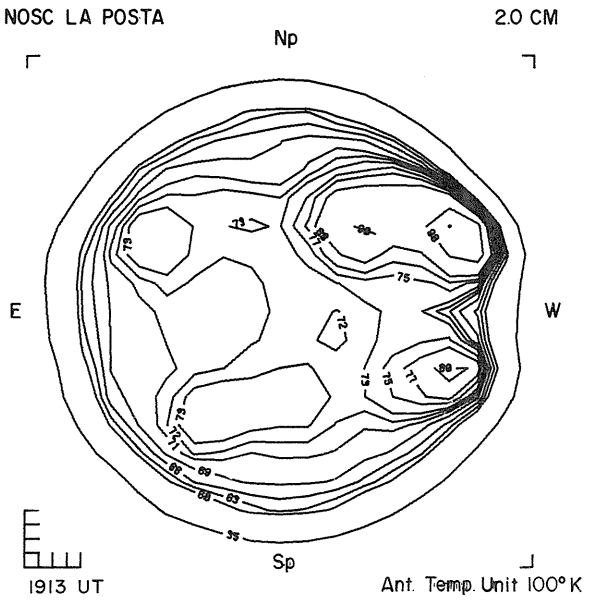


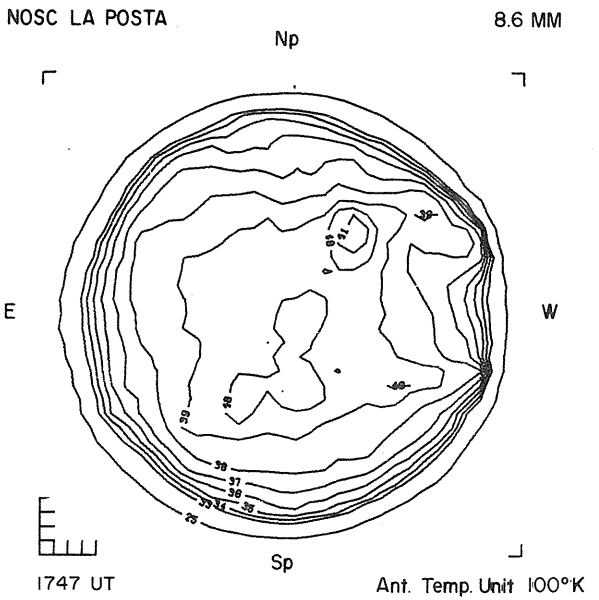



OI
SACRAMENTO PEAK
Np
Hα
E
W
1404 UT
Sp

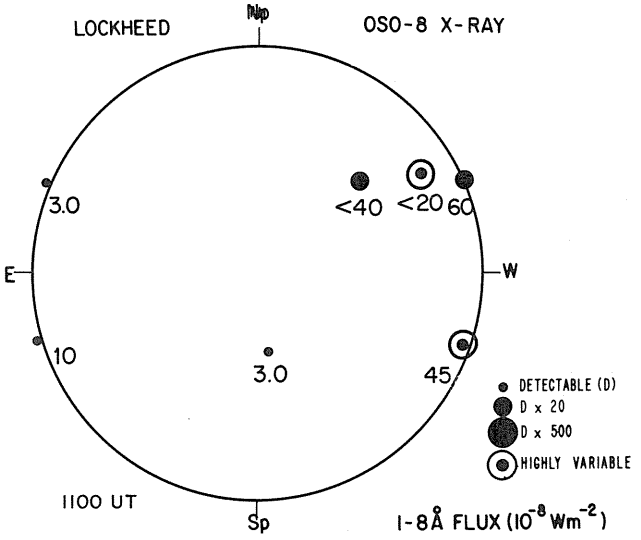

BOULDER
Np
SUNSPOTS
E
NO DATA
W
PROMINENCES
Sp

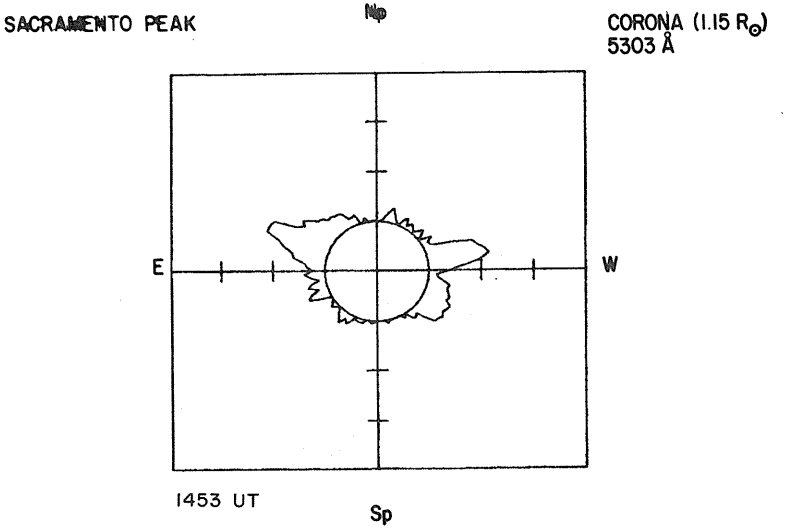

McMATH-HULBERT
Np
CALCIUM REPORT
E
W
1300 UT
Sp
GOOD | S
14 - 12000 - 3.5
19 - 3300 - 3.0
21 - 1000 - 3.5
32 - 0400 - 2.5
33 - 1600 - 2.5
35 - 0900 - 2.5

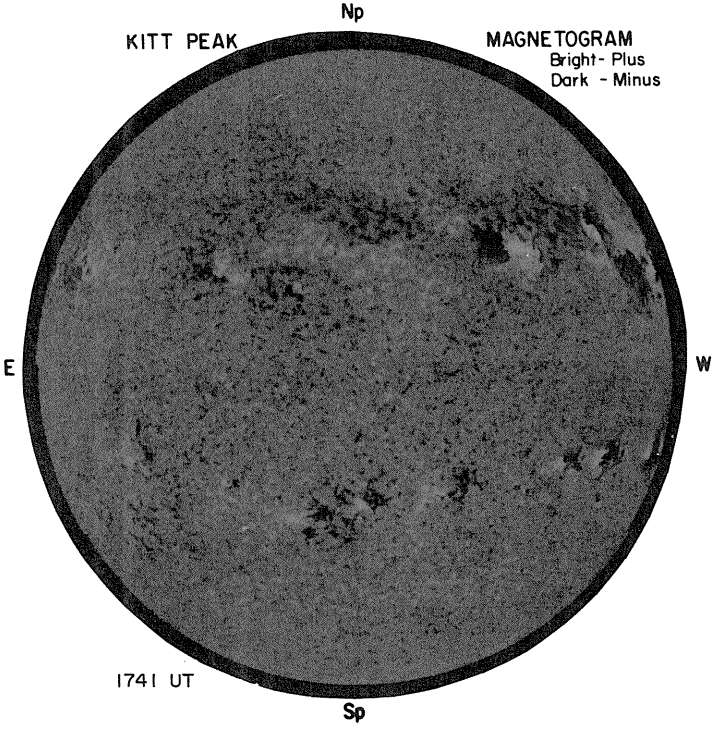

NOSC LA POSTA
2.0 CM
Np
E
W
Sp
1913 UT
Ant. Temp. Unit 100°K

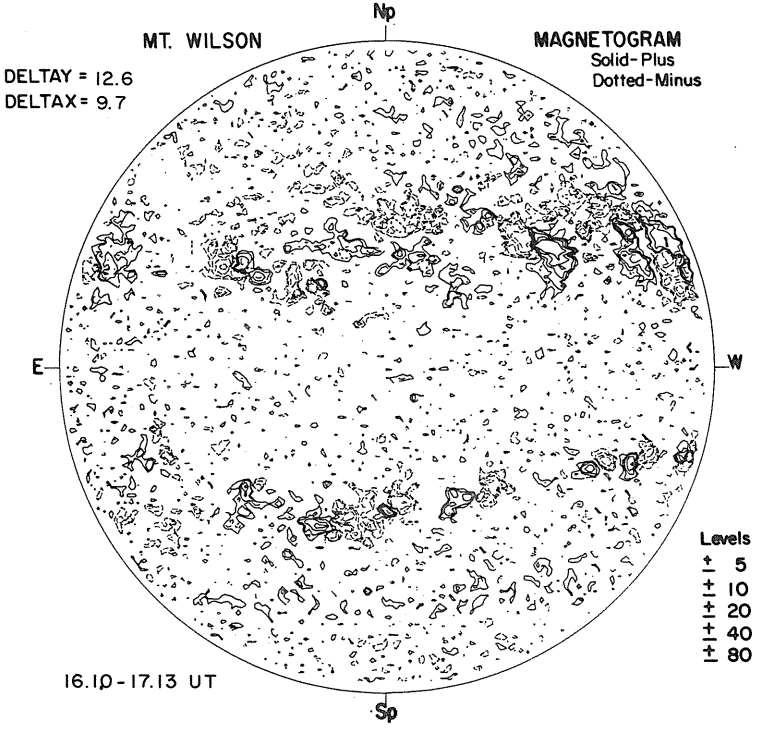

NOSC LA POSTA
8.6 MM
Np
E
W
Sp
1747 UT
Ant. Temp. Unit 100°K

JUNE 2, 1978 (P = -15.22, B_o = -0.55, L_o = 15.40)

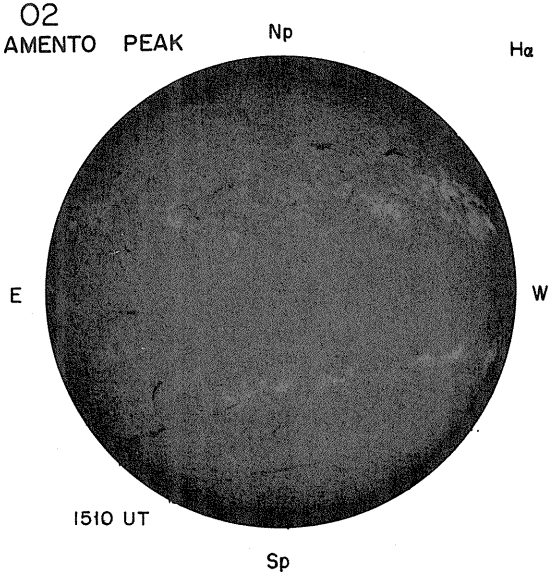






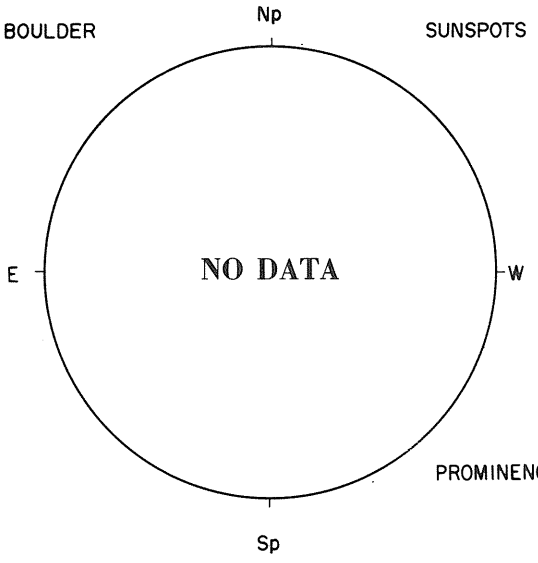


02
SACRAMENTO PEAK



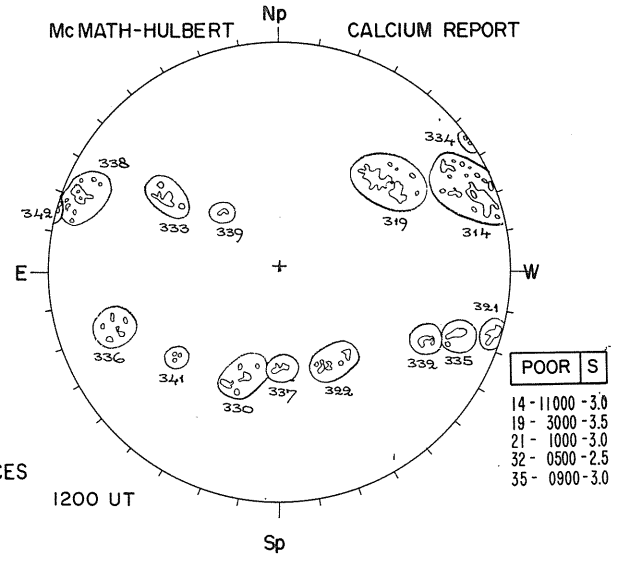
1510 UT

Hα BOULDER



SUNSPOTS

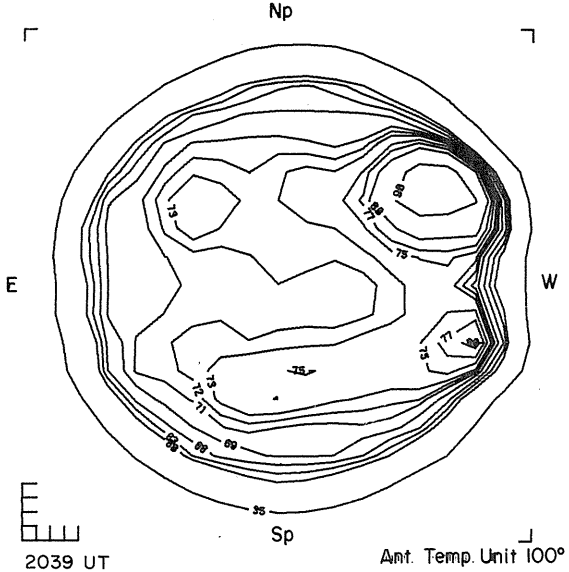
McMATH-HULBERT CALCIUM REPORT



PROMINENCES

1200 UT

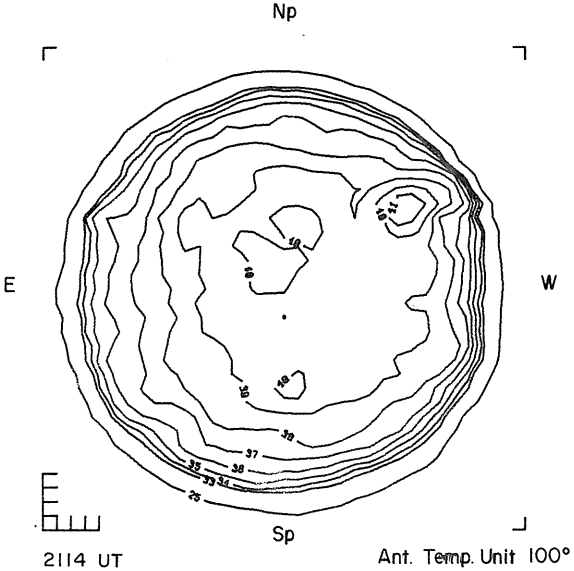
NOSC LA POSTA 2.0 CM



2039 UT

Ant. Temp. Unit 100° K

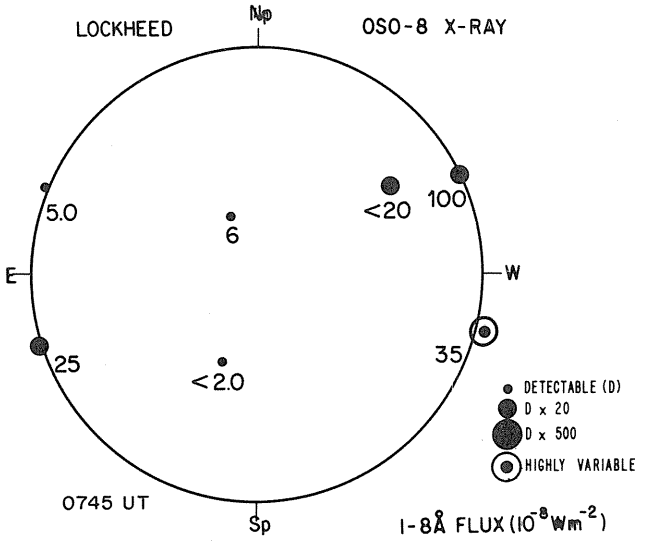
NOSC LA POSTA 8.6 MM

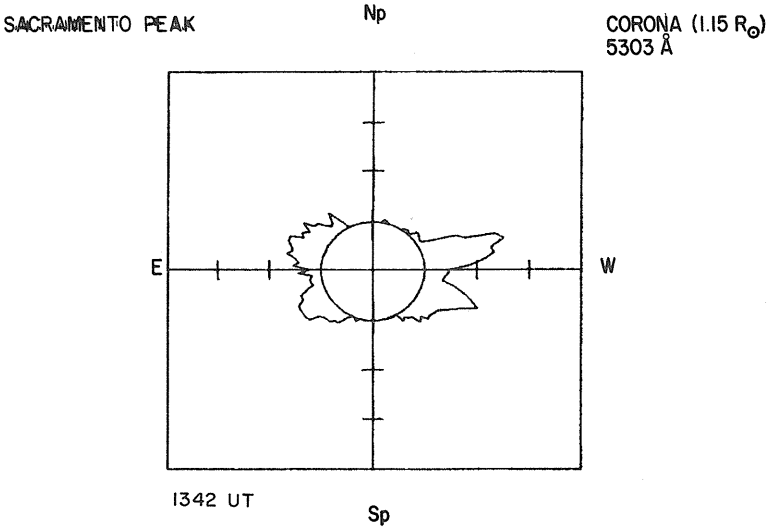


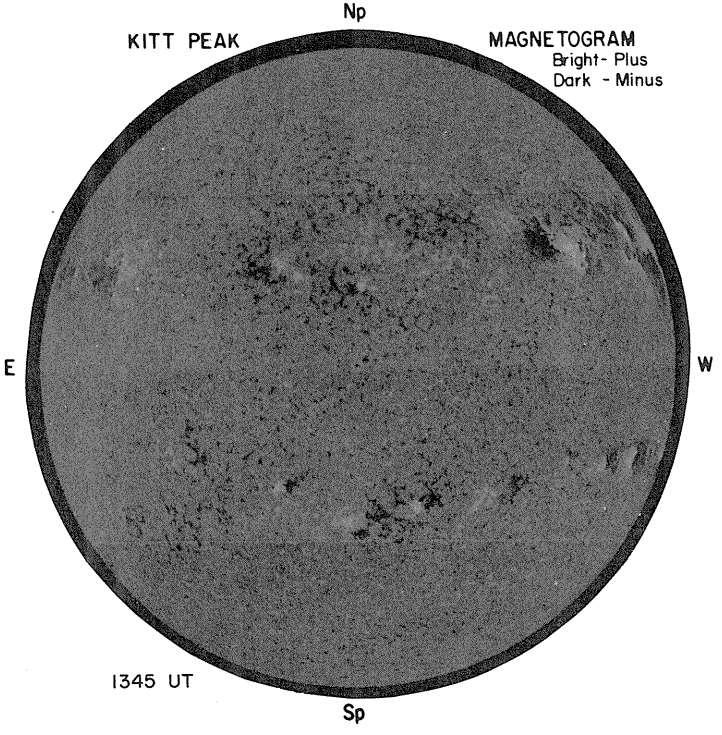
2114 UT

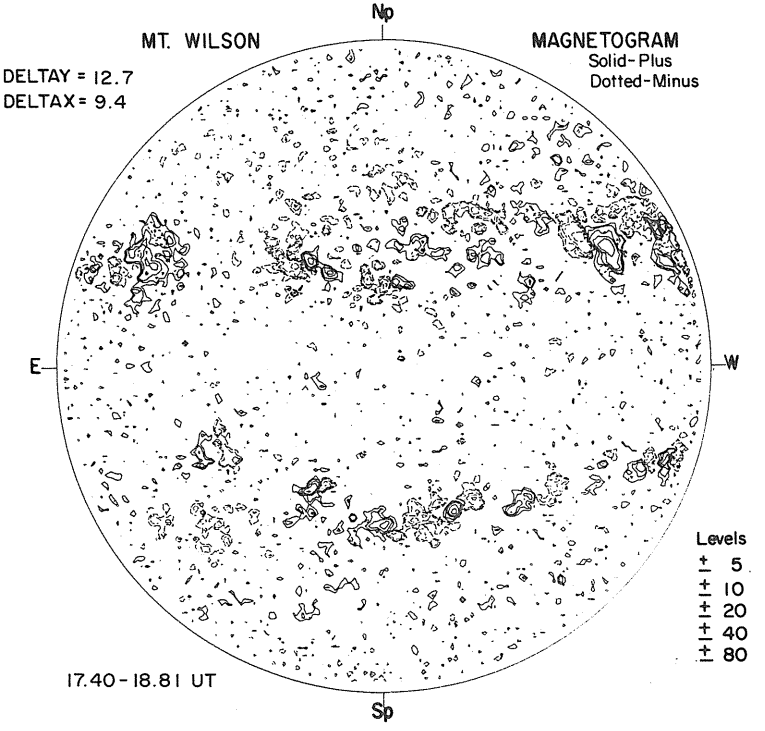
Ant. Temp. Unit 100° K

JUNE 3, 1978 (P =-14.84, B_o =-0.43, L_o = 2.16)

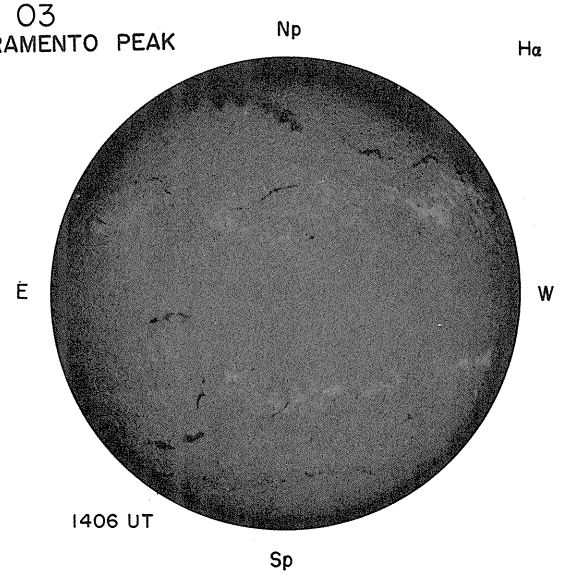




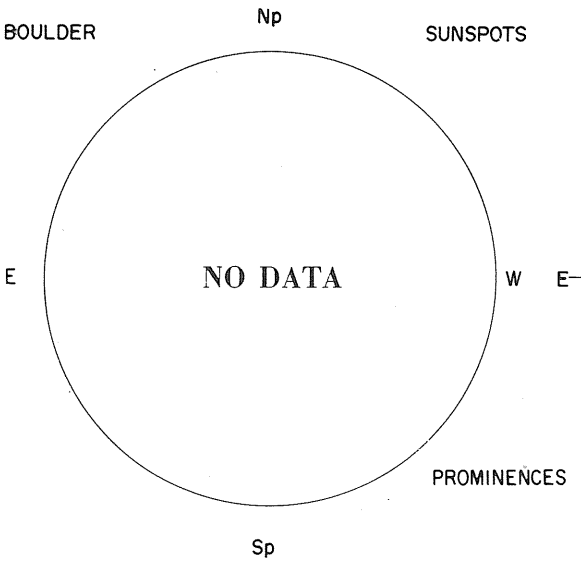




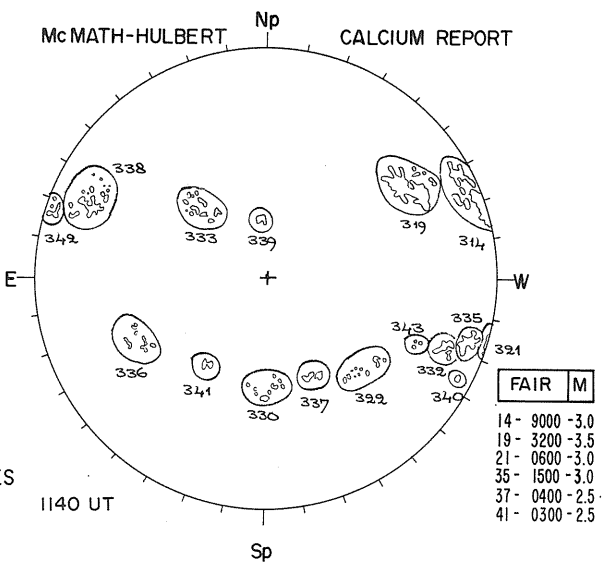
03
SACRAMENTO PEAK



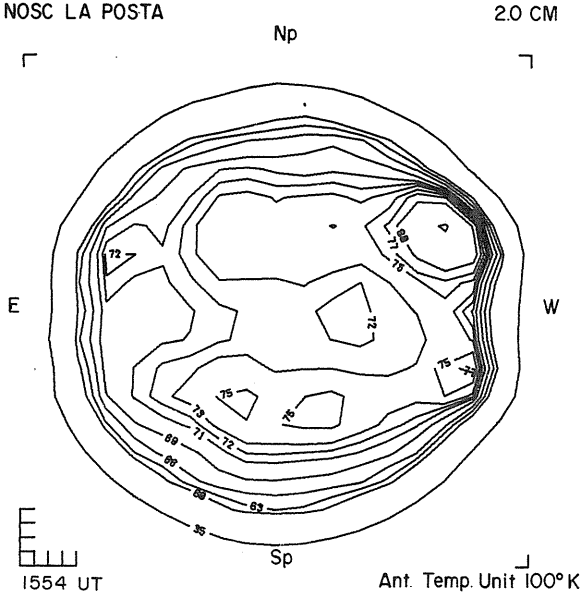
BOULDER



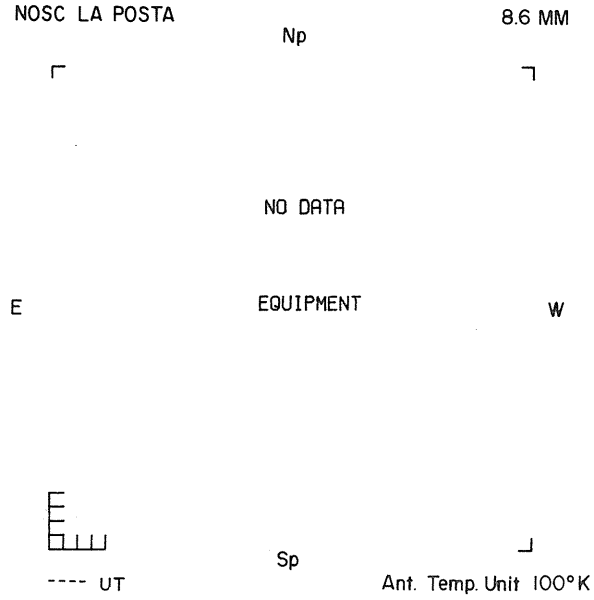
McMATH-HULBERT



NOSC LA POSTA

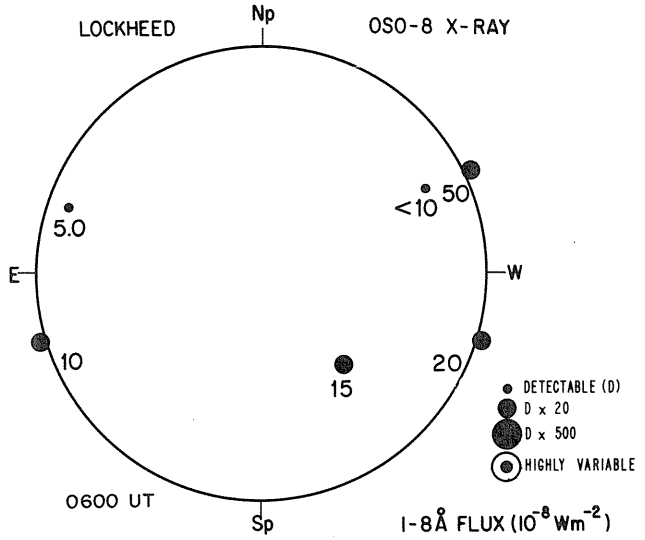


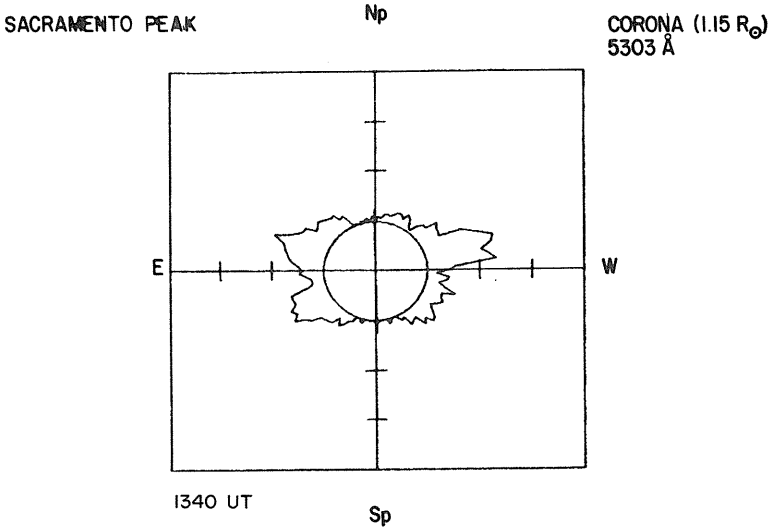
NOSC LA POSTA

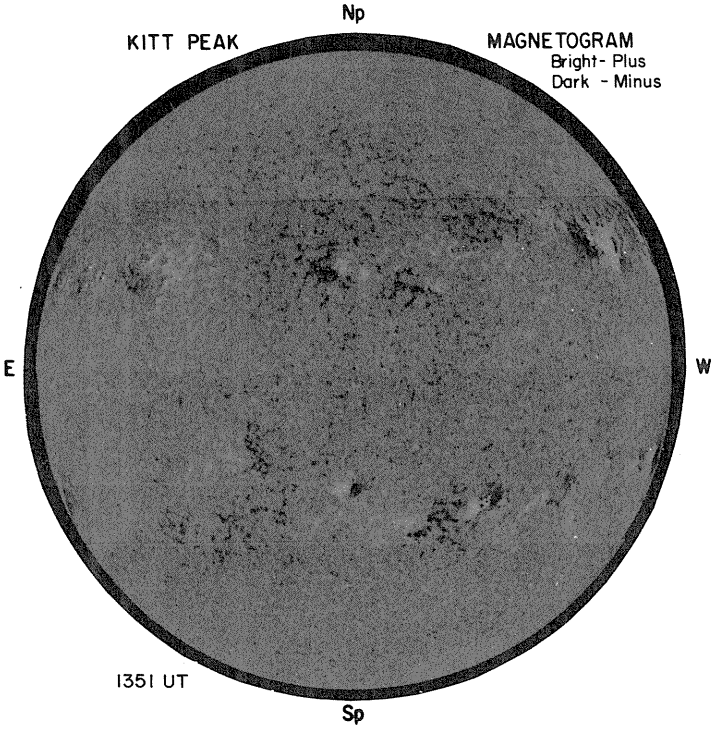


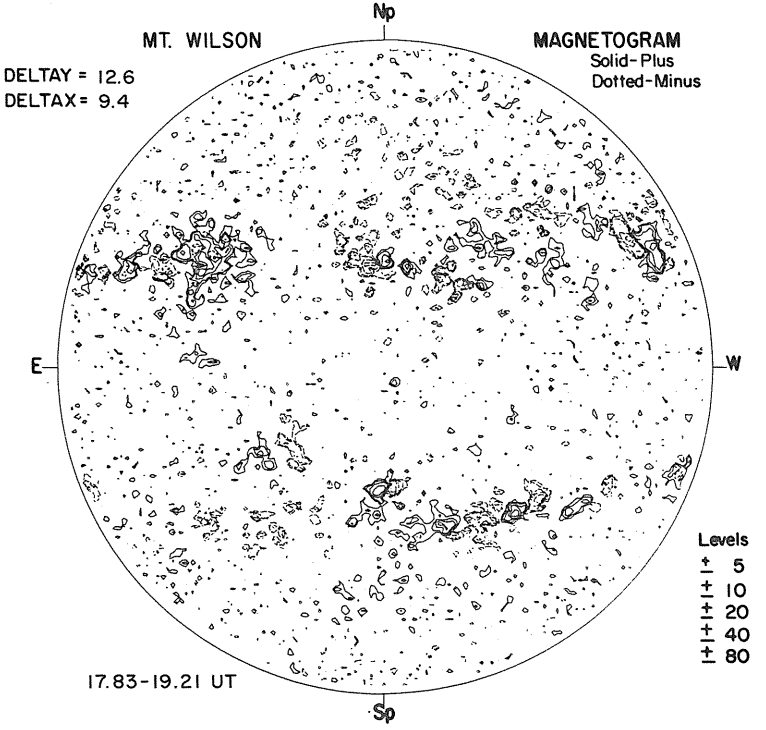
55
Jun 78

JUNE 4, 1978 (P = -14.46, B_o = -0.31, L_o = 348.93)



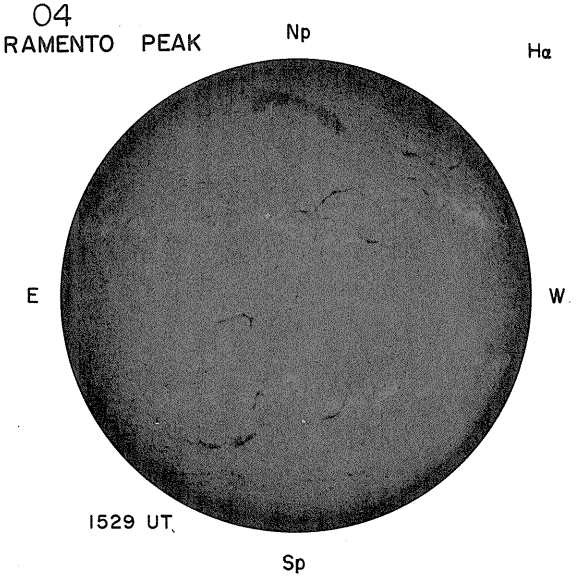




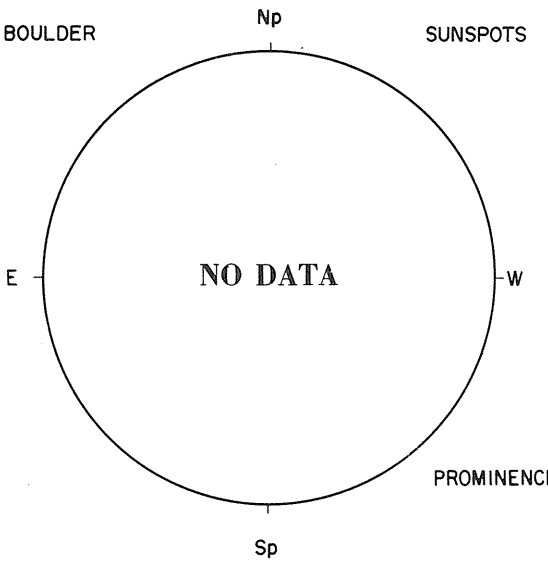


04

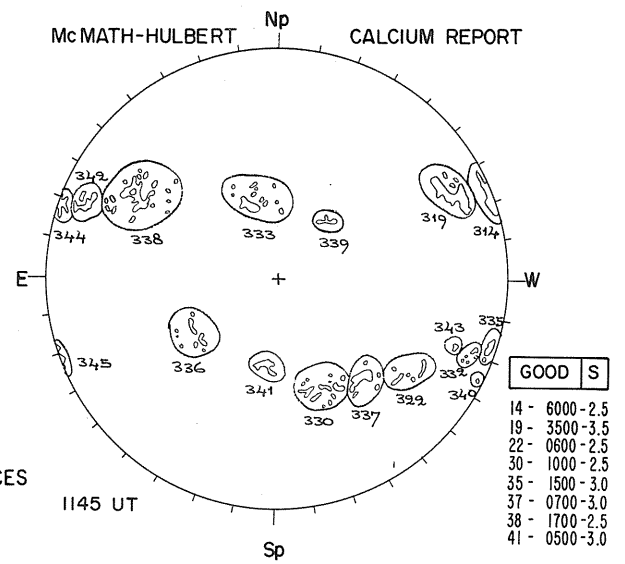
SACRAMENTO PEAK



Hα BOULDER

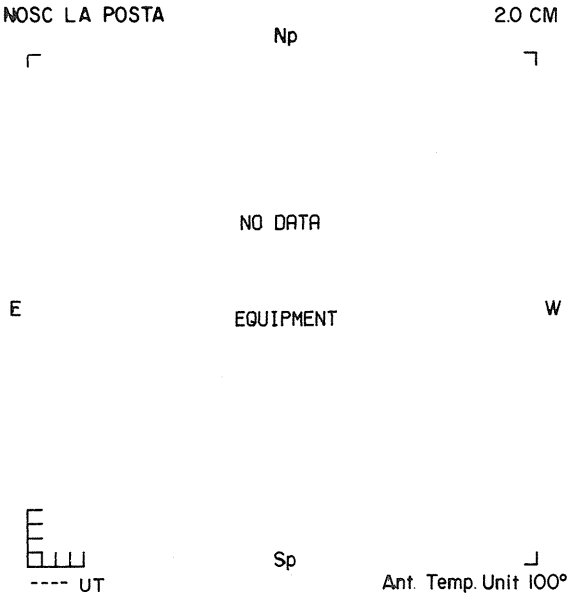


SUNSPOTS McMATH-HULBERT CALCIUM REPORT

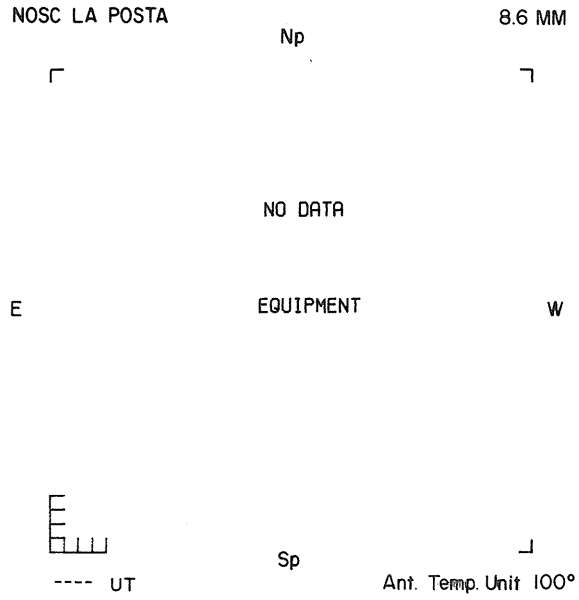


PROMINENCES

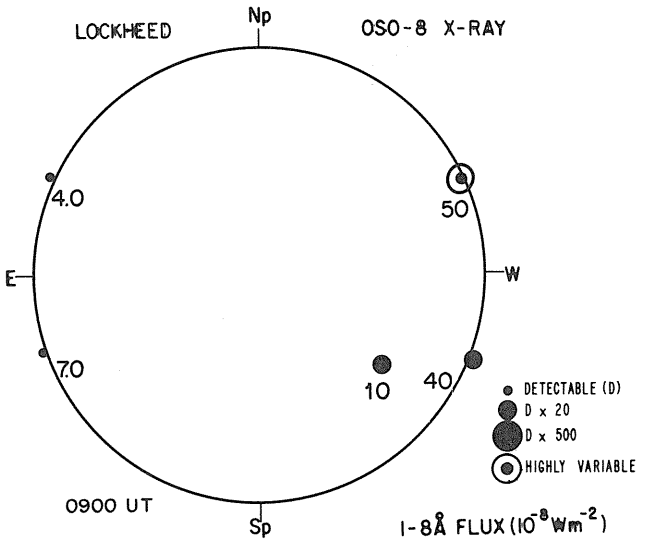
NOSC LA POSTA 2.0 CM

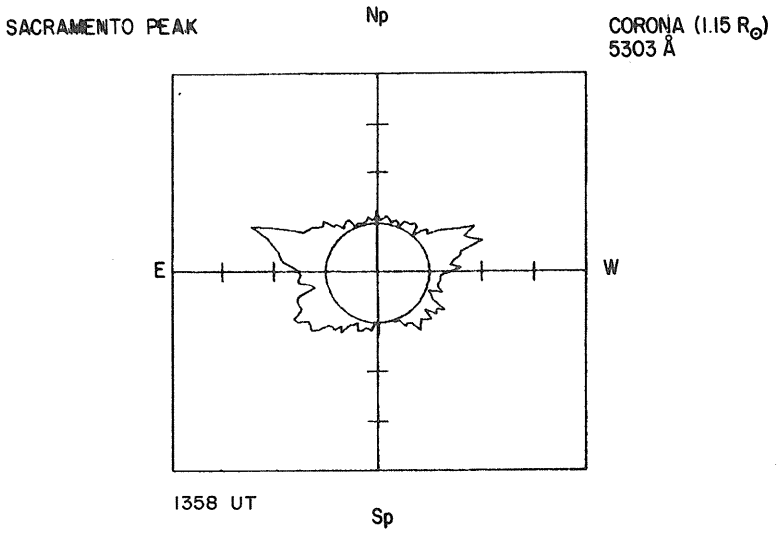


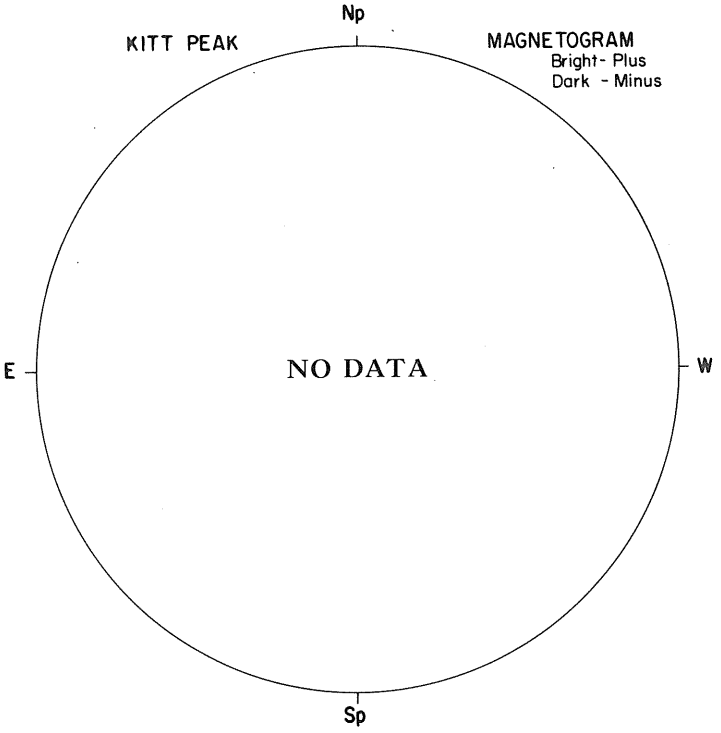
NOSC LA POSTA 8.6 MM

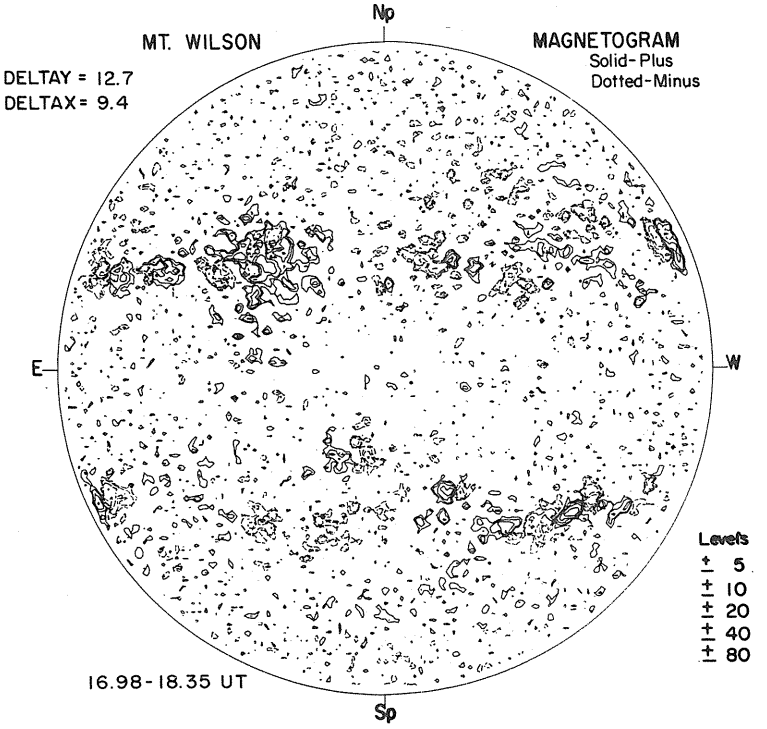


JUNE 5, 1978 (P = -14.07, B_0 = -0.19, L_0 = 335.69)

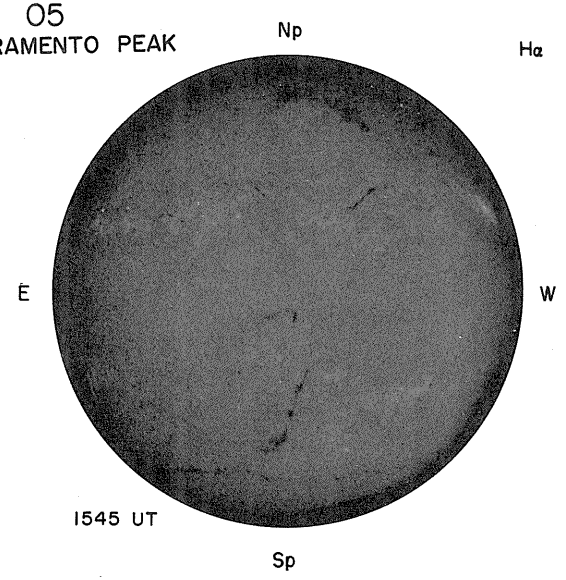






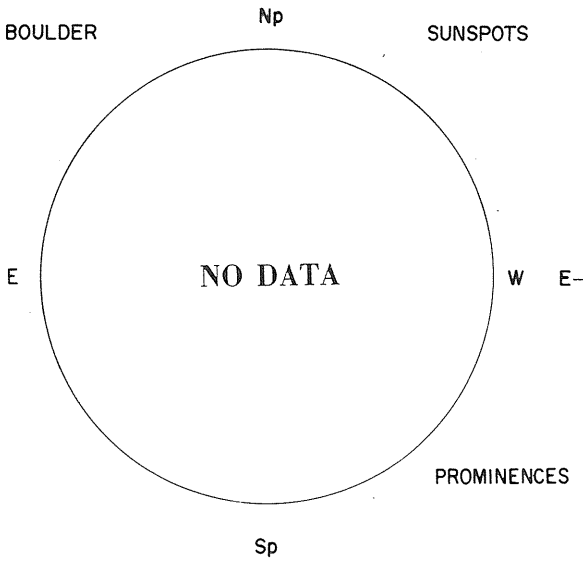


05
SACRAMENTO PEAK



1545 UT

Hα BOULDER

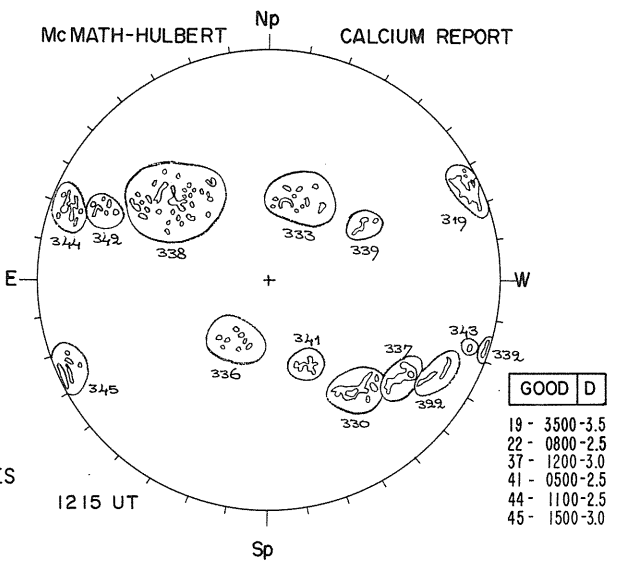


NO DATA

SUNSPOTS

PROMINENCES

McMATH-HULBERT CALCIUM REPORT

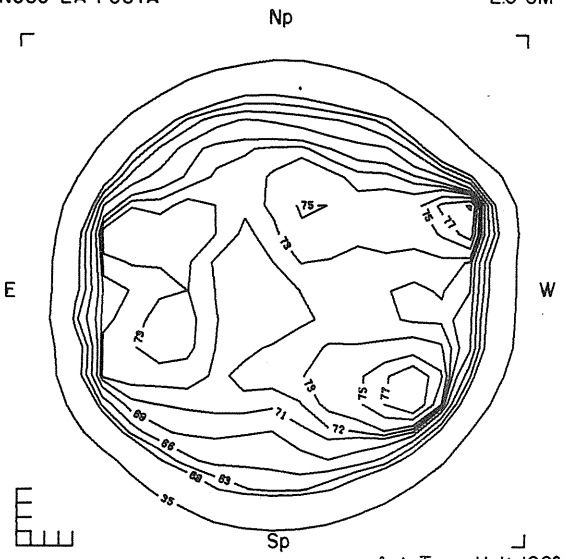


GOOD	D

19 - 3500-3.5
22 - 0800-2.5
37 - 1200-3.0
41 - 0500-2.5
44 - 1100-2.5
45 - 1500-3.0

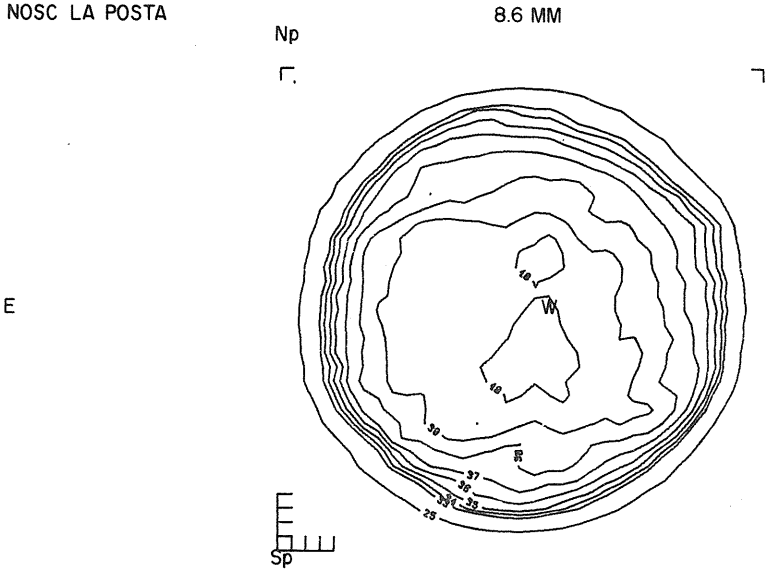
1215 UT

NOSC LA POSTA 2.0 CM



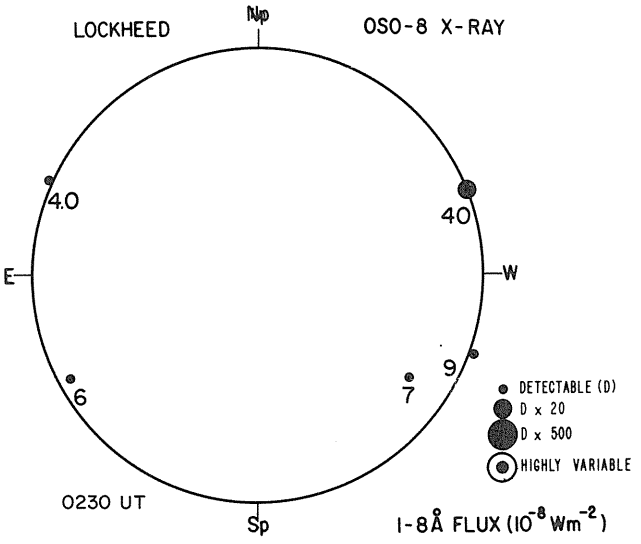
1624 UT Ant. Temp. Unit 100°K

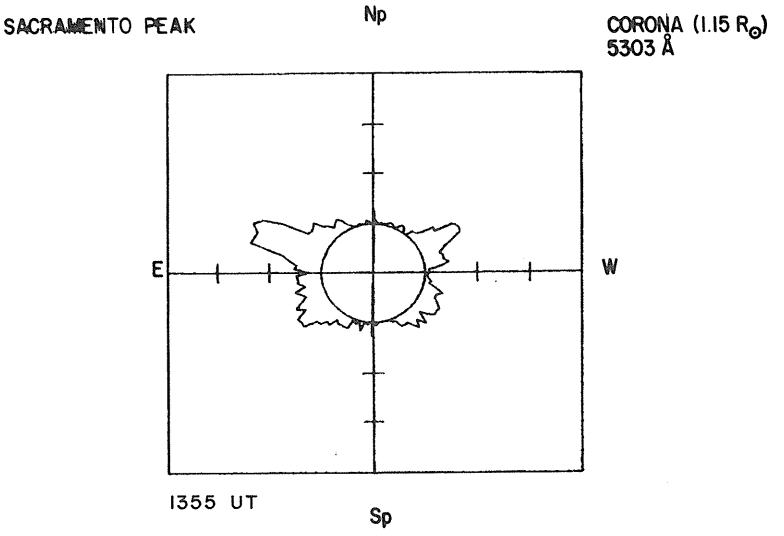
NOSC LA POSTA 8.6 MM

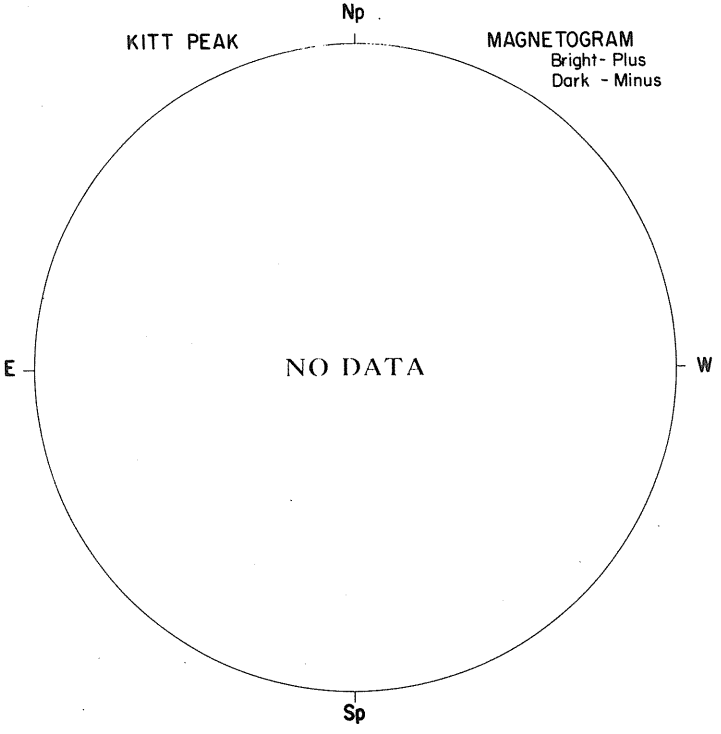


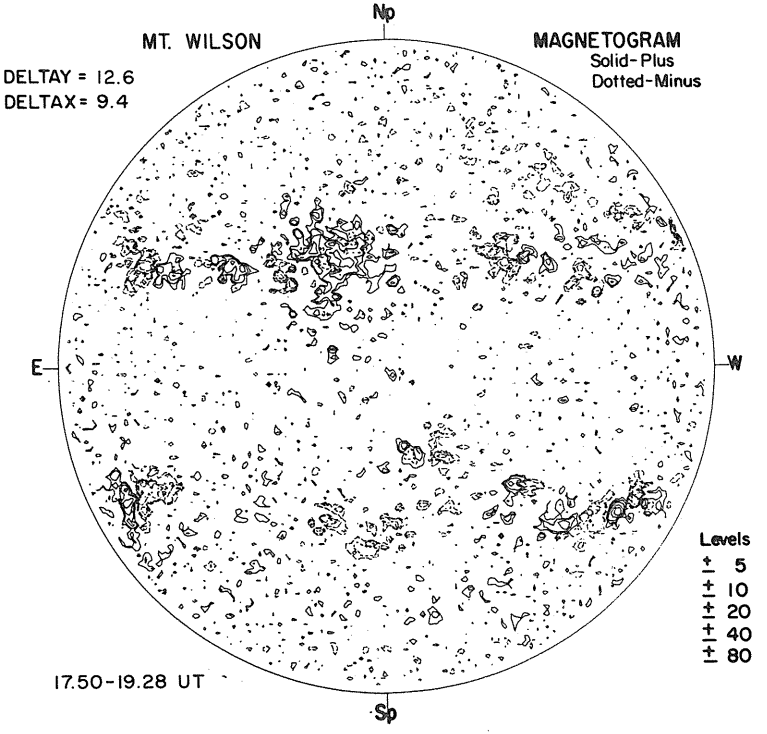
1720 UT Ant. Temp. Unit 100°K

JUNE 6, 1978 (P =-13.68, B_o =-0.06, L_o = 322.46)



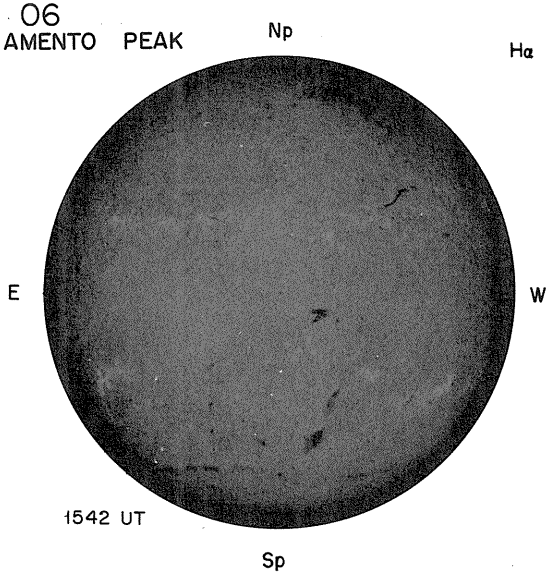




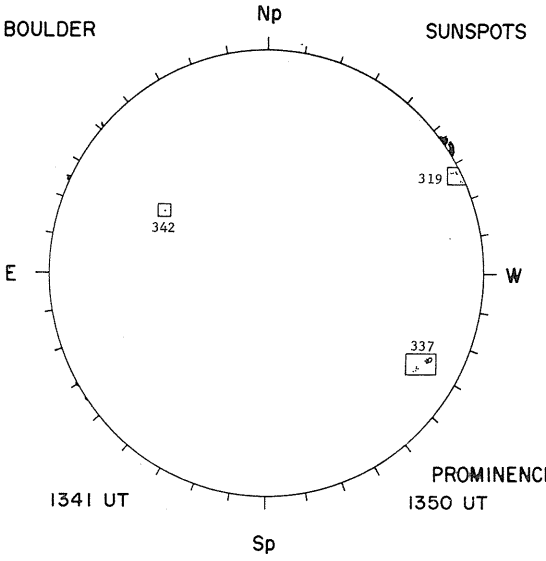


06

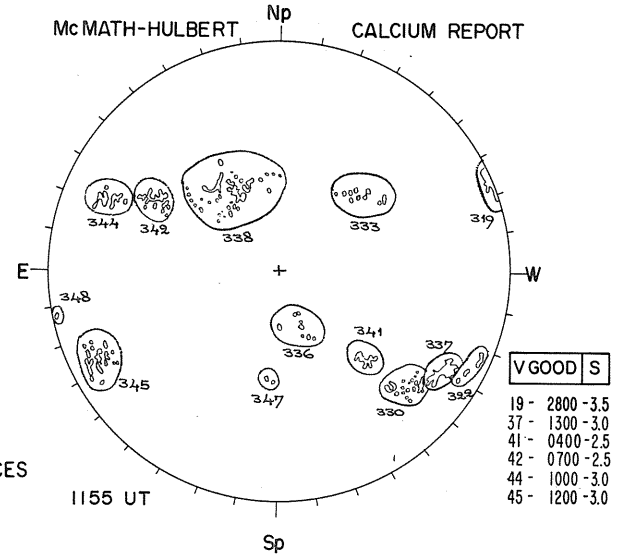
SACRAMENTO PEAK



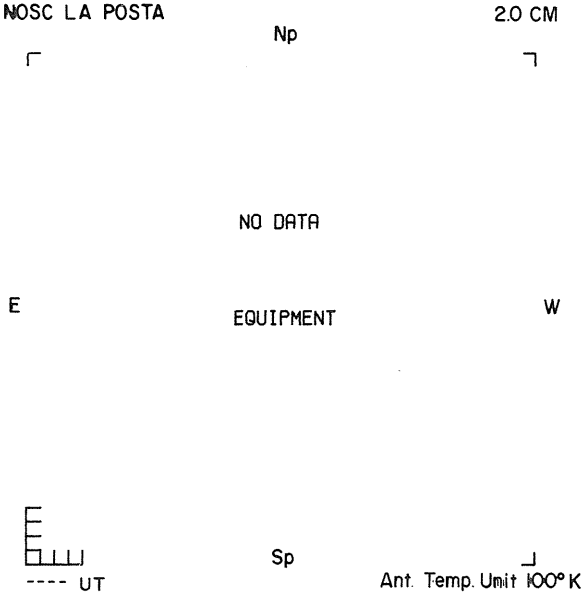
BOULDER



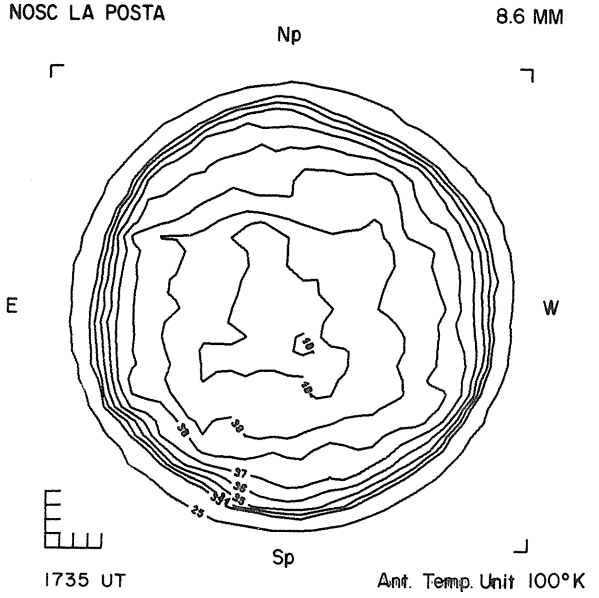
McMATH-HULBERT



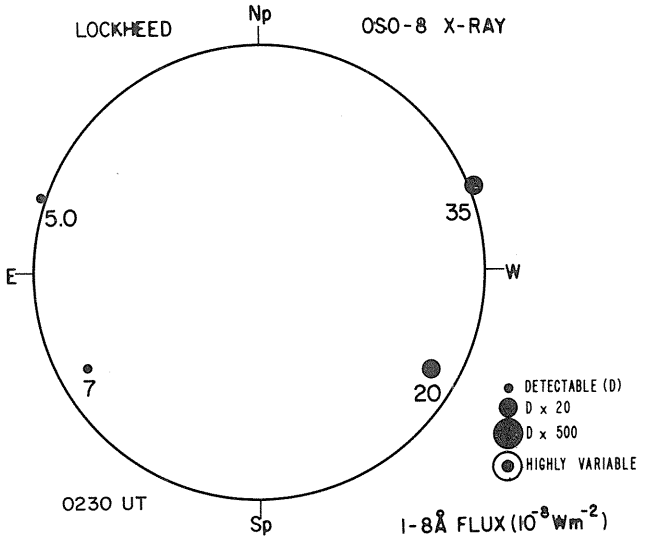
NOSC LA POSTA

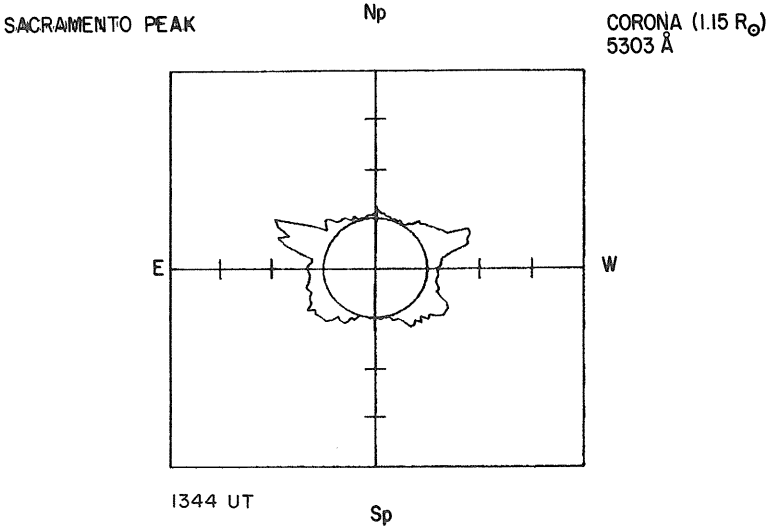


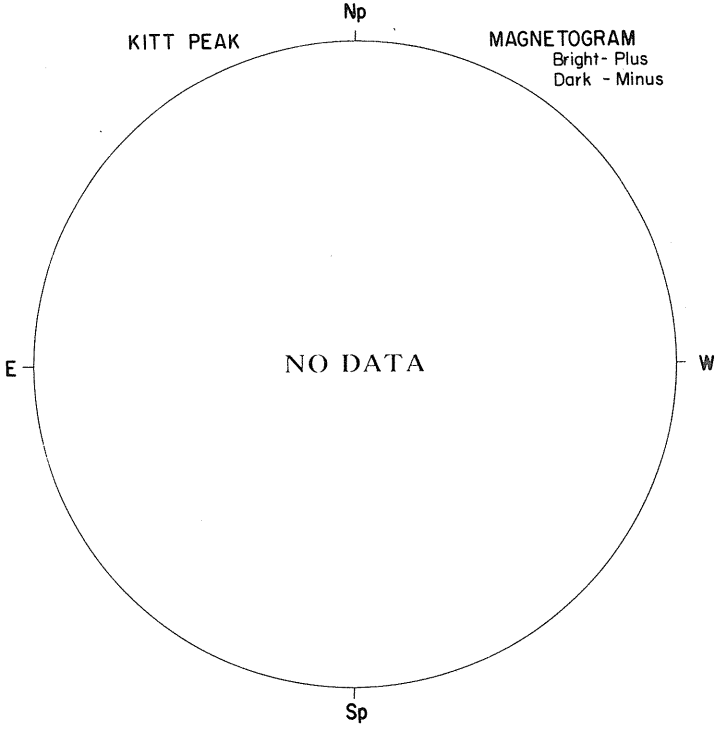
NOSC LA POSTA

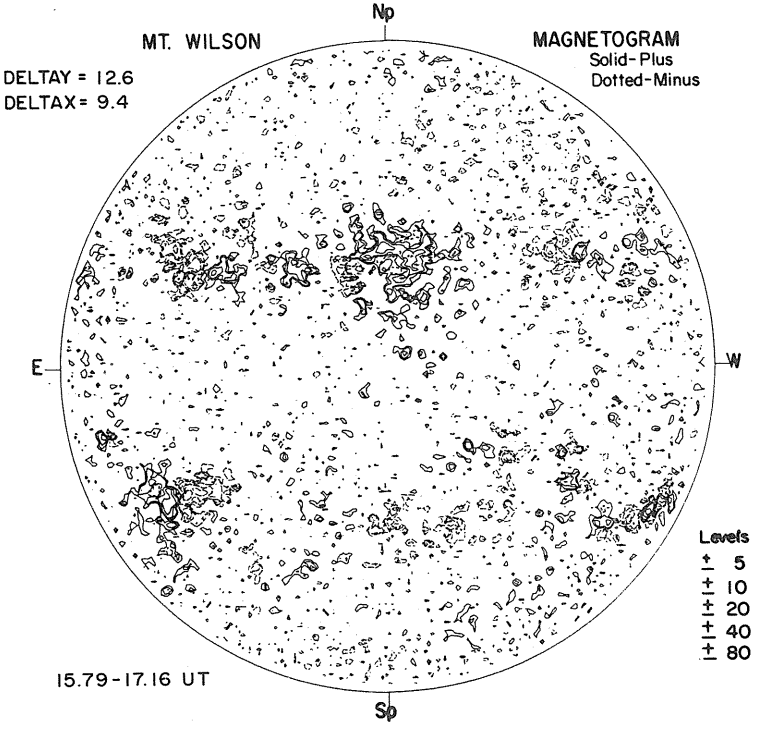


JUNE 7, 1978 (P =-13.28, B_o = 0.06, L_o = 309.23)



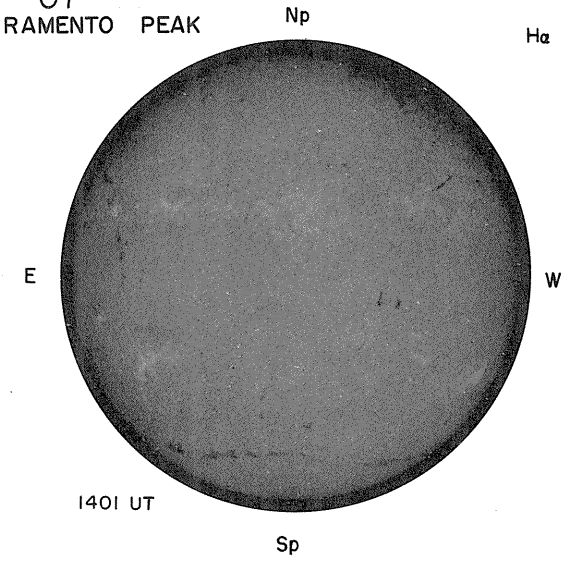




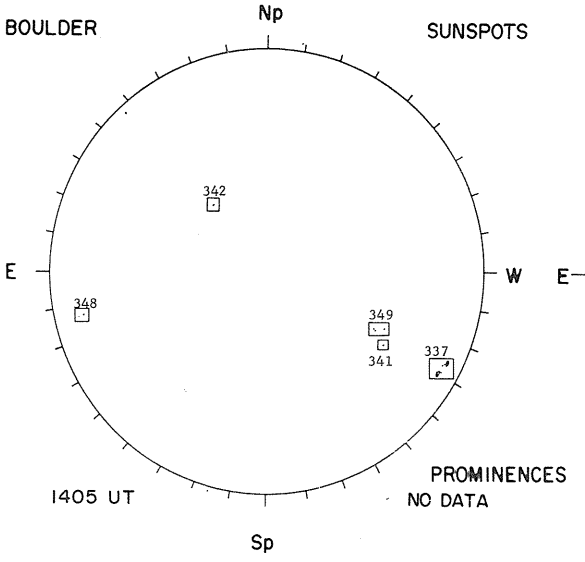


07

SACRAMENTO PEAK



BOULDER



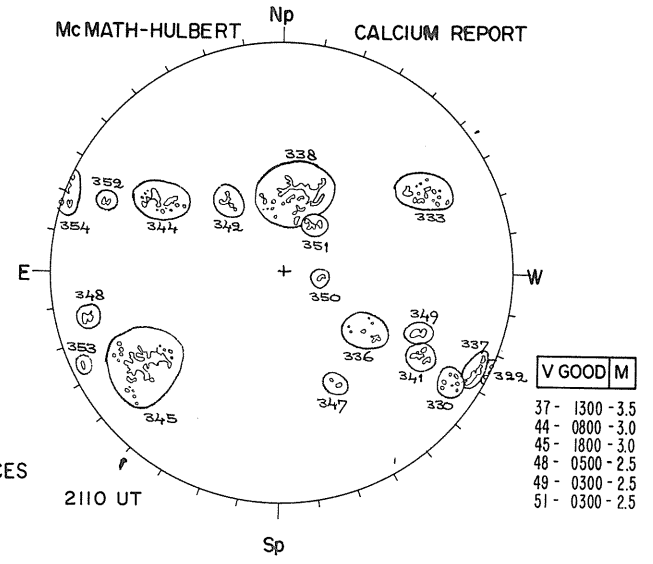
SUNSPOTS

PROMINENCES

NO DATA

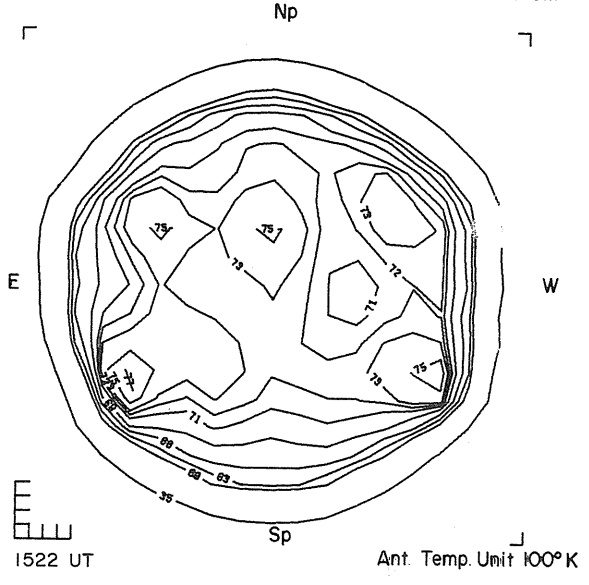
McMATH-HULBERT

CALCIUM REPORT



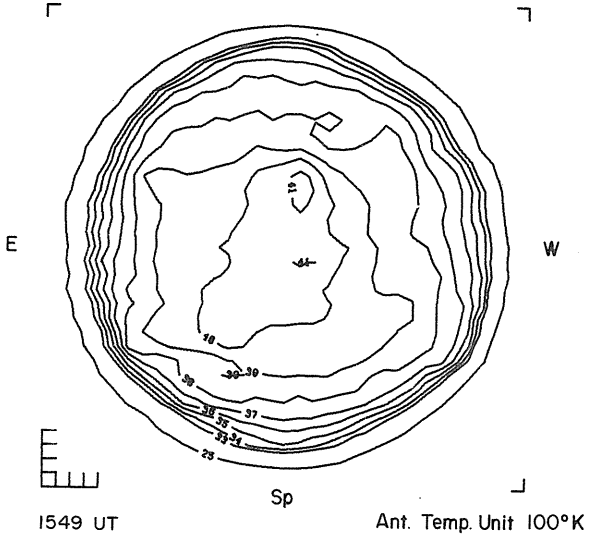
NOSC LA POSTA

2.0 CM



NOSC LA POSTA

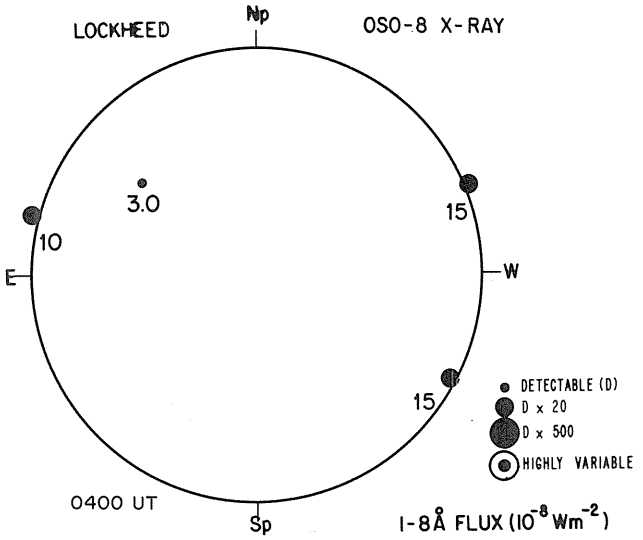
8.6 MM

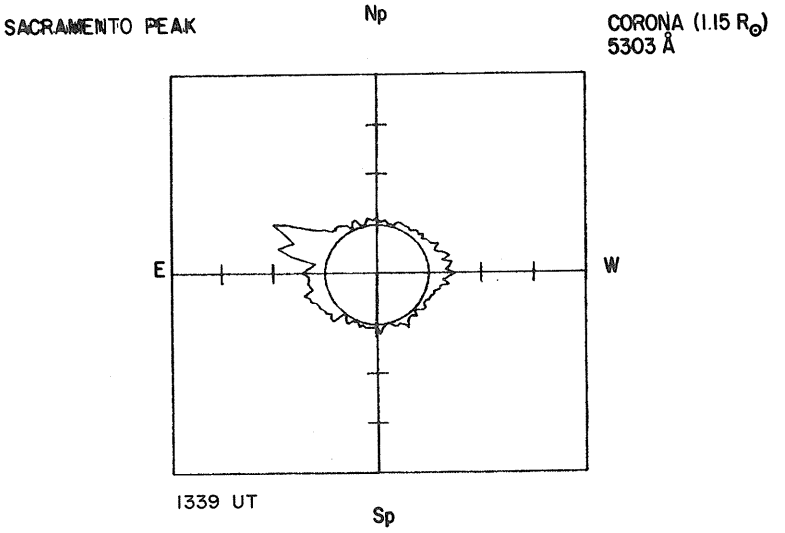


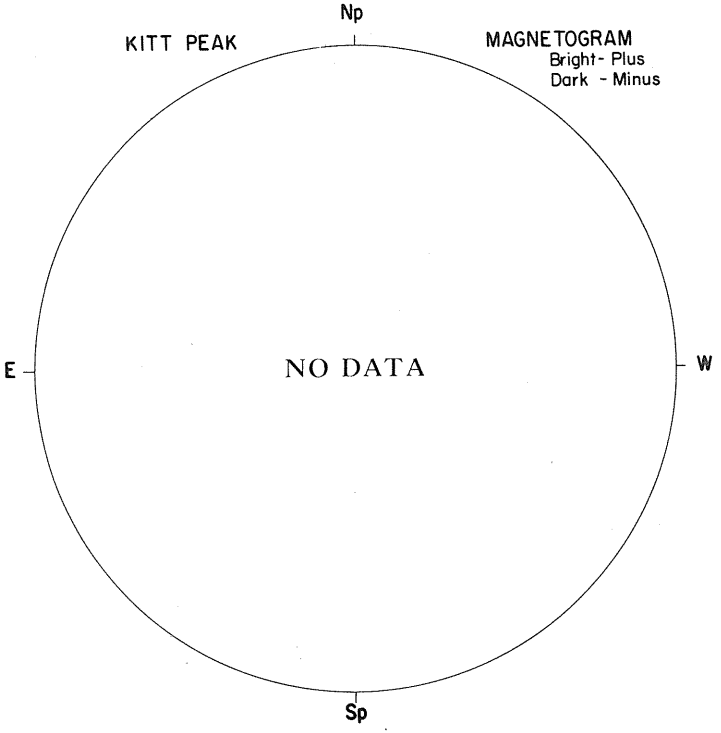
63

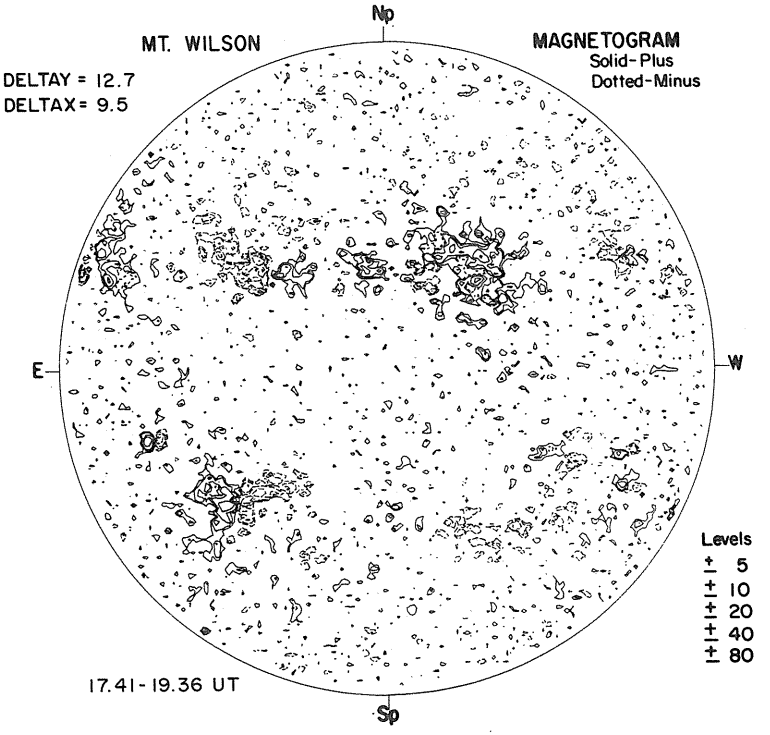
Jun 78

JUNE 8, 1978 (P =-12.88, B_o =0.18, L_o = 295.99)

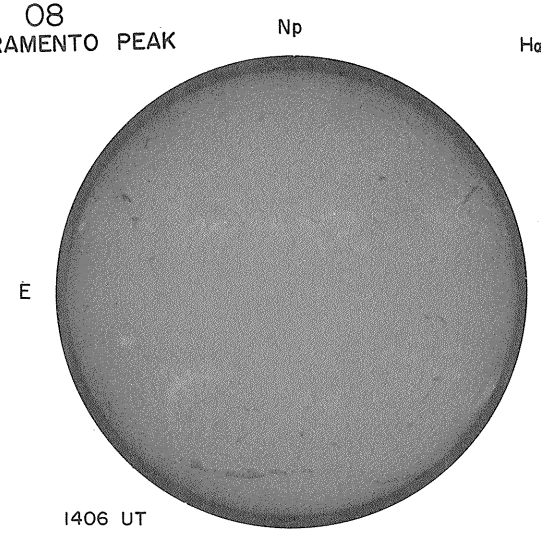




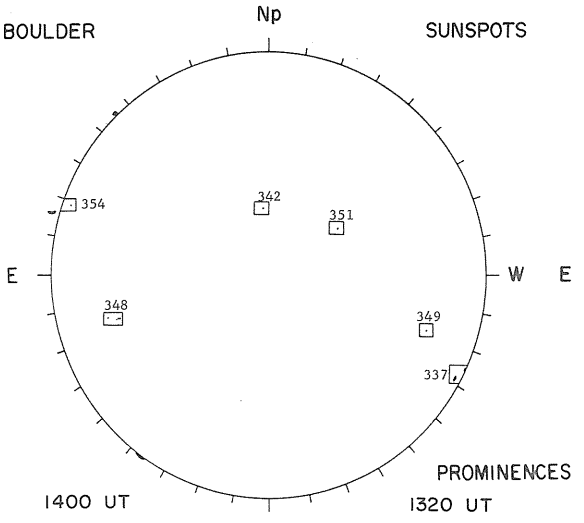




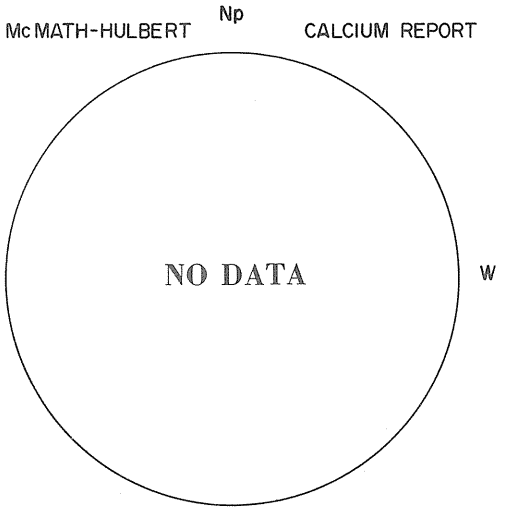
08
SACRAMENTO PEAK



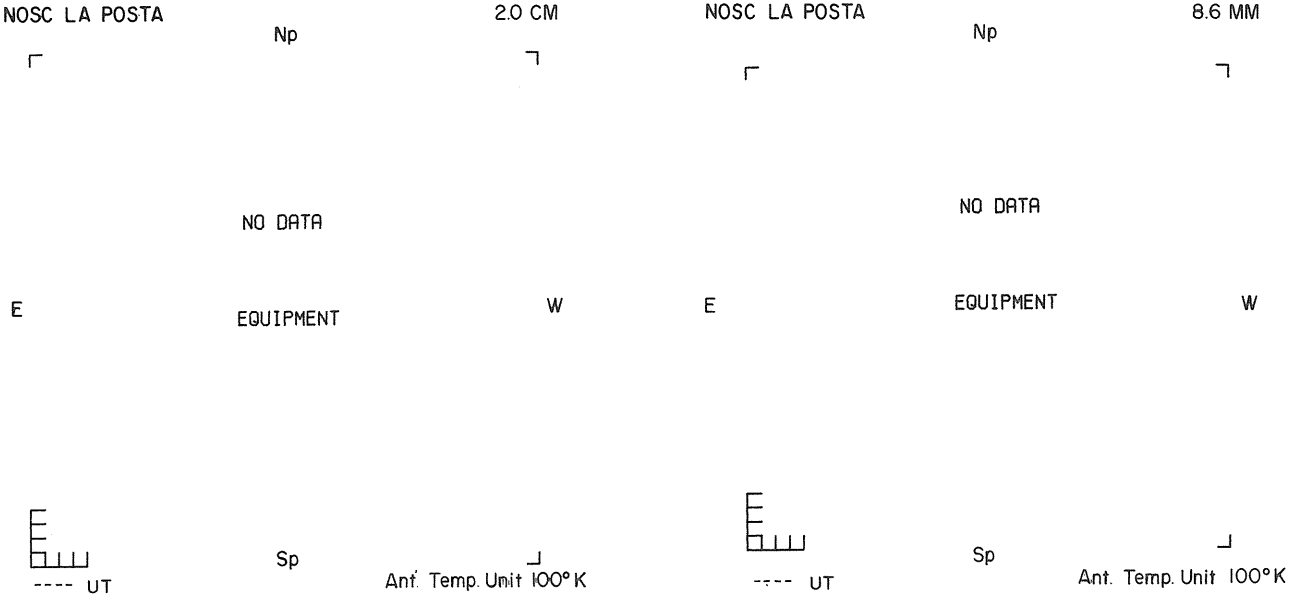
BOULDER



McMATH-HULBERT



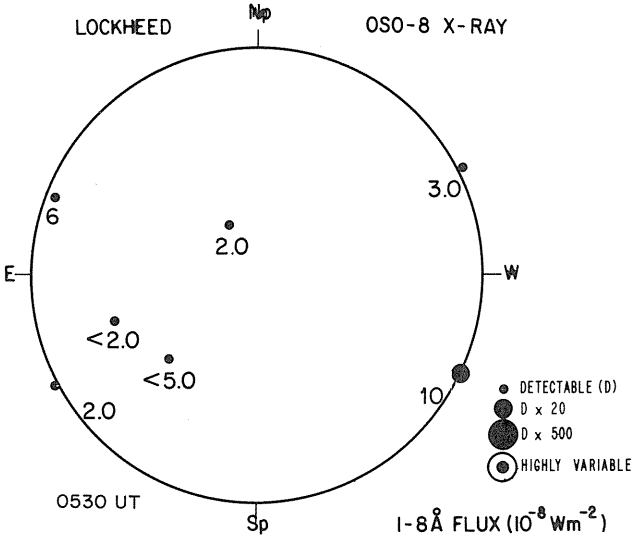
NOSC LA POSTA

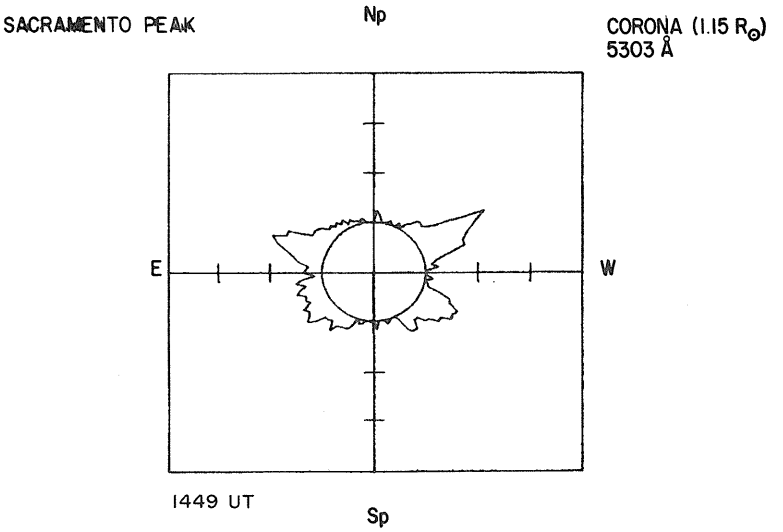


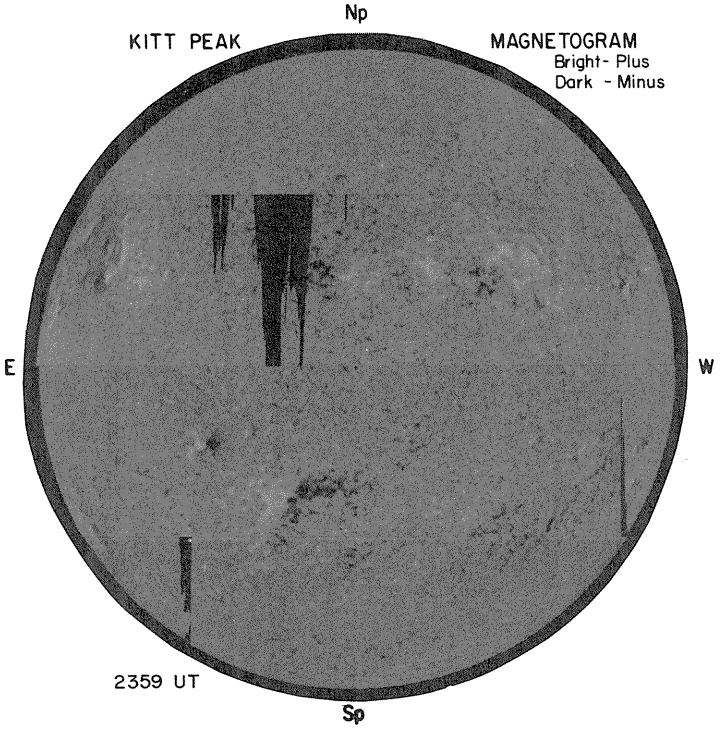
NOSC LA POSTA

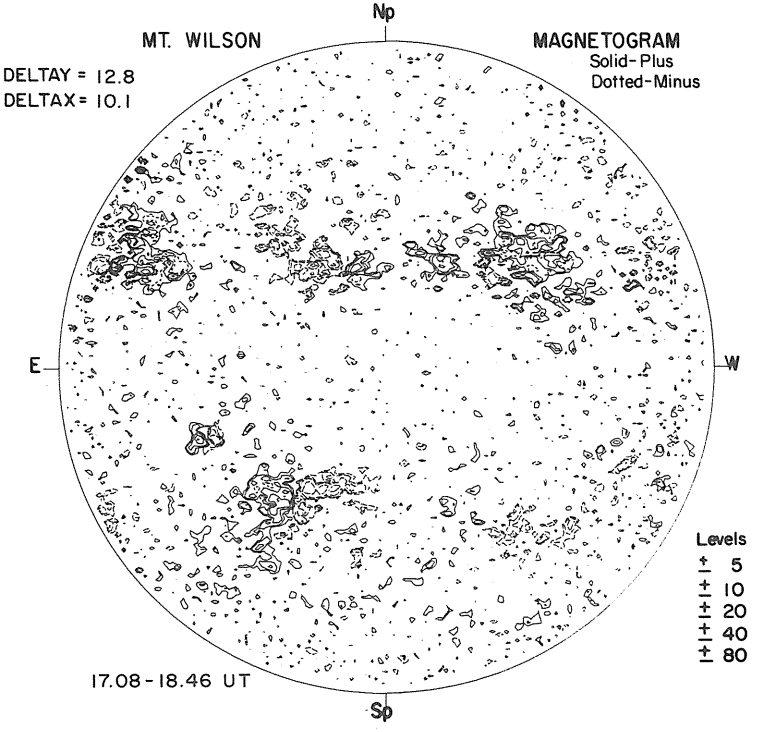
65
Jun 78

JUNE 9, 1978 (P = -12.47, B_0 = 0.30, L_0 = 282.76)



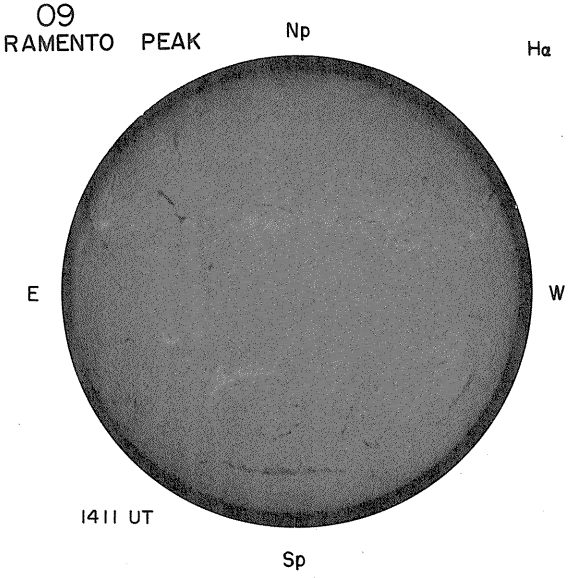




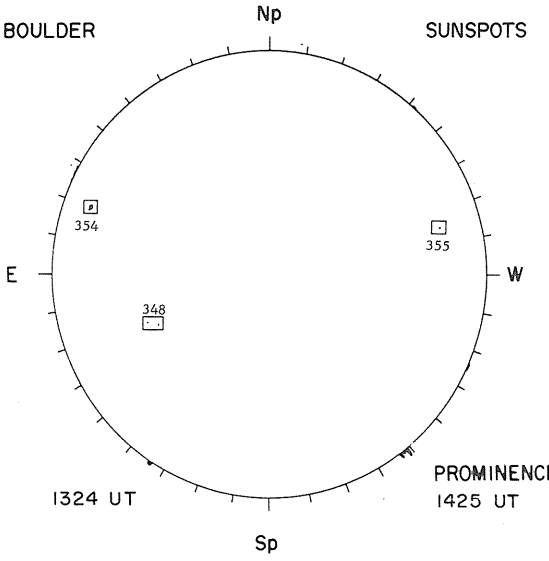


09

SACRAMENTO PEAK

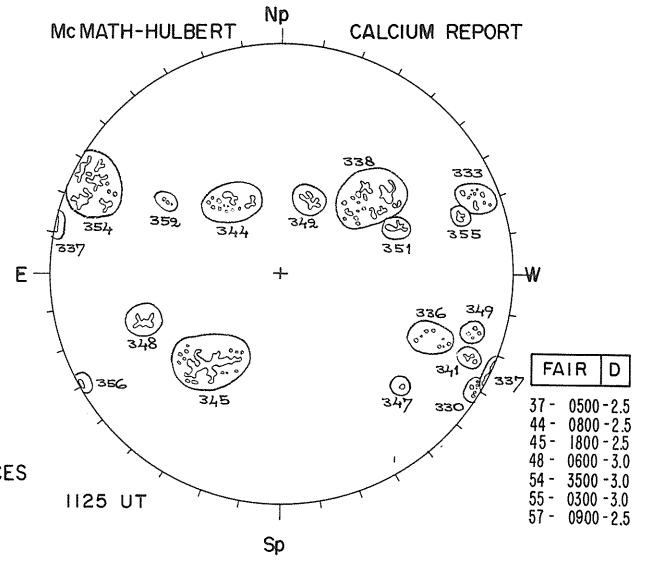


BOULDER



SUNSPOTS

McMATH-HULBERT



CALCIUM REPORT

FAIR	D

37 - 0500 - 2.5
44 - 0800 - 2.5
45 - 1800 - 2.5
48 - 0600 - 3.0
54 - 3500 - 3.0
55 - 0300 - 3.0
57 - 0900 - 2.5

PROMINENCES

1425 UT

1125 UT

NOSC LA POSTA

2.0 CM

Np

NO DATA

E

EQUIPMENT

W

Sp

---- UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

8.6 MM

Np

NO DATA

E

EQUIPMENT

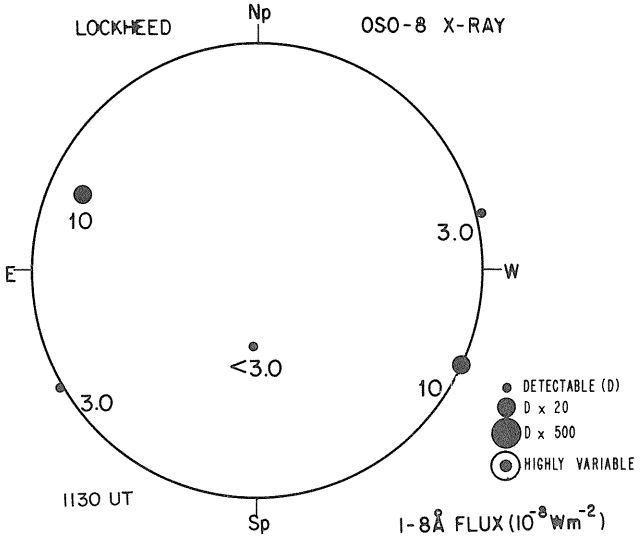
W

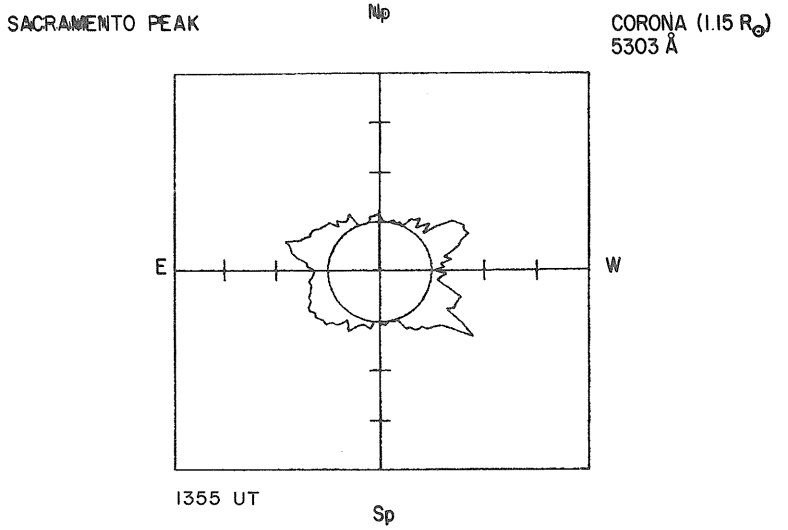
Sp

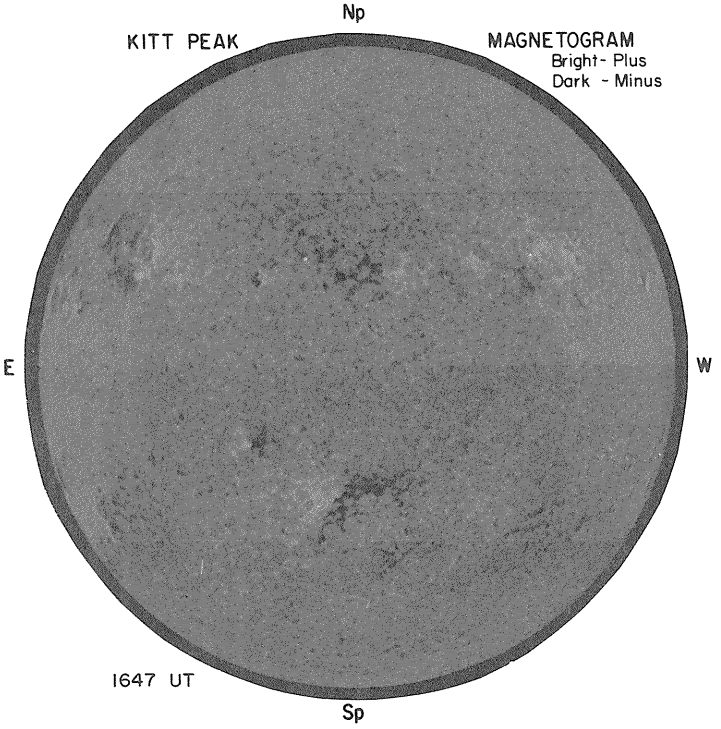
---- UT

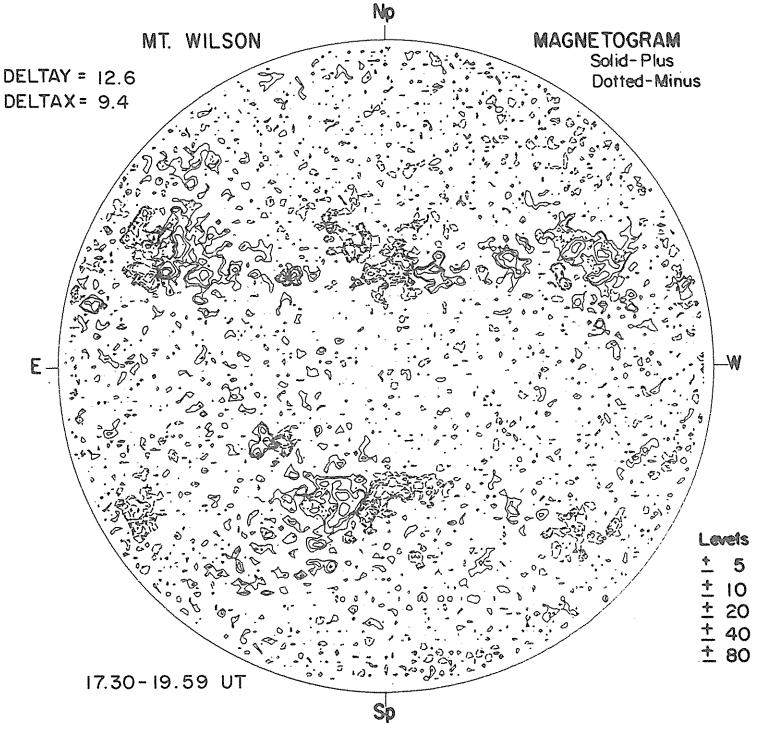
Ant. Temp. Unit 100°K

JUNE 10, 1978 (P =-12.06, B_o =0.42, L_o =269.52)

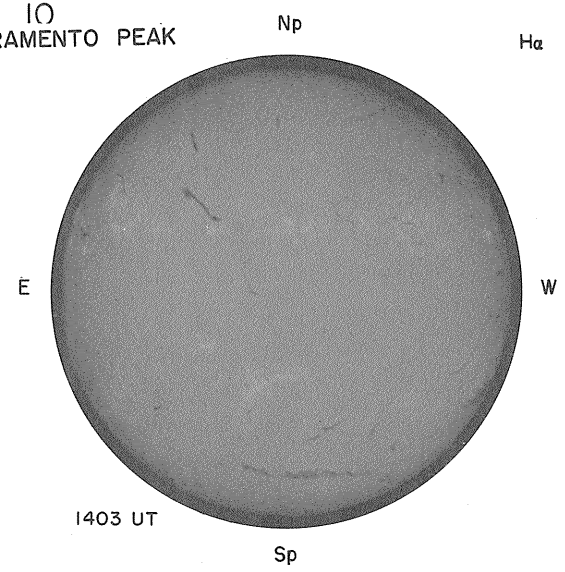




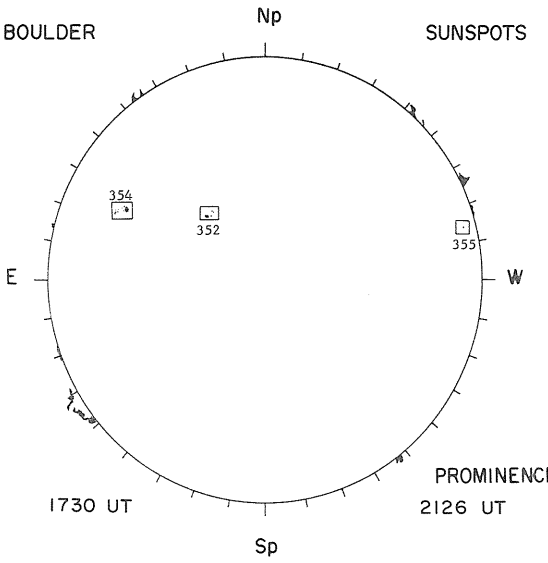




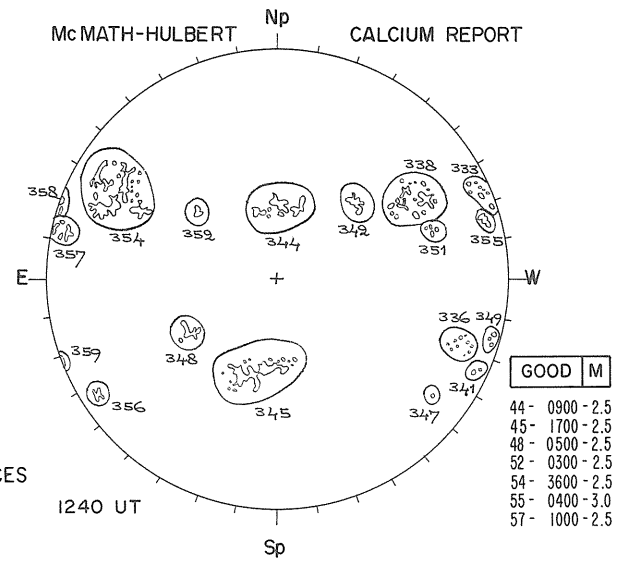
10
SACRAMENTO PEAK



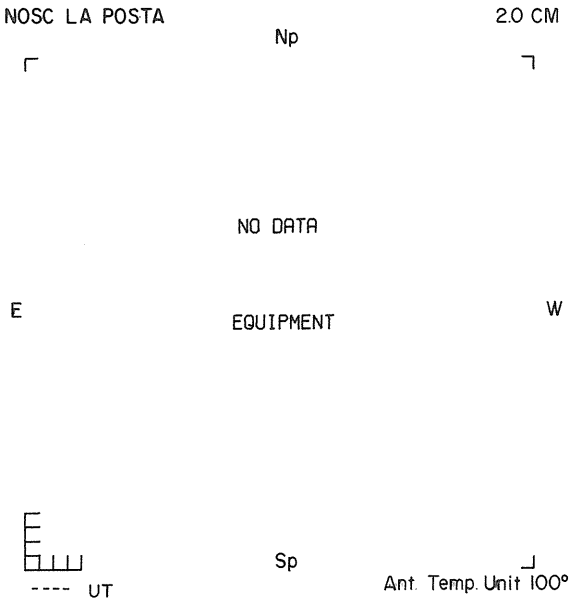
BOULDER



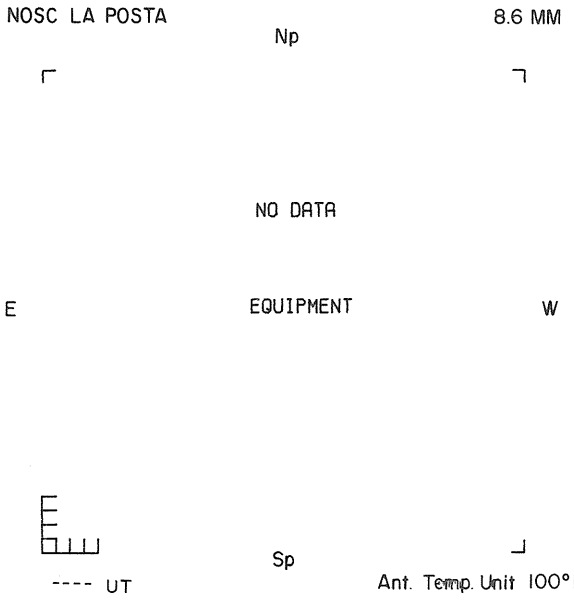
McMATH-HULBERT



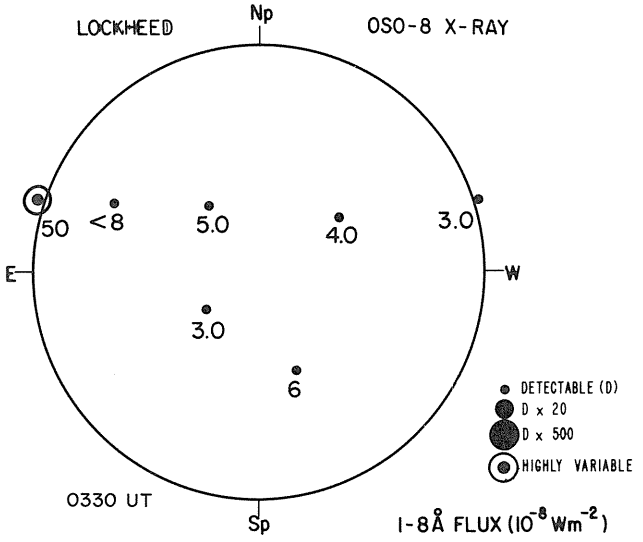
NOSC LA POSTA

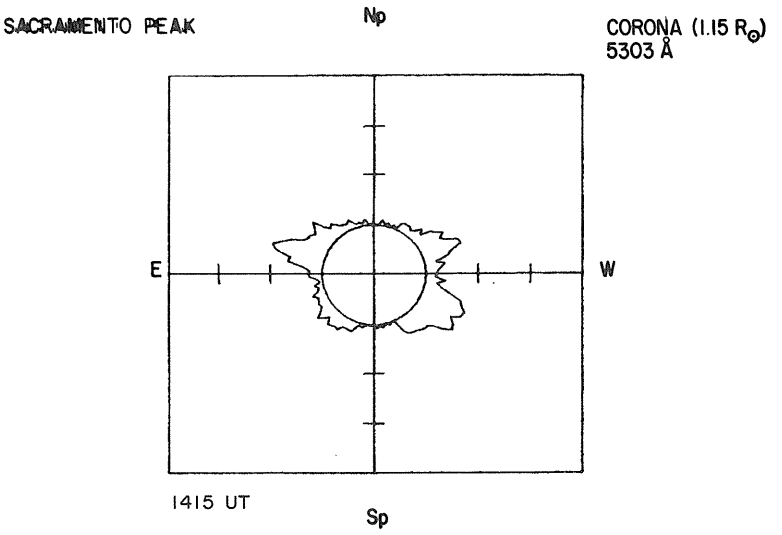


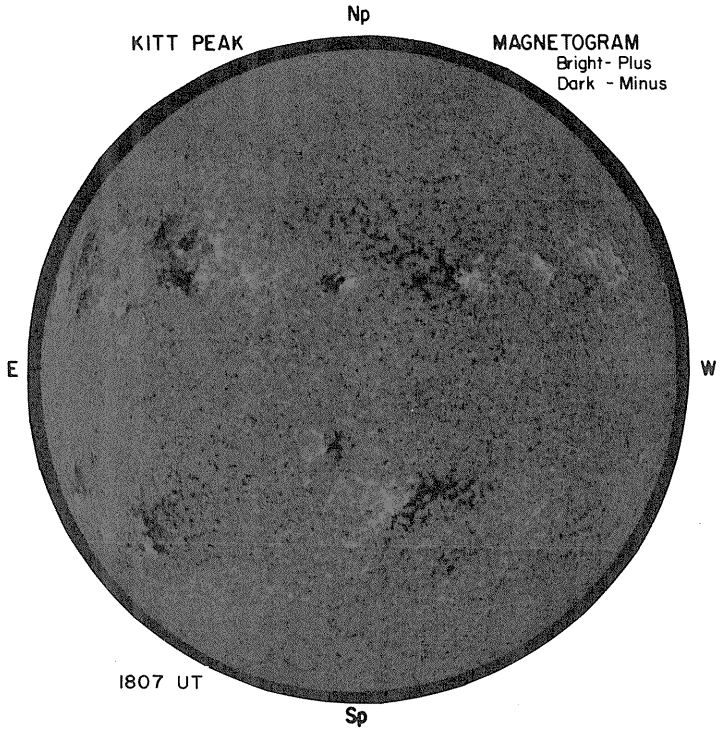
NOSC LA POSTA

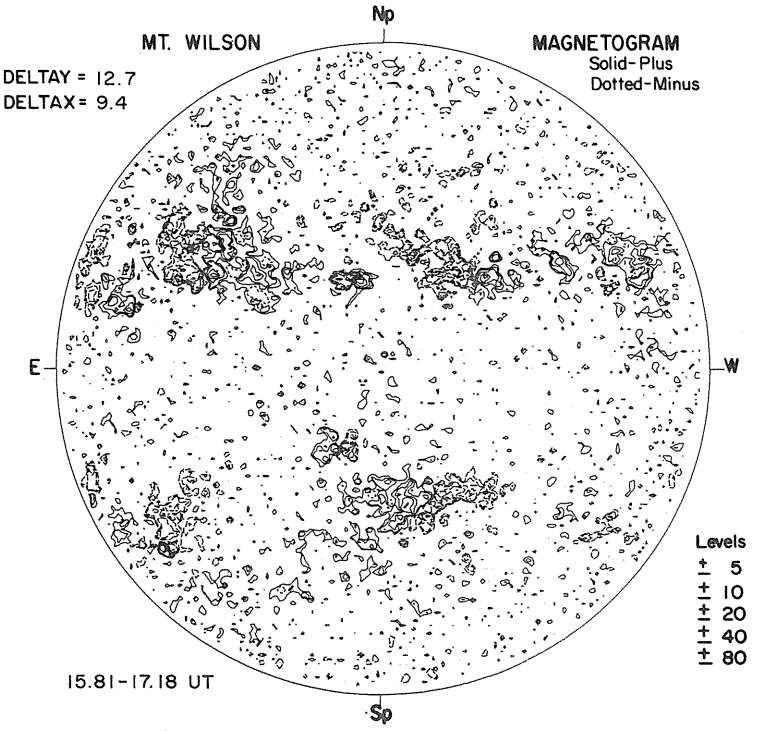


JUNE 11, 1978 (P =-11.65, B_o =0.54, L_o =256.28)

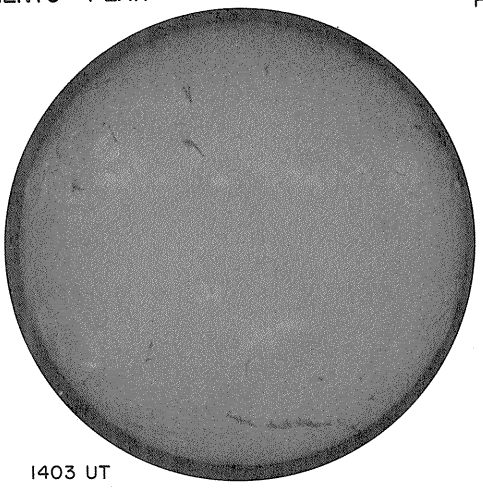




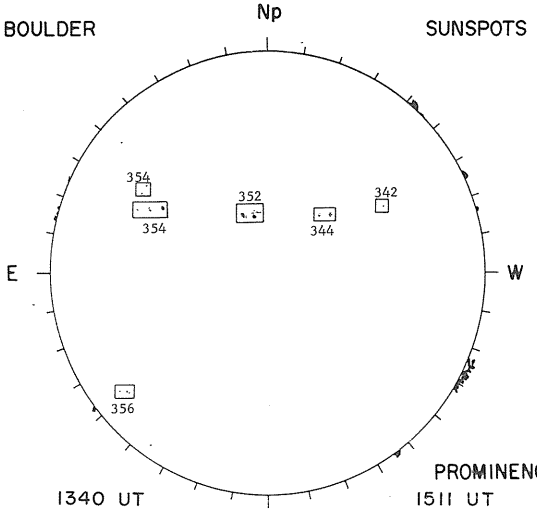




SACRAMENTO PEAK

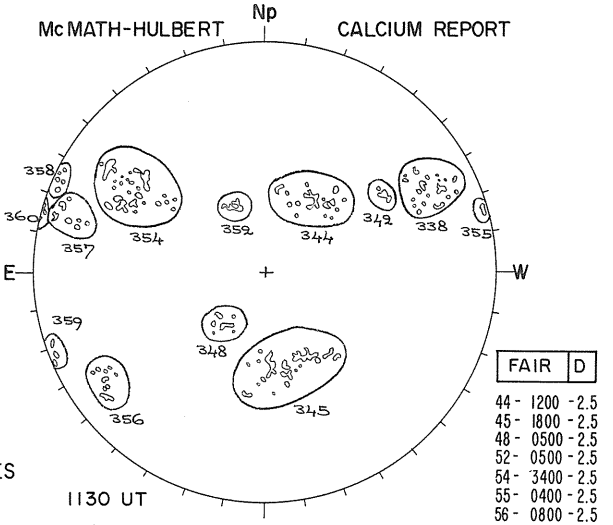


BOULDER



SUNSPOTS

McMATH-HULBERT



CALCIUM REPORT

PROMINENCES

1511 UT

NOSC LA POSTA

2.0 CM

Np

NO DATA

E

EQUIPMENT

W

Sp

---- UT

Ant. Temp. Unit 100° K

NOSC LA POSTA

8.6 MM

Np

NO DATA

E

EQUIPMENT

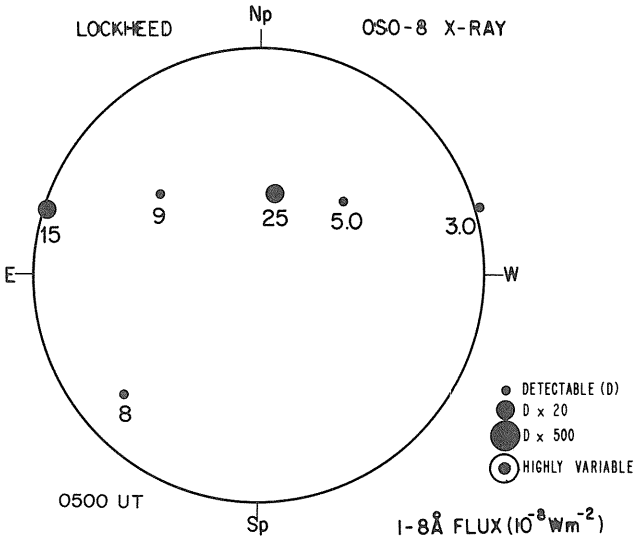
W

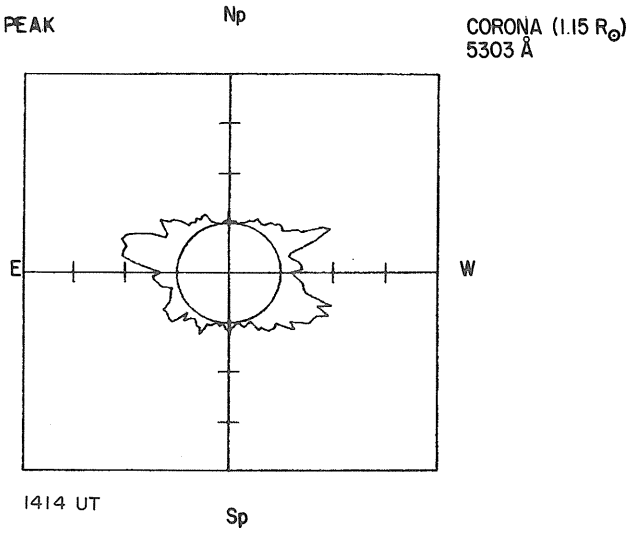
Sp

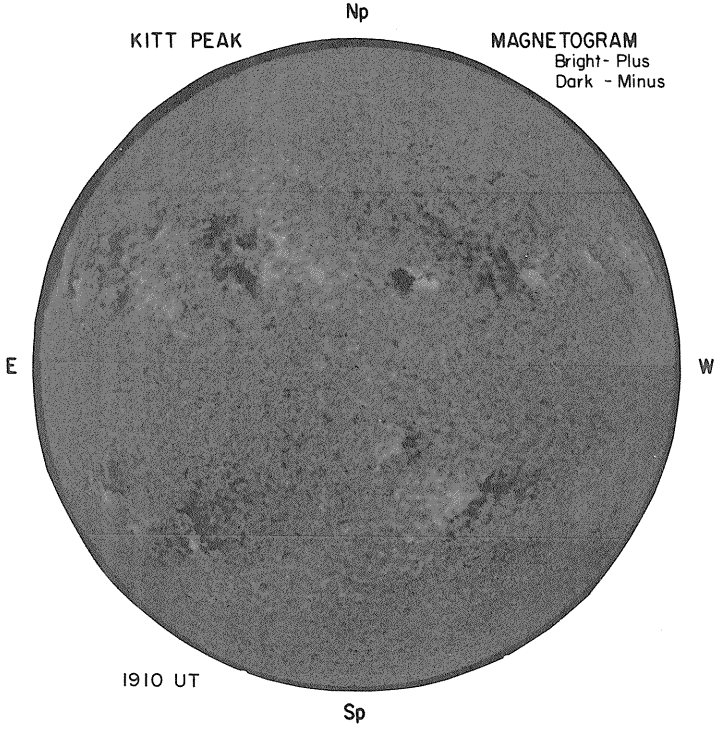
---- UT

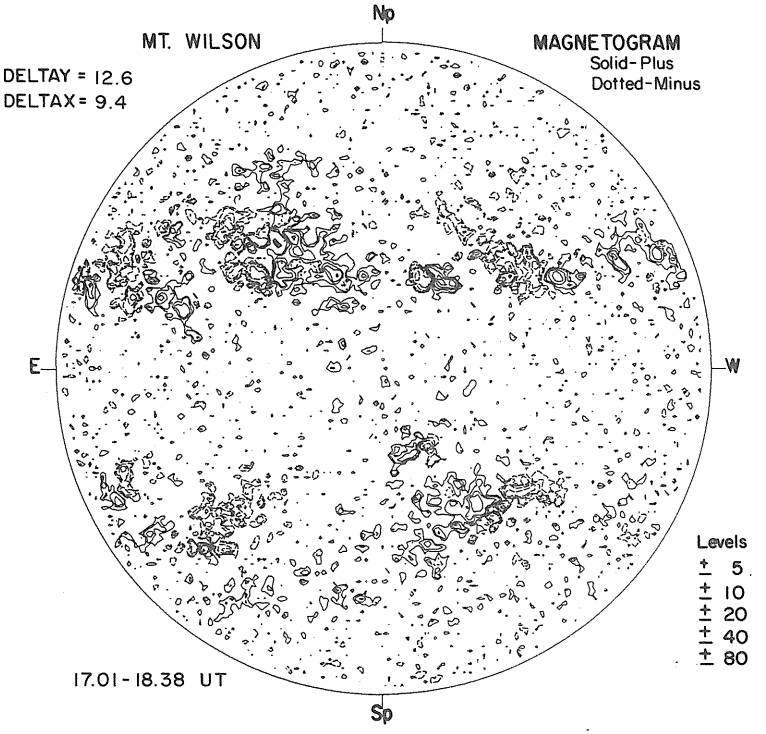
Ant. Temp. Unit 100° K

JUNE 12, 1978 (P = -11.23, B_o = 0.66, L_o = 243.05)



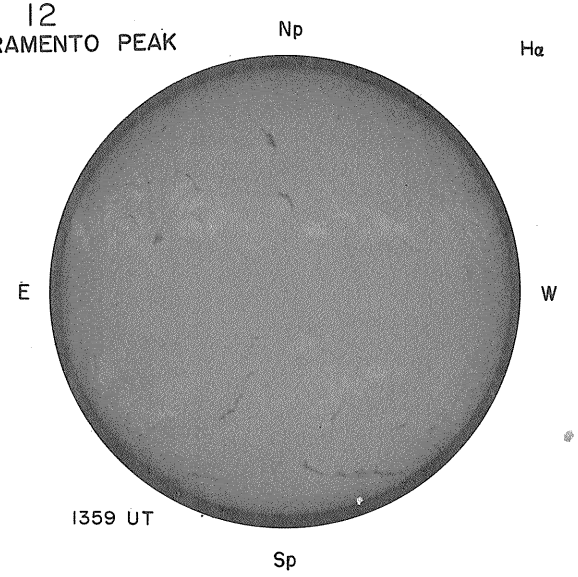






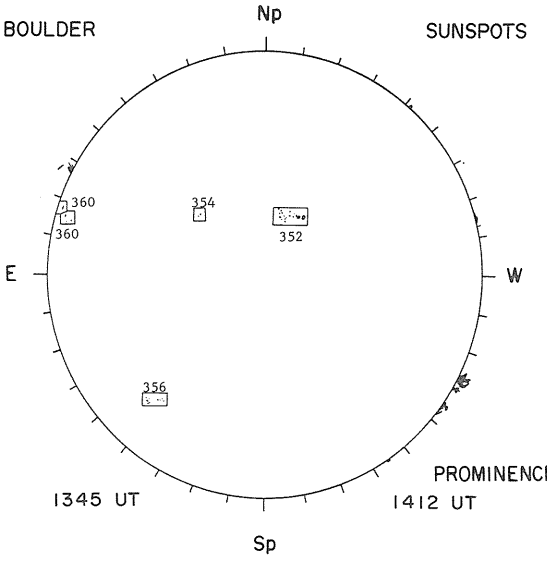
12

SACRAMENTO PEAK Hα



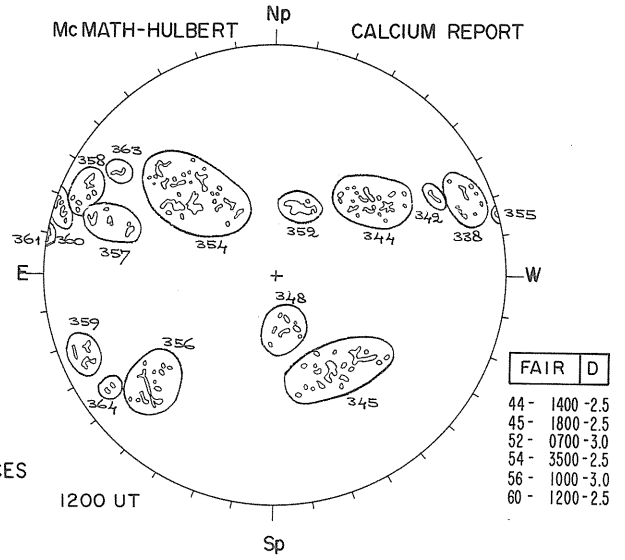
1359 UT

BOULDER SUNSPOTS



1345 UT

McMATH-HULBERT CALCIUM REPORT



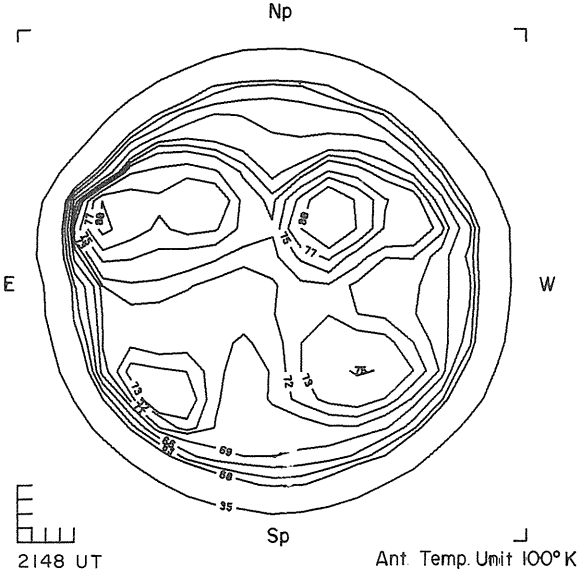
FAIR	D

44 - 1400 -2.5
45 - 1800 -2.5
52 - 0700 -3.0
54 - 3500 -2.5
56 - 1000 -3.0
60 - 1200 -2.5

1412 UT PROMINENCES

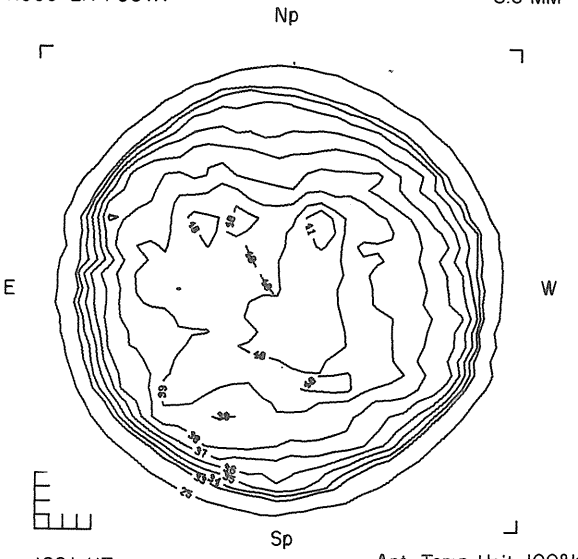
1200 UT

NOSC LA POSTA 2.0 CM



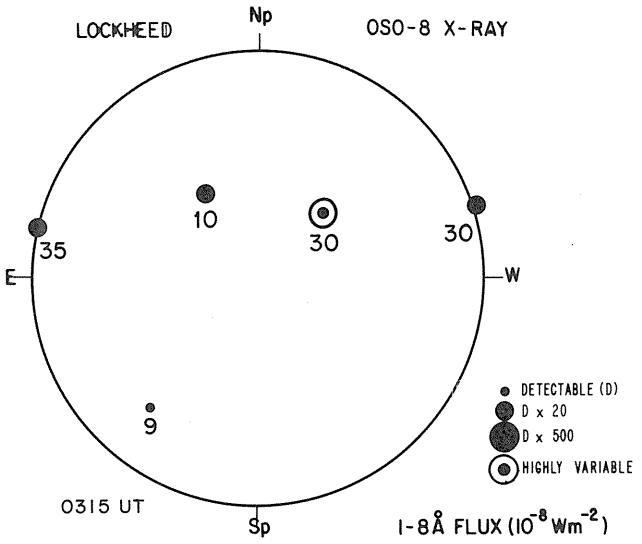
2148 UT Ant. Temp. Unit 100° K

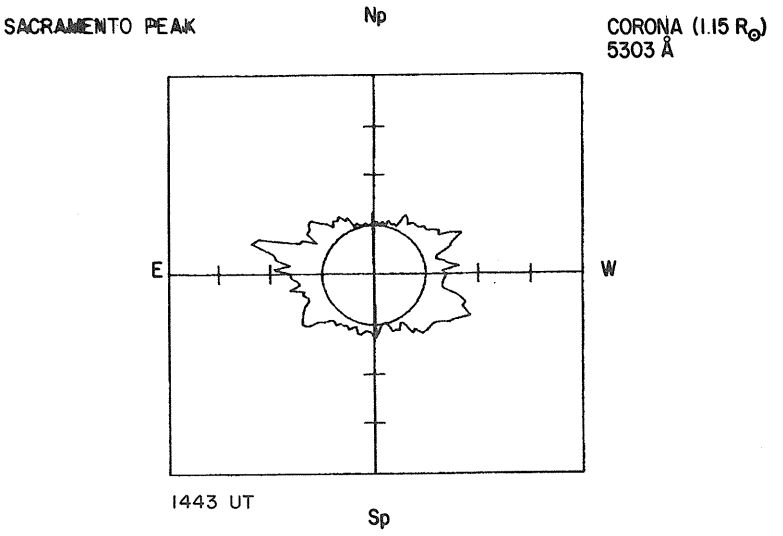
NOSC LA POSTA 8.6 MM

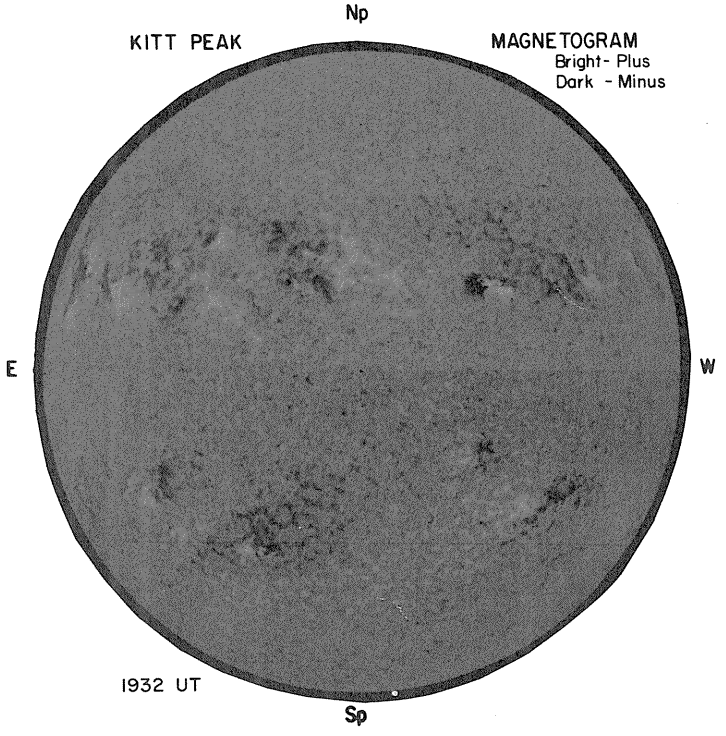


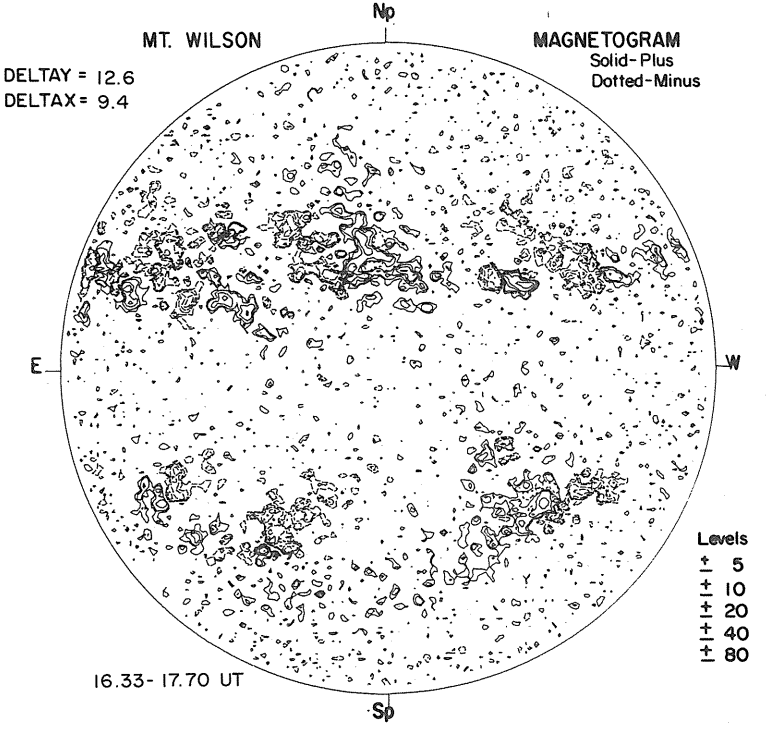
1821 UT Ant. Temp. Unit 100° K

JUNE 13, 1978 (P = -10.81, B_o = 0.78, L_o = 229.81)



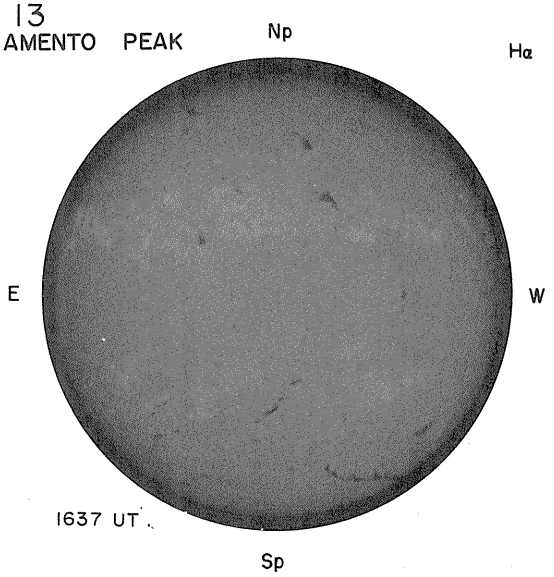




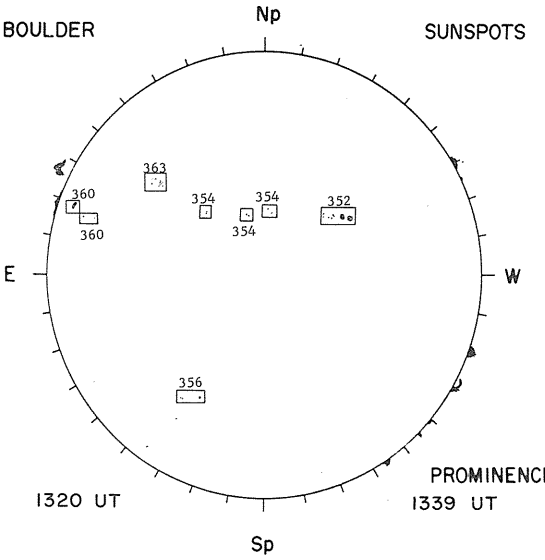


13

SACRAMENTO PEAK



BOULDER

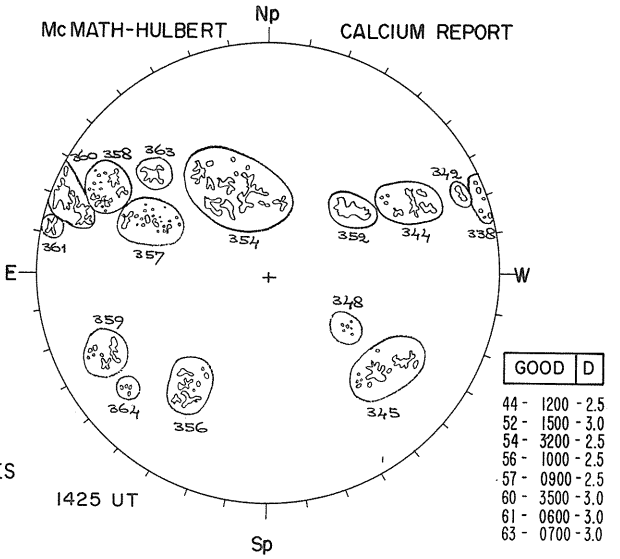


SUNSPOTS

PROMINENCES

1339 UT

McMATH-HULBERT

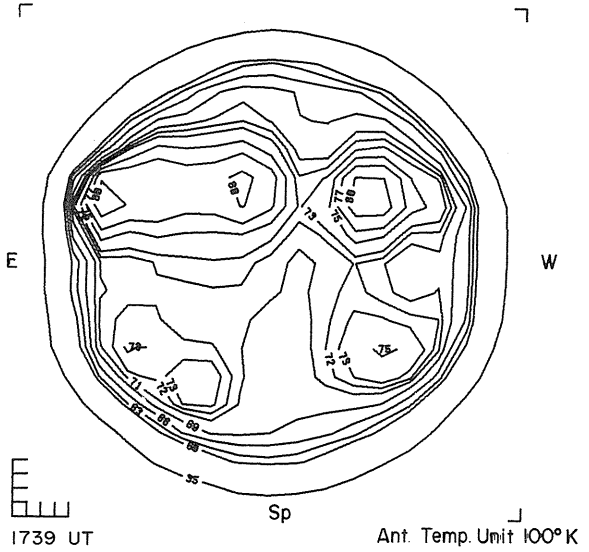


CALCIUM REPORT

GOOD	D
44 -	1200 - 2.5
52 -	1500 - 3.0
54 -	3200 - 2.5
56 -	1000 - 2.5
57 -	0900 - 2.5
60 -	3500 - 3.0
61 -	0600 - 3.0
63 -	0700 - 3.0

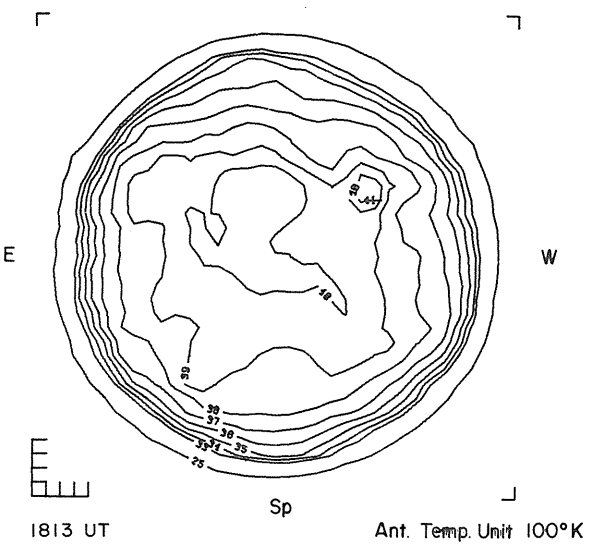
NOSC LA POSTA

2.0 CM



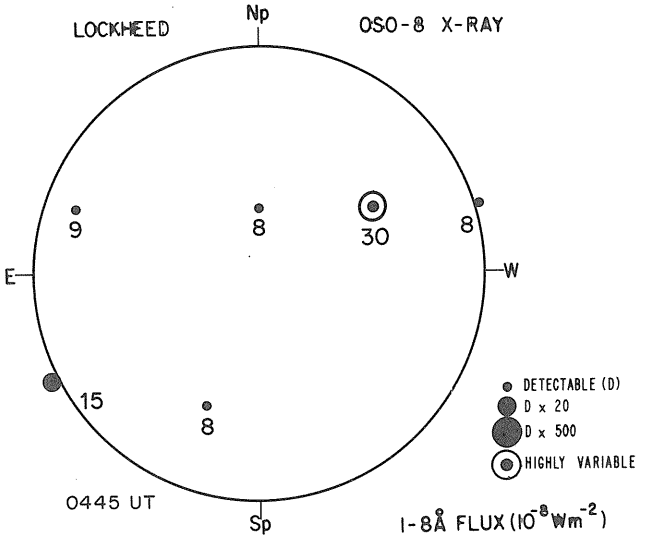
NOSC LA POSTA

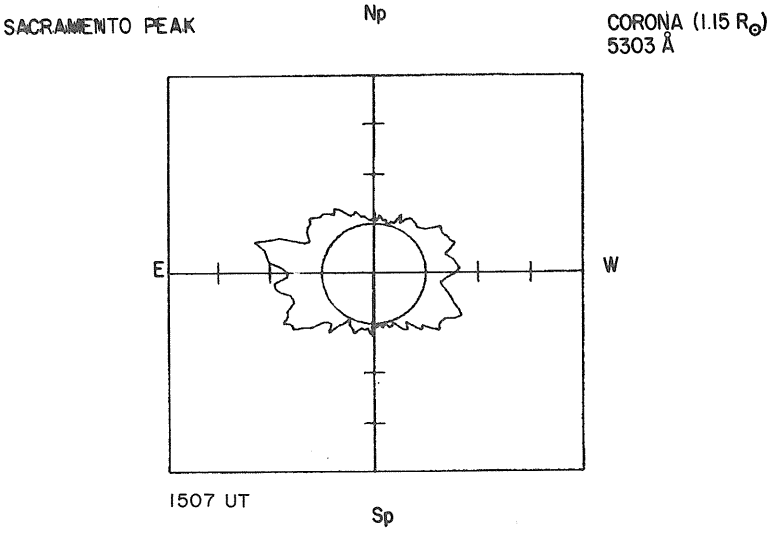
8.6 MM

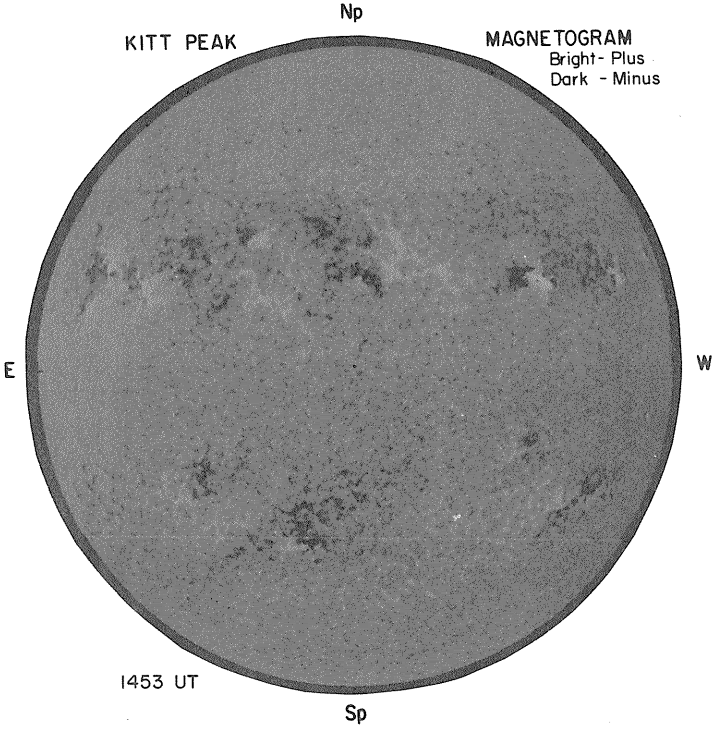


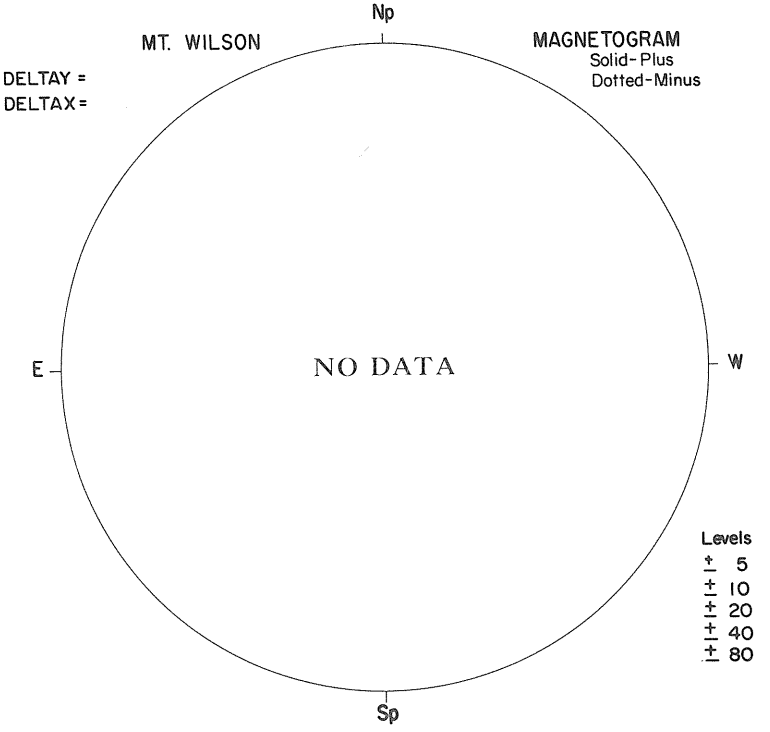
75
Jun 78

JUNE 14, 1978 (P =-10.39, B_o =0.90, L_o = 216.58)



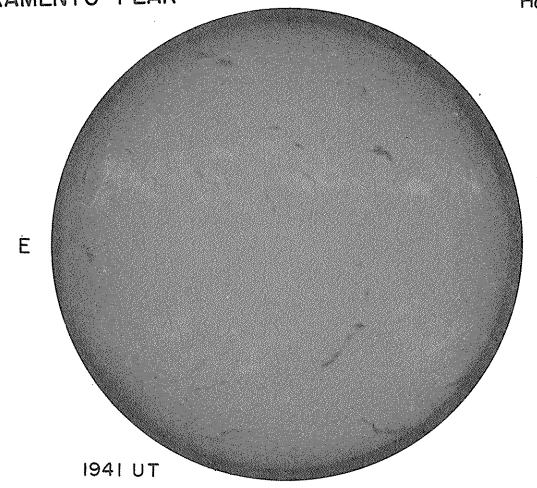






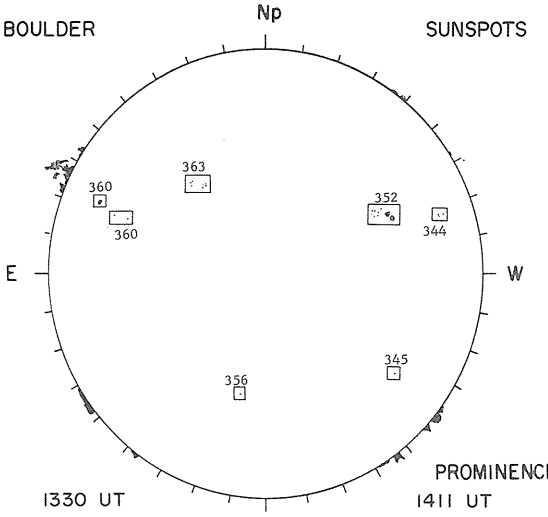
14

SACRAMENTO PEAK Hα



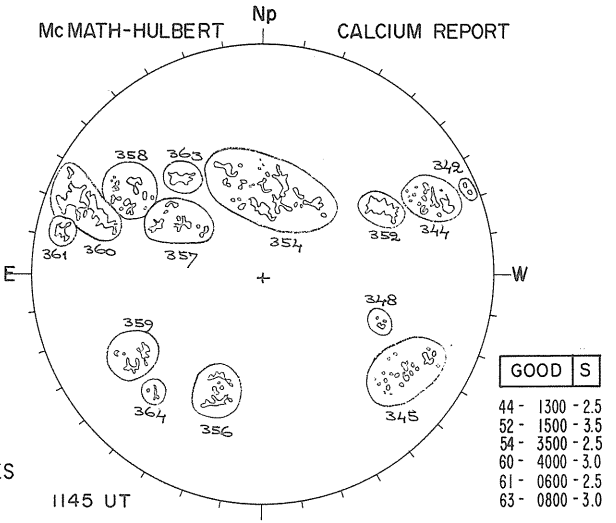
1941 UT

BOULDER SUNSPOTS



1330 UT

McMATH-HULBERT CALCIUM REPORT

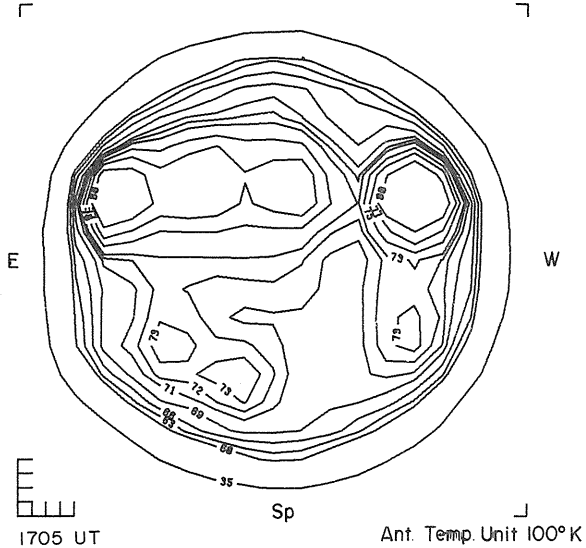


1145 UT

PROMINENCES

1411 UT

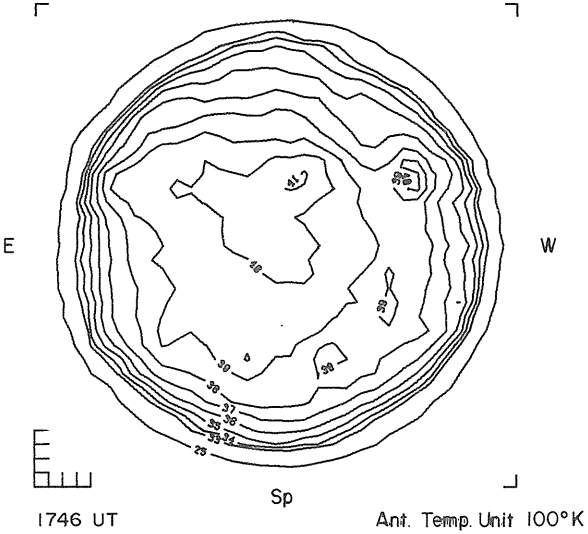
NOSC LA POSTA 2.0 CM



1705 UT

Ant. Temp. Unit 100°K

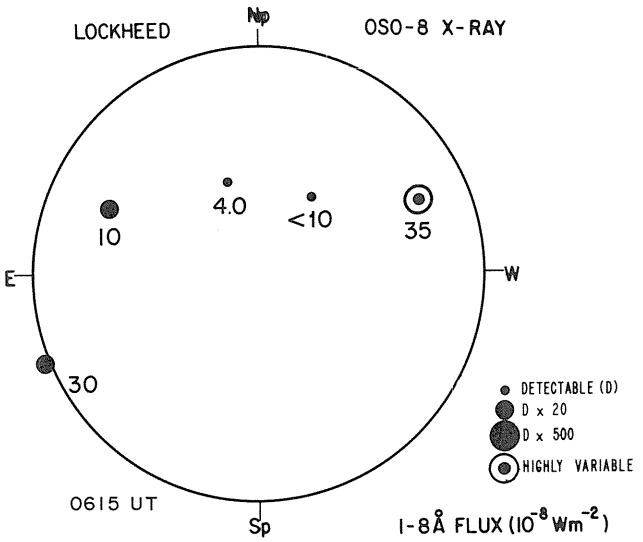
NOSC LA POSTA 8.6 MM

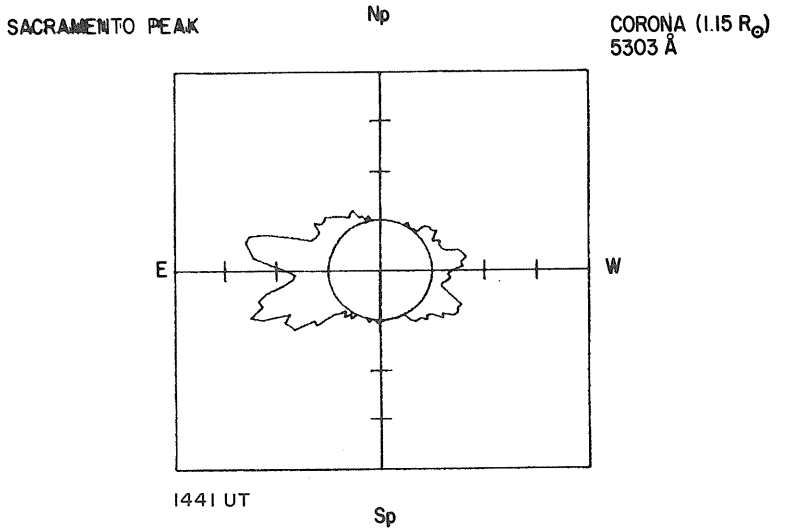


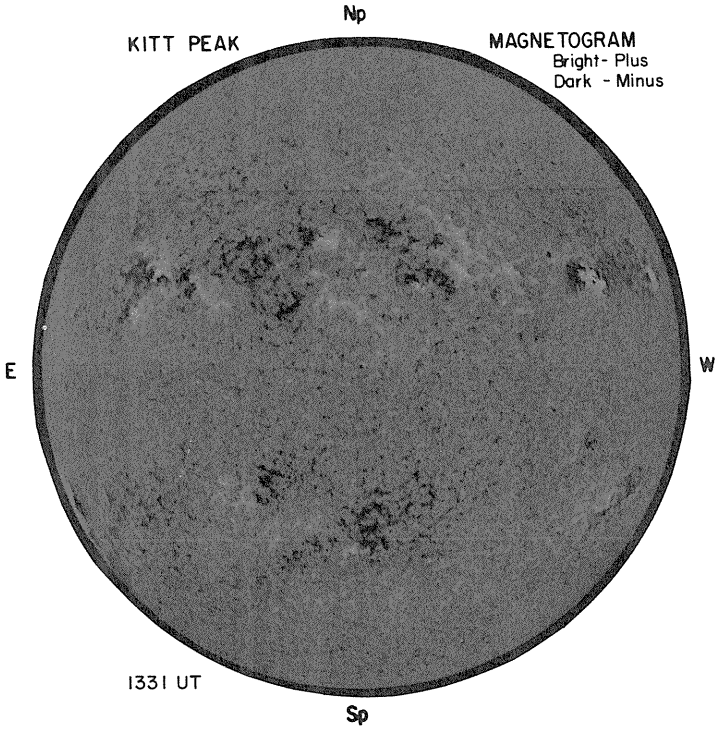
1746 UT

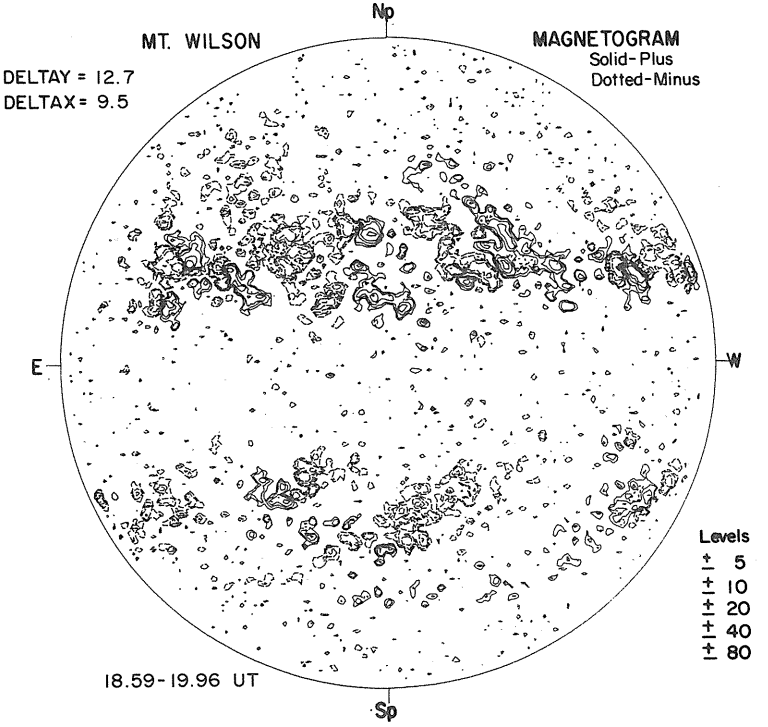
Ant. Temp. Unit 100°K

JUNE 15, 1978 (P = -9.97, B_o = 1.02, L_o = 203.34)



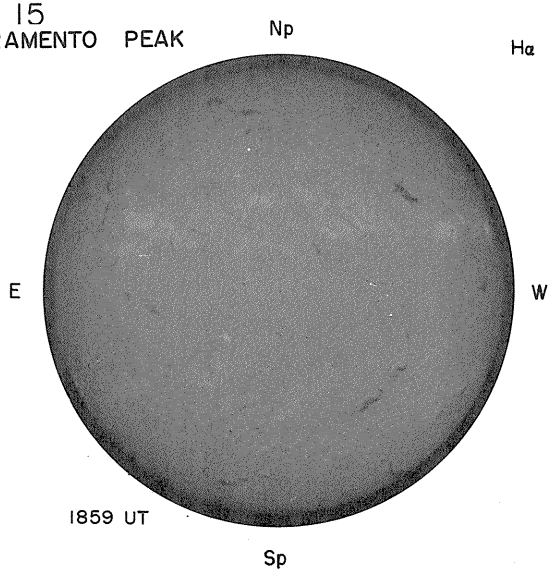




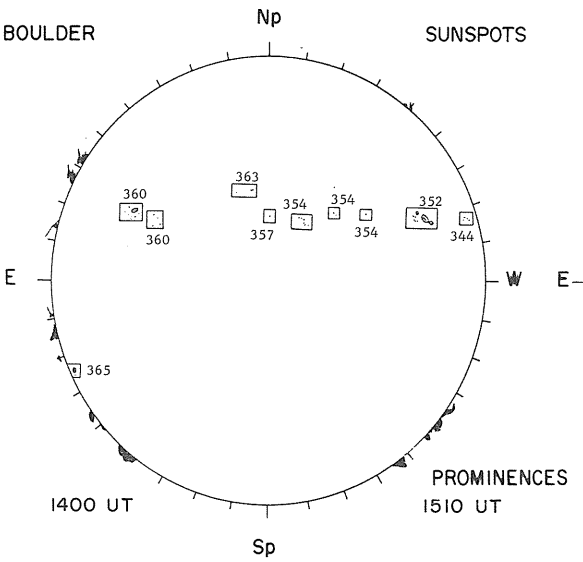


15

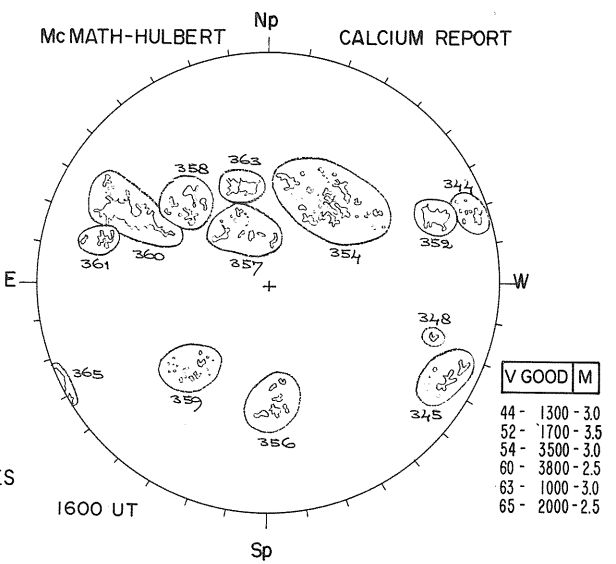
SACRAMENTO PEAK



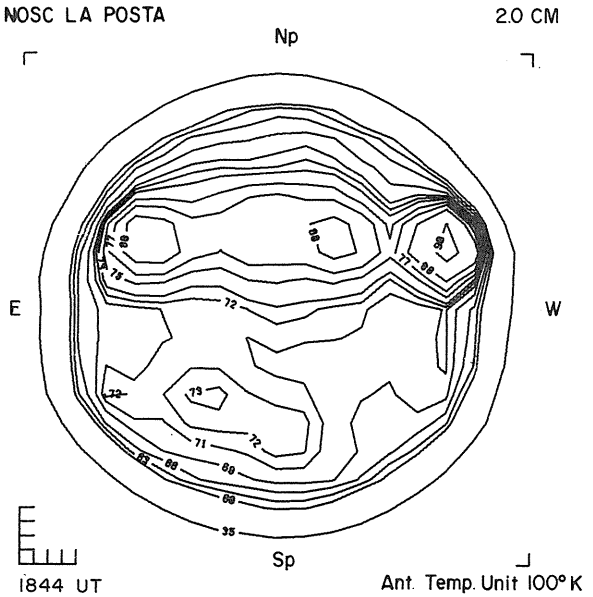
BOULDER



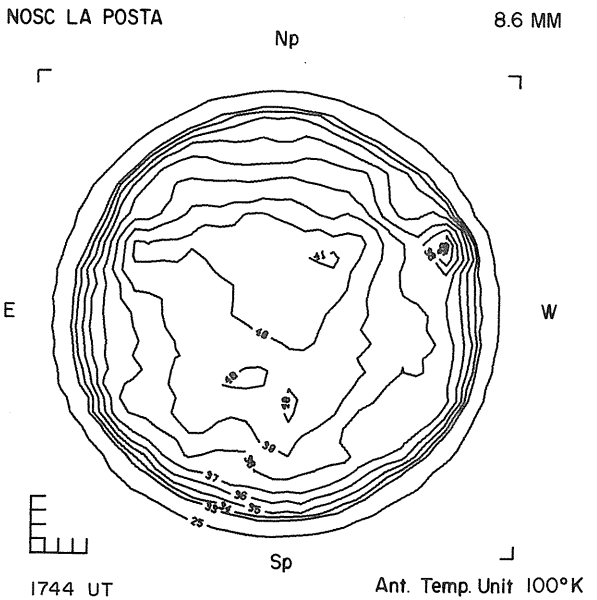
McMATH-HULBERT



NOSC LA POSTA

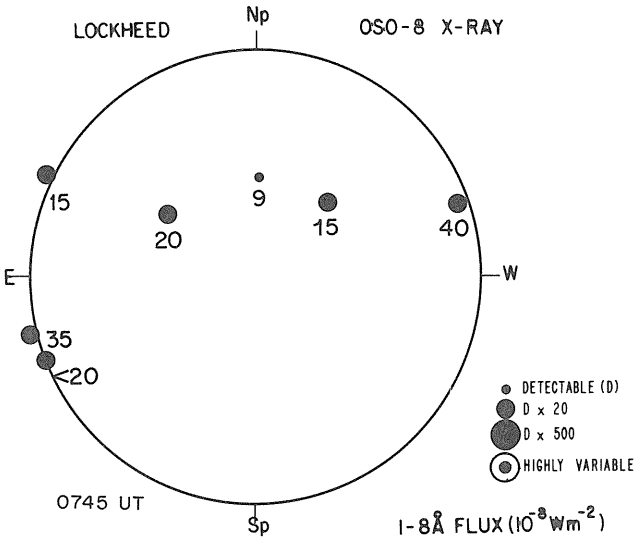


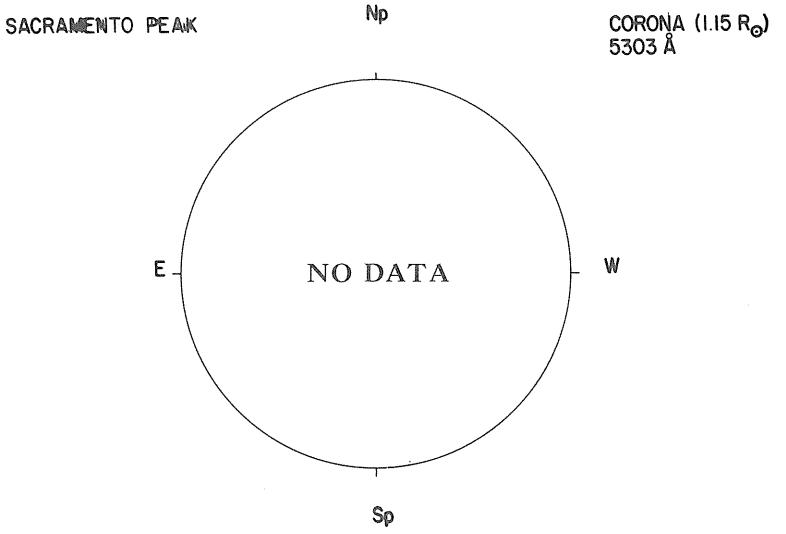
NOSC LA POSTA

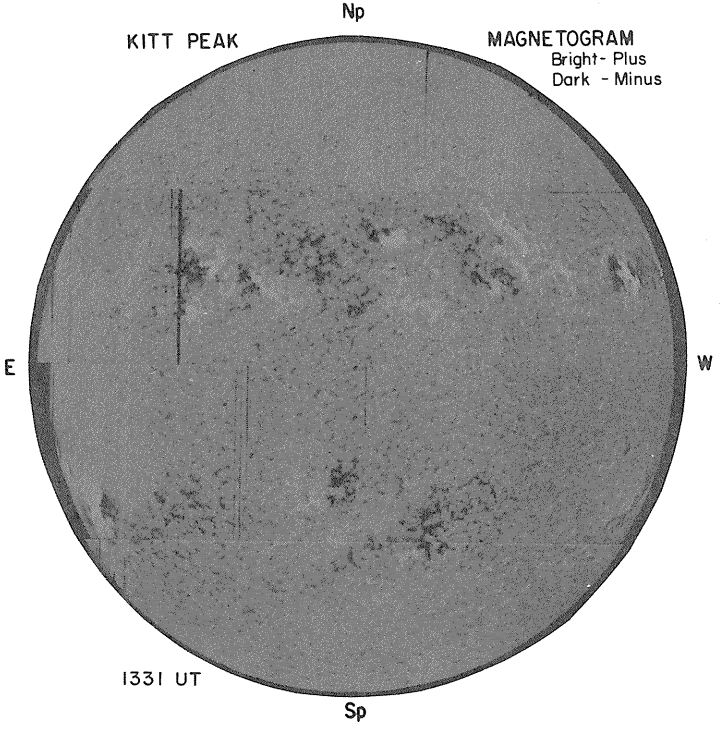


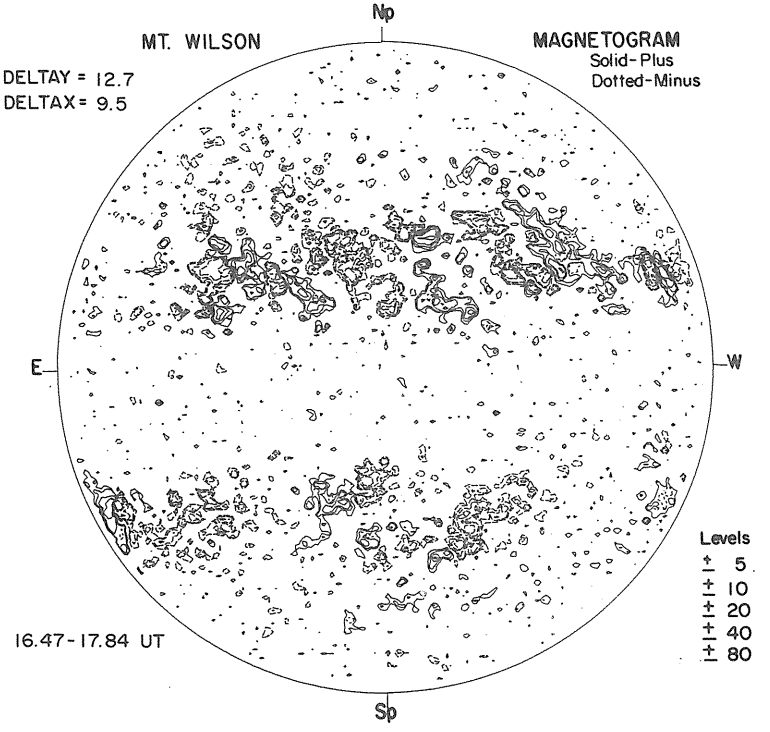
79
Jun 78

JUNE 16, 1978 (P=-9.54, B_o=1.14, L_o=190.10)



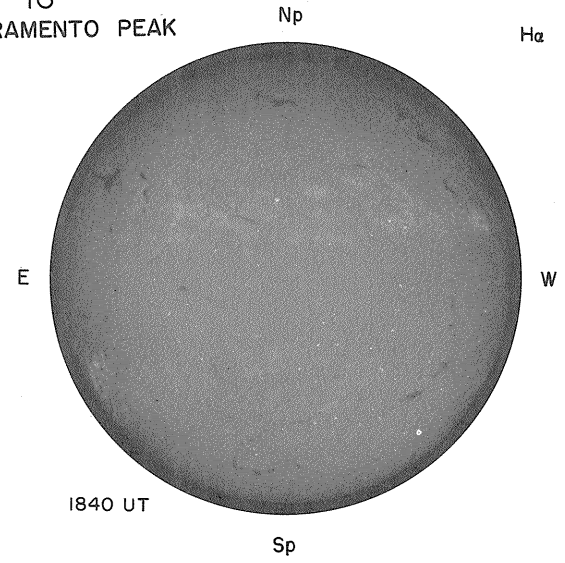




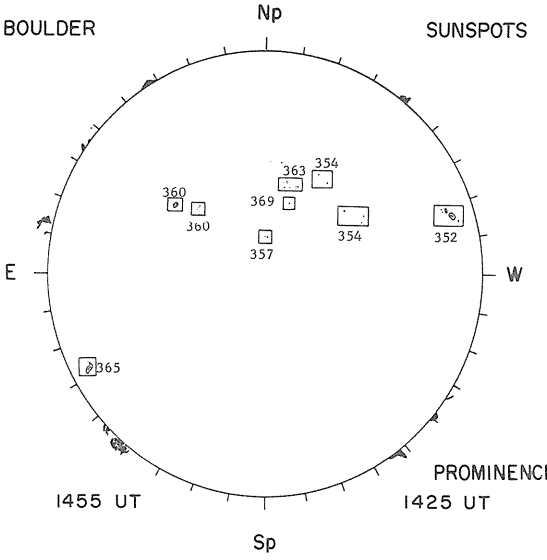


16

SACRAMENTO PEAK



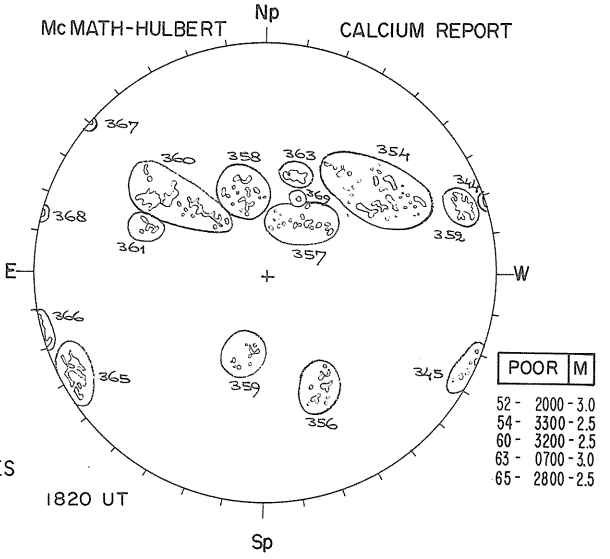
BOULDER



SUNSPOTS

Mc MATH-HULBERT

CALCIUM REPORT

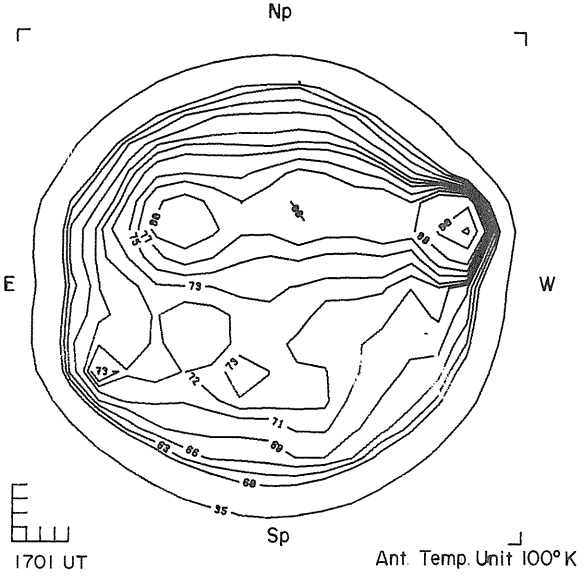


PROMINENCES

1425 UT

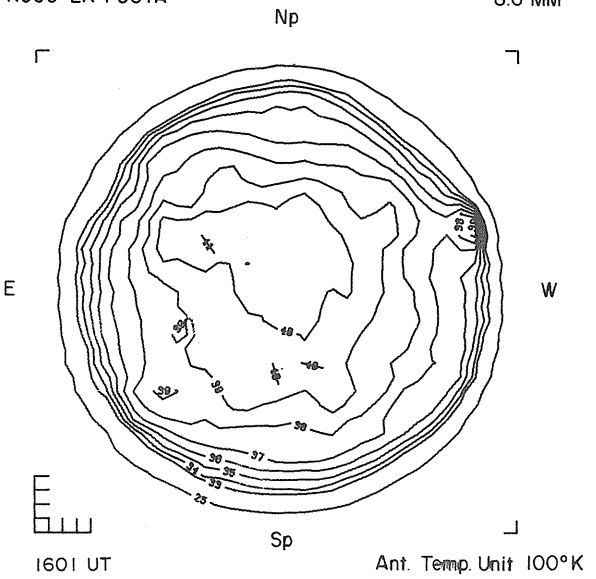
NOSC LA POSTA

2.0 CM

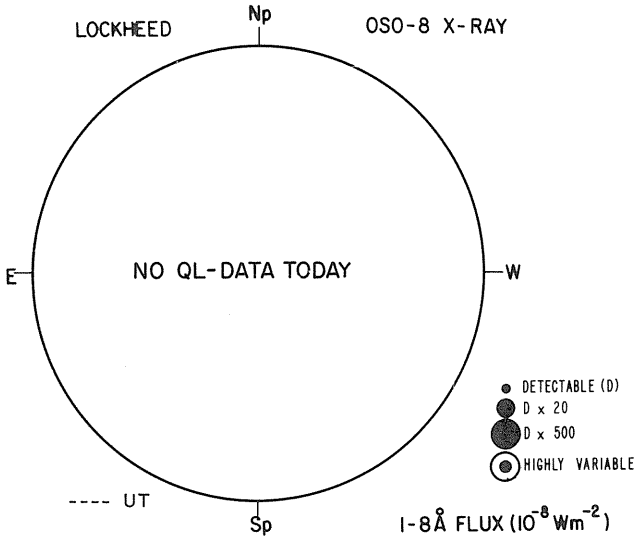


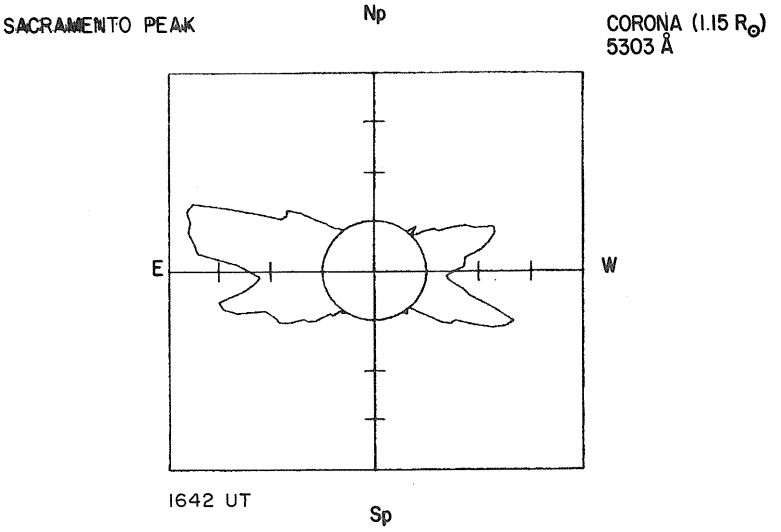
NOSC LA POSTA

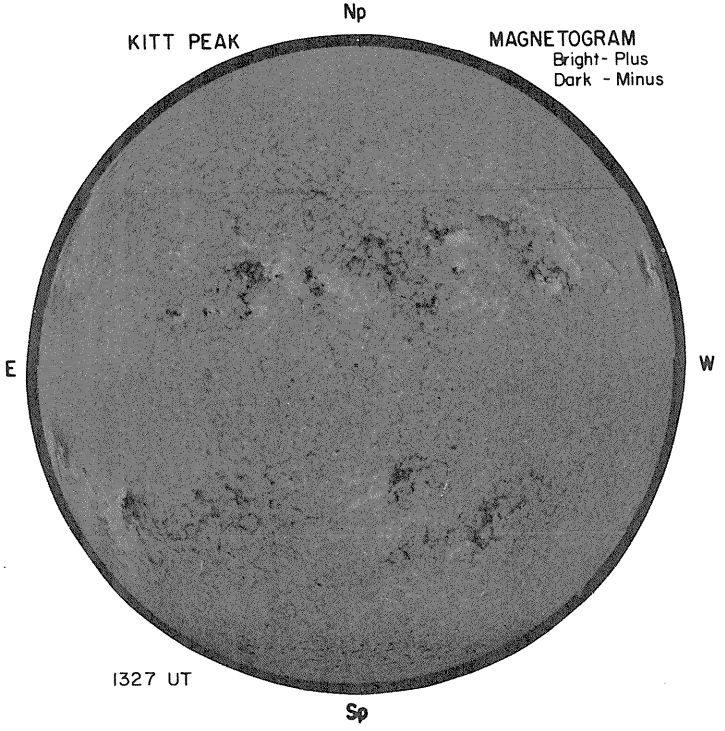
8.6 MM

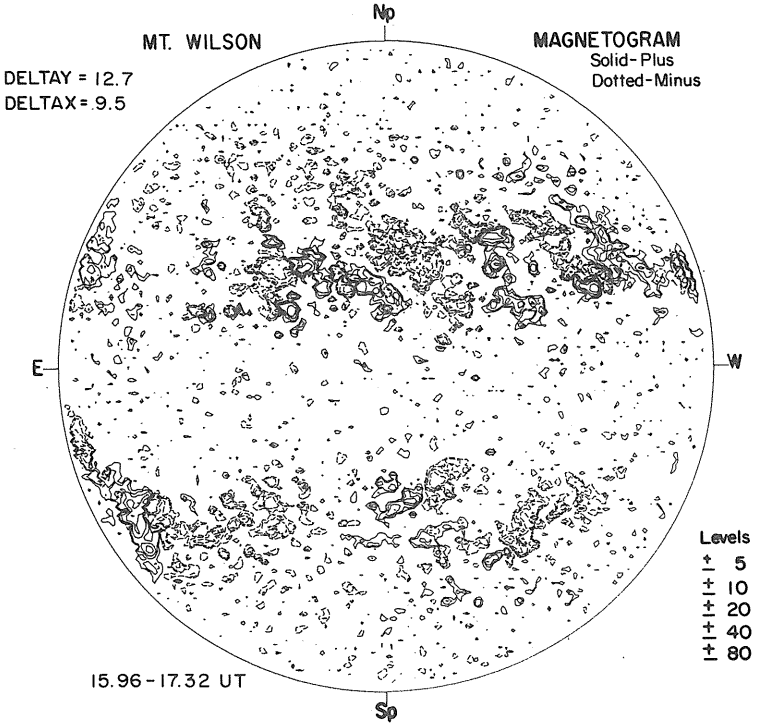


JUNE 17, 1978 (P = -9.11, B_0 = 1.26, L_0 = 176.87)

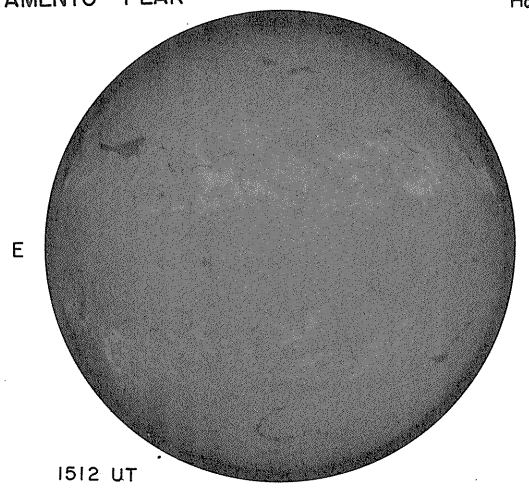






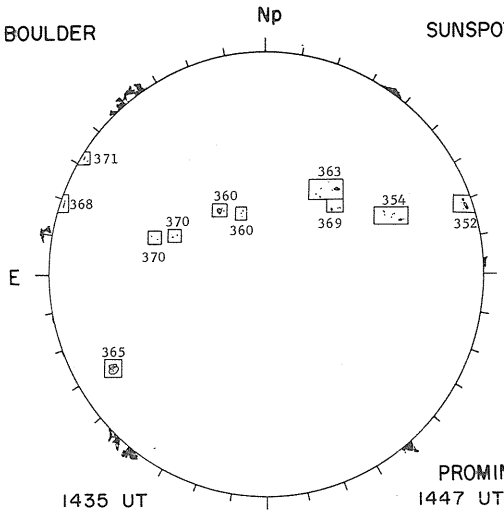


SACRAMENTO PEAK Hα



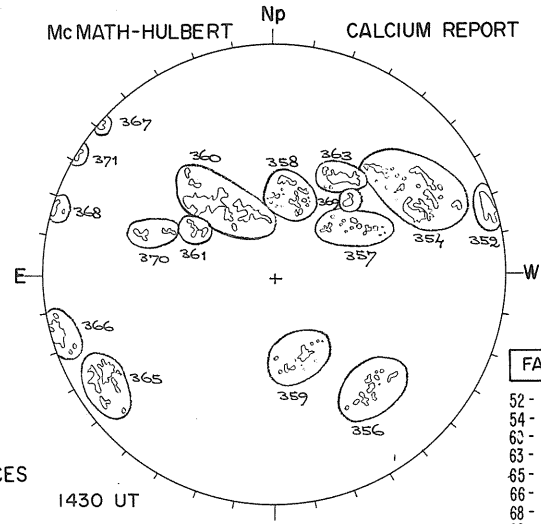
1512 UT

BOULDER SUNSPOTS



1435 UT

McMATH-HULBERT CALCIUM REPORT



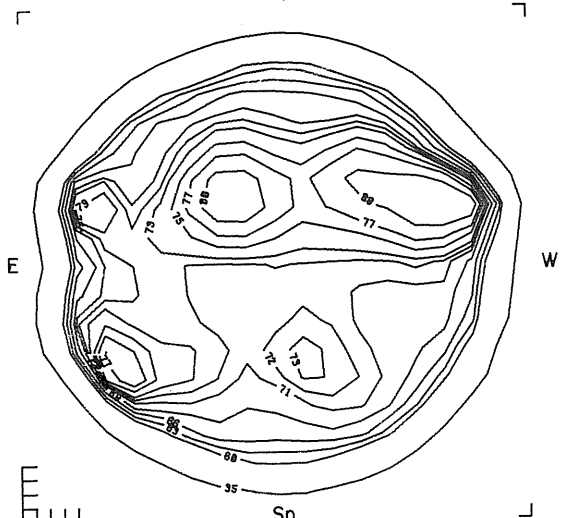
1430 UT

PROMINENCES

1447 UT

FAIR	M
52 - 2000 - 3.0	
54 - 3700 - 3.0	
60 - 3200 - 2.5	
63 - 0900 - 3.0	
65 - 2500 - 3.0	
66 - 2000 - 3.0	
68 - 1000 - 2.5	
69 - 0300 - 2.5	
70 - 0600 - 2.5	
71 - 0600 - 2.5	

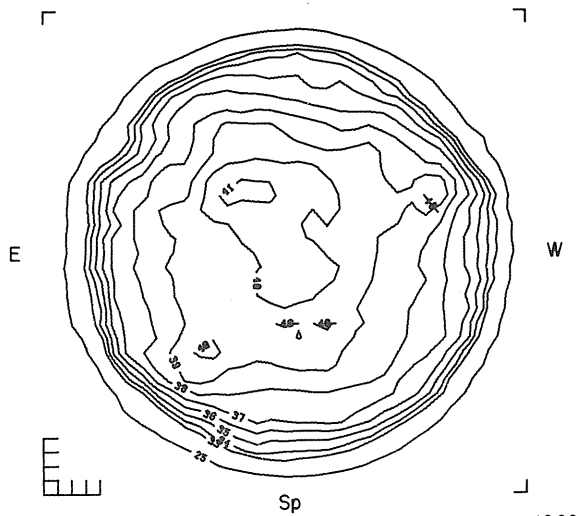
NOSC LA POSTA 2.0 CM



1710 UT

Ant. Temp. Unit 100°K

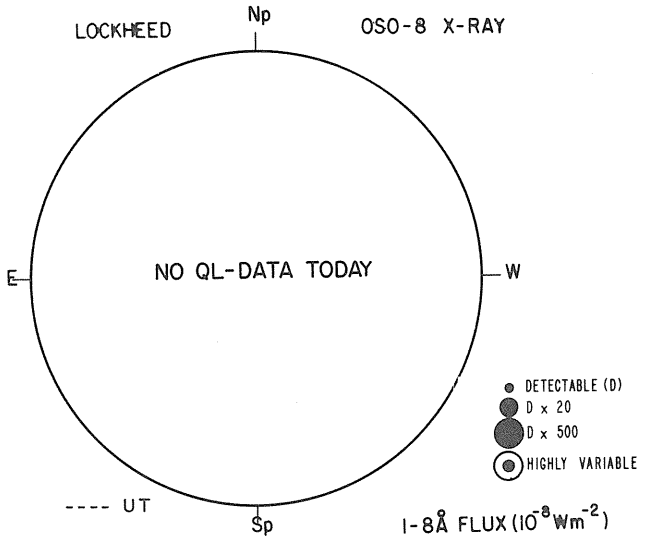
NOSC LA POSTA 8.6 MM

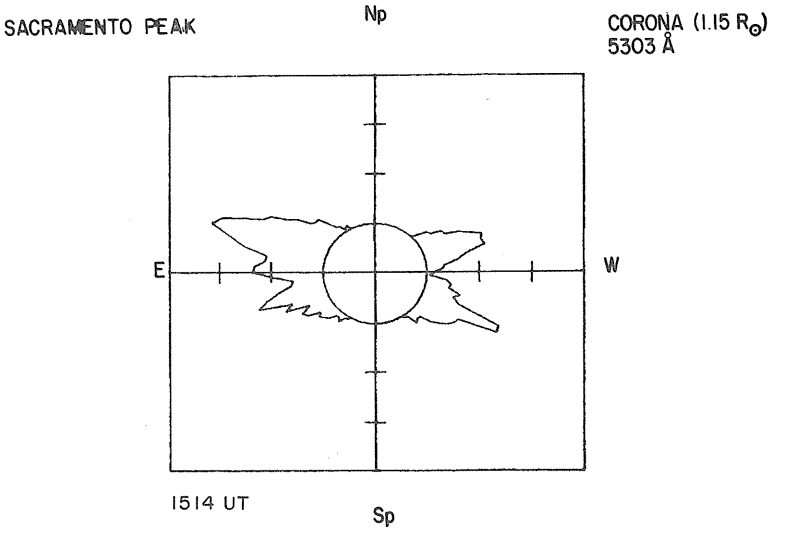


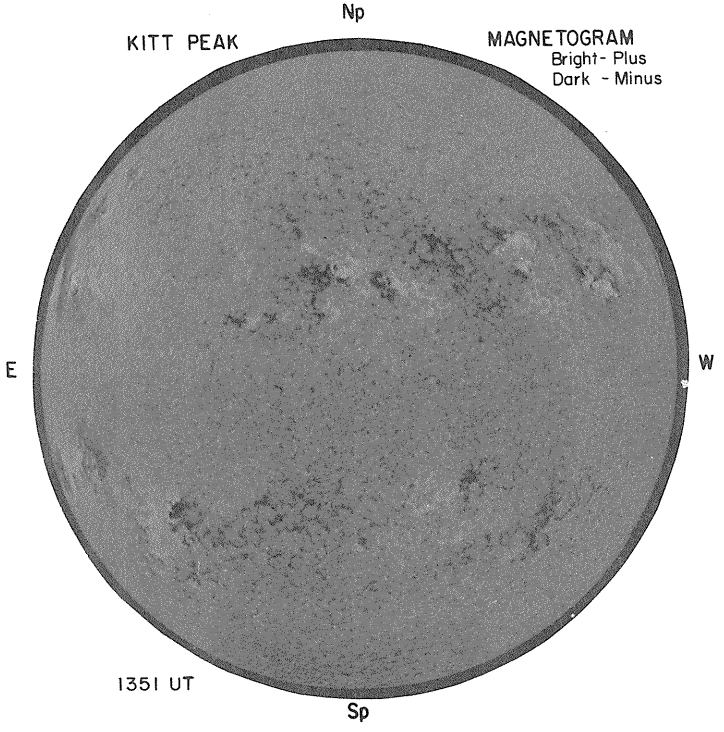
1611 UT

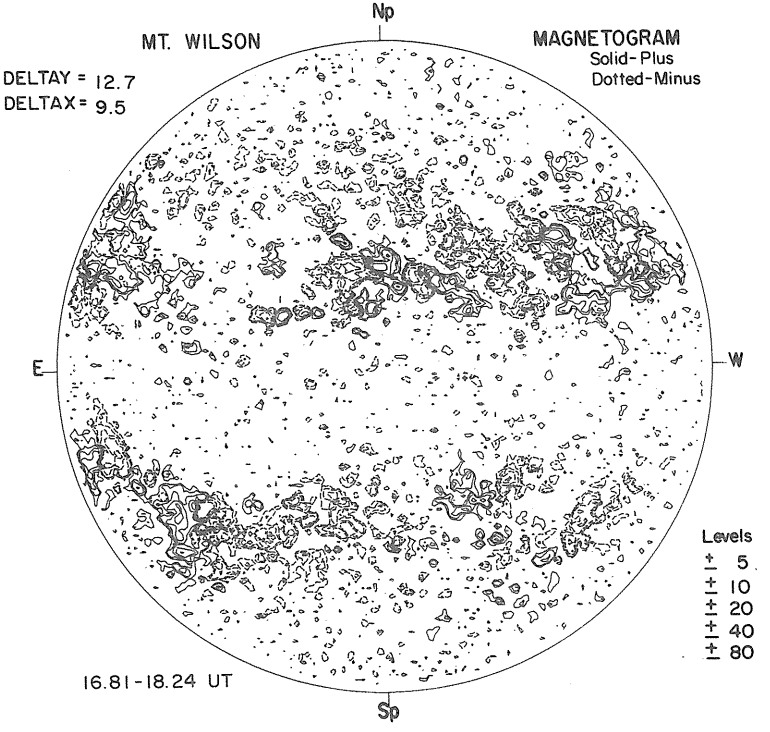
Ant. Temp. Unit 100°K

JUNE 18, 1978 (P = -8.67, B_0 = 1.37, L_0 = 163.63)



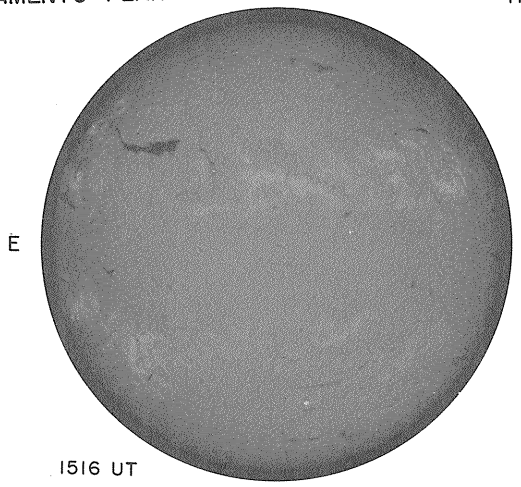






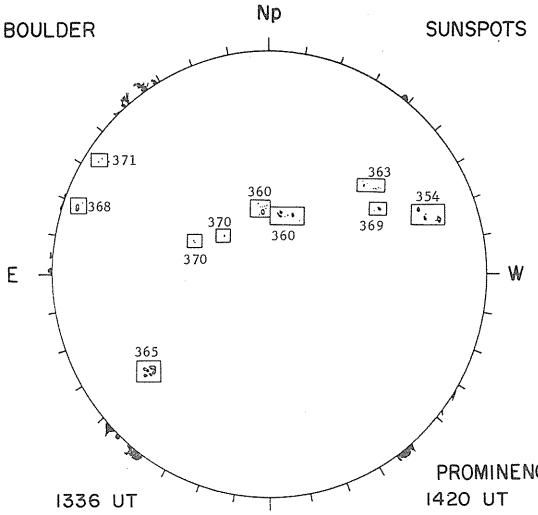
18

SACRAMENTO PEAK Hα



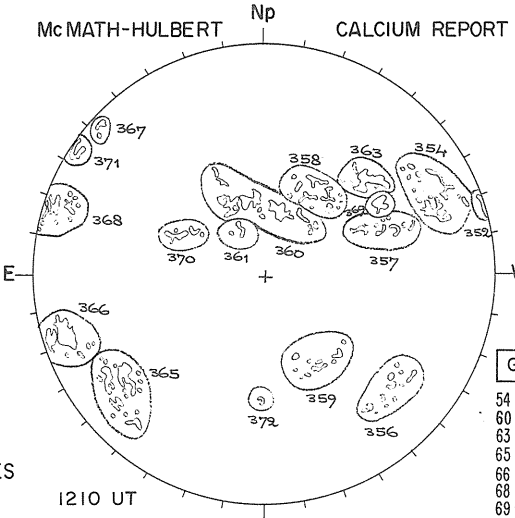
1516 UT

BOULDER SUNSPOTS



1336 UT

McMATH-HULBERT CALCIUM REPORT



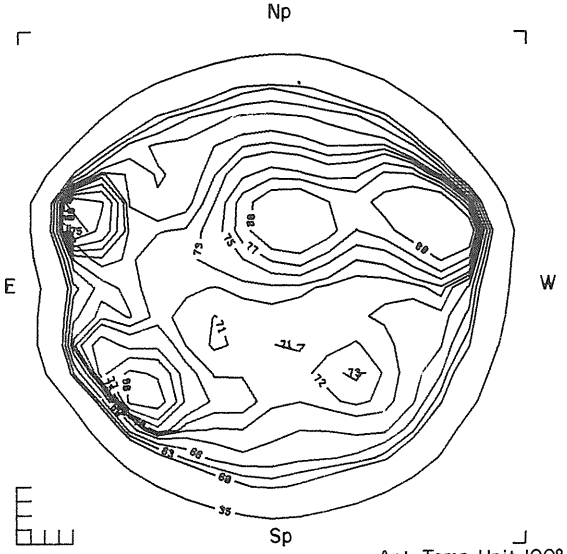
1210 UT

GOOD	S
54 -	4000-3.0
60 -	3200-2.5
63 -	1100-3.0
65 -	2800-3.0
66 -	2800-2.5
68 -	2100-3.0
69 -	0400-2.5
71 -	0800-2.5

PROMINENCES

1420 UT

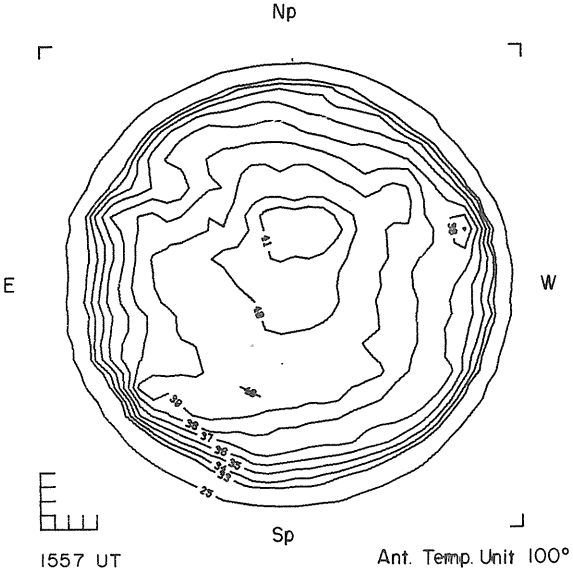
NOSC LA POSTA 2.0 CM



1701 UT

Ant. Temp. Unit 100° K

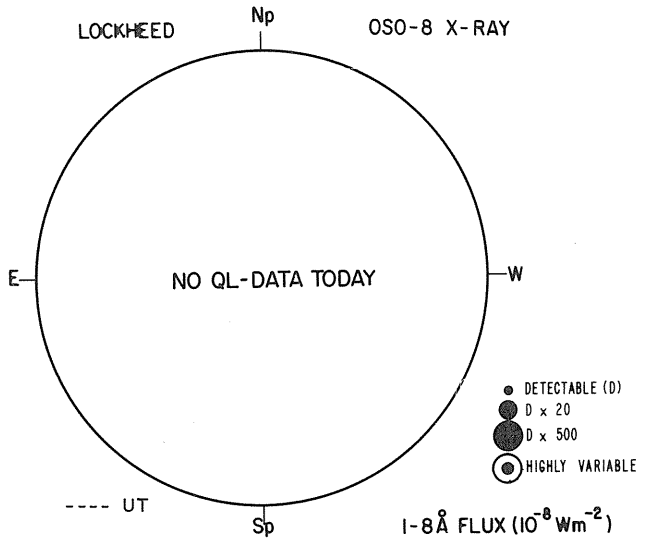
NOSC LA POSTA 8.6 MM

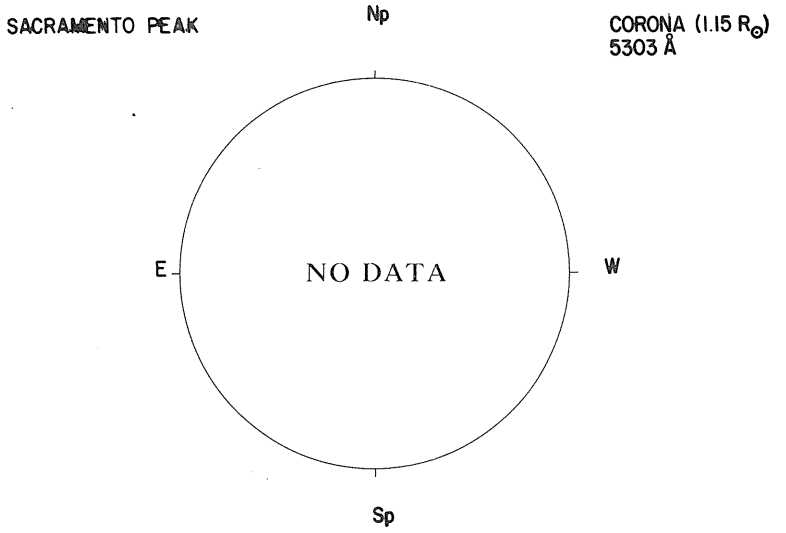


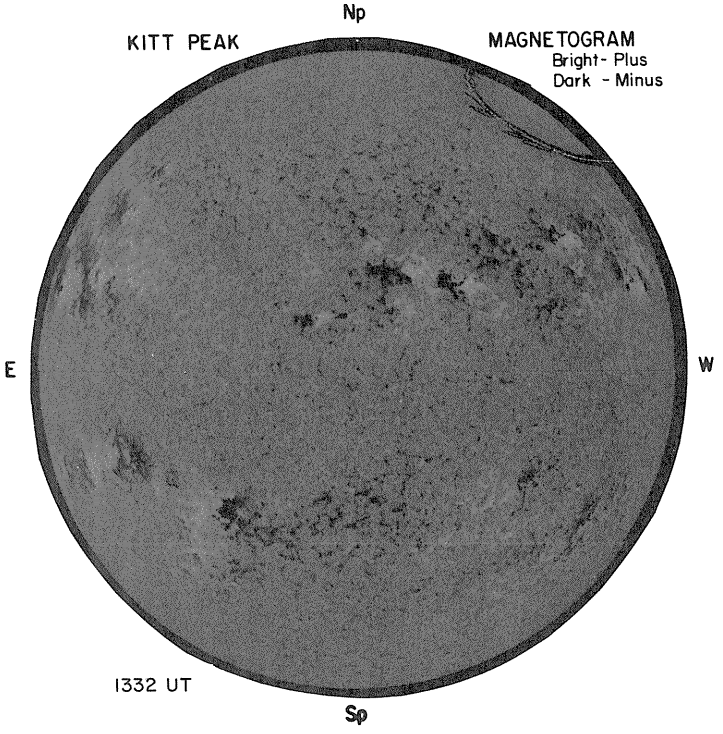
1557 UT

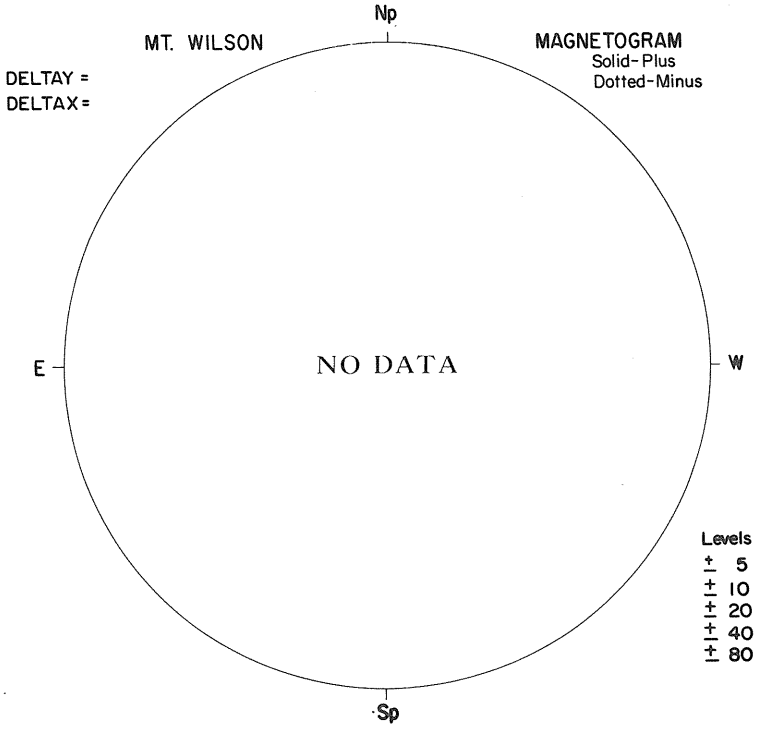
Ant. Temp. Unit 100° K

JUNE 19, 1978 (P =-8.24, B_o = 1.49, L_o = 150.39)

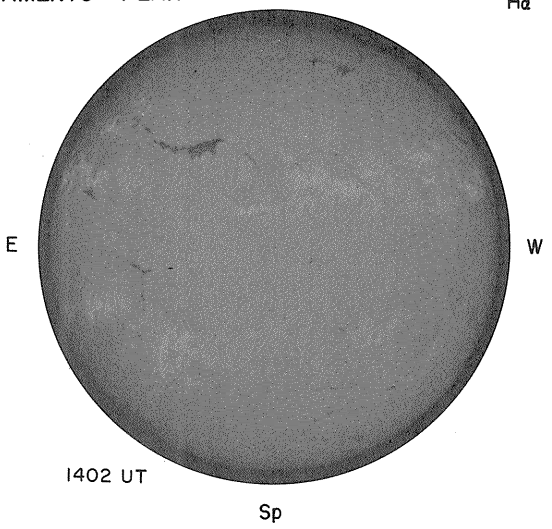




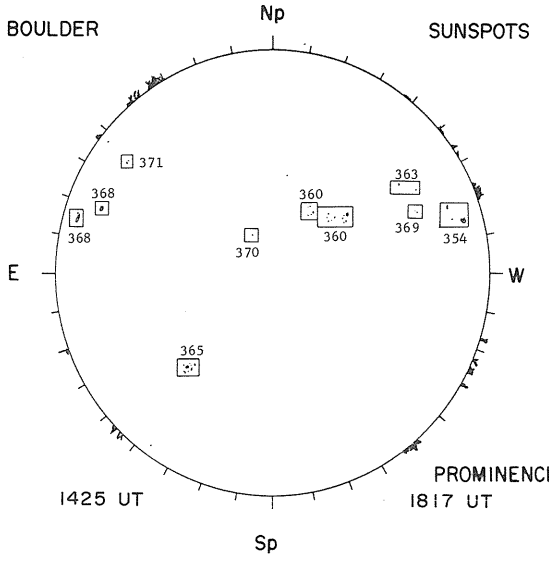




SACRAMENTO PEAK

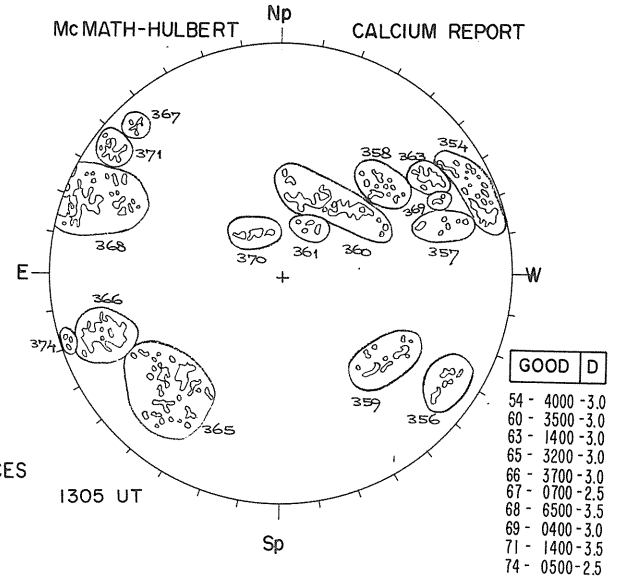


BOULDER



SUNSPOTS

McMATH-HULBERT



CALCIUM REPORT

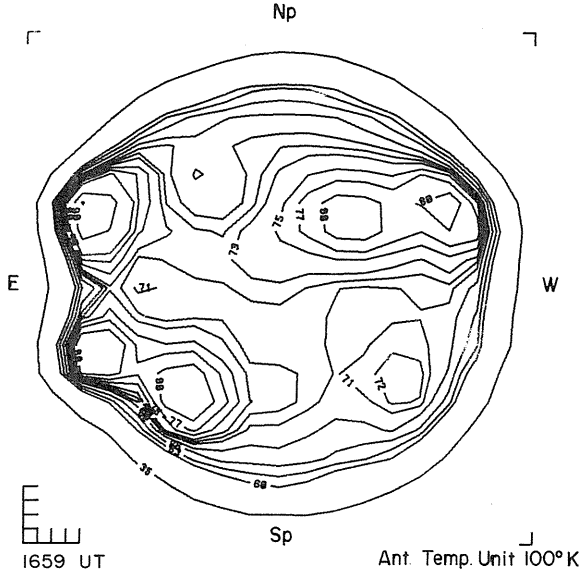
PROMINENCES

1817 UT

1305 UT

NOSC LA POSTA

2.0 CM

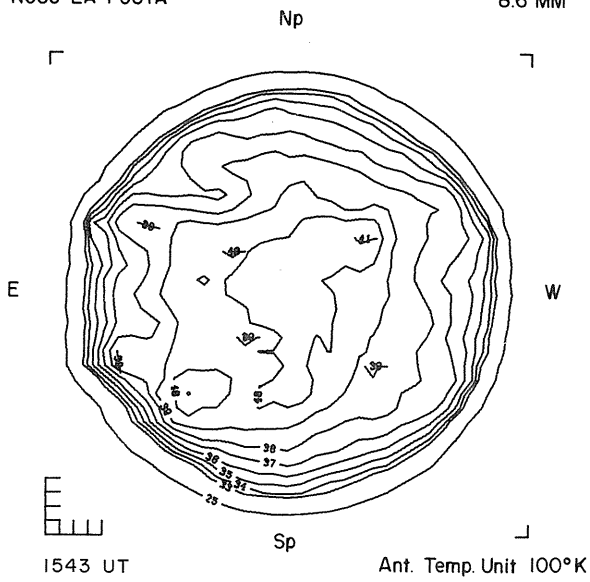


1659 UT

Ant. Temp. Unit 100°K

NOSC LA POSTA

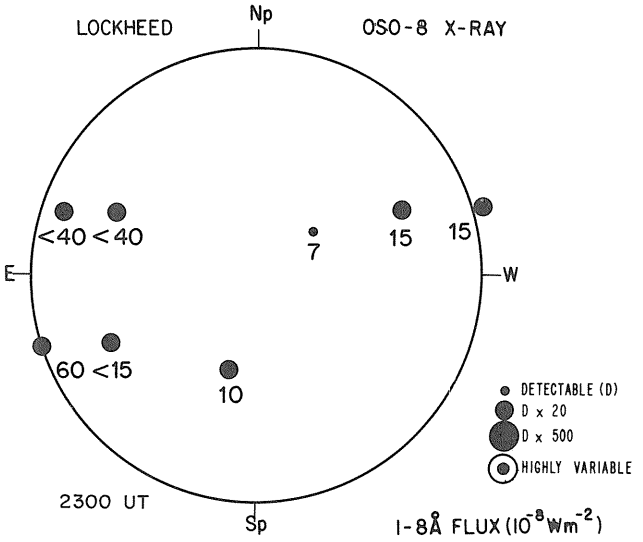
8.6 MM

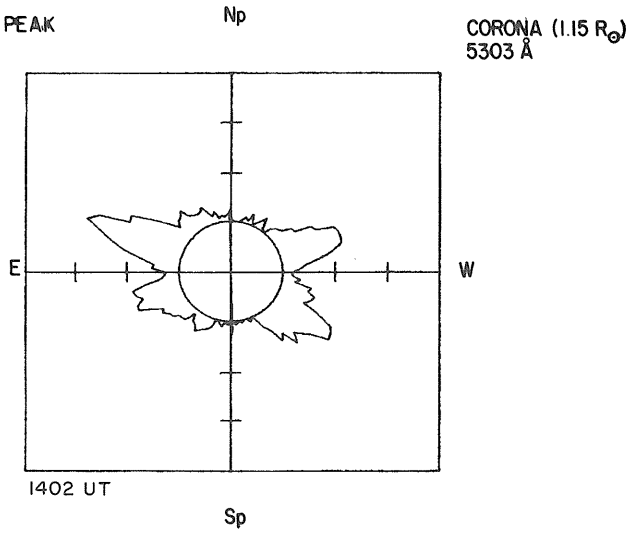


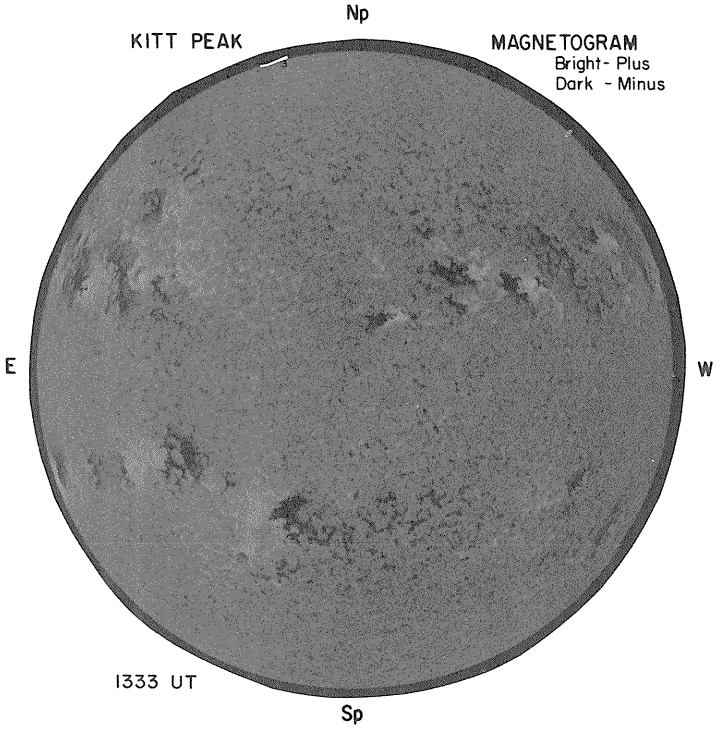
1543 UT

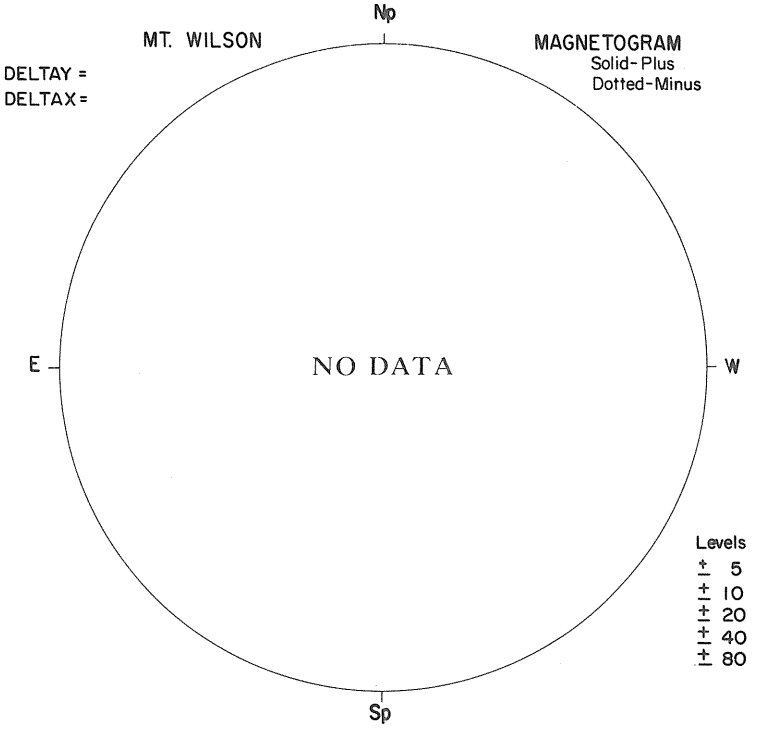
Ant. Temp. Unit 100°K

JUNE 20, 1978 (P = -7.80, B_o = 1.61, L_o = 137.15)



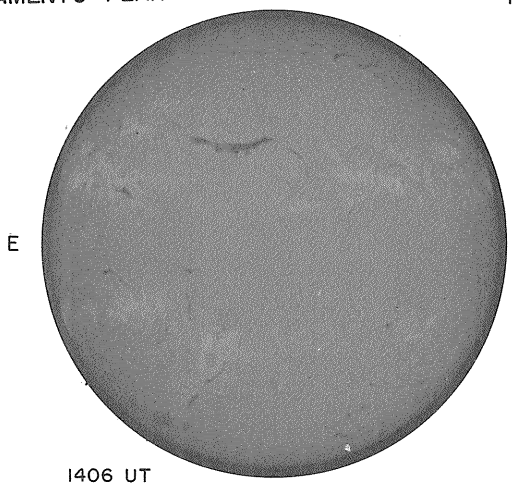






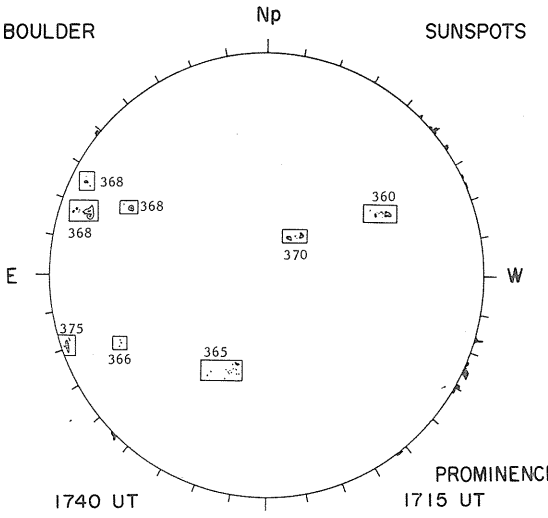
20

SACRAMENTO PEAK Hα



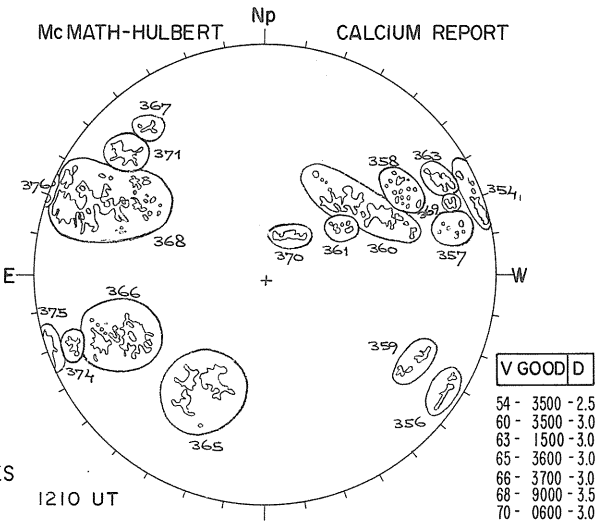
1406 UT

BOULDER SUNSPOTS



1740 UT

McMATH-HULBERT CALCIUM REPORT



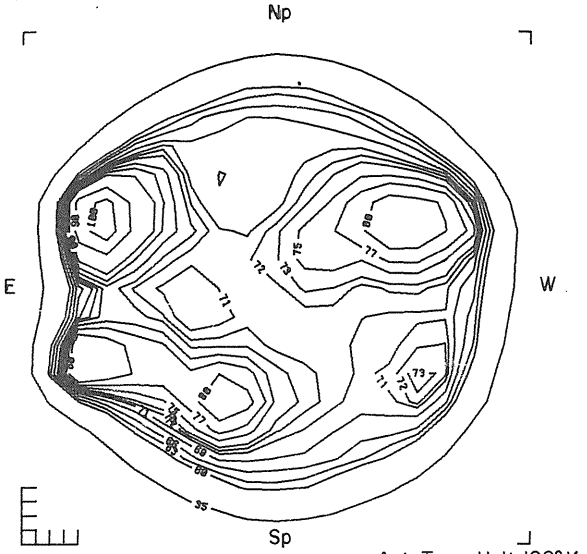
1210 UT

PROMINENCES

1715 UT

V GOOD	D
54 - 3500	- 2.5
60 - 3500	- 3.0
63 - 1500	- 3.0
65 - 3600	- 3.0
66 - 3700	- 3.0
68 - 9000	- 3.5
70 - 0600	- 3.0
71 - 1500	- 2.5
75 - 3800	- 3.5

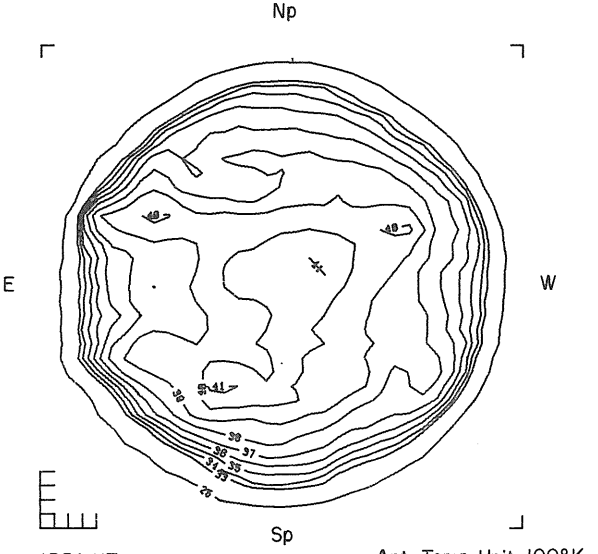
NOSC LA POSTA 2.0 CM



1653 UT

Ant. Temp. Unit 100° K

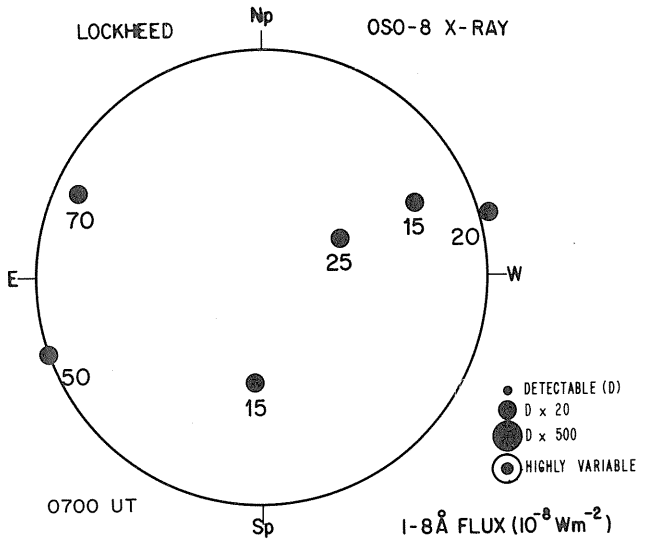
NOSC LA POSTA 8.6 MM

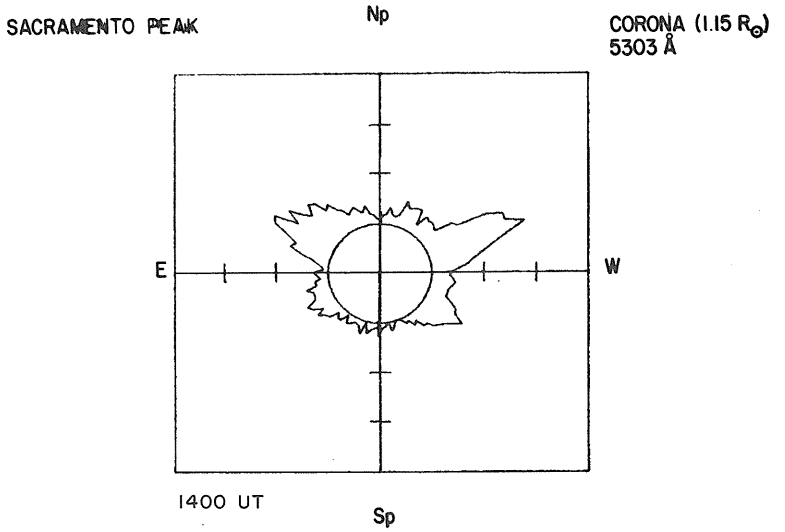


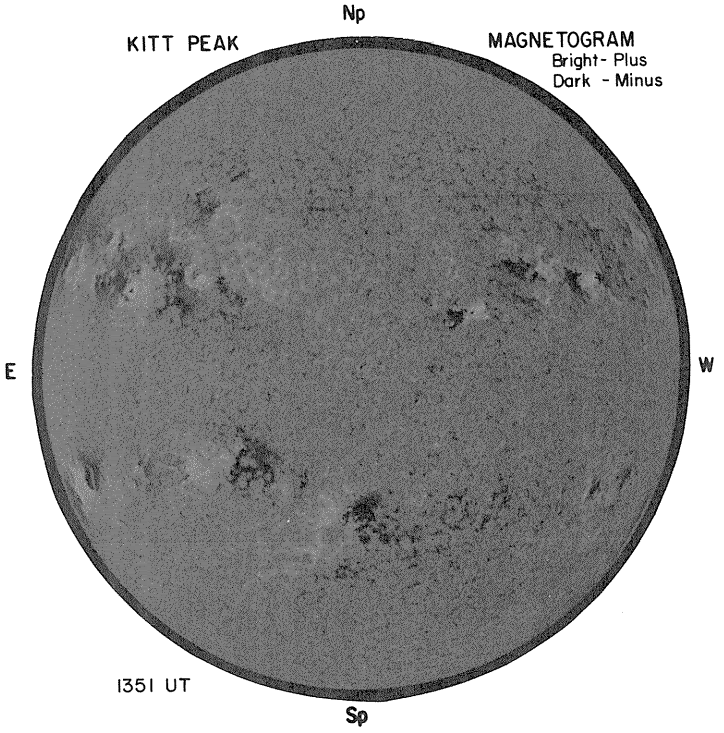
1551 UT

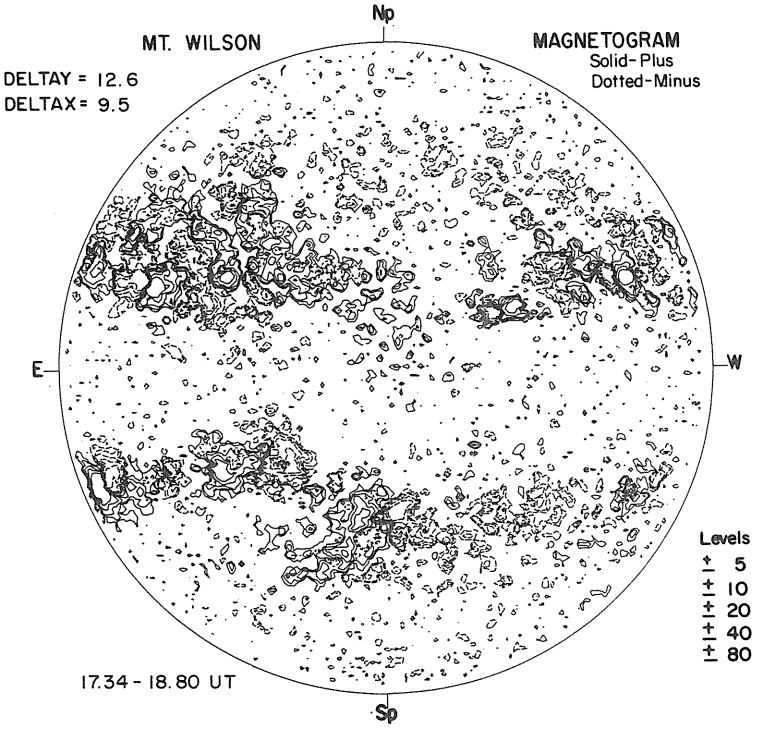
Ant. Temp. Unit 100° K

JUNE 21, 1978 (P = -7.36, B_0 = 1.73, L_0 = 123.92)



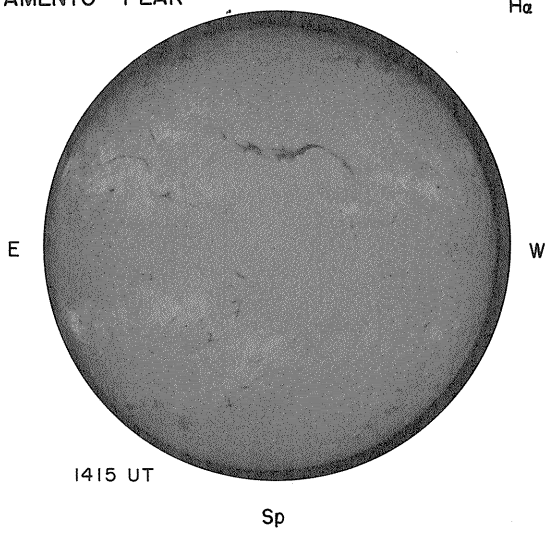




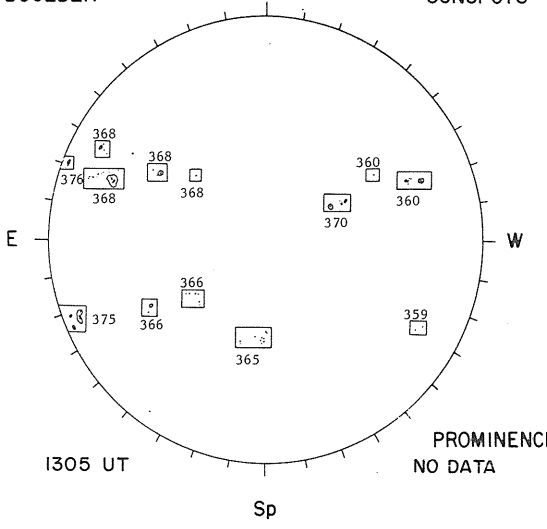


21

SACRAMENTO PEAK Np Hα

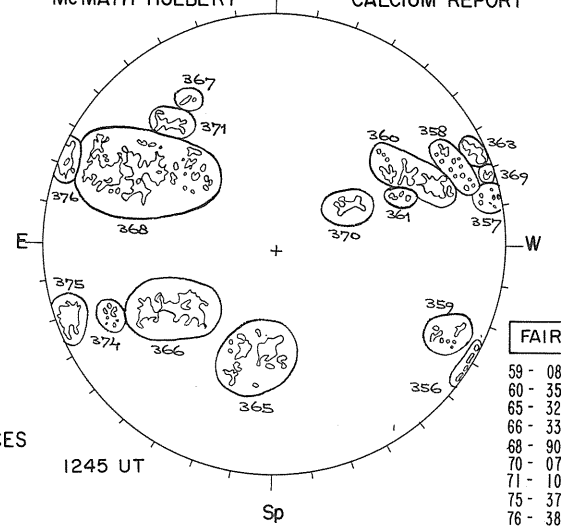


BOULDER Np SUNSPOTS



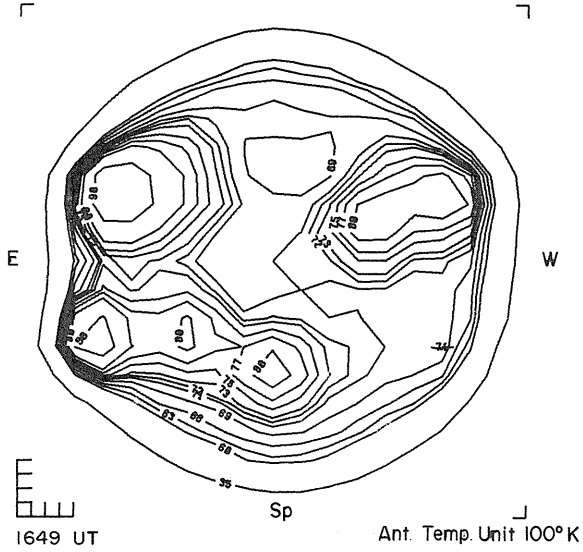
PROMINENCES
NO DATA

McMATH-HULBERT Np CALCIUM REPORT

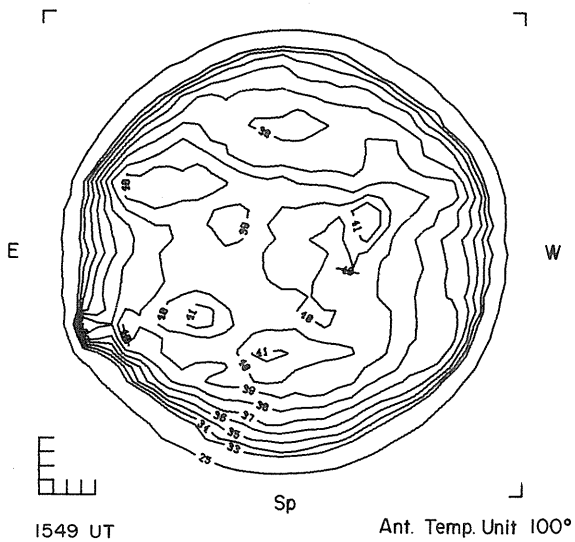


FAIR	S
59 -	0800 - 2.5
60 -	3500 - 3.0
65 -	3200 - 2.5
66 -	3300 - 2.5
68 -	9000 - 3.0
70 -	0700 - 3.0
71 -	1000 - 3.0
75 -	3700 - 3.5
76 -	3800 - 3.0

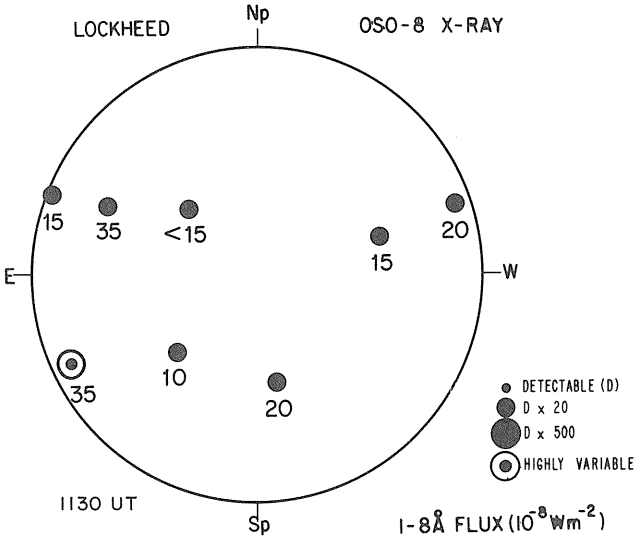
NOSC LA POSTA Np 2.0 CM

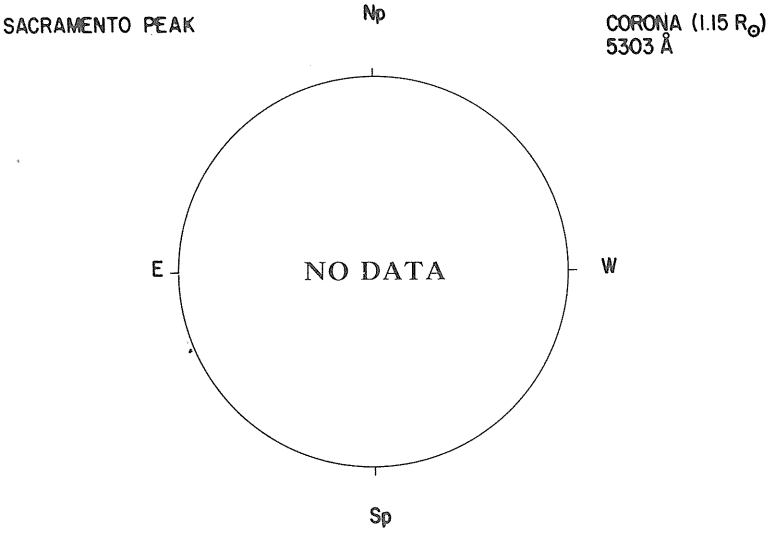


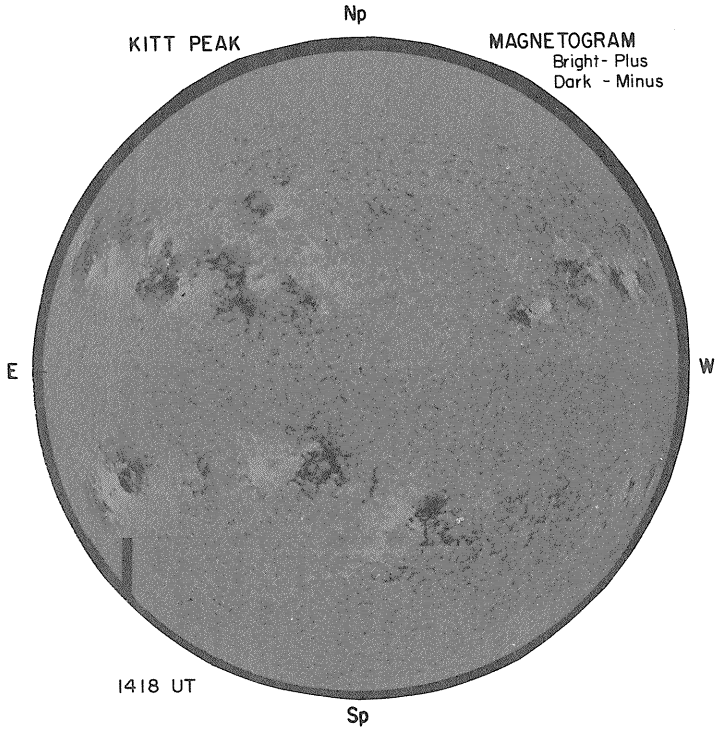
NOSC LA POSTA Np 8.6 MM

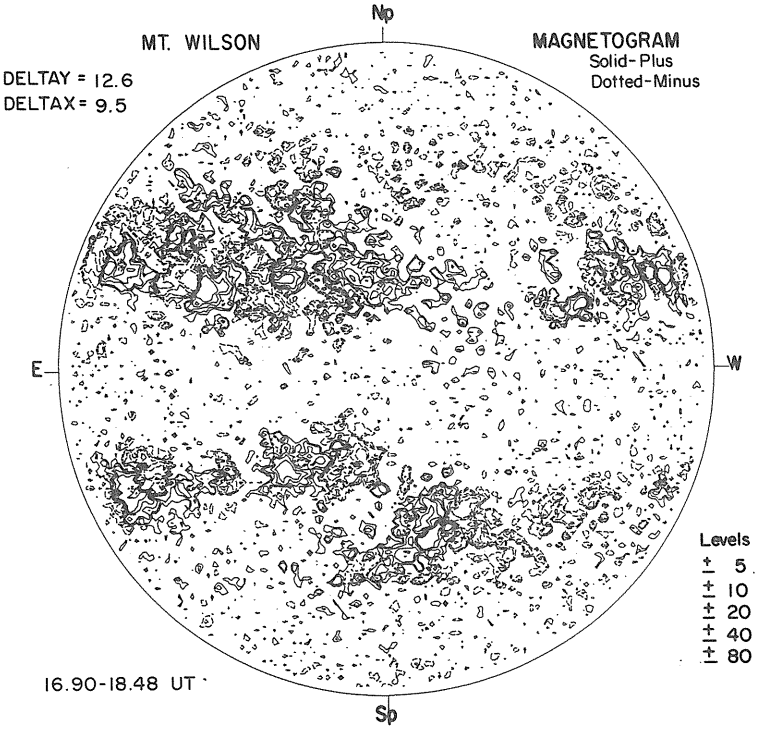


JUNE 22, 1978 (P = -6.91, B_o = 1.84, L_o = 110.68)

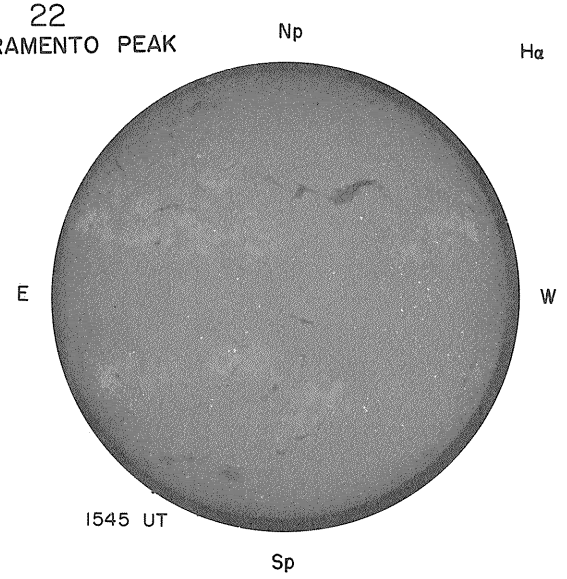




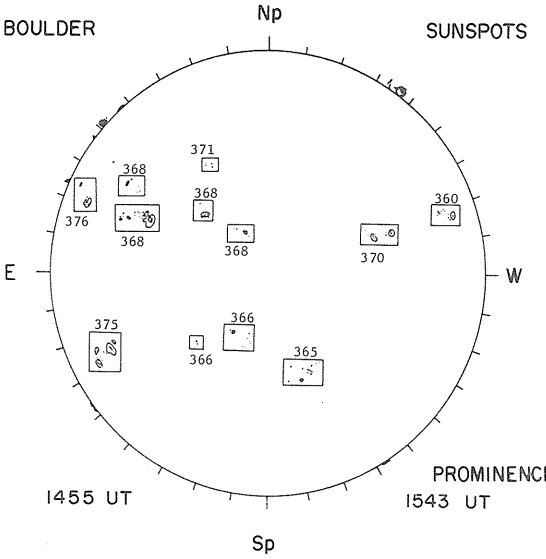




SACRAMENTO PEAK

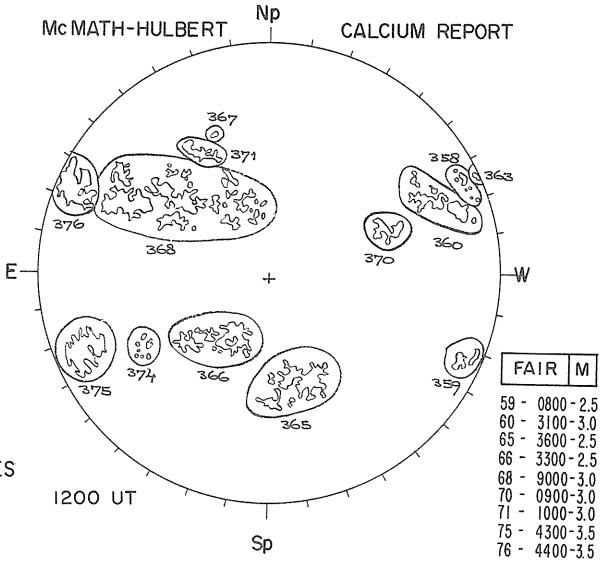


BOULDER



SUNSPOTS

McMATH-HULBERT



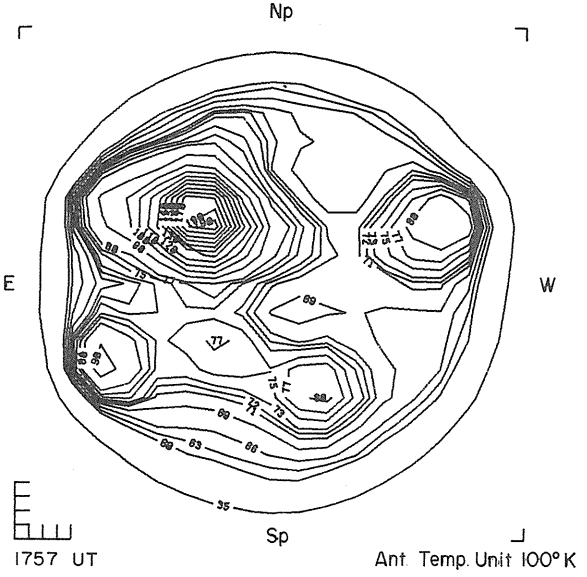
CALCIUM REPORT

PROMINENCES

1543 UT

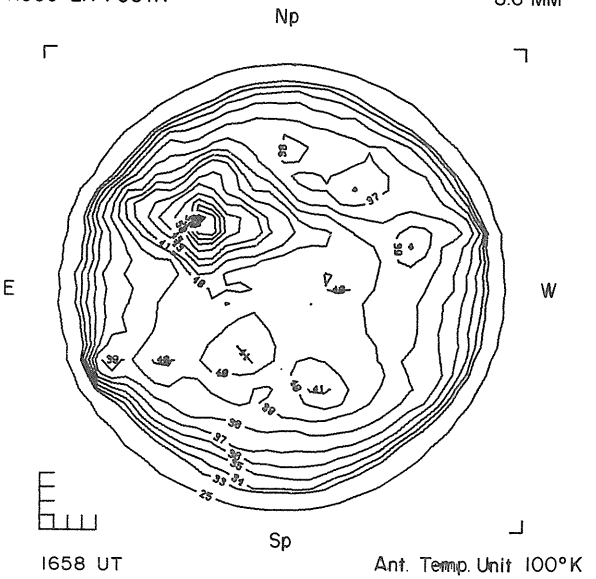
NOSC LA POSTA

2.0 CM

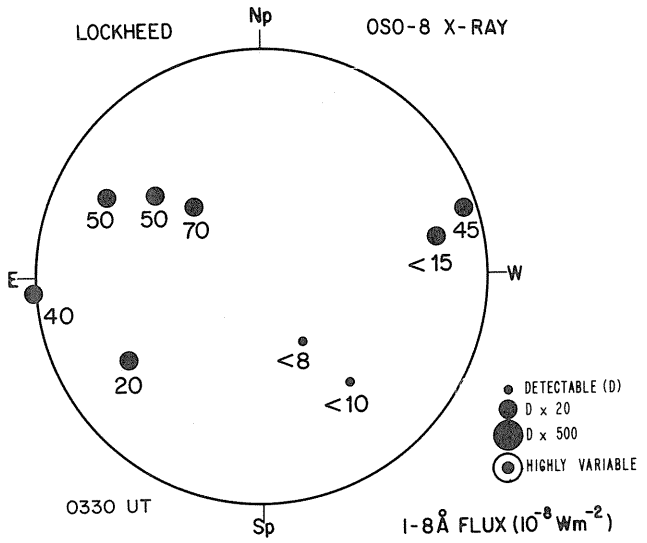


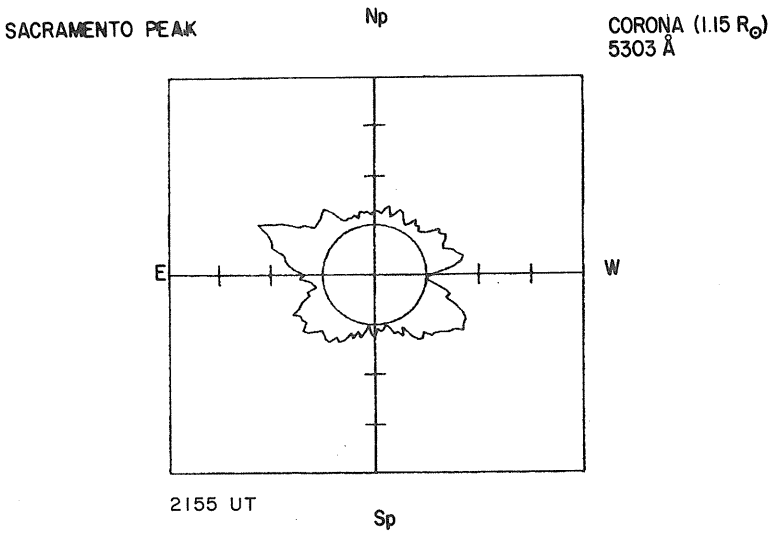
NOSC LA POSTA

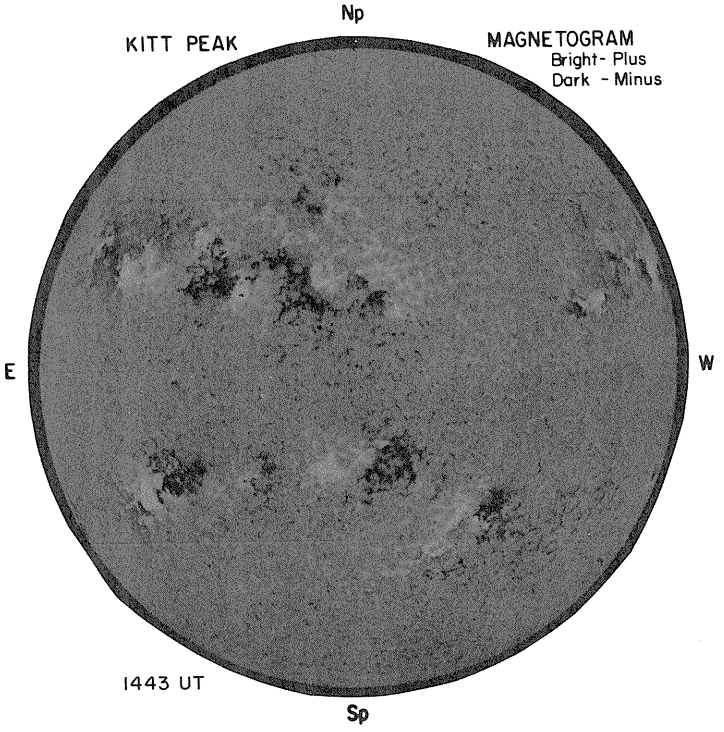
8.6 MM

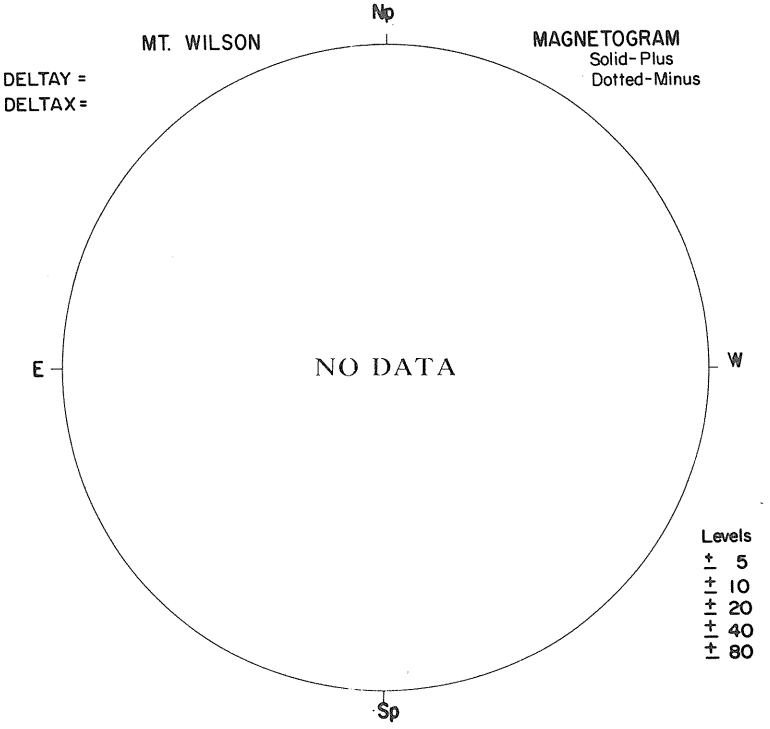


JUNE 23, 1978 (P =-6.47, B_o =1.96, L_o = 97.44)



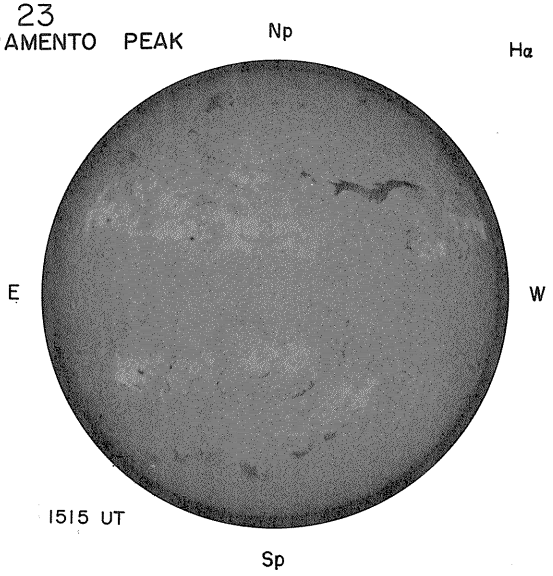




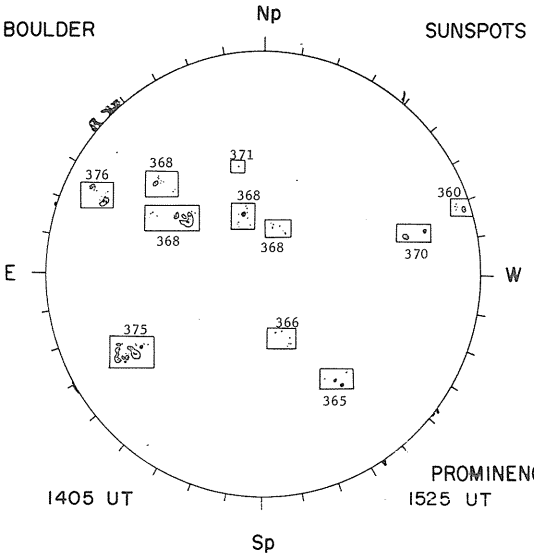


23

SACRAMENTO PEAK



BOULDER

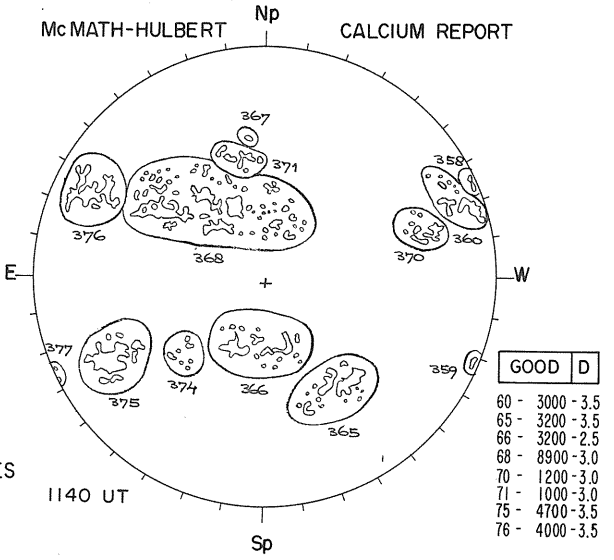


SUNSPOTS

PROMINENCES

1525 UT

McMATH-HULBERT



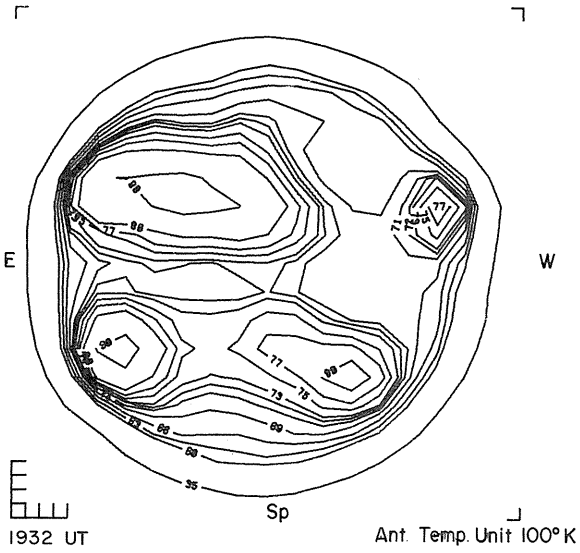
CALCIUM REPORT

GOOD	D

60 - 3000 - 3.5
65 - 3200 - 3.5
66 - 3200 - 2.5
68 - 8900 - 3.0
70 - 1200 - 3.0
71 - 1000 - 3.0
75 - 4700 - 3.5
76 - 4000 - 3.5

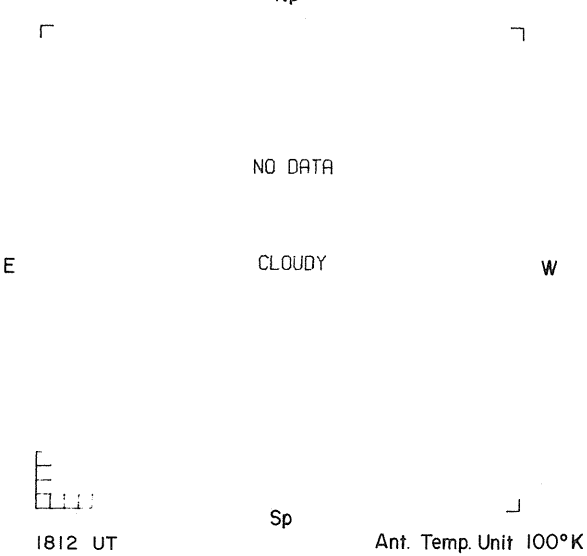
NOSC LA POSTA

2.0 CM



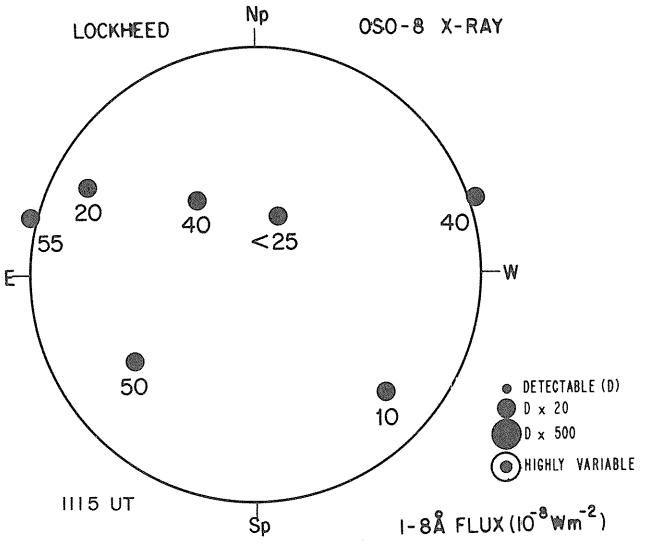
NOSC LA POSTA

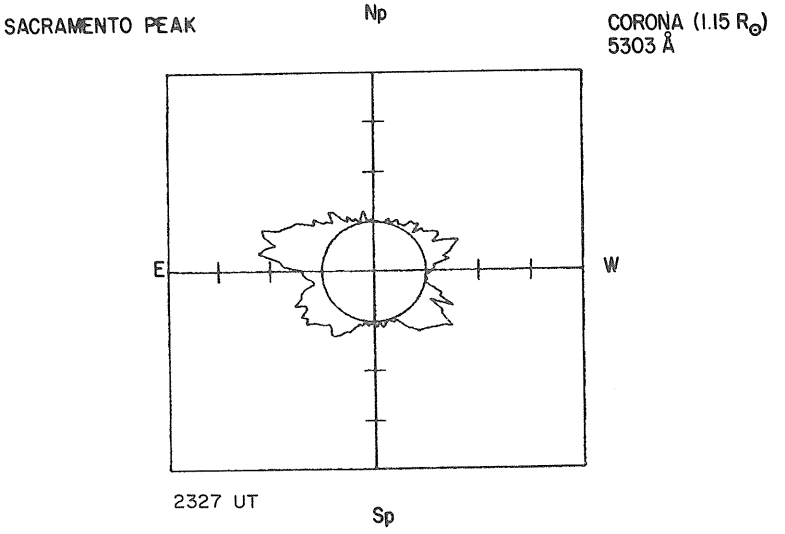
8.6 MM

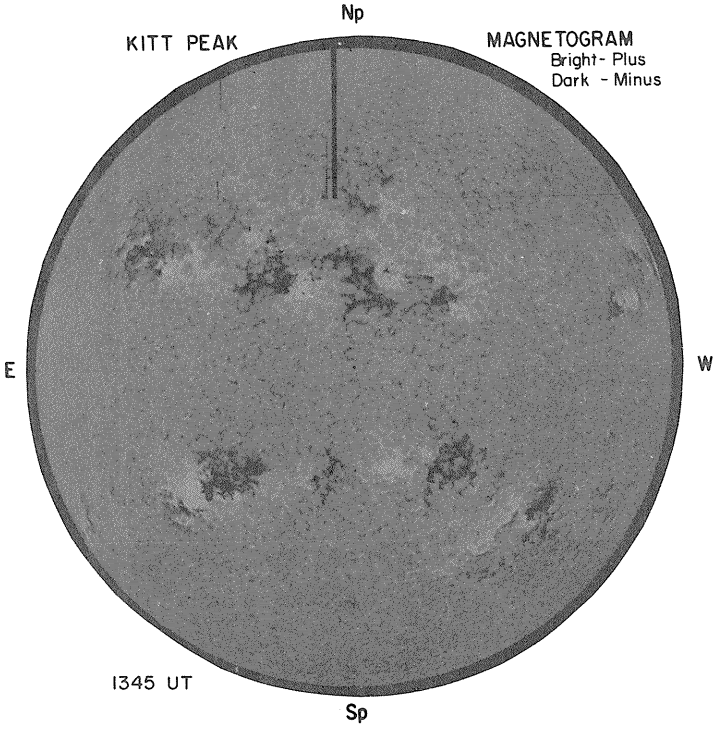


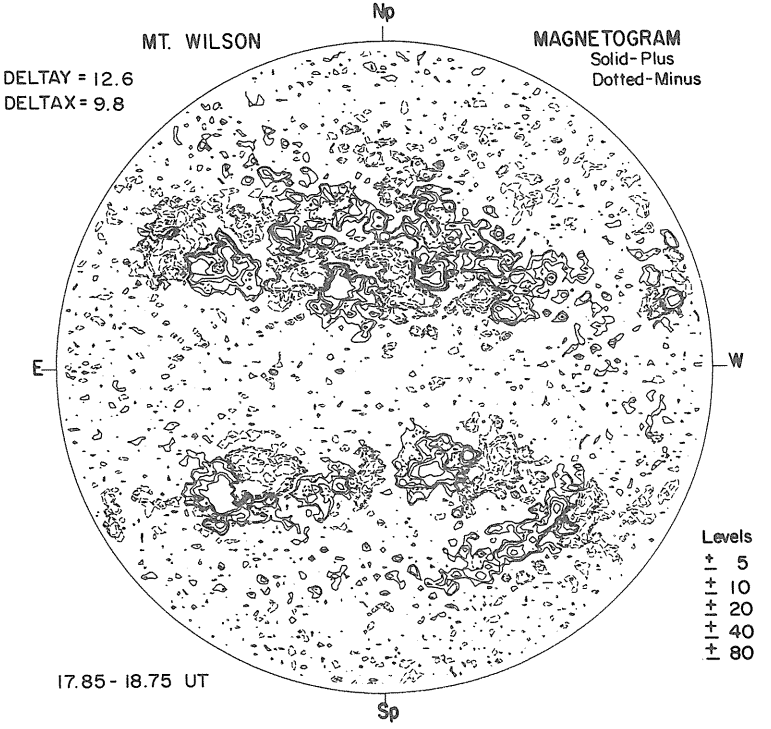
95
Jun 78

JUNE 24, 1978 (P =-6.02, B_o =2.08, L_o = 84.20)



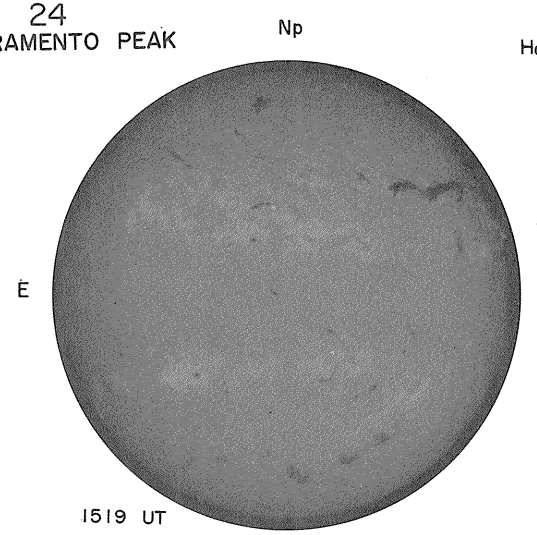




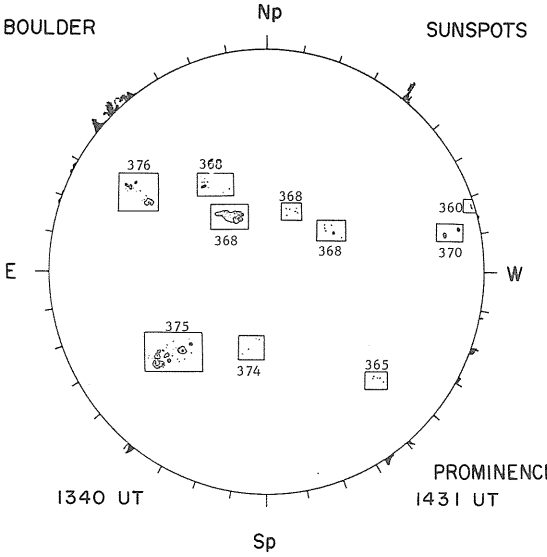


24

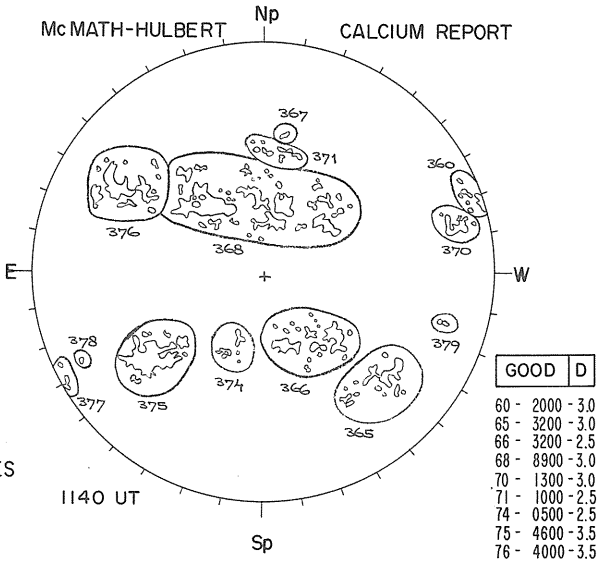
SACRAMENTO PEAK



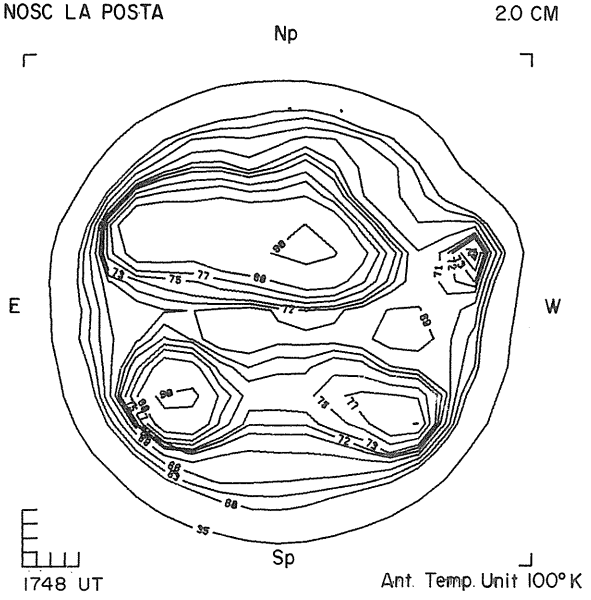
BOULDER



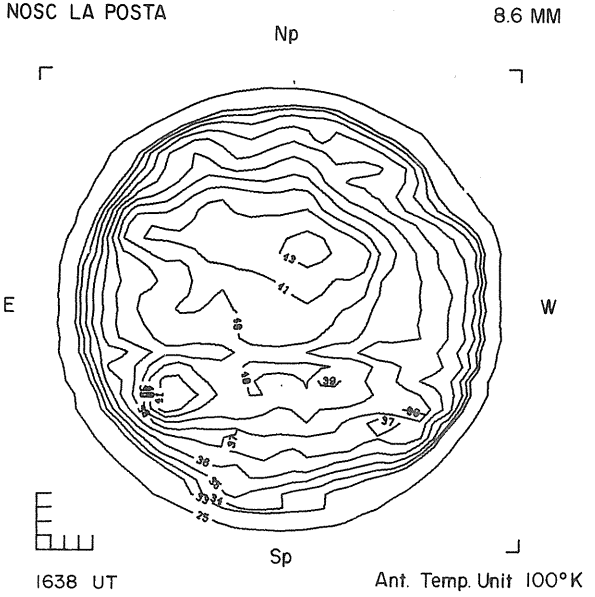
McMATH-HULBERT



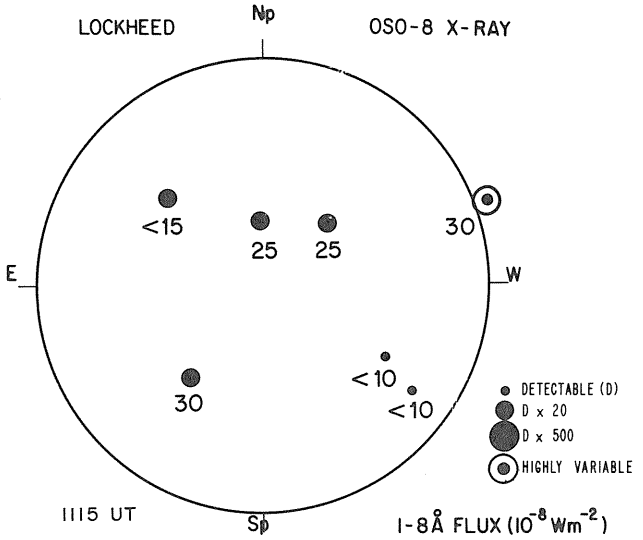
NOSC LA POSTA

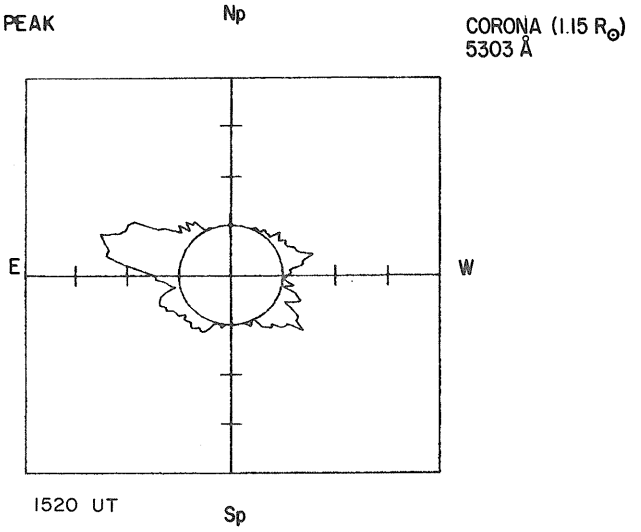


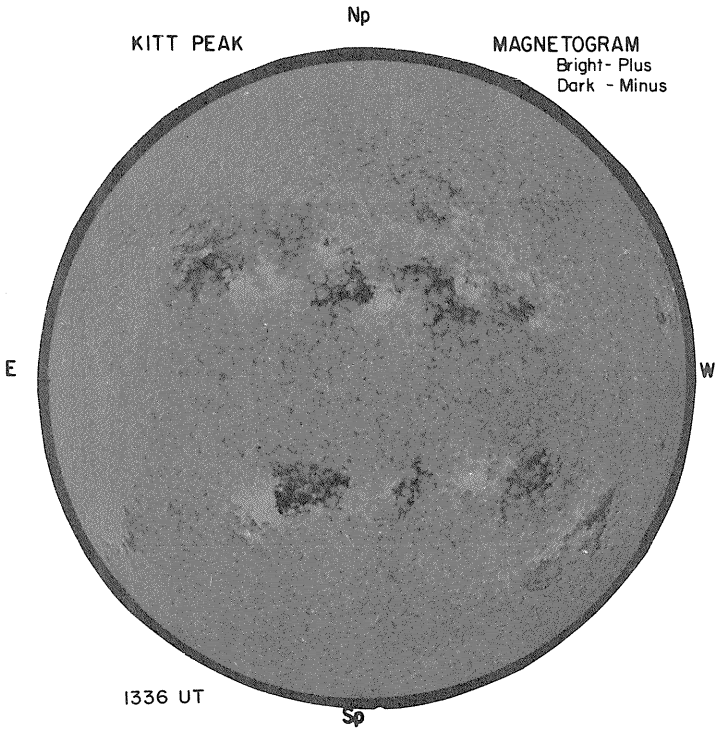
NOSC LA POSTA

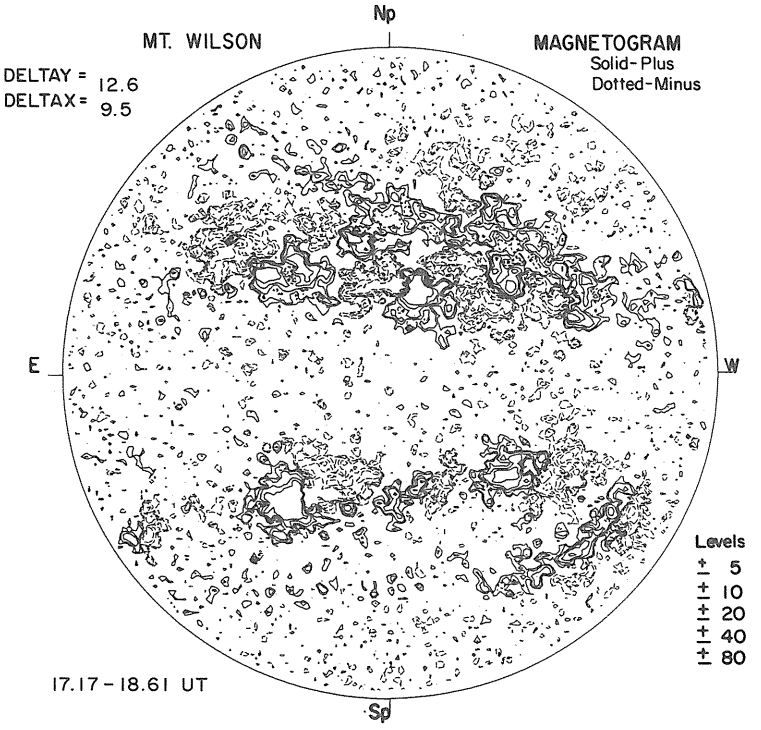


JUNE 25, 1978 (P = -5.57, B_o = 2.19, L_o = 70.97)



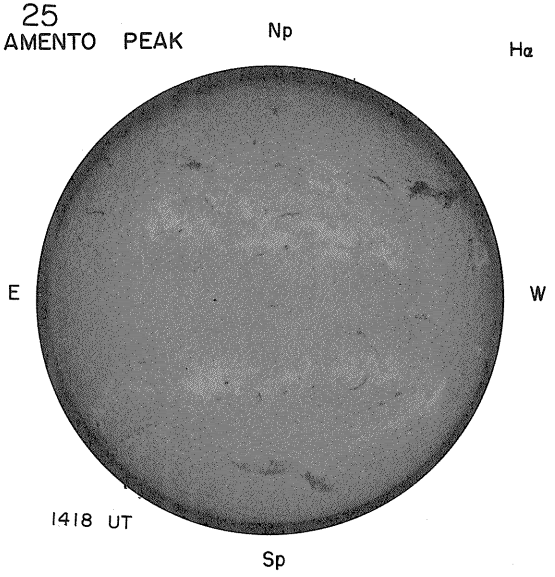






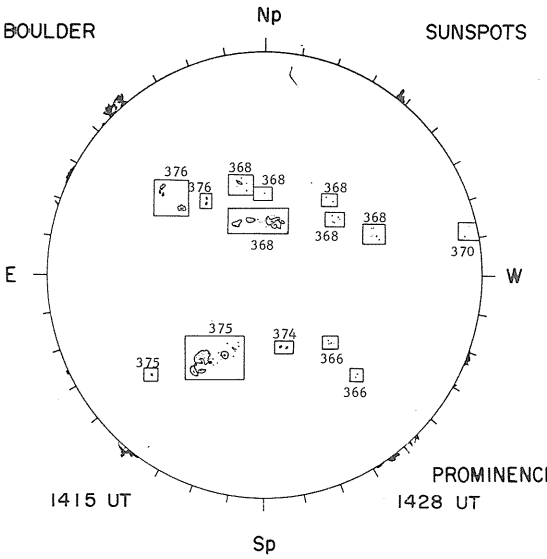
25

SACRAMENTO PEAK Hα



1418 UT

BOULDER SUNSPOTS

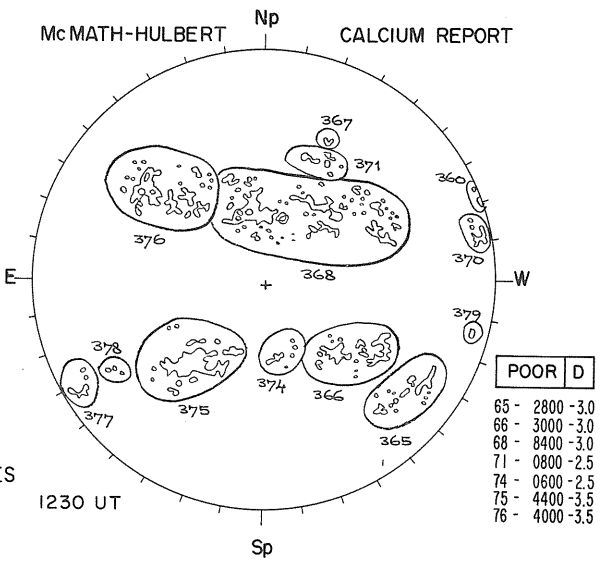


1415 UT

PROMINENCES

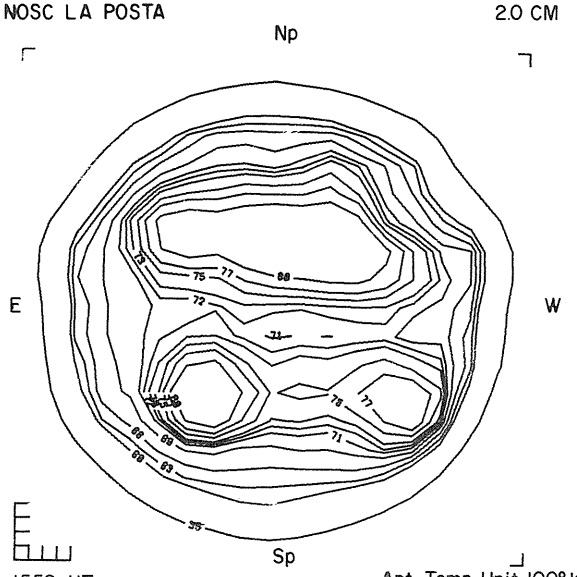
1428 UT

McMATH-HULBERT CALCIUM REPORT



1230 UT

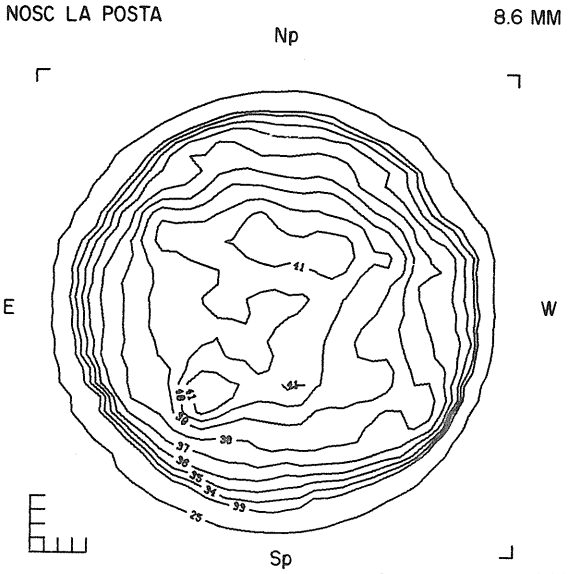
NOSC LA POSTA 2.0 CM



1559 UT

Ant. Temp. Unit 100°K

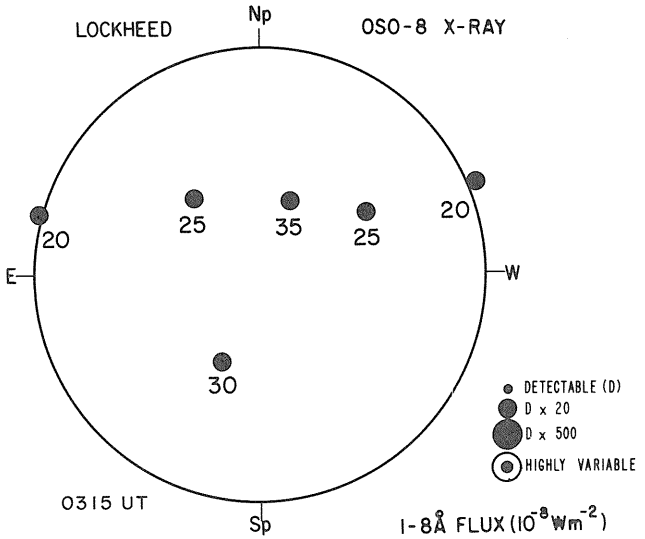
NOSC LA POSTA 8.6 MM

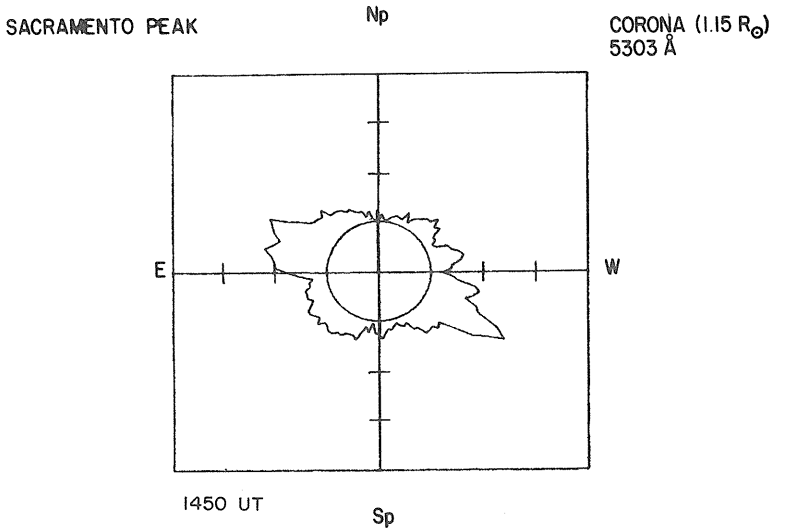


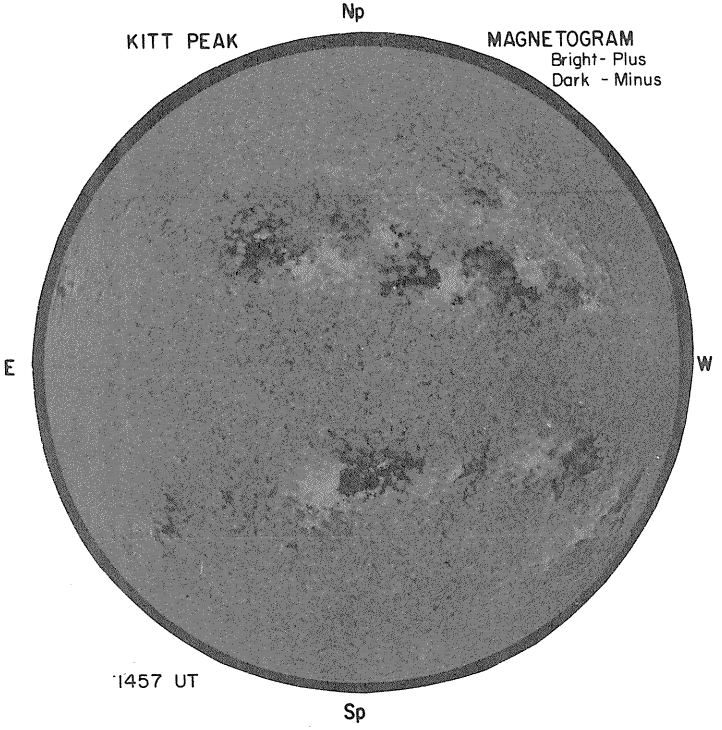
1501 UT

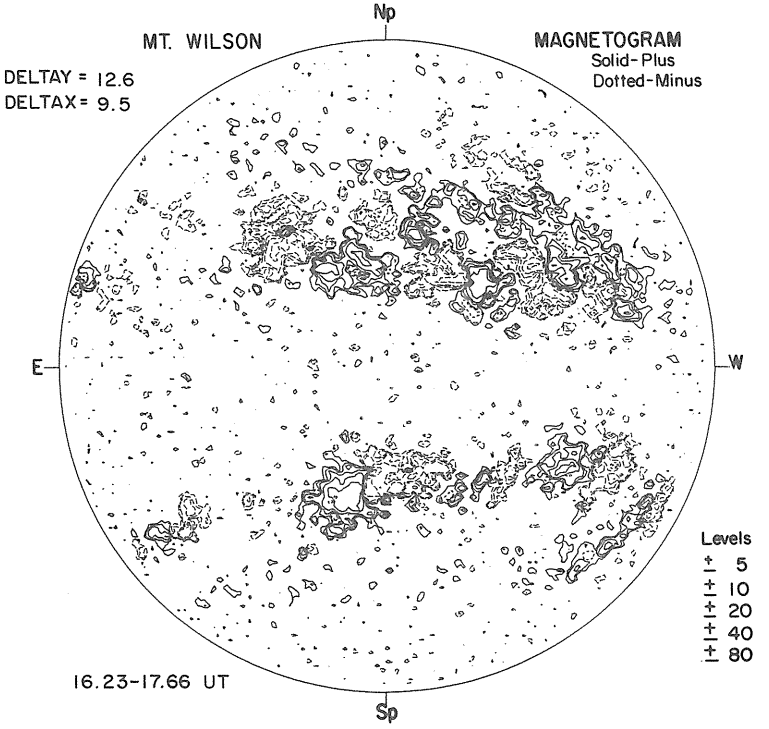
Ant. Temp. Unit 100°K

JUNE 26, 1978 (P = -5.12, B_o = 2.31, L_o = 57.73)



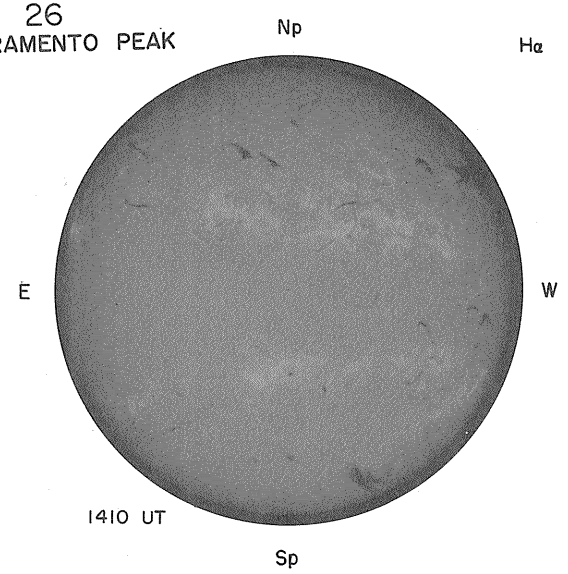




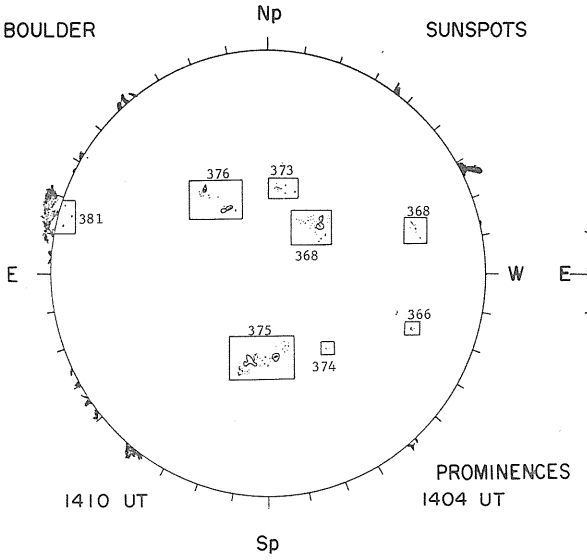


26

SACRAMENTO PEAK



BOULDER

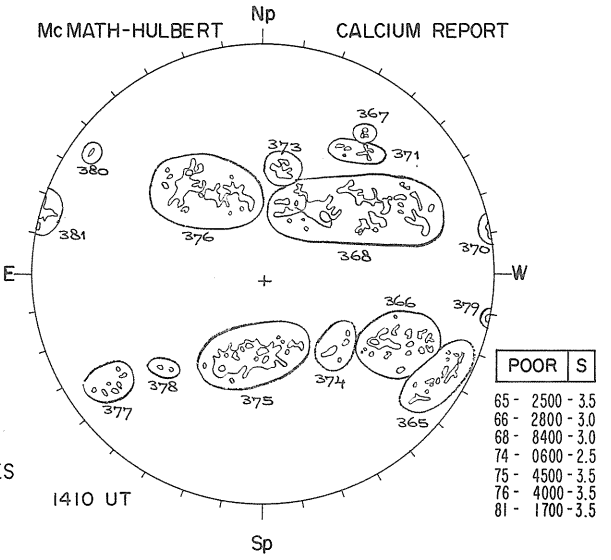


SUNSPOTS

PROMINENCES

1404 UT

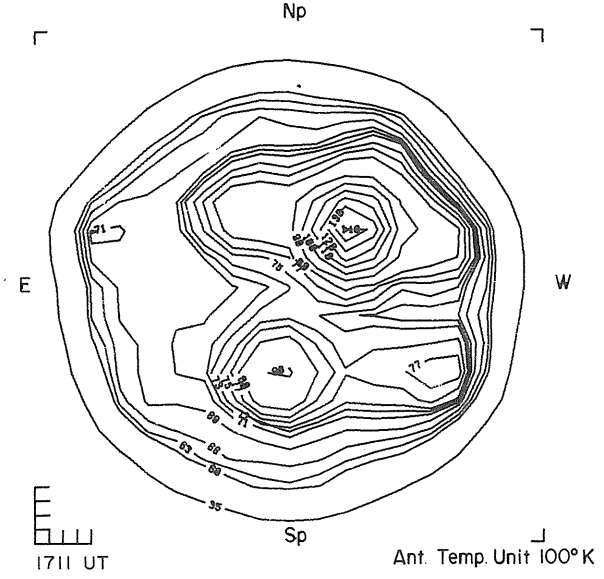
McMATH-HULBERT



CALCIUM REPORT

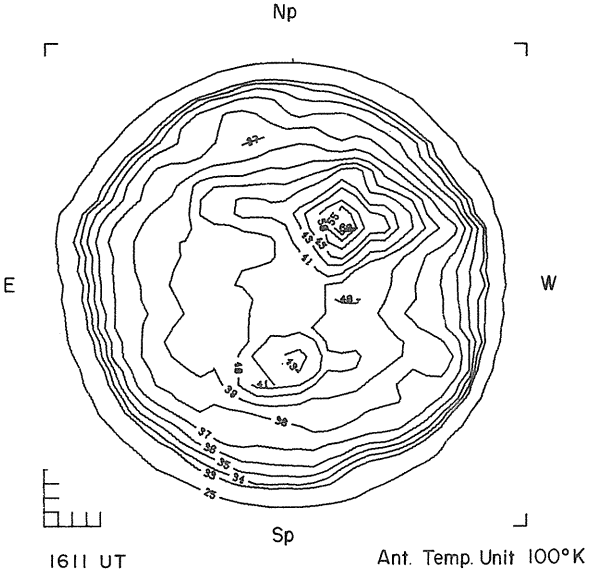
NOSC LA POSTA

2.0 CM

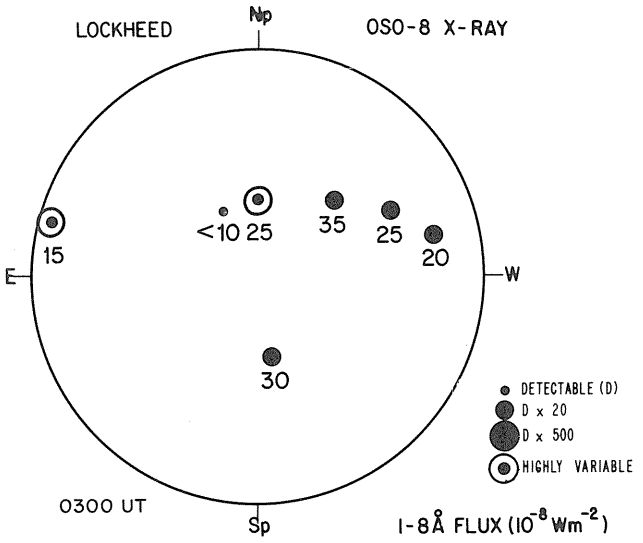


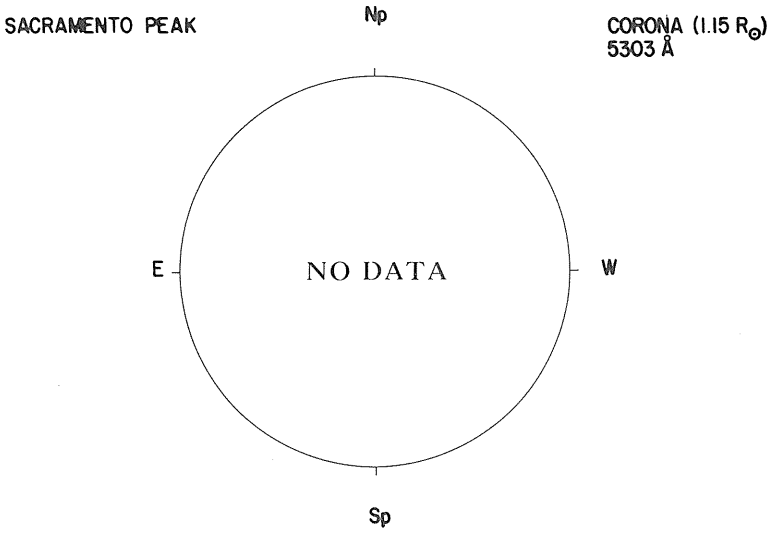
NOSC LA POSTA

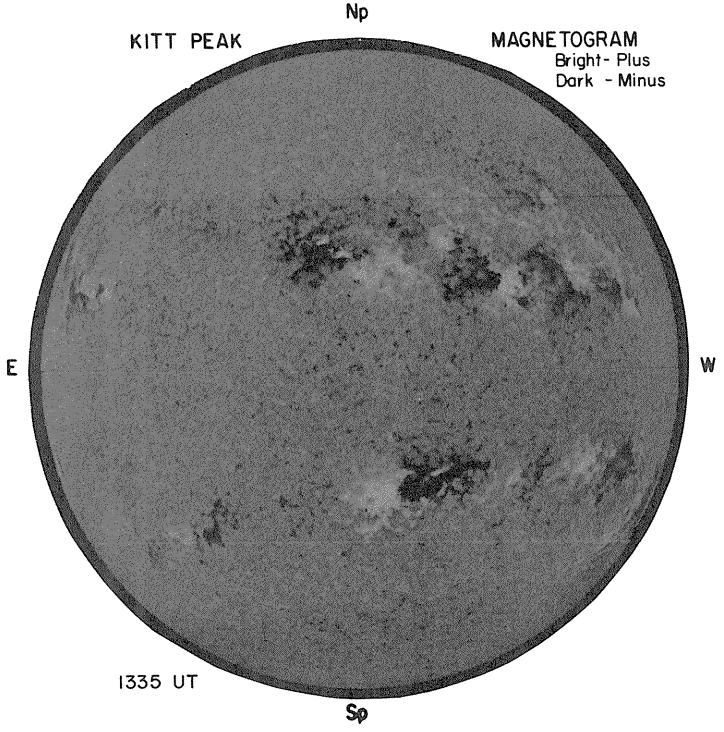
8.6 MM

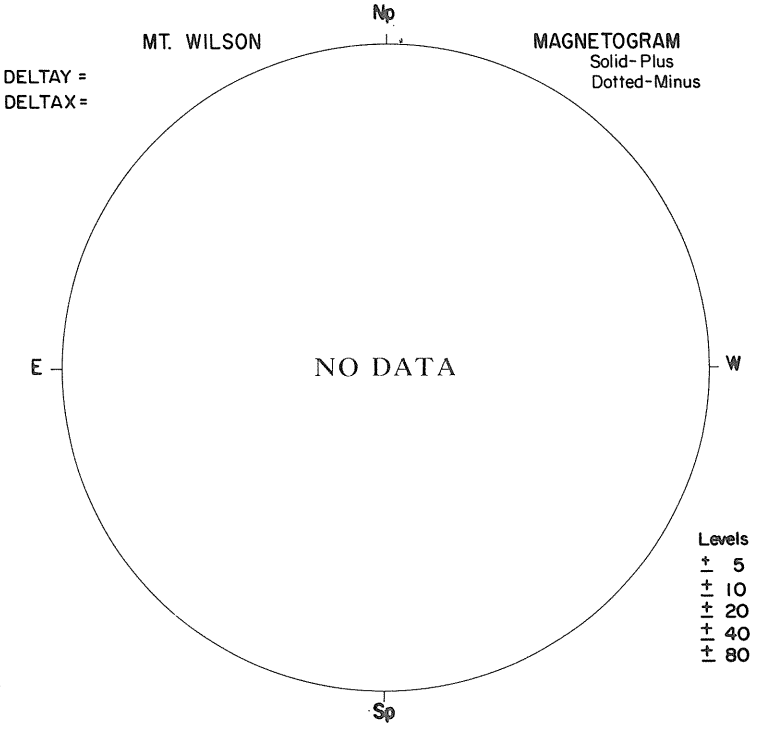


JUNE 27, 1978 (P =-4.67, B_o =2.42, L_o = 44.49)



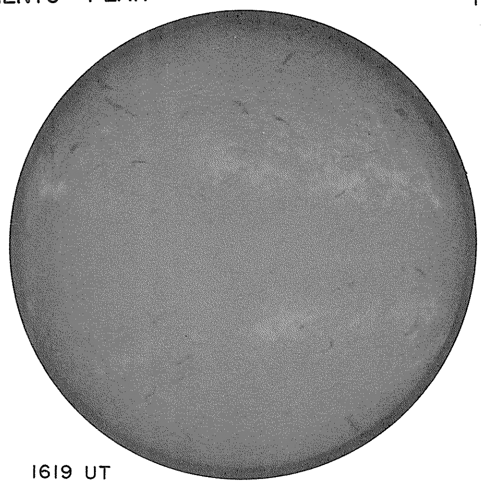




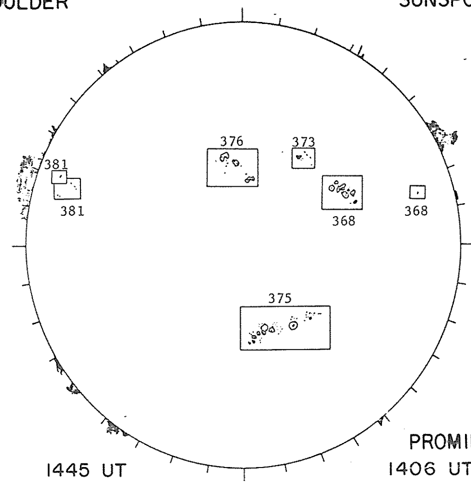


27

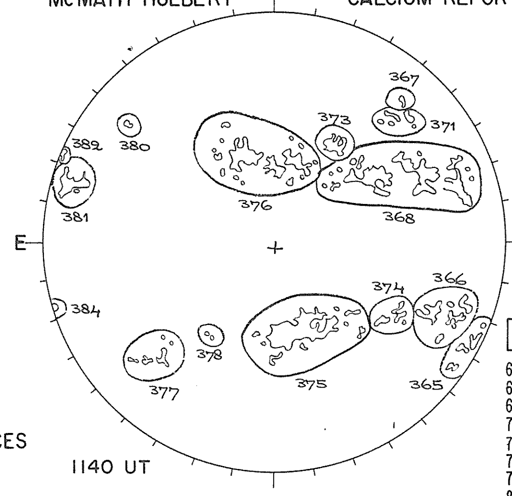
SACRAMENTO PEAK Hα



BOULDER SUNSPOTS

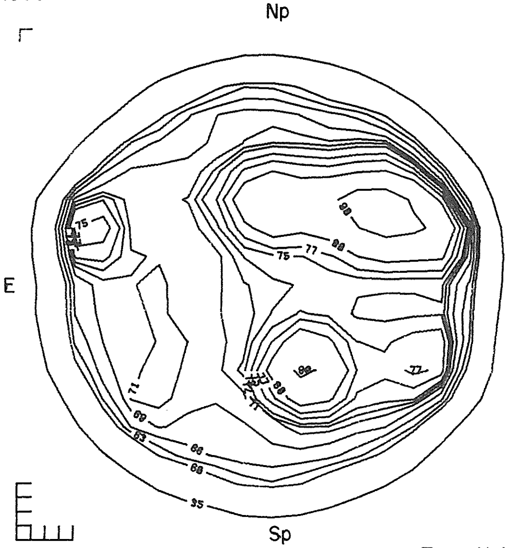


McMATH-HULBERT CALCIUM REPORT

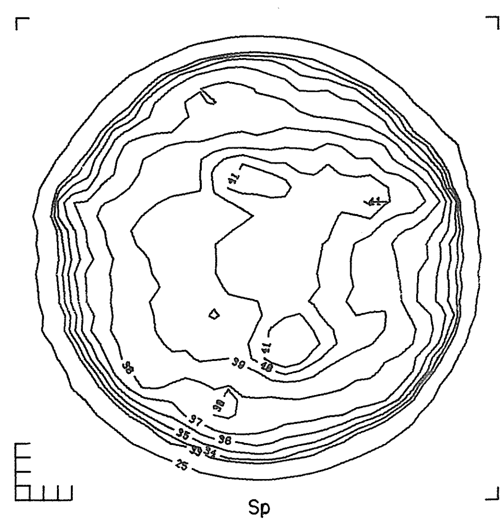


FAIR	D
65 - 2000	-2.5
66 - 2800	-3.0
68 - 8000	-3.5
73 - 1000	-2.5
75 - 4500	-3.5
76 - 3800	-3.0
77 - 1200	-2.5
80 - 0200	-2.5
81 - 3000	-3.5
82 - 0500	-2.5

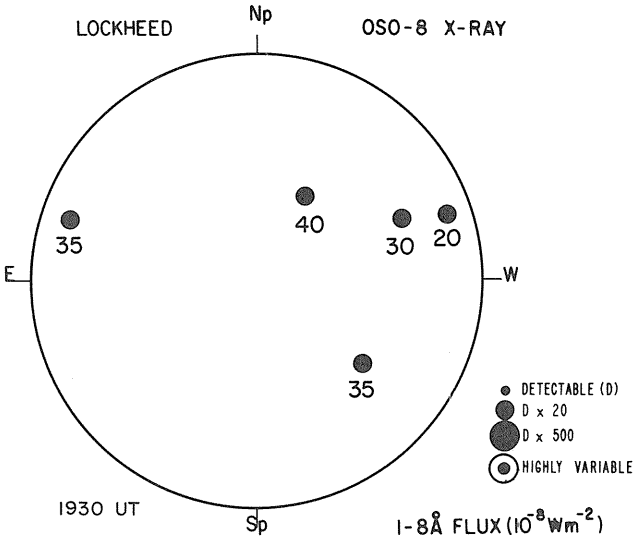
NOSC LA POSTA 2.0 CM

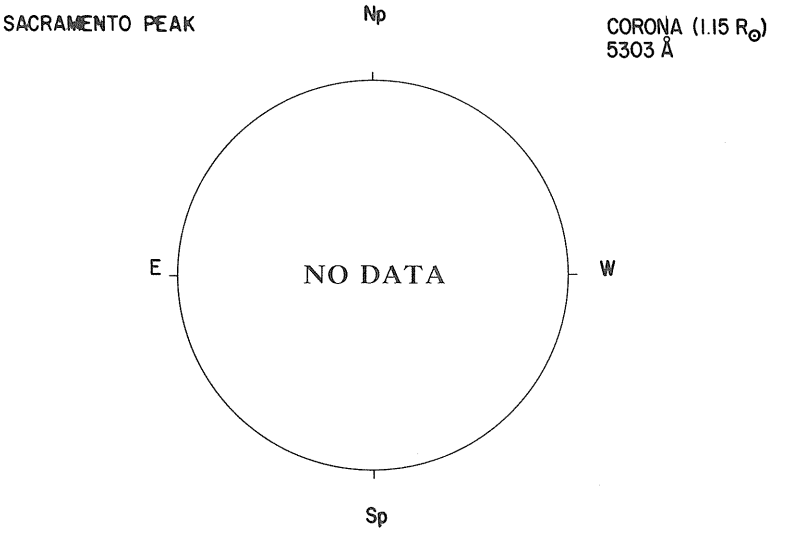


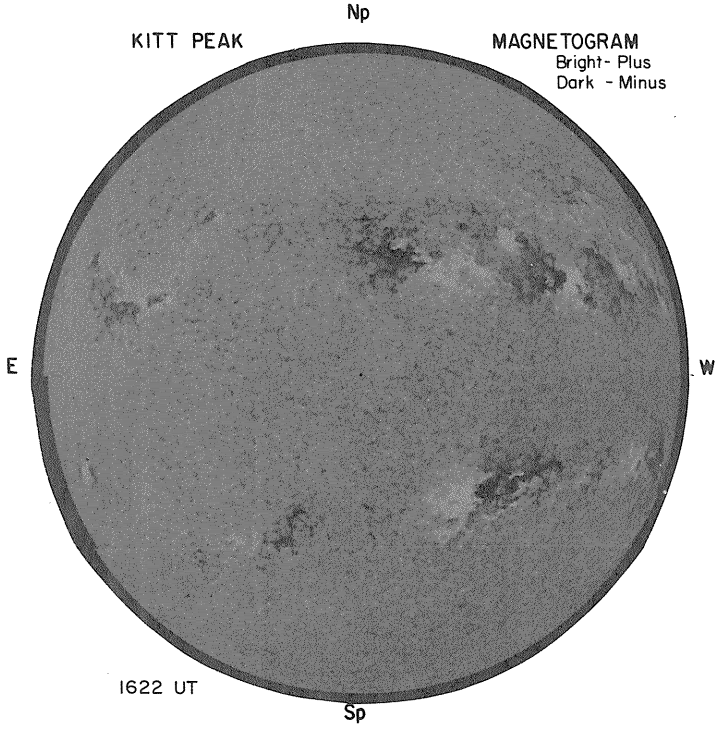
NOSC LA POSTA 8.6 MM

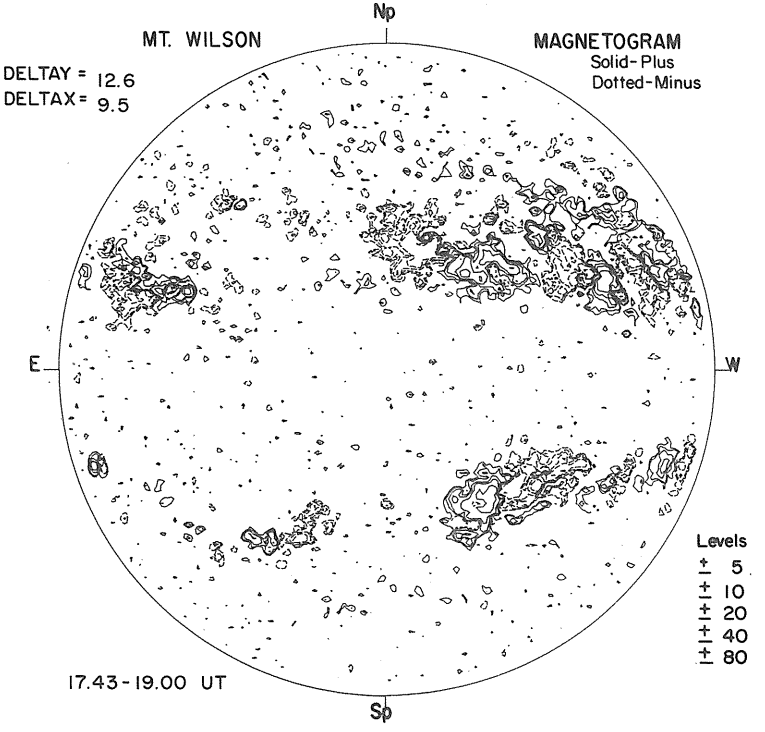


JUNE 28, 1978 (P = -4.22, B_o = 2.53, L_o = 31.26)



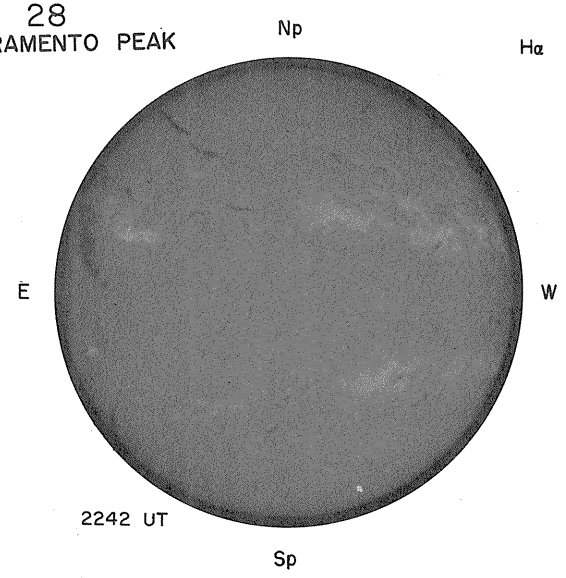




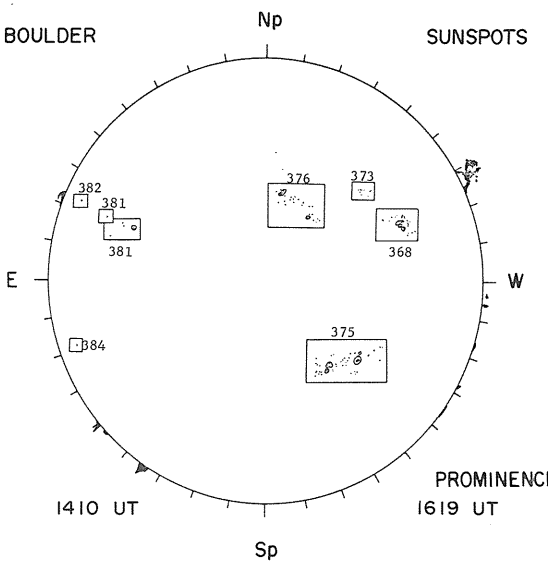


28

SACRAMENTO PEAK



BOULDER

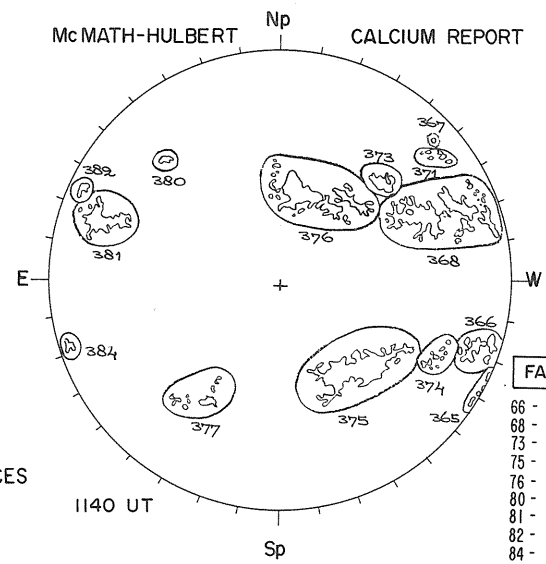


SUNSPOTS

PROMINENCES

1619 UT

McMATH-HULBERT

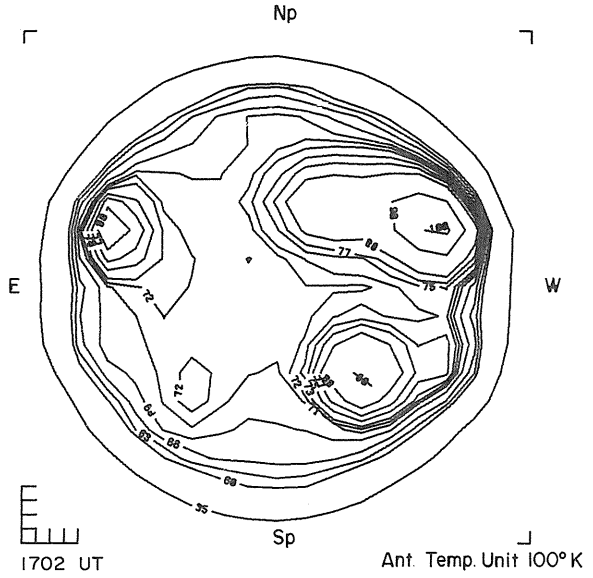


CALCIUM REPORT

FAIR	S
66 -	2300 -2.5
68 -	7500 -3.5
73 -	1000 -3.0
75 -	5000 -3.0
76 -	4000 -3.5
80 -	0400 -3.0
81 -	2800 -3.5
82 -	0600 -3.5
84 -	0600 -3.5

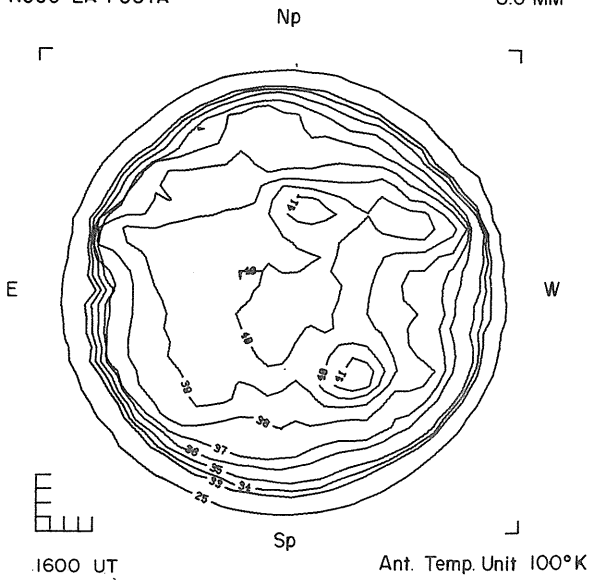
NOSC LA POSTA

2.0 CM

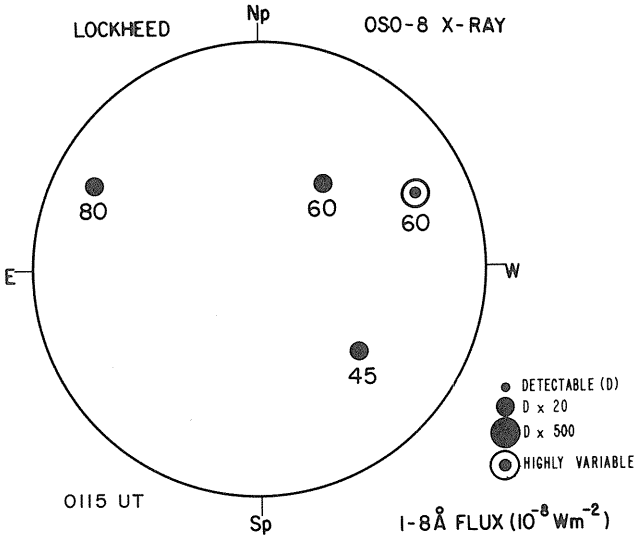


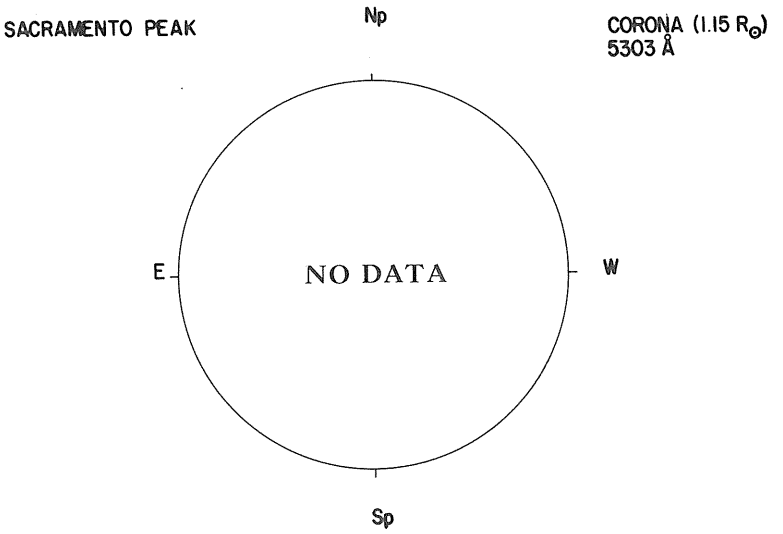
NOSC LA POSTA

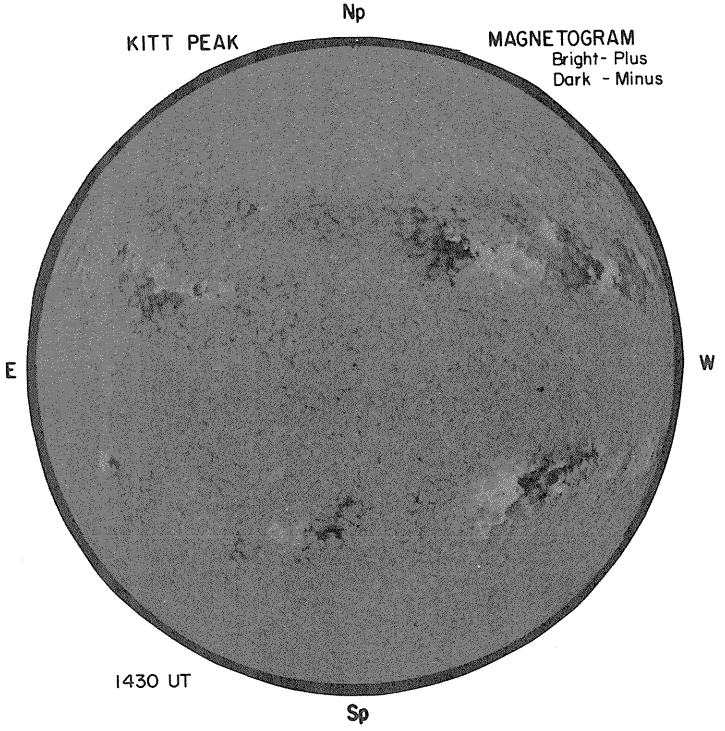
8.6 MM

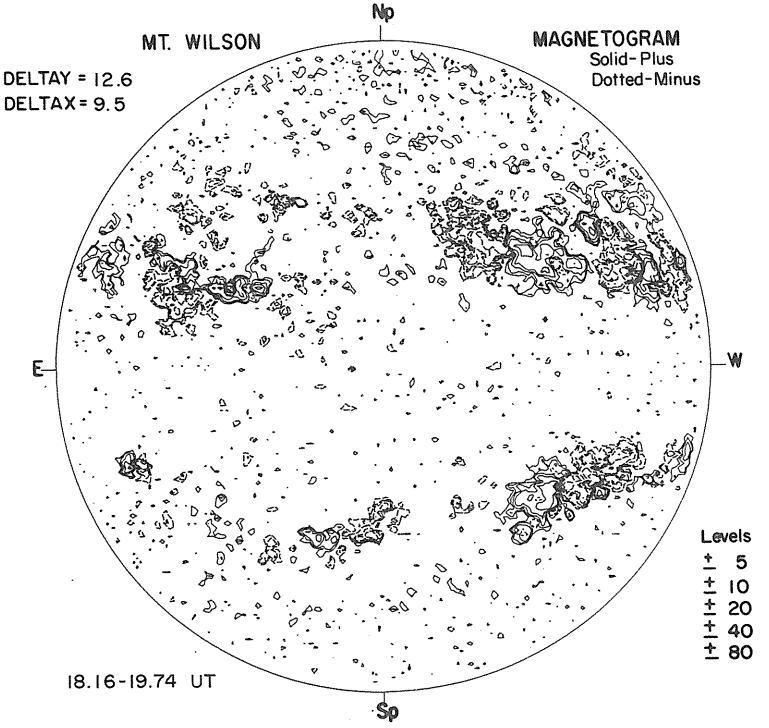


JUNE 29, 1978 (P =-3.77, B_o = 2.64, L_o = 18.02)



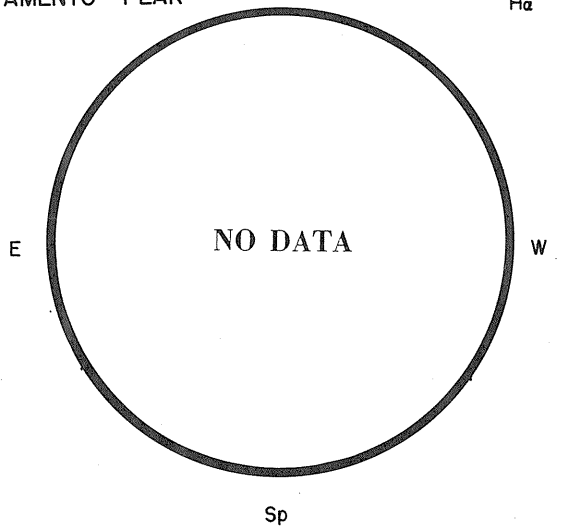




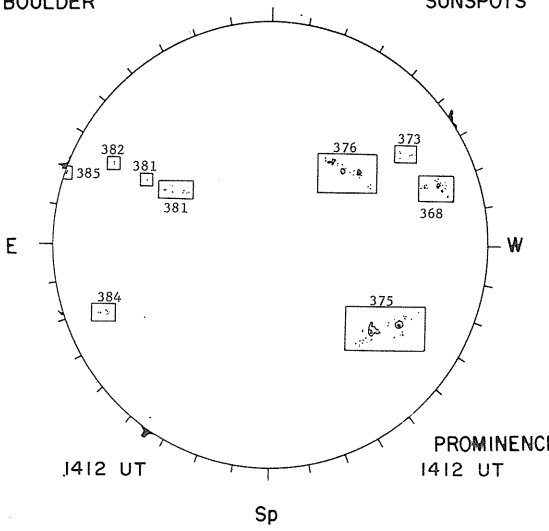


29

SACRAMENTO PEAK Hα

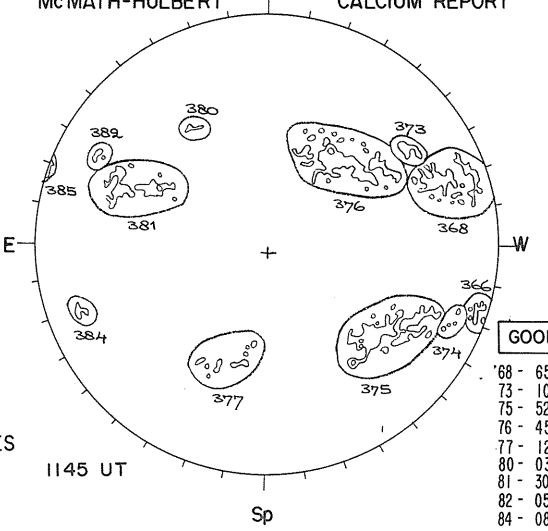


BOULDER SUNSPOTS



1412 UT

McMATH-HULBERT CALCIUM REPORT



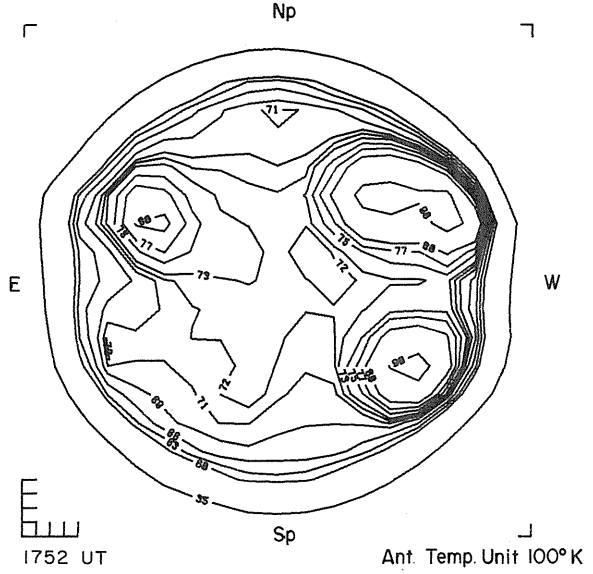
1145 UT

GOOD	S
'68 -	6500 - 3.5
73 -	1000 - 3.0
75 -	5200 - 3.5
76 -	4500 - 3.5
77 -	1200 - 2.5
80 -	0300 - 2.5
81 -	3000 - 3.5
82 -	0500 - 2.5
84 -	0800 - 3.5

PROMINENCES

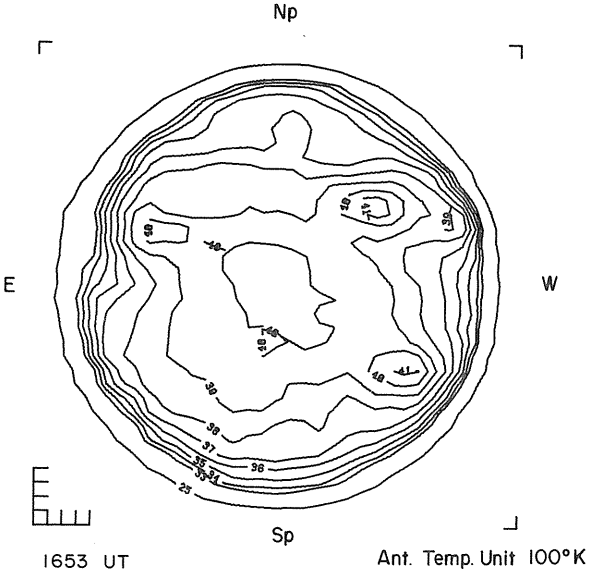
1412 UT

NOSC LA POSTA 2.0 CM



1752 UT Ant. Temp. Unit 100° K

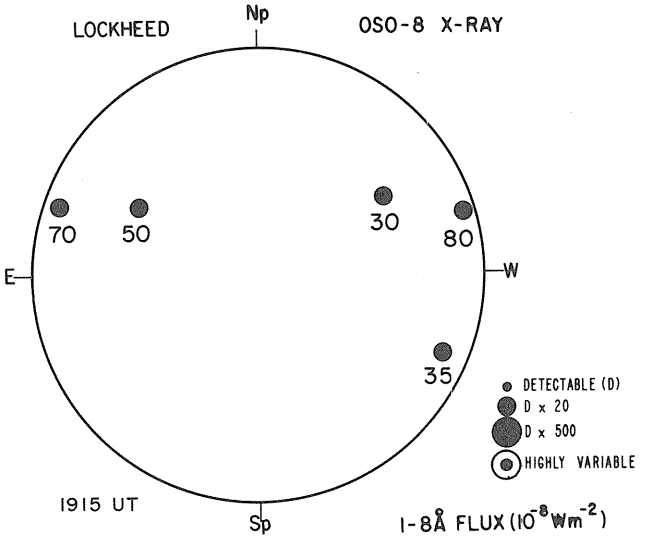
NOSC LA POSTA 8.6 MM

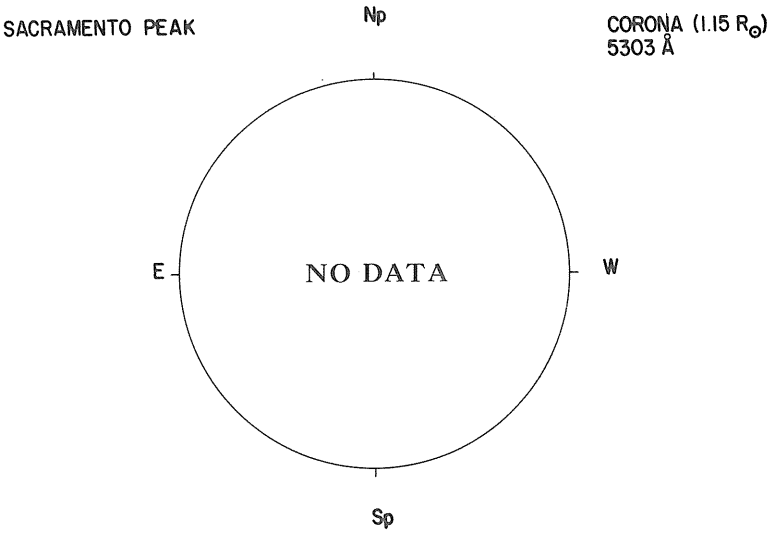


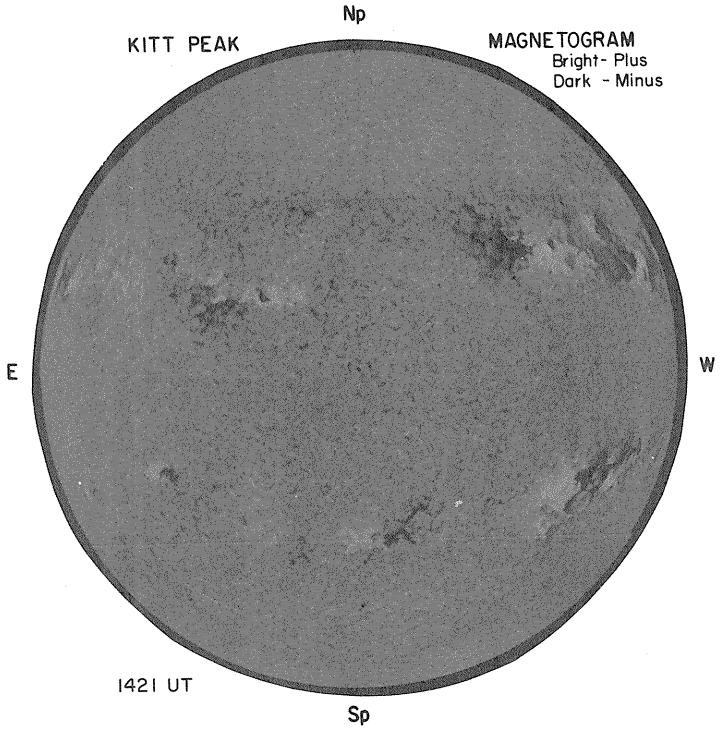
1653 UT Ant. Temp. Unit 100° K

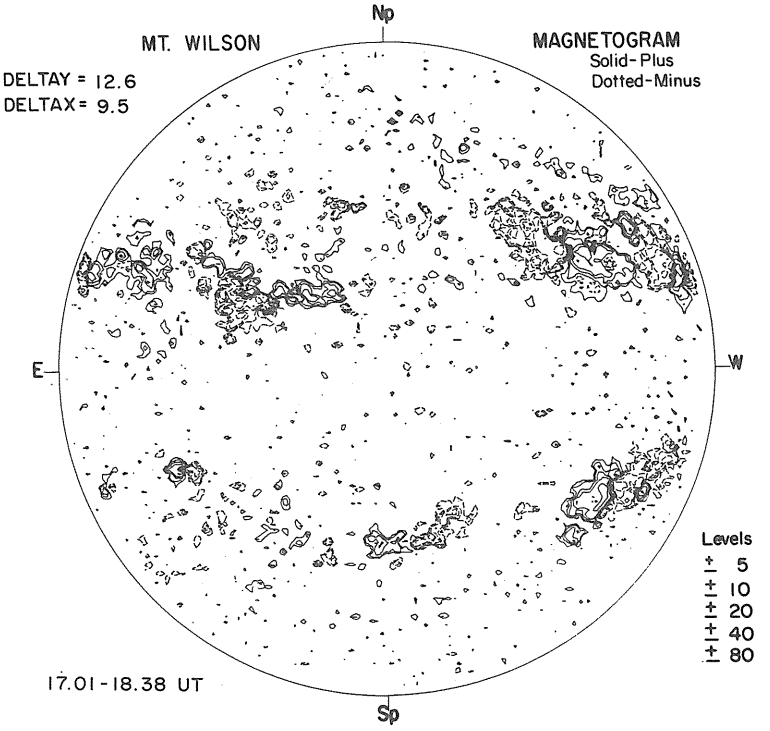
107
Jun 78

JUNE 30, 1978 (P =-3.31, B_o = 2.76, L_o = 4.78)



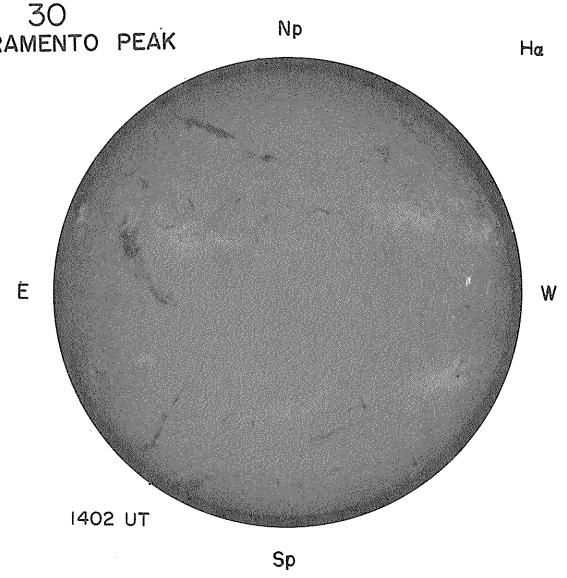




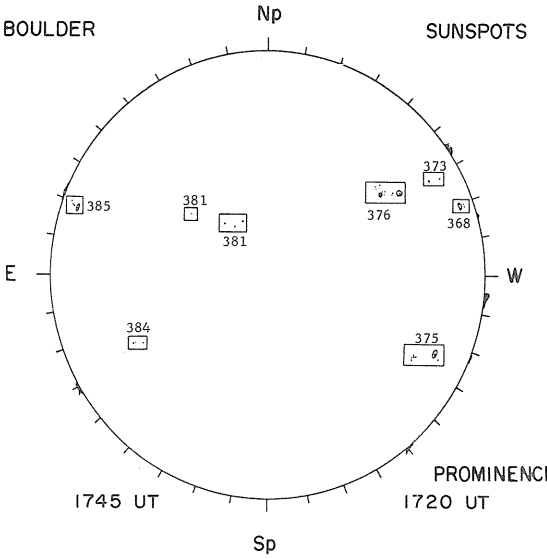


30

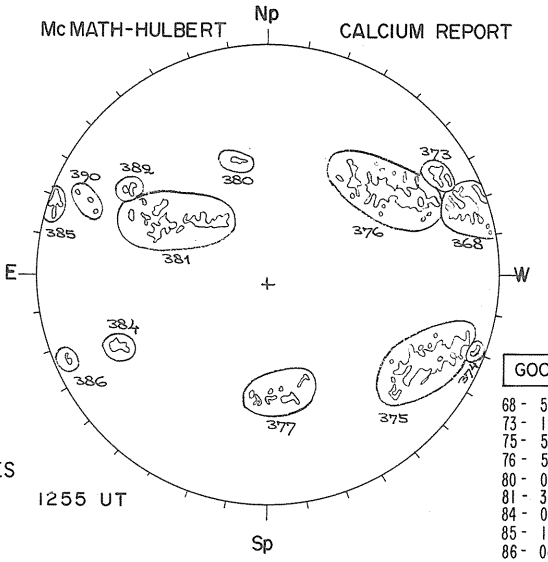
SACRAMENTO PEAK



BOULDER



Mc MATH-HULBERT

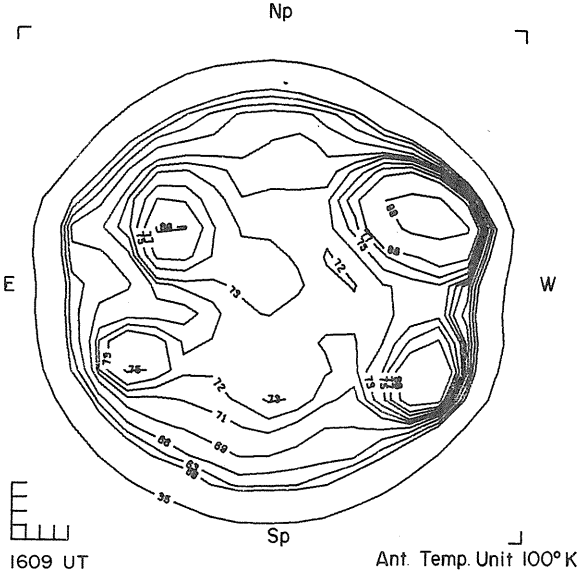


GOOD	S
68 -	5000 - 3.5
73 -	1200 - 3.0
75 -	5800 - 3.5
76 -	5000 - 3.5
80 -	0300 - 2.5
81 -	3400 - 3.0
84 -	0900 - 3.5
85 -	1600 - 3.5
86 -	0400 - 2.5

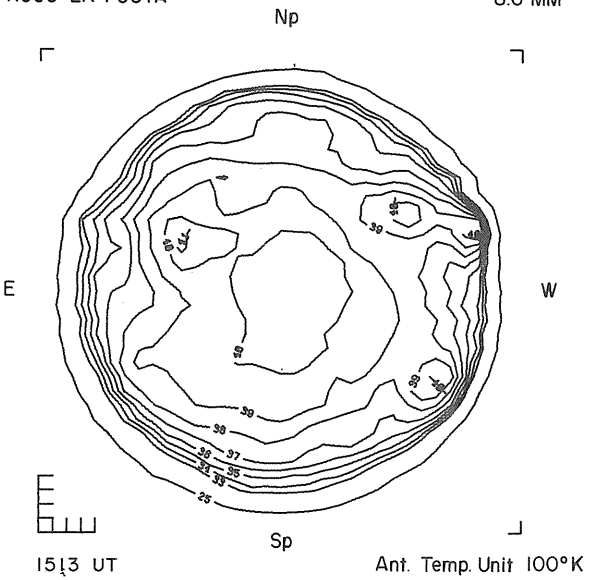
PROMINENCES

1720 UT

NOSC LA POSTA



NOSC LA POSTA



REGIONS OF SOLAR ACTIVITY

JUNE 1978

MCMATH REGION 15322 CMP DATE 1.0

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	5	26	15322	S24 E78	25	800	2.5									
78	5	27	15322	S23 E65	24	700	2.5	20054	S23 E65	23	X	1	B	10	2	BXO
78	5	28	15322	S24 E52	24	900	2.5									
78	5	29	15322	S24 E39	24	1100	2.0	20056	S23 E36	26	(B)	4	B	10	4	BXO
78	5	30	15322	S23 E24	26	1000	2.0	20056	S24 E24	24	(B)	4	R	60	14	CRI
78	5	31	15322	S23 E11	26	700	2.5	20056	S25 E13	22	(AF)	3	R	30	8	CRO
78	6	1	15322	S23 W02	23	700	2.0									
78	6	2	15322	S23 W17	25	700	2.0		S22 W14				M	10	1	HRX
78	6	3	15322	S23 W29	24	600	2.0									
78	6	4	15322	S23 W40	23	600	2.5									
78	6	5	15322	S24 W53	23	800	2.5									
78	6	6	15322	S24 W66	23	900	2.0									
78	6	7	15322	S24 W84	22	400	1.0									

MCMATH REGION 15337 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	6	01	15337					20061	S24 E25	10	(AP)	2				
78	6	1	15337	S26 E13	8	300	2.0	20061	S25 E11	9	(AP)	3				
78	6	2	15337	S25 E00	8	300	2.0	20061	S25 W02	8	(B)	3				
78	6	3	15337	S25 W13	8	400	2.5	20061	S25 W14	8	(B)	3	M	30	8	DRO
78	6	4	15337	S25 W25	8	700	3.0	20061	S25 W27	8	(B)	4				
78	6	5	15337	S25 W38	8	1200	3.0	20061	S25 W43	11	(BP)	4	M	120	11	CSO
78	6	6	15337	S25 W51	8	1300	3.0	20061	S25 W55	10	(BP)	4	B	80	8	CAO
78	6	7	15337	S25 W68	6	1300	3.5	20061	S24 W68	10	(BP)	3	B	200	7	DSO
78	6	8	15337					20061	S26 W79	7	BF)	3	B	90	2	ESO
78	6	9	15337	S25 W90	7	500	2.5									

MCMATH REGION 15330 CMP DATE 3.4 RETURN OF REGION 15280 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	5	28	15330	S28 E72	4	400	1.0									
78	5	29	15330	S28 E59	4	800	2.0									
78	5	30	15330	S28 E49	1	1200	3.5									
78	5	31	15330	S28 E37	0	1000	2.0		S27 E24				R	10	4	BXO
78	6	1	15330	S28 E24	358	900	1.5									
78	6	2	15330	S28 E12	357	800	2.0									
78	6	3	15330	S28 W01	357	700	2.0									
78	6	4	15330	S28 W14	357	1000	2.5		S27 W19				M	50	8	DRO
78	6	5	15330	S28 W26	356	1300	2.0		S27 W32				M	80	20	DAI
78	6	6	15330	S28 W40	357	1000	2.0									
78	6	7	15330	S28 W58	356	600	1.5									
78	6	9	15330	S28 W79	356	400	1.0									

MCMATH REGION 15339 CMP DATE 3.6

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	6	2	15339	N14 E14	355	200	1.5	20062	N14 E13	354	(AP)	3				
78	6	3	15339	N14 E01	355	200	2.0									
78	6	4	15339	N14 W12	355	300	2.0									
78	6	5	15339	N14 W24	354	400	1.0									

MCMATH REGION 15341 CMP DATE 4.8

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	6	2	15341	S22 E30	339	200	1.5	20063	S22 E28	339		3				
78	6	3	15341	S22 E16	340	300	2.5	20063	S21 E14	341	(B)	3	M	10	3	BXO
78	6	4	15341	S22 E04	339	500	3.0	20063	S21 E00	341	(AP)	3	M	20	5	DRO
78	6	5	15341	S22 W10	340	500	2.5	20063	S22 W13	341	(AP)	2	M	20	3	CRO
78	6	6	15341	S22 W23	340	400	2.5	20063	S20 W25	340	(AF)	2				
78	6	7	15341	S21 W41	339	400	2.0	20063	S19 W38	340	(AF)	1	B	0	1	AXX
78	6	9	15341	S21 W63	340	300	2.0									
78	6	10	15341	S22 W75	339	300	1.0									

REGIONS OF SOLAR ACTIVITY

JUNE 1978

MCMATH REGION 15333 CMP DATE 5.0 RETURN OF REGION 15299 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	5	29	15333	N17 E85	339	1200	2.5									
78	5	30	15333	N17 E72	339	1800	3.5									
78	5	31	15333	N17 E57	341	1600	2.5									
78	6	1	15333	N17 E45	337	1600	2.5									
78	6	2	15333	N17 E30	339	1200	2.0									
78	6	3	15333	N17 E18	338	800	2.0									
78	6	4	15333	N18 E07	336	1100	2.0									
78	6	5	15333	N19 W07	337	1200	2.0	20065	N14 E01	327	(AF)	1	M	10	2	BXO
78	6	6	15333	N19 W20	337	700	1.5									
78	6	7	15333	N20 W40	338	700	1.5									
78	6	9	15333	N20 W62	339	700	1.5									
78	6	10	15333	N20 W75	339	600	1.0									

MCMATH REGION 15349 CMP DATE 5.0

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	6	7	15349	S15 W38	336	300	2.5	20066	S14 W36	338	(AP)	3	B	10	3	BXO
78	6	8	15349					20066	S16 W51	339	(AP)	2	B	10	1	AXX
78	6	9	15349	S14 W60	337	200	2.0									
78	6	10	15349	S15 W74	338	200	1.5									

MCMATH REGION 15355 CMP DATE 5.4

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	6	9	15355	N15 W54	331	300	3.0	20069	N13 W56	331	(AP)	2	B	10	1	AXX
78	6	10	15355	N14 W67	331	400	3.0	20069	N15 W70	332	AP	1	B	0	1	AXX
78	6	11	15355	N15 W80	331	400	2.5									
78	6	12	15355	N16 W90	327	200	1.5									

MCMATH REGION 15336 CMP DATE 6.2 RETURN OF REGION 15295 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	5	31	15336	S15 E76	322	500	1.0									
78	6	1	15336	S16 E63	319	500	1.5									
78	6	2	15336	S15 E49	320	500	1.0									
78	6	3	15336	S16 E36	320	600	1.0									
78	6	4	15336	S14 E22	321	500	1.0									
78	6	5	15336	S15 E09	321	600	1.0									
78	6	6	15336	S14 W04	321	300	1.5									
78	6	7	15336	S14 W22	320	300	1.5									
78	6	9	15336	S15 W43	320	300	1.0									
78	6	10	15336	S16 W56	320	300	1.0									

MCMATH REGION 15347 CMP DATE 6.6

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	6	6	15347	S28 E02	315	100	1.0									
78	6	7	15347	S29 W15	313	100	1.0									
78	6	9	15347	S29 W37	314	100	1.0									
78	6	10	15347	S29 W50	314	100	1.0									

MCMATH REGION 15350 CMP DATE 7.1

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	6	7	15350	S01 W10	308	100	2.0									

REGIONS OF SOLAR ACTIVITY

JUNE 1978

MCMATH REGION 15351 CMP DATE 7.3

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	6	7	15351	N12 W08	306	300	2.5									
78	6	8	15351						N12 W19				B	0	1	AXX
78	6	9	15351	N12 W30	307	300	1.5									
78	6	10	15351	N12 W44	308	200	1.5									

MCMATH REGION 15338 CMP DATE 7.7 RETURN OF PART OF REGION 15291 ROTATION 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	6	1	15338	N18 E80	302	600	1.0									
78	6	2	15338	N18 E67	302	1500	2.0									
78	6	3	15338	N19 E55	301	1500	2.0									
78	6	4	15338	N20 E41	302	1700	2.5									
78	6	5	15338	N20 E29	301	1900	2.0		N19 E38				M	20	1	HRX
78	6	6	15338	N20 E15	302	1300	2.0									
78	6	7	15338	N20 W03	301	1200	2.0									
78	6	9	15338	N20 W24	301	1200	2.0									
78	6	10	15338	N20 W38	302	1000	2.0									
78	6	11	15338	N20 W50	301	1400	2.0									
78	6	12	15338.	N20 W62	299	1200	2.0									
78	6	13	15338	N20 W75	298	800	1.5									

MCMATH REGION 15342 CMP DATE 8.9 RETURN OF PART OF REGION 15291 ROTATION 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	6	2	15342	N17 E90	279	500	2.0									
78	6	3	15342	N17 E75	281	600	2.0	20064	N18 E69	286	(AP)	3	M	30	1	HSX
78	6	4	15342	N17 E62	281	1200	2.0	20064	N18 E55	286	(AP)	3	M	20	1	HRX
78	6	5	15342	N17 E50	280	900	2.0	20064	N18 E41	287	(AP)	4	M	10	1	HRX
78	6	6	15342	N17 E36	281	700	2.5	20064	N18 E28	287	(AP)	4	B	10	1	AXX
78	6	7	15342	N17 E16	282	500	2.0	20064	N17 E17	285	(AP)	3	B	10	1	AXX
78	6	8	15342					20064	N18 E02	286	(AP)	3	B	0	1	AXX
78	6	9	15342	N17 W07	284	500	2.0									
78	6	10	15342	N17 W21	285	500	2.0									
78	6	11	15342	N17 W33	284	400	2.0	20071	N20 W37	285	(AP)	1	R	10	1	AXX
78	6	12	15342	N20 W48	285	300	2.0									
78	6	13	15342	N20 W62	285	300	2.0									
78	6	14	15342	N21 W74	285	200	1.0									

MCMATH REGION 15344 CMP DATE 10.5 RETURN OF REGION 15294 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	6	4	15344	N18 E80	263	1000	1.5									
78	6	5	15344	N17 E67	263	1100	2.5		N19 E63				M	20	1	HRX
78	6	6	15344	N18 E52	265	1000	3.0									
78	6	7	15344	N18 E34	264	800	3.0									
78	6	9	15344	N18 E13	264	800	2.5									
78	6	10	15344	N18 W01	265	900	2.5									
78	6	11	15344	N18 W12	263	1200	2.5	20072	N17 W19	267	(B)	3	R	50	8	DAO
78	6	12	15344	N19 W25	262	1400	2.5		N18 W24				M	20	3	CRO
78	6	13	15344	N19 W39	262	1200	2.5									
78	6	14	15344	N19 W51	262	1300	2.5									
78	6	15	15344	N19 W66	262	1300	3.0	20079	N16 W72	268	(B)	3	M	80	4	DRO
78	6	16	15344	N19 W81	262	500	1.0									

MCMATH REGION 15345 CMP DATE 11.0 RETURN OF REGION 15296 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	6	4	15345	S22 E85	258	800	1.5									
78	6	5	15345	S25 E75	255	1500	3.0									
78	6	6	15345	S25 E62	255	1200	3.0									
78	6	7	15345	S24 E41	257	1800	3.0									
78	6	9	15345	S24 E20	257	1800	2.5									
78	6	10	15345	S24 E06	258	1700	2.5									
78	6	11	15345	S24 W07	258	1800	2.5									
78	6	12	15345	S24 W19	256	1800	2.5									
78	6	13	15345	S24 W33	256	1500	2.0									

CONTD

REGIONS OF SOLAR ACTIVITY

JUNE 1978

MCMATH REGION 15345 CONTD CMP DATE 11.0 RETURN OF REGION 15296 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	6	14	15345	S24 W45	256	1200	2.0									
78	6	15	15345	S24 W60	256	1300	2.0									
78	6	16	15345	S24 W75	256	700	1.5									

MCMATH REGION 15352 CMP DATE 12.1

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	6	7	15352	N19 E54	244	200	2.0									
78	6	9	15352	N19 E32	245	100	1.0									
78	6	10	15352	N18 E21	243	300	2.5	20070	N16 E19	243	(B)	3	B	20	5	CRO
78	6	11	15352	N18 E08	243	500	2.5	20070	N16 E05	243	(B)	4	R	80	19	DAO
78	6	12	15352	N18 W07	244	700	3.0	20070	N17 W10	245	(BP)	4	M	70	14	DAO
78	6	13	15352	N18 W21	244	1500	3.0	20070	N17 W23	245	(BP)	3	B	80	11	DAI
78	6	14	15352	N17 W33	244	1500	3.5	20070	N17 W36	243	(BY)	4				
78	6	15	15352	N17 W48	244	1700	3.5	20070	N17 W50	246	(BP)	5	M	230	15	DAO
78	6	16	15352	N17 W63	244	2000	3.0	20070	N17 W65	245	(B)	4	B	370	10	DAI
78	6	17	15352	N17 W75	245	2000	3.0	20070	N18 W75	245	(AP)	3	B	270	4	DAC
78	6	18	15352	N17 W88	246	1000	2.0									

MCMATH REGION 15348 CMP DATE 12.3

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	6	6	15348	S12 E79	238	100	1.5									
78	6	7	15348	S12 E60	238	500	2.5	20067	S14 E62	240	(B)	3	B	10	2	BXO
78	6	8	15348					20067	S12 E48	240	(B)	3	B	10	5	BXO
78	6	9	15348	S12 E38	239	600	3.0	20067	S13 E35	240	(B)	2	B	80	2	BXO
78	6	10	15348	S13 E24	240	500	2.5									
78	6	11	15348	S13 E11	240	500	2.5									
78	6	12	15348	S13 W04	241	500	2.0									
78	6	13	15348	S13 W20	243	200	1.5									
78	6	14	15348	S13 W32	243	200	1.5									
78	6	15	15348	S13 W47	243	200	1.5									

MCMATH REGION 15353 CMP DATE 13.2

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	6	7	15353	S25 E70	228	200	2.0									

MCMATH REGION 15354 CMP DATE 14.3 RETURN OF REGION 15298 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	6	7	15354	N20 E80	218	700	1.5									
78	6	8	15354					20068	N18 E76	212	(AP)	3	B	10	1	AXX
78	6	9	15354	N22 E65	212	3500	3.0	20068	N17 E60	215	(AP)	4	B	10	4	HRX
78	6	10	15354	N22 E51	213	3600	2.5	20068	N18 E47	215	(BP)	3	B	50	12	CAI
78	6	11	15354	N22 E38	213	3400	2.5	20068	N18 E32	216	(AP)	3	R	70	24	CAO
78	6	12	15354	N21 E22	215	3500	2.5	20068	N18 E19	216	(AP)	2	M	30	5	CRO
78	6	13	15354	N21 E09	214	3200	2.5	20076	N18 W03	225	(AP)	3	B	10	2	AXX
78	6		15354					20077	N17 E16	206	(AF)	2	B	0	2	AXX
78	6	14	15354	N21 W02	213	3500	2.5									
78	6	15	15354	N22 W17	213	3500	3.0	20080	N19 W21	217	(AP)	2	M	0	1	AXX
78	6		15354					20081	N16 W12	208	(B)	3	M	40	9	CRO
78	6	16	15354	N22 W31	212	3300	2.5	20081	N15 W30	210	(AP)	3	B	10	3	BXO
78	6	17	15354	N21 W42	212	3700	3.0	20081	N16 W38	208	(B)	3	B	30	8	CRO
78	6	18	15354	N22 W54	212	4000	3.0	20081	N16 W52	208	(B)	4	B	150	8	DAI
78	6	19	15354	N20 W66	210	4000	3.0	20081	N17 W65	209	(B)	4	B	120	5	DAO
78	6	20	15354	N20 W78	210	3500	2.5	20081	N16 W82	212	(AF)	2				

MCMATH REGION 15356 CMP DATE 15.4 RETURN OF PAPT OF REGION 153Ø1 ROTATION 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	6	9	15356	S30 E78	199	500	1.5									
78	6	10	15356	S30 E65	199	400	1.5									

CONTD

REGIONS OF SOLAR ACTIVITY

JUNE 1978

MCMATH REGION 15356 (CONT) CMP DATE 15.4 RETURN OF PART OF REGION 153Ø1 ROTATION 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	6	11	15356	S30	E52	199	800	2.5	20073	S32	E53	195	(AF)	1	R	40	8	CRO
78	6	12	15356	S30	E38	199	1000	3.0	20073	S33	E38	197	(B)	3	M	20	5	BXO
78	6	13	15356	S30	E24	199	1000	2.5	20073	S33	E22	200	(BP)	3	B	20	3	CRO
78	6	14	15356	S30	E12	199	800	2.0										
78	6	15	15356	S30	W02	198	800	2.0										
78	6	16	15356	S29	W16	197	800	2.0										
78	6	17	15356	S30	W28	198	800	2.0										
78	6	18	15356	S30	W40	198	800	1.5										
78	6	19	15356	S30	W53	197	800	1.5										
78	6	20	15356	S30	W66	198	800	1.5										
78	6	21	15356	S30	W78	197	800	1.0										

MCMATH REGION 15357 CMP DATE 16.0 RETURN OF PART OF REGION 153ØØ 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	6	9	15357	N12	E82	195	900	2.5										
78	6	10	15357	N13	E74	190	1000	2.5										
78	6	11	15357	N14	E60	191	1000	2.0										
78	6	12	15357	N14	E47	190	1000	2.0										
78	6	13	15357	N14	E32	191	900	2.5										
78	6	14	15357	N14	E20	191	900	2.0										
78	6	15	15357	N14	E05	191	800	2.0										
78	6	16	15357	N14	W09	190	700	1.5		N11	E01				B	0	2	AXX
78	6	17	15357	N14	W20	190	600	1.5										
78	6	18	15357	N13	W33	191	800	1.5										
78	6	19	15357	N13	W46	190	600	1.5										
78	6	20	15357	N13	W58	190	500	1.5										
78	6	21	15357	N13	W72	191	500	1.0										

MCMATH REGION 15369 CMP DATE 16.1

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	6	16	15369	N19	W09	190	100	2.0	20084	N19	W11	191	(AP)	2	B	0	1	AXX
78	6	17	15369	N19	W20	190	300	2.5	20084	N19	W20	190	(B)	3	B	20	4	CRO
78	6	18	15369	N19	W32	190	400	2.5	20084	N19	W34	190	(B)	3	B	20	3	CRO
78	6	19	15369	N19	W45	189	400	3.0	20084	N19	W47	191	(AP)	2	B	10	2	BXI
78	6	20	15369	N19	W59	191	300	2.0										
78	6	21	15369	N19	W73	192	300	1.0										

MCMATH REGION 15363 CMP DATE 16.3

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	6	12	15363	N26	E46	191	300	2.0										
78	6	13	15363	N26	E34	189	700	3.0	20078	N25	E34	188	(BP)	3	B	30	9	CRI
78	6	14	15363	N26	E23	188	800	3.0	20078	N25	E18	189	(B)	3				
78	6	15	15363	N26	E08	188	1000	3.0		N24	E14				M	10	4	BXO
78	6	16	15363	N26	W07	188	700	3.0	20083	N26	W11	191	(B)	3	B	10	8	BXO
78	6	17	15363	N26	W18	188	900	3.0	20083	N25	W18	188	(B)	3	B	60	8	CRO
78	6	18	15363	N25	W30	188	1100	3.0	20083	N26	W33	189	(B)	3	B	40	9	CRI
78	6	19	15363	N25	W44	188	1400	3.0	20083	N26	W45	189	(B)	3	B	10	2	CRO
78	6	20	15363	N25	W57	189	1500	3.0	20083	N26	W55	185	(AF)	2				
78	6	21	15363	N25	W70	189	1500	2.0										
78	6	22	15363	N25	W83	188	500	1.5										

MCMATH REGION 15364 CMP DATE 16.9

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	6	12	15364	S30	E56	181	200	1.5										
78	6	13	15364	S30	E45	178	200	1.5										
78	6	14	15364	S30	E32	179	200	1.0										

REGIONS OF SOLAR ACTIVITY

JUNE 1978

MCMATH REGION 15359 CMP DATE 17.3 RETURN OF REGION 15324 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	6	10	15359	S21 E88	176	400	1.0									
78	6	11	15359	S21 E74	177	800	1.5									
78	6	12	15359	S21 E61	176	800	2.0									
78	6	13	15359	S20 E48	175	700	2.0									
78	6	14	15359	S20 E36	175	700	2.0									
78	6	15	15359	S20 E22	174	500	2.0									
78	6	16	15359	S20 E07	174	500	2.0									
78	6	17	15359	S20 W05	175	700	2.0									
78	6	18	15359	S21 W18	176	700	2.0									
78	6	19	15359	S21 W29	173	800	2.0									
78	6	20	15359	S20 W43	175	800	2.0									
78	6	21	15359	S20 W56	175	800	2.5	20096	S22 W50	168	(B)	3	B	10	2	BXO
78	6	22	15359	S20 W69	174	800	2.5	20096	S20 W67	170	AP	1				
78	6	23	15359	S20 W80	172	500	2.0									

MCMATH REGION 15358 CMP DATE 17.4 RETURN OF PART OF REGION 15300 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	6	10	15358	N20 E88	176	600	1.5									
78	6	11	15358	N22 E78	173	700	2.0									
78	6	12	15358	N20 E62	175	1200	2.0									
78	6	13	15358	N21 E49	174	1200	2.0									
78	6	14	15358	N21 E38	173	1100	2.0									
78	6	15	15358	N20 E22	174	1100	2.0		N15 E25				M	20	6	BXO
78	6	16	15358	N20 E08	173	800	2.0									
78	6	17	15358	N21 W04	174	700	2.0	20085	N24 W03	173	X	1				
78	6	18	15358	N21 W15	173	1000	2.0									
78	6	19	15358	N21 W28	172	1200	2.0									
78	6	20	15358	N21 W41	173	1000	2.0									
78	6	21	15358	N21 W56	175	900	1.5									
78	6	22	15358	N21 W69	174	700	2.0									
78	6	23	15358	N23 W81	173	400	1.5									

MCMATH REGION 15372 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	6	18	15372	S31 E01	157	200	1.5									

MCMATH REGION 15360 CMP DATE 18.7

			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	6	11	15360	N16 E90	161	600	1.5		N13 E83				R	20	2	HAX
78	6	12	15360	N18 E78	159	1200	2.5	20074	N15 E70	165	(B)	3	M	30	4	CRO
78	6		15360					20075	N19 E85	200	(AP)	2	M	0	1	AXX
78	6	13	15360	N18 E65	158	3500	3.0	20074	N15 E60	162	(AF)	2	B	10	2	BXO
78	6		15360					20075	N19 E69	153	(AP)	3	B	90	2	HSX
78	6	14	15360	N18 E54	157	4000	3.0	20074	N16 E43	164	(B)	2				
78	6		15360					20075	N19 E53	174	(AP)	4				
78	6	15	15360	N18 E39	157	3800	2.5	20075	N19 E41	155	(AP)	4	M	70	8	DAO
78	6	16	15360	N19 E25	156	3200	2.5	20075	N19 E25	155	(AP)	4	B	50	2	HAX
78	6	17	15360	N19 E14	156	3200	2.5	20075	N19 E15	155	(D)	3	B	60	5	HAX
78	6		15360					20086	N17 E07	163	(B)	2	B	10	3	AXX
78	6	18	15360	N18 E02	156	3200	2.5	20075	N20 E03	153	(Y)	3	B	80	11	DRI
78	6		15360					20086	N18 W06	162	(B)	5	B	80	9	DAI
78	6	19	15360	N18 W12	156	3500	3.0	20075	N20 W09	153	(BP)	2	B	10	5	BXC
78	6		15360					20086	N18 W19	163	(BP)	4	B	70	14	DSI
78	6	20	15360	N18 W25	157	3500	3.0	20075	N19 W22	152	(B)	3	B	140	11	DAI
78	6		15360					20086	N18 W35	165	(BP)	5				
78	6	21	15360	N18 W39	158	3500	3.0	20075	N19 W33	151	(B)	3	B	0	1	AXX
78	6		15360					20086	N18 W48	166	(B)	5	B	160	11	DSO
78	6	22	15360	N18 W51	156	3100	3.0	20086	N18 W62	165	(BF)	5				
78	6	23	15360	N18 W64	156	3000	3.5	20086	N18 W75	165	BP	3				
78	6	24	15360	N18 W76	155	2000	3.0		N17 W84				B	70	2	HSX
78	6	25	15360	N20 W88	154	600	1.0									

REGIONS OF SOLAR ACTIVITY

JUNE 1978

MCMATH REGION 15361 CMP DATE 19.0

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	6	12	15361	N10	E90	147	300	1.0										
78	6	13	15361	N12	E75	148	600	3.0										
78	6	14	15361	N12	E63	148	600	2.5										
78	6	15	15361	N12	E49	147	600	2.0										
78	6	16	15361	N12	E34	147	400	2.0										
78	6	17	15361	N12	E21	149	500	2.0		N11	E25				B	0	2	AXX
78	6	18	15361	N12	E07	151	400	2.0										
78	6	19	15361	N12	W07	151	400	2.0										
78	6	20	15361	N12	W20	152	400	2.0										
78	6	21	15361	N12	W33	152	300	1.0										

MCMATH REGION 15370 CMP DATE 20.1

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	6	17	15370	N11	E33	137	600	2.5	20087	N11	E35	135	(B)	3	B	60	2	BXO
78	6	18	15370	N11	E20	138	800	2.0		N10	E21				B	10	2	HSX
78	6	19	15370	N11	E08	136	500	2.0	20090	N12	E06	138	(AP)	3	B	10	1	AXX
78	6	20	15370	N11	W05	137	600	3.0	20090	N12	W08	138	(B)	4	B	80	7	DAO
78	6	21	15370	N11	W18	137	700	3.0	20090	N12	W21	139	(B)	4	B	110	11	DAO
78	6	22	15370	N12	W31	136	900	3.0	20090	N12	W35	138	(B)	4	B	240	13	DAO
78	6	23	15370	N12	W43	135	1200	3.0	20090	N13	W48	138	(B)	5	B	180	4	DSO
78	6	24	15370	N12	W56	135	1300	3.0	20090	N12	W64	140	(B)	4	B	120	2	DSO
78	6	25	15370	N12	W70	136	1100	2.0										
78	6	26	15370	N11	W86	138	600	1.5										

MCMATH REGION 15379 CMP DATE 20.3

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	6	24	15379	S12	W54	25	200	1.5										
78	6	25	15379	S12	W69	135	300	1.5										
78	6	26	15379	S11	W84	136	300	1.5										

MCMATH REGION 15365 CMP DATE 21.9 RETURN OF REGIONS 153Ø5 & 15331 ROTATION 2 & 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	6	15	15365	S25	E79	117	2000	2.5	20082	S24	E78	118	(AP)	2	M	240	4	DAO
78	6	16	15365	S26	E67	114	2800	2.5	20082	S24	E62	118	(BP)	4	B	90	4	HAX
78	6	17	15365	S26	E56	114	2500	3.0	20082	S24	E52	118	(D)	4	B	250	8	DAC
78	6	18	15365	S28	E44	114	2800	3.0	20082	S23	E38	118	(D)	4	B	240	20	DAC
78	6	19	15365	S28	E30	114	3200	3.0	20082	S23	E26	118	(BP)	3	B	60	14	DRI
78	6	20	15365	S28	E17	115	3600	3.0	20082	S25	E13	117	(BP)	3	B	40	18	CRI
78	6	21	15365	S27	E05	114	3200	2.5	20082	S25	E03	115	(BP)	3	B	30	11	BXI
78	6	22	15365	S28	W08	113	3600	2.5	20082	S25	W14	117	(B)	4	B	40	22	DAI
78	6	23	15365	S28	W20	112	3200	3.5	20082	S27	W24	114	(B)	3	B	40	7	DAO
78	6	24	15365	S28	W33	112	3200	3.0	20082	S28	W39	115	(B)	3	B	20	5	DRO
78	6	25	15365	S27	W46	112	2800	3.0										
78	6	26	15365	S28	W60	112	2500	3.5										
78	6	27	15365	S28	W72	111	2000	2.5										
78	6	28	15365	S28	W85	111	1100	1.5										

MCMATH REGION 15366 CMP DATE 23.6 RETURN OF REGION 15321 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	6	16	15366	S15	E85	96	800	1.5										
78	6	17	15366	S15	E75	95	2000	3.0										
78	6	18	15366	S15	E68	90	2800	2.5										
78	6	19	15366	S15	E54	90	3700	3.0	20093	S18	E59	85	AP	2				
78	6	20	15366	S15	E40	92	3700	3.0	20093	S18	E43	87	(B)	3	B	30	3	CRO
78	6		15366						20094	S18	E36	94	(AP)	2				
78	6	21	15366	S15	E27	92	3300	2.5	20093	S17	E35	83	(B.	4	B	20	4	CRO
78	6		15366						20097	S14	E20	98	(BP)	3	B	20	6	BXO
78	6	22	15366	S15	E14	91	3300	2.5	20093	S16	E20	83	(AF)	4	B	30	2	HSX
78	6		15366						20097	S13	E07	96	(AP)	4	B	20	12	CSO
78	6	23	15366	S15	E02	90	3200	2.5	20097	S14	W06	96	(AP)	4	B	10	8	BXO
78	6	24	15366	S15	W11	90	3200	2.5										
78	6	25	15366	S15	W23	89	3000	3.0										

CONTD

REGIONS OF SOLAR ACTIVITY

JUNE 1978

MCMATH REGION 15366 CONTD CMP DATE 23.6 RETURN OF REGION 15321 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	6	26	15366	S15 W39	91	2800	3.0									
78	6	27	15366	S15 W51	90	2800	3.0									
78	6	28	15366	S15 W66	92	2300	2.5									
78	6	29	15366	S15 W78	91	1800	1.5									

MCMATH REGION 15367 CMP DATE 23.9

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	6	16	15367	N40 E87	94	100	1.5									
78	6	17	15367	N40 E79	91	400	2.0									
78	6	18	15367	N40 E68	90	700	2.0									
78	6	19	15367	N40 E55	89	700	2.5									
78	6	20	15367	N40 E43	89	600	2.0									
78	6	21	15367	N40 E30	89	400	2.0									
78	6	22	15367	N39 E18	87	200	2.0									
78	6	23	15367	N39 E06	86	100	2.0									
78	6	24	15367	N39 W07	86	200	2.0									
78	6	25	15367	N39 W19	85	200	2.0									
78	6	26	15367	N39 W32	84	200	1.0									
78	6	27	15367	N39 W45	84	200	1.5									
78	6	28	15367	N39 W58	84	100	1.5									

MCMATH REGION 15371 CMP DATE 24.1

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	6	17	15371	N31 E85	85	600	2.5		N31 E81				B	60	1	HSX
78	6	18	15371	N33 E75	83	800	2.5	20089	N32 E68	88	(AP)	2	B	20	2	BXO
78	6	19	15371	N33 E61	83	1400	3.5	20089	N32 E54	90	(AP)	3	B	10	2	BXI
78	6	20	15371	N33 E48	84	1500	2.5	20089	N32 E42	88	(AP)	3				
78	6	21	15371	N33 E34	85	1000	3.0									
78	6	22	15371	N33 E21	84	1000	3.0		N31 E19				B	10	4	BXO
78	6	23	15371	N33 E08	84	1000	3.0		N31 E08				B	0	1	AXX
78	6	24	15371	N33 W04	83	1000	2.5									
78	6	25	15371	N33 W16	82	800	2.5									
78	6	26	15371	N33 W29	81	1000	2.0									
78	6	27	15371	N33 W40	79	800	2.0									
78	6	28	15371	N33 W54	80	700	1.5									

MCMATH REGION 15368 CMP DATE 24.5 RETURN OF REGION 15314 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	6	16	15368	N16 E87	94	100	1.0									
78	6	17	15368	N16 E80	90	1000	2.5	20088	N19 E85	85	AP	3	B	70	1	HSX
78	6	18	15368	N17 E70	88	2100	3.0	20088	N19 E70	86	(AP)	4	B	130	2	HSX
78	6	19	15368	N19 E65	79	6500	3.5	20088	N19 E58	86	(AP)	5	B	50	1	HAX
78	6		15368					20091	N17 E78	66	(AP)	5	B	160	2	CSI
78	6	20	15368	N19 E52	80	9000	3.5	20088	N19 E45	85	(AP)	5	B	90	2	HSX
78	6		15368					20091	N17 E65	65	(D)	5	B	630	7	EKO
78	6	21	15368	N19 E40	79	9000	3.0	20088	N19 E32	86	(AP)	5	B	70	4	HSX
78	6		15368					20091	N18 E54	64	(D)	6	B	480	19	EKI
78	6		15368					20098	N19 E21	97	(AP)	3	B	0	1	AXX
78	6	22	15368	N19 E26	79	9000	3.0	20088	N19 E19	84	(AP)	5	B	80	5	HAX
78	6		15368					20091	N18 E40	63	(B)	6	B	530	26	EKI
78	6		15368					20100	N14 E08	95	(B)	3	B	20	5	CRO
78	6	23	15368	N19 E13	79	8900	3.0	20088	N18 E06	84	(AP)	4	B	40	10	HSX
78	6		15368					20091	N17 E25	65	(B)	6	B	560	19	CKI
78	6		15368					20100	N13 W05	95	(B)	4	B	30	7	CRO
78	6	24	15368	N19 E00	79	8900	3.0	20088	N18 W08	84	(AP)	3	B	20	6	CRI
78	6		15368					20091	N16 E08	68	(AP)	5	B	760	15	CKI
78	6		15368					20100	N13 W20	96	(B)	3	B	30	6	DRO
78	6	25	15368	N19 W12	78	8400	3.0	20091	N17 W04	68	(BP)	6				
78	6		15368					20100	N11 W33	97	(B)	3				
78	6	26	15368	N19 W27	79	8400	3.0	20091	N17 W16	67	(Y)	5				
78	6	27	15368	N19 W39	78	8000	3.5									
78	6	28	15368	N19 W52	78	7500	3.5	20091	N18 W43	67	(BY)	3	B	140	29	DAC
78	6	29	15368	N19 W65	78	6500	3.5	20091	N18 W54	65	(BP)	4	B	100	19	ESI
78	6	30	15368	N19 W78	77	5000	3.5	20091	N18 W70	68	(BF)	4	R	120	16	DAO
78	7	01	15368						N18 W87				B	150	3	C

REGIONS OF SOLAR ACTIVITY

JUNE 1978

MCMATH REGION 15374 CMP DATE 25.2 RETURN OF REGION 15335 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	6	19	15374	S18 E75	69	500	2.5									
78	6	20	15374	S18 E61	71	500	2.0									
78	6	21	15374	S17 E48	71	500	2.0									
78	6	22	15374	S17 E35	70	400	2.0									
78	6	23	15374	S17 E22	70	500	2.0									
78	6	24	15374	S17 E09	70	500	2.5		S17 E04				B	10	4	BXO
78	6	25	15374	S17 W04	70	600	2.5	20101	S17 W07	71	(B)	3				
78	6	26	15374	S17 W19	71	600	2.5	20101	S18 W18	69	(AP)	3				
78	6	27	15374	S17 W32	71	600	2.0									
78	6	28	15374	S17 W45	71	500	2.0									
78	6	29	15374	S17 W58	71	400	2.0									
78	6	30	15374	S17 W72	71	400	1.5	20108	S15 W61	59	(AP)	2				

* MCMATH REGION 15373 CMP DATE 26.1

				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	6	19	15373					20092	N26 E88	56	(AP)	3				
78	6	20	15373					20092	N24 E69	61	(AP)	2	B	90	5	CRO
78	6	21	15373					20092	N25 E58	60	(Y)	3				
78	6	22	15373					20092	N25 E45	58	(AP)	4				
78	6	23	15373					20092	N25 E30	60	(AP)	4	B	50	11	CSO
78	6	24	15373					20092	N27 E17	59	(BF)	4	B	70	10	DSO
78	6	25	15373					20092	N26 E08	56	(AP)	4				
78	6	26	15373	N27 W06	58	900	2.0	20092	N26 W06	57	(AP)	4				
78	6	27	15373	N26 W18	57	1000	2.5									
78	6	28	15373	N26 W30	56	1000	3.0	20092	N26 W33	57	(B)	3	B	20	9	BXO
78	6	29	15373	N27 W43	56	1000	3.0	20092	N26 W47	58	(B)	3	B	30	4	BXO
78	6	30	15373	N27 W56	55	1200	3.0	20092	N27 W59	57	(B)	3				
78	7	01	15373						N25 W76				B	20	3	B

MCMATH REGION 15375 CMP DATE 26.7

				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	6	20	15375	S20 E79	53	3800	3.5	20095	S18 E80	50	(AP)	3	B	270	6	DHO
78	6	21	15375	S19 E69	50	3700	3.5	20095	S19 E68	50	(AP)	5	B	650	8	EKO
78	6	22	15375	S20 E58	47	4300	3.5	20095	S19 E55	48	(B)	6	B	600	23	EKI
78	6	23	15375	S20 E45	47	4700	3.5	20095	S20 E42	48	(B)	5	B	650	34	EKC
78	6	24	15375	S20 E32	47	4600	3.5	20095	S21 E28	48	(BP)	6	B	700	39	EAC
78	6	25	15375	S20 E18	48	4400	3.5	20095	S20 E15	49	(B)	6				
78	6	26	15375	S20 E02	50	4500	3.5	20095	S20 E03	48	(BY)	6				
78	6	27	15375	S20 W10	49	4500	3.5									
78	6	28	15375	S20 W23	49	5000	3.0	20095	S19 W25	49	(BY)	4	B	360	47	FSI
78	6	29	15375	S20 W37	50	5200	3.5	20095	S19 W40	51	(Y)	4	B	390	38	FKI
78	6	30	15375	S19 W50	49	5800	3.5	20095	S20 W50	48	(D)	4				
78	7	01	15375					20095	S20 W70		(AP)	2	B	200	15	E
78	7	02	15375					20095	S20 W80		(AP)	3	B	140	2	H

MCMATH REGION 15376 CMP DATE 27.6 RETURN OF REGION 15319 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	6	20	15376	N20 E89	43	600	1.5									
78	6	21	15376	N22 E78	41	3800	3.0	20099	N20 E79	39	(AP)	4	B	130	1	HSX
78	6	22	15376	N23 E66	39	4400	3.5	20099	N22 E69	34	(B)	5	B	300	5	EKO
78	6	23	15376	N23 E53	39	4000	3.5	20099	N22 E55	35	(B)	5	B	390	14	EAO
78	6	24	15376	N23 E40	39	4000	3.5	20099	N22 E42	34	(B)	5	B	260	19	EAI
78	6	25	15376	N23 E27	39	4000	3.5	20099	N22 E29	35	(D)	5				
78	6	26	15376	N23 E14	38	4000	3.5	20099	N22 E15	36	(BP)	5				
78	6	27	15376	N23 E02	37	3800	3.0									
78	6	28	15376	N23 W10	36	4000	3.5	20099	N20 W15	39	(AP)	3				
78	6		15376					20103	N25 W10	34	(D)	3	B	120	28	EAI
78	6	29	15376	N23 W23	36	4500	3.5	20103	N24 W24	35	(BY)	4	B	180	38	EAI
78	6	30	15376	N23 W35	34	5000	3.5	20103	N24 W38	36	(BY)	4				
78	7	01	15376					20103	N23 W55		(B)	3	B	140	29	E
78	7	02	15376					20103	N23 W65		(B)	3	B	110	15	E
78	7	03	15376					20103	N23 W78		(AP)	3	B	70	4	C

*NOTE: McMath Region 15373 did not appear on the solar disk until 26 June. Previous to this date Mt. Wilson Spot Group 20092 appears to be in McMath Region 15368.

REGIONS OF SOLAR ACTIVITY

JUNE 1978

MCMATH REGION 15378 CMP DATE 28.8

				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	6	24	15378	S22 E57	22	200	2.0									
78	6	25	15378	S22 E45	21	200	1.5									
78	6	26	15378	S22 E29	23	300	1.0									
78	6	27	15378	S22 E17	22	200	1.0									

MCMATH REGION 15377 CMP DATE 30.4 RETURN OF REGIONS 1533Ø AND 15337 ROTATION 2 & 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	6	23	15377	S25 E88	4	200	1.0									
78	6	24	15377	S27 E74	5	600	1.5									
78	6	25	15377	S27 E62	4	1000	2.0									
78	6	26	15377	S28 E50	2	1200	2.0									
78	6	27	15377	S26 E38	1	1200	2.5									
78	6	28	15377	S27 E25	1	1200	2.0									
78	6	29	15377	S28 E12	1	1200	2.5									
78	6	30	15377	S28 W01	0	1200	2.0									
78	7	05	15377	S28 W69		800	1.0									

Note: No calcium spectroheliograms were secured at the McMath-Hulbert Observatory on June 8, 1978.
No sunspot observations were made at Mt. Wilson June 27, 1978.

DAILY CALCIUM PLAGE INDEX

JUNE 1978

YR	MO	DAY	INDEX	YR	MO	DAY	INDEX	YR	MO	DAY	INDEX
78	6	1	41.4	78	6	11	20.3	78	6	21	55.3
78	6	2	29.7	78	6	12	24.8	78	6	22	63.0
78	6	3	21.8	78	6	13	28.8	78	6	23	70.2
78	6	4	22.0	78	6	14	30.9	78	6	24	69.7
78	6	5	19.9	78	6	15	32.5	78	6	25	66.6
78	6	6	14.2	78	6	16	25.9	78	6	26	65.3
78	6	7	14.9	78	6	17	31.4	78	6	27	61.8
78	6	8	*	78	6	18	34.8	78	6	28	56.1
78	6	9	16.5	78	6	19	48.6	78	6	29	51.2
78	6	10	17.1	78	6	20	58.7	78	6	30	46.1

* NO OBSERVATIONS

Errata: In SGD 406 Part I, page 118, Mt. Wilson sunspot group 20014 erroneously appeared in McMath Region 15235 for 20 April 1978. This Mt. Wilson 20014 entry should appear in McMath Region 15254.

SUDDEN IONOSPHERIC DISTURBANCES

JUNE 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	0007	0130	0023	1-	1				1				0006	15319
01	1325	1421	1334	1-	3	1			1		1		1326	15319
01	2104	2218	2112	1-	5	3		1	1	1	10		2100	X-RAY
02	0258	0414	0309	1-	1				1				0258	15314
02	0614	0630	0619	1	3			1	2				0612	X-RAY
02	0754	0803	0758	1-	3			2	1		1		0750	15321
02	1107	1151	1114	1-	3				2		1		1103	15321
02	1809E	1849	1832	1-	1			1					1803	15319
02	2303	2336	2312	1-	1				1				2307E	15314
03	0206	0325	0238	1-	1				1				*	
03	0228	0322	0244	1-	1				1				0230	X-RAY
03	0531	0630	0540	1-	1				1				0535	15314
03	0823	0942	0829	1-	5	1		1	3		1		0825	15321
05	0226	0325	0233	1-	3	1			1				0220	X-RAY
05	0416	0524D	0426	1-	1				1				0411	X-RAY
05	0726	0924	0742	2-	3	2	1	3	4		2		0729E	15319
05	1306	1417	1318	1-	5			1	3	1	11		1250	15319
08	0021	0058	0024	1-	1				1				0020	15337
10	1219E	1350	1258	1-	3			2					1221	15333
10	2344	0010	2353	1-	1				1				2346	X-RAY
12	0408	0508	0421	1-	1				1				0408	X-RAY
12	1637	1704	1644	1-	5	2					8		1637	15352
13	0141	0216	0150	1-	3		1		1				0136E	15352
13	0438	0515	0451	1-	1				1				0444	15352
13	2121	2130	2124	1-	1	1							2121	15352
14	0130	0212	0135	1-	1				1				0125	X-RAY
14	0902	0958	0913	1-	1				1				0910	15358
15	0330	0412	0342	1-	1				1				0333	X-RAY
16	2319E	0117	2352	1	1				1				2318	15366
16	2330	0046	2356	1-	1				1				2323	15352
17	0154	0222D	0204	1-	1				1				0159	15352
17	0218E	0317D	0227	1-	1				1				0215	15360
17	1818	1915	1820	1	5	1					7		1826E	15354
17	1836	1906	1843	1-	3						5		1835	15354
18	0009	0118D	0038	1-	1				1				0010	15360
18	0118E	0222	0124	1-	3	1			1				0112	15352
18	0735	0828	0742	1-	1				1				0718	15363
19	0525E	0610	0536	1-	1				1				0529	15356
19	0646	0733D	0659	1	3				2				0649	X-RAY
19	1225	1255	1231	1	5			1	4		2		1222	X-RAY
19	1517	1557	1524	1-	3				2		1		1515	X-RAY
19	2130	2207	2141	1-	1				1				2129	X-RAY
19	2337	0020D	2344	1-	1				1				2336	15354
20	0813	0848	0827	1	3			1	2				0807	15368
20	0924	0945	0930	1	3			1	2				0922	15375
20	1153	1240	1201	1	3			1	2		1		1143	15375
20	1726	1818	1735	1-	5				1		7		1721	15368
20	1921	2024	1933	1	5	3	1	1	3	1	11		1918	15375
20	2209	2258	2215	1-	1				1				2209	15375
20	2329	0012	2341	1-	1				1				2332	15368
21	0506	0646	0521	1-	1				1				0514E	15375
21	1533	1659	1548	1+	5	1	1	1	3		13		1534E	15375
21	2347	0022	2354	1-	1				1				2347	X-RAY
22	0235	0420	0250	2	5	1		1	1		1		0236E	15375
22	0601	0758	0611	1	5	3		2	3		1		0601	15370
22	1026	1125	1035	1	5	1			4		1		1027	15375
22	1653	1859	1724	2+	5	3	1	1	5	1	12		1645	15368
22	1949	2122	2024	1	5	3		1	2	1	13		1940	15373

SUDDEN IONOSPHERIC DISTURBANCES

JUNE 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
23	0742	0930	0751	1	5	2		2	2		2		0744E	15373
24	1320	1500	1337	1-	3			1	2		1		1320	15375
24	1522	1532	1525	1	1		1						1524	X-RAY
24	1817	1857	1830	1	3	1		1			9		NF	
24	1950	2030	1955	1	1	1							*	
25	0033E	0102	0039	1-	1				1				0032	X-RAY
25	0604	0710	0622	1-	1				1				0609	X-RAY
25	0819	1025	0844	1	5	2		1	3		1		0822	X-RAY
25	1613	1636	1623	1-	1			1					*	
25	1709	1734	1717	1-	1			1					*	
25	1740	1806	1747	1-	1			1					*	
25	1818	1854	1827	1-	1			2					*	
26	1210	1230D	1230	1-	1				1		1		1207	X-RAY
26	1438	1455	1443	1-	5	1		2	2		10		1453E	15375
26	1535	1910	1557	3	5	3	2	5	4	1	14		1533	X-RAY
26	2203	2238D	2210	1-	3				1		1		2202	X-RAY
26	2238	2313	2251	1-	1				1				2236	X-RAY
27	0100	0223	0109	1-	3	1			1				0057	X-RAY
27	1146	1251	1158	1-	1				1		1		1147	15376
28	0245	0407	0252	2	3	1			1		1		0248E	15375
29	0322	0415	0334	1-	1				1				0335E	15375
29	0431	0627	0440	1	1				1				0434E	15376
29	1121	1150	1127	1	5	2		3	3		3		1117	X-RAY
29	1416	1539	1423	1	5	1		4	2		10		1414	15376
29	1538	1634	1544	1	1			1					1542	15375
29	2212	0040	2240	1	5	1			2		4		2206	15376
29	2300E	0002	2319	1-	1				1				2303	15368
30	0148	0356	0215	1-	1				1				0149	15368
30	1411	1431	1413	1-	1			1					1411	15381
30	1447	1627	1502	1-	5	2	2	3	2	1	12		1445	15376
30	1627	1700	1636	1-	5				1		9		1631E	15376
30	1704	1758	1722	1	5	2	1	1	2	1	10		1706E	15376
30	1802	1842	1810	1-	5			1	1	1	9		1759	X-RAY

PERIODS OF NO OBSERVATIONS:

DATE	TIME (UT) and STATION
01-25	0000-2400 A3
01-18	0000-2400 A5
03-04	0000-2400 A46
05-14	0000-2400 A28
06	0000-2400 TN, 1005-1326 UM (16kHz)
08	0000-2400 A40
09	1505-1523 UM (16 kHz)
10	1507-1525 UM (16 kHz)
13	1014-1329 UM (16 kHz)
15	0000-2400 A40
20	1004-1340 UM (16 kHz), 1822-1900 TM
21-30	0000-2400 A28
21	0750-0817 UM (16 kHz)
27-30	0000-2400 A3
27	1006-1324 UM (16 kHz)
29-30	0000-2400 A40
29	0000-2400 A26

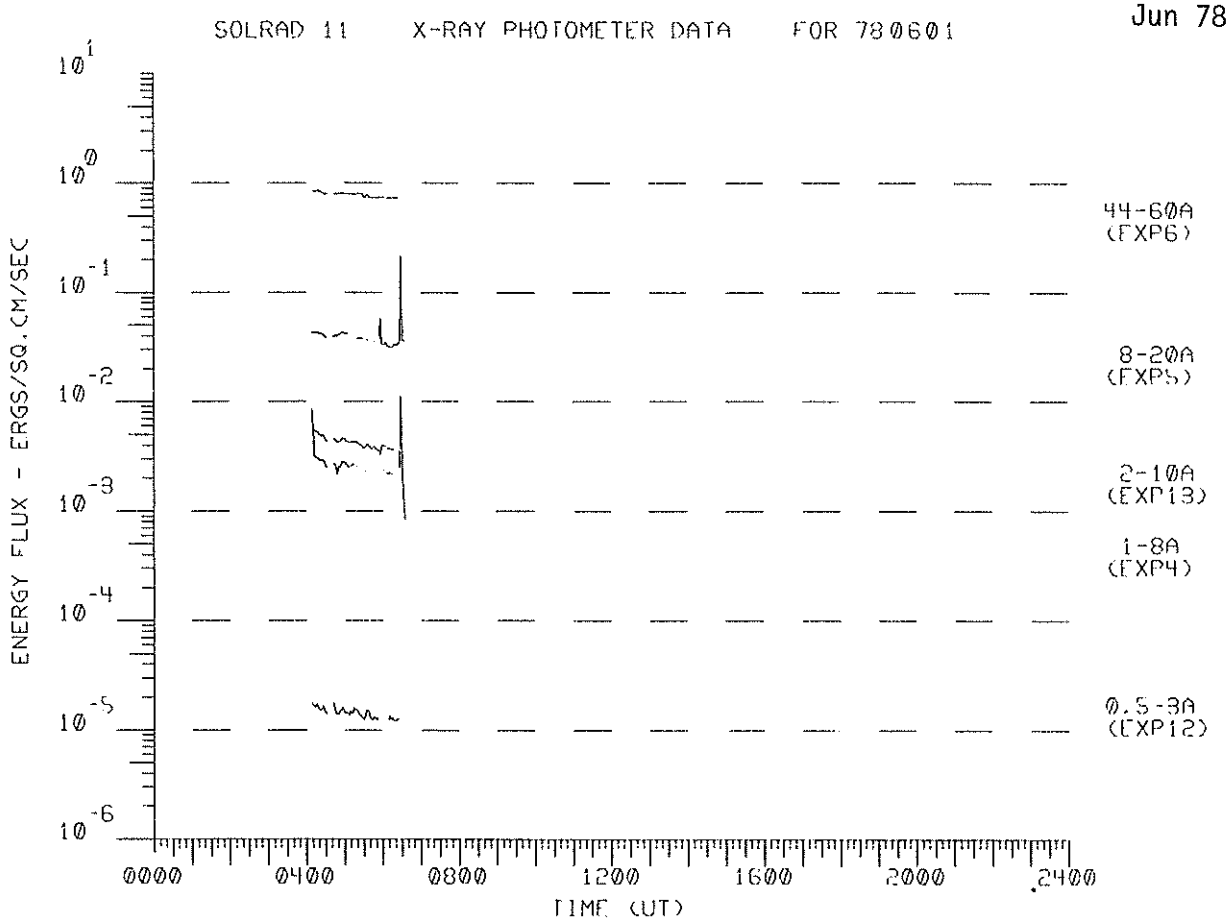
STATIONS REPORTING FOR JUNE 1978

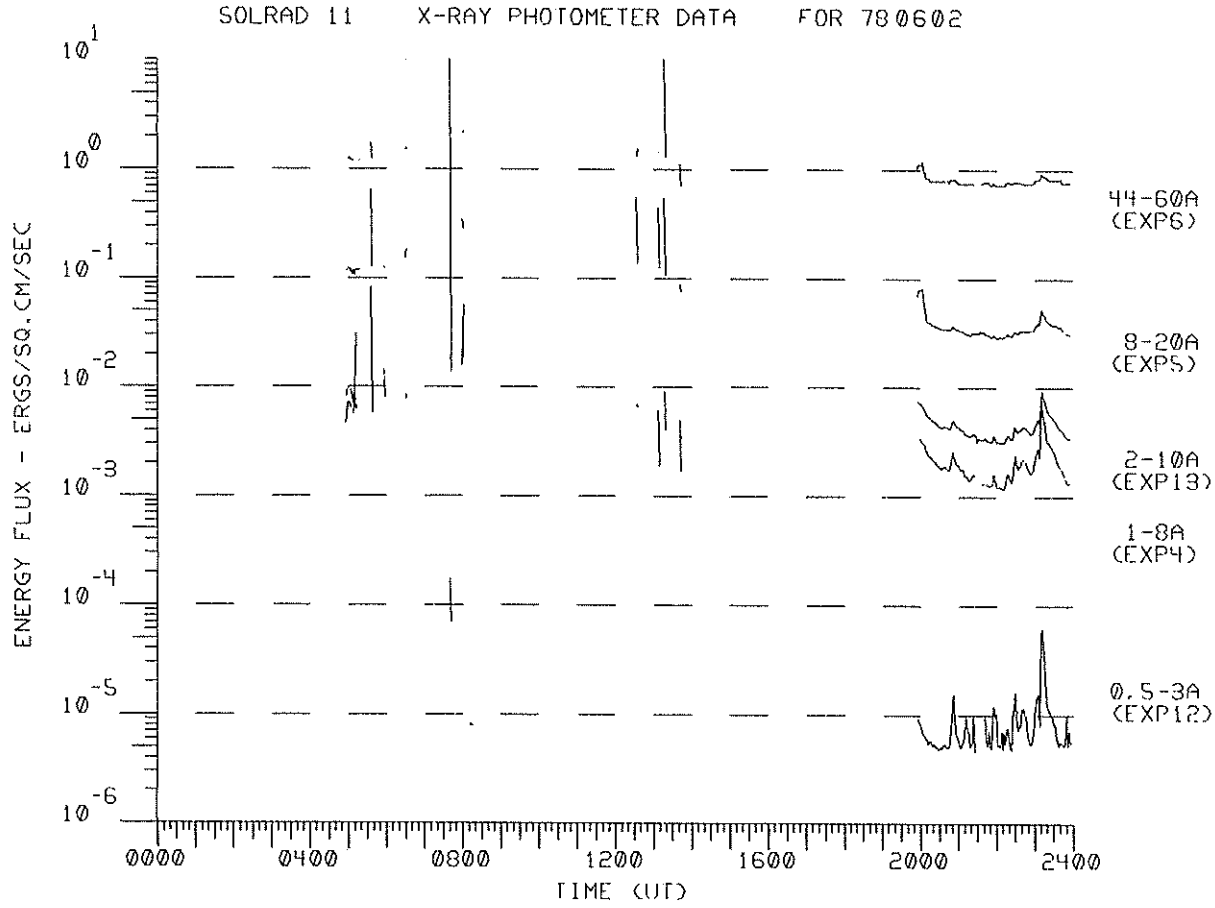
AAVSO (A1, A3, A5, A19, A21, A26, A28, A31, A34, A37, A40, A45, A46) (SES) (A1, A31) (SEA) (A31) (SWF)
CHILWORTH (CL) (SCNA)
HERSTMONCEUX (HC) (SEA)
HIRAISO (HI) (SWF)
HOBART (TA) (SEA, SES)
HUANCAYO (HU) (SWF)
INUBO (IN) (SPA)
JULIUSRUH (JH) (SWF)
KUHLUNGSBORN (KU) (SEA, SPA)
MC MATH (MC) (SWF, SCNA)
NEW JERSEY (NJ) (SES)
PANSKA VES (PU) (SWF, SEA, SES)
PRESTON (LO) (SEA)
RIO DE JANEIRO (RJ) (SPA)
SAO PAULO (UM) (SES, SPA)
SOFIA (SF) (SES)
ST CLOUD (SC) (SES)
TABLE MOUNTAIN (TM) (SPA, LF-SPA)
TORINO (TN) (SPA)
UPICE (UI) (SEA)
VSETIN (VS) (SEA)

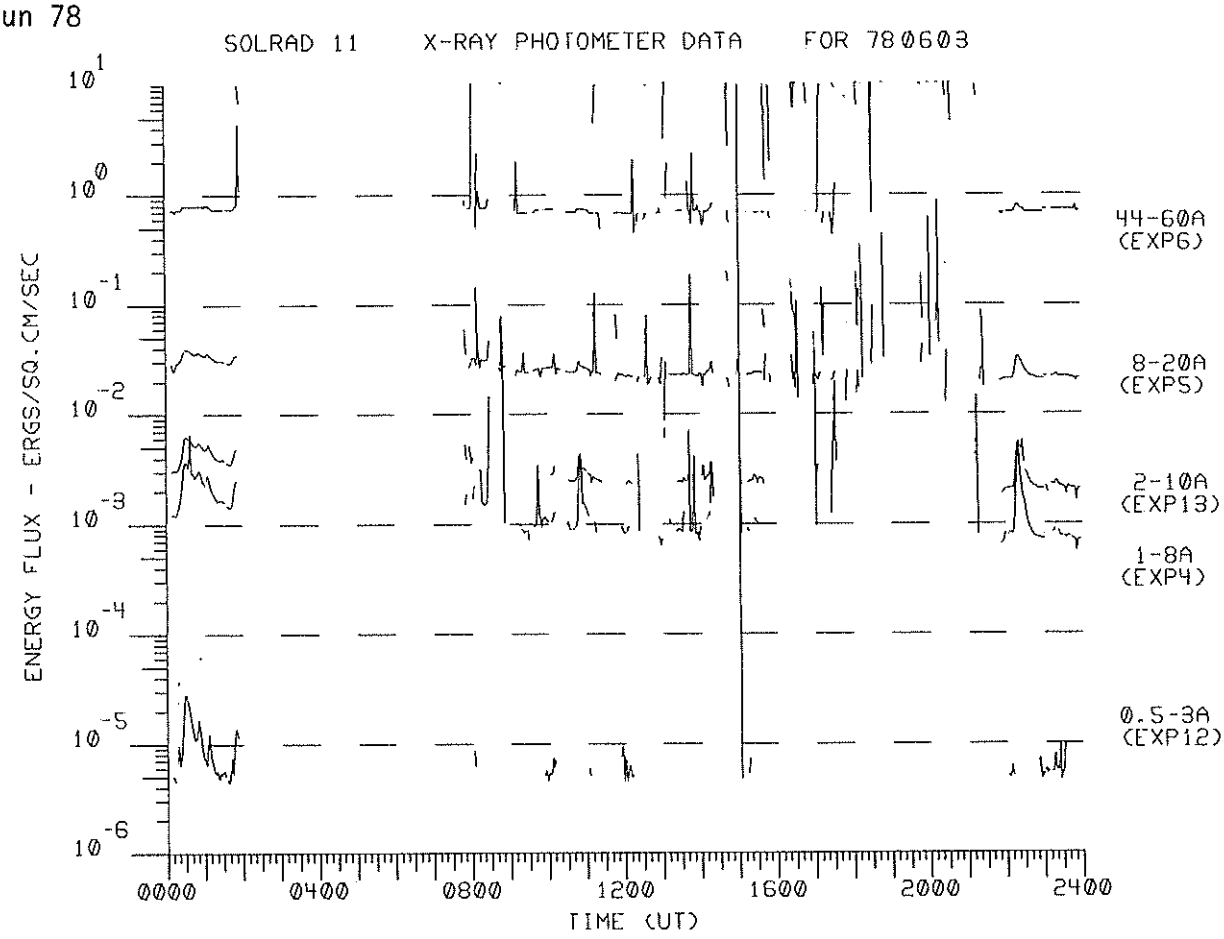
NOTE: RIO DE JANEIRO, BRAZIL IS A NEW STATION REPORTING FOR THE FIRST TIME

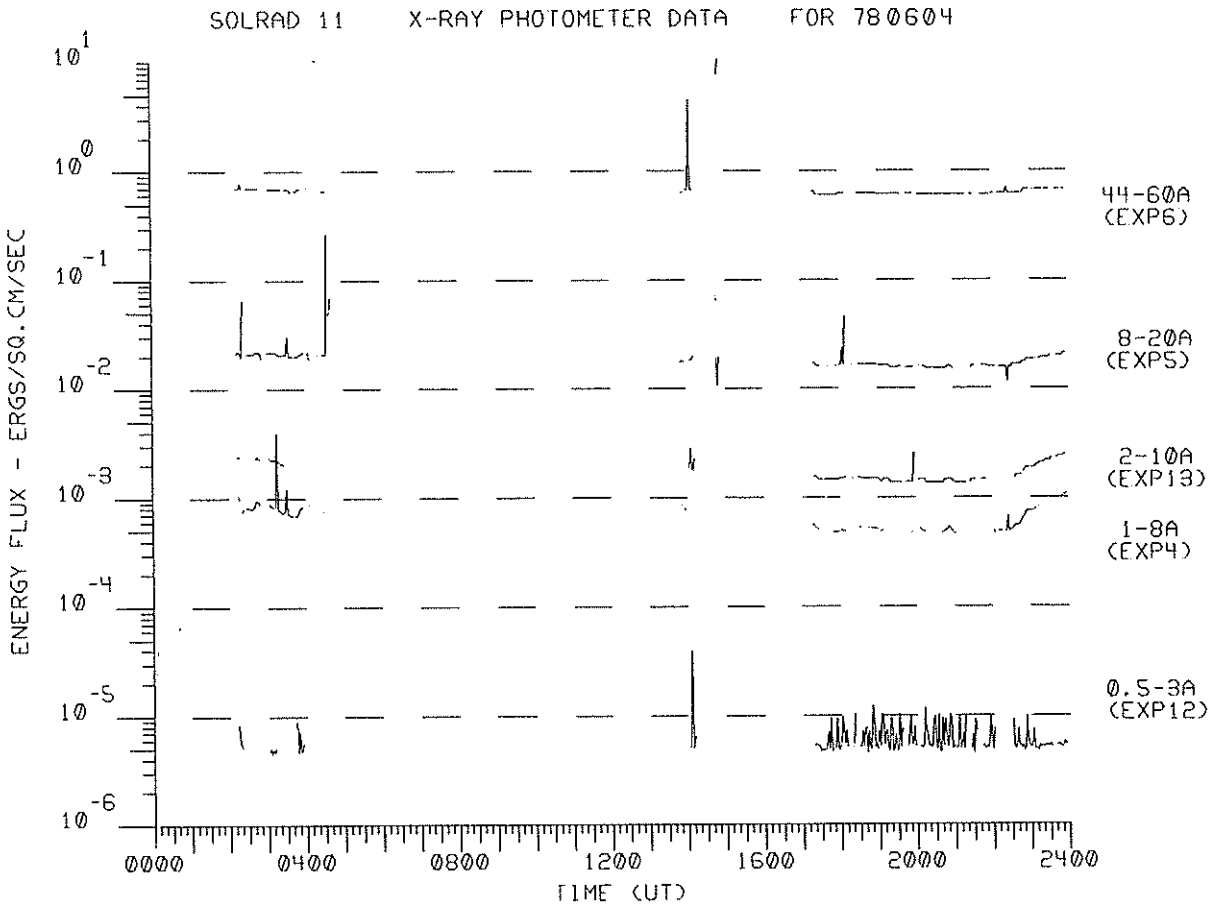
SIDs BY McMATH REGION
JUNE 1978

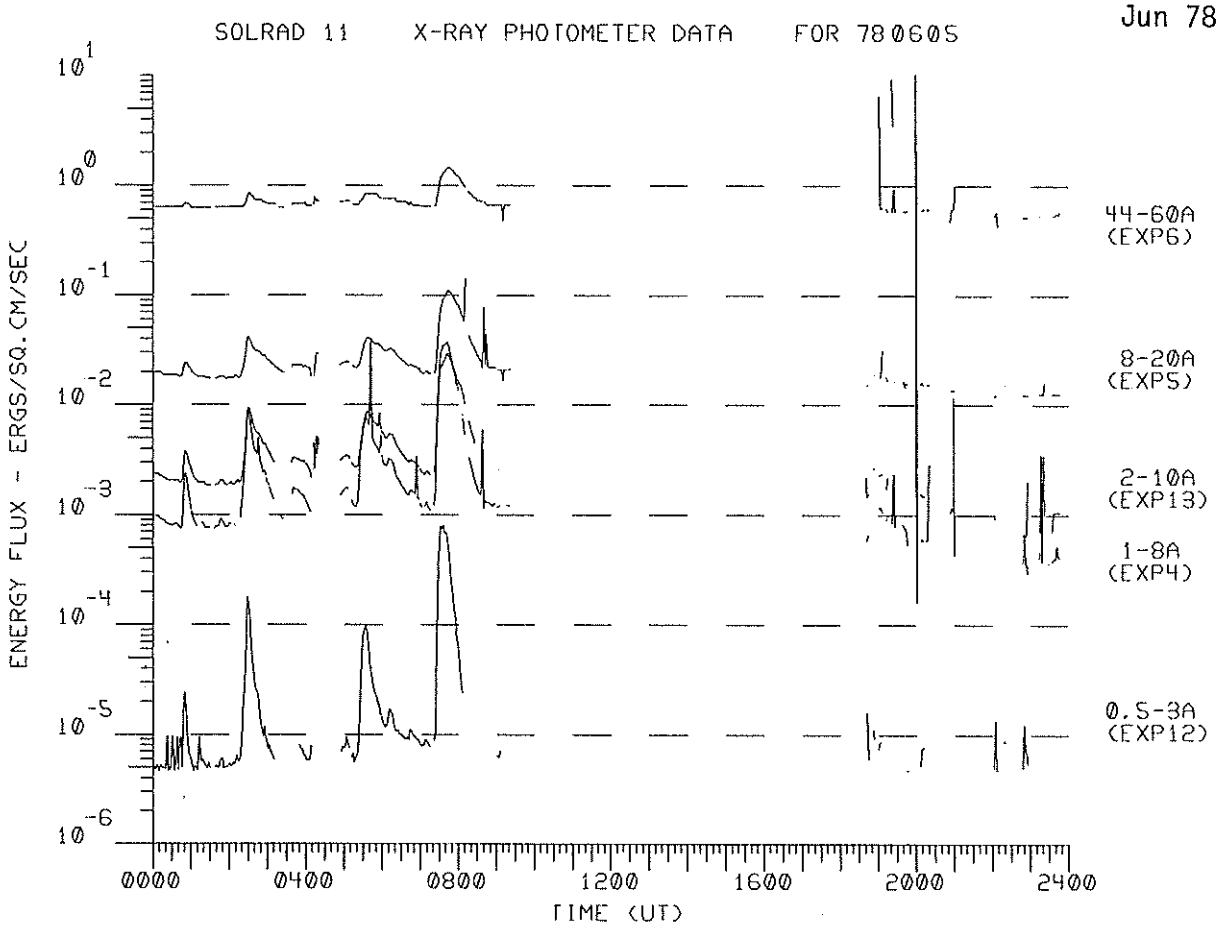
DAY	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
REGION																														
15314		2	1																											
15319	2	1			2																									
15321		2	1																											
15333										1																				
15337								1																						
15352												1	3			1	1	1												
15354																	2		1											
15356																			1											
15358														1																
15360																	1	1												
15363																		1												
15366																1														
15368																				3		1							1	1
15370																						1								
15373																						1	1							
15375																				4	2	2		1		1		1	2	
15376																											1		3	1
15381																														1
X-RAY	1	1	1		2					1		1		1	1				4		1			1	3	4	1		1	1
UNKNOWN																								1						
NO FP			1																					1	4					

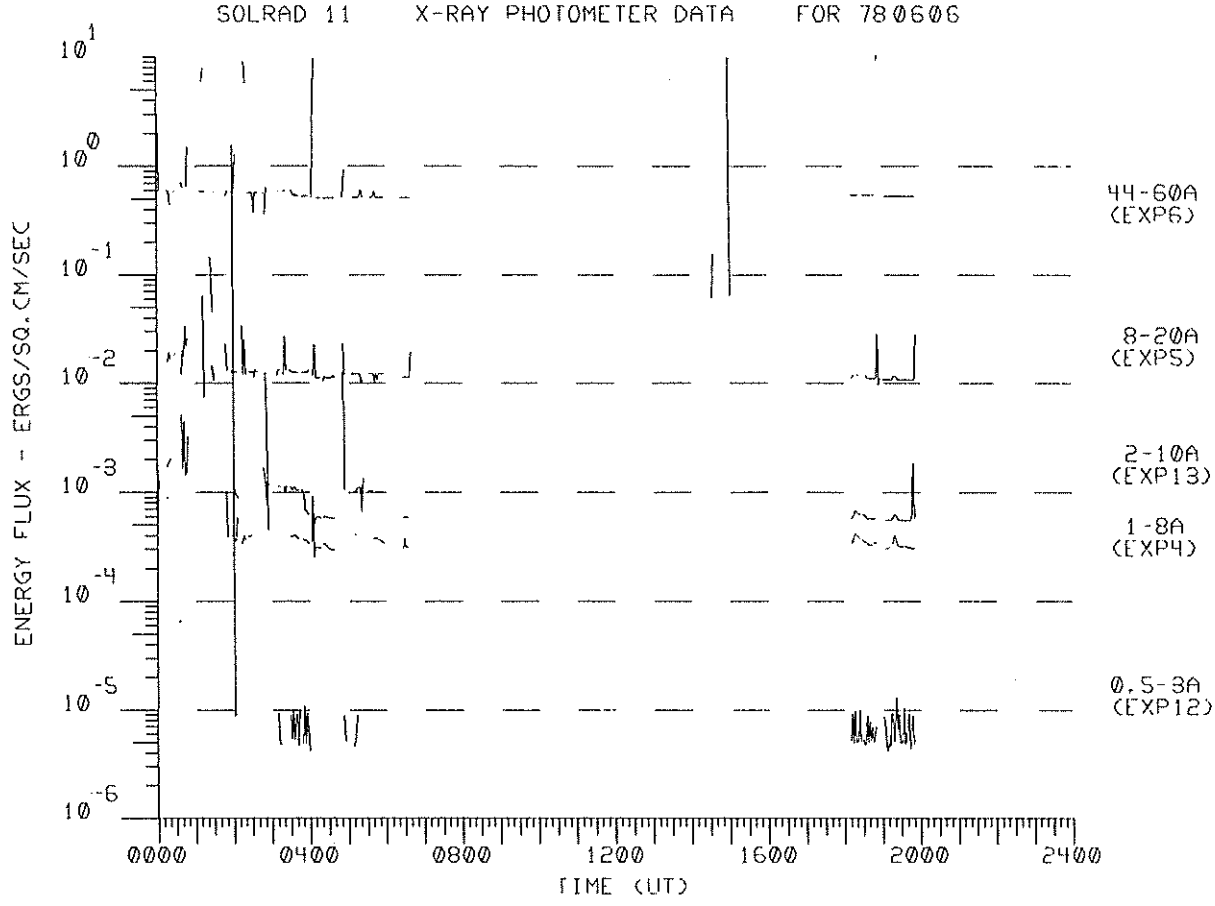

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780601
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

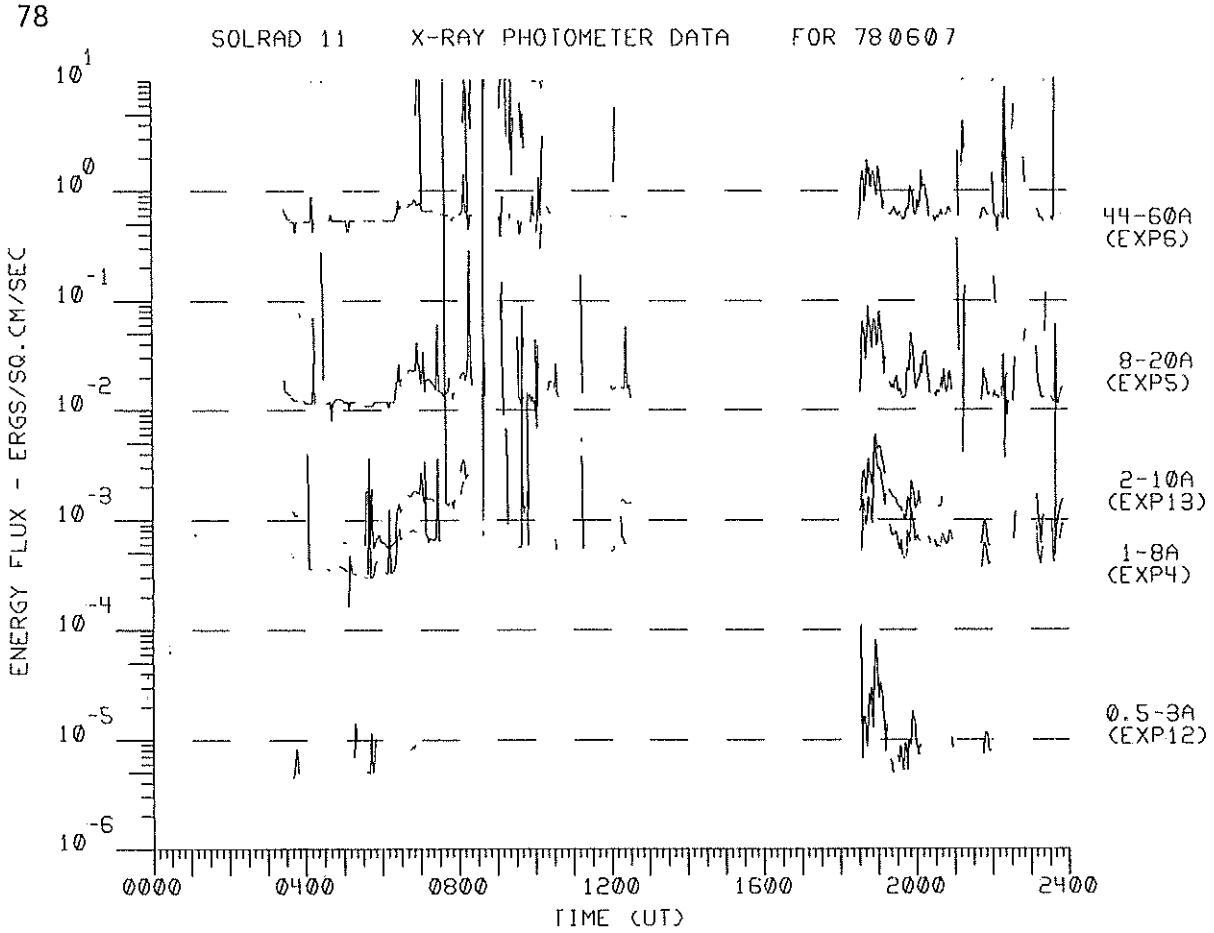

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780602
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

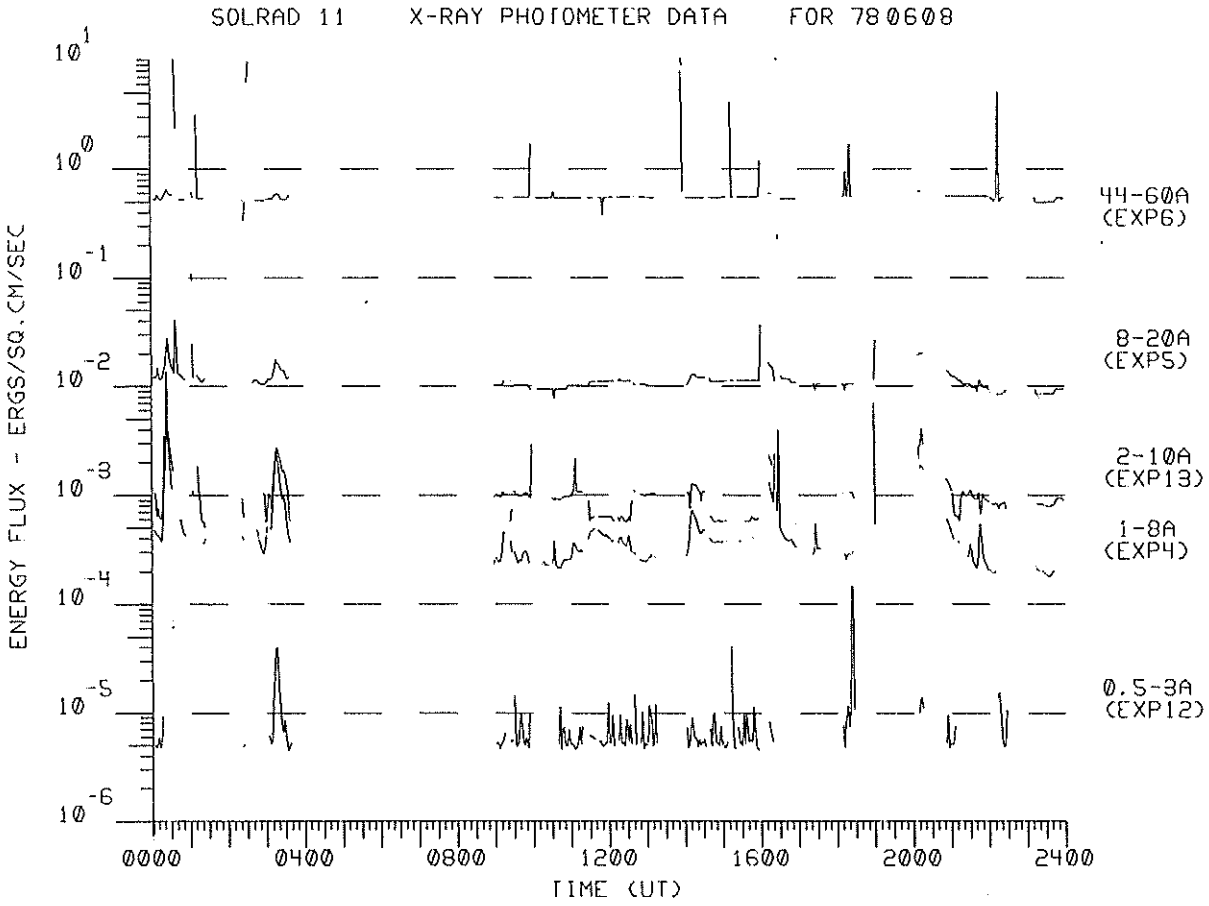

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780603
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

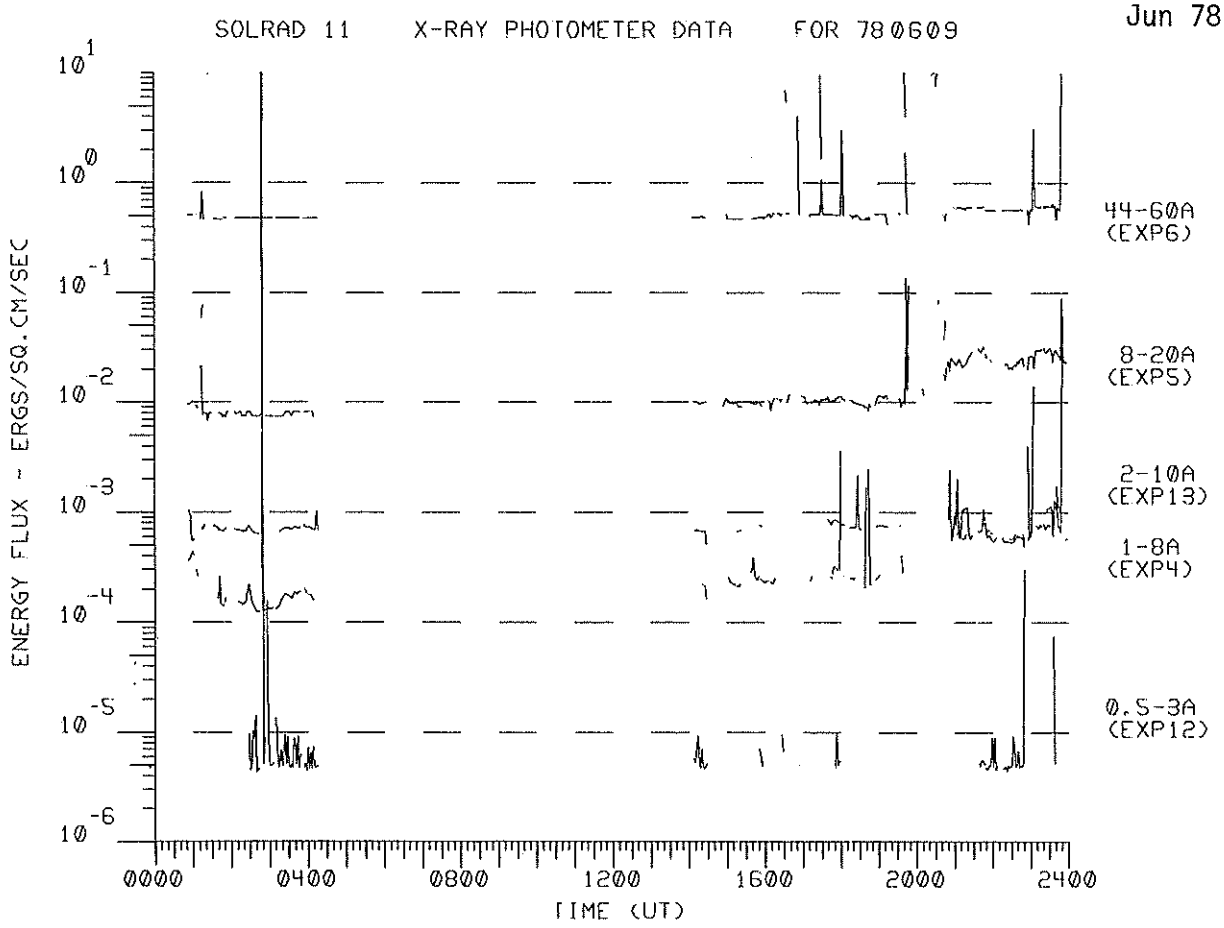

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780604
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

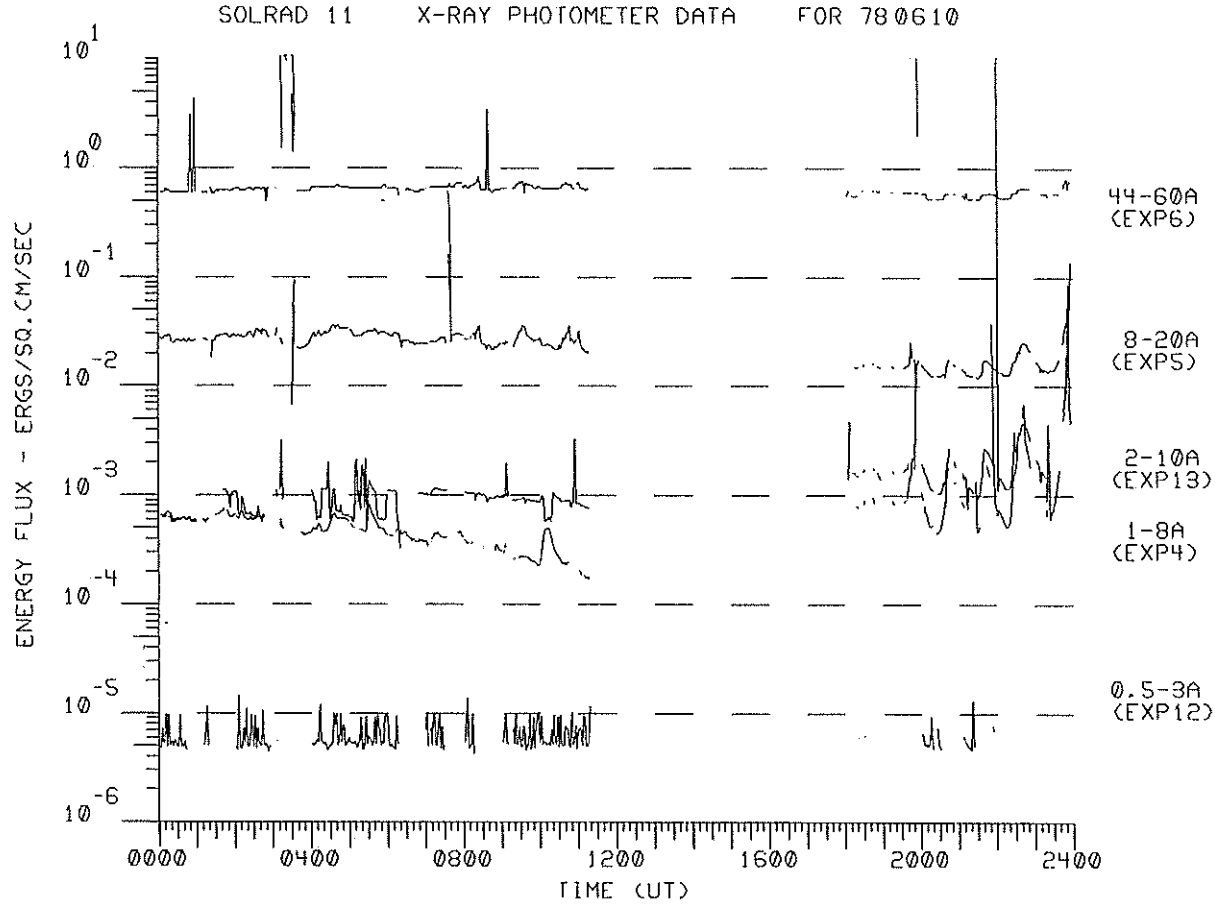

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780605
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

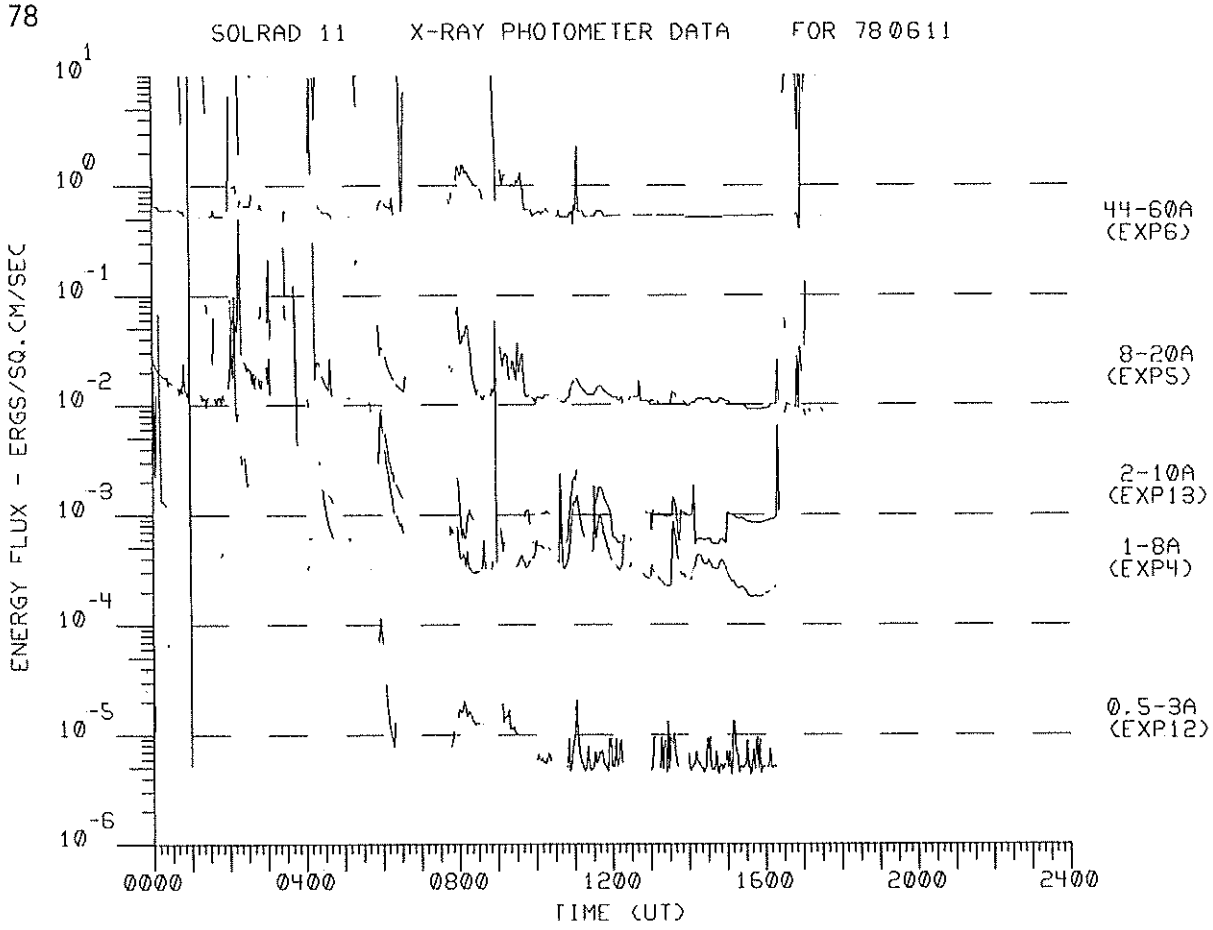

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780606
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

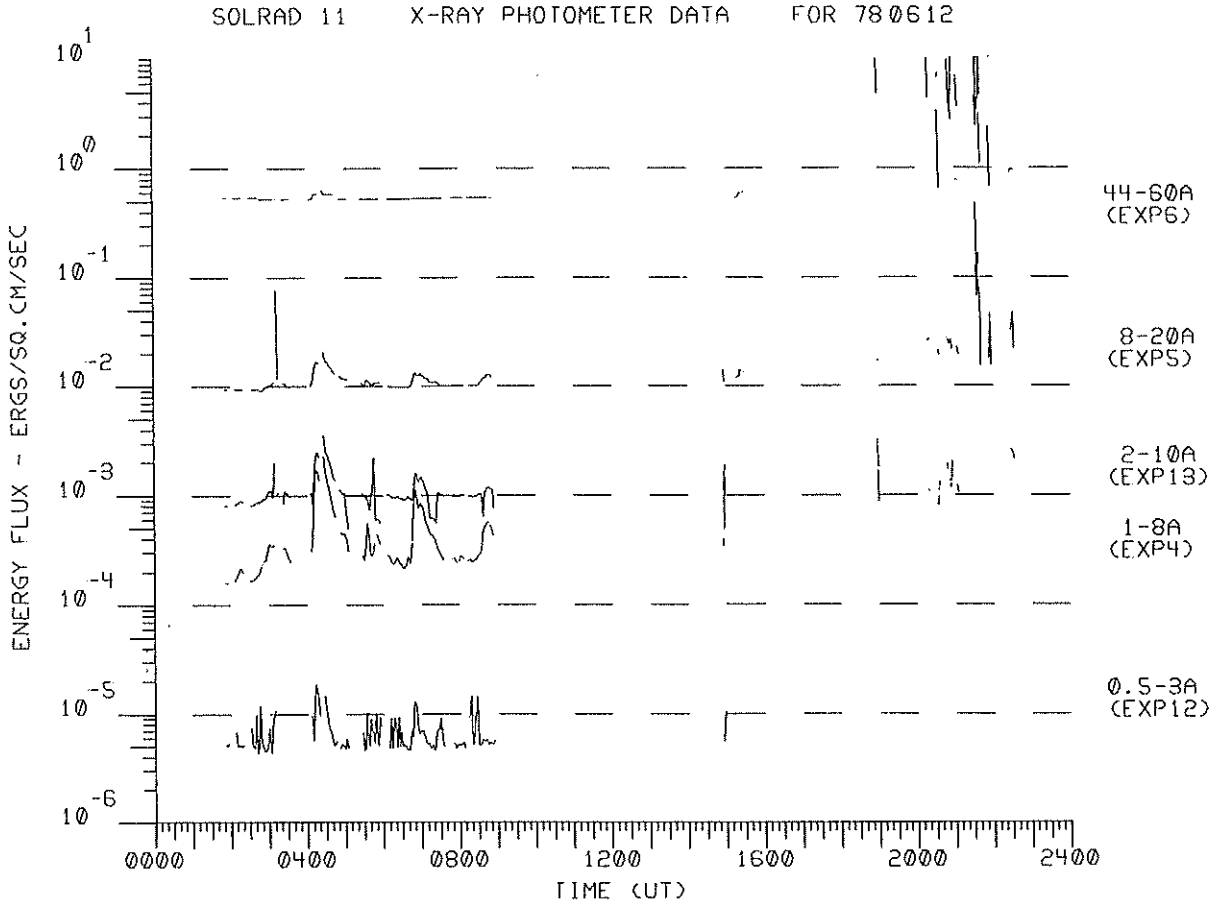

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780607
ENERGY FLUX - ERGS/SQ.CM/SEC
TIME (UT)
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)

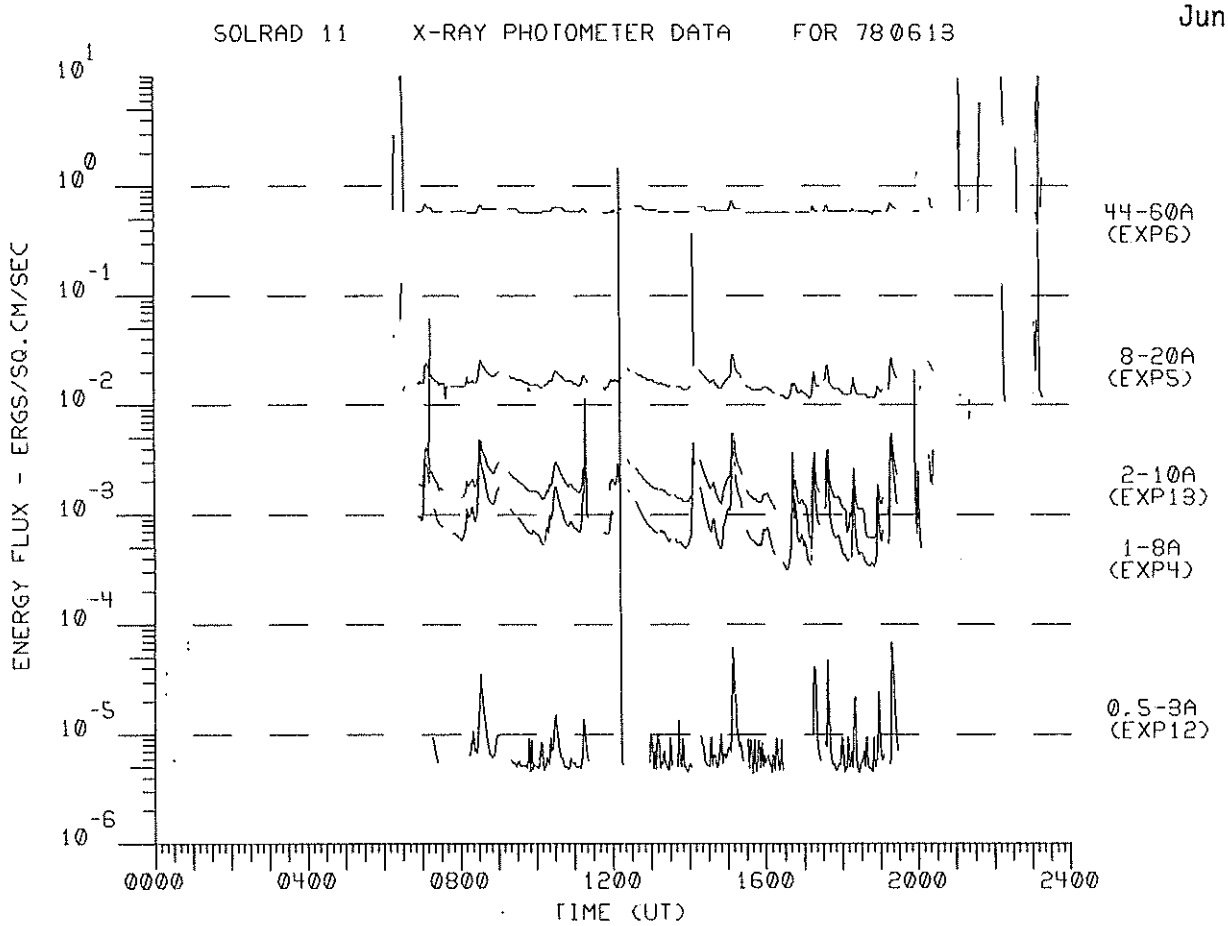

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780608
ENERGY FLUX - ERGS/SQ.CM/SEC
TIME (UT)
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)

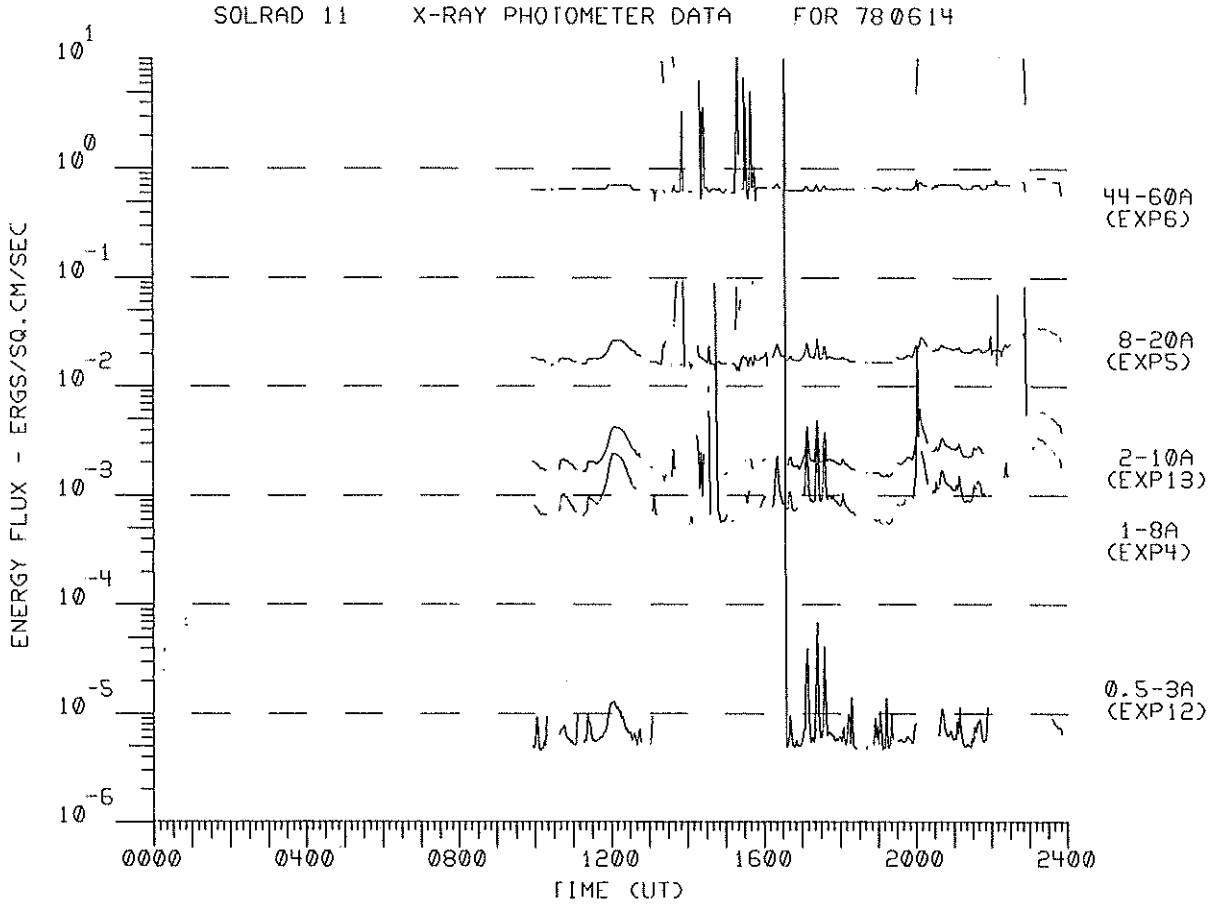

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780609
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

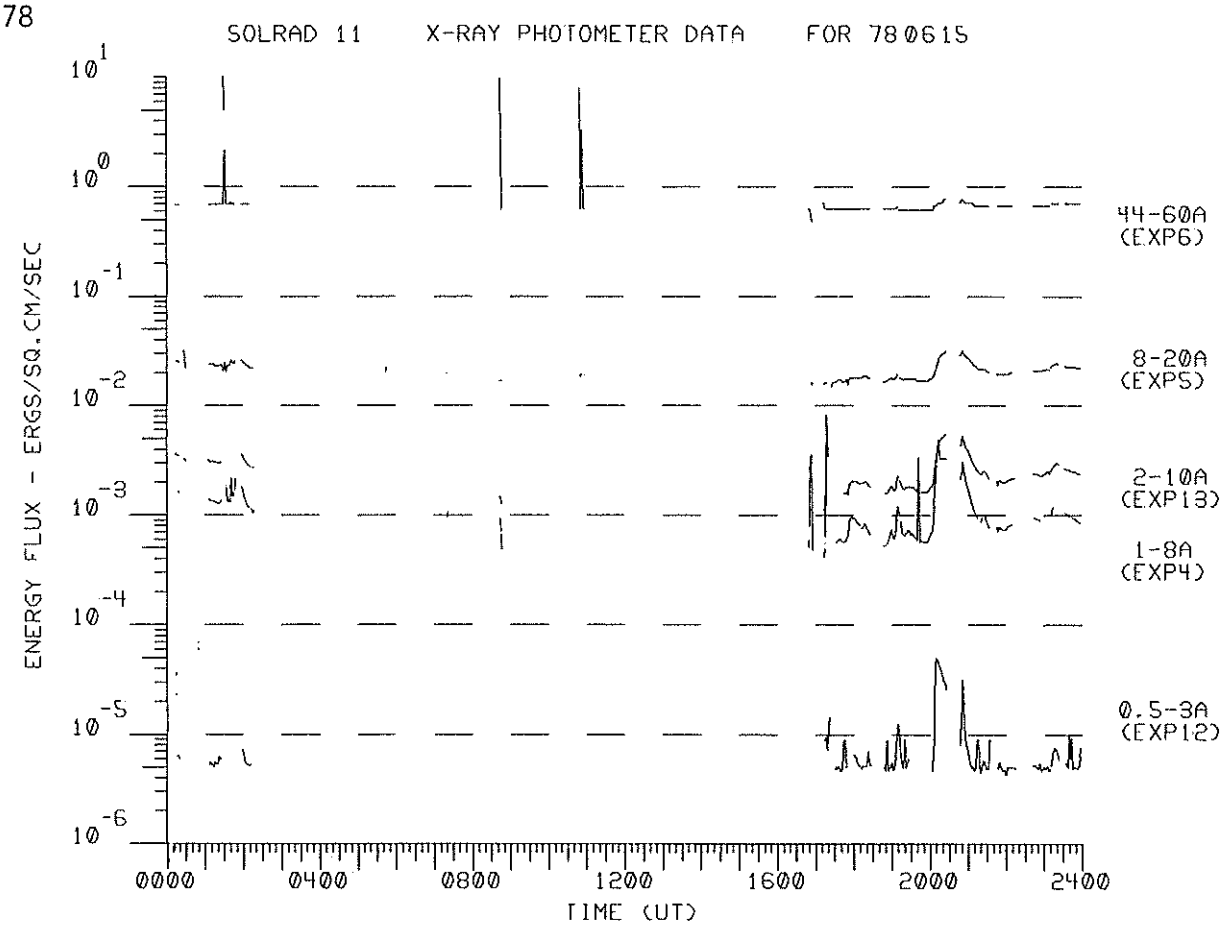

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780610
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

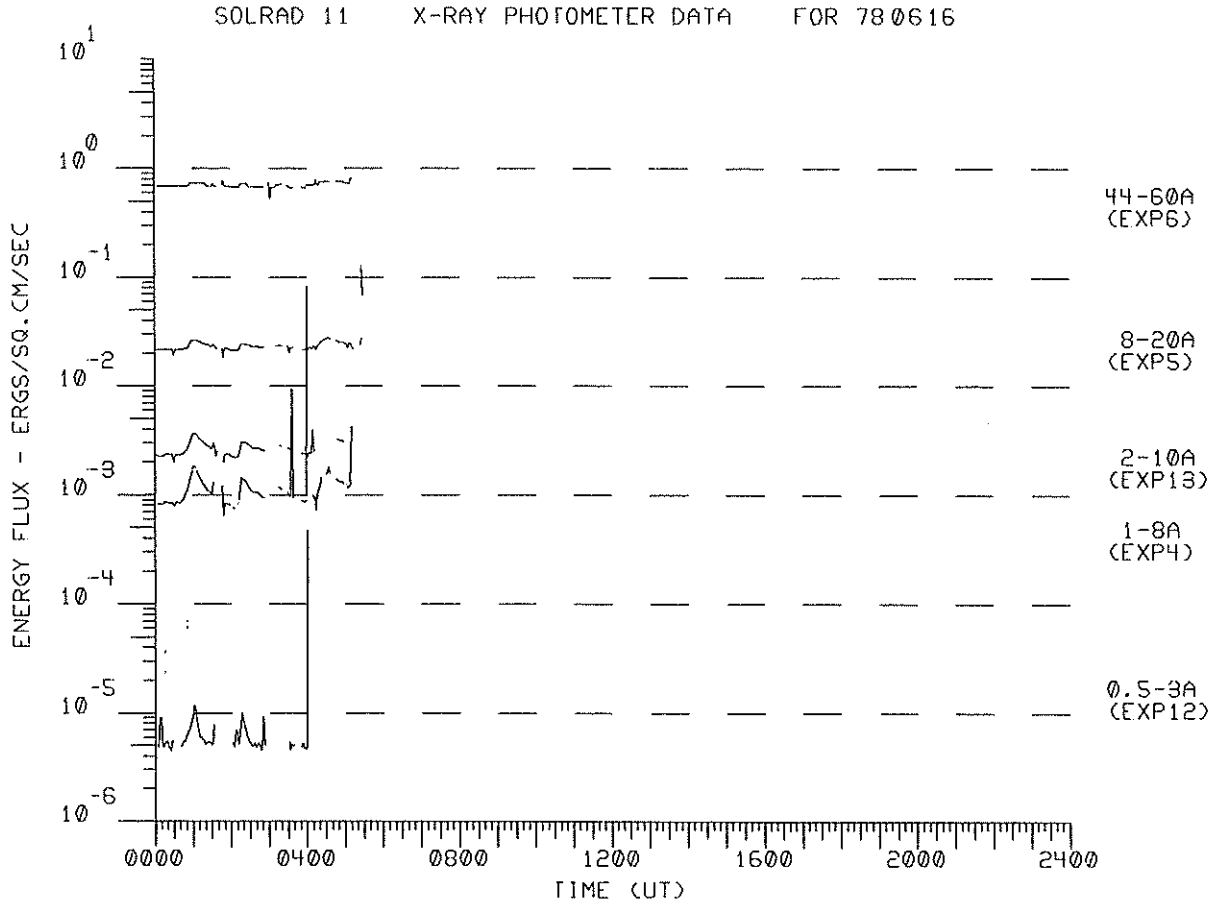

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780611
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

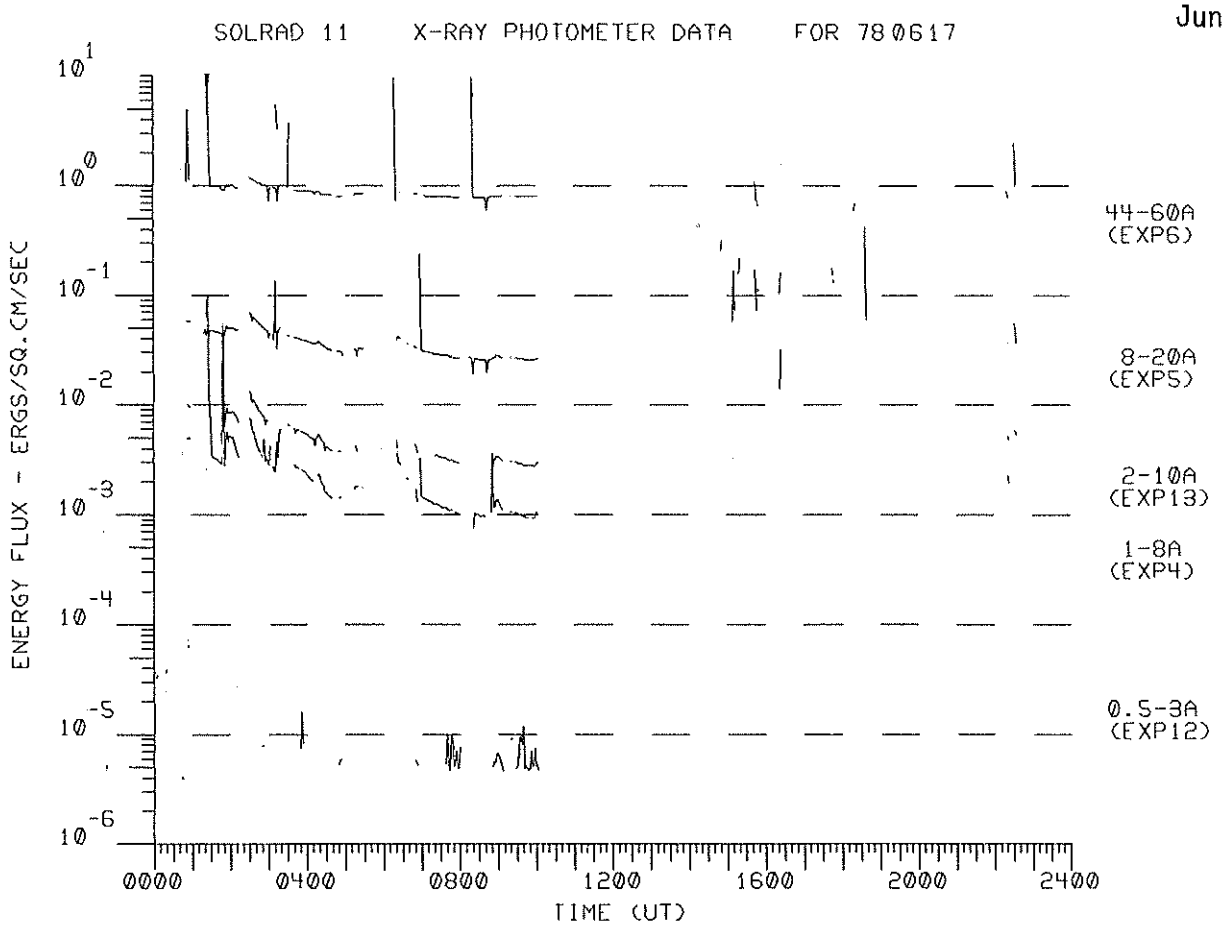

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780612
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

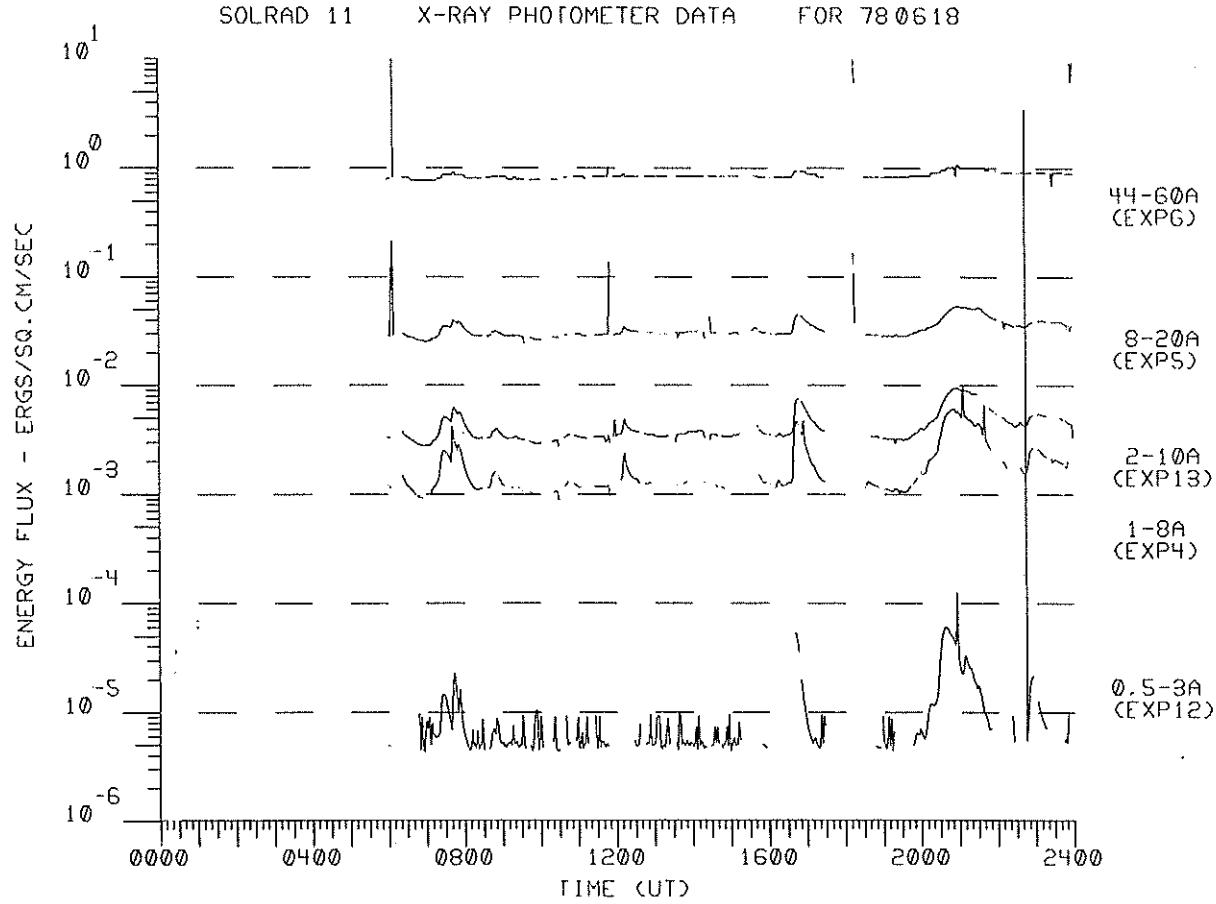

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780613
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

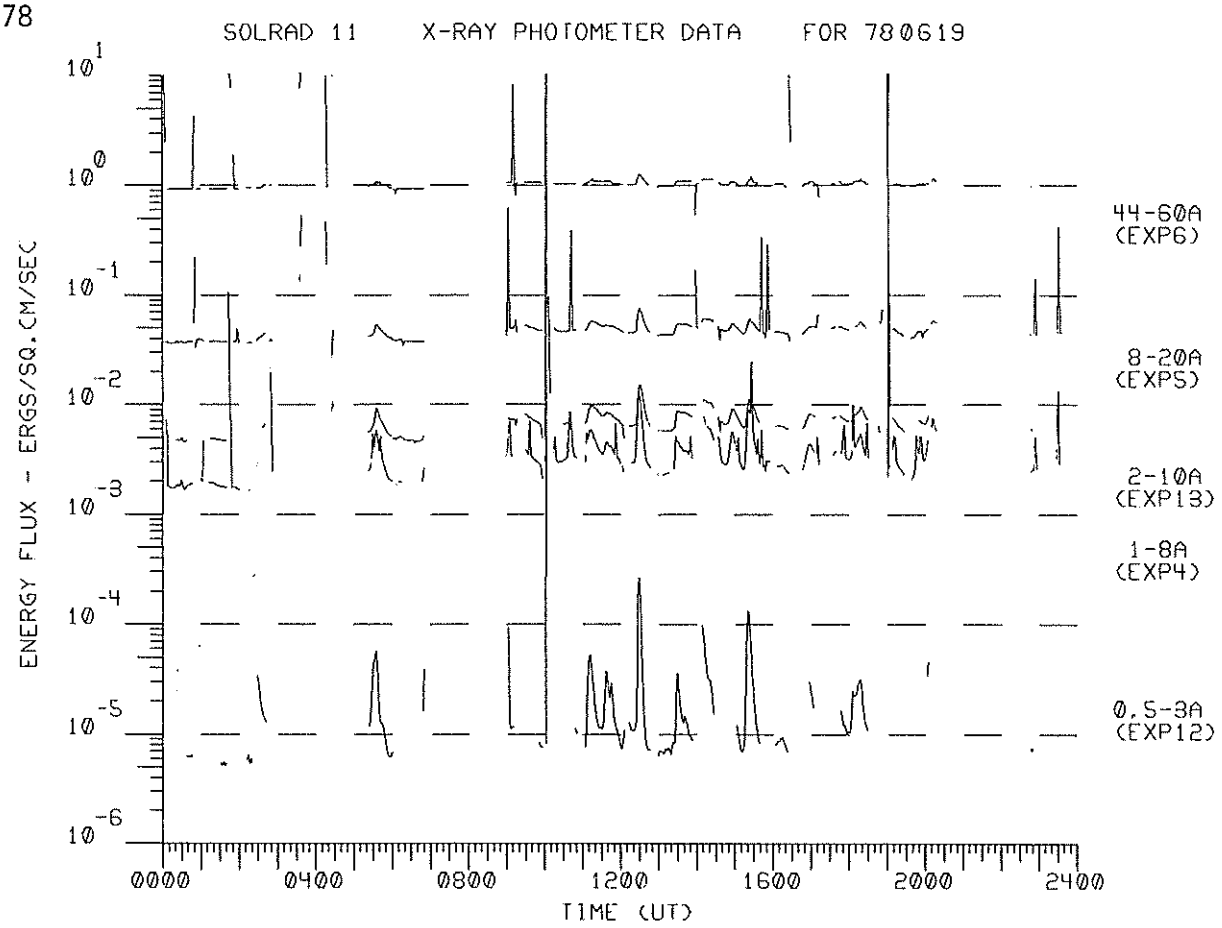

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780614
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780615
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)

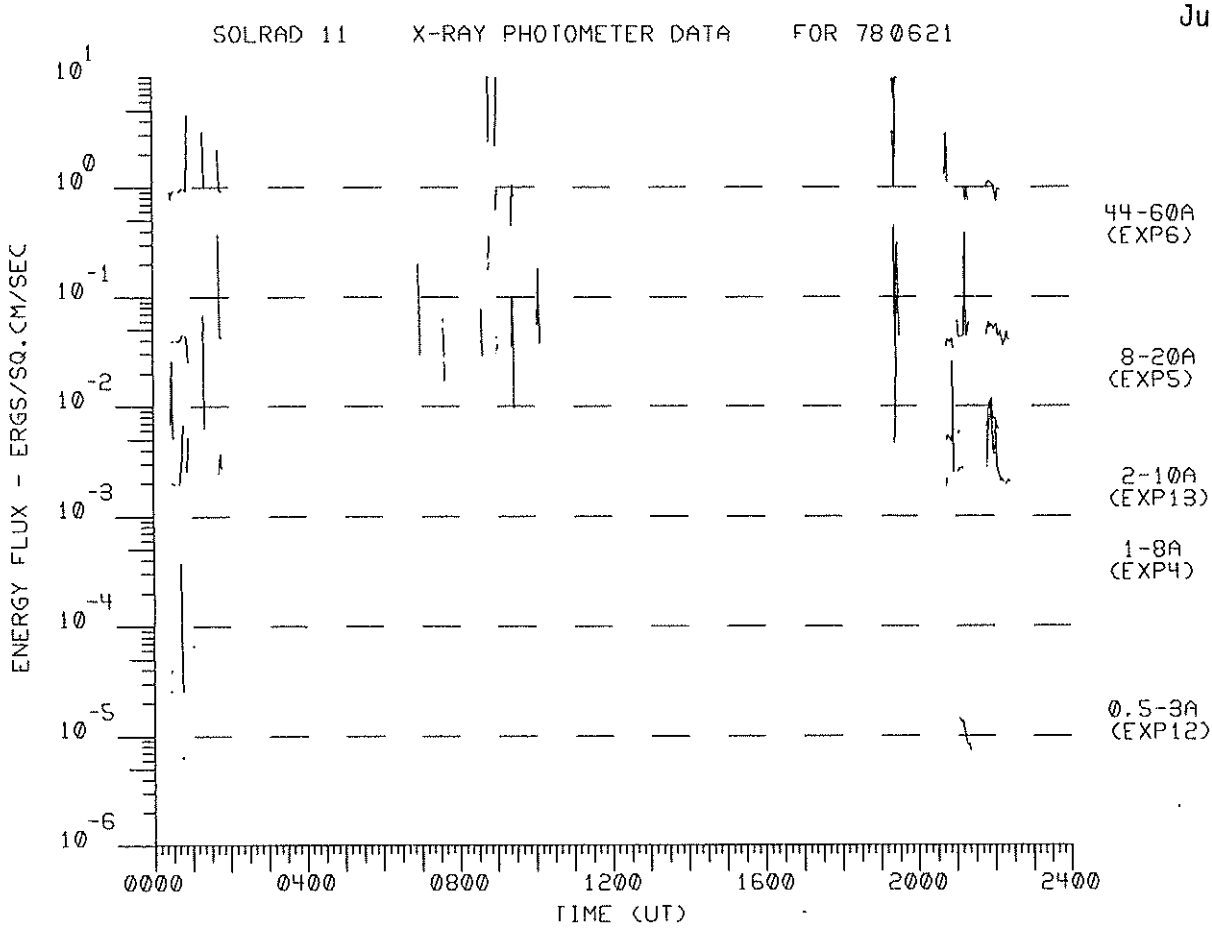

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780616
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

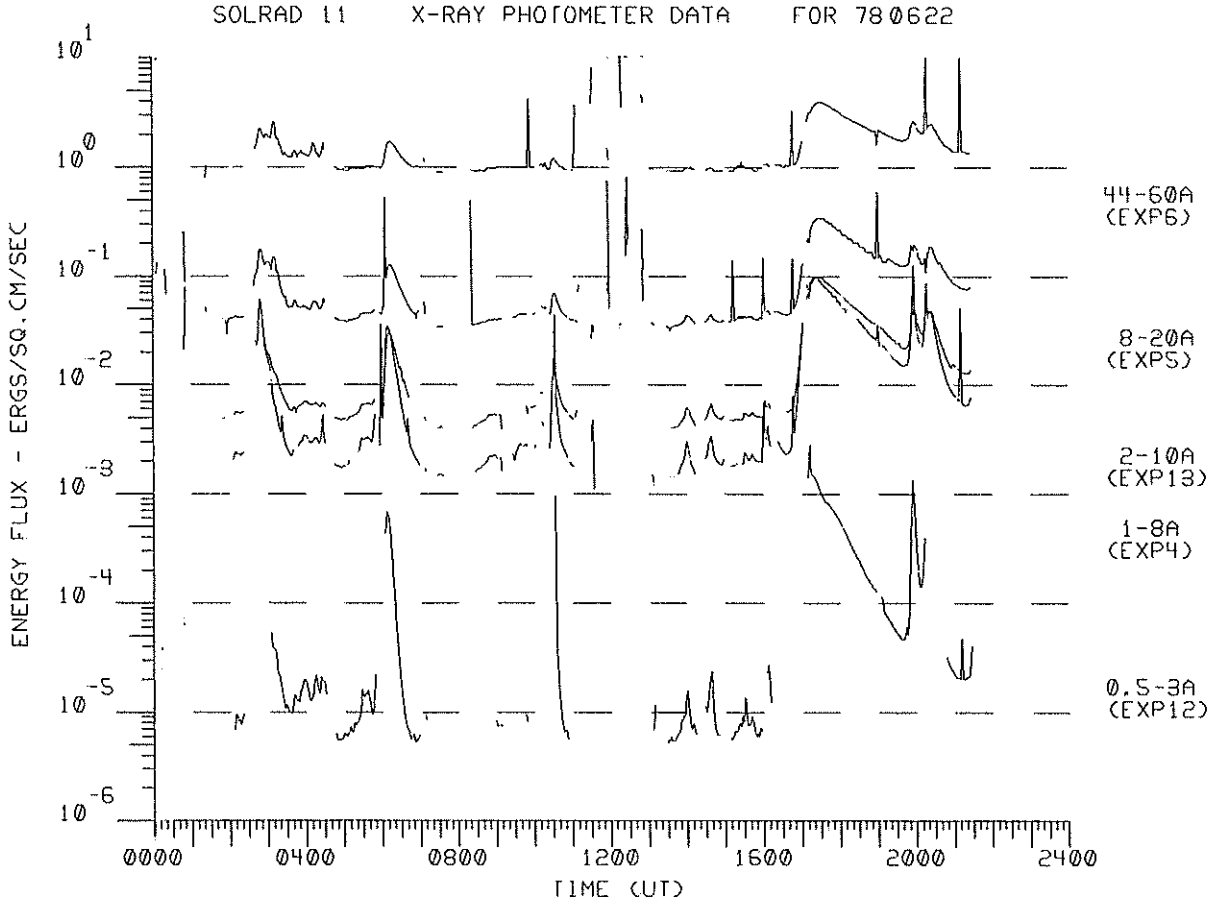

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780617
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

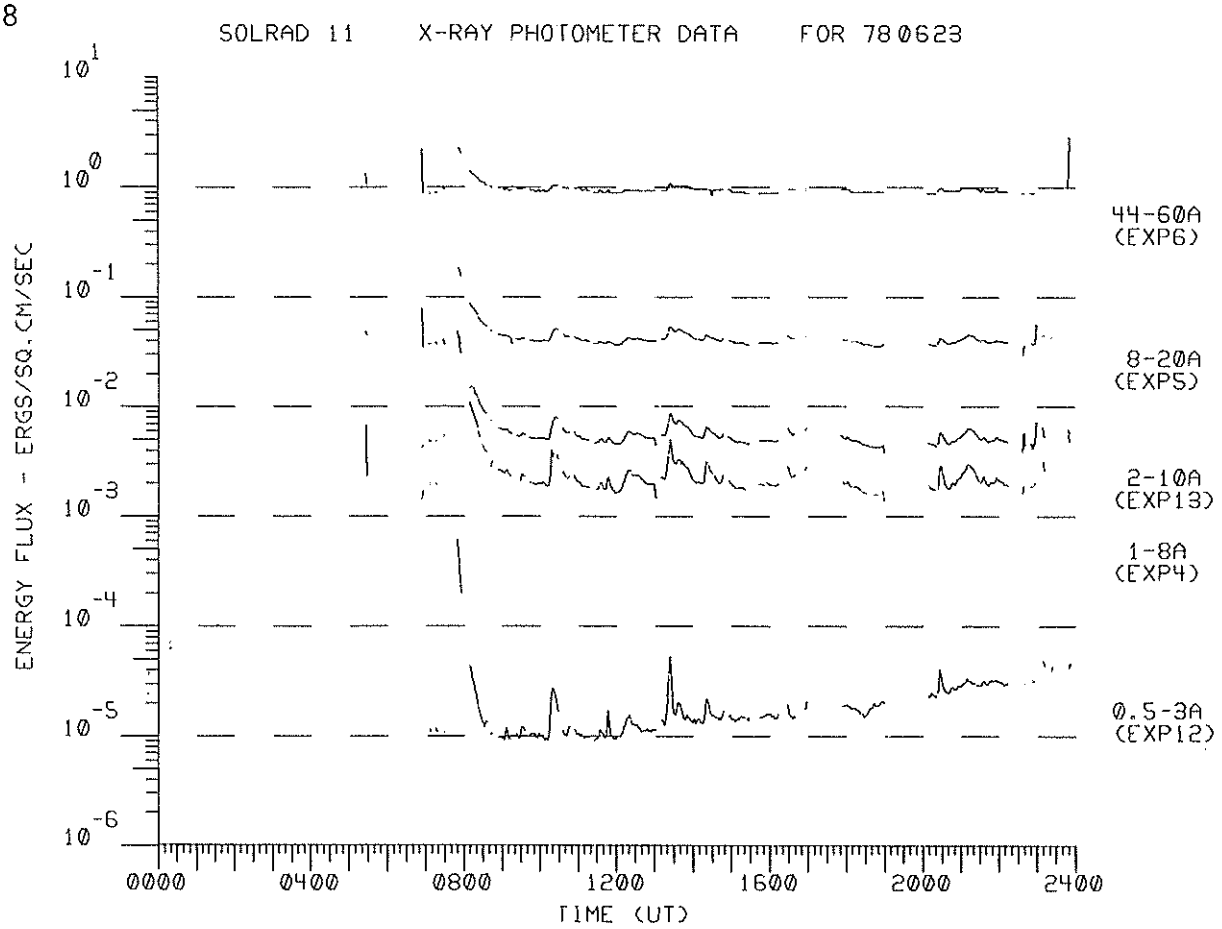

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780618
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

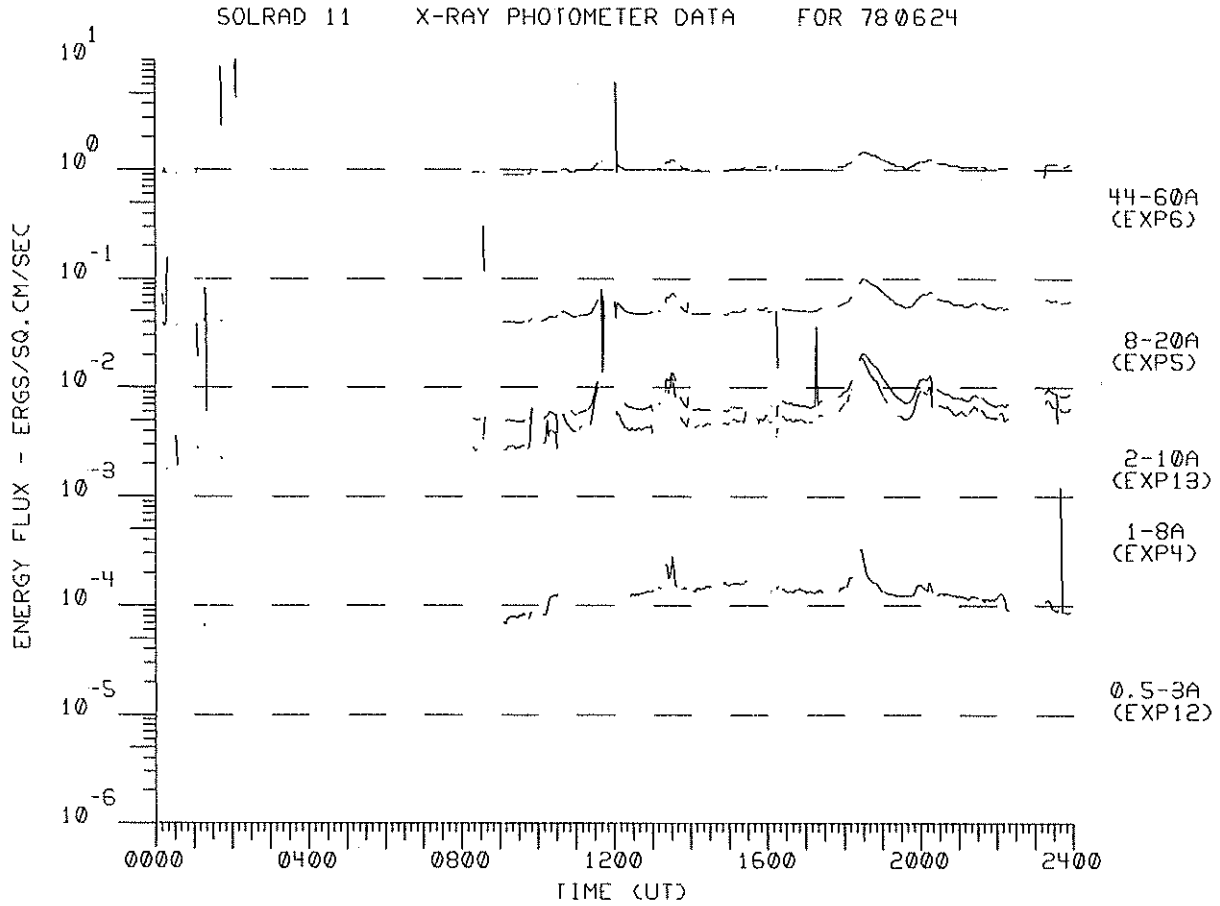

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780619
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

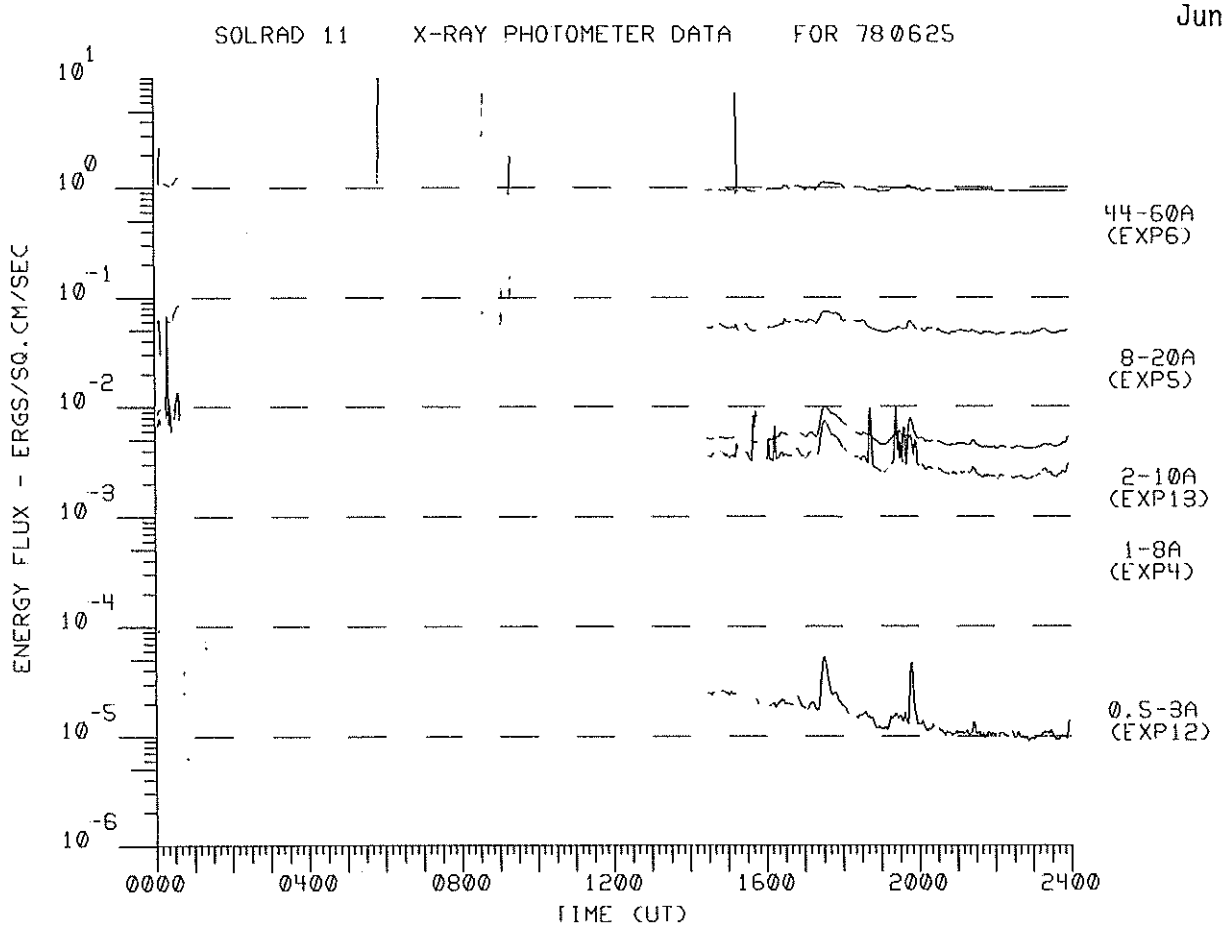
SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780620
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

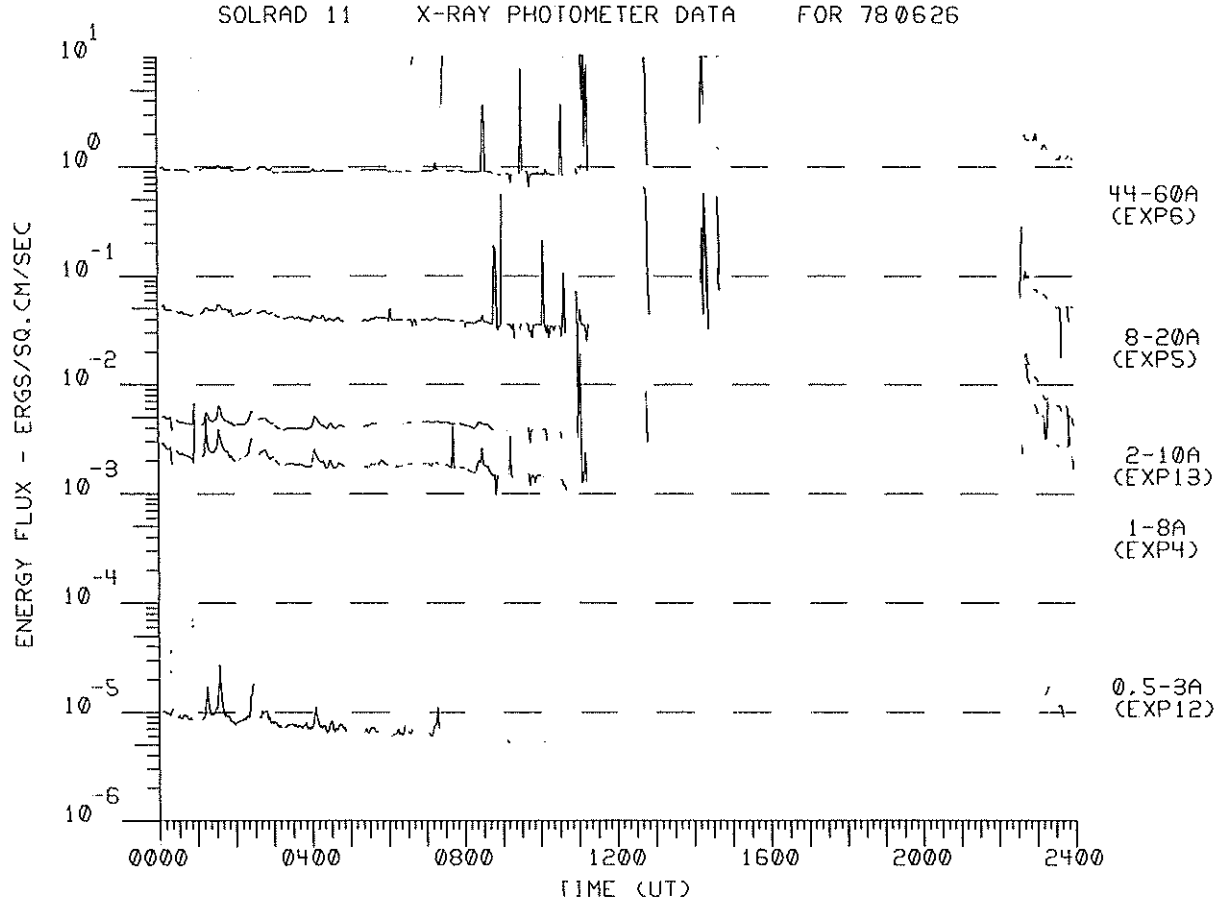

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780621
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

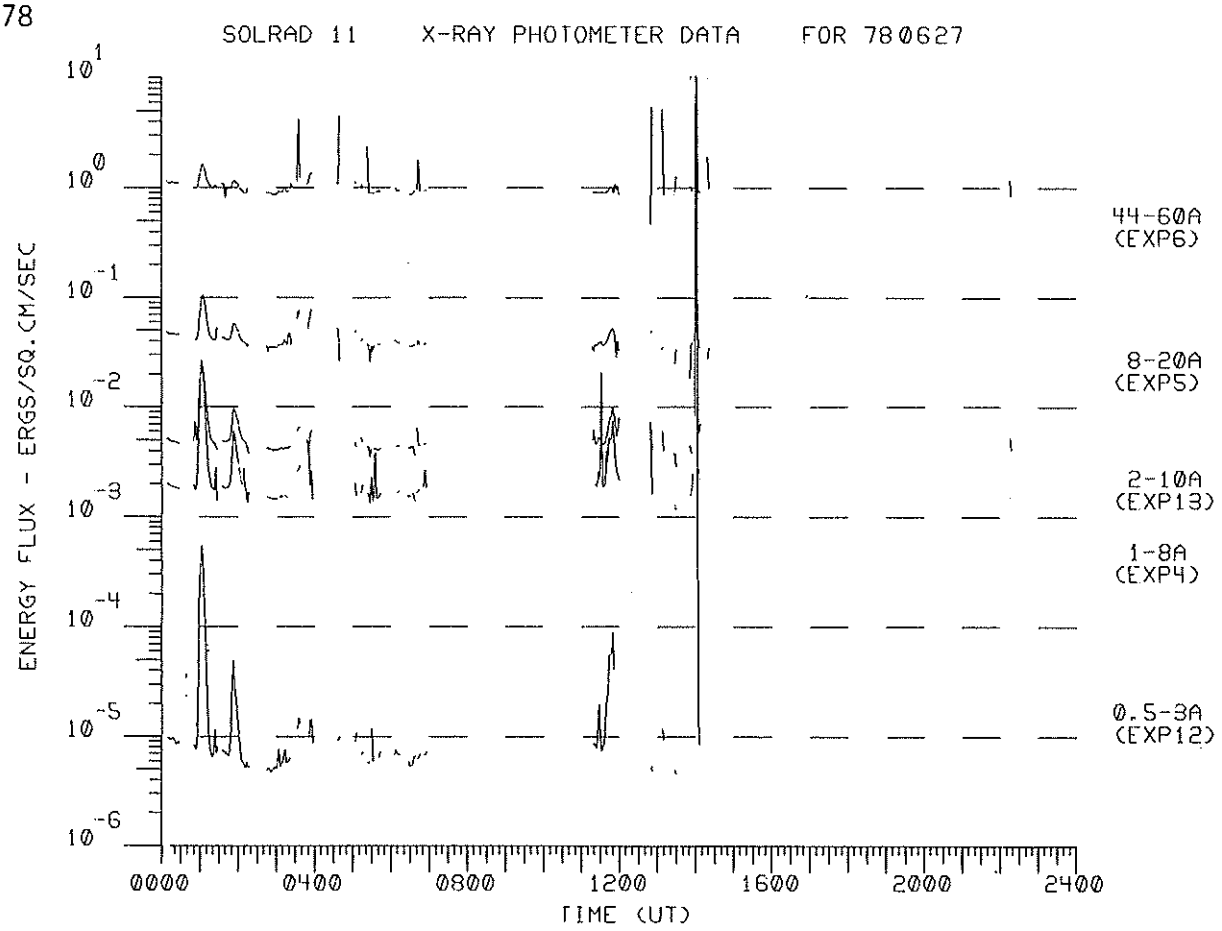

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780622
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

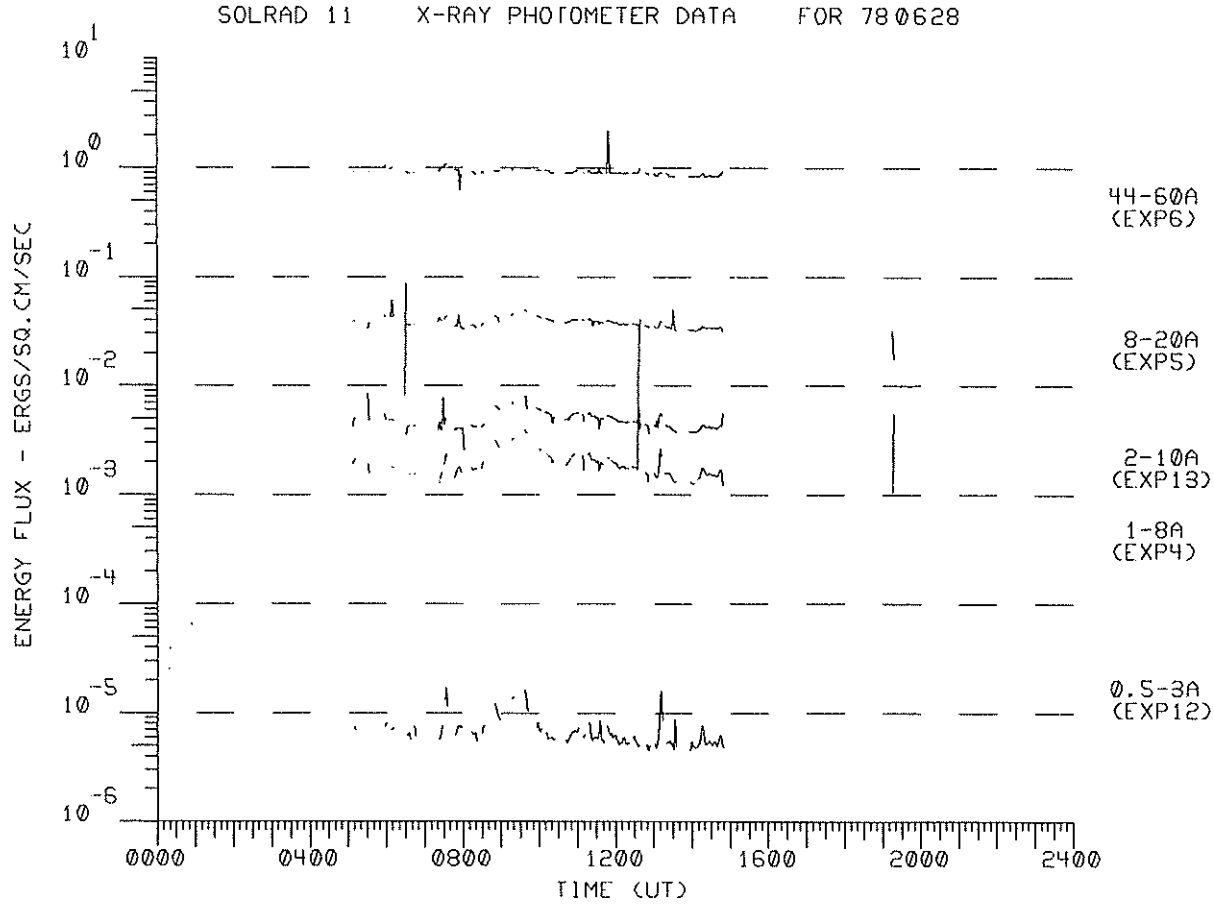

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780623
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

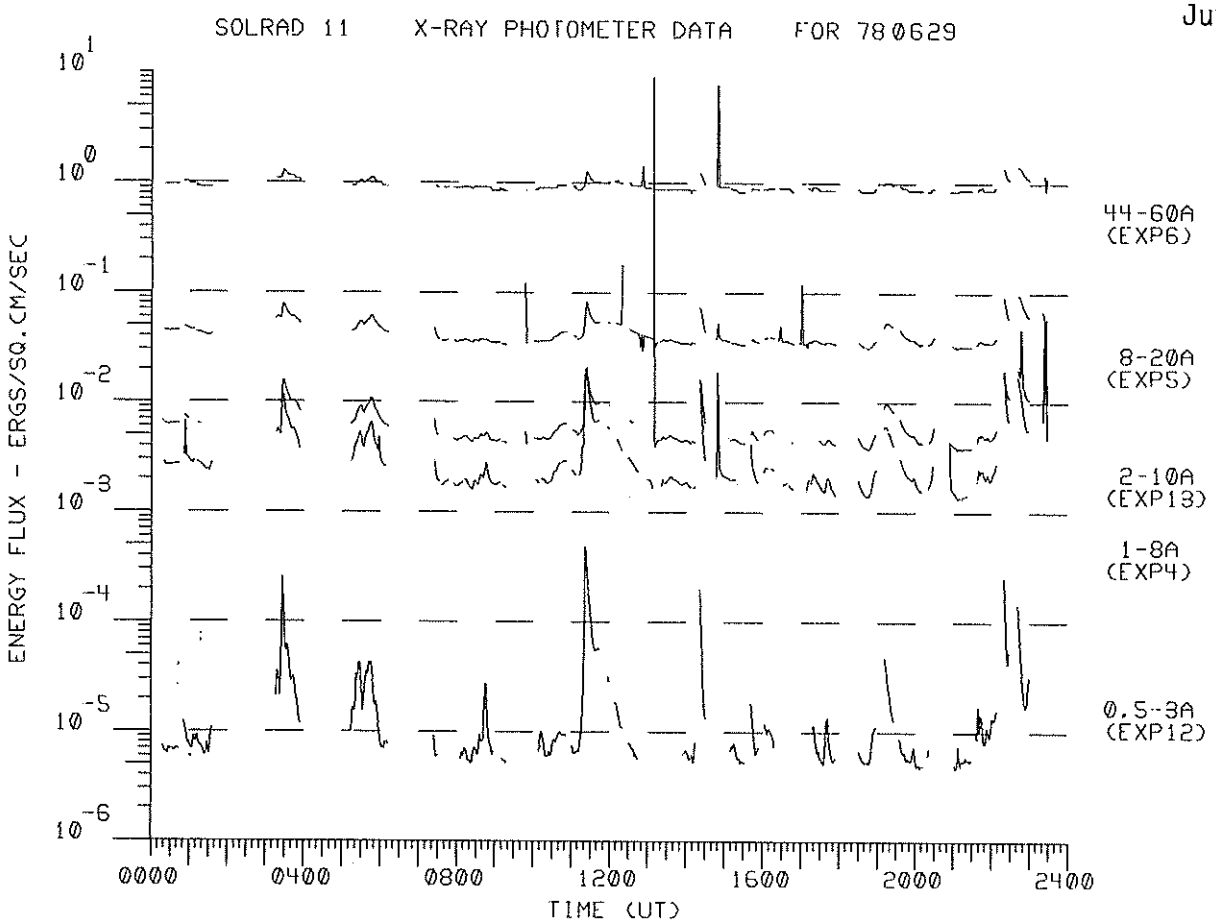

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780624
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)

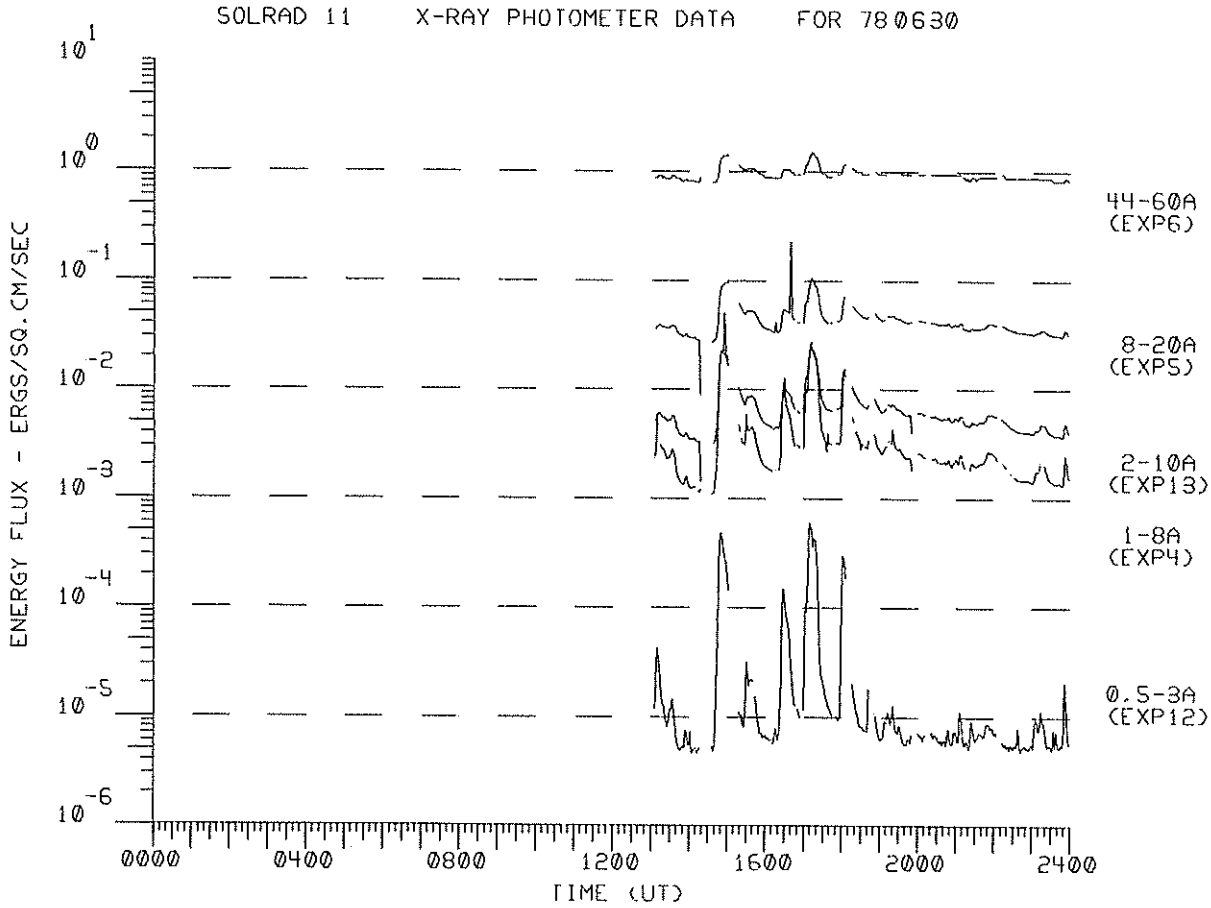

SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780625
ENERGY FLUX - ERGS/SQ.CM/SEC
10^1
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
10^-6
44-60A (EXP6)
8-20A (EXP5)
2-10A (EXP13)
1-8A (EXP4)
0.5-3A (EXP12)
0000
0400
0800
1200
1600
2000
2400
TIME (UT)


SOLRAD 11 X-RAY PHOTOMETER DATA FOR 780626
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 780627
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 780628
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 780629
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 780630
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

JUNE 1978

JUN 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	0255	CULG				0000	0103					IN,W
	0000	0951	MANI										
			CULG				0059.5						IIIB,W
			CULG				0112	0113	1				IIIG
			CULG				0128	0129					IIIG,W
			CULG				0135	0137.5	1				IIIGG
	0350	0640	CULG										
	0409	1830	WEIS				0914.6	0916.0	2				IIIG
	0430	1819	DURN				1025.1	1025.2	2				IIIG
			WEIS				1028.0	1029.3	2				IIIG
			WEIS				1041.4	1041.6	3				IIIB
			WEIS				1049.7	1050.8	2				IIIG
			WEIS				1101.4	1101.5	1				IIIB
			WEIS				1214.6	1214.7	1				IIIB
			WEIS				1324.7	1324.8	1				IIIB
	0913	2409	SGMR				1328.3	1329.4	2				III
			WEIS				1435.9	1436.9	2				IIIG
			DURN	1435.9	1436.8		1435.9	1436.8	3				IIIGG
			SGMR				1436.7	2000.0	1				IIIS
	1230	2245	HARV				1436	1437	1				IIIG
			WEIS				1449.4	1449.6	2				IIIB
			HARV				1614	1802	1				IN,W
			WEIS				1700.0	1758.0	1				IS
			HARV				2034	2035	1				IIIG
			CULG	2101.5	2106	2	2101.5	2106	3				IIIGG,V,U
	2052	2400	CULG				2101	2101.5					IIIG,W
			CULG	2102.5	2108.5	1							POSSIBLE P
			SGMR				2102.5	2106.5	3				V
			HARV	2102	2106	3	2102	2106	3	2102	2106	3	IIIGG,V
			CULG				2108.5	2135	2				II
			CULG				2111.5	2115	1				IIIGG
			SGMR				2112.0	2130.0	2				II
			HARV				2112	2114	2	2112	2114	2	UNCL
			HARV				2114	2131	3	2117	2131	3	II
			CULG	2117.5	2400								IN,W
			CULG	2118	2119	1	2118	2120	2				IIIGG
			HARV				2119		1				IIIG
	2123	2400	MANI										
			CULG				2130	2217.5	1				POSSIBLEIV
			CULG				2131	2400	1				IS
			CULG				2326						RS,DP,W
			CULG				2326	2327					IIIG,W
02	0000	0705	CULG				0000	0322	1				IS,DC
			CULG	0000	0705								IS,W
	0000	0947	MANI										
			CULG				0018						IIIB,W
			CULG				0019	0019.5	1				IIIG
			CULG				0021						IIIB,W
			CULG				0049.5		1				IIIB,U
			CULG				0106						IIIB,W
			CULG	0145.5	0146	1	0145.5	0146	1				IIIG
			CULG				0213.5	0315.5					IIIS,W
			CULG				0233.5	0234.5	1				IIIG
			CULG				0241.5		1				IIIB
			CULG				0243	0244	1				IIIG
			CULG				0254	0258.5	1				IIIGG
			CULG				0300	0304	2				II
			CULG	0301	0303.5	1	0300.5	0304	2				IIIGG
			CULG				0322	0432					IS,W
	0430	1615	DURN										
			CULG				0432	0701.5	1				IS,DC
			CULG				0509.5	0632					IIIN,W
			CULG	0525.5	0526.5	1							IIIG,U
			DURN	0714.1	0716.9	3	0714.1	0716.9	3				IIIGG
	0409	0552	WEIS				0758.2	0758.3	2				IIIB
	0724	1831	WEIS				0809.6	0813.8	2				IIIGG
			WEIS				0821.3	0822.5	2				IIIG
			WEIS				0824.0	0826.7	2				IIIG
			WEIS				0847.3	0851.5	3				IIIGG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JUNE 1978

JUN 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
02			DURN	0848.8	0849.8	3	0848.2	0849.2	3				IIIGG
			WEIS				0910.4	0910.6	1				IIIB
			WEIS				0947.6	0947.7	1				IIIB
			WEIS				0950.4	0952.6	2				IIIG
			DURN				0954.6	0959.3	3				IIIG,N
			WEIS				0954.7	0959.9	3				IIIGG
			DURN				1021.4	1022.0	2				IIIG
			WEIS				1021.6	1022.6	3				IIIG
			WEIS				1024.4	1024.8	3				IIIG
			DURN	1101.0	1119.2		1101.0	1119.2	3				IIIG,N
			WEIS	1101.1	1101.2	2							IIIB
			WEIS				1102.2	1102.3	1				IIIG
			WEIS				1103.9	1105.0	3				IIIGG
	0912	2410	SGMR				1104.2	1104.9	2				IIIG
			WEIS				1108.6	1109.7	3				IIIG
			WEIS				1118.6	1120.0	2				IIIG
			WEIS				1134.9	1135.3	1				IIIG
			WEIS				1138.2	1138.5	2				IIIG
			SGMR				1138.3	1410.0	2				IIIS
			WEIS				1140.5	1141.8	1				IIIG
			DURN				1150.8	1154.8	2				IIIG,N
			WEIS				1150.9	1151.1	1				IIIG
			WEIS				1152.8	1153.2	1				IIIG
			WEIS				1154.1	1154.3	1				IIIG
			WEIS				1206.3	1210.7	2				IIIG
			WEIS				1213.0	1213.2	1				IIIB
			WEIS				1231.1	1231.2	1				IIIB
			WEIS				1238.3	1238.5	1				IIIB
			WEIS				1246.7	1251.3	1				IIIG
			WEIS				1255.3	1256.3	1				IIIG
			DURN	1259.4	1259.4	3	1259.4	1259.4	3				III
			DURN	1429.9	1430.2	3	1429.9	1430.2	3				IIIG
			WEIS				1455.1	1456.0	1				IIIG
			DURN				1455.5	1458.4	3				IIIGG
			WEIS				1615.8	1615.9	1				IIIG
			WEIS				1639.4	1639.8	1				IIIG
	1230	2240	HARV				1640		1	1640		1	IIIG
			WEIS				1655.0	1655.1	1				IIIB
			HARV				1656		1	1656		1	IIIB
			WEIS				1709.1	1710.8	1				IIIG
			WEIS				1712.6	1712.7	1				IIIB
			SGMR				1714.0	1715.0	1				IIIG
			WEIS				1727.8	1732.1	1				IIIG
			WEIS				1742.1	1742.6	1				IIIG
			HARV				1800		1	1800		1	IIIB
			HARV				1806		2	1806		2	IIIB
			HARV	1849		2							IIIG
			HARV				1914	1915	2	1914	1915	2	IIIG
			SGMR				1956.2	1956.3	1				III
			HARV				1956		2	1956		3	IIIB
	2050	2400	CULG	2054	2400								IN,W
			CULG				2058	2400	1				IS
			CULG				2131.5	2313.5					IIIN,W
	2140	2400	MANI										
			CULG	2257.5	2258								IIIG,W
			CULG	2306	2306.5	1							IIIG
03	0000	0710	CULG				0000	0458					IS,W
	0000	0944	MANI										
			CULG				0008	0704					IIIN,W
			CULG	0100	0705								IN,W
			CULG				0155	0159.5	1				IIIGG
			CULG	0158	0158.5								IIIG,W
			CULG	0201	0201.5								IIIG,W
			CULG				0231.5		2				IIIB
			CULG	0231	0231.5	1	0229.5	0232.5	1				IIIGG,V
	0408	1328	WEIS				0433.0	0434.0	1				IIIB
			WEIS				0456.3	0457.7	1				IIIG
			CULG				0458	0700	1				IS
			WEIS				0514.7	0519.7	2				IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JUNE 1978

JUN 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			CULG				0516	0538.5	1				IIIS
			WEIS				0521.8	0528.3	2				IIIG
	0525	1819	DURN				0525 E	1819	3				I,DC
			WEIS				0530.2	0538.6	2				IIIG
			WEIS				0548.4	0548.5	1				IIIB
			WEIS				0628.1	0628.3	1				IIIB
			CULG				0628						IIIB,U,W
			WEIS				0638.3	0638.4	1				IIIB
			WEIS				0702.3	0702.4	2				IIIB
			WEIS				0733.7	0733.8	1				IIIG
			WEIS				0739.9	0740.1	1				IIIB
			WEIS				0745.4	0745.5	3				IIIB
			DURN	0826.1	0826.3	3	0826.1	0826.3	3				IIIG,U
			WEIS	0826.2	0826.3	2							IIIB
			WEIS				0910.4	0910.5	2				IIIB
			WEIS				0949.4	0949.5	1				IIIB
			DURN				1205.6	1206.2	3				IIIG
			WEIS				1205.8	1206.4	3				IIIG
			WEIS	1307.8	1308.8	1							IIIG
			DURN	1307.8	1311.0	3	1307.8	1311.0	3				IIIGG
	1230	2245	HARV	1308		1							IIIG
			WEIS				1310.2	1311.1	3				IIIG
	1343	1833	WEIS										
			HARV				1736		1				I
			HARV				1826		1	1826		1	IIIB
			HARV				2031		1	2031		1	IIIB
	2050	2400	CULG	2058	2400		2100	2400					IS,W
			CULG				2120.5	2400					IIIS,W
			CULG				2142.5	2342.5	1				IIIN
	2152	2400	MANI										
	0912	2411	SGMR				2213.7	2214.6	1				IIIG
			HARV				2213	2215	2	2214	2215	2	IIIGG
			CULG	2214	2214.5	1	2213	2215	2				IIIGG
04			CULG				0000	0219					IIIN,W
	0000	0712	CULG				0000	0229					IS,W
	0000	0944	MANI										
			CULG				0219	0457					IIIS,W
			CULG				0229	0443	1				IS
	0408	1834	WEIS				0419.5	0531.5	1				IIIN
			CULG				0443	0651					IS,W
			CULG				0457	0644					IIIN,W
			WEIS	0646.2	0646.6	2	0646.2	0646.6	2				IIIG
	0430	1819	DURN	0647.1	0650.6	3	0647.1	0650.6	3				IIIGG,N
			CULG	0647	0648	1							IIIG,RS
			WEIS	0650.2	0650.5	1							IIIG
			CULG	0650	0651	1							IIIG
			DURN	1031.9	1031.9	1	1031.9	1031.9	3				III
			WEIS				1145.7	1146.0	1				IIIB
			WEIS				1150.8	1151.1	1				IIIB
			WEIS				1156.4	1156.5	1				IIIB
			DURN	1212.1	1214.4	3	1212.1	1214.4	3				IIIGG
			WEIS	1212.2	1217.5	3	1212.2	1217.5	3				IIIG
	0912	2412	SGMR				1213.0	1214.6	3				V
			WEIS				1250.9	1251.3	1				IIIB
			WEIS				1304.8	1305.4	1				IIIG
			SGMR				1305.0	1305.3	1				V
			WEIS				1308.8	1308.9	1				IIIB
			WEIS				1340.4	1341.6	3				IIIG
			WEIS				1346.3	1346.4	1				IIIB
			WEIS				1348.0	1351.4	3				IIIGG
			DURN	1348.0	1350.1	1	1348.0	1350.1	3				IIIGG
			SGMR				1349.4	1351.5	3				V
	1230	2245	HARV				1349	1350	3	1349	1350	3	IIIG
			WEIS				1412.5	1413.5	3				IIIG
			DURN	1412.7	1413.0	1	1412.7	1413.0	3				IIIGG
			SGMR				1413.0	1700.0	1				IIIS
			HARV				1413		2				IIIG
			WEIS				1417.7	1419.6	1				IIIG
			WEIS				1434.6	1434.7	1				IIIB

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JUNE 1978

JUN 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
04			OURN	1440.4	1440.8	2	1440.4	1440.8	3				IIIGG
			HARV				1441		2				IIIG
			OURN				1446.2	1446.2	1				III
			WEIS				1515.8	1515.9	2				IIIB
			OURN				1520.5	1521.0					IIIG
			WEIS				1520.6	1520.8	1				IIIG
			WEIS				1523.6	1523.7	1				IIIB
			WEIS				1638.9	1639.3	2				IIIB
			HARV				1639		2				IIIB
			WEIS				1714.7	1715.4	1				IIIG
			WEIS				1733.4	1733.7	2				IIIG
			SGMR				1733.7	1734.0	2				III
			HARV				1733		3	1733		3	IIIB
	2051	2400	CULG				2101	2244					IS,W
			CULG				2102	2227					IIIS,W
	2146	2400	MANI										
			CULG				2227	2349					IIIN,W
			CULG	2357	2358.5	1							IIIGG
05	0000	0950	MANI										
	0000	0712	CULG				0011	0609					IIIN,W
			CULG				0014	0337					IN,W
			CULG	0022	0022.5								IIIG,W
			CULG	0050.5	0056.5	1	0050.5	0056.5	1				IIIN
			CULG	0113.5	0114	1	0113.5	0114	1				IIIG
			CULG	0302.5		1	0302.5	0303	2				IIIG,V
			CULG				0304.5		1				IIIB
			CULG	0305		1	0305		2				IIIB
			CULG				0417.5	0418.5	2				IIIG,V
	0407	0531	WEIS				0417.5	0419.7	3				IIIG
	0430	0858	OURN										
			CULG				0520	0521.5	2				IIIG,V
			WEIS				0521.2	0521.4	2				IIIG
			CULG				0546	0547.5	3				IIIG,V
			CULG				0603.5	0605	2				IIIGG,V
	0605	1834	WEIS				0606.6	0606.9	1				IIIB
			WEIS				0608.8	0609.0	1				IIIB
			WEIS				0724.2	0726.2	2				IIIG
			WEIS				0941.2	0941.3	2				IIIB
			OURN				1000	1402					I
	0938	1402	OURN	1024.7	1024.7		1024.7	1024.7					III
			WEIS				1130.6	1130.9	3				IIIB
	0911	2412	SGMR				1131.7	1132.0	1				V
			WEIS				1405.6	1405.8	1				IIIB
			WEIS				1431.5	1431.7	1				IIIB
			WEIS				1542.3	1542.5	1				IIIB
	1638	1816	OURN										
			WEIS				1716.0	1716.3	1				IIIB
			SGMR				1716.2	1716.4	2				III
	1230	2245	HARV				1716		3	1716		3	IIIB
	2046	2400	CULG				2119	2400					IIIN,W
			CULG				2127	2210					IS,W
			CULG	2127	2220								IN,W
	2137	2400	MANI										
			CULG				2210	2400	1				IS,DC
			HARV				2217		1				IW
			CULG	2220	2400								IS,W
			CULG	2302	2304.5	1	2303.5	2305	1				II
06			CULG				0000	0223					IIIN,W
	0000	0255	CULG				0000	0116	1				IS,DC
	0000	0940	MANI										
			CULG	0043	0207								IN,W
			CULG				0116	0255					IS,W
			CULG				0249.5		2				IIIB
	0355	0640	CULG				0355	0640	1				IS,C
			CULG	0355	0640								IN,W
	0430	1819	OURN				0430 E	0820	1				IDC
	0407	1149	WEIS				0653.0	0911.0	2				IN
	1205	1835	WEIS				1424.4	1424.7	2				IIIB

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JUNE 1978

JUN 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
06	0911	2413	SGMR				1424.7	1425.0	1				III
			WEIS				1640.2	1640.4	1				IIIB
			WEIS				1655.5	1655.7	2				IIIG
			SGMR				1655.8	1656.1	1				III
	1400	2245	HARV				1656		2	1656		2	IIIG
			HARV				1816		1	1816		2	IIIB
	2155	2400	MANI										
			SGMR				2206.7	2207.0	1				III
			SGMR				2306.9	2307.1	1				III
	2055	2400	CULG				2330.5	2331	1				IIIB
			CULG				2341.5		1				IIIB
07	0000	0916	MANI										
	0000	0640	CULG				0151.5	0640					IS,W
			CULG				0344	0640					IIIN,W
			CULG	0425	0442								IN,W
	0430	0447	DURN										
			CULG				0636.5		1				IIIB
	0757	1834	WEIS				0949.7	0945.8	1				IIIB
	0525	1819	DURN				1630	1819 D	1				I
			WEIS				1647.3	1647.4	1				IIIB
	0911	2414	SGMR				1819.7	1819.9	1				V
	1230	2245	HARV				1820		2	1820		2	IIIG
	2056	2400	CULG				2103	2400					IIIN,W
			CULG				2110	2400					IN,W
	2121	2400	MANI										
08	0000	0947	MANI										
	0000	0643	CULG				0000	0551					IS,W
			CULG				0258.5	0259	1				IIIG
	0406	0736	WEIS										
	0430	1145	DURN										
	0910	2414	SGMR										
	1155	1322	DURN										
	0745	1836	WEIS				1735.7	1735.8	2				IIIB
	1230	2245	HARV				1736		1	1736		1	IIIB
			CULG				2155.5		1				IIIB
	2055	2400	CULG				2155	2222.5					IIIN,W
			CULG				2158		1				IIIB
09	0100	0945	MANI										
	0000	0730	CULG				0305.5		1				IIIB
			CULG				0347.5	0354					IIIN,W
			CULG				0348		1				IIIB
			CULG				0352		1				IIIB
			CULG				0403.5	0404	1				IIIG
			CULG				0418	0424.5	1				IIIGG
	0406	1307	WEIS				0422.3	0424.3	1				IIIG
			CULG				0455	0456					IIIG,W
			CULG				0649.5						IIIB,W
			WEIS				0649.6	0649.7	1				IIIB
			WEIS				0833.3	0833.4	1				IIIB
			WEIS				0842.6	0843.5	1				IIIG
			WEIS				1242.1	1243.4	3				IIIG
	0910	2415	SGMR				1242.2	1243.6	3				IIIG
	1230	2245	HARV				1242	1245	2	1242		2	IIIG
	1325	1837	WEIS										
	2031	2400	CULG										
	2145	2400	MANI										
10	0000	0935	MANI										
	0000	0730	CULG				0145.5		1				IIIB
	0910	2415	SGMR										
	0406	1837	WEIS				1112.4	1112.6	2				IIIG
	1230	2245	HARV										
	2031	2400	CULG										
	2200	2400	MANI										
11	0000	0940	MANI										
	0000	0620	CULG				0103.5						IIIB,W

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JUNE 1978

JUN 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
11			CULG				0214.5	0217.5	1				II
	0405	0501	WEIS										
			CULG				0553.5						IIIB,W
	0635	0730	CULG				0639.5						IIIB,W
	0744	1838	WEIS										
	0910	2416	SGMR										
	1400	1817	DURN										
	2123	2400	MANI										
	1230	2245	HARV				2227	2228	2				IIIG
	2301	2400	CULG										
12	0000	0940	MANI										
	0000	0730	CULG				0047		2				IIIB
	0405	1308	WEIS										
			CULG	0430.5	0435.5	1							FAST DRIFT
	0430	1819	DURN	0431.4	0431.5	1							IIIG,RS
	0910	1740	SGMR										
	1230	2245	HARV										
	1323	1838	WEIS										
			DURN				1707.1	1707.1	2				IIIB
	2031	2400	CULG										
	2138	2400	MANI										
	1830	2416	SGMR				2335.5	2336.5	2				V
13	0000	0944	MANI										
	0000	0730	CULG				0234.5	0242	1				IIIS
			CULG				0246	0453					IS,W
			CULG				0248	0256					IIIN,W
			CULG	0316		1							IIIB
			CULG	0417.5	0418	1							IIIG
	0405	1839	WEIS	0417.8	0417.9	1	0417.8	0417.9	1				IIIB
	0431	1819	DURN										
	0910	1600	SGMR										
			WEIS				0916.8	0923.8	1				IIIG
	1230	2245	HARV										
			WEIS				1442.3	1442.4	1				IIIG
	1900	2417	SGMR										
	2031	2400	CULG	2123	2129.5	1							POSSIBLE P
	2143	2400	MANI										
			CULG	2211		1							FAST DRIFT
			CULG	2331		1							FAST DRIFT
14	0000	0942	MANI										
	0000	0730	CULG	0129	0129.5	1							FAST DRIFT
			CULG	0143	0144	1							FAST DRIFT
			CULG	0253	0254.5	1							FAST DRIFT
	0405	0441	WEIS										
	0431	1817	DURN	0440.7	0441.7	1							IIIG
			DURN	0540.2	0540.3	1							IIIG
			CULG	0559.5		1							IIIB
			DURN	0645.1	0645.9	2	0645.3	0645.5	2				IIIG
			CULG	0645	0645.5	1							IIIG
			DURN	0909.0	0909.6	3	0909.2	0909.4	3				IIIGG,RS
	0550	1839	WEIS	0909.2	0909.4	1							IIIG
	0910	2417	SGMR										
			DURN	0912.8	0912.8	2			2				III
			DURN	0936.3	0936.3	3	0936.3	0936.3	3				IIIG
	1230	2300	HARV										
			DURN	1601.5	1602.7	3							IIIGG
			DURN	1615.0	1615.1	2							III
			DURN	1620.0	1620.6	3	1620.2	1620.6	3				IIIGG
			DURN	1639.1	1641.0	3	1639.1	1639.3	3				IIIGG
			DURN	1704.8	1706.3	3							IIIGG
			DURN	1716.3	1716.5	2							IIIG
			DURN	1721.4	1724.2	3							IIIGG,RS
			DURN	1729.9	1734.7	3							IIIGG
			DURN	1801.5	1801.9	3							IIIG
	2032	2400	CULG	2132.5	2133.5	1							FAST DRIFT
	2140	2400	MANI										
15	0000	0940	MANI										

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JUNE 1978

JUN 1978	TIMES OF OBSERVATION START UT	END UT	STATION	EVENTS: DECIMETRIC BAND START UT	END UT	INT	METRIC BAND START UT	END UT	INT	DEKAMETRIC BAND START UT	END UT	INT	SPECTRAL TYPE
15	0000	0732	CULG	0008	0008.5	1							FAST DRIFT
			CULG				0222.5						IIIB,W
			CULG				0301						IIIB,W
	0405	1054	WEIS										
			CULG				0653	0653.5					IIIG,W
	0427	1518	DURN	0731.3	0731.3	1							IIIB
	0910	2418	SGMR										
	1110	1840	WEIS										
	1215	2250	HARV				1944	1946	1				IIIG
	2032	2400	CULG	2102.5	2400	1							IS
	2213	2400	MANI										
16	0000	0705	CULG	0000	0356	1							IS,DC
	0000	0940	MANI							0016.2	0016.3	1	III
			CULG				0016	0024.5	1				IIIGG
			CULG	0016	0016.5	1	0016	0016.5	3	0016	0016.5	2	IIIG
			CULG	0020		1	0020		2	0020		1	IIIB
			CULG	0024		1	0024	0024.5	2	0024	0024.5	1	IIIB
			CULG				0037	0652					IIIN,W
			CULG				0344.5	0355.5	1				IIIGG
			CULG				0351	0351.5	2				IIIG
			CULG	0356	0512.5								IN,W
			CULG				0514	0516.5	1				IIIG
	0405	1652	WEIS				0515.3	0515.6	1				IIIG
			WEIS				0523.8	0523.9	1				IIIB
			CULG				0527.5		1				IIIB
			WEIS				0527.7	0527.8	1				IIIB
			WEIS				0537.7	0537.8	1				IIIB
			CULG				0538		1				IIIB
			WEIS				0615.7	0617.5	1				IIIG
			WEIS				0638.2	0638.4	2				IIIG
			CULG				0638	0638.5	2				IIIG
			WEIS				0642.3	0644.4	2				IIIG
			CULG				0642	0644.5	2				IIIG
			WEIS				0652.1	0652.2	1				IIIB
	0715	0732	CULG										
	0910	2418	SGMR										
			WEIS				1518.7	1519.5	2				IIIG
			WEIS				1524.4	1526.6	2				IIIG
	1215	2240	HARV				1526		2				IIIG
	0720	1819	DURN	1628.2	1628.2	2							III
	2139	2400	MANI										
	2032	2400	CULG				2215.5	2337					IIIS,W
			CULG				2217.5		1				IIIB
			CULG				2253	2257	1				IIIGG
			CULG	2323.5	2334.5	1							IIIB
			CULG				2331		2				IIIB
17	0000	0940	MANI										
	0000	0733	CULG				0015	0526					IIIN,W
			CULG				0016.5	0018	3				IIIG,V,U
			CULG				0524	0524.5	2				IIIG,V,U
	0425	1815	DURN				0734.4	0734.5	3				IIIG
	0910	2419	SGMR										
	1154	1217	WEIS										
	1215	2240	HARV										
	2140	2305	MANI										
	2033	2400	CULG	2222.5	2223	2	2222.5	2223	2				IIIG
	2331	2400	MANI										
18	0000	0940	MANI										
	0000	0733	CULG				0021	0447					IIIN,W
			CULG				0156		1				IIIB
			CULG				0210.5	0211	1				IIIG
			CULG				0407.5	0408.5	2				IIIG,U
			CULG				0415	0421.5	1				II
			CULG				0457	0459	1				IIIG
			CULG				0517		1				IIIB
			CULG				0651.5		1				IIIB
	1100	1841	WEIS				1109.5	1109.7	1				IIIB

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JUNE 1978

JUN 1978	TIMES OF OBSERVATION START UT	END UT	STATION	EVENTS DECIMETRIC BAND START UT	END UT	INT	METRIC BAND START UT	END UT	INT	DEKAMETRIC BAND START UT	END UT	INT	SPECTRAL TYPE
18	0426	1818	DURN				1635.5	1636.0					IIIG
			WEIS				1727.6	1727.8	2				IIIB
	1215	2245	HARV	1745	1747	2							IIIG
	2033	2400	CULG				2119	2151					IS,H
	2145	2400	MANI										
			CULG	2147.5	2148.5	2	2148	2149.5	2				IIIG,V,U
	0910	2419	SGMR				2147.6	2148.3	2				IIIG
			HARV				2147	2148	2	2147	2148	2	IIIG
			CULG				2154						IIIB,W
			CULG				2155.5		1				IIIB
			CULG				2223	2224					IIIG,W
			CULG				2238.5	2239	2				IIIB
19	0000	0733	CULG				0000.5	0002	1				IIIG,V
			CULG	0015	0015.5	1							FAST DRIFT
			CULG				0035.5	0552					IIIN,W
			CULG				0140.5		1				IIIG
			CULG	0156.5	0157	1							FAST DRIFT
	0000	0944	MANI							0257.8	0258.0	1	III
			CULG				0259	0300	3				IIIG
			CULG				0331.5	0332	1				IIIB
			CULG				0402	0402.5	1				IIIG
	0427	1817	DURN										
			CULG	0430.5	0431	1							IIIG
	0405	1632	WEIS				0445.0	1045.0	3				CONT
			CULG				0535		1				IIIB
			WEIS				1223.7	1225.0	2				IIIG
	0910	2419	SGMR				1224.0	1225.1	1				IIIG
			WEIS				1510.3	1511.7	3				IIIG
			SGMR				1510.6	1511.6	2				V
	1215	2305	HARV				1510	1511	2	1510	1511	2	UNCL
	1646	1841	WEIS										
	2033	2400	CULG				2138	2325.5					IN,W
	2142	2400	MANI										
			CULG				2153	2155					IIIGG,W
20	0000	0943	MANI										
	0000	0733	CULG				0007	0600					IS,W
			CULG				0012.5	0013					IIIB,U,W
			CULG				0012	0012.5	1				IIIB
			CULG	0134	0607.5								IN,W
			CULG	0510.5	0511.5		0510.5						IIIG,W
	0405	1842	WEIS				0540.0	1045.0	3				CONT
	0449	1816	DURN	0656.6	0656.9	1							IIIG
			DURN	0811.2	1811.4	2							IIIG
	0910	2419	SGMR										
	1215	2245	HARV										
	2142	2400	MANI										
	2034	2400	CULG				2156	2359					IIIN,W
			CULG				2159	2200	1				IIIG
21	0000	0935	MANI										
	0000	0715	CULG	0032	0032.5	1	0032	0032.5	1				IIIG
			CULG	0041.5	0042		0041.5	0042					IIIG,W
			CULG				0053	0437.5					IN,W
			CULG				0057	0058	1				UNCLF,SL D
			CULG	0111	0116		0110	0116					IIIGG,W
			CULG				0111	0111.5	2				IIIG
			CULG				0115.5		1				IIIB
			CULG				0122.5	0132	2				II
			CULG	0124.5		1							IIIB
			CULG	0126		1	0126		2				IIIG
			CULG				0143	0550					IIIN,W
			CULG				0153.5	0154.5	1				IIIG,U
			CULG	0249.5		1	0249.5		1				IIIB,RD
			CULG	0322.5	0323	1							IIIG
			CULG	0350	0350.5	1	0350	0350.5	1				IIIG
	0427	1819	DURN				0427 E	1819 D	1				I
			DURN	0438.5	0438.8	1							IIIG
			CULG	0441	0704	1							IN

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JUNE 1978

JUN 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
21	0405	0815	WEIS				0529.8	0531.4	1				IIIG
			DURN				0529.9	0533.4	3				IIIGG
			CULG	0531	0531.5	1	0530.5	0531.5	1				IIIG
			CULG	0533	0533.5	1	0533	0533.5	1				IIIG
			WEIS				0538.0	0538.4	2				IIIG
			DURN				0538.1	0538.5	3				IIIG
			CULG	0538	0538.5	1	0538	0538.5	1				IIIG
			DURN				0546.4	0547.7	1				IIIG
			CULG	0547.5		1	0547.5		1				IIIB
			DURN	0852.2	0852.5	1	0852.2	0852.5	2				IIIG
	0910	2420	SGMR										
	1215	2245	HARV										
			DURN				1314.4	1314.9	3				IIIG
	0845	1842	WEIS				1657.5	1657.7	1				IIIG
	2058	2400	CULG	2103	2400	1							IS
			CULG				2115	2400					IN,W
	2150	2400	MANI										
			CULG				2232	2232.5					IIIB,W
22	0000	0657	CULG	0000	0657		0000	0657					IS,W
	0000	0944	MANI										
			CULG				0005.5	0607.5					IIIN,W
	0405	1206	WEIS										
	0427	1819	DURN				0427 E	1819 D	1				I,DC
			DURN	1339.5	1339.8	1	1339.5	1339.8	3				IIIG
	1224	1842	WEIS	1340.7	1341.4	2	1340.7	1341.4	2				IIIG
	0910	2420	SGMR				1340.8	1341.3	1				III
	1215	2250	HARV				1341		2				IIIG
			DURN	1654.0	1654.8		1654.0	1654.8	2				IIIGG
			HARV				1654	1655	1				IIIG
			DURN	1655	1812	3	1655	1812	3				IV, F
			WEIS	1657.0	1703.0	2	1657.0	1703.0	2				IIIGG
			DURN	1657.5	1658.3	3	1657.5	1658.3	3				IIIGG
			SGMR				1658.0	1706.3	2				V
			SGMR				1658.8	1719.0	3				IV
			HARV				1658	1704	3	1659	1704	3	IIIGG,V,U
			HARV	1658	1711	3							IVN
			WEIS	1703.0	1756.0	2	1703.0	1756.0	2				IVDM,FLUCT
			WEIS				1703.0	1755.0	2				IVM
			WEIS	1703.0	1708.0								DM-SPIKES
			HARV				1704	1724	3	1704	1724	3	II
			HARV				1704	1800	3	1704	1800	3	I,III,C
			HARV				1710	1716	3	1710	1716	3	III,RS
			SGMR				1719.0	2420.0D	2				CONT
			HARV	1719	1810	3							IV
			HARV				1735	1748	3	1739	1748	3	II
			HARV				1800	2014	1	1800	2014	1	IN,IIIN
			HARV				1942	1943	2	1942	1943	2	IIIG
			HARV				2014	2100	2	2014	2100	2	IN,IIIN
			HARV				2059	2100	3	2059	2100	3	IIIG
			HARV				2100	2202	1				IN,IIIN
	2100	2400	CULG	2105	2400	1	2110	2320.5	1				IS,DC
			CULG				2110	2400					IIIS,W
			CULG				2131	2211.5	1				IIIS
	2151	2400	MANI										
			HARV				2211		2				
			CULG				2229	2233	1				POSSIBLEII
			CULG				2306	2330	1				IIIS
			CULG				2320	2400					IS,W
23			CULG				0000	0127					IS,W
	0000	0700	CULG	0000	0235	1							IS
	0000	0837	MANI										
			CULG				0004.5	0219.5					IIIS,W
			CULG				0051		1				IIIB
			CULG				0127	0529	1				IS
			CULG				0215.5	0216.5	2				IIIG
			CULG				0219.5	0700	1				IIIS
			CULG	0235	0607.5	2							IS
			CULG				0302		1				IIIB

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JUNE 1978

JUN 1978	TIMES OF OBSERVATION START UT	END UT	STATION	EVENTS: DECIMETRIC BAND START UT	END UT	INT	METRIC BAND START UT	END UT	INT	DEKAMETRIC BAND START UT	END UT	INT	SPECTRAL TYPE
23			WEIS				0422.0	0622.0	2				IN
	0405	1834	WEIS				0422.0	0815.0	2				I
	0427	1816	DURN				0427 E	1816 D	2				I,DC
			CULG				0529.5	0611.5	2				IS
			CULG	0607.5	0700	1							IS
			CULG				0611.5	0700	1				IS
			WEIS				0800.0	1010.0	2				IIIN
	0911	2420	SGMR										
			DURN				0927.5	0927.7	3				IIIG
			DURN	0929.4	0929.5	3	0929.4	0929.5	3				IIIG
			DURN	1547.9	1548.2	2	1547.9	1548.2	2				IIIG
			DURN	1553.8	1554.6	3	1553.8	1554.6	3				IIIGG
			WEIS	1553.8	1554.5	1							IIIG
	1215	2250	HARV	1554	1555	2							IIIG
			DURN	1646.3	1647.0	3	1646.3	1647.0	3				IIIGG
			WEIS	1646.4	1646.6	1							IIIG,U
			HARV	1646	1647	1	1646	1647	1				IIIG
			HARV				1948	1949	2				IIIG
			HARV	2001		2							IIIG
			HARV	2025		1	2023	2025	1				IIIG
	2100	2400	CULG	2105	2400	1							IS
			CULG				2118	2313					IN,W
			CULG				2136.5	2400					IIIN,W
			CULG	2137.5	2138	2							IIIG
			CULG	2138.5	2139	1	2138.5	2139	2				IIIG
			HARV	2138		2	2138	2139	2				IIIG
	2144	2400	MANI										
			CULG				2313	2400	1				IS,W
24			CULG	0000	0700		0003	0226.5					IIIN,W
	0000	0700	CULG	0000	0700		0000	0043					IS,W
	0000	0948	MANI										
			CULG				0043	0227	1				IS,DC
			CULG				0116	0118	2				DC
			CULG	0135	0135.5		0135	0135.5					IIIG,W
			CULG	0147	0147.5								IIIG,W
			CULG				0226.5	0700					IIIS,W
			CULG				0227	0544	2				IS,DC
			CULG	0509	0509.5	1	0509	0509.5	1				IIIG
			CULG				0544	0700	1				IS,DC
			CULG				0550.5		1				IIIB
	0544	1843	WEIS				0550.6	0550.7	1				IIIB
			WEIS				0603.5	0603.9	2				IIIG
			CULG				0603.5		2				IIIB
			WEIS				0638.6	0638.6	1				IIIB
			WEIS				0648.0	0648.9	1				IIIG
			WEIS				0701.8	0702.2	3				IIIG
			WEIS	0706.6	0708.8	3	0706.6	0708.8	3				IIIG,RS
			WEIS				0814.5	0814.7	2				IIIG
	0924	1819	DURN				0924 E	1819 D	1				I,DC
			WEIS				1023.3	1023.4	1				IIIG
			WEIS				1033.2	1033.3	2				IIIB
			WEIS	1037.2	1041.8	2	1037.2	1041.8	2				IIIGG
			DURN	1037.3	1042.0	1	1037.3	1042.0	3				IIIGG
			WEIS				1217.6	1218.2	3				IIIG
			DURN	1217.8	1218.3	1	1217.8	1218.3	3				IIIG
	1215	2245	HARV	1218		1	1218		2				IIIG
			WEIS				1305.0	1305.3	2				IIIG
			DURN				1305.1	1305.3	2				IIIG
			WEIS				1439.9	1440.4	2				IIIG
			DURN				1440.1	1440.5	2				IIIG
			WEIS	1500.8	1501.9	3	1500.8	1501.9	3				IIIG
			DURN	1501.0	1502.1	1	1501.0	1502.1	3				IIIG
			WEIS	1505.5	1507.7	2	1505.5	1507.7	2				IIIG
			DURN	1505.6	1507.9	3	1505.6	1507.9	3				IIIGG
			WEIS				1613.1	1613.3	2				IIIG
	0911	2420	SGMR				2018.8	2019.6	1				IIIG
	2100	2400	CULG				2105	2400	1				IS,DC
			CULG				2129	2400					IIIN,W
			CULG	2133.5	2134	1							FAST DRIFT

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JUNE 1978

JUN 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
24	2136	2400	MANI										
			CULG	2141	2400								IN,W
25	0000	0700	CULG				0000	0100	1				IS
			CULG				0002.5	0115	1				IIIN
			CULG	0025	0051								IS,W
			CULG	0051	0114								IS,DC
			CULG			1	0100	0114	2				IS,DC
			CULG				0114	0530	2				IS,C,DC
			CULG	0114	0700	1							IS,C
			CULG				0115	0523.5	2				IIIS
	0000	0930	MANI							0213.1	0215.7	1	III
	0405	0746	WEIS				0407.0	0544.0	2				IS,DC
			WEIS				0407.0	0720.0	2				IIIS
			CULG	0426	0505	1	0420	0505	1				SCINTILLAT
	0428	1819	DURN				0428 E	1819 D	1				I,DC
			DURN	0437.5	0437.9	2	0437.5	0437.9	2				IIIG
			CULG	0437.5		2	0437.5		2				IIIB
			CULG	0505		1							IS
			CULG				0523.5	0650.5	1				IIIS
			CULG				0530	0655	1				IS,DC
			CULG				0609		2				IIIB
			DURN	0739.8	0740.1	1	0739.8	0740.1	1				IIIG
			DURN	0801.4	0801.8	1	0801.4	0801.8	1				IIIG
	0803	1843	WEIS				0845.0	0847.5	2				IIIG
	0911	2420	SGMR										
			DURN	1008.8	1009.1	2	1008.8	1009.1	2				IIIG
			WEIS				1031.8	1032.0	2				IIIB
			WEIS				1048.0	1049.2	2				IIIG
			WEIS				1054.3	1054.4	1				IIIG
			DURN	1105.4	1105.9	1	1105.4	1105.9	2				IIIG,RS
			WEIS				1135.5	1136.7	1				IIIG
	1215	2245	HARV										
	2105	2400	CULG				2118.5	2400					IN,W
			CULG				2143	2400					IIIN,W
			CULG				2219		2				IIIB
			CULG				2224	2224.5	2				IIIB,U
			CULG	2244.5	2333	1	2231	2325	1				IS
	2150	2400	MANI							2304.6	2304.8	1	III
			CULG				2306.5	2307.5	2				IIIG
			CULG	2323		1							IIIB
			MANI							2349.9	2351.0	1	III
26	0000	0945	MANI										
	0000	0708	CULG				0000	0648					IIIN,W
			CULG				0009	0318					IN,W
			CULG	0029	0705	1							IN
			CULG	0112		1	0112	0113.5	1				IIIG,U
			CULG				0117.5		1				IIIB
			CULG	0117.5	0119	1							DC
			CULG				0128.5	0129	3				IIIG
			CULG				0152.5	0153	1				IIIB,U
			CULG				0203	0203.5	1				IIIG
			CULG	0222.5	0223.5	1							IIIG
			CULG				0318.5	0335	1				IS
	0428	0844	DURN				0428 E	0844 D	1				I,DC
			CULG				0625	0708	1				IS
	0407	1405	WEIS				0734.3	0736.5	3				IIIG
			WEIS				0749.8	0750.3	3				IIIG
			WEIS				0824.0	1828.0	2				III
			WEIS				0908.0	1840.0	3				I
			WEIS				1126.6	1127.3	3				IIIG
	0912	2420	SGMR				1126.8	1127.0	1				III
			WEIS				1203.7	1203.9	3				IIIB
			WEIS				1207.3	1207.7	3				IIIG
			WEIS				1211.9	1212.1	1				IIIG
			WEIS				1217.3	1229.5	3				IIH,B,HARM
			SGMR				1217.5	1230.5	2				II
	1215	2250	HARV				1218	1220	1				I
			SGMR				1249.6	1249.9	1				III

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JUNE 1978

JUN 1978	TIMES OF OBSERVATION START UT	END UT	MONTH 06 STATION	EVENTS DECIMETRIC BAND START UT	END UT	INT	METRIC BAND START UT	END UT	INT	DEKAMETRIC BAND START UT	END UT	INT	SPECTRAL TYPE
26			SGMR				1334.0	2420.0D	1				CONT
			HARV				1340		1				IIIG
			HARV				1349		1				IIIB
	1413	1843	WEIS	1430.6	1441.0	3	1430.6	1441.0	3				IIIGG
			HARV				1431		2				IIIG
			HARV	1434	1439	3	1434	1439	3	1437	1439	3	IIIGG
			SGMR				1436.5	1443.0	3				V
			WEIS				1442.5	1453.5	3				II, HARM
			SGMR				1443.0	1453.8	3				IV
			SGMR				1443.0	1449.0	3				II
			HARV				1443	1454	3	1444	1454	3	II
			HARV				1443	1454	3	1443	1454	3	H
			HARV				1454	1520	1				IC,IIIN
			HARV				1520	1540	2	1520	1540	2	IC,IIIN
			WEIS	1533.0	1658.0	2							IVP
			WEIS				1537.2	1550.0	3				IIIGG
			SGMR				1537.4	1553.0	3				V
			HARV				1537	1541	3	1537	1541	3	IIIGG
			HARV				1540	2220	3	1540	2220	3	IC,IIIS
			WEIS				1545.0	1700.0	3				IVDM-SPIKE
			SGMR				1546.5	1645.5	3				IV
			DURN	1605	1736	2	1605	1736	3				IV
			SGMR				1645.5	1940.0	3				IIIS
			WEIS	1732.5	1736.5	3	1732.5	1736.5	3				IIIG
			HARV	1736		3	1733	1736	3	1733	1736	3	IIIGG,V
			WEIS	1758.6	1803.2	3	1758.6	1803.2	3				IIIG
	1605	1819	DURN	1759.3	1802.9	2	1759.3	1802.9	2				IIIGG
			HARV	1759	1803	3	1758	1803	3	1758	1803	3	IIIGG
			HARV				1910	1950	3	1910	1950	3	IIIGG,RS
	2101	2400	CULG				2107	2117	2				IS
			CULG				2108	2136	1				IIIS
			CULG				2117	2400	2				IS,C
			CULG				2118.5		2				IIIB
			CULG				2136	2400	2				IIIS
			CULG	2140	2140.5								IIIG
			CULG	2204.5	2207.5	2	2204.5	2209	3	2205	2209.5	2	IIIGG,V
			HARV	2205	2207	3	2205	2207	5				IIIGG
	2140	2400	MANI							2206.0-	2206.3	1	III
			CULG	2207.5	2217								IIIGG
			CULG	2209.5	2210.5	2	2210	2218	2				II
			CULG	2209	2209.5								UNCLF
			HARV				2209	2213	3				UNCL
			HARV				2220	2250	2	2220	2250	2	I,IIIS
			CULG				2243.5	2244.5	2				IIIG,V
			HARV				2244		3	2244		3	IIIB
			CULG							2327	2334		IIIN
			MANI							2340.3	2342.0	2	III
			CULG	2340	2344.5	1	2339.5	2342.5	2	2340	2342	2	IIIGG,V
27			CULG				0000	0154					IIIS,W
	0000	0700	CULG				0000	0410	1				IS,C,DC
			CULG				0001.5	0002	1	0001.5			IIIG
			CULG	0059	0106.5	2	0059	0104.5	3	0100.5		3	IIIGG,V
	0000	0940	MANI							0100.7	0102.6	2	IIIG
			CULG				0107	0120	2				II
			CULG	0111	0114	1	0111.5	0113	2	0111.5	0113	1	IIIGG
			CULG	0133.5	0134		0133	0134		0133.5			IIIG
			CULG				0154.5	0253					IIIS
			CULG				0253	0700					IIIS,W
			CULG				0307	0309.5	2				IIIG,UNCLF
			CULG				0410	0700	1				IS,DC
	0428	1820	DURN				0428 E	1820 D	1				I,DC
			CULG	0430	0700								IS
	0405	1843	WEIS				0449.0	0449.8	2				IIIG
			CULG				0449	0450	1				IIIG
			WEIS	0540.0	1645.0	2	0540.0	1645.0	2				IN
			WEIS				0806.5	1713.0	2				IIIN
			DURN				1038.7	1038.9	2				IIIG
	0912	2420	SGMR				1134.0	1144.5	2				V
	1215	2245	HARV				1236		1				IIIG

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JUNE 1978

JUN 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
27			SGMR				1501.0	2420.00	1				CONT
			HARV				1510	1605	1				IN
			HARV				1605	1650	2				I
			HARV				1637		3	1637		3	IIIB
			HARV				1645	1826	1				IIIN,W
			HARV				1944		2	1944		2	IIIB
			HARV				2004		3	2004		3	IIIG
	2101	2400	CULG				2106	2400					IIIN,W
			CULG				2109	2157					IS
	2135	2400	MANI										
			CULG				2157	2400					IS,W
			CULG	2159	2200.5		2159	2200.5					IIIGG
			CULG				2238						IIIB
28			CULG				0000	0215					IIIN,W
	0000	0700	CULG				0000	0223					IS,W
			CULG				0042.5	0043					IIIG
			CULG				0127.5	0128					UNCLF
			CULG				0215.5	0700					IIIS,W
			CULG				0223	0700					IS,DC
	0000	0935	MANI							0245.5	0247.4	2	IIIG
			CULG	0245	0247	3	0245.5	0248.5	3	0246	0248.5	3	IIIGG,V
			CULG							0247	0256		S.W.F.
			CULG	0247	0250	3	0247	0316	3	0254	0258.5	3	II
			MANI							0252.0	0258.0	2	IIIG
			CULG	0252.5	0306								IN
			CULG	0253	0253.5								IIIG
	0408	0421	WEIS										
	0443	1843	WEIS				0909.3	0909.4	1				IIIB
			WEIS				0912.8	0913.2	1				IIIG
			WEIS				0936.9	0937.2	1				IIIB
	0428	1620	DURN				1100	1200	1				I
	1215	2245	HARV				1230		1				IW
			WEIS				1305.0	1305.2	1				IIIB
			WEIS				1522.5	1522.6	2				IIIB
			WEIS				1827.2	1827.4	2				IIIG
			HARV				1827		1				IIIG
	0912	2420	SGMR				1914.9	1917.5	2				IIIS
			HARV	1934	1935	2	1935	1937	3	1935	1937	3	IIIG
			HARV				2041		2	2041		2	IIIG
	2102	2400	CULG				2119.5	2211					IIIN,W
			CULG				2123.5	2149	2				II
			SGMR				2125.5	2138.2	1				II
			HARV				2126	2138	2	2130	2138		II
			CULG				2146.5	2147					IIIG
			CULG	2210.5	2400								IN,W
			CULG				2211	2230					IIIS,W
			CULG				2222	2400					IS
	2140	2400	MANI							2350.0	2351.1	1	III
			CULG	2351		1	2349.5	2352	2	2349.5	2351.5	1	IIIGG
			CULG				2352.5	2353					POSSIBLEII
29	0000	0700	CULG				0000	0220					IN,W
			CULG				0012.5	0014					IIIG,W
			CULG				0042.5						IIIB,W
			CULG	0107	0107.5								UNCLF
			CULG				0325.5	0343.5					IIIN,W
			CULG				0329.5	0331					IIIG
			CULG	0334	0334.5								IIIG
			CULG	0336	0336.5								IIIG,W
			CULG				0416						IIIB,W
	0407	1047	WEIS				0426.2	0427.0	2				IIIG
			CULG				0426	0427.5					IIIG
			WEIS				0429.1	0434.0	3				IIIG
	0000	0945	MANI							0430.2	0434.1	1	IIIG
			CULG	0430	0431	1	0429	0434.5	2	0430	0431	2	IIIGG,V
			CULG	0451.5	0452								RD
			CULG	0456.5	0457								FAST DRIFT
			WEIS	0456.6	0458.7	3	0456.6	0458.7	3				IIIG
			CULG	0457.5	0458.5	3	0457.5	0459	3	0457.5	0459	3	IIIGG,V

SOLAR RADIO EMISSION
SPECTRAL OBSERVATIONS

JUNE 1978

JUN 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
29			MANI							0458.0	0458.8	1	III
			CULG				0459.5						IIIB
			CULG	0513	0658.5								IN
			CULG	0517	0518								IIIG
			WEIS				0536.8	0537.0	1				IIIB
			CULG				0537	0539.5					IIIG,W
			WEIS				0557.8	0558.2	1				IIIG
	0724	1818	DURN				0724 E	1040	1				I,DC
			WEIS	0810.3	0810.5	2							IIIG
			WEIS				0834.5	0836.1	2				IIIG
			WEIS				1045.3	1045.4	2				IIIG
	1053	1843	WEIS				1212.5	1212.7	2				IIIG
			DURN	1413.5	1416.2	3	1415.1	1416.2	3				IIIGG
	1215	2245	HARV	1413	1417	2	1415	1417	3	1415	1417	3	IIIGG,V A
			WEIS				1414.7	1418.0	3				IIIGG,V
			DURN				1415.3	1417.0	3				V
	0913	2420	SGMR				1416.0	1417.2	3				V
			DURN				1548.9	1549.1	2				IIIG
	2101	2400	CULG				2130.5						IIIB,W
	2151	2400	MANI										
			CULG				2210.5		2				IIIB
			CULG				2210.5	2212.5					IIIG
			CULG	2213.5	2214	2							IIIG
30	0000	0940	MANI										
	0000	0700	CULG				0211						IIIB,W
			CULG				0227.5	0228	2				IIIG
			CULG				0334	0457					IIIN,W
	0408	1549	WEIS				0645.9	0646.0	1				IIIB
			CULG				0646	0647					IIIG,W
			WEIS				0741.2	0741.4	1				IIIG
	0430	1821	DURN				0741.6	0741.7	3				IIIG
			DURN	0820.2	0820.6	1	0820.2	0820.6	3				IIIG
			WEIS				0941.7	0941.8	1				IIIB
			WEIS				1006.3	1006.7	3				IIIG
			DURN				1006.4	1006.7	3				IIIG
			WEIS	1051.8	1053.1	3	1051.8	1053.1	3				IIIG,U
			DURN	1052.1	1052.8	3	1052.1	1052.8	3				IIIGG,RS,U
	0913	2420	SGMR				1053.4	1053.6	2				III
	1607	1843	WEIS										
			DURN	1707.5	1710.7	2							IIIGG
	1215	2245	HARV	1710	1716	2							IIIGG
			DURN	1715.8	1716.4	2	1715.8	1716.4	3				IIIG
			SGMR				1944.6	1945.7	3				V
			HARV				1944	1945	3	1944	1945	3	IIIG,V
	2101	2400	CULG	2144.5	2145								IIIG
	2155	2400	MANI										
			CULG				2159	2200					IIIG,W
			CULG				2215.5						IIIB,W
			CULG				2232	2233					IIIG,W
			CULG	2244.5									IIIB
			CULG	2352	2354								IIIG

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

SELECTED SOLAR EVENTS

JUNE 1978

Culgoora

UT Date 197.8 JUNE	HELIOGRAPH EVENT Start (UT)	End (UT)	Freq. (MHz)	Positions Central Dist. ($R_\odot$)	Positions Position Angle (Deg.)	Polarization	Intensity (1-3)	Spectral Type	REMARKS
31/1	2300	0500	80)	.4)	20	L	1	I	Type I activity persisted from this region until 3rd.
			160)	0)					
	0135	0138	43.25)	1.2)			3)		
			.80)	1.0)	290	-	2)	IIIGG	*
			160)	.9)			1)		
2	0254	0304	43.25)	1.3)				IIIGG,II,	Complex source
			.80)	1.1)	295	-	3)	IIIGG	structure.
			160)	.9)					
2/3	2300	0500	80)	1.3)	230	R	1)	I	Type I activity persisted from this region until 5th.
			160)	1.2)			2)		
	2300	0500	160	.2	270	R	2	I	This region persisted until 4th.
3/4	2300	0500	43.25)	.8	155)		2)		Activity from this region persisted until 6th.
			80)	.8	190)	R	1)	III S,W	
			160)	.9	190)		1)		
	0302	0303	43.25)	1.2			)		
			80)	1.2	245	-	2)	III G,V	*
			160)	1.3			)		

Days without Heliograph observations: Nil

*Other type III's observed from same position during the day.

UT Date 197.8 JUNE	HELIOGRAPH EVENT Start (UT)	End (UT)	Freq. (MHz)	Positions Central Dist. ($R_\odot$)	Positions Position Angle (Deg.)	Polarization	Intensity (1-3)	Spectral Type	REMARKS
5/6	2303	2305	43.25	1.0	250		2)		
			80	1.0	240		1)	II	
			160)	.7)	220)		2)		
			)	1.0)	330)		)		
6/7	2330	0500	80)	1.0	245	unpol	1	I	Type I activity persisted from this region until 8th.
			160)						
	0440	0500	80)	1.0)	220	-	1	I	
			160)	.8)					
11	0214	0217	80	1.3	225	-	3	II	
12	0047		43.25)	1.2)	305	-	3)	III B	
			80)	1.1)			2)		
16	0346	0352	43.25)	1.0	250	-	3)	IIIGG	
			80)				2)		
			160)				2)		
17	0017	0018	43.25)	1.0	90		3)	IIIG,V,U	
			80)				1)		
	0150		160	.2	180	-	1	IIIB	

Days without Heliograph observations: Nil

* Other type III's observed from same position during the day.

SELECTED SOLAR EVENTS

JUNE 1978

Culgoora

UT Date 1978. JUNE	HELIOGRAPH EVENT Start (UT)	End (UT)	Freq. (MHz)	Positions Central Dist. ($R_\odot$)	Positions Position Angle (Deg.)	Polarization	Intensity (1-3)	Spectral Type	REMARKS
18	0210	0211	43.25) 80)	1.6 1.3	115	-	2))	IIIG	
	0405	0408	80) 160)	1.3	115	-	2))	IIIG	
	0416	0420	80	1.3	100	-	2	II	
21	0115	0116	80) 160)	1.2	270	-	3) 1)	IIIB	*
	0123	0130	43.25) 80) 160)	1.1	270	-	2) 3) 2)	II	
	0125		160	1.0	90	-	2	IIIB	
22/23	2300	0500	43.25) 80) 160)	.2	65	-	2) 1) 1)	IIIS	
23/24	2300	0500	80) 160)	.4	130) 180)	L) R)	2	IS	

Days without Heliograph observations: Nil

* Other type III's observed from same position during the day.

UT Date 197.8 JUNE	HELIOGRAPH EVENT Start (UT)	End (UT)	Freq. (MHz)	Positions Central Dist. ($R_\odot$)	Positions Position Angle (Deg.)	Polarization	Intensity (1-3)	Spectral Type	REMARKS
23/24	2300	0500	80) 160)	.4	130) 180)	L) R)	2	IS	
24/25	2300	0500	43.25) 80) 160)	.2	350	unpol	3) 3) 2)	I	
	2300	0500	160	.8	145	L	2	I	Type I activity persisted from this region until 26th.
25/26	2300	0500	80) 160)	.4	310	See Note	1	I	Complex polarisation and structure. Activity persisted until 29th.
27	0059	0104	43.25) 80) 160)	.3	315	-	3	IIIGG,V	*
	0107	0120	43.25) 80) 160)	.3	315	-	3	II	

Days without Heliograph observations: Nil

* Other type III's obs erved from same position during the day.

SELECTED SOLAR EVENTS

JUNE 1978

Culgoora

UT Date 197.8 JUNE	HELIOGRAPH EVENT							Spectral Type	REMARKS
	Start (UT)	End (UT)	Freq. (MHz)	Positions		Polar-ization	Inten-sity (1-3)		
				Central Dist. ($R_\odot$)	Position Angle (Deg.)				
28	0245	0249	43.25)	.7)					
			80)	.3)	290	-	3	IIIGG,V	
			160)	.1)					
	0249	0306	43.25)	.7)					
			80)	.3)	290	-	3	II	
			160)	.1)					
	0400	0500	80)	.9	180	L	2	I	
			160)						
	2349	2352	43.25)	.6)					
			80)	.4)	40	-	3	IIIGG	*
			160)	.2)					
28/29	2300	0500	160	.2	40	L	2	I	
29	0457	0501	43.25)	.9	330)				
			80)	.4)	310)	-	3	IIIGG,V	*
			160)	.4)	310)				

Days without Heliograph observations: Nil

* Other type III's observed from same position during the day.

COSMIC RAY INDICES

(Neutron Monitors)

JUNE 1978

June 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.	7112	6703	Data not available at time of publication.	Data not available at time of publication.	6056.0	Data not available at time of publication.	3548.8	Data not available at time of publication.
2		6993	6572			5956.1		3513.2	
3		6899	6481			5865.0		3485.9	
4		6922	6562			5907.1		3497.0	
5		6977	6585			5954.0		3518.6	
6		7042	6676			6008.7		3539.5	
7		7066	6684			6016.6		3557.0	
8		7124	6180			6092.9		3572.7	
9		7190	6816			6152.9		3581.4	
10		7243	6850			6177.3		3582.4	
11		7178	6752			6116.6		3566.9	
12		7216	6799			6149.0		3576.7	
13		7230	6829			6165.5		3575.2	
14		7249	6877			6196.0		3572.6	
15		7253	6887			6215.8		3575.4	
16		7239	6858			6198.9		3562.8	
17		7224	6805			6163.5		3565.7	
18		7235	6792			6155.4		3568.4	
19		7275	6837			6198.0		3572.0	
20		7274	6844			6196.5		3571.1	
21		7247	6826			6202.3		3568.8	
22		7256	6831			6201.3		3567.9	
23		7262	6845			6227.0		3562.5	
24		7283	6888			6251.4		3567.7	
25		7226	6784			6181.9		3551.9	
26		7014	6539(17)			5954.5		3535.1	
27		6955(2)	6555			5943.5		3525.1	
28		7146(4)	6099			6047.6		3558.0	
29		7128	5580			6059.0		3550.5	
30		7055	6652			6004.5		3531.7(23)	
MEAN		7150.4	6666.3			6100.5		3554.1	

( ) 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.

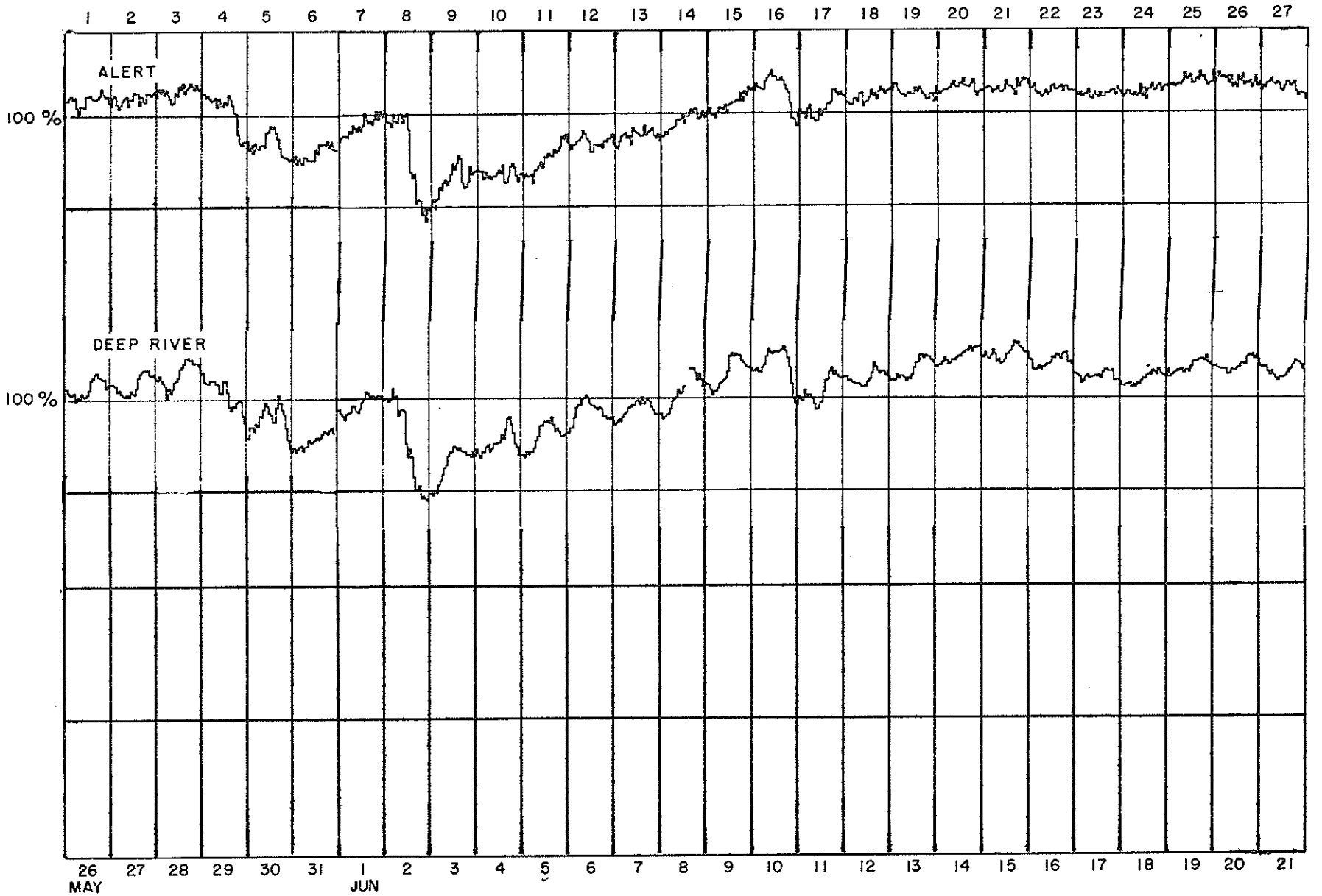
Notes: Thule, Alert, Calgary, Sulphur Mountain, Kiel, Climax and Kula Scaling Factors = 100. Deep River Scaling Factor = 300. Tokyo Scaling Factor = 256.

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.

Note about Alert and Deep River graphical plots: A programming oversight causes the monthly 100% reference level to change for May and June data. NGSDC will remedy this shortly.

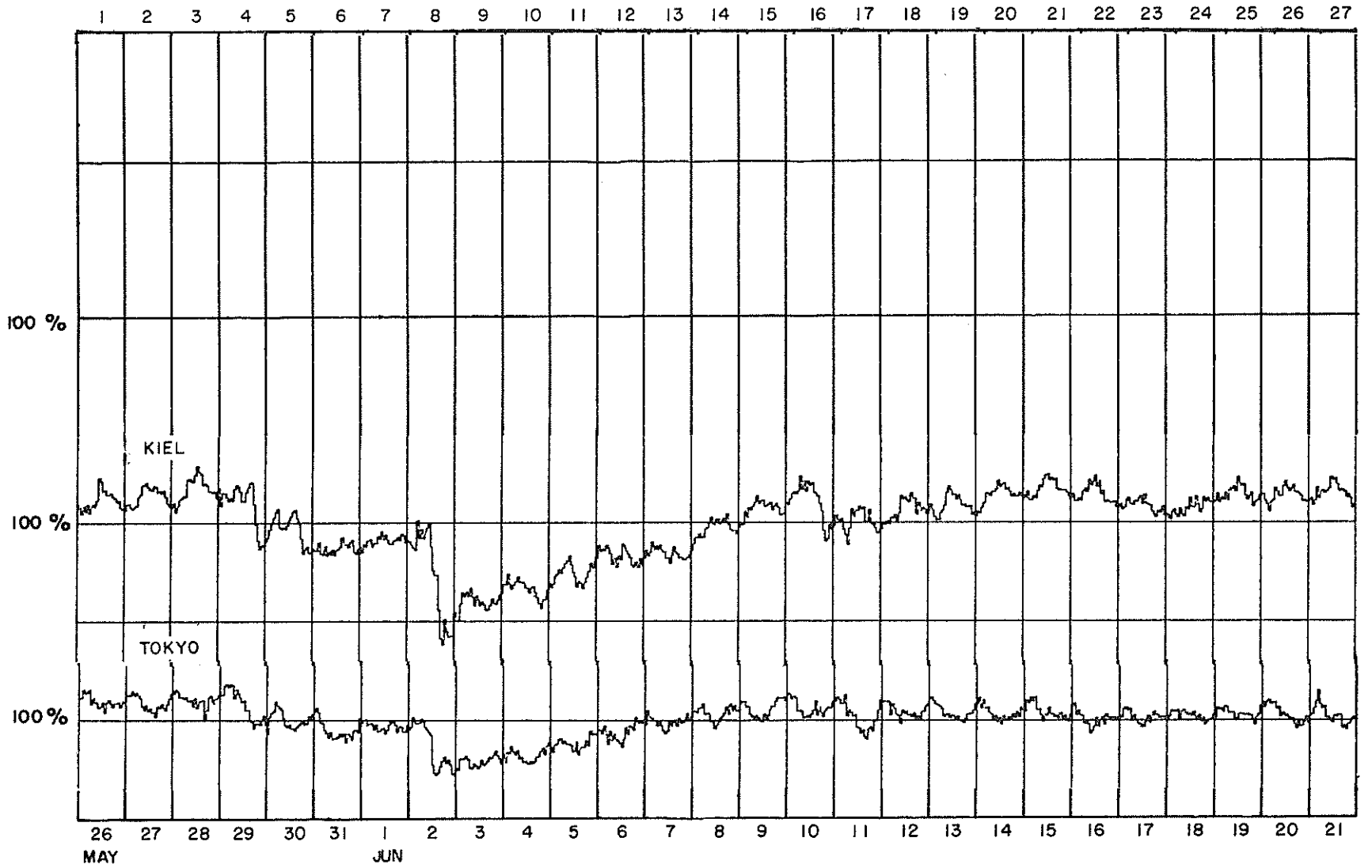
COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1980 (May-June 1978)

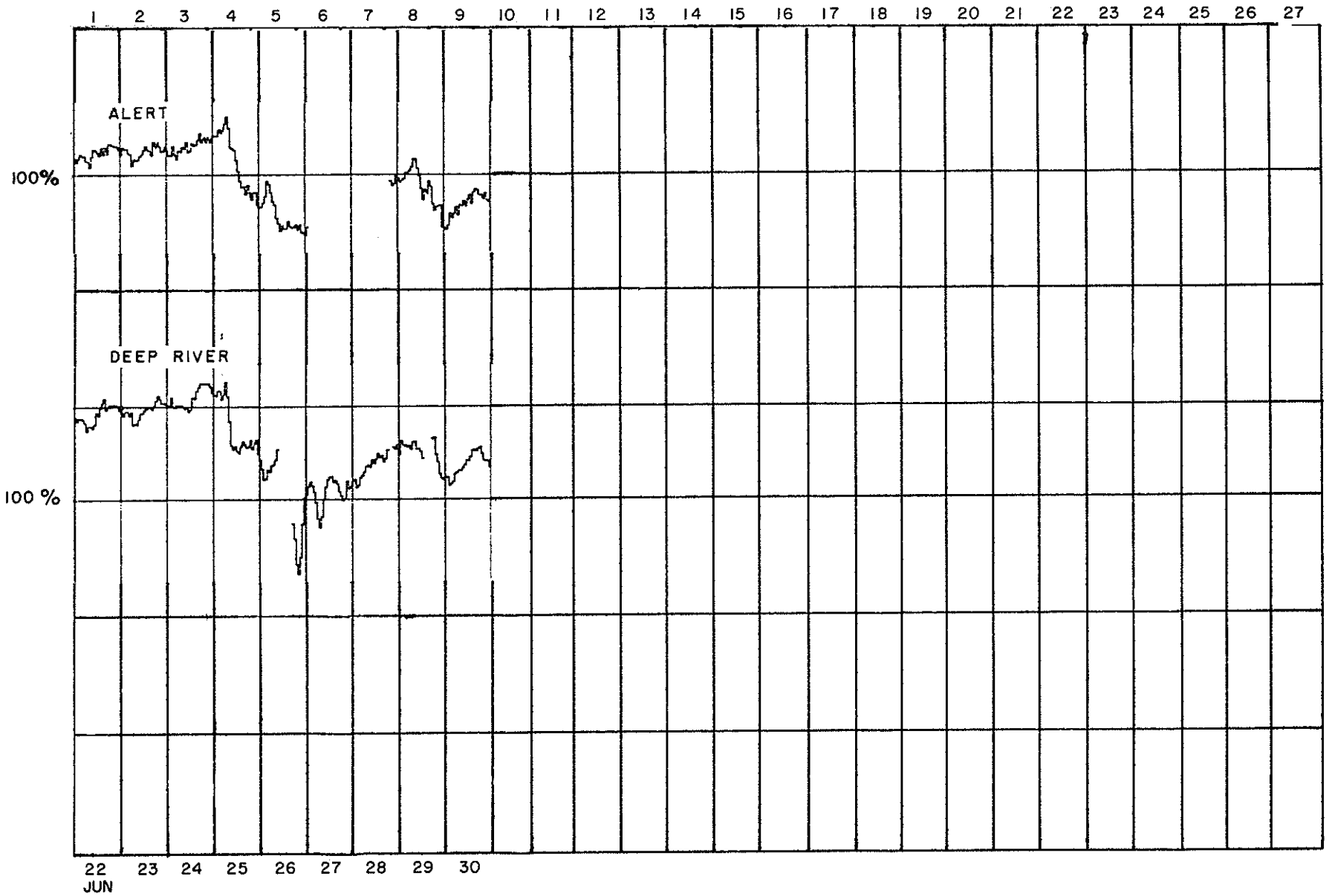


COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1980 (May-June 1978)

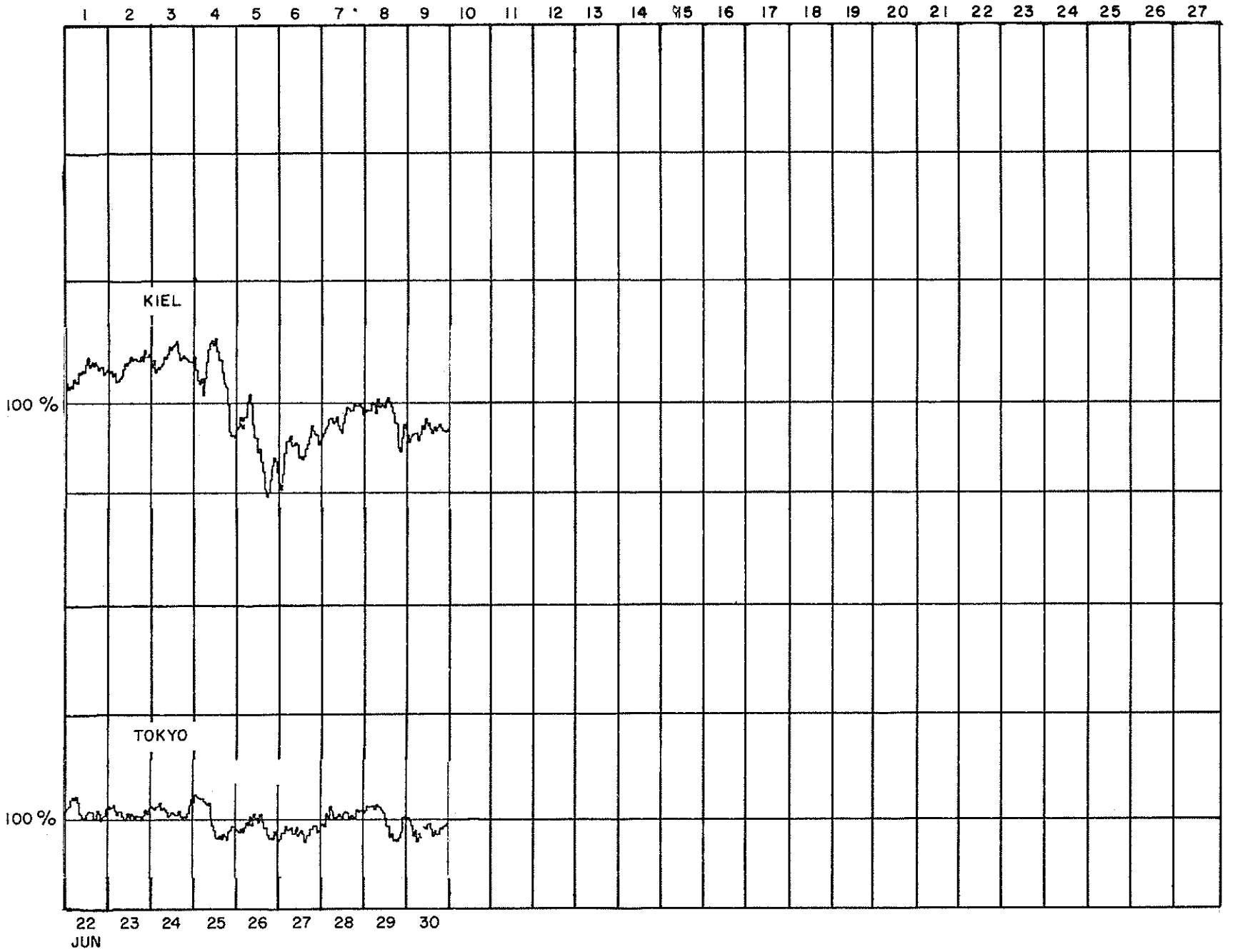


COSMIC RAY INDICES
(Neutron Monitors)
Bartels Rotation 1981 (June 1978)



COSMIC RAY INDICES
(Neutron Monitors)

Bartels Rotation 1981 (June 1978)



159
Jun 78

GEOMAGNETIC ACTIVITY INDICES

JUNE 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	Q7A	1	3-	2	2-	1-	2	2-	4	16-	1+	3-	2+	2	1-	2-	1+	4-	9	19	11	13	17		0.5
2	D1	2	2+	4-	7	7+	7	7+	5	42-	2	2+	4-	6+	6-	6-	6+	4+	82	102	76	59	120		1.8
3		6	5	4-	4	2+	3-	5-	2+	31-	6-	5	4-	3+	2+	2+	4	2	31	43	45	63	25		1.3
4		3	2	2-	3-	4+	3	4	6+	27	3	3-	2-	2+	4-	3-	4-	5-	26	40	31	18	53		1.2
5	D3	6+	6+	4+	3+	2+	3-	4	3+	33-	5	5+	4+	3+	3-	2+	3-	3	38	45	38	60	24		1.4
6	Q6A	2+	2-	1+	3+	2-	1	2-	3-	16-	2+	2-	2-	3-	2-	2-	2	3-	8	21	13	19	16		0.4
7		2+	3-	3-	2	2	2+	3	3+	20+	2+	3-	3	2	1+	2	3	3	11	25	21	21	25		0.6
8	Q9A	3+	4	2	1	2	2	1+	0+	16	4-	4	2+	1-	2-	2+	1+	1-	10	19	15	20	14		0.5
9	Q1	1-	2-	1+	0+	1	1-	1+	1	8	1-	2	1+	1-	1	1	1	1+	4	9	4	7	7	CK	0.1
10		2-	1	4-	4-	3	4	3	6	26	2-	1+	4	4-	3	3+	3	5-	24	38	31	24	45		1.2
10		2-	1	4-	4-	3	4	3	6	26	2-	1+	4	4-	3	3+	3	5-	24	38	31	24	45		1.2
11		4+	4	5-	3+	2	2-	1-	1	22-	4-	4	4+	4-	2+	1+	1	1+	17	34	31	51	14		0.9
																									0
12	Q8A	1-	2-	1-	3-	3	3	3+	1+	16+	1-	2	1	3-	3	3-	3-	1+	10	18	16	12	22		0.5
13	Q5A	1+	2-	1	3-	3-	2	1	1+	14-	1+	1+	1	2+	2	2-	1	1+	7	17	12	15	14		0.3
14	Q2	0+	1	1-	1-	1	1+	2-	2-	8+	1-	1	1-	1-	1	2-	2	1+	4	10	8	6	12	CC	0.1
15	Q4	2	2	2+	2	2	2-	1	1-	14-	2-	2	3-	3-	2	2-	1	1-	6	11	15	17	10	CC	0.3
16	Q3	1	2-	1-	2-	2	2-	2+	2+	13+	1-	1+	1	2-	2	1+	2	2	6	11	10	8	14	CC	0.3
17	Q0A	2+	3-	2+	3	2	2	2+	2	19-	2+	3-	2+	3-	2	2-	2+	2-	9	17	13	19	12		0.5
18		3-	2	3-	2+	3+	3-	3-	2+	21-	2+	2-	2+	3-	3-	3-	2+	2	11	21	16	16	22		0.7
19		3-	3-	3	3-	3	3	4-	4+	25	3-	2+	3	3	2+	3	3	4-	17	31	27	26	33		0.9
20		3	3-	2+	3-	2	2-	2+	3	20-	3	3-	2+	2+	2-	2-	2	3-	11	24	16	24	17		0.6
21	D4	3+	5+	4-	3+	5-	5	5	3+	34-	3+	4+	4-	3	3+	4	4-	3+	33	56	34	41	48		1.3
22		3+	3+	3-	3-	3+	3	3+	2+	24	3+	3	3-	3	3	2+	3	2+	15	29	23	25	27		0.8
23		3+	3-	3-	3+	3-	3+	4+	4-	26	3	2+	3-	3+	2+	3-	4-	4-	18	31	21	22	31		1.0
24		5-	4	4-	3-	3+	3-	3-	3-	26+	4	4-	3+	3-	3+	2+	2+	3-	19	35	25	33	28		1.0
25		3-	3-	4-	4	3-	4+	5	4	29	2	2+	3+	3+	2+	3+	4-	4-	24	43	23	27	40		1.2
26	D2	4	5+	6-	4+	5-	5	5	5	39	3+	5-	5	4-	3+	4-	4	4+	46	60	48	51	58		1.5
27		4-	4	3	2	3	2+	3+	2+	24-	4-	4-	3	2	3-	2-	3	2	15	27	21	26	23		0.9
28		2+	3-	2+	3-	3+	3+	2+	2+	21+	2	3-	2	3-	3-	3-	2-	2	12	21	15	16	21		0.7
29		1-	2-	2	3-	3-	4-	3+	8-	24+	1	2-	2+	3	3-	3	3	7-	32	55	28	15	68		1.3
30	D5	6	4-	5-	4-	4	3+	4+	1+	31	5-	4-	4+	3+	3+	3-	4-	1+	31	55	32	55	32		1.3
																		Mean	20	32.3	24.1	28.3			0.84

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	1+	3-	2+	2+	1	2+	2	4+	1-	2+	2+	2-	0+	1	1-	3
2	2+	3-	4	7-	6+	6	6+	5-	2-	2	4-	6	5	6-	6+	4-
3	6-	5+	4	4-	3-	3-	4	2	6-	5-	3+	3	2	2-	4	2-
4	3	2+	2-	2+	4	3	3+	5	3+	3-	1+	2+	4-	2+	4	4+
5	5+	6-	4-	3+	3-	3	3+	3	5	5	5-	4-	2	2-	2	3
6	2+	2-	2-	3	2	2-	2	2+	2	2-	2-	2+	1+	1+	2+	3-
7	2	3-	3-	2	2	2+	3	3	2+	3-	3	2+	1-	2-	3	2+
8	3+	4	2	1	2+	2+	1+	1-	4	4-	3-	1-	1+	3-	1	0+
9	1	2	2-	1	1+	1+	2-	2-	0+	2+	1+	0+	0+	0+	0	1-
10	2	1+	4+	4	3	4-	3	5	1+	1-	3	3+	3-	3+	3-	4+
11	4-	4	4+	4-	3-	2	1+	1+	4-	4	4+	4-	2-	1-	0+	1
12	1	2	1+	3	3	3	3	2	1-	2	1-	2+	3-	2	3-	1-
13	1+	1+	1+	3-	2+	2+	1+	2-	1+	1+	1-	2-	2-	1+	0+	1-
14	1	1	1	1+	1+	1+	2	2	0+	1	1-	0+	1-	2-	2	1-
15	2	2-	3-	3-	2+	2-	1+	1	1+	2+	3-	2+	1+	1+	1-	0+
16	1+	2-	1	2	2+	2-	2+	3-	0+	1+	1-	1+	1+	1-	2-	2-
17	3-	3-	3-	3-	2+	2+	3-	2+	2	2+	2+	2	1+	1	2	1+
18	2+	2	3-	3-	3	3	3-	2+	2	2-	2+	3-	2+	2-	2-	1+
19	3	2+	3	3	3-	3	3+	4-	2+	2+	3-	3	2	3	3-	4-
20	3-	3-	3-	3-	2	2	3-	3-	3+	3-	2	2-	1+	1+	1+	3-
21	3	5-	4-	3	4	4	4	3+	4-	4	4-	3	3-	4	4-	4-
22	3	3	3-	3+	3+	3-	3	2+	4-	3+	3-	3-	3-	2	3-	3-
23	3	2+	3	4-	3-	3-	4-	3+	3	2	2	3+	2-	3-	4-	4
24	4	4	3+	3-	3	3-	3-	3-	4	3+	3	3-	4-	2-	2+	3-
25	2+	2+	4-	4-	3	4-	4	4-	2	3-	3-	3-	2-	3	3+	3+
26	4	5-	5	4-	4-	4	4-	4	3-	5-	5	4-	3	3+	4	4+
27	4-	4	3+	2+	3-	2+	3	2+	4-	3+	3	2-	2+	1+	3+	1+
28	2+	3	2+	3	3	3	2+	2+	2	2+	2-	3-	2	2+	1	1+
29	1+	2-	3-	3+	3	3+	3+	7-	1-	1+	2	3-	2	2+	3-	6+
30	5-	4-	5-	4-	4-	3	4-	1+	5-	4-	4+	3+	3	2	3+	1+

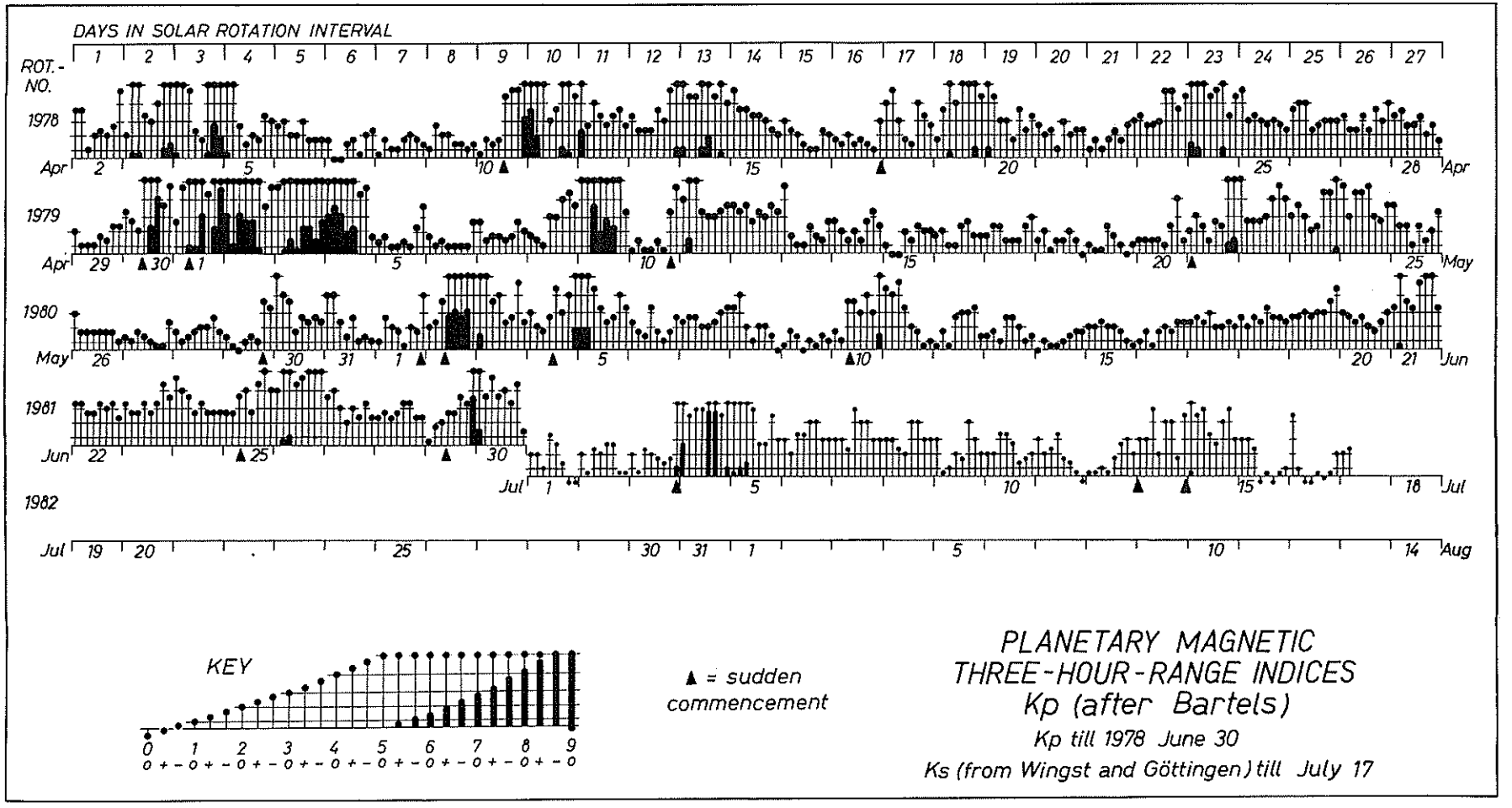
Quiet days (Q) and disturbed days (D), geomagnetic planetary three-hour-range indices (Kp) (integers alone are equivalent to those normally given with a small zero), magnetic character figures (Cp), and average amplitude (Ap) (unit 2γ) prepared by Geophysikalisches Institut at the University of Göttingen, 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	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
1	15	6	4	4	5	6	7	15	33	12	88	9
2	11	4	6	5	6	69	8	14	27	15	94	82
3	9	7	8	10	4	9	13	14	15	41	83	31
4	8	9	6	7	8	14	89	11	3	55	96	26
5	5	40	3	8	10	18	31	17	6	21	7	38
6	28	21	4	8	7	5	34	14	7	9	5	8
7	15	17	6	3	5	3	13	7	9	5	7	11
8	14	12	8	6	3	2	19	10	20	5	16	10
9	16	20	11	2	3	3	23	16	14	6	85	4
10	14	12	13	4	9	4	21	7	12	36	10	24
11	10	28	19	12	6	38	7	5	7	64	30	17
12	4	11	6	28	18	21	4	10	3	29	18	10
13	9	11	28	14	26	16	8	8	12	24	11	7
14	18	12	10	13	42	8	3	11	10	51	9	4
15	12	11	9	19	25	5	2	48	17	19	5	6
16	27	9	7	8	14	9	14	11	24	8	7	6
17	14	29	10	12	8	12	9	10	25	7	8	9
18	7	13	6	22	6	3	12	10	24	19	5	11
19	23	24	42	28	6	3	6	12	15	38	4	17
20	29	8	44	7	4	4	3	12	9	23	8	11
21	10	5	64	5	5	6	1	12	7	9	26	33
22	11	5	63	22	3	6	3	22	13	8	24	15
23	6	6	21	6	2	4	2	6	15	22	24	18
24	7	10	12	6	2	5	6	5	6	48	26	19
25	5	27	10	4	15	5	12	12	3	17	10	24
26	3	13	18	6	19	11	12	37	49	18	7	46
27	3	14	24	62	12	6	5	42	70	16	5	15
28	4	7	9	47	5	10	9	46	17	12	7	12
29	61	6	3	9	6	8	36		14	6	8	32
30	17	5	4	9	12	5	36		16	58	18	31
30	17	5	4	9	12	5	36		16	58	18	31
31	8	4		6		6	23		8		12	
MEAN	14	13	16	13	10	10	15	16	16	23	25	20

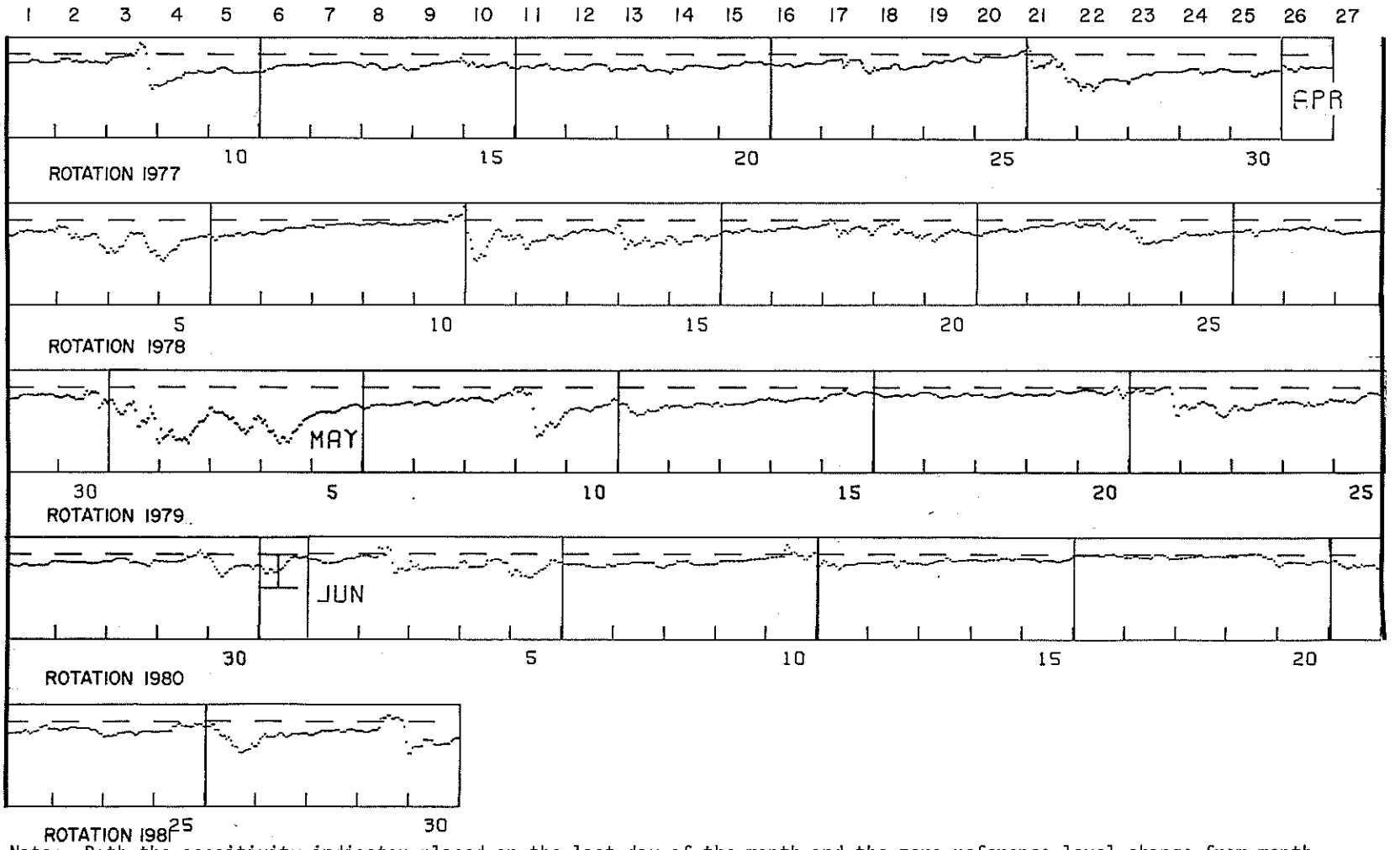
GEOMAGNETIC ACTIVITY INDICES



GEOMAGNETIC ACTIVITY INDICES

Hourly Equatorial Dst

by Bartels Rotation



Note: Both the sensitivity indicator placed on the last day of the month and the zero reference level change from month to month.

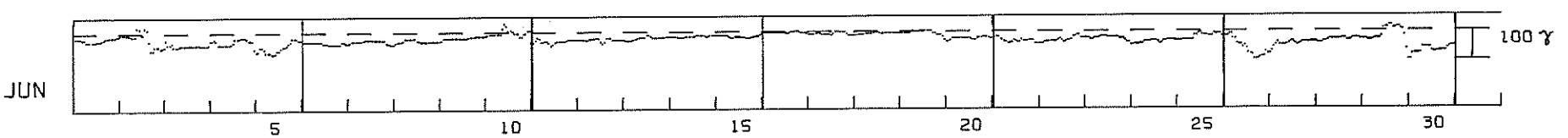
HOURLY EQUATORIAL Dst VALUES (PROVISIONAL)

JUNE 1978

NASA/GODDARD SPACE FLIGHT CENTER

(Time-UT) (Units-Gammas)

DAY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	-21	-19	-23	-23	-26	-25	-32	-32	-30	-29	-29	-27	-26	-25	-24	-21	-17	-15	-13	-15	-15	-15	-10	-13
2	-7	-7	-8	-9	-11	-13	-16	-14	-10	17	10	-10	-6	16	8	-31	-61	-57	-46	-44	-49	-54	-49	-46
3	-23	-42	-42	-33	-49	-51	-46	-42	-41	-45	-43	-43	-39	-44	-46	-40	-39	-40	-46	-41	-42	-45	-39	-27
4	-28	-21	-30	-41	-40	-40	-39	-40	-43	-41	-37	-32	-20	-24	-18	-15	-17	-21	-24	-30	-27	-32	-58	-67
5	-62	-49	-48	-58	-68	-69	-68	-74	-75	-67	-60	-62	-52	-47	-45	-41	-36	-31	-20	-20	-24	-29	-29	-28
6	-35	-34	-33	-35	-33	-31	-32	-32	-32	-34	-39	-40	-38	-43	-42	-41	-42	-41	-39	-38	-32	-33	-39	-37
7	-35	-30	-31	-30	-28	-34	-30	-26	-24	-25	-24	-25	-27	-30	-29	-29	-27	-25	-31	-39	-41	-43	-46	-40
8	-36	-32	-31	-31	-28	-22	-22	-24	-22	-20	-24	-31	-34	-37	-36	-34	-34	-32	-30	-32	-33	-34	-31	-30
9	-27	-22	-20	-20	-19	-21	-23	-22	-23	-23	-23	-22	-20	-19	-17	-15	-15	-15	-13	-14	-15	-16	-15	-12
10	-10	-6	-13	-8	-8	-7	-8	-11	12	27	15	0	6	-3	-9	-5	-7	-19	-18	-7	-5	3	1	-38
11	-35	-27	-19	-26	-35	-37	-30	-34	-39	-47	-40	-35	-31	-31	-30	-31	-32	-28	-25	-28	-29	-29	-28	-27
12	-23	-28	-30	-32	-27	-23	-23	-22	-21	-20	-26	-36	-41	-34	-21	-19	-24	-30	-29	-31	-31	-29	-31	-30
13	-34	-35	-31	-28	-25	-24	-21	-19	-17	-20	-17	-12	-11	-19	-24	-22	-20	-18	-18	-18	-19	-16	-15	-16
14	-18	-18	-21	-23	-24	-22	-19	-15	-15	-19	-17	-18	-15	-12	-12	-14	-14	-17	-20	-15	-12	-13	-14	-15
15	-14	-16	-17	-15	-14	-15	-21	-24	-24	-16	-17	-17	-22	-22	-22	-25	-25	-22	-17	-15	-14	-13	-10	-7
16	-2	-3	-3	-5	-8	-5	-2	-4	-5	-4	-6	-10	-9	-5	0	0	1	2	-2	-8	-10	-7	-10	-13
17	-11	-9	-8	-6	-5	-10	-13	-14	-11	-9	-14	-16	-8	-1	0	-2	-6	-6	-7	-12	-15	-12	-13	-13
18	-14	-10	-10	-9	-8	-6	-8	-9	-10	-4	-1	-5	-10	-12	-6	-4	-5	-6	-6	-4	-10	-10	-11	-9
19	-8	-10	-8	-9	-4	1	-4	-5	-1	3	1	4	-2	-3	0	-2	-10	-10	-15	-14	-15	-21	-31	-37
20	-38	-29	-23	-21	-25	-24	-24	-26	-27	-24	-22	-23	-31	-32	-27	-21	-20	-19	-17	-18	-21	-25	-28	-21
21	-19	-16	-22	-30	-32	-37	-39	-43	-42	-36	-30	-37	-40	-35	-28	-36	-31	-33	-29	-31	-34	-43	-45	-43
22	-42	-43	-36	-34	-35	-33	-33	-36	-36	-29	-25	-34	-39	-34	-29	-30	-26	-18	-15	-12	-13	-25	-26	-24
23	-22	-23	-31	-32	-23	-22	-23	-18	-16	-20	-22	-24	-20	-21	-24	-24	-22	-29	-27	-28	-34	-39	-41	-48
24	-45	-42	-48	-43	-40	-41	-36	-34	-34	-33	-31	-34	-34	-39	-45	-38	-33	-31	-29	-29	-30	-34	-36	-33
25	-35	-32	-30	-30	-29	-29	-28	-28	-15	-14	-9	-6	-16	-19	-19	-21	-20	-15	-8	-14	-9	-13	-20	-19
26	-16	-17	-11	-14	-30	-31	-45	-49	-44	-57	-49	-61	-76	-80	-83	-96	-98	-90	-87	-84	-82	-69	-78	-74
27	-56	-53	-47	-39	-49	-48	-47	-47	-44	-40	-35	-39	-45	-50	-45	-41	-37	-39	-39	-42	-36	-35	-37	-38
28	-44	-42	-39	-35	-34	-31	-27	-29	-30	-31	-28	-28	-25	-24	-26	-35	-33	-31	-25	-23	-23	-27	-32	-29
29	-30	-33	-36	-32	-31	-28	-25	-28	-26	-19	8	11	11	17	13	5	7	12	9	1	-2	-19	-64	-98
30	-98	-77	-74	-77	-78	-72	-54	-57	-60	-56	-60	-71	-74	-70	-67	-66	-65	-68	-66	-59	-52	-49	-49	-47



NOTE: Hourly values of the provisional equatorial Dst index for June 1978 are based on data from Hermanus, Kakioka, and San Juan. The magnetometer at Honolulu was not operating during May and June 1978.

PRINCIPAL MAGNETIC STORMS

JUNE 1978

OBS. 2 letter IAGA code	GEOMAG-NETIC LATI-TUDE	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
COL	64.6N	1	2143	SC*	+17	-56	+14	02(4,7)	7	248	1790	990	03	12
SIT	60.1N	1	2143	SC*	+ 7.4*	-13.7*	- 5.9*	02(4)	8	--	--	860	03	11
NEW	55.1N	1	2143	SC*	2	31	--	02(4,7)	-	--	--	--		
WIT	54.2N	1	2143	SC*	- 1 *	+53 *		02(5,6)	7	38	425	135	03	21
FRD	49.6N	1	2143	SC*	- 1	+37	- 5	2(4,5,7,8) 3(1,2) 5(1)	6	43	258	122	06	03
SJG	29.9N	1	2142	SC	--	+15	+ 3		-	--	--	--		
GUL	24.5N	1	2143	SC	- .2	20	- 2	--	-	14	247	59	04	03
JAI	17.3N	1	2143	SC	- .6	19	- 5	--	-	13	237	60	04	03
SHL	14.6N	1	2143	SC	- .2	15	3	--	-	10	220	43	04	03
UJJ	13.5N	1	2143	SC	- .2	22	- 5	--	-	11	267	63	04	03
A IG	09.5N	1	2143	SC	- .3	17	- 3	02(4)	7	10	242	70	04	03
HYB	07.6N	1	2142	SC	- .2	+17	- 2	--	-	--	--	--		
GUA	04.0N	1	2143	SC*	--	--	--		-	--	--	--		
ANN	01.4N	1	2143	SC	- .6	17	9	--	-	10	284	103	04	03
HUA	00.6S	1	2143	SC*	--	32	4	02(6,7)	7	16	510	44	04	04
TRD	01.2S	1	2143	SC	.2	14	20	--	-	6	336	174	04	03
HER	33.7S	1	2143	SC	+ 2	+14	+12	02(4) 03(1)	6	18	161	135	04	03
KGL	56.5S	1	2143	SC*	--	--	--	02(7)	9	--	--	--	03	18
NEW	55.1N	2	0913	SC	9	110	13	03(1)	7	78	385	458	04	11
IRK	41.0N	2	0724	SC	.9	12	2	02(4)	7	25	314	77	05	21
SJG	29.9N	2	0913	SC	+ 1	+45	+14	02(6)	6	14	122	57	04	03
HYB	07.6N	2	0913	SC	- 1.9	+ 8	- 5	02(4,6)	7	9	256	30	04	03
GUA	04.0N	2	0914	SC	--	66	-17	02(4)	7	10	170	50	04	04
PMG	18.7S	2	0915	SC		+60	+49	02(4)	7	4	200	110	03	12
GNA	43.3S	2	0914	SC	+ 5.4	+41	+25	02(7) 03(1)	6	26	140	150	03	12
TOO	46.7S	2	0915	SC	- 4.6	+49	+11	02(4,6)	6	27	160	80	03	12
COL	64.6N	4	23--	..	..	..	..	05(2,3)	6	148	880	760	05	13
SIT	60.1N	4	1212	SC*	- 7.7*	+21.9	+ 2.2	05(2)	7	--	730	370	05	11
NEW	55.1N	4	1211	SC*	5	18	6	05(2)	7	72	182	232	06	04
WIT	54.2N	4	1211	SC*	- 2 *	+58 *		04(8) 05(1,2)	6	25	180	65	05	24
GUL	24.5N	4	1211	SC	- .4	32	- 4	--	-	8	102	31	06	02
JAI	17.3N	4	1211	SC	- 1.1	26	- 6	--	-	7	87	25	06	02
SHL	14.6N	4	1211	SC	- .2	26	4	--	-	7	83	47	06	02
UJJ	13.5N	4	1211	SC	- .7	32	- 7	--	-	6	91	36	06	02
A EG	09.5N	4	1211	SC	- .9	23	- 8	05(2)	5	5	74	43	06	02
HYB	07.6N	4	1212	SC	- .6	+26	- 2	05(2)	5	5	77	31	06	02
GUA	04.0N	4	1212	SC	--	--	--		-	--	--	--		
ANN	01.4N	4	1211	SC	- 1.4	30	16	--	-	5	81	64	06	02
HUA	00.6S	4	1211	SC*	3	44	4	04(5)	5	7	253	24	05	24
TRD	01.2S	4	1211	SC	- .3	26	31	--	-	4	113	61	06	02
PMG	18.7S	4	1211	SC	+ .2	+20	+17	04(8)	5	4	100	30	05	13
HER	33.7S	4	1212	SC	- 1	+11	+ 5	04(8) 05(1,2)	5	13	59	100	05	12
KGL	56.5S	4	1211	SC*	--	--	--	05(1)	6	--	--	--	05	11
COL	64.6N	10	0842	SC*	- 8	+150	-22	11(4)	6	69	920	340	11	12
SIT	60.1N	10	0830	SC	- 5.1	+74.7	+ 8.9	11(3)	5	30	160	320	11	12
NEW	55.1N	10	0827	SC	5	84	--	10(3,8) 11(2,4)	5	28	164	97	11	15
FRD	49.6N	10	0827	SC	+ 1	+71	-11	10(8)	6	18	128	60	12	00
IRK	41.0N	10	0827	SC	- 1.0	54	10	10(3,4,8) 11(3)	5	20	176	36	11	15
SJG	29.9N	10	0913	SC	+ 1	+36	+11	10(8)	6	8	85	27	11	11
GUL	24.5N	10	0827	SC	- 1.4	48	- 3	--	-	12	113	48	11	11
JAI	17.3N	10	0827	SC	- 1.8	46	-11	--	-	10	123	37	11	11
SHL	14.6N	10	0827	SC	- .8	41	8	--	-	8	121	38	11	11
UJJ	13.5N	10	0827	SC	- 1.3	58	-14	--	-	8	134	39	11	11
ABG	09.5N	10	0827	SC	- 1.5	45	-13	10(3,4,8)	5	7	118	40	11	11
HYB	07.6N	10	0828	SC	- 1.1	+47	- 3	10(3,4,8)	5	4	126	27	11	16
GUA	04.0N	10	0828	SC	--	39	- 9	11(3)	5	10	130	20	11	12
ANN	01.4N	10	0827	SC	- 2.6	68	30	--	-	6	138	77	11	11
HUA	00.6S	10	0827	SC	2	55	11	10(8)	5	7	242	48	11	12
TRD	01.2S	10	0827	SC	- .2	58	64	--	-	4	157	117	11	11
PMG	18.7S	10	0827	SC	- .7	+39	+33	10(3,4,8)	5	3	130	60	11	12
H ER	33.7S	10	0830	SC	+ 4	+29	+24	10(3,8)	5	22	94	77	11	16
TOO	46.7S	10	0830	SC	- 2.7	+34	+11	10(4,8) 11(2,3,4)	4	8	120	30	11	15
KGL	56.5S	10	2118	SC	--	--	--	10(8) 11(3,4)	4	--	--	--	11	11
NEW	55.1N	20	18--	..	..	..	..	21(2)	6	35	195	194	29	04
KGL	56.5S	20	21--	..	..	..	..	21(1,2,6,7,8) 22(1,7)	4	--	--	--	23	03
FRD	49.6N	21	03--	..	..	..	..	21(2) 24(1,2)	5	24	133	61	24	06
HUA	00.6S	21	0028	..	--	--	--	21(6,7)	5	7	218	25	22	05
WIT	54.2N	25	0825	SC*	+ 5 *	-15 *		25(7)	6	24	200	85	26	23
FRD	49.6N	25	0825	SC*	- 5	+23	- 3	26(3)	6	23	159	117	28	06
IRK	41.0N	25	0400	..	..	..	..	25(3,4) 26(2,3)	5	29	142	57	27	21
GUL	24.5N	25	0700	..	..	..	..	--	-	11	106	69	27	01
JAI	17.3N	25	0700	..	..	..	..	--	-	10	114	63	27	01
SHL	14.6N	25	0700	..	..	..	..	--	-	10	127	36	27	01
UJJ	13.5N	25	0700	..	..	..	..	--	-	9	135	64	27	01
ABG	09.5N	25	0700	..	..	..	..	26(1,2,3)	5	7	146	77	27	01
HYB	07.6N	25	0825	SC	- .5	+19	- 2	26(2,3)	5	8	161	52	26	23
GLA	04.0N	25	2301	..	..	..	..	26(2)	5	10	170	50	27	08
HUA	00.6S	25	0824	SC	--	18	6	26(5,6)	5	5	223	46	26	23
TRD	01.2S	25	0700	..	..	..	..	--	-	5	245	125	27	01
PMG	18.7S	25	21--	..	..	..	..	26(2)	6	5	180	60	27	00
HER	33.7S	25	2200	..	..	..	..	26(2,7)	5	29	108	74	27	09

PRINCIPAL MAGNETIC STORMS

JUNE 1978

OBS. 2 letter IAGA code	GEOMAG-NETIC LATI-TUDE	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
COL	64.6N	26	04--	..	..	..	..	26(6,7)	6	245	1410	820	26	20
SIT	60.1N	26	00--	..	..	..	..	26(3)	7	50	640	420	27	07
KGL	56.5S	26	0437	SC*	--	--	--	26(2,7,8)	5	--	--	--	26	23
COL	64.6N	29	20--	..	..	..	..	29(8) 30(3,4)	5	132	920	490	30	20
SIT	60.1N	29	0951	SC	- 1.2	+32.2	+ 1.5	30(5)	7	50	490	500	30	19
NEW	55.1N	29	0951	SC	1	35	--	29(8)	7	35	244	226	01	05
HIT	54.2N	29	0951	SC	+ 1	+ 8		29(8)	7	50	260	125	30	20
FRD	49.6N	29	0951	SC	- 1	+26	- 6	29(8)	7	18	304	134	01	04
IRK	41.0N	29	2100	SC*	.6	26	8	29(8)	5	21	160	80	30	21
SJG	29.9N	29	0951	SC	--	+16	+ 4	29(8)	7	10	192	44	30	13
GUL	24.5N	29	0951	SC	- 1.1	23	- 2	--	-	10	133	40	30	19
JAI	17.3N	29	0951	SC	- 1.0	20	- 4	--	-	9	125	41	30	19
SHL	14.6N	29	0951	SC	- .4	..	4	--	-	6	143	33	30	19
UJJ	13.5N	29	0951	SC	- .7	25	- 5	--	-	7	141	46	30	19
ABG	09.5N	29	0951	SC	- .7	18	- 7	29(8)	6	7	129	53	30	19
HYB	07.6N	29	0951	SC	- .6	+21	- 1	29(8)	6	6	130	26	30	20
GUA	04.0N	29	0951	SC	--	18	- 3	29(8)	7	10	130	40	30	15
HUA	00.6S	29	0950	SC	1	23	5	29(8)	7	7	312	32	30	21
TRD	01.2S	29	0951	SC	- .3	26	30	--	-	3	192	125	30	19
PMG	18.7S	29	0951	SC		+18	+14	29(8)	6	5	130	50	30	15
HER	33.7S	29	0951	SC	+ 1	+ 6	+ 4	29(8)	6	26	107	115	30	15
TOO	46.7S	29	21--	..	..	..	..	29(8)	5	22	100	50	30	16
KGL	56.5S	29	0951	SC*	--	--	--	29(8)	8	--	--	--	30	16

Reports were received from the following observatories:

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

Please note: The Boulder Geomagnetic Observatory converted to digital format in March 1978. Since that time, data which were reduced from the anolog recordings are no longer available, e.g., Principal magnetic storms and K indices.

SUDDEN COMMENCEMENTS AND SOLAR FLARE EFFECTS

JUNE 1978

PRELIMINARY REPORT ON RAPID MAGNETIC VARIATIONS (by Dr. A. Romaná).

The meaning of the station symbols is given in the IAGA-News No. 16.
Times of ssc are mean values.

Sudden commencements followed by a magnetic storm or a period of storminess (ssc).

01 2143 A: ESK DOU VIC FUR OTT EBR COI FRD HUA LMN PAF
B: WNG WIT VAL HAD AQU TOL KAK CZT DRV
C: NGK MMB KNY (bs: B: KSA)

02 0913 A: MMB TOL KAK KSA KNY HUA
B: WNG WIT VAL EBR (si: A: FUR)

04 1211 A: SOD ESK WNG WIT DOU VIC FUR OTT EBR COI TOL HUA LMN PAF
B: NGK VAL HAD AQU KAK SZT CZT
C: MMB (si: A: KNY)

10 0828 A: SOD VIC FUR OTT EBR COI FRD KSA SZT HUA LMN
B: ESK WNG WIT VAL DOU AQU TOL KAK KNY PAF DRV
C: NGK HAD CZT

10 2116 B: VAL KAK SZT PAF
C: WNG MMB KNY CZT (si: A: WIT FUR; B: TOL)

25 0825 A: SOD OTT FRD HUA
B: ESK WIT KAK DRV
C: MMB CZT (bs: A: LMN; si: A: FUR)

29 0951 A: VIC OTT COI TOL FRD HUA LMN
B: SOD WNG VAL FUR MMB KAK PAF
C: WIT HAD AQU EBR KNY CZT DRV

Solar-flare effects (sfe).

Effects confirmed by ionospheric or solar observations are underlined.

01 1545 - 1610 HUA

11 0204 - 0225 MMB

23 1316 - 1327 HUA

28 0245 - 0302 MMB KAK KNY

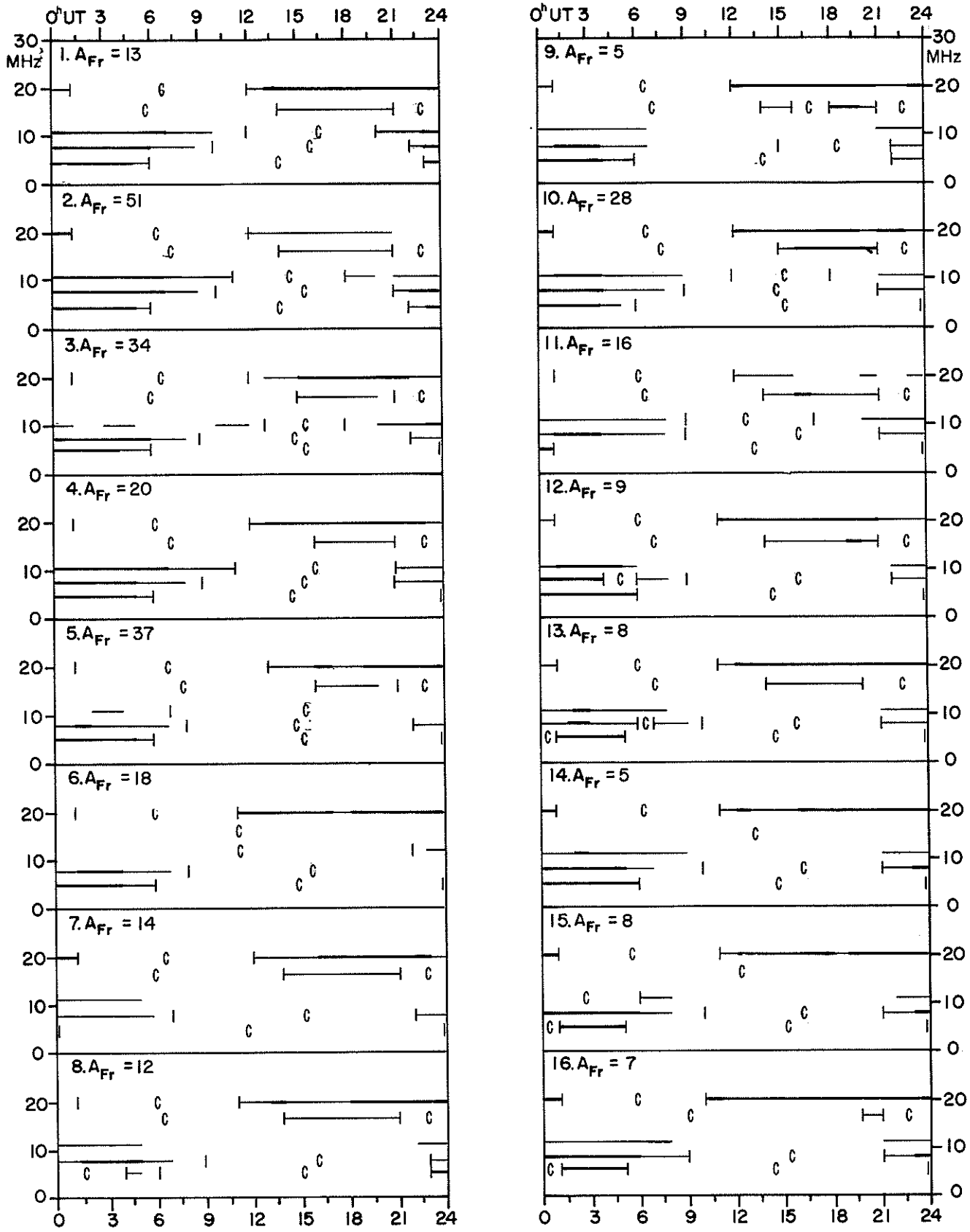
28 1157 - 1206 HUA

Very unusual events.

29 2101 si FUR (+70 -15 -8) COI (++) HUA (+++) PAF (-582 -409 +195)

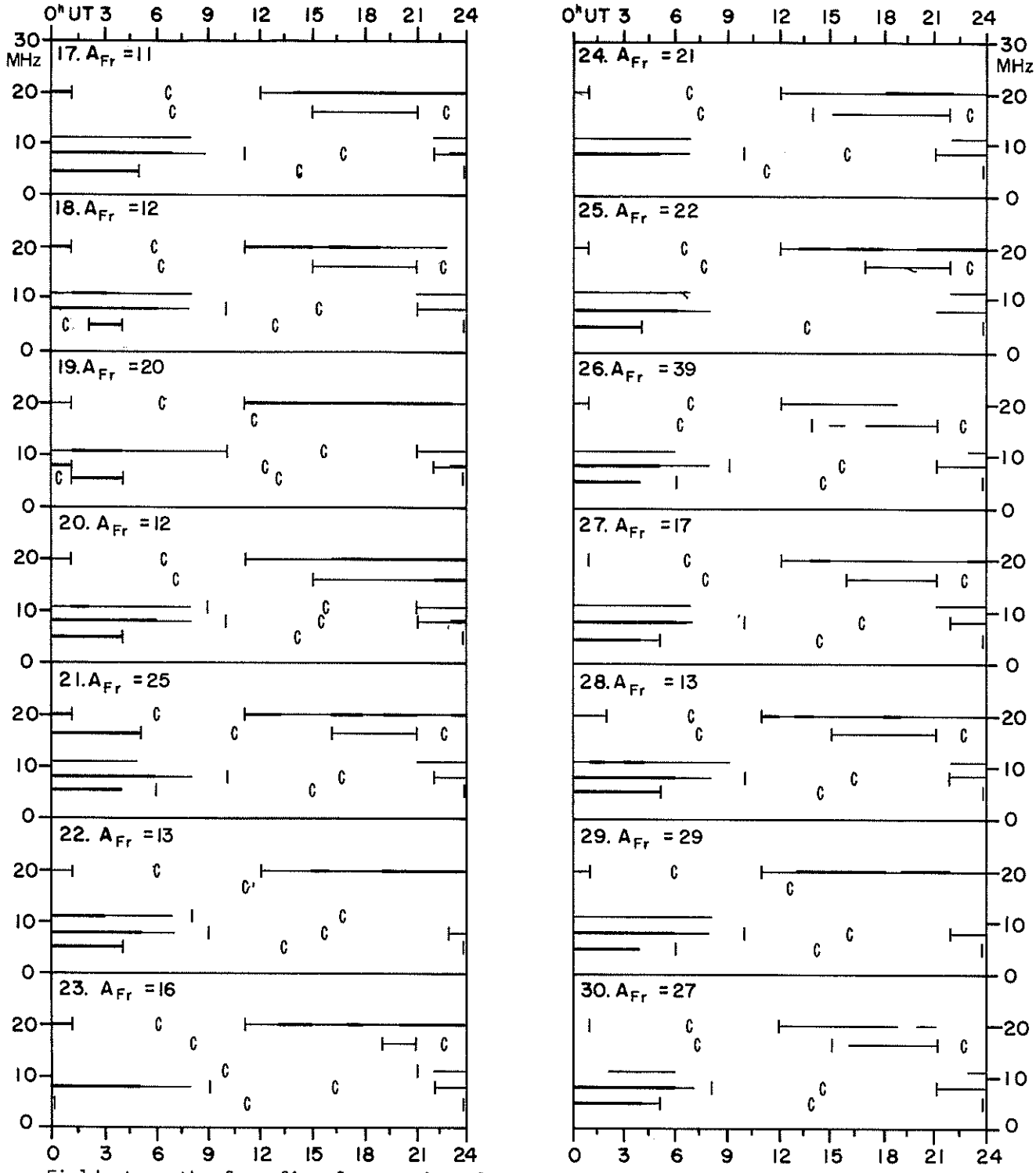
TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

JUNE 1978



TRANSMISSION FREQUENCY RANGES -- NORTH ATLANTIC PATH

JUNE 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

JUNE 1978

Quality indices calculated for reception at Lüchow

DAY	TOKYO	NORFOLK	MOSCOW	CANBERRA	BRACKNELL
1	7.3	5.1	12.8	5.4	15.0
2	2.9	3.5	12.1	5.4	14.3
3	3.4	4.5	12.1	6.4	13.6
4	3.8	4.7	11.8	4.7	14.0
5	4.2	4.0	12.0	4.9	14.1
6	6.7	5.5	11.9	5.1	14.0
7	6.2	4.4	11.9	5.0	15.1
8	5.2	3.9	11.9	4.9	13.8
9	5.9	4.4	12.3	4.9	13.5
10	5.8	4.7	12.1	5.2	13.9
11	5.2	3.9	12.1	5.9	13.2
12	5.4	4.8	12.1	5.1	14.2
13	5.9	5.4	11.4	5.3	13.2
14	6.1	4.9	10.7	5.1	13.2
15	7.1	5.3	11.7	5.4	13.3
16	7.2	5.9	12.3	4.7	15.2
17	6.8	5.1	11.8	5.4	13.9
18	6.2	4.4	12.0	5.3	14.2
19	5.6	5.5	11.9	4.6	14.1
20	5.6	4.6	11.8	4.4	14.1
21	4.3	4.2	12.0	4.8	13.4
22	5.5	4.1	12.2	5.2	13.9
23	5.6	4.6	11.6	5.0	14.0
24	4.4	4.3	12.3	5.7	13.6
25	4.7	4.2	11.7	6.0	13.5
26	2.7	3.5	11.7	5.1	13.3
27	5.1	3.9	11.6	5.4	13.5
28	6.3	4.3	11.6	5.1	12.6
29	5.0	4.6	11.5	4.0	12.9
30	4.4	3.2	11.4	5.0	12.1
MEAN	5.3	4.5	11.9	5.1	13.8

USCOMM-NOAA-ASHEVILLE,N.C. 9/78 950

WORLD DATA CENTER A
FOR
SOLAR-TERRESTRIAL PHYSICS

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

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