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DAILY RELATIVE SUNSPOT NUMBERS AND SUNSPOT AREAS

APRIL 1989

Day			Relative-Numbers			Sunspot Areas			
			Gro.	W.H.	S.H.	Sum	Drawing		Photographic
							N.H.	S.H.	
						Sum			Sum
1	11	56	64	120	90	1216	1306	151	1375 1526
2	10	39	86	125	74	1238	1312	82	1410 1492
3	11	53	88	141	97	1396	1493		
4	9	34	78	112	140	1383	1523	0	1423 1423
5	10	35	90	125	1261	229	1490	179	1333 1512
6	11	48	82	130	1291	180	1471	269	1521 1790
7	14	78	90	168	1243	241	1484	518	1300 1818
8	14	77	80	157	1473	244	1717	843	1310 2153
9	11	69	56	125	1231	162	1393	630	1238 1868
10	9	54	60	114	1062	157	1219	345	1074 1419
11	8	46	47	93	650	57	707	315	128 443
12	9	35	63	98	295	147	442	345	207 552
13	8	51	39	90	557	203	760	604	250 854
14	7	44	30	74	1236	243	1479	1016	271 1287
15	7	52	47	99	1341	343	1684		
16	7	60	36	96	1139	778	1917	1149	539 1688
17	10	91	66	157	985	632	1617	1210	1112 2322
18	8	87	75	162	1033	968	2001	1034	1028 2062
19	9	82	73	155	867	943	1810	1427	1319 2746
20	12	117	64	181	984	863	1847		
21	13	121	81	202	1064	860	1924	1437	1164 2601
22	12	69	87	156	860	812	1672	1328	778 2106
23	12	85	76	161	792	521	1313		
24	9	57	67	124	693	613	1306	856	699 1555
25	10	42	78	120	426	754	1180	750	875 1625
26	9	43	82	125	304	1186	1490	244	1040 1284
27	9	41	86	127	173	1243	1416	160	1577 1737
28	9	39	90	129	152	1309	1461	132	1244 1376
29	9	41	83	124	171	1218	1389	172	1246 1418
30	9	48	65	113	309	811	1120		
Mean			59.8	70.3	130.1	733.1	698.3	1431.4	

DAILY RELATIVE SUNSPOT NUMBERS AND SUNSPOT AREAS

MAY 1989

Relative-Numbers				Sunspot Areas						
Day	Gro.	N.H.	S.H.	Drawing		Photographic				
				N.H.	S.H.	Sum	N.H.	S.H.	Sum	
1	8	48	47	95	455	650	1105	439	739	1178
2	8	58	37	95	596	547	1143	658	676	1334
3	6	44	47	91	533	626	1159	618	920	1538
4	7	44	62	106	682	921	1603	612	1261	1873
5	5	36	49	85	512	1084	1596	463	1037	1500
6	7	38	61	99	606	1116	1722	568	998	1566
7	8	67	52	119	471	1141	1612	592	1434	2026
8	12	88	95	183	341	840	1181	1212	571	1783
9	15	127	103	230	417	424	841	893	579	1472
10	14	95	86	181	395	460	855			
11	16	99	86	185	366	408	774			
12	18	99	93	192	380	378	758	430	536	966
13	7	68	63	131	371	372	743	410	427	837
14	8	88	51	139	628	351	979			
15	11	131	64	195	498	605	1103			
16	14	113	53	166	703	607	1310	670	350	1020
17	16	124	59	183	603	488	1091	759	423	1182
18	14	122	52	174	701	471	1172			
19	16	122	58	180	754	521	1275	850	410	1260
20	13	112	62	174	1082	290	1372	1142	539	1681
21	15	105	80	185	1168	462	1630	1311	427	1738
22	12	96	104	200	1307	745	2052	1342	1136	2478
23	9	95	126	221	1070	720	1790	1093	737	1830
24	13	101	147	248	919	1396	2315	1337	1481	2818
25	12	67	154	221	769	1574	2343	959	1643	2602
26	12	49	133	182	670	1749	2419	653	1746	2399
27	12	42	131	173	571	1575	2146	580	1825	2405
28	13	41	109	150	522	1498	2020	651	1291	1942
29	9	38	99	137	453	569	1022	493	825	1318
30	10	61	92	153	457	440	897	473	626	1099
31	10	61	85	146	500	530	1030	665	731	1396
Mean		80.0	81.9	161.9	629.0	759.9	1389.0			

DAILY SUNSPOT OBSERVATIONS

APRIL 1989

Day Group	CMP		Lat	L	CMD	Type	r/R	Sd	Corre. Area		See	Remarks
	Mo-Day	Lat							Whole	Max		
1.03	135	3-26.8	-26	70	69W	CSO	0.93	101	138	127	4	
	138	3-27.8	14	58	56W	HSX	0.85	55	52	52	4	
	141	3-29.8	20	31	30W	BXI	0.66	17	11	6	4	
	144	3-31.8	13	5	3W	BXI	0.34	17	9	2	4	
	145	3-29.3	-22	38	40W	BXO	0.67	8	6	3	4	
	146	4- 2.8	16	338	25E	BXO	0.56	8	5	3	4	
	147	4- 4.9	-19	311	49E	PHI	0.76	1379	1059	768	4	
	149	4- 2.0	-26	349	9E	BXI	0.37	8	5	2	4	
	150	4- 5.2	36	307	56E	AXX	0.92	4	5	5	4	
	151	4- 5.4	-26	304	58E	BXO	0.86	8	8	4	4	
	152	4--6.4	12	291	71E	AXX	0.97	4	8	8	4	
2.05	135				80W	CSI	0.98	34	79	49	4	
	138				69W	HSX	0.94	29	44	44	4	
	141				43W	BXO	0.77	17	13	7	4	
	146				12E	BXO	0.44	8	5	2	4	
	147				35E	FKC	0.60	1821	1136	729	4	
	149				1W	AXX	0.33	4	2	2	4	
	150				44E	BXO	0.86	8	8	4	4	
	151				47E	BXO	0.77	8	7	3	4	
	152				57E	AXX	0.86	4	4	4	4	
	153	4- 7.7	-23	274	75E	BXI	0.95	8	14	7	4	
3.05	138				81W	HSX	0.99	17	56	56	3	
	141				57W	BXO	0.87	17	17	4	3	
	146				3W	BXO	0.37	8	5	2	3	
	147				22E	FKC	0.45	2094	1171	725	3	
	150				28E	AXX	0.76	8	6	6	3	
	151				33E	AXX	0.60	4	3	3	3	
	152				44E	AXX	0.74	8	6	3	3	
	153				60E	CRO	0.85	34	32	20	3	
	154	3-30.9	36	16	41W	BXO	0.83	8	7	4	3	
	155	4- 3.6	-28	328	7E	BXO	0.38	17	9	5	3	
	156	4- 9.3	-15	253	83E	HSX	0.99	55	181	181	3	
4.05	141				69W	CRI	0.94	76	113	101	4	
	146				16W	AXX	0.46	8	5	2	4	
	147				10E	FKC	0.28	2326	1210	685	4	
	150				15E	AXX	0.71	8	6	6	4	
	153				46E	BXI	0.72	34	24	12	4	
	154				56W	AXX	0.92	13	16	11	4	

DAILY SUNSPOT OBSERVATIONS

APRIL 1989

CMP		Day Group	Mo-Day	Lat	L	CMD	Type	r/R	Sd	Corre. Area			
										Whole	Max	See Remarks	
5.05	155					7W	BXO	0.37	8	5	2	4	
	156					70E	CSO	0.93	88	121	115	4	
	157	4- 6.0	-12	296		26E	CRI	0.44	42	23	19	4	
	141					81W	BXO	0.99	8	28	14	3	
	147					2W	FKC	0.22	2136	1095	668	3	
	150					2E	AXX	0.67	4	3	3	3	
	151					5E	AXX	0.36	4	2	2	3	
	153					35E	BXO	0.59	21	13	8	3	
	156					57E	CSO	0.83	143	127	124	3	
	157					13E	DSI	0.24	147	76	28	3	
	158	4- 6.9	16	284		24E	BXO	0.53	13	7	2	3	
	159	4-10.2	-19	241		69E	AXX	0.92	8	11	5	3	
	160	4-11.0	33	230		74E	HSX	0.98	55	128	118	3	
6.06	147					15W	FKC	0.33	2006	1064	651	3	
	151					9W	AXX	0.39	4	2	2	3	
	156					43E	CSO	0.68	164	112	109	3	
	157					1W	CSI	0.09	109	55	25	3	
	158					11E	BXO	0.41	29	16	7	3	
	159					55E	AXX	0.82	4	4	4	3	
	160					61E	HKX	0.94	130	195	189	3	
	161	4- 3.3	16	331		36W	BXO	0.67	8	6	3	3	
	162	4- 4.3	7	318		23W	AXX	0.45	8	5	2	3	
	163	4- 4.9	29	310		15W	AXX	0.61	8	5	3	3	
	164	4- 7.8	-17	272		23E	BXO	0.43	13	7	5	3	
	7.05	147					29W	FKI	0.49	1522	876	636	4
		153					7E	AXX	0.31	8	4	2	4
156						30E	CSO	0.51	223	129	127	4	
157						14W	CSI	0.25	114	59	48	4	
158						2W	CRO	0.38	55	30	16	4	
159						42E	AXX	0.70	8	6	3	4	
160						49E	CKO	0.87	261	268	264	4	
161						48W	BXO	0.79	8	7	3	4	
162						37W	AXX	0.63	4	3	3	4	
163						30W	BXO	0.71	8	6	3	4	
164						10E	CRI	0.25	84	43	22	4	
165		4- 3.9	27	324		42W	BXO	0.78	29	24	7	4	
166		4- 8.4	27	265		18E	AXX	0.61	8	5	3	4	
167	4-13.8	19	204		73E	BXO	0.97	13	24	16	4		
8.07	147					42W	FHI	0.69	1241	857	668	3	

DAILY SUNSPOT OBSERVATIONS

APRIL 1989

CMP		Corre. Area								
Day Group	Mo-Day	Lat	L	CMD Type	r/R	Sd	Whole	Max	See	Remarks
153				5W	BXO 0.30	13	7	4	3	
156				16E	DSO 0.31	236	124	111	3	
157				27W	CSI 0.47	42	24	14	3	
158				16W	CSO 0.48	88	50	34	3	
159				28E	BXO 0.51	8	5	2	3	
160				36E	DKI 0.79	400	328	321	3	
161				65W	CRO 0.94	55	82	63	3	
163				43W	BXO 0.82	8	7	4	3	
164				3W	DSO 0.20	156	79	51	3	
165				55W	DSI 0.90	76	85	47	3	
166				4E	AXX 0.54	8	5	2	3	
167				61E	CRO 0.92	46	59	54	3	
168	4- 6.8	-28	286	17W	AXX 0.46	8	5	2	3	
9.30 147				59W	FHO 0.86	786	776	656	3	
153				21W	BXO 0.40	8	5	2	3	
156				1W	DSI 0.17	156	79	60	3	
157				43W	BXO 0.69	8	6	3	3	
158				32W	CSO 0.66	50	33	28	3	
160				19E	DKI 0.71	421	300	153	3	
163				60W	AXX 0.93	4	6	6	3	
164				19W	CSO 0.36	143	77	72	3	
165				72W	CRI 0.98	29	69	49	3	
167				46E	CRO 0.82	42	36	29	3	
169	4- 7.6	31	276	23W	AXX 0.68	8	6	3	3	
10.11 147				70W	FHI 0.93	517	709	565	4	
153				33W	BXO 0.60	8	5	3	4	
156				11W	DSI 0.24	168	87	61	4	
157				53W	BXO 0.79	8	7	3	4	
158				46W	HRX 0.77	34	26	26	4	
160				11E	DKI 0.66	437	289	223	4	
164				29W	CAD 0.51	109	63	58	4	
167				37E	CRO 0.71	42	30	24	4	
169				32W	AXX 0.74	4	3	3	4	
11.12 147				85W	CHO 0.99	118	389	376	4	
153				48W	AXX 0.76	8	6	3	4	
156				24W	DRI 0.43	42	23	7	4	
157				69W	AXX 0.93	4	6	6	4	
158				60W	AXX 0.90	8	9	5	4	
160				2W	DAI 0.63	366	236	144	4	

DAILY SUNSPOT OBSERVATIONS

APRIL 1989

Day	Group	CMP		L	CMD	Type	r/R	Sd	Corre. Area			Remarks
		Mo-Day	Lat						Whole	Max	See	
164					41W	HRX	0.67	42	28	25	4	
167					23E	BXI	0.56	17	10	3	4	
12.08	153				61W	AXX	0.87	4	4	4	4	
	156				36W	CRI	0.60	55	34	18	4	
	157				83W	AXX	0.99	4	14	14	4	
	160				13W	DAI	0.67	257	172	68	4	
	164				54W	AXX	0.80	8	7	4	4	
	167				10E	BXI	0.46	25	14	5	4	
	170	4- 9.7	-29	248	32W	AXX	0.62	8	5	3	4	
	171	4-16.2	-20	161	55E	CRI	0.82	101	87	76	4	
	172	4-17.8	14	141	74E	HSX	0.97	55	105	105	4	
13.10	156				50W	BXO	0.76	21	16	6	4	
	160				26W	DRI	0.72	93	67	21	4	
	164				66W	AXX	0.91	4	5	5	4	
	167				2W	BXI	0.41	17	9	2	4	
	170				45W	BXI	0.75	8	6	3	4	
	171				39E	DAI	0.64	269	176	137	4	
	172				60E	CSO	0.89	80	86	81	4	
	173	4-18.7	9	128	77E	DAO	0.98	168	395	286	4	
14.04	156				65W	AXX	0.90	4	5	5	4	
	159				49W	AXX	0.76	8	6	3	4	
	160				39W	CRO	0.80	46	39	28	4	
	167				14W	BXI	0.44	21	12	5	4	
	171				27E	ESI	0.51	400	232	139	4	
	172				48E	CSO	0.78	101	81	78	4	
	173				65E	EKI	0.91	925	1104	643	4	
15.03	156				78W	AXX	0.98	4	10	10	3	
	160				49W	CRO	0.87	34	35	30	3	
	167				27W	DRI	0.55	109	66	25	3	
	170				72W	BXO	0.94	8	13	6	3	
	171				16E	ESC	0.36	597	320	122	3	
	172				35E	CSO	0.64	143	93	88	3	
	173				52E	EKO	0.80	1363	1147	577	3	
16.09	160				60W	HRX	0.93	13	17	17	3	
	167				41W	BXI	0.70	29	21	6	3	
	171				2E	EH1	0.24	744	384	212	3	
	172				21E	CSO	0.48	109	62	60	3	

DAILY SUNSPOT OBSERVATIONS

APRIL 1989

Day	Group	CMP		L	CMD	Type	r/R	Sd	Corre. Area			See	Remarks
		Mo-Day	Lat						Whole	Max			
173					36E	EKI	0.61	1640	1034	477		3	
174		4-18.0	22	138	23E	BXO	0.55	8	5	3		3	
175		4-22.0	-17	85	79E	ESO	0.98	172	404	266		3	
17.05	160				72W	AXX	0.98	4	10	10		4	
	167				54W	BXI	0.84	29	27	12		4	
	171				11W	EH1	0.33	799	424	234		4	
	172				9E	HSX	0.36	118	63	63		4	
	173				23E	EKI	0.46	1501	845	407		4	
	174				12E	BXI	0.47	17	10	2		4	
	175				66E	EAI	0.91	84	100	70		4	
	176	4-16.3	13	160	10W	AXX	0.36	8	5	2		4	
	177	4-22.0	17	85	68E	CRO	0.94	17	25	19		4	
	178	4-23.3	-22	67	82E	CHI	0.98	46	108	69		4	
18.04	167				68W	DSI	0.93	114	156	92		5	
	171				24W	EKI	0.47	959	544	381		5	
	172				4W	HSX	0.33	109	58	58		5	
	173				10E	FKI	0.31	1430	752	407		5	
	174				1W	BXI	0.47	13	7	2		5	
	175				53E	ESI	0.79	109	90	35		5	
	177				54E	CSI	0.85	63	60	44		5	
	178				69E	CHI	0.93	244	334	317		5	
19.01	167				67W	HRX	0.98	34	79	69		4	
	171				37W	EKI	0.64	778	508	518		4	
	172				17W	HSX	0.43	97	53	51		4	
	173				4W	FKI	0.29	1039	542	292		4	
	174				16W	BXO	0.53	8	5	2		4	
	175				38E	CSI	0.62	114	72	40		4	
	177				40E	CSI	0.71	88	63	45		4	
	178				56E	CHI	0.83	408	363	337		4	
	179	4-25.3	33	41	79E	HHX	0.99	38	125	125		4	
20.08	171				51W	EKO	0.79	496	407	366		3	
	172				30W	CSI	0.57	84	51	49		3	
	173				18W	FKI	0.40	917	501	225		3	
	175				25E	ESI	0.45	126	71	47		3	
	177				26E	DSI	0.56	160	97	69		3	
	178				42E	CHI	0.69	547	377	366		3	
	179				65E	HHX	0.94	206	308	308		3	
	180	4-15.8	6	166	56W	AXX	0.83	4	4	4		3	

DAILY SUNSPOT OBSERVATIONS

APRIL 1989

Day Group	CMP Mo-Day	Lat	L	CMD Type	r/R	Sd	Corre. Area		See Remarks
							Whole	Max	
181	4-17.2	29	148	38W	BXI 0.76	21	16	3	3
182	4-19.2	19	122	12W	AXX 0.45	4	2	2	3
183	4-20.0	21	111	1W	BXO 0.44	8	5	2	3
184	4-25.8	-19	34	78E	AXX 0.97	4	8	8	3
21.03	171			64W	CKI 0.91	353	422	402	4
172				43W	CSO 0.72	50	37	34	4
173				31W	FHI 0.56	841	509	244	4
175				13E	CSI 0.28	118	61	22	4
177				13E	CSI 0.44	185	103	86	4
178				30E	CHI 0.55	606	363	353	4
179				53E	HHX 0.89	341	366	366	4
180				67W	BXO 0.93	8	12	6	4
181				53W	CRO 0.86	29	29	12	4
182				24W	AXX 0.55	4	3	3	4
183				14W	BXO 0.44	8	5	2	4
184				63E	AXX 0.89	4	5	5	4
185	4-19.2	-9	122	24W	BXI 0.41	17	9	2	4
22.06	171			79W	CHO 0.98	151	355	345	3
712				56W	HRX 0.86	29	29	29	3
173				44W	FHI 0.74	551	407	227	3
175				1W	CSI 0.21	80	41	15	3
177				1W	CSO 0.37	147	79	72	3
178				17E	CHI 0.40	656	358	351	3
179				40E	HHX 0.80	353	297	297	3
181				62W	CRO 0.92	38	48	32	3
184				49E	BXI 0.76	17	13	6	3
185				38W	CRI 0.62	59	38	21	3
186	4-19.8	-13	114	30W	AXX 0.52	4	2	2	3
187	4-22.2	-27	82	3E	BXO 0.37	8	5	2	3
23.02	172			69W	HRX 0.94	13	19	19	3
173				56W	FAI 0.84	404	371	139	3
175				14W	BXI 0.30	21	11	4	3
177				15W	CSI 0.45	172	96	80	3
178				4E	CHI 0.30	770	403	397	3
179				28E	HHX 0.72	362	262	259	3
181				73W	CRO 0.98	17	39	30	3
184				37E	DRI 0.62	93	59	21	3
185				53W	DRI 0.68	59	40	17	3
186				42W	AXX 0.67	4	3	3	3

DAILY SUNSPOT OBSERVATIONS

APRIL 1989

Day Group	CMP		Lat	L	CMD	Type	r/R	Sd	Corre. Area		See Remarks
	Mo-Day								Whole	Max	
187					10W	BX0	0.39	8	5	2	3
188	4-20.9	19	99	28W	BX0	0.60		8	5	3	3
24.18 173					71W	EAI	0.93	315	432	173	3
175					29W	BX0	0.51	17	10	2	3
177					30W	CSI	0.60	109	68	52	3
178					10W	CHI	0.33	677	359	348	3
179					14E	CSI	0.64	252	165	126	3
184					22E	DSI	0.41	294	162	85	3
185					68W	DR0	0.92	63	80	43	3
189	4-23.7	-31	62	6W	AXX	0.45		4	2	2	3
190	4-30.3	12	335	80E	AXX	0.99		8	28	14	3
25.17 173					81W	CSI	0.98	50	118	99	3
175					38W	BX0	0.62	8	5	3	3
177					42W	CSI	0.70	50	35	27	3
178					23W	EHI	0.46	858	483	336	3
179					2E	CSI	0.61	261	164	159	3
184					9E	EHI	0.28	404	210	101	3
185					81W	AXX	0.99	8	28	14	3
190					67E	DS0	0.93	80	109	63	3
191	4-23.8	-14	61	18W	AXX	0.33		8	4	2	3
192	5- 2.1	-19	311	79E	AXX	0.97		13	24	8	3
26.05 175					50W	BX0	0.77	8	7	3	3
177					54W	CSI	0.84	46	43	35	3
178					34W	EHI	0.61	862	544	366	3
179					9W	CSI	0.61	265	167	159	3
184					3W	ESI	0.26	336	174	102	3
190					56E	DS0	0.85	84	80	40	3
191					31W	BX0	0.53	8	5	2	3
192					71E	EHI	0.95	273	456	358	3
193	5- 1.3	28	322	69E	AXX	0.95		8	14	7	3
27.05 177					67W	BX0	0.93	8	12	6	3
178					47W	EHI	0.75	622	468	361	3
179					21W	CSI	0.67	177	118	116	3
184					17W	ESI	0.39	336	183	103	3
190					44E	CRI	0.74	46	34	16	3
191					44W	AXX	0.70	8	6	3	3
192					60E	EHI	0.86	589	581	307	3
193					56E	AXX	0.89	8	9	5	3

DAILY SUNSPOT OBSERVATIONS

APRIL 1989

		CMP						Corre. Area			
Day	Group	Mo-Day	Lat.	L	CMD	Type	r/R	Sd	Whole	Max	See Remarks
194		4-25.5	-30	38	20W	BXO	0.53	8	5	2	3
28.05	178				60W	EH1	0.87	412	423	350	3
	179				33W	CSI	0.74	181	133	127	3
	184				31W	ESI	0.57	345	211	118	3
	190				31E	BXO	0.57	13	8	3	3
	191				58W	AXX	0.85	8	8	4	3
	192				49E	EH1	0.76	866	665	432	3
	193				43E	AXX	0.79	8	7	3	3
	195	4-27.5	-30	12	7W	AXX	0.44	4	2	2	3
	196	5- 2.4	28	307	54E	AXX	0.87	4	4	4	3
29.06	178				74W	EH1	0.95	248	414	351	3
	179				45W	CSI	0.83	168	150	142	3
	184				46W	ESI	0.76	303	232	168	3
	190				18E	BXI	0.40	13	7	2	3
	191				72W	BXO	0.95	8	14	7	3
	192				36E	EH1	0.62	871	555	418	3
	196				43E	BXO	0.82	8	7	4	3
	197	4-29.0	25	353	1W	BXI	0.49	13	7	2	3
	198	5- 3.1	-21	298	50E	AXX	0.77	4	3	3	3
30.18	178				86W	AXX	0.99	8	28	28	3
	179				59W	HSX	0.92	84	107	107	3
	184				61W	ESI	0.89	248	267	149	3
	190				2E	BXI	0.29	13	7	2	3
	192				22E	FHI	0.46	900	507	436	3
	197				16W	BXI	0.55	13	8	3	3
	199	4-28.2	-40	3	26W	BXO	0.68	13	9	3	3
	200	5- 4.7	14	277	61E	AXX	0.90	8	9	5	3
	201	5- 5.9	29	261	70E	HRX	0.97	93	178	89	3

SMOOTHED (PREDICTED) SUNSPOT NUMBERS

FEBRUARY 1989 - JANUARY 1990

Time	89,02	89,03	89,04	89,05	89,06	89,07	89,08	89,09	89,10	89,11	89,12	90,01
R	145.2	147.9	150.6	153.5	156.5	159.8	163.2	166.9	170.7	174.6	178.5	182.6
E	2.9	3.0	6.0	12.3	14.1	19.2	26.1	26.7	32.4	33.2	37.5	36.5

DAILY SUNSPOT OBSERVATIONS

MAY 1989

Day Group	CMP Mo-Day	Lat	L	CMD Type	r/R	Sd	Corre. Area		See Remarks
							Whole	Max	
1.00	179	4-25.3	33	41	70W	HSX 0.97	55	105	3
	184	4-25.6	-19	34	74W	CSI 0.95	88	98	3
	190	4-30.3	12	335	11W	BXO 0.33	13	7	2
	192	5- 2.1	-19	311	14E	DHI 0.33	938	497	3
	197	4-27.0	25	353	24W	BXO 0.62	8	5	3
	199	4-28.2	-40	3	35W	BXO 0.75	8	5	3
	200	5- 4.7	14	277	49E	BXO 0.78	8	7	3
	201	5- 6.0	29	260	60E	DSC 0.91	278	331	3
2.04	184				77W	AXX 0.97	4	8	4
	190				22W	BXO 0.46	8	5	2
	192				1E	DHI 0.25	908	469	4
	196	5- 2.4	28	307	5E	BXO 0.54	8	5	2
	197				38W	BXO 0.74	8	6	3
	201				47E	EKC 0.82	664	575	4
	202	5- 3.3	21	295	17E	AXX 0.49	8	5	2
	203	5- 7.7	-21	237	73E	CRD 0.95	42	70	4
3.12	192				13W	DHI 0.32	1001	529	3
	196				7W	AXX 0.54	4	2	2
	197				50W	CRD 0.84	46	43	19
	201				35E	EAC 0.72	673	488	125
	203				58E	HRX 0.85	97	92	92
	204	5- 4.3	-24	282	16E	AXX 0.43	8	5	2
4.33	192				28W	DKC 0.52	1442	843	823
	197				69W	CRD 0.95	38	63	49
	198	5- 3.1	-21	298	16W	BXO 0.39	8	5	2
	201				21E	DKC 0.62	950	606	577
	203				42E	CRI 0.69	101	70	64
	205	4-30.5	-18	333	51W	AXX 0.78	4	3	3
	206	5- 9.8	16	210	69E	BXO 0.94	8	13	6
5.32	192				41W	EKC 0.68	1514	1030	887
	201				8E	DKC 0.55	841	504	187
	203				28E	HRX 0.53	84	50	50
	206				56E	BXO 0.85	8	8	4
	207	5- 4.9	-8	275	6W	AXX 0.13	8	4	2
6.03	192				50W	EKC 0.78	1249	1001	775
	201				1W	DKC 0.54	997	592	350

DAILY SUNSPOT OBSERVATIONS

MAY 1989

Day	Group	CMP		L	CMD	Type	r/R	Sd	Corre. Area			See Remarks
		Mo-Day	Lat						Whole	Max		
203					19E	CSO	0.44	101	56	51	3	
206					49E	AXX	0.78	8	7	3	3	
207					15W	AXX	0.26	8	4	2	3	
208	5- 9.8	10	209		51E	BXO	0.79	8	7	3	3	
209	5-10.5	-30	201		63E	DRO	0.91	46	55	30	3	
7.00	192				63W	EKC	0.89	900	967	813	3	
	201				13W	DKC	0.56	576	349	168	3	
	203				7E	CRO	0.32	59	31	27	3	
	206				35E	CRI	0.63	59	38	16	3	
	207				28W	AXX	0.47	8	5	2	3	
	208				39E	BXO	0.66	21	14	3	3	
	209				50E	DSO	0.82	160	138	80	3	
	210	5-12.5	26	174	78E	HRX	0.99	21	70	70	3	
8.02	192				76W	EKO	0.97	294	565	501	4	
	201				27W	EAI	0.66	366	242	164	4	
	203				4W	BXO	0.31	21	11	2	4	
	204				51W	BXI	0.68	25	17	6	4	
	206				21E	CRI	0.46	55	31	14	4	
	207				40W	BXO	0.64	8	5	3	4	
	208				25E	DRI	0.47	55	31	7	4	
	209				35E	DSI	0.67	172	116	45	4	
	210				63E	CRI	0.92	25	32	27	4	
	211	5- 7.2	-25	244	11W	BXI	0.40	8	5	2	4	
	212	5- 8.7	24	225	7E	BXI	0.44	8	5	2	4	
	213	5-13.0	-19	159	75E	CSI	0.97	63	121	97	4	
9.01	192				88W	AXX	0.99	8	28	28	5	
	201				40W	CAI	0.77	193	152	132	5	
	203				15W	BXI	0.39	25	14	2	5	
	204				64W	CRI	0.90	25	28	9	5	
	206				10E	BXI	0.37	67	36	2	5	
	208				10E	CRI	0.29	71	37	26	5	
	209				20E	CSI	0.53	362	213	178	5	
	210				48E	CSO	0.83	105	94	56	5	
	211				26W	BXO	0.54	8	5	2	5	
	212				5W	AXX	0.47	4	2	2	5	
	213				61E	CSO	0.87	126	130	112	5	
	214	5- 9.0	13	220	0W	BXI	0.29	17	9	2	5	
	215	5-12.1	-22	180	40E	BXI	0.70	8	6	3	5	
	216	5-13.1	17	166	52E	AXX	0.82	4	4	4	5	

DAILY SUNSPOT OBSERVATIONS

MAY 1989

		CMP								Corre. Area		See Remarks
Day	Group	Mo-Day	Lat	L	CMD	Type	r/R	Sd	Whole	Max		
	217	5-14.9	9	143	80E	CSI	0.99	25	83	70	5	
10.02	201				54W	CSO	0.86	114	112	104	4	
	203				26W	BXI	0.52	13	7	2	4	
	204				78W	CRO	0.98	21	49	30	4	
	206				3W	BXI	0.33	50	27	4	4	
	208				3W	BXI	0.23	42	22	2	4	
	209				6E	CHI	0.45	450	252	216	4	
	210				34E	CAO	0.70	97	68	65	4	
	211				41W	AXX	0.70	4	3	3	4	
	212				20W	AXX	0.54	4	2	2	4	
	213				48E	CSI	0.76	185	142	113	4	
	215				27E	BXI	0.55	8	5	3	4	
	217				66E	CSO	0.92	126	161	155	4	
	218	5-11.1	-21	192	14E	AXX	0.39	4	2	2	4	
	219	5-12.2	16	178	31E	AXX	0.59	4	3	3	4	
11.03	201				67W	HSX	0.94	50	76	76	4	
	203				39W	BXI	0.67	8	6	3	4	
	206				15W	BXI	0.43	25	14	5	4	
	208				16W	BXI	0.34	25	13	4	4	
	209				7W	CAI	0.46	463	260	180	4	
	210				20E	CSI	0.59	76	47	26	4	
	212				33W	AXX	0.67	4	3	3	4	
	213				35E	CSO	0.61	193	122	111	4	
	214				26W	BXI	0.48	8	5	2	4	
	215				16E	BXO	0.45	8	5	2	4	
	216				29E	AXX	0.55	4	3	3	4	
	217				53E	CHO	0.80	236	198	195	4	
	218				1E	AXX	0.31	4	2	2	4	
	219				17E	AXX	0.43	4	2	2	4	
	220	5-10.4	27	201	8W	BXO	0.52	8	5	2	4	
	221	5-16.4	-10	123	71E	AXX	0.94	8	13	13	4	
12.02	201				80W	HSX	0.99	13	42	42	4	
	203				51W	BXO	0.79	8	7	3	4	
	206				28W	BXI	0.55	13	8	3	4	
	208				29W	BXO	0.54	17	10	2	4	
	209				20W	ESI	0.54	387	230	125	4	
	210				6E	HSX	0.49	50	29	27	4	
	211				56W	AXX	0.85	4	4	4	4	
	213				22E	CSI	0.45	202	113	104	4	

DAILY SUNSPOT OBSERVATIONS

MAY 1989

Day	Group	CMP		L	CMD	Type	r/R	Sd	Corre. Area			Remarks
		Mo-Day	Lat						Whole	Max	See	
215					1E	BXI	0.31	13	7	2	4	
216					14E	AXX	0.40	8	5	2	4	
217					39E	CHO	0.64	353	231	228	4	
218					15W	BXO	0.40	8	5	2	4	
219					3E	AXX	0.33	4	2	2	4	
220					22W	AXX	0.60	8	5	3	4	
221					58E	HRX	0.84	13	12	12	4	
222		5-13.6	26	160	21E	AXX	0.57	4	3	3	4	
223		5-14.5	27	147	33E	AXX	0.69	4	3	3	4	
224		5-17.2	16	112	72E	CSI	0.95	25	42	28	4	
13.00	207				31W	DAI	0.66	320	212	117	4	PURP
	210				6W	CAO	0.51	55	32	27	4	PURP
	213				10E	CSI	0.33	265	141	132	4	PURP
	217				27E	CKI	0.48	454	259	255	4	PURP
	221				47E	HRX	0.74	25	19	19	4	PURP
	224				61E	DRI	0.89	46	50	23	4	PURP
	225	5-18.8	16	90	79E	BXI	0.98	13	30	10	4	PURP
14.03	209				47W	CAO	0.78	265	212	115	3	PLAT
	210				14W	BXO	0.53	80	47	2	3	PLAT
	213				4W	CAI	0.26	214	112	90	3	PLAT
	217				12E	CKI	0.29	425	222	209	3	PLAT
	221				30E	CRO	0.52	46	27	25	3	PLAT
	224				43E	CAO	0.74	156	115	99	3	PLAT
	225				66E	DAI	0.93	172	236	127	3	PLAT
	226	5-16.6	17	120	36E	BXO	0.64	13	8	3	3	PLAT
15.06	209				60W	CAO	0.89	164	176	99	3	PLAT
	210				30W	BXI	0.64	76	49	3	3	PLAT
	213				19W	CAI	0.40	252	138	96	3	PLAT
	216				23W	BXO	0.49	13	7	2	3	PLAT
	217				2E	DAI	0.21	294	150	107	3	PLAT
	221				17E	HSX	0.31	50	27	27	3	PLAT
	224				30E	CAI	0.57	105	64	39	3	PLAT
	225				50E	DSI	0.80	231	195	106	3	PLAT
	226				22E	BXI	0.49	50	29	2	3	PLAT
	227	5-15.4	16	136	4E	AXX	0.32	8	4	2	3	PLAT
	228	5-21.3	-26	57	80E	HRX	0.99	80	264	264	3	PLAT
16.08	209				74W	HSX	0.97	97	186	145	3	
	210				45W	BXO	0.77	25	20	7	3	

DAILY SUNSPOT OBSERVATIONS

MAY 1989

Day	Group	CMP		L	Lat	CMD	Type	r/R	Sd	Corre. Area		See
		Mo-Day	Mo-Day							Whole	Max	
213						34W	ESI	0.61	345	217	141	3
216						40W	AXX	0.69	4	3	3	3
217						16W	DAI	0.36	303	162	126	3
221						4E	CSO	0.14	63	32	28	3
224						15E	CSO	0.40	55	30	28	3
225						38E	DAI	0.66	576	381	167	3
226						9E	DSI	0.36	172	92	41	3
227						9W	AXX	0.34	8	4	2	3
228						68E	HSX	0.93	105	144	144	3
229						6W	AXX	0.25	8	4	2	3
230						26E	BXO	0.53	13	7	2	3
231						85E	AXX	0.99	8	28	14	3
17.04												
209						85W	AXX	0.99	8	28	14	4
210						56W	BXO	0.87	13	13	4	4
213						48W	ESI	0.76	269	207	107	4
216						31W	CAI	0.55	214	129	118	4
221						9W	HSX	0.20	76	39	39	4
224						2E	CSO	0.44	71	40	37	4
225						24E	DAI	0.51	618	358	190	4
226						6W	CSI	0.36	67	36	26	4
227						22W	AXX	0.47	4	2	2	4
228						54E	HSX	0.83	156	139	139	4
229						19W	BXO	0.39	8	5	2	4
230						12E	BXI	0.39	17	9	5	4
231						70E	HSX	0.92	50	64	59	4
232						5-13.7	44W	BXO	0.72	8	6	3
233						5-19.1	27E	BXO	0.61	8	5	3
234						5-20.1	40E	BXI	0.66	17	11	6
18.05												
210						69W	BXO	0.94	8	13	6	3
213						61W	ESI	0.87	210	216	121	3
216						44W	CAI	0.71	172	123	105	3
221						22W	HSX	0.39	46	25	25	3
224						10W	HSX	0.36	50	27	25	3
225						10E	EAI	0.36	824	441	252	3
226						20W	CSI	0.47	84	48	29	3
228						42E	HSX	0.72	185	134	134	3
230						2W	BXI	0.32	38	20	9	3
231						56E	HSX	0.83	88	79	71	3
232						56W	BXO	0.84	8	8	4	3
233						16E	BXI	0.49	13	7	2	3

DAILY SUNSPOT OBSERVATIONS

MAY 1989

Day	Group	CMP		L	CMD	Type	r/R	Sd	Corre. Area		See	Remarks
		Mo-Day	Lat						Whole	Max		
	234				27E	BXI	0.52	29	17	5	3	
	235	5-20.0	13	75	25E	BXO	0.48	25	14	12	3	
19.03	213				73W	ESO	0.94	109	164	101	3	
	216				57W	DSI	0.85	156	148	88	3	
	221				36W	HSX	0.59	42	26	26	3	
	222				70W	BXO	0.94	13	19	13	3	
	224				23W	CSO	0.48	50	29	26	3	
	225				3W	EAO	0.31	820	431	246	3	
	226				34W	CSI	0.60	46	29	13	3	
	228				29E	HSX	0.59	189	117	117	3	
	230				15W	CRD	0.39	29	16	7	3	
	231				43E	HSX	0.69	97	67	64	3	
	232				70W	AXX	0.94	8	13	6	3	
	233				2E	BXO	0.40	25	14	5	3	
	234				13E	BXI	0.32	13	7	2	3	
	235				12E	DSI	0.33	93	49	22	3	
	236	5-21.7	32	52	34E	AXX	0.71	8	6	3	3	
	237	5-23.3	-20	30	56E	DSI	0.85	147	140	92	3	
20.35	216				76W	CSO	0.98	29	69	59	3	
	221				52W	HRX	0.80	13	11	11	3	
	224				39W	CSO	0.68	29	20	17	3	
	225				20W	EAC	0.46	681	384	251	3	
	226				51W	CRI	0.80	21	18	7	3	
	228				12E	HSX	0.44	181	101	101	3	
	230				31W	AXX	0.57	8	5	3	3	
	231				26E	CSI	0.47	55	31	26	3	
	233				17W	DAC	0.47	824	467	229	3	
	234				4W	BXI	0.26	29	15	4	3	
	235				5W	CAO	0.28	219	114	103	3	
	236				18E	BXO	0.61	8	5	3	3	
	237				39E	DSI	0.64	202	132	47	3	
21.23	221				64W	AXX	0.90	4	5	5	3	
	224				52W	AXX	0.82	8	7	4	3	
	225				32W	EAC	0.62	639	408	274	3	
	226				64W	BXI	0.91	17	20	10	3	
	228				1E	HSX	0.40	214	117	117	3	
	230				42W	AXX	0.71	8	6	3	3	
	231				13E	BXI	0.33	13	7	2	3	
	233				29W	EAC	0.61	1051	631	191	3	

DAILY SUNSPOT OBSERVATIONS

MAY 1989

Day	Group	CMP		L	CMD	Type	r/R	Sd	Corre. Area		See	Remarks
		Mo-Day	Lat						Whole	Max		
234					17W	CSI	0.39	97	53	39	3	
235					17W	CAO	0.39	156	85	80	3	
236					6E	BXO	0.56	8	5	3	3	
237					27E	EAC	0.52	463	270	76	3	
238		5-18.8	-14	90	32W	BXO	0.57	8	5	3	3	
239		5-23.0	-7	34	24E	AXX	0.41	8	5	2	3	
240		5-23.6	33	27	31E	AXX	0.71	8	6	3	3	
22.06	224				63W	AXX	0.90	8	9	5	4	
	225				46W	EKI	0.75	505	380	316	4	
	228				9W	CSO	0.43	219	121	118	4	
	230				54W	AXX	0.83	8	7	4	4	
	231				3E	CRI	0.29	34	18	7	4	
	233				39W	EKC	0.69	1178	813	209	4	
	234				28W	DRI	0.52	151	88	44	4	
	235				29W	HAX	0.53	151	89	89	4	
	237				17E	EKC	0.41	925	508	212	4	
	239				13E	AXX	0.24	4	2	2	4	
	241	5-26.4	22	349	58E	AXX	0.87	8	9	4	4	
	242	5-28.5	-20	322	78E	AXX	0.97	4	8	8	4	
23.01	225				58W	CAI	0.86	307	303	282	3	PLAT
	228				20W	HSX	0.51	189	110	110	3	PLAT
	231				9W	BXI	0.30	25	13	2	3	PLAT
	233				50W	EKI	0.80	812	683	266	3	PLAT
	234				40W	CSI	0.67	97	65	31	3	PLAT
	235				41W	HAX	0.67	118	79	79	3	PLAT
	237				4E	EAI	0.30	896	469	128	3	PLAT
	242				71E	CAO	0.94	42	63	31	3	PLAT
	243	5-24.1	22	20	15E	BXI	0.46	8	5	2	3	PLAT
24.01	225				72W	CAI	0.95	126	210	196	3	PLAT
	228				33W	HSX	0.63	143	92	92	3	PLAT
	231				23W	BXI	0.45	25	14	2	3	PLAT
	233				63W	BAI	0.90	425	477	180	3	PLAT
	234				54W	EAI	0.82	101	87	33	3	PLAT
	235				54W	HAX	0.82	42	36	33	3	PLAT
	237				9E	EAI	0.32	1169	617	144	3	PLAT
	242				58E	CAO	0.84	84	77	62	3	PLAT
	243				1E	BXO	0.40	13	7	2	3	PLAT
	244	5-29.8	-19	305	75E	CAO	0.97	265	509	485	3	PLAT
	245	5-30.3	20	299	0	HSX	0.99	42	139	139	3	PLAT

DAILY SUNSPOT OBSERVATIONS

MAY 1989

CMP		Day Group				Mo-Day		Lat		L		CHD Type		r/R		Sd		Corre. Area		Whole Max		See Remarks	
246	5-30.5	28	296	0	HRX	0.99	13	42	42	3	3	PLAT											
247	5-22.2	33	46	24W	BXO	0.66	8	6	6	3	3	PLAT											
25.02	228																						
231					46W	CAO	0.76	151	116	107	3	PLAT											
233					36W	BXO	0.62	13	8	3	3	PLAT											
234					76W	EAI	0.97	214	412	178	3	PLAT											
235					69W	DAI	0.93	63	86	75	3	PLAT											
237					68W	HAX	0.93	25	35	29	3	PLAT											
242					22W	FKI	0.45	1438	804	261	3	PLAT											
244					43E	CAO	0.71	97	69	63	3	PLAT											
245					61E	CAO	0.89	446	479	398	3	PLAT											
246					69E	HAX	0.94	126	189	189	3	PLAT											
247					71E	HAX	0.97	55	105	105	3	PLAT											
248a	5-24.7	-8	13	70W	BXO	0.93	8	12	6	3	3	PLAT											
26.02	228																						
233					59W	CSO	0.87	97	99	91	3												
234					84W	HSX	0.99	29	97	97	3												
235					85W	AXX	0.99	4	14	14	3												
236					85W	AXX	0.99	8	28	14	3												
237					53W	DAI	0.86	219	216	124	3												
242					38W	FKC	0.66	1556	1030	334	3												
244					33E	CRO	0.60	105	66	55	3												
245					49E	DHI	0.77	652	511	372	3												
246					54E	CSO	0.84	198	182	178	3												
248b	5-24.7	-8	13	18W	BXI	0.33	25	13	4	3	3												
249	5-31.1	-21	288	75E	BXO	0.97	8	16	8	3	3												
27.13	228																						
231					73W	HRX	0.95	34	56	49	3												
236					66W	AXX	0.92	4	5	5	3												
237					70W	CSO	0.95	101	168	140	3												
242					53W	FKC	0.80	1178	991	312	3												
244					18E	CRI	0.44	97	54	42	3												
245					33E	DHI	0.60	690	430	309	3												
246					38E	CAO	0.70	336	236	218	3												
248b					41E	HSX	0.76	210	161	161	3												
249					34W	BXI	0.56	13	8	3	3												
250	5-24.1	10	20	40W	BXO	0.66	8	6	6	3	3												
251	6- 1.7	-19	267	74E	AXX	0.95	8	14	7	3	3												
28.03	228																						
85W	HRX	0.99	13	42	42	3																	

DAILY SUNSPOT OBSERVATIONS

MAY 1989

Day	Group	CMP		L	CMD	Type	r/R	Sd	Corre. Area		See	Remarks
		Mo-Day	Lat						Whole	Max		
236					85W	HRX	0.99	13	42	42	3	
237					65W	FKC	0.90	799	902	290	3	
242					6E	CRI	0.34	38	20	9	3	
244					22E	DHI	0.47	833	472	350	3	
245					28E	HKX	0.57	551	337	334	3	
246					30E	HSX	0.66	202	134	134	3	21
248b					48W	BXO	0.75	13	9	6	3	
249					44E	CRI	0.74	59	43	37	3	
250					52W	B ₁	0.79	8	7	3	3	
251					59E	B ₁	0.86	8	8	4	3	
252		5-26.5	-4	348	20W	AXX	0.34	4	2	2	3	
253		5-29.8	24	305	21E	AXX	0.54	4	2	2	3	
29.31	237				79W	DAI	0.98	67	158	30	3	PLAT
	242				10W	BXO	0.34	13	7	2	3	PLAT
	244				5E	CKI	0.31	664	349	310	3	PLAT
	245				12E	CKG	0.40	488	266	241	3	PLAT
	246				14E	HAX	0.53	223	131	129	3	PLAT
	248b				66W	CRO	0.91	21	25	15	3	PLAT
	249				26E	CRO	0.53	46	27	10	3	PLAT
	254	6- 4.1	15	235	0	DRO	0.99	17	56	28	3	PLAT
	255	6- 1.1	-18	275	37E	AXX	0.64	4	3	3	3	PLAT
30.03	242				19W	BXO	0.45	8	5	2	3	PLAT
	244				4W	CKI	0.29	631	329	296	3	PLAT
	245				3E	CKO	0.36	442	236	225	3	PLAT
	246				6E	CSO	0.48	240	137	134	3	PLAT
	248b				78W	CSO	0.97	25	48	40	3	PLAT
	249				16E	CRI	0.43	97	53	12	3	PLAT
	251				36E	BXD	0.61	8	5	3	3	PLAT
	253				4W	AXX	0.44	4	2	2	3	PLAT
	254				72E	BXO	0.94	8	13	6	3	PLAT
	256	6- 4.9	19	224	76E	HSX	0.98	29	69	69	3	PLAT
31.01	242				40W	AXX	0.67	8	6	3	4	
	244				16W	CHI	0.39	589	320	302	4	
	245				10W	CHI	0.40	429	234	230	4	
	246				7W	CSI	0.49	198	114	111	4	
	249				1E	EAI	0.34	370	197	78	4	
	251				23E	BXD	0.45	13	7	2	4	
	253				16W	AXX	0.48	8	5	2	4	
	254				54E	BXO	0.83	17	15	7	4	
	256				63E	HSX	0.91	101	120	120	4	
	257	6- 4.1	19	235	55E	BXI	0.84	13	12	4	4	

H-ALPHA SOLAR FLARES

APRIL 1989

Day	Sta	T i m e			Lat	L	CMD	Area Measurement			Obs		A.R.	Rem
		Start (UT)	Max (UT)	End (UT)				Gen Dist	Appar (Sd)	Corr (Sp)	Imp	Type		
1	YUNN	0208	0213	0218	S19	313	E48	.747	161	121	1N	C	147	
1	YUNN	0221	0229	0254	N17	335	E26	.565	64	39	-N	C	146	
3	YUNN	0121	0126	0135D	S17	307	E28	.495	161	93	-N	P	147	
4	YUNN	0147E	0151U	0155	S18	309	E12	.284	64	33	-N	P	147	
4	YUNN	0257E	0257U	0303D	S24	303	E18	.409	193	106	1B	P	147	
5	YUNN	0214E	0217U	0222	N19	284	E24	.562	32	19	-N	P	158	
6	YUNN	0113E	0113U	0129	S25	321	W26	.513	32	19	-N	P	147	
7	YUNN	0253E	0306	0321	S12	296	W15	.271	402	209	1N	P	157	
9	YUNN	0111E	0119U	0233	N37	229	E27	.765	1125	873	3B	P	160	
9	PURP	0120E	0120U	0228	N33	227	E29	.744	717	537	2N	P	160	
9	YUNN	0200	0206	0233	S20	250	E 5	.254	482	249	1B	C	156	
9	PURP	0205	0211	0228D	S21	251	E 4	.267	453	235	1B	P	156	
9	YUNN	0233	0240	0252	N18	339	W84	.998	16		-B	C	165	
15	YUNN	0215	0224	0243	S21	158	E18	.398	80	44	-N	C	171	
17	YUNN	0329	0331	0337	N11	122	E27	.521	161	94	-N	C	173	
18	YUNN	0212	0218	0252	N13	143	W 7	.334	80	42	-B	C	172	
18	YUNN	0640E	0645U	0702	S16	79	E55	.822	32	28	-N	P	175	
19	YUNN	0255	0301	0308	S20	80	E43	.697	209	146	1N	C	175	
19	YUNN	0618E	0619U	0624	N10	124	W 3	.272	48	25	-N	P	173	
21	YUNN	0022	0024	0045	N14	144	W46	.765	193	150	1N	C	172	
21	YUNN	0311	0324U	0335	N20	87	E 9	.453	161	90	-N	P	177	
22	YUNN	0133	0136	0146	N12	122	W38	.663	129	86	-B	C	173	
22	YUNN	0153	0200	0216	S 9	125	W41	.648	241	158	1N	C	185	
22	YUNN	0340E	0340U	0345	N11	122	W39	.675	80	54	-N	P	173	
23	YUNN	0047	0053	0105	N19	83	W12	.447	48	27	-N	C	177	
23	YUNN	0215	0220	0235	N17	85	W15	.443	241	134	1N	C	177	
24	PURP	2348E	2348U	0003	S21	62	W17	.400	189	103	1F	P	178	E

H-ALPHA SOLAR FLARES

APRIL-MAY 1989

Day	Sta	T i m e			Lat	L	CMD	Area Measurement			Obs		A.R.	Rem
		Start (UT)	Max (UT)	End (UT)				Cen Dist	Appar (Sd)	Corr (Sp)	Imp	Type		
APRIL 1989														
25	YUNN	0407	0409	0416	S21	62	W19	.424	16	9	-N	C	178	
26	YUNN	0140	0151	0201	S17	315	E76	.966	16		-N	C	192	
28	YUNN	0250	0258	0314	S31	38	W34	.661	80	53	-N	C		G
29	YUNN	0249	0253	0303	S22	319	E32	.578	32	20	-N	C	192	
30	YUNN	0419E	0419U	0427D	S20	315	E22	.439	16	9	-N	P	192	
30	YUNN	0610E	0610U	0618	S21	309	E27	.514	48	28	-N	P	192	
MAY 1989														
1	YUNN	0202E	0204	0216	S17	315	E10	.278	63	33	-N	P	192	E
1	YUNN	0202E	0209	0236	N30	270	E55	.890	16	18	-N	P	201	
1	YUNN	0325	0334	0343D	N30	268	E56	.896	63	71	-F	P	201	F
1	YUNN	0824E	0824U	0825	S18	314	E 7	.268	19	10	-F	P	192	D
2	YUNN	0121E	0140	0214	N28	265	E47	.825	157	139	1N	P	201	F
5	YUNN	0726E	0740U	0835	N29	262	E 7	.547	786	469	2N	P	201	FU
6	PURP	0111E	0213U	0221	S15	312	W53	.800	113	94	-N	P	192	E
6	YUNN	0220	0224	0229	S21	305	W47	.755	31	24	-B	C	192	D
6	YUNN	0522E	0534	0542	S29	192	E65	.918	204		1F	P	209	F
7	YUNN	0018E	0018U	0103	N32	257	W11	.600	31	19	-F	P	201	E
7	YUNN	0118E	0122	0131	S27	193	E53	.830	79	71	-F	P	209	F
7	PURP	2333	0020	0053	N33	257	W11	.633	528	341	2N	C	201	C
8	YUNN	0110	0134	0209	N30	259	W26	.669	110	74	-N	P	201	F
8	YUNN	0118	0121	0126	S20	309	W76	.967	39		-N	C	192	D
8	YUNN	0131	0134	0141	S30	191	E42	.739	47	35	-N	C	209	D
8	YUNN	0151	0201	0218	S19	282	W50	.786	16	13	-N	C	204	E
8	YUNN	0153E	0154	0157	S16	307	W75	.965	39		-N	P	192	
8	YUNN	0222	0229	0322	N30	259	W27	.678	393	267	2N	C	201	F
8	YUNN	0343	0350	0351D	S30	195	E36	.682	110	75	-N	P	209	E
8	YUNN	0518E	0518U	0547D	N12	210	E20	.423	189	104	1N	P	206	F

H-ALPHA SOLAR FLARES

MAY 1989

Area	Measurement	Gen Appar Corr	Obs	Day	Sta	Start	Max	End	(UT)	(UT)	(UT)	Lat	L	CMD	Dist (Sd)	(Sp)	Imp	Type	A.R.	Rem
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8	YUNN	0518E	0532	0547D	S29	196	E34	.661	24	16	-N	P	209	D	213	E	-F	P	213	E
8	YUNN	0820E	0820U	0825D	S25	158	E71	.945	16		-N	P	209	D	213	E	-F	P	213	E
9	PURP	0020E	0020U	0034	S29	198	E22	.544	75	45	-N	P	209	E	213	D	-N	C	209	E
9	PURP	0029	0030	0039	S26	152	E68	.922	38		-N	C	213	D	213	D	-N	C	213	D
12	YUNN	0253E	0253U	0306	S30	196	W17	.515	24	14	-F	P	209	E	217	E	-F	P	209	E
13	PURP	0032	0040	0109	N 6	140	E27	.478	75	43	-N	C	217	E	217	E	-N	C	217	E
18	YUNN	0238	0239	0245D	N21	85	E15	.453	24	13	-N	P	233	D	233	D	-N	P	233	D
20	WLMQ	0241	0242	0244	N22	86	W13	.455	48	27	-N	C	233	E	233	E	-N	C	233	E
20	WLMQ	0541	0543	0544	N22	86	W14	.469	32	18	-N	C	233	D	233	D	-N	C	233	D
20	WLMQ	0627	0636	0643	N22	87	W16	.486	64	37	-N	C	233	E	233	E	-N	C	233	E
21	WLMQ	0647	0654	0741	S20	39	E19	.436	96	53	-N	C	231	E	231	E	-N	C	231	E
21	WLMQ	0835E	0835	0836	N16	98	W41	.701	32	22	-N	C	230	D	230	D	-N	C	230	D
21	WLMQ	0931E	0931	0932	S17	78	W22	.436	48	27	-N	C	234	D	234	D	-N	C	234	D
21	WLMQ	1057	1137	1157	S17	78	W23	.456	64	36	-F	C	234	E	234	E	-F	C	234	E
21	WLMQ	2341	2359	0011	N23	88	W40	.725	80	58	-N	C	233	E	233	E	-N	C	233	E
22	WLMQ	0000	0029		S21	33	E15	.411	884	485	2B	C	237	UX	237	UX	2B	C	237	UX
22	WLMQ		0038		S22	33	E15	.418	755	416	2B	C	237	U	237	U	2B	C	237	U
22	WLMQ		0050	0200	S22	33	E15	.415	643	353	2B	C	237	U	237	U	2B	C	237	U
22	WLMQ	0128	0129	0132	N23	87	W40	.721	32	23	-F	C	233	D	233	D	-F	C	233	D
22	YUNN	0148E	0149U	0149D	S21	31	E16	.419	79	44	-B	P	237	E	237	E	-B	P	237	E
22	WLMQ	0747	0758	0822D	S20	31	E12	.371	241	130	1B	C	237	E	237	E	1B	C	237	E
23	WLMQ	0145	0147	0201	N24	85	W51	.829	209	187	1B	C	233	D	233	D	1B	C	233	D
23	WLMQ	0235	0325	0414	S20	32	E 1	.313	289	152	1N	C	237	F	237	F	1N	C	237	F
23	WLMQ	0539	0554	0654	S20	32	W 0	.307	209	110	1N	C	237	E	237	E	1N	C	237	E
23	PURP	0706	0706U	0708D	S21	40	W 9	.356	226	121	1B	P	231	E	231	E	1B	P	231	E
24	WLMQ	0842	0849	0859	N25	91	W74	.971	241		2B	C	233	E	233	E	2B	C	233	E
24	WLMQ	0907	0909	0913	S26	300	E77	.976	113		1N	C	244	D	244	D	1N	C	244	D
24	WLMQ	1013	1015	1024	N23	94	W77	.982	16		-N	C	233	A	233	A	-N	C	233	A
25	PURP	0035	0045	0053D	S18	36	W28	.511	75	44	-N	C	237		237		-N	C	237	
25	WLMQ	0441E	0448	0533	N33	48	W42	.794	96	79	-N	C	247	EG	247	EG	-N	C	247	EG
25	WLMQ	0537	0614	0633	N34	50	W44	.814	80	69	-N	C	247	E	247	E	-N	C	247	E

H-ALPHA SOLAR FLARES

MAY 1989

Day	Sta	T i m e			Lat	L	CMD	Area Measurement			Obs			A.R.	Rem
		Start	Max	End				Cen	Appar	Corr					
		(UT)	(UT)	(UT)				Dist	(Sd)	(Sp)	Imp	Type			
25	WLMQ	0559	0605	0617	S18	40	W34	.609	64	40	-N	C	237	E	
25	WLMQ	0637	0700	0715	S20	36	W31	.584	64	39	-N	C	237	E	
25	WLMQ	0640	0641	0651	S17	48	W43	.709	46	33	-F	C	231	E	
25	WLMQ	0649	0752	0836	N33	49	W45	.813	161	138	1B	C	247	E	
25	WLMQ	0712	0721	0729	S19	38	W34	.605	64	40	-N	C	237	E	
26	YUNN	0328	0330	0337D	S 7	13	W20	.351	47	25	-N	P	248	E	
26	YUNN	0644	0648	0656	S17	31	W39	.661	16	11	-F	C	237	D	
26	YUNN	0726	0729	0753	S 8	14	W23	.401	94	51	-N	C	248		
26	YUNN	0827E	0829	0835	N23	74	W83	.994				P	233	A	
26	YUNN	0837	0841	0846	S15	307	E44	.712	16	11	-N	C	244	D	
26	YUNN	0841E	0841	0846D	S18	37	W46	.740	16	12	-N	P	237	D	
27	YUNN	0535E	0548	0554	S19	27	W48	.771	63	49	-N	P	237		
28	WLMQ	0143	0155	0214	S16	339	W11	.322	80	42	-F	C		E	
28	YUNN	0730	0736	0740D	S19	28	W63	.902	63	73	-N	P	237	E	
30	WLMQ	1118	1120	1126	N25	300	W 4	.447	48	27	-N	C	253	D	
30	WLMQ	2345E	2345	2352	N16	229	E60	.879	96	101	1N	C	256	D	
30	WLMQ	2347	2350	0005	N19	225	E64	.909	48		-N	C	256	D	
31	WLMQ	0737	0742	0801	N21	296	W11	.405	80	44	-N	C	245	D	
31	WLMQ	0752	0812	0832	N19	224	E60	.888	48	52	-N	C	256	D	

INTERVALS OF H-ALPHA FLARE PATROL OBSERVATION

APRIL 1989

Day	From	To	From	To	From	To	From	To	From	To	From	To	From	To
1	140	313												
2	46	51	200	252	303	329								
3	30	310												
4	49	303												
5	112	135	210	301										
6	14	118	130	310										
7	0	11	40	312	711	714								
8	49	145	223	313										
9	110	315												
10	437	533	800	911										
11	214	302	310	325	335	340	711	753						
12	146	200												
13	210	238	640	650	713	745								
14	58	310	321	335	720	802	2329	2400						
15	140	230	330	340	635	711	725	735						
16	4	38	46	101	130	212	244	256	653	715	2357	2359		
17	104	343	630	806	814	833								
18	2	53	109	331	635	805								
19	14	33	48	325	618	730	750	855						
20	50	330	640	900										
21	22	201	250	335										
22	117	228	245	310	340	352	725	735						
23	40	50	105	349	414	418								
24	730	805												
25	1	6	15	19	49	108	132	159	335	442	624	719	802	808
26	31	36	49	140	149	255	305	332	405	420				
27	2	27	320	345	355	440								
28	20	116	145	151	218	330								
29	26	40	112	116	145	153	228	310	325	349				
30	419	427	532	655										

INTERVALS OF H-ALPHA FLARE PATROL OBSERVATION

MAY 1989

Day	From	To	From	To	From	To	From	To	From	To	From	To
1	202	314	323	343	749	825						
2	121	235										
3	307	310	700	724	736	752	802	848				
4	747	752										
5	726	910	2319	2333								
6	25	53	103	114	156	337	359	407	418	427	452	457
	522	640	649	652	716	753	900	955				
7	3	148	155	207	218	250	350	353	401	420	446	501
8	307	313	459	502	518	547	602	613	715	723	740	801
9	10	49	57	241								820
10												825
11	150	303										
12	7	47	57	213	228	240	253	324	333	417		
13	26	123	131	136								
14												
15												
16	736	745	752	755								
17	201	205	223	225	232	322	348	411	425	445	819	834
18	107	245	255	336	357	429						
19	35	240	247	324	355	427						
20	148	300	336	457	535	556	607	651				
21	33	410	450	510	602	808	835	1150	2334	2400		
22	0	11	21	200	215	421	739	758	811	822		
23	137	724	814	1106								
24	3	10	41	50	121	144	221	251	834	1058		
25	16	53	441	912								
26	52	144	237	337	642	729	742	753	825	917		
27	127	310	535	742								
28	35	219	714	743	806	831						
29												
30	15	56	114	144	738	844	854	1126	2345	2400		
31	0	115	143	145	156	208	421	647	717	850	857	914

SOLAR RADIO EMISSION FLUX

APRIL 1989

Day	BEIJ 2840	PURP 2700	YUNN 2840
1	172	117	120
2	178	119	128
3	183	131	134
4	187	138	136
5	202	135	134
6	193	138	147
7	200	143	139
8	199	150	145
9	207	154	144
10	183	140	150
11	187	152	142
12	178	138	133
13	175	119	137
14	198	133	133
15	204	149	138
16	208	152	134
17	213	163	141
18	219	158	151
19	214	156	137
20	202	151	146
21	192	141	142
22	202	145	139
23	187	147	135
24	185	145	132
25	186	138	136
26	165	136	129
27	179	132	129
28	176	110	129
29	188	121	133
30	184	133	136
Mean	191.5	139.5	137.0

SOLAR RADIO EMISSION FLUX

MAY 1989

Day	BEIJ 2840	PURP 2700	YUNN 2840
1	176	115	124
2	185	130	125
3	201	146	130
4	212		135
5	211		138
6	197		129
7	202		132
8	224		136
9	217		136
10	206		182
11	201		183
12	197		185
13	217		180
14			186
15	221		196
16	210		184
17	214		175
18	180		182
19	192		172
20	209		180
21			201
22	216		195
23	227		211
24	210		205
25	220		202
26	211		191
27	196		168
28	191		167
29	203		168
30	187		163
31	187		176
Mean	204.1		168.9

SOLAR RADIO EMISSION OUTSTANDING OCCURRENCES

APRIL 1989

Day	Freq	Sta	Type	Start (UT)	Time of Maximum (UT)	Duration (Min)	Flux Peak	Density Rel	Mean
08	2840	YUNN	5 S	0738	0738.2	1	46		
09	2700	PURP	47 GB	0040.5	0103.5	25.5	392		
09	2840	BEIJ	45 C	0042	0051.3	37	858D	414.5D	
09	2700	PURP	29 PBI	0106		36.0D			
09	2840	BEIJ	30 PBI	0119		107	70	33.8	
09	2840	BEIJ	1 S	0131	0133	3	4.6	2.2	
09	2840	BEIJ	1 S	0142	0142.4	3	4.6	2.2	
09	2840	BEIJ	1 S	0202	0204.3	5	19.2	9.3	
16	2840	BEIJ	46 C	0345	0351.1	11	27.1	13	
19	2840	BEIJ	4 S/F	0026	0028.4	5.5	27.4	12.8	
20	2840	BEIJ	45 C	0433	0436.7	10.8	9.0	4.5	
20	2840	BEIJ	46 C	0520	0526.7	8	15.5	7.7	
21	2840	BEIJ	1 S	2348	2349	4	12.2	6	
22	2840	BEIJ	1 S	0131	0133.2	7	23.9	11.8	
22	2840	BEIJ	1 S	0248	0248.3	3	10.1	5	
22	2840	BEIJ	45 C	0330	0331.6	31	52.8	26.2	
22	2840	BEIJ	3 S	0513	0516.8	13	12.9	6.4	
22	2840	BEIJ	45 C	0541	0545.4	5.5	88.9	44.0	
22	2840	YUNN	4 S/F	0543	0545	4	34		
22	2840	BEIJ	30 PBI	0546.5	0546.5	28.5	12.6	6.2	
22	2840	BEIJ	1 S	0551	0552.3	3	11.9	5.9	
22	2840	YUNN	45 C	0823.7	0824.6	9.6	63		

INTERVALS OF SOLAR RADIO EMISSION PATROL OBSERVATION

APRIL 1989

Day	BEIJ From To 2840	PURP From To 2700	YUNN From To 2840
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1	0120 0715	0050 0805	0155 0835
2	0039 0625	0050 0825	0147 0805
3	0048 0710	0115 0820	0040 0830
4	0053 0746	0028 0830	0120 0810
5	0523 0745	0019 0840	0130 0800
6	0054 0745	0024 0840	0030 0810
7	0057 0745	0017 0835	0130 0815
8	0057 0717	0016 0836	0100 0800
9	0040 0710	0015 0830	0130 0800
10	0118 0715	0705 0830	0145 0830
11	0054 0540	0015 0834	0130 0830
12	0151 0753	0037 0842	0130 0830
13	0105 0750	0042 0831	0145 0830
14	0106 0928	0045 0830	0130 0815
15	0100 0710	2310 2400	0200 0810
16	0000 0611	0000 0733	0145 0815
17	2348 2400	2342 2400	0150 0805
18	0000 0645	0000 0740	0040 0810
19	0000 0650	0000 0742	0040 0850
20	0000 0650	0050 0735	0040 0902
21	0000 0651	0000 0736	0100 0910
22	0000 0620		0115 0954
23	2335 2400		0156 0842
24	0000 0650		0056 0816
25	0000 0643	0158 0735	0140 0752
	2345 2400	2324 2400	

INTERVALS OF SOLAR RADIO EMISSION PATROL OBSERVATION

APRIL 1989

Day	BEIJ From To 2840	PURP From To 2700	YUNN From To 2840
26	0000 0653	0000 0735	0120 0727
27	0047 0425 2347 2400	0000 0735 2317 2400	0050 0703
28	0000 0645 2349 2400	0000 0735 2321 2400	0145 0712
29	0000 0620 2345 2400	0000 0243 2315 2400	0120 0720
30	0000 0520	0000 0734	0145 0704

INTERVALS OF SOLAR RADIO EMISSION PATROL OBSERVATION

MAY 1989

Day	BEIJ From To	PURP From To	YUNN From To
	2840	2700	2840

1	2330 2400	0000 0735	0150 0430
2	0000 0644	2323 2400	0130 0724
	2329 2400	0000 0735	
3	0000 0645	2324 2400	0050 0445
	2342 2400	0000 0735	
4	0000 0550		0050 0750
	2345 2400		
5	0000 0650		0110 0905
	2349 2400		
6	0000 0650		0020 1014
	2350 2400		
7	0000 0617		0000 1002
	2337 2400		
8	0000 0700		0022 1006
	2347 2400		
9	0000 0650		0044 1005
	2344 2400		
10	0000 0645		0159 0930
	0009 0648		
11	2346 2400		0136 0746
	0000 0645		
12	2344 2400		0046 0800
	0000 0650		
13	2349 2400		0206 0813
	0000 0650		
14			0215 0801
15	2347 2400		0206 1025
	0000 0706		
16	2354 2400		0112 0730
	0000 0722		
17	2341 2400		0145 0700
	0000 0721		
18	2345 2400		0140 0816
	0000 0716		
19	2326 2400		0130 0911
	0000 1003		
20	0023 0622		0239 0505
21			0224 0840

INTERVALS OF SOLAR RADIO EMISSION PATROL OBSERVATION

MAY 1989

Day	BEIJ From To 2840	PURP From To 2700	YUNN From To 2840
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22	2350 2400	0120 0830
23	0000 0709	0130 1015
23	2356 2400	0130 0900
24	0000 0650	
24	2350 2400	0130 0830
25	0000 0708	
25	2340 2400	0110 0830
26	0000 0710	
26	2356 2400	0120 0900
27	0000 0700	
27	2353 2400	0120 0800
28	0000 0646	
28	2328 2400	0120 0700
29	0000 0245	
29	2350 2400	0100 0730
30	0000 0720	
30	2345 2400	0130 0900
31	0000 0720	
31	2343 2400	0130 0900
	0000 0720	

COSMIC RAY NEUTRON INTENSITY
Real Counts: 256 Times (Tabulated Counts Plus 1500)

APRIL 1989

U.T. Hours at End of Interval

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	Mean
1	414	421	433	426	428	424	430	425	417	416	412	414	408	408	404	404	409	406	409	402	413	419	410	411	414.8
2	415	418	419	418	422	421	423	426	426	426	426	432	434	433	433	433	437	438	439	440	440	440	440	440	440
3	414	421	423	426	428	424	430	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432	432
4	432	431	436	432	431	433	424	425	434	434	431	431	439	431	418	411	410	407	410	418	419	410	410	410	410
5	425	429	423	425	428	424	430	432	426	426	426	432	434	433	433	433	437	438	439	440	440	440	440	440	440
6	416	420	419	417	414	414	418	405	405	405	405	405	405	405	405	405	405	405	405	405	405	405	405	405	405
7	417	427	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428	428
8	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
9	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
10	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
11	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
12	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
13	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
14	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
15	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
16	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
17	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
18	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
19	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
20	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
21	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
22	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
23	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
24	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418
Mean	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418	418

NORTHLY MEAN DAILY VARIATION FOR 30 COMPLETE DAYS DEVIATIONS FROM AVERAGE: 402.076
(1-12) 3.29 3.99 3.29 4.96 4.76 5.82 6.39 3.02 1.49 -0.81 -0.08 -0.08
(13-24) -2.18 -4.01 -3.44 -3.78 -4.54 -3.61 -5.44 -3.78 -5.01 -4.61 -0.08 -0.08
HARMONIC COMPONENTS (ORDER, COS, SIN, AMPLITUDE, MAX, -HN)
U.T.=(1) 1.26 5.22 5.37 5.10 (2) -0.47 0.54 0.71 4.37 (3) 0.77 0.00 0.77 8.00 (4) 0.52 0.22 0.57 0.38
L.T.=(1) -5.15 -1.52 5.37 13.10 (2) 0.70 0.14 0.71 0.37 (3) 0.77 0.00 0.77 8.00 (4) -0.45 0.34 0.57 2.38

COSMIC RAY NEUTRON INTENSITY Real Counts: 256 Times (Tabulated Counts Plus 1500)

U.T. Hours at End of Interval

MAY 1989

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	Mean	N		
1	387	376	385	386	387	381	385	394	389	380	378	373	373	368	380	379	379	380	373	377	375	376	374	370	392	380.2	24	
2	385	387	388	379	382	387	378	380	393	378	381	375	371	382	378	381	382	374	384	373	377	366	370	373	371	371	376.8	24
3	369	380	379	367	365	374	370	371	373	386	373	373	373	383	369	373	379	374	377	366	370	373	373	371	371	376.8	24	
4	371	374	366	367	366	364	366	363	357	379	379	373	373	386	373	378	379	376	373	377	367	378	370	366	354	373.2	24	
5	354	357	356	358	357	354	357	357	357	379	379	373	373	386	373	378	379	376	373	377	367	378	370	366	354	373.8	24	
6	361	369	372	372	372	372	372	372	372	379	379	373	373	386	373	378	379	376	373	377	367	378	370	366	354	373.2	24	
7	371	371	371	371	371	371	371	371	371	379	379	373	373	386	373	378	379	376	373	377	367	378	370	366	354	373.2	24	
8	366	370	360	364	366	363	357	372	354	356	347	353	343	348	346	354	344	344	344	349	349	349	349	349	349	349.0	24	
9	361	369	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372.0	24	
10	359	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368.0	24	
11	357	374	381	371	382	383	382	379	379	366	370	364	365	369	369	369	369	369	369	369	369	369	369	369	369	369.0	24	
12	379	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372.0	24	
13	364	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363.0	24	
14	363	381	398	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396.0	24	
15	365	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372	372.0	24	
16	367	376	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366	366.0	24	
17	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371	371.0	24	
18	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368	368.0	24	
19	363	373	368	373	373	373	373	373	373	373	373	373	373	383	369	373	379	374	377	366	370	373	373	371	371	376.8	24	
20	359	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362	362.0	24	
21	356	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361	361.0	24	
22	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352	352.0	24	
23	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363	363.0	24	
24	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346.0	24	
25	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356.0	24	
26	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346.0	24	
27	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346.0	24	
28	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346.0	24	
29	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346.0	24	
30	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346.0	24	
31	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346	346.0	24	
MONTHLY MEAN DAILY VARIATION FOR 31 COMPLETE DAYS DEVIATIONS FROM AVERAGE:367.151																												

MONTHLY MEAN=367.151

MONTHLY MEAN DAILY VARIATION FOR 31 COMPLETE DAYS DEVIATIONS FROM AVERAGE:367.151

(1-12) 0.37 -0.09 1.11 1.66 4.27 3.59 3.43 4.75 2.24 2.82 -1.02 -0.47
(13-24) -0.05 -1.73 -1.70 -2.76 -1.67 -3.63 -2.92 -1.96 -2.31 -1.47 -1.80 -0.63
HARMONIC COMPONENTS (ORDER, COS, SIN, AMPLITUDE, MAX.-HR)

U.T.=(1)-0.03 3.13 6.04 (2)-0.65 -0.17 0.67 2.50 (3) 0.14 -0.41 0.43 6.41 (4) 0.01 0.14 0.14 1.45
L.T.=(1)-2.70 -1.59 3.13-14.04 (2) 0.18 0.65 0.67 2.50 (3) 0.14 -0.41 0.43 6.41 (4) -0.13 -0.07 0.14 3.45

COSMIC RAY MESON INTENSITY Real Relative Intensity: 0.1% Times (Tabulated Value Plus 1000)

APRIL 1989

U.T. Hours at End of Interval

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	Mean	σ
1	17	17	19	20	19	16	18	15	15	16	14	15	15	17	16	16	16	16	15	15	15	15	16	13	16.1	24
2	15	14	16	15	16	12	15	13	10	15	13	10	13	15	10	15	14	15	14	17	16	17	18	17	14.4	24
3	20	20	19	22	20	20	20	17	17	18	17	19	19	20	21	22	20	23	20	19	22	19	20	20	19.8	24
4	23	23	22	21	18	17	19	18	18	17	17	17	15	16	16	16	16	16	15	16	17	18	18	18	17.9	24
5	19	20	19	20	20	19	19	18	18	18	17	17	16	18	19	19	18	19	17	20	17	18	18	18	18.4	24
6	19	19	17	17	16	15	17	16	15	15	15	15	15	17	18	19	18	19	19	19	19	19	21	22	17.8	24
7	22	22	23	20	20	20	20	19	16	14	17	19	18	18	20	20	22	20	21	20	19	20	19	20	19.5	24
8	19	19	20	19	19	19	17	18	13	15	15	16	17	17	17	19	19	22	23	21	23	24	26	19.3	24	
9	24	27	27	25	26	26	24	25	23	25	24	24	26	23	28	26	27	28	26	27	28	28	29	27	26.0	24
10	30	27	29	26	26	24	24	23	23	22	23	21	21	21	24	24	21	24	22	24	23	25	25	24	24.0	24
11	26	25	21	24	25	23	25	22	19	21	20	21	25	24	24	24	25	25	25	26	23	24	21	21	23.4	24
12	20	18	18	17	18	14	13	16	15	14	12	15	15	16	17	17	17	19	18	18	18	19	22	20	17.1	24
13	23	20	20	20	17	16	14	17	14	14	15	14	17	16	17	18	20	21	20	20	19	19	19	21	20.2	24
14	21	19	20	20	20	22	21	21	19	19	19	20	19	21	22	21	21	20	20	17	19	21	20	21	20.2	24
15	19	19	19	18	19	21	19	18	14	15	17	16	14	13	12	12	12	13	15	14	16	14	15	16	15.8	24
16	17	17	15	15	12	16	14	17	18	15	16	15	11	12	13	15	11	11	14	14	14	13	13	14	14.3	24
17	14	11	12	12	13	13	11	10	7	9	11	12	12	10	10	11	11	12	11	10	12	12	14	14	11.4	24
18	14	14	13	15	14	14	15	14	13	13	13	11	14	14	13	13	14	14	16	12	11	12	11	11	13.3	24
19	13	14	15	12	12	12	12	13	12	11	10	11	12	9	10	11	10	10	7	9	8	10	9	7	10.8	24
20	9	11	10	9	10	12	10	12	11	11	11	11	11	10	12	9	10	8	9	9	9	9	10	12	10.2	24
21			11	12	9	13	13	13	13	10	12	9	10	12	9	10										
22		17				15	14	14	15	14	15	14	14	14	15	15										
23		16				17	17	17	13	15	13	14	14	15	15											
24	16	14				14																				
25	9	11	11	13	10	12	15	15	13	12	13	14	14	15	14	12	13	12	11	15	15	18	14	14	13.1	24
26	16	15	14	14	15	15	14	16	14	16	16	16	17	18	17	16	16	17	16	14	19	15	17	18	15.9	24
27	16	19	19	19	19	19	18	18	18	16	16	16	15	20	19	21	18	18	17	14	13	18	18	18	17.7	24
28	16	15	18	16	16	20	19	18	17	16	18	15	15	16	12	16	15	16	12	18	15	14	14	14	16.0	24
29	13	13	15	14	14	13	11	13	15	15	14	13	13	13	13	12	11	12	13	11	14	12	14	14	13.1	24
30	12	14	14	12	13	13	11	10	11	10	10	9	9	11	10	10	10	9	9	9	10	12	12	13	11.0	24

MONTHLY MEAN DAILY VARIATION FOR 26 COMPLETE DAYS DEVIATIONS FROM AVERAGE: 16.700

(1-12) 1.30 1.11 1.18 0.88 0.45 0.34 0.03 -0.08 -1.28 -1.16 -1.28 -1.05
(13-24) -0.74 -0.62 -0.24 -0.32 -0.20 0.30 -0.39 -0.39 0.30 0.53 0.76 0.57

HARMONIC COMPONENTS (ORDER, COS, SIN, AMPLITUDE, MAX.-ERR)

U.T.=(1 0.95 0.07 0.95 0.27) (2 0.01 0.40 0.40 2.94) (3 0.07 -0.11 0.13 6.76) (4 0.03 0.03 0.04 0.63)
L.T.=(1 -0.53 0.78 0.95 8.27) (2 0.34 -0.21 0.40 10.94) (3 0.07 -0.11 0.13 6.76) (4 -0.04 0.02 0.04 2.63)

MONTHLY MEAN= 16.378

COSMIC RAY MESON INTENSITY

Real Relative Intensity: 0.1% Times (Tabulated Value Plus 1000)

U.T. Hours at End of Interval

MAY 1989

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	Mean	±	
1	9	8	8	11	9	8	11	11	10	8	10	8	9	9	10	10	10	10	10	11	12	10	8	11	10	9.6	23
2	12	10	8	12	9	9	10	7	12	9	7	7	10	9	10	9	9	10	9	6	9	8	8	8	8	9.0	24
3	10	8	12	9	9	8	12	6	8	8	7	8	8	9	9	9	9	8	8	7	8	8	10	10	10	8.6	24
4	10	10	8	10	9	8	7	8	9	8	8	8	10	11	12	10	11	10	11	12	10	11	10	10	10	9.5	24
5	8	8	8	8	6	5	8	8	6	5	4	4	5	2	2	2	2	8	7	2	2	1	2	3	3	4.8	24
6	4	8	8	8	5	5	3	3	3	3	3	3	4	4	5	8	8	8	7	7	8	11	10	11	5.8	24	
7	10	12	10	13	10	9	10	9	6	6	6	6	6	6	10	8	8	8	5	3	2	9	6	7	7.8	24	
8	10	8	8	9	9	10	8	10	10	8	8	8	8	8	8	7	7	7	4	4	7	10	11	8	8.5	24	
9	11	10	10	11	12	12	12	11	11	10	10	11	11	11	10	6	6	6	9	9	7	6	8	9	9.5	24	
10	9	10	10	12	11	11	15	15	9	9	8	11	13	12	12	10	10	10	10	10	9	11	11	10	10.9	11	
11	11	11	11	14	14	14	14	14	15	15	15	16	16	16	16	16	16	16	16	14	14	14	14	14	14.3	24	
12	13	13	12	14	14	13	14	14	15	15	16	16	16	16	16	16	16	16	16	16	16	16	16	16	15.5	21	
13	15	15	13	16	16	16	16	16	17	17	17	17	16	16	16	16	16	16	16	14	14	14	14	14	16.1	24	
14	18	18	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	14	14	14	14	14	16.1	24	
15	8	8	9	7	7	6	7	7	4	4	3	6	6	6	6	6	6	6	6	7	7	7	7	7	5.1	24	
16	8	8	6	8	6	6	7	7	5	5	5	8	8	7	7	10	10	9	9	7	7	8	8	10	7.5	24	
17	8	7	7	7	6	6	6	5	5	5	4	8	8	7	7	10	10	9	9	7	7	8	8	10	7.0	23	
18	8	8	10	7	10	6	7	6	5	5	5	6	6	6	6	6	6	6	6	11	11	15	15	15	9.3	24	
19	8	8	10	7	10	6	7	6	5	5	5	6	6	6	6	6	6	6	6	11	11	15	15	15	9.3	24	
20	15	15	15	14	14	12	11	11	11	11	12	12	14	14	15	15	14	14	14	14	12	12	13	13	13	7.2	24
21	19	18	17	17	15	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	12	12	13	13	13	7.2	24
22	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	4.1	24	
23	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	3.1	24	
24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	3.1	24
																										7.81	

MONTHLY MEAN = 7.811

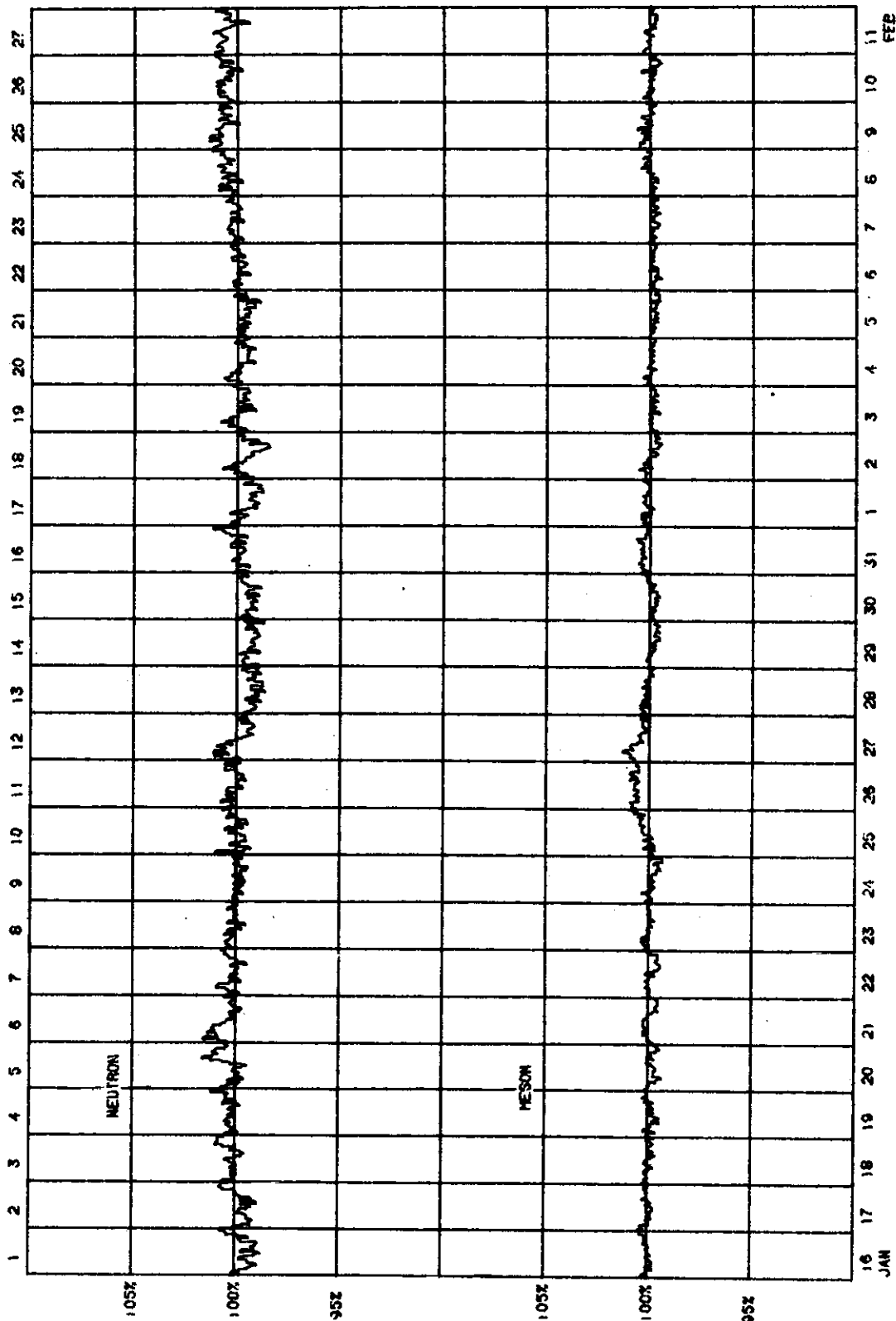
MONTHLY MEAN DAILY VARIATION FOR 25 COMPLETE DAYS DEVIATIONS FROM AVERAGE: 7.477

(1-12) 1.20 1.04 0.96 0.92 1.04 0.23 0.20 -0.08 -1.00 -0.66 -1.00 0.00 0.56
 (13-24) -0.12 -0.64 -0.36 -0.12 -0.28 -0.44 -0.44 -0.28 0.00 0.04 0.00 0.56

HARMONIC COMPONENTS (ORDER, COS, SIN, AMPLITUDE, MAX., -HR)

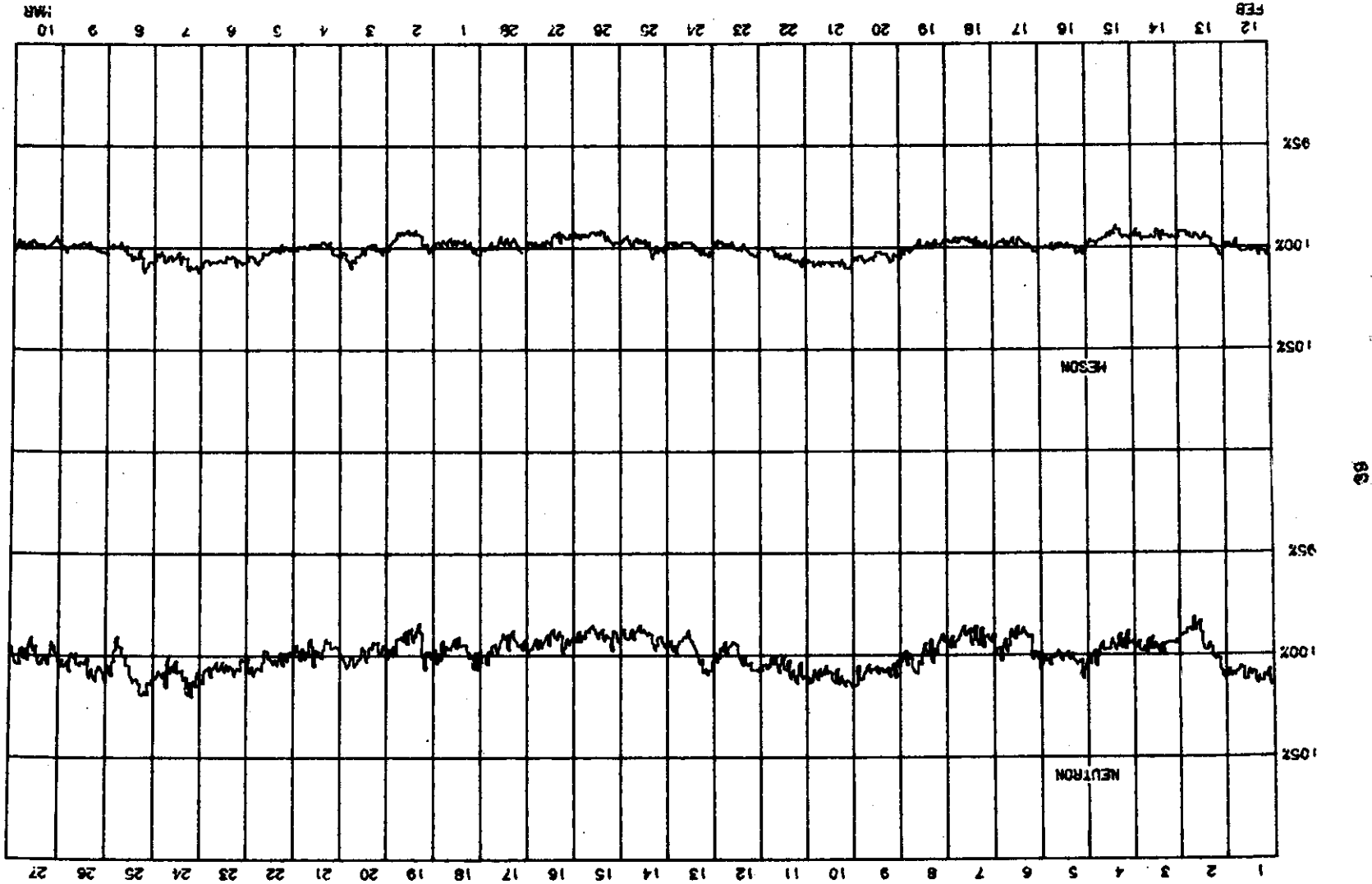
U.T.=(1 0.71 0.30 0.77 1.53) (2 0.03 0.39 0.39 2.85) (3 0.00 -0.01 0.01 6.01) (4 0.03 0.01 0.03 0.16)
 L.T.=(1 -0.62 0.47 0.77 9.53) (2 0.32 -0.22 0.39 10.85) (3 0.00 -0.01 0.01 6.01) (4 -0.02 0.02 0.03 2.18)

COSMIC RAY INDICES BARTELS ROTATION 2124 (JAN 1989-FEB 1989)



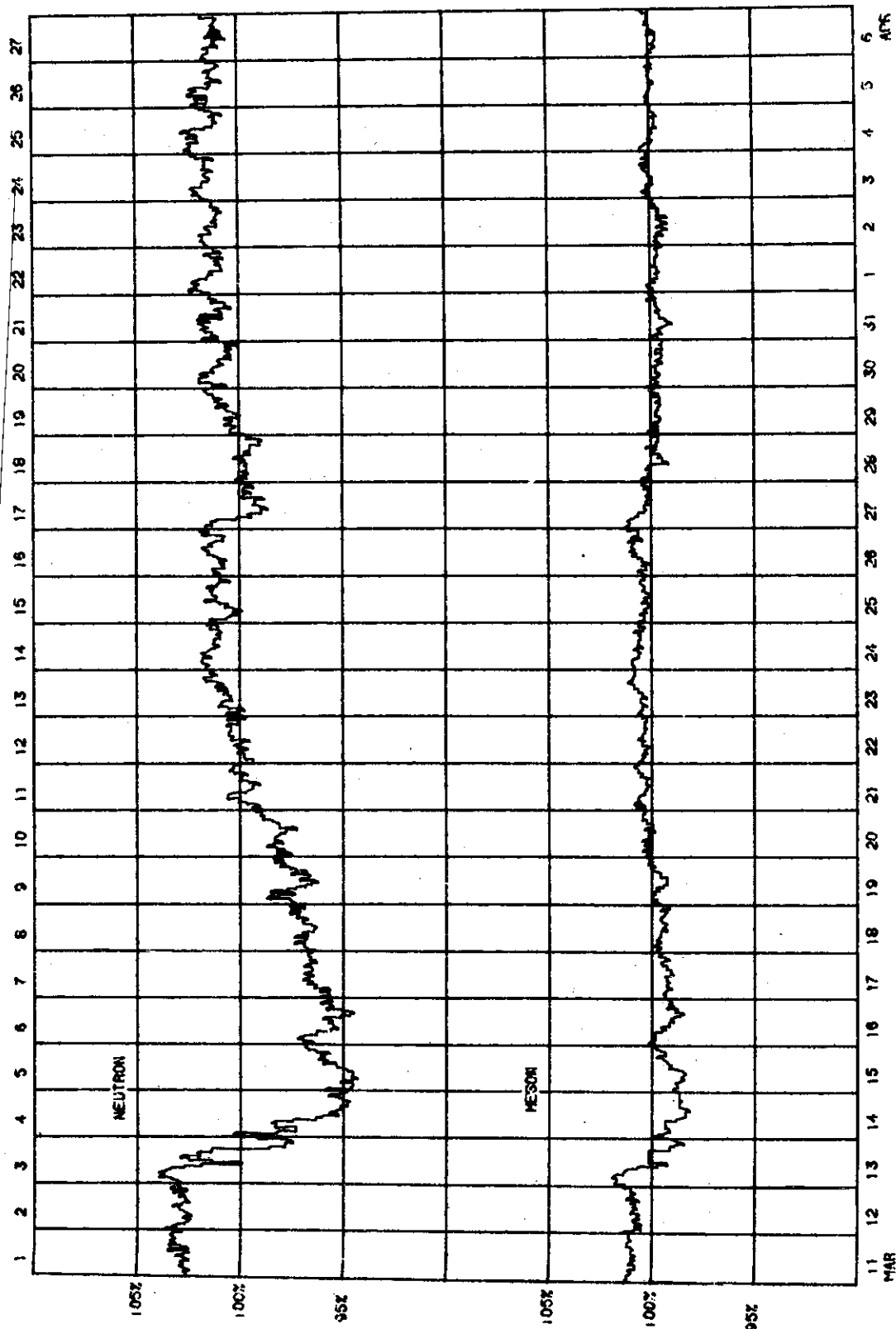
COSMIC RAY INDICES

BARTLETS ROTATION 2125 (FEB 1989-MAR 1989)

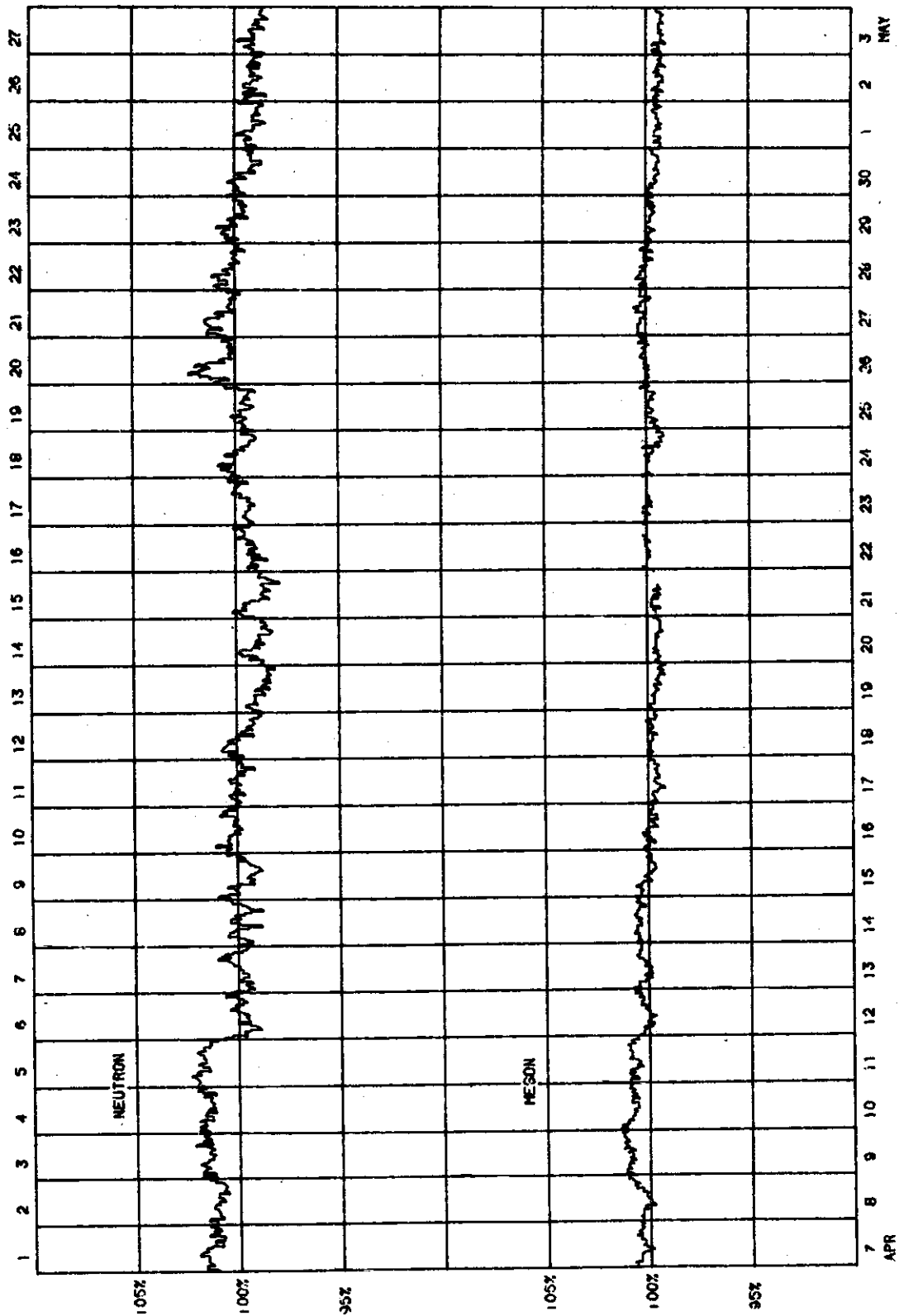


COSMIC RAY INDICES

BARTELS ROTATION 2126 (MAR 1989-APR 1989)

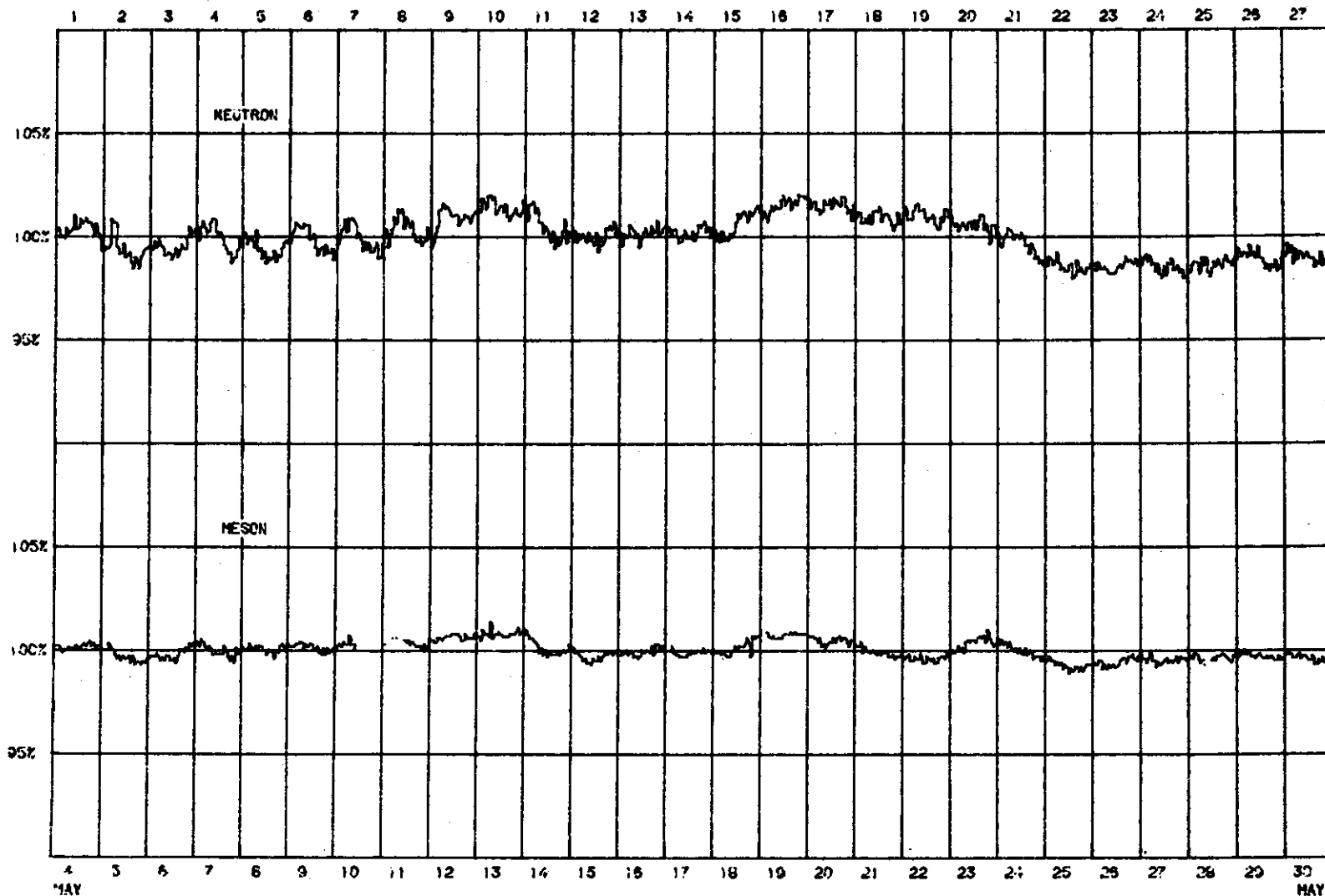


COSMIC RAY INDICES BARTELS ROTATION 2127 (APR 1989-MAY 1989)



COSMIC RAY INDICES

BARTELS ROTATION 2128 (MAY 1989)



SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

APRIL 1989

Day	Sta	Start (UT)	Max (UT)	End (UT)	Imp	SPA		SFA LF
						LF	VLF	
01	LINT	0111	0118	0132	1-	- 0.6	- 3	- 1.8
01	YUNN	0847	0852	0922	1+	- 3.0		
02	LINT	0110	0114	0123	1-	- 0.3	- 3	- 0.6
02	LINT	0449	0505	0514U	1-	- 0.3	- 7	- 0.8
03	LINT	0610	0614	0640	1	- 1.2	-10	- 3.4
03	LINT	0916	0921	0950	2-	- 3.3	-13	- 2.9
03	YUNN	0919	0925	1000	2+	- 5.4		
03	LINT	2325	2334	0040D	3+	-14.4	- 7	- 5.2,+ 2.8
04	LINT	0126	0131	0145	1-	- 0.3	- 4	- 1.3
04	LINT	0148	0154	0220	1	- 1.4	- 6	- 4.9
04	LINT	0246	0249	0301U	1-	- 0.2	- 3	- 0.8
04	LINT	0317	0321	0330	1-	- 0.3	0	- 0.3
04	LINT	0423	0430	0452	1-	- 0.3	0	- 2.6
05	LINT	2352	0000	0007U	1-	- 0.3	0	+ 0.9
05	YUNN	0347	0354	0429	1+	- 2.6		
05	LINT	0341	0355	0500	2	- 4.5	-21	- 9.0,+ 1.3
05	YUNN	0855	0857	0912	1+	- 2.6		
05	LINT	0850	0903	0940D	3+	- 9.2	-36	- 6.5
06	LINT	0500	0503	0522	1-	- 0.3	0	- 1.3
06	LINT	0534	0537	0600	1	- 1.1	- 1	- 1.1
06	YUNN	1054	1059	1100	3	- 7.4		
07	LINT	0520	0528	0550	1-	- 0.4	0	+ 1.9
08	LINT	0200	0204	0230	1-	- 0.5	- 2	- 2.4
08	LINT	0318	0323	0348	1-	- 0.8	- 3	- 3.9
08	YUNN	1039	1044	1100	3+	-13.9		
09	YUNN	0045	0051	0141	2+	- 5.5		
09	LINT	0042	0104	0220D	3+	-14.6	-58	-14.0,+12.3
09	YUNN	0155	0158	0253	1	- 1.7		
09	YUNN	0929	0934	0943	2-	- 3.5		
09	YUNN	0943	0948	0956	2-	- 3.7		
09	YUNN	0956	1003	1036	3-	- 6.8		
10	YUNN	1014	1020	1027	3+	- 8.3		
10	YUNN	1027	1035	1100	3+	-26.5		
12	LINT	0102	0109	0116	1-	- 0.3	0	- 0.9
12	LINT	0605	0611	0700	1	- 1.3	- 8	- 4.1
12	YUNN	0609	0612	0642	1	- 1.3		
13	LINT	0330	0336	0355	1-	- 0.5	0	+ 4.4
13	LINT	0502	0509	0516U	1-	- 0.4	0	- 1.2
13	LINT	0516	0525	0550	1-	- 0.3	- 4	- 1.1
15	LINT	0022	0025	0032	1-	- 0.5	0	+ 2.5
15	YUNN	0955	0957	1002	1	- 1.8		
16	YUNN	0013	0017	0027	1+	- 2.6		

SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

APRIL 1989

Day	Sta	Start (UT)	Max (UT)	End (UT)	Imp	SPA		SFA LF
						LF	VLF	
16	LINT	0206	0208	0230	1-	- 0.4	- 2	+ 4.2
16	LINT	0352	0356	0420	1-	- 0.9	- 5	- 3.1
17	LINT	0330	0334	0352	1-	- 0.5	- 4	- 1.9
18	LINT	0158	0210	0220U	1-	- 0.3	- 8	- 1.5, + 0.4
18	LINT	0248	0254	0324	1-	- 0.3	- 1	- 1.5
18	LINT	0629	0631	0637D	1-	- 0.5	- 3	- 0.6
18	LINT	0637	0641	0700	1-	- 0.8	- 3	- 2.1
19	LINT	0019	0032	0140	2-	- 3.2	- 6	- 6.2
19	LINT	0420	0428	0520	1	- 1.7	-10	- 5.5
19	YUHN	0425	0429	0459	1	- 1.5		
19	LINT	0537	0542	0630	1	- 1.5	- 9	- 4.9
19	YUHN	0542	0544	0624	1-	- 0.8		
20	LINT	2347	0000	0012	1	- 1.5	- 5	- 1.8
20	LINT	0221	0223	0240	1-	- 0.3	- 2	- 1.5
20	LINT	0521	0529	0630	2+	- 5.2	-29	- 8.9, + 4.6
20	YUHN	0524	0531	0643	2-	- 3.8		
20	YUHN	1038	1043	1100	3+	-48.5		
21	YUHN	0439	0446	0536	1+	- 2.8		
21	LINT	0429	0448	0540	2	- 5.0	-26	-11.8, + 3.8
21	LINT	0657	0702	0716	1-	- 0.6	0	- 1.0
21	YUHN	0701	0702	0717	2-	- 3.5		
22	LINT	0108	0111	0126	1-	- 0.5	0	- 1.1
22	LINT	0134	0138	0200D	1+	- 2.2	- 9	- 6.0
22	LINT	0200	0204	0220	1-	- 0.8	- 8	- 2.1
22	LINT	0248	0252	0332D	1	- 1.5	- 7	- 3.8
22	YUHN	0334	0337	0432	1+	- 2.4		
22	LINT	0332	0338	0502	2-	- 3.2	-21	- 3.6, + 3.2
22	LINT	0516	0522	0546D	1+	- 2.6	-12	- 3.5, + 1.9
22	YUHN	0517	0522	0620	1	- 1.9		
22	LINT	0546	0550	0630	1	- 1.5	- 7	+ 3.5
22	LINT	0714	0719	0734	1-	- 0.6	- 4	- 1.1
22	LINT	0826	0830	0850U	1+	- 2.4	-13	- 2.1
22	LINT	2349	2355	0020	2-	- 3.3	- 3	- 3.4
23	LINT	0633	0637	0720	1	- 1.8	-13	- 3.3
23	YUHN	0635	0639	0659	1	- 1.4		
24	LINT	2356	0008	0045D	2+	- 6.0	- 9	- 4.9
24	LINT	0045	0055	0112	3-	- 6.1	- 2	+ 8.0
24	LINT	0336	0340	0348U	1-	- 0.2	0	- 0.5
24	LINT	0348	0355	0428	1-	- 0.3	- 2	- 0.9
24	YUHN	0527	0531	0613	1	- 1.1		
24	LINT	0525	0536	0622D	1+	- 2.5	-11	- 2.7
24	LINT	0622	0628	0724	1+	- 2.2	-13	+ 3.3

SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

APRIL-MAY 1989

Day	Sta	Start (UT)	Max (UT)	End (UT)	Imp	SPA		SFA LF
						LF	VLF	
25	YUNN	1004	1009	1054	3-	- 6.4		
26	LINT	0302	0308	0336	1-	- 0.3	- 2	- 0.6
28	YUNN	0939	0945	0954	2	- 4.8		
28	YUNN	0954	1004	1016	3+	-12.1		
28	YUNN	1016	1023	1044	3+	- 9.9		
28	YUNN	1059	1100	1100	3+	-22.8		
29	LINT	0110	0121	0220	1	- 1.7	0	- 4.4
29	YUNN	1031	1036	1056	3+	-10.3		
30	LINT	0422	0436	0458	1-	- 0.4	0	- 1.2
30	YUNN	0747	0752	0802	1+	- 2.3		
1989,5								
01	LINT	0052	0114	0252D	3+	-10.4	-40	-10.8,+11.0
02	LINT	0115	0120	0130U	1-	- 1.0	- 2	- 1.4
02	LINT	0130	0208	0310	1+	- 2.1	-22	- 1.9,+ 1.2
02	LINT	0313	0318	0333	1-	- 0.6	- 3	+ 0.5
02	LINT	0409	0420	0600	2+	- 5.6	-39	- 2.8,+ 7.3
03	LINT	0325	0358	0604	3+	- 9.3	-88	- 7.7,+12.7
03	YUNN	0506	0511	0554	2-	- 3.1		
03	YUNN	0820	0828	0823	1	- 2.0		
04	LINT	0101	0106	0123	1	- 1.6	- 7	- 3.3
04	LINT	0246	0256	0330D	1+	- 2.9	- 8	- 5.0
04	LINT	0333	0340	0420D	2-	- 3.8	-25	+ 4.6
04	LINT	0418	0424	0520D	2	- 4.8	-54	+16.4
04	LINT	0710	0720	0810	1+	- 2.5	-23	-14.0
04	LINT	0820	0825	0924	3	- 7.2	-46	+ 4.0
05	LINT	0030	0038	0045U	1	- 2.0	- 5	- 2.5
05	LINT	0058	0106	0120	1	- 1.9	- 5	- 1.0
05	LINT	0247	0255	0350	2-	- 3.7	-18	- 4.8,+ 1.8
05	LINT	0409	0415	0446	1	- 1.7	-11	+ 1.8
05	LINT	0527	0533	0634	2	- 4.5	-34	+ 4.4
05	LINT	0723	0736	0909	3+	-12.8	-73	- 4.5,+ 7.2
06	LINT	0110	0123	0150D	1-	- 0.8	- 5	- 3.2
06	LINT	0206	0216	0224	1-	- 0.1	-15	+ 0.7
06	LINT	0250	0256	0316	1-	- 0.3	- 2	- 2.4
06	LINT	0507	0518	0557D	2-	- 3.6	-19	- 4.3,+ 1.2
06	YUNN	0511	0519	0531	1	- 1.6		
06	YUNN	0531	0534	0551	1	- 1.1		
06	LINT	0528	0536	0608	1+	- 2.4	-26	+ 4.4
06	LINT	0844	0852	0908	1	- 1.3	- 9	- 0.6
07	LINT	0004	0020	0112	2-	- 3.1	- 5	- 2.3,+ 0.3

SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

MAY 1989

Day	Sta	Start (UT)	Max (UT)	End (UT)	Imp	SPA		SFA LF
						LF	VLF	
07	LINT	0117	0128	0155	1-	- 0.9	- 4	- 0.5
07	LINT	0319	0327	0338	1-	- 0.3	- 2	- 0.8
07	LINT	0455	0507	0518	1-	- 0.5	- 3	- 2.1
07	LINT	0522	0538	0612D	1	- 1.1	- 7	- 2.0
07	LINT	0550	0600	0625	1-	- 0.6	- 5	- 1.6
07	LINT	0658	0706	0742	1+	- 2.8	-20	- 1.8,+ 1.6
07	LINT	2340	2346	0011	1	- 2.0	- 3	- 3.0
08	LINT	0113	0130	0203D	1	- 2.0	0	- 4.8,+ 0.6
08	LINT	0132	0136	0232D	2-	- 3.8	-17	- 1.3,+ 2.5
08	LINT	0221	0228	0300	1-	- 0.7	-13	+ 8.5
08	LINT	0515	0530	0614	1+	- 2.2	-12	- 5.4
08	LINT	2333	2340	2348	1-	- 0.4	- 2	0
09	YUNN	0504	0508	0538	1	- 1.6		
09	LINT	0454	0508	0550	1+	- 2.4	-14	- 4.4
09	YUNN	0924	0927	0937	2-	- 3.2		
10	LINT	2358	0020	0048U	1-	- 0.2	0	+ 1.3
10	LINT	0027	0032	0100	1+	- 2.2	- 5	- 3.9
10	LINT	0204	0210	0223	1-	- 1.0	- 8	- 4.4
10	LINT	0229	0234	0244	1-	- 0.6	- 3	- 2.0
10	YUNN	0422	0424	0509	1+	- 2.2		
10	LINT	0422	0428	0530	2	- 5.0	-30	- 5.0,+ 6.0
10	YUNN	0939	0943	0952	2-	- 3.9		
11	YUNN	0028	0034	0041	2-	- 3.8		
11	LINT	0023	0036	0113U	1	- 1.9	- 6	- 3.7
11	LINT	0123	0142	0250	1-	- 0.7	- 4	- 2.2
11	LINT	0510	0530	0608D	1-	- 0.9	- 3	- 1.6
11	LINT	0610	0617	0635D	1-	- 0.5	0	+ 1.0
11	LINT	0627	0637	0700	1-	- 1.0	- 9	- 5.0
11	LINT	0751	0758	0830	1+	- 3.0	-22	- 2.3
12	LINT	0720	0729	0742	1-	- 0.7	- 3	- 1.7
12	YUNN	0839	0842	0852	1+	- 3.0		
13	LINT	0016	0024	0040	1-	- 0.6		- 1.7
14	LINT	0000	0020	0035U	1-	- 0.1	0	+ 0.4
14	LINT	0654	0659	0737	1	- 1.6	-15	- 3.9
14	YUNN	0659	0704	0709	1	- 1.3		
15	LINT	0045	0100	0115U	1-	- 0.5	0	+ 0.2
15	LINT	0534	0538	0614	1	- 1.6	-15	- 2.9
15	YUNN	0534	0538	0613	1	- 1.9		
16	LINT	0314	0330	0349U	1-	- 0.2	0	- 1.4
18	LINT	0136	0144	0156U	1-	- 0.2	- 6	- 0.3
20	LINT	0231	0258	0333	1-	- 0.2	- 3	- 2.7
20	LINT	0434	0438	0502		- 0.6	- 4	

SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

MAY 1989

Day	Sta	Start (UT)	Max (UT)	End (UT)	Imp	SPA		SFA LF
						LF	VLF	
20	LINT	0922	0925	0949	1	- 1.4	- 8	- 2.2
21	LINT	0010	0020	0037	1-	- 0.1	- 9	+ 0.8
21	LINT	0319	0328	0359	1-	- 1.0	- 6	- 3.9
21	LINT	0637	0644	0728	1	- 1.9	-24	- 8.0
21	YUNN	0640	0646	0721	1+	- 2.1		
22	YUNN	0020	0032	0142	2+	- 5.8		
22	LINT	0006	0036	0230	3	- 7.8	-32	- 1.5,+ 7.0
22	YUNN	0428	0433	0518	1	- 1.8		
22	LINT	0428	0439	0516	1+	- 2.7	-16	- 1.7,+ 0.6
22	LINT	0546	0549	0558D	1-	- 0.7	- 3	+ 1.1
22	YUNN	0601	0605	0635	1	- 1.3		
22	LINT	0602	0606	0650	1+	- 2.1	-18	+ 1.3
22	LINT	0753	0758	0819	1-	- 0.8	-10	- 1.0
23	LINT	0003	0011	0028	1-	- 0.9		- 0.6
23	LINT	0049	0055	0109U	1-	- 0.2	- 2	+ 0.7
23	LINT	0126	0133	0145D	1-	- 0.3	- 4	- 1.3
23	LINT	0145	0148	0256	3-	- 7.0	-26	- 3.9,+ 5.6
23	YUNN	0145	0150	0240	2	- 4.4		
23	YUNN	0304	0313	0343	1+	- 2.1		
23	LINT	0305	0330	0420	1+	- 2.9	- 9	+ 3.1
23	YUNN	0447	0454	0529	1	- 1.8		
23	LINT	0442	0455		2-	- 3.2	-24	- 2.3,+ 4.6
23	YUNN	0711	0715	0745	1	- 1.3		
23	YUNN	0802	0806	0836	1	- 1.6		
23	YUNN	1001	1005	1040	2-	- 4.0		
24	LINT	0007	0037	0100D	1-	- 0.9	- 5	+ 4.5
24	LINT	0108	0120	0136	1-	- 0.2	- 3	- 0.1
24	LINT	0142	0157	0208	1-	- 0.4	- 5	+ 3.0
24	LINT	0216	0234	0300	1-	- 1.0	- 8	- 1.4,+ 6.2
24	LINT	2321	2328	2338	1-	- 0.8	- 2	- 0.6
25	LINT	0009	0013	0029	1-	- 0.6	- 4	+ 0.7
25	LINT	0508	0516	0528D	1-	- 0.8	- 6	- 0.5
25	LINT	0527	0537	0606	1	- 1.6	-16	+ 1.3
25	LINT	2321	2322	2356D	1	- 1.4	- 3	- 1.4
26	LINT	0023	0038	0054	1-	- 0.4	- 3	- 2.0
26	LINT	0100	0118	0135	1-	- 0.3	- 4	+ 2.6
26	LINT	0352	0356	0412	1-	- 0.6	- 3	- 1.4
26	LINT	0557	0600	0612	1-	- 0.7	- 4	- 1.3
27	LINT	0456	0508	0534	1-	- 0.6	- 3	- 2.3
28	LINT	0729	0735	0750	1-	- 0.6	- 7	- 0.6
28	YUNN	0910	0915	0922	1+	- 3.0		
28	YUNN	1041	1051	1100	3+	-13.8		

SUDDEN IONOSPHERIC DISTURBANCES (D REGION)

MAY 1989

Day	Sta	Start (UT)	Max (UT)	End (UT)	Imp	SPA		SFA LF
						LF	VLF	
29	LINT	0022	0038	0120	1	- 1.5	- 8	+ 1.9
29	LINT	0220	0224	0245U	1-	- 0.3	- 4	- 1.0
29	LINT	0246	0253	0328D	2	- 4.4	-25	- 3.1,+ 3.3
29	YUHN	0248	0254	0329	2-	- 3.9		
29	LINT	0328	0333	0415D	1+	- 3.0	-35	+16.7
29	LINT	0418	0433	0510	1	- 1.3	-27	+ 7.3
30	LINT	0028	0047	0108U	1	- 1.4	- 3	- 3.2
30	LINT	0104	0110	0250	3+	- 8.3	-34	- 8.0,+11.9
30	LINT	0331	0343	0416	1-	- 1.0	- 5	- 1.6
30	LINT	0428	0434	0450	1-	- 0.6	- 2	- 1.1
30	LINT	0520	0524	0527	1-	- 0.3	0	- 0.9
30	LINT	0531	0538	0552	1-	- 0.3	- 4	- 0.9
30	YUHN	0713	0720	0805	2+	- 6.0		
30	LINT	0714	0722	0844D	3+	- 8.2	-53	-10.6,+14.4
31	LINT	0018	0033	0154	3-	- 6.8	-16	- 2.9,+ 3.2
31	YUHN	0023	0033	0118	2+	- 5.8		
31	LINT	0403	0410	0430	1-	- 0.2		- 1.1

GEOMAGNETIC ACTIVITY INDICES K AND A_K

APRIL 1989

BGMO

Three-Hourly Indices K

Day	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24	Sum	A _K
1 D	4	4	4	3	3	4	3	3	28	21
2	3	4	2	4	4	3	3	2	25	18
3	2	2	2	2	3	3	4	2	20	12
4 D	3	3	5	5	4	4	4	3	31	28
5 D	3	3	5	3	4	2	3	3	26	20
6	3	2	2	2	2	2	3	2	18	9
7	1	2	3	3	4	4	4	2	23	16
8	2	2	3	3	4	3	2	1	20	12
9	3	2	2	2	1	2	3	1	16	8
10 Q	1	1	1	1	2	2	2	1	11	5
11	1	1	2	1	4	5	3	2	19	14
12 Q	2	3	3	1	1	1	1	1	13	7
13	1	3	3	3	3	1	4	3	21	14
14	2	3	3	3	3	5	5	4	28	24
15	3	4	2	3	2	3	2	1	20	12
16	0	1	2	0	2	4	3	5	17	13
17	2	0	0	1	1	2	1	2	9	4
18	2	2	2	1	2	1	0	1	11	5
19 Q	1	0	1	2	2	2	2	2	12	5
20	1	2	2	1	1	1	2	2	12	5
21 Q	0	2	3	1	2	3	2	1	14	7
22 Q	3	2	1	1	2	2	2	1	14	7
23	2	1	3	2	5	3	5	2	23	19
24	1	1	1	3	3	3	2	1	15	8
25	2	2	3	4	4	5	6	6	32	36
26 D	5	5	5	5	3	5	3	5	36	40
27 D	4	5	4	3	4	4	4	3	31	27
28	3	3	3	3	4	4	3	3	26	18
29	1	3	4	4	3	3	2	2	22	15
30	2	2	3	3	2	3	3	1	19	11
									Sum	440
									Mean	14.7

GEOMAGNETIC ACTIVITY INDICES K AND A_K

MAY 1989

BGMO

Three-Hourly Indices K

Day	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24	Sum	A _K
1	1	1	1	2	1	3	2	1	12	6
2	2	3	2	3	2	3	4	2	21	13
3	2	3	2	2	2	1	2	2	16	8
4	3	2	1	2	2	4	3	3	20	12
5 D	6	4	5	4	3	2	2	3	29	28
6	1	2	2	3	2	2	3	3	18	10
7 D	0	6	5	5	5	4	4	3	32	37
8 Q	0	1	2	2	1	1	2	0	9	4
9 Q	0	0	2	1	2	1	1	1	8	3
10 Q	1	1	1	1	0	0	1	1	6	2
11 Q	1	0	2	1	1	2	2	3	12	6
12	3	4	3	3	2	2	2	2	21	13
13	1	1	3	3	4	4	2	0	18	12
14	3	3	2	2	1	3	2	1	17	9
15	1	1	3	3	2	1	2	3	16	9
16	1	2	1	2	1	2	2	1	12	5
17	2	2	3	2	2	1	1	1	14	7
18	1	2	2	1	3	2	1	1	13	6
19 Q	1	1	1	1	2	2	1	0	9	4
20	0	2	2	6	5	4	1	0	20	22
21	2	3	4	3	2	2	2	0	18	11
22	1	1	2	3	3	3	3	3	19	11
23 D	2	3	1	3	6	7	4	3	29	38
24 D	3	4	4	4	5	5	3	3	31	28
25 D	3	3	3	2	4	3	3	2	23	15
26	1	2	2	3	3	4	1	3	19	12
27	1	3	3	3	3	1	2	2	18	10
28	2	2	2	3	3	3	2	2	19	10
29	2	3	3	4	3	2	3	2	22	14
30	2	2	2	2	2	1	2	1	14	6
31	1	2	3	2	2	2	3	1	16	8
									Sum	379
									Mean	12.2

MAGNETIC STORMS

APRIL - MAY 1989

BGMO

Time of Magnetic				Sudden Com.			Deg.	Maximum Acti.			Maximum			
Beginning		Ending		Type	Amplitude			of	on K-scale			Range		
Day	h	m	Day		h	D'	HnT		ZnT	Day	Int.	Index	D'	HnT
3hour k														

APRIL 1989

25	10	17	28	23	SC *	0.8	20	0	ms	25	7	6	4.9	199	42
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MAY 1989

04	23	51	05	18	SC	5.4	19	-1	ms	05	1	6	9.9	139	43
07	05	12	07	22	SC	0.9	82	4	ms	07	2	6	3.6	195	36
20	09	57	20	19	SC	0.6	17	1	ms	20	4	6	3.5	98	5
23	13	46	25	09	SC	4.6	103	4	ms	23	6	7	3.1	268	45

一个耀斑冲浪事件的观测

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1988年4月15日 03:06 — 03:20 (UT) 我们利用紫金山天文台多波段太阳光谱仪的缝前导行装置^[1,2] 拍摄到一组耀斑冲浪快速变化的 H_{α} 单色光照片。这个耀斑冲浪发生在编号为 NOAA / USAF №. 4990 活动区内, 具有亮冲浪的特征。它从开始发生到结束仅仅持续了十几分钟, 当它消失以后, 两股暗的冲浪立即出现。

这个耀斑发生在黑子群的后随黑子附近, 它的日面位置大约是 N26 E52。这一光学事件未被列入 S.G.D. 的综合报告中。在 S.G.D. 的综合报告中发表了发生在4月15日的太阳 X 射线事件, 其中有一个 C1.9 级 X 射线事件, 发生的时间为世界时 03:06 — 03:19, 但未给出对应的耀斑, 我们观测到的耀斑冲浪正是这个 X 射线事件对应的光学耀斑。根据面积估计, 耀斑的级别约为 1 级。它的一系列 H_{α} 单色光照片给在图 1 中, 从图中可见它具有喷射的特征和扭绞的结构。

参考文献

[1] 太阳望远镜研制组: 天文学报, 16 (1975), №. 2, 225

[2] 尤建圻, 孙如琪, 李挺: 紫金山天文台台刊, 5 (1986), №. 2, 79

THE OBSERVATION ON A FLARE SURGE EVENT

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(Received July 10, 1989)

Using the slit-jaw system attached to the multiple wavelength solar spectrograph at Purple Mountain Observatory ^[1,2], we have photographed a set of H_{α} chromospheric photographs of a flare surge from 0306 to 0320 UT on April 15, 1988. The flare surge occurred in active region NOAA/USAF No. 4990 and seemed to be a bright surge. The dark surge appeared after the flare surge disappearing.

The flare occurred near by following sunspots of sunspot group. Its location was about N26 E52. The event has not been included in flare list of S.G.D. Comprehensive Reports.

We think that the flare surge observed here was just associated with the C 1.9 X-ray event occurred from 0306 to 0319 UT listed in Comprehensive Reports of S.G.D.. The importance of the H_{α} flare is about importance 1. Its H_{α} photographs are shown in Figure 1, where the twisted structure can be seen.

References

- [1] The Solar Telescope Research and Production Group: ACTA Astronomica Sinica 16 (1975) No. 2, 225
- [2] You Jianqi, Sun Ruqi and Li Ting: Publication of Purple Mountain Observatory 5 (1986) No. 2, 79

Figure 1. H_{α} filtergrams of the flare surge on April 15, 1988

031602 UT



031134 UT



024013 UT



032248 UT



031502 UT



030938 UT



1989年7月9日发生在AR 5572 中的3B级耀斑

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1989年7月9日,在AR 5572中发生了一个3B/M5.1级耀斑。北京天文台怀柔太阳观测站获得了该活动区耀斑前后的矢量磁场图、 H_p 单色象及 H_p 视向速度图。现将初步分析结果报告于下:

1. 该活动区黑子分型为DAO, 磁场分型为B(偶极群)。磁轴与赤道成 $65^\circ - 70^\circ$ 角, 属异常磁结构⁽¹⁾。贯穿黑子群的极性分界线呈复杂的S形(见图1)。

2. 没有观测到耀斑的FeI 5324Å的发射, 有很强的 H_p 发射。耀斑在0115时有许多亮块, 在极大(0125)前双带已形成(见图2)。双带以每秒11公里的速度分离, 耀斑结束(0220)前双带的分离运动停止。

3. 图1a—1d为耀斑前后的矢量磁图(横场迭加在纵场之上)。纵场以等强线表示, 虚线表示负级, 实线表示正极, 等强线由外向里分别为20、40、80、160、320、640、960、1280、1600 G; 横场用不同长度和取向的线段表示, 横场强度50 G以上者均画入图中。耀斑前(见图1b), 横场与纵场的极性分界线($H_{||} = 0$)形成锐角, 显示了强烈的磁剪切位形^(2,3); 而在耀斑之后(见图1c), 横场在 $H_{||} = 0$ 线上明显减小; 在0608时, 磁剪切又有发展(见图1d), 该处又出现新的亚耀斑。在黑子群的前导黑子上, 横场强达300 G, 无磁剪切(见图1b), 故而未见耀斑。故磁剪切可能是耀斑发生的敏感指示器。当负极磁结构N1向正极靠拢, 纵场梯度($\nabla H_{||}$)达每公里为0.2 G时, 磁场对消发生了⁽⁴⁾。但耀斑前后纵场梯度并无突然的变化。

由S.G.D.周报得知⁽⁵⁾, 该耀斑有M5.1级的X射线发射(1—8Å), 并有强的II型射电爆发。

本工作得到国家自然科学基金的资助。作者对北台怀柔磁场组的支持与帮助深表感谢。

(文献见英文稿)

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THE 3B FLARE ON JULY 9, 1989 IN AR 5572

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(Received August 1, 1989)

A 3B/M5.1 flare occurred on July 9, 1989 in AR 5572. The vector magnetograms (at FeI 5324 Å), H_β filtergrams and H_β dopplergrams of AR 5572 were obtained at Huairou Solar Observing Station of Beijing Astronomical Observatory. The preliminary analyses are reported as follows.

1. This active region was characterized as DAO spot classification and β magnetic classification. As the magnetic axis inclined with the equator by $65^\circ \sim 70^\circ$, the magnetic configuration was considered as abnormal.^[1] The polarity inverse line in the following part of the region was shaped as a complex "S" (Fig.1).

2. There was no emission at FeI 5324 Å during the flare, but strong H_β emission was seen. Two ribbons built up before the flare maximum (see Fig.2). The separation velocity of two ribbons was 11 km/s. The separation was stopped several minutes before the end of the flare (0220 UT).

3. Fig. 1a to 1d are vector magnetograms obtained (longitudinal field with the superposition of transverse field) before and after the flare. The longitudinal fields are showed by iso-gauss contours. The solid lines represent the positive polarity, the dashed lines are for the negative polarity. The strength and the direction of the transverse fields are shown by the line segments. Only strength higher than 50 G are presented in the figures. Magnetic shear was evidenced by sharp angle between the transverse field alignment and the polarity inverse line.^[2,3] The obvious decay of the transverse fields at the polarity inverse line was observed after the flare. The magnetic shear developed again before a subflare occurrence at 0608 UT. The transverse magnetic fields were very strong (300G) upon the leading sunspot, but no magnetic shear could be observed, and the flare did not occur at that site. Therefore the magnetic shear appears to be a sensitive indicator for flare occurrence. When the negative flux concentration N1 collided with the positive one and the gradient between them became as high as 0.2 G/km, the cancellation of magnetic flux has been identified.^[4] But sudden changes of the magnetic gradient has not been observed.

A M5.1 soft X-ray ($1 \sim 8$ Å) flare and strong type II radio emission are observed elsewhere during this flare.^[5]

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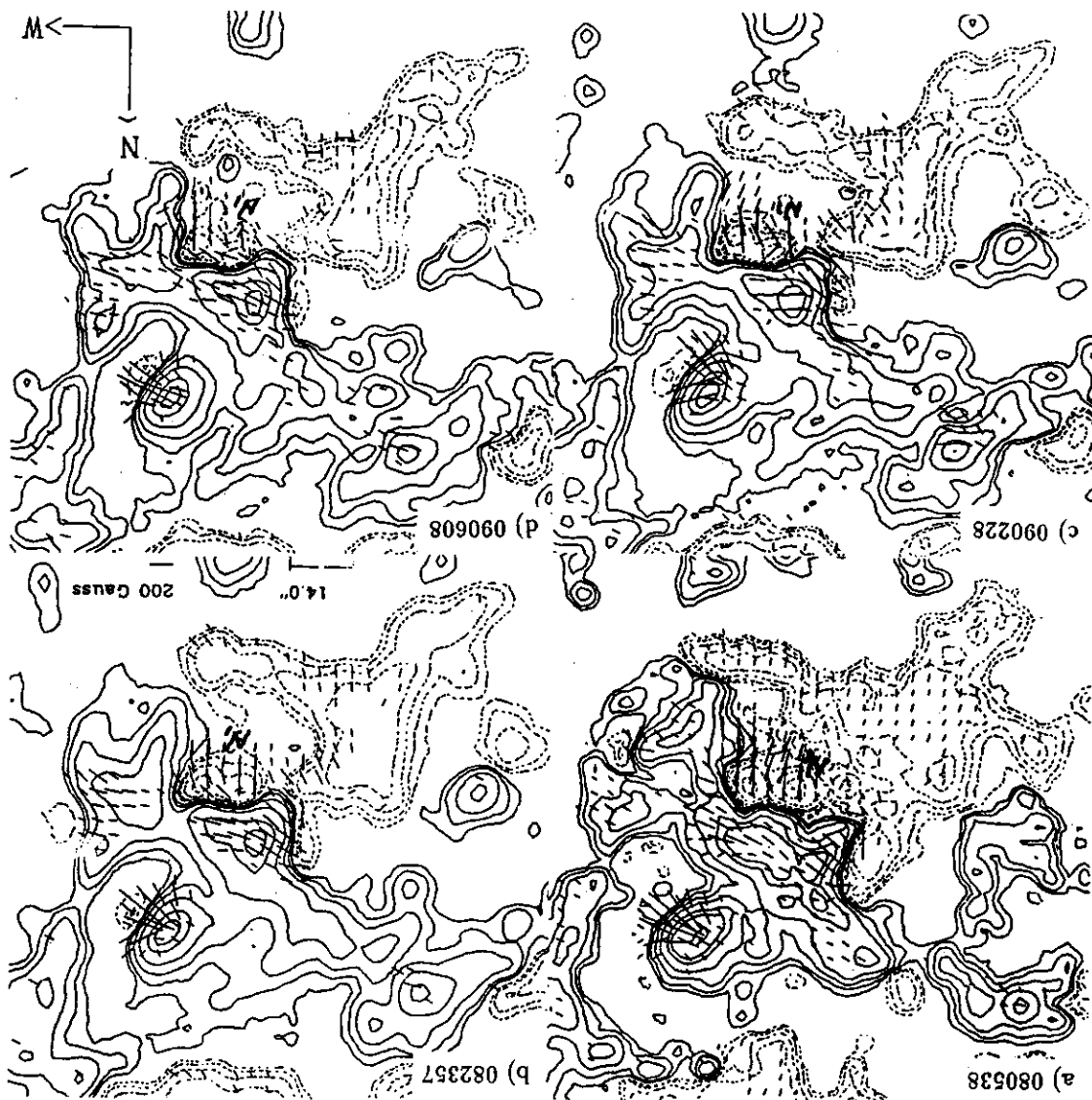


Fig.1 Vector magnetograms before and after the flare

Levels (longitudinal field): 20,40,80,160,320,640,960,1280,1600G

Fig.2 Isophote maps of the $H\beta$ flare

