

# Solar Bulletin

THE AMERICAN ASSOCIATION OF VARIABLE STAR OBSERVERS - SOLAR DIVISION

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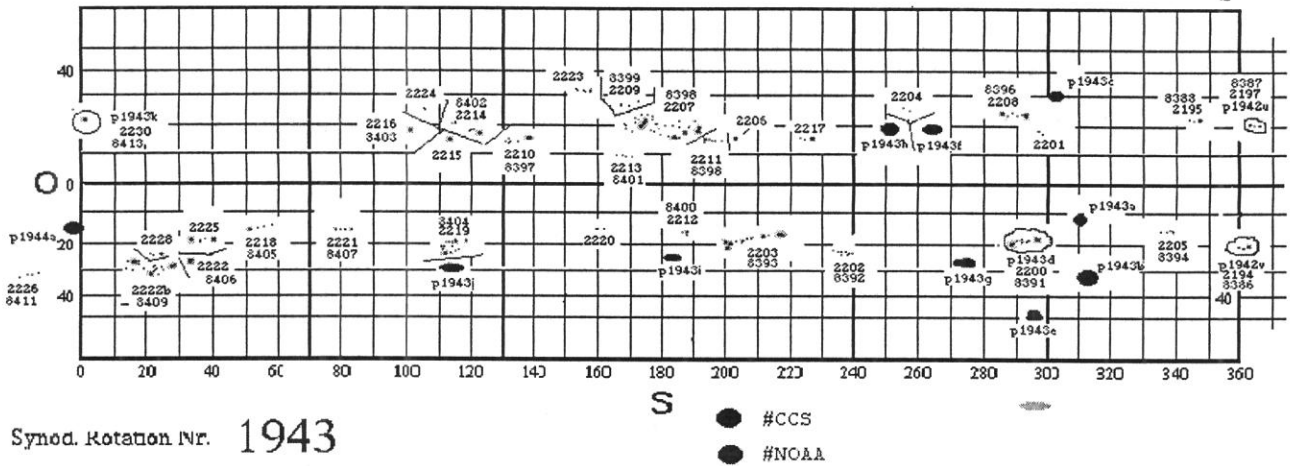
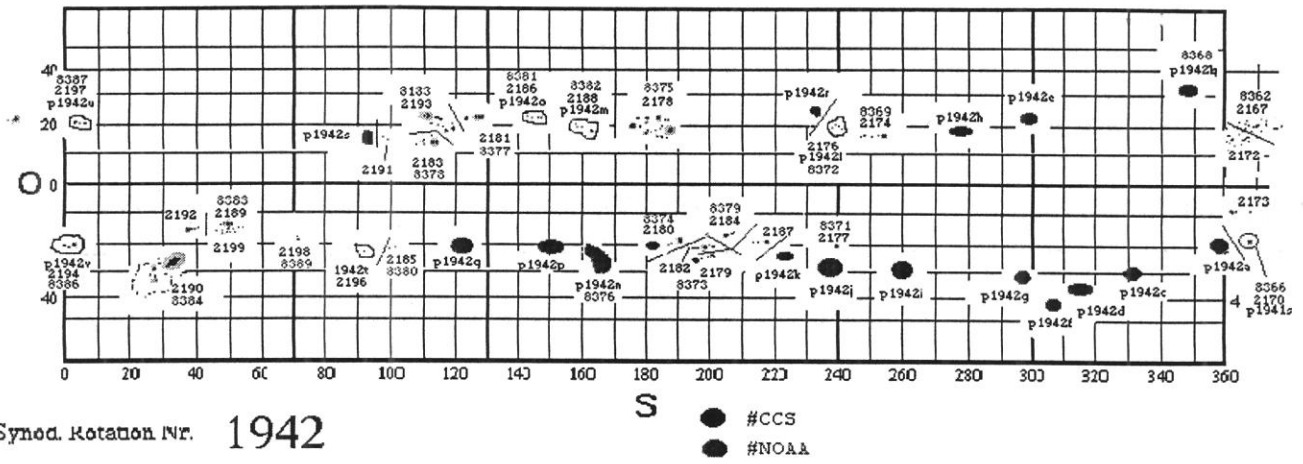
January 1999

Daily Mean Sunspot Numbers,  $R_a$  for January 1999  
(computational analysis performed by Grant Foster, AAVSO Headquarters)  
simple average    k-corrected

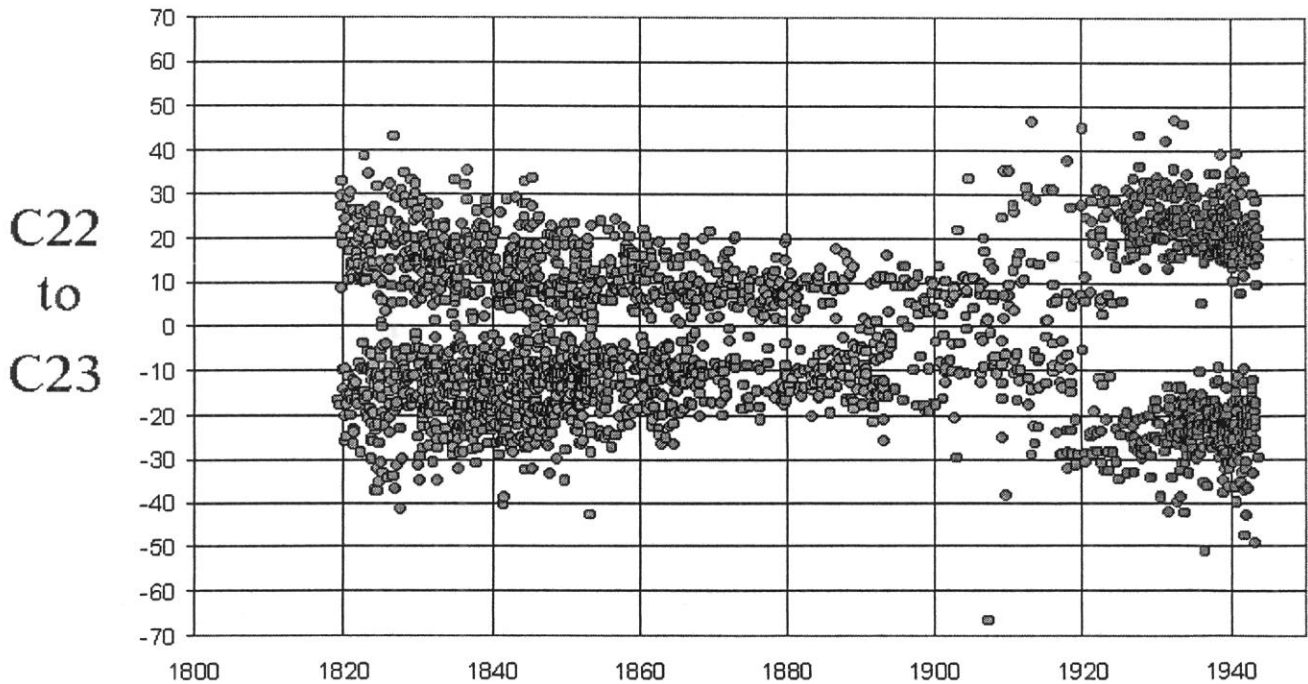
Day	$R_a$ avg	Std. Dev.		$R_a$ k	Std. Dev.
1	77	7.7		64	5.4
2	83	6.1		61	3.7
3	70	4.4		58	2.4
4	78	3.5		67	2.8
5	70	4.0		59	2.6
6	56	3.7		47	2.5
7	66	5.5		54	3.5
8	61	6.3		55	4.0
9	55	3.6		48	2.0
10	52	3.2		45	1.5
11	31	3.0		26	2.2
12	40	2.9		31	1.9
13	57	1.9		48	1.9
14	82	4.5		68	2.0
15	100	7.4		79	4.1
16	107	8.1		86	4.6
17	120	6.9		101	3.7
18	109	6.4		98	4.9
19	134	9.1		118	6.1
20	134	8.7		118	4.7
21	120	10.4		108	6.1
22	112	10.1		94	5.9
23	102	7.2		79	4.0
24	68	4.2		57	3.6
25	34	4.0		26	2.8
26	27	2.4		22	1.4
27	35	3.5		31	2.2
28	30	4.9		27	3.1
29	31	3.8		21	2.3
30	29	1.4		26	1.2
31	28	2.1		27	1.4

Monthly Mean  $R_a$  avg = 70.9  
Monthly Mean  $R_a$  k = 59.6

Observer	Code	Days Obs.
Abbott, P	AAP	3
Anderson, E	ANDE	5
Atkinson, G	ATKG	6
Barnes, H	BARH	11
Barton, W	BARW	2
Battaiola, R	BATR	4
Black, B	BLAB	6
Blackwell, J	BLAJ	13
Boschat, M	BMF	13
Bose, B	BOSB	30
Branch, R	BRAR	19
Branchett, B	BRAB	26
Carlson, J	CARJ	16
Chavez, G	CHAG	20
Clemens, C	CLEC	24
Conlin, G	CONG	2
Cragg, T	CR	29
Cudnik, B	CKB	18
Dempsey, F	DEMF	4
Dragesco, J	DRAJ	18
Dyck, G	DGP	18
Eleizalde, G	ELEG	28
Ellerbe, J	ELLJ	8
Feehrer, C	FEEC	9
Fernandez, J	FERJ	19
Fleming, A	FLEN	6
Giovanoni, R	GIOR	18
Gottschalk, S	GOTS	13
Hay, K	HAYK	9
Hrutkay, T	HRUT	9
Ibanez, J	IBAJ	18
Janssens, J	JANJ	9
Kaplan, J	KAPJ	13
Knight, J	KNJS	22
Lawrence, J	LAWJ	10
Leventhal, M	LEVM	18
Lizak, T	LIZT	18
Lopriore, J	LGN	7
Malde, K	MALK	14
Maranon, J	MARJ	27
Mariani, E	MARE	6
McHenry, L	MCHL	4
Miller, J	MILJ	6
Mochizuki, E	MCE	26
Moeller, M	MMI	16
Mudry, G	MUDG	2
Parker, N	PARN	16
Randall, T	RANT	3
Richardson, E	RICE	11
Scholl, G	SCHG	13
Schott, G	SCGL	16
Simpson, C	SIMC	5
Stefanopoulos, G	STEF	1
Stemmler, G	STEM	19
Takuma, H	TAKH	27
Teske, D	TESD	16
Thompson, R	THR	7
Vardaxoglou, P	VARP	14
Vargas, G	VARG	14
Vazquez, C	VAZC	20
Watts, K	WKW	2
Wilson, W	WILW	9
Witkowski, L	WITL	19
Yesilyaprak, H	YESH	15



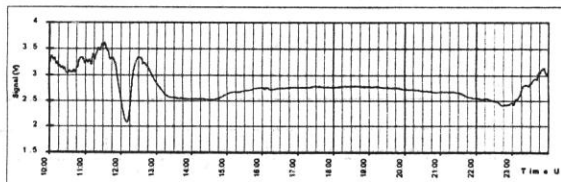
Synoptic maps during CR 1942 and 1943



Butterfly diagram including 2250 groups observed during solar cycle 22 and 23  
Diagrams provided by Gontran Eleizalde - ELEG from Venezuela  
using a 3" f/16 alt-azimuth refractor

# Sudden Ionospheric Disturbance Report

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## Sudden Ionospheric Disturbances (SID) Recorded During January 1999

(correlation analysis performed by Joseph Lawrence, SID Analyst)

Date	Max	Imp	Date	Max	Imp	Date	Max	Imp	Date	Max	Imp
990101	1405	2	990114	1904	2+	990117	1117	1-	990120	1930	3+
990103	1510	2+	990115	0140	1-	990117	1616	1	990122	0540	1
990103	1907	2	990115	0301	1	990117	1702	1+	990122	0707	1
990103	1950	1+	990115	0530	1-	990117	1834	2	990122	1330	1+
990104	0835	1-	990115	0609	1+	990117	1954	2	990122	1722	2+
990108	1025	2+	990115	0643	3	990118	0730	1-	990123	1355	1
990112	1156	2	990115	1445	1+	990118	0740	1-	990123	1513	1
990113	0610	1-	990115	1912	2	990118	0800	2+	990123	1539	2
990113	0725	1-	990115	2000	2+	990118	0940	1-	990123	1915	1
990113	1433	1-	990116	0804	1	990118	1240	1+	990123	2131	1
990113	1507	2	990116	0904	1-	990118	1314	1	990123	2354	1+
990113	1540	1-	990116	0926	1	990118	1520	1+	990124	0500	2
990113	1858	2+	990116	1209	2	990118	1904	2	990124	0820	2
990113	2015	1	990116	1305	1+	990119	0135	1+	990124	1235	1
990114	0910	1	990116	1442	1	990119	0507	1	990125	0100	2+
990114	1017	2+	990116	1642	1+	990119	0807	1	990125	0746	2+
990114	1350	1-	990116	1750	2+	990119	1409	1	990126	1155	2
990114	1545	1	990116	1909	1+	990119	2025	1+	990126	1846	2
990114	1555	2	990116	1957	2	990119	2245	2	990127	1650	2+
990114	1656	1-	990117	0524	1	990120	1420	1	990129	1455	1

- The events listed above meet at least one of the following criteria:
- 1) reported in at least two observers' reports.
  - 2) visually analyzed with definiteness rating = 5 on submitted charts
  - 3) reported by overseas observers with high definiteness rating

Observer	Code	Station(s) Monitored
Parker, N	A-40	NAA
Winkler, J	A-50	NAA, NPM
Overbeek, D	A-52	NAA, NSW, NPM
Toldo, D	A-52	NAA, NSW, NPM
Stokes, A	A-62	NAA
Ellerbe, J	A-63	ICV
Witkowski, L	A-72	NAA
King, P	A-80	FTA
Lawrence, J	A-82	NAA
Moos, W	A-84	ICV
Mandaville, J	A-90	NAA, NPM

Importance	Duration (min)
1-	< 19
1	19 - 25
1+	26 - 32
2	33 - 45
2+	46 - 85
3	86 - 125
3+	> 125

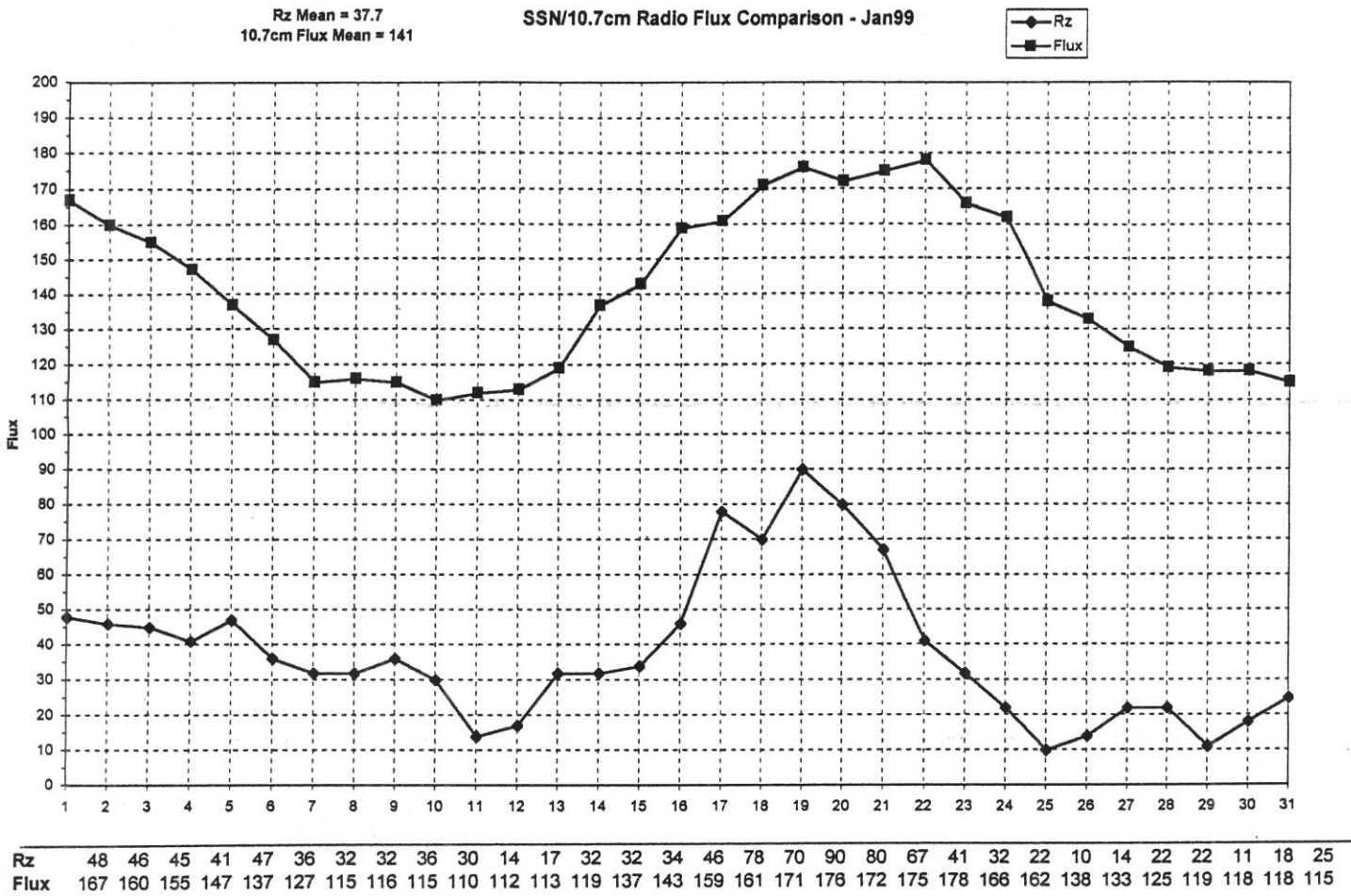
**Editor's Note:** A review of the *Solar Bulletin* distribution list has identified many former observers/contributors which have not submitted reports for many months. It is the policy of the AAVSO Solar Division to provide all contributing observers a monthly copy of the *Solar Bulletin*. Several solar research institutions, professional scientists, and observers allied with solar observing groups who share reports with the AAVSO also receive complimentary issues of the *Solar Bulletin*. In an effort to minimize publication expenses, observers who have not contributed reports for the past year will be removed from the distribution list and this issue will be their last and only notice.

**Note to Observers:** All observers are reminded to send their monthly reports directly to Joseph Lawrence, Solar Division Chairman, as early as possible each month. Only observer reports received by the 10th of the month will be included in the relative sunspot count computation. Reports received after the 10th will be archived in the sunspot database. Please write legibly and carefully review your reports for inaccuracies and omissions. Most notably, a handful of sunspot reports were received in January which omitted the universal time of observation and numerous Wolf number computation mistakes were identified during data entry.

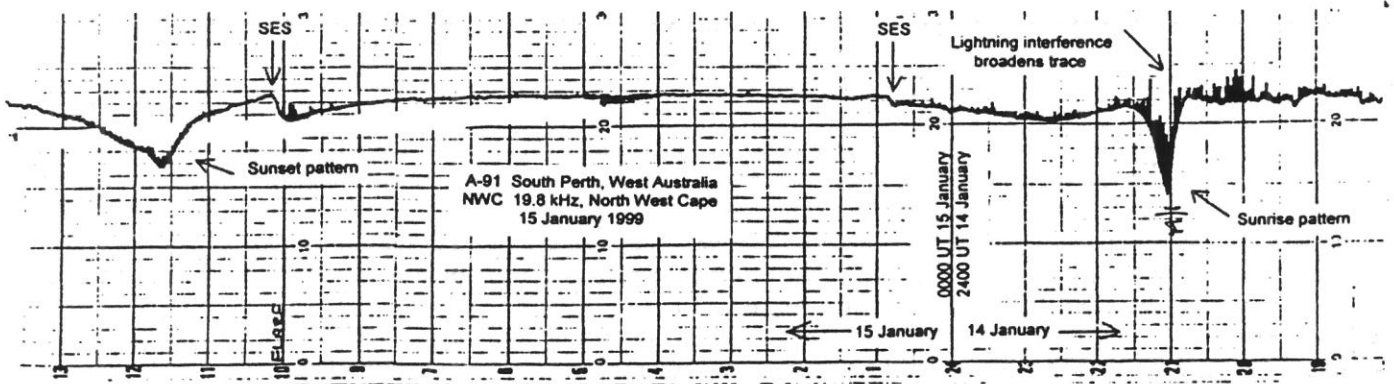
Joseph D. Lawrence, Chairman  
 AAVSO Solar Division

# Sudden Ionosphere Disturbances Recorded during January

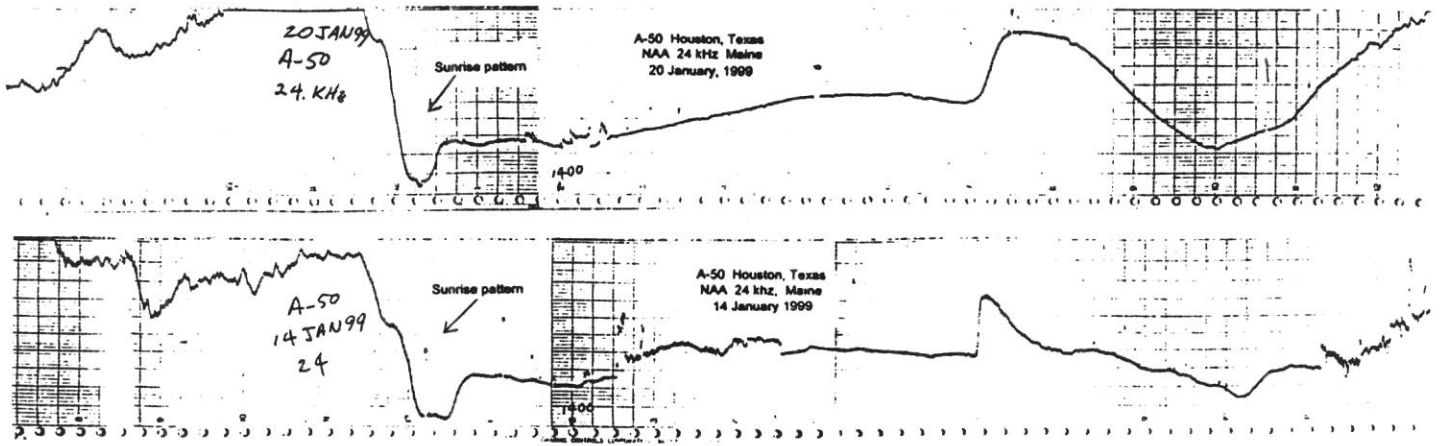
Prepared by  
Casper H. Hossfield



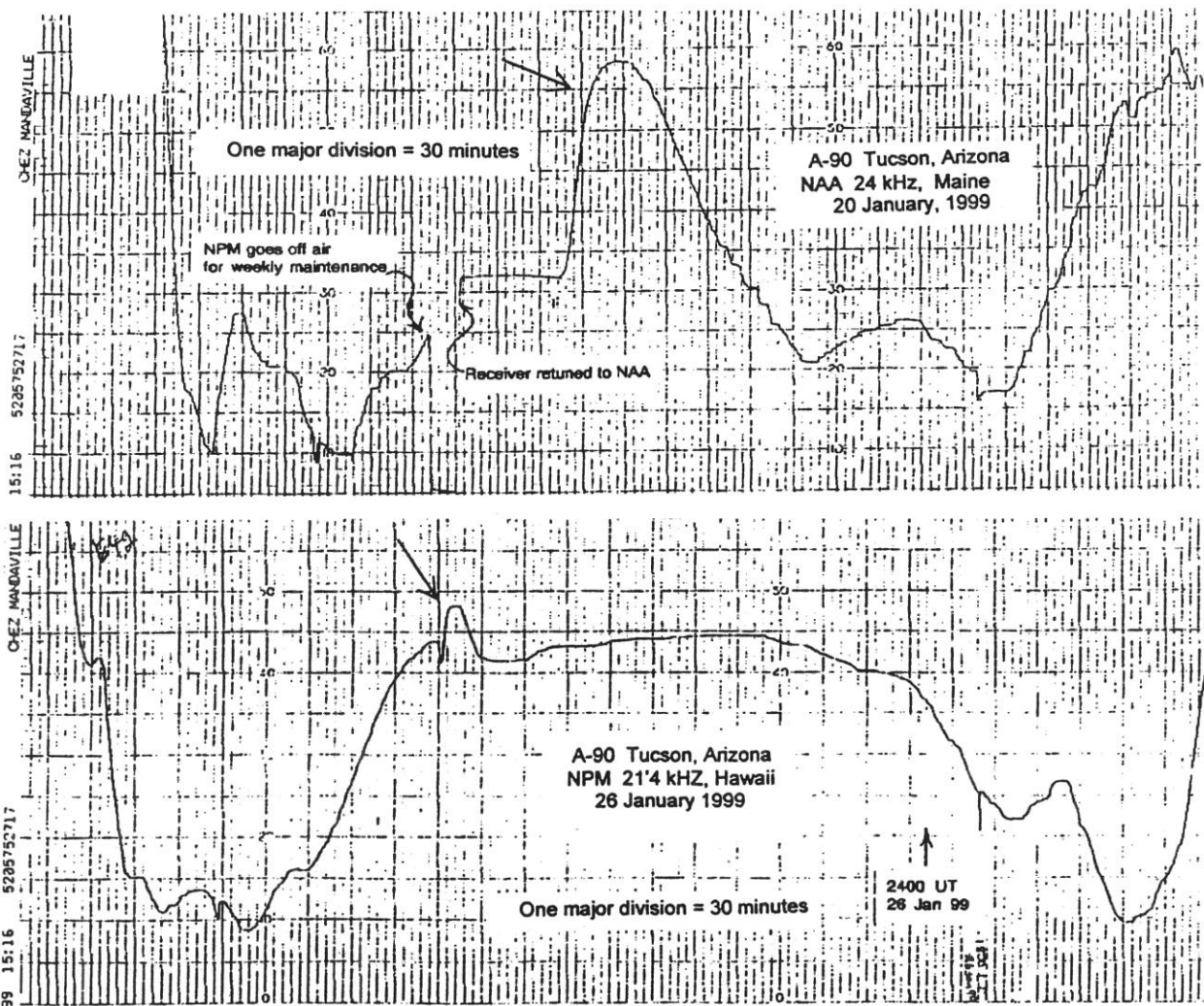
The graph above shows 10.7 cm flux plotted against Zurich sunspot numbers computed from observations of seven AAVSO sunspot observers who count according to the Zurich system. The Zurich reduction formula was used to reduce their counts to true Zurich Relative Sunspot Numbers, RZ. AAVSO Sunspot observer, Tom Lizak, prepared the graph



Len Anderson, A-91, made the above recording of two SIDs. Notice that his chart reads from right to left unlike the others. Being in West Australia he can record SIDs in the early Universal Time day that other AAVSO observers cannot detect because their propagation paths are in darkness Thanks to his recordings AAVSO now has 24-hour coverage. His station is located about 1000km south of the NWC transmitter in Northwest Cape. Last month he recorded inverted SIDs but this month they are normal enhancements of the signal.



Two charts above are by Jerry Winkler, A-50. The top chart shows an unusually large SES that lasts for three hours. The 30-minute rise to maximum is also unusual. Most SESs rise to maximum in about 3 minutes like A-50's second chart that shows an event of equal intensity that lasts only about 45 minutes. Below is a recording of the same 3-hour SID as recorded by Jim Mandaville, A-90 who normally records NPM in Hawaii. He had switched to NAA because NPM was off the air for maintenance that day. His chart also shows the event lasting 3 hours and taking 30 minutes to rise to maximum.



Another chart by A-90 shows an interesting SID on 26 January soon after the sunrise pattern ended. The rise to maximum starts out inverted but after about one minute it reverses and rises to maximum in an additional 4 minutes. It is a short duration SID that ends 30 minutes after it started. A-90 has been recording NPM since last summer and the SESs have been normal enhancements. January was the first month partially inverted SIDs were found. This is surprising considering the long propagation path from Arizona to Hawaii. Inversions are usually found on short paths.