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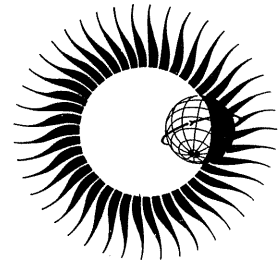
REPORT UAG-3

OBSERVATION OF JUPITER'S SPORADIC RADIO EMISSION IN THE RANGE 7.6-41 MHz 6 JULY 1966 THROUGH 8 SEPTEMBER 1968



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WORLD DATA CENTER A

Upper Atmosphere Geophysics

REPORT UAG-3

OBSERVATIONS OF JUPITER'S SPORADIC RADIO EMISSION IN THE RANGE 7.6-41 MHz 6 JULY 1966 THROUGH 8 SEPTEMBER 1968

by

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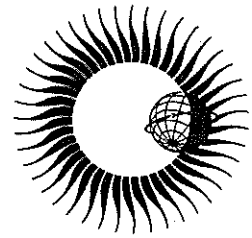

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OBSERVATIONS OF JUPITER'S SPORADIC RADIO EMISSION IN THE RANGE 7.6-41 MHz, 6 JULY 1966 THROUGH 8 SEPTEMBER 1968

This report extends the list of Jupiter decametric emissions through the Jupiter apparition of 1968. (There was no apparition of 1966 because oppositions were on 20 December 1965 and 10 January 1967). The data were recorded on the University of Colorado's Boulder spectograph (formerly belonging to the High Altitude Observatory). Previous reports (Warwick, J. W. and Kreiss, W. T., IGY Solar Activity Report Number 28, 2 November 1964; Warwick, J. W. and Dulk, G. A., IGY Solar Activity Report Number 32, 16 August 1965; and Warwick, J. W. and Dulk, G. A., IGY Solar Activity Report Number 34, 1 November 1966, published by the IGY World Data Center A at High Altitude Observatory, Boulder, Colorado 80302) listed the Jupiter emissions from 1960 through 5 July 1966.

We described the observing equipment and the data format in the previous reports. The present report uses the same scheme. The observing periods from 6 July to 6 August 1966, from 11 July to 10 September 1967, and from 9 August to 8 September 1968 represent times when the antennas were tracking the sun. Jupiter was within 30° of the sun and therefore in the antenna beam. Observing periods and emission intervals which spanned 00^h UT are shown with negative times or times greater than 24^h; for example, the period from 1 January 2315 UT to 2 January 0103 UT may be designated: 1 January 2315 to 2503 or alternately, 2 January -0045 to 0103.

The overall emission probability for 1967 was 0.071, for 1968 it was .044; these compare to the average emission probability of 0.077 for the apparitions of 1961 through 1968. Figure 1 is a histogram of emission probability vs. longitude of the central meridian (System III 1957.0, denoted LCM) for the 1967 apparition. Figure 2 is a histogram of emission probability vs. Io's angle from superior geocentric conjunction (denoted ϕ_{Io}). These curves closely resemble the previous years' curves, but the overall emission probability is lower in 1967 than it was in 1965. Figure 3 shows the joint probability distribution as a function of the LCM and ϕ_{Io}. Note that the emission probability was greater than 90% near coordinate (LCM, ϕ_{Io}) = (150°, 90°) and that it was above 40% near (240°, 240°).

Figure 4 is a plot of the LCM, ϕ_{Io} relation of the emissions recorded in 1967. Each sloped line represents one Jupiter event and is the path of the coordinate (LCM, ϕ_{Io}) from beginning to end of the emission. The line slope is equal to P_J/P_{Io} where Jupiter's rotational period $P_J \approx .413$ days and Io's period $P_{Io} \approx 1.77$ days. The uneven

distribution of lines is due partly to Io's influence, partly to the near commensurabilities of the periods of Jupiter and Io, and partly to the 24 hour period of a single observer on the earth. Figure 5 shows the (LCM, ϕ_{Io}) path from beginning to end of each observation interval (time when Jupiter was in the antenna beam). The uneven distribution of observations is quite evident, despite the fact that Jupiter was observed for 3270 hours (corresponding to an average of 324 rotations of Jupiter or 77 revolutions of Io).

Figures 6 through 10 are similar plots for the 1968 apparition. The low emission probability is evident, especially in the main and 3rd source regions. Especially notable are the relatively large number of events (compared to previous years) occurring near $\phi_{Io} = 240°$ and $60° < LCM < 180°$.

Figures 11 through 13 are similar plots of combined emissions and observations for the apparitions of 1961 through 1968. Figure 14 shows the emission probabilities vs. LCM for each apparition of 1961 through 1968. The drift of histogram features toward greater longitudes seems to have stopped in 1967, and the drift may be reversed in 1968.

DATE 1966	OBSERVING PERIOD	JUPITER OBSERVATIONS	INTENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
7 6	1110 2640						
7 7	1107 2642						
7 8	1104 2640						
7 9	1101 2641						
7 10	1058 2641						
7 11	1055 2640						
7 12	1052 2638	2008 2120	1	SMOOTH	22-29	133.1-176.6	78.8- 88.9
7 13	1014 2635						
7 14	1012 2632						
7 15	1043 2629						
7 16	1041 2626						
7 17	1038 2622						
7 18	1035 2619						
7 19	1032 2616						
7 20	1029 2613						
7 21	1026 2610						
7 22	1025 2607						
7 23	1020 2604						
7 24	1017 2601						
7 25	1014 2558						
7 26	1012 2555						
7 27	1009 2551						
7 28	1006 2548	1700 1705	2	SMOOTH	22-25	264.8-267.9	64.5- 65.2
7 29	1003 2545						
7 30	1000 2542	1501 1532	3	SMOOTH	22-34	133.5-152.2	94.3- 98.7
7 31	0957 2359						
8 1	0955 2535						
8 2	0952 2532						
8 3	0949 2529						
8 4	0946 2525						
8 5	0943 2522						
8 6	0941 2519	1558 1637	1	WEAK	22-31	140.5-164.0	85.3- 90.8
8 7	0938 1230						
8 8	0935 1229						
8 9	1055 1229						
8 10	0929 1129						
8 11	0926 1129						
8 12	0923 1130						
8 13	0922 1130						
8 14	0920 1130						
8 15	0938 1134						
8 16	0929 1138						
8 17	0919 1131						
8 18	0926 1133						
8 19	0928 1130						
8 20	0903 1200						
8 21	0857 1201						
8 22	0854 1200						
8 23	0851 1159	1012 1045	3	SMOOTH	13-16	327.6-347.5	252.4-257.1
8 24	0848 1200	0953 1050	2	MODERATE	12-34	106.5-141.0	93.1-101.1
8 25	0845 1201						
8 26	0843 1200						
* 8 26	1200 1415						
8 27	0840 1201	1030 1104	2	WEAK	12-14	220.1-240.6	348.3-353.1
8 28	0837 1059						
8 29	0834 1200						
8 30	0840 1225	1050 1225	1	SMOOTH	14-23	323.4- 20.8	241.0-254.4
8 31	0848 1404	1016 1248	2	STRONG	11-34	93.2-185.1	79.5-100.9

* DENOTES SPECIAL OBSERVING PERIOD WHEN Io-RELATED EMISSIONS WERE POSSIBLE.

DATE 1966	OBSERVING PERIOD	JUPITER OBSERVATIONS	INTENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
9 1	0838 1200						
9 2	0840 1200	0954 1040	2	SMOOTH	12-19	20.7- 48.5	123.0-129.5
* 9 2	1200 1741						
9 3	0819 1059						
9 4	0817 1200						
9 5	0812 1200	0911 0953	1	SMOOTH	10-14	85.9-111.3	6.9- 12.8
* 9 5	1800 2159						
9 6	0809 1200	0953 1011	1	MODERATE	13-24	261.7-272.6	216.1-218.7
		1121 1200	2	SMOOTH	11-15	314.9-338.5	228.6-234.1
9 7	0806 1200						
* 9 7	1200 1357	1224 1252	1	STRONG	16-24	143.5-160.4	80.8- 84.7
9 8	0803 1225	1015 1145	1	MODERATE	12-18	215.9-270.3	265.9-278.7
9 9	0759 1201						
* 9 9	1500 1900						
9 10	0756 1203						
9 11	0753 1202	0853 0925	2	WEAK	10-18	257.5-276.9	144.3-148.8
		1011 1044	1	WEAK	12-14	304.7-324.6	155.3-160.0
9 12	0750 1201						
* 9 12	1848 2321	2127 2217	2	STRONG	23-35	143.8-174.1	94.1-101.1
9 13	0747 1201						
9 14	0750 1200	0830 0852	2	MODERATE	12-17	334.9-348.2	31.1- 34.2
9 15	0747 1319	1108 1200	1	WEAK	11-18	220.9-252.4	256.7-264.0
		1200 1225	2	STRONG	13-27	252.4-267.5	264.0-267.5
		1300 1319	3	MODERATE	16-23	288.6-300.1	272.5-275.2**
9 16	0749 1200	0810 1030	2	WEAK	12-19	263.7-348.4	74.9- 94.6
9 17	0747 1201						
9 18	0747 1201	0813 0850	2	WEAK	12-14	206.4-228.8	122.0-127.2
		0920 1025	2	WEAK	12-18	246.9-286.2	131.4-140.6
9 19	0751 1200	0952 1000	1	WEAK	12-16	56.7- 61.5	339.2-340.4
		1019 1105	1	WEAK	15-35	73.0-100.8	343.1-349.6
9 20	0748 1240	1027 1208	3	STRONG	12-26	228.3-289.4	187.6-201.8
9 21	0721 1230	0917 0953	2	STRONG	12-18	336.4-358.2	21.0- 26.1
9 22	0718 1230	1107 1215	2	STRONG	14-25	193.4-234.5	240.0-249.6
9 23	0715 1230						
9 24	0711 1230						
9 25	0708 1230						
9 26	0707 1229	0829 0846	1	MODERATE	13-16	339.7-350.0	311.0-313.4
9 27	0702 1230	0923 1000	1	MODERATE	12-18	162.8-185.1	162.0-167.2
* 9 27	1230 1243						
9 28	0710 1234						
9 29	0702 1229						
9 30	0703 1229						
10 1	0702 1235	0733 0857	1	MODERATE	12-18	338.2- 28.9	239.9-251.7
10 2	0704 1230	0737 0923	2	STRONG	12-36	131.1-195.2	83.8- 98.7
10 3	0703 1227						
10 4	0705 1230						
*10 4	1230 1351						
10 5	0704 1230						
10 6	0634 1231						
10 7	0630 1230						
*10 7	1230 1800	1552 1727	3	MODERATE	17-39	102.7-160.2	90.5-103.9
10 8	0627 1230	0812 0907	2	WEAK	10-19	335.1- 8.4	228.9-236.7
		0945 0958	1	MODERATE	13-19	31.4- 39.2	242.1-243.9
10 9	0624 1230						
*10 9	1900 2148						
10 10	0620 1230						
10 11	0617 1230	0647 0727	2	STRONG	14-17	15.2- 39.4	107.1-112.7
*10 11	1230 1500						

** EMISSION OCCURRED WHEN ANTENNAS WERE TRACKING SUN. JUPITER WAS ABOUT 40 DEG. FROM SUN AND OUTSIDE THE NOMINAL BEAMWIDTH OF THE ANTENNAS.

DATE 1966	OBSERVING PERIOD	JUPITER OBSERVATIONS	INTENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
10 12	0618 1230						
10 13	0617 1230						
10 14	0617 1229						
*10 14	1416 1857	1718 1832	2	STRONG	25-36	128.2-173.0	86.4- 96.9
10 15	0619 1230	0908 1020	1	SMOOTH	13-17	342.5- 26.0	220.6-230.8
10 16	0618 1230	0926 1023	3	STRONG	15-26	143.9-178.3	66.5- 74.6
10 17	0617 1229	0634 0703	3	MODERATE	15-19	190.4-207.9	245.6-249.7
		0756 0814	1	MODERATE	14-23	240.0-250.8	257.2-259.7
10 18	0636 1228						
10 19	0618 1229	0926 1055	2	STRONG	14-20	235.4-289.2	316.8-329.3
10 20	0617 1230						
10 21	0544 1236						
10 22	0541 1240						
10 23	0537 1240						
10 24	0918 1241						
10 25	0531 1240	0900 1101	2	MODERATE	12-16	42.9-116.0	93.5-110.6
10 26	0528 1241	1025 1122	1	WEAK	12-19	244.7-279.2	309.0-317.0
10 27	0524 1244						
10 28	0521 1239						
10 29	0518 1240	0933 0939	3	MODERATE	15-17	305.0-308.6	191.9-192.7
10 30	0518 1301						
10 31	0517 1259	0854 1025	2	STRONG	14-34	222.5-277.5	233.3-246.1
11 1	0518 1300						
*11 1	1300 1335						
11 2	0522 1259						
11 3	0517 1259						
*11 3	1507 1900						
11 4	0518 1259						
11 5	0453 1330	0905 1120	1	STRONG	12-17	262.0-343.6	172.0-191.1
11 6	0450 1330						
11 7	0446 1329	0547 0640	1	STRONG	12-17	83.4-115.4	191.0-198.4
		0924 1120	2	MODERATE	12-30	214.6-284.7	221.6-238.0
		1135 1235	2	MODERATE	12-18	293.8-330.0	240.1-248.6
11 8	0442 1509	0650 0810	1	MODERATE	12-21	272.1-320.4	43.4- 54.7
		1236 1415	3	MODERATE	20-37	121.2-181.1	92.3-106.2
11 9	0735 1330						
11 10	0434 1300						
*11 10	1458 1900						
11 11	0430 1331						
11 12	0426 1330	1113 1201	1	MODERATE	12-20	313.4-342.4	174.3-181.1
11 13	0422 1330						
11 14	0418 1330	1008 1225	1	MODERATE	12-32	215.3-298.1	212.2-231.5
11 15	0418 1330	0612 0631	1	MODERATE	12-18	223.2-234.7	22.3- 25.0
		0709 0832	2	STRONG	12-25	257.6-307.8	30.4- 42.1
*11 15	1330 1518	1354 1452	2	MODERATE	24-34	142.5-177.6	87.6- 95.8
11 16	0418 1332						
11 17	0418 1331	0603 0627	1	STRONG	12-22	158.9-173.5	68.0- 71.4
		0823 1157	1	STRONG	12-16	243.6- 13.0	87.7-118.0
11 18	0957 1329						
11 19	0418 1330	0932 1038	2	STRONG	12-25	226.5-266.4	144.4-153.7
11 20	0418 1330	0537 0915	1	MODERATE	12-20	235.0- 6.8	314.6-345.4
11 21	0417 1329						
11 22	0347 1335	0835 1100	1	MODERATE	12-17	283.9- 11.6	27.0- 47.5
11 23	0343 1330	0515 0610	1	MODERATE	15-19	313.6-346.9	202.2-210.0
		0755 0927	1	MODERATE	12-17	50.4-106.0	224.8-237.8
		1225 1252	1	MODERATE	13-23	213.6-229.9	262.9-266.8
11 24	0339 1330	0636 0733	2	STRONG	13-22	153.2-187.7	57.1- 65.2
		0932 1000	1	MODERATE	15-24	259.6-276.5	82.0- 85.9

DATE 1966	OBSERVING PERIOD	JUPITER OBSERVATIONS	IN-TENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
11 25	0335 1329	0454 0540	1	MODERATE	14-25	242.1-269.9	246.2-252.7
		0657 0850	1	SMOOTH	14-19	316.5- 24.8	263.6-279.6
11 26	0332 1330						
11 27	0328 1330	0619 0718	3	STRONG	13-26	234.8-270.5	305.2-313.5
		0943 1020	1	MODERATE	15-19	358.1- 20.5	334.0-339.2
11 28	0324 1329						
11 29	0320 1329						
11 30	0318 1330						
12 1	0318 1330	0724 0815	3	STRONG	14-19	156.6-187.4	48.6- 55.8
		0940 0943	1	MODERATE	15-18	238.8-240.6	67.8- 68.3
		1002 1014	1	MODERATE	11-16	252.1-259.4	71.0- 72.7
		1152 1250	2	MODERATE	13-24	318.6-353.7	86.5- 94.7
12 2	0318 1329	0440 0650	2	STRONG	15-32	208.2-286.8	229.0-247.3
		0710 0715	1	MODERATE	13-16	298.9-301.9	250.2-250.9
		0734 0748	3	MODERATE	13-15	313.4-321.8	253.6-255.5
		0822 0920	1	MODERATE	12-14	342.4- 17.4	260.4-268.6
12 3	0317 1330	0720 0856	3	STRONG	12-18	95.5-153.5	95.1-108.6
		0930 1007	2	STRONG	14-22	174.1-196.5	113.5-118.7
		1137 1252	1	STRONG	12-19	250.9-296.2	131.4-142.0
12 4	0317 1330	0730 0805	2	STRONG	13-19	252.2-273.4	300.0-304.9
		0943 0951	1	MODERATE	16-19	332.6-337.5	318.7-319.9
12 5	0317 1330	1227 1247	1	MODERATE	15-28	222.4-234.5	185.5-188.3
*12 5	1330 1514						
12 6	0251 1354	1044 1055	2	MODERATE	12-14	310.8-317.5	14.6- 16.1
12 7	0246 1339	0443 0505	1	MODERATE	22-25	243.2-256.5	167.1-170.2
12 8	0242 1340	0810 0817	1	MODERATE	15-16	159.0-163.3	39.9- 40.8
		1058 1215	2	MODERATE	13-24	260.6-307.1	63.6- 74.5
12 9	0237 1341	0547 0551	1	WEAK	28-29	223.2-225.6	223.2-223.7
		0618 0930	3	STRONG	11-31	241.9-358.0	227.6-254.7
12 10	0233 1340	0752 1050	3	WEAK	12-38	89.4-197.1	84.4-109.6
		1205 1239	1	WEAK	13-19	242.4-262.9	120.2-125.0
12 11	0228 1340	0935 0948	1	WEAK	12-17	302.3-310.2	302.6-304.4
		1035 1113	1	MODERATE	11-17	338.6- 1.6	311.1-316.4
12 12	0224 1340						
*12 12	1340 1501						
12 13	0219 1339						
12 14	0218 1339						
12 15	0218 1340						
12 16	0218 1340	0906 0934	2	STRONG	19-28	318.2-335.1	236.3-240.2
		1015 1050	2	STRONG	16-20	359.9- 21.1	246.0-251.0
12 17	0913 1340	0940 1128	3	MODERATE	11-36	129.3-194.6	84.7-100.0
		1203 1229	1	STRONG	12-18	215.8-231.5	104.9-108.6
12 18	0225 1340	0942 0943	2	STRONG	12-18	281.2-281.8	288.6-288.7
		1044 1145	1	STRONG	12-17	318.7-355.6	297.4-306.0
12 19	0217 1340						
*12 19	1340 1554						
12 20	0218 1341						
12 21	0143 1331						
12 22	0139 1341	1139 1226	1	MODERATE	12-19	234.7-263.1	39.5- 46.1
12 23	0134 1326	0538 0548	2	MODERATE	15-16	167.1-173.2	192.0-193.4
		0705 0850	2	MODERATE	11-19	219.7-283.2	204.3-219.2
		0946 1105	3	STRONG	13-22	317.1- 4.8	227.1-238.3
		1140 1232	2	MODERATE	13-19	26.0- 57.4	243.2-250.6
12 24	0130 1320	0310 0618	1	WEAK	12-18	228.4-342.0	14.7- 41.3
		0927 1025	1	WEAK	17-29	96.3-131.3	68.0- 76.2
		1045 1201	3	STRONG	12-28	143.4-189.4	79.0- 89.8
12 26	0826 1330						

DATE 1966	OBSERVING PERIOD	JUPITER OBSERVATIONS	INTENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
12 27	0118 1331	0955 1030	1	MODERATE	12-16	205.3-226.5	322.7-327.6
		1043 1105	2	MODERATE	13-22	234.3-247.6	329.5-332.6
12 28	0118 1320	0610 0625	1	WEAK	12-14	219.9-228.9	134.5-136.6
		0725 0805	3	STRONG	10-19	265.2-289.4	145.1-150.7
		0835 1013	3	MODERATE	11-23	307.5- 6.8	155.0-168.8
		1111 1120	2	MODERATE	13-19	41.8- 47.3	177.0-178.3
12 29	0118 1320						
12 30	0119 1320	0734 0852	3	MODERATE	12-24	212.1-259.2	193.6-204.6
		1101 1140	2	MODERATE	14-18	337.2- .8	222.8-228.4
12 31	0117 1320	1141 1227	1	MODERATE	12-18	152.1-179.9	72.1- 78.6
1967							
1 2	0832 1320						
1 3	0118 1321						
1 4	0118 1320						
1 5	0118 0740						
1 5	0835 1332	1115 1123	1	WEAK	15-17	169.9-174.7	6.5- 7.6
		1211 1312	3	MODERATE	12-23	203.7-240.6	14.4- 23.0
1 6	0125 1335	0839 0848	1	WEAK	20-30	226.2-231.6	188.1-189.3
		0940 1023	1	STRONG	13-22	263.0-289.0	196.7-202.8
1 7	0126 1320						
1 8	0021 1320	0920 0954	3	STRONG	16-20	192.3-212.9	241.1-245.9
		1019 1036	2	STRONG	16-25	228.0-238.3	249.4-251.8
		1057 1113	2	STRONG	12-23	251.0-260.7	254.8-257.1
1 9	0116 1329	0542 0554	2	WEAK	12-14	211.3-218.5	53.9- 55.6
		1038 1159	3	MODERATE	10-15	30.2- 79.2	95.7-107.2
1 10	0118 1324	0329 0548	2	SMOOTH	11-18	281.5- 5.6	238.7-258.3
1 11	0120 1320	0443 0542	3	SMOOTH	12-38	117.0-152.7	92.8-101.1
		0610 0633	2	WEAK	34-36	169.6-183.5	105.1-108.3
		0940 1000	3	MODERATE	13-16	296.5-308.6	134.8-137.6
		1049 1102	1	MODERATE	14-17	338.2-346.1	144.5-146.3
1 12	0122 1321	0337 0524	2	SMOOTH	13-18	227.8-292.5	287.0-302.2
		0539 0601	1	MODERATE	13-21	301.5-314.8	304.3-307.4
1 13	0119 1325	0933 1131	2	MODERATE	11-22	233.7-305.0	181.0-197.7
		1158 1218	1	MODERATE	12-15	321.4-333.5	201.5-204.3
1 14	0130 1330						
1 15	-0012 1340	0223 0259	1	WEAK	10-17	275.0-296.8	167.4-172.5
		0330 0439	2	SMOOTH	10-19	315.6-357.3	176.9-186.6
		1016 1228	3	MODERATE	16-34	201.0-280.8	234.3-253.0
1 16	0128 0520						
1 16	1245 1317						
1 17	0118 1320	0204 0349	2	MODERATE	12-32	205.0-268.4	212.0-226.8
		0407 0420	3	MODERATE	12-19	279.3-287.2	229.3-231.2
		0450 0705	3	MODERATE	11-23	305.3- 26.9	235.4-254.5
		1101 1109	1	MODERATE	12-18	169.6-174.4	287.9-289.0
1 18	0118 1327	0505 0528	1	WEAK	13-31	105.1-119.0	81.2- 84.4
		0554 0753	3	MODERATE	11-36	134.7-206.6	88.1-104.9
		0923 0959	1	MODERATE	13-16	261.1-282.8	117.6-122.7
1 19	0118 1320	0512 0613	2	WEAK	13-17	260.0-296.9	285.8-294.4
1 20	0118 1320	0837 0843	1	WEAK	12-15	174.5-178.2	158.4-159.2
		0955 1005	1	WEAK	11-15	221.7-227.7	169.4-170.8
		1025 1235	2	MODERATE	10-21	239.8-318.4	173.6-192.0
1 21	0121 1344	0740 0912	3	MODERATE	12-24	290.8-346.4	353.9- 6.9
1 22	0118 1320	0339 0550	2	WEAK	11-25	295.8- 15.0	163.5-182.0
		0733 0738	2	STRONG	11-16	77.3- 80.3	196.5-197.3
		1108 1300	3	MODERATE	14-26	207.2-274.9	226.9-242.8
1 23	0118 1320	0750 1252	3	MODERATE	11-23	238.2- 60.8	42.6- 85.3
* 1 23	1320 1440						
1 24	0118 1320	0302 0828	3	WEAK	11-27	214.7- 51.8	205.5-251.5

DATE 1967	OBSERVING PERIOD	JUPITER OBSERVATIONS	IN-TENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
1 25	0118 1300	0312 0422	1	SMOOTH	12-18	11.5- 53.8	50.5- 60.4
		0638 0838	3	STRONG	11-20	136.0-208.6	79.6- 96.6
		0917 1056	2	MODERATE	12-22	232.1-292.0	102.1-116.1
		1122 1124	2	MODERATE	12-15	307.7-308.9	119.8-120.1
		1200 1202	2	MODERATE	13-14	330.7-331.9	125.2-125.5
1 26	0218 1320	0457 0535	2	MODERATE	11-16	225.6-248.6	269.0-274.4
		0620 0643	1	WEAK	11-14	275.8-289.7	280.8-284.0
		0655 0657	2	WEAK	12-14	297.0-298.2	285.7-286.0
		0752 0826	1	WEAK	12-16	331.4-352.0	293.8-298.6
1 27	0118 0803	0326 0437	2	WEAK	10-15	321.2- 4.2	99.8-109.8
		0620 0648	3	WEAK	10-16	66.4- 83.4	124.4-128.3
		0659 0743	2	WEAK	10-14	90.0-116.6	129.9-136.1
1 28	0117 1340	0557 0812	1	MODERATE	12-23	203.2-284.8	324.7-343.7
1 29	0117 1322	0226 0432	1	WEAK	12-21	226.4-302.5	138.4-156.2
		1203 1259	1	WEAK	12-29	215.2-249.0	220.0-227.9
1 30	0118 1337	0405 0504	1	SMOOTH	12-14	76.8-112.5	356.0- 4.4
		0833 1011	1	WEAK	11-23	238.8-298.1	33.9- 47.8
1 31	0118 1320	0406 0755	1	SMOOTH	11-19	228.1- 6.6	199.8-232.2
		0848 1003	3	WEAK	10-17	38.6- 83.9	239.7-250.3
2 1	0147 1320	0721 0834	3	STRONG	12-25	136.6-180.7	71.0- 81.3
2 4	0132 1320	1000 1115	3	MODERATE	11-15	324.7- 10.1	344.3-354.9
2 5	0118 1320	0354 0411	2	MODERATE	16-27	254.1-264.3	136.2-138.6
2 6	0118 1320	0934 1002	2	STRONG	13-24	250.2-267.1	27.8- 31.8
2 7	0118 1320	0208 0350	2	MODERATE	16-36	131.3-192.9	168.3-182.8
		0423 0551	1	MODERATE	12-29	212.9-266.1	187.4-199.9
		0601 0858	2	STRONG	11-23	272.1- 19.1	201.3-226.3
2 8	0117 1321	1120 1121	2	STRONG	15-17	255.6-256.2	90.0- 90.1
2 9	0117 1320	0453 0628	3	STRONG	11-19	172.2-229.7	238.9-252.4
		0743 0820	2	MODERATE	11-20	275.0-297.4	263.0-268.2
2 10	0120 1320	0347 0400	3	MODERATE	13-18	283.0-290.9	73.2- 75.1
		0648 0734	1	MODERATE	12-15	32.5- 60.3	98.8-105.3
2 11	0117 1325	0739 1019	3	MODERATE	12-23	213.9-310.6	309.5-332.2
2 12	-0101 1320	0106 0132	2	MODERATE	22-35	126.9-142.6	97.5-101.2
		0335 0622	1	WEAK	12-23	217.0-317.9	118.6-142.2
		0755 0805	1	MODERATE	11-14	14.2- 20.2	155.3-156.7
2 13	0118 0817						
2 14	0150 1312						
2 15	0128 1308						
2 16	-0213 1304	0619 0831	2	SMOOTH	12-28	198.5-278.3	236.1-254.8
2 17	0117 1300						
2 18	0125 1256	0223 0248	2	MODERATE	15-17	357.0- 12.2	249.9-253.4
		0847 0957	2	MODERATE	13-26	229.2-271.5	304.2-314.1
2 19	-0009 1252	0113 0337	3	MODERATE	16-35	105.3-192.4	83.5-103.9
2 20	0116 1247	1024 1200	1	STRONG	12-17	229.0-287.1	4.9- 18.5
2 21	-0029 1219						
2 22	0117 1231						
2 23	0117 1200	0717 0912	3	STRONG	12-35	207.8-277.3	229.3-245.5
2 24	0122 1200						
2 25	0120 1200						
2 26	0117 1200	0256 0400	2	MODERATE	19-28	141.7-180.4	83.0- 92.0
		0630 0826	1	MODERATE	12-18	271.1-341.2	113.2-129.6
2 27	0118 1200	0918 1000	1	STRONG	12-18	163.1-188.5	340.5-346.4
		1046 1115	3	MODERATE	12-18	216.3-233.9	352.9-357.0
2 28	0117 1200						
3 1	0117 1200						
3 2	0121 1200	0629 1003	2	MODERATE	13-33	152.7-282.0	207.2-237.5
3 3	0116 1200	0507 0549	2	STRONG	16-25	253.6-279.0	39.2- 45.1

	DATE 1967	OBSERVING PERIOD		JUPITER OBSERVATIONS		INTENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
	3 4	0117	1156	1031	1154	1	SMOOTH	13-16	240.1-290.2	288.5-300.2
	3 5	0117	1152	0553	0738	1	MODERATE	16-25	222.5-286.0	92.7-107.6
	3 6	0118	1148	0827	0841	2	STRONG	16-22	106.2-114.7	318.0-320.0
	3 7	0118	1144							
	3 8	0142	1140							
	3 9	0121	1136	0844	1041	1	WEAK	14-18	208.0-278.7	210.9-227.5
	3 10	0118	1130							
	3 11	0117	1128	0915	0937	1	MODERATE	15-18	167.8-181.1	262.3-265.4
	3 12	0121	1124							
	3 13	0118	1120	0525	0549	1	MODERATE	16-20	329.8-344.3	276.9-280.3
	3 14	0118	1116							
	3 15	0119	1112							
	3 16	0118	1108							
	3 17	0118	1104							
	3 18	-0012	0830							
	3 18	0903	1130							
	3 19	0117	1056							
	3 20	0118	1052							
	3 21	0128	1030	0623	0705	2	WEAK	16-25	128.7-154.1	112.9-118.8
	3 22	0119	1032							
*	3 22	1959	2400	2213	2332	1	WEAK	22-35	133.5-181.2	90.6-101.7
	3 23	0000	1030							
	3 24	0120	1030							
	3 25	0117	1030							
	3 26	0120	1028							
	3 27	0118	1024							
	3 28	0118	1020							
	3 29	0117	1016							
*	3 29	2107	2500							
	3 30	0100	1012							
	3 31	0117	1008							
	4 1	0117	1005							
	4 2	0117	1001							
	4 3	0118	0958	0451	0520	1	WEAK	28-30	228.9-246.5	224.7-228.8
	4 4	0120	0954	0718	0835	3	MODERATE	20-36	108.2-154.7	88.9- 99.7
	4 5	0116	0950							
	4 6	0147	0947	0454	0508	2	WEAK	16-20	322.0-330.5	115.4-117.4
	4 7	0120	0929							
	4 8	0148	0730							
	4 8	0807	0930							
	4 9	0148	0925							
	4 10	0147	0932							
	4 11	0147	0929							
	4 12	0147	0925							
	4 13	0147	0922							
	4 14	0152	0918							
	4 15	0148	0914							
	4 16	0147	0911							
	4 17	0147	0907	0546	0651	1	WEAK	22-30	207.9-247.2	200.2-209.4
	4 18	0149	0904							
*	4 18	2031	2400							
	4 19	0000	0900							
	4 20	0147	0857							
	4 21	0212	0848							
	4 22	0203	0849							
	4 23	0202	0830							
	4 24	0200	0830	0637	0715	1	MODERATE	20-30	211.3-234.3	191.0-196.4
	4 25	0202	0830							

DATE 1967	OBSERVING PERIOD	JUPITER OBSERVATIONS	INTENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
4 26	0204 0830						
4 27	0204 0829						
4 28	0201 0825						
4 29	0203 0821	0257 0334	3	STRONG	25-34	110.1-132.5	96.7-102.0
4 30	0201 0817						
5 1	0200 0814						
5 2	0200 0810						
* 5 2	2200 2600						
5 3	0200 0806						
5 4	0203 0802						
5 5	0103 0759						
5 6	0203 0732	0341 0549	3	STRONG	16-35	109.1-186.5	86.4-104.5
5 7	0203 0730						
5 8	0200 0728						
5 9	0200 0730						
5 10	0202 0731						
5 11	0200 0730						
5 12	0202 0728						
5 13	0200 0730	0525 0617	2	STRONG	19-32	144.3-175.7	84.4- 91.8
5 14	0203 0728						
5 15	0200 0724						
5 16	0200 0720						
5 17	0203 0717						
5 18	0220 0700						
5 19	0221 0632	0600 0632	1	SMOOTH	16-20	347.4- 6.8	229.3-233.8
5 20	0217 0630						
5 22	0218 0629						
5 23	0218 0629						
5 24	0228 0630						
5 25	0218 0630						
5 26	0219 0630						
5 28	0216 0630						
5 29	0216 0625						
5 30	0219 0630						
5 31	0218 0628						
6 1	0217 0626						
6 2	0327 0623						
6 3	0217 0621						
6 4	0217 0618						
6 5	0217 0615						
6 6	0217 0611						
6 7	0248 0608						
6 8	0247 0605						
6 9	0248 0601						
6 10	0247 0557						
6 11	0247 0553						
6 12	0246 0550						
6 13	0247 0546						
* 6 14	0021 0247						
6 14	0247 0543						
6 15	0248 0540						
6 16	0247 0536						
6 17	0247 0533						
6 18	0247 0530						
6 19	0247 0526						
6 20	0247 0523						

DATE 1967	OBSERVING PERIOD	JUPITER OBSERVATIONS	INTENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
6 21	0248 0520						
* 6 21	1349 2000						
6 22	0247 0516						
6 23	0248 0513						
6 24	0247 0510						
6 25	0247 0506						
6 26	0247 0503						
* 6 26	2200 2600						
6 27	0200 0459						
6 28	0248 0456						
* 6 28	1400 1900						
6 29	0247 0453						
6 30	0250 0449						
7 1	0247 0446	2047 2120	2	SMOOTH	22-36	146.8-166.7	96.1-100.8**
7 2	0247 0442						
7 3	0247 0439						
* 7 3	2300 2700						
7 4	0300 0435						
7 5	0106 0439						
7 6	0247 0401						
7 7	0244 0400						
7 8	0247 0400	2132 2203	1	SMOOTH	24-33	146.1-164.8	85.4- 89.8**
7 9	0247 0400						
7 10	0247 0400						
7 11	0000 0102						
7 11	0119 0400						
7 11	1254 2800						
7 12	1251 2800						
7 13	1249 2800						
7 14	1246 2758						
7 15	1244 2754						
7 16	1241 2751						
7 17	1239 2748						
7 18	1236 2744						
7 19	1234 2741						
7 20	1231 2700						
7 21	1229 2700						
7 22	1226 2700						
7 23	1224 2700						
7 24	1221 2700						
7 25	1219 2700						
7 26	1219 2700						
7 27	1219 2700						
7 28	1219 2700						
7 29	1219 2700						
7 30	1238 2700						
7 31	1219 2700						
8 1	1219 2658						
8 2	1220 2600						
8 3	1221 2650						
8 4	1219 2647						
8 5	1221 2643						
8 6	1220 2640						
8 7	1219 2600						
8 8	1228 2600						
8 9	1229 2600						
8 10	1227 2600						

* DENOTES SPECIAL OBSERVING PERIOD WHEN Io-RELATED EMISSIONS WERE POSSIBLE.
** EMISSION OCCURRED WHEN ANTENNAS WERE TRACKING SUN. JUPITER WAS ABOUT 40 DEG. FROM SUN AND OUTSIDE THE NOMINAL BEAMWIDTH OF THE ANTENNAS.

DATE 1967	OBSERVING PERIOD	JUPITER OBSER-VATIONS	INTEN-SITY	BURSTI-NESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
8 11	1228 1410						
8 11	1620 2555						
8 12	1228 2540						
8 13	1233 2135						
8 13	2145 2600						
8 14	1220 2103						
8 15	1758 2019						
8 16	1800 1947						
8 17	1838 1950						
8 18	1859 2600						
8 19	1232 2556						
8 20	1232 2554						
8 21	1104 2551						
8 22	1101 2548						
8 23	1058 2545						
8 24	1055 2542						
8 25	1052 2455						
8 26	1049 2457						
8 27	1050 2458	1233 1337	2	SMOOTH	26-35	136.2-174.9	93.2-102.2
8 28	1044 1911						
8 29	1051 1935						
8 29	1955 2033						
8 29	2100 2523						
8 30	1200 1430						
8 30	1440 2508						
8 31	1940 2515						
9 1	1049 2512						
9 2	1050 2500						
9 3	1049 2456						
9 4	1049 2502						
9 5	1045 2456						
9 6	1019 1751						
9 6	2140 2445						
9 7	1016 2436						
9 8	1013 1424						
9 8	1436 2440	2141 2350	2	STRONG	25-36	111.7-189.7	90.1-108.3
9 9	1010 2431						
9 10	1007 2429						
9 11	1004 2423	1110 1130	1	SMOOTH	15-17	181.3-193.4	250.9-253.7
9 12	1001 1219						
9 13	0958 1221						
9 14	0955 1223						
9 15	0952 1221						
9 16	0949 1215	1108 1140	2	WEAK	12-21	212.0-231.4	187.1-191.6
9 17	0951 1227						
9 18	0949 1223						
9 19	0947 1223						
9 20	0947 1221						
9 21	0934 1230						
9 22	0931 1230						
9 23	0928 1502						
9 24	0928 1230						
9 25	0922 1230						
9 26	0919 1230						
9 27	0919 1230	0932 1002	2	MODERATE	12-17	8.2- 26.3	249.9-254.1
9 28	0917 1231						
9 29	0931 1231						
9 30	0918 1300						
* 9 30	1300 1501						

DATE 1967	OBSERVING PERIOD	JUPITER OBSERVATIONS	INTENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
10 1	0919 1237						
10 2	0918 1237						
10 3	0918 1300						
*10 3	1300 2000	1745 1815	2	MODERATE	27-38	128.7-146.9	99.4-103.6
10 4	0927 1229	1050 1105	1	WEAK	14-18	28.3- 37.3	244.1-246.2
10 5	0920 1230						
10 6	0850 1241						
10 7	0847 1200						
*10 7	1200 1600						
10 8	0844 1230						
10 9	0841 1230						
10 10	0838 1230						
*10 10	1555 2001						
10 11	0835 1238						
10 12	0832 1230						
10 13	0843 1230						
10 14	0827 1231						
10 15	0843 1230						
10 16	0827 1231						
10 17	0827 1239						
*10 17	1705 2105						
10 18	0833 1226						
10 19	0828 1229						
10 20	0828 1241	1019 1035	1	MODERATE	15-22	256.3-266.0	253.1-255.3
10 21	0802 1243						
10 22	0759 1241						
10 23	0756 1236						
10 24	0752 1236						
10 25	0749 1235						
10 26	0746 1235						
10 27	0746 1236	1004 1115	1	MODERATE	18-35	220.4-263.4	234.4-244.5
10 28	0747 1240						
10 29	0745 1240						
10 30	0751 1310						
10 31	0754 1232						
11 1	0747 1238						
11 2	0807 1244						
11 3	0811 1240	0837 0922	2	WEAK	14-16	141.1-168.4	205.6-212.0
		1130 1149	1	MODERATE	13-18	245.7-257.2	230.1-232.8
11 4	0747 1200						
*11 4	1200 1515	1330 1503	2	STRONG	26-36	108.8-165.0	90.4-103.5
11 5	0747 1240						
11 6	0754 1239	0818 0839	2	MODERATE	11-15	221.1-233.8	93.1- 96.0
		0851 1105	1	MODERATE	12-17	241.0-322.0	97.7-116.7
*11 6	1657 2040						
11 7	0731 1331						
11 8	0719 1330						
11 10	0719 1342						
11 11	0717 1330	0953 1056	2	MODERATE	11-22	311.0-349.1	43.5- 52.4
		1123 1132	2	MODERATE	12-14	5.4- 10.8	56.2- 57.5
*11 11	1330 1700						
11 12	0737 1330						
11 13	0723 1328	1118 1133	2	MODERATE	12-17	303.4-312.4	102.3-104.4
		1153 1217	3	MODERATE	13-17	324.5-339.0	107.2-110.6
11 13	1701 2104						
11 14	0724 1335						
11 15	0720 1327						
11 16	0726 1330	0923 0944	1	MODERATE	13-18	325.4-338.1	336.3-339.2
11 17	0719 1329						
11 18	0717 1330	1101 1123	1	MODERATE	12-17	325.7-339.0	36.9- 40.0
11 19	0818 1334						

DATE 1967	OBSERVING PERIOD	JUPITER OBSERVATIONS	IN-TENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
11 20	0816 1325	1144 1234	2	STRONG	12-21	292.7-322.9	89.8- 96.9
11 21	0619 1330	0652 0712	2	MODERATE	12-18	266.8-278.9	252.0-254.8
		0807 0813	2	MODERATE	12-14	312.1-315.7	262.6-263.4
11 22	0626 1331	0634 0753	2	SMOOTH	14-18	46.4- 94.1	92.8-104.0
11 23	0621 1328						
11 24	0623 1140						
11 25	0617 1330						
11 26	0619 1330						
11 27	0619 1330	1130 1147	1	STRONG	13-17	258.0-268.3	71.8- 74.2
11 28	0629 1335	0911 0942	2	MODERATE	15-18	324.5-343.2	255.6-260.0
11 29	0619 1330	0837 0922	2	MODERATE	12-17	94.5-121.8	94.2-100.6
11 30	0625 1328	0850 0951	1	STRONG	12-23	252.9-289.8	299.4-308.0
		1014 1147	2	STRONG	13-20	303.7-359.9	311.3-324.4
12 1	0615 1330	0851 0900	2	WEAK	14-16	44.1- 49.6	143.0-144.3
*12 1	1330 1559						
12 2	0618 1330						
12 3	0617 1332	0655 0708	1	WEAK	14-18	275.1-282.9	173.5-175.3
		0738 0755	2	MODERATE	11-17	301.1-311.4	179.6-182.0
		0812 0921	3	MODERATE	12-20	321.6- 3.3	184.4-194.1
12 4	0616 1344	1001 1005	1	MODERATE	14-15	178.1-180.5	43.2- 43.8
12 5	0634 1330	0908 1103	3	MODERATE	12-21	296.6- 6.1	239.2-255.4
12 6	0524 1339	0956 1204	3	STRONG	12-36	116.2-193.6	89.4-107.5
12 7	0531 1338						
12 8	0516 1330						
*12 8	1330 1603						
12 9	0512 1341						
12 10	0754 1338						
12 11	0504 1338						
12 12	0504 1340	0946 1240	2	STRONG	10-21	293.7- 38.9	228.9-253.5
12 13	0539 1340	0631 0703	2	MODERATE	13-18	326.4-345.7	44.8- 49.3
		1011 1248	2	MODERATE	12-30	99.4-194.3	75.9- 98.1
12 14	0531 1340	1038 1120	2	MODERATE	12-26	266.3-291.7	283.1-289.1
		1210 1221	2	WEAK	12-18	321.9-328.6	296.1-297.7
12 15	0611 1325						
12 16	0517 1340						
12 17	0502 1355						
12 20	0526 0900						
12 20	0925 1337						
12 21	0842 1340						
12 22	0427 1255	0616 0747	1	MODERATE	13-24	232.7-287.7	74.1- 86.9
12 24	0416 1400						
12 27	0424 1349	0535 0546	1	WEAK	16-18	241.0-247.7	5.8- 7.3
		0743 0823	1	MODERATE	12-15	318.4-342.6	23.9- 29.5
12 28	0402 1339	0809 1122	1	STRONG	12-18	124.8-241.5	231.1-258.4
12 29	0933 1343	1129 1218	3	MODERATE	14-18	36.3- 66.0	102.9-109.8
12 30	0403 1340	0523 0601	2	MODERATE	15-21	325.7-348.6	254.7-260.1
		0824 1055	2	MODERATE	12-18	75.1-166.4	280.3-301.6
12 31	0440 1340	0501 0617	3	MODERATE	12-37	103.1-149.0	95.1-105.9
1968							
1 3	0402 1351						
1 4	0357 1345	0920 1011	1	WEAK	12-14	142.1-173.0	225.9-233.1
		1145 1252	1	MODERATE	12-36	229.8-270.3	246.4-255.8
1 5	0402 1343						
1 6	0326 1340	0516 0701	2	STRONG	12-23	295.9-359.4	238.5-253.4
1 7	0322 1340	0603 0817	2	MODERATE	15-38	115.0-196.1	88.8-107.7
		1103 1139	1	STRONG	11-18	296.4-318.2	131.2-136.3
1 8	0318 1337	0737 0752	1	SMOOTH	15-18	322.5-331.5	305.6-307.7
		0904 0931	1	SMOOTH	14-19	15.1- 31.4	317.9-321.7
1 9	0313 1335	0342 0351	1	MODERATE	16-17	331.1-336.5	115.9-117.2
		1102 1155	1	WEAK	12-26	237.1-269.1	178.1-185.6

DATE 1968	OBSERVING PERIOD	JUPITER OBSERVATIONS	INTENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
1 10	0309 1338	0654 0754	2	STRONG	13-24	237.9-274.2	346.6-355.1
		0942 1018	3	STRONG	12-16	339.4- 1.2	10.3- 15.4
1 11	0307 1339	1154 1314	3	MODERATE	16-33	209.8-258.2	232.5-243.8
1 12	0307 1340						
1 13	0309 1340	0408 0426	1	WEAK	26-30	229.5-240.4	213.8-216.3
		0642 0715	2	MODERATE	13-20	322.6-342.6	235.6-240.2
		0753 0848	2	STRONG	13-22	5.5- 38.8	245.6-253.4
1 14	0307 1340						
1 15	0307 0925	0756 0900	1	MODERATE	12-19	308.7-347.4	293.1-302.2
1 15	1000 1341						
1 16	0307 1336						
1 17	0339 1338						
1 18	0307 1337						
1 19	0308 1345						
1 20	0226 1340	0801 0819	2	STRONG	11-18	345.1-356.0	231.9-234.4
		0920 1006	2	MODERATE	13-18	32.8- 60.7	243.1-249.6
1 21	0222 1340	0344 0443	3	MODERATE	11-18	340.3- 16.0	39.2- 47.5
1 22	0217 1337	0748 0808	1	WEAK	12-14	278.5-290.6	277.2-280.0
1 23	0213 1336	0606 0639	3	MODERATE	14-17	7.6- 27.5	106.3-111.0
1 24	0209 1338	0558 0612	1	MODERATE	14-16	153.4-161.9	308.7-310.7
1 25	0204 1342						
1 26	0202 1337						
1 27	0203 1340	0514 0623	1	WEAK	14-29	218.8-260.5	193.4-203.1
		1100 1129	2	STRONG	12-18	68.0- 85.5	242.3-246.4
1 28	0202 1340	0853 1015	1	STRONG	12-17	141.9-191.5	68.0- 79.6
1 29	0213 1349	0528 0536	1	MODERATE	15-17	168.7-173.5	242.5-243.7
		0618 0713	3	STRONG	14-22	198.9-232.2	249.6-257.4
		0942 1050	2	MODERATE	13-17	322.2- 3.4	278.4-288.1
1 30	0202 1336	0708 0802	3	STRONG	12-18	19.8- 52.5	100.2-107.8
1 31	0202 1342						
"							
2 1	0156 1337	0158 0212	2	MODERATE	27-35	133.8-142.3	103.5-105.5
2 2	0205 1341						
2 3	0203 1335	0625 0731	1	STRONG	12-28	236.6-276.5	188.6-198.0
		0815 0855	1	MODERATE	12-14	303.1-327.3	204.2-209.8
		0927 1007	1	STRONG	12-16	346.7- 10.9	214.4-220.0
2 4	0207 1338						
2 5	0233 1337	0724 0959	3	STRONG	12-26	213.6-307.3	244.2-266.1
2 6	0207 1331	0556 0617	2	STRONG	14-16	311.1-323.8	75.3- 78.3
		0840 1015	3	STRONG	15-17	50.3-107.7	98.5-111.9
2 7	0202 1337	0709 0723	2	MODERATE	12-15	145.9-154.4	289.2-291.2
		0920 1120	2	STRONG	11-18	225.1-297.7	307.7-324.7
* 2 8	0101 0200						
2 8	0200 1336	0220 0408	3	WEAK	23-36	121.9-187.2	91.9-107.2
		0603 0621	1	MODERATE	16-18	256.7-267.6	123.5-126.0
2 9	0202 1337						
2 10	0209 1340	0433 0443	1	MODERATE	15-17	143.7-149.8	158.1-159.5
		0510 0522	2	WEAK	15-17	166.1-173.4	163.3-165.0
		0632 0640	2	WEAK	22-26	215.7-220.5	174.9-176.0
2 11	0209 1341						
2 12	0204 1335	0825 1018	2	STRONG	13-30	225.3-293.6	238.1-254.1
2 13	0213 1337	1035 1153	2	STRONG	12-17	94.6-141.7	100.1-111.1
2 14	0203 1335	0336 0442	3	STRONG	12-22	352.0- 31.9	244.4-253.7
		1116 1125	2	MODERATE	19-22	270.1-275.5	309.4-310.7
* 2 15	0121 0200						
2 15	0202 1335	0328 0524	3	STRONG	11-34	137.8-208.0	86.9-103.3
		0631 0650	1	MODERATE	13-16	248.5-260.0	112.7-115.4
2 16	0202 1343						
2 17	0207 1340	0843 0854	3	STRONG	12-18	269.7-276.3	178.7-180.3
2 18	0207 1341						
2 19	0207 1335	0906 1018	2	STRONG	20-30	224.9-268.4	229.2-239.4
2 20	0207 1424	1153 1245	3	STRONG	12-36	116.5-148.0	96.4-103.8
2 21	0213 1250	0512 0525	2	MODERATE	16-20	24.8- 32.7	243.3-245.2

	DATE 1968	OBSERVING PERIOD		JUPITER OBSERVATIONS		IN-TENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
*	2 22	0118	0200							
	2 22	0200	1333	0436	0525	2	STRONG	14-26	153.7-183.3	81.9- 88.8
				0811	0824	2	MODERATE	12-16	283.6-291.5	112.3-114.1
	2 23	0207	1253							
	2 24	0208	1250	0847	0920	2	MODERATE	12-16	246.8-266.7	164.6-169.3
				1011	1015	3	STRONG	12-16	297.6-300.0	176.5-177.0
	2 25	0208	1300							
	2 26	0216	1253	0918	1105	2	STRONG	12-34	206.8-271.5	216.2-231.3
				1206	1246	3	SMOOTH	16-23	308.4-332.6	240.0-245.6
	2 27	0208	1256	0626	0645	3	MODERATE	10-18	253.6-265.0	35.5- 38.2
				1204	1245	2	MODERATE	16-31	97.9-122.7	83.3- 89.1
	2 28	0202	1251	1126	1236	2	STRONG	13-18	225.5-267.8	281.5-291.4
	2 29	0207	1254	0818	0906	2	MODERATE	14-18	262.6-291.6	98.6-105.3
	3 1	0207	1300							
	3 2	0208	1250	0934	1014	3	STRONG	12-18	249.8-274.0	156.5-162.2
				1043	1153	1	STRONG	12-16	291.5-333.8	166.3-176.2
	3 3	0210	1253	0723	0807	2	MODERATE	12-17	321.3-347.9	341.6-347.8
	3 4	0207	1250	0843	0851	2	MODERATE	13-17	160.3-165.1	196.5-197.7
				1047	1115	1	WEAK	20-29	235.2-252.2	214.1-218.0
				1152	1222	2	MODERATE	15-17	274.5-292.7	223.3-227.5
	3 5	0216	1300	0656	0813	2	STRONG	10-18	246.3-292.8	25.0- 35.9
				0844	1040	3	STRONG	10-16	311.6- 21.7	40.3- 56.7
	3 6	0207	1250							
	3 7	0207	1300							
	3 8	0207	1300	0422	0437	2	MODERATE	17-24	245.1-254.2	254.1-256.2
	3 9	0207	1250	0511	0605	1	STRONG	16-18	65.3- 98.0	104.6-112.2
	3 10	0207	1254							
	3 11	0207	1250							
	3 12	0217	1252	0706	0844	3	STRONG	10-24	226.7-286.0	11.6- 25.5
*	3 13	0119	0210							
	3 13	0210	1248	0245	0307	1	STRONG	17-30	219.5-232.8	178.3-181.4
				0417	0625	1	STRONG	16-20	275.2-352.5	191.3-209.4
				0920	1048	1	STRONG	14-18	98.3-151.5	234.2-246.6
	3 14	0207	1244	0717	0730	3	STRONG	16-18	174.7-182.5	60.4- 62.2
	3 15	0232	1240	0349	0550	3	STRONG	16-28	199.5-272.7	234.5-251.6
				0615	0620	2	MODERATE	15-18	287.8-290.8	255.1-255.8
	3 16	0234	1225	0631	0817	2	STRONG	16-19	88.1-152.2	101.0-115.9
	3 17	0233	1222							
*	3 17	2230	2630	2334	2447	2	MODERATE	28-37	137.1-181.3	89.2- 99.5
	3 18	0230	1103							
	3 19	0233	1223							
*	3 20	0147	0230							
	3 20	0230	1219	0557	0653	2	STRONG	16-21	309.9-343.8	190.5-198.4
	3 21	0232	1104	1029	1036	1	WEAK	16-17	265.0-269.2	72.5- 73.5
	3 22	0232	1130	0543	0614	2	MODERATE	16-35	242.7-261.4	235.6-240.0
	3 23	0232	1206	0807	0843	2	MODERATE	16-34	120.3-142.1	99.5-104.6
				0846	1007	2	MODERATE	16-21	143.9-192.9	105.1-116.5
	3 24	0234	1202	0734	0821	1	STRONG	14-19	251.0-279.4	298.5-305.1
	3 25	0233	1157							
	3 26	0133	1028							
	3 27	0148	1030							
	3 28	0147	1030	0522	0553	3	STRONG	16-20	53.5- 72.2	14.0- 18.4
				0809	1008	3	STRONG	14-22	154.4-226.4	37.6- 54.4
	3 29	0147	1030							
	3 30	0134	1100	0817	1036	3	STRONG	16-35	100.4-184.4	85.8-105.4
	3 31	0134	1030	0800	0926	3	STRONG	14-23	240.6-292.6	286.9-299.1
	4 1	0200	1029							
	4 2	0135	1031							
	4 3	0149	1037							
	4 4	0138	1031							

DATE 1968	OBSERVING PERIOD	JUPITER OBSERVATIONS	INTENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
4 5	0137 1031	0619 0814	1	MODERATE	15-23	212.3-281.8	210.3-226.6
		0855 1010	2	STRONG	12-21	306.6-352.0	232.4-243.0
4 6	0134 1030	1000 1008	2	WEAK	12-18	136.4-141.3	85.1- 86.2
4 7	0134 1032						
4 8	0149 1030	0650 0726	3	STRONG	14-20	322.7-344.4	105.3-110.3
4 9	0134 1032						
4 10	0137 0945						
4 11	0205 0950						
4 12	0154 0949						
4 13	0154 0945						
4 14	0155 0945						
4 15	0154 0945	0525 0616	3	STRONG	16-27	244.8-275.6	77.7- 84.9
4 16	0155 0952						
4 17	0200 0945						
4 18	0157 0946						
4 19	0152 0954						
4 20	0153 0945						
4 21	0154 0945						
4 22	0204 0946	0414 0427	3	MODERATE	21-35	175.3-183.1	52.1- 54.0
		0736 0817	3	STRONG	16-28	297.4-322.2	80.6- 86.4
4 23	0154 0950						
4 24	0154 0710	0421 0456	2	STRONG	15-36	120.5-141.6	99.9-104.8
		0539 0629	2	STRONG	12-23	167.6-197.9	110.9-118.0
4 24	0750 0945						
4 25	0154 0947						
4 26	0154 0945						
4 27	0154 0944						
4 28	0154 0940						
4 29	0155 0936						
4 30	0202 0611	0243 0304	1	WEAK	22-34	243.9-256.6	226.8-229.8
		0500 0603	2	MODERATE	16-22	326.8- 4.8	246.2-255.1
4 30	0733 0932						
5 1	0154 0928	0450 0653	3	STRONG	20-36	111.1-185.5	88.2-105.5
5 2	0155 0617						
5 2	0703 0924						
5 3	0200 0921						
5 4	0153 0917						
5 5	0158 0913						
5 6	0157 0910						
5 7	0154 0906						
5 8	0201 0902						
5 9	0205 0859	0524 0529	2	MODERATE	20-24	255.1-258.1	280.3-281.1
		0617 0622	2	MODERATE	18-20	287.1-290.1	287.8-288.5
5 10	0204 0855						
5 11	0203 0851						
5 12	0203 0848						
5 13	0203 0844						
5 14	0203 0840						
5 15	0203 0836	0618 0637	1	MODERATE	22-26	110.2-121.7	68.4- 71.1
5 16	0204 0833						
5 17	0204 0829						
5 18	0202 0825						
5 19	0202 0822						
5 20	0203 0818						
5 21	0204 0814	0514 0527	1	WEAK	22-26	253.8-261.7	199.7-201.5
5 22	0204 0811						
5 23	0208 0700	0614 0627	2	MODERATE	16-24	230.8-238.7	254.9-256.8
5 23	0740 0807						
5 24	0304 0800						
5 25	0232 0800						
* 5 25	2251 2600						

DATE 1968	OBSERVING PERIOD	JUPITER OBSERVATIONS	INTENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
5 26	0200 0756						
5 27	0234 0752						
5 28	0247 0730						
5 29	0239 0745						
5 30	0237 0741						
5 31	0232 0738						
6 1	0233 0657						
6 2	0232 0730	0231 0335	2	MODERATE	25-34	159.7-198.4	97.0-106.1
* 6 3	0003 0200						
6 3	0200 0727						
6 4	0232 0723						
6 5	0233 0720						
6 6	0232 0716						
6 7	0233 0700						
6 8	0240 0708						
6 9	0235 0706	0307 0351	2	WEAK	22-30	153.8-180.4	85.6- 91.8
6 10	0251 0656						
6 11	0232 0659						
6 12	0232 0655						
6 13	0232 0652						
6 14	0238 0648						
6 15	0232 0645						
6 16	0238 0641						
6 17	0235 0638						
6 18	0232 0634						
6 21	0233 0510						
6 22	0244 0511						
6 23	0247 0511						
6 24	0256 0531						
6 25	0248 0532						
6 26	0248 0532						
* 6 26	1917 2202						
6 27	0234 0511						
6 28	0233 0510						
* 6 29	0026 0230						
6 29	0230 0510						
6 30	0234 0511						
7 1	0248 0530						
7 2	0250 0531						
7 3	0251 0533						
7 4	0247 0529						
7 5	0230 0510						
* 7 6	0055 0230						
7 6	0230 0510						
7 7	0232 0510						
7 8	0249 0524						
7 9	0257 0520						
7 10	0239 0510						
7 11	0255 0510						
7 12	0238 0510						
7 13	0237 0506						
7 14	0233 0503						
7 15	0230 0459						
7 16	0235 0456						
7 17	0228 0452						
7 18	0321 0449						
7 19	0218 0430						
7 20	0219 0430						
7 21	0223 0430						
7 22	0218 0435						

	DATE 1968	OBSERVING PERIOD		JUPITER OBSERVATIONS		INTENSITY	BURSTINESS	FREQ. RANGE MHZ	JUPITER LONGITUDE	Io RANGE
	7 23	0215	0431							
*	7 23	1941	2258	2108	2147	1	WEAK	22-27	221.4-244.9	183.7-189.2
	7 24	0212	0428							
	7 25	0302	0424							
	7 26	0218	0421							
	7 27	0218	0418							
	7 28	0219	0414							
*	7 28	1602	1900	1753	1850	2	WEAK	28-35	135.0-169.4	92.5-100.5
	7 29	0215	0411							
	7 30	0220	0407							
*	7 30	2040	2400							
	7 31	0216	0404							
	8 1	0229	0400							
	8 2	0217	0348							
	8 3	0222	0353							
	8 4	0235	0350							
	8 5	0219	0346							
	8 6	0202	0330							
	8 7	0201	0332							
	8 8	0000	0330							
	8 8	1415	2730							
	8 9	1416	2729							
	8 10	1424	2726							
	8 11	1331	2722							
	8 12	1411	2719							
	8 13	1411	1500							
	8 13	1647	2057							
	8 13	2108	2716							
	8 14	1457	2145							
	8 14	2223	2712							
	8 15	1413	1707							
	8 15	1746	2709							
	8 16	1414	2705							
	8 17	1428	2702							
	8 18	1432	2133							
	8 19	1624	1650							
	8 19	2148	2655							
	8 20	1417	1552							
	8 20	1605	2236							
	8 20	2323	2652							
	8 21	1356	2648							
	8 22	1411	1740							
	8 22	1753	2645							
	8 23	1413	2641							
	8 24	1428	2630							
	8 25	1440	2635							
	8 26	1414	2631							
	8 27	1430	2628							
	8 28	1417	2624							
	8 29	1240	2621	1338	1516	2	SMOOTH	25-32	110.6-169.9	81.3- 95.2
	8 30	1411	2617							
	8 31	1418	2614							
	9 1	1432	2611							
	9 2	1413	2607							
	9 3	1413	2540	2256	2328	3	SMOOTH	25-36	119.7-139.0	96.5-101.0
	9 4	1223	2559							
	9 5	1224	2558							
	9 6	1217	2554							
	9 7	1218	2551							
	9 8	1235	2548							
	9 9	1227	2545							

* DENOTES SPECIAL OBSERVING PERIOD WHEN Io-RELATED EMISSIONS WERE POSSIBLE.

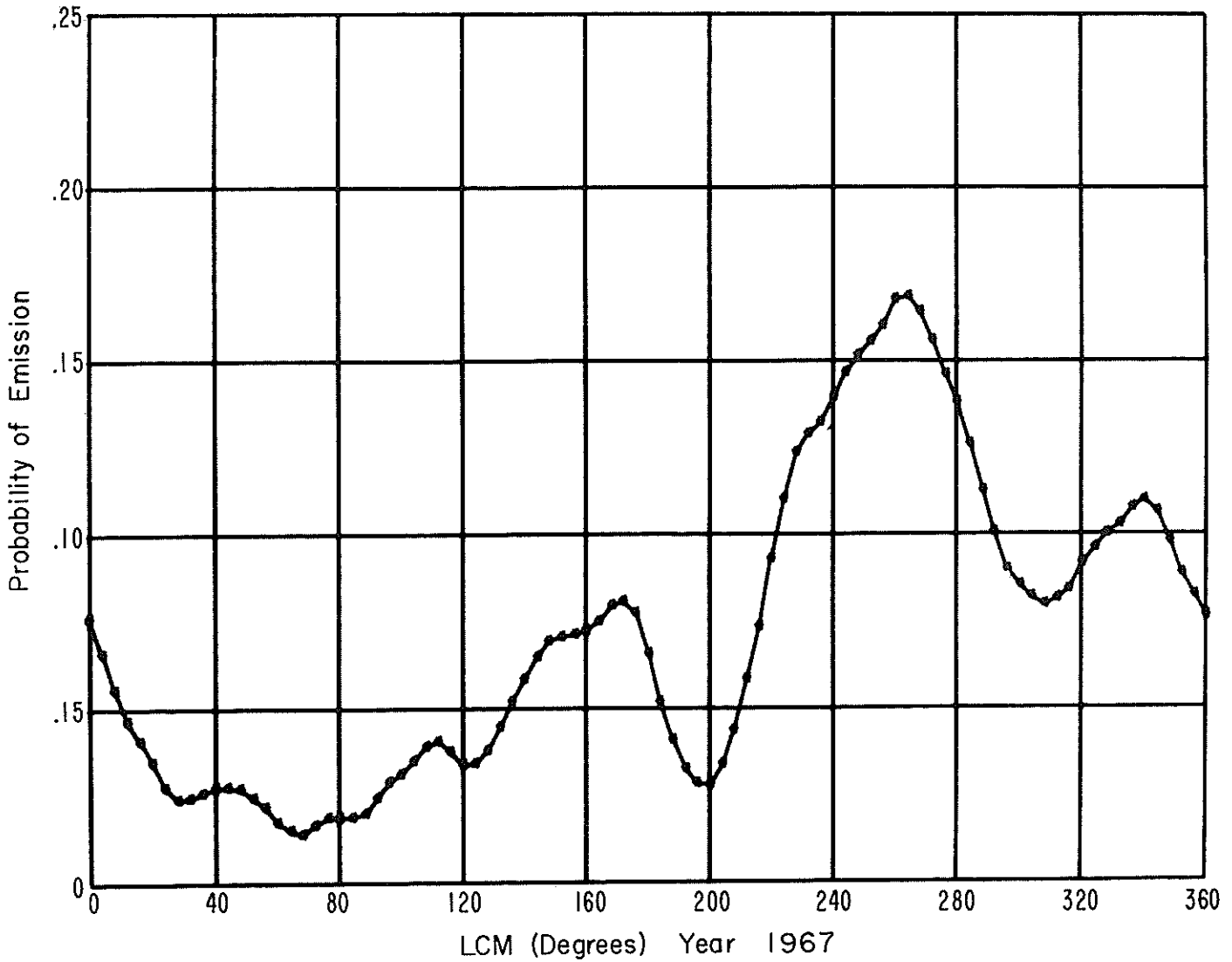
.25
.20
.15
.10
.15
0
Probability of Emission
0
40
80
120
160
200
240
280
320
360
LCM (Degrees) Year 1967

Fig. 1

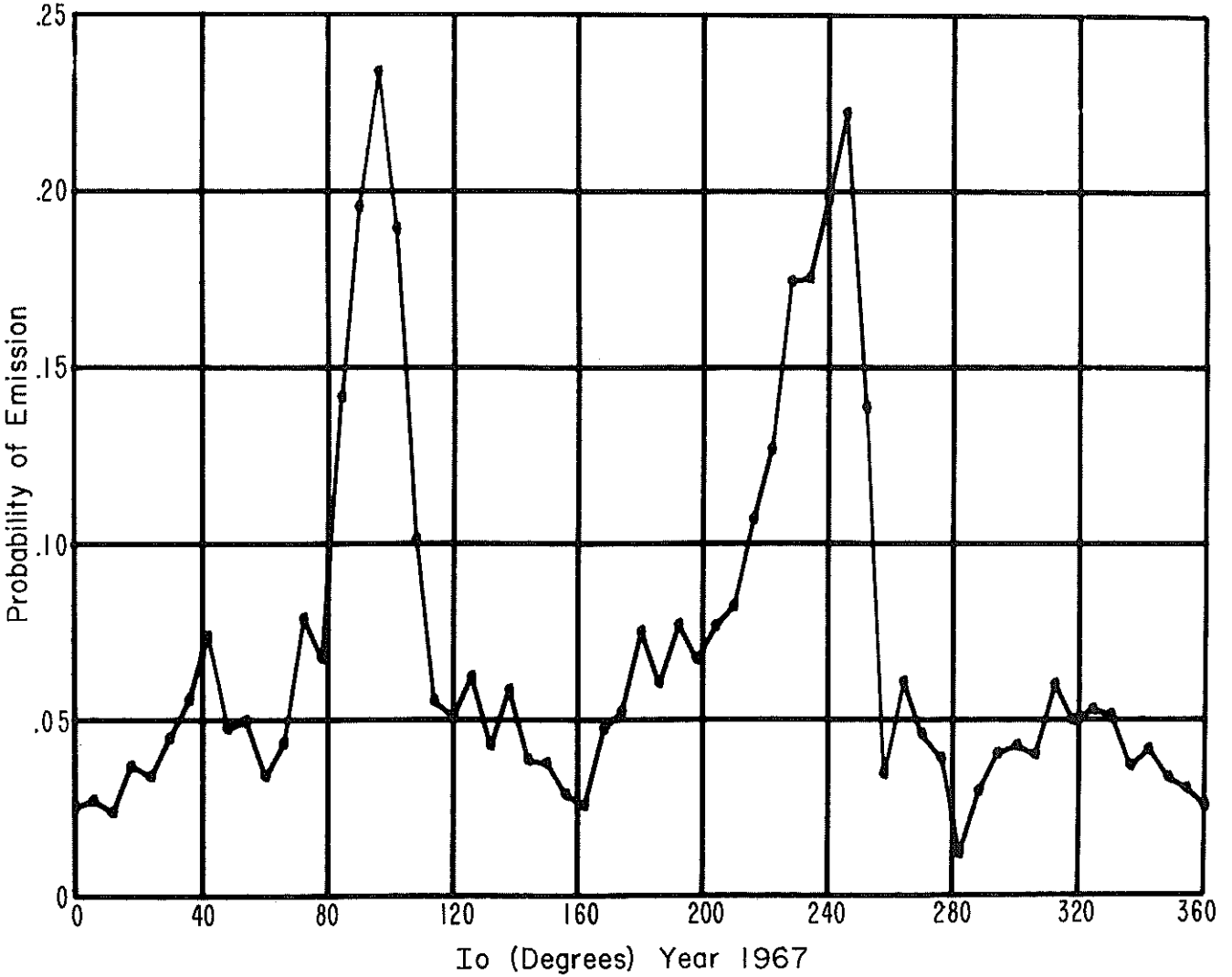
.25
.20
.15
.10
.05
0
Probability of Emission
0
40
80
120
160
200
240
280
320
360
Io (Degrees) Year 1967

Fig. 2

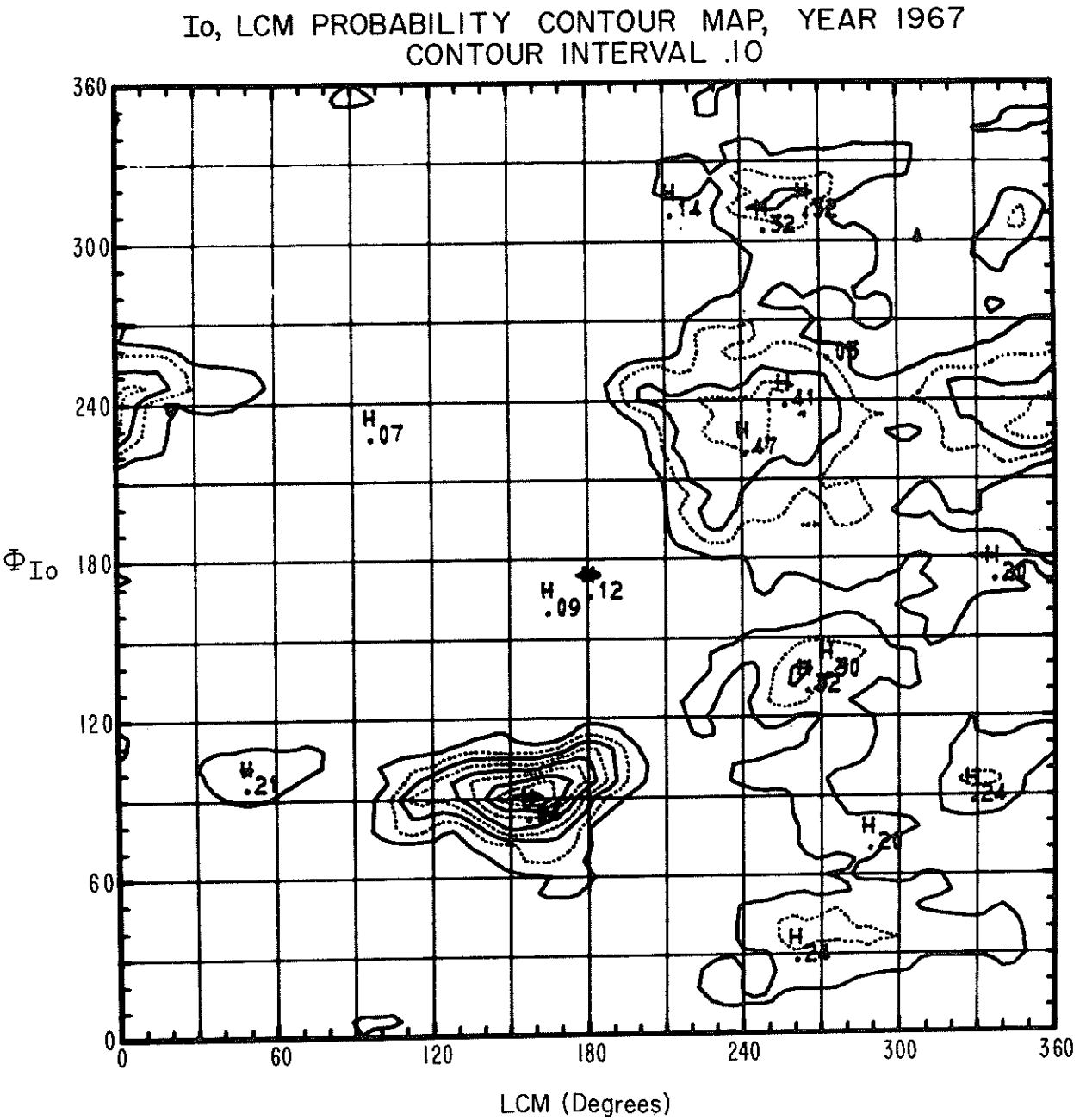
Io, LCM PROBABILITY CONTOUR MAP, YEAR 1967
CONTOUR INTERVAL .10
360
300
240
180
120
60
0
Φ_{Io}
0
60
120
180
240
300
360
LCM (Degrees)

Fig. 3

EMISSION PLOT FOR THE APPARITION OF 1967

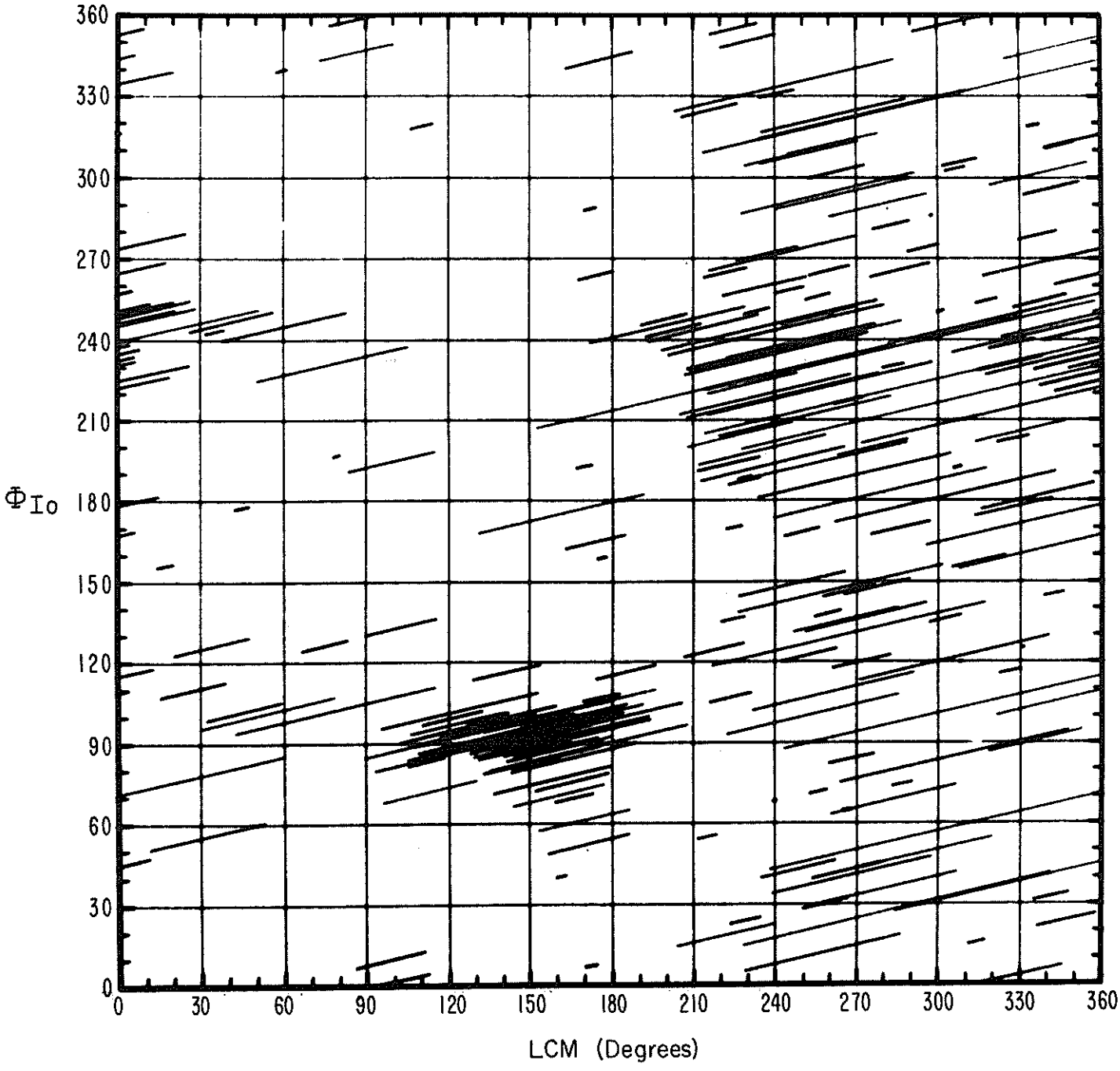

Fig. 4

OBSERVATION PLOT FOR THE APPARITION OF 1967

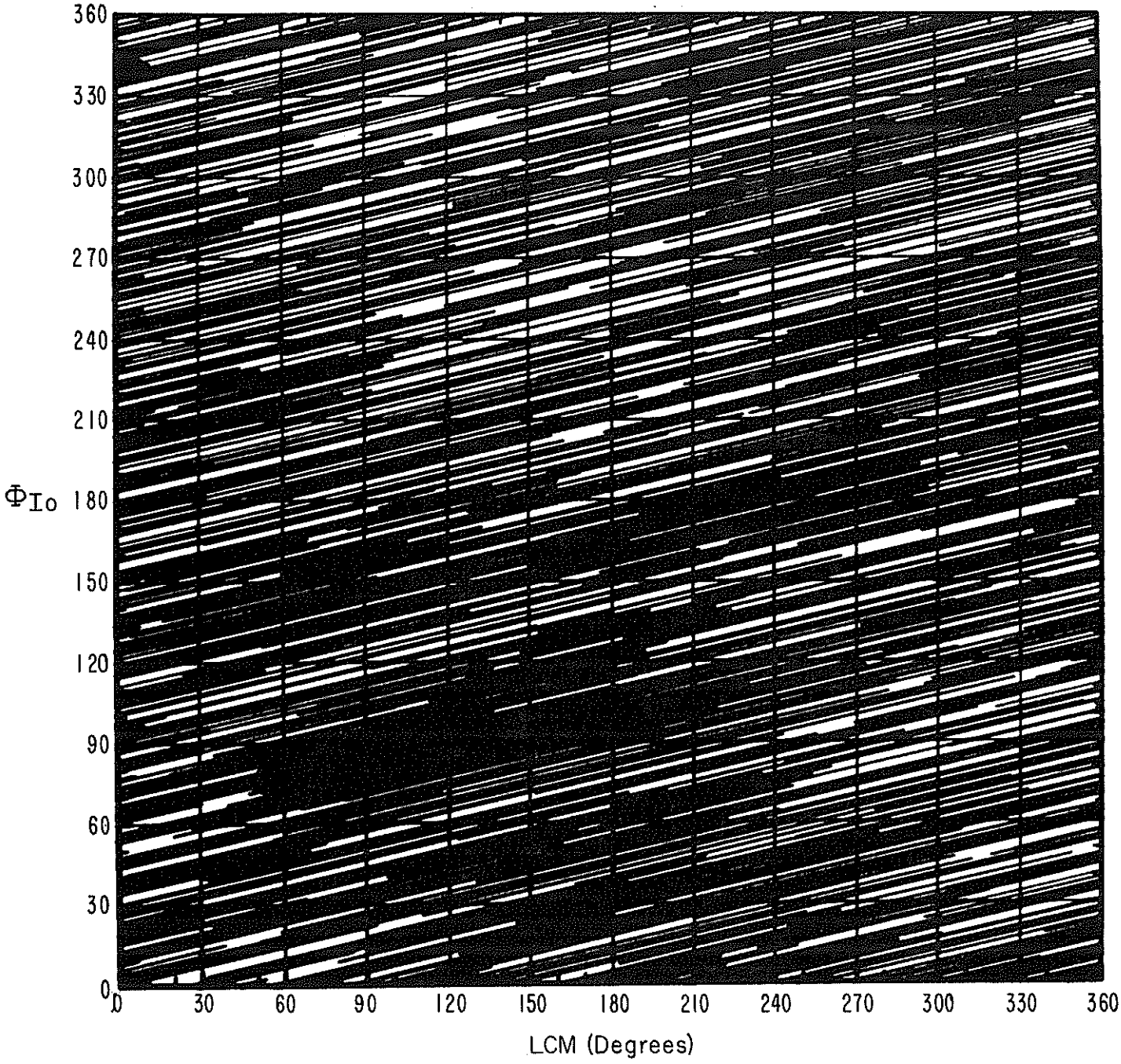

Fig. 5

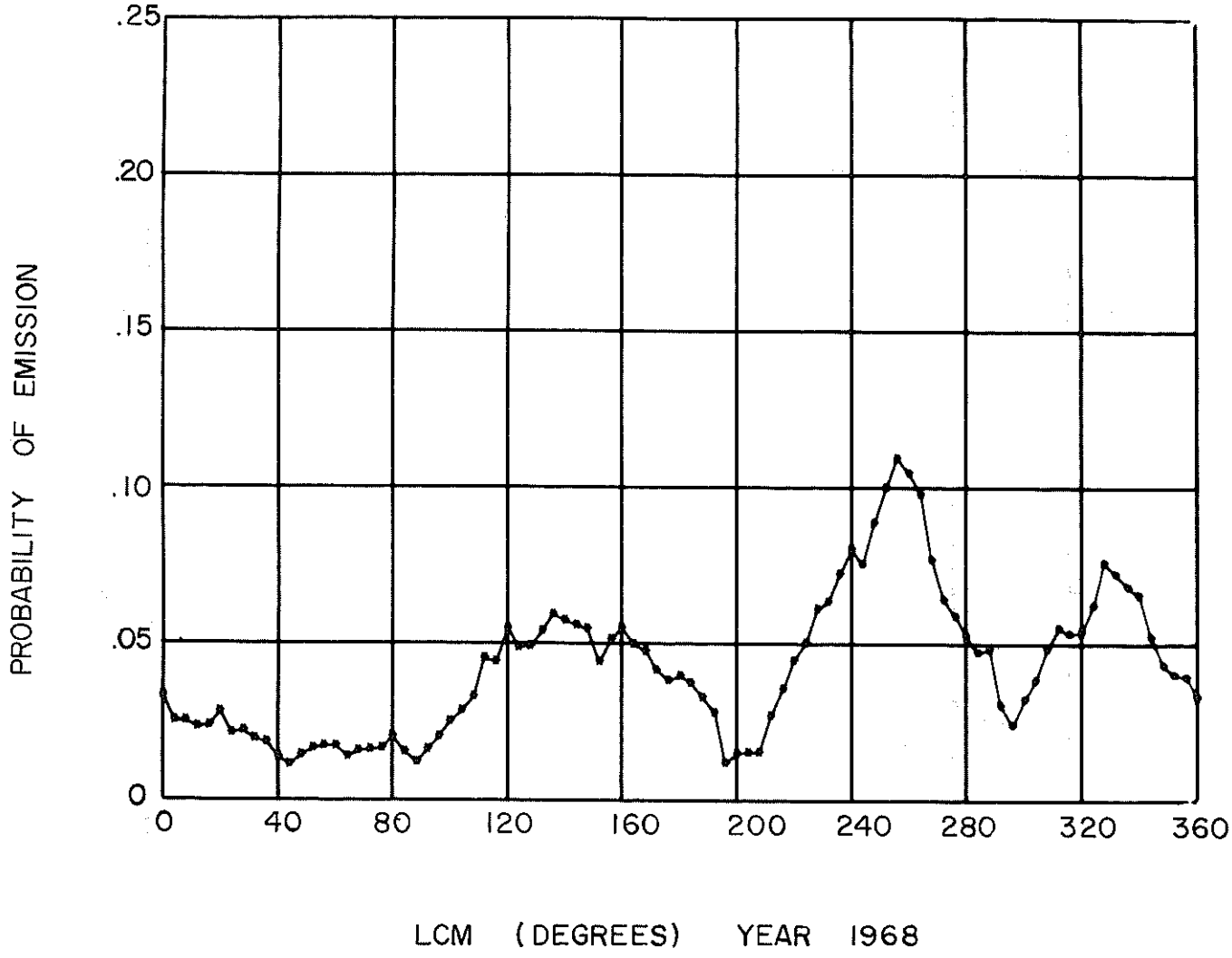
PROBABILITY OF EMISSION
.25
.20
.15
.10
.05
0
0
40
80
120
160
200
240
280
320
360
LCM (DEGREES) YEAR 1968

Fig. 6

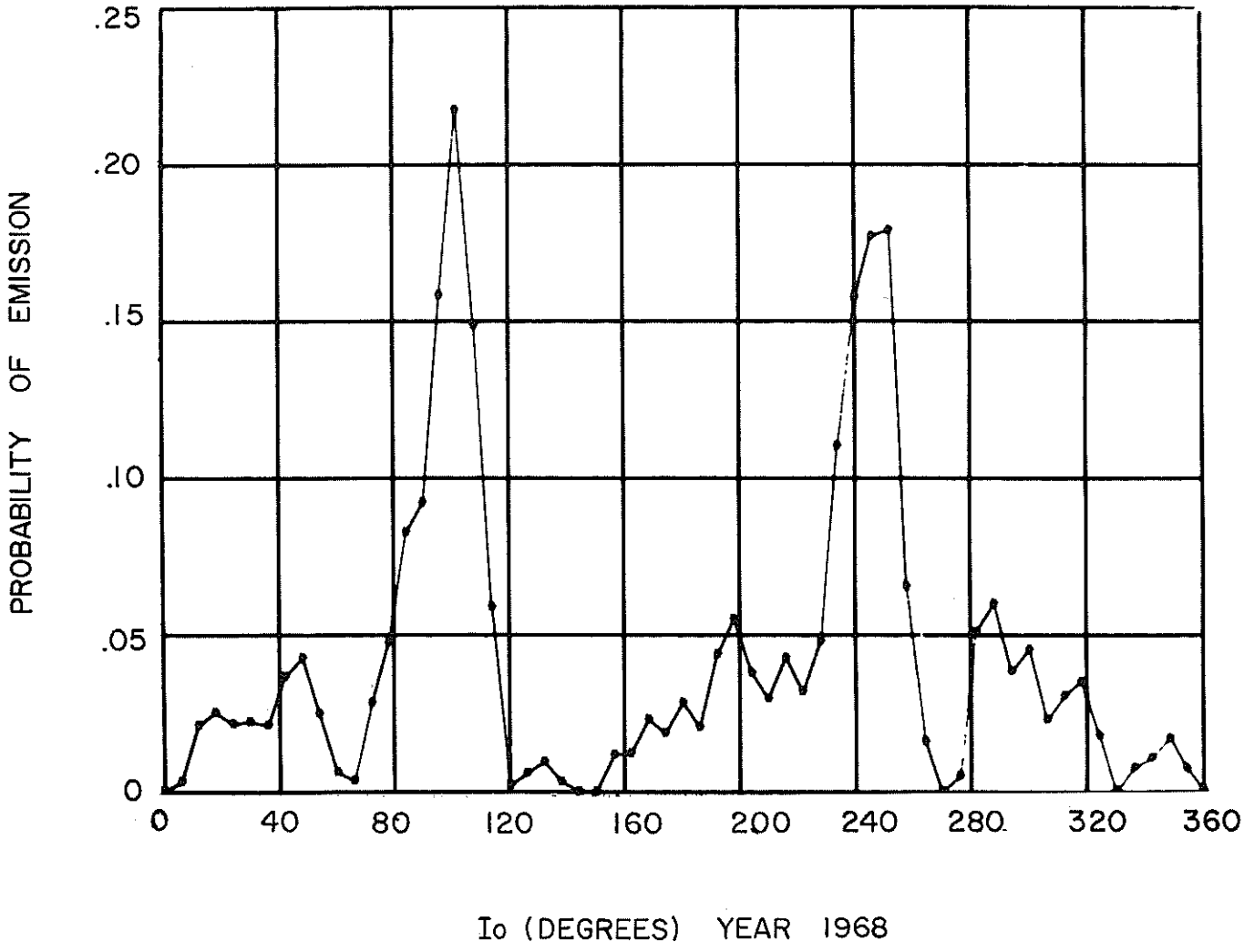
PROBABILITY OF EMISSION
.25
.20
.15
.10
.05
0
0
40
80
120
160
200
240
280
320
360
Io (DEGREES) YEAR 1968

Fig. 7

Io, LCM PROBABILITY CONTOUR MAP, YEAR 1968, CONTOUR INTERVAL .10

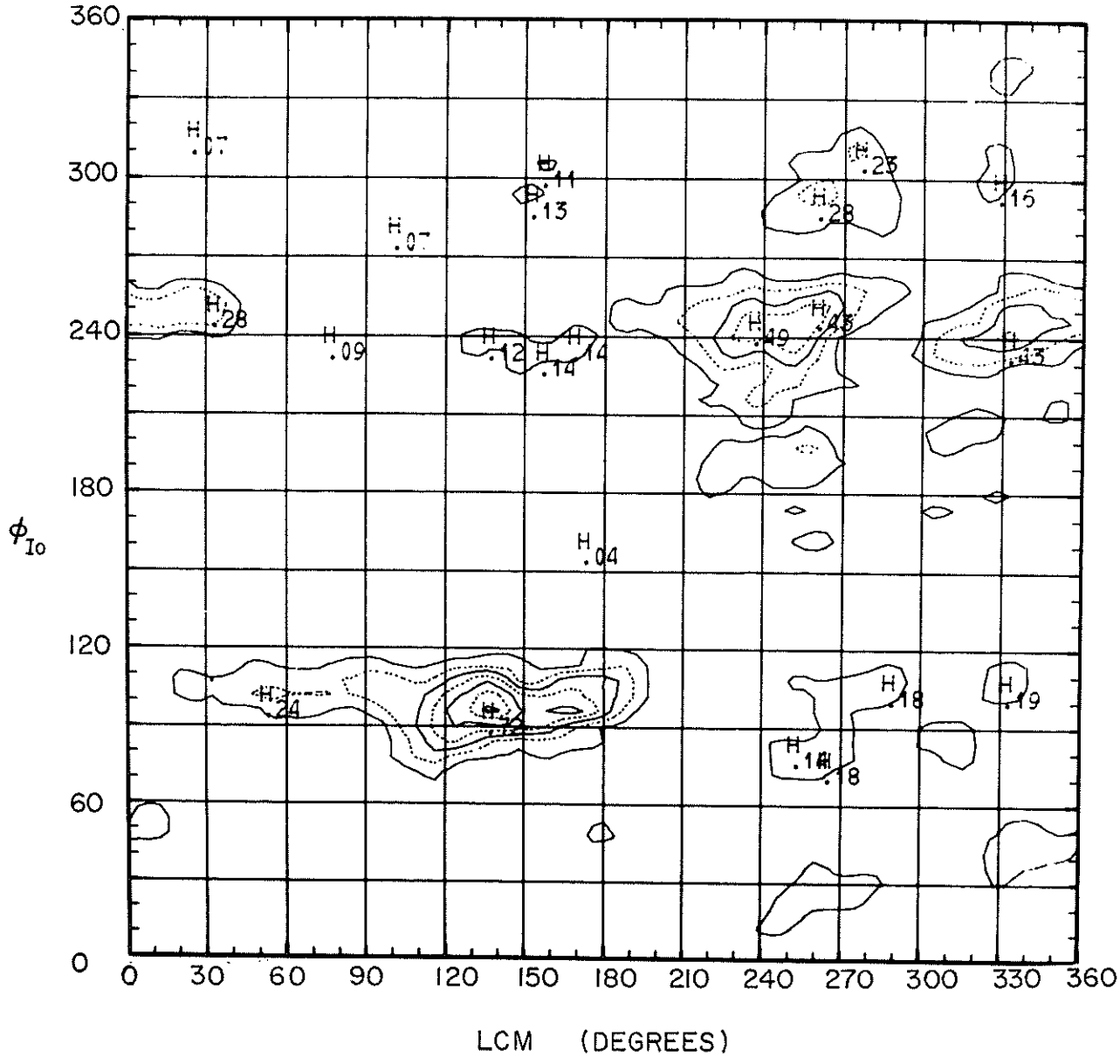

Fig. 8

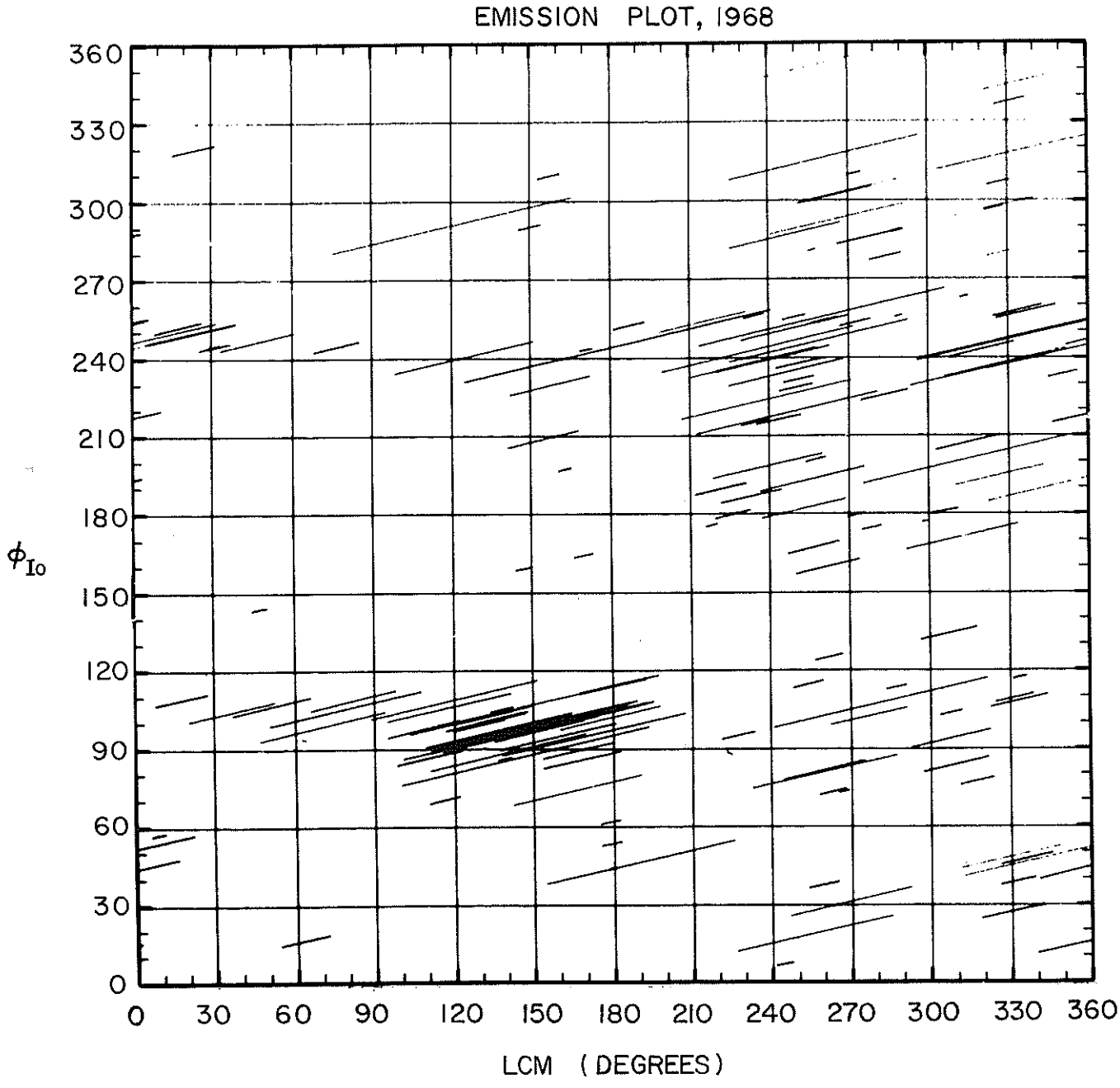
EMISSION PLOT, 1968
360
330
300
270
240
210
180
150
120
90
60
30
0
ϕ_{Io}
0 30 60 90 120 150 180 210 240 270 300 330 360
LCM (DEGREES)

Fig. 9

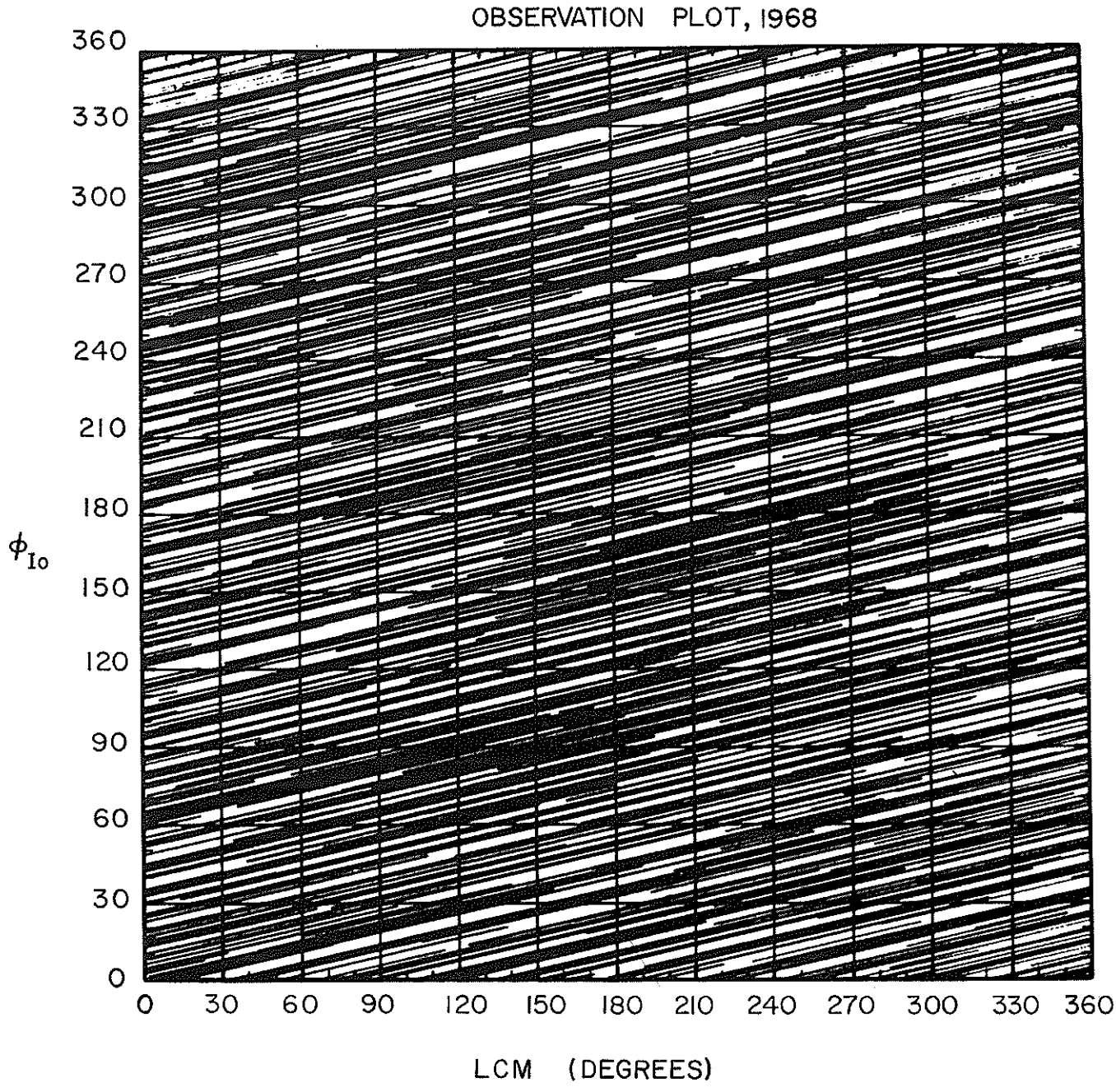
OBSERVATION PLOT, 1968
360
330
300
270
240
210
180
150
120
90
60
30
0
ϕ_{Io}
0 30 60 90 120 150 180 210 240 270 300 330 360
LCM (DEGREES)

Fig. 10

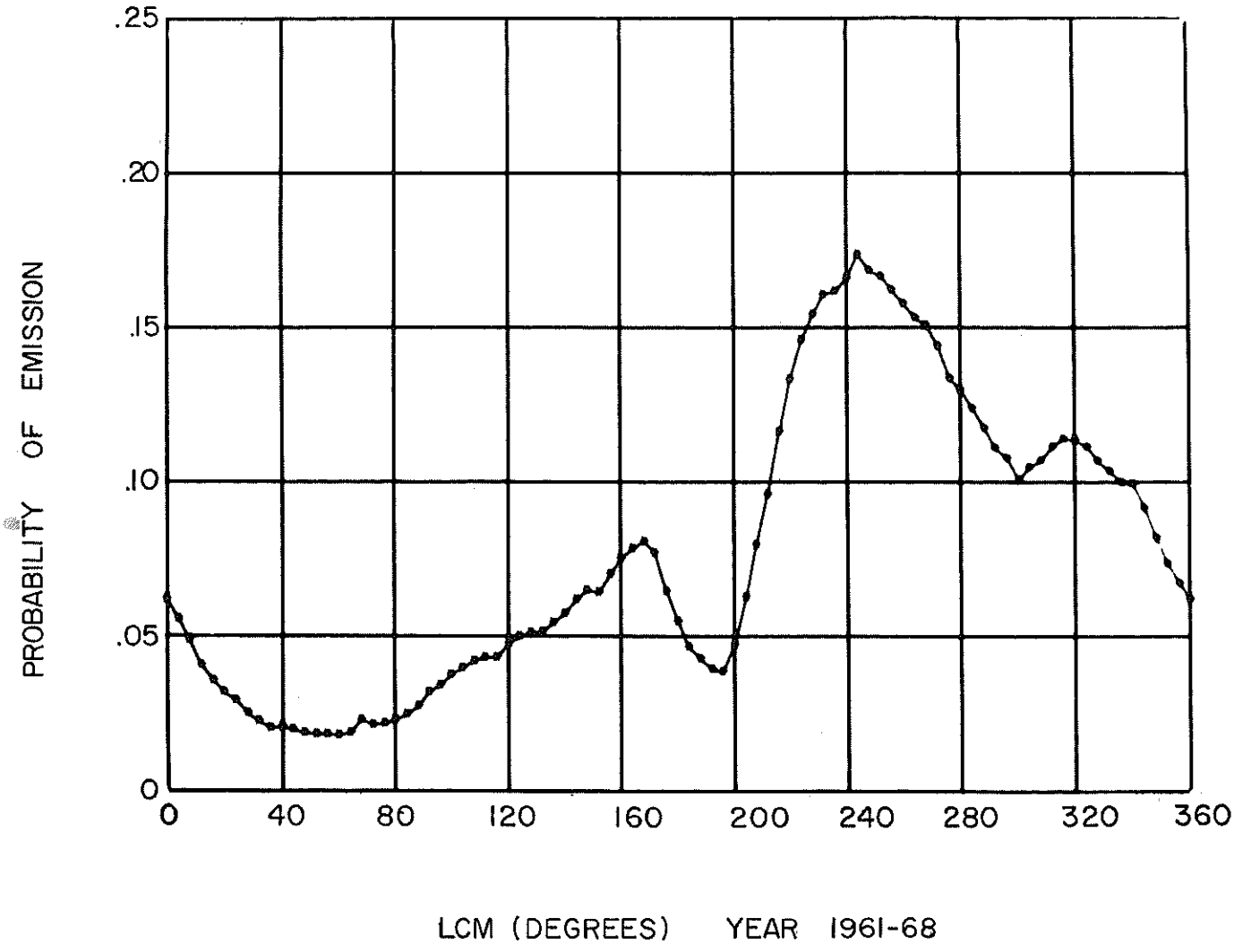
.25
.20
.15
.10
.05
0
PROBABILITY OF EMISSION
0
40
80
120
160
200
240
280
320
360
LCM (DEGREES) YEAR 1961-68

Fig. 11

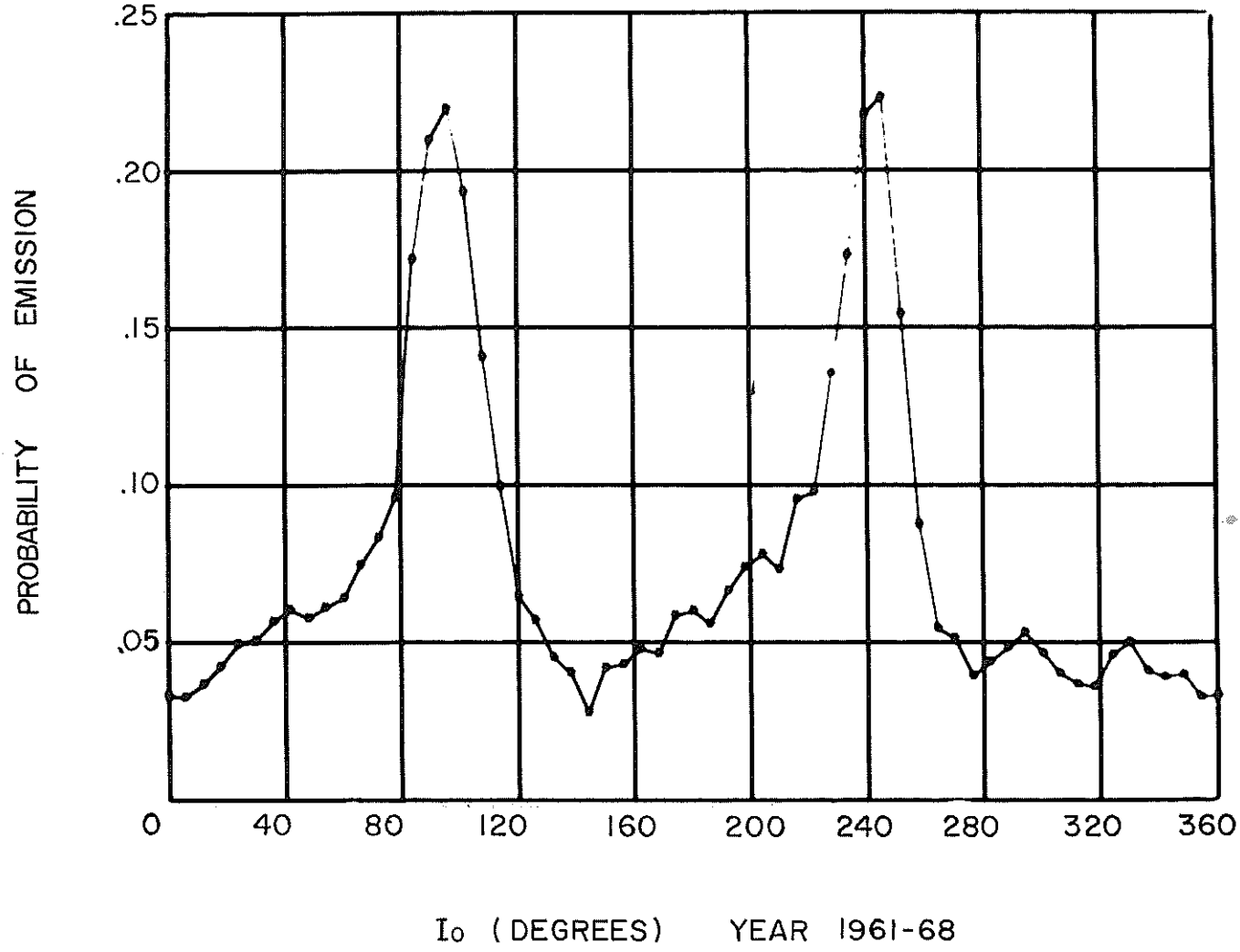
PROBABILITY OF EMISSION
.25
.20
.15
.10
.05
0
40
80
120
160
200
240
280
320
360
Io (DEGREES) YEAR 1961-68

Fig. 12

Io, LCM PROBABILITY CONTOUR MAP FOR COMBINED DATA OF 1961-68, CONTOUR INTERVAL .10

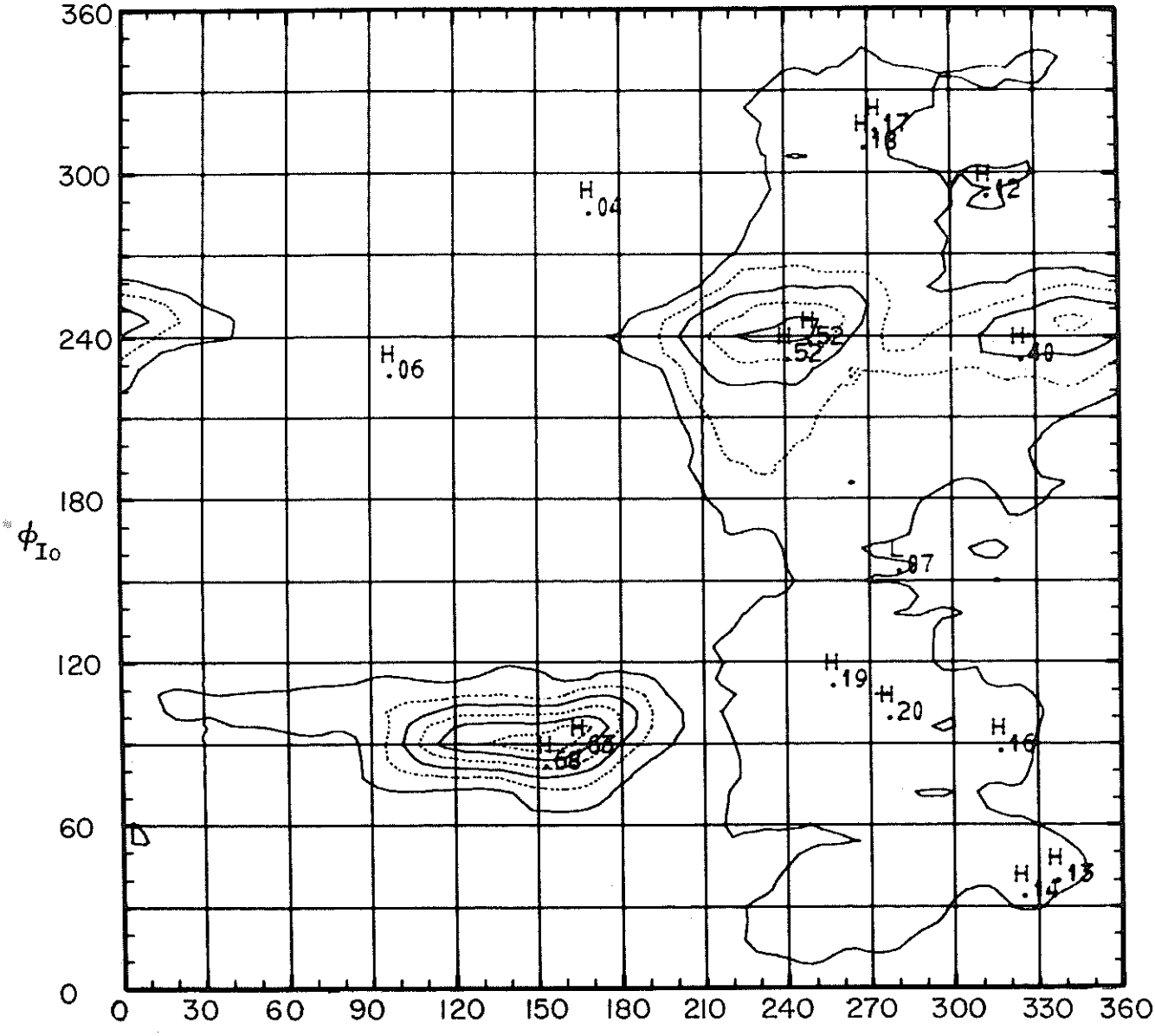

Fig. 13

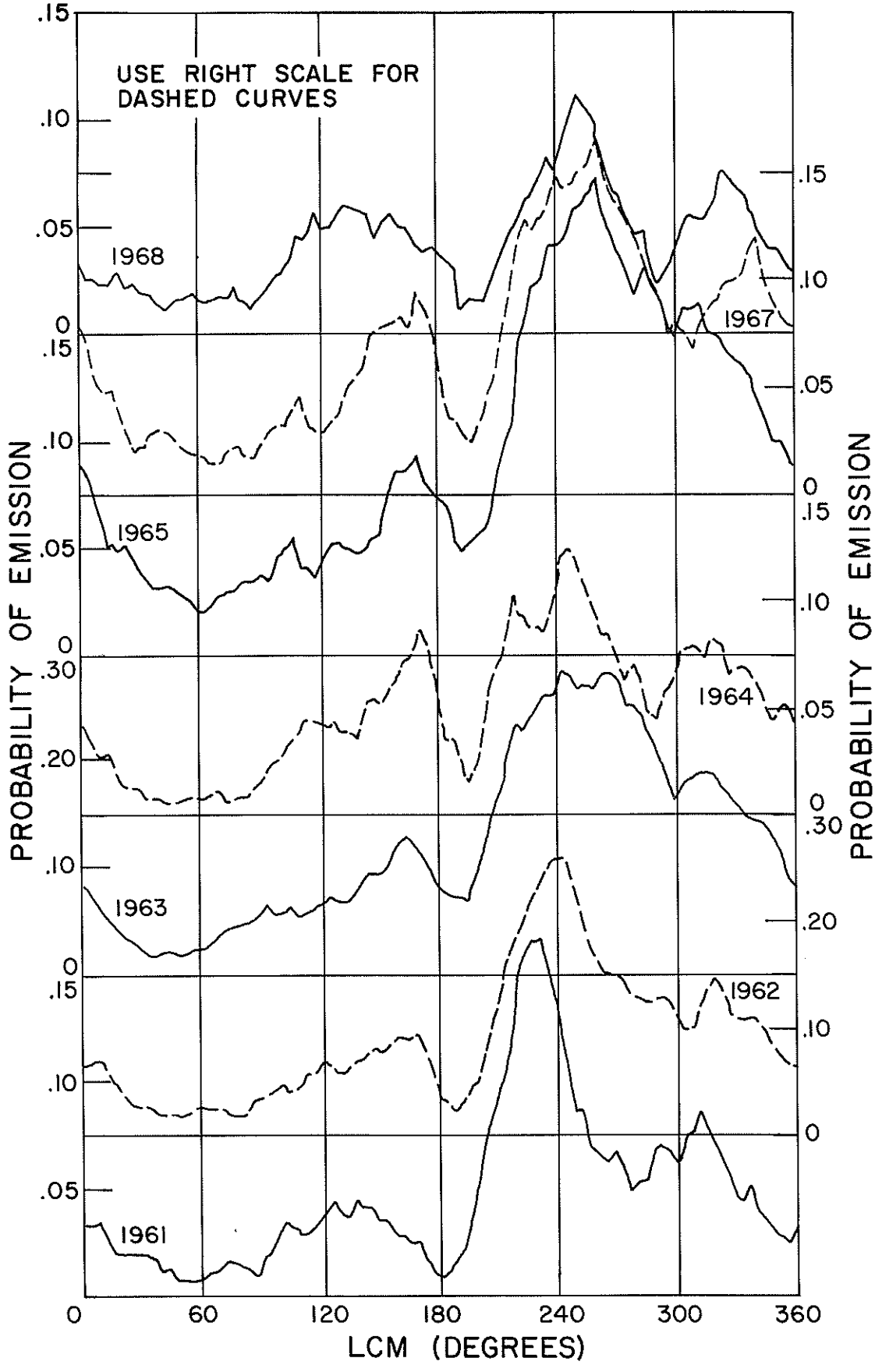

Fig. 14

USCOMM - ESSA - ASHEVILLE -- 11/5/68 -- 600