

National Radio Astronomy Observatory
Tucson, Arizona

March 21, 1989

MEMORANDUM

To: D. Emerson, D. Chase, R. Freund, J. Lamb, and J. Payne

From: P. R. Jewell *PRJ*

Subject: Pointing Nastiness

I have attached some graphs showing just how bad the pointing currently is. All these data were taken over the past five days using the 3 mm SIS receiver. The weather has been good, and for the most part, the observations had good signal-to-noise. The data are from an observing run I had last week and one that Connie Walker is finishing up this morning. Six graphs and a table are attached:

1. ΔAz vs. elevation for both observing runs;
2. ΔEl vs. elevation for both observing runs;
3. ΔAz vs. elevation for Walker's run only;
4. ΔEl vs. elevation for Walker's run only;
5. ΔAz vs. elevation for both runs, with day/night points distinguished (day was defined to be between 0800 and 1830 MST)
6. ΔEl vs. elevation for both runs, with day/night points distinguished.
7. A table of the input data.

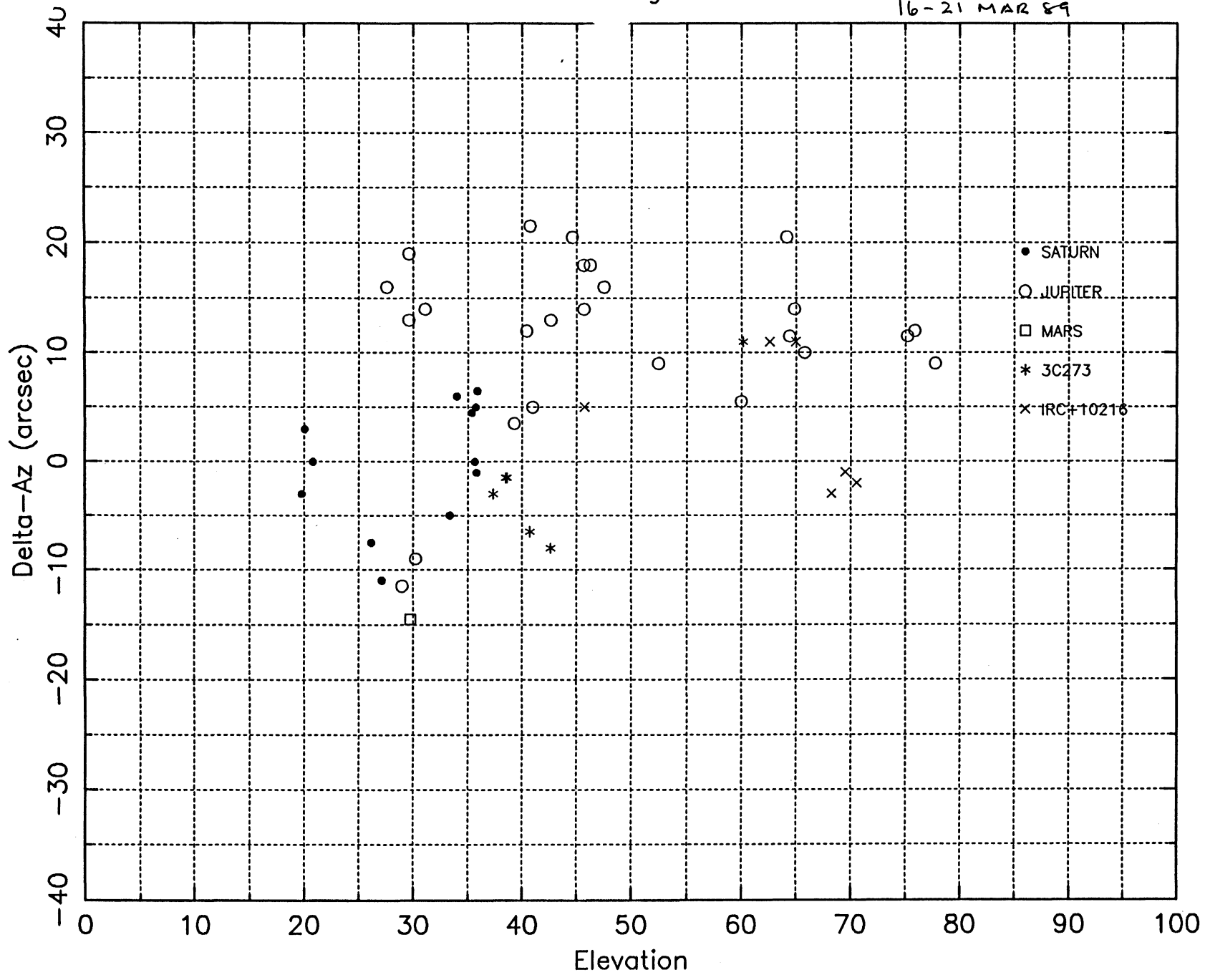
Although the elevation plots are nothing to be proud of, at least there is an identifiable trend with a scatter that is not too bad, *at least for 3 mm*. This type of scatter is what I am used to seeing for the past several years. The azimuth corrections are just terrible, however. The total scatter is over 30"! This isn't even tolerable for 3 mm observations, let alone 800 μm . There may be a few clues to what is going on. The azimuth errors appear to be bifurcated between day and night, although most of the day points are Jupiter.

What could be going on? If there is a day/night effect, why is it only seen in azimuth? Jupiter isn't extremely close to the sun now, so I doubt it is caused by focused heating of the feedlegs. Could there be something wrong with the Jupiter ephemeris? If so, why does it only affect azimuth? Could the subreflector positioning be off? If so, why is it different for day or night or for different sources? There must be some gross error causing this problem and we must find it.

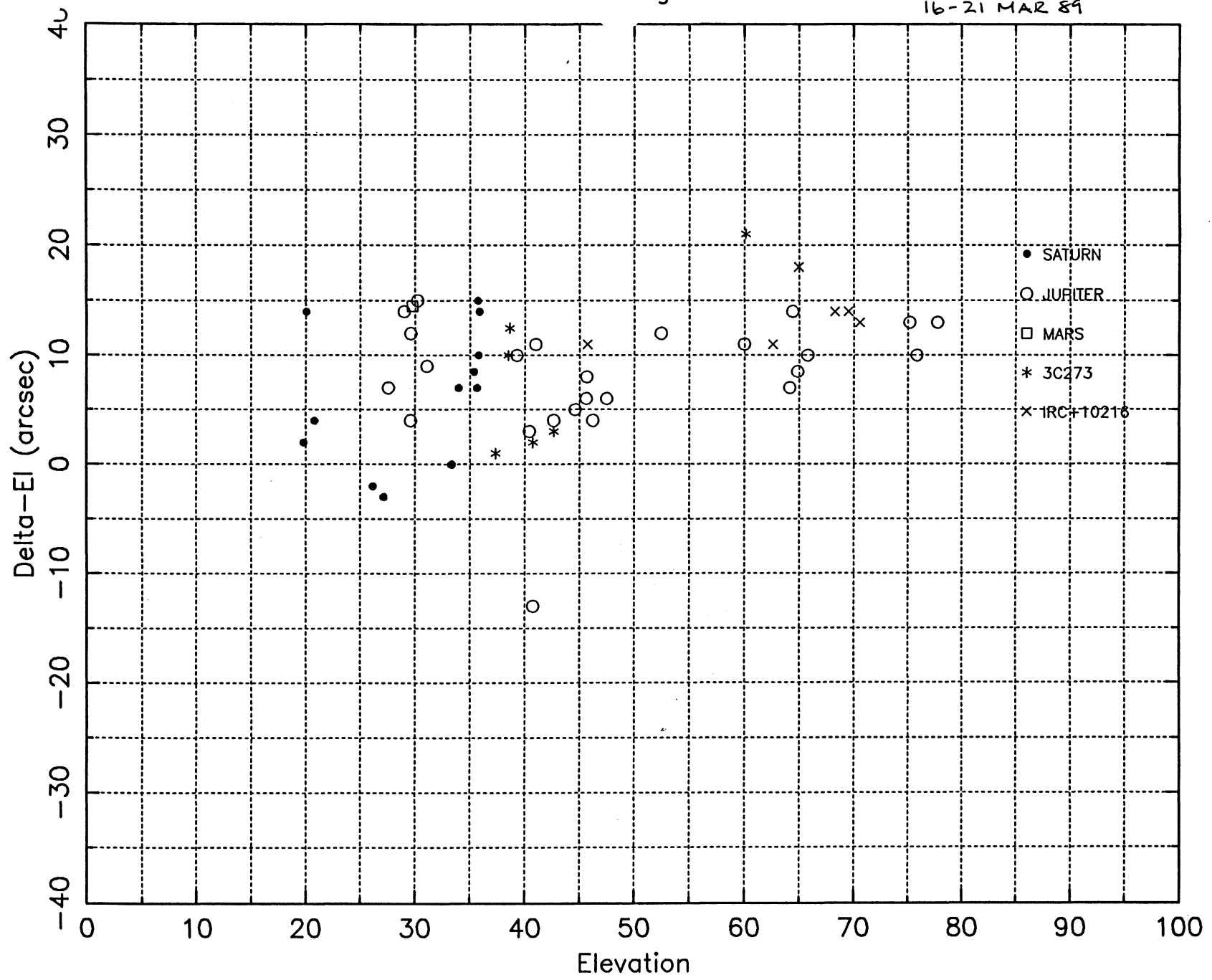
Azimuth P_c 1g Corrections 3mm SIS POINTING
16-21 MAR 89

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(2)

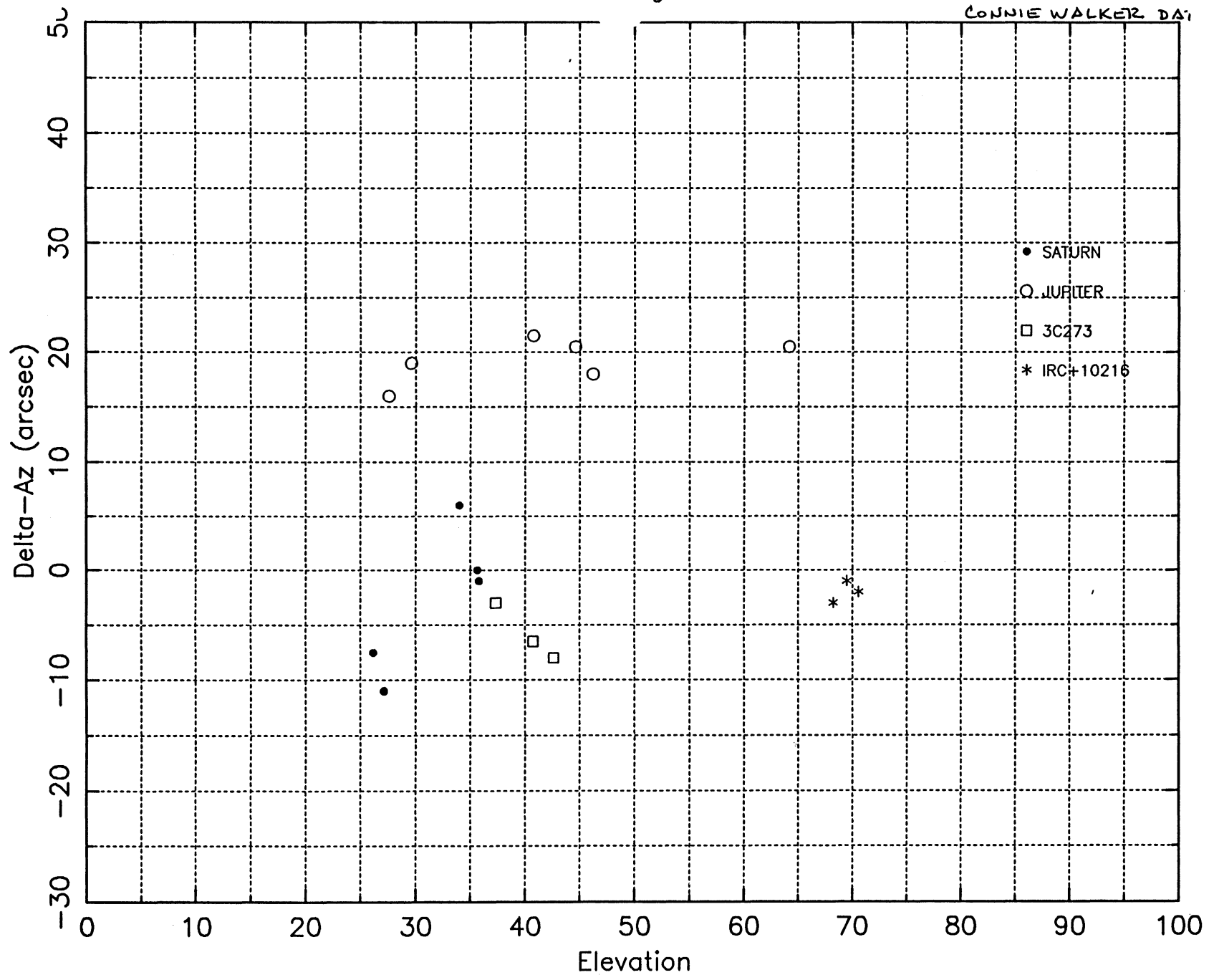


Azimuth Position Corrections

3MM SIS POINTING
18-21 MAR 89
CONNIE WALKER DAY

JULY

3

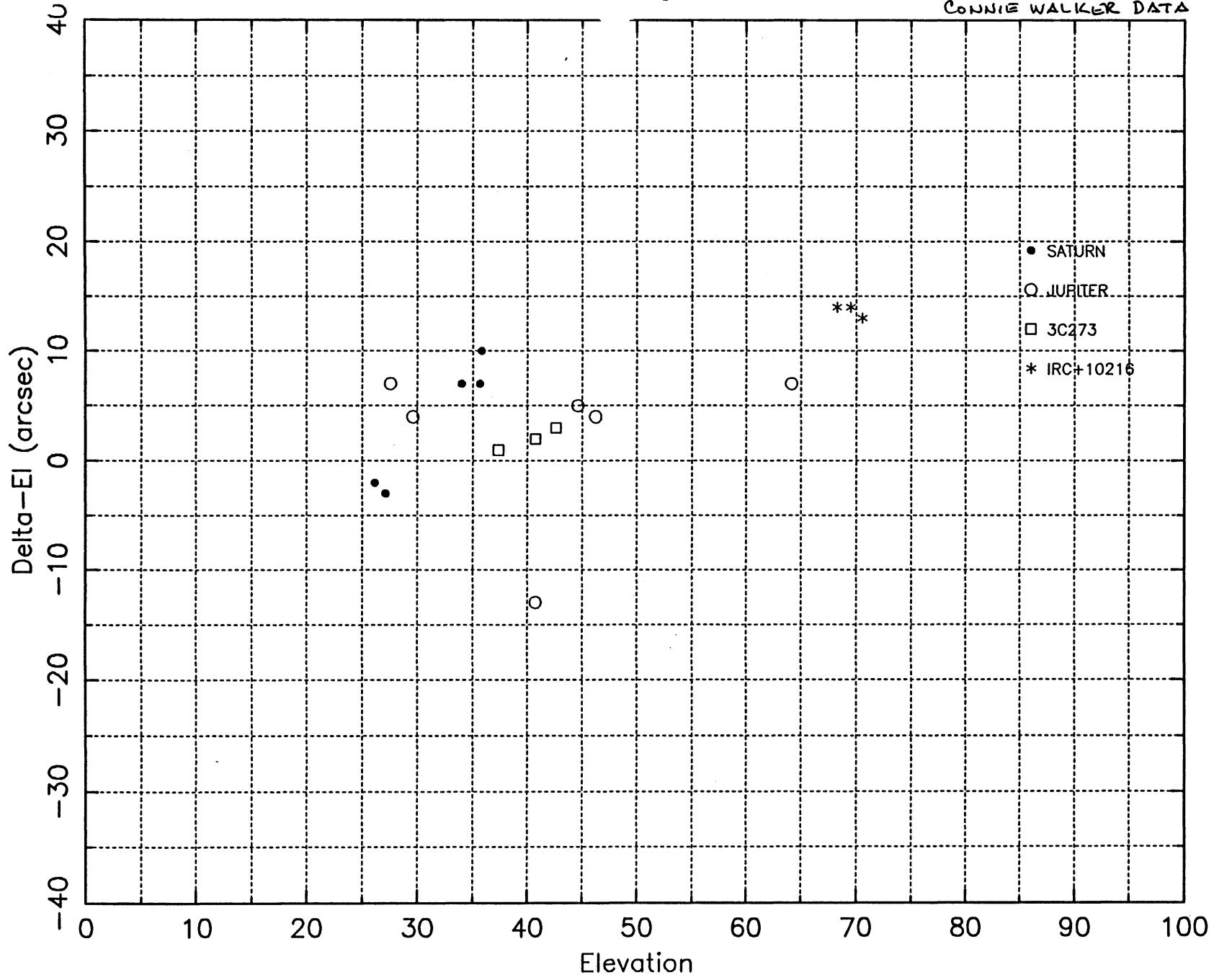


Elevation Pointing Corrections

3MM SIS POINTING
18-21 MAR 89
CONNIE WALKER DATA

7

(4)

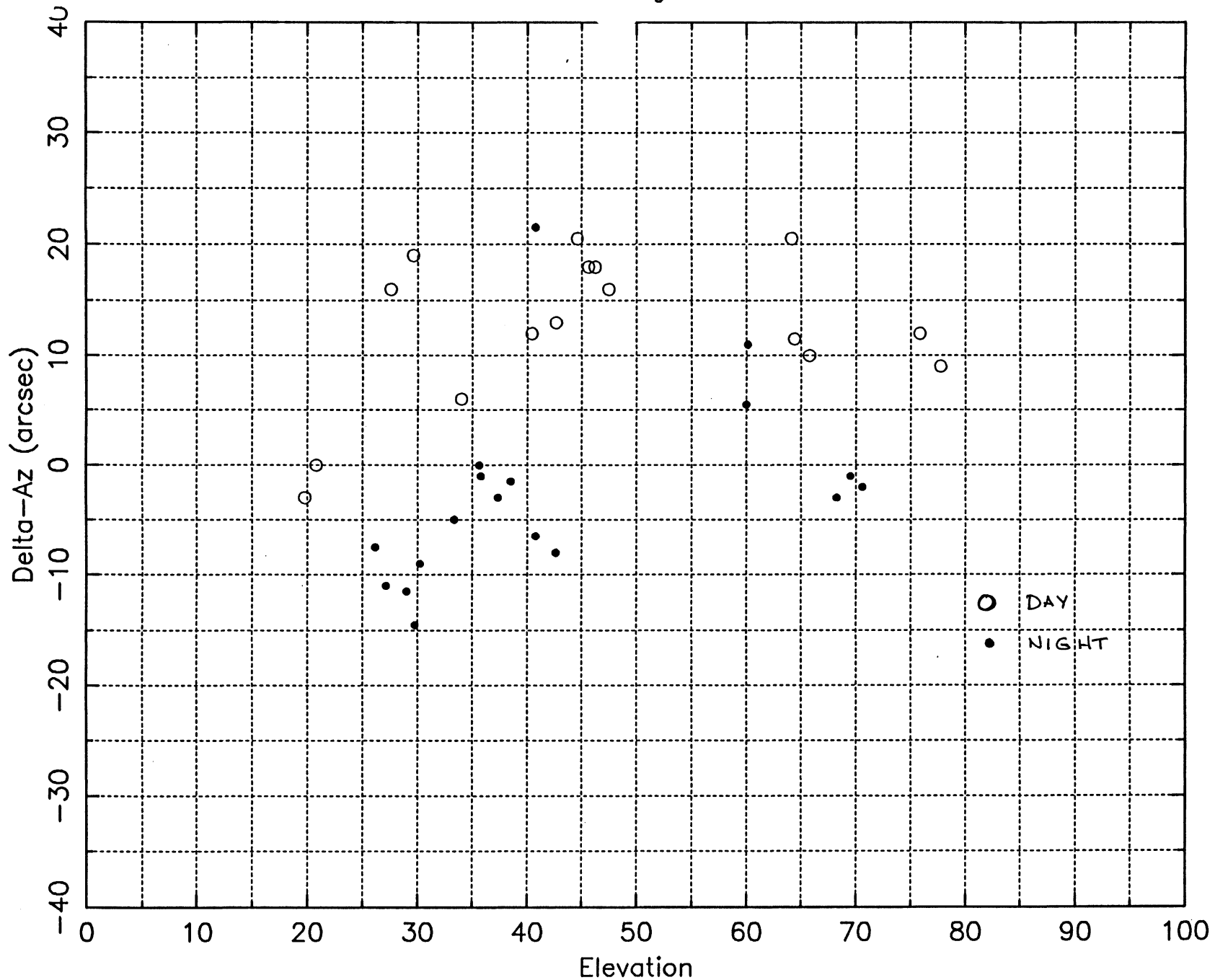


Azimuth Pointing Corrections

3 mm SIS POINTING
16-21 MAR 89

PRJ
CEP

(5)

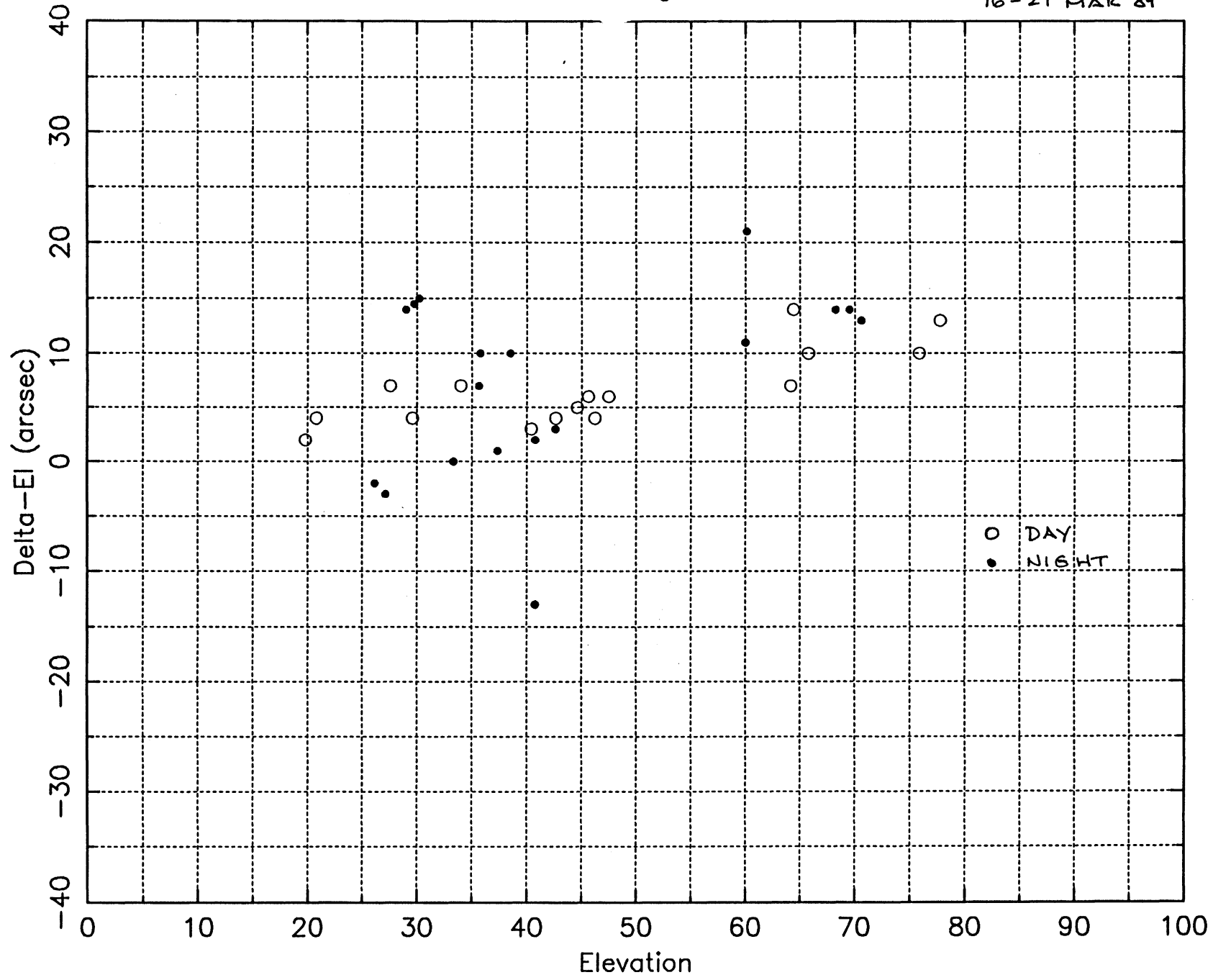


Elevation P ng Corrections

3mm SIS POINTING
16-21 MAR 89

PRJ
CEP

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DATA TABLE

1430	SATURN	3 16 89	93.13232	PRJ	1	224.604	20.803	0.0	4.0	30	60.3	58.5	210.82	17:45	9.0
1440	SATURN	3 16 89	93.13232	PRJ	1	225.879	19.786	-3.0	2.0	30	62.5	65.8	199.78	17:51	8.9
1486	JUPITER	3 16 89	93.13532	PRJ	1	93.911	45.590	18.0	6.0	30	63.9	72.3	1305.65	20:32	14.2
1496	JUPITER	3 16 89	93.13532	PRJ	1	95.229	47.461	16.0	6.0	30	65.9	66.2	1333.94	20:41	14.2
1532	JUPITER	3 16 89	93.13332	PRJ	1	114.565	65.773	10.0	10.0	30	64.0	64.6	1248.41	22:10	14.4
1568	JUPITER	3 16 89	93.13332	PRJ	1	186.899	77.718	9.0	13.0	30	64.2	65.6	1206.27	23:49	13.2
1604	JUPITER	3 17 89	93.13532	PRJ	1	253.543	59.993	5.5	11.0	30	69.1	68.5	1228.94	1:45	9.8
1652	JUPITER	3 17 89	93.13532	PRJ	1	275.647	30.218	-9.0	15.0	30	64.2	66.1	1150.89	4: 7	6.4
1662	JUPITER	3 17 89	93.13532	PRJ	1	276.328	28.991	-11.5	14.0	30	66.7	67.1	1115.45	4:13	6.2
1674	MARS	3 17 89	93.13532	PRJ	1	278.987	29.746	-14.5	14.5	30	65.7	62.7	33.64	4:23	6.0
1696	3C273	3 17 89	93.13532	PRJ	1	116.147	38.476	-1.5	10.0	30	69.3	63.0	20.18	5:17	5.9
1754	3C273	3 17 89	93.13532	PRJ	1	181.824	60.141	11.0	21.0	30	69.3	62.2	19.90	8:19	6.2
1844	SATURN	3 17 89	93.13532	PRJ	1	160.423	33.329	-5.0	0.0	30	64.3	65.0	218.45	13:31	5.8
1946	JUPITER	3 17 89	93.12932	PRJ	1	90.417	40.382	12.0	3.0	30	63.8	67.5	1255.11	20: 4	12.7
1958	JUPITER	3 17 89	93.12932	PRJ	1	91.868	42.624	13.0	4.0	30	65.3	68.0	1209.49	20:15	13.7
1994	JUPITER	3 17 89	93.13132	PRJ	1	112.236	64.387	11.5	14.0	30	66.5	82.0	1256.64	22: 0	15.6
2020	JUPITER	3 17 89	93.13132	PRJ	1	147.304	75.837	12.0	10.0	30	63.9	63.6	1230.63	23: 8	15.4
4194	SATURN	3 19 89	97.98097	CEP	1	197.117	33.976	6.0	7.0	30	60.2	59.8	428.74	15:34	8.9
4254	JUPITER	3 19 89	97.98097	CEP	1	82.793	27.554	16.0	7.0	30	59.3	61.7	1964.41	18:57	13.4
4264	JUPITER	3 19 89	97.98097	CEP	1	83.936	29.585	19.0	4.0	30	61.2	59.3	1904.37	19: 7	14.8
4288	JUPITER	3 19 89	97.98097	CEP	1	93.054	44.585	20.5	5.0	30	66.1	66.1	2036.43	20:17	13.9
4298	JUPITER	3 19 89	97.98097	CEP	1	94.175	46.203	18.0	4.0	30	66.5	66.6	2006.75	20:25	14.1
4328	JUPITER	3 19 89	97.98097	CEP	1	111.687	64.153	20.5	7.0	30	63.8	63.5	2091.97	21:52	14.1
4412	JUPITER	3 20 89	97.98097	CEP	1	269.407	40.964	5.0	11.0	30	62.8	62.8	897.57	3: 7	12.0
4414	JUPITER	3 20 89	97.98097	CEP	1	269.539	40.728	21.5	-13.0	30	52.5	78.1	835.69	3: 8	12.0
4422	JUPITER	3 20 89	97.98097	CEP	1	270.461	39.253	3.5	10.0	30	63.3	57.5	839.49	3:15	11.9
4482	IRC+10216	3 20 89	97.98097	CEP	1	226.604	64.976	11.0	18.0	30	71.8	69.3	1.24	6:35	9.3
4492	IRC+10216	3 20 89	97.98097	CEP	1	232.734	62.593	11.0	11.0	30	65.8	57.1	1.30	6:50	9.1
4520	IRC+10216	3 20 89	97.98097	CEP	1	255.850	45.721	5.0	11.0	30	64.9	60.0	2.15	8:18	8.1
4584	3C273	3 20 89	97.98097	CEP	1	243.765	38.602	-1.5	12.5	30	59.7	59.6	28.56	11: 1	4.9
4648	SATURN	3 20 89	97.98097	CEP	1	183.538	35.835	6.5	14.0	30	65.3	61.7	407.16	14:42	3.7
4658	SATURN	3 20 89	97.98097	CEP	1	185.713	35.706	5.0	15.0	30	62.9	61.1	423.53	14:50	3.9
4670	SATURN	3 20 89	97.98097	CEP	1	189.360	35.344	4.5	8.5	30	63.8	63.7	217.35	15: 3	4.3
4716	SATURN	3 20 89	97.98097	CEP	1	225.571	20.053	3.0	14.0	30	59.3	64.1	308.30	17:35	8.6
4746	JUPITER	3 20 89	97.98097	CEP	1	83.914	29.605	13.0	12.0	30	64.1	61.9	1819.71	19: 3	10.0
4756	JUPITER	3 20 89	97.98097	CEP	1	84.749	31.072	14.0	9.0	30	62.7	60.0	1794.19	19:10	11.0
4780	JUPITER	3 20 89	97.98097	CEP	1	93.713	45.645	14.0	8.0	30	62.0	65.7	1942.29	20:19	10.1
4810	JUPITER	3 20 89	97.98097	CEP	1	112.676	64.860	14.0	8.5	30	61.3	61.5	1971.84	21:52	10.7
4852	JUPITER	3 21 89	97.98097	CEP	1	217.925	75.167	11.5	13.0	30	61.6	61.3	1998.04	0: 9	9.6
4890	JUPITER	3 21 89	97.98097	CEP	1	261.233	52.429	9.0	12.0	30	64.6	62.5	976.89	2: 9	9.4
4940	3C273	3 21 89	97.98097	CEP	1	114.939	37.324	-3.0	1.0	30	58.1	58.4	31.86	4:55	4.8
4960	3C273	3 21 89	97.98097	CEP	1	118.718	40.728	-6.5	2.0	30	56.2	60.1	32.64	5:13	2.5
4970	3C273	3 21 89	97.98097	CEP	1	121.003	42.596	-8.0	3.0	30	61.3	62.1	31.37	5:23	1.6
4980	IRC+10216	3 21 89	97.98097	CEP	1	198.699	70.561	-2.0	13.0	30	61.9	75.5	2.06	5:43	0.7
4990	IRC+10216	3 21 89	97.98097	CEP	1	207.466	69.496	-1.0	14.0	30	58.2	63.0	2.27	5:56	0.7
5000	IRC+10216	3 21 89	97.98097	CEP	1	214.497	68.244	-3.0	14.0	30	68.7	66.6	2.22	6: 7	0.6
5102	SATURN	3 21 89	97.98097	CEP	1	143.240	26.147	-7.5	-2.0	30	63.0	61.9	394.82	12: 5	1.8
5112	SATURN	3 21 89	97.98097	CEP	1	144.954	27.129	-11.0	-3.0	30	61.2	61.0	401.95	12:12	1.9
5144	SATURN	3 21 89	97.98097	CEP	1	173.276	35.619	0.0	7.0	30	63.4	59.0	400.86	14: 2	-1.1
5154	SATURN	3 21 89	97.98097	CEP	1	175.188	35.766	-1.0	10.0	30	59.8	58.7	399.07	14: 9	-1.2