Unreported Common Proper-Motion Pairs in the UCAC3 Catalogue

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Abstract:

Data mining the UCAC3 catalogue has yielded 300 previously unreported double stars where each component of the pair shows a large shared proper-motion. Details of brightness, motion, positional angle, separation and spectral type are presented.

1 INTRODUCTION

The Third U.S. Naval Observatory CCD Astrograph Catalogue (UCAC3) was released on the Vizier site in September 2009. It can be accessed via:

http://vizier.u-strasbg.fr/viz-bin/VizieR?-source=I/315

UCAC3 (Zacharias et al. 2009) is an all-sky star catalogue primarily covering objects in the magnitude range 8 to 16 in a band pass between *V* and *R*. Positional errors are typically between 15 to 20 milliarcsec (mas) for stars in the magnitude range 10 to 14. Proper-motion data is based on results from up to 140 catalogues but caution is required when using the results for fainter stars (*R* less than or equal to 13.5).

A total of 44 fields are available for examination via the Vizier site and the catalogue contains 100765502 rows.

2 METHODOLOGY

Nicholson, 2006, describes in detail how astrometric data downloaded from the Vizier web site can be used to calculate the position angle and separation of two stars. The UCAC3 catalogue contains 100765502 rows but the relevant information for common proper-motion pair identification was only downloaded for stars with a UCAC fit model magnitude (579 – 642 nm) between 8 and 14 that also fell into one of four groups:

- Proper-motion in declination greater than 60 mas yr^{-1}
- or proper-motion in declination less than –60 mas yr^{-1}
- or proper-motion in right ascension greater than 60 mas yr^{-1}
- or proper-motion in right ascension less than –60 mas yr^{-1}

Once the astrometric, magnitude and proper-motion data had been downloaded it was passed through the purpose built software (Nicholson, 2005), designed to identify pairs of stars with less than any pre-set separation. In the case of this project a distance of 90 arcsec was selected. The primary star in each pair was taken to be the one with the brighter UCAC3 fit model magnitude. Systematic errors in this value are expected to be below 0.1 mag and this value is expected to be more accurate than the alternative UCAC3 aperture magnitude for what the catalogue compilers call "well behaved" stars.

The pairs of stars identified using the software were then regarded as “candidate” common proper-motion pairs. Since the aim of the project was to generate a relatively small number of probable common proper-motion pairs all the candidate pairs were subject to a series of four filtering processes.

1) If the average difference in the quoted proper-motions of the two components in right ascension and declination was over 10 percent then the pair was rejected.

2) If both the primary and secondary stars could not be matched, at a 1 arcsec radius level, to a star in the 2MASS (Skrutskie *et al.* 2006) catalogue the pair was rejected.

3) If the software gave a separation of under 5 arcsec the pair was rejected since with very close pairs any errors in the quoted positions in the UCAC3 catalogue have a disproportionate impact on the calculated values for both the position angle and the separation of the candidate common proper-motion pair.

4) All remaining candidate pairs were then checked against the on-line version of the Washington Visual Double Star Catalogue (13-Sep-2009 version containing 104854 binaries) and any pair where either the primary or secondary component lay within 120 arcsec of a listed system was rejected.

Any candidate pair passing all four filters was subject to a system of warning flags. Caution flag 1 was applied when any of the quoted figures for proper-motion in declination or proper-motion for either the primary or secondary component was between –10 and 10 mas yr^{-1}. Caution flag 2 was applied when the Halbwachs criterion, as described by López (2008), was over 1000 years. Caution flag 3 was applied when the difference in proper motion in declination or right ascension between the two components was greater than the sum of the mean errors in these values and where the mean error is defined as the average error of the positive and negative errors without regard to sign.

3 RESULTS AND OBJECTS OF INTEREST

Please note that downloaded coordinates are equinox J2000.0 and epoch J2000.000 and that proper-motion has been taken into account.

Table 1 provides a listing in the standard format of all the common proper-motion pairs found.

Table 2 provides details of the proper-motion of both components of each pair with caution flags added where appropriate.

Table 3 provides details of the 2MASS *J* and *K* band magnitudes of the primary and secondary component of each pair, the UCAC3 fit model magnitude and the spectral type of the two components of each pair.

Bessel & Brett (1988) demonstrate how the 2MASS *J* – *K* colour can be used to estimate the spectral type of a star and Greaves (2004) outlines some caveats associated with the analysis.

144 (48 percent) of the primary stars and 224 (75 percent) of the secondary stars were found to be spectral type K. This was somewhat surprising since M class stars are by far the most common spectral type and the observed result may be due to a selection effect resulting from the decision to examine only stars with a UCAC fit

model magnitude (579 – 642 nm) between 8 and 14. Perhaps many of the common proper-motion pairs involving M type stars were fainter than this lower limit. Only seven pairs (#19, 22,103, 133, 186, 210 and 225) were M + M common proper motion pairs but 118 were K + K pairs.

A few pairs are worthy of special note:

Pair #24: The differences between the UCAC3 and the 2MASS magnitudes are only 0.061 and 0.008 respectively. The two G class stars can be thought of as twins.

Pair #209: The 2MASS *J* – *K* magnitudes of 1.400 and 1.386 suggest that both components of the pair are late spectral class M stars.

Pair #245: The difference in the 2MASS *J* – *K* magnitudes between the two components is the largest of all the pairs surveyed. The results suggest a G class star with a late M class companion.

Pairs #114, 254, 292: These three pairs had particularly high total proper motions and it is therefore likely, but not conclusive, that they are relatively close to the Sun.

4 CONCLUSIONS

Common proper-motion pairs are an interesting group to research because they do not fall into either of the extensively studied groups of orbiting binaries or open clusters and because each component of a common proper-motion pair can be considered to be at the same distance from the observer, of the same age and subject to the same degree of reddening (Greaves, 2004). It is to be hoped that these new discoveries will be included in the Washington Double Star Catalog.

There are two possible areas where this project might be extended in the future. Looking at fainter stars in the UCAC3 catalogue might reveal more M + M class common proper-motion pairs and extending the survey area from 90 to 120 arc sec might reveal additional pairs. However both options put greatly increased strain on the current data processing pipeline.

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Nicholson M., 2006, Journal of Double Star Observations, 2(2), 68-73

Skrutskie M. F., Cutri R.M., Steining R. et al. 2006, AJ., 131, 1163.

Zacharias N., Finch C., Girard T. et al., 2009, in press

7 WEBSITES

The Washington Visual Double Star Catalog (Mason et al. 2001-2009)
http://vizier.u-strasbg.fr/viz-bin/VizieR?-source=B/wds

Third U.S. Naval Observatory CCD Astrograph Catalog (Zacharias et al. 2009)

http://vizier.u-strasbg.fr/viz-bin/VizieR?-source=I/315

Table 1

	PRIMARY		SECONDARY		PRIMARY	SECONDARY	CPM Pair		
#	RA	DEC	RA	DEC	MAGNITUDE	MAGNITUDE	SEP (arc sec)	PA (degrees)	EPOCH
1	00 04 56.92	-18 10 43.4	00 04 55.82	-18 10 52.6	8.771	11.956	18.1	240	2000.000
2	00 10 59.50	-63 09 04.1	00 10 55.59	-63 08 41.0	11.594	13.328	35.1	311	2000.000
3	00 11 24.79	-40 48 39.4	00 11 29.67	-40 49 19.9	10.480	10.535	68.6	126	2000.000
4	00 14 14.43	-32 58 47.0	00 14 17.38	-32 59 20.2	10.942	12.912	49.9	132	2000.000
5	00 18 29.24	-53 25 25.7	00 18 27.01	-53 25 46.8	11.479	11.627	29.0	223	2000.000
6	00 25 01.81	-59 03 54.3	00 25 02.02	-59 03 29.8	11.006	13.374	24.6	4	2000.000
7	00 28 51.55	-30 54 59.3	00 28 56.01	-30 55 49.5	11.200	11.977	76.3	131	2000.000
8	00 30 53.44	-16 43 26.7	00 30 51.89	-16 43 02.9	11.711	12.418	32.6	317	2000.000
9	00 37 42.63	-03 40 42.8	00 37 42.10	-03 41 02.4	9.816	12.633	21.2	202	2000.000
10	00 38 32.73	-77 44 59.5	00 38 23.24	-77 45 58.2	11.656	13.373	66.1	207	2000.000
11	00 42 15.38	-08 33 03.0	00 42 17.74	-08 33 55.9	9.587	10.392	63.4	146	2000.000
12	00 47 36.10	-19 35 23.1	00 47 33.10	-19 36 40.2	11.937	12.871	88.0	209	2000.000
13	00 50 16.47	-02 27 00.4	00 50 18.97	-02 27 13.0	9.937	10.822	39.6	109	2000.000
14	00 50 36.48	-26 02 05.6	00 50 37.87	-26 01 55.2	10.440	12.910	21.4	61	2000.000
15	00 51 06.57	-07 32 03.0	00 51 07.14	-07 31 56.6	11.026	13.995	10.5	53	2000.000
16	00 54 09.89	-16 19 08.7	00 54 13.77	-16 19 00.3	11.472	12.056	56.5	81	2000.000
17	00 59 28.30	-83 08 18.1	00 59 23.00	-83 08 29.2	9.239	13.888	14.6	221	2000.000
18	01 12 19.92	-10 52 00.3	01 12 15.17	-10 51 53.9	13.248	13.664	70.4	275	2000.000
19	01 12 54.33	-47 51 37.9	01 12 53.86	-47 52 10.7	12.581	13.306	33.1	188	2000.000
20	01 17 03.34	-30 55 03.8	01 17 04.54	-30 55 14.3	8.607	13.675	18.7	124	2000.000
21	01 17 57.82	-12 08 24.8	01 17 58.85	-12 08 14.2	12.888	13.440	18.4	55	2000.000
22	01 23 55.53	-21 47 15.7	01 23 54.14	-21 47 24.9	13.703	13.980	21.4	245	2000.000
23	01 30 06.54	-40 24 07.9	01 30 06.67	-40 24 28.4	11.945	11.963	20.5	176	2000.000
24	01 30 10.65	-50 23 36.3	01 30 09.73	-50 23 24.1	11.673	11.734	15.0	324	2000.000
25	01 30 18.25	-06 49 20.8	01 30 16.19	-06 49 05.1	13.457	13.774	34.4	297	2000.000
26	01 35 08.67	-23 26 51.0	01 35 03.17	-23 27 35.9	8.367	10.009	88.1	239	2000.000
27	01 39 35.70	-18 24 52.4	01 39 35.49	-18 24 37.6	10.056	11.749	15.1	349	2000.000
28	01 43 55.99	-76 07 52.8	01 43 55.52	-76 07 37.7	9.178	13.996	15.2	354	2000.000
29	01 54 36.46	-43 08 56.4	01 54 42.26	-43 08 48.5	10.893	12.217	63.9	83	2000.000
30	02 00 29.13	-31 06 46.0	02 00 29.93	-31 06 52.0	11.769	12.611	11.8	120	2000.000
31	02 01 49.31	-22 17 12.2	02 01 48.59	-22 17 01.1	9.805	13.513	14.9	318	2000.000
32	02 04 20.45	-19 53 10.3	02 04 22.37	-19 52 48.4	11.553	13.496	34.9	51	2000.000
33	02 04 59.91	-19 37 34.9	02 05 04.96	-19 37 46.9	11.910	12.912	72.3	100	2000.000
34	02 05 04.49	-55 34 32.7	02 05 04.04	-55 34 15.0	11.382	12.539	18.1	348	2000.000
35	02 06 00.99	-33 37 09.0	02 06 01.50	-33 37 00.6	10.349	12.281	10.5	37	2000.000
36	02 07 47.39	-56 16 41.3	02 07 49.86	-56 16 49.3	12.326	13.904	22.0	111	2000.000
37	02 16 39.92	-61 25 44.5	02 16 36.41	-61 26 06.9	9.607	12.033	33.7	228	2000.000
38	02 18 16.23	-49 02 15.5	02 18 15.31	-49 02 04.2	11.912	12.090	14.5	321	2000.000
39	02 20 24.57	-25 38 28.7	02 20 25.06	-25 38 38.6	10.973	11.455	11.9	146	2000.000
40	02 24 23.26	-17 49 10.6	02 24 26.50	-17 48 08.7	9.484	12.677	77.3	37	2000.000
41	02 25 11.56	-18 29 32.1	02 25 12.07	-18 29 43.0	11.558	13.747	13.1	146	2000.000
42	02 29 26.46	-34 19 31.5	02 29 25.20	-34 18 57.3	12.383	13.880	37.6	335	2000.000
43	02 30 47.23	-38 36 09.6	02 30 48.08	-38 35 36.0	11.054	13.598	35.1	17	2000.000
44	02 32 55.88	-41 51 37.8	02 32 57.16	-41 53 01.2	12.599	13.647	84.6	170	2000.000
45	02 32 58.11	-43 15 35.4	02 32 56.26	-43 16 39.6	11.193	12.601	67.3	198	2000.000

46	02 33 15.06	-23 05 44.5	02 33 13.76	-23 05 11.7	11.360	12.646	37.4	331	2000.000
47	02 33 47.20	-38 53 35.5	02 33 46.06	-38 53 34.6	11.050	11.604	13.4	274	2000.000
48	02 33 55.11	-14 03 09.5	02 33 53.38	-14 02 17.3	9.948	10.427	58.0	334	2000.000
49	02 41 02.77	-61 26 25.4	02 41 05.77	-61 26 11.3	13.353	13.797	25.8	57	2000.000
50	02 41 45.57	-67 34 19.9	02 41 47.84	-67 33 32.4	11.888	12.007	49.3	15	2000.000
51	02 43 23.26	-42 32 02.5	02 43 21.83	-42 31 34.6	10.319	11.855	32.1	331	2000.000
52	02 45 27.81	+50 15 17.7	02 45 20.73	+50 15 50.2	10.683	13.929	75.3	296	2000.000
53	02 46 03.73	-18 53 11.9	02 46 05.70	-18 53 09.9	10.165	12.201	28.0	86	2000.000
54	02 50 49.51	-12 12 05.2	02 50 50.08	-12 12 33.0	11.697	12.969	28.9	163	2000.000
55	02 50 50.30	-75 39 59.5	02 50 47.56	-75 40 17.5	12.192	13.506	20.7	210	2000.000
56	02 54 26.73	-00 29 41.4	02 54 25.68	-00 29 30.3	10.612	13.594	19.3	305	2000.000
57	02 54 55.40	-54 43 17.8	02 54 53.99	-54 43 16.7	11.093	13.546	12.3	275	2000.000
58	02 55 46.48	-16 06 25.1	02 55 51.15	-16 05 39.3	11.485	13.914	81.4	56	2000.000
59	02 58 37.40	-23 22 23.4	02 58 36.96	-23 22 34.6	12.697	13.863	12.7	209	2000.000
60	02 59 15.25	-05 15 42.1	02 59 15.28	-05 14 50.4	10.481	11.356	51.7	1	2000.000
61	03 03 14.91	-62 59 35.0	03 03 18.31	-62 59 45.8	9.072	13.222	25.6	115	2000.000
62	03 08 00.21	-54 18 11.2	03 08 05.04	-54 17 41.1	12.564	12.815	51.9	55	2000.000
63	03 15 49.66	-32 48 08.8	03 15 48.03	-32 47 56.3	9.418	10.557	24.2	301	2000.000
64	03 19 42.40	-60 02 02.4	03 19 46.72	-60 02 43.0	13.209	13.319	51.9	141	2000.000
65	03 24 13.02	-75 55 50.1	03 24 10.56	-75 55 52.1	13.728	13.874	9.2	257	2000.000
66	03 25 04.99	-51 44 46.0	03 25 04.98	-51 44 56.9	10.413	12.977	10.8	180	2000.000
67	03 26 59.84	-20 47 22.3	03 27 01.95	-20 46 27.9	12.788	13.023	61.9	28	2000.000
68	03 34 24.14	-07 52 07.3	03 34 23.33	-07 51 14.2	12.083	12.930	54.4	347	2000.000
69	03 34 46.48	-25 30 39.5	03 34 47.04	-25 30 32.5	9.410	12.603	10.4	47	2000.000
70	03 37 59.33	-04 05 06.4	03 37 58.28	-04 04 46.6	11.628	12.318	25.3	322	2000.000
71	03 40 20.44	-31 21 48.9	03 40 19.64	-31 21 26.7	12.093	12.991	24.5	335	2000.000
72	03 46 28.07	-64 45 19.1	03 46 30.92	-64 44 58.4	10.869	13.007	27.5	41	2000.000
73	03 48 04.20	-56 34 51.5	03 48 04.56	-56 34 37.8	9.804	12.739	14.0	12	2000.000
74	03 48 38.18	-54 29 24.7	03 48 38.98	-54 29 46.3	11.602	12.033	22.7	162	2000.000
75	03 49 38.61	-75 10 43.5	03 49 22.29	-75 09 57.4	11.907	13.612	77.8	306	2000.000
76	03 50 56.17	-22 54 13.6	03 50 57.45	-22 52 57.2	9.302	12.972	78.5	13	2000.000
77	03 54 33.71	-21 43 52.5	03 54 36.30	-21 44 18.6	9.938	10.248	44.6	126	2000.000
78	03 55 08.72	+61 56 41.4	03 55 05.13	+61 56 49.3	11.263	11.546	26.6	287	2000.000
79	04 04 40.64	-66 28 54.5	04 04 42.91	-66 28 15.9	11.441	13.145	40.9	19	2000.000
80	04 07 13.85	-67 33 12.9	04 07 16.50	-67 32 55.6	11.777	12.975	23.1	41	2000.000
81	04 09 07.75	-16 23 58.0	04 09 10.65	-16 23 42.8	8.073	10.976	44.4	70	2000.000
82	04 09 19.43	-61 46 21.9	04 09 17.94	-61 46 25.7	12.406	12.830	11.2	250	2000.000
83	04 21 39.20	-72 58 31.4	04 21 36.88	-72 57 53.3	10.089	12.585	39.4	345	2000.000
84	04 21 44.46	-51 41 35.5	04 21 48.94	-51 41 19.8	12.296	13.359	44.5	69	2000.000
85	04 24 18.22	-84 25 32.8	04 24 36.95	-84 24 44.6	11.454	12.383	55.4	30	2000.000
86	04 29 35.52	-52 48 37.2	04 29 35.76	-52 48 25.3	11.274	12.339	12.1	10	2000.000
87	04 32 45.63	-10 27 55.8	04 32 43.97	-10 28 49.3	9.996	13.723	58.8	205	2000.000
88	04 33 32.83	-52 04 27.2	04 33 38.61	-52 05 14.6	9.602	13.781	71.3	132	2000.000
89	04 35 37.91	-37 15 39.5	04 35 37.01	-37 15 21.0	12.842	13.223	21.4	330	2000.000
90	04 39 48.34	-10 09 33.6	04 39 49.77	-10 09 47.1	9.627	10.739	25.1	123	2000.000
91	04 41 19.24	-53 40 21.0	04 41 22.27	-53 41 11.3	12.776	13.489	57.0	152	2000.000
92	04 45 07.32	-51 01 14.3	04 45 14.04	-51 00 39.4	11.797	13.400	72.4	61	2000.000
93	04 45 17.52	-65 18 54.7	04 45 14.71	-65 19 09.1	11.061	13.900	22.7	231	2000.000

94	04 46 36.19	-29 31 16.0	04 46 35.22	-29 31 27.3	10.752	11.367	17.0	228	2000.000
95	04 56 53.63	-02 43 12.0	04 56 52.77	-02 42 34.1	9.479	10.014	40.0	341	2000.000
96	05 10 48.32	-25 23 42.5	05 10 51.74	-25 24 12.6	10.258	11.864	55.3	123	2000.000
97	05 10 55.17	-47 21 21.9	05 10 55.44	-47 21 13.3	10.140	11.411	9.1	18	2000.000
98	05 14 57.03	-54 47 55.0	05 14 56.26	-54 48 23.4	10.625	11.340	29.1	193	2000.000
99	05 16 15.30	-55 40 48.5	05 16 15.10	-55 41 39.9	9.275	11.482	51.4	182	2000.000
100	05 19 33.70	-42 53 01.9	05 19 32.29	-42 53 19.7	12.227	12.416	23.6	221	2000.000
101	05 23 15.53	-57 51 00.3	05 23 15.03	-57 51 18.5	11.575	13.496	18.6	192	2000.000
102	05 26 14.48	-05 58 14.1	05 26 14.20	-05 58 21.2	12.793	13.575	8.3	211	2000.000
103	05 32 59.32	+75 26 06.0	05 32 56.24	+75 26 29.5	11.148	12.716	26.3	334	2000.000
104	05 33 55.90	-46 54 29.4	05 33 56.55	-46 54 51.6	12.092	12.960	23.2	163	2000.000
105	05 35 35.94	-81 16 56.8	05 35 37.38	-81 16 41.4	11.544	13.057	15.7	12	2000.000
106	05 41 08.81	-60 00 05.2	05 41 10.86	-59 59 06.3	11.637	11.814	60.8	15	2000.000
107	05 45 42.63	-45 01 46.2	05 45 40.31	-45 00 40.9	12.445	13.077	69.7	339	2000.000
108	05 48 32.31	-11 14 38.7	05 48 33.67	-11 14 57.7	13.308	13.844	27.6	133	2000.000
109	05 49 57.67	-24 59 57.0	05 49 58.32	-24 59 37.2	8.376	13.101	21.7	24	2000.000
110	05 54 57.45	-25 29 02.4	05 54 56.68	-25 29 00.4	11.230	12.285	10.6	281	2000.000
111	05 56 25.83	+57 44 27.4	05 56 25.99	+57 44 09.3	11.541	12.262	18.2	176	2000.000
112	06 00 11.98	-21 49 26.2	06 00 12.93	-21 50 11.9	13.099	13.817	47.6	164	2000.000
113	06 02 57.61	-61 11 34.8	06 02 55.27	-61 11 10.9	9.106	13.008	29.3	325	2000.000
114	06 14 35.10	-33 37 12.2	06 14 33.59	-33 37 19.0	10.516	12.087	20.1	250	2000.000
115	06 22 55.32	+55 08 43.8	06 22 56.70	+55 08 27.5	9.029	12.535	20.2	144	2000.000
116	06 43 56.94	-10 08 21.8	06 43 59.75	-10 08 48.4	10.128	11.805	49.4	123	2000.000
117	06 53 13.85	+65 10 58.7	06 53 15.14	+65 11 10.1	11.593	12.419	13.9	36	2000.000
118	06 57 59.22	-41 28 40.8	06 57 53.36	-41 29 08.0	9.512	12.209	71.3	248	2000.000
119	06 59 40.52	+55 08 25.6	06 59 39.26	+55 08 52.9	11.077	11.414	29.3	338	2000.000
120	07 05 21.61	+73 55 39.0	07 05 07.04	+73 55 25.6	11.552	13.614	62.0	258	2000.000
121	07 07 01.69	-57 58 16.1	07 06 55.33	-57 58 07.8	12.293	12.727	51.3	279	2000.000
122	07 07 17.25	-11 26 13.4	07 07 22.03	-11 26 12.8	9.971	10.223	70.2	90	2000.000
123	07 09 23.58	-57 29 47.1	07 09 25.59	-57 30 08.8	8.842	10.682	27.0	143	2000.000
124	07 28 30.06	-49 08 58.9	07 28 22.02	-49 08 37.7	8.586	9.714	81.6	285	2000.000
125	07 33 05.71	-54 19 40.4	07 33 04.59	-54 19 42.4	10.439	13.870	10.0	259	2000.000
126	07 35 00.91	-47 09 02.2	07 35 01.52	-47 09 43.5	11.533	12.776	41.8	171	2000.000
127	07 37 27.42	-74 58 53.5	07 37 15.66	-74 57 55.5	10.404	13.301	73.8	322	2000.000
128	07 38 42.07	-57 17 12.8	07 38 42.09	-57 17 00.5	11.715	12.492	12.3	0	2000.000
129	07 39 32.47	-45 06 50.4	07 39 32.83	-45 06 34.2	12.287	13.747	16.6	13	2000.000
130	07 43 17.41	-25 03 41.7	07 43 16.60	-25 03 24.5	10.748	13.291	20.4	327	2000.000
131	07 48 52.75	-41 04 47.5	07 49 00.13	-41 05 12.5	12.127	13.685	87.1	107	2000.000
132	08 02 35.76	-79 14 32.4	08 02 42.37	-79 13 51.7	13.317	13.858	44.7	24	2000.000
133	08 09 16.85	-61 03 20.7	08 09 07.97	-61 03 49.1	8.905	12.482	70.4	246	2000.000
134	08 09 17.38	-47 47 53.9	08 09 14.15	-47 47 41.7	10.587	13.950	34.7	291	2000.000
135	08 15 20.95	+66 18 29.1	08 15 11.45	+66 18 24.5	10.072	11.373	57.4	265	2000.000
136	08 21 11.40	-53 51 08.6	08 21 05.64	-53 52 18.4	11.506	11.838	86.4	216	2000.000
137	08 24 37.83	-70 09 32.3	08 24 28.86	-70 09 45.0	9.242	11.628	47.4	255	2000.000
138	08 25 29.04	-68 42 30.4	08 25 30.93	-68 42 03.4	10.882	13.825	28.9	21	2000.000
139	08 30 53.86	-44 31 43.6	08 30 52.77	-44 31 43.2	10.268	12.432	11.6	272	2000.000
140	08 33 34.25	-06 01 15.2	08 33 37.67	-06 02 09.4	9.271	10.429	74.4	137	2000.000
141	08 34 46.61	-63 17 02.1	08 34 46.91	-63 16 50.6	13.289	13.379	11.7	10	2000.000

142	08 37 46.81	-32 27 53.3	08 37 46.32	-32 27 57.5	10.043	12.366	7.5	236	2000.000
143	08 40 16.67	-56 46 34.4	08 40 19.10	-56 47 43.7	8.921	12.491	72.1	164	2000.000
144	08 46 15.64	-28 39 29.6	08 46 17.49	-28 39 39.4	12.686	13.467	26.3	112	2000.000
145	08 58 00.70	-58 21 57.1	08 58 03.18	-58 22 13.9	9.059	12.102	25.8	131	2000.000
146	08 59 15.28	-69 18 42.6	08 59 13.66	-69 19 44.3	13.116	13.169	62.3	188	2000.000
147	08 59 47.04	-20 48 37.9	08 59 41.64	-20 47 55.1	8.080	10.867	86.9	300	2000.000
148	09 02 19.75	+61 39 39.2	09 02 18.74	+61 39 26.0	11.899	12.150	15.0	209	2000.000
149	09 08 38.78	-20 36 44.6	09 08 39.58	-20 37 10.8	11.739	12.081	28.5	157	2000.000
150	09 08 54.93	-82 51 16.4	09 09 08.83	-82 50 45.6	8.438	12.982	40.3	40	2000.000
151	09 15 34.11	-08 33 13.9	09 15 39.27	-08 33 47.3	11.862	13.913	83.5	114	2000.000
152	09 19 43.91	-80 08 54.3	09 19 20.89	-80 08 28.3	11.833	13.177	64.5	294	2000.000
153	09 21 31.42	+80 58 01.3	09 21 29.09	+80 58 05.6	11.546	12.719	6.9	308	2000.000
154	09 41 18.76	-18 18 02.0	09 41 18.86	-18 18 41.8	11.374	11.617	39.9	178	2000.000
155	09 44 51.58	-18 22 41.1	09 44 50.88	-18 23 18.7	12.124	13.831	38.9	195	2000.000
156	09 47 48.54	-51 26 26.8	09 47 49.60	-51 26 19.2	12.080	13.391	12.5	52	2000.000
157	09 55 19.72	-41 16 34.0	09 55 23.44	-41 16 25.5	9.969	12.550	42.8	79	2000.000
158	10 03 08.17	-78 59 32.3	10 03 05.83	-78 59 51.7	11.270	11.523	20.5	199	2000.000
159	10 04 16.89	-04 57 44.5	10 04 20.76	-04 56 37.9	9.260	13.335	88.2	41	2000.000
160	10 10 11.04	+64 55 46.4	10 10 09.85	+64 55 49.7	12.226	12.560	8.3	294	2000.000
161	10 11 53.83	+65 00 54.7	10 11 42.15	+65 00 55.7	12.072	12.373	74.0	271	2000.000
162	10 18 31.50	-18 11 25.0	10 18 30.58	-18 11 09.4	12.143	12.304	20.4	320	2000.000
163	10 19 14.91	-87 59 15.9	10 19 31.57	-88 00 31.8	12.467	12.828	76.4	173	2000.000
164	10 20 00.32	-31 21 09.4	10 20 01.13	-31 20 48.7	9.264	12.120	23.1	27	2000.000
165	10 22 09.16	-75 12 06.3	10 22 07.02	-75 12 22.2	12.748	13.680	17.8	207	2000.000
166	10 22 36.78	-58 48 03.7	10 22 38.68	-58 48 00.0	11.758	13.387	15.2	76	2000.000
167	10 22 38.69	-25 50 24.8	10 22 38.86	-25 50 30.4	12.685	13.218	6.1	158	2000.000
168	10 25 55.70	-31 49 19.3	10 25 58.00	-31 48 34.6	11.363	11.583	53.5	33	2000.000
169	10 26 08.46	-76 27 07.3	10 26 06.32	-76 27 22.8	8.296	13.918	17.2	206	2000.000
170	10 31 46.85	-63 57 07.1	10 31 56.33	-63 57 28.8	10.946	12.235	66.1	109	2000.000
171	10 32 49.51	-41 29 18.3	10 32 48.37	-41 29 16.7	10.886	13.187	12.9	277	2000.000
172	10 38 27.68	-62 21 25.3	10 38 27.17	-62 22 01.8	10.896	13.725	36.7	186	2000.000
173	10 39 01.53	+51 04 24.8	10 38 59.84	+51 04 32.4	9.843	13.949	17.7	295	2000.000
174	10 41 45.55	-50 59 43.6	10 41 44.69	-50 59 42.8	11.311	12.386	8.2	276	2000.000
175	10 42 53.72	-71 44 52.5	10 42 59.65	-71 44 08.5	8.419	10.298	52.0	32	2000.000
176	10 48 31.81	-71 29 54.3	10 48 33.59	-71 30 15.5	12.585	12.874	22.8	158	2000.000
177	10 48 48.06	-14 24 35.3	10 48 48.01	-14 24 10.3	12.624	13.048	25.0	358	2000.000
178	10 49 07.12	-00 57 40.0	10 49 10.40	-00 58 19.2	9.665	10.976	62.8	129	2000.000
179	10 49 58.71	-09 50 53.3	10 49 59.80	-09 50 41.0	12.121	13.198	20.3	53	2000.000
180	10 50 27.74	-06 40 30.2	10 50 28.09	-06 39 40.6	8.359	11.182	49.9	6	2000.000
181	10 52 14.10	-45 10 54.6	10 52 11.11	-45 11 26.3	10.069	10.349	44.7	225	2000.000
182	10 53 20.28	-43 16 00.5	10 53 20.16	-43 15 45.5	8.947	9.455	15.1	355	2000.000
183	10 53 34.73	-11 11 00.6	10 53 37.20	-11 11 32.4	13.241	13.871	48.3	131	2000.000
184	10 56 11.86	+78 05 36.2	10 56 15.69	+78 05 23.6	11.311	13.794	17.3	137	2000.000
185	10 57 11.15	-33 21 36.9	10 57 11.26	-33 21 26.2	12.283	13.272	10.7	8	2000.000
186	10 58 35.05	-43 43 45.5	10 58 32.62	-43 44 13.1	12.292	13.854	38.2	224	2000.000
187	10 58 51.19	-08 22 49.3	10 58 54.38	-08 22 24.7	10.421	12.790	53.3	63	2000.000
188	11 03 23.96	-18 35 36.9	11 03 26.46	-18 34 59.1	10.945	13.374	51.8	43	2000.000
189	11 25 46.28	-21 36 24.6	11 25 45.86	-21 36 07.7	12.110	12.204	17.9	341	2000.000

190	11 27 47.13	-36 04 28.8	11 27 50.08	-36 04 12.6	8.184	12.523	39.2	66	2000.000
191	11 30 24.24	-03 16 11.9	11 30 22.34	-03 16 57.4	10.679	11.370	53.8	212	2000.000
192	11 35 15.11	-17 38 56.5	11 35 13.03	-17 37 50.3	12.332	12.488	72.5	336	2000.000
193	11 40 53.37	-55 40 35.1	11 40 50.04	-55 41 44.8	12.171	13.208	75.2	202	2000.000
194	11 47 23.29	+54 58 00.5	11 47 21.27	+54 57 37.2	9.700	11.916	29.1	217	2000.000
195	11 49 59.76	-55 51 00.6	11 49 59.29	-55 51 27.4	10.912	11.178	27.1	189	2000.000
196	11 50 20.64	+51 33 16.5	11 50 21.19	+51 33 19.4	12.519	13.254	5.9	60	2000.000
197	11 56 31.43	-43 43 39.7	11 56 33.00	-43 43 29.4	11.840	11.918	19.9	59	2000.000
198	11 58 24.55	-57 59 43.3	11 58 27.60	-57 59 33.3	8.958	9.216	26.2	68	2000.000
199	12 00 08.94	-67 46 38.7	12 00 16.25	-67 46 12.0	9.032	12.935	49.3	57	2000.000
200	12 33 21.21	-15 19 48.0	12 33 23.38	-15 19 43.4	10.664	13.395	31.8	82	2000.000
201	12 41 26.19	-04 17 33.2	12 41 28.85	-04 18 23.7	10.677	13.783	64.3	142	2000.000
202	12 52 40.99	-28 24 39.0	12 52 41.14	-28 24 51.4	10.305	12.194	12.5	170	2000.000
203	12 55 57.14	-83 05 31.1	12 55 52.46	-83 05 20.1	11.974	13.334	13.9	323	2000.000
204	13 00 23.64	-12 36 11.9	13 00 24.51	-12 36 20.9	11.435	11.490	15.6	125	2000.000
205	13 16 48.29	+62 22 03.0	13 16 43.47	+62 23 06.2	11.393	12.327	71.5	332	2000.000
206	13 18 22.78	-19 54 22.9	13 18 21.99	-19 53 29.1	10.059	11.096	54.9	348	2000.000
207	13 20 36.16	+61 58 25.2	13 20 38.98	+61 58 16.9	9.913	11.878	21.5	113	2000.000
208	13 22 39.65	-31 26 14.0	13 22 45.11	-31 26 37.0	10.550	12.559	73.6	108	2000.000
209	13 25 42.91	-63 28 12.5	13 25 49.53	-63 27 28.3	13.785	13.835	62.6	45	2000.000
210	13 26 36.96	-42 22 58.8	13 26 34.32	-42 23 15.9	10.323	13.900	33.9	240	2000.000
211	13 32 04.71	-11 15 23.0	13 32 06.89	-11 16 40.8	8.585	11.784	84.1	158	2000.000
212	13 32 13.20	+66 07 05.5	13 32 14.67	+66 07 11.3	10.506	11.943	10.6	57	2000.000
213	13 32 47.19	-56 56 15.3	13 32 46.20	-56 55 45.6	11.650	12.471	30.8	345	2000.000
214	14 03 46.64	+69 46 27.6	14 03 50.50	+69 47 02.4	11.883	12.220	40.2	30	2000.000
215	14 22 21.27	+66 16 25.4	14 22 16.27	+66 16 01.5	10.315	11.417	38.4	232	2000.000
216	14 24 46.78	-52 06 36.1	14 24 43.72	-52 06 00.5	10.138	12.144	45.4	322	2000.000
217	14 32 19.69	-57 30 41.4	14 32 20.00	-57 30 58.6	10.814	10.916	17.4	172	2000.000
218	14 32 20.82	-46 54 05.0	14 32 24.08	-46 54 09.1	10.092	11.356	33.7	97	2000.000
219	14 41 29.71	+70 34 28.6	14 41 29.87	+70 34 13.1	12.043	13.575	15.5	177	2000.000
220	14 43 36.40	-41 44 16.4	14 43 39.71	-41 45 21.0	13.668	13.699	74.5	150	2000.000
221	14 52 47.56	-24 42 54.1	14 52 52.37	-24 41 56.7	13.703	13.708	87.2	49	2000.000
222	14 58 12.72	+68 57 02.8	14 58 18.48	+68 57 14.7	13.660	13.903	33.2	69	2000.000
223	14 59 24.60	+83 19 39.9	14 59 08.68	+83 20 33.2	9.361	10.568	60.1	333	2000.000
224	15 00 25.22	+72 31 33.7	15 00 26.84	+72 31 57.8	12.803	12.910	25.2	17	2000.000
225	15 03 45.49	-47 28 11.4	15 03 52.88	-47 27 47.5	13.508	13.705	78.6	72	2000.000
226	15 06 05.84	+69 30 17.0	15 06 03.92	+69 29 47.5	11.722	12.453	31.2	199	2000.000
227	15 07 33.26	+70 27 37.8	15 07 32.70	+70 27 49.6	10.435	13.998	12.1	347	2000.000
228	15 09 18.77	+66 39 36.4	15 09 06.33	+66 40 04.6	9.412	12.272	79.1	291	2000.000
229	15 14 35.97	+59 17 04.2	15 14 36.43	+59 16 41.6	10.356	10.663	22.8	171	2000.000
230	15 20 58.79	+50 46 28.6	15 20 57.11	+50 46 35.1	10.629	13.161	17.3	292	2000.000
231	15 21 26.53	-34 57 44.4	15 21 24.35	-34 57 46.2	10.495	11.575	26.9	266	2000.000
232	15 23 27.93	-13 05 56.1	15 23 27.94	-13 06 08.2	12.613	12.693	12.1	179	2000.000
233	15 27 19.56	-31 47 02.1	15 27 18.39	-31 47 10.5	12.102	12.744	17.0	240	2000.000
234	15 29 13.66	+59 26 40.4	15 29 14.98	+59 25 22.1	10.985	11.839	79.0	173	2000.000
235	15 54 27.45	-04 42 21.0	15 54 22.53	-04 42 42.5	8.732	11.031	76.7	254	2000.000
236	15 54 49.76	-56 38 44.6	15 54 57.21	-56 38 44.3	13.114	13.208	61.4	90	2000.000
237	16 04 38.63	-84 44 03.5	16 04 40.38	-84 44 32.1	10.494	12.347	28.8	175	2000.000

238	16 12 53.50	-34 29 15.5	16 12 54.80	-34 29 10.8	9.469	11.418	16.8	73	2000.000
239	16 13 09.40	-65 36 02.4	16 12 55.69	-65 36 22.4	13.890	13.895	87.3	257	2000.000
240	16 16 09.41	-55 48 39.6	16 16 03.76	-55 48 43.1	12.909	13.953	47.7	266	2000.000
241	16 20 36.61	-72 13 25.7	16 20 34.87	-72 13 58.0	9.788	13.374	33.3	194	2000.000
242	16 23 07.91	-18 45 24.6	16 23 11.80	-18 44 43.0	9.474	10.468	69.2	53	2000.000
243	16 27 16.59	-50 45 59.9	16 27 14.88	-50 45 52.8	12.956	13.512	17.7	294	2000.000
244	16 27 31.16	-54 04 05.8	16 27 33.21	-54 04 17.2	9.864	13.940	21.3	122	2000.000
245	16 36 53.33	-46 39 26.9	16 36 50.46	-46 40 24.4	12.961	13.989	64.6	207	2000.000
246	16 39 07.39	-52 51 38.0	16 38 59.18	-52 51 36.9	13.648	13.977	74.4	271	2000.000
247	16 39 43.57	+67 37 58.5	16 39 44.97	+67 37 44.9	11.094	11.502	15.8	150	2000.000
248	16 45 26.14	+55 35 24.4	16 45 35.62	+55 34 52.9	10.730	12.817	86.3	111	2000.000
249	16 46 30.80	-08 38 29.0	16 46 29.08	-08 38 44.2	11.279	13.303	29.7	239	2000.000
250	16 50 39.25	-63 53 59.6	16 50 41.09	-63 54 07.2	11.158	12.892	14.3	122	2000.000
251	16 55 57.89	-58 42 44.7	16 55 56.09	-58 42 08.7	12.728	13.888	38.7	339	2000.000
252	16 57 28.58	+63 49 01.0	16 57 28.56	+63 48 47.5	10.787	11.607	13.6	180	2000.000
253	16 58 10.17	-48 53 45.6	16 58 09.99	-48 54 27.0	10.619	12.210	41.4	182	2000.000
254	16 58 43.31	-40 13 18.7	16 58 45.21	-40 13 03.9	10.473	11.567	26.3	56	2000.000
255	17 06 05.38	-24 39 29.2	17 06 11.86	-24 39 26.3	11.751	13.867	88.3	88	2000.000
256	17 16 21.49	+49 34 08.2	17 16 17.23	+49 34 12.9	8.887	13.502	41.7	277	2000.000
257	17 18 34.66	-62 36 00.5	17 18 34.68	-62 36 09.8	9.187	11.261	9.3	179	2000.000
258	17 25 29.56	+57 01 14.1	17 25 26.18	+57 00 54.0	12.722	12.790	34.2	234	2000.000
259	17 37 40.26	-16 46 07.3	17 37 40.16	-16 47 26.8	12.772	13.876	79.5	181	2000.000
260	17 51 04.89	-37 52 45.6	17 51 09.29	-37 52 40.3	12.403	12.531	52.4	84	2000.000
261	18 09 26.10	+50 18 54.0	18 09 25.24	+50 19 04.6	10.889	11.019	13.4	322	2000.000
262	18 11 47.26	+72 47 42.4	18 11 47.66	+72 47 04.6	10.983	12.036	37.9	177	2000.000
263	18 16 04.98	-25 19 25.5	18 16 00.92	-25 19 46.5	13.842	13.985	59.0	249	2000.000
264	18 16 24.77	+50 14 16.3	18 16 24.86	+50 13 56.9	8.728	12.625	19.4	177	2000.000
265	18 23 21.05	-11 37 00.7	18 23 19.83	-11 36 54.1	11.361	11.507	19.2	290	2000.000
266	18 24 04.06	+72 20 06.0	18 24 01.70	+72 20 22.7	9.463	11.220	19.8	327	2000.000
267	18 28 38.79	-14 38 09.4	18 28 38.74	-14 39 17.5	12.757	13.716	68.2	181	2000.000
268	18 47 35.04	-06 55 20.7	18 47 36.56	-06 55 32.9	12.733	13.521	25.7	118	2000.000
269	18 48 03.07	-07 11 18.6	18 48 02.68	-07 10 53.7	11.014	13.010	25.6	347	2000.000
270	18 54 55.68	-35 44 04.5	18 54 53.67	-35 43 55.0	8.185	10.792	26.3	291	2000.000
271	18 59 57.35	-50 01 30.1	18 59 59.97	-50 01 09.9	11.263	11.602	32.3	51	2000.000
272	19 20 17.74	-70 35 40.4	19 20 17.11	-70 35 57.8	12.138	13.704	17.7	190	2000.000
273	19 23 27.24	-13 43 03.9	19 23 31.11	-13 44 07.6	10.482	13.577	85.1	138	2000.000
274	19 32 49.29	-03 37 12.3	19 32 45.32	-03 36 08.7	12.856	13.948	87.1	317	2000.000
275	19 38 24.97	-26 22 04.4	19 38 24.64	-26 21 11.6	9.492	12.245	53.0	355	2000.000
276	19 39 13.85	-22 34 28.7	19 39 08.34	-22 34 49.1	9.087	11.128	78.9	255	2000.000
277	19 50 25.59	-11 13 42.0	19 50 25.01	-11 13 30.8	11.046	11.088	14.1	322	2000.000
278	20 20 01.87	+62 17 53.1	20 20 02.53	+62 17 19.4	10.938	11.803	34.1	172	2000.000
279	20 23 58.98	-66 23 07.1	20 24 00.82	-66 23 02.3	11.898	13.252	12.1	67	2000.000
280	20 26 15.49	-16 00 34.1	20 26 16.07	-16 00 36.1	9.413	11.751	8.7	103	2000.000
281	20 45 48.63	+71 46 23.8	20 45 40.44	+71 46 30.9	8.632	10.338	39.1	281	2000.000
282	20 48 41.36	-22 15 37.2	20 48 39.11	-22 15 48.2	13.090	13.311	33.2	251	2000.000
283	21 33 28.84	+59 50 58.9	21 33 32.34	+59 50 34.7	11.529	12.595	35.7	133	2000.000
284	21 37 08.13	-04 06 37.9	21 37 08.78	-04 06 22.6	11.409	13.716	18.1	32	2000.000
285	21 47 54.39	+49 49 28.5	21 47 48.68	+49 50 07.2	9.700	9.750	67.4	305	2000.000

286	21 48 52.15	-13 43 44.2	21 48 49.69	-13 44 36.5	9.313	10.457	63.4	214	2000.000
287	21 56 55.41	+65 32 24.0	21 56 55.13	+65 32 44.3	8.741	10.355	19.8	70	2000.000
288	22 05 39.20	+71 50 59.5	22 05 43.10	+71 51 13.5	10.910	12.388	22.9	52	2000.000
289	22 24 49.73	-66 51 33.5	22 24 49.63	-66 51 45.1	9.119	10.369	11.6	183	2000.000
290	22 44 00.92	+65 21 24.0	22 44 05.13	+65 21 43.8	9.225	10.000	33.0	53	2000.000
291	22 48 32.74	-45 40 49.3	22 48 35.35	-45 40 51.8	12.216	13.007	27.5	95	2000.000
292	22 53 13.85	-02 28 40.2	22 53 16.86	-02 29 28.3	9.350	9.378	65.9	137	2000.000
293	23 31 20.12	+56 57 31.0	23 31 15.93	+56 57 28.5	11.894	12.403	34.4	266	2000.000
294	23 33 10.70	-35 27 49.0	23 33 10.76	-35 27 41.0	10.801	11.679	8.1	4	2000.000
295	23 33 34.42	-29 47 15.7	23 33 36.50	-29 47 40.6	10.450	11.516	36.7	133	2000.000
296	23 34 16.55	-15 08 38.8	23 34 19.51	-15 07 54.7	12.415	13.711	61.5	44	2000.000
297	23 37 08.66	+54 32 43.5	23 37 08.27	+54 33 05.4	11.392	13.278	22.2	351	2000.000
298	23 43 24.11	-56 50 38.9	23 43 23.44	-56 51 17.2	11.423	13.756	38.6	188	2000.000
299	23 49 43.26	-17 47 09.6	23 49 42.40	-17 47 02.7	11.272	13.442	14.1	299	2000.000
300	23 55 04.72	+76 45 20.5	23 55 06.59	+76 45 15.4	9.173	11.790	8.2	128	2000.000

Table 2

	PRIMARY		SECONDARY				
#	PM in RA	PM in DEC	PM in RA	PM in DEC	CAUTION FLAG		
	mas yr^{-1}	mas yr^{-1}	mas yr^{-1}	mas yr^{-1}			
1	-19.1	-90.8	-20.3	-99.5			Caution flag 3
2	52.7	18.9	52.2	22.5			
3	74.5	28.9	76.6	28.0			
4	60.5	26.6	61.0	25.7			
5	47.4	-22.6	45.6	-23.0			
6	81.7	68.8	80.6	72.6			
7	-61.5	-22.2	-64.0	-24.8		Caution flag 2	Caution flag 3
8	55.5	-11.6	53.9	-10.3			
9	43.7	37.7	40.9	38.6			
10	83.5	15.3	77.7	13.6			Caution flag 3
11	-17.8	51.9	-17.8	48.8		Caution flag 2	
12	45.5	33.8	44.8	33.6		Caution flag 2	
13	-63.0	-68.7	-61.8	-67.8			
14	69.7	52.8	69.6	60.9			Caution flag 3
15	47.6	9.3	54.0	9.9	Caution flag 1		
16	90.6	-29.9	88.9	-28.4			
17	57.5	65.7	54.2	60.4			Caution flag 3
18	-43.8	-36.1	-42.3	-34.3		Caution flag 2	
19	84.7	44.5	85.9	43.4			
20	64.0	-15.1	63.0	-13.7			
21	76.6	-20.0	73.8	-19.9			
22	40.6	16.9	47.8	16.8			
23	88.9	-18.8	90.0	-19.1			
24	-18.9	-51.5	-19.6	-45.9			Caution flag 3
25	51.2	20.9	44.8	19.6			
26	48.5	61.1	48.6	59.7		Caution flag 2	
27	-26.2	-60.2	-25.1	-57.3			
28	147.5	36.5	142.8	37.6			
29	-24.4	-45.1	-26.9	-41.0		Caution flag 2	Caution flag 3
30	50.8	47.4	51.5	46.3			
31	-22.2	-42.7	-24.6	-41.0			
32	-80.5	-27.9	-83.5	-29.0			
33	61.2	30.2	60.1	28.6		Caution flag 2	
34	36.8	58.5	37.0	59.3			
35	71.8	-17.0	75.6	-14.8			
36	59.0	7.3	65.3	7.4	Caution flag 1		
37	59.9	43.0	58.3	39.4			Caution flag 3
38	51.5	53.0	52.2	57.7			Caution flag 3
39	45.8	25.3	47.3	21.6			Caution flag 3

40	43.5	7.3	42.5	7.1	Caution flag 1	Caution flag 2	
41	69.6	63.6	70.9	57.9			
42	-45.0	-35.9	-43.2	-36.2			
43	73.4	-49.3	70.3	-46.9			Caution flag 3
44	38.3	59.8	37.8	60.4		Caution flag 2	
45	44.7	-3.2	42.8	-3.7	Caution flag 1	Caution flag 2	
46	99.4	-36.6	100.0	-34.6			
47	-42.4	-38.7	-45.0	-35.6			
48	49.9	-18.1	50.2	-18.3		Caution flag 2	
49	64.1	39.2	66.0	42.5			
50	42.9	27.3	42.9	28.8			
51	67.8	30.6	65.6	32.2			
52	-53.3	-31.8	-58.8	-32.6		Caution flag 2	Caution flag 3
53	62.9	-15.6	66.2	-17.7			
54	43.9	-31.5	43.7	-32.3			
55	47.4	17.1	46.5	17.4			
56	54.7	-40.7	55.8	-38.4			
57	32.6	55.5	35.4	58.6			
58	-28.6	-118.9	-32.7	-123.4			
59	41.9	51.2	40.3	46.0			
60	45.3	-28.0	45.6	-30.7			
61	45.3	44.3	47.7	39.0			
62	19.3	49.8	18.7	51.9			
63	59.5	9.1	58.6	10.1	Caution flag 1		
64	-47.5	-75.0	-48.1	-75.3			
65	69.7	62.1	69.9	57.0			
66	-29.0	-94.0	-27.2	-101.2			Caution flag 3
67	141.3	-40.1	142.2	-40.8			
68	41.2	24.4	40.3	23.9		Caution flag 2	
69	70.4	130.8	72.1	135.0			
70	65.9	-28.9	64.5	-25.6			
71	-18.0	-43.3	-15.9	-42.6			
72	46.1	23.7	47.0	24.3			
73	-55.3	-98.3	-53.1	-96.4			
74	30.1	43.0	33.3	41.9			
75	66.5	24.0	60.9	23.7		Caution flag 2	
76	22.7	92.5	23.2	91.0			
77	-39.9	-57.2	-38.6	-59.2			
78	9.1	46.5	8.5	45.8	Caution flag 1		
79	57.5	19.4	55.6	17.2			
80	14.3	46.2	13.9	44.0			
81	21.7	176.7	20.1	168.7			Caution flag 3
82	51.1	41.7	51.3	35.3			Caution flag 3
83	-33.3	-61.2	-33.7	-58.4			

84	55.7	34.4	59.1	30.3			
85	21.6	43.8	20.1	46.1		Caution flag 2	
86	40.5	42.1	34.7	41.8			
87	98.9	-39.8	102.7	-35.7			
88	80.9	68.0	79.2	66.6			
89	25.1	55.8	24.2	59.7			
90	-85.9	-62.5	-85.3	-58.6			
91	43.8	-21.6	40.5	-21.5		Caution flag 2	
92	6.4	54.4	6.5	55.3	Caution flag 1	Caution flag 2	
93	-17.1	61.9	-16.1	61.8			
94	-23.4	69.6	-23.7	72.9			
95	88.7	54.2	84.2	56.5			
96	144.5	-27.6	144.5	-26.5			
97	-18.6	42.8	-17.9	47.4			
98	-44.8	79.6	-46.0	77.6			
99	-36.5	47.5	-36.8	42.9			
100	-6.4	47.7	-6.8	43.6	Caution flag 1		Caution flag 3
101	17.3	104.7	16.6	101.3			
102	26.2	55.6	26.3	47.6			
103	-51.5	47.2	-53.5	47.4			
104	24.0	84.6	21.6	84.2			
105	12.5	79.9	11.4	87.6			Caution flag 3
106	7.8	57.1	8.9	56.0	Caution flag 1	Caution flag 2	
107	11.7	57.4	10.6	60.0		Caution flag 2	
108	49.6	-17.1	51.4	-15.6			
109	26.3	49.7	24.0	46.2			Caution flag 3
110	51.0	45.0	45.7	47.8			Caution flag 3
111	24.5	53.5	24.7	54.3			
112	-24.5	-44.7	-22.5	-46.4			
113	47.9	97.2	46.9	98.3			
114	-69.6	166.7	-65.8	151.9			Caution flag 3
115	34.5	54.0	31.9	49.1			
116	64.4	-86.2	61.6	-83.6			
117	20.0	48.2	17.1	49.1			
118	-16.2	57.8	-17.7	51.7		Caution flag 2	Caution flag 3
119	-58.3	-33.6	-57.2	-31.5			
120	-42.2	-31.6	-41.8	-34.5		Caution flag 2	
121	-13.1	71.5	-12.5	73.7			
122	-72.4	26.6	-72.4	27.8			
123	-21.7	71.2	-22.2	68.4			
124	-25.2	50.7	-26.2	47.6		Caution flag 2	
125	-67.1	67.2	-66.8	73.8			
126	-35.8	45.7	-39.2	48.5			Caution flag 3
127	-17.4	54.9	-16.2	52.4		Caution flag 2	

128	-23.2	44.3	-22.2	46.7			
129	-26.5	63.7	-23.7	61.5			
130	-56.8	37.8	-67.5	37.8			
131	-11.6	77.5	-11.4	74.6		Caution flag 2	
132	-16.1	94.0	-16.7	92.8			
133	57.8	-105.6	53.5	-109.8			Caution flag 3
134	-6.6	48.7	-6.6	54.0	Caution flag 1		Caution flag 3
135	-43.4	-10.3	-41.7	-10.4		Caution flag 2	
136	-43.5	45.5	-44.5	45.4		Caution flag 2	
137	50.8	-118.7	47.3	-117.3			Caution flag 3
138	-53.4	44.2	-56.9	47.5			Caution flag 3
139	-25.8	55.2	-22.4	55.4			
140	-16.0	69.8	-17.6	69.3		Caution flag 2	
141	-25.2	44.6	-24.3	46.1			
142	45.7	-41.8	40.4	-42.6			Caution flag 3
143	-41.8	59.3	-45.8	60.2			
144	-43.5	25.9	-48.8	24.0			
145	-44.6	22.5	-44.6	26.0			
146	-27.8	53.4	-24.9	54.7		Caution flag 2	
147	-41.2	25.1	-41.5	22.0		Caution flag 2	
148	-40.1	-76.1	-40.2	-79.6			
149	-34.6	-42.2	-35.5	-41.1			
150	-55.6	52.4	-51.1	54.2			Caution flag 3
151	-49.7	27.2	-52.6	24.5		Caution flag 2	
152	-41.8	84.2	-40.3	87.8			
153	-52.4	-22.0	-52.4	-25.0			
154	-47.4	40.1	-45.4	40.0			
155	-99.0	-25.3	-96.6	-24.8			
156	-43.7	38.2	-40.0	41.2			
157	-34.2	43.8	-34.9	46.0			
158	-38.5	62.6	-40.7	64.1			
159	-47.8	-79.9	-49.3	-72.5			
160	-45.1	-35.2	-45.2	-41.1			
161	-92.5	-27.3	-89.7	-29.5			
162	54.4	-82.6	54.1	-79.5			
163	-44.6	22.4	-44.5	24.0		Caution flag 2	
164	75.8	-62.9	80.0	-64.1			
165	-55.8	23.4	-59.2	21.9			
166	-47.5	20.8	-48.1	23.8			
167	-129.0	101.0	-136.0	102.0			
168	-73.8	23.0	-72.9	24.1			
169	-103.1	95.0	-105.1	82.1			Caution flag 3
170	-51.7	25.2	-51.2	23.3		Caution flag 2	
171	-49.4	-25.8	-47.8	-22.2			Caution flag 3

172	51.8	-57.6	44.8	-58.5			
173	-110.6	-28.4	-115.3	-27.9			
174	-98.8	48.4	-106.7	50.7			Caution flag 3
175	-64.6	42.7	-66.6	43.6			
176	-58.6	51.9	-58.9	51.9			
177	-53.0	24.2	-50.5	25.6			
178	-71.0	-49.0	-66.8	-50.8			
179	-65.4	-25.4	-65.8	-25.7			
180	-19.5	-62.3	-21.2	-63.1			
181	-63.6	-21.1	-64.4	-20.5			
182	77.2	-73.0	78.7	-71.2			
183	-53.4	20.2	-53.2	21.4			
184	-45.9	-29.3	-46.2	-32.6			
185	91.2	-25.3	89.8	-23.5			
186	-34.9	-62.9	-38.6	-62.4			
187	-46.6	-45.1	-44.9	-42.9			
188	104.9	-66.5	105.5	-65.2			
189	43.4	-28.5	41.9	-24.6			
190	-77.7	-59.7	-76.6	-59.2			
191	-56.2	-27.1	-55.3	-28.3			
192	-44.9	40.4	-43.8	41.0		Caution flag 2	
193	-48.2	35.7	-47.7	30.8		Caution flag 2	
194	-44.1	34.4	-44.6	33.8			
195	60.5	-22.2	61.2	-24.3			
196	-144.0	-66.0	-144.0	-66.0			
197	-25.5	40.6	-28.2	41.0			
198	-52.3	-37.6	-52.2	-33.5			
199	-21.4	-46.4	-21.5	-47.2			
200	-63.5	-83.9	-60.2	-76.7			Caution flag 3
201	-99.7	-67.9	-97.7	-66.6			
202	-52.2	-55.6	-48.9	-52.6			Caution flag 3
203	-32.8	-51.5	-30.0	-47.6			
204	-16.5	-42.6	-15.7	-43.9			
205	-98.1	26.5	-99.7	27.0			
206	-63.7	131.7	-62.5	130.8			
207	-64.0	32.8	-65.3	30.7			
208	-59.8	42.9	-58.8	44.5		Caution flag 2	
209	-20.6	-43.2	-22.9	-41.7		Caution flag 2	
210	-83.0	45.0	-84.6	41.0			
211	-33.1	-81.1	-35.1	-85.1			
212	-45.0	9.5	-43.2	9.8	Caution flag 1		
213	-50.5	-62.2	-48.4	-65.1			
214	-46.9	25.4	-47.9	23.8			
215	-14.2	41.2	-14.7	41.5			

216	-80.3	-43.0	-68.1	-43.6			Caution flag 3
217	-54.1	52.0	-57.1	49.8			
218	-56.4	-41.4	-62.4	-41.2			
219	-46.3	71.8	-47.7	61.9			
220	-22.0	-50.7	-24.5	-52.0		Caution flag 2	
221	-72.4	-53.8	-72.5	-48.0			Caution flag 3
222	-69.8	39.3	-66.4	34.2			
223	-44.2	22.2	-44.9	21.3		Caution flag 2	
224	-76.8	39.3	-77.6	39.7			
225	43.6	50.9	47.0	57.1		Caution flag 2	Caution flag 3
226	-55.9	48.4	-53.1	45.9			
227	-65.9	29.9	-66.6	31.1			
228	-60.8	-75.0	-62.2	-74.9			
229	-75.7	71.5	-75.6	70.8			
230	-60.5	53.5	-64.1	48.6			
231	-45.6	-41.8	-48.2	-40.1			
232	-82.4	54.9	-80.3	51.5			
233	-17.7	-57.7	-18.9	-59.4			
234	-62.6	24.0	-62.2	21.6		Caution flag 2	
235	-74.3	-72.5	-74.8	-74.3			
236	-57.7	-75.9	-51.7	-83.0			
237	7.8	47.2	8.1	44.7	Caution flag 1		
238	-38.3	-69.4	-35.7	-69.5			
239	-49.6	-124.9	-47.2	-120.0			
240	-45.0	-40.3	-47.8	-40.8			
241	-19.4	-66.5	-20.9	-71.7			Caution flag 3
242	-25.1	-71.1	-29.5	-70.4			Caution flag 3
243	-44.5	-64.1	-41.9	-58.3			
244	-39.7	-84.8	-45.0	-81.5			
245	-44.8	-46.3	-46.7	-40.9		Caution flag 2	
246	-33.4	-44.2	-33.8	-40.8		Caution flag 2	
247	-62.0	53.5	-64.0	52.4			
248	-57.2	-19.0	-59.9	-21.8		Caution flag 2	Caution flag 3
249	-81.1	-79.6	-79.8	-79.5			
250	-37.9	-85.5	-42.3	-78.5			
251	-51.5	-45.3	-42.9	-44.8			
252	-3.8	55.0	-4.2	54.9	Caution flag 1		
253	-12.1	48.1	-10.3	47.5			
254	-145.0	-129.0	-147.0	-136.0			
255	-43.3	-43.7	-40.4	-49.0		Caution flag 2	
256	-80.0	-135.0	-91.4	-135.8			
257	-66.3	-115.0	-58.1	-112.5			Caution flag 3
258	-15.7	46.0	-14.2	44.3			
259	45.6	52.8	45.4	49.7		Caution flag 2	

260	-26.2	-42.6	-26.2	-45.4		Caution flag 2	
261	-89.6	112.2	-85.2	112.5			
262	-21.9	87.4	-24.9	89.3			
263	-41.6	-60.9	-41.9	-57.5			
264	-26.3	60.6	-26.5	60.1			
265	25.1	63.9	23.1	68.7			
266	27.4	95.3	30.2	99.6			
267	14.7	55.9	15.5	48.5		Caution flag 2	
268	-44.0	72.8	-38.0	71.7			
269	-12.9	56.1	-12.2	51.6			
270	-21.1	-129.7	-21.9	-128.2			
271	-19.9	-51.5	-20.6	-48.8			
272	-23.2	-108.3	-26.2	-114.3			Caution flag 3
273	-65.5	-51.8	-62.2	-50.3		Caution flag 2	
274	-8.2	63.4	-7.6	69.2	Caution flag 1	Caution flag 2	
275	-80.5	-104.8	-74.9	-96.0			Caution flag 3
276	-68.4	47.0	-69.5	42.7			
277	-21.5	-65.7	-24.1	-60.8			Caution flag 3
278	19.1	40.4	20.7	43.1			Caution flag 3
279	-30.3	-96.3	-28.7	-94.1			
280	-31.3	-64.6	-30.8	-63.8			
281	31.6	50.7	31.0	49.5			
282	-59.4	-61.8	-59.8	-65.4			
283	43.3	56.3	42.0	57.5			
284	-36.2	-45.4	-38.9	-43.5			
285	-42.2	-87.2	-42.1	-87.7			
286	-62.2	-63.2	-63.9	-63.5			
287	66.8	26.3	67.7	26.6			
288	15.7	87.7	14.5	84.4			
289	115.9	46.4	119.5	40.1			Caution flag 3
290	-24.8	46.2	-24.7	46.8			
291	-53.8	-69.1	-45.2	-70.2			
292	-99.3	-128.9	-97.8	-129.3			
293	91.7	42.7	94.2	39.8			
294	-108.0	-87.7	-111.2	-77.2			Caution flag 3
295	-63.8	-70.6	-63.8	-72.0			
296	-71.6	-65.5	-71.2	-64.7			
297	52.1	-25.8	51.9	-23.7			
298	-32.1	-85.5	-33.5	-85.5			
299	-47.1	-62.3	-43.1	-56.6			Caution flag 3
300	57.8	10.6	57.1	10.6			

Caution flag 1 was applied when any of the quoted figures for proper-motion in declination or proper-motion for either the primary or secondary component was between –10 and 10 mas yr-1.

Caution flag 2 was applied when the Halbwachs criterion, as described by López (2008), was over 1000 years.

Caution flag 3 was applied when the difference in proper motion in declination or right ascension between the two components was greater than the sum of the mean errors in these values

Table 3

#	PRIMARY UCAC3 MAGNITUDE	SECONDARY UCAC3 MAGNITUDE	PRIMARY 2MASS *J-K* MAGNITUDE	SECONDARY 2MASS *J-K* MAGNITUDE	PRIMARY - SECONDARY UCAC3 MAGNITUDE	PRIMARY - SECONDARY 2MASS MAGNITUDE	SPECTRAL TYPE
145	12.686	13.467	0.731	0.729	0.781	0.002	K + K
5	11.479	11.627	0.551	0.553	0.148	0.002	K + K
19	12.581	13.306	0.834	0.831	0.725	0.003	M + M
266	11.361	11.507	0.571	0.575	0.146	0.004	K + K
133	13.317	13.858	0.886	0.882	0.541	0.004	M + M
54	11.697	12.969	0.349	0.344	1.272	0.005	F + F
84	12.296	13.359	0.809	0.814	1.063	0.005	K + K
186	12.283	13.272	0.856	0.863	0.989	0.007	M + M
225	12.803	12.910	0.850	0.842	0.107	0.008	M + M
24	11.673	11.734	0.364	0.356	0.061	0.008	G + G
193	12.332	12.488	0.407	0.415	0.156	0.008	G + K
103	11.148	12.716	0.862	0.853	1.568	0.009	M + M
100	12.227	12.416	0.353	0.343	0.189	0.010	G + F
278	11.046	11.088	0.408	0.418	0.042	0.010	G + K
105	11.544	13.057	0.362	0.373	1.513	0.011	G + G
210	13.785	13.835	1.400	1.386	0.050	0.014	M + M
137	11.506	11.838	0.323	0.309	0.332	0.014	F + F
147	13.116	13.169	0.823	0.837	0.053	0.014	K + M
292	12.216	13.007	0.776	0.762	0.791	0.014	K + K
230	10.356	10.663	0.619	0.634	0.307	0.015	K + K
226	13.508	13.705	0.829	0.813	0.197	0.016	K + K
64	13.209	13.319	0.716	0.732	0.110	0.016	K + K
233	12.613	12.693	0.528	0.511	0.080	0.017	K + K
182	10.069	10.349	0.390	0.372	0.280	0.018	G + G
178	12.624	13.048	0.436	0.454	0.424	0.018	K + K
261	12.403	12.531	0.589	0.571	0.128	0.018	K + K
97	10.140	11.411	0.340	0.359	1.271	0.019	F + G
72	10.869	13.007	0.447	0.467	2.138	0.020	K + K
48	9.948	10.427	0.286	0.308	0.479	0.022	F + F
179	9.665	10.976	0.346	0.369	1.311	0.023	F + G
272	11.263	11.602	0.307	0.330	0.339	0.023	F + F
46	11.360	12.646	0.393	0.417	1.286	0.024	G + K
62	12.564	12.815	0.377	0.401	0.251	0.024	G + G
65	13.728	13.874	0.789	0.813	0.146	0.024	K + K
219	10.092	11.356	0.468	0.492	1.264	0.024	K + K
16	11.472	12.056	0.479	0.504	0.584	0.025	K + K
284	11.529	12.595	0.472	0.447	1.066	0.025	K + K
294	11.894	12.403	0.693	0.718	0.509	0.025	K + K
184	13.241	13.871	0.362	0.388	0.630	0.026	G + G
196	10.912	11.178	0.527	0.553	0.266	0.026	K + K
244	12.956	13.512	0.689	0.715	0.556	0.026	K + K
7	11.200	11.977	0.788	0.815	0.777	0.027	K + K
108	13.308	13.844	0.545	0.573	0.536	0.028	K + K
71	12.093	12.991	0.836	0.808	0.898	0.028	M + K
82	12.406	12.830	0.373	0.404	0.424	0.031	G + G
22	13.703	13.980	0.871	0.840	0.277	0.031	M + M

50	11.888	12.007	0.657	0.689	0.119	0.032	K + K
140	10.268	12.432	0.384	0.417	2.164	0.033	G + K
149	11.899	12.150	0.620	0.586	0.251	0.034	K + K
218	10.814	10.916	0.387	0.421	0.102	0.034	G + K
3	10.480	10.535	0.408	0.443	0.055	0.035	G + K
220	12.043	13.575	0.759	0.794	1.532	0.035	K + K
190	12.110	12.204	0.328	0.364	0.094	0.036	F + G
21	12.888	13.440	0.558	0.520	0.552	0.038	K + K
23	11.945	11.963	0.372	0.410	0.018	0.038	G + G
283	13.090	13.311	0.594	0.632	0.221	0.038	K + K
253	10.787	11.607	0.371	0.410	0.820	0.039	G + G
26	8.367	10.009	0.319	0.358	1.642	0.039	F + G
142	13.289	13.379	0.449	0.409	0.090	0.040	K + G
205	11.435	11.490	0.339	0.380	0.055	0.041	F + G
240	13.890	13.895	0.828	0.869	0.005	0.041	K + M
58	11.485	13.914	0.777	0.818	2.429	0.041	K + K
67	12.788	13.023	0.770	0.727	0.235	0.043	K + K
70	11.628	12.318	0.420	0.464	0.690	0.044	K + K
129	11.715	12.492	0.406	0.450	0.777	0.044	G + K
271	8.185	10.792	0.497	0.543	2.607	0.046	K + K
162	12.072	12.373	0.627	0.673	0.301	0.046	K + K
77	9.938	10.248	0.256	0.306	0.310	0.050	F + F
286	9.700	9.750	0.506	0.557	0.050	0.051	K + K
198	11.840	11.918	0.413	0.362	0.078	0.051	K + G
227	11.722	12.453	0.791	0.844	0.731	0.053	K + M
207	10.059	11.096	0.776	0.829	1.037	0.053	K + K
55	12.192	13.506	0.478	0.424	1.314	0.054	K + K
150	11.739	12.081	0.675	0.730	0.342	0.055	K + K
123	9.971	10.223	0.453	0.508	0.252	0.055	K + K
68	12.083	12.930	0.415	0.471	0.847	0.056	K + K
169	11.363	11.583	0.407	0.464	0.220	0.057	G + K
250	11.279	13.303	0.735	0.792	2.024	0.057	K + K
238	10.494	12.347	0.321	0.379	1.853	0.058	F + G
180	12.121	13.198	0.338	0.396	1.077	0.058	F + G
296	10.450	11.516	0.390	0.331	1.066	0.059	G + F
163	12.143	12.304	0.450	0.390	0.161	0.060	K + G
38	11.912	12.090	0.771	0.832	0.178	0.061	K + M
39	10.973	11.455	0.363	0.424	0.482	0.061	G + K
49	13.353	13.797	0.615	0.676	0.444	0.061	K + K
122	12.293	12.727	0.499	0.561	0.434	0.062	K + K
168	12.685	13.218	0.711	0.777	0.533	0.066	K + K
85	11.454	12.383	0.538	0.472	0.929	0.066	K + K
222	13.703	13.708	0.417	0.351	0.005	0.066	K + G
29	10.893	12.217	0.317	0.384	1.324	0.067	F + G
106	11.637	11.814	0.332	0.399	0.177	0.067	F + G
161	12.226	12.560	0.429	0.496	0.334	0.067	K + K
262	10.889	11.019	0.431	0.364	0.130	0.067	K + G
155	11.374	11.617	0.390	0.321	0.243	0.069	G + F
94	10.752	11.367	0.721	0.791	0.615	0.070	K + K
91	12.776	13.489	0.505	0.576	0.713	0.071	K + K
197	12.519	13.254	0.577	0.650	0.735	0.073	K + K

293	9.350	9.378	0.292	0.367	0.028	0.075	F + G
152	11.862	13.913	0.410	0.486	2.051	0.076	G + K
241	12.909	13.953	0.428	0.349	1.044	0.079	K + F
199	8.958	9.216	0.386	0.467	0.258	0.081	G + K
175	11.311	12.386	0.714	0.795	1.075	0.081	K + K
13	9.937	10.822	0.306	0.387	0.885	0.081	F + G
171	10.946	12.235	0.361	0.443	1.289	0.082	G + K
177	12.585	12.874	0.559	0.475	0.289	0.084	K + K
239	9.469	11.418	0.329	0.414	1.949	0.085	F + K
192	10.679	11.370	0.646	0.561	0.691	0.085	K + K
120	11.077	11.414	0.347	0.433	0.337	0.086	F + K
234	12.102	12.744	0.496	0.582	0.642	0.086	K + K
153	11.833	13.177	0.516	0.603	1.344	0.087	K + K
254	10.619	12.210	0.748	0.836	1.591	0.088	K + M
158	9.969	12.550	0.272	0.362	2.581	0.090	F + G
78	11.263	11.546	0.671	0.761	0.283	0.090	K + K
42	12.383	13.880	0.333	0.424	1.497	0.091	F + K
74	11.602	12.033	0.586	0.677	0.431	0.091	K + K
166	12.748	13.680	0.781	0.689	0.932	0.092	K + K
280	11.898	13.252	0.300	0.393	1.354	0.093	F + G
102	12.793	13.575	0.480	0.573	0.782	0.093	K + K
154	11.546	12.719	0.279	0.373	1.173	0.094	F + G
176	8.419	10.298	0.349	0.443	1.879	0.094	F + K
214	11.650	12.471	0.455	0.550	0.821	0.095	K + K
47	11.050	11.604	0.458	0.360	0.554	0.098	K + G
288	8.741	10.355	0.282	0.380	1.614	0.098	F + G
249	10.730	12.817	0.423	0.521	2.087	0.098	K + K
128	10.404	13.301	0.328	0.427	2.897	0.099	F + K
12	11.937	12.871	0.409	0.509	0.934	0.100	G + K
32	11.553	13.496	0.520	0.621	1.943	0.101	K + K
34	11.382	12.539	0.377	0.478	1.157	0.101	G + K
118	11.593	12.419	0.329	0.430	0.826	0.101	F + K
213	10.506	11.943	0.415	0.517	1.437	0.102	K + K
188	10.421	12.790	0.445	0.548	2.369	0.103	K + K
63	9.418	10.557	0.302	0.405	1.139	0.103	F + G
235	10.985	11.839	0.322	0.425	0.854	0.103	F + K
167	11.758	13.387	0.745	0.849	1.629	0.104	K + M
33	11.910	12.912	0.353	0.459	1.002	0.106	G + K
124	8.842	10.682	0.318	0.424	1.840	0.106	F + K
90	9.627	10.739	0.484	0.592	1.112	0.108	K + K
183	8.947	9.455	0.287	0.395	0.508	0.108	F + G
8	11.711	12.418	0.630	0.740	0.707	0.110	K + K
30	11.769	12.611	0.374	0.484	0.842	0.110	G + K
83	10.089	12.585	0.446	0.557	2.496	0.111	K + K
112	13.099	13.817	0.500	0.611	0.718	0.111	K + K
75	11.907	13.612	0.675	0.788	1.705	0.113	K + K
194	12.171	13.208	0.467	0.354	1.037	0.113	K + G
204	11.974	13.334	0.500	0.615	1.360	0.115	K + K
141	9.271	10.429	0.318	0.435	1.158	0.117	F + K
223	13.660	13.903	0.697	0.814	0.243	0.117	K + K
95	9.479	10.014	0.376	0.495	0.535	0.119	G + K

130	12.287	13.747	0.699	0.818	1.460	0.119	K + K
172	10.886	13.187	0.380	0.499	2.301	0.119	G + K
191	8.184	12.523	0.617	0.738	4.339	0.121	K + K
89	12.842	13.223	0.394	0.515	0.381	0.121	G + K
164	12.467	12.828	0.504	0.625	0.361	0.121	K + K
301	9.173	11.790	0.319	0.443	2.617	0.124	F + K
117	10.128	11.805	0.286	0.412	1.677	0.126	F + K
88	9.602	13.781	0.557	0.683	4.179	0.126	K + K
289	10.910	12.388	0.299	0.425	1.478	0.126	F + K
295	10.801	11.679	0.463	0.591	0.878	0.128	K + K
208	9.913	11.878	0.360	0.490	1.965	0.130	G + K
92	11.797	13.400	0.518	0.649	1.603	0.131	K + K
232	10.495	11.575	0.423	0.554	1.080	0.131	K + K
206	11.393	12.327	0.347	0.482	0.934	0.135	F + K
107	12.445	13.077	0.395	0.531	0.632	0.136	G + K
35	10.349	12.281	0.425	0.562	1.932	0.137	K + K
80	11.777	12.975	0.283	0.420	1.198	0.137	F + K
287	9.313	10.457	0.424	0.562	1.144	0.138	K + K
31	9.805	13.513	0.461	0.601	3.708	0.140	K + K
156	12.124	13.831	0.692	0.832	1.707	0.140	K + M
291	9.225	10.000	0.386	0.529	0.775	0.143	G + K
11	9.587	10.392	0.503	0.647	0.805	0.144	K + K
59	12.697	13.863	0.480	0.626	1.166	0.146	K + K
110	11.230	12.285	0.318	0.465	1.055	0.147	F + K
224	9.361	10.568	0.304	0.454	1.207	0.150	F + K
40	9.484	12.677	0.711	0.559	3.193	0.152	K + K
159	11.270	11.523	0.559	0.407	0.253	0.152	K + G
300	11.272	13.442	0.384	0.539	2.170	0.155	G + K
248	11.094	11.502	0.447	0.606	0.408	0.159	K + K
18	13.248	13.664	0.540	0.701	0.416	0.161	K + K
60	10.481	11.356	0.520	0.358	0.875	0.162	K + G
264	13.842	13.985	0.927	0.759	0.143	0.168	M + K
101	11.575	13.496	0.608	0.778	1.921	0.170	K + K
86	11.274	12.339	0.440	0.610	1.065	0.170	K + K
148	8.080	10.867	0.313	0.483	2.787	0.170	F + K
251	11.158	12.892	0.354	0.526	1.734	0.172	G + K
136	10.072	11.373	0.368	0.543	1.301	0.175	G + K
98	10.625	11.340	0.395	0.573	0.715	0.178	G + K
259	12.722	12.790	0.379	0.558	0.068	0.179	G + K
255	10.473	11.567	0.546	0.725	1.094	0.179	K + K
157	12.080	13.391	0.474	0.654	1.311	0.180	K + K
195	9.700	11.916	0.299	0.479	2.216	0.180	F + K
25	13.457	13.774	0.356	0.537	0.317	0.181	G + K
45	11.193	12.601	0.342	0.523	1.408	0.181	F + K
215	11.883	12.220	0.641	0.823	0.337	0.182	K + K
209	10.550	12.559	0.636	0.818	2.009	0.182	K + K
263	10.983	12.036	0.526	0.708	1.053	0.182	K + K
143	10.043	12.366	0.324	0.508	2.323	0.184	F + K
44	12.599	13.647	0.525	0.712	1.048	0.187	K + K
4	10.942	12.912	0.496	0.685	1.970	0.189	K + K
6	11.006	13.374	0.519	0.708	2.368	0.189	K + K

111	11.541	12.262	0.478	0.668	0.721	0.190	K + K
114	10.516	12.087	0.523	0.715	1.571	0.192	K + K
79	11.441	13.145	0.293	0.488	1.704	0.195	F + K
104	12.092	12.960	0.432	0.628	0.868	0.196	K + K
290	9.119	10.369	0.341	0.539	1.250	0.198	F + K
2	11.594	13.328	0.322	0.520	1.734	0.198	F + K
267	9.463	11.220	0.260	0.460	1.757	0.200	F + K
51	10.319	11.855	0.426	0.626	1.536	0.200	K + K
125	8.586	9.714	0.247	0.447	1.128	0.200	F + K
14	10.440	12.910	0.430	0.631	2.470	0.201	K + K
27	10.056	11.749	0.374	0.577	1.693	0.203	G + K
53	10.165	12.201	0.348	0.554	2.036	0.206	F + K
121	11.552	13.614	0.599	0.805	2.062	0.206	K + K
174	9.843	13.949	0.598	0.808	4.106	0.210	K + K
119	9.512	12.209	0.288	0.502	2.697	0.214	F + K
245	9.864	13.940	0.483	0.701	4.076	0.218	K + K
127	11.533	12.776	0.271	0.496	1.243	0.225	F + K
282	8.632	10.338	0.249	0.475	1.706	0.226	F + K
173	10.896	13.725	0.536	0.763	2.829	0.227	K + K
243	9.474	10.468	0.353	0.580	0.994	0.227	G + K
10	11.656	13.373	0.571	0.803	1.717	0.232	K + K
297	12.415	13.711	0.577	0.811	1.296	0.234	K + K
41	11.558	13.747	0.566	0.801	2.189	0.235	K + K
187	12.292	13.854	0.538	0.777	1.562	0.239	K + K
273	12.138	13.704	0.450	0.691	1.566	0.241	K + K
216	10.315	11.417	0.518	0.274	1.102	0.244	K + F
96	10.258	11.864	0.462	0.707	1.606	0.245	K + K
201	10.664	13.395	0.567	0.818	2.731	0.251	K + K
99	9.275	11.482	0.373	0.630	2.207	0.257	G + K
202	10.677	13.783	0.291	0.551	3.106	0.260	F + K
299	11.423	13.756	0.541	0.804	2.333	0.263	K + K
252	12.728	13.888	0.451	0.716	1.160	0.265	K + K
9	9.816	12.633	0.263	0.535	2.817	0.272	F + K
93	11.061	13.900	0.364	0.642	2.839	0.278	G + K
203	10.305	12.194	0.485	0.763	1.889	0.278	K + K
73	9.804	12.739	0.404	0.687	2.935	0.283	G + K
285	11.409	13.716	0.400	0.688	2.307	0.288	G + K
66	10.413	12.977	0.301	0.589	2.564	0.288	F + K
298	11.392	13.278	0.358	0.646	1.886	0.288	G + K
43	11.054	13.598	0.553	0.843	2.544	0.290	K + M
146	9.059	12.102	0.165	0.464	3.043	0.299	F + K
189	10.945	13.374	0.327	0.627	2.429	0.300	F + K
57	11.093	13.546	0.442	0.743	2.453	0.301	K + K
36	12.326	13.904	0.508	0.809	1.578	0.301	K + K
236	8.732	11.031	0.302	0.606	2.299	0.304	F + K
165	9.264	12.120	0.303	0.614	2.856	0.311	F + K
135	10.587	13.950	0.306	0.619	3.363	0.313	F + K
139	10.882	13.825	0.411	0.725	2.943	0.314	K + K
37	9.607	12.033	0.395	0.712	2.426	0.317	G + K
229	9.412	12.272	0.592	0.916	2.860	0.324	K + M
134	8.905	12.482	0.307	0.635	3.577	0.328	F + K

52	10.683	13.929	0.477	0.807	3.246	0.330	K + K
81	8.073	10.976	0.171	0.502	2.903	0.331	F + K
279	10.938	11.803	0.340	0.676	0.865	0.336	F + K
258	9.187	11.261	0.374	0.712	2.074	0.338	G + K
277	9.087	11.128	0.375	0.713	2.041	0.338	G + K
132	12.127	13.685	0.337	0.675	1.558	0.338	F + K
17	9.239	13.888	0.512	0.852	4.649	0.340	K + M
1	8.771	11.956	0.399	0.742	3.185	0.343	G + K
211	10.323	13.900	0.497	0.847	3.577	0.350	K + M
274	10.482	13.577	0.397	0.754	3.095	0.357	G + K
87	9.996	13.723	0.398	0.768	3.727	0.370	G + K
138	9.242	11.628	0.314	0.685	2.386	0.371	F + K
131	10.748	13.291	0.376	0.752	2.543	0.376	G + K
56	10.612	13.594	0.329	0.705	2.982	0.376	F + K
185	11.311	13.794	0.532	0.924	2.483	0.392	K + M
76	9.302	12.972	0.362	0.757	3.670	0.395	G + K
115	9.313	13.085	0.420	0.816	3.772	0.396	K + K
170	8.296	13.918	0.424	0.820	5.622	0.396	K + K
61	9.072	13.222	0.424	0.828	4.150	0.404	K + K
231	10.629	13.161	0.308	0.713	2.532	0.405	F + K
181	8.359	11.182	0.296	0.705	2.823	0.409	F + K
242	9.788	13.374	0.298	0.711	3.586	0.413	F + K
212	8.585	11.784	0.445	0.861	3.199	0.416	K + M
281	9.413	11.751	0.316	0.734	2.338	0.418	F + K
116	9.029	12.535	0.264	0.685	3.506	0.421	F + K
256	11.751	13.867	0.382	0.804	2.116	0.422	G + K
217	10.138	12.144	0.359	0.782	2.006	0.423	G + K
276	9.492	12.245	0.419	0.865	2.753	0.446	K + M
200	9.032	12.935	0.232	0.684	3.903	0.452	F + K
257	8.887	13.502	0.369	0.824	4.615	0.455	G + K
15	11.026	13.995	0.341	0.796	2.969	0.455	F + K
126	10.439	13.870	0.410	0.868	3.431	0.458	G + M
228	10.435	13.998	0.242	0.703	3.563	0.461	F + K
221	13.668	13.699	0.737	0.271	0.031	0.466	K + F
69	9.410	12.603	0.337	0.807	3.193	0.470	F + K
113	9.106	13.008	0.292	0.768	3.902	0.476	F + K
160	9.260	13.335	0.300	0.813	4.075	0.513	F + K
109	8.376	13.101	0.308	0.830	4.725	0.522	F+ M
151	8.438	12.982	0.268	0.795	4.544	0.527	F + K
237	13.114	13.208	0.353	0.888	0.094	0.535	G + M
28	9.178	13.996	0.297	0.855	4.818	0.558	F +M
144	8.921	12.491	0.234	0.799	3.570	0.565	F + K
269	12.733	13.521	0.234	0.809	0.788	0.575	F + K
275	12.856	13.948	0.995	0.420	1.092	0.575	M + K
265	8.728	12.625	0.306	0.884	3.897	0.578	F + M
20	8.607	13.675	0.244	0.838	5.068	0.594	F +M
270	11.014	13.010	1.172	0.486	1.996	0.686	M + K
268	12.757	13.716	0.275	1.057	0.959	0.782	F + M
260	12.772	13.876	0.393	1.384	1.104	0.991	G + M
246	12.961	13.989	0.449	1.698	1.028	1.249	K + M
247	13.648	13.977	NULL	0.389	0.329	NO DATA	UNKNOWN