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Original scientific paper

CATALOGUE OF DECLINATIONS OF 307 BRIGHT STARS IN THE ZONE +65° – +90° (BCAD)

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SUMMARY: Catalogue of declinations of 307 bright stars in the zone +65° – +90° (BCAD) for the equinoxes B1950.0 and J2000.0 and epoch of observation is presented. The declinations were observed with the Vertical Circle of the Belgrade Observatory by absolute method from 1976 to 1980. All stars were observed at both culminations.

The mean error of a single zenith distance observation is $\epsilon_Z^2 = (0.''42)^2 + (0.''23 \tan z)^2$ and the mean error of the catalogue declinations is $\epsilon_\delta = \pm 0.''13$.

The mean epoch of observation is 1978.62.

The mean systematic differences with respect to the fundamental catalogues FK4 and FK5 are: BCAD – FK4 = –0.''01 and BCAD – FK5 = +0.''05.

The systematic differences $\Delta\delta_\alpha$ and $\Delta\delta_\delta$ with respect to these catalogues are also given. The system of Catalogue BCAD is close to the FK5 system.

1. INTRODUCTION

After a detailed reconstruction of the Belgrade Vertical Circle (BVC) ASKANIA N° 80118 (d=190 mm, f=2578 mm) performed in late 1974 (Usanov et al, 1978) and after satisfactory observational results had been obtained during 1975 (Teleki and Mijatov, 1976), we could start regular observations.

At the 20. Soviet Astrometric Conference held in Leningrad in 1975 after having become acquainted with the state of BVC, following M.S. Zverev's initiative, it was proposed to the fellows of the Belgrade Observatory, participating in the Conference, to work aut, using BVC, a Catalogue of declinations from the programme of bright stars (zone +65° – +90°) by absolute method. The proposal was accepted. It was also recommended to observe all the stars from this catalogue at both culminations since the latitude of the Belgrade Observatory ($\varphi \approx +44^\circ\ 48'$) makes this possible.

The list of stars recommended for observation was compiled at the Pulkovo Observatory (USSR) and was sent to the Belgrade Observatory in late 1975.

2. OBSERVING PROGRAMME AND ITS REALISATION

The programme of bright stars was composed at the Pulkovo Observatory (Zverev and Timashkova, 1960) on the basis of a accepted at the 14. Soviet Astrometric Conference. At the X IAU General Assembly it was recommended to observe the stars from this programme. The observational list proposed for the Catalogue contained 308 stars of the programme mentioned above. All the stars are contained in the catalogues GC and BD, 198 stars in the BS catalogue, 110 in the FK4 and 237 in the FK5.

The characteristics of the observing programme are the following: The brightest star is of 2.1 magnitude

and the faintest one 7.9 magnitude. About 76% of the stars are between 5.0 and 6.9 magnitudes. About 60% of the stars have spectral types A and K. The stars are uniformly distributed in α, but not in δ, because about 60% of them are within the zone $+70^\circ$ – $+80^\circ$ declination.

Since the recommendation to observe all stars at both culminations was accepted on our part, we decided to observe every star at each culmination not less than four times.

The obervations began in April 1976 and were finished in December 1980.

In the course of the observing programme's execution the observations of one star were not successful and for this reason the Catalogue contains 307 stars. Besides, because some observations were rejected (by applying the criterion 2.5σ about 1.5% of the observational material was rejected), for some stars the number of observations appearing in the final declination derivation was less than four per culmination.

The total number of observations taken into account in the compilation of the Catalogue is 3032. The average number of observations per star is 9.9: 4.8 at the upper culmination and 5.1 at the lower one.

The following observers took part in the observations: M. Mijatov, Dj. Božičković, G. Teleki, B. Kubičela and M. Dačić. The observations were mostly carried out by two observers. One set the instrument on a star and read the eyepiese micrometer and the other read the circle and the levels. The two observers mentioned first performed about 56% of the observations working together and 35% was performed by Božičković working alone. Other observers took part in a small number of observations, only in 1976.

3. METHOD OF OBSERVATIONS AND REDUCTIONS

The determination of the zenith distances of stars is performed by using the method applied for vertical circles consisting of observing star meridian transits in two instrument clamps (CE and CW).

The zenith distances are calculated by using the following formula:

$$z=1/2(C_W-C_E)+R/2(m_E-m_W)-1/2\,\Delta i \mp \Delta m+\Delta k+ \\ +\Delta r+\Delta\varphi'+\rho-b\sin z \qquad (1)$$

where:

C_E, C_W – circle readings in the positions CE and CW;
m_E, m_W – eyepiece micrometer readings in the positions CE and CW;
R – value of the eyepiece–micrometer–screw revolution in are seconds;
Δi – vertical axis inclination;
Δm – correction for the parallel curvature (sign "–" corresponds to the upper culmination and "+" to lower one);
Δk – total correction to circle reading;
Δr – total correction for run;
$\Delta\varphi'$ – correction for the latitude change due to the polar motion;
ρ – refraction;
b – horizontal flexure component.

The examinations of the microscope micrometer and of the exepiece micrometer (Teleki et al, 1968) have shown that these measuring devices are of good quality.

The corrections for the inclination Δi are determined by measuring with two levels installed of the microscope bearing. Their constants, as well as their quality have been determined earlier (Sadžakov, Mijatov, 1968; Mijatov, Trajkovska, 1984; Bozhichkovich, 1986).

The circle reading corrections Δk are determined by the interpolation from the corrections to the circle divisions obtained by examining the 10' – divisions (Bozhichkovich, Mijatov, 1984).

The run was determined only four times during the observational period and the corrections Δr were applied for the corresponding periods.

The corrections $\Delta\varphi'$ are calculated in accordance with the pole coordinates published by BIH.

The refraction ρ is calculated according to the Pulkovo Refraction Tables (fifth edition). The parameters necessary to the refraction calculation – the outside temperature, the barometric pressure and the water vapour pressure – are determined in the following way. The outside temperature was measured immediately after the observation of every star. The barometric pressure was obtainerd by interpolation from its measurements at the beginning and at the end of the observing night. The water vapour pressure was calculated from the relative humidity. This humidity for every observing night was available from the Aerological Observatory situated near our own.

The flexure determination with the horizontal collimators was made during the entire observational period. The results of these examinations given by Mijatov and Trajkovska (1989) were applied for the determination of b for every observing night.

For stars with declinations higher than 85° the time of the mean setting was registered by a chronometer and taken account of.

The instrument constants a_E, a_W, b'+c (b' – lateral flexure) were within tolerable limits throughout the observational period and required no corrections.

4. SYSTEMATIC DIFFERENCES OF OBSERVED ZENITH DISTANCES

For furter reductions the zenith distances determined observationally are reduced to the equinox

Table 1. Systematic Differences $z_{EW} - z_{WE}$ and $z_{MB} - z_B$.

z	$z_{EW} - z_{WE}$	ϵ	n	$z_{MB} - z_B$	ϵ	n
20° – 25°	+0".13	±0".06	35	+0".03	±0".07	14
25 – 30	+0.08	0.04	102	+0.09	0.07	33
30 – 35	+0.06	0.04	83	+0.11	0.07	31
35 – 40	+0.08	0.04	64	+0.32	0.11	22
40 – 45	+0.31	0.10	23	–	–	–
45 – 50	+0.41	0.08	23	–	–	–
50 – 55	+0.24	0.07	64	+0.22	0.12	26
55 – 60	+0.08	0.06	83	+0.36	0.08	42
60 – 65	+0.02	0.05	102	+0.42	0.09	38
65 – 70	+0.11	0.10	35	+0.36	0.16	18

and epoch B1950.0 using the FK4 proper motions for the stars from this Catalogue and the SAO proper motions for other stars and also to the equinox and epoch J2000.0 using FK5 proper motions for the stars from this Catalogue and the SAO proper motions for the rest of stars.

The examination show that there are systematic differences in the zenith distances associated with the order of observations $z_{EW} - z_{WE}$ and with the observers – between the pair Mijatov–Božičković (MB) on the one hand and Božičković (B) alone on the other $z_{MB} - z_B$. These systematic differences are determined in 5 – zones of zenith distances and are presented in Table 1 where ϵ – is the error of the corresponding difference and n is the number of differences.

The systematic differences are determined only in cases where the minimum number of observations of a star for the derivation of the corresponding quantities (z_{EW}, z_{WE}, z_{MB}, z_B) was two. No weights are applied.

Since $\varphi \approx +45°$ the observed zenith distances from 20° to 45° belong to the observations at the upper culmination and those from 45° to 70° to the lower culmination.

The systematic differences $z_{EW} - z_{WE}$ are significant only for the zones 40° – 55° and are prominent for the declination zone 85° – 90° (zenith distance zone 40° – 50°). However, since these differences in the case of the same number of observations for the order EW and WE (even number of observations) have no influence and in the case of different number of observations (odd number of observations) only a slight influence on the derived declinations, a special analysis of this effect is not made.

The systematic differences $z_{MB} - z_B$ are not great only for the zones 20° – 35°, but are significant in the rest of them. In determined from a very small number of stars according to the established criterion. For this reason we did not take them into account. The mean systematic differences $z_{MB} - z_B$ from both culminations differ only sisqhtly in all declination zones (range between +0".20 and +0".27). The mean difference for all zones is $z_{MB} - z_B = +0".24$.

5. ACCURACY OF ZENITH DISTANCE OBSERVATION

The random errors of a single zenith distance observation are determined within the zenith distance zones according to the formula:

$$\epsilon_z = \pm 1.25 \frac{\text{abs}(v)}{n - m/2} \qquad (2)$$

where:
v – doviations of individual z values, corrected for the systematic differences from Table 1, from the mean values for every star in a zone;
n – number of deviations;
m – number of stars within a zone.

In Table 2 the values of ϵ_z, n and m for the zenith distance zones of 5° are presented.

The accuracy for ϵ_z is within the accuracy limits obtainable with vertical circles, except at higher zenith

Table 2. Random Error of a Single Observation ϵ_z

z	ϵ_z	n	m
20° – 25°	±0".33	156	35
25 – 30	0.44	492	102
30 – 35	0.42	394	83
35 – 40	0.44	319	64
40 – 45	0.41	98	23
45 – 50	0.46	104	23
50 – 55	0.51	334	64
55 – 60	0.57	420	83
60 – 65	0.57	526	102
65 – 70	0.67	189	35

distances. This is a consequence of poorer atmospheric conditions for observations of northern stars (proximity of the Danube river and immediate vicinity of buildings), so that the star images, especially at higher zenith distances, are indinstinct and unsteady.

The mean random error of a single zenith distance observation can be represented by the fallowing formula:

$$\epsilon_z^2 = (0''.42)^2 + (0.23\tan z)^2 .$$

6. DETERMINATION OF THE CORRECTIONS FOR THE LATITUDE AND FOR THE REFRACTION CONSTANT

The corrections for the latitude, as well as the refraction constant are determined from the well-known equation:

$$2\Delta\varphi + (\tan z_1 + \tan z_2)\,\Delta R = \delta_2 - \delta_1 \qquad (3)$$

where:
$\Delta\varphi$ – correction for the preliminary latitude;
ΔR – correction for the refrection constant;
z_1, z_2 – zenith distances of stars at the upper and lower culminations, respectively;
δ_1, δ_2 – mean declination values derived from the observations at the upper and lower culmnations, respectively, with the preliminary latitude $\varphi = +44^\circ\ 48'\ 08''.0$.

The equations of condition of the expression (3) are reduced to equations with the same weights by applying the weights $p = 4\epsilon_0^2/(\epsilon_1^2/n_1 + \epsilon_2^2/n_2)$, where ϵ_1, ϵ_2 are the random errors of a single declination determination at the two culminations, respectively, n_1, n_2 are the numbers of measurements at the two culminations, respectively, and ϵ_0 is the error of the unit weight (assumed $\epsilon_0 = \pm 0''.1$).

From expression (3), after applying the weights p, using the least–square method, we obtain the unknown values $\Delta\varphi$ and ΔR first taking the declinations reduced to the equinox and expoch B1950.0 and then the declinations reduced to the equinox and epoch J2000.0. Although there are some differences in the values of $\Delta\varphi$ and ΔR corresponding to the two equinoxes and epochs, obtained in this way, the declinations obtained by applying $\Delta\varphi$ and ΔR differ negligible. Bearing this in mind we decided to addopt the mean value of these two systems:

$\Delta\varphi = -0''.284 \pm 0''.107$ and $\Delta R = +0''.140 \pm 0''.091$.

The obtained values of $\Delta\varphi$ and ΔR can however, only formally be considered as corrections for the latitude and for the refraction constant since there are other causes affecting the declination determination not taken into account in (3) (Podobed 1968).

With ther addopted correction $\Delta\varphi$ the latitude value becomes: $\varphi = +44^\circ\ 48'\ 07''.716 \pm 0''.107$.

7. DECLINATIONS OF STARS

The declinations of stars are derived from the preliminary corrected declinations iwith latitude φ_0) for the systematic diferences $z_{EW} - z_{WE}$ and $z_{MB} - z_B$ from Table 1 and using $\Delta\varphi$ and ΔR tanz according to the expression:

$$\delta = \delta_1 + \frac{\delta_2 - \delta_1}{1 + q\,(\epsilon_2/\epsilon_1)^2} \qquad (4)$$

where:
δ_1, δ_2 – mean values of the corrected declinations observed at the upper and lower culminations, respectively;
ϵ_1, ϵ_2 – mean errors of a single declination observation at the upper and lower culminations, respectively;

$$q = \frac{(n_1 - 3)(n_2 - 1)}{(n_2 - 3)(n_1 - 1)}$$

n_1, n_2 – number of observations at the upper and lower culminations, respectively. If both n_1 and n_2 are less than four, then $q = 1$.

Expression (4) with q=1 was applied by Korol' (1969) in the derivation of a unified declination system for bright and faint fundamental stars.

The declinations are derived for the eqinox and epoch B1950.0 and J2000.0. Thereupon by applying the corresponding proper motions from the catalogues FK4, FK5 and SAO, used for reducing zenith distances, they are reduced to the epochs of observation.

The accuracy of the declinations obtained in this way is determined according to the formula:

$$\epsilon_\delta^2 = \left(\frac{a-1}{a}\right)\frac{\epsilon\delta_1^2}{n_1} + \frac{1}{a^2}\,\frac{\epsilon\delta_2^2}{n_2}$$

where $a = 1 + q\,(\epsilon_2/\epsilon_1)^2$.

The mean error in declination is $\epsilon_\delta = \pm 0''.13$.
The mean epoch of observation is $T = 1978.62$.

8. COMPARISON WITH THE FUNDAMENTAL CATALOGUES

The mean systematic differences of the Catalogue with respect to FK4 and FK5 are: BCAD–FK4 = –0".01 and BCAD–FK5 = +0".05. The systematic differences of the Catalogue BCAD of the types $\Delta\delta_\alpha$ and $\Delta\delta_\delta$ with respect to FK4 and FK5 are presented in Tables 3 and 4. The differences $\Delta\delta_\delta$ are obtained by averaging within right ascension zones of 4 hours after eliminating the declination zones of 5°, and the $\Delta\delta_\alpha$ ones by averaging within right ascension zones of 4 hours after eliminating

Table 3. Systematic Differences $\Delta\delta_\alpha$.

α	$\Delta\delta_\alpha$			
	FK4		FK5	
0^h – 4^h	–0".01	(17)	–0".01	(38)
	±0.05		±0.04	
4 – 8	+0.18	(16)	+0.14	(38)
	±0.06		±0.04	
8 – 12	+0.02	(19)	0.00	(39)
	±0.06		±0.04	
12 – 16	+0.11	(17)	+0.07	(40)
	±0.08		±0.04	
16 – 20	–0.11	(21)	–0.13	(41)
	±0.05		±0.03	
20 – 24	–0.14	(20)	–0.06	(40)
	±0.05		±0.04	

Table 4. Systematic Differences $\Delta\delta_\delta$

δ	$\Delta\delta_\delta$			
	FK4	F	FK5	
65° – 70°	–0".07	(29)	–0".01	(36)
	±0.05		±0.05	
70 – 75	–0.10	(27)	0.00	(71)
	±0.04		±0.03	
75 – 80	+0.08	(28)	+0.11	(66)
	±0.05		±0.03	
80 – 85	0.00	(15)	+0.06	(46)
	±0.09		±0.04	
85 – 90	+0.14	(11)	+0.11	(17)
	±0.08		±0.05	

the $\Delta\delta_\delta$ differences. The number of differences is given in the perentheses.

As apparent from Tables 3 and 4 there are significant systematic differences of $\Delta\delta_\alpha$ and $\Delta\delta_\delta$ types in the Catalogue BCAD slightly more pronounced with respect to FK4 indicating that the system of this Catalogue is closer to that of FK5.

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CATALOGUE OF DECLINATIONS OF 307 BRIGHT STARS IN THE ZONE +65° – +90° (BCAD)

The columns contain

1. N – number of the star in the Catalogue BCAD;
2. GC – number of the star in the GC Catalogue;
3. FK5 – number of the star in the FK5 Catalogue;
4. α_{1950} – right ascension of the star for the equinox and epoch B1950.0 rounded to 1;
5. δ_{1950} – declination of the star obtained from observations for the equinox B1950.0 and for the epoch of observation;
6. α_{2000} – right escension of the star for the equinox and epoch J2000.0 rounded to 1;
7. δ_{2000} – declination of the star obtained from observation for the equinox J12000.0 and for the epoch of observation;
8. ϵ – mean random error of obtained declinations;
9. n – number of observations of the star;
10. E – epoch of observation of the star calculated from 1900.0.

N	GC	FK5	α_{1950}	δ_{1950}	α_{2000}	δ_{2000}	ε	n	E
			h m s	° ′ ″	h m s	° ′ ″	″		
1	33322	3930	23 59 4	73 20 1.41	0 1 39	73 36 42.74	±0.11	9	78.66
2	303		0 13 22	76 40 23.46	0 16 14	76 57 3.02	.12	9	78.85
3	521	2023	0 23 52	79 46 31.94	0 27 7	80 3 7.35	.14	11	78.14
4	588	2031	0 27 40	76 44 37.16	0 30 55	77 1 10.40	.11	9	78.33
5	648	2034	0 30 19	70 42 22.39	0 33 19	70 58 54.31	.10	10	78.67
6	760	3941	0 35 55	82 13 7.35	0 39 47	82 29 35.13	.12	8	77.80
7	891	24	0 42 18	74 42 54.15	0 45 39	74 59 17.40	.14	10	78.48
8	934		0 44 23	74 34 29.60	0 47 46	74 50 51.10	.10	10	78.88
9	943		0 44 51	72 24 6.84	0 48 9	72 40 27.91	.06	8	78.29
10	1045	3942	0 50 3	83 26 11.60	0 54 53	83 42 27.16	.14	9	78.43
11	1175	2062	0 56 15	80 16 33.56	1 0 30	80 32 42.92	.09	8	78.97
12	1190	2063	0 57 8	70 42 49.71	1 0 31	70 58 58.64	.08	11	78.83
13	1288	906	1 1 31	85 59 24.43	1 8 45	86 15 26.02	.13	9	78.10
14	1420	41	1 7 52	79 24 31.33	1 12 17	79 40 26.57	.13	9	77.87
15	1616	2087	1 17 52	75 58 39.15	1 21 59	76 14 20.46	.13	8	78.97
16	1473		1 10 57	88 45 18.49	1 33 51	89 0 57.07	.17	9	79.53
17	1707	46	1 22 22	67 52 12.50	1 25 56	68 7 47.32	.05	14	78.61
18	1817	1042	1 27 28	70 0 27.53	1 31 14	70 15 53.99	.16	9	78.67
19	1955	51	1 34 29	72 47 10.40	1 38 31	73 2 24.60	.14	10	77.60
20	1987		1 36 10	77 42 57.86	1 40 53	77 58 8.36	.11	8	78.69
21	2045	55	1 38 36	67 47 28.00	1 42 21	68 2 34.86	.20	8	78.87
22	2059		1 39 1	70 22 15.59	1 42 56	70 37 21.55	.10	9	79.52
23	2215		1 47 15	75 20 34.31	1 51 48	75 35 23.85	.12	9	78.88
24	2270		1 50 12	80 39 49.69	1 56 3	80 54 31.92	.11	10	78.61
25	2424		1 57 49	70 39 57.06	2 1 57	70 54 24.92	.06	9	77.11
26	2445	70	1 59 7	72 10 51.67	2 3 26	72 25 16.22	.14	12	79.19
27	2459	2139	2 0 2	77 2 32.17	2 5 7	77 16 53.97	.13	11	79.06
28	2475		2 0 41	75 52 33.79	2 5 31	76 6 54.52	.15	9	78.54
29	2517	3943	2 3 7	81 3 31.90	2 9 25	81 17 45.43	.13	10	79.80
30	2243	907	1 48 49	89 1 43.89	2 31 49	89 15 51.26	.06	8	79.62
31	2618	2149	2 8 42	73 47 38.49	2 13 21	74 1 40.99	.17	9	79.46
32	2661	76	2 10 32	66 17 29.03	2 14 29	66 31 27.77	.22	8	79.18
33	2622	1635	2 8 52	83 19 43.99	2 16 46	83 33 42.34	.11	10	78.19
34	3041	2175	2 29 24	71 4 29.87	2 33 58	71 17 40.18	.03	9	78.97
35	3033	2174	2 29 4	76 29 56.73	2 34 31	76 43 6.70	.14	10	79.72
36	3019	3944	2 28 39	83 36 58.03	2 37 28	83 50 4.32	.09	9	79.92
37	3116	87	2 33 14	72 36 6.20	2 38 2	72 49 5.54	.13	7	79.10
38	3271	92	2 40 30	67 36 49.77	2 44 50	67 49 29.43	.13	10	78.70
39	3270	3945	2 40 26	81 14 20.17	2 47 48	81 26 55.95	.06	10	78.73
40	3527		2 53 21	72 28 21.56	2 58 23	72 40 22.53	.12	11	78.62
41	3638	105	2 59 21	79 13 26.95	3 6 8	79 25 6.76	.08	10	78.01
42	3715	3946	3 3 48	81 16 50.48	3 11 43	81 28 14.31	.12	10	78.49
43	3759	2222	3 6 28	74 12 20.00	3 11 56	74 23 39.22	.12	10	78.59
44	3912	115	3 13 54	77 33 12.91	3 20 20	77 44 6.37	.16	8	79.25
45	4030	1636	3 20 6	84 44 20.04	3 32 20	84 54 43.06	.12	9	77.57
46	4225	2251	3 29 41	73 10 48.26	3 35 12	73 20 49.42	.08	9	79.02

N	GC	FK5	α_{1950}	δ_{1950}	α_{2000}	δ_{2000}	ε	n	E
			h m s	° ′ ″	h m s	° ′ ″	″		
47	4423	2262	3 39 15	74 23 6.22	3 45 7	74 32 32.32	± .14	10	78.18
48	4530		3 44 0	70 43 6.76	3 49 14	70 52 17.39	.08	13	79.47
49	4557	138	3 45 3	71 10 50.49	3 50 22	71 19 57.01	.12	11	78.98
50	4691	2277	3 51 4	71 40 33.94	3 56 30	71 49 17.61	.14	10	78.69
51	4781	2285	3 56 3	78 3 48.02	4 3 11	78 12 10.54	.19	10	78.27
52	4693	3947	3 51 17	86 29 17.65	4 10 1	86 37 36.51	.11	9	79.54
53	4882		4 1 14	73 51 58.06	4 7 11	74 0 2.82	.12	12	79.34
54	4894		4 1 34	80 33 56.47	4 10 3	80 41 55.16	.16	10	79.15
55	5180	2312	4 14 43	75 59 11.47	4 21 20	76 6 22.71	.15	12	79.83
56	5208		4 16 24	83 41 33.98	4 28 13	83 48 28.28	.06	8	79.02
57	5265	2321	4 18 14	80 42 34.86	4 27 3	80 49 27.70	.17	11	79.35
58	5279		4 18 49	83 13 37.69	4 30 0	83 20 23.55	.11	9	77.75
59	5401	1122	4 24 35	69 16 8.36	4 29 52	69 22 42.63	.07	9	80.30
60	5301	908	4 19 54	85 25 4.60	4 35 24	85 31 37.42	.13	8	79.69
61	5478	2333	4 27 41	72 25 23.86	4 33 31	72 31 44.74	.02	8	79.41
62	5677	2346	4 36 58	79 33 47.04	4 45 15	79 39 24.97	.18	9	77.58
63	5711		4 39 2	76 31 10.70	4 46 0	76 36 42.84	.15	11	79.06
64	5774	173	4 42 4	75 51 11.52	4 48 50	75 56 31.59	.13	9	77.80
65	5835	2358	4 44 59	70 51 20.09	4 50 36	70 56 30.28	.10	11	79.16
66	5924	178	4 49 4	66 15 39.13	4 54 3	66 20 33.59	.08	8	79.90
67	5962	3948	4 50 54	81 7 0.70	5 0 21	81 11 38.24	.16	10	78.46
68	6288	2387	5 6 3	73 53 8.79	5 12 22	73 56 48.98	.15	10	78.75
69	6405		5 12 2	73 12 51.49	5 18 13	73 16 6.20	.12	9	78.71
70	6471	2396	5 14 46	71 39 49.92	5 20 38	71 42 53.60	.09	10	79.87
71	6455	191	5 14 17	79 10 48.21	5 22 33	79 13 48.88	.12	10	78.93
72	6447	1637	5 13 50	85 53 38.82	5 31 48	85 56 20.74	.17	9	79.37
73	6633		5 21 10	70 11 6.09	5 26 47	70 13 42.69	.15	10	79.42
74	6647	2404	5 21 42	77 56 9.66	5 29 26	77 58 39.34	.08	12	79.32
75	6778		5 26 42	85 38 18.12	5 43 49	85 40 6.04	.18	8	78.00
76	6938	205	5 33 2	75 0 54.80	5 39 44	75 2 37.75	.19	11	78.83
77	7297	2436	5 46 27	71 16 35.46	5 52 17	71 17 21.95	.16	10	78.60
78	7273	1638	5 45 34	85 10 27.52	6 1 20	85 10 56.09	.14	10	78.13
79	7606	2459	5 58 16	75 35 17.76	6 5 9	75 35 10.36	.09	9	77.88
80	7856	233	6 7 49	65 43 52.89	6 12 51	65 43 7.49	.12	11	79.36
81	8020	234	6 13 20	69 20 24.30	6 18 51	69 19 13.80	.16	9	78.42
82	8293		6 22 33	70 33 57.84	6 28 15	70 32 6.88	.08	10	79.02
83	8540	2503	6 31 37	73 44 16.44	6 37 55	73 41 44.87	.11	10	78.62
84	8574	2507	6 32 44	78 2 24.66	6 40 29	77 59 44.87	.14	10	79.43
85	8630	2511	6 34 39	71 47 39.28	6 40 32	71 44 55.78	.17	8	78.51
86	8605	3950	6 33 59	82 9 46.79	6 44 30	82 6 56.17	.05	9	78.78
87	8505	3949	6 30 10	86 44 3.99	6 51 47	86 41 5.66	.11	8	78.34
88	8711	248	6 37 44	79 37 9.03	6 46 14	79 34 6.27	.11	9	79.81
89	8957	259	6 48 19	68 56 59.44	6 53 42	68 53 18.20	.06	9	79.07
90	9073	260	6 52 48	77 2 43.72	7 0 4	76 58 39.40	.13	10	79.08
91	9152		6 55 42	70 52 43.27	7 1 22	70 48 30.09	.16	10	78.82
92	9434	2550	7 6 0	78 50 9.59	7 13 55	78 45 9.07	.12	10	78.24

N	GC	FK5	α_{1950}	δ_{1950}	α_{2000}	δ_{2000}	ε	n	E
			h m s	° ′ ″	h m s	° ′ ″	″		
93	9489	2552	7 8 10	71 54 5.52	7 13 58	71 48 59.68	± .08	10	78.50
94	9851	3951	7 20 41	82 30 48.93	7 31 4	82 24 42.06	.16	8	78.50
95	9985	284	7 25 42	68 34 13.95	7 30 53	68 27 57.21	.11	10	79.61
96	9972		7 25 22	78 47 35.36	7 33 5	78 41 15.00	.21	9	79.59
97	9772	909	7 17 50	87 7 33.35	7 40 31	87 1 12.92	.10	8	78.74
98	10433	2604	7 42 11	70 19 49.91	7 47 31	70 12 27.28	.19	11	78.95
99	10657	2612	7 50 38	77 42 34.38	7 57 40	77 34 35.51	.17	8	78.84
100	10745	300	7 54 15	74 3 15.85	8 0 12	73 55 5.34	.12	10	78.91
101	10808	2617	7 57 1	79 37 12.38	8 4 47	79 28 47.95	.20	10	79.44
102	11100	1215	8 7 52	68 37 25.81	8 12 49	68 28 26.08	.06	9	79.13
103	11031	1639	8 5 14	84 12 30.35	8 16 54	84 3 28.02	.12	8	79.04
104	11246	310	8 13 19	75 54 46.31	8 19 32	75 45 24.42	.09	11	79.35
105	11302		8 15 12	72 33 53.99	8 20 40	72 24 26.67	.14	11	79.31
106	11296	3952	8 15 3	82 35 25.15	8 24 33	82 25 51.13	.13	16	79.39
107	11526	2659	8 24 0	78 23 44.19	8 30 52	78 13 43.30	.13	11	78.99
108	11799	322	8 34 12	73 48 22.59	8 39 43	73 37 48.78	.20	9	78.95
109	11900	3953	8 37 32	82 25 12.62	8 46 23	82 14 21.78	.12	9	78.99
110	12105	2692	8 44 14	78 21 3.44	8 50 47	78 9 54.75	.14	10	78.66
111	12309		8 51 58	78 20 18.12	8 58 23	78 8 44.74	.08	10	78.57
112	12447	338	8 58 4	67 49 35.96	9 2 33	67 37 46.37	.08	12	79.16
113	12154	3954	8 45 54	88 46 15.08	9 21 49	88 34 12.94	.13	9	79.13
114	12603	1640	9 5 16	84 23 11.06	9 15 21	84 10 51.53	.09	8	77.91
115	12687	2729	9 9 14	71 51 45.34	9 14 3	71 39 22.15	.17	11	78.79
116	12726		9 10 54	73 9 16.81	9 15 53	72 56 47.98	.12	8	78.97
117	12814		9 14 49	74 13 41.09	9 19 56	74 1 0.94	.16	11	78.15
118	12988	2749	9 22 40	75 18 55.63	9 27 52	75 5 53.20	.14	16	79.39
119	13171	357	9 30 6	70 3 8.79	9 34 29	69 49 47.78	.11	8	78.37
120	13178		9 30 13	72 25 43.74	9 34 54	72 12 22.04	.19	11	79.05
121	13174	910	9 30 7	81 32 59.99	9 37 5	81 19 35.51	.12	10	79.25
122	13358	363	9 38 0	69 27 57.98	9 42 15	69 14 16.80	.13	9	78.60
123	13364	2772	9 38 24	72 28 52.52	9 42 57	72 15 9.95	.16	8	78.90
124	13419	2780	9 41 29	79 22 4.21	9 47 18	79 8 12.77	.18	11	78.50
125	13684	372	9 53 58	73 7 6.33	9 58 23	72 52 47.18	.16	9	78.58
126	13749	2805	9 57 22	75 0 0.15	10 1 59	74 45 33.31	.22	8	78.33
127	13814	3955	10 0 52	84 9 43.92	10 8 34	83 55 5.96	.17	10	77.93
128	14041	2820	10 11 8	79 11 44.88	10 16 17	78 56 48.95	.15	9	78.67
129	14104		10 13 52	71 18 23.71	10 17 51	71 3 23.35	.18	10	79.20
130	14123	1262	10 14 26	65 21 31.35	10 18 2	65 6 30.18	.13	8	77.60
131	14260	387	10 20 33	65 49 12.24	10 24 8	65 33 59.75	.17	10	78.16
132	14305		10 22 42	84 30 27.35	10 29 41	84 15 8.09	.10	9	78.64
133	14367	911	10 25 10	82 48 52.55	10 31 5	82 33 30.11	.14	10	78.16
134	14507	395	10 30 54	75 58 17.48	10 35 6	75 42 46.82	.09	9	79.35
135	14509	2845	10 31 0	80 45 12.36	10 36 2	80 29 40.84	.18	11	79.72
136	14692		10 38 40	80 41 20.63	10 43 30	80 25 37.56	.13	13	79.19
137	14713	403	10 39 31	69 20 17.92	10 43 4	69 4 34.47	.14	10	78.11
138	14903	2864	10 47 28	76 15 36.83	10 51 23	75 59 41.76	.14	8	77.60

N	GC	FK5	α_{1950}	δ_{1950}	α_{2000}	δ_{2000}	ε	n	E
			h m s	° ′ ″	h m s	° ′ ″	″		
139	15077	413	10 56 1	78 2 18.60	10 59 57	77 46 13.18	±.09	9	78.45
140	15304	2888	11 5 1	72 13 47.49	11 8 22	71 57 32.31	.20	10	78.22
141	15335		11 6 40	82 0 15.05	11 10 55	81 43 58.14	.09	9	77.79
142	15376	1641	11 8 49	85 54 43.68	11 14 30	85 38 24.21	.07	8	78.82
143	15459	2896	11 12 32	78 34 54.47	11 16 9	78 18 32.53	.07	7	78.95
144	15799	433	11 28 28	69 36 26.17	11 31 24	69 19 52.75	.10	10	77.58
145	15795	3956	11 28 23	81 24 11.09	11 31 50	81 7 37.49	.14	8	78.12
146	15932	2928	11 34 37	77 52 21.06	11 37 42	77 35 44.13	.10	8	78.55
147	16072	440	11 39 42	67 1 18.77	11 42 28	66 44 40.24	.14	8	77.96
148	16414	3957	11 57 44	81 7 54.86	12 0 19	80 51 12.87	.14	8	78.36
149	16424	2962	11 58 19	70 30 57.88	12 0 53	70 14 15.94	.15	9	78.13
150	16496	1642	12 2 10	85 51 53.41	12 4 28	85 35 11.71	.15	10	79.05
151	16514	451	12 2 44	77 11 4.61	12 5 15	76 54 22.81	.12	8	77.59
152	16672	454	12 9 53	77 53 38.94	12 12 12	77 36 58.31	.09	10	78.18
153	16733	2980	12 12 46	70 28 40.95	12 15 9	70 12 0.68	.05	9	77.67
154	16744		12 13 21	72 49 44.72	12 15 41	72 33 4.72	.11	9	77.24
155	16763	3958	12 14 45	87 58 39.17	12 15 20	87 41 59.51	.14	9	79.58
156	16797	2986	12 16 36	75 26 16.86	12 18 50	75 9 37.76	.09	8	77.76
157	16960	2998	12 24 14	72 12 23.67	12 26 24	71 55 47.67	.15	9	77.07
158	17126	472	12 31 22	70 3 49.85	12 33 29	69 47 17.91	.12	9	78.62
159	17148		12 32 38	70 17 49.62	12 34 44	70 1 18.43	.20	9	78.06
160	17347	3017	12 43 10	80 53 40.67	12 44 26	80 37 16.90	.07	8	77.07
161	17440		12 48 39	83 41 23.17	12 49 7	83 25 4.08	.15	11	78.52
162	17443		12 48 46	83 41 5.27	12 49 14	83 24 46.28	.17	11	78.43
163	17554	486	12 53 29	65 42 33.22	12 55 29	65 26 19.36	.13	10	77.91
164	17637	3037	12 57 19	75 44 31.11	12 58 47	75 28 21.15	.15	10	78.29
165	17932	3056	13 11 57	80 44 9.13	13 12 25	80 28 16.55	.09	9	78.18
166	17934	3057	13 12 6	73 3 48.76	13 13 32	72 47 57.14	.09	8	78.64
167	17991	3060	13 14 50	68 40 16.27	13 16 29	68 24 28.32	.15	10	77.34
168	18183	499	13 24 51	72 39 2.68	13 26 8	72 23 29.53	.07	8	77.13
169	18223	3075	13 26 30	78 54 8.31	13 26 57	78 38 37.36	.19	8	78.79
170	18445	505	13 35 59	71 29 46.70	13 37 11	71 14 32.42	.19	10	78.41
171	18583	3090	13 42 25	78 18 54.39	13 42 39	78 3 51.26	.17	11	79.33
172	18611	1643	13 43 41	83 0 12.19	13 42 23	82 45 9.84	.07	8	78.21
173	18752	3105	13 50 9	79 14 33.12	13 50 1	78 59 44.54	.16	11	78.72
174	18744	3103	13 49 45	68 33 44.11	13 50 59	68 18 56.33	.07	10	78.26
175	19097	3125	14 6 32	74 49 49.85	14 6 56	74 35 37.23	.14	9	79.32
176	19142	524	14 9 1	77 46 58.09	14 8 51	77 32 50.59	.14	9	79.02
177	19189	3128	14 11 8	69 39 59.58	14 12 4	69 25 58.30	.10	10	79.00
178	19548	1379	14 27 36	75 55 6.64	14 27 32	75 41 45.31	.12	9	77.98
179	19630		14 31 5	81 1 52.87	14 29 22	80 48 38.58	.11	14	78.65
180	19705	3159	14 34 57	79 52 39.05	14 33 38	79 39 35.75	.08	8	79.62
181	20088		14 53 35	87 25 20.55	14 40 19	87 12 52.64	.12	9	78.14
182	20029	550	14 50 50	74 21 36.25	14 50 42	74 9 19.75	.13	8	77.38
183	20087	1644	14 53 34	82 43 0.59	14 50 20	82 30 47.71	.15	12	79.32
184	20170	554	14 56 47	66 7 53.01	14 57 35	65 55 55.82	.10	9	77.28

N	GC	FK5	α_{1950}	δ_{1950}	α_{2000}	δ_{2000}	ε	n	E
			h m s	° ′ ″	h m s	° ′ ″	″		
185	20236	3189	15 0 22	71 57 41.04	15 0 27	71 45 53.63	±.08	9	77.31
186	20532	565	15 14 3	67 31 59.78	15 14 38	67 20 56.91	.19	8	78.11
187	20598		15 17 7	72 0 19.57	15 17 6	71 49 25.89	.18	10	78.60
188	20613	3208	15 17 48	74 13 33.81	15 17 23	74 2 41.56	.13	11	79.55
189	20692	569	15 20 47	72 0 43.42	15 20 44	71 50 1.82	.13	9	77.79
190	20994	3959	15 34 33	84 59 39.18	15 27 10	84 49 32.13	.11	10	77.58
191	20951		15 32 50	80 56 20.65	15 29 54	80 46 15.44	.14	10	78.89
192	20952	3229	15 32 51	77 30 59.92	15 31 25	77 20 57.37	.14	10	78.21
193	21074		15 37 52	71 18 55.75	15 37 46	71 9 13.28	.17	10	79.15
194	21114	3244	15 39 48	80 46 31.77	15 36 48	80 36 50.78	.14	9	78.79
195	21243	590	15 45 48	77 56 56.59	15 44 4	77 47 39.64	.15	9	77.60
196	21295	1645	15 48 28	83 6 2.97	15 43 27	82 56 49.85	.18	10	79.07
197	21676		16 5 8	76 55 42.15	16 3 31	76 47 37.67	.16	9	78.43
198	21669	3272	16 4 59	70 23 43.84	16 4 49	70 15 41.24	.11	12	79.13
199	21851	606	16 12 13	76 0 15.60	16 10 50	75 52 38.89	.13	10	78.46
200	21880		16 13 46	75 20 8.02	16 12 32	75 12 37.63	.20	10	78.96
201	21916	3289	16 15 21	73 31 4.13	16 14 33	73 23 40.87	.19	9	77.61
202	21999	612	16 18 56	75 52 23.94	16 17 30	75 45 13.59	.13	11	79.59
203	22205	3305	16 28 28	79 4 22.43	16 25 43	78 57 47.24	.11	8	78.85
204	22194	619	16 28 4	68 52 35.46	16 27 59	68 46 4.05	.16	10	79.37
205	22301	623	16 32 46	77 32 58.52	16 30 39	77 26 42.00	.14	9	78.80
206	22337		16 34 28	79 53 36.79	16 31 17	79 47 25.12	.11	8	78.83
207	22749	912	16 51 1	82 7 21.26	16 45 58	82 2 13.80	.12	10	79.51
208	22843		16 54 27	75 28 20.17	16 52 55	75 23 34.26	.18	8	77.63
209	22855	3345	16 54 56	70 32 32.74	16 54 28	70 27 51.44	.19	12	79.03
210	22910	3351	16 57 16	73 12 13.75	16 56 17	73 7 40.76	.10	10	77.52
211	23182	639	17 8 38	65 46 34.64	17 8 47	65 42 52.19	.13	20	78.12
212	23397		17 16 59	71 50 41.02	17 16 13	71 47 32.42	.18	9	78.99
213	23472	3380	17 19 33	70 50 13.34	17 18 57	70 47 16.23	.06	8	77.60
214	23599	3384	17 23 23	80 10 58.49	17 19 37	80 8 10.91	.19	10	78.57
215	23821	659	17 32 10	68 10 4.90	17 31 58	68 8 2.90	.06	10	76.64
216	23865	3396	17 34 3	74 15 34.31	17 32 41	74 13 37.95	.16	9	77.87
217	23944	664	17 37 14	68 47 1.92	17 36 57	68 45 21.84	.14	9	78.27
218	23968		17 38 5	72 28 57.94	17 37 9	72 27 20.21	.09	8	79.48
219	24266		17 49 12	86 59 31.99	17 30 48	86 58 4.64	.10	8	79.64
220	24236	913	17 48 18	86 36 36.23	17 32 13	86 35 10.00	.17	8	79.36
221	24089	670	17 42 49	72 10 18.42	17 41 56	72 9 1.29	.03	9	76.55
222	24090		17 42 51	72 10 47.77	17 41 58	72 9 30.82	.15	9	77.06
223	24180		17 46 8	80 18 5.77	17 42 12	80 16 56.58	.18	9	78.28
224	25111	914	18 21 22	89 3 3.41	17 16 57	89 2 15.79	.09	8	79.41
225	24343	675	17 51 41	76 58 22.29	17 49 27	76 57 41.00	.07	11	77.73
226	24459	3429	17 56 3	72 0 37.79	17 55 11	72 0 18.54	.10	10	78.89
227	24667		18 3 48	79 59 51.72	18 0 3	80 0 0.00	.09	16	77.37
228	24669		18 3 54	80 0 3.42	18 0 9	80 0 12.18	.08	16	77.45
229	25114		18 21 29	71 18 43.15	18 20 45	71 20 15.19	.12	10	77.43
230	25122	695	18 21 58	72 42 31.75	18 21 3	72 44 5.46	.10	10	78.91

N	GC	FK5	α_{1950}	δ_{1950}	α_{2000}	δ_{2000}	ε	n	E
			h m s	° ′ ″	h m s	° ′ ″	″		
231	25364	3960	18 31 48	86 37 43.90	18 15 29	86 39 27.14	±.11	9	78.33
232	25244	3467	18 27 23	79 11 27.87	18 24 8	79 13 19.97	.16	10	78.93
233	25334	1646	18 30 48	83 8 32.33	18 24 9	83 10 32.14	.10	8	78.11
234	25372	700	18 32 11	77 30 34.17	18 29 45	77 32 49.10	.15	10	77.61
235	25491	701	18 36 4	65 26 40.28	18 36 13	65 29 17.53	.16	9	79.23
236	25803		18 47 2	74 1 44.61	18 45 47	74 5 6.09	.12	9	78.79
237	25839	1494	18 48 0	75 22 36.07	18 46 22	75 26 0.76	.14	10	77.89
238	25868	3501	18 49 12	79 53 6.28	18 45 38	79 56 31.65	.08	11	78.17
239	26024	714	18 55 1	71 13 52.16	18 54 24	71 17 49.10	.14	10	79.29
240	26155	3961	18 59 21	82 18 6.51	18 53 54	82 22 11.57	.06	10	78.01
241	26146	3517	18 59 12	69 27 37.12	18 58 53	69 31 53.19	.09	9	78.08
242	26484	3536	19 11 1	76 28 38.47	19 9 10	76 33 40.00	.06	10	77.79
243	26520	723	19 12 33	67 34 27.91	19 12 33	67 39 39.69	.09	11	79.45
244	26638	729	19 16 32	73 15 51.27	19 15 33	73 21 17.60	.15	11	79.49
245	26773	3962	19 21 39	83 22 9.76	19 15 8	83 27 45.93	.09	8	79.00
246	26857	734	19 24 45	79 30 14.55	19 21 40	79 36 10.30	.10	10	78.01
247	27023	3561	19 31 25	70 52 52.59	19 31 0	70 59 20.40	.17	10	79.54
248	27174	3568	19 36 14	74 15 52.48	19 35 10	74 22 38.55	.13	10	78.23
249	27471		19 48 21	70 8 27.99	19 48 10	70 16 3.71	.14	20	79.60
250	27809	3605	20 1 3	76 20 31.80	19 59 37	76 28 54.00	.13	8	78.26
251	27964	1647	20 6 53	84 31 35.28	19 59 20	84 40 8.00	.17	9	79.37
252	27920	3614	20 5 10	73 45 54.82	20 4 27	73 54 33.69	.14	9	78.83
253	28066	759	20 10 37	77 33 43.17	20 8 53	77 42 40.50	.17	13	79.50
254	28070		20 10 44	68 7 18.61	20 10 57	68 16 19.95	.15	9	79.11
255	28324	3631	20 19 53	68 43 13.70	20 20 6	68 52 47.92	.08	9	77.81
256	28611	3963	20 31 28	81 15 12.22	20 28 15	81 25 21.61	.12	12	79.46
257	28583	1538	20 30 14	72 21 44.42	20 30 1	72 31 54.65	.23	8	78.20
258	28690		20 34 14	83 27 16.50	20 29 3	83 37 32.07	.16	9	78.61
259	28639	770	20 32 11	74 47 0.35	20 31 30	74 57 16.61	.11	10	79.57
260	28803		20 38 2	79 15 15.39	20 36 1	79 25 49.31	.13	13	79.62
261	29019	915	20 46 20	82 20 53.10	20 42 35	82 31 51.84	.15	16	79.23
262	29107		20 49 55	80 21 56.15	20 47 34	80 33 8.94	.09	9	78.52
263	29254	3672	20 55 21	75 43 58.62	20 54 44	75 55 31.45	.11	16	78.91
264	29620		21 9 17	86 49 58.65	20 57 23	87 1 57.40	.09	9	78.41
265	29563	795	21 6 32	77 55 27.92	21 5 29	78 7 34.54	.12	18	79.43
266	29550	3693	21 6 6	71 13 49.38	21 6 23	71 25 56.65	.20	11	78.49
267	29792	3964	21 15 31	81 1 20.18	21 13 22	81 13 51.85	.13	18	79.67
268	29998	3709	21 22 51	76 52 31.08	21 22 21	77 5 24.68	.21	9	78.40
269	30118	809	21 28 1	70 20 28.20	21 28 40	70 33 38.41	.11	16	78.69
270	30415	817	21 41 12	71 4 54.98	21 41 55	71 18 39.33	.11	21	79.78
271	30452		21 42 28	72 5 25.81	21 43 4	72 19 13.19	.12	10	78.93
272	30564	3965	21 47 33	83 48 22.96	21 44 23	84 2 18.49	.20	10	78.58
273	30681		21 52 48	79 18 55.59	21 52 13	79 33 6.27	.13	10	77.69
274	30669	1578	21 52 12	73 27 57.00	21 52 47	73 42 7.67	.14	10	78.67
275	30730	3755	21 55 13	80 4 15.12	21 54 26	80 18 30.93	.09	20	79.81
276	30772	3758	21 57 23	74 45 26.19	21 57 51	74 59 48.33	.12	9	78.30

N	GC	FK5	α_{1950}			δ_{1950}			α_{2000}			δ_{2000}			ε	n	E
			h	m	s	°	′	″	h	m	s	°	′	″	″		
277	30800		21	58	33	72	56	25.57	21	59	15	73	10	50.64	± .13	9	78.85
278	31037	837	22	8	51	72	5	41.12	22	9	48	72	20	28.26	.11	21	79.62
279	31056		22	9	30	69	53	7.89	22	10	39	70	7	56.58	.12	8	77.85
280	31223	1648	22	17	34	85	51	28.49	22	13	11	86	6	27.63	.13	11	78.62
281	31227	3784	22	17	45	76	14	12.65	22	18	20	76	29	16.70	.13	10	78.60
282	31365	3794	22	24	43	70	30	57.02	22	26	1	70	46	14.45	.06	9	77.53
283	31401		22	26	21	78	31	50.15	22	26	43	78	47	9.68	.12	8	78.59
284	31474	1593	22	29	28	78	34	2.78	22	29	53	78	49	27.68	.15	10	78.60
285	31506	1594	22	31	24	75	58	7.10	22	32	16	76	13	35.57	.16	12	79.61
286	31567	851	22	34	32	73	23	1.20	22	35	46	73	38	34.97	.17	8	78.00
287	31604		22	36	9	75	6	42.08	22	37	13	75	22	18.49	.08	8	78.33
288	31671	3966	22	39	20	81	7	50.88	22	39	25	81	23	31.43	.24	9	78.19
289	31855		22	47	44	82	53	20.42	22	47	29	83	9	12.74	.09	9	77.92
290	31857	863	22	47	54	65	56	10.16	22	49	41	66	12	3.83	.16	11	78.70
291	31999	1649	22	54	53	84	4	44.21	22	54	25	84	20	45.37	.17	12	78.20
292	32025	3837	22	56	14	72	51	57.05	22	57	48	73	8	1.41	.17	11	78.41
293	32070	3841	22	58	18	80	4	31.47	22	59	9	80	20	37.55	.17	8	78.32
294	32237		23	6	18	75	7	0.80	23	7	54	75	23	15.98	.20	8	77.83
295	32366		23	12	50	73	57	31.10	23	14	37	74	13	52.47	.10	9	78.89
296	32388	3862	23	13	41	70	36	55.07	23	15	38	70	53	17.07	.10	9	79.05
297	32436	3865	23	15	33	75	1	33.07	23	17	19	75	17	56.58	.18	9	78.07
298	32639		23	25	9	70	5	4.76	23	27	17	70	21	35.68	.14	9	77.47
299	32680	3967	23	27	34	87	1	55.16	23	27	1	87	18	26.73	.09	8	78.26
300	32733		23	29	44	77	32	37.40	23	31	40	77	49	10.91	.10	10	78.70
301	32793	3893	23	32	48	71	21	56.30	23	34	59	71	38	31.49	.20	10	79.01
302	32872	3898	23	37	9	73	43	32.01	23	39	21	74	0	9.10	.13	9	77.68
303	32875	893	23	37	17	77	21	16.61	23	39	21	77	37	53.89	.17	9	78.80
304	33031	895	23	45	30	67	31	44.66	23	47	55	67	48	24.64	.13	9	77.44
305	33113	3919	23	49	32	77	19	19.08	23	51	58	77	35	59.91	.05	8	77.53
306	33166	1627	23	52	22	74	7	55.01	23	54	49	74	24	36.27	.11	9	78.25
307	33205	1650	23	54	4	82	54	46.20	23	56	28	83	11	27.75	.12	9	77.69

APPENDIX

The columns contain

1. N – number of the star in the Catalogue BCAD;
2. $\delta_{1950.0}$ – declination of the star obtained from observation for the equinox and epoch B1950.0;
3. Δ_1 – difference of the star declination obtained from observations at the upper culmination for the equinox and epoch B1950.0 and the declination $\delta_{1950.0}$ from Column 2;
4. Δ_2 – difference of the star declination obtained from observations at the lower culmination for the equinax and epoch B1950.0 and the declination $\delta_{1950.0}$ from Column 2;
5. $\delta_{J2000.0}$ – declination of the star obtained from observation for the equinox and epoch J2000.0;
6. Δ_3 – difference of the star declination obtained from observations at the upper culmination for the equinox and epoch J2000.0 and the declination $\delta_{J2000.0}$ from Column 5;
7. Δ_4 – difference of the star declination obtained from observations at the lower culmination for the equinox and epoch J2000.0 and the declination $\delta_{J2000.0}$ from Column 5;
8. ϵ_1 – random error of a single declination observation of the star at the upper culmination;
9. n_1 – number of observations at the upper culmination of the star;
10. E_1 – epoch of observation of the star at the upper culmination calculated from 1900.0;
11. ϵ_2 – random error of a single declination determination of the star at the lower culmination;
12. n_2 – number of observations at the lower culmination of the star;
13. E_2 – epoch of observation of the star at the lower culmination calculated from 1900.0;

N	$\delta_{1950.0}$	Δ_1	Δ_2	$\delta_{J2000.0}$	Δ_3	Δ_4	ε_1	n_1	E_1	ε_2	n_2	E_2
	° ′ ″	″		° ′ ″	″	″	″			″		
1	73 20 1.16	+0.03	-0.13	73 36 42.84	+0.06	-0.31	±0.24	4	78.76	±0.58	5	78.30
2	76 40 23.31	.00	.06	76 57 3.03	.03	-.16	.27	4	78.68	.65	5	79.50
3	79 46 31.75	.16	-.34	80 3 7.41	.19	-.53	.41	6	78.56	.59	5	77.08
4	76 44 37.72	-.09	.22	77 1 9.84	-.03	.09	.24	4	78.68	.51	5	77.29
5	70 42 22.25	.06	-.36	70 58 54.33	.09	-.53	.20	4	78.78	.67	6	77.99
6	82 13 4.84	.16	-.84	82 29 37.09	.19	-1.09	.28	4	77.95	.63	4	77.03
7	74 42 54.69	-.03	.09	74 59 16.88	.03	-.09	.31	5	78.71	.75	5	77.11
8	74 34 29.66	.06	-.06	74 50 50.97	.16	-.22	.27	4	78.77	.40	6	79.01
9	72 24 5.92	-.03	.55	72 40 28.50	-.02	.14	.14	4	78.26	.63	4	78.87
10	83 26 12.00	.16	-.22	83 42 26.75	.28	-.44	.32	4	78.45	.51	5	78.40
11	80 16 32.81	.03	.00	80 32 43.38	.25	-.03	.51	4	78.23	.20	4	79.08
12	70 42 49.59	-.25	.11	70 58 58.63	-.13	.05	.34	5	78.71	.24	6	78.88
13	85 59 24.63	-.19	.56	86 15 25.75	-.13	.38	.30	4	78.52	.61	5	76.96
14	79 24 31.25	.47	-.31	79 40 26.53	.59	-.41	.38	4	78.76	.37	5	77.32
15	75 58 39.81	-.03	.06	76 14 19.88	.06	-.09	.34	4	79.22	.39	4	78.65
16	88 45 19.22	-.13	.59	89 0 56.34	-.09	.38	.34	4	79.65	.87	5	79.00
17	67 52 11.59	-.02	.06	68 7 47.89	.02	-.08	.11	4	78.49	.33	10	79.08
18	70 0 29.55	.28	-.38	70 15 52.39	.36	-.52	.41	4	78.76	.59	5	78.55
19	72 47 10.64	.36	-.27	73 2 24.31	.50	-.38	.47	5	78.72	.41	5	76.78
20	77 42 58.06	.25	-.47	77 58 8.13	.31	-.69	.29	4	79.00	.39	4	78.12
21	67 47 28.09	.13	-.42	68 2 34.70	.16	-.55	.46	4	79.02	.85	4	78.36
22	70 22 15.77	.00	.02	70 37 21.34	.03	-.11	.23	4	79.28	.48	5	80.19
23	75 20 35.22	.03	-.09	75 35 23.06	.06	-.16	.17	4	78.98	.52	5	78.22
24	80 39 52.06	-.31	.16	80 54 30.03	-.16	.06	.36	4	78.78	.33	6	78.54
25	70 39 56.78	-.88	.09	70 54 25.06	-.64	.08	.46	5	79.15	.12	4	76.88
26	72 10 50.81	.02	-.05	72 25 16.77	.06	-.22	.36	5	79.34	.80	7	78.66
27	77 2 33.66	.03	-.09	77 16 52.75	.09	-.28	.34	5	79.42	.63	6	78.05
28	75 52 34.22	-.38	.19	76 6 54.13	-.19	.13	.58	5	79.37	.34	4	78.12
29	81 3 31.66	-.25	.31	81 17 45.53	-.13	.19	.37	5	79.63	.41	5	80.02
30	89 1 44.13	-.16	.78	89 15 50.94	-.13	.44	.17	4	79.65	.41	4	79.44
31	73 47 39.34	.03	-.09	74 1 40.31	.31	-.41	.44	4	79.54	.94	5	79.22
32	66 17 29.00	-.16	.20	66 31 27.72	-.09	.11	.58	4	79.02	.66	4	79.38
33	83 19 45.13	.19	-.09	83 33 41.38	.34	-.22	.36	4	79.07	.36	6	77.71
34	71 4 31.59	-.75	.06	71 17 38.88	-.50	.02	.54	5	79.52	.12	4	78.93
35	76 29 58.13	-.13	.19	76 43 5.66	.00	.03	.35	4	79.69	.53	6	79.76
36	83 36 57.13	-.03	.00	83 50 4.88	.13	-.13	.23	4	79.77	.28	5	80.06
37	72 36 5.55	-.14	.38	72 49 5.97	-.09	.22	.30	4	79.79	.50	3	77.23
38	67 36 50.55	.11	-.28	67 49 28.77	.16	-.44	.31	4	79.07	.68	6	77.70
39	81 14 22.16	-.09	.00	81 26 54.41	.19	-.03	.31	4	78.83	.13	6	78.72
40	72 28 22.05	-.13	.05	72 40 22.09	.03	-.02	.45	4	78.78	.40	7	78.56
41	79 13 26.59	-.25	.13	79 25 6.97	-.06	.03	.35	6	79.57	.19	4	77.20
42	81 16 50.59	.06	-.06	81 28 14.19	.16	-.28	.28	4	79.07	.47	6	77.56
43	74 12 22.41	.09	-.13	74 23 37.31	.19	-.28	.29	4	79.00	.50	6	77.93
44	77 33 14.53	.31	-.38	77 44 5.16	.47	-.47	.46	4	79.30	.48	4	79.19
45	84 44 23.72	.50	-.22	84 54 40.13	.75	-.31	.55	5	79.14	.29	4	76.93
46	73 10 48.81	-.09	.06	73 20 48.97	.06	-.03	.23	4	79.24	.25	5	78.84

N	$\delta_{1950.0}$	Δ_1	Δ_2	$\delta_{J2000.0}$	Δ_3	Δ_4	ε_1	n_1	E_1	ε_2	n_2	E_2
	° ′ ″	″	″	° ′ ″	″	″	″			″		
47	74 23 5.16	.00	-.03	74 32 33.09	.09	-.09	± .43	5	79.20	± .45	5	77.03
48	70 43 8.53	-.27	.08	70 52 16.11	-.09	.03	.39	6	79.60	.23	7	79.43
49	71 10 51.58	-.31	.36	71 19 56.17	-.20	.25	.39	6	79.61	.39	5	78.25
50	71 40 33.66	.22	-.77	71 49 17.80	.28	-.92	.39	6	79.35	.54	4	76.46
51	78 3 48.78	.09	-.13	78 12 9.91	.19	-.28	.57	5	79.06	.66	5	77.22
52	86 29 19.91	-.03	.06	86 37 34.66	.06	-.16	.24	4	79.69	.56	5	79.02
53	73 52 0.00	.03	.00	74 0 1.41	.13	-.13	.41	6	79.95	.39	6	78.78
54	80 33 56.47	-.41	.47	80 41 55.13	-.28	.19	.68	6	79.52	.55	4	78.72
55	75 59 12.13	-.06	.13	76 6 22.22	.03	-.03	.45	7	80.11	.63	5	79.06
56	83 41 33.63	.16	-.03	83 48 28.50	.38	-.06	.31	4	79.58	.12	4	78.93
57	80 42 35.47	-.34	.69	80 49 27.22	-.28	.38	.50	5	79.97	.77	6	78.12
58	83 13 34.69	.03	.00	83 20 25.81	.25	-.09	.53	5	79.81	.26	4	76.98
59	69 16 9.28	-.05	.73	69 22 41.98	-.03	.53	.15	4	80.34	.69	5	79.73
60	85 25 3.78	.00	.06	85 31 37.94	.06	-.19	.29	4	79.77	.51	4	79.45
61	72 25 26.17	-.27	.03	72 31 43.06	.09	.00	.67	4	79.18	.25	4	79.44
62	79 33 46.63	.53	-.34	79 39 25.28	.75	-.44	.53	4	78.97	.52	5	76.71
63	76 31 14.44	-.09	.31	76 36 39.97	-.03	.16	.42	6	79.57	.75	5	77.08
64	75 51 15.25	.28	-.06	75 56 28.72	.50	-.16	.65	5	79.13	.28	4	77.44
65	70 51 20.50	.00	.00	70 56 29.95	.11	-.08	.32	4	79.77	.37	7	78.74
66	66 15 38.89	.00	-.13	66 20 33.73	.02	-.28	.16	4	80.02	.69	4	77.68
67	81 6 59.88	.03	-.06	81 11 38.84	.19	-.22	.52	5	79.14	.56	5	77.69
68	73 53 9.66	-.13	.31	73 56 48.28	-.06	.13	.34	5	79.36	.58	5	77.00
69	73 12 52.34	-.09	.19	73 16 5.53	-.03	.03	.31	4	79.16	.59	5	77.66
70	71 39 50.38	-.03	.20	71 42 53.25	.00	-.05	.21	5	80.34	.55	5	76.72
71	79 10 43.56	-.38	.34	79 13 52.31	-.22	.22	.40	5	80.25	.38	5	77.72
72	85 53 41.25	-.06	.06	85 56 19.03	.09	-.09	.58	5	79.86	.43	4	78.96
73	70 11 6.78	-.05	.28	70 13 42.17	-.02	.13	.41	6	79.70	.76	4	77.74
74	77 56 10.00	.03	-.16	77 58 39.06	.09	-.41	.22	6	79.76	.46	6	77.34
75	85 38 18.06	-.47	.38	85 40 6.09	-.28	.22	.54	4	79.18	.49	4	77.03
76	75 0 54.03	.03	-.03	75 2 38.31	.13	-.13	.60	6	79.98	.67	5	77.10
77	71 16 35.31	-.36	.45	71 17 22.05	-.33	.33	.49	6	79.66	.42	4	77.22
78	85 10 27.47	-.28	.16	85 10 56.13	-.09	.06	.61	6	79.83	.32	4	77.28
79	75 35 18.19	-.19	.06	75 35 10.03	-.03	.03	.42	5	79.48	.22	4	77.22
80	65 43 53.81	.02	-.19	65 43 6.80	.03	-.25	.31	6	79.68	.82	5	76.70
81	69 20 27.28	.38	-.63	69 19 11.52	.42	-.70	.48	5	79.28	.50	4	76.98
82	70 33 57.14	-.45	.44	70 32 7.39	-.33	.31	.25	5	80.14	.24	5	77.93
83	73 44 17.16	.09	-.09	73 41 44.41	.13	-.28	.40	5	79.51	.44	5	77.55
84	78 2 24.66	-.16	.22	77 59 44.88	-.06	.06	.39	5	80.54	.50	5	77.59
85	71 47 39.11	-.08	.02	71 44 55.92	.11	-.03	.68	4	79.95	.39	4	78.05
86	82 9 48.38	-.56	.09	82 6 55.06	-.38	.13	.29	5	79.84	.09	4	78.62
87	86 44 7.03	-.41	.09	86 41 3.41	-.22	.03	.50	4	79.18	.26	4	78.12
88	79 37 26.69	.13	-.63	79 33 53.69	.19	-.81	.24	5	80.22	.44	4	77.82
89	68 56 59.28	.00	.03	68 53 18.34	.00	.00	.17	4	79.15	.86	5	77.78
90	77 2 44.13	-.34	.25	76 58 39.13	-.19	.16	.52	6	80.22	.32	4	78.33
91	70 52 43.81	-.34	.34	70 48 29.70	-.20	.28	.54	5	79.85	.54	5	77.78
92	78 50 9.59	-.06	.03	78 45 9.09	.13	-.09	.51	6	79.75	.30	4	77.26

N.	$\delta_{1950.0}$			Δ_1	Δ_2	$\delta_{J2000.0}$			Δ_3	Δ_4	ε_1	n_1	E_1	ε_2	n_2	E_2
	°	′	″	″	″	°	′	″	″	″	″			″		
93	71	54	4.91	-.28	.17	71	49	0.14	-.19	.11	±.30	6	80.03	±.18	4	77.54
94	82	30	50.09	-.31	.34	82	24	41.22	-.22	.22	.45	4	79.45	.45	4	77.55
95	68	34	15.08	-.14	.52	68	27	56.44	-.09	.38	.25	4	79.87	.65	6	78.63
96	78	47	38.44	-.19	.22	78	41	12.88	-.06	.06	.54	4	80.87	.74	5	77.99
97	87	7	34.28	-.56	.09	87	1	12.31	-.34	.06	.53	4	79.19	.23	4	78.65
98	70	19	54.06	-.06	.11	70	12	24.30	-.02	.05	.63	6	79.72	.71	5	77.76
99	77	42	34.78	-.03	.09	77	34	35.25	.00	.00	.40	4	79.17	.75	4	77.63
100	74	3	16.94	-.19	.22	73	55	4.59	-.09	.16	.41	5	79.51	.44	5	78.24
101	79	37	13.91	-.03	.00	79	28	46.94	.13	-.13	.67	5	80.06	.65	5	78.86
102	68	37	25.63	-.02	.33	68	28	26.27	-.02	.23	.13	4	79.17	.73	5	78.28
103	84	12	30.97	.03	-.06	84	3	27.63	.06	-.16	.40	4	79.59	.43	4	78.42
104	75	54	45.88	-.09	.22	75	45	24.78	-.03	.16	.27	4	79.85	.53	7	78.42
105	72	33	54.75	-.09	.17	72	24	26.17	-.03	.09	.41	5	79.73	.63	6	78.47
106	82	35	26.00	-.19	.22	82	25	50.59	-.09	.13	.55	9	79.83	.56	7	78.88
107	78	23	45.16	-.06	.47	78	13	42.63	-.06	.34	.21	4	79.17	.79	7	77.67
108	73	48	25.50	-.03	.19	73	37	46.66	-.06	.16	.38	4	79.16	.92	5	78.09
109	82	25	13.16	-.03	.47	82	14	21.44	-.06	.25	.18	4	79.18	.69	5	77.06
110	78	21	4.09	.13	-.22	78	9	54.31	.09	-.28	.50	5	79.18	.63	5	77.85
111	78	20	18.38	.03	-.03	78	8	44.63	.06	-.09	.30	5	79.19	.27	5	78.08
112	67	49	35.48	-.06	.73	67	37	46.78	-.05	.61	.22	7	79.23	.65	5	78.35
113	88	46	14.91	-.38	.22	88	34	13.16	-.16	.09	.41	4	80.01	.36	5	78.67
114	84	23	10.81	-.50	.13	84	10	51.78	-.47	.06	.34	4	79.17	.16	4	77.63
115	71	51	46.78	-.13	.09	71	39	21.16	-.09	.23	.81	5	79.19	.75	6	78.50
116	73	9	18.69	-.09	.41	72	56	46.66	-.06	.22	.27	4	79.28	.54	4	77.73
117	74	13	43.06	-.38	.28	74	0	59.50	-.28	.22	.62	6	78.51	.48	5	77.88
118	75	18	54.78	-.31	.34	75	5	53.88	-.19	.28	.60	7	79.82	.69	9	78.90
119	70	3	6.64	.19	-.36	69	49	49.53	.30	-.39	.24	4	78.72	.34	4	77.65
120	72	25	46.02	-.23	.52	72	12	20.42	-.16	.39	.56	6	79.57	.76	5	77.90
121	81	33	0.50	-.19	.59	81	19	35.22	-.19	.41	.30	5	79.51	.51	5	78.53
122	69	28	0.03	-.02	.06	69	14	15.30	.00	-.03	.42	5	79.06	.65	4	76.93
123	72	28	53.41	-.30	.47	72	15	9.38	-.20	.33	.40	4	79.52	.50	4	77.93
124	79	22	5.09	-.19	.34	79	8	12.19	-.09	.25	.57	6	78.39	.72	5	78.71
125	73	7	7.47	-.22	.63	72	52	46.41	.00	-.03	.39	5	78.65	.54	4	78.36
126	75	0	1.28	-.09	.06	74	45	32.53	-.03	.00	.73	4	78.18	.52	4	78.41
127	84	9	43.78	.19	-.34	83	55	6.16	.19	-.53	.61	6	78.38	.61	4	77.15
128	79	11	44.97	.00	-.09	78	56	48.97	.03	-.22	.24	4	78.70	.83	5	78.42
129	71	18	25.13	.08	-.30	71	3	22.41	.11	-.47	.48	5	79.45	.91	5	78.29
130	65	21	31.67	.00	.00	65	6	30.02	.03	-.11	.29	4	77.46	.58	4	78.18
131	65	49	12.95	-.05	.13	65	33	59.28	-.02	.03	.37	4	78.25	.89	6	77.87
132	84	30	28.50	.19	-.31	84	15	7.38	.28	-.50	.32	5	78.82	.32	4	78.38
133	82	48	51.81	.00	.00	82	33	30.78	.09	-.13	.41	5	78.21	.45	5	78.09
134	75	58	17.66	-.03	.06	75	42	46.78	.06	-.13	.21	4	80.04	.34	5	78.14
135	80	45	12.56	-.31	.44	80	29	40.78	-.22	.28	.54	5	80.33	.68	6	78.92
136	80	41	20.31	-.19	.41	80	25	37.88	-.09	.25	.46	8	79.32	.60	5	78.88
137	69	20	18.38	-.13	.47	69	4	34.20	-.08	.38	.37	5	78.01	.71	5	78.48
138	76	15	37.66	-.06	.06	75	59	41.19	.06	-.06	.39	4	77.49	.41	4	77.71

N	$\delta_{1950.0}$	Δ_1	Δ_2	$\delta_{J2000.0}$	Δ_3	Δ_4	ε_1	n_1	E_1	ε_2	n_2	E_2
	° ′ ″	″	″	° ′ ″	″	″	″			″		
139	78 2 19.38	.13	-.16	77 46 12.69	.16	-.25	±.25	4	78.46	±.31	5	78.45
140	72 13 47.86	.06	-.09	71 57 32.13	.13	-.20	.59	5	78.43	.72	5	77.90
141	82 0 20.28	-.22	.09	81 43 54.03	-.03	.03	.38	5	77.46	.22	4	77.95
142	85 54 43.63	-1.09	.16	85 38 24.34	-.84	.19	.38	4	79.77	.14	4	78.69
143	78 34 55.00	.06	-.03	78 18 32.25	.25	-.09	.24	4	79.76	.14	3	78.69
144	69 36 26.73	-.20	.63	69 19 52.41	-.14	.47	.22	4	77.28	.53	6	78.56
145	81 24 10.16	-.06	.28	81 7 38.31	.00	.06	.31	4	78.00	.67	4	78.69
146	77 52 20.78	.09	-.41	77 35 44.44	.09	-.56	.24	4	78.76	.49	4	77.66
147	67 1 17.81	-.63	.41	66 44 41.09	-.48	.38	.44	4	77.25	.36	4	78.42
148	81 7 55.91	-.41	.75	80 51 12.16	-.28	.59	.34	4	78.57	.47	4	77.95
149	70 30 57.59	-.22	.25	70 14 16.25	-.13	.16	.40	4	78.31	.53	5	77.92
150	85 51 50.84	-.16	.06	85 35 13.66	.03	.00	.56	4	79.05	.45	6	79.05
151	77 11 7.31	-.09	.31	76 54 20.78	-.03	.13	.27	4	77.28	.52	4	78.77
152	77 53 38.44	.13	.00	77 36 58.81	.38	-.03	.66	5	77.08	.20	5	78.28
153	70 28 41.63	-.22	.67	70 12 0.25	-.16	.53	.14	5	77.32	.20	4	78.71
154	72 49 45.78	-.03	.16	72 33 3.98	.00	-.06	.24	4	77.05	.81	5	78.76
155	87 58 37.63	.34	-.19	87 42 0.66	.53	-.28	.43	4	80.04	.40	5	79.31
156	75 26 16.75	.09	-.34	75 9 37.94	.13	-.53	.20	4	77.53	.41	4	78.76
157	72 12 24.22	.13	-.20	71 55 47.31	.22	-.36	.34	4	76.35	.55	5	78.31
158	70 3 49.61	.28	-.17	69 47 18.19	.39	-.23	.47	5	78.33	.29	4	78.79
159	70 17 49.70	.08	-.20	70 1 18.45	.13	-.38	.47	4	77.87	.93	5	78.55
160	80 53 41.94	-.16	.88	80 37 15.97	-.13	.63	.14	4	76.80	.31	4	78.48
161	83 41 22.69	.19	-.13	83 25 4.53	.38	-.28	.56	6	77.62	.43	5	79.15
162	83 41 4.84	.19	-.19	83 24 46.69	.38	-.28	.63	6	77.62	.55	5	79.15
163	65 42 34.17	-.11	.42	65 26 18.73	-.08	.30	.27	4	77.62	.72	6	79.09
164	75 44 30.94	.13	-.16	75 28 21.38	.22	-.31	.46	5	77.89	.52	5	78.79
165	80 44 8.91	.00	-.03	80 28 16.81	.13	-.19	.26	4	77.54	.34	5	78.95
166	73 3 49.59	.22	-.38	72 47 56.61	.27	-.55	.22	4	78.58	.31	4	78.77
167	68 40 15.94	.02	-.16	68 24 28.67	.03	-.34	.39	6	77.20	.93	4	78.81
168	72 39 3.03	.00	.09	72 23 29.34	.00	-.16	.16	4	77.05	.71	4	78.79
169	78 54 7.56	.06	-.06	78 38 37.97	.19	-.22	.49	4	78.60	.57	4	79.05
170	71 29 46.94	.14	-.16	71 14 32.33	.23	-.27	.59	5	77.94	.62	5	78.93
171	78 18 53.22	-.06	.09	78 3 52.16	.03	-.06	.54	6	79.22	.63	5	79.52
172	83 0 13.53	-.03	.53	82 45 8.94	.00	.28	.12	4	78.16	.62	4	79.43
173	79 14 33.06	-.03	.03	78 59 44.66	.09	-.06	.52	5	78.18	.52	6	79.17
174	68 33 46.09	.00	.06	68 18 54.92	.02	-.11	.17	5	78.14	.54	5	79.49
175	74 49 49.47	-.50	.53	74 35 37.56	-.38	.44	.38	4	78.87	.47	5	79.78
176	77 46 57.22	-.19	.50	77 32 51.28	-.13	.31	.32	4	78.82	.65	5	79.56
177	69 40 1.02	-.22	.45	69 25 57.36	-.14	.31	.24	4	78.64	.47	6	79.74
178	75 55 6.06	.47	-.44	75 41 45.84	.59	-.56	.43	5	77.13	.34	4	78.78
179	81 1 56.59	-.28	.69	80 48 35.84	-.22	.50	.39	10	78.50	.40	4	79.01
180	79 52 36.56	-.28	.16	79 39 37.50	-.09	.06	.26	4	79.43	.20	4	79.74
181	87 25 20.06	.09	-.13	87 12 53.06	.28	-.31	.32	4	77.16	.46	5	79.52
182	74 21 35.97	-.06	.38	74 9 20.03	-.03	.13	.29	4	76.92	.66	4	79.70
183	82 43 7.25	-.31	.19	82 30 43.06	-.13	.06	.68	8	79.02	.37	4	79.51
184	66 7 52.25	.03	-.30	65 55 56.47	.03	-.45	.22	4	77.11	.89	5	79.01

N	$\delta_{1950.0}$	Δ_1	Δ_2	$\delta_{J2000.0}$	Δ_3	Δ_4	ε_1	n_1	E_1	ε_2	n_2	E_2
	° ′ ″	″	″	° ′ ″	″	″	″			″		
185	71 57 38.44	.00	.11	71 45 55.55	.02	-.13	± .16	4	77.14	± .74	5	79.67
186	67 32 10.78	-.13	.13	67 20 48.41	-.03	.03	.54	4	76.94	.52	4	79.22
187	72 0 19.31	-.14	.23	71 49 26.14	-.06	.09	.50	5	78.00	.63	5	79.55
188	74 13 32.63	-.22	.16	74 2 42.44	.00	-.03	.52	5	79.23	.46	6	79.77
189	72 0 42.89	.13	-.53	71 50 2.28	.17	-.77	.28	4	77.41	.70	5	79.34
190	84 59 40.75	-.13	.34	84 49 31.00	-.03	.13	.24	4	76.96	.56	6	79.48
191	80 56 20.13	-.41	.75	80 46 15.88	-.31	.56	.40	5	78.43	.55	5	79.74
192	77 30 59.66	-.03	.06	77 20 57.59	.03	-.16	.30	4	77.93	.91	6	79.60
193	71 18 55.28	-.69	.78	71 9 13.66	-.56	.66	.53	5	78.61	.56	5	79.75
194	80 46 30.38	-.03	.19	80 36 51.81	.03	-.09	.29	4	78.69	.83	5	79.33
195	77 56 56.69	.06	-.31	77 47 39.63	.13	-.53	.34	4	77.20	.83	5	79.22
196	83 6 2.97	-.53	.38	82 56 49.91	-.34	.25	.55	4	78.23	.61	6	79.64
197	76 55 41.72	-.28	.31	76 47 38.03	-.16	.16	.50	5	77.64	.43	4	79.32
198	70 23 42.88	-.23	.45	70 15 41.97	-.16	.28	.31	6	78.60	.44	6	80.15
199	76 0 15.25	.00	.00	75 52 39.19	.16	-.16	.34	4	77.18	.46	6	79.80
200	75 20 7.06	.13	-.16	75 12 38.34	.22	-.34	.57	5	78.43	.71	5	79.79
201	73 31 3.22	-.06	.28	73 23 41.59	-.03	.09	.42	4	76.99	.94	5	79.73
202	75 52 16.66	-.34	.09	75 45 18.81	-.13	.03	.67	5	78.03	.36	6	79.98
203	79 4 19.19	-.28	.53	78 57 49.53	-.22	.38	.28	3	77.87	.37	5	80.56
204	68 52 34.45	-.17	.20	68 46 4.78	-.09	.11	.41	4	78.67	.58	6	80.15
205	77 32 50.53	.00	.09	77 26 47.72	.03	-.16	.30	4	78.68	.91	5	79.57
206	79 53 39.06	.34	-.19	79 47 23.47	.56	-.25	.38	4	76.95	.27	4	79.79
207	82 7 21.16	-.41	.09	82 2 13.91	-.16	.03	.50	4	78.01	.35	6	79.91
208	75 28 20.59	-.03	.06	75 23 33.97	.03	-.09	.41	4	77.25	.88	4	79.40
209	70 32 34.28	-.36	.58	70 27 50.36	-.25	.44	.62	6	78.65	.79	6	79.64
210	73 12 14.38	-.06	.28	73 7 40.31	.00	.06	.19	4	77.22	.65	6	79.41
211	65 46 34.03	-.06	.17	65 42 52.63	-.03	.06	.35	5	77.36	.76	15	80.21
212	71 50 41.11	-.42	.27	71 47 32.38	-.28	.17	.55	4	77.22	.53	5	80.10
213	70 50 12.84	-.02	.41	70 47 16.59	.00	.25	.11	4	77.55	.78	4	80.17
214	80 10 58.41	-.13	.16	80 8 11.00	-.03	.03	.54	5	77.68	.56	5	79.55
215	68 10 1.06	.00	.19	68 8 5.78	.00	-.03	.14	4	76.52	.99	6	80.02
216	74 15 33.22	-.19	.38	74 13 38.78	-.09	.19	.44	5	77.09	.50	4	79.39
217	68 46 52.50	-.16	1.00	68 45 28.55	-.13	.86	.35	5	77.86	.73	4	80.89
218	72 28 57.30	-.52	.20	72 27 20.69	-.39	.14	.37	4	78.00	.23	4	80.04
219	86 59 31.91	-.41	.22	86 58 4.81	-.22	.13	.35	4	78.97	.27	4	80.03
220	86 36 34.63	-.25	.56	86 35 11.13	-.16	.41	.41	4	78.97	.60	4	80.18
221	72 10 26.03	.00	-.13	72 8 55.59	.00	-.38	.06	4	76.52	.97	5	80.23
222	72 10 55.72	.00	.02	72 9 24.88	.03	-.20	.31	4	76.52	.94	5	80.23
223	80 18 5.63	-.50	.53	80 16 56.69	-.38	.38	.49	4	77.23	.62	5	79.42
224	89 3 3.53	-.41	.38	89 2 15.66	-.16	.28	.22	4	78.91	.21	4	79.88
225	76 58 15.22	-.22	.41	76 57 46.25	-.16	.22	.16	4	76.53	.31	7	79.99
226	72 0 37.70	-.09	.03	72 0 18.61	.09	-.02	.42	4	76.99	.34	6	79.60
227	79 59 48.00	-.09	.31	80 0 2.66	-.06	.13	.19	4	76.53	.56	12	80.21
228	79 59 59.91	-.19	.50	80 0 14.69	-.09	.31	.19	4	76.53	.50	12	80.21
229	71 18 41.97	-.08	.55	71 20 16.05	-.05	.28	.25	4	77.01	.85	6	80.13
230	72 42 41.95	.03	-.06	72 43 58.16	.16	-.14	.35	6	78.27	.37	4	80.17

N	$\delta_{1950.0}$	Δ_1	Δ_2	$\delta_{J2000.0}$	Δ_3	Δ_4	ε_1	n_1	E_1	ε_2	n_2	E_2
	° ′ ″	″	″	° ′ ″	″	″	″			″		
231	86 37 43.09	-.13	.38	86 39 27.72	-.03	.16	± .28	5	77.91	± .39	4	79.50
232	79 11 25.66	-.34	.47	79 13 21.53	-.22	.34	.46	5	77.91	.54	5	80.32
233	83 8 33.22	-.03	.44	83 10 31.47	-.03	.28	.19	4	78.06	.86	4	79.14
234	77 30 34.16	-.06	.13	77 32 49.09	.03	-.03	.35	4	76.77	.74	6	79.73
235	65 26 37.89	.27	-.14	65 29 19.25	.31	-.17	.51	4	77.51	.45	5	80.11
236	74 1 42.34	.09	-.06	74 5 7.75	.22	-.09	.40	4	77.25	.41	5	79.84
237	75 22 33.88	-.03	.16	75 26 2.34	.00	.00	.31	4	77.30	.76	6	79.86
238	79 53 4.13	-.06	.22	79 56 33.19	.00	-.06	.19	5	77.57	.40	6	80.39
239	71 13 50.84	-.61	.17	71 17 50.03	-.42	.22	.60	6	78.80	.24	4	79.44
240	82 18 5.91	.03	-.13	82 22 12.00	.19	-.22	.16	4	77.30	.34	6	79.75
241	69 27 38.28	-.16	.45	69 31 52.33	-.14	.38	.20	4	77.27	.42	5	80.46
242	76 28 41.94	.06	-.13	76 33 37.41	.09	-.22	.14	4	77.03	.29	6	79.74
243	67 34 25.13	-.42	.63	67 39 41.59	-.36	.53	.26	5	79.00	.35	6	80.11
244	73 15 48.00	-.31	.53	73 21 19.78	-.19	.38	.42	5	79.04	.59	6	80.25
245	83 22 9.50	-.38	.06	83 27 46.09	-.31	.03	.52	4	78.12	.22	4	79.16
246	79 30 15.53	.09	-.41	79 36 9.56	.19	-.63	.22	4	77.51	.56	6	79.80
247	70 52 50.84	-.25	.30	70 59 21.56	-.14	.16	.54	5	78.66	.57	5	80.54
248	74 15 51.91	.16	-.31	74 22 38.94	.25	-.41	.31	4	77.51	.58	6	79.61
249	70 8 26.83	-.42	.44	70 16 4.48	-.34	.34	.60	9	79.03	.64	11	80.20
250	76 20 33.41	-.16	.28	76 28 52.75	-.06	.13	.31	4	77.53	.44	4	79.74
251	84 31 36.53	-.13	.47	84 40 7.09	-.09	.28	.44	5	79.05	.66	4	80.46
252	73 45 54.03	.06	-.03	73 54 34.25	.16	-.03	.67	5	77.30	.39	4	79.59
253	77 33 42.38	-.28	.38	77 42 41.00	-.19	.22	.59	7	79.12	.62	6	79.97
254	68 7 18.67	-.41	.36	68 16 19.86	-.30	.28	.49	5	78.42	.38	4	79.74
255	68 43 12.58	-.05	.16	68 52 48.70	.00	.00	.17	4	77.30	.42	5	79.78
256	81 15 11.69	-.28	.38	81 25 21.94	-.13	.28	.40	7	79.33	.42	5	79.65
257	72 21 44.94	-.38	.64	72 31 54.20	-.30	.55	.55	4	77.15	.71	4	79.97
258	83 27 16.94	.00	.00	83 37 31.72	.09	-.22	.35	4	77.88	.63	5	80.17
259	74 47 0.69	-.44	.13	74 57 16.31	-.28	.06	.54	5	78.65	.27	5	79.80
260	79 15 15.13	-.22	.16	79 25 49.44	-.13	.03	.60	6	79.04	.50	7	79.99
261	82 20 52.31	-.25	.47	82 31 52.34	-.19	.28	.56	9	79.00	.70	7	79.64
262	80 21 57.09	-.13	.19	80 33 8.16	-.03	.03	.25	4	78.15	.41	5	79.21
263	75 43 57.25	-.13	.38	75 55 32.38	-.06	.16	.38	8	78.54	.60	8	79.85
264	86 49 58.16	-.31	.56	87 1 57.72	-.41	.19	.28	4	77.71	.47	5	79.72
265	77 55 26.91	-.09	.28	78 7 35.19	-.03	.13	.42	10	79.38	.73	8	79.59
266	71 13 52.39	-.52	.39	71 25 54.28	-.39	.28	.67	5	77.28	.65	6	79.43
267	81 1 20.09	-.38	.34	81 13 51.84	-.25	.22	.55	8	79.18	.55	10	80.12
268	76 52 30.31	-.03	.03	77 5 25.19	.06	-.06	.51	4	77.66	.66	5	79.20
269	70 20 27.83	-.02	.08	70 33 38.61	.00	-.05	.32	8	78.64	.80	8	78.98
270	71 4 51.83	-.22	.56	71 18 41.38	-.17	.42	.40	10	79.61	.67	11	80.23
271	72 5 26.73	.11	-.06	72 19 12.42	.13	-.03	.58	5	77.87	.48	5	79.66
272	83 48 22.19	-.03	.09	84 2 19.03	.06	-.13	.63	6	78.35	.65	4	79.00
273	79 18 54.94	.06	-.34	79 33 6.69	.16	-.47	.27	4	77.42	.77	6	78.88
274	73 27 56.13	.16	-.06	73 42 8.25	.31	-.09	.47	4	77.18	.44	6	79.40
275	80 4 15.09	-.38	.63	80 18 30.88	-.28	.50	.37	11	79.54	.47	9	80.29
276	74 45 26.28	-.16	.84	74 59 48.19	-.13	.63	.29	5	78.09	.59	4	79.53

N	$\delta_{1950.0}$	Δ_1	Δ_2	$\delta_{J2000.0}$	Δ_3	Δ_4	ε_1	n_1	E_1	ε_2	n_2	E_2
	° ′ ″	″	″	° ′ ″	″	″	″			″		
277	72 56 30.06	.06	-.25	73 10 47.34	.13	-.38	±.31	4	78.62	±.70	5	79.66
278	72 5 40.81	-.27	.50	72 20 28.39	-.19	.38	.44	10	79.42	.61	11	79.99
279	69 53 6.91	-.06	.28	70 7 57.25	-.03	.16	.26	4	77.70	.54	4	78.52
280	85 51 27.06	-.44	.75	86 6 28.59	-.44	.53	.40	5	77.95	.58	6	79.79
281	76 14 12.22	-.03	.13	76 29 16.94	.00	.03	.37	5	78.08	.56	5	79.84
282	70 30 56.44	-1.06	.06	70 46 14.83	-.84	.06	.62	5	77.77	.13	4	77.51
283	78 31 51.22	-.03	.22	78 47 8.81	.00	.00	.25	4	78.40	.57	4	79.53
284	78 34 3.25	.00	.00	78 49 27.25	.03	-.09	.43	5	78.32	.71	5	79.37
285	75 58 7.22	.09	-.22	76 13 35.41	.22	-.31	.52	6	79.24	.71	6	80.30
286	73 23 0.34	-.56	.41	73 38 35.56	-.47	.28	.54	4	77.98	.44	4	78.02
287	75 6 41.72	-.38	.06	75 22 18.69	-.16	.06	.36	4	77.43	.15	4	78.50
288	81 7 50.59	.13	-.16	81 23 31.56	.25	-.28	.60	4	77.69	.85	5	78.85
289	82 53 18.91	-.66	.44	83 9 13.84	-.47	.34	.27	4	76.74	.28	5	78.75
290	65 56 13.61	-.05	.06	66 12 1.23	.02	-.02	.46	5	77.89	.59	6	79.79
291	84 4 43.28	.06	-.06	84 20 46.00	.06	-.13	.42	4	77.90	.72	8	78.63
292	72 51 57.84	.25	-.22	73 8 0.72	.31	-.31	.53	5	77.52	.57	6	79.27
293	80 4 30.19	-.06	.13	80 20 38.44	.03	-.03	.42	4	77.67	.52	4	79.29
294	75 7 1.44	-.09	.13	75 23 15.38	.00	.00	.53	4	77.69	.62	4	78.01
295	73 57 30.72	.22	-.28	74 13 52.66	.34	-.31	.27	4	78.62	.39	5	79.25
296	70 36 54.78	-.22	.19	70 53 17.19	-.11	.09	.29	4	77.70	.32	5	80.14
297	75 1 32.81	-.13	.25	75 17 56.69	-.06	.09	.42	4	77.69	.75	5	78.85
298	70 5 4.73	.30	-.06	70 21 35.61	.47	-.09	.65	4	77.66	.34	5	77.44
299	87 1 54.59	-.25	.63	87 18 27.09	-.22	.44	.21	5	77.93	.34	3	79.09
300	77 32 36.94	-.13	.47	77 49 11.16	-.06	.25	.25	5	78.46	.50	5	79.69
301	71 21 56.09	-.31	.38	71 38 31.55	-.20	.25	.61	5	78.72	.66	5	79.33
302	73 43 31.63	-.16	.34	74 0 9.31	-.09	.22	.29	4	77.96	.51	5	77.09
303	77 21 12.13	-.16	.13	77 37 57.09	-.03	.03	.49	4	78.22	.54	5	79.29
304	67 31 44.52	.13	-.16	67 48 24.66	.20	-.27	.33	4	77.69	.46	5	77.09
305	77 19 21.44	-.16	.38	77 35 57.88	-.09	.19	.13	4	77.74	.20	4	77.06
306	74 7 55.06	-.06	.25	74 24 36.13	.00	.06	.23	4	78.41	.62	5	77.45
307	82 54 45.72	-.09	.03	83 11 28.03	.19	-.03	.48	4	78.40	.31	5	77.50

КАТАЛОГ ДЕКЛИНАЦИЈА 307 СЈАЈНИХ ЗВЕЗДА (ЗОНА +65° – +90°)

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Оригинални научни рад

Дат је Каталог деклинација 307 сјајних звезда (зона +65° – +90°) за еквиноције 195.0 и 2000.0 и епохе посматрања. Декинације су одређене на Вертикалном кругу Астрономске опсерваторије у Београду апсолутном методом у току 1976--1980. године. Све звезде су посматарне у обе кулминације.

Средња грешка једног посматрања зенитске даљине је дата изразом $\epsilon_z^2 = (0''.42)^2 + (0''.23\mathrm{tg}z)^2$, а срдња грешка каталошких деклинација је $\epsilon_\delta = +0''.13$.

Средња епоха посматрања је T = 1978.62.

Средње систематске разлике у односу на фундаменталне каталоге FK4 и FK5 су: Каталог -- FK4 = = -- 0''.01 и Каталог – FK5 = +0''.05.

Дате су и систематске разлике $\Delta\delta_\alpha$ и $\Delta\delta_\delta$ у односу на ове каталоге. Констатовано је да је систем Каталога ближи систему FK5.