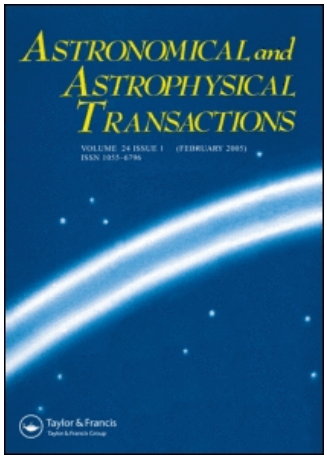

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THE PULKOVO ASTROLABE CATALOGUE (PAC)

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The parametric adjustment method (PAM) adapted to astrometrical problems by Gubanov (1988) was applied for the first time to improving of the fundamental catalogue FK4 by means of observational data received in 1963–75 by the A. Danjon astrolabe in the Pulkovo observatory. This method allows taking into account in the least-square procedure, the a priori information on accuracy of the FK4 system and interior covariances in the observational data. Systematic corrections to both coordinates for all 525 observed stars and individual corrections to 325 of those which were observed in double transit across the astrolabe almucantarat were calculated. The system of the Pulkovo Astrolabe Catalogue (PAC) of the type $\Delta\alpha_\alpha \cos\delta$ is in agreement with the new fundamental catalogue (FK5) in the Pulkovo zenith zone.

KEY WORDS Astrometry, catalogues.

OBSERVATION PROGRAMS AND DATA

The observations by the A. Danjon astrolabe OPL-24 in the Pulkovo observatory started in March 1963 and continued up to Feb. 1975 without a break. During this period more than 53,000 observations were made by four astronomers: N. P. Godisov (44%), V. M. Vasiljev (23%), V. S. Gubanov (22%) and L. I. Yagudin (11%). The whole cycle of observations may be divided into three four-year periods in which approximately equal numbers of observations were made according to three partly overlapping programs P_1, P_2, P_3. Normalized distributions of stars via declination in these programs are shown in Figure 1. The initial coordinates, proper motions, parallaxes and radial velocities of the total list of 525 stars are presented in Appendix 1.

The observational data are residuals of the type (O–C)

$$l_i = (T - T_0)_i \cos\varphi \sin a_i + \sum_j (\text{corr.})_{ij}, \qquad (i = 1, 2, \ldots) \tag{1}$$

where T and T_0 are the observed and calculated moments of star transit across astrolabe almucantarat, respectively, a is its azimuth at this moment and φ is the latitude of the astrolabe. These data were obtained in accordance with the algorithm presented by Gubanov (1981).

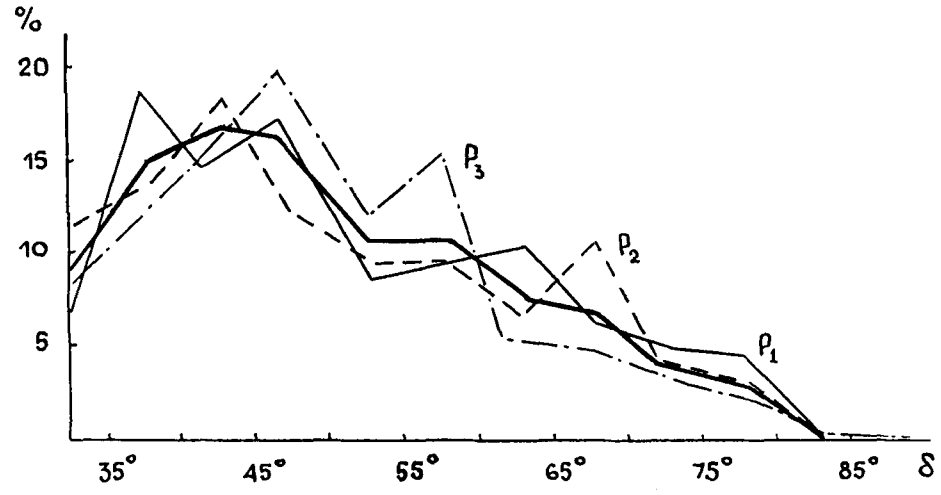


Figure 1 The normalized distribution of the stars number via declination (P_1, P_2 and P_3—the first, second and third programs of observations correspandingly; the bold line designates the mean distribution).

The observational programs P_1, P_2, P_3 have the same traditional construction and consist of 12 groups each of 2-hour duration. The succession of two neighbouring groups with numbers s and $s+1$ will be called a "link" with number s. As a rule one observational in the series consists of two groups that form one link.

FUNDAMENTAL PARAMETRIC EQUATION

The parametric adjustment method is based on the representation of the observations data vector $l = (l_i)$ $(i = 1, 2, \ldots)$ in the form of a linear parametric model

$$l = Ax + By + w, \tag{2}$$

where x is the parameters vector of the instrumental system, y is the parameters vector of the initial catalogue systematic errors; A, B are the influence matrices, $w = \varepsilon + v$ is the random vector, which consists of two components: ε is the vector of the observational random errors and v is the influence vector of the individual coordinates errors. In the present case we have

$$v = -\Delta\alpha \cos\delta \sin p - \Delta\delta \cos p, \tag{3}$$

where p is the parallactic angle.

The instrumental system within a 4-hour interval of observations during one night is represented by a 10-parameter model $u = Ax$, where $u = (u_i)$ and

$$\begin{aligned} u_i = {} & [x_{1,0}P_0(t_i) + x_{1,1}P_1(t_i) + x_{1,2}P_2(t_i)] \sin a_i \\ & + [x_{2,0}P_0(t_i) + x_{2,1}P_1(t_i) + x_{2,2}P_2(t_i)] \cos a_i \\ & + x_{3,0}P_0(t_i) + x_{3,1}P_1(t_i) + x_{3,2}P_2(t_i) + x_{3,3}P_3(t_i) \end{aligned} \tag{4}$$

where $-1 \leq t_i \leq +1$ is the observational time calculated from midnight, and P_n are the ordinary Legendre polynomials.

The systematic errors of the initial catalogue in the declination zone of the Pulkovo astrolabe ($\delta_1 = +31° \leq \delta_i \leq 78° = \delta_2$) may be represented by a 52-parameter model for both coordinates in common $v = By$, where $v = (v_i)$ and

$$v_i = \left[\sum_{m=0}^{4}\sum_{n=0}^{2}(a_{mn}\cos m\alpha_i + b_{mn}\sin m\alpha_i)R_n(\theta_i)\right]\sin p_i + \left[\sum_{m=0}^{4}\sum_{n=0}^{2}(c_{mn}\cos m\alpha_i + d_{mn}\sin m\alpha_i)R_n(\theta_i)\right]\cos p_i. \quad (5)$$

In this formula $\theta \in [-1, +1]$ is the normalized argument of declination

$$\theta = 2(\delta - \delta_1)/(\delta_2 - \delta_1) - 1,$$

$R_n(\theta)$ are the orthogonal Legendre polynomials normalized with a weight function equal to the mean distribution of stars via declination as presented in Figure 1. In formula (5) indices m and n are not equal to zero simultaneously because the zero-points of the right ascensions and declinations cannot be found by means of only the astrolabe observations.

REDUCTIONS OF OBSERVATIONAL DATA TO MEAN LINKS SYSTEM (MLS)

The procedure of mutual reductions of separate observation series was described by Gubanov (1975, 1988). The application of this procedure to each of the three observation programs produces 12 mean vectors of data l_s ($s = 1, 2, \ldots, 12$) which may be represented as 12 systems of parametric equations in the form

$$l_s = A_s x_s + B_s y + w_s \quad (6)$$

with the unknown parameters vector x_s of the instrumental system for every mean link and the common parameters vector y of the systematic errors of both coordinates of the initial catalogue.

COVARIANCE MATRIX OF DATA

In the mutual reduction procedure for all links of every program the covariance matrices of observations $(Q_\varepsilon)_s$ have been calculated. This matrix may be represented as a table with two arguments, τ and β, which are the mean intervals of time and azimuth between observable stars, respectively. These covariance matrices turned out to be very close to each other. So in the following they were averaged in all the links and the programs, and additionally smoothed by means of two-dimensional orthogonal polynomials. Thus we obtained the normalized correlation function $K(\tau, \beta)$ which is shown in Figure 2. Coming back from the arguments (τ, β) to the original indices (i, j) of the stars in the link, from the data of Figure 2 it is easy to reconstruct the covariance matrices $(Q_\varepsilon)_s$ of all the links and the common covariance matrix $Q_\varepsilon = \mathrm{diag}\,(Q_\varepsilon)_s$ of equations system (6). The

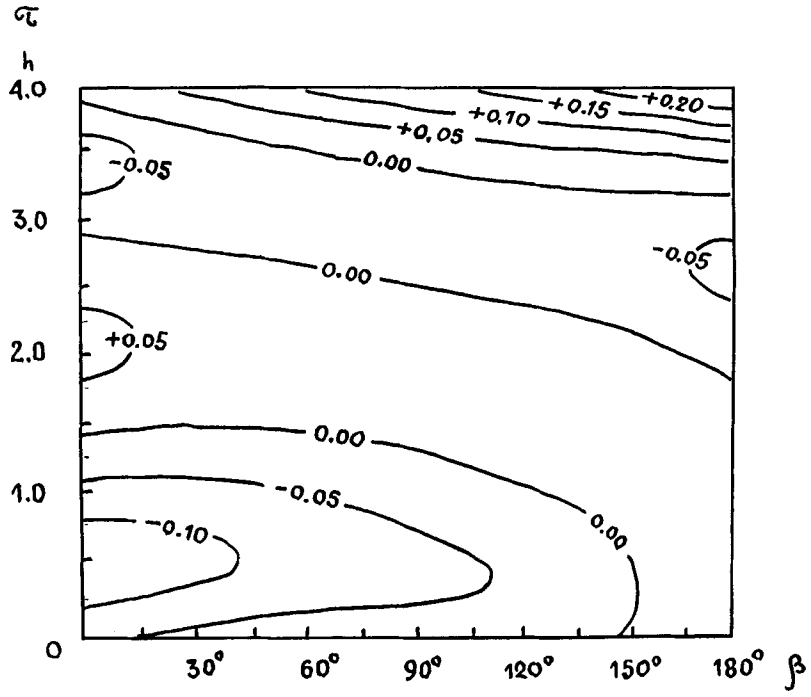


Figure 2 The mean function $K(\tau, \beta)$ of correlations between observational data ($K(0, 0) = 1.00$).

elements of matrix Q_ε are

$$(q_{ij})_\varepsilon = K(\tau, \beta)_{ij}\sigma_i\sigma_j,$$

where σ_i, σ_j are estimates of the random errors of the free terms of these equations. Being averaged over all the stars of the mean links, the errors of the unit weight as estimations of the observational accuracy may be obtained (see Table 1).

THE WEIGHT MATRIX OF DATA

The weight matrix of the observational data is

$$P_w = \sigma_0^2 Q_w^{-1} = \sigma_0^2 (Q_\varepsilon + Q_v)^{-1},$$

Table 1 Mean errors of unit weight, in 0".01.

p/s	1	2	3	4	5	6	7	8	9	10	11	12	Mean
1	23	24	23	25	23	23	23	23	23	22	21	21	24
2	22	24	27	21	21	21	20	19	19	19	19	20	22
3	20	22	21	19	19	22	17	17	18	17	19	18	20

where Q_v is the covariance matrix of the individual coordinate errors, elements of which according to (3) are

$$(q_{ij})_v = -\sigma_\alpha^2 \sin^2 p + \sigma_\delta^2 \cos^2 p,$$

where $\sigma_{\Delta\alpha\cos\delta}$ and $\sigma_{\Delta\delta}$ are the averaged estimations of the individual coordinate errors in the catalogue FK4, having been calculated by Lederle (1978)

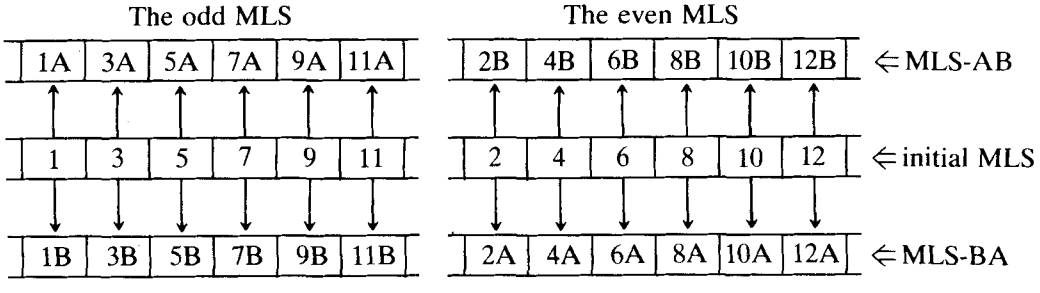
$$\sigma_\alpha^2 = (0''.04)^2 + (0''.12T)^2,$$
$$\sigma_\delta^2 = (0''.05)^2 + (0''.12T)^2,$$

where T is the epoch of observation from 1950 in centuries.

So, Q_w is a square rarefied matrix similar to a block-diagonal one and the dimensions of Q_w are $N_1 = 608$, $N_2 = 730$, $N_3 = 950$ for programs P_1, P_2, P_3 respectively.

DIVISION OF THE MEAN LINKS SYSTEM (MLS)

Aiming at diminution of the correlations between unknown parameters in equation system (6), every MLS for programs, P_1, P_2, P_3 was divided into pairs, in which groups with the same numbers have no common stars. The covariance matrices Q_w were also divided. As a result six independent systems of MLS were formed (P = 1AB, 1BA, 2AB, 2BA, 3AB, 3BA). Each was treated independently. The scheme of the MLS division is the following:



A PRIORI WEIGHTS OF THE VECTOR y PARAMETERS

A priori information about the FK4 system accuracy is contained in the estimates calculated by Lederle (1978)

$$\sigma_\alpha^2 = (0''.04)^2 + (0''.11T)^2,$$
$$\sigma_\delta^2 = (0''.02)^2 + (0''.06T)^2.$$

Hence we can calculate a priori weights of the unknown elements of the vector $y = (y_\alpha, y_\delta)$ separately for both coordinates by the formula

$$p_\alpha = \frac{\sigma_0^2}{\sigma_\alpha^2} \frac{\|B_\alpha\|^2}{N_\alpha}, \qquad p_\delta = \frac{\sigma_0^2}{\sigma_\delta^2} \frac{\|B_\alpha\|^2}{N_\delta},$$

Table 2 Weight coefficients of unknown parameters.

MLS	1*AB*	1*BA*	2*AB*	2*BA*	3*AB*	3*BA*
N	304	304	365	365	475	475
p_α	581	533	511	465	296	296
p_δ	2203	2023	1889	1721	1067	1067

where B_α and B_δ are the blocks of the influence matrix $B = [B_\alpha \mid B_\delta]$, $\|\cdot\|$ are their spherical norms, and $N_\alpha = N_\delta = N$ are the dimensions of these matrices. The results of the calculations are presented in Table 2.

PARAMETRICAL ADJUSTMENT OF DIVIDED MLS

All MLS were adjusted separately by means of the least-square algorithm with the general condition

$$S = w^T P_w w + p_\alpha (y_\alpha^T y_\alpha) + p_\delta (y_\delta^T y_\delta) = \text{minimum}.$$

This condition yield a solution of the system of parametrical equations (6) with the weight matrix P_w in the form

$$\begin{vmatrix} x \\ y \end{vmatrix} = \begin{vmatrix} D_{xx} & D_{xy} \\ D_{yx} & D_{yy} \end{vmatrix}^{-1} \cdot \begin{vmatrix} l_x \\ l_y \end{vmatrix}$$

where

$$D_{xx} = A^T P_w A, \qquad D_{xy} = A^T P_w B = D_{yx}^T, \qquad D_{yy} = B^T P_w B + P_y.$$
$$l_x = A^T P_w l, \qquad l_y = B^T P_w l.$$

Here $x = (x_s)$ $(s = 1, 2, \ldots, 12)$ is the vector of unknown parameters of the instrumental system for all the links of the given program, P_y is the diagonal weight matrix of the vector y, made of the weight coefficients p_α and p_δ, which, therefore, play the role of regularization parameters.

As for the errors of the estimated parameters, they are defined by the least-square procedure with the condition that the outside variance of unit weight is

$$\mu_0^2 = \frac{S}{N - m},$$

where N is the number of equations in system (6) (see Table 1), and m is the number of unregularized parameters in this system ($m = 10 * 12 = 120$).

COMPOSITION OF COMPILED CATALOGUE

Calculation of the weighted parameters of the vector y for all six MLS was made according to the formula

$$\bar{y} = P^{-1}(P_1 y_1 + P_2 y_2 + \cdots + P_6 y_6),$$

Table 3 Systematic error parameters of the initial catalogue, type $\Delta\alpha\cos\delta$ (the vector y_α) in 0.″001.

	a_{mn}					b_{mn}				
$n\backslash m$	*0*	*1*	*2*	*3*	*4*	*0*	*1*	*2*	*3*	*4*
0	—	0±10	−2±9	1±9	5±9	—	1±10	5±9	−12±9	−1±9
1	−8±5	5±8	−1±8	−6±7	−1±8	—	−14±8	2±8	−11±7	−11±8
2	2±5	−8±6	2±7	−7±7	3±7	—	5±6	5±6	−3±7	−1±7

where

$$P = P_1 + P_2 + \cdots + P_6; \qquad P_1 = Q_1^{-1},\ P_2 = Q_2^{-1},\ \ldots,\ P_6 = Q_6^{-1},$$

$Q_1, Q_2, \ldots, Q_6$ are covariance matrices of the vectors $y_1, y_2, \ldots, y_6$, obtained by the least-square procedure. The final estimations of the weighted parameters of the vectors y_α and y_δ are shown in Tables 3 and 4. Since the coordinates and proper motions of stars in the initial catalogue (see Sect. 1) are given in the FK4 system, the calculated components of the vectors y_α and y_δ can be regarded as the parameters of the FK4 systematic errors of types $\Delta\alpha\cos\delta$ and $\Delta\delta$ respectively. These errors, having been calculated by formula (5) (the expressions in the square brackets correspond to them), are shown in Figures 3 and 4. The divergences between the systems of the programs P = 1, 2, 3 can be explained, if we take into account that the programs only partly overlap (see Figure 5).

From the 525 stars observed only 205 may be found in the catalogue FK4, 101 stars belong to the FK4Sup. and 219 of the rest to the catalogue N30. Nevertheless, as can be seen from Figure 6, our system of the $\Delta\alpha\cos\delta$ corrections is in a good agreement with similar corrections to the FK4 in the Pulkovo's zenith zone, obtained by some authors.

IMPROVEMENT OF THE CATALOGUE IN RELATION OF RANDOM ERRORS

Excluding the instrumental system $u_s = A_s x_s$ and the catalogue system $v_s = B_s y$ from equation (6), we get the residuals w_s

$$w_s = l_s - A_s x_s - B_s y.$$

The residuals which correspond to the same links for all the six MLS were united, and for common stars in these links the residuals have been averaged. After that the system of residuals w_s for 12 united links was improved in relation to random

Table 4 Systematic error parameters of the initial catalogue, type $\Delta\delta$ (the vector y_δ) in 0.″001.

	c_{mn}					d_{mn}				
$n\backslash m$	*0*	*1*	*2*	*3*	*4*	*0*	*1*	*2*	*3*	*4*
0	—	0±5	0±5	−4±5	−3±5	—	0±5	0±5	0±5	−2±5
1	−4±5	−2±5	0±5	4±5	2±5	—	−4±5	0±5	−4±5	3±5
2	13±4	−1±5	0±5	−3±5	−1±5	—	−3±5	−3±5	−2±5	−5±5

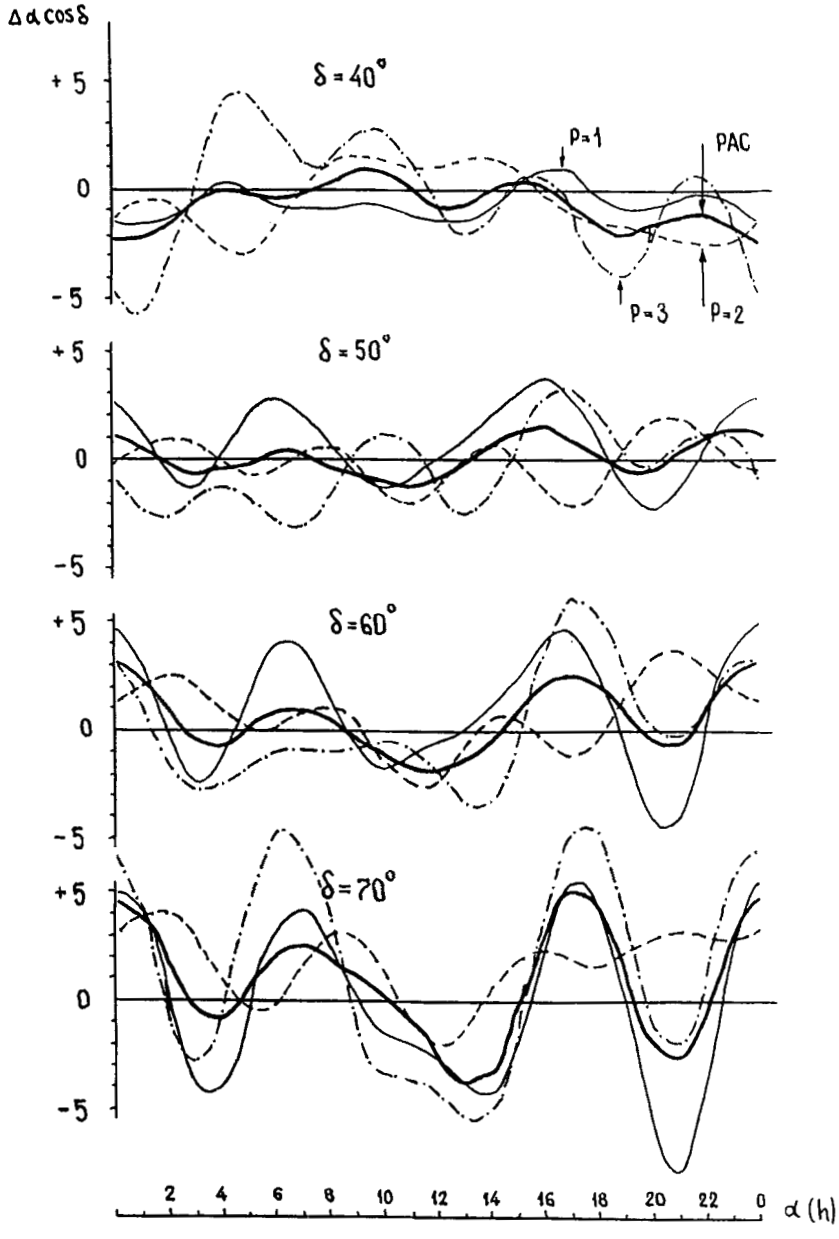


Figure 3 The systematic residuals (Astrolabe—FK4) of the type $\Delta\alpha \cos\delta$ in 0^s.001 for $P = 1, 2, 3$ (the bold line is the mean system—PAC).

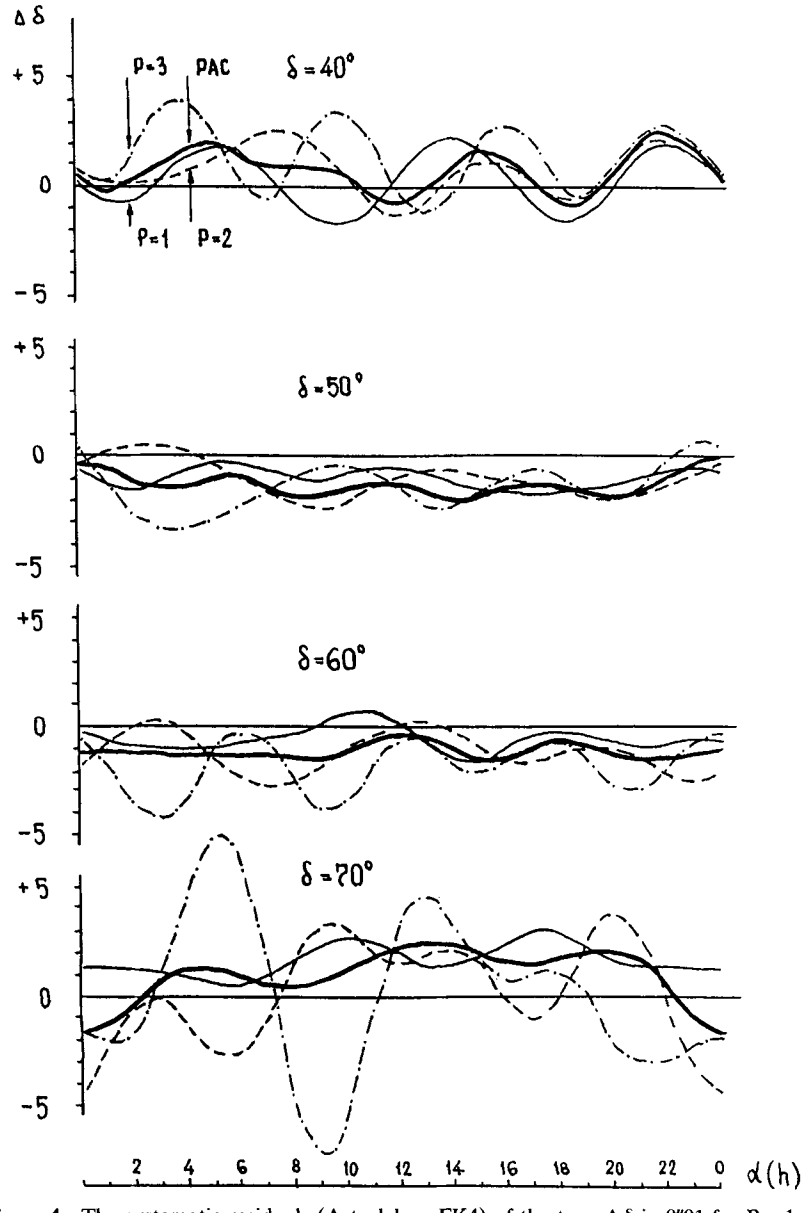


Figure 4 The systematic residuals (Astrolabe—FK4) of the type $\Delta\delta$ in 0.″01 for P = 1, 2, 3.

errors at the expense of defective data, which were not included in the process of parametrical adjustment. These consist of incomplete links and groups, which contain over 30% of the omissions. The improvement procedure comparises the following operations: the catalogue system $v_s = B_s y$ is eliminated from the observation data of each defective group, and after that the parameters of the instrumental system and the new random residuals for all the stars of the given

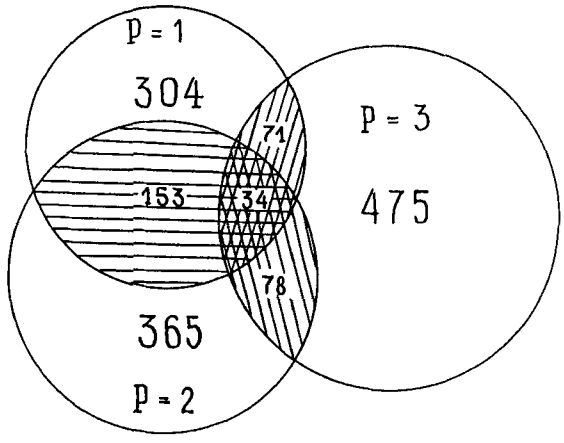


Figure 5 The overlapping of the observations programs.

group are found by the least-square procedure. The original and new residuals are averaged with their corresponding weights. All 357 different groups were treated in this way.

In the vector of corrected residuals w_s the same transit of the star across the astrolabe almucantarat appears twice in the neighbouring links, since all the divided links have been already united. This allows averaging of the residuals for the same transit of all the stars and makes the vector of residuals w_s twice as short.

CALCULATION OF INDIVIDUAL CORRECTIONS TO COORDINATES

In residuals corrected in this way $w_s = \varepsilon + v$ random errors of observations ε may be considered to be the lowest, so it is possible to put $w_s \cong v$ and use them for

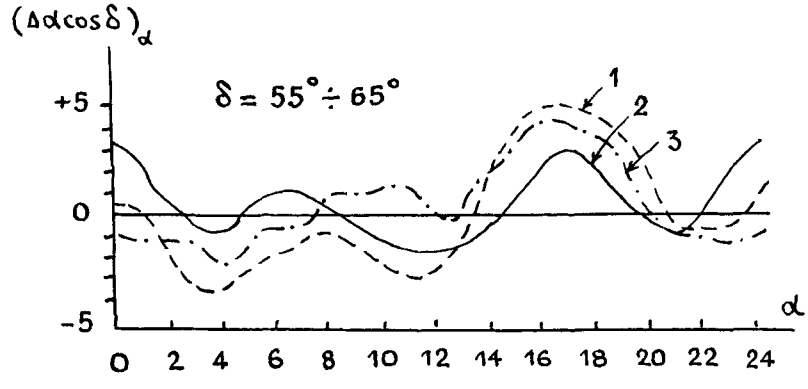


Figure 6 The systematic corrections to the FK4 of the type $\Delta\alpha \cos\delta$ in the Pulkovo zenith zone in 0^s.001 (1—Pose (1981), 2—PAC, 3—FK5); The nean epoch is 1969.5.

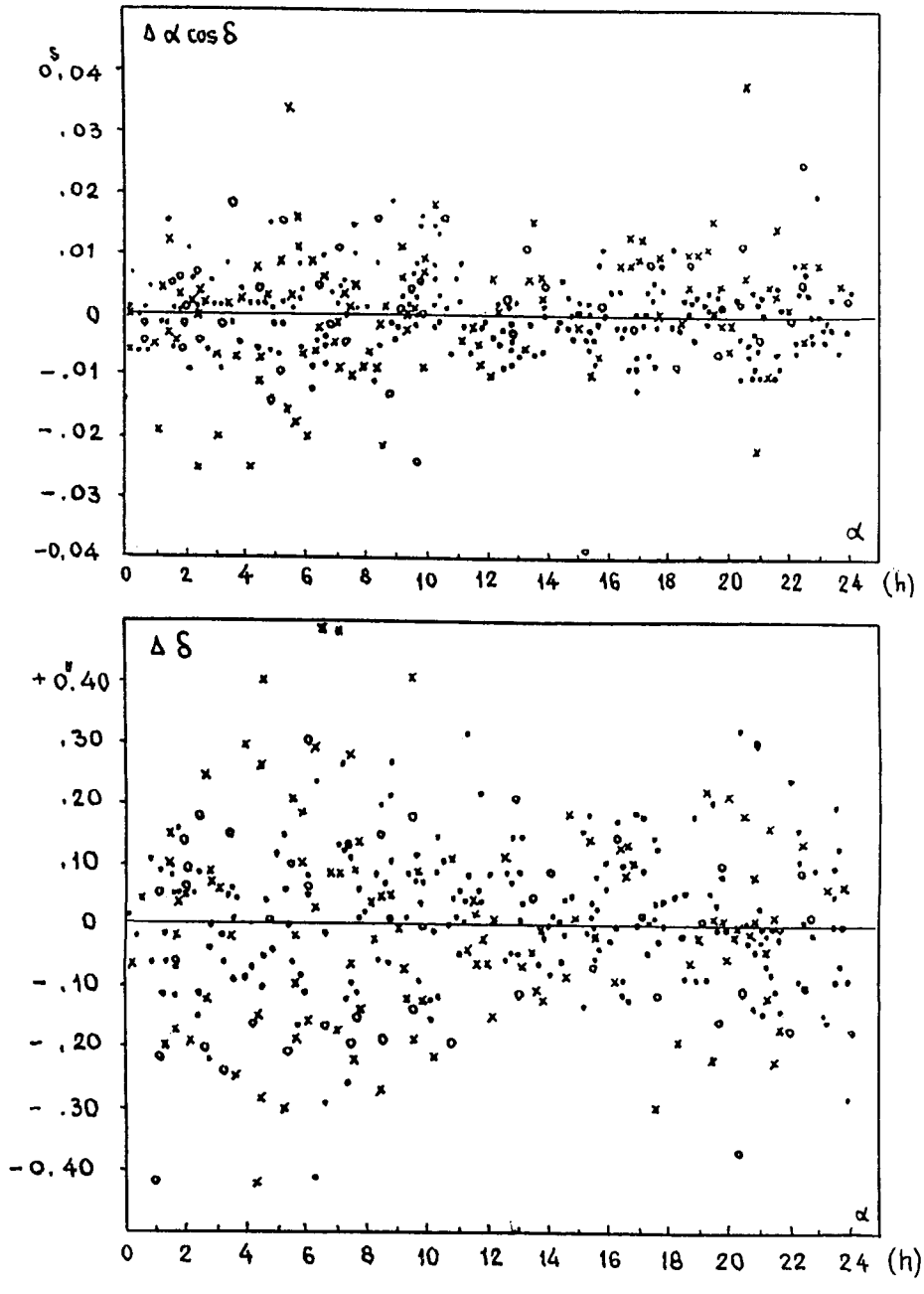


Figure 7 The individual corrections to the star coordinates (·)—the FK4, (×) – the FK4Sup. and (○)—the N30.

calculating the individual corrections to the star coordinates. If the star was observed in two transits—east (e) and (w)—then according to formula (2) we have

$$\Delta\alpha \cos\delta = \frac{\nu_w - \nu_e}{2 \sin p_e}, \qquad \Delta\delta = \frac{\nu_w + \nu_e}{2 \cos p_e},$$

$$\sigma_\alpha^2 = \frac{\sigma_w^2 + \sigma_e^2}{4 \sin^2 p_e}, \qquad \sigma_\delta^2 = \frac{\sigma_w^2 + \sigma_c^2}{4 \cos^2 p_e},$$

where σ_w^2, σ_e^2 are covariances of the residuals ν_w and ν_e respectively, and p_e is the parallactic angle at the moment of east transit of star. From the 525 stars only 352 were observed in two transits, so individual corrections to both coordinates are calculated only for these (see Sect. 2). These corrections, depending on their right ascension, are shown in the Figure 7. For the other 173 stars in the catalogue only their residuals ν_w or ν_e are presented.

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APPENDIX 1. THE INITIAL CATALOGUE OF COORDINATES AND PROPER MOTIONS OF STARS OBSERVED BY THE PULKOVO ASTROLABE IN 1963–1975 (THE FK4 SYSTEM)

Notes

GC —number of star in the catalogue GC,
FK4 —number of star in the catalogues FK4 and FK4Supp.,
R.A.—the right ascension on the epoch and equinox 1950.0,
DEC—the declination on the same epoch and equinox,
PMA—the centennial proper motion in R.A. in second of time,
PMD—the centennial proper motion in DEC in second of arc,
PAR—the annual parallax in milliarcsecond,
VEL—the radial velocity in km/sec.

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
1	147	2	2.4	F5	000629.735	585226.77	6.787	- 17.66	72	
2	169	4	5.1	F0	000742.744	454738.94	0.063	0.49		
3	244	2010	5.7	A5	001054.515	404533.80	- 1.101	- 14.75	24	
4	414		6.0	K5	001808.226	323802.83	- 0.210	- 0.90		
5	425	1009	5.2	F5	001828.790	374130.68	0.511	- 3.38	15	
6	546	2027	5.2	A2	002531.854	440705.34	0.760	- 1.08		
7	611		6.1	K0	002845.857	331821.01	0.369	- 1.50		
8	645	16	4.2	B0	003008.341	623922.13	0.024	0.28		
9	726		5.4	K5	003402.813	441247.34	- 0.220	3.80	6	-32.8
10	727	17	3.7	B3	003410.333	533719.42	0.210	- 0.49		
11	729	18	4.4	B3	003412.186	332639.75	0.127	- 0.01		
12	792	21	*	K0	003739.313	561548.60	0.635	- 2.72		
13	828		4.9	B3	003915.829	501419.38	0.144	0.24		
14	882	25	4.7	B2	004155.654	480040.00	0.191	- 0.26		
15	891	24	*	A2	004218.429	744254.68	- 0.432	- 1.94		
16	962		3.6	F8	004603.928	573301.48	13.657	- 51.07		
17	999	2055	6.1	A0	004730.115	444348.59	0.589	1.32		
18	1004	29	5.5	*	004740.282	635832.83	0.435	- 0.67		
19	1117	32	2.3	B0P	005340.325	602647.38	0.341	- 0.05	34	
20	1122	33	3.9	A2	005358.160	381342.99	1.289	3.71	32	
21	1360	1030	5.3	G5	010455.680	544032.95	39.472	-157.53	136	-97.2
22	1394		4.3	B8	010635.338	465832.81	0.080	- 0.50		
23	1406	2074	5.3	A0	010714.616	683047.78	0.667	- 1.69	14	1.0
24	1410	2075	5.7	G0	010727.829	414857.98	- 1.146	- 4.45		
25	1594		5.3	F5P	011655.117	575809.99	- 0.010	0.10		
26	1647	1035	5.0	K0	011923.103	451602.87	0.301	1.25	25	
27	1681	2093	5.5	A0	012048.441	372716.30	0.675	- 2.15		
28	1707	46	5.0	K0	012222.244	675211.62	1.351	3.16	12	
29	1715	48	2.8	A5	012231.498	595834.36	3.996	- 4.46	29	
30	1752	1040	5.0	F5	012439.155	450857.55	3.276	- 10.02	24	

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
31	1879		4.9	K0	013038.679	585834.64	- 0.488	- 1.61	19	6.4
32	1948	1045	4.2	G0	013351.142	410922.13	- 1.527	- 37.93	62	
33	1965	2108	5.7	K0	013450.351	574325.28	0.038	- 0.71		
34	1991	2112	5.2	G5	013620.404	440757.42	- 0.161	1.62		
35	2025		4.9	B8	013737.099	401928.75	0.110	- 2.10		
36	2026		5.5	F0	013739.158	430243.97	1.162	- 3.37		
37	2050		5.1	F8	013843.830	422148.24	7.297	- 14.58	86	4.0
38	2064	1047	5.5	B8	013909.559	345938.62	0.392	- 2.66		
39	2102	57	4.2	B0P	014030.757	502615.93	0.273	- 1.09	18	
40	2161		5.7	K0	014406.336	633624.47	8.731	- 23.75	111	1.8
41	2241	2122	5.5	B3	014841.291	545402.85	0.176	- 0.62		
42	2289	63	3.4	B3	015046.378	632529.89	0.488	- 1.50		
43	2313	2129	5.0	B8	015204.912	682627.00	0.225	- 0.53		
44	2372		5.8	G5	015522.080	485739.11	0.089	4.20		
45	2379		5.2	A0	015555.182	642246.04	0.508	- 1.39		
46	2458		5.4	A2	020002.205	330238.55	- 0.130	- 0.90	8	3.3
47	2477	73	2.3	K0	020049.177	420527.01	0.413	- 4.75		
48	2572	75	3.1	A5	020633.579	344506.52	1.200	- 3.74	12	
49	2645	2153	5.1	K0	021004.466	435953.60	- 0.200	- 0.98		
50	2653	77	5.4	K0	021015.926	505005.11	3.663	- 16.54		
51	2710		5.3	A0	021258.339	330738.85	- 0.139	- 3.40		
52	2742	79	4.1	A0	021420.011	333701.46	0.372	- 4.55	36	
53	2779	1063	5.1	A0	021602.464	470901.73	- 0.576	- 0.33	12	
54	2836	2159	5.2	A2P	021851.235	553705.02	0.020	- 0.31		
55	2952		4.6	A5P	022454.860	671045.32	- 0.250	1.69	21	1.2
56	3100		5.9	K0	023233.420	370540.98	0.020	- 0.50		
57	3245	2187	5.0	G0	023904.962	395901.58	- 0.187	- 18.16	40	
58	3277	93	4.2	K8	024046.276	490106.45	3.420	- 8.31	77	
59	3390	99	3.9	K0	024701.935	554122.43	0.226	- 1.09		
60	3419	2198	4.7	K5	024825.494	345119.59	0.041	- 5.36		

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
61	3462	103	4.1	G0	025041.856	523333.90	0.002 -	0.14	12	2.2
62	3487	2201	5.6	F5	025157.750	611907.65	1.957	3.51		
63	3544	2205	5.2	A0P	025414.740	314402.99	0.044 -	2.96		
64	3575	1082	5.0	K0	025557.291	345902.76 -	0.389	0.96		
65	3600		5.4	B5	025717.532	520916.11	0.310 -	2.19		
66	3664	108	3.1	*	030109.595	531844.29	0.004 -	0.19	11	
67	3674	2217	5.1	K0	030145.910	563039.98 -	0.299	7.01		
68	3682	109	*	MB	030157.795	383852.86	1.105 -	10.21		
69	3740	112	4.2	G0	030526.709	492526.63	12.951 -	7.82	84	50.0
70	3759	2222	4.9	A2	030627.701	741222.13	0.432 -	8.62	29	
71	3870		5.9	A0P	031157.088	565721.69	0.020 -	0.60		
72	3912	115	5.5	F0	031353.961	773314.61	2.011 -	5.48	12	
73	3948	2232	4.9	K0	031535.729	340228.64	0.048 -	0.25	10	
74	4004	2236	5.0	A2	031805.031	430901.98 -	0.487	0.03	21	
75	4024		5.3	B3	031939.897	490209.89	0.230 -	1.69		
76	4034	1096	5.6	K2	032018.581	642434.09 -	0.056	0.71		
77	4133		4.7	B5	032546.826	492014.80	0.270 -	2.39	12 -	1.0
78	4140		4.8	A0P	032554.175	584226.58	0.080	0.20		
79	4158	124	4.6	K0	032702.277	474927.84	0.045	2.31		
80	4210	2249	5.4	F0	032857.808	455321.02 -	0.500 -	7.08	28	
81	4287		4.3	B5P	033255.532	480141.07	0.240 -	2.29		
82	4383	129	5.3	MA	033747.684	630324.86 -	0.256	2.02		
83	4420		5.0	B2	033912.039	334822.17 -	0.040 -	0.70		
84	4427	131	3.1	B5	033921.241	473746.34	0.276 -	3.21		
85	4474	134	3.9	F5	034147.281	422520.62 -	0.119	0.03	14	
86	4557	138	4.7	A0	034502.619	711051.59	0.441 -	3.74		
87	4592		5.1	A2	034622.623	325622.65 -	0.230	0.29		
88	4727		5.2	*	035251.367	605753.13	0.001 -	0.90	13	
89	4728		5.5	F5P	035252.750	503309.05	0.973 -	12.57		
90	4730	2281	4.9	B9	035259.519	625540.91	0.183	0.81		

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
91	4734		5.5	B3	035314.968	345611.18	0.050	0.20		
92	4759	147	3.0	B1	035429.432	395202.54	0.152 -	2.45		
93	4779	148	4.1	OE5	035542.825	353856.50	0.026	0.13		
94	4858	2290	5.1	F0	040016.214	590107.66	- 0.067 -	0.18		
95	4924	1113	4.3	A0	040250.904	501303.34	- 0.147 -	3.45		
96	4967	152	4.0	B3P	040501.311	473451.78	0.212 -	2.76	15	
97	5099	1117	4.3	G0	041113.008	481703.73	0.055 -	1.56	12	
98	5132	2310	5.1	A2	041248.358	532918.36	- 0.180	0.19	8 -	3.0
99	5191		5.5	A5	041527.496	495544.20	0.651 -	4.98		
100	5199	2315	5.4	G0	041556.936	650115.87	- 0.430 -	0.41		
101	5207	2316	5.5	B3	041623.655	504805.51	0.080 -	0.41		
102	5235	158	5.1	G5	041709.476	342652.30	- 0.191 -	0.32		
103	5244	2317	5.7	K0	041725.800	603709.15	0.770 -	10.80		
104	5256	2319	4.9	B3	041755.696	462252.66	0.248 -	4.35		
105	5265	2321	5.6	K0	041814.526	804235.00	0.370 -	2.09	12 -	9.1
106	5359	2325	5.3	K0	042254.989	311940.10	0.582 -	11.58		
107	5493	165	5.9	B1	042803.574	534815.95	0.004 -	0.11		
108	5609	2338	4.5	*	043313.171	410950.58	- 0.129 -	1.60	20	4.7
109	5719	2349	5.2	A0	043921.113	431619.04	0.363 -	4.81	16	
110	5726	1128	5.8	B8	043933.076	495249.70	- 0.042 -	1.66		
111	5880	2361	5.8	G5	044723.362	483923.68	- 0.340 -	3.72		
112	5924	178	4.4	B0	044903.825	661538.64	0.056	0.81		
113	5932		5.6	A0	044915.510	423014.70	- 0.050 -	0.00		
114	5988		5.8	A2	045208.887	524726.15	- 0.020	0.90		
115	6029	181	2.9	K2	045343.982	330519.94	0.026 -	1.76	15	
116	6123	183	*	F5P	045822.530	434505.36	0.005 -	0.40		
117	6136	182	4.2	G0P	045857.617	602218.62	- 0.048 -	1.37		
118	6137	1137	3.9	*	045858.680	410017.79	0.079 -	2.17		
119	6219		5.0	F0	050245.325	513201.01	- 0.293 -	17.21	11 -	1.4
120	6226	185	3.3	B3	050300.214	411008.38	0.262 -	6.68	13	

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
121	6288	2387	5.4	A0P	050602.650	735309.32	0.041	- 2.96	21	
122	6427	193	0.2	G0	051259.466	455658.04	0.775	- 42.27	73	
123	6469		5.9	MB	051441.172	424424.14	0.121	- 2.70	4	-38.0
124	6494	1145	4.9	G0	051537.212	400324.51	4.561	- 66.09	66	65.7
125	6515	2399	5.2	A5P	051642.952	335427.93	- 0.008	- 0.99		
126	6556	2400	5.1	B3	051815.839	414524.49	0.180	- 3.87		
127	6578	2402	5.3	A0	051910.513	572954.24	0.131	- 5.41	19	
128	6582		5.6	A3	051919.378	405855.87	- 0.110	0.50		
129	6744	203	5.8	K5	052526.423	630142.13	- 0.048	- 0.24		
130	6921	2416	6.0	K5	053228.761	542352.67	0.003	- 0.88		
131	7182	216	5.5	A0	054201.442	494824.60	- 0.099	0.04	15	
132	7277		4.6	K0	054542.456	390958.54	- 0.219	- 2.31	4	-19.6
133	7322	2440	5.0	MA	054737.686	371735.57	0.272	- 4.66		
134	7334	221	4.2	K0	060534.296	585641.48	0.199	1.51	11	31.1
135	7402	2446	5.3	A0	055028.973	595247.21	0.017	- 1.95		
136	7404	1157	4.9	A2	055039.215	554152.55	- 0.139	2.18	12	
137	7521	225	3.9	K0	055524.518	541700.14	0.948	- 12.57	20	
138	7543	227	2.1	A0P	055551.579	445640.69	- 0.523	- 0.07	37	
139	7554		4.6	MA	055613.361	455604.26	0.000	- 0.60	3	0.9
140	7557		2.7	A0P	055618.626	371240.05	0.435	- 8.16	18	
141	7580		5.7	A0	055710.863	475403.94	0.061	- 1.90		
142	7641	2461	6.1	G5	055941.624	425455.24	1.066	- 14.36	14	
143	7723	2465	5.3	A3	060308.245	382920.96	0.172	- 5.95		
144	7796		5.4	K0	060534.296	585641.48	0.199	1.51	11	31.1
145	7856	233	5.4	K0	060749.304	654353.20	0.151	- 3.24		
146	8016	2479	5.3	MA	061318.275	613203.32	- 0.099	- 0.76		
147	8068	237	4.4	A0	061512.749	590154.24	- 0.073	2.48	35	
148	8151	2484	5.4	F5	061742.423	532838.35	0.229	- 9.33		
149	8281	2491	*	A3	062212.665	561851.33	- 0.261	2.09	23	-12.7
150	8416		6.0	G5	062626.722	581207.44	- 0.331	- 33.71	23	36.0

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
151	8574	2507	5.9	K0	063244.098	780224.85	0.396 -	0.13	14	
152	8648	250	5.7	K0	063511.702	392613.20	- 0.193 -	11.07		
153	8836	255	5.3	G0	064308.206	433745.74	- 0.017	16.36	68	
154	8858	1176	5.3	K0	064350.996	485040.75	- 0.021	0.70		
155	8902	2523	5.0	B3	064544.862	673748.58	0.090	0.20	10	5.3
156	8931	2527	5.0	K0	064713.914	415031.81	- 0.227 -	14.23		
157	8957	259	5.1	B5	064819.454	685658.72	0.111	0.56		
158	8989	261	3.6	A2	064929.672	340124.57	- 0.009 -	5.08	21	
159	9073	260	4.8	K5	065248.331	770243.68	2.216 -	1.29	20	
160	9082		4.5	G0	065257.178	582927.03	- 0.032 -	13.30	12	8.9
161	9113	2537	4.8	A2	065358.345	450940.57	- 0.197 -	0.33		
162	9354		5.6	G5	070253.956	343307.05	- 0.439 -	5.12	33	4.8
163	9490	274	5.1	K2	070813.118	392414.81	0.379	1.00	220	
164	9581	2558	5.3	K0	071133.431	594344.62	- 1.305 -	26.37	34	
165	9606	1190	5.6	G0	071207.624	471951.20	0.325 -	18.27	37	
166	9677	276	5.8	A3	071433.781	405827.16	- 0.134	1.25		
167	9681		4.8	A2	071444.329	493321.77	- 0.050	1.10	9	-11.7
168	9769	2567	5.6	F0	071740.573	451921.85	- 0.414	0.78		
169	9796	2568	5.2	K0	071842.347	365123.34	- 0.747 -	2.83	21	
170	9800	280	5.6	B8	071847.691	552240.73	- 0.025 -	3.08	4	
171	9985	284	5.8	K0	072541.708	683414.90	- 0.147 -	3.86		
172	9992		5.4	F5	072608.551	494640.50	- 1.174 -	8.16	44	-26.7
173	10168	1195	5.8	K5	073254.143	461733.13	- 0.282 -	3.42		
174	10257	2592	4.9	F0	073554.279	344203.09	- 0.293 -	11.44	19	
175	10305	2594	5.8	G5	073731.163	481500.82	- 0.456 -	13.22	9	39.8
176	10343	292	5.0	A2	073847.235	584947.02	- 0.473 -	5.17	17	
177	10420	2602	6.0	K0	074154.340	653439.99	0.427	1.64		
178	10460	1199	5.5	MA	074319.306	373825.07	0.216	1.23		
179	10482	296	5.3	K2	074417.115	333224.61	- 0.122 -	3.12	13	
180	10809		5.8	F2	075709.995	591107.19	0.209	2.91		

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
181	11018	307	4.9	A2	080442.307	513909.91	- 0.640	- 0.72		
182	11158	2640	5.9	K0	080951.815	563614.67	- 0.209	- 4.21		
183	11246	310	5.7	G5	081318.920	755446.00	0.833	1.53		
184	11252	2645	5.5	A5	081342.052	594335.45	- 0.067	0.16		
185	11401	314	4.4	K5	081925.155	432100.83	- 0.162	- 10.04	20	
186	11424	2649	5.6	A2	082001.943	532257.40	- 0.277	- 10.51	27	21.3
187	11593	317	3.5	G0	082607.631	605314.56	- 1.804	- 11.05		
188	11684	320	6.1	K0	082940.284	381121.98	- 0.872	- 17.27	13	
189	11700		5.4	A0	083008.921	651903.72	- 0.788	- 6.62	14	-15.5
190	11810		5.7	G5	083438.838	533438.30	- 0.921	- 1.93		
191	11903	1225	5.5	K0	083734.214	460039.49	0.222	8.75	14	
192	12221	2700	5.2	G5	084835.957	435451.44	- 0.127	5.01	16	
193	12235	2701	5.7	F0	084916.538	620904.12	- 0.091	1.70		
194	12242		5.8	A3	084929.571	323946.28	- 0.020	1.20		
195	12289		5.6	K0	085111.928	304612.05	0.311	- 2.29		
196	12317		5.6	G5	085221.665	644749.79	- 0.406	- 8.41		
197	12341	2706	5.9	F2	085316.244	402339.44	- 0.619	- 4.58		
198	12346		5.9	K0	085327.354	454929.59	- 1.201	- 4.83		
199	12407	335	3.1	A5	085547.627	481422.05	- 4.432	- 23.54	66	
200	12434	339	4.2	F2	085724.075	415855.79	- 3.942	- 25.29	70	
201	12503	341	3.7	A0	090013.266	472120.79	- 0.328	- 5.65	10	
202	12540		5.6	F5	090157.647	484349.72	- 0.130	- 2.00		
203	12565	1237	4.7	G5	090321.311	383912.26	- 0.248	- 1.94	19	
204	12604	2721	4.5	A3P	090521.304	514828.45	- 1.485	- 3.65		
205	12646	2727	4.7	*	090649.103	634307.72	1.438	- 5.56		
206	12716	346	5.3	B8	091032.470	432530.92	- 0.259	- 3.59		
207	12748		5.5	K5	091208.434	565700.68	- 0.219	- 3.41		
208	12761	2734	4.9	A5	091236.223	541347.26	0.594	5.92		
209	12799	2738	5.7	A0	091410.453	470137.03	0.173	0.70		
210	12830		3.8	A2	091544.339	370055.55	- 0.254	- 12.75	33	

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
211	12880	352	3.5	K5	091800.865	343618.57	- 1.808	1.31	21	
212	12883	2743	6.0	MB	091803.953	565445.06	- 0.100	- 0.80		
213	13051	2751	5.6	G5	092523.893	454918.81	- 0.108	- 12.80		
214	13109	355	3.8	F0	092736.565	631655.11	1.614	2.58	34	
215	13133		5.5	K5	092830.186	351931.43	- 0.459	- 10.81		
216	13157	358	3.3	F8P	092931.490	515423.17	-10.292	- 53.97	52	
217	13171	357	4.6	G0	093005.838	700306.47	- 1.243	7.60	39	
218	13203	360	4.6	G5	093109.969	363714.38	0.051	- 2.63		
219	13212		4.6	A0	093124.632	521630.14	- 0.731	- 4.02	21	23.1
220	13221	2762	5.0	K0	093157.125	395039.99	- 0.181	0.71		
221	13265	2765	5.7	MA	093345.129	312312.85	0.036	- 4.44		
222	13372	2773	5.5	K0	093854.889	395912.69	- 0.442	- 4.69	19	
223	13442		5.4	MA	094300.162	572131.95	0.009	3.00		
224	13497	1255	5.2	F0	094522.444	461518.13	2.162	- 9.52	66	
225	13540	368	3.9	F0	094727.102	591630.31	- 3.817	- 15.55	36	
226	13559		4.5	A2	094843.025	541756.70	- 0.061	1.60	25	-11.9
227	13643	2793	5.3	A2	095227.793	500324.95	- 0.064	0.17		
228	13700	374	5.2	F5	095437.760	411740.83	- 1.056	- 2.91	38	
229	13763	1258	5.6	G5	095808.015	321013.66	- 4.140	- 43.32	53	56.0
230	13896	2812	4.5	A5	100429.189	352921.50	0.462	0.19		
231	14113	383	3.5	A2	101405.353	430953.54	- 1.512	- 4.26		
232	14154	2827	6.2	K0	101621.044	483857.85	- 0.990	- 11.65		
233	14260	387	4.9	A0	102033.038	654912.47	- 0.149	- 2.53	40	
234	14280		5.8	K0	102116.463	335819.61	- 0.160	- 0.80		
235	14358	390	4.4	K0	102459.888	365750.88	- 0.996	- 10.55	21	
236	14427	394	4.8	F5	102726.446	561415.65	- 2.140	- 3.49	80	
237	14491	2844	4.8	A5	103019.278	404100.41	- 1.222	- 0.12	27	14.0
238	14507	395	5.0	G5	103054.070	755817.36	- 0.844	- 0.62	24	
239	14527	398	5.2	F0	103157.350	572027.14	0.815	3.54	23	
240	14624	1275	4.8	G0	103554.672	321411.49	0.007	0.18	15	

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
241	14625	2849	5.7	K0	103600.268	535547.55	- 1.112	- 8.21		
242	14688	2850	5.1	K0	103833.329	655844.29	- 2.778	- 7.39	29	
243	14713	403	5.2	K0	103931.060	692018.38	0.021	- 1.63		
244	14737	1276	5.3	F0	104037.108	462801.90	- 2.610	- 7.20	19	
245	14961	412	3.9	K0	105031.231	342905.62	0.694	- 28.32	17	
246	15018		5.2	K0	105258.534	334627.26	- 0.881	- 3.21		
247	15087	1282	5.1	G0	105640.348	404151.77	- 2.812	5.15	73	
248	15109	2878	5.7	K2	105722.865	454741.01	0.050	0.30		
249	15128		5.1	F0	105802.654	392851.78	- 0.641	- 2.41		
250	15145	416	2.4	A0	105850.251	563903.12	0.981	2.91	42	
251	15185	417	2.0	K0	110039.571	620116.80	- 1.682	- 7.05	31	
252	15339		6.0	MA	110650.951	432844.57	- 0.611	- 1.50		
253	15340	420	3.2	K0	110651.583	444612.61	- 0.637	- 3.15		
254	15506	424	6.0	K0	111353.307	494458.02	- 0.898	- 1.48		
255	15547	425	3.7	K0	111546.947	332202.56	- 0.219	2.26	13	
256	15558	1293	4.8	A2	111624.722	382736.38	- 0.493	- 7.40	21	
257	15625	2908	5.1	G5	112005.355	434526.26	- 0.337	- 1.38		
258	15751		5.3	A2	112622.873	393644.38	- 0.451	1.10		
259	15782	432	5.9	F8	112749.156	432652.41	- 0.495	7.77		
260	15799	433	4.1	MA	112827.546	693626.09	- 0.743	- 2.02	24	
261	15962		5.5	F0	113541.087	435410.16	- 1.353	- 3.80		
262	16035	1300	5.5	G5	113825.282	342902.89	- 0.103	- 38.79	110	
263	16051	2938	5.7	F5	113858.316	320122.64	- 2.781	2.45	28	
264	16137	441	3.9	K0	114325.030	480324.16	- 1.382	2.43	14	
265	16153	2941	5.4	K0	114415.626	555423.15	0.151	- 3.20		
266	16268	447	2.5	A0	115112.566	535821.98	1.053	0.68	20	
267	16315	2953	5.9	K0	115322.241	565236.49	0.051	- 0.50		
268	16439	2963	5.6	K0	115906.161	361917.46	- 0.762	- 8.25	27	
269	16445	2965	5.1	A3	115934.787	431922.86	- 2.970	7.00	17	
270	16736	456	3.4	A2	121257.584	571836.95	1.257	0.43	52	

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
271	16750	458	5.8	K5	121337.464	405618.08	0.132 -	3.73		
272	16754	2983	5.1	K0	121359.495	332026.94	- 0.450 -	11.19	23	
273	16797	2986	5.4	A2	121636.407	752616.62	- 0.951	0.18	15	
274	16843		5.7	K2	121825.967	580832.56	0.492 -	7.80		
275	16899	2993	6.0	F0	122119.712	424910.92	- 0.681	2.28		
276	16906	2994	5.0	K0	122136.071	515020.58	0.107	0.97	36	
277	16948	461	5.2	K0	122323.345	391744.81	- 0.704 -	3.72	29	
278	16985	3000	5.8	MA	122512.782	555921.82	- 0.337 -	1.41		
279	17038	467	5.4	A5	122737.655	584050.24	- 0.835	8.83		
280	17126	472	3.9	B5P	123121.550	700348.96	- 1.163	0.86	10	
281	17127	470	4.3	G0	123122.289	413744.11	- 6.308	28.76	108	
282	17148		5.2	K0	123237.658	701749.69	- 0.695 -	0.40		
283	17278	478	5.9	A0	123923.262	625914.10	- 0.521 -	2.02		
284	17342	1327	*	NB	124247.084	454247.88	- 0.023	1.18		
285	17518	483	1.7	A0	125150.084	561351.14	1.313 -	1.02	7	
286	17554	486	5.3	F0	125329.454	654233.68	- 0.141 -	3.35	29	
287	17557	485	2.9	A0P	125341.478	383516.82	- 2.011	5.20	23	
288	17664		4.9	F0	125835.328	563807.83	1.435 -	1.31	30	-10.4
289	17758	1338	5.7	K0	130337.463	453207.73	- 0.145	2.37		
290	17916		5.1	G5	131127.033	402501.99	- 0.441	1.01	3	-21.3
291	17953		5.7	A5	131317.170	410707.33	- 0.992	0.81		
292	18000	494	4.7	F0	131518.147	405007.24	- 1.116	1.71	14	
293	18009	3063	5.1	A0	131607.072	495640.39	- 0.381	1.31	16	
294	18133	497	2.4	A2P	132154.916	551109.46	1.387 -	2.52	37	
295	18155		4.0	A5	132313.496	551452.65	1.344 -	2.22	37	- 7.5
296	18171		5.9	K0	132407.951	461715.41	0.210 -	2.60		
297	18226	500	5.4	A0	132637.109	601212.87	- 1.119	3.54	21	
298	18356	3083	4.6	A3	133224.768	491615.94	- 1.362	2.49	30	
299	18359	502	5.0	F0	133233.917	372616.62	0.691 -	1.33	19	
300	18473		5.3	A2	133734.465	531024.19	- 1.634	5.63	9	-18.0

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
301	18504	3087	4.8	MA	133850.564	545602.89	- 0.311	- 1.41	14	
302	18539	3089	6.0	K0	134029.742	351425.16	0.009	1.51		
303	18636	3094	5.6	K0	134450.406	384731.67	- 1.206	- 2.38		
304	18643	509	1.9	B3	134534.294	493344.13	- 1.285	- 1.41		
305	18726		6.0	MA	134856.826	345443.09	0.029	- 5.80	11	-40.0
306	18741	3102	5.0	MA	134935.159	344128.25	- 0.191	- 3.80	27	
307	18750	511	4.8	MA	134958.224	645811.15	- 0.057	- 0.62	14	
308	18796		5.7	A0	135200.662	535826.39	- 0.401	- 0.79	10	-21.0
309	18990		6.1	A0	140108.125	511241.93	- 0.211	- 0.40		
310	19019	521	3.6	A0P	140301.963	643651.57	- 0.905	1.48	11	
311	19084	1368	5.4	MB	140555.835	440529.74	0.071	- 3.08	24	
312	19207		4.6	A5	141141.489	520123.32	0.631	- 0.61	14	-15.6
313	19269	528	4.8	A5	141423.673	513549.93	- 1.652	8.80	44	
314	19273	527	4.3	A0	141428.969	461901.94	- 1.834	15.80	43	
315	19296	1370	4.8	K0	141552.952	354421.87	- 0.020	1.08		
316	19467	531	4.1	F8	142329.610	520452.32	- 2.623	- 40.01	67	
317	19548	1379	4.4	K2	142736.189	755505.76	0.123	2.05	17	
318	19607	535	3.0	F0	143003.837	383134.12	- 0.991	14.93	16	
319	19733		5.9	K0	143619.539	435125.06	- 0.090	2.80		
320	19747	540	5.4	A0	143658.529	443710.48	- 0.664	- 1.97	9	
321	19841	3166	5.8	K0	144147.996	404011.84	- 0.169	1.62		
322	19982		5.5	K0	144831.145	372834.65	- 1.811	9.24	26	-66.4
323	20029	550	2.2	K5	145049.645	742135.58	- 0.862	1.01	31	
324	20119	3179	5.7	B9	145443.313	494955.76	1.015	- 23.08	26	
325	20170	554	4.9	MB	145646.803	66.752.18	- 1.394	2.74	11	
326	20226	555	3.6	G5	150003.664	403512.80	- 0.405	- 3.23	22	
327	20281		4.9	G0	150208.372	475052.96	- 3.937	2.60	76	
328	20308	1395	5.6	A0	150346.364	482036.15	- 0.707	2.79	24	
329	20332	1397	5.2	G5	150450.853	544453.13	0.478	1.10	29	
330	20523	563	3.5	K0	151329.117	333001.20	0.665	- 11.64	28	

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
331	20532	565	5.2	G0	151403.231	673210.65	3.681 -	39.29	46	
332	20641	3210	5.5	A3	151836.779	520816.38	0.070	1.00		
333	20692	569	3.1	A2	152047.348	720042.97 -	0.509	1.88		
334	20724	568	4.5	F0	152235.995	373305.49 -	1.245	8.36	30	
335	20747	571	3.5	K0	152348.741	590826.16 -	0.199	1.34	32	
336	20866	573	5.2	K5	152907.882	410009.24	0.062 -	1.00	20	
337	20883		5.0	A2	152959.466	410404.99 -	0.179 -	1.55	16	
338	20908	576	4.2	B5	153054.696	313136.47 -	0.174 -	1.49	20	
339	20952	3229	5.3	K5	153251.309	773059.65 -	1.547	1.04	19	-25.0
340	20964		5.4	MA	153324.692	391030.46	0.140	0.50	5	
341	21032	580	5.4	G5	153601.742	403055.00	0.519	5.89	19	
342	21036		6.0	K0	153614.645	544018.53 -	0.512 -	1.78		
343	21064		5.1	B8	153729.581	364749.53 -	0.160 -	1.10	15	-24.3
344	21154	3247	5.5	A0P	154128.982	523104.68 -	0.763	2.77		
345	21243	590	4.3	A2	154547.812	775657.09	0.449 -	0.35		
346	21246	587	5.1	A2	154553.826	624513.06	0.452 -	5.87	13	
347	21319	1414	4.8	K0	154920.761	354841.14 -	0.098 -	35.13	36	
348	21340	1416	4.6	G0	155056.688	423525.79	3.957	62.81	56	-55.2
349	21402	3259	5.5	F2	155358.319	380525.33	0.216	7.79	43	
350	21467	595	5.0	A5	155636.000	545325.24 -	1.824	10.80	19	
351	21499	3260	5.9	F0	155739.049	500121.90	0.148 -	5.06		
352	21572	598	4.1	F8	160056.829	584153.69 -	4.168	33.62		
353	21577		*	MC	160108.775	472235.70 -	0.459	5.81		
354	21733	1423	4.9	K0	160708.471	363700.61 -	0.470	32.83	27	
355	21736	601	4.3	B9P	160711.504	450354.26 -	0.284	3.54	12	
356	21851	606	5.5	B8	161213.173	760015.27 -	0.186	1.24		
357	21863		5.4	G0	161248.242	335902.41 -	2.233 -	8.53	47	
358	21984	3293	5.5	F2	161812.198	394938.11 -	1.217	0.08	40	-55.2
359	21987	608	3.9	B5	161814.106	462553.60 -	0.157	3.75	27	
360	21999	612	5.0	F0	161856.288	755216.64 -	2.322	25.05	38	

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
361	22026		5.4	MA	162028.365	335456.11	0.029 -	4.10		
362	22101		2.9	G5	162318.476	613737.10 -	0.328	5.92	43	
363	22102	614	5.7	A2	162319.476	551905.27	0.065	1.96		
364	22108	3296	5.5	A3	162337.172	373024.58	0.059 -	1.32		
365	22205	3305	5.5	A3	162827.590	790419.50 -	4.178	10.43	28	
366	22251		5.6	A0	163016.733	454212.24 -	0.100	0.41		
367	22281	1432	5.9	A0	163142.905	605539.52	0.165 -	1.07		
368	22296	621	4.3	A0	163229.324	423221.08 -	0.131	4.37	3	
369	22398	3320	5.4	G5	163659.571	560645.50 -	0.118	6.50	14	
370	22412	1434	5.1	MA	163723.247	490131.30 -	0.515	3.13	17	
371	22502	626	3.6	K0	164110.779	390058.80	0.282 -	8.29	53	
372	22584	627	4.9	F0	164420.643	565214.29	0.139	6.41	42	
373	22662		4.9	A2P	164746.229	460410.19	0.198 -	5.71	4	- 1.0
374	22935	634	3.9	A0	165822.471	305955.92 -	0.375	2.78	22	
375	23172	3365	5.1	K0	170755.888	405018.98 -	0.490	0.92	18	-56.2
376	23182	639	3.2	B5	170838.146	654633.99 -	0.402	2.09	17	
377	23302	643	3.4	K5	171318.212	365151.83 -	0.250	0.29	20	
378	23359		*	B3	171528.639	330910.01 -	0.010 -	0.60		
379	23374		4.8	A2	171556.664	372033.91 -	0.369	5.91	12	- 9.9
380	23452	3377	5.8	K2	171856.215	461720.39 -	0.339	4.51		
381	23544		4.5	A0	172157.328	371126.90 -	0.370	0.31		
382	23741	653	3.0	G0	172918.009	522015.65 -	0.236	1.31	9	
383	23797	655	5.0	A5	173111.293	551304.07	1.629	5.51		
384	23801	657	5.0	A5	173116.720	551222.82	1.653	5.37	26	
385	23821	659	5.2	K0	173209.543	681001.20 -	0.313	13.43	18	
386	23944	664	4.9	F5	173714.348	684652.48 -	0.017	32.24	39	
387	23965	663	3.8	B3	173803.064	460155.28 -	0.096	0.41		
388	24089	670	4.9	F5	174249.282	721026.21	0.334 -	26.66	46	
389	24093		5.7	A5	174256.408	534919.25	0.169 -	1.61		
390	24221	3416	5.2	A2	174752.534	504731.83 -	0.543	21.22		

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
391	24342		5.1	K0	175140.258	400059.02	0.061	5.20	14	-34.9
392	24364	671	3.9	K0	175239.700	565247.68	1.064	7.76	31	
393	24415	672	4.0	K0	175432.183	371521.68	0.007	0.61		
394	24432	676	2.4	K5	175526.576	512938.53	- 0.139	- 1.97	17	
395	24459	3429	5.5	F2	175602.885	720037.59	- 0.015	- 0.38		
396	24820	3447	5.9	K0	180930.029	541615.60	1.201	25.04	20	
397	24916	685	5.0	F5	181336.423	642248.39	5.263	3.17	47	
398	25032	1477	4.3	K0	181806.453	360227.36	- 0.157	4.28		
399	25114		4.2	A0P	182128.506	711842.23	- 0.200	4.05		
400	25122	695	3.7	F8	182157.480	724242.15	11.691	- 35.62	120	32.5
401	25137	3463	5.0	A2	182234.863	392844.22	- 0.202	0.08		
402	25466	699	0.1	A0	183514.655	384409.68	1.708	28.47	123	
403	25491	701	6.0	A3	183603.843	652637.71	0.210	8.23		
404	25635	3491	5.1	A0	184139.774	552917.59	- 0.089	2.40	7	-30.0
405	25667		5.1	A3	184240.866	393700.11	0.102	6.00	15	
406	25676		4.3	A3	184302.919	373306.17	0.191	2.49	25	-26.0
407	25757	1492	5.8	B5	184535.976	525556.41	0.063	- 0.06		
408	25839	1494	5.4	A0	184759.715	752233.84	- 0.516	7.63		
409	25847	705	*	*	184813.936	331812.51	0.001	- 0.20		
410	25935		5.0	G5	185159.151	503842.71	- 0.011	- 2.40	23	8.2
411	25996	711	4.2	M5	185348.728	435245.51	0.185	8.43		
412	26055	3514	5.8	K0	185612.414	651126.73	- 0.466	- 2.48		
413	26138	3515	5.2	B3	185858.157	502742.71	0.021	0.94		
414	26169		5.5	G5	185944.001	553509.87	- 0.250	- 0.49		
415	26181		5.1	A5	190001.379	465146.78	0.127	- 8.40	31	
416	26338	719	5.1	B5	190530.954	360114.52	- 0.034	- 0.08		
417	26484	3536	5.1	F0	191101.014	762841.84	1.200	- 12.40	46	
418	26520	723	3.2	K0	191232.824	673425.03	1.582	9.34	28	
419	26537		5.3	K0	191301.579	573705.50	- 0.213	- 6.89	24	
420	26621	726	4.0	K0	191556.786	531631.88	0.615	12.52	23	

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
421	26638	729	4.6	K0	191631.472	731547.87	- 3.298	11.15	13	
422	26735	3547	4.6	A2	192024.847	653705.23	0.089	4.31	14	
423	26846	3554	5.2	A0P	192420.981	361259.47	0.002	1.36		
424	26947	733	3.9	A2	192826.674	513720.99	0.187	13.02		
425	26988	1510	4.9	B3	192954.724	342044.00	- 0.019	- 0.02		
426	27050		4.8	K0	193227.578	693454.30	10.871	-254.33	179	26.7
427	27068		5.6	F5	193302.005	510742.83	0.273	- 18.81	35	1.2
428	27141	738	4.6	F5	193505.974	500616.12	- 0.247	25.63	66	
429	27213	3572	5.4	B8	193748.745	424206.38	0.211	3.39		
430	27249	3575	5.0	F2	193917.511	452419.93	0.843	11.47	18	-20.2
431	27328	740	5.0	K0	194228.301	371356.99	0.589	3.54	18	
432	27347		3.0	A0	194324.669	450028.22	0.454	4.86	21	
433	27486		5.4	MA	194847.590	383533.85	0.073	10.90		
434	27506	3586	5.2	K2	194922.415	525137.57	- 0.152	- 6.70	12	
435	27589		5.8	G5	195258.542	365146.56	0.100	2.30		
436	27618		4.9	A3	195420.174	521819.76	- 0.445	- 2.79		
437	27622	1521	4.0	K0	195425.726	345658.24	- 0.275	- 2.63		
438	27635	3591	5.1	K2	195458.157	584242.71	- 0.214	- 2.05		
439	27724	3599	5.2	B3	195805.074	365416.84	0.011	- 0.16		
440	27856	3608	4.7	K0	200235.939	674351.31	0.228	5.25	13	
441	27912	3613	5.7	F5	200454.806	530101.76	2.356	26.13	21	
442	27980	1525	4.8	B2P	200734.092	364129.09	0.014	1.59		
443	28066	759	4.4	B9	201036.574	773342.36	0.299	2.67		
444	28091		5.0	A2	201143.640	463949.18	0.100	0.50	2	
445	28108	758	4.3	A3	201214.137	562450.95	0.731	8.46	16	
446	28160		4.2	*	201355.470	473335.59	- 0.040	0.90	8	-14.4
447	28242	3627	5.2	F5P	201643.741	344931.47	- 0.029	- 0.76		
448	28338	765	2.3	F8P	202025.927	400544.58	0.014	0.25		
449	28378	3633	4.6	K2	202151.710	320139.51	0.363	- 0.46	10	
450	28541	767	4.3	A5	202844.678	624932.32	0.598	- 1.06	32	

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
451	28639	770	5.2	A2P	203211.343	744701.08	0.082	- 1.16		
452	28846	777	1.3	A2P	203943.539	450603.12	0.008	0.51		
453	28919	3656	5.6	A5	204233.783	662831.48	0.264	3.86	31	
454	28956	782	4.6	G0	204406.628	572359.12	- 0.851	- 23.20	41	
455	28959	780	2.6	K0	204411.168	334655.16	2.847	32.90	44	
456	28962	783	3.6	K0	204416.488	613838.85	1.280	122.17	71	-87.3
457	28994	784	4.5	B5	204527.538	361821.96	0.031	- 0.32		
458	29150		4.7	B3	205128.521	441149.40	0.050	- 0.20		
459	29159	3668	5.7	K2	205152.230	331448.17	- 0.141	3.14		
460	29219		5.8	B8P	205408.355	471330.68	- 0.050	0.10		
461	29251	788	4.0	A0	205518.418	405825.85	0.073	- 1.15		
462	29327	1551	4.9	B0P	205807.395	471930.08	0.029	0.48		
463	29459	792	3.9	K5	210306.589	434339.33	0.047	0.43		
464	29519	3688	4.9	K5	210452.611	472648.31	0.079	0.39		
465	29786	1558	4.3	A0P	211526.951	391103.50	- 0.019	- 0.03		
466	29802	1559	4.4	B3P	211551.599	344109.87	- 0.088	- 0.05	16	
467	29848	803	2.6	A5	211723.182	622223.74	2.150	5.21	63	
468	29875	3703	5.2	B3P	211819.994	643934.14	- 0.039	1.00		
469	30118	809	3.3	B1	212801.326	702027.85	0.196	1.28		
470	30207	1568	4.2	K0	213205.828	452212.30	- 0.251	- 9.10		
471	30219	3722	5.0	K0	213243.827	381832.61	1.005	9.63		
472	30263	811	5.1	A5	213456.508	401117.55	- 0.047	1.67	15	
473	30302	3725	4.9	B2P	213634.654	615121.30	- 0.085	0.03		
474	30322	813	5.6	0E5	213724.390	571544.56	- 0.055	- 0.03		
475	30338	3730	5.4	K5	213813.157	430246.18	0.509	2.19	3	-28.3
476	30391	3733	4.8	B3	214018.925	505739.10	- 0.033	0.31		
477	30412		5.5	MA	214105.658	405531.83	- 0.220	- 1.00		
478	30415	817	4.9	K0	214111.735	710451.74	2.384	10.47		
479	30440		*	MA	214158.516	583300.87	- 0.010	0.00	13	19.3
480	30483	1572	4.5	A2P	214400.269	605322.50	- 0.054	0.10		

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
481	30512	821	4.3	B3	214456.560	490439.35	0.019	0.29		
482	30691	3749	6.0	B9P	215312.099	562226.18	- 0.080	0.20		
483	30731	3756	*	M2E	215514.435	632313.58	- 0.058	0.69		
484	30837		5.5	B0	220023.526	574531.11	- 0.070	0.20		
485	30904	830	5.4	K5	220329.144	623228.69	0.202	6.35	1	
486	31037	837	5.0	G5	220851.004	720541.00	0.670	1.02	11	
487	31044	836	3.6	K0	220906.936	575715.50	0.162	0.85	19	
488	31070	3775	5.4	F8	221000.173	563524.48	2.784	12.75	22	-18.9
489	31081	3776	5.4	K0	221034.870	342126.83	0.179	- 4.60	4	- 7.3
490	31104	1583	4.6	K2	221143.708	392758.45	0.321	1.42	18	
491	31105		5.5	A0	221145.584	451131.68	0.749	1.29		
492	31252		4.7	B5	221857.321	461703.33	0.210	0.90	34	- 9.5
493	31310	844	4.6	K0	222135.317	515840.99	- 0.183	- 18.32	18	
494	31326		4.6	B8P	222229.041	491320.67	- 0.100	0.10		
495	31426	3799	4.6	*	222726.461	472701.55	- 0.072	- 0.23		
496	31430	1590	5.5	A0	222744.365	321858.19	0.274	- 1.01		
497	31449	3800	4.5	B3	222819.451	425159.73	- 0.130	- 0.10		
498	31567	851	5.2	F0	223431.983	732300.37	3.969	2.99		
499	31626	852	4.9	0E5	223700.772	384722.44	- 0.003	- 0.04		
500	31652		4.6	K0	223818.943	440053.40	0.848	1.59	8	-10.0
501	31732	858	5.2	K0	224151.369	413323.08	- 0.084	0.77		
502	31857	863	3.7	K0	224753.604	655613.80	- 1.086	- 11.90	36	
503	32063	3839	5.5	G0P	225758.164	564036.60	- 0.132	- 0.05		
504	32095	869	3.6	*	225936.873	420325.12	0.186	- 0.04		
505	32197		4.9	B1	230429.495	590857.56	0.100	0.50		
506	32220	1604	5.8	F0	230528.677	490123.31	1.543	13.66	20	
507	32272		5.6	A3	230735.252	590340.92	- 0.060	1.30		
508	32409	3863	5.6	F8	231425.021	525637.26	1.183	- 22.86	36	
509	32432		5.0	MA	231525.115	484430.55	0.349	1.30	12	- 8.0
510	32463		4.9	G5	231633.619	675016.03	0.994	1.99	23	-18.2

No	GC	FK4	MAG	SP	R.A.(1950)	DEC(1950)	PMA	PMD	PAR	VEL
511	32510	1610	5.8	F5	231828.097	375432.77	1.086 -	5.96		
512	32577	1613	5.5	A0	232223.656	320635.87	0.108	0.44		
513	32582	882	5.2	K5	232236.330	620029.34	0.126 -	0.62		
514	32639		5.6	A2	232508.917	700504.45	2.314	0.19	21	- 3.0
515	32780	1616	5.5	A0	233210.367	395738.31	- 0.154 -	3.97	11	
516	32832	890	4.0	K0	233506.520	461113.83	1.544 -	41.58	43	
517	32850	891	4.3	B8	233540.605	425928.22	0.256	0.37		
518	32875	893	3.4	K0	233716.534	772111.73	- 1.980	15.56	64	
519	32886	1619	4.3	A0	233756.259	440325.16	0.751 -	1.49	12	
520	32988	1622	5.1	K0P	234332.875	460833.55	0.088 -	0.04		
521	33009		5.8	K0	234434.583	571025.26	0.010	0.30		
522	33010	3909	5.1	K0	234436.019	582224.18	0.721	5.86		
523	33031	895	5.0	A0	234530.274	673144.41	0.228	0.52	12	
524	33160	899	*	F8P	235152.422	571316.52	- 0.035	0.46	16	
525	33268		5.8	F8	235656.097	332648.94	- 0.489 -	7.60		

APPENDIX 2. THE SYSTEMATIC AND INDIVIDUAL CORRECTIONS TO POSITIONS OF STARS OBSERVED BY PULKOVO ASTROLABE IN 1963–1975 (EPOCH 1969.5)

Notes:

GC —the number in the GC catalogue,

AS, SA —the systematic corrections $\Delta\alpha_s \cos\delta$ in right ascension and their random errors in 0.001,

DS, SD —the systematic corrections $\Delta\delta_s$ in declination and their random errors in 0.01,

AI, SA —the individual corrections $\Delta\alpha_i \cos\delta$ in right ascension and their random errors in 0.001,

DI, SD —the individual corrections $\Delta\delta_i$ in declination and their random errors in 0.01,

VE, SE —the residuals v_e for east transit of stars and their random errors in 0.01,

NE —the number of east transits,

VW, SW—the residuals v_w for west transit of stars and their random errors in 0.01,

NW —the numbers of west transits,

PE —the parallactic angles for the east transits in degrees.

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
1	147	3	2	-1	2	-14	1	-21	4	9	2	122	-29	3	29	61.78
2	169	0	1	0	1	-5	2	2	3	7	2	61	-4	4	64	45.93
3	244	-2	2	0	1	0	3	-6	3	-5	3	54	-5	3	32	38.16
4	414	-5	3	1	3								-26	3	34	19.84
5	425	-3	2	0	2	1	3	-2	3	-2	3	60	-1	3	43	32.48
6	546	-1	1	0	1	-6	2	4	3	9	2	124	-3	4	50	43.46
7	611	-5	3	0	3								32	5	34	21.96
8	645	4	2	-1	2	7	2	11	5	-6	2	125	15	4	26	65.76
9	726	-1	1	0	1					10	3	60				43.61
10	727	2	2	-1	2					8	2	62				55.89
11	729	-5	3	0	3								9	3	42	22.37
12	792	2	2	-1	2	-6	1	9	4	12	2	61	-3	3	62	58.91
13	828	1	2	0	1								-19	5	33	51.80
14	882	0	1	0	1	-6	2	-12	3	-1	3	60	-14	3	28	48.94
15	891	5	4	-2	4	0	1	-1	10	0	2	59	-1	3	44	77.51
16	962	2	2	-1	2	-1	3	-42	7	-20	3	59	-22	6	14	60.34
17	999	-1	1	0	1	-4	3	-22	4	-11	4	46	-21	5	23	44.39
18	1004	3	2	-1	2	1	1	-7	4	-4	2	63	-2	3	69	67.06
19	1117	3	2	-1	2								1	3	29	63.47
20	1122	-3	2	0	2	4	3	-6	3	-8	3	60	-2	4	35	33.56
21	1360	1	2	-1	2								19	5	24	57.09
22	1394	0	1	-1	1					16	2	62				47.56
23	1406	4	2	-1	2	-5	1	-19	7	2	2	62	-14	4	28	71.60
24	1410	-2	1	0	1	-19	4	10	4	26	4	51	-10	6	29	39.91
25	1594	2	2	-1	2					4	2	62				60.79
26	1647	-1	1	-1	1	-2	1	8	2	7	2	112	3	2	65	45.15
27	1681	-3	2	0	2	4	4	15	3	10	2	96	15	5	27	32.02
28	1707	3	2	-1	2								6	2	28	70.94
29	1715	2	2	-1	2	-2	2	5	5	5	2	63	0	4	27	62.96
30	1752	-1	1	-1	1	16	3	-12	4	-26	2	106	9	5	26	45.00

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
31	1879	1	2	-1	2					19	2	63				61.86
32	1948	-2	2	0	1								11	3	66	38.81
33	1965	1	2	-1	2	13	2	-17	5	-25	2	112	9	4	43	60.53
34	1991	-1	1	-1	1	-3	2	4	2	6	2	108	0	2	60	43.51
35	2025	-2	2	0	1	5	3	5	3	-1	3	48	9	4	24	37.39
36	2026	-1	1	0	1					22	2	151				41.84
37	2050	-2	1	0	1								-3	4	24	40.76
38	2064	-3	2	1	2	1	3	5	2	3	2	106	5	4	65	26.50
39	2102	0	2	-1	1	-5	2	-7	3	1	2	62	-10	3	29	52.05
40	2161	2	2	-1	2	6	2	-6	5	-11	2	63	6	4	29	66.69
41	2241	0	2	-1	2	-4	2	-1	6	5	3	61	-6	5	22	57.40
42	2289	1	2	-1	2	1	2	16	7	5	2	67	8	5	28	66.49
43	2313	2	2	-1	2	3	1	5	5	-3	2	120	6	3	71	71.52
44	2372	0	1	-1	1	1	2	6	4	3	3	52	4	4	28	50.18
45	2379	1	2	-1	2	-1	1	14	5	7	2	60	4	3	30	67.47
46	2458	-3	3	2	3	-6	5	8	3	10	3	48	4	4	27	21.11
47	2477	-1	1	0	1	-9	2	5	2	12	2	106	-5	3	29	40.31
48	2572	-2	2	1	2	11	4	8	3	0	2	99	14	4	27	25.89
49	2645	-1	1	-1	1	3	3	-18	4	-17	3	39	-10	4	24	43.29
50	2653	0	2	-1	1	6	2	-15	5	-16	3	58	-2	5	45	52.56
51	2710	-2	3	2	3	7	4	18	2	13	3	48	20	3	28	21.35
52	2742	-2	3	2	3					-8	2	39				22.82
53	2779	-1	1	-1	1	2	2	-11	4	-10	4	45	-4	3	52	47.75
54	2836	0	2	-2	2	0	2	25	4	13	3	58	13	3	71	58.20
55	2952	0	2	0	2								-10	3	42	70.21
56	3100	-1	2	1	2	-4	3	-20	3	-14	3	45	-21	4	22	31.24
57	3245	-1	2	0	2	3	3	9	3	5	2	40	10	5	40	36.77
58	3277	-1	1	-1	1								-6	4	28	50.23
59	3390	0	2	-2	2								0	3	46	58.25
60	3419	-1	2	2	2								-3	2	30	26.13

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
61	3462	-1	2	-2	2					-11	2	55				54.63
62	3487	0	2	-1	2	2	2	-12	5	-8	3	49	-2	3	36	64.32
63	3544	0	5	4	5	-25	7	8	3	18	5	23	-3	3	52	16.45
64	3575	-1	2	3	2	-5	4	-4	3	0	5	43	-7	3	36	26.44
65	3600	-1	2	-2	2								4	3	30	54.14
66	3664	-1	2	-2	2	2	2	0	3	-3	3	55	2	2	56	55.49
67	3674	-1	2	-2	2					-29	5	32				59.18
68	3682	-1	2	1	2	6	2	-2	2	-6	2	102	4	3	28	34.30
69	3740	-1	2	-1	1								4	3	30	50.74
70	3759	-1	4	3	4	-7	1	6	7	11	2	119	-9	3	41	76.98
71	3870	-1	2	-2	2					23	3	47				59.65
72	3912	-1	5	4	5	-9	2	-22	13	10	2	65	-17	4	37	80.30
73	3948	0	3	4	3					-25	2	89				23.97
74	4004	0	1	0	1	-20	2	-6	2	16	3	45	-25	3	72	41.97
75	4024	-1	1	-1	1	-2	2	-24	3	-13	3	49	-17	3	27	50.26
76	4034	-1	2	-1	2								11	3	44	67.47
77	4133	-1	1	-1	1								-5	4	29	50.62
78	4140	-1	2	-2	2								-37	2	41	61.56
79	4158	-1	1	-1	1	2	2	-9	3	-8	3	59	-3	3	45	48.66
80	4210	0	1	-1	1	2	2	-25	3	-20	3	49	-15	3	68	45.98
81	4287	0	1	-1	1					30	2	52				48.91
82	4383	-1	2	-1	2								-13	5	40	66.11
83	4420	0	3	4	3								25	3	29	23.29
84	4427	0	1	-1	1	8	2	5	3	-6	2	97	12	3	70	48.35
85	4474	0	1	0	1	-1	2	6	3	5	3	37	4	3	45	40.81
86	4557	-1	3	2	3								11	4	36	74.10
87	4592	0	3	5	3	17	5	15	3	6	4	35	23	4	29	20.67
88	4727	-1	2	-1	2					-19	3	52				63.94
89	4728	0	2	-1	1								0	3	44	52.15
90	4730	-1	2	-1	2	-7	1	-2	3	9	2	156	-11	2	85	65.99

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
91	4734	0	2	4	2								-32	5	22	26.26
92	4759	0	2	2	2	4	3	1	3	-3	3	47	4	4	28	36.50
93	4779	0	2	4	2	-4	3	4	3	6	3	47	1	3	64	27.99
94	4858	-1	2	-1	2	3	2	30	4	11	3	53	18	3	42	61.86
95	4924	0	2	-1	1	2	2	-9	4	-8	2	94	-3	4	39	51.74
96	4967	0	1	-1	1	2	2	-7	3	-7	4	48	-3	2	91	48.30
97	5099	0	1	-1	1								16	3	44	49.22
98	5132	0	2	-2	2								4	3	43	55.67
99	5191	0	2	-1	1	-25	2	-17	4	19	4	44	-40	3	43	51.37
100	5199	0	2	0	2	4	1	-15	4	-12	2	102	1	2	79	68.09
101	5207	0	2	-1	1					21	4	37				52.43
102	5235	0	2	4	2	-7	5	-10	3	-5	4	37	-13	5	37	24.98
103	5244	0	2	-1	2	8	1	-41	4	-29	3	51	-8	3	43	63.57
104	5256	0	1	0	1	-11	1	42	2	40	2	75	17	2	120	46.67
105	5265	0	6	7	6								26	3	40	83.31
106	5359	0	5	6	5								37	4	28	14.59
107	5493	0	2	-2	2					-2	5	33				56.04
108	5609	0	2	1	1								35	3	44	38.74
109	5719	0	1	0	1	-6	3	-27	3	-14	4	43	-26	3	43	42.11
110	5726	0	2	-1	1	2	2	-5	4	-6	5	36	0	3	78	51.28
111	5880	0	1	-1	1	3	2	26	4	14	4	42	20	3	43	49.71
112	5924	0	2	0	2	-6	1	4	6	10	3	57	-7	3	49	69.30
113	5932	0	1	1	1	-14	3	1	3	15	4	35	-13	4	42	40.88
114	5988	0	2	-1	2					21	3	39				54.84
115	6029	1	3	5	3	15	4	-4	2	-12	3	56	4	3	89	21.06
116	6123	0	1	0	1	1	2	12	3	7	3	48	10	2	83	42.82
117	6136	0	2	-1	2	-1	1	15	4	8	2	47	6	3	89	63.29
118	6137	0	2	1	1	-6	2	6	3	10	3	39	-1	3	46	38.43
119	6219	0	2	-1	1	-9	2	10	4	17	4	41	-5	3	41	53.31
120	6226	0	2	1	1	-2	2	0	3	2	3	35	-2	3	45	38.72

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
121	6288	1	4	3	4	8	2	-30	11	-19	4	40	5	4	47	76.65
122	6427	0	1	0	1					-10	3	40				46.01
123	6469	0	1	1	1	16	2	-21	3	-32	4	32	0	3	44	41.24
124	6494	0	2	1	2	2	2	-6	2	-7	2	83	-2	2	85	36.77
125	6515	0	3	4	3	34	4	21	3	-1	4	28	40	3	26	23.45
126	6556	0	1	1	1	-15	2	-1	2	14	2	82	-15	3	82	39.65
127	6578	0	2	-1	2	16	2	-9	5	-26	3	79	17	4	47	60.22
128	6582	0	2	1	1					-14	4	33				38.39
129	6744	1	2	-1	2	1	1	-8	5	-5	3	38	-2	3	48	66.06
130	6921	0	2	-1	2	-17	2	-18	5	12	4	42	-32	4	33	56.69
131	7182	0	1	-1	1	3	2	-16	4	-14	4	33	-6	4	37	51.16
132	7277	0	2	2	2					-30	5	29				35.13
133	7322	0	2	2	2	12	3	10	3	-1	4	27	18	4	35	31.48
134	7334	0	2	2	2					-16	4	25				35.10
135	7402	1	2	-1	2	3	2	19	5	4	4	46	13	3	47	62.75
136	7404	0	2	-1	2	8	2	-11	4	-16	4	41	4	3	39	58.16
137	7521	0	2	-1	2	4	1	5	3	-3	3	48	8	2	139	56.54
138	7543	0	1	0	1	-5	3	8	5	11	6	23	0	4	41	44.54
139	7554	0	1	0	1					16	4	34				45.96
140	7557	0	2	2	2	-14	2	31	2	38	3	67	16	2	45	31.30
141	7580	0	1	-1	1	5	3	7	4	-1	5	31	10	3	37	48.66
142	7641	0	1	0	1	-6	4	-16	5	-6	7	29	-18	4	39	41.51
143	7723	0	2	2	2	-20	3	30	3	42	4	31	8	4	45	33.85
144	7796	1	2	-1	2					-11	4	38				61.76
145	7856	2	2	0	2	-13	2	-41	6	4	3	45	-33	3	43	68.74
146	8016	1	2	-1	2	9	2	3	5	-11	4	43	14	2	49	64.47
147	8068	1	2	-1	2	-9	2	24	5	23	4	42	0	2	94	61.84
148	8151	0	2	-1	2	-7	2	49	5	37	4	27	18	4	48	55.63
149	8281	1	2	-1	2								-9	3	38	58.86
150	8416	1	2	-1	2	5	2	-16	5	-15	3	33	-1	4	36	60.91

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
151	8574	4	5	3	5								3	3	54	80.70
152	8648	0	2	1	2					-13	5	25				35.59
153	8836	0	1	0	1	-5	2	-1	2	5	3	68	-6	2	135	42.57
154	8858	0	1	-1	1	10	2	-29	4	-30	3	35	-7	4	45	49.88
155	8902	2	2	0	2	-2	2	8	8	6	4	35	0	3	30	70.63
156	8931	0	1	0	1	6	2	8	2	0	2	66	11	2	85	39.74
157	8957	2	2	0	2	-5	2	13	7	11	3	41	-3	3	53	71.86
158	8989	0	3	3	3	-8	3	13	2	16	2	74	7	2	81	23.66
159	9073	4	4	3	5	-3	1	27	12	8	3	47	1	3	56	79.72
160	9082	1	2	-2	2	-1	2	13	4	7	3	34	6	3	38	61.26
161	9113	0	1	0	1	-5	2	-17	3	-6	3	70	-17	2	40	44.82
162	9354	0	2	3	2								9	3	39	25.05
163	9490	0	2	1	2	4	2	11	3	5	4	28	12	2	136	35.52
164	9581	1	2	-2	2	-1	1	29	4	14	3	27	13	2	55	62.52
165	9606	0	1	-1	1	3	2	-13	3	-12	3	60	-6	3	80	47.86
166	9677	0	2	1	1	5	3	-26	4	-25	4	22	-16	4	38	38.27
167	9681	0	1	-1	1	12	2	-19	4	-26	3	27	2	3	38	50.77
168	9769	0	1	0	1	4	3	-23	4	-21	4	26	-12	4	43	45.05
169	9796	0	2	2	2	-9	3	10	3	15	4	46	2	3	38	30.47
170	9800	0	2	-2	2					-3	7	26				57.75
171	9985	2	2	0	2	5	2	6	7	-6	3	38	10	3	29	71.45
172	9992	0	2	-1	1	-4	2	-15	4	-5	4	24	-14	3	37	51.04
173	10168	0	1	-1	1	0	3	2	5	2	5	29	1	4	38	46.41
174	10257	1	2	3	2	1	4	-7	3	-7	4	29	-6	3	48	25.41
175	10305	0	1	-1	1	-10	3	14	5	21	5	26	-3	3	38	49.05
176	10343	0	2	-2	2	1	1	-11	4	-7	3	70	-4	2	111	61.56
177	10420	1	2	-1	2	5	2	-13	7	-12	4	55	3	4	53	68.53
178	10460	1	2	2	2	15	3	-10	3	-20	3	47	4	3	49	32.08
179	10482	1	3	4	3					-19	2	28				22.20
180	10809	0	2	-2	2								-3	3	31	61.96

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
181	11018	0	2	-2	2	10	2	2	3	-11	3	61	13	2	87	53.37
182	11158	0	2	-2	2	-8	2	4	6	12	5	25	-8	3	32	59.13
183	11246	3	4	3	4	1	2	8	15	0	5	27	3	3	59	78.59
184	11252	0	2	-2	2	-6	2	-2	6	7	5	27	-9	3	98	62.50
185	11401	0	1	0	1	-11	3	20	4	27	4	30	4	3	29	42.09
186	11424	0	2	-2	2	-8	2	5	4	13	3	25	-7	3	30	55.45
187	11593	0	2	-2	2	-5	2	7	6	10	4	41	-4	3	52	63.72
188	11684	1	2	2	2					12	4	28				33.13
189	11700	1	2	-1	2					17	5	25				68.23
190	11810	0	2	-2	2	17	3	15	7	-13	6	21	30	5	30	55.63
191	11903	0	1	-1	1	8	2	-5	3	-12	3	27	5	4	28	45.98
192	12221	0	1	0	1	-1	2	-27	2	-18	3	66	-21	2	111	42.89
193	12235	0	2	-1	2					14	5	22				65.05
194	12242	3	3	4	3								-3	3	40	19.34
195	12289	4	5	5	6					-24	3	43				11.14
196	12317	0	2	-1	2					-16	3	26				67.75
197	12341	1	2	1	1	-22	3	5	4	24	5	24	-16	3	43	37.21
198	12346	0	1	-1	1	-13	3	-18	4	1	4	29	-27	4	22	45.70
199	12407	0	1	-1	1	-4	2	22	3	19	2	74	10	4	55	49.02
200	12434	1	1	0	1	18	2	27	3	4	3	45	38	2	55	39.88
201	12503	0	1	-1	1	-3	2	-7	3	-2	2	76	-8	3	31	47.83
202	12540	0	1	-1	1	1	2	2	4	1	4	26	2	4	27	49.65
203	12565	1	2	1	2	3	2	12	2	7	3	44	13	3	32	34.03
204	12604	-1	2	-2	2	0	2	0	3	0	3	28	0	2	82	53.54
205	12646	0	2	-1	2								-8	3	34	66.64
206	12716	0	1	0	1	2	4	1	5	-1	6	26	3	4	56	42.16
207	12748	-1	2	-2	2					4	4	28				59.46
208	12761	-1	2	-2	2	-2	1	-7	3	-1	2	74	-7	3	51	56.42
209	12799	0	1	-1	1	1	3	-12	4	-10	4	26	-6	4	28	47.39
210	12830	2	2	2	2	4	2	-14	2	-15	2	81	-9	2	55	30.72

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
211	12880	3	2	3	2	7	3	8	2	3	2	47	11	4	40	25.05
212	12883	-1	2	-2	2					-2	5	28				59.45
213	13051	0	1	-1	1					-1	5	28				45.70
214	13109	-1	2	-1	2	-2	1	7	4	6	3	65	0	2	121	66.16
215	13133	2	2	3	2					14	2	45				26.86
216	13157	-1	2	-2	2	0	2	-8	4	-5	3	26	-5	3	35	53.63
217	13171	1	3	1	3	4	1	12	7	-2	3	37	9	2	51	72.90
218	13203	2	2	2	2	9	3	-6	2	-12	3	39	2	2	88	29.88
219	13212	-1	2	-2	2	0	4	18	9	10	10	4	11	3	32	54.08
220	13221	1	2	1	2	-24	2	41	2	54	3	53	12	3	56	36.22
221	13265	3	5	5	5	11	6	9	2	4	3	44	12	3	44	14.29
222	13372	1	2	1	2	6	3	-18	3	-20	3	38	-10	3	47	36.48
223	13442	-1	2	-1	2								-4	2	36	59.90
224	13497	0	1	-1	1	2	2	4	3	0	4	43	4	2	51	46.27
225	13540	-1	2	-1	2	-1	2	8	5	5	4	28	3	3	69	61.98
226	13559	-1	2	-2	2	15	2	0	5	-19	4	29	19	3	37	56.46
227	13643	-1	2	-1	1	5	2	-12	3	-13	3	98	-2	3	83	51.34
228	13700	1	2	0	1	8	2	-12	2	-17	2	77	-2	2	105	38.74
229	13763	2	5	5	5	17	5	-15	2	-22	3	41	-6	3	49	17.49
230	13896	2	2	2	2	-9	3	-21	2	-12	3	40	-25	3	56	27.24
231	14113	0	1	0	1	8	2	-12	3	-17	3	44	-2	3	34	41.75
232	14154	-1	1	-1	1								-17	4	42	49.51
233	14260	-1	2	0	2	6	2	-1	6	-9	4	27	8	2	111	68.74
234	14280	2	3	2	3								29	3	24	23.29
235	14358	1	2	1	2								7	3	30	30.56
236	14427	-1	2	-1	2	-2	2	9	4	7	4	27	2	2	113	58.64
237	14491	0	2	0	1					2	3	43				37.67
238	14507	1	4	4	4	3	1	15	10	-2	3	48	8	2	67	78.57
239	14527	-1	2	-1	2								-4	2	144	59.88
240	14624	1	5	5	5	15	4	11	2	4	3	51	18	2	113	17.72

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
241	14625	-1	2	-1	2	19	2	12	6	-17	6	28	31	2	32	56.04
242	14688	-1	2	1	2					-22	4	43				68.86
243	14713	-1	3	2	2					9	3	75				72.16
244	14737	-1	1	-1	1	-1	2	0	3	2	2	81	-1	3	64	46.56
245	14961	1	3	1	3	14	3	5	2	-4	3	46	14	2	30	24.70
246	15018	1	3	1	3					16	2	40				22.73
247	15087	0	2	0	1	3	2	2	2	-1	2	85	4	2	86	37.69
248	15109	-1	1	-1	1					-14	3	43				45.65
249	15128	0	2	0	2	16	2	-18	2	-29	2	41	-1	3	33	35.52
250	15145	-1	2	-1	2	1	2	6	4	1	3	42	5	3	32	59.13
251	15185	-1	2	0	2	-7	1	-4	4	8	3	72	-11	1	184	64.84
252	15339	0	1	-1	1					25	4	40				42.21
253	15340	-1	1	-1	1	6	1	1	2	-5	2	88	7	2	87	44.14
254	15506	-1	1	-1	1					3	4	41				50.92
255	15547	1	3	1	3	8	4	4	2	0	3	48	8	3	52	21.51
256	15558	0	2	0	2	2	2	9	2	5	3	39	9	2	48	33.60
257	15625	-1	1	-1	1	-4	2	-4	3	1	3	45	-7	4	50	42.62
258	15751	0	2	0	2								1	3	33	35.77
259	15782	-1	1	-1	1	-2	2	4	3	5	3	76	0	3	107	42.13
260	15799	-2	3	2	3	-7	1	33	5	21	3	30	-1	1	185	72.46
261	15962	-1	1	-1	1								4	3	34	42.84
262	16035	0	2	0	3					4	3	40				24.67
263	16051	-2	5	5	5	-2	7	3	3	3	2	39	2	5	28	16.89
264	16137	-1	1	-1	1	-2	2	6	3	6	3	42	2	4	32	48.74
265	16153	-1	2	-1	2	-4	1	-6	3	2	3	44	-8	2	46	58.28
266	16268	-1	2	-1	2	-1	1	5	3	3	2	85	2	2	187	56.08
267	16315	-1	2	-1	2					-6	4	44				59.40
268	16439	-1	2	0	2	-7	3	-6	2	0	3	48	-11	3	64	29.17
269	16445	-1	1	-1	1	-10	2	-2	3	8	3	39	-11	2	82	41.97
270	16736	-1	2	-1	2	-3	1	23	3	16	2	43	7	2	49	59.84

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
271	16750	-1	2	-1	1	-4	2	9	3	12	3	47	3	3	63	38.08
272	16754	-1	3	1	3	6	4	-14	2	-16	4	35	-9	2	112	21.43
273	16797	-4	4	5	4	-9	1	3	7	14	2	78	-13	2	48	78.08
274	16843	-1	2	0	2					-4	3	43				60.75
275	16899	-1	1	-1	1					-19	5	43				41.19
276	16906	-1	2	-1	2	0	1	12	3	7	3	76	7	2	183	53.54
277	16948	-1	2	0	2	-2	2	9	2	10	3	39	6	2	81	35.18
278	16985	-1	2	-1	2					-10	3	79				58.41
279	17038	-1	2	0	2	1	1	-5	3	-4	2	82	-1	2	110	61.33
280	17126	-3	3	2	3	-6	1	-4	5	8	2	87	-10	2	133	72.90
281	17127	-1	1	-1	1	2	2	15	2	9	2	87	14	2	93	39.25
282	17148	-3	3	2	3	2	1	22	6	4	2	46	9	2	44	73.10
283	17278	-2	2	0	2					-1	5	36				65.84
284	17342	0	1	-1	1	-8	2	-4	2	5	3	48	-11	2	106	45.49
285	17518	-1	2	-1	2	-5	2	7	4	10	3	29	-3	3	45	58.64
286	17554	-2	2	1	2	1	1	9	5	1	3	42	5	2	52	68.59
287	17557	-1	2	0	2	-1	3	15	3	14	3	47	12	3	56	33.85
288	17664	-1	2	-1	2								-48	3	42	59.13
289	17758	0	1	-1	1					-4	4	47				45.26
290	17916	0	2	0	1	-2	2	-11	3	-7	4	38	-10	2	49	37.21
291	17953	0	2	0	1					18	4	37				38.41
292	18000	0	2	0	1	-7	1	1	2	7	2	87	-6	1	184	37.92
293	18009	0	2	-1	1	-6	2	-7	3	2	3	48	-12	2	107	51.19
294	18133	0	2	-1	2	-6	1	3	2	9	2	96	-6	1	182	57.46
295	18155	0	2	-1	2	12	1	4	3	-13	2	40	17	2	52	57.57
296	18171	0	1	-1	1					-10	4	36				46.30
297	18226	-1	2	-1	2								3	3	51	63.00
298	18356	0	1	-1	1	6	1	-3	2	-8	2	134	5	2	131	50.32
299	18359	-1	2	2	2	-2	2	-6	2	-3	2	84	-6	3	67	31.57
300	18473	0	2	-2	2					3	3	38				55.16

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
301	18504	0	2	-2	2	16	1	-10	3	-26	3	49	15	2	134	57.17
302	18539	-1	2	3	2					-32	3	53				26.64
303	18636	0	2	1	2	6	2	-11	2	-14	3	50	-4	3	49	34.26
304	18643	1	1	-1	1	-6	1	-2	2	5	2	124	-8	2	166	50.71
305	18726	-1	2	3	2					-14	4	24				25.81
306	18741	-1	2	3	2	3	2	0	2	-2	3	51	2	1	174	25.26
307	18750	-2	2	0	2	1	1	0	4	-1	3	48	1	2	131	67.86
308	18796	0	2	-2	2					-7	4	39				56.11
309	18990	1	2	-2	1					2	5	36				52.78
310	19019	-1	2	0	2	0	1	-7	3	-3	2	94	-2	2	132	67.52
311	19084	1	1	0	1					3	2	131				43.14
312	19207	1	2	-2	2	5	1	9	3	0	3	38	11	2	52	53.77
313	19269	1	2	-2	1								5	3	64	53.27
314	19273	1	1	-1	1	-2	1	2	2	3	2	78	-1	2	53	46.38
315	19296	0	2	4	2	-1	2	1	1	1	2	105	0	2	118	27.85
316	19467	1	2	-2	2	-2	1	-7	3	-1	3	48	-7	2	133	53.84
317	19548	-4	4	5	4	6	1	-1	7	-9	2	99	9	1	128	78.49
318	19607	0	2	2	2	3	1	5	1	1	2	108	7	1	134	33.78
319	19733	1	1	0	1					-34	4	29				42.82
320	19747	1	1	0	1					6	4	30				43.96
321	19841	1	2	1	1					9	3	82				37.67
322	19982	0	2	3	2					0	4	29				31.70
323	20029	-2	4	4	4	-3	1	5	7	5	3	49	-3	2	132	77.07
324	20119	1	2	-2	1	-2	2	-8	3	-3	2	79	-7	3	48	51.07
325	20170	0	2	0	2	0	1	19	6	7	3	45	7	2	65	69.05
326	20226	1	2	2	1	0	2	2	2	2	2	134	2	3	65	37.53
327	20281	1	1	-1	1	-43	2	12	3	56	3	30	-41	3	47	48.49
328	20308	1	1	-1	1	0	2	1	4	1	4	53	0	3	47	49.14
329	20332	1	2	-2	2								4	2	107	57.01
330	20523	0	3	6	3	-4	3	16	2	17	3	41	12	2	122	22.00

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
331	20532	0	2	0	2	1	1	-13	6	-6	3	46	-2	2	64	70.45
332	20641	1	2	-2	2					-6	3	31				53.94
333	20692	0	3	3	3	-4	1	-1	7	5	3	39	-6	2	61	74.76
334	20724	1	2	3	2	-5	2	4	2	7	3	47	-1	2	71	31.86
335	20747	1	2	-2	2	1	1	19	4	7	3	56	11	2	133	61.86
336	20866	1	2	1	1								-14	2	69	38.27
337	20883	1	2	1	1								9	1	115	38.39
338	20908	0	5	7	5	-8	4	4	2	6	3	62	1	2	68	15.01
339	20952	0	5	6	5	-7	1	15	9	14	2	39	-8	2	61	80.07
340	20964	1	2	2	2								34	3	49	35.05
341	21032	1	2	2	1	-1	3	0	3	1	4	37	-1	2	50	37.44
342	21036	2	2	-2	2					-45	5	25				56.93
343	21064	1	2	4	2	2	2	-6	2	-7	2	36	-4	2	53	30.30
344	21154	2	2	-2	2	-10	1	-1	3	12	3	52	-13	2	122	54.42
345	21243	2	5	6	5					0	3	39				80.56
346	21246	2	2	-1	2	9	1	4	4	-10	3	51	14	2	58	65.69
347	21319	0	2	4	2	-3	2	8	2	9	2	51	5	2	71	28.09
348	21340	1	1	1	1	0	2	-5	3	-4	4	50	-4	3	61	40.88
349	21402	1	2	3	2					-13	4	50				32.95
350	21467	2	2	-2	2								15	2	63	57.17
351	21499	1	2	-1	1					-20	4	45				51.34
352	21572	2	2	-2	2	11	1	-4	4	-16	3	29	13	2	61	61.40
353	21577	1	1	-1	1					30	5	20				47.88
354	21733	0	2	3	2	3	2	7	1	3	2	98	8	2	133	29.94
355	21736	1	1	0	1	4	1	11	2	4	2	77	11	2	63	44.65
356	21851	4	4	4	4	-2	1	-3	11	3	4	27	-4	2	58	78.62
357	21863	0	3	4	3					19	3	34				23.47
358	21984	0	2	1	2	8	2	-9	2	-14	3	50	0	2	143	36.27
359	21987	1	1	-1	1	-2	1	0	1	2	1	143	-2	1	195	46.59
360	21999	5	4	4	4	-3	1	18	9	8	3	53	-1	2	61	78.51

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
361	22026	0	3	4	3					16	2	33				23.29
362	22101	3	2	-1	2	-2	1	15	4	10	3	55	3	1	182	64.49
363	22102	2	2	-2	2					-6	4	29				57.70
364	22108	0	2	2	2	8	3	13	3	5	4	61	17	3	45	31.81
365	22205	5	5	6	6	9	1	12	15	-12	4	27	16	2	58	81.58
366	22251	1	1	-1	1								-22	3	59	45.57
367	22281	3	2	-1	2					-14	4	52				63.79
368	22296	0	1	0	1	-9	2	10	2	16	3	35	-1	2	63	40.86
369	22398	2	2	-1	2	14	1	9	3	-13	3	51	22	2	61	58.59
370	22412	1	1	-1	1	-8	1	-9	2	3	2	102	-15	1	122	50.09
371	22502	0	2	1	2	0	2	-11	2	-9	2	34	-9	3	59	34.80
372	22584	2	2	-1	2					-7	2	30				59.45
373	22662	1	1	-1	1					-4	3	35				46.12
374	22935	8	5	5	6	-13	5	-12	2	-7	2	58	-16	2	78	12.65
375	23172	0	2	0	1	13	2	11	2	-3	2	34	21	2	64	38.06
376	23182	4	2	0	2	-7	1	19	5	17	3	52	-3	2	62	68.77
377	23302	-1	2	1	2	-1	2	0	1	1	2	130	-1	2	129	30.52
378	23359	-1	3	2	3								-9	2	44	21.11
379	23374	-1	2	1	2	8	2	2	2	-5	3	42	8	2	64	31.53
380	23452	0	1	-1	1					-15	3	30				46.43
381	23544	-1	2	0	2								6	2	64	31.21
382	23741	1	2	-1	2	4	2	10	3	1	3	34	10	3	61	54.25
383	23797	2	2	-1	2	6	2	1	4	-7	2	66	8	3	60	57.61
384	23801	2	2	-1	2	9	2	19	4	-1	3	34	21	3	59	57.58
385	23821	5	2	1	2	0	1	-4	5	-1	2	51	-1	2	62	71.13
386	23944	5	2	1	2	3	1	1	7	-4	3	30	5	3	61	71.76
387	23965	0	1	-1	1	-7	1	4	2	10	2	115	-4	2	119	46.09
388	24089	6	3	2	3	-8	1	15	5	15	2	104	-8	1	172	75.00
389	24093	1	2	-1	2								-26	2	62	56.00
390	24221	0	2	-1	1	0	2	-29	4	-18	4	34	-17	2	59	52.37

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
391	24342	-1	2	-1	2								-7	2	59	36.66
392	24364	2	2	-1	2	9	1	13	3	-5	2	101	18	2	62	59.50
393	24415	-2	2	0	2	-1	1	-3	1	-2	2	121	-3	1	190	31.38
394	24432	0	2	-1	1	5	1	4	3	-4	3	64	8	2	66	53.24
395	24459	5	3	2	3								7	3	50	74.86
396	24820	1	2	-1	2								-8	4	60	56.57
397	24916	3	2	0	2					-10	3	36				67.41
398	25032	-2	2	0	2	12	2	0	2	-8	2	111	9	2	59	28.78
399	25114	4	3	2	3	-8	1	-11	6	9	2	66	-15	2	100	74.20
400	25122	4	3	2	3	-3	1	5	4	5	1	153	-3	2	103	75.55
401	25137	-2	2	-1	2	-1	2	-18	2	-13	2	134	-15	2	107	35.72
402	25466	-2	2	-1	2	-1	2	6	2	6	3	71	4	3	62	34.35
403	25491	2	2	0	2	3	2	-2	7	-6	3	48	4	4	43	68.44
404	25635	1	2	-1	2	5	1	-6	3	-9	3	33	3	2	60	57.95
405	25667	-2	2	-1	2					44	2	45				36.00
406	25676	-2	2	-1	2					7	2	46				32.04
407	25757	0	2	-2	2								-5	3	52	54.98
408	25839	3	4	4	4	0	1	18	9	3	3	48	4	3	52	78.13
409	25847	-3	3	0	3	4	2	-8	1	-10	2	133	-6	2	128	21.71
410	25935	0	2	-2	1	8	1	3	2	-8	2	48	11	2	61	52.21
411	25996	-1	1	-1	1	-4	1	-8	2	-2	1	185	-9	2	129	43.02
412	26055	1	2	0	2	10	1	-1	4	-14	2	113	14	2	99	68.20
413	26138	0	2	-2	1								-16	2	115	52.02
414	26169	0	2	-1	2								7	3	57	58.07
415	26181	-1	1	-2	1					0	3	49				47.28
416	26338	-3	2	0	2	2	3	-8	2	-8	3	59	-6	2	58	28.78
417	26484	0	4	5	5	10	1	23	8	-10	2	102	19	2	91	79.13
418	26520	1	2	1	2					3	2	34				70.63
419	26537	0	2	-1	2								15	2	50	60.34
420	26621	0	2	-2	2	2	1	6	3	1	2	68	6	3	50	55.41

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
421	26638	0	3	4	4	1	1	21	7	3	2	34	7	2	51	76.05
422	26735	0	2	0	2	11	1	2	6	-14	3	49	16	3	44	68.68
423	26846	-3	2	1	2	16	2	1	2	-11	2	51	13	2	55	29.23
424	26947	0	2	-2	2	-1	1	4	3	4	1	187	1	3	51	53.47
425	26988	-3	3	1	3	4	2	0	2	-3	2	71	2	2	56	24.70
426	27050	0	3	2	3								-5	2	52	72.53
427	27068	0	2	-2	1								16	4	45	52.82
428	27141	0	2	-2	1					-8	2	131				51.56
429	27213	-1	1	-1	1	0	2	-21	2	-16	2	44	-16	2	60	41.22
430	27249	-1	1	-1	1								21	3	56	45.28
431	27328	-2	2	1	2	3	2	9	1	6	2	135	10	2	127	31.43
432	27347	-1	1	-1	1	-6	1	10	2	13	2	131	0	2	111	44.69
433	27486	-2	2	0	2								14	3	62	34.15
434	27506	0	2	-2	2					-6	3	48				54.94
435	27589	-2	2	1	2								-52	2	52	30.67
436	27618	0	2	-2	2	2	1	-15	3	-12	3	61	-6	2	53	54.28
437	27622	-3	2	2	2	-1	3	0	2	1	3	66	0	2	66	26.26
438	27635	0	2	-1	2	5	2	-5	5	-9	2	66	4	4	45	61.55
439	27724	-2	2	2	2	-6	2	22	2	23	2	53	14	2	118	30.77
440	27856	-1	2	1	2	-1	1	-1	3	0	1	184	-1	2	96	70.75
441	27912	0	2	-2	2					-3	3	47				55.12
442	27980	-2	2	2	2	2	2	0	2	-1	2	48	1	2	62	30.31
443	28066	-4	5	6	5	-3	1	33	10	10	3	47	1	2	43	80.30
444	28091	0	1	-1	1	2	2	-36	3	-27	3	44	-22	3	46	47.07
445	28108	0	2	-2	2	-10	1	2	4	14	2	48	-12	3	49	59.04
446	28160	0	1	-1	1	13	2	-10	3	-21	3	44	7	3	54	48.27
447	28242	-3	2	3	2	7	3	18	2	12	2	44	21	3	67	25.99
448	28338	-1	2	1	1	-5	2	-2	2	2	3	67	-6	2	119	36.93
449	28378	-5	5	7	5	37	3	-1	2	-17	2	56	16	2	69	17.53
450	28541	-1	2	-1	2	-6	1	1	4	8	2	119	-8	2	56	65.89

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
451	28639	-4	4	5	4	-10	2	0	10	15	2	63	-15	4	41	77.58
452	28846	0	1	0	1	-8	1	3	2	11	2	120	-7	2	114	44.87
453	28919	-2	2	0	2								15	3	41	69.56
454	28956	0	2	-2	2	-3	1	-3	4	2	3	44	-5	2	47	60.14
455	28959	-3	3	5	3	4	2	-2	1	-5	2	98	0	2	153	23.25
456	28962	-1	2	-1	2					6	2	114				64.68
457	28994	-2	2	3	2	2	2	-14	2	-14	2	57	-11	2	58	29.52
458	29150	0	1	0	1	-3	2	31	3	25	2	52	20	3	53	43.56
459	29159	-3	3	5	3	-21	4	8	2	19	3	62	-4	3	53	21.68
460	29219	0	1	-1	1								6	3	47	47.86
461	29251	-1	2	1	1	2	1	-2	2	-4	1	181	0	2	106	38.46
462	29327	0	1	-1	1	-10	2	-14	3	2	2	117	-20	3	56	47.99
463	29459	0	1	0	1	-5	2	-6	2	1	2	71	-10	2	46	42.84
464	29519	0	1	-1	1	-10	2	-12	3	4	2	123	-19	3	41	48.16
465	29786	-1	2	2	2								1	2	54	35.32
466	29802	-2	2	5	2					4	2	62				25.68
467	29848	0	2	-1	2								-7	3	41	65.43
468	29875	-1	2	-1	2					-25	3	44				67.72
469	30118	-2	3	1	3	-10	1	-7	6	12	2	64	-17	2	86	73.28
470	30207	0	1	0	1	0	2	0	3	1	2	70	0	3	40	45.28
471	30219	-1	2	3	2	5	1	17	1	10	1	198	18	2	150	33.67
472	30263	-1	2	2	1	5	2	-10	2	-12	3	59	-4	2	97	37.14
473	30302	0	2	-1	2	4	2	2	5	-4	3	61	6	3	43	64.88
474	30322	1	2	-2	2	-7	2	0	5	9	3	50	-10	4	41	59.99
475	30338	0	1	1	1								-1	3	49	41.84
476	30391	1	2	-1	1	15	2	-22	3	-32	2	120	5	4	65	52.69
477	30412	-1	2	2	1					-16	2	59				38.41
478	30415	-2	3	1	3					-1	2	65				74.00
479	30440	1	2	-2	2								5	3	40	61.43
480	30483	1	2	-1	2	-9	1	-1	4	11	2	122	-13	3	46	63.87

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
481	30512	1	1	-1	1	1	2	-13	3	-10	3	49	-7	3	41	50.29
482	30691	1	2	-2	2								4	3	35	59.04
483	30731	1	2	-1	2	1	2	-16	6	-8	2	69	-5	4	41	66.46
484	30837	1	2	-1	2	0	2	-16	5	-7	3	50	-8	3	36	60.55
485	30904	1	2	-1	2								-1	4	36	65.62
486	31037	0	3	1	3	9	2	25	9	-7	1	116	19	4	26	75.05
487	31044	1	2	-1	2					10	1	121				60.75
488	31070	1	2	-1	2								29	3	39	59.27
489	31081	-3	3	5	3								-10	3	51	24.88
490	31104	-1	2	3	2	-6	1	17	2	19	1	190	9	2	104	35.86
491	31105	0	1	1	1								-27	4	33	45.05
492	31252	1	1	0	1								-1	3	43	46.59
493	31310	1	2	-1	2	3	2	11	4	2	2	111	11	4	40	53.94
494	31326	1	1	0	1	5	2	9	4	0	3	63	11	4	39	50.50
495	31426	1	1	0	1	9	2	14	3	0	2	67	19	3	45	48.19
496	31430	0	5	2	5	8	4	-9	2	-13	3	53	-5	3	52	18.71
497	31449	0	1	1	1								22	3	41	41.55
498	31567	1	3	0	4	4	1	-8	7	-7	1	134	4	3	72	76.27
499	31626	-2	2	3	2	-3	2	1	2	3	3	64	-1	2	92	34.61
500	31652	0	1	1	1	25	2	2	3	-24	2	62	28	3	41	43.31
501	31732	-1	1	2	1	-4	2	-1	2	3	2	61	-5	3	84	39.46
502	31857	3	2	-1	2	-4	1	10	4	10	1	134	-3	3	70	69.05
503	32063	2	2	-1	2								19	4	41	59.37
504	32095	-1	1	1	1	-3	2	-14	3	-8	2	122	-14	4	40	40.29
505	32197	3	2	-1	2								-17	5	28	62.08
506	32220	1	1	0	1	0	3	-15	5	-10	3	60	-10	5	35	50.29
507	32272	3	2	-1	2								-12	6	27	62.00
508	32409	2	2	0	2	9	2	7	4	-8	2	113	15	4	36	55.09
509	32432	1	1	0	1								11	5	31	49.91
510	32463	4	2	-1	2					2	2	47				70.90

No	GC	AS	SA	DS	SD	AI	SA	DI	SD	VE	SE	NE	VW	SW	NW	PE
511	32510	-2	2	2	2	0	3	6	3	5	3	62	5	5	43	32.94
512	32577	4	5	-2	5	20	4	-8	2	-17	3	43	2	3	48	18.03
513	32582	3	2	-1	2	-2	1	10	4	6	2	61	2	3	42	65.07
514	32639	4	3	-2	3								8	3	25	73.10
515	32780	-2	2	1	2								-20	5	40	36.77
516	32832	0	1	0	1	-1	1	0	2	1	1	180	-2	3	45	46.46
517	32850	-1	1	1	1	-4	1	-6	2	0	2	115	-9	2	89	41.77
518	32875	5	5	-2	5	-1	1	20	7	5	1	133	2	2	67	80.07
519	32886	-1	1	0	1	3	2	13	2	6	2	111	12	2	85	43.39
520	32988	0	1	0	1	-6	2	0	3	6	2	62	-6	3	81	46.41
521	33009	3	2	-1	2								-8	4	30	59.94
522	33010	3	2	-1	2	5	1	7	3	-3	2	120	10	3	68	61.23
523	33031	4	2	-2	2	2	2	-9	8	-6	3	53	0	4	38	70.60
524	33160	3	2	-1	2	-3	2	-28	4	-10	2	65	-18	4	25	59.99
525	33268	-5	3	1	3	3	6	-17	4	-17	4	59	-14	6	28	22.37