

EFFECT OF THE FK5-FK4 CATALOGUE CORRECTIONS FOR THE OBSERVATIONS  
OF THE PHOTOELECTRIC ASTROLABE AT SHANGHAI OBSERVATORY

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ABSTRACT. On the basis of the observational materials of the photoelectric astrolabe from 1976 to 1977 at Shanghai Observatory, the possible increase improvement in observational precision after adopting the FK5 catalogue is estimated. The calculation proves that the improvements are about 6 per cent and 9 per cent in the right ascension and declination respectively.

The publication of FK5 catalogue will contribute to the improvement of precision in the case of optical astrometric observations. Using the observational materials of the photoelectric astrolabe ZPA from 1976 to 1977 at Shanghai Observatory, the possible improvement in precision is estimated after adding the catalogue corrections FK5 - FK4.

There are 12 groups in the observational programme of ZPA, mean 35 FK4 stars per group. Using the FK5 Fundamental Stars Catalogue, IAU(1976) astronomical constants, equinox correction and its motion, the catalogue corrections  $\Delta\alpha_{FK5-FK4}$ ,  $\Delta\delta_{FK5-FK4}$  of these twelve groups at 1977.0 are calculated. The mean catalogue corrections per group are given in Table 1.

After using the corrections FK5 - FK4 of Table 1 to revise the observational results of ZPA, the mean rms of a group observation for time, latitude measurement decrease about 6 per cent, 9 per cent respectively.

The unbalance of the improvements between time and latitude measurements might caused by weight difference (1.5:1) in compiling the observational programme for the astrolabe ZPA.

It is quite possible that the further improvement of star catalogue can contribute not as much as one has been expecting. In order to improve the accuracy of astrometric observation, attention should also be paid for the other sources of errors: the errors of the astronomical constants, atmospheric refraction and local effects etc.

Table 1. Mean catalogue corrections for ZPA programme

Group	$\overline{\Delta\alpha}_{FK5-FK4}$	$\overline{\Delta\delta}_{FK5-FK4}$	R.A. in the middle per group
1	- 0. <sup>s</sup> 0038	- 0." <sup>s</sup> 047	1h
2	- 21	- 14	3
3	- 6	- 12	5
4	- 10	- 8	7
5	- 5	- 9	9
6	- 5	- 2	11
7	- 0	- 18	13
8	- 6	- 17	15
9	- 5	- 13	17
10	- 26	- 14	19
11	- 38	- 33	21
12	- 28	- 14	23
mean	- 0. <sup>s</sup> 0014	- 0." <sup>s</sup> 008	

Table 2. Decrement of rms for time and latitude measurement after using the FK5-FK4 corrections

	rms for a measurement	
	Time	Latitude
No correction	0. <sup>s</sup> 0078	0." <sup>s</sup> 082
Correction by FK5-FK4 corrections	0. 0074	0. 075

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#### REFERENCE

FK5 Fundamental Stars Catalogue(tape), 1988, Astronomisches Rechen Institut, Heidelberg.