

## BRASHEAR PLATE CATALOGUES IN THE WIDE-FIELD PLATE DATABASE

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**Abstract.** We present the work of reduction and inclusion of the Brashear Plate Catalogues in the Wide-Field Plate Database (WFPDB). About 5000 plates were obtained with the Brashear astrograph of the Tokyo Astronomical Observatory located in Mitaka in the period 1943-1962. The astrograph was equipped with two cameras: 16 cm Zeiss Tessar and 20 cm Petzval Triplet. The observing programme included mostly asteroids and comets. We divided the Brashear plates in two catalogues accordingly the both used cameras, to which were assigned the following WFPDB identifiers respectively TOK016 and TOK020. Analysis of the catalogues using the available data is present. Comparison of the original catalogues with the files obtained from the scanned in table form catalogues and following image processing is present too.

### 1. INTRODUCTION

With the Brashear astrograph of the Tokyo Astronomical Observatory located in Mitaka campus in the period 1943-1962 about 5000 plates were obtained according to Nakamura et al (1990). The Brashear astrograph was equipped with two cameras whose parameters satisfy the Wide-Field Plate Database (WFPDB, <http://www.wfpdb.org>) criterion for plate inclusion. According to the accepted WFPDB standards the Brashear astrograph cameras - Petzval Triplet and Zeiss Astro Tessar - received the WFPDB identifiers – TOK020 and TOK016 respectively. Table 1 presents the information concerning the camera parameters for the both instruments included in the Catalogue of the Wide-Field Plate Archives (Tsvetkova and Tsvetkov, 2006).

**Table 1:** The Brashear astrograph cameras parameters

WFPDB identifier	Camera	D cm	F. length cm	Field of view arcmin	Scale arcmin/mm
TOK020	Petzval Triplet	20	127	6.8 x 9.2	2.706
TOK016	Zeiss Astro Tessar	16	79	11.3 x 15.0	4.364

Nakamura et al (1990) presented lists of obtained plates. In Fig. 1 a part of these tables is given. We put the aim to convert the plate lists in a computer-readable form in order to include the plate information into the WFPDB.

## 2. OCR OF TABLES AND DATA TRANSFORMATIONS

We use OCR software (<http://www.cuneiform.ru/>) for extracting data having at disposal the tables (Fig. 1), given in Nakamura et al. (1990).

PLATE NO.	DATE	TIME	EXP	CENTRAL OBJECT	R.A.	DEC	NOTE
B3588 Z0878	1960/10/18	10:25:00	20:00	M-P	00:01.6	+17:25.7	103A-0-8
B2033	1950/09/16	22:59:03(J	42:00	M-P	00:03.3	-13:23.2	O.S.B.-8
B1761	1949/12/09	18:00:29(J	40:00	C-1949E	00:03.7	-04:07.5	O.H.P.-K
B3597 Z0887	1960/10/21	11:19:00	20:00	M-P	00:05.2	-02:02.5	103A-0-8

**Figure 1.** Part of the original tables of Nakamura et al. (1990).

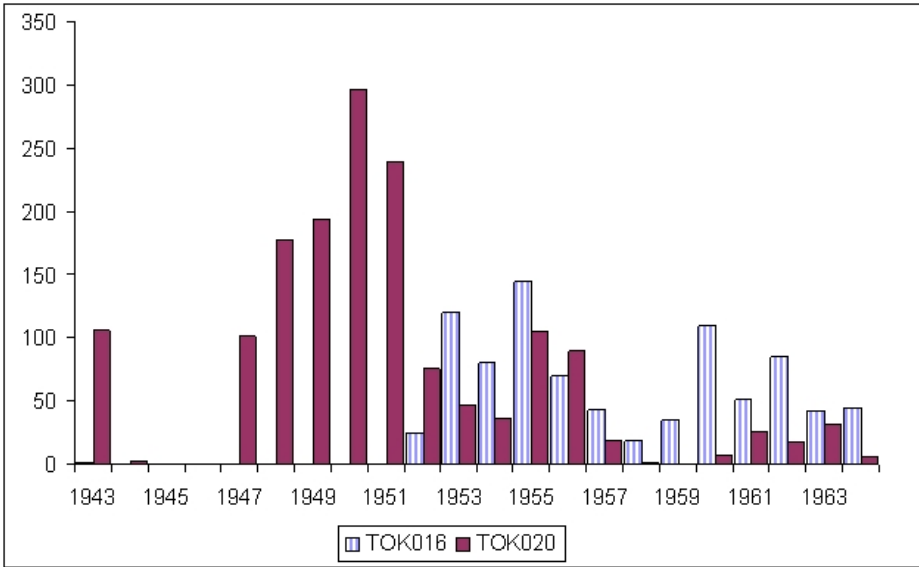
When we finished this step, T. Nakamura sent us a file with the data. Thus we proved that OCR gives us 90% correct recognition of the table columns. This encourages us to recommend Cuneiform for OCR of tables.

We reduced the data to the accepted WFPDB format by:

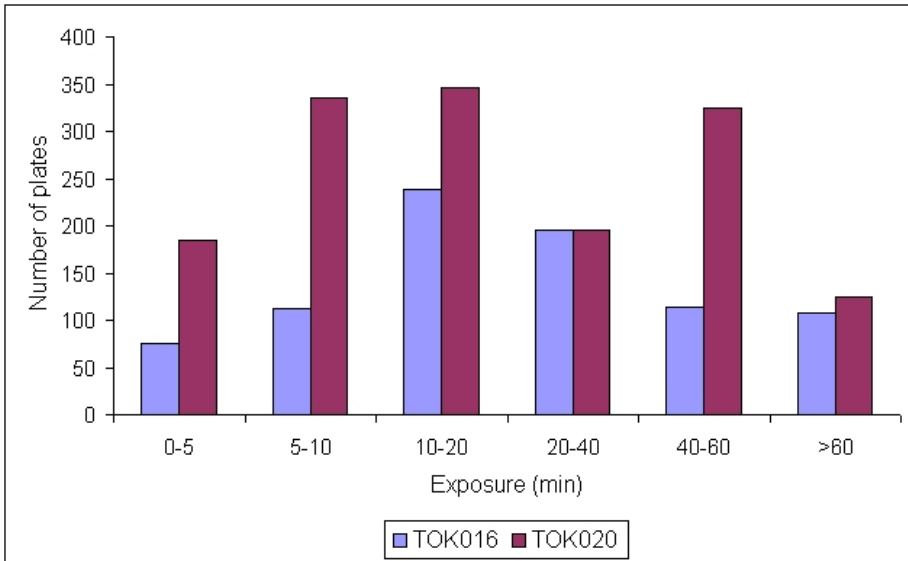
- Conversion of the given time of observations JST (Japan Standard Time) to required Universal Time (UT), i.e.  $JST = UT + 9h$ .
- Conversion of the coordinates of the plate centers (RA and DEC) given according to Nakamura (2010) in equinox B1950 to equinox J2000.
- Assigning object code in the main data file.

## 3. STATISTICS

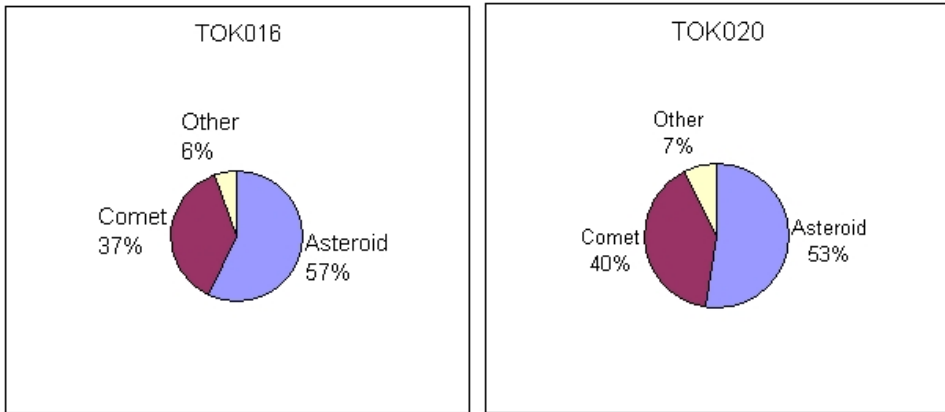
The metadata for total 868 plates for TOK016 and 1577 plates for TOK020 are included in WFPDB. The time distribution of the plates is presented in Fig. 2. The distribution of the number of plates versus used exposure is given in Fig. 3.



**Figure 2.** Time distribution of the plates.



**Figure 3.** Distribution of the plates with respect to the used exposure.

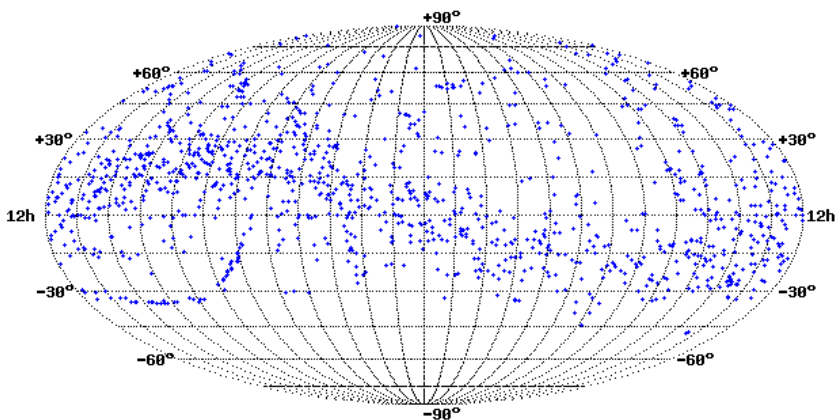


**Figure 4.** Distribution of the plates with respect to the type of the observed objects.

The most common objects of observations were asteroids and comets as can be seen in Fig. 4. The observations of variable stars, and especially supernova are presented in Table 3.

**Table 3:** Plate number used for variable stars observations.

Type of observed object	TOK020	TOK016
Variable stars	33	7
Supernova	1	6



**Figure 5.** All-sky distribution for TOK020 plate centers.

## Details for archive: TOK016

<i>Location of the Archvie:</i>	<i>Clear aperture:</i> <b>0.16 m</b>
Site: <b>Mitaka</b>	<i>Mirror diameter:</i>
Country: <b>Japan</b>	<i>Focal length:</i> <b>0.79 m</b>
<i>Observatory:</i>	<i>Scale:</i> <b>262 "/mm</b>
Name: <b>Tokyo</b>	<i>Type:</i> <b>Cam</b>
Site: <b>Mitaka</b>	<i>Field size:</i> <b>15.7°</b>
Country: <b>Japan</b>	<i>Years of operation:</i>
<i>Time zone:</i> <b>+9 h</b>	From: <b>1943</b>
<i>East longitude:</i> <b>139° 32.5'</b>	To: <b>1962</b>
<i>Latitude:</i> <b>35° 40.3'</b>	<i>P/F:</i>
<i>Altitude:</i> <b>62 m</b>	

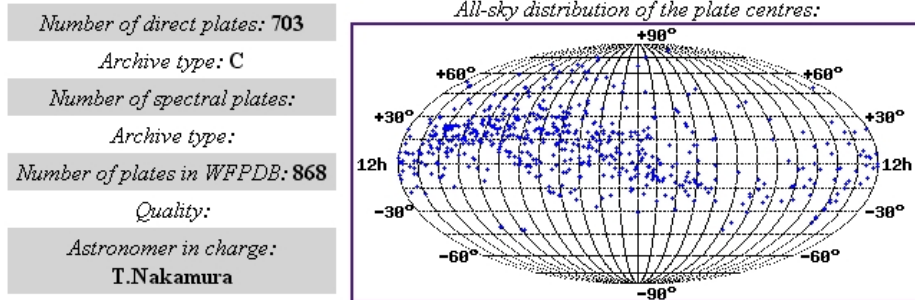


Figure 6. Description of the WFPDB TOK016 plate archive.

## Details for: TOK020 002589

IDobs: <b>TOK</b>	OBJNAM: <b>M-P</b>
IDins: <b>20</b>	OBJTYP: <b>A4</b>
IDSuf1:	METHOD: <b>01</b>
IDno: <b>002589</b>	MULTEX:
IDSuf2:	EXP: <b>10.0</b>
RAJ2000: <b>03 41 10</b>	EMULS: <b>O.S.B.-8</b>
DEC2000: <b>13 13 11</b>	FILT:
CCOD:	SPEC:
DATE: <b>1953 11 13</b>	DIMx: <b>16</b>
UT: <b>17 35 38</b>	DIMy: <b>22</b>

Figure 7. Metadata for the WFPDB TOK020\_002589 plate.

Figs. 5 – 7 presents different information for the WFPDB TOK020 and TOK016 plate catalogues.

### **Acknowledgments**

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### **References**

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