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THE LAST PLATE OBSERVATIONS WITH ROZHEN OBSERVATORY SCHMIDT TELESCOPE

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Abstract. We present the last 549 plate observations with the 50/70/172 cm Schmidt telescope of Rozhen Observatory obtained in the period 1994 - 1998. These plate observations were carried out after the appearance of the first version of the Rozhen Schmidt telescope plate catalogue (see Mutafov et al. 1994). Statistics and analysis of these last plate observations are done.

1. INTRODUCTION

The plate observations with the 50/70/172 cm Schmidt telescope of Rozhen Observatory started immediately after the telescope installation and tests in June 1979. The first version of the Rozhen Observatory Schmidt telescope plate catalogue containing metadata information for 7348 plates obtained in the period June 1979-February 1994 was prepared by Mutafov et al. (1994). In Tsvetkova et al. (2010) one can find a statistics and analysis of this first plate catalogue version made with data retrieval from the Wide-Field Plate Database (WFPDB, http://www.wfpdb.org), where this catalogue is included with the WFPDB identifier ROZ050. A lot of mistakes done either by the observer or during the typing of the first version of the Schmidt telescope plate catalogue were corrected in the work of Tsvetkova et al. (2010). Recently the information for the last plate observations carried out in the period March 1994-February 1998 was put in computer-readable form using the telescope logbook.

2. WFPDB FORMAT PREPARATION OF THE PLATE METADATA

We reduced the available plate metadata to the accepted WFPDB format by:

- Structuring the plate metadata in multi-file system with conventional names of the files – Maindata, Quality, Notes, Observer, Availability, Digitization;
- Following the accepted WFPDB file format;
- Conversion of the equatorial coordinates of the plate centers (RA and DEC) given by the observer in the epoch of observations to equinox J2000.0;
- Conversion of the given time of observations LT (Local Time) to required Universal Time (UT), taking in view the information for the Daylight Saving Time (DST) for Bulgaria;
- Assigning object code in the main data file.

During the reduction of the plate metadata to the required WFPDB format we met different problems:

1. Plates without given coordinates - total number 155. The reasons that the observer did not write down the coordinates are different - the observer wrote down the name of the observed object; the observer missed to fill in the coordinates in the logbook but he has the coordinates in his notes.
2. Plates without given time of the exposure beginning - 8 of the plates are without exposure beginning.
3. Mistakes made by the observers, which were corrected logically.
4. Wrongly given time of the beginning of the exposure - this revealed itself in disturbance of the plate serial number, such cases are mentioned with "E".

3. STATISTICS AND ANALYSIS

The information about the last plate observations concerning the total number, the time period comprised, the type of the plates (different from the direct one-exposure plates) is summarized in Table 1.

Table 1: New added Rozhen Schmidt telescope plates

Number of Plates	549
Period Beginning	March 8, 1994
Period End	February 28, 1998
Multi-Exposure Plates	68
Objective Prism Plates	35

The time distribution of the plates obtained in the period 1994 – 1998 (Fig. 1) reflects the decreasing observing activity up to its stopping in February 28, 1998. Since that time the Rozhen Observatory Schmidt telescope has been equipped with CCD camera.

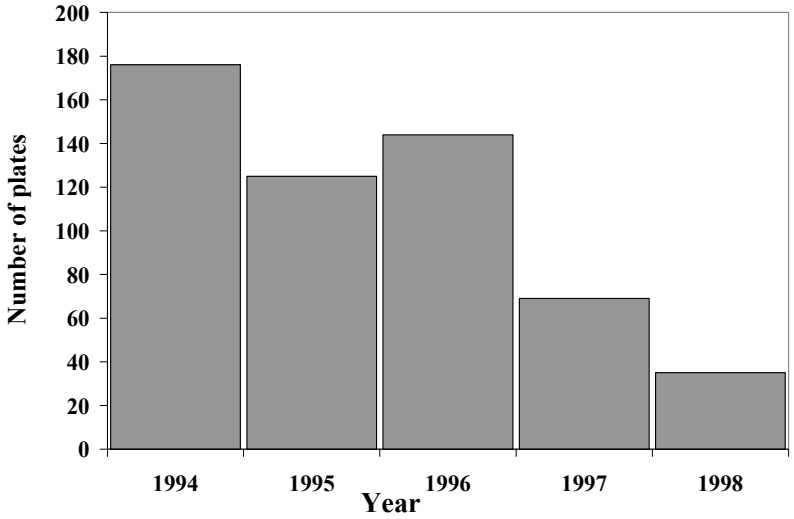

Figure 1: Time distribution versus number of the plates.

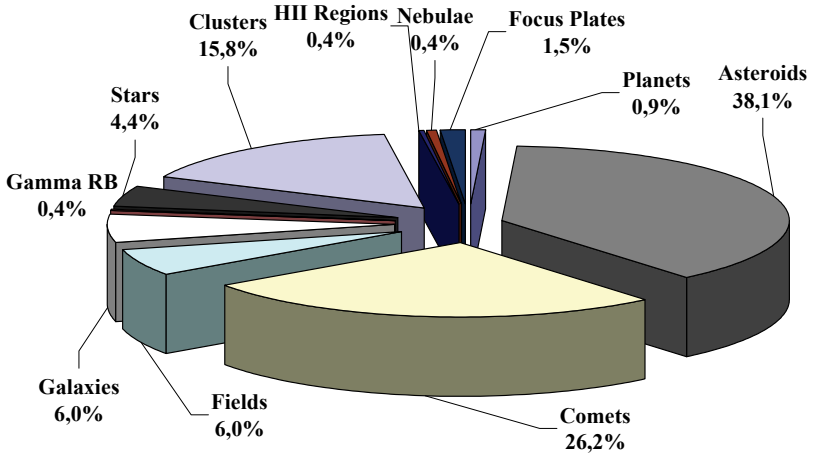

Figure 2: Observing programmes executed for the period 1994 – 1998.

Fig. 2 presents the executed observing programmes for the period 1994 – 1998. The assigned codes to the object types enable plate selection by observed object, respectively executed programme. The most observed objects were

asteroids (209 plates or 38.1% including 7 Vesta, 1094 AH2, Geographos 1620); comets (144 plates or 26.2% presented in Table 2) and stellar clusters (81 plates or 15.8%). Asteroids and comets were also the most southern objects observed with declination up to - 25 degrees. Among the observed variable stars it has to be mentioned KR Aur and AM Her.

Table 2: Observed comets

Comet	Number of Plates
Hale-Bopp (C/1995 O1)	84
6P/d'Arrest	16
Hyakutake (C/1996 B2)	11
P/1994 X1 McNaught-Russell	7
Shoemaker-Levy 9 (C/1994 F2)	6
22P/Kopff	6
9P/Tempel	4
Takamizawa-Levy (C/1994 G1)	3
31P/Schwassmann-Wachmann 2	2
65P/Gunn	1
19P/Borrelly	1
Tabur (C/1996 Q1)	1

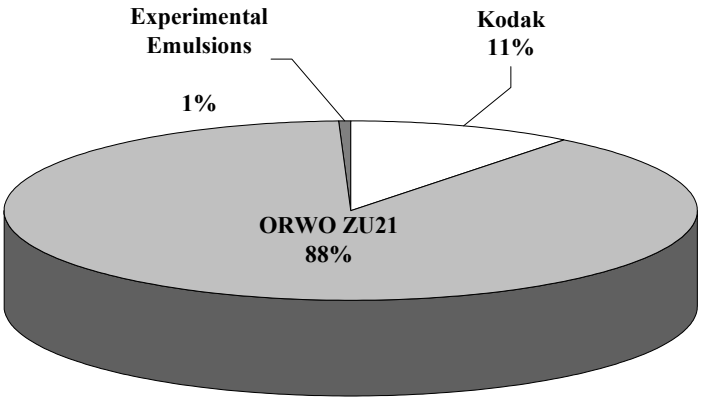

Figure 3: Emulsion type used.

In this time period with decreasing observing activity the used emulsions (Fig. 3) predominantly were ORWO ZU21 (88%) and "pg" photometric band (Fig. 4) by using Kodak IIaO or ORWO ZU21 emulsion without filter. Johnson's UBVRI broad band photometric system was realized with the given combinations

of emulsion + filter in Table 3 valid for all plate observations with the Rozhen Observatory Schmidt telescope. For comet observations CN filters were used.

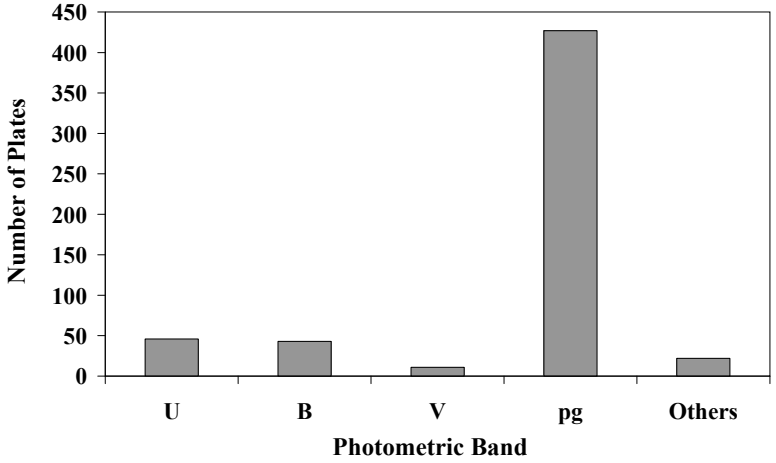

Figure 4: Broad band photometric system used for the obtained plates.

Table 3: Used combinations of emulsion and filter for Johnson's broad band photometric system (UBVRI)

Band	Emulsion	Filter
U	ORWO ZU1 ORWO ZU21 Kodak 103aO	UG1 UG1 (or UG2) UG1 (or UG2)
B	Kodak 103aO ORWO ZU21 ORWO ZU21	GG13 GG13 GG385
V	Kodak 103aD Kodak 103aD ORWO RP1 ORWO ZP3	GG11 GG495 GG11 GG11
R	ORWO ZP 3 Kodak 103aF	RG610 RG610
I	I-N (IV N)	RG715

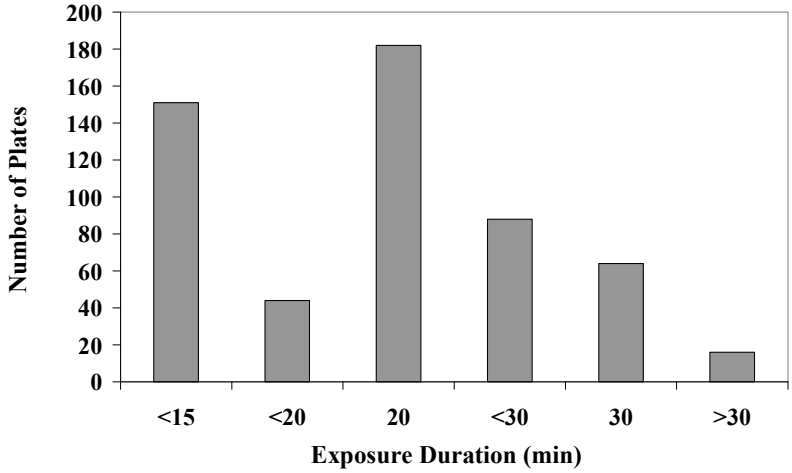

Figure 5: Distribution of the used exposure duration.

From Fig. 5 it is seen that mainly short exposure up to 15 min were used (about 34%) and exposures equal to 20min (33%) or 30 min (about 12%). Exposures with duration more than 30 min were used very rarely (3%). Mainly plates with sizes 16x16 cm were used. There are only 5 plates with sizes 9x12 cm.

From all 549 plates obtained in this period exactly 255 plates were obtained by V. Radeva in the frames of the observing programmes for asteroids and comets. Among the observers are E. Elst (Royal Observatory of Belgium), as well as G. Apostolovska and her students from the Skopje University.

4. CONCLUSIONS

With the added in 2012 new information for 549 plates concerning the last plate observations with the Rozhen Observatory Schmidt telescope done in the period 1994-1998 the upgrading catalogue includes now exactly 7897 plates. The main observing programmes during the last years of plate observations with this telescope were search of new asteroids and investigations of comets.

Acknowledgments

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