The All Sky Automated Survey. A Catalog of almost 3900 variable stars. *

by

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ABSTRACT

Results of the first two years of observations using the All Sky Automated Survey prototype camera are presented. More than 140 000 stars in 50 Selected Fields covering 300 sq. degrees were monitored each clear night in the I-band resulting in the ASAS Photometric I-band Catalog containing over 50×10^6 individual measurements. Nightly monitoring of over 100 standard stars confirms that most of our data remains within $\sigma_I = 0.03$ of the standard I system. Search for the stars varying on the time scales longer than a day revealed almost 3900 variables (mostly irregular, pulsating and binaries) brighter than 13 mag. Only 167 of them are known variables included in GCVS, 56 were observed by Hipparcos satellite (46 were marked as variable). Among the stars brighter than $I \sim 7.5$ (which are saturated on our frames) we have found about 50 variables (12 are in GCVS, 6 other in Hipparcos (Perryman *et al.* 1997) catalog). Because of the large volume of the data we present here only selected tables and light-curves, but the complete ASAS Catalog of Variable Stars (currently divided into Periodic and Miscellaneous sections) and all photometric data are available on the Internet *http://www.astrouw.edu.pl/~gp/asas/asas.html* or *http://archive.princeton.edu/~asas/*

Key words: *Catalogs – Stars:variables – Surveys*

1 Introduction

The All Sky Automated Survey (Pojmaski 1997, hereafter Paper I) is a low-cost observing project dedicated to detection and investigation of photometric variability of stars and other objects all over the sky (Paczyński 1997). We have started in 1997 with the small, automated prototype instrument equipped with 768 × 512 MEADE Pictor 416 CCD camera, 135 mm f/1.8 telephoto lens and I-band (Schott RG-9, 3mm) filter. The limiting magnitude of the system is 13. The instrument was placed at the Las Campanas

*Based on observations obtained at the Las Campanas Observatory of the Carnegie Institution of Washington.

Observatory which is operated by the Carnegie Institution of Washington. LCO kindly allocated space in the slide-roof house of the 10" astroghraph, and OGLE-2 team (Udalski, Kubiak and Szymaski 1997) generously helps us making the system running.

Detailed description of the prototype instrument, data acquisition and reduction process and the ASAS Catalog were described in Paper I and the first results of the search for short time scale periodic variables were presented by Pojmaski (1998, hereafter Paper II).

This paper presents results of the search for long term variables in the ASAS Selected Fields using data obtained during the first two years of the prototype instrument operation, monitoring 300 square degrees of the sky. Although many short-term periodic variables have been discovered in the course of current work, detailed search for the variables with periods shorter than 1 day is still to be done.

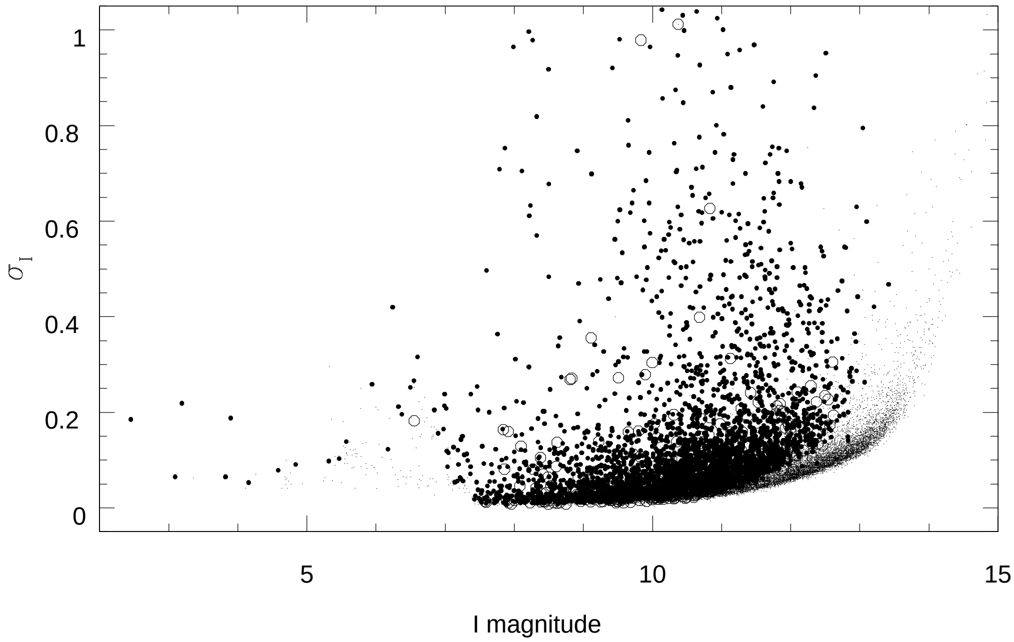

Fig. 1. Standard deviation σ_I of the stellar magnitudes *vs* I-band magnitudes for 140000 stars observed so far. Filled dots and open circles represent miscellaneous and periodic variables respectively.

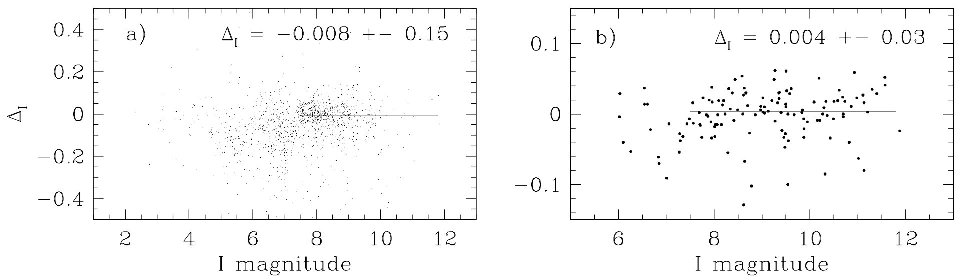

Fig. 2. Difference between a) Hipparcos (Perryman *et al.* 1997) "I" entries, b) standard Landolt (1992) I magnitudes and ASAS $I-band$ measurements for common stars.

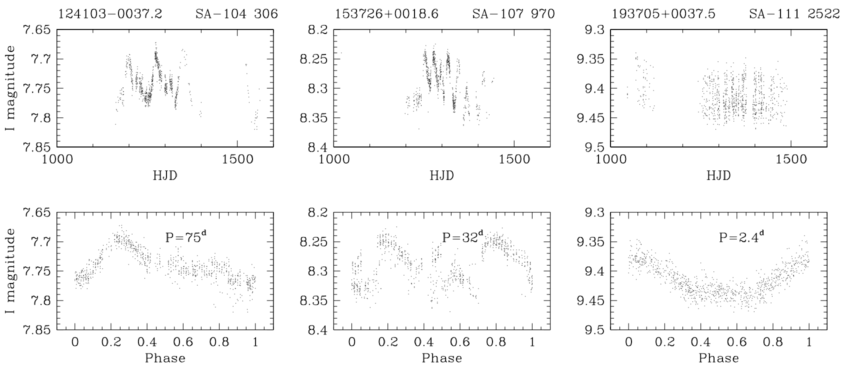

Fig. 3. Landolt (1992) stars found to be variable in the ASAS data.

2 Observations, Data Reduction, Variability Search

Fifty 2 × 3 deg fields (24 old, described in Paper II, and 26 new, mostly Landolt (1992)) were observed. Old fields were observed only once per night, while the new ones - initially more often than that. Coordinates of the Selected Field centers as well as number of observed stars N_{star}, number of detected miscellaneous N_{misc} and periodic N_{per} variables and corresponding detection rates $f_{misc} = N_{misc}/N_{star}$ and $f_{per} = N_{per}/N_{star}$ respectively are given in Table 1. Table 2 lists numbers of newly detected and previously known variables and total number of observed stars in 1 magnitude bins.

Data reduction process was similar to this presented in Paper II. There were however two differences. The flatfielding process was slightly improved,

Table 1

Selected Fields observed during the first 2 years of ASAS operation

ID	α 2000	δ 2000	l	b	N star	N per	N misc	f_{per} %	f_{misc} %
Vel	10:44	-52:25	284.0544	5.7212	6688	14	142	.21	2.12
Dor	5:07	-80:30	292.9800	-30.9557	2955	4	14	.14	.47
LMC 1	5:10	-68:10	278.8949	-34.4050	2680	19	144	.71	5.37
LMC 2	5:10	-70	281.0500	-33.9766	2932	16	153	.55	5.22
LMC 3	5:40	-68:10	278.3590	-31.6538	2708	11	179	.40	6.61
LMC 4	5:40	-70	280.4979	-31.4555	2972	6	163	.20	5.48
Cen 1	11:35	-60	293.5079	1.4657	7444	32	425	.43	5.71
Cen 2	11:35	-61:50	294.0422	-0.2880	6716	65	289	.96	4.30
Cen 3	11:35	-63:40	294.5766	-2.0418	5640	30	167	.53	2.96
Oct 1	12:00	-85:00	301.7311	-22.2486	2004	4	16	.20	.80
Vir 1	12:30	3:00	290.0177	65.3328	572	1	0	.17	0
Cru	12:50	-63:00	302.7688	-0.1287	5261	35	214	.66	4.07
Vir 2	13:25	-8:50	316.8372	53.1299	715	0	4	0	.56
Cen 4	13:50	-30:00	317.7561	31.1804	1566	6	18	.36	1.15
Cen 5	13:50	-31:50	317.2028	29.4104	1726	2	11	.11	.64
Lib	15:05	-15:00	344.5631	36.8518	1267	4	7	.31	.55
Sgr 1	17:00	-22:30	359.5874	12.1070	3889	2	177	.05	4.55
Sco	17:55	-35:00	355.7998	-4.8083	8238	12	758	.15	9.20
Sgr 2	18:00	-23:30	6.3198	-0.0102	5039	18	166	.36	3.29
Sgr 3	19:00	-22:30	13.5471	-11.8418	4678	6	184	.19	3.93
CrA	19:00	-40:00	356.7925	-18.5763	3263	7	66	.21	2.02
Sgr 4	20:00	-20:30	21.2047	-23.9146	2074	4	16	.19	.77
Cap 1	21:00	-17:00	30.9357	-35.8809	1548	2	16	.13	1.03
Cap 2	22:00	-12:00	44.9717	-47.1328	1218	1	4	.08	.33
Aqr	23:00	-6:30	65.7819	-56.4493	1073	1	3	.09	.28
Psc	0:00	0:00	96.3375	-60.1886	807	0	1	0	.12
S-092	0:55	1:00	124.8203	-61.8587	1075	1	1	.09	.09
S-093	1:55	0:45	154.2385	-58.2047	1281	1	3	.08	.23
S-094	2:56	0:30	175.3464	-49.2647	1337	1	2	.07	.15
S-095	3:53	0:00	188.7133	-38.6830	1466	2	4	.14	.27
S-096	4:52	0:00	198.2627	-26.3019	2378	8	10	.34	.42
S-097	5:57	0:00	206.6324	-12.0880	3258	6	38	.18	1.17
S-098	6:51	-0:20	213.1787	-0.2493	6534	31	63	.47	.96
S-099	7:56	-0:20	220.7528	14.1675	3690	8	20	.22	.54
S-100	8:53	-0:40	228.5439	26.4171	2065	2	2	.10	.10
S-101	9:57	-0:30	239.0337	39.8217	1450	2	1	.14	.07
S-102	10:57	-0:20	253.1906	51.1380	1102	0	4	0	.36
S-103	11:56	-0:30	274.9302	59.3239	1052	2	2	.19	.19
S-104	12:43	-0:30	298.3910	62.2973	1009	1	2	.10	.20
S-105	13:37	-0:20	326.5261	60.4343	1092	0	1	0	.09
S-106	14:40	-0:10	351.0974	52.2473	1268	1	2	.08	.16
S-107	15:40	-0:20	5.8356	41.0914	1612	2	7	.12	.43
S-108	16:37	0:20	16.3987	29.6880	2269	4	7	.18	.31
S-109	17:45	0:00	25.1863	14.7379	4359	5	74	.11	1.70
S-110	18:41	0:10	31.8899	2.3982	3732	7	124	.19	3.32
S-111	19:38	0:10	38.4485	-10.2678	5718	8	161	.14	2.81
S-112	20:42	0:10	46.5206	-24.3028	3125	6	23	.19	.74
S-113	21:41	-0:20	55.1875	-37.0604	2151	2	11	.00	.51
S-114	22:40	1:00	69.2319	-47.6908	1551	2	5	.13	.32
S-115	23:40	1:00	88.6300	-57.0362	1354	1	4	.07	.30

Table 2

Number of periodic and miscellaneous variable stars detected in the selected fields *vs* number of previously known variables in 1 mag bins. Last column lists a total number of observed stars.

Mag	Miscellaneous		Periodic		Total
	N_{ASAS}	N_{known}	N_{ASAS}	N_{known}	N_{obs}
2-6	13	8	0	0	520
6-7	12	3	1	0	570
7-8	98	5	10	5	810
8-9	327	17	51	4	2500
9-10	666	22	12	13	7100
10-11	1231	43	148	12	19500
11-12	904	21	88	8	39000
12-13	245	2	26	2	46100
13-	5	0	0	0	16000

so the magnitudes in the overlapping regions of different frames are much closer to each other (usually stay within 0.05 mag). Photometry was related to the I-band magnitudes compiled by Hipparcos (Perryman *et al.* 1997) project. Only data with I magnitudes determined using methods A-H (transformed direct measurements) were used, since most of the others displayed large scatter when compared to our data (Fig. 2a). The final check of our photometry was done on 104 unsaturated standards measured in 24 Landolt (1992) equatorial fields. Only for 10 stars the difference between our I-band and standard I magnitudes was larger than 0.1 mag. For the remaining 94 stars (Fig. 2b) the average calibration error is $\Delta I = 0.004 \pm 0.03$. 3 Landolt (1992) standards were found to be variable. Their light curves are presented in Fig. 3.

We believe therefore, that for most of the stars ASAS measurements are close to the standard system and, since measured in the uniform way, provide more accurate I-band data than Hipparcos (Perryman *et al.* 1997) compilation. One should be aware however that we have performed aperture photometry only, so for stars having close companions (<1 arcmin $=4$ pixels) results are systematically biased.

The final data base - The ASAS Photometric I-band Catalog (containing over 140,000 stars and over 50×10^6 individual measurements) is accessible over the Internet.

In our analysis we have also included saturated stars. This was done with dedicated routines measuring bleeding regions. For most stars we were able to keep an *rms* error below the 0.1 mag level, but in some cases (mostly for stars with $5.5 < I < 7.5$ for which presence of saturation depends on

Table 3

Subset of the ASAS Catalog of Variable Stars - Miscellaneous Variables. Only stars satisfying the condition $\Delta I > 1.5$ and $I < 12$ were included.

ID	I-mag	Δ I	GCVS	ID	I-mag	Δ I	GCVS
050135 − 6805.9	8.324	2.172	RX DOR	064728 − 0101.5	9.704	2.050	
075743 − 0041.1	9.119	1.765		075939 + 0030.5	10.147	2.230	AF CMI
085816 − 0049.9	7.787	2.472		103706 − 5313.7	10.354	2.042	
103817 − 5136.1	10.137	2.365		104317 − 5333.3	8.637	1.987	
104448 − 5225.4	9.754	5.517		104956 − 5246.1	8.092	2.424	
105341 − 5311.5	7.461	1.717	RU VEL	105441 − 5203.8	9.949	1.811	
110055 − 8405.4	10.410	1.823		112407 − 6146.0	9.421	2.853	
112638 − 5947.8	9.652	1.968	V780 CEN	112939 − 6011.0	9.962	1.707	
113321 − 6135.4	10.414	2.576	V781 CEN	113632 − 6257.4	8.930	1.920	
114107 − 6129.3	10.396	1.710		114130 − 6004.9	10.768	1.811	
114523 − 5942.4	9.455	2.083		114630 − 6153.4	7.986	2.431	VV CEN
114754 − 6344.9	9.904	2.125		114857 − 6404.6	8.499	1.742	
130330 − 6339.5	9.723	1.906	TY CEN	135333 − 2905.6	10.242	1.665	
135743 − 3104.1	5.796	2.798	TW CEN	150855 − 1529.8	8.210	2.721	TT LIB
164153 + 0101.1	10.709	2.050		170002 − 2325.3	10.531	1.592	V2097 OPH
170150 − 2311.6	9.645	2.645	V2098 OPH	170323 − 2316.3	9.965	2.382	
170353 − 2144.4	10.439	2.717	V1290 OPH	170601 − 2157.6	9.939	2.626	V1353 OPH
170630 − 2242.0	10.821	1.756		174428 + 0049.1	9.564	1.773	V376 OPH
174651 + 0056.2	9.910	1.971		174803 − 0041.0	8.235	1.803	
174820 − 3542.1	7.600	1.595	SV SCO	174843 − 3444.3	10.665	2.732	
174947 − 3505.9	10.874	1.904	V397 SCO	175210 − 3542.2	10.261	1.626	
175225 − 3503.3	8.624	4.255	V407 SCO	175226 − 3411.4	10.935	2.542	
175340 − 3401.0	10.132	1.935		175342 − 3556.3	10.563	1.660	
175349 − 3424.0	7.864	2.437	SY SCO	175358 − 3423.6	10.344	1.942	V420 SCO
175410 − 3420.5	6.240	1.827	BN SCO	175430 − 3548.9	10.720	1.944	V421 SCO
175527 − 2406.8	8.910	2.805		175651 − 3509.2	10.714	1.734	
175712 − 3541.7	10.632	1.658		175847 − 3538.4	10.581	3.475	
175930 − 3539.6	10.999	1.648		175958 − 3523.2	10.333	2.965	V537 SGR
180021 − 3456.7	9.880	2.163	V544 SGR	180032 − 3438.6	8.500	1.952	FT SGR
180033 − 2416.3	8.495	2.367		180043 − 3520.7	10.366	2.189	V549 SGR
180100 − 3436.7	10.444	2.119	FU SGR	180156 − 3556.8	10.313	1.848	
180157 − 3511.6	8.981	3.498	V561 SGR	180220 − 3454.2	10.793	3.642	FV SGR
180240 − 2322.0	10.687	1.973	V1950 SGR	180306 − 3436.2	10.454	2.082	
180331 − 2259.7	9.677	1.834	V1951 SGR	180502 − 2327.6	10.925	2.545	
180657 − 2314.9	10.605	1.727		184517 + 0056.5	10.902	1.887	
185349 − 3937.9	10.636	2.418		185357 − 2316.4	10.872	2.268	V2062 SGR
185449 − 2334.7	10.678	2.272		185457 − 2331.7	10.684	2.019	
185509 − 2246.8	10.668	1.695		185614 − 2132.8	10.578	1.999	
185654 − 3925.6	9.950	1.621	AB CRA	185802 − 2234.6	8.264	2.725	BU SGR
185933 − 2206.1	10.457	2.722	V2083 SGR	190049 − 2134.5	9.525	2.463	V2090 SGR
190303 − 3942.9	9.341	2.836		190333 − 2317.8	9.527	1.598	
190559 − 2207.7	10.198	2.379		190659 − 2244.3	10.573	2.484	V337 SGR
193200 − 0028.6	10.925	2.555		193526 + 0042.7	8.226	2.649	V607 AQL
193956 − 0035.9	9.089	3.207		194007 − 0020.8	8.112	1.709	
204637 − 0054.1	8.324	2.153		214805 + 0022.1	10.164	2.422	TY AQR

Table 4

Subset of the ASAS Catalog of Variable Stars - Periodic Variables. Only stars satisfying the condition $\Delta I > 0.3$ and $I < 12$ were included.

ID	I-mag	$\Delta\ I$	P	GCVS	ID	I-mag	$\Delta\ I$	P	GCVS
045206 − 7043.9	10.500	0.700	4.68927		045423 − 7054.1	11.722	0.522	34.5602	
045720 − 8023.0	11.529	0.714	.366925		045810 − 6957.0	11.801	0.600	39.4135	
045832 − 7020.8	11.927	0.585	35.7411		050047 − 7029.8	10.683	0.355	.387359	
050648 − 7002.2	11.845	0.628	47.4203		050720 − 7027.2	12.604	0.941	26.2895	
050818 − 6846.8	11.492	0.326	30.4386		050920 − 7027.4	11.847	0.637	37.4883	
051023 − 6846.4	10.394	0.351	74.4470		051833 − 6813.6	10.027	0.548	.285465	RW DOR
051931 − 6841.2	10.977	0.453	118.73		052507 − 6738.6	11.283	0.571	48.2742	
052650 − 8135.2	7.913	0.430	.461666	TY MEN	053120 − 7057.5	11.539	0.464	52.3697	
053959 − 6828.7	10.713	0.484	.362219		055122 − 6812.8	11.736	0.375	.321769	
064558 − 0017.5	10.062	0.552	.568018		064918 − 0003.5	12.371	0.694	.773591	V514 MON
064919 + 0019.8	10.725	0.505	2.59701	V450 MON	065032 + 0000.4	10.939	0.344	7.09559	TW MON
065052 − 0125.8	9.650	0.417	8.70508	TX MON	065128 − 0122.3	9.109	0.972	16.3744	SZ MON
065144 − 0034.6	11.970	0.575	1.22343		065640 + 0011.5	10.347	0.361	4.02311	TY MON
075222 − 0117.5	11.709	0.832	5.75735		075623 − 0043.7	11.285	0.426	1.15097	
075717 − 0005.0	11.538	0.446	.660746		075947 + 0021.0	11.545	0.553	1.05386	
103617 − 5202.5	11.965	0.409	.422209		104526 − 5224.3	10.308	0.683	2.38364	FW VEL
104528 − 5321.9	10.830	0.523	95.3013		104755 − 5214.9	6.553	0.554	1.76740	
112404 − 6403.2	11.039	0.421	1.70404		112612 − 6210.2	10.533	0.391	1.31624	
112645 − 6251.8	11.188	0.479	1.59504		112653 − 6211.9	11.999	0.675	.587651	V343 CEN
112803 − 6124.7	8.609	0.483	3.48927	MN CEN	112927 − 6201.9	10.577	0.321	3.2246	
112939 − 5953.7	11.487	0.367	1.91642		113318 − 6314.6	10.679	0.391	4.97437	LV CEN
113617 − 6128.1	8.619	0.892	3.69340	BF CEN	113708 − 6148.0	10.140	0.381	1.22635	
114346 − 6144.6	9.729	0.341	2.99289	MP CEN	114353 − 6024.7	10.090	0.343	3.22799	
114510 − 6058.2	10.154	0.464	3.91355	MR CEN	114556 − 5922.6	11.417	0.695	.453195	
114726 − 6132.9	11.792	0.444	78.3978		114757 − 6033.9	8.810	0.926	1.65749	
115934 − 8546.0	11.222	0.328	.611267		123808 − 6353.8	11.492	0.563	1.12587	VZ CRU
124203 − 6226.2	10.896	0.525	1.90701		124422 − 6300.7	11.375	0.550	12.6528	
124715 − 6309.8	11.125	0.919	122.49		125159 − 6353.2	11.888	0.669	29.6164	
125420 − 6356.1	10.610	0.341	24.0326		125427 − 6356.1	9.895	0.656	24.0462	RY CRU
125816 − 6258.1	11.093	0.515	2.52430		125900 − 6405.0	11.942	0.358	8.08679	
135336 − 2934.7	11.952	0.556	.636646	FY HYA	164121 + 0030.4	7.842	0.422	.453391	V502 OPH
164254 + 0107.4	10.678	1.095	151.70		174108 + 0029.8	9.834	2.259	172.45	
175147 − 3500.7	11.673	0.504	116.373		175322 − 3550.9	10.832	1.565	182.31	
180059 − 2301.9	9.224	0.836	4.67002	WY SGR	180209 − 3429.6	10.781	0.341	27.4366	V564 SGR
180253 − 2409.6	9.797	0.445	2.10910		180305 − 2251.8	9.507	0.764	3.93154	V792 SGR
180326 − 2236.9	8.098	0.442	1.39134		180328 − 2332.1	11.300	0.546	1.70632	
180428 − 2260.0	11.561	0.556	6.69200		180445 − 2243.8	10.595	0.345	15.4463	
180449 − 2243.9	8.830	0.692	15.3882	AV SGR	184010 − 0047.7	10.814	0.768	.435804	
184139 − 0044.7	11.031	0.325	.287523		185448 − 2326.2	10.415	0.445	3.52499	
185627 − 4043.9	11.756	0.384	.360170		190403 − 2228.6	11.808	0.708	1.35612	V1071 SGR
190514 − 2316.5	11.942	0.402	1.28938		193459 − 0032.4	9.997	0.869	201.00	
193640 + 0053.7	11.016	0.335	2.00165	V1269 AQL	200339 − 1956.0	11.054	0.321	.912107	
203901 + 0056.0	10.372	2.547	304.38		204045 + 0056.4	8.270	0.369	2.36813	
204859 + 0027.4	11.133	0.408	.513487		210554 − 1647.8	11.777	0.333	.303387	
214610 − 0106.8	11.768	0.589	.285142		224553 + 0102.9	10.280	0.545	.721005	DD AQR

the observing conditions) the error was much larger. Justification for such effort was the final score: over 40 new bright variables, but since the mean magnitudes of the saturated stars were brought closer to the standard system by non-linear transformations - they should be used with extreme caution.

The detection algorithm which we have used was optimized for the long-term variables. First, the standard deviations σ_I of stellar magnitudes were plotted against the I-band magnitudes (Fig. 1), and the lower envelope of the plotted points was determined. Stars with magnitude dispersion larger then 2σ were selected and their light curves extracted from the catalog. Running median was than subtracted from the light curve and new magnitude dispersion calculated. If it became significantly reduced (3 times or more) light curve was inspected by eye. Otherwise light curve was tested for periodicity using the analysis of variance (AoV) method (Schwarzenberg-Czerny 1989). The minimum frequency used in this calculation was 1 day - variables with shorter periods were detected only if they contained enough power also at lower frequencies.

Initially over 6000 light curves passed the long-term variability test and another 1000 - period detection test. This set contained a lot of "garbage" mainly due to a) full-moon interference in ecliptic and equatorial fields, b) annual error for circumpolar fields, c) small number of measurements, d) one-day observing cycle aliasing, f) photometric errors for close companions, e) other system inaccuracies.

Trying to do our best we have removed most of the spurious variables by hand. It must be understood however, that some residual garbage (mainly low-amplitude) might have survived. Also data for saturated stars ($I < 7.5$) are far from what we would like to present - it should be used only as an indication of the variability.

3 Results

The final ASAS Catalog of Variable Stars contains almost 3900 stars. Currently it is divided in 2 sections: a) Periodic Variables (binaries and pulsating stars with well defined periods) containing about 385 objects and b) Miscellaneous Variables (quasi-periodic, irregular, slow pulatsors, multi-periodic and other) with over 3500 objects which will be successively classified and appointed to the different sections in the Catalog.

All detected variables were searched for in the GCVS (Kholopov 1985) and Hipparcos (Perryman *et al.* 1997) databases. Only 47 out of 385 periodic and 120 out of 3500 miscellaneous variables are included in GCVS. Hipparcos includes 19 (11 with periods listed) periodic objects and 37 miscellaneous (9 classified as non-variable).

Because of the volume of the data, only small subset of our results could

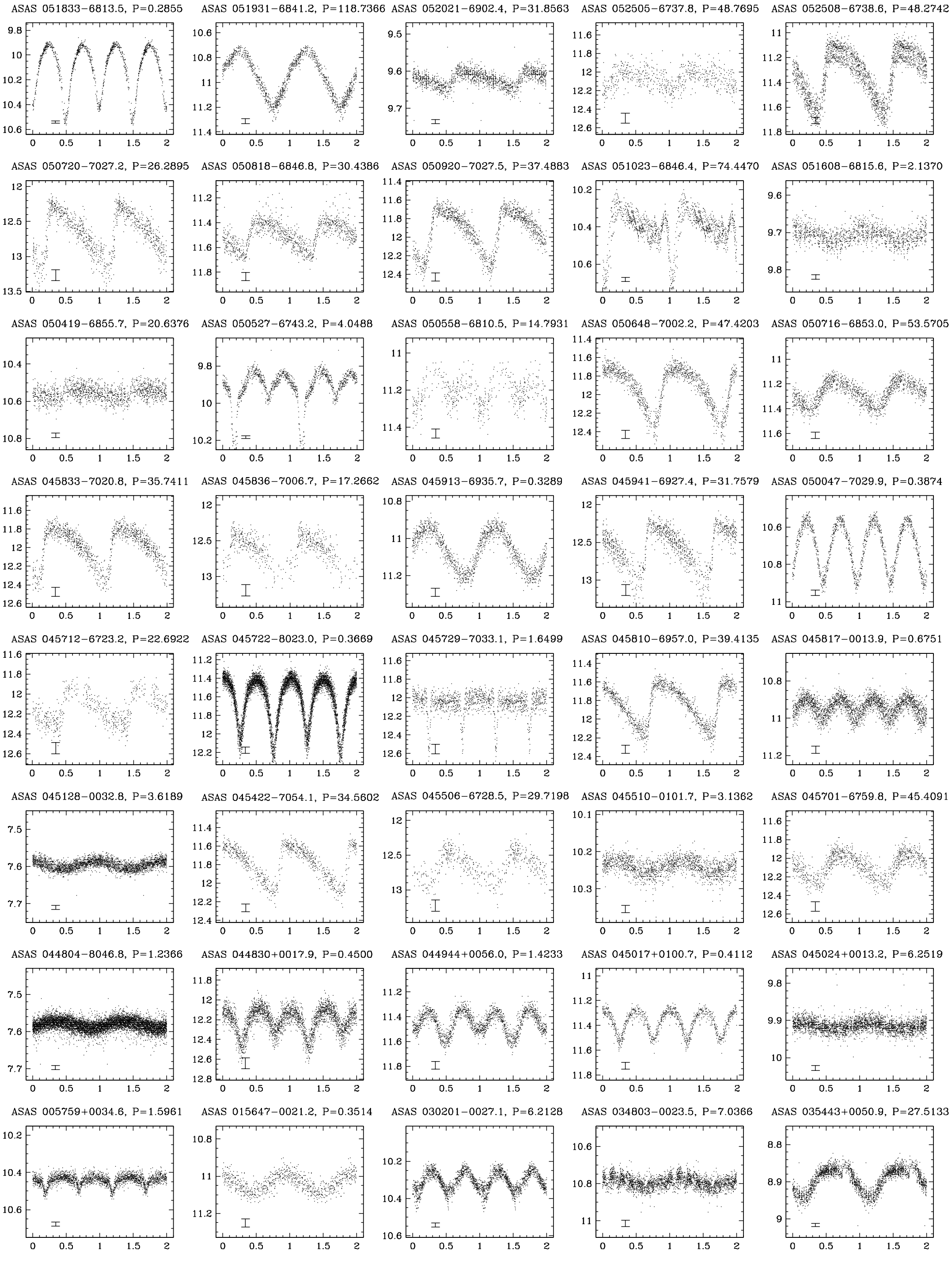

Fig. 4. The first 40 periodic variables from the ASAS Catalog of Variable Stars.

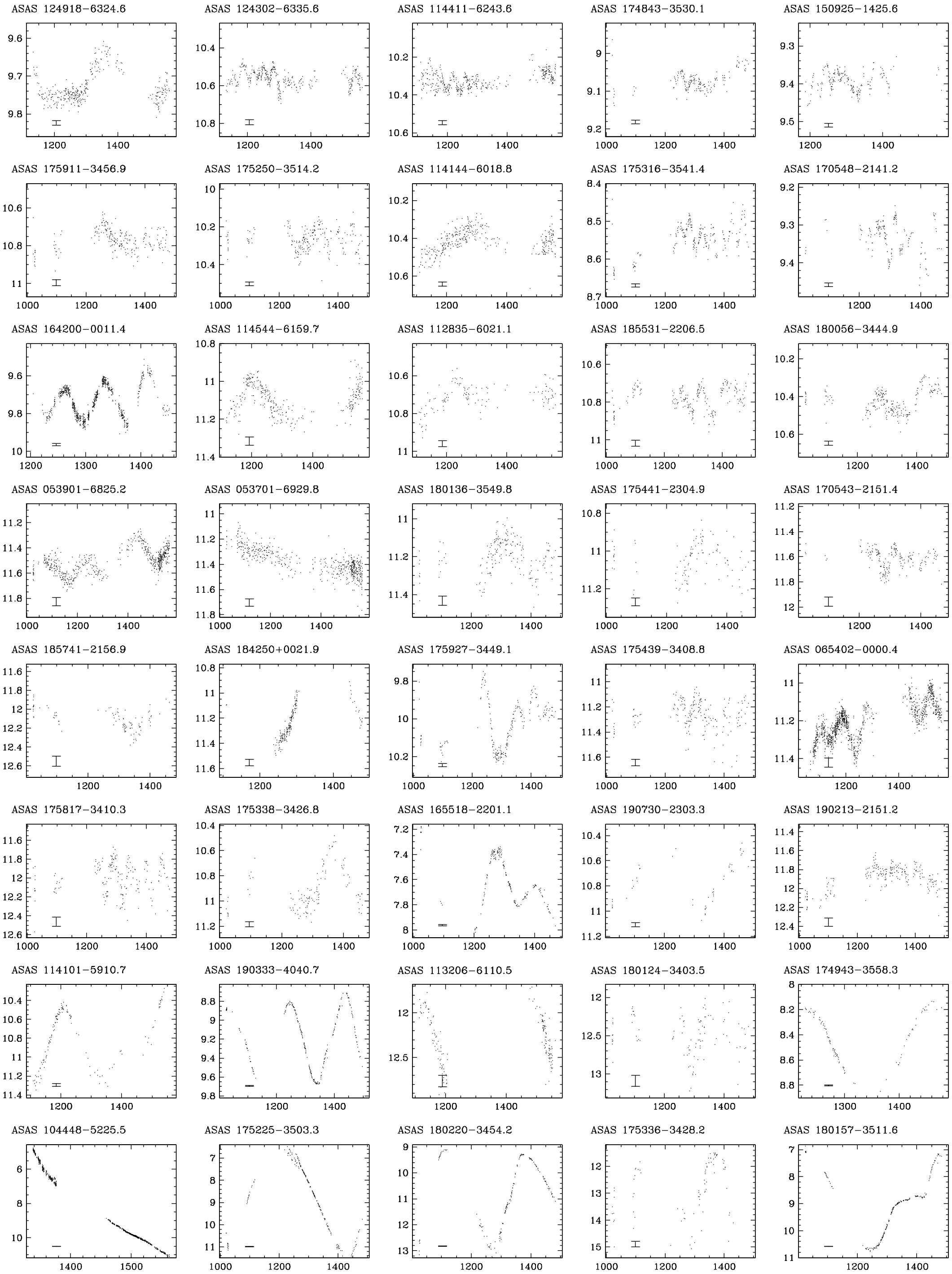

Fig. 5. Representation of the mscellaneous variables in the ASAS Catalog Variable Starss.

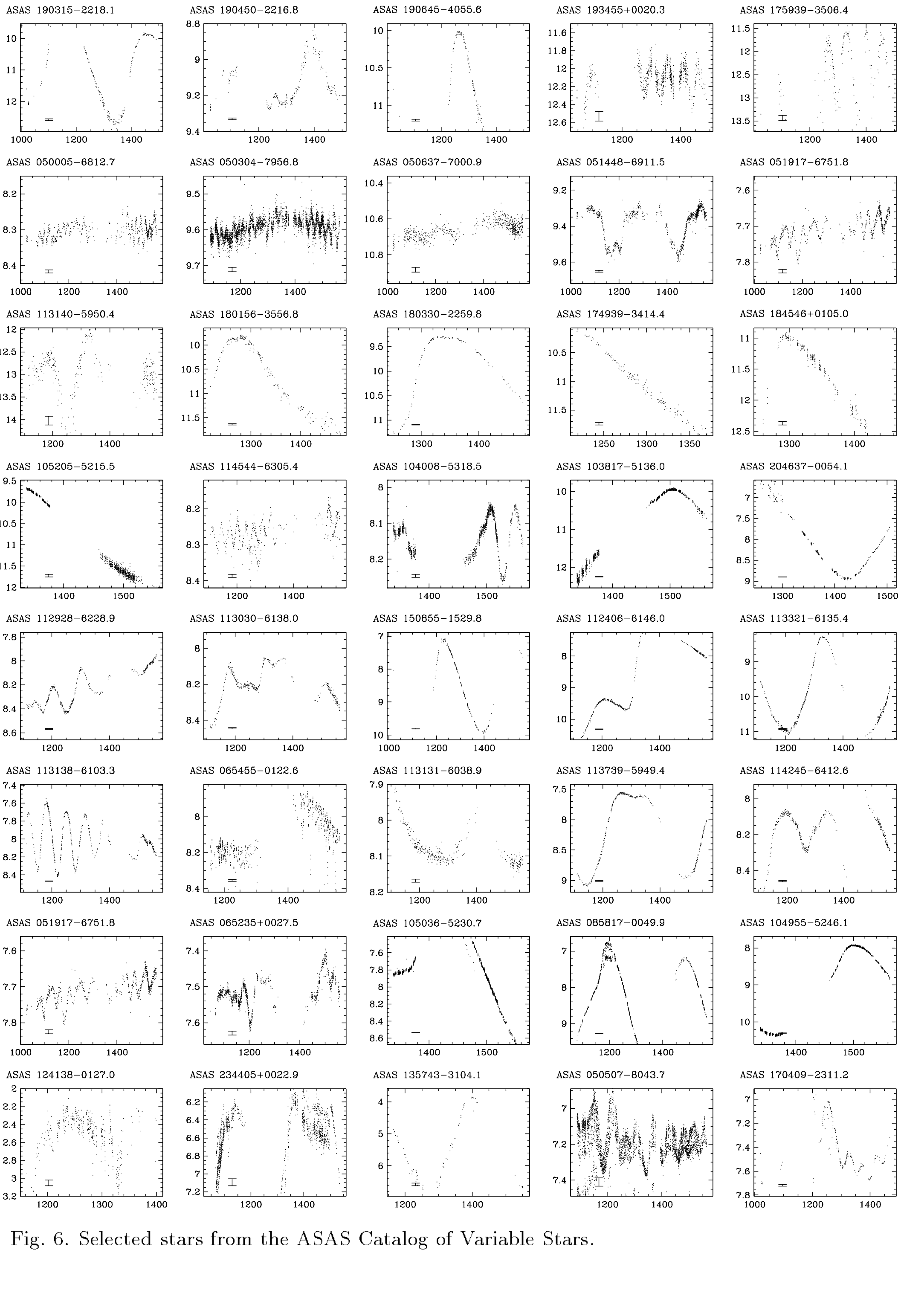

Fig. 6. Selected stars from the ASAS Catalog of Variable Stars.

be included in this paper. The most prominent miscellaneous variables ($I < 12^{\mathrm{m}}$ and $\Delta I > 1.5$) are listed in Table 3 and a subset of periodic variables ($I < 12^{\mathrm{m}}$ and $\Delta I > 0.3$) in Table 4.

Some examples of the available light curves are also presented in Figs. 4-6. Fig. 4 shows the first 40 light curves taken from the catalog of periodic variables. Fig. 5 contains light curves uniformly selected from the catalog of the miscellaneous variables and sorted according to the amplitude of variation. Fig. 6 is a subjective selected appetizer presenting some interesting light curves.

4 The ASAS Catalogs - Internet Access

Complete versions of the ASAS Catalog of Variable Stars and the ASAS Photometric I-band Catalog are available over the Internet.

The ASAS Home Page is located at: *http://www.astrouw.edu.pl/~gp/asas/asas.html* and its US mirror at: *http://archive.princeton.edu/~asas/*

The following services are available (please refer to the ASAS Home Page to obtain correct URL addresses):

- ASAS Catalog of Variable Stars containing lists of Miscellaneous and Periodic Variables with
  - ID (ASAS identification constructed using α_{2000} and δ_{2000} coordinates)
  - I-band mean brightness
  - Amplitude of variation
  - Number of available measurements
  - Period or time-scale of variation
  - Cross-identification
- Gallery of Periodic and Miscellaneous Variables' light curves (over 120 pages, 32 light curves each)
- ASAS Photometric I-band Catalog Interface providing access to full photometric data (HJD, I) for
  - individual objects selected by ID or coordinates
  - lists of objects
  - objects in the specified box
- ASAS Sky Atlas providing interactive maps of objects in the Catalog
- Download Page with

- ASAS Catalog of Variable Stars - lists of miscellaneous and periodic stars (53 kB and 8 kB) and compressed light curves (1.7 MB and 12MB)
- ASAS Photometric I-band Catalog - (ID, mean-I, σ_I) for all available objects (about 140,000 entries, 1.4 MB)

5 Summary

After two years of operation the ASAS Catalog of Variable Stars contains now almost 3900 objects found among 140000 stars on 300 sq. degrees. Although most of the stars are bright - only 5% were previously known variables. Most of new detections are bright, red irregular variables, for which some classification schemes are required. Among the periodic stars there are many examples of bright (7-9 magnitude) Algol and WUMa binaries - easy targets for small size spectroscopic instruments.

It is striking that even among very bright stars, saturated on our small CCD camera, a large fraction of variables has not been discovered yet. Note that new discoveries include lots of stars with large amplitudes as listed in Tables 3 and 4. Also note, that the 3900 variables were found by this pilot project in just 0.7% of the whole sky.

The prototype instrument, consisting of the simple off-the-shelf amateur camera, telephoto lens and custom made equatorial mount proved to be a very robust and efficient tool. It is perfectly well suited for detecting and monitoring variability on the sky at a very low cost, thanks to a high level of automation and simplicity of equipment. It required only two author's visits to Las Campanas (4 weeks in April 1997 and 4 weeks in July 1998) to set up the system and let it run for over 2 years. The OGLE team provided regular (1 per month) tape exchange service and occasional rebooting of the system (necessary due to rare and hard to pin down flaws in software).

In the next months the prototype instrument will be replaced by two larger (2K x 2K) devices, capable to monitor 20000 sq. degrees per night. We expect to increase our data steam by a factor of 30, so any achievements in the field of automated variability detection and light curve classification will be highly appreciated. We encourage interested people to use our data for testing purposes.

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