

# Chromospherically active stars in the ASAS-3 database: Paper 1. 25 new variables

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**Abstract:** 25 new chromospherically active stars are presented, which were found in the ASAS-3 database:

GSC 09500-00821, GSC 09390-00322, GSC 09473-00014, GSC 09486-00927, GSC 09356-01284, GSC 09384-01942, GSC 09411-01577, GSC 09442-01129, GSC 09444-02266, GSC 09288-00744, GSC 09235-01702, GSC 09214-00531, GSC 09338-02016, GSC 09275-02349, GSC 08906-00808, GSC 09034-00643, GSC 08923-01147, GSC 08950-00019, GSC 08933-01802, GSC 09014-00118, GSC 09031-04159, GSC 08983-00564, GSC 09010-04839, GSC 08870-00372, GSC 05275-00646

During a programme of optical identification of X-ray sources from the ROSAT All-Sky Bright Source Catalogue (1RXS) (Voges et al. 1999) in the ASAS3 database (Pojmanski, 2002) (<http://www.astrouw.edu.pl/asas/?page=main>) 25 new chromospherically active stars have been found. This research continues the search for new chromospherically active stars in the ROTSE-I database (Bernhard & Lloyd 2008).

The criteria for including a star in this list of chromospherically active stars were, i) the X-ray identification, ii) a suitable period after an analysis of the ASAS-3 data with Period 04 (Lenz and Breger 2005) and iii) appropriate B-V (Høg et al. 2000) and 2MASS J-K (Skrutskie et al. 2006, Table 8 in Gonzalez-Solares et al. 2008) colour indexes if available. Chromospherically active stars exhibit spectral types of F-K (these are mostly RS CVn systems, and a smaller number of FK Comae stars) and K-M (BY Dra variables). Partial information about LiI equivalents (Torres et al., 2006) is useful to identify young stellar objects among the variables.

Table 1: Positions, identifications and photometric data for the new chromospherically active stars

No.	GSC	RA (2000)	Dec	1RXS	Range (ASAS)	Epoch (Min)	Per. (d)
1	09500-00821	05 06 18.45	-86 41 44.6	J050623.6-864141	11.0-11.4	2131.74(7)	7.94026(6)
2	09390-00322	05 53 29.32	-81 56 53.1	J055327.9-815650	9.1-9.3	3983.85(1)	1.85769(4)
3	09473-00014	21 18 47.14	-81 45 17.9	J211839.2-814515	10.7-11.0	2069.69(2)	2.3028(3)
4	09486-00927	21 25 27.48	-81 38 27.6	J212529.0-813836	11.6-12.0	3866.840(5)	0.541945(2)
5	09356-01284	01 23 17.20	-79 41 32.3	J012326.1-794139	10.1-10.3	2895.676(3)	0.380781(2)
6	09384-01942	07 05 09.12	-78 25 17.8	J070510.2-782519	9.1-9.4	2221.6(8)	88.9(2)
7	09411-01577	11 25 47.95	-76 30 29.1	J112545.4-763035	9.0-9.2	3828.7(2)	21.608(9)
8	09442-01129	16 14 46.04	-76 01 49.9	J161444.0-760204	10.1-10.3	3802.81(9)	9.867(1)
9	09444-02266	17 23 29.60	-75 38 57.0	J172327.2-753852	12.1-12.4	2443.65(5)	5.6999(4)
10	09288-00744	17 18 47.55	-73 25 13.4	J171850.0-732527	9.5-9.8	4256.65(7)	7.145(1)
11	09235-01702	12 21 05.13	-71 16 49.3	J122107.9-711642	11.6-11.9	1981.69(6)	6.855(2)
12	09214-00531	10 03 56.12	-70 53 53.2	J100355.7-705406	11.9-12.3	2055.47(1)	1.58759(8)
13	09338-02016	23 21 52.50	-69 42 11.8	J232151.4-694211	9.8-10.0	2133.73(1)	1.8746(3)
14	09275-02349	17 05 42.53	-67 42 41.5	J170541.8-674211	12.4-12.7	3104.86(3)	3.69137(1)
15	08906-00808	06 23 10.75	-67 25 24.2	J062310.4-672532	9.5-9.7	4330.90(1)	1.098464(8)
16	09034-00643	15 26 49.19	-65 53 35.7	J152648.5-655341	9.6-9.8	3160.72(3)	3.8981(1)
17	08923-01147	07 54 08.84	-65 41 30.7	J075407.7-654137	10.5-11.2	1919.7(1)	15.270(9)
18	08950-00019	09 47 03.89	-65 35 05.0	J094704.4-653501	11.5-11.7	4180.77(3)	3.0561(4)
19	08933-01802	08 27 09.56	-65 04 42.6	J082709.9-650447	9.3-9.8	1908.70(4)	4.43723(7)
20	09011-01129	14 19 54.08	-64 38 17.5	J141952.6-643808	9.9-10.1	4352.5(6)	63.2(1)
21	09031-04159	15 59 58.01	-64 33 59.0	J155957.8-643350	9.3-9.6	4235.7(5)	54.76(8)
22	08983-00564	12 21 30.78	-64 03 52.7	J122125.6-640346	10.7-11.0	2703.74(6)	6.0746(3)
23	09010-04839	14 32 08.35	-63 42 14.5	J143208.7-634230	9.7-9.9	4150.8(5)	57.9(1)
24	08870-00372	03 31 48.87	-63 31 53.5	J033149.8-633155	10.7-11.0	1913.53(2)	2.7321(2)
25	05275-00646	01 01 45.32	-12 08 02.5	J010145.4-120751	10.0-10.4	4756.7(2)	28.48(1)

The ASAS-3 telescopes are situated at Las Campanas Observatory in Chile, V and I filters are used in combination with 200/2.8 lenses and AP-10 CCD cameras. The aperture suggested by the ASAS-3 system (first row of the ASAS data) was taken for the calculations of the ephemeris and the figures. Figures in brackets denote errors (sigma) in units of the last decimal.

### Light curves, folded light curves (with the period given above) and comments:

Some of the following stars showed a clear variation of the shape of the light curves. Therefore the folded light curves are given for a distinct time period of time (described in figure as HJD 245 ....-.....). This is somewhat typical of chromospherically active stars which can show secular variation in mean magnitude and/or amplitude as a result of starspot cycles similar in nature to the Sun's sunspot cycle.

#### No. 1: GSC 09500-00821

2MASS J-K: 0.846

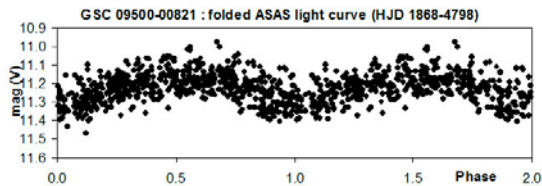
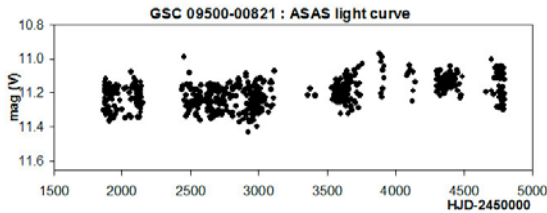
Tycho-2: 09500-00821-1: Johnson B-V=1.176 (derived from Tycho-2)

Spectral type: K0IIIe (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 130 (Torres et al., 2006)

ASAS variable (type DCEP-FU/ESD)

Likely an RS CVn variable



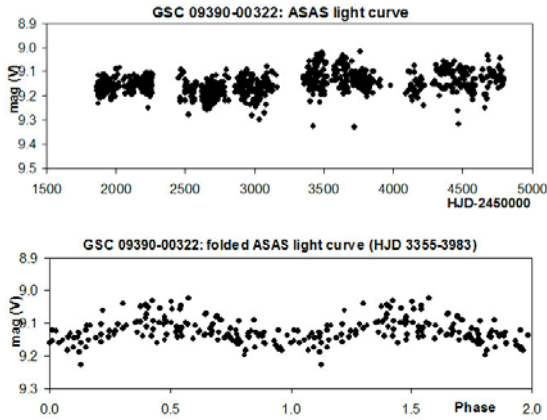
**No. 2: GSC 09390-00322**

2MASS J-K: 0.588

Tycho-2: 09390-00322 -1: Johnson B-V= 0.753 (derived from Tycho-2)

Spectral type: K0/1 IV/V (Wright et al., 2003)

Likely an RS CVn variable



**No. 3: GSC 09473-00014**

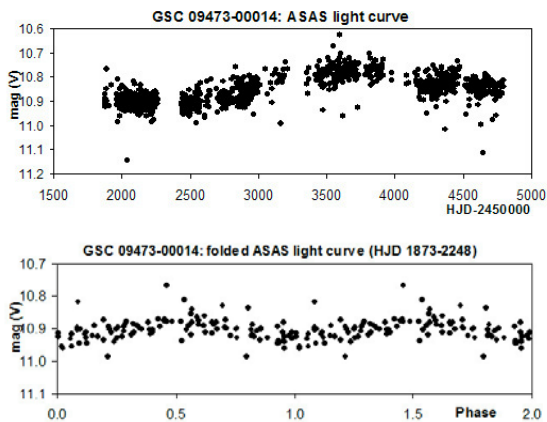
2MASS J-K: 0.575

Tycho-2: 09473-00014-1: Johnson B-V= 0.936 (derived from Tycho-2)

Spectral type: K0V (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 120 (Torres et al., 2006)

Not to distinguish between RS CVn and BY Dra



**No. 4: GSC 09486-00927**

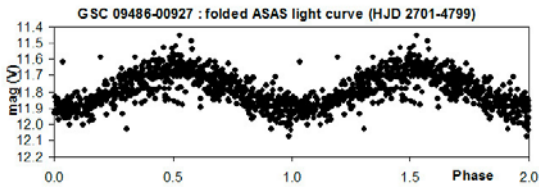
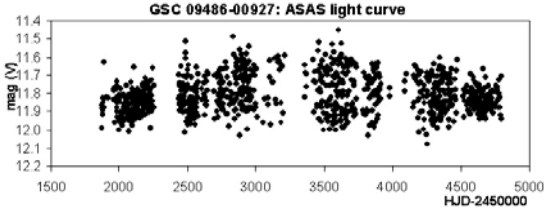
2MASS J-K: 0.898

ASAS variable (type MISC)

Spectral type: M1Ve (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 104 (Torres et al., 2006)

Probable BY Dra variable

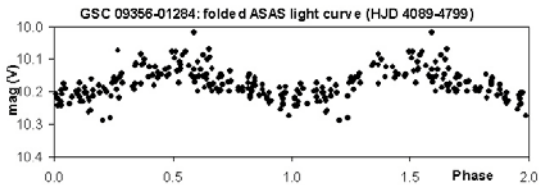
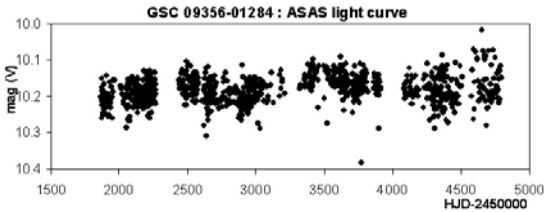


**No. 5: GSC 09356-01284**

2MASS J-K: 0.899

Tycho-2: 09356-01284-1: Johnson B-V=1.109 (derived from Tycho-2)

Probable BY Dra variable



**No. 6: GSC 09384-01942**

2MASS J-K: 0.804

Tycho-2: 09384-01942-1: Johnson B-V= 1.050 (derived from Tycho-2)

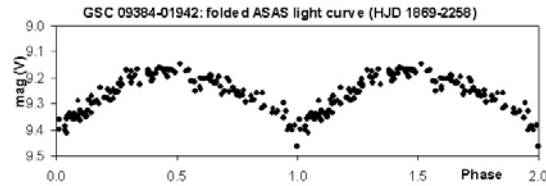
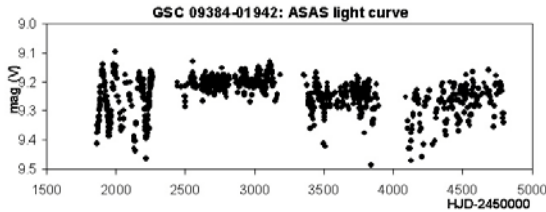
Spectral type: G8 III/IV (Wright et al., 2003)

Spectral type: K0III (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 0 (Torres et al., 2006)

ASAS variable (type MISC)

Likely an RS CVn variable



**No. 7: GSC 09411-01577**

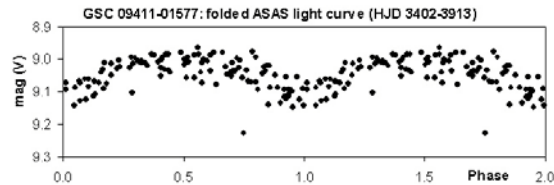
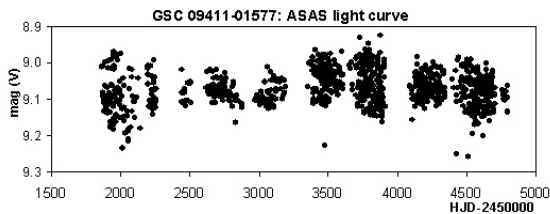
2MASS J-K: 0.796

Tycho-2: 09411-01577-1: Johnson B-V=1.178 (derived from Tycho-2)

Spectral type: K0 III (Houk et al., 1975)

ASAS variable (type MISC)

Likely an RS CVn variable



**No. 8: GSC 09442-01129**

2MASS J-K: 0.557

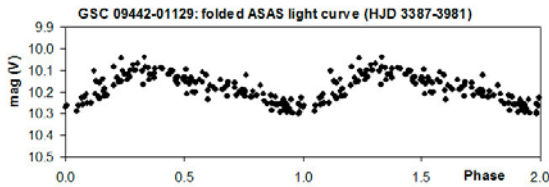
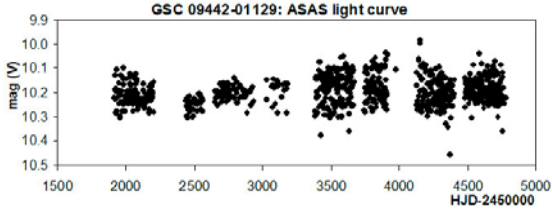
Tycho-2: 09442-01129-1: Johnson B-V= 0.975 (derived from Tycho-2)

Spectral type: G9III(e) (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 105 (Torres et al., 2006)

ASAS variable (type MISC)

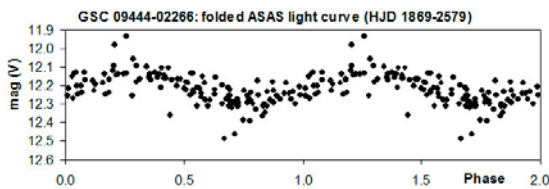
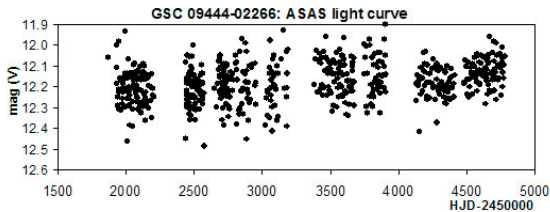
Likely an RS CVn variable



**No. 9: GSC 09444-02266**

2MASS J-K: 0.900

Not to distinguish between RS CVn and BY Dra



**No. 10: GSC 09288-00744**

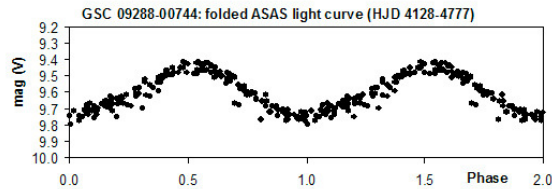
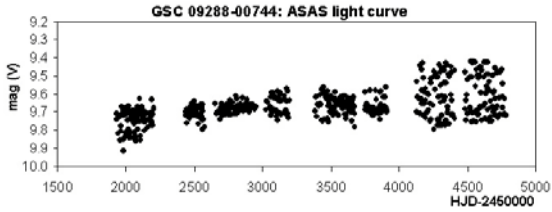
2MASS J-K: 0.736

Tycho-2: 09288-00744-1: Johnson B-V=0.911 (derived from Tycho-2)

Spectral type: K0IIIe (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 130 (Torres et al., 2006)

Likely an RS CVn variable

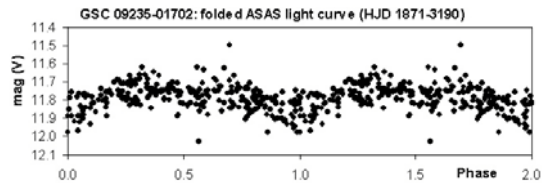
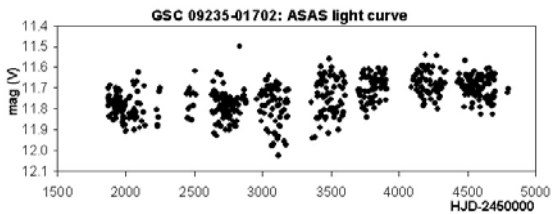


**No. 11: GSC 09235-01702**

2MASS J-K: 0.847

Spectral type: K7 (Riaz et al., 2006)

Probable BY Dra variable

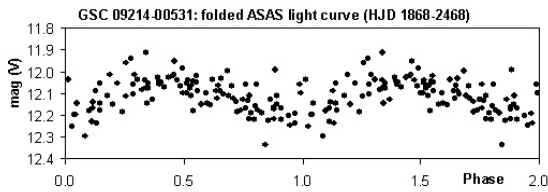
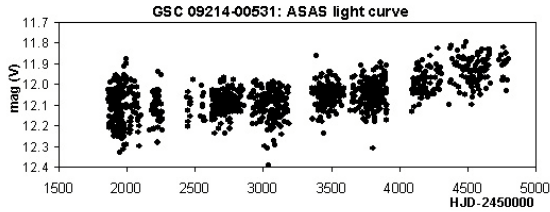


**No. 12: GSC 09214-00531**

2MASS J-K: 0.791

ASAS variable (type DCEP-FO/EC/ESD)

Likely an RS CVn variable

**No. 13: GSC 09338-02016**

2MASS J-K: 0.453

Tycho-2: 09338-02016-1: Johnson B-V= 0.704 (derived from Tycho-2)

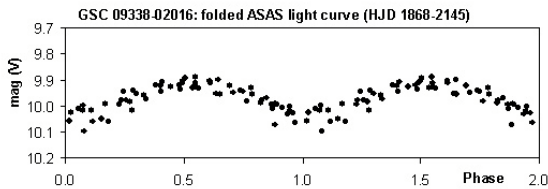
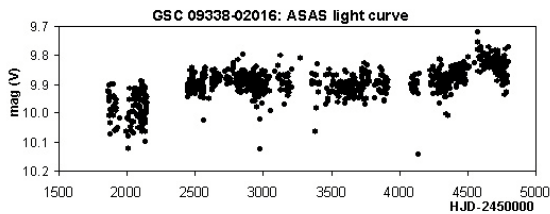
Spectral type: G5 IV (Wright et al., 2003)

Spectral type: G8V (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 259 (Torres et al., 2006)

ASAS variable (type DCEP-FO)

Likely a young stellar object

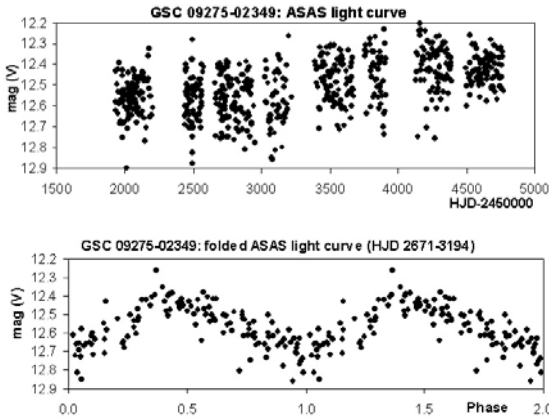




**No. 14: GSC 09275-02349**

2MASS J-K: 0.862

Not to distinguish between RS CVn and BY Dra



**No. 15: GSC 08906-00808**

2MASS J-K: 0.484

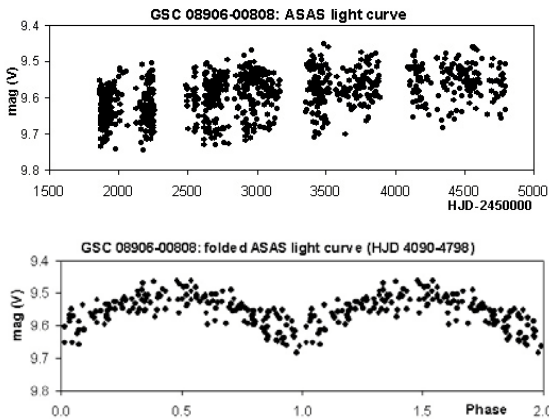
Tycho-2: 08906-00808-1 :Johnson B-V= 0.762 (derived from Tycho-2)

Spectral type: G7III (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 0 (Torres et al., 2006)

ASAS variable (type EC/ESD)

Likely an RS CVn variable



**No. 16: GSC 09034-00643**

2MASS J-K: 0.749

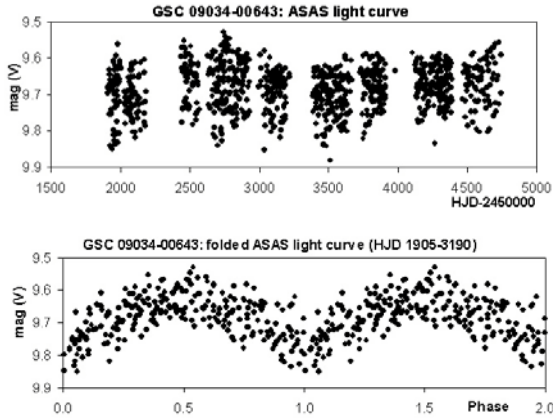
Tycho-2: 09034-00643-1: Johnson B-V=1.036 (derived from Tycho-2)

Spectral type: K1III (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 0 (Torres et al., 2006)

ASAS variable (type MISC)

Likely an RS CVn variable



**No. 17: GSC 08923-01147**

2MASS J-K: 0.838

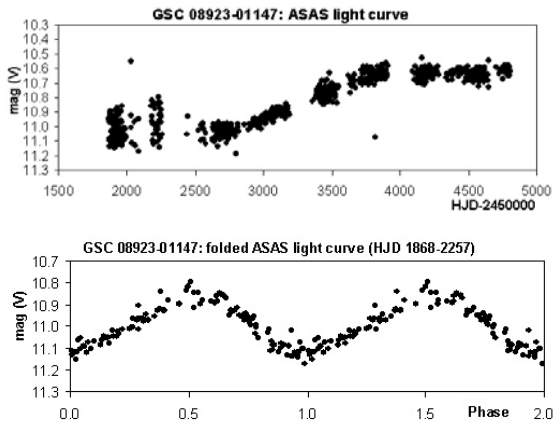
Tycho-2: 08923-01147-1: Johnson B-V= 0.639 (derived from Tycho-2)

Spectral type: K0IIIe (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 100 (Torres et al., 2006)

ASAS variable (type MISC)

Likely an RS CVn variable

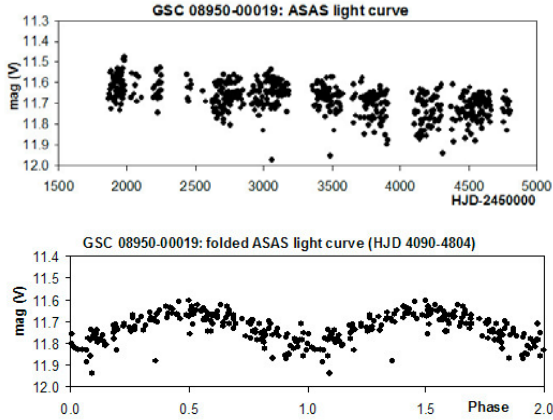


**No. 18: GSC 08950-00019**

2MASS J-K: 0.790

ASAS variable (type DCEP-FO/DCEP-FU/EC/E)

Not to distinguish between RS CVn and BY Dra



**No. 19: GSC 08933-01802**

2MASS J-K: 0.815

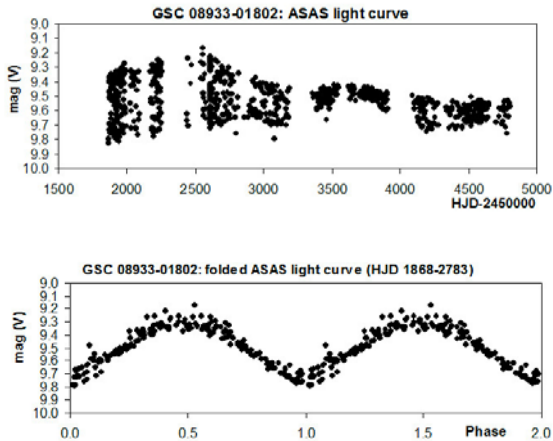
Tycho-2: 08933-01802-1: Johnson B-V=1.111 (derived from Tycho-2)

Spectral type: K2IIIe (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 170 (Torres et al., 2006)

ASAS variable (type DCEP-FO)

Likely an RS CVn variable



**No. 20: GSC 09014-00118**

2MASS J-K: 0.782

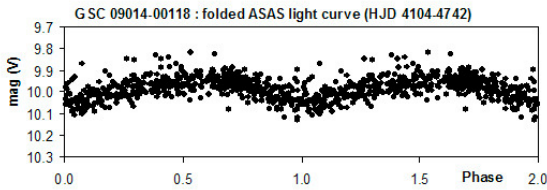
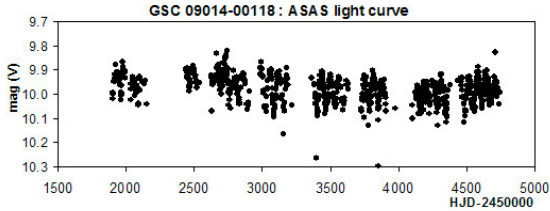
Tycho-2: 09014-00118-1: Johnson B-V=1.183 (derived from Tycho-2)

Spectral type: K0III (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 50 (Torres et al., 2006)

ASAS variable (type MISC)

Likely an RS CVn variable



**No. 21: GSC 09031-04159**

2MASS J-K: 0.779

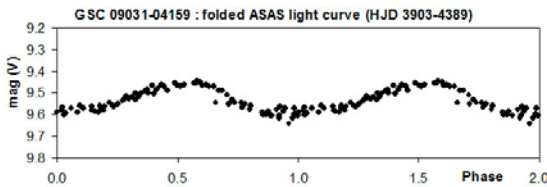
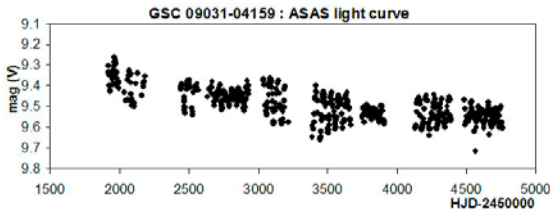
Tycho-2: 09031-04159-1: Johnson B-V=1.173 (derived from Tycho-2)

Spectral type: K2III (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 110 (Torres et al., 2006)

ASAS variable (type MISC/SR)

Likely an RS CVn variable



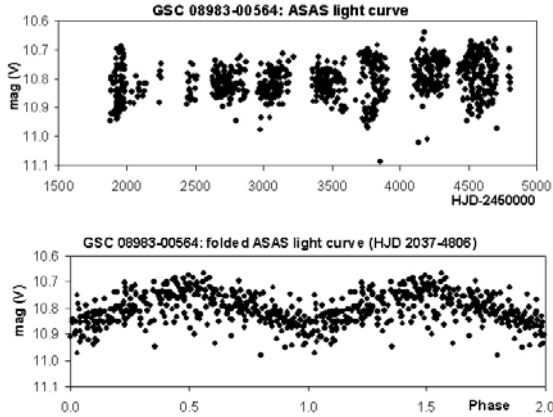
**No. 22: GSC 08983-00564**

2MASS J-K: 0.836

Tycho-2: 08983-00564-1: Johnson B-V=1.307 (derived from Tycho-2)

Spectral type: K2 (Skiff, 2008)

Not to distinguish between RS CVn and BY Dra



**No. 23: GSC 09010-04839**

2MASS J-K: 0.815

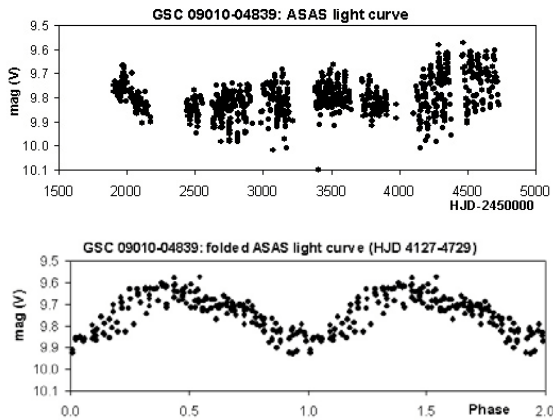
Tycho-2: 09010-04839-1: Johnson B-V=1.005 (derived from Tycho-2)

Spectral type: K 1 III (Buscombe, 1999)

Spectral type: K1III(e) (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 150 (Torres et al., 2006)

Likely an RS CVn variable



**No. 24: GSC 08870-00372**

2MASS J-K: 0.498

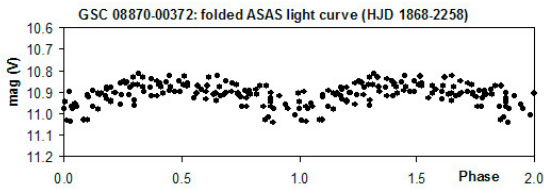
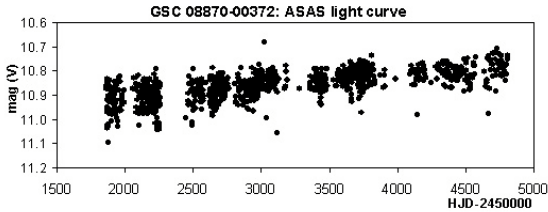
Tycho-2: 08870-00372-1: Johnson B-V=0.672 (derived from Tycho-2)

Spectral type: K0V (Torres et al., 2006)

LiI equivalent width in milli-Angstroms: 300 (Torres et al., 2006)

ASAS variable (type DCEP-FU/ESD)

Probable a young stellar object



**No. 25: GSC 05275-00646**

2MASS J-K: 0.735

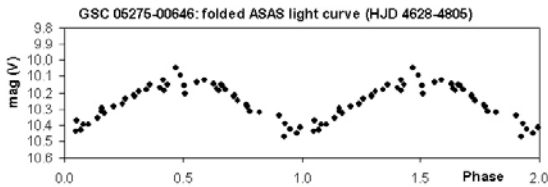
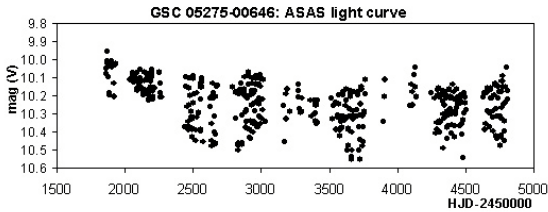
Tycho-2: 05275-00646-1: Johnson B-V=1.042 (derived from Tycho-2)

Spectral type: K0IIIe (Torres et al., 2006)

LiI equivalent width in milli-Angstroms:0 (Torres et al., 2006)

ASAS variable (type DCEP-FU)

Likely an RS CVn variable



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