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Chromospherically active stars in the ASAS-3 database: Paper 4. 25 new variables

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Abstract: Another 25 new chromospherically active stars are presented, which were found in the ASAS-3 database:
GSC 07037-01333, GSC 06584-00040, GSC 08188-01052, GSC 07195-01866, GSC 07713-01595
GSC 07710-02231, GSC 08641-01961, GSC 08633-00825, GSC 08244-00494, GSC 08650-01272
GSC 07783-02098, GSC 08259-00401, GSC 08252-01015, GSC 07796-02110, GSC 07274-00609
GSC 07804-01633, GSC 08678-01367, GSC 08679-00484, GSC 07825-00956, GSC 08696-01232
GSC 07838-00556, GSC 08319-01323, GSC 06267-02271, GSC 07432-01663, GSC 06302-02521

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 ASAS-3 database (Pojmanski, 2002) (http://www.astrouw.edu.pl/asas/?page=main) another 25 new chromospherically active stars have been found. This research continues the search for new chromospherically active stars in the ASAS-3 database (Bernhard & Bernhard, 2011).

The criteria for including a star in this list of chromospherically active stars after an analysis of the available data with Period 04 (Lenz and Breger, 2005) were:

i) the X-ray identification: Only those variable ASAS-3 objects were chosen, which were within the error ellipse of the ROSAT All-Sky Bright Source Catalogue. Therefore it is very likely that the X-ray identifications of the variable stars given in this paper are correct and types of variables like Cepheids or semiregular variables can be ruled out because of their low X-ray emission (see the more detailed discussion in Bernhard and Lloyd, 2008).

ii) period, amplitude and shape of the light curve are consistent with the definition of RS CVn, BY Dra and young stellar objects (IN) stars in the GCVS (http://www.sai.msu.su/groups/cluster/gcvs/gcvs/iii/vartype.txt), for a detailed description and sample light curves of the various types of chromospherically active stars see Berdyugina, 2005. Due to the shapes of the light curves other types of chromospherically active and X-ray emitting objects like W UMa variables and Algol stars can be ruled out.

iii) appropriate 2MASS J-K (Skrutskie et al. 2006, Table 8 in Gonzalez-Solares et al. 2008) and B-V (Høg et al. 2000) colour indices if available.

iv) Further information like
- -spectral types including the lithium content as indicator of young stellar objects,
- -the ratios of X-ray to optical flux f_X / f_opt (Voges et al., 1999),
- -proper motions,
- -the relation of the maximum amplitude vs. periods of main sequence stars given in Messina et al., 2003 and
- -an investigation of the respectively star fields using ALADIN (http://aladin.u-strasbg.fr/aladin.gml) to check, if there are nearby open star clusters or known young stellar objects

was also used for the classification of the objects.

The resulting list of variables (Table 1) contains with a very high likelihood chromospherically active stars of the types RS CVn (spectral types F-K), BY Dra (spectral types F-K) or young stellar objects (spectral types F-M).
The light variability of these objects is caused by axial rotation of a star with a variable degree of nonuniformity of the surface brightness (spots). Some of these variables are also eclipsing systems. Secular variations of the light curves, which are typical for many RS CVn, BY Dra variables and young stellar objects (see the detailed light curves below) can be explained by the existence of a long-period stellar activity cycle similar to the 11-year solar activity cycle, during which the number and total area of spots on the star's surface vary.

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-3 V data) was taken for the calculations of the ephemeris and the figures. The ranges given in Table 1 are derived from the time span of the ASAS-3 V observations, due to secular variations (activity cycles) the full ranges could be somewhat larger.

The values of the column "var" denote the extent of secular variations: "0" for no secular variation, "1" for weak secular variation, "2" for strong secular variation of amplitude and/or mean magnitude. The epochs are given for the minima as HJD-2450000, figures in brackets denote errors (sigma) in units of the last decimal.

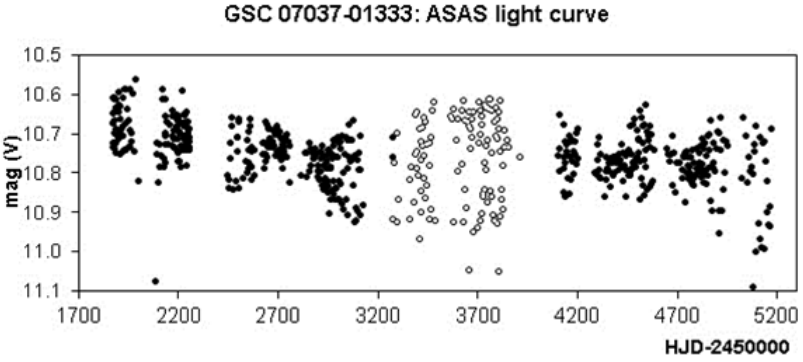
Table 1: Positions, identifications and photometric data for the new chromospherically active stars

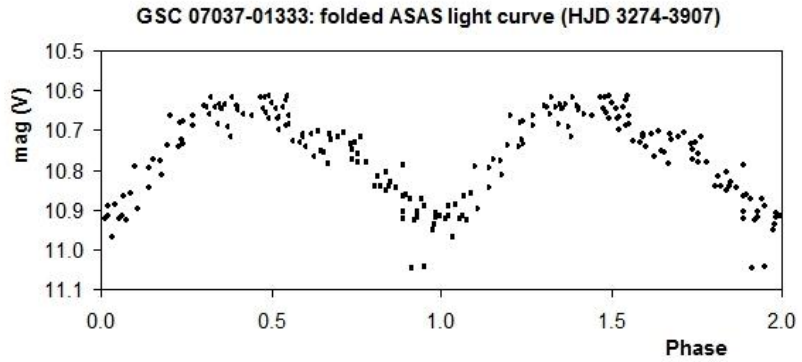
No.	GSC	RA (2000)	Dec	1RXS	Range(ASAS3-V)	Epoch(Min)	Per.(d)	var
76	07037-01333	04 13 59.00	-31 32 40.0	J041358.8-313229	10.60-10.95	3458.51(8)	8.360(2)	2
77	06584-00040	08 50 19.52	-28 56 38.8	J085019.4-285644	9.90-10.25	3068.7(3)	31.83(7)	2
78	08188-01052	10 18 55.91	-48 25 14.2	J101856.1-482514	9.90-10.10	4175.76(9)	9.200(2)	1
79	07195-01866	10 20 21.76	-36 12 13.4	J102021.3-361213	8.35-8.65	4479.7(3)	29.6(1)	2
80	07713-01595	10 22 30.43	-39 50 14.0	J102231.6-395011	8.60-8.85	4435.8(5)	51.0(2)	2
81	07710-02231	10 32 10.19	-39 05 46.5	J103211.4-390553	9.20-9.55	3087.6(6)	62.2(2)	2
82	08641-01961	12 17 04.65	-57 43 55.8	J121704.2-574356	10.75-11.30	3449.64(7)	7.549(2)	1
83	08633-00825	12 26 02.24	-54 21 15.5	J122603.0-542113	10.25-10.55	2054.5(2)	21.3(1)	2
84	08244-00494	12 36 17.67	-50 42 42.0	J123620.3-504238	11.45-11.70	4282.59(3)	3.091(1)	1
85	08650-01272	12 39 11.03	-54 29 24.9	J123912.6-542920	8.90-9.45	4507.7(4)	37.6(1)	2
86	07783-02098	12 47 55.65	-44 57 34.7	J124757.9-445735	10.40-10.60	1918.77(9)	8.6709(1)	1
87	08259-00401	13 15 16.66	-50 58 07.3	J131516.1-505803	9.05-9.20	4501.83(8)	8.242(2)	1
88	08252-01015	13 29 18.52	-47 22 50.6	J132917.6-472316	11.90-12.50	4149.80(4)	4.406(1)	2
89	07796-02110	13 34 31.89	-42 09 30.7	J133432.2-420929	10.40-10.75	1889(1)	104.6(5)	2
90	07274-00609	13 43 31.11	-35 20 25.0	J134331.9-352027	8.95-9.4	4848.8(3)	27.1(1)	2
91	07804-01633	14 12 46.91	-38 31 22.0	J141245.7-383114	11.45-11.70	5018.65(4)	4.074(1)	1
92	08678-01367	14 22 07.35	-54 17 05.1	J142206.2-541706	11.05-11.40	3621.539(8)	0.7773(3)	2
93	08679-00484	14 35 36.64	-53 47 37.7	J143536.1-534729	9.95-10.25	4575.7(8)	78.2(2)	2
94	07825-00956	15 04 28.64	-39 24 26.0	J150428.9-392423	10.75-11.10	3402.83(2)	18.2(1)	1
95	08696-01232	15 45 17.87	-53 18 10.2	J154519.5-531751	11.30-11.85	4314.49(5)	5.272(1)	2
96	07838-00556	15 52 04.54	-37 47 44.0	J155204.3-374751	8.65-8.80	2766.7(4)	37.4(1)	1
97	08319-01323	16 10 03.20	-50 26 12.1	J161003.3-502605	9.90-10.10	4952.71(2)	1.6823(5)	1
98	06267-02271	18 36 36.41	-15 06 42.6	J183635.9-150642	10.55-10.75	2702.9(1)	10.665(4)	2
99	07432-01663	19 28 31.99	-35 07 59.0	J192832.0-350801	9.60-9.80	4546.88(3)	3.244(1)	1
100	06302-02521	19 35 03.80	-18 33 56.8	J193504.4-183357	9.10-9.25	3634.6(2)	22.7(1)	2

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

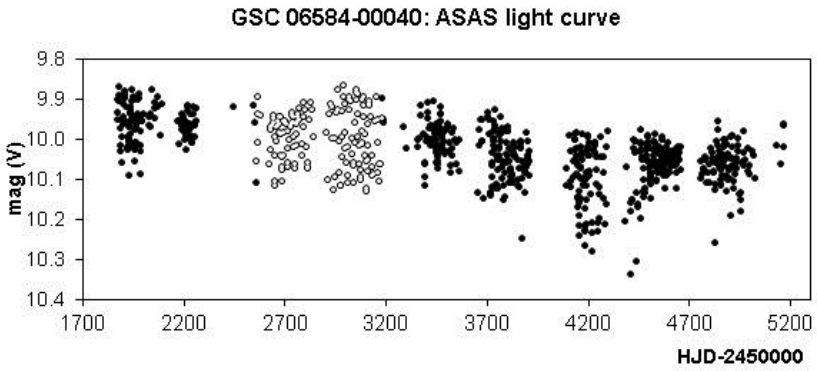
All of the following stars showed a clear variation of the shape of their light curves, which is typical of chromospherically active stars .
The folded light curves are given for a distinct time period with only small changes in amplitudes and mean magnitudes, therefore a special detrending was not necessary (described in figure as HJD 245 ....-....). The time periods used for the folded light curves are marked as open circles in the original light curves.

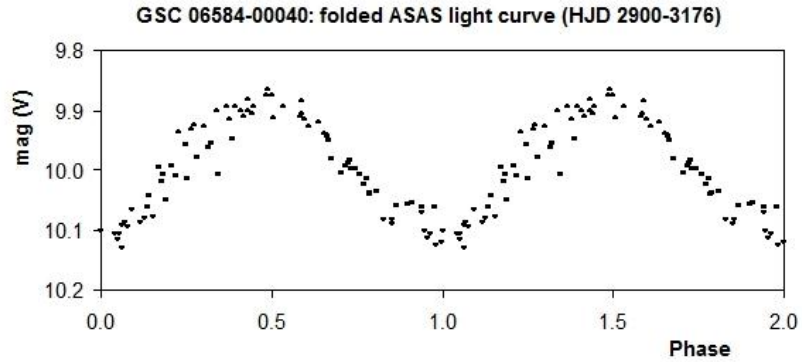
No. 76: GSC 7037-01333
Period: 8.360(2) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/041359-3132.7,asas3,0,0,500,0,0
2MASS J-K: 0.653
Johnson B-V = 0.670 (derived from Tycho-2)
ROSAT: HR1 = 0.41, HR2 = 0.39, fxfopt = -2.14
Proper motion: pmRA: 3.17 mas/yr, pmDE: -1.41 mas/yr (Roeser et al., 2008)
Spectral type: G8IIIe, Li: 0 (0.1pm, Torres et al., 2006)
ASAS variable (type MISC)
Likely an RS CVn variable



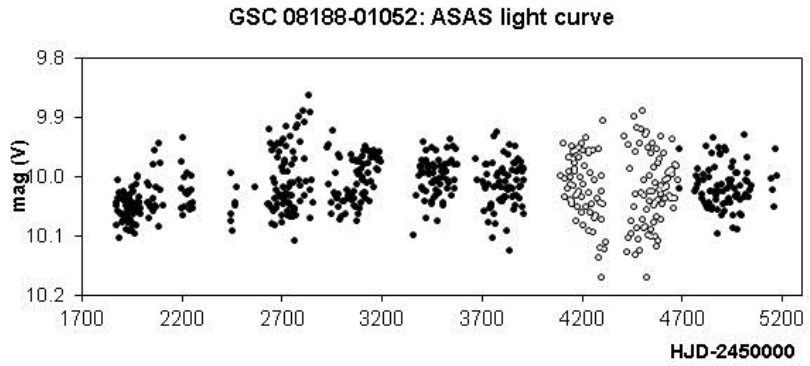


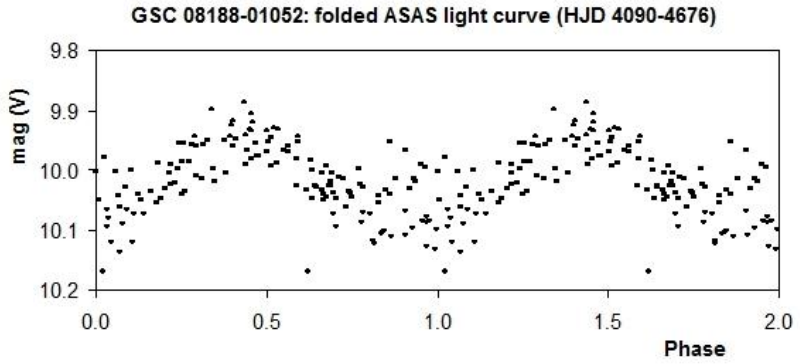
No. 77: GSC 06584-00040
Period: 31.83(7) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/085020-2856.6,asas3,0,0,500,0,0
2MASS J-K: 0.680
Johnson B-V = 1.016 (derived from Tycho-2)
ROSAT: HR1 = 0.81, HR2 = -0.06, fxfopt = -2.50
Proper motion: pmRA: -7.67 mas/yr, pmDE: 8.73 mas/yr (Roeser et al., 2008)
Spectral type: G7III, Li: 0 (0.1pm, Torres et al., 2006)
ASAS variable (type MISC)
Likely an RS CVn variable



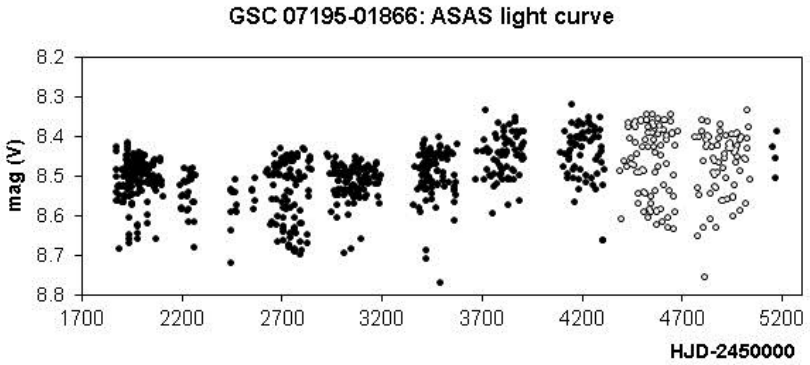


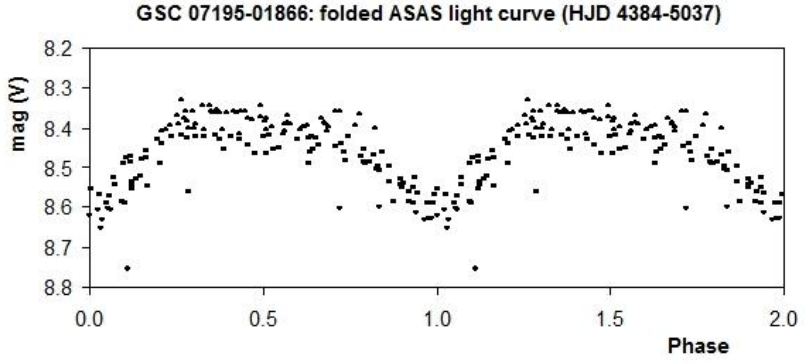
No. 78: GSC 8188-01052
Period: 9.200(2) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/101856-4825.2,asas3,0,0,500,0,0
2MASS J-K: 0.737
Johnson B-V = 0.934 (derived from Tycho-2)
ROSAT: HR1 = 0.53, HR2 = 0.22, fxfopt = -1.65
Proper motion: pmRA: 9.02 mas/yr, pmDE: -1.69 mas/yr (Roeser et al., 2008)
Spectral type: K0III, Li: 30 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable



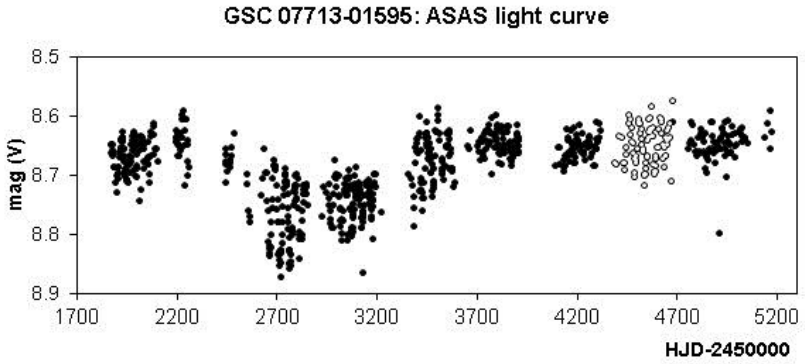


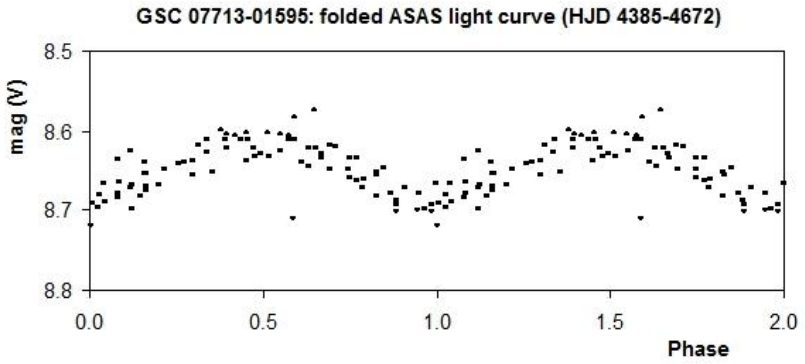
No. 79: GSC 7195-01866
Period: 29.6(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/102022-3612.2,asas3,0,0,500,0,0
2MASS J-K: 0.723
Johnson B-V = 0.967 (derived from Tycho-2)
ROSAT: HR1 = 0.35, HR2 = 0.31, fxfopt = -2.89
Proper motion: pmRA: -2.82 mas/yr, pmDE: -12.31 mas/yr (Roeser et al., 2008)
Spectral type: K1III, Li: 0 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable



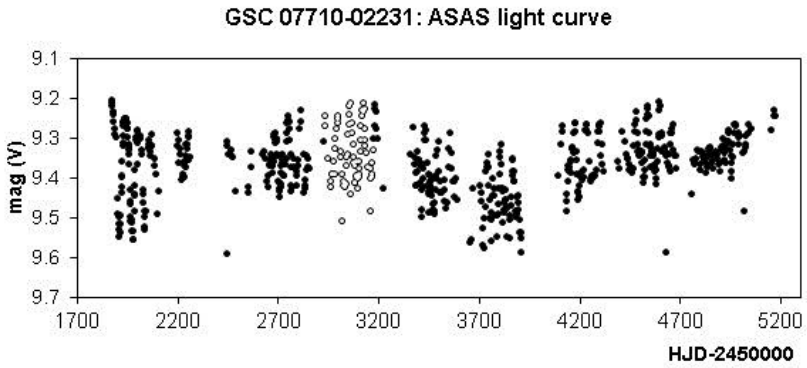


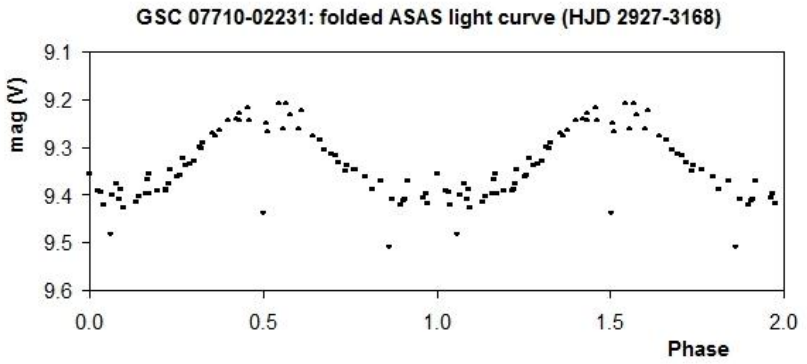
No. 80: GSC 7713-01595
Period: 51.0(2) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/102230-3950.2,asas3,0,0,500,0,0
2MASS J-K: 0.815
Johnson B-V = 1.192 (derived from Tycho-2)
ROSAT: HR1 = 0.32, HR2 = 1.00, fxfopt = -2.98
Proper motion: pmRA: -28.91 mas/yr, pmDE: 8.64 mas/yr (Roeser et al., 2008)
Spectral type: K2III, Li: 40 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable



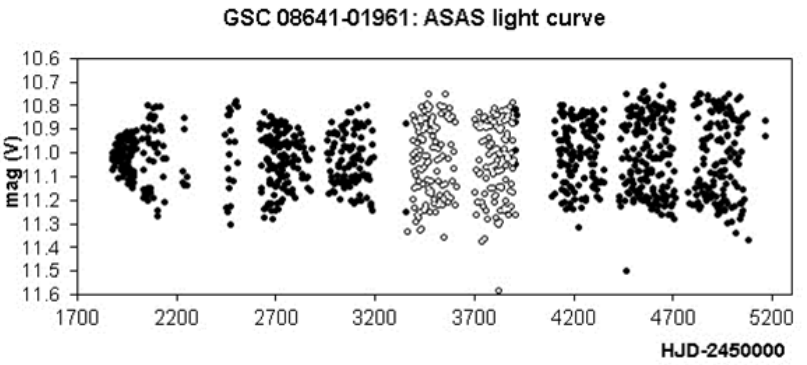


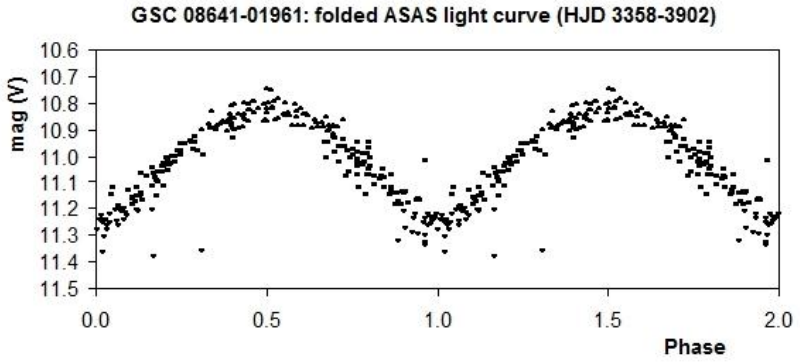
No. 81: GSC 7710-02231
Period: 62.2(2) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/103210-3905.8,asas3,0,0,500,0,0
2MASS J-K: 0.697
Johnson B-V = 1.067 (derived from Tycho-2)
ROSAT: HR1 = 0.73, HR2 = 0.20, fxfopt = -2.89
Proper motion: pmRA: -32.21 mas/yr, pmDE: -4.97 mas/yr (Roeser et al., 2008)
Spectral type: G9III, Li: 0 (0.1pm, Torres et al., 2006)
ASAS variable (type MISC)
Likely an RS CVn variable



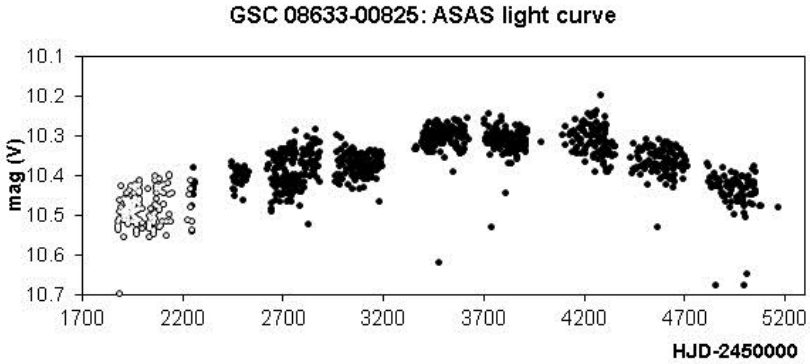


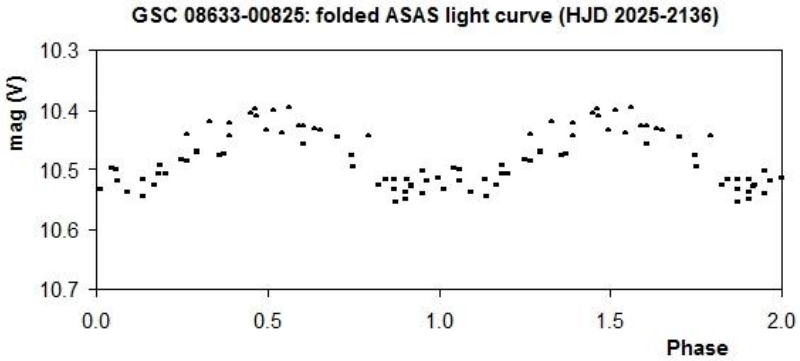
No. 82: GSC 8641-01961
Period: 7.549(2) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/121705-5743.9,asas3,0,0,500,0,0
2MASS J-K: 0.832
Johnson B-V = 1.047 (derived from Tycho-2)
ROSAT: HR1 = 0.85, HR2 = 0.49, fxfopt = -2.03
Proper motion: pmRA: -91.98 mas/yr, pmDE: -12.65 mas/yr (Roeser et al., 2008)
Spectral type: K0IIIe, Li: 160 (0.1pm, Torres et al., 2006)
ASAS variable (type DCEP-FU:)
Likely an RS CVn variable



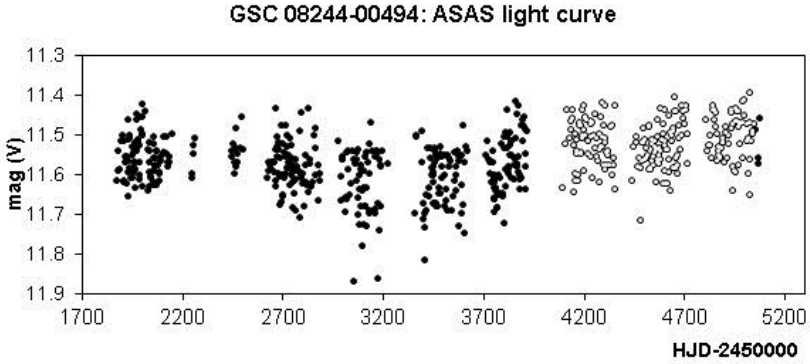


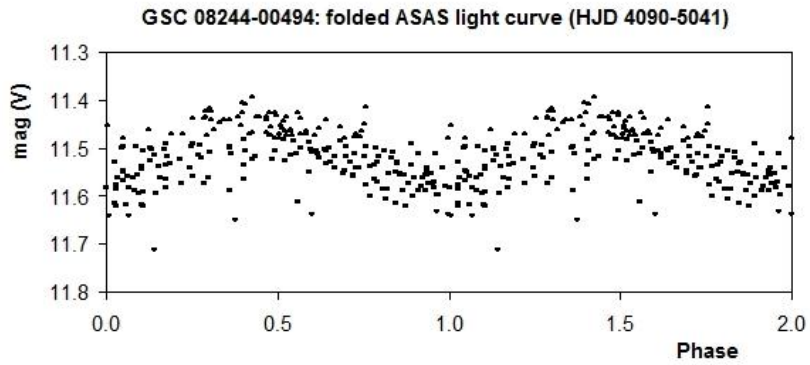
No. 83: GSC 8633-00825
Period: 21.3(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/122602-5421.3,asas3,0,0,500,0,0
2MASS J-K: 0.788
Johnson B-V = 0.606 (derived from Tycho-2)
ROSAT: HR1 = 1.00, HR2 = 0.47, fxfopt = -2.30
Proper motion: pmRA: -7.63 mas/yr, pmDE: 3.31 mas/yr (Roeser et al., 2008)
Likely an RS CVn variable



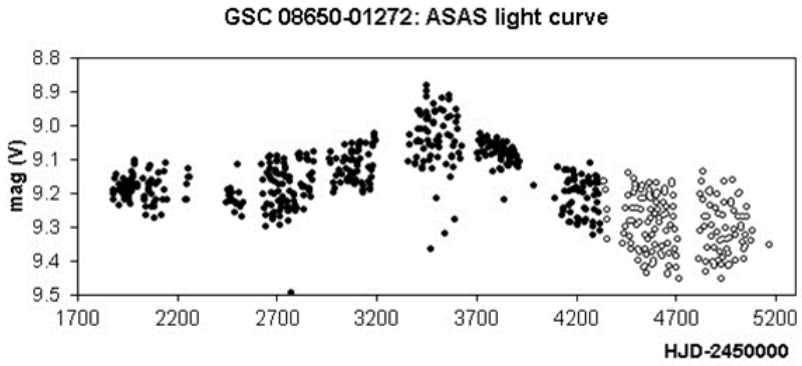


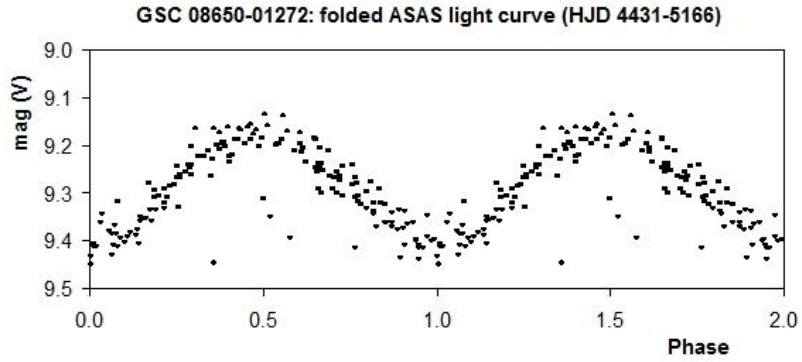
No. 84: GSC 8244-00494
Period: 3.091(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/123618-5042.7,asas3,0,0,500,0,0
2MASS J-K: 0.746
Johnson B-V = 0.652 (derived from Tycho-2)
ROSAT: HR1 = 0.25, HR2 = 0.68, fxfopt = -1.91
Proper motion: pmRA: -34.94 mas/yr, pmDE: -13.07 mas/yr (Roeser et al., 2008)
Spectral type: K4Ve, Li: 475, remark: Li strong (0.1pm, Torres et al., 2006)
Likely a BY Dra variable



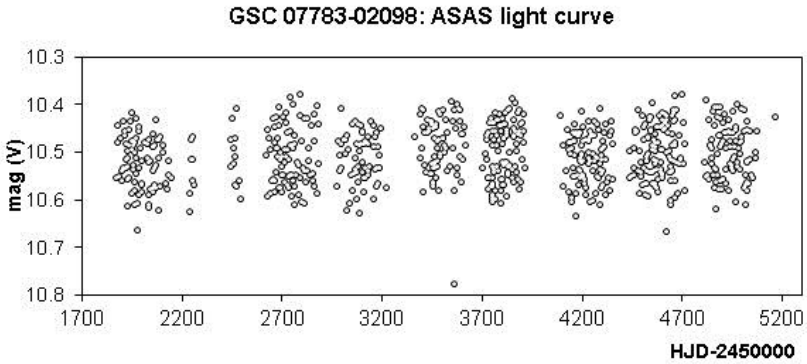


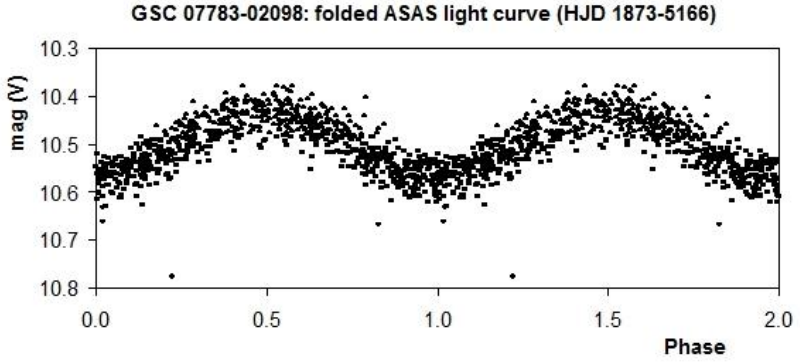
No. 85: GSC 8650-01272
Period: 37.6(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/123911-5429.4,asas3,0,0,500,0,0
2MASS J-K: 0.816
Johnson B-V = 1.093 (derived from Tycho-2)
ROSAT: HR1 = 0.81, HR2 = -0.25, fxfopt = -2.78
Proper motion: pmRA: -27.26 mas/yr, pmDE: -10.63 mas/yr (Roeser et al., 2008)
Spectral type: K3III, Li: 130 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable



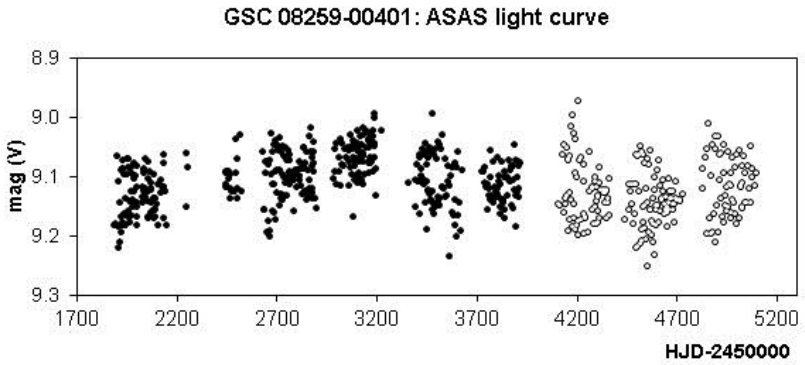


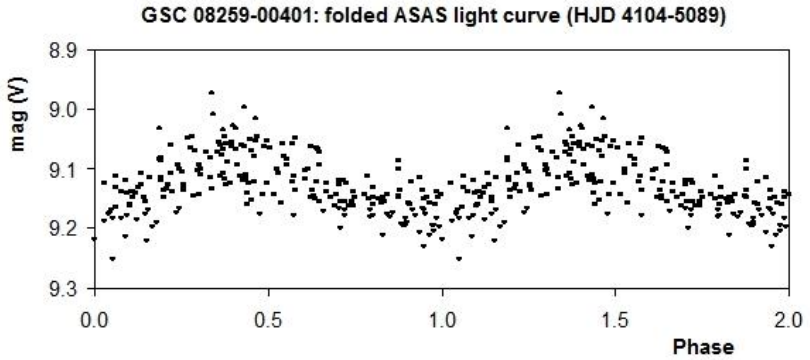
No. 86: GSC 7783-02098
Period: 8.6709(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/124756-4457.6,asas3,0,0,500,0,0
2MASS J-K: 0.797
Johnson B-V = 1.141 (derived from Tycho-2)
ROSAT: HR1 = 1.00, HR2 = 0.20, fxfopt = -2.19
Proper motion: pmRA: -12.66 mas/yr, pmDE: 5.94 mas/yr (Roeser et al., 2008)
Spectral type: K1IIIe, Li: 100 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable



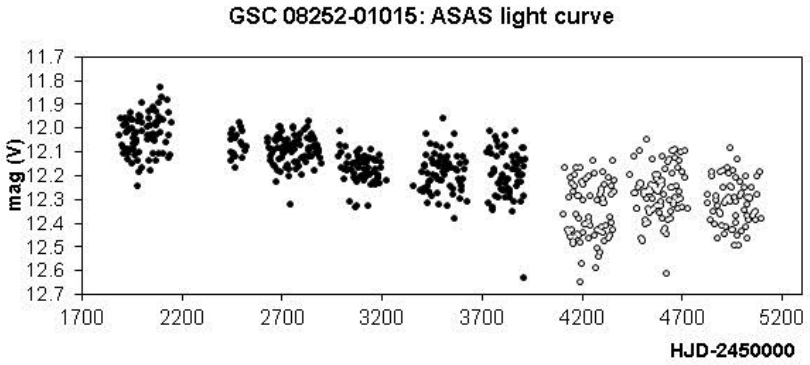


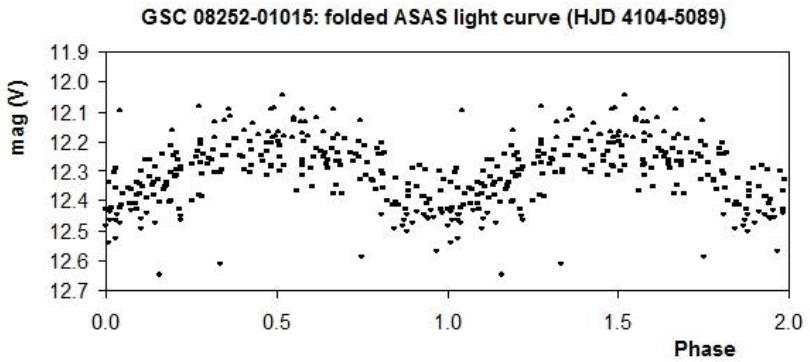
No. 87: GSC 8259-00401
Period: 8.242(2) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/131517-5058.1,asas3,0,0,500,0,0
2MASS J-K: 0.634
Johnson B-V = 0.890 (derived from Tycho-2)
ROSAT: HR1 = 0.50, HR2 = 0.14, fxfopt = -2.08
Proper motion: pmRA: 1.64 mas/yr, pmDE: -20.44 mas/yr (Roeser et al., 2008)
Spectral type: G6III, Li: 10 (0.1pm, Torres et al., 2006)
NSV 19664 (9.16 - 9.33 Hp, no type / period determined)
Likely an RS CVn variable



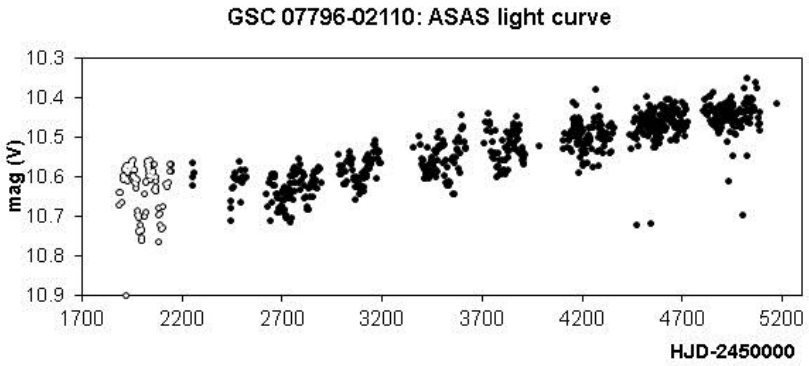


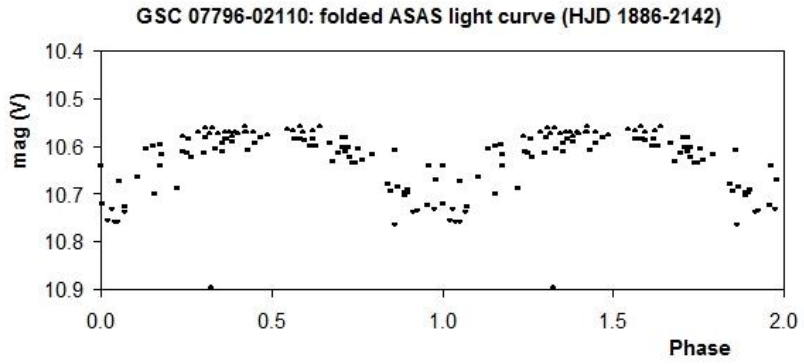
No. 88: GSC 8252-01015
Period: 4.406(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/132919-4722.9,asas3,0,0,500,0,0
2MASS J-K: 0.741
ROSAT: HR1 = 0.84, HR2 = 0.21, fxfopt = -1.34
Proper motion: pmRA: 19.70 mas/yr, pmDE: -7.09 mas/yr (Roeser et al., 2008)
Likely an RS CVn variable



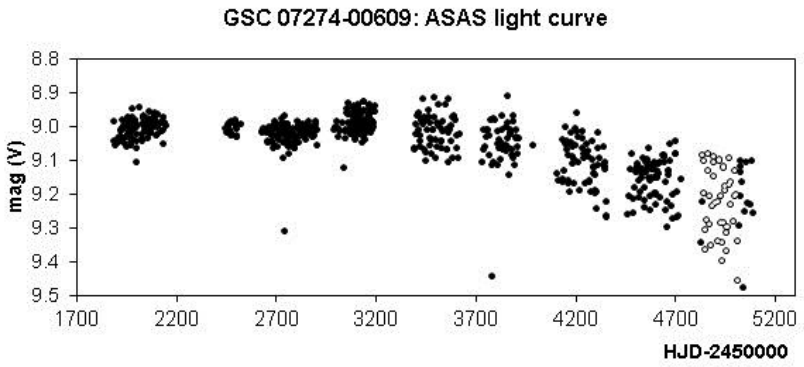


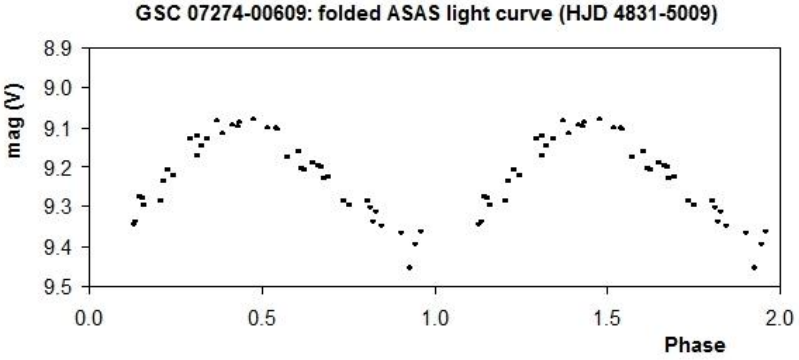
No. 89: GSC 7796-02110
Period: 104.6(5) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/133432-4209.5,asas3,0,0,500,0,0
2MASS J-K: 0.690
Johnson B-V = 0.962 (derived from Tycho-2)
ROSAT: HR1 = 0.18, HR2 = 0.15, fxfopt = -1.93
Proper motion: pmRA: -48.53 mas/yr, pmDE: -24.14 mas/yr (Roeser et al., 2008)
Spectral type: K2IVe, Li: 400, remark Li strong, SB2? (0.1pm, Torres et al., 2006)
ASAS variable (type MISC)
Probably a binary T Tauri variable



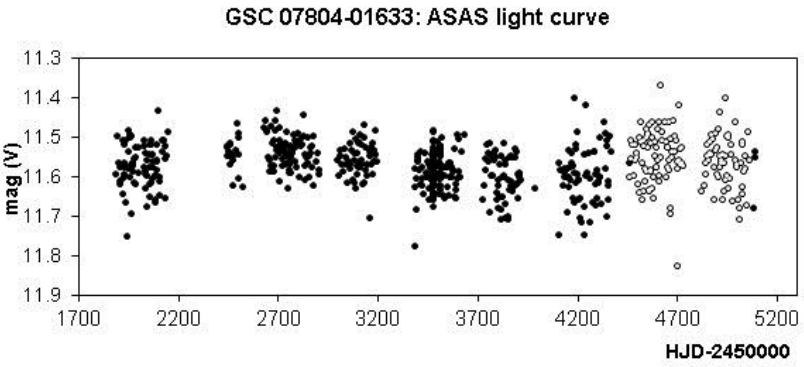


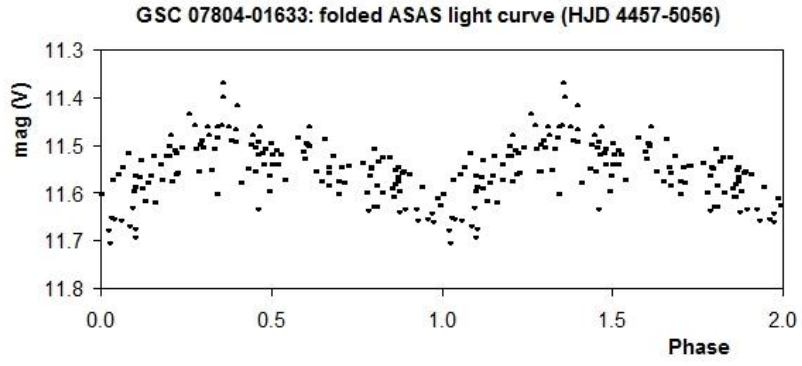
No. 90: GSC 7274-00609
Period: 27.1(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/134331-3520.4,asas3,0,0,500,0,0
2MASS J-K: 0.677
Johnson B-V = 1.020 (derived from Tycho-2)
ROSAT: HR1 = 0.81, HR2 = 0.54, fxfopt = -2.56
Proper motion: pmRA: -32.42 mas/yr, pmDE: -2.79 mas/yr (Roeser et al., 2008)
Spectral type: G8III, Li: 50 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable



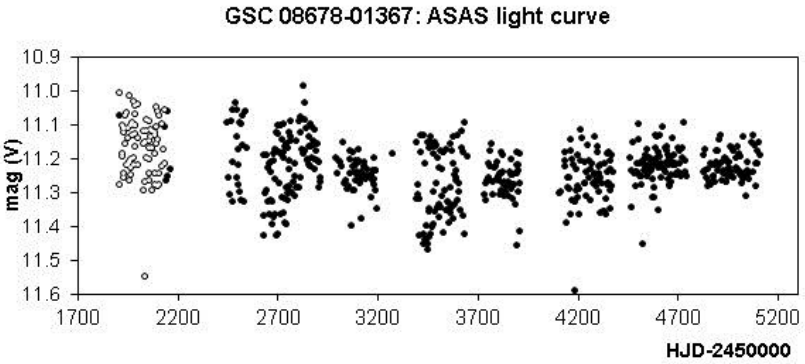


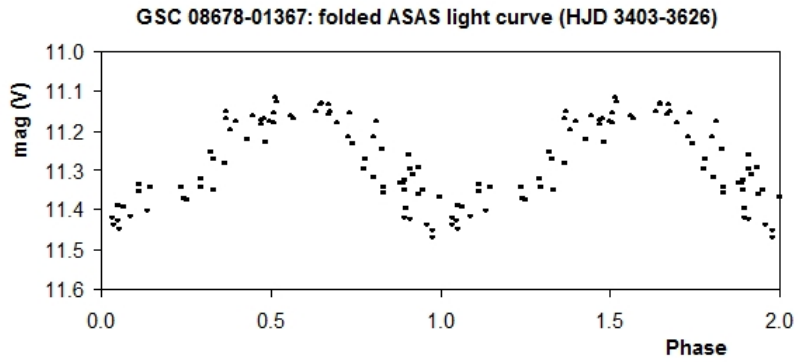
No. 91: GSC 7804-01633
Period: 4.074(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/141247-3831.4,asas3,0,0,500,0,0
2MASS J-K: 0.760
Johnson B-V = 1.241 (derived from Tycho-2)
ROSAT: HR1 = 0.27, HR2 = -0.09, fxfopt = -1.29
Proper motion: pmRA: -30.66 mas/yr, pmDE: -30.94 mas/yr (Roeser et al., 2008)
Spectral type: K3Ve, Li: 420, remark: Li strong (0.1pm, Torres et al., 2006)
Likely a BY Dra variable



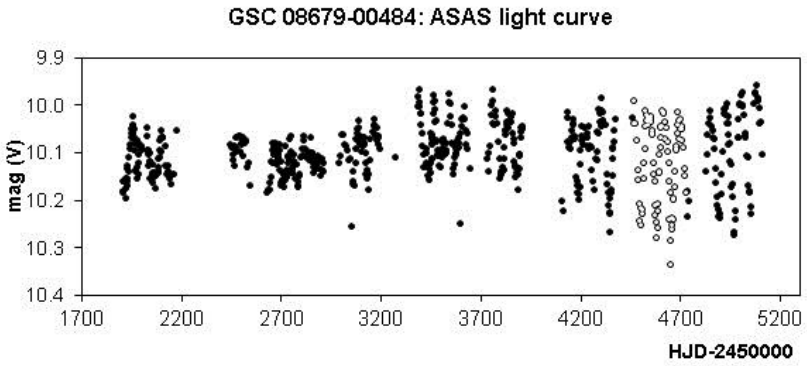


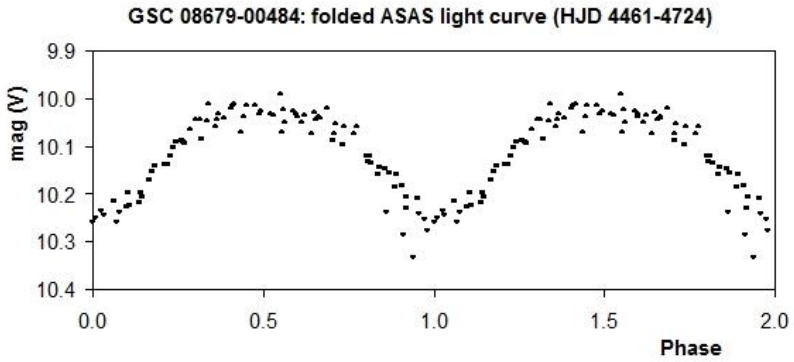
No. 92: GSC 8678-01367
Period: 0.7773(3) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/142207-5417.1,asas3,0,0,500,0,0
2MASS J-K: 0.667
ROSAT: HR1 = 0.33, HR2 = 0.30, fxfopt = -1.75
Proper motion: pmRA: -23.55 mas/yr, pmDE: -24.56 mas/yr (Roeser et al., 2008)
ASAS variable (type DCEP-FO|EC|ESD)
Likely an RS CVn variable



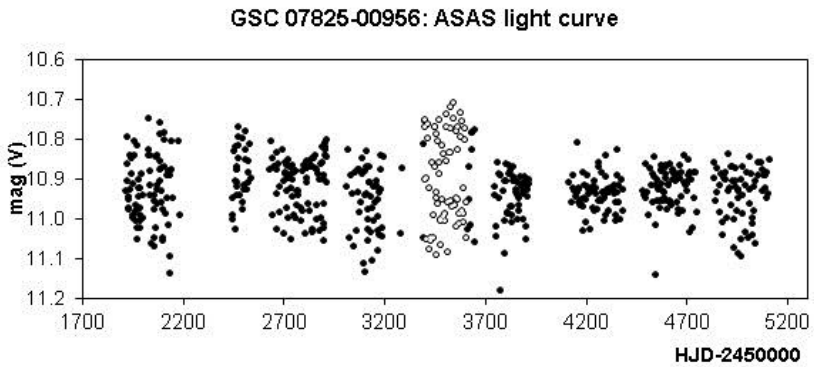


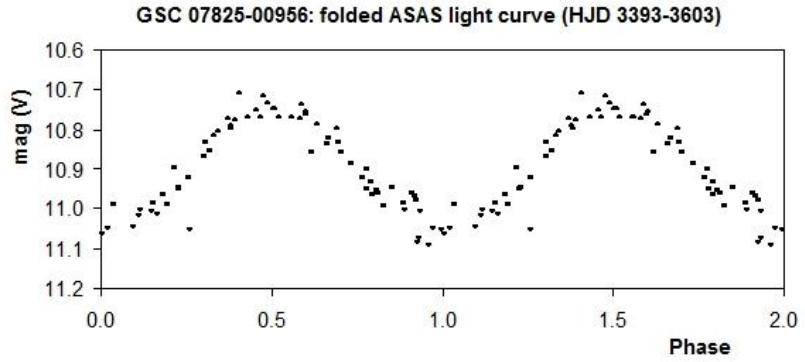
No. 93: GSC 8679-00484
Period: 78.2(2) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/143537-5347.6,asas3,0,0,500,0,0
2MASS J-K: 0.828
Johnson B-V = 1.240 (derived from Tycho-2)
ROSAT: HR1 = 0.92, HR2 = 0.68, fxfopt = -2.36
Proper motion: pmRA: -4.98 mas/yr, pmDE: 0.38 mas/yr (Roeser et al., 2008)
Spectral type: K1III, Li: 100 (0.1pm, Torres et al., 2006)
ASAS variable (type MISC|SR)
Likely an RS CVn variable



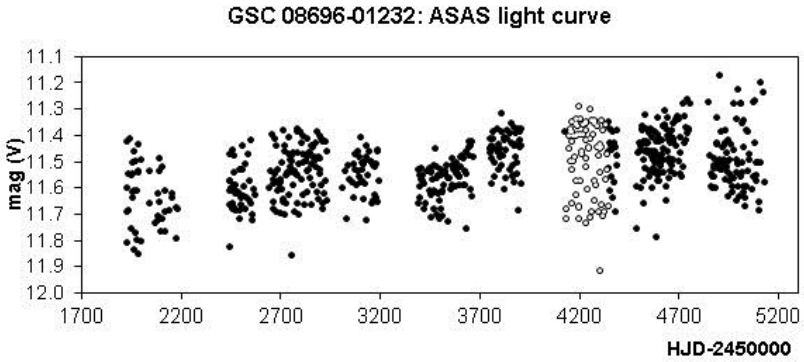


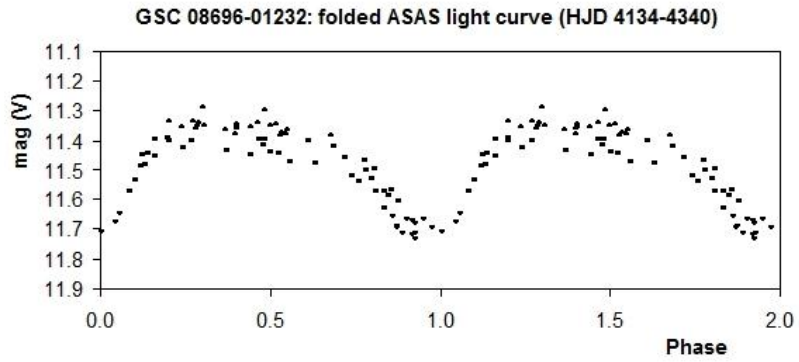
No. 94: GSC 7825-00956
Period: 18.2(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/150429-3924.4,asas3,0,0,500,0,0
2MASS J-K: 0.705
Johnson B-V = 0.855 (derived from Tycho-2)
ROSAT: HR1 = 0.87, HR2 = 0.56, fxfopt = -2.36
Proper motion: pmRA: 0.04 mas/yr, pmDE: 2.48 mas/yr (Roeser et al., 2008)
Spectral type: K0III(e), Li: 80 (0.1pm, Torres et al., 2006)
ASAS variable (type CW-FU|ESD)
Likely an RS CVn variable



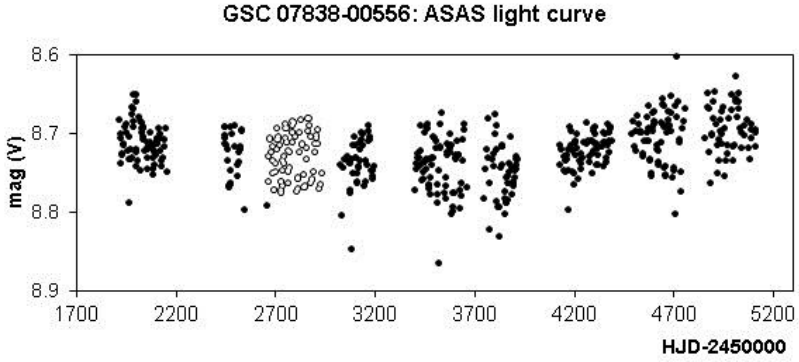


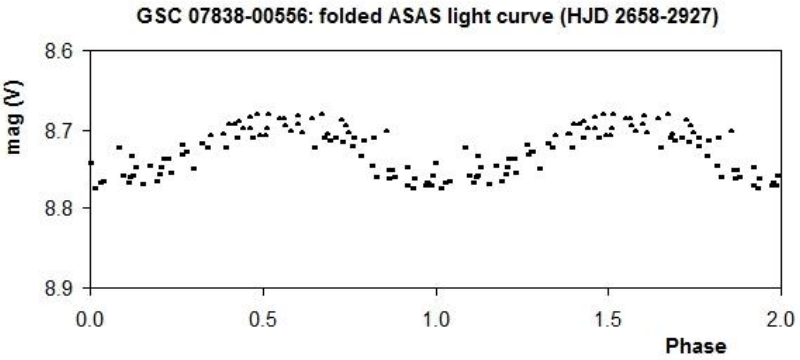
No. 95: GSC 8696-01232
Period: 5.272(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/154518-5318.2,asas3,0,0,500,0,0
2MASS J-K: 0.877
Johnson B-V = 1.483 **(**derived from Tycho-2)
ROSAT: HR1 = 1.00, HR2 = 0.46, fxfopt = -2.04
Proper motion: pmRA: 19.26 mas/yr, pmDE: -16.16 mas/yr (Roeser et al., 2008)
Spectral type: G6IIIe, Li: 40 (0.1pm, Torres et al., 2006)
ASAS variable (type MISC)
Likely an RS CVn variable



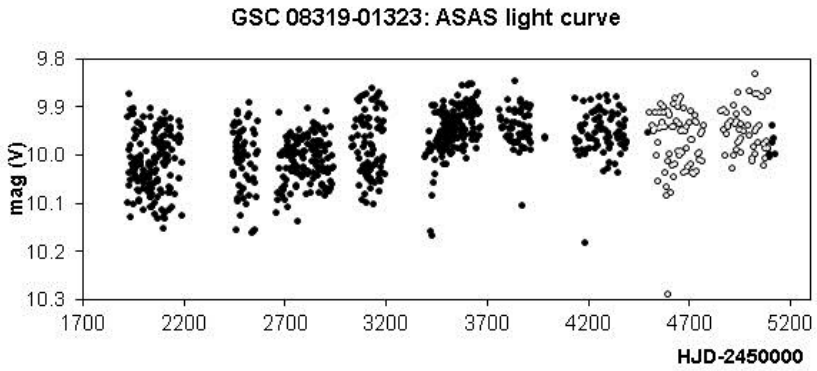


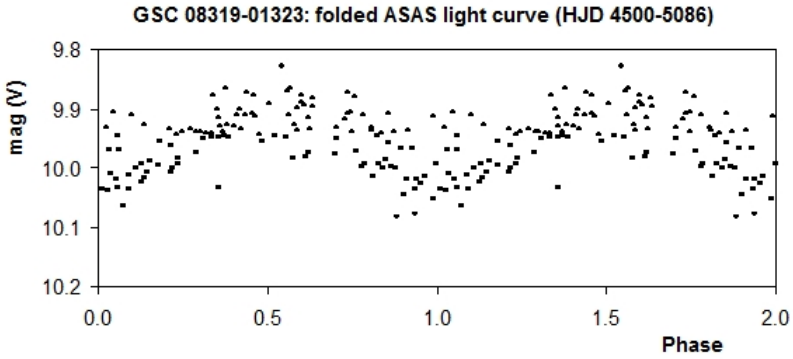
No. 96: GSC 7838-00556
Period: 37.4(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/155205-3747.7,asas3,0,0,500,0,0
2MASS J-K: 0.766
Johnson B-V = 1.300 **(**derived from Tycho-2)
ROSAT: HR1 = 0.91, HR2 = 0.03, fxfopt = -2.67
Proper motion: pmRA: -2.97 mas/yr, pmDE: -19.71 mas/yr (Roeser et al., 2008)
Spectral type: K1III, Li: 50 (0.1pm, Torres et al., 2006)
ASAS variable (type MISC)
Likely an RS CVn variable



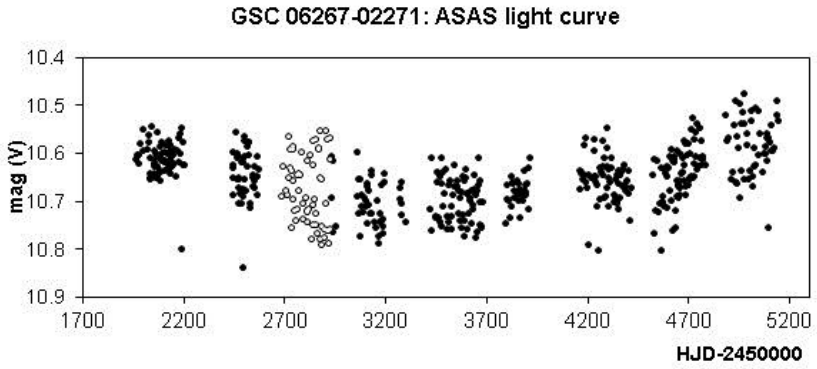


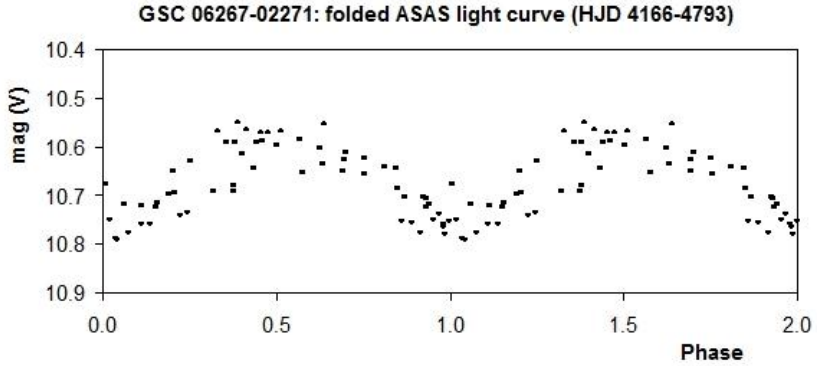
No. 97: GSC 8319-01323
Period: 1.6823(5) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/161003-5026.2,asas3,0,0,500,0,0
2MASS J-K: 0.713
Johnson B-V = 1.129 **(**derived from Tycho-2)
ROSAT: HR1 = 0.90, HR2 = 0.22, fxfopt = -2.79
Proper motion: pmRA: -15.45 mas/yr, pmDE: -14.33 mas/yr (Roeser et al., 2008)
Spectral type: K0III, Li: 200 (0.1pm, Torres et al., 2006)
ASAS variable (type ESD|EC)
Likely an RS CVn variable



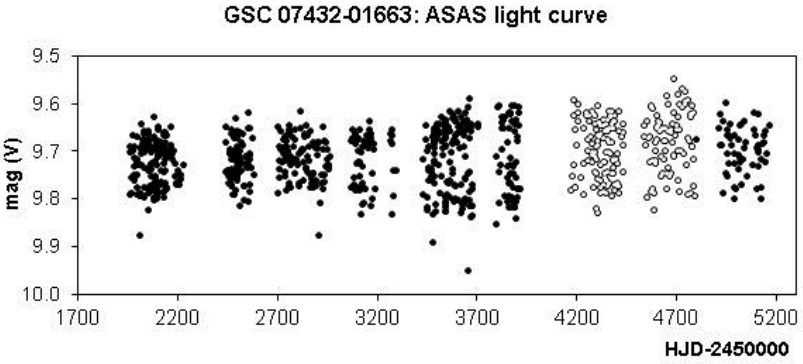


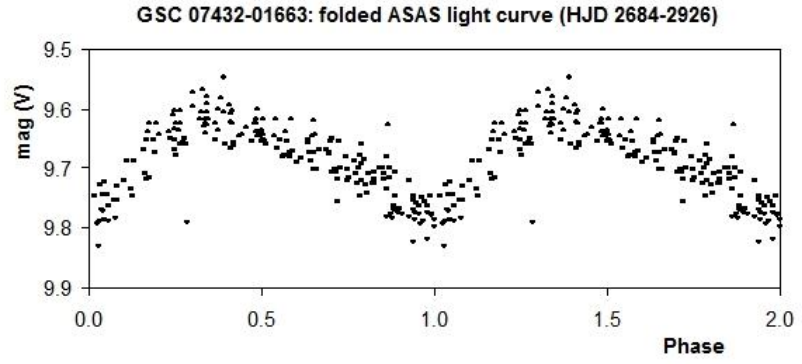
No. 98: GSC 6267-02271
Period: 10.664 (4) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/183636-1506.7,asas3,0,0,500,0,0
2MASS J-K: 0.647
Johnson B-V = 0.915 **(**derived from Tycho-2)
ROSAT: HR1 = 0.42, HR2 = 0.15, fxfopt = -2.33
Proper motion: pmRA: 11.38 mas/yr, pmDE: -68.11 mas/yr (Roeser et al., 2008)
Spectral type: G7IIIe, Li: 0 (0.1pm, Torres et al., 2006)
ASAS variable (type MISC)
Likely an RS CVn variable



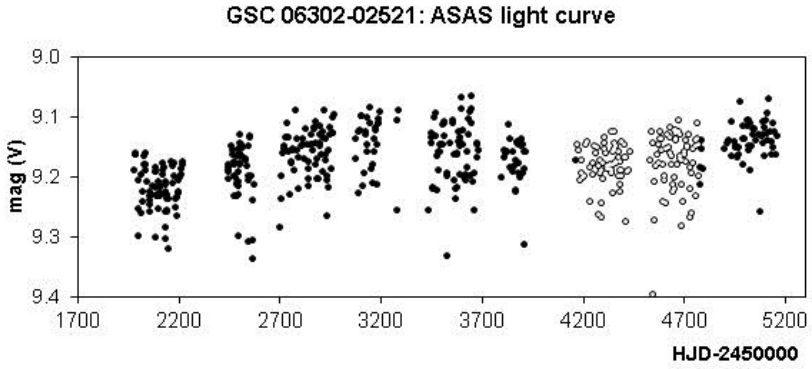


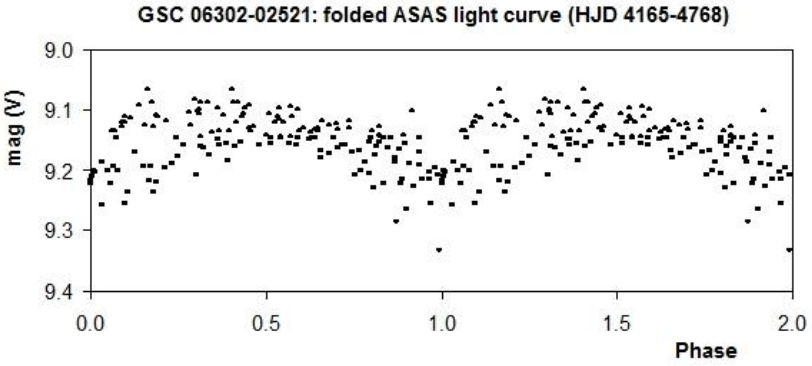
No. 99: GSC 07432-01663
Period: 3.244(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/192832-3508.0,asas3,0,0,500,0,0
2MASS J-K: 0.701
Johnson B-V = 0.692 (derived from Tycho-2)
ROSAT: HR1 = 0.84, HR2 =0.25 , fxfopt = -2.00
Proper motion: pmRA: -15.73 mas/yr, pmDE: -13.91 mas/yr (Roeser et al., 2008)
Spectral type: G8IIIe, SB2 Li: 90 (0.1pm, Torres et al., 2006)
ASAS variable (type DCEP-FO|EC)
Likely an RS CVn variable





No. 100: GSC 6302-02521
Period: 22.7(1) d
ASAS data: http://www.astrouw.edu.pl/cgi-asas/asas_variable/193504-1834.0,asas3,0,0,500,0,0
2MASS J-K: 0.848
Johnson B-V = 1.172 (derived from Tycho-2)
ROSAT: HR1 = 0.93, HR2 = 0.26, fxfopt = -2.48
Proper motion: pmRA: 3.16 mas/yr, pmDE: 2.13 mas/yr (Roeser et al., 2008)
Spectral type: K2III, Li: 30 (0.1pm, Torres et al., 2006)
Likely an RS CVn variable





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