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New Variable Stars in Ursa Major: Area of 9°.2×2°.3, Centered at α=13h38m, δ=53°30′

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#	Name	Other	Coord (J2000)	Type	Max	Min	System	Period	Epoch (JD)	type	Sp	Comment	L.Curve	Find.Chart	Data
1		USNO-A2.0 1425-07936760	13 18 51.30, +52 45 43.6	EW	14.69	15.44		0.2875	2456022.014	min		Comm. 1	lc_00434.png	ch_00434.png	out00434.txt
2		USNO-A2.0 1425-07918377	13 11 45.21, +52 52 09.6	RRAB	15.72	16.09		0.6404	2456022.254	max			lc_00598.png	ch_00598.png	out00598.txt
3		USNO-A2.0 1425-07917464	13 11 23.15, +53 17 28.8	RRAB	14.88	15.69		0.5946	2456022.161	max			lc_01036.png	ch_01036.png	out01036.txt
4		USNO-A2.0 1425-07909860	13 08 30.07, +53 17 32.8	EA	12.69	12.79		1.5924:	2456021.772	min		Comm. 4	lc_01059.png	ch_01059.png	out01059.txt
5		USNO-A2.0 1425-07916683	13 11 04.78, +54 32 26.3	RRAB	15.50	16.36:		0.5765	2456031.253	max			lc_01474.png	ch_01474.png	out01474.txt
6		USNO-A2.0 1425-07919848	13 12 20.85, +53 41 40.7	RRAB	14.57	15.11		0.6169	2456019.367	max			lc_01691.png	ch_01691.png	out01691.txt
7		USNO-A2.0 1425-07933902	13 17 47.43, +53 41 28.6	RRAB	15.47	16.09		0.5058	2456036.133	max			lc_01729.png	ch_01729.png	out01729.txt
8		USNO-A2.0 1425-07964667	13 29 05.17, +52 36 41.6	EW	14.76	15.40		0.2796	2456051.223	min		Comm. 8	lc_00291.png	ch_00291.png	out00291.txt
9		USNO-A2.0 1425-07973827	13 32 24.42, +53 07 55.9	EA	13.53	13.92		0.5681	2456049.059	min		Comm. 9	lc_00794.png	ch_00794.png	out00794.txt
10		USNO-A2.0 1425-07983652	13 35 52.54, +53 31 25.1	BY	13.55	13.66		8.9	2456045.4	max		Comm. 10	lc_01168.png	ch_01168.png	out01168.txt
11		USNO-A2.0 1425-07979026	13 34 14.71, +53 34 12.9	RRC	16.20	16.48		0.2780	2456045.363	max		Comm. 11	lc_01226.png	ch_01226.png	out01226.txt
12		USNO-A2.0 1425-07985594	13 36 30.90, +53 35 39.2	EW	12.83	13.12		0.2685	2456045.156	min		Comm. 12	lc_01241.png	ch_01241.png	out01241.txt
13		USNO-A2.0 1425-07965100	13 29 14.29, +53 34 46.3	EA	14.42	15.29		1.2812	2456048.749	min		Comm. 13	lc_01263.png	ch_01263.png	out01263.txt
14		USNO-A2.0 1425-07957319	13 26 22.69, +54 32 20.6	RS	12.76	12.84		5.0	2456045.3	max		Comm. 14	lc_01420.png	ch_01420.png	out01420.txt
15		USNO-A2.0 1425-07950307	13 23 48.75, +54 28 28.6	L:	12.85	12.93				other		Comm. 15	lc_01454.png	ch_01454.png	out01454.txt
16		USNO-A2.0 1425-07947889	13 22 53.45, +54 25 47.2	BY:	14.74	14.82		0.4137	2456045.316	max		Comm. 16	lc_01490.png	ch_01490.png	out01490.txt
17		USNO-A2.0 1425-07969460	13 30 50.90, +54 07 45.5	HADS	14.24	14.90		0.063309	2456051.278	max		Comm. 17	lc_02041.png	ch_02041.png	out02041.txt
18		USNO-A2.0 1425-08023238	13 49 24.82, +53 01 13.7	EW	14.28	14.63		0.2735	2456053.081	min		Comm. 18	lc_00695.png	ch_00695.png	out00695.txt
19		USNO-A2.0 1425-08017407	13 47 09.21, +52 59 20.9	EW	14.40	14.58		0.3432	2456049.296	max		Comm. 19	lc_00705.png	ch_00705.png	out00705.txt
20		USNO-A2.0 1425-07994272	13 39 20.45, +53 22 53.8	EW	13.51	13.78:		0.27355	2456044.193	min		Comm. 20	lc_01212.png	ch_01212.png	out01212.txt
21		USNO-A2.0 1425-08067806	14 06 32.06, +52 36 10.9	RRC	14.97	15.42		0.3332	2456018.142	max			lc_00216.png	ch_00216.png	out00216.txt

22		USNO-A2.0 1425-08040721	13 56 28.30, +54 29 22.3	RRAB	15.61	16.11		0.6352	2456037.194	max		Comm. 22	lc_01562.png	ch_01562.png	out01562.txt
23		USNO-A2.0 1425-08033861	13 53 40.30, +54 16 01.2	RRAB	15.37	16.12:		0.6446	2456037.272	max		Comm. 23	lc_02048.png	ch_02048.png	out02048.txt

Comments:

1. Min II = $15^m.31$.

4. Min II = $12^m.74$.

8. Min II = $15^m.36$.

9. Min II = $13^m.70$. O′Connell effect.

10. The star in the NSVS database: NSVS ID 5072183, NSVS ID 2724194, NSVS ID 2682439. The NSVS data confirm the star's type and period.
B = 14.6, R = 13.2 (USNO-A2.0). J = 11.995, H = 11.486, K = 11.430 (2MASS).

11. Type EW with the period $0^d.55595$ is also possible.

12. TSVSC1 TN-N111120113-1-67-2 (Damerdji et al. 2007).
Min II = $13^m.11$. O′Connell effect.

13. Min II = $14^m.94$. The period $1^d.56575$ is also possible.

14. USNO-A2.0 1425-07957319 is located at the distance of r = 13″.4 from the X-ray source 1WGA J1326.3+5432 (HR1 = 0.7308, HR2 = 0.2667), which is larger than the position error of the source (12″). Nevertheless, we believe this is the same object.
The star in the NSVS database: NSVS ID 2679420. The NSVS data confirm the star's type and period.
B = 14.4, R = 13.6 (USNO-A2.0). J = 10.851, H = 10.238, K = 10.071 (2MASS).

15. The star in the NSVS database: NSVS ID 2678698.
B = 14.2, R = 13.4 (USNO-A2.0). J = 11.438, H = 11.018, K = 10.887 (2MASS).

16. J = 12.122, H = 11.481, K = 11.305 (2MASS).

17. TSVSC1 TN-N111120221-1-67-2 (Damerdji et al. 2007).

18. Min II = $14^m.56$.

19. The star is present in the database of the Catalina Surveys, CSS J134709.1+525920. The Catalina data confirm the star's type and period.
B = 15.5, R = 14.6 (USNO-A2.0). J = 14.056, H = 13.759, K = 13.703 (2MASS).

20. The star is present in the database of the Catalina Surveys, CSS J133920.6+532253. The Catalina data confirm the star's type and period.
An unresolved double star. Min II = $13^m.70$.

22. The star is present in the database of the Catalina Surveys, CSS J135628.3+542922. The Catalina data confirm the star's type and period.

23. The star is present in the database of the Catalina Surveys, CSS J135340.3+541601. The Catalina data confirm the star's type and period.

Remarks:

In March and April, 2010, we observed four adjacent fields in Ursa Major. Our observations were performed in the observatory of the Siberian State Aerospace University, in the city of Krasnoyarsk, with a Hamilton telescope (D = 400 mm, F = 915 mm), equipped with an FLI ML9000 CCD chip (3056x3056 pixels, pixel size 12 µm). The exposure time was 30 seconds for each frame. The size of the four fields taken together is 9°.2 × 2°.3.
All our CCD observations were obtained without a filter. The magnitudes were referred to red magnitudes of comparison stars from the USNO-A2.0 catalog (Monet et al. 1998).
We used the VaST software (Sokolovsky & Lebedev 2005) to search for new variable stars. We discovered 21 new variable stars and confirmed two stars earlier reported without a variability type. Periods were derived using the WinEfk software provided by V.P. Goranskij. The coordinates in the Table are from the USNO-A2.0 catalog (Monet et al. 1998). Observations for several stars can also be found in the ROTSE-I/NSVS survey (Wozniak et al. 2004) or in the Catalina Surveys (Drake et al. 2009).

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