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Astrometry of minor planets made at the Skalnaté Pleso Observatory in the year 2011

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Abstract. The paper presents results of position determinations of minor planets carried out at the Skalnaté Pleso Observatory in 2011. A total of 162 accurate positions of 33 minor planets are given.
Key words: asteroids – astrometry

1. Introduction

The present paper is a continuation of our previous papers which gave the results of positional CCD observations of minor planets obtained at the Skalnaté Pleso Observatory (the last paper of this series being Neslušan, 2006) and contains the observations made in 2011. Missing observations from 2005 to 2010 will be published one after the other simultaneously with new obtained positions.

The observations were performed with a 0.61-m f/4.3 reflector and a CCD camera SBIG ST-10XME. We obtained CCD frames using a Johnson-Cousins R filter with 3×3 binning and resolution of 1.6 arcsec/px. We applied the standard calibration with dark and flatfield frames with IRAF tools. The positions of minor planets were made using the method of plate constants within software *Astrometrica* (Raab, 2011). The reference stars were selected from UCAC-3 and USNO-B1.0 star catalogues.

A total of 162 accurate positions of 33 minor planets are given, as well as a list of collaborators.

2. Positions of minor planets

Table 1 presents the results of positional CCD observations. The data have been arranged according to serial numbers of minor planets.

Table 1. The individual columns of the table contain the following information: N – ordinal number of observation, Date U.T. – date and time of the middle of the exposure, $R.A._{2000}$ – right ascension for equinox 2000.0 (in h, m, s), $Decl._{2000}$ – declination for equinox 2000.0 (in °, ′, ″), dα – the mean residual in R.A. (in s), dδ – the mean residual in Decl. (in ″), Magn. – magnitude of the minor planet in R filter, dmag – the mean residual in magnitude (in mag), Ref. st. – number of reference stars with a known position and/or magnitude, that are used to find the plate constants and photometric calibration of an image.

N	Date U.T.	$R.A._{2000}$ dα	$Decl._{2000}$ dδ	Magn. dmag	Ref. st.
		(1164) Kobolda			
1	2011 May 23.96748	17 18 27.53	+18 02 31.9	16.0	106
		0.01	0.2	0.2	
2	2011 May 24.01088	17 18 25.09	+18 02 42.6	16.2	103
		0.01	0.2	0.2	
3	2011 May 25.87169	17 16 42.32	+18 09 41.5	16.1	83
		0.01	0.2	0.2	
4	2011 May 25.93072	17 16 38.94	+18 09 53.7	16.3	78
		0.01	0.1	0.1	
5	2011 May 29.89060	17 12 51.72	+18 20 13.2	16.2	70
		0.01	0.1	0.1	
6	2011 May 29.98088	17 12 46.32	+18 20 23.1	16.2	78
		0.01	0.1	0.2	
		(1453) Fennia			
7	2011 Apr. 05.93672	10 07 59.87	+25 38 57.7	14.9	27
		0.01	0.2	0.1	
8	2011 Apr. 05.98730	10 07 57.81	+25 38 00.5	14.8	24
		0.01	0.2	0.1	
		(1717) Arlon			
9	2011 Oct. 09.87966	00 25 53.96	+09 33 01.8	14.3	23
		0.01	0.1	0.1	
10	2011 Oct. 09.93024	00 25 50.56	+09 32 50.6	14.2	24
		0.01	0.2	0.1	
11	2011 Oct. 17.72834	00 17 46.50	+09 03 04.3	14.6	18
		0.01	0.2	0.1	
12	2011 Oct. 17.97591	00 17 31.60	+09 02 07.1	14.4	11
		0.02	0.2	0.1	
13	2011 Nov. 15.73480	00 01 45.64	+07 46 38.7	14.7	28
		0.01	0.2	0.1	
14	2011 Nov. 15.84395	00 01 45.07	+07 46 34.7	14.8	28
		0.02	0.3	0.2	
15	2011 Nov. 19.87881	00 01 49.28	+07 45 33.2	14.8	27
		0.01	0.2	0.1	
16	2011 Nov. 19.93737	00 01 49.51	+07 45 33.5	14.9	27
		0.01	0.2	0.1	

N	Date U.T.		$R.A._{2000}$	$Decl._{2000}$	Magn.	Ref. st.
			dα	dδ	dmag	
17	2011 Nov.	21.76826	00 02 03.21	+07 46 03.7	14.9	32
			0.01	0.2	0.1	
18	2011 Nov.	21.88273	00 02 04.09	+07 46 06.8	15.0	28
			0.01	0.2	0.1	
19	2011 Nov.	23.68347	00 02 24.84	+07 47 13.8	14.8	22
			0.01	0.2	0.2	
20	2011 Nov.	23.83788	00 02 26.65	+07 47 21.2	14.9	20
			0.01	0.2	0.2	
21	2011 Nov.	27.71898	00 03 34.52	+07 51 51.7	15.2	24
			0.01	0.2	0.1	
22	2011 Nov.	27.85475	00 03 37.20	+07 52 04.1	15.1	21
			0.02	0.2	0.1	
23	2011 Nov.	29.69574	00 04 20.50	+07 55 12.0	15.1	27
			0.02	0.1	0.2	
24	2011 Nov.	29.83683	00 04 23.84	+07 55 28.0	15.2	28
			0.02	0.1	0.1	
			(1718) Namibia			
25	2011 Jul.	27.90197	20 26 14.60	−01 14 25.5	14.6	171
			0.01	0.1	0.2	
26	2011 Jul.	28.03796	20 26 08.44	−01 14 47.3	14.6	143
			0.01	0.1	0.2	
			(2501) Lohja			
27	2011 Sep.	30.88292	02 14 11.77	+14 50 23.7	15.8	33
			0.01	0.2	0.2	
28	2011 Sep.	30.93350	02 14 09.41	+14 50 16.1	15.5	36
			0.01	0.2	0.2	
29	2011 Oct.	02.01920	02 13 19.16	+14 47 24.8	15.7	35
			0.01	0.1	0.1	
30	2011 Oct.	02.12036	02 13 14.30	+14 47 08.2	15.5	32
			0.01	0.1	0.1	
31	2011 Oct.	02.88029	02 12 38.59	+14 45 02.7	15.9	17
			0.01	0.1	0.1	
32	2011 Oct.	02.97427	02 12 34.00	+14 44 47.2	15.7	15
			0.01	0.1	0.1	
33	2011 Oct.	03.95030	02 11 46.79	+14 41 59.8	15.5	31
			0.01	0.1	0.2	
34	2011 Oct.	04.04104	02 11 42.22	+14 41 44.0	15.7	36
			0.01	0.1	0.2	
35	2011 Oct.	04.85697	02 11 02.06	+14 39 18.6	15.6	23
			0.01	0.2	0.3	
36	2011 Oct.	05.06479	02 10 51.44	+14 38 41.1	15.4	24
			0.01	0.2	0.2	
			(2815) Soma			
37	2011 May	09.82721	12 09 48.28	+07 33 56.6	16.7	17
			0.01	0.2	0.2	

N	Date U.T.	$R.A._{2000}$ dα	$Decl._{2000}$ dδ	Magn. dmag	Ref. st.
38	2011 May 09.87929	12 09 47.29 0.01	+07 33 55.5 0.2	16.8 0.2	16
		(2897) Ole Romer			
39	2011 Aug. 25.94171	00 57 07.15 0.01	−01 32 05.4 0.2	16.8 0.1	17
40	2011 Aug. 26.10144	00 57 03.40 0.01	−01 32 35.3 0.2	16.7 0.1	15
41	2011 Aug. 29.91752	00 55 26.46 0.01	−01 45 27.0 0.2	16.5 0.1	29
42	2011 Aug. 30.01475	00 55 23.54 0.01	−01 45 48.3 0.1	16.7 0.1	25
43	2011 Sep. 01.02461	00 54 22.14 0.03	−01 53 16.1 0.4	16.7 0.1	24
44	2011 Sep. 01.07322	00 54 20.45 0.01	−01 53 29.1 0.2	16.6 0.2	27
45	2011 Sep. 03.03594	00 53 14.00 0.01	−02 01 14.3 0.2	16.3 0.2	29
46	2011 Sep. 03.09497	00 53 11.82 0.01	−02 01 28.7 0.2	16.5 0.2	30
47	2011 Sep. 03.90700	00 52 42.69 0.01	−02 04 48.2 0.1	16.4 0.2	25
48	2011 Sep. 03.98339	00 52 39.77 0.01	−02 05 07.3 0.2	16.5 0.1	20
		(3541) Graham			
49	2011 Apr. 21.87733	13 27 10.79 0.01	−01 40 34.3 0.1	14.8 0.1	25
50	2011 Apr. 21.95834	13 27 06.41 0.01	−01 40 17.6 0.1	14.8 0.1	23
51	2011 May 01.90962	13 19 08.89 0.01	−01 14 34.9 0.1	14.4 0.7	41
52	2011 May 01.97038	13 19 06.16 0.01	−01 14 28.7 0.1	14.5 0.6	40
53	2011 May 04.87098	13 17 07.39 0.01	−01 10 31.4 0.1	15.2 0.1	29
54	2011 May 04.92885	13 17 05.01 0.01	−01 10 27.7 0.1	15.3 0.1	27
55	2011 May 05.83734	13 16 30.38 0.01	−01 09 35.4 0.1	15.2 0.1	31
56	2011 May 05.91257	13 16 27.40 0.01	−01 09 31.7 0.3	14.9 0.1	23
		(3951) Zichichi			
57	2011 Jan. 25.98463	08 54 16.08 0.01	+10 48 53.8 0.1	14.7 0.1	50
58	2011 Jan. 26.01935	08 54 13.74 0.01	+10 48 57.1 0.1	14.9 0.1	45

N	Date U.T.	$R.A._{2000}$	$Decl._{2000}$	Magn.	Ref. st.
		dα	dδ	dmag	
59	2011 Jan. 26.97669	08 53 11.34	+10 50 29.8	14.7	62
		0.01	0.1	0.2	
60	2011 Jan. 27.01431	08 53 08.79	+10 50 33.6	14.9	58
		0.01	0.1	0.2	
61	2011 Jan. 27.95494	08 52 07.30	+10 52 10.3	14.7	44
		0.01	0.2	0.3	
62	2011 Jan. 28.02439	08 52 02.61	+10 52 17.5	14.7	43
		0.01	0.2	0.2	
63	2011 Jan. 28.98477	08 50 59.66	+10 54 01.6	14.9	58
		0.01	0.1	0.2	
64	2011 Jan. 29.05712	08 50 54.77	+10 54 09.5	14.8	52
		0.01	0.1	0.2	
65	2011 Jan. 30.90306	08 48 54.01	+10 57 43.5	14.8	56
		0.01	0.1	0.2	
66	2011 Jan. 30.97922	08 48 48.86	+10 57 52.7	14.8	57
		0.01	0.1	0.2	
67	2011 Jan. 31.87194	08 47 50.74	+10 59 41.9	14.7	54
		0.01	0.1	0.1	
68	2011 Jan. 31.97900	08 47 43.52	+10 59 55.3	14.7	54
		0.01	0.1	0.1	
69	2011 Feb. 01.76506	08 46 52.74	+11 01 34.3	14.6	50
		0.01	0.1	0.2	
70	2011 Feb. 01.84030	08 46 47.73	+11 01 44.3	14.7	46
		0.00	0.1	0.1	
71	2011 Feb. 07.79044	08 40 31.94	+11 15 24.5	14.7	46
		0.01	0.1	0.2	
71	2011 Feb. 07.87400	08 40 26.72	+11 15 36.9	14.7	51
		0.01	0.1	0.2	
73	2011 Feb. 12.91495	08 35 34.35	+11 28 06.0	15.5	51
		0.02	0.2	0.1	
74	2011 Feb. 13.03069	08 35 27.77	+11 28 23.1	14.9	46
		0.03	0.3	0.1	
75	2011 Feb. 21.78324	08 28 28.73	+11 49 58.9	15.2	58
		0.01	0.1	0.2	
76	2011 Feb. 21.87583	08 28 24.81	+11 50 12.4	15.2	60
		0.01	0.1	0.1	
77	2011 Mar. 07.78003	08 22 12.39	+12 18 44.5	15.8	65
		0.01	0.1	0.1	
78	2011 Mar. 07.84080	08 22 11.52	+12 18 50.6	15.9	68
		0.01	0.1	0.1	
79	2011 Mar. 09.77397	08 21 51.29	+12 21 51.6	15.7	76
		0.01	0.1	0.1	
80	2011 Mar. 09.84052	08 21 50.61	+12 21 57.6	15.7	78
		0.01	0.1	0.1	
81	2011 Apr. 03.77781	08 28 11.88	+12 32 56.4	16.5	62
		0.01	0.2	0.2	

N	Date U.T.	$R.A._{2000}$ dα	$Decl._{2000}$ dδ	Magn. dmag	Ref. st.
82	2011 Apr. 03.86172	08 28 14.85 0.01	+12 32 52.8 0.2	16.4 0.2	61
		(5342) Le Poole			
83	2011 May 10.00954	14 32 56.29 0.01	+08 40 41.8 0.1	15.7 0.2	38
84	2011 May 10.04148	14 32 54.78 0.01	+08 40 57.3 0.1	15.7 0.2	48
85	2011 May 11.80964	14 31 37.19 0.01	+08 54 25.6 0.1	15.9 0.1	29
86	2011 May 11.88419	14 31 33.78 0.01	+08 54 58.3 0.2	15.8 0.1	21
87	2011 May 13.85481	14 30 09.30 0.01	+09 08 30.8 0.2	16.1 0.1	34
88	2011 May 13.90539	14 30 07.05 0.01	+09 08 50.5 0.2	15.8 0.2	37
89	2011 May 19.94138	14 26 09.45 0.01	+09 40 38.7 0.1	15.8 0.1	30
90	2011 May 20.00388	14 26 07.07 0.01	+09 40 53.8 0.1	15.8 0.1	29
		(7343) Ockeghem			
91	2011 Feb. 01.98793	10 09 48.79 0.01	+16 33 04.6 0.2	16.1 0.2	66
92	2011 Feb. 02.03712	10 09 45.63 0.01	+16 33 17.9 0.2	16.3 0.2	66
93	2011 Feb. 27.73841	09 41 18.44 0.01	+18 09 51.4 0.2	16.5 0.2	59
94	2011 Feb. 27.81502	09 41 13.70 0.01	+18 10 02.3 0.2	16.6 0.2	57
95	2011 Mar. 03.88303	09 37 20.10 0.01	+18 17 46.8 0.2	16.8 0.1	56
96	2011 Mar. 03.92354	09 37 17.82 0.01	+18 17 50.6 0.2	16.8 0.1	60
		(13284) 1998 QB52			
97	2011 Aug. 09.84126	22 39 02.67 0.02	+04 37 05.1 0.3	16.2 0.1	34
98	2011 Aug. 10.01198	22 38 57.81 0.01	+04 35 56.0 0.1	16.3 0.1	32
99	2011 Aug. 17.82370	22 39 02.67 0.02	+04 37 05.1 0.3	16.0 0.2	38
100	2011 Aug. 17.87868	22 38 57.81 0.01	+04 35 56.0 0.2	15.8 0.2	37
101	2011 Aug. 21.89994	22 32 28.60 0.01	+02 54 56.2 0.2	16.2 0.2	48
102	2011 Aug. 21.94624	22 32 26.80 0.01	+02 54 27.9 0.2	15.8 0.2	47

N	Date U.T.		$R.A._{2000}$	$Decl._{2000}$	Magn.	Ref. st.
			dα	dδ	dmag	
103	2011 Aug.	23.84737	22 31 14.94	+02 34 52.8	16.2	51
			0.01	0.2	0.2	
104	2011 Aug.	23.89367	22 31 13.09	+02 34 23.8	15.7	49
			0.01	0.2	0.2	
		(39991) 1998 HR37				
105	2011 Sep.	26.86648	23 35 10.82	+00 00 59.4	16.8	29
			0.01	0.1	0.2	
106	2011 Sep.	26.91509	23 35 08.00	+00 00 46.7	17.0	29
			0.01	0.1	0.2	
107	2011 Sep.	27.99204	23 34 08.06	−00 03 52.6	17.1	18
			0.01	0.1	0.2	
108	2011 Sep.	28.04412	23 34 05.07	−00 04 05.9	16.9	20
			0.01	0.2	0.2	
		(46198) 2001 FS147				
109	2011 Nov.	29.69574	00 04 52.63	+07 52 42.2	18.5	27
			0.02	0.2	0.2	
110	2011 Nov.	29.83683	00 04 55.77	+07 52 05.0	18.3	28
			0.02	0.3	0.1	
		(59406) 1999 FM35				
111	2011 Sep.	27.99204	23 34 17.87	+00 03 53.6	17.3	18
			0.01	0.2	0.2	
112	2011 Sep.	28.04412	23 34 15.05	+00 03 31.7	17.1	20
			0.01	0.2	0.2	
		(59783) 1999 NN43				
113	2011 Mar.	07.78003	08 21 49.82	+12 19 51.6	18.3	65
			0.02	0.3	0.2	
114	2011 Mar.	07.84080	08 21 48.47	+12 20 06.7	18.1	68
			0.01	0.2	0.2	
		(60370) 2000 AG126				
115	2011 Jan.	25.98463	08 54 43.21	+10 45 11.8	17.8	50
			0.02	0.3	0.1	
116	2011 Jan.	26.01935	08 54 41.57	+10 45 24.9	17.8	45
			0.02	0.4	0.1	
		(63356) 2001 FG149				
117	2011 May	09.82721	12 09 30.05	+07 34 55.6	18.7	17
			0.02	0.2	0.2	
118	2011 May	09.87929	12 09 29.40	+07 35 00.4	18.8	16
			0.02	0.2	0.2	
		(70030) Margaretmiller				
119	2011 Sep.	04.82874	22 44 51.29	+06 25 44.8	17.0	27
			0.02	0.3	0.3	
120	2011 Sep.	04.90861	22 44 44.33	+06 25 54.0	16.9	27
			0.01	0.2	0.3	

N	Date U.T.	$R.A._{2000}$ dα	$Decl._{2000}$ dδ	Magn. dmag	Ref. st.
		(85294) 1994 SO9			
121	2011 Feb. 01.98793	10 09 27.46	+16 32 06.5	18.1	66
		0.01	0.2	0.2	
122	2011 Feb. 02.03712	10 09 24.90	+16 32 20.0	18.0	66
		0.01	0.2	0.2	
		(86525) 2000 DD76			
123	2011 Apr. 21.87733	13 26 54.54	−01 45 52.2	17.8	25
		0.01	0.1	0.1	
124	2011 Apr. 21.95834	13 26 50.48	−01 45 17.2	17.7	23
		0.01	0.1	0.1	
		(92925) 2000 RO22			
125	2011 May 09.82721	12 10 07.49	+07 36 00.5	17.7	17
		0.01	0.2	0.2	
126	2011 May 09.87929	12 10 07.76	+07 36 24.2	17.7	16
		0.01	0.2	0.2	
		(96705) 1999 JB117			
127	2011 Sep. 30.88292	02 13 54.98	+14 48 44.3	18.6	33
		0.04	0.5	0.2	
128	2011 Sep. 30.93350	02 13 52.61	+14 48 36.8	18.8	29
		0.03	0.5	0.2	
129	2011 Oct. 02.01920	02 13 03.38	+14 45 47.1	19.1	35
		0.04	0.6	0.1	
130	2011 Oct. 02.12036	02 12 58.56	+14 45 31.5	18.8	32
		0.02	0.3	0.1	
131	2011 Oct. 02.88029	02 12 23.41	+14 43 25.7	19.1	17
		0.02	0.4	0.1	
132	2011 Oct. 02.97427	02 12 18.93	+14 43 10.4	19.0	15
		0.01	0.1	0.1	
133	2011 Oct. 04.85697	02 10 48.02	+14 37 38.0	18.6	23
		0.02	0.4	0.3	
134	2011 Oct. 05.06479	02 12 18.93	+14 37 04.1	18.7	24
		0.03	0.5	0.2	
		(101029) 1998 QJ75			
135	2011 Jan. 31.87194	08 48 13.95	+11 05 38.6	18.1	54
		0.01	0.2	0.1	
136	2011 Jan. 31.97900	08 48 06.42	+11 05 44.3	18.0	54
		0.01	0.2	0.1	
137	2011 Feb. 07.79044	08 40 19.99	+11 12 24.8	18.0	46
		0.03	0.5	0.2	
138	2011 Feb. 07.87400	08 40 14.25	+11 12 29.7	18.1	51
		0.02	0.4	0.2	
		(106009) 2000 SG290			
139	2011 Oct. 17.72834	00 17 06.64	+09 01 45.0	18.5	18
		0.02	0.3	0.2	

N	Date U.T.		$R.A._{2000}$ dα	$Decl._{2000}$ dδ	Magn. dmag	Ref. st.
140	2011 Oct.	17.97591	00 16 56.89	+09 00 28.3	18.5	11
			0.03	0.3	0.1	
			(118822) 2000 SP137			
141	2011 Sep.	26.86648	23 35 22.39	−00 04 55.7	18.3	29
			0.01	0.2	0.2	
142	2011 Sep.	26.91509	23 35 19.90	−00 05 01.0	17.9	29
			0.01	0.2	0.2	
143	2011 Sep.	27.99204	23 34 26.79	−00 06 54.5	18.4	18
			0.02	0.3	0.2	
144	2011 Sep.	28.04412	23 34 24.15	−00 07 00.2	18.6	20
			0.02	0.4	0.2	
			(150742) 2001 QY85			
145	2011 Mar.	03.88303	09 36 53.79	+18 20 36.6	19.1	56
			0.02	0.3	0.1	
146	2011 Mar.	03.92354	09 36 51.83	+18 20 39.0	19.3	60
			0.01	0.2	0.1	
			(168138) 2006 GW49			
147	2011 Aug.	09.84126	22 38 32.68	+04 39 01.8	17.6	34
			0.06	1.0	0.1	
148	2011 Aug.	10.01198	22 38 25.93	+04 38 05.9	18.6	32
			0.02	0.3	0.1	
			(196405) 2003 GX37			
149	2011 Aug.	29.91752	00 55 55.72	−01 49 14.1	19.0	29
			0.02	0.3	0.1	
150	2011 Aug.	30.01475	00 55 52.34	−01 49 39.9	18.8	25
			0.02	0.3	0.1	
151	2011 Sep.	03.03594	00 53 37.03	−02 05 41.9	18.8	29
			0.03	0.5	0.2	
152	2011 Sep.	03.09497	00 53 35.10	−02 05 54.3	19.1	30
			0.02	0.3	0.2	
153	2011 Sep.	03.90700	00 53 04.39	−02 09 22.2	18.9	25
			0.01	0.2	0.2	
154	2011 Sep.	03.98339	00 53 01.56	−02 09 42.2	19.2	20
			0.02	0.3	0.1	
			(259379) 2003 HS50			
155	2011 Mar.	03.88303	09 36 38.25	+18 19 43.0	18.9	56
			0.02	0.3	0.1	
156	2011 Mar.	03.92354	09 36 36.17	+18 19 58.0	18.8	60
			0.02	0.3	0.1	
			(281115) 2007 BP15			
157	2011 Feb.	27.77740	09 41 11.31	+18 12 00.2	19.5	59
			0.03	0.5	0.2	

N	Date U.T.		$R.A._{2000}$ dα	$Decl._{2000}$ dδ	Magn. dmag	Ref. st.
158	2011 Feb.	27.81502	09 41 09.56	+18 12 13.7	19.3	57
			0.01	0.2	0.2	
			2006 WD204			
159	2011 Feb.	01.98793	10 09 24.29	+16 35 17.9	18.8	66
			0.02	0.2	0.2	
160	2011 Feb.	02.03712	10 09 21.79	+16 35 33.9	18.9	66
			0.02	0.3	0.2	
			2011 PH			
161	2011 Sep.	30.88292	02 14 28.40	+14 46 13.2	17.6	33
			0.02	0.2	0.2	
162	2011 Sep.	30.93350	02 14 27.53	+14 46 58.5	17.7	36
			0.02	0.2	0.2	

3. List of collaborators

Table 2. A list of people who participated in the observations and the position measurements and reductions.

Name	Exposures	Measurements	Reductions
G. Červák	37	–	–
M. Husárik	1	162	162
Z. Kaňuchová	1	–	–
Z. Krišandová	8	–	–
M. Pikler	37	–	–

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