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HI observations of nearby galaxies

IV. More dwarf galaxies in the southern sky*

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Abstract. In this paper we present H I observations of nearby galaxies from two more lists of the Karachentsev catalog of candidates for nearby dwarf galaxies in the southern sky. Observations north of declination $-31°$ were performed with the 100-m radio telescope at Effelsberg. Data for more southern galaxies were taken from HIPASS (`www.atnf.csiro.au/research/multibeam`). This sample is a supplement to the list of 94 southern dwarf galaxy candidates (1998, A&AS, 127, 409) located in the same declination range around the known Local Volume galaxies (i.e. galaxies within 10 Mpc, LV hereafter). We observed 17 galaxies not observed in the previous sample; and all 67 candidate dwarf galaxies from the SERC EJ sky survey (Karachentsev et al. 2000) and 81 objects from a supplementary list of candidate dwarf galaxies (Karachentseva & Karachentsev 2000). This yields a total of 165 (=17 + 67 + 81) galaxies. Overall we have a detection rate of 48%. The sample of detected galaxies has the following median parameters: radial velocity $V_{\rm LG} = 1127$ km s^{-1}, H I line width $W_{50} = 59$ km s^{-1}, absolute blue magnitude $M^0_{\rm BT} = -14.4$ mag, linear diameter $A_0 = 4.0$ kpc, hydrogen mass-to-luminosity ratio 1.6 $M_\odot/L_\odot$. The sample of known galaxies within the Local Volume increased from 179 in 1979 (Kraan-Korteweg & Tammann 1979) to 387 now. This corresponds to an increase in total luminosity of 22%. The known H I mass in the LV increased by 25%; the relative H I content $M_{\rm HI}/L_{\rm B}$ increased from 0.21 to 0.26 for the whole volume. However we still might have missed half of the dwarf galaxies in the Local Volume.

Key words. galaxies: distances and redshifts – radio lines: galaxies

1. Introduction

Including the present list of objects, all 601 candidate dwarf galaxies of the Karachentsev survey of the whole sky have been searched for in the H I line. In the northern sky the sample contains 173 candidates (Huchtmeier et al. 2000a, Paper I) plus 74 objects in the Local Void region (Huchtmeier et al. 2000b, Paper II) and 99 more objects (Karachentsev 2001, Paper III), i.e. 351 galaxies in total. For the southern sky there are 84 galaxies in Paper I plus 4 in Paper II and 2 in Paper III plus 160 in the present paper, i.e. a total of 250 southern objects.

The first step toward a reference sample of nearby galaxies was undertaken by Kraan-Korteweg & Tammann (1979) who published a list of 179 galaxies with corrected radial velocities $V_{\rm LG} < 500$ km s^{-1} with respect to the Local Group centroid. This sample was updated by Huchtmeier & Richter (1988, 1989) and Karachentsev (1994) to reach 215 galaxies. Over the last years the nearby galaxy census was increased by H I line surveys of the Milky Way (Henning et al. 1998), as well as a "blind" H I – survey of the southern sky with the Australian multibeam radio telescope (Kilborn et al. 1999; Banks et al. 1999). In addition to these activities 94 galaxies from the Karachentsev catalog were found to be within a distance of 10 Mpc, increasing the LV sample to a total of 387 galaxies. The advantage in investigating a nearby sample is that it is only for nearby galaxies that we have the sensitivity in the optical and radio domain to detect the intrinsically faintest galaxies and hence to study the luminosity function of galaxies and the H I mass function down to faint and tiny galaxies. The obvious disadvantages of the Local Volume are the facts that we do have an all sky sample, and that the zone of avoidance is a crowded and absorbed area. In addition, the local neutral hydrogen confuses extragalactic H I emission in the (heliocentric) velocity range $-150 \leq 30$ or ≤ 50 km s^{-1}, especially

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* Table 1 is also, and Table 2 only, available in electronic form at the CDS via anonymous ftp to `cdsarc.u-strasbg.fr (139.79.128.5)` or via `http://cdsweb.u-strasbg.fr/cgi-bin/qcat?J/A+A/377/801`

for faint HI lines. This only affects part of the Local Group galaxies and the M 81 group, the IC 342/Maffei group and the NGC 6946 group. Even in the Local Volume we are far from being complete, optically we are definitely incomplete for galaxies fainter than $m_{\rm BT} = 16$. A rough estimate shows that we might still miss half the galaxies in the Local Volume.

In this paper we present new HI observations in Sect. 2, and describe the data in Sect. 3 followed by a discussion in Sect. 4.

2. Observations

The 100-m radio telescope at Effelsberg has been used in the total power mode (ON-OFF) combining a reference field 5 min earlier in RA or another emission-free field with the on-source position. The dual channel HEMT receiver had a system noise of 30 K. The 1024 channel autocorrelator was split into four bands (each 6.25 MHz wide) of 256 channels each shifted in frequency by 5 MHz with respect to their neighboring band in order to cover a velocity range from –470 to 3970 $\rm km\,s^{-1}$ with a 1.5 MHz overlap between individual frequency bands. The resulting channel separation was 5.1 $\rm km\,s^{-1}$ yielding a resolution of 6.2 $\rm km\,s^{-1}$ (10.2 $\rm km\,s^{-1}$ after Hanning smoothing). The H I profiles observed with the 100-m radio telescope are presented in Fig. 1a in order of increasing RA H I profiles for galaxies from "supplementary dwarf galaxy candidates" (Karachentseva & Karachentsev 2000) are given in Fig. 1b. The half power beamwidth (HPBW) of the Effelsberg telescope at this wavelength is 9.3′.

3. The data

Optical data of our galaxies are given in Tables 1a and 1b corresponding respectively to Figs. 1a and 1b; Table 1c corresponds to H I data extracted from the HIPASS data bank (e.g. Barnes et al. 2001). Their successive columns contain: (1) the running number (kks, kksg, and kk); (2) and (3) equatorial coordinates (epoch 1950.0); (4) and (5) major and minor angular diameter measured on blue plates to the limiting isophote $\sim$(26.5−27.0) mag/□″ with an accuracy of ∼15%; (6) morphological type in the usual designations: Sph – spheroidal, Ir – irregular, Sm – irregular with signs of spiral structure; (7) mean surface brightness to the limiting isophote in a scale: H – high (22−23 mag/□″), L – low (∼24 mag/□″), VL – very low (∼25 mag/□″), EL – extremely low (∼26 mag/□″); (8) apparent blue magnitude of the galaxy estimated visually by I. Karachentsev (IK) with an accuracy of 0.5 mag based on comparison with other LSB galaxies having photometrically measured total magnitudes or from the NED; (9) reference for the magnitude; (10) galactic extinction A_b from Schlegel et al. (1998); (11) comments.

About 64% of the objects are classified as irregular (Ir or Ir?), 13.5% as spheroidal (Sph) while all kinds of disk galaxy types and BCD's are to be found among the other galaxies. The majority of all galaxies (90.1%) are low surface brightness galaxies while about a third of these (35%) having very low and extremely low surface brightness.

The measured and derived parameters of H I observations are given in Tables 2a–2c for the data sets corresponding to Tables 1a–1c. Table 2a and part of Table 2b display H I data obtained with the Effelsberg radio telescope. Table 2c and part of Table 2b contain H I data extracted from HIPASS. Their columns contain: (1) the running number; (2) the H I-flux in Jy $\rm km\,s^{-1}$; (3 the maximum emission and/or the rms noise in mJy; (4) the mean heliocentric radial velocity and its error; (5) the line widths at the 50%, the 25%, and the 20% level of the peak emission; (6) the radial velocity with respect to the Local Group centroid with the solar apex parameters: $V_{\rm A} = 316\ \rm km\,s^{-1}$, $l_{\rm A} = 93°$, $b_{\rm A} = -4°$ (Karachentsev & Makarov 1996); (7) the integrated absolute magnitude corrected for galactic extinction A_b (Schlegel et al. 1998) assuming a kinematic distance $D = V_{\rm LG}/H_0$ with a Hubble constant of $H_0 = 75\ \rm km\,s^{-1}\,Mpc^{-1}$; (8) the integrated H I mass-to-luminosity ratio in solar units, where

$$(M_{\rm H\,I}/M_\odot) = 2.35 \times 10^5 \times D^2 \times S_{\rm H\,I};$$

(9) the galaxy "*dynamical*" mass-to-luminosity ratio in solar units, where the indicative dynamical mass

$$M_{\rm dyn} = 0.83 \times 10^4 \times a \times W_{50}^2 \times D$$

is obtained from the measured angular blue diameter a (Table 1, Col. 4) in arcmin and the H I line width in $\rm km\,s^{-1}$; here we did not introduce a correction for galaxy inclination because of its uncertainty for irregular galaxies. Therefore the calculated value is a lower limit for the dynamical galaxy mass inside the isophote of ∼27 mag/□″; (10) comments concerning galaxy membership in groups or cases of confusion with galactic hydrogen emission.

4. Discussion

In Papers I to IV we have presented H I observations of galaxies of the whole Karachentsev catalog with an average detection rate of 52% (values are between 60% for Paper I and 42% for Paper II). Most profiles in Figs. 1a and 1b show the typical signature of dwarf galaxies, single-peaked narrow profiles. Only a few wider double-horned profiles are present.

In the following we will discuss the complete data set (Papers I to IV) in order to give an overview of the galaxy population in the Karachentsev catalog. As this catalog is the result of a search for candidate nearby dwarf galaxies, we expect faint galaxies with a small apparent extent. A cut-off of 0.5 arcmin was chosen in order to exclude low surface brightness galaxies at greater distances. In Fig. 2 we present the frequency distribution of the apparent blue diameter of all galaxies (in the D_{25} system) by steps of 0.1 arcmin starting with 0.5 arcmin (the cutoff) for all

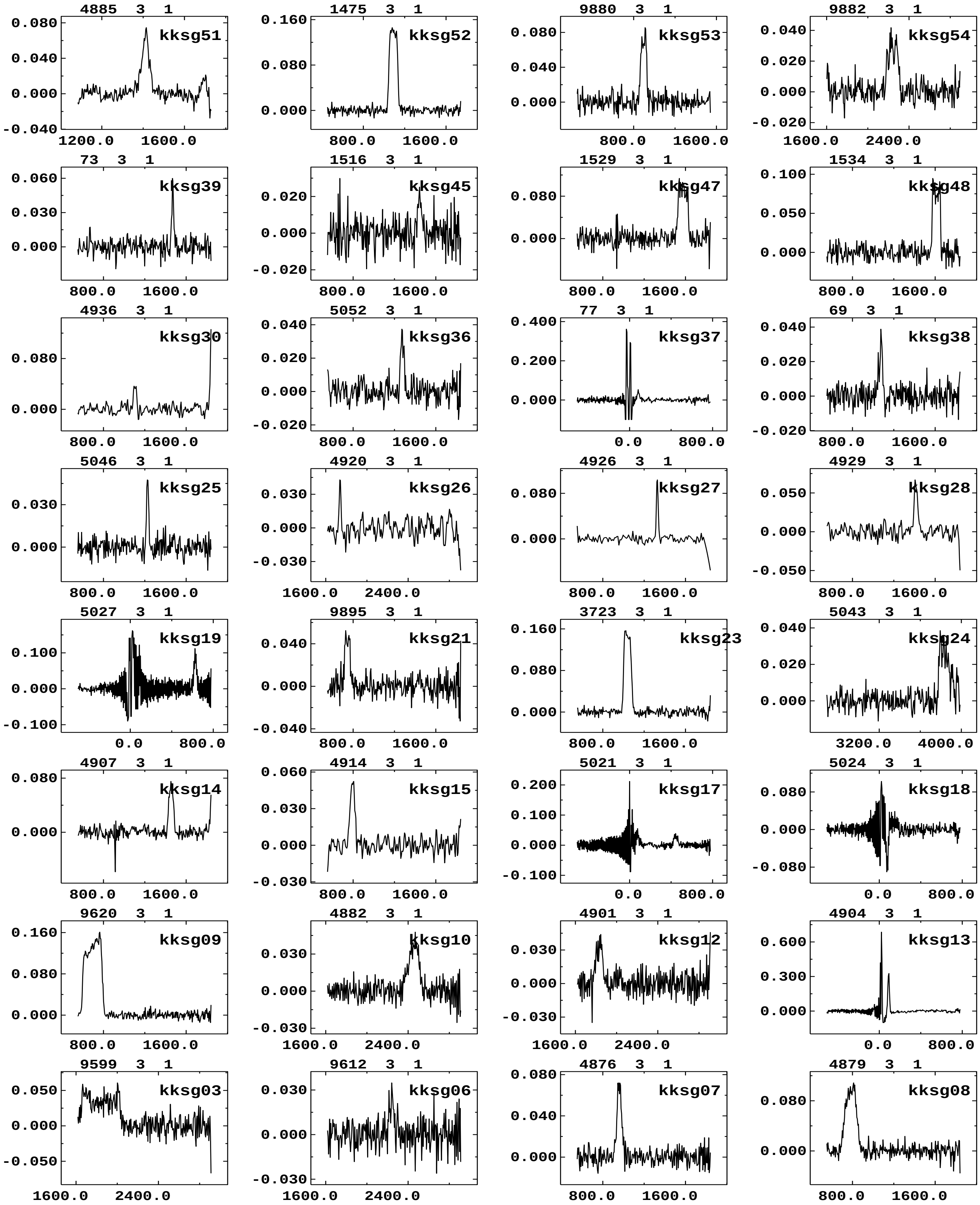

Fig. 1. a) H I profiles for dwarf galaxy candidates in the SERC EJ sky survey observed with the Effelsberg 100-m radio telescope. The profiles are arranged by increasing RA starting at the bottom left corner. The flux scale is in Jy, the heliocentric radial velocity (optical convention) in km s^{-1}. The velocity resolution of most spectra is 6.2 km s^{-1}. The profiles of kksg26, 27, and 30 have been Hanning smoothed (resolution: 10.2 km s^{-1}).

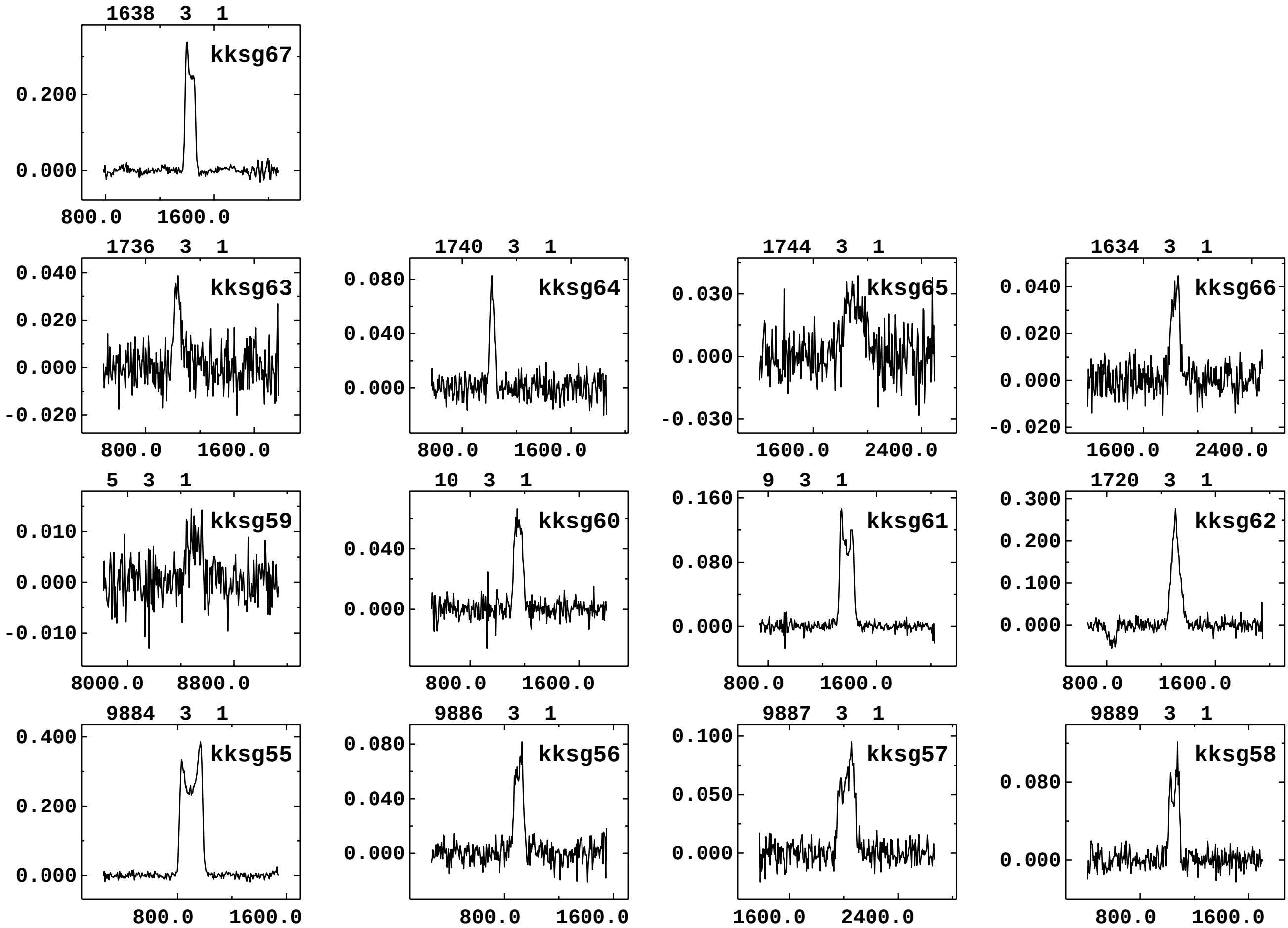

Fig. 1. a) continued.

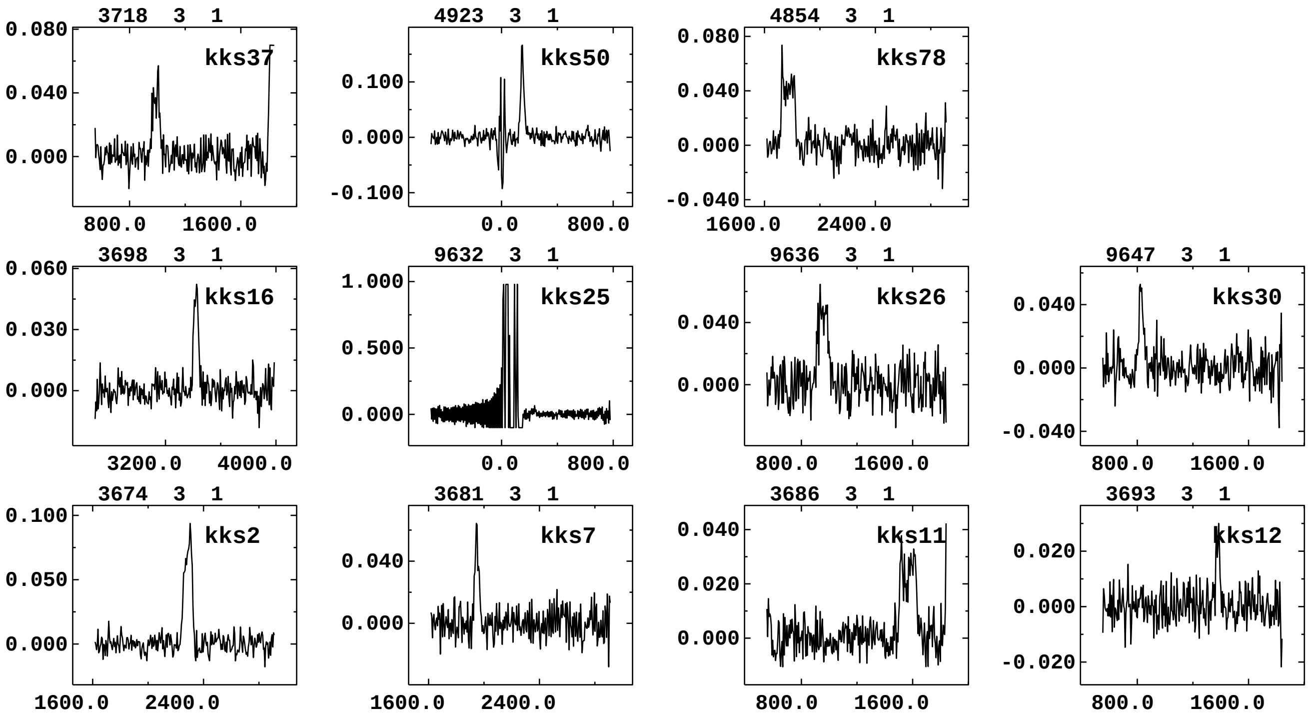

Fig. 1. b) H I profiles for dwarf galaxy candidates from Karachentseva & Karachentsev (2000) observed with the 100-m radio telescope at Effelsberg. The flux scale is in Jy, the heliocentric radial velocity in km s^{-1}. The velocity resolution of the spectra is 6.2 km s^{-1}.

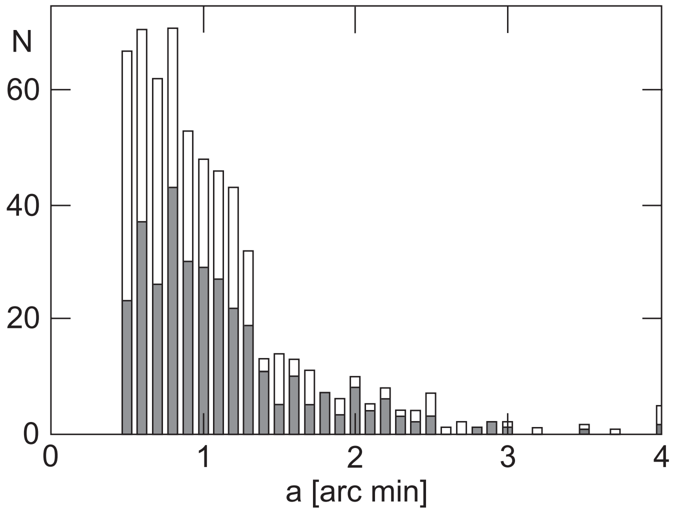

Fig. 2. The distribution of the apparent blue diameters a_{25} binned to 0.1 armin of fall galaxies (Papers I to IV) and the detected galaxies (in grey) is shown. There are 4 galaxies with apparent blue diameters between 4 and 6 arcmin not beyond the scope of this figure.

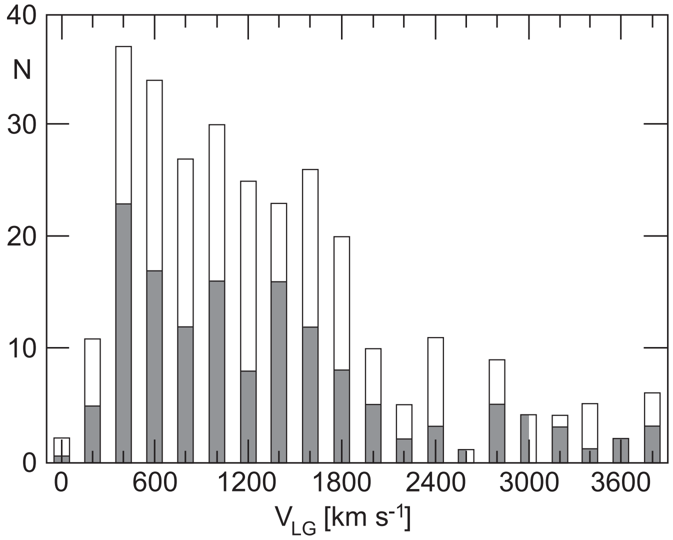

Fig. 3. The radial velocity (corrected for the motion of the Local Group), $V_{\rm LG}$, distribution is given for all detected galaxies and for the detected galaxies of Paper I (in grey) is given here, binned into velocity intervals of 200 km s^{-1} width.

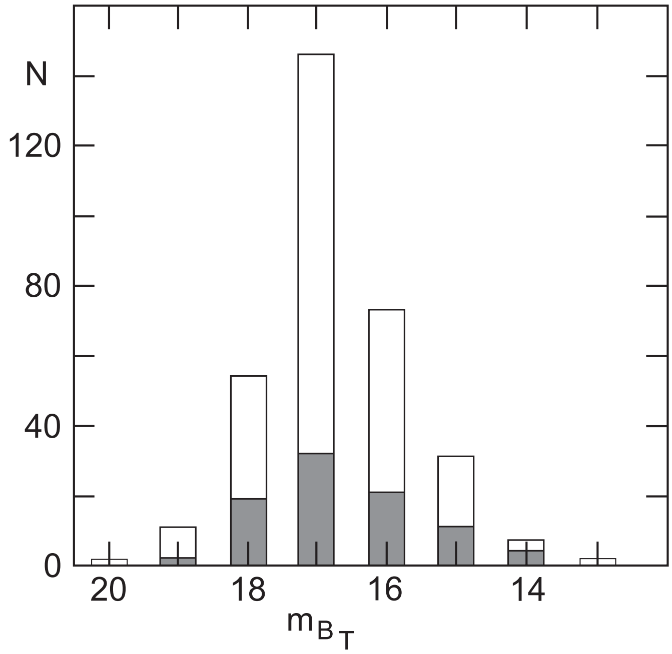

Fig. 4. The distribution of the apparent blue magnitude $m_{\rm BT}$ binned to 0.5 mag. of all detected galaxies (Papers I to IV) and the detected galaxies for the present data (Paper IV) is shown (in grey).

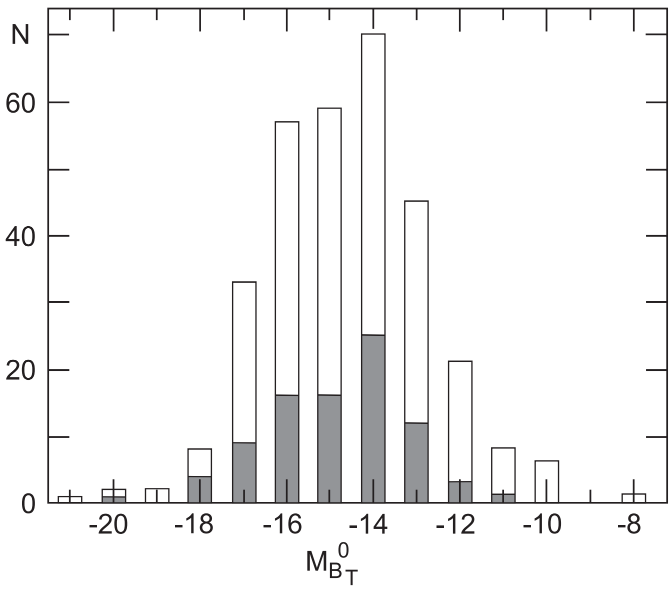

Fig. 5. The distribution of the absolute blue magnitude $M^0_{\rm BT}$ binned to 0.5 mag. of all detected galaxies (Papers I to IV) and the detected galaxies of the present paper (in grey) is shown.

galaxies and for the detected galaxies. The majority of the galaxies in this sample has small angular extent. More than 50% of the galaxies are smaller than 1 arcmin, a trend already found in Paper I.

As all other parameters are available for the detected galaxies we will only consider from now on the detected galaxies. The distribution of their radial velocities corrected for the motion of the Local Group, $V_{\rm LG}$, is given in Fig. 3 for the whole sample and for Paper I binned into velocity intervall of 200 km s^{-1}. The similarity of both samples is obvious. Most galaxies are relatively nearby; they belong to the Local supercluster. Next we will consider the distribution of apparent blue magnitudes. All detected galaxies fall within the range of apparent blue magnitude, $m_{\rm BT}$, between 13 m and 20 m (Fig. 4). The distribution of apparent blue magnitude peaks around $m_{\rm BT} = +17$ and falls down to fainter objects. This obviously is a sign of incompleteness but the cut-off at 0.5 arcmin diameter also reduces the number of faint galaxies.

The dwarfish character of the Karachentsev galaxies becomes evident when considering luminosity and size. We display in Fig. 5 the distribution of the galaxies in

Table 1. a) List of new dwarf galaxy candidates found in the SERC EJ zone.

kksg	RA (1950.0)	Dec	a	b	Type	S.B.	B_t	Ref.(B)	A_b	Notes
	h m s	° ′ ″	arcmin							
1	2	3	4	5	6	7	8	9	10	11
1	00 23 38.5	−11 19 50	5.0	4.3	Sph	VL			0.12	Cetus dw, LG member
2	00 37 44.6	−18 06 04	0.9	0.6	Sph/Ir	L			0.08	
3	01 32 16.7	−07 36 38	0.6	0.4	Ir	L	17.4	IK	0.14	NGC 615 5′ NE
4	02 39 19.2	−08 36 54	1.2	1.1	Sph	L			0.10	in NGC 1052 gr.?
5	02 47 03.0	−13 25 06	1.0	0.5	Ir	L			0.12	
6	04 27 59.2	−14 18 56	0.9	0.4	Ir	L	17.7	IK	0.64	
7	05 57 02.8	−13 05 28	0.8	0.2	Ir	L	17.7	IK	2.20	
8	06 42 15.2	−17 52 51	1.8	0.3	Ir	H	15.13	NED	1.79	
9	06 44 44.3	−17 53 10	0.5	0.35	Epec	H	17.2	IK	1.91	NGC 2283 22′S
10	07 10 28.9	−07 44 12	1.0	0.25	Ir	L	18.5	IK	3.38	
11	07 28 41.0	−00 52 04	0.7	0.4	Ir	L			0.47	
12	08 51 05.8	−17 47 42	0.5	0.4	Ir	L	17.4	IK	0.80	
13	09 33 05.4	−16 06 34	1.2	0.2	Ir	VL	18.2	IK	0.24	
14	09 37 55.0	−03 39 30	1.1	1.0	Ir	L	16.6	IK	0.23	
15	09 52 40.9	−06 02 00	1.3	0.3	Ir?	H	15.14	NED	0.18	comp. N 3115?
16	09 57 18.2	−09 06 39	0.9	0.7	Ir?	VL			0.31	comp. N 3115 ?
17	09 59 09.4	−08 00 27	1.4	0.25	Ir	H	15.5	NED	0.26	comp. N 3115?
18	10 03 12.3	−07 44 16	1.7	1.4	S0pec	H	13.84	NED	0.23	
19	10 22 00.5	−12 10 43	0.7	0.6	Ir	L	17.9	IK	0.30	
20	11 02 06.3	+00 19 40	0.4	0.4	Ir/Sph	L			0.16	comp. N 3521?
21	11 03 01.7	−01 35 36	1.7	0.8	Ir	L	17.3	IK	0.24	UGC 6145, comp. N3521?
22	11 03 34.5	−01 10 36	0.5	0.4	Ir?	L			0.20	comp. N 3521?
23	11 03 42.2	−14 08 04	3.5	1.2	Ir	L	15.8	IK	0.23	
24	11 11 20.3	−03 15 31	0.5	0.4	Ir	L	17.4	IK	0.25	
25	11 42 45.5	−16 59 46	1.2	0.7	Ir	VL	18.2	IK	0.17	
26	11 51 18.3	−14 44 51	1.8	1.1	Ir	VL	17.8	IK	0.17	
27	12 19 30.9	−09 31 23	0.8	0.3	Ir	L	17.7	IK	0.19	
28	12 21 22.0	−14 40 34	1.2	1.0	Ir	EL	18.6	IK	0.25	
29	12 34 38.4	−10 13 21	1.4	0.6	Ir	L			0.12	comp. N 4594?
30	12 35 00.5	−08 35 32	1.0	0.5	Ir	L	17.3	IK	0.14	comp. N 4594?
31	12 35 58.0	−10 12 56	0.8	0.7	Sph	VL			0.13	comp. N 4594?
32	12 37 18.3	−11 28 35	0.6	0.5	Sph	EL			0.21	comp. N 4594?
33	12 37 32.7	−12 05 25	0.4	0.4	Sph	VL			0.20	comp. N 4594?
34	12 38 42.7	−11 39 12	0.8	0.7	Sph	VL			0.23	comp. N 4594?
35	12 39 58.6	−14 40 02	0.4	0.4	Ir	EL			0.22	
36	12 44 02.8	−03 48 10	0.9	0.65	Ir	L	17.4	IK	0.10	
37	12 45 24.2	−12 23 00	0.6	0.5	Sph?	VL	18.7	IK	0.22	
38	12 50 56.6	−05 39 25	1.2	0.5	Ir	L	17.0	IK	0.15	
39	12 51 06.5	−05 48 46	0.8	0.6	Sph	EL	18.5	IK	0.17	
40	12 57 15.7	−13 51 04	1.0	0.6	Ir	VL			0.20	
41	13 03 07.6	−07 29 29	1.4	1.1	Ir	L			0.20	comp. N 4948?
42	13 03 42.7	−07 49 31	1.2	0.9	Ir	VL			0.20	comp. N 4948?
43	13 06 39.6	−17 05 55	0.7	0.5	Ir?	EL			0.31	
44	13 30 23.5	−12 00 20	0.5	0.3	Ir	L			0.26	
45	14 11 06.0	−01 57 12	0.6	0.4	Sph?	L	17.5	IK	0.29	

Table 1. a) continued.

kksg	RA (1950.0)	Dec	a	b	Type	S.B.	B_t	Ref.(B)	A_b	Notes
	h m s	° ′ ″	arcmin							
1	2	3	4	5	6	7	8	9	10	11
46	14 25 47.0	−08 41 55	0.5	0.5	Ir	L			0.25	
47	14 32 38.5	−16 56 43	1.8	0.9	Ir	L	17.7	IK	0.33	
48	16 03 02.4	−04 26 16	1.3	1.0	Ir	L	18.2	IK	1.19	
49	16 40 45.7	−07 58 00	1.1	0.4	Ir	L			1.72	
50	17 39 00.1	−04 35 59	1.3	0.5	Ir	L			3.08	
51	02 31 28.0	−06 34 44	0.8	0.4	Ir	L	15.4	IK	0.11	
52	02 46 50.9	−02 51 43	0.9	0.5	Ir/SB	L	16.9	IK	0.22	
53	04 06 39.3	−08 45 28	1.0	0.6	Ir/S	L	17.3	IK	0.23	
54	05 39 36.7	−12 35 09	1.0	0.4	Ir/Sm	L	15.4	IK	0.73	
55	05 47 55.8	−10 18 45	2.0	0.9	SB/Ir	L	17.4	IK	3.57	
56	05 49 44.0	−11 09 05	0.9	0.8	Sph/Ir	VL	15.5	NED	2.90	pair w.No55
57	08 41 04.4	−17 12 15	1.8	0.5	Ir	L	16.1	IK	0.32	
58	10 50 29.1	+02 45 33	1.5	0.5	Ir	L	17.4	NED	0.16	CGCG08-043 at 8.8′
59	11 10 13.9	−00 17 39	0.5	0.4	Ir	L	17.8	NED	0.17	
60	12 20 35.1	−13 40 05	1.4	0.9	Ir	L	16.2	IK	0.21	
61	12 42 18.7	−08 51 15	4.0	1.8	Sm	L	15.1	IK	0.16	UGCA295
62	12 56 29.6	−11 57 31	1.2	0.8	Ir	L	16.6	IK	0.18	
63	13 23 43.5	+02 43 06	0.8	0.4	Ir	L	16.8	NED	0.10	
64	13 25 39.4	+02 32 20	0.8	0.45	Ir	L	16.3	NED	0.12	
65	14 11 47.0	−02 47 59	0.8	0.25	Ir	L	15.8	NED	0.30	
66	14 31 20.7	+01 42 14	1.0	0.2	Ir	L	17.4	NED	0.20	
67	20 06 41.4	−06 26 05	2.2	1.4	S	L	15.3	IK	0.34	

absolute blue magnitude $M^0_{\rm BT}$ binned into magnitude intervals of 1 magnitude. Apart from a few bright galaxies all objects are fainter than $M^0_{\rm BT} = -18$, i.e. dwarfs. More than half of the detected galaxies are fainter than $M^0_{\rm BT} = -15$. The distribution of galaxies from Paper IV is similar to that for the whole sample. In Fig. 6 the size distribution of the galaxies in linear extent, A_0 [kpc], in the de Vaucouleurs D_{25} system, is given for the whole sample and for Paper I. Over 50% of the galaxies are smaller than 3.5 kpc, as in Paper I. The indicative H I surface density is derived by dividing the HI mass by the surface of the galaxy ($a^2 2.3^2 \pi$), assuming the H I extent to be 2.3 times the optical extent, $r_{\rm HI} = 2.3 \times r_{25}$ (Salpeter & Hoffman 1996). The dynamical mass has been calculated without inclination correction because of the large uncertainty of the inclinations of dwarf galaxies.

Our sample of galaxies (Papers I to IV) may be described by the following parameters (median values):

- apparent blue diameter a: 0.9 arcmin,
- apparent blue magnitude $m_{\rm BT} = 16.22$,
- half power line widths $W_{50} = 51$ km s^{-1},
- linear diameter $A_0 = 3.2$ kpc,
- absolute blue magnitude $M^0_{\rm BT} = -14.8$,
- mass of neutral atomic hydrogen $M_{\rm H\,I} = 1.5 \times 10^8\ M_\odot$,
- relative H I content $M_{\rm H\,I}/L_{\rm B} = 2.8$,
- H I surface density $\sigma_{\rm H\,I} = 3.4\ M_\odot/{\rm pc}^2$,
- dynamical mass (not corrected for inclination) $M_{\rm dyn} = 3.6 \times 10^8\ M_\odot$,
- mass-to-luminosity ratio $M_{\rm dyn}/L_{\rm B} = 2.4$.

Recently Eder & Schombert (2000) presented H I data for gas rich dwarf galaxies selected from the POSS II survey and observed with the 305-m Arecibo radio telescope. Their sample has about the same median $M_{\rm H\,I}/L_{\rm B}$ ratio, 2.0 compared to 2.8 for our sample, but their mean H I mass ($8 \times 10^8\ M_\odot$) exceeds the median of our sample by a factor 5 to 6; the dynamical masses for their sample are much higher than for our sample. Therefore, they observed a more distant sample of larger and more massive galaxies.

Eder & Schombert (2000) used estimated H I radii for their sample of low surface brightness (LSB) galaxies and derived an average H I surface density range from 0.6 to 20 $M_\odot/{\rm pc}^2$, all well below the critical threshold for star formation which is in the range 5 to 30 $M_\odot/{\rm pc}^2$ (Kennicutt 1998). This is true for our sample, too, where the median values for the H I surface density decrease from 4.1 (to 3.4 to 2.7) to 2.6 $M_\odot/{\rm pc}^2$ with decreasing surface brightness (from high to low to very low to extremely low SB). This decrease is in agreement with Paper I and with de Blok (1997) who compares the H I surface density

Table 1. b) List of new dwarf galaxy candidates found in the southern sky.

kks	RA (1950.0)	Dec	a	b	Type	S.B.	B_t	Ref.(B)	A_b	Notes
	h m s	° ′ ″	arc	min						
1	2	3	4	5	6	7	8	9	10	11
1	02 12 45.1	−32 26 31	0.80	0.70	Ir	LV	18.0:	IK	0.09	
2	02 23 38.7	−19 55 07	1.30	0.60	Ir	L	16.23	NED	0.14	
3	02 24 23.1	−73 44 16	2.50	1.00	Sph?	VL	16.0:	IK	0.22	
4	03 12 06.1	−66 27 22	2.0:	1.0:	Ir	EL	17.8:	IK	0.14	comp. to NGC 1313
5	03 12 12.4	−38 10 42	1.20	0.70	Sph	L	17.18	NED	0.07	
6	03 13 47.5	−66 34 32	3.2:	1.4:	Ir	EL	17.0:	IK	0.24	comp. to NGC 1313
7	03 15 28.0	−25 05 30	1.20	0.60	Ir	L	17.2	IK	0.05	
8	03 19 37.2	−42 10 40	1.10	0.90	Ir	L	16.37	NED	0.05	
9	03 33 36.1	−51 37 11	1.3:	1.0:	Ir	VL	16.24	NED	0.06	
10	03 37 33.1	−31 57 12	1.20	0.70	Ir	L	16.9	IK	0.04	
11	03 40 08.9	−22 54 54	1.90	1.40	S	VL	14.92	NED	0.08	projected on E482-36
12	03 41 49.2	−25 04 48	1.0:	0.7:	Ir	L	17.49	NED	0.06	
13	03 47 12.8	−48 34 18	1.10	0.80	Ir	L	16.39	NED	0.04	
14	05 26 23.6	−63 36 16	0.70	0.55	Ir	EL	17.8	IK	0.22	near NGC 1947
15	05 26 45.5	−63 16 41	1.70	0.80	Ir?	VL	16.81	NED	0.24	near NGC 1947
16	05 30 10.8	−17 43 54	0.70	0.40	Ir	L	17.8	IK	0.32	
17	05 32 13.0	−61 57 49	0.95	0.65	Ir	VL	17.4	IK	0.26	
18	06 03 55.2	−33 04 33	3.5:	2.5:	Ir?	L	13.58	NED	0.19	
19	06 15 06.3	−57 42 27	1.40	1.00	Ir	L	15.85	NED	0.17	ESO 121-G020
20	07 01 21.5	−44 59 30	1.10	0.50	Ir	L	16.19	NED	0.41	
21	07 14 52.7	−40 00 21	1.30	0.40	Ir	L	16.32	NED	1.17	
22	07 31 04.6	−35 22 50	1.20	0.80	Ir	VL	16.7	IK	1.94	
23	07 42 13.9	−45 01 45	0.90	0.90	Sph?	EL	17.5	IK	1.49	
24	07 50 14.8	−55 19 22	1.10	0.90	Ir	L	17.3	IK	0.89	
25	07 54 33.4	−26 07 03	0.50	0.40	Ir	VL	17.7	IK	1.45	
26	07 55 43.5	−26 44 00	0.80	0.35	Ir	VL	18.0	IK	2.67	
27	08 44 39.8	−21 36 43	0.80	0.60	Ir	L	17.4	IK	0.74	
28	08 52 39.5	−32 37 34	1.20	0.50	Ir	VL	17.42	NED	1.36	
29	09 08 51.2	−63 41 27	0.75	0.45	Ir	VL	17.5	IK	0.89	
30	09 20 51.7	−19 57 10	0.60	0.40	Im	H	15.53	NED	0.27	
31	09 30 38.2	−33 01 20	1.3:	0.7:	Ir	L	16.4	IK	0.58	
32	09 32 24.3	−74 01 55	0.80	0.60	Ir	VL	16.69	NED	0.48	
33	09 53 30.2	−67 50 06	0.70	0.50	Sph?	L	17.2	IK	0.80	
34	10 03 11.4	−31 47 17	0.80	0.40	Ir	L	17.5	IK	0.45	
35	10 05 32.0	−64 07 16	1.00	0.90	Ir?	VL	14.3	NED	0.93	
36	10 28 25.0	−46 00 51	1.60	1.20	Sph?	L	14.86	NED	0.77	
37	10 29 18.9	−21 59 33	1.20	0.60	Ir	L	16.44	NED	0.28	
38	10 43 38.3	−44 25 04	0.80	0.40	Ir	L	16.8	IK	0.77	
39	10 53 00.6	−47 26 12	1.10	0.80	Ir	VL	17.5	IK	0.93	
40	10 55 16.8	−47 54 40	2.00	1.20	Ir?	VL	16.03	NED	0.95	
41	11 17 39.2	−68 48 49	0.90	0.60	Ir	VL	18.0	IK	1.20	
42	11 24 11.0	−72 20 19	1.00	0.60	Ir?	VL	17.8	IK	1.46	
43	11 32 51.7	−41 16 14	0.70	0.50	Ir?	VL	17.9	IK	0.35	
44	11 35 25.2	−38 56 37	1.40	0.90	Ir	H	15.85	NED	0.61	
45	11 37 59.9	−46 55 44	0.60	0.50	Ir	VL	18.2	IK	0.71	

Table 1. b) continued.

kks	RA (1950.0)	Dec	a	b	Type	S.B.	B_t	Ref.(B)	A_b	Notes
	h m s	° ′ ″	arc	min						
1	2	3	4	5	6	7	8	9	10	11
46	11 40 02.3	−25 38 08	0.80	0.70	Ir	L	16.60	NED	0.20	
47	11 54 57.6	−27 50 45	1.30	1.10	Ir/Sph	VL	17.5	IK	0.32	conf. E440-35
48	12 03 01.0	−43 29 30	1.30	0.90	Ir	L	17.20	NED	0.53	
49	12 05 02.6	−30 54 58	0.80	0.60	Ir/Sph	L	17.25	NED	0.28	
50	12 06 55.1	−30 05 07	0.60	0.45	Sph?	L	18.0	IK	0.25	
51	12 41 36.2	−42 39 58	0.90	0.40	E/Sph	L	16.7	IK	0.38	
52	12 55 13.5	−45 32 31	1.60	1.10	Ir/Sm	VL	16.4	IK	0.38	
53	13 08 24.3	−38 38 26	0.80	0.70	Sph	VL	17.3	IK	0.38	
54	13 18 44.5	−31 37 29	1.10	0.75	Ir?	EL	17.6	IK	0.29	
55	13 19 17.8	−42 28 00	0.80	0.70	Sph	EL	18.5	IK	0.63	Centaurus. gr.
56	13 32 56.1	−56 16 46	1.10	0.95	Ir?	L	16.7	IK	3.02	
57	13 38 38.5	−42 19 47	0.80	0.70	Sph	EL	18.1	IK	0.39	Centaurus gr.?
58	13 43 05.7	−36 04 41	1.00	0.70	Sph?	VL	17.1	IK	0.27	
59	13 44 43.9	−53 06 08	3.00	1.30	Ir	L	14.2	NED	2.13	
60	13 50 42.2	−61 59 18	1.70	1.20	RN?	L	17.1	IK	77.92	
61	15 05 56.6	−67 45 15	1.50	0.60	Ir	L	18.0	IK	0.79	
62	15 40 49.7	−27 55 07	1.00	0.50	Ir	L	18.1	IK	0.90	
63	15 56 42.3	−31 08 45	2.5:	1.5:	Ir?	EL	16.0	IK	0.94	
64	16 06 01.7	−65 37 14	0.90	0.75	Ir?	L	16.9	IK	0.56	
65	16 44 08.9	−27 05 17	0.80	0.60	S?	L	17.5	IK	1.24	
66	16 49 29.1	−59 00 29	1.50	0.70	Ir	VL	16.7	IK	0.58	comp. to NGC 6221?
67	17 00 38.2	−18 48 14	0.70	0.70	Ir	VL	17.7	IK	1.40	
68	18 18 05.8	−62 17 42	1.00	0.55	Ir	L	16.59	NED	0.34	
69	18 46 22.8	−64 04 02	0.40	0.30	Ir	L	18.09	NED	0.37	comp. to NGC 6744?
70	19 02 12.3	−64 02 28	0.55	0.50	Ir?	L	17.7	IK	0.20	comp. to NGC 6744?
71	19 04 00.6	−63 48 41	2.70	0.70	Ir	L	15.10	NED	0.19	comp. to NGC 6744
72	19 07 40.0	−63 56 21	0.60	0.45	Ir	VL	17.9	IK	0.17	comp. to NGC 6744?
73	19 17 20.4	−60 46 41	1.20	1.00	Ir	L	16.9	IK	0.23	
74	19 23 16.9	−61 06 43	0.90	0.45	Ir	VL	17.6	IK	0.34	
75	20 17 21.2	−22 03 48	0.50	0.45	Ir	L	18.2	IK	0.34	
76	20 39 57.8	−61 26 52	0.80	0.70	Ir	L	17.11	NED	0.23	
77	20 49 44.9	−39 06 43	0.80	0.30	Ir	L	17.8	IK	0.24	
78	21 50 30.9	−26 48 54	1.10	0.50	Ir	L	16.25	NED	0.15	
79	22 04 02.0	−46 39 31	0.9:	0.7:	Sph?	L	17.5	IK	0.06	
80	22 12 51.8	−59 46 48	0.90	0.70	Ir	L	17.4	IK	0.11	
81	22 44 29.4	−19 06 33	1.10	0.60	Ir	L	16.47	NED	0.14	

from high surface brightness galaxies (spiral galaxies of late type) of 6 to 7 $M_\odot/\mathrm{pc}^2$ with a value of $\sim$3.2 $M_\odot/\mathrm{pc}^2$ for LSB galaxies. For LSB galaxies a trend of decreasing H I surface density with decreasing surface brightness has been observed (e.g. van de Hulst et al. 1993). We do confirm that the H I surface density decreases with decreasing surface brightness, which seems to suggest a correlation with star formation rate. On the other hand the galaxies in our sample are so small that their size and luminosity is outside the range of galaxies studied by Kennicutt (1998), which complicates a direct comparison.

5. Conclusion

In this paper we present H I observations of two other lists of the Karachentsev catalog of candidates for nearby dwarf galaxies. The detection rate for these 165 galaxies is 48%. Including Papers I to III we have now performed H I observations of all the published Karachentsev dwarf galaxies. We discuss the whole sample of 601 galaxies and confirm the dwarfish character of these galaxies by the shape and linewidths ($\langle w_{50}\rangle = 51$ km s^{-1}) of the H I profiles, their linear sizes ($\langle A_0\rangle = 3.2$ kpc)

Table 1. c) List of new dwarf galaxy candidates from the kk list.

kk	RA (1950.0)	Dec	a	b	Type	S.B.	B_t	Ref.(B)	A_b	Notes
	h m s	° ′ ″	arcmin							
1	2	3	4	5	6	7	8	9	10	11
11	01 06 03.4	−38 28 35	0.9	0.4	Im	H				K3, AM0106-382 distant?
47	05 27 49.0	−87 37 36	1.0	0.45	Im	L	17.78	NED	0.652	AM 0528-873
63	07 37 20.0	−69 13 38	1.5	0.9	Sph	VL				FG219, AM0737-691
87	10 12 37.6	−44 36 08	1.2	1.0	Sm?	H	13.49	NED	0.902	AM 1012-443
88	10 13 57.4	−39 44 23	0.9	0.5	Ir	VL	16.7	IK	0.592	AM 1013-394
179	13 00 40.5	−46 19 07	1.2:	0.9:	Sph	L				FG367, AM1300-461
272	13 03 33.1	−49 33 38	1.6	0.6	Ir	L	17.83	NED	0.822	ESO 219-G027
184	13 06 15.0	−50 44 46	1.9	0.4	Ir	H				AM1305-501 distant?
189	13 09 53.2	−41 34 01	1.0	0.6	Sph?	VL				EL in R
190	13 10 14.6	−44 37 28	2.7	1.7	Sph	L				FG373, AM1310-443
197	13 19 06.8	−42 16 20	1.5	1.1	Sph	VL				near NGC 5128
203	13 24 29.6	−45 05 36	0.5	0.5	Ir/Sph	L				AM1324-450
211	13 39 03.4	−44 57 11	1.2	1.1	Sph?	L				AM1339-445
213	13 40 34.6	−43 31 04	0.6	0.3	Sph?	VL				EL in R
214	13 40 44.0	−45 29 41	0.75	0.4	Ir	L				AM1340-453 distant?
217	13 43 13.4	−45 26 06	1.0	0.9	Sph	L				AM1343-452
221	13 45 40.5	−46 44 54	1.5:	1.0:	Sph	EL				near br.star
222	13 46 04.9	−47 57 21	0.5	0.4	Ir/Sph	L				AM1346-475
226	13 53 01.2	−45 24 47	1.1	0.7	Ir	L	15.73	NED	0.311	
235	15 03 11.2	−39 42 36	0.8	0.6	Ir	L				FG438 distant?
239	15 25 33.2	−42 36 36	1.9	0.7	Ir	L	15.06	NED	0.621	FG444
244	19 09 20.3	−61 59 57	0.45	0.45	Sph?	L	17.0:	IK	0.239	AM1909-615
248	20 22 46.0	−71 34 23	0.8	0.4	Ir	L	15.87	NED	0.208	FG499 distant?
256	22 09 04.6	−43 25 29	0.6	0.5	Im	L	16.89	NED	0.053	AM 2209-432
260	23 11 46.9	−43 52 39	4.5	1.8	Ir	VL	15.0:	IK	0.049	

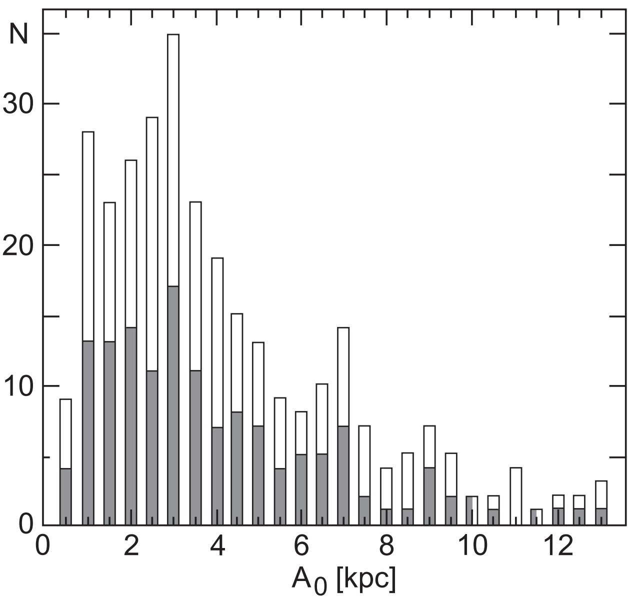

Fig. 6. The distribution of the linear blue diameters A_0 [kpc] binned to 0.5 kpc of all galaxies (Papers I to IV) and the detected galaxies of Paper I (in grey) is shown. There are seven galaxies with linear diameters A_0 between 13 and 17 kpc beyond the scope of this figure.

and absolute magnitudes ($\langle M^0_{BT} \rangle = -14.8$). Histograms of Figs. 3 to 6 demonstrate that subsamples of the Karachentsev catalog show the general trends of the whole catalog. The indicative H I surface density of these low surface brightness galaxies in our sample is definitely lower than for high surface brightness galaxies and decreases with decreasing surface brightness.

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References

Banks, G. D., Disney, M. J., Knezek, P. M., et al. 1999, ApJ, 524, 612

Barnes, D. G., Staveley-Smith, L., & de Blok, W. J. G. 2001, MNRAS, 322, 486

de Blok, W. J. G. 1997, Ph.D. Thesis Univ. of Groningen
Eder, J. A., & Schombert, J. 2000, ApJS, 131, 47
Henning, P. A., Kraan-Korteweg, R. C., Rivers, A. J., et al. 1998, AJ, 115, 584
Huchtmeier, W. K., & Richter, O. G. 1988, A&A, 203, 237
Huchtmeier, W. K., & Richter, O. G. 1989, A&A, 210, 1
Huchtmeier, W. K., Karachentsev, I. D., Karachentseva, V. E., & Ehle, M. H. 2000a, A&AS, 141, 469 (Paper I)
Huchtmeier, W. K., Karachentsev, I. D., & Karachentseva, V. E. 2000b, A&AS, 147, 187 (Paper II)
Karachentsev, I. D. 1994, A&A, Trans. 6, 1
Karachentsev, I. D., Karachentseva, V. E., & Huchtmeier, W. K. 2001, A&A, 366, 428 (Paper III)
Karachentsev, I. D., Karachentseva, V. E., Suchkov, A. A., & Grebel, E. K. 2000, A&AS, 145, 415
Karachentsev, I. D., & Makarov, D. I. 1996, AJ, 111, 535 A&AS, 135, 221
Karachentseva, V. E., & Karachentsev, I. D. 2000, A&AS, 146, 359
Kennicutt, R. 1998, ApJ, 498, 541
Kilborn, V., Webster, R., & Staveley-Smith, L. 1999, PASA, 16, 8 (HIPASS)
Kraan-Korteweg, R. C., & Tammann, G. A. 1979, Astron. Nachr., 300, 181
Salpeter, E., & Hoffman, G. 1996, ApJ, 465, 595
Schlegel, D. J., Finkbeiner, D. P., & Davis, M. 1998, ApJ, 500, 525
van de Hulst, J. M., Skillman, E. D., Smith, T. R., et al. 1993, AJ, 106, 548