



**HAL**  
open science

## Some noteworthy DENIS galaxies near the galactic plane

J. Rousseau, G. Paturel, I. Vauglin, A. Schröder, B. de Batz, J. Borsenberger,  
N. Epchtein, P. Fouqué, S. Kimeswenger, F. Lacombe, et al.

### ► To cite this version:

J. Rousseau, G. Paturel, I. Vauglin, A. Schröder, B. de Batz, et al.. Some noteworthy DENIS galaxies near the galactic plane. *Astronomy and Astrophysics - A&A*, 2000, 363, pp.62-68. hal-04110309

**HAL Id: hal-04110309**

**<https://hal.science/hal-04110309>**

Submitted on 6 Jun 2023

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Some noteworthy DENIS galaxies near the galactic plane

J. Rousseau<sup>1</sup>, G. Paturel<sup>1</sup>, I. Vauglin<sup>1</sup>, A. Schröder<sup>2</sup>, B. de Batz<sup>3</sup>, J. Borsenberger<sup>4</sup>, N. Epchtein<sup>2</sup>, P. Fouqué<sup>5</sup>, S. Kimeswenger<sup>13</sup>, F. Lacombe<sup>5</sup>, T. Le Bertre<sup>8</sup>, G. Mamon<sup>4</sup>, D. Rouan<sup>5</sup>, G. Simon<sup>2</sup>, and D. Tiphène<sup>5</sup>

<sup>1</sup> CRAL-Observatoire de Lyon, 69561 Saint-Genis Laval CEDEX, France

<sup>2</sup> Observatoire de la Côte d'Azur, Dept. Fresnel, 06304 Nice Cedex, France

<sup>3</sup> DASGAL, Observatoire de Paris-Meudon, 5 place Jules-Janssen, 92195 Meudon, France

<sup>4</sup> Institut d'Astrophysique de Paris, 98 bis Bd Arago, 75014 Paris, France

<sup>5</sup> European Southern Observatory, Casilla 19001, Santiago 19, Chile

<sup>6</sup> Institut für Astronomie, Innsbruck University, 6020 Innsbruck, Austria

<sup>7</sup> DESPA, Observatoire de Paris-Meudon, 5 place Jules-Janssen, 92195 Meudon, France

<sup>8</sup> DEMIRM, Observatoire de Paris, 61 Av. de l'Observatoire, 75014 Paris, France

<sup>9</sup> DASGAL, Observatoire de Paris, 61 Av. de l'Observatoire, 75014 Paris, France

Received 9 May 2000 / Accepted 8 September 2000

**Abstract.** From a visual inspection of J and K images obtained within the Deep Near Infrared Survey (DENIS) we detected 37 noteworthy galaxies near the galactic plane ( $|b| < 15$  deg). Most of these galaxies are yet uncatalogued. They have either a large dimension (more than 1 arcmin in J-band) or a position very close to the galactic plane ( $|b| < 3$  deg). Some of these galaxies are simply not visible on the Digitized Sky Survey. Among them 15 galaxies are suspected to be spirals and could be detected from HI observations. Several large galaxies near the assumed position of the Great Attractor suggests that a concentration of galaxies may be present around the equatorial position:  $\alpha_{2000} = 16h15m$ ,  $\delta_{2000} = -30$  deg. An inspection of this field from the Digitized Sky Survey and from available 2MASS data confirms the presence of extragalactic structures.

**Key words:** infrared: galaxies – cosmology: large-scale structure of Universe – galaxies: general – catalogs – surveys – ISM: dust, extinction

## 1. Introduction

The DEep Near Infrared Survey (Hereafter DENIS; Epchtein et al., 1997) was the first general survey using direct images from CCD and NICMOS detectors. It covers the southern sky (from  $\delta = +2$  deg to  $\delta = -87.2$  deg) in three photometric bands I, J and K ( $Gunn - i = 0.8 \mu m$ ,  $J = 1.25 \mu m$  and  $K = 2.15 \mu m$ , respectively).

The I-band has been used to detect new galaxies (Vauglin et al., 1999) at high galactic latitudes ( $|b| > 15$  deg). At lower galactic latitude the J and K bands are more appropriate. An estimation has shown that below  $|b| \approx 5$  deg the K-band is more suitable while J is better in the intermediate zone  $5 \text{ deg} < |b| < 15$  deg. The reason for the K-band being better below

$|b| = 5$  deg is (of course) the smaller extinction. That the J-band is better at intermediate latitudes is because the Denis K-band magnitude limit is rather bright - in other words at those latitudes (or rather intermediate extinction levels) the 'loss' by higher extinction in J is cancelled out by the fainter magnitude limit and therefore the J-band is superior (see Schröder et al. 1999, for more detailed study).

Although automatic galaxy recognition programs (Bertin & Arnouts, 1996, Paturel et al., 2000) work reasonably well at high latitude the crowding of the field makes them less efficient near the galactic plane. In the present paper we made instead a visual inspection of J and K bands for  $|b| < 15$  deg.

Each J or K frame is  $12' \times 12'$  with pixels of  $3''$ , i.e.  $256 \times 256$  pixels. Using microscanning this resolution is improved and it produces  $768 \times 768$  logical pixels of  $1''$  each. The integration time is 9 s. Measurements are made along strips covering 30 deg in declination. Each strip contains 180 elementary frames.

An extended catalogue in the Zone of Avoidance (ZoA, for galactic latitude  $|b| < 15$  deg) is in preparation. It contains about 2000 galaxies (Vauglin et al. 2000, in preparation) with J and K photometry. It will be used to underline some structures behind the Milky Way. Nevertheless, before its completion, it is interesting to extract galaxies with noteworthy characteristics in order to stimulate complementary observations. Two main characteristics are searched for: (1) galaxies very close to the galactic plane (below 3 deg) (2) galaxies with a large diameter.

## 2. Observations and method

Each image is checked by eye to detect non-stellar objects. The external diameter is measured on the J frame. Because the preliminary coordinates provided by the telescope positioning are not secure enough, each galaxy has been measured on the Digitized Sky Survey following the procedure previously used (Paturel et al., 1999). Some galaxies are visible and the positioning of the center can be done in a direct manner. When the galaxy is

---

Send offprint requests to: G. Paturel (patu@obs.univ-lyon1.fr)

barely or not visible the centering is made by a direct comparison of J plate and DSS plate. The accuracy of the coordinates is a few arcseconds.

We checked that these objects are not known as Globular clusters (Harris & Racine, 1979), Open clusters (Lynga, 1983), Bright Nebulae (Lynds, 1965), HII regions (Sharpless, 1959), Planetary Nebulae (Acker et al., 1992). Further, we checked that they were not previously catalogued by teams currently searching galaxies near the galactic plane (Weinberger, 1980; Saito et al., 1990, Saito et al. 1991; Roman et al., 1996; Roman et al., 1998; Seeberger et al. 1996; Lercher et al. 1996; Saurer et al. 1997; Seeberger & Saurer, 1998; Kraan-Korteweg et al. 1995; Woudt et al. 1999; Weinberger et al. 1999; Kraan-Korteweg, 2000).

Nevertheless, five galaxies were known in the catalogue of 2.7 Million galaxies automatically extracted from the DSS (MIGAL catalogue, Paturel et al., 2000). This catalogue is now loaded in the LEDA database with the acronym of the Principal Galaxy Catalog (PGC, Paturel et al., 1989). These five galaxies are:

#8 = *PGC0934968*; #24 = *PGC0484547*;  
 #25 = *PGC0377390*; #26 = *PGC0457765* and  
 #30 = *PGC0668889*.

Incidentally, this shows that we will be able to discover new, bright galaxies in the galactic plane using this MIGAL catalogue. One galaxy (#16 = 134403.3 – 601936) was also discovered independently by A. Schröder.

Further we checked the second release of the 2MASS survey. Ten galaxies are reported in the Extended Source catalogue. They are: #1, #2, #3, #4, #6, #7, #9, #30, #33, #37. The coordinates agree within 2'' (2.1'' in RA and 1.7'' in DEC). Owing to the fact that the center of a galaxy can hardly be defined with an accuracy better than two or three pixels, the agreement is satisfactory and, anyway, good enough for identifying a galaxy without ambiguity. Obviously, this study will be conducted also with the full sample of 2000 galaxies.

### 3. Catalogue

The galaxies are presented in two tables. Table 1 gives the galaxies very close to the galactic plane ( $|b| < 3$  deg). Table 2 gives galaxies with a diameter larger than one arcminute and located at low galactic latitude ( $|b| < 15$  deg).

Both tables have the same arrangement of columns.

**Column 1:** Running number

**Column 2:** Galactic longitude (in degrees)

**Column 3:** Galactic latitude (in degrees)

**Column 4:** Right Ascension and Declination for equinox 2000 (in hours, minutes, seconds and tenths and degrees, arcminutes and arcseconds)

**Column 5:** Apparent diameter visually measured from the J frame (in log of 0.1 arcmin)

**Column 6:** Comments. S for spirals, E for Elliptical, M for multiple or interacting, A for very absorbed, ? for uncertainty.

**Table 1.** List of galaxies very close to the galactic plane ( $|b| < 3$  deg).

#	l deg	b deg	RA2000 <i>h min sec</i>	DEC2000 <i>deg ' ''</i>	logD	note
1	229.68	-0.25	072145.5	- 145841	0.70	
2	230.82	-0.85	072148.0	- 161557	0.58	
3	233.17	-1.36	072435.0	- 183431	0.72	
4	233.72	-1.65	072435.7	- 191150	0.75	
5	225.87	2.70	072503.3	- 101332	0.58	
6	235.70	-1.52	072905.7	- 205242	0.68	
7	235.65	-1.45	072916.1	- 204808	0.73	
8	229.41	2.03	072932.1	- 133932	0.60	
9	229.82	1.85	072942.4	- 140602	0.73	
10	263.34	1.88	085451.0	- 420618	-	S
11	287.77	2.10	105537.6	- 571910	0.78	
12	296.75	-2.17	115350.8	- 642041	0.45	S M
13	295.96	2.46	115551.4	- 593941	0.73	
14	300.78	2.82	123413.3	- 595900	1.04	S
15	304.69	2.97	130525.1	- 595109	0.82	A
16	309.40	1.88	134403.3	- 601936	0.72	
17	324.61	1.08	153120.1	- 545451	0.83	
18	330.84	-0.16	160914.9	- 515853	0.99	S
19	354.52	-0.51	173358.7	- 335115	0.78	?
20	23.79	-0.31	183544.8	- 081617	0.85	A
21	29.18	2.47	183547.6	- 021235	0.62	? A
22	34.07	1.64	184739.6	+ 014538	0.60	

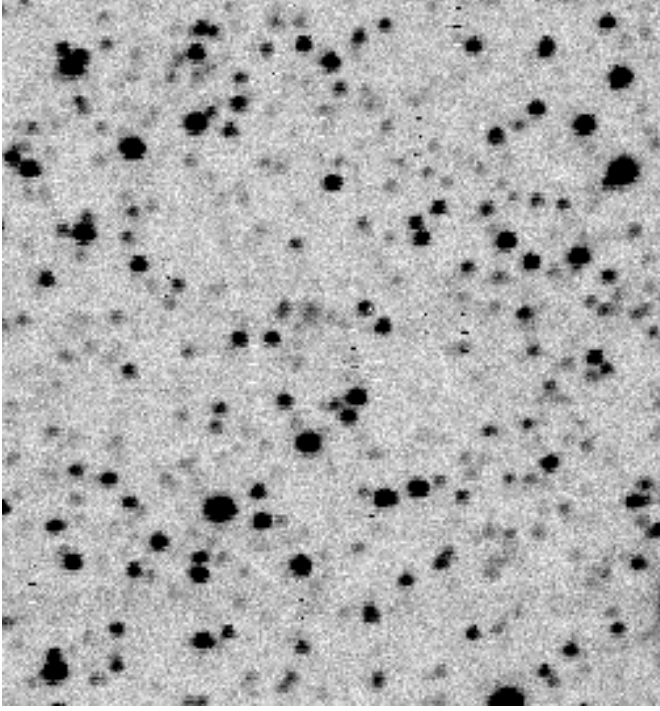
**Table 2.** List of galaxies with large diameters ( $D_J > 1'$ ).

#	l deg	b deg	RA2000 <i>h min sec</i>	DEC2000 <i>deg ' ''</i>	logD	note
23	286.51	12.78	111601.1	- 470152	1.07	S
14	300.78	2.82	123413.3	- 595900	1.04	S
24	301.26	14.13	124138.0	- 484250	1.03	
25	304.15	4.19	130045.1	- 583946	1.03	S
26	315.46	9.61	141127.4	- 511800	1.07	S?
27	324.40	-3.81	155143.9	- 585657	1.02	E?
28	325.29	-4.73	160135.6	- 590446	1.22	S?
29	323.24	-7.35	160305.7	- 622358	1.06	E
30	343.27	12.96	160930.7	- 335839	1.10	S M
31	337.26	6.45	161031.2	- 424618	1.01	S?
32	340.09	9.38	161038.1	- 384252	1.01	S?
33	345.97	13.89	161517.6	- 312758	1.07	E?
34	347.96	15.67	161536.6	- 285050	1.24	E?
35	342.48	-8.03	173315.0	- 480005	1.08	S
36	15.27	13.71	172935.5	- 085229	1.07	
37	351.20	-8.57	180017.0	- 404917	1.20	S A

One galaxy (#14 = *J1234133* – 595900) belongs to both lists because it is large (diameter=1.1') and close to the galactic plane ( $b = 2.8$  deg).

For each galaxy we present a finding chart extracted from the Digitized Sky Survey (Figs. A.3 and A.4)<sup>1</sup>. Each chart is 5' × 5'. The North direction is on the top and the East direction is on the left. The precise location of the new galaxies is just

<sup>1</sup> Finding charts are of better use in B-band because in J or K-bands the field may look quite different.



**Fig. 1.** J-frame presenting the galaxy #18 =  $J160914.9 - 515853$  not visible on Fig. A.3. The galaxy is probably a late type galaxy with a relatively low surface brightness. It is visible slightly above the center of the frame. The orientation is the same than the one of Fig. A.3. The field is roughly  $3' \times 3'$ .

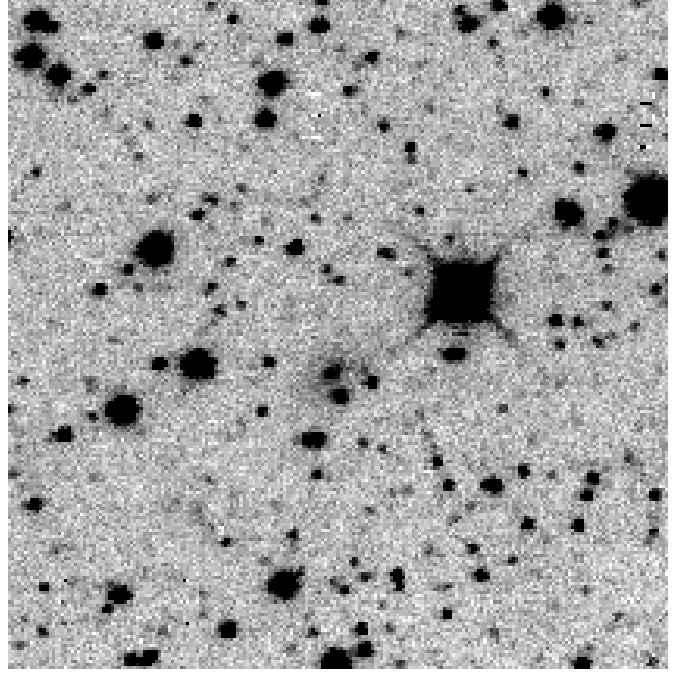
between the internal tick marks. The provisional DENIS name constructed with the coordinates is given on each finding chart. As an example we also present three J-frames where galaxies, unvisible on the B plate, are clearly visible on the J one. We present respectively, one late type galaxy (#18, Fig. 1), one early type spiral (#28, Fig. 2) and one Elliptical (#29, Fig. 3). Each frame is about  $3' \times 3'$ .

#### 4. Discussion

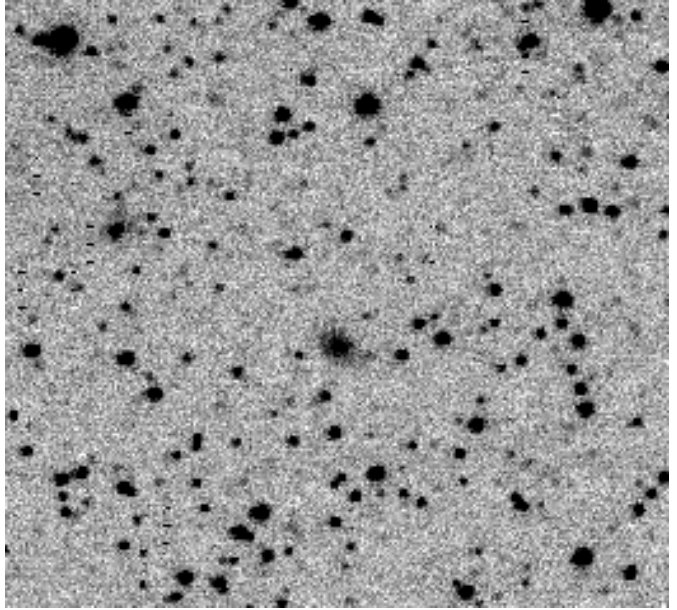
An inspection of the DSS images shows that some of these objects could have been discovered on the blue plates, but most of them are simply not visible. Some have been classified as spirals (S) or possibly spirals (S?). They will be observed in neutral hydrogen (HI).

One large galaxy (#23 =  $J111601.1 - 470152$ ) is very bright in B. It has high surface brightness and a relatively sharp edge. Despite being elongated, it looks like a planetary nebula. It would be interesting to confirm with a spectrum that this object is an extragalactic object.

The position of these new objects along the galactic plane may reveal either the presence of nearby groups or transparent regions. We present the positions of these new galaxies on a Flamsteed equal area projection in supergalactic coordinates (Fig. 4). In such a projection a part of the galactic plane appears on the vertical, central meridian and on the edge of the graph (the dashed curves show the  $|b| = 15$  deg limits). The putative Great

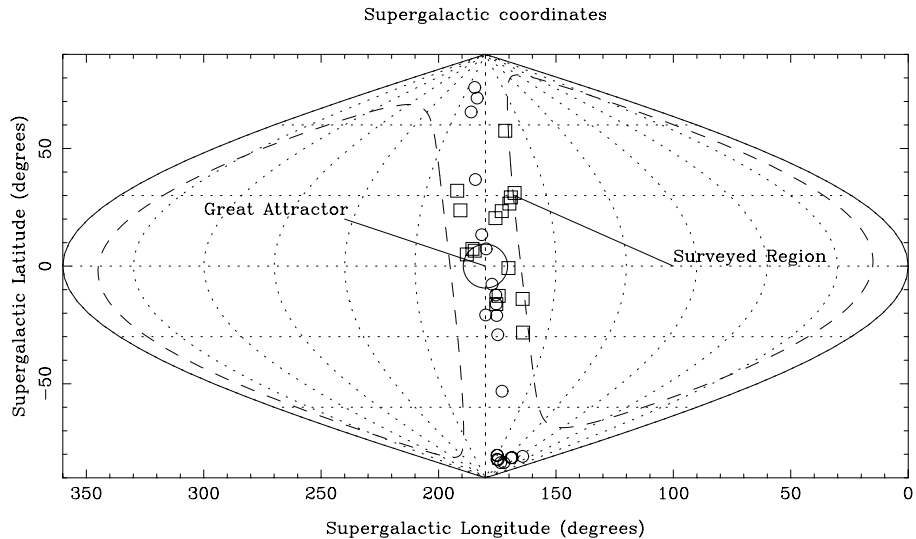


**Fig. 2.** J-frame presenting the galaxy #28 =  $J160135.6 - 590446$  not visible on Fig. A.4. The galaxy is probably an early type spiral with a relatively bright bulge and a visible disk. It is visible slightly below the center of the frame. The orientation is the same than the one of Fig. A.4. The field is roughly  $3' \times 3'$ .

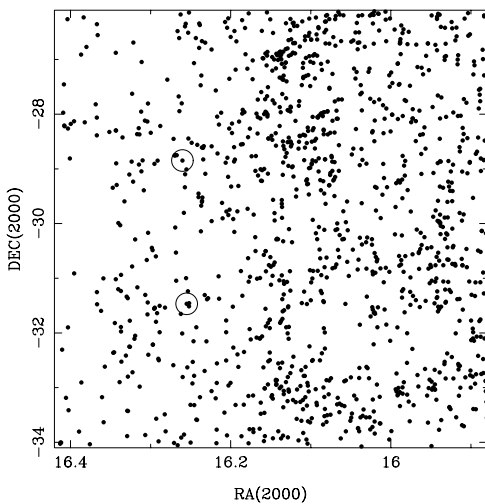


**Fig. 3.** J-frame presenting the galaxy #29 =  $J160305.7 - 622358$  not visible on Fig. A.4. The galaxy is probably an elliptical. It is visible slightly below the center of the frame. The orientation is the same than the one of Fig. A.4. The field is roughly  $3' \times 3'$ . Another faint galaxy is visible on the left side (East) slightly above the center.

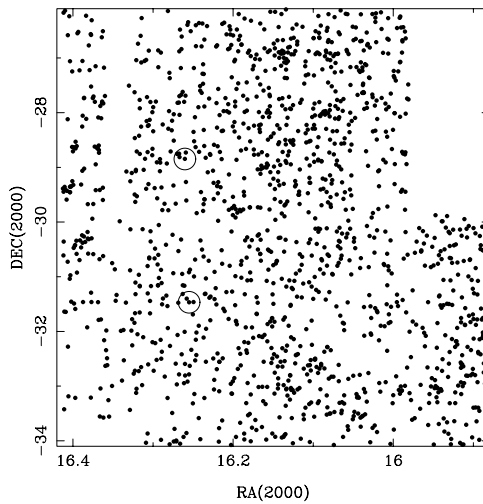
Attractor is indicated at the supergalactic coordinates  $SGL = 180$  deg and  $SGB = 0$  deg, (i.e.,  $\alpha_{2000} = 16h15m$ ,  $\delta_{2000} = -60$  deg). The galactic plane is well delineated by the galaxies



**Fig. 4.** Distribution of the noteworthy galaxies in a supergalactic Flamsteed projection. Galaxies very close to the galactic plane are represented by open circles, while large galaxies are represented by open squares. The dashed curves show the  $|b| = 15$  deg limits. The possible position of the Great Attractor is represented by a very large open circle. There is a remarkable concentration of large galaxies above the Great Attractor.



**Fig. A.1.** Distribution of galaxies as seen from a detailed inspection of the DSS. The positions of the elliptical galaxies detected in the DENIS J and K-bands are seen as large open circles. The galactic plane is roughly parallel to the Y-axis, on the left side.



**Fig. A.2.** Distribution of extended objects detected from 2MASS.

with  $|b| < 3$  deg (small open circles), which are well distributed along the longitude.

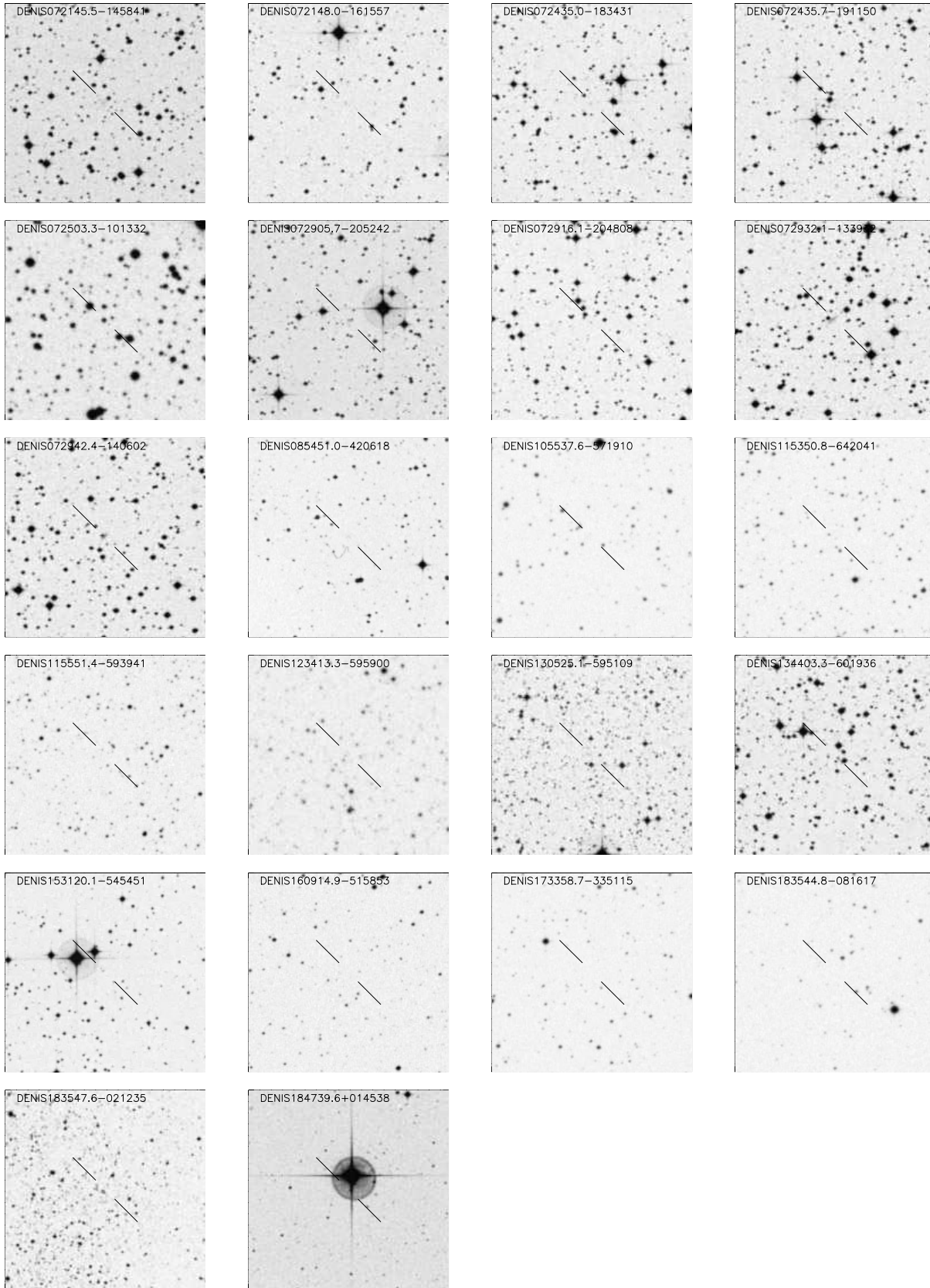
Several large galaxies above the position of the Great Attractor suggests that a concentration may be present near this position (equatorial position:  $\alpha_{2000} = 16h15m$ ,  $\delta_{2000} = -30$  deg). Two galaxies in the center of this concentration are elliptical galaxies (#33 =  $J161536.6 - 285050$  and #34 =  $J161517.6 - 312758$ ). No Abell cluster (Abell et al. 1989) is found at this position. This is noteworthy because, among 2000 galaxies discovered from the visual inspection of the randomly chosen DENIS strips, five of the largest galaxies are in this concentration. A survey of the field near the ESO chart #451 (Appendix 1) confirms that there are many galaxies in this region. Some elliptical are amazingly bright.

*Acknowledgements.* We thank M.H. Lassalle, M.C. Marthinet and C. Petit for their technical assistance. We made use of the ESO facility in

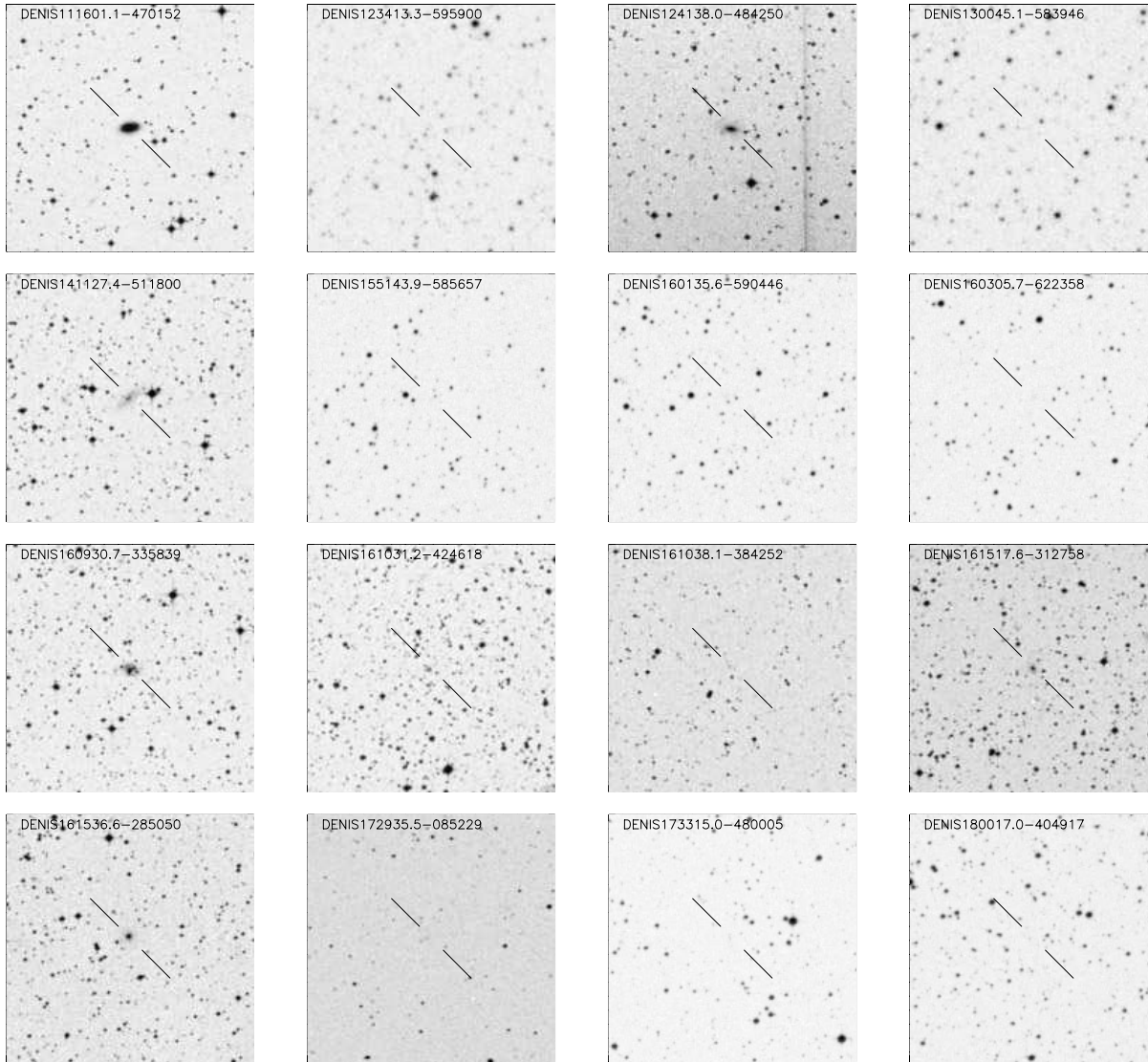
Münich for retrieving images from the Digitized Sky Survey produced at the Space Telescope Science Institute under US Government grant NAG W-2166. It is based on photographic data obtained using The UK Schmidt Telescope and the Palomar Sky Survey. The UK Schmidt Telescope was operated by the Royal Observatory Edinburgh, with funding from the UK Science and Engineering Research Council, until 1988 June, and thereafter by the Anglo-Australian Observatory. Original plate material is copyright (c) the Royal Observatory Edinburgh and the Anglo-Australian Observatory. The plates were processed into the present compressed digital form with their permission.

**Appendix A: inspection of the field around 16h15m -30 deg**

We inspected the region around the equatorial coordinates  $RA(2000) = 16h15$ ,  $DEC(2000) = -30$  deg by searching visually galaxy-like objects on the Digitized Sky Survey. The field centered at 16h15m -30 deg was covered by  $60 \times 60$  fields



**Fig. A.3.** Finding charts for galaxies very close to the galactic plane ( $|b| < 3$  deg). The frame is  $5' \times 5'$ . North is on the upper side, East is on the left side. The new galaxies are located in the center, between the two central tick marks. The 2000 equatorial coordinates are given on the top of each frame.



**Fig. A.4.** Same as Fig. A.3 for galaxies larger than 1 arcmin.

of  $10' \times 10'$  each, with an overlap of  $1'$  on each side. The total field is thus  $8deg \times 8deg$ . For each galaxy-like object we measured the coordinates and extracted the main parameters (diameter, axis ratio, position angle and apparent magnitude) with the same procedure than the one described in Paturel et al. (2000). Further, we assigned a morphological type for each galaxy.

The catalogue resulted in 1500 measurements. After an internal cross-identification 1212 extended objects remain (from overlapped surface one expects about 1131 remaining objects). For each of them the following parameters are given:

**Column 1:** Right Ascension and Declination for equinox 2000 (in h mn s and deg ' '')

**Column 2:** Apparent diameter (log of 0.1 arcmin)

**Column 3:** Decimal log of axis ratio  $\log D/d$

**Column 4:** Position angle in degrees (from North to the East)

**Column 5:** Apparent magnitude

**Table A.1.** Beginning of the catalogue. The whole catalogue contains 1202 galaxies. It is available in electronic form at the CDS.

RA2000 h mn s deg. ' ''	DEC2000 deg. ' ''	logD D in '	logR	p.a. deg.	m	Type
J155248.3-333309		0.64	0.56	143.	17.58	Sm
J155250.5-331530		0.49	0.06	109.	17.00	E
J155239.1-330152		0.42	0.31	54.	17.90	S0
J155255.1-325241		0.84	0.17	54.	15.86	Sc
J155304.4-324400		0.54	0.12	63.	16.99	Sb
J155249.5-325210		0.36	0.28	2.	17.90	Sm
J155305.0-322836		0.23	0.11	32.	18.40	Sm
J155259.3-320600		0.77	0.57	131.	17.08	Sc
J155316.3-320414		0.75	0.16	104.	15.50	Sa
J155317.4-314515		0.75	0.17	94.	15.70	Sb
J155322.1-314658		0.74	0.11	103.	15.72	Sb
...						

**Column 6:** Morphological type visually estimated for each object assuming it is a galaxy.

We made a cross-identification of this catalogue with the second release of the 2MASS survey. 1476 extended objects are found up to a limiting J magnitude of 16.5. By crossidentifying, 490 objects are found in common. An inspection of remaining objects reveals that 591 extended objects in the 2MASS list are probably not galaxies.

The questions are whether the distribution seen by our inspection is similar to the one seen by 2MASS and whether one can see some structures. In Figs. A.1 and A.2 we show the distribution of extended objects from the present catalogue and from 2MASS.

It is clear that both surveys describe the same structures with the same concentrations and voids. However, when approaching the galactic plane (on the left of Figs. A.1 and A.2) there are less objects visible in B than in JHK. Obviously, the extinction explains this lack of galaxies.

An inspection of a larger field around the region of the putative Great Attractor shows that there are many large and deep concentrations of galaxies like the one reported here. This is also visible on a plot made from MIGAL.

## References

- Abell G.O., Corwin Jr. H.G., Olowin R.P., 1989, *ApJS* 70, 1  
 Acker A., Ochsenein F., Stenholm B., et al., 1992, *The Strasbourg-ESO Catalogue of Galactic Planetary Nebulae*. ESO, Garching bei München  
 Bertin E., Arnouts S., 1996, *A&A* 311, 356  
 Epchtein N., de Batz B., Capoani L., 1997, *The Messenger* 87, 27  
 Harris, W.E., Racine R., 1979, *ARA&A* 17, 241  
 Kraan-Korteweg R., 2000, *A&AS* 141, 123  
 Kraan-Korteweg R., Fairall A.P., Balkowski C., 1995, *A&A* 297, 617  
 Lercher G., Kerber F., Weinberger D.H., 1996, *A&AS* 117, 369  
 Lynds B.T., 1965, *ApJS* 12, 163  
 Lynga G., 1983, *Revised Catalogue of Open Cluster Data*. Lund Observatory  
 Paturel G., Fouqué P., Bottinelli L., Gouguenheim L., 1989, *A&AS* 80,299  
 Paturel G., Petit C., Garnier R., Prugniel P., 1999, *A&AS* 140, 89  
 Paturel G., Fang Y., Petit C., Rousseau J., 2000, *A&AS* in press  
 Roman A.T., Nakanishi K., Tomita A., et al., 1996, *PASJ* 48, 679  
 Roman A.T., Saito M., 1998, *Contrib. Dept. Astro. Kyoto Univ.*, 570  
 Saito,M., Ohtani H., Asonuma A., et al., 1990, *PASJ* 42, 603  
 Saito M., Ohtani H., Baba A., et al., 1991, *PASJ* 43, 449  
 Saurer W., Seeberger R., Weinberger D.H., 1997, *A&AS* 126, 247  
 Schröder A., Kraan-Korteweg R.C., Mamon G.A., 1999, In: Kraan-Korteweg R.C., Henning P.A., Andernach H. (eds.) *Mapping the Hidden Universe*. ASP Conf. Ser., in press (astro-ph/0005447)  
 Seeberger R., Saurer W., Weinberger R., 1996, *A&AS* 117, 1  
 Seeberger R., Saurer W., 1998, *A&AS* 127, 101  
 Sharpless S., 1959, *ApJS* 4, 257  
 Vauglin I., Rousseau J., Paturel G., et al., 2000, in preparation  
 Vauglin I., Paturel G., Borsenberger J., et al., 1999, *A&AS* 135, 133  
 Weinberger R., Gajdosik M., Zanin C., 1999, *A&AS* 137, 293  
 Weinberger R., 1980, *A&AS* 40, 123  
 Woudt P.A., Kraan-Korteweg R., Fairall A.P., 1999, *A&A* 352, 39