DRAFT – 16 February 1996

The Peculiar Motions of Elliptical Galaxies in Two Distant Regions. I. Cluster and Galaxy Selection

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ABSTRACT

The EFAR project is a study of 736 candidate elliptical galaxies in 84 clusters lying in two regions towards Hercules-Corona Borealis and Perseus-Pisces-Cetus at distances $cz\approx$6000–15000 km s^{-1}. In this paper (the first of a series) we present an introduction to the EFAR project and describe in detail the selection of the clusters and galaxies in our sample. Fundamental data for the galaxies and clusters are given, including accurate new positions for each galaxy and redshifts for each cluster. The galaxy selection functions are determined using diameters measured from Schmidt sky survey images for 2185 galaxies in the cluster fields. Future papers in this series will present the spectroscopic and photometric observations of this sample, investigate the properties of the fundamental plane for ellipticals, and determine the large-scale peculiar velocity fields in these two regions of the universe.

Subject headings: galaxies: clusters — galaxies: elliptical — galaxies: distances and redshifts — large-scale structure of universe

1. Introduction

This paper is the first in a series reporting the results of the EFAR project studying the properties and peculiar motions of elliptical galaxies and clusters in two volumes of the universe at distances between 6000 and 15000 km s^{-1}. The aims of this extensive observational program are: (i) to study the intrinsic properties of elliptical galaxies in clusters by compiling a large and homogeneous sample with high-quality photometric and spectroscopic data; (ii) to test possible systematic errors, such as environmental dependence, in existing elliptical galaxy distance estimators; (iii) to seek improved distance estimators based on a more comprehensive understanding of the properties of ellipticals and how these are affected by the cluster environment; and (iv) to determine the peculiar velocity field in regions that are dynamically independent of the mass concentrations within 6000 km s^{-1}in order to test whether the large-amplitude coherent flows seen locally are typical of bulk motions in the universe.

The EFAR project was conceived in 1986 as a natural progression from the work of the Seven Samurai (7S: Dressler et al. 1987a; Lynden-Bell et al. 1988), who studied the peculiar velocity field traced by elliptical galaxies closer than 6000 km s^{-1}. The major finding of that work was that the local region of the universe was dominated by large-scale, large-amplitude coherent motions. This result has been substantially confirmed both by further analysis (Faber & Burstein 1988; Bertschinger et al. 1990) and by subsequent observational studies, mostly employing the independent Tully-Fisher distance estimator for spiral galaxies (Aaronson et al. 1986, 1989; Han & Mould 1990; Willick 1990, 1991; Mathewson et al. 1992; Mould et al. 1993; Courteau et al. 1993; Mathewson & Ford 1994). Although something is known about the peculiar velocity field within 6000 km s^{-1} the nature of the mass concentrations causing the flow remains controversial (see reviews by Bertschinger 1990; Burstein 1990; Dekel 1994; Strauss & Willick 1995) and relatively little is known about galaxy motions far away.

Initial comparisons of the velocity field with the predictions of cosmological models (Vittorio et al. 1986; Bertschinger & Juszkiewicz 1988) suggested that the observed motions were difficult to reconcile with the favoured biased CDM models that they considered. The immediate question raised was whether the local volume was indeed typical of other regions of the universe (implying that the standard cosmological models were incorrect) or whether the local motions are merely an unusual statistical fluctuation in the universal velocity field. More recent analyses (Kaiser 1988, 1991; Feldman & Watkins 1994; Seljak & Bertschinger 1994; Dekel et al. 1996), suggest that the local motions are consistent with the COBE-normalised standard CDM model. Nonetheless, whether or not the local motions are typical of the universe at large remains an important question. In order to answer this we are measuring the peculiar motions in similarly-large regions at sufficient distances to be dynamically independent of the local volume studied by 7S and most other workers.

During the period it has taken to complete the EFAR observing program, however, a wider variety of questions have arisen. Chief among these has been a more searching inquiry as to the reliability of the D_n–σ distance indicator developed by 7S (Dressler et al. 1987b; Lynden-Bell et al. 1988) and the physical origin of the fundamental plane (FP) of elliptical galaxies (Djorgovski & Davis 1987; Bender et al. 1992; Saglia et al. 1993a; Jørgensen et al. 1993; Pahre et al. 1995) of which it is simply a convenient projection. Various authors have suggested that there may be variations in the FP which correlate with galaxy environment, either directly, through mechanisms such as tidal stripping (Silk 1989), or indirectly via different stellar populations (Gregg 1992, 1995). Such effects could lead to significant systematic errors in any distance estimators based on the FP relations. Some claims have been made for the detection of such variations (de Carvalho & Djorgovski 1992; Guzman & Lucey 1993). Other studies, however, find little variation of the FP with environment (Lynden-Bell et al. 1988; Burstein et al. 1990; Lucey et al. 1991), and comparisons of FP and D_n–σ distance estimates with those derived from relatively independent and perhaps more accurate estimators, such as the Tully-Fisher and surface brightness fluctuation methods, show good agreement (Jacoby et al. 1992).

These concerns, and the focus they bring on the formation and evolution of the elliptical galaxy population, have become as important a motivation for this work as the original goal of measuring the peculiar velocity field at large distances. The EFAR project's goal of measuring the peculiar motions of *distant* ellipticals from a *large* and *homogeneous* sample, provides a test of the FP distance estimators that is both *severe* (since systematic errors in peculiar velocities are amplified at large distances) and *fair* (given the difficulties of comparing the FP for differently selected samples observed in different studies). It is worth noting that the 7S dataset is still the largest in the literature for elliptical galaxies, though it was obtained a decade ago and is based on photoelectric aperture photometry and IDS spectroscopy. The EFAR sample is comparable in size to that of 7S and is based largely on CCD imaging and spectroscopy, which confer a number of advantages in the attempt to reduce observational errors.

Even if *systematic* errors prove negligible, the relatively large (∼20%) *random* errors in the D_n–σ and Tully-Fisher distance estimators limit exploration of the velocity field beyond about 6000 km s^{-1} (the 'local' region). The only studies which have attempted to measure the velocity field as far out as 15000 km s^{-1} are those of Lauer & Postman (1994), using brightest cluster galaxies as distance estimators, and Riess et al. (1995), using Type Ia supernovae. These sparse, all-sky samples are suitable for measuring the convergence of the Local Group dipole motion to the cosmic microwave background dipole (or lack thereof), but they do not probe the velocity field on scales of tens of Mpc. This requires the use of distance estimators which have greater precision per object and/or apply to clustered objects, allowing denser sampling.

FP-based distance estimators for elliptical galaxies fulfill these criteria. As recent work by Jørgensen et al. (1993) has shown, the FP can yield distances with errors as low as 11% per galaxy (compared to 17% for D_n–σ distances based on the same data, and 25% for the original D_n–σ distances obtained by the 7S). For individual *clusters* it is possible to reduce the distance errors by $\sqrt{N}$, where N is the number of galaxies in each cluster. With 5–15 ellipticals per cluster it is therefore possible in principle to measure individual cluster distances with 3–5% precision, corresponding to peculiar velocity errors of 500-750 $\mathrm{km\,s^{-1}}$ at a distance of 15000 $\mathrm{km\,s^{-1}}$. Thus with sufficient clusters in a given volume it becomes feasible to measure the peculiar velocity field with enough precision to reliably detect large-scale coherent motions at distances out to 15000 $\mathrm{km\,s^{-1}}$which have amplitudes comparable to those observed in the local volume within 6000 $\mathrm{km\,s^{-1}}$. Provided significant sources of systematic error in the FP distance estimator can be ruled out or corrected for, the potential exists to determine the peculiar velocity fields in distant regions and thus further constrain cosmological models.

Two preparatory papers have discussed the photoelectric photometry and photometric system we use (Colless et al. 1993) and the methods we apply to correct for seeing in measuring the galaxies' light profiles (Saglia et al. 1993b), an important effect for galaxies at greater distances. Other aspects of this project and some preliminary results have been reported in Wegner et al. (1991), Davies et al. (1993) and Baggley et al. (1994).

This paper (Paper I) describes how the galaxy clusters and galaxies belonging to those clusters were selected for this project. Future papers in this series will detail the spectroscopic and photometric data we have obtained, describe the methods used to analyze the luminosity profiles of the galaxies, examine the intrinsic properties of the galaxies and their dependence on environment, derive an optimal distance estimator, and discuss the peculiar motions of the galaxies and clusters and their significance for models of the large-scale structure of the universe.

In §2 of this paper we describe the selection of the regions and clusters used in this study, setting them in context with the surrounding large-scale structures. §3 gives the procedures used to select candidate elliptical galaxies in each cluster, and gives the master list of basic information on the galaxies in the study. The selection functions for the galaxies in each cluster are quantified in §4, and the conclusions we draw from this analysis are given in §5.

2. Selection of the Cluster Sample

We wanted to probe the peculiar velocity field of the galaxies to greater distances than had been sampled in the 7S study in order to discover whether the motions found locally within 4000 $\mathrm{km\,s^{-1}}$ are typical of elsewhere in the universe. In order to achieve this, we chose two regions of similar size at sufficient distance from each other and the main parts of the local supercluster that their peculiar motions should be largely independent of the mass concentrations producing bulk motions in the local volume. Choosing directions perpendicular to the Supergalactic plane ensures the maximum separation between our two regions, and helps avoid possible confusion with distant parts of the local supercluster.

The depth of the sample is dictated by the choice of the distance indicator. For example, if a distance indicator has errors of about 20% for individual objects, then at around 10000 $\mathrm{km\,s^{-1}}$ motions less than 1000 $\mathrm{km\,s^{-1}}$ can only be detected by averaging over several galaxies. The strong clustering of elliptical galaxies allows the selection of sets of galaxies at the same distance, so that the fundamental plane for elliptical galaxies is a natural choice for the distance estimator. We have chosen our regions to lie in the range cz=6000–15000 $\mathrm{km\,s^{-1}}$: from about twice the outer limit of the 7S sample to about the practical upper limit of the distance indicator.

An *all-sky* survey at this depth would have been considerably more difficult. As it was, about 350 galaxies had to be observed in each region to obtain sufficient sampling. Moreover an all-sky survey is not neccesary to achieve our goal of comparing the bulk motions of other regions with the local motions within a distance of about 6000 $\mathrm{km\,s^{-1}}$. We expect that the geometry of the sample is well-suited for picking out specific components of the bulk flow if we compare e.g. with Lauer & Postman, though not as sensitive to all other directions (Cf. Kaiser 1988; Feldman & Watkins 1995; Watkins & Feldman 1996).

These considerations led us to look for regions that were rich in clusters (so that they could be well sampled) and which lie out of the Supergalactic plane at distances between 6000 $\mathrm{km\,s^{-1}}$ and 15000 $\mathrm{km\,s^{-1}}$. The selection of suitable regions and clusters (by which we mean elliptical-rich galaxy associations ranging from Abell clusters to poor groups) was accomplished in two steps.

(1) *Selection of the regions.* Our cluster sample is based on the Abell (1958) catalog and Jackson's (1982) unpublished list of elliptical-rich groups and clusters. To select suitable regions we compiled a list of all the Abell and Jackson clusters with redshifts in the range cz=6000–15000 $\mathrm{km\,s^{-1}}$ as given by Struble & Rood (1987) and Jackson (1982). Examining the distribution of these clusters on the sky led us to choose two regions which we will refer to as HCB (Hercules–Corona Borealis) and PPC (Perseus–Pisces–Cetus), although they do *not* correspond precisely to the supercluster complexes with similar names identified by Tully & Fisher (1987). HCB is bounded by $\alpha = 13^h$ to 19^h and $90\,\mathrm{deg} > \delta > -21\,\mathrm{deg}$ and PPC by $\alpha = 21^h$ to 06^h and $90\,\mathrm{deg} > \delta > -27\,\mathrm{deg}$, in both cases excluding the region with $|b| < 10\,\mathrm{deg}$. The declination limit in HCB is the southern limit of Jackson's catalog; in PPC we extended this limit to incorporate some more southerly clusters at $\alpha \approx 5^h$.

Subsequent examination of the redshift distributions in each cluster showed that many have fore- or background galaxies or groups superposed on them. The problems caused by such contamination have been discussed in the literature (e.g. Primack et al. 1991) and will be dealt with in the context of our sample in a subsequent paper. Here we note that it complicates the problem of selecting a volume-limited sample of clusters. In particular, we find that the redshift of an Abell cluster given in the literature is sometimes that of a bright foreground galaxy while the true cluster is more distant (see below).

(2) *Inspection of the Sky Survey plates.* We next examined glass copies of all the Palomar Observatory Sky Survey (POSS) E plates in these two areas and the J plates from the SERC Sky Survey in the south, identifying the Abell and Jackson aggregates. In addition we searched the plates to find all elliptical galaxies in each region with diameters (or redshifts if they appeared in the Huchra redshift catalog) which indicated that they were likely to be at roughly the same distance as the Struble & Rood (1987) and Jackson (1982) clusters on the plate. This led us to identify some aggregates not previously cataloged, and in a few cases led us to follow the galaxy distributions onto neighboring Sky Survey plates. Only those aggregates which contained at least three ellipticals, as judged by examining the plates, were retained for further study. The KPNO photographic lab then made enlargements of all the cluster fields found on the plates in order to provide a standard set of images which would allow us to select galaxies in a more reproducible way than is possible from the glass Sky Survey plates. The selection of the galaxy sample is described in detail in §3.

Table 1 lists the clusters in our sample. Columns 1-9 give respectively the cluster ID number (CID), N, the number of sample galaxies selected in the cluster, the R.A. and Dec. (J2000), the Galactic coordinates (l, b), the number of sample galaxies selected in the cluster N, the median redshift cz_{EFAR} in km s^{-1} (from the cluster members in our sample), the redshift from the literature cz_{lit} (obtained using NED[1]), and the name of the cluster. The cluster positions are in fact those of the 'A' galaxy in the cluster (normally the brightest; see §3), and so are not necessarily coincident with the Abell catalog positions. The table includes the 84 program clusters we initially selected (CID=1–84) and the Coma cluster (CID=90), our primary reference cluster.

For the 40 cases where there is a redshift in the literature, Fig.1 shows the distribution of differences between the median cluster redshifts we obtain and the literature values (the notes to Table 1 indicate the few cases where we prefer another literature redshift to the one adopted by NED). The scatter of 312 km s^{-1} shown in Fig. 1 is consistent with the 200–400 km s^{-1} errors expected when estimating the mean redshift of clusters with line-of-sight velocity dispersions in the range 500–1000 km s^{-1} from 6 galaxy redshifts (the median number of usable objects in our sample). The mean difference of -49 km s^{-1} is consistent with the standard error in the mean expected from the observed scatter. Better estimates of the individual errors of the cluster cz_{EFAR} in Table 1 first require the assignment of membership to the clusters. That can only be finalized using both redshift and distance information because of the fore and background objects. That information will be presented in subsequent papers dealing with the spectroscopy (Wegner et al. 1996) and the photometry (Saglia et al. 1996).

The cluster names given in Table 1 are either the Abell number (e.g. A2052) from the catalogs of Abell (1958) and Abell et al. (1989), Jackson numbers (e.g. J17) from Jackson (1982), or P-numbers which combine the number of the Sky Survey field on which the cluster was found with

[1]NED, the NASA/IPAC extragalactic database, is operated for NASA by the Jet Propulsion Laboratory at Caltech.

a sequence number (e.g. P777-1, P777-2 etc.). Some clusters were split into suspected components (there is a J34/35 as well as J34 and J35, a A533-1 as well as A533, a A2162-N and a A2162-S, etc.). Some clusters have alternate names: A85 is also J29, A2152 is also J19, our A2162-S is A2162, and of course Coma is A1656. A few clusters were misnamed in Colless et al. (1993): A85, A147, A1983, A1991, A2152 and P522-1 were called J29, A150, A1983-1, A1983, J19 and A2506 in that paper; the names are given correctly in Table 1, and the galaxies in these clusters are also renamed in the list of sample galaxies (see §3 and Table 3 below).

The locations of the survey regions and the 84 program clusters are shown in Fig.2. The projection in Galactic coordinates is shown for three redshift shells, with the middle shell corresponding to the nominal redshift range of our cluster sample, cz=6000–15000 km s^{-1}. In order to illustrate the level of completeness in our sample, the figure also shows the positions of all Abell clusters (Abell et al. 1989; excluding supplementary clusters) with measured redshifts (extracted from NED in May 1995). Fig.2 also shows the direction of the Local Group motion with respect to the cosmic microwave background (Smoot et al. 1992) and with respect to the reference frame of Abell clusters within 15000 km s^{-1} (Lauer & Postman 1994; Colless 1995). The HCB and PPC regions are well away from the CMB dipole direction, while the Lauer & Postman dipole lies towards the edge of PPC.

A summary of the numbers of Abell (N_A), Jackson (N_J) and supplementary P-numbered (N_P) clusters and their sum (N_S) as a function of redshift range is given in Table 2 and shows that we were very successful in choosing clusters in the nominal redshift range 6000–15000 km s^{-1}. Only 11 of the 84 program clusters are outside this range, and only 2 lie outside the range 4000–17000 km s^{-1}. These two clusters are A419 (#23, cz=20329 km s^{-1}) and A2148 (#56; cz=26322 km s^{-1}). They were selected on the basis of redshifts from Struble & Rood's compilation (12180 km s^{-1} and 13250 km s^{-1} respectively) which proved erroneous. Note that Coma is not a program cluster—although it has an appropriate redshift, it lies just outside the survey region (it is the Abell cluster nearest the NGP in Fig.2) and the galaxies in it were not selected in the same way (see below).

In the nominal redshift range cz=6000–15000 km s^{-1} there are a total of 32 distinct Abell clusters in our sample, 12 in HCB and 20 in PPC. (The total of 37 in Table 2 arises because we split 5 Abell clusters into two components due to apparent substructure: A533, A548, A2063, A2162, A2593.) NED lists a total of 50 Abell clusters in the survey region over this same redshift range, 15 in HCB and 35 in PPC (Abell et al. 1989, excluding supplementaries). However scrutiny of the literature references and comparison with the Sky Survey plates provide strong evidence that the NED redshifts for a significant number of the Abell clusters which apparently should have been in our sample are incorrect, mostly belonging to foreground objects (see Appendix A for details).

Excluding these clusters as very probably outside our sample redshift range, we find there are in fact 13 Abell clusters in the HCB volume and 27 in the PPC volume, so that our samples of Abell clusters are 12/13=92% complete in HCB and 20/27=74% complete in PPC. In fact 4 of the clusters missed from our PPC sample are from Abell et al. (1989), which was not available when we were selecting our sample; excluding these our completeness in PPC is 20/23=87%. The selection of our cluster sample will need to be accounted for in interpreting the results obtained on the velocity field.

The location of our survey volumes with respect to the major large-scale structures is illustrated in Fig.3, which shows the program clusters relative to the superclusters identified by Einasto et al. (1994). These are very similar to the superclusters given in the earlier supercluster catalogues of Bahcall & Soneira (1984), Batuski & Burns (1985), Tully & Fisher (1987), Tully et al. (1992) and Zucca et al. (1993), differing only in the effective density threshold used to define the superclusters and in having more Abell clusters with redshifts to work with. The names of the superclusters are those given in Einasto et al. (following earlier authors) except for Pisces A and Pisces B, which we have supplied for Einasto et al.'s superclusters 16 and 17. The volume we call HCB is centered on the Hercules supercluster at 10000 $\mathrm{km\,s^{-1}}$, and reaches towards (but does not encompass) the Corona Borealis and Bootes superclusters at around 20000 $\mathrm{km\,s^{-1}}$. It does not include any other superclusters identified by Einasto et al. The PPC volume includes the Perseus-Pegasus A, Pisces A and Lepus superclusters at distances around 12000 $\mathrm{km\,s^{-1}}$and has an outer boundary that does not quite include the Pisces B, Pisces-Cetus and Horologium-Reticulum superclusters at around 18000 $\mathrm{km\,s^{-1}}$.

3. Selection of the Galaxy Sample

The search for suitable ellipticals in each of the selected clusters was carried out using the high-quality enlargements of the relevant regions of Sky Survey glass copies described above. These enlargement prints greatly aided the uniform selection of our galaxy sample and the quantification of the selection criteria. Galaxies were selected entirely by their morphology and size on the enlargments. As redshifts were unavailable for many of the galaxies in our program clusters we used the ellipticals with known redshifts as a guide in finding other galaxies with elliptical morphologies and similar apparent sizes. We erred on the side of including some objects with disks rather than exclude possible ellipticals. In order not to bias the selection, we did not identify known galaxies, but chose objects solely on the basis of their appearance on the Sky Survey enlargement prints.

From our previous experience (Faber et al. 1989), high-quality photographic enlargements of the Sky Survey glass copies can be used to make quantifiable selection of elliptical galaxies. Thus an initial survey of the enlargements was conducted picking out suitably-sized objects that could possibly be E or S0 galaxies. As many galaxy images are saturated on the Sky Survey plates, we realized at the outset that this selection procedure also yields spiral galaxies which would have to be weeded out with further imaging. However we decided it was preferable to use an inclusive procedure in order to make the selection criteria more readily quantifiable, and to bear the overhead of the extra subsequent imaging needed to make final morphological classifications.

All galaxies identified as possible E or S0 galaxies by the initial selection process were given capital letter designations within each cluster (e.g. A119_A, J3_C, P777-3_B). This yielded 598 E/S0 galaxy candidates. A second pass through the selection process added 145 additional candidates (generally fainter, smaller galaxies), which are given numerical designations (e.g. A119_2, J3_1) to distinguish them from the first set. Altogether we selected a total of 743 E/S0 galaxy candidates in the program clusters. The final list of galaxies useful as distance indicators was further refined after spectroscopy and spectra were obtained.

In order to have a calibration and comparison sample, we also chose 52 well-studied galaxies in Coma, Virgo and the field. These galaxies were *not* selected in the same way as the program galaxies, but were drawn from samples studied by previous workers investigating the D_n–σ and fundamental plane relations. Our primary comparison sample of 32 Coma cluster galaxies are designated by their Dressler (1984) numbers (e.g. COMA_124 is D124). The 7 Virgo cluster and 13 field galaxies are called by their NGC names (e.g. N4486 is NGC 4486).

Table 3 gives the basic data on all 795 objects observed in the EFAR project, listing the Galaxy Identification Number (GIN), the galaxy name, its position (J2000), the R-band extinction A_R derived as described below, the galactic coordinates (l, b), the log of the photographic diameter D_W in arcsec (see §4), and some comments, which include other names for the galaxies (mainly NGC/IC names). The GIN is the unique identifier for each galaxy: the 743 program objects are assigned numbers 1 to 742 and 901 (P777-2_2). The 52 calibration galaxies are assigned numbers 750 to 801. Note that there has been some re-naming of the galaxies compared to Colless et al. (1993) due to the incorrect cluster names used in that paper. Only the cluster part of the name has been changed (following §2 and the notes to Table 1); the alphanumeric designation (and the GIN) remains the same (e.g. A2506_A has become P522-1_A).

Of the total of 743 E/S0 galaxy candidates it was subsequently found that there were 3 duplicated pairs (GINs 53=55, 406=435, 565=576) and that 4 'galaxies' are actually stars (GINs 123, 131, 133, 191); these are all noted in the comments column of Table 3. Excluding the duplicates and stars gives a sample of 736 galaxies which are E/S0 candidates. The distribution of the number of galaxies per program cluster is shown in Fig.4; the number of galaxies selected per cluster ranges from 2 to 19, with a median of 8.

Accurate positions were determined for all program galaxies using the Galaxy Automated Scanning Program (GASP) of the Space Telescope Science Institute. The positions obtained appear to have an accuracy of $0.5''$, and have been checked repeatedly during acquisition at the telescope. The R-band extinctions given in Table 3 were computed as $A_R = 2.4E(B-V)$, with $E(B-V)$ obtained from Burstein & Heiles (1982, 1984).

4. Sample Selection Functions

It has long been known, starting with Malmquist (1920), Neyman & Scott (1959) and others, that the statistical properties of a sample of objects depends on a number of observational factors including the cutoff and completeness of the sample. In investigations of this kind, there are two levels of selection with which we must deal: (1) the choice of the clusters (or "fields") which we have described above and (2) the selection of the galaxies themselves. Having dealt with the former in §2 we now turn to quantifying the latter.

Incompleteness amongst the small, faint galaxies observed in a given cluster can lead to a strong selection bias which affects the estimated distance to the cluster (cf. Lynden-Bell et al. 1988; Willick 1994; Strauss & Willick 1995; Freudling et al. 1995). As each cluster has its own intrinsic distance, richness, and structure, it will also have its own selection function which depends on the observational quantity on which the sample is selected. The relevant quantity in this study is the photographic diameter as measured from the Sky Survey images.

For a cluster of galaxies, index j, found within a fixed solid angle on the sky, we estimated the selection function of the survey (the completeness as a function of the selection variable X), $S_j(X)$, by binning the program elliptical galaxies in k fixed intervals ΔX and summing the number in each bin. We excluded program galaxies found to be spirals or otherwise unusable in our subsequent CCD imaging, as these will not be used for obtaining distances and so should not be included in the selection function. This gives the count, N_{jk}^{obs}, of observed galaxies with the range of desired morphological types belonging to cluster j in the interval $X_k - \frac{1}{2}\Delta X \leq X_k < X_k + \frac{1}{2}\Delta X$. The ratio of this to the true number of galaxies in this cluster and interval with the range of desired morphological types, N_{jk}^{all}, yields the selection function,

$$S_j(X_k) = N_{jk}^{obs}(X_k)/N_{jk}^{all}(X_k)\,. \quad (1)$$

In order to estimate N_{jk}^{all} and thus determine S_j, a second catalog of all galaxies that *might* have been in the sample must be constructed. This means, for each cluster, measuring the photographic diameters for all ellipticals (spirals were excluded) as big or bigger than the smallest galaxy that is included in our sample.

The method for selecting candidate galaxies simply consisted of choosing, by eye, objects larger than some size which looked like ellipticals on our high-quality photographic enlargements of the glass copies of the Sky Survey plates. This selection procedure can be quantified by measuring optical major-axis diameters, D_W (in arcsec), for every elliptical-like galaxy in all the cluster fields (including both the galaxies in the sample and other, mostly smaller, galaxies in the same fields). These diameters were measured in a homogeneous fashion by GW off the photographic enlargements of the Sky Survey glass copies. In all, 2185 diameter measurements were made; those for the program galaxies are listed in Table 3. These D_W are a good measure of the true size of the galaxies, as is illustrated by Fig.5, which, using preliminary estimates of D_R (the diameter enclosing a mean surface brightness of 20.5 mag arcsec^{-2} in the Kron-Cousins R band), shows the good correlation that exists between $\log D_W$ and $\log D_R$. The full details of the derivation of the D_R values will be given in the Paper III on the photometry (Saglia et al. 1996).

The selection function for each cluster j was computed from the ratio of the $\log D_W$ distributions (with $\Delta \log D_W = 0.2$ dex binning) of the EFAR program galaxies (with spirals omitted), N_j^{EFAR}, and *all* galaxies with measured D_W, N_j^{all}:

$$S_j(\log D_W) = N_j^{EFAR}(\log D_W)/N_j^{all}(\log D_W)\,. \tag{2}$$

To characterise the selection function $S_j(\log D_W)$ we follow Neyman & Scott (1959) and Willick (1994) and adopt the useful form

$$S_j(\log D_W) = 0.5\{1 + \mathrm{erf}[(\log D_W - \log D^0_{Wj})/\delta_{Wj}]\}\,, \tag{3}$$

where $\log D^0_{Wj}$ is the midpoint, and δ_{Wj} the width, of the cutoff in the selection function. In practice, we fitted this relation by doing a linear least-squares fit to

$$\mathrm{erf}^{-1}[2S_j(\log D_W) - 1] = (\log D_W - \log D^0_{Wj})/\delta_{Wj}\,, \tag{4}$$

where erf^{-1} denotes the inverse error function. For some of the clusters there were too few points to fit both parameters and we used the mean width $\langle\delta_W\rangle$=0.24 and determined only the cut-off $\log D^0_W$. The uncertainty in $\log D^0_W$ is dominated by the small numbers of galaxies in each cluster, and is approximately 0.1 dex. Example selection functions for some of the clusters are shown in Fig.6. Note that the cutoff in the selection function for Coma is particularly broad, due to the fact that the galaxies in Coma were not selected in the same way as the other clusters but were simply garnered from the literature of previous observations in the cluster.

Our estimates of the selection functions for each cluster are valid as long as (1) the diameters measured for all galaxies are as small or smaller than the smallest program galaxy in the cluster and (2) the two samples are not badly contaminated by galaxies of the wrong morphological types. Fig. 7a shows that this first requirement is satisfied, for the catalog of all $\log D_W$ diameters (striped histogram) only begins to show incompleteness about 0.2 dex below the cutoff $\log D^0_W$ in the sample of program galaxies in each cluster.

The second potential source of error in the galaxy counts stemming from the difficulty of assigning correct types to the smallest galaxies could produce a systematic change in the contamination by spirals with diameter. However this would be compensated approximately if the fractions of incorrectly selected galaxies are similar in the two catalogs. This is shown to be the case in Fig. 7b which compares the distributions of rejected spirals from the two samples. Here the two distributions have nearly the same shape and their ratio remains nearly constant at ~0.5 near the cutoff of the selection functions. The final morphological types will be given in the photometry paper (Saglia et al. 1996). Here we are concerned purely with the initial sample selection; this involved the by-eye morphologies, but not the detailed CCD-image-based classifications which will be discussed in later papers.

The combined selection function for the whole sample, correcting for differences in $\log D_W$ between clusters, is shown in Fig.8. The selection function corresponding to the mean parameters $\langle\log D_W^0\rangle$=1.25 and $\langle\delta_W\rangle$=0.24 (i.e. cluster-weighted using the subsample of clusters for which we could directly determine these parameters) is shown as the solid curve. Fitting the combined galaxy sample directly yields the dashed curve which is the galaxy weighted selection function and it has a slightly higher cutoff $\log D_W^0$=1.30 and is slightly broader δ_W=0.30. Thus the selection functions typically have a cutoff at $\langle D_W^0\rangle$=18–20″ and drop from 90% to 10% completeness over a range of $1.8\langle\delta_W\rangle$=0.44–0.54 dex (i.e. between 30″ and 10″). Fig.9 shows that the selection is indeed by angular diameter: note the curves of constant angular size produced by the discreteness of the $\log D_W^0$ estimates. Over the range from 6000 km s^{-1} to 15000 km s^{-1} a typical cutoff diameter of 19″ corresponds to a metric diameter increasing from 11 kpc to 28 kpc (for H_0=50 km s^{-1} Mpc^{-1}).

The selection regions and the parameters of the selection functions for all clusters are given in Table 4. The CID in the first column correspond to those in Table 1. The solid angles on the sky that were surveyed for each cluster were measured from the photographic prints and with the exception of two clusters, the fields are rectangles running EW and NS. Thus we measured the right ascension and declination of the center of each rectangle (not the same as the cluster centers in Table 1), given in columns 2 and 3, and the total length and height, $\Delta\alpha$ and $\Delta\delta$ of the sides of these rectangles in units of arc minutes in columns 4 and 5. The selection function parameters N_W (the total number of D_W diameters measured in each field), $\log D_W$, and δ_W are listed in columns 6, 7, and 8.

In subsequent papers we will apply additional selection criteria (such as the availability of spectroscopic and photometric observations or morphological criteria based on the CCD imaging) in order to refine the initial program sample. We will then compute the corresponding new selection functions using the method described above. In general we would expect such subsamples to omit more objects with small diameters, leading to larger values of the cutoff diameter. This is borne out using a preliminary stringently chosen list of our highest quality distance indicators (Saglia et al. 1996). With this whittled down subsample which is 55% of the original list, the mean $\log D_W^0$ increases by only 0.1 while δ_W changes insignificantly and shows the insensitivity of the selection function to large changes in the sample.

A maximum likelihood fitting method is to be used to determine the galaxy distances, and since this technique fits a probability distribution to all observables this gives additional explicit and implicit selection criteria besides $S_j(D_W)$. The final values that we use will be given in subsequent papers, but examples of these with preliminary values are as follows: the lower cutoff in the velocity dispersion at σ<140 km s^{-1} due to the resolution of the instruments is an explicit limit (Wegner et al. 1996), while the mean surface brightness 23.39≥ $\langle SB_e\rangle$≥16.84 mag arcsec^{-2} and the smallest effective radius R_e≥1.5″ we have observed in our sample are implicit limits (Saglia et al. 1996).

5. Conclusions

The EFAR project is aimed at measuring the properties and peculiar motions of elliptical galaxies in clusters selected in two regions at distances of 6000–15000 km s^{-1}. The primary goals of the project are: first, to study the physical properties of a large sample of elliptical galaxies and derive an optimal distance estimator; and second, to determine the bulk motions in the two selected regions in order to establish whether the large-scale coherent motions seen within 6000 km s^{-1} are typical of other regions of the universe, thereby tightening the constraints on cosmological models set by the local velocity field.

There are 84 clusters in our sample, 39 in the region we call Hercules-Corona Borealis (HCB) and 45 on the opposite side of the sky in the region we call Perseus-Pisces-Cetus (PPC). Most of these clusters lie in the redshift range 6000–15000 km s^{-1}, with 42 being drawn from the Abell (1958) catalog, 32 from the catalog of Jackson (1982), and a further 10 supplementary clusters found by us on the Sky Survey plates. We give the redshifts for all of these clusters and show where they are located with respect to the superclusters identified by Einasto et al. (1994). We find that our sample of Abell (1958) clusters in the range 6000-15000 km s^{-1} is 92% complete in HCB and 87% complete in PPC.

In these clusters we have selected 736 candidate elliptical galaxies based on their morphology and apparent size on enlargements of Sky Survey glass copies. Our master list of EFAR galaxies gives the fundamental data, including accurate new positions, for these program galaxies and for 52 calibration galaxies in Coma, Virgo and the nearby field. In order to quantify our selection criteria we have measured visual diameters from the Sky Survey enlargements for all the program galaxies (and for the calibration galaxies in Coma) and for a large number of other galaxies in these clusters—a total of 2185 objects. The visual diameters of the program galaxies turn out to correlate with preliminary estimates of the the photometric sizes established by subsequent CCD imaging. For each cluster we are therefore able to characterise the selection criterion for the sample galaxies in terms of these visual diameters. We find that the samples of galaxies in the program clusters are typically 50% complete at 18–20″, and drop from 90% to 10% completeness between 30″ and 10″.

Subsequent papers in this series will report the spectroscopic and photometric observations, estimate distances and peculiar velocities for the galaxies and clusters, and interpret the implied peculiar velocity field.

GW is grateful to the SERC and Wadham College for a year's stay in Oxford, and to the Alexander von Humboldt-Stiftung for making possible a visit to the Ruhr-Universität in Bochum. MMC acknowledges the support of a Lindemann Fellowship, a DIST Collaborative Research Grant and an Australian Academy of Science/Royal Society Exchange Program Fellowship. RPS acknowledges the support by DFG grants SFB 318 and 375. This work was partially supported by NSF Grant AST90-16930 to DB, AST90-17048 and AST93-47714 to GW, AST90-20864 to RKM, and NASA grant NAG5-2816 to EB. The entire collaboration benefitted from NATO Collaborative Research Grant 900159 and from the hospitality and monetary support of Dartmouth College, Oxford University, the University of Durham and Arizona State University. Support was also received from PPARC visitors grants to Oxford and Durham Universities and a PPARC rolling grant: "Extragalactic Astronomy and Cosmology in Durham 1994-98." The KPNO photographic laboratory produced the extensive set of prints from the Sky Surveys used for measuring galaxy diameters and as finders, which were provided by RLD and DB. DB measured the positions of all program galaxies using the GASP system; we extend our great appreciation to the STScI personnel for their help. Josef Wegner compiled the initial sample of candidate galaxies and provided a list of cross-references which proved invaluable.

A. Clusters Omitted from the Survey Sample

As of mid-1995 there were 56 Abell clusters with known redshifts and sky positions that would nominally have placed them in the survey sample. The EFAR sample has 34 (61%) of these clusters. The 22 remaining Abell clusters were excluded for the reasons listed below.

Five clusters had redshifts known at the time of the 1986 search but were rejected:

(1) A195 - Nominal z=0.047. Examination of POSS print shows that the cluster is much fainter and likely to have z>0.05.

(2) A261 - Nominal z=0.0467. Examination of POSS prints shows quoted redshift is that of a foreground elliptical. The real Abell cluster is much more distant.

(3) A407 - Nominal z=0.047. Famous "cD-in-the-making", seven galaxies in a common envelope associated with UGC 2489 (cf. Nilson 1973). We could not get good data on each part of this complex system.

(4) A484 - Nominal z=0.0386. Redshift quoted corresponds to a small radio galaxy near the cluster, but not in it. The real Abell cluster is of very faint galaxies in background.

(5) A539 - Nominal z=0.0267. This cluster lies at low Galactic latitude, has strong differential reddening, and is in the middle of an emission line nebula.

Ten clusters did not have redshifts known at the time of the 1986 search and subsequent investigation indicates our survey would not have used them:

(6) A256 - Nominal cz=13379 km s^{-1}. Examination of POSS prints finds a foreground E superimposed on a faint, background cluster. Zabludoff et al. (1993) show this region to have galaxies with cz from 6000 to 30000 km s^{-1}, but no definite clusters except at the highest cz.

(7) A2995 - Nominal cz=11332 km s^{-1}. Examination of POSS prints finds 3 larger galaxies (2 spirals, 1 elliptical) superimposed on faint background clusters. Abell (1958) calls this cluster

distance class 5, making it too far away for our survey. Quoted redshift comes from NED.

(8) A480 - Nominal cz=14180 km s^{-1}. Struble & Rood (1991) report this as an incorrect redshift. We confirm this from examination of the POSS, as we only see faint cluster and Abell gives it a distance class of 5.

(9) S0449 - Nominal cz=14390 km s^{-1}. Redshift from Dalton et al. (1994), but assigned probability of 0.05 or less of being correct. Examination of SRC J prints indicate galaxies in cluster have z>0.1.

(10) S0471 - Nominal cz=12891 km s^{-1}. Redshift from Dalton et al. (1994), but assigned probability of 0.05 or less of being correct. Examination of SRC J prints indicate galaxies in cluster have z>0.1.

(11) A3175 - Nominal cz=11691 km s^{-1}. Redshift from Dalton et al. (1994), but assigned probability of 0.05 or less of being correct. Examination of SRC J prints indicate galaxies in cluster have z>0.1.

(12) A2022B - Nominal cz=9144 km s^{-1}. Examination of POSS shows this to be a foreground group to a much fainter Abell cluster. The actual Abell cluster is too distant for our survey.

(13) A2025 - Nominal cz=13550 km s^{-1}. Examination of POSS shows only faint galaxies at the Abell cluster position. Quoted redshift probably of foreground galaxy.

(14) A2506 - Nominal cz=8660 km s^{-1}. The confusing picture given by POSS examination is clarified by Zabludoff et al. (1993) which shows the galaxies in this region have a large range in redshift. Only the nearest galaxies are used for the quoted redshift. Our survey originally identified a set of galaxies at this redshift as A2506, but these are really a degree away from the Abell cluster position, and are now called the P522-1 group.

(15) A2592 - Nominal cz=13880 km s^{-1}. Examination of the POSS finds only faint galaxies. Struble & Rood (1991) state that this is an incorrect redshift for this cluster.

Two clusters did not have redshifts at the time of our 1986 search and would have been of marginal use for this survey.

(16) A3367 - Nominal z=0.0443. Examination of POSS prints shows this cluster is dominated by a cD but the other galaxies in the cluster are too faint and too small for our survey. This could be another foreground galaxy contaminated-cluster.

(17) A3374 - Nominal z=0.0471. Examination of POSS prints shows this cluster is dominated by a cD. Only faint galaxies are seen around this cD, too faint for this survey.

Five clusters would have been included in the EFAR survey had we known about their redshifts in 1986:

(18) A154A - cz=12837 km s^{-1}.

(19) A295 - cz=12717 km s^{-1}.

(20) A536 - cz=11931 km s^{-1}.

(21) A2881 - cz=13280 km s^{-1}.

(22) A3223 - cz=12981 km s^{-1}.

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Table 1. The Cluster Sample

CID	N	R.A. (J2000)	Dec.	l	b	cz_{EFAR}	cz_{lit}	Name
1	7	00 39.4	+06 44	117.57	-56.02	12082	12471	A76
2	5	00 41.8	−09 18	115.23	-72.04	16614	16680	A85[a]
3	12	00 56.4	−01 15	125.80	-64.07	13140	13307	A119
4	6	01 02.0	+26 57	125.87	-35.86	14052	···	J3
5	5	00 58.8	+12 58	125.72	-49.85	12684	···	J4
6	7	01 09.3	+02 12	132.02	-60.34	13042	13130	A147[b]
7	12	01 12.4	+15 44	130.33	-46.82	13150	13400	A160
8	9	01 13.0	−00 15	134.36	-61.61	13473	13427	A168
9	4	01 25.4	+01 44	140.13	-59.99	9603	9594	A189
10	9	01 20.9	−13 51	151.84	-75.04	15390	···	J30
11	6	01 25.1	+08 41	136.94	-53.26	14701	14584	A193
12	12	01 37.2	−09 11	156.21	-69.05	12298	···	J32
13	9	01 50.7	+33 04	137.00	-28.17	11035	10433	A260
14	10	01 52.7	+36 09	136.59	-25.09	5161	4827	A262
15	7	02 25.6	+36 57	143.10	-22.18	10726	···	J7
16	13	02 30.2	+23 09	150.69	-34.33	9425	···	J8
17	7	02 46.0	+36 54	147.11	-20.52	14550	14659	A376
18	7	02 49.7	+46 58	143.01	-11.22	8426	···	J9
19	2	02 55.7	−14 12	195.20	-58.30	9235	···	J33
20	9	02 56.5	+15 54	161.84	-37.33	9518	9743	A397
21	14	02 57.5	+05 58	170.28	-45.00	6804	7189	A400
22	3	03 08.3	−04 08	183.86	-50.08	8660	···	J28
23	12	03 08.2	−23 41	214.31	-59.00	20329	19936	A419
24	6	04 33.6	−13 15	209.59	-36.49	9691	9844	A496
25	10	04 45.1	−15 52	213.90	-34.95	10809	···	J34
26	3	04 52.7	+01 14	197.18	-25.49	8933	···	J10
27	6	04 58.8	−00 29	198.62	-24.50	4490	···	P597-1
28	5	04 54.8	−18 06	217.47	-33.61	9530	···	J35
29	7	04 51.3	−17 30	216.40	-34.19	9460	···	J34/35
30	4	04 59.7	−18 34	218.49	-32.70	12701	···	P777-1
31	8	05 02.9	−20 21	220.77	-32.62	8254	···	P777-2
32	10	05 05.2	−19 13	219.72	-31.71	16392	···	P777-3
33	8	05 04.0	−23 59	224.95	-33.54	12422	···	A533-1
34	9	05 01.6	−22 36	223.18	-33.65	14543	14150	A533
35	19	05 48.6	−25 28	230.28	-24.43	12357	12291	A548-1
36	17	05 42.3	−26 05	230.40	-25.97	11629	12291	A548-2
37	8	13 05.6	+53 33	118.21	63.43	8868	···	J11
38	8	13 43.4	+30 04	50.52	78.23	12685	···	J12
39	18	13 55.2	+25 03	28.27	75.54	8855	···	J13
40	7	14 08.1	−09 04	332.77	49.31	11437	···	J36
41	9	14 47.0	+13 40	12.21	59.85	9114	···	J14

Table 1—Continued

CID	N	R.A. (J2000)	Dec.	l	b	cz_{EFAR}	cz_{lit}	Name
42	10	14 47.1	+11 35	8.80	58.73	8806	···	J14-1
43	10	14 54.3	+16 21	18.59	59.60	13740	13238	A1983[c]
44	11	14 54.5	+18 38	22.74	60.52	16845	17567	A1991[d]
45	12	15 19.0	+04 31	6.81	48.20	10973	···	J16
46	11	15 11.6	+04 29	5.08	49.63	11129	···	J16W
47	3	15 21.9	+08 25	12.36	49.83	12850	···	A2063-S
48	10	15 12.8	+07 25	9.08	51.15	13544	13526	A2040
49	7	15 16.7	+07 01	9.42	50.11	10002	10432	A2052
50	10	15 23.0	+08 36	12.80	49.70	10381	10609	A2063
51	7	15 39.6	+21 46	34.41	51.51	12573	12369	A2107
52	10	15 55.0	+41 34	66.25	49.99	9988	···	J17
53	15	16 02.2	+15 58	28.91	44.53	10746	10537	A2147
54	4	15 57.1	+22 24	37.09	47.81	4430	···	P386-1
55	6	16 11.3	+23 57	40.53	45.09	9624	···	P386-2
56	9	16 03.3	+25 27	41.97	47.23	26322	26606	A2148[e]
57	8	16 04.9	+23 55	39.95	46.50	9598	···	J18[f]
58	16	16 04.5	+17 43	31.47	44.64	11122	11059	A2151
59	17	16 06.4	+15 41	29.06	43.50	13016	13047	A2152[g]
60	8	15 58.3	+18 04	31.19	46.17	13890	···	P445-1
61	4	15 57.8	+16 18	28.77	45.63	10757	···	P445-2
62	6	16 13.2	+30 54	50.36	46.10	14866	···	A2162-N
63	11	16 12.5	+29 29	48.36	46.03	9668	9593	A2162-S[h]
64	5	16 18.0	+35 06	56.54	45.58	8960	···	J20
65	17	16 29.7	+40 48	64.68	43.50	9337	9134	A2197
66	19	16 28.6	+39 33	62.92	43.70	8892	9063	A2199
67	11	16 37.5	+50 20	77.51	41.64	13798	···	J21
68	8	16 52.8	+81 37	114.45	31.01	11559	11751	A2247
69	9	17 01.9	+28 25	49.95	35.22	10507	···	P332-1
70	8	16 57.9	+27 51	49.02	35.93	10394	···	J22[i]
71	5	17 15.3	+57 24	85.81	35.40	8421	···	J23
72	6	17 33.0	+43 45	69.51	32.08	10383	···	J24
73	3	17 55.8	+62 36	91.82	30.22	8245	···	J25
74	5	18 02.6	+42 47	69.59	26.60	15083	···	J26
75	5	18 36.3	+51 27	80.41	23.15	9754	···	J27
76	4	21 41.0	−16 41	36.09	-44.90	15540	···	J38
77	12	22 50.0	+11 41	81.75	-41.26	7610	···	P522-1[j]
78	7	23 18.7	+18 41	94.28	-38.95	11338	11841	A2572
79	10	23 23.9	+16 46	94.64	-41.23	12657	12621	A2589
80	18	23 24.3	+14 38	93.44	-43.19	12420	12981	A2593-N
81	7	23 24.4	+13 58	93.05	-43.79	12708	12981	A2593-S
82	13	23 38.5	+27 01	103.50	-33.08	9463	9354	A2634

Table 1—Continued

CID	N	R.A. (J2000)	Dec.	l	b	cz_{EFAR}	cz_{lit}	Name
83	9	23 44.9	+09 12	96.73	-50.25	12252	12099	A2657
84	5	23 50.9	+27 09	106.71	-33.80	8389	7945	A2666
90	32	12 59.6	+27 58	58.00	88.00	6769	6853	COMA[k]

[a]CID=2: A85 is also J29, the name used by Colless et al. (1993); cz_{lit} is from Fetisova (1982).

[b]CID=6: A147 was incorrectly called A150 in Colless et al. (1993).

[c]CID=43: A1983 was incorrectly called A1983-1 in Colless et al. (1993).

[d]CID=44: A1991 was incorrectly called A1983 in Colless et al. (1993).

[e]CID=56: A2148 cz_{lit} is from Postman & Lauer (1995).

[f]CID=57: J18 is also AWM 4

[g]CID=59: A2152 is also J19, as used by Colless et al. (1993); cz_{lit} is for the BCG (UGC 10187) from RC3.

[h]CID=63: A2162-S is A2162

[i]CID=70: J22 is also AWM 5

[j]CID=77: P522-1 was incorrectly called A2506 in Colless et al. (1993).

[k]CID=90: COMA is A1656; cz_{lit} is from Colless & Dunn (1996).

Note. — The sky survey fields originally examined for the cluster selection are (P=POSS, S=SERC): P010, P102, P103, P133, P141, P155, P179, P225, P226, P228, P229, P245, P246, P247, P247, P273, P276, P294, P297, P324, P330, P332, P351, P354, P381, P385, P386, P403, P408, P412, P442, P445, P463, P467, P468, P502, P503, P522, P523, P526, P528, P532, P563, P584, P587, P588, P595, P597, P649, P653, P655, P680, P706, P708, P709, P712, P777, P819, S480, S486, S488.

Table 2. Cluster Sample by Type and Redshift

cz range	N_A	N_J	N_P	N_S
		.... HCB		
<6000	0	0	1	1
6000–15000	14	17	4	35
15000–20000	1	1	0	2
>20000	1	0	0	1
Total	16	18	5	39
		.... PPC		
<6000	1	0	1	2
6000–15000	23	12	3	38
15000–20000	1	2	1	4
>20000	1	0	0	1
Total	26	14	5	45

Table 3. The Master List of EFAR Sample Galaxies

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
1	A76	A	00 39 26.27	+06 44 03.3	0.037	117.60	−56.01	1.57	I1565
2	A76	B	00 40 28.02	+06 43 10.9	0.041	118.05	−56.05	1.36	I1569
3	A76	C	00 39 55.95	+06 50 55.0	0.037	117.83	−55.91	1.45	I1568
4	A76	D	00 40 30.59	+06 55 02.9	0.058	118.10	−55.85	1.49	
5	A76	E	00 38 54.76	+07 03 45.3	0.053	117.42	−55.67	1.36	N0190
6	A76	F	00 39 04.56	+07 29 33.5	0.082	117.55	−55.25	1.41	
7	A76	1	00 40 44.71	+06 33 32.2	0.041	118.15	−56.21	1.23	
8	A85	A	00 41 50.40	−09 18 12.5	0.089	115.24	−72.03	1.54	HOLM015A,H
9	A85	B	00 41 50.07	−09 25 47.4	0.082	115.18	−72.16	1.10	
10	A85	C	00 42 54.67	−09 13 50.1	0.089	116.11	−71.99	1.24	
11	A85	1	00 43 10.15	−09 51 42.7	0.068	116.10	−72.62	1.24	
12	A85	2	00 41 22.23	−09 52 41.9	0.070	114.62	−72.59	1.20	
13	A119	A	00 56 25.63	−01 15 45.5	0.046	125.79	−64.11	1.39	
14	A119	B	00 56 16.09	−01 15 18.9	0.046	125.70	−64.10	1.65	
15	A119	C	00 57 34.95	−01 23 27.9	0.032	126.46	−64.22	1.45	3C 029
16	A119	D	00 56 56.98	−01 12 43.2	0.032	126.08	−64.05	1.31	
17	A119	E	00 56 02.67	−01 20 03.4	0.046	125.58	−64.18	1.26	
18	A119	F	00 55 40.64	−01 18 43.3	0.046	125.36	−64.16	1.35	
19	A119	G	00 55 18.82	−01 16 37.3	0.037	125.15	−64.13	1.15	
20	A119	H	00 57 45.27	−00 25 11.3	0.041	126.44	−63.25	1.54	
21	A119	I	00 57 27.84	−00 28 18.9	0.041	126.29	−63.30	1.31	
22	A119	J	00 57 17.12	−00 40 11.2	0.041	126.21	−63.50	1.31	
23	A119	1	00 56 12.82	−00 35 49.1	0.037	125.60	−63.44	1.09	
24	A119	2	00 55 21.46	−01 21 09.6	0.037	125.18	−64.21	1.26	
25	J3	A	01 02 05.44	+26 57 06.4	0.159	125.86	−35.86	1.50	
26	J3	B	00 58 47.45	+26 58 39.3	0.125	124.95	−35.87	1.28	
27	J3	C	00 59 24.44	+27 03 32.8	0.149	125.12	−35.78	1.24	I0064
28	J3	D	00 58 22.68	+26 51 58.7	0.125	124.84	−35.98	1.54	N0326
29	J3	1	01 00 56.43	+27 09 53.1	0.154	125.53	−35.66	1.15	
30	J3	2	01 00 18.06	+26 56 57.3	0.149	125.37	−35.88	1.04	
31	J4	A	00 58 51.18	+12 58 21.2	0.085	125.73	−49.86	1.64	
32	J4	B	00 59 36.06	+12 59 09.7	0.073	126.02	−49.84	1.38	
33	J4	C	00 58 41.32	+12 41 35.0	0.099	125.69	−50.14	1.36	
34	J4	1	00 59 39.27	+12 57 34.1	0.073	126.04	−49.86	1.12	
35	J4	2	00 58 48.27	+13 05 57.5	0.085	125.71	−49.73	1.31	
36	A147	A	01 09 18.13	+02 12 15.1	0.010	131.98	−60.35	1.32	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	log D_W	Comments
37	A147	B	01 08 38.00	+02 16 06.5	0.008	131.63	−60.31	1.48	
38	A147	C	01 08 12.09	+02 11 37.5	0.008	131.43	−60.40	1.40	
39	A147	D	01 08 14.59	+02 10 36.1	0.008	131.46	−60.42	1.14	
40	A147	E	01 08 43.32	+02 11 31.0	0.008	131.70	−60.39	1.10	
41	A147	F	01 08 34.98	+02 09 44.2	0.008	131.63	−60.42	1.10	
42	A147	1	01 07 41.75	+02 07 09.2	0.010	131.20	−60.49	1.26	
43	A160	A	01 12 27.34	+15 44 59.9	0.053	130.33	−46.82	1.38	
44	A160	B	01 12 23.50	+15 43 33.8	0.053	130.31	−46.85	1.10	I1645
45	A160	C	01 10 28.96	+16 11 25.7	0.077	129.57	−46.44	1.30	
46	A160	D	01 12 18.66	+16 19 33.5	0.080	130.18	−46.25	1.23	
47	A160	E	01 13 15.75	+15 30 58.1	0.058	130.66	−47.03	1.53	
48	A160	F	01 13 02.89	+15 31 37.9	0.058	130.58	−47.02	1.35	
49	A160	G	01 12 59.67	+15 29 27.1	0.058	130.57	−47.06	1.51	
50	A160	H	01 13 47.70	+15 30 28.9	0.056	130.84	−47.02	1.19	
51	A160	I	01 11 24.88	+15 34 21.9	0.051	130.00	−47.02	1.23	
52	A160	J	01 14 14.44	+15 53 54.1	0.061	130.93	−46.62	1.57	
53	A160	1	01 11 50.18	+15 21 00.8	0.051	130.18	−47.23	1.05	same as 55
54	A160	2	01 10 37.92	+16 14 42.8	0.063	129.62	−46.38	1.10	
55	A160	3	01 11 50.18	+15 21 00.8	0.051	130.18	−47.23	1.05	same as 53
56	A168	A	01 13 00.07	−00 15 11.3	0.015	134.72	−62.63	1.64	N0430
57	A168	B	01 12 48.76	−00 17 26.8	0.015	134.64	−62.68	1.52	N0426
58	A168	C	01 14 21.60	+00 10 46.5	0.025	135.27	−62.14	1.32	
59	A168	D	01 14 57.64	+00 25 49.2	0.022	135.48	−61.87	1.42	
60	A168	E	01 14 54.38	+00 18 10.2	0.027	135.51	−61.99	1.15	
61	A168	F	01 15 15.83	+00 12 46.9	0.034	135.73	−62.07	1.24	
62	A168	G	01 16 12.86	−00 06 30.5	0.029	136.37	−62.33	1.15	
63	A168	1	01 15 16.88	+00 11 06.7	0.034	135.75	−62.09	1.20	
64	A168	2	01 14 46.35	−00 00 06.3	0.022	135.56	−62.30	1.32	
65	A189	A	01 25 31.36	+01 45 32.8	0.034	140.15	−59.97	1.96	N0533
66	A189	B	01 24 47.80	+01 36 25.8	0.013	139.87	−60.16	1.49	I1694
67	A189	C	01 25 13.09	+02 03 58.4	0.041	139.84	−59.69	1.49	I0109
68	A189	D	01 24 36.50	+02 02 37.6	0.046	139.56	−59.75	1.53	I0103
69	J30	A	01 20 58.56	−13 51 00.8	0.008	151.84	−75.04	1.41	
70	J30	B	01 20 55.53	−13 50 06.2	0.008	151.77	−75.03	1.22	
71	J30	C	01 20 36.23	−13 51 50.0	0.008	151.55	−75.09	1.04	
72	J30	D	01 20 34.24	−13 51 50.6	0.008	151.52	−75.09	1.22	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	log D_W	Comments
73	J30	E	01 20 20.61	−13 53 23.1	0.020	151.37	−75.14	1.27	
74	J30	F	01 20 20.53	−13 58 26.4	0.020	151.51	−75.22	0.97	
75	J30	G	01 19 16.79	−13 54 08.6	0.010	150.48	−75.26	1.17	
76	J30	1	01 20 04.97	−13 47 47.2	0.008	150.99	−75.09	1.11	
77	J30	2	01 19 32.19	−13 43 34.6	0.037	150.41	−75.08	1.27	
78	A193	A	01 25 07.66	+08 41 56.9	0.080	136.94	−53.25	1.50	I1695
79	A193	B	01 25 11.99	+08 39 20.1	0.080	136.98	−53.29	1.06	
80	A193	C	01 24 40.94	+08 36 31.5	0.065	136.79	−53.37	1.16	
81	A193	D	01 24 38.64	+08 30 35.0	0.080	136.81	−53.46	1.31	
82	A193	E	01 24 34.81	+08 34 34.2	0.065	136.76	−53.40	1.11	
83	A193	1	01 24 43.69	+08 46 33.4	0.065	136.75	−53.20	1.11	
84	J32	A	01 37 15.38	−09 11 51.7	0.053	156.19	−69.06	1.59	
85	J32	B	01 37 23.42	−09 10 07.9	0.065	156.23	−69.01	1.33	
86	J32	C	01 37 06.95	−09 08 58.0	0.053	156.04	−69.03	1.18	
87	J32	D	01 37 23.14	−09 16 14.5	0.053	156.37	−69.10	1.33	
88	J32	E	01 37 59.90	−09 00 26.6	0.065	156.37	−68.80	1.38	
89	J32	F	01 37 50.26	−08 58 50.4	0.065	156.24	−68.80	1.38	
90	J32	G	01 37 25.39	−08 55 53.7	0.056	155.93	−68.80	1.26	
91	J32	H	01 39 24.84	−09 24 04.0	0.049	157.76	−68.96	1.43	N0640
92	J32	1	01 38 22.32	−08 58 32.7	0.049	156.55	−68.73	1.08	
93	J32	2	01 37 23.39	−09 05 59.2	0.065	156.14	−68.95	1.22	
94	J32	3	01 37 15.68	−09 01 33.1	0.056	155.96	−68.91	1.26	
95	J32	4	01 36 27.66	−09 28 44.1	0.056	156.10	−69.40	1.13	
96	A260	A	01 50 43.02	+33 04 54.4	0.097	137.00	−28.17	1.52	I1733
97	A260	B	01 50 51.78	+33 05 31.9	0.097	137.03	−28.15	1.34	
98	A260	C	01 51 23.66	+33 01 51.3	0.092	137.17	−28.18	1.40	
99	A260	D	01 51 21.37	+33 11 10.5	0.092	137.12	−28.03	1.15	
100	A260	E	01 49 13.02	+33 05 44.0	0.082	136.65	−28.23	1.27	
101	A260	F	01 50 15.59	+33 29 43.4	0.082	136.78	−27.79	1.40	
102	A260	G	01 51 45.53	+33 32 14.1	0.068	137.11	−27.67	1.34	
103	A260	H	01 52 24.98	+33 30 26.4	0.068	137.26	−27.66	1.19	
104	A260	1	01 50 32.13	+33 02 49.7	0.097	136.97	−28.21	1.23	
105	A262	A	01 52 46.45	+36 09 06.8	0.145	136.57	−25.09	1.87	N0708
106	A262	B	01 50 51.29	+36 16 31.7	0.125	136.12	−25.07	1.68	
107	A262	C	01 50 33.28	+36 22 14.1	0.125	136.03	−24.99	1.74	N0687
108	A262	D	01 49 43.79	+35 47 06.8	0.111	136.01	−25.60	1.68	N0679

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	log D_W	Comments
109	A262	E	01 55 10.27	+35 16 53.6	0.123	137.34	−25.80	1.79	I0171
110	A262	F	01 53 08.53	+36 49 10.8	0.121	136.46	−24.43	1.68	N0712
111	A262	G	01 57 50.41	+36 20 34.3	0.123	137.60	−24.63	1.61	N0759
112	A262	H	01 58 54.87	+36 40 28.9	0.121	137.72	−24.25	1.57	I0178
113	A262	I	01 52 39.68	+36 10 16.5	0.145	136.54	−25.08	1.68	N0703
114	A262	1	01 54 53.95	+36 55 03.8	0.113	136.80	−24.24	1.53	A0151+36
115	J7	A	02 25 38.27	+36 57 51.3	0.142	143.10	−22.19	1.57	
116	J7	B	02 25 27.43	+37 10 26.7	0.116	142.98	−22.01	1.48	A0222+36
117	J7	C	02 23 56.01	+37 03 45.3	0.118	142.72	−22.23	1.37	
118	J7	D	02 26 27.62	+37 02 24.3	0.142	143.23	−22.06	1.21	
119	J7	E	02 26 14.63	+37 17 30.3	0.116	143.08	−21.84	1.27	
120	J7	F	02 26 12.24	+37 13 17.7	0.142	143.11	−21.91	1.21	
121	J7	G	02 26 09.82	+36 47 04.7	0.109	143.28	−22.32	1.18	
122	J8	A	02 30 16.42	+23 09 12.3	0.185	150.67	−34.34	1.28	
123	J8	B	02 30 10.54	+23 08 33.5	0.185	150.65	−34.36	···	STAR
124	J8	C	02 29 54.43	+23 05 48.5	0.185	150.61	−34.43	1.37	
125	J8	D	02 29 49.91	+23 06 29.6	0.169	150.59	−34.43	1.47	
126	J8	E	02 29 14.08	+23 04 56.5	0.169	150.45	−34.51	1.50	I1803
127	J8	F	02 29 34.98	+22 56 34.3	0.185	150.62	−34.60	1.28	I1806
128	J8	G	02 30 31.04	+22 56 56.7	0.185	150.84	−34.50	1.28	I1807
129	J8	H	02 28 39.84	+23 00 43.3	0.169	150.35	−34.63	1.11	
130	J8	I	02 29 13.98	+22 57 57.7	0.169	150.51	−34.61	1.23	
131	J8	J	02 28 20.94	+23 01 42.0	0.197	150.26	−34.65	···	STAR
132	J8	K	02 27 33.18	+23 03 35.2	0.197	150.04	−34.70	1.17	
133	J8	L	02 27 44.34	+23 01 42.4	0.197	150.11	−34.71	···	STAR
134	J8	1	02 29 14.30	+22 50 22.0	0.169	150.59	−34.73	0.87	
135	A376	A	02 46 04.03	+36 54 17.8	0.123	147.10	−20.53	1.35	
136	A376	B	02 45 48.39	+36 51 12.3	0.123	147.08	−20.60	1.10	
137	A376	C	02 45 43.87	+36 51 16.1	0.123	147.06	−20.60	1.04	
138	A376	D	02 46 50.09	+36 58 43.5	0.159	147.21	−20.39	1.15	
139	A376	E	02 45 13.82	+36 41 40.5	0.123	147.05	−20.79	1.20	
140	A376	F	02 45 12.56	+36 42 42.9	0.123	147.03	−20.78	1.10	
141	A376	G	02 45 04.07	+36 42 34.8	0.123	147.01	−20.79	1.20	
142	J9	A	02 49 45.56	+46 58 33.3	0.526	143.02	−11.23	1.74	I0257
143	J9	B	02 49 40.40	+46 57 15.1	0.526	143.01	−11.26	1.18	
144	J9	C	02 51 01.00	+46 57 16.5	0.517	143.22	−11.15	1.68	I0260

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	log D_W	Comments
145	J9	D	02 50 12.86	+47 10 51.0	0.526	142.99	−11.01	1.51	
146	J9	E	02 52 16.90	+46 54 47.1	0.519	143.44	−11.09	1.35	
147	J9	F	02 48 59.87	+47 06 11.8	0.526	142.84	−11.17	1.18	
148	J9	G	02 48 10.87	+47 01 36.0	0.608	142.75	−11.30	1.30	
149	J33	A	02 55 44.28	−14 12 30.0	0.037	195.18	−58.31	1.66	
150	J33	B	02 55 48.39	−14 15 14.5	0.032	195.28	−58.31	1.09	
151	A397	A	02 56 32.92	+15 54 36.3	0.159	161.83	−37.34	1.23	
152	A397	B	02 56 28.85	+15 54 57.0	0.159	161.81	−37.34	1.50	
153	A397	C	02 56 27.92	+16 00 28.6	0.248	161.74	−37.27	1.23	
154	A397	D	02 57 04.64	+15 58 59.2	0.248	161.91	−37.20	1.20	
155	A397	E	02 56 32.53	+16 00 14.8	0.248	161.76	−37.26	1.29	
156	A397	F	02 57 23.63	+16 05 41.8	0.248	161.91	−37.07	1.26	
157	A397	G	02 57 37.59	+16 04 03.7	0.248	161.98	−37.06	1.39	
158	A397	H	02 57 57.55	+16 06 19.1	0.245	162.04	−36.98	1.17	
159	A397	I	02 57 08.06	+15 58 47.2	0.248	161.93	−37.20	1.17	
160	A400	A	02 57 33.72	+05 58 36.0	0.190	170.28	−44.99	1.47	
161	A400	B	02 55 19.94	+06 07 29.0	0.164	169.54	−45.24	1.30	
162	A400	C	02 55 14.90	+06 10 38.6	0.171	169.47	−45.21	1.30	
163	A400	D	02 58 14.27	+05 58 18.0	0.190	170.46	−44.88	1.25	
164	A400	E	02 58 21.03	+06 05 41.4	0.190	170.37	−44.77	1.44	
165	A400	F	02 58 37.77	+06 10 32.8	0.190	170.37	−44.67	1.53	
166	A400	G	02 58 54.29	+06 06 57.8	0.190	170.50	−44.67	1.20	
167	A400	H	02 59 16.14	+06 07 59.6	0.190	170.58	−44.59	1.30	
168	A400	I	02 58 29.75	+06 18 22.3	0.190	170.22	−44.59	1.55	
169	A400	J	02 58 24.62	+06 35 30.2	0.188	169.93	−44.39	1.64	
170	A400	K	02 59 52.37	+06 31 57.5	0.200	170.37	−44.19	1.50	
171	A400	L	02 57 41.61	+06 01 35.4	0.190	170.26	−44.93	1.71	
172	A400	1	03 00 08.67	+05 48 15.2	0.176	171.12	−44.69	1.44	
173	A400	2	02 59 59.92	+05 58 02.9	0.173	170.92	−44.60	1.30	
174	J28	A	03 08 20.06	−04 08 19.2	0.092	183.86	−50.07	1.57	
175	J28	B	03 07 44.60	−04 19 09.6	0.087	183.94	−50.30	1.34	
176	J28	C	03 08 03.25	−04 23 59.8	0.087	184.11	−50.29	1.42	
177	A419	A	03 08 15.97	−23 41 29.6	0.003	214.30	−59.01	1.43	
178	A419	B	03 08 10.82	−23 40 53.9	0.003	214.27	−59.02	1.17	
179	A419	C	03 08 15.85	−23 40 47.2	0.003	214.28	−59.00	1.09	
180	A419	D	03 08 28.07	−23 46 30.6	0.000	214.48	−58.98	0.99	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
181	A419	E	03 08 33.26	−23 47 55.3	0.000	214.53	−58.97	1.23	
182	A419	F	03 08 21.63	−23 38 47.7	0.003	214.22	−58.97	1.20	
183	A419	G	03 08 20.24	−23 37 32.3	0.003	214.18	−58.97	1.34	
184	A419	H	03 08 16.33	−23 33 50.2	0.003	214.06	−58.97	1.29	
185	A419	I	03 08 48.58	−23 26 07.3	0.003	213.88	−58.82	1.17	
186	A419	J	03 09 20.17	−23 25 44.4	0.003	213.92	−58.70	1.20	
187	A419	1	03 08 03.44	−23 35 52.0	0.003	214.10	−59.03	0.99	
188	A419	2	03 07 50.76	−23 48 54.5	0.013	214.49	−59.13	1.13	
189	A496	A	04 33 37.80	−13 15 43.3	0.015	209.59	−36.49	1.62	
190	A496	B	04 34 10.46	−13 22 12.7	0.017	209.78	−36.41	1.27	
191	A496	C	04 34 39.37	−13 23 30.6	0.017	208.75	−35.90	···	STAR
192	A496	D	04 33 57.05	−13 27 45.7	0.017	209.85	−36.50	1.30	
193	A496	1	04 35 06.96	−13 23 39.2	0.041	209.92	−36.21	1.18	
194	A496	2	04 33 41.55	−13 10 13.1	0.020	209.49	−36.44	1.30	
195	A496	3	04 33 32.12	−13 10 20.7	0.020	209.47	−36.47	1.13	
196	J34	A	04 45 11.53	−15 52 13.4	0.181	213.90	−34.94	1.70	N1650
197	J34	B	04 45 21.72	−15 47 29.0	0.142	213.83	−34.88	1.17	
198	J34	C	04 45 35.11	−16 01 18.6	0.065	214.11	−34.91	1.22	
199	J34	D	04 45 31.16	−16 04 17.7	0.065	214.16	−34.95	1.17	
200	J34	E	04 43 45.39	−15 49 01.5	0.166	213.68	−35.24	1.36	
201	J34	F	04 47 51.82	−15 31 31.3	0.123	213.81	−34.22	1.43	I0393
202	J34	1	04 47 13.48	−15 55 25.5	0.070	214.18	−34.51	1.22	
203	J34	2	04 46 55.95	−16 26 17.4	0.065	214.73	−34.77	1.28	
204	J34	3	04 46 51.88	−16 20 09.1	0.065	214.61	−34.75	1.17	
205	J34	4	04 46 37.84	−16 18 15.6	0.065	214.55	−34.79	1.22	
206	J10	A	04 52 49.27	+01 15 31.5	0.178	197.18	−25.48	1.61	
207	J10	B	04 52 57.66	+01 15 22.5	0.178	197.20	−25.45	1.31	
208	J10	C	04 53 28.79	+01 16 55.6	0.178	197.25	−25.33	1.27	
209	P597-1	A	04 58 54.68	−00 29 21.4	0.149	199.70	−25.06	1.88	N1713
210	P597-1	B	04 58 44.03	−00 28 41.8	0.149	199.66	−25.09	1.58	N1709
211	P597-1	C	04 58 33.27	−00 33 12.0	0.173	199.71	−25.17	1.44	
212	P597-1	D	04 58 31.50	−00 34 30.3	0.173	199.73	−25.18	1.48	
213	P597-1	E	04 58 38.51	−00 17 28.2	0.149	199.47	−25.02	1.48	
214	P597-1	1	04 59 43.03	−00 35 58.9	0.149	199.91	−24.94	1.18	
215	J35	A	04 54 52.26	−18 06 55.7	0.068	217.46	−33.62	1.89	E522G020
216	J35	B	04 57 04.52	−18 17 09.2	0.094	217.87	−33.19	1.41	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	log D_W	Comments
217	J35	C	04 56 53.65	−18 14 43.8	0.094	217.81	−33.22	1.41	
218	J35	D	04 55 23.18	−18 23 14.3	0.061	217.81	−33.60	1.41	
219	J35	E	04 57 17.76	−17 27 15.5	0.094	216.97	−32.84	1.29	
220	J35	1	04 53 55.35	−18 20 44.2	0.061	217.62	−33.91	1.29	
221	J34/35	A	04 51 20.62	−17 30 14.3	0.056	216.40	−34.18	1.45	A0449-17
222	J34/35	B	04 52 12.23	−17 24 30.7	0.051	216.39	−33.96	1.72	
223	J34/35	C	04 47 34.26	−17 20 51.6	0.051	215.83	−34.96	1.39	
224	J34/35	D	04 47 04.10	−17 20 58.1	0.053	215.78	−35.08	1.45	
225	J34/35	1	04 51 00.10	−17 19 55.0	0.061	216.17	−34.20	1.26	
226	J34/35	2	04 50 41.65	−16 45 03.9	0.070	215.49	−34.05	1.31	
227	J34/35	3	04 48 00.05	−16 39 51.8	0.053	215.10	−34.62	1.31	
228	P777-1	A	04 59 47.30	−18 34 51.9	0.097	218.47	−32.70	1.51	E552G044
229	P777-1	B	05 00 24.30	−18 51 58.2	0.099	218.85	−32.66	1.23	
230	P777-1	C	04 59 33.35	−18 12 18.1	0.109	218.03	−32.61	1.36	
231	P777-1	1	05 01 27.78	−18 18 33.2	0.116	218.34	−32.23	1.09	
232	P777-2	A	05 02 54.33	−20 21 59.7	0.037	220.77	−32.63	1.48	E552G057
233	P777-2	B	05 03 11.53	−20 19 01.4	0.037	220.74	−32.55	1.33	
234	P777-2	C	05 03 03.56	−20 16 32.4	0.039	220.68	−32.56	1.06	
235	P777-2	D	05 03 23.43	−20 18 42.0	0.039	220.75	−32.50	1.06	
236	P777-2	E	05 04 14.86	−20 06 59.4	0.037	220.61	−32.25	1.48	
237	P777-2	F	05 03 47.48	−20 00 06.2	0.037	220.44	−32.31	1.31	
238	P777-2	1	05 03 29.86	−20 27 25.0	0.037	220.92	−32.53	1.01	
901	P777-2	2	05 03 26.15	−20 02 30.2	0.037	220.45	−32.40	1.53	E552G059
239	P777-3	A	05 05 16.35	−19 13 06.6	0.053	219.72	−31.71	1.32	
240	P777-3	B	05 05 12.75	−19 08 35.8	0.053	219.63	−31.70	1.35	
241	P777-3	C	05 04 35.55	−19 16 11.5	0.053	219.71	−31.88	1.37	
242	P777-3	D	05 06 20.79	−19 28 01.6	0.041	220.10	−31.56	1.51	N1780, E553G001
243	P777-3	E	05 04 22.36	−19 02 26.3	0.053	219.44	−31.85	1.30	
244	P777-3	F	05 04 43.59	−19 18 37.5	0.053	219.77	−31.86	1.09	
245	P777-3	G	05 04 35.63	−19 19 20.8	0.053	219.77	−31.90	1.24	
246	P777-3	H	05 03 54.39	−19 07 43.5	0.053	219.49	−31.98	1.35	
247	P777-3	1	05 05 34.94	−19 09 24.4	0.053	219.68	−31.62	1.14	
248	P777-3	2	05 04 58.94	−19 18 58.1	0.053	219.80	−31.81	1.30	
249	A533-1	A	05 04 01.44	−23 59 48.2	0.027	224.97	−33.55	1.59	E486G023
250	A533-1	B	05 03 57.88	−24 00 32.8	0.027	224.98	−33.57	1.18	
251	A533-1	C	05 03 50.66	−23 31 01.3	0.017	224.40	−33.45	1.48	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
252	A533-1	D	05 05 36.41	−24 19 54.6	0.013	225.48	−33.31	1.41	
253	A533-1	E	05 01 35.38	−23 44 47.4	0.013	224.48	−34.01	1.18	
254	A533-1	F	05 01 07.97	−23 44 28.0	0.005	224.43	−34.11	1.41	
255	A533-1	G	05 01 11.54	−23 56 34.5	0.005	224.67	−34.15	1.38	
256	A533-1	H	05 05 39.92	−23 44 49.7	0.017	224.82	−33.12	1.29	
257	A533	A	05 01 36.10	−22 36 03.6	0.008	223.17	−33.65	1.41	
258	A533	B	05 01 08.32	−22 34 58.7	0.008	223.11	−33.75	1.41	
259	A533	C	05 01 06.68	−22 34 57.1	0.008	223.10	−33.75	1.15	
260	A533	D	05 00 18.34	−22 23 38.5	0.010	222.82	−33.87	1.48	
261	A533	E	05 00 31.02	−22 18 28.8	0.010	222.74	−33.79	1.21	
262	A533	F	05 02 28.48	−22 43 40.6	0.017	223.39	−33.50	1.21	
263	A533	G	05 01 31.49	−22 58 58.9	0.005	223.60	−33.79	1.27	
264	A533	H	05 01 45.72	−23 09 42.1	0.008	223.82	−33.79	1.27	
265	A533	1	05 03 44.24	−23 19 24.3	0.008	224.18	−33.41	1.37	
266	A548-1	A	05 48 38.47	−25 28 41.0	0.000	230.28	−24.43	1.61	E488G027
267	A548-1	B	05 48 43.20	−25 28 39.6	0.000	230.28	−24.41	1.55	
268	A548-1	C	05 47 34.77	−25 32 46.4	0.000	230.26	−24.68	1.48	
269	A548-1	D	05 47 25.23	−25 34 20.4	0.000	230.27	−24.72	1.53	E488G016
270	A548-1	E	05 46 55.52	−25 38 09.1	0.000	230.30	−24.85	1.59	E488G013
271	A548-1	F	05 47 47.55	−25 44 45.5	0.000	230.48	−24.70	1.45	
272	A548-1	G	05 47 43.24	−25 54 56.9	0.003	230.66	−24.77	1.43	
273	A548-1	H	05 49 21.79	−25 20 48.3	0.000	230.20	−24.23	1.65	E488G033
274	A548-1	I	05 47 26.62	−25 14 50.5	0.000	229.94	−24.60	1.40	E488G019, VV180b
275	A548-1	J	05 47 24.70	−25 15 22.5	0.000	229.95	−24.61	1.20	E488G015, VV180a
276	A548-1	K	05 48 33.28	−25 21 52.9	0.000	230.15	−24.41	1.20	
277	A548-1	L	05 49 59.06	−25 44 22.3	0.000	230.66	−24.23	1.36	
278	A548-1	M	05 50 02.72	−25 46 16.0	0.000	230.70	−24.23	1.40	
279	A548-1	N	05 45 22.15	−25 47 30.6	0.003	230.33	−25.23	1.61	E488G006
280	A548-1	O	05 45 05.02	−25 47 42.0	0.000	230.31	−25.29	1.36	
281	A548-1	P	05 49 13.16	−25 36 43.6	0.000	230.47	−24.35	1.29	
282	A548-1	Q	05 45 27.20	−25 53 53.9	0.010	230.45	−25.25	1.20	
283	A548-1	R	05 45 29.67	−25 55 58.6	0.010	230.49	−25.25	1.10	E488G009, VV162C
284	A548-1	1	05 46 34.05	−25 22 52.7	0.000	230.00	−24.84	1.25	
285	A548-2	A	05 42 18.85	−26 05 53.5	0.000	230.40	−25.98	1.48	
286	A548-2	B	05 42 04.62	−26 07 20.5	0.000	230.41	−26.04	1.64	
287	A548-2	C	05 42 04.79	−26 08 42.4	0.000	230.43	−26.04	1.48	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
288	A548-2	D	05 42 07.27	−26 11 54.4	0.000	230.49	−26.05	1.50	
289	A548-2	E	05 41 25.55	−26 14 31.2	0.000	230.48	−26.21	1.30	
290	A548-2	F	05 41 20.59	−26 15 34.5	0.000	230.49	−26.24	1.40	
291	A548-2	G	05 41 02.52	−26 11 14.0	0.000	230.39	−26.28	1.30	
292	A548-2	H	05 43 14.95	−25 54 12.5	0.049	230.27	−25.71	1.37	
293	A548-2	I	05 42 20.92	−25 32 29.0	0.022	229.82	−25.79	1.67	E487G036
294	A548-2	J	05 42 14.62	−25 32 25.4	0.022	229.81	−25.81	1.40	
295	A548-2	K	05 44 56.19	−25 55 16.8	0.049	230.43	−25.36	1.40	
296	A548-2	L	05 45 07.99	−26 05 35.1	0.000	230.63	−25.38	1.37	
297	A548-2	M	05 43 03.54	−25 59 07.3	0.000	230.34	−25.78	1.26	
298	A548-2	N	05 44 29.72	−26 03 32.6	0.000	230.54	−25.50	1.48	
299	A548-2	O	05 44 26.08	−26 04 41.4	0.000	230.55	−25.52	1.30	
300	A548-2	1	05 42 54.82	−26 18 43.9	0.000	230.68	−25.92	1.33	
301	A548-2	2	05 41 46.38	−25 51 57.5	0.015	230.11	−26.02	1.48	
302	J11	A	13 05 36.58	+53 33 49.9	0.020	118.22	+63.43	1.44	N4967
303	J11	B	13 05 56.16	+53 39 32.8	0.020	118.14	+63.33	1.51	N4973
304	J11	C	13 05 32.28	+53 41 05.6	0.020	118.28	+63.32	1.44	I0847
305	J11	D	13 05 03.09	+53 39 13.5	0.020	118.43	+63.36	1.44	
306	J11	E	13 05 25.93	+53 35 29.2	0.020	118.29	+63.41	1.24	
307	J11	F	13 07 21.93	+53 35 10.9	0.027	117.65	+63.38	1.47	
308	J11	1	13 06 50.97	+53 32 48.1	0.037	117.81	+63.43	1.16	
309	J11	2	13 06 25.02	+53 29 03.5	0.037	117.94	+63.50	1.16	
310	J12	A	13 43 24.96	+30 04 08.8	0.000	50.45	+78.23	1.35	N5282
311	J12	B	13 42 55.61	+29 52 05.6	0.000	49.57	+78.37	1.38	N5280
312	J12	C	13 42 48.71	+29 42 19.2	0.000	48.80	+78.42	1.28	
313	J12	D	13 44 14.21	+29 48 13.4	0.000	49.02	+78.10	1.28	
314	J12	E	13 42 23.39	+29 50 50.6	0.000	49.58	+78.49	1.35	N5274
315	J12	F	13 42 23.64	+29 49 28.0	0.000	49.46	+78.49	1.35	
316	J12	1	13 44 11.74	+29 34 59.2	0.000	47.97	+78.14	1.24	
317	J12	2	13 41 17.06	+29 50 03.4	0.000	49.74	+78.72	1.10	
318	J13	A	13 55 13.46	+25 03 04.7	0.000	28.26	+75.54	1.52	I4345
319	J13	B	13 55 12.60	+25 01 15.2	0.000	28.14	+75.54	1.59	I4344
320	J13	C	13 55 34.47	+25 02 58.1	0.000	28.32	+75.46	1.38	Hickson 69B
321	J13	D	13 54 55.88	+25 07 20.3	0.000	28.48	+75.62	1.48	I4343
322	J13	E	13 53 40.70	+25 04 43.8	0.000	28.08	+75.89	1.43	
323	J13	F	13 52 44.93	+25 02 22.4	0.000	27.74	+76.09	1.38	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
324	J13	G	13 52 37.52	+24 44 54.1	0.000	26.54	+76.05	1.59	
325	J13	H	13 51 05.48	+25 05 35.4	0.000	27.64	+76.46	1.48	
326	J13	I	13 51 04.69	+25 04 57.2	0.000	27.59	+76.46	1.08	
327	J13	J	13 50 31.88	+24 58 22.5	0.000	27.02	+76.56	1.38	HOLM546A
328	J13	K	13 50 30.87	+24 57 44.7	0.000	26.97	+76.56	1.33	HOLM546B
329	J13	L	13 50 25.15	+24 54 30.3	0.000	26.72	+76.57	1.08	
330	J13	M	13 49 52.58	+25 11 25.7	0.000	27.81	+76.75	1.33	I4332
331	J13	N	13 55 48.41	+24 48 17.8	0.000	27.41	+75.36	1.26	
332	J13	O	13 55 56.21	+24 57 02.2	0.000	28.00	+75.36	1.26	
333	J13	P	13 56 09.37	+25 11 42.5	0.000	28.99	+75.36	1.26	
334	J13	1	13 56 01.99	+24 40 30.7	0.000	26.96	+75.28	1.18	
335	J13	2	13 51 39.37	+24 41 17.4	0.000	26.08	+76.25	1.18	
336	J36	A	14 08 07.00	−09 04 18.4	0.039	332.76	+49.31	1.39	
337	J36	B	14 08 07.56	−09 03 42.8	0.039	332.77	+49.32	0.94	
338	J36	C	14 08 06.20	−09 04 41.5	0.039	332.75	+49.30	0.99	
339	J36	D	14 06 36.63	−09 13 45.6	0.032	332.14	+49.33	1.17	
340	J36	1	14 09 55.79	−09 04 55.7	0.037	333.36	+49.10	0.94	
341	J36	2	14 09 54.01	−08 49 22.2	0.037	333.53	+49.33	1.09	
342	J36	3	14 08 04.25	−09 09 09.6	0.039	332.68	+49.24	1.09	
343	J14	A	14 47 02.19	+13 40 04.3	0.010	12.22	+59.86	1.36	N5758
344	J14	B	14 46 39.21	+13 40 32.6	0.010	12.13	+59.95	1.25	
345	J14	C	14 46 47.82	+13 41 40.3	0.010	12.20	+59.93	1.14	
346	J14	D	14 46 54.17	+13 42 35.8	0.010	12.25	+59.91	1.01	
347	J14	1	14 48 17.28	+13 45 25.1	0.010	12.68	+59.65	1.06	
348	J14	2	14 48 05.20	+13 28 48.9	0.010	12.16	+59.55	1.18	
349	J14	3	14 47 45.66	+13 20 31.6	0.005	11.84	+59.54	1.06	
350	J14	4	14 46 50.42	+13 50 51.8	0.010	12.47	+60.00	1.33	
351	J14	5	14 46 22.02	+13 28 35.6	0.005	11.72	+59.90	0.88	
352	J14-1	A	14 47 06.34	+11 35 36.9	0.013	8.81	+58.73	1.50	
353	J14-1	B	14 46 53.77	+11 37 33.7	0.013	8.80	+58.80	1.31	
354	J14-1	C	14 46 46.51	+11 34 11.5	0.015	8.68	+58.79	1.35	
355	J14-1	D	14 46 27.74	+11 30 24.9	0.015	8.50	+58.82	1.31	
356	J14-1	E	14 47 06.93	+10 59 57.6	0.015	7.87	+58.40	1.43	
357	J14-1	F	14 49 07.62	+10 58 46.2	0.008	8.37	+57.98	1.35	
358	J14-1	1	14 49 34.94	+11 14 52.6	0.005	8.91	+58.04	1.28	
359	J14-1	2	14 48 36.62	+11 19 31.4	0.005	8.78	+58.28	1.28	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
360	J14-1	3	14 47 17.71	+11 07 47.9	0.015	8.12	+58.43	1.28	
361	J14-1	4	14 46 53.56	+11 22 46.3	0.015	8.41	+58.66	1.20	
362	A1983	A	14 54 23.50	+16 21 17.6	0.010	18.58	+59.59	1.76	I4516
363	A1983	B	14 52 55.36	+16 42 09.4	0.010	18.90	+60.06	1.57	
364	A1983	C	14 52 56.91	+16 43 39.0	0.010	18.95	+60.06	1.43	
365	A1983	D	14 52 43.31	+16 54 12.6	0.015	19.22	+60.19	1.53	
366	A1983	E	14 52 22.90	+17 07 16.7	0.008	19.55	+60.35	1.53	
367	A1983	F	14 49 59.15	+16 48 35.6	0.008	18.48	+60.74	1.34	
368	A1983	G	14 49 56.99	+16 48 30.5	0.008	18.47	+60.74	1.23	
369	A1983	1	14 52 57.84	+16 41 48.3	0.010	18.90	+60.04	1.23	
370	A1983	2	14 51 14.66	+16 41 42.0	0.000	18.54	+60.41	1.34	
371	A1983	3	14 49 22.41	+16 25 55.8	0.003	17.65	+60.70	1.18	
372	A1991	A	14 54 31.54	+18 38 32.0	0.015	22.79	+60.50	1.66	N5778
373	A1991	B	14 54 48.00	+18 33 49.3	0.015	22.69	+60.41	1.51	
374	A1991	C	14 54 17.98	+18 33 10.8	0.015	22.58	+60.51	1.42	
375	A1991	D	14 51 14.31	+18 45 25.9	0.022	22.40	+61.26	1.21	
376	A1991	E	14 51 17.70	+18 41 12.4	0.022	22.27	+61.22	1.49	I1062
377	A1991	F	14 53 40.02	+18 04 11.1	0.013	21.56	+60.46	1.29	
378	A1991	1	14 54 54.07	+18 50 11.5	0.020	23.22	+60.49	1.21	
379	A1991	2	14 54 05.16	+18 26 00.2	0.015	22.31	+60.51	1.21	
380	A1991	3	14 55 56.80	+18 02 48.9	0.025	21.95	+59.95	1.29	
381	A1991	4	14 55 58.08	+18 30 07.9	0.015	22.79	+60.13	1.17	
382	A1991	5	14 55 23.88	+18 50 08.1	0.020	23.31	+60.38	1.29	
383	J16	A	15 19 01.53	+04 31 13.5	0.039	6.82	+48.20	1.53	
384	J16	B	15 19 03.56	+04 19 59.6	0.027	6.60	+48.08	1.40	
385	J16	C	15 18 27.88	+04 40 30.6	0.039	6.88	+48.40	1.19	
386	J16	D	15 21 22.60	+04 20 28.9	0.027	7.13	+47.62	1.27	
387	J16	E	15 17 23.00	+04 12 47.8	0.022	6.08	+48.34	1.27	
388	J16	F	15 19 24.75	+04 34 45.5	0.039	6.98	+48.16	1.19	
389	J16	G	15 18 52.61	+04 51 55.6	0.041	7.20	+48.43	1.34	
390	J16	1	15 20 51.87	+04 23 27.5	0.027	7.07	+47.75	1.04	
391	J16	2	15 19 37.41	+04 26 53.7	0.027	6.87	+48.04	1.10	
392	J16	3	15 19 33.78	+04 20 15.3	0.027	6.72	+47.98	1.10	
393	J16	4	15 19 27.82	+04 05 44.2	0.025	6.41	+47.86	1.19	
394	J16	5	15 18 09.29	+04 33 45.6	0.039	6.67	+48.40	1.27	
395	J16W	A	15 11 41.53	+04 29 26.9	0.051	5.10	+49.64	1.33	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
396	J16W	B	15 11 31.53	+04 31 01.5	0.049	5.09	+49.68	1.36	
397	J16W	C	15 11 37.04	+04 28 01.6	0.049	5.05	+49.64	1.19	
398	J16W	D	15 12 52.96	+04 30 48.4	0.053	5.41	+49.41	1.42	
399	J16W	E	15 13 10.47	+04 28 54.2	0.053	5.43	+49.34	1.27	
400	J16W	F	15 13 18.61	+04 28 37.4	0.053	5.46	+49.31	1.27	
401	J16W	G	15 14 06.19	+04 13 18.0	0.027	5.34	+49.00	1.33	
402	J16W	H	15 13 50.80	+04 37 19.4	0.032	5.76	+49.29	1.09	
403	J16W	I	15 13 49.70	+04 43 23.2	0.058	5.88	+49.36	1.27	
404	J16W	1	15 13 43.46	+04 21 43.1	0.029	5.42	+49.16	1.09	
405	J16W	2	15 10 52.32	+04 52 03.8	0.058	5.37	+50.03	1.09	
406	A2063-S	A	15 21 55.39	+08 25 24.5	0.049	12.34	+49.83	1.54	same as 435, I1116
407	A2063-S	B	15 20 53.32	+08 23 47.1	0.044	12.09	+50.03	1.37	
408	A2063-S	C	15 21 36.91	+07 43 08.4	0.044	11.36	+49.51	1.26	
409	A2040	A	15 12 50.76	+07 25 25.5	0.032	9.07	+51.14	1.01	
410	A2040	B	15 12 47.60	+07 26 02.2	0.032	9.07	+51.16	1.26	
411	A2040	C	15 12 43.37	+07 26 48.1	0.032	9.07	+51.18	1.09	
412	A2040	D	15 12 37.66	+07 27 04.1	0.032	9.06	+51.20	1.01	
413	A2040	E	15 12 34.39	+07 25 51.9	0.032	9.02	+51.20	1.15	
414	A2040	F	15 11 31.44	+07 15 05.5	0.029	8.54	+51.31	1.31	
415	A2040	G	15 10 11.06	+07 37 41.8	0.029	8.73	+51.80	1.15	
416	A2040	H	15 09 28.27	+07 33 22.4	0.029	8.47	+51.90	1.21	
417	A2040	1	15 12 28.21	+07 58 24.0	0.025	9.71	+51.53	1.09	
418	A2040	2	15 11 16.11	+07 29 19.9	0.034	8.80	+51.50	1.15	
419	A2052	A	15 16 44.56	+07 01 15.6	0.027	9.42	+50.12	1.70	A1514+07
420	A2052	B	15 16 45.87	+07 00 14.6	0.027	9.40	+50.11	1.34	
421	A2052	C	15 16 53.98	+06 56 20.3	0.027	9.35	+50.04	1.16	
422	A2052	D	15 16 09.85	+06 57 51.3	0.025	9.22	+50.21	1.06	
423	A2052	E	15 16 09.99	+06 57 04.2	0.025	9.20	+50.20	1.06	
424	A2052	F	15 17 12.64	+07 01 40.9	0.027	9.53	+50.03	1.24	
425	A2052	G	15 17 10.91	+06 56 29.3	0.027	9.41	+49.98	1.06	
426	A2063	A	15 23 05.35	+08 36 31.9	0.044	12.82	+49.68	1.55	
427	A2063	B	15 23 10.92	+08 38 02.1	0.044	12.87	+49.68	1.13	
428	A2063	C	15 23 14.06	+08 38 42.3	0.044	12.90	+49.67	1.13	
429	A2063	D	15 23 15.06	+08 34 24.4	0.044	12.81	+49.63	1.25	
430	A2063	E	15 23 07.52	+08 31 41.0	0.044	12.72	+49.63	1.25	
431	A2063	F	15 23 10.45	+08 30 18.7	0.044	12.70	+49.61	1.13	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	log D_W	Comments
432	A2063	G	15 23 35.30	+09 20 45.1	0.046	13.89	+49.97	1.35	
433	A2063	H	15 23 39.26	+08 45 31.6	0.039	13.13	+49.65	1.25	
434	A2063	1	15 24 37.34	+08 59 24.3	0.046	13.63	+49.57	1.19	
435	A2063	2	15 21 55.40	+08 25 24.6	0.049	12.34	+49.83	1.50	same as 406, I1116
436	A2107	A	15 39 39.10	+21 46 56.3	0.109	34.39	+51.52	1.54	
437	A2107	B	15 39 22.96	+21 44 20.0	0.109	34.30	+51.57	1.24	
438	A2107	C	15 37 26.16	+21 44 36.5	0.101	34.09	+52.00	1.21	
439	A2107	D	15 39 56.82	+21 49 25.6	0.109	34.49	+51.47	1.16	
440	A2107	E	15 40 17.34	+21 54 52.9	0.113	34.66	+51.42	1.07	
441	A2107	1	15 40 46.69	+21 46 20.0	0.109	34.50	+51.27	0.94	
442	A2107	2	15 39 51.38	+21 42 13.6	0.109	34.29	+51.45	0.77	
443	J17	A	15 55 02.01	+41 34 40.7	0.017	66.26	+49.99	1.51	
444	J17	B	15 55 13.93	+41 34 53.5	0.017	66.26	+49.95	1.26	
445	J17	C	15 55 40.26	+41 30 16.1	0.010	66.13	+49.88	1.33	
446	J17	D	15 53 28.98	+41 34 47.9	0.025	66.31	+50.28	1.41	
447	J17	E	15 55 27.12	+41 33 29.0	0.017	66.22	+49.91	1.29	
448	J17	F	15 54 14.24	+41 24 52.9	0.017	66.03	+50.16	1.19	
449	J17	G	15 53 45.57	+41 23 23.7	0.017	66.01	+50.25	1.29	
450	J17	1	15 55 14.23	+41 28 00.8	0.017	66.08	+49.96	1.05	
451	J17	2	15 55 09.60	+41 26 54.2	0.017	66.06	+49.98	1.19	
452	J17	3	15 53 52.95	+41 29 50.9	0.017	66.17	+50.21	1.05	
453	A2147	A	16 02 17.10	+15 58 27.1	0.017	28.91	+44.52	1.76	A1600+16C, VV159a, ARP 324
454	A2147	B	16 02 12.87	+15 54 26.2	0.017	28.81	+44.51	1.56	A1600+16A, VV159c, ARP 324
455	A2147	C	16 02 19.92	+16 20 43.9	0.022	29.40	+44.65	1.58	
456	A2147	D	16 02 18.07	+16 21 56.4	0.017	29.42	+44.67	1.43	
457	A2147	E	16 03 14.80	+16 24 09.1	0.017	29.59	+44.47	1.51	
458	A2147	F	16 00 35.80	+15 41 07.4	0.029	28.31	+44.79	1.51	I1155
459	A2147	G	16 01 16.90	+15 38 41.8	0.029	28.35	+44.62	1.36	I1161
460	A2147	H	16 01 30.60	+15 30 12.6	0.029	28.20	+44.51	1.43	I1163
461	A2147	I	16 03 43.78	+16 19 38.2	0.017	29.55	+44.34	1.40	
462	A2147	J	16 03 45.91	+16 20 16.3	0.017	29.57	+44.33	1.13	
463	A2147	1	16 03 38.19	+15 54 01.7	0.029	28.99	+44.20	1.13	
464	A2147	2	16 02 40.43	+15 45 20.2	0.032	28.68	+44.35	1.36	
465	A2147	3	16 02 08.11	+15 41 46.8	0.032	28.53	+44.45	1.46	VV090a,b
466	A2147	4	16 01 54.96	+16 27 15.3	0.017	29.48	+44.79	1.40	
467	A2147	5	16 01 21.26	+16 40 34.5	0.017	29.70	+45.00	1.40	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
468	P386-1	A	15 57 08.24	+22 24 14.8	0.068	37.08	+47.81	1.71	N6020, I1148
469	P386-1	B	15 58 17.52	+22 40 28.0	0.061	37.58	+47.63	1.42	
470	P386-1	C	15 58 06.96	+22 39 51.9	0.061	37.55	+47.67	1.06	
471	P386-1	1	15 58 12.49	+22 29 19.4	0.065	37.31	+47.60	1.06	
472	P386-2	A	16 11 22.62	+23 57 53.2	0.082	40.55	+45.08	1.51	N6075, VV380
473	P386-2	B	16 12 05.95	+23 50 28.8	0.082	40.44	+44.89	1.21	
474	P386-2	C	16 12 07.80	+23 43 04.6	0.082	40.27	+44.85	1.29	
475	P386-2	D	16 11 18.91	+24 10 54.0	0.101	40.84	+45.15	1.14	
476	P386-2	1	16 12 22.40	+24 12 25.0	0.092	40.96	+44.93	1.06	
477	P386-2	2	16 10 30.59	+24 03 14.5	0.106	40.60	+45.30	1.17	
478	A2148	A	16 03 19.91	+25 27 12.5	0.094	41.98	+47.22	1.35	
479	A2148	B	16 03 03.48	+25 27 09.3	0.094	41.96	+47.28	1.11	
480	A2148	C	16 03 52.47	+25 26 47.6	0.082	42.02	+47.10	1.17	
481	A2148	D	16 04 04.67	+25 33 45.3	0.082	42.20	+47.08	1.20	
482	A2148	E	16 02 30.36	+25 36 03.8	0.082	42.13	+47.43	1.08	
483	A2148	F	16 04 03.08	+25 29 48.5	0.082	42.10	+47.07	1.14	
484	A2148	1	16 03 22.26	+25 22 20.8	0.094	41.87	+47.19	0.97	
485	A2148	2	16 03 20.94	+25 18 32.2	0.094	41.78	+47.18	1.04	
486	A2148	3	16 02 47.85	+25 30 32.1	0.082	42.02	+47.35	1.04	
487	J18	A	16 04 56.79	+23 55 56.4	0.099	39.96	+46.49	1.80	N6051
488	J18	B	16 05 17.71	+23 45 19.5	0.089	39.74	+46.37	1.33	
489	J18	C	16 04 50.62	+23 58 29.0	0.099	40.01	+46.53	1.27	
490	J18	D	16 03 41.91	+24 05 41.1	0.099	40.08	+46.81	1.15	
491	J18	E	16 04 46.89	+24 16 42.5	0.104	40.43	+46.62	1.15	
492	J18	F	16 05 49.60	+24 10 32.1	0.104	40.37	+46.36	1.15	
493	J18	1	16 06 23.28	+24 13 23.3	0.101	40.49	+46.25	1.15	
494	J18	2	16 05 06.54	+23 51 52.7	0.089	39.88	+46.44	1.15	
495	A2151	A	16 04 35.86	+17 43 15.9	0.025	31.47	+44.66	1.73	N6041, VV213a,b
496	A2151	B	16 04 39.62	+17 42 01.6	0.025	31.45	+44.64	1.52	N6042
497	A2151	C	16 05 01.42	+17 46 31.9	0.037	31.60	+44.58	1.30	N6043
498	A2151	D	16 05 09.04	+17 43 45.9	0.037	31.55	+44.54	1.49	N6047
499	A2151	E	16 04 59.74	+17 52 12.0	0.037	31.72	+44.62	1.42	N6044, I1172
500	A2151	F	16 05 44.72	+17 42 59.0	0.039	31.60	+44.40	1.42	I1185
501	A2151	G	16 06 32.23	+17 42 48.8	0.039	31.70	+44.22	1.42	I1193
502	A2151	H	16 06 39.39	+17 45 39.0	0.039	31.77	+44.21	1.42	I1194
503	A2151	I	16 05 46.38	+18 00 59.2	0.034	32.00	+44.50	1.42	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
504	A2151	J	16 05 32.64	+18 09 33.0	0.032	32.16	+44.60	1.55	N6055
505	A2151	K	16 05 39.71	+18 09 50.0	0.032	32.18	+44.58	1.30	N6057
506	A2151	L	16 05 36.62	+18 16 21.2	0.032	32.32	+44.63	1.49	
507	A2151	M	16 06 16.09	+18 14 58.7	0.049	32.36	+44.47	1.42	N6061, I1190
508	A2151	N	16 06 06.15	+18 36 23.4	0.027	32.82	+44.63	1.25	
509	A2151	O	16 07 09.93	+18 38 27.4	0.034	32.98	+44.41	1.25	
510	A2151	1	16 07 38.61	+18 28 46.9	0.034	32.83	+44.25	1.19	
511	A2152	A	16 06 25.49	+15 41 07.2	0.037	29.07	+43.49	1.50	VV215a
512	A2152	B	16 06 25.85	+15 41 36.5	0.037	29.08	+43.50	1.45	VV215b
513	A2152	C	16 05 47.16	+15 47 26.2	0.037	29.12	+43.68	1.45	
514	A2152	D	16 04 51.79	+15 43 21.9	0.037	28.92	+43.85	1.55	
515	A2152	E	16 07 19.57	+15 50 57.9	0.037	29.39	+43.36	1.27	
516	A2152	F	16 05 15.15	+15 55 31.8	0.037	29.23	+43.85	1.32	
517	A2152	G	16 06 19.60	+16 25 52.0	0.051	30.01	+43.80	1.39	
518	A2152	H	16 05 29.24	+16 26 07.9	0.017	29.91	+43.99	1.42	
519	A2152	I	16 05 26.47	+16 26 35.3	0.017	29.92	+44.00	1.42	
520	A2152	J	16 04 41.19	+16 25 46.4	0.017	29.80	+44.16	1.27	
521	A2152	K	16 04 43.77	+16 31 19.4	0.017	29.93	+44.19	1.23	
522	A2152	L	16 04 49.94	+16 35 02.4	0.020	30.02	+44.19	1.35	
523	A2152	M	16 06 03.55	+16 10 31.4	0.041	29.65	+43.76	1.27	
524	A2152	N	16 06 16.55	+16 02 19.4	0.041	29.50	+43.66	1.23	
525	A2152	1	16 04 41.61	+16 38 56.9	0.020	30.09	+44.24	1.27	
526	A2152	2	16 06 58.41	+16 09 43.4	0.044	29.75	+43.55	1.23	
527	A2152	3	16 04 10.55	+16 05 13.9	0.025	29.30	+44.15	1.18	
528	P445-1	A	15 58 20.65	+18 04 49.7	0.037	31.20	+46.18	1.51	
529	P445-1	B	15 58 32.40	+17 52 16.2	0.037	30.94	+46.06	1.44	
530	P445-1	C	15 54 24.32	+18 39 05.8	0.034	31.51	+47.25	1.51	
531	P445-1	D	15 54 06.07	+18 38 51.0	0.032	31.46	+47.32	1.36	
532	P445-1	E	16 00 14.93	+18 22 32.6	0.034	31.83	+45.85	1.21	
533	P445-1	F	15 53 50.03	+18 20 27.6	0.032	31.01	+47.27	1.27	
534	P445-1	G	15 53 30.92	+18 21 27.6	0.032	30.99	+47.35	1.27	
535	P445-1	1	15 57 04.43	+17 37 31.7	0.053	30.43	+46.30	1.36	
536	P445-2	A	15 57 49.66	+16 18 35.0	0.051	28.77	+45.64	1.60	N6023
537	P445-2	B	15 57 42.66	+16 13 04.0	0.051	28.63	+45.63	1.40	
538	P445-2	C	15 57 30.79	+15 57 20.8	0.032	28.26	+45.58	1.63	N6021
539	P445-2	D	15 56 23.65	+16 31 22.6	0.032	28.86	+46.04	1.50	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	log D_W	Comments
540	A2162-N	A	16 13 14.77	+30 54 08.8	0.032	50.38	+46.09	1.52	
541	A2162-N	B	16 13 04.99	+30 54 05.0	0.032	50.37	+46.12	1.17	
542	A2162-N	C	16 13 04.17	+30 54 00.4	0.032	50.37	+46.13	1.52	
543	A2162-N	D	16 13 08.90	+30 49 37.0	0.032	50.27	+46.10	1.59	
544	A2162-N	E	16 13 24.75	+30 35 58.0	0.032	49.96	+46.01	1.25	
545	A2162-N	1	16 12 57.06	+30 46 14.1	0.032	50.18	+46.13	1.32	
546	A2162-S	A	16 12 35.61	+29 29 04.3	0.044	48.33	+46.01	1.73	N6086
547	A2162-S	B	16 11 58.88	+29 50 26.4	0.039	48.81	+46.20	1.60	
548	A2162-S	C	16 11 55.34	+29 49 45.5	0.039	48.79	+46.21	1.41	
549	A2162-S	D	16 12 16.76	+29 34 21.6	0.044	48.44	+46.09	1.15	
550	A2162-S	E	16 12 11.31	+29 34 25.9	0.044	48.44	+46.11	1.57	
551	A2162-S	F	16 11 56.69	+29 27 15.1	0.049	48.25	+46.14	1.30	
552	A2162-S	G	16 12 38.94	+29 38 35.7	0.044	48.56	+46.02	1.49	
553	A2162-S	H	16 11 29.61	+29 26 59.9	0.049	48.22	+46.24	1.23	
554	A2162-S	I	16 11 02.05	+29 31 27.7	0.051	48.31	+46.35	1.30	
555	A2162-S	1	16 14 15.01	+29 17 31.5	0.053	48.15	+45.62	1.15	
556	A2162-S	2	16 11 36.32	+29 29 31.7	0.049	48.29	+46.22	1.15	
557	J20	A	16 18 00.61	+35 06 35.6	0.003	56.54	+45.57	1.32	N6112
558	J20	B	16 17 40.60	+35 00 13.8	0.008	56.38	+45.63	1.49	N6109
559	J20	C	16 17 20.19	+34 54 04.9	0.008	56.23	+45.69	1.66	N6107
560	J20	D	16 17 09.39	+34 52 43.2	0.005	56.19	+45.72	1.52	N6105
561	J20	E	16 18 23.70	+35 10 26.2	0.003	56.64	+45.49	1.46	N6114
562	A2197	A	16 29 44.93	+40 48 39.7	0.000	64.68	+43.51	1.79	N6173
563	A2197	B	16 27 41.20	+40 55 36.1	0.003	64.84	+43.90	1.55	N6190
564	A2197	C	16 25 10.37	+40 53 33.1	0.003	64.79	+44.37	1.60	N6146
565	A2197	D	16 30 41.91	+40 31 44.4	0.000	64.29	+43.32	1.25	same as 576
566	A2197	E	16 30 33.98	+40 32 20.7	0.000	64.31	+43.35	1.42	N6180
567	A2197	F	16 30 17.83	+40 35 53.0	0.000	64.39	+43.40	1.30	
568	A2197	G	16 29 23.84	+40 52 28.6	0.000	64.77	+43.57	1.25	A1627.7+40
569	A2197	H	16 28 54.21	+40 51 58.3	0.000	64.75	+43.67	1.19	
570	A2197	I	16 26 39.89	+40 28 39.7	0.008	64.21	+44.09	1.55	
571	A2197	J	16 28 37.98	+41 09 48.6	0.000	65.16	+43.72	1.19	
572	A2197	K	16 28 27.59	+41 09 38.3	0.000	65.16	+43.75	1.19	
573	A2197	L	16 28 41.72	+41 08 12.4	0.000	65.13	+43.71	1.19	
574	A2197	M	16 30 58.83	+40 55 48.4	0.000	64.85	+43.27	1.25	
575	A2197	N	16 28 21.60	+40 54 23.1	0.001	64.81	+43.77	1.25	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
576	A2197	1	16 30 42.04	+40 31 45.1	0.000	64.30	+43.32	1.25	same as 565
577	A2197	2	16 30 26.90	+41 29 01.9	0.003	65.61	+43.38	1.49	
578	A2197	3	16 29 09.44	+40 59 14.7	0.001	64.92	+43.62	1.25	
579	A2199	A	16 28 38.31	+39 33 03.3	0.000	62.93	+43.69	1.75	N6166, VV364
580	A2199	B	16 28 23.40	+39 34 11.8	0.000	62.96	+43.74	1.27	N6166C
581	A2199	C	16 27 58.76	+39 36 13.4	0.001	63.00	+43.82	1.27	
582	A2199	D	16 27 55.33	+39 15 30.1	0.000	62.52	+43.82	1.48	
583	A2199	E	16 33 49.71	+39 15 45.4	0.008	62.59	+42.68	1.42	I4610, I4612
584	A2199	F	16 31 02.84	+39 47 31.7	0.000	63.29	+43.24	1.53	
585	A2199	G	16 28 50.21	+39 50 04.7	0.003	63.33	+43.66	1.39	
586	A2199	H	16 31 19.30	+39 09 01.4	0.000	62.41	+43.16	1.27	
587	A2199	I	16 31 07.06	+39 12 17.8	0.000	62.48	+43.20	1.23	
588	A2199	J	16 30 45.32	+39 11 41.6	0.000	62.46	+43.27	1.27	
589	A2199	K	16 31 03.50	+39 50 17.6	0.000	63.35	+43.24	1.35	
590	A2199	L	16 27 40.96	+39 22 57.5	0.000	62.69	+43.87	1.48	N6158
591	A2199	M	16 27 03.69	+39 31 37.5	0.003	62.89	+44.00	1.35	
592	A2199	N	16 27 22.16	+39 06 33.3	0.003	62.31	+43.92	1.53	
593	A2199	O	16 24 17.68	+39 12 39.4	0.000	62.43	+44.52	1.35	
594	A2199	P	16 23 28.15	+39 11 28.9	0.000	62.40	+44.68	1.35	
595	A2199	1	16 30 20.30	+39 48 15.0	0.001	63.30	+43.37	1.18	
596	A2199	2	16 29 56.67	+39 56 36.3	0.003	63.48	+43.45	1.23	
597	A2199	3	16 26 14.31	+39 58 00.9	0.001	63.50	+44.16	1.35	
598	J21	A	16 37 34.39	+50 20 42.0	0.000	77.52	+41.63	1.63	
599	J21	B	16 33 40.97	+50 22 28.8	0.000	77.66	+42.24	1.39	
600	J21	C	16 33 13.93	+50 23 53.9	0.000	77.71	+42.31	1.33	
601	J21	D	16 33 01.02	+50 23 41.5	0.000	77.71	+42.34	1.09	
602	J21	E	16 32 57.28	+50 24 05.3	0.000	77.72	+42.35	1.55	
603	J21	F	16 32 05.78	+50 22 45.5	0.000	77.71	+42.49	1.36	
604	J21	G	16 32 16.69	+50 11 21.0	0.000	77.45	+42.48	1.50	
605	J21	H	16 31 42.76	+50 14 10.4	0.000	77.53	+42.57	1.15	VV687
606	J21	I	16 31 42.58	+50 10 03.1	0.000	77.44	+42.58	1.25	
607	J21	1	16 33 06.19	+50 32 08.6	0.000	77.89	+42.31	1.02	
608	J21	2	16 33 10.40	+50 18 21.5	0.000	77.58	+42.33	1.09	
609	A2247	A	16 52 48.57	+81 37 56.1	0.161	114.45	+31.01	1.35	
610	A2247	B	16 52 13.43	+81 37 10.6	0.161	114.44	+31.04	1.15	
611	A2247	C	16 51 45.53	+81 35 29.3	0.161	114.42	+31.06	1.23	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
612	A2247	D	16 51 07.88	+81 34 56.1	0.161	114.43	+31.09	0.92	
613	A2247	E	16 50 59.18	+81 34 28.1	0.161	114.42	+31.10	1.15	
614	A2247	F	16 48 45.85	+81 36 37.8	0.161	114.50	+31.15	1.29	
615	A2247	1	17 01 42.70	+81 54 44.7	0.202	114.59	+30.61	1.05	
616	A2247	2	16 51 58.72	+81 30 42.2	0.161	114.34	+31.09	1.15	
617	P332-1	A	17 01 55.00	+28 25 01.9	0.169	49.95	+35.24	1.46	
618	P332-1	B	17 01 56.14	+28 23 15.5	0.169	49.92	+35.23	1.33	
619	P332-1	C	17 00 53.63	+27 43 27.4	0.142	49.06	+35.28	1.40	
620	P332-1	D	17 00 46.98	+27 50 55.4	0.152	49.20	+35.34	1.33	
621	P332-1	E	17 00 43.67	+28 01 31.8	0.152	49.41	+35.39	1.25	
622	P332-1	F	16 59 46.97	+27 46 01.1	0.157	49.04	+35.53	1.43	
623	P332-1	G	17 00 11.49	+28 16 45.1	0.152	49.67	+35.57	1.21	
624	P332-1	1	17 02 13.68	+28 07 43.9	0.157	49.63	+35.10	1.21	
625	P332-1	2	17 00 03.28	+28 25 40.4	0.147	49.84	+35.64	1.10	
626	J22	A	16 57 58.17	+27 51 14.1	0.157	49.01	+35.94	1.71	N6269
627	J22	B	16 56 43.27	+27 49 17.9	0.166	48.89	+36.20	1.47	N6263
628	J22	C	16 57 29.18	+27 50 38.3	0.157	48.97	+36.04	1.44	N6265
629	J22	D	16 58 44.08	+27 51 31.6	0.157	49.07	+35.78	1.36	
630	J22	E	16 58 50.77	+27 57 52.7	0.157	49.21	+35.78	1.31	N6271
631	J22	F	16 57 55.29	+27 41 56.7	0.140	48.82	+35.91	1.14	
632	J22	G	16 57 42.89	+27 39 32.1	0.140	48.76	+35.94	1.14	
633	J22	H	16 57 52.96	+28 07 41.2	0.157	49.33	+36.03	1.36	
634	J23	A	17 15 22.96	+57 24 39.8	0.044	85.81	+35.40	1.75	N6338
635	J23	B	17 15 24.51	+57 19 20.8	0.037	85.70	+35.40	1.40	N6346
636	J23	C	17 14 37.65	+57 18 19.4	0.017	85.69	+35.51	1.37	
637	J23	D	17 16 24.64	+57 25 16.9	0.044	85.81	+35.26	1.28	
638	J23	E	17 14 53.84	+57 40 21.6	0.049	86.13	+35.44	1.15	
639	J24	A	17 33 02.11	+43 45 33.0	0.041	69.52	+32.07	1.61	I1262
640	J24	B	17 33 08.86	+43 42 33.6	0.041	69.46	+32.05	1.25	
641	J24	C	17 33 21.53	+43 38 03.8	0.041	69.38	+32.00	1.18	I1264
642	J24	D	17 33 20.49	+43 54 46.9	0.046	69.71	+32.04	1.52	
643	J24	E	17 32 35.17	+43 51 08.8	0.046	69.61	+32.17	1.18	
644	J24	1	17 31 21.11	+43 36 57.1	0.041	69.30	+32.35	1.42	
645	J25	A	17 55 48.45	+62 36 42.2	0.106	91.82	+30.22	1.60	N6521
646	J25	B	17 54 50.34	+62 38 40.1	0.106	91.85	+30.33	1.35	N6512
647	J25	C	17 55 22.96	+62 39 28.2	0.106	91.87	+30.27	1.07	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
648	J26	A	18 02 40.27	+42 47 42.7	0.082	69.60	+26.60	1.32	
649	J26	B	18 01 42.90	+42 43 07.8	0.070	69.47	+26.75	1.20	
650	J26	C	17 59 30.25	+42 30 54.0	0.056	69.14	+27.10	1.30	
651	J26	1	17 59 11.67	+42 35 27.8	0.056	69.21	+27.17	1.20	
652	J26	2	18 03 04.42	+42 57 21.2	0.082	69.79	+26.56	1.07	
653	J27	A	18 36 20.76	+51 27 57.9	0.099	80.39	+23.15	1.71	
654	J27	B	18 35 58.69	+51 27 31.1	0.099	80.37	+23.21	1.57	
655	J27	C	18 34 05.01	+51 24 47.9	0.099	80.24	+23.48	1.39	
656	J27	D	18 36 51.50	+51 26 03.3	0.099	80.38	+23.07	1.37	
657	J27	E	18 36 52.29	+51 31 50.0	0.085	80.48	+23.09	1.17	
658	J38	A	21 41 03.96	−16 41 40.3	0.106	36.08	−44.90	1.41	
659	J38	B	21 40 57.65	−16 42 58.7	0.106	36.04	−44.89	1.23	
660	J38	C	21 42 15.95	−16 56 19.9	0.073	35.91	−45.26	1.36	
661	J38	1	21 42 01.58	−16 54 13.1	0.068	35.93	−45.19	1.27	
662	P522-1	A	22 50 02.23	+11 41 53.8	0.089	81.76	−41.27	1.76	N7386
663	P522-1	B	22 49 54.69	+11 36 30.1	0.089	81.66	−41.32	1.68	N7385
664	P522-1	C	22 49 25.31	+11 35 32.5	0.080	81.52	−41.26	1.20	
665	P522-1	D	22 49 35.70	+11 33 22.2	0.080	81.53	−41.32	1.50	N7383
666	P522-1	E	22 49 46.00	+11 33 08.6	0.080	81.57	−41.35	1.11	
667	P522-1	F	22 50 19.62	+11 31 51.7	0.089	81.70	−41.45	1.28	N7390
668	P522-1	G	22 50 17.73	+11 38 11.7	0.089	81.78	−41.36	1.46	N7387
669	P522-1	1	22 51 28.23	+11 37 53.4	0.104	82.08	−41.53	1.20	
670	P522-1	2	22 51 09.04	+11 15 19.1	0.085	81.70	−41.79	1.11	
671	P522-1	3	22 49 21.56	+11 55 56.0	0.089	81.77	−40.98	1.28	
672	P522-1	4	22 49 10.26	+11 32 59.2	0.080	81.42	−41.26	1.35	
673	P522-1	5	22 48 55.55	+11 20 31.7	0.075	81.19	−41.39	0.98	
674	A2572	A	23 18 43.60	+18 41 52.7	0.080	94.28	−38.96	1.34	N7602
675	A2572	B	23 18 33.27	+18 44 57.7	0.080	94.26	−38.90	1.23	N7598
676	A2572	C	23 18 30.26	+18 41 19.5	0.080	94.22	−38.95	1.52	N7597
677	A2572	D	23 19 13.34	+18 54 40.4	0.070	94.54	−38.82	1.21	
678	A2572	E	23 17 21.45	+18 56 28.4	0.092	94.05	−38.60	1.12	
679	A2572	1	23 18 39.28	+18 41 21.3	0.080	94.26	−38.96	1.06	
680	A2572	2	23 18 29.45	+18 37 15.8	0.092	94.17	−39.00	0.93	
681	A2589	A	23 23 57.48	+16 46 36.7	0.029	94.62	−41.24	1.73	N7647
682	A2589	B	23 23 59.18	+16 48 39.4	0.029	94.65	−41.21	1.29	
683	A2589	C	23 23 48.23	+16 46 07.0	0.029	94.57	−41.23	1.21	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	log D_W	Comments
684	A2589	D	23 23 54.47	+16 40 50.2	0.029	94.55	−41.32	1.16	
685	A2589	E	23 23 51.43	+16 38 41.6	0.029	94.51	−41.34	1.35	
686	A2589	F	23 23 50.89	+16 53 48.3	0.029	94.66	−41.12	1.21	
687	A2589	G	23 23 47.68	+16 51 07.9	0.029	94.62	−41.15	1.05	
688	A2589	H	23 23 58.99	+16 52 29.1	0.029	94.68	−41.15	0.90	
689	A2589	1	23 24 19.65	+16 43 53.7	0.029	94.70	−41.32	1.05	
690	A2589	2	23 23 10.61	+16 54 45.5	0.041	94.48	−41.03	1.05	
691	A2593-N	A	23 24 20.20	+14 38 48.8	0.065	93.45	−43.18	1.68	N7649
692	A2593-N	B	23 24 12.24	+14 37 06.7	0.065	93.39	−43.19	1.22	
693	A2593-N	C	23 24 32.21	+14 38 20.2	0.065	93.50	−43.21	1.16	
694	A2593-N	D	23 24 37.33	+14 38 31.8	0.065	93.53	−43.22	1.22	
695	A2593-N	E	23 24 41.30	+14 37 58.1	0.065	93.54	−43.23	1.46	I1487
696	A2593-N	F	23 24 23.10	+14 39 29.9	0.065	93.47	−43.18	1.08	
697	A2593-N	G	23 24 39.82	+14 40 01.2	0.065	93.55	−43.20	1.19	
698	A2593-N	H	23 24 35.89	+14 40 57.0	0.065	93.55	−43.18	1.19	
699	A2593-N	I	23 24 23.70	+14 42 23.9	0.065	93.50	−43.14	1.22	
700	A2593-N	J	23 24 12.15	+14 25 25.2	0.061	93.27	−43.37	1.31	
701	A2593-N	K	23 24 42.84	+14 31 05.0	0.063	93.48	−43.34	1.36	
702	A2593-N	L	23 25 37.66	+14 34 24.8	0.063	93.78	−43.39	1.16	
703	A2593-N	M	23 25 24.85	+14 45 23.1	0.068	93.83	−43.20	1.22	
704	A2593-N	1	23 24 36.87	+14 35 00.5	0.065	93.49	−43.27	1.16	
705	A2593-N	2	23 24 28.45	+14 41 40.5	0.065	93.52	−43.16	0.92	
706	A2593-N	3	23 24 01.52	+14 28 52.7	0.061	93.25	−43.30	1.03	
707	A2593-N	4	23 23 33.56	+14 34 35.3	0.065	93.17	−43.16	1.03	
708	A2593-N	5	23 23 11.85	+14 54 03.7	0.065	93.27	−42.83	1.22	
709	A2593-S	A	23 24 26.11	+13 58 18.1	0.061	93.05	−43.79	1.61	N7651
710	A2593-S	B	23 24 49.11	+13 59 46.1	0.061	93.18	−43.82	1.28	
711	A2593-S	C	23 24 16.69	+13 57 58.8	0.061	93.00	−43.78	1.31	
712	A2593-S	D	23 24 31.86	+14 16 18.3	0.061	93.27	−43.54	1.26	
713	A2593-S	E	23 23 26.77	+14 07 52.6	0.061	92.86	−43.54	1.35	
714	A2593-S	F	23 24 03.51	+13 56 51.1	0.061	92.92	−43.77	1.06	
715	A2593-S	G	23 23 55.54	+13 54 36.6	0.061	92.86	−43.79	1.13	
716	A2634	A	23 38 29.53	+27 01 53.0	0.097	103.50	−33.07	1.84	N7720
717	A2634	B	23 38 38.90	+27 00 39.5	0.087	103.53	−33.10	1.34	I5342
718	A2634	C	23 38 29.34	+26 58 42.1	0.087	103.48	−33.12	1.31	
719	A2634	D	23 38 26.90	+26 59 04.6	0.087	103.47	−33.11	1.31	I5341

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
720	A2634	E	23 38 50.79	+27 16 01.0	0.097	103.68	−32.88	1.47	
721	A2634	F	23 37 57.93	+27 15 50.9	0.109	103.46	−32.81	1.31	
722	A2634	G	23 40 00.95	+27 07 58.6	0.104	103.92	−33.09	1.68	N7728
723	A2634	H	23 40 46.92	+26 50 04.3	0.082	104.00	−33.43	1.55	A2338+26
724	A2634	I	23 39 49.50	+27 22 31.9	0.104	103.97	−32.85	1.31	
725	A2634	J	23 40 19.15	+27 33 39.5	0.111	104.17	−32.71	1.59	
726	A2634	K	23 40 54.43	+27 30 32.5	0.111	104.29	−32.80	1.34	
727	A2634	1	23 38 22.88	+27 09 27.8	0.097	103.52	−32.95	1.31	
728	A2634	2	23 38 18.63	+26 53 11.2	0.087	103.40	−33.20	1.34	
729	A2657	A	23 44 57.45	+09 11 33.9	0.133	96.72	−50.26	1.57	
730	A2657	B	23 44 43.91	+09 12 55.2	0.133	96.65	−50.22	1.13	
731	A2657	C	23 44 30.50	+09 15 48.2	0.133	96.60	−50.16	1.32	
732	A2657	D	23 44 27.78	+09 16 00.2	0.133	96.59	−50.15	0.91	
733	A2657	E	23 44 24.69	+09 09 51.9	0.133	96.51	−50.24	1.23	
734	A2657	F	23 44 16.22	+09 02 54.2	0.133	96.39	−50.33	1.33	
735	A2657	G	23 45 01.73	+09 02 39.8	0.133	96.65	−50.41	0.99	
736	A2657	H	23 45 17.34	+09 16 16.4	0.133	96.89	−50.23	1.18	
737	A2657	1	23 45 40.65	+09 14 06.3	0.133	97.00	−50.30	1.18	
738	A2666	A	23 50 58.70	+27 08 48.5	0.080	106.72	−33.81	1.79	N7768
739	A2666	B	23 50 52.42	+27 09 56.9	0.080	106.69	−33.79	1.36	N7765
740	A2666	C	23 51 01.30	+27 15 26.1	0.080	106.76	−33.71	1.20	
741	A2666	D	23 51 00.92	+27 17 18.8	0.061	106.77	−33.68	1.28	
742	A2666	E	23 51 30.16	+27 14 08.5	0.065	106.88	−33.76	1.36	
750	COMA	70	12 59 07.91	+27 46 10.7	0.024	53.97	+88.18	1.34	I3957
751	COMA	69	12 59 07.90	+27 47 01.7	0.024	54.38	+88.17	1.46	I3959
752	COMA	240	12 57 31.89	+28 28 16.0	0.026	78.18	+88.10	1.63	N4841A
753	COMA	239	12 57 33.88	+28 28 54.0	0.026	78.26	+88.08	1.46	N4841B
754	COMA	194	12 59 03.79	+28 07 25.6	0.031	63.89	+88.04	1.62	N4860
755	COMA	159	12 59 12.82	+27 58 37.8	0.031	59.60	+88.08	1.52	N4864
756	COMA	133	12 59 14.82	+27 58 13.8	0.031	59.33	+88.08	1.44	N4867
757	COMA	105	12 59 22.82	+27 54 44.0	0.031	57.39	+88.07	1.52	N4869
758	COMA	31	12 57 24.27	+27 29 47.9	0.014	48.81	+88.62	1.67	N4839
759	COMA	49	13 01 54.45	+27 37 28.8	0.024	45.59	+87.62	1.55	N4926
760	COMA	87	12 59 30.84	+27 47 35.1	0.024	53.76	+88.09	1.19	
761	COMA	103	12 59 30.81	+27 53 03.1	0.024	56.28	+88.06	1.42	I3973
762	COMA	106	12 59 22.82	+27 53 49.0	0.031	56.97	+88.08	1.30	

Table 3—Continued

GIN	Name		R.A. (J2000)	Dec.	A_R	l	b	$\log D_W$	Comments
763	COMA	107	12 59 20.83	+27 53 15.0	0.031	56.79	+88.09	1.40	
764	COMA	118	13 00 39.62	+27 55 21.4	0.029	54.69	+87.81	1.49	N4906
765	COMA	129	12 59 34.77	+27 57 38.2	0.029	58.16	+88.01	1.96	N4874
766	COMA	134	12 59 03.85	+27 57 32.6	0.031	59.54	+88.12	1.19	
767	COMA	135	12 58 59.86	+27 58 02.6	0.031	59.97	+88.13	1.12	
768	COMA	136	12 58 55.87	+27 58 01.5	0.031	60.16	+88.14	1.16	
769	COMA	148	13 00 07.68	+27 58 32.8	0.029	57.18	+87.90	2.08	N4889
770	COMA	160	12 59 05.83	+27 59 47.7	0.031	60.46	+88.09	1.57	I3955
771	COMA	172	13 00 13.64	+28 02 20.9	0.029	58.50	+87.85	1.36	I4021
772	COMA	217	12 59 57.60	+28 14 50.6	0.034	64.10	+87.81	1.60	N4881
773	N3379		10 47 49.50	+12 34 56.9	0.029	233.49	+57.63	···	
774	N 936		02 27 37.67	−01 09 17.2	0.029	168.57	−55.26	···	
775	N3115		10 05 13.42	−07 43 06.5	0.058	247.78	+36.78	···	
776	N3377		10 47 42.05	+13 59 09.1	0.036	231.18	+58.32	···	
777	N4365		12 24 27.87	+07 19 04.9	0.000	283.80	+69.18	···	
778	N4374		12 25 03.15	+12 53 11.2	0.074	278.20	+74.48	···	
779	N4382		12 25 24.23	+18 11 23.4	0.017	267.72	+79.24	···	
780	N4406		12 26 11.07	+12 56 47.7	0.067	279.07	+74.64	···	
781	N4472		12 29 46.57	+08 00 07.5	0.000	286.92	+70.20	···	
782	N4473		12 29 47.75	+13 25 49.6	0.036	281.60	+75.40	···	
783	N4486B		12 30 31.85	+12 29 26.0	0.053	283.41	+74.56	···	
784	N4494		12 31 23.50	+25 46 32.5	0.031	228.58	+85.31	···	
785	COMA	130	12 59 33.78	+27 56 50.2	0.029	57.85	+88.02	1.49	N4872
786	COMA	153	12 59 43.73	+27 59 47.4	0.029	58.70	+87.97	1.30	
787	COMA	124	12 59 43.77	+27 54 44.4	0.029	56.51	+88.00	1.49	N4876
788	COMA	125	12 59 42.76	+27 55 37.4	0.029	56.94	+88.00	1.27	
789	COMA	143	13 00 52.56	+28 00 21.7	0.029	56.24	+87.73	1.60	I4051
790	COMA	168	13 00 48.54	+28 05 21.6	0.034	58.31	+87.71	1.51	I4045
791	COMA	151	13 00 03.69	+27 59 08.7	0.029	57.59	+87.91	1.56	N4886
792	COMA	150	13 00 06.67	+28 00 08.8	0.029	57.89	+87.89	1.36	I4011
793	COMA	174	13 00 07.64	+28 04 38.8	0.029	59.68	+87.85	1.39	I4012
794	N 584		01 31 21.01	−06 52 16.1	0.065	149.81	−67.64	···	
795	N 596		01 32 52.08	−07 01 54.6	0.062	150.89	−67.63	···	
796	N4697		12 48 35.71	−05 48 02.9	0.022	301.63	+57.06	···	
797	N5846		15 06 28.73	+01 36 15.6	0.084	0.42	+48.80	···	
798	N6181		16 32 21.00	+19 49 35.6	0.137	37.17	+39.21	···	

Table 3—Continued

GIN	Name	R.A. (J2000)	Dec.	A_R	l	b	log D_W	Comments
799	N7626	23 20 42.29	+08 13 02.5	0.096	87.86	−48.38	···	
800	N4486	12 30 49.24	+12 23 32.1	0.053	283.77	+74.49	···	
801	N 224	00 42 44.23	+41 16 07.7	0.187	121.17	−21.57	···	

Table 4. Selection Regions and Selection Function Parameters

CID	R.A. (J2000)	Dec.	$\Delta\alpha'$	$\Delta\delta'$	N_W	$\log D_W^0$	δ_W
1	00 39.4	+06 54	83.22	92.15	28	1.3	0.20
2	00 42.1	−09 32	67.41	53.12	26	1.3	0.24
3	00 56.4	−01 05	58.66	81.38	49	1.4	0.24
4	00 59.9	+27 00	99.38	51.42	29	1.2	0.23
5	00 58.9	+12 56	48.16	38.85	20	1.2	0.20
6	01 08.6	+02 11	62.01	44.76	23	1.1	0.20
7	01 12.3	+15 32	81.74	47.44	48	1.4	0.24[a]
7	01 12.2	+16 20	68.86	45.10	···	···	··· [a]
8	01 14.8	+00 08	79.65	65.17	27	1.2	0.22
9	01 24.8	+01 47	65.19	44.52	21	1.4	0.20
10	01 20.6	−13 47	41.92	30.58	34	1.2	0.36
11	01 25.0	+08 44	50.42	47.47	25	1.1	0.20
12	01 37.5	−09 06	58.91	50.16	19	1.2	0.26
13	01 50.7	+33 15	64.38	50.55	16	1.2	0.21
14	01 53.9	+36 11	126.25	113.05	31	1.6	0.21
15	02 25.1	+37 06	41.03	38.28	9	1.1	0.20
16	02 29.7	+23 04	65.53	34.73	23	1.2	0.24
17	02 45.9	+36 59	56.48	51.29	24	1.1	0.20
18	02 50.6	+47 00	64.13	41.96	20	1.3	0.27
19	02 55.5	−14 12	58.14	45.45	8	1.1	0.20
20	02 57.3	+16 03	56.26	39.74	22	1.3	0.24
21	02 58.0	+06 10	88.06	58.27	25	1.3	0.20
22	03 08.5	−04 09	64.73	51.10	12	1.2	0.20
23	03 08.4	−23 35	36.55	39.63	33	1.2	0.42
24	04 33.9	−13 13	75.26	54.96	27	1.4	0.24
25	04 45.6	−15 57	75.49	70.34	32	1.4	0.24
26	04 52.8	+01 18	32.99	27.32	5	1.3	0.20
27	04 58.8	−00 23	45.41	41.32	12	1.1	0.20
28	04 55.0	−18 04	79.41	69.31	23	1.3	0.20
29	04 49.8	−17 05	89.69	68.17	20	1.3	0.20
30	04 60.4	−18 32	48.42	51.33	20	1.2	0.21
31	05 03.5	−20 11	44.98	42.57	8	1.1	0.20
32	05 04.8	−19 15	50.04	41.59	15	1.1	0.20
33	05 03.2	−23 57	98.88	72.28	44	1.3	0.24
34	05 01.6	−22 56	72.36	76.31	25	1.4	0.36
35	05 47.9	−25 27	80.87	58.78	39	1.3	0.22[b]

Table 4—Continued

CID	R.A. (J2000)	Dec.	$\Delta\alpha'$	$\Delta\delta'$	N_W	$\log D_W^0$	δ_W
36	05 43.5	−25 55	75.53	53.15	60	1.3	0.20[c]
37	13 05.7	+53 43	58.00	45.96	21	1.3	0.27
38	13 43.3	+29 58	67.89	51.79	21	1.2	0.24
39	13 53.3	+25 00	93.08	49.85	32	1.2	0.21
40	14 08.3	−09 02	57.22	40.96	23	1.2	0.24
41	14 47.3	+13 40	57.67	41.53	23	1.1	0.24
42	14 47.7	+11 23	66.61	52.49	30	1.3	0.20
43	14 51.8	+16 45	76.32	55.66	30	1.4	0.29
44	14 53.2	+18 28	85.88	54.83	43	1.3	0.22
45	15 19.2	+04 27	83.60	50.03	16	1.1	0.20
46	15 10.9	+04 29	118.93	50.22	50	1.3	0.24
47	15 21.9	+08 08	47.57	60.07	10	1.5	0.24
48	15 11.7	+07 35	80.74	67.48	27	1.2	0.24
49	15 17.1	+07 02	64.95	47.19	33	1.4	0.24
50	15 23.7	+08 57	92.42	75.62	22	1.3	0.24
51	15 39.1	+21 44	56.20	48.24	24	0.9	0.24
52	15 54.6	+41 34	42.35	32.71	25	1.1	0.20
53	16 01.9	+16 07	59.01	84.49	32	1.5	0.24
54	15 57.3	+22 30	36.49	31.14	8	1.1	0.20
55	16 11.6	+23 59	41.84	37.66	12	1.2	0.24
56	16 03.3	+25 28	31.27	30.00	23	1.0	0.22
57	16 05.1	+23 58	40.78	38.97	31	1.3	0.24
58	16 05.9	+18 09	69.42	68.28	49	1.4	0.24
59	16 06.1	+16 08	58.37	83.84	65	1.3	0.34
60	15 57.0	+18 08	105.42	71.07	38	1.3	0.20
61	15 57.9	+16 07	52.24	84.17	16	1.4	0.20
62	16 13.1	+30 58	57.71	49.03	27	1.1	0.20
63	16 12.8	+29 32	60.51	46.34	42	1.2	0.24
64	16 17.6	+35 01	78.37	69.19	26	1.5	0.23
65	16 28.2	+40 55	117.87	72.36	27	1.3	0.42
66	16 28.5	+39 29	125.14	61.31	54	1.3	0.28
67	16 34.0	+50 25	76.86	57.42	12	1.3	0.24
68	16 50.8	+81 43	57.62	45.47	12	1.0	0.24
69	17 01.2	+28 03	46.12	59.88	20	1.2	0.24
70	16 57.6	+27 54	45.15	38.53	15	1.3	0.24
71	17 15.4	+57 28	50.62	52.49	16	1.2	0.22

Table 4—Continued

CID	R.A. (J2000)	Dec.	$\Delta\alpha'$	$\Delta\delta'$	N_W	$\log D_W^0$	δ_W
72	17 33.1	+43 50	42.18	41.96	19	1.3	0.24
73	17 55.5	+62 41	41.03	38.28	17	1.2	0.24
74	18 01.5	+42 44	70.69	42.88	14	1.3	0.24
75	18 36.4	+51 35	49.78	40.37	11	1.2	0.30
76	21 41.2	−16 43	64.49	46.69	14	1.2	0.20
77	22 50.1	+11 41	43.67	54.04	16	1.1	0.20
78	23 18.1	+18 48	35.84	31.62	24	1.3	0.24
79	23 23.9	+16 49	31.17	26.64	23	1.1	0.20
80	23 24.8	+14 42	45.98	38.09	34	1.1	0.24
81	23 24.7	+14 04	43.14	31.79	18	1.2	0.24
82	23 39.2	+27 10	60.11	50.49	30	1.3	0.20
83	23 45.0	+09 14	33.11	29.12	16	1.1	0.24
84	23 51.4	+27 14	39.43	29.23	18	1.2	0.24
90	12 60.0	+28 01	36.19	51.03	74	1.5	0.55

[a]CID=7: Two adjacent fields; the smaller lies N of the larger and runs nearly along the E edge.

[b]CID=35: Overlap with CID=36 in SW corner.

[c]CID=36: Overlap with CID=35 in NE corner. The region is 19.02 arcmin EW and 28.53 arcmin NS centered at (05 43.6,−25 45), and was excluded from this field.

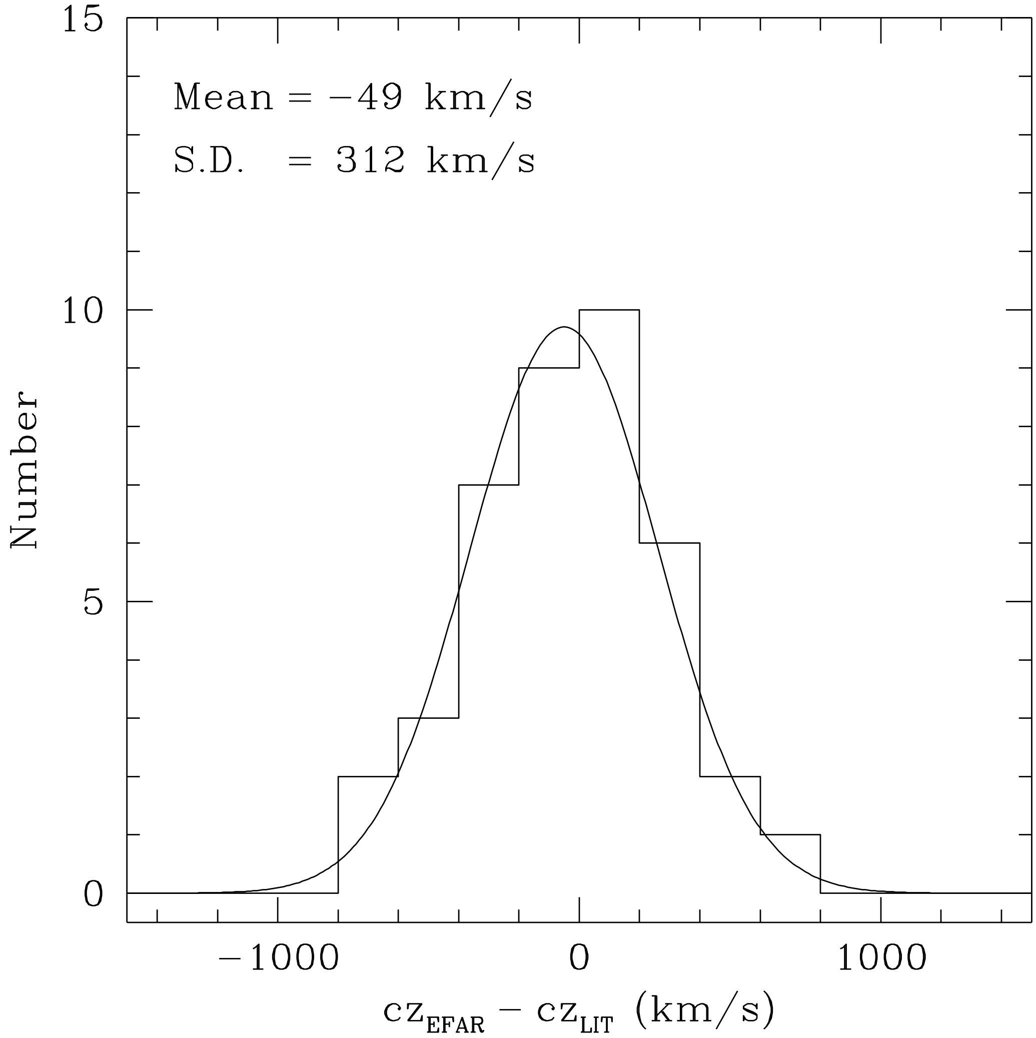

Fig. 1.— The distribution of differences between our median redshifts for each Abell cluster in our sample and the cluster redshifts given by NED. The curve is a Gaussian with mean and standard deviation determined from the data.

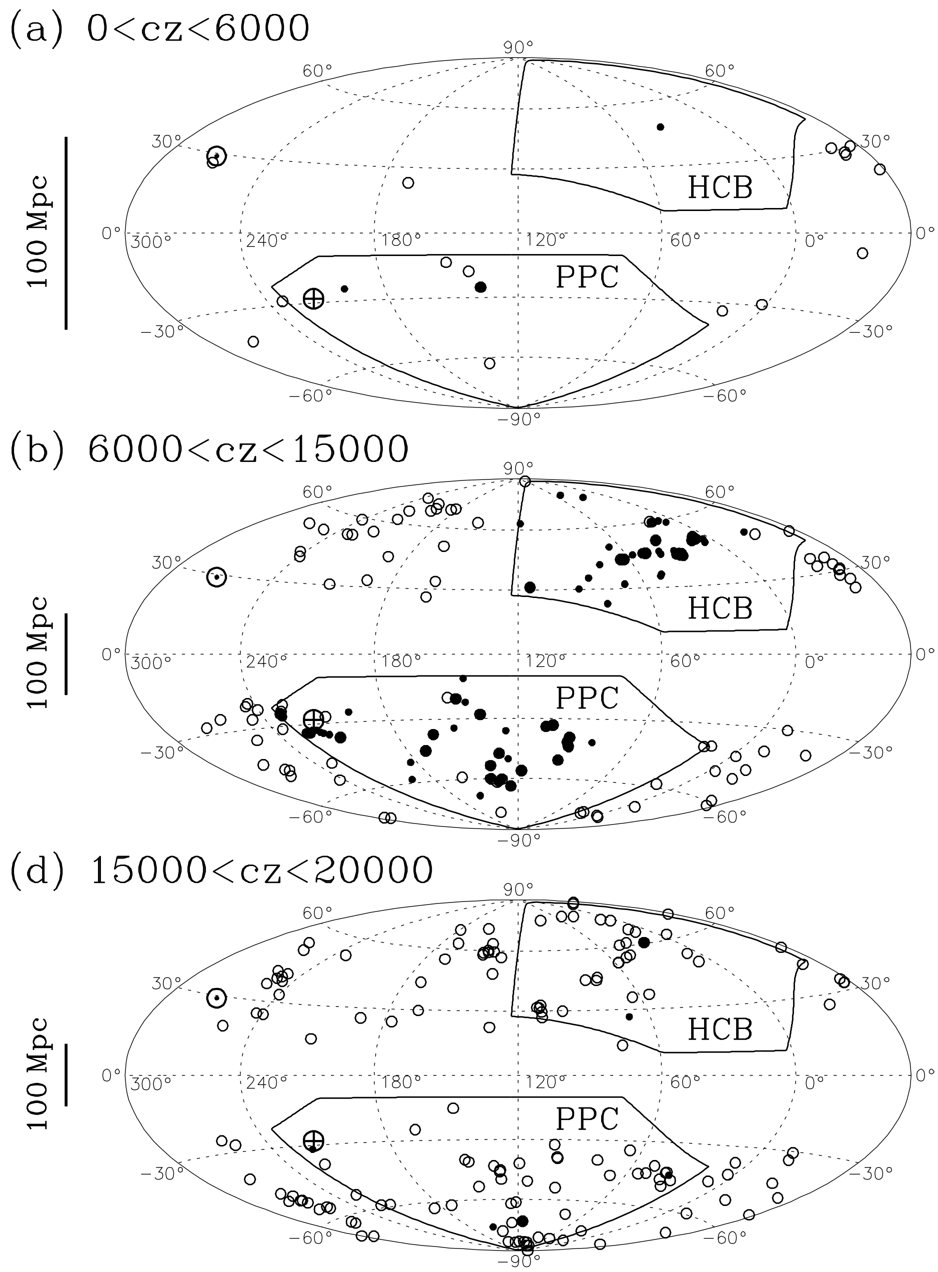

Fig. 2.— The EFAR cluster sample compared to the overall distribution of Abell clusters. The boundaries of the HCB and PPC regions on the sky are indicated. Large circles are Abell clusters (filled if they are in the EFAR sample); small dots are non-Abell clusters in the EFAR sample. The three panels show the cluster distribution (in an Aitoff projection of Galactic coordinates) for three redshift ranges: (a) cz=0–6000 km s^{-1}, (b) cz=6000–15000 km s^{-1}, (c) cz=15000–20000 km s^{-1}. The scale in h^{-1} Mpc at the upper end of each redshift range is indicated by the bar at left. Also indicated are the direction of the Local Group motion with respect to the CMB ($\odot$) and with respect to the Lauer-Postman dipole for the Abell clusters within 15000 km s^{-1} ($\oplus$).

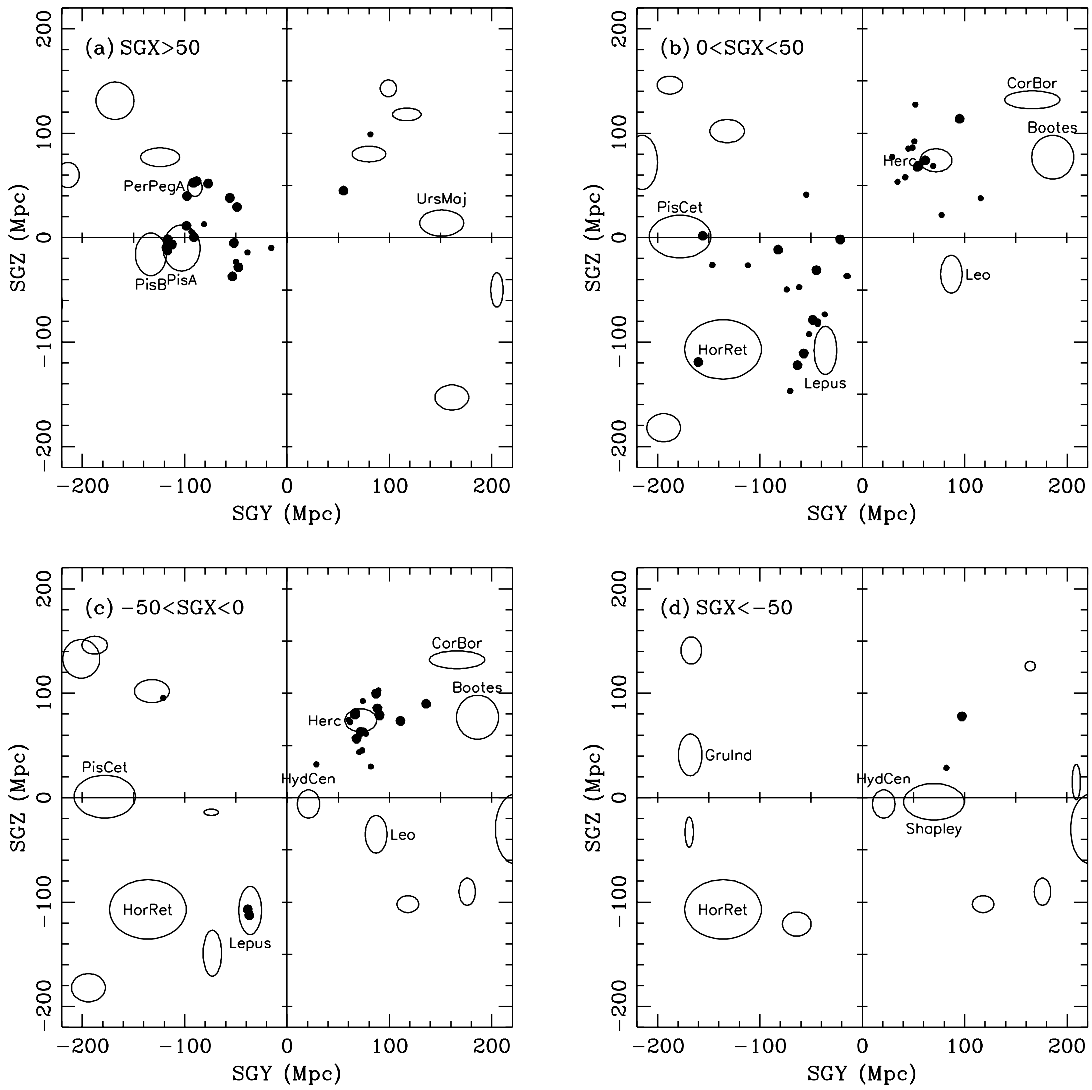

Fig. 3.— The EFAR cluster sample in relation to the surrounding large-scale structures. Large dots are Abell clusters and small dots are non-Abell clusters. The ellipses are the superclusters identified by Einasto et al. (1994), with the relevant ones named. The clusters and superclusters are shown projected onto the supergalactic SGY–SGZ plane, with the four panels corresponding to four slices in SGX: (a) SGX>50 h^{-1} Mpc, (b) SGX=0–50 h^{-1} Mpc, (c) SGX=−50–0 h^{-1} Mpc, and (d) SGX<−50 h^{-1} Mpc. The size of each supercluster given by Einasto et al.(1994) is represented by the axes of the ellipses and thus should roughly correspond to the extent of supercluster.

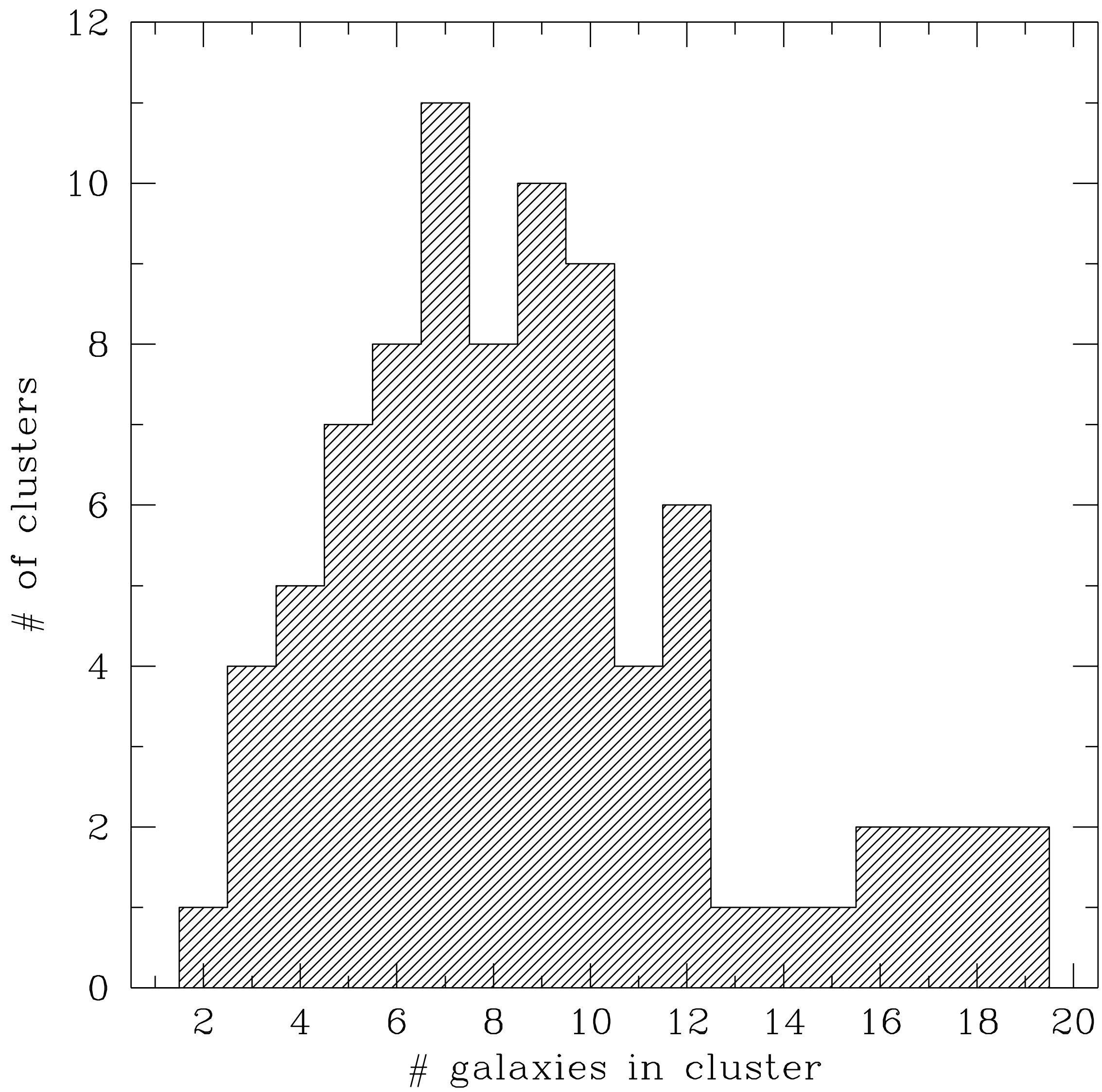

Fig. 4.— The distribution of the number of galaxies selected in each program cluster.

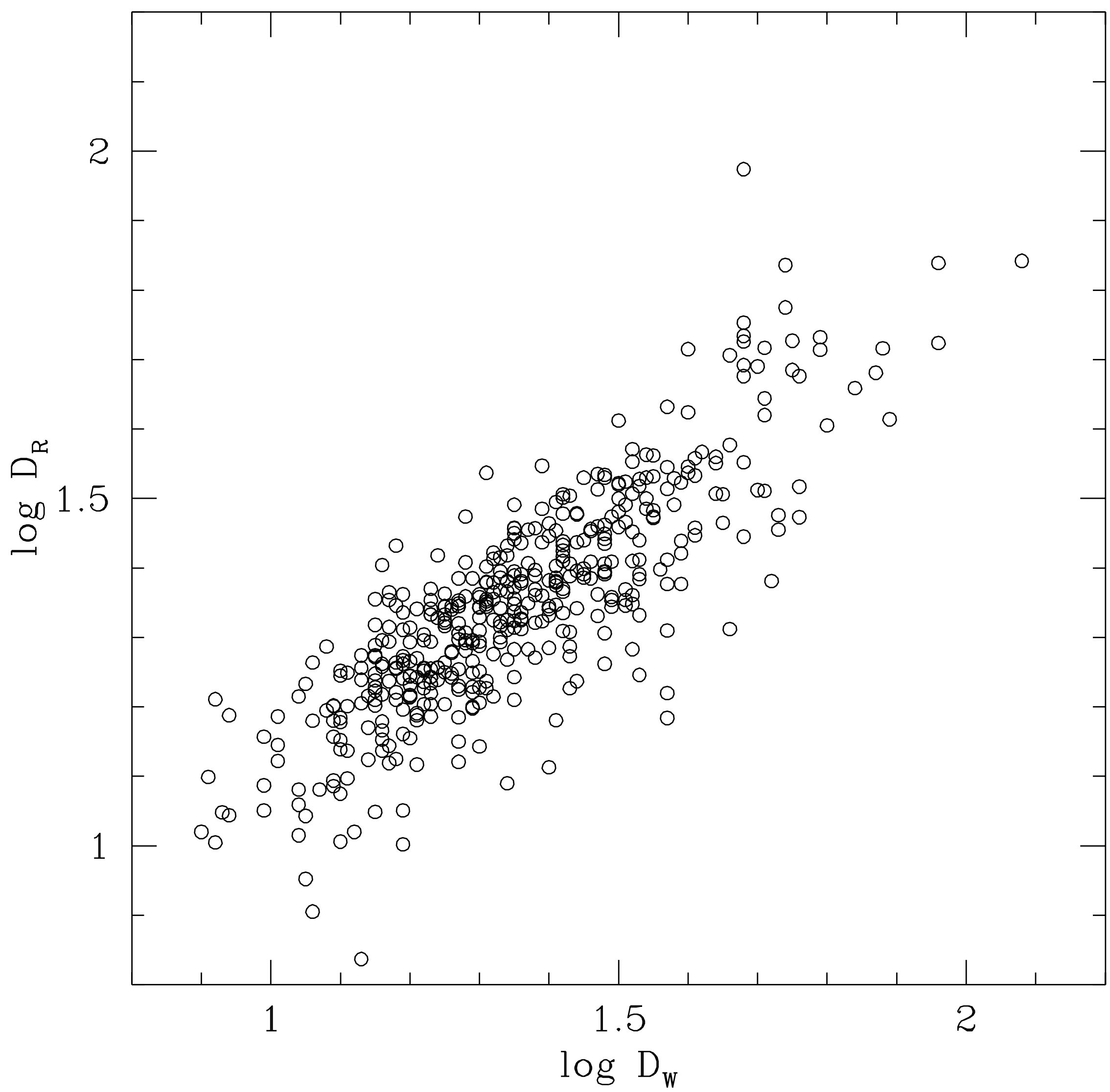

Fig. 5.— The relation between $\log D_W$ (diameters measured by hand) and $\log D_R$ (photometric diameter at fixed surface brightness) for the whole galaxy sample, without allowing for offsets between clusters due to differences in extinction etc.

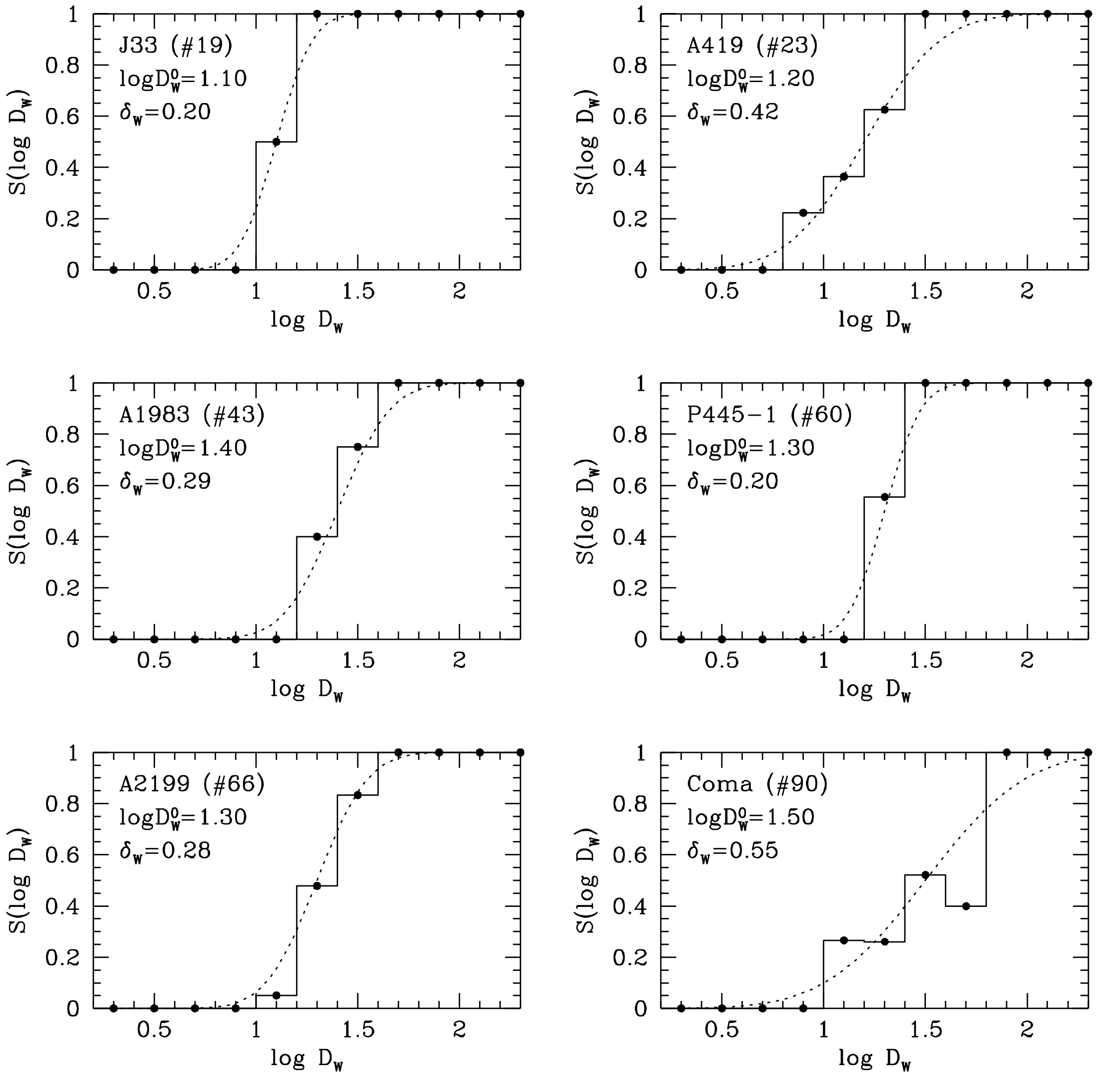

Fig. 6.— Examples of the selection functions for some individual galaxy clusters. The dots and histograms show the selection function for elliptical galaxies measured for the cluster whose name is in the upper left corner of each panel. The dashed curves give the fit to these data using equation (3) with the cutoff and slope parameters D_W^0 and δ_W.

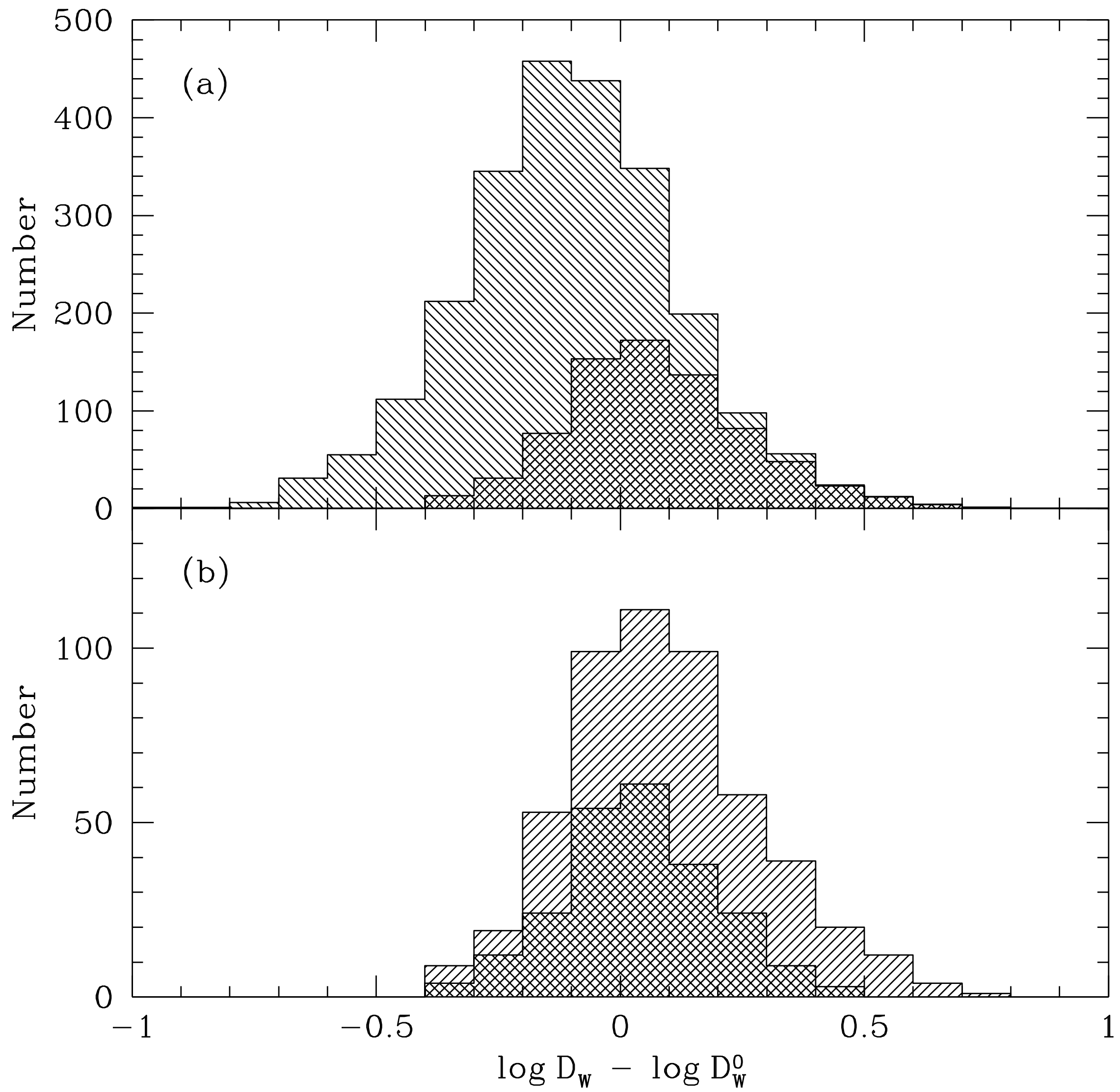

Fig. 7.— (a) The distributions of $\log D_W - \log D_W^0$ for the complete set of objects (E, S0, and cD galaxies) with D_W diameter measurements from the POSS (striped histogram) and for subset of the the EFAR program galaxies only (hashed histogram). (b) The corresponding distributions of spirals rejected from the two samples.

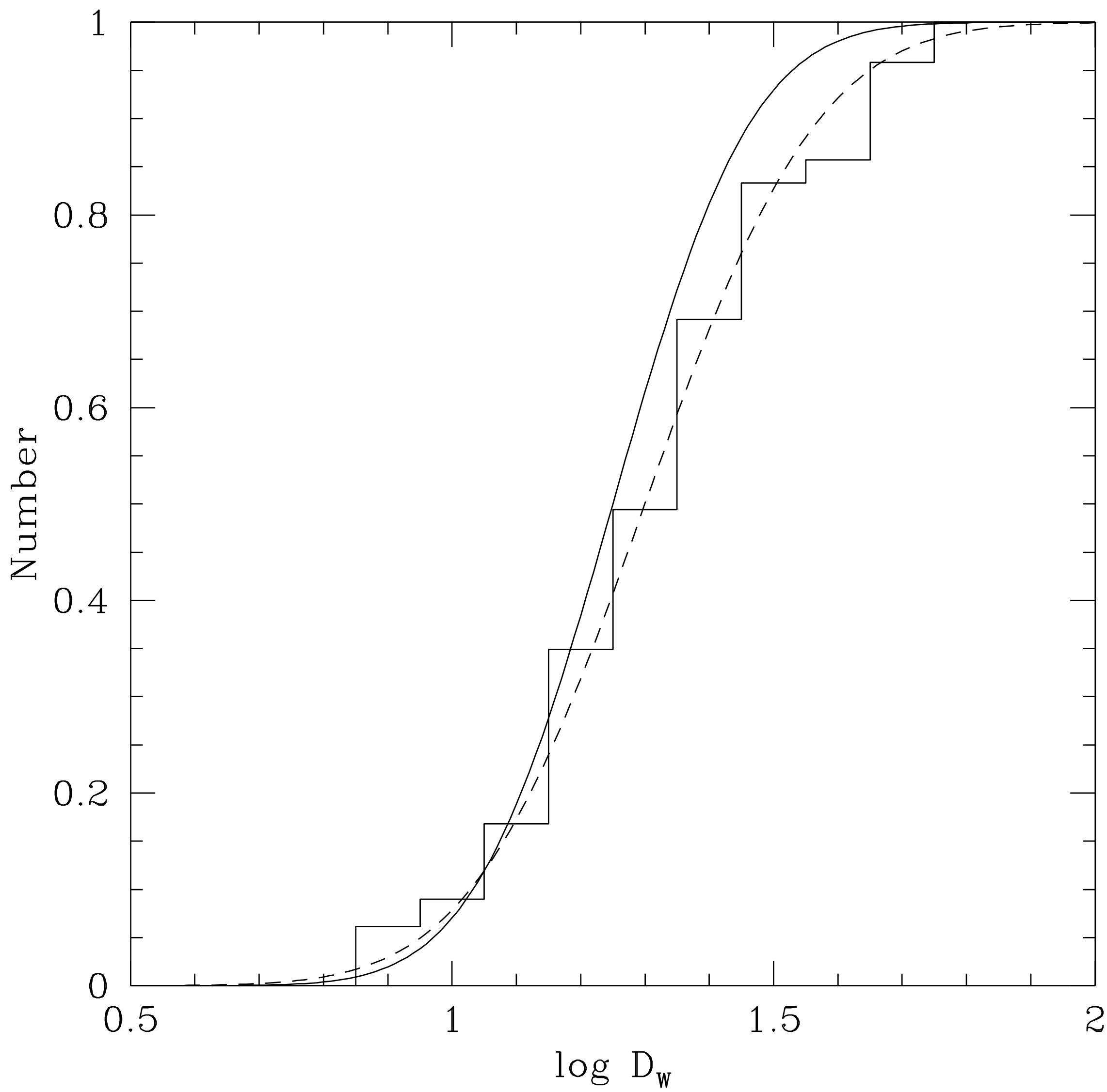

Fig. 8.— The combined selection function for the whole sample, with each cluster's selection function shifted to the mean $\log D_W^0$. The solid curve has $\langle \log D_W^0 \rangle$=1.2 and $\langle \delta_W \rangle$=0.24, the mean parameters averaged over all the clusters. The dashed curve has $\log D_W^0$=1.30 and δ_W=0.30, and is the fit to the combined selection function.

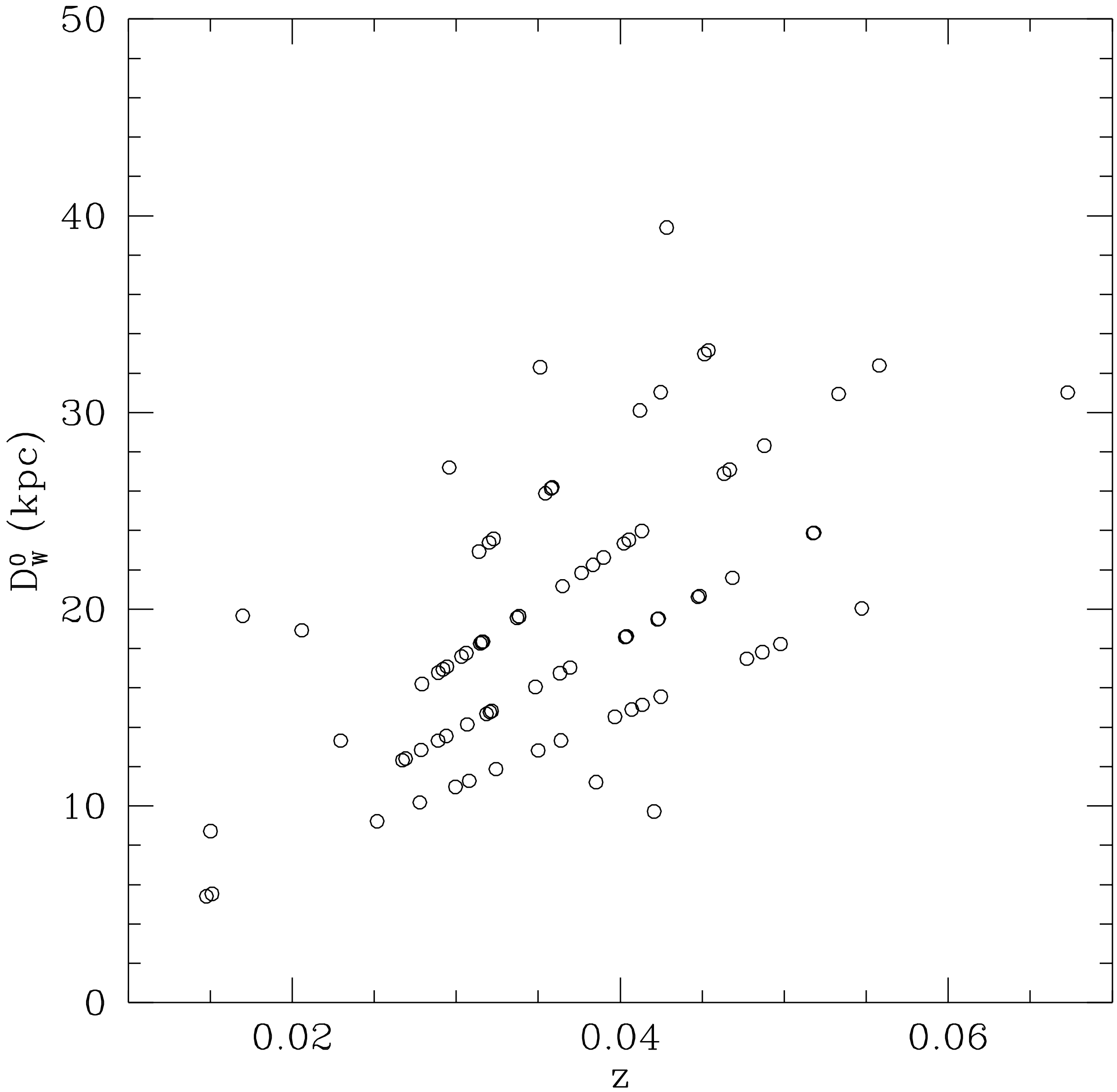

Fig. 9.— The relation between cluster redshift and the cutoff diameter D_W^0 in units of kiloparsecs (for H_0=50 km s^{-1} Mpc^{-1}), showing that the selection criterion is effectively a constant cut in angular diameter and thus corresponds to a metric diameter that increases with redshift.