

# A SEARCH FOR LARGE VOIDS FROM COMBINED SAMPLES OF GALAXY CLUSTERS AND GALAXIES

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## 1. Introduction

This paper is part of a more extensive study of the large voids in spatial volumes both wide and deep. Three samples of optical tracers with spectroscopically measured redshifts in a volume with  $b \geq 30^\circ$  and  $z \leq 0.14$  have been extracted from the catalogue of Lebedev and Lebedeva (1986) and the NASA/IPAC Extragalactic Database (NED):

- (1) a homogeneous sample of 277 rich Abell clusters
- (2) an inhomogeneous sample of 969 objects: rich and poor Abell clusters, Zwicky clusters, other clusters, and groups
- (3) a sample of 18 623 NED galaxies.

## 2. Void Catalog

We have found from the normalized to  $1 \text{ Mpc}^3$  distributions of the number of objects by redshift that sample 1 is fairly complete to  $z=0.8-0.9$ , while the completeness of the subsamples of Zwicky clusters, other clusters, and groups falls sharply at about twice smaller redshifts. All samples are processed following Stavrev (1990). With the void selection criterion: void diameter  $D \geq 80 \text{ Mpc}$  ( $H_0=100 \text{ Mpc km}^{-1} \text{ s}^{-1}$ ) and exclusion of “open” voids, the procedure generates a catalog of 18 and 22 large voids, respectively for samples 1 and 2.

We have added sample 3 to sample 2 and repeated the void-search on this combined sample. The generated catalog contains 20 large galaxy voids (Table 1). Figure 1 shows the dependence of the void diameters on their distance. The increase of the void sizes in the interval above 300 Mpc is obviously due to sample incompleteness. The dimensions of the voids

TABLE 1. Large voids completely devoid of galaxies

Void No.	$\alpha$ (h)	$\delta$ ( $^\circ$ )	l ( $^\circ$ )	b ( $^\circ$ )	R (Mpc)	D (Mpc)	A ( $^\circ$ )	MAX (Mpc)	e	Percolating Void(s) No.
1	8.5	49	171	37	330	80	14	80	1.0	2
2	9.1	64	151	39	321	100	18	142	0.7	1, 5
3	9.5	25	204	45	281	92	19	152	0.6	4, 7
4	9.8	14	221	46	306	108	20	180	0.6	3, 7
5	10.6	50	162	56	338	80	13	80	1.0	2
6	10.9	-14	266	40	341	100	17	100	1.0	9
7	11.0	21	220	64	356	100	16	188	0.5	3, 4, 8
8	11.1	29	203	67	391	86	13	86	1.0	7
9	11.2	-6	265	49	369	108	17	188	0.6	6,13,14
10	11.3	37	180	69	279	88	18	88	1.0	
11	12.0	-21	288	40	248	82	19	116	0.7	
12	12.2	36	162	79	346	88	14	88	1.0	
13	12.3	-12	292	50	338	94	16	148	0.6	9,14,15
14	13.2	12	323	74	354	96	15	202	0.5	9,13,18
15	13.7	-9	325	51	387	126	18	126	1.0	13
16	13.8	48	98	66	350	80	13	80	1.0	17
17	13.9	39	79	72	336	80	14	80	1.0	16
18	14.2	12	0	65	331	100	17	169	0.6	14
19	15.6	15	24	49	370	88	14	88	1.0	
20	15.6	60	94	47	383	86	13	131	0.7	

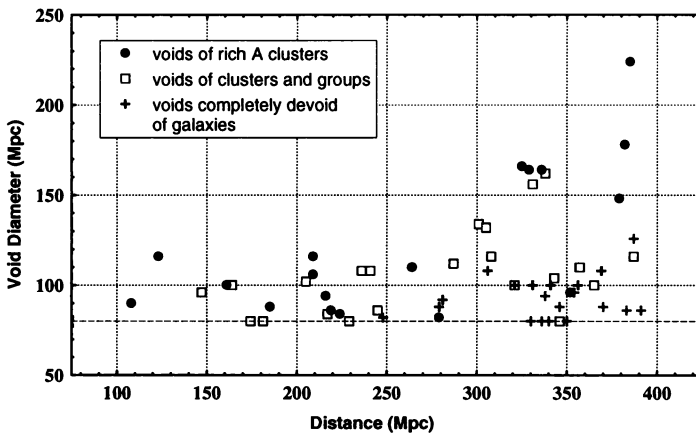


Figure 1. Void diameter versus distance

estimated from the more complete part of the volume are about 100 Mpc, in agreement with Einasto *et al.* (1994). The nearer part of the volume does not contain large, completely empty voids.

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### References

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