J/MNRAS/436/3759 ECDFS sources optical/IR counterparts (Bonzini+, 2013)

The sub-mJy radio sky in the Extended Chandra Deep Field-South: source population.
Bonzini M., Padovani P., Mainieri V., Kellermann K.I., Miller N., Rosati P., Tozzi P., Vattakunnel S.
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=2013MNRAS.436.3759B (SIMBAD/NED BibCode)

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Abstract:
The sub-mJy radio population is a mixture of active systems, that is star-forming galaxies (SFGs) and active galactic nuclei (AGNs). We study a sample of 883 radio sources detected at 1.4GHz in a deep Very Large Array survey of the Extended Chandra Deep Field-South that reaches a best rms sensitivity of 6μJy. We have used a simple scheme to disentangle SFGs, radio-quiet (RQ), and radio-loud (RL) AGNs based on the combination of radio data with Chandra X-ray data and mid-infrared observations from Spitzer. We find that at flux densities between about 30 and 100μJy, the radio population is dominated by SFGs (~60%) and that RQ AGNs become increasingly important over RL ones below 100 μJy. We also compare the host galaxy properties of the three classes in terms of morphology, optical colours and stellar masses. Our results show that both SFG and RQ AGN host galaxies have blue colours and late-type morphology while RL AGNs tend to be hosted by massive red galaxies with early-type morphology. This supports the hypothesis that radio emission in SFGs and RQ AGNs mainly comes from the same physical process: star formation in the host galaxy.

Description:
We consider a sample of 883 radio sources detected at 1.4GHz in a deep Very Large Array (VLA) survey of the Extended Chandra Deep Field-South (E-CDFS) that reaches a best rms sensitivity of 6uJy.

We used deep Spitzer InfraRed Array Camera (IRAC) and Multiband Imaging Photometer for Spitzer (MIPS) data. The IRAC data were obtained as part of the Spitzer IRAC/MUSYC Public Legacy Survey in the Extended CDF-South (SIMPLE) survey (Damen et al., 2011ApJ...727....1D, Cat. J/ApJ/727/1). It covers an area of about 1600 arcmin^2 centred on the E-CDFS. The typical 5σ flux density limits are 1.1, 1.3, 6.3 and 7.6uJy at 3.6, 4.5, 5.8 and 8.0um, respectively. We also use MIPS 24um data from the Far-Infrared Deep Extragalactic Legacy (FIDEL) survey (Dickinson & FIDEL Team, 2007AAS...211.5216D).

The E-CDFS has been mapped in the X-ray band by Chandra. A total of 129 radio sources have a counterpart in the 4 Ms observations of the CDFS presented in Xue et al. (2011ApJS..195...10X, Cat. J/ApJS/195/10) and another 99 in the main E-CDFS catalogue by Lehmer et al. (2005ApJS..161...21L, Cat. J/ApJS/161/21) obtained with shallower (250ks) observations in each of four pointings. The list of the X-ray counterparts of the radio sources is given in Bonzini et al. (2012ApJS..203...15B, Cat. J/ApJS/203/15).

File Summary:

FileName	Lrecl	Records	Explanations
ReadMe	80	.	This file
table1.dat	87	883	Classification of radio sources

See also:
J/ApJS/161/21 : Extended Chandra Deep Field-South survey (Lehmer+, 2005)
J/ApJS/195/10 : The CDF-S survey: 4Ms source catalogs (Xue+, 2011)
J/ApJ/727/1 : IRAC/MUSYC SIMPLE survey (Damen+, 2011)
J/ApJS/203/15 : Counterparts to 1.4GHz sources in ECDF-S (Bonzini+, 2012)

Byte-by-byte Description of file: table1.dat

Bytes	Format	Units	Label	Explanations
1- 3	I3	---	RID	Radio source ID, [MBF2013] NNN in Simbad (1)
5- 6	I2	h	RAh	? Optical-IR counterpart right ascension (J2000)
8- 9	I2	min	RAm	? Optical-IR counterpart right ascension (J2000)
11- 15	F5.2	s	RAs	? Optical-IR counterpart right ascension (J2000)

17	A1	---	DE-	Optical-IR counterpart declination sign (J2000)
18- 19	I2	deg	DEd	? Optical-IR counterpart declination (J2000)
21- 22	I2	arcmin	DEm	? Optical-IR counterpart declination (J2000)
24- 28	F5.2	arcsec	DEs	? Optical-IR counterpart declination (J2000)
30- 35	A6	---	Class	Classification of the source (2)
37- 40	F4.2	---	z	?=- Redshift
42- 46	F5.2	[W/Hz]	logPr	?=- Radio power
48	A1	---	l_logLX	Limit flag for 3σ upper limit
49- 53	F5.2	[10-7W]	logLX	?=0 X-ray luminosity in the hard band (2-10keV) (3)
55- 59	F5.2	---	logq24o	?=- Ratio of the observed 24um and 1.4GHz luminosities
61- 65	F5.2	[-]	log(S3/S1)	?=- log10 of the ratio of the flux density in the 5.8 and 3.6um IRAC bands
67- 71	F5.2	[-]	log(S4/S2)	?=- log10 of the ratio of the flux density in the 8.0 and 4.5um IRAC bands
73- 76	F4.1	---	alphar	?=- Radio spectral index; alphar=0.7 if no 6cm observations are available
78- 83	F6.2	mag	BMAG	?=- Rest frame absolute B magnitude
85	I1	---	QF	[1/3] Quality flag of the classification: from 3=secure to 1=insecure
87	I1	---	f_logq24o	[0/1] Flag for the logq24o: 1 = upper limit on logq24o, 0 = detection

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Note (1): from Miller et al., 2013, Cat. J/ApJS/205/13 &
Bonzini et al., 2012, Cat. J/ApJS/203/15.
Note (2): Classification of the source as follows:
SFG = star forming galaxy
RQ AGN = radio quiet AGN
RL AGN = radio loud AGN
Note (3): sources without redshift have upper limits computed assuming z=1

History:
From electronic version of the journal

(End) Patricia Vannier [CDS] 05-Oct-2015

The document above follows the rules of the Standard Description for Astronomical Catalogues; from this documentation it is possible to generate f77 program to load files into arrays or line by line