J/MNRAS/462/1910 H-ATLAS NGP LOFAR radio catalogue (Hardcastle+, 2016)

LOFAR/H-ATLAS: a deep low-frequency survey of the
Herschel-ATLAS North Galactic Pole field.

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Abstract:
We present Low-Frequency Array (LOFAR) High-Band Array observations of the Herschel-ATLAS North Galactic Pole survey area. The survey we have carried out, consisting of four pointings covering around 142deg^2 of sky in the frequency range 126-173MHz, does not provide uniform noise coverage but otherwise is representative of the quality of data to be expected in the planned LOFAR wide-area surveys, and has been reduced using recently developed 'facet calibration' methods at a resolution approaching the full resolution of the data sets (~10x6 arcsec) and an rms off-source noise that ranges from 100μJy beam^{-1} in the centre of the best fields to around 2mJy/beam at the furthest extent of our imaging. We describe the imaging, cataloguing and source identification processes, and present some initial science results based on a 5σ source catalogue. These include (i) an initial look at the radio/far-infrared correlation at 150 MHz, showing that many Herschel sources are not yet detected by LOFAR; (ii) number counts at 150MHz, including, for the first time, observational constraints on the numbers of star-forming galaxies; (iii) the 150-MHz luminosity functions for active and star-forming galaxies, which agree well with determinations at higher frequencies at low redshift, and show strong redshift evolution of the star-forming population; and (iv) some discussion of the implications of our observations for studies of radio galaxy life cycles.

Description:
The NGP field was observed in four separate pointings, chosen to maximize sky covered, with the LOFAR HBA as part of the Surveys Key Science project. Observations used the HBA$_{DUAL}$INNER mode, meaning that the station beams of core and remote stations roughly matched each other and giving the widest possible field of view. The first observation, which was made early on in LOFAR operations, was of slightly longer duration (~10h) than the others (~8h). International stations were included in some of the observations in 2014 but were not used in any of our analysis, which uses only the Dutch array.

File Summary:

FileName	Lrecl	Records	Explanations
ReadMe	80	.	This file
tablea1.dat	327	15292	Radio catalogue

See also:
VII/204 : Galaxy properties at NGP (Odewahn+ 1995)
VII/214 : APS Galaxies in the North Galactic Pole (Cabanela, 1999)
J/A+A/372/276 : Polarization catalogue for NGP area (Berdyugin+, 2001)
J/ApJS/99/391 : The CfA redshift survey: NGP +36 zone. (Huchra+ 1995)
J/ApJS/175/86 : NGP+30° zone galaxies I. (Petrosian+, 2008)

Byte-by-byte Description of file: tablea1.dat

Bytes	Format	Units	Label	Explanations
1- 19	A19	---	Name	IAU name of the radio source (JHHMMSS.ss+DDMMSS.s)
21- 30	F10.6	deg	RAdeg	Source right ascension (J2000) (1)
32- 39	F8.6	deg	e_RAdeg	Nominal (statistic) error on RAdeg
41- 50	F10.6	deg	DEdeg	Source declination (J2000) (1)
52- 59	F8.6	deg	e_DEdeg	Nominal (statistic) error on DEdeg
61- 69	F9.6	Jy	Ftot	Total flux density at 150MHz (2)
71- 78	F8.6	Jy	e_Ftot	Error on Ftot
80- 86	F7.3	---	Sep	? Component separation (3)
88- 96	F9.6	Jy	F130	Total flux density in the 130MHz spectral window
98-106	F9.6	Jy	e_F130	[]? Error on F130
108-116	F9.6	Jy	F138	Total flux density in the 138MHz spectral window
118-126	F9.6	Jy	e_F138	[]? Error on F138

128-136	F9.6	Jy	F146	Total flux density in the 146MHz spectral window
138-146	F9.6	Jy	e_F146	[]? Error on F146
148-156	F9.6	Jy	F154	Total flux density in the 154MHz spectral window
158-166	F9.6	Jy	e_F154	[]? Error on F154
168-176	F9.6	Jy	F161	Total flux density in the 161MHz spectral window
178-186	F9.6	Jy	e_F161	[]? Error on F161
188-196	F9.6	Jy	F169	Total flux density in the 169MHz spectral window
198-206	F9.6	Jy	e_F169	[]? Error on F169
208-215	A8	---	Class	Classificiation, Single for a single PYBDSM source, Multiple for a composite source
217	I1	---	Ncomp	? Number of components (4)
219-226	F8.6	deg	Maj	? Major axis of the best-fitting elliptical Gaussian fitted by PYBDSM
228-235	F8.6	deg	e_Maj	? Error on Maj
237-244	F8.6	deg	Min	? Minor axis of the best-fitting elliptical Gaussian fitted by PYBDSM
246-253	F8.6	deg	e_Min	? Error on Min
255-264	F10.6	deg	PA	? Position angle axis of the best-fitting elliptical Gaussian fitted by PYBDSM
266-275	F10.6	deg	e_PA	? Error on PA
277-284	F8.6	deg	DCMaj	? Major axis after deconvolution of the LOFAR beam
286-293	F8.6	deg	e_DCMaj	? Error on DC Maj
295-302	F8.6	deg	DCMin	? Minor axis after deconvolution of the LOFAR beam
304-311	F8.6	deg	e_DCMin	? Error on DCMin
313-319	F7.3	deg	DCPA	? Position angle after deconvolution of the LOFAR beam
321-327	F7.3	deg	e_DCPA	? Error on DCPA

Note (1): For a composite source, i.e. one created by associating more than one PYBDSM component, these are the mean right ascension and declination of the associated sources.
Note (2): for composite sources, the sum of the flux densities of all the associated components
Note (3): For composite sources only, indicates the largest distance between the positions of two components that were associated to make the source.
Note (4): the number of components used to make a source.
1 for a single source, >1 for a composite source.

History:
From electronic version of the journal

(End) Patricia Vannier [CDS] 31-Jan-2018

*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*