

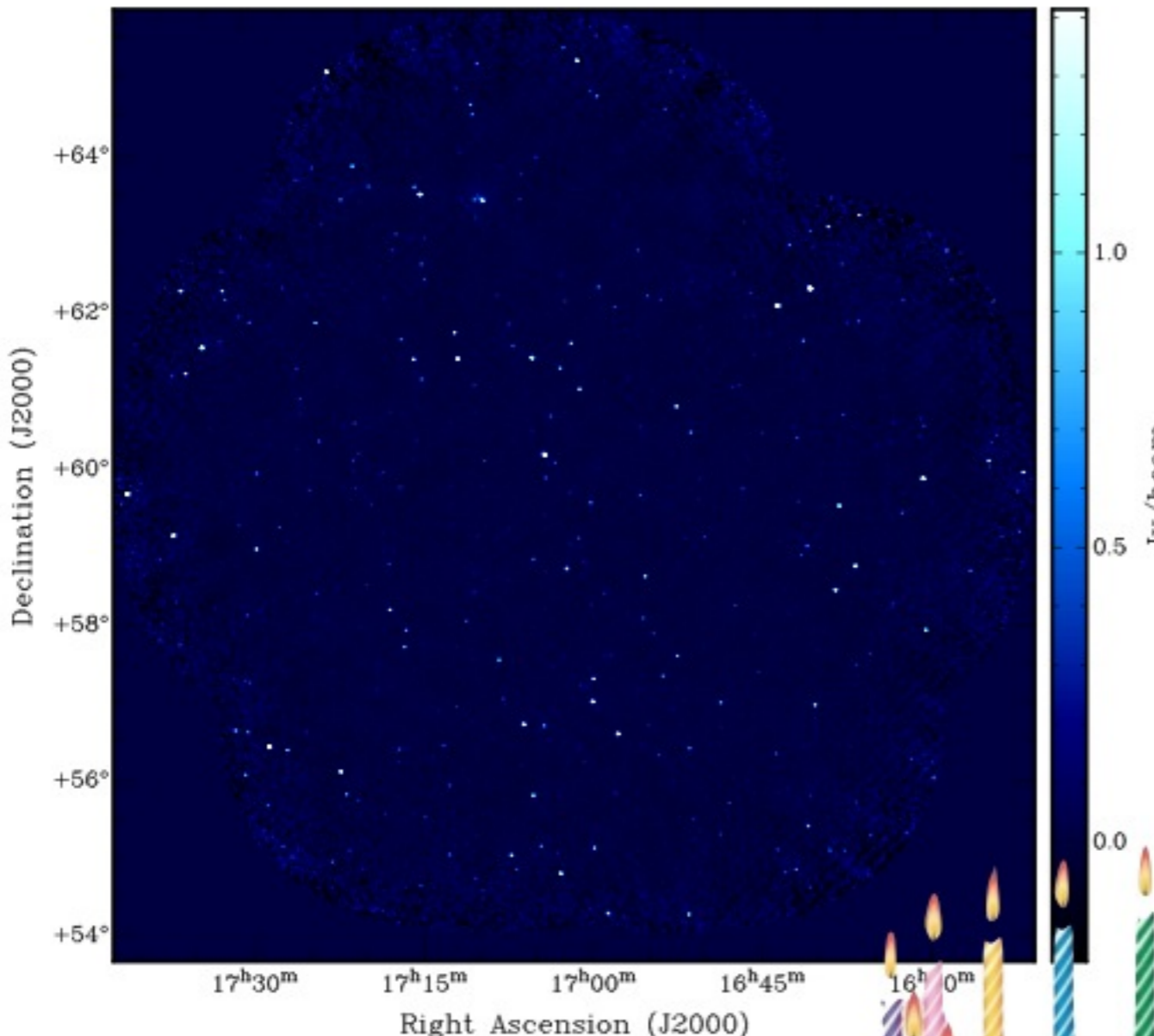
LOFAR MSSS

Multifrequency Snapshot Sky Survey

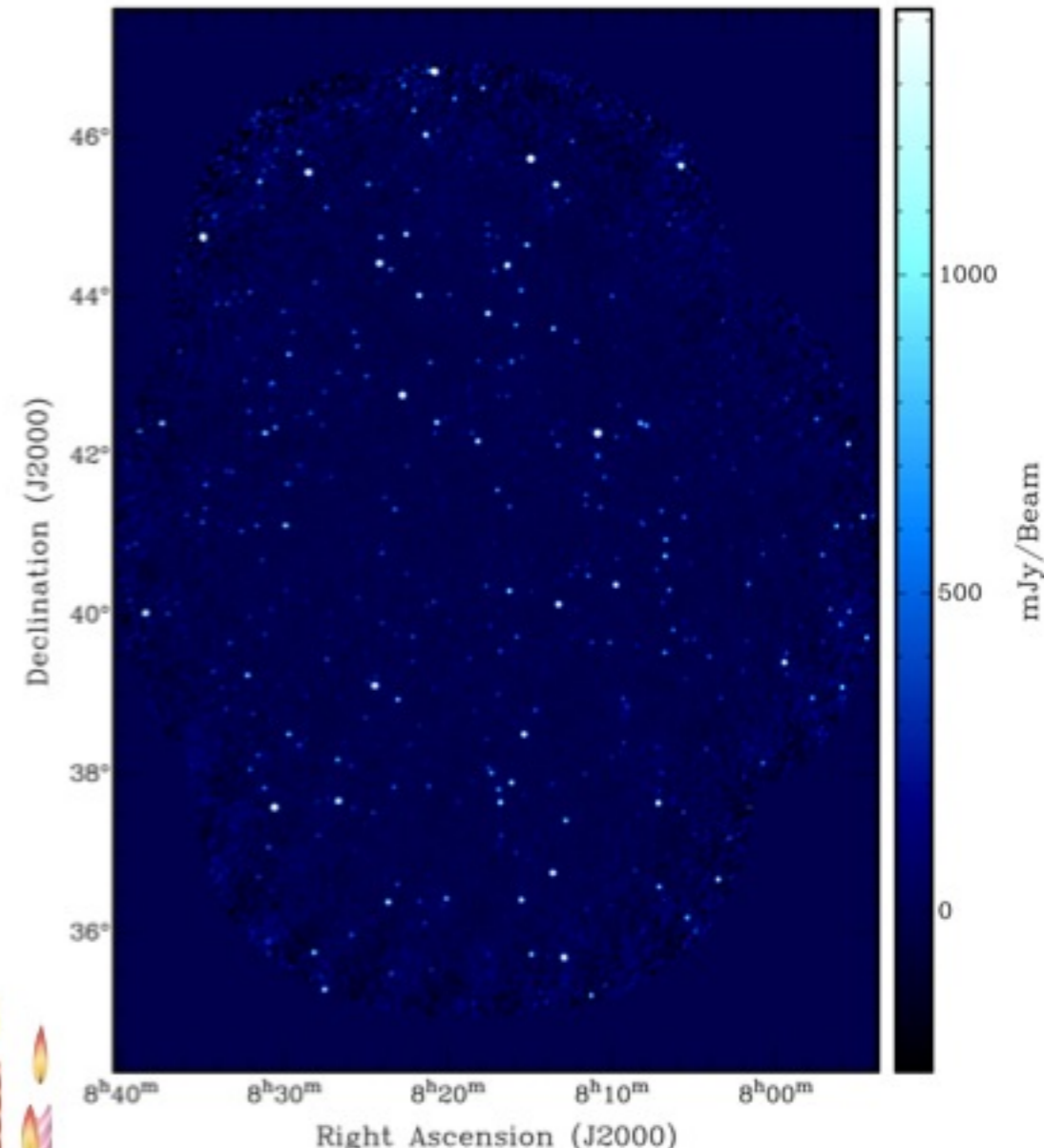
Progress Update

George Heald (MSSS Project Leader)
(on behalf of the MSSS Team)
LSM, 28/05/2014





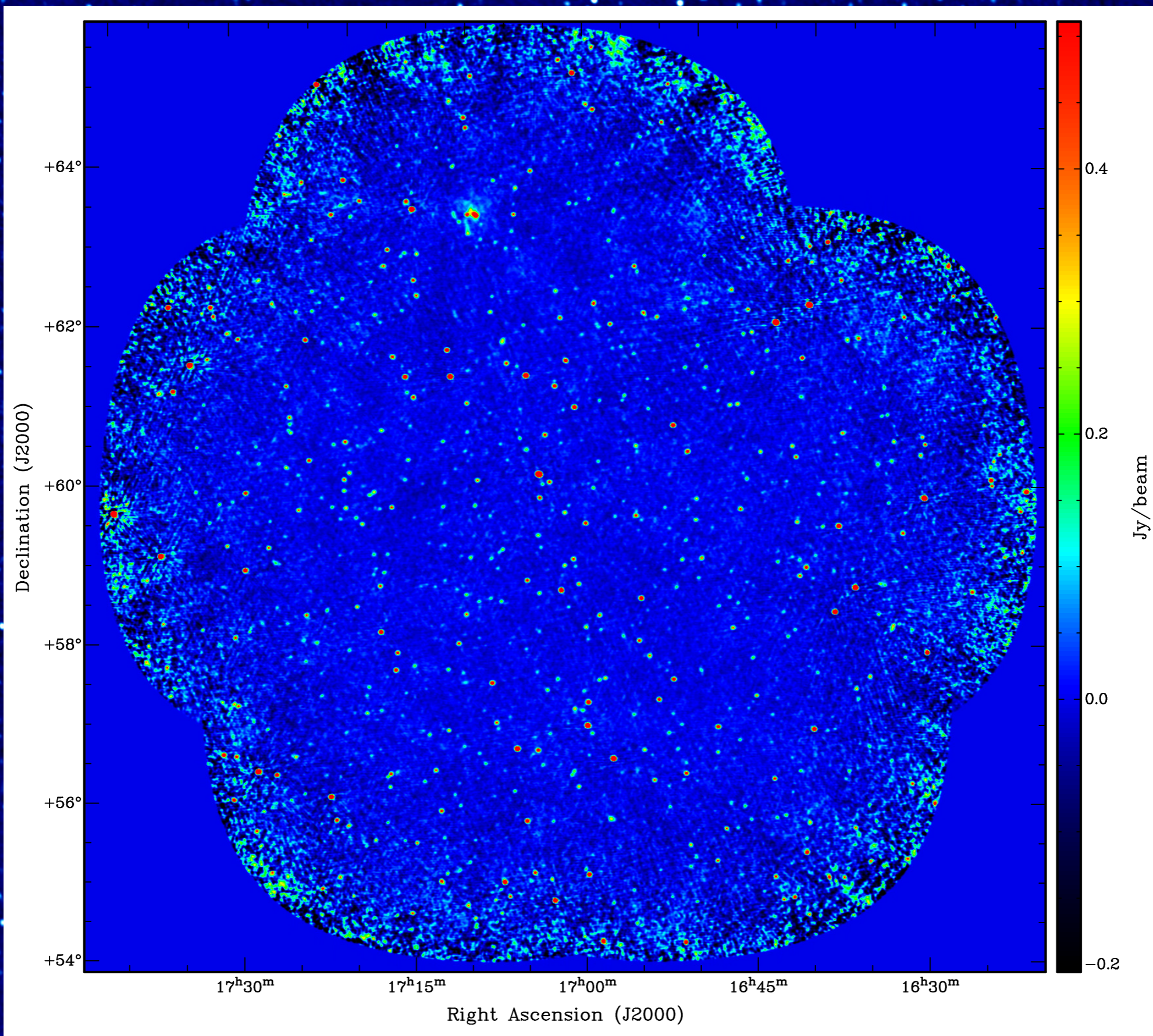
First MSSS-HBA mosaic
8 February 2013



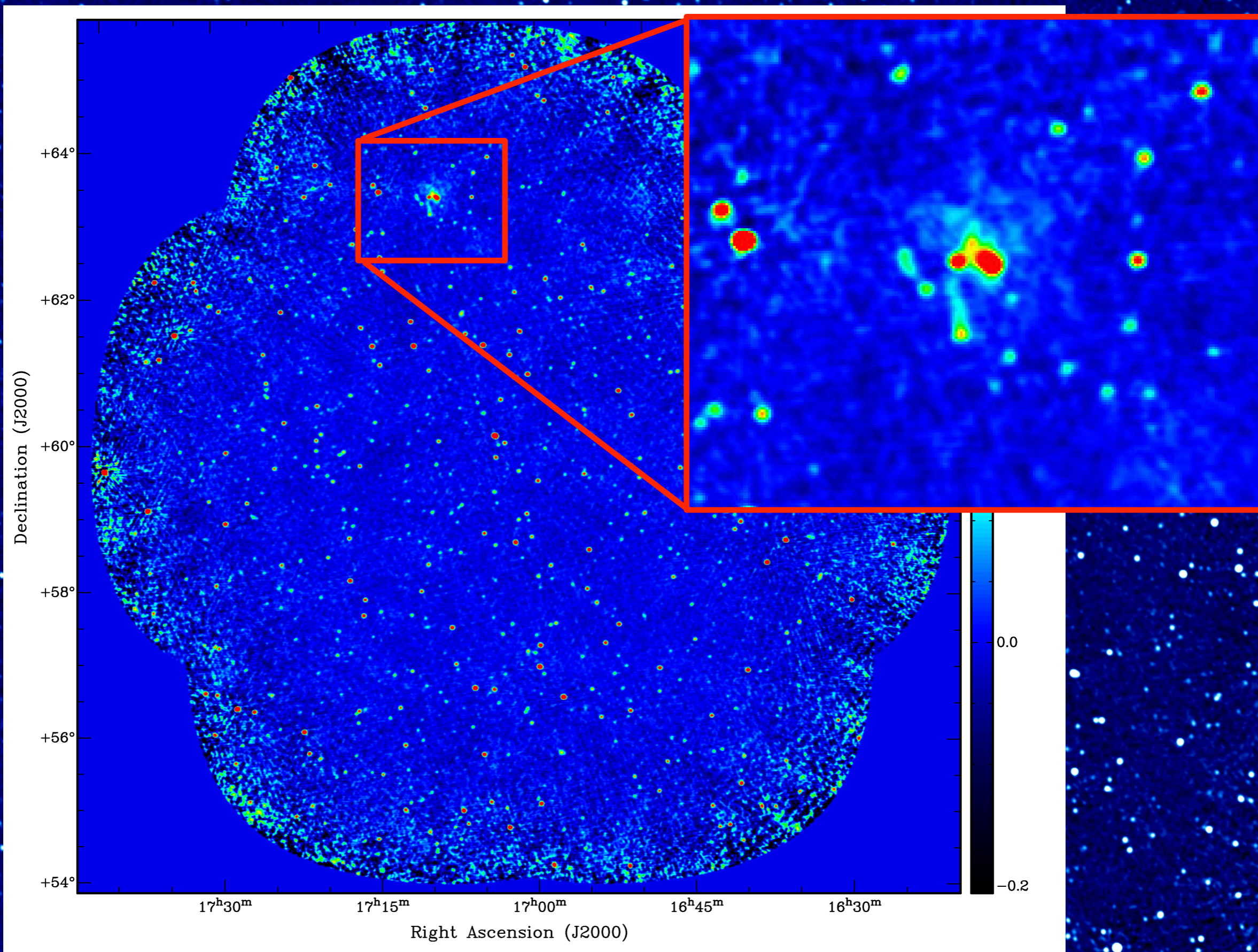
Last MSSS-HBA mosaic
9 May 2014



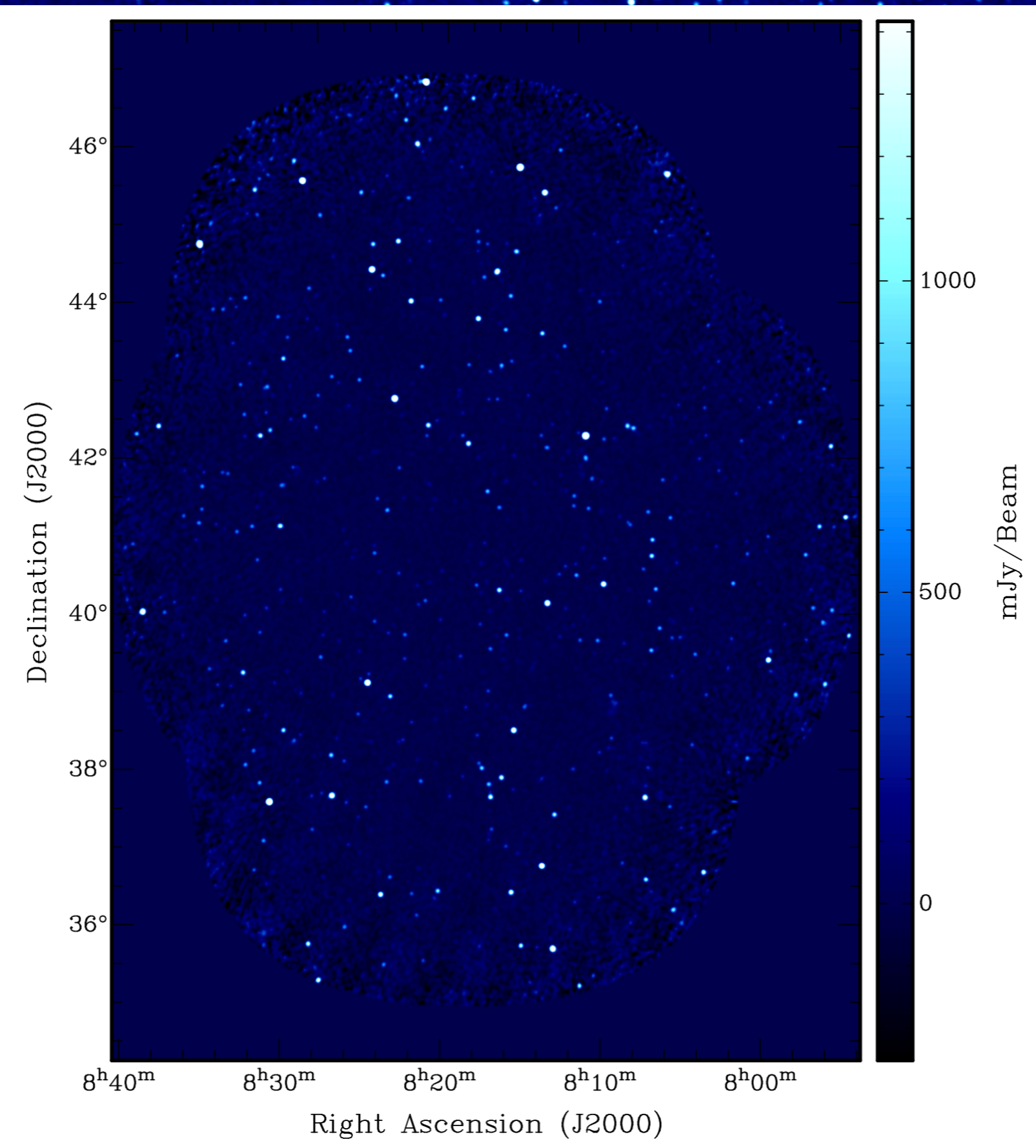
First MSSS-HBA mosaic



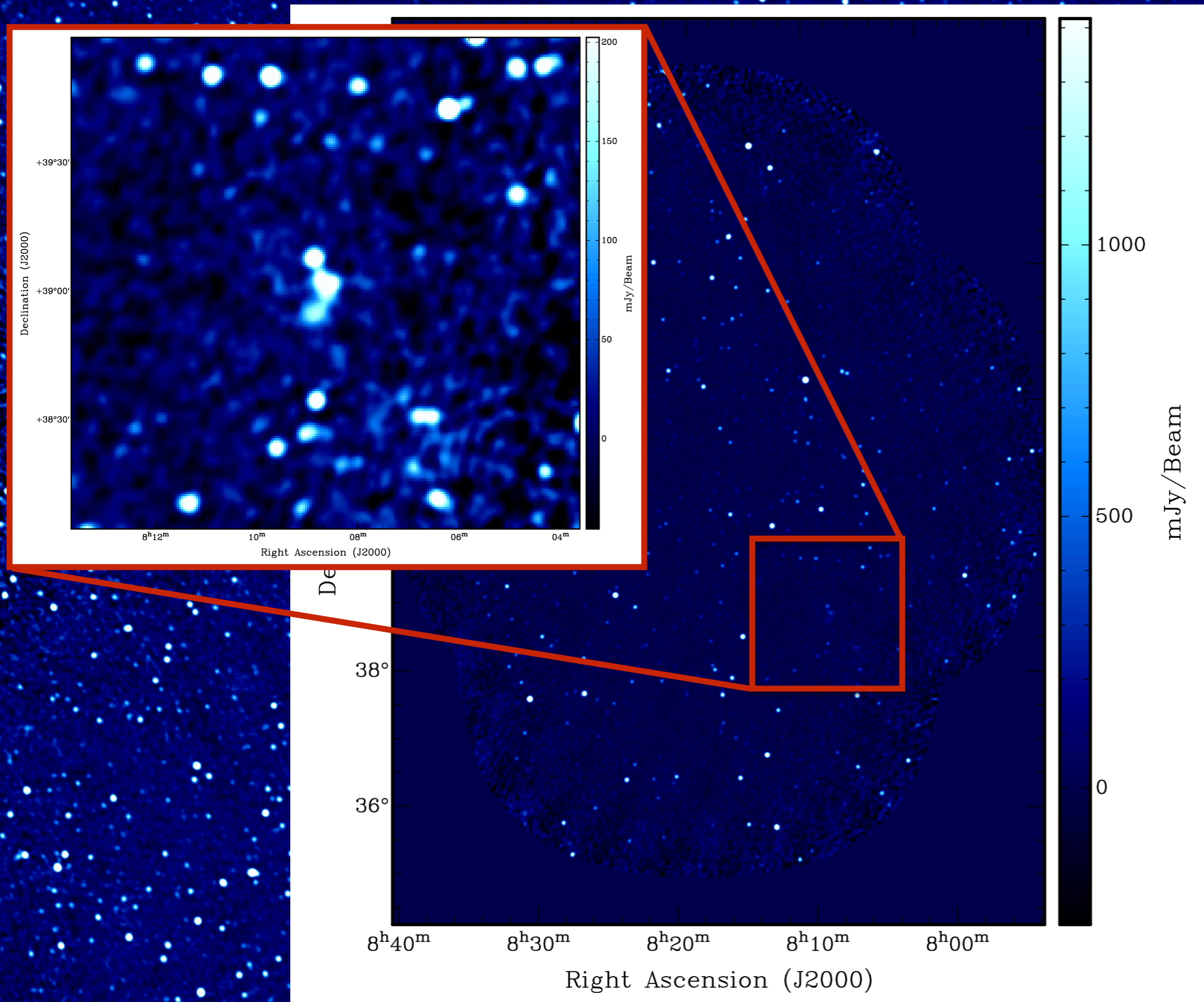
First MSSS-HBA mosaic

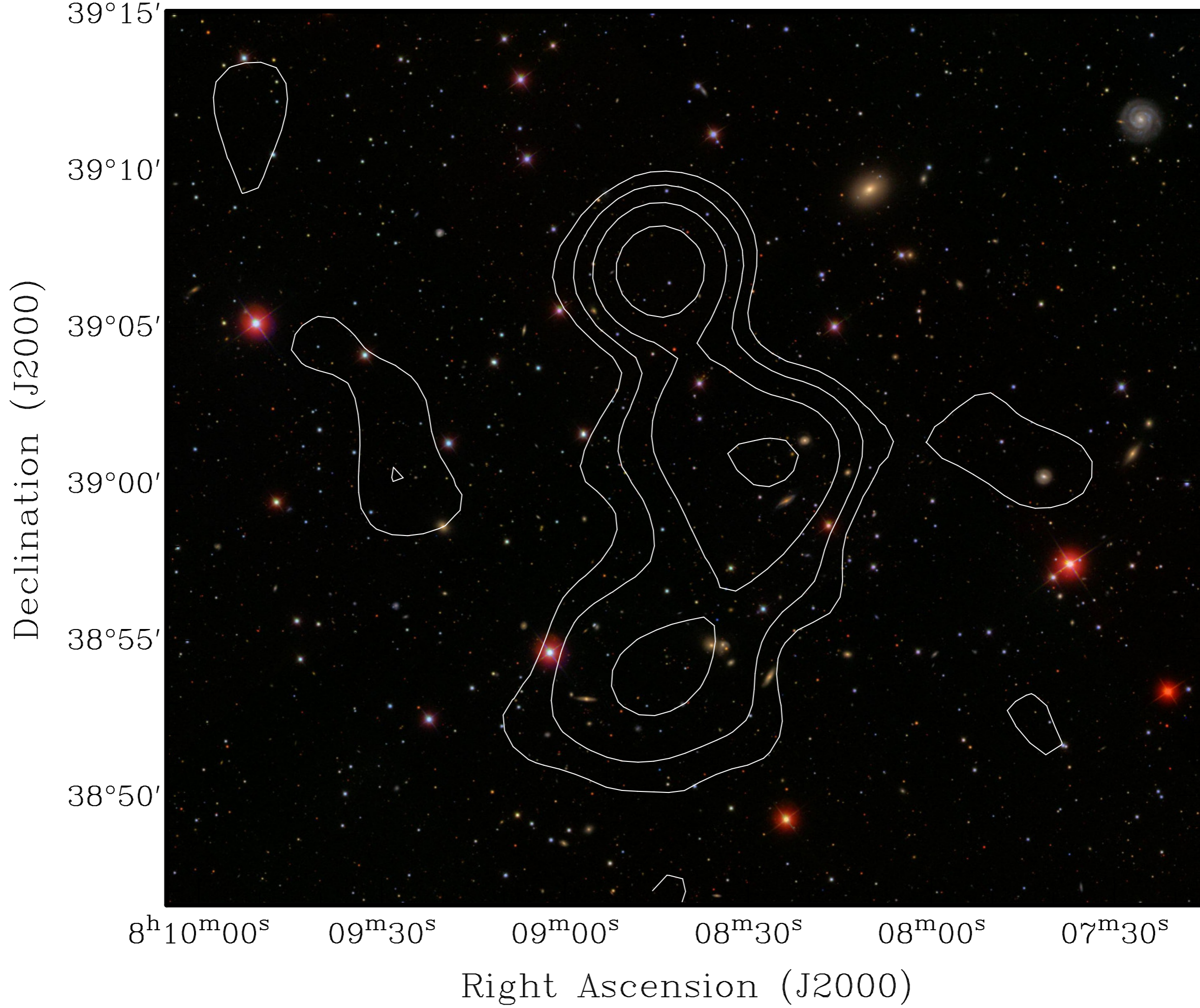


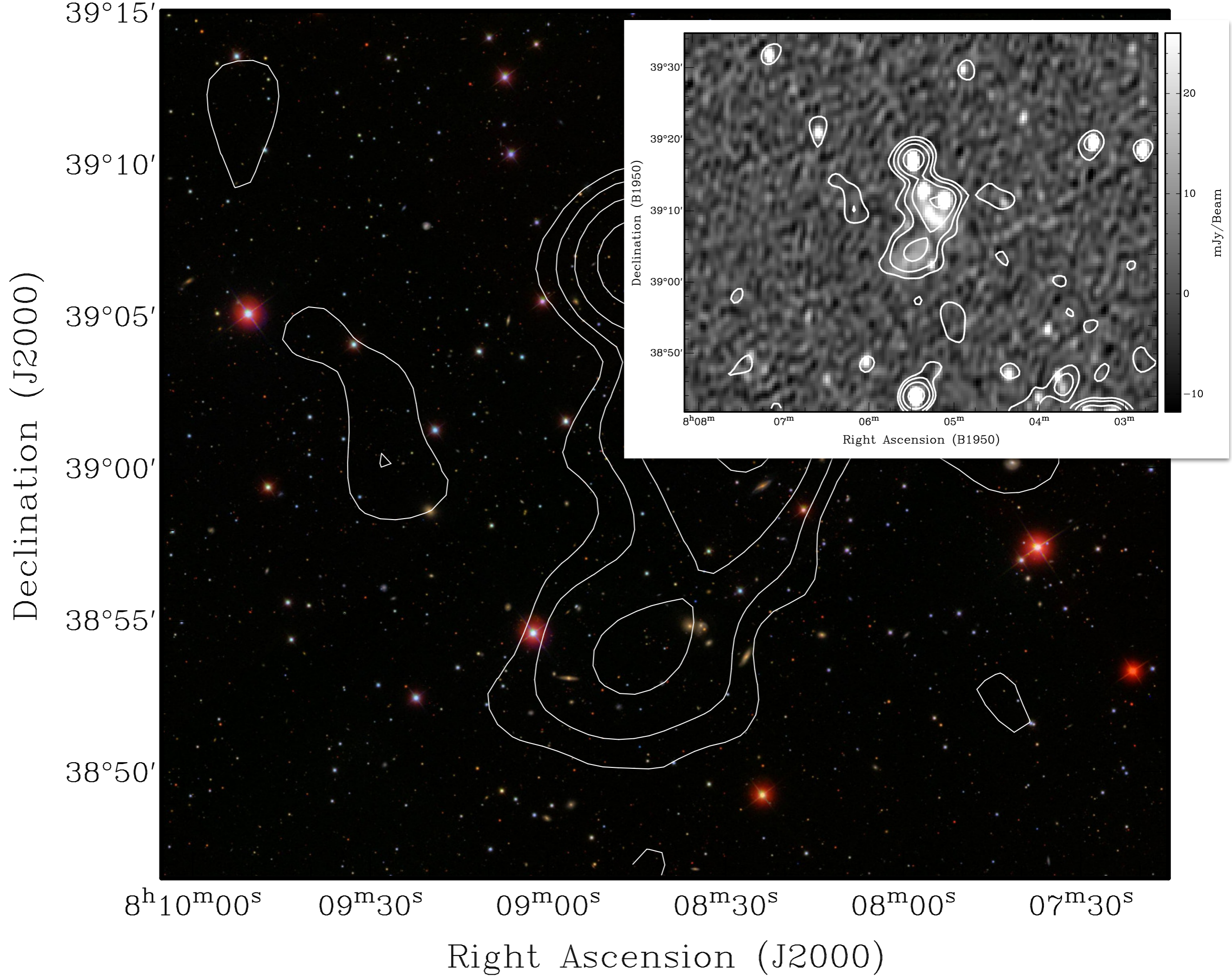
Last MSSS-HBA mosaic

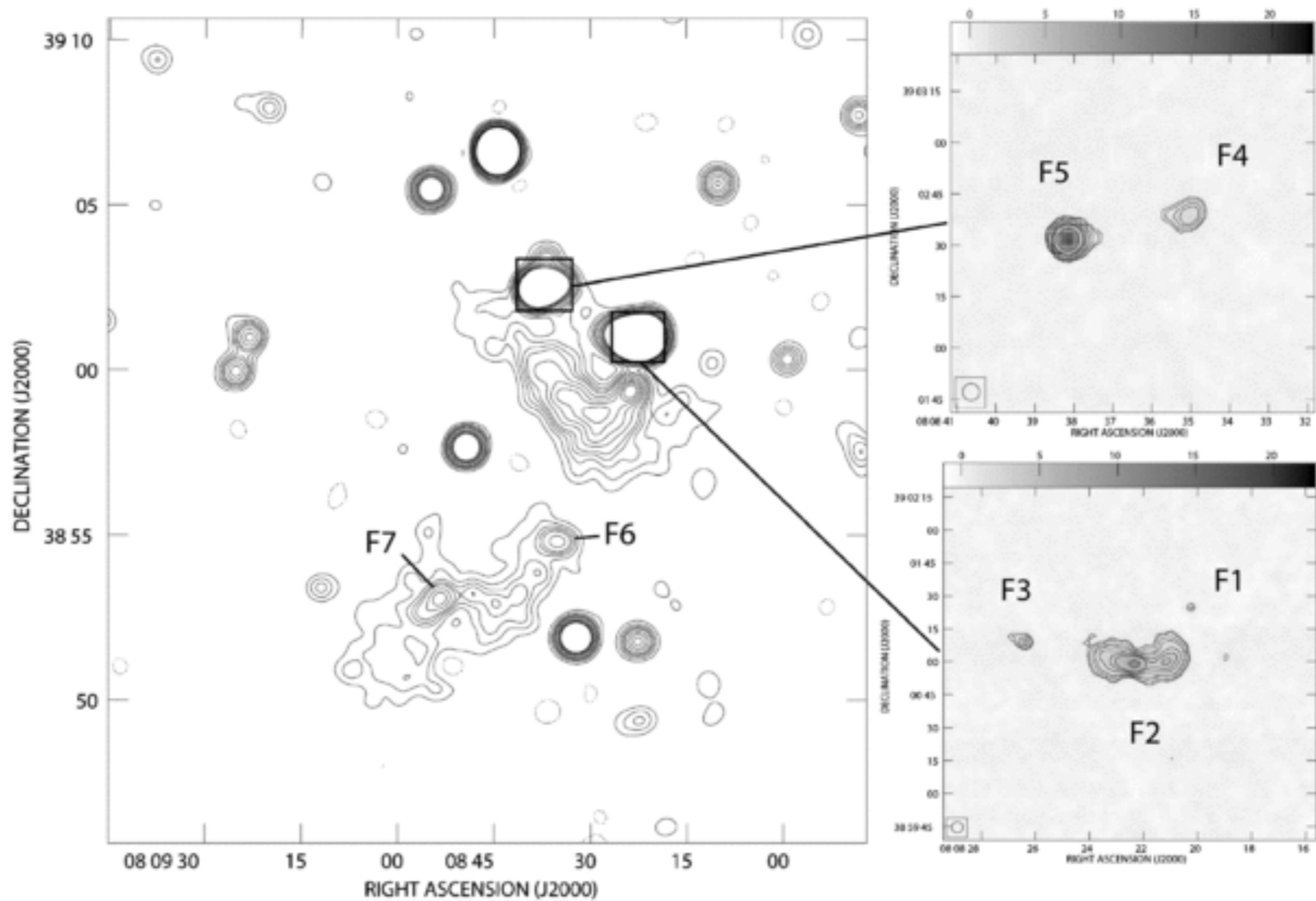


Last MSSS-HBA mosaic



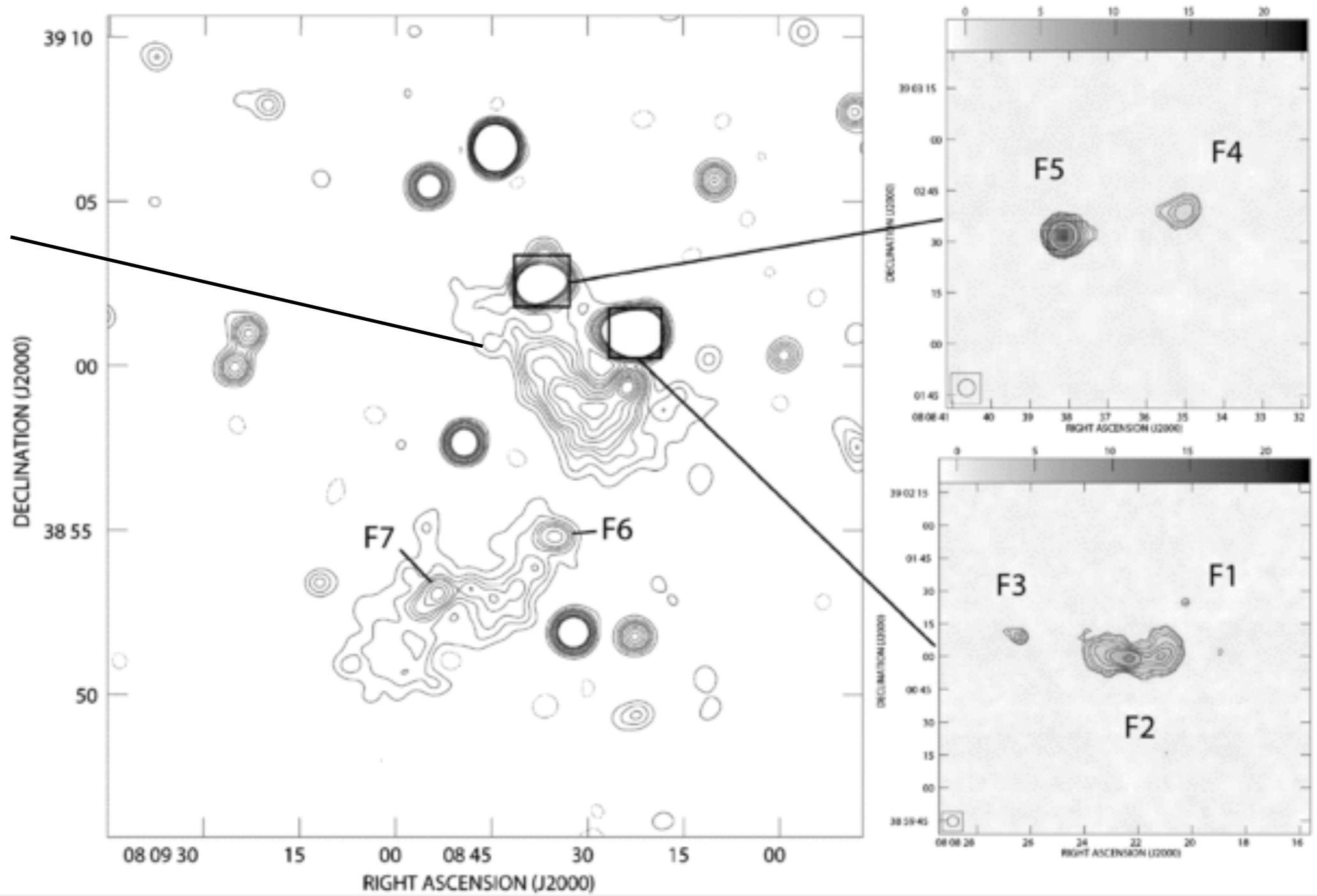






Brown & Rudnick (2009)

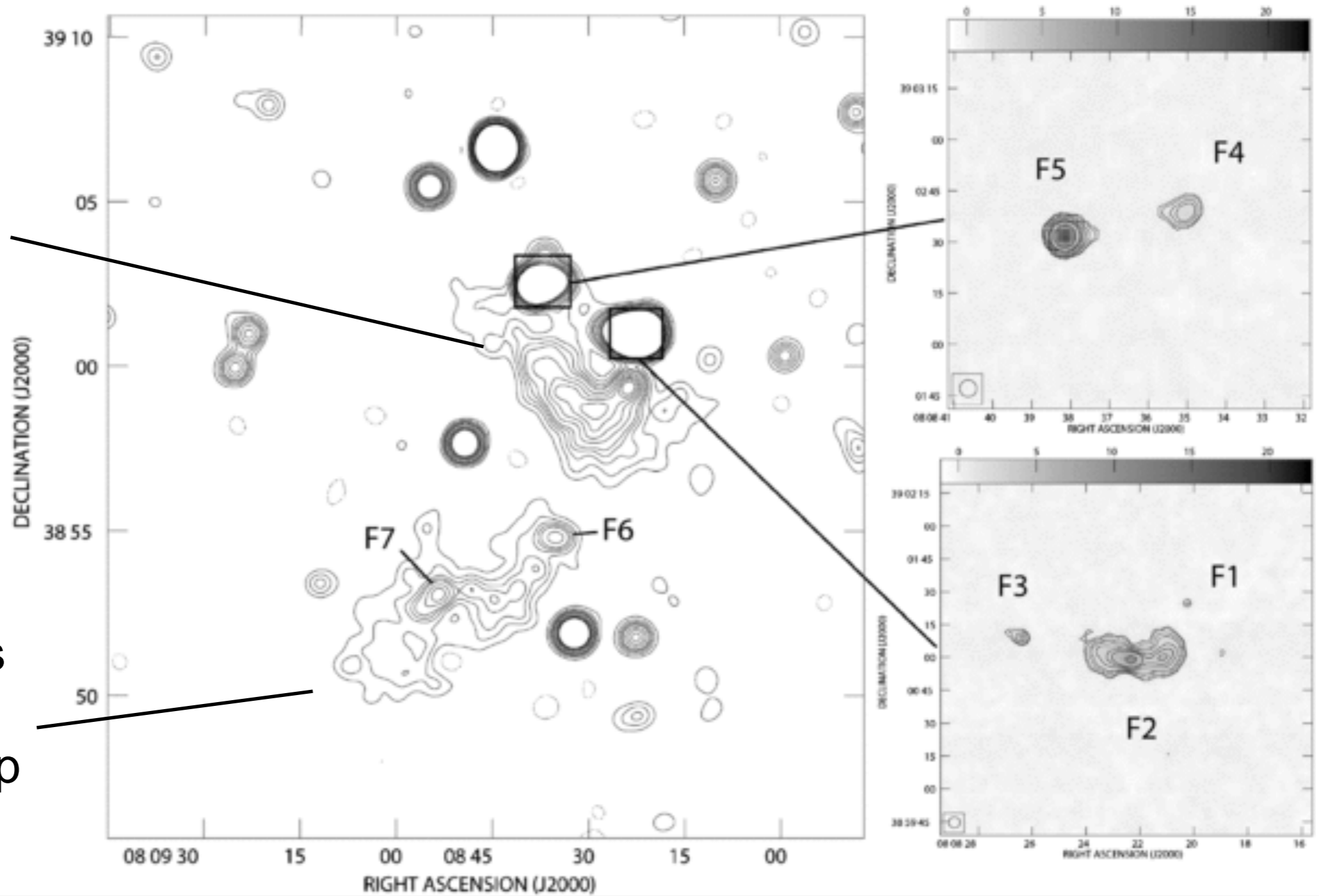
N_{diff} -
radio relic
associated with
 $z=0.2$ group



Brown & Rudnick (2009)

N_{diff} -
radio relic
associated with
 $z=0.2$ group

S_{diff} -
origin ambiguous
but coincidence
with $z=0.04$ group
intriguing

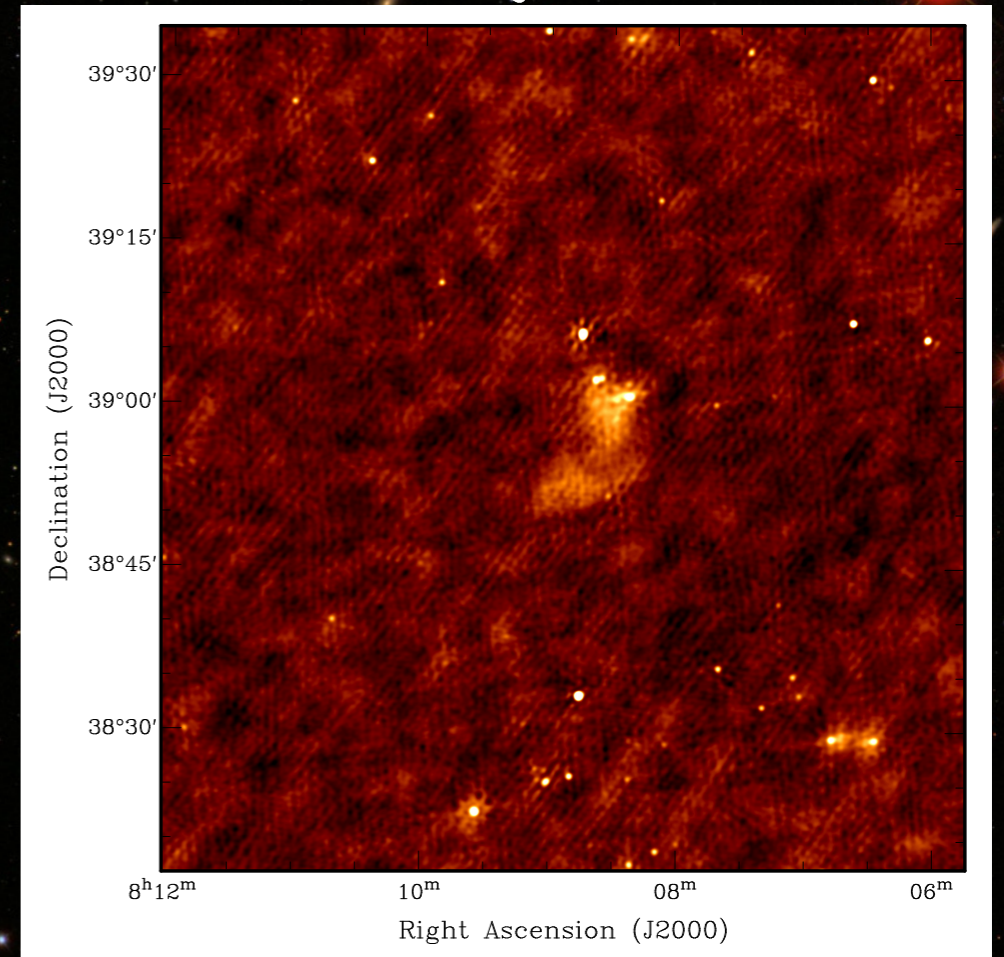


Brown & Rudnick (2009)

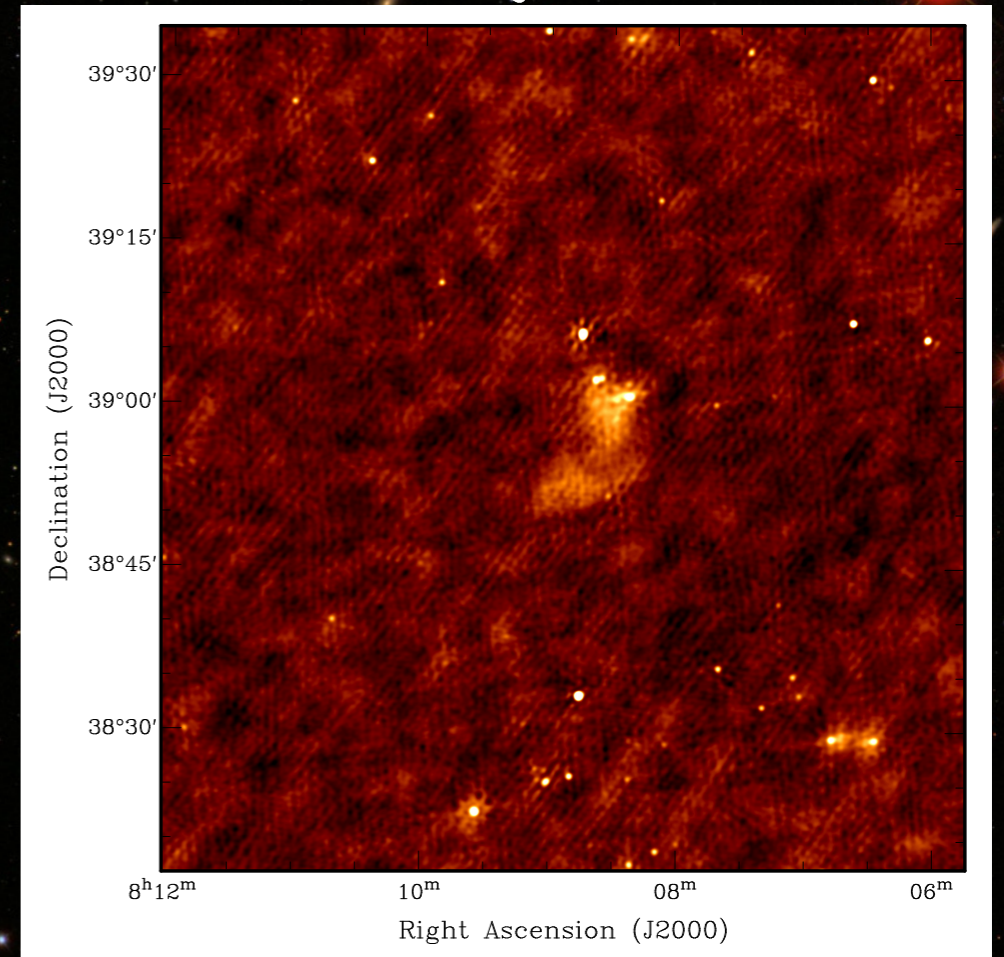
Reprocessed MSSS data
rms ~ 3 mJy/beam
beamsize $27''$



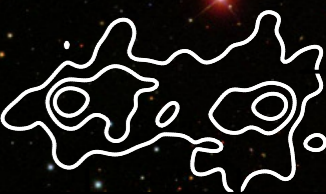
Reprocessed MSSS data
rms ~ 3 mJy/beam
beamsize $27''$

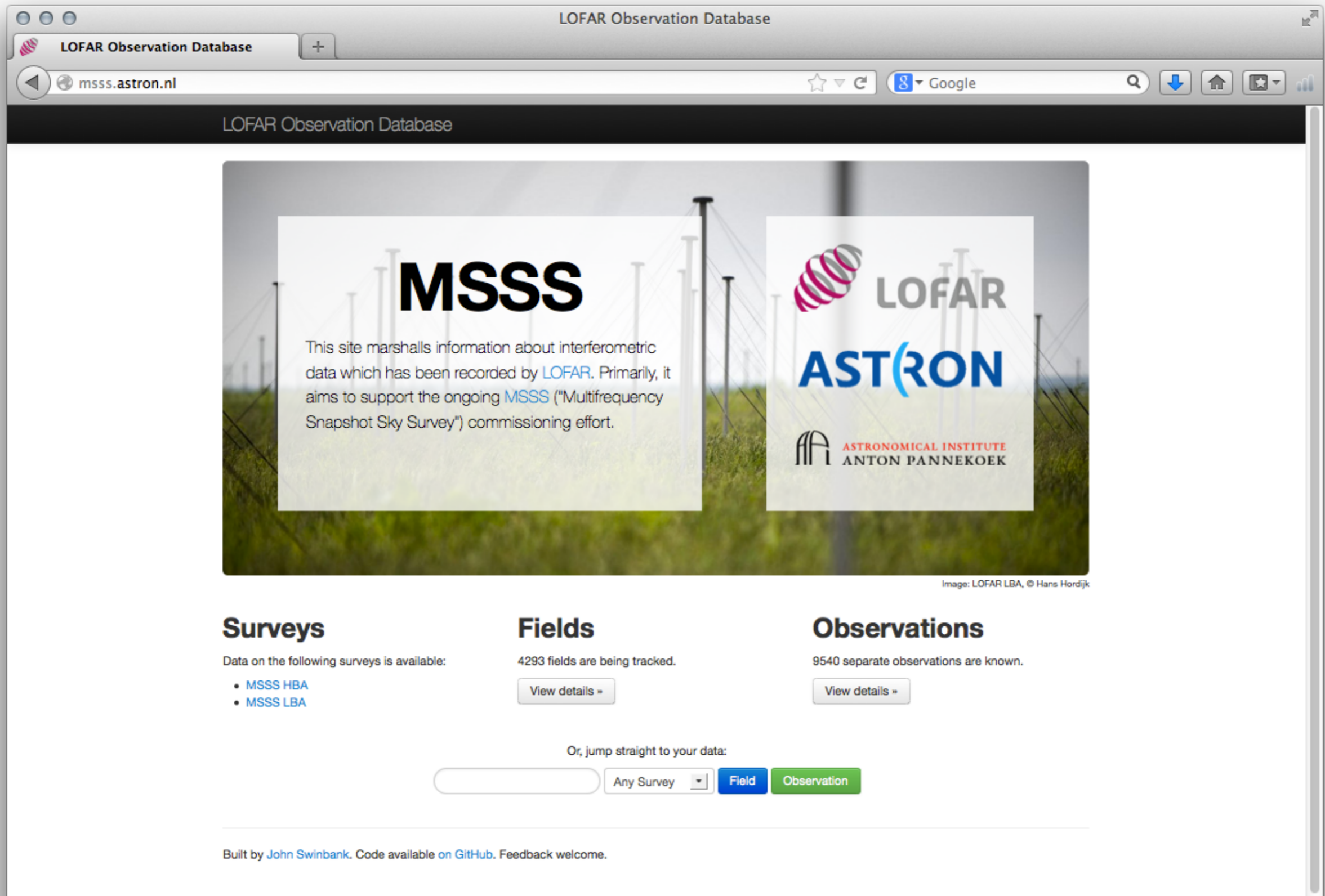


Reprocessed MSSS data
rms ~ 3 mJy/beam
beamsize $27''$



Processing all of MSSS-HBA this way would require 420 khr
= one year of dedicated time on 48 CEP2 nodes





<http://msss.astron.nl>

MSSS Image Archive

The Multifrequency Snapshot Sky Survey (MSSS) is the first major observing program to be carried out with LOFAR during its ongoing commissioning phase. The primary goal of MSSS is to produce an accurate and detailed low frequency sky model, which will be used as the basis of calibrating images produced in the future by LOFAR.

Position [deg]
ICRS Position, RA,DEC, or Simbad object (e.g., 234.234,-32.45)

Field size [deg]
Size in decimal degrees (e.g., 0.2 or 1,0.1)

Intersection type
 Image overlaps Rol
 Image covers Rol
 Rol covers image
 The given position is shown on image
Relation of image and specified Region of Interest.

Obs. Freq. No selection matches all, multiple values legal.
HBA Average
120 MHz
125 MHz
129 MHz
135 MHz
143 MHz
147 MHz
151 MHz
157 MHz

Table Sort by Limit to items.

Output format

[\[Result link\]](#) ★

Sipior

<http://msss.astron.nl>

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Relation of image and specified Region of Interest.

Obs. Freq.

ANY No selection matches all, multiple values legal.

HBA Average

120 MHz

125 MHz

129 MHz

135 MHz

143 MHz

147 MHz

151 MHz

157 MHz

Table

Sort by Limit to items.

Output format

MSSS Image Archive

Parameters

- Field size: 0.5
- Output format: image/fits
- Position: 225.0 69.0

Result

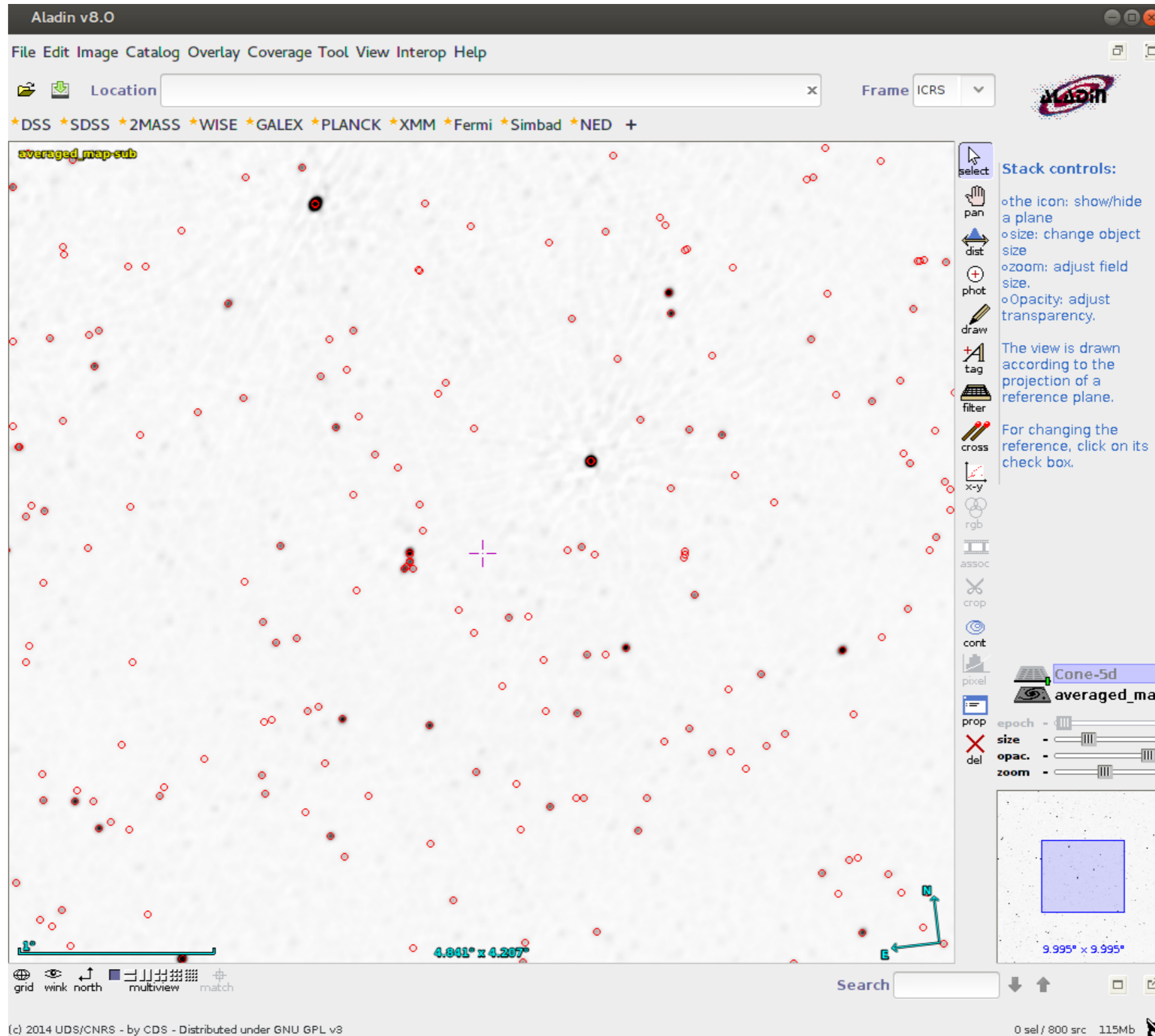
Matched: 9

Obs. Freq.	Product key	Owner	Embargo ends	Type	File size [byte]	Ctr. RA [deg]	Ctr. Dec [deg]	Title	Instrument	Obs. date	#axes	Axis Lengths [pix]	Scales [deg/pix]	Ref. Frame	E
147 MHz		N/A	N/A	image/fits	12.4MiB	225.01	69.00	mosaic-band5_sub	LOFAR	N/A	4	[1799, 1799, 1, 1]	[0.005556, 0.005556]	ICRS	N
143 MHz		N/A	N/A	image/fits	12.4MiB	225.01	69.00	mosaic-band4_sub	LOFAR	N/A	4	[1799, 1799, 1, 1]	[0.005556, 0.005556]	ICRS	N
120 MHz		N/A	N/A	image/fits	12.4MiB	225.01	69.00	mosaic-band0_sub	LOFAR	N/A	4	[1799, 1799, 1, 1]	[0.005556, 0.005556]	ICRS	N

Sipior

<http://msss.astron.nl>

- Building VO interface to MSSS data products



- Steps taken:
 - Initially processed data, shallow clean (SET1)
 - Selfcal data, shallow clean (SET2)
Produced thanks to [Martin Hardcastle](#)
NB: Report on selfcal procedure on MSSS wiki (2013w28)
 - Selfcal data, deep clean & tile fix (SET3)
Produced thanks to [Wojtek Jurusik](#)
NB: Report on deep clean procedure on MSSS wiki (2014w16)

- Source finding done consistently for all three cases
Thanks to [Georgi Kokotanekov](#)

- Catalog formed from combined source finder results
Thanks to [Rene Breton](#)

- Python interface to VO service (pyvo)

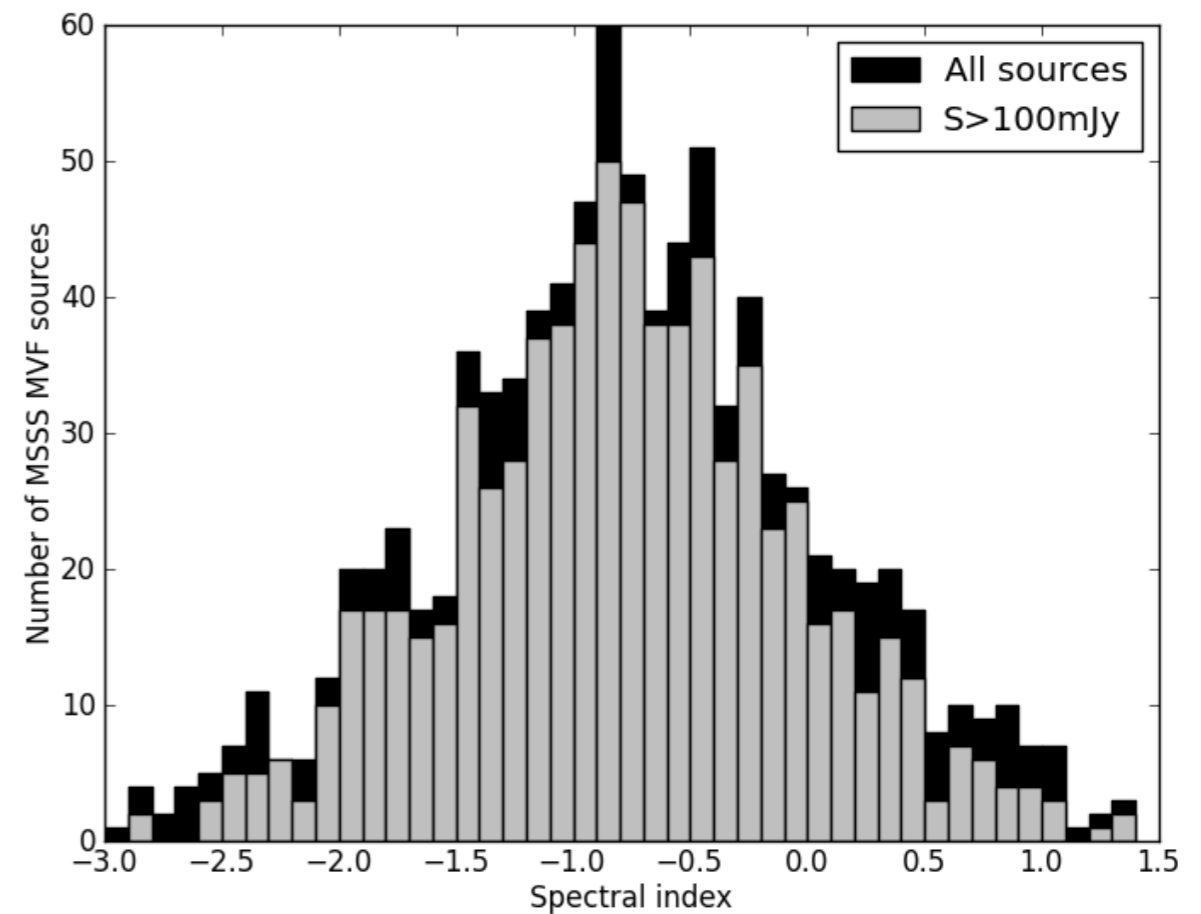
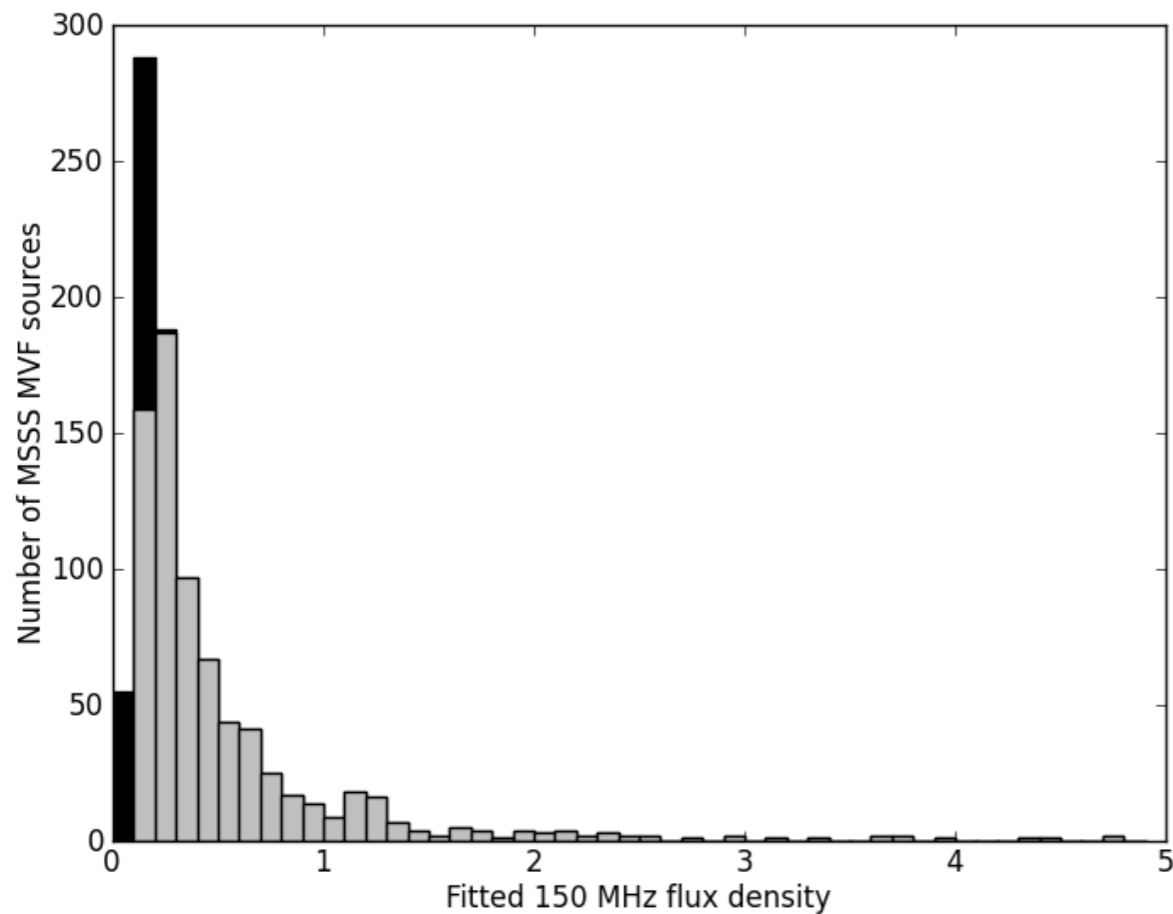
```
import pyvo as vo
import astropy.table as table
```

```
# get the data within 10 degrees of the center of the MSSS MVF
msss='http://vo.astron.nl:8080/msss/q/cone/scs.xml' # URL
query = vo.scs.SCSQuery(msss)
query.pos = (225.,69.)
query.radius = 10.
t = table.Table.read(query.execute_votable())
```

```
# now use the numbers
s120=t['Sint120']
```

```
# make plots etc ...
```


- S150 and spectral index values fitted for MSSS MVF region (HBA only!), using VO-based python script



- For sources $S > 100$ mJy, mean/median spectral index = -0.78 as determined ***from MSSS-HBA fluxes alone***