

# An Update on LC0\_025: Low-Frequency Investigation of the Super-CLASS Super Cluster

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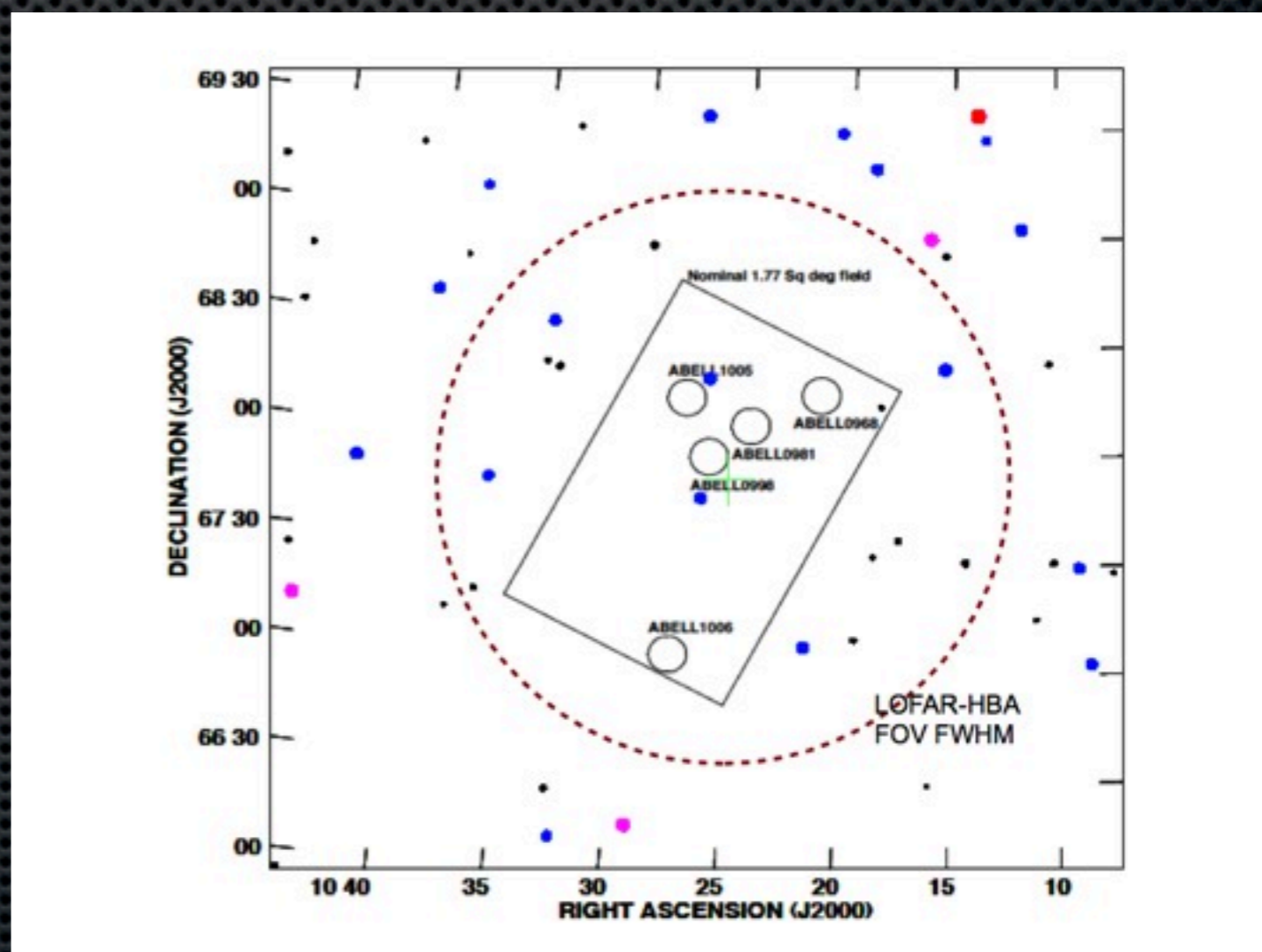
A.M.M. Scaife, The SuperCLASS Collaboration

# Overview

- ✦ What is Super-CLASS?
- ✦ The Super-CLASS field.
- ✦ Where we're at.
- ✦ What's still to come.

# Super-CLASS

- ✦ Multiwavelength collaboration.
  - ▶ Radio: e-MERLIN, JVLA, GMRT, LOFAR...
  - ▶ Also: optical, NIR, sub-mm, X-ray...
- ✦ Field contains 5 Abell clusters.
  - ▶  $z \sim 0.2$
  - ▶ 1.77 deg<sup>2</sup> survey area.
  - ▶ Covered by 12x7 mosaic with e-MERLIN.
  - ▶ Single LOFAR pointing.



Credit: A.M.M. Scaife, Cycle 0 proposal

# Observations

- Conducted 2013 April.
- HBA 115-165MHz
- Netherlands CS/RS.
- A998\*/3C196 alternating, 47 integrations each.
- Full-Stokes.

PSR J0218+42

20 min

A998/3C196

10 min : 2 min

PSR B1937+21

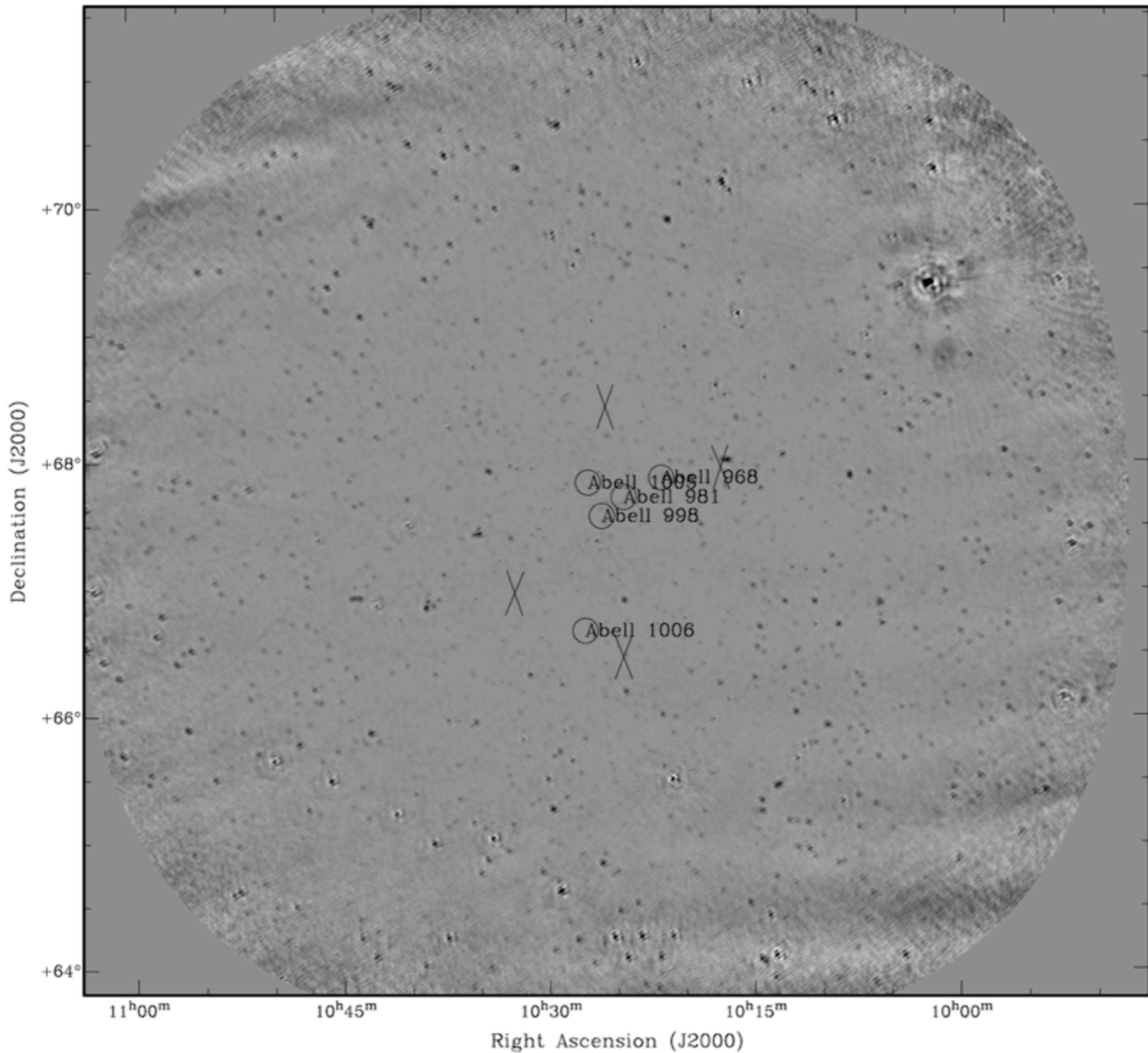
20 min

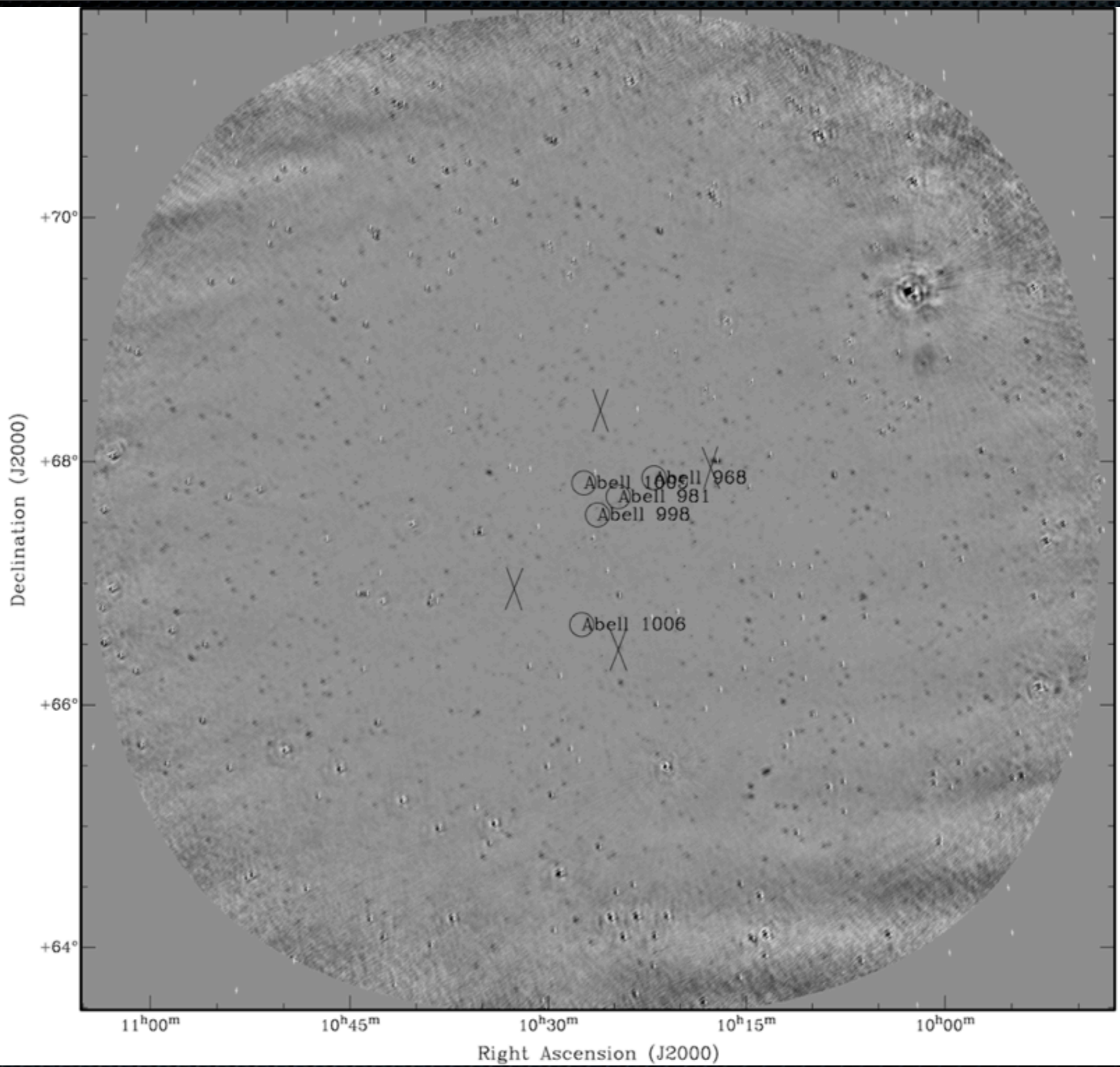
\*Science field designated 'A998', but whole field covered.

# So far...

- Processed subset of 12 snapshots.
- Run through RSM pipeline (A. Stewart) for initial calibration/imaging.
- GSM model insufficient #sources, initial results not great.
- Performed loop of calibration/PyBDSM with increasing max baseline length.
- Now using all baselines with data (23 CS & 11 RS).
- Subsequent post-processing pipeline written, undergoing refinement.
- Post-processing (currently) involves:
  - ▶ Extract corrected data.
  - ▶ Concatenate MS with same #channels.
  - ▶ Phase-calibrate.
  - ▶ Image with AWMImager.
  - ▶ Combine images.

Results so far...

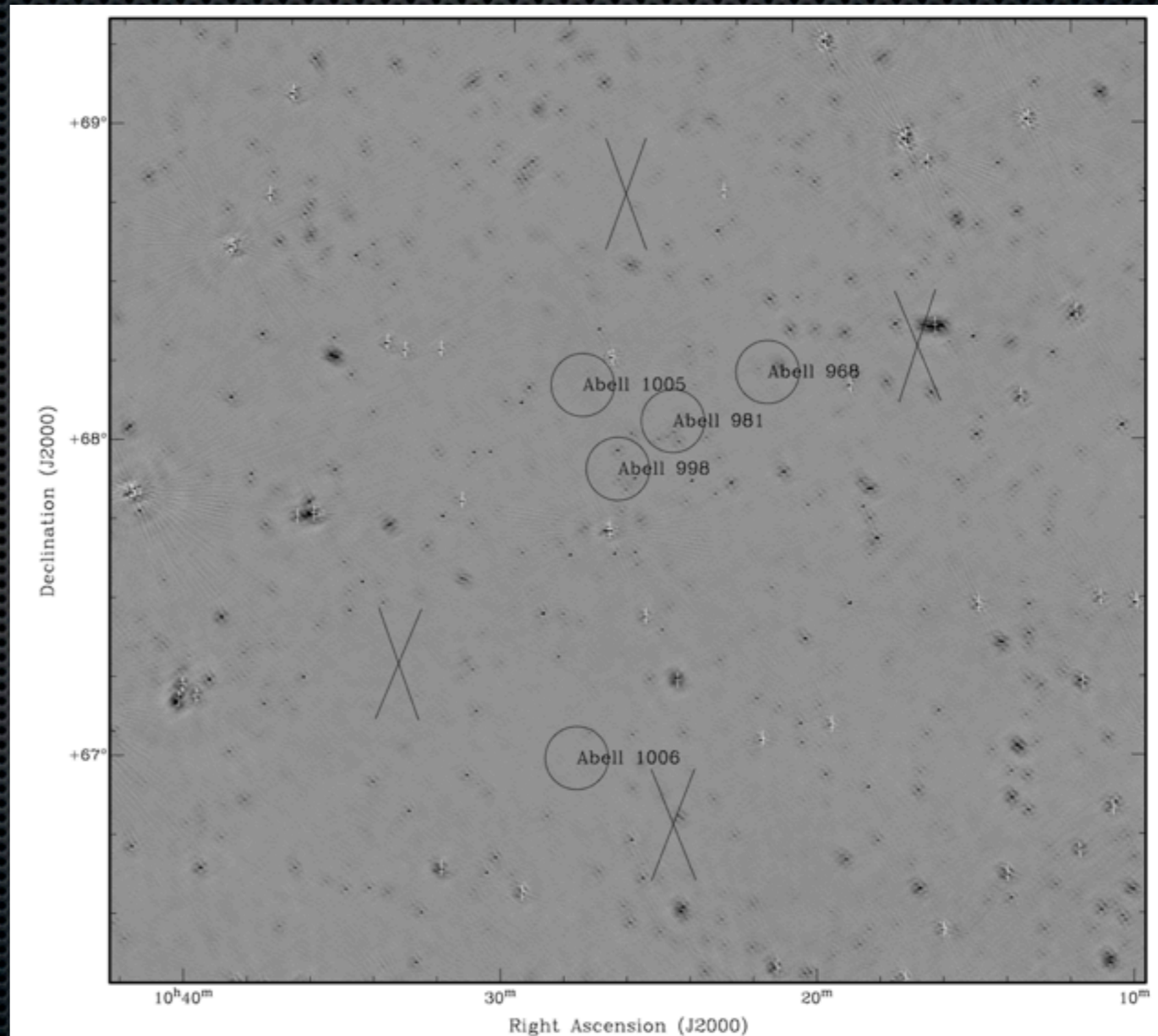






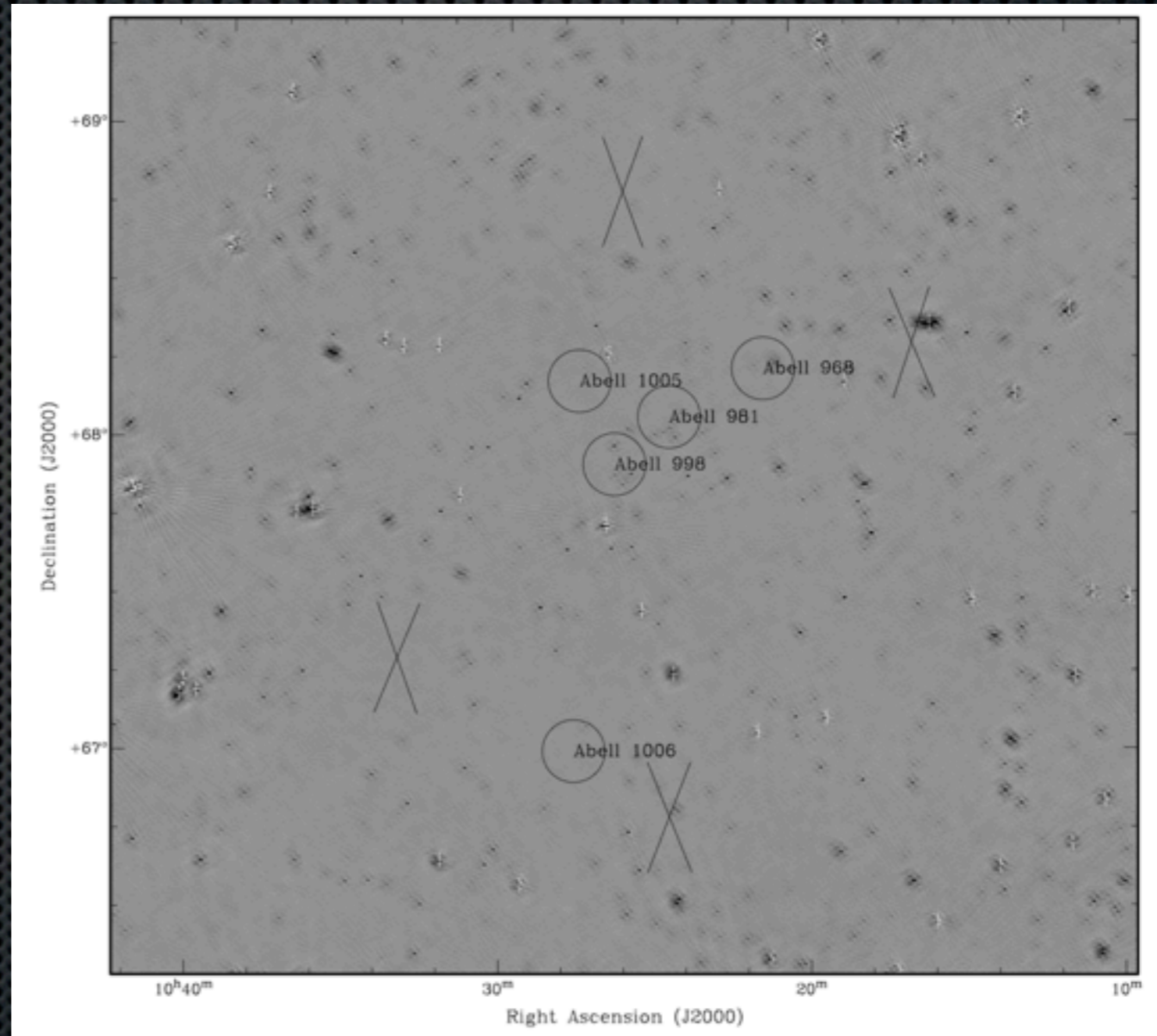
# Zooming in...

- ✦ Detecting all sources found by VLSS/NVSS.
  - ▶ White x denote GSM catalogue sources.
- ✦ Many others besides, emission from cluster regions.
- ✦ Achieving image rms  $\sim 0.8\text{mJy/beam}$ .
- ✦ Sensitivity calculator (G. Heald, July 2012) suggests full-band image sensitivity  $\sim 82\mu\text{Jy/beam}$ .



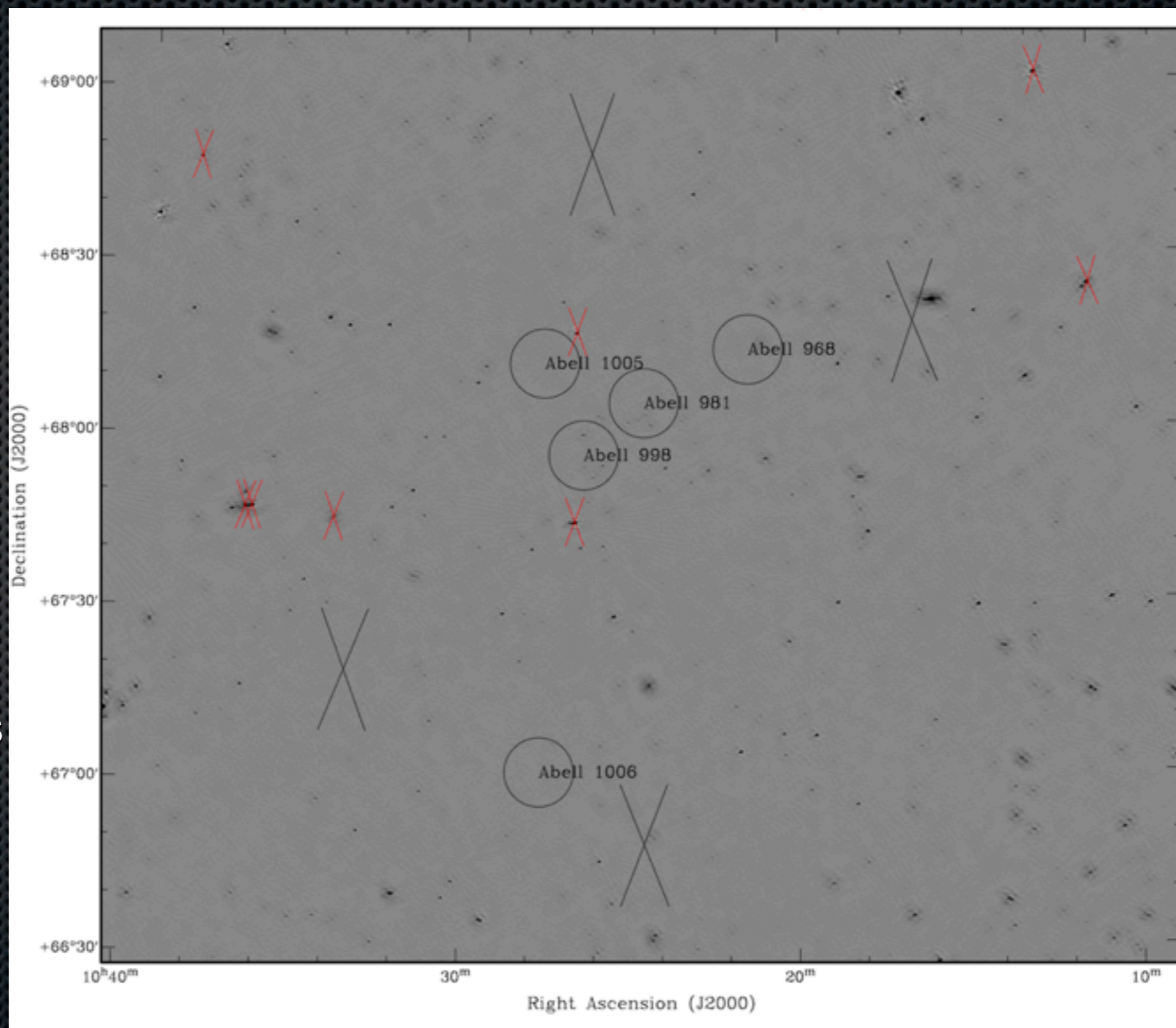
# Where Next?

- ✦ Very large field => DDC
  - ▶ Being incorporated now...
  - ▶ BUT large #snapshots and sources makes DDC very memory-hungry.
  - ▶ Looking at 'peeling' & DDC combination (MSSS progress reports wk 27-29).
  - ▶ Sagecal.
- ✦ Bright sources present => may require peeling.
- ✦ Final images can still be improved.
  - ▶ Beam errors still present.



# Where Next? (II)

- ✦ Ionospheric correction still required.
- ✦ RM Synthesis.
  - ▶ MKSP involvement.
  - ▶ Reconstruct ICM B-field strength.
- ✦ Taylor et. al. (2009) RM catalogue provides sources for comparison.



# Summary

- ✦ Work is ongoing.
- ✦ Getting promising results.
- ✦ Plenty left to do.
  - ▶ Plan for doing so.