



# The LOBOS survey

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# International baselines: general remarks

Easy because:

- Average dataset around sources
- In linear regime (ignore confusing sources)
- Relatively small datasets

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Difficult because:

- Lower S:N (relatively few baselines)
- Different calibration procedures required (phased ST001)
- Delay and phase variations problematic
- **Shortage of calibrators for delay and phase**

Replicate 10x for full steering beam

# LB pipeline - Observations

have target + phase - up call (3C1% + Axi)

NDPPP  
 → 4 chan, 4s  
 (50 kHz → 3000  
 → 20' fields  
 → 200ms is  $\frac{1}{100} \times \frac{1}{20}$ )  
 4s = 3000 cycles

BBS in phase-up  
 cal, single-clock  
 Station only  
 (solve)

cell chunk size  
 chunk size = 0  
 priority  
 (on call)

(need something compact + field dominat)

↑ selection: do not need to worry about beam phase  
 (< 1 rad in HPBW which is < phased-array field) ☹️  
 probably less

Corrected data  
 (call this) (1 phase up per antenna)

either beam works in BBS + pyramid OR do not beam work in BBS + mscropol (TBB)

Need check for Alignment  
 Error messages  
 Need to check with PRINTER  
 DAVID KERN

NDPPP  
 parse in opt remove core starting

Corrected + TSOOL  
 phase core (single clock)

convert → gradient  
 RR → X+Y etc

MS 2uv fits  
 = YES

known usable calib

course X to 2.00 MHz around cal (phase shift pattern)

FRING

delay rule (S/N ratio!)

apply

correctly

die not work for Ek1

notes  
 few hours? to 100%

no

☹️

disturbance

☹️

NDPPP  
 call file

☹️

☹️

☹️

☹️

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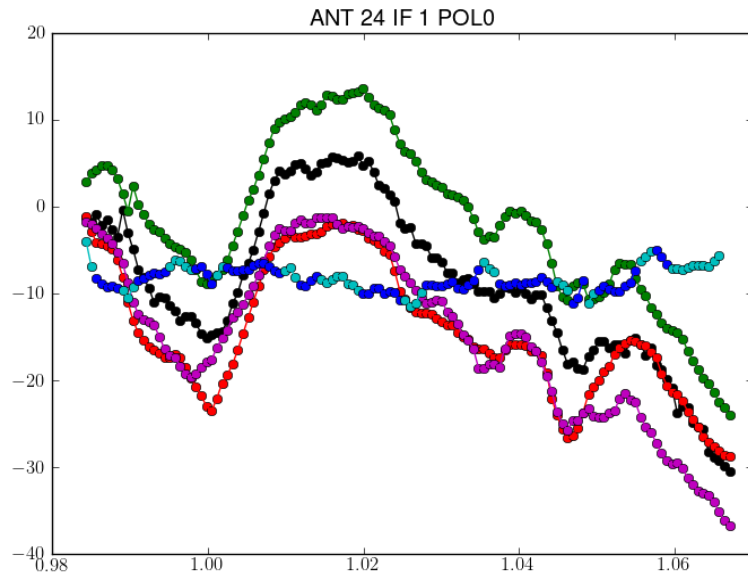
☹️

☹️

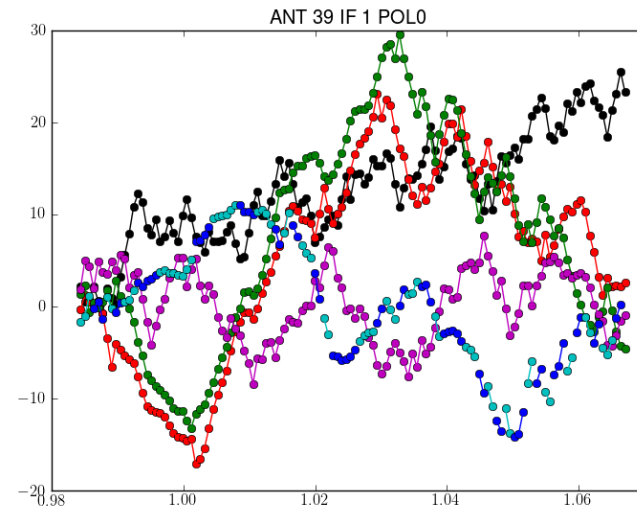
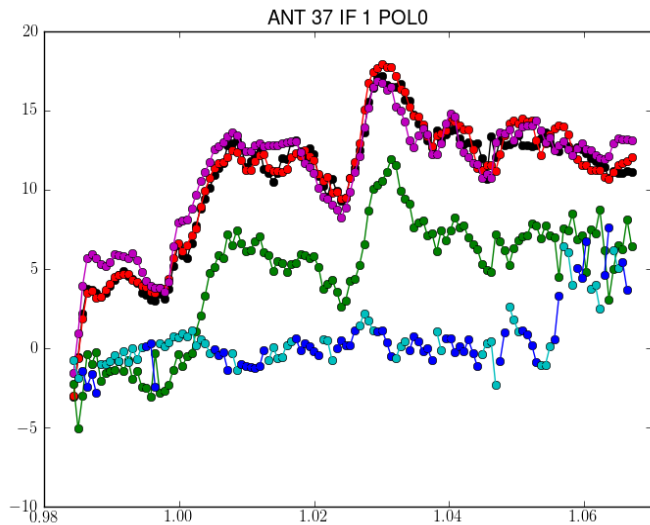
☹️



# Phase variations on different sources in field



Phases core-Eb (left),  
Core-RS508 (bottom left),  
Core-Ons (below)



Need calibrators with  $>100\text{mJy}$  in HBA compact (0.3") flux

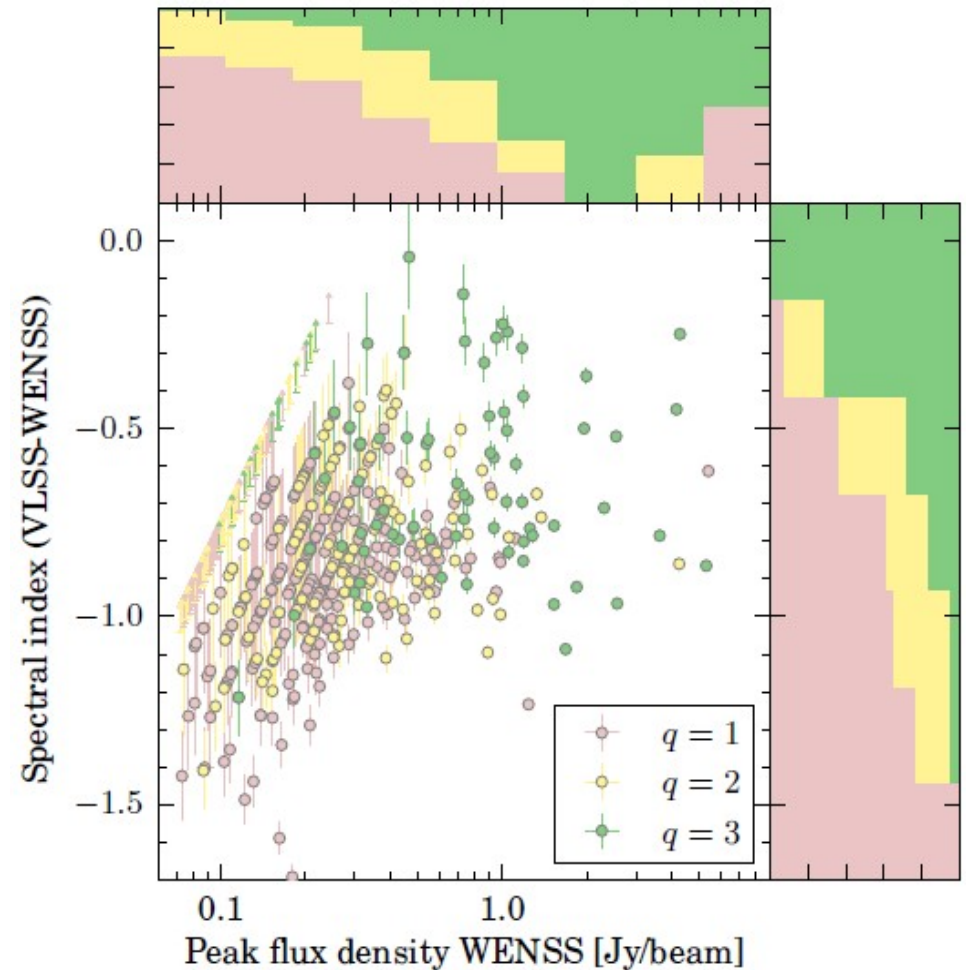
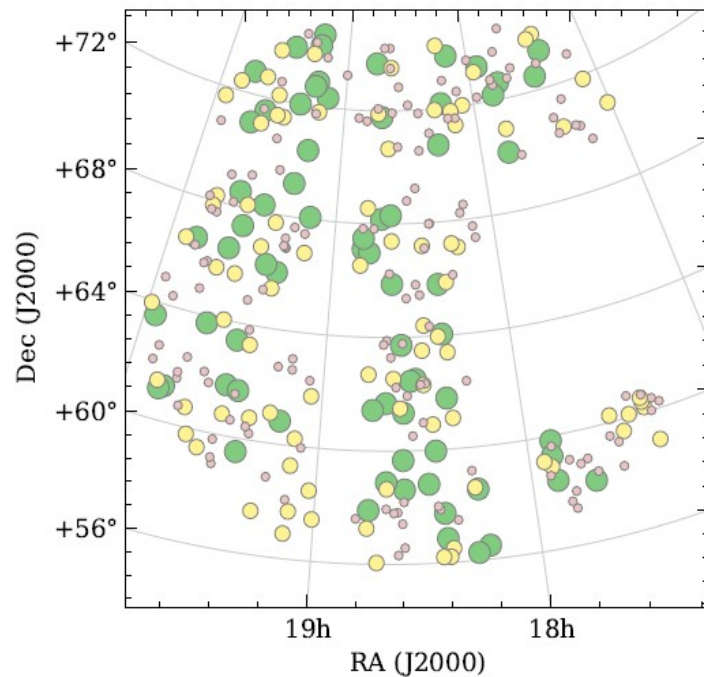
(Your favourite 3C source probably won't do!)

So which sources will do? - we don't know

Option 1: small calibrator survey before each observation

Option 2: find the calibrators first

# Pilot survey – Moldon et al. 2014



## Lessons learned:

- Brighter is better
- Flat low-frequency spectrum is better
- Other things (GHz spectral index) less important

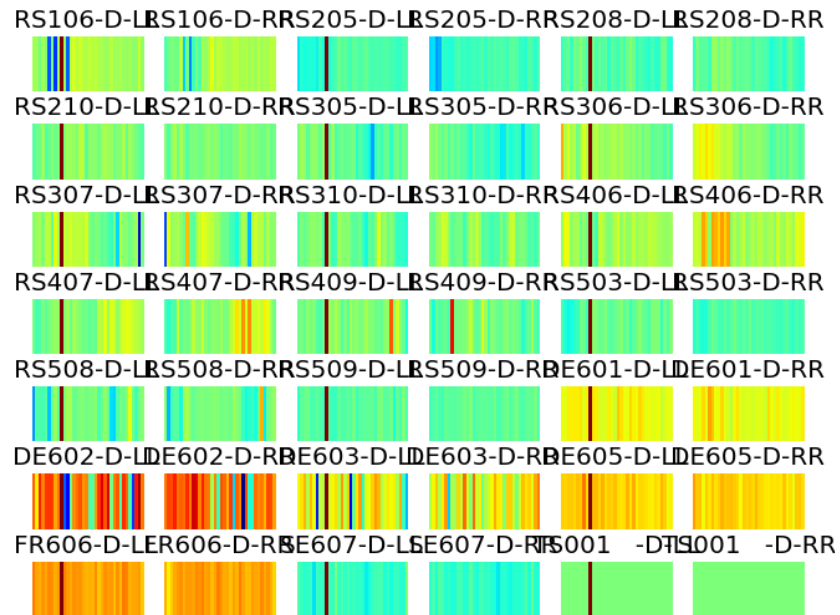




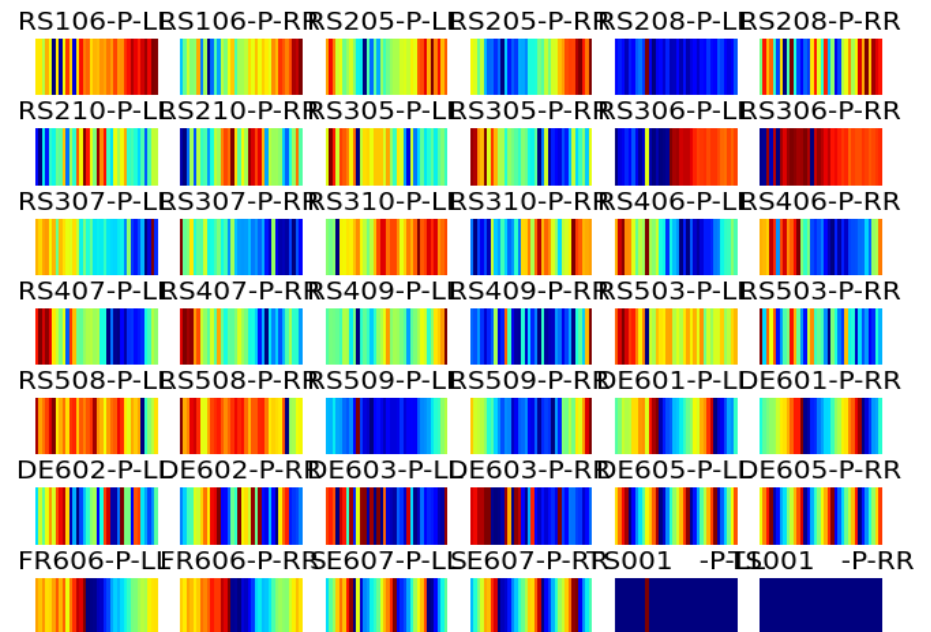
## Long Baseline calibrator Survey (LOBOS)

- Find calibrators in all-sky north of 30
  - Input catalogues: VLSS, MSSS, WENSS
  - Aim to examine >20000 sources
  - Do strong/flat-spectrum sources first
  - Aim: 80-90% completeness, ~1 calibrator/sq deg
- 
- 1 hour test observations, just before Christmas
  - Ultimately 96h needed (awarded as commissioning)

# Preliminary results: a good one

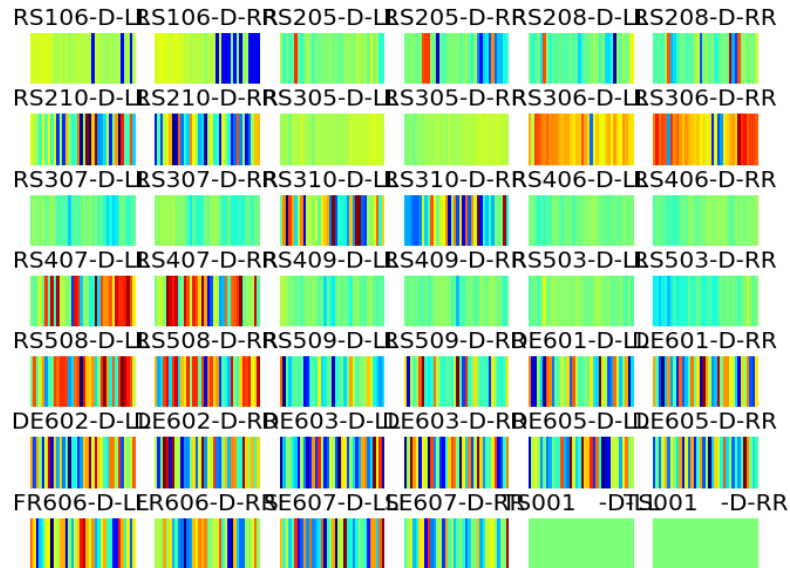


delay

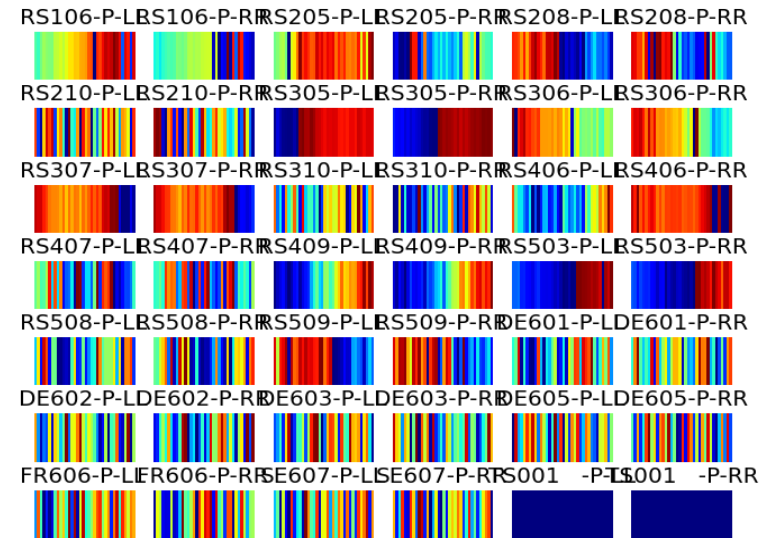


phase

# Preliminary results: a not-so-good one



delay



phase

# Progress and current plans

- First 100 sources: about 40% good
- working on better fringe-fitting / parameter tweaking
- 24h observations end of February
- concentrate first on survey KSP area particularly (7-17h, 30-60d)
- aim for publishable catalogue by end of year