

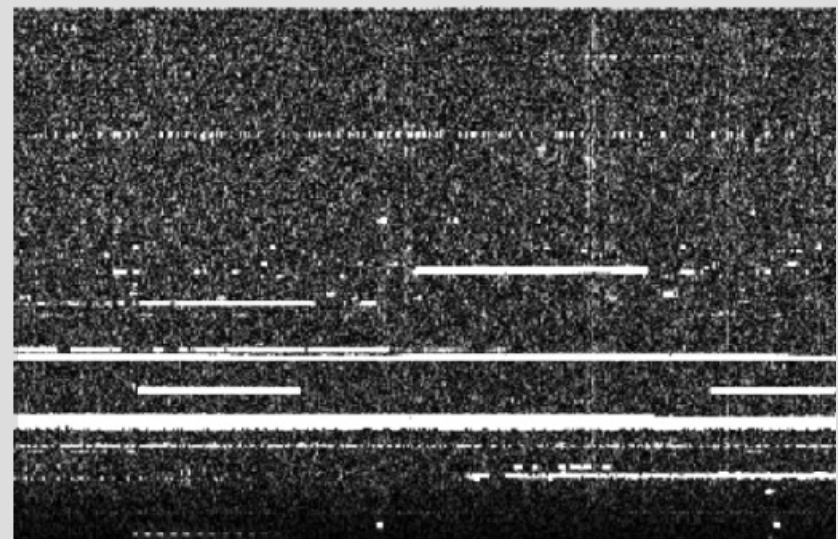
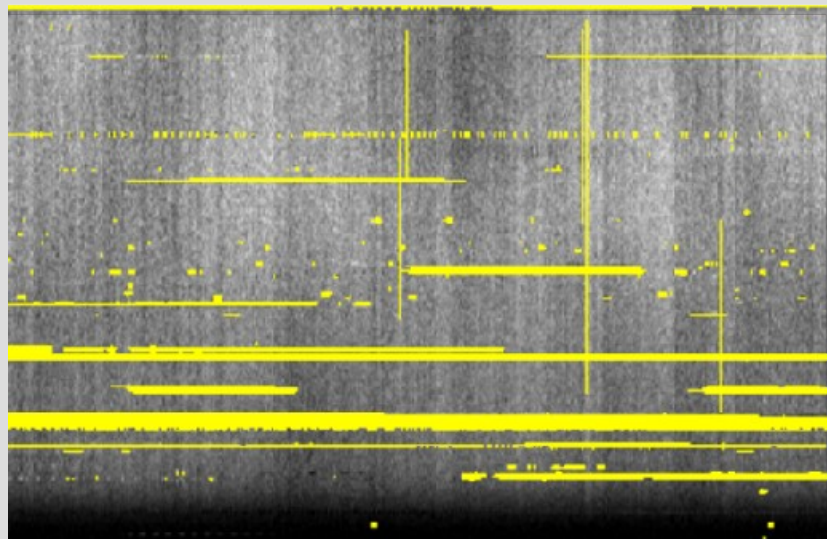
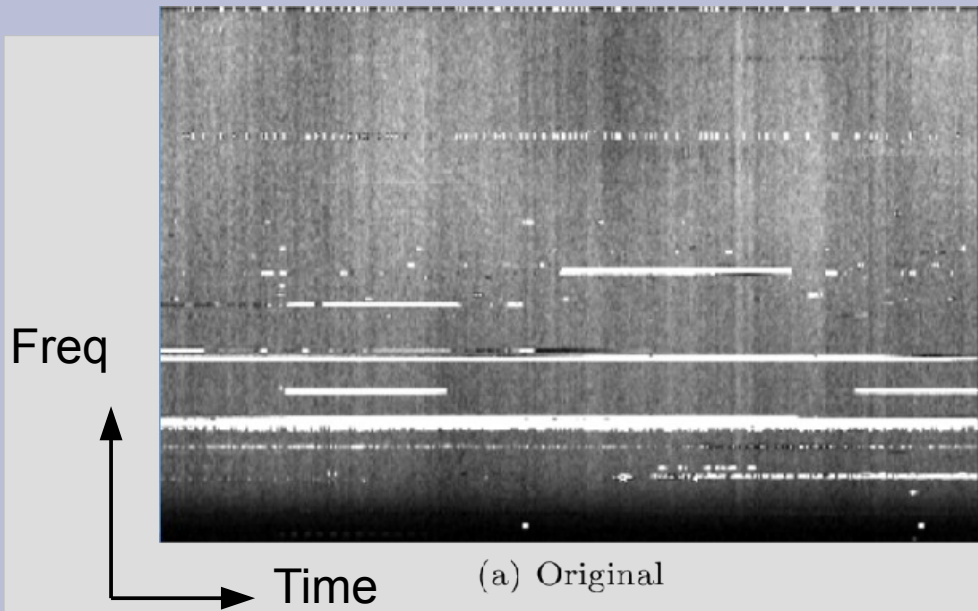


LOFAR and RFI

Results of a new flagging algorithm

André Offringa

RFI Flagging (Westerbork data)



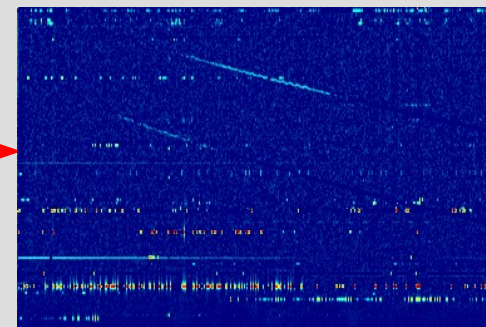
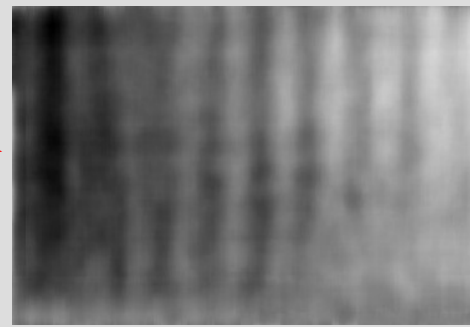
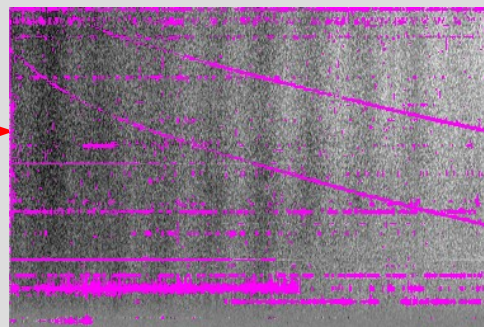
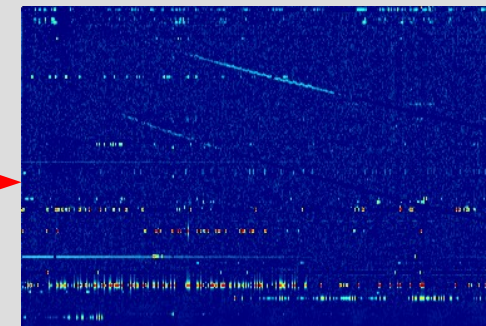
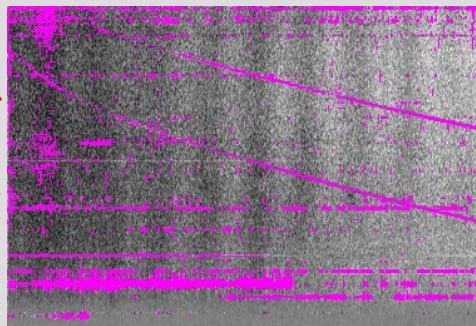
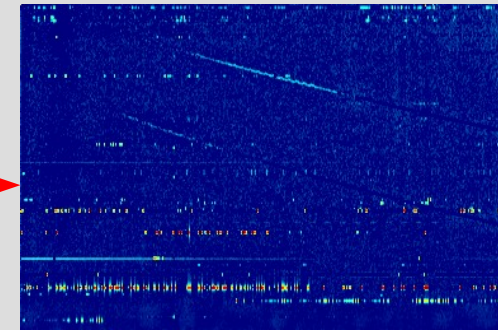
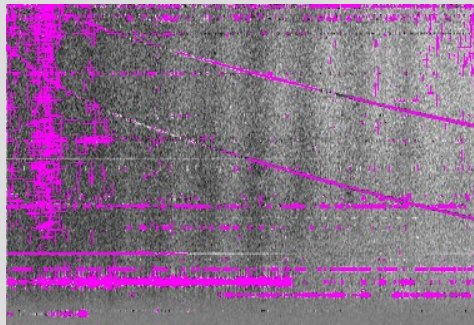
Constructing the fit: iterative

Threshold

Fit background

Subtract:
original - background = noise + RFI

Iteration 1



















Iteration 2 iteration 10



Combinatorial thresholding

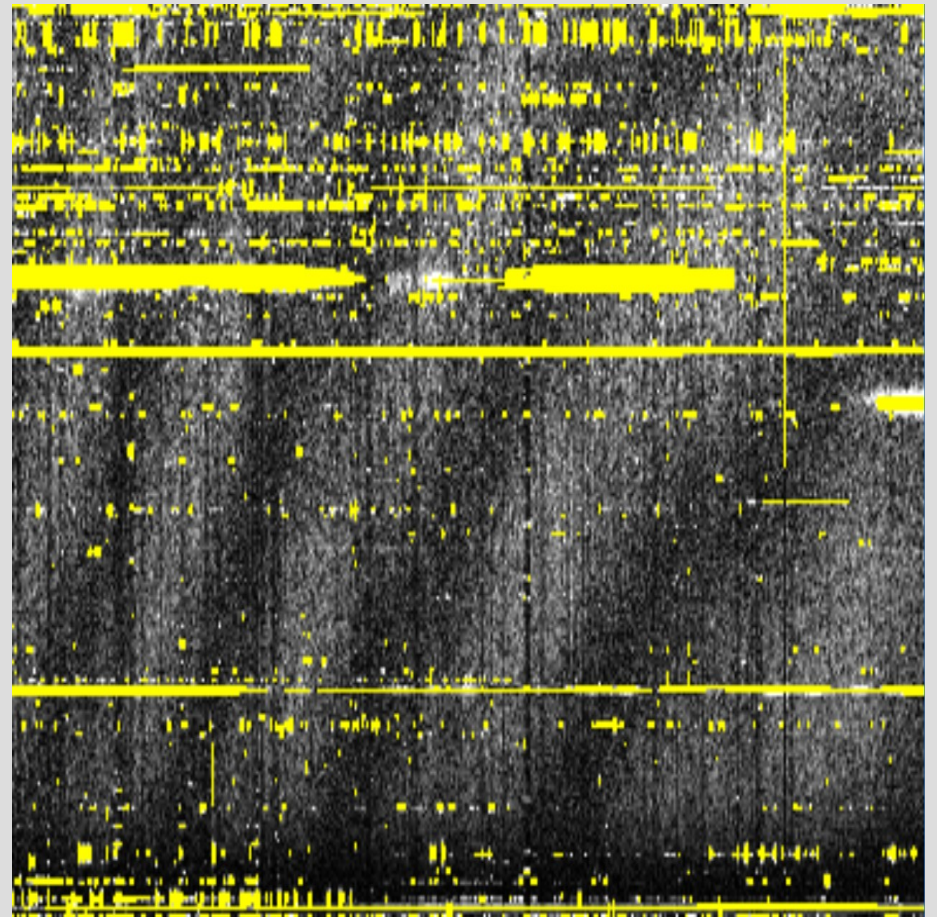
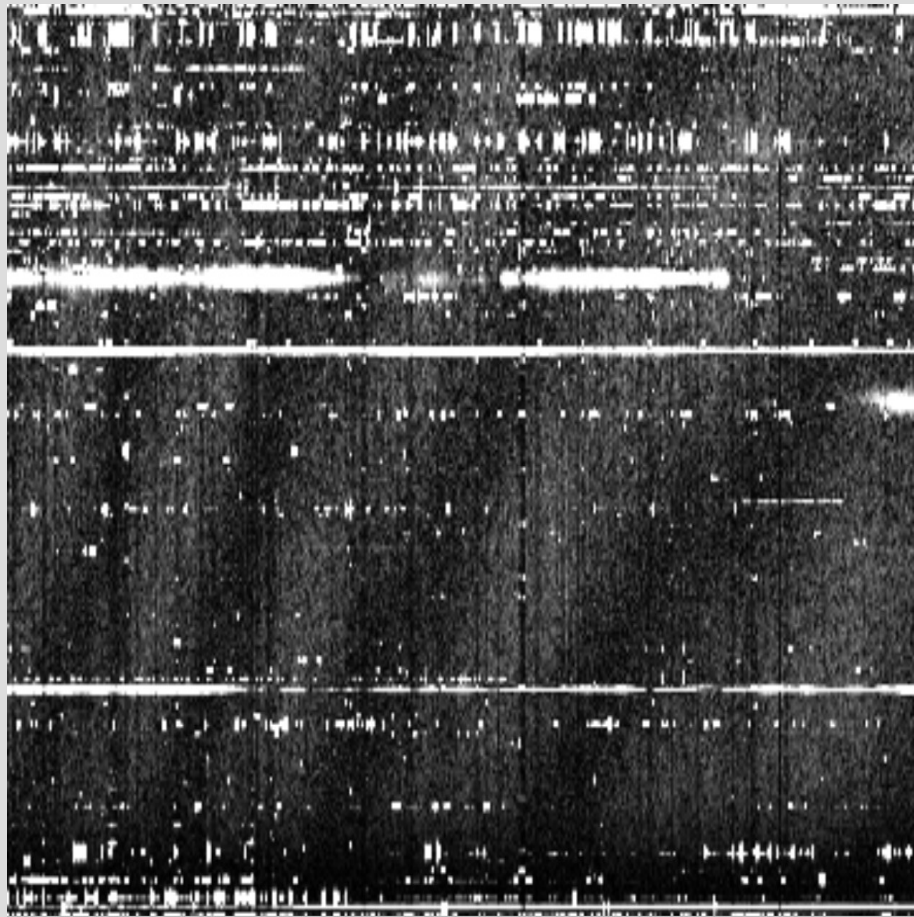
- Advanced thresholding strategy
- Idea:
 - Sum samples and use different thresholds

				A	> threshold1? → FLAG A
				A+B	> threshold2? → FLAG A, B
				A+B+C	> threshold3? → FLAG A, B, C
				A+B+C+D	> threshold4? → FLAG A, B, C, D
				A+E	> threshold2? → FLAG A, E
				A+E+F	> threshold3? → FLAG A, E, F
				A+E+F+G	> threshold4? → FLAG A, E, F, G
				B	> threshold1? → FLAG B
				B+C	> threshold2? → FLAG B, C

.....

RFI Flagging (Westerbork data)

- Worst-case scenario:

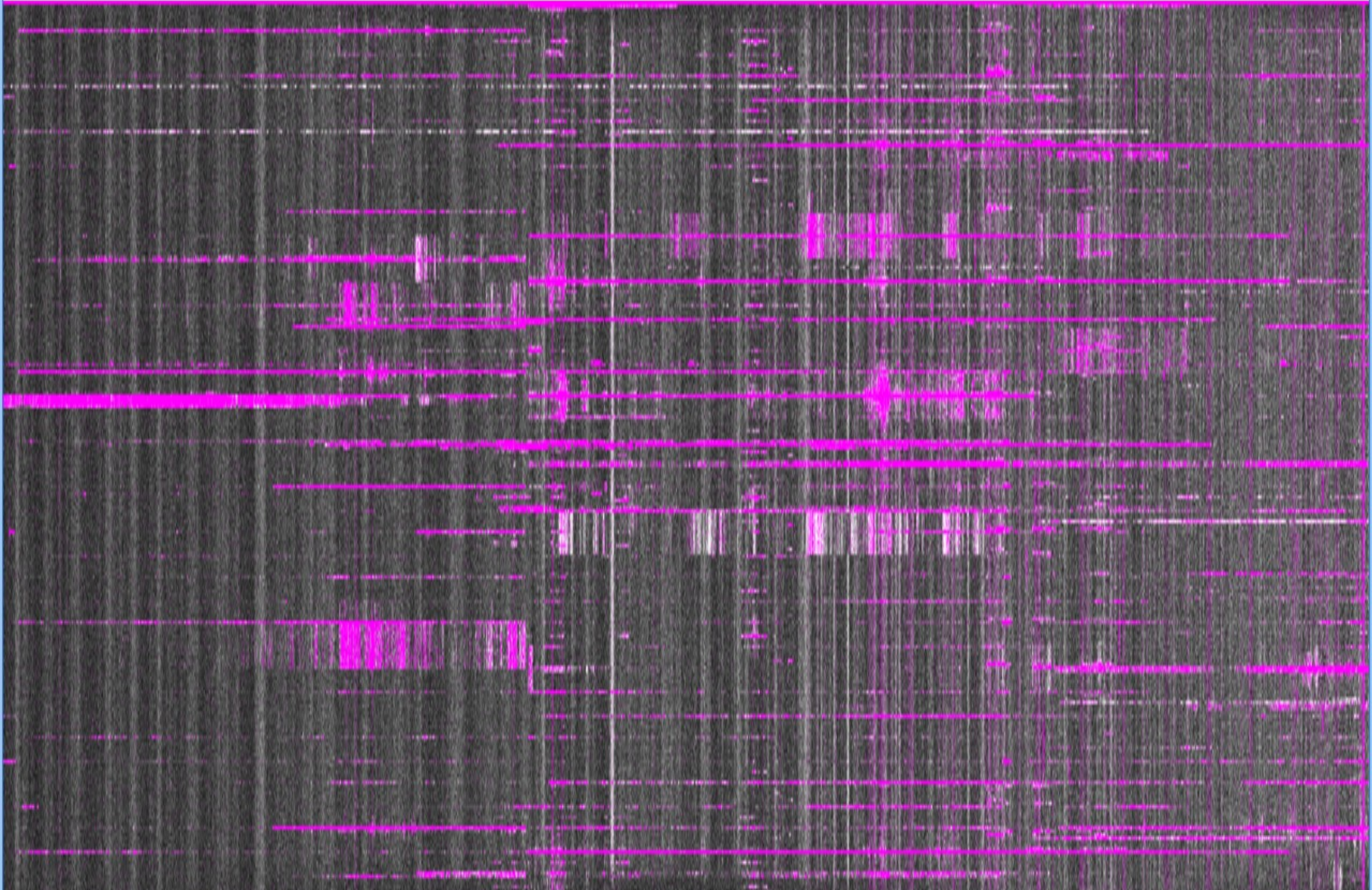


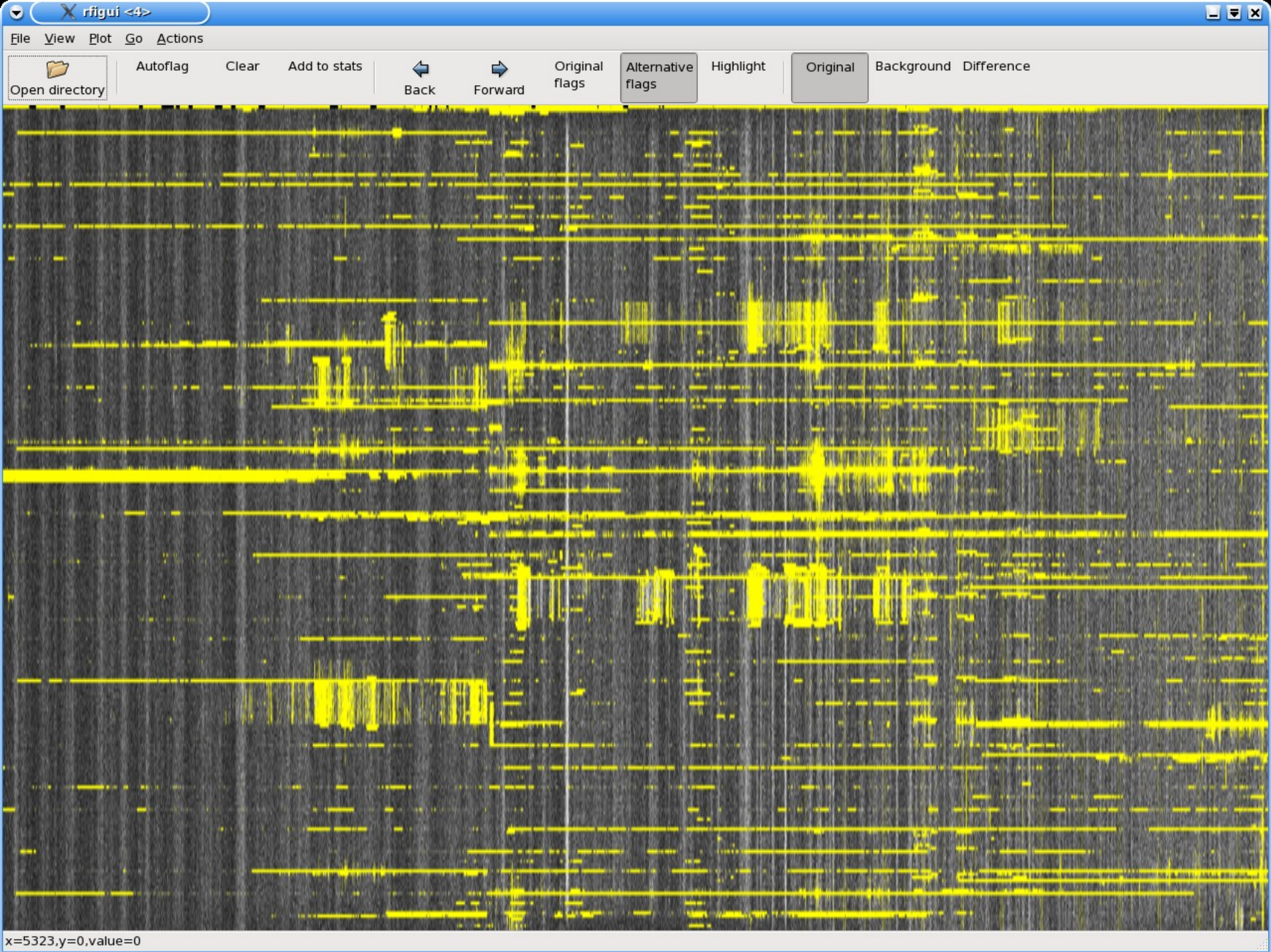
Freq
Time

LOFAR results

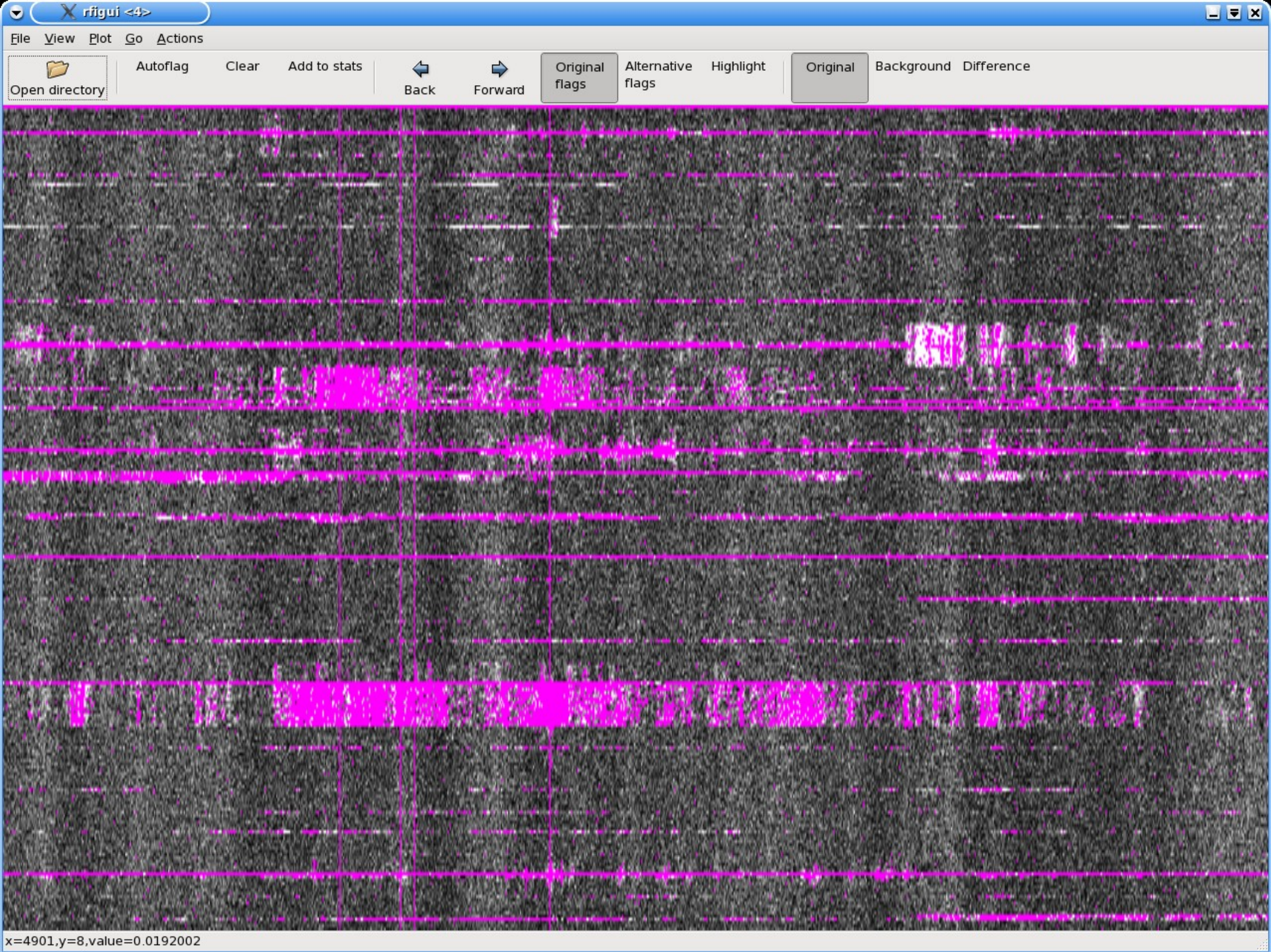
- Following slides show LBA observation L2009_14473, sub band 50.
- Observation of 2 days, all 6 stations
- MS of ~30 GB
- Flagging takes four hours on a single thread

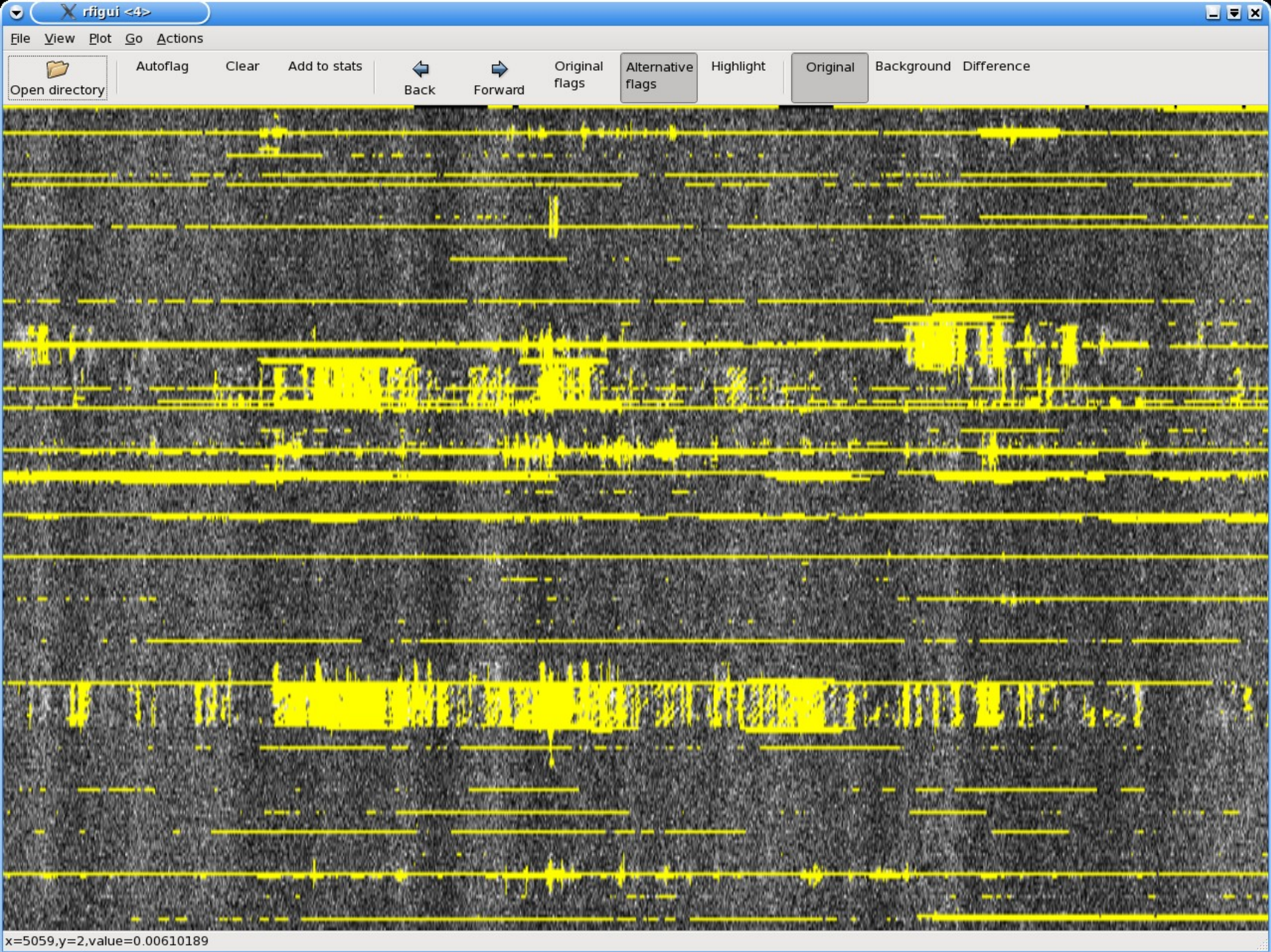










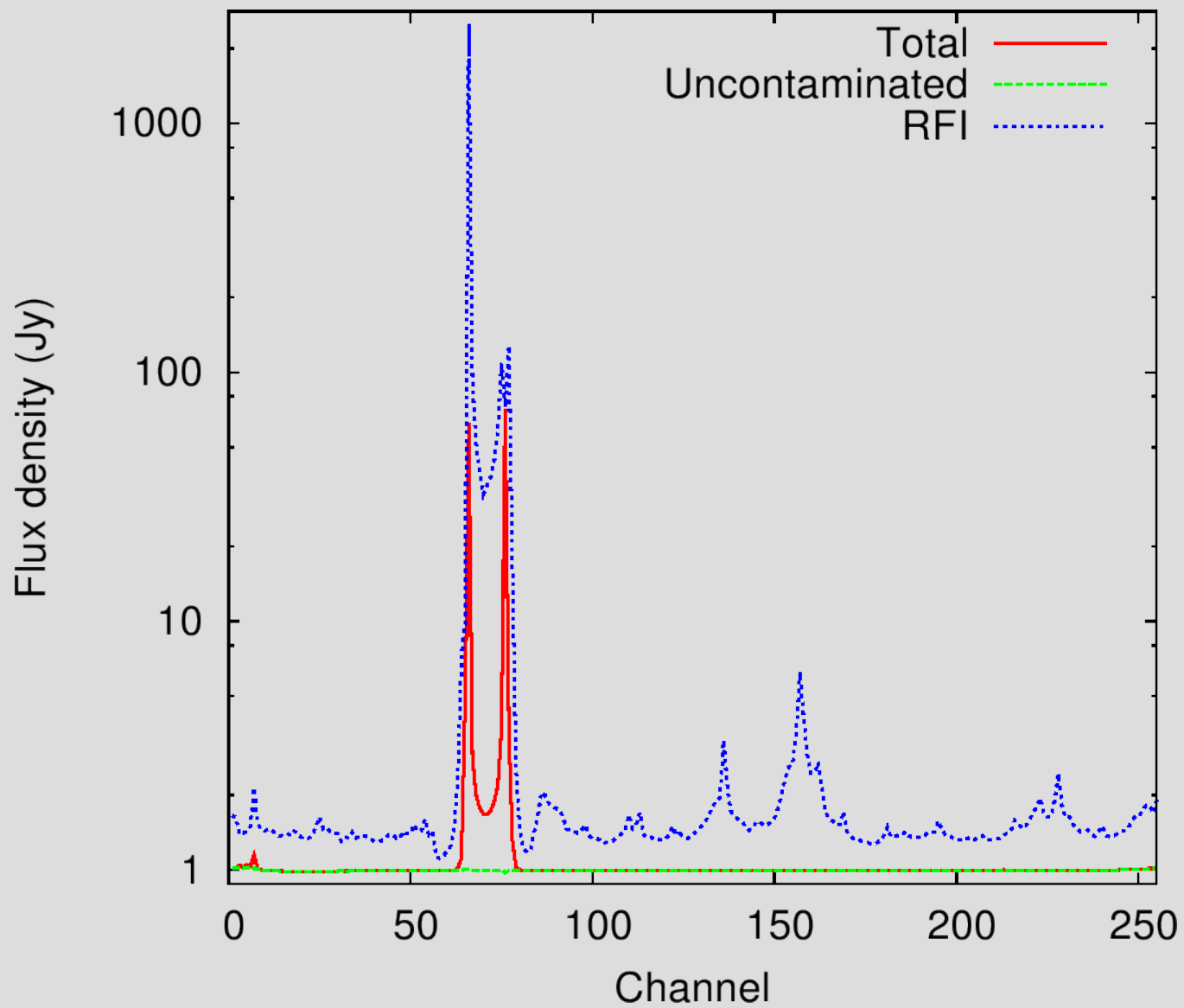


x=5059,y=2,value=0.00610189

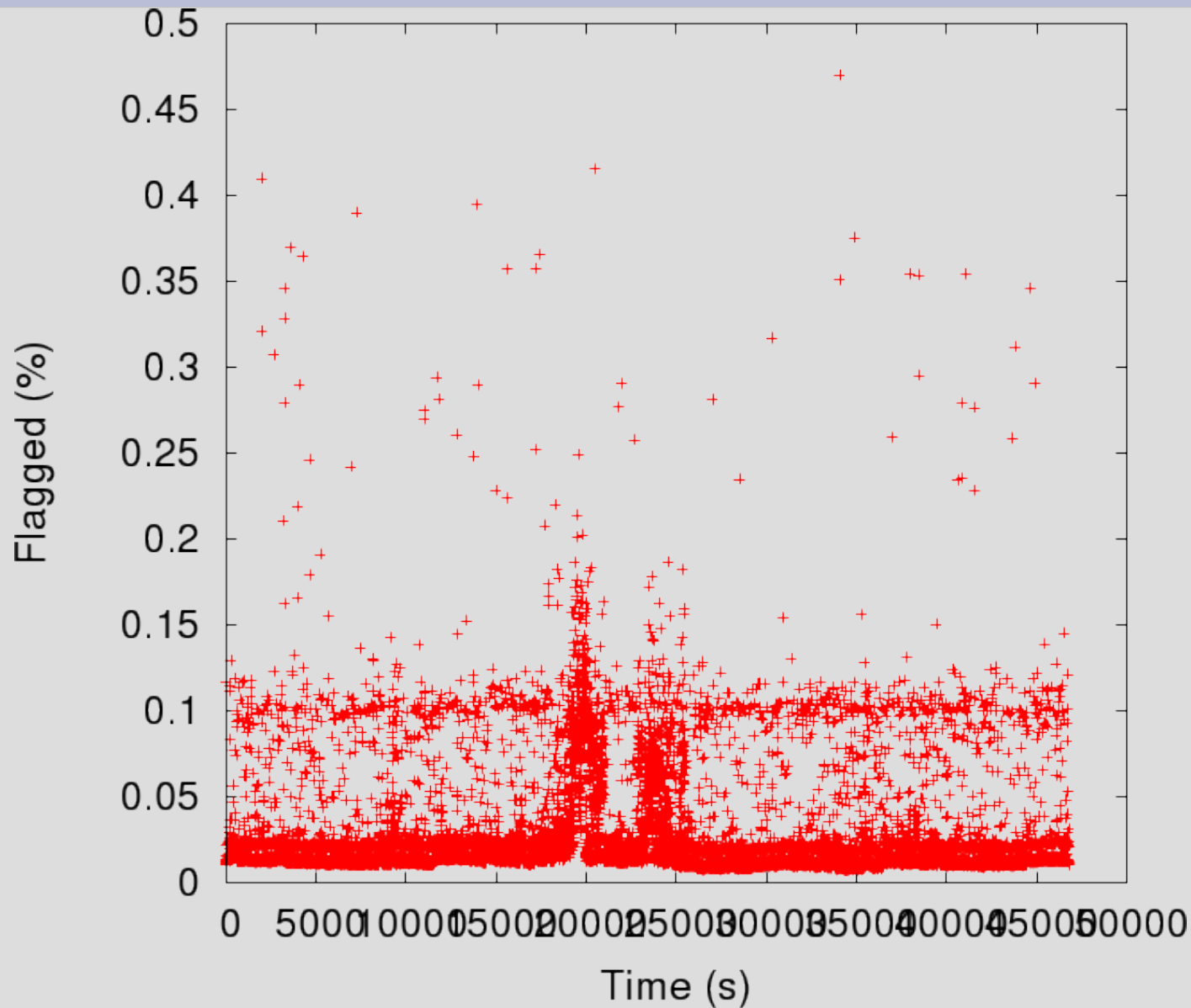
Another set: L2009_14319

- Results of LBA observation L2009_14319
- 2.6 GB per SB, 307 GB in total
- 6 stations
- Executed flagger on all 120 SB's.
- Used “best” flagger
 - (= flag all polarizations individually + all baselines (including auto-correlations))
- 7 threads worked on it for 50 hours

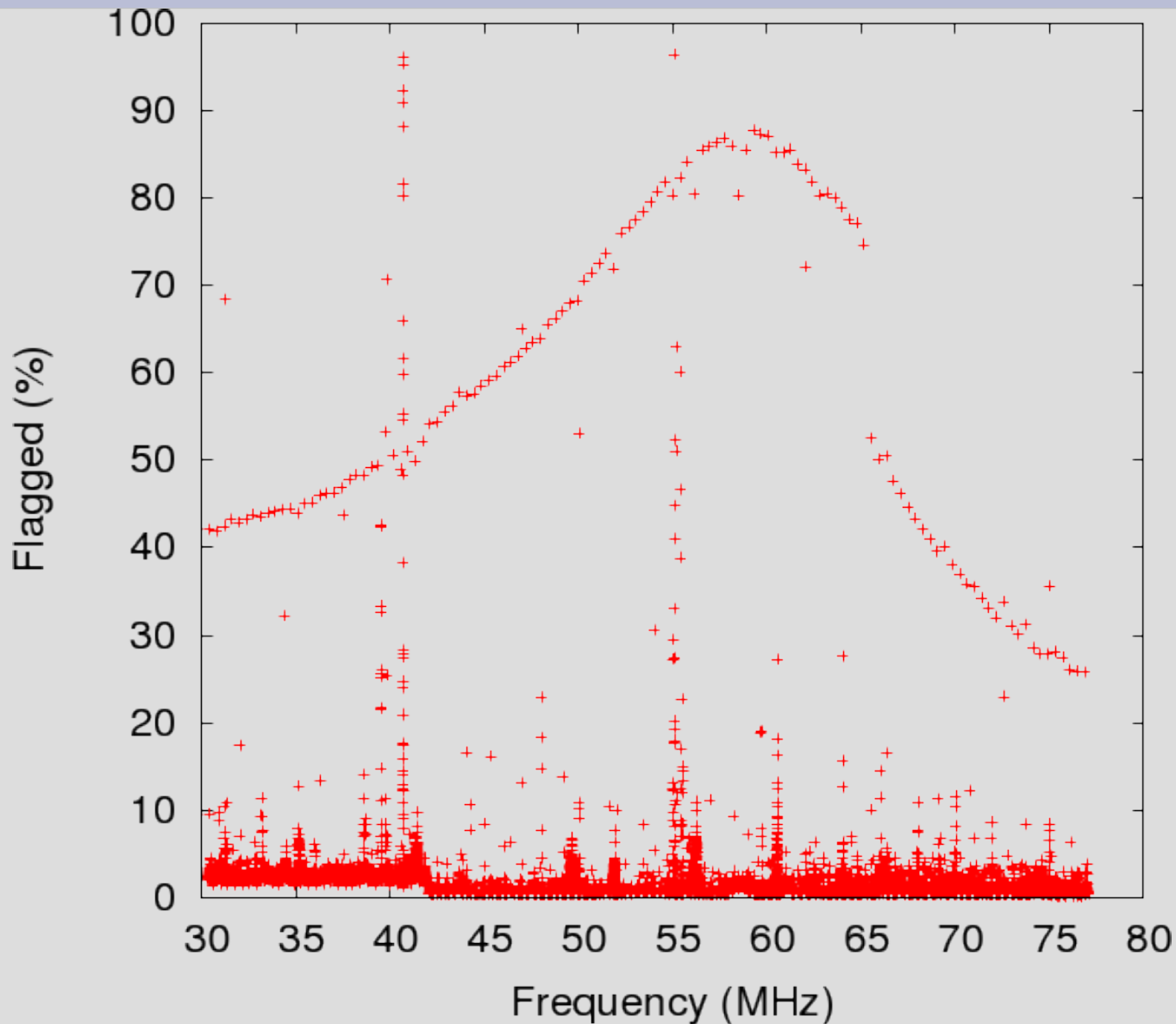
L2009_14319 SB 24 power spectrum



Flag counts vs. time (all baselines together)

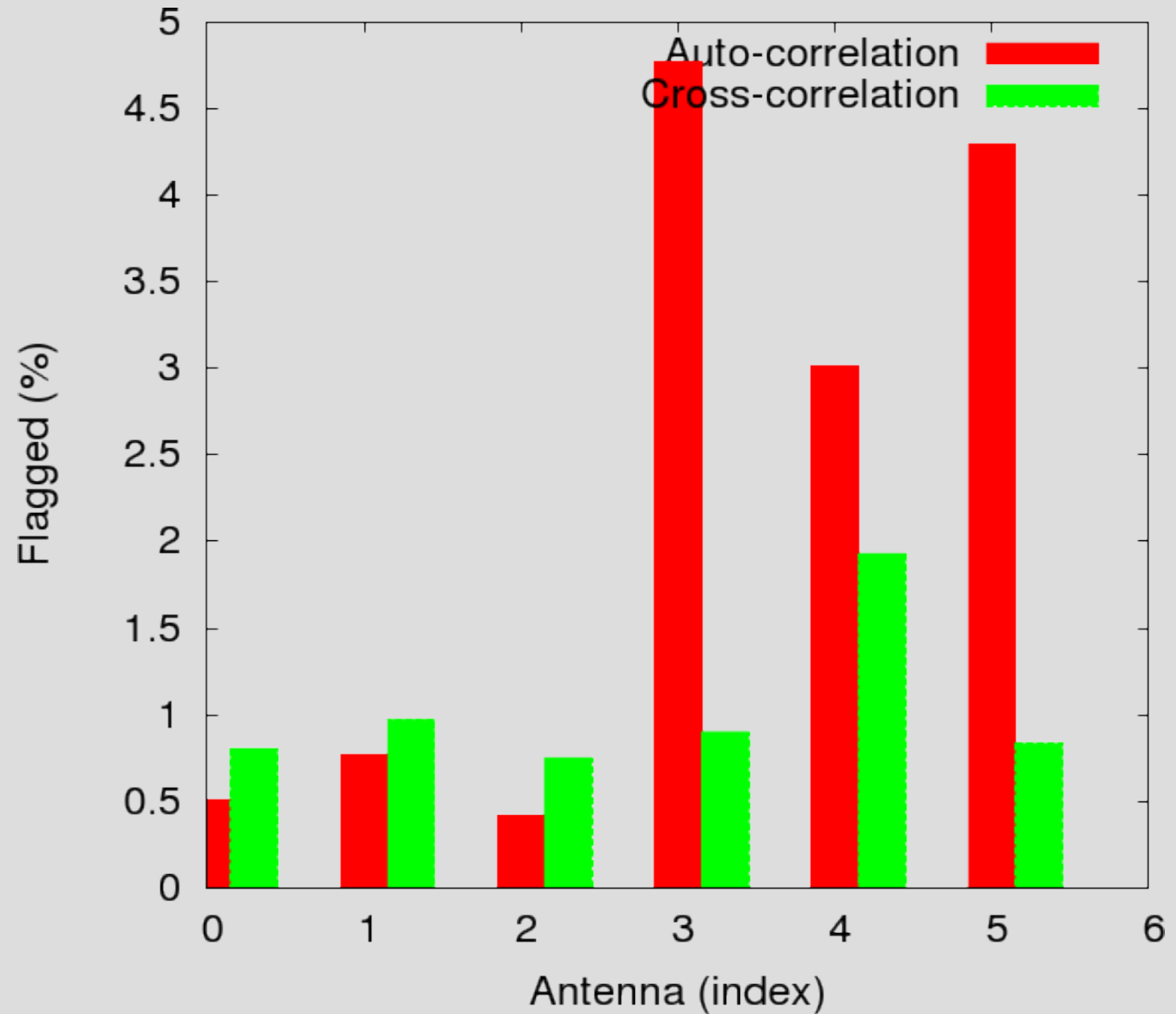


Flag counts vs. frequency (all baselines together)



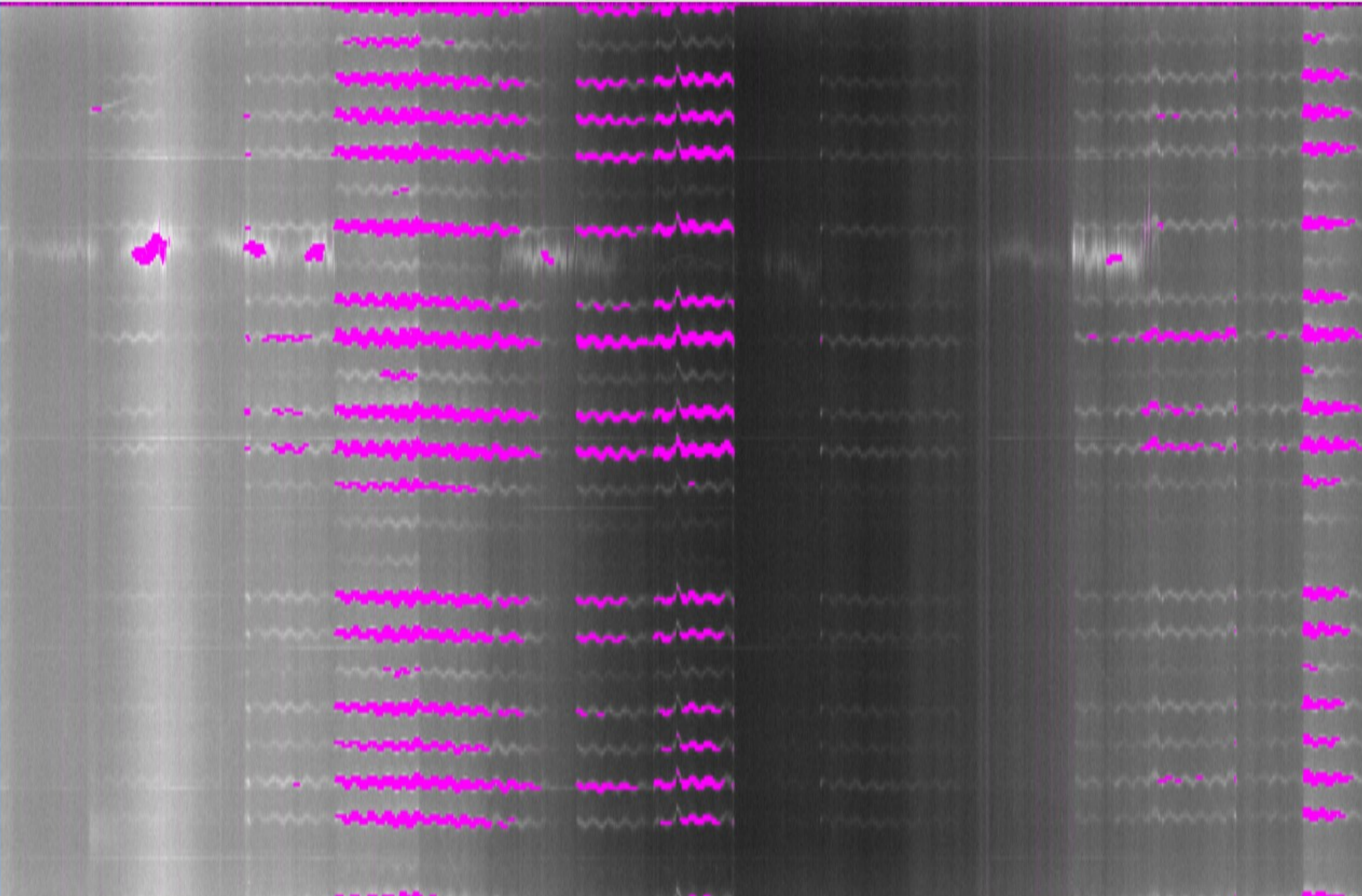
Flag counts vs. antennae (all baselines together)

- 0) RS106
- 1) RS208
- 2) RS302
- 3) RS307
- 4) RS503
- 5) DE601



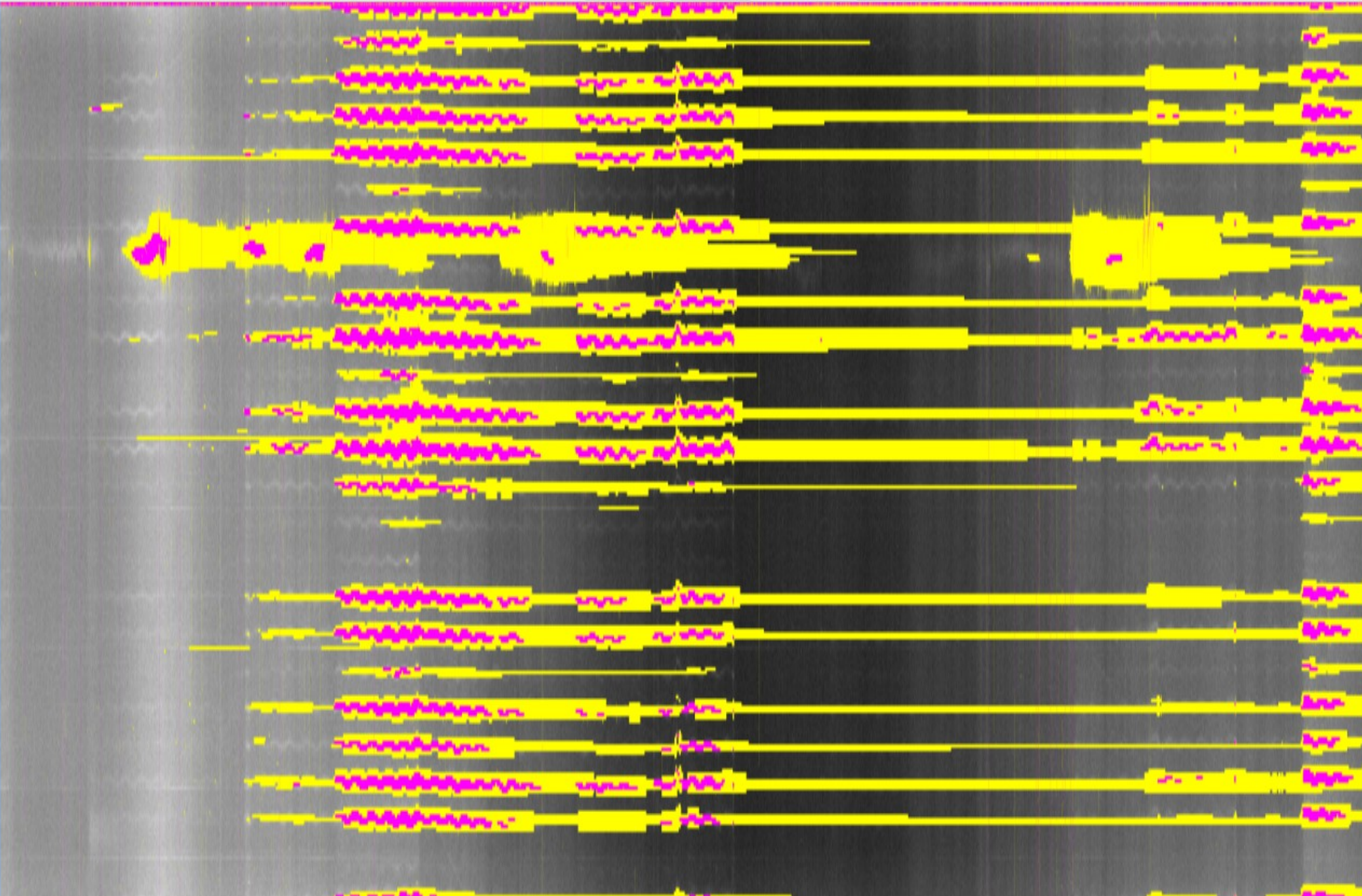
Open directory

Autoflag Clear Add to stats Back Forward Original flags Alternative flags Highlight Original Background Difference



Open directory

Autoflag Clear Add to stats Back Forward Original flags Alternative flags Highlight Original Background Difference

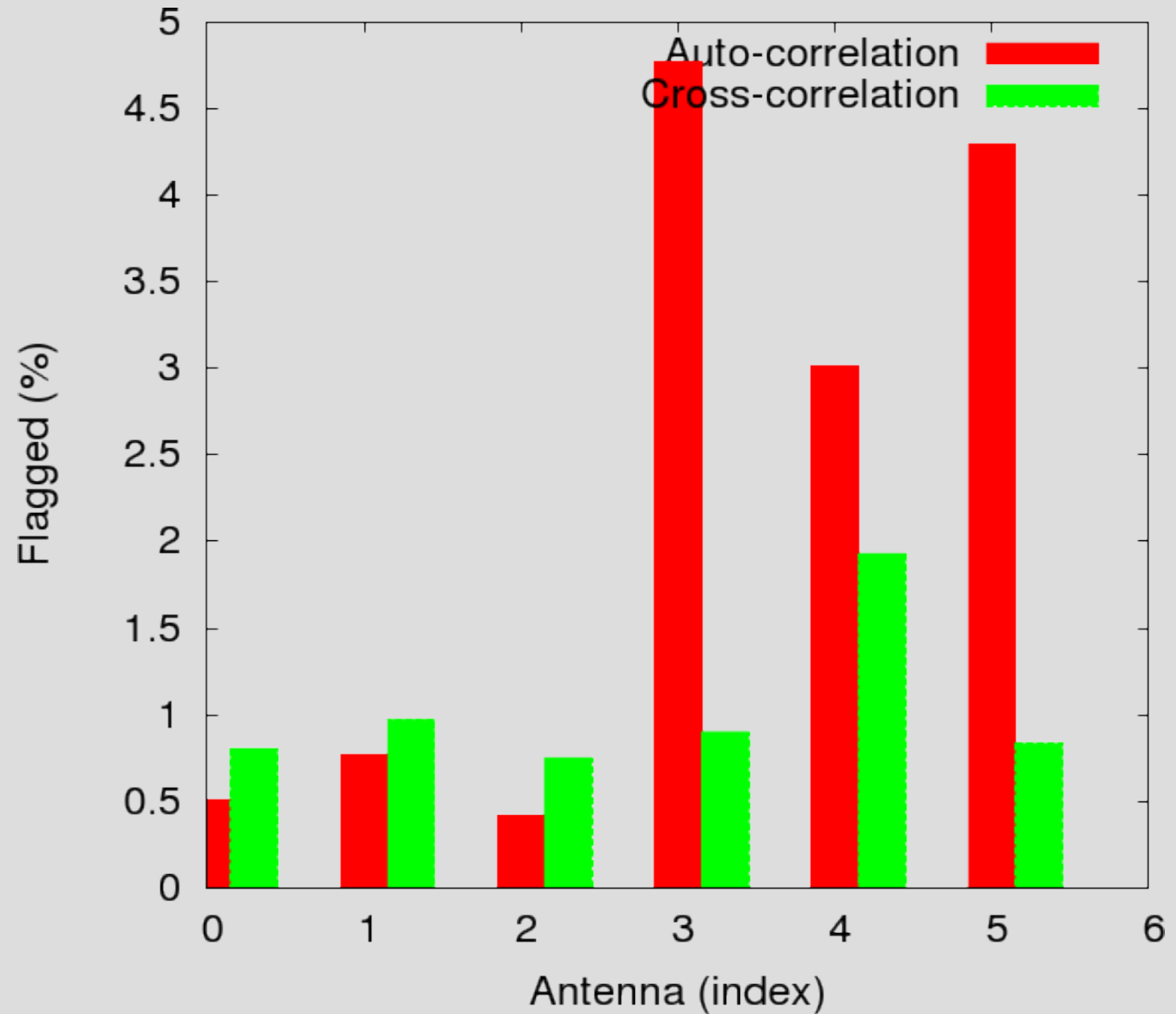


Open directory | Autoflag | Clear | Add to stats | Back | Forward | Original flags | Alternative flags | Highlight | Original | Background | Difference

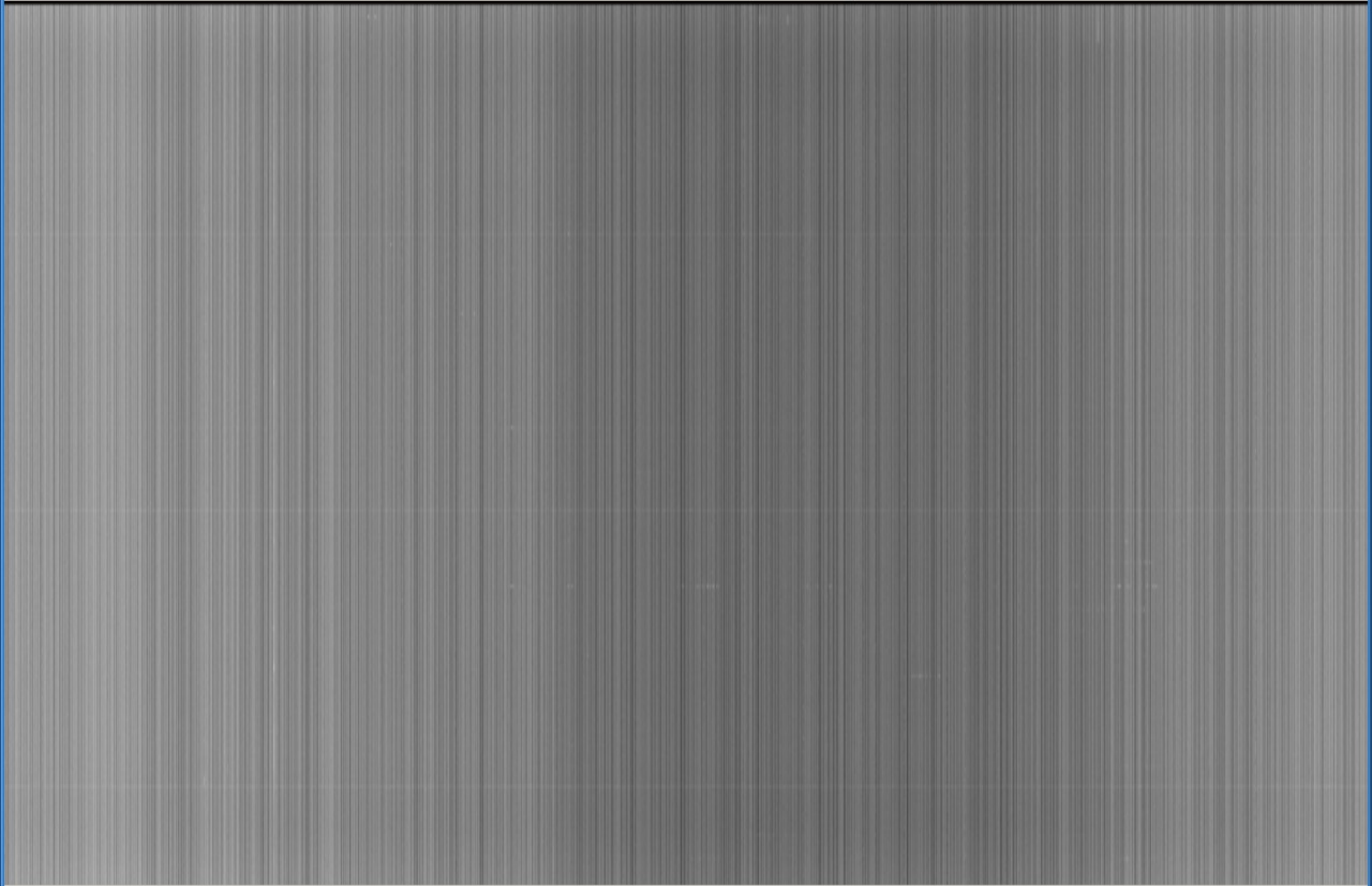


Flag counts vs. antennae (all baselines together)

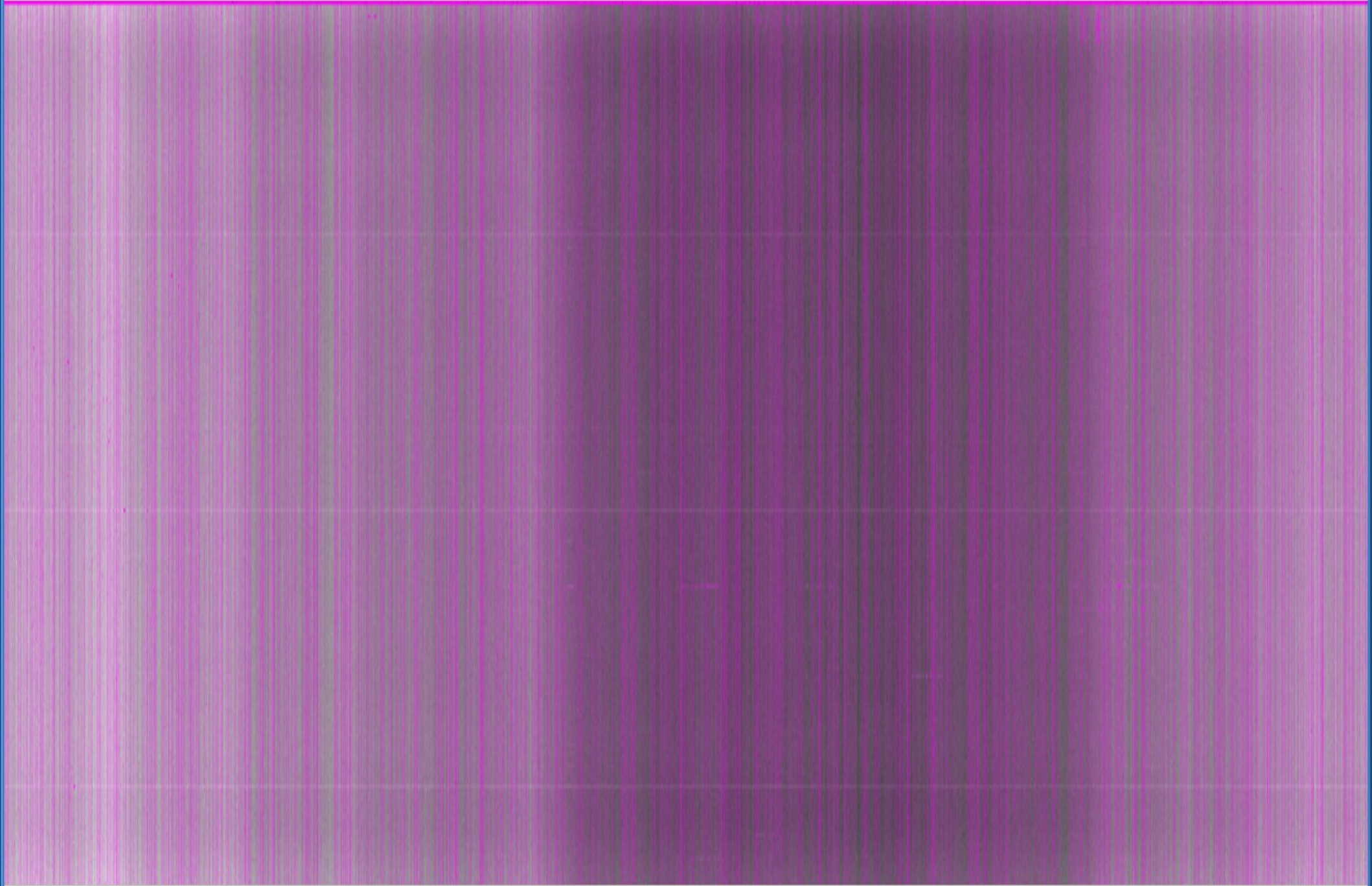
- 0) RS106
- 1) RS208
- 2) RS302
- 3) RS307
- 4) RS503
- 5) DE601



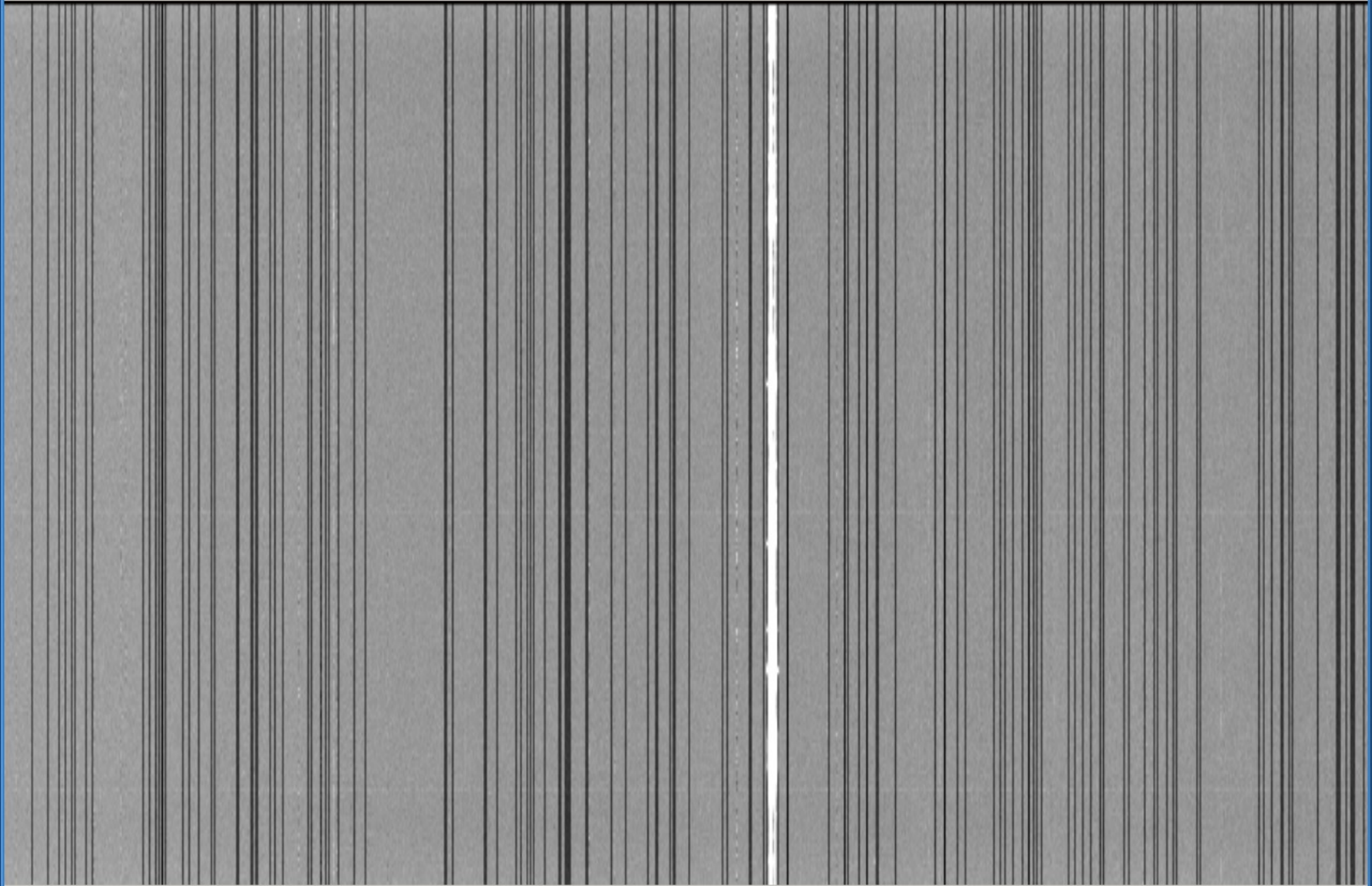
Open directory | Autoflag Clear Add to stats | Back Forward | Original flags Alternative flags Highlight | Original Background Difference



Open directory | Autoflag Clear Add to stats | Back Forward | Original flags Alternative flags | Highlight | Original Background Difference



Open directory | Autoflag | Clear | Add to stats | Back | Forward | Original flags | Alternative flags | Highlight | Original | Background | Difference



Summary

- New flagger seems to work better than current implementations
- Quality of flagging is still relative to spent time
- Problems with Effelsberg
 - Partially solvable by a density dilution
- Problems in some SB's of 503.
- Some “smooth” broadband RFI left... Need another strategy for that.