Recent LOFAR data analysis:

3C196 HBA

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with help and data from Sarod, Panos, Michiel, Oscar,…

3C196 LEA 128 project

Goals

1) Monitoring of long-term stability (Gain, MTBF)

2) Assess data quality (noise, RFI)

3) Investigate calibration errors (due to e.g. ionosphere)

4) Look for subtle systematic errors in DEEP imaging

5) Test pipelines on EoR cluster

Great diagnostic information in differential analysis: visibility, solutions, and images

Noise per baseline in 2s per subband ~ 4 Jy → SEFD ~ 2000-3000 Jy
1000+ baselines, 10000 timesamples, 248 subbands, 2 pol → improvement of 70000 to be expected!

Currently we have 3 epochs of 3C196 HBA data

23 Oct 2010 L2010_20984 (25 stations, HBA0 only)

Proper HBA beamformer tables mid Dec 2010

19 Dec 2010 L2010_22006 (44 stations HBA0 and HBA1)

7 Jan 2011 L2010_22667 (45 stations HBA0 and HBA1)

All 248 subbands with 64 ch Frequencies from 115-163 Mhz
6h with 2s integration (~25 GB per subband → 6 TB raw data)

6 CS on superterp CS002,003,04,005,006,007
13/14 CS CS001,007,017,021,024,026,030,032,101,201,301,401,501,302,103
6/5 RS RS 106,205,208,306,(307),503

Show only results on sb009 → 116.8 MHz

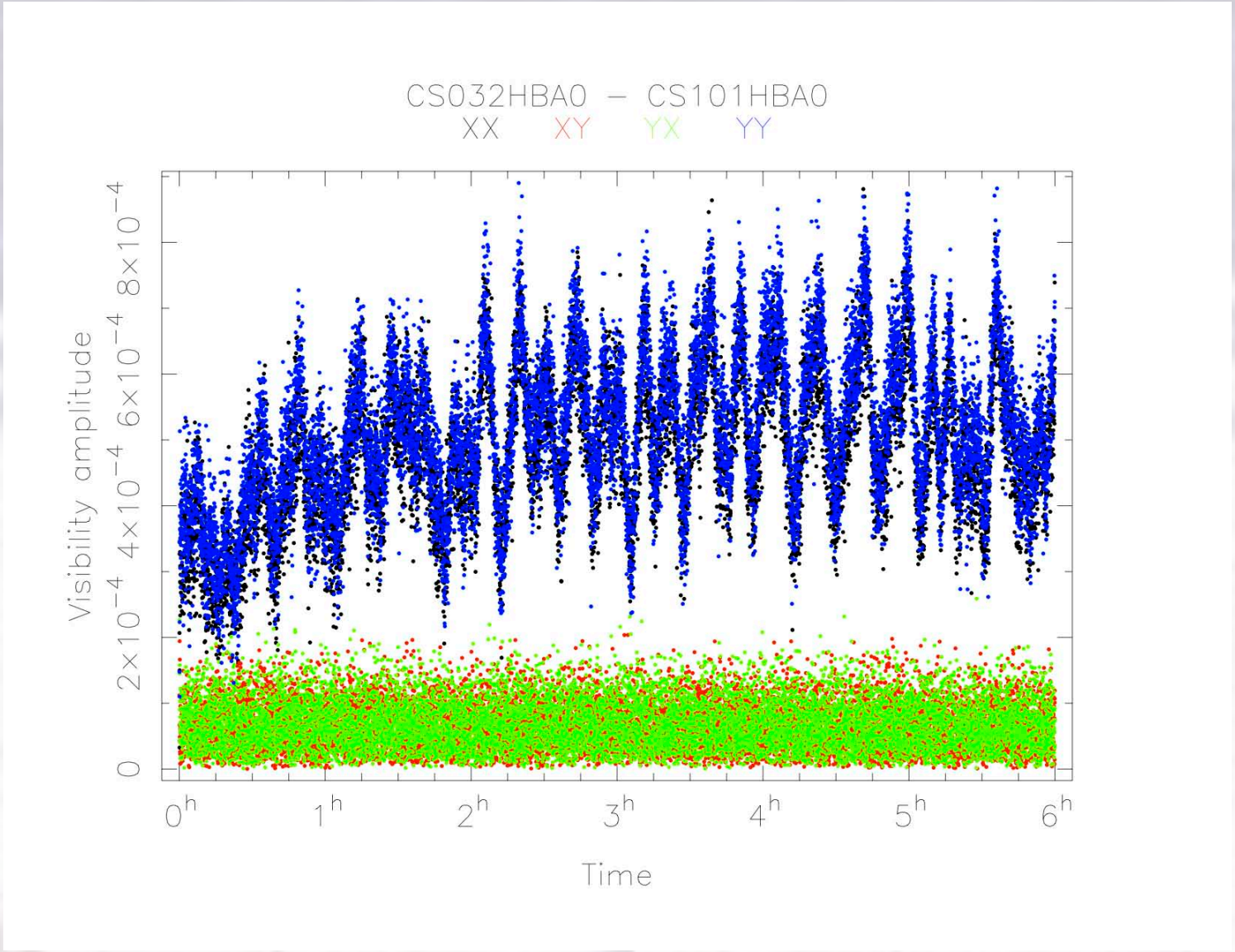
3C196 HBA 23 Oct 2010

SB009

117 MHz

2s

L2010
-20984



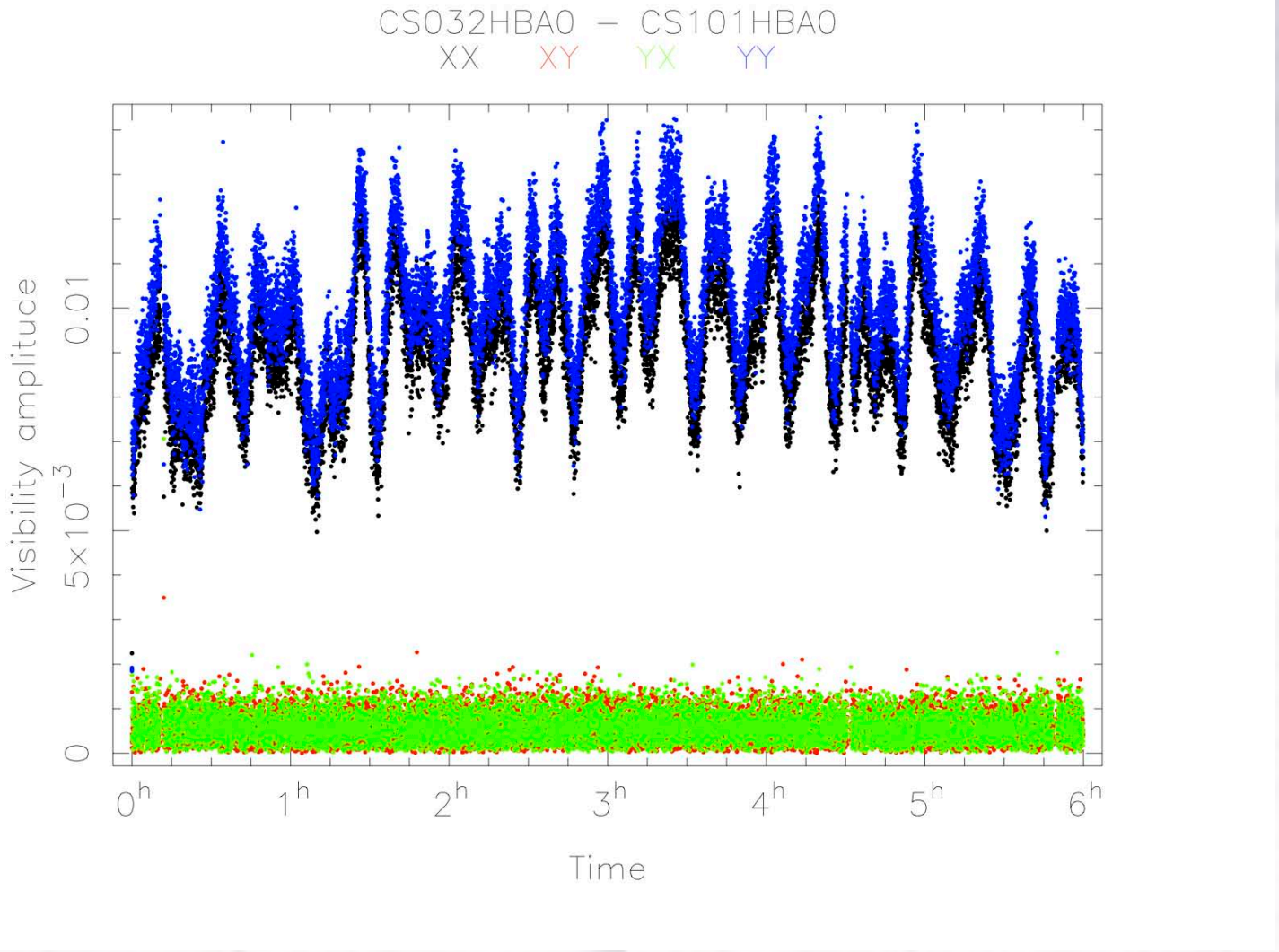
3C196 HBA 19 Dec 2010

SB009

117 MHz

2s

L2010
-22006



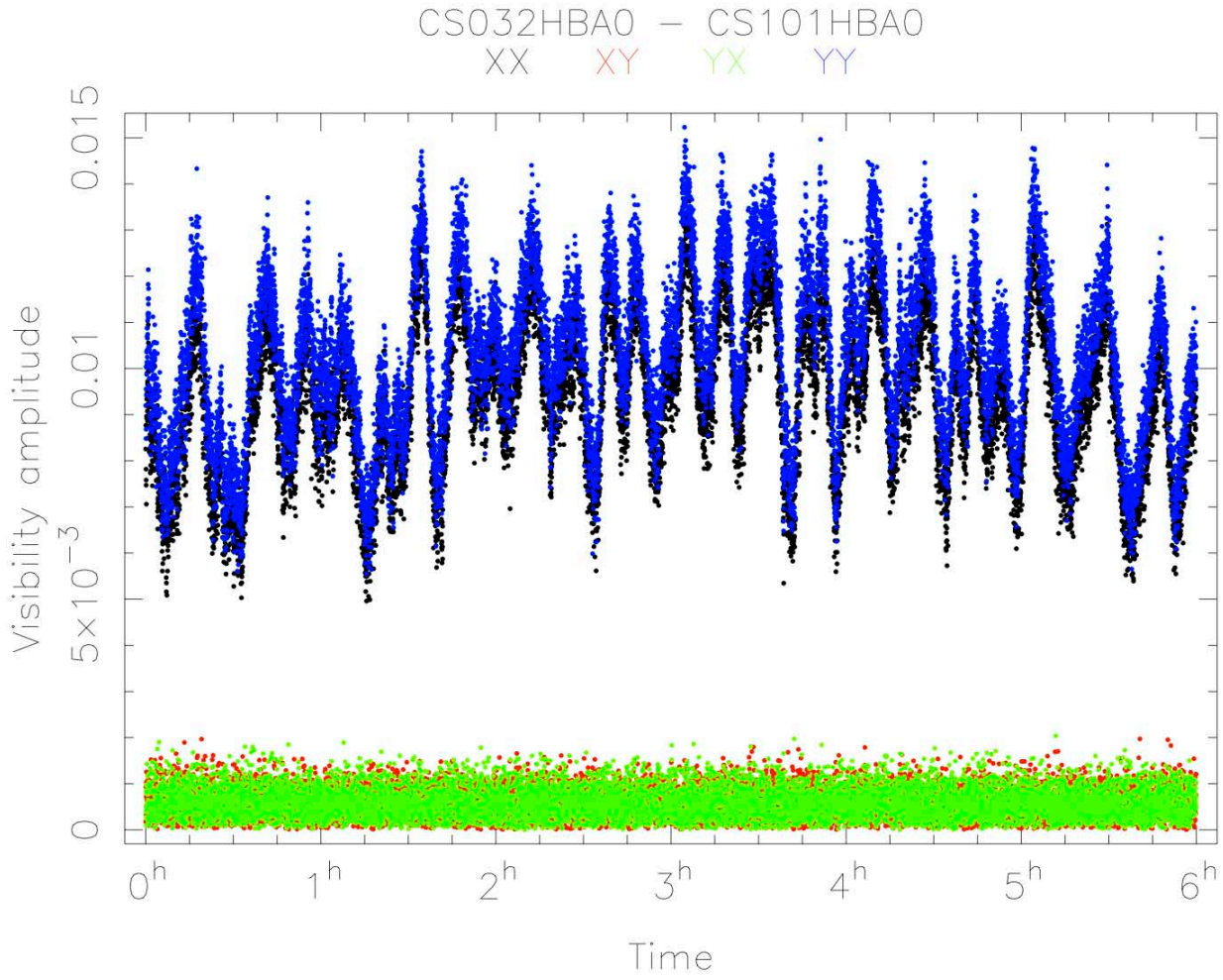
3C196 HBA 7 Jan 2011

SB009

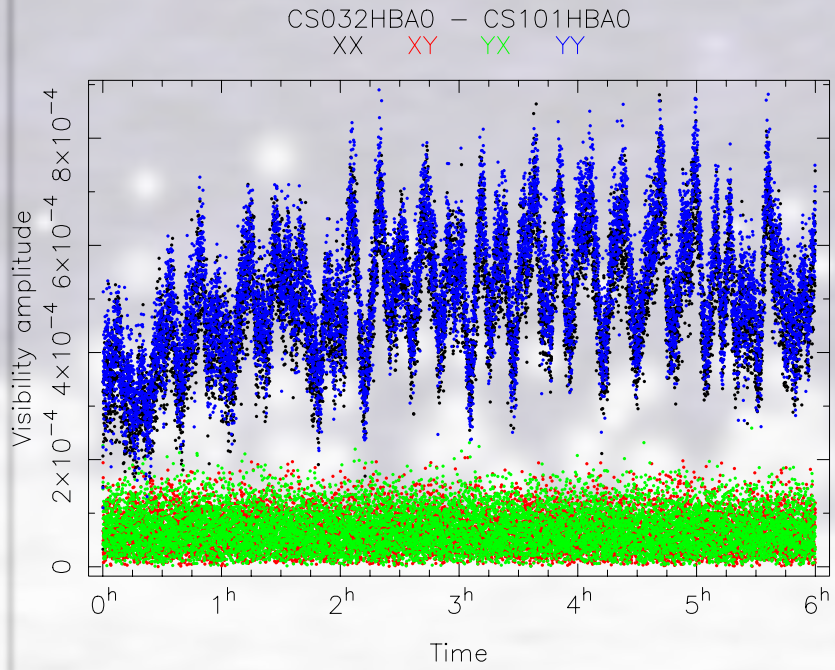
117 MHz

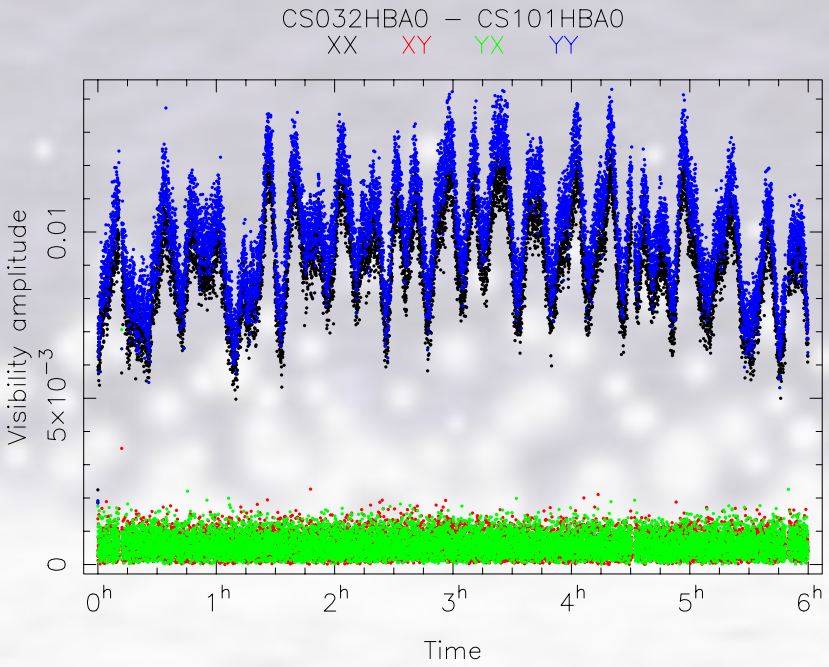
2s

L2010
-22667



3C196 HBA





The improvement between 23Oct10 and 19Dec10 is most likely due to proper station beamforming. It is visible in the data in two ways:

- level of XX and YY correlated flux relative to XY and YX
- noise level on the fringes

Both give a S/N improvement on this baselines of a factor 1.8. At 117 MHz ! Expect more at higher frequencies.

3C196 HBA 19 Dec 2010

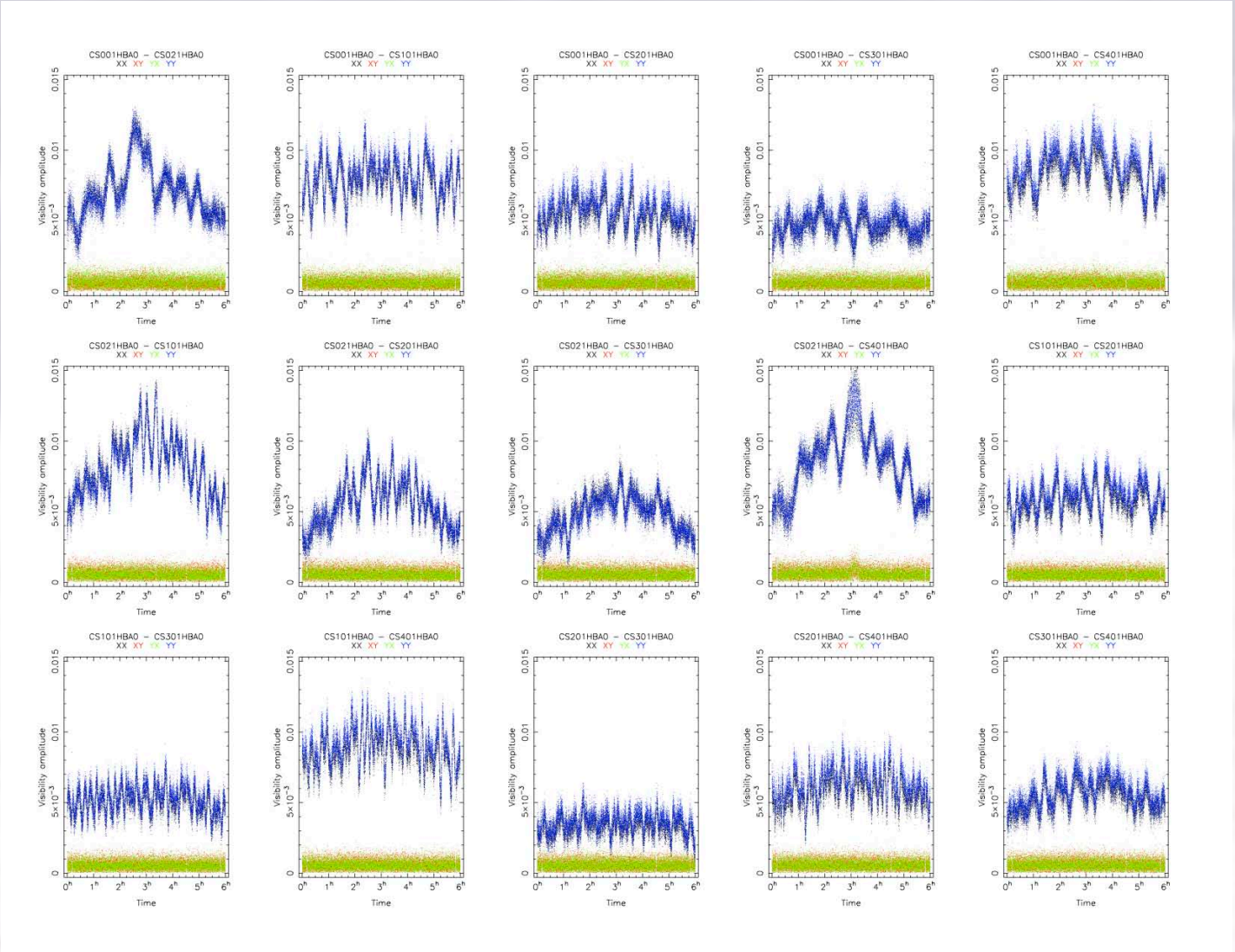
SB009

117 MHz

2s

L2010
-22006

6 CS
15 ifrs



3C196 HBA 7 Jan 2011

SB009

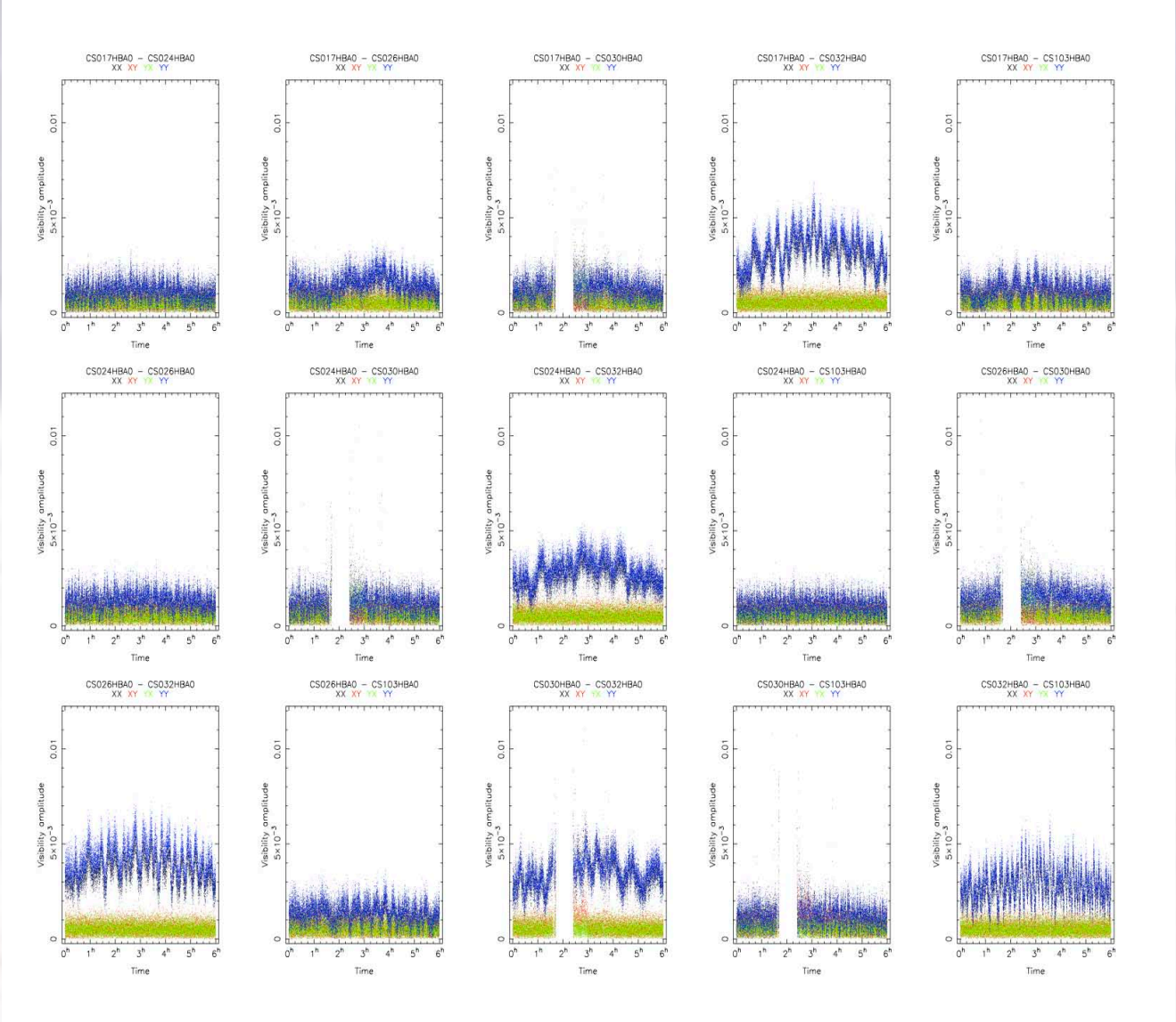
117 MHz

2s

L2010 -22667

Some poor core stations

CS017,CS024 CS026,CS103, ..



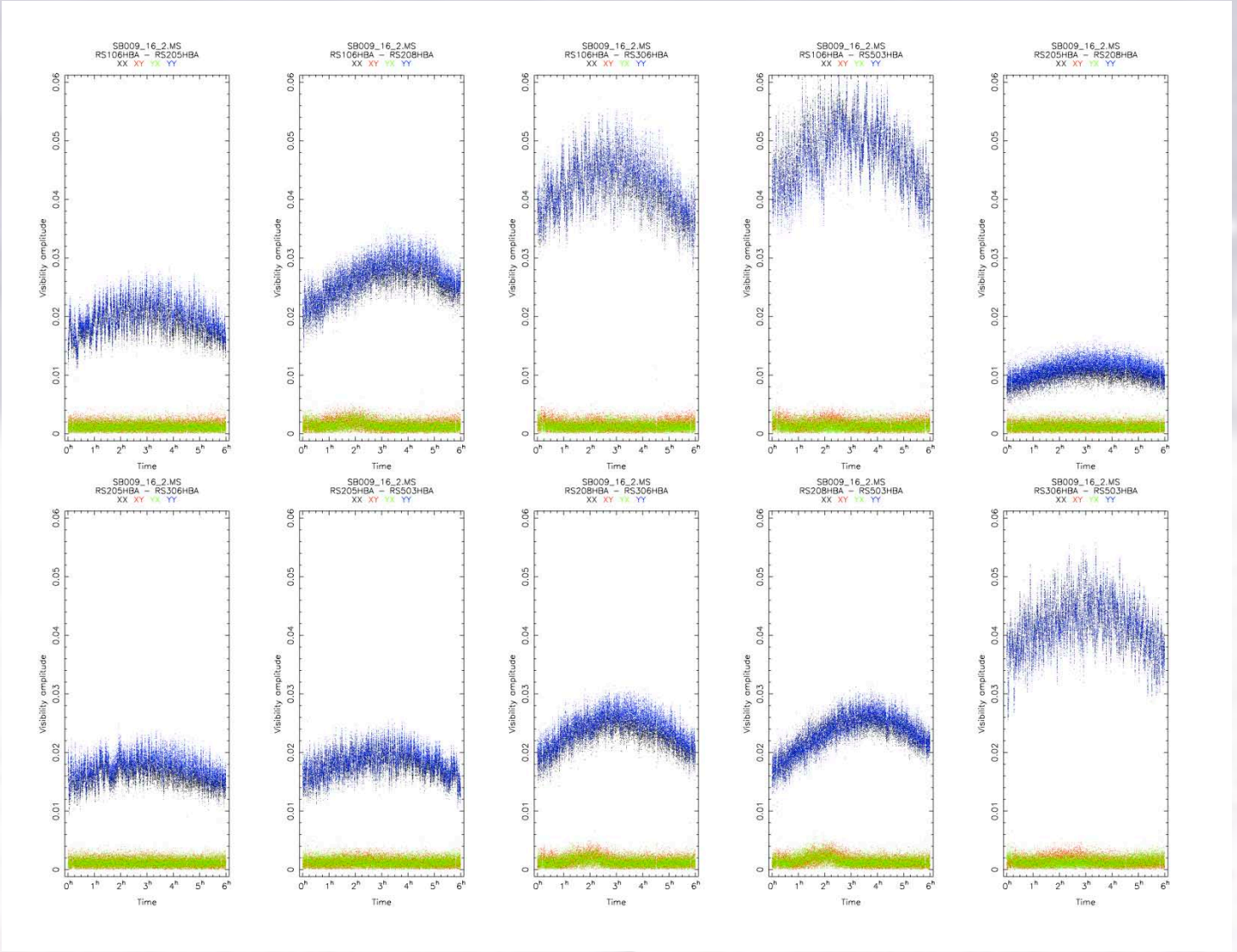
3C196 HBA 19 Dec 2010

SB009
117 MHz
2s

L2010
-22006

5 RS
10 ifrs

Note
different
amplitude
levels



3C196 HBA 7 Jan 2011

SB009
117 MHz
2s

L2010
-22667

5 RS
10 ifrs

Note
different
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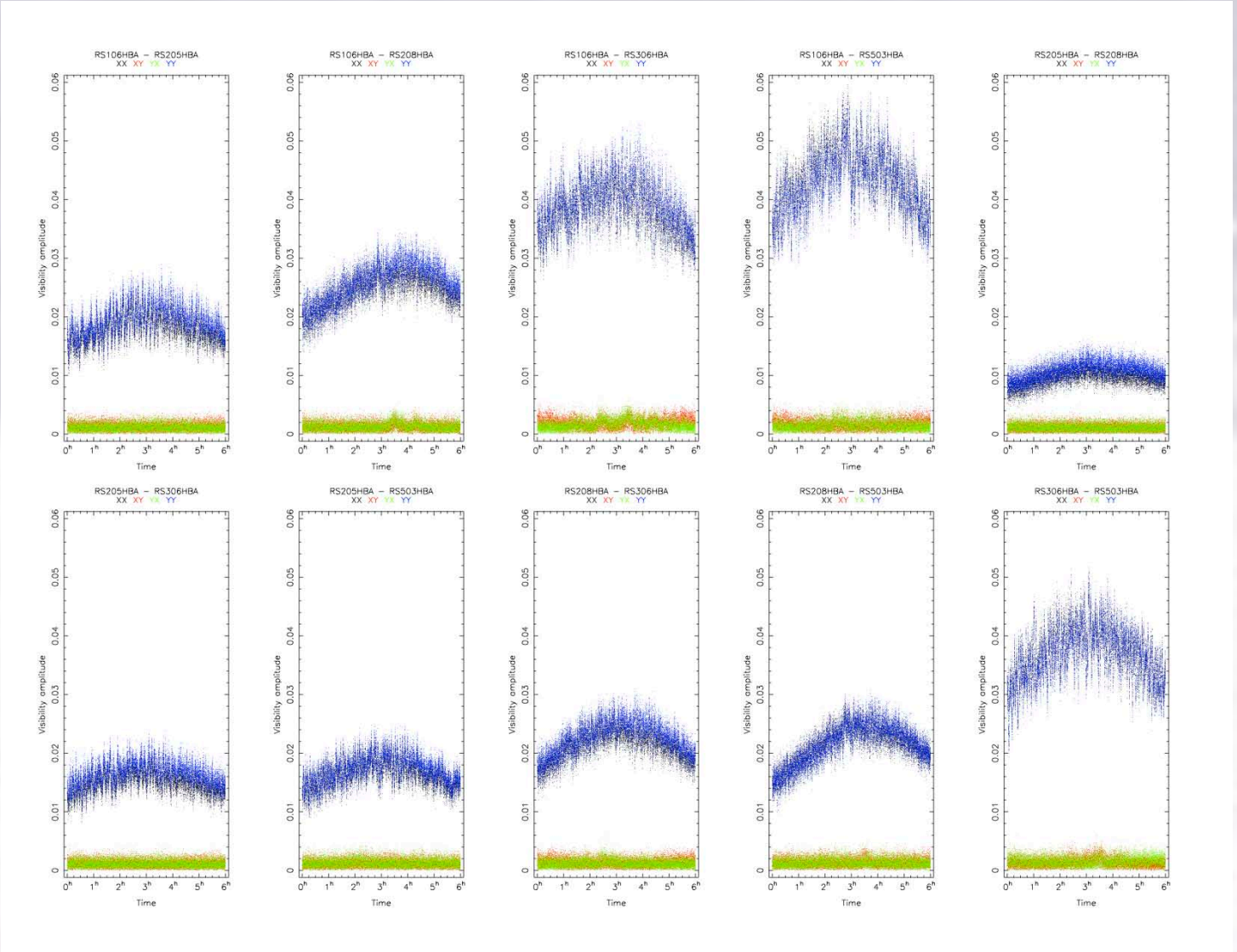
levels



EoR cluster image (8 subbands)

EoR cluster

80 nodes
(each 8 CPU / 2 GPU)

3.6 TB data per node

rficonsole
NDPPP
BBS
Cimager/Casaimager

More on EoR cluster
at next LSM
(Panos Labropoulos)