

# CS-1 developments: 24-31 Jan 2007

- Partially succesful attempt to observe Jupiter (Friday 26Jan07)
- Continuing obs/theory/sim study of rain effects....  
(WimvCappellen/Michel Arts, Menno Norden, Pandey/deBruyn,...)

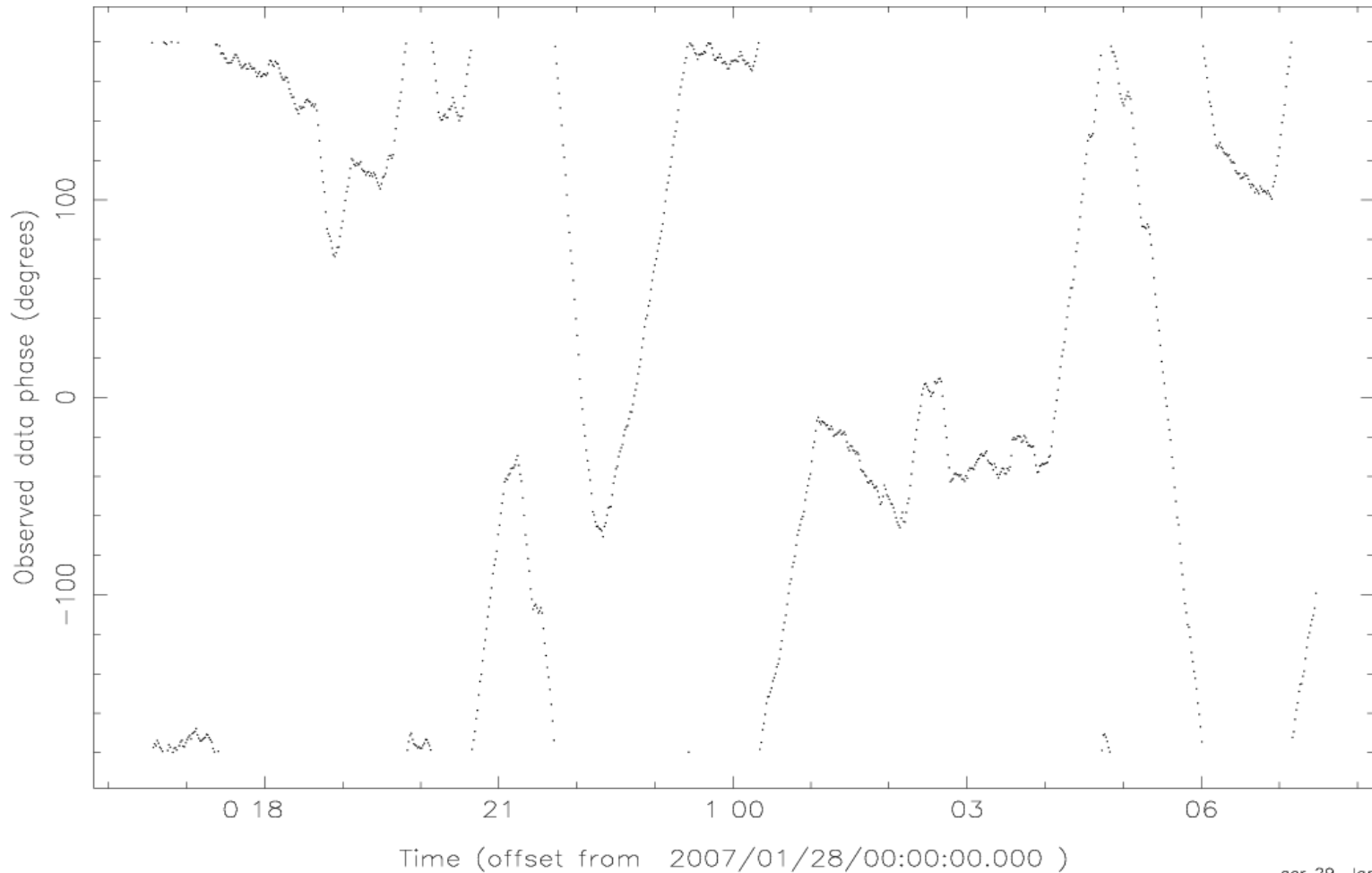
Successful observing in a (rainy) weekend:

- 2x24h on CasA and CygA with 'standard' setup  
---> 16 subbands in 8 MS, all look good
- 16h without fringe tracking --> clock drift study ANT 1 - 9
- Plans for HBA antennas at CS-1

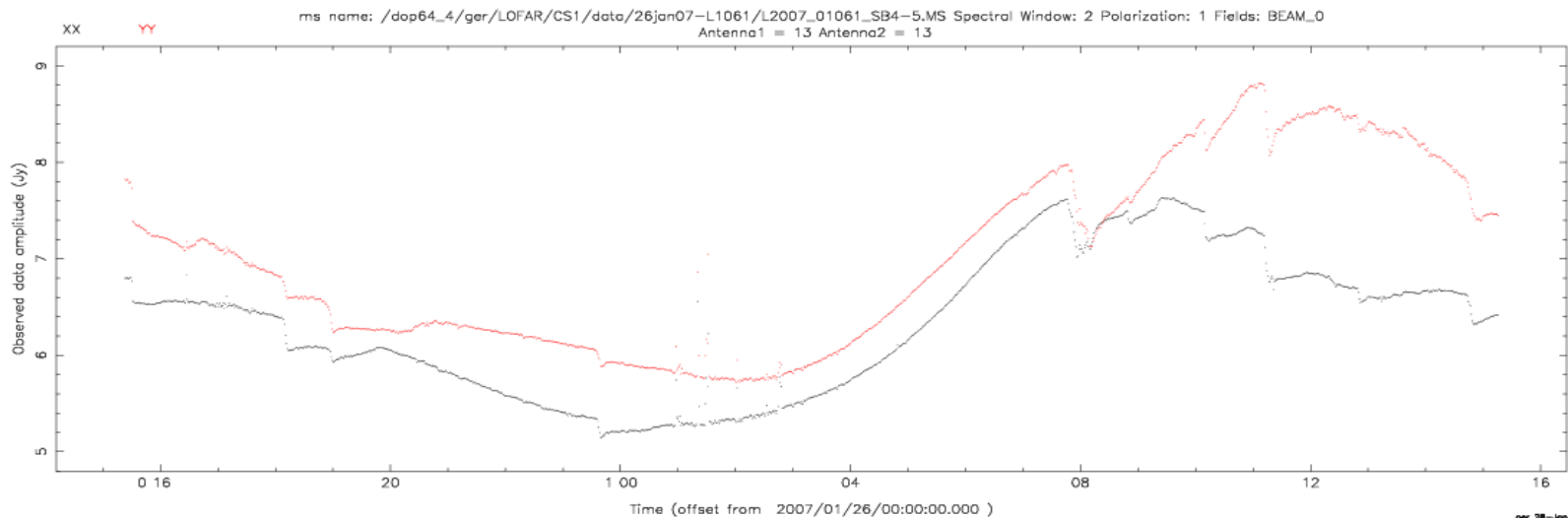
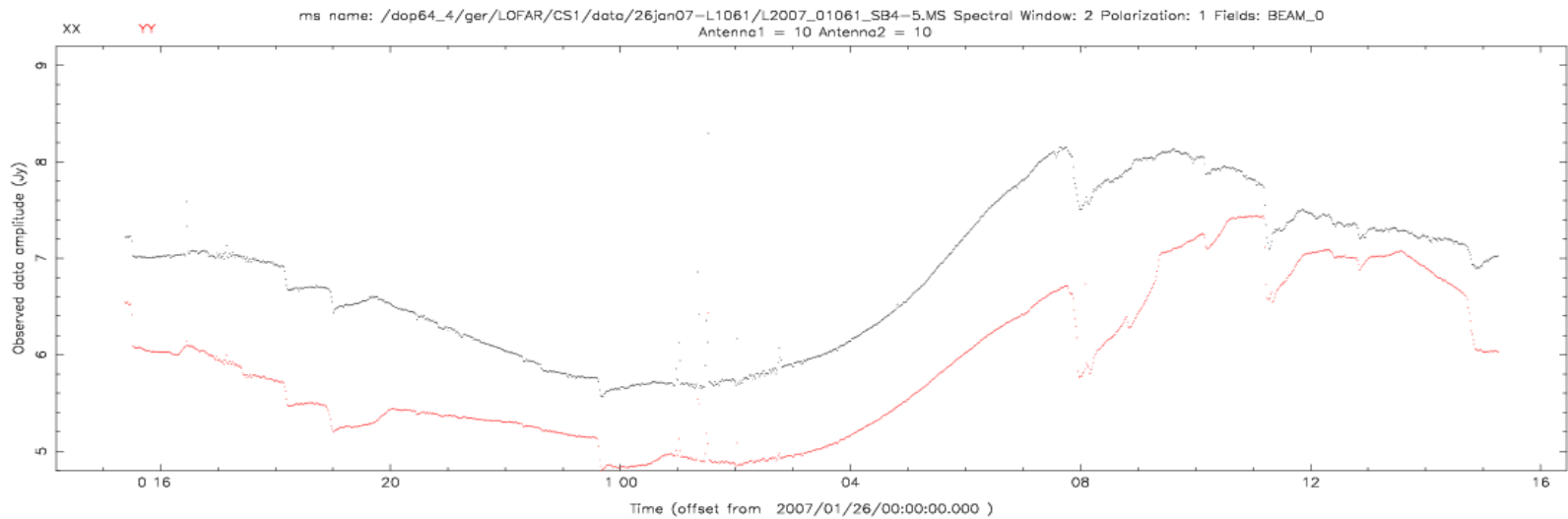
# Phase on baseline ANT1-ANT9

## 28-Jan-07 UT16h - 29-Jan-07 UT07 (L1068)

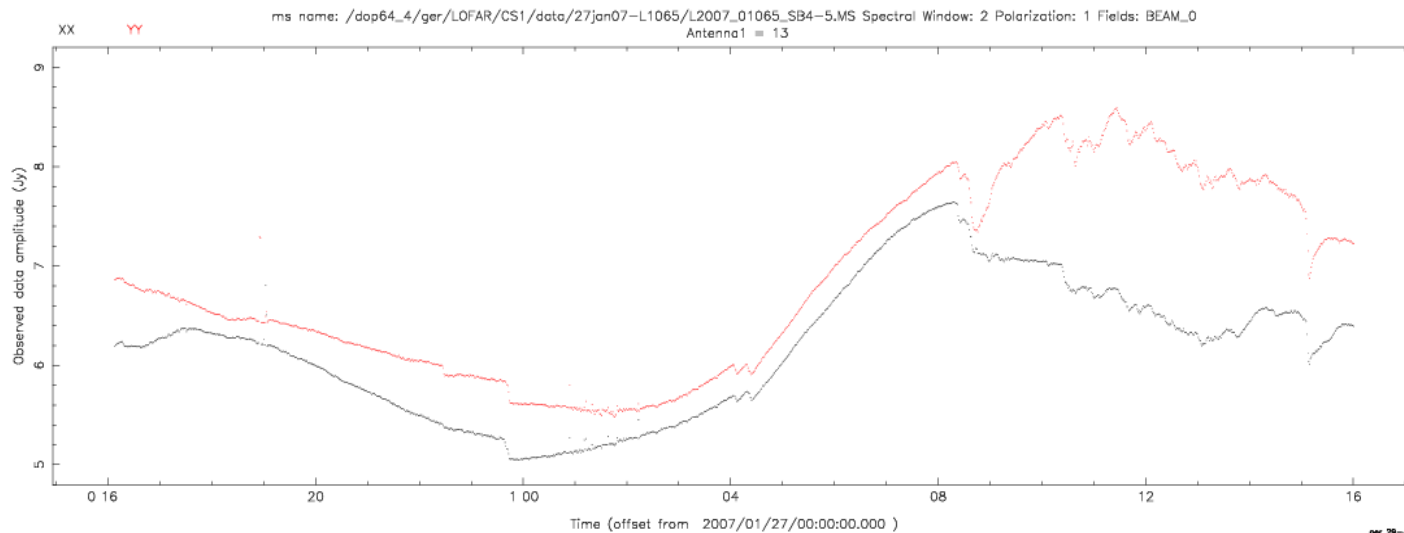
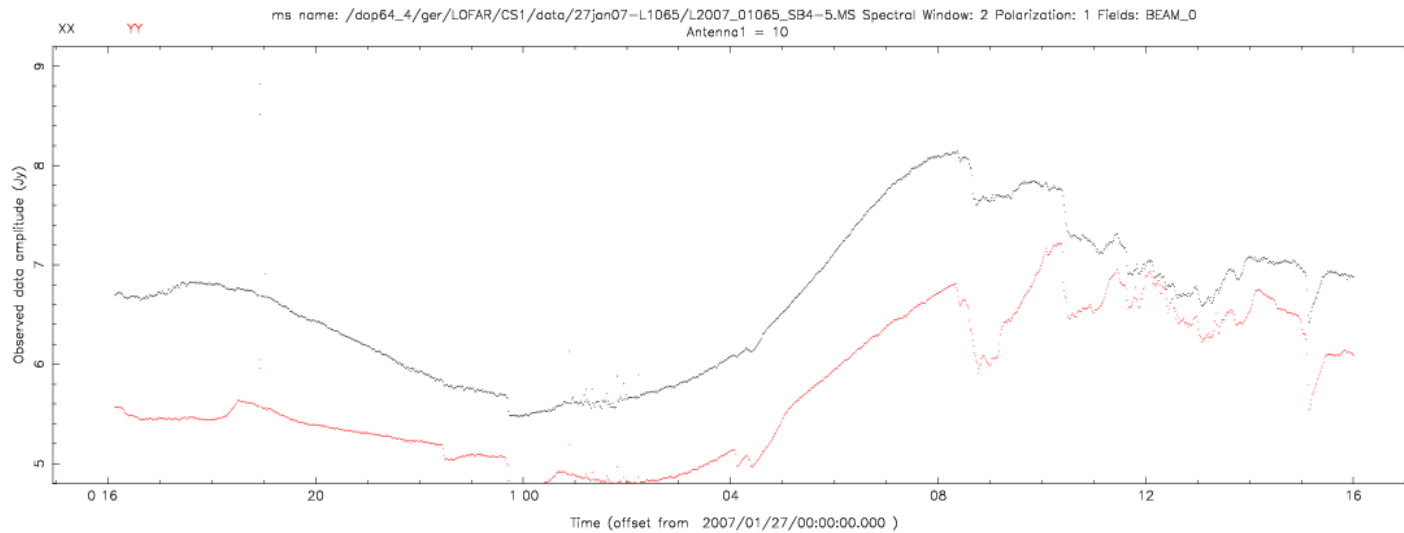
sp64\_4/ger/LOFAR/CS1/data/28jan07-L1068/L2007\_01068\_SB4-5.MS Spectral Window: 2 Polarization: 1 F  
YY  
Antenna1 = 1



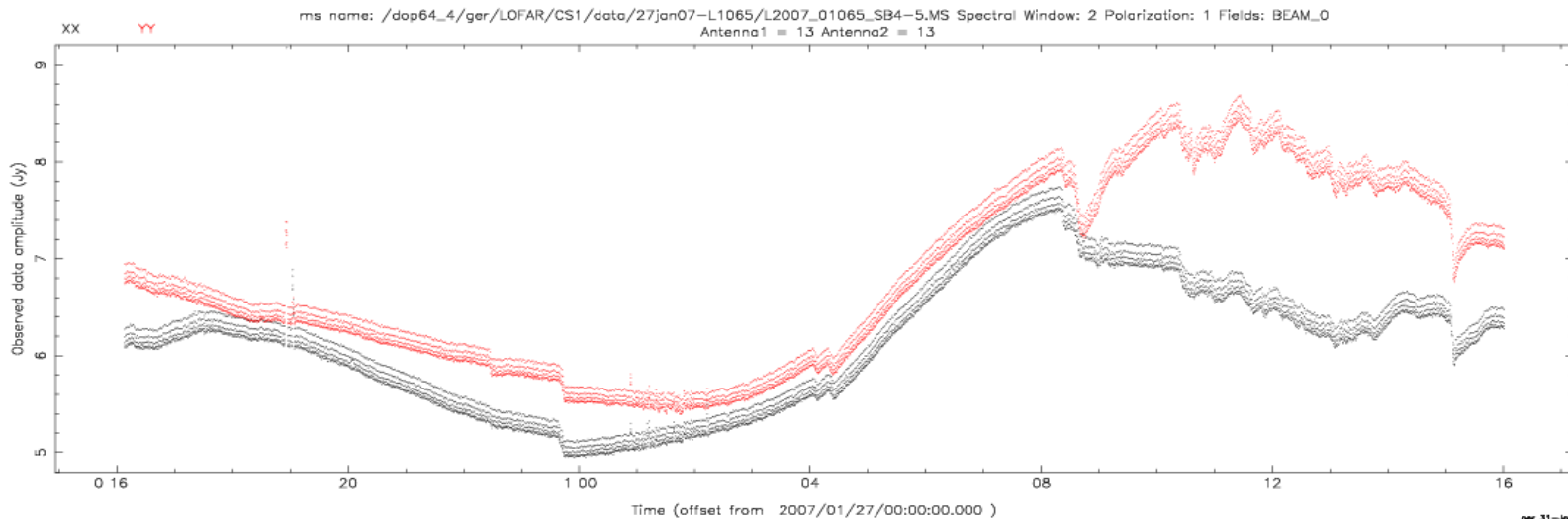
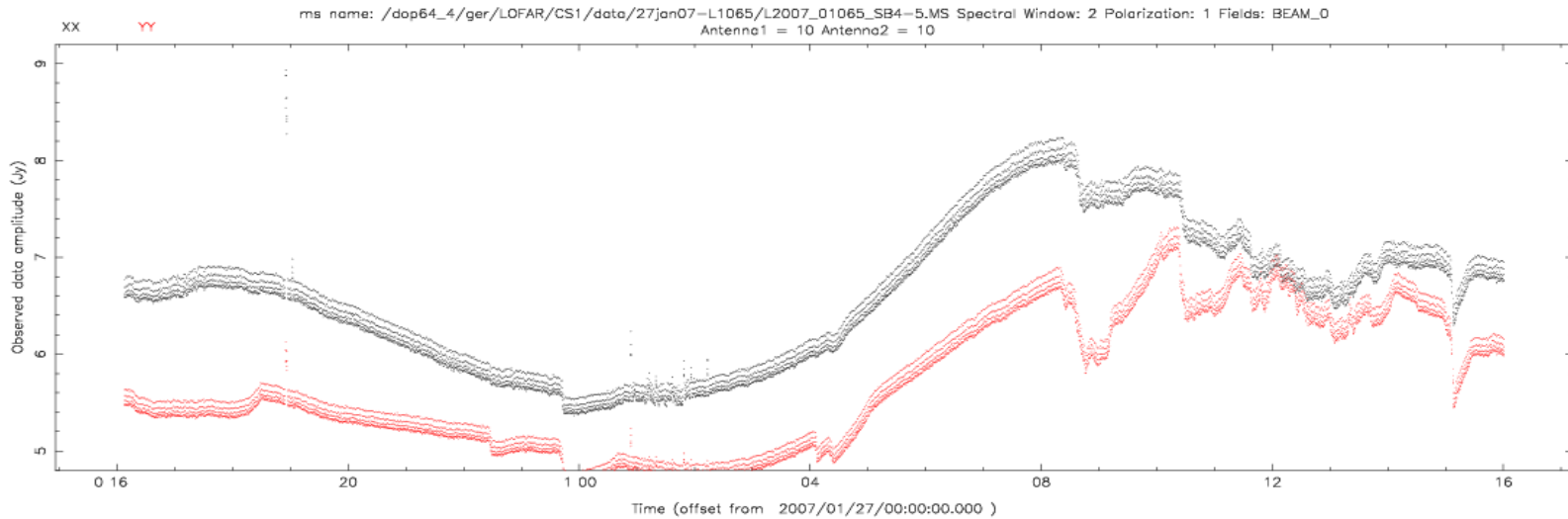
# Saturday rain effects at 60 MHz (L1061, autocorrelations, ANT 10 and 13 )



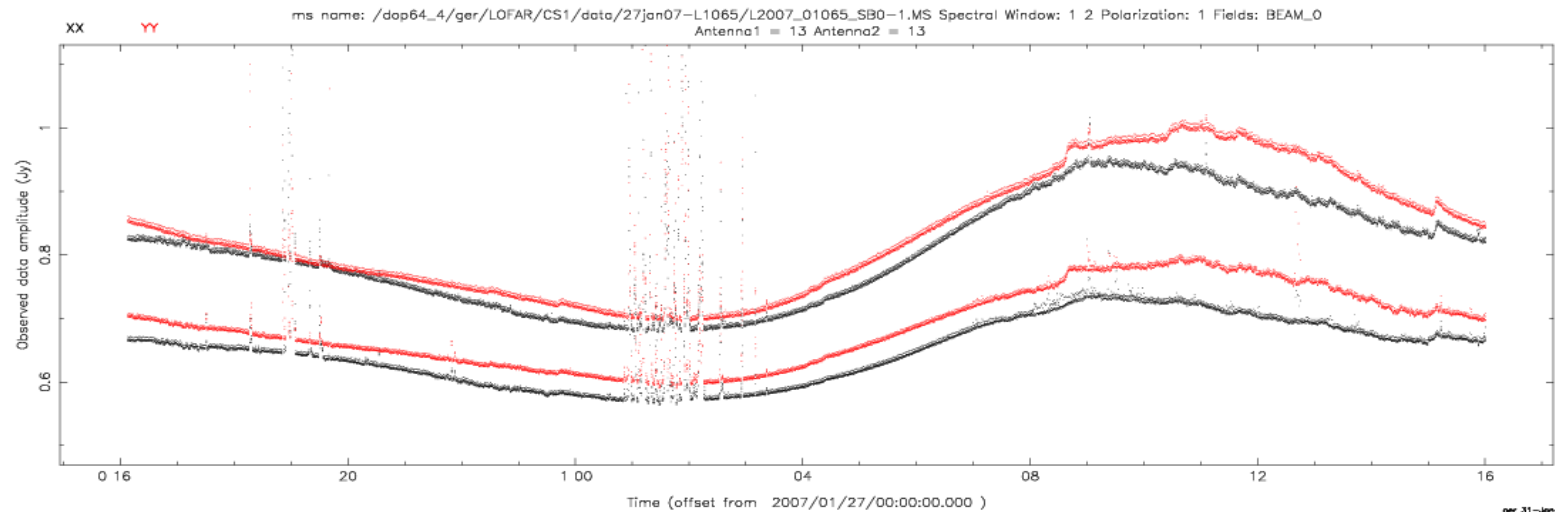
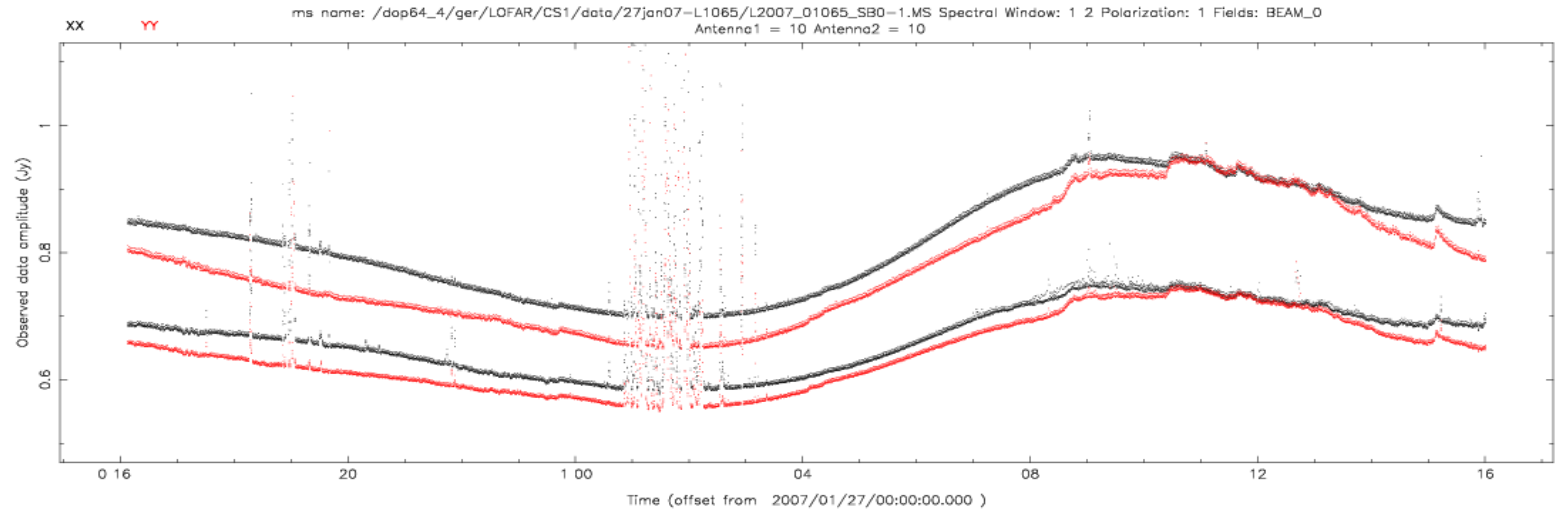
# Sunday rain effects at 60 MHz (L1065, Autocorrelations ANT 10 and 13 )



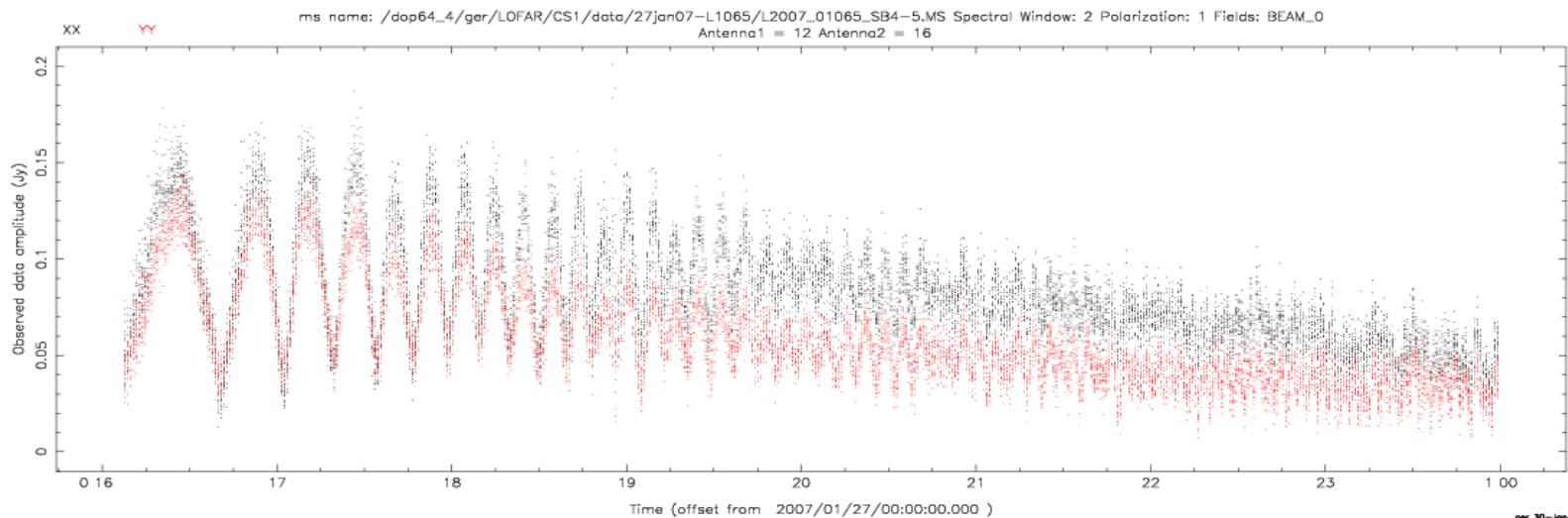
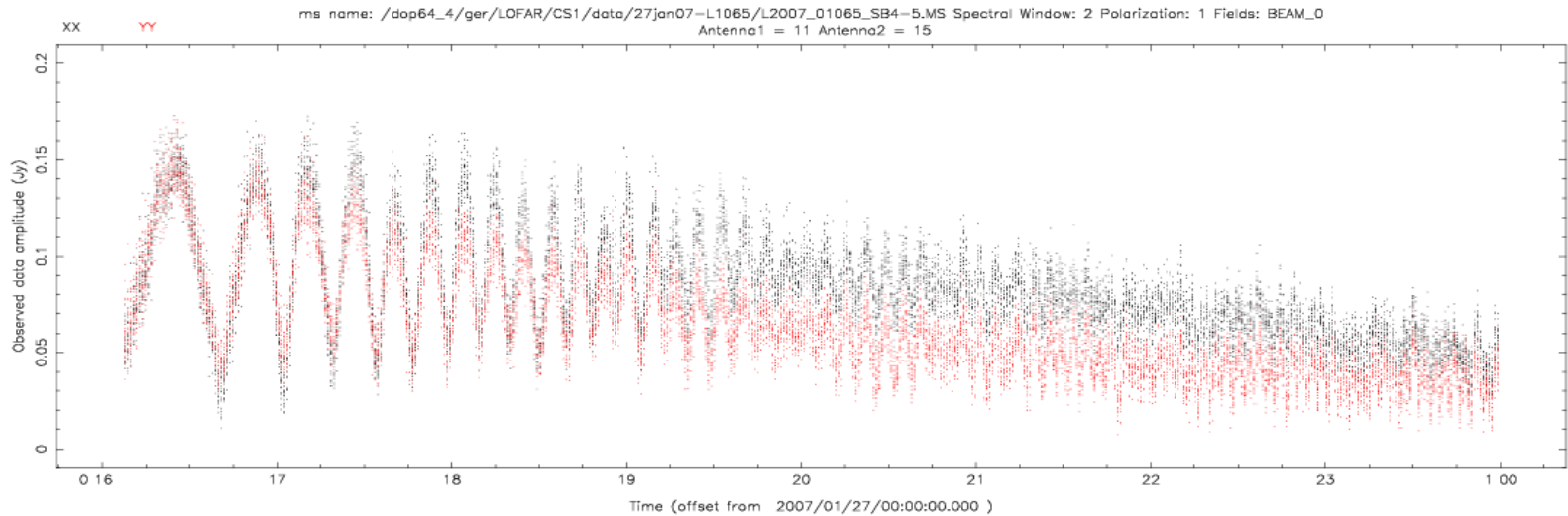
# Sunday rain effects at 60 MHz (L1065, Autocorrelations ANT 10 and 13 , X & Y pol )



# Sunday rain effects at 33 MHz and 38 MHz (L1065, Autocorrelations ANT 10 and 13 , X & Y pol )

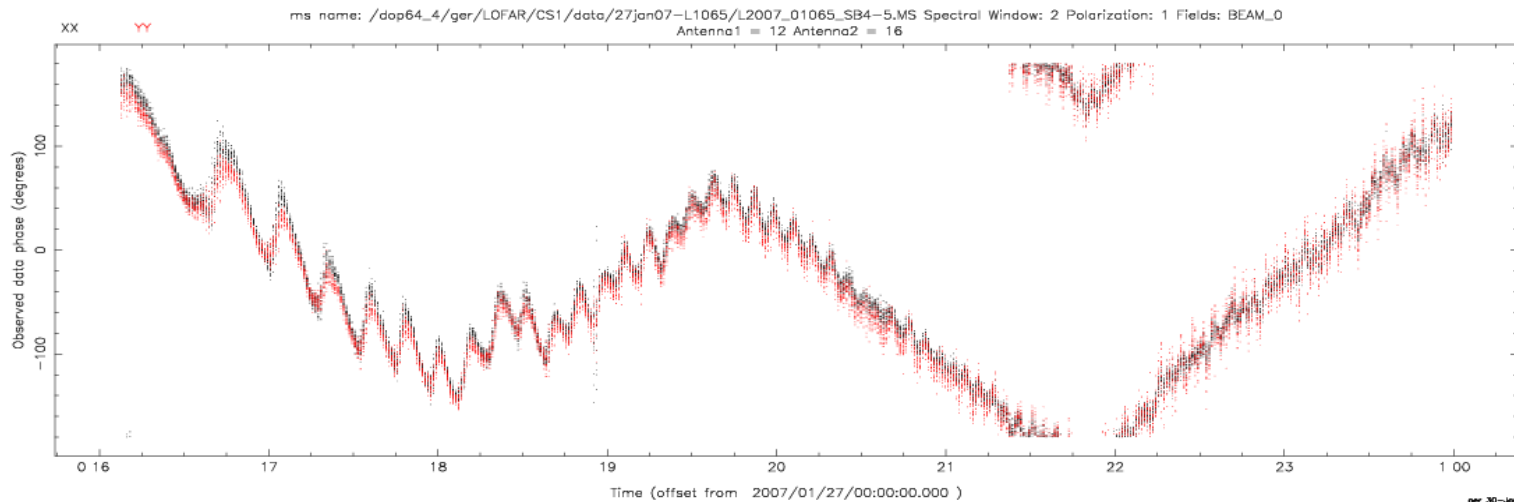
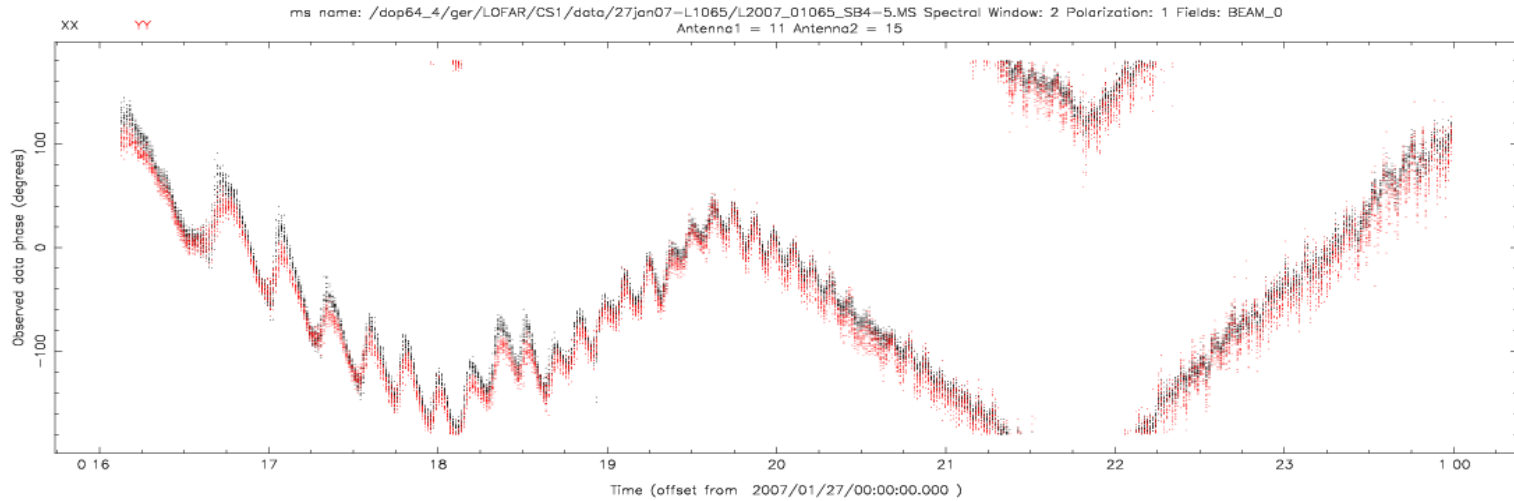


# Amplitude on (redundant) IFR1-15 & IFR12-16, 60MHz Fringes CasA stopped, CygA causes oscillation



# Phase on (redundant) baselines ANT11-15, ANT12-16

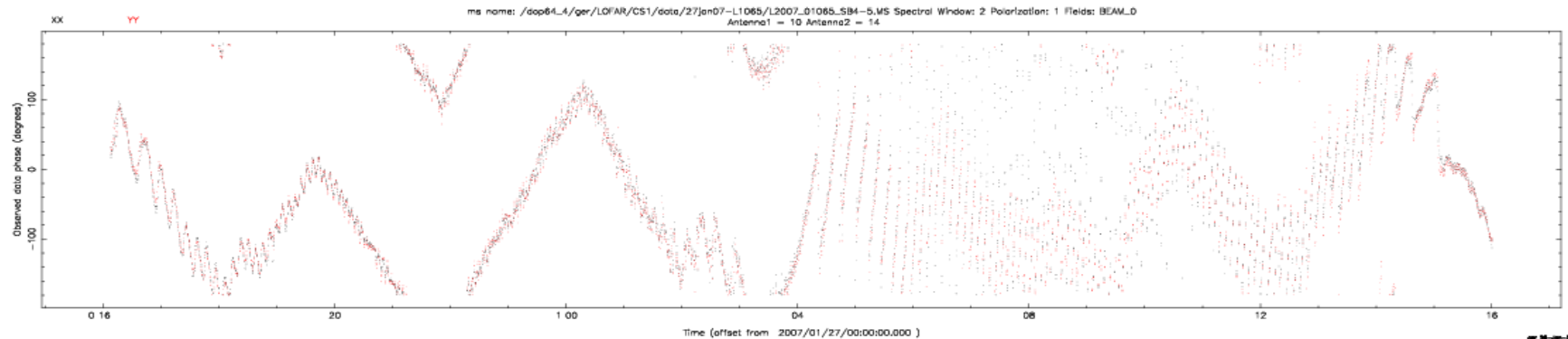
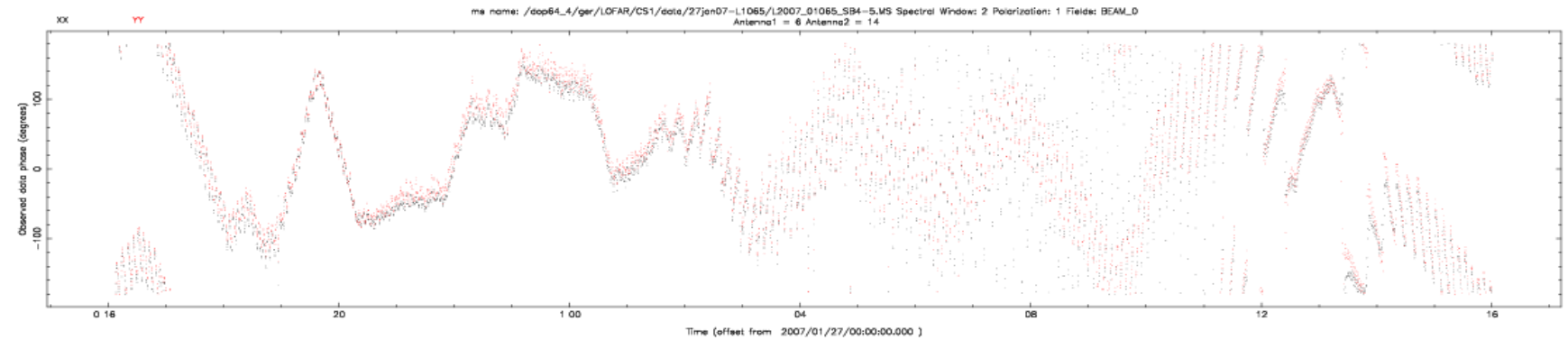
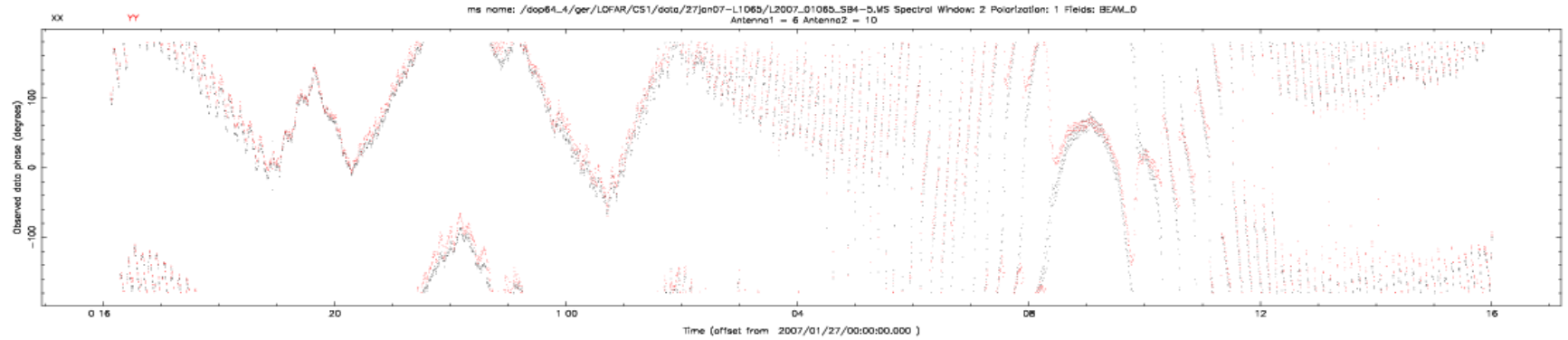
## Fringes CasA stopped, CygA causes oscillation





# Triangle ANT6-10-14      L1065 - 28Jan07

## Closure Phase: $(6-10)+(10-14)-(6-14) \sim 0$



# Simple LBA S/N estimates and A/T ( $\nu$ )

Data from 27/28 Jan 2007: 24h on CasA - L1065 (see wiki observations catalog)

Subband frequencies at- 33,38,44,52,57,60,65,74 MHz (standaard set)

(plus 48,49,50,51,52,53,54,55 (special rain set))

The observed S/N  $\sim 4$  per sample at 60 MHz (see figure)

Since  $S_{\text{CasA}} \sim 20,000 \text{ Jy } (\nu / 60\text{MHz})^{-0.77}$  (good to 10%?), the noise is  $\sim 5000 \text{ Jy}$ .

Thermal noise = SEFD /  $\sqrt{Bt}$

For  $B=0.62 \text{ Khz}$ ,  $t=60\text{s}$  we then derive a SEFD  $\sim 190 \times 5000\text{Jy} \sim 1,000,000 \text{ Jy}$

This corresponds to, for example,  $A/T = 8 \text{ m}^2 / 3000 \text{ K}$  for one dipole at 60 MHz !

(Note:  $A_{\text{eff}}=2760 \text{ m}^2 \rightarrow 1\text{Jy/K}$ )

# HBA test plans Feb-June 2007

## At WHAT platform near WSRT:

- Feb/Mar tile tests (new summator+powersupplier)
- Apr 1 'autonational styrofoam' tile on WHAT platform

## At Exloo (CS-1):

- Feb/Mar 16 close-packed (4x4 tile) dipoles + free 16 dipoles
- Mar/Apr 4x4 tile + 4 dipoles in CS010, and 4 dipoles each at CS001,CS008, CS016
- Apr 6 new styrofoam tiles in Exloo

## Goals/experiments:

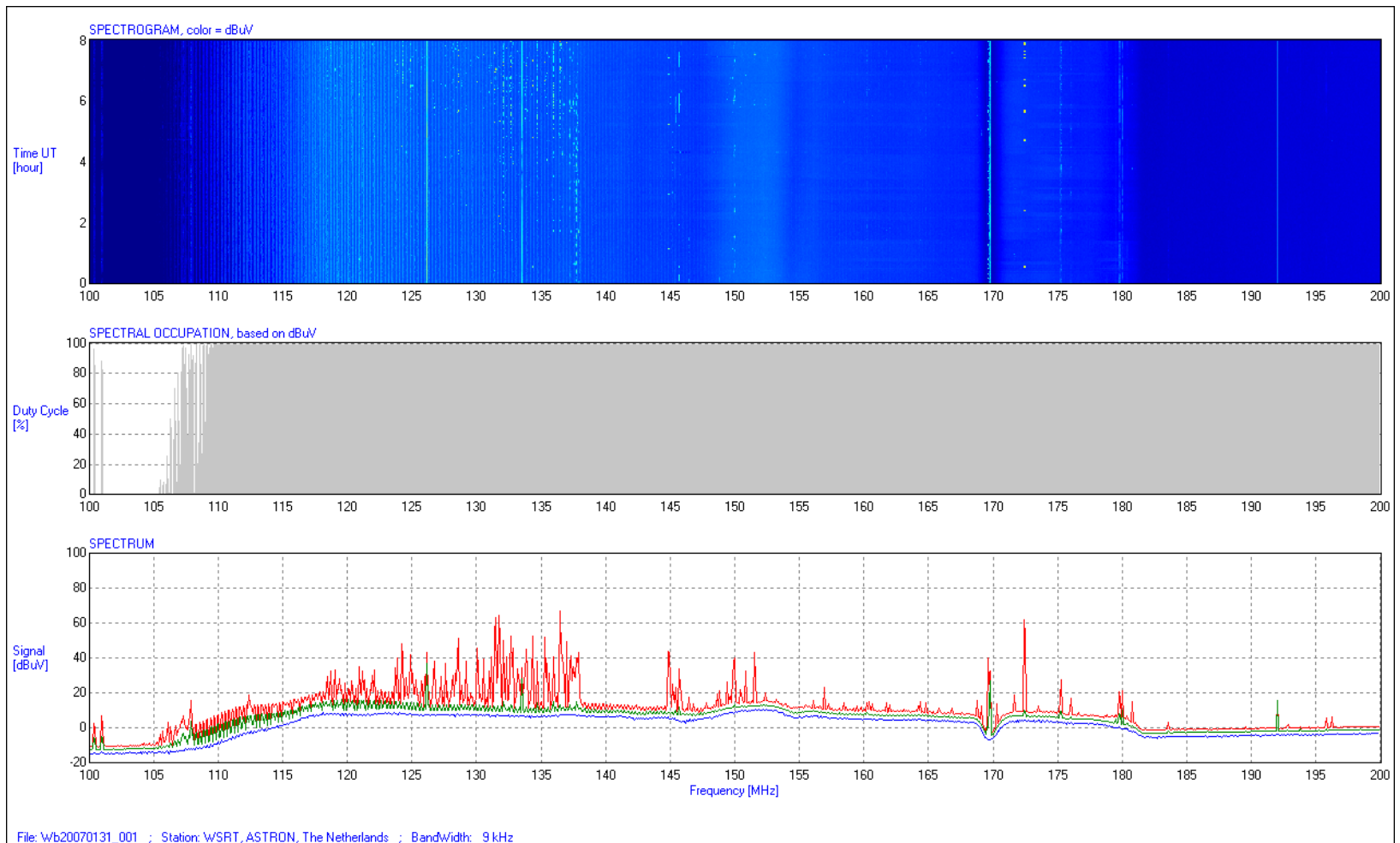
### *technical*

- measure beam, coupling effects as a function of frequency (simulation manpower)
- determine optimal element-spacing in tile and decide on station configuration
- develop optimal station calibration strategy
- measure performance:  $A_{\text{eff}}/T_{\text{sys}}$  (v)

### *astronomical:*

- test calibration pipelines at 120-240 MHz
- measure large scale ionospheric effects, settle flux scale
- study RFI (linearity) / polarization
- ascertain rain effects (hopefully none)

# WSRT/WHAT platform: HBA2 + new summator, X pol (HvdMarel, 31-jan07)



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