Comparisons of correlations using disk-transfer and eVLBI-transfer

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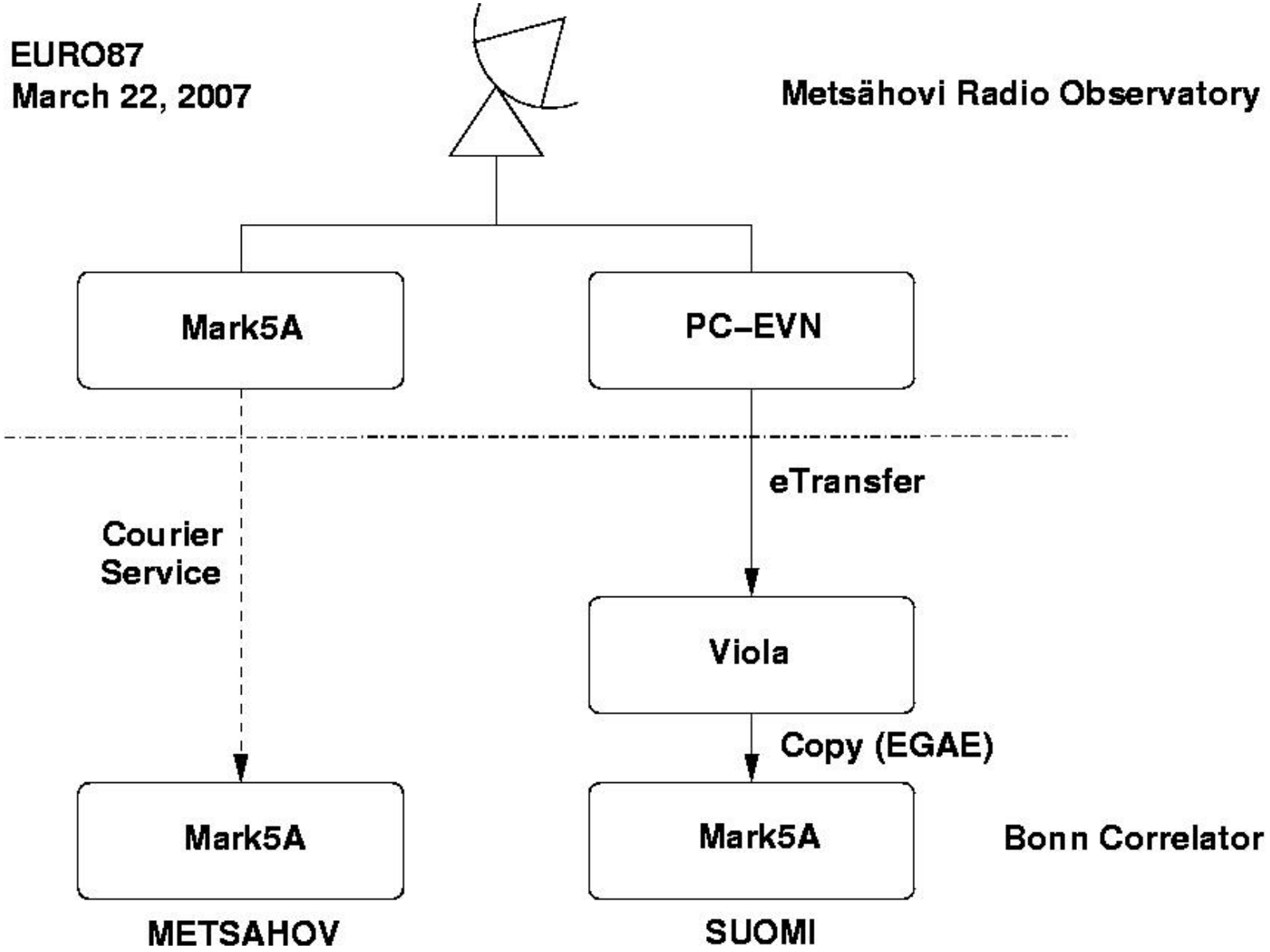
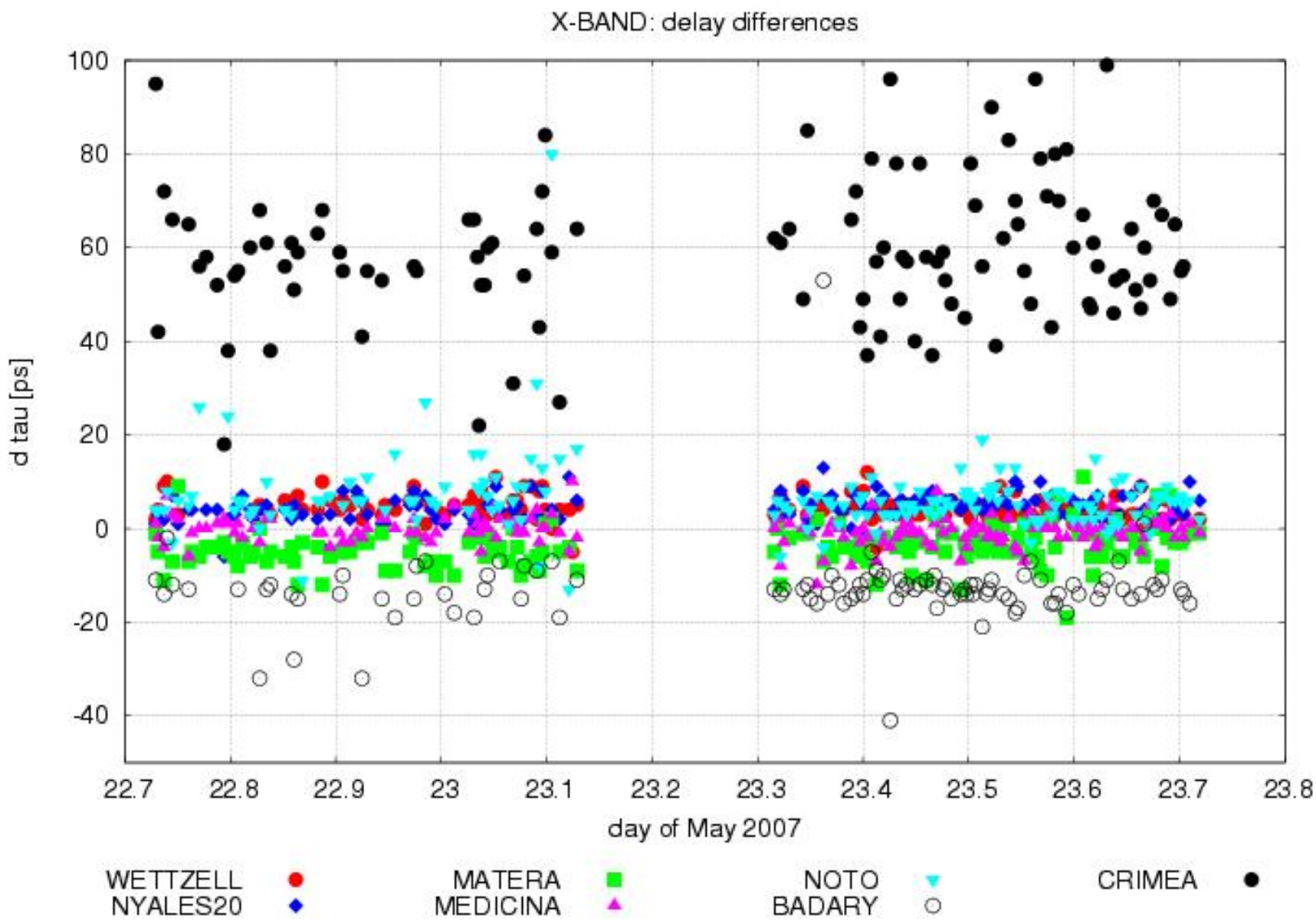
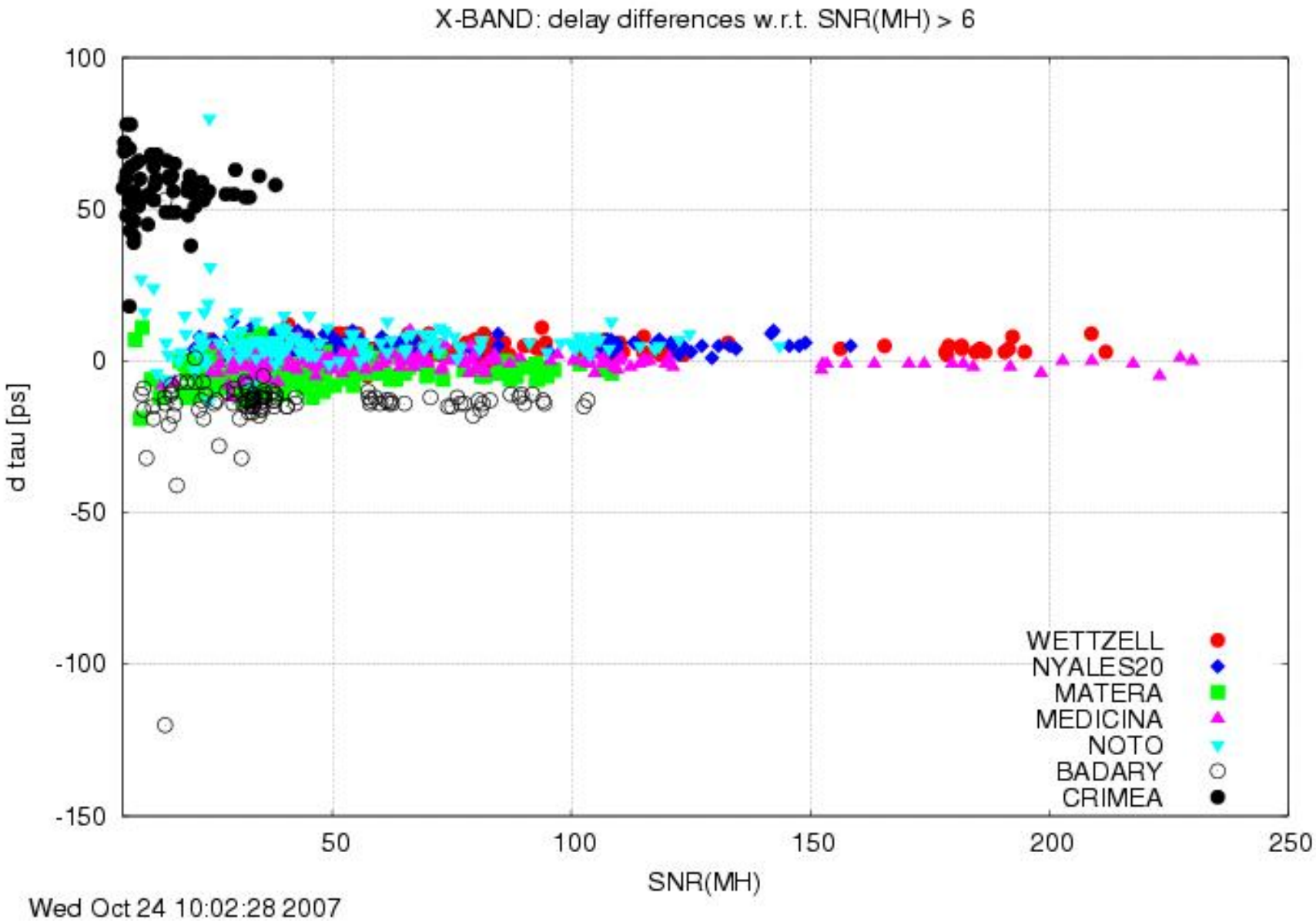
Observation Setup



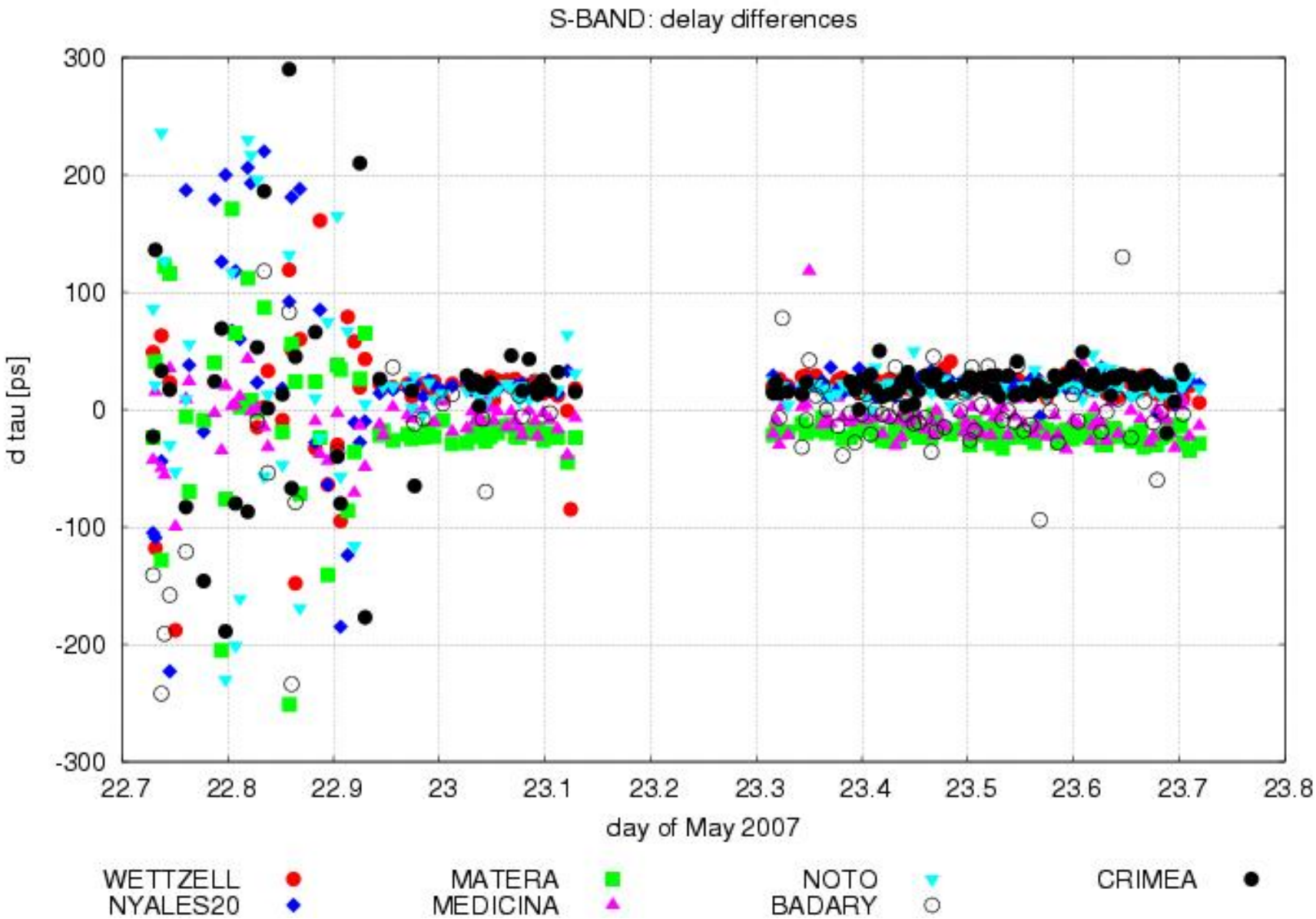
Delays: SUOMI - METSAHOV



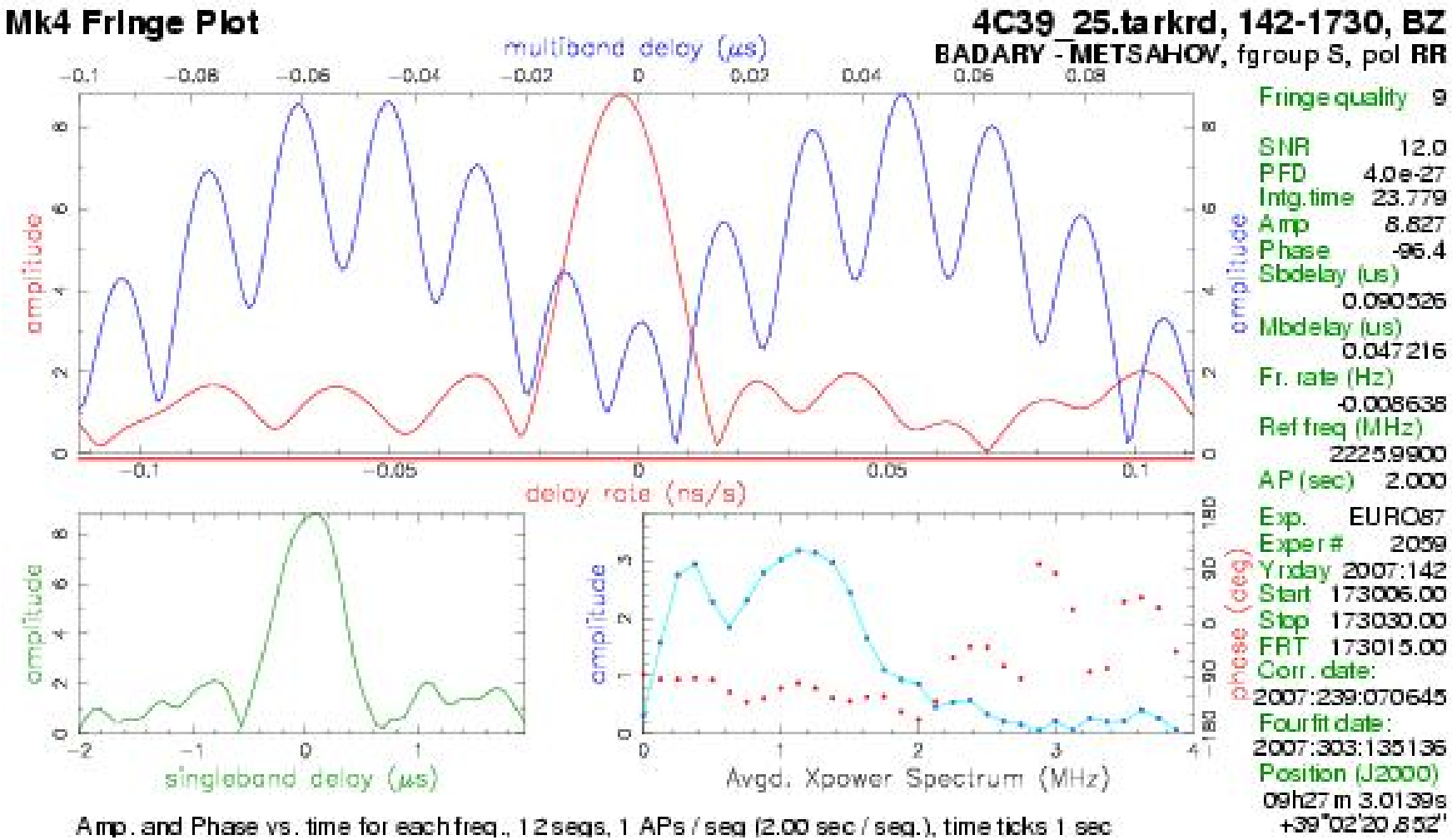
Delays: SUOMI - METSAHOV



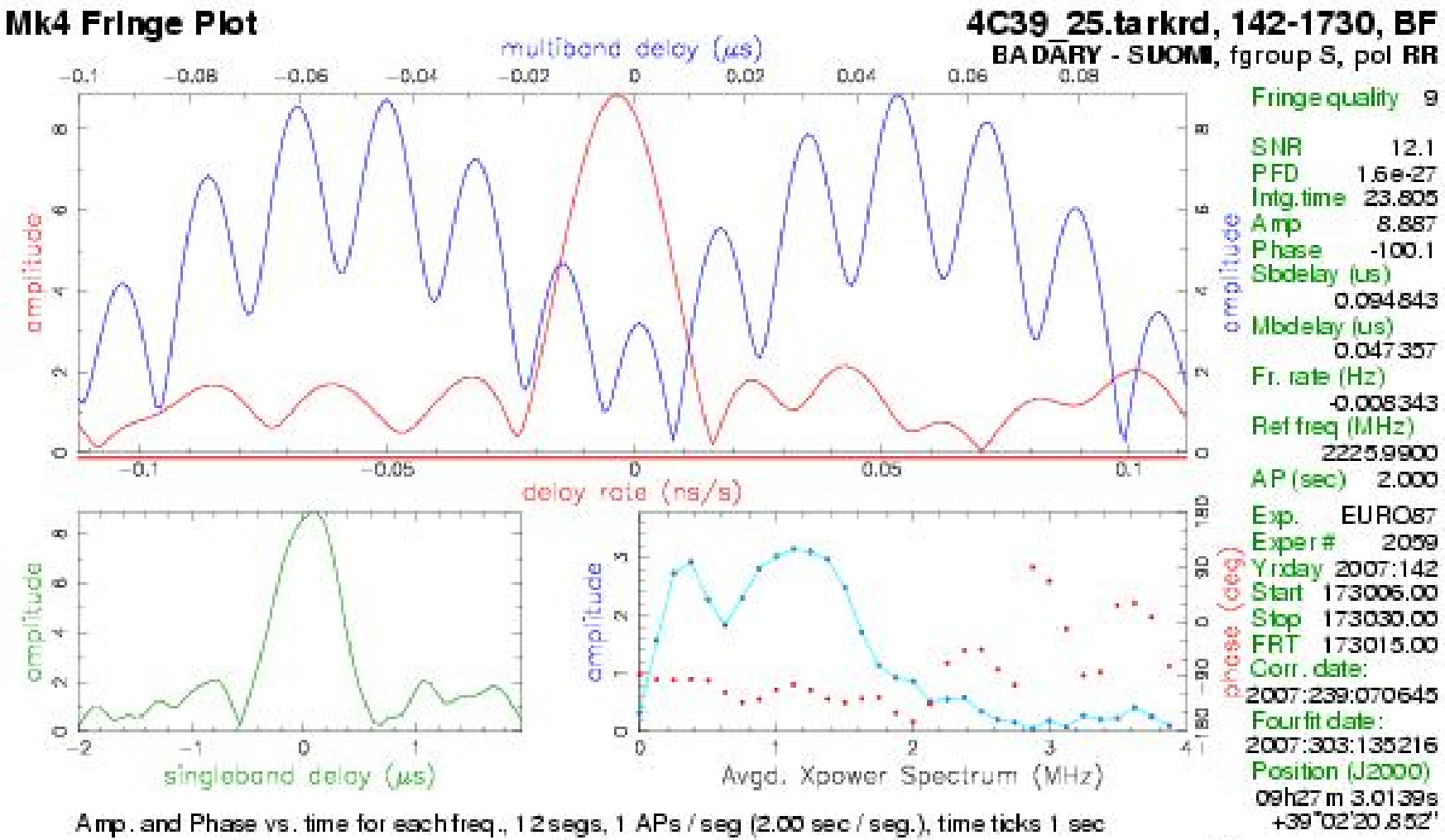
Delays: SUOMI - METSAHOV



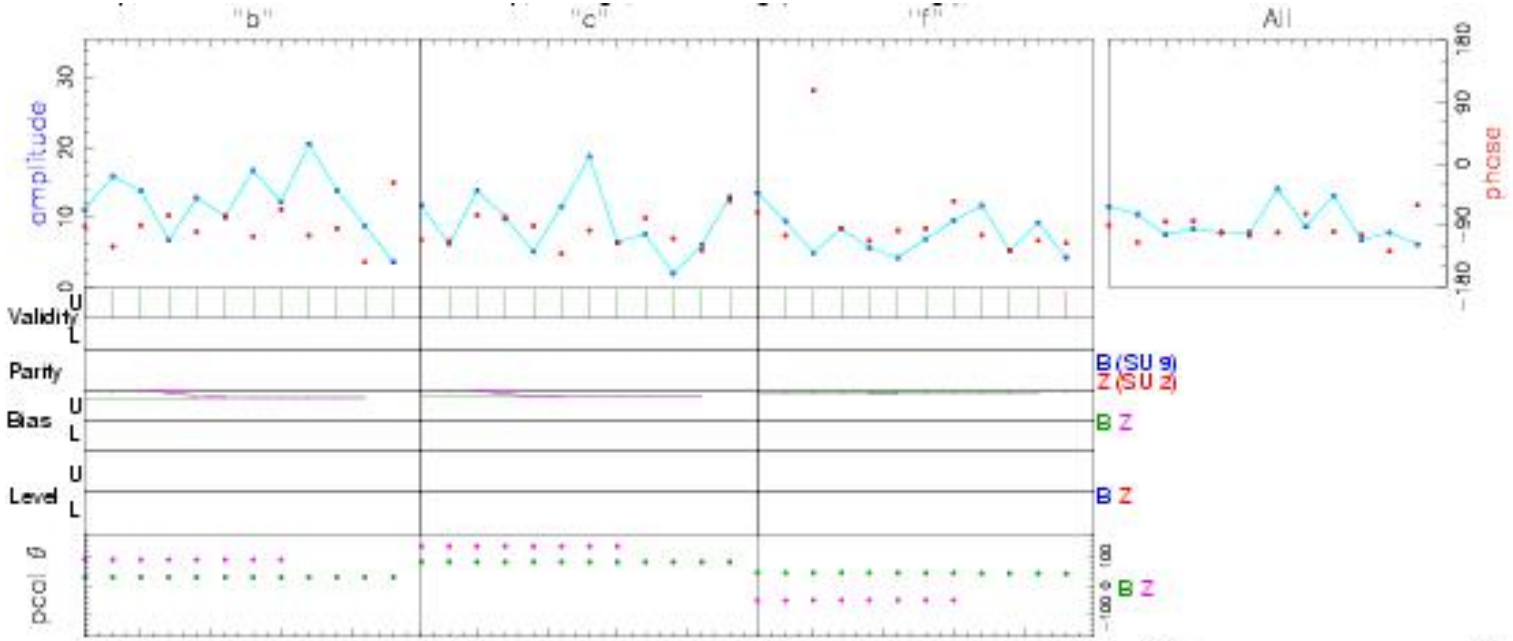
Fringe Plot (top part)



Fringe Plot (top part)



Fringe plot (bottom part)



	2227.99	2237.99	2292.99	Freq (MHz)	All
	-97.1	-95.3	-96.6	Phase	-96.4
	11.4	8.6	6.5	Ampl.	8.7
	35.4	33.4	31.2	Std box	34.4
U/L	12/0	12/0	12/0	APs used	
B Σ	10:1010	10:1010	10:1010	PC freqs	
B Σ	28:90	82:137	43:-53	PC phase	
B Σ	-4:3	-8:0	10:0	Mart PC	
B Σ	29:23	26:20	27:10	PC amp	
B	S2R	S3R	S6R	Chan ids	
	24	26	32	Tracks	
Z	S2R	S3R	S6R	Chan ids	
	15,17	19,21	31,33	Tracks	

Group delay (usec)	-1.08462042755E+04	Apriori delay (usec)	-1.08462514912E+04	Resid mbdelay (usec)	4.72157E-02	+/-	4.6E-04
Sband delay (usec)	-1.08461609655E+04	Apriori clock (usec)	-2.00009577E-02	Resid sbdelay (usec)	9.05257E-02	+/-	1.1E-02
Phase delay (usec)	-1.08462516114E+04	Apriori clockrate (us/s)	-6.39999999E-07	Resid phdelay (usec)	-1.20260E-04	+/-	1.2E-05
Delay rate (us/s)	-4.74737842796E-01	Apriori rate (us/s)	-4.74733967967E-01	Resid rate (us/s)	-3.87483E-06	+/-	8.6E-07
Total phase (deg)	-224.8	Apriori accel (us/s/s)	5.18132541527E-05	Resid phase (deg)	-96.4	+/-	9.5

	RMS	Theor.			
ph/seg (deg)	16.7	15.8	Amplitude	8.827 +/- 0.733	Pcal mode: NORMAL, NORMAL
amp/seg (%)	27.7	27.5	Search (32X64)	8.383	Pcal rate: -3.273E-08, -2.706E-08 (us/s)
ph/frq (deg)	0.7	6.7	Interp.	8.396	Bits/sample: 1 SampCntNorm: disabled
amp/frq (%)	22.6	11.7	hc. seg. avg	8.808	Sample rate(MSamp/s): 8
			hc. frq avg.	8.737	Data rate(Mb/s): 24 nlags: 32

Control file: cf_2059 Input file: /datafs/2059/142-1730/BZ..tarkrd Output file: Suppressed by test mode

Fringe plot differences

	2227.99		2237.99		2292.99		Freq (MHz)						All
	-97.1		-95.3		-96.6		Phase						-96.4
	11.4		8.6		6.5		Ampl.						8.7
	35.4		33.4		31.2		Std box						34.4
U/L	12:0		12:0		12:0		APs used						
B:Z	10:10:10		10:10:10		10:10:10		PC freqs						
B:Z	28:90		82:137		43:-53		PC phase						
B:Z	-4:3		-8:0		10:0		Mart PC						
B:Z	29:23		26:20		27:10		PC amp						
B	S2R		S3R		S6R		Chan ids						
	24		26		32		Tracks						
Z	S2R		S3R		S6R		Chan ids						
	15.17		19.21		31.33		Tracks						

Group delay (usec)	-1.0846204275 5E+04	Apriori delay (usec)	-1.0846251491 2E+04	Resid mbdelay (usec)	4.72157E-02	+/-	4.6E-04
Sbandi delay (usec)	-1.0846160065 5E+04	Apriori clock (usec)	-2.0009577E-02	Resid sbdelay (usec)	9.05257E-02	+/-	1.1E-02
Phase delay (usec)	-1.0846251611 4E+04	Apriori clock rate (us/s)	-6.3009906E-07	Resid phdelay (usec)	-1.20380E-04	+/-	1.2E-05
Delay rate (us/s)	-4.7473784279 6E-01	Apriori rate (us/s)	-4.7473396796 7E-01	Resid rate (us/s)	-3.87483E-06	+/-	8.6E-07
Total phase (deg)	-224.8	Apriori accel (us/s/s)	5.1813254152 7E-05	Resid phase (deg)	-96.4	+/-	9.5

	RMS	Theor.	Amplitude	8.827 +/- 0.733
ph/seg (deg)	16.7	15.8	Search (32X64)	8.383
amp/seg (%)	27.7	27.5	Interp.	8.396
ph/frq (deg)	0.7	6.7	Inc. seg. avg	8.808
amp/frq (%)	22.6	11.7	Inc. frq avg.	8.737

Pcal mode: NORMAL NORMAL
Pcal rate: -3.273E-08 -2.706E-08 (us/s)
Bits/sample: 1 SampCntNorm: disabled
Sample rate(MSamp/s): 8
Data rate(Mb/s): 24 nlags: 32

METSAHOV

	2227.99		2237.99		2292.99		Freq (MHz)						All
	-102.2		-96.7		-100.7		Phase						-100.1
	11.4		8.6		6.7		Ampl.						8.8
	35.4		33.4		31.1		Std box						34.5
U/L	12:0		12:0		12:0		APs used						
B:F	10:10:10		10:10:10		10:10:10		PC freqs						
B:F	28:90		82:137		43:-53		PC phase						
B:F	-4:1		-8:3		10:0		Mart PC						
B:F	29:23		26:20		27:10		PC amp						
B	S2R		S3R		S6R		Chan ids						
	24		26		32		Tracks						
F	S2R		S3R		S6R		Chan ids						
	15.17		19.21		31.33		Tracks						

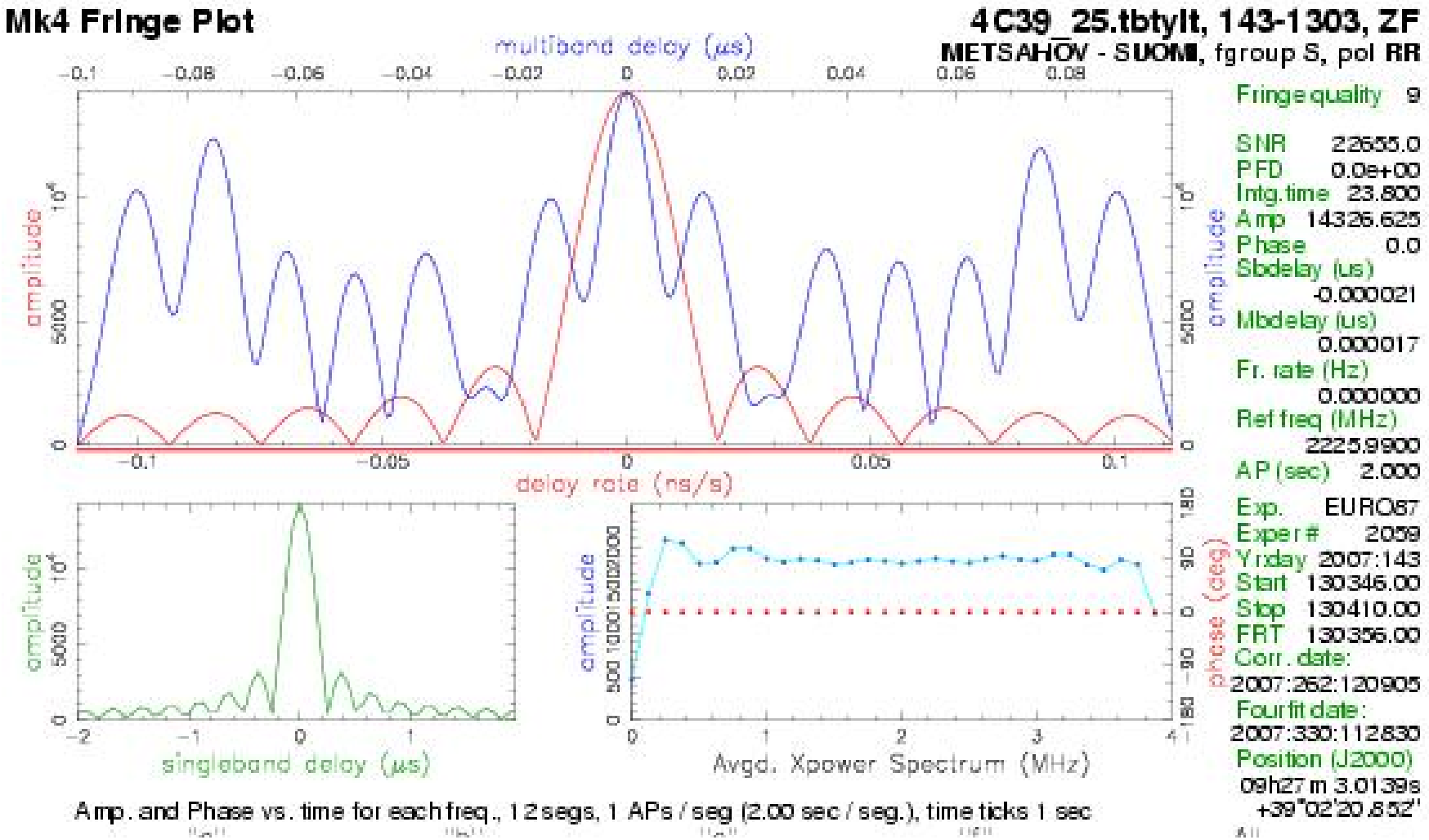
Group delay (usec)	-1.0846204134 4E+04	Apriori delay (usec)	-1.0846251491 2E+04	Resid mbdelay (usec)	4.73567E-02	+/-	4.6E-04
Sbandi delay (usec)	-1.0846156647 8E+04	Apriori clock (usec)	-2.0009577E-02	Resid sbdelay (usec)	9.48434E-02	+/-	1.1E-02
Phase delay (usec)	-1.0846251616 0E+04	Apriori clock rate (us/s)	-6.3009906E-07	Resid phdelay (usec)	-1.24873E-04	+/-	1.2E-05
Delay rate (us/s)	-4.7473771035 1E-01	Apriori rate (us/s)	-4.7473396796 7E-01	Resid rate (us/s)	-3.74238E-06	+/-	8.5E-07
Total phase (deg)	-228.5	Apriori accel (us/s/s)	5.1813254152 7E-05	Resid phase (deg)	-100.1	+/-	9.5

	RMS	Theor.	Amplitude	8.887 +/- 0.733
ph/seg (deg)	17.1	15.7	Search (32X64)	8.376
amp/seg (%)	27.4	27.4	Interp.	8.389
ph/frq (deg)	2.3	6.7	Inc. seg. avg	8.894
amp/frq (%)	21.8	11.7	Inc. frq avg.	8.804

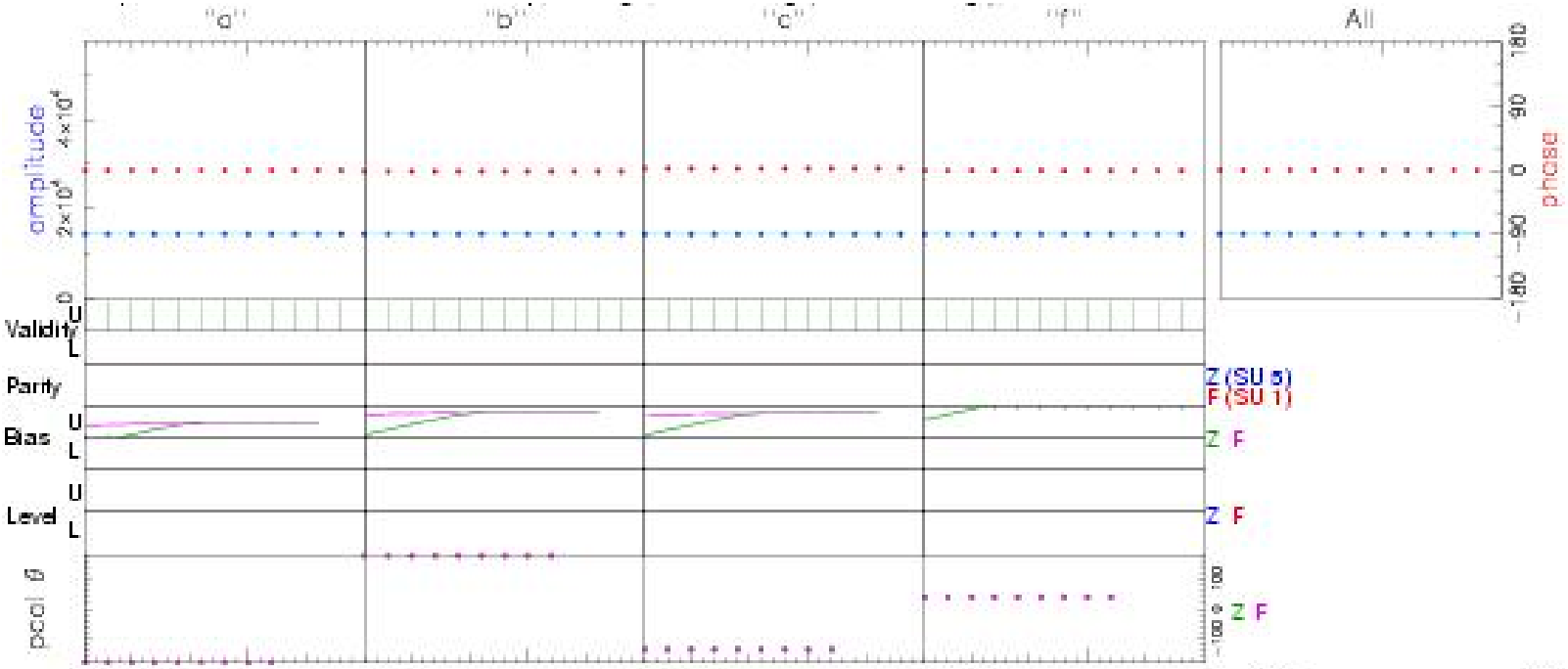
Pcal mode: NORMAL NORMAL
Pcal rate: -3.273E-08 -2.706E-08 (us/s)
Bits/sample: 1 SampCntNorm: disabled
Sample rate(MSamp/s): 8
Data rate(Mb/s): 24 nlags: 32

SUOMI

Zero baseline with phase offsets



Zero baseline with phase offsets

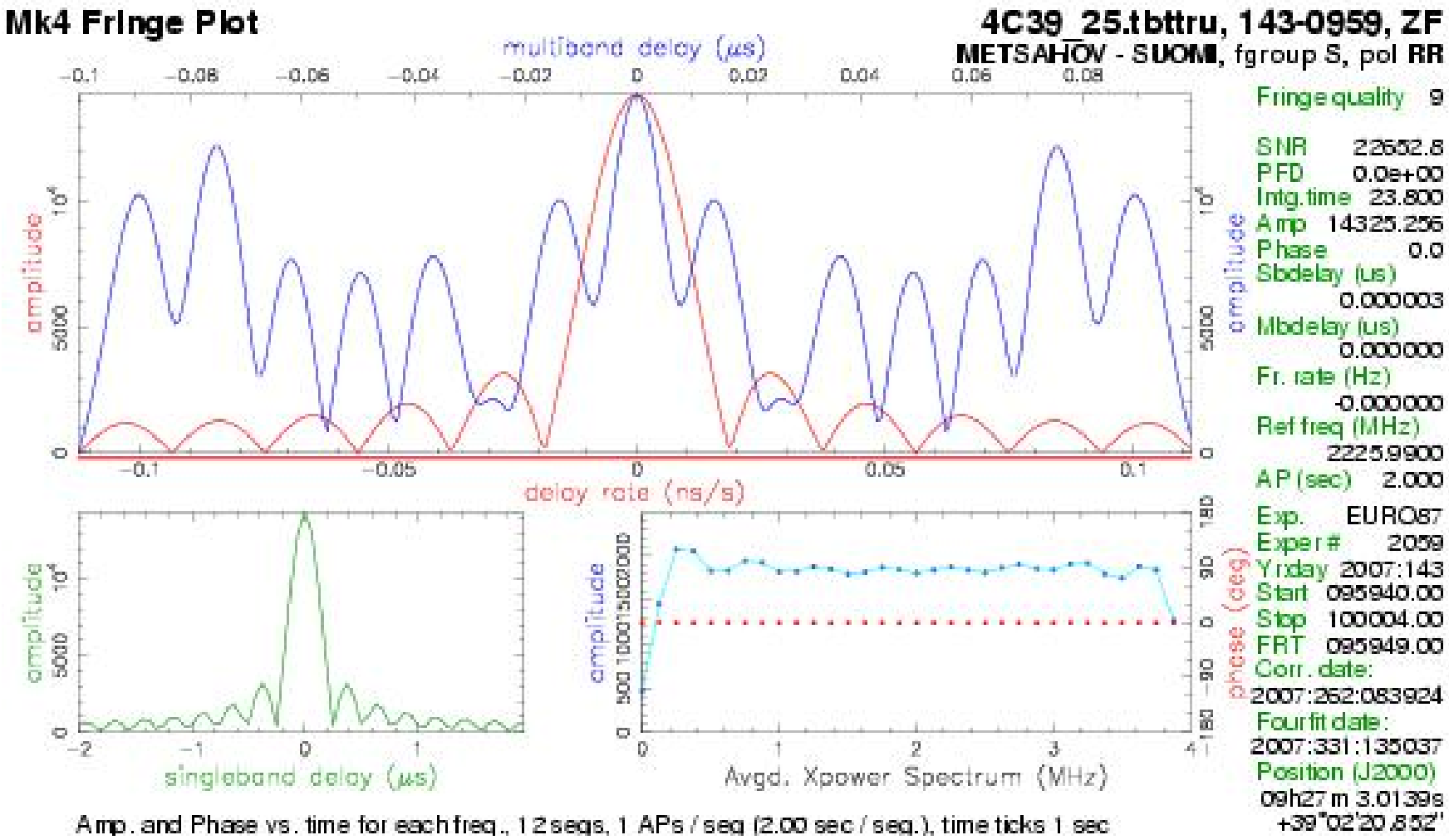


	2212.99	2227.99	2237.99	2292.99	Freq (MHz)	All
	-0.2	-1.7	2.4	-0.4	Phase	0.0
	14358.7	14332.9	14317.3	14317.3	Ampl.	14331.6
	33.0	33.0	33.0	33.0	Sbd bw	33.0
U/L	12/0	12/0	12/0	12/0	APs used	
Z/F	1010:1010	1010:1010	1010:1010	1010:1010	PC freqs	
Z/F	-179:-179	178:178	-136:-136	40:40	PC phase	
Z/F	-3:-4	3:1	0:3	0:0	Nani PC	
Z/F	28:28	22:22	21:21	9:9	PC amp	
Z	S1R	S2R	S3R	S6R	Chan ids	
	11,13	15,17	19,21	31,33	Tracks	
F	S1R	S2R	S3R	S6R	Chan ids	
	11,13	15,17	19,21	31,33	Tracks	

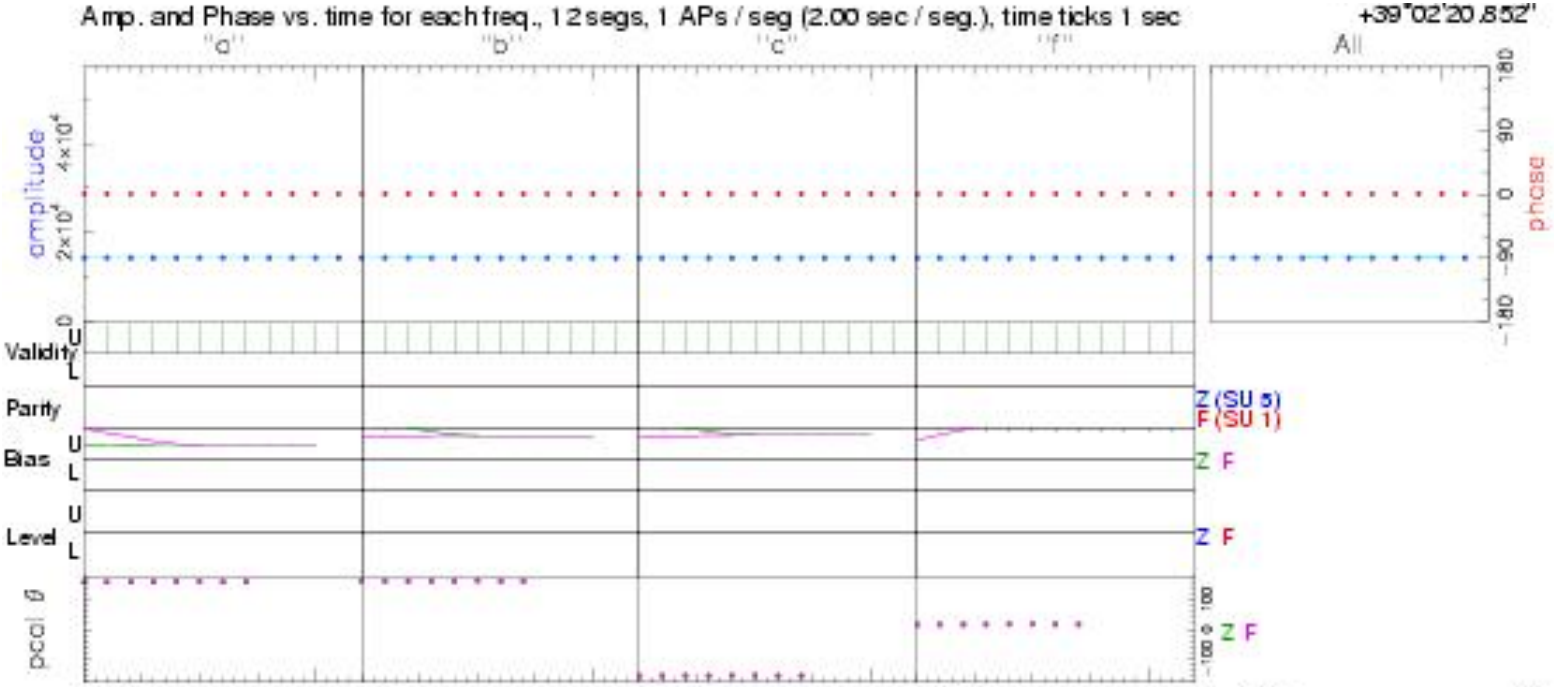
Group delay (usec)	1.690478993716E-05	Apriori delay (usec)	0.000000000000E+00	Resid mbdelay (usec)	1.690489E-05	+/-	2.3E-07
Sband delay (usec)	-2.088205392091E-05	Apriori clock (usec)	0.000000000E+00	Resid sbdelay (usec)	-2.088621E-05	+/-	6.1E-08
Phase delay (usec)	4.524804537666E-08	Apriori clock rate (us/s)	0.000000000E+00	Resid phdelay (usec)	4.524880E-08	+/-	6.3E-09
Delay rate (us/s)	5.861993127746E-11	Apriori rate (us/s)	0.000000000000E+00	Resid rate (us/s)	5.861993E-11	+/-	4.6E-10
Total phase (deg)	0.0	Apriori accel (us/s/s)	0.000000000000E+00	Resid phase (deg)	0.0	+/-	0.0

	RMS	Theor.			
			Amplitude	14326.625 +/- 0.632	Pcal mode: NORMAL, NORMAL
ph/seg (deg)	0.0	0.0	Search (32X128)	14326.552	Pcal rate: 7.398E-09, 7.444E-09 (us/s)
amp/seg (%)	0.0	0.0	Interp.	14326.552	Bits/sample: 1 SampCntNorm: disabled
ph/frq (deg)	1.5	0.0	Inc. seg. avg	14326.630	Sample rate(MSamp/s): 8
amp/frq (%)	0.1	0.0	Inc. frq avg	14331.554	Data rate(Mb/s): 32 nlags: 32

Zero baseline with identical phase offsets



Zero baseline with identical phase offsets



	2212.99	2227.99	2237.99	2292.99	Freq (MHz)	All
	0.0	0.0	0.0	0.0	Phase	0.0
	14351.4	14313.2	14317.5	14318.9	Ampl	14325.3
	33.0	33.0	33.0	33.0	Sbd box	33.0
U/L	12/0	12/0	12/0	12/0	APs used	
Z/F	1010:1010	1010:1010	1010:1010	1010:1010	PC freqs	
Z/F	161:161	164:164	-158:-158	16:16	PC phase	
Z/F	-3:-3	3:3	0:0	0:0	Man PC	
Z/F	26:26	19:19	19:19	9:9	PC amp	
Z	S1R	S2R	S3R	S6R	Chan ids	
	11,13	15,17	19,21	31,33	Tracks	
F	S1R	S2R	S3R	S6R	Chan ids	
	11,13	15,17	19,21	31,33	Tracks	

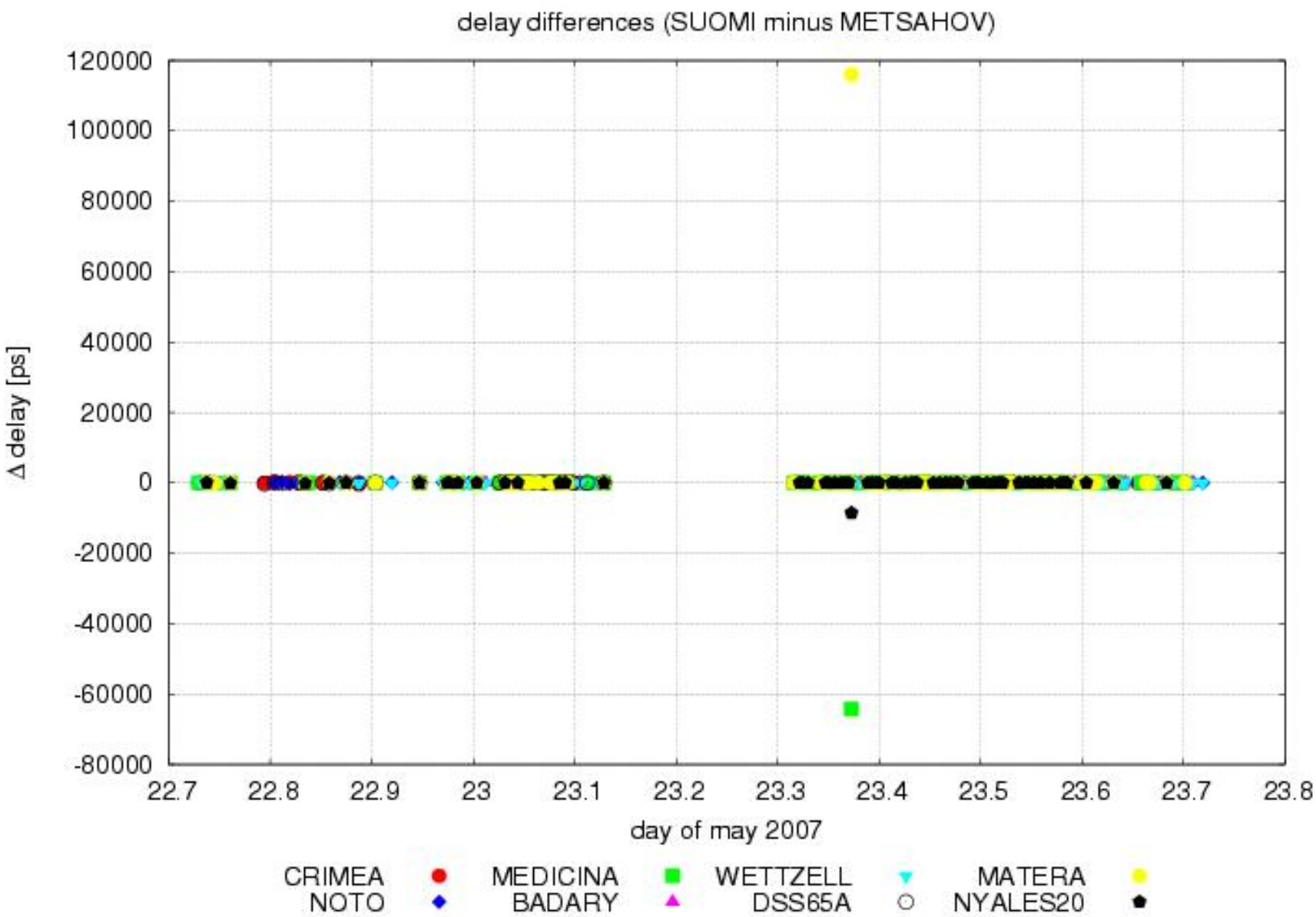
Group delay (usec)	1.412563561125E-07	Apriori delay (usec)	0.000000000000E+00	Resid mbdelay (usec)	1.412565E-07	+/-	2.3E-07
Sband delay (usec)	2.876765480495E-06	Apriori clock (usec)	0.0000000E+00	Resid sbdelay (usec)	2.876777E-06	+/-	6.1E-06
Phase delay (usec)	2.972275530066E-09	Apriori clock rate (us/s)	0.0000000E+00	Resid phdelay (usec)	2.972238E-09	+/-	6.3E-09
Delay rate (us/s)	5.145658004195E-10	Apriori rate (us/s)	0.000000000000E+00	Resid rate (us/s)	5.145666E-10	+/-	4.6E-10
Total phase (deg)	0.0	Apriori accel (us/s/s)	0.000000000000E+00	Resid phase (deg)	0.0	+/-	0.0

	RMS	Theor.	Amplitude	14325.256 +/- 0.632
ph/seg (deg)	0.0	0.0	Search (32X 128)	14325.256
amp/seg (%)	0.0	0.0	Interp.	14325.256
ph/frq (deg)	0.0	0.0	Inc. seg. avg	14325.251
amp/frq (%)	0.1	0.0	Inc. frq avg.	14325.256

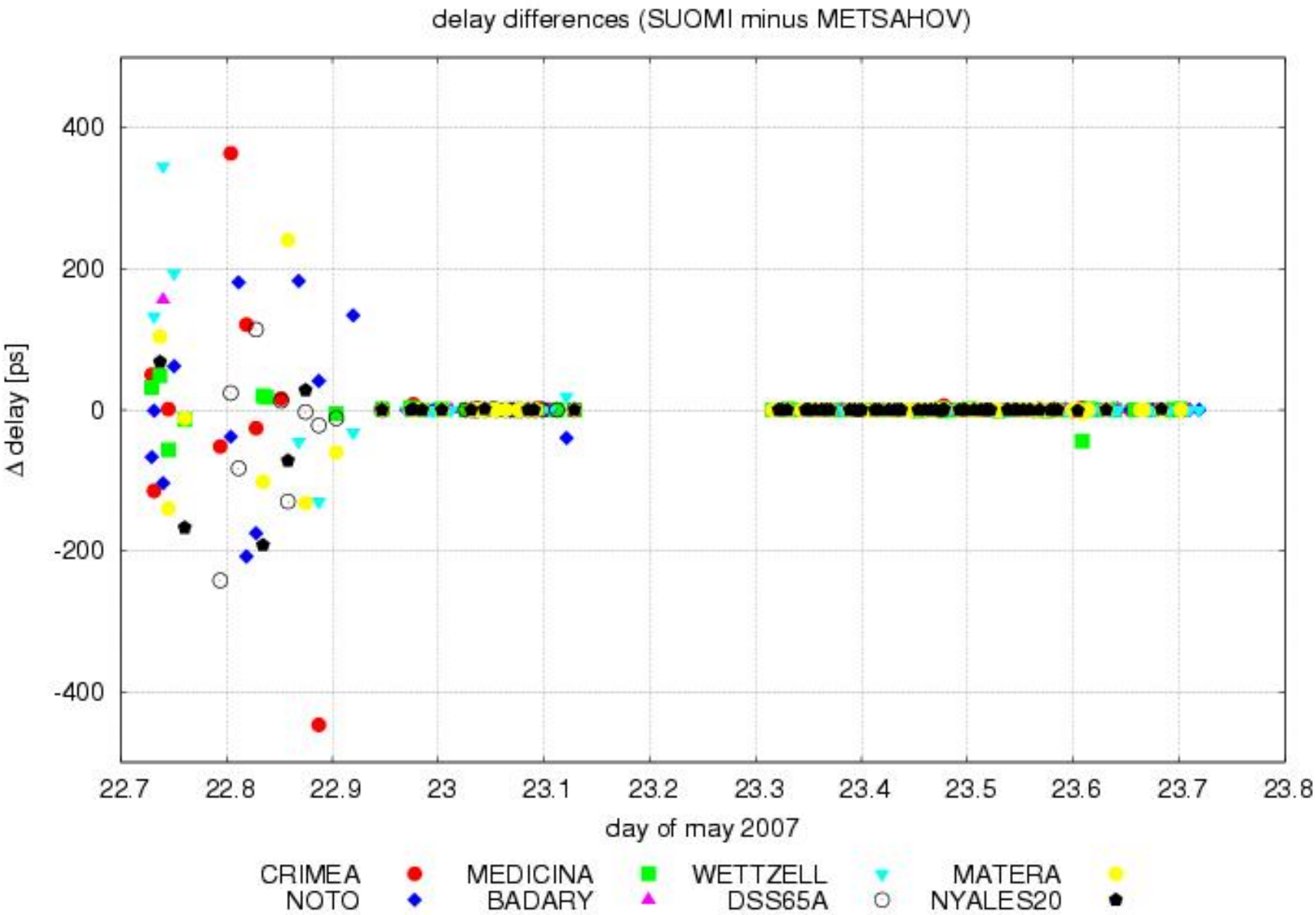
Pcal mode: NORMAL, NORMAL
Pcal rate: 8.078E-08, 8.129E-08 (us/s)
Bits/sample: 1 SampCntNorm: disabled
Sample rate(MSamp/s): 8
Data rate(Mb/s): 32 nlags: 32

Control file: cf_2059 Input file: /datafs/2059/143-0959/2F..tbitru Output file: Suppressed by test mode

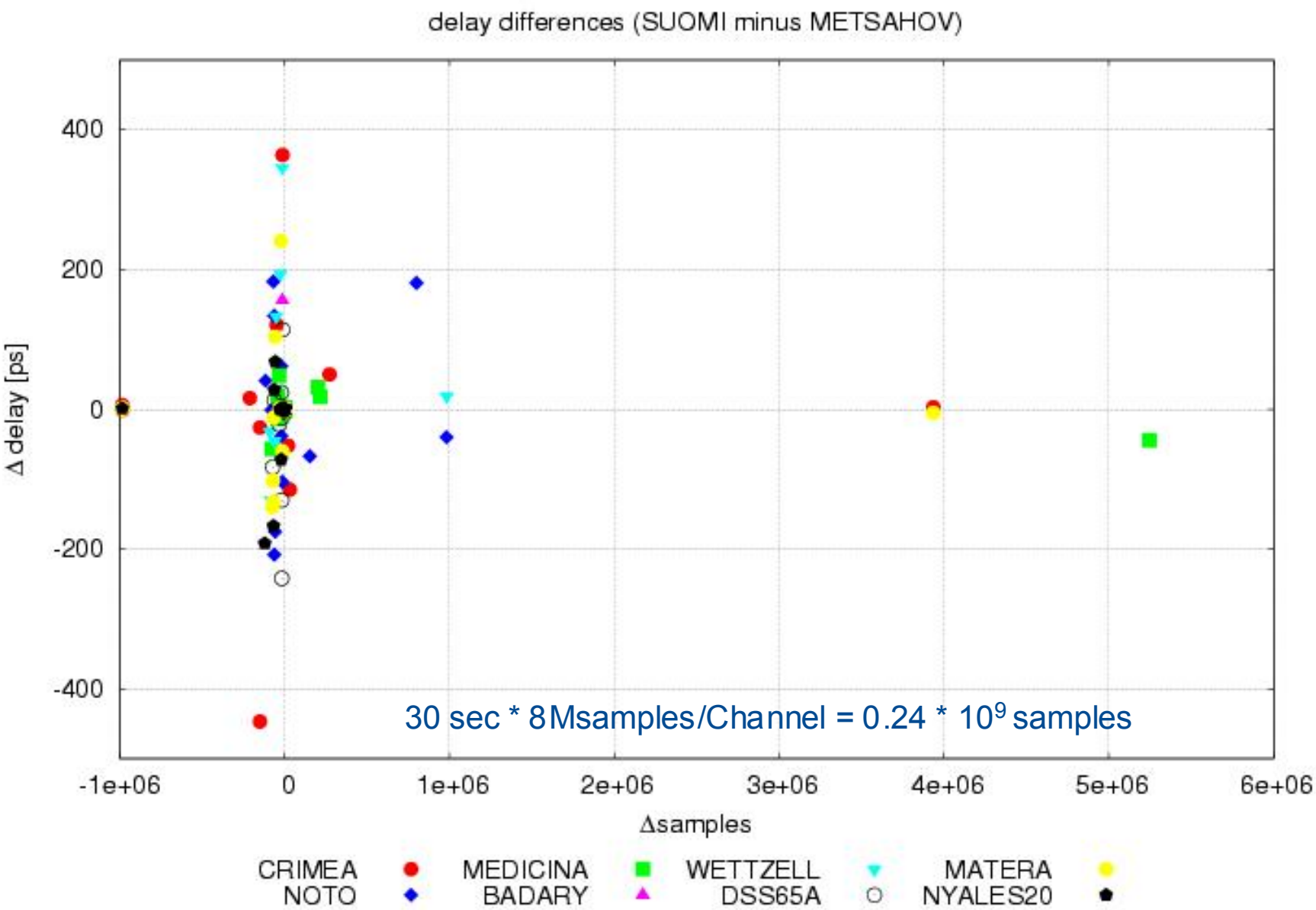
After correction of phase offsets



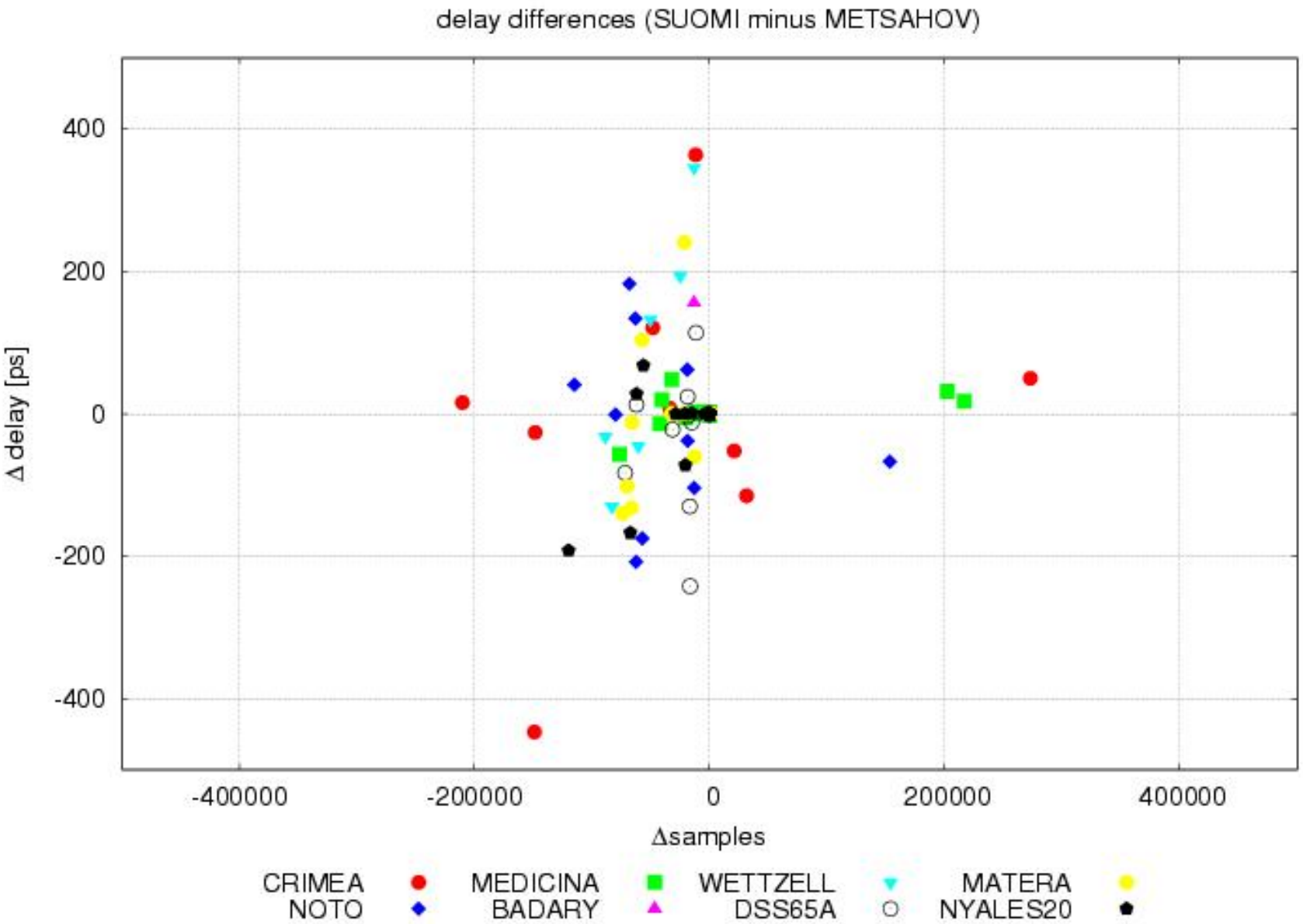
After correction of phase offsets



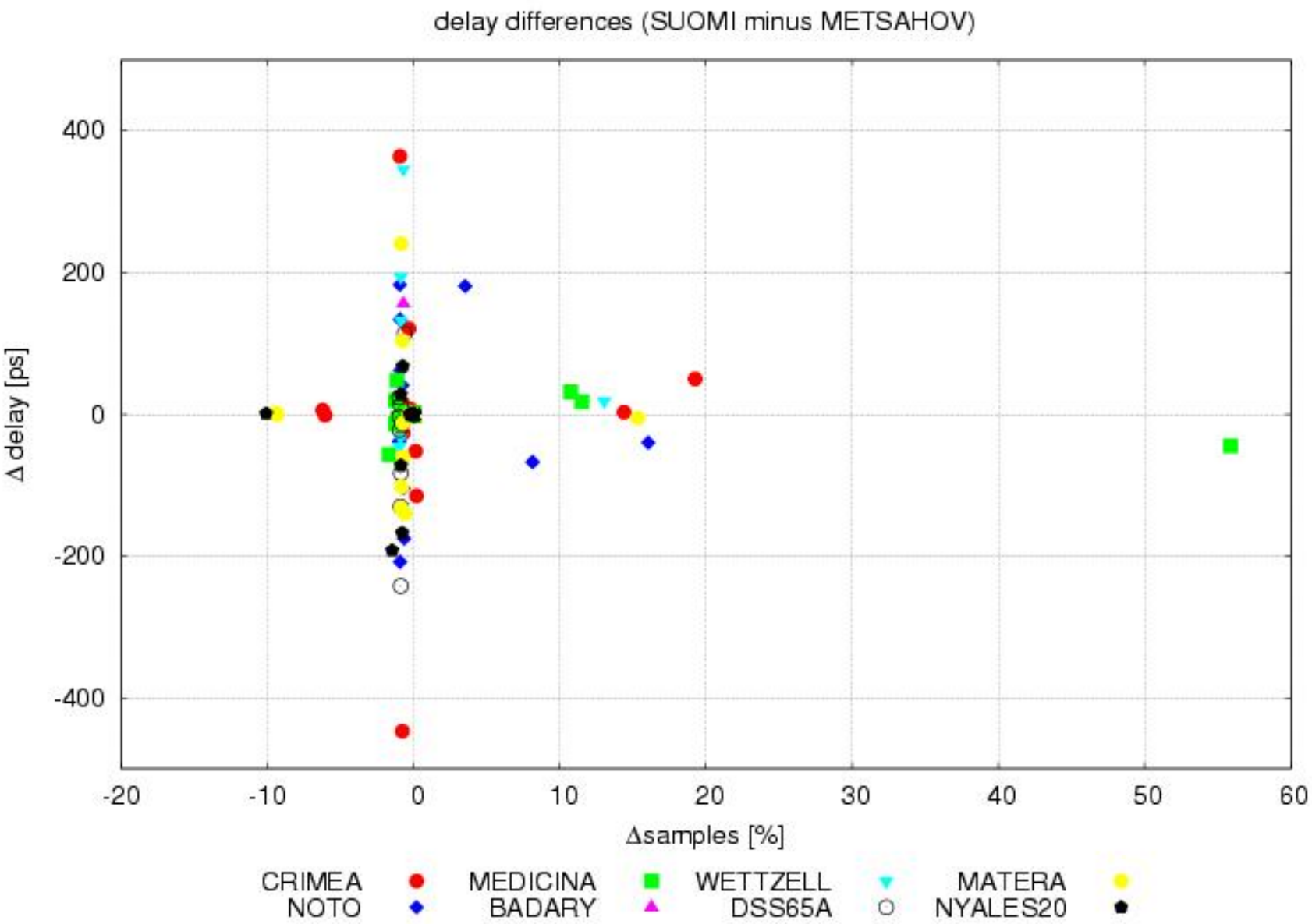
Effect of different number of samples



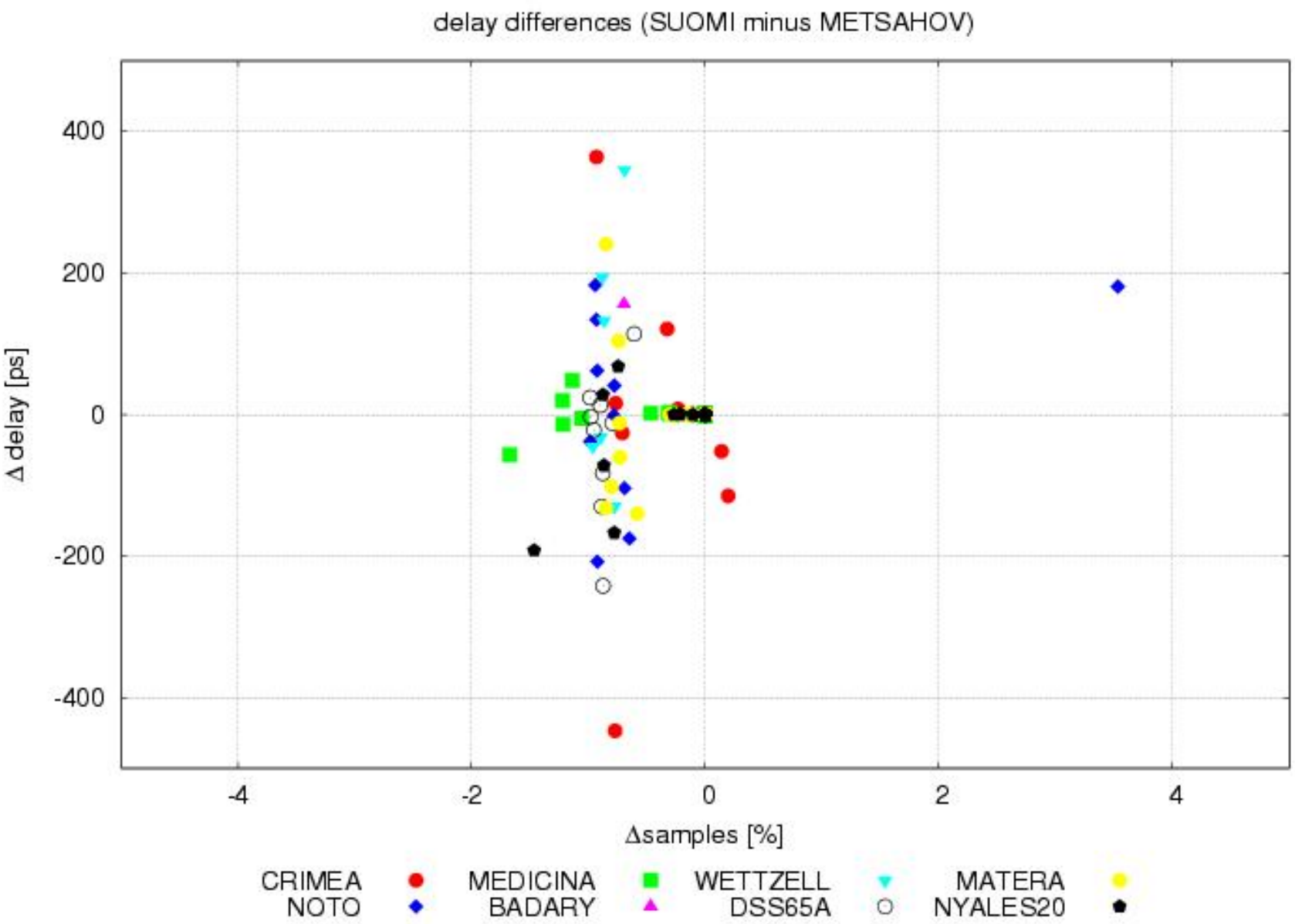
Effect of different number of samples



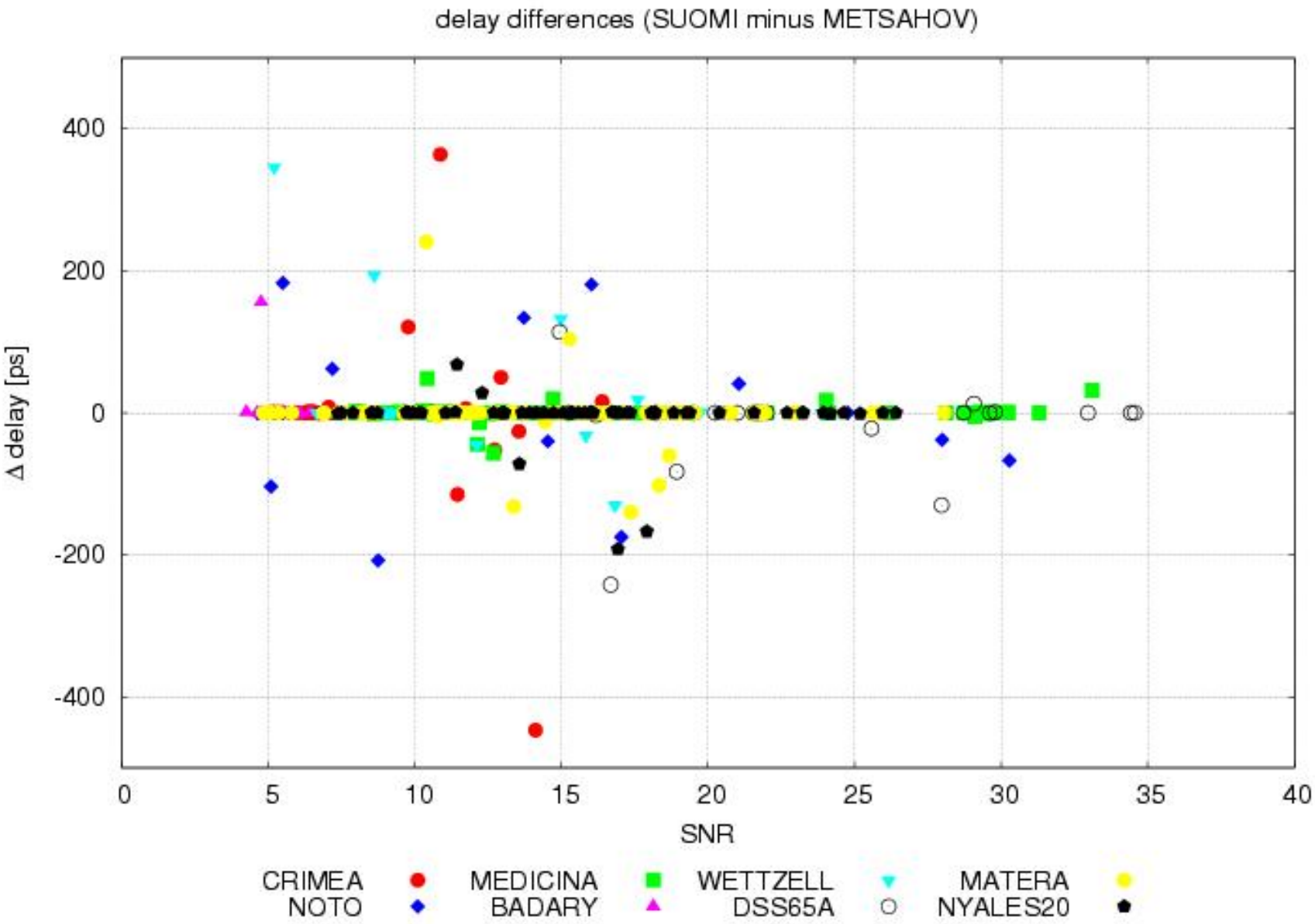
Effect of different number of samples



Effect of different number of samples



Limitations by SNR



Channel drop outs in Euro87

	X1	X2	X3	X4	X5	X6	X7	X8		S1	S2	S3	S4	S5	S6
BADA	XX		XX	XX	XX	XX	XX				SS	SS	SS	SS	SS
CRIM	XX	XX	XX	XX	XX		XX			SS	SS	SS	SS		SS
DS65	XX	XX	XX	XX	XX	XX	XX	XX		SS	SS	SS	SS	SS	SS
MATE	XX	XX	XX	XX	XX	XX	XX	XX		SS	SS	SS	SS		SS
MEDI	XX	XX	XX	XX	XX	XX	XX	XX			SS	SS	SS	SS	SS
METS	XX	XX	XX	XX	XX	XX	XX	XX		SS	SS	SS			SS
NOTO	XX	XX	XX	XX	XX	XX	XX	XX		SS	SS	SS	SS	SS	SS
NYAL	XX	XX	XX	XX	XX	XX	XX	XX		SS	SS	SS	SS	SS	SS
WETT	XX	XX	XX	XX	XX	XX	XX	XX		SS	SS	SS	SS	SS	SS

S band

- Badary: Low amp
- Crimea: Low amp
- Matera: RFI
- Medicina: RFI
- Metsahovi: No fringes ??

Conclusions

Quality of eTransfer

- Equivalent to disk shipments if set up properly

Sensitivity of delays w.r.t. loss of samples

- Loss of small percentage has noticeable effect
- Sensitivity of VLBI

Recommendation

- Avoid low threshold SNRs