

ILRSA CC
contribution to ITRF2008:
the V24 solution

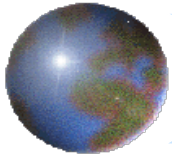


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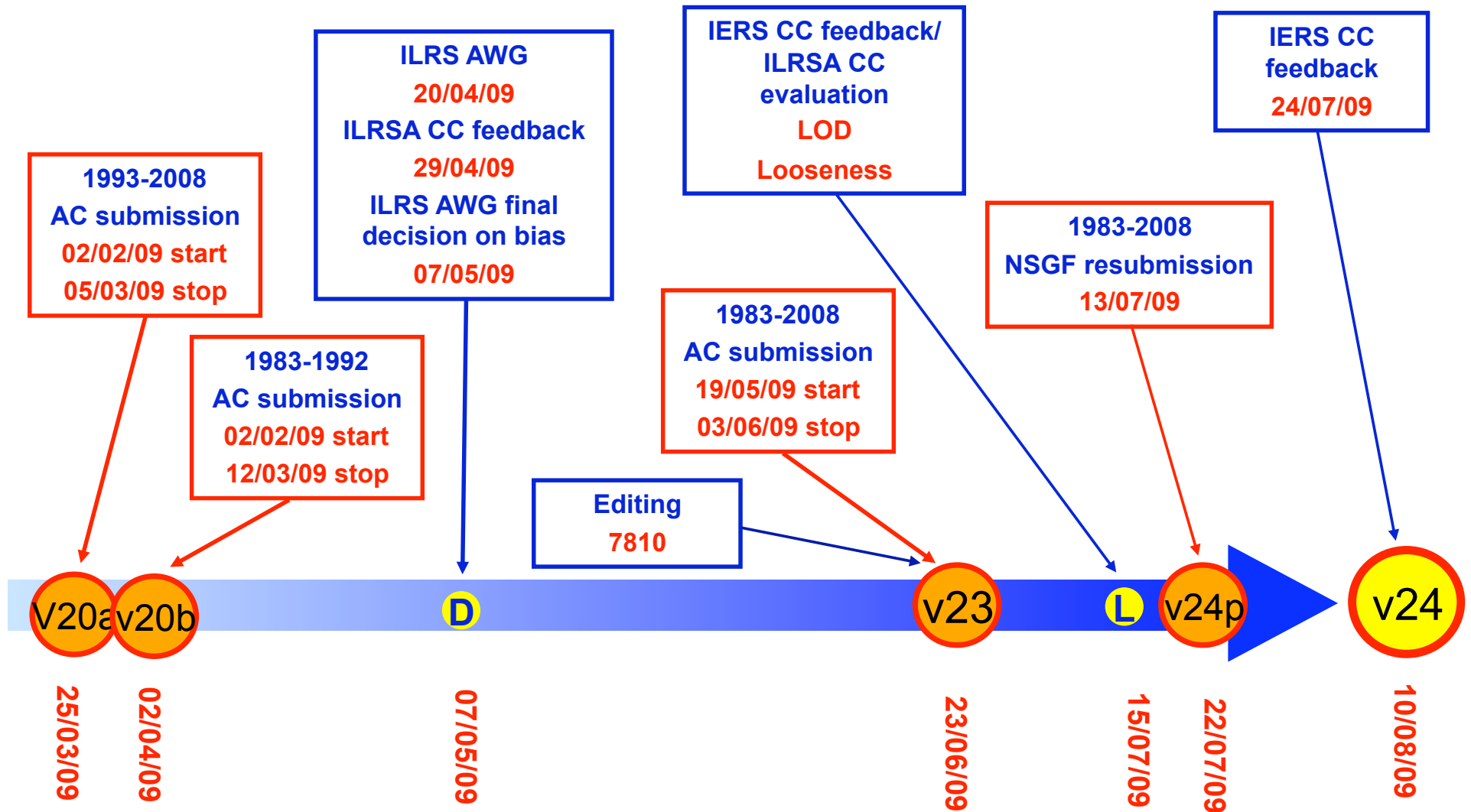


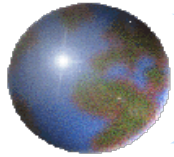
G. Bianco
Agenzia Spaziale Italiana, CGS - Matera

ILRS AWG Meeting, 19 September 2009, Metsovo



Major events in the ILRS contribution to ITRF2008



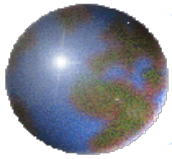


D - *Data & bias*

ACs have been provided of

- a detailed feedback about the correct implementation of ILRS AWG in terms of data to be deleted by ILRSA CC at the **end of April**
- final decision in terms of bias application for critical sites (e.g. Herstmonceux) by ILRS Analysis Coordinators at the **beginning of May**

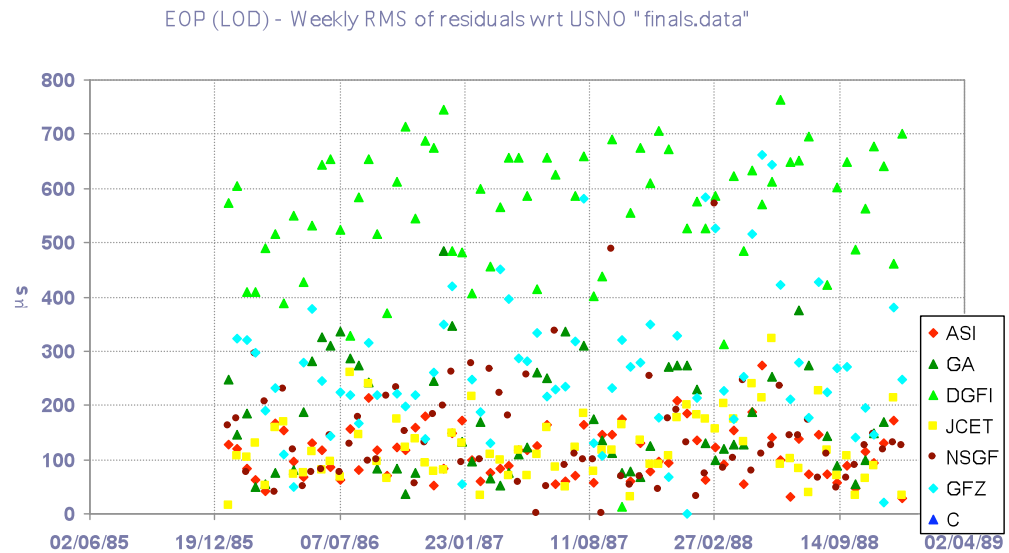
To eliminate completely the risk of uncorrect application of ILRS AWG recommendations in terms of data to be deleted, all the incoming SNX files at ILRSA CC are purified, by an automatic procedure, of the SSC estimates relevant to those forbidden periods, if present.

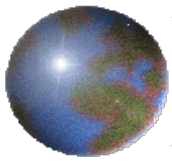


V23

The ACs submit their new solutions between **19/05/09** and **03/06/09**. The results of a preliminary test on 1986-1988 for the LOD indicates to eliminate this parameter from the **DGFI** solution in the combination phase.

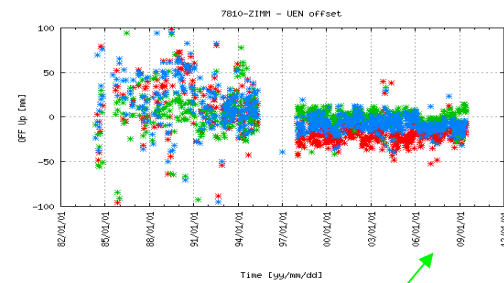
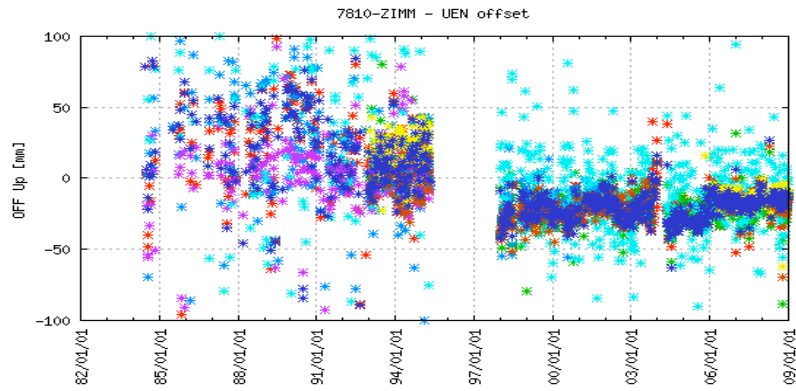
AC	Mean μs	STD μs
dgfi	564	128
gfz	267	137
nsgf	143	98
jcet	125	61
asi	112	49
ga	177	107



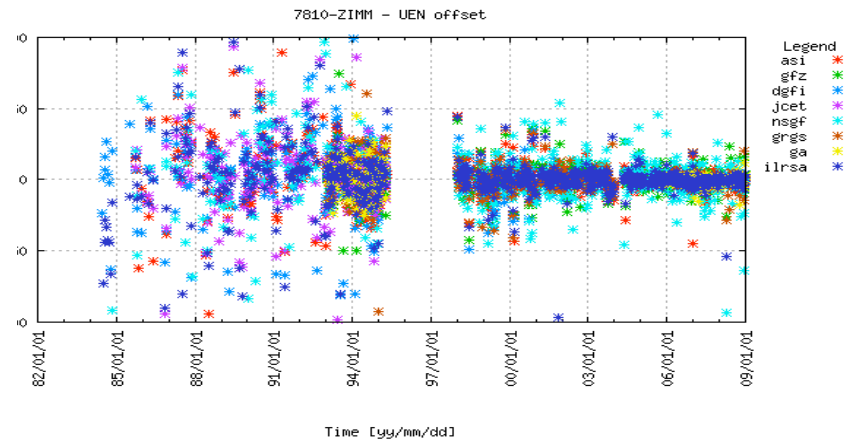
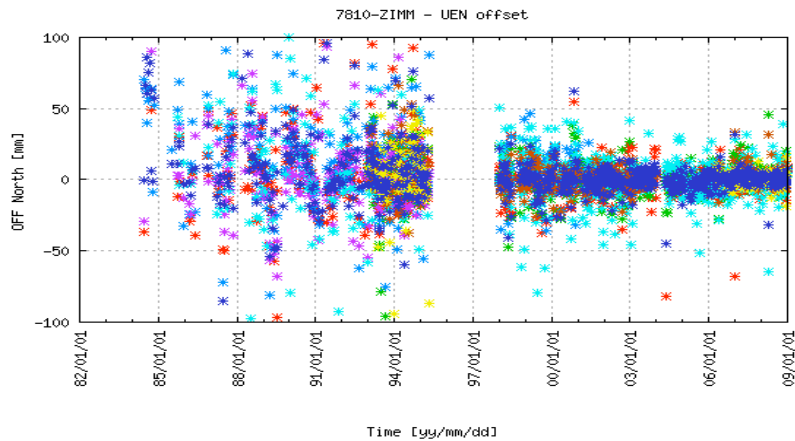


V23

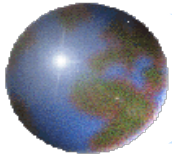
After a preliminary combination phase, a specific problem is detected for **7810**, causing a reworking for the combination from the year 1998 onwards.



GA, GRGS, JCET excluded



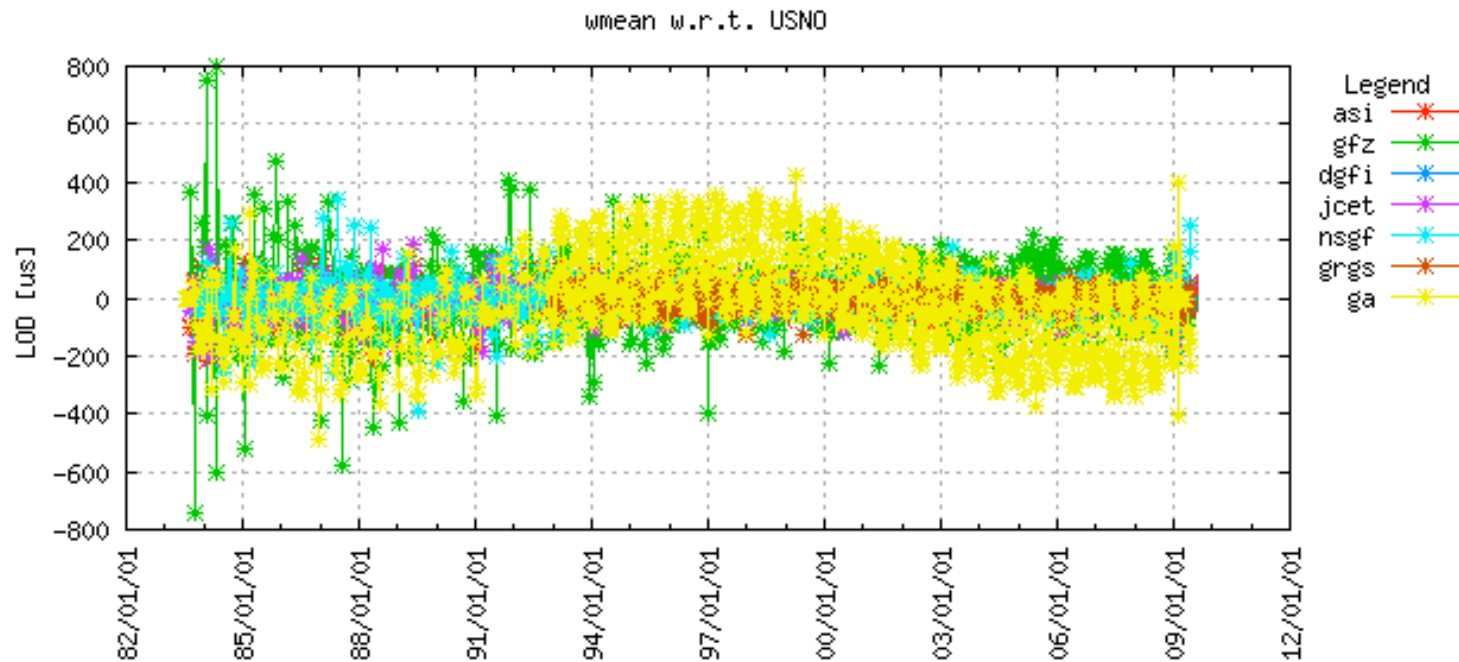
The ILRSA V23 is submitted on **23/06/09**.

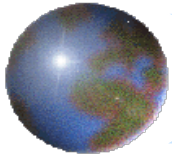


L-LOD

After an internal overall revision of the V23, an unexpected problem appeared: the **LOD GA** series showed a long periodic component, not visible in the 86-88 test.

-> **GA LOD will be eliminated from the following versions of ILRSA solution.**



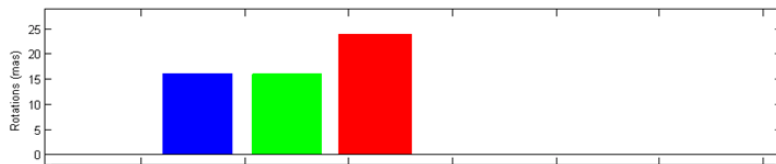


L-Looseness

A feedback from **DGFI and IGN inter-technique** combination centers at the **beginning of July** alerted us on an unsatisfactorily level of looseness of the V23 solution.

By performing a check on the whole AC's solution time series, several specific problems have been detected.

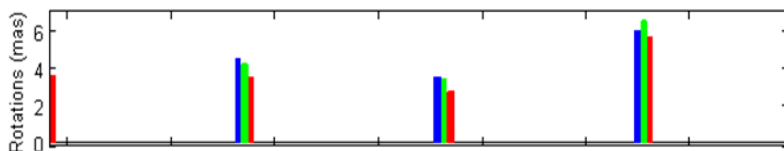
The following AC solution show typical, good values for rotation uncertainties:



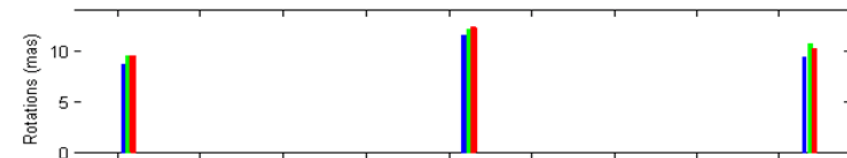
ASI v23



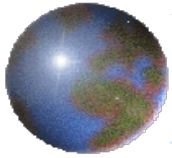
DGFI v24



GA v22

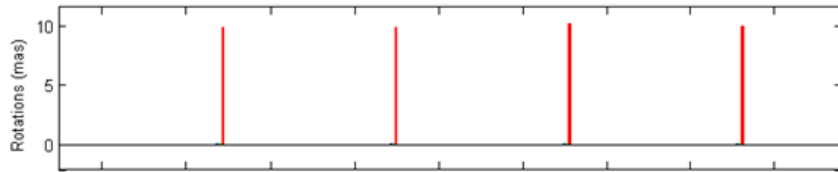


JCET v23

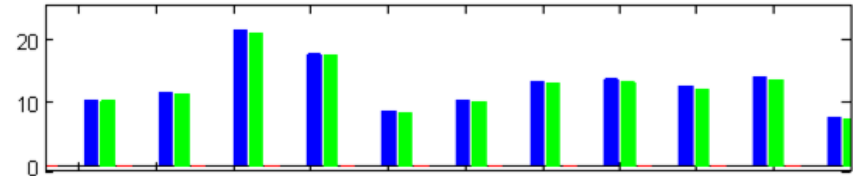


L-Looseness

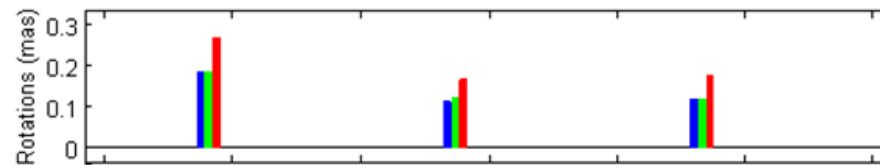
The following AC solutions, instead, show **bad values** for rotation uncertainties:



GFZ v23



GRGS v23



NSGF v23

The **NSGF**, in particular, appeared to be completely constrained: NSGF re-submitted V24 on 13/07/09, with the same level of looseness of the V20 solution. The **GFZ** and **GRGS** cases have been treated by adding a loosening factor on the specific problematic rotation component.

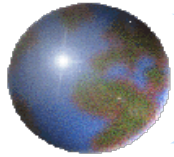


After the correction of the “L” problems, the **ILRSA V24, preliminary**, is submitted on **23/07/09**.

The feedback from the **DGFI and IGN inter-technique CC** are now positive, but for

- almost **50 solutions**, sparse, still below the DGFI IT CC minimum looseness threshold in Rz (8 cm)
- Wrong start/stop in the SITE EPOCHS SNX section for several sites for a **few tens of solutions**

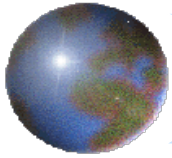
Corrective actions are performed and the final V24 ILRSA solution is issued, officially, at August 10.



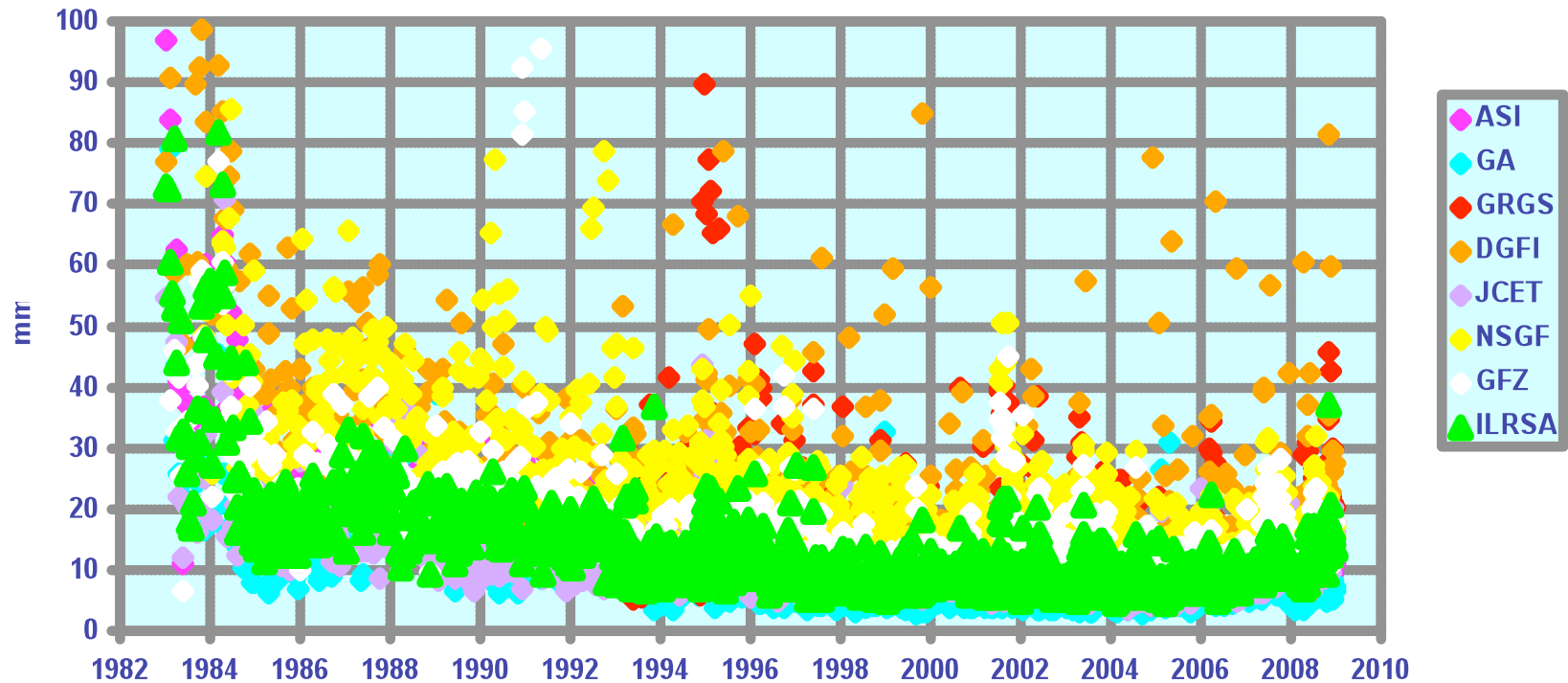
ILRSA basic facts

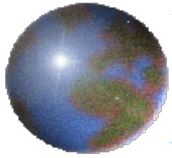
AC	Version	Issue Date	% Coverage 1983-1992	% Coverage 1993-2008
ASI	V23	19/05/09	88,84%	95,92%
DGFI	V23/V24	27/05/09	88,84%	91,49%
GA	V22	19/05/09	69,42%	90,89%
GFZ	V23	19/05/09	86,36%	95,56%
GRGS	V24	03/06/09	-	96,04%
JCET	V23	24/05/09	88,02%	92,69%
NSGF	V23	13/07/09	85,54%	95,08%

- ∅ 7 ACs have submitted several versions of their SLR SSC/EOP 7/15-day arc solutions covering the period 1983–2008 during **Spring/Summer 2009**
- ∅ ILRSA has been issued in its final version **v24** on **August 10th**, after two preliminary versions (v20, v23)

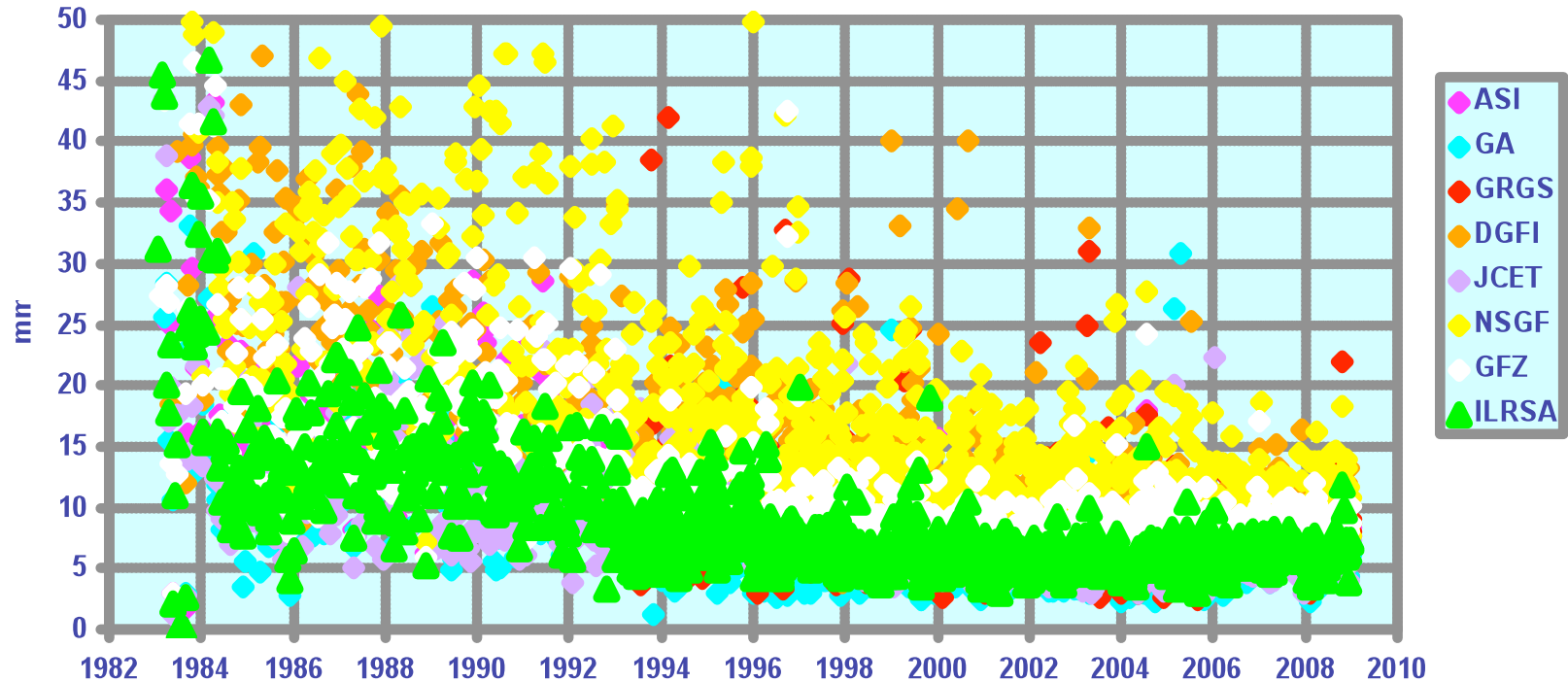


SSC – All Sites - Weekly WRMS residuals wrt SLRF2005

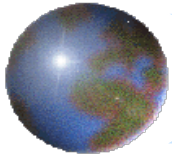




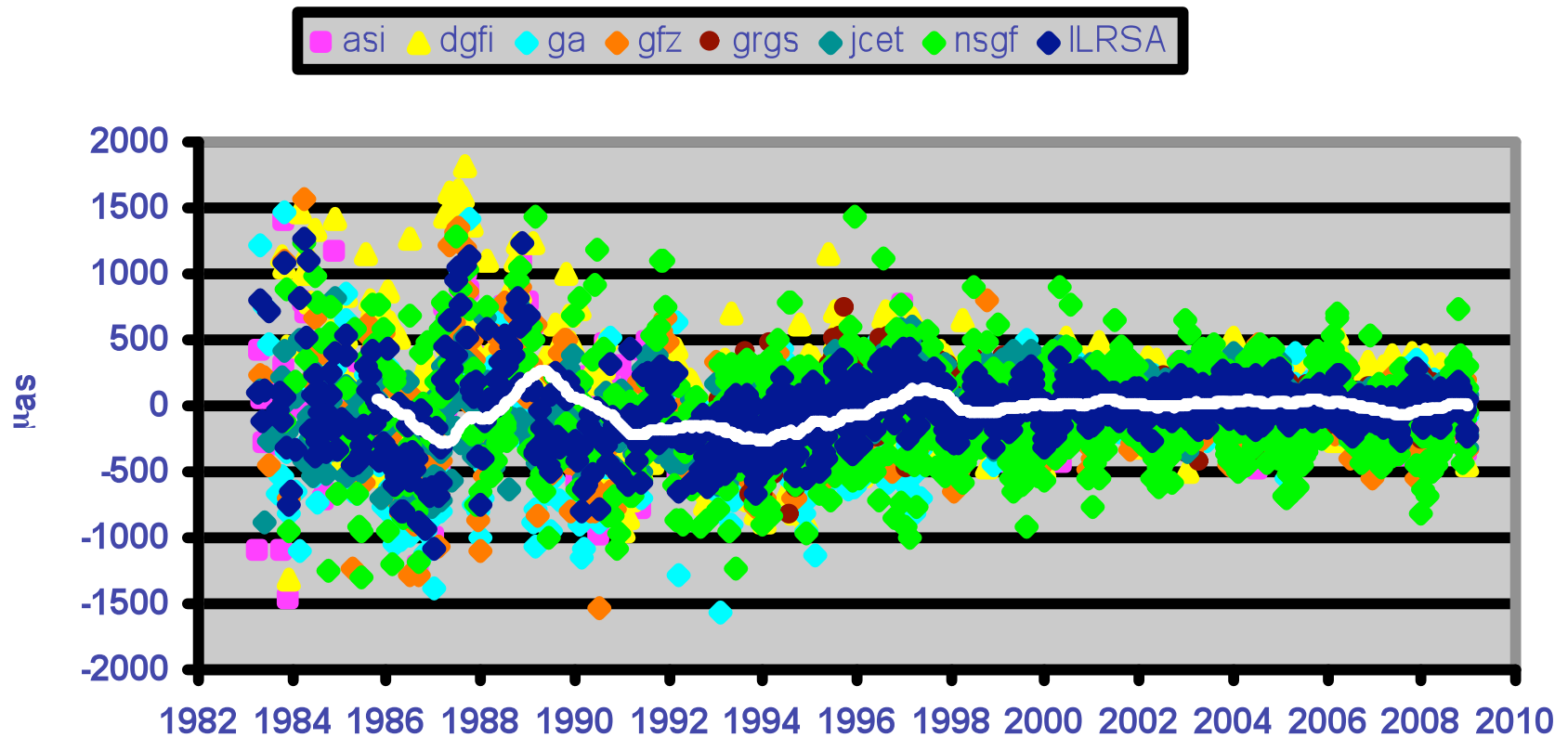
SSC – Core Sites - Weekly WRMS residuals wrt SLRF2005

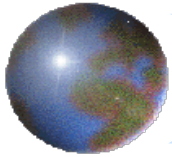


mm	ASI	GA	GRGS	GFZ	DGFI	JCET	NSGF	ILRSA
All Sites	13+/-8	8+/-6	15+/-9	16+/-9	26+/-30	11+/-7	22+/-12	13+/-18
Core Sites	10+/-6	7+/-4	8+/-4	11+/-7	16+/-20	8+/-5	17+/-10	8+/-6

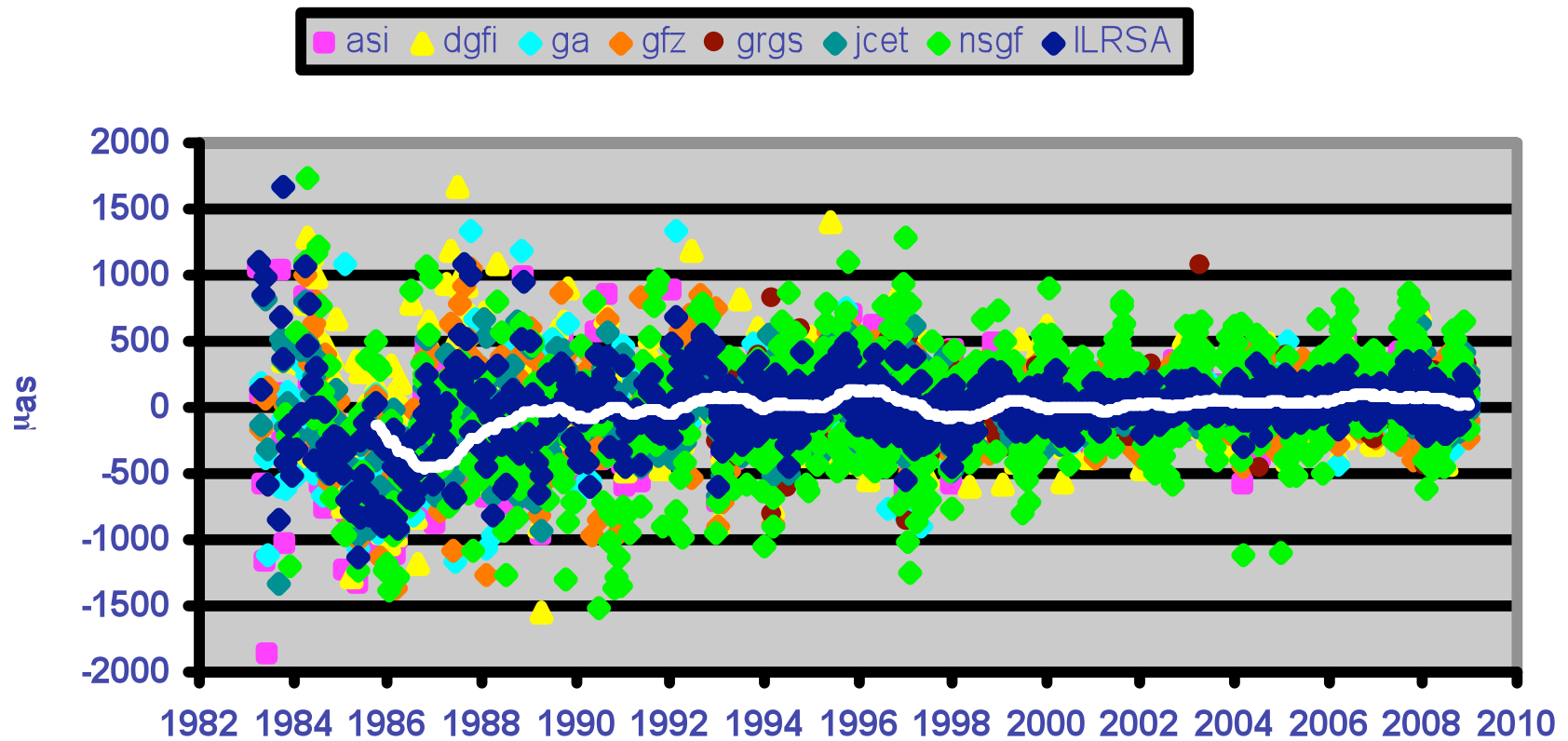


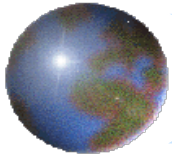
EOP - X - Weekly Mean of residuals wrt USNO "finals.data"



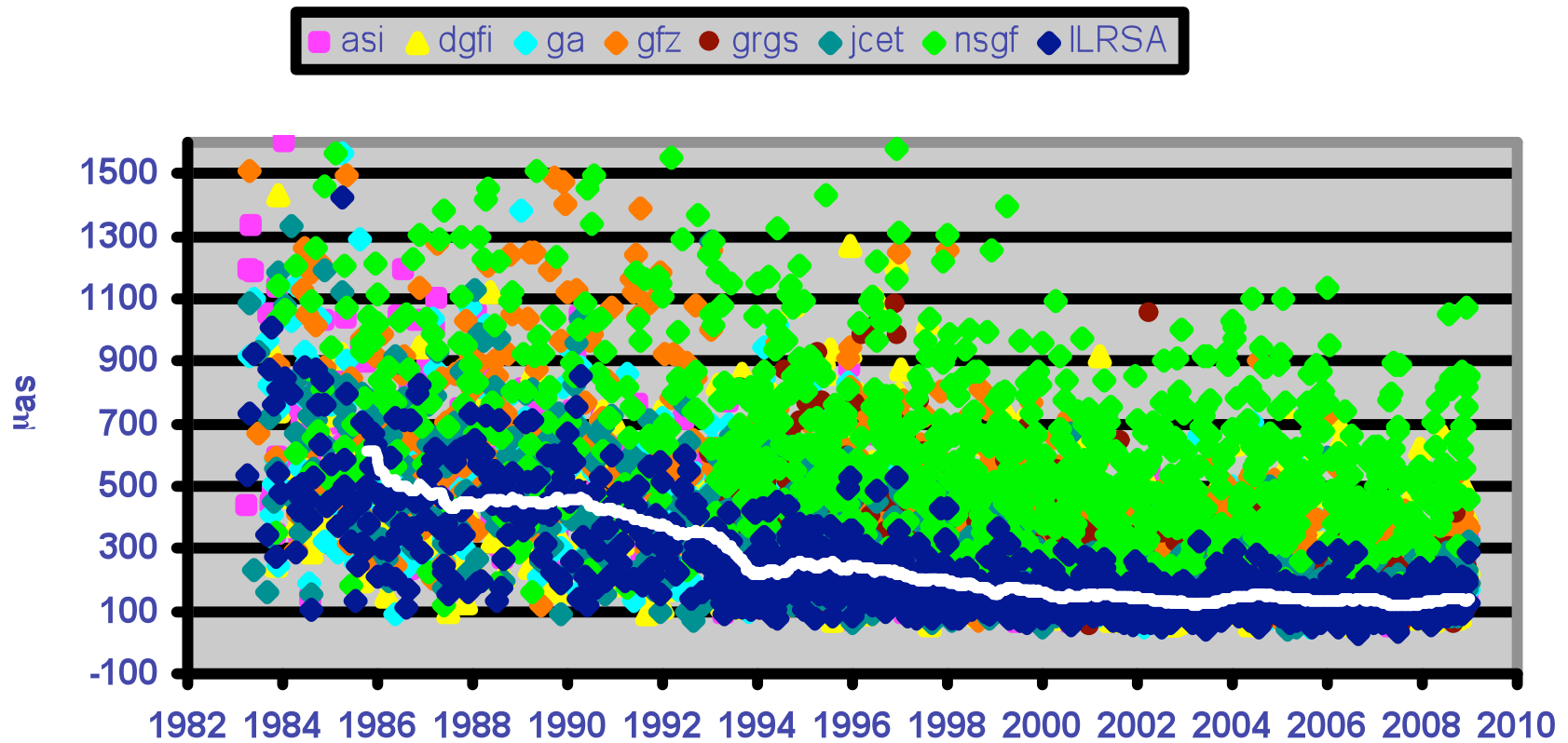


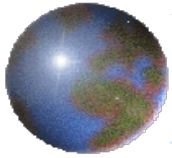
EOP - X - Weekly STD of residuals wrt USNO "finals.data"



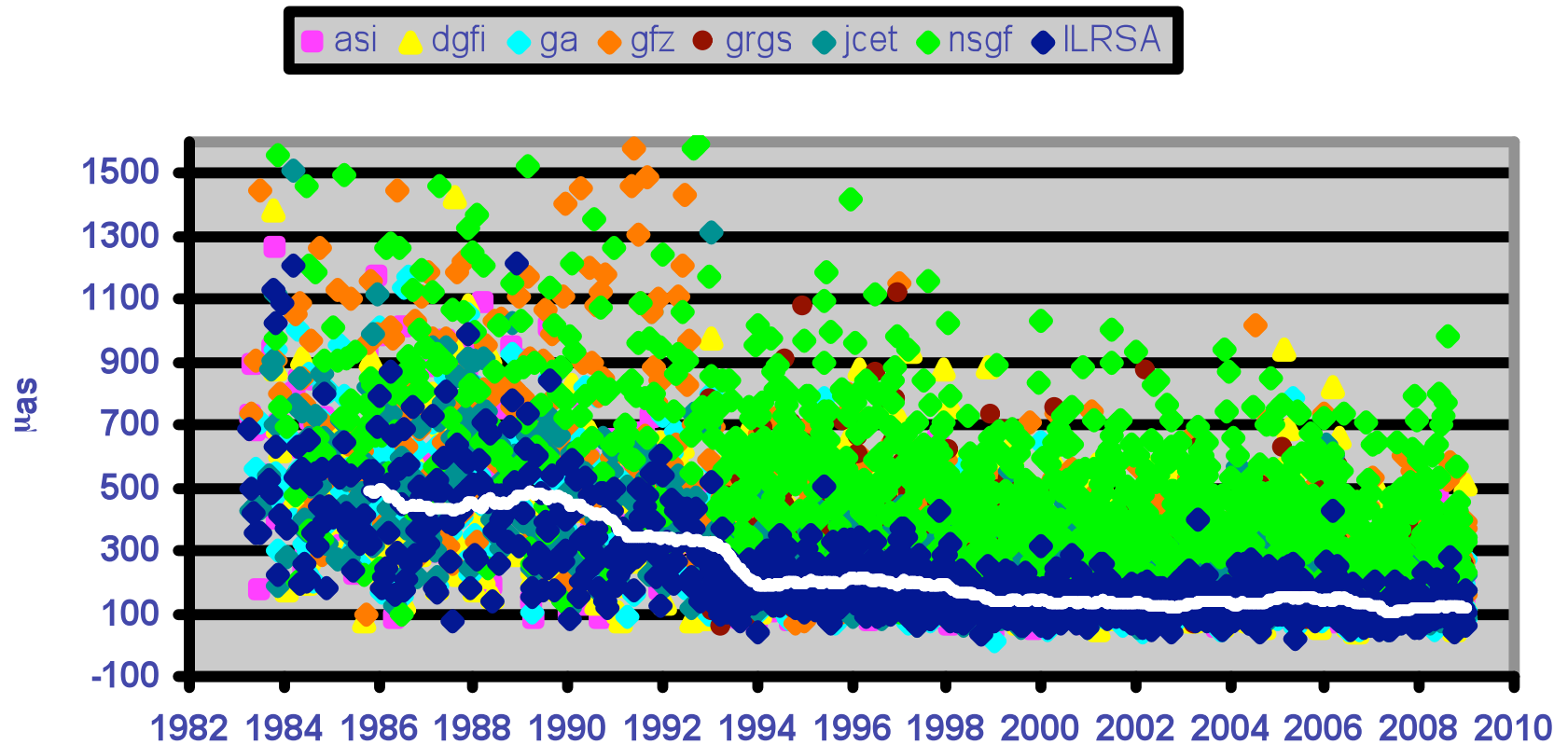


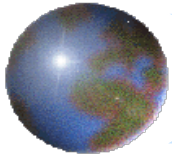
EOP - Y - Weekly Mean of residuals wrt USNO "finals.data"



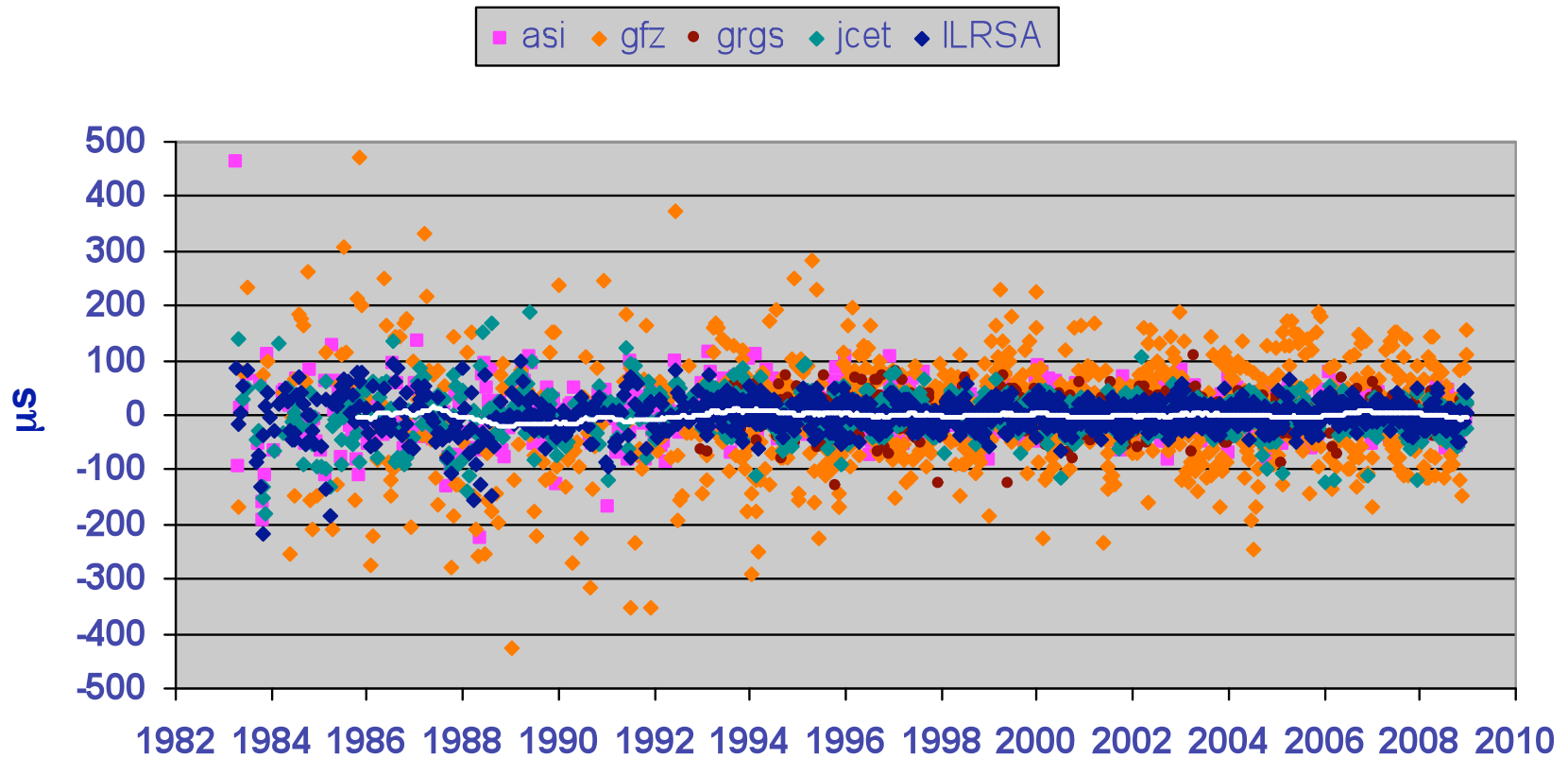


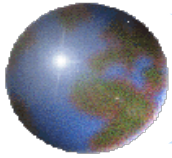
EOP - Y - Weekly STD of residuals wrt USNO "finals.data"



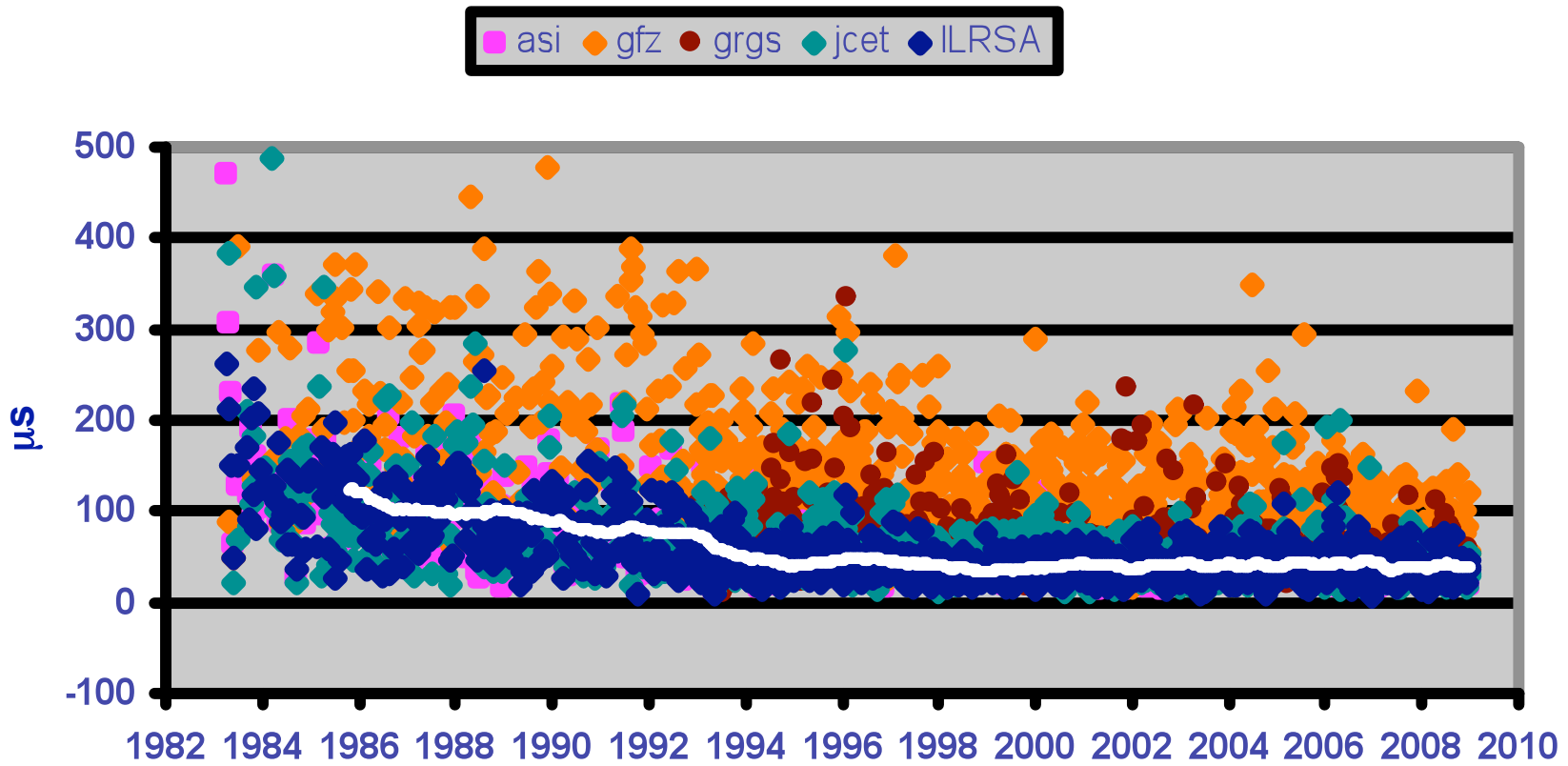


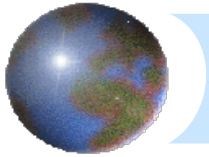
EOP – LOD - Weekly Mean of residuals wrt USNO "finals.data"





EOP – LOD - Weekly STD of residuals wrt USNO "finals.data"



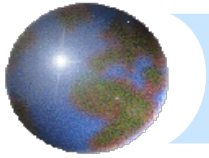


EOP – Summary table

	ASI		DGFI		GA		GFZ		
Mean of the weekly mean res. →	X	-52	297	60	310	-85	286	-77	414
STD of the weekly mean res. →	σ	252	203	351	192	307	212	292	272
	Y	3	268	29	294	-7	250	23	397
Mean of the weekly STD res. →	σ	278	182	293	183	256	183	266	270
STD of the weekly STD res. →	LOD	2	61	-	-	-	-	1	126
	σ	40	38	-	-	-	-	103	76

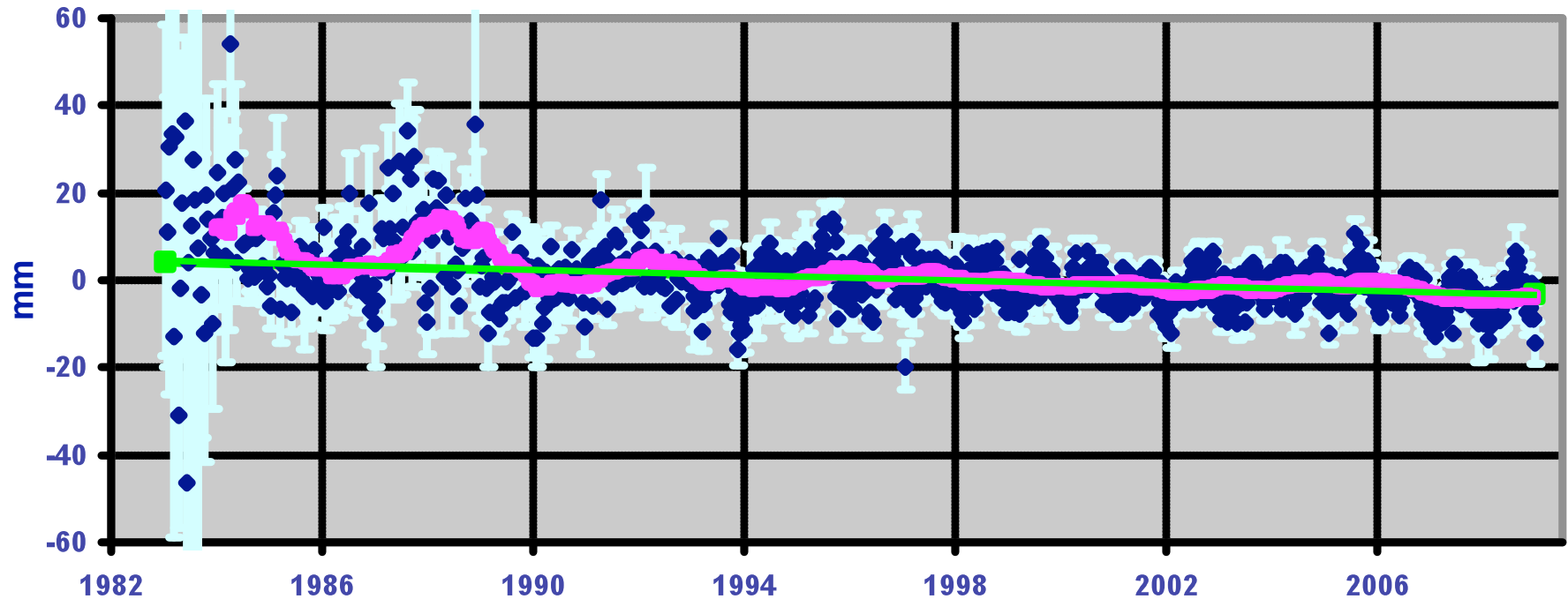
	GRGS		JCET		NSGF		ILRSA		
	X	10	242	-15	279	-59	627	-27	229
	σ	176	146	223	198	378	288	239	174
	Y	6	234	-1	258	3	548	6	210
	σ	160	140	219	186	406	285	229	154
	LOD	1	61	-1	60	-	-	-1	53
	σ	26	34	36	44	-	-	29	33

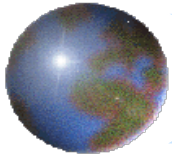
$\mu\text{as}, \mu\text{s}$



Helmert parameters – Tx

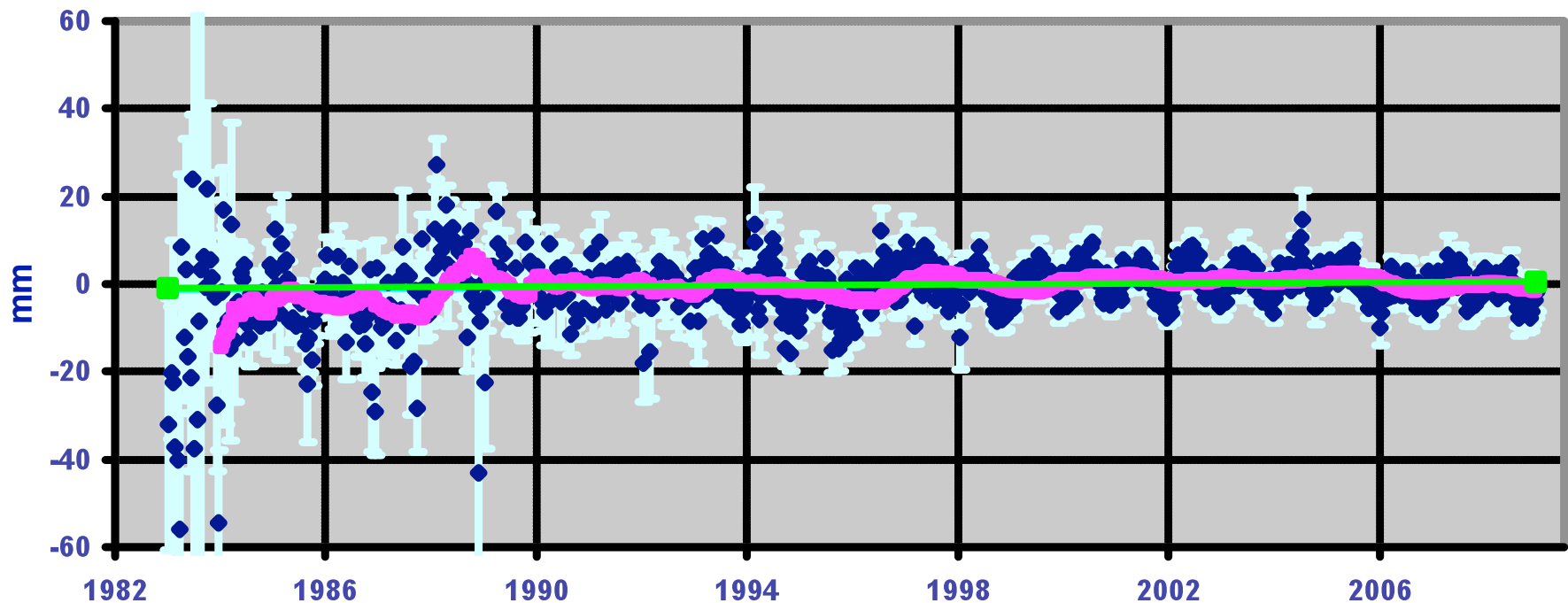
Tx shows a clear slope of -0.29 ± 0.02 mm/yr, with a residual WRMS of 4.16 mm

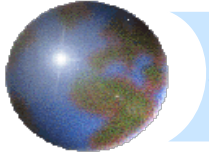




Helmert parameters – Ty

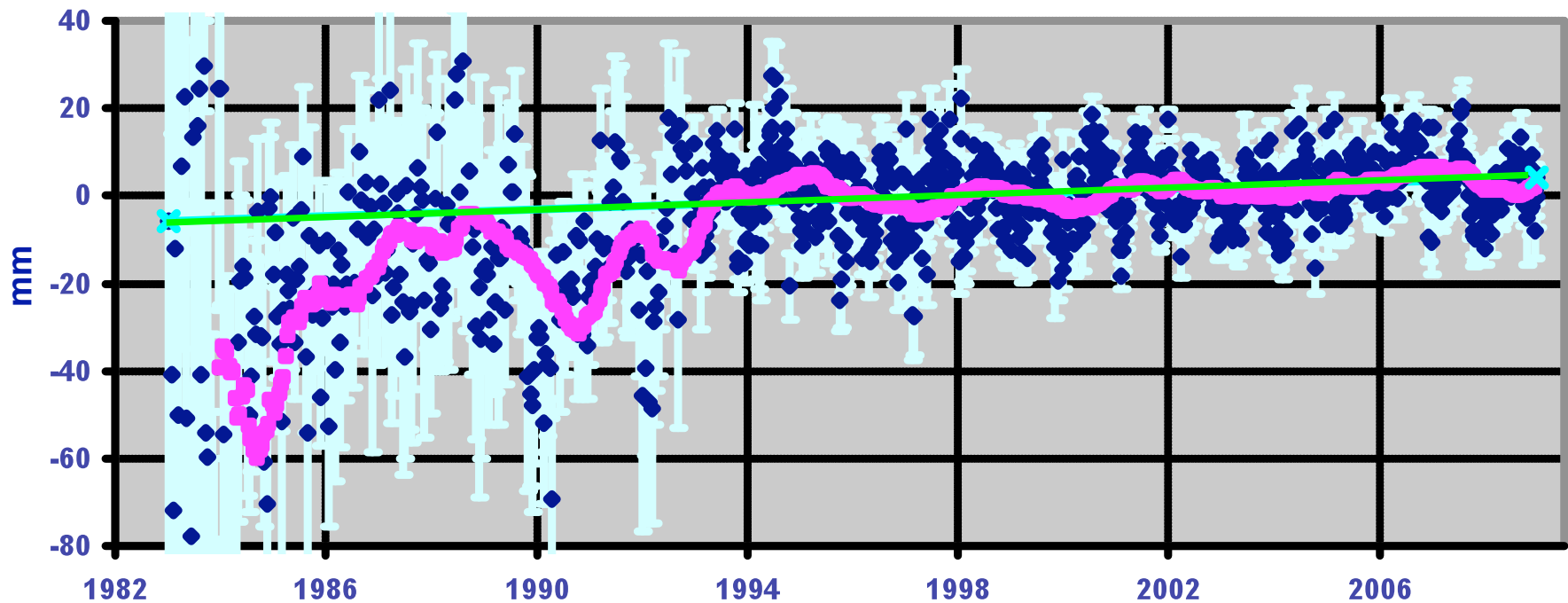
Ty shows the stablest behavior, with a slope 0.06 ± 0.02 mm/yr and a WRMS of the residuals of 3.82 mm.

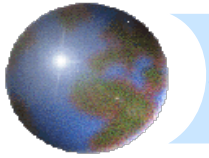




Helmert parameters – T_z

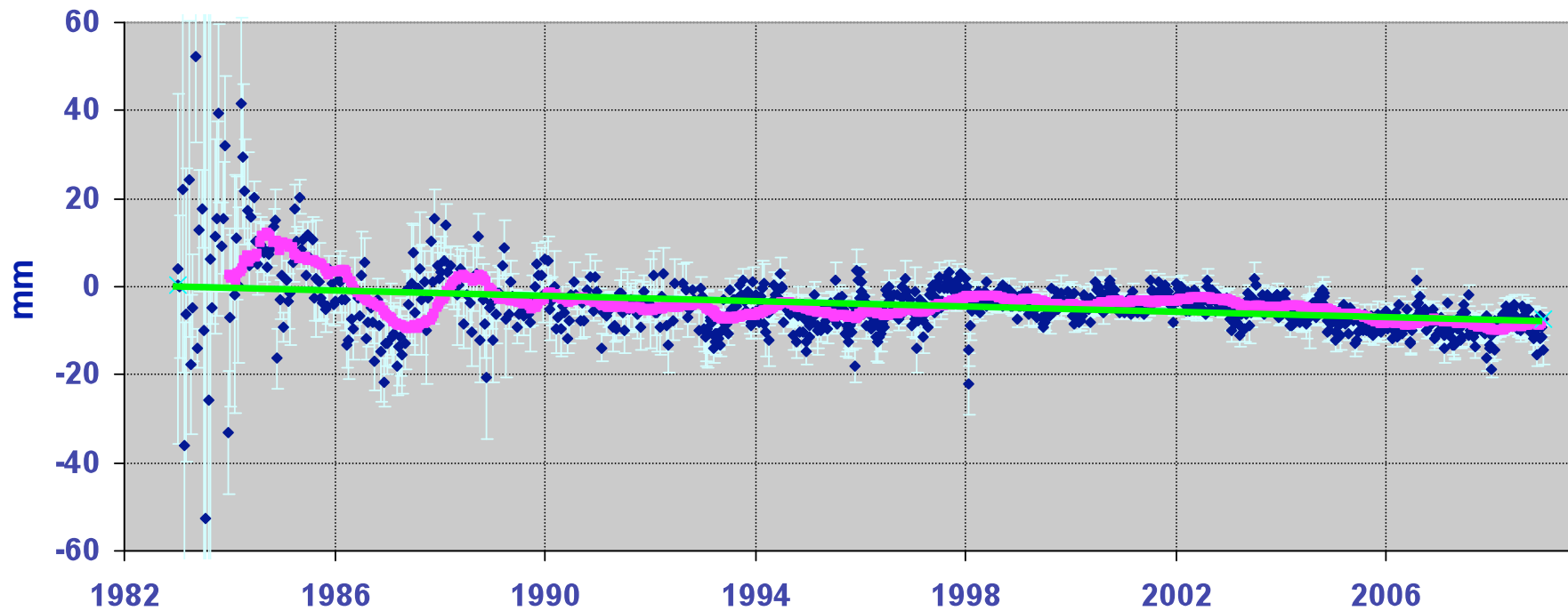
T_z , affected by the unevenly data distribution in the the two emispheres, highly remarkable especially in the initial SLR years, indicates a slope of almost **0.38** **+/- 0.03 mm/yr** with a residual WRMS of **7.45 mm**

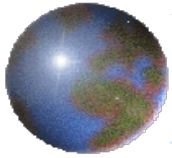




Helmert parameters – Scale

Δ_{scale} shows a very clear slope of -0.30 ± 0.01 mm/yr with a residual WRMS of 3.15 mm

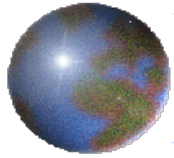




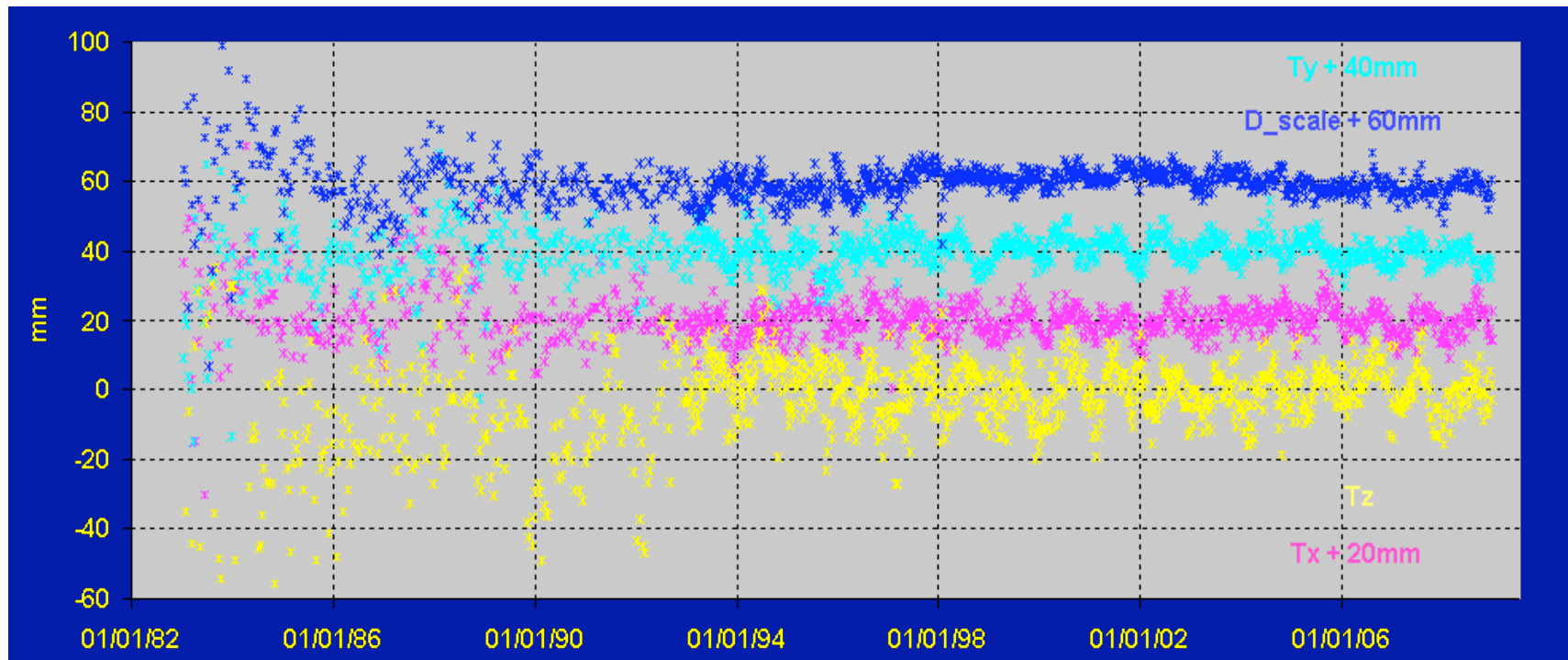
Helmert parameters – Summary table

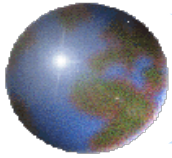
Tx	Tx_dot mm/yr	σ_{Tx_dot} mm/yr	WRMS (res) mm	Ty	Ty_dot mm/yr	σ_{Ty_dot} mm/yr	WRMS (res) mm
asi	-0,35	0,02	5,37	asi	-0,12	0,02	4,50
dgfi	-0,57	0,03	6,27	dgfi	0,09	0,03	5,78
ga	0,05	0,02	4,18	ga	0,17	0,02	4,29
gfz	-0,49	0,03	5,46	gfz	0,11	0,02	4,98
grgs	-0,32	0,03	4,50	grgs	0,04	0,03	3,71
jcet	-0,18	0,02	4,19	jcet	0,10	0,02	3,99
nsgf	-0,41	0,03	6,70	nsgf	-0,08	0,03	7,26
C	-0,29	0,02	4,16	C	0,06	0,02	3,82
Tz	Tz_dot mm/yr	σ_{Tz_dot} mm/yr	WRMS (res) mm	D_Sc	D_Sc_dot mm/yr	$\sigma_{D_Sc_dot}$ mm/yr	WRMS (res) mm
asi	0,24	0,06	10,38	asi	-0,31	0,02	4,26
dgfi	0,88	0,08	13,07	dgfi	-0,48	0,03	4,98
ga	0,83	0,04	8,58	ga	-0,22	0,01	3,64
gfz	0,36	0,06	10,89	gfz	-0,08	0,03	4,71
grgs	0,06	0,02	7,11	grgs	-0,46	0,02	3,34
jcet	0,25	0,04	8,32	jcet	-0,23	0,01	2,88
nsgf	0,11	0,08	14,06	nsgf	-0,62	0,03	6,00
C	0,38	0,03	7,45	C	-0,30	0,01	3,15

>50% WRMS

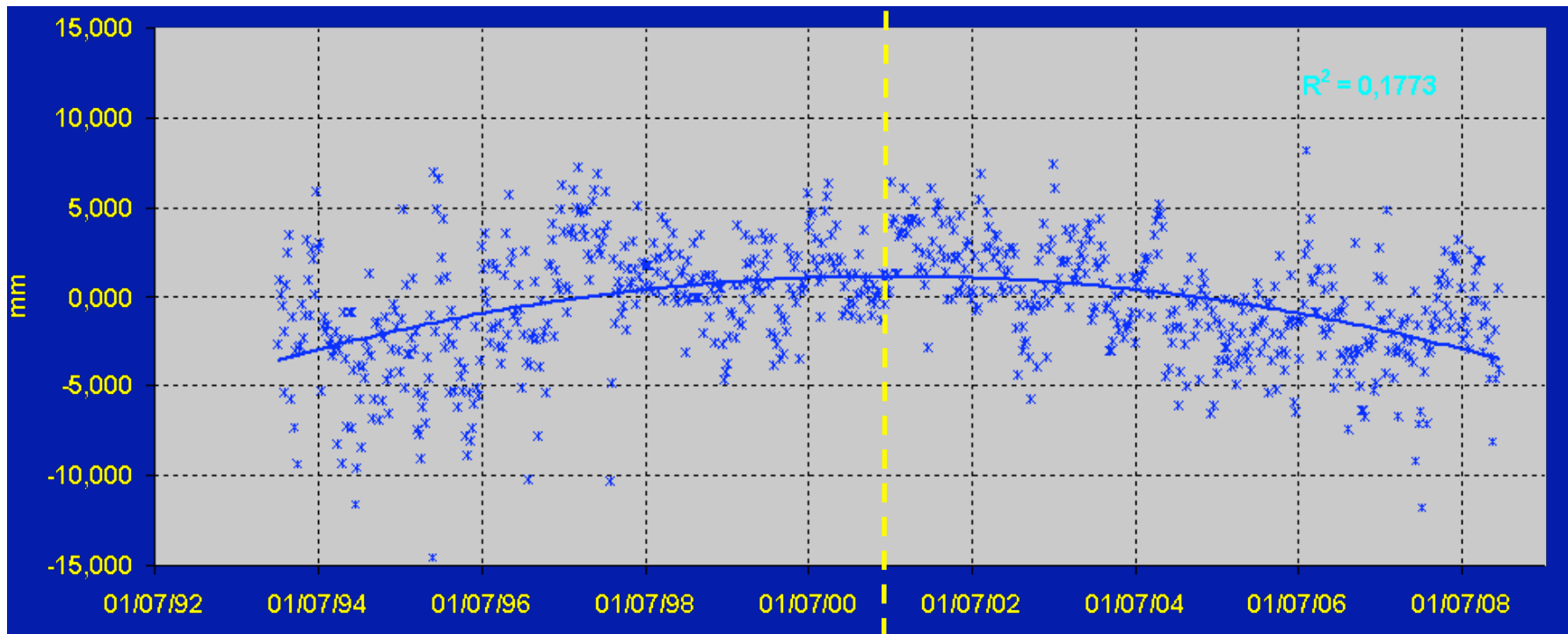


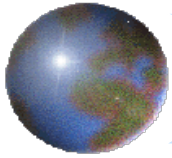
Helmert parameters – non linear residuals



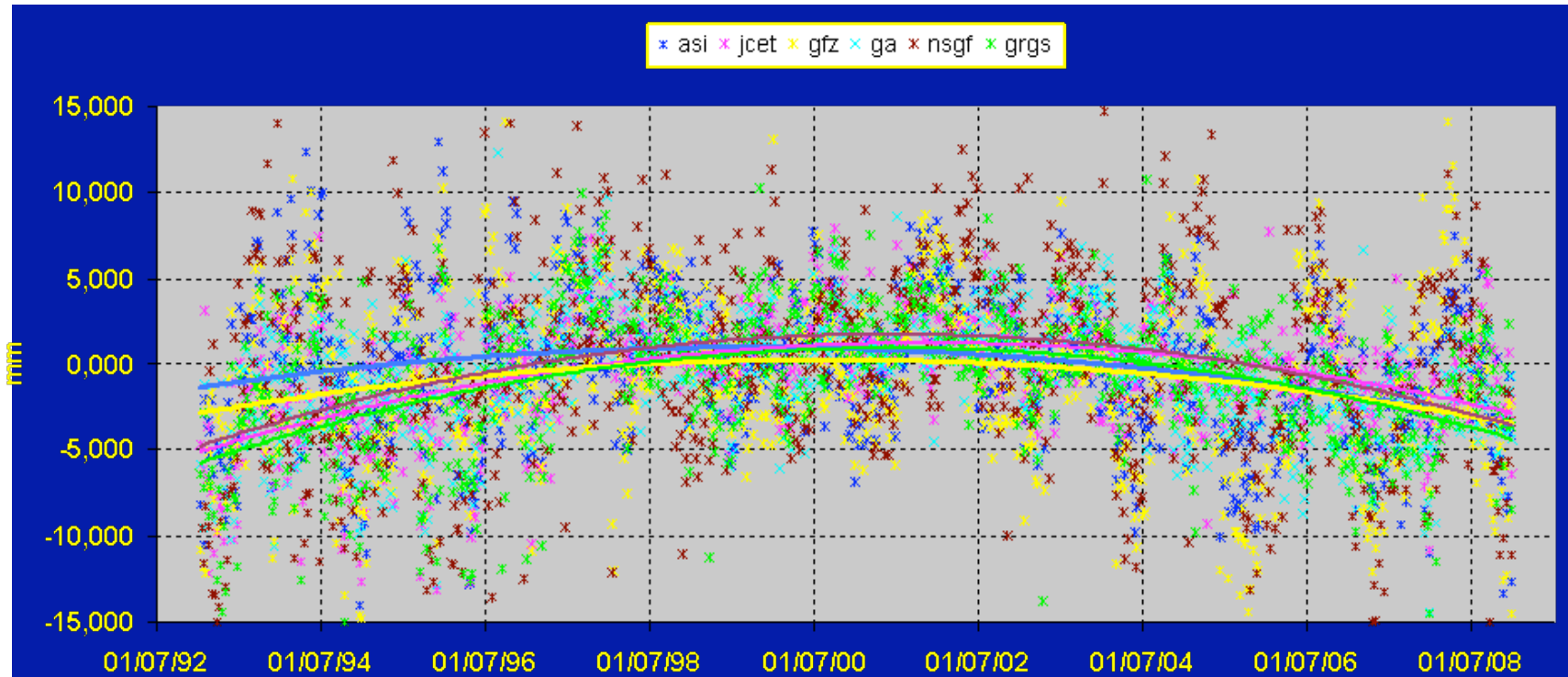


Helmert parameters – scale residuals

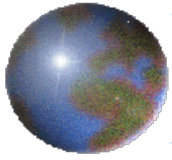




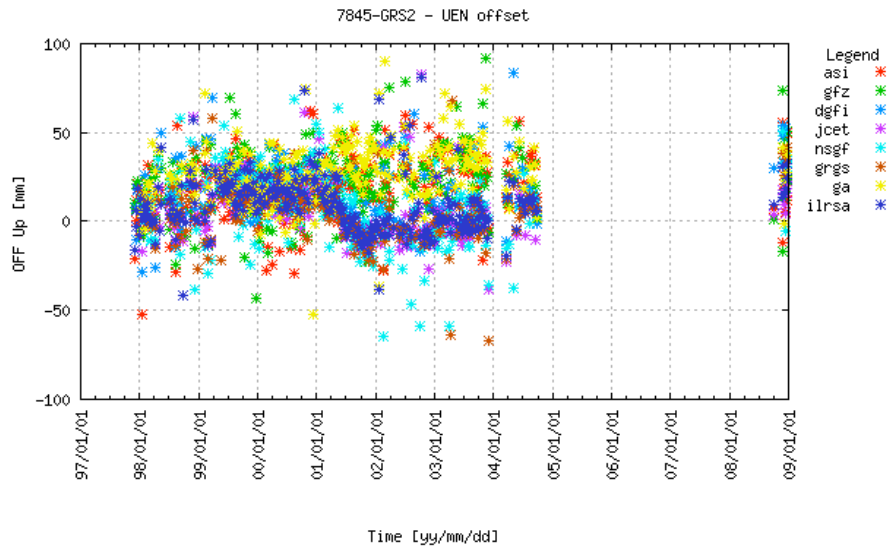
Helmert parameters – scale residuals



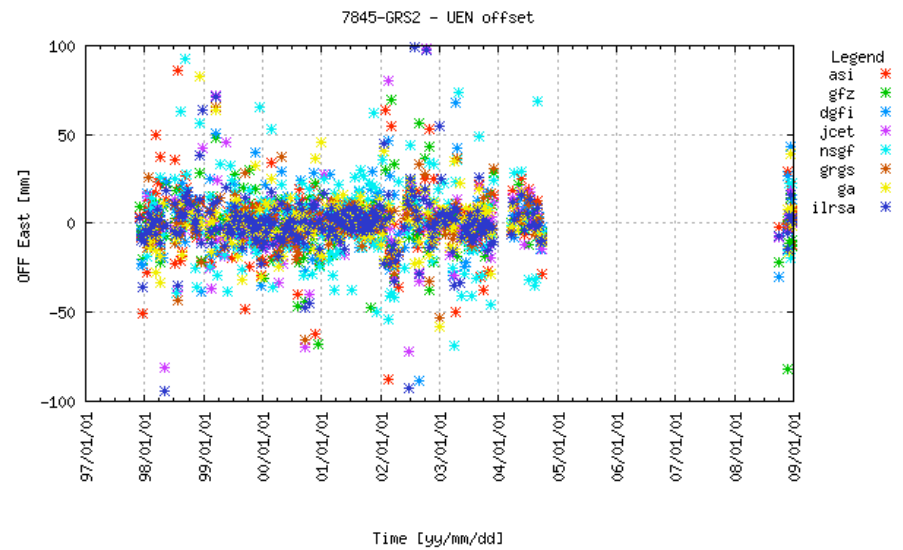
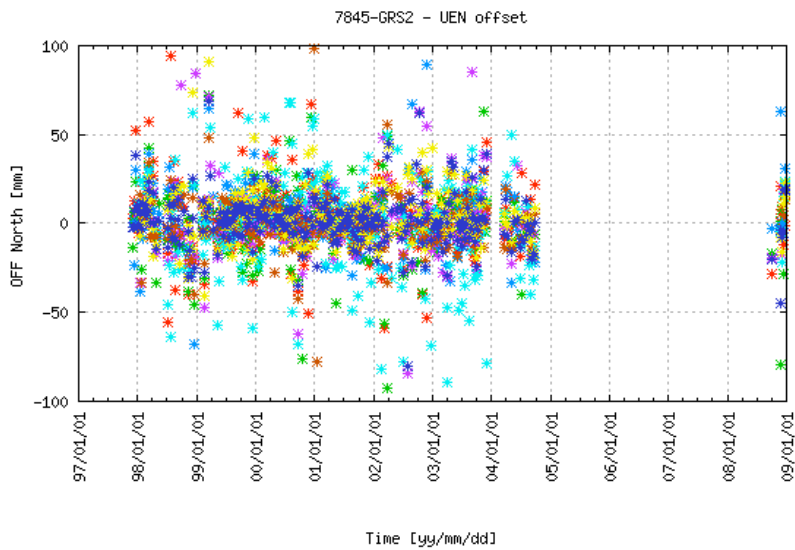
no dgfi

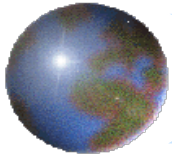


Problematic sites from Zuheir's list – 7845

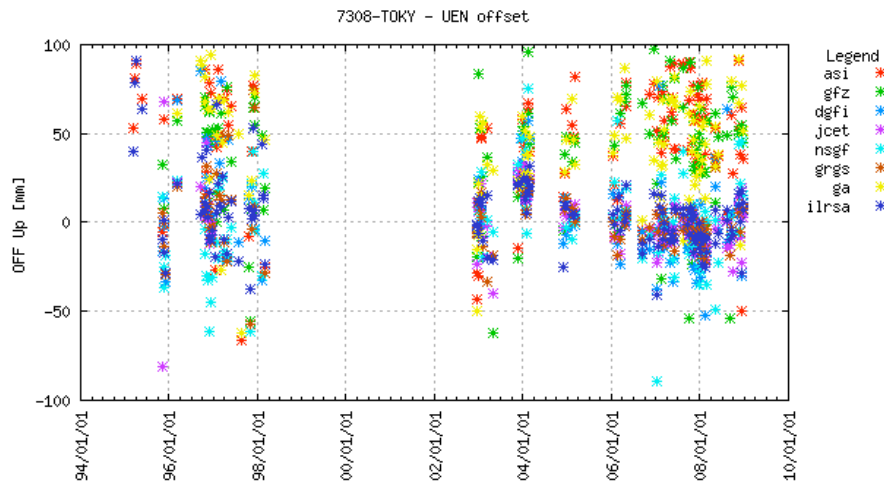


-GA, GFZ, ASI
-DGFI, JCET, NSGF, GRGS



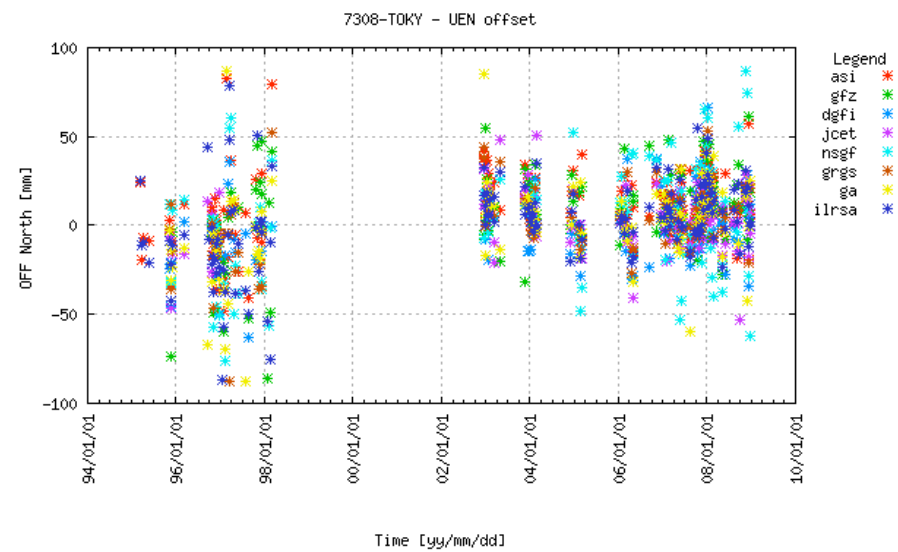
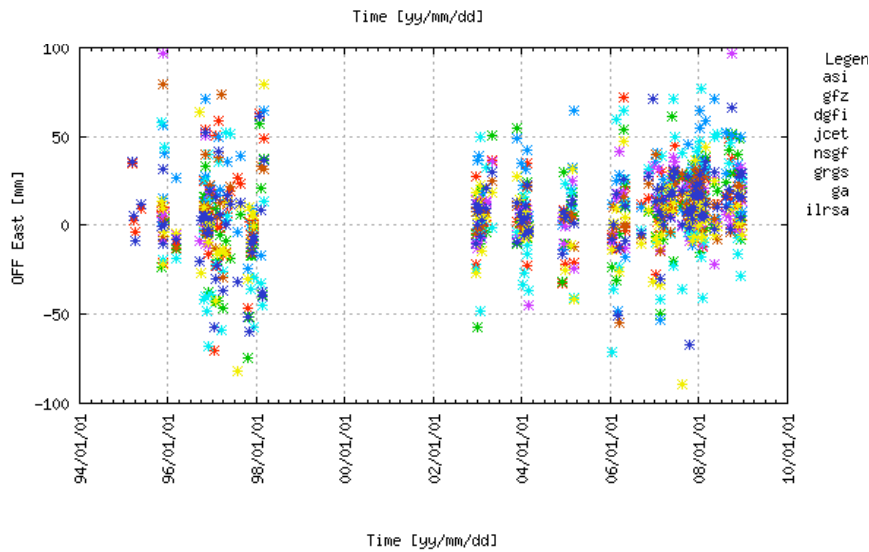


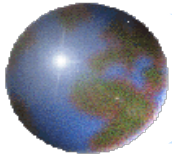
Problematic sites from Zuheir's list – 7308



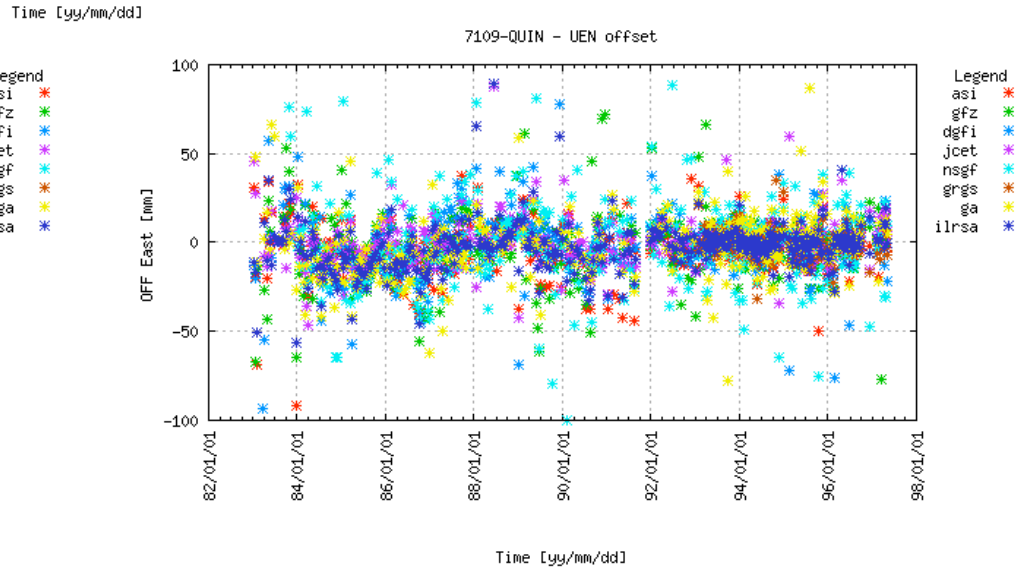
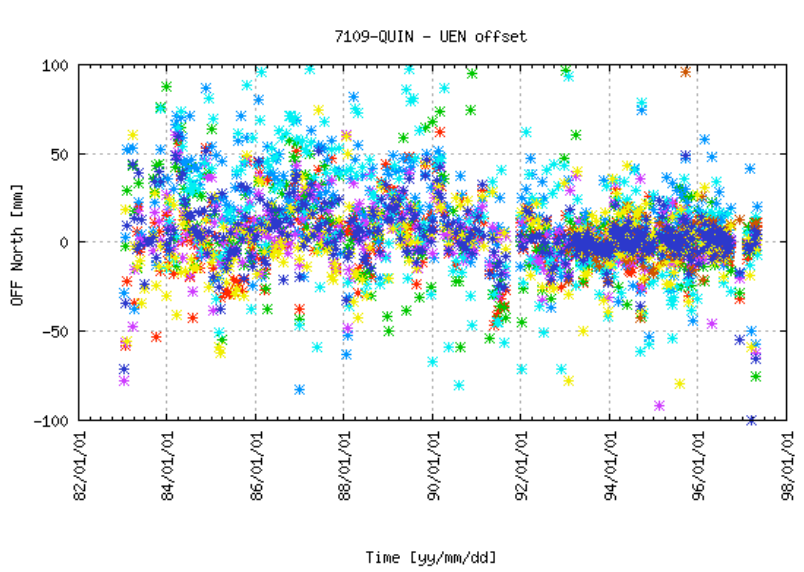
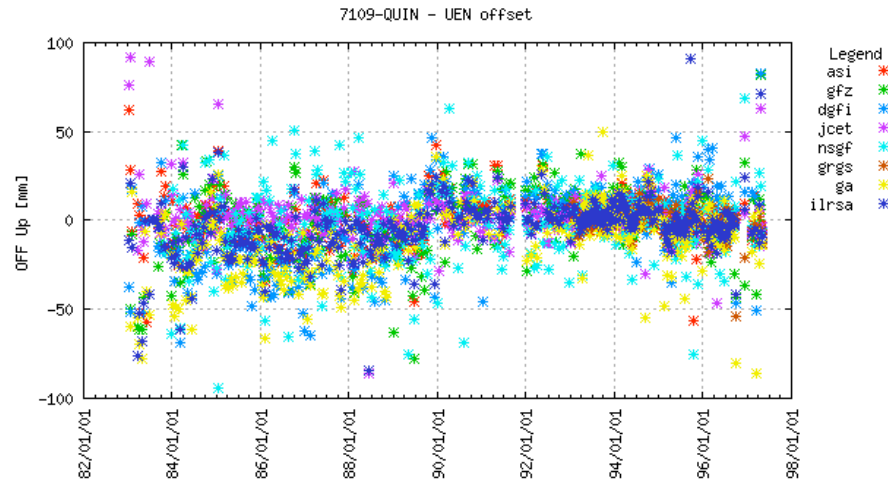
-GA, GFZ, ASI

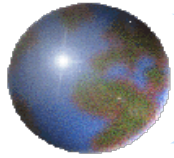
-DGFI, JCET, NSGF, GRGS





Problematic sites – 7109



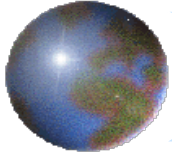


After V24: working remarks

The ILRSA V24 seems to have a good overall and detailed quality level; in particular, it presents high coherence among the contributing solutions, turning in more precise and accurate estimates.

However, the detailed analysis and evaluation is still in progress, both at the ITRF IT CCs, preparing the final ITRF2008 issue, and at the ILRS CCs.

ILRSA V24 critical issues and feedbacks should be used within ILRS AWG (both ACs and CCs) to raise the performances of the routine products also.



After V24: working remarks

ASI: no major criticism

DGFI:

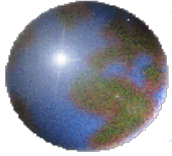
- periodicity in LOD;
- high SSC WRMS ('all' and 'core' sites)
- slightly high Helmert WRMS (Tx, Tz)

GA:

- too few non-core sites used;
- long periodicity in LOD;
- very poor 'coverage' of 83-92 period (69%);
- problems on 7810 after 1998;
- nominal start/stop used in the EPOCH section of SNX file

GFZ:

- looseness in Rx, Ry?
- noisy EOPs
- noisy Tz



After V24: working remarks

GRGS:

- problems on 7810 after 1998
- looseness in Rz??

JCET:

- problems on 7810 after 1998
- longer time span (e.g. 8 days) indicated in the EPOCH section of the SNX file in some cases

NSGF:

- high SSC WRMS ('all' and 'core' sites)
- noisy EOP
- noisy Helmert parameters
- partial application of the data deletion recommendation

ILRSA CC:

- verification of the looseness problems on the 2009 solutions
- follow on of the ILRSA V24 critical analysis (EOP, SSC)

ALL: reasons for two AC groups (ASI, GA, GFZ / DGFI, GRGS, JCET, NSGF) in some cases of bias estimation (e.g. 7308, 7845)

ILRSA discontinuities



V. Luceri
e-GEOS S.p.A., CGS – Matera



C. Sciarretta
e-GEOS S.p.A., Roma



G. Bianco
Agenzia Spaziale Italiana, CGS - Matera

Coordinate Time series discontinuities

ITRF retrieves coordinates and velocities from coordinates time series, under the assumption of linear velocities. A discontinuity is inserted whenever:

- there is a real change in the coordinates (e.g. earthquake)
- Unknown physical reason but the time series shows jumps

In these cases the time series is better fitted with a piece-wise linear function, estimating more than one set of coordinates and velocities

BUT

the fitting cannot follow the short term signals in the time series. A unique set of coordinates and velocities can represent the station and its motion even in presence of jumps.

DISCONTINUITIES IN ITRF2008P

+SOLUTION/DISCONTINUITY

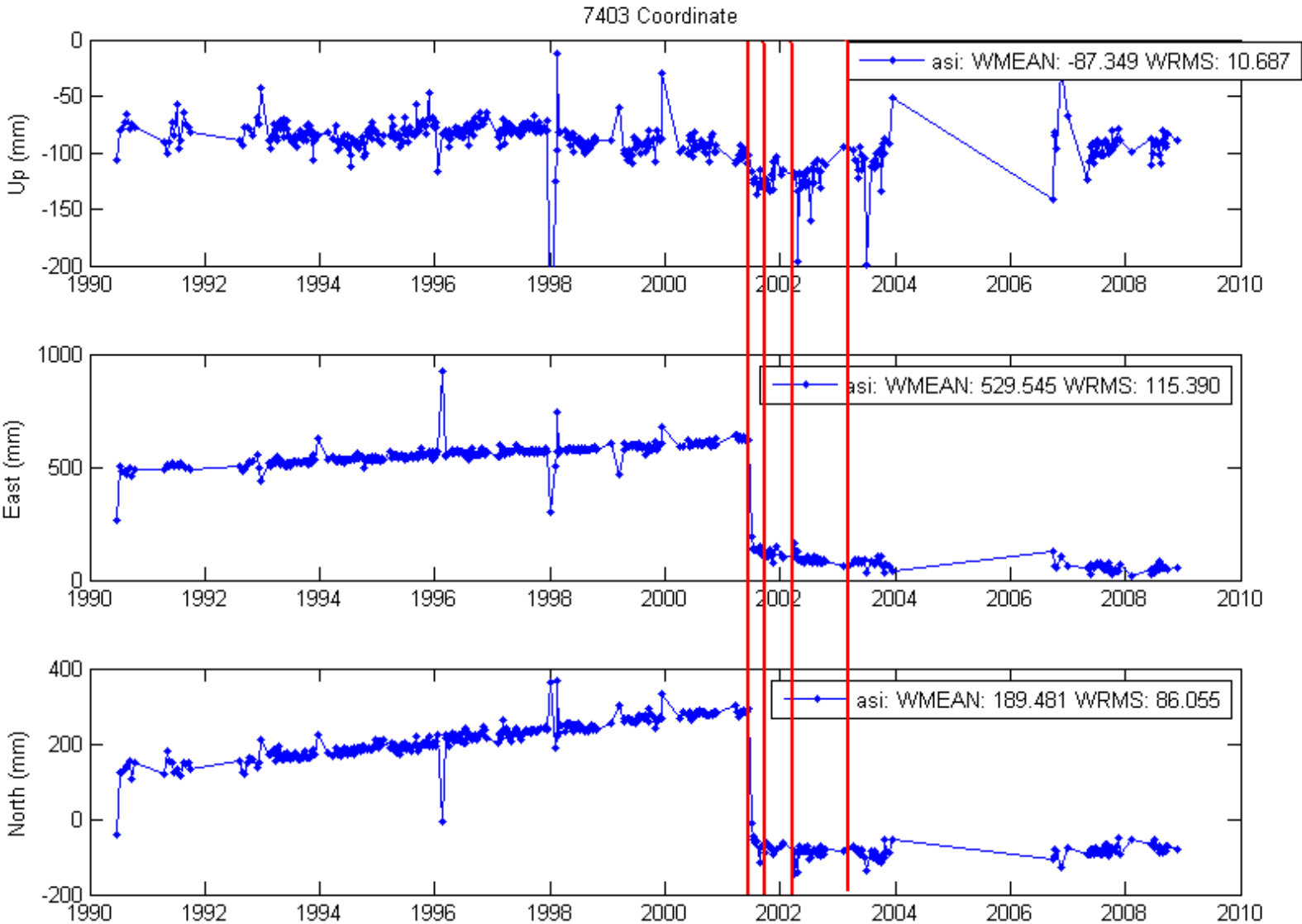
*CODE PT SOLN T DATA_START DATA_END COMMENTS

7403 A 1 L 00:000:00000 01:175:73994 P - Arequipa Earthquake
7403 A 2 L 01:175:73994 01:266:00000 P - Post seismic
7403 A 3 L 01:266:00000 02:083:00000 P - Post seismic
7403 A 4 L 02:083:00000 03:082:00000 P - Post seismic
7403 A 5 L 03:082:00000 00:000:00000 P -
7080 A 1 L 00:000:00000 96:034:00000 P -
7080 A 2 L 96:034:00000 03:217:00000 P - Installation of new laser
7080 A 3 L 03:217:00000 06:175:00000 P -
7080 A 4 L 06:175:00000 00:000:00000 P -
7210 A 1 L 00:000:00000 90:001:00000 P - Approximative Discontinuity
7210 A 2 L 90:001:00000 94:022:00000 P - Approximative Discontinuity
7210 A 3 L 94:022:00000 00:000:00000 P - Approximative Discontinuity
7845 A 1 L 00:000:00000 01:180:00000 P - Use of two lasers
7845 A 2 L 01:180:00000 00:000:00000 P -
7837 A 1 L 00:000:00000 95:274:00000 P - Installation date of the laser
7837 A 2 L 95:274:00000 00:000:00000 P -
8834 A 1 L 00:000:00000 00:344:00000 P - Installation of the time of flight observer
8834 A 2 L 00:344:00000 00:000:00000 P -
7249 A 1 L 00:000:00000 03:200:00000 P - Approximative Discontinuity
7249 A 2 L 03:200:00000 00:000:00000 P -
7811 A 1 L 00:000:00000 02:208:00000 P -
7811 A 2 L 02:208:00000 00:000:00000 P -
7124 A 1 L 00:000:00000 01:207:00000 P - Approximative Discontinuity
7124 A 2 L 01:207:00000 00:000:00000 P -
7825 A 1 L 00:000:00000 07:160:00000 P -
7825 A 2 L 07:160:00000 00:000:00000 P -
7820 A 1 L 00:000:00000 08:001:00000 P -
7820 A 2 L 08:001:00000 00:000:00000 P -
7843 A 1 L 00:000:00000 91:001:00000 P -
7843 A 2 L 91:001:00000 00:000:00000 P -

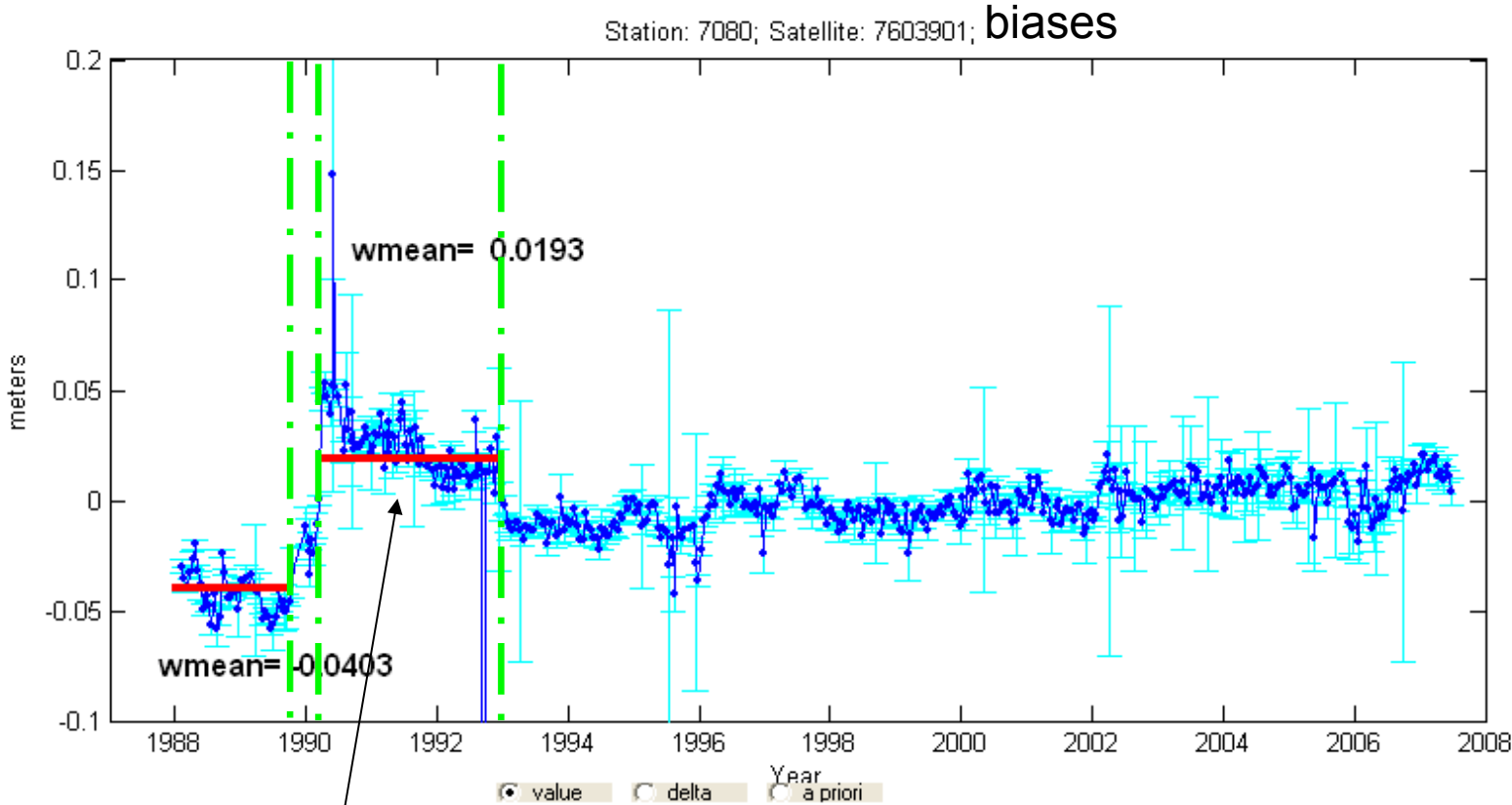
more than one break needed???

-SOLUTION/DISCONTINUITY

Arequipa-7403



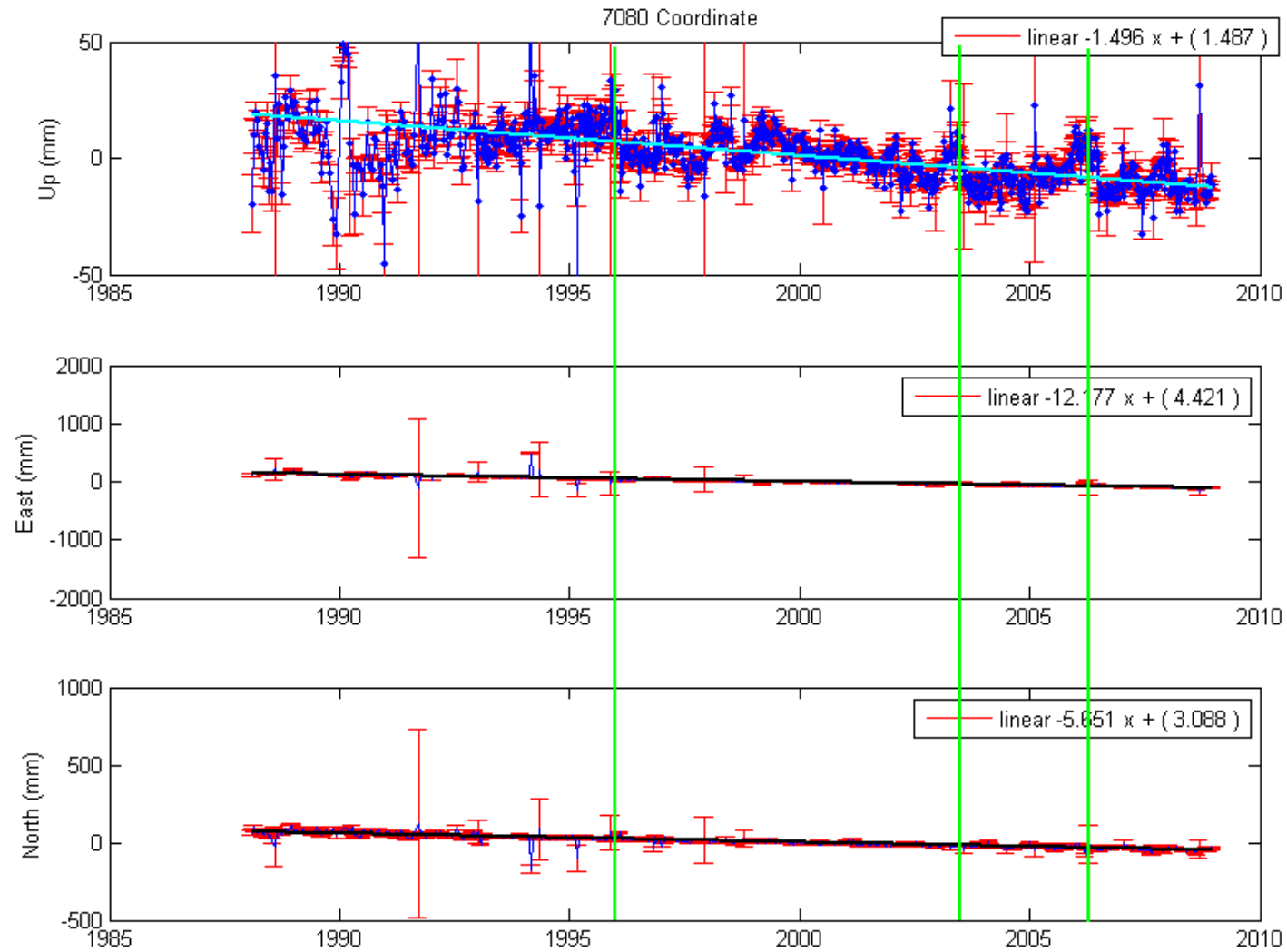
McDonald-7080



CDDIS bulletin 7080 MLRS data was biased long by 2.5 cm between April 4, 1990 and January 31, 1993

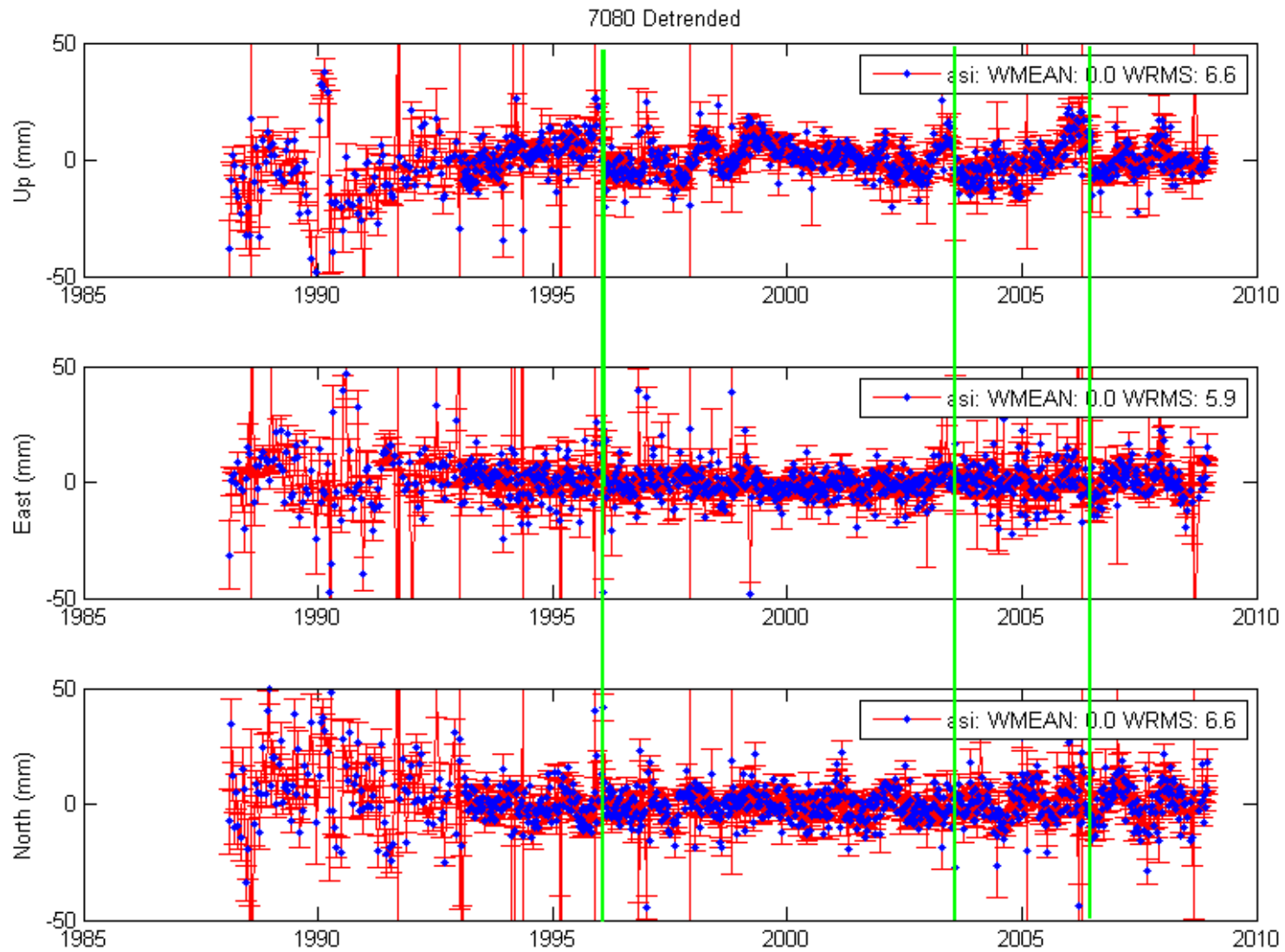
Start Date	End Date	Correction	
jan 1, 1988	dec 15, 1989	-40 mm	
mar 30, 1990	jan 28, 1993	25 mm	
7080	950306	960126	+2.1 mB
7080	960126	960425	+10.3 mB
7080	960425	960509	+9.7 mB

McDonald-7080



7080 A 1 L 00:00:0000 96:034:00000 P -
7080 A 2 L 96:034:00000 03:217:00000 P - Installation of new laser
7080 A 3 L 03:217:00000 06:175:00000 P -
7080 A 4 L 06:175:00000 00:000:00000 P -

McDonald-7080



7080 A 1 L 00:00:00000 96:034:00000 P -
7080 A 2 L 96:034:00000 03:217:00000 P - Installation of new laser
7080 A 3 L 03:217:00000 06:175:00000 P -
7080 A 4 L 06:175:00000 00:000:00000 P -

sch_7080.log

McDonald-7080

SOD Byte Start Description
46 date

70802403 1 1989001 Baseline system configuration:
Varian PMT, 200 ps laser, TD811+ UT Timer A/B+ UT CMOS,
Setra 270 barometer, Cesium beam+ Rubidium clock,
FTS8400 GPS xcvr, X/Y mount,
ND: YAG laser, wavelength 532.1 nm,
internal corner cube calibration.

70802404 2 1989256 Constant clock phase gate modification

70802405 3 1989271 MCP moved to Port 2 for Varian PMT/MCP switch

70802406 4 1989322 Varian with no amplifier receive
configuration. (Lunar, high satellites)

70802407 5 1990016 Notch Discr. capability.

70802408 6 1990026 Insertion of an "OR" Gate.

70802409 7 1990094 Spider Calibration Config.

70802410 8 1990120 Using Phase 3B timing - TD811.

70802411 9 1990157 Phase 3B mod removed - now using
Phase 3A timing configuration.

70802412 0 1990268 MCP installed for Lageos data.
(Note: Etalon data will continue to
be taken using the Varian PMT.)

70802413 1 1990335 All satellite data is now taken with MCP

70802414 2 1991100 HP Computer hdwre & s/w installed.

70802415 3 1991185 HP s/w changes installed to enhance
q/l & normalpoint data production.

70802416 4 1992101 S/w change to optimize normal-point
integration step size & degree/order

70802417 5 1992226 HP Normalpoint software upgrade
installed - Poisson filter.

70802419 6 1993162 Software change -- Quick-look data.
(Engineering & NP). Caused by
colloc. testng range bias discovery.

70802419 7 1994001 New onsite processing for full
rate & quick-look data products.

70802419 8 1995001 APD added as another lunar detector

70802419 9 1995065 LynxOS-based controller system

70802419 0 1996087 Installation of new temperature and
humidity sensor

SOD Byte Start Description
46 date

70802419 1 1997181 Linux-based on-site analysis system (HP replacement)

70802419 2 1997239 Cesium beam replaced by crystal clock

70802419 3 1997344 Make Timer B return circuitry similar to that for
fire to prevent sync problems with faster computer.

70802419 4 1998225 Replace controller with PC identical to new analysis
workstation, running LynxOS 2.4.0 and updated software.

70802419 5 2001142 New hardware bit positively identifies detector in use,
and controller software puts it into the data stream.

70802419 6 2003137 Paroscientific MET3 meteorology package (NASA network
standard) installed. Old sensors are backup.

70802419 8 2004043 Processor computer upgraded with new motherboard,
hard disk & Fedora Core 1 Linux O/S. All software
recompiled.

70802419 9 2006127 Fedora Core 4 Linux O/S installed on processor
computer. All software recompiled.

70802419 0 2007146 HAMAMATSU detector with AvanteK amp added for
use with high satellites and the moon.

70802419 1 2008023 Begin parallel production processing and transmission
of CRD format data with old format.

70802419 2 2009124 Old format full-rate and normalpoint dropped as CRD
products have been validated.

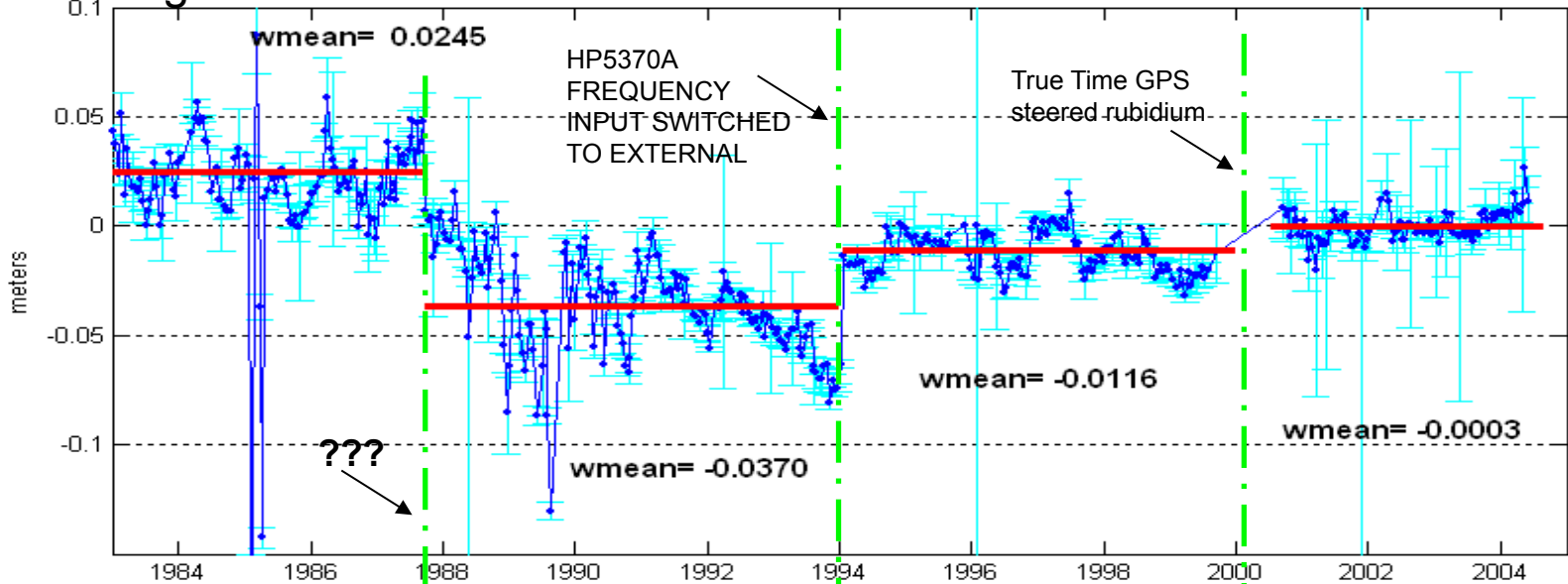
70802419 3 2009169 Processor system replaced w/ Dell Precision 380 running
RHEL5 & MLRS software

70802419 4 2009182 Symmetricon Cs clock now station standard; TAC is backup.

Haleakala-7210

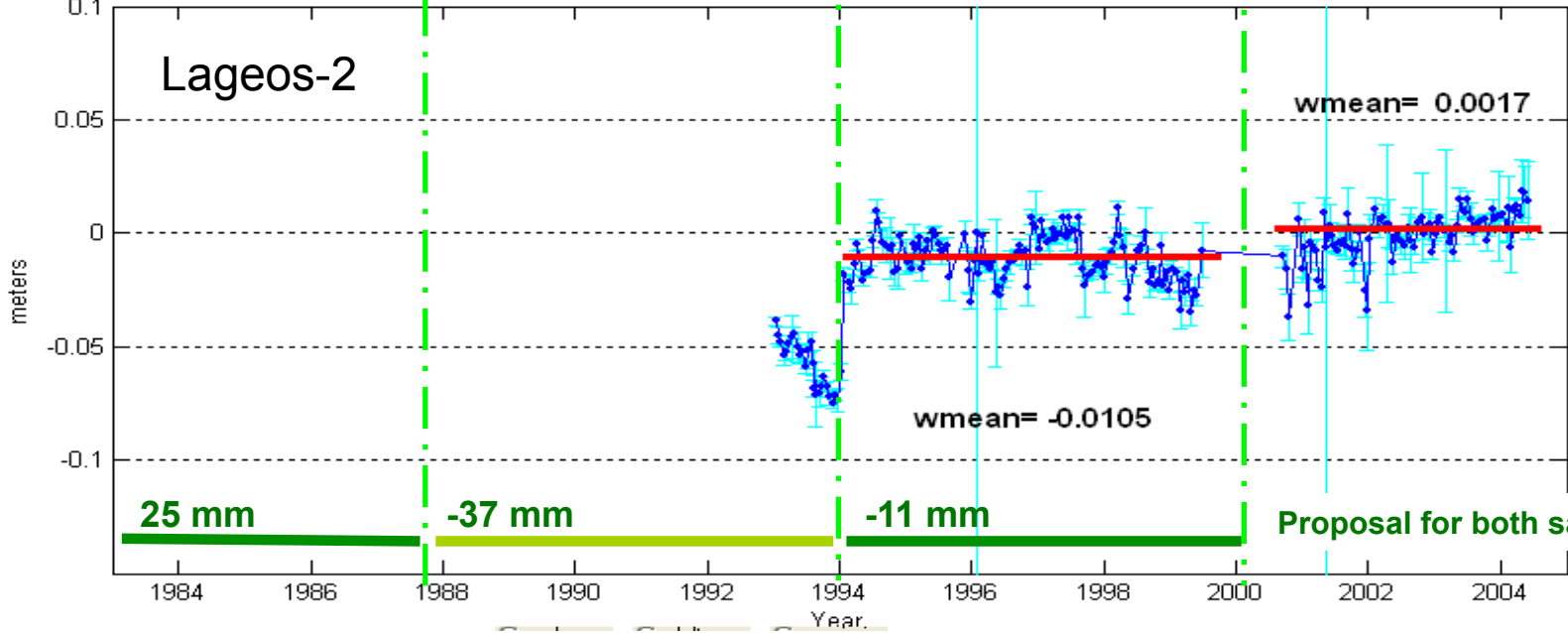
Lageos-1

Station: 7210; Satellite: 7603901; biases



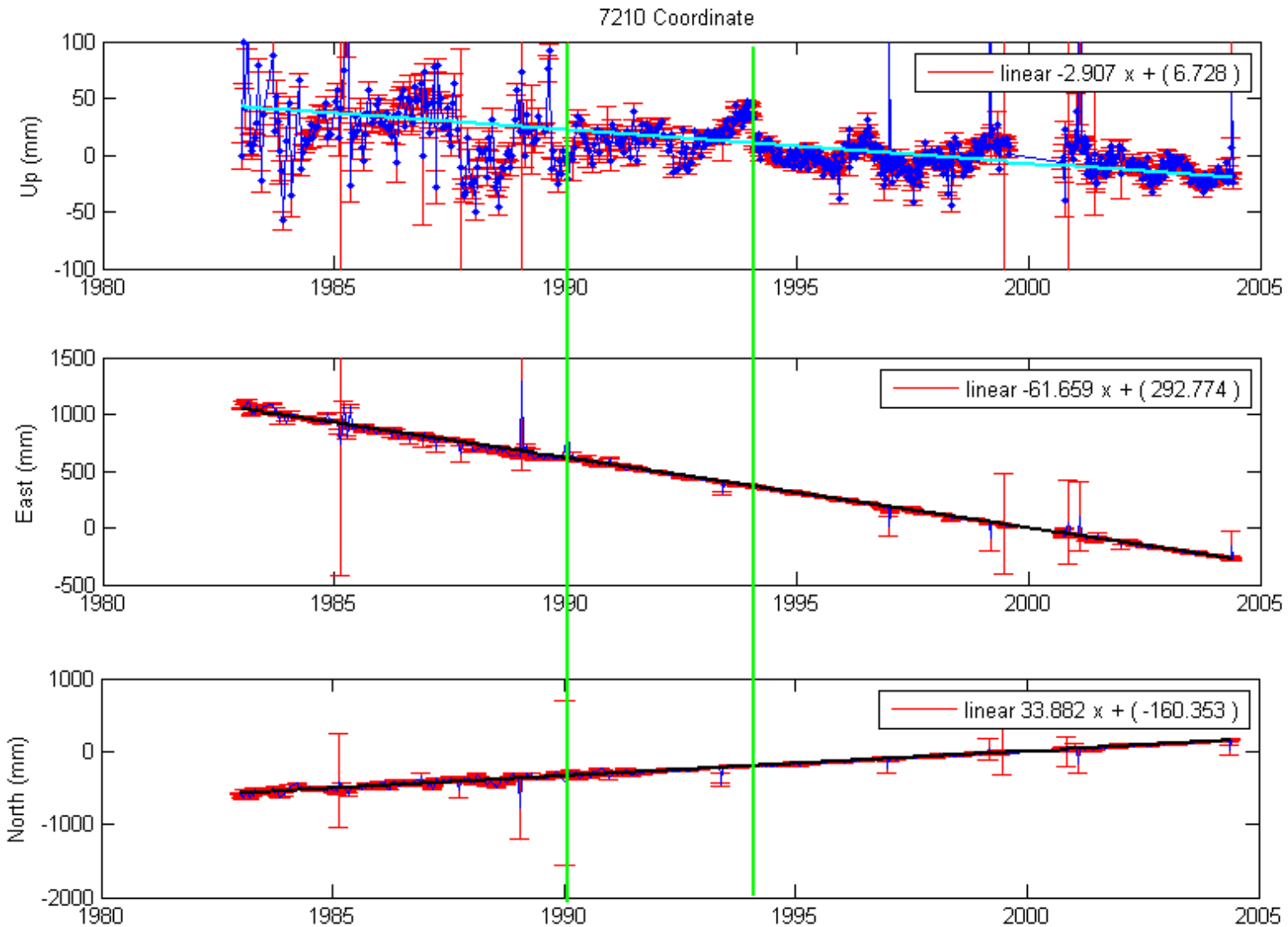
Lageos-2

Station: 7210; Satellite: 9207002;



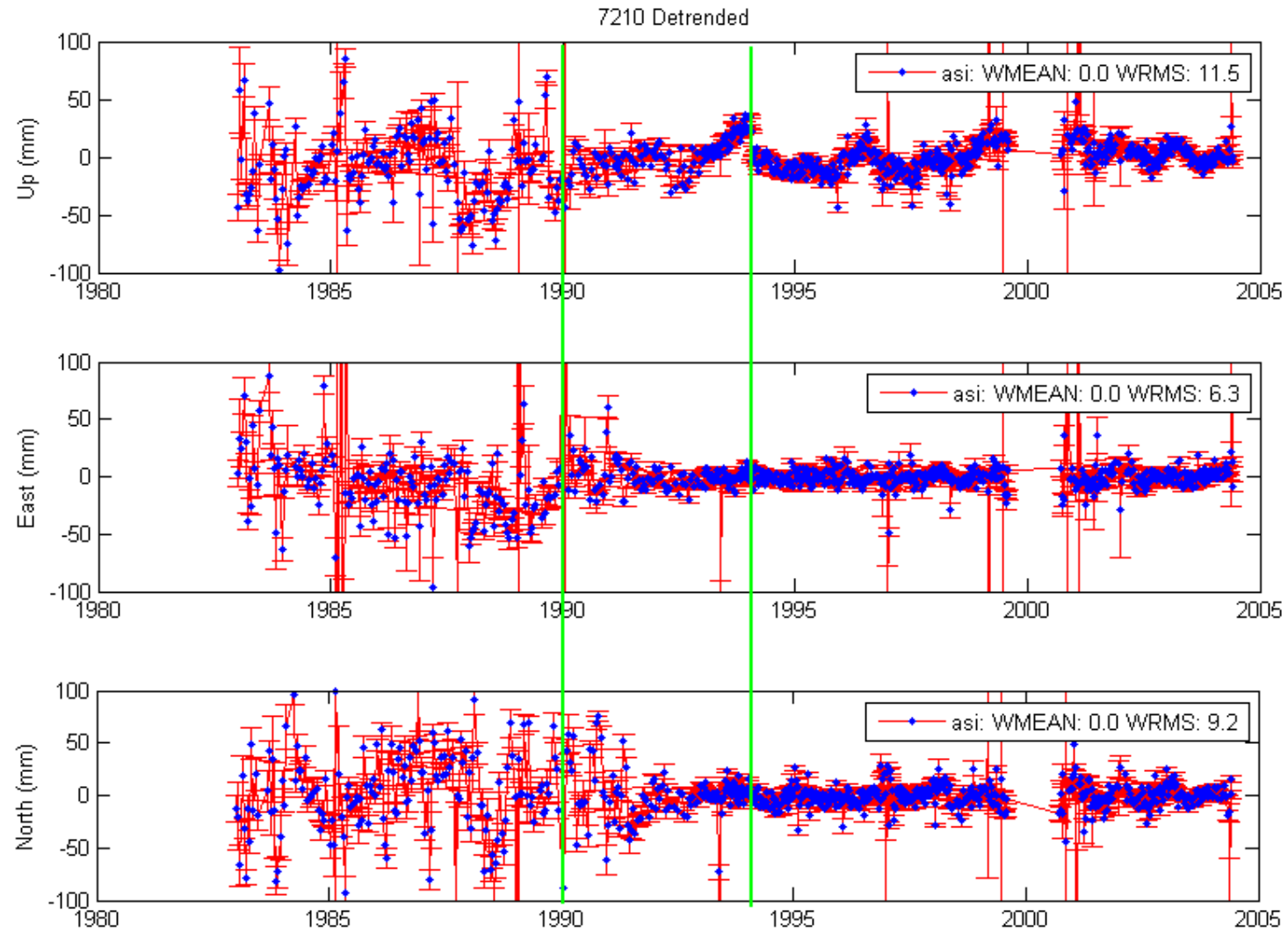
Year

Haleakala-7210



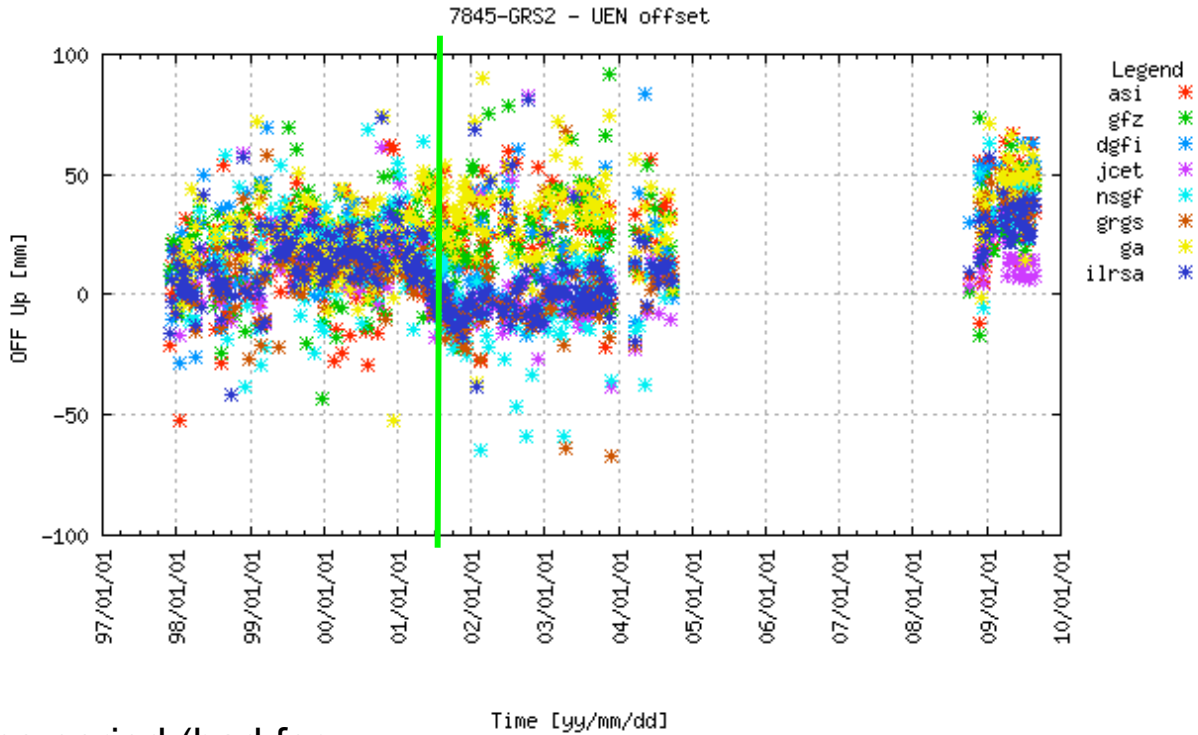
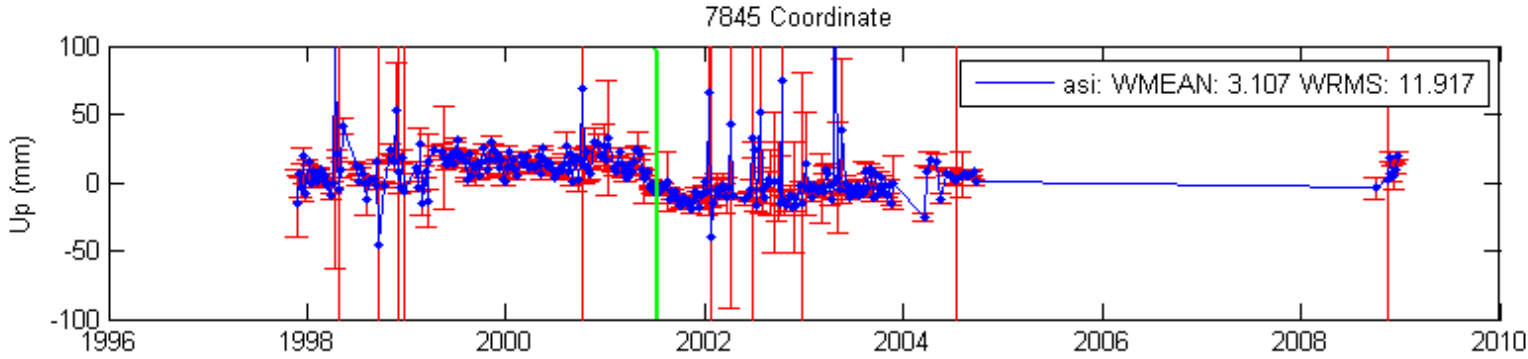
- 7210 A 1 L 00:000:00000 90:001:00000 P - Approximative Discontinuity
- 7210 A 2 L 90:001:00000 94:022:00000 P - Approximative Discontinuity
- 7210 A 3 L 94:022:00000 00:000:00000 P - Approximative Discontinuity

Haleakala-7210



7210 A 1 L 00:000:00000 90:001:00000 P - Approximative Discontinuity
7210 A 2 L 90:001:00000 94:022:00000 P - Approximative Discontinuity
7210 A 3 L 94:022:00000 00:000:00000 P - Approximative Discontinuity

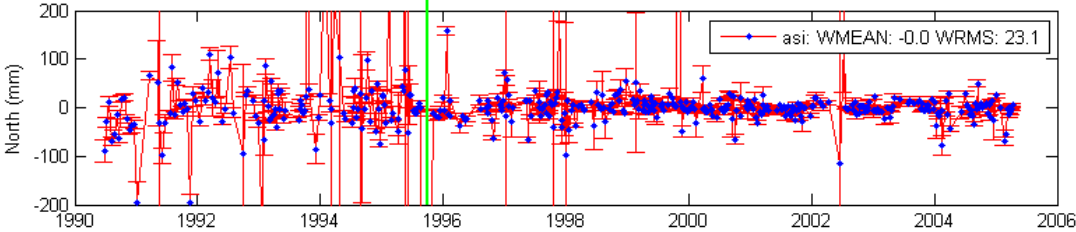
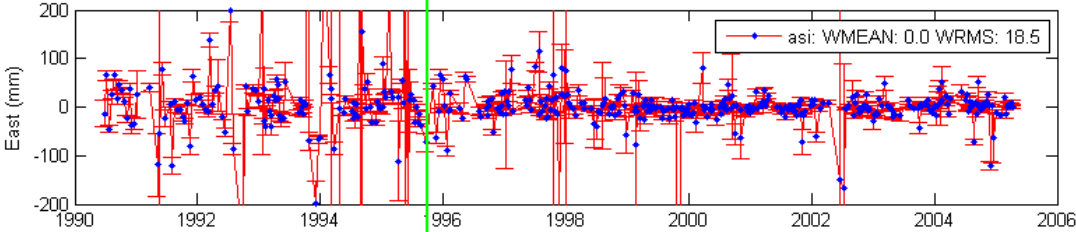
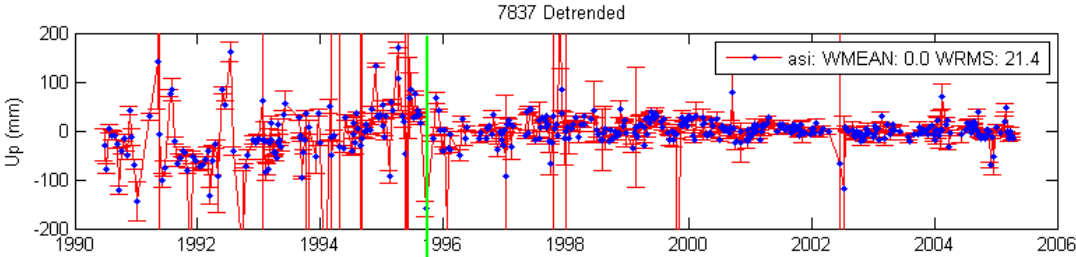
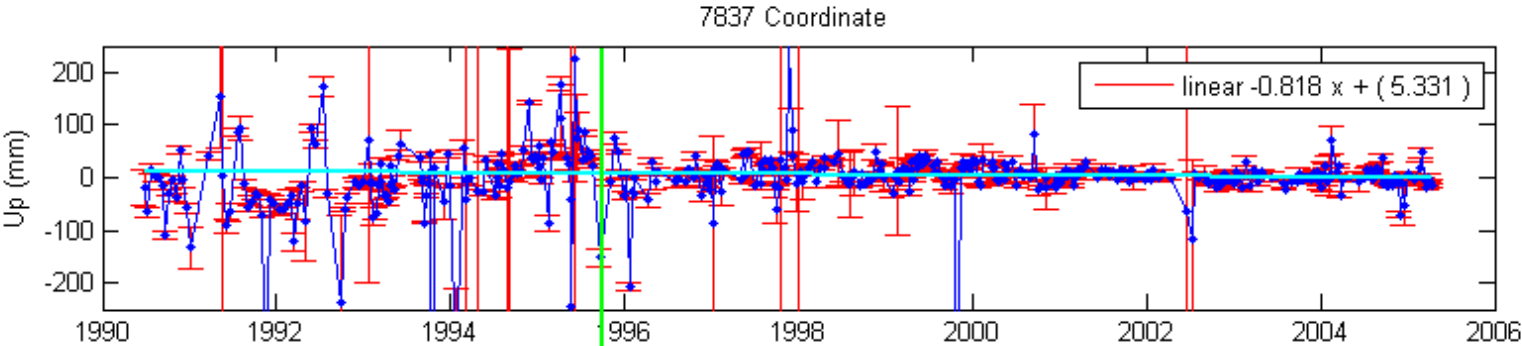
Grasse-7845



All except asi, gfz, ga

bias to be estimated over all the period (bad for EOP referencing)

Shanghai-7837

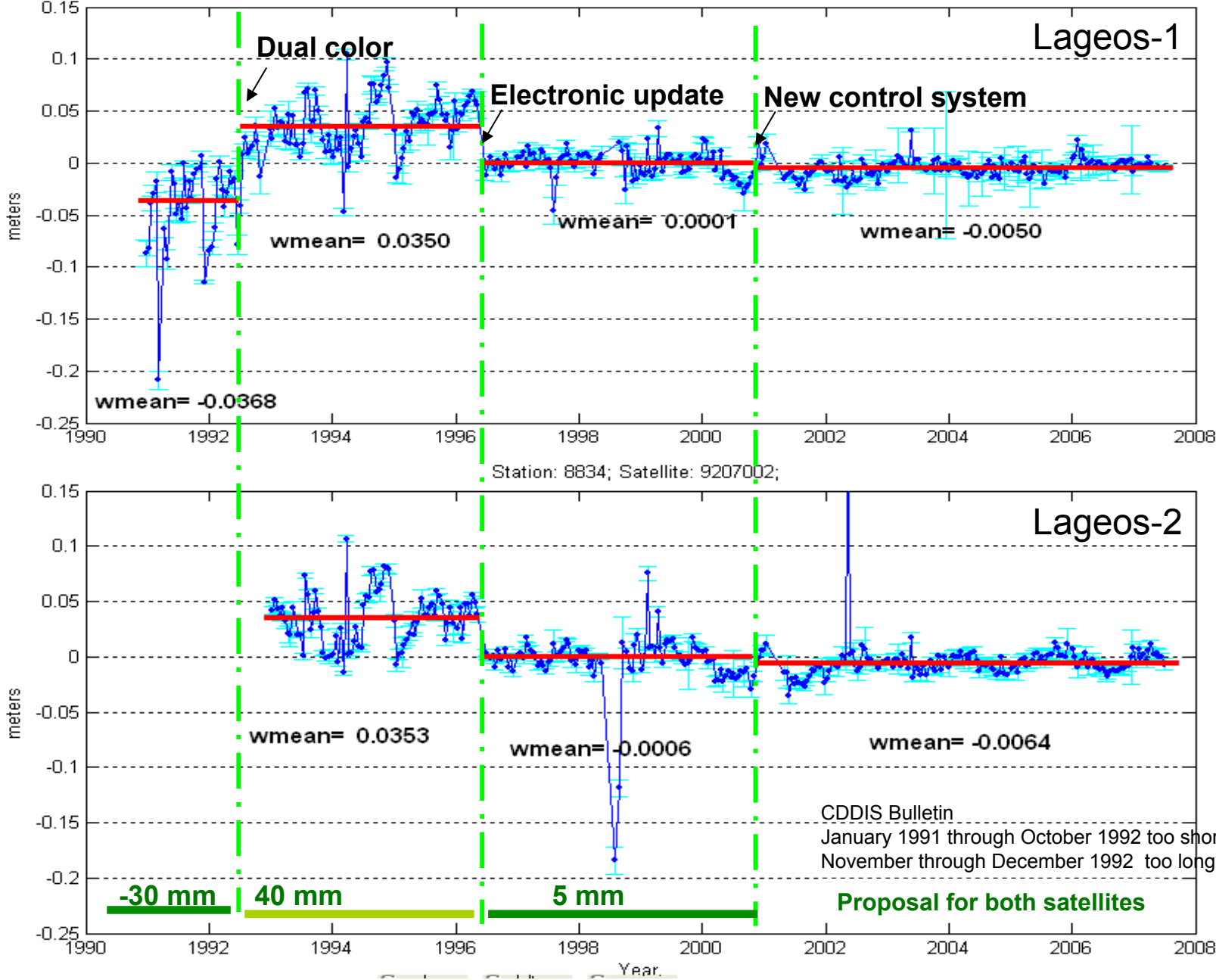


SOD	Byte	Start date	Description
78372805	1	1990078	180ps Active-passive mode laser + HP5370B + PMT
78372805	2	1992129	SPAD replaces PMT
78372805	3	1992247	PMT replaces SPAD
78372805	4	1993128	New ground target (corner)
78372805	5	1993258	GPS Time Synchro. adopte
78372805	6	1994231	SPAD replaces PMT
78372805	7	1995300	New 100ps SFUR
78372805	8	1995361	PMT replaces SPAD
78372805	9	1996008	SPAD#2 replaces PMT
78372805	10	1996247	New counter HP5370B#2

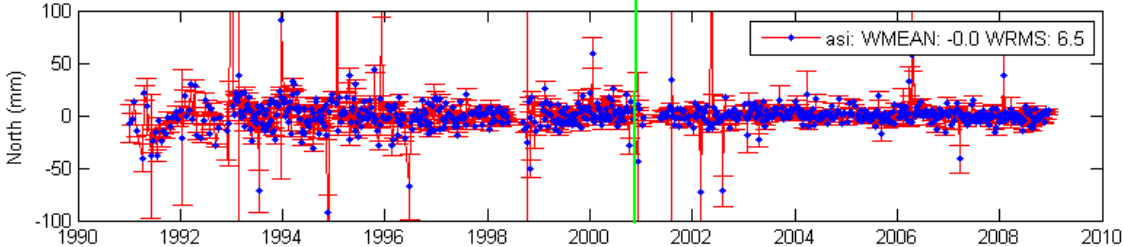
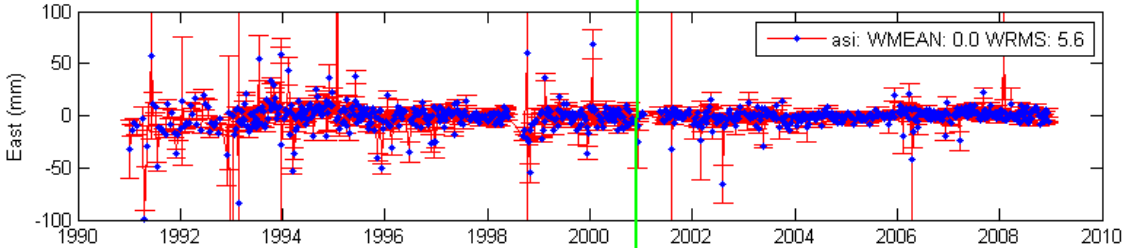
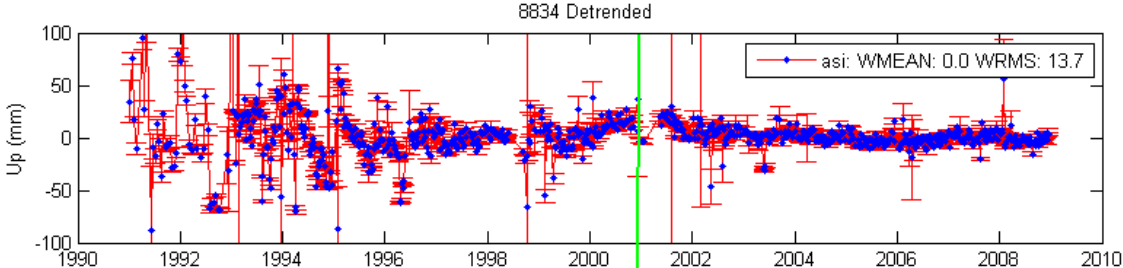
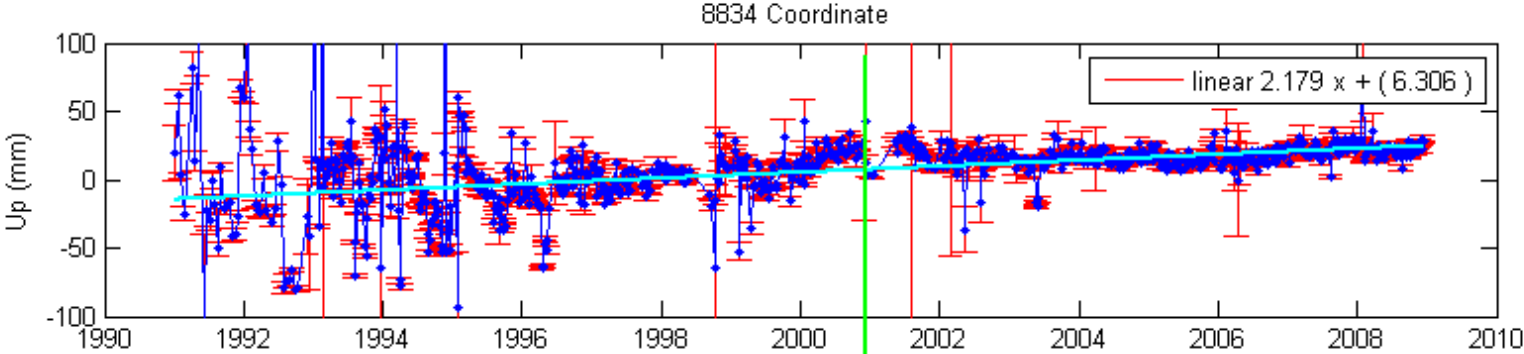
No analysis correction, data edited before 1990

Wettzell-8834

biases

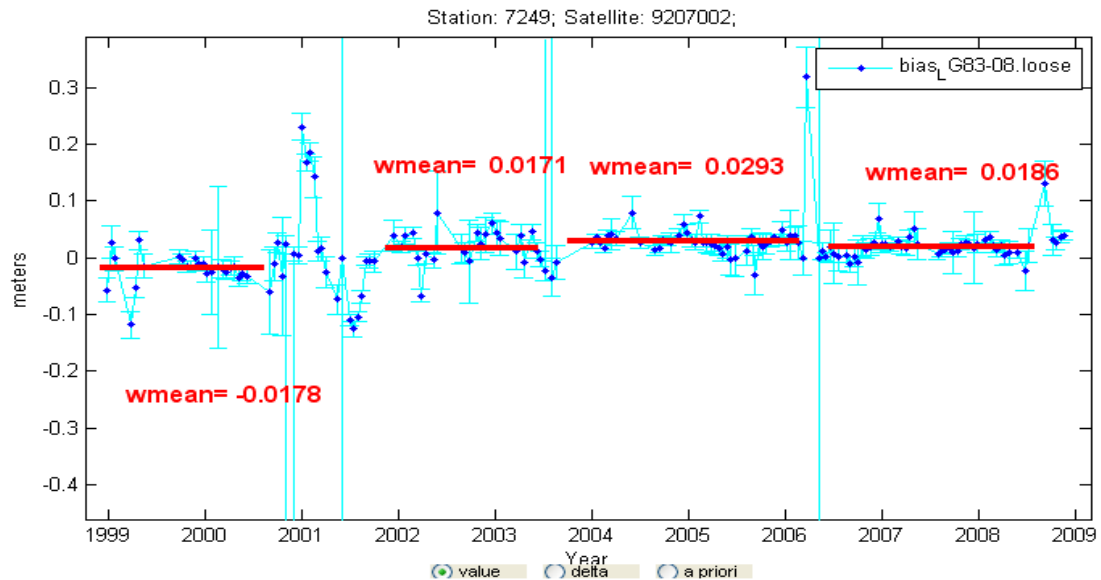
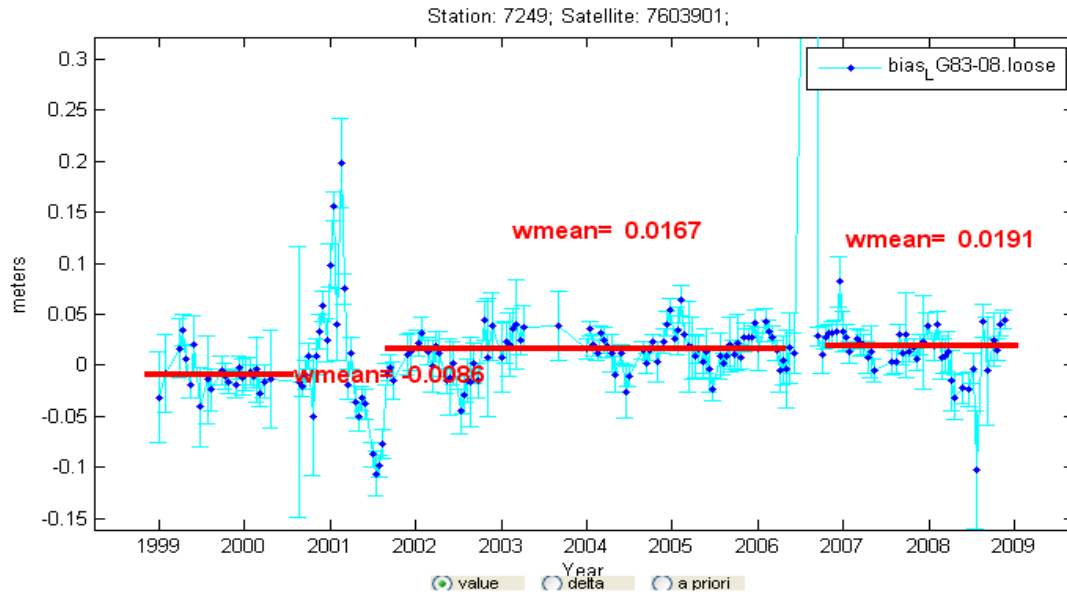


Wetzell-8834



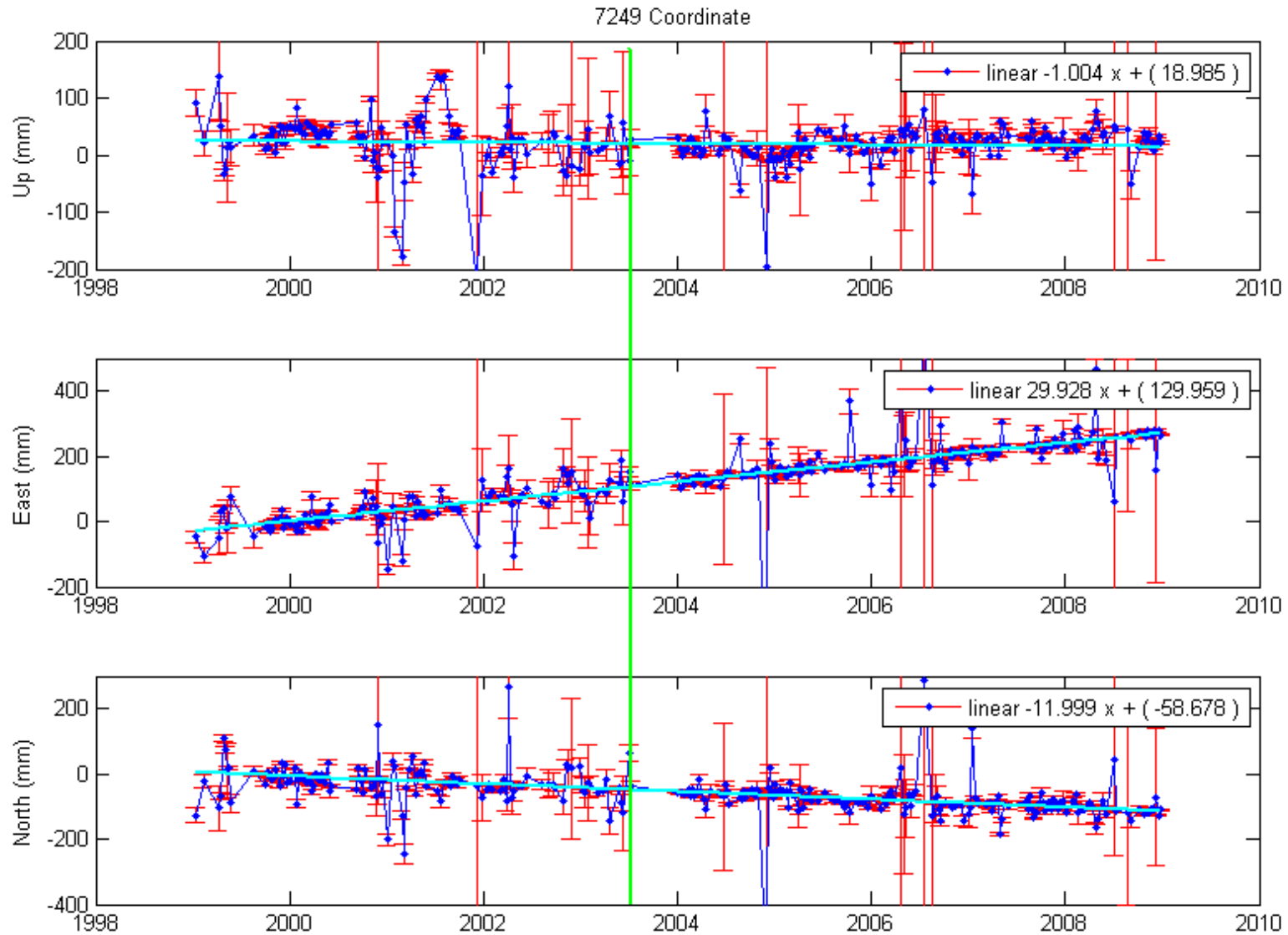
BREAK
8834 00:344:00000 P -
Installation of the time of flight observer

Beijing-7249



Appleby suggests 22 mm for Lageos and 21 mm Etalon to be added after 2001:020, the analysis result is roughly 20 mm to be subtracted

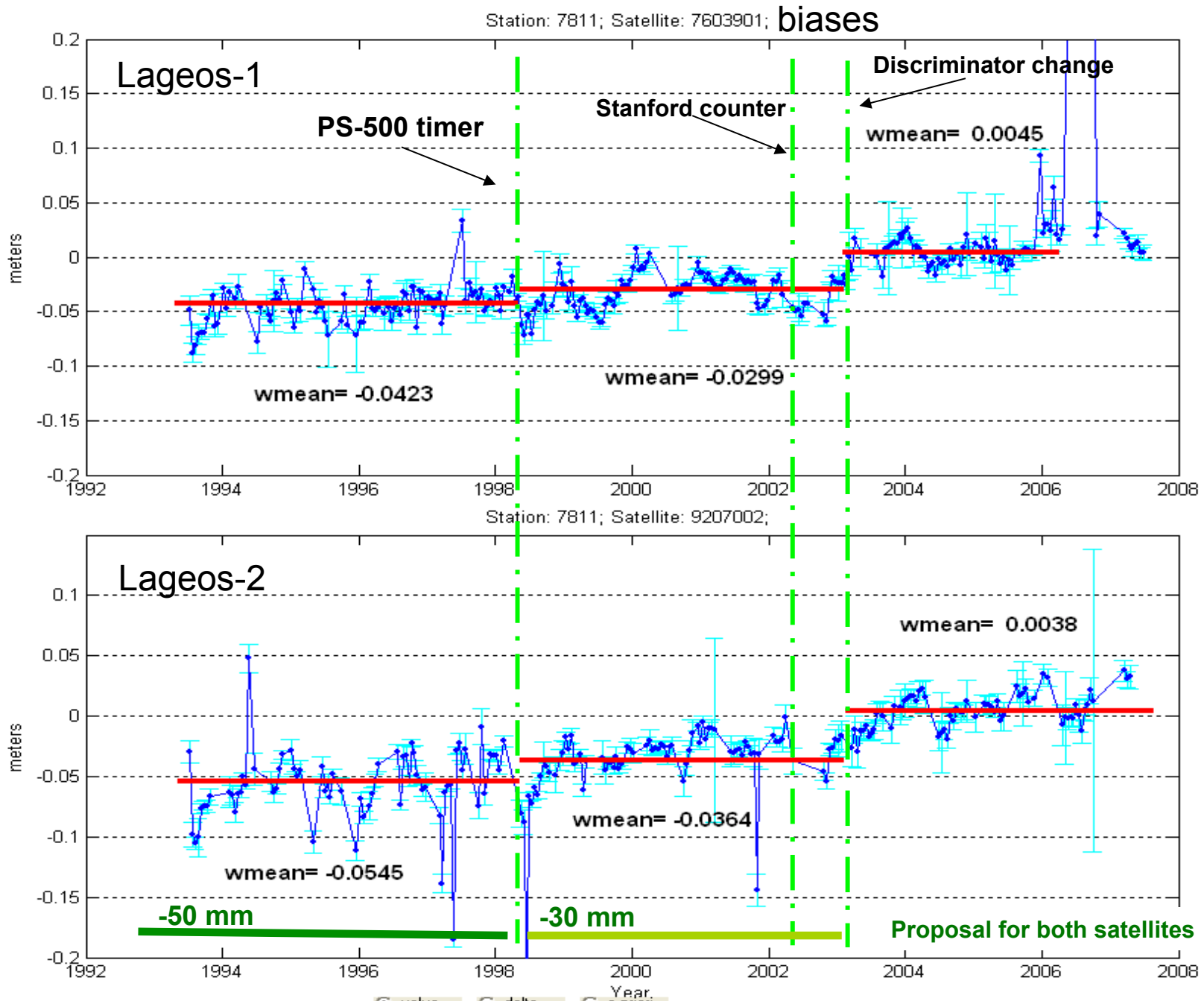
Beijing-7249



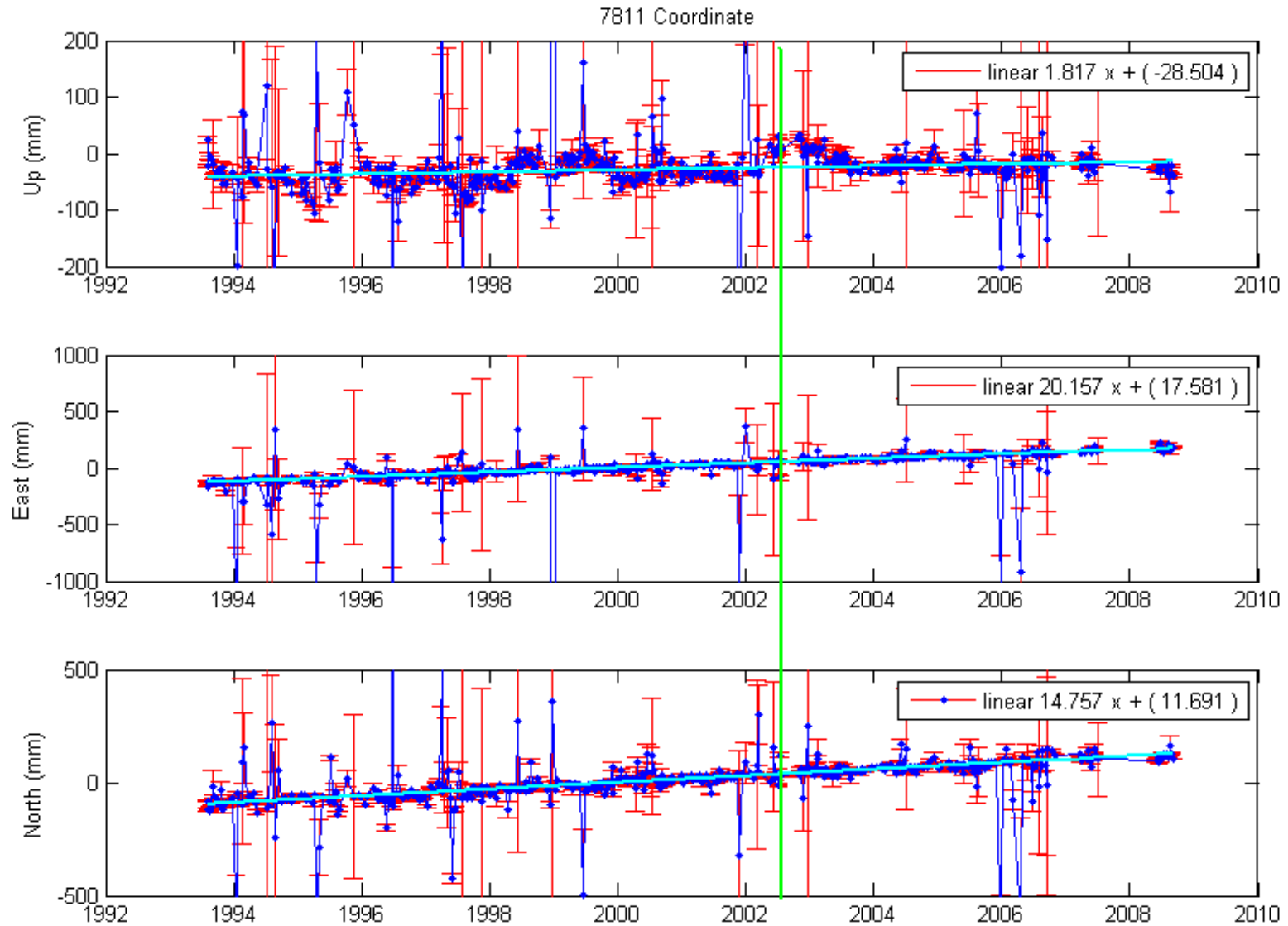
AWG bias
7249 010120 ----- +20

ITRF discontinuity
7249 03:200:00000 P - Approximative Discontinuity

Borowiec-7811



Borowiec-7811



AWG corrections

Data before 930702 to be deleted

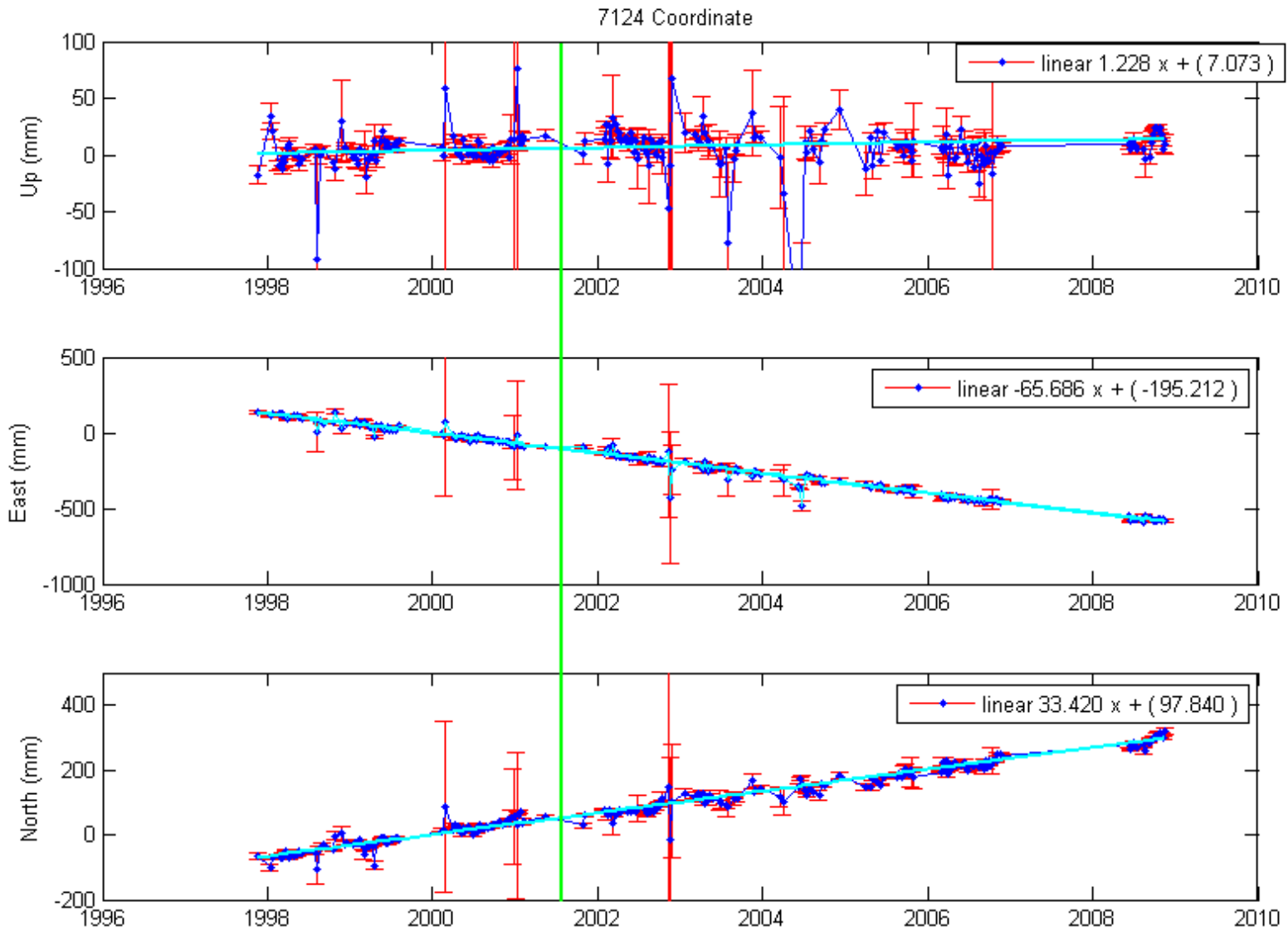
7811 930720 980701 -50

7811 980701 020506 -30

ZA Discontinuities

7811 02:208:00000

Papete-7124

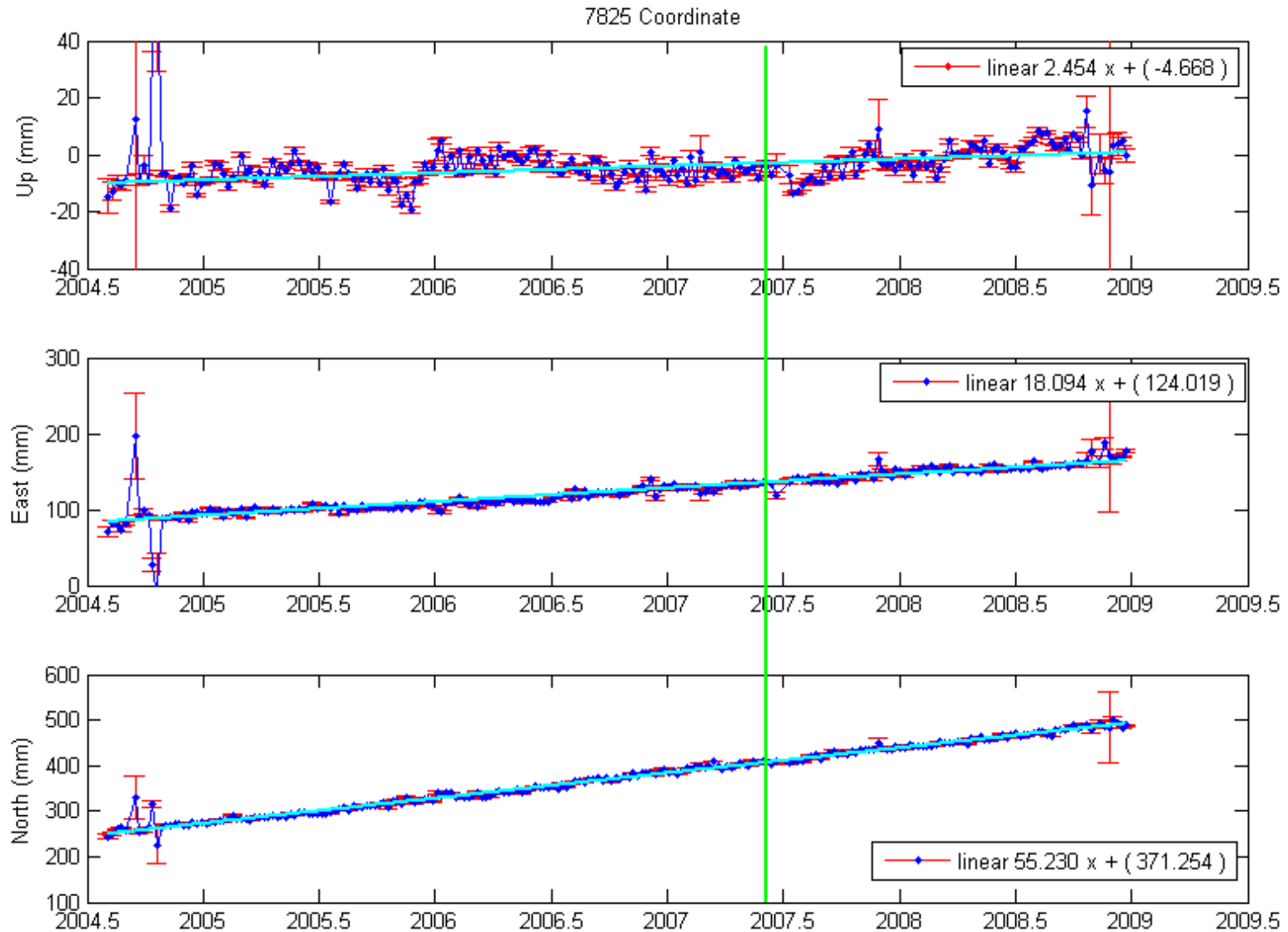


NO AWG corrections

ZA discontinuity

7124 01:207:00000 P - Approximative Discontinuity

Mt Stromlo-7825



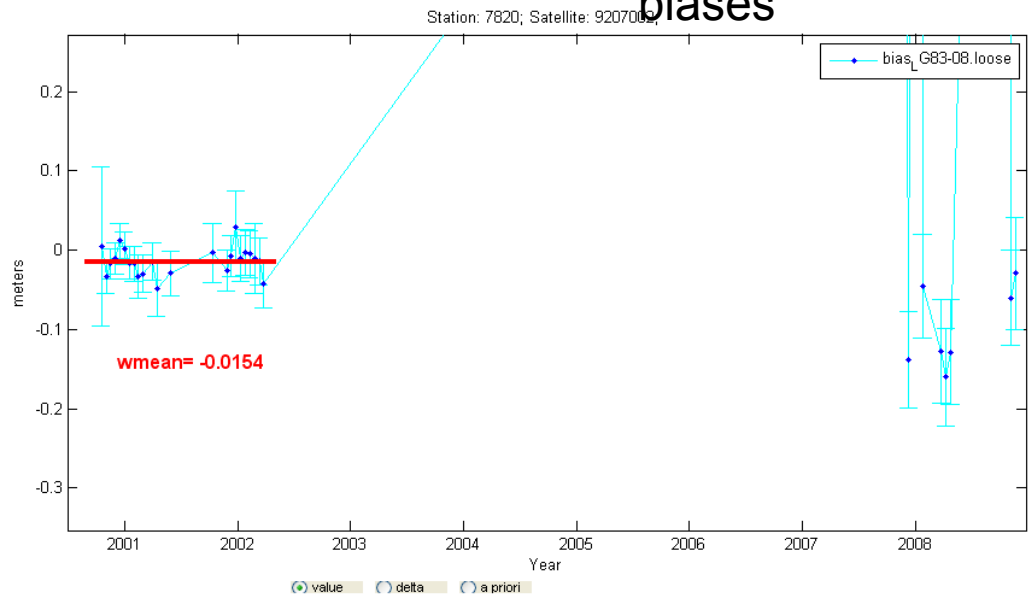
NO AWG corrections

ZA discontinuity

7825 A 1 L 00:000:00000 07:160:00000

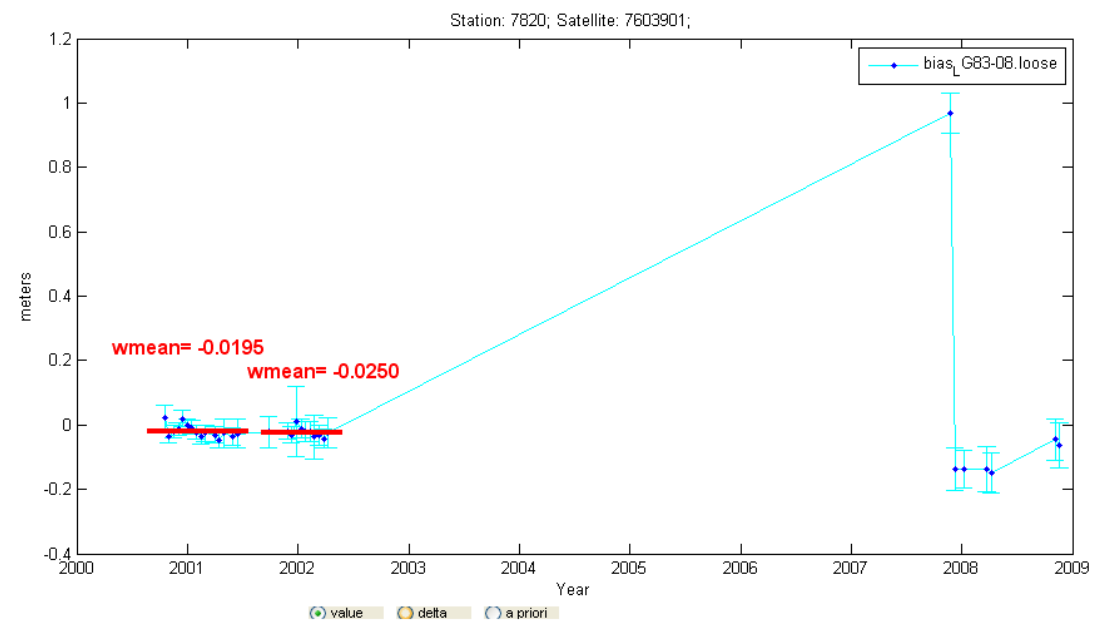
Kunming-7820

biases

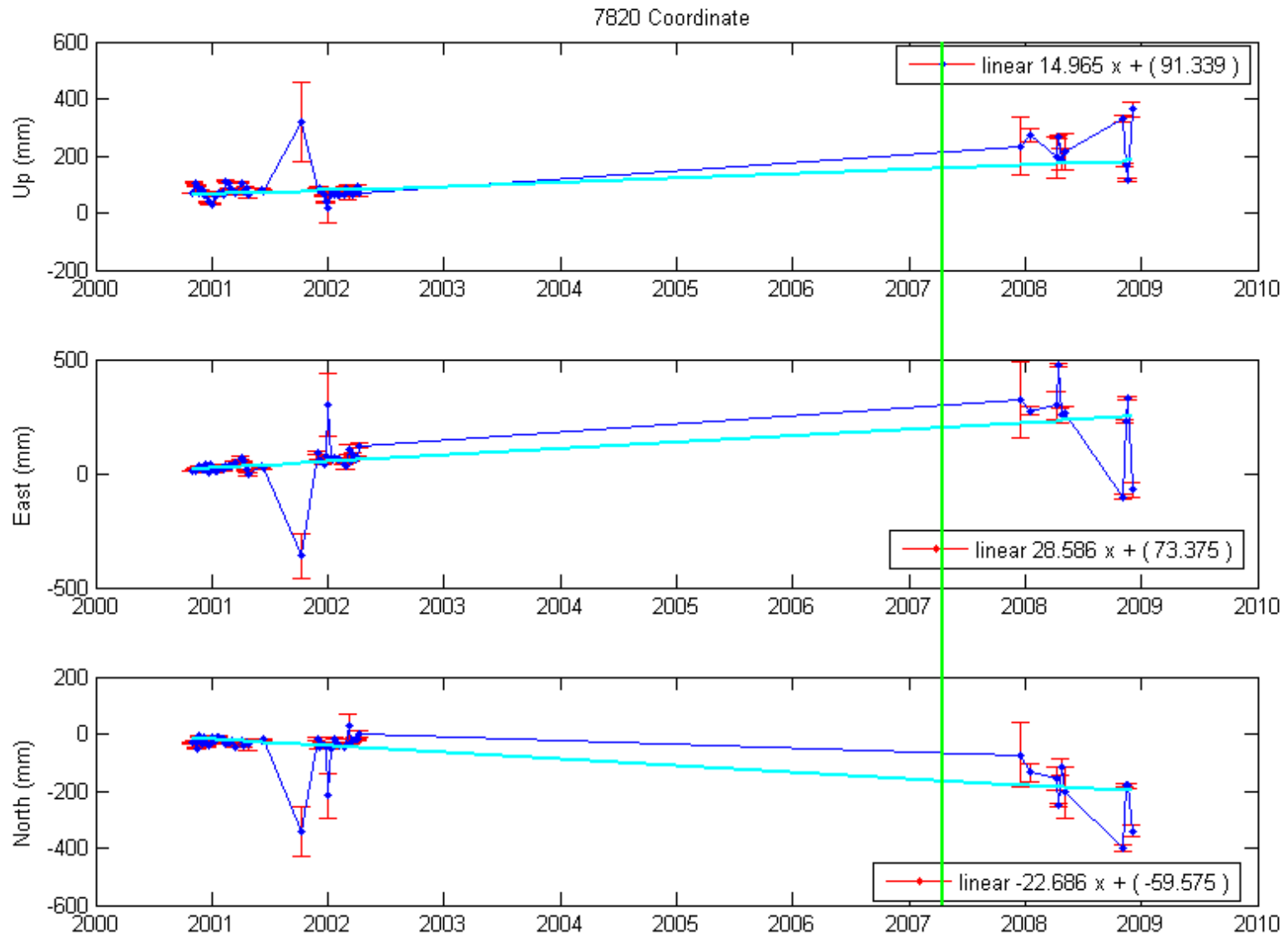


Similar to the corrections sent by Graham, 19 mm to add after 1998:140

Data before 001019 deleted



Kunming-7820



AWG corrections

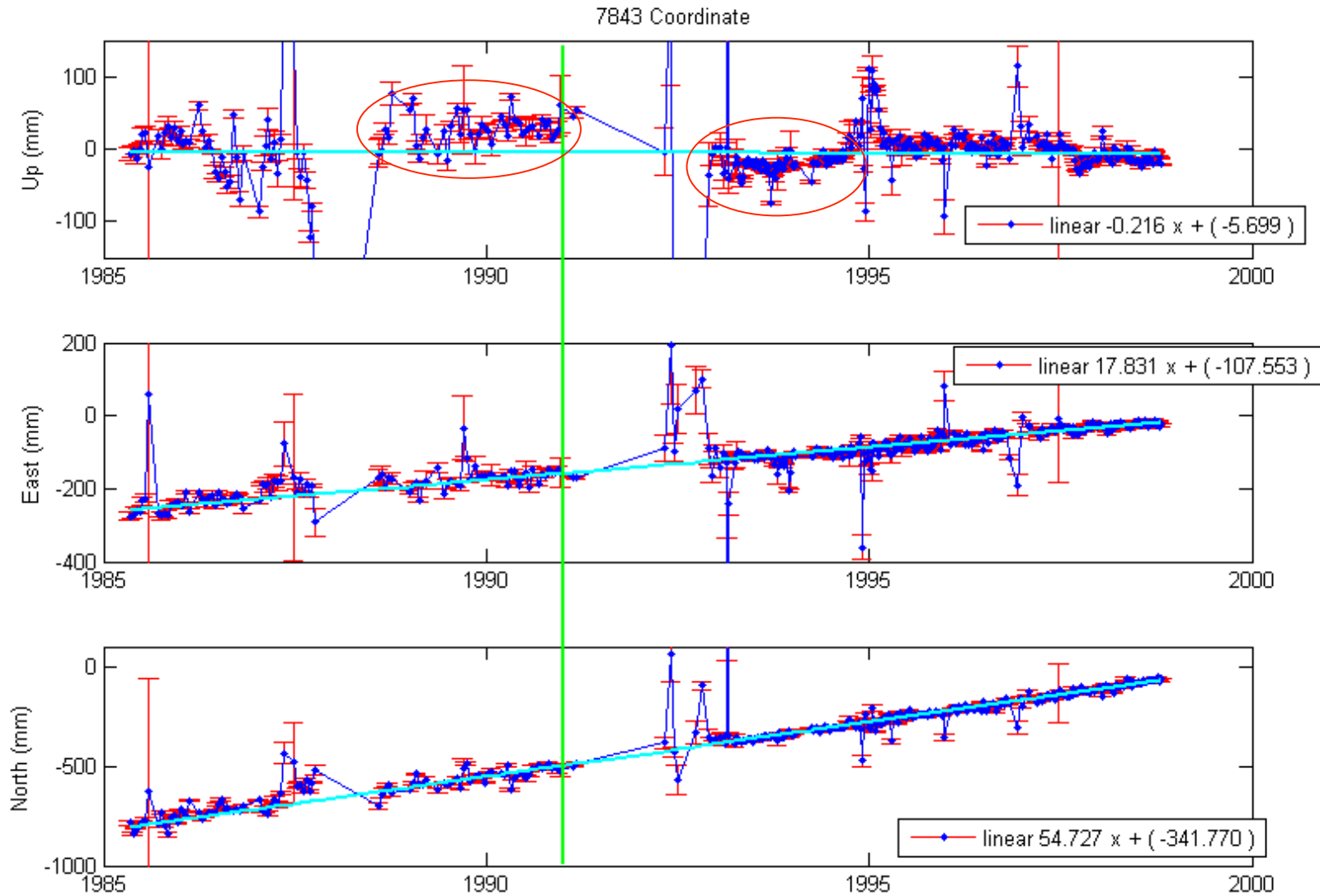
Data before 001019 deleted

7820 001019 ----- -20

ZA discontinuity

7825 A 1 L 00:000:00000 07:160:00000

Orroral-7843

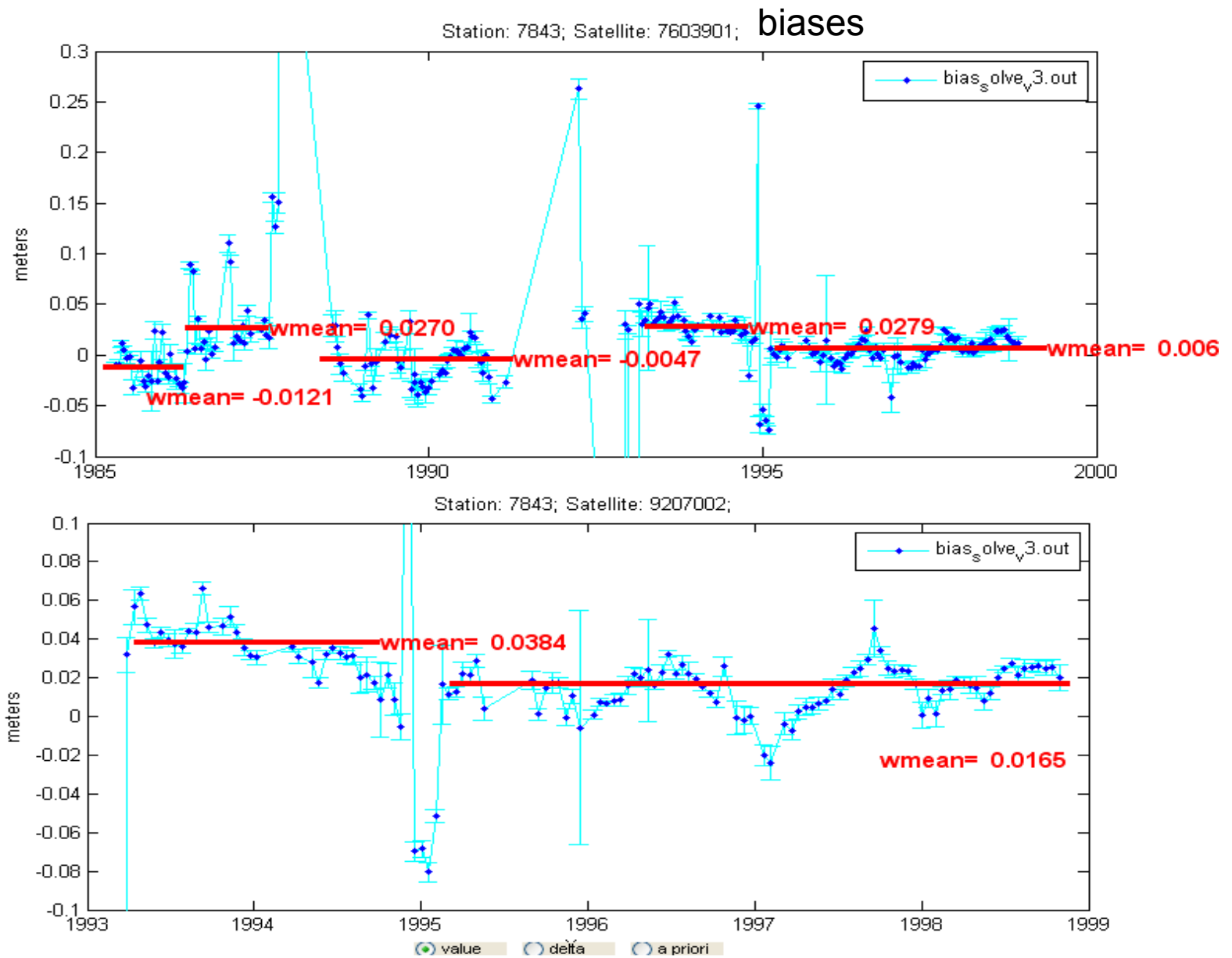


NO AWG corrections

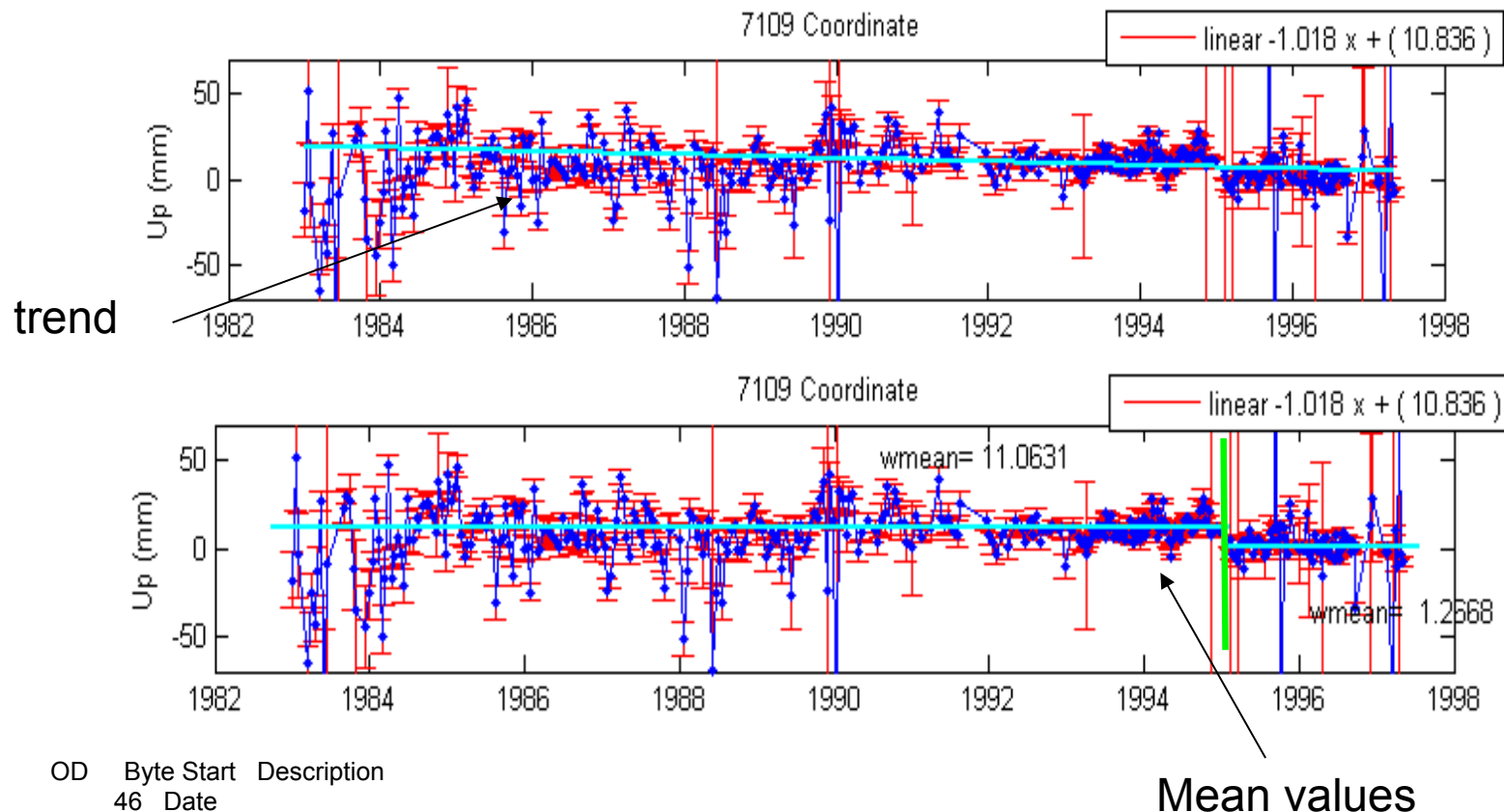
ZA discontinuity

7843 A 1 L 00:00:00000 91:001:00000

Orroral-7843



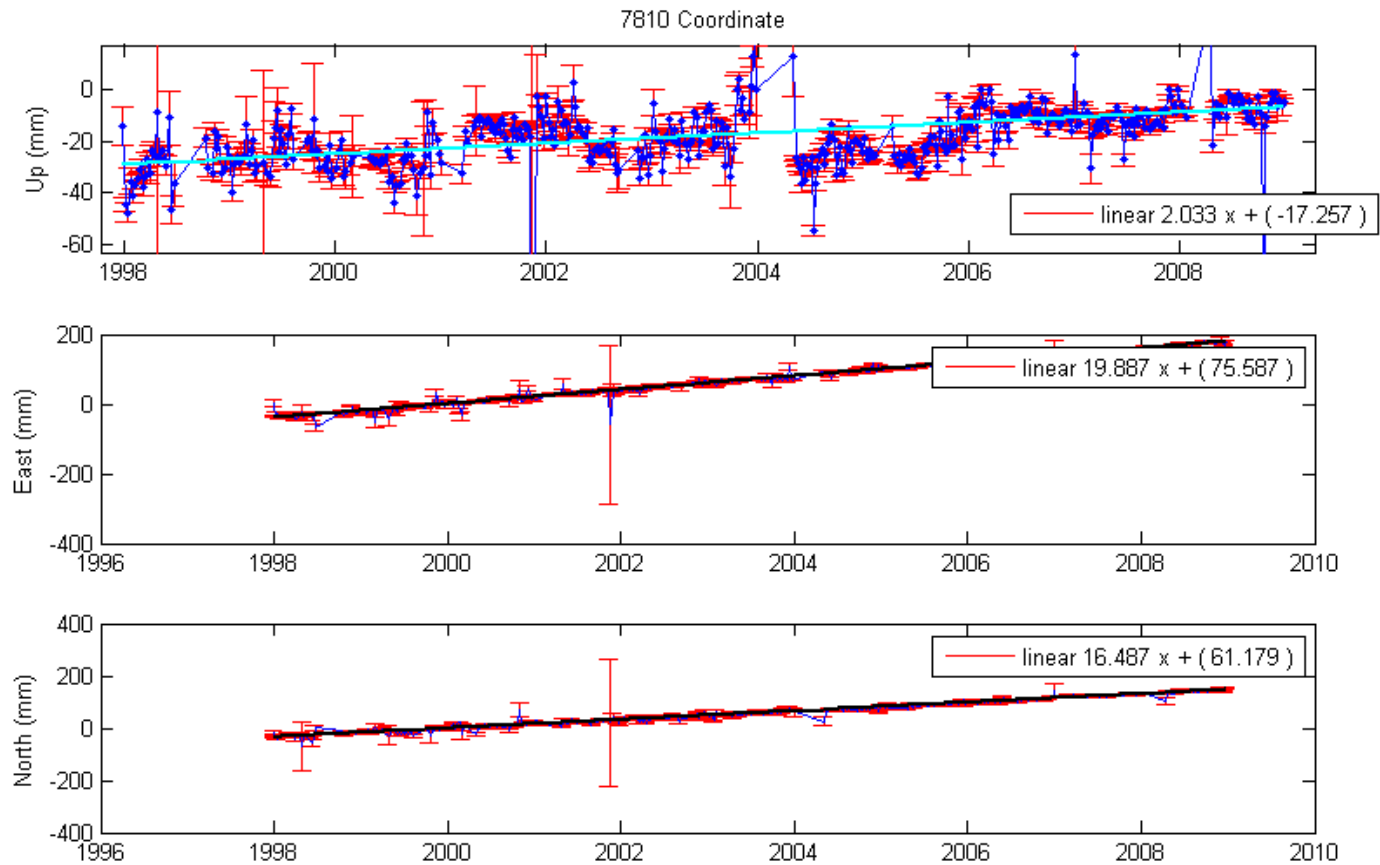
1 more discontinuity: Quincy-7109



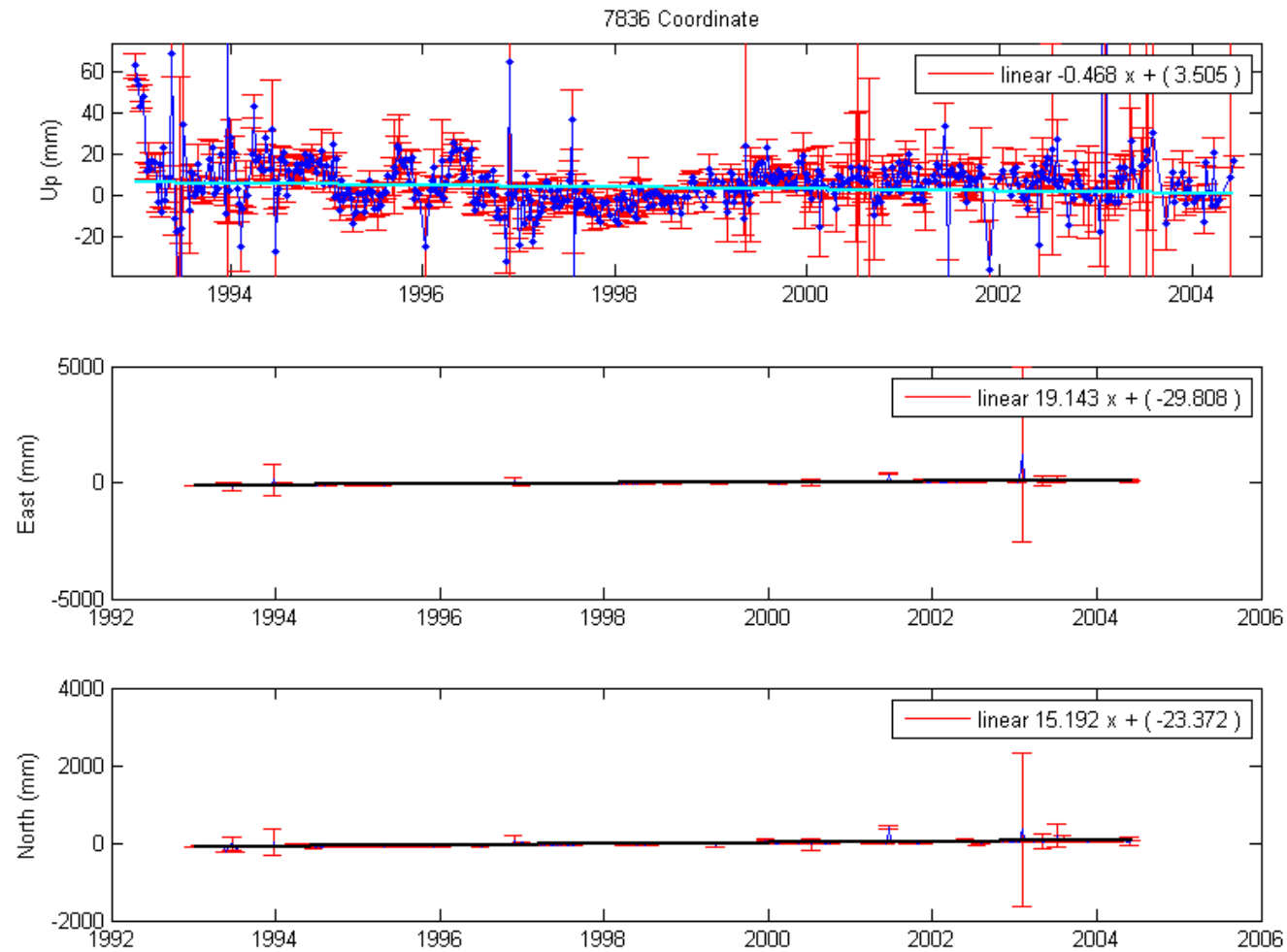
OD	Byte	Start	Description
46	Date		
71090815	7	1992116	Analysis computer upgrade, tracking and analysis software upgrade
71090815	8	1994244	New normal point generation software (VM)
71090815	9	1995001	Paroscientific barometer
71090815	0	1995284	Mount observer automation
71090815	1	1996245	High sensivity receiver (phase 1)
71090815	2	1996330	Controller upgrade project
71090815	3	1997017	Low loss cable
71090815	4	1997032	Single operator automation

Critical sites

Zimmerwald-7810



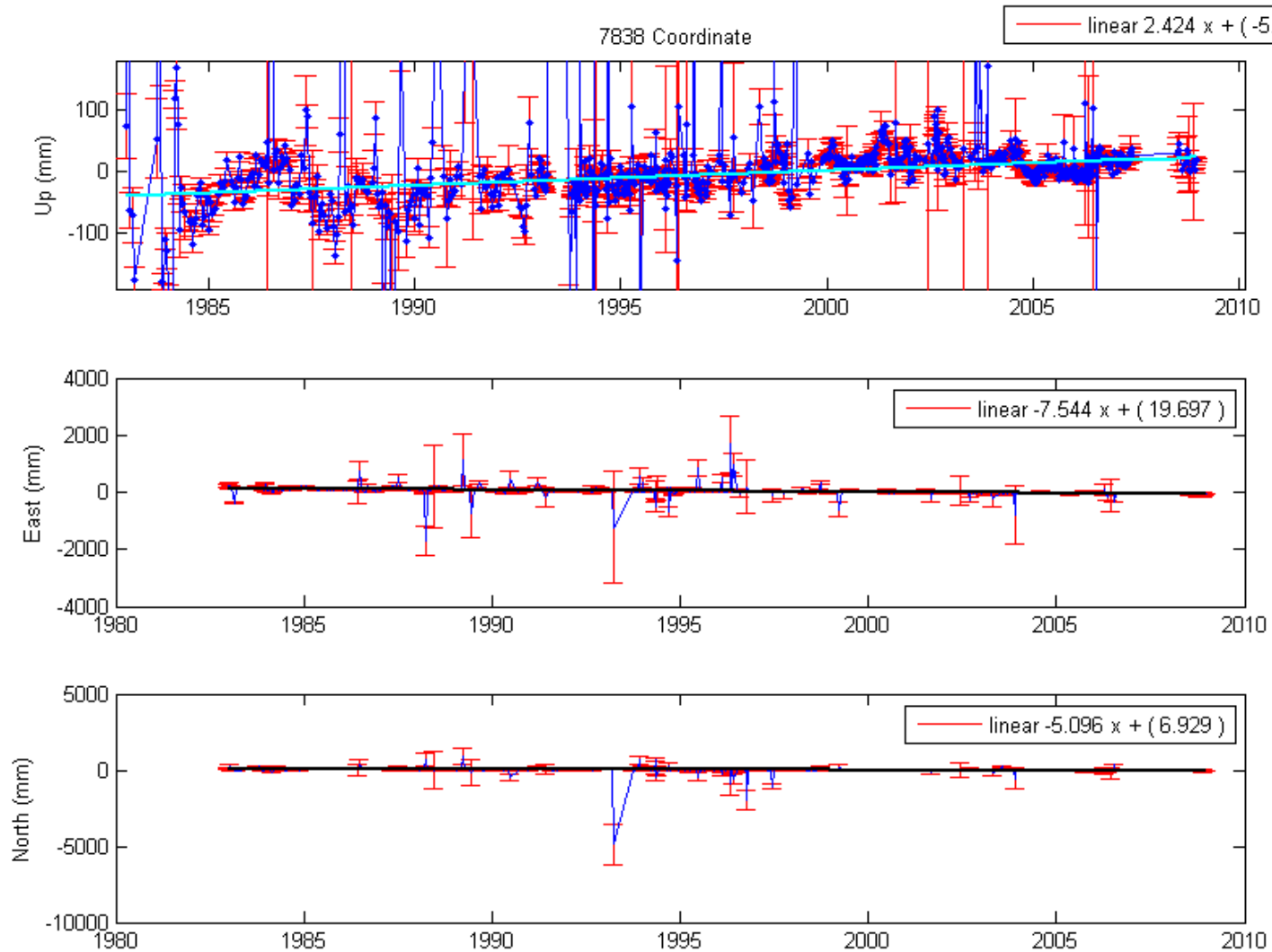
Potsdam-7836



AWG correction

7836 940101 941013 18

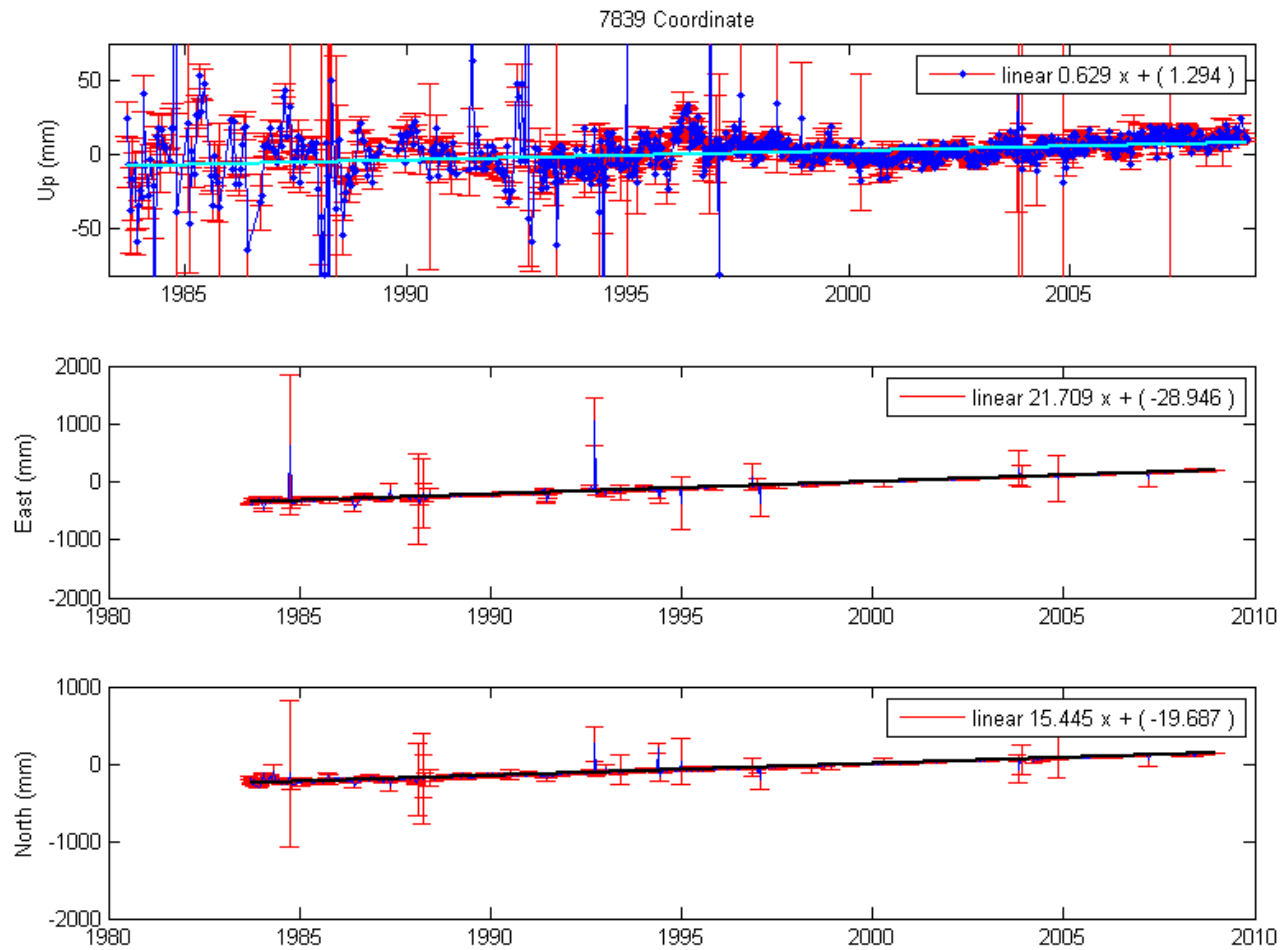
Simosato-7838



AWG correction

7838 040701 ----- +10 an external comparison of the SSC/SSV needed, the multi-year sol. shows large biases over all the period

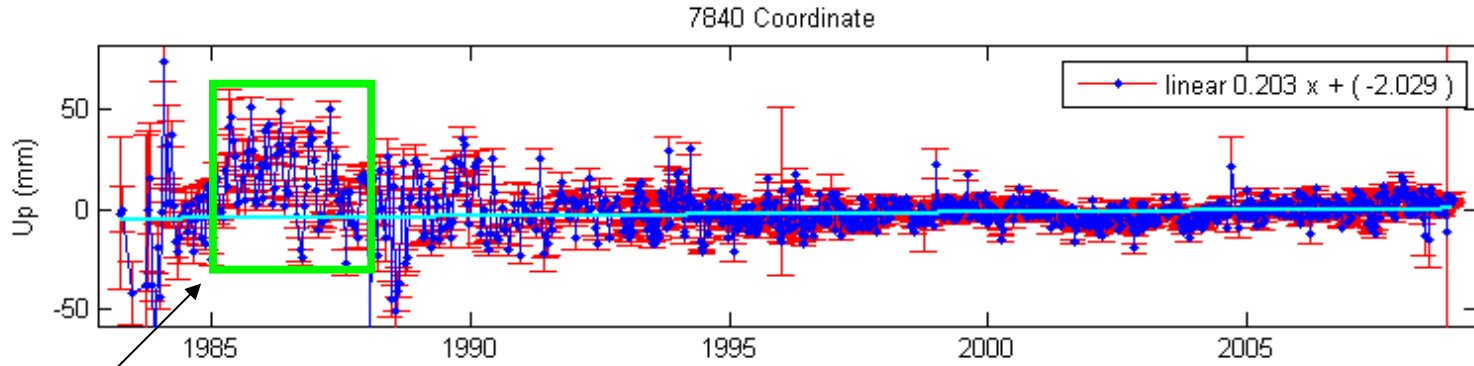
Graz-7839



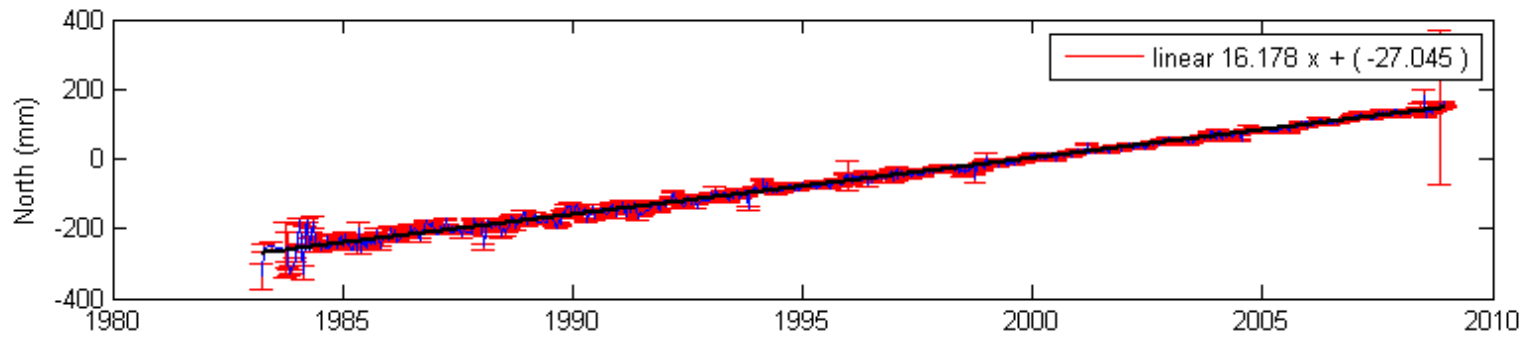
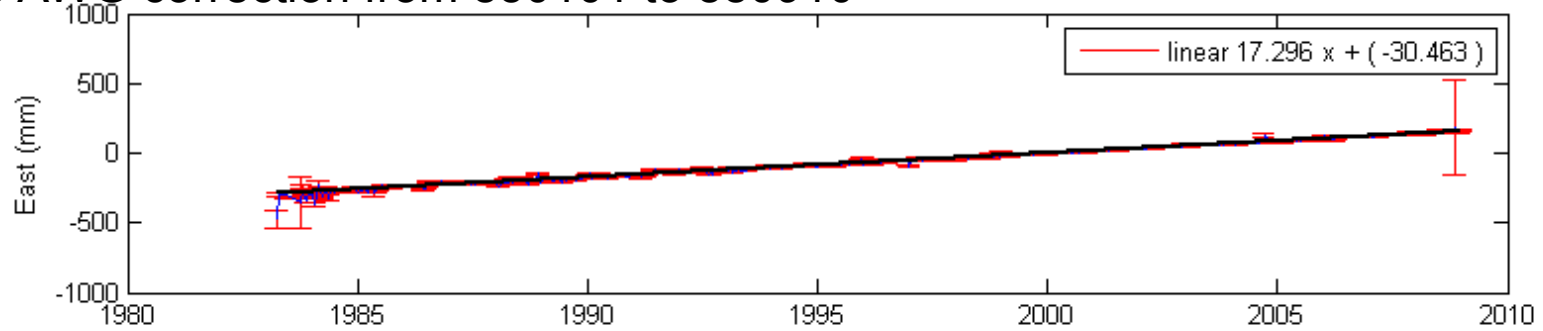
AWG correction

7839 830101 960928 -22

Herstmonceux-7840



No AWG correction from 850101 to 880910



Status of ILRSB

Rainer Kelm
Deutsches Geodätisches Forschungsinstitut

Weekly reprocessing v24 and v25

Processing remarks

Time series plots 1983 – 1992 (v24)

Time series plots 1993 – 2008 (v25)

AC SINEX files deleted

Main reasons for processing crash

Recommendations

Processing remarks

*** ILRSB reprocessing for ITRF2008: 1983 – 2008**

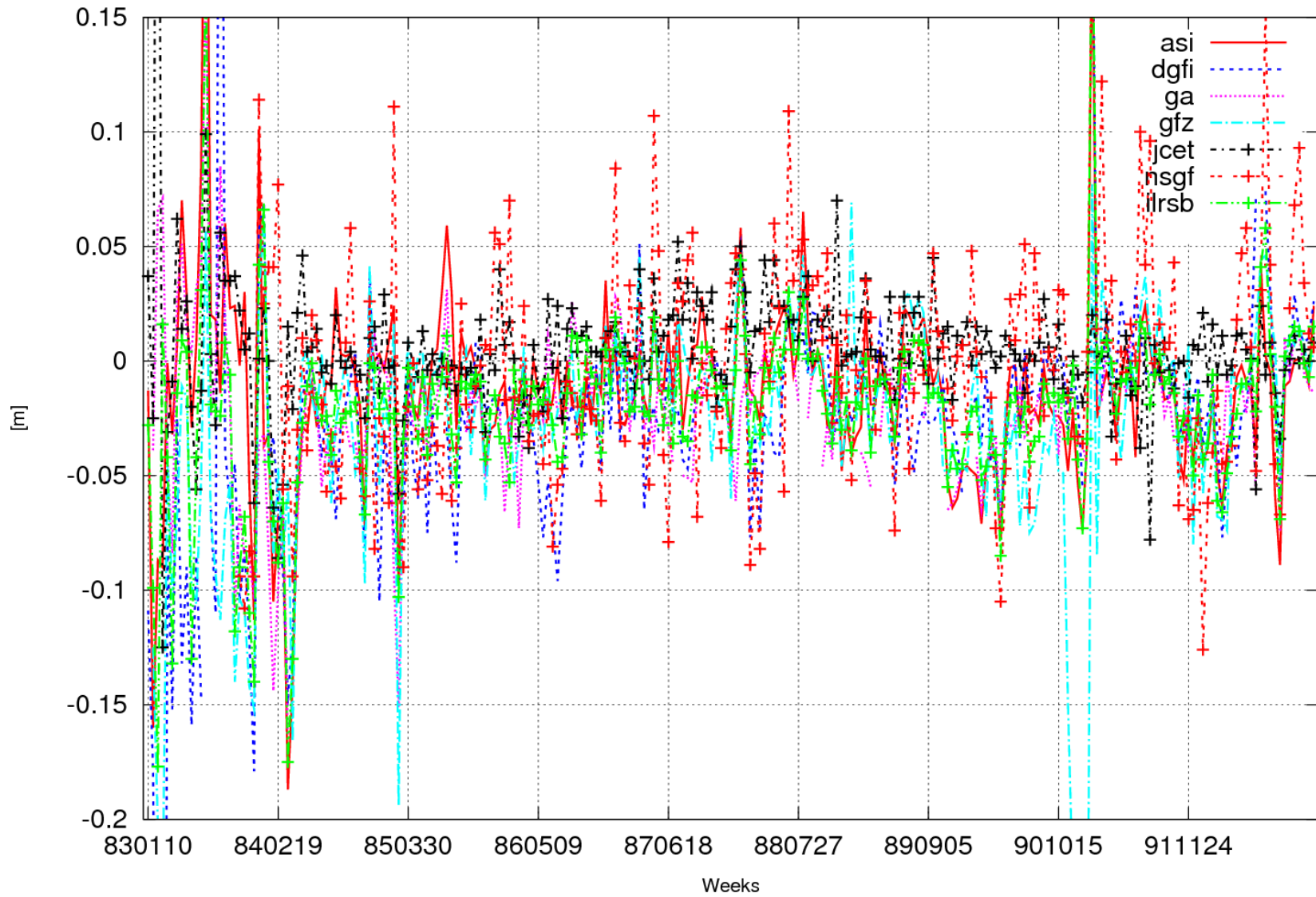
=> v23: version with new ILRS conventions (deadline May 31)

→ ilrsb.v23 for 1982 – 1992 (May 30)

=> v24 for 1983 – 1992: nsgf.v24 (Jul 13) → ilrsb (Jul 17)

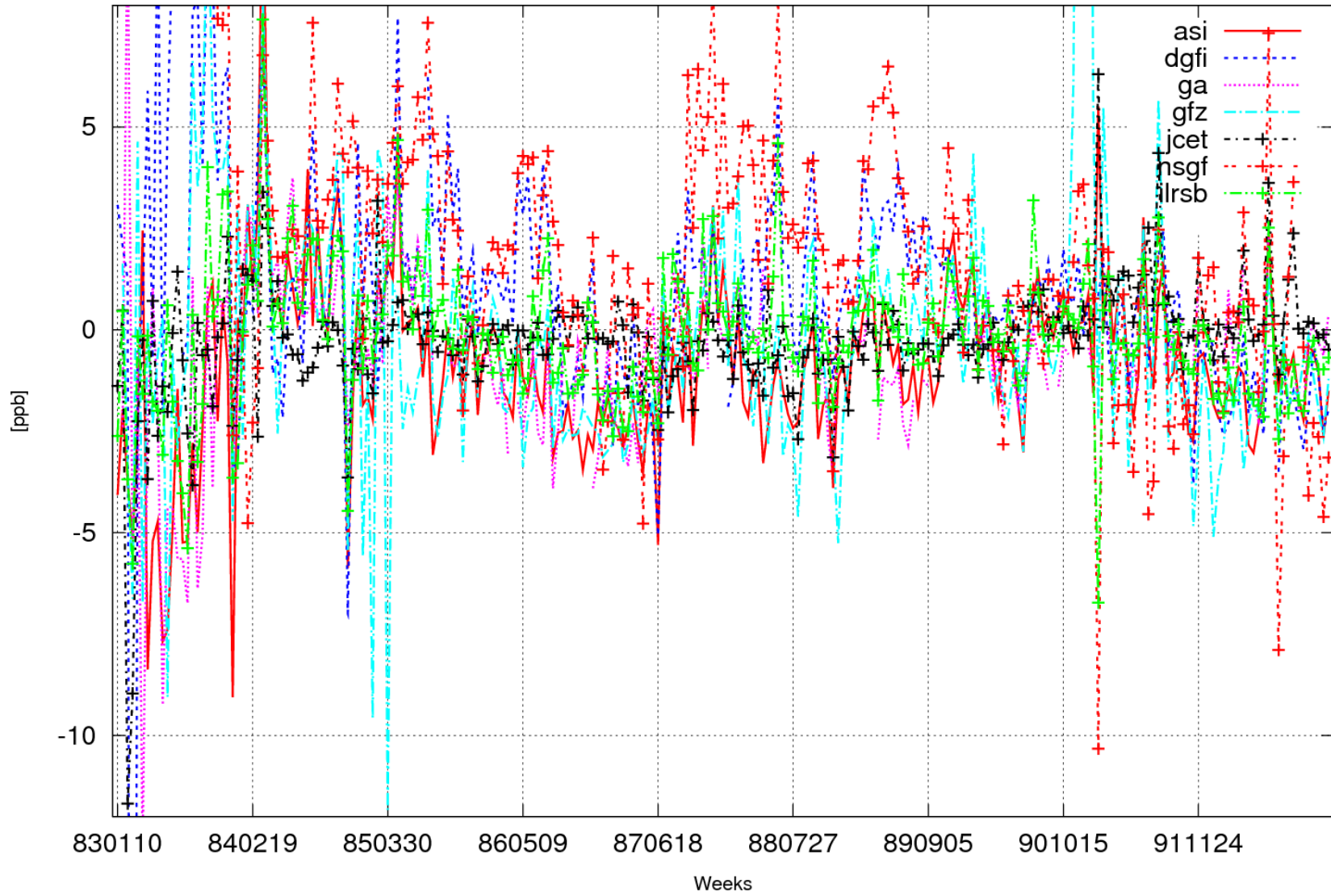
=> v25 for 1993 – 2008: nsgf.v24 (Jul 13) → ilrsb (Jul 20)

Helmert parameter tz for 830110 - 921218



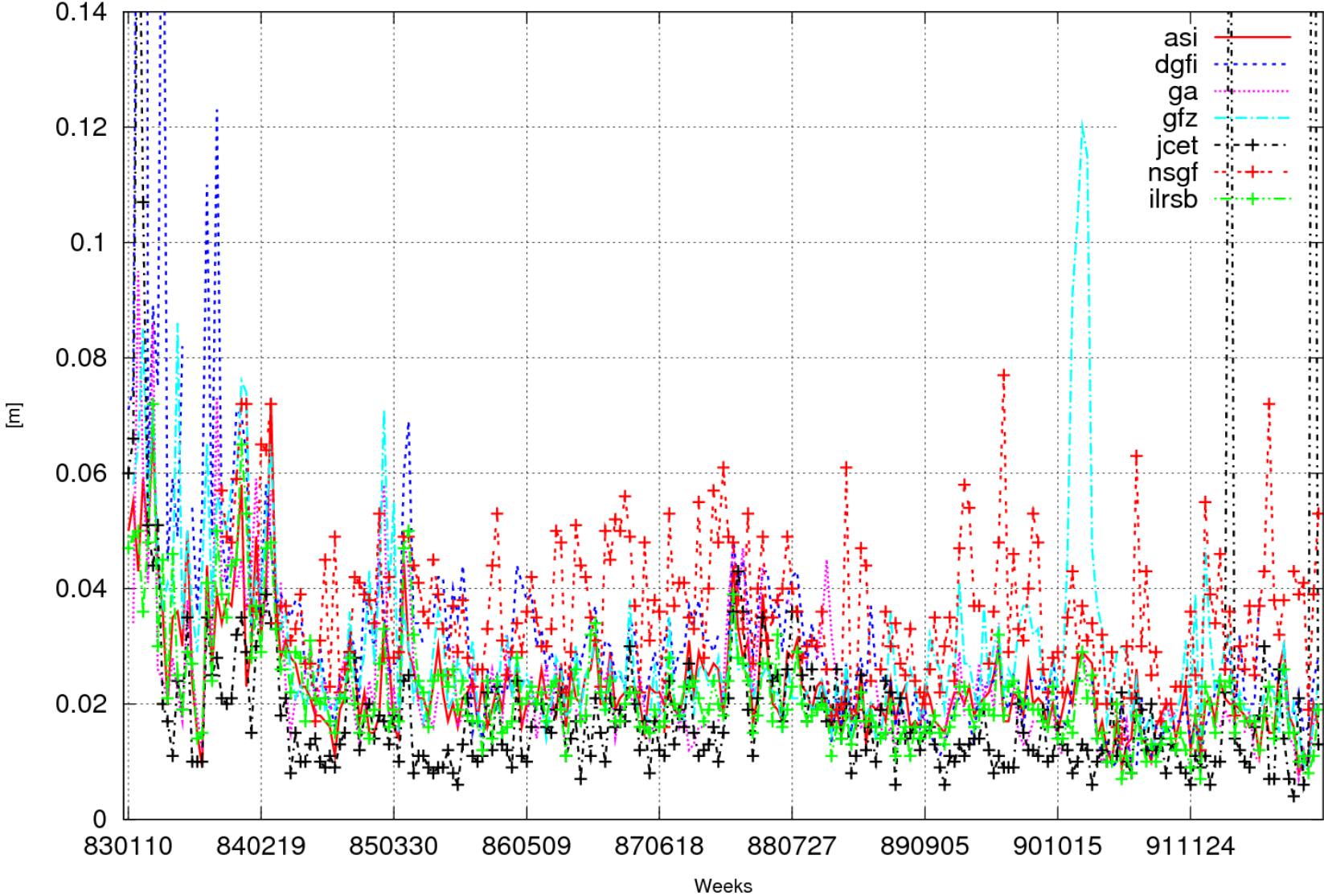
ILF

Helmert parameter sc for 830110 - 921218



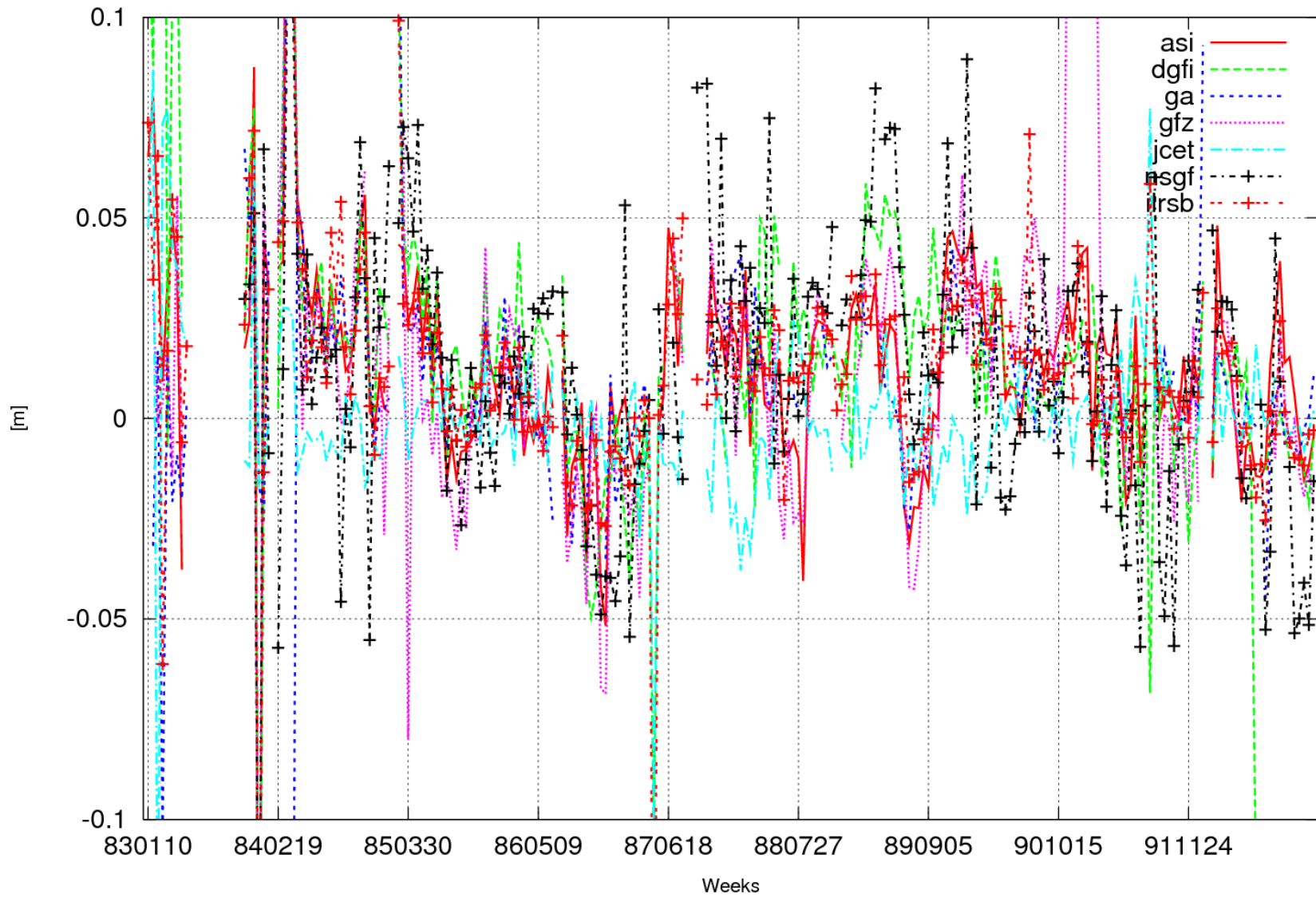
ILF

Helmert parameter wrms for 830110 - 921218



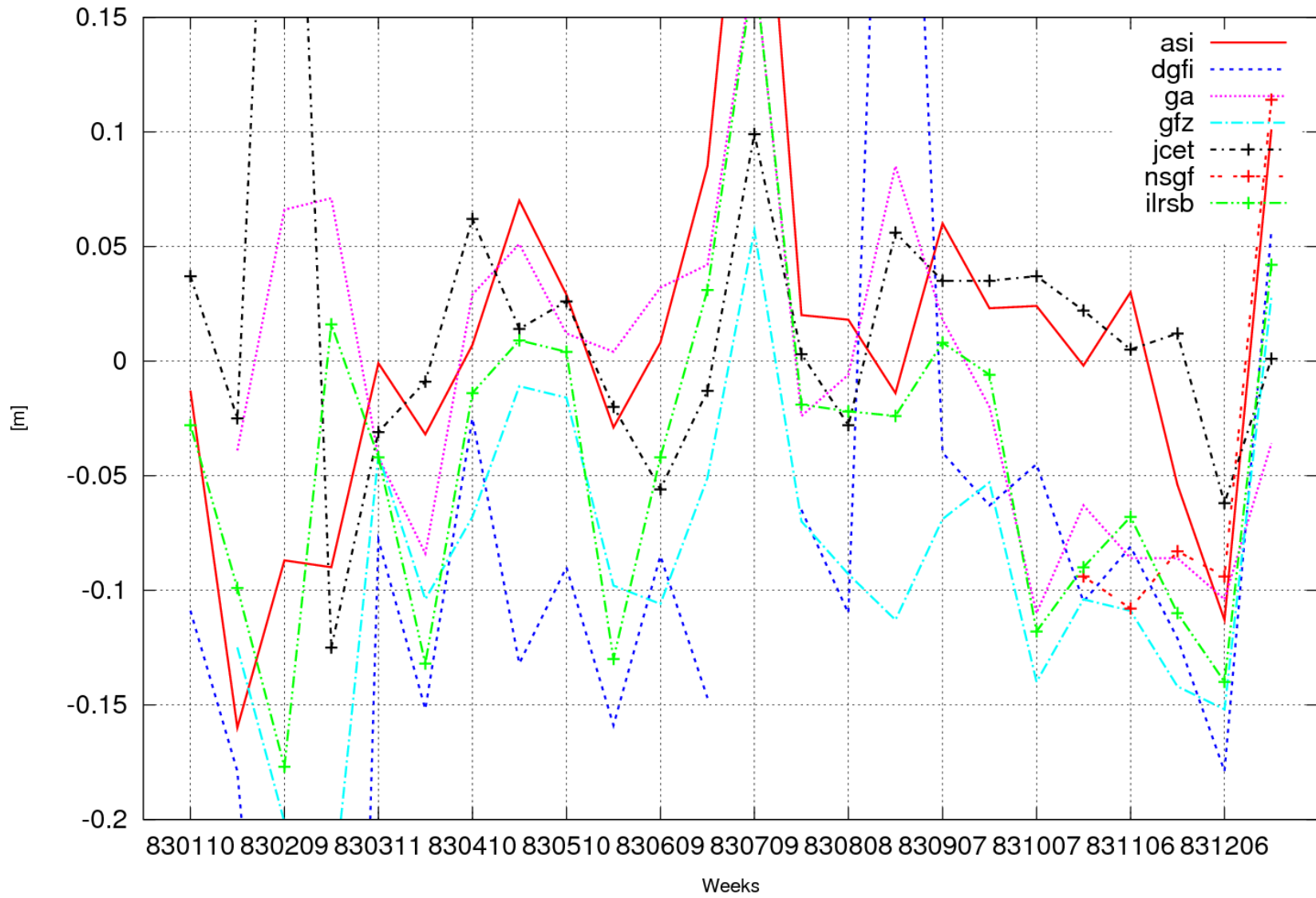
ILF

50107M001 (core_max): dH w.r.t. SLRF2005: 830110 - 921218



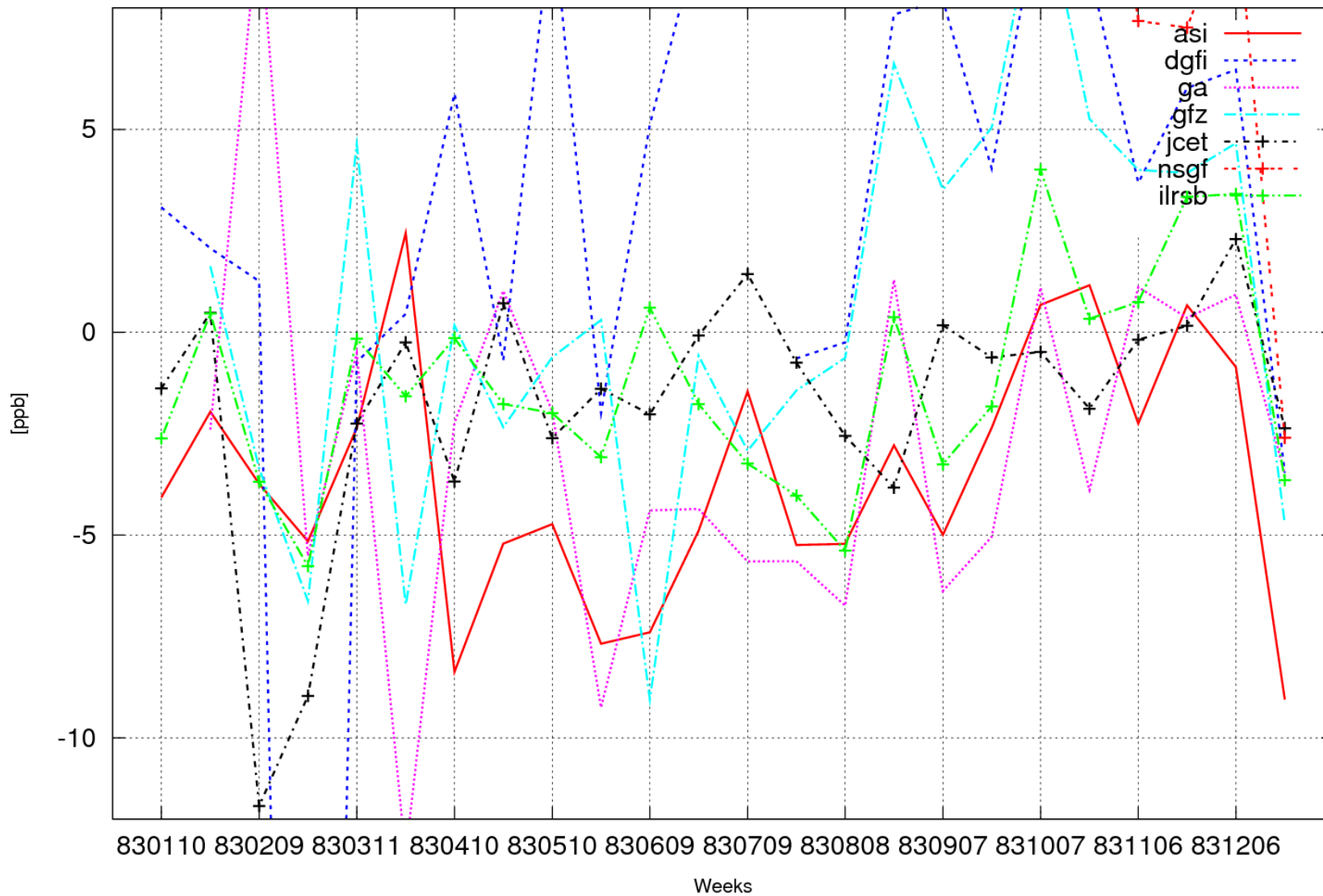
ILF

Helmert parameter tz for 830110 - 831221



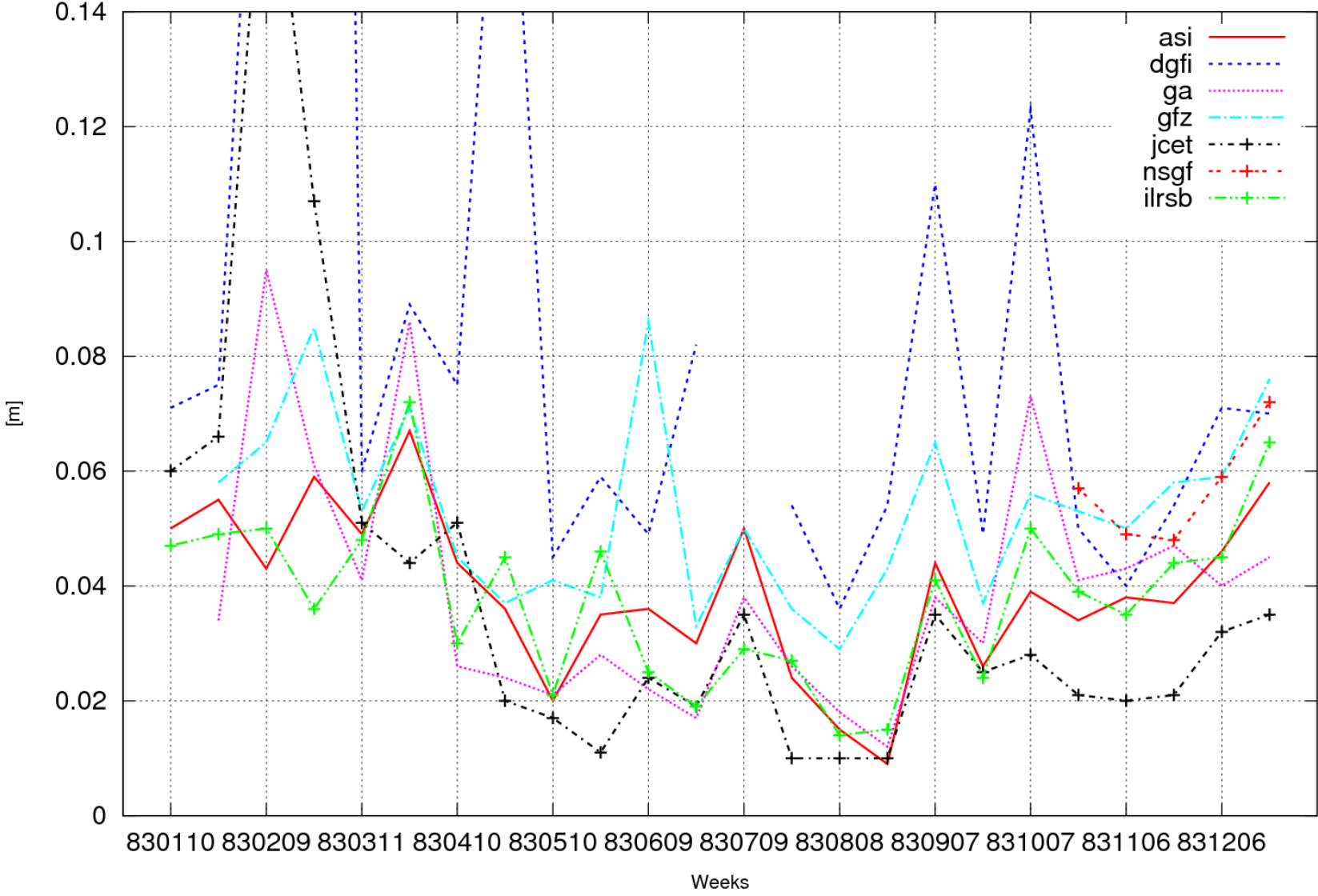
ILF

Helmert parameter sc for 830110 - 831221



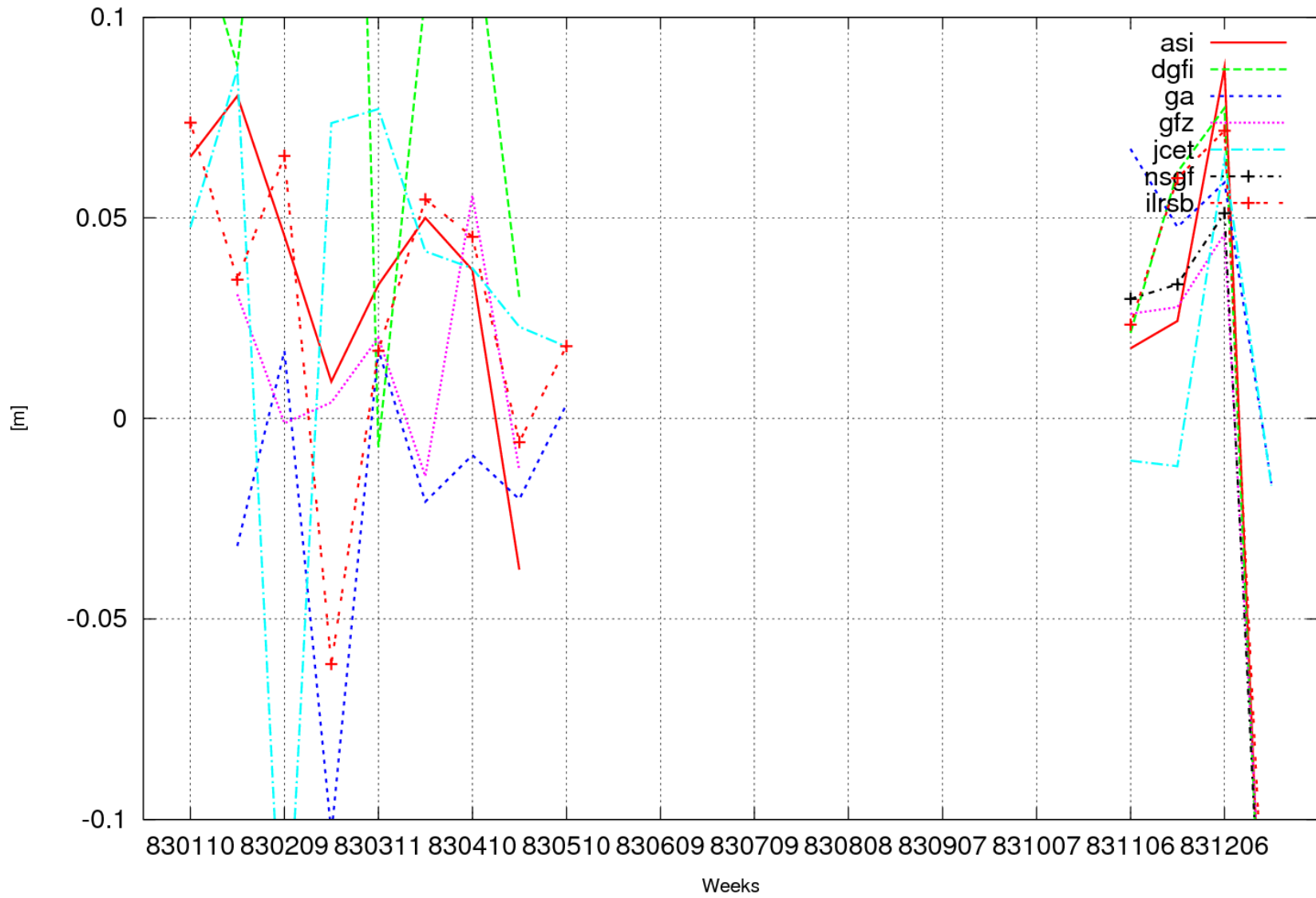
ILF

Helmert parameter wrms for 830110 - 831221



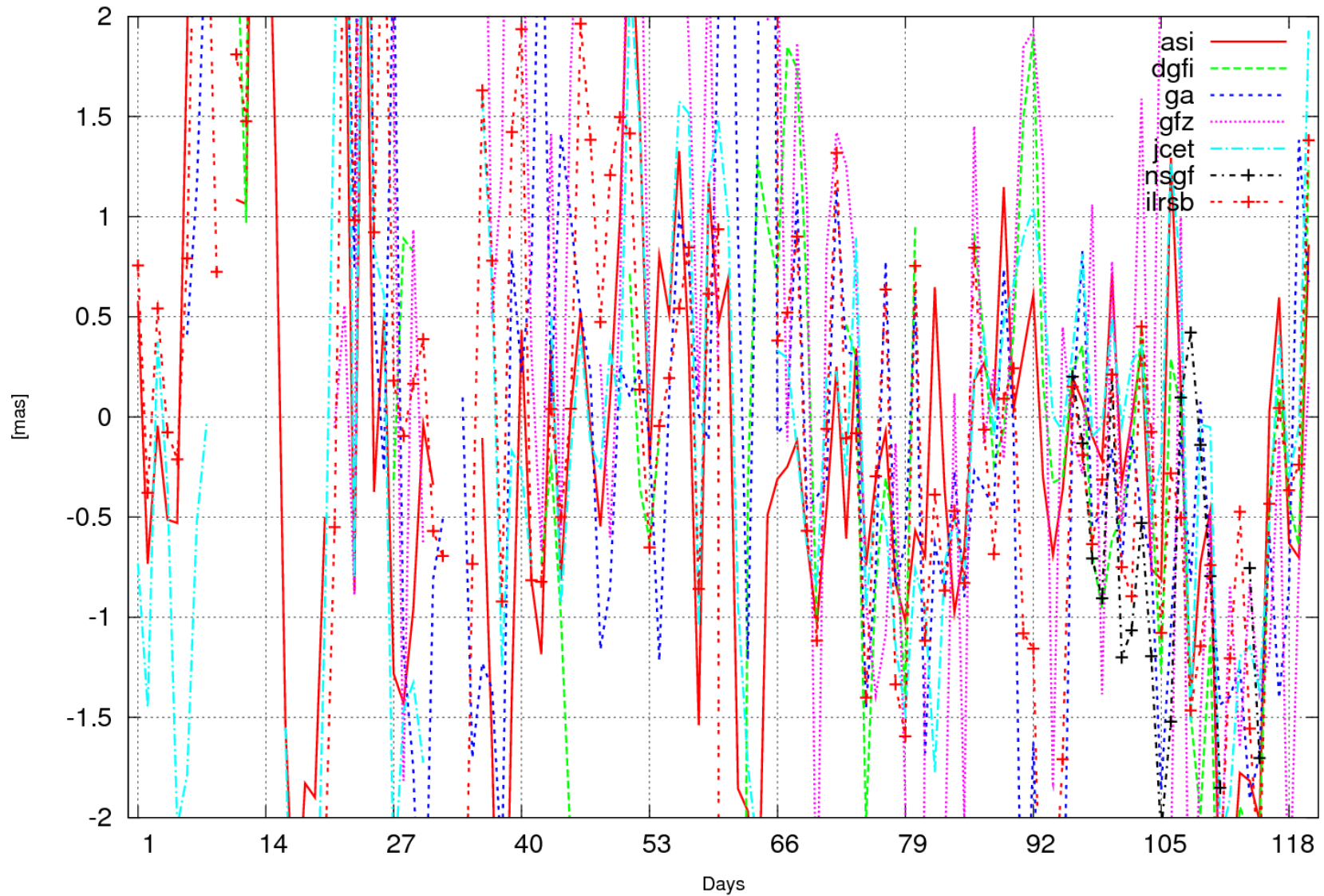
ILF

50107M001 (core_max): dH w.r.t. SLRF2005: 830110 - 831221



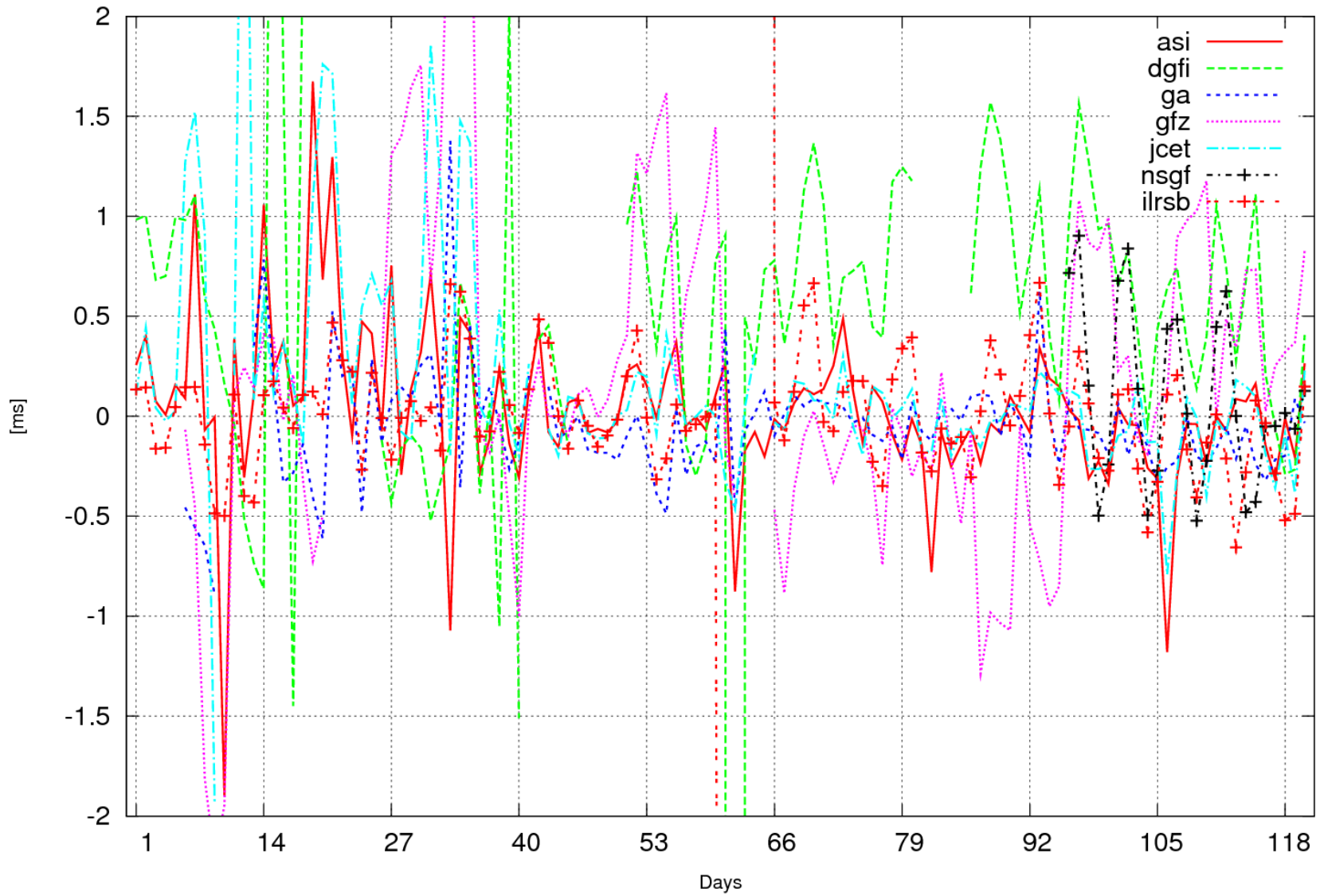
ILF

Relative EOP for DXPO: 830110 - 831221



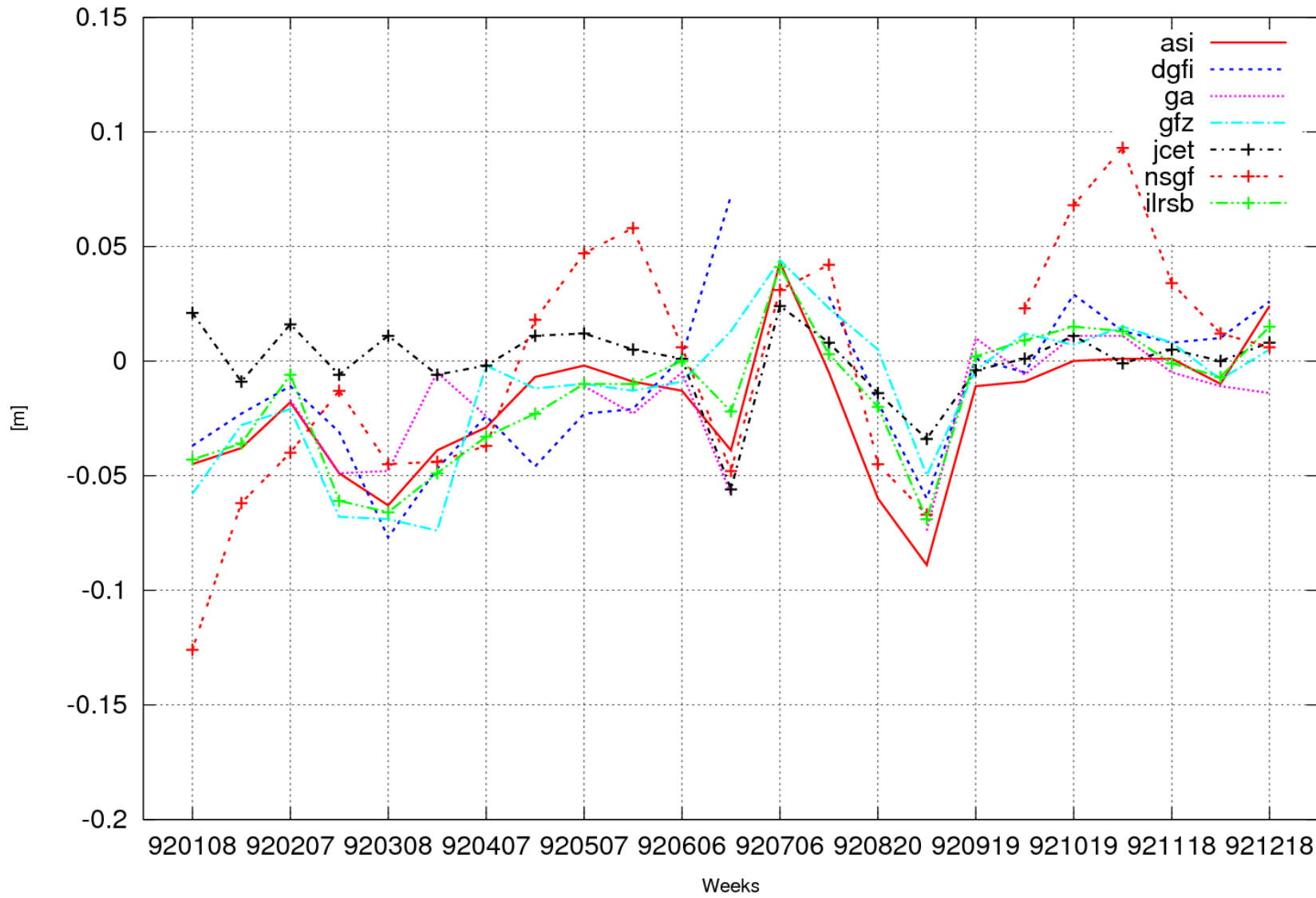
ILRS AWG MeetingMetsovo, September 19, 2009

Relative EOP for DLOD: 830110 - 831221



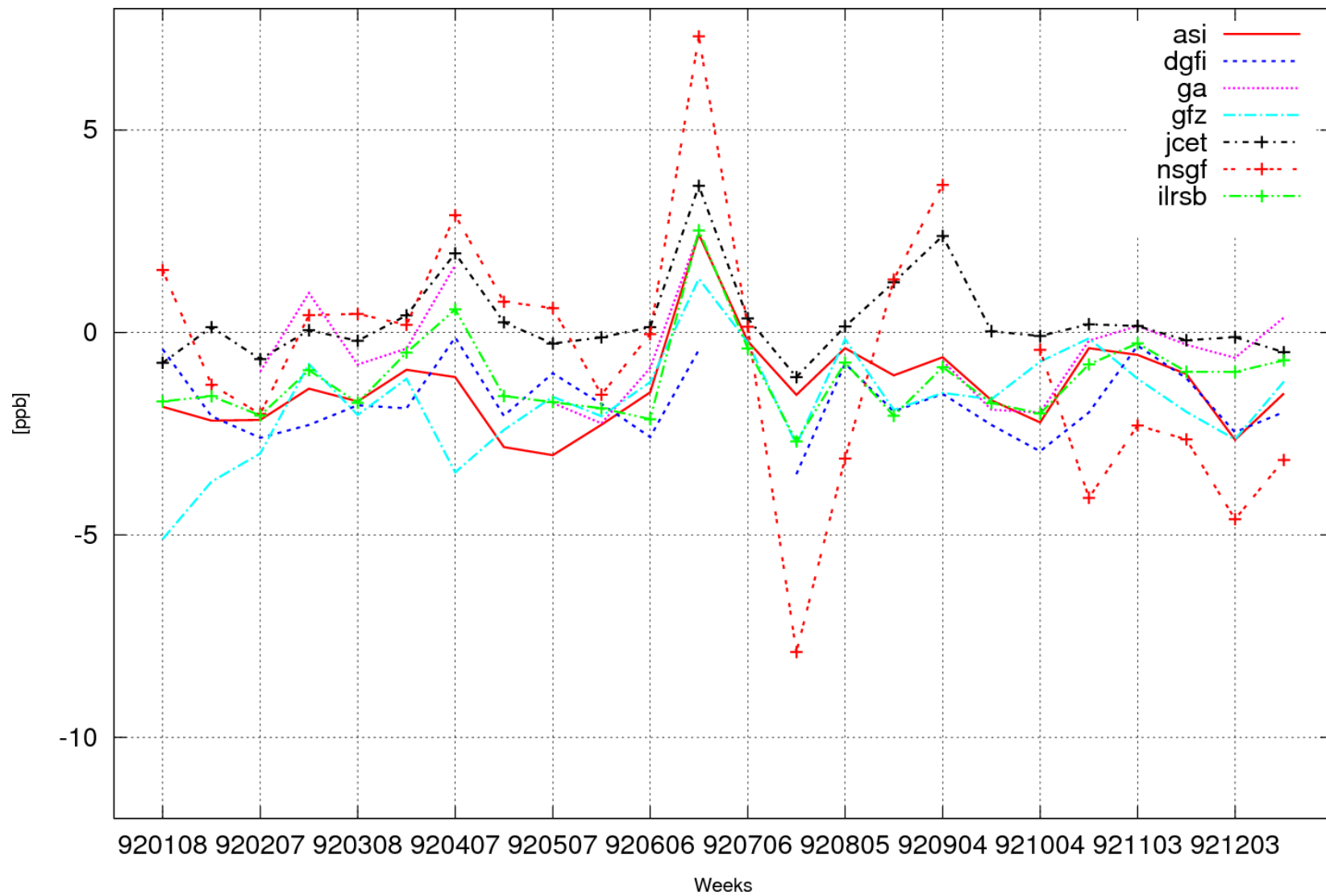
ILRS AWG Meeting Metsovo, September 19, 2009

Helmert parameter tz for 920108 - 921218



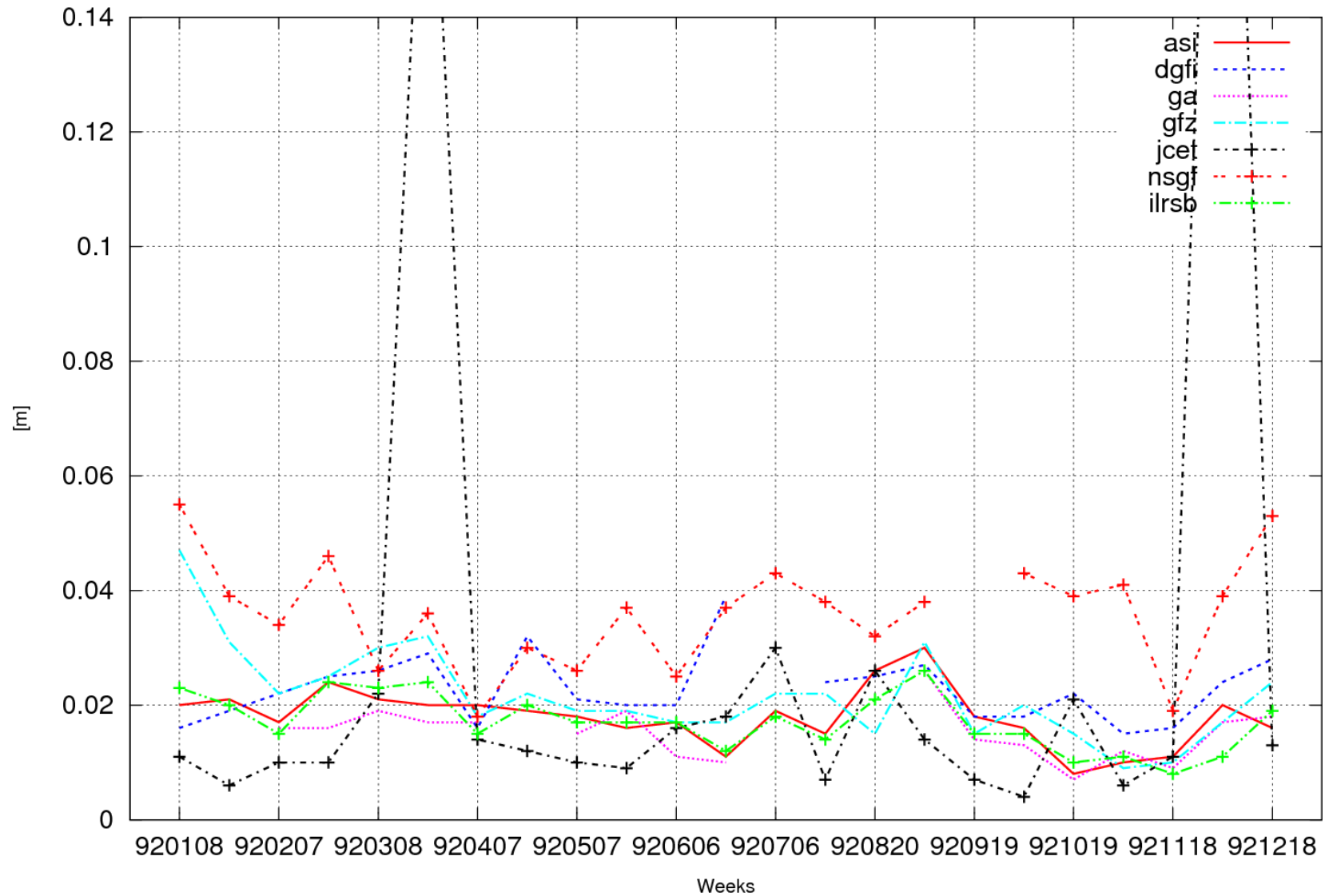
ILF

Helmert parameter sc for 920108 - 921218

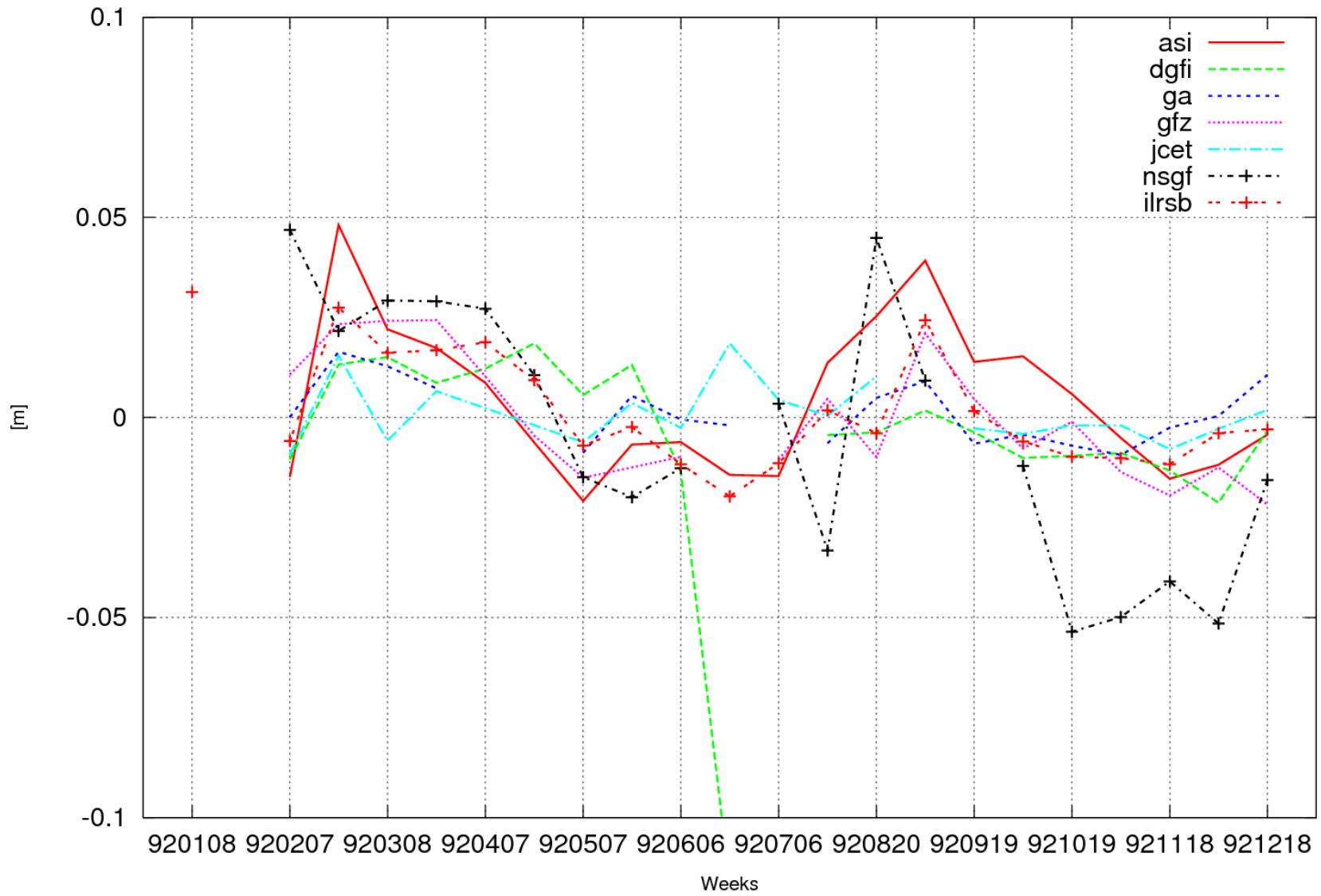


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Helmert parameter wrms for 920108 - 921218

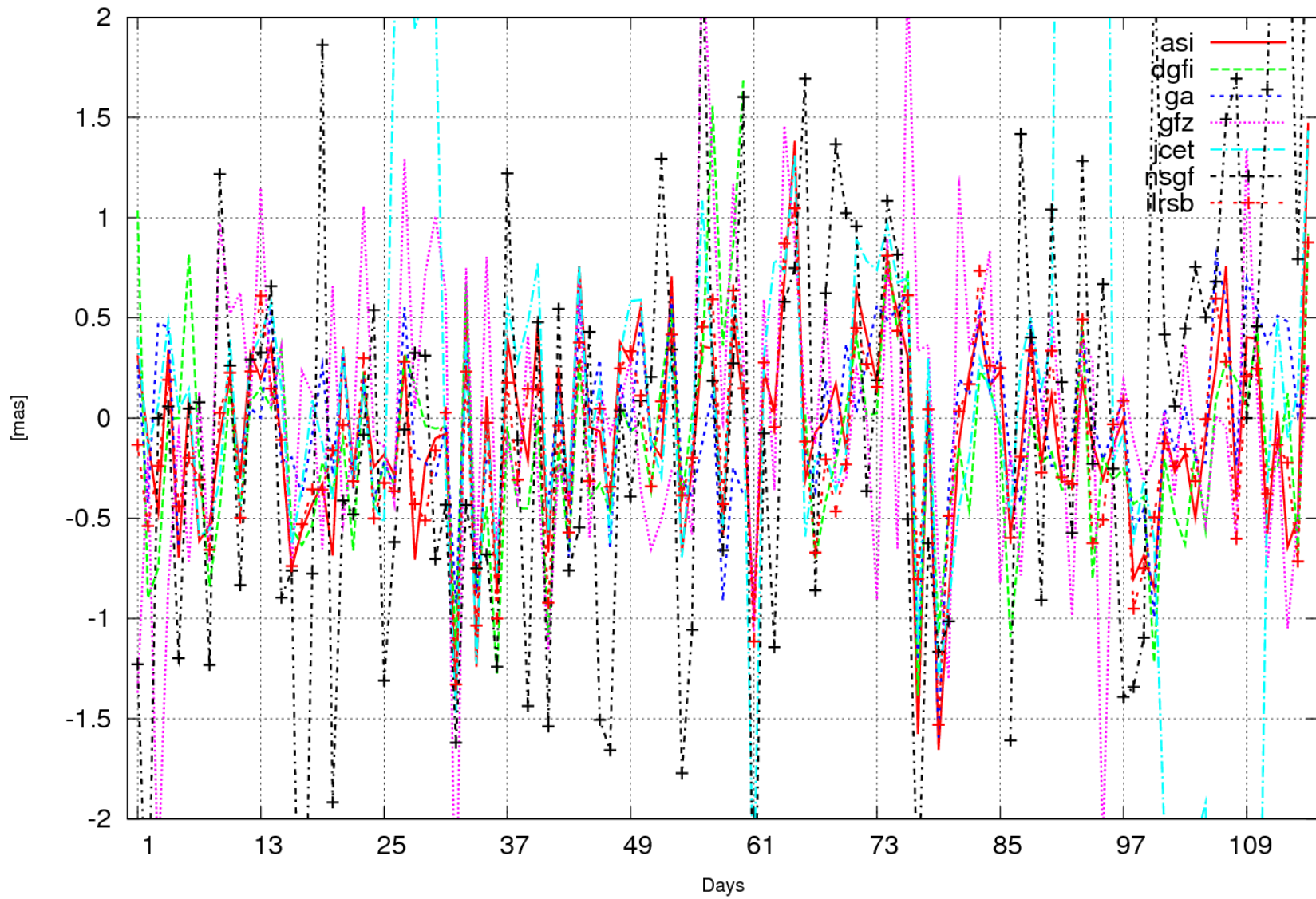


50107M001 (core_max): dH w.r.t. SLRF2005: 920108 - 921218



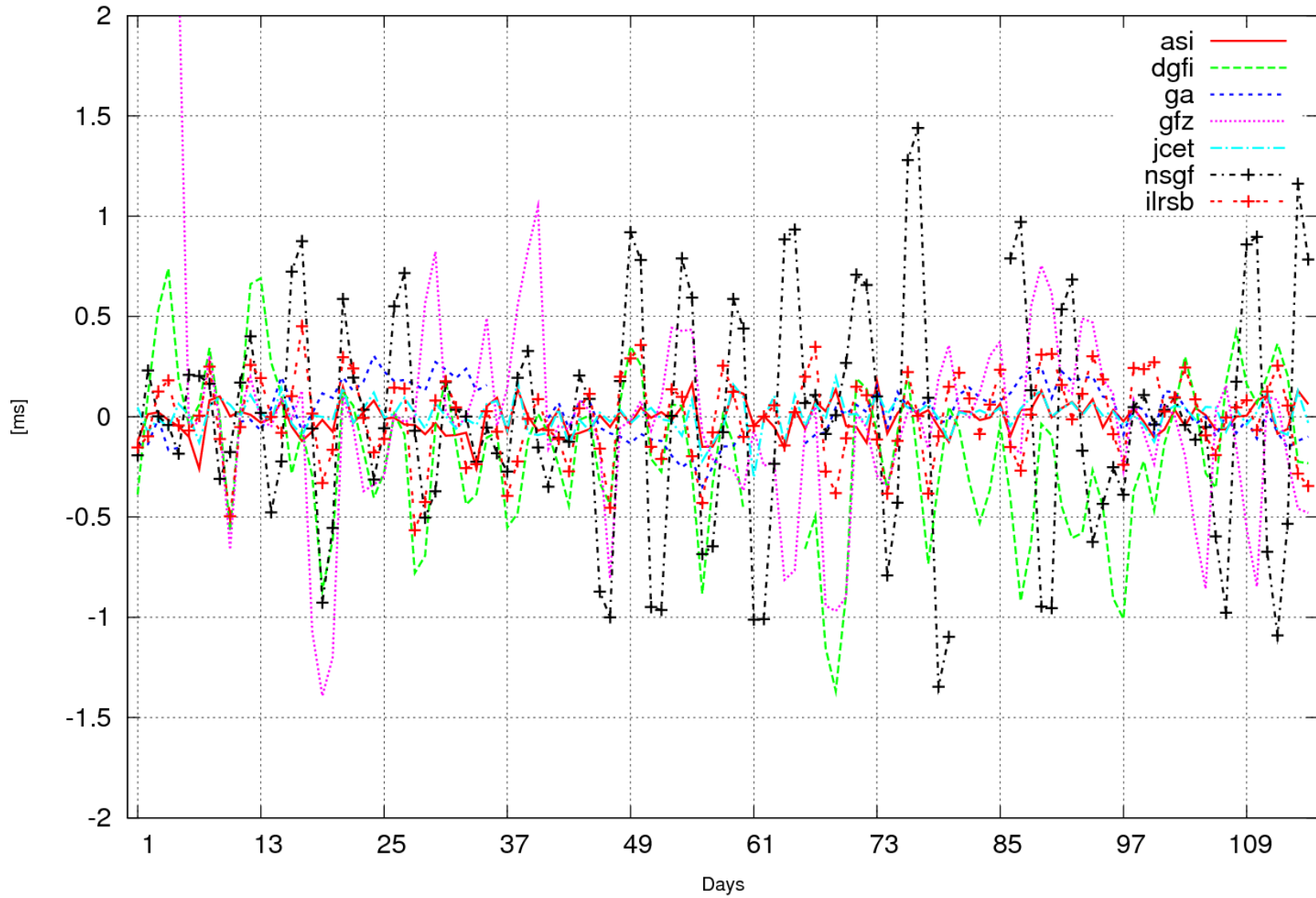
ILF

Relative EOP for DXPO: 920108 - 921218



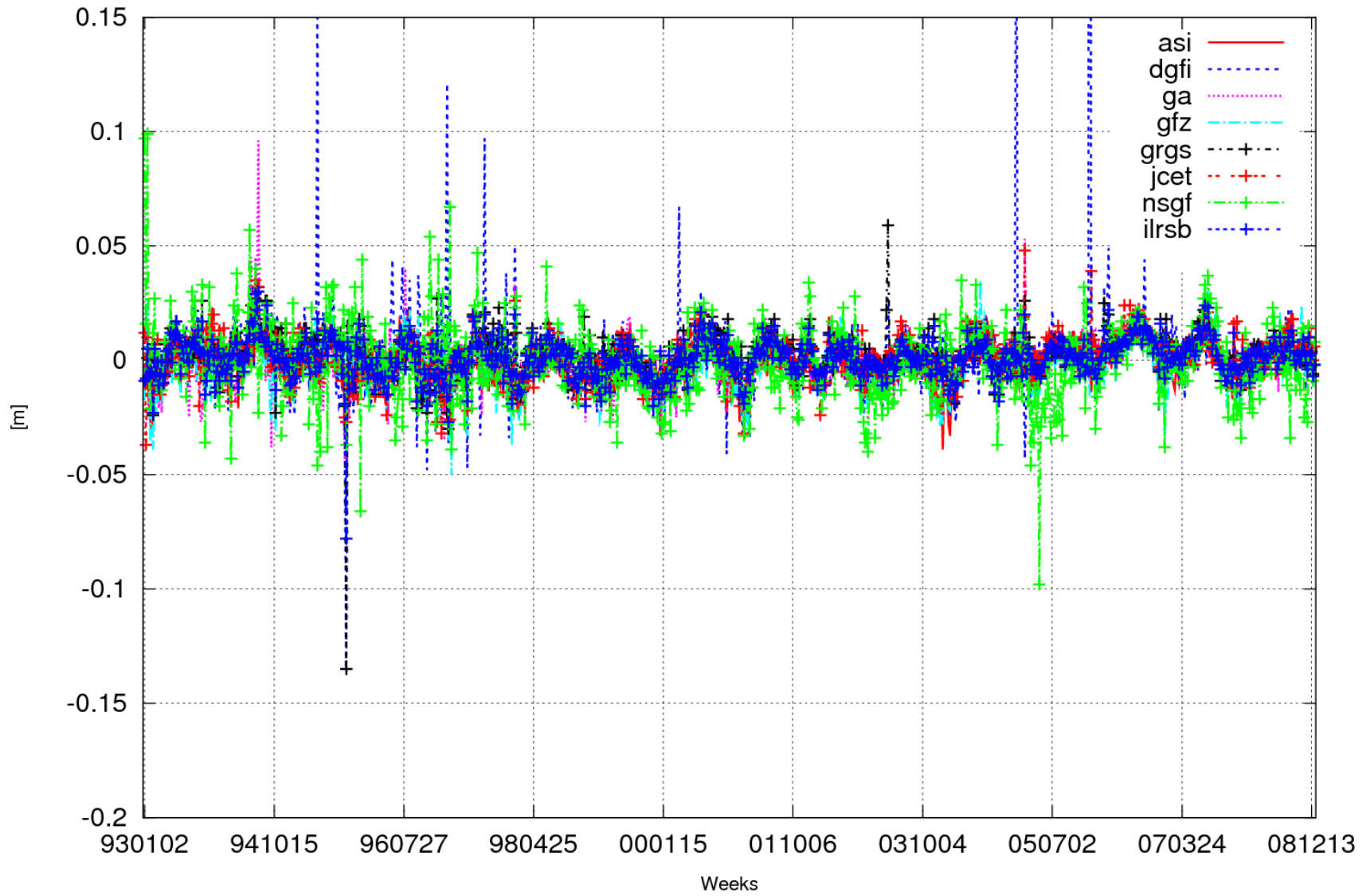
ILF

Relative EOP for DLOD: 920108 - 921218



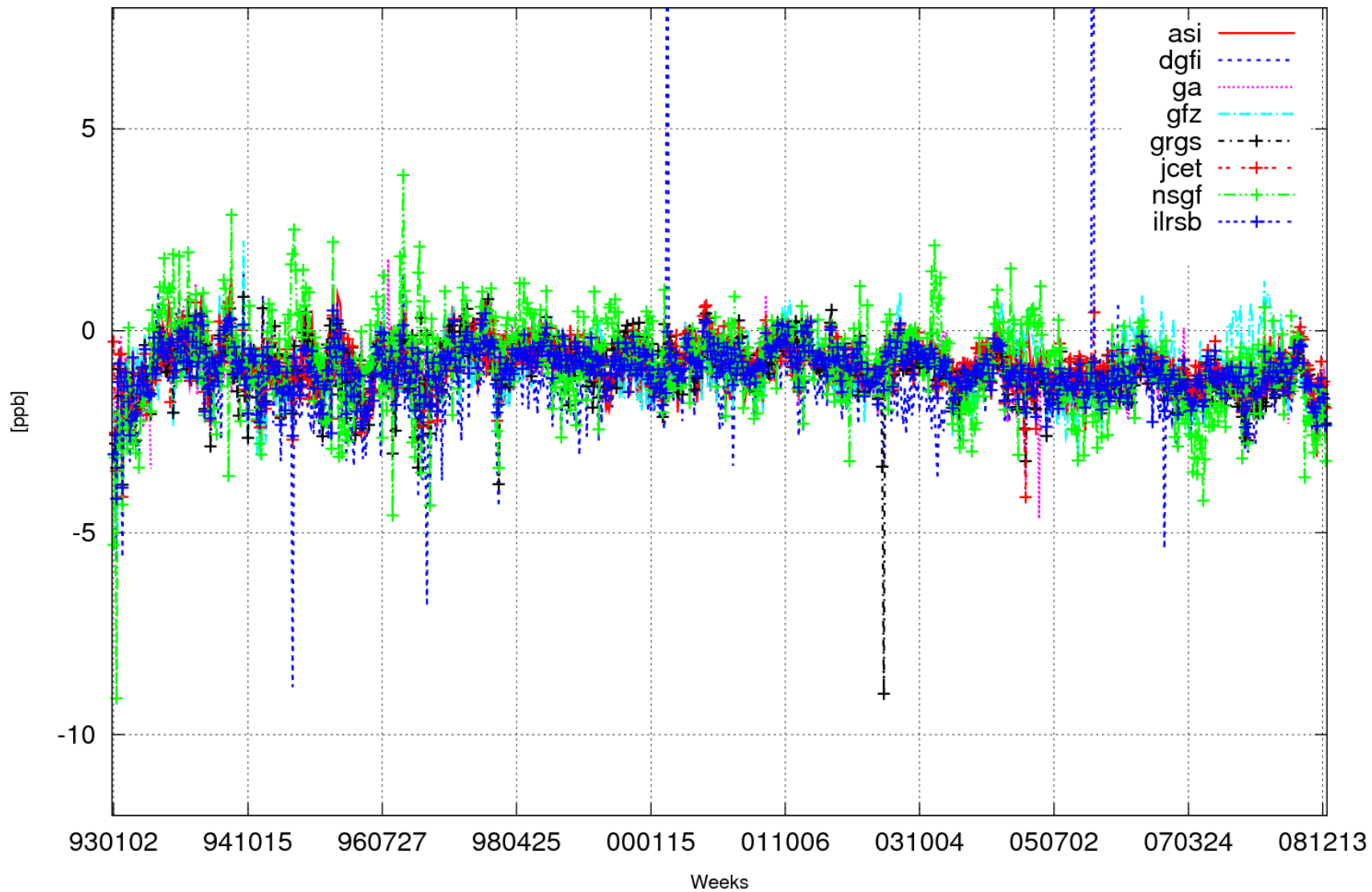
ILF

Helmert parameter tz for 930102 - 081227



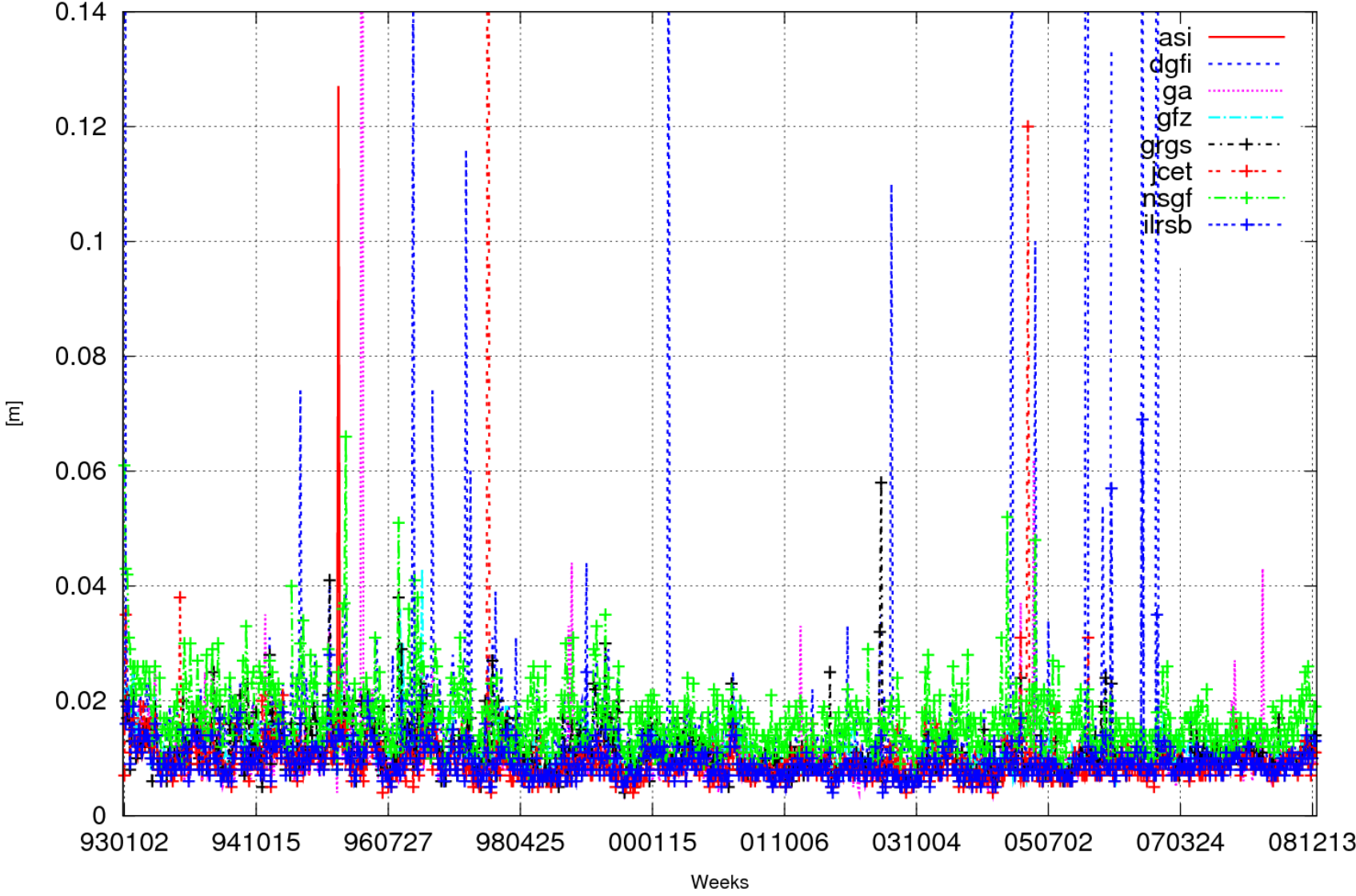
ILF

Helmert parameter sc for 930102 - 081227



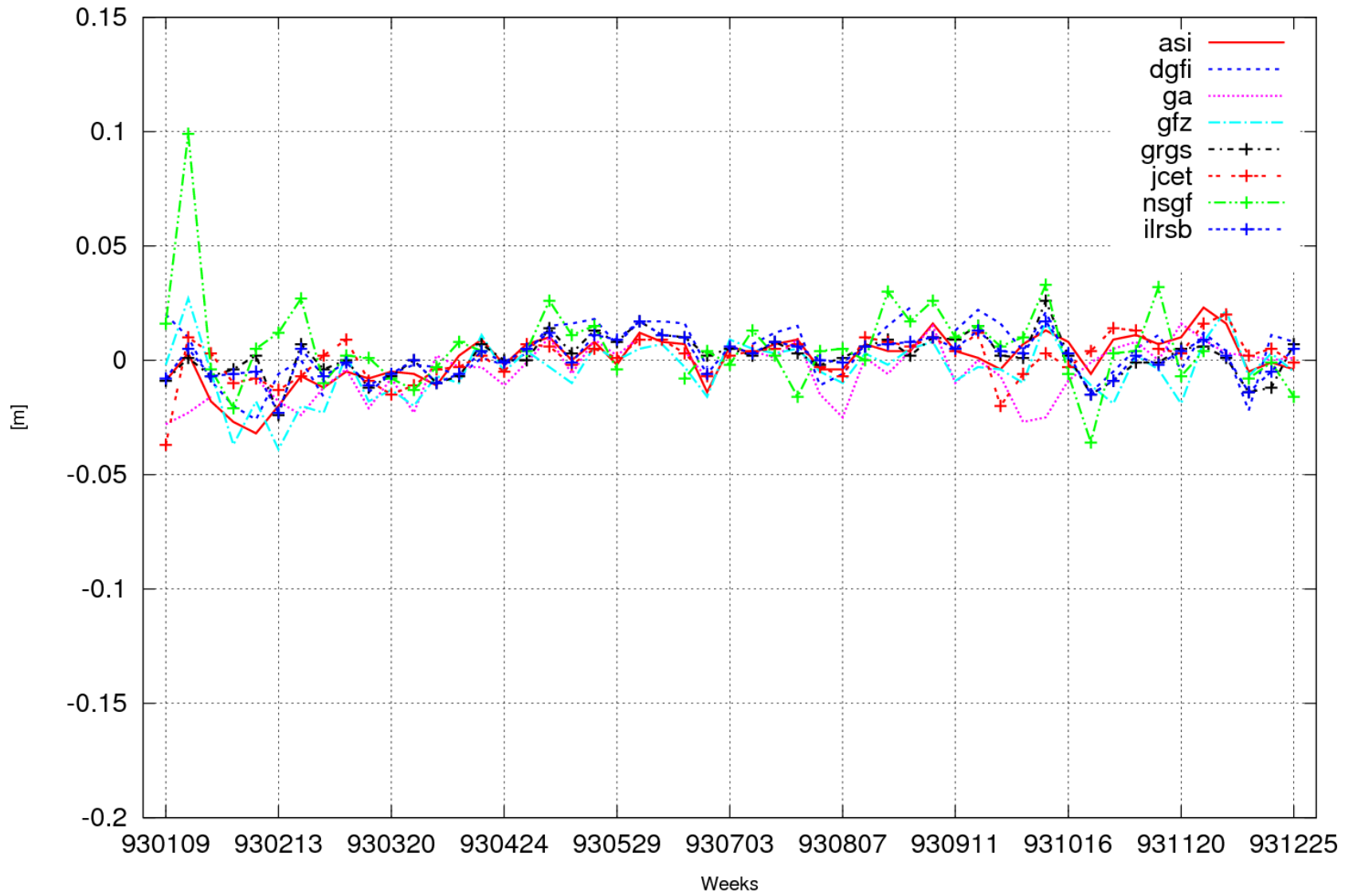
ILF

Helmert parameter wrms for 930102 - 081227



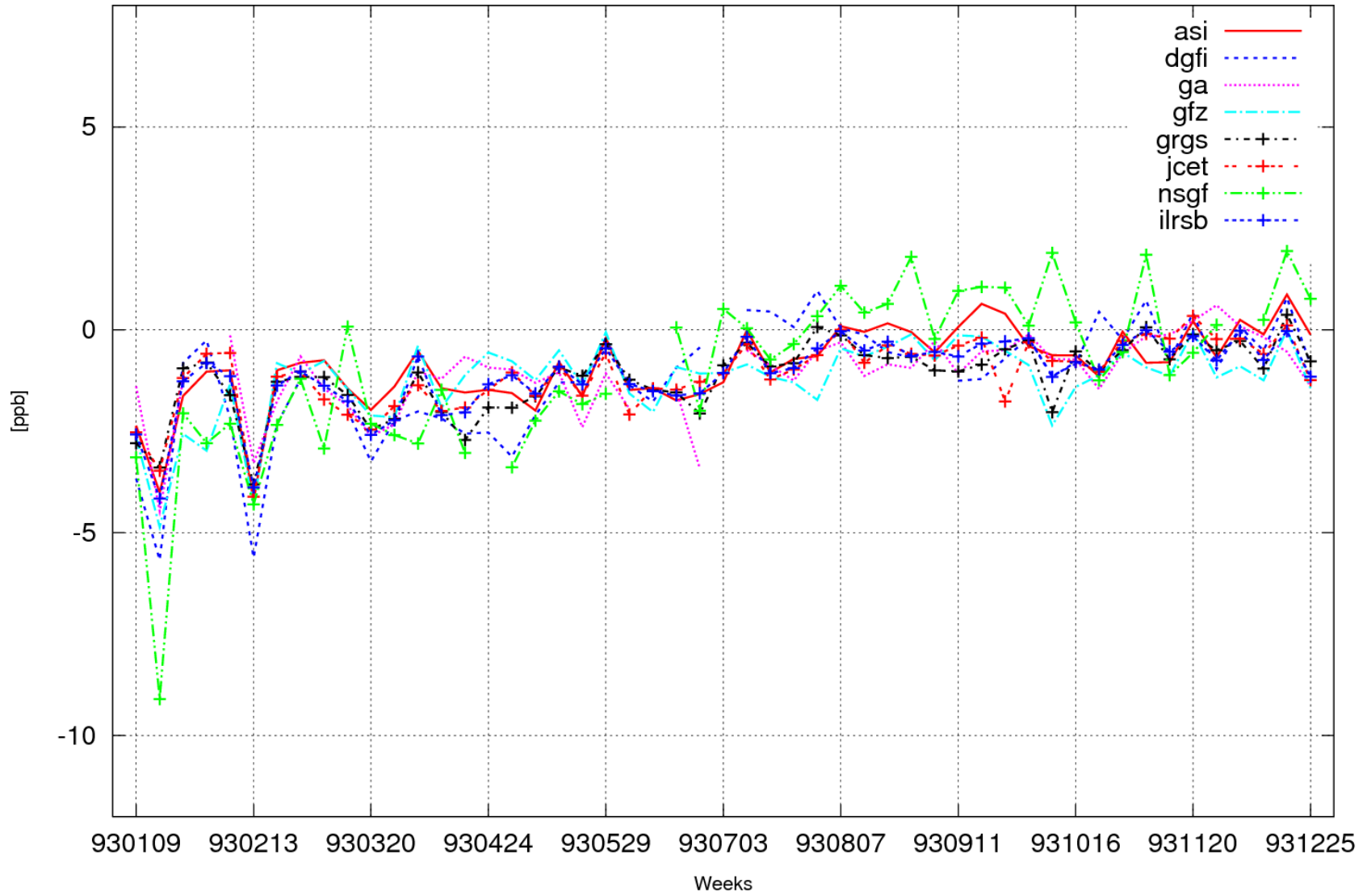
ILF

Helmert parameter tz for 930109 - 931225



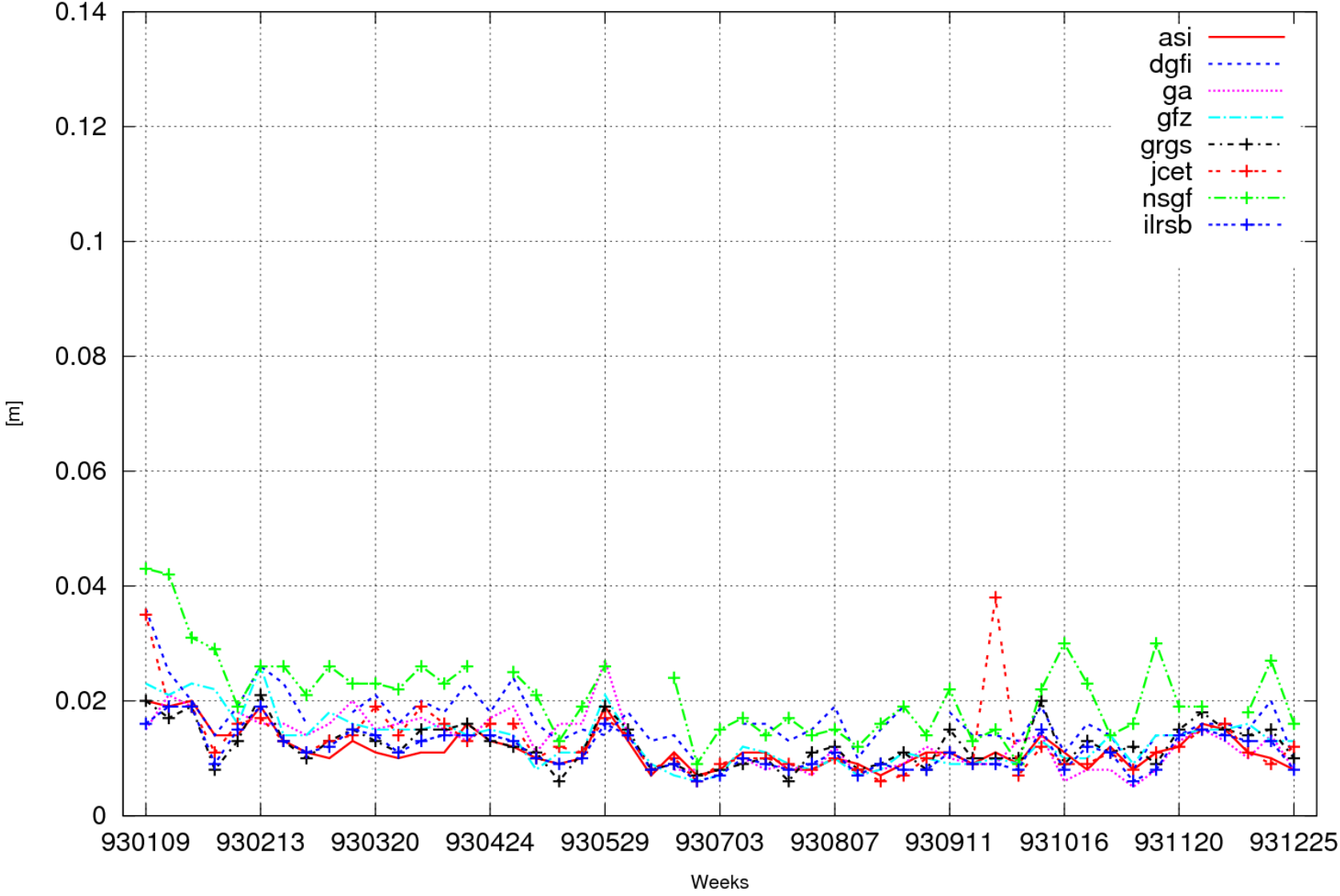
ILF

Helmert parameter sc for 930109 - 931225



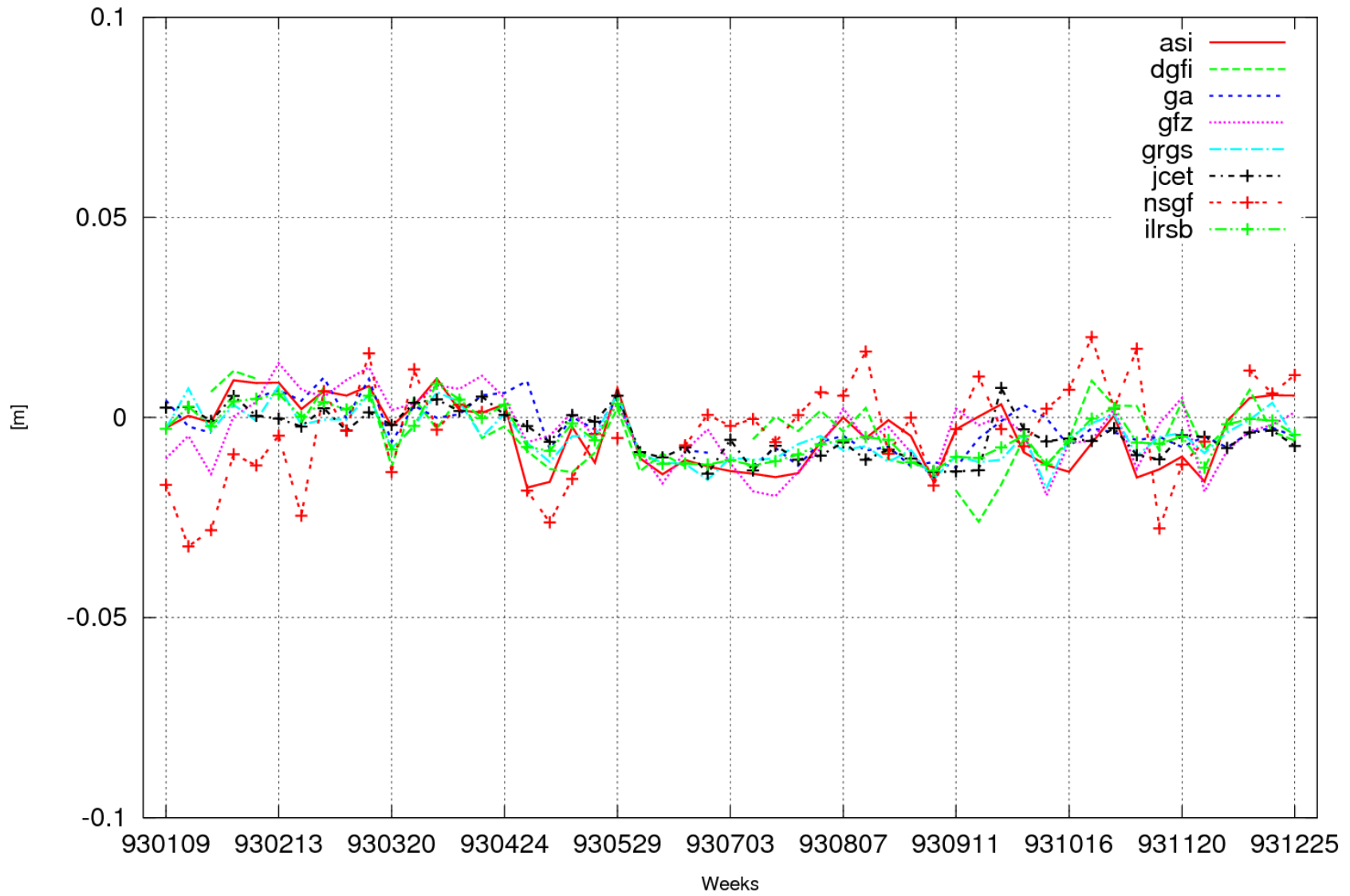
ILF

Helmert parameter wrms for 930109 - 931225



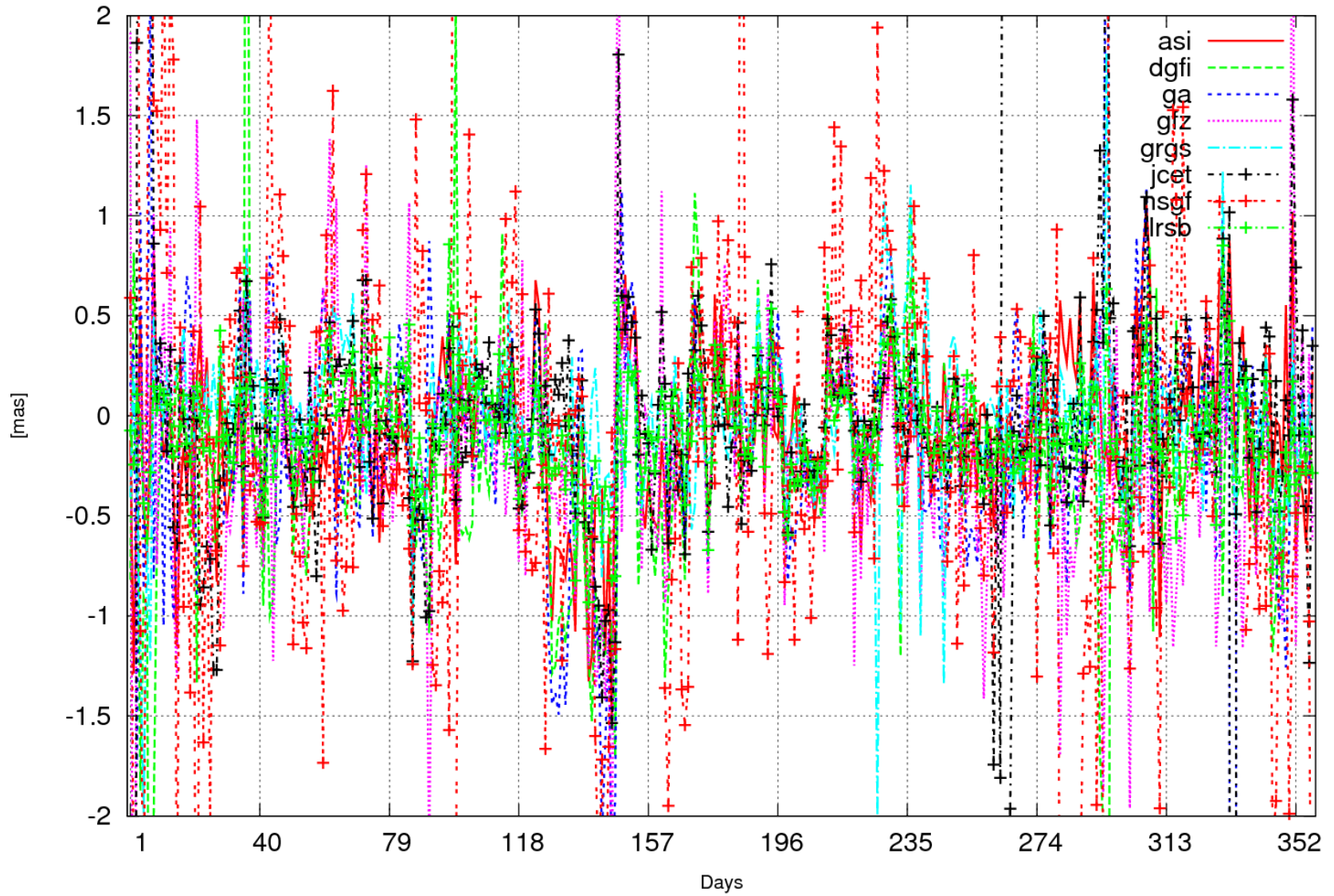
ILF

50107M001 (core_max): dH w.r.t. SLRF2005: 930109 - 931225



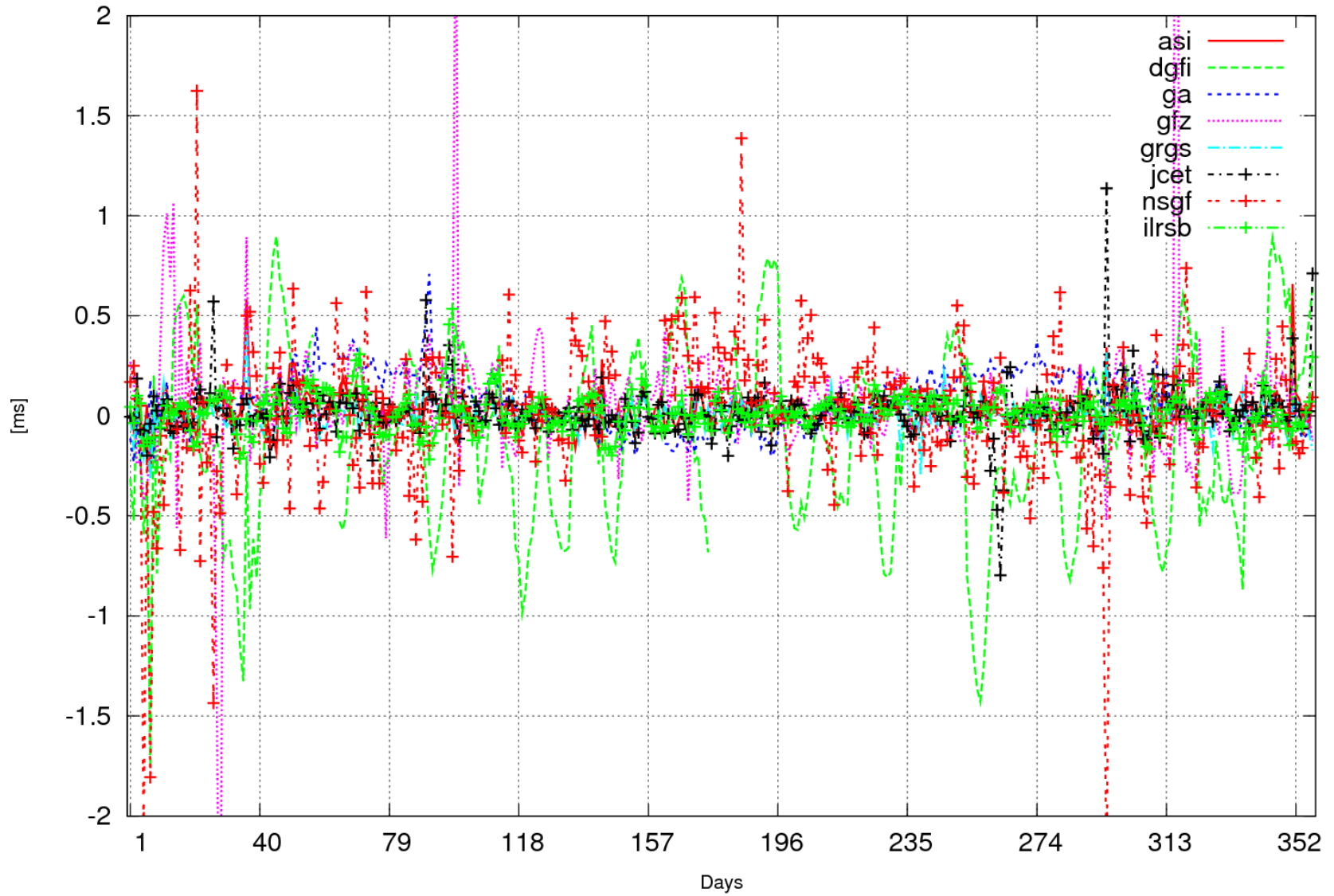
ILF

Relative EOP for DXPO: 930109 - 931225



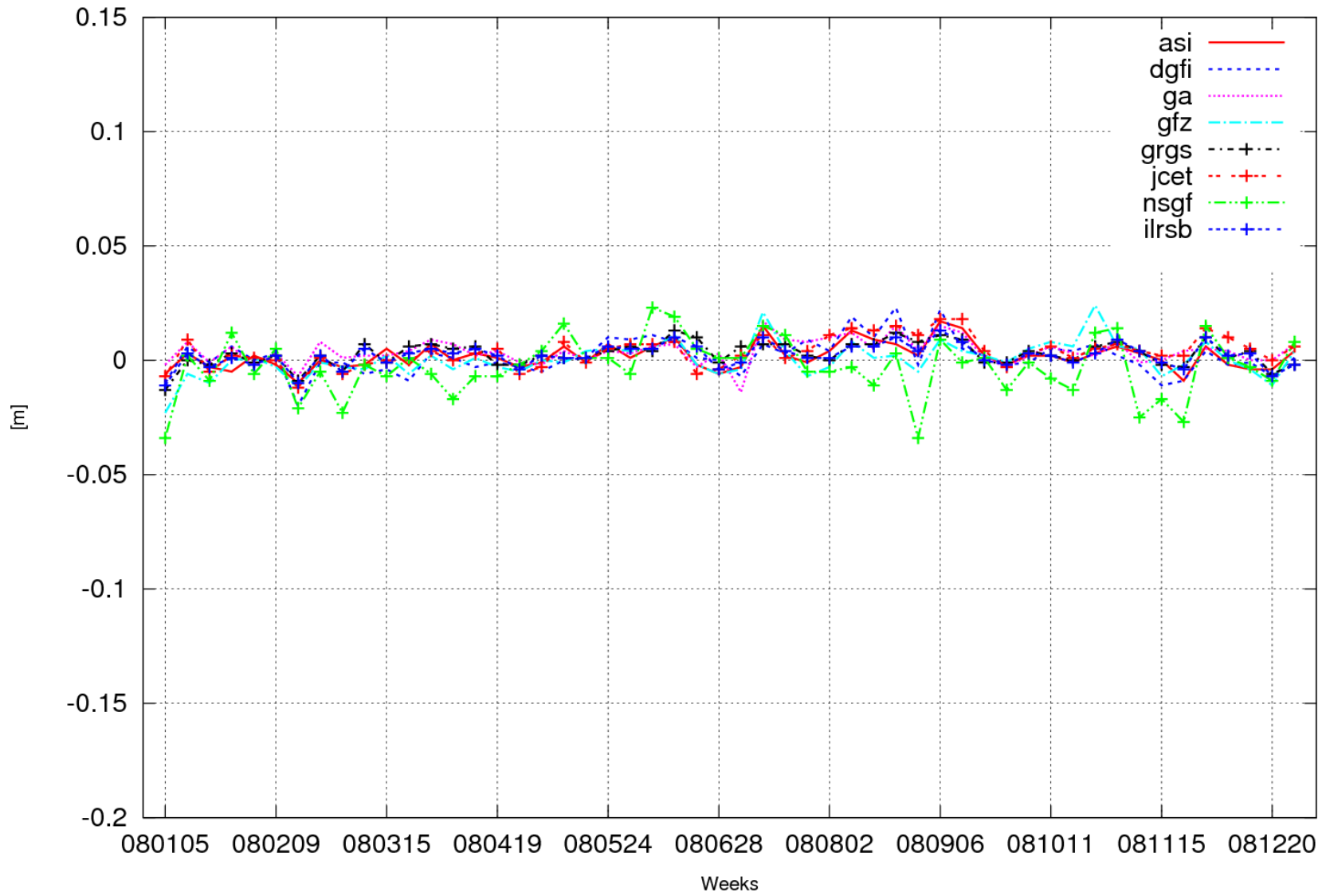
ILF

Relative EOP for DLOD: 930109 - 931225



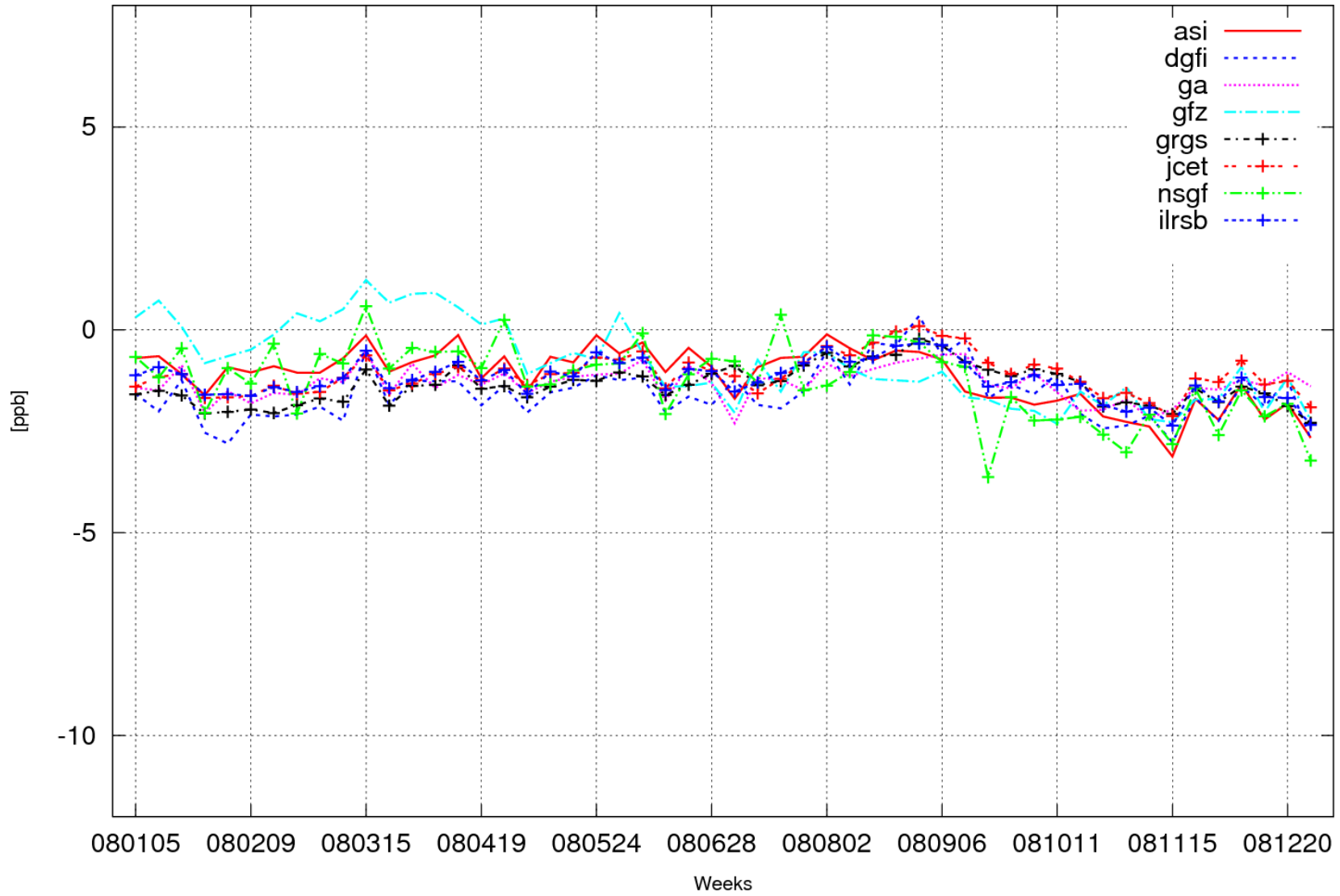
ILF

Helmert parameter tz for 080105 - 081227



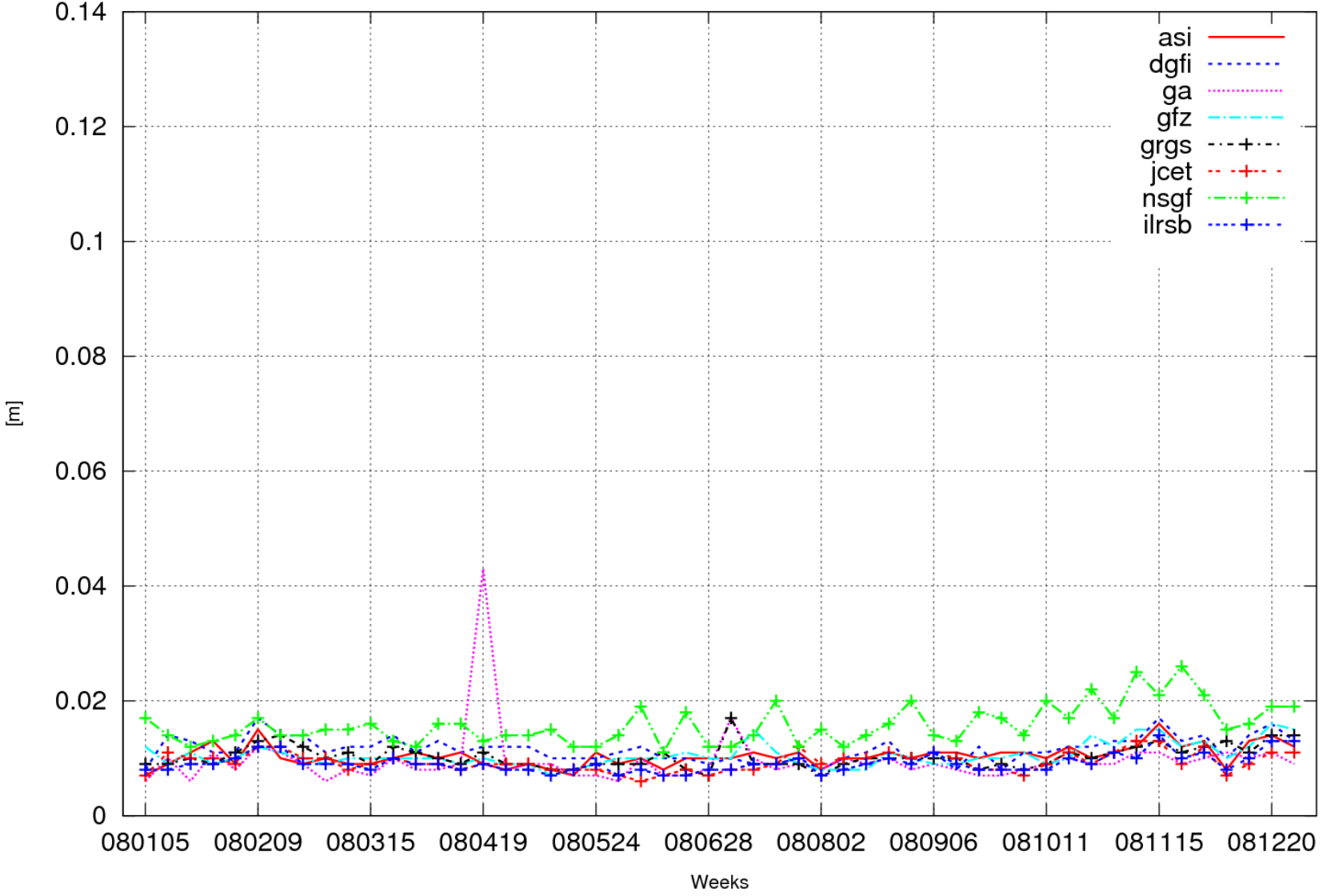
ILF

Helmert parameter sc for 080105 - 081227



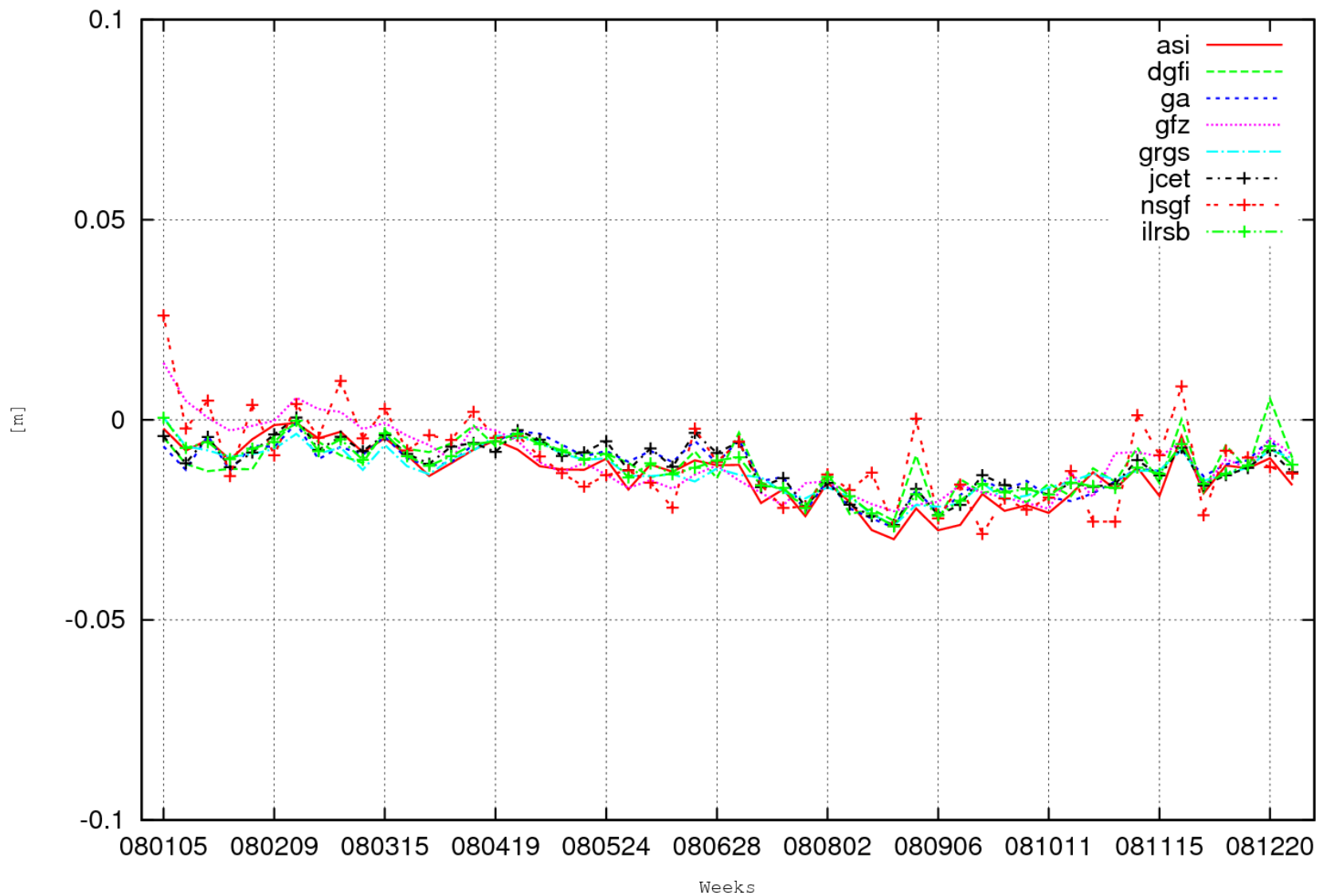
ILF

Helmert parameter wrms for 080105 - 081227



ILF

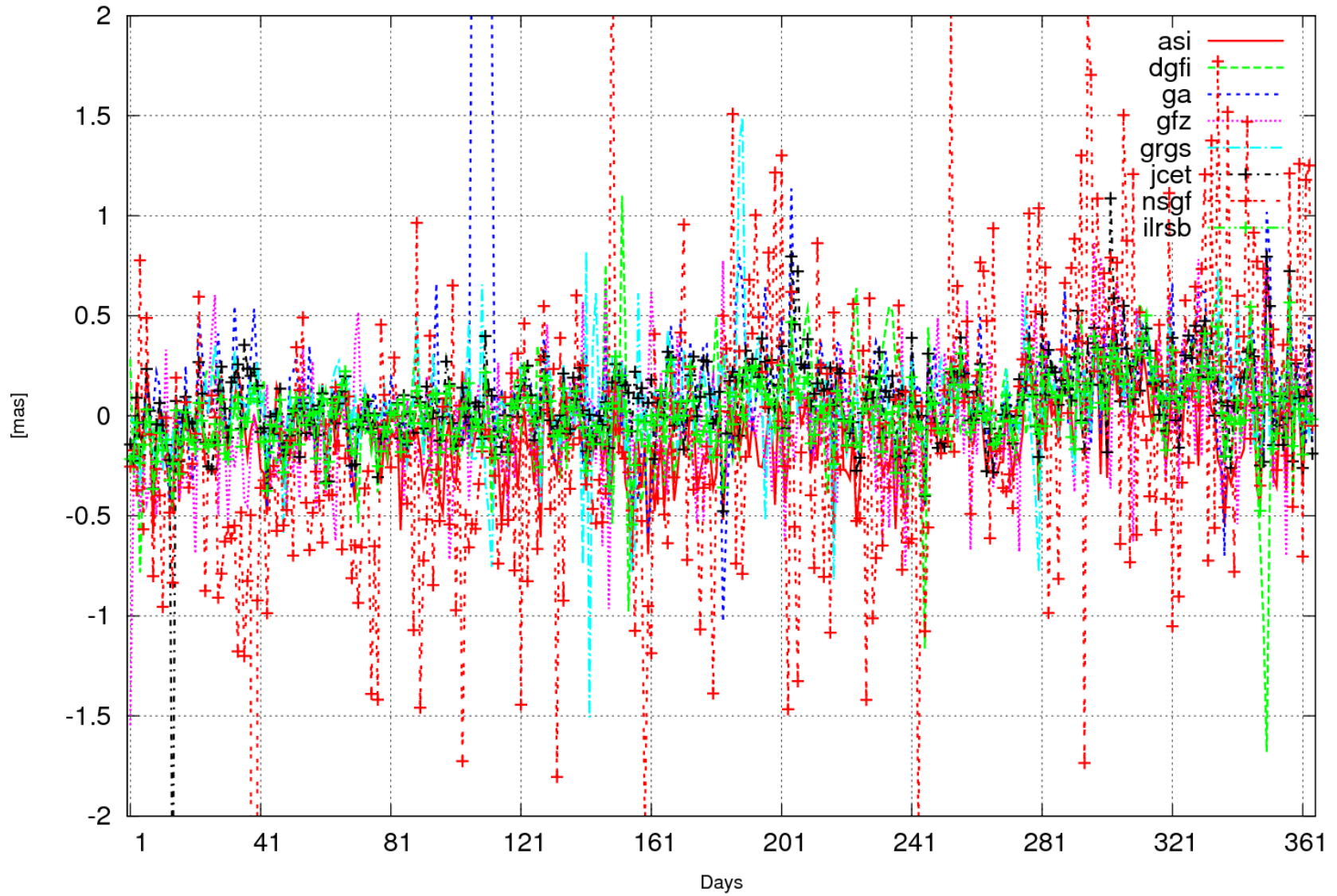
50107M001 (core_max): dH w.r.t. SLRF2005: 080105 - 081227



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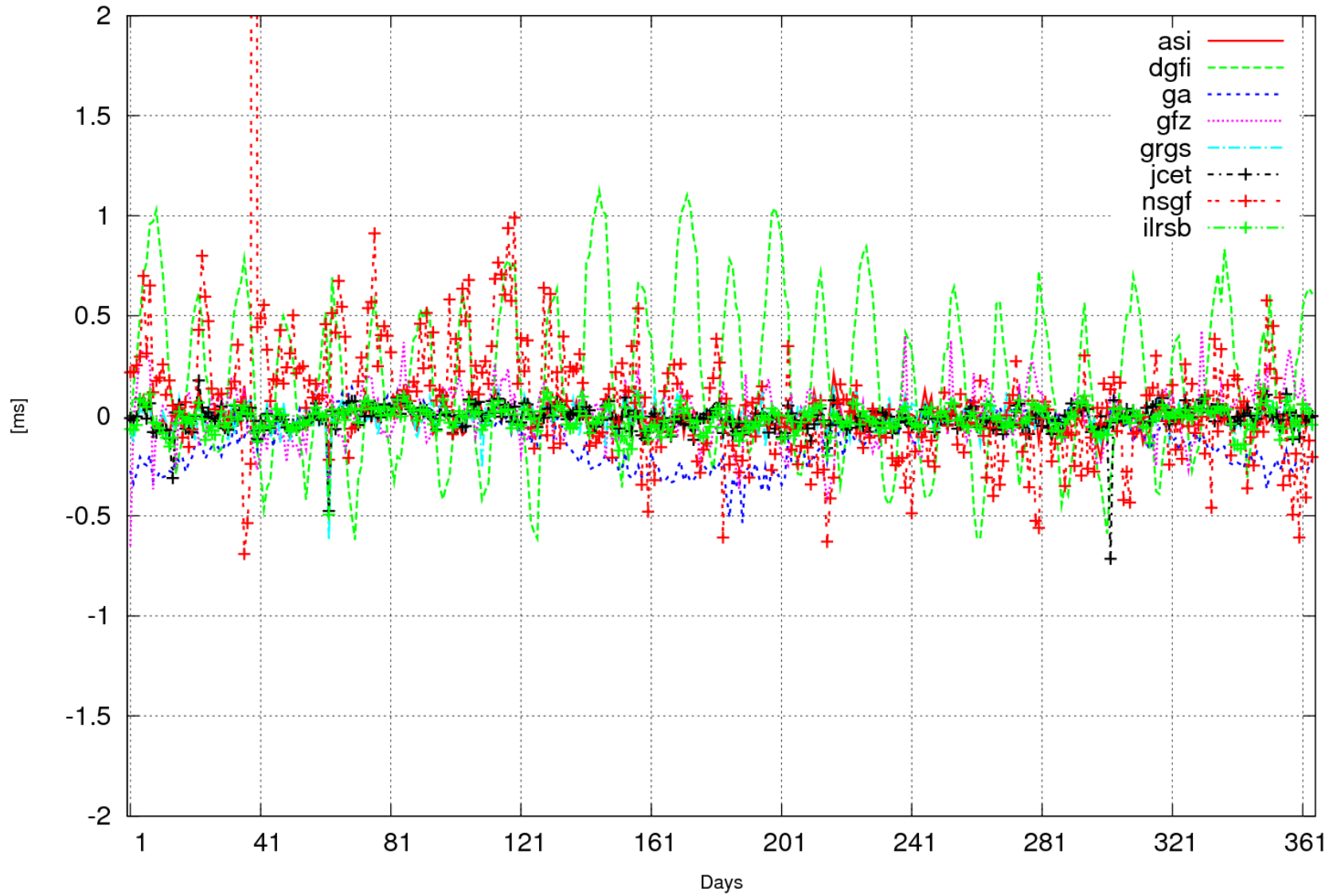


Relative EOP for DXPO: 080105 - 081227



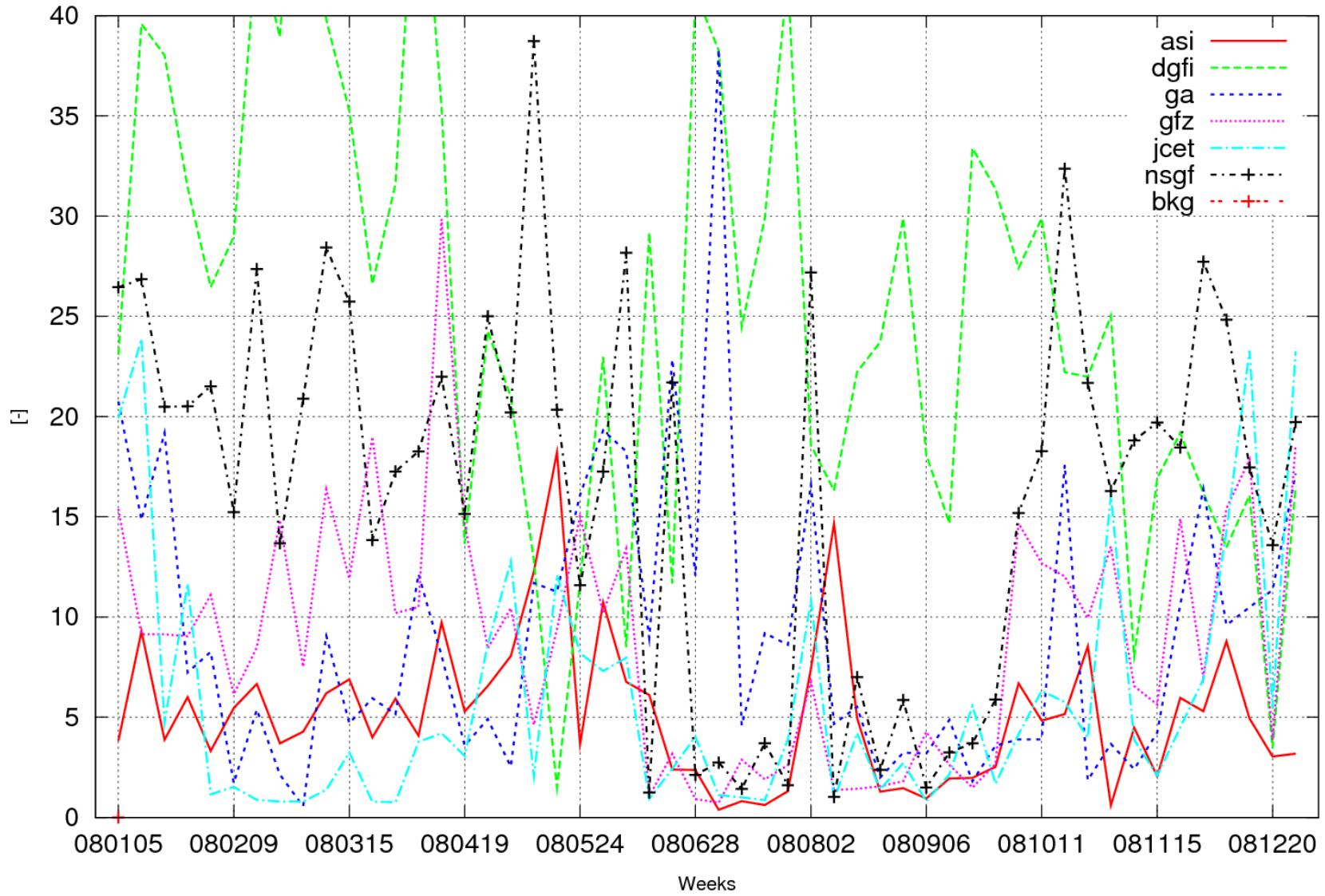
ILF

Relative EOP for DL0D: 080105 - 081227



ILF

variance factors vf: 080105 - 081227



ILF

AC SINEX files deleted in ILRSB_v24 and v25

#####

- > 830709 => dgfi deleted: too large increments
- > 890408 => nsgf deleted: too many neg. variances
- > 930130 => ga deleted: negative variances for eop
- > 930424 => nsgf deleted: binary data in SINEX file
- > 930612 => nsgf deleted: binary data in SINEX file
=> ga deleted: no rotational deficiency ($E^T * N * E$)
- > 930903 => dgfi deleted: Header-SINEX incorrect
- > 940319 => asi deleted: negative variance within Helmert parameter estimation
- > 940507 => nsgf deleted: binary data in SINEX file
- > 940827 => nsgf deleted: binary data in SINEX file
- > 950311 => nsgf deleted: binary data in SINEX file
- > 950408 => nsgf deleted: binary data in SINEX file
- > 950603 => gfz deleted: singular normal equation system with minimal constraints
- > 960106 => gfz deleted: incorrect EOP epochs and values
- > 960406 => dgfi deleted: SINEX header incorrect
- > 970705 => gfz deleted: Estimated EOP increments too large
- > 980606 => dgfi deleted: SINEX header incorrect

- > 020525 => nsgf deleted: neg. variances
=> jcet deleted: neg. variances
- > 020330 => nsgf deleted: neg. variances
- > 050402 => dgfi deleted: SINEX header incorrect
- > 050505 => dgfi deleted: SINEX header incorrect
- > 050702 => nsgf deleted: binary data in SINEX file
- > 050723 => dgfi deleted: SINEX header incorrect
- > 050806 => nsgf deleted: neg. variances
- > 050813 => nsgf deleted: neg. variances
- > 051022 => dgfi deleted: SINEX header incorrect
- > 060107 => gfz deleted: incorrect EOP epochs
- > 060506 => dgfi deleted: SINEX header incorrect
- > 060527 => dgfi deleted: too many neg. variances
- > 060617 => dgfi deleted: too many neg. variances
- > 060812 => dgfi deleted: too many neg. variances
- > 060805 => dgfi deleted: SINEX header incorrect
- > 060812 => dgfi deleted: too many neg. variance
gf deleted: neg. variances

Main reasons for processing crash

- * **negative or unrealistic variance factors of VCE for EOP**
=> **dgfi.970104**
- * **negative or unrealistic variance factors of stations**
=> **850228: check of diagonals of covariance matrices**
- * **negative diagonals of minimal constraints covariance matrix for EOP**
=> **ga.930130_v25**
- * **incorrect zero elements in SOLUTION/ESTIMATED or SOLUTION/MATRIX_ESTIMATED**
=> **gfz**
- * **binary data in SINEX file**
=> **nsgf.930424_v25**
- * **no rotational deficiency ($E^T * N * E$ test)**
=> **ga.930612_v25**
- * **Header-SINEX incorrect**
=> **dgfi.930904_v25**
- * **matrix singular to machine precision, rcond = 0**
=> **950603: incorrect domes codes**
- * **incorrect EOP epochs**
=> **gfz.960106_v25**
- * **SINEX header incorrect**
=> **dgfi.960406_v25**

- * **singular normal equation system with minimal constraints**
=> **gfz.950603_v25**
- * **Estimated EOP increments too large**
=> **gfz.970705**
- * **matrix singular to machine precision, rcond = 0 in the beginning**
=> **880513**
- * **6 times matrix singular to machine precision, rcond = 0 in the beginning**
=> **920919: large increments in sum-file for jcet 7835 => eliminated**

Recommendations

- * **time for combination and validation by CC's: at least one month after having received the last AC solution**
- * **stricter observance of AWG conventions by AC's (e.g. multiple est.)**
- * **better communication between CC's and AC's during reprocessing phase**