

# 2024/2 ILRS Analysis Standing Committee meeting

**Mathis Bloßfeld<sup>(1)</sup> and Cinzia Luceri<sup>(2)</sup>**

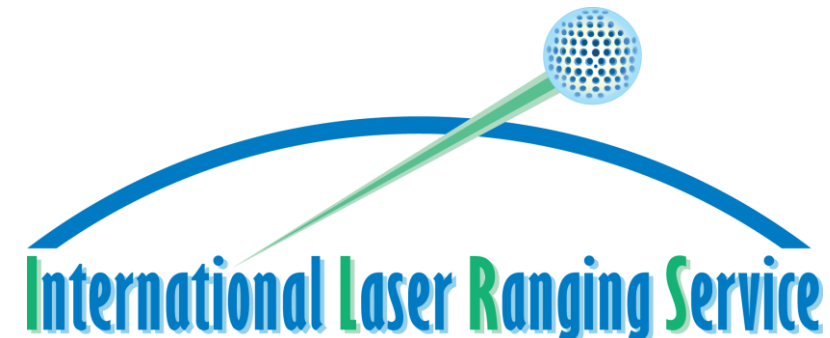
(Conveners)

(1) DGFI-TUM

(2) ASI/e-geos

Wednesday, April 17th, 2024, Zoom, 8:30 to 11:30 AM (UTC)

ILRS ASC meeting – 2024-04-17



# Today's agenda



0) Last meeting + open Action Items (AIs)	(MB, CL)	10 minutes
1) Status reports of SLR/LLR ACs/CCs	(all)	70 minutes
2) ITRF2020 update (reprocessing, publication, etc.)	(CL, MB)	20 minutes
3) LARES-2: DHF and inclusion into operational products	(CL)	10 minutes
4) LE filter, TS model and DHF (incl. quarantine release and delayed NPs)	(VH, MB)	20 minutes
5) ESA's GENESIS mission	(MB)	10 minutes
6) ASC recommendations for SINEX format updates	(MB)	10 minutes
7) Survey on satellite-/station-weighting strategies at ACs	(AB, MB)	10 minutes
8) DSC files at ILRS website	(MB)	10 minutes
9) Any other business and next ASC meeting	(all, MB)	10 minutes

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# Open Ais from last ASC meeting



NEW ACTIONS		
# AI	Description	AC/person
1_jan2024	Clarify with GRGS which steps are necessary to get GRGS becoming an ILRS AC in 2024.	F. Deleflie, M. Bloßfeld
2_jan2024	New product-based DSC files (instead of old AC-based DSC files).	M. Bloßfeld
3_jan2024	Compute orbit product based on v85 reprocessed solutions.	all
4_jan2024	Compile report on SINEX format updates wanted by the ILRS for IERS DB.	all
5_jan2024	New format for AC-based DSC files.	M. Bloßfeld
6_jan2024	Investigation of test solutions based on different satellite- and station-weighting strategies.	DGFI/ASI CC/JCET CC
7_jan2024	Investigation of large cross-track orbit differences of NSGF w.r.t. other AC orbits	NSGF

ongoing

not yet done

under discussion; cf. 2)

cf. 6)

not yet done

ongoing; cf. 7)

status?

OLD OPEN ACTIONS		
# AI	Description	AC
1_apr2023	Large scatter of GFZ LOD w.r.t. USNO.	GFZ
3_apr2023	Publication on ILRS contribution to ITRF2020.	E. Pavlis
5_apr2023	New strategy for the processing of arcs before 1993.	C. Luceri, m. Bloßfeld

status?

not yet done; cf. 2)

not yet done

# Today's agenda



0) Last meeting + open Action Items (AIs)	(MB, CL)	10 minutes
<b>1) Status reports of SLR/LLR ACs/CCs</b>	<b>(all)</b>	<b>70 minutes</b>
ASI (AC/CC), BKG, CNES, DGFI, ESA, GFZ, (GRGS), JCET (AC/CC), NSGF		
2) ITRF2020 update (reprocessing, publication, etc.)	(CL, MB)	20 minutes
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9) Any other business and next ASC meeting	(all, MB)	10 minutes

# *ASI AC&CC report*



**A. Basoni , V. Luceri, D. Sarrocco**  
e-GEOS S.p.A., ASI/CGS - Matera



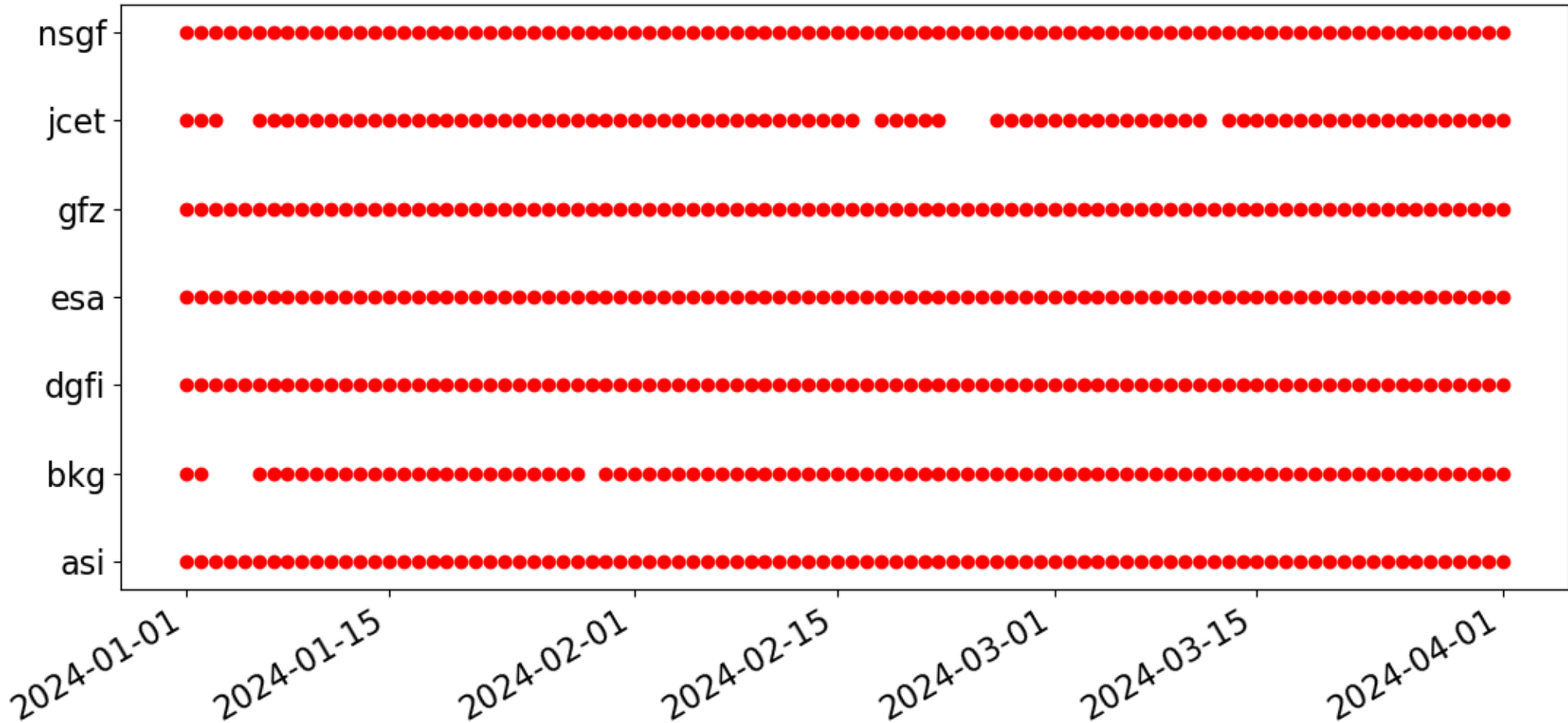
**G. Bianco**  
Agenzia Spaziale Italiana, CGS - Matera

# *ASI/CGS Activities since last ASC meeting*

- ACs performance check
  - Product submissions
  - 3D wrms of the residuals w.r.t. SLRF (daily and weekly)
  - Scale
  - Geocenter motion
  - EOP
  - Orbits: RMS of residuals w.r.t. combination
  - Monitoring of systematic error

# *Solution submissions*

Daily v180 ACs time series (valid only)  
2024/01/01 – 2024/04/01



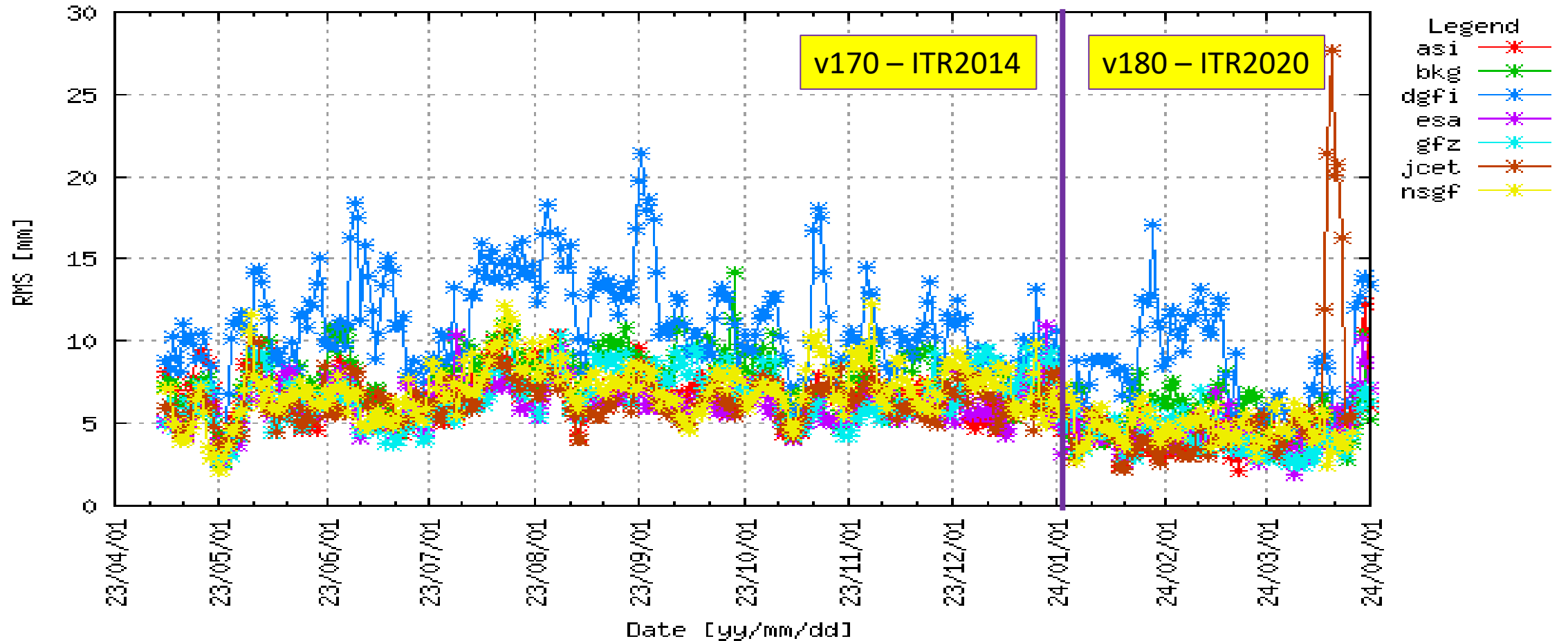




# Stations coordinates from *daily* solutions

3D wrms of the residual w.r.t. SLRF2020  
CORE SITES

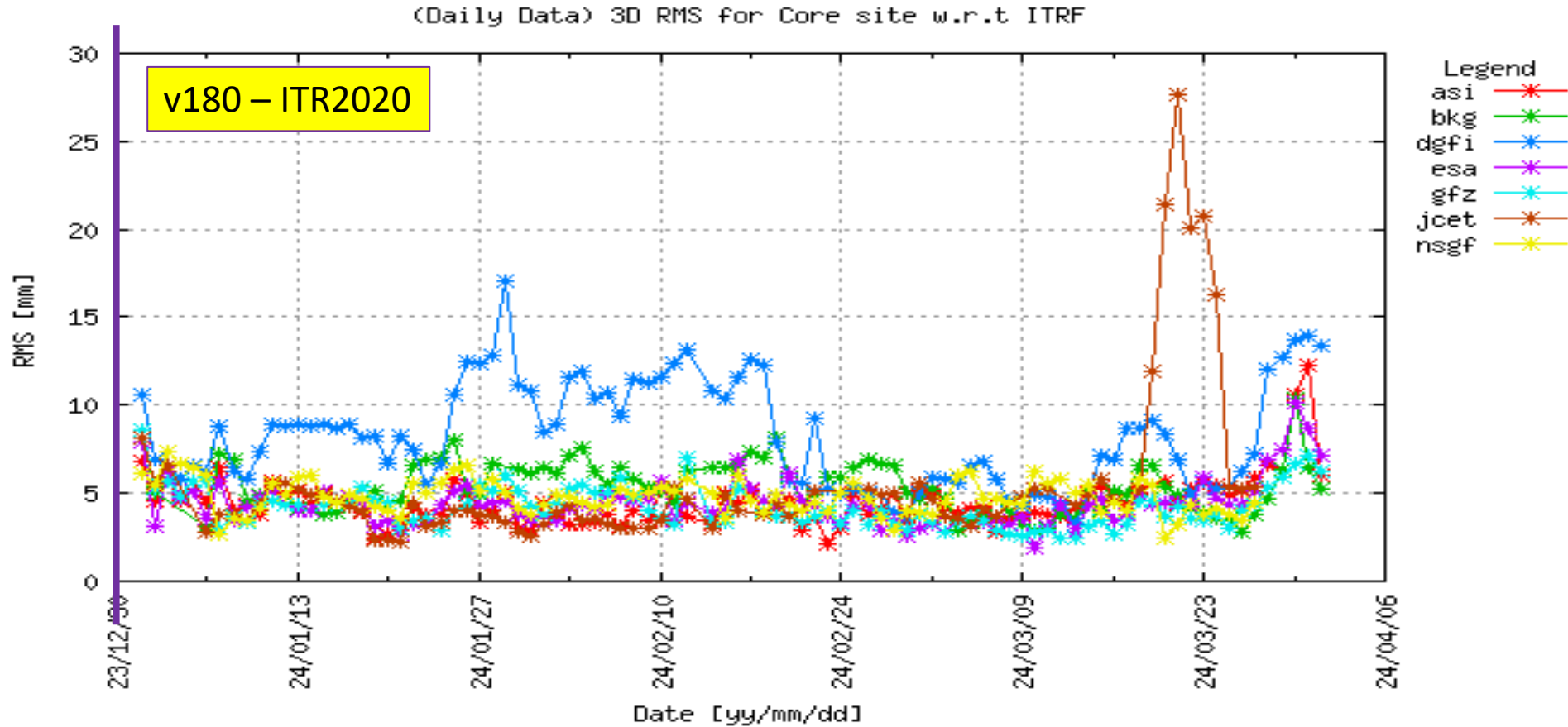
(Daily Data) 3D RMS for Core site w.r.t. ITRF



**DGFI:** First ITRF2020 period, higher values (as with ITRF2014).

# Stations coordinates from *daily* solutions

3D wrms of the residual w.r.t. SLRF2020  
CORE SITES



.....Zooming on 2024.....



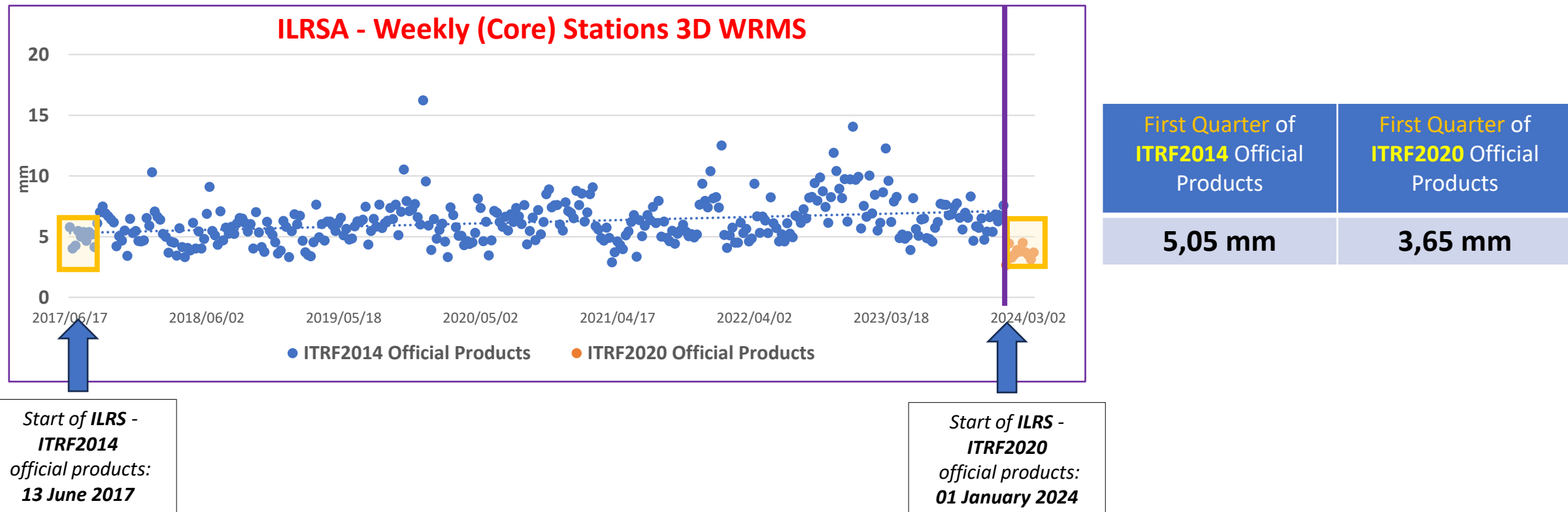
**DGFI:** First ITRF2020 period, higher values (as with ITRF2014).

# Stations coordinates from *weekly solutions*

- **Official operational products using SLRF2020 with Data Handling File (DHF) and CoM correction:**

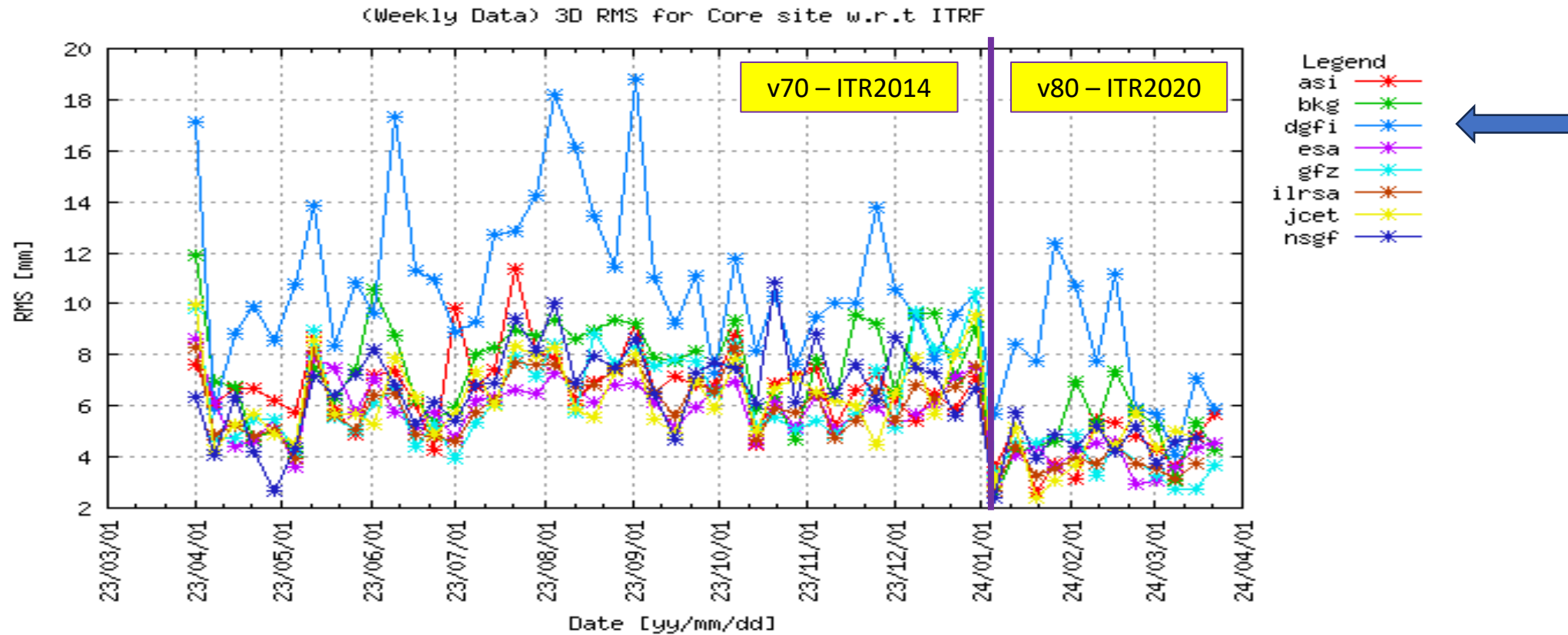
**SLRF2020:** Expanded set of SLR stations in ITRF2020 frame with historical sites NOT in ITRF2020 and some very recently installed sites that came after ITRF2020.

- **Daily Sinex solution:** Station Site Coordinates & Earth Observation Parameters
- **Weekly Sinex solution:** Station Site Coordinates & Earth Observation Parameters & ORBITS

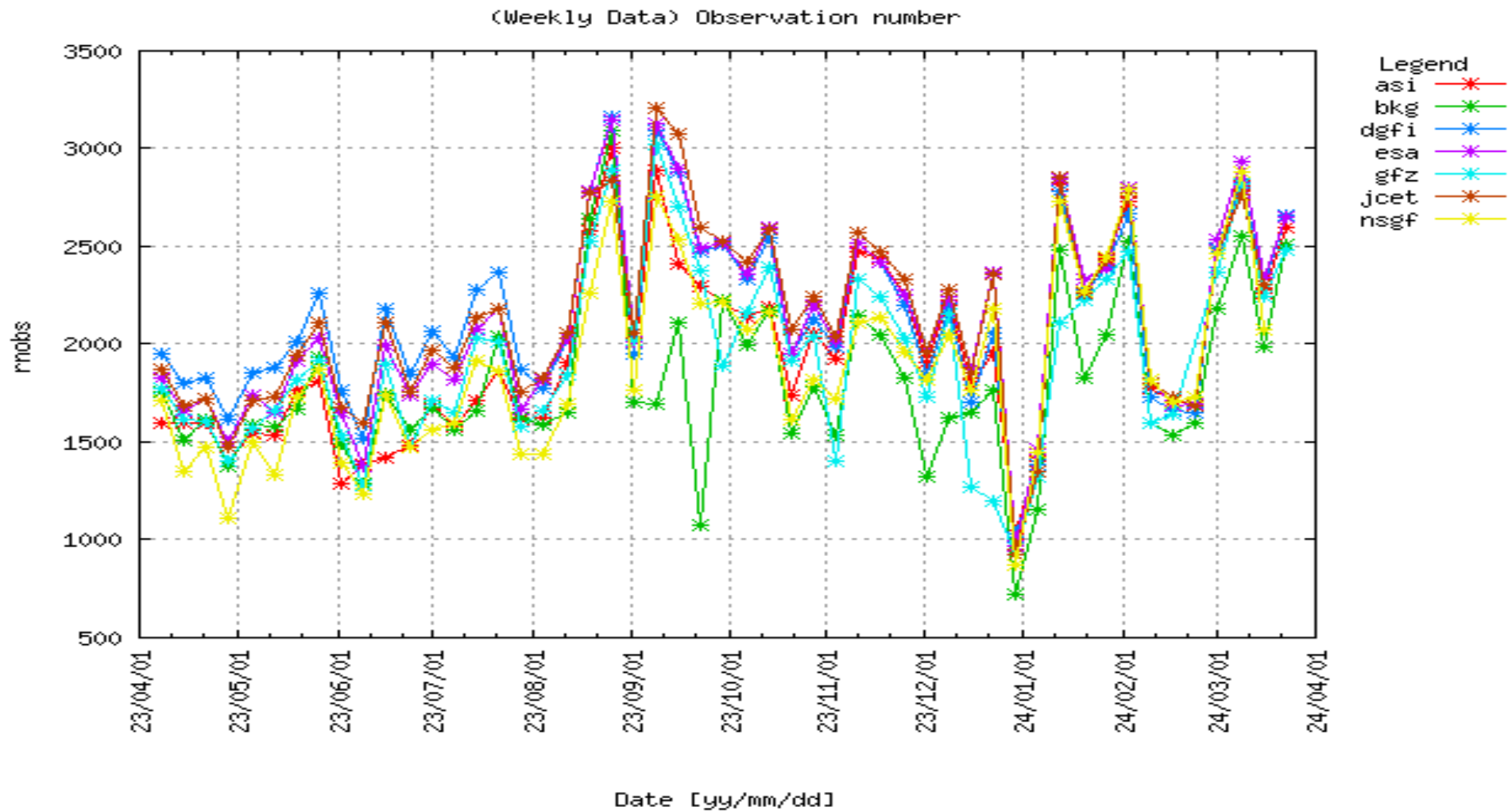


# Stations coordinates from *weekly solutions*

3D wrms of the residual w.r.t. SLRF2020  
CORE SITES

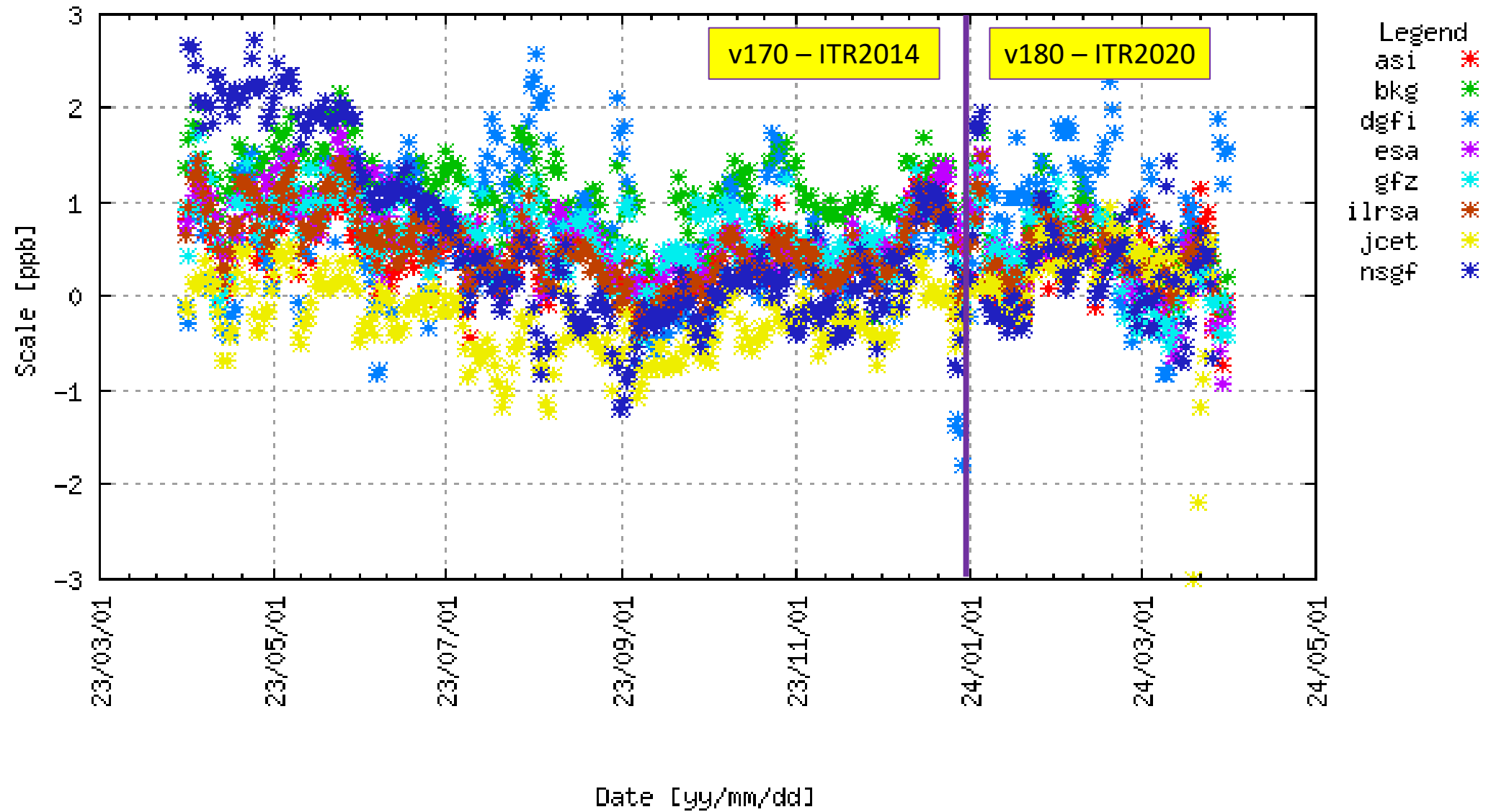


# Weekly -Number of observations for ACs

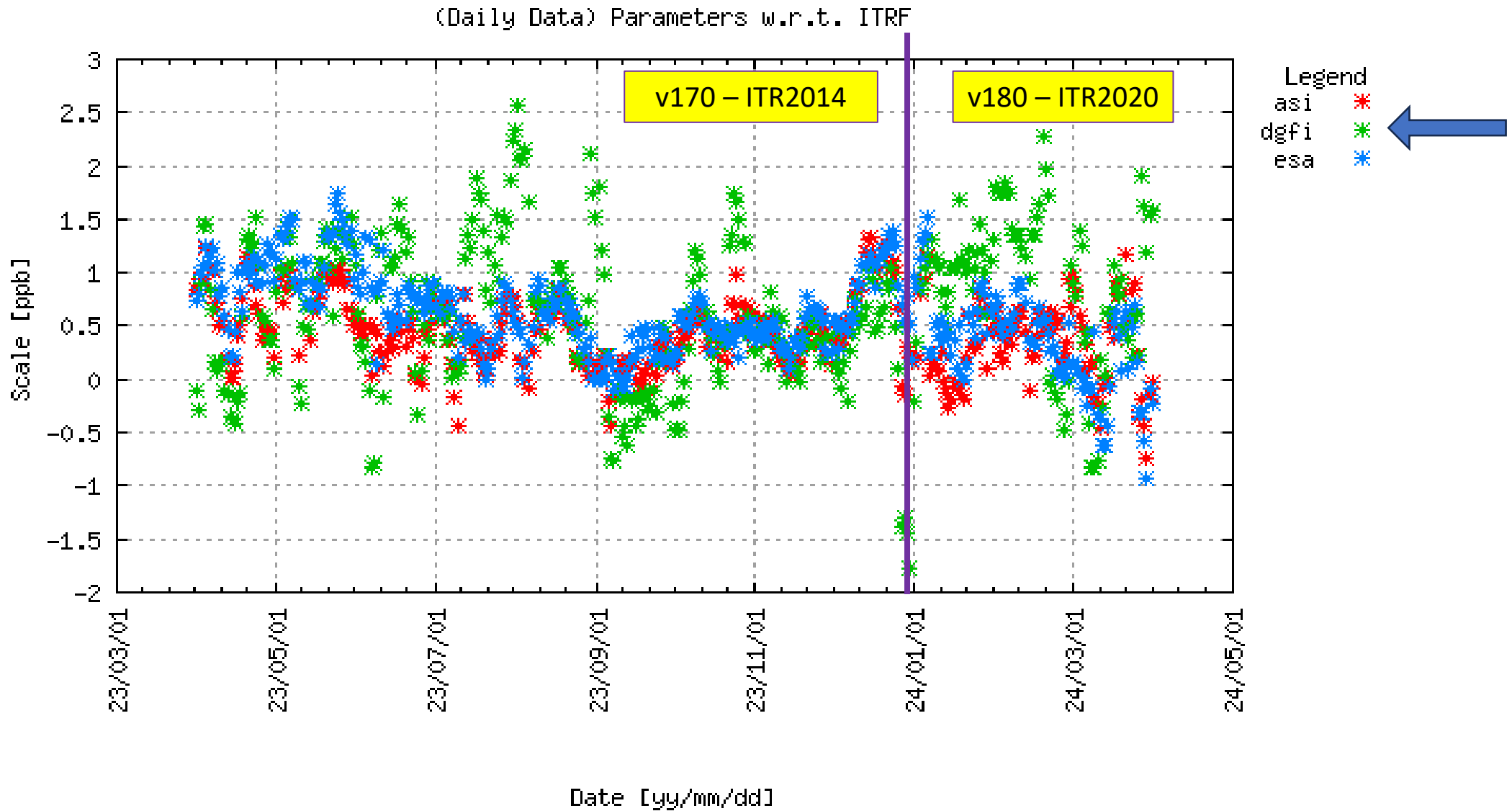


# Scale from daily solutions

(Daily Data) Parameters w.r.t. ITRF

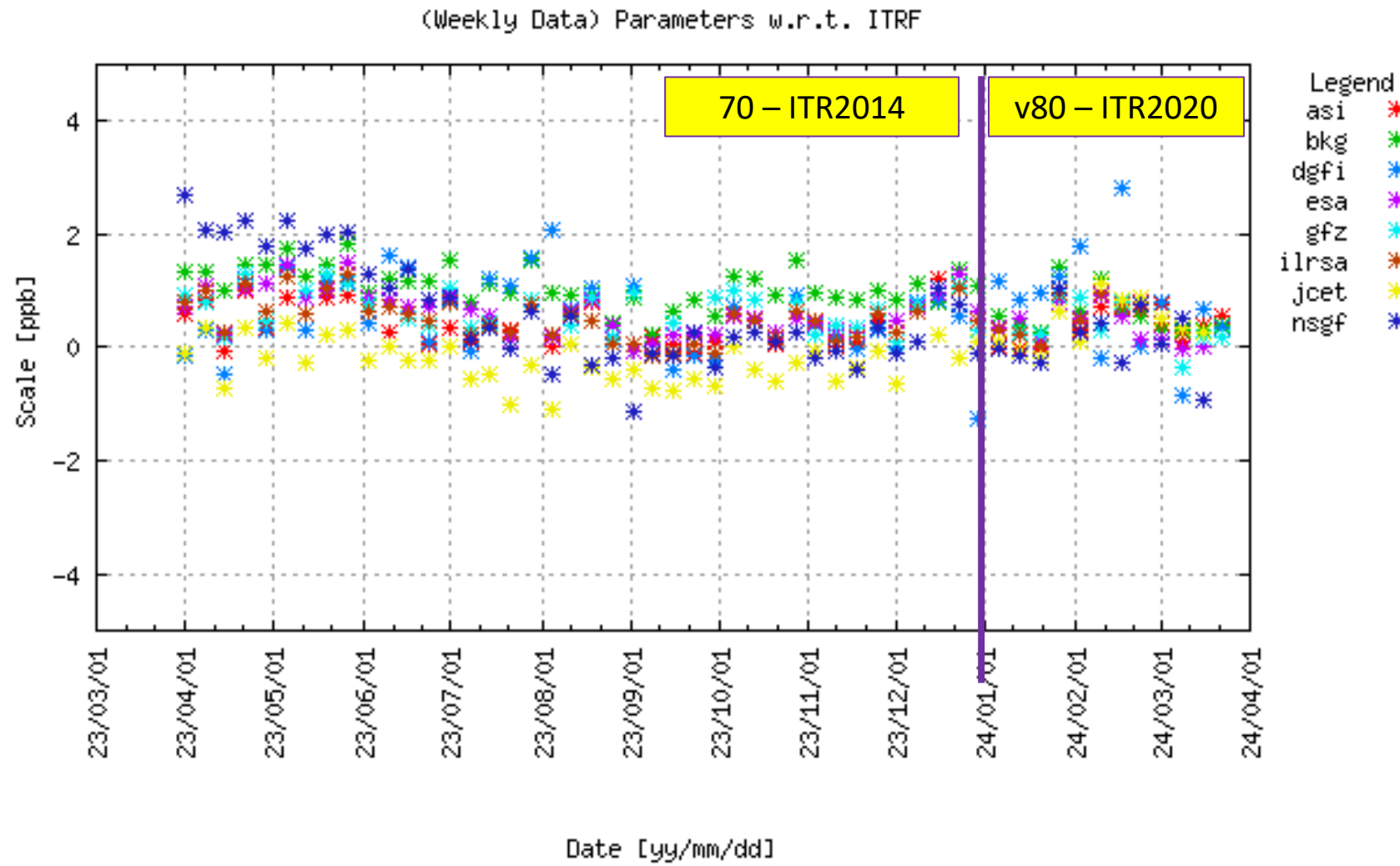


# Scale from daily solutions



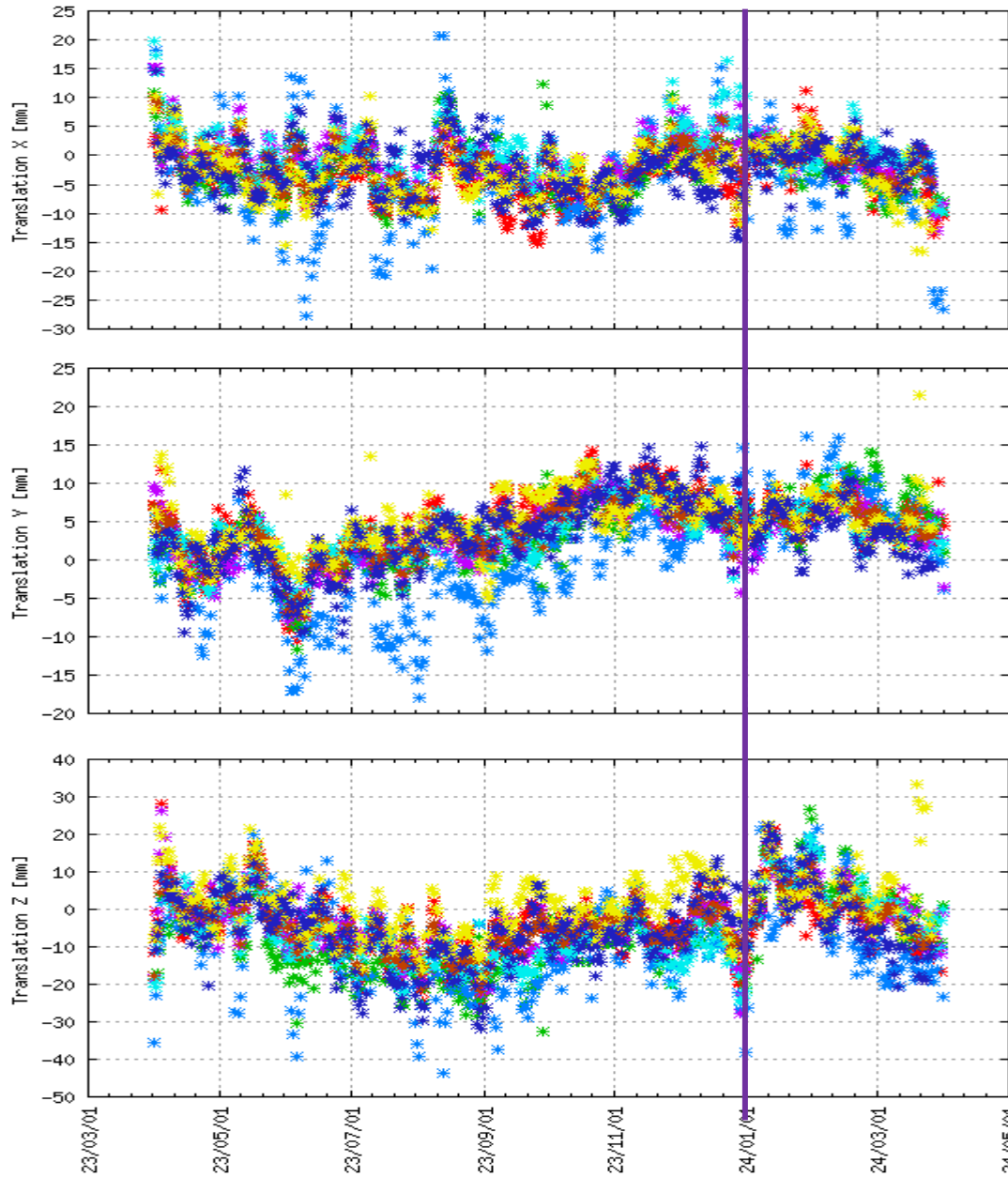


# Scale from *weekly solutions*



# Geocenter motion from *daily solutions*

(Daily Data) Parameters w.r.t. ITRF

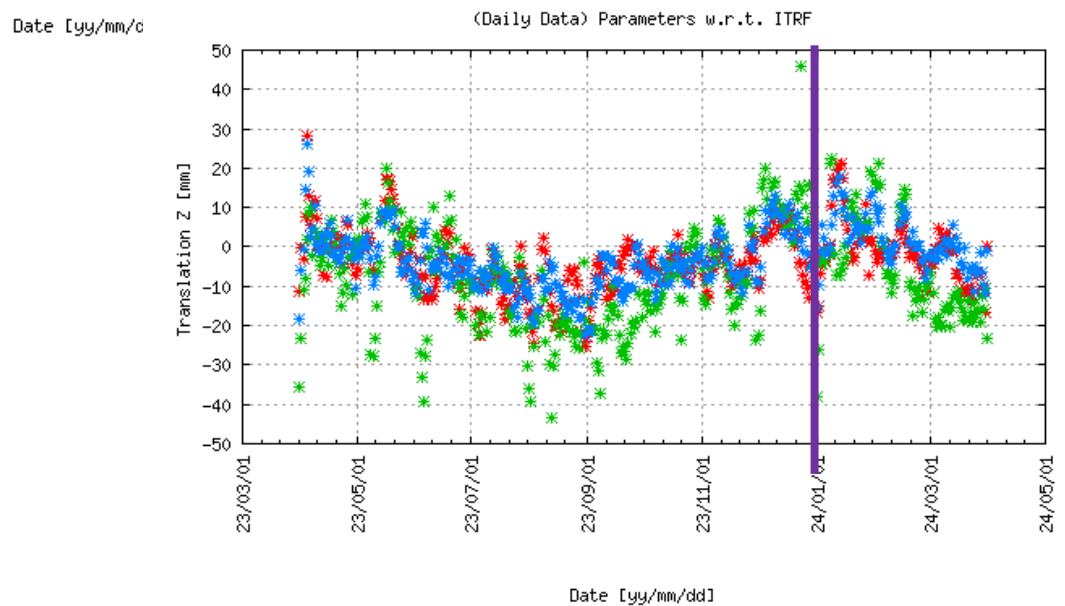
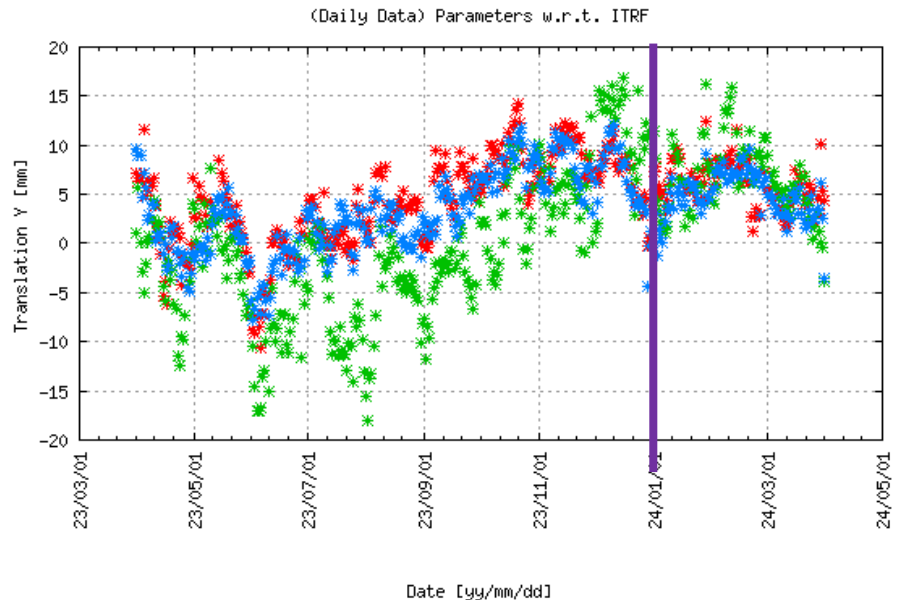
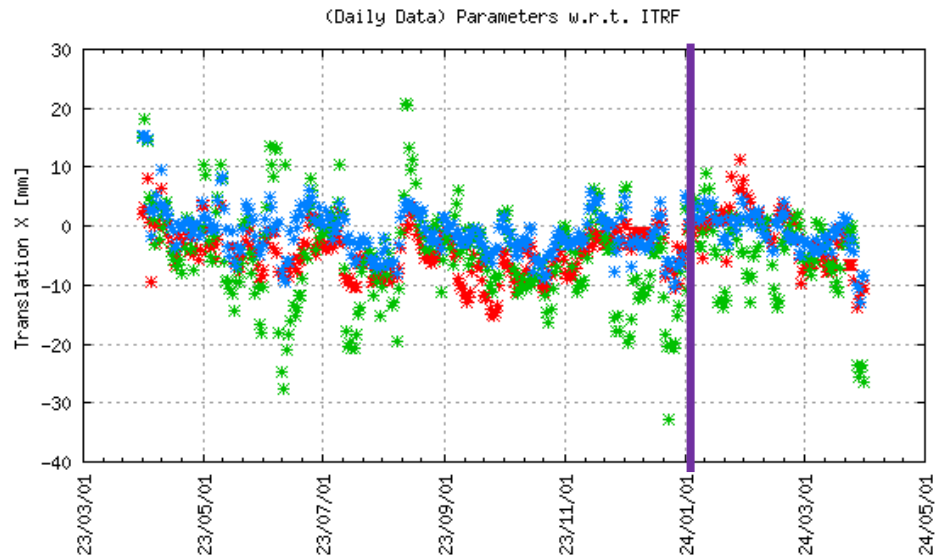


Legend

- asi \*
- bkg \*
- dgfi \*
- esa \*
- gfz \*
- ilrsa \*
- joet \*
- noef \*

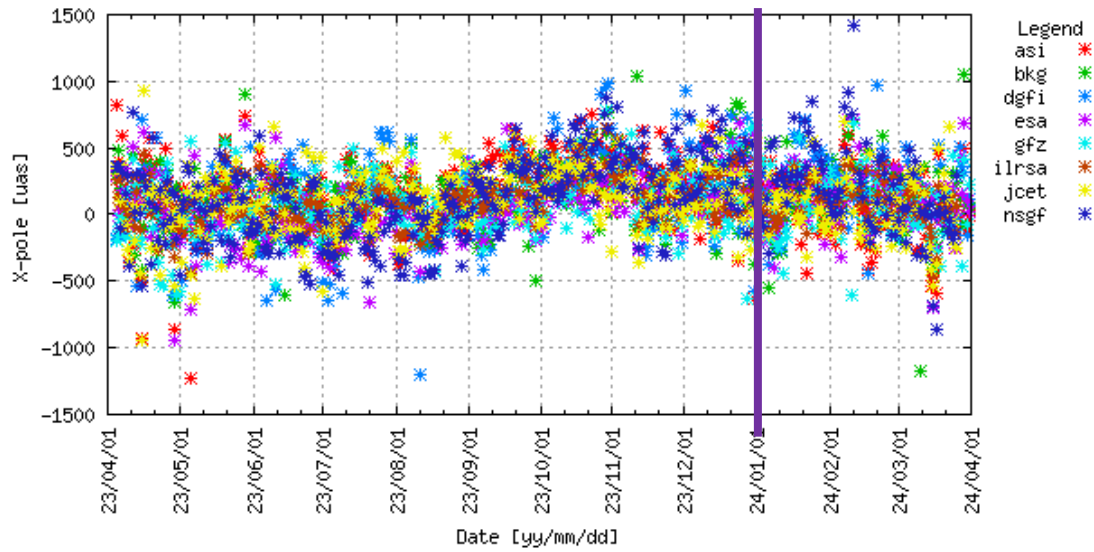


# Geocenter motion from *daily solutions*

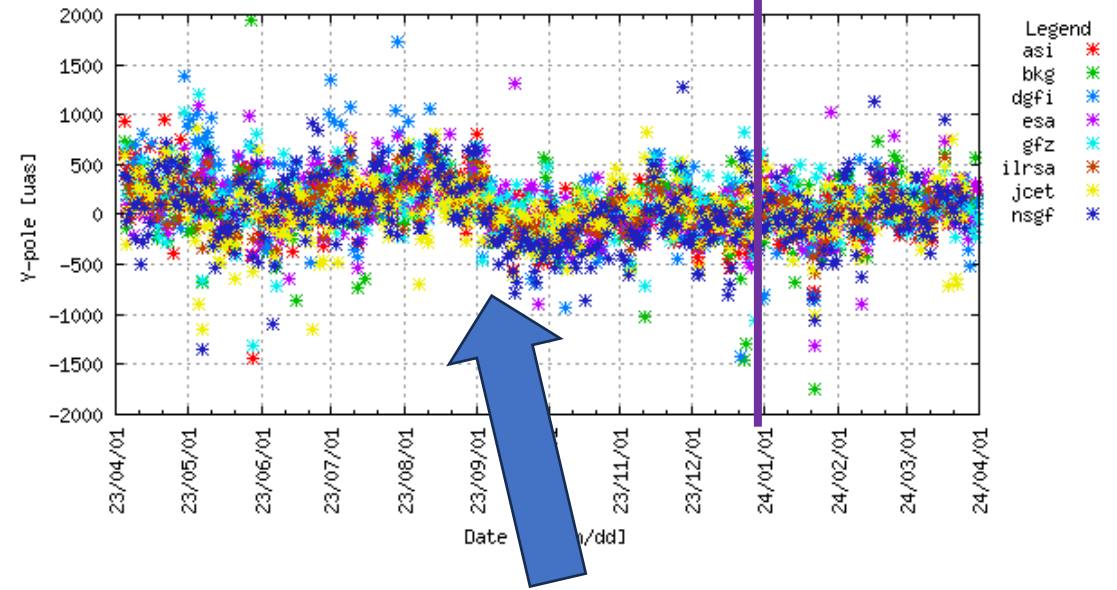


# EOP from daily solutions

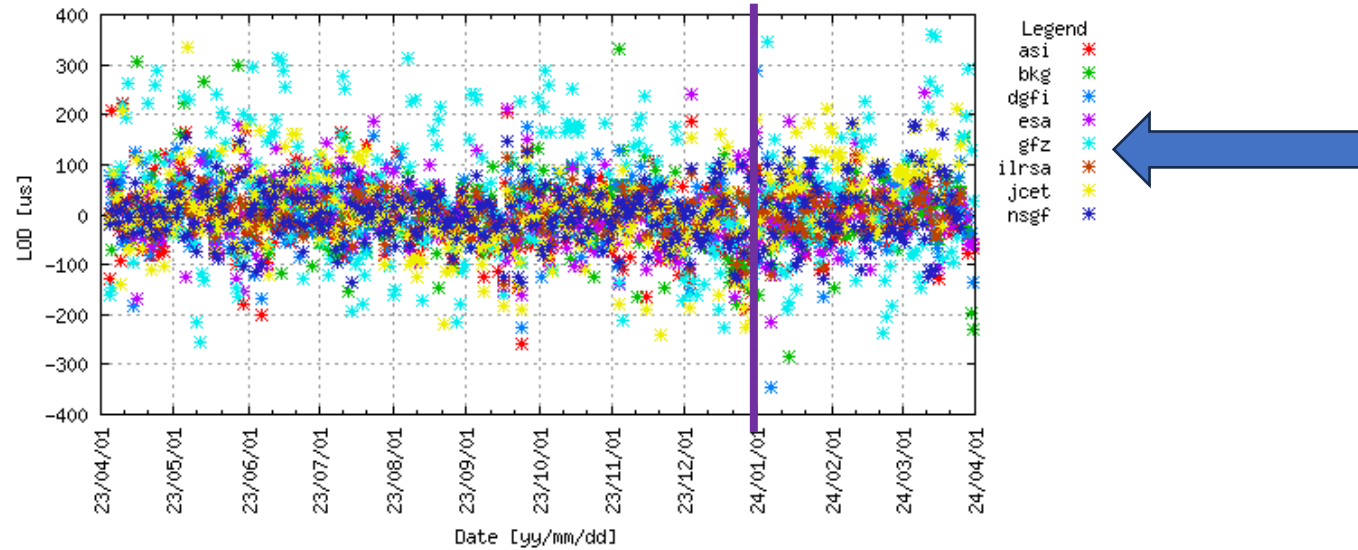
(Daily Data, day = 6) EOP w.r.t. USNO



(Daily Data, day = 6) EOP w.r.t. USNO

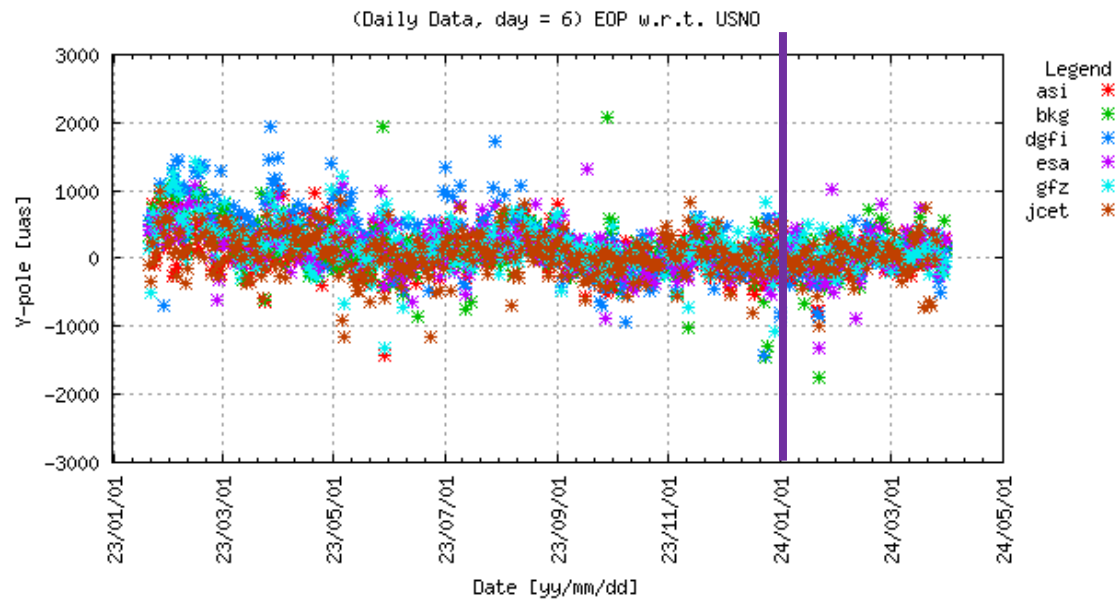


(Daily Data, day = 6) EOP w.r.t. USNO

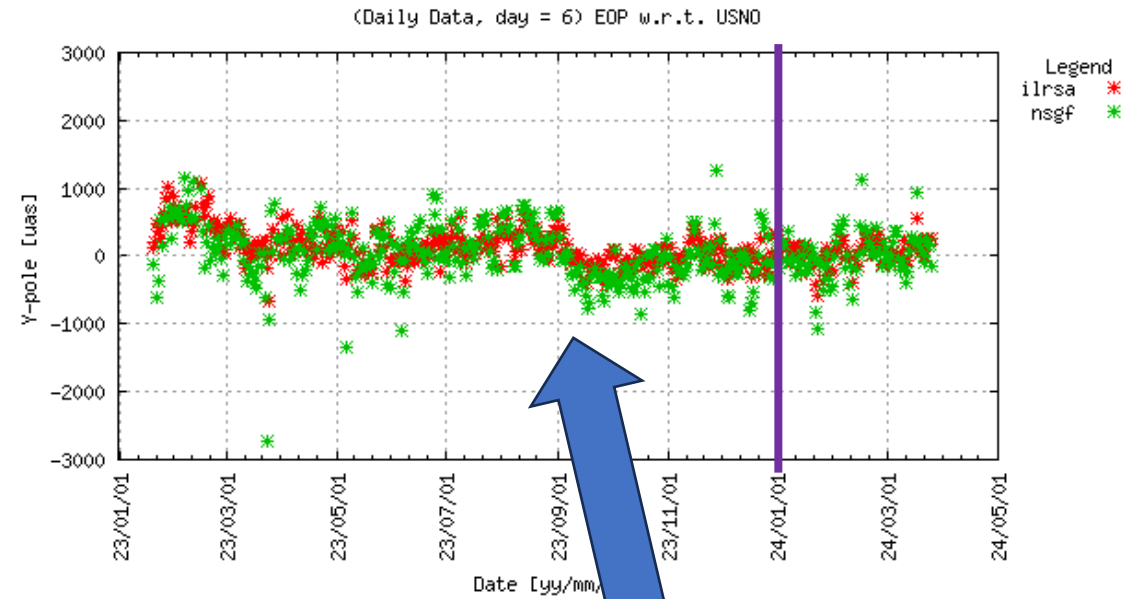


# EOP from daily solutions

ACs except NSGF

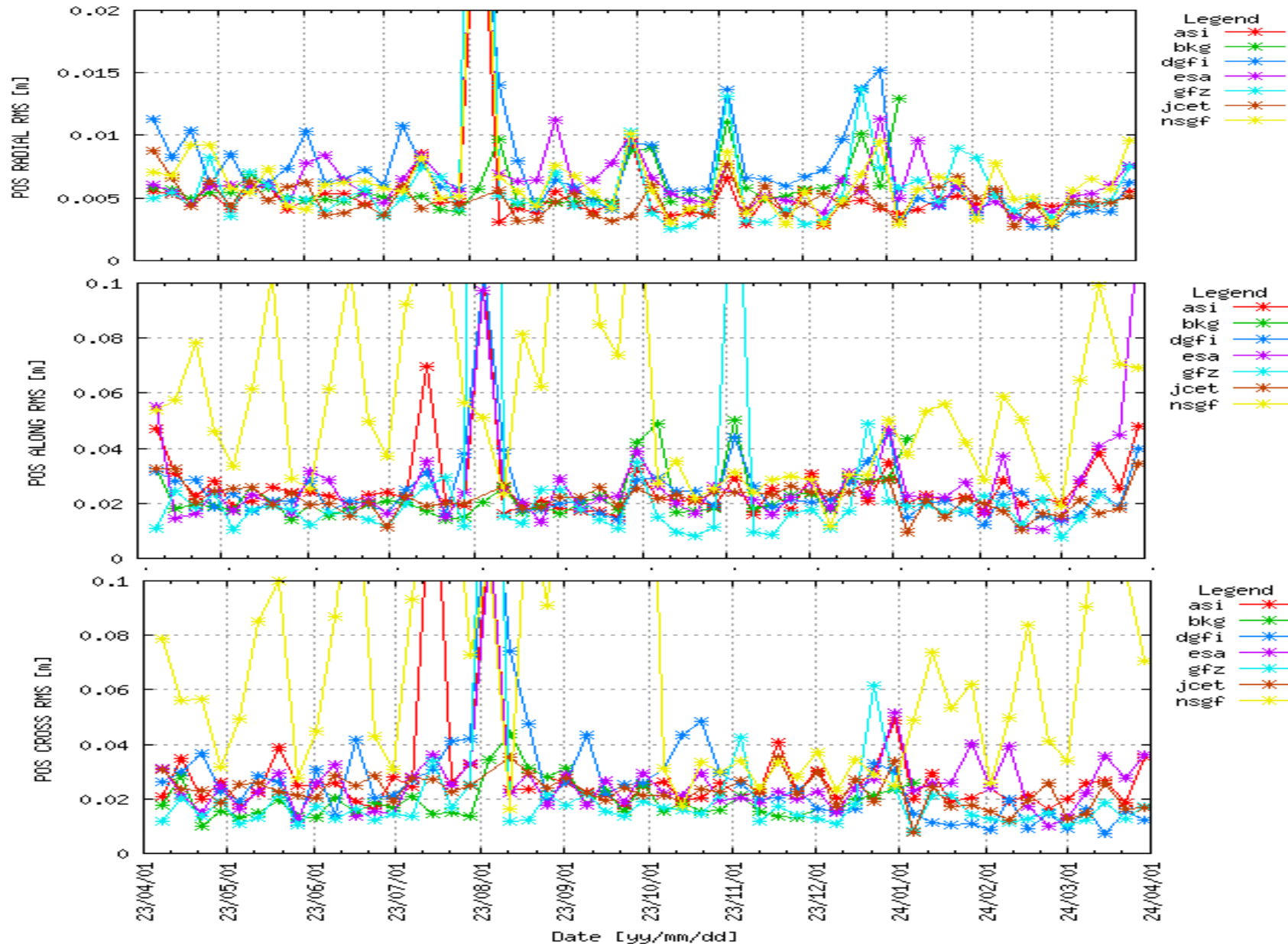


NSGF vs ILRSA



Y- Pole

# LAGEOS1 orbits – RMS of residuals w.r.t. combination



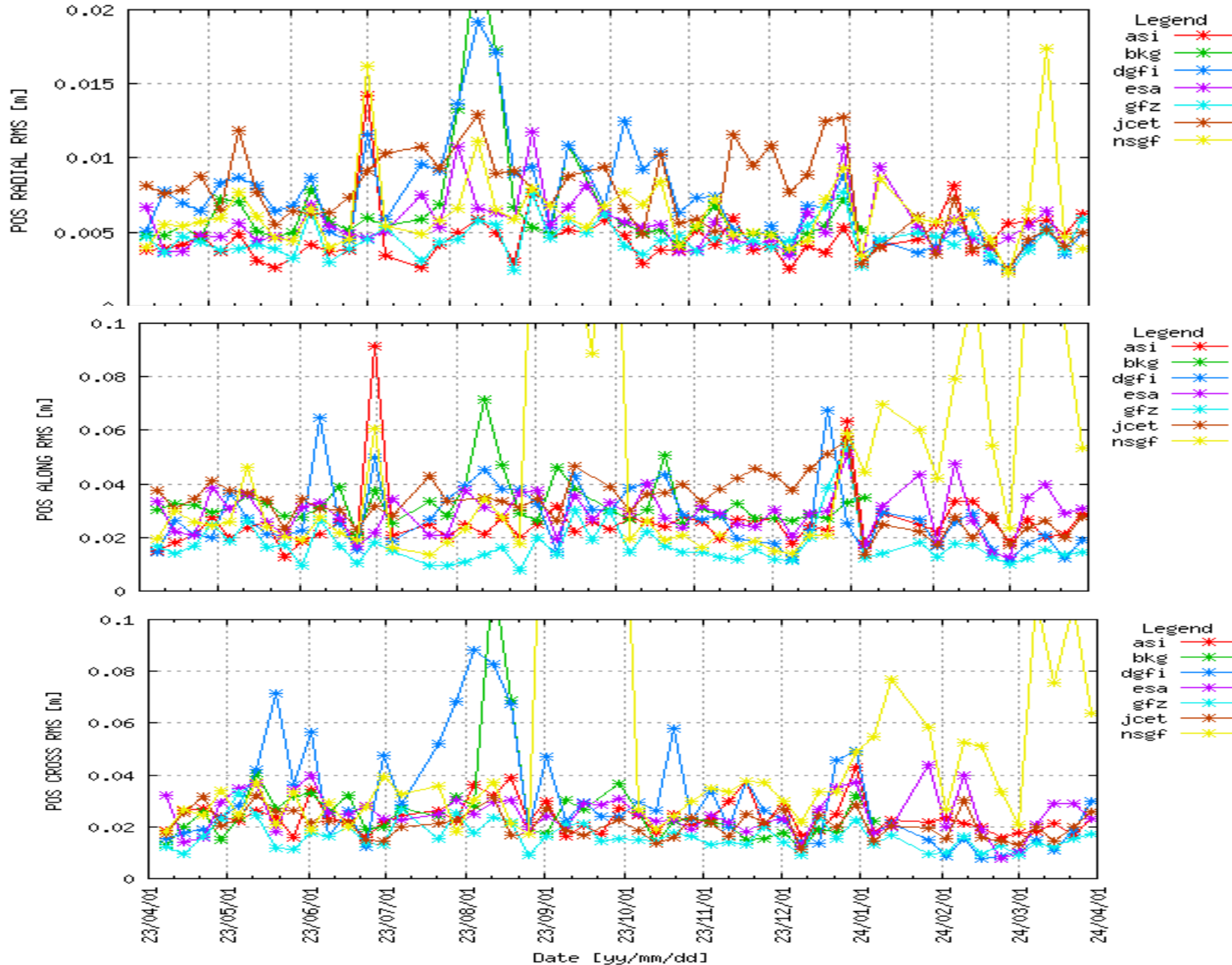
**BKG** is still experiencing epoch issue for all satellites (Basoni-Koenig 18/03, BKG will reprocess all v80 sp3).



**NSGF** CROSS and ALONG component



# LAGEOS2 orbits – RMS of residuals w.r.t. combination



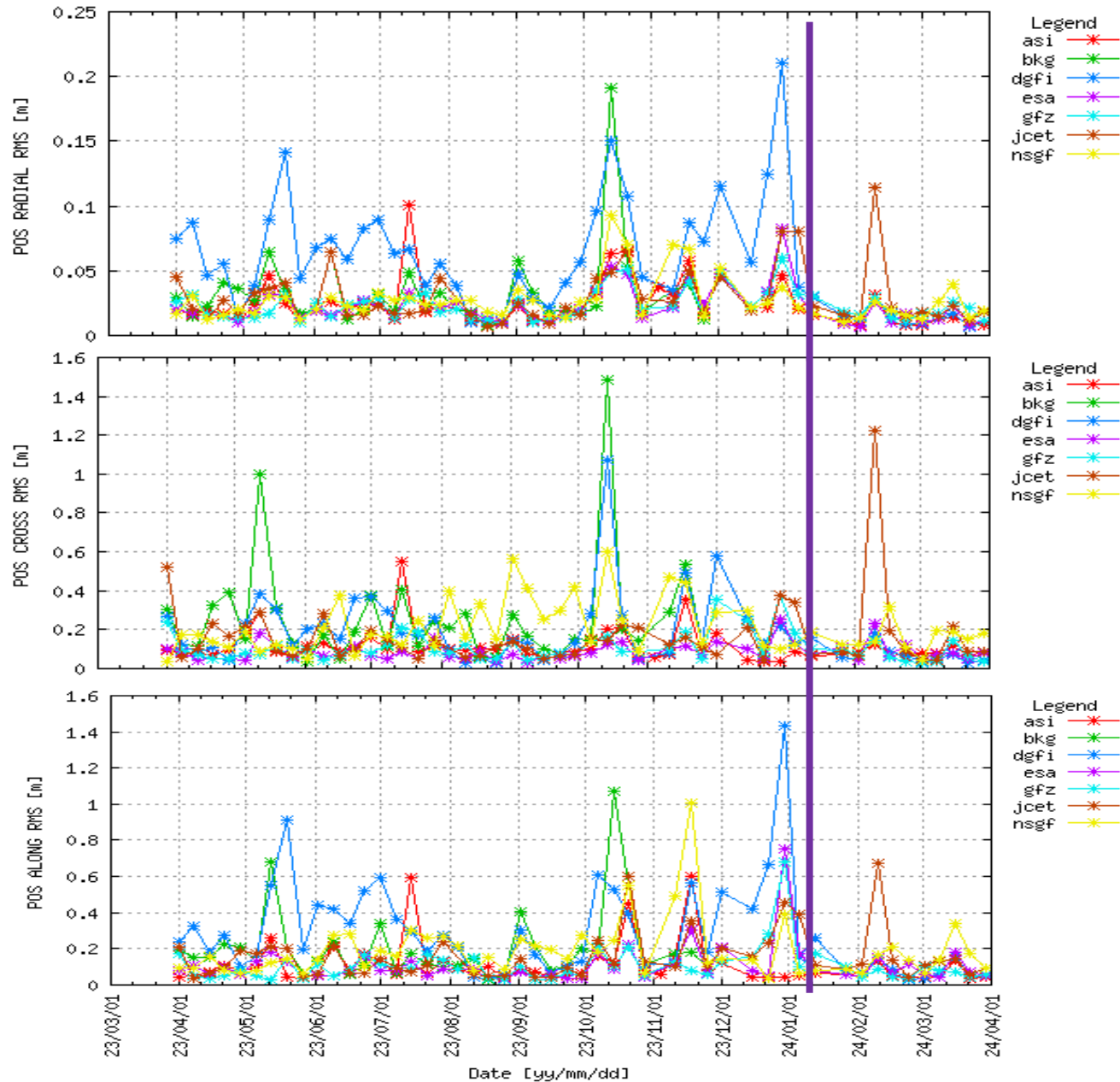
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**NSGF** CROSS and ALONG component



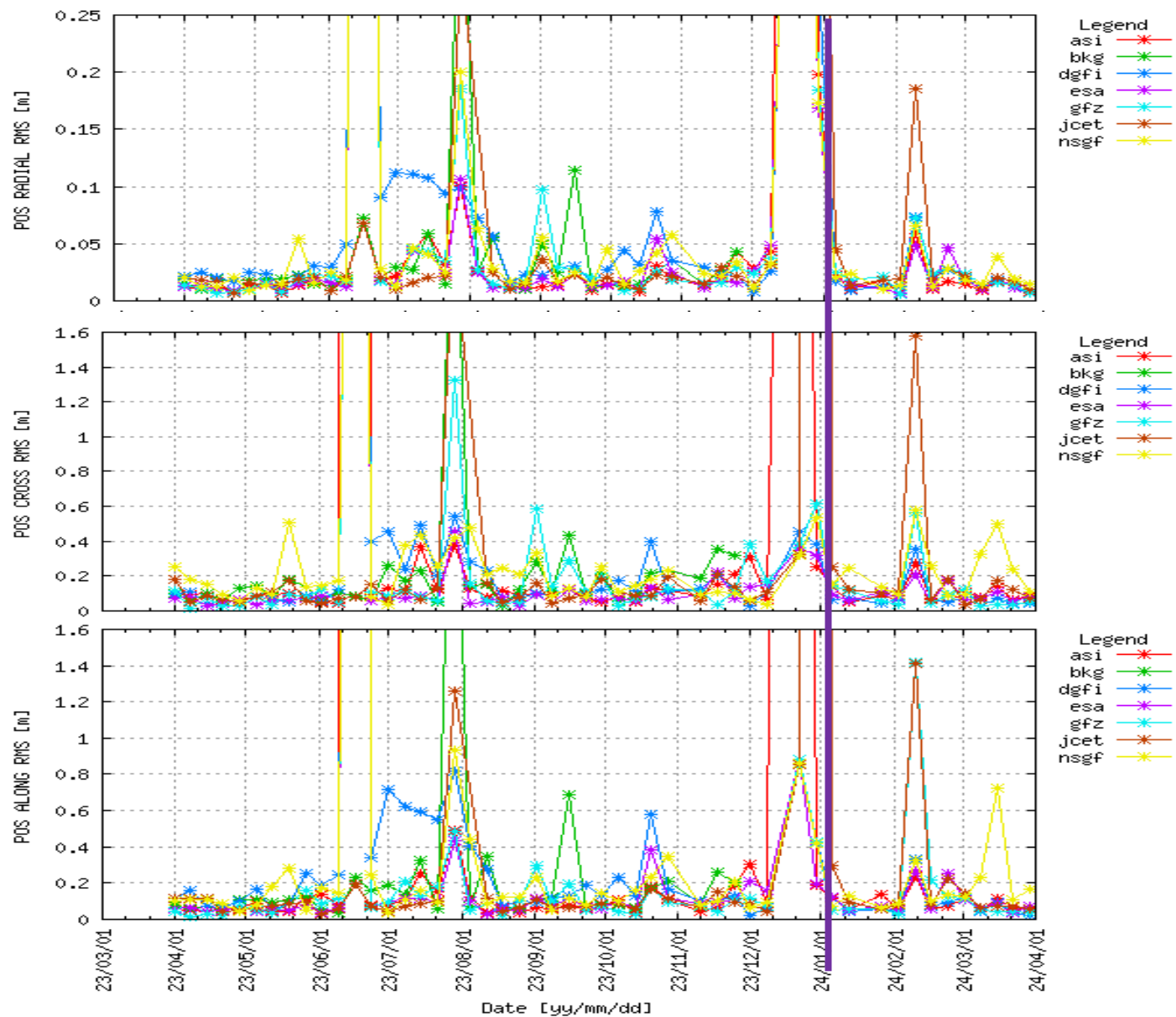
# *Etalon1 orbits – RMS of residuals w.r.t. combination*



**! Improvement with ITRF2020 !**



# *Etalon2 orbits – RMS of residuals w.r.t. combination*



**! Improvement with ITRF2020 !**

*CURRENT STATUS OF THE CNES ANALYSIS  
CENTER FOR THE ILRS*

ASC Meeting, Vienna 2024



# *CNES AC STATUS AS OF TODAY*

- Evaluation of products finished **sucessfully**: v180, v80, v280
- SSEM-X v320 product (no evaluation but running operationally)
- Latest DHF and CoM
- Combined Etalon biases
- New 532 nm Wetzell observations
- Application form and DSC file completed
- Software : GINS v23\_2 and DYNAMO v2





# Report of the DGFI-TUM ILRS AC

**Mathis Bloßfeld**, Alexander Kehm

Deutsches Geodätisches Forschungsinstitut, Technische Universität München (DGFI-TUM)

ILRS ASC meeting – 2024-04-17

Deutsches Geodätisches Forschungsinstitut (DGFI-TUM) | Technische Universität München

# ILRS product array at DGFI-TUM



**discontinued**

ILRS label	description	file format
v170	daily LA-1/2 and ET-1/2 TRF and ERP solution	SINEX
v70	weekly LA-1/2 and ET-1/2 TRF and ERP solution	SINEX
v70-sp3c	weekly LA-1/2 and ET-1/2 (reduced dynamic) orbit solution	SP3c
---	daily orbit predictions for LA-1/2 and ET-1/2	CPF(v2)
v230	weekly LA-1/2 and ET-1/2 TRF and EOP solution (including RBs for all stations)	SINEX
v180	daily LA-1/2 and ET-1/2 TRF and ERP solution (based on most recent standards and files)	SINEX
v80	weekly LA-1/2 and ET-1/2 TRF and ERP solution (based on most recent standards and files)	SINEX
v80-sp3c	weekly LA-1/2 and ET-1/2 orbit solution (based on most recent standards and files)	SP3c
v280	weekly LA-1/2 and ET-1/2 TRF and EOP solution (including RBs for all stations; based on most recent standards and files)	SINEX
v85	Reprocessing 1982-2023 of LA-1/2 and ET-1/2 TRF and EOP solution (based on most recent standards and files)	SINEX
v320	weekly LA-1/2, ET-1/2 and LR-2 TRF and EOP solution (including RBs for all stations; based on most recent standards and files)	SINEX
v300	weekly LA-1/2, ET-1/2 and LR-1 TRF, EOP and SH deg2-6 solution	SINEX
---	daily 10-satellite TRF and EOP solution	SINEX
---	weekly 10-satellite TRF and EOP solution	SINEX
---	weekly 10-satellite GM solution	SINEX
---	weekly 10-satellite SH deg1 solution	SINEX
---	weekly 10-satellite SH deg2 solution	SINEX
---	weekly 10-satellite (reduced dynamic) orbit solution	SP3c
---	weekly 10-satellite TRF, EOP and SH deg2-20 solution	SINEX
---	daily orbit predictions for LA-1/2, Ajisai, Stella, Starlette and Larets	CPF(v2)

# Future plans at DGFI-TUM



- Revisit **NTL application at observation level** in DOGS
- Further tests on the **refined tide handling**:
  - test *'combined' ocean tide models*, e.g. replace long-period tides in EOT20
  - test alternative *tidal admittance* methods
  - test *alternative atmospheric tide models* with more main tides (e.g. AOD1BRL06, TiME22, etc.)
  - *site displacements* not yet consistent!
- Work on **pilot project for the inclusion of LARES**
  - test series finished
- Implementation of **Sentinel satellites** (TOPEX and Jason-1/-2/-3 already implemented)
  - focus on combined SLR/DORIS POD

# ESOC ILRS AC Status

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Tim Springer and Erik Schoenemann

17/04/2024



- ITRF2020 (v80/v180/v280/v320) solutions running routinely since June 2023
  - v180: Daily solution
  - v80: Weekly solution
  - v280: Weekly solution with biases for all stations and all satellites
    - But combined bias for Etalon-1 and -2
  - v320: Weekly solution like v280 but including LARES-2
- ITRF Update Work
  - v280: Update (mainly for resubmitted data) and extension of the station-satellite biases
  - v320: Like v280 but including LARES-2
  - v85: Weekly solutions from 1993 until 2024 as input for ITRF update



- LARES
  - LARES is included in our initial 21-day cleaning step since February 2012
  - Ready for fully including LARES
    - Gravity field SINEX implementation still needs to be validated
      - Based on the examples from Mathis

# Status report of the ILRS AC at GFZ

**Anton Reinhold**<sup>1</sup>, Patrick Schreiner<sup>1</sup>, Ahmad Desai<sup>1</sup>

(1) Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, Potsdam, Germany  
(anton.reinhold@gfz-potsdam.de)

ILRS – ASC meeting 2024  
Vienna April 17, 2024

# Current Status

## Staff Situation

- Unfortunately, Margarita eventually retired and left GFZ on March 31, 2024
- New colleague in GFZ ILRS team: Ahmad Desai
  - Current team:
    - Desai, Ahmad
    - Reinhold, Anton
    - Schreiner, Patrick

## Operational Processing

- All products (v80,v180,v320) are nominal
- Relocation of processing to Potsdam is complete. As of April 1, 2024, all processing takes place in Potsdam

# The NASA/JCET report to the ILRS ASC

**F.G. Lemoine (1), M. Kuzmich-Cieslak (2), K. Evans (2), A. Belli (3)**

- (1) Geodesy & Geophysics Laboratory, NASA GSFC, Greenbelt, MD, USA.
- (2) Joint Center for Earth Systems Technology (JCET), UMBC, Baltimore, MD, USA.
- (3) SAIC, Greenbelt, MD, USA.

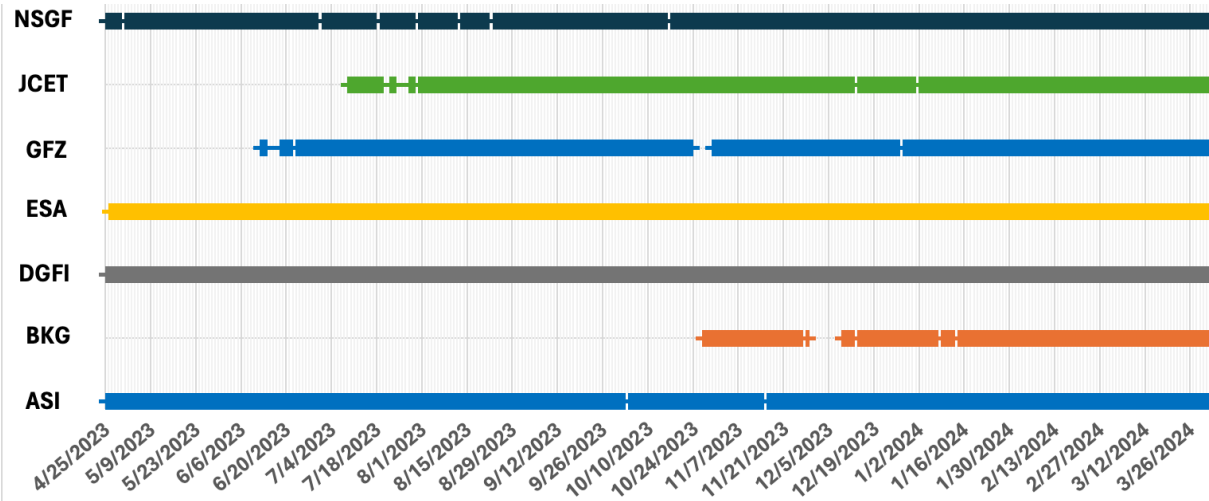
*with special thanks to E.C. Pavlis (2, Emeritus)*

EGU2024 ILRS ASC Meeting, TU Wien  
April 17, 2024

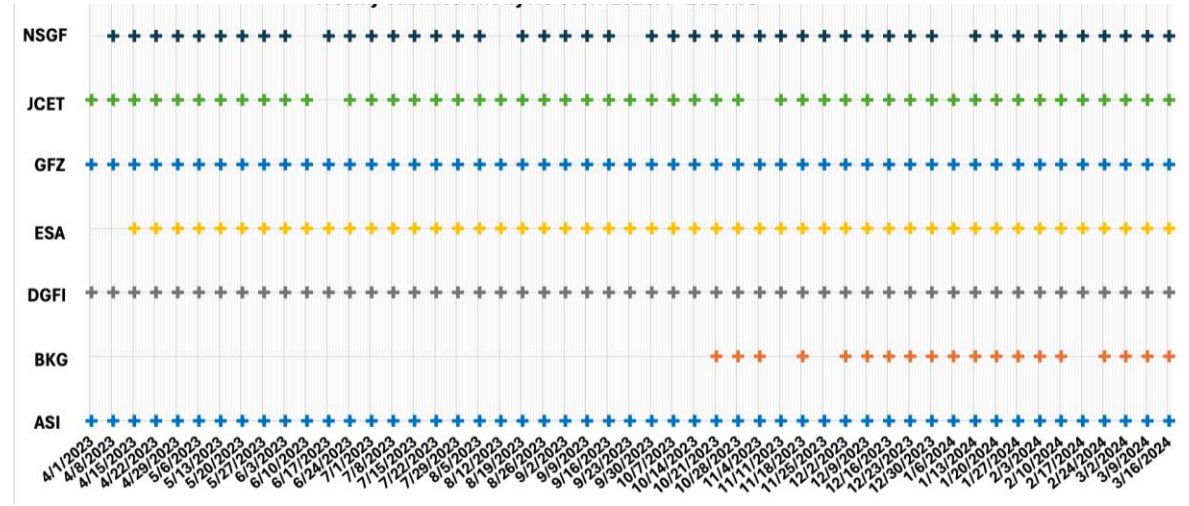
# Outline

- **Operational Products Status Report.**
- **Weekly Combination Status Report.**
- **LARES-2 Data Analysis Report.**
- **Report on Tsukuba, 7306 Validation for ASC.**
- **Other topics.**

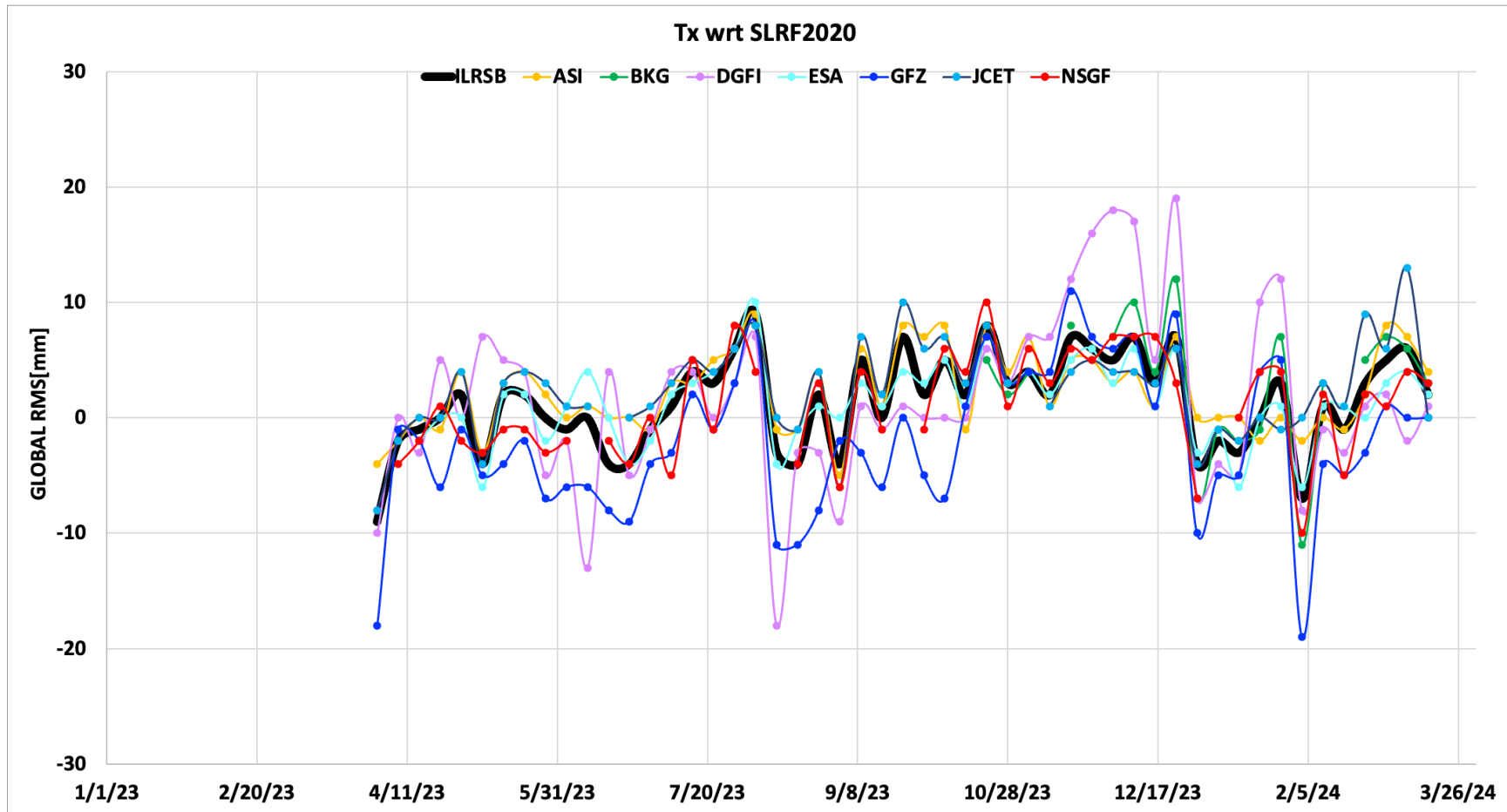
Daily Submissions by AC (2023.7 – 2024.03), v180



Weekly Submissions by AC (2023.4 – 2024.03), v80

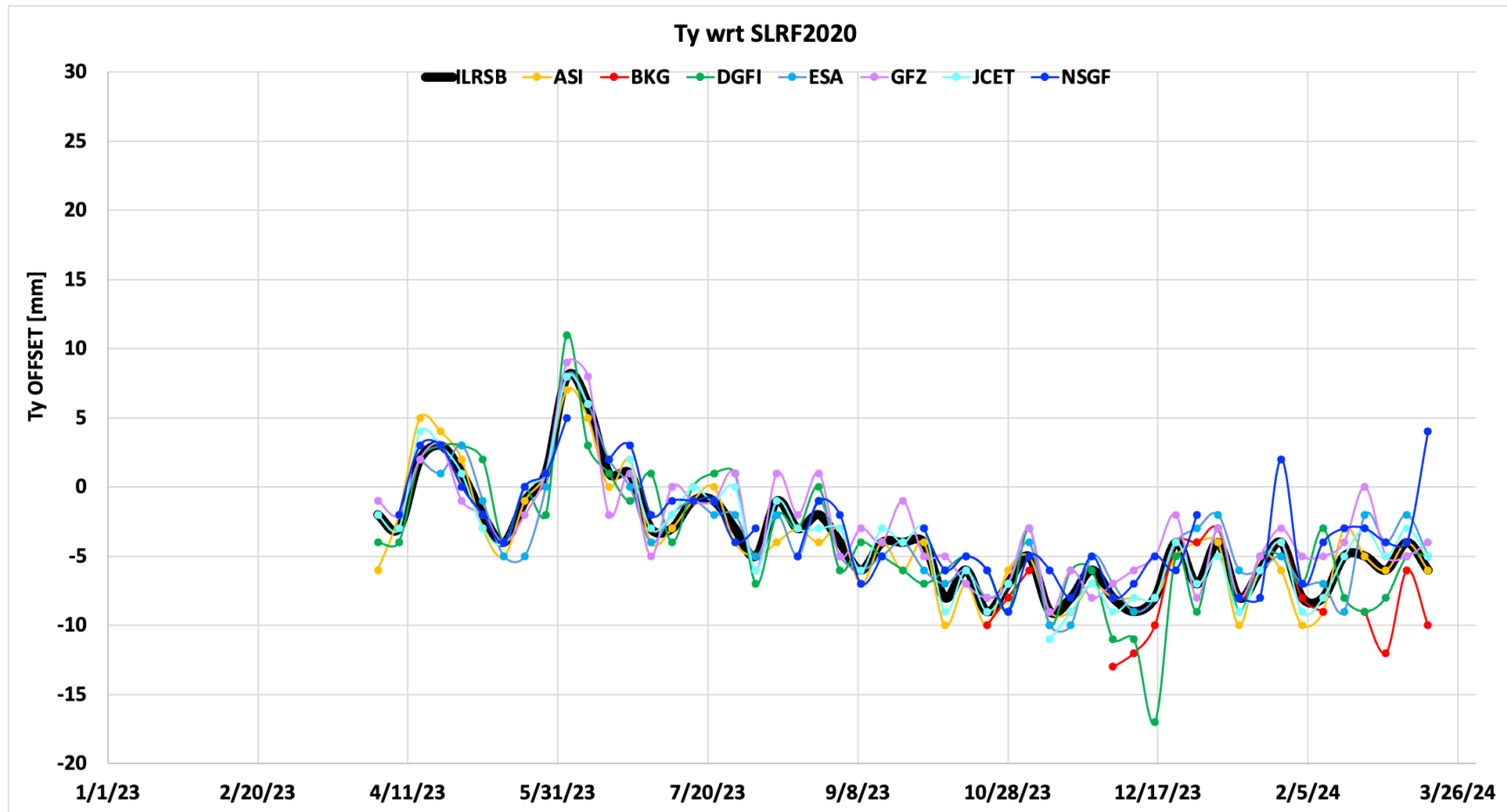


# Tx Offset w.r.t. SLRF2020



AC	Mean ± StdDev
ILRSB	1.4±4.0
ASI	2.3±3.5
BKG	3.2±5.7
DGFI	1.5±7.5
ESA	1.4±3.4
GFZ	-2.0±6.4
JcET	2.5±4.1
NSGF	1.0±4.4

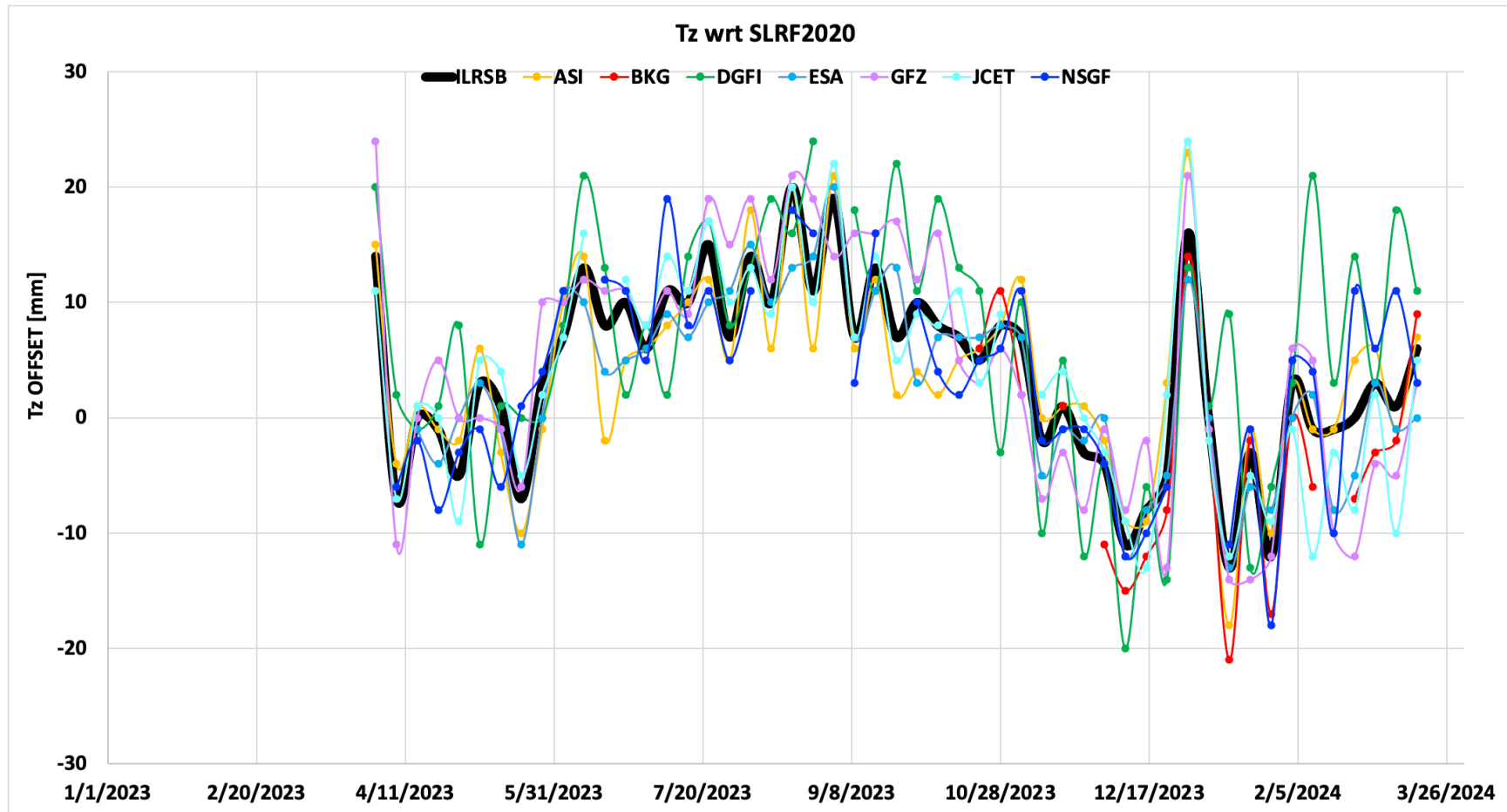
# Ty Offset w.r.t. SLRF2020



AC	Mean ± StdDev
ILRSB	-3.7±3.8
ASI	-4.1±4.1
BKG	-7.9±3.0
DGFI	-4.0±4.7
ESA	-3.7±3.8
GFZ	-2.9±3.8
JcET	-3.7±4.1
NSGF	-3.0±3.6

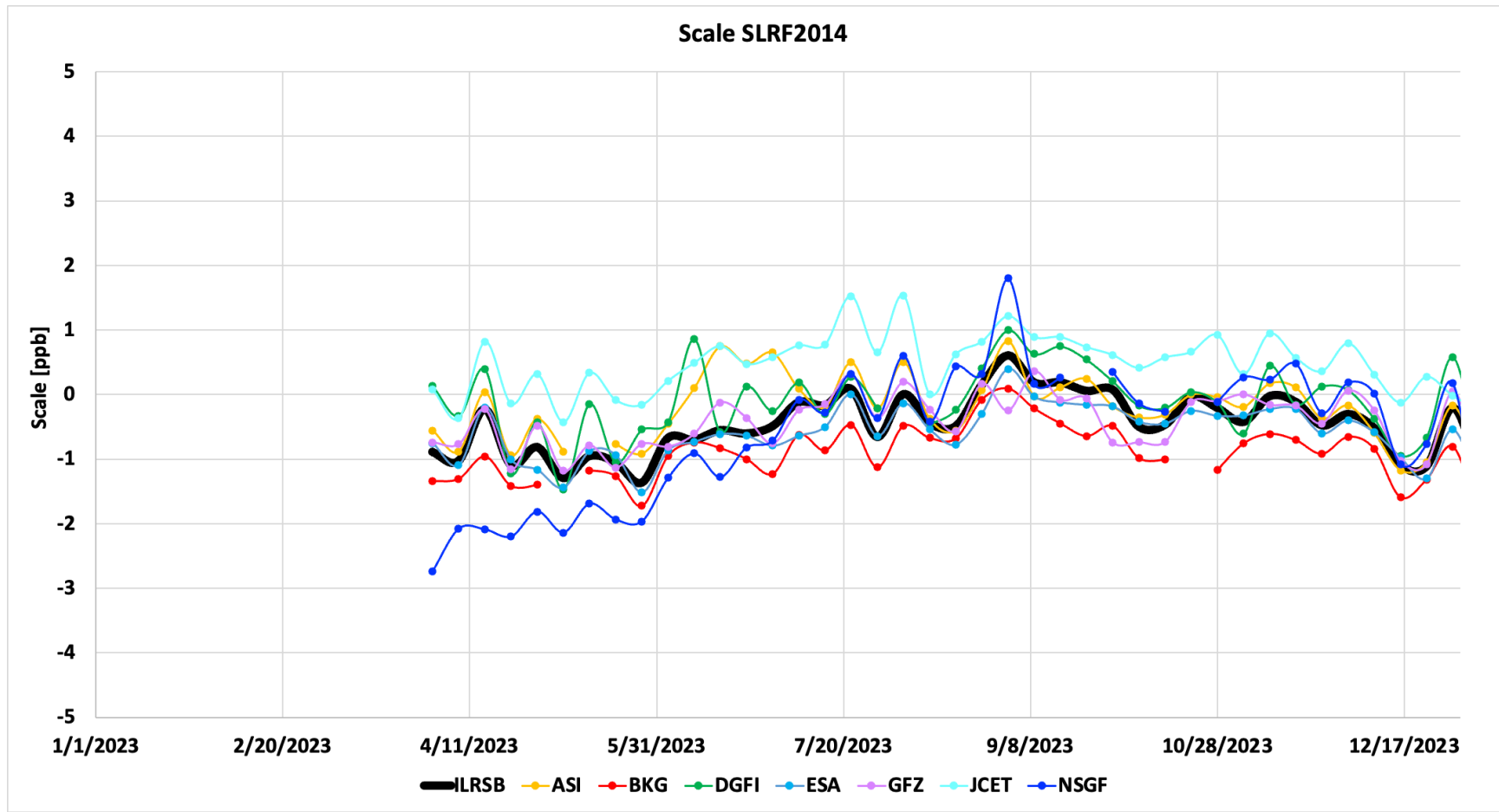


# Tz Offset w.r.t. SLRF2020



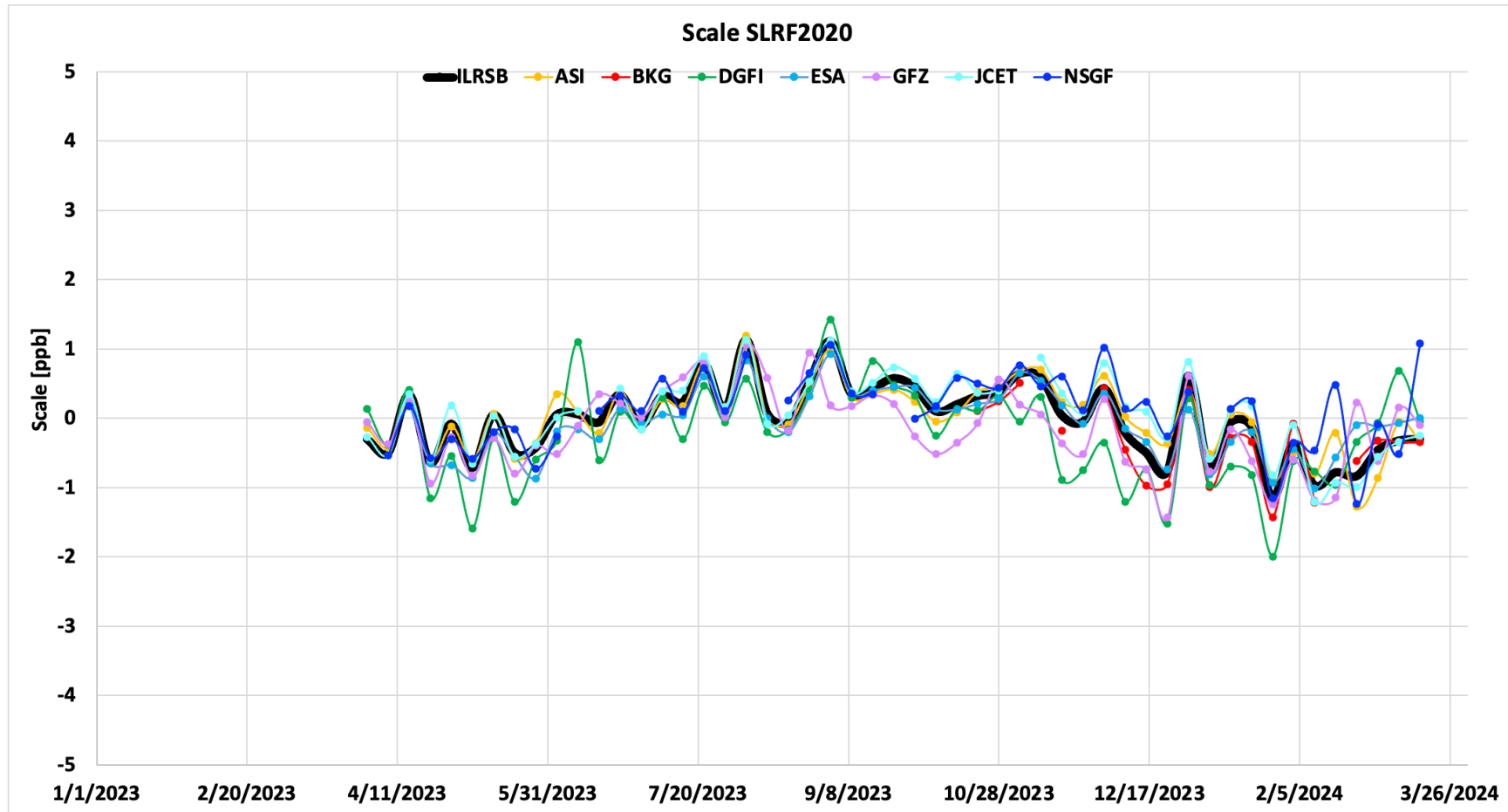
AC	Mean $\pm$ StdDev
ILRSB	3.9 $\pm$ 7.9
ASI	3.8 $\pm$ 8.1
BKG	-3.3 $\pm$ 9.5
DGFI	6.3 $\pm$ 10.7
ESA	2.9 $\pm$ 7.7
GFZ	4.4 $\pm$ 10.6
JcET	3.9 $\pm$ 9.3
NSGF	2.9 $\pm$ 8.7

# Scale w.r.t. SLRF2014



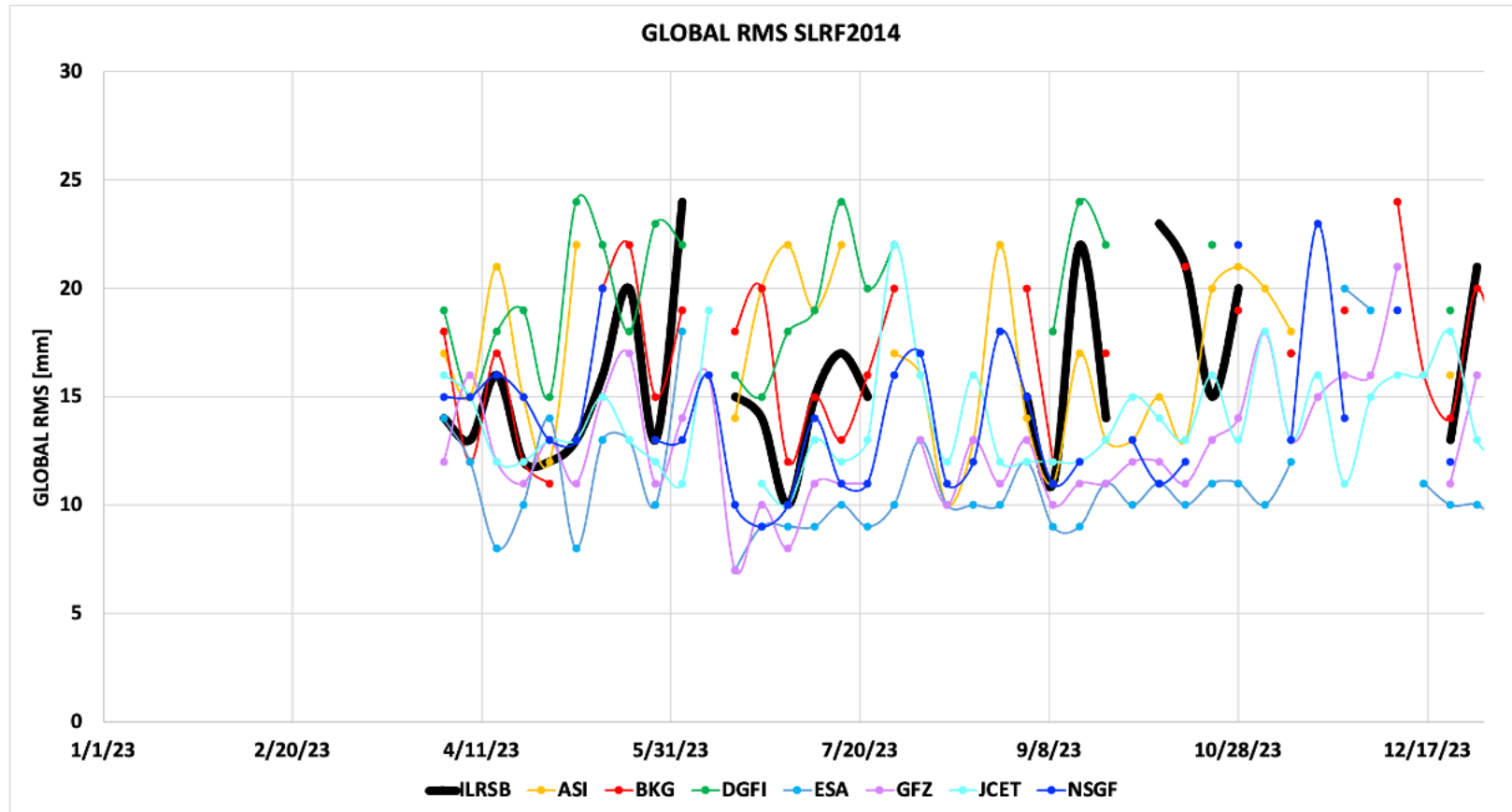
AC	Mean ± StdDev
ILRSB	-0.5±0.5
ASI	-0.2±0.5
BKG	-0.9±0.4
DGF1	-0.1±0.6
ESA	-0.6±0.4
GFZ	-0.4±0.4
JcET	0.5±0.5
NSGF	-0.6±1.0

# Scale w.r.t. SLRF2020



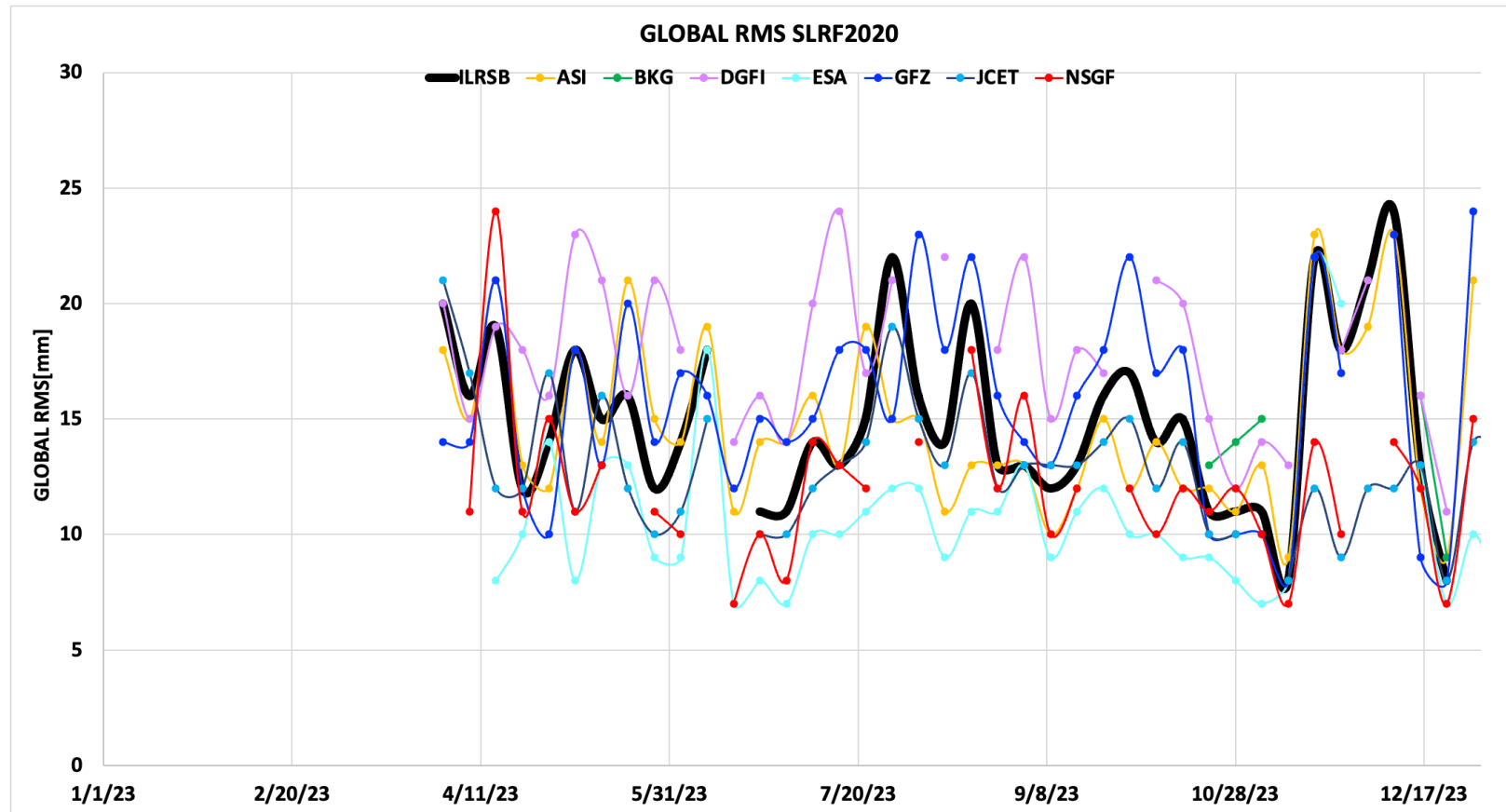
AC	Mean $\pm$ StdDev
ILRSB	0.1 $\pm$ 0.5
ASI	0.1 $\pm$ 0.4
BKG	-0.1 $\pm$ 0.6
DGFI	-0.2 $\pm$ 0.7
ESA	0.0 $\pm$ 0.5
GFZ	-0.1 $\pm$ 0.5
JcET	0.2 $\pm$ 0.5
NSGF	0.2 $\pm$ 0.5

# 3D WRMS of All Sites w.r.t. SLRF2014



AC	Mean ± StdDev
ILRSB	16.0±3.8
ASI	16.6±3.7
BKG	16.9±3.5
DGFI	19.7±3.0
ESA	11.1±2.9
GFZ	12.8±2.8
JCET	13.9±2.5
NSGF	14.3±3.6

# 3D WRMS of All Sites w.r.t. SLRF2020



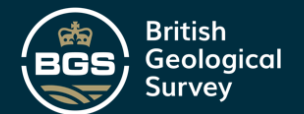
AC	Mean $\pm$ StdDev
ILRSB	14.0 $\pm$ 4.3
ASI	14.1 $\pm$ 4.0
BKG	14.2 $\pm$ 4.4
DGFI	16.7 $\pm$ 4.1
ESA	10.2 $\pm$ 3.3
GFZ	14.6 $\pm$ 4.8
JcET	12.2 $\pm$ 3.0
NSGF	11.8 $\pm$ 3.4



# NSGF AC report

ILRS Analysis Standing Committee Meeting, 17 April 2024 online

**Andreja Susnik (1), Graham Appleby (2)**



(1) BGS Space Geodesy Facility, Herstmonceux Castle, UK; (2) BGS Honorary Research Associate, SGF;

# NSGF AC activities

- Finished, ongoing

Solution	Submission	Status
v80	weekly (with 10 day delay; snx + orbits)	(routinely since 18 April 2023)
v180	Daily	(routinely since 18 April 2023)
v230	weekly	(routinely since January 2023)
v415	two submissions (on 22/12/2022 and end of February);	√
v85	submitted	√
v280	weekly (with 10 day delay)	(routinely since July 2023)
v320	weekly, just submitted test solutions	

- gravity estimation (for pilot project) – in collaboration with dr. Linda Geiser, AIUB
- NP generation - in collaboration with dr. Linda Geiser, AIUB
- identification of possible reason behind large offset in cross-track for LG1/LG2 with respect to other AC

# Today's agenda



0) Last meeting + open Action Items (AIs)	(MB, CL)	10 minutes
1) Status reports of SLR/LLR ACs/CCs	(all)	70 minutes
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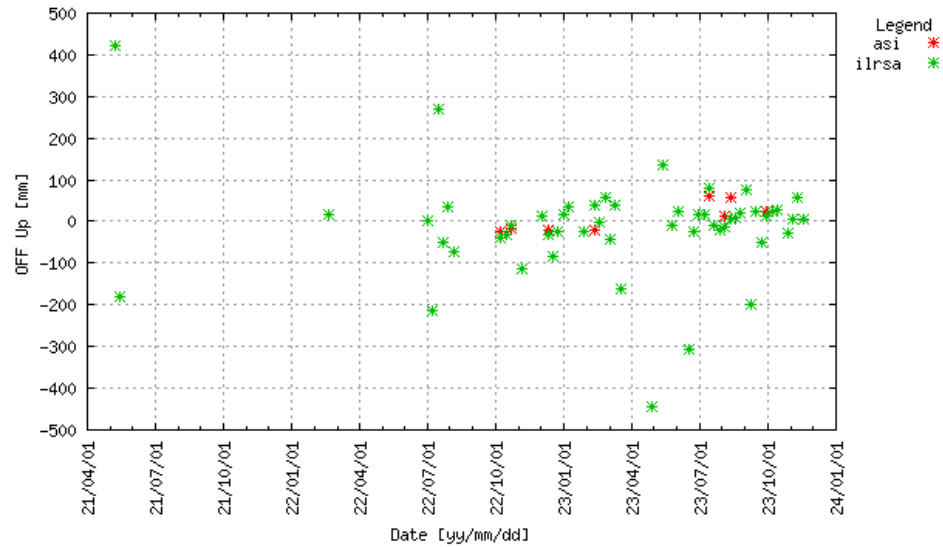
# *ITRF2020 Update & Reprocessing*

# ITRF2020 Update & Reprocessing

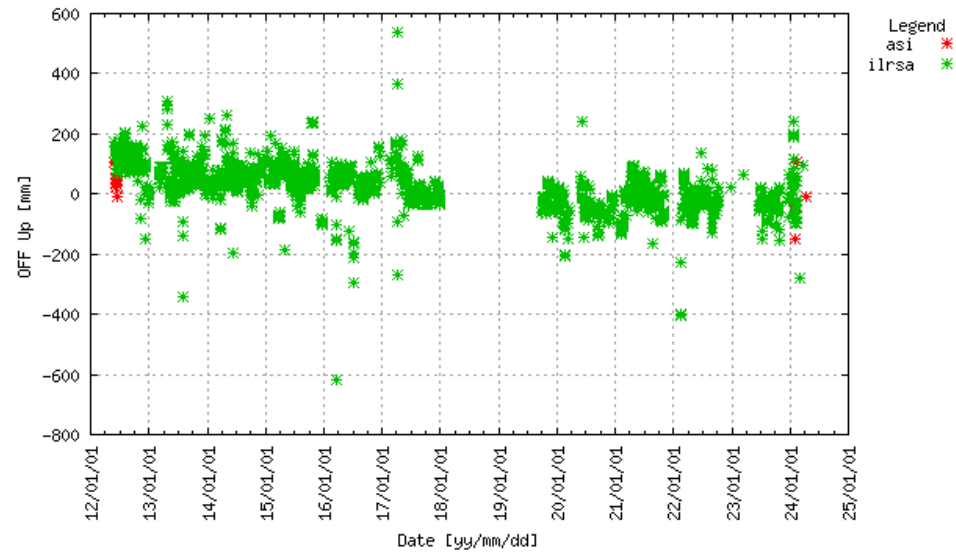
- 2021-2023 (contribute to ITRF2020 update) [high priority]:
  - ASI did not provide data/excluded in ILRSA for station 1824, 1873, 7810, anomalous st. dev. for station 1893.
  - BKG, excluded stations 7090 and 7237 from ILRSA, missed DHF records (Basoni-Koenig 14/03, asking for confirmation)
  - DGFI, all fixed RBs had not been applied (Basoni-Bloßfeld 05/04 e-mail). DGFI v86 2021-2023 uploaded on 10/04 – fixed [to be checked].
  - JCET, excluded stations 1887, 7110, 7124, 7249, 7406, 8834 from ILRSA. Estimate DHF records were not applied. JCET uploaded a v86 series on 14/04 – fixed (to be checked).
- 1993-2020 (Reprocessing last decades):
  - BKG uploaded SINEXs from 000108 to 201226 on 08/04/2024 – to be checked
  - Reprocessing of some of the solutions by ACs is required, in particular DGFI and JCET (estimate and fixed RB too).
  - ESA (1884) and GFZ (7841) check.

# ITRF2020 Update & Reprocessing

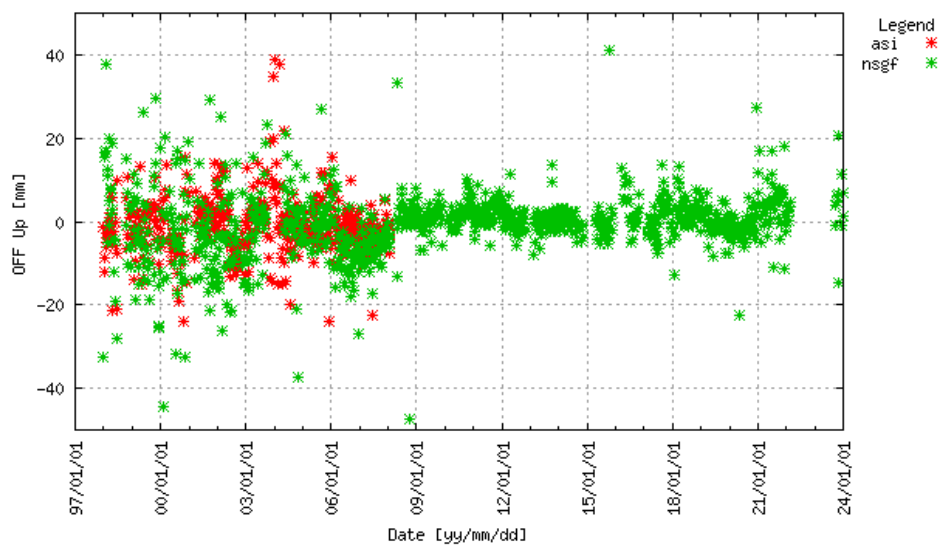
(Test Data) 1824-GLSL - UEN offset



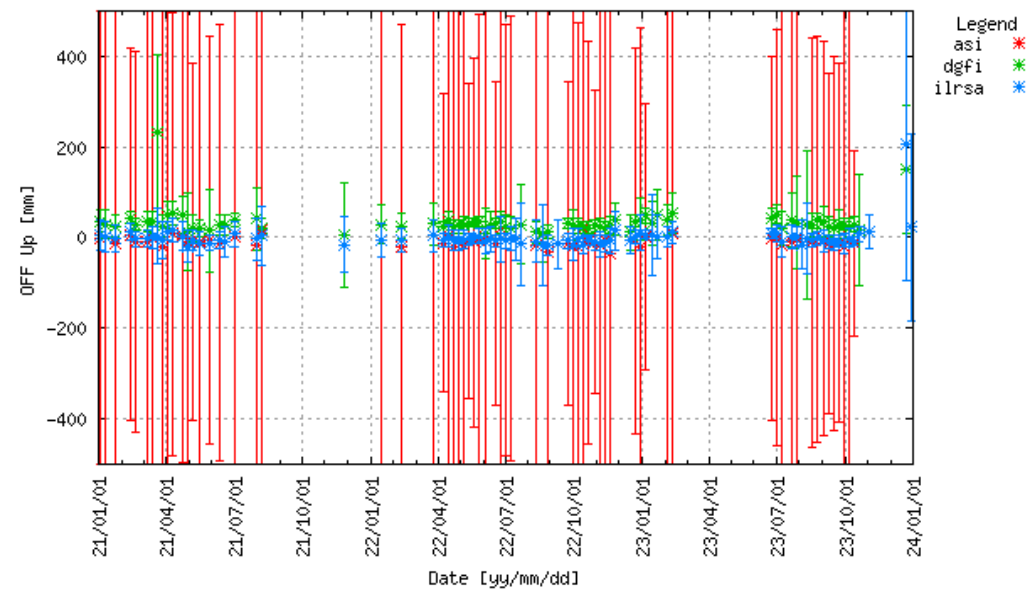
(Daily Data) 1873-SIME - UEN offset



(Test Data) 7810-ZIMM - UEN offset

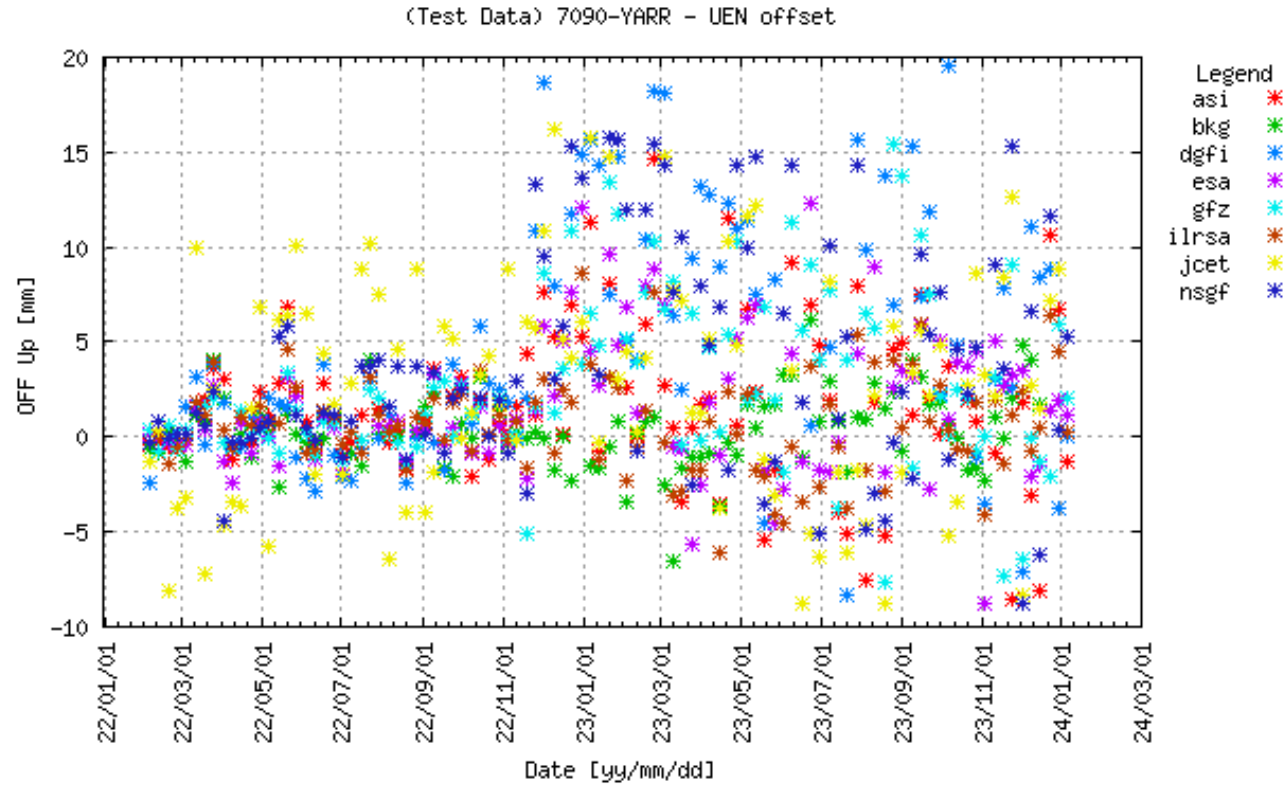


(Test Data) 1893-KATZ - UEN offset



ASI

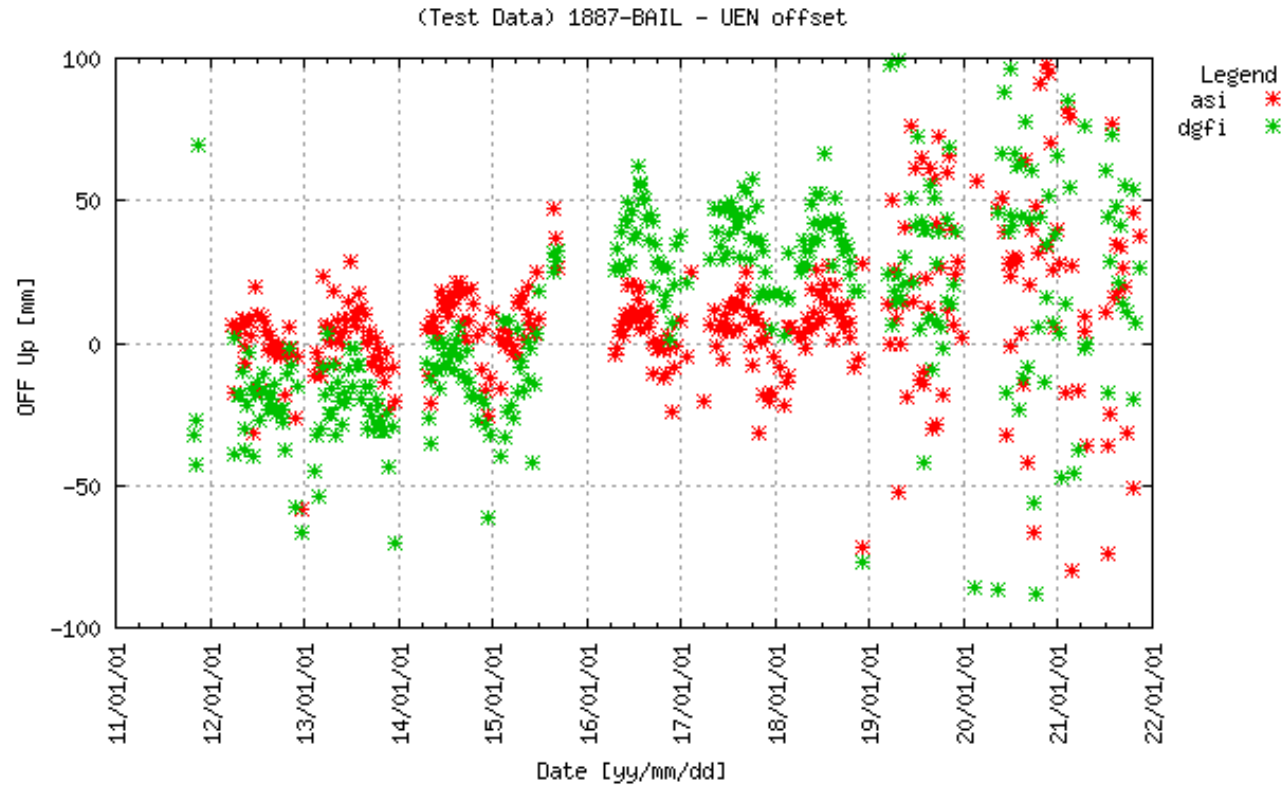
# ITRF2020 Update & Reprocessing



BKG

7090	51	501	A	21:066:00000	22:324:00000	R	2.6	0.3	mm	(extended to 00:000 ?)
7090	51	501	A	22:324:00000	00:000:00000	E			mm	(missed ?)

# ITRF2020 Update & Reprocessing

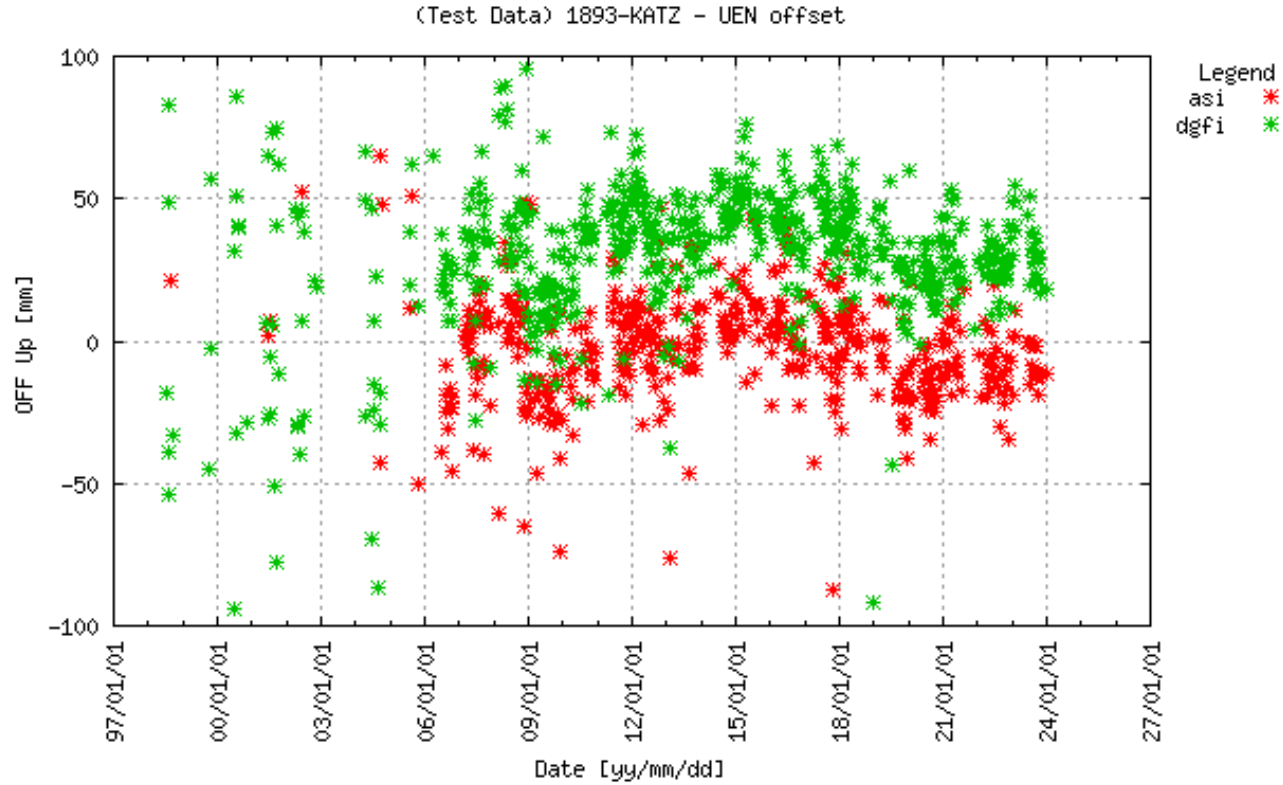


DGFI

Bias not applied

1887	51	501	A	11:296:00000	15:249:00000	R	21.4	1.7	mm	(missed ?)
1887	51	501	A	16:101:00000	18:343:00000	R	-21.6	1.4	mm	(missed ?)

# ITRF2020 Update & Reprocessing

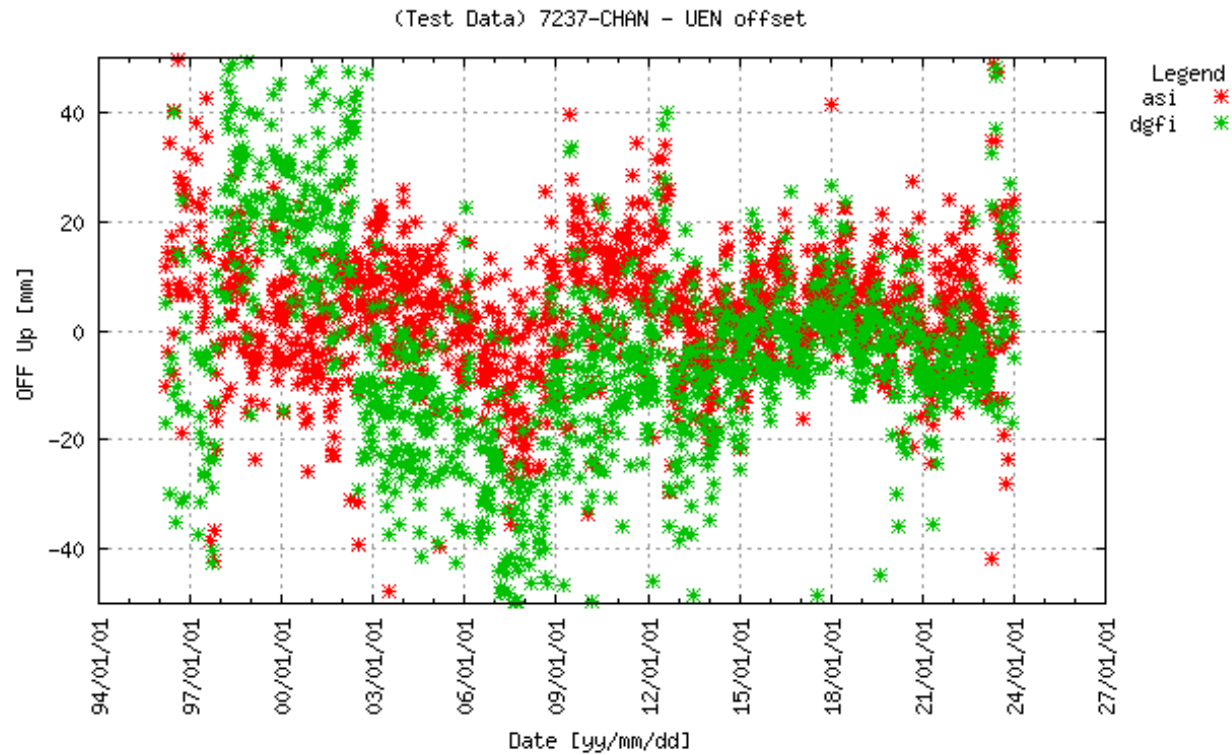


DGFI

Bias not applied

1893 51 501 A 05:212:00000 00:000:00000 R -33.3 1.4 mm (missed ?)

# ITRF2020 Update & Reprocessing



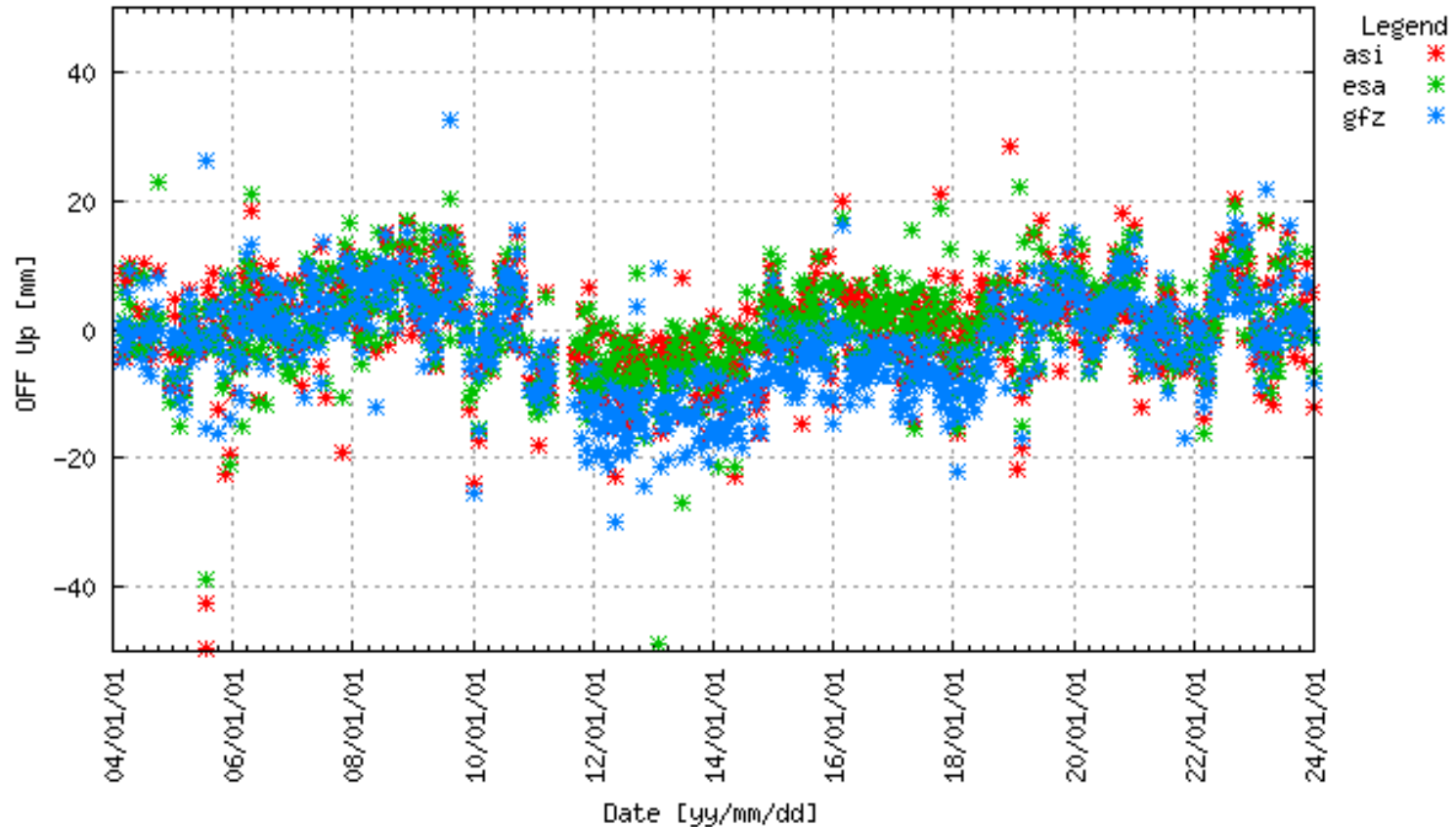
DGFI

Bias not applied

7237	51	501	A	96:056:00000	97:222:00000	R	19.4	4.8	mm
7237	51	501	A	97:222:00000	02:195:00000	R	-22.9	1.3	mm
7237	51	501	A	02:195:00000	12:120:00000	R	13.1	0.8	mm
7237	51	501	A	12:120:00000	20:033:00000	R	4.3	0.4	mm
7237	51	501	A	20:033:00000	23:085:00000	R	10.3	0.8	mm

# ITRF2020 Update & Reprocessing

(Test Data) 7841-POT3 - UEN offset



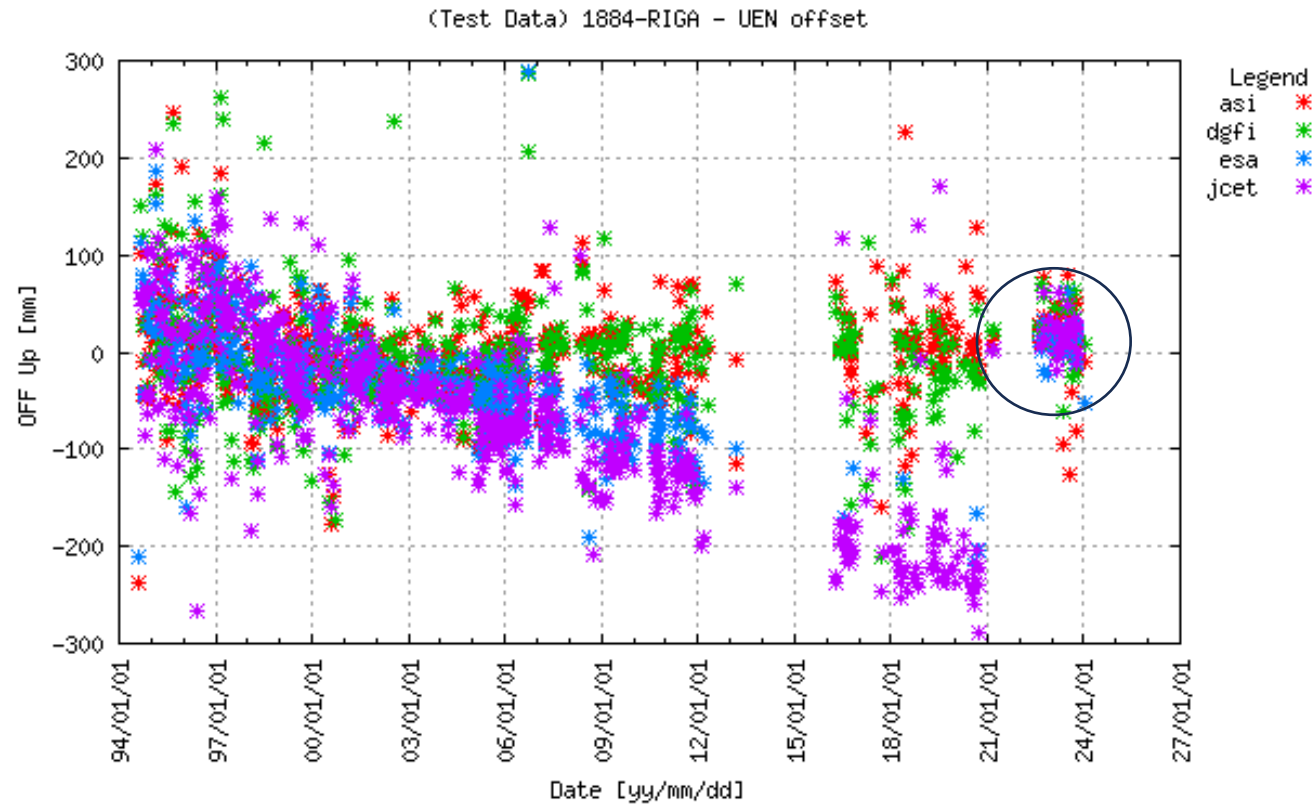
GFZ

7841	51	501	A	04:053:00000	00:000:00000	R	1.9	0.3	mm
7841	52	501	A	04:053:00000	00:000:00000	R	3.0	0.3	mm
7841	53	501	A	04:172:00000	00:000:00000	R	12.1	0.9	mm
7841	54	501	A	04:172:00000	00:000:00000	R	12.1	0.9	mm

Did really GFZ apply the BIASES on the whole interval?



# ITRF2020 Update & Reprocessing



ESA

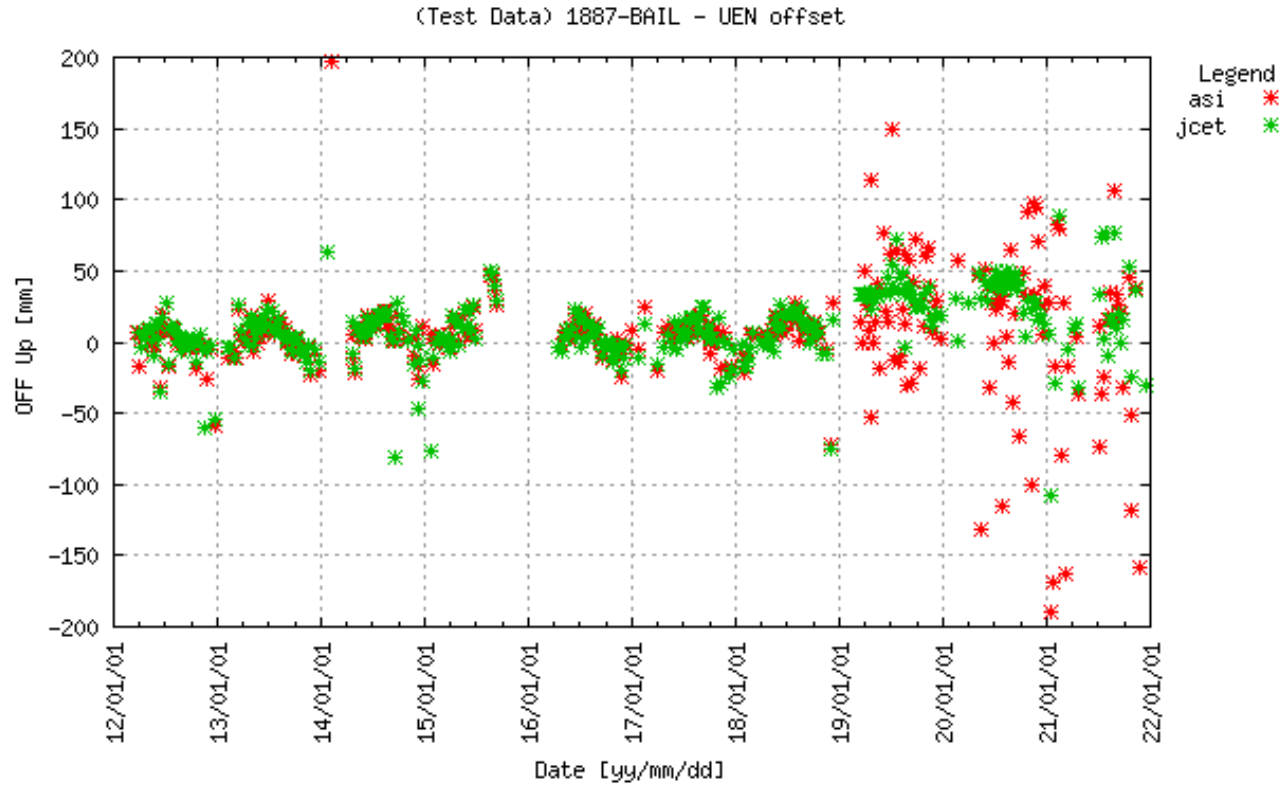
JCET

1884 -- 501 A 00:000:00000 00:000:00000 E mm

Implemented by **JCET only** on interval 2021-2023 (?)

Did **ESA** implement the record?

# ITRF2020 Update & Reprocessing



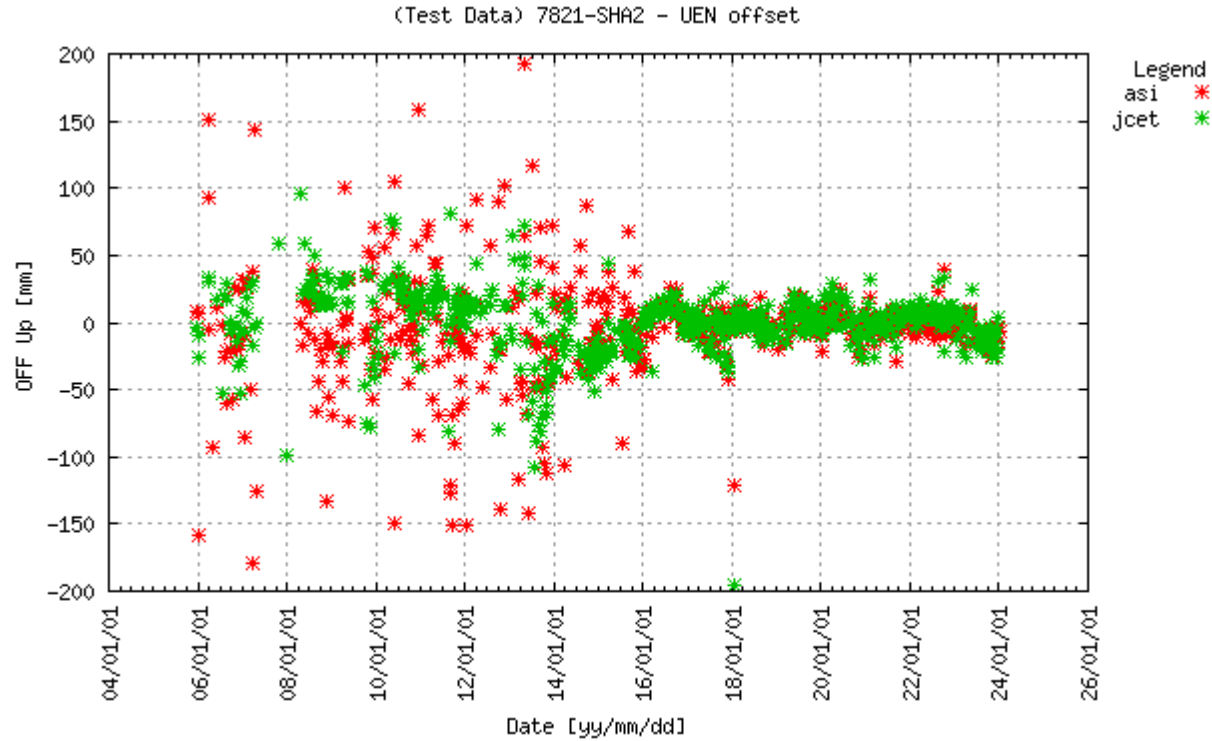
JCET

No Estimations

1887 51 501 A 16:101:00000 18:343:00000 R -21.6 1.4 mm  
1887 -- 501 A 18:343:00000 00:000:00000 E mm

(not used)

# ITRF2020 Update & Reprocessing



JCET

No Estimations

7821 -- 501 A 00:000:00000 16:017:00000 E

mm

(not used)

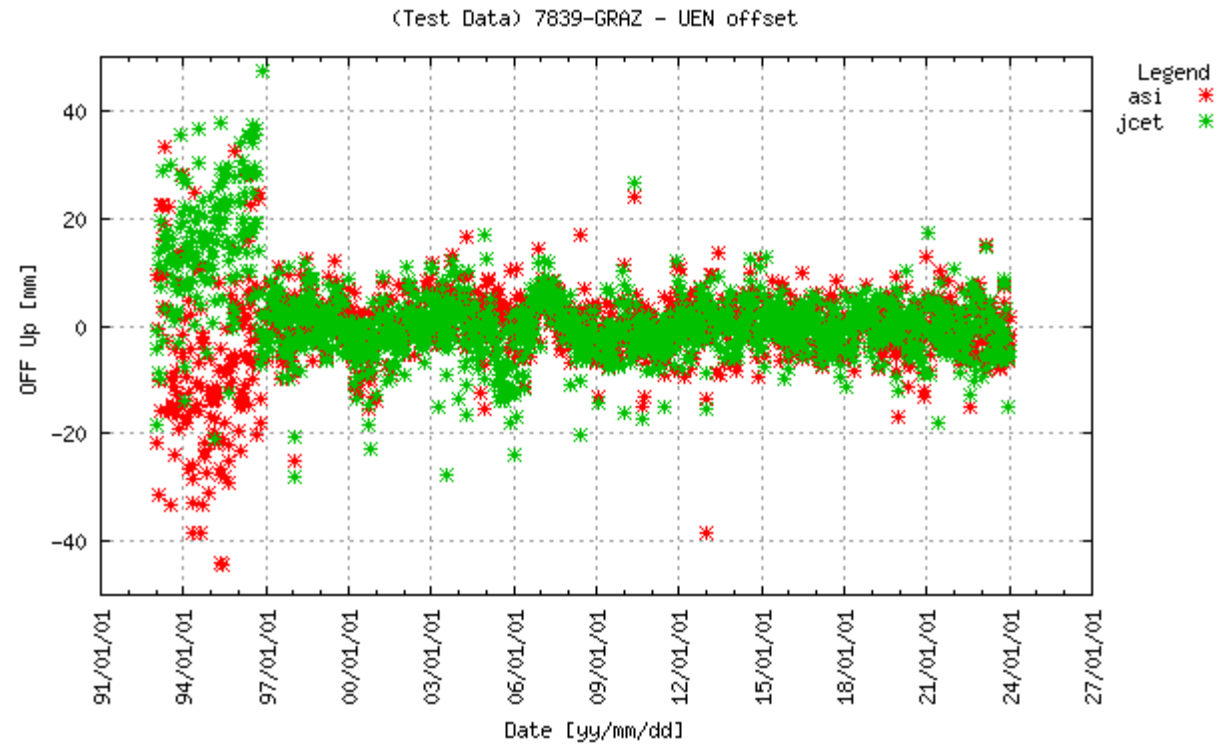
7821 51 501 A 16:017:00000 00:000:00000 R

-5.4 0.6

mm

# ITRF2020 Update & Reprocessing

JCET



JCET

No Estimations

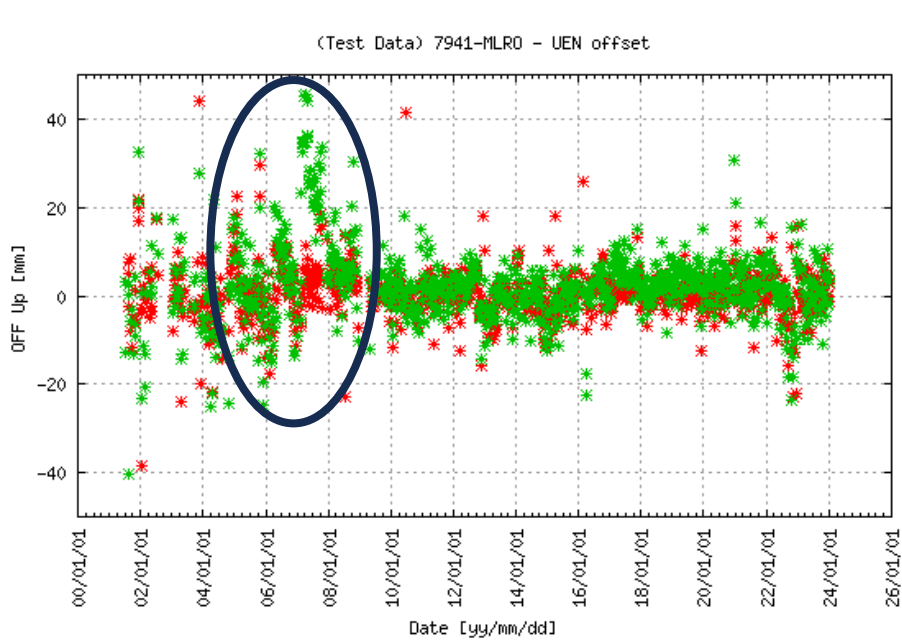
7839 -- 501 A 00:000:00000 96:294:00000 E

mm

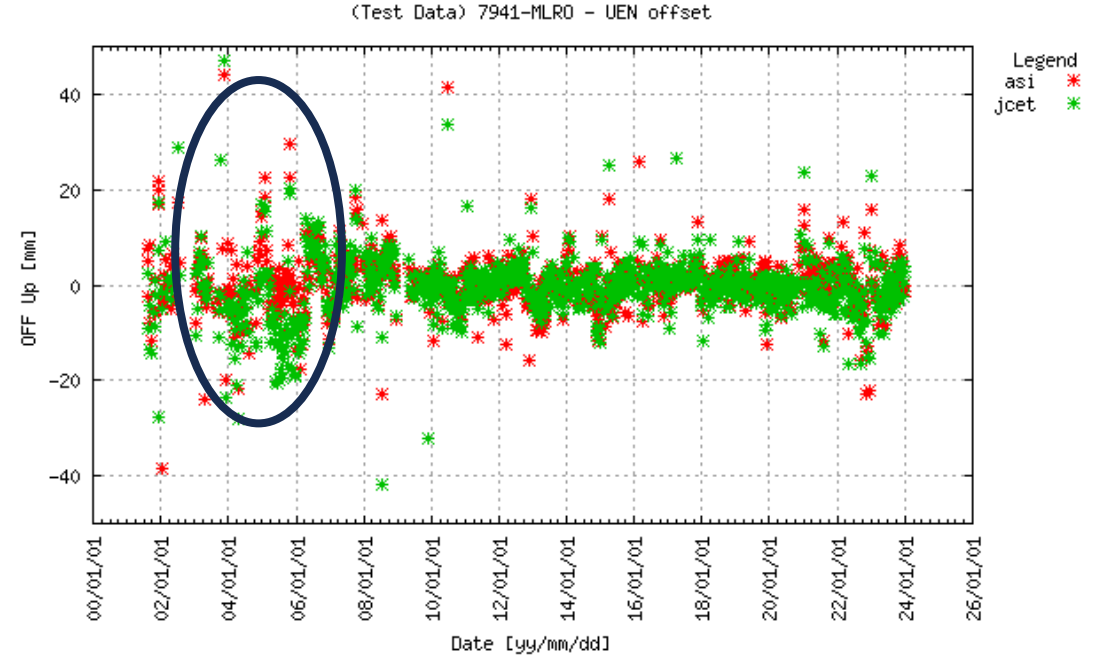
(not used)

Analogous situation on: [7080-7249-7110-7249-7124-1886](#)

# ITRF2020 Update & Reprocessing



DGFI



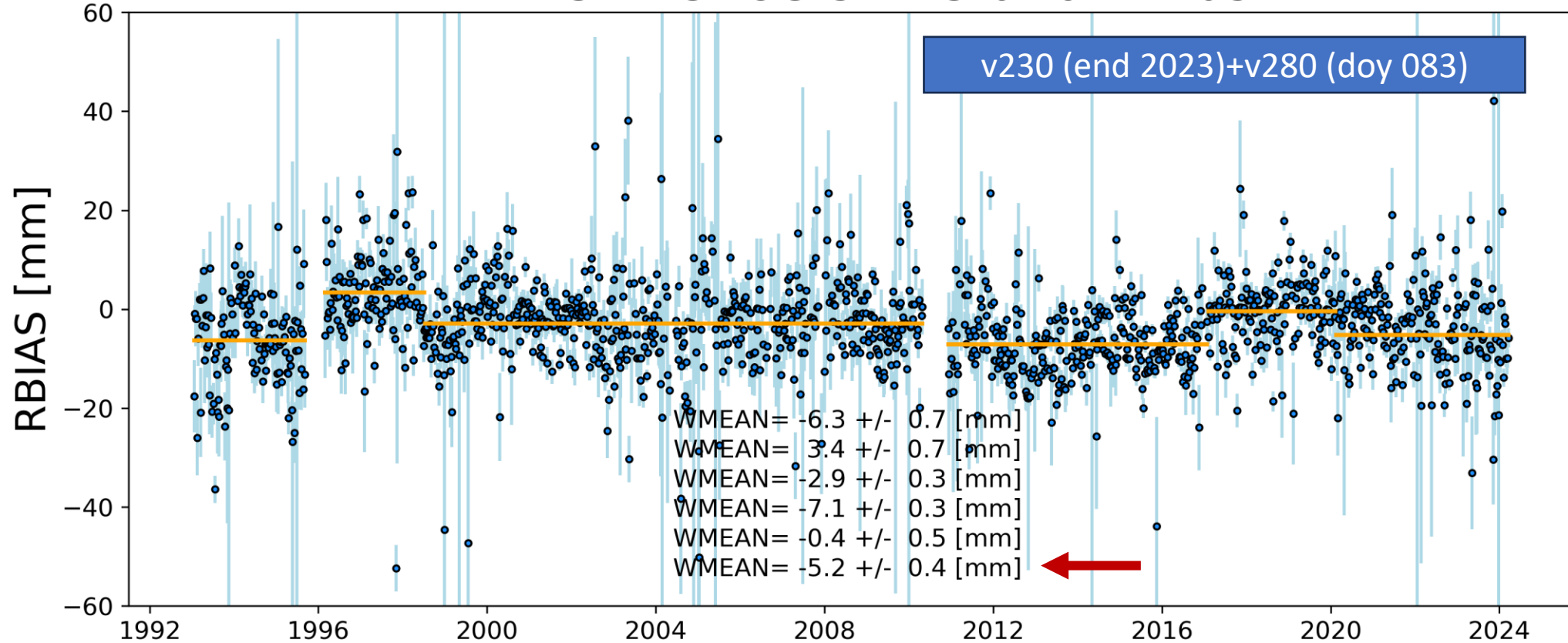
JCET

7941	51	501	A	01:182:00000	07:049:00000	R	-2.1	0.5	mm
7941	51	501	A	07:049:00000	07:189:00000	R	-25.4	0.8	mm
7941	51	501	A	07:189:00000	07:301:00000	R	-12.7	1.6	mm

**DGFI** did not implement the fixed RB record but **JCET** should check what happened (no matching DHF record).

# Monitoring RBIAS - v280

## RBIAS LAGEOS 51 - Station 7105

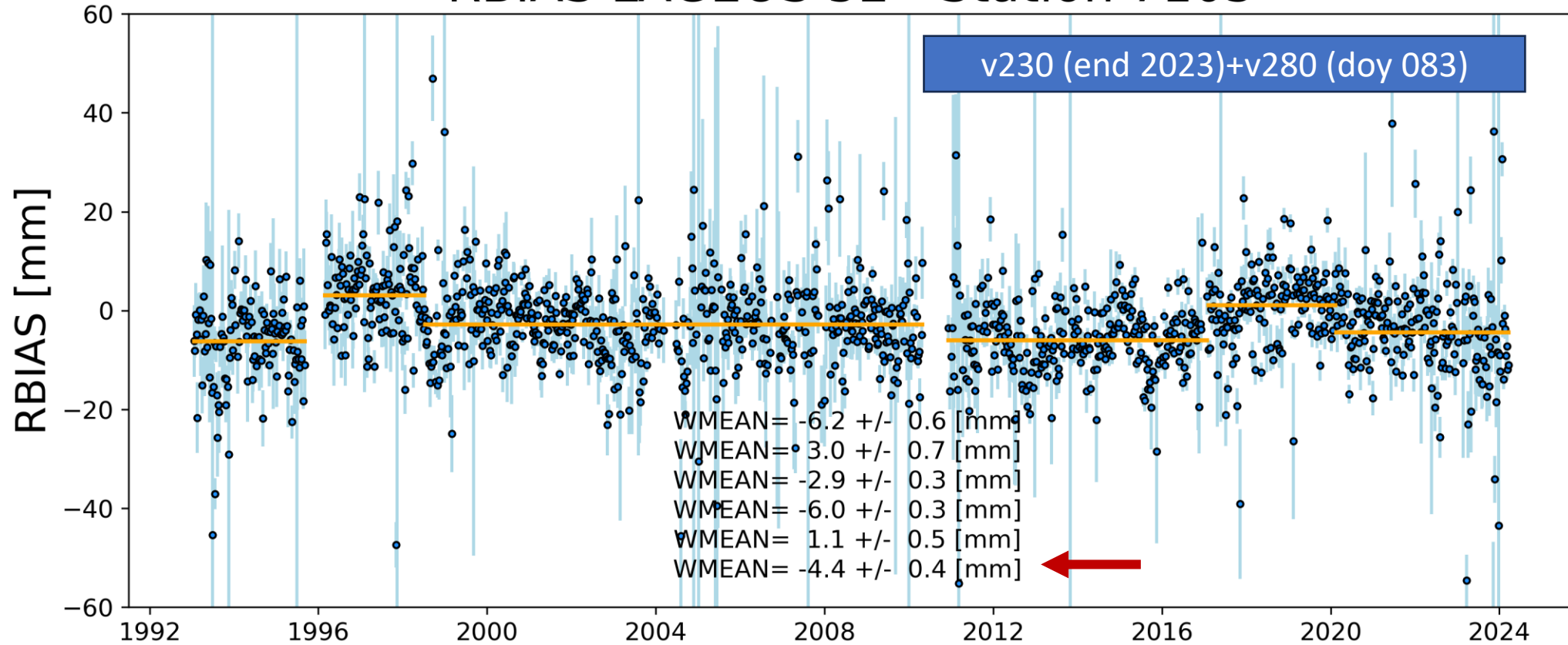


7105 51 501 A 20:047:00000 00:000:00000 R -5.1 0.4 mm

Introduced in DHF version 2024.02.13 based on v230 (end of 2023)

# Monitoring RBIAS - v280

## RBIAS LAGEOS 52 - Station 7105



7105 52 501 A 20:047:00000 00:000:00000 R -4.3 0.4 mm

Introduced in DHF version 2024.02.13 based on v230 (end of 2023)

# ITRF2020 update

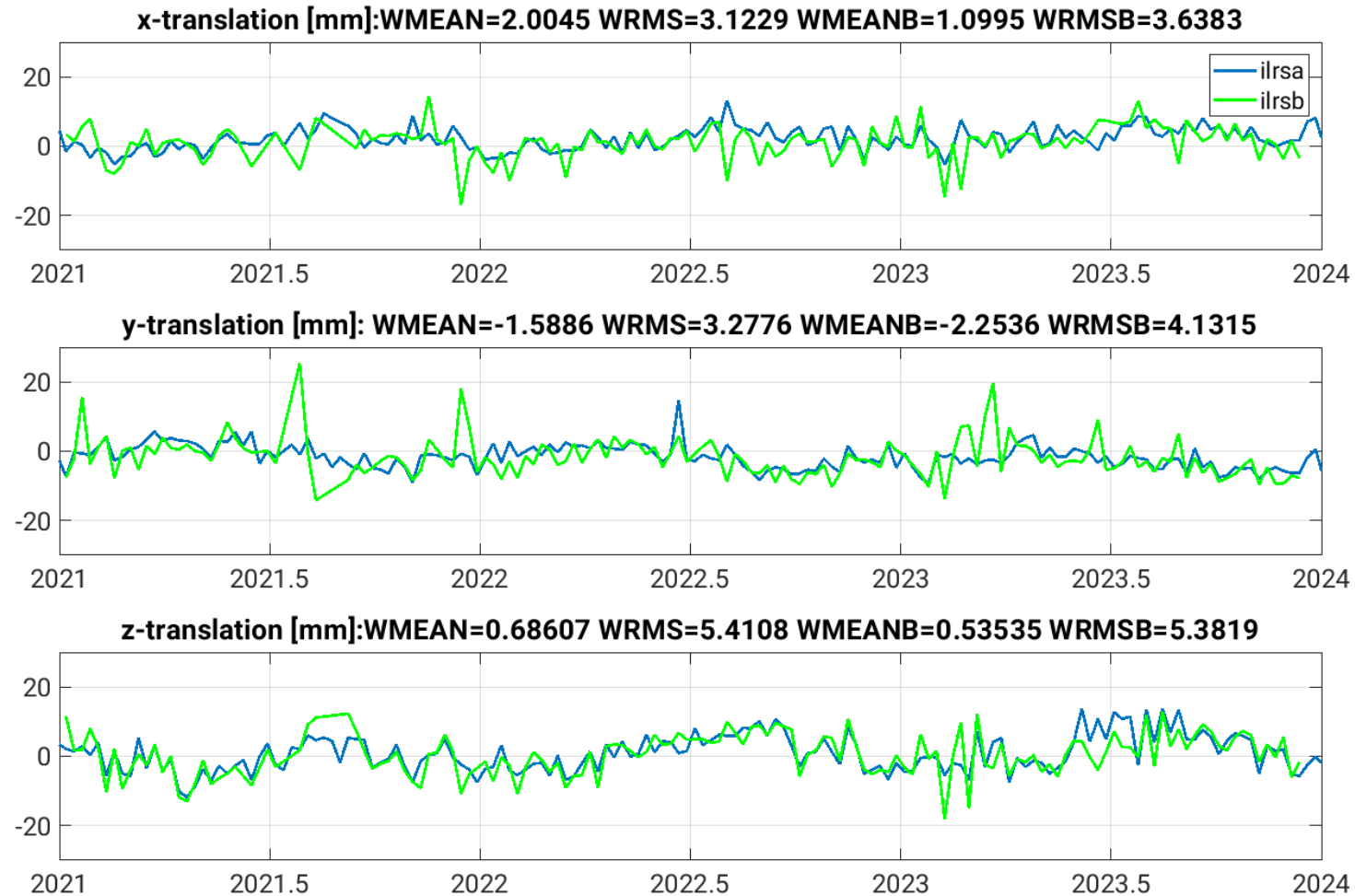


- ILRS-A/-B analysis



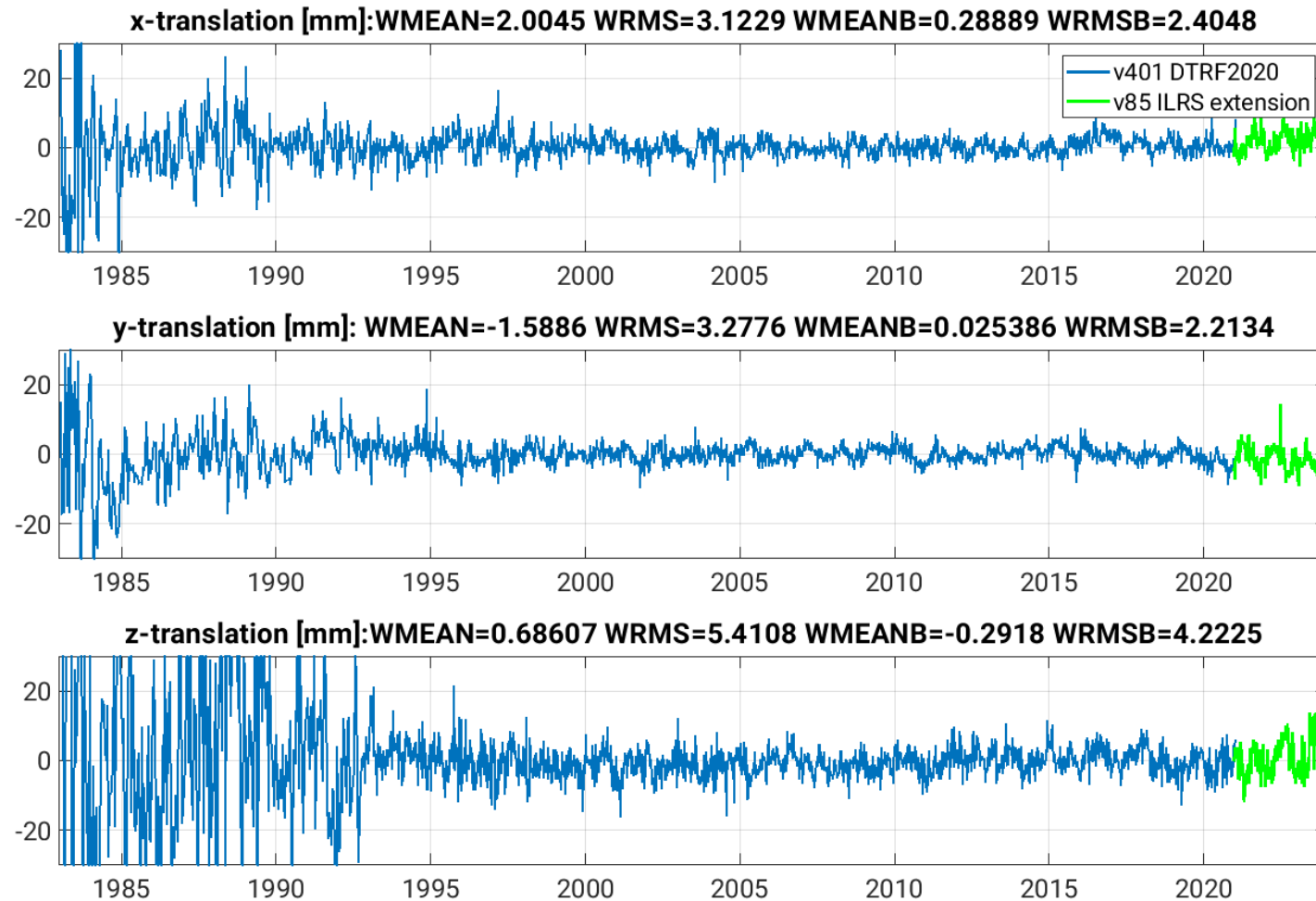
# ITRF2020 update

➤ Plots compiled by M. Seitz; ILRS w.r.t. DTRF2020



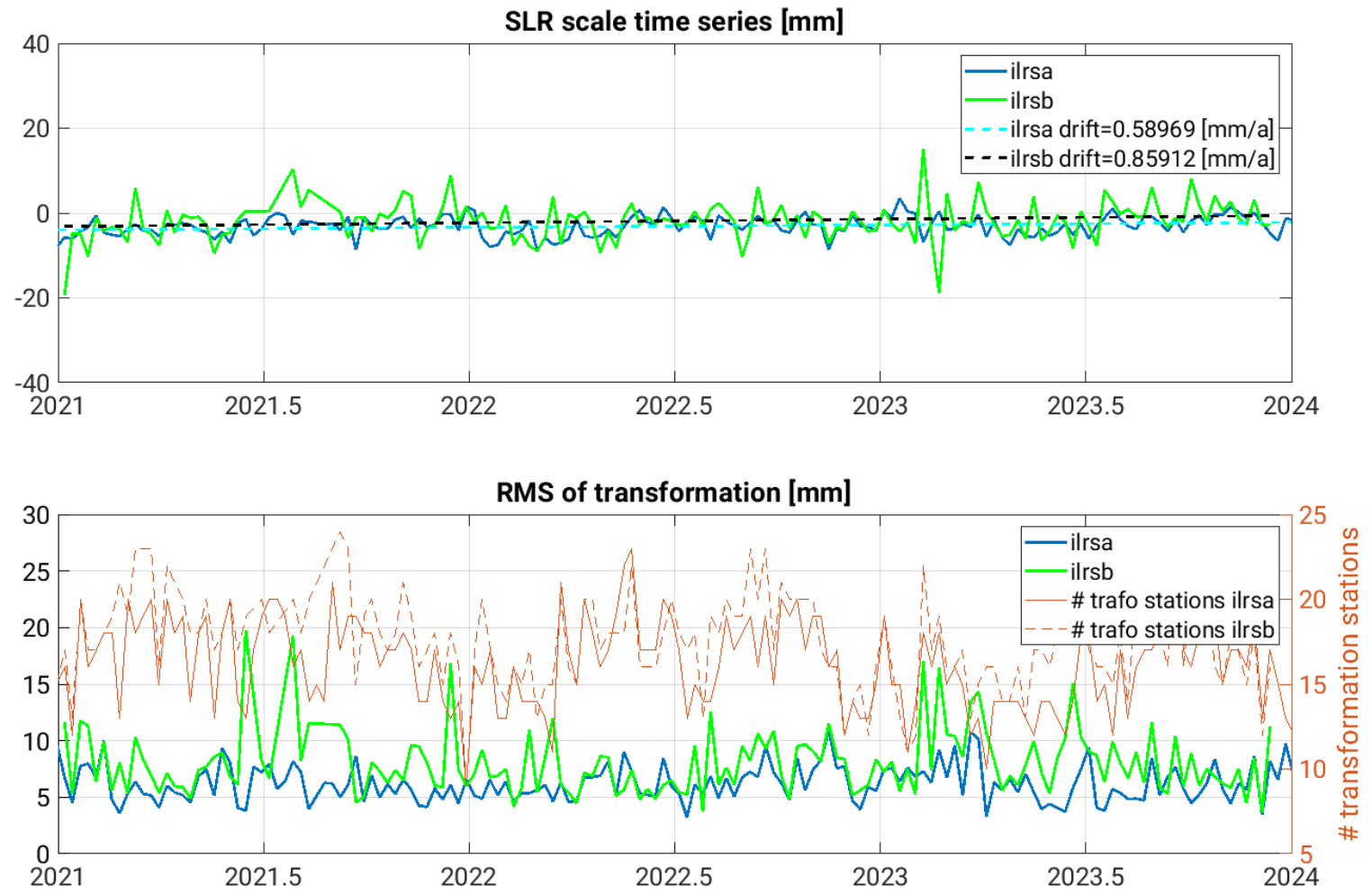
# ITRF2020 update

➤ Plots compiled by M. Seitz; ILRS w.r.t. DTRF2020



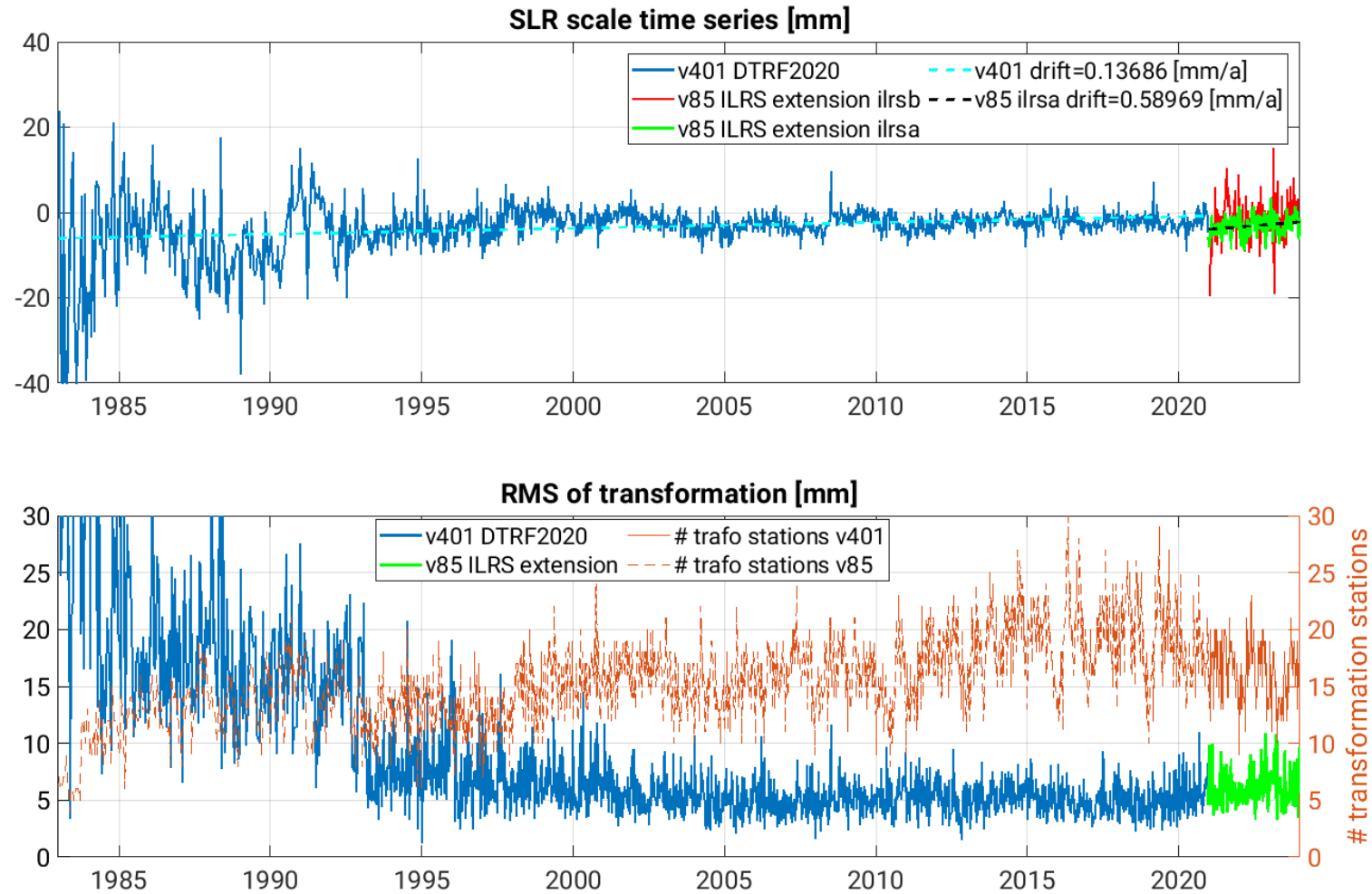
# ITRF2020 update

➤ Plots compiled by M. Seitz; ILRS w.r.t. DTRF2020



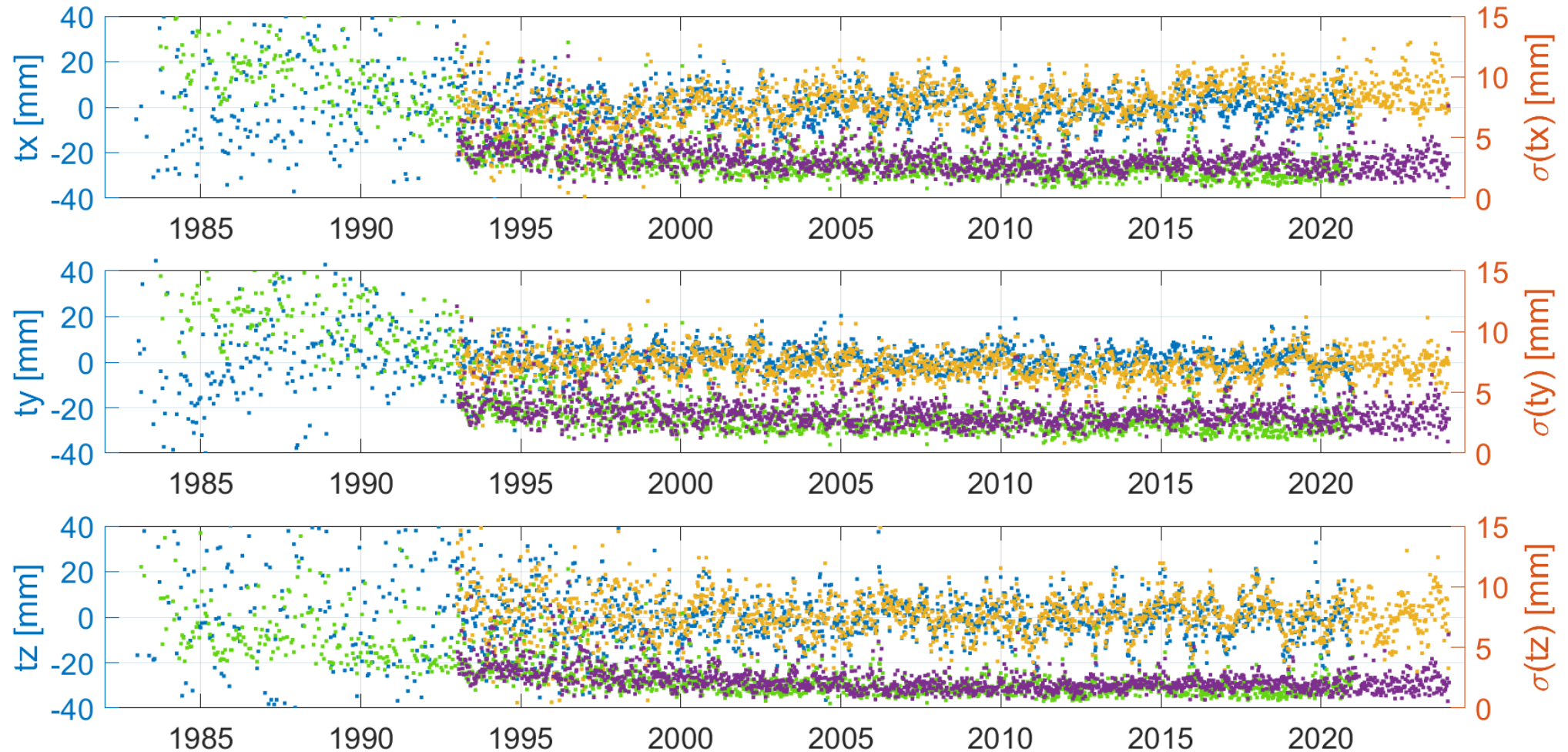
# ITRF2020 update

➤ Plots compiled by M. Seitz; ILRS w.r.t. DTRF2020



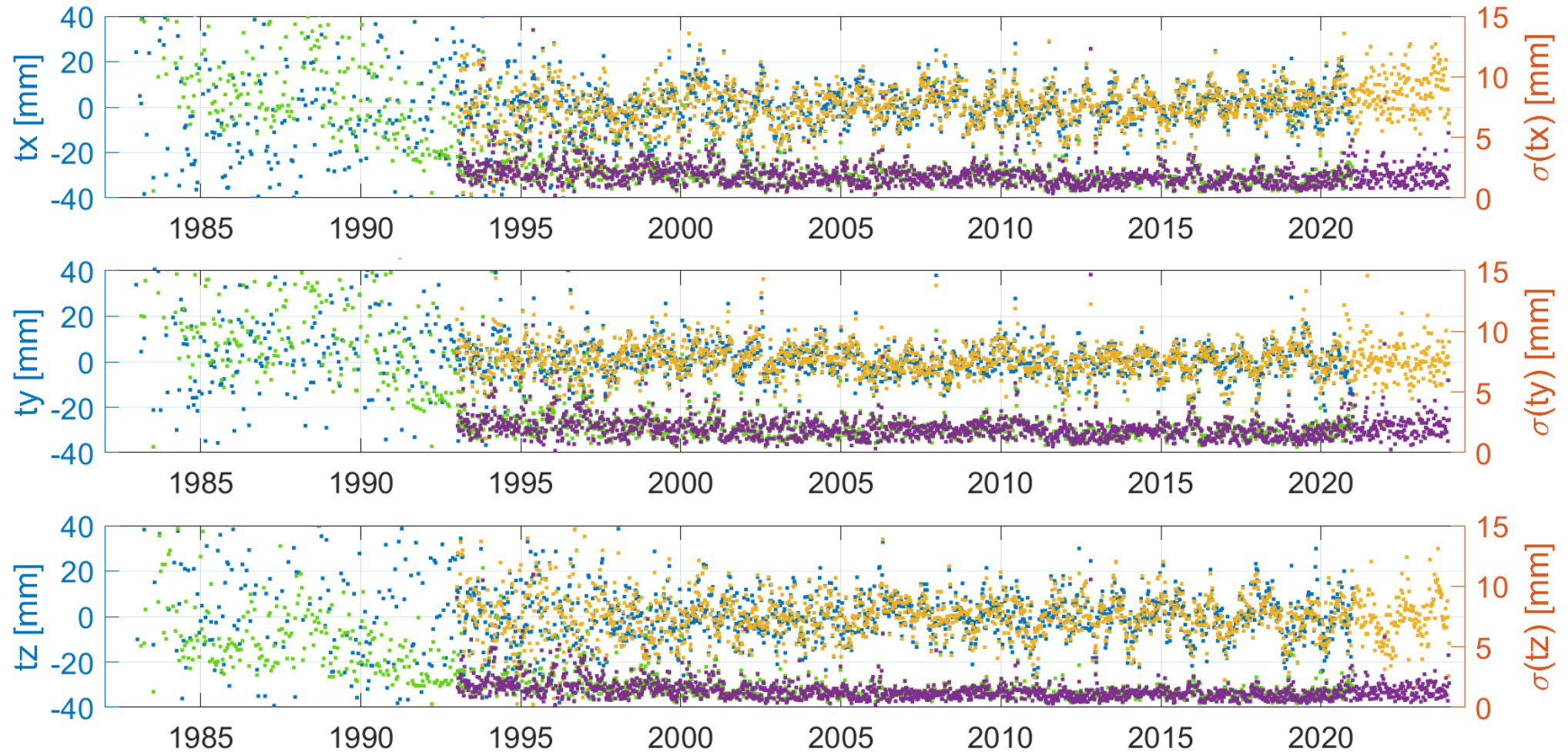
# ITRF2020 update

➤ Erroneous usage of DHF in DGFI-TUM's **v85** submission → v86 already resubmitted



# ITRF2020 update

➤ Erroneous usage of DHF in DGFI-TUM's v85 submission → **v86** already resubmitted



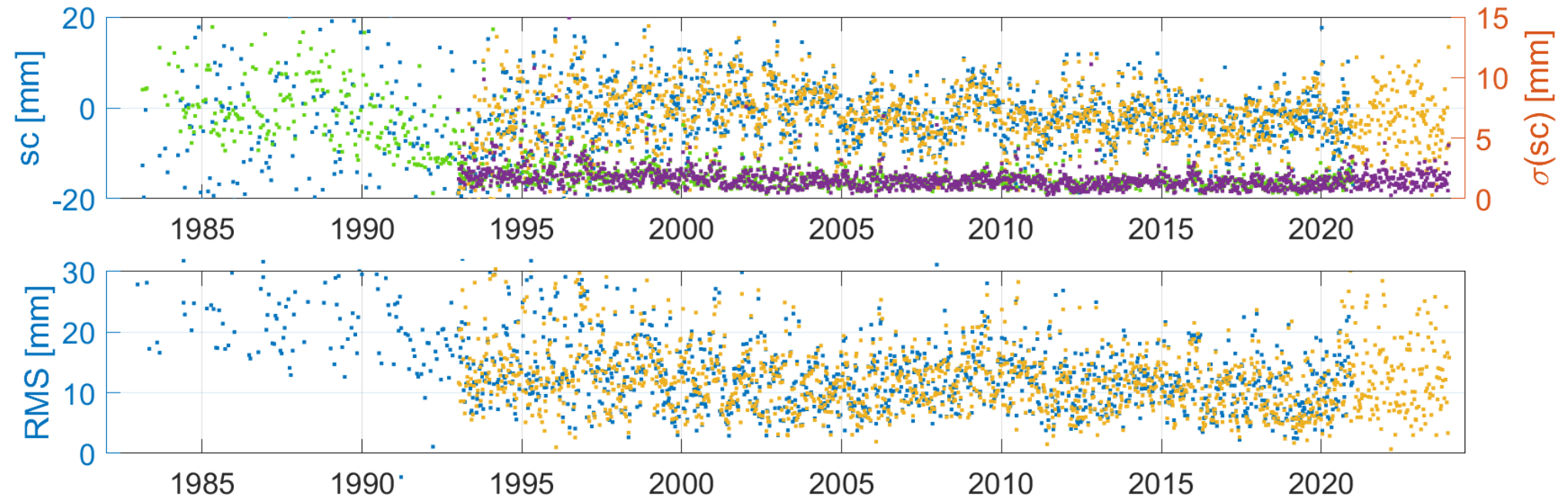
# ITRF2020 update

➤ Erroneous usage of DHF in DGFI-TUM's **v85** submission → v86 already resubmitted



# ITRF2020 update

➤ Erroneous usage of DHF in DGFI-TUM's v85 submission → **v86** already resubmitted





# ITRF2020 update



- No news on publication about ILRS contribution to ITRF2020 until today...
- Should we (all the ASC) go for a publication about the ILRS contribution to the ITRF2020 update?
  - main author from ASI and JCET or Analysis Coordinators?
  - all ASC members (persons who are running the official ACs) should be co-author!

AB – Antonio Basoni	ABE –Alexandre Belli	ABG – Adrian Banos-Garcia
AK – Alexander Kehm	AR – Anton Reinhold	AS – Andreja Susnik
CL – Cinzia Luceri	DK – Daniel König	DS – David Sarrocco
DT – Daniela Thaller	ES –Erik Schönemann	FD – Florent Deleflie
FL –Frank Lemoine	FR – Franck Reinquin	GA – Graham Appleby
JR – José Rodriguez	KE – Keith Evans	MB – Mathis Bloßfeld
MCK – Magda Kuzmicz-Cieslak	MV – Margarita Vei	PS – Patrick Schreiner
TS – Tim Springer	SL –Scott Luthcke	UM – Ulrich Meyer

# Today's agenda



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# LARES-2: DHF and inclusion into operational products



- Submission of weekly v320 SSEM-X-like solutions since the beginning of the year
  - comprises TRF+EOP+RBs (including LARES-2)
- ILRS-A/-B: status of combination?

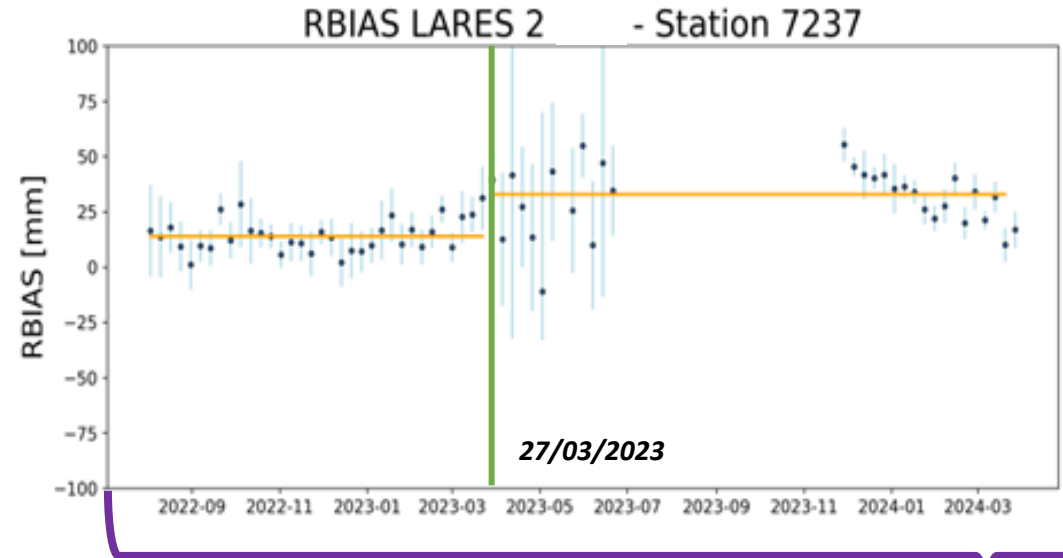
## *Lares-2 & Range Bias Estimation*

# Lares2 Biases Estimations

## • Range Bias Estimation

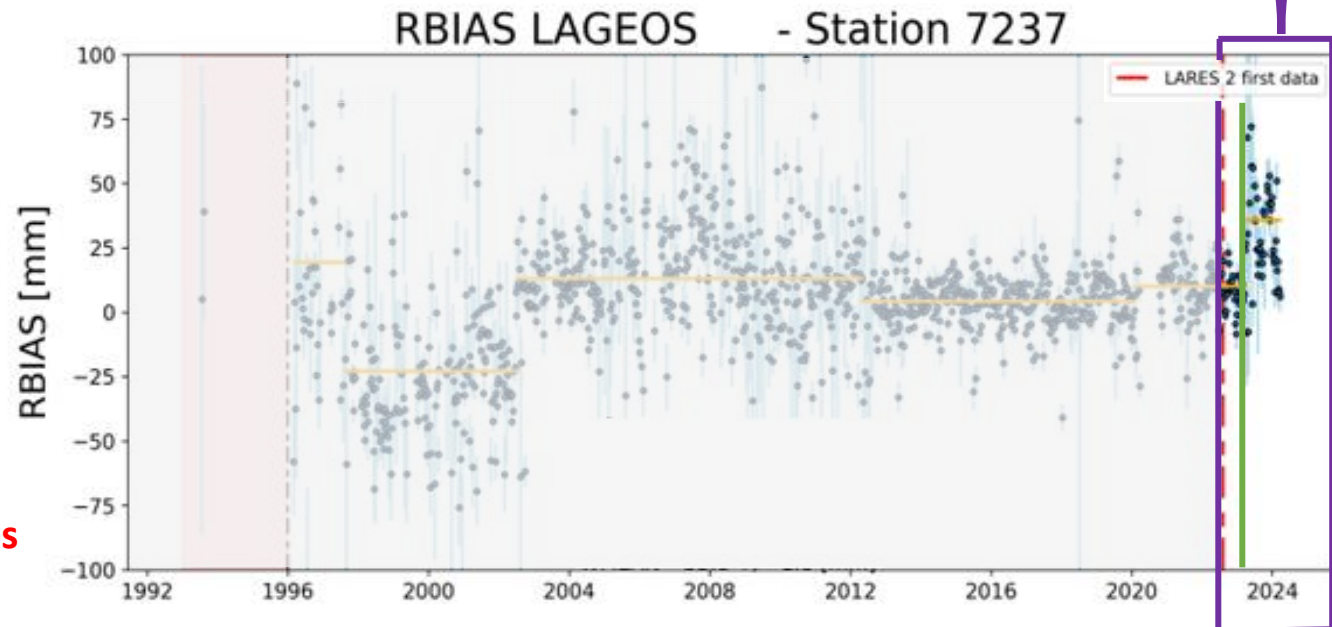
Example for **7237** station:

- Discontinuity at **27/03/2023**
- 13.9 mm before 27/03/2023
- **33.0** mm after 27/03/2023



### Range Bias

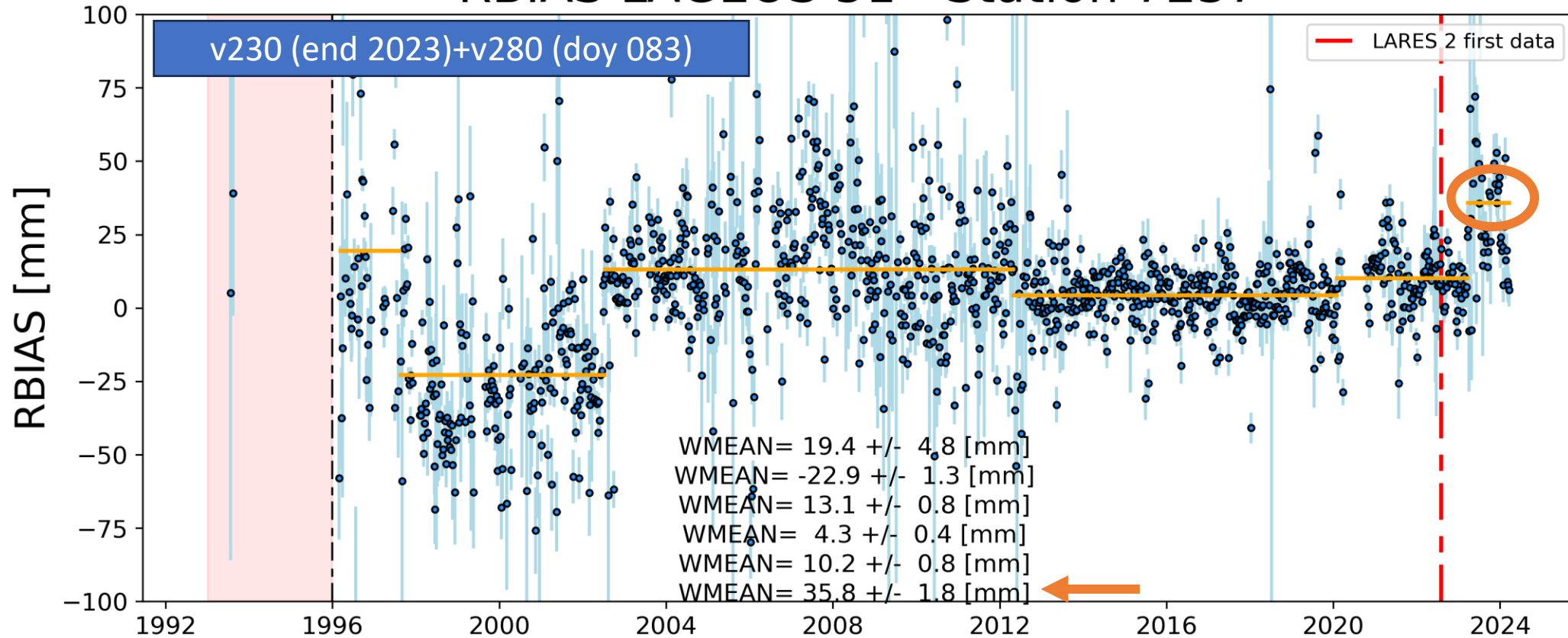
Satellite	Before Disc.	After Disc.
Lares 2	13.9 +/- 1.2 mm	<b>33.0</b> +/- 2.0 mm
Lageos 1	10.2 +/- 0.8 mm	<b>35.8</b> +/- 1.8 mm
Lageos 2	11.3 +/- 0.8 mm	<b>31.4</b> +/- 1.8 mm



➔ **Lares-2 Range Biases aligned with the Lageos ones**

# Monitoring RBIAS

## RBIAS LAGEOS 51 - Station 7237



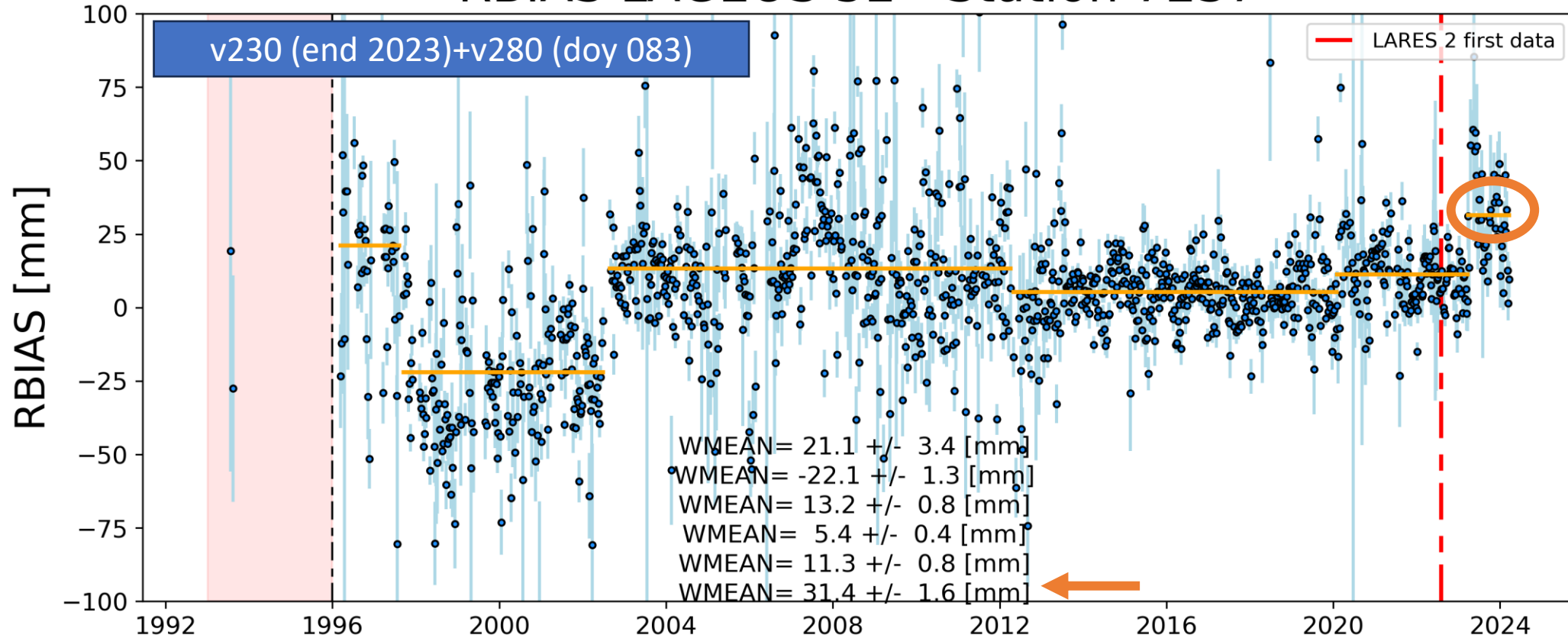
7237 51 501 A 20:033:00000 23:085:00000 R 10.3 0.8 mm

7237 -- 501 A 23:085:00000 00:000:00000 E mm

23:085 discontinuity introduced in DHF version 2024.02.13 based on v230 (end of 2023)

# Monitoring RBIAS

## RBIAS LAGEOS 52 - Station 7237



7237 52 501 A 20:033:00000 23:085:00000 R 11.5 0.8 mm

**7237 -- 501 A 23:085:00000 00:000:00000 E mm**

23:085 discontinuity introduced in DHF version 2024.02.13 based on v230 (end of 2023)

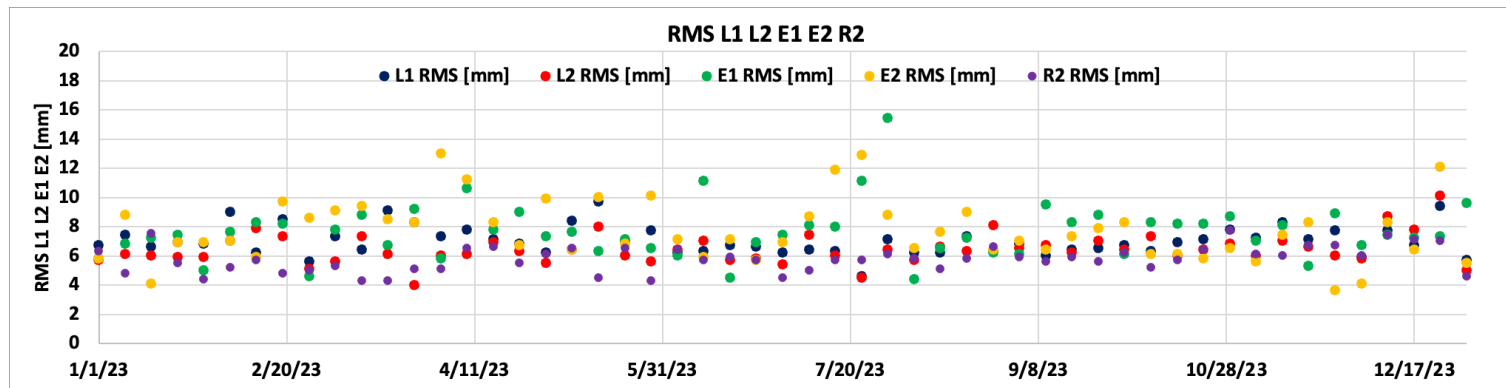
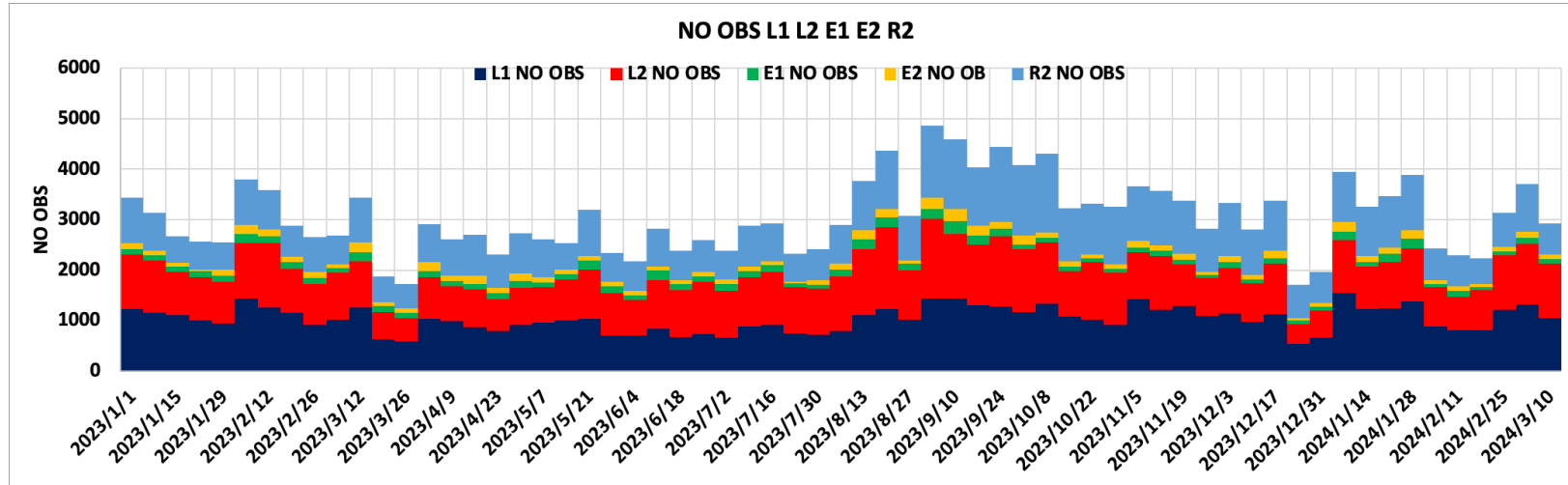
# Monitoring RBIAS

7237 51	501 A	23:085:00000	00:000:00000	R	35.8	1.8	mm	LAGEOS
7237 52	501 A	23:085:00000	00:000:00000	R	31.4	1.6	mm	LAGEOS 2
7237 67	501 A	23:085:00000	00:000:00000	R	33.0	2.0	mm	LARES 2

.....need to have more data ....



# 3D WRMS of Core Sites w.r.t. SLRF2020



	L1	L2	E1	E2	LR2
Avg. RMS (mm)	7.0	6.5	7.6	7.7	6.0
Avg. Nobs.	1030	945	119	112	840
Narcs	63	63	63	63	63

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5) ESA's GENESIS mission	(MB)	10 minutes
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# LE filter, TS model and DHF



➤ missing/erroneous station logs cause problems in the derived TS models and DHF entries; consequently, TS model and DHF are not consistent

- changes of the NP generation algorithm (e.g., LE filter) applied at station-level are causing changes of the TS model
- if the TS model is changed the DHF must be adapted!
- E.g., receiver change at Monument Peak in 2001

▪ TS model (200608)

7105	12	09	2007	27	07	2016	532	583.6
7105	27	07	2016	01	01	2050	532	583.3
7110	31	03	1986	19	08	2001	532	583.0
7110	19	08	2001	01	01	2050	532	583.8
7119	01	04	2005	17	10	2017	532	582.6
7119	17	10	2017	01	01	2050	532	588.1
7124	01	08	1997	27	06	2008	532	585.6

jump!

▪ TS model (231127)

7105	30	04	2003	12	09	2007	532	583.1
7105	27	07	2016	01	01	2050	532	583.3
7105	27	07	2016	01	01	2050	532	583.3
7110	31	03	1986	19	08	2001	532	583.3
7110	19	08	2001	01	01	2050	532	583.4
7119	01	04	2005	17	10	2017	532	582.6
7119	17	10	2017	01	01	2050	532	588.1
7124	01	08	1997	27	06	2008	532	584.8

no jump!

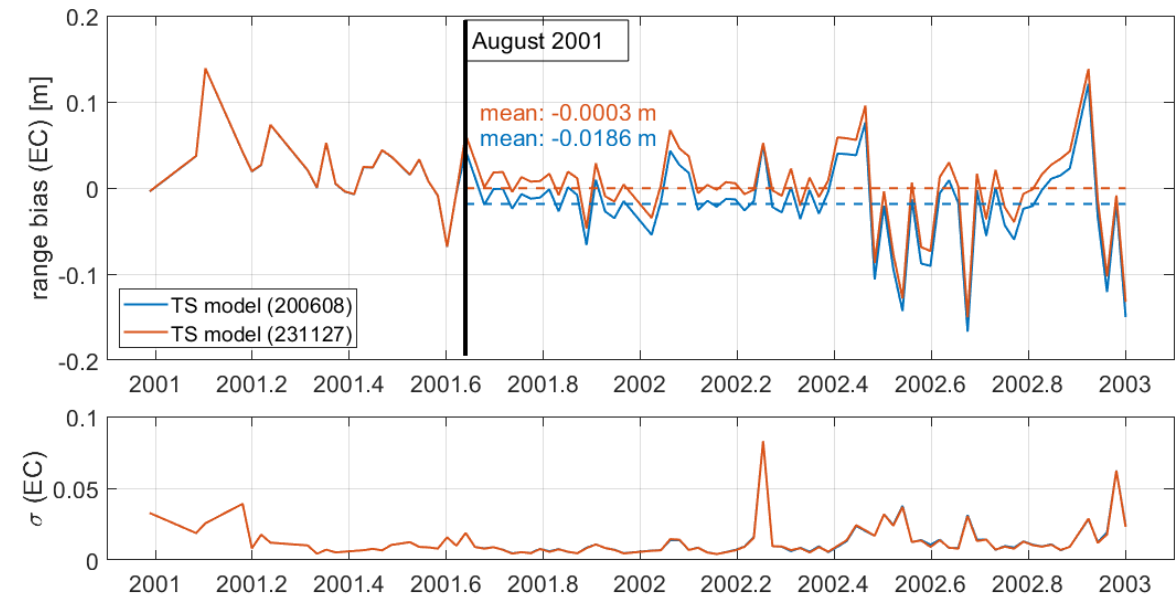
DHF (any version of ITRF2020 contribution)

8834	52	501	A	15:011:00000	19:181:00000	R	-17.7	0.7	mm
*									
1874	53	501	A	14:103:00000	00:000:00000	R	-12.8	1.5	mm
1879	53	501	A	13:188:00000	18:322:00000	R	16.2	2.1	mm
1887	53	501	A	11:313:00000	15:256:00000	R	16.6	3.0	mm
1887	53	501	A	16:101:00000	18:154:00000	R	-29.5	2.5	mm
1893	53	501	A	11:149:00000	00:000:00000	R	-22.6	3.2	mm
7080	53	501	A	00:002:00000	15:165:00000	R	4.1	0.8	mm
7090	53	501	A	03:201:00000	14:208:00000	R	-7.8	0.3	mm
7105	53	501	A	00:226:00000	16:346:00000	R	2.6	0.6	mm
7105	53	501	A	17:020:00000	20:047:00000	R	17.3	0.8	mm
7105	53	501	A	20:047:00000	00:000:00000	R	7.4	0.8	mm
7110	53	501	A	96:237:00000	96:274:00000	R	163.6		mm CDDIS
7110	53	501	A	01:238:00000	00:000:00000	R	-14.5	0.5	mm
7124	53	501	A	08:343:00000	18:105:00000	R	12.1	1.3	mm
7210	53	501	A	01:077:00000	04:123:00000	R	18.7	1.6	mm
7237	53	501	A	97:257:00000	02:188:00000	R	-21.9	2.5	mm
7237	53	501	A	02:195:00000	12:092:00000	R	12.1	1.4	mm

▪ problem: TS model changed by DHF remains the same → double accounting for this effect in v85/86 solution

# LE filter, TS model and DHF

- missing/erroneous station logs cause problems in the derived TS models and DHF entries; consequently, TS model and DHF are not consistent
  - changes of the NP generation algorithm (e.g., LE filter) applied at station-level are causing changes of the TS model
  - if the TS model is changed the DHF must be adapted!
  - E.g., receiver change at Monument Peak in 2001
  - problem: TS model changed by DHF remains the same
    - even long-time ago RBs might change today!
- delayed NPs are also an issue; not only delayed NPs based on a 2nd wavelength (8834) but also delayed NPs due to quarantine release (7306) are not yet included in the most recent (and potentially best) DHF



# LE filter, TS model and DHF



- Presentation by V. Husson (online)

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# ESA's GENESIS mission



- Today morning was the 1st meeting of the IAG/IERS/GGOS JWG 1.1.1 on GENESIS
- Slides of IAG WG 1.1.1 on GENESIS (chair: J. Böhm)

# Today's agenda



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<b>6) ASC recommendations for SINEX format updates</b>	<b>(MB)</b>	<b>10 minutes</b>
7) Survey on satellite-/station-weighting strategies at ACs	(AB, MB)	10 minutes
8) DSC files at ILRS website	(MB)	10 minutes
9) Any other business and next ASC meeting	(all, MB)	10 minutes



# ASC recommendations for SINEX format updates



- During the IERS DB meeting in November 2023, Daniela asked the Services to provide feedback on SINEX format updates they want to see?
- Up to now, the ASC uses three additional (non-official) blocks for its operational products:
  - **MODEL/TARGET\_SIGNATURE\_GEOMETRY**
  - **MODEL/RANGE\_BIAS**
  - **MODEL/TIME\_BIAS**

} Should they replace the current BIAS/EPOCHS block?
- Within the ASC, we identified two new blocks with potential beneficial impact for the user:
  - **NUMBER\_OF\_OBSERVATIONS/SATELLITE**
  - **NUMBER\_OF\_OBSERVATIONS/SITE**
- Really necessary?
  - Maybe its enough to extend the existing SATELLITE/ID and SOLUTION/EPOCHS block?

```

+-----+
+ SATELLITE/ID
+-----+
*Sat PR Cospar_ID T Data_start_ Data_end_ antenna_type_
L051 51 1976-039A L 24:015:00000 24:022:00000
L052 52 1992-070B L 24:015:00000 24:022:00000
L053 53 1989-001C L 24:015:00000 24:022:00000
L054 54 1989-039C L 24:015:00000 24:022:00000
+-----+
- SATELLITE/ID
+-----+
+ SITE/ECCENTRICITY
+-----+
*Code PT SOLN T Data_start_ Data_end_ typ Apr → Benchmark (m)
1824 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
1873 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
1884 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
1893 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7090 A 1 L 72:229:00000 49:365:00000 XYZ -1.2073 2.5034 -1.5509
7105 A 1 L 72:229:00000 49:365:00000 XYZ 0.5250 -2.3865 1.9689
7110 A 1 L 72:229:00000 49:365:00000 XYZ -1.2109 -2.4036 1.7117
7119 A 1 L 72:229:00000 49:365:00000 XYZ -2.2500 -0.9932 0.9328
7124 A 1 L 72:229:00000 49:365:00000 XYZ -2.5739 -1.5213 -0.9628
7237 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7249 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7811 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7819 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7821 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7825 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7838 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7839 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7840 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7841 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7845 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7941 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
8834 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
+-----+
- SITE/ECCENTRICITY
+-----+
+ SOLUTION/EPOCHS
+-----+
*Code PT SOLN T Data_start_ Data_end_ Mean_epoch_
1824 A 1 L 24:016:63450 24:017:14760 24:016:82305
1873 A 1 L 24:016:63827 24:020:01569 24:018:32698
1884 A 1 L 24:018:64061 24:019:20500 24:018:85480
1893 A 1 L 24:016:63476 24:017:72816 24:017:24946
7090 A 1 L 24:015:09244 24:021:61699 24:018:35472
7105 A 1 L 24:017:86202 24:018:24836 24:018:12319
7110 A 1 L 24:015:52713 24:020:17631 24:017:78372
7119 A 1 L 24:015:65431 24:020:18678 24:017:85254
7124 A 1 L 24:015:63669 24:019:70051 24:017:66860
7237 A 1 L 24:015:43459 24:018:79480 24:017:18269
7249 A 1 L 24:015:42143 24:021:75604 24:018:58874
7811 A 1 L 24:015:68193 24:021:64775 24:018:66484
7819 A 1 L 24:015:41347 24:021:57803 24:018:49575
7821 A 1 L 24:015:05908 24:017:46993 24:016:26451
7825 A 1 L 24:016:39178 24:018:34780 24:017:36979
7838 A 1 L 24:015:06430 24:017:57078 24:016:31754
7839 A 1 L 24:015:26881 24:020:71921 24:018:06201
    
```

# ASC recommendations for SINEX format updates



➤ During the IERS DB meeting in November 2023, Daniela asked the Services to provide feedback on SINEX format updates they want to see?

➤ Up to now, the ASC uses three additional (non-official) blocks for its operational products:

- **MODEL/RANGE\_BIAS** → contains info about estimated biases
- **BIAS/EPOCHS** → contains info about applied biases
- **MODEL/RANGE\_BIAS** → contains info about applied biases

➤ Within the ASC, we identified two new blocks with potential beneficial impact for the user:

- **NUMBER\_OF\_OBSERVATIONS/SATELLITE**
- **NUMBER\_OF\_OBSERVATIONS/SITE**

➤ Really necessary?

- Maybe its enough to extend the existing SATELLITE/ID and SOLUTION/EPOCHS block?

```

-----
+SITE/ID
*Sat PR Cospar_ID T Data_start_ Data_end_ antenna_type_
L051 51 1976-039A L 24:015:00000 24:022:00000
L052 52 1992-070B L 24:015:00000 24:022:00000
L053 53 1989-001C L 24:015:00000 24:022:00000
L054 54 1989-039C L 24:015:00000 24:022:00000
-----
-SATELLITE/ID
*
-----
+SITE/ECCENTRICITY
*Code PT SOLN T Data_Start_ Data_End_ typ Apr → Benchmark (m)
1824 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
1873 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
1884 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
1893 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7090 A 1 L 72:229:00000 49:365:00000 XYZ -1.2073 2.5034 -1.5509
7105 A 1 L 72:229:00000 49:365:00000 XYZ 0.5250 -2.3865 1.9689
7110 A 1 L 72:229:00000 49:365:00000 XYZ -1.2109 -2.4036 1.7117
7119 A 1 L 72:229:00000 49:365:00000 XYZ -2.2500 -0.9932 0.9328
7124 A 1 L 72:229:00000 49:365:00000 XYZ -2.5739 -1.5213 -0.9628
7237 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7249 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7811 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7819 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7821 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7825 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7838 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7839 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7840 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7841 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7845 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
7941 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
8834 A 1 L 72:229:00000 49:365:00000 XYZ 0.0000 0.0000 0.0000
-----
-SITE/ECCENTRICITY
*
-----
+SOLUTION/EPOCHS
*Code PT SOLN T Data_start_ Data_end_ Mean_epoch_
1824 A 1 L 24:016:63450 24:017:14760 24:016:82305
1873 A 1 L 24:016:63827 24:020:01569 24:018:32698
1884 A 1 L 24:018:64061 24:019:20500 24:018:85480
1893 A 1 L 24:016:63476 24:017:72816 24:017:24946
7090 A 1 L 24:015:09244 24:021:61699 24:018:35472
7105 A 1 L 24:017:86202 24:018:24836 24:018:12319
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7124 A 1 L 24:015:63669 24:019:70051 24:017:66860
7237 A 1 L 24:015:43459 24:018:79480 24:017:18269
7249 A 1 L 24:015:42143 24:021:75604 24:018:58874
7811 A 1 L 24:015:68193 24:021:64775 24:018:66484
7819 A 1 L 24:015:41347 24:021:57803 24:018:49575
7821 A 1 L 24:015:05908 24:017:46993 24:016:26451
7825 A 1 L 24:016:39178 24:018:34780 24:017:36979
7838 A 1 L 24:015:06430 24:017:57078 24:016:31754
7839 A 1 L 24:015:26881 24:020:71921 24:018:06201

```

# Today's agenda



0) Last meeting + open Action Items (AIs)	(MB, CL)	10 minutes
1) Status reports of SLR/LLR ACs/CCs	(all)	70 minutes
2) ITRF2020 update (reprocessing, publication, etc.)	(CL, MB)	20 minutes
3) LARES-2: DHF and inclusion into operational products	(CL)	10 minutes
4) LE filter, TS model and DHF (incl. quarantine release and delayed NPs)	(VH, MB)	20 minutes
5) ESA's GENESIS mission	(MB)	10 minutes
6) ASC recommendations for SINEX format updates	(MB)	10 minutes
<b>7) Survey on satellite-/station-weighting strategies at ACs</b>	<b>(AB, MB)</b>	<b>10 minutes</b>
8) DSC files at ILRS website	(MB)	10 minutes
9) Any other business and next ASC meeting	(all, MB)	10 minutes

# Survey on satellite-/station-weighting strategies at ACs



- Motivation of the survey: DGFI-TUM and other ACs have significant higher WRMS values when comparing HT residuals for ILRS (core) network
  - potential causes: different station/observation weighting strategy or different satellite weighting strategy?
  - strategy to quantify impact on DGFI-TUM solution: providing 4 different solutions to ASI CC to check ;-)

	station/observation weighting	satellite weighting
v180 (operational)	1 cm constant	VCE
v180 (special_1)	ESA-scheme applied	VCE
v180 (special_2)	1 cm constant	equal weights
v180 (special_3)	ESA-scheme applied	equal weights

- Investigations are running; I've sent test solutions to ASI CC in January
- Any news?

# Today's agenda



- |   |             |                   |
|---|-------------|-------------------|
| 0) Last meeting + open Action Items (AIs)                                 | (MB, CL)    | 10 minutes        |
| 1) Status reports of SLR/LLR ACs/CCs                                      | (all)       | 70 minutes        |
| 2) ITRF2020 update (reprocessing, publication, etc.)                      | (CL, MB)    | 20 minutes        |
| 3) LARES-2: DHF and inclusion into operational products                   | (CL)        | 10 minutes        |
| 4) LE filter, TS model and DHF (incl. quarantine release and delayed NPs) | (VH, MB)    | 20 minutes        |
| 5) ESA's GENESIS mission  | (MB)        | 10 minutes        |
| 6) ASC recommendations for SINEX format updates                           | (MB)        | 10 minutes        |
| 7) Survey on satellite-/station-weighting strategies at ACs               | (AB, MB)    | 10 minutes        |
| <b>8) DSC files at ILRS website (no news!)</b>                            | <b>(MB)</b> | <b>10 minutes</b> |
| 9) Any other business and next ASC meeting                                | (all, MB)   | 10 minutes        |

# Today's agenda



0) Last meeting + open Action Items (AIs)	(MB, CL)	10 minutes
1) Status reports of SLR/LLR ACs/CCs	(all)	70 minutes
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8) DSC files at ILRS website	(MB)	10 minutes
<b>9) Any other business and next ASC meeting</b>	<b>(all, MB)</b>	<b>10 minutes</b>

# SLRF2020 update: new Tsukuba coordinates



➤ cf. TSUKUBA update slides

# Tsukuba, 7306 Re-Validation (1)

**LAGEOS-1: precision:  $3.0 \pm 1.4$  mm**  
**Range bias:  $-13.2 \pm 14.7$  mm**

SLRF2020 QC L1 73069301	PREC EST [mm]	RANGE BIAS [mm]
Mean	3.0	-13.2
STD	1.4	14.7
RMS	3.3	19.6
Passes	57	57

**LARES: precision:  $4.2 \pm 2.4$  mm**  
**Range bias:  $0.5 \pm 28.2$  mm**

SLRF 2020 QC LR 73069301	PREC EST [mm]	RANGE BIAS [mm]
Mean	4.2	0.5
STD	2.4	28.2
RMS	4.8	27.8
Passes	34	34

**LAGEOS-2: precision:  $3.0 \pm 1.8$  mm**  
**Range bias:  $3.9 \pm 16.1$  mm**

SLRF2020 QC L2 73069301	PREC EST [mm]	RANGE BIAS [mm]
Mean	3.0	3.9
STD	1.8	16.1
RMS	3.5	16.3
Passes	40	40

**LARES-2: precision:  $3.1 \pm 1.6$  mm**  
**Range bias:  $-0.1 \pm 22.0$  mm**

SLRF2020 QC R2 73069301	PREC EST [mm]	RANGE BIAS [mm]
Mean	3.1	-0.1
STD	1.6	22.0
RMS	3.5	21.3
Passes	16	16

(1) Data from Jan 11, 2024 to March 27, 2024.  
 (2) Minimum 5 npts per pass (after dynamic diting).

We used the following default CoM values in the SLR analysis with GEODYN, pending updates from JCR and the ASC.

Lageos-1: 245.4 mm  
 Lageos-2: 244.8 mm  
 LARES: 130.2 mm  
 LARES-2: 174.0 mm



SLRF2020 vs. DGFI-preliminary coordinates  
(post 2024-01-01 Noto earthquake)

Satellite	SLRF2020			DGFI_preliminary		
	N	Precision (mm)	Range bias (mm)	N	Precision (mm)	Range bias (mm)
Lageos-1	43	$3.2 \pm 1.5$	$-11.7 \pm 15.7$	48	$2.3 \pm 1.0$	$-10.1 \pm 10.2$
Lageos-2	30	$3.1 \pm 2.1$	$3.0 \pm 18.3$	30	$2.8 \pm 1.4$	$-5.9 \pm 12.6$
LARES-2	13	$3.0 \pm 1.6$	$-0.5 \pm 23.3$	13	$2.6 \pm 1.6$	$-2.4 \pm 17.8$
LARES	33	$4.5 \pm 2.3$	$0.7 \pm 26.3$	32	$4.4 \pm 2.2$	$-0.3 \pm 23.0$

# Other items: (1) History Log status

[https://geodesy.jcet.umbc.edu/MASTER\\_HST\\_log\\_stations.html](https://geodesy.jcet.umbc.edu/MASTER_HST_log_stations.html)

**Table 1. History Log Voids by Station (2024.04.09)**

Station Location	CDP #	Time Gap(s)*	Last entry
Kiev	1824	000120-080302 080402-110515	141410
Komsomolsk	1868	NO DATA	
Simeiz	1873	NO DATA	
Mendeleevo	1874	NO DATA	
Altay	1879	NO DATA	
Riga	1884		240404
Arkhyz	1886	NO DATA	
Baikonur	1887	NO DATA	
Svetloe	1888	NO DATA	
Zelenchukskaya	1889	NO DATA	
Badary	1890	NO DATA	
Irkutsk	1891	NO DATA	
Katzively	1893	NO DATA	
Yarragadee	7090		240212
Greenbelt	7105		240303
Monument_Peak	7110		231109
Haleakala	7119		240304
Tahiti	7124	020825-080414 130321-191022	230520
Changchun	7237	950101-970802 020714-051002 180410-210106	240128
Beijing	7249	881101-940301 940301-981116 981116-211013	230425
Tsukuba	7306		231108
Seiona	7394	NO DATA	

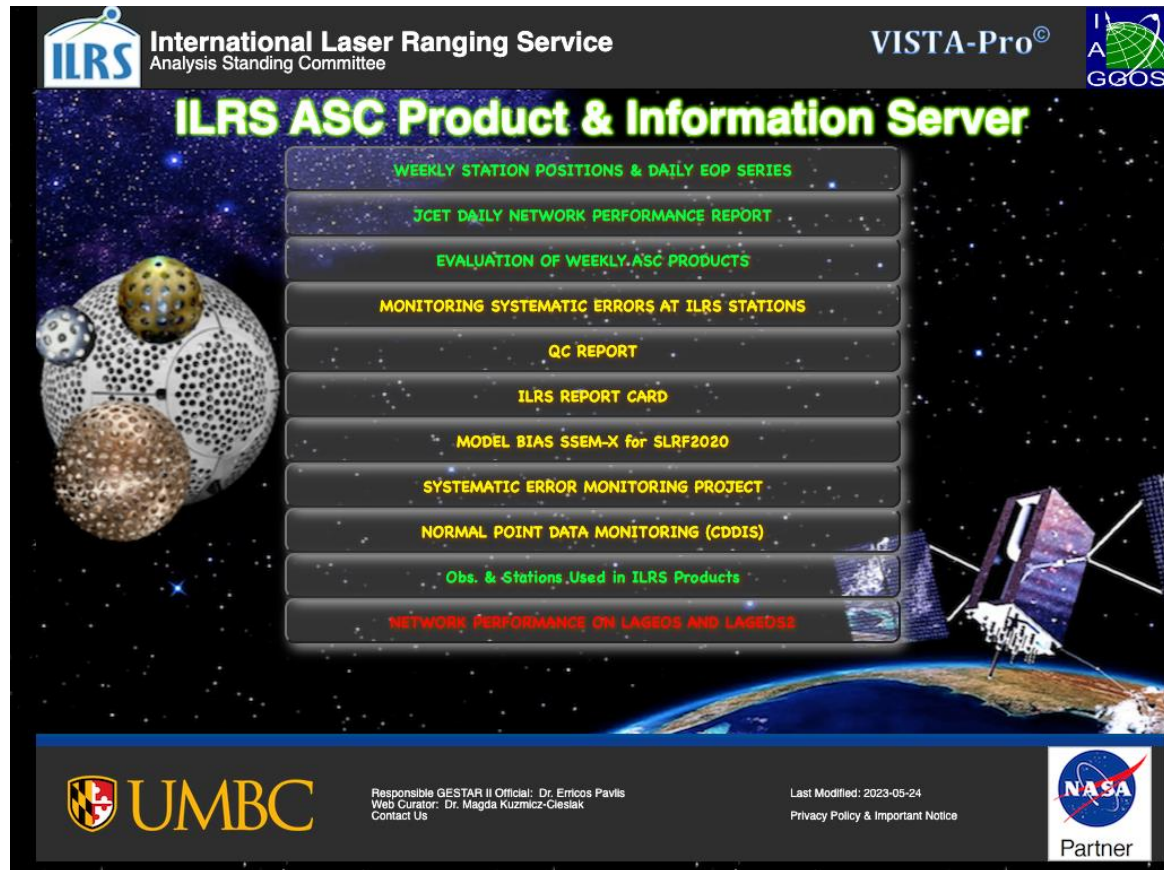
Wuhan	7396	NO DATA			
Arequipa	7403	920718-951023	951023-981130	981130-010523	200629
San Juan, Argentina	7406	NO DATA			
Brasilia	7407	NO DATA			
Hartebeesthoek_HARL	7501	020409-081105			230711
Hartebeesthoek_HRTL	7503	NO DATA			
Izana	7701				230406
Zimmerwald_532	7810	030905-060203	080715-100901		231019
Borowiec	7811	030329-071227	080205-131218		211005
Kunming	7819				240306
Shanghai_2	7821	140222-170315	170720-190811		231113
San_Fernando	7824	900703-930222 180801-210518	971216-010124	090302-110601	231121
Mount_Stromlo_2	7825				210901
Wetzell_SOSW	7827	140501-160511	160511-190528	200424-230607	240119
Simosato	7838	900701-950810 080401-181212	950810-991007	991019-040701	211209
Graz	7839	150504-190311			240117
Herstmonceux	7840				230427
Potsdam_3	7841	040906-081026	081026-110501	170303-200303	240305
Grasse_MEO	7845	010601-200818			231012
Matera_MLRO	7941	140902-171204 980720-001012	171206-210629 001012-090324	090324-131021	230209
Wetzell	8834	170407-190604			210115

\* Assuming at least 2 year data gap

Status 2024.04.12

# Other items: (2) Updates to website

[http://geodesy.jcet.umbc.edu/ILRS\\_AWG\\_MONITORING/](http://geodesy.jcet.umbc.edu/ILRS_AWG_MONITORING/)



The screenshot shows the ILRS ASC Product & Information Server interface. At the top left is the ILRS logo and 'International Laser Ranging Service Analysis Standing Committee'. At the top right is 'VISTA-Pro' and 'IAGGOS'. The main title is 'ILRS ASC Product & Information Server'. A central menu lists various reports and data, with some items highlighted in green and others in red. The background features a satellite and Earth from space.

ILRS International Laser Ranging Service Analysis Standing Committee

VISTA-Pro<sup>®</sup> IAGGOS

## ILRS ASC Product & Information Server

- WEEKLY STATION POSITIONS & DAILY EOP SERIES
- JcET DAILY NETWORK PERFORMANCE REPORT
- EVALUATION OF WEEKLY ASC PRODUCTS
- MONITORING SYSTEMATIC ERRORS AT ILRS STATIONS
- QC REPORT
- ILRS REPORT CARD
- MODEL BIAS SSEM-X for SLRF2020
- SYSTEMATIC ERROR MONITORING PROJECT
- NORMAL POINT DATA MONITORING (CDDIS)
- Obs. & Stations Used in ILRS Products
- NETWORK PERFORMANCE ON LAGEOS AND LAGEOS2

UMBC Responsible GESTAR II Official: Dr. Ericos Pavlis  
Web Curator: Dr. Magda Kuzmicz-Cieslak  
Contact Us

Last Modified: 2023-05-24  
Privacy Policy & Important Notice

NASA Partner

Green: Updated version available for SLRF2020  
Red: Work in progress for SLRF2020

# Summary

- **Operational Series (v80, v180) continue with same software and procedures on UMBC computers for the time being; Reprocessing of large time spans uses supercomputers at NASA Ames.**
- **v86 (v85, 2021-2023, corrected) has been delivered, with corrections requested by ASI CC; v86 ILRSB combination done by K. Evans 16-04-2024.**
- **Waiting for software updates from ECP before we can deliver series that include LARES-2.**
- **We plan a TVG update soon, based on GRACE-FO (CSR) RL06 series, and GRACE Technical Note 14 for C20, C30.**

# Addendum



**St. Johnsbury, Vermont**  
44°26'1"N 72°0'54"W

©Dominik Cieslak

# Analysis of Tsukuba (7306) station coordinates

**Mathis Bloßfeld<sup>(1)</sup>**

(1) DGFI-TUM

v1: Monday, March 11<sup>th</sup>, 2024

v2: Tuesday, March 26<sup>th</sup>, 2024

## Situation for Tsukuba SLR station (7306)

### ➤ Data availability and status

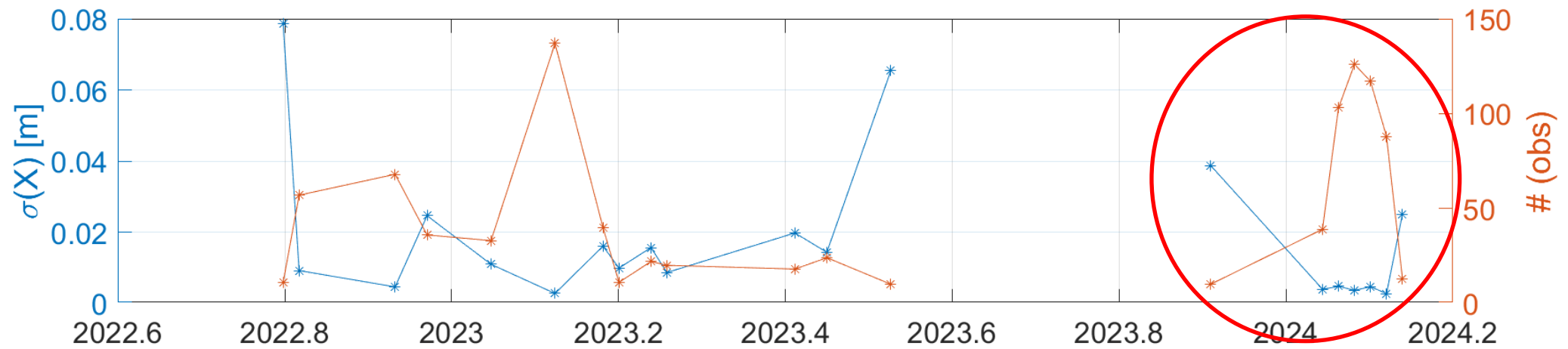
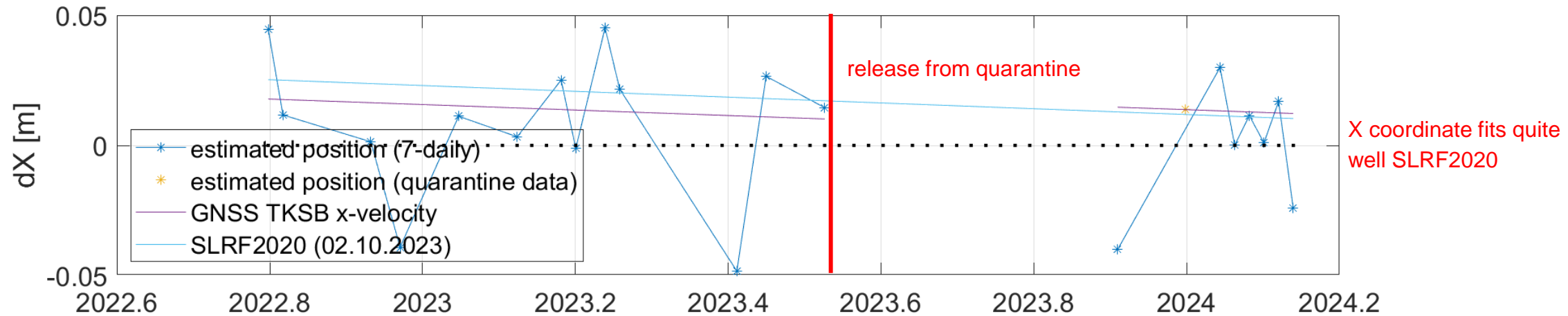
- Data available since Oct. 2022 (same month was switch from CRD (v1) to CRD (v2) format → different folders at EDC!
- XX.10.2022 – 16.06.2023 → quarantine status but data released (16.06.2023) → BUT: data double stored at EDC!
- 16.06.2023 – 01.11.2023 → validated status
- 01.11.2023 – now → quarantine status

→ ASC-internal problem for v280 solution: no 7306 data in 'older' solutions since data was released

### ➤ Frank Lemoine suggested to keep GNSS TSKB velocity

- $dX = -0.01054$  [m/yr];
- $dY = 0.00635$  [m/yr];
- $dZ = -0.00415$  [m/yr];

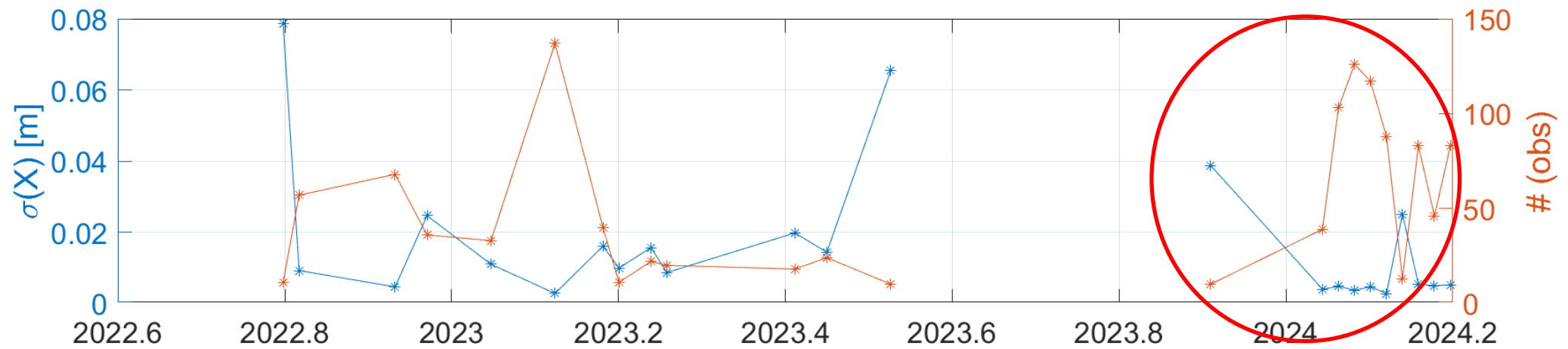
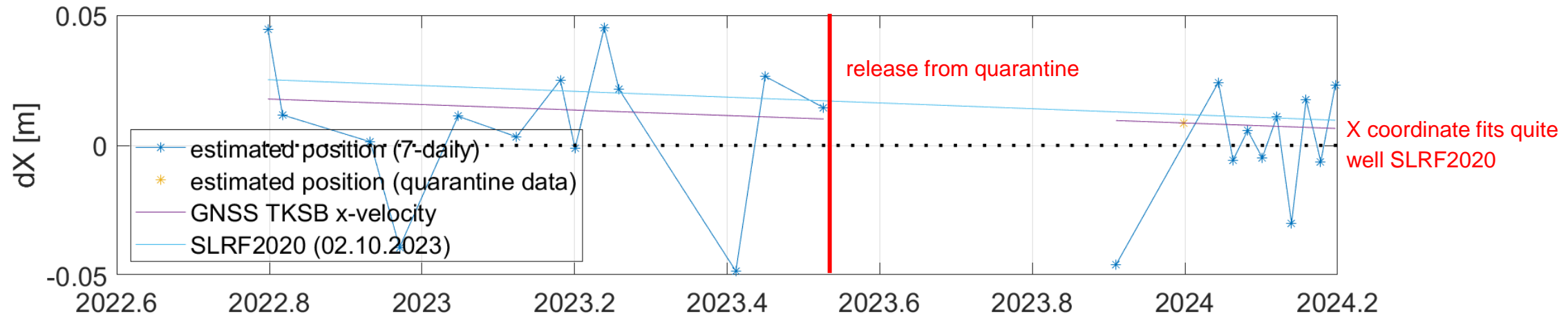
# 7306 – X coordinate (data until end of February 2024)



more obs means smaller STD

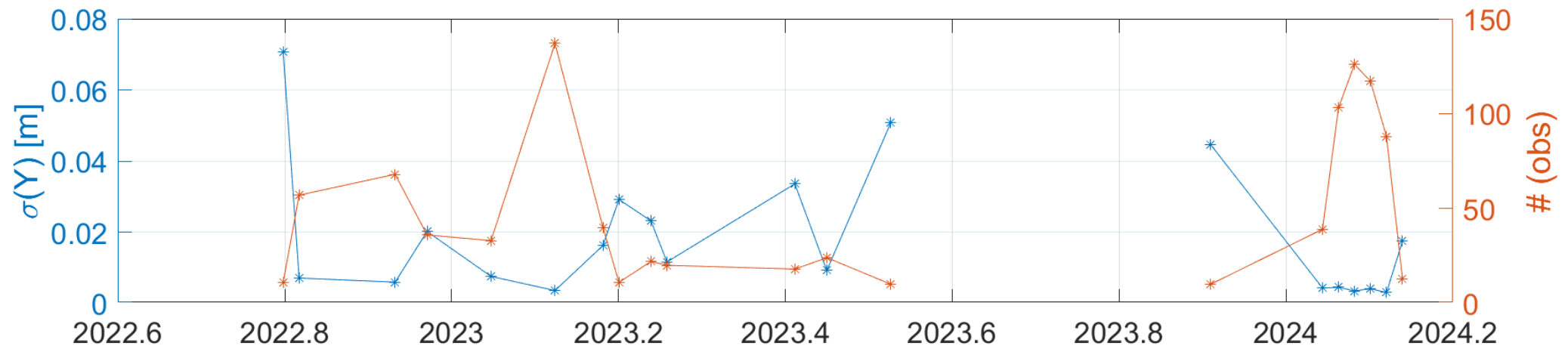
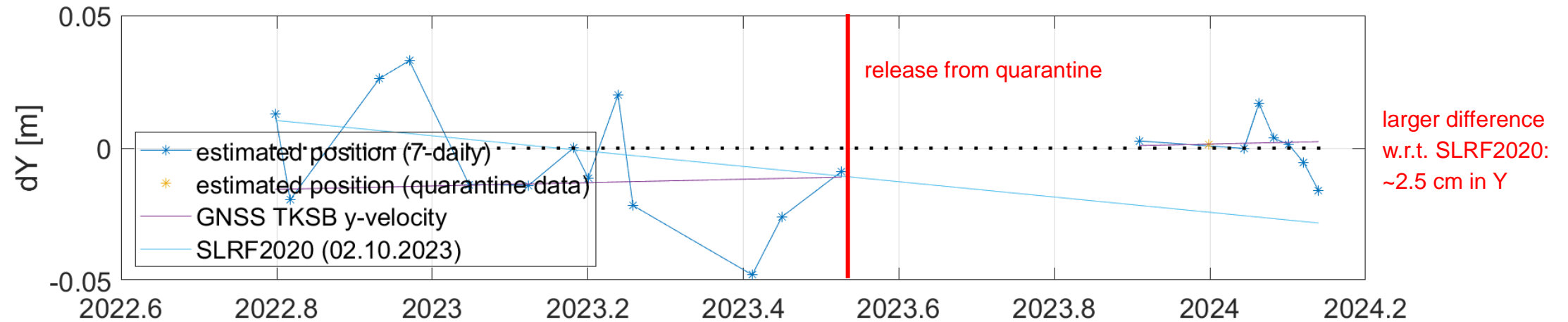


# 7306 – X coordinate (data until end of March 2024)

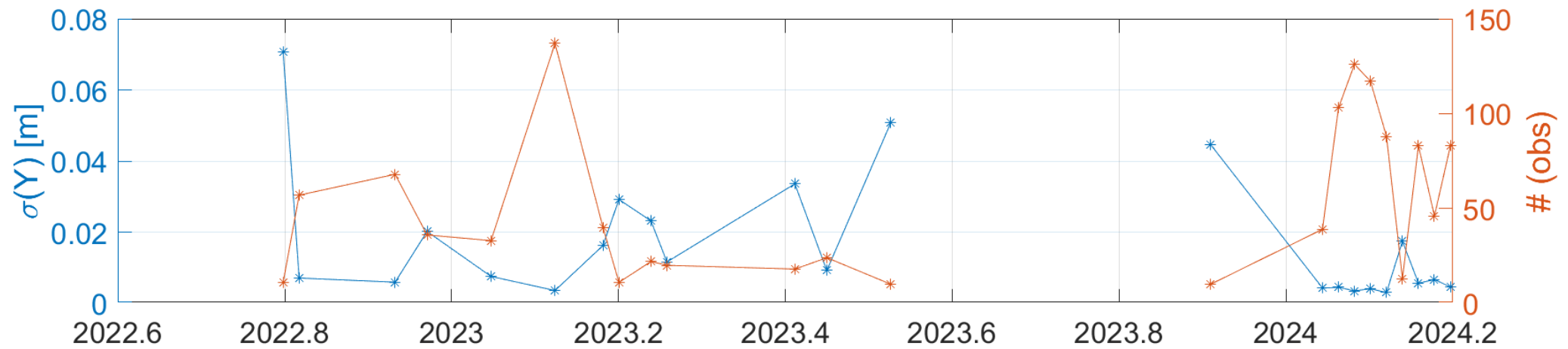
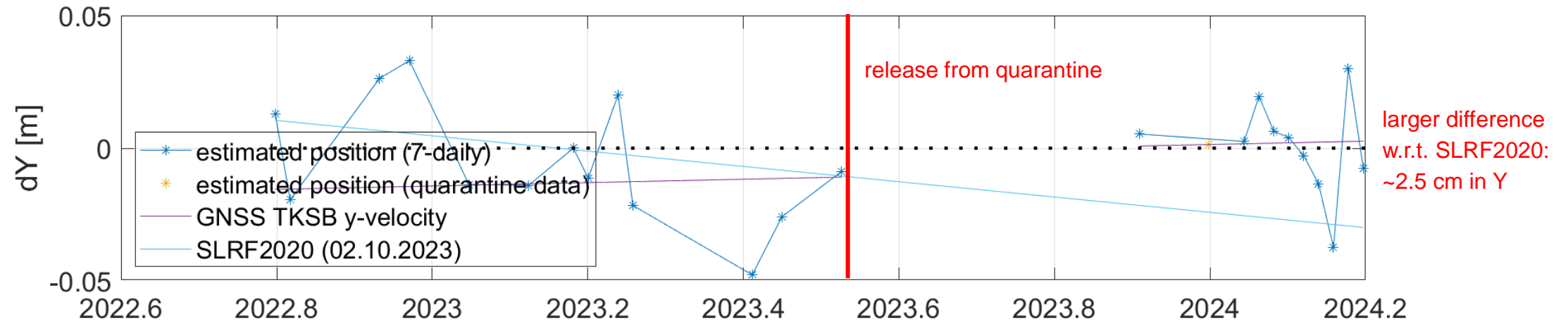


more obs means smaller STD

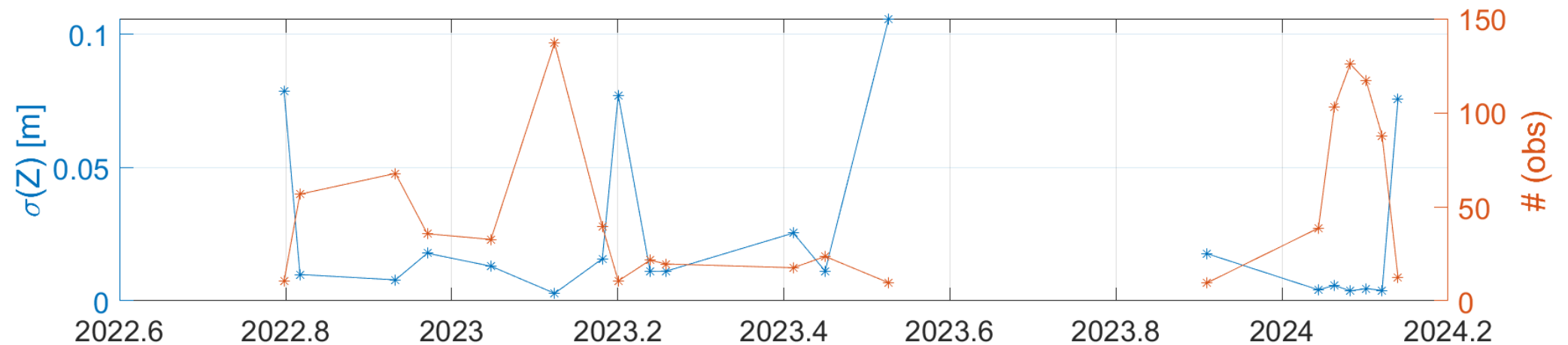
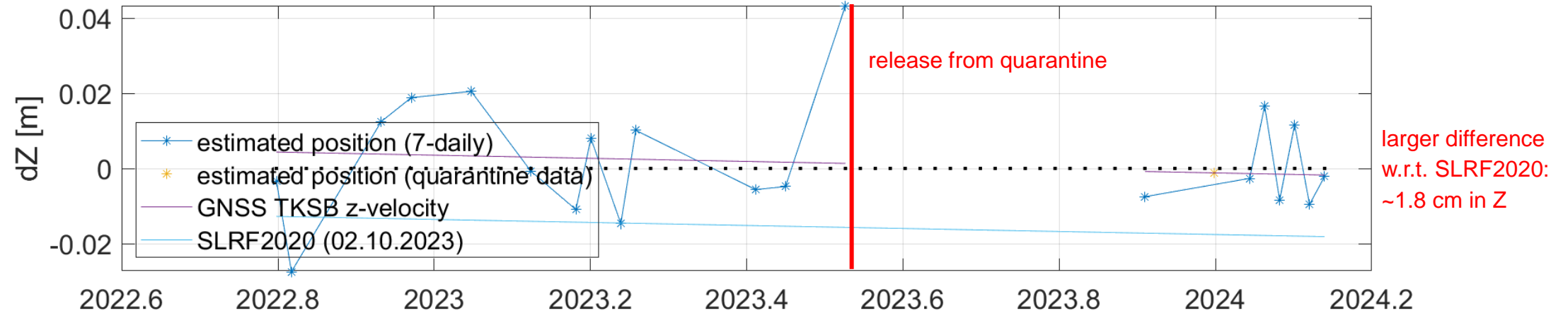
# 7306 – Y coordinate (data until end of February 2024)



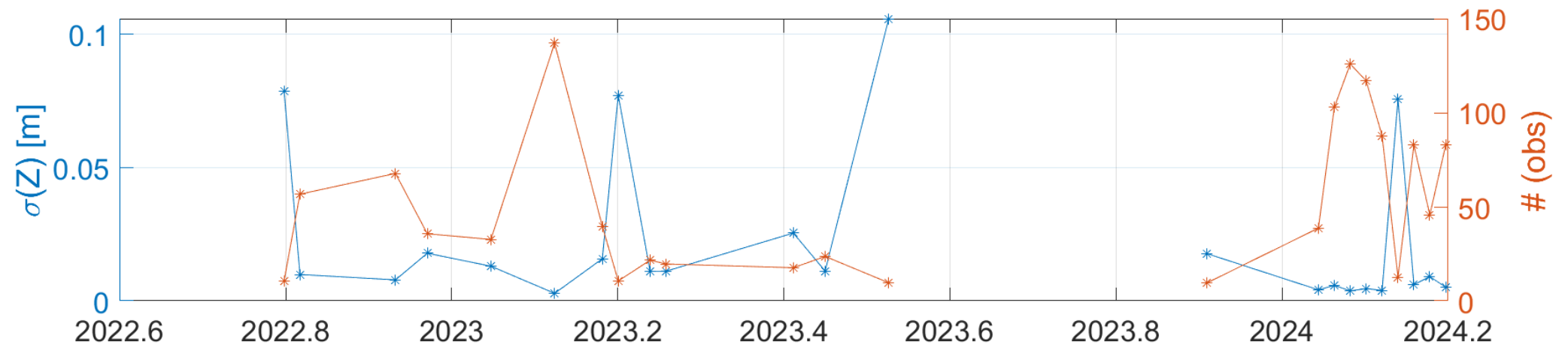
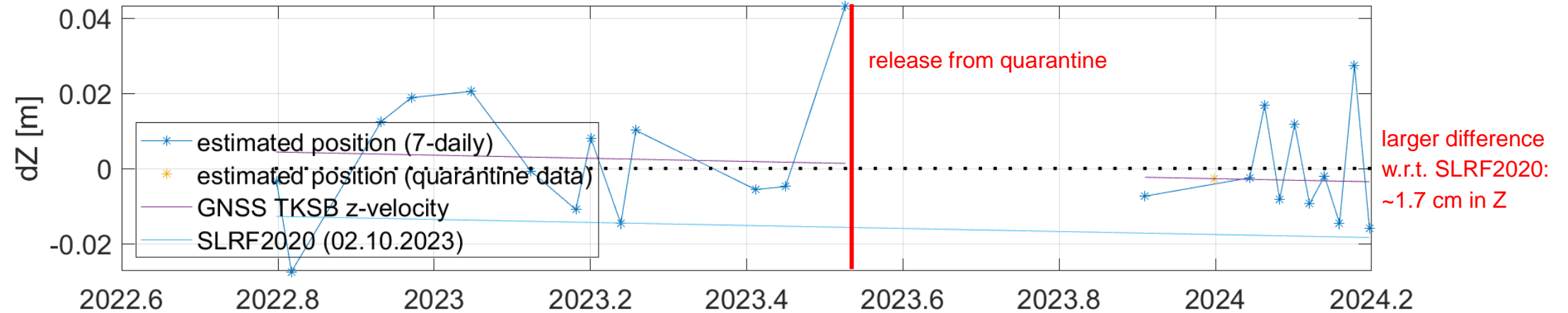
# 7306 – Y coordinate (data until end of March 2024)



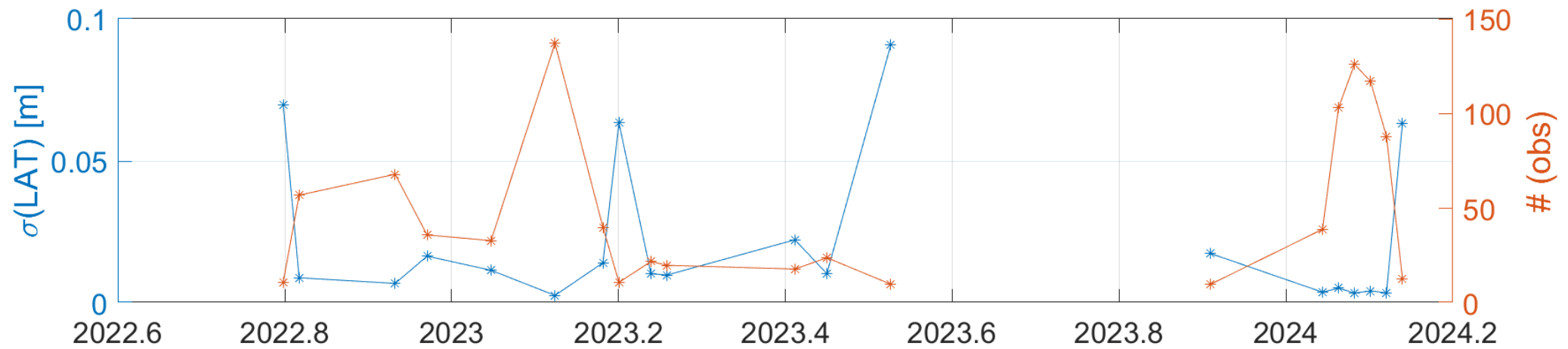
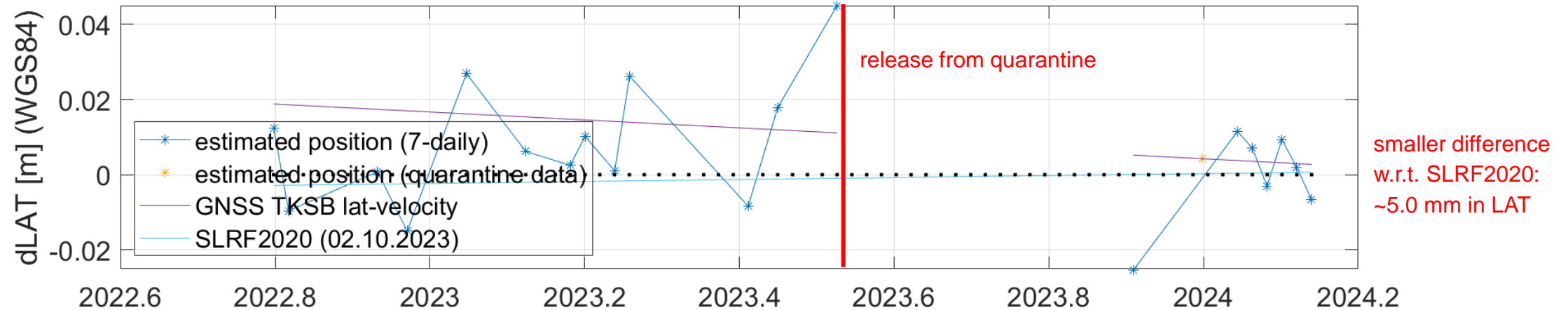
# 7306 – Z coordinate (data until end of February 2024)



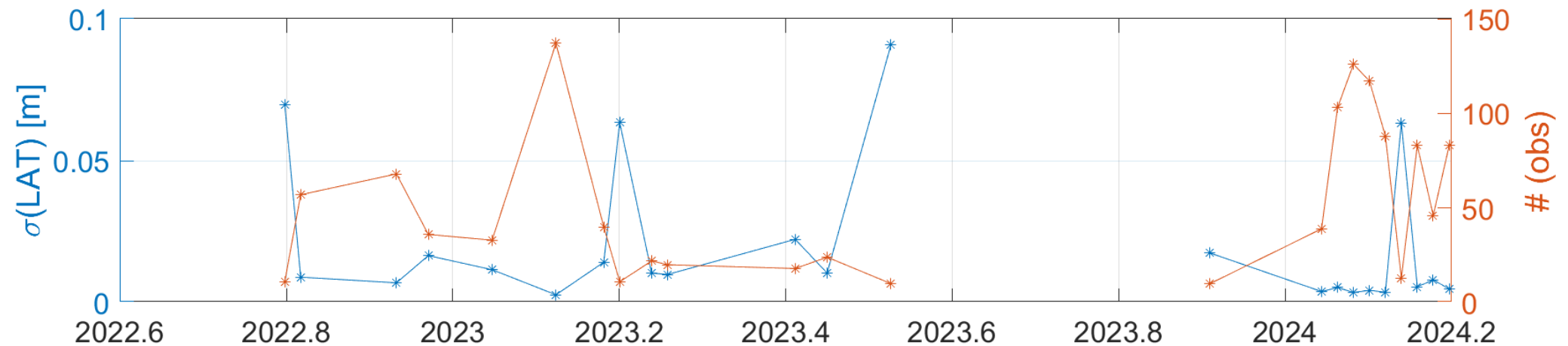
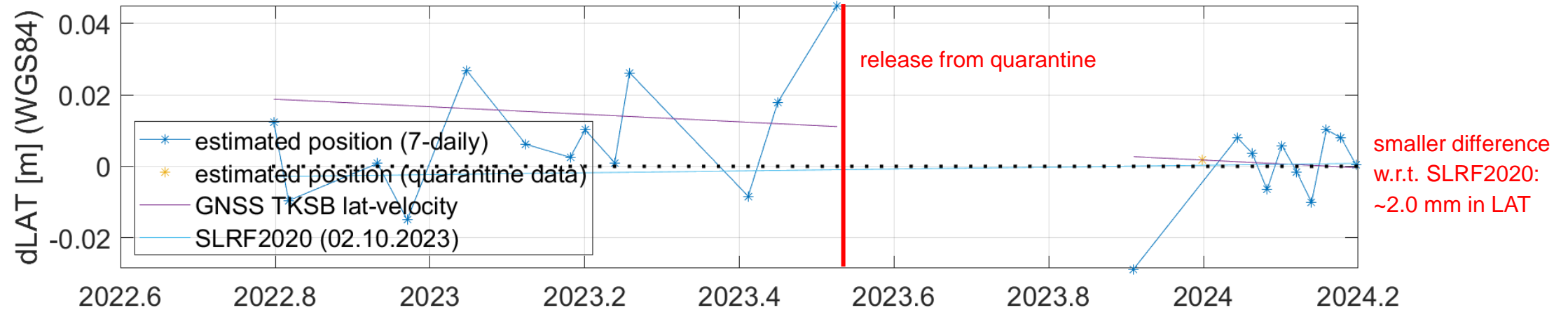
# 7306 – Z coordinate (data until end of March 2024)



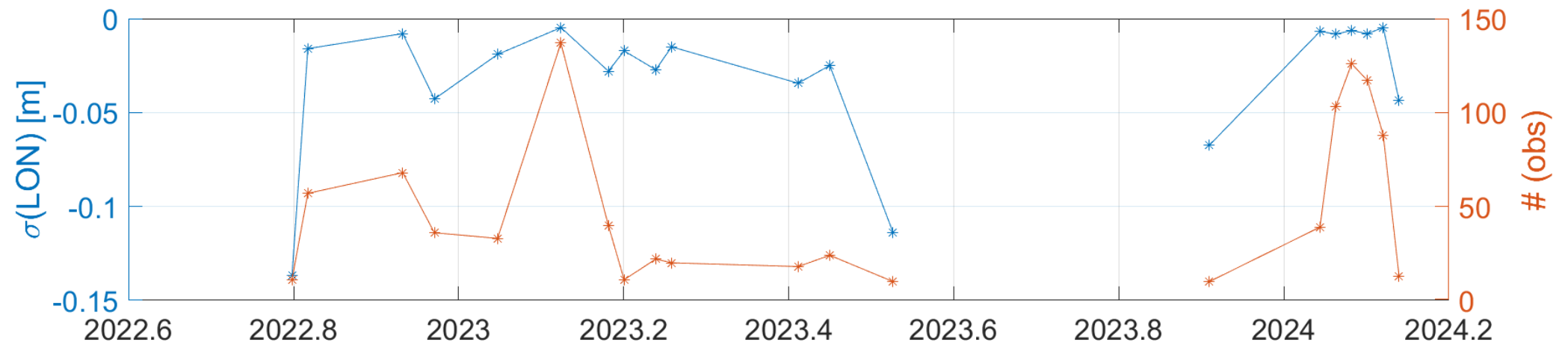
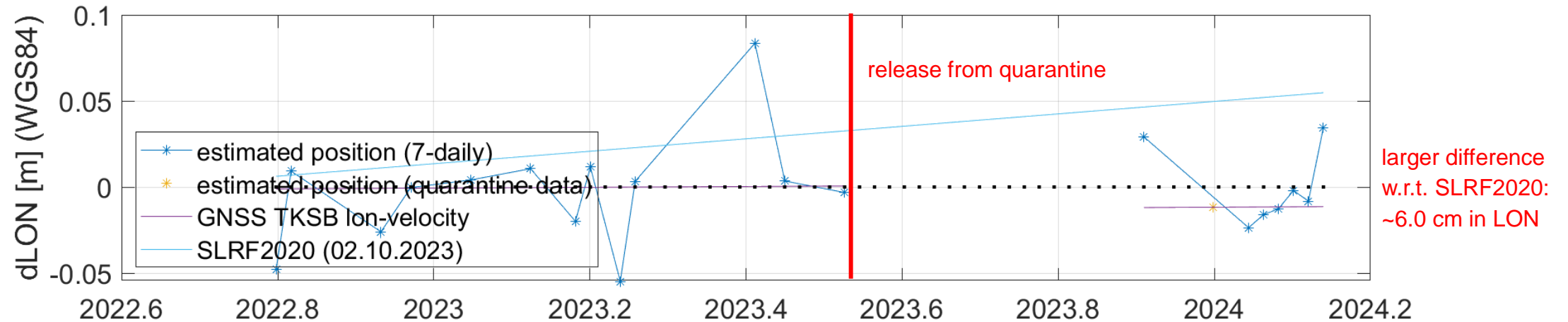
# 7306 – latitude (data until end of February 2024)



# 7306 – latitude (data until end of March 2024)

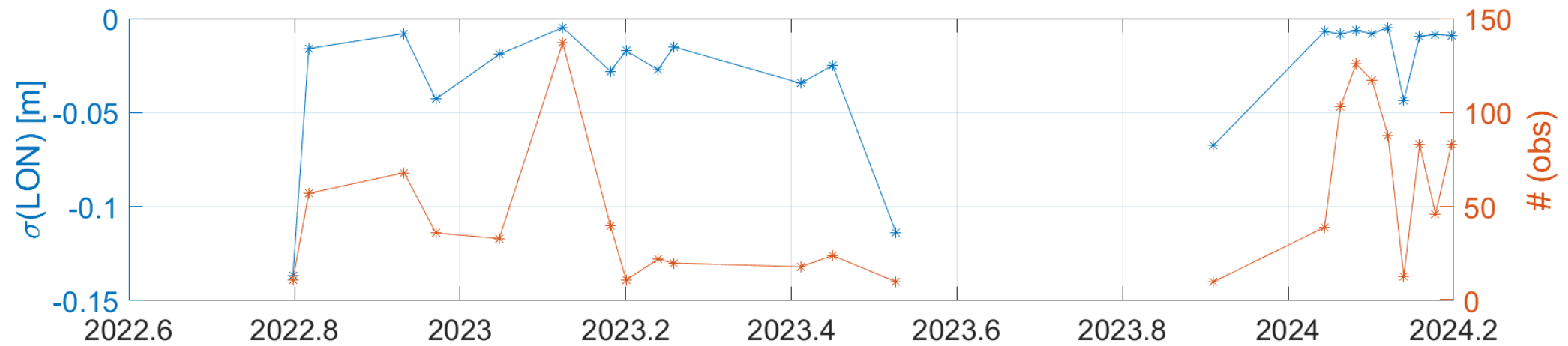
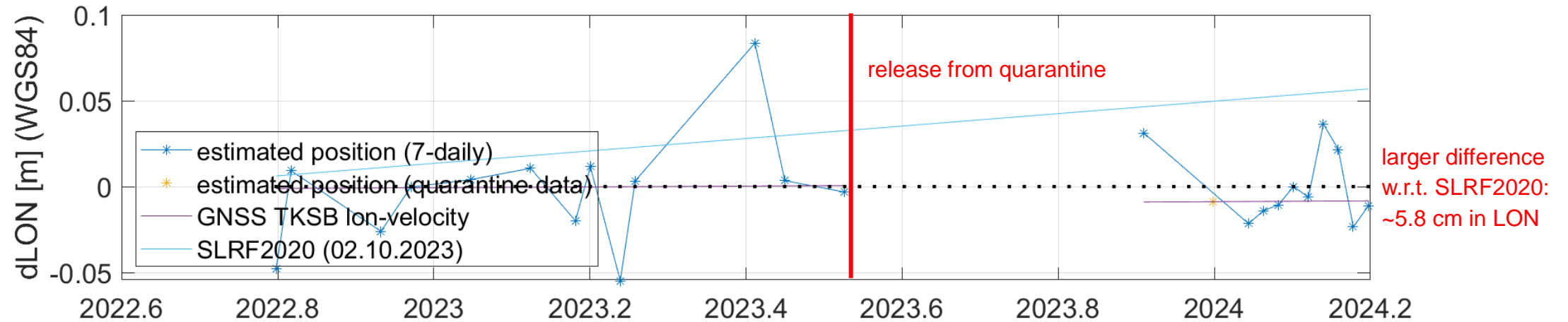


# 7306 – longitude (data until end of February 2024)

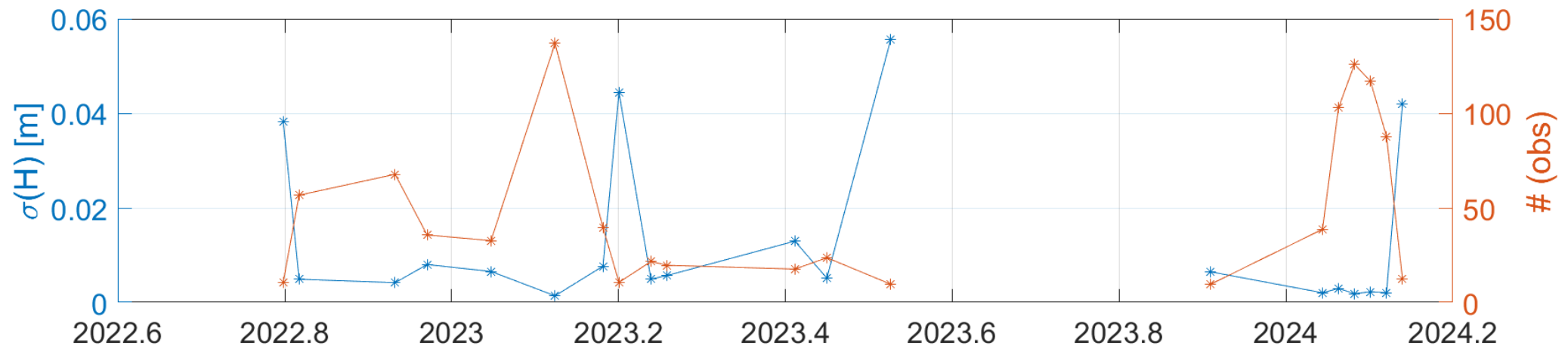
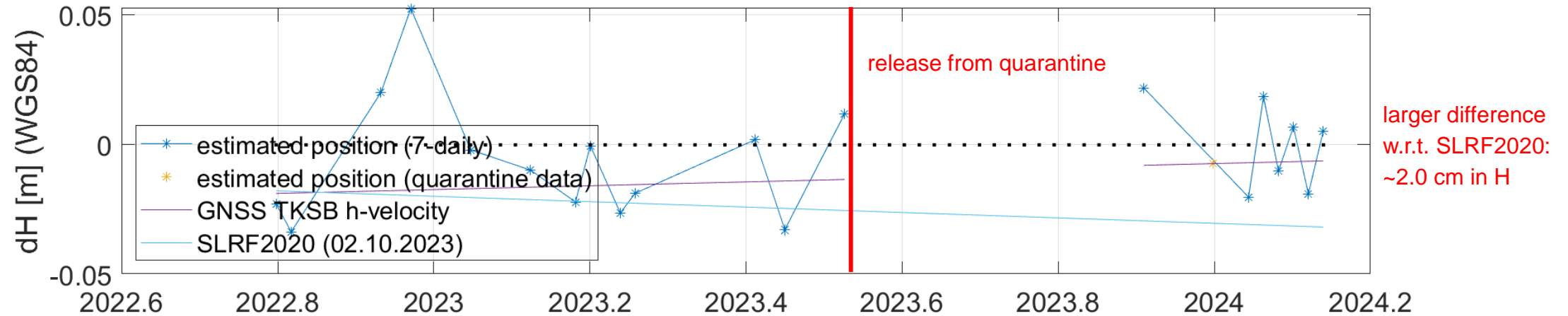




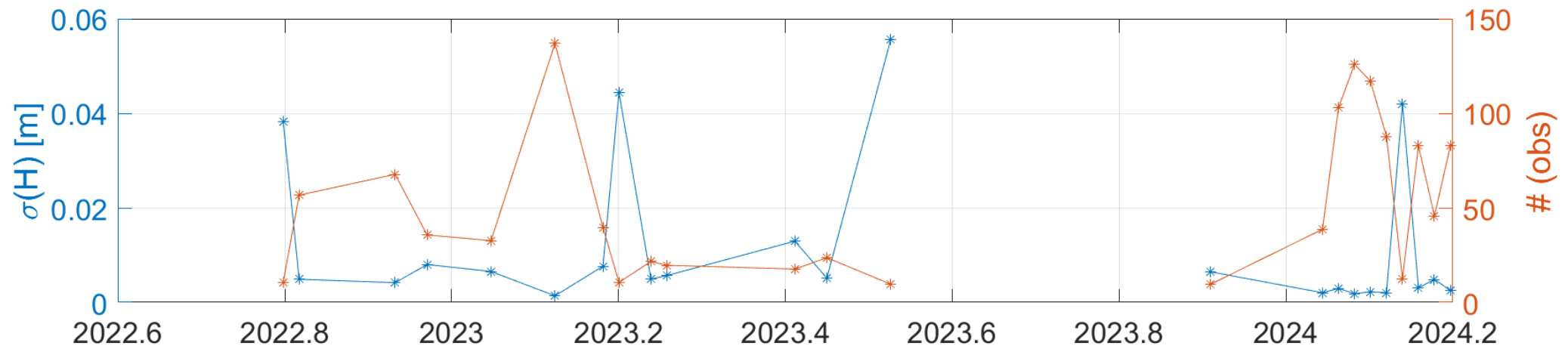
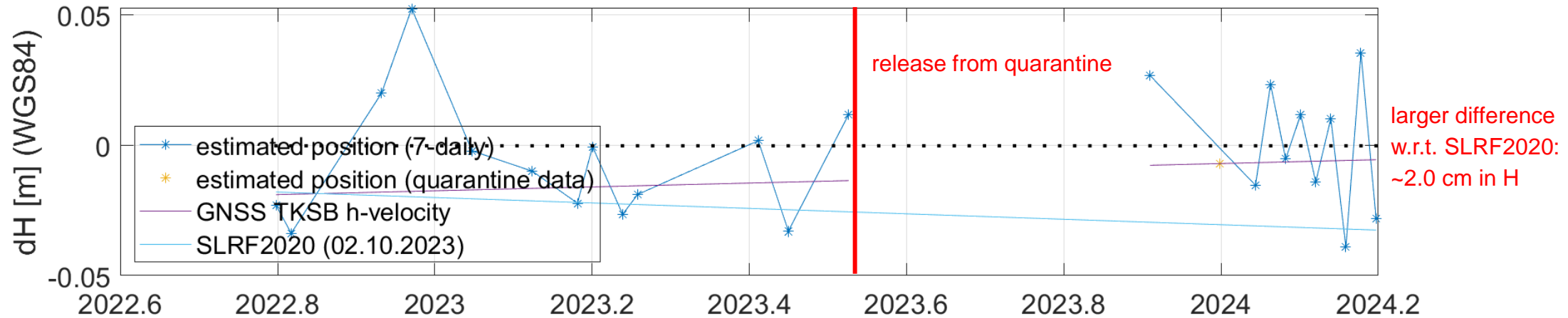
# 7306 – longitude (data until end of March 2024)



# 7306 – height (data until end of February 2024)



# 7306 – height (data until end of March 2024)



# Conclusions

- Differences between SLRF2020 position and newly estimated position reach cm-level (esp. in Y and Z, i.e. east and height)
- Newly estimated 7306 coordinates

	(data until end of February 2024)		(data until end of March 2024)	
	offset [m, m/yr]	STD [m, m/yr]	offset [m, m/yr]	STD [m, m/yr]
X	-3961641.0325	0.0119	-3961641.0182	0.0099
Y	3308774.4441	0.0116	3308774.4428	0.0099
Z	3734291.4632	0.0168	3734291.4603	0.0139
dX	-0.0105	0.0050	-0.0105	0.0050
dY	0.0064	0.0050	0.0064	0.0050
dZ	-0.0042	0.0050	-0.0042	0.0050

- reference epoch: 01.01.2024
- Estimates based on v280-like solution
  - station coordinates and EOP estimated together with biases (satellite-, station- and frequency-specific)
  - iterative VCE-based 4-satellite solution
  - NNR-condition used to realize orientation

# ILRS WS in Kunming, China



- The ILRS circulated the **first announcement for the 23rd International Workshop on Laser Ranging**, to be held during the week of **October 20th- 26th, 2024, in Kunming, China**

The screenshot shows the website for the 23rd International Workshop on Laser Ranging. The main heading is "23rd International Workshop on Laser Ranging, 20-26 Oct. 2024, Kunming (China)" with a subtitle "Celebrating 60 Years of SLR (1964-2024), Cooperation for the new era of ILRS". A navigation menu on the left includes: HOME, ABOUT, PROGRAMME, REGISTRATION, SUBMISSION, INVITATION & VISA, TRANSPORTATION, and HOTEL INFO. The main content area is titled "Introduction" and contains the following text:

The ILRS sponsors International Workshops on Laser Ranging (IWLRL) which are typically held every two years. In addition, the ILRS organizes focused technical or specialized workshops in years between the International Workshops on Laser Ranging. Recently, the ILRS has created guidelines for the community to propose future workshops and for the ILRS in planning these workshops.

The Yunnan Observatories and the International Laser Ranging Service (ILRS) are pleased to announce that the 23rd International Workshop on Laser Ranging will be held in Kunming, China during 20-26 October 2024. The hybrid format of the workshop is also to be set, enabling both in-person and online participation. Specific information will be released later.

We look forward to your participation!

Proposed session topics include:

SLR Contribution to Global Geodetic Observing System
--

On the right side, there is an "Important Dates" section with the following information:

02 SEP	Deadline for Registration
02 SEP	Deadline for Submission
21 OCT	The conference date
21 MAR	Start time of registration

Below this is a "Sponsors" section with logos for the Chinese Academy of Sciences and the International Laser Ranging Service.

# Next ILRS ASC meetings 2024?



- It might be beneficial to meet regularly, on a quarterly basis...
  - no day-long meetings
  - faster solving of potential problems
  
- January 2024
- April 2024
- July 2024? Just before the summer break?
- October 2024 (Kunming workshop)?