Current IGS developments with relations to EUREF

Elmar Brockmann and Rolf Dach

IGS 2023 Report

- Annual Report published just now
  (~260 pages, including EUREF contributions)

- Download via: https://igs.org/tech-report/

https://files.igs.org/pub/resource/technical_reports/2023_techreport.pdf

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New IGS Terms of References

Nomenclature of Working Groups, Pilot Projects, and Committees

As per the new Terms of Reference, the nomenclature of IGS components has changed. The mapping below will help with new names and conversions.

Previous nomenclature (2019 ToR)	Updated nomenclature (2023 ToR)
long-standing Working Groups	Committees
experimental Working Groups	Pilot Projects
Pilot Projects	Working Groups

Old Name	
Working Groups	
• Antenna	WG
• Bias and Calibration	WG
• Clock	WG
• Ionosphere	WG
• Troposphere	WG
• Real-Time	WG
• Reference Frame	WG
• RINEX	WG
***Experimental* Working Groups**	
• GNSS Monitoring	WG
• *MGEX*	*WG*
• PPP-AR	WG
• *TIGA*	*WG*
Committees	
• Infrastructure	Committee
• Analysis Center	Coordinator
Pilot Project	
• *Weather and Climate Research PP*	

• Troposphere	Committee
• Real-Time	Committee
• Reference Frame	Committee
• RINEX	Committee
Pilot Projects	
• GNSS Monitoring	Pilot Project
• *MGEX*	*Pilot Project*
• PPP-AR	Pilot Project
• *TIGA*	*Pilot Project*
Committees	
• Infrastructure	Committee
• Analysis Center	Coordinator
Working Group	
• *Weather and Climate Research WG*	

ITRF2020: yearly updates

- ITRF2020 was made available in early 2022 after a huge reprocessing effort by the IAG services: IGS, IVS, ILRS, IDS
- It was activated for the operational IGS solutions in November 2022.
- The IAG services will deliver yearly extensions of their solutions in order to extent the validity of the ITRF2020 (and increase number of reference stations)
- Yearly updates of the IGS20 frame:
  IGb20 is expected for September 2024
  IGc20 is expected 2025
  IGd20 is expected 2026

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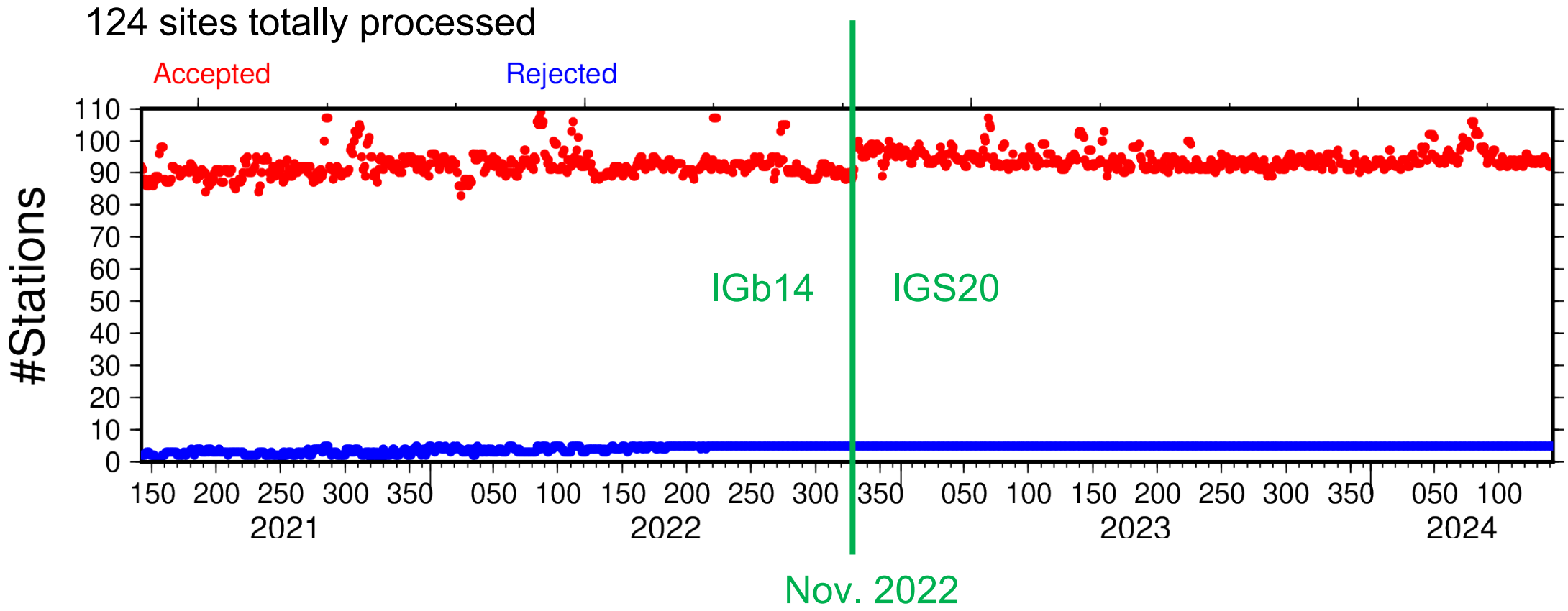
ITRF2020: yearly updates (cont)

Example IGb14->IGS20: CODE IGS Rapid products – number of stations used for reference frame



ITRF2020: yearly updates (cont)

- Expectation is that the frame realization (transformation parameters) is unchanged
- Impact is probably small, but coordinating, switching to new frame representation might cause some extra efforts depending on the user
- **IGS ACs will agree on a date to switch to IGb20 (test of the impact first)**

BeiDou/QZSS – update of the antenna calibration file

- Since November 2022 the operational IGS final solution includes GPS+GLONASS+Galileo (using pre-launch calibrations for Galileo and GPS Block IIIA satellites).
- BeiDou and QZSS in the MGEX products still based on unverified satellite antenna corrections.
- Beginning 2023, the IGS planned a series of global calibration solutions in order to compute consistent satellite antenna pattern and offsets for BDS: B1C/B2a and QZSS: L1/L5 signals. (-> new receiver tracking better; station coordinates may change depending antenna calibr.)
- Consequence of the decision: No BDS2 support
  (-> no orbit products for 10 satellites;
  for Europe only 4 MEOs relevant)

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Bias convention          S/S  O/F  OBS
**********************   ***  ***  ***
BEIDOU                   C    C1   C2I -> C1P
                         C    C2   C6I -> C5P

QZSS                     J    C1   C1C
                         J    C2   C2L -> C5Q
```

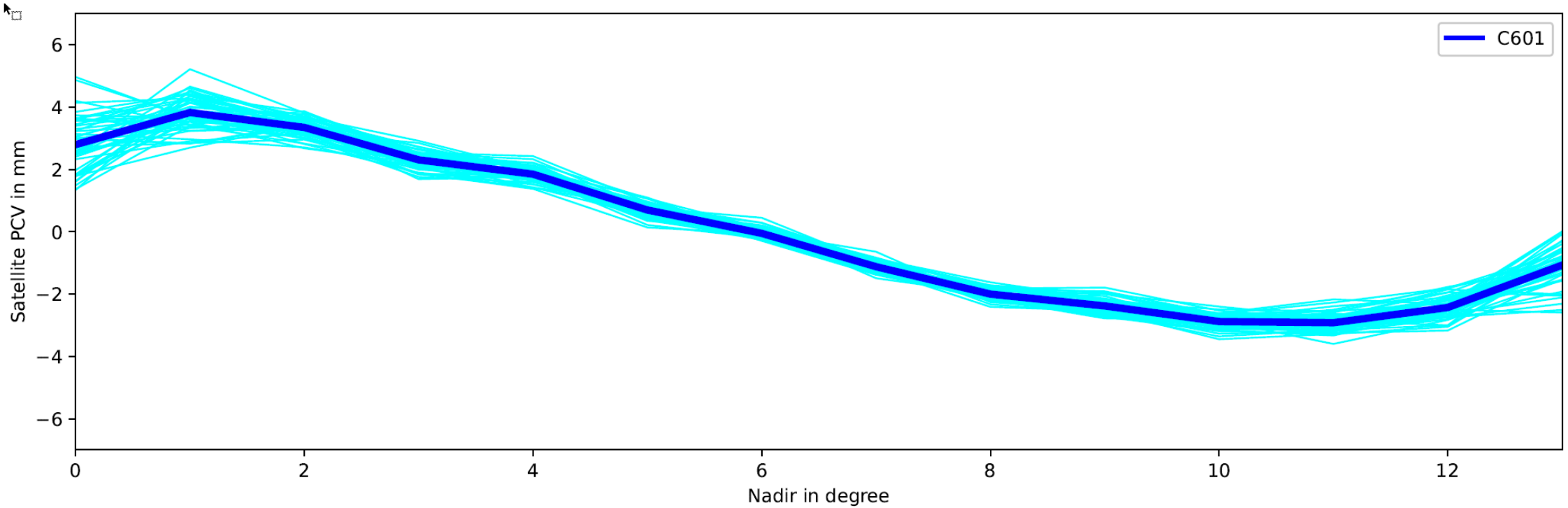
Bernese SEL file

BeiDou/QZSS – update of the antenna calibration file: STEPS

- STEP1:
  - 6 ACs processed **one year of data (2023)** using agreed processing options to determine with assumed constant offsets, in a first step the **elevation depending antenna corrections.** QZSS manufacturer values; BeiDou estimation from data
  - Combination done with COD ESA GFZ SHA TUM WHU
- STEP2:
  - Assume the combined elevation depending as given
  - 7 ACs will process **3 years of data (2021-2023)** in order to **compute constant offsets**
  - Start reprocessing expected after summer 2024

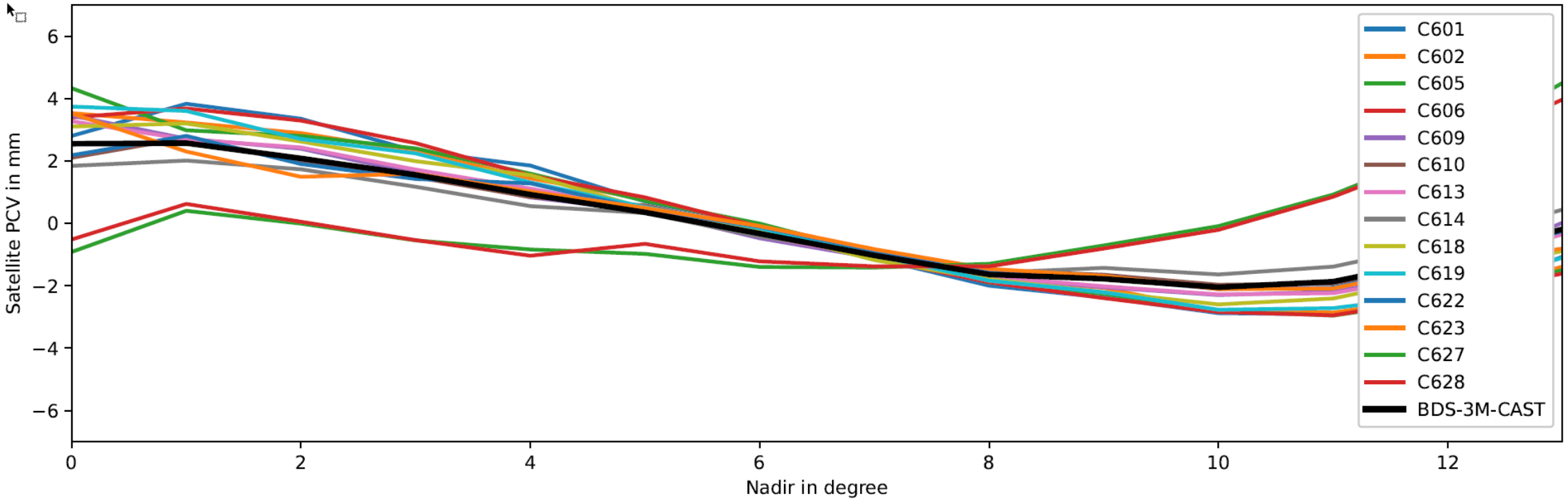
BeiDou/QZSS – update of the antenna calibration file: STEP1

Example: CODE results for C601 (C19) (and repeatability from weekly estimates)



BeiDou/QZSS – update of the antenna calibration file: STEP1

Example: CODE results for BeiDou CAST satellites



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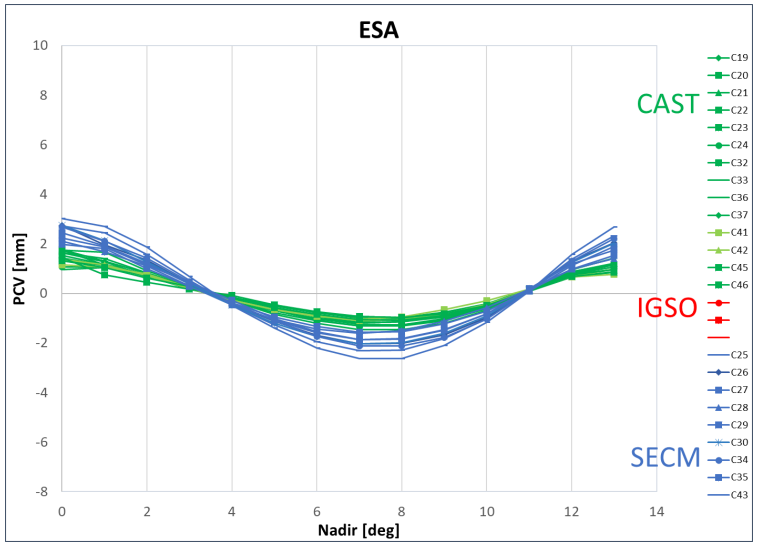
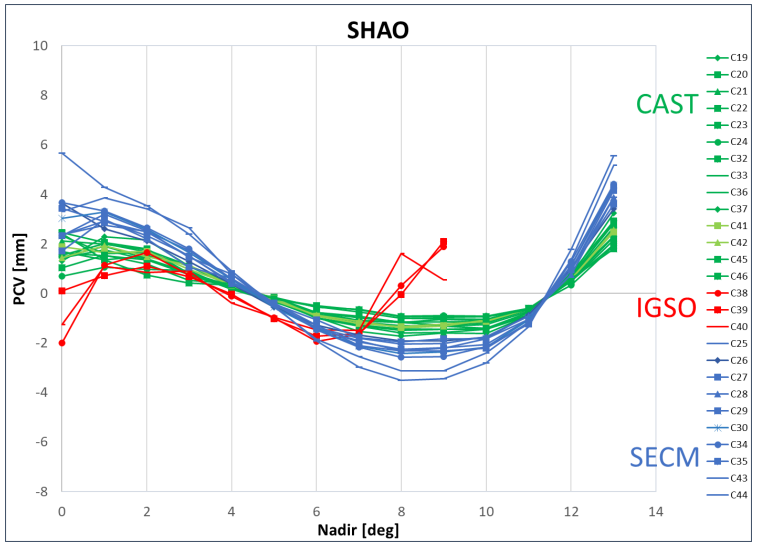
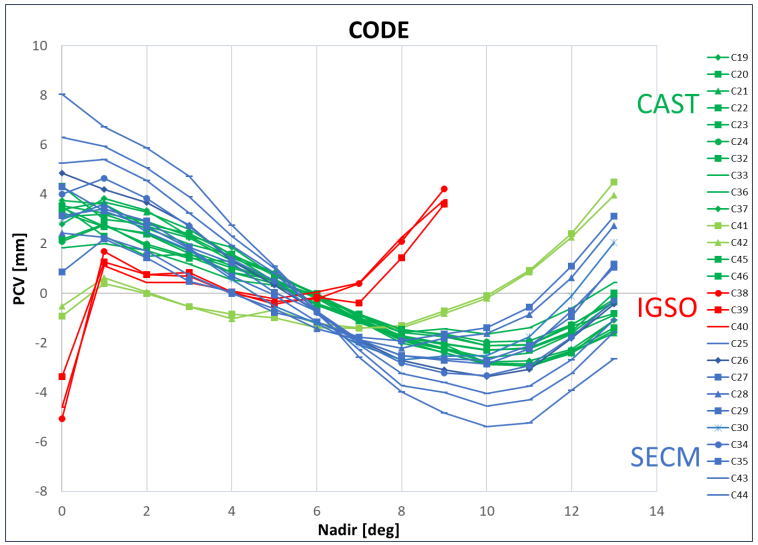
BeiDou/QZSS – update of the antenna calibration file: STEP1

Example: Results of 3 ACs







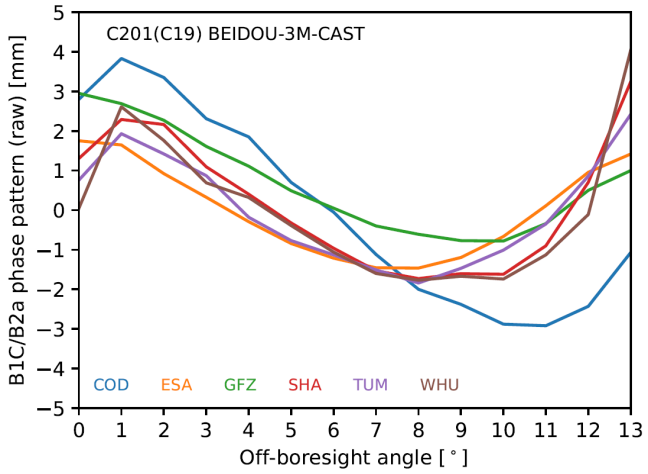
BeiDou/QZSS – update of the antenna calibration file: STEP1

Combination by P. Steigenberger/O. Montenbruck

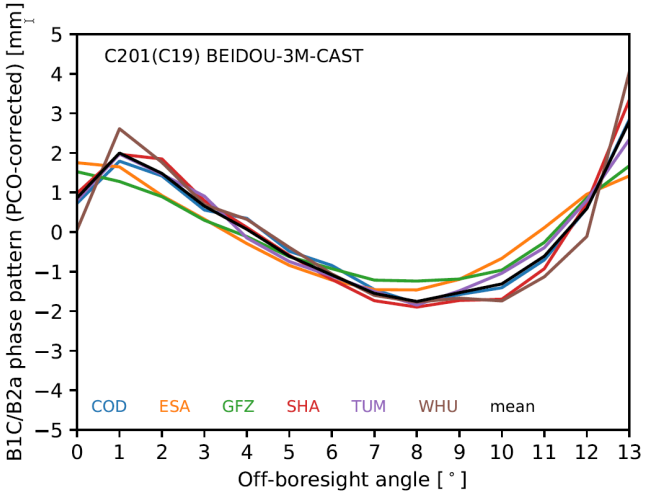
COD ESA GFZ SHA TUM WHU → mean

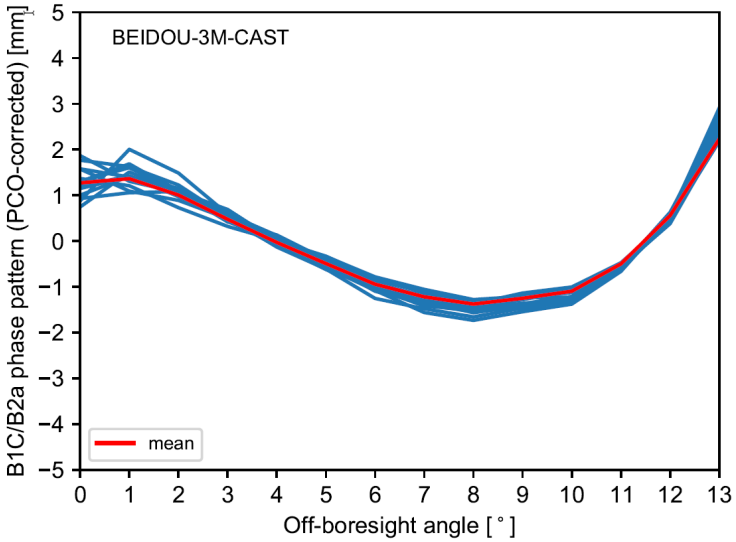
(z-PCO correction and constant phase bias that minimizes the phase pattern in a least-squares sense)

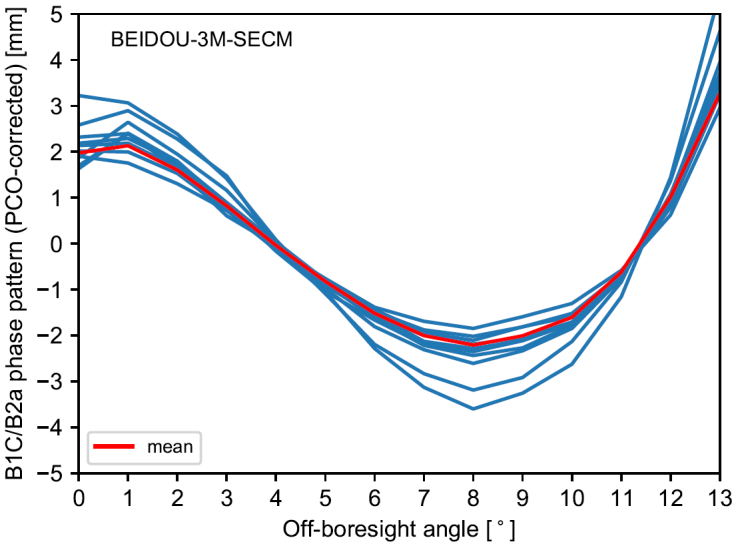
C201 (C19) **raw**



C201 (C19) **corr**







-> After agreement on averaged values, STEP2 can be started

Analysis Center Coordinator

- GA and MIT served two terms (2016-2024) as a successful ACC team.

- Call for proposals open February – June 2024 with following requirements:
  - MULTI-GNSS orbit and clock combination
  - Hand-over planned for early 2025

- Decision of new ACC expected at IGS GB meeting (IGS Symposium Bern, June 30, 2024)

Analysis Center Coordinator

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IGS demonstration ultra-rapid orbit combination for:
week 2300 day 1 (year 2024 doy 036) hour 00 to week 2300 day 03 (year 2024 doy 038) hour 00
The first 24 hours are observed, but the last 24 hours are predicted orbits
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* * * THIS COMBINATION IS STRICTLY EXPERIMENTAL -- USE WITH CAUTION * * *

 Author: IGS AC Coordinator
 Contact: acc@igs.org

 All AC solutions:
  - COD = COD0OPSULT_20240360000_02D_05M_ORB.SP3 : Center for Orbit Determination in Europe (CODE)
  - EMR = EMR0OPSULT_20240360000_02D_05M_ORB.SP3 : Natural Resources Canada (NRC)
  - ESA = ESA0OPSULT_20240360000_02D_15M_ORB.SP3 : European Space Agency
  - GFZ = GFZ0OPSULT_20240360000_02D_05M_ORB.SP3 : GeoForschungsZentrum Potsdam
  - GRG = GRG0OPSULT_20240360000_02D_05M_ORB.SP3 : Centre National d'Etudes Spatiales (CNES/CLS)
  - SIO = SIO0OPSULT_20240360000_02D_15M_ORB.SP3 : Scripps Institution of Oceanography (SIO)
  - USN = USN0OPSULT_20240360000_02D_15M_ORB.SP3 : The United States Naval Observatory (USNO)
  - WHU = WHU0OPSULT_20240360000_02D_05M_ORB.SP3 : Wuhan University
  - IGV : IGS (GPS+GLONASS) ultra-rapid experimental product, with GPS sourced from the IGS operational combination

 AC solutions used in the combination:
  AC  | Sat. System or PRN/SVN
 -----------------------------
  COD | G R E
  EMR | G R
  ESA | G R
  GFZ | G R E
  GRG | E
  WHU | G R
```

Demonstration combinations routinely provided since Feb. 2024

IGS Symposium Bern 2024

- Celebrating 30th anniversary
- symposium (1-4 July) and workshop (4-5 July)
- Registration possible till June 9

IGS Symposium Bern 2024

- ~150 contributions (64 oral slots, ~100 posters)
- Program:
  - Keynote Speakers (Marco Falcone, Heike Bock, past and current IGS chairs and CB directors)
  - S1: GNSS Standards and Infrastructure
  - S2: Building Global GNSS-Based Reference Frames
  - S3: Giving Access To The Reference Frames
  - S4: GNSS for Climate
  - S5: GNSS-Enabled Applications

https://www.conftool.com/igs2024/sessions.php

Conference Agenda

Overview and details of the sessions of this conference. Please select a date or location to show only sessions at that day or location. Please select a single session for detailed view (with abstracts and downloads if available).

List View | Authors | Table with Max 4 Columns | More... | Name, Title...

Filter by Session Topic: All topics: do not filter

Session Overview

Date: Monday, 01/July/2024

8:30am Opening IGS Symposium & Workshop

	Monday, 01. July	Tuesday, 02. July	Wednesday, 03. July	Thursday, 04. July	Friday, 05. July	
8.30 h	Opening	Session 2: Building Global GNSS-Based Reference Frames	Session 3: Giving Access to the Reference Frame Through GNSS	Session 5: GNSS-Enabled Applications	Workshop: A6: MGEX	8.30 h
9.00 h	Session 1: GNSS Standards and Infrastructure					
10.00 h	*Coffee break*	*Coffee break*	*Coffee break*	*Coffee break*	*Coffee break*	10.00 h
10.30 h	Session 1: GNSS Standards	Session 2: Building Global GNSS-Based Reference Frames	Session 4: GNSS for Climate	Session 5: GNSS-Enabled Applications	Workshop: A6: Analysis centers & reference frame	10.30 h
11.00 h	Session 2: Building Global GNSS-Based Reference Frames					
12.00 h	*Lunch*	*Lunch*	*Lunch*	Closing Symposium		
				Lunch	*Lunch*	12.30 h
13.30 h	Session 2: Building Global GNSS-Based Reference Frames	Session 3: Giving Access to the Reference Frame Through GNSS	Session 4: GNSS for Climate	Workshop: A6: Bias & PPP	Workshop: A6: 14.00h-14.30h AC exchange on Genesis mission A6: 14.30h-16.00h Antenna B5: Clock products	14.00 h
15.00 h	*Break*	*Break*	*Break*			
15.15 h	Keynote: Marco Falcone	Keynote: Heike Peter	Celebrating: 30 years of IGS			
16.00 h	Posters with Apero	Posters with Apero	Posters with Apero and Racelette	*Coffee break*	*Coffee break*	16.00 h
				Workshop: A6: Infrastructure B5: 16.30h-18.00h Troposphere B5: 18.00h-19.00h Ionosphere	Workshop: A6: Real time B5: RINEX	16.30 h
					Summary/Closing	18.30 h
19.00 h						19.00 h