

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: <u>https://igs.org/tech-report/</u>

IGS Annual Technical Report





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.

Old Name	Previous nomenclature (2019 ToR) Updated nomenclature (20	23 ToR)
Working Groups Antenna Bias and Calibration Clock WG 	long-standing Working GroupsCommitteesexperimental Working GroupsPilot ProjectsPilot ProjectsWorking Groups	
Troposphere WG Real-Time WG Reference Frame WG RINEX WG	Troposphere Committee Real-Time Committee Reference Frame Committee RINEX Committee	
Experimental Working Groups • GNSS Monitoring WG • MGEX WG • PPP-AR WG • TIGA WG	Pilot Projects • GNSS Monitoring Pilot Project • MGEX Pilot Project • PPP-AR Pilot Project • T/GA Pilot Project	
Committees Infrastructure Analysis Center Coordinator 	Committees Infrastructure Analysis Center Coordinator	
Pilot Project • Weather and Climate Research PP	Working Group • Weather and Climate Research WG	

3



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



ITRF2020: yearly updates (cont)

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

frame 124 sites totally processed



Nov. 2022



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)

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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 sup (-> no orbit products for 10 satellites; for Europe only 4 MEOs relevant)

C	Bias convention	S/S ***	O/F ***	OBS ***
	BEIDOU	C C	C1 C2	C2I -> C1P C6I -> C5P
	QZSS	J J	C1 C2	C1C C2L -> C5Q

Bernese SEL file

INTERNATIONAL GNSSSERVICE

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



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





Example: CODE results for BeiDou CAST satellites



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Example: Results of 3 ACs



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)





65

G N S S SERVICE



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

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 Demonstration The first 24 hours are observed, but the last 24 hours are predicted orbits combinations * * * THIS COMBINATION IS STRICTLY EXPERIMENTAL -- USE WITH CAUTION * * * routinely provided since Feb. 2024 Author: IGS AC Coordinator Contact: acc@igs.org All AC solutions: - COD = COD00PSULT 20240360000 02D 05M ORB.SP3 : Center for Orbit Determination in Europe (CODE) - EMR = EMR0OPSULT 20240360000 02D 05M ORB.SP3 : Natural Resources Canada (NRC) - ESA = ESA00PSULT 20240360000 02D 15M ORB.SP3 : European Space Agency - GFZ = GFZ00PSULT 20240360000 02D 05M ORB.SP3 : GeoForschungsZentrum Potsdam - GRG = GRG00PSULT 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 = USN00PSULT 20240360000 02D 15M ORB.SP3 : The United States Naval Observatory (USNO) - WHU = WHU00PSULT 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



IGS Symposium Bern 2024

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





G N S S SERVICE

GS

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

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

E 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).

E List View	ø Authors	Table with Max 4 Columns	✓ More	🔍 Name, Title	
	Filter by	Session Topic All topics: do not fi	Iter	✓	
	Filter by Session Topic All topics: do not filter				
	List View Authors Authors Authors Authors All topics: do not filter Session Overview E: Monday, 01/July/2024				
Date: Mon	day, 01/Ju	ıly/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 9.00 h	Opening Session 1: GNSS Standards and Infrastructure	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	8.301
10.00 h	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break	10.00
10.30 h 11.00 h	Session 1: GNSS Standards Session 2: Building Global GNSS-Based Reference Frames	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
12.00 h	Lunch	Lunch	Lunch	Closing Symposium	Lunch	12.30
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	14.00
15.00 h	Break	Break	Break		A6: 14.30h-16.00h	
15.15 h	Keynote: Marco Falcone	Keynote: Heike Peter	Celebrating: 30 years of IGS	-	Antenna 35: Clock products	
16.00 h	Posters with Apero	Posters with Apero	Posters with Apero and Racelette	Coffee break	Coffee break	16.00
				Workshop: A6: Infrastructure B5: 16.30h-18.00h Troposphere	Workshop: A6: Real time B5: RINEX	16.30
				B5: 18.00h-19.00h		