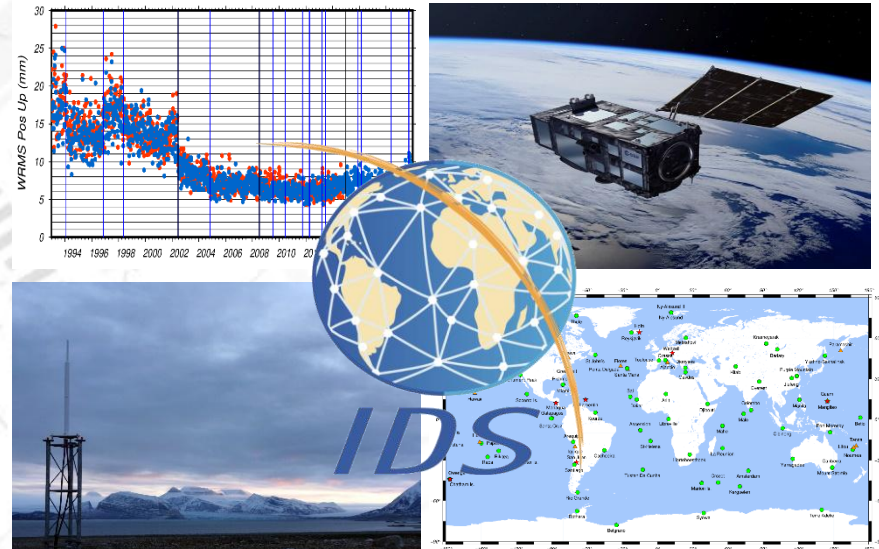


IDS Position/Velocity Cumulative Solution ids25d02

Guilhem Moreaux

Collecte Localisation Satellites

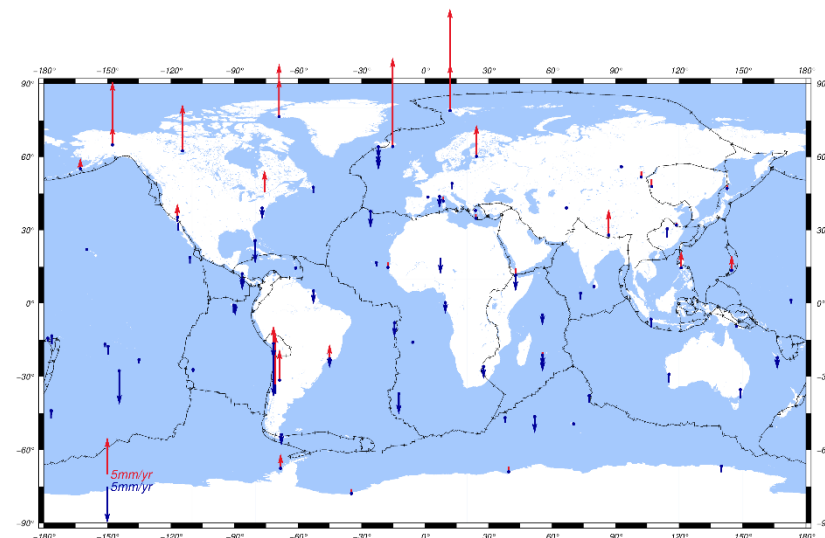
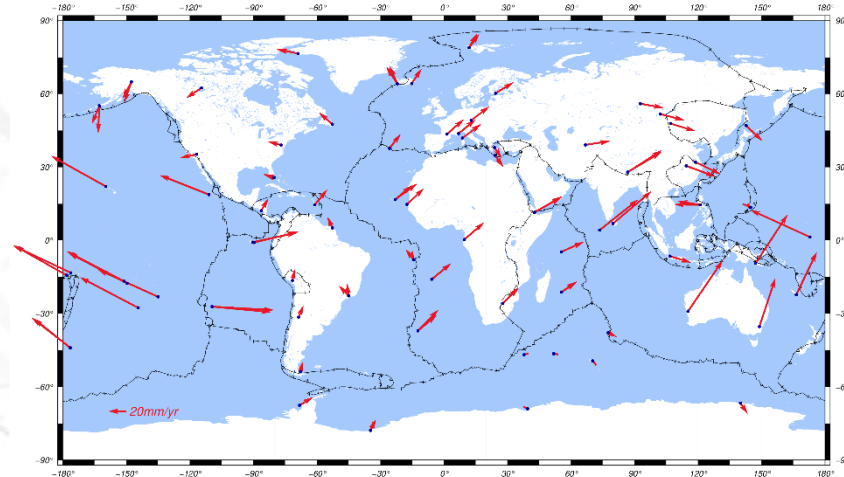
2025/11/17





IDS Cumulative Solution

- **ids25d02:**
 - Is the output of the stacking of the IDS combined series ids 19&26 from 1993.0 to 2025.5.
 - Is aligned onto ITRF2020-u2023.
 - Includes annual and semi-annual station position corrections.
 - Periodic terms are only estimated for sites with observations after mid-2002 and with at least two years of observations.
- **Ids25d01:** cumulative solution as output of the stacking of the ids 19&25 series from 1993.0 to 2025.0.



ids25d02 – Velocity Constraints

For sites with less than 2 years of observations.

Site	DORIS station	Reference station	Technique	Source
Ajaccio	AJAB	AJAC	GNSS	ITRF2020
Gavdos	GAVC	DORIS mail 1367		
Hanga Roa	HROC	FISL	GNSS	ITRF2020
Huahine	HUAA	7123	Laser Ranging	ITRF2020
Ulaanbaatar	ULAC	ULAB	GNSS	ITRF2020

No more external constraints on the HROC velocities.

ids25d02 – Discontinuities

	ids25d01	ids25d02
Observations time span	1993.0-2025.0	1993.0-2025.5
Nb of stations	222	224
Nb of sites	90	90
Discontinuities		
Overall number	135	135
Nb of affected sites	50	50
Nb of affected stations	68	68
With geophysical origin	60	60
With technical origin	25	25
With unknown origin	50	50

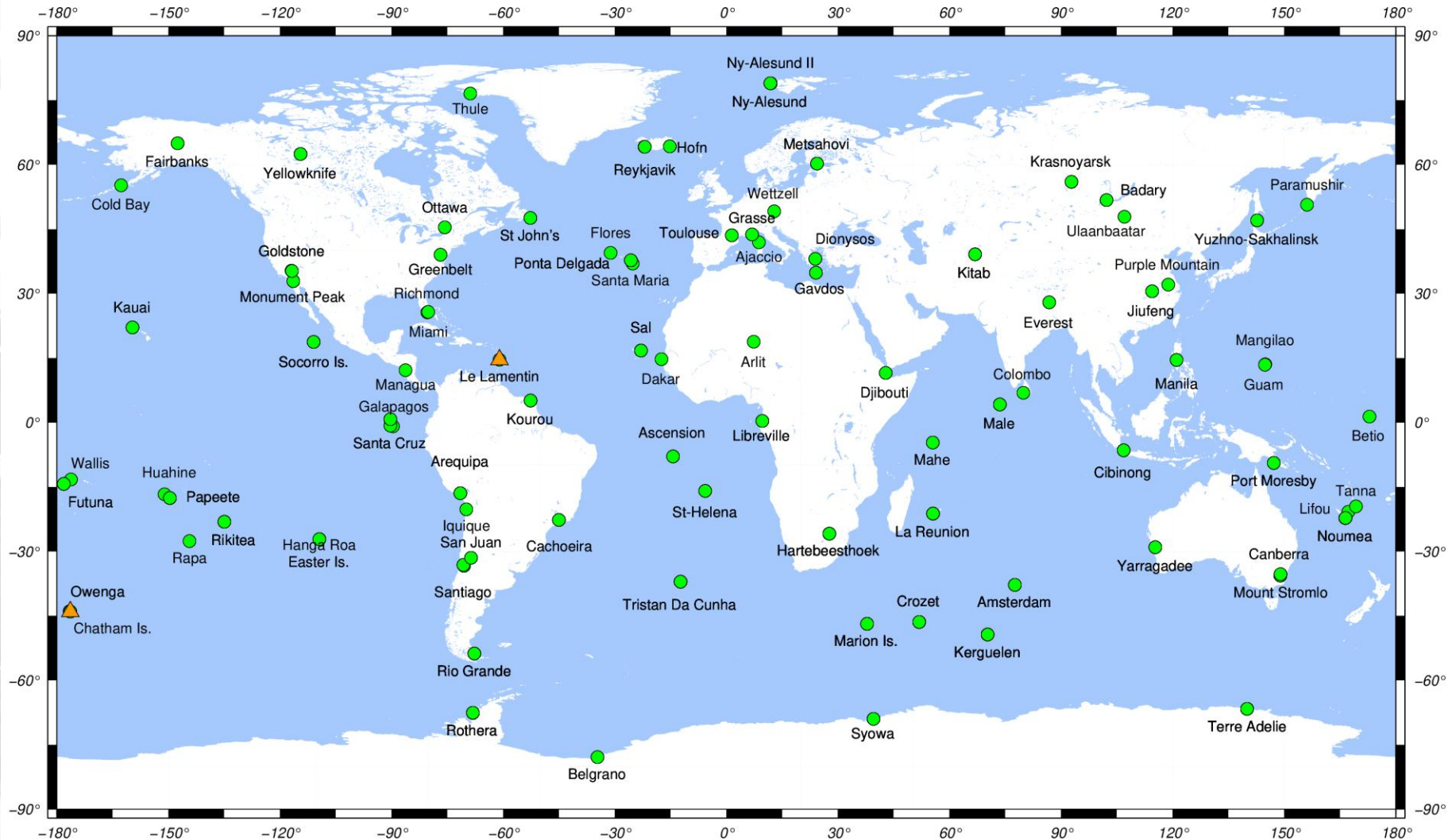
**Two more stations: LAPB (Le Lamentin) and OWGC (Owenga).
No more discontinuity over the new 6 months of observations.**



ids25d02 – DORIS Station Network

90 DORIS sites – 224 DORIS stations

Two more stations since ids25d01: LAPB (Le Lamentin) and OWGC (Owenga)





World map showing the number of plate boundaries (discontinuities) passing through various locations. The map uses a color scale from 1 (blue) to 9 (red) to indicate the count. Major plate boundaries are visible as lines across the map. Locations are labeled with names, and some are marked with colored dots corresponding to the number of boundaries they intersect.

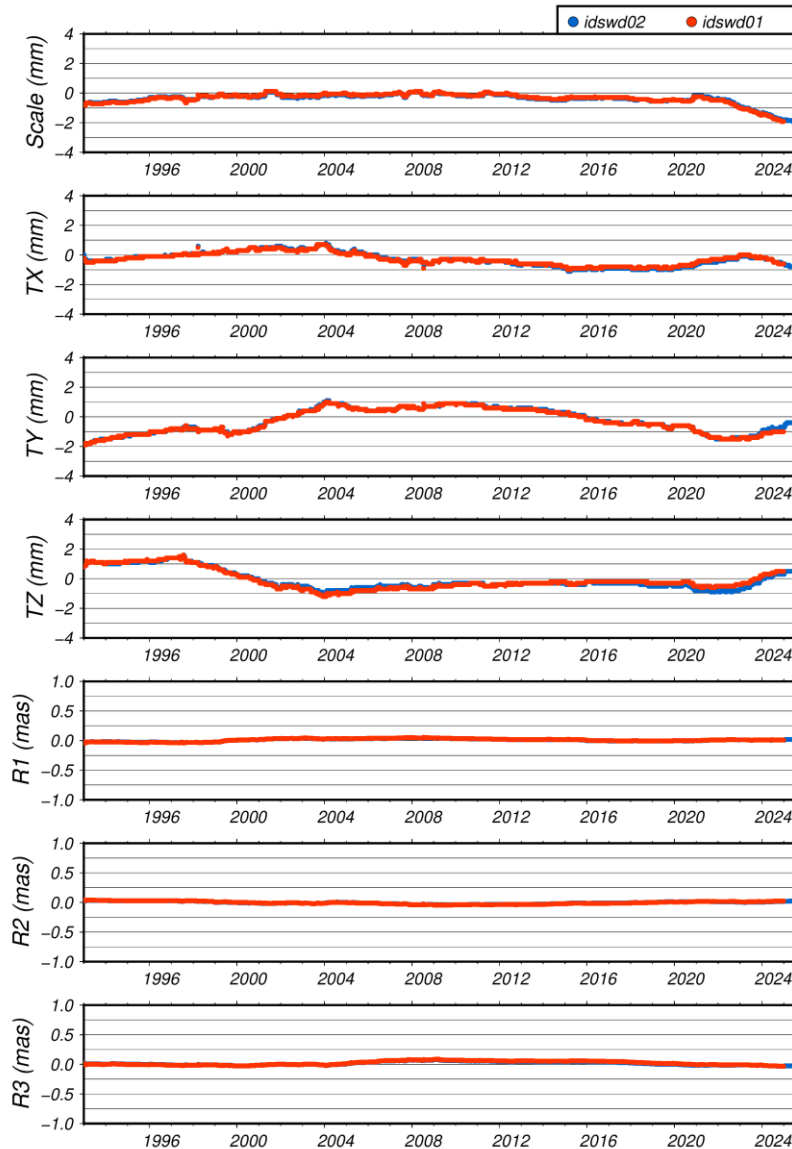
Color scale: 1 (blue) to 9 (red).

Locations marked with dots (color indicates number of discontinuities):

- 1 (blue): Chatham Is., Rapa, Easter Is., Socorro Is., Miami, Le Lamentin, Santa Cruz, Galapagos, Managua, Santa Maria, Santa John's, Flores, Reykjavik, Ny-Alesund, Ny-Alesund II, Metsahovi, Grasse, Ajaccio, Dionysos, Gavdos, Ulaanbaatar, Purple Mountain, Jiu Feng, Ciboong, La Reunion, Marion Is., Syowa, Belgrano, Rio Grande, Rothera, Chatham Is., Rapa, Easter Is., Socorro Is., Miami, Le Lamentin, Santa Cruz, Galapagos, Managua, Santa Maria, Santa John's, Flores, Reykjavik, Ny-Alesund, Ny-Alesund II, Metsahovi, Grasse, Ajaccio, Dionysos, Gavdos, Ulaanbaatar, Purple Mountain, Jiu Feng, Ciboong, La Reunion, Marion Is., Syowa, Belgrano, Rio Grande, Rothera.
- 2 (dark blue): Fairbanks, Cold Bay, Kauai, Monument Peak, Richmond, Greenbelt, Ottawa, Yellowknife, Thule, Hofn, Toulouse, Wetzell, Krasnoyarsk, Badary, Paramushir, Yuzhno-Sakhalinsk, Ulaanbaatar, Purple Mountain, Jiu Feng, Ciboong, La Reunion, Marion Is., Syowa, Belgrano, Rio Grande, Rothera.
- 3 (light blue): Goldstone, Socorro Is., Miami, Le Lamentin, Santa Cruz, Galapagos, Managua, Santa Maria, Santa John's, Flores, Reykjavik, Ny-Alesund, Ny-Alesund II, Metsahovi, Grasse, Ajaccio, Dionysos, Gavdos, Ulaanbaatar, Purple Mountain, Jiu Feng, Ciboong, La Reunion, Marion Is., Syowa, Belgrano, Rio Grande, Rothera.
- 4 (cyan): Easter Is., Socorro Is., Miami, Le Lamentin, Santa Cruz, Galapagos, Managua, Santa Maria, Santa John's, Flores, Reykjavik, Ny-Alesund, Ny-Alesund II, Metsahovi, Grasse, Ajaccio, Dionysos, Gavdos, Ulaanbaatar, Purple Mountain, Jiu Feng, Ciboong, La Reunion, Marion Is., Syowa, Belgrano, Rio Grande, Rothera.
- 5 (green): Easter Is., Socorro Is., Miami, Le Lamentin, Santa Cruz, Galapagos, Managua, Santa Maria, Santa John's, Flores, Reykjavik, Ny-Alesund, Ny-Alesund II, Metsahovi, Grasse, Ajaccio, Dionysos, Gavdos, Ulaanbaatar, Purple Mountain, Jiu Feng, Ciboong, La Reunion, Marion Is., Syowa, Belgrano, Rio Grande, Rothera.
- 6 (yellow): Easter Is., Socorro Is., Miami, Le Lamentin, Santa Cruz, Galapagos, Managua, Santa Maria, Santa John's, Flores, Reykjavik, Ny-Alesund, Ny-Alesund II, Metsahovi, Grasse, Ajaccio, Dionysos, Gavdos, Ulaanbaatar, Purple Mountain, Jiu Feng, Ciboong, La Reunion, Marion Is., Syowa, Belgrano, Rio Grande, Rothera.
- 7 (orange): Easter Is., Socorro Is., Miami, Le Lamentin, Santa Cruz, Galapagos, Managua, Santa Maria, Santa John's, Flores, Reykjavik, Ny-Alesund, Ny-Alesund II, Metsahovi, Grasse, Ajaccio, Dionysos, Gavdos, Ulaanbaatar, Purple Mountain, Jiu Feng, Ciboong, La Reunion, Marion Is., Syowa, Belgrano, Rio Grande, Rothera.
- 8 (red): Easter Is., Socorro Is., Miami, Le Lamentin, Santa Cruz, Galapagos, Managua, Santa Maria, Santa John's, Flores, Reykjavik, Ny-Alesund, Ny-Alesund II, Metsahovi, Grasse, Ajaccio, Dionysos, Gavdos, Ulaanbaatar, Purple Mountain, Jiu Feng, Ciboong, La Reunion, Marion Is., Syowa, Belgrano, Rio Grande, Rothera.
- 9 (dark red): Easter Is., Socorro Is., Miami, Le Lamentin, Santa Cruz, Galapagos, Managua, Santa Maria, Santa John's, Flores, Reykjavik, Ny-Alesund, Ny-Alesund II, Metsahovi, Grasse, Ajaccio, Dionysos, Gavdos, Ulaanbaatar, Purple Mountain, Jiu Feng, Ciboong, La Reunion, Marion Is., Syowa, Belgrano, Rio Grande, Rothera.



ids25d02 vs ITRF2020-u2023



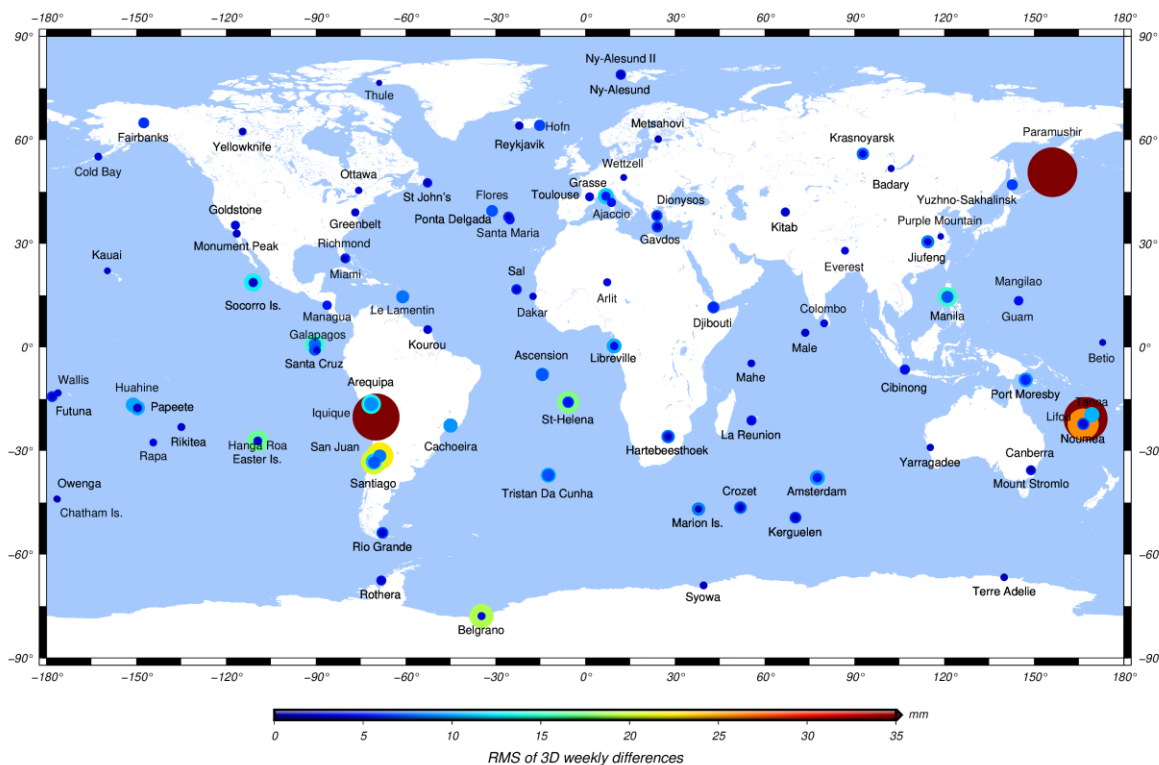
Helmert parameters of the weekly propagations of ids25d01 and ids25d02 wrt ITRF2020-u2023 without annual and semi-annual corrections.

	ids25d01			ids25d02		
	mean	std	rms	mean	Std	rms
Sc [mm]	-0.35	0.36	0.50	-0.38	0.37	0.53
Tx [mm]	-0.27	0.41	0.49	-0.29	0.46	0.54
Ty [mm]	-0.30	0.81	0.86	-0.27	0.80	0.85
Tz [mm]	-0.09	0.68	0.68	-0.10	0.66	0.67
R1 [mas]	0.01	0.02	0.03	0.01	0.02	0.02
R2 [mas]	0.00	0.02	0.02	0.00	0.02	0.02
R3 [mas]	0.02	0.03	0.04	0.02	0.03	0.03

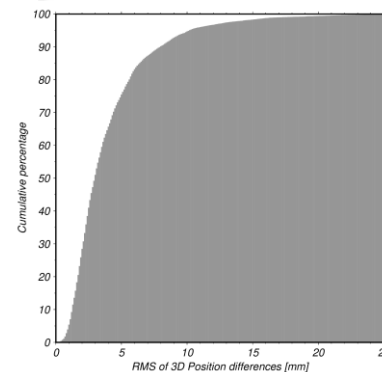
Similar results for ids25d01 and ids25d02.

ids25d02 vs ITRF2020-u2023

Weekly station coordinate differences between ids25d02 and ITRF2020-u2023 from 1993.0 to 2025.5.
Without annual and semi-annual corrections.



	[mm]
Max	76.1
Median	3.0
RMS	5.9
Mean	4.2
STD	4.1

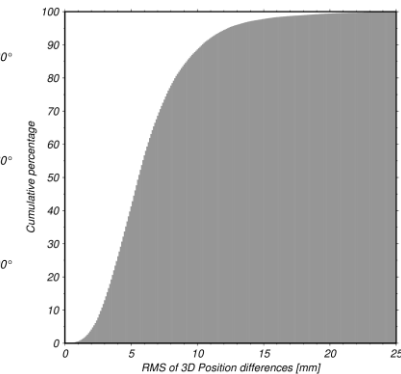


95% of the weekly 3D differences are smaller than 10 mm.
As expected, largest differences are due to very short time spans (Paramushir, Iquique, Lifou, Noumea-NOWB).
Differences @ Belgrano (BEMB) are due to different discontinuities.



A world map showing the RMS of 3D weekly differences for various stations. The map uses a color scale from 0 to 35 mm, with larger circles indicating higher RMS values. Stations are labeled with names like Fairbanks, Reykjavik, Paris, Tokyo, etc.

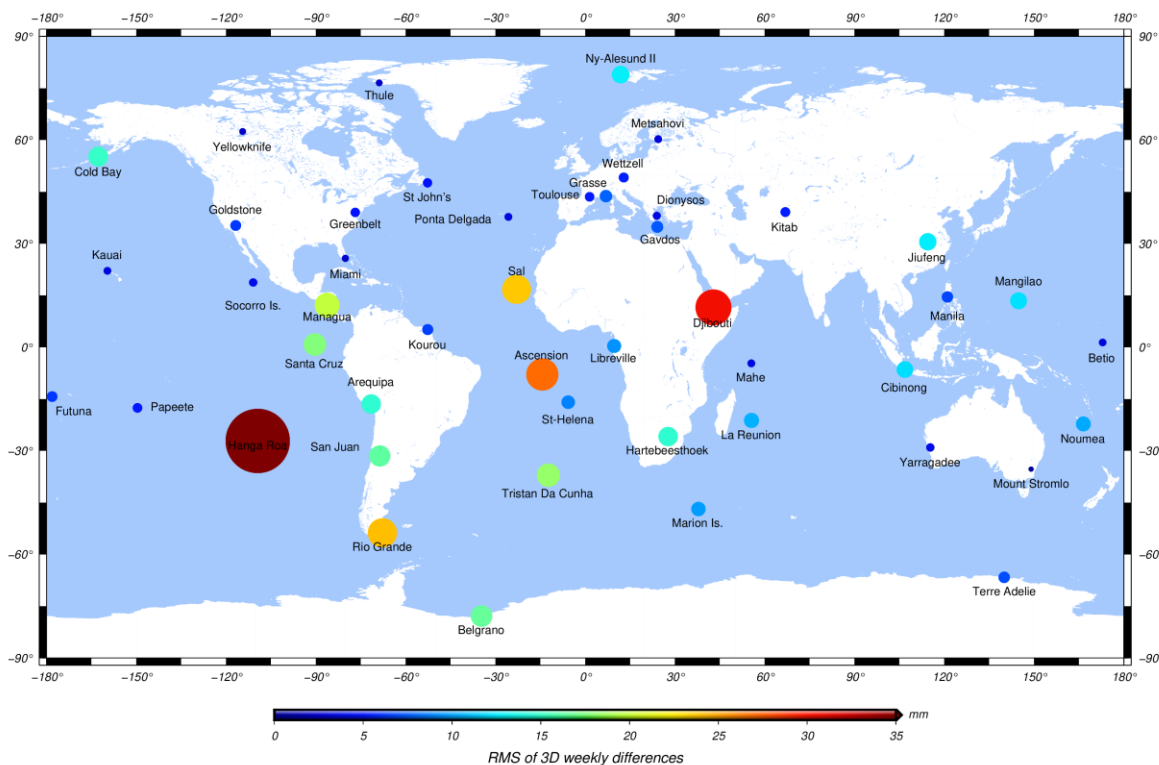
[mm]	
Max	98.5
Median	5.6
RMS	7.8
Mean	6.4
STD	4.3



**89% of the weekly 3D differences are smaller than 10 mm.
As expected, largest differences are due to very short time spans
(Paramushir, Iquique, Lifou, Noumea-NOWB).
Differences @ Belgrano (BEMB) are due to different discontinuities.**

ids25d02 vs ITRF2020-u2023

Weekly station coordinate differences between ids25d02 and ITRF2020-u2023 from **2026.0 to 2028.0**.
Without annual and semi-annual corrections.



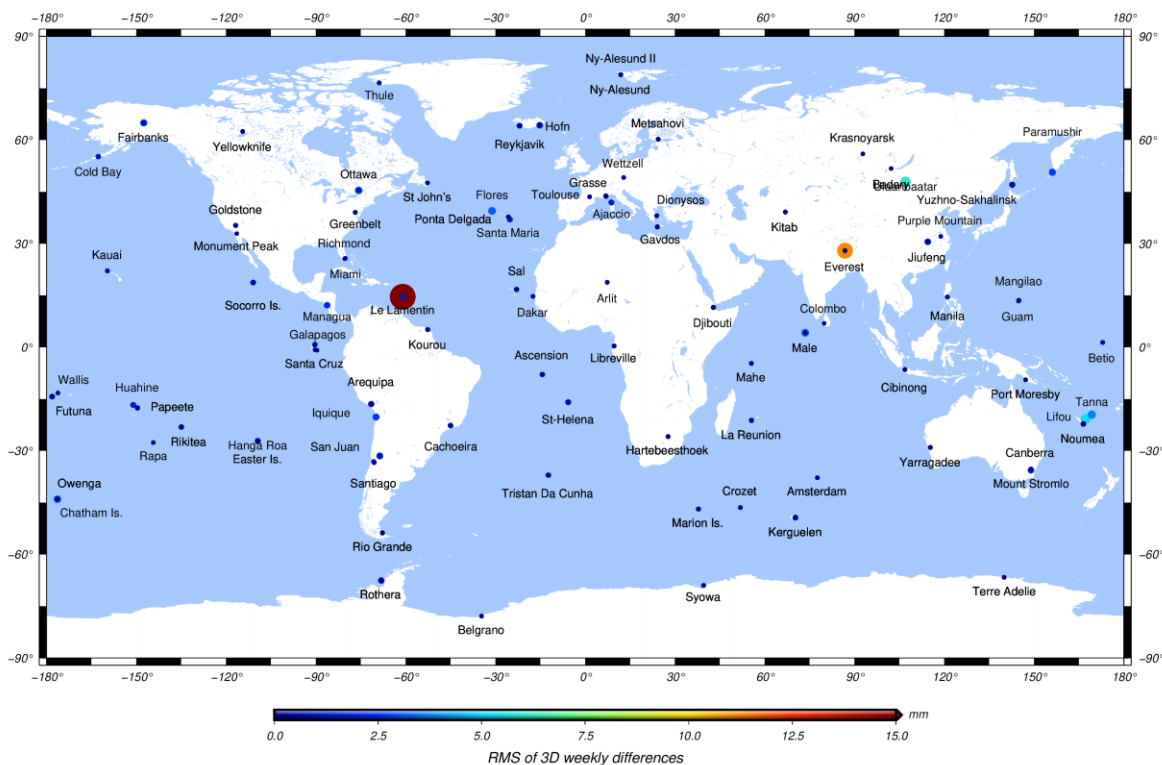
	[mm]
Max	74.1
Median	7.3
RMS	14.7
Mean	10.8
STD	9.9

Largest differences occur at:

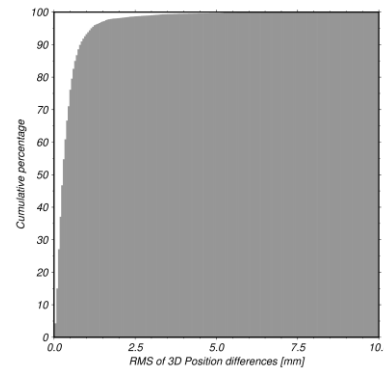
- ✓ **Hanga-Roa** – Short time span in ITRF2020-u2023 - Installation on 2023/04/13.
- ✓ **Djibouti** – Discontinuity in ids25d02 due to a beacon change on 2023/11/30.
- ✓ **Ascension** – Discontinuity due to an earthquake on 2022/06/11.
- ✓ **Rio Grande** – Discontinuity in East and Up in ids25d02 on 2020/11/11 (unknown origin).
- ✓ **Sal** – Discontinuity in East in ids25d02 on 2021/11/10 (unknown origin).

ids25d02 vs ids25d01

Weekly station coordinate differences between ids25d01 and ids25d02 from 1993.0 to 2025.0.
Without annual and semi-annual corrections.



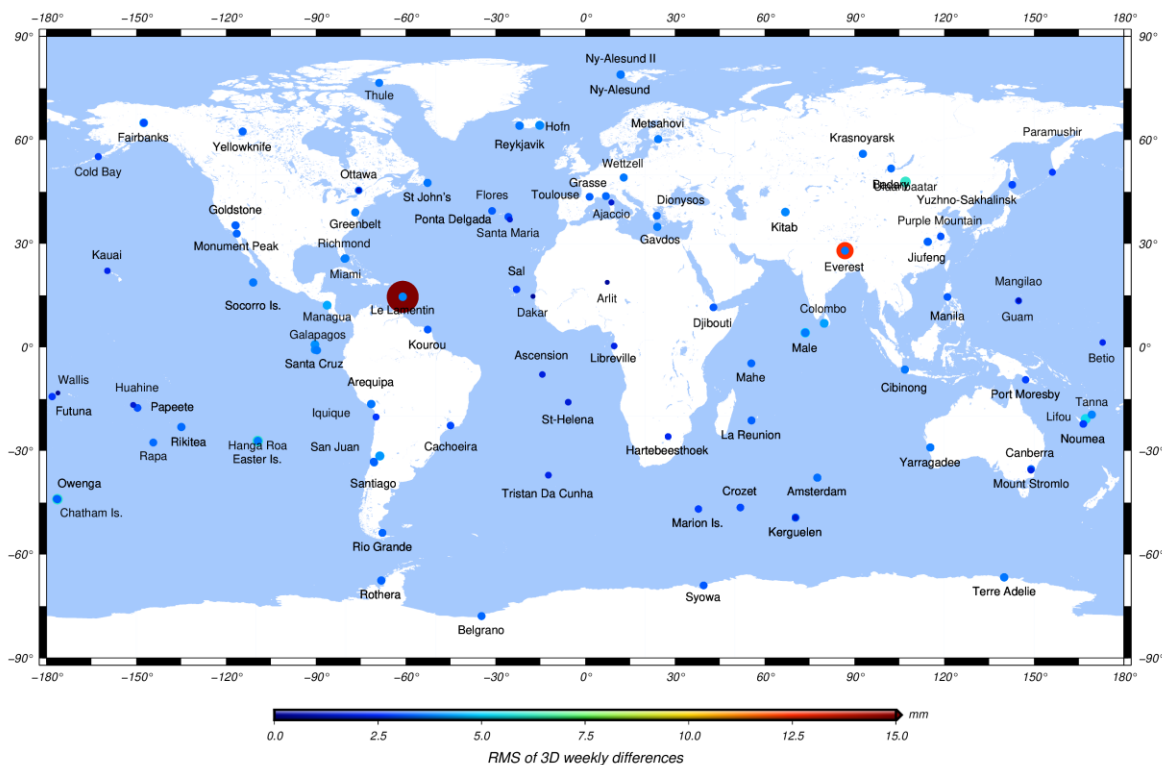
	[mm]
Max	20.9
Median	0.3
RMS	0.8
Mean	0.4
STD	0.7



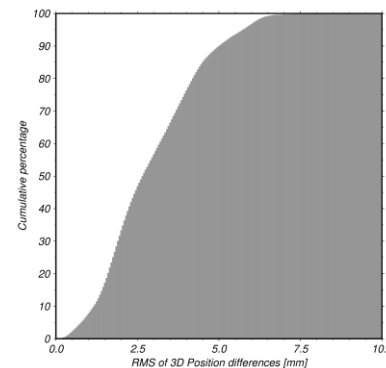
**98% of the weekly 3D differences are smaller than 2.5 mm.
 As expected, largest differences are for stations EVEC (Everest)
 and LAPB (Le Lamentin) which started after 2024.8.**

ids25d02 vs ids25d01

**Weekly station coordinate differences between ids25d01 and ids25d02 from 1993.0 to 2025.0.
With annual and semi-annual corrections.**



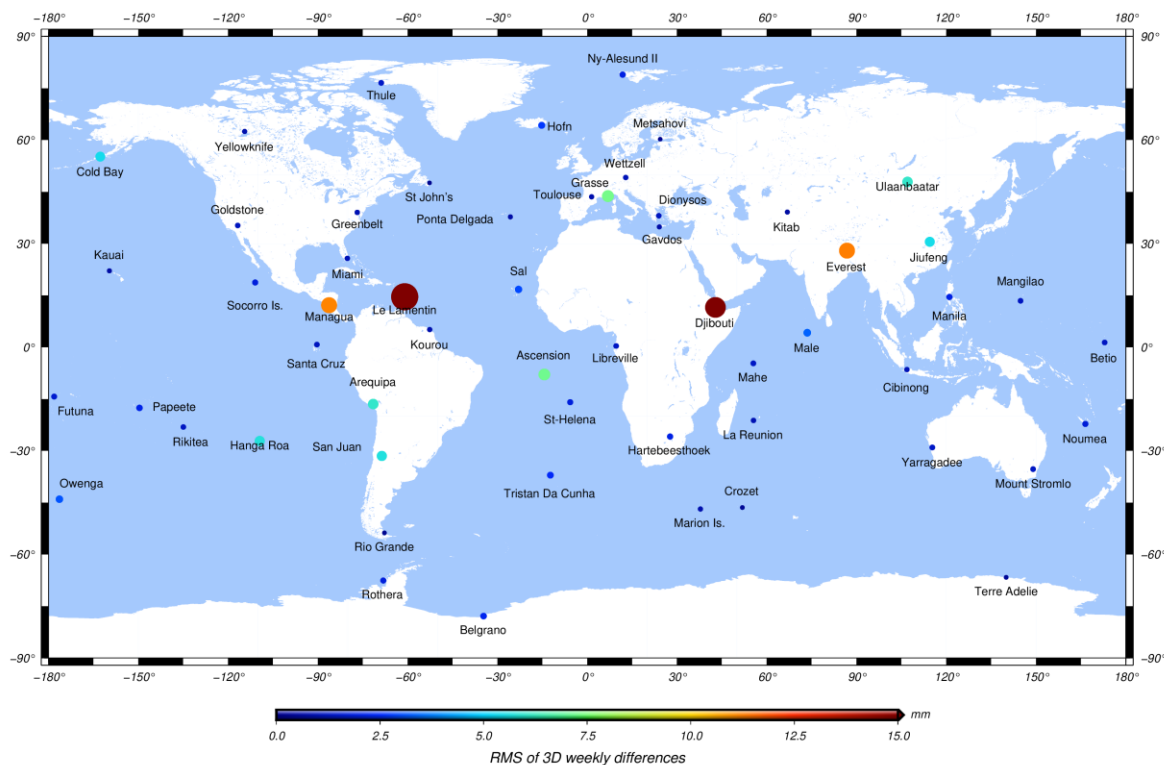
	[mm]
Max	29.1
Median	2.7
RMS	3.3
Mean	2.9
STD	1.5



**87% of the weekly 3D differences are smaller than 5 mm.
As expected, largest differences are for stations EVEC (Everest)
and LAPB (Le Lamentin) which started after 2024.8.**

ids25d02 vs ids25d01

Weekly station coordinate differences between ids25d01 and ids25d02 from 2026.0 to 2085.0.
Without annual and semi-annual corrections.



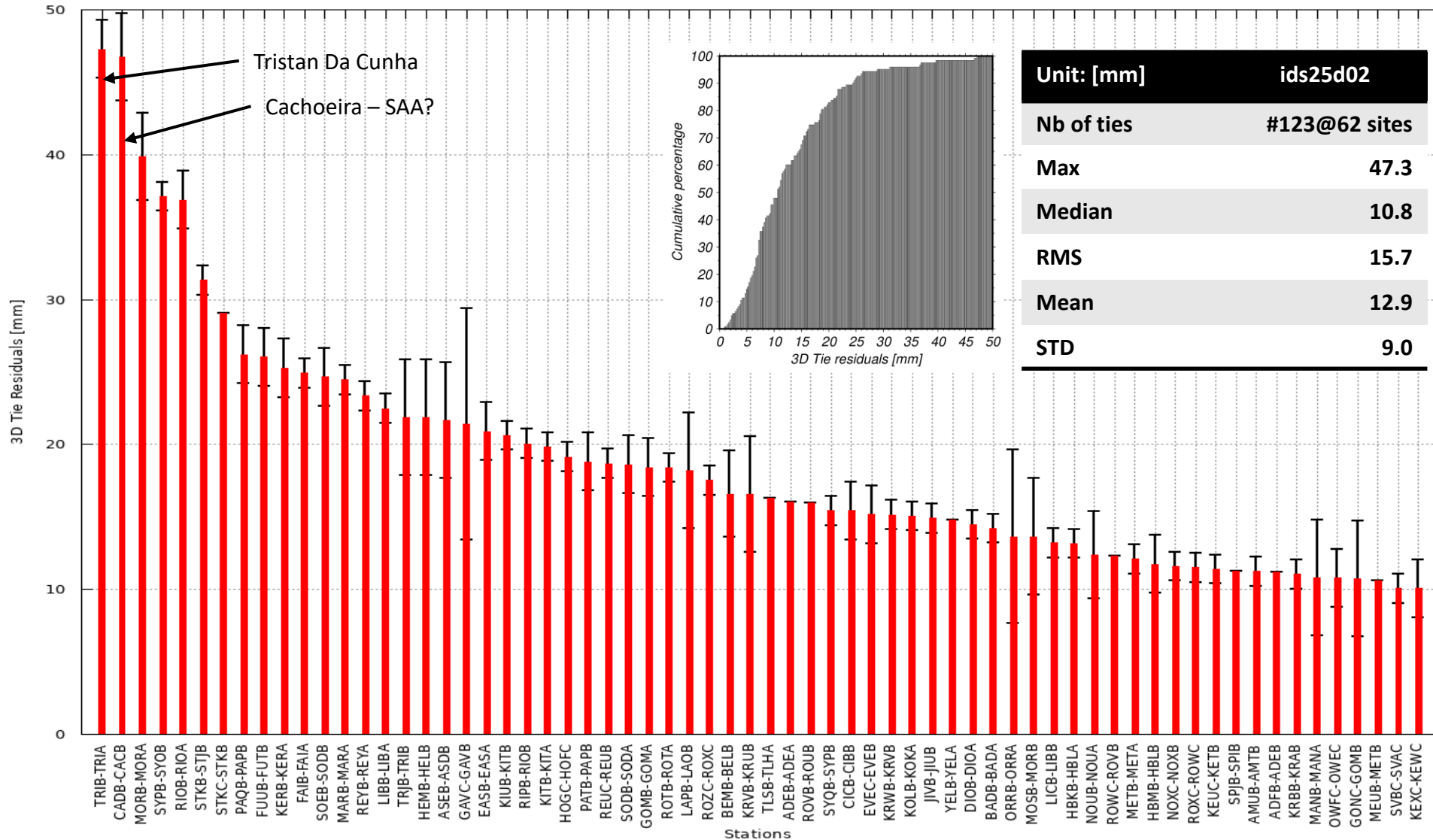
	[mm]
Max	22.8
Median	1.4
RMS	5.0
Mean	3.0
STD	4.0

Large differences at:

- ✓ Everest (EVEC) and Le Lamentin (LAPB) may be the consequence of a late installation (after 2024.8).
- ✓ Djibouti (DJIB) is due to a beacon change on 2023/11/30.
- ✓ Managua (MNAC) may be explained by an earthquake on 2022/04/21.

ids25d02 vs IGN DORIS to DORIS Ties

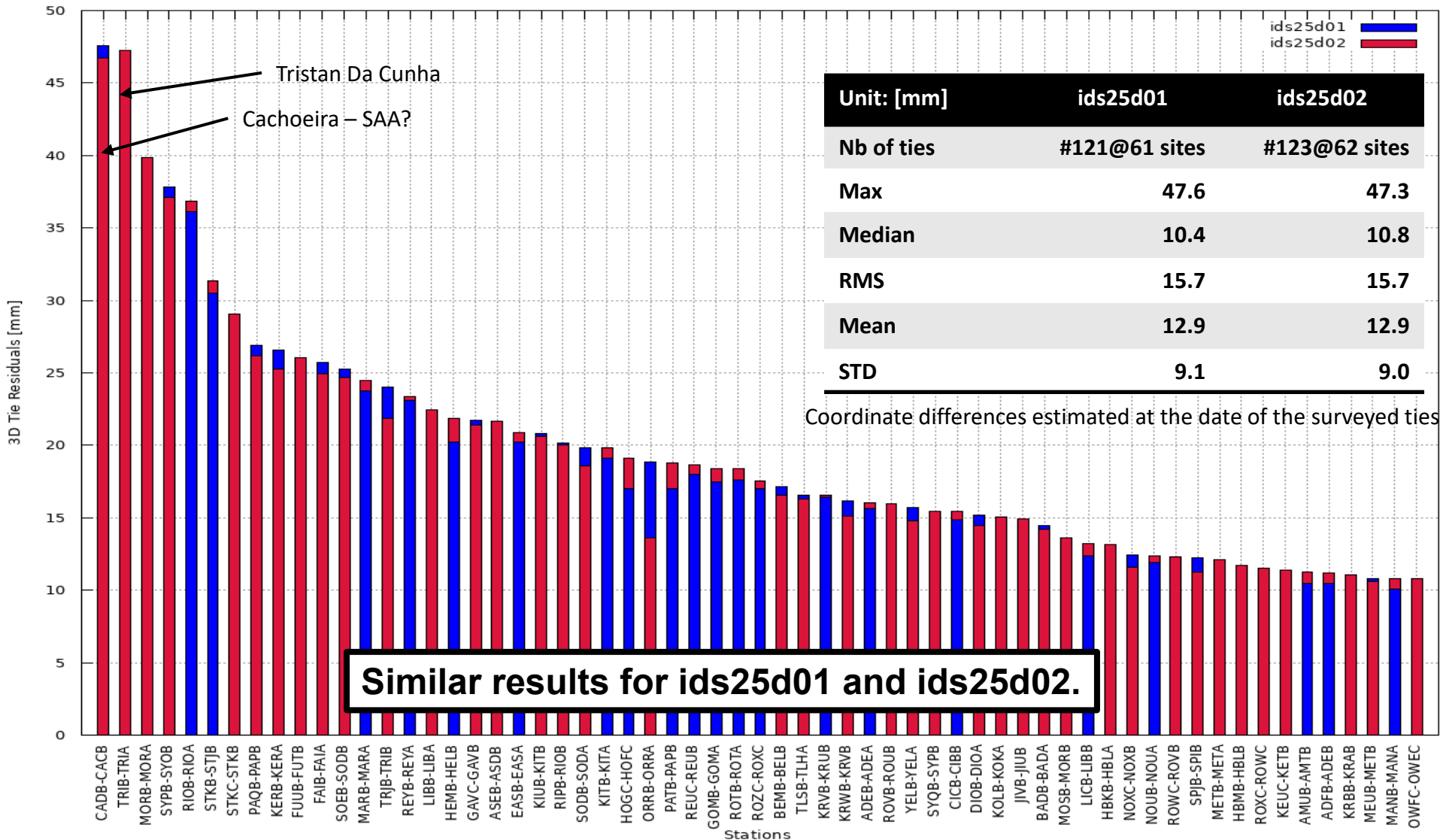
Coordinate differences estimated at the date of the surveyed ties





ids25d02 vs ids25d01

IGN DORIS to DORIS Tie Residuals



Conclusions

- **ids25d02:**
 - Is the output of the stacking of the IDS combined series ids 19&26 from 1993.0 to 2025.5.
 - Is aligned onto ITRF2020-u2023.
 - Includes annual and semi-annual station position corrections.
 - Periodic terms are only estimated for sites with observations after mid-2002 and with at least two years of observations.
- Internal evaluation of ids25d02 did not reveal any issue → realization of DPOD2020 v5.0 will start soon.

