DPOD2020 version 2.0

Guilhem Moreaux (IDS Combination Center) – 2024/02/02

http://ids-doris.org

- **Based on the DORIS position and velocity cumulative solution ids23d01 (stacking of the IDS combined series ids 20 from 1993 doy 003 to 2022 doy 359).**

- **First DPOD solution to include:**
  - **Annual and semi-annual corrections/**
  - **Post-Seismic Deformation corrections from DORIS observations only.**

- **Available in SINEX and text formats.**

- **SINEX solution contains two additional (and unofficial) blocks:**
  - **SOLUTION/DISCONTINUITY: origin (ex: earthquake, beacon change, antenna problem…) of the position discontinuities.**
 - **SOLUTION/DATA_REJECT: periods of time not included in the combination.**

Constrained Velocities

http://ids-doris.org

| Site	DORIS station	Reference station	Technique	Source
Ajaccio	AJAB	AJAC	GNSS	ITRF2020
Huahine	HUAA	7123	Laser Ranging	ITRF2020
Hofn	HOFC	HOFN	GNSS	ITRF2020
San Juan	SJUC	OAFA	GNSS	ITRF2020
San Juan	SJVC	OAFA	GNSS	ITRF2020

DPOD2020 v02 - Network

89 DORIS sites – 216 DORIS stations
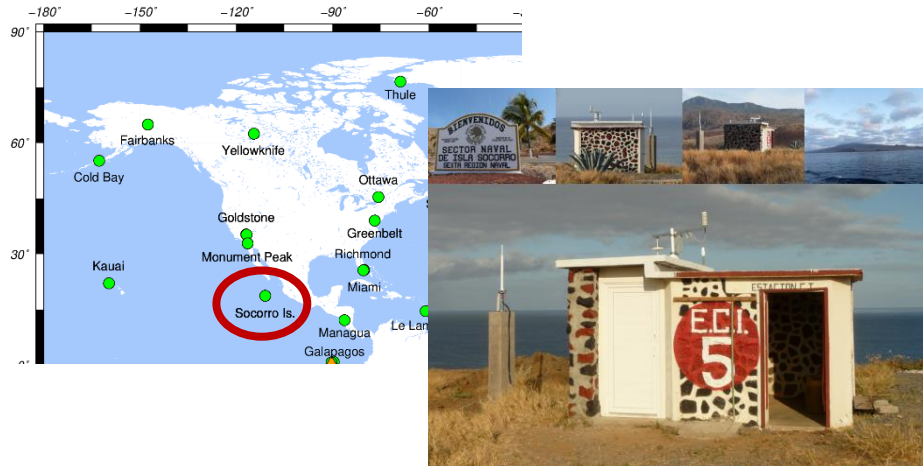**Compared to ITRF2020: 2 sites and 14 stations more.**
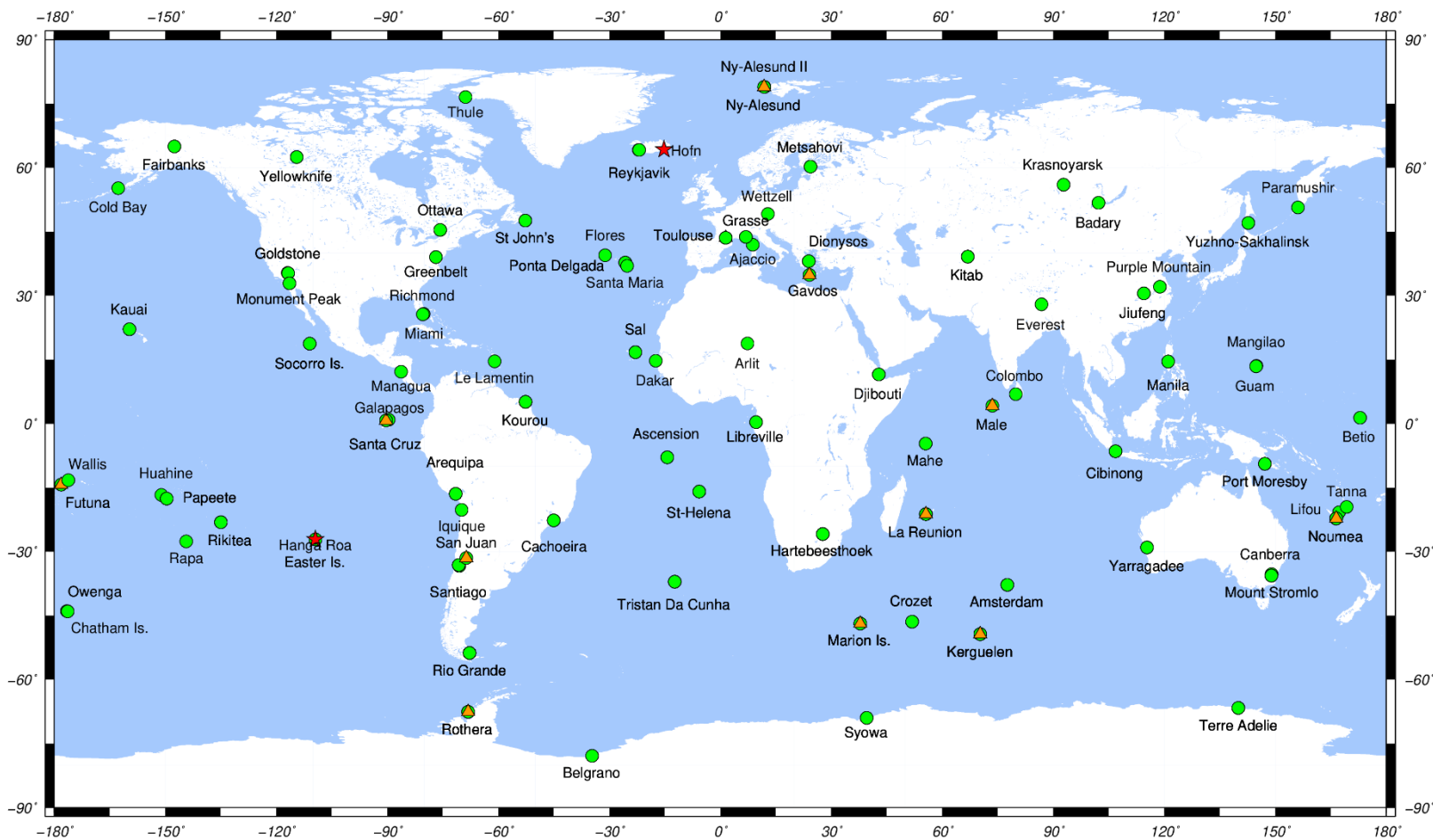
Site not included ITRF2020 (# 2) – Site with new station(s) since ITRF2020 (# 11)

DPOD2020 v02 – Position Discontinuities

Number of discontinuities by DORIS site. Sites with discontinuities are in boldface. Sites with no discontinuity are indicated with grey squares.

http://ids-doris.org
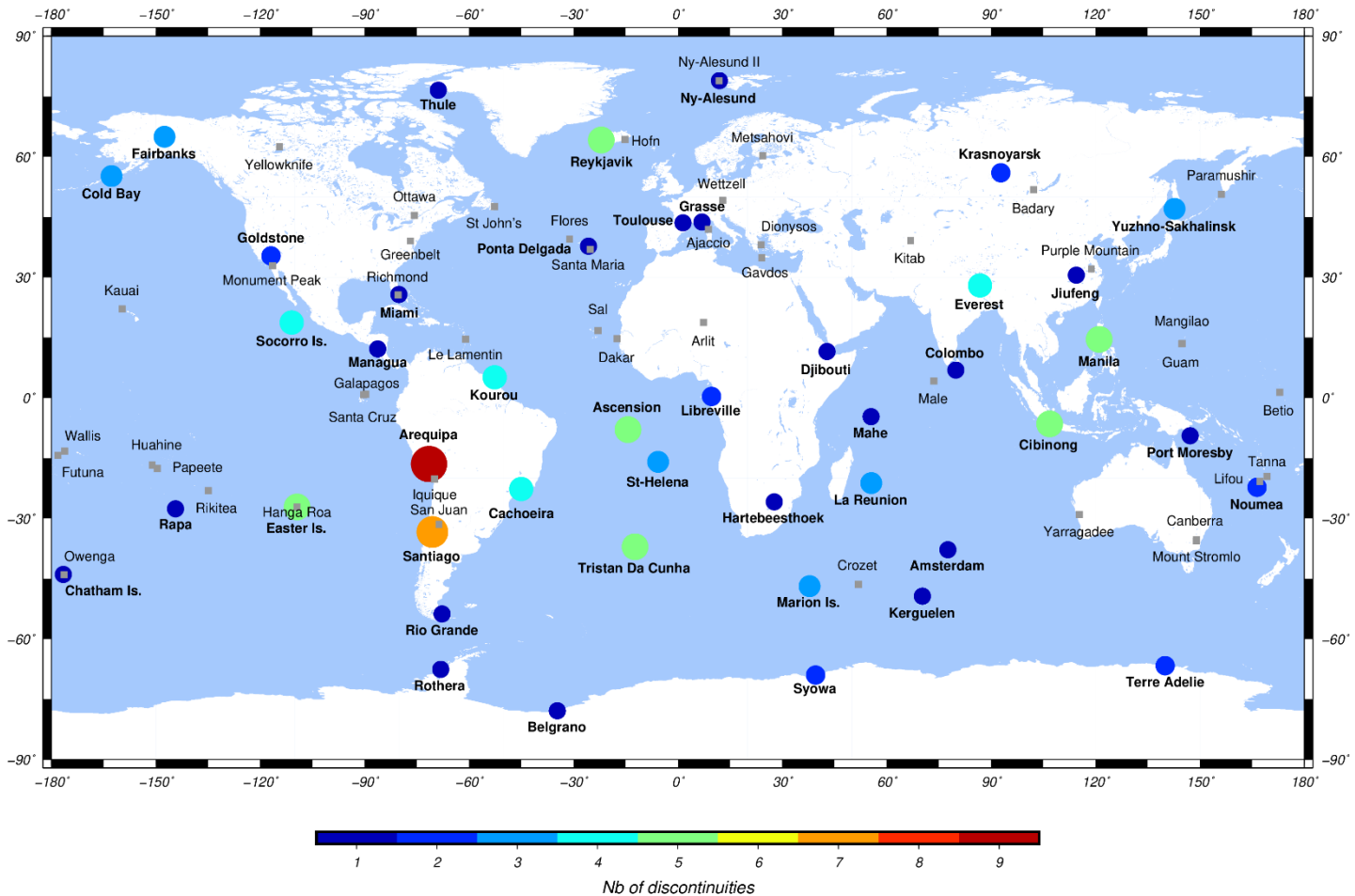
SODA – Socorro Island

DORIS is at Socorro since 1991/02/08.
Host agency: INEGI & Armada de Mexico.
Tide gauge (Gloss nb 162) @ 370m.
No GNSS, no SLR, no VLBI.

Submarine eruption on 1993/01/29 @ 4km.

DORIS observations
Linear model
Linear model + PSD corections
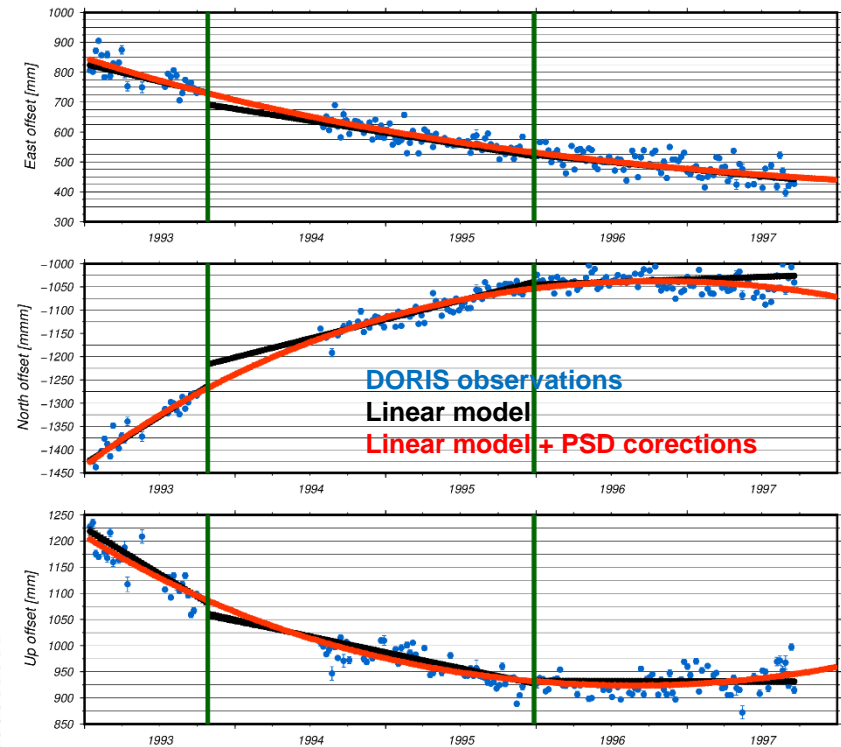
DPOD2020 2.0 is the first DPOD solution with DORIS only PSD corrections.
DPOD2020 2.0 gives PSD corrections for SODA only.
PSD corrections are given in ASCII text file dpod2020_020_psd_corr.txt.

DPOD2020 v02 – Seasonal Corrections

Impact of the estimation of the seasonal terms on the weekly DORIS station coordinates. DPOD2020 v2.0 vs Stacking without estimation of periodic terms.
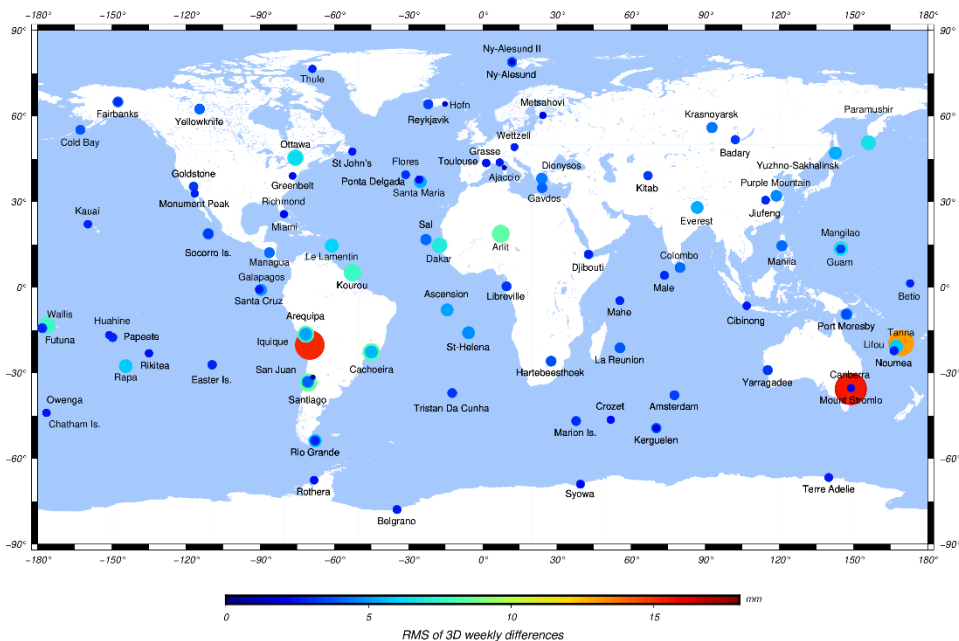

|	[mm]
Max	31.8
Median	3.0
RMS	4.0
Mean	3.4
STD	2.0
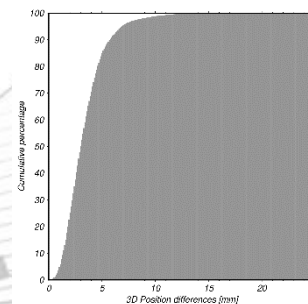
Small impact of the seasonal terms on the station positions.
85% of the weekly 3D differences are smaller than 5 mm.
Seasonal corrections are given in ASCII text file dpod2020_020_freq_corr.txt.

DPOD2020 v02 vs DPOD2020 v01

**Weekly station coordinate differences between DPOD2020 v2.0 and DPOD2020 v1.0.
No annual and semi-annual correction.**

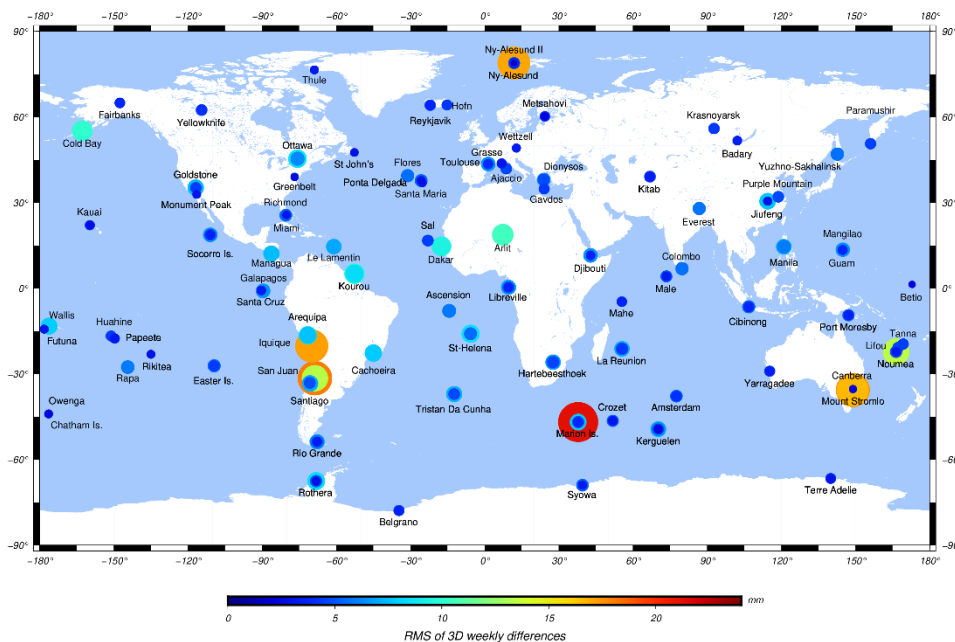RMS of 3D weekly differences
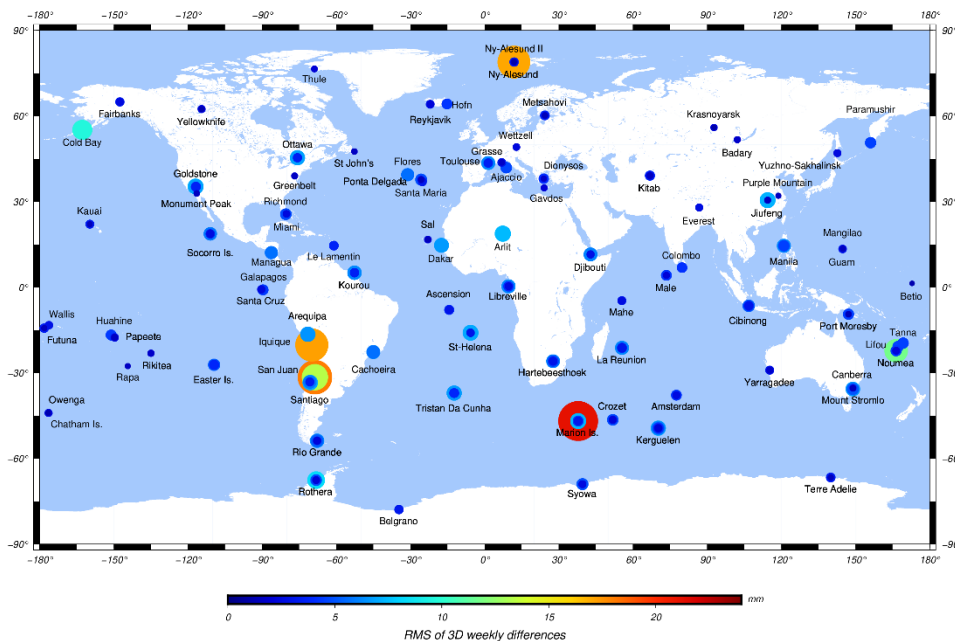
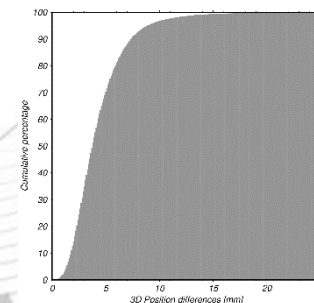|	[mm]
Max	66.2
Median	2.4
RMS	3.9
Mean	3.0
STD	2.4
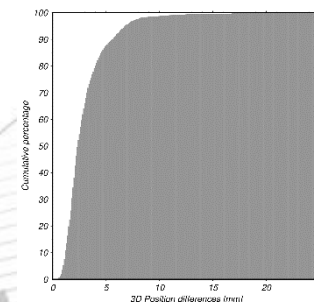
**87% of the weekly 3D differences are smaller than 5 mm.
Largest differences are for sites with either**
- ✓ **new discontinuities (Marion Island), or**
- ✓ **very short time span (Iquique, Ny Ålesund II, San Juan, Tanna).**

DPOD2020 v02 vs DPOD2020 v01

Weekly station coordinate differences between DPOD2020 v2.0 and DPOD2020 v1.0. <u>DPOD2020 v2.0 includes annual and semi-annual corrections</u>.


|	[mm]
Max	65.1
Median	3.8
RMS	5.3
Mean	4.4
STD	2.9

70% of the weekly 3D differences are smaller than 5 mm.
Largest differences are for sites with either
- ✓ **new discontinuities (Marion Island), or**
- ✓ **strong periodic terms (Canberra), or**
- ✓ **very short time span (Iquique, Ny Ålesund II, San Juan, Tanna).**

DPOD2020 v02 vs ITRF2020

Weekly station coordinate differences between DPOD2020 v2.0 and ITRF2020. Both solutions without annual and semi-annual corrections.

RMS of 3D weekly differences
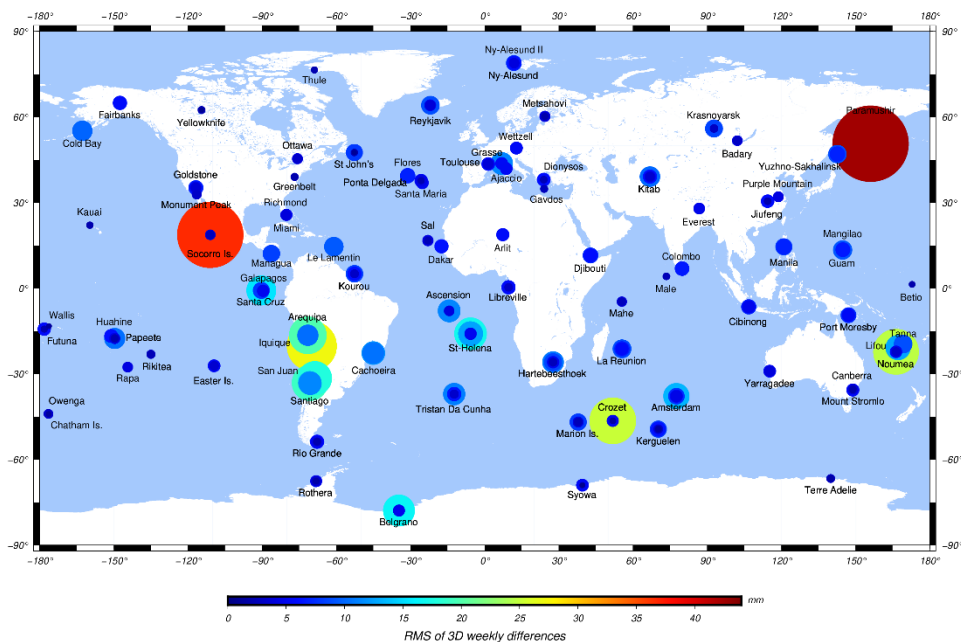
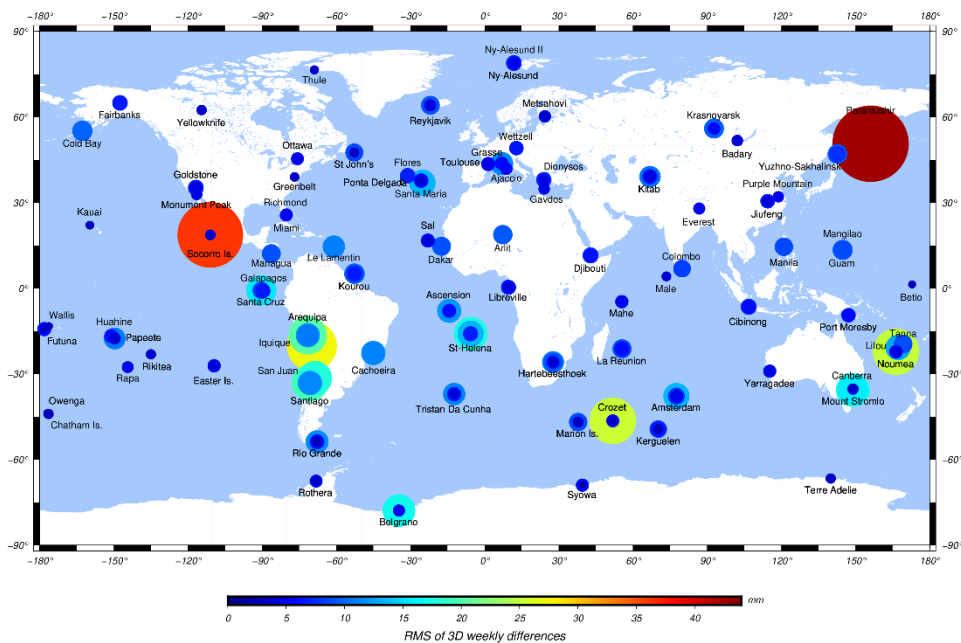|	[mm]
Max	127.3
Median	3.6
RMS	6.4
Mean	4.6
STD	4.4
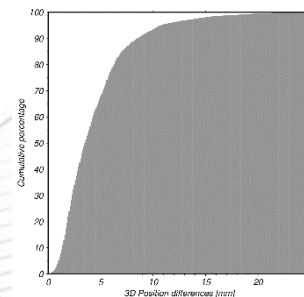
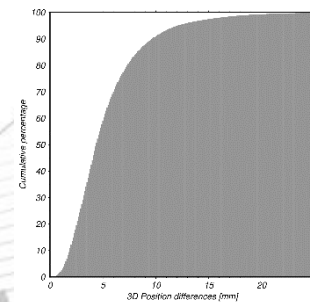**69% of the weekly 3D differences are smaller than 5 mm.**
Largest differences
- ✓ **Paramushir, Iquique (very short time span).**
- ✓ **Socorro Island (one velocity vector for all the time segments in ITRF2020).**
- ✓ **Crozet (CRQC – smaller DORIS tie residuals for DPOD2020).**

DPOD2020 v02 – 2024/02/02

DPOD2020 v02 vs ITRF2020

Weekly station coordinate differences between DPOD2020 v2.0 and ITRF2020.
Both solutions include annual and semi-annual corrections.

RMS of 3D weekly differences

	[mm]
Max	125.9
Median	4.4
RMS	7.1
Mean	5.5
STD	4.5

59% of the weekly 3D differences are smaller than 5 mm.

Largest differences
- ✓ **Paramushir, Iquique (very short time span).**
- ✓ **Socorro Island (one velocity vector for all the time segments in ITRF2020).**
- ✓ **Crozet (CRQC – smaller DORIS tie residuals for DPOD2020).**

DPOD2020 v02 – 2024/02/02

DPOD2020 v02 vs IGN DORIS-to-DORIS ties

Coordinate differences estimated at the date of the surveyed ties

DPOD2020 v02 – 2024/02/02