On the processing of GFZ's DORIS contribution to ITRF2020

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Content

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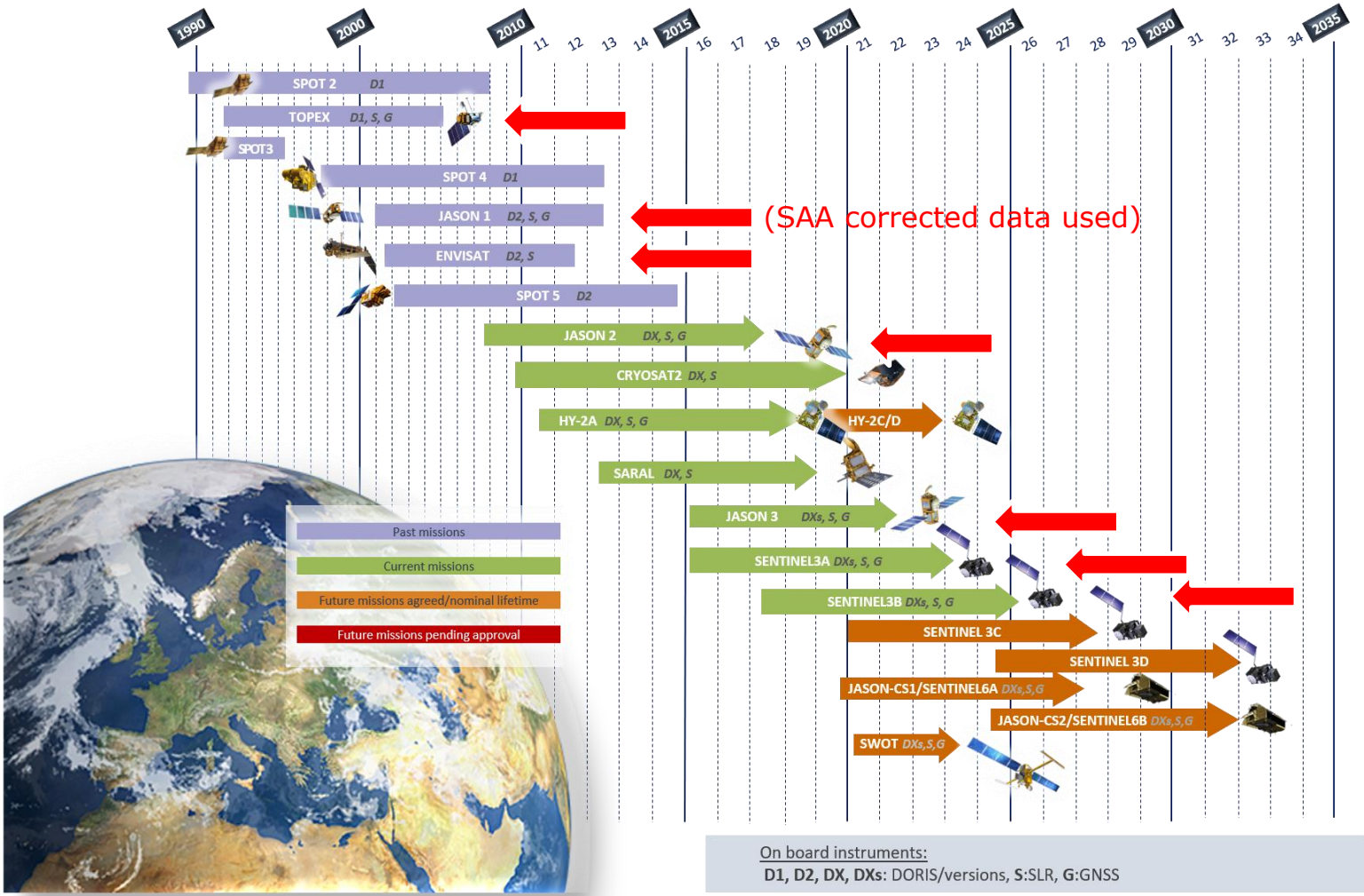
1 Introduction

Processing for GFZ's DORIS contribution to ITRF2020

- First DORIS contribution by GFZ

- Software used: EPOS-OC
- Arcs according to GPS weeks
- Timespan Aug. 1992 to Dec. 2020
- Estimated:
  - Station coordinates
  - LOD and pole coordinates

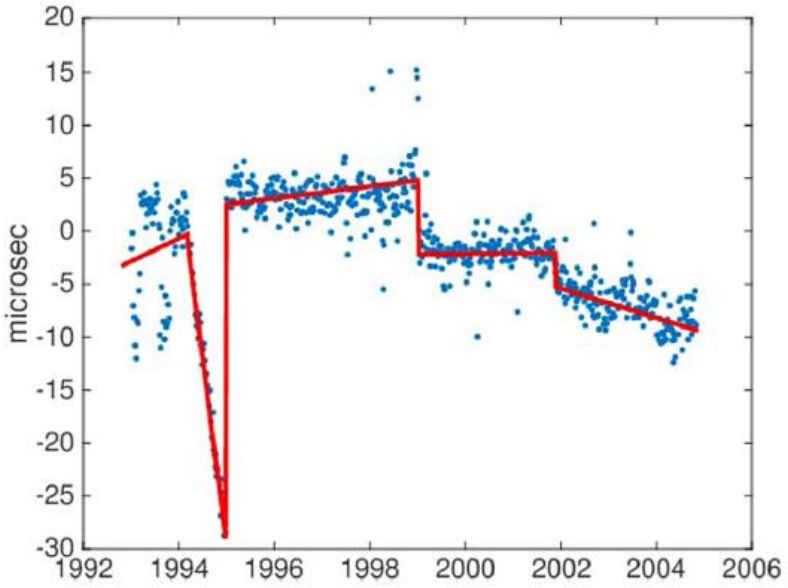
2 Satellites Used



3 Time Bias Handling

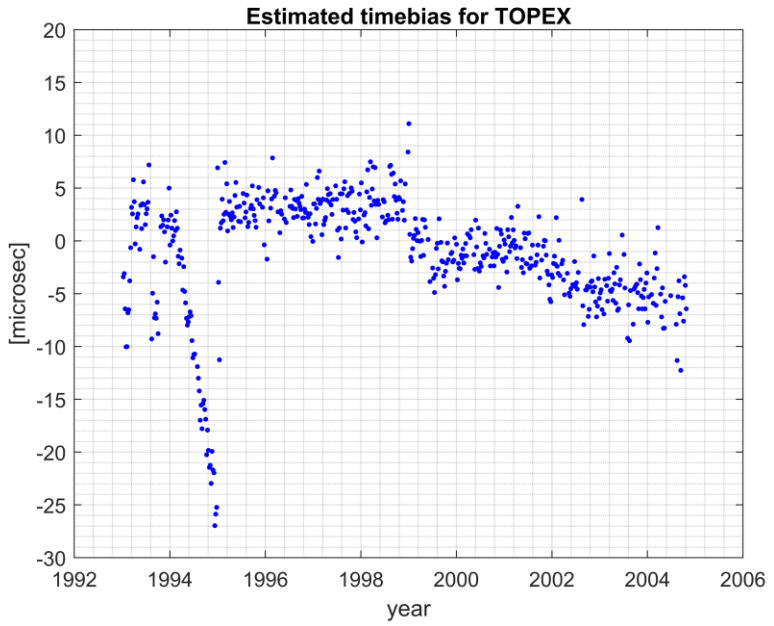
- We used SLR to estimate one DORIS time bias per weekly arc
- Comparison to f.i. GSFC shows good coincidence

GSFC



Lemoine et al. (2016)

GFZ

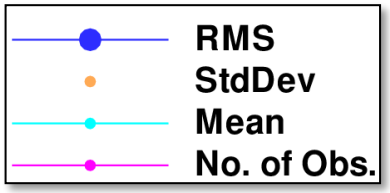


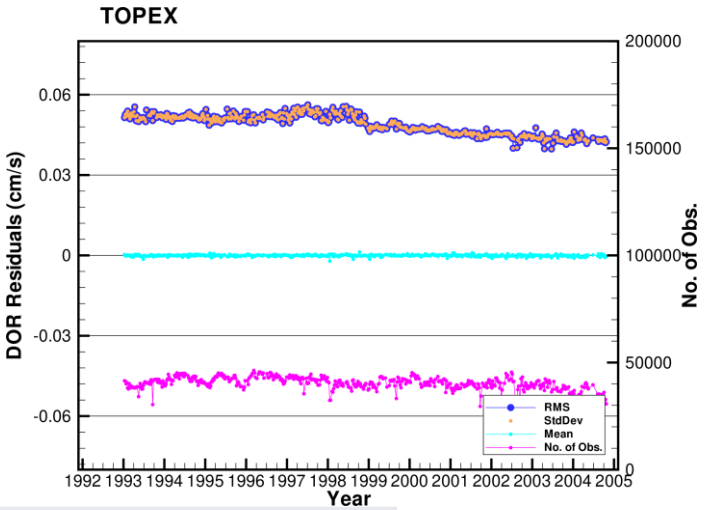
4 SAA Handling

- Stations encircled are downweighted (factor 10)
- Estimated frequency bias and tropospheric scaling factors constrained to SLR and nearby non SAA DORIS station values

5 Orbital Fits

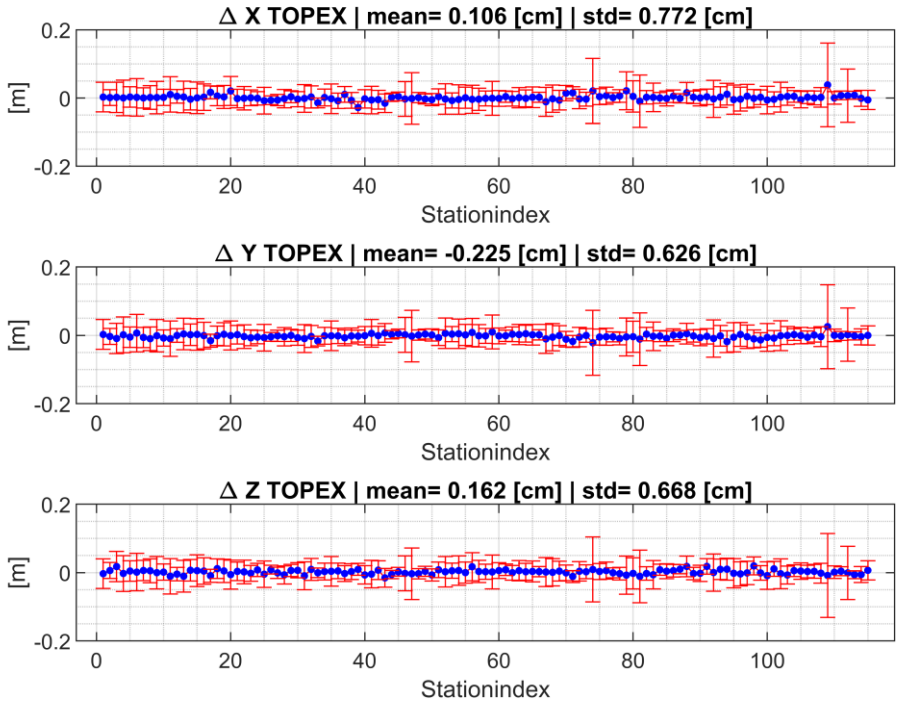
- Overall DORIS RMS ~0.4 mm/s
- SLR RMS for validation 1-2 cm (downweighted / global range bias)





	DORIS RMS [mm/s]	SLR RMS [cm]
TOPEX	0.48	1.82
ENVISAT	0.43	1.13
Jason-1	0.35	1.15
Jason-2	0.35	1.23
Jason-3	0.41	1.48
Sentinel-3a	0.42	1.44
Sentinel-3b	0.44	1.53

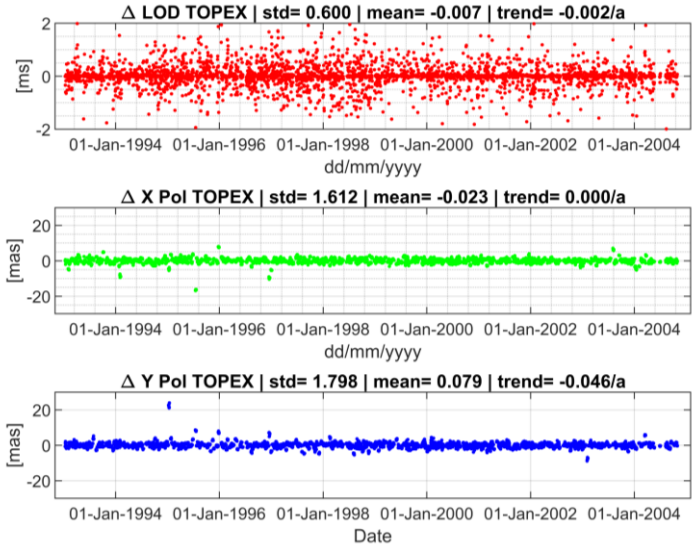
6 Station Coordinates



- Differences to a-priori (DPOD2014)

	X [cm]	Y [cm]	Z [cm]
KOUROU	0.7 ± 4.4	0.0 ± 4.4	-0.3 ± 4.4

7 EOPs



- Differences to a-priori (EOP14C04)
- 3.5 sigma filtered (<1% elim.)

	$\sigma(\Delta\mathrm{LOD})$ [ms]	$\sigma(\Delta\, X\ Pol)$ $[mas]$	$\sigma(\Delta\, Y\ Pol)$ $[mas]$
TOPEX	0.4127	1.1336	1.2601
ENVISAT	0.3906	1.0920	1.5180
Jason-1	0.2695	1.9830	1.8100
Jason-2	0.1760	1.3810	1.2163
Jason-3	0.1893	1.4113	1.4663
Sentinel-3A	0.3624	1.5839	2.4075
Sentinel-3B	0.4524	1.6230	2.4479

8 Summary

Summary:

- Prepared seven satellites
- Used SLR for DORIS time bias handling
- Special treatment for SAA stations
- Satellites show good orbital fit
- Estimated station coordinates and EOPs show no peculiarities

- Confident of good quality of the solution

Acknowledgement:

We thank the IAG services IDS, ILRS, and IERS for providing data and proxies

References:

- Lemoine FG, Chinn DS, Zelensky NP, Beall JW, Le Bail K (2016) The development of the GSFC DORIS contribution to ITRF2014. Advances in Space Research, 58: 2520-2542