The IDS Contribution to the ITRF2020: Realization and Evaluation

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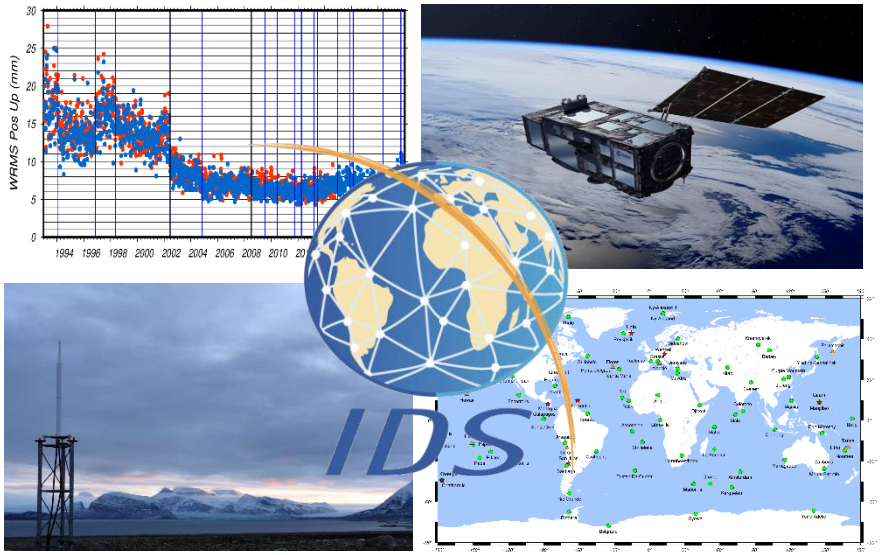
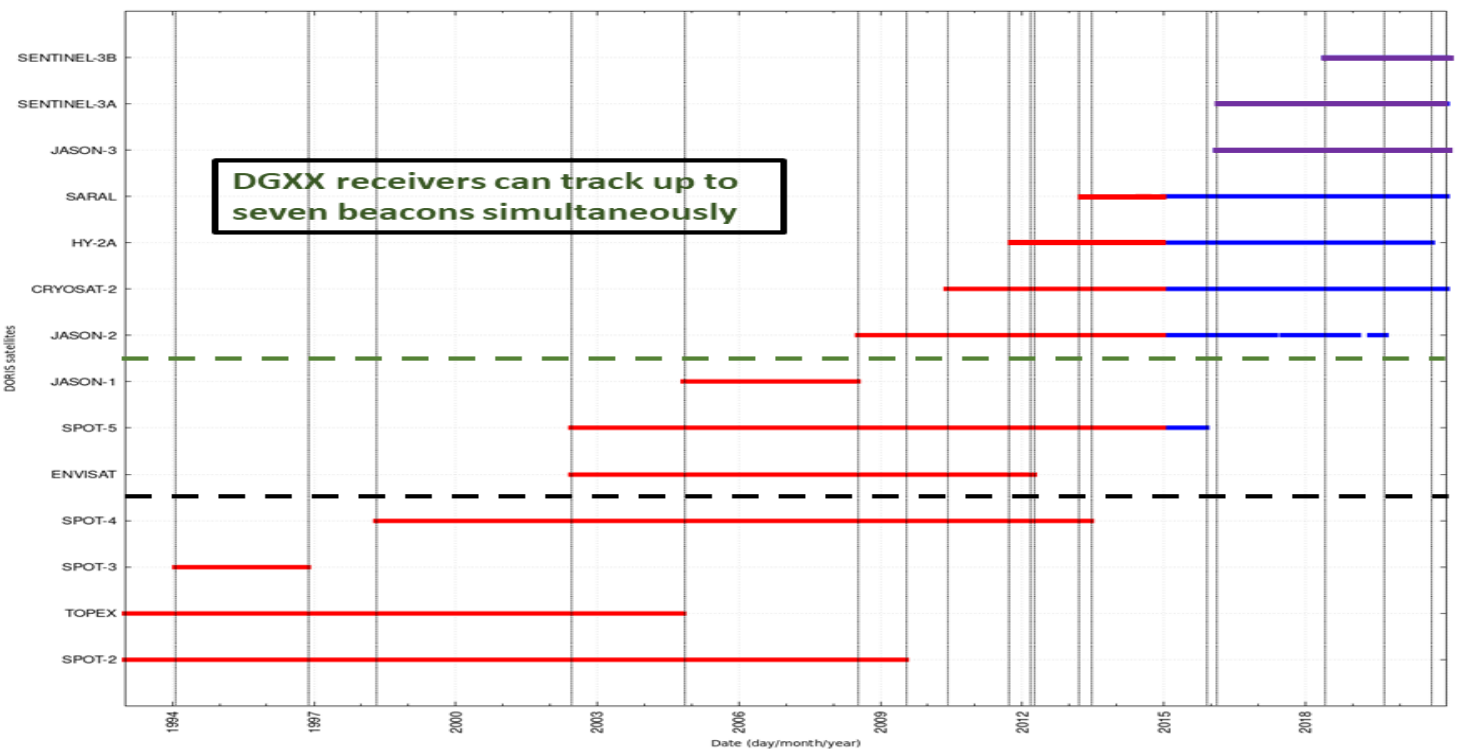


ITRF2020 = ITRF2014 + new missions (Jason-3, Sentinel-3A, Sentinel-3B)



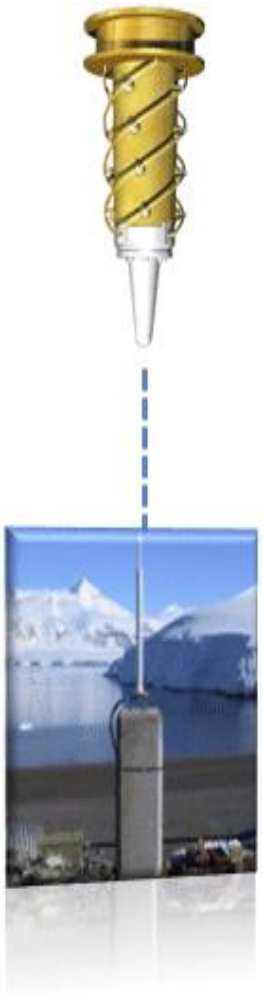
There are 14 DORIS missions in overall and DGXX missions only since 2016.

The IDS contribution to ITRF2020 is based on 4 solutions from 4 different software packages.

AC	Software	Series number	Nb of Files	Nb of Sites	Nb of stations	Solution Type	EOPs
ESA	NAPEOS	13	1447	87	199	NEQ	(Motion+rate+LOD)
GOP	BERNESE	66	1458	83	195	COV	Motion+rate
GRG	GINS-DYNAMO	42	1461	86	199	COV	Motion
GSC	GEODYN	48	1461	88	200	NEQ	Motion
IDS	**CATREF**	**15**	**1456**	**86**	**200**	**COV**	**Motion**

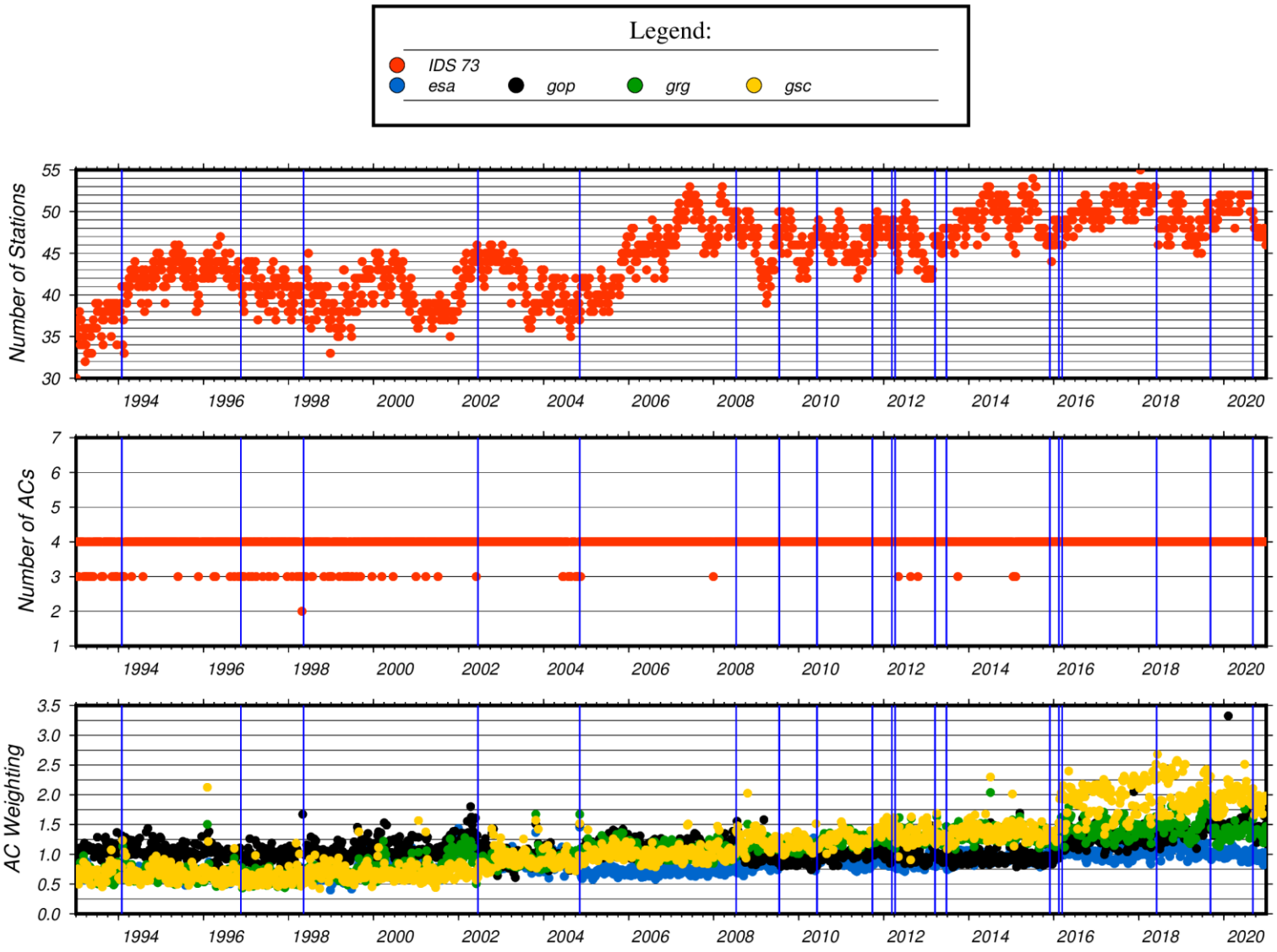
IERS Standards applied (new mean pole model, Desai & Sibois HF tidal EOP model...)
+ Use of DORIS RINEX data (format associated with DGXX receivers)
+ New phase center ALCATEL antennae corrections
+ Precise SPOT-5 solar panel angle values
+ South Atlantic Anomaly mitigation strategies for Spot-5, Jason-1/2/3, Sentinel3A/B*
+ …

Few words on the IDS Combined Solution

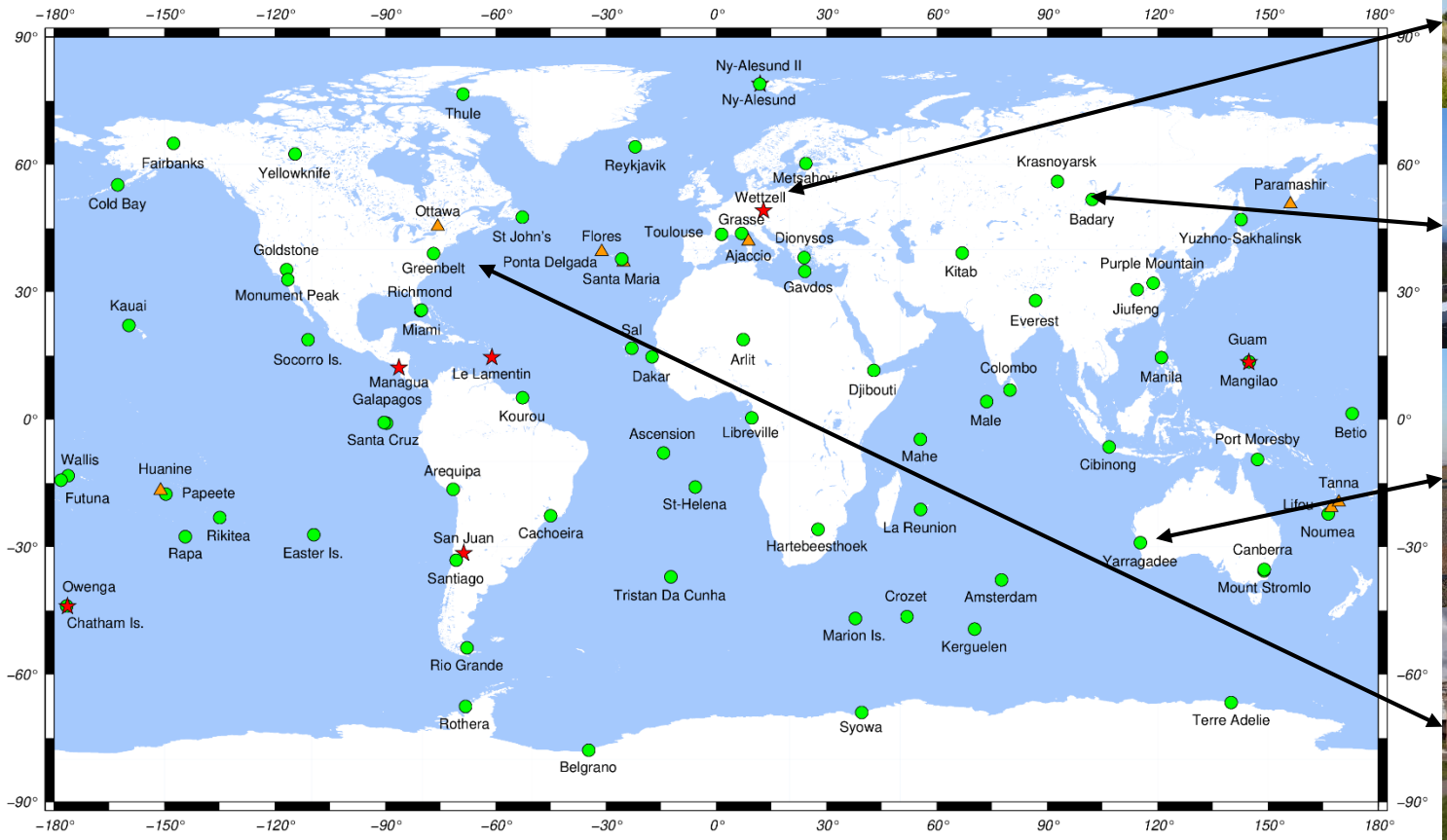


- **New:** includes sites with data span lower than 2.5 years:
  - Old sites: Ajaccio, Flores, Huanine, Lifou, Paramashir, Santa Maria, Tana
  - New sites: Guam, Ny-Ålesund II, San Juan
- **New data editing:** detection of outliers based on each IDS AC cumulative solution from 1993.0 to 2021.0.
- Each week, an AC solution contributes to the IDS combined solution if contains more than 20 stations.
- Each week, a beacon is part of the IDS combined solution if included in at least 2 AC solutions.

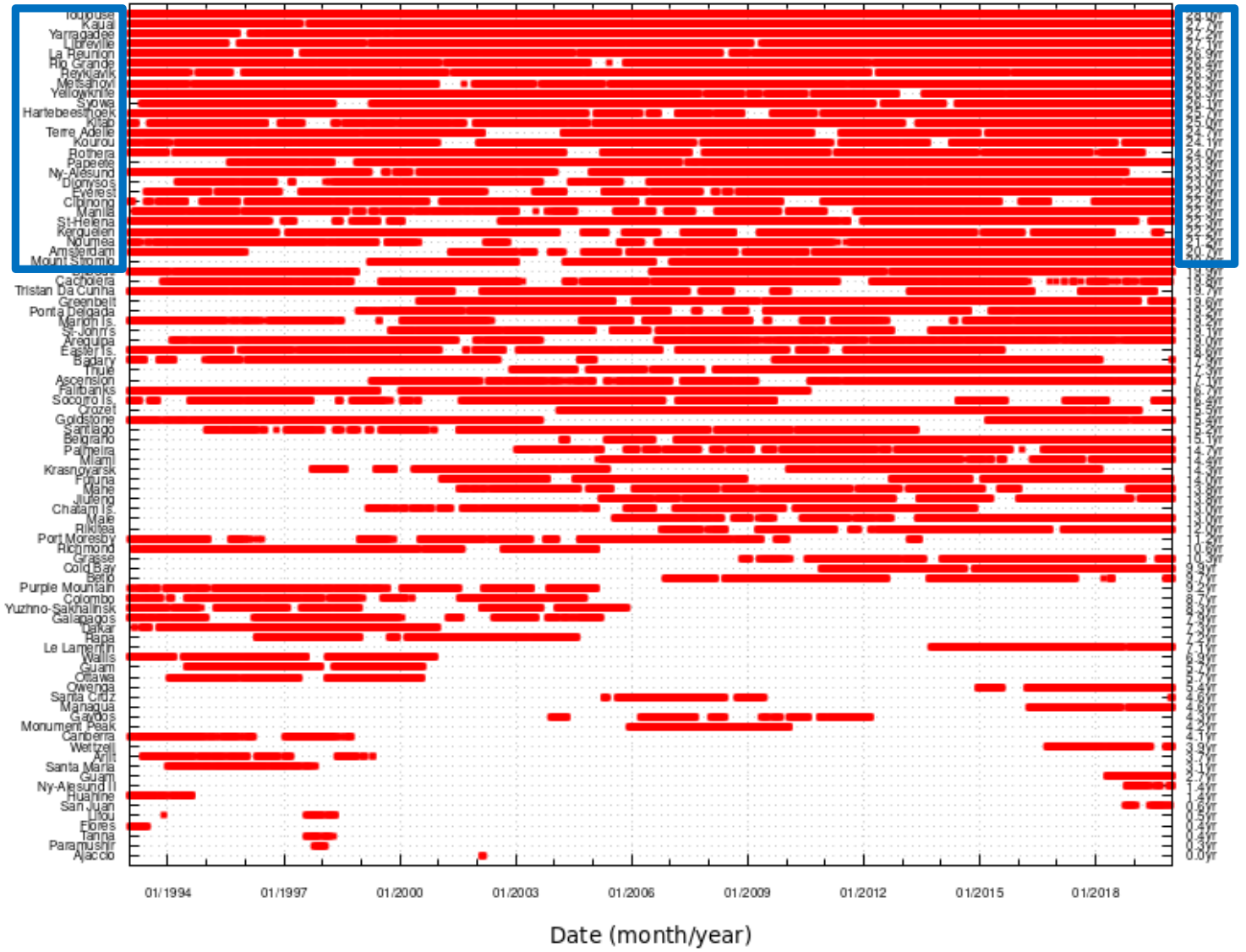
IDS AC Contributions to IDS Combined Solution



The IDS ITRF2020 network

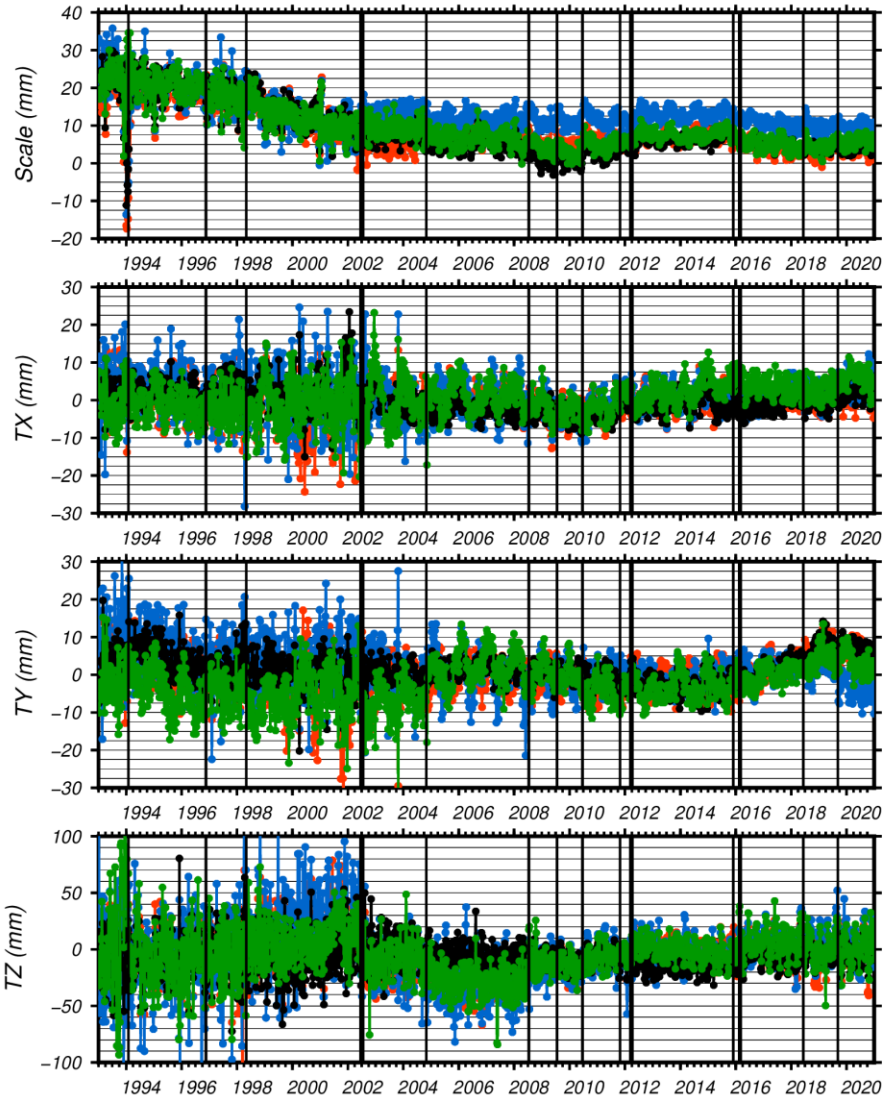


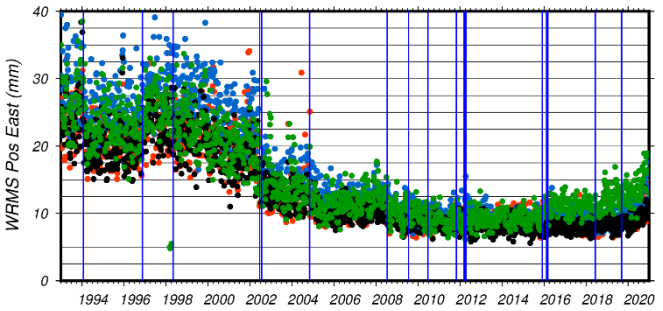
Contains 200 stations@86 sites including 4 4T GGOS sites.
15 sites and 40 stations more than for ITRF2014.

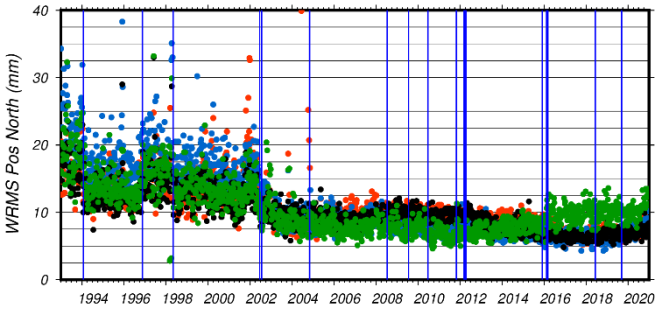


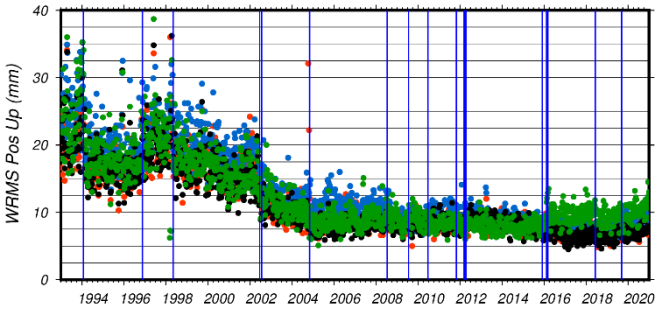
The IDS ITRF2020 contribution includes 26 sites (30%) with more than 20 years of observation.

Origin, scale and WRMS of Station Positions wrt DPOD2014v5



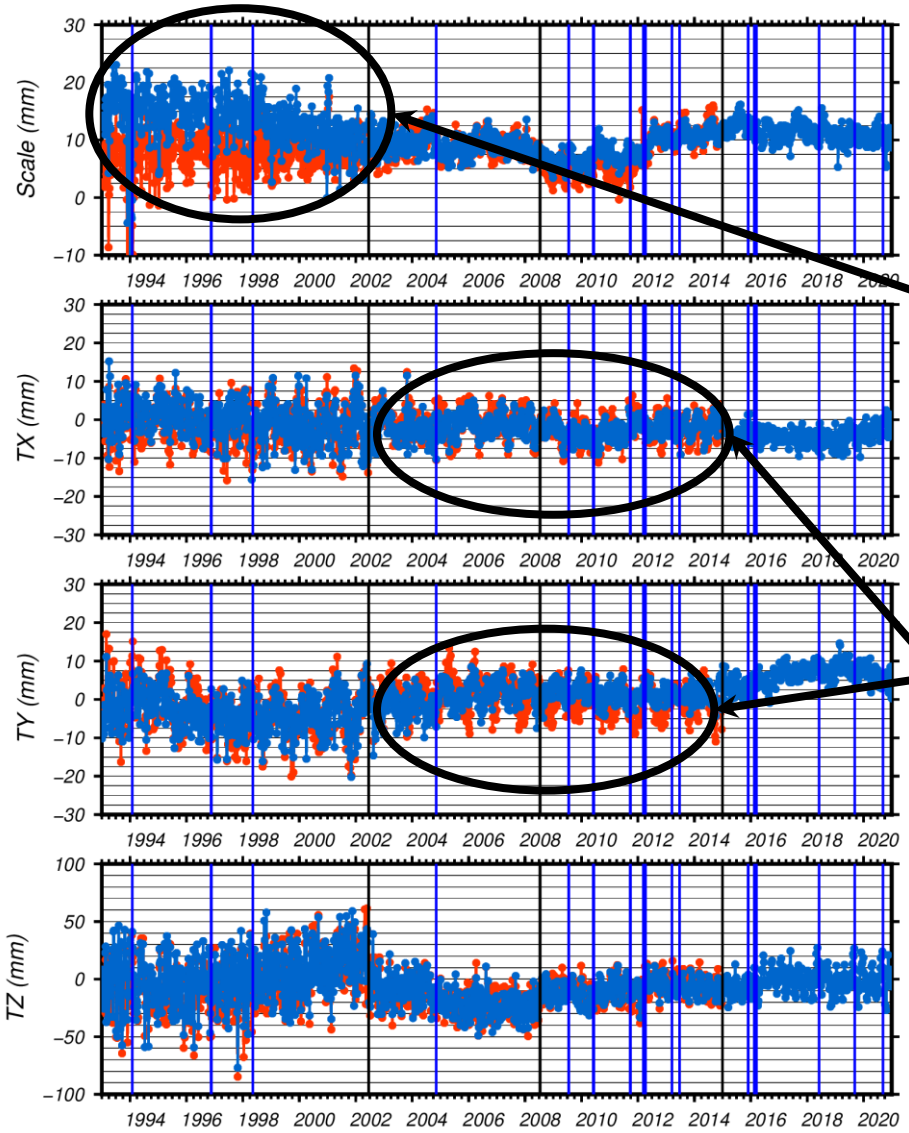






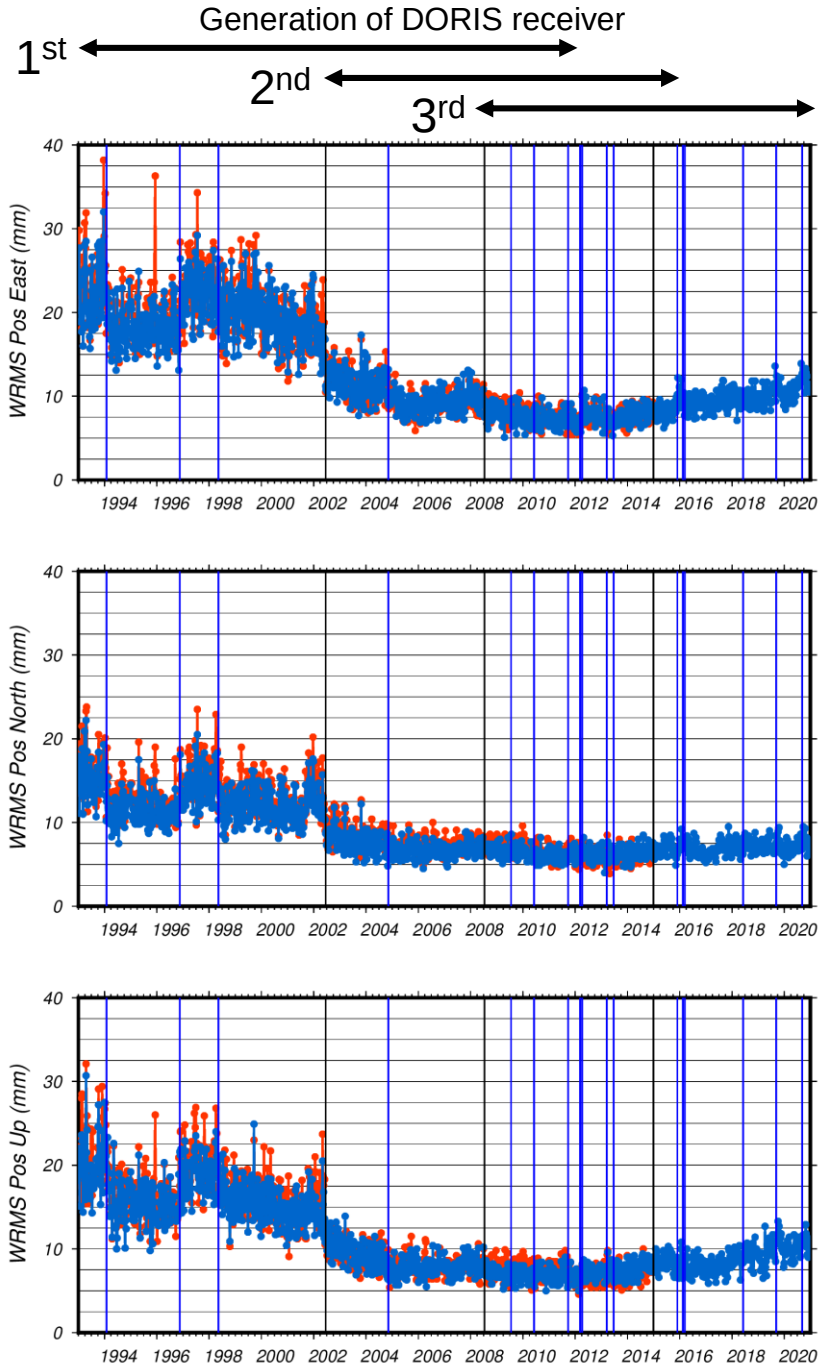
Origin and scale wrt ITRF2014

ids 09 (ITRF2014) – **ids 15** (ITRF2020)
Time period: 1993.0-2021.0



Scale difference until 2002.5 is due to the new ALCATEL antennae PCV.

IDS-ITRF2020 solution performs better (lower STDs and lower 118-day signal).



Station Position WRMS wrt ITRF2014

ids 09 (ITRF2014) – **ids 15** (ITRF2020)
Time period: 1993.0-2021.0

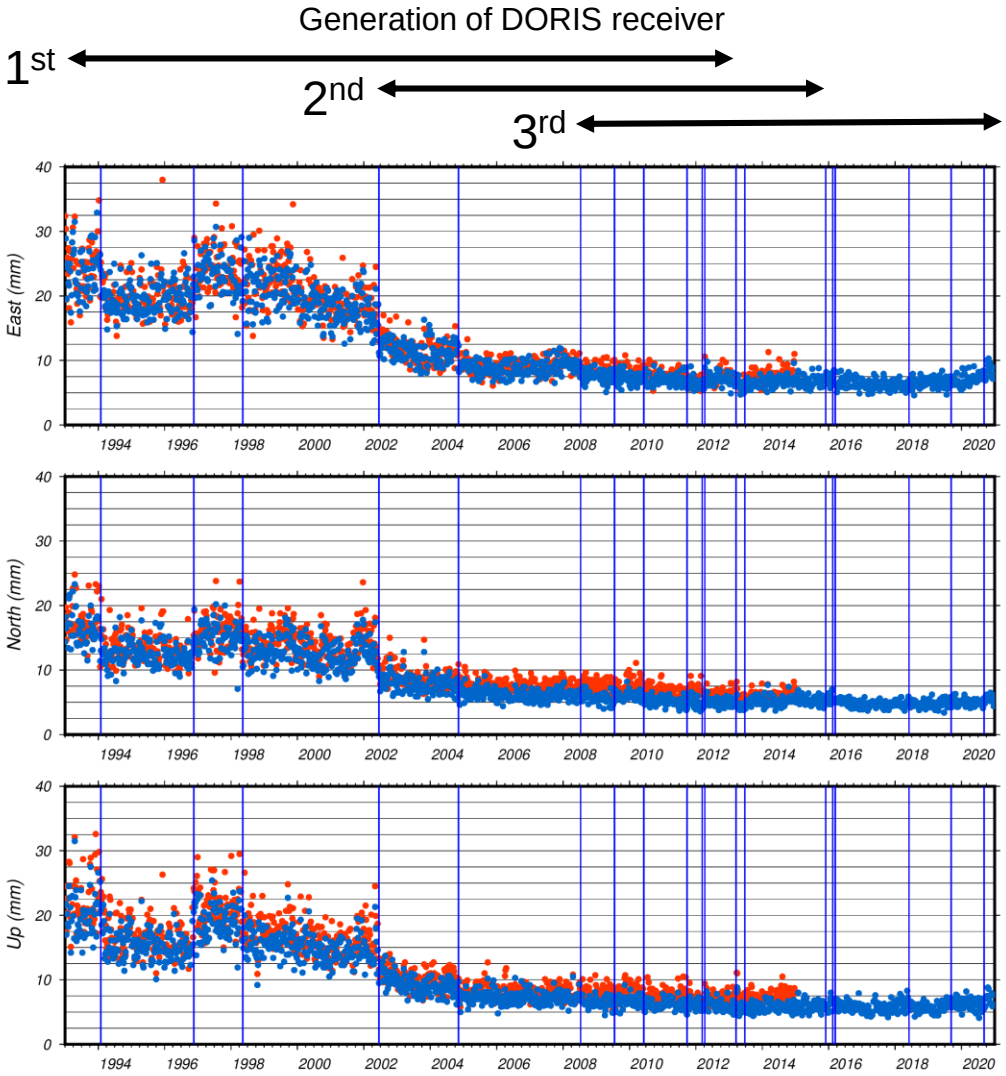
3D WRMS [mm]	1993.0 2002.5	2002.5 2008.5	2008.5 2015.0	2015.0 2021.0
ids 09	16.8 ± 2.8	8.7 ± 1.3	7.1 ± 0.7	
ids 15	15.7 ± 2.5	8.4 ± 1.2	6.9 ± 0.6	8.3 ± 0.9

- **Results improved when more satellites are available and with more and more recent generation of DORIS receivers.**
- **3D WRMS below 10mm after including Jason-1 (late 2004).**
- **3D WRMS around 7-8mm since adding of HY-2A (late 2011).**

IDS-ITRF2020 solution performs better than IDS-ITRF2014.

Station Position WRMS wrt Cumulative Solution

ids 09 (ITRF2014) – **ids 15** (ITRF2020)
Time period: 1993.0-2021.0

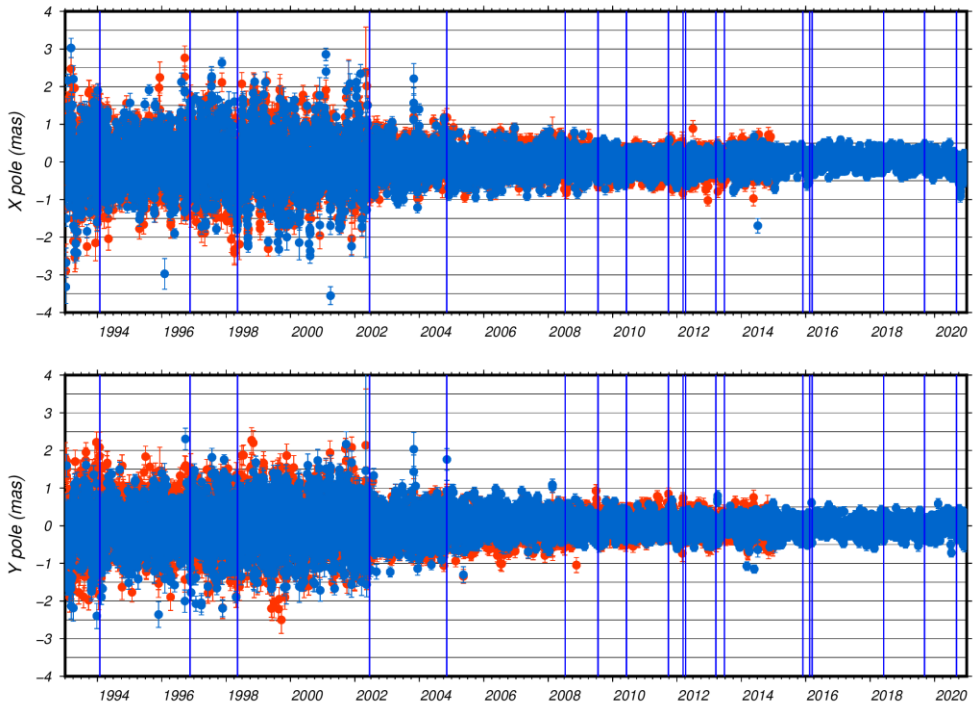


- **Strong correlation with the time evolution of the generation of DORIS receivers (i.e. number of stations simultaneously received onboard).**
- **Slight improvement since late 2015 while only 3rd generation of DORIS receivers are on flight.**

IDS-ITRF2020 solution performs better than IDS-ITRF2014.

3D WRMS [mm]	1993.0 2002.5	2002.5 2008.5	2008.5 2015.0	2015.0 2021.0
ids 09	17.7 ± 2.9	9.0 ± 1.3	7.4 ± 0.8	
ids 15	16.4 ± 2.5	8.1 ± 1.3	6.1 ± 0.6	5.8 ± 0.6

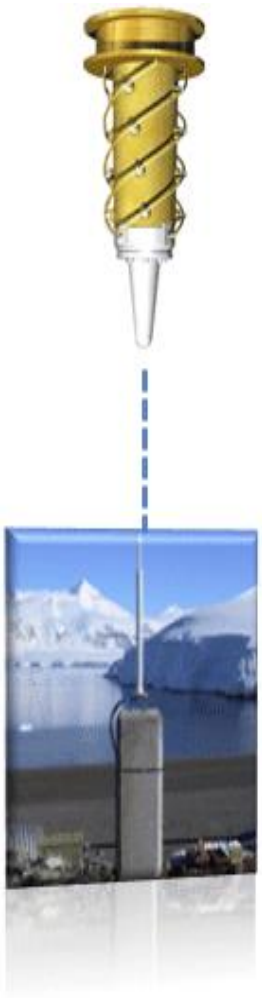
EOPs differences wrt IERS C04 series



ids 09 (ITRF2014) – **ids 15** (ITRF2020)
Time period: 1993.0-2021.0

Period of time	Std ΔX [mas]	Std ΔY [mas]
1993.0-2002.5	0.68 / 0.70	0.61 / 0.61
2002.5-2008.5	0.31 / 0.32	0.29 / 0.30
2008.5-2015.0	0.24 / 0.21	0.22 / 0.19
2015.0-2021.0	- / 0.18	- / 0.17

ITRF2020 and ITRF2014 IDS contributions have similar performances in both X and Y.



The IDS contribution to the ITRF2020 is ready and on time wrt IERS deadline.

The IDS contribution to ITRF2020 performs even slightly better than the IDS contribution to the ITR2014.

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