

Status report of the IDS AAC at GFZ

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IDS – AWG meeting 2023
Paris - November 28+29, 2023

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1 General

- **ITRF2020 extension**

- Reprocessing
 - All DORIS satellites except SPOT and HY-2A/C/D
 - Delivered solutions to IDS CC for evaluation
 - Single satellite solutions
 - On NEQ level combined solution
 - New solution in progress which also includes the NNR condition of the “NNR datum finder”

- **Work for application as IDS AC**

- Added new satellites
- Evaluation of POD (estimated parameters)
- External orbit comparison

2 New Satellites

Cryosat-2



SARAL



SWOT



2.1 Internal validation

2.2 Analysis of estimated parameters in POD

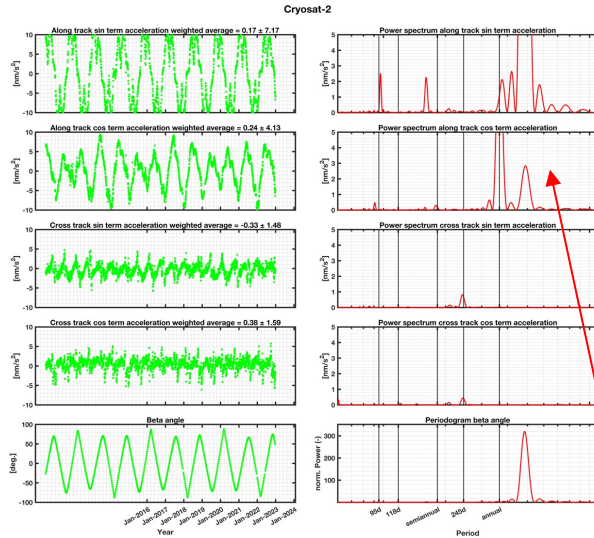
2.3 External orbit comparison

2.1 Orbital Fit

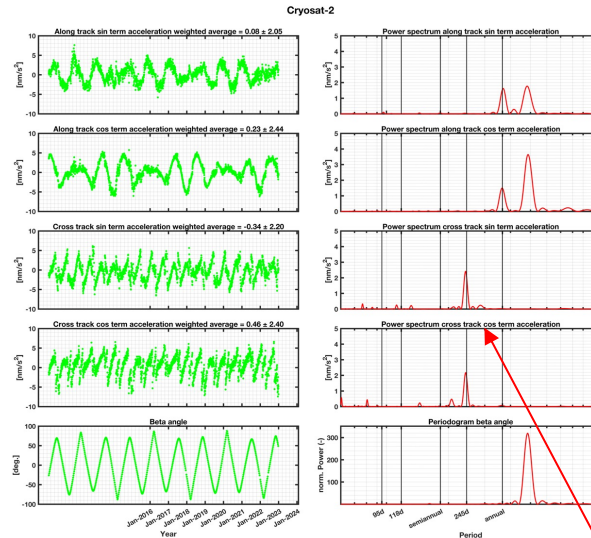
		SARAL		Cryosat-2		SWOT (preliminary)	
		RMS	No. Obs.	RMS	No. Obs.	RMS	No. Obs.
SLR	[cm]	1.08	512'866	1.1	721'764	0.97	12'949
DORIS	[mm/s]	0.37	30'136'368	0.39	38'697'154	0.41	823'507
SLR (valid.)	[cm]	1.28	512'866	1.5	721'764	1.24	12'949
DORIS	[mm/s]	0.37	30'136'368	0.39	38'697'154	0.41	823'507

2.2.1 Cryosat-2 (1)

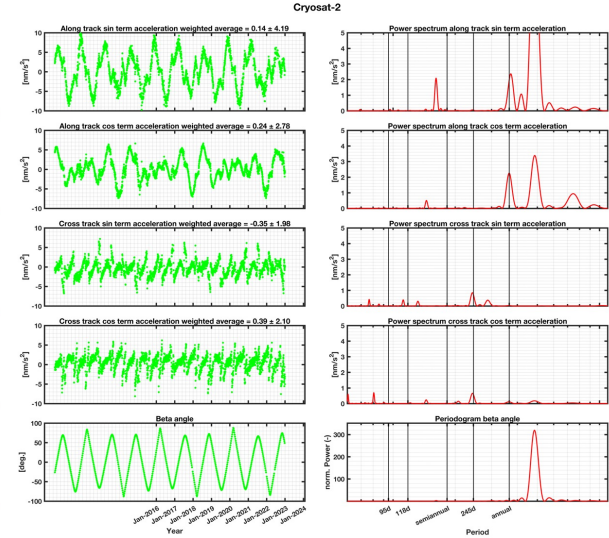
ESA (3 double-side)



CNES (7 single-side)



GFZ (21 single-side)



Motivation: Reduce along-track signal and no introduction of cross-track signal

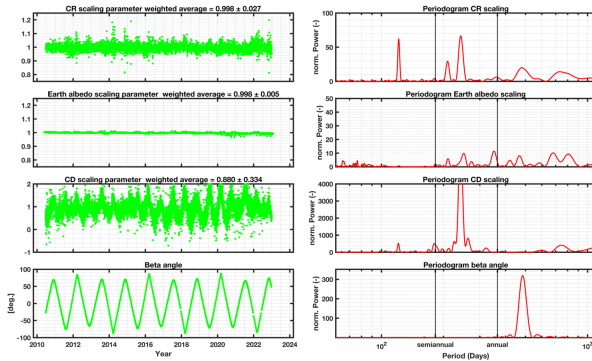
2.2.1 Cryosat-2 (2)

ESA (3 double-side)

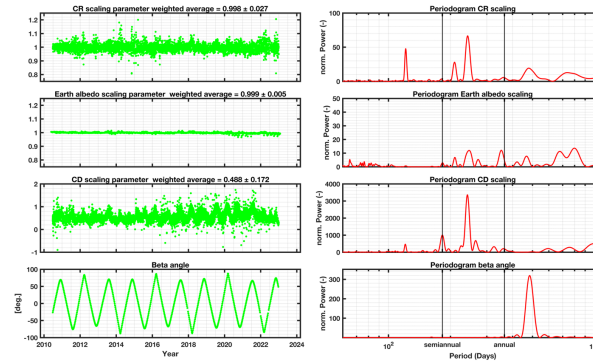
CNES (7 single-side)

GFZ (21 single-side)

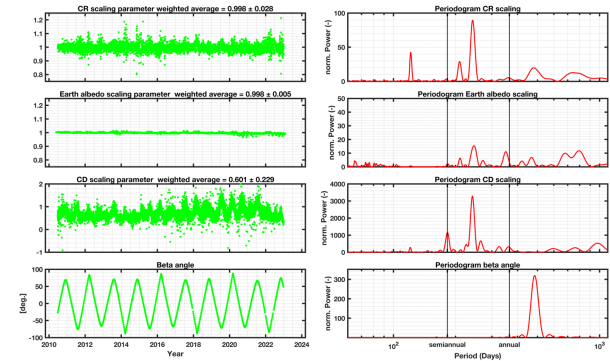
Cryosat-2



Cryosat-2



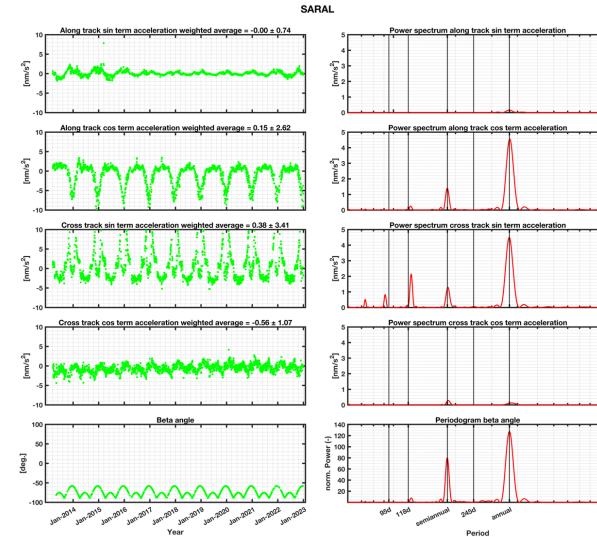
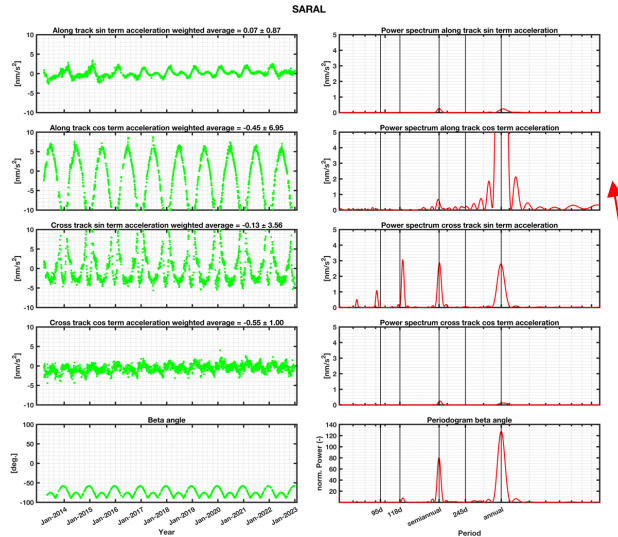
Cryosat-2



2.2.2 SARAL (1)

CNES (3 double-side)

GFZ (3 double-side)



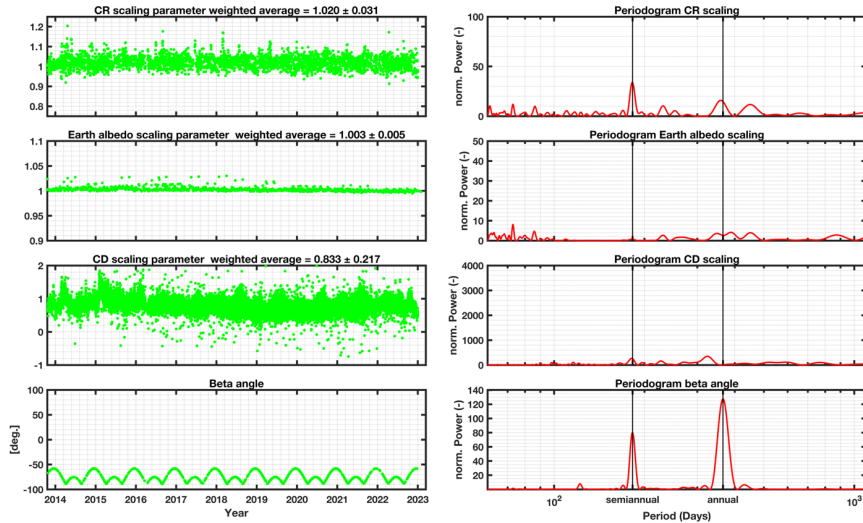
Reduce along-track signal

2.2.2 SARAL (2)

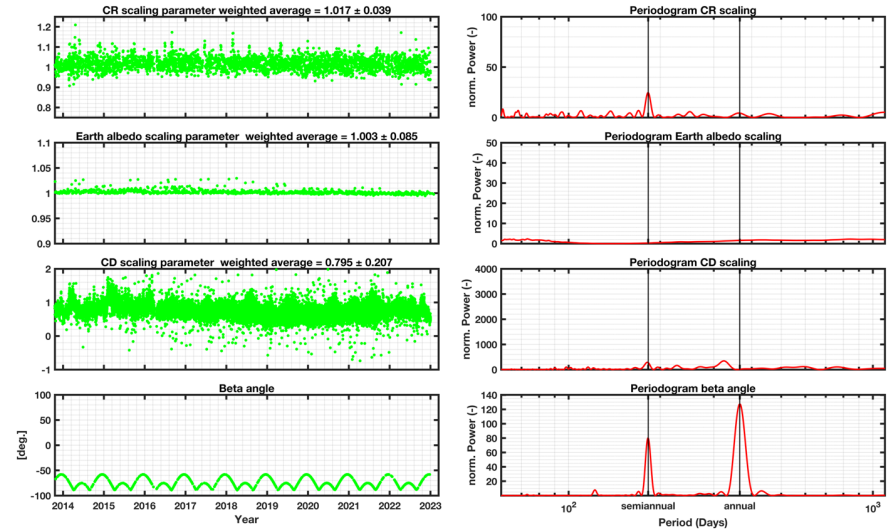
CNES (3 double-side)

GFZ (3 double-side)

SARAL

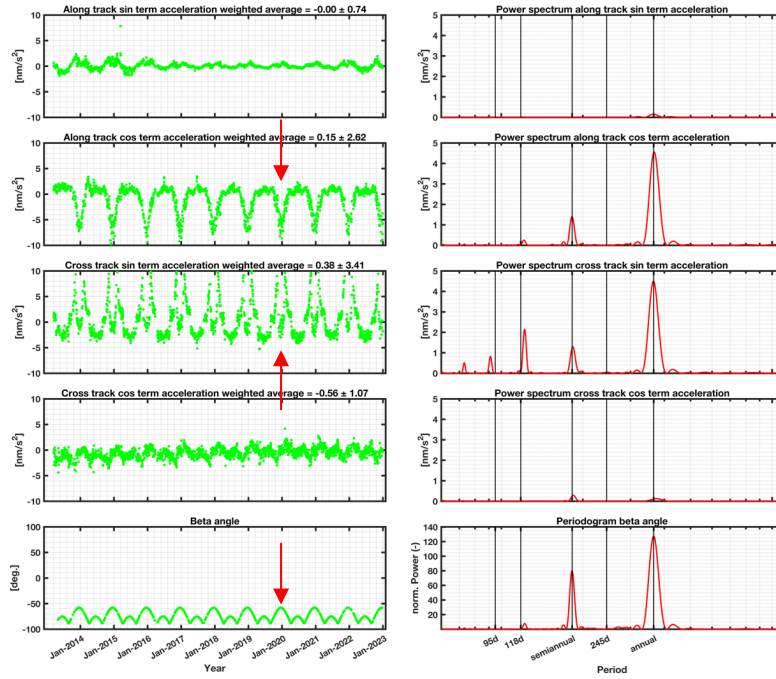


SARAL



2.2.2 SARAL (3)

GFZ (3 double-side)
SARAL



EUMETSAT

Significant self shadowing effect,
depending on the beta angle

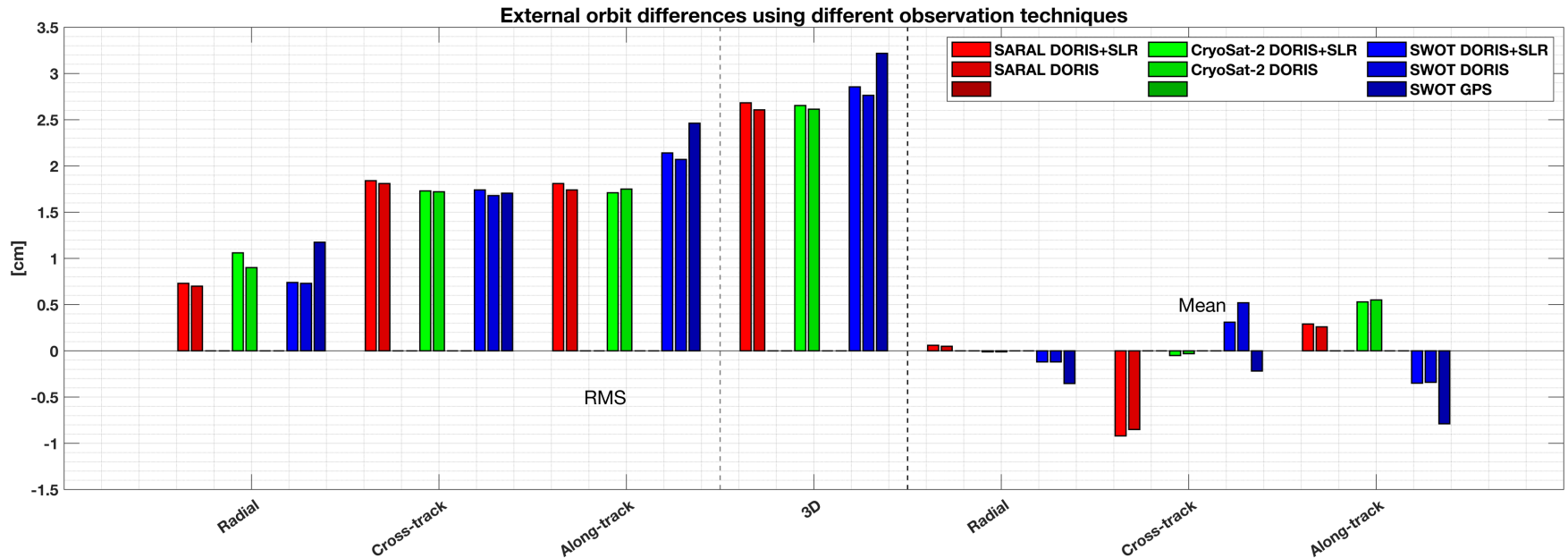
2.2.3 SWOT (preliminary)

Orbital fit

		SWOT	
		RMS	No. Obs.
Code	[cm]	53.0	388'555
Phase	[mm]	5.2	388'555
SLR (valid.)	[cm]	1.8	4'212
DORIS	[mm/s]	0.4	823'507
SLR	[cm]	0.9	12'949
DORIS	[mm/s]	0.4	823'507
SLR (valid.)	[cm]	1.2	12'949

2.4 External Orbit Comparison

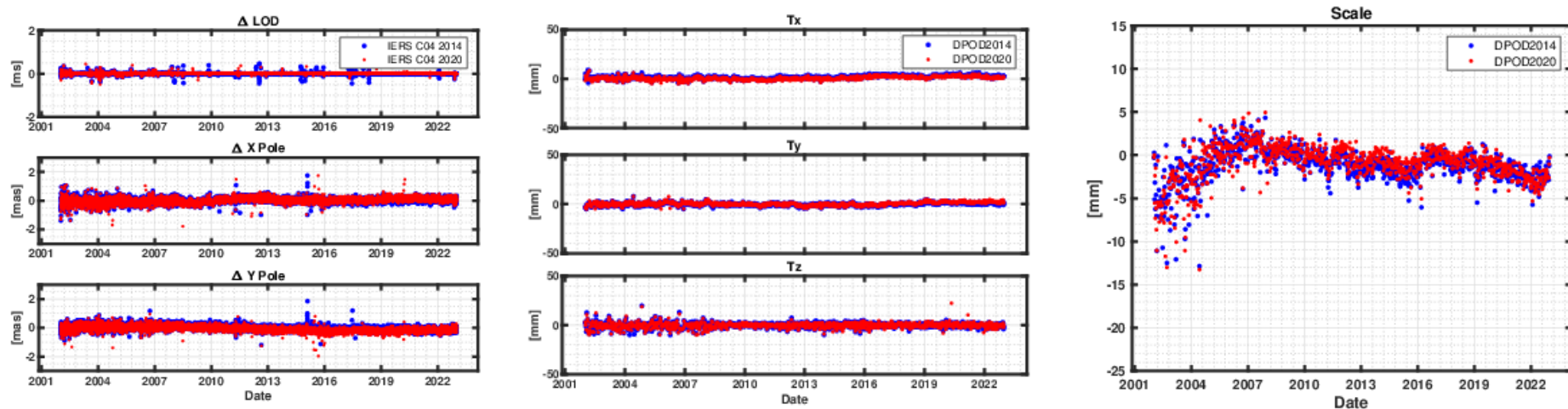
External orbit comparison with SSA



3 DPOD2020 comparison (1)

- We computed single-satellite weekly DORIS-only solutions
- Solved for station positions and ERPs (X-/Y-pole and LOD)
 - 1m constraint to station positions and ERPs
- Combined solution
 - Combination of all satellites equally weighted on normal equation level
- Apply iterative NNR station network finder
 - Strength of the condition equivalent to 1mm
- Compare results for DPOD2014 w/ EOP14C04 and DPOD2020 w/ EOP20C04 with a priori

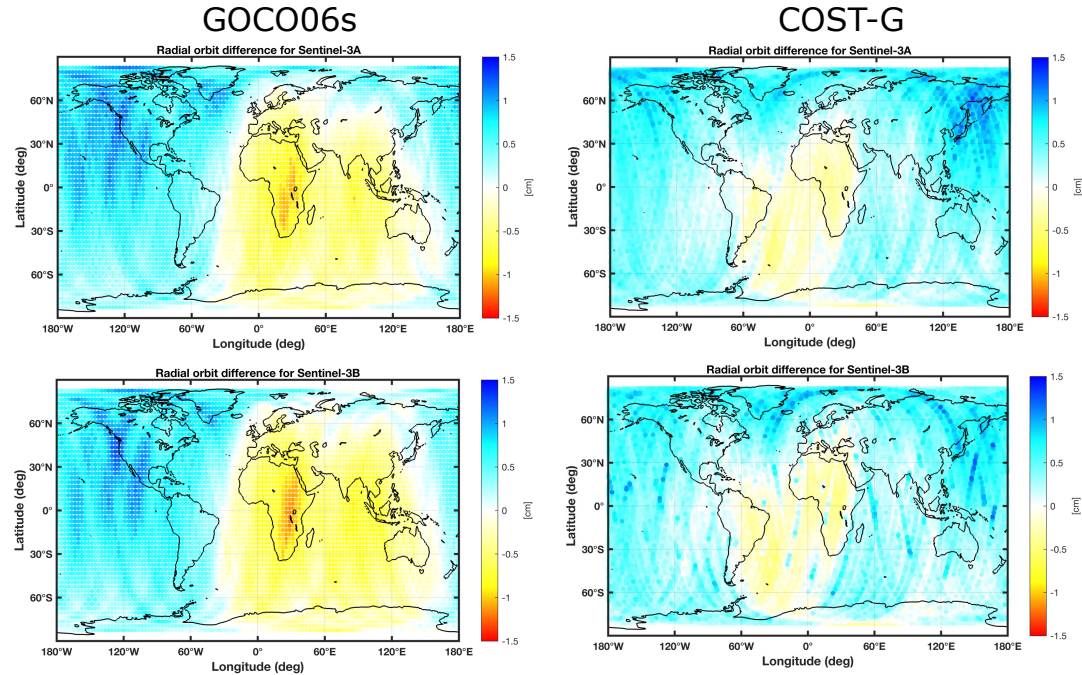
3 DPOD2020 comparison (2)



	Δ X Pole [ms]	Δ Y Pole [mas]	Δ LOD [mas]	Tx [mm]	Ty [mm]	Tz [mm]	Scale
DPOD2014	-0.02 ± 0.18	-0.02 ± 0.18	0.00 ± 0.96	1.62 ± 1.73	-0.10 ± 1.51	0.19 ± 2.72	-1.21 ± 2.00
DPOD2020	-0.02 ± 0.20	-0.01 ± 0.19	0.00 ± 0.78	0.74 ± 1.72	0.25 ± 1.74	-0.41 ± 2.82	-0.95 ± 2.12

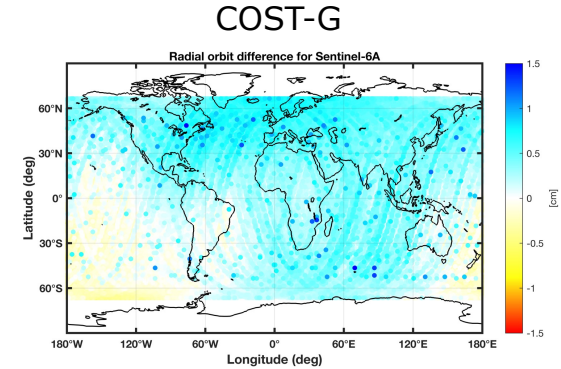
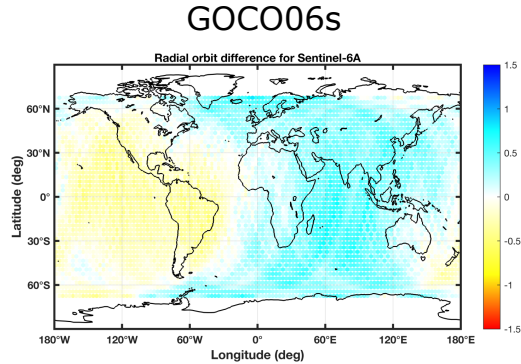
4 Geographic Patterns (1)

- Orbit comparison against CPOD-QWG combined orbit solution
- Regional West-East pattern visible
- Switched gravity field model GOCO06S (120x120) to COST-G (90x90)



4 Geographic Patterns (2)

- Orbit comparison against CPOD-QWG combined orbit solution
- Regional West-East pattern visible
- Switched gravity field model GOCO06S (120x120) to COST-G (90x90)



5 Conclusion

Conclusion:

- Processing for ITRF2020 extension ongoing
- Signals in estimated parameters of the POD could be reduced
- New satellites in the set show good agreement in external orbit comparison
- Systematic geographic orbit difference in radial direction could be reduced by COST-G EGM