Ocean Surface Topography Science Team Meeting

Precise Orbit Determination Splinter

JASON-2, JASON-3 and SENTINEL-3A/B POD STATUS

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POE-F STANDARDS

	POE-E	POE-F
Surface forces	Atmospheric model : DTM-13 for Jason satellites, HY-2A , and MSIS-86 for other satellites	Atmospheric model : DTM-13 for Jason satellites, HY-2A , and **MSIS-00 for other satellites**
Geopotential	EIGEN-GRGS.RL03-v2.MEAN-FIELD C21/S21 modeled according to IERS 2010 conventions Ocean tides: FES2012 Atmospheric gravity: 6hr NCEP pressure fields (72x72) + tides from Biancale-Bode model	**EIGEN-GRGS.RL04-v1.MEAN-FIELD** **C21/S21 non modified** Ocean tides: **FES2014** Atmospheric gravity: **3hr dealiasing products from GFZ AOD1B RL06**
Geocenter	Seasonal non-tidal geocenter motion from J. Ries model for DORIS/SLR stations	**Full non-tidal geocenter motion derived from DORIS data and the OSTM/Jason-2 satellite, for DORIS/SLR stations and GPS satellites**

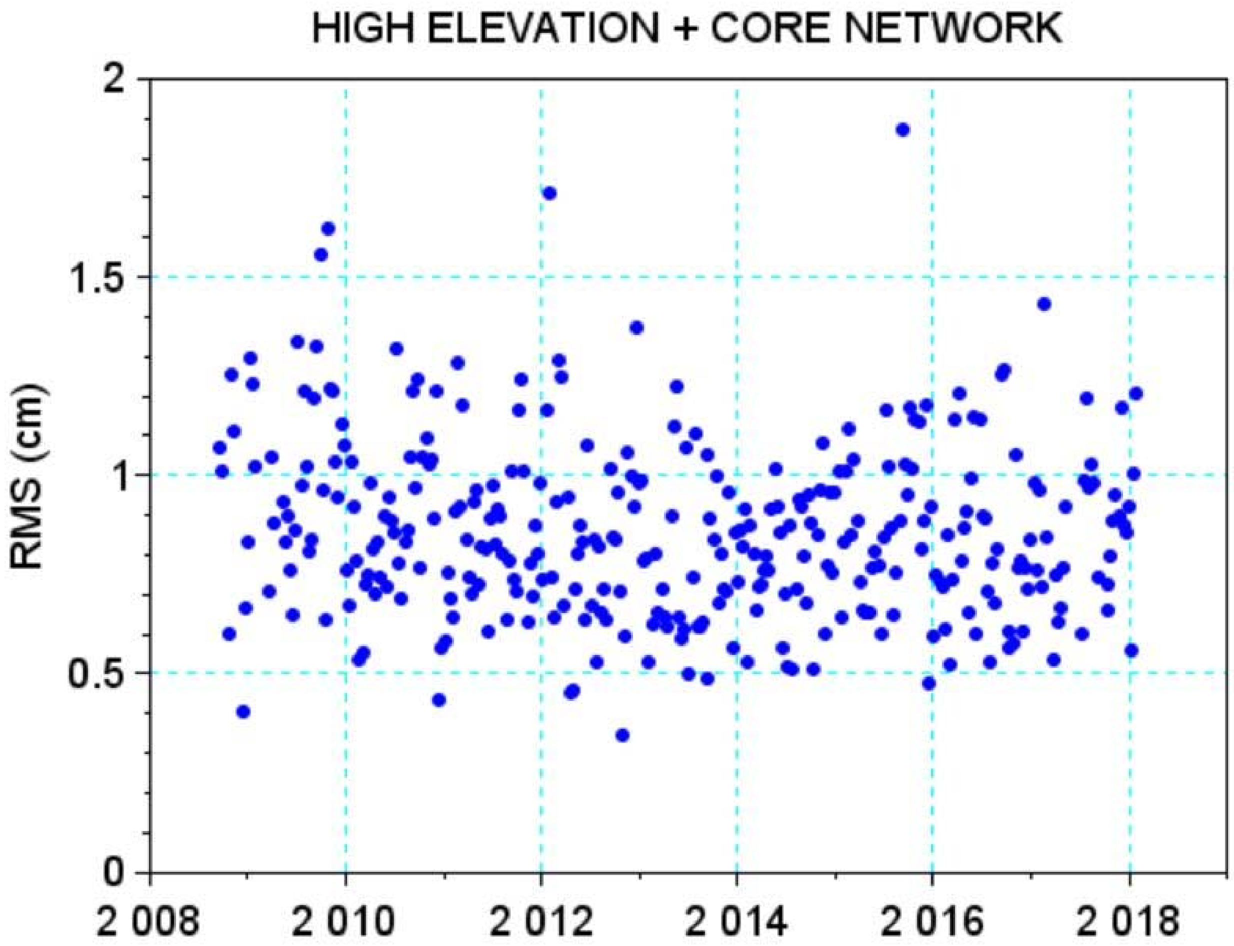
POE-F STANDARDS

	POE-E	POE-F
Loading	Ocean loading: FES2012 Pole tide: solid earth pole tides and ocean pole tides (Desai, 2002) Mean pole cubic+linear (IERS 2010)	Ocean loading: **FES2014** Pole tide: solid earth pole tides and ocean pole tides (Desai, 2002) **New linear mean pole model**
GPS constellation	JPL solution in “native” format (orbits and clocks), referenced to the CoM of the solid Earth/Ocean – fully consistent with IGS08	**GRG solution with fixed ambiguity for JASON-3 SENTINEL-3A SENTINEL-3B** – fully consistent with **IGS14**
Propagation delay	Tropospheric model GPT GMF	Tropospheric model **GPT2 VMF1**

POE-F STANDARDS

	POE-E	POE-F
Others	DORIS station coordinates in DPOD 2008 SLR coordinates stations in SLRF2008	DORIS station coordinates in **DPOD 2014** SLR station coordinates in **SLRF2014** **Low elevation DORIS measurement (>5°) with weighting function and tropospheric gradients**

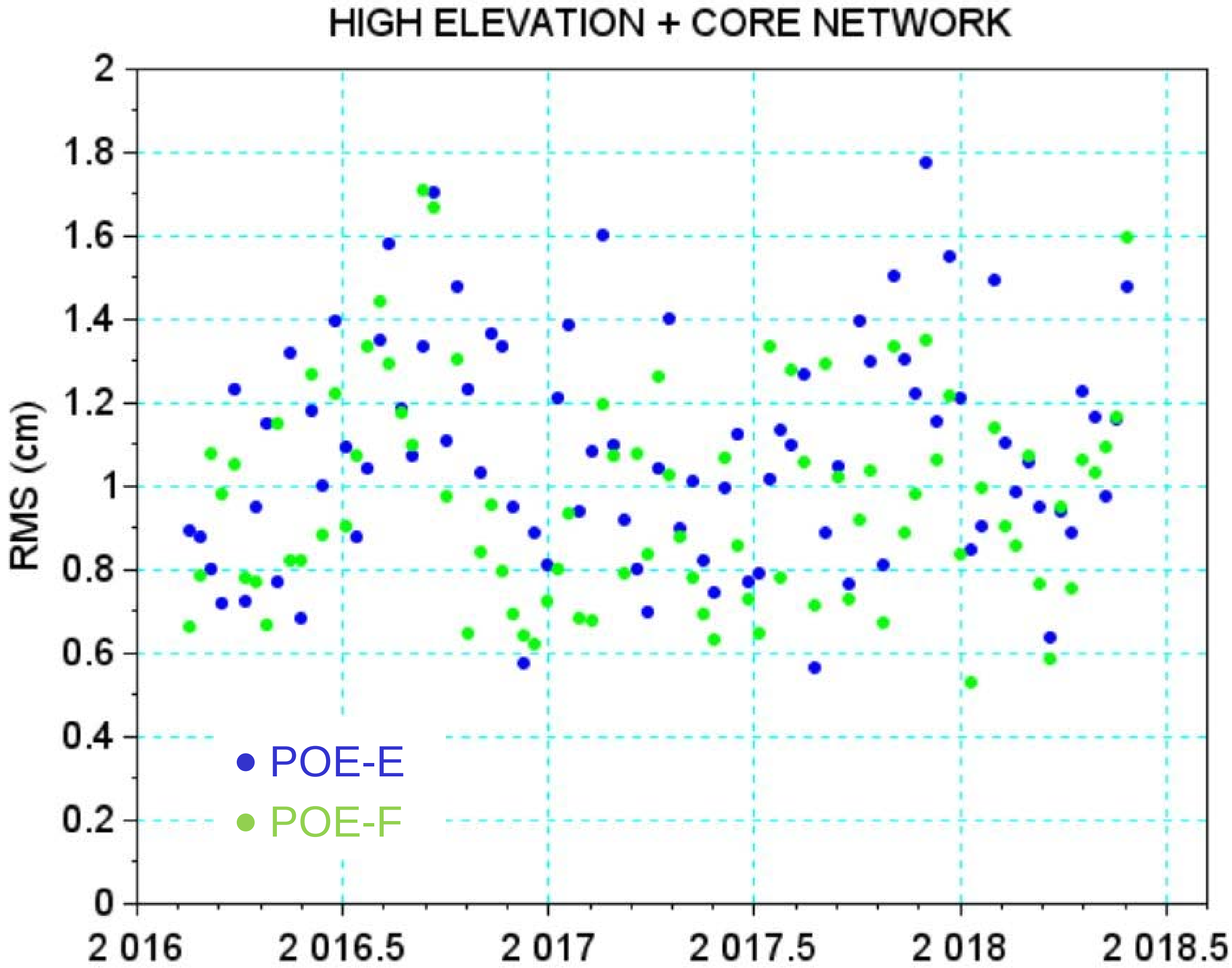
JASON-2, POE-E standards, RMS SLR



SLR CORE NETWORK
L7090 L7105 L7810 L7840 L7941

Stable time series for these RMS SLR, with mean RMS 8mm

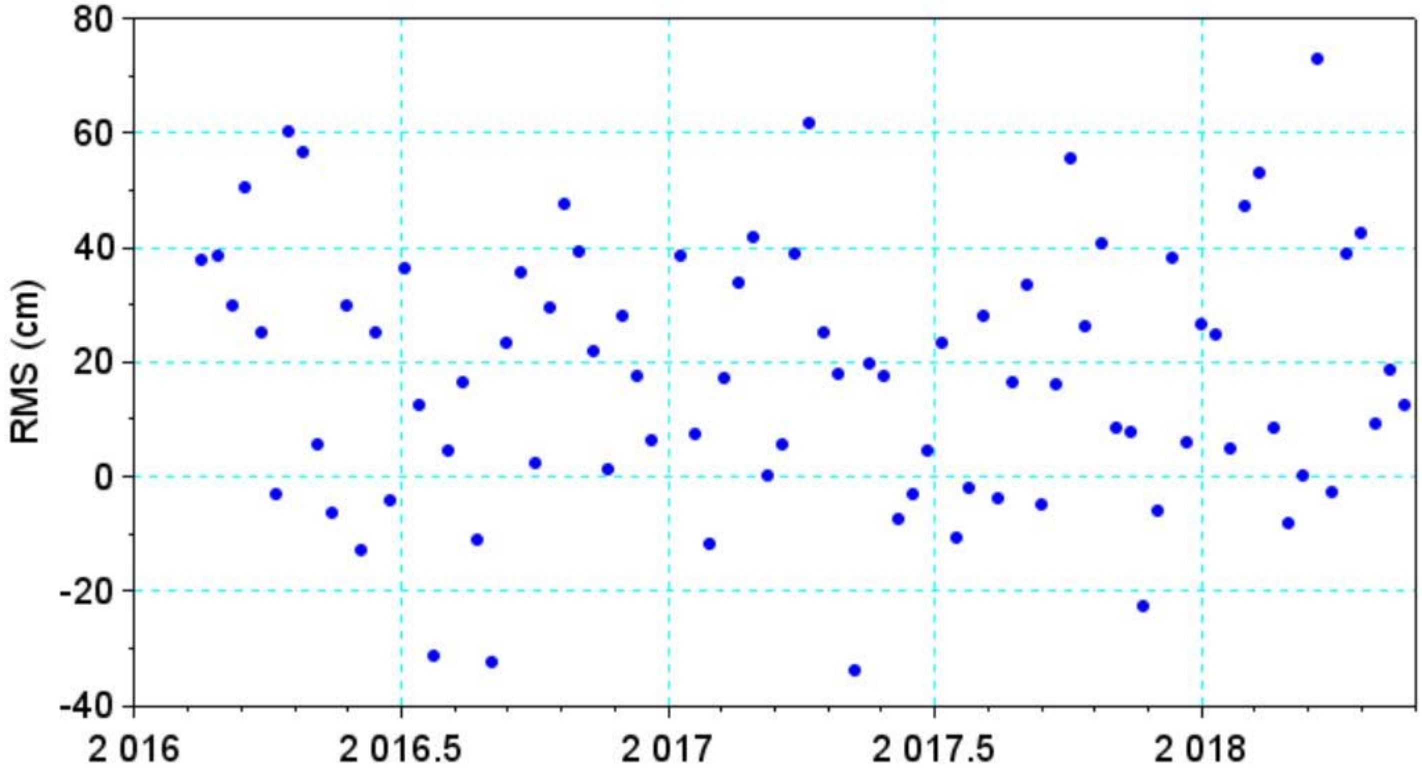
JASON-3, RMS SLR



MEAN RMS SLR
POE-E *1.08cm*
POE-F *0.97cm*

→ *fixing ambiguities*
c.f. poster & presentation of F.Mercier

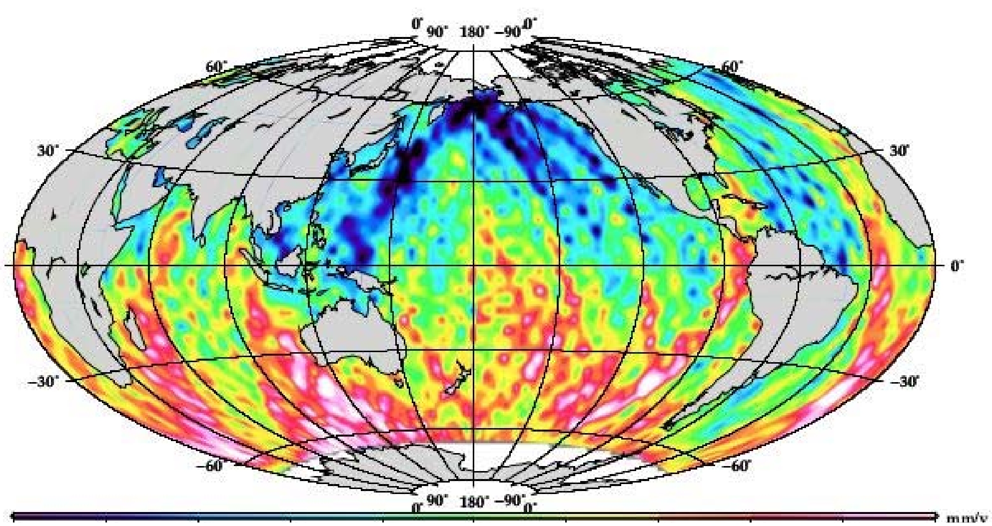
JASON-3, CROSSOVER VARIANCE, POE-E vs POE-F



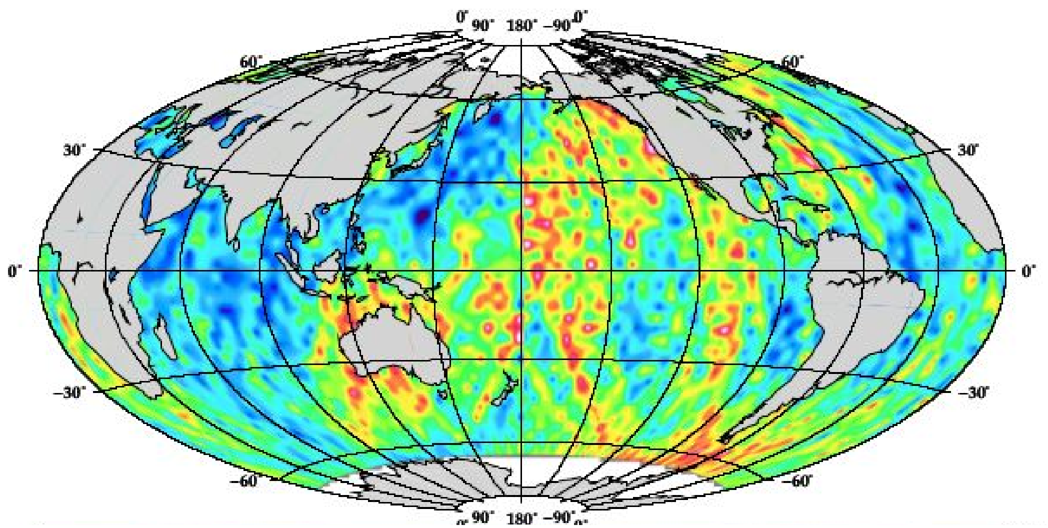
IMPROVEMENT of 17.5mm²

JASON-3, GEOGRAPHICALLY CORRELATED RADIAL DIFF.

POE-E vs POE-F, cycles 1→85

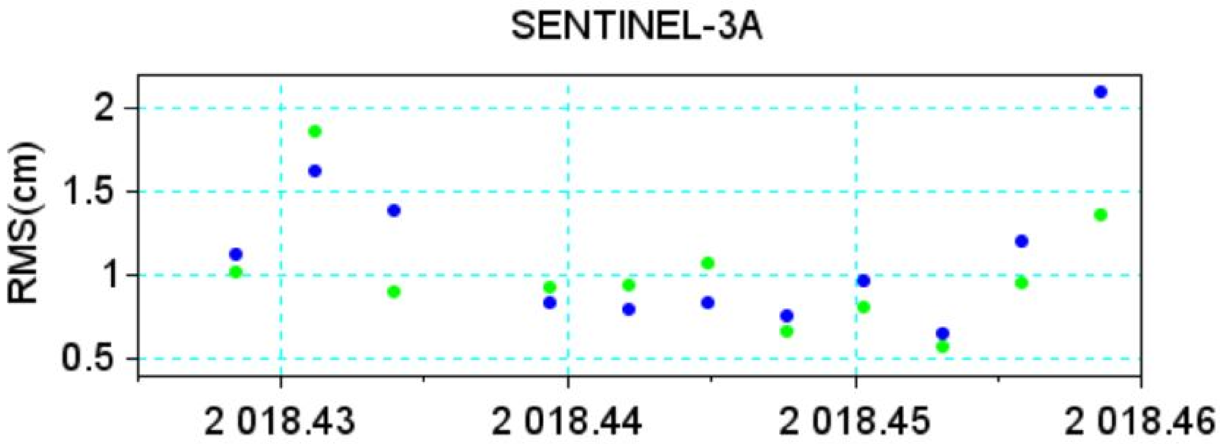


POE-E vs POE-F, cycles 1→85

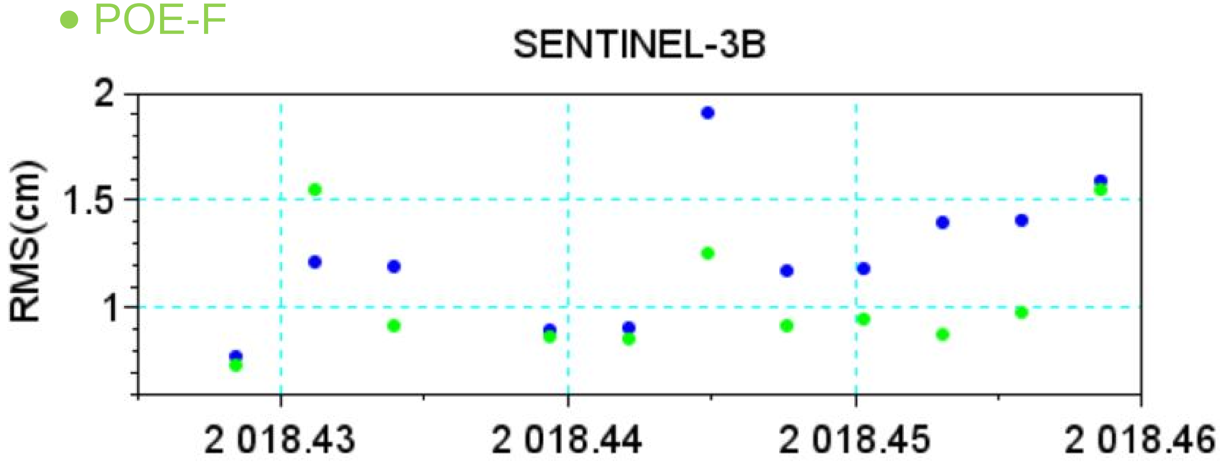


Difference between POE-E and POE-F DORIS+GPS reduced dynamic orbits, patchs north/south and west/east : combination of gravity field correction (sectorial terms) and geocenter motion ?

SENTINEL-3A/3B, RMS SLR CORE NETWORK



- POE-E
- POE-F

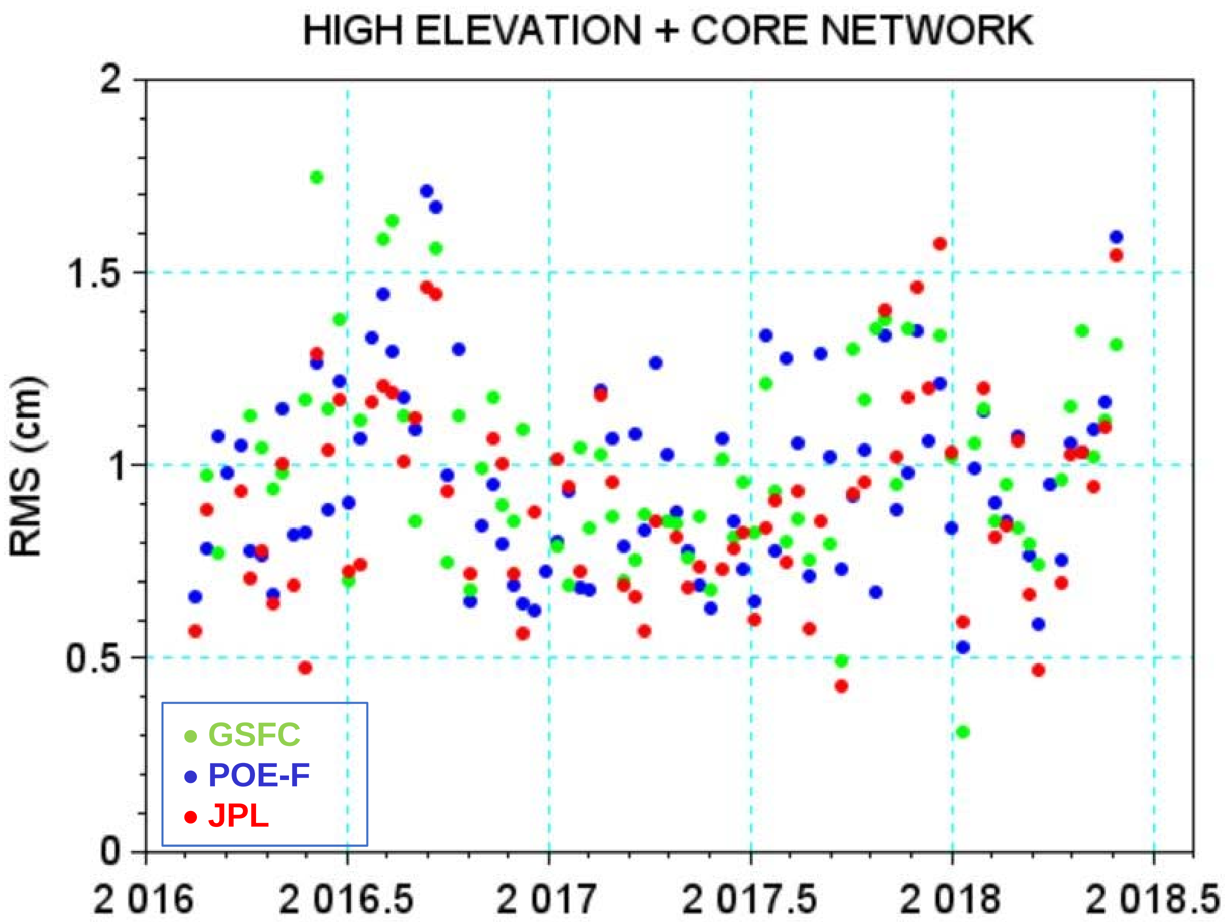


RMS BY DAYS, TANDEM PHASE FOR SENTINEL-3A AND SENTINEL-3B

MEAN RMS SENTINEL-3A
POE-E 1.11cm
POE-F 1.00cm

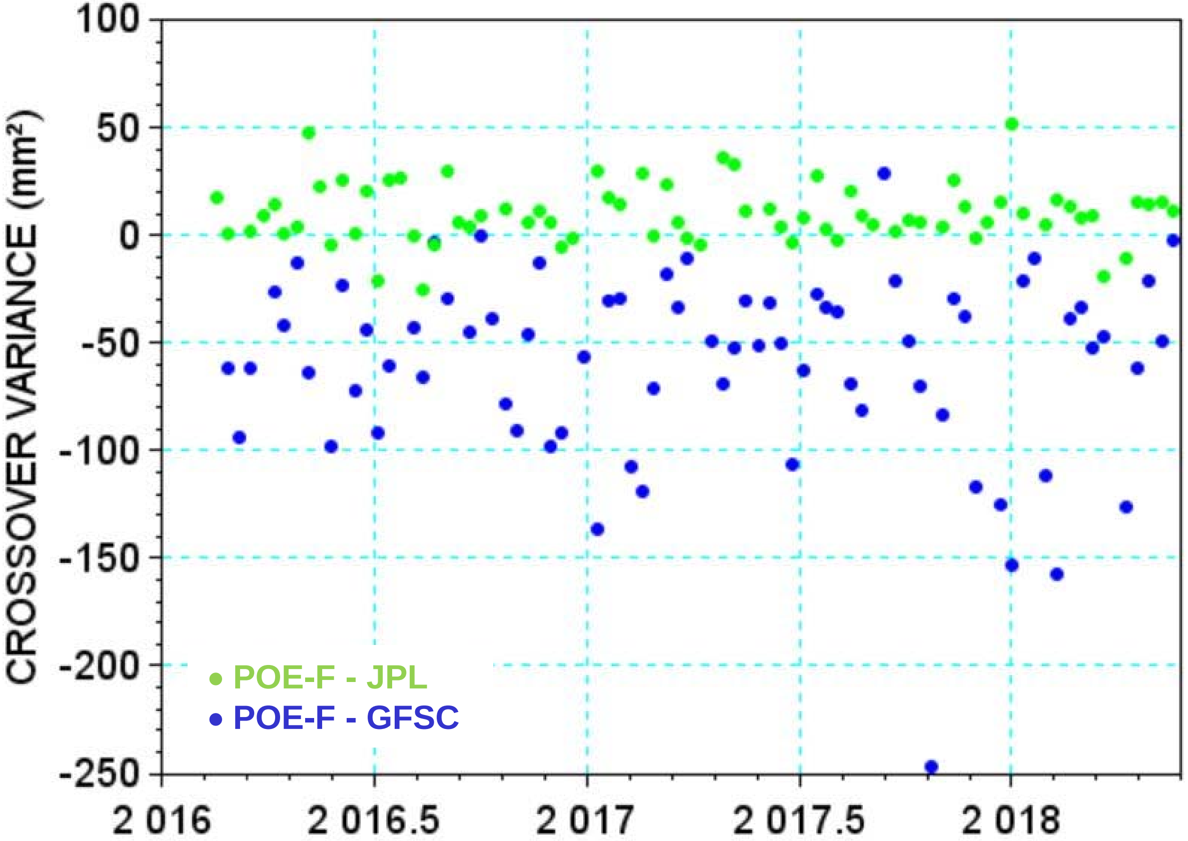
MEAN RMS SENTINEL-3B
POE-E 1.03cm
POE-F 0.80cm

JPL & GSFC COMPARISONS, RMS SLR



HIGH ELEVATION + CORE NETWORK	DIFFERENCE RMS
POE-F – GSFC	*-0.08 MM*
POE-F – JPL	*0.8 MM*

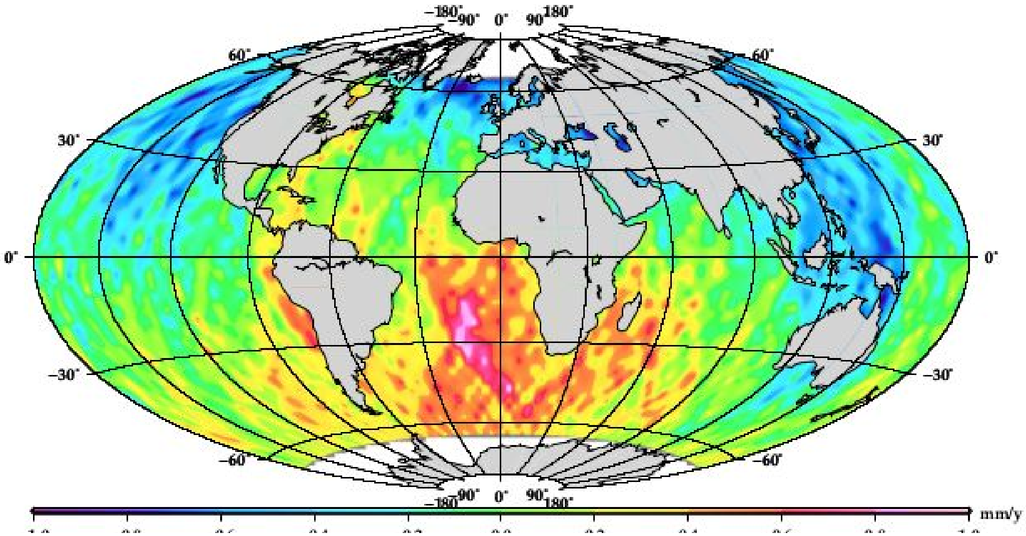
JPL & GSFC COMPARISONS, CROSSOVER VARIANCE



CROSSOVER VARIANCE DIFFERENCE	MEDIAN
POE-F – GSFC	*-50 MM²*
POE-F – JPL	*8 MM²*

JPL COMPARISONS, GEO. CORR. RADIAL DIFF.

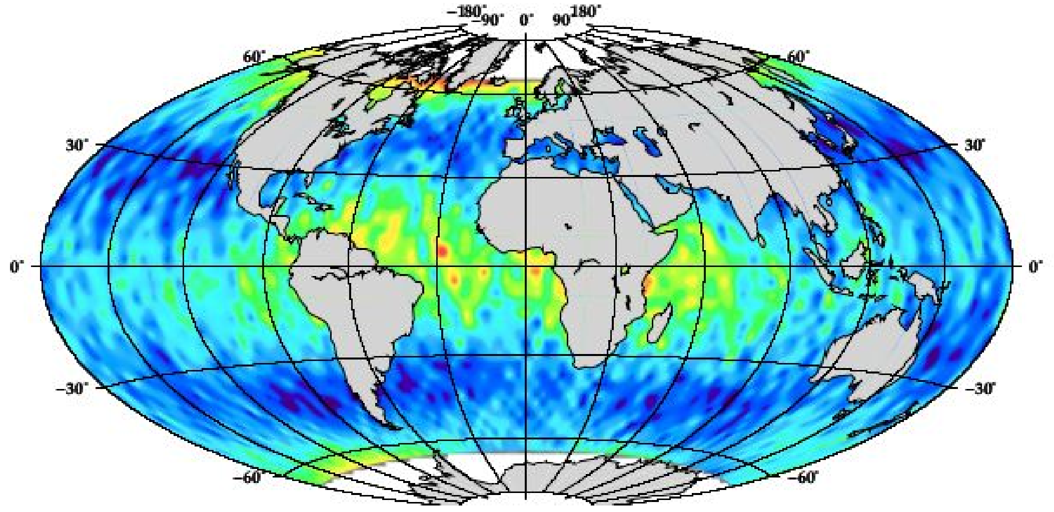
POE-F vs JPL, cycles 1→85



-1. ⟷ 1.mm/y

drift amplitude

POE-F vs JPL, cycles 1→85



0. ⟷ 2.0mm

annual amplitude

PATCH NORTH / SOUTH : IMPACT OF MODELING GEOCENTER MOTION ?

PLANNED SWITCHS FROM POE-E TO POE-F

POE-F standard used in operational context :

- at the end of the tandem phase for SENTINEL-3A/B (first POE-F delivered in November this year)
- from cycle 95 for JASON-3 (first POE-F delivered in October this year)

Past orbits already reprocessed in POE-F for JASON-3

Reprocessing

- TOPEX POSEIDON, in progress
- JASON-2, beginning of 2019

CONCLUSION

POE-F standards show good improvements for JASON-3 and SENTINEL-3A/B

POE-F standards show improvements too for the TOPEX/Poseidon orbits, c.f. C. Masson's presentation

CNES POE-F JASON-3 and JPL orbits are very close

Operational switch from POE-E to POE-F for Sentinel-3A/B and JASON-3 is coming soon

… THANK YOU FOR YOUR ATTENTION , ANY QUESTIONS ? …