Jason-3 GDR-F mission performances over ocean

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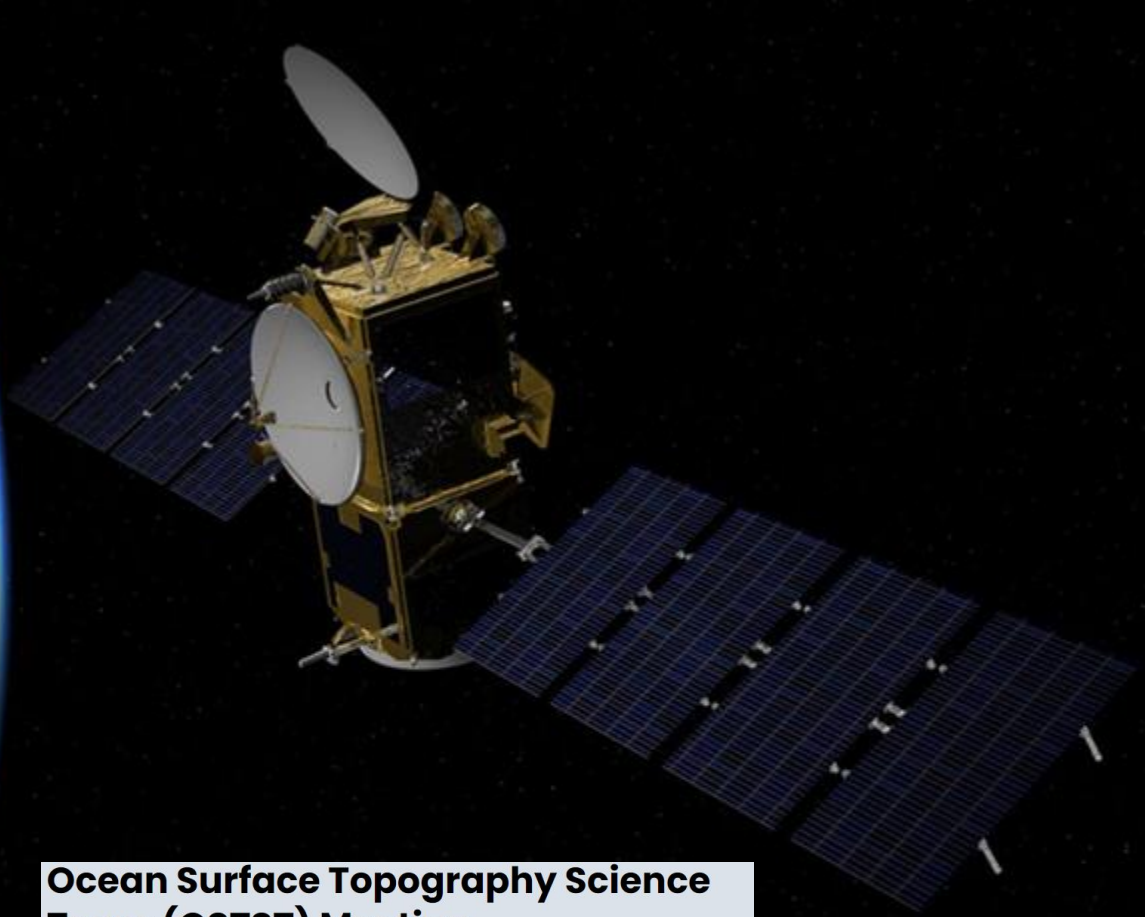

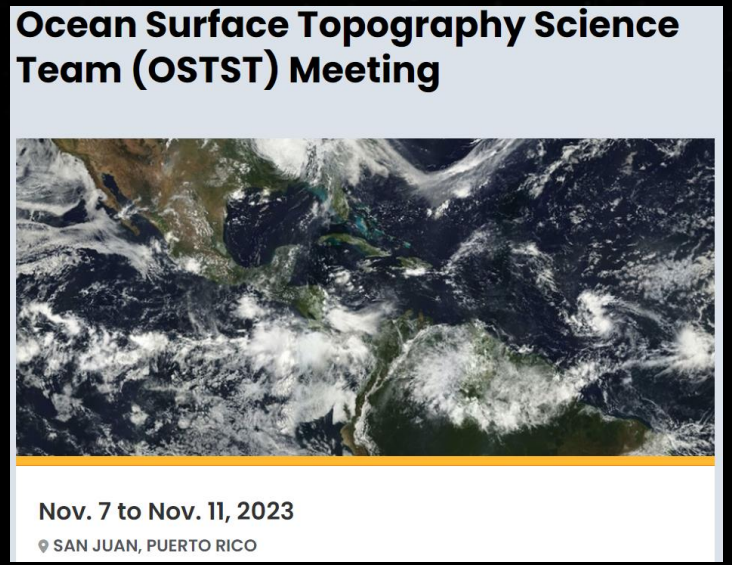

Regional and Global CAL/VAL for Assembling a Climate Data Record

1. GDR-F mission performances over ocean

2. GDR-F adaptive retracker outputs vs MLE4

3. Ongoing work on improvements and conclusions

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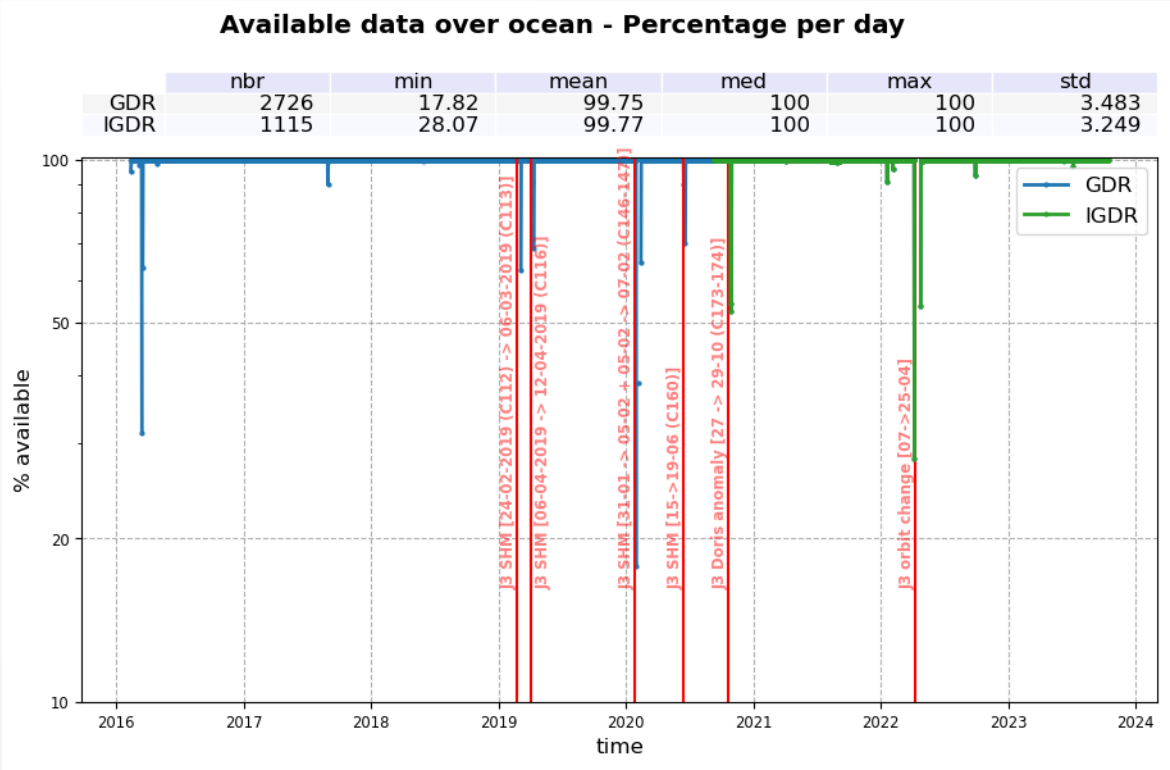
Data availability at 1Hz

Very good data availability over ocean

99.75 % calibrations included, without SHM and DEM patch uploads



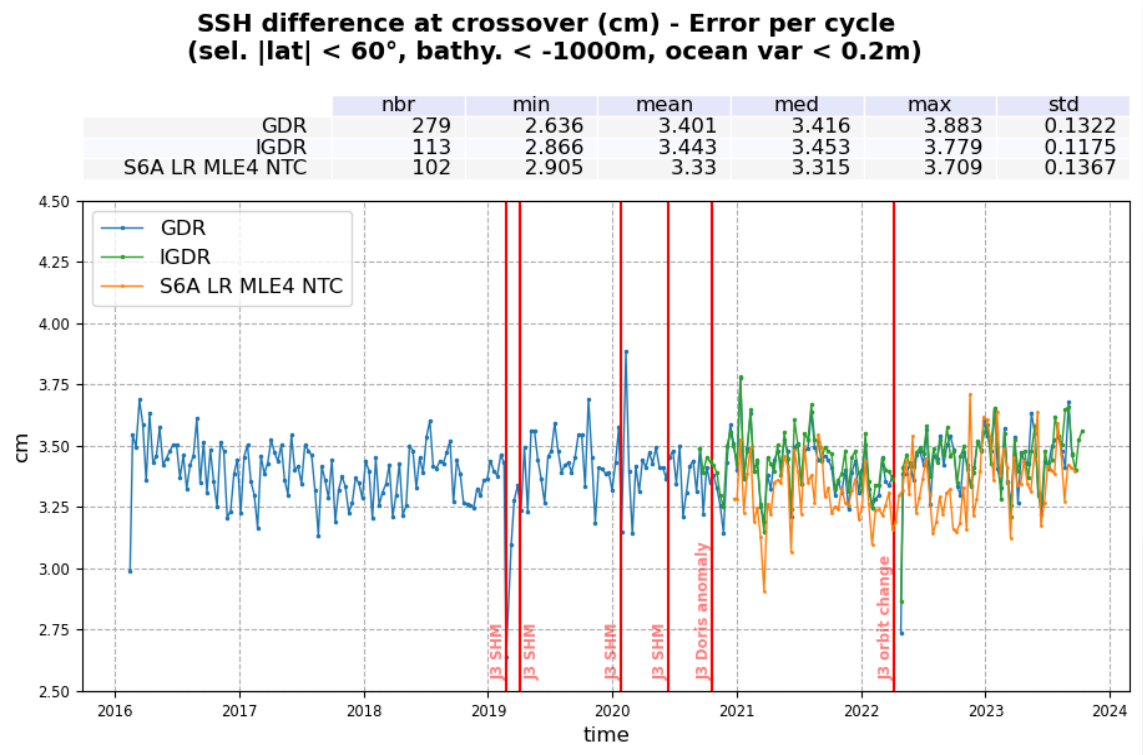
Sea Level Performances at 1Hz

SSH error is deduced from crossovers analyses using radiometer data : 3,4cm

Sentinel-6 shows a higher stability in the BOL but this improvement is reduced from 2023.

selecting :

- |latitudes| < 50°
- bathy<-1000m
- oceanic variability < 20 cm

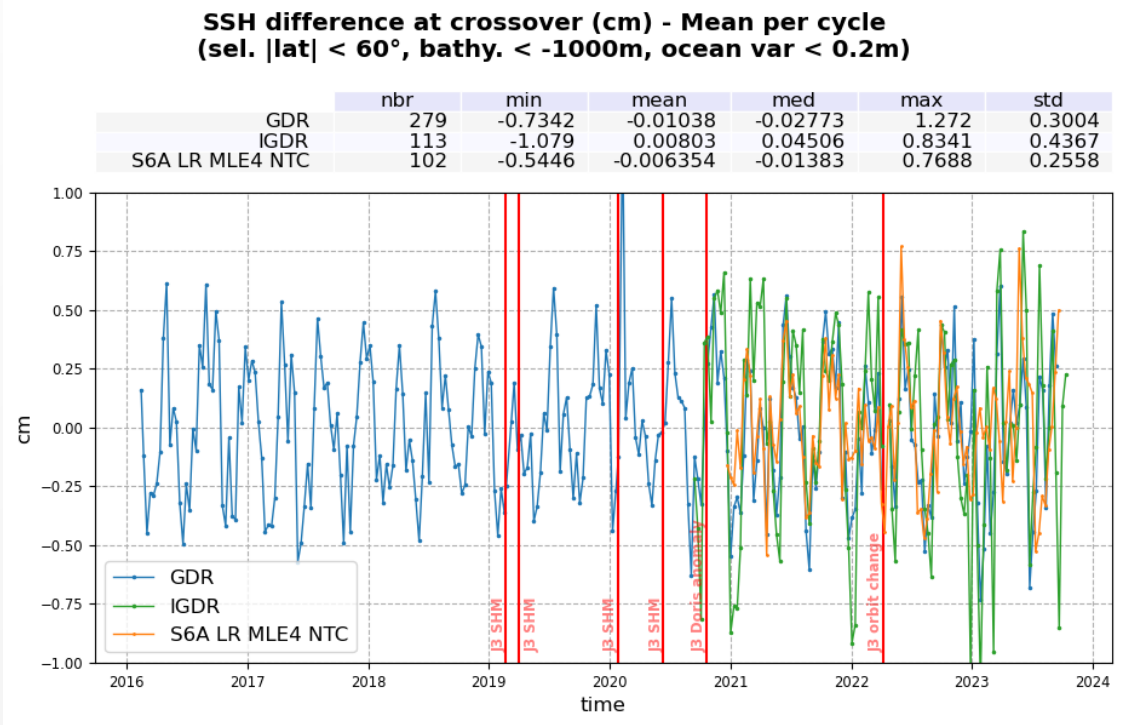


SSH differences at crossovers at 1Hz

Very close to zero in average.

Sentinel-6 shows a slightly higher stability.

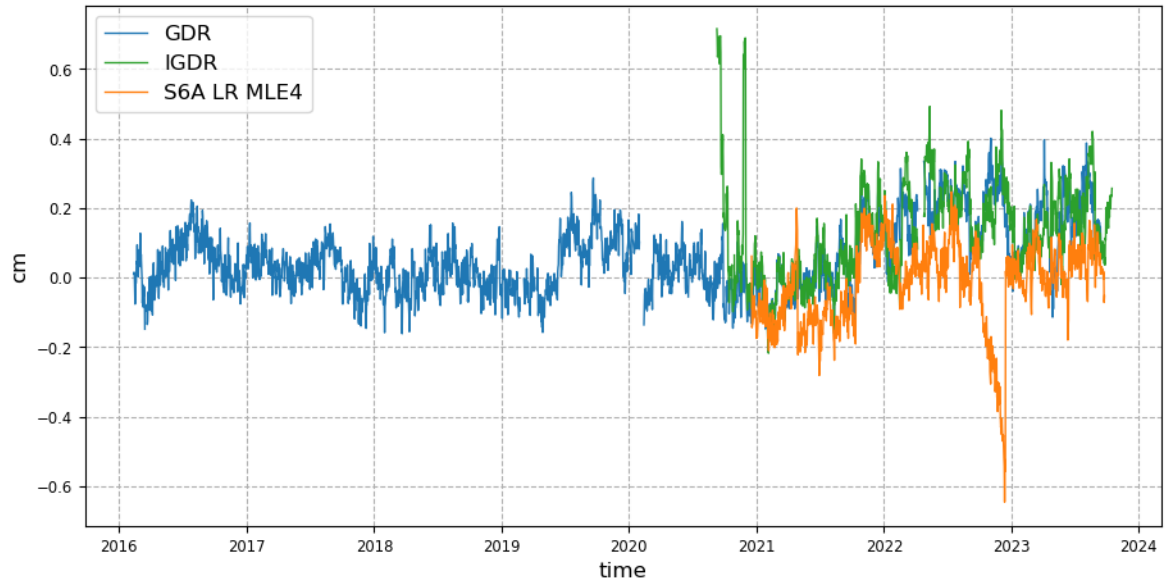
Small 120 days signal at crossovers, present for both missions.



AMR monitoring

Radiometer minus model wet troposphere - Mean per day (cm)

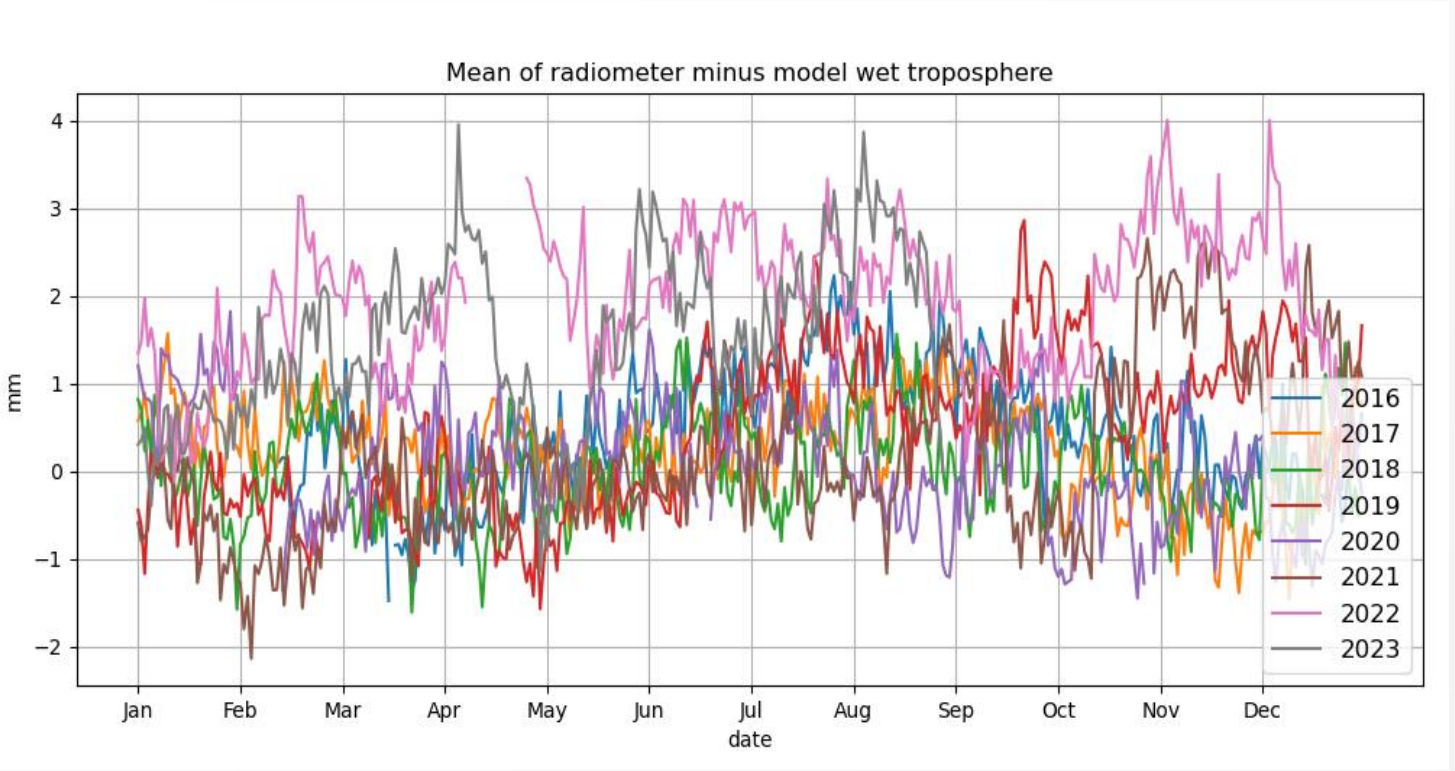
	nbr	min	mean	med	max	std
GDR	2726	-0.214	0.05734	0.0425	0.4009	0.1011
IGDR	1115	-0.2171	0.133	0.1228	0.7158	0.1419
S6A LR MLE4	1012	-0.6452	-0.01897	0.001742	0.2469	0.123



Good stability of radiometer minus ECMWF model WTC.

Drift identified for Jason-3 (~-0.5mm/yr) and some investigations are still ongoing to fix this.

AMR monitoring



Great stability of radiometer minus ECMWF model WTC over 2016 to 2021 :

- Strong increase in 2022 due to new version of ECMWF model and radiometer drift
- Back to performances previously observed in 2023

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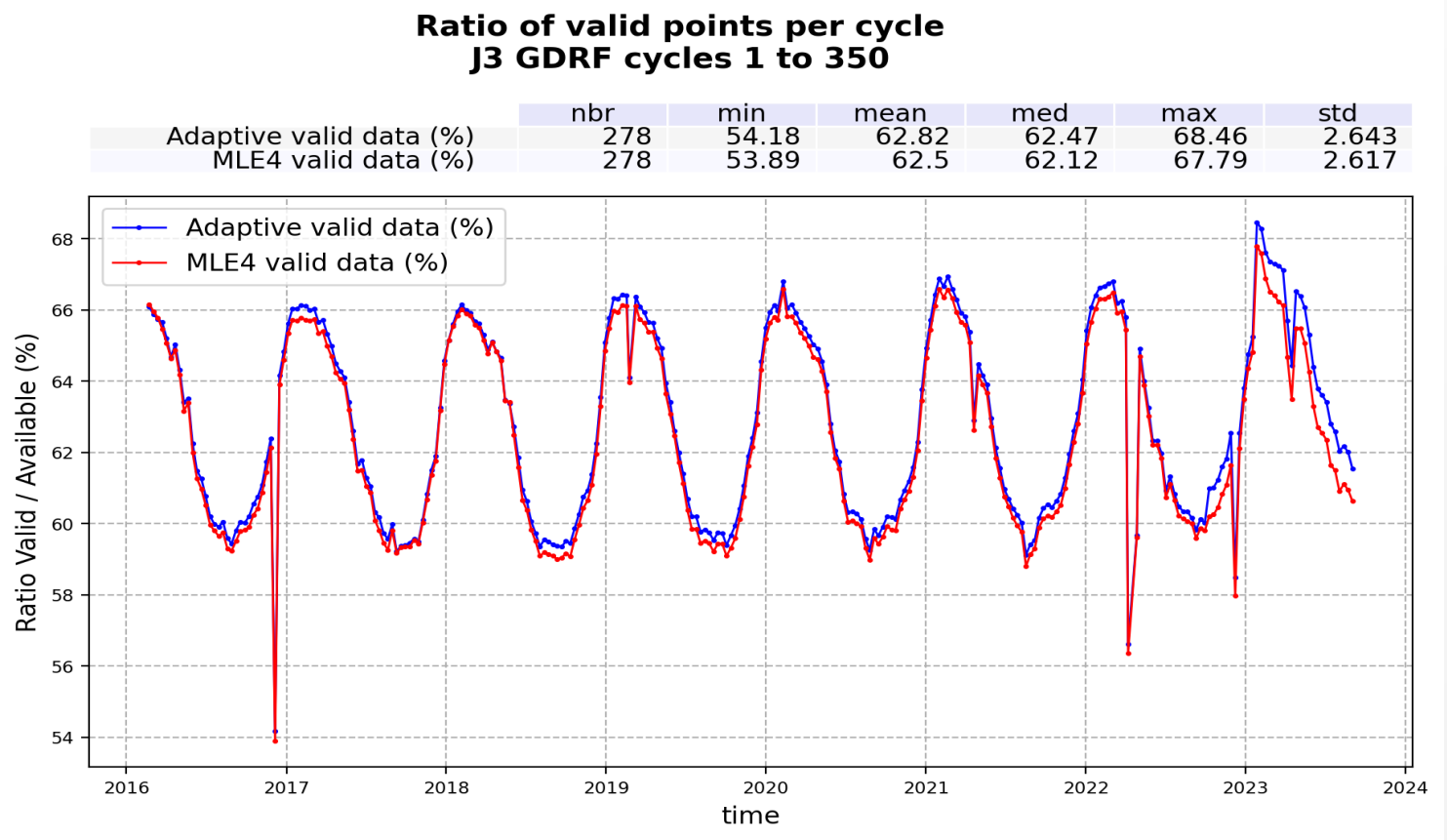
1Hz data selection

Global valid data rate from GDR-F dataset against retracking solution (same thresholds applied to both solutions).

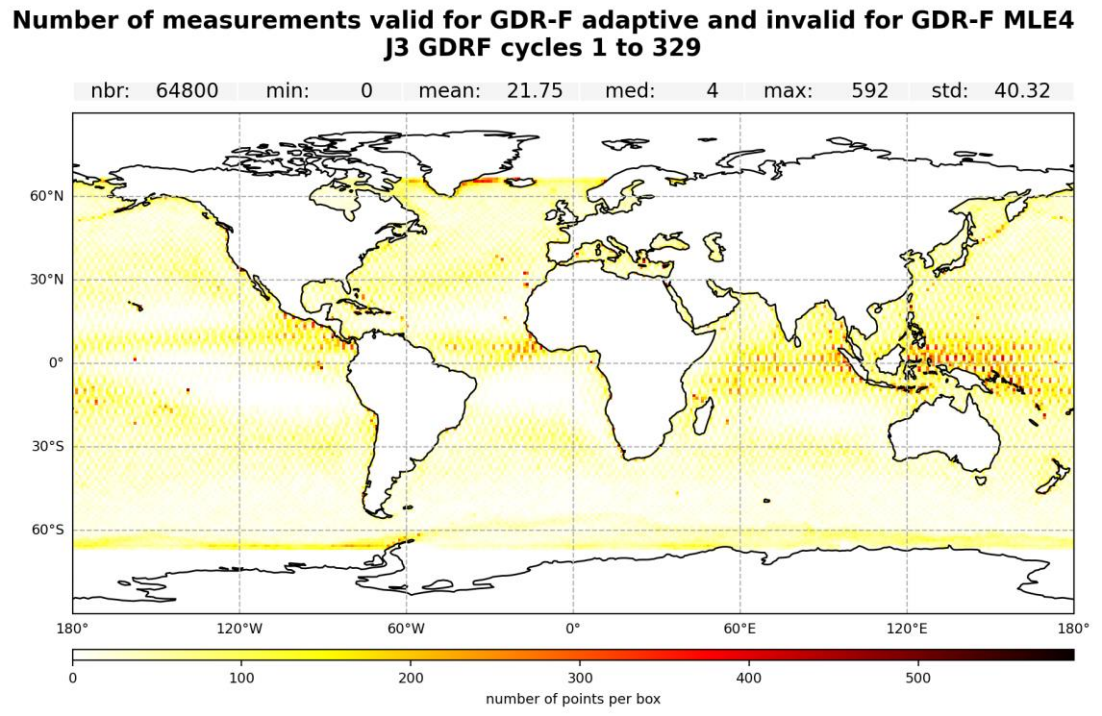
The level of valid data with **adaptive** retracking outputs (62,82%) is slightly higher than **mle4** rate (62,5%) .

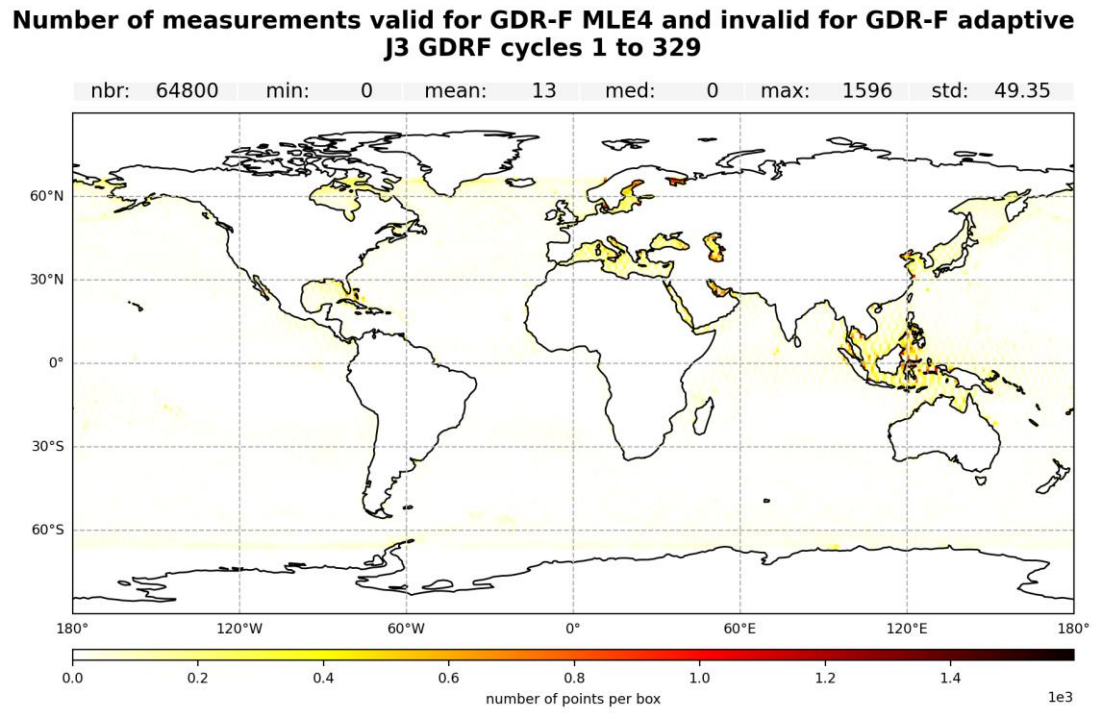


1Hz data selection

Difference in rejected points from GDR-F adaptive SLA vs MLE4 SLA over 7 years on historical ground track:

MLE4 data are globally more rejected than adaptive data over low swh and rain areas
(mainly thanks to sigma0_rms decrease with adaptive wrt mle4)

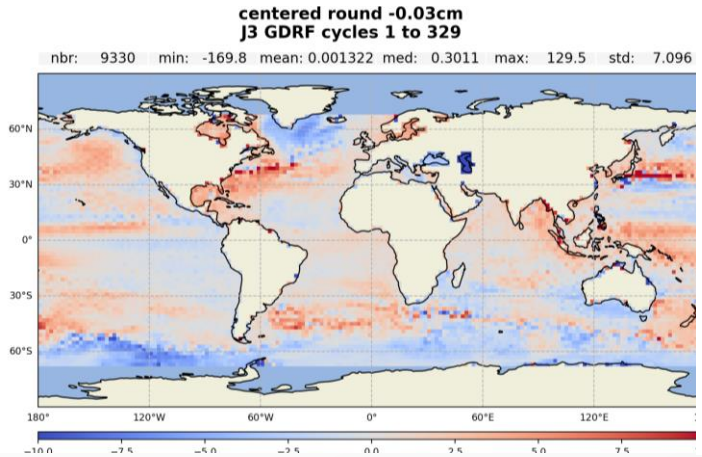


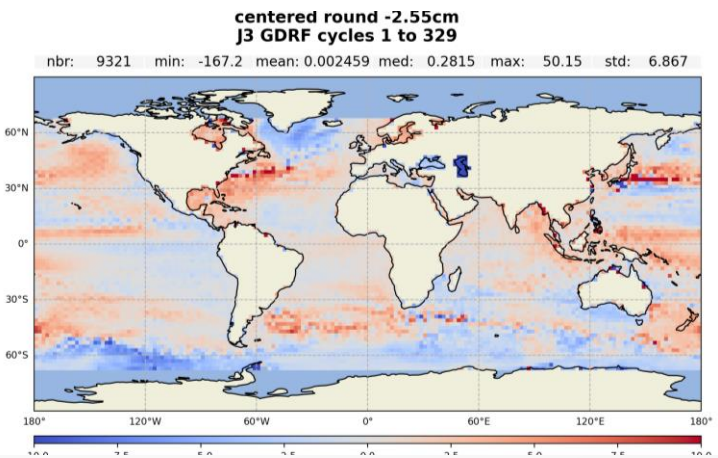


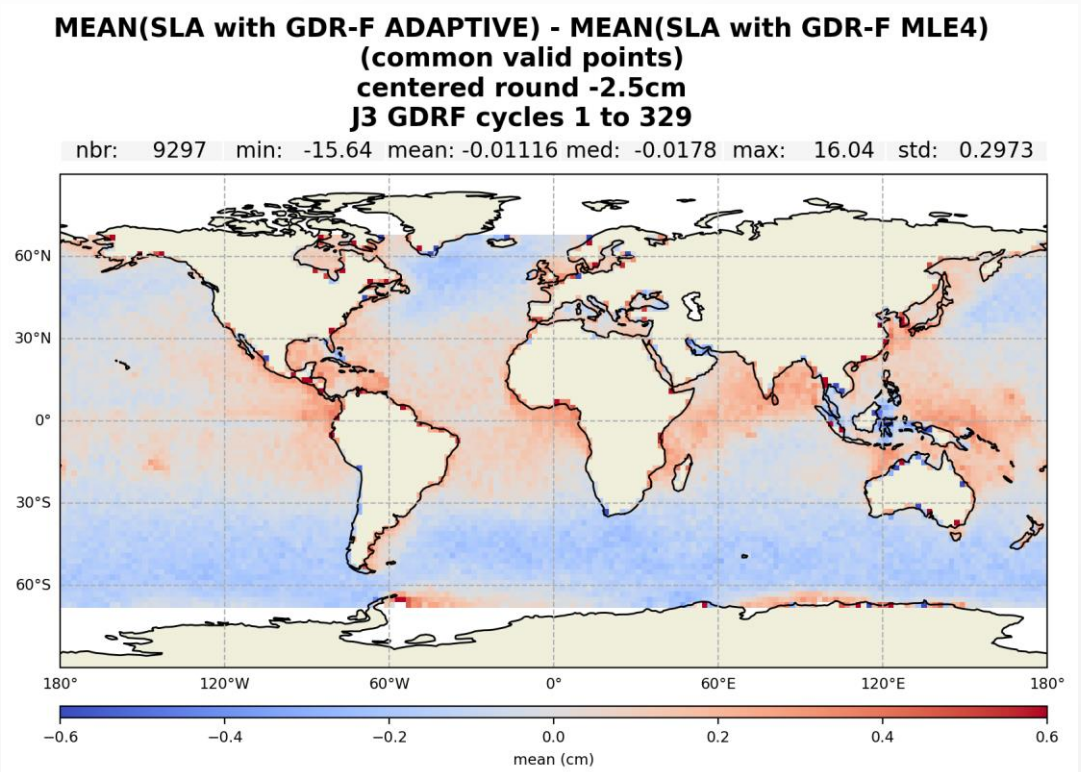
Adaptive / MLE4 SLA biais

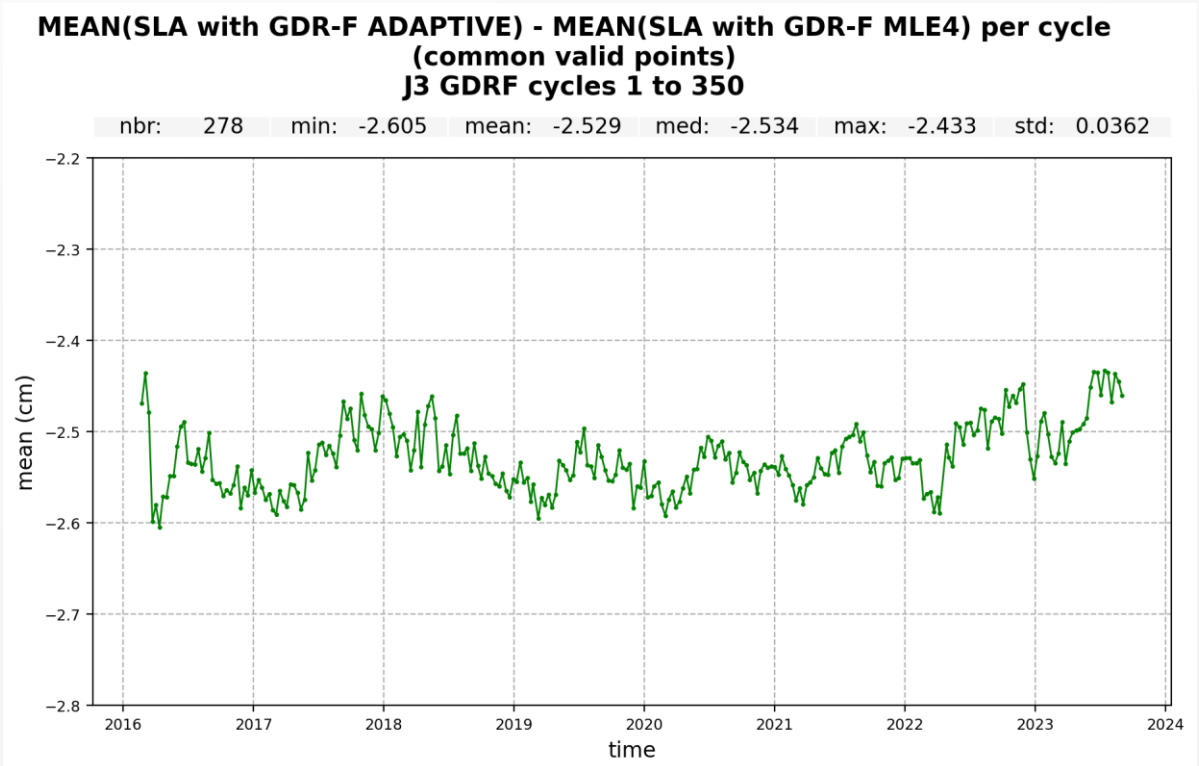
Global bias from MLE4 to adaptive SLA round -2.5 cm

Regional biases up to few mm



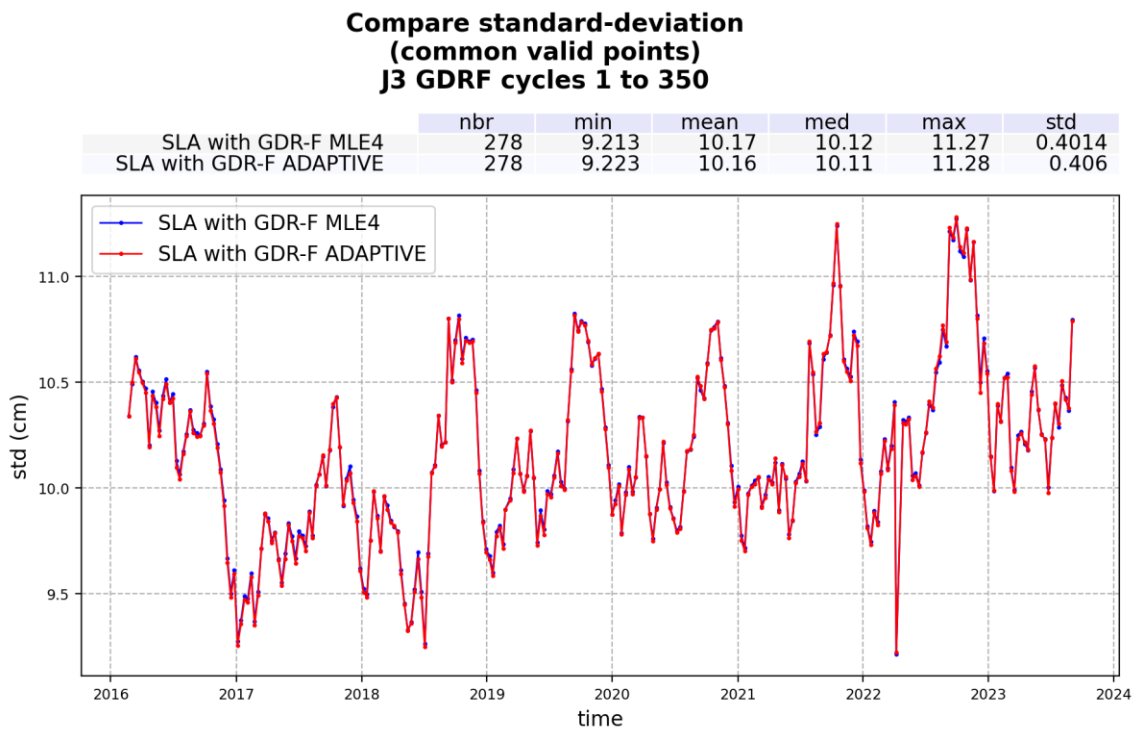


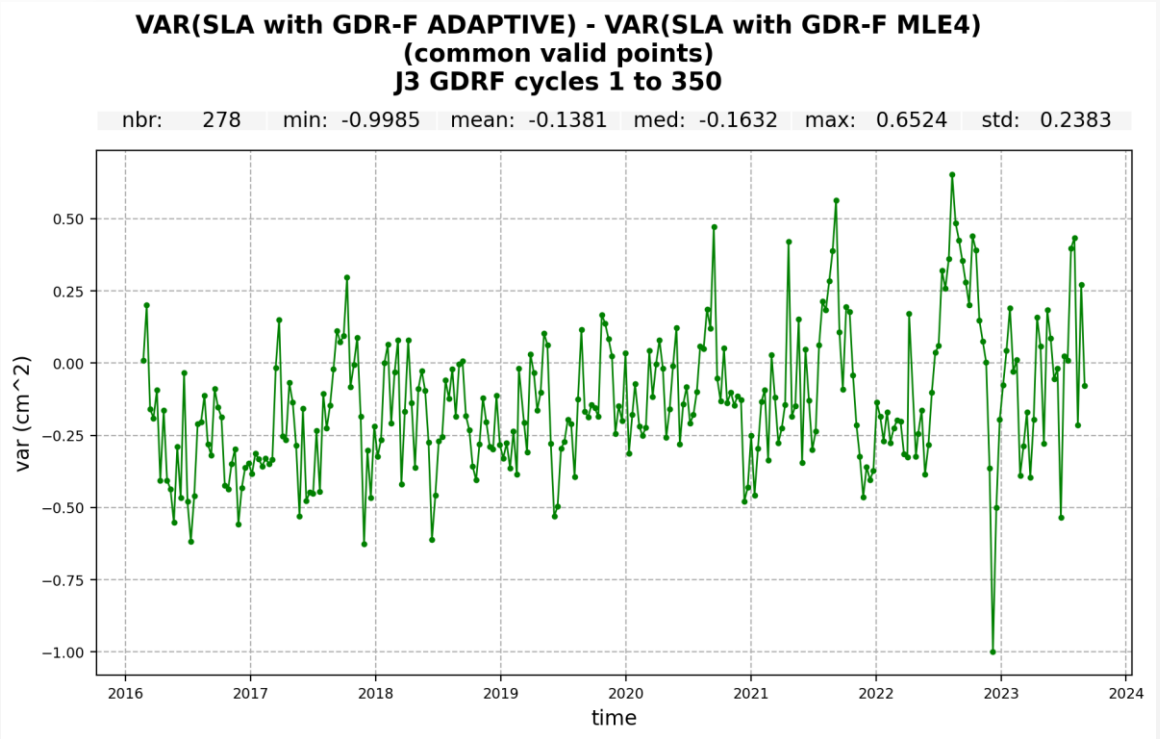




Along-track SLA performance

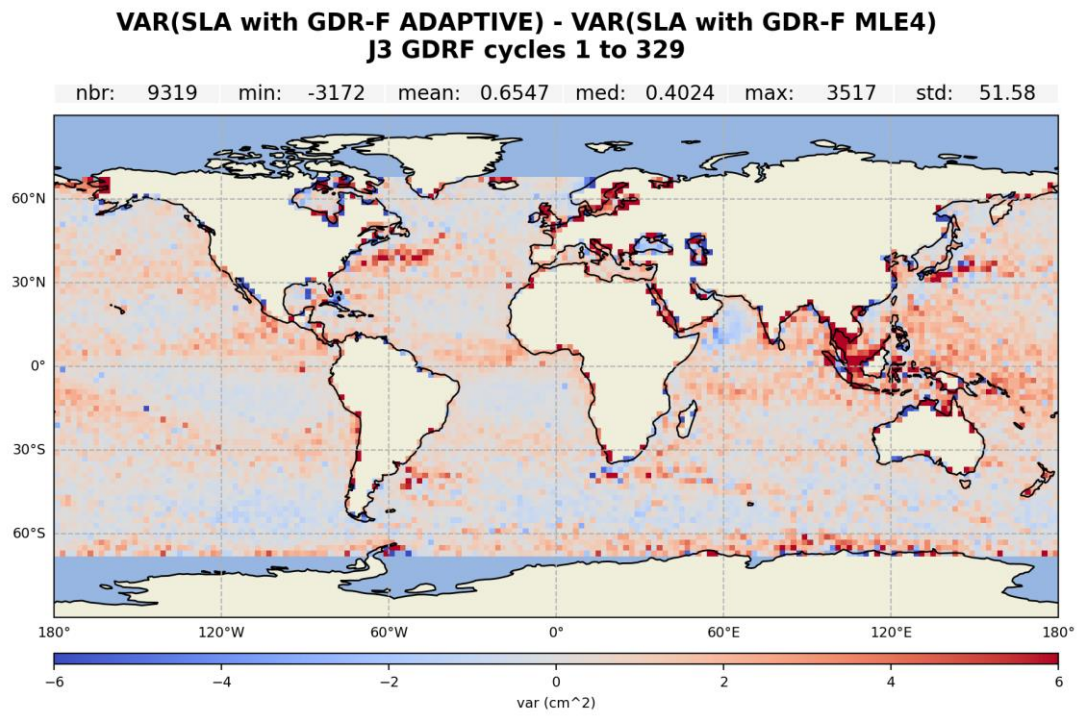
Variance of along track SLA shows a slight noise reduction for the adaptive



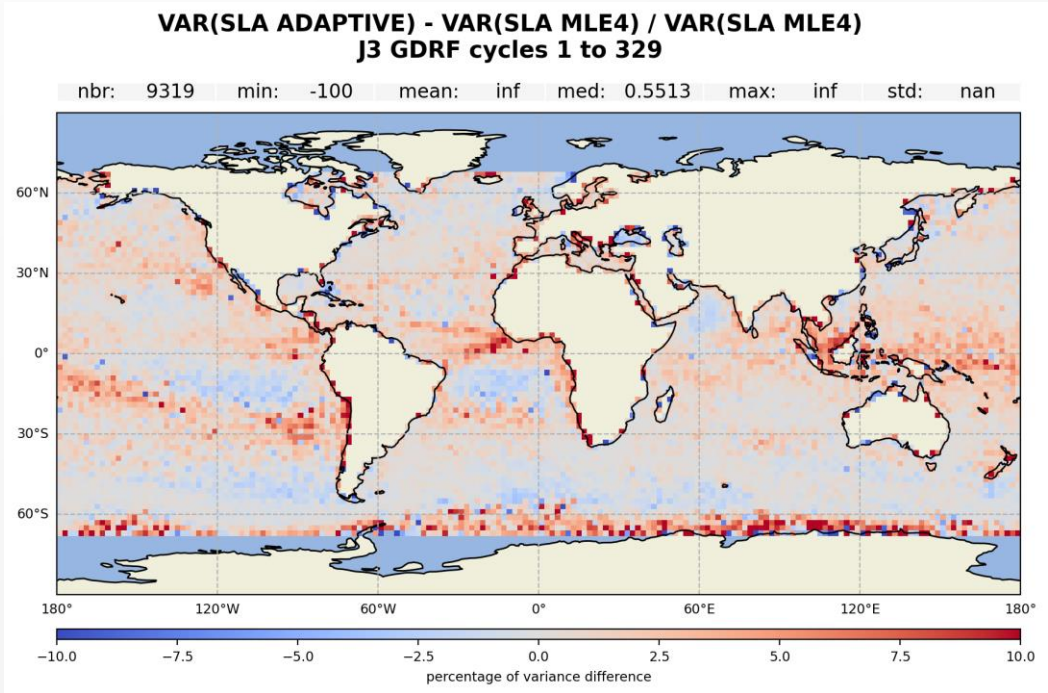


Along-track SLA performance

SLA variance difference visible over oceanic currents



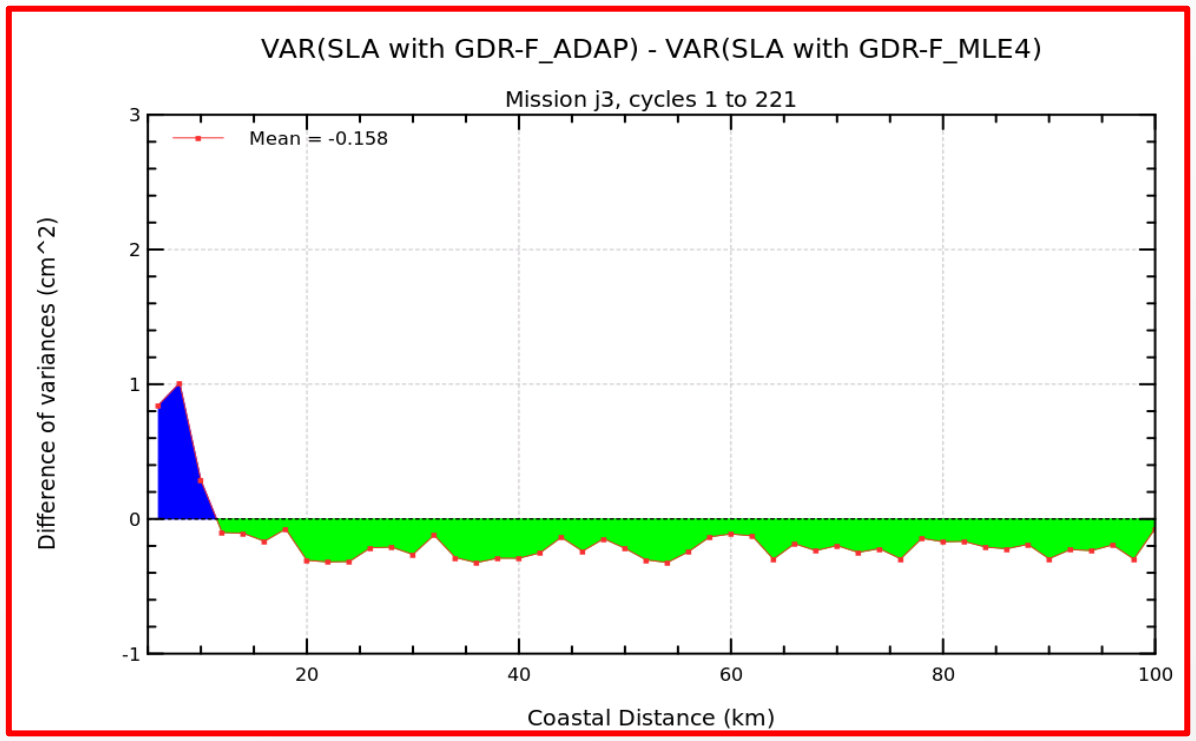
Regional SLA variance reduction rate (blue) from MLE4 to adaptive (wrt variance of SLA with GDR-F MLE4)

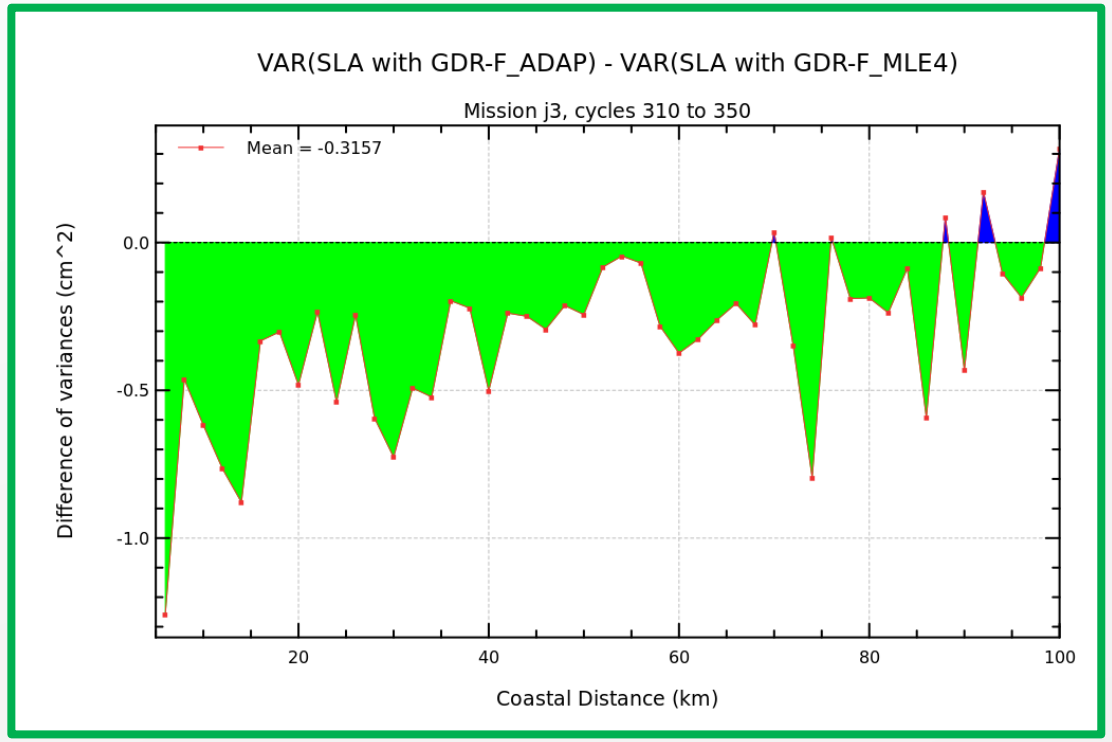


Along-track SLA performance

In the previous version ADAPTIVE version, the behaviour was degraded near coast (0-10km).

This was corrected and the variance of along track SLA is reduced near everywhere with adaptive compared to MLE4,





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Ongoing work

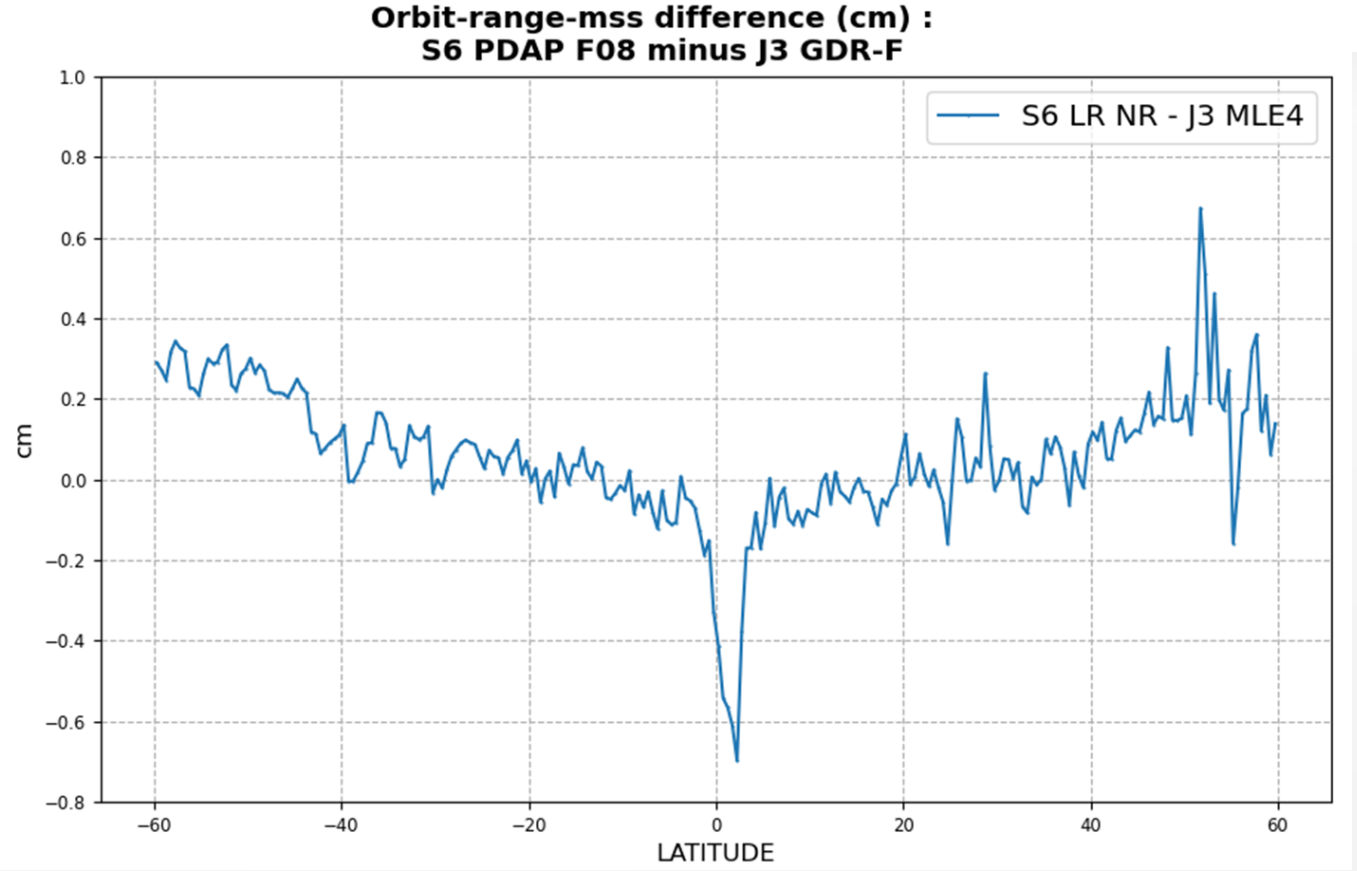
Reminder :

- Sentinel 6A / Jason 3 tandem phase allows to detect a 5 mm differences within a 4° large band at equator

- Investigations shows that J1/J2/J3 have the same behavior on one hand, and S6, S3, Altika, Topex on the other hand

Up to date :

- Investigations still on to identify the root cause



Behaviour at equator crossing

Conclusions

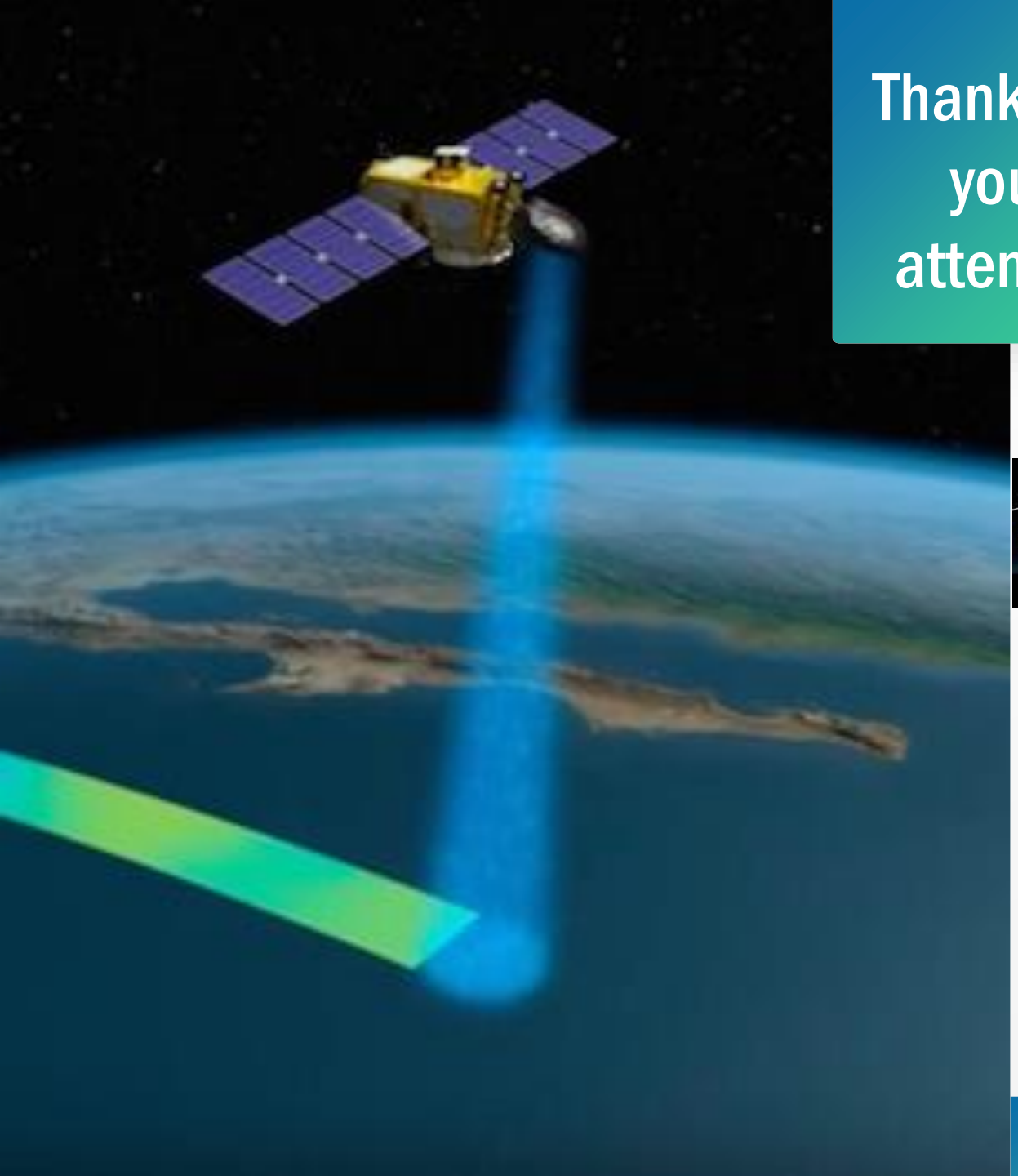
Very good performances of reference MLE4 Jason-3 GDR-F SLA

- ❑ No visible degradation of the products due to the instruments ageing
- ❑ Almost no impact of the new orbit on the performance

Improvements are allowed using adaptive retracker outputs

- ❑ SLA ADAPTIVE data are globally more valid than SLA MLE4 data (using recommended in handbook procedure)

- ❑ Taking into account valid in both datasets points, performances are better with adaptive solution than with MLE4, over 7 years (2016/02 to 2023/02) of data :
  - ✓ variance of along-track 1Hz SLA is reduced by 0,13cm²



Thanks for your attention

Questions ?

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