



Jason-3 validation and cross calibration activities

Executive Summary - Annual Report 2025

Reference: SALP-RP-MA-EA-23761-CLS

Issue: 2.0

Date: March 2, 2026

Contract: SALP 2025-26

By succeeding to TOPEX/Poseidon, Jason-1 and Jason-2 on their primary ground track, Jason-3 has extended the high-precision ocean altimetry data record. It was launched on January 17th 2016 and is still on orbit at this date.

During each cycle, missing measurements were monitored, spurious data were edited, and relevant parameters derived from instrumental measurements and geophysical corrections were analysed for OGDR, IGDR and GDR. Please note that analysis are done over ocean only, no assessment is done over hydrological targets. GDR cyclic reports are publicly available through the [AVISO web page](#).

Please note the changes in orbit standard solutions available in the products:

- GDR-G data orbit solution is POE-G ;
- until Jason-3 cycle 413, MOE-F orbit standard is available in IGDR products (MOE-G from cycle 500 onwards) ;

1 Orbit History

This report focuses on the period of 2025 during which the satellite was in tandem phase between Jason-3 and Sentinel-6A before reaching its drifting orbit.

1.1. Tandem Phase with Jason-2

During Jason-3 tandem phase with Jason-2 (February 12th to October 2nd 2016), both satellites were on the same ground-track (with only 80 seconds delay), which was a unique opportunity to precisely assess parameter discrepancies between both missions and detect geographically correlated biases, jumps or drifts. At the end of this tandem phase, Jason-3 was declared fully operational and became the reference mission for the GMSL computation, and Jason-2 continued its mission on another orbit.

1.2. Reference Mission Period

From October 2nd 2016 to April 7th 2022, during 5 and a half years, Jason-3 was the reference mission for the GMSL computation. OGDR and IGDR products have been publicly available since June 30th 2016. OGDR were firstly generated in version “T” for the first cycles, and then turned into “D” version. GDR products have been available in version “T” since early October 2016 (more details on products versions on Jason-3 handbook). From cycle 174 onwards (29/10/2020), respectively cycle 171 onwards (29/09/2020), IGDR and GDR have been produced in standard F. The complete reprocessing to standard “F” of the GDR data was achieved during 2021. GDR data have been distributed in standard F from cycle 171 onwards (16/12/2020).

1.3. First Tandem Phase with Sentinel-6A / Michael Freilich

In order to ensure the extension of the legacy of SSH measurements, Sentinel-6A / Michael Freilich satellite was launched on November 21st 2020: it reached Jason-3 orbit at the end of 2020. From cycle 179 onwards (18/12/2020), Jason-3 is used as a reference for Sentinel-6A tandem phase. At the end of cycle

226 (07/04/2022), the tandem-phase is completed and Sentinel-6A takes the lead as the reference mission.

1.4. Interleaved Orbit Period

At the end of the tandem phase, Jason-3 was moved to an interleaved orbit. The maneuver took place between April 7th 2022 and April 25th 2022, and it was decided to start over the cycle count at 300.

1.5. Second Tandem Phase with Sentinel-6A / Michael Freilich

From January 30th 2025 to June 2nd 2025, the second tandem phase between Sentinel-6A and Jason-3 occurred. This short tandem phase was useful to assess the stability of the altimetric and radiometric variables between the two missions.

1.6. LRO period

From June 18th 2025 onwards, Jason-3 has been set in a drifting orbit. The altimetry constellation will continue to benefit from the data from this phase and this period will also serve to strengthen our knowledge of the ocean bathymetry.

2 Data Availability

Data availability is excellent for Jason-3. Jason-3 presents 98.7% of data availability over ocean and 96% over 2025..

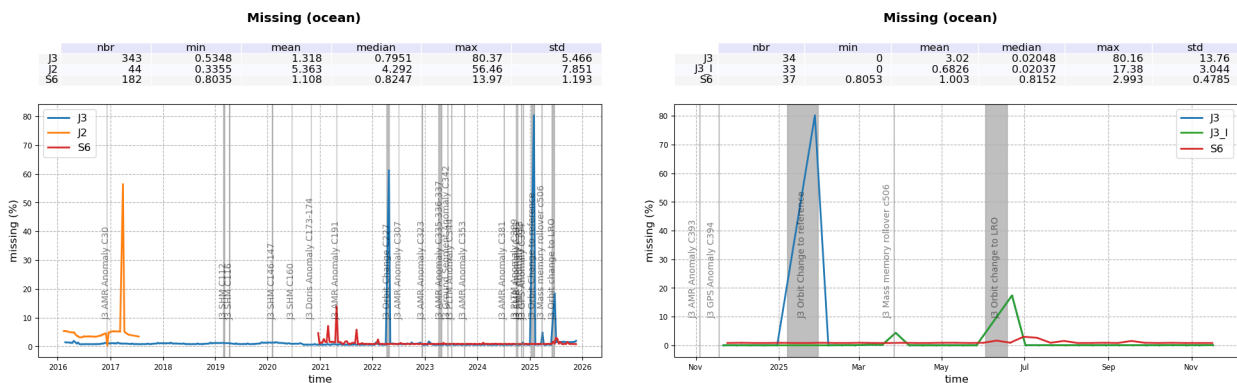


Figure 1: Jason-3 GDR and IGDR data availability over ocean (per cycle) in the whole period (left) and in the last year with comparison to Sentinel-6A (right).

3 Sea Level Anomalies

During Sentinel-6A first tandem phase with Jason-3, the averaged difference of gridded SLA shows little difference between both missions as they have a very small temporal shift, similar to Jason-2/Jason-3 tandem phase. One noticeable difference between both missions is the dependency of range to SWH for

4 Performances at crossover points

Looking at SSH difference at crossovers (figure 3), the standard-F is used for the record before 2025 and the standard-G after. This reduces the orbital 120-days and 180-days signals. Concerning SSH error at crossover points ($standard\ deviation / \sqrt{2}$), the Jason-3 mission shows very good and stable performances with an error of 3.27 cm. This satisfying performance is confirmed from cycle 15 onwards for Sentinel-6A.

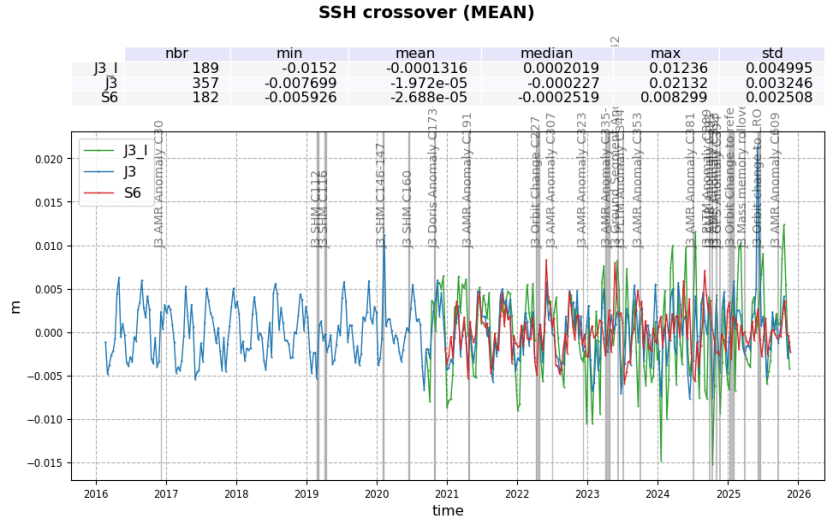


Figure 3: Monitoring of mean of Jason-3 and Sentinel-6A SSH crossover differences for IGDRs (only Jason-3) and GDRs. Only data with $|latitude| < 50^\circ$, bathymetry $< -1000m$ and low oceanic variability were selected. (ocean_tide_sol1 = FES is used in SSH computation)

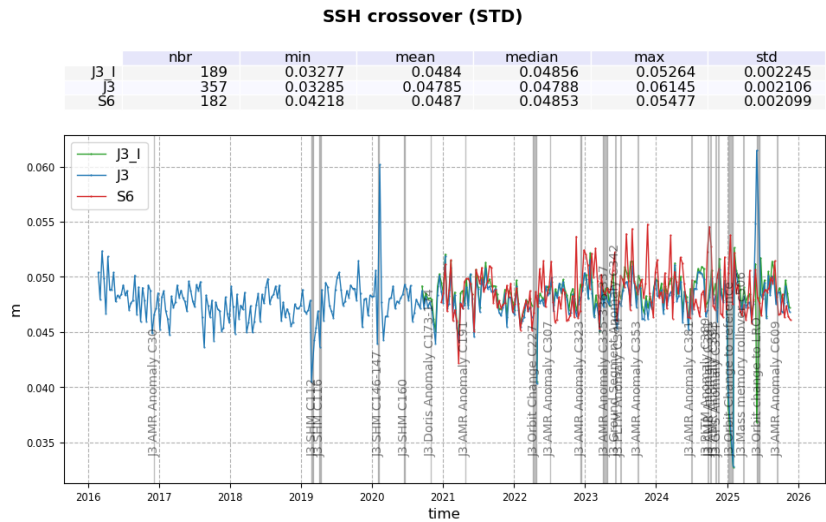


Figure 4: Cycle by cycle standard deviation of SSH crossover differences for Jason-3 and Sentinel-6. Only data with $|latitude| < 50^\circ$, bathymetry $< -1000m$ and low oceanic variability was selected.

The mean SSH differences at Jason-3 crossovers is highly stable (figure 5), thus proving the accuracy of Jason-3 despite its ageing.

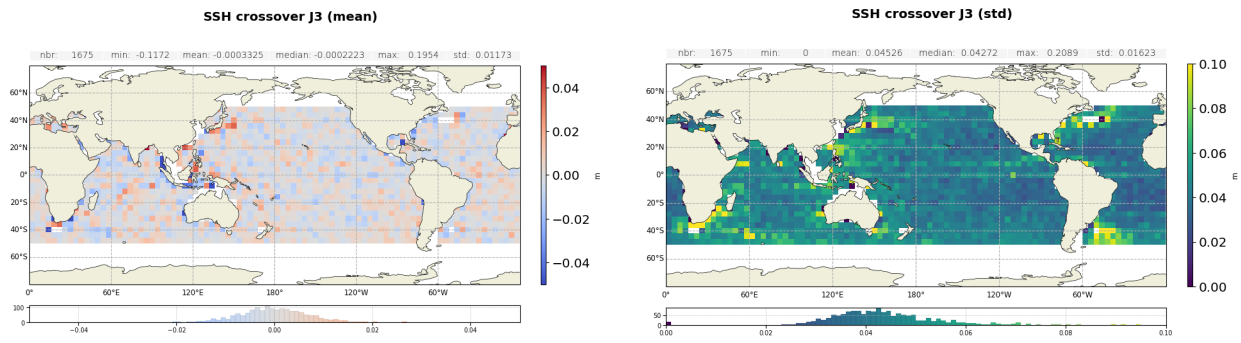


Figure 5: Map of Jason-3 SSH crossover differences over cycles 395 to 615.

5 Contribution to Global Mean Sea Level

From May 2016 (Jason-3 cycle 11) to April 2022, Jason-3 has been the reference altimetry mission to estimate the Global Mean Sea Level (GMSL), replacing Jason-2.

Regional and global biases between missions have to be precisely estimated in order to ensure the quality of the reference GMSL serie on [AVISO+ website](#).

Part of Jason-3 contribution to the GMSL nowadays is to support the constant validation of Sentinel-6A data, which is currently the reference mission.

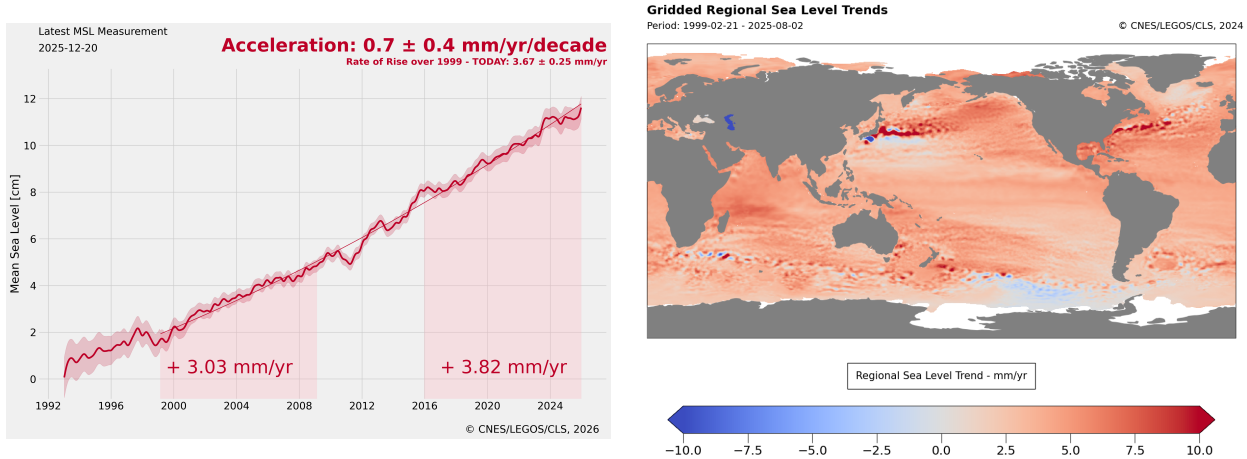


Figure 6: Global (right) and regional (left) MSL trends from 1993 onwards.