OSTST 2020

Oct. 2020 – Virtual meeting

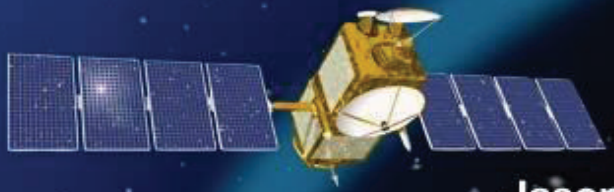
Jason-3 Project Status

Jason 3

2016

OSTM/Jason 2

2008 -- 2019



Jason 1

2001 -- 2013

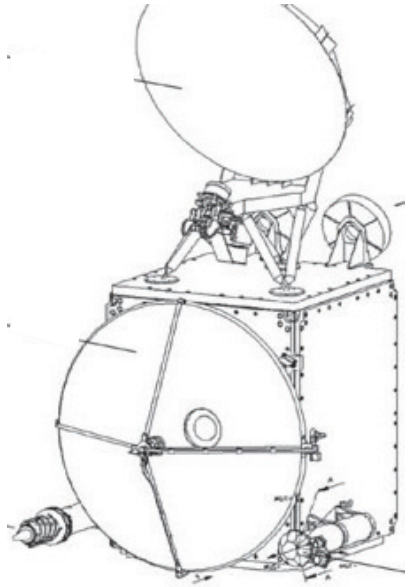
TOPEX/Poseidon

1992 -- 2006

Christophe MARECHAL, CNES

on behalf Jason-3 Project Managers

Platform Status

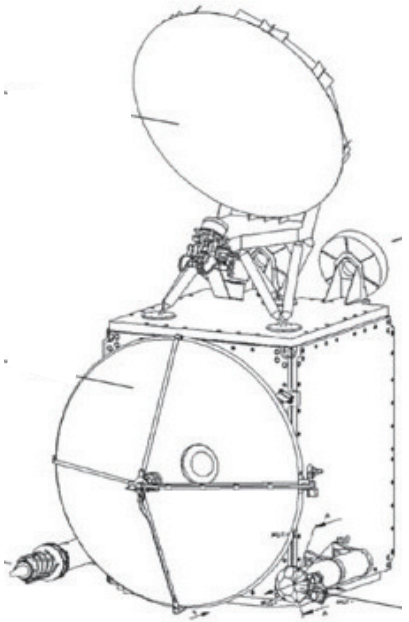


- The Jason-3 satellite bus is **OK**
  - Command / control , RF on **PMB** — **OK**
    - On-Board Software, Mass Memory, Telemetry & Telecommand system
  - Thermal aspects: — **OK**
    - Active thermal control works successfully and is sized with significant margins to meet further worst case conditions
  - Electrical aspects : — **OK**
    - Satellite power and consumption are within the power, consumption and energetic budgets
  - AOCS (attitude and orbit control system) : — **OK**

- Exceptional activities :
  - Unused equipment destocking (gyro, STR) — **OK**
  - STR monitoring, SADM expertise, PCE expertise — **OK**
  - Gyro calibration — **OK**

Jason-3 bus is fully operational with all redundant systems available

Payload Status



- **Core Payload**
  - **POSEIDON3 (99,99%)** **OK**
  - **DORIS (100%)** **OK**
  - **AMR (99.6%)** **OK**
  - **GPSP-B (100%)** **OK**

- **Passengers**
  - CARMEN / AMBRE **OK**
  - LPT **OK**

- **Exceptional activities :**
  - POS3B DEM upload September 2nd 2020 **OK**

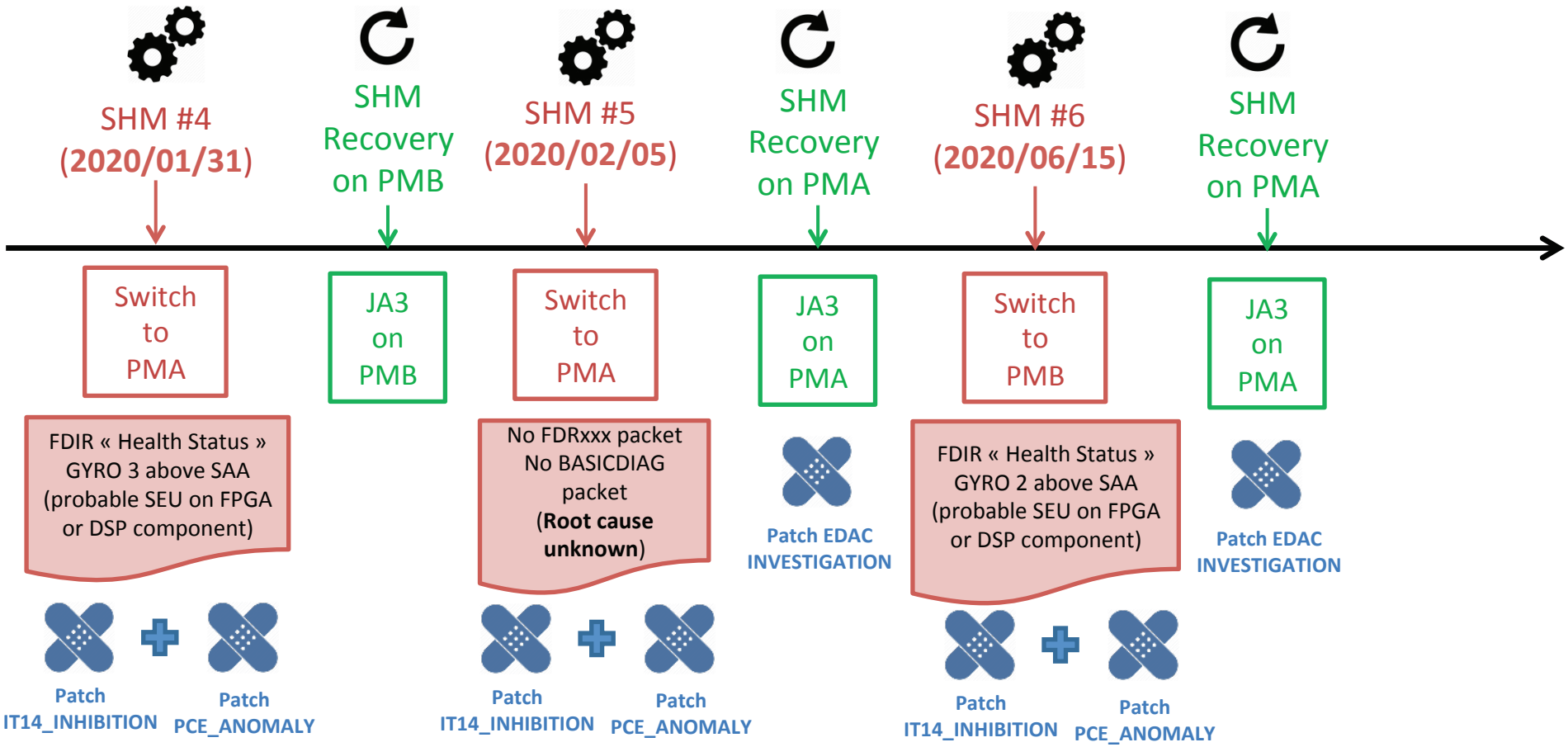
➔ **Fully OPERATIONAL with redundancy available for POS-3, DORIS & AMR**

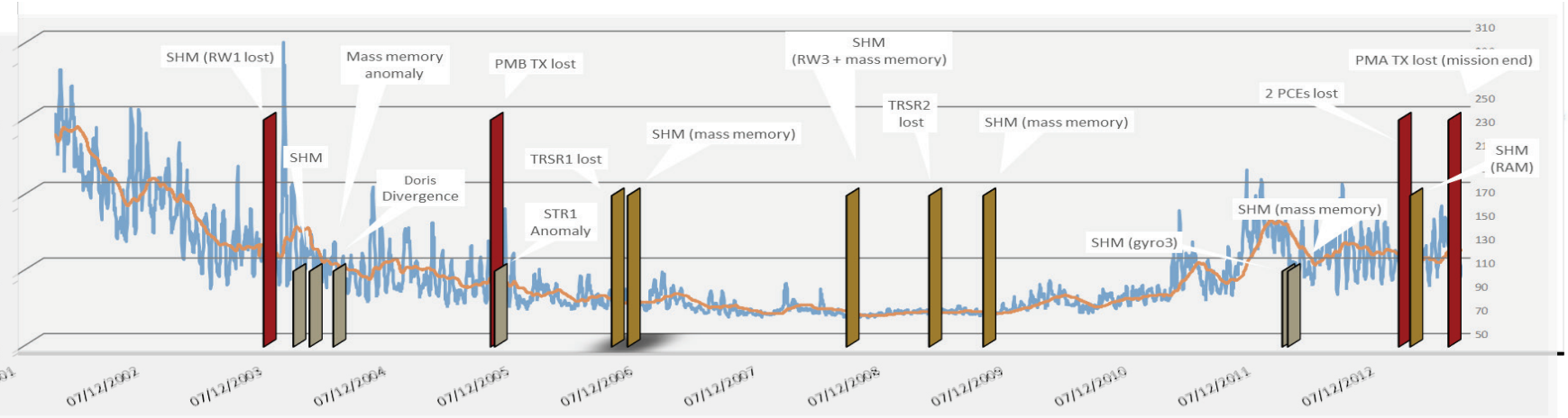
➔ **Passengers fully operation**

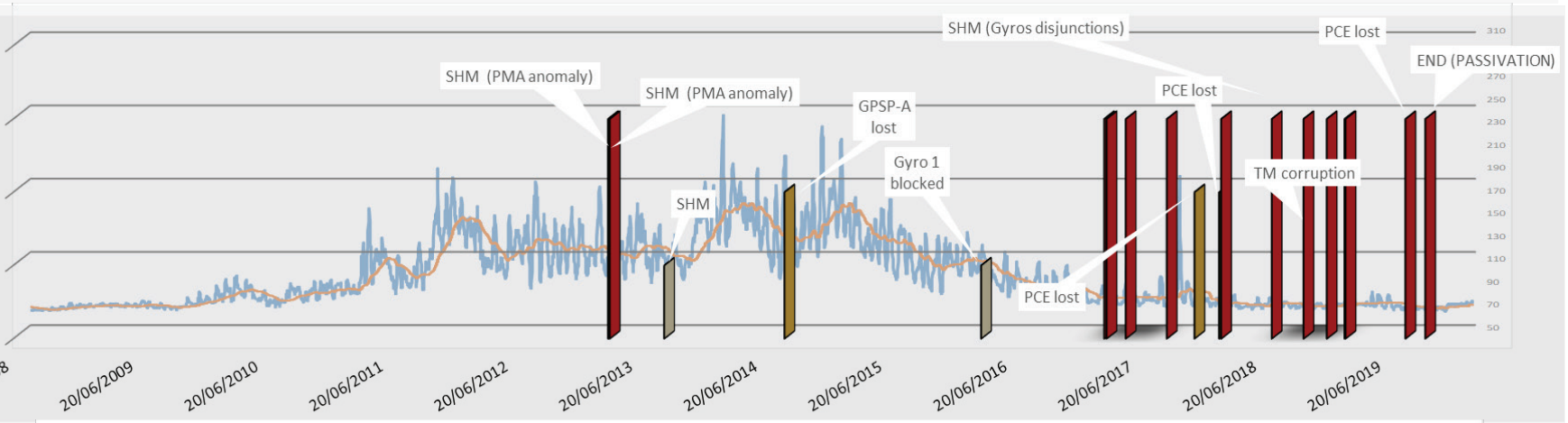
Ground & Operations Status

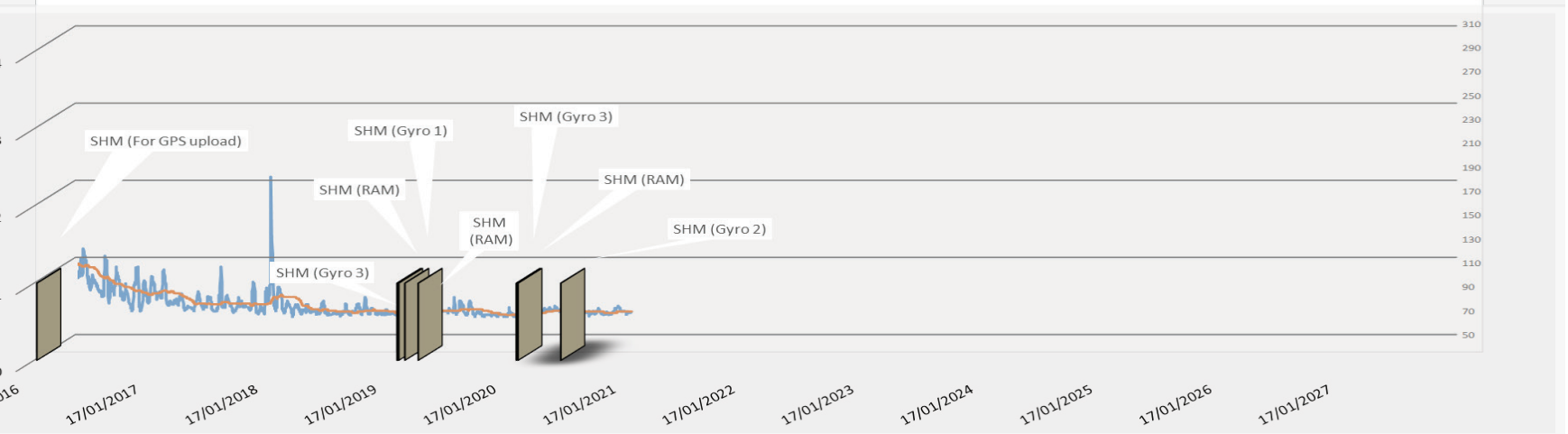
- Earth terminals :
  - Usingen – USG2, + partial USG1 shadowing **OK**
  - Wallops, Fairbanks and Barrow (CDAS) **OK**
- Control Centers :
  - JCCC CNES Control center **OK**
    - all the elements are OK
  - SOCC NOAA Control center **OK**
    - all the elements are OK
- Instrument Commanding and Monitoring Centers :
  - SSALTO for CNES instruments **OK**
  - JPL Mission facility for NASA/JPL instruments **OK**
  - Passengers Mission centers **OK**

Safe Hold Modes since last OSTST









JA3 comparisc with JA1& JA2 history

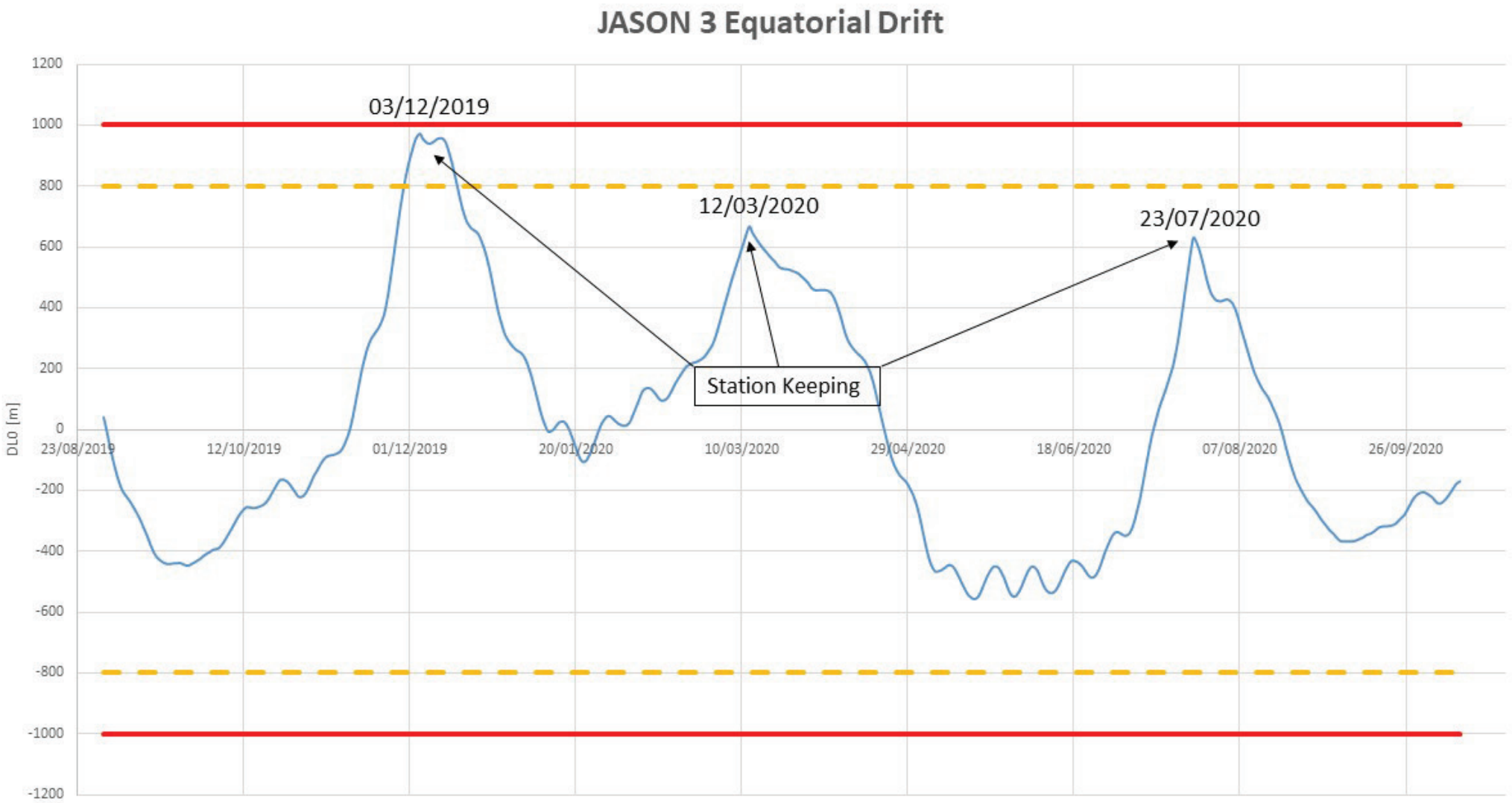
Critical Event Levels:

1. Minor :
   No impact on expect satellite lifetime

2. Major :
   Potential impact on expected satellite lifetime

3. Critical :
   Confirmed impact or expected satellite

Routine navigation and guidance



System Requirements and Performances

ltimeter Antenna

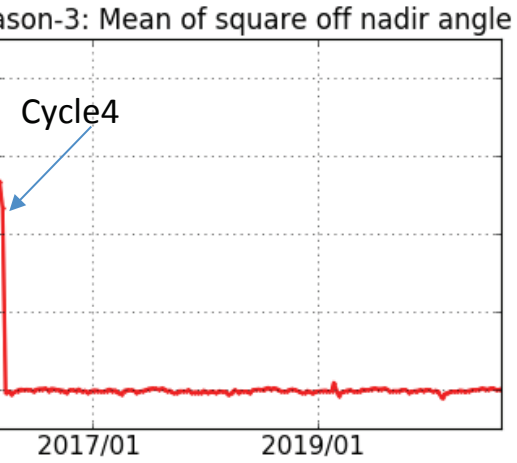
nting : **typical value**

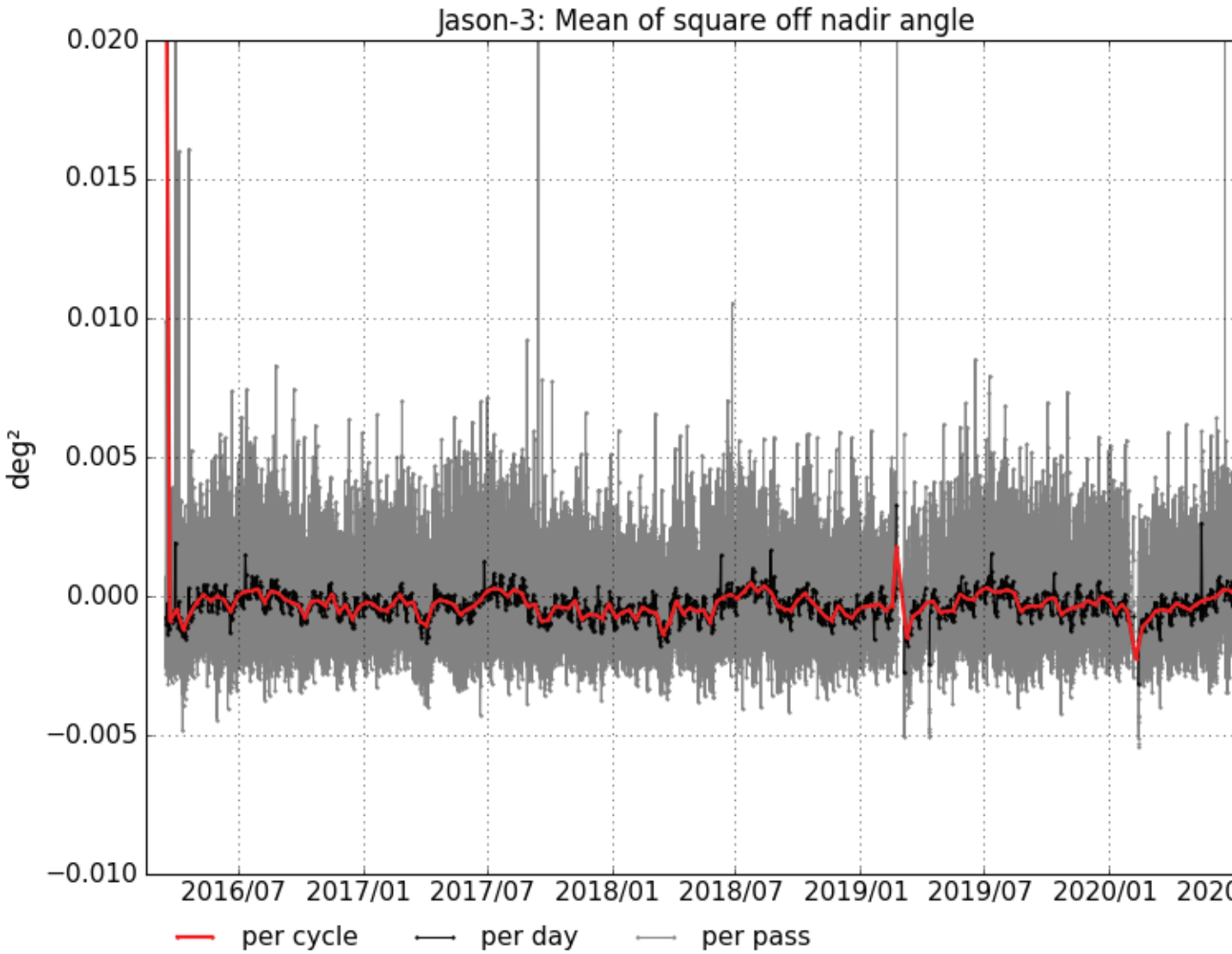
below 0.005°

Requirement < 0.2°)

nting performance

table since cycle4



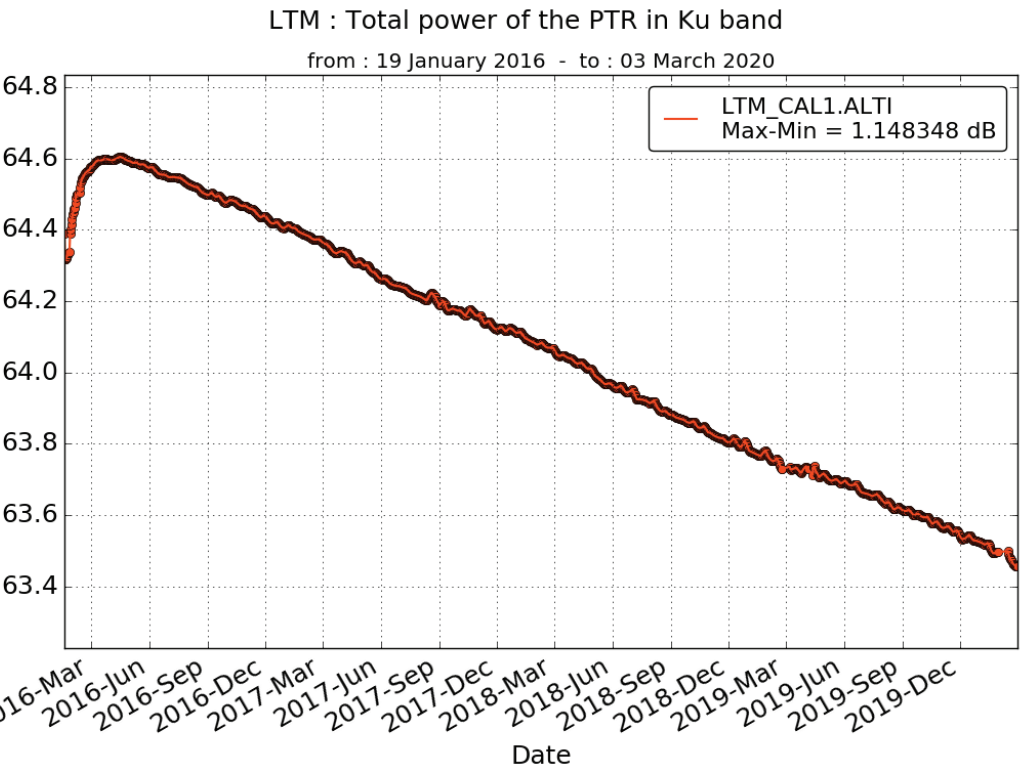


Poseidon-3B / JASON-3

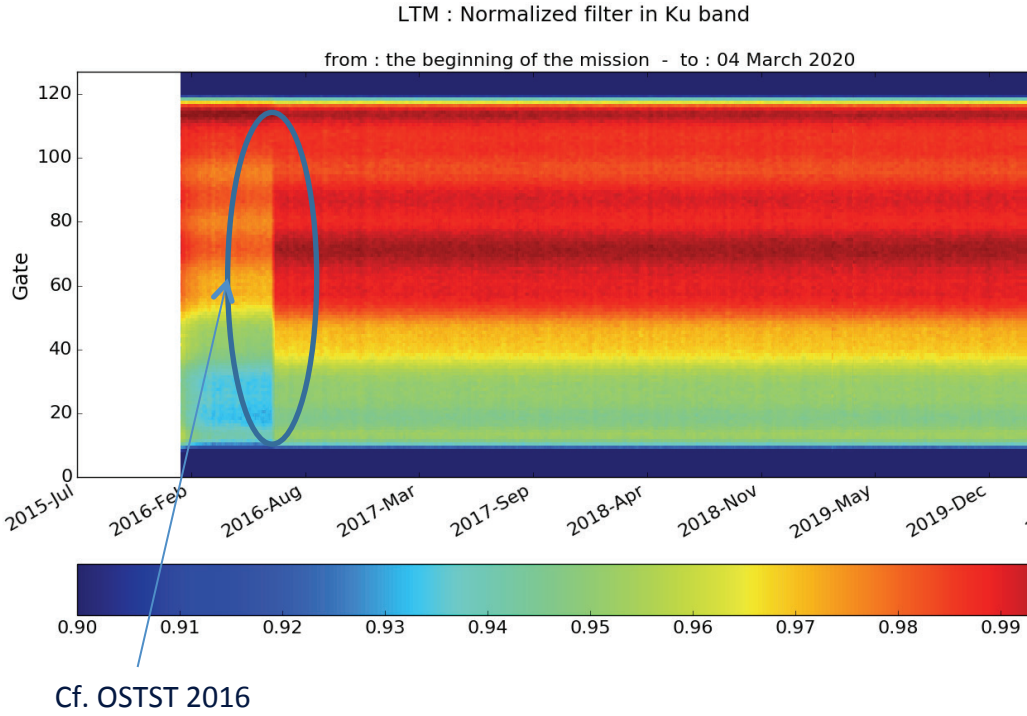
Routine/Exceptional calibrations are OK

Excellent Measurement Stability (short and long term)

- CAL1 Ku-band PTR power



- CAL2 Ku-band LPF

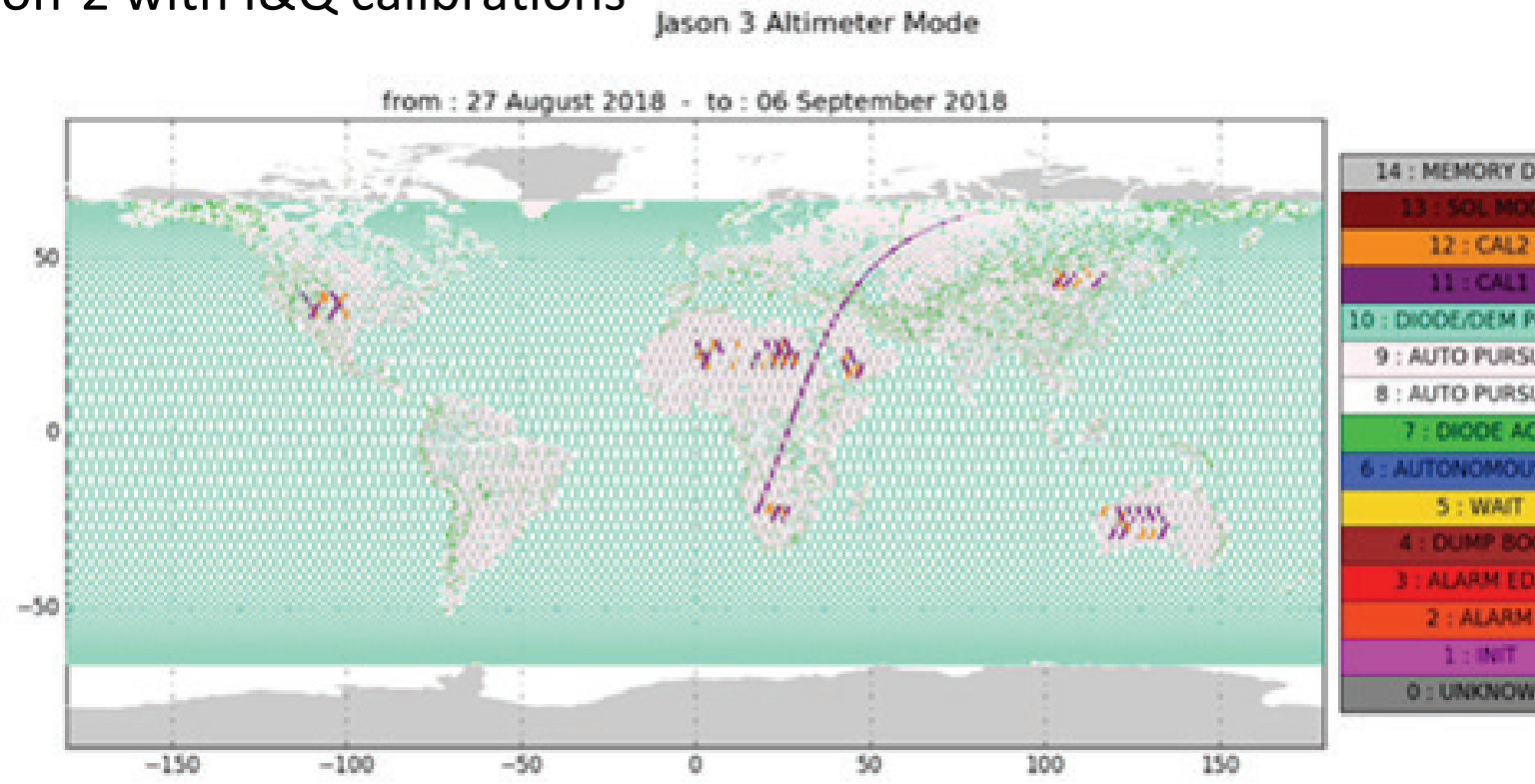


Cf. OSTST 2016

POSEIDON 3B CNG calibrations

CNG calibration

- Approximately every 3 months
- Analysis and processing performed by CNES instrument responsible
- Good Stability (of the order of calibration accuracy)
- Very low trend variation in the functioning AGC range
- Increase accuracy wrt Jason-2 with I&Q calibrations

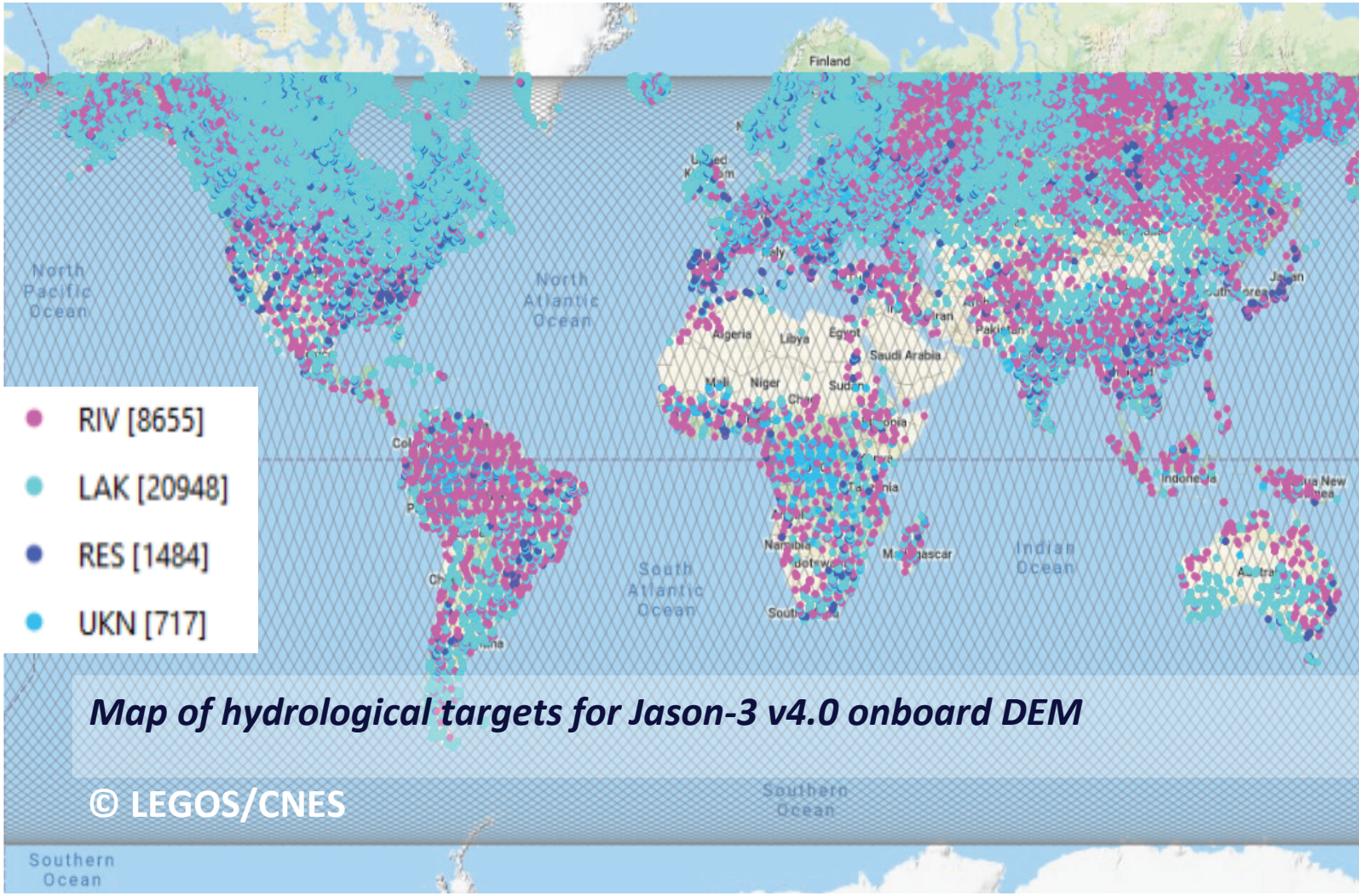


POSEIDON 3B – new Digital Elevation Model

Science IV
Generation of 2020 Hyd
Targets databases for Sen
3B and Jason-3/Sentinel-6
D. Blumstein & al

lew DEM (V4.0) in
peration since Sept.
rd , 2020.

- **91.7%** usable echoes
- **7 times more hydrologic targets** (Around 31,500)
- Usable for Sentinel 6 intercalibration

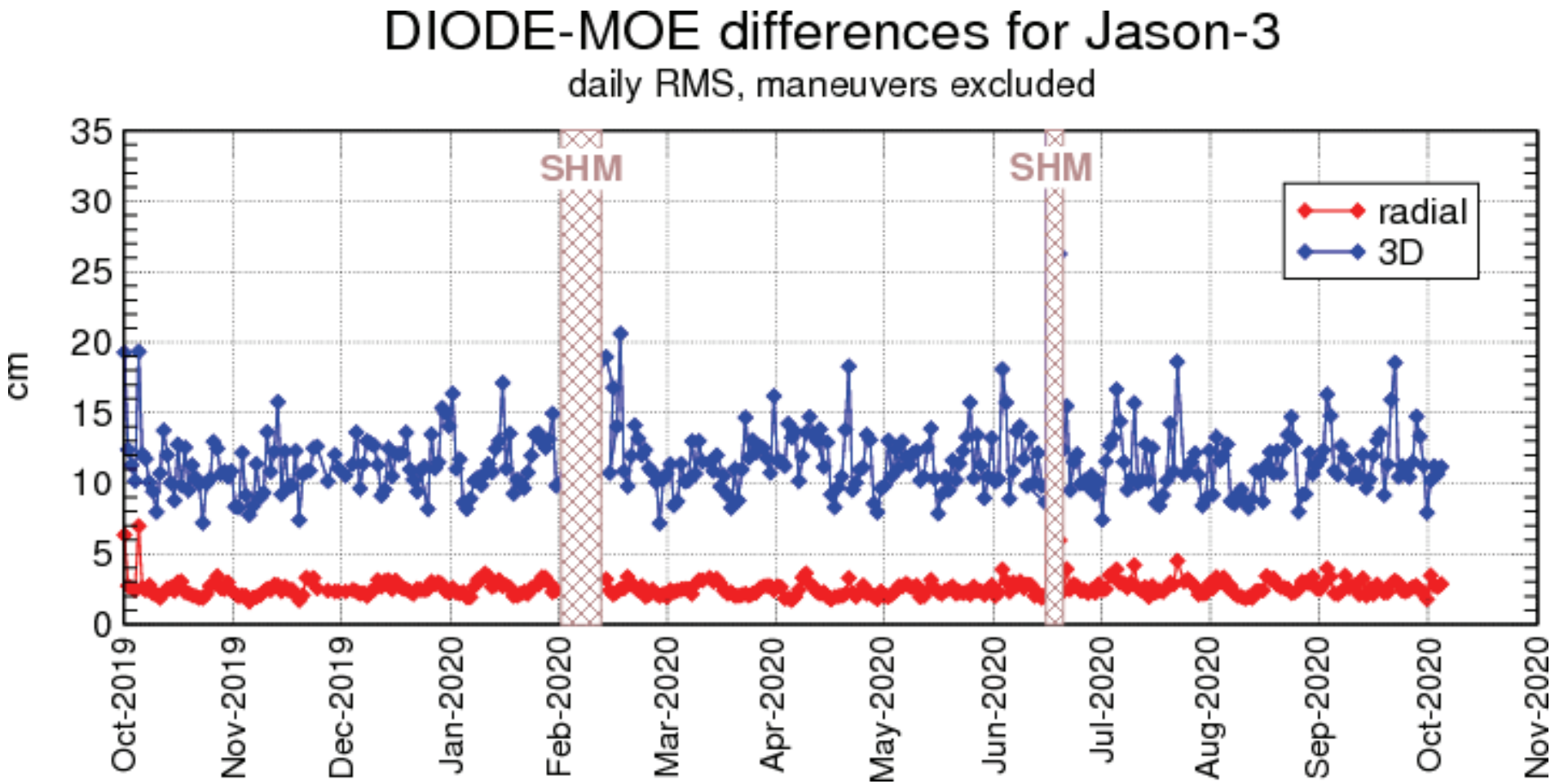


Map of hydrological targets for Jason-3 v4.0 onboard DEM

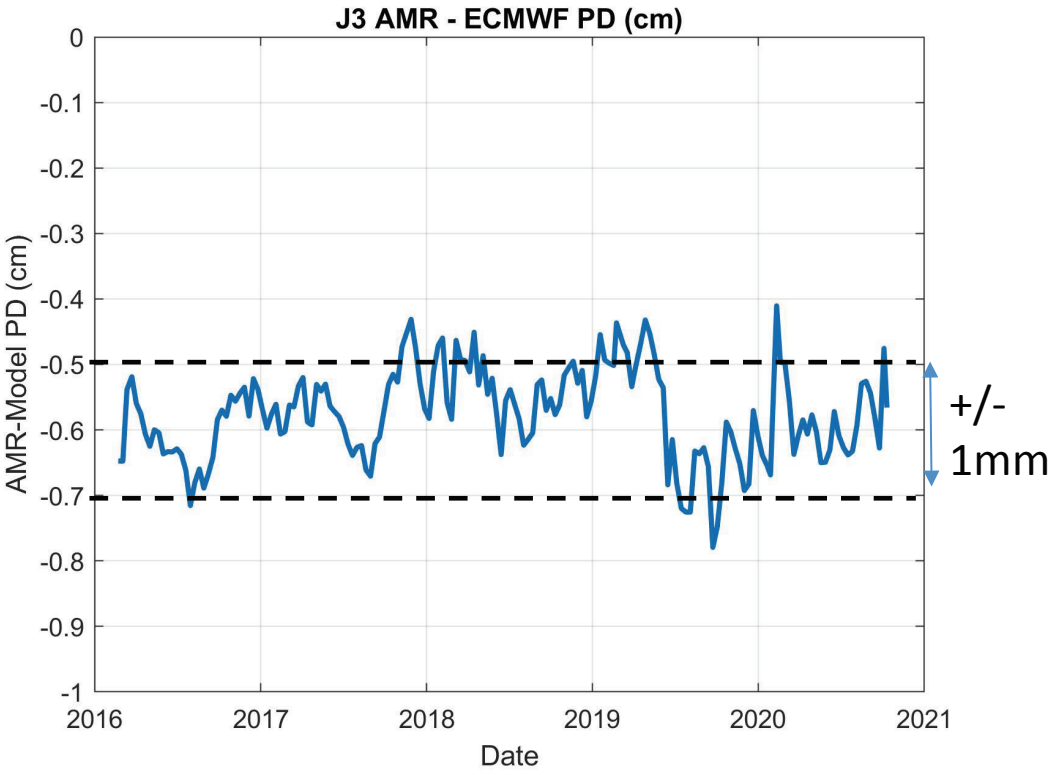
w upgrades of OLTC tables of
nadir altimeters in 2020 --
efits for Inland waters users
S. Legac & al

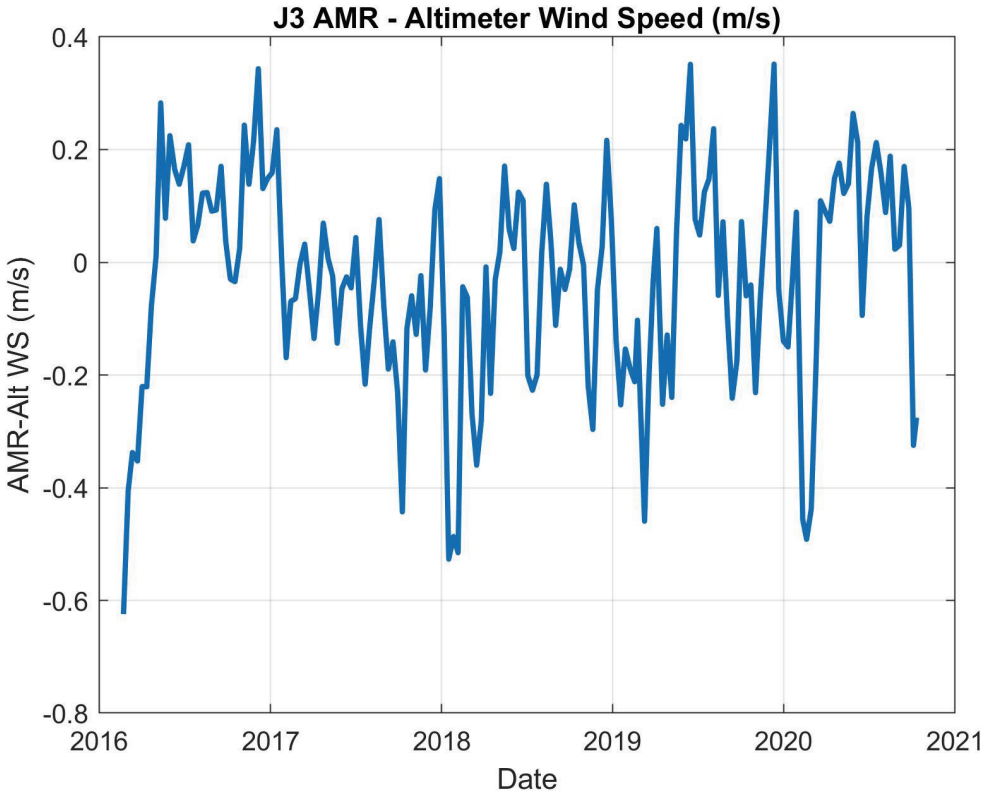
Availability = **100% over the period**

DORIS

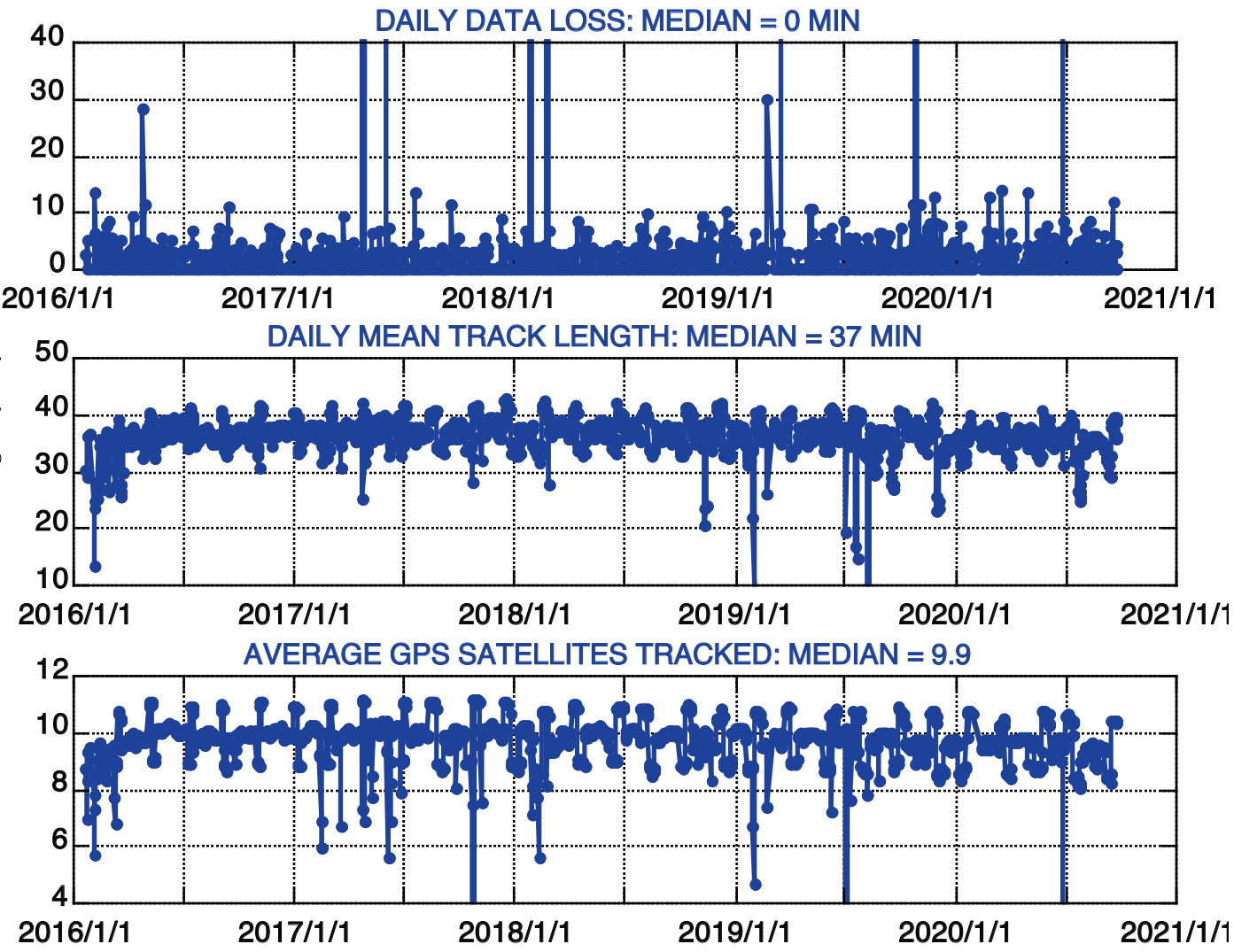


- **Jason-3 AMR performing nominally since launch** **AMR**
  - Jason-3 AMR maintains excellent performance -- 99.9% availability in the past year
  - Cold sky calibrations are critical to stabilizing Jason-3 at the mm-level
  - Jason-3 AMR global average PD within ±1mm of the ECMWF model PD over the mission.
  - Wind speed (which is more sensitive to drift) is stable relative to altimeter.
  - **No detectible calibration shifts on the AMR resulting from three 2020 safe hold events**





Jason-3 GPSP: Receiver Performance



GPSP

- 99.7% availability in th past year
- Tracking metrics are consistent since launch
  - Metrics based upon data to 26-Sep-2020
- Jason-3 receiver tracks to lower elevations tha Jason-2

OGDR products Status and performances 1/2

NRT products made by **EUMETSAT** and **NOAA/ESPC** Mission Center

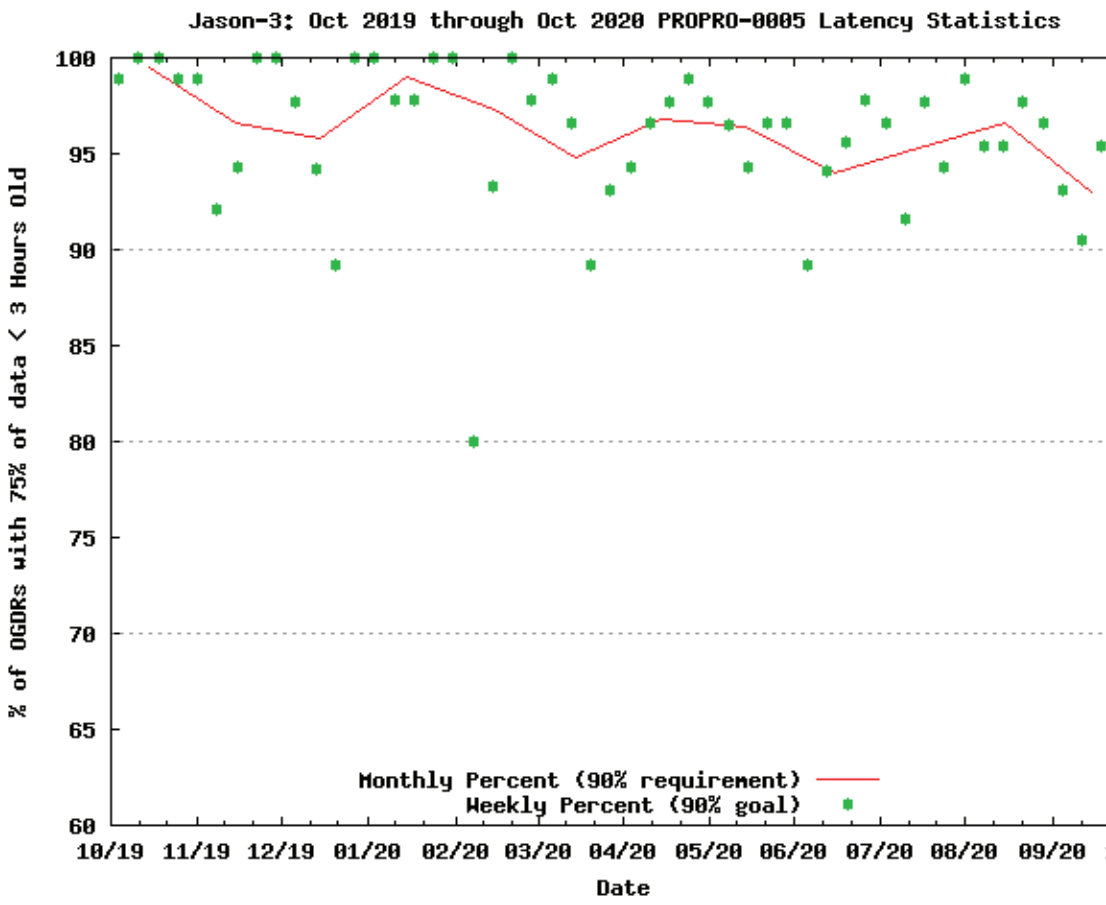
No major changes in the period

EUMPC : ~100% OGDR successful for PLTM1 acquired at USG

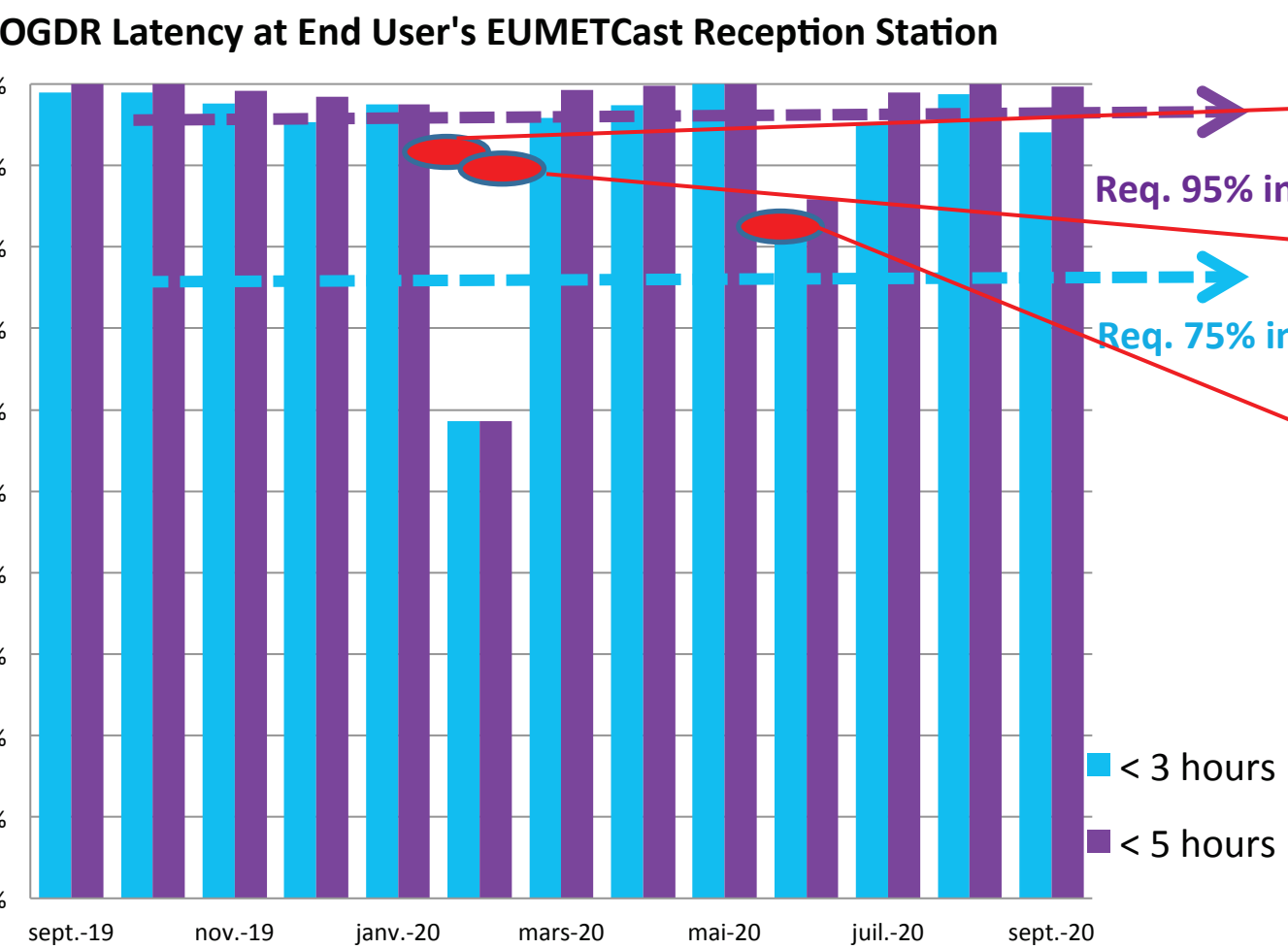
NOAA ESPC : ~100% OGDR successful for PLTM1 acquired at CDAs

100 % OGDR products archived, all disseminated via EUMETCast and via NOAA dissemination services

NOAA



Jason-3 OGDR Latency at EUMETCast



A SHM (Safe Hold Mode) on Jason occurred due to a Gyro 3 Anomaly most probable cause was a Single Upset.

A second SHM on Jason 3 occurred shortly after the recovery, the mos probable cause was again a Single Upset.

Jason-3 triggered a Safe Hold Mod a gyro2 anomaly. It triggered abov SAA due to Single Event Upset.

3 Safe Hold Modes:

31 Jan 2020 – 5 Feb 2020

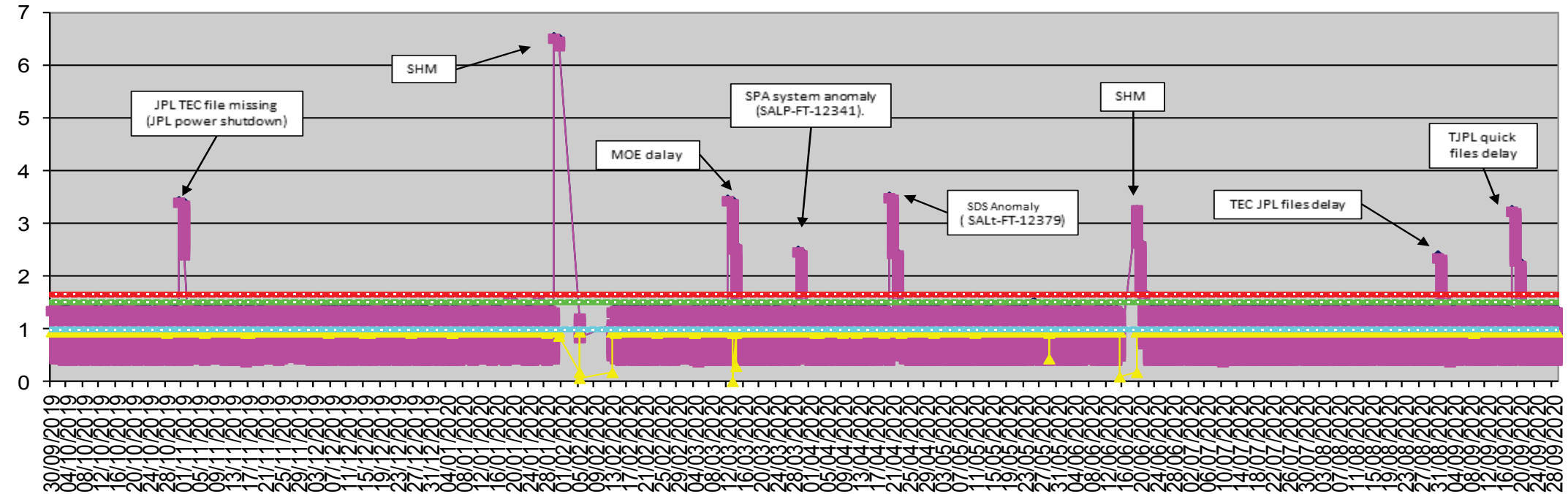
5 **Feb 2020 – 13 Feb 2020**

15 Jun 2020 – 19 Jun 202

IGDR - status and performances

- Jason-3 IGDR processing is OK (CNES : 100% IGDR successful)
- 100% IGDR products archived
- All disseminated via CNES AVISO+ and NOAA dissemination services

Jason-3 IGDR Timeliness



GDR - status and performances

CALVAL sessi
Jason-3 GDR-F standard
for operational switch
H. Roinard – F. Bignalet

GDR produced by CNES/SSALTO

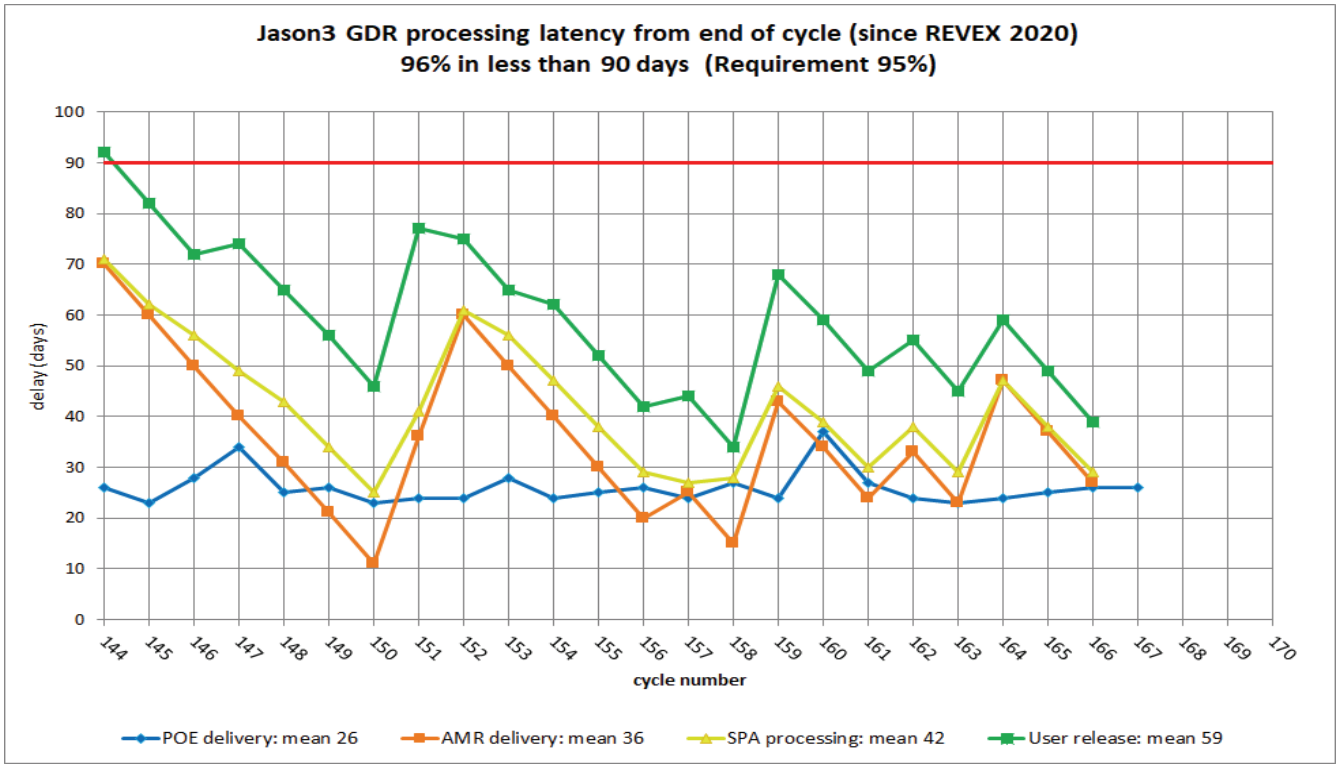
- **Currently GDR-D, transition to GDR-F on Oct. 29th 2020**
- GDR-D & F parallel production until end of 2020 for a smooth transition
- Reprocessing started, will be delivered beginning of 2021.

Jason-3 GDR processing is OK

- Cycle per cycle (and yearly) validation reports available on AVISO+ http://www.aviso.altimetry.fr/en/data/calval/systematic-calval.html
- Systematic cross checked validation by CNES and JPL
- Data availability & latency OK

100% GDR products archived

All disseminated via CNES AVISO+ and NOAA dissemination services

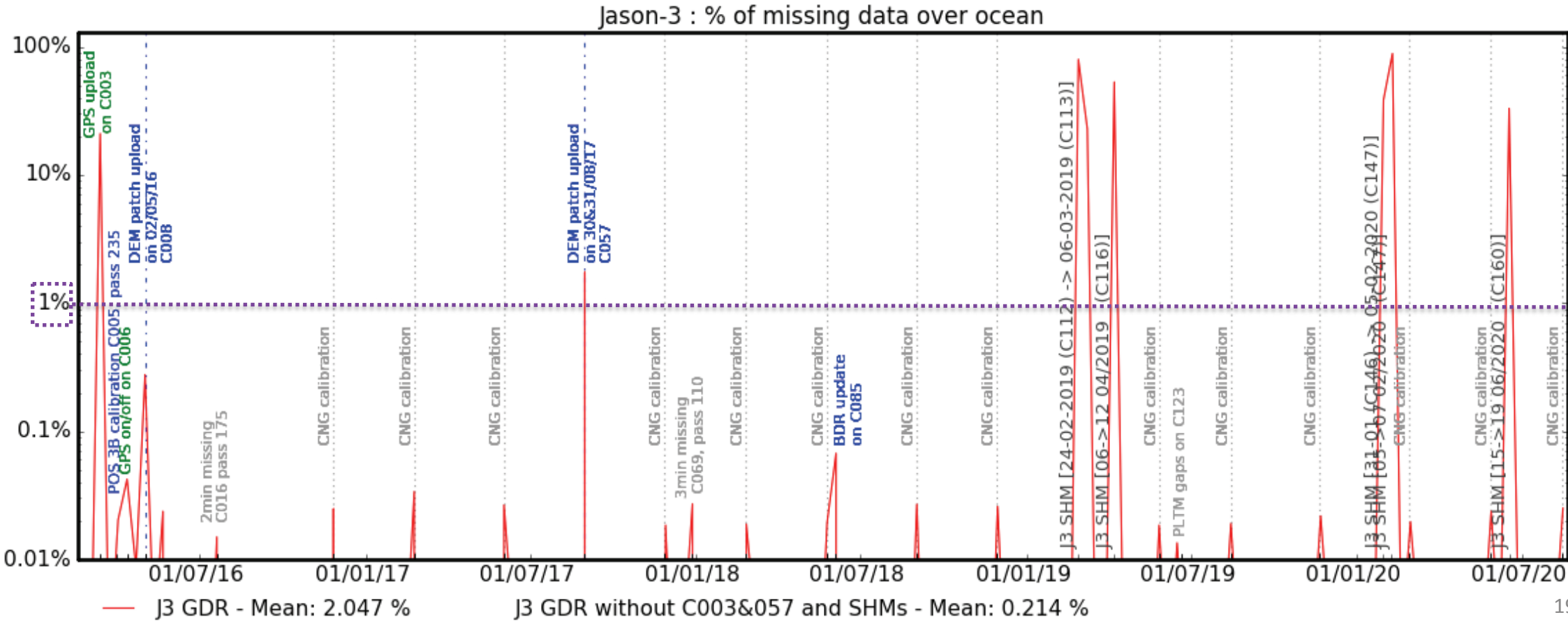


Instrument session
nefits of the Adaptive retracker for
mproving Jason-3 GMSL estimations
P. Thibaut et al

Performances – missing measurements

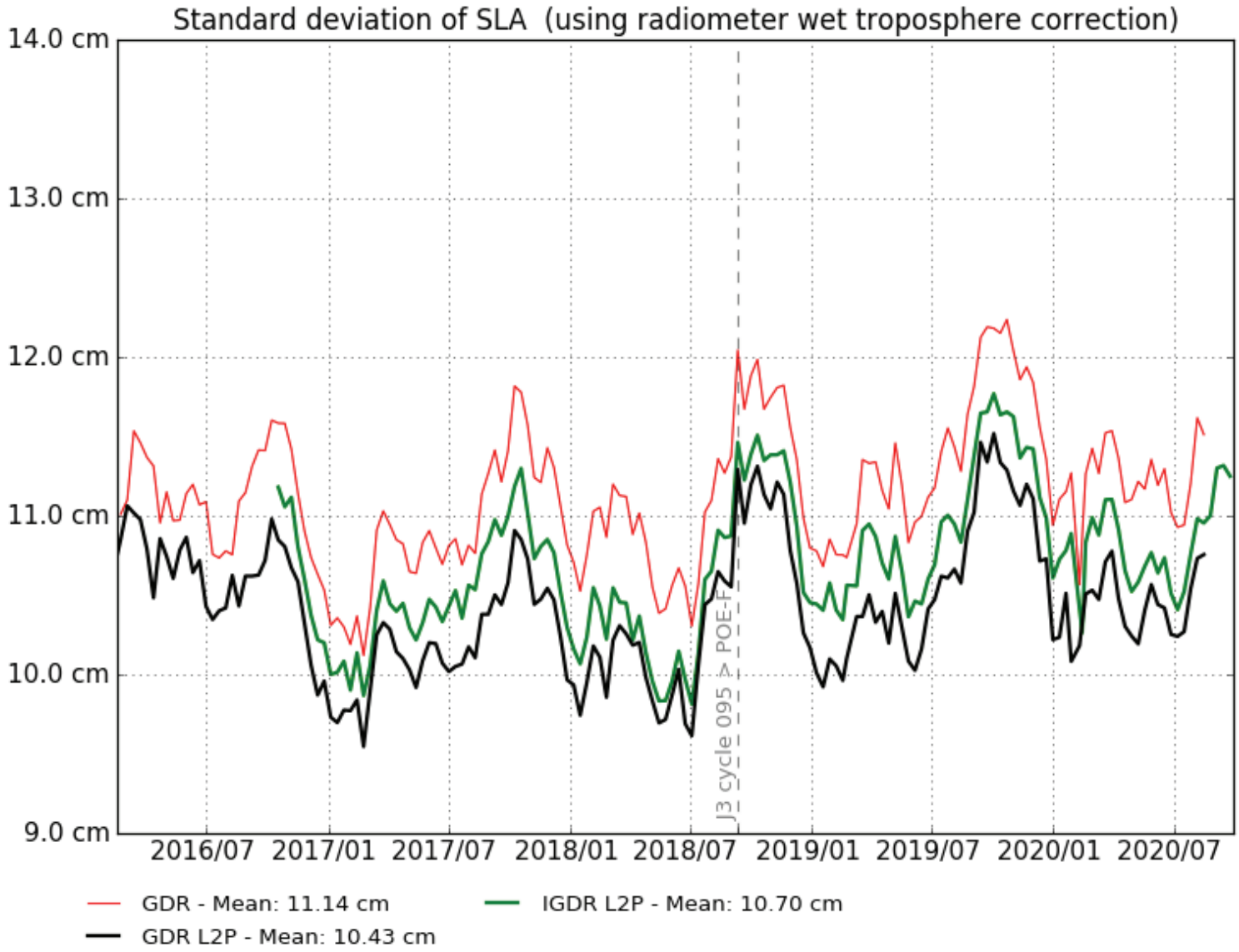
Very good data availability over ocean — 97.95 % calibrations and incidents included

After removing uploads and SHM: — >99.7 % data are available over ocean

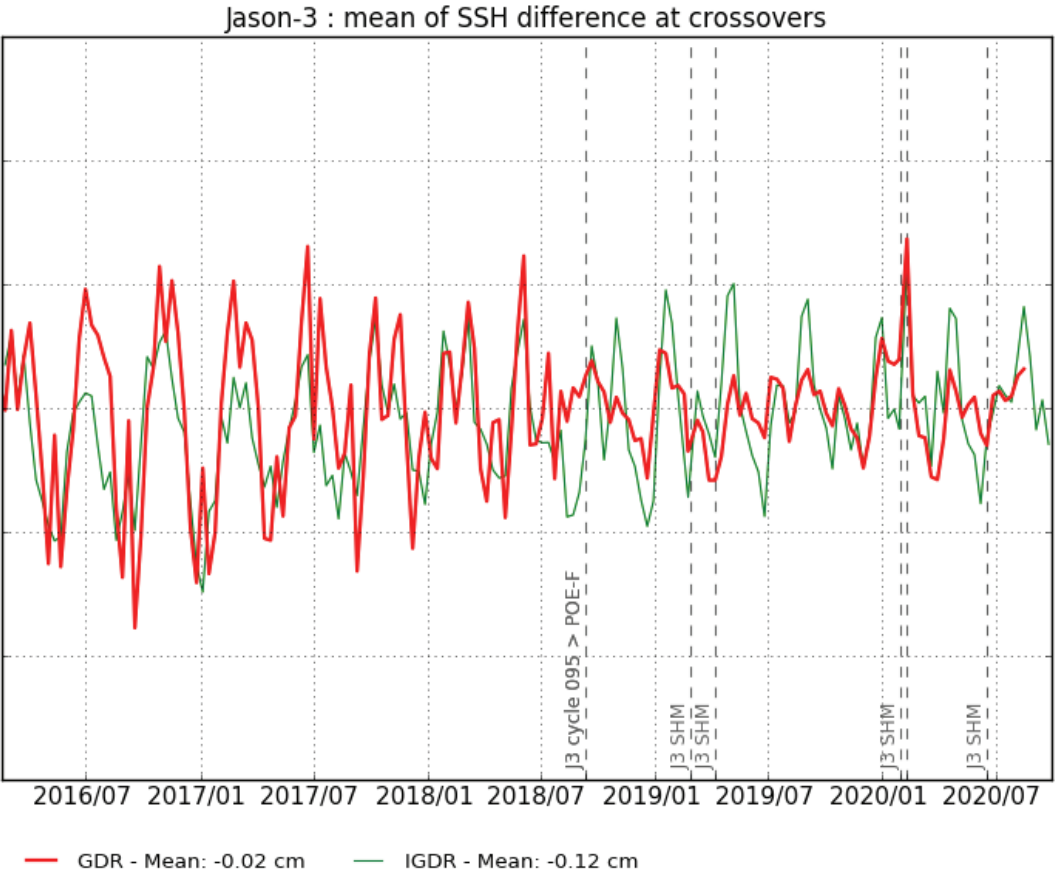


Performances – Sea Level

eduction
om **L2 (GDR:11cm)**
L2P(GDR:10.4cm)

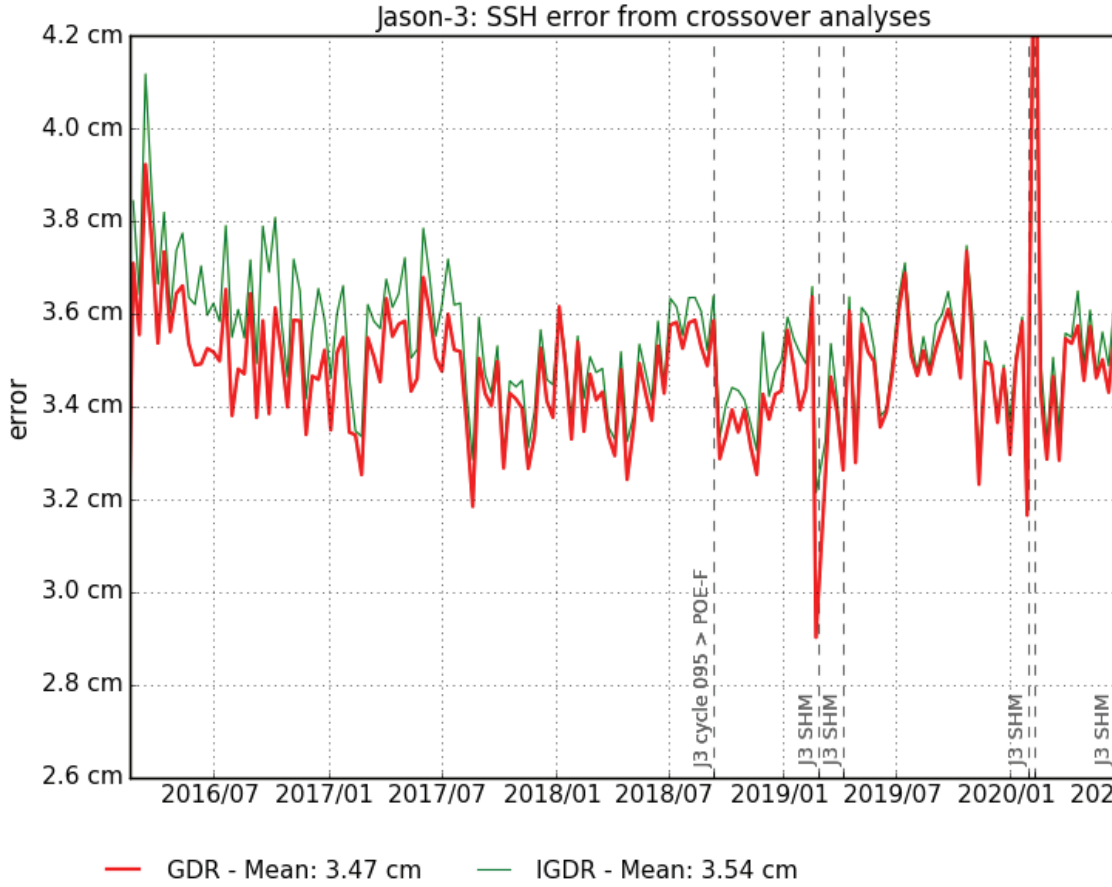


Performances – Xover



In GDR -> better homogeneity between ascending / descending passes since use of POE-F

SSH error is deduced from crossovers analyses using radiometer data
->selecting |latitudes| < 50°, bathy<-1000m, oceanic variability < 20



System Requirements and Performances

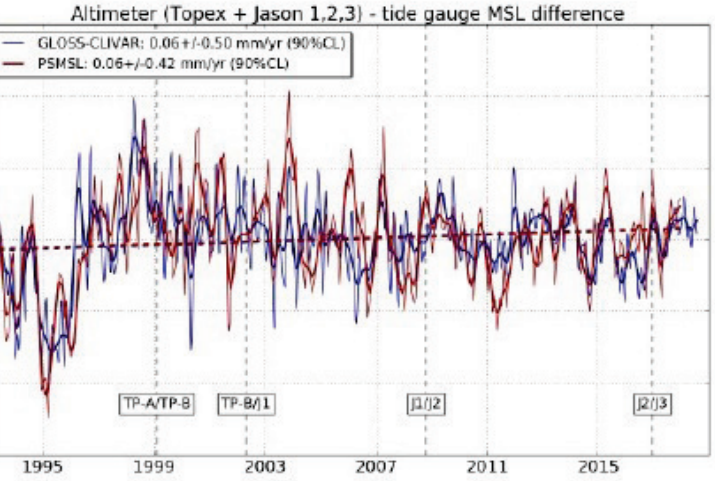
- Data availability :
  - Requirement : The GDR shall contain 95% of all possible over-ocean data (acquisition and archive) during any 12 month period, with no systematic gaps.
- from November 2019 until October 2020
  - 3 SHMs (4.4%)
  - DEM upload (0.02%)

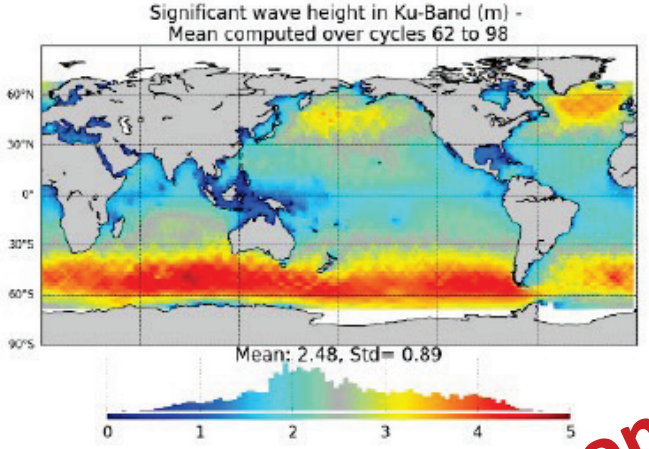
⇒ **satellite unavailability** **~4.4 %**

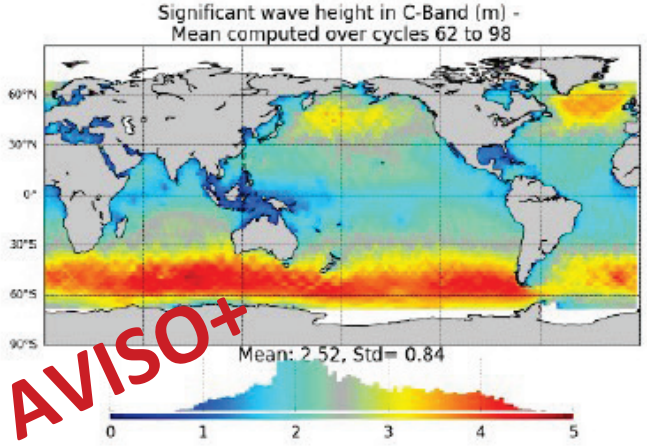
- bus : 4.4% altimeter : 0.02% Doris : 0% AMR : 0.1%

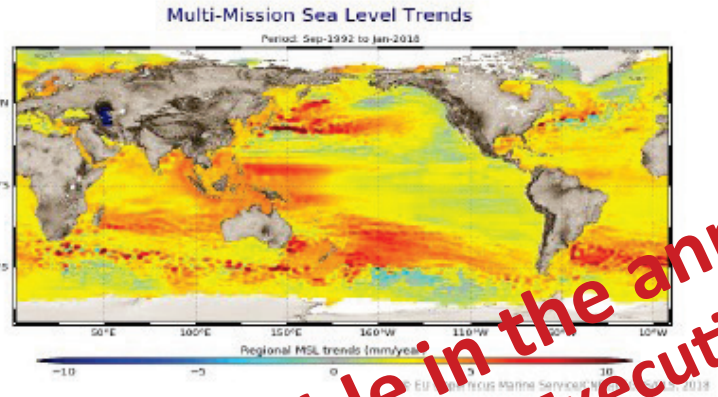
⇒ **ground unavailability** **~0.00 %**

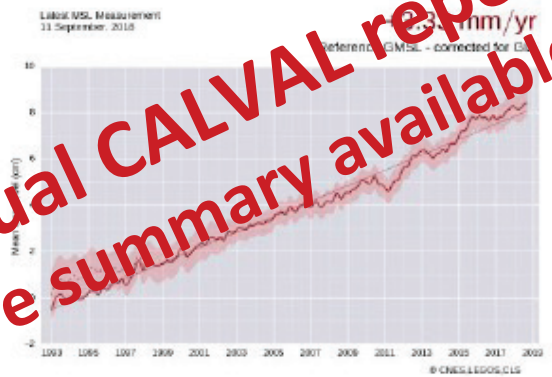
➔ **Global Jason-3 system availability : 95.5%**

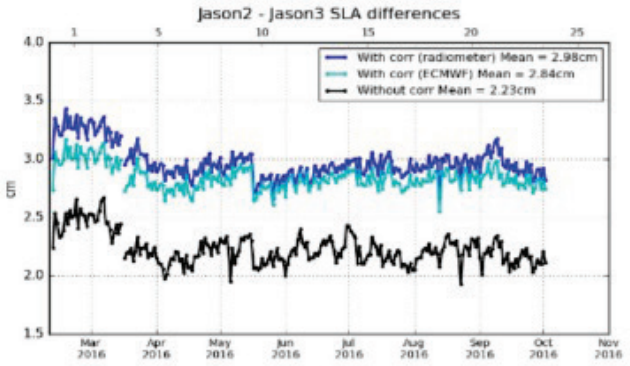


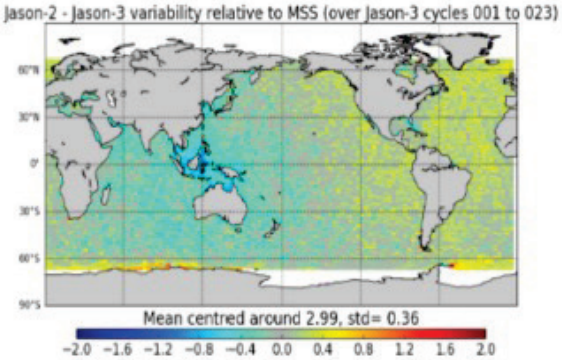












Available in the annual CALVAL report on AVISO+

Executive summary available

Conclusion – Jason-3 at a glance

4th Jason-3 Exploitation Review (REVEX) : successful in April 2020
Platform and instrument in perfect conditions

Jason-3 mission extension agreed at 4P agencies level in September 2020, for 1+2+2 years.

New OLTC (31500 targets), coherent with Jason-CS/Sentinel 6

GDR-F standard will be operational on Oct. 29th, 2020

- In coherence with Jason-CS/Sentinel-6

Thank you to all the teams from CNES, NOAA, EUMETSAT & NASA/JPL

Items to consider

➔**Jason-3 is required for Jason-CS/Sentinel-6 intercalibration**

➔**What will be its mission after that ?**

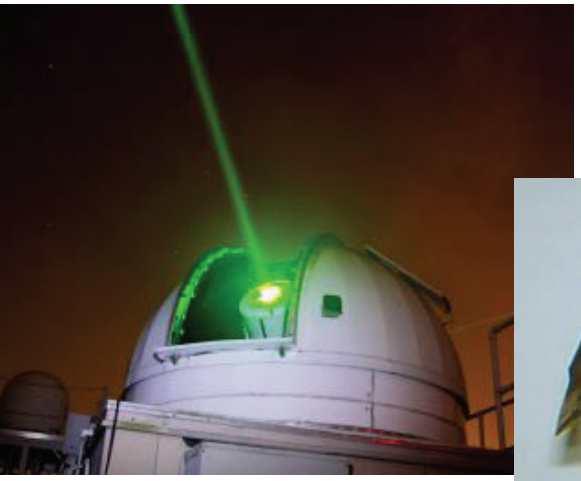
- ➔Interleaved orbit ?
- ➔Geodetic ?
- ➔New intercalibration in 2 years / 3 years ? Earlier in case of emergency linked to Jason-3 status ?

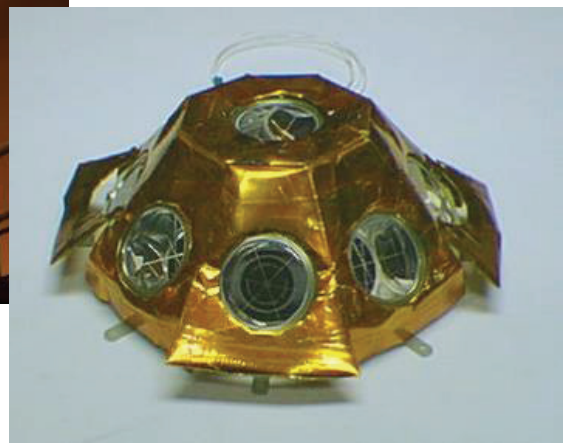
- JPL
  - G. Shirtliffe
  - K. Garcia
  - S. Brown
  - S. Desai
  - JD Desjonquères
  - B. Haines
  - A. Dorsey
  - W. Bertiger
  - M. Talpe
- CNES
  - T. Médina
  - E. Coulaud
  - Y. Ducassou
  - F. Bailly-Poirot
  - N. Picot
  - Ch. Jayles
  - A. Guerin
  - A. Guerry
  - S. LeGac
  - J-P Chauveau
- NOAA
  - D. Donahue
  - D. Richardson
- EUMETSAT
  - M. Tahtadjiev
  - L. Soliveres

Thank you for your attention ... and also to the contributors !!

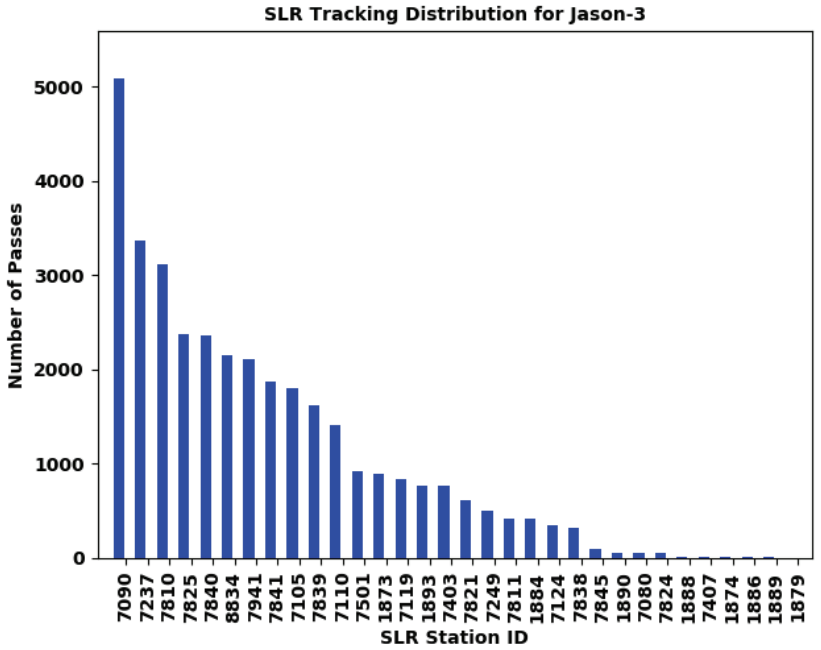
Backup slides

SLR/LRA





- Laser ranging array (LRA) is passive (No electronics or software)
- Copy of Jason-1 & Jason-2 LRA system, supporting cm-level ranging
- Tracking of Jason-3 is a high priority for International Laser Ranging Service (ILRS)
- Performance of Jason-3 LRA has been nominal
- 100% availability since launch



Cumulative Passes Per Station for Jason-3

- **Top 5 stations by pass volume from Oct. 2019 to Oct. 2020:**
  - ***Yaragadee(AUS), Zimmerwald(CHE), Changchun(CHN), Matera (ITA), Herstmonceux (GBR)***