Absolute Calibration of TOPEX/Poseidon, Jason-1 and Jason-2 Altimeters in Corsica

FIrst results of Jason-1 and Jason-2 Formation Flight Phase

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OSTST Meeting

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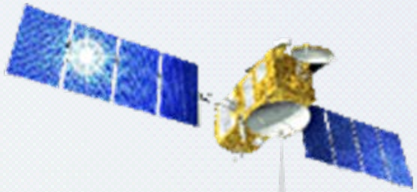
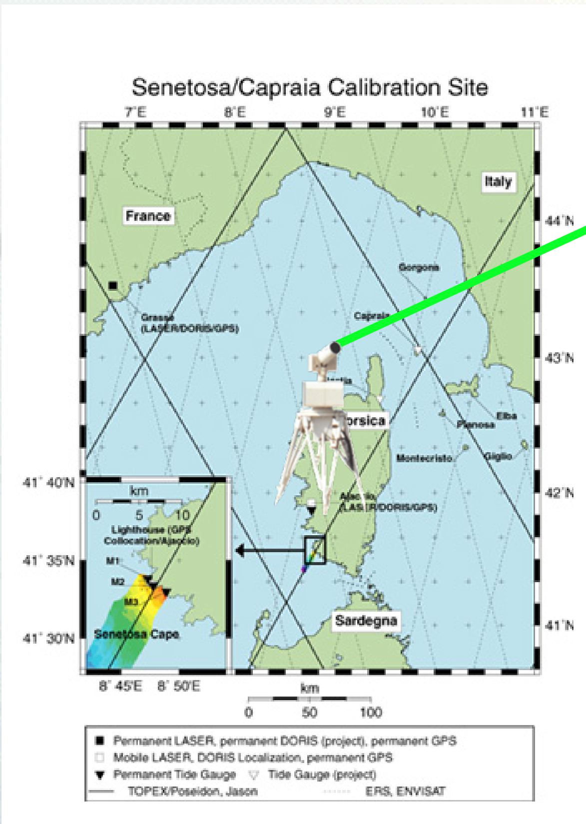
OSTM JASON-2

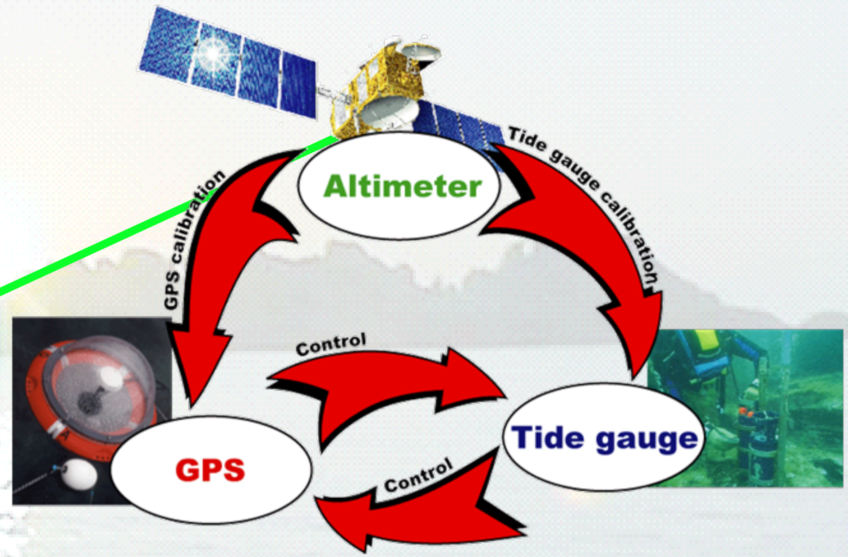


The absolute calibration site in Corsica is based on a double configuration:

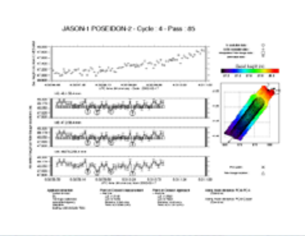
- **A geodetic site at Ajaccio: FTLRS has been settled** in 2002 and **2005**.
FTLRS is in Corsica since July 11th to december 2008
- **An in-situ site at Senetosa cape** under the track N°85

The Senetosa site allows to perform altimeter calibration from **tide gauges** as well as from a **GPS buoy**.





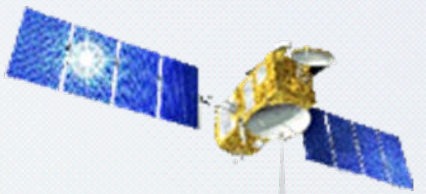
Products used for the study:
- **Jason-1: IGDR-C, GDR-C**
- **Jason-2: IGDR-C**
- **T/P: MGDR+ (TMR & orbit)**



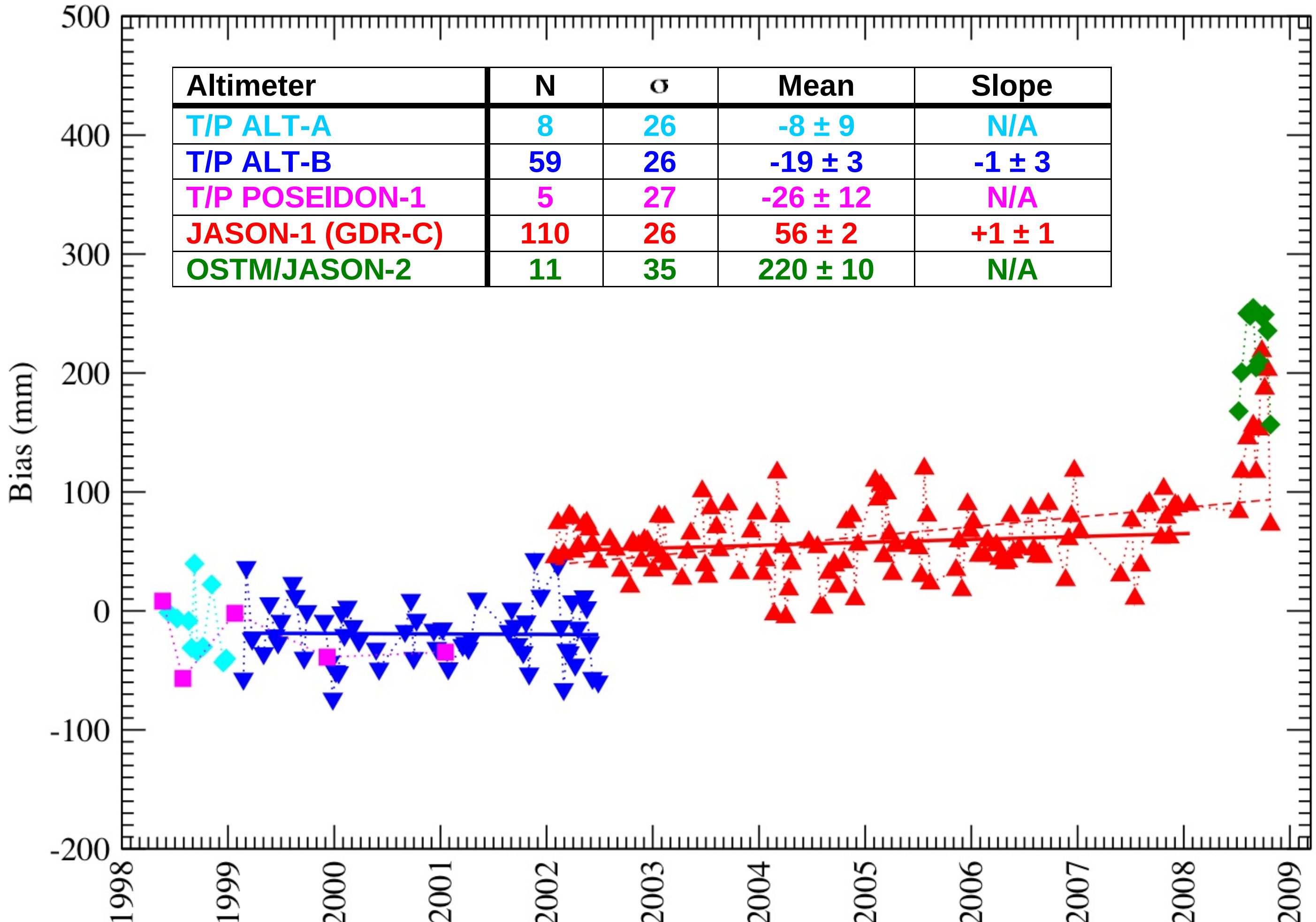
Definition of altimeter bias calibration:

sea height bias = altimeter sea height - in situ sea height

Sea height bias < 0 meaning the altimetric sea height being too low (or the altimeter measuring too long)
Sea height bias > 0 meaning the altimetric sea height being too high (or the altimeter measuring too short)



BIASES TIME SERIES



Altimeter	N	σ	Mean	Slope
T/P ALT-A	8	26	-8 ± 9	N/A
T/P ALT-B	59	26	-19 ± 3	-1 ± 3
T/P POSEIDON-1	5	27	-26 ± 12	N/A
JASON-1 (GDR-C)	110	26	56 ± 2	+1 ± 1
OSTM/JASON-2	11	35	220 ± 10	N/A

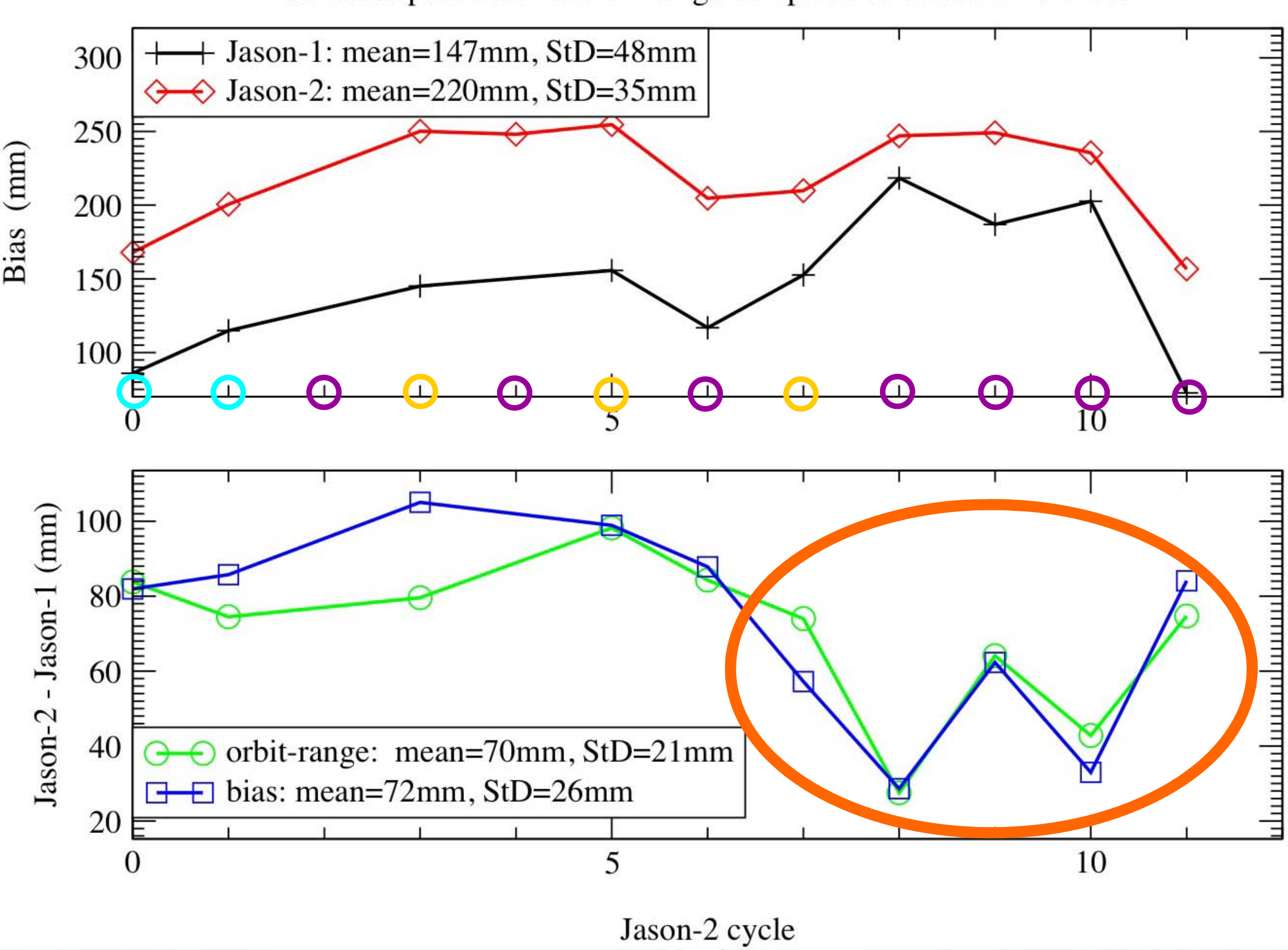
Products used:

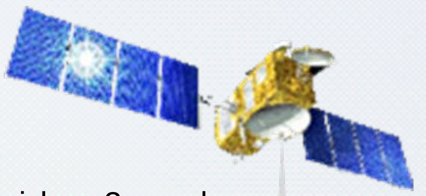
- T/P: MGDR + TMR replacement products + TVG ITRF05-rescaled orbits
- Jason-1: reconstructed GDR-C (cycle 1 to 212) + GDR-C (cycle 208 to 240) +IGDR-C (cycle 239 to 250)
- Jason-2: IGDR-C (cycle 0 to 11)

Note that the Jason-1 **biases should be increase by about +10 mm to compensate the JMR land contamination**.

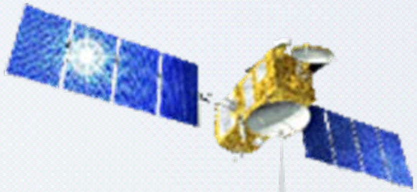
For the sudden increase of Jason-1 bias (affecting probably also Jason-2) during summer 2008 we have for the moment no explanation. See poster for details.

Jason-1&2 altimeter calibration





No clear dependence of the Poseidon-3 modes
Orbit minus range lower than global analysis: larger orbit errors on MOE for cycle 8 and probably 10
=> **Orbit minus range closer to global analysis when using POE**
Very good agreement of bias differences and Orbit-Range: 2 mm (correction impact)



Jason-2 Š Jason-1 (corrections):

Correction	**Mean (mm)**	**Standard Deviation (mm)**
Dry Tropo.	-0.4	2.6
Wet Tropo. (radiometer)	**-9.8**	**7.6**
Wet Tropo. (ECMWF)	0.2	0.6
AMR - ECMWF	*21.8*	*17.7*
JMR - ECMWF	*31.6*	*15.0*
AMR Š GPS	*-0.5*	*13.2*
JMR - GPS	*+9.3*	*11.9*
Iono. (dual frequency)	**+11.6**	**6.4**
Iono. (GIM)	0.0	0.0
JS2 - GIM	*-2.4*	*15.2*
JS1 - GIM	*-14.0*	*16.9*
SSB	**-3.6**	**4.6**
Solid Tides	+0.2	0.8
Loading	0.0	0.0
Pole Tide	0.0	0.0
Total	**-2.0**	

JASON-1&2 CORRECTIONS

Main contribution comes from Wet tropospheric (~-10 mm) and Ionopheric (~+12 mm) corrections

Other environmental parameters:

- SWH: Mean = +7 cm StD = 12 cm
- Wind Speed: Mean = +0.5 m/s StD = 0.6 m/s

SSB differences probably mainly come from SWH differences

Calibration from Corsica

Absolute bias 10 four common overflights:

Jason-2: +220 mm *(207 from Harvest)*

Jason-1: +147 mm *(110 from Harvest)*

The very high values of the bias need to be investigated because it is very different from the whole Jason-1 time series (see poster for details).

=> Can't trust absolute values for this period

Relative bias from 10 common overflights:

Jason-2 - Jason-1: +72 mm *(97 from Harvest)* **(70 mm from orbit-range)**

Difference with global analysis (84 mm) comes from MOE orbit errors on some cycle

POE reconciles results: ~80 mm for orbit-range (84 mm from global analysis).

Corrections:

- **Wet tropo. from radiometers show a bias of -10 mm** (AMR-JMR) and **GPS confirms that it comes from JMR (dryer) .** However **no drift detected from JMR/GPS** comparisons**.**
- **Dual Ionospheric corrections exhibit a bias of +12 mm** (Jason-2 - Jason-1). Compared to GIM the biases are respectively -2 mm and -14 mm for Jason-2 and Jason-1

Transition from GDR-B to GDR-C:

Large impact of SSB (-30 mm); JMR, POE and range corrections account for few mm

T/P MGDR+:

10 mm decrease of the T/P ALT-B bias compared to MGDR (-3 mm from TMR and -7 mm from orbit)

Jason-1 (GDR-C) - T/P (ALT-B, MGDR+): +85 mm (11 common overflghts)

(78 from Harvest)

Using retracked products increases T/P ALT-B bias by 13 mm

C O N C L U S I O N