



Latest absolute calibration results for Jason-2 and HY-2 satellites using the Gavdos/Crete permanent calibration facilities

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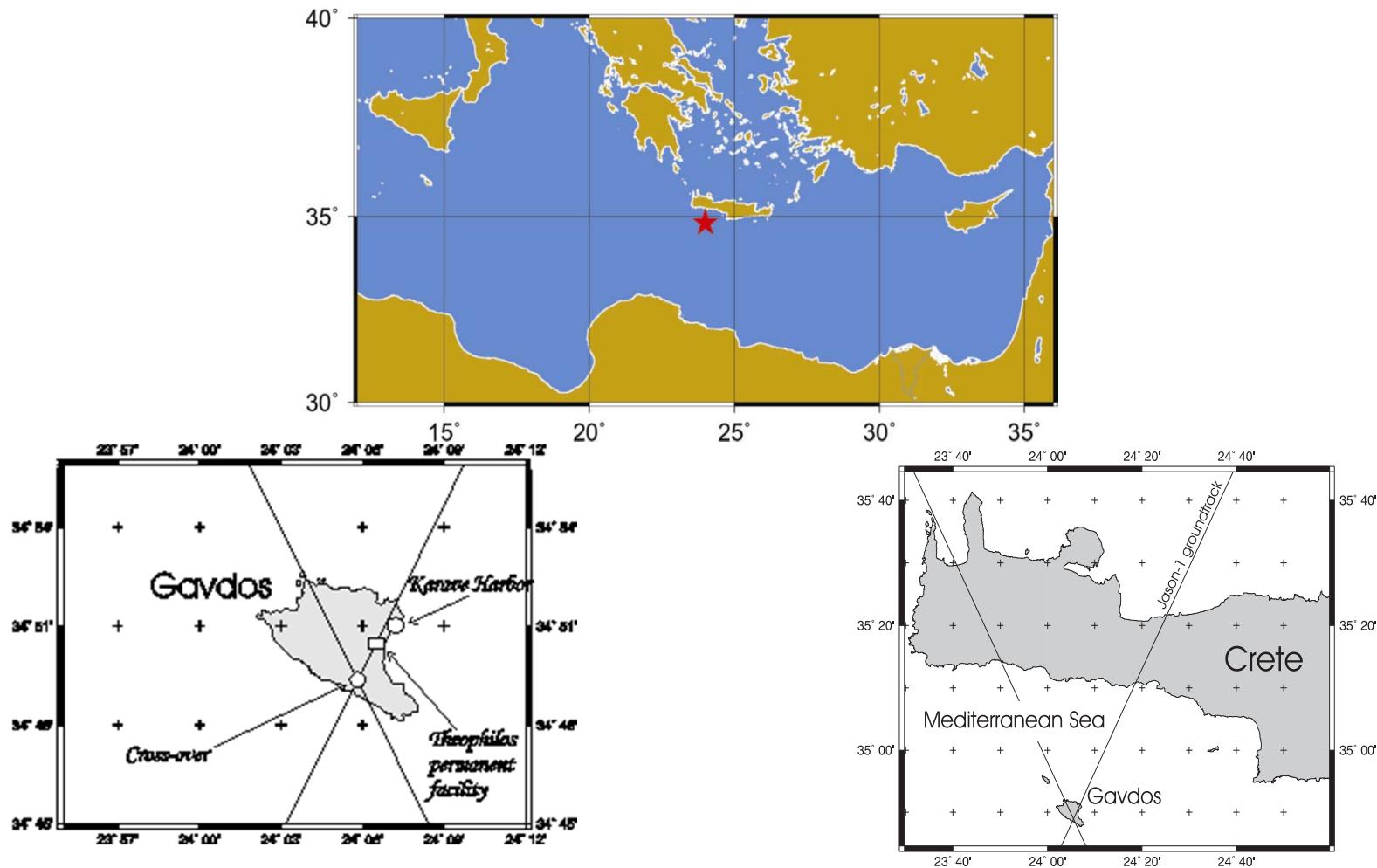
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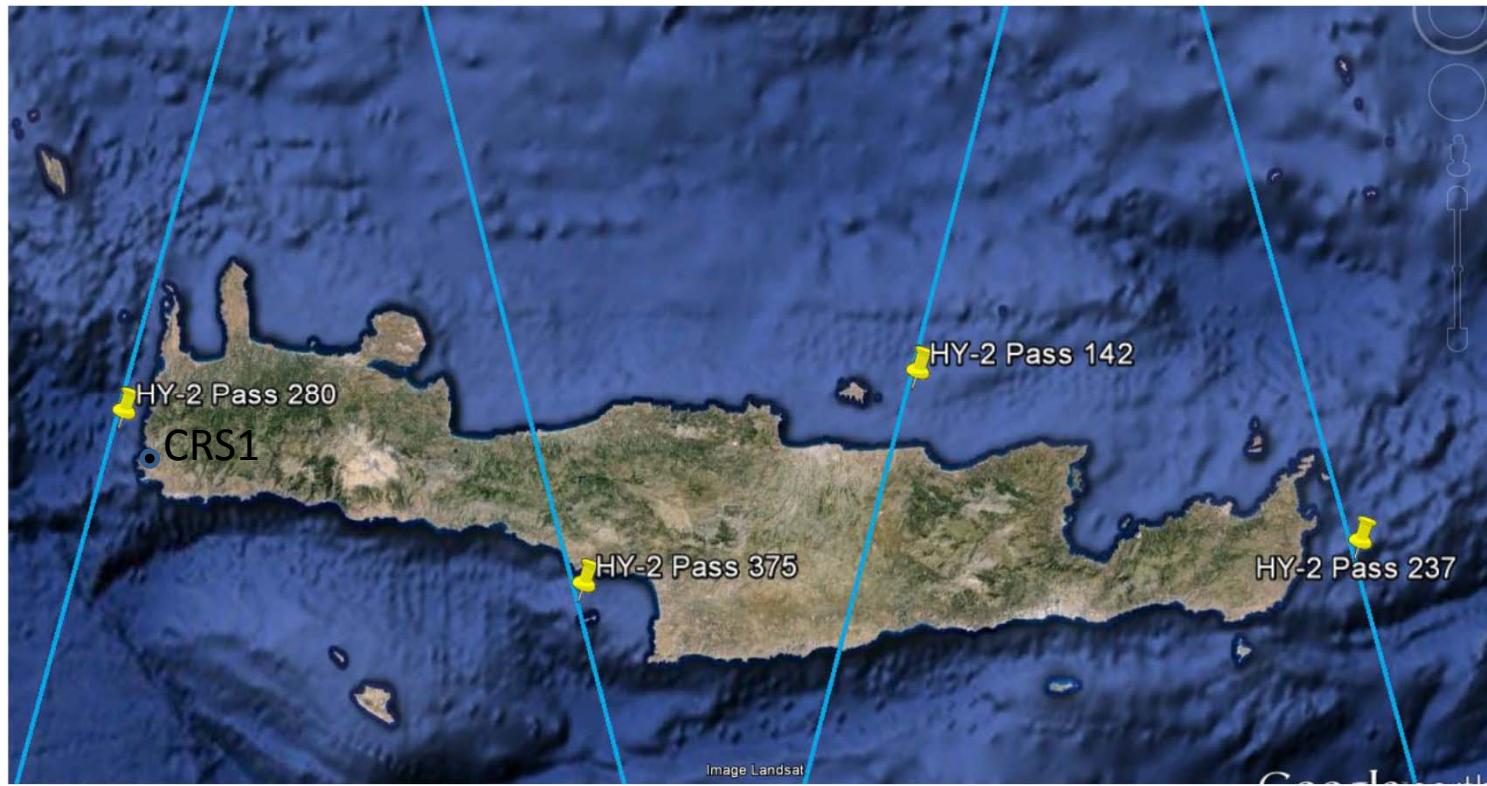
⁵ First Institute of Oceanography, China;

⁶ University of the Aegean, Greece.

Gavdos Permanent Facility

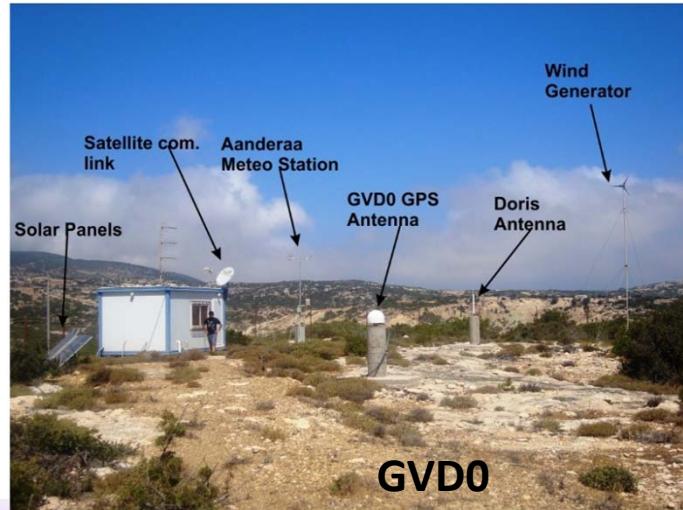


HY-2 Ground tracks over Crete



- CRS1 is the Cal/Val site for HY-2, Only 10 km away from PCA,
- South & north track for HY-2 calibration.

Gavdos and West Crete Facilities

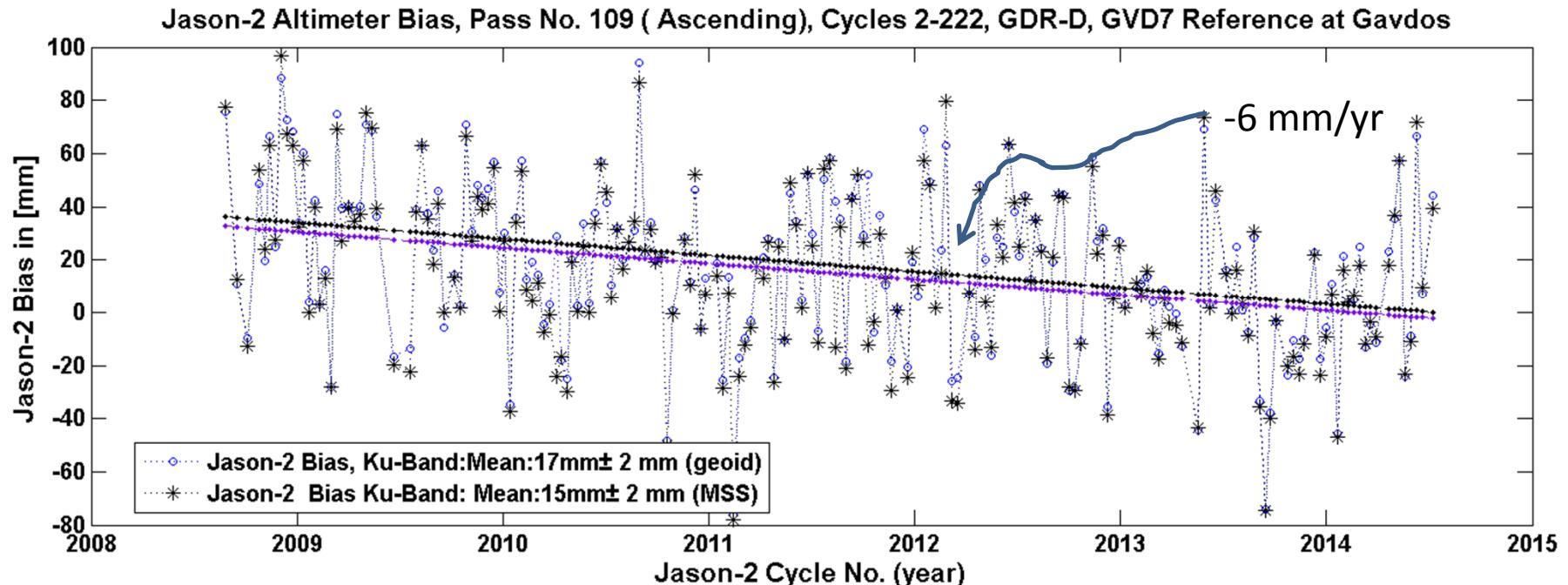


CRS1 in southwest Crete

Jason-2 Calibrating regions



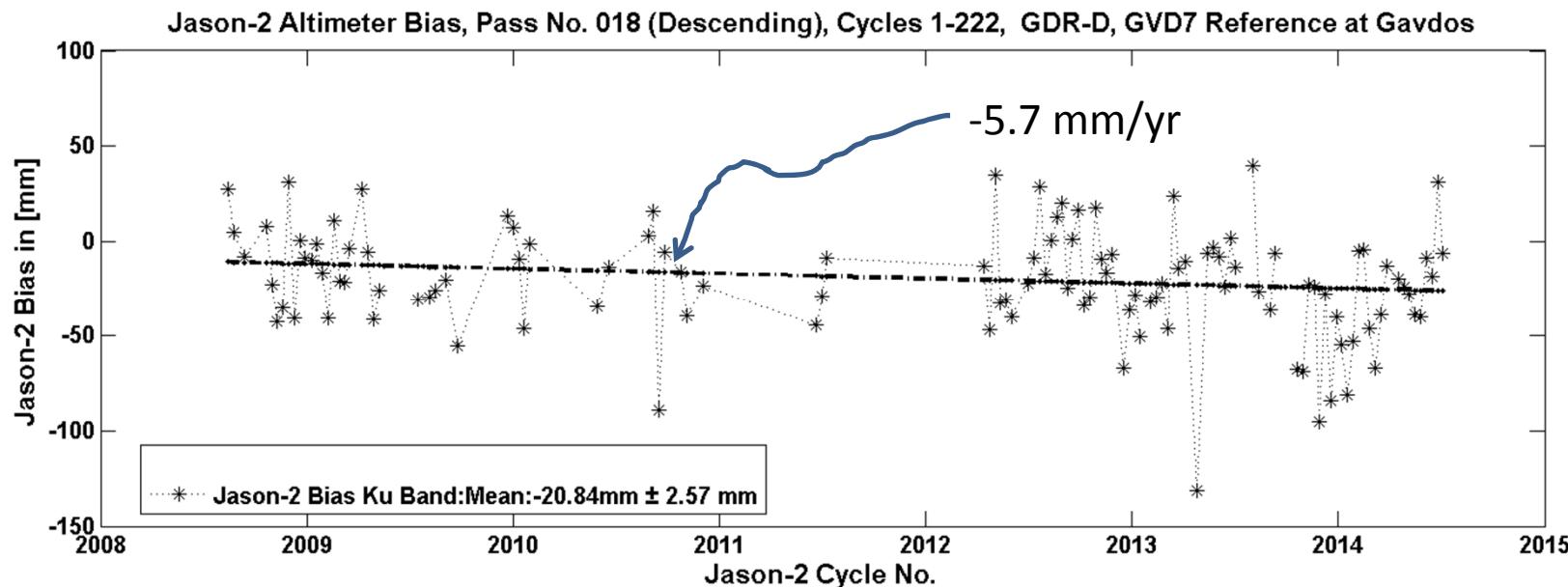
Jason-2 bias, Ascending pass No.109



- Ascending Pass No.109, GDR-D , Cycles: 2-222;
- Calibration region **14.5km-24 km**;
- **Bias= +17 mm** ± 2 mm, using local gravimetric geoid model;
- **Bias= +15 mm** ± 2 mm, using altimetric MSS reference.
- Transponder Calibration over No. 109 in 2010-2011 (**Bias=+28.4cm**)



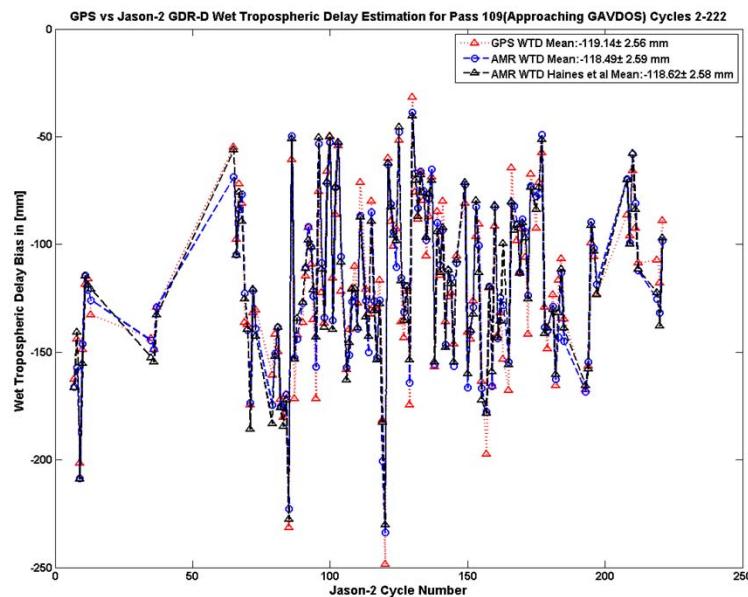
Jason-2 bias, Descending pass No.18



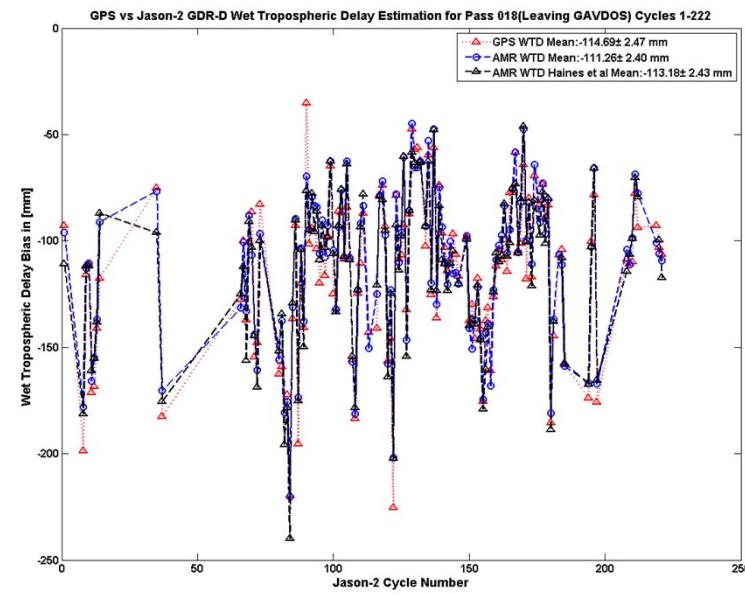
- Descending Pass No. 18, GDR-D , Cycles: 2-222;
- GOCE dynamic topography; Cal region **9km-20 km**;
- Bias= **-20 mm** ±2 mm
- Transponder Calibration over No. 18 in 2010-2011 (**Bias=+25.48cm**)



Wet troposphere delays



Pass No. 109, Ascending;
[AMR]-[GNSS wet tropo]= -1mm ±2mm;
 Meteo sensor site data.



Pass No. 18, Descending;
[AMR]-[GNSS wet tropo]= +1mm ±2mm;
 Meteo sensor site data.



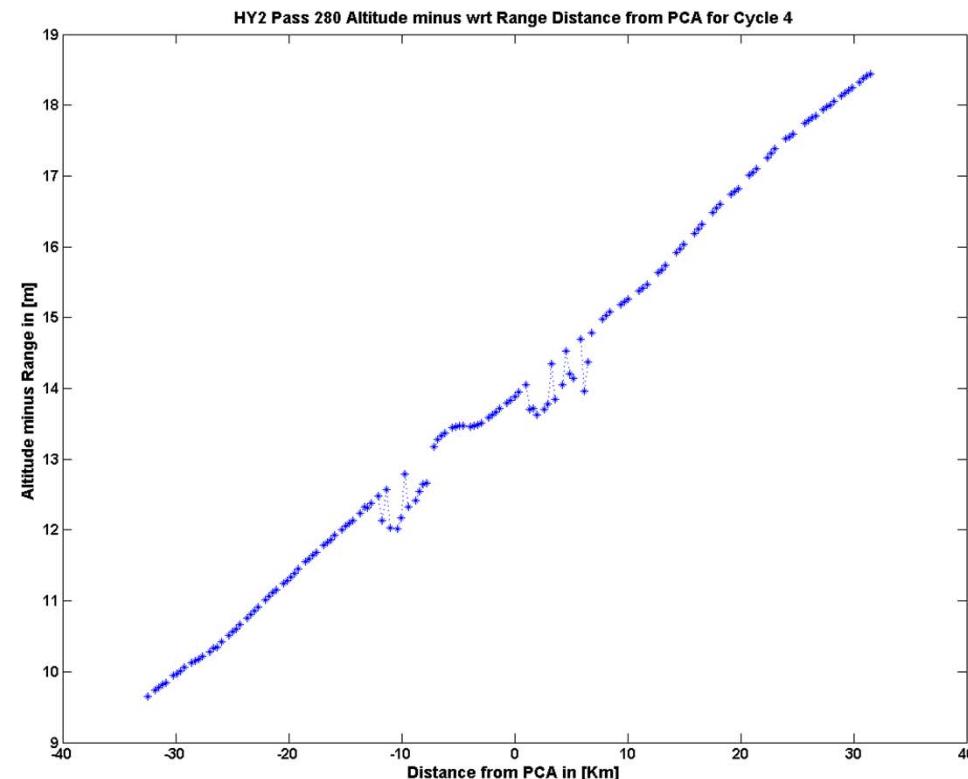
Calibrating HY-2 using CRS1



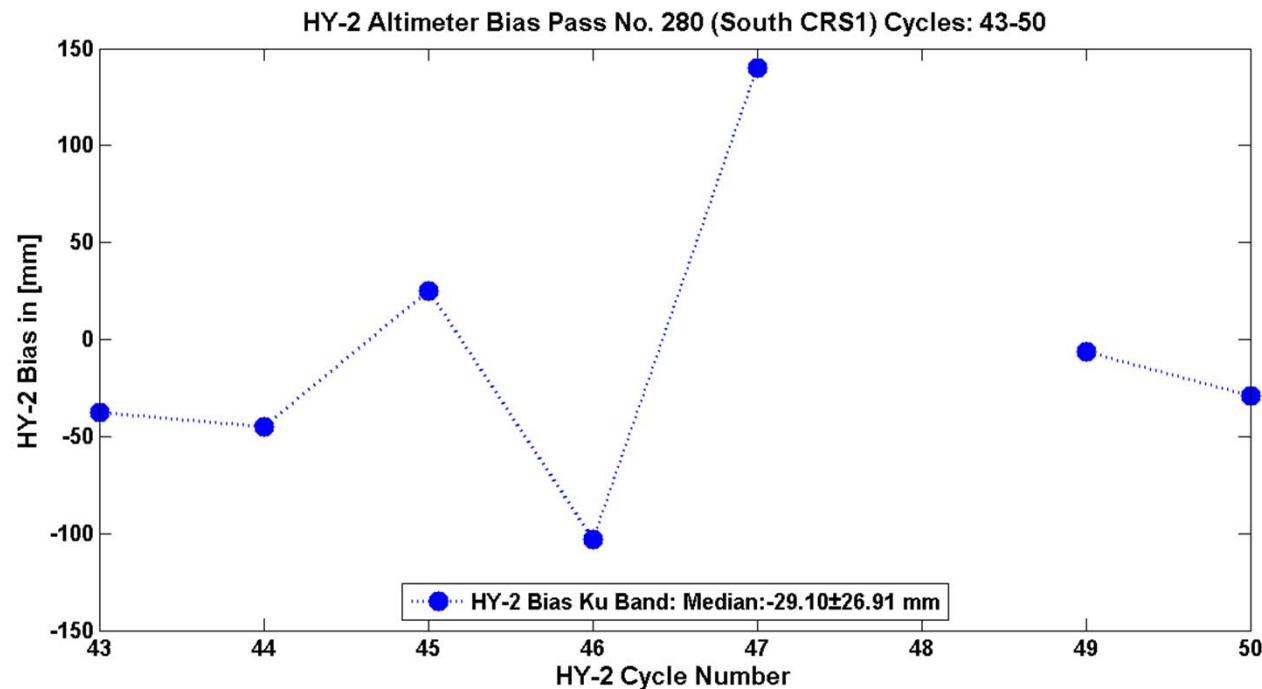
- ▶ I-GDR files: Cycle No. 19-22 (19 June-14 Aug, 2012);
- ▶ Models for ionosphere, dry and wet troposphere, and Sea State Bias.
- ▶ 1-Hz Data , Time-tagging problems, Missing values in orbit.
- ▶ **HY-2 Bias = +2.879 m** (Preliminary in 2012, Pass No.280)



HY-2 “Altitude(t)-Range(t)”, S-GDR



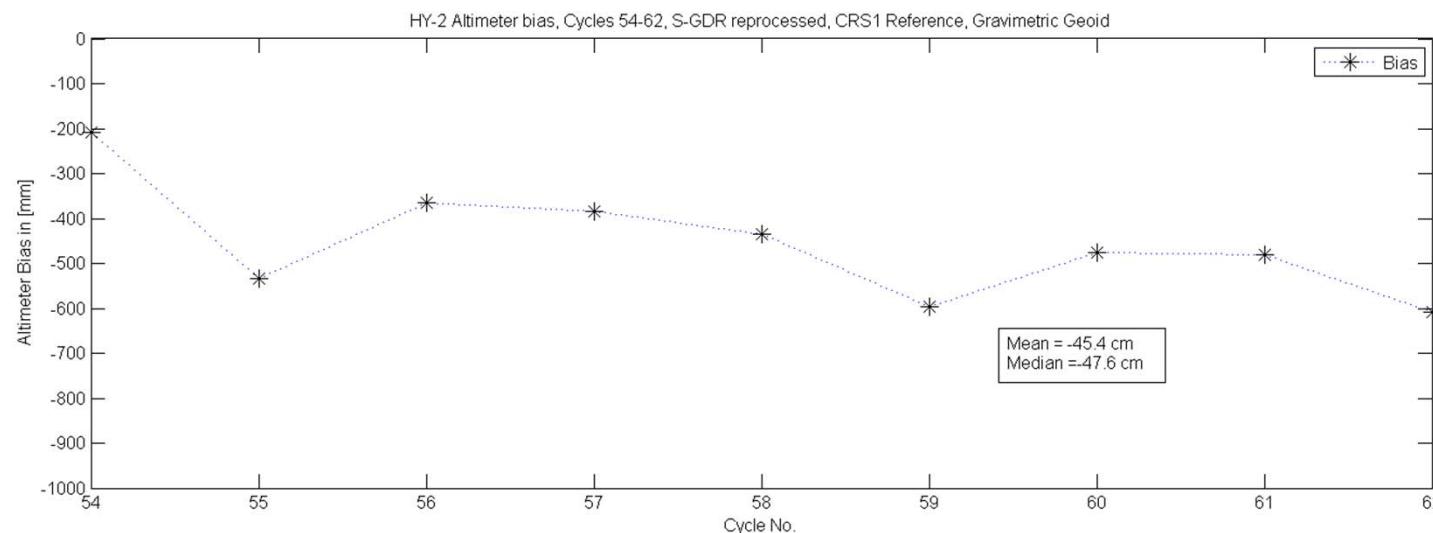
HY-2 altimeter bias



Cycles: 43-50, I-GDR data, 20-Hz, Cycle=48 contains no SSB,
 Calibrating regions: **9-16 km (south), 10-18 km (north)**,
 Median bias= **-29 mm \pm 27 mm**, Mean = **-1.3 mm \pm 40mm**
 Wet and dry tropo values from ECMWF model.



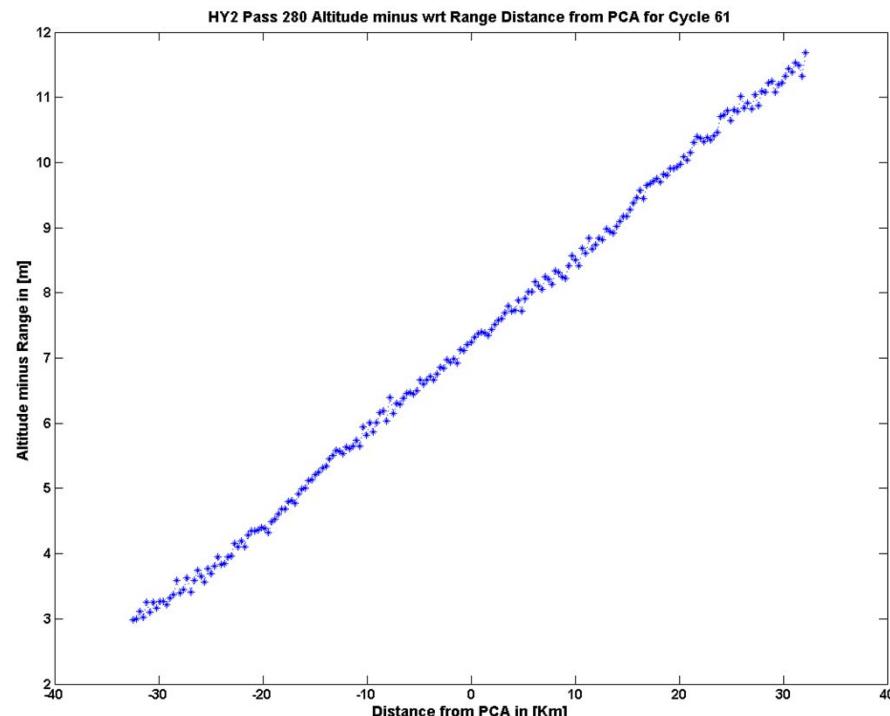
HY-2 altimeter Bias



- Bias = **-45.6 cm** (mean); **-47.6cm** (median)
- Cycles = 54-62,
- CRS1 Cal/Val site as reference in West Crete,
- Gravimetric geoid model.

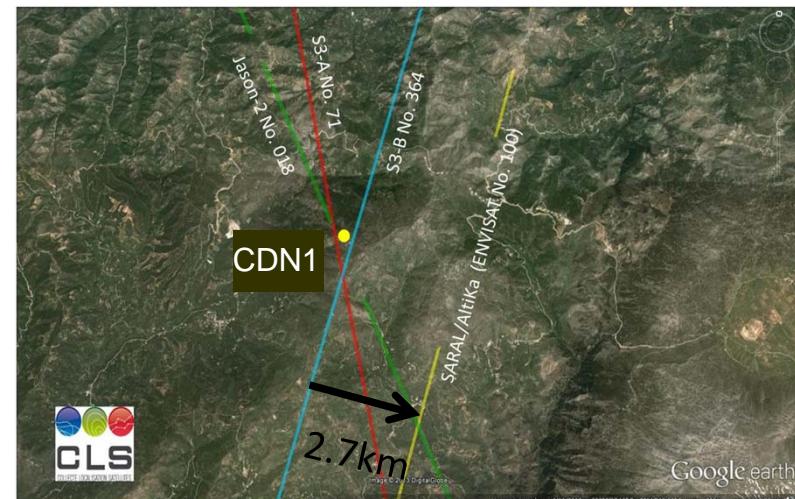


Now HY-2 GDR are reprocessed



- “Altitude(t)-Range(t)” around PCA of CRS1

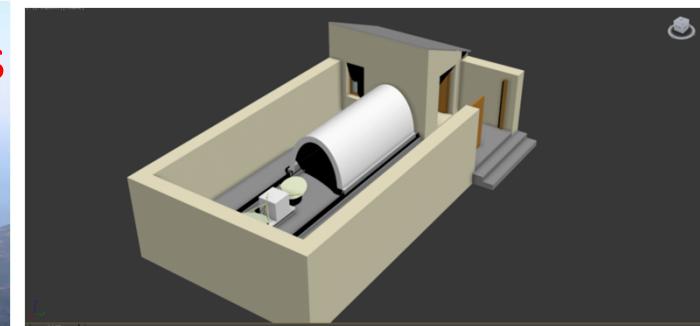
CDN1: Sentinel-3 Altimeter Calibration



- Transponder is now operational for Cryosat-2;
- Signal quality has been already tested with Jason-2.

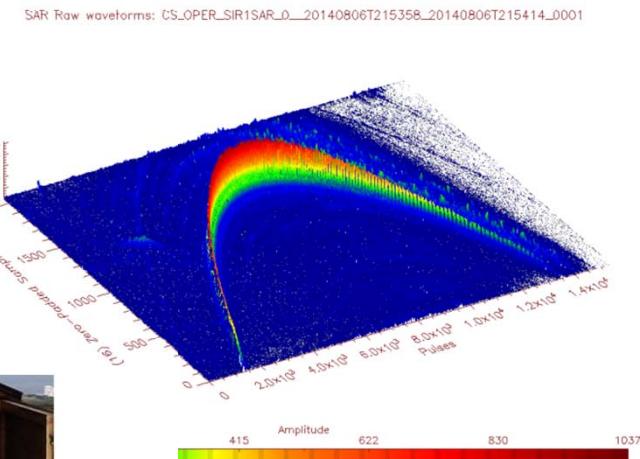
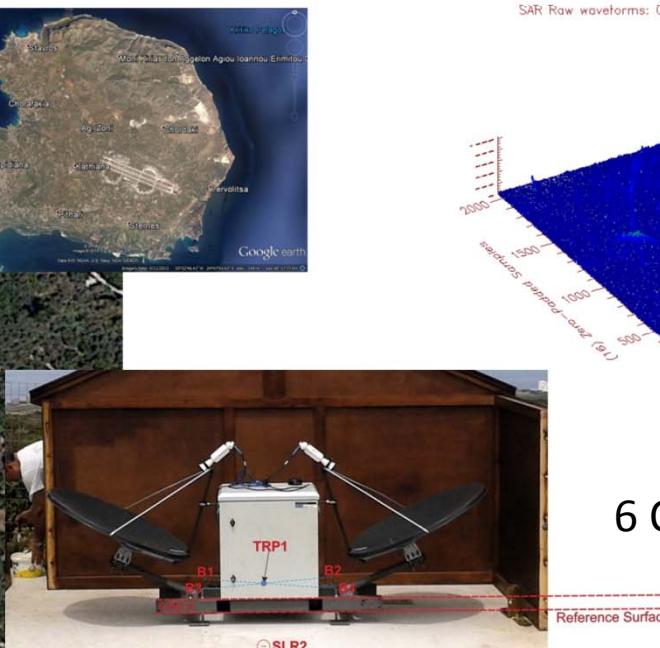
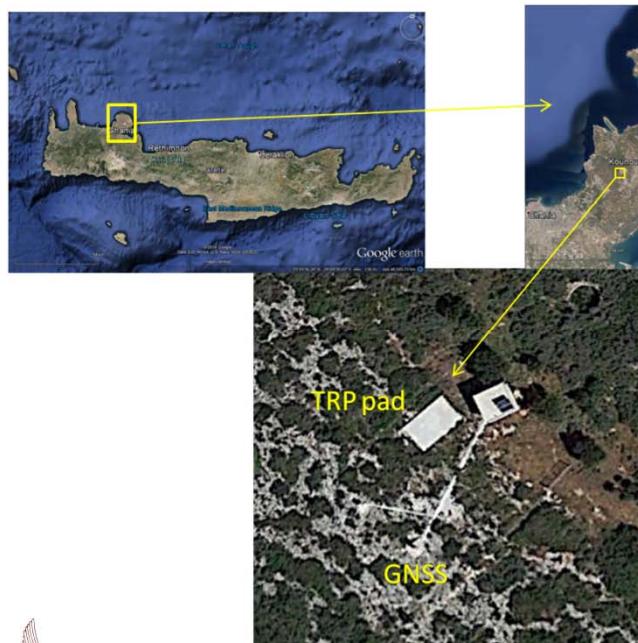


CDN1 Sentinel-3 Altimeter Calibration Site



Cryosat-2 calibrations with the transponder

- The “CDN1” site will be fully operational in 2014 to calibrate Jason-2, Sentinel-3A, 3B (2015), Cryosat-2, and possibly SARAL/AltiKa;
- Transponder has been effectively used for Cryosat-2 calibrations at the “SLR2” site;
- Clear signal response even at 7km off ground track of Cryosat-2;



6 October 2014, 07:06:06 UTC



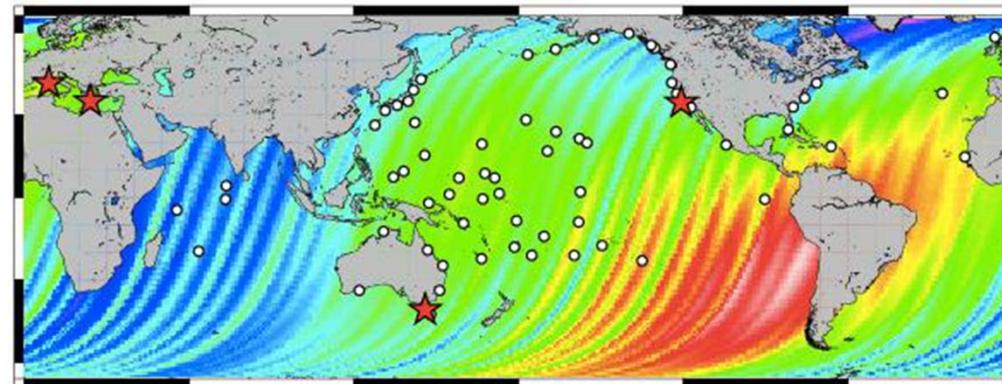
Conclusions

- **Jason-2 altimeter bias (GDR-D, Cycle=2-222, Gavdos):**
 - $B(\text{No.109}) = +17 \text{ mm} \pm 2 \text{ mm}$, [Ascending]; Trend (No.109) = -6mm/yr
 - **$B(\text{No. 18}) = -20 \text{ mm} \pm 2 \text{ mm}$, [Descending]; Trend (No.18) = -5 mm/yr**
 - Diff[No.18-No.109]= **37mm**, sea-surface calibration;
 - Diff[No.18-No.109]= **29 mm**, transponder calibration [2010-2011];
- Wet Troposphere , AMR against GNSS:
 - Pass No. 109 : **-1mm** $\pm 2 \text{ mm}$; Pass No. 18 : **+1mm** $\pm 2 \text{ mm}$;
- **HY-2 Calibration: HY-2 data require further processing.**
- Transponder regularly calibrates now Cryosat-2;
- Permanent ESA transponder calibration site at CDN1 :
 - Operational for Jason-2 in 2014,
 - And for Sentinel-3 in the commissioning phase in 2015.

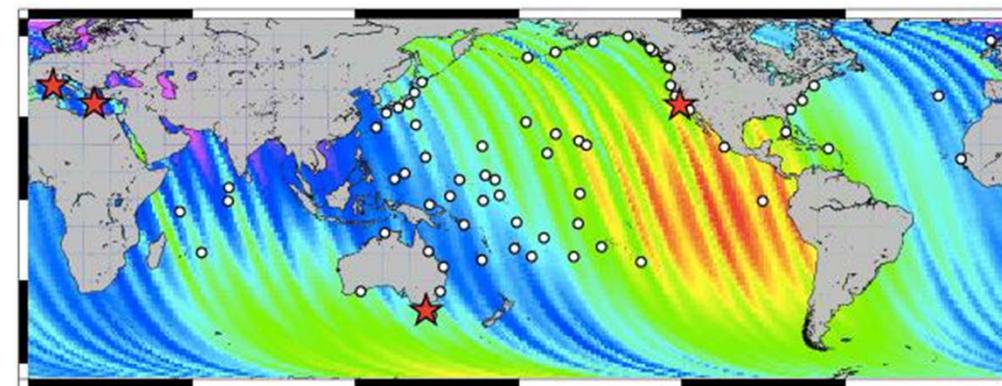


Ascending and Descending orbits

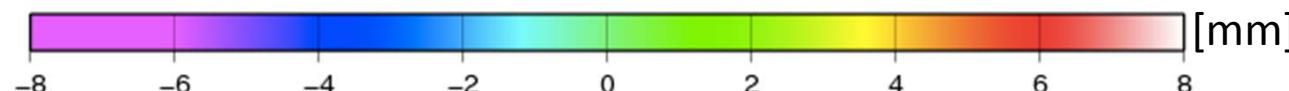
[OSTST Report 2013]



Ascending



Descending



Acknowledgements

- Help and support from CNES during transponder campaigns in 2010-2011,
- Nicolas Picot,
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