



Recent Results for Jason-2 altimeter bias using the Gavdos Cal/Val Facility

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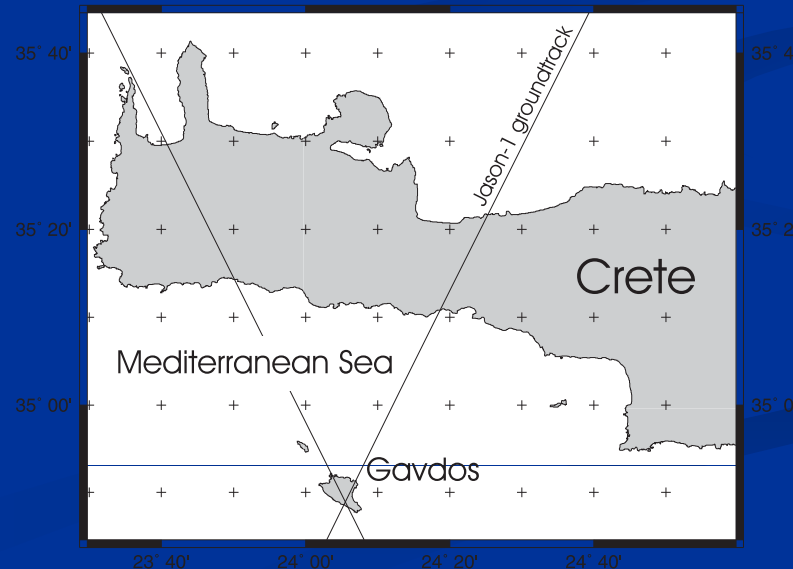
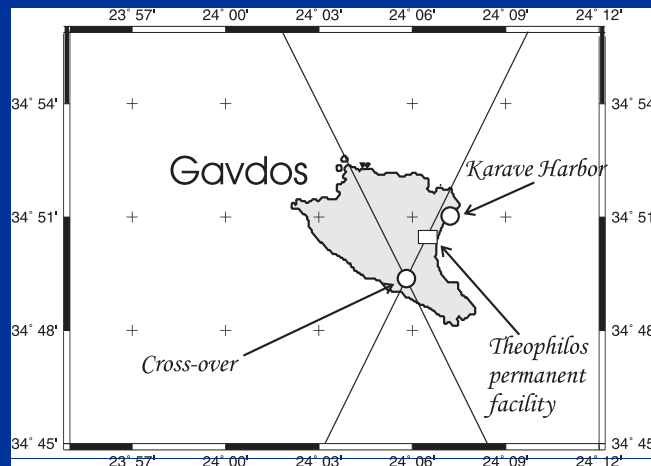
Ocean Surface Topography Science Team Meeting,
19 - 21 October 2011, San Diego, USA

Laboratory of Geodesy and Geomatics Engineering





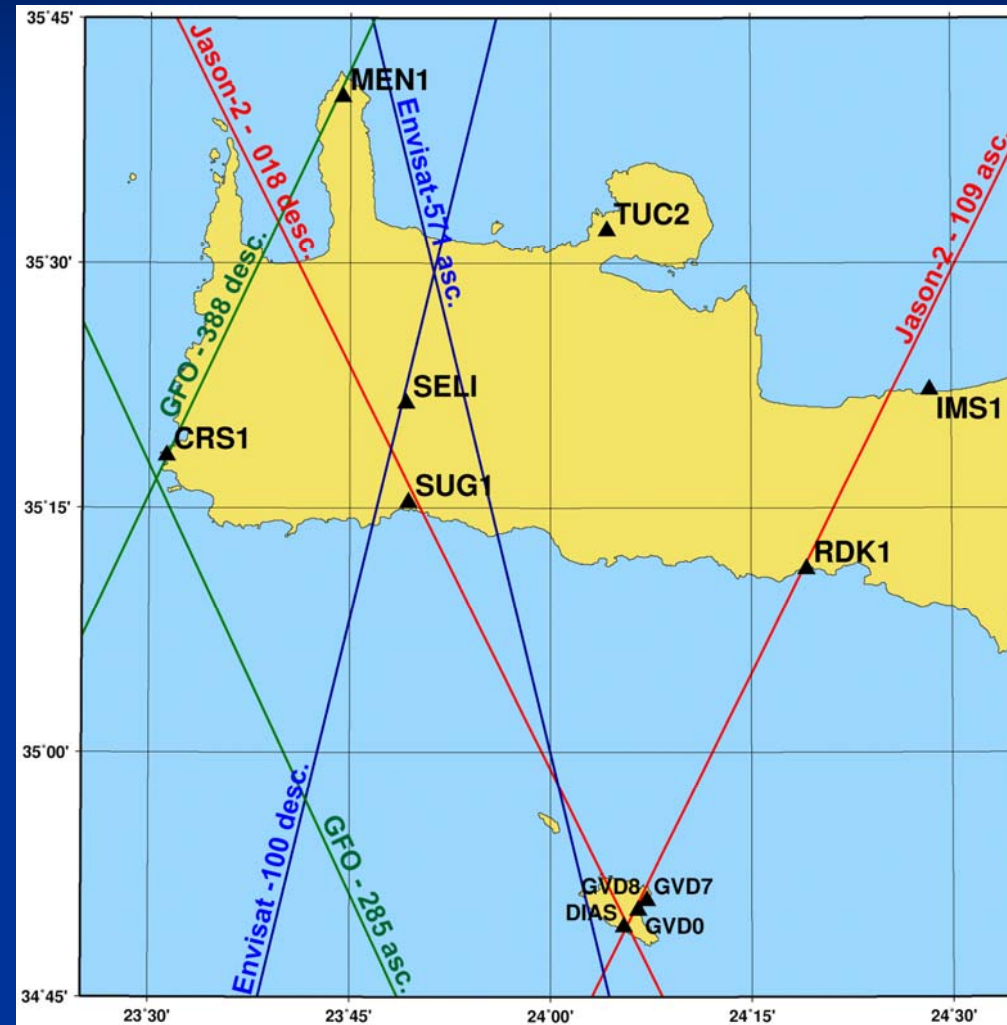
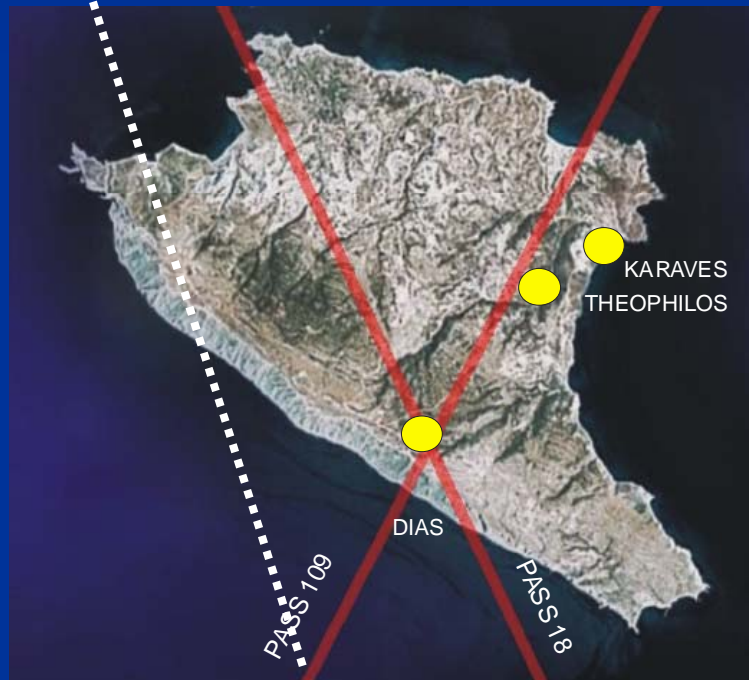
Gavdos/Crete Cal/Val site





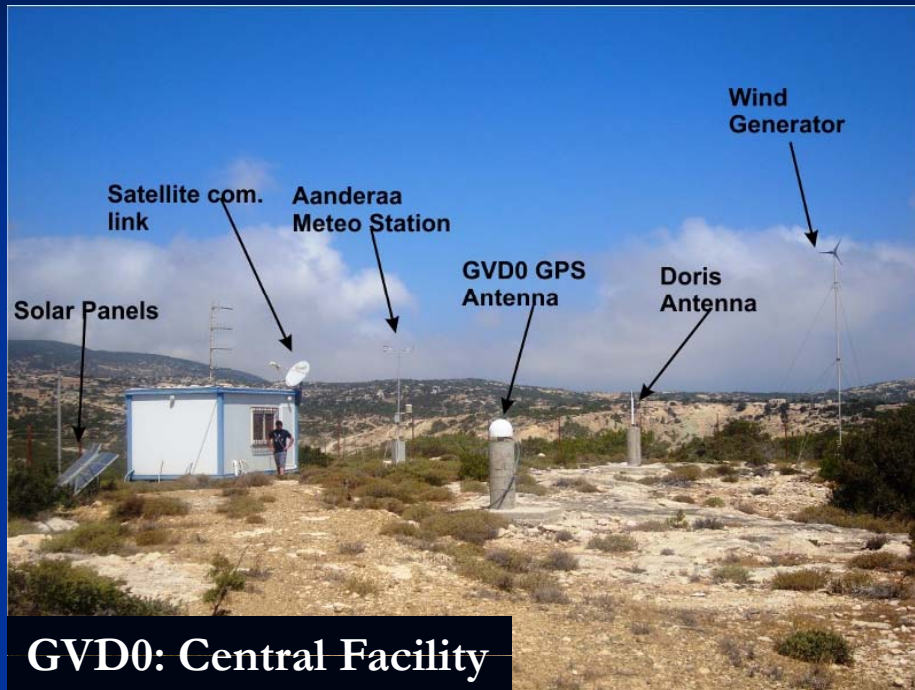
Jason, AltiKa and GFO tracks

AltiKa, EnviSat No. 571





Cal/Val Facilities: Gavdos, Crete



GVD0: Central Facility



GVD7&8



RDK1



CRS1





Jason-2 calibration regions

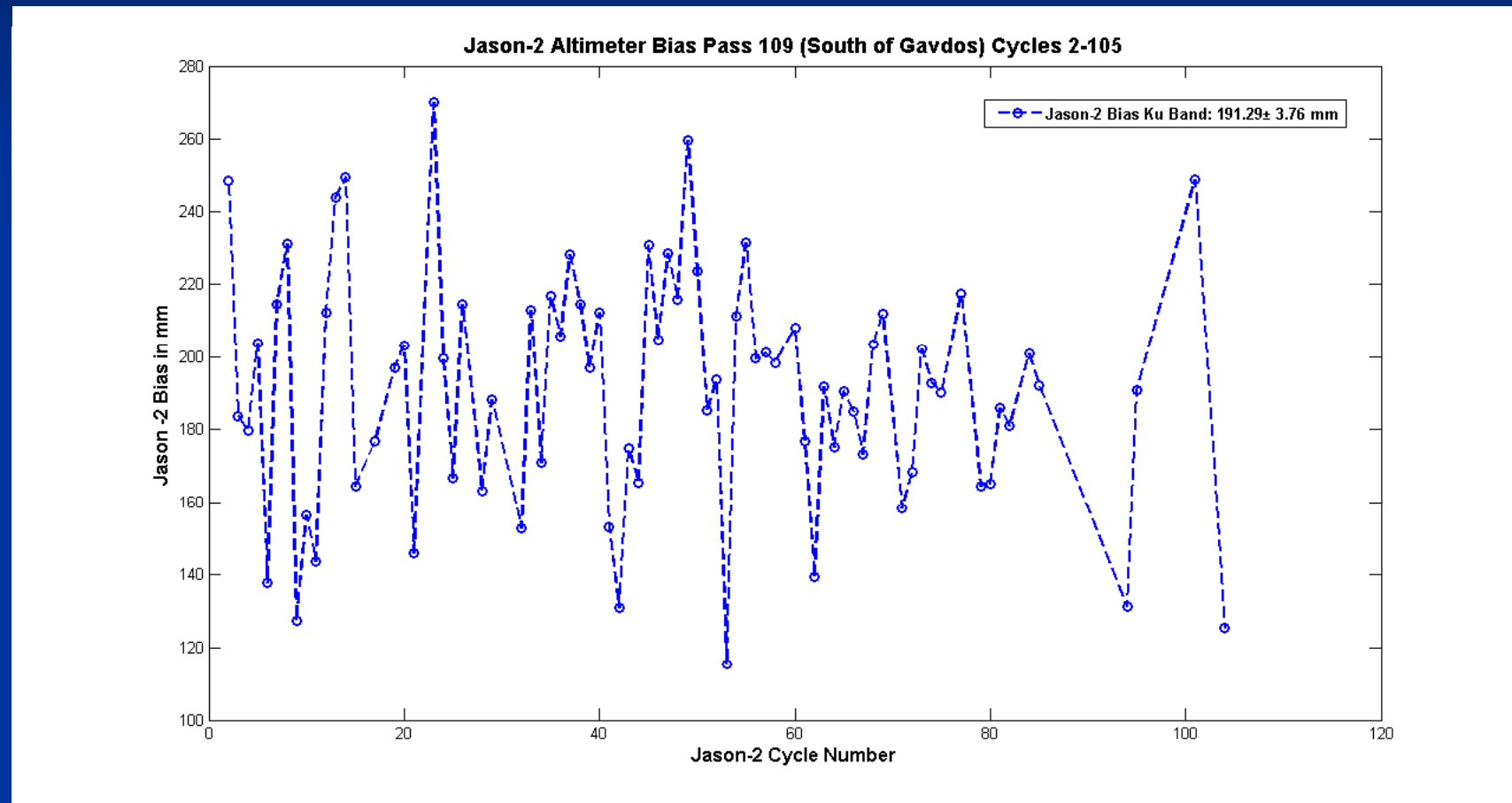


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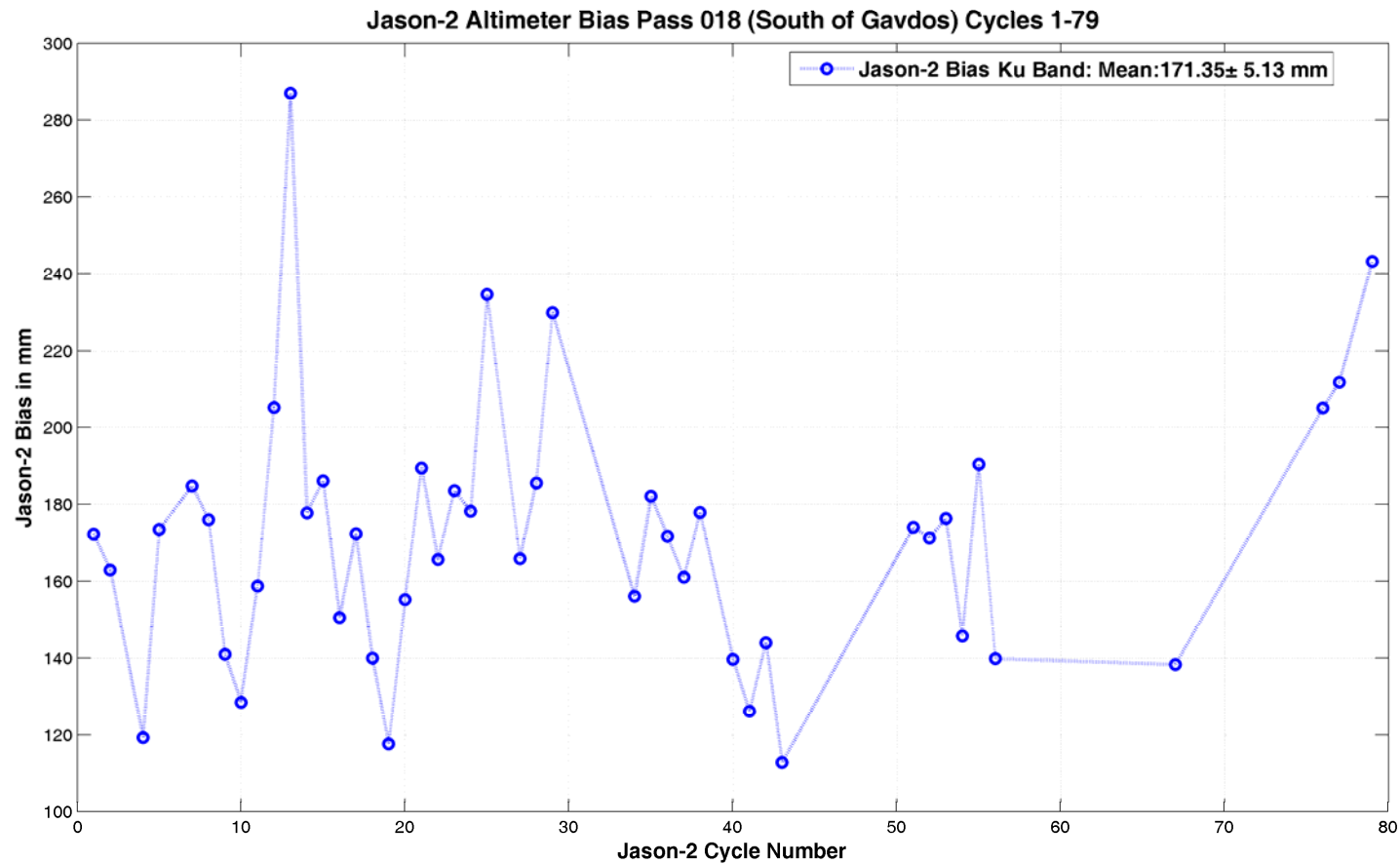


Jason-2 bias over pass No. 109



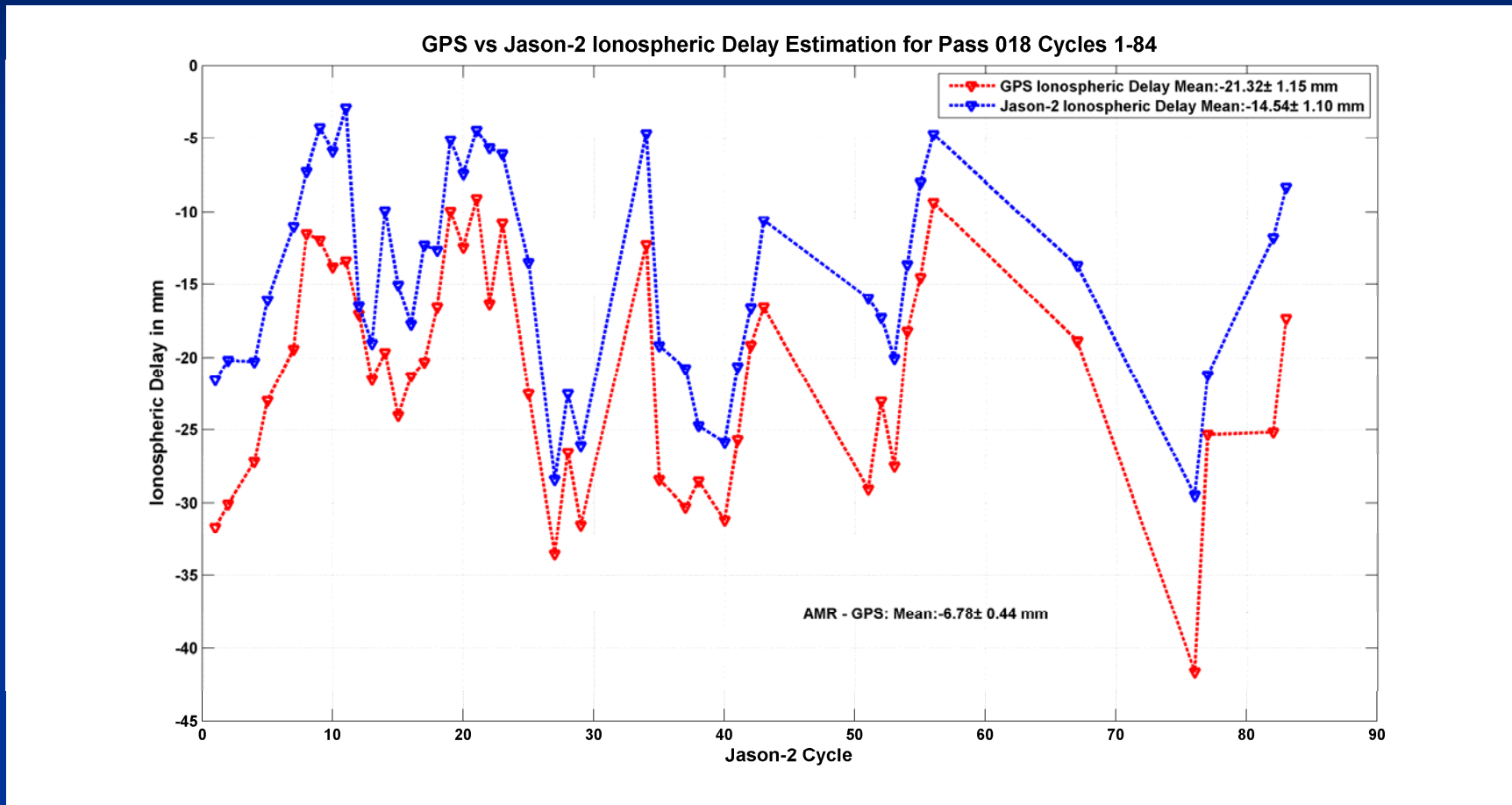


Jason-2 bias over pass No. 18



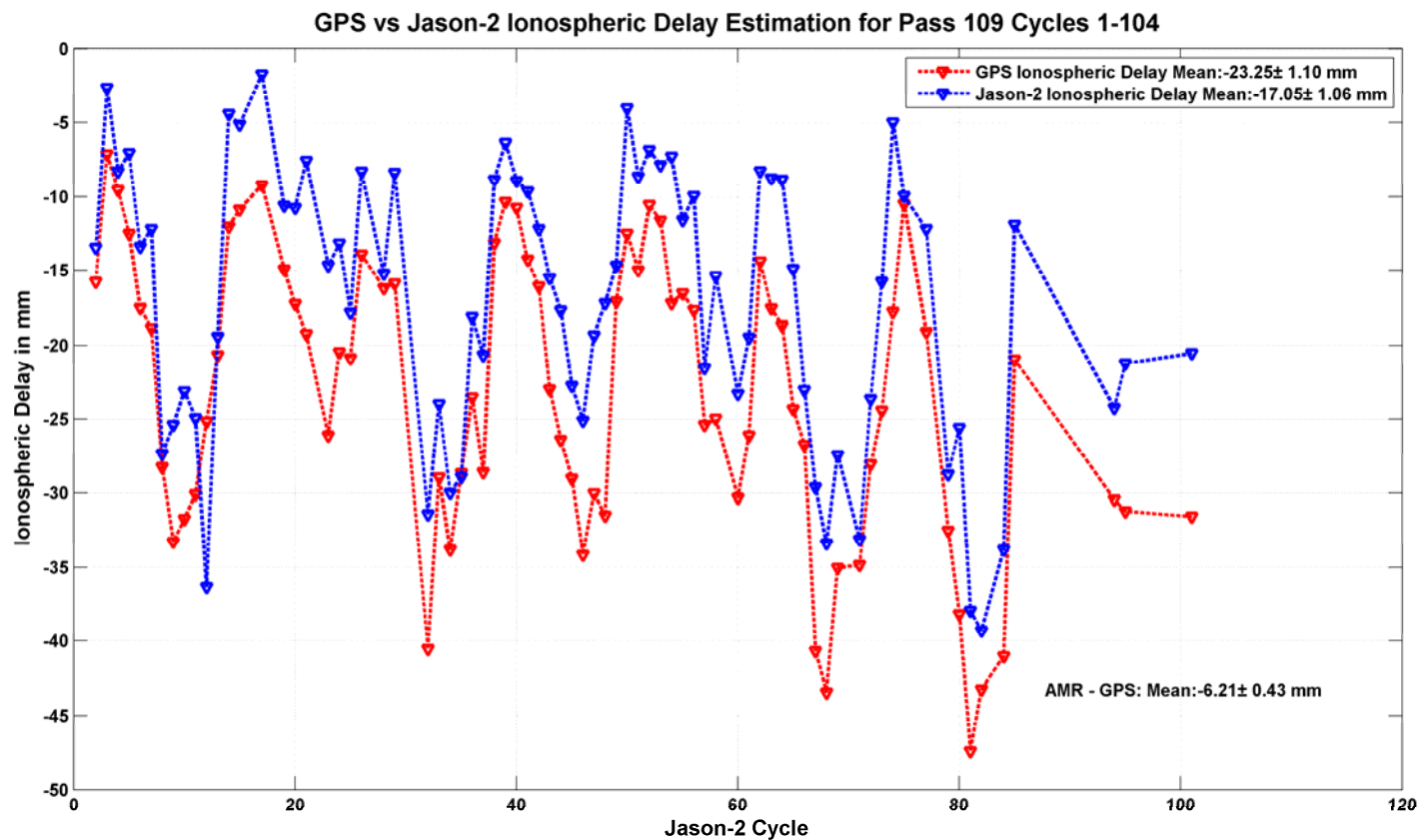


Ionosphere wrt GPS for Pass No. 018



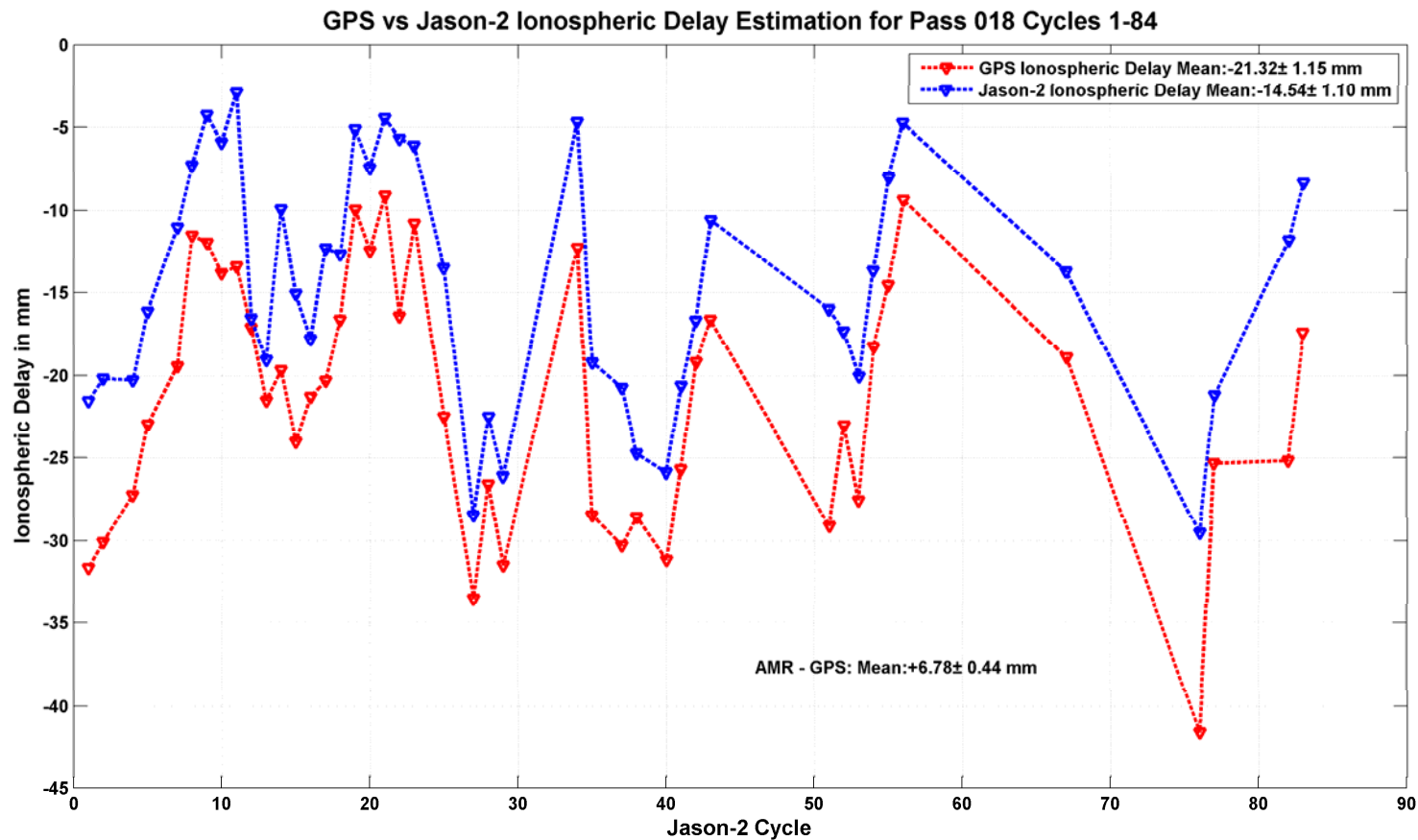


Ionosphere wrt GPS for Pass No. 109



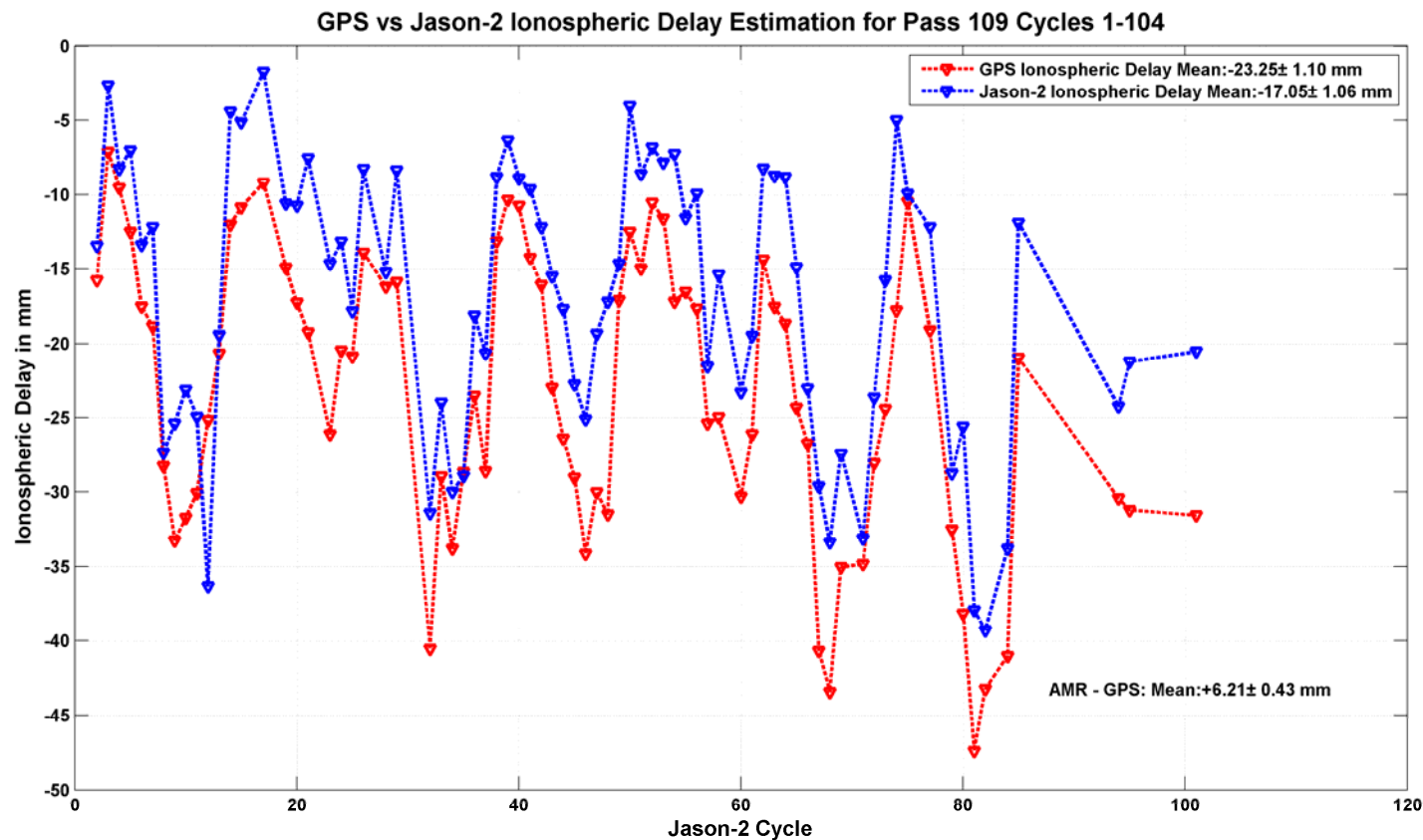


Wet Tropo wrt GPS for Pass No. 018



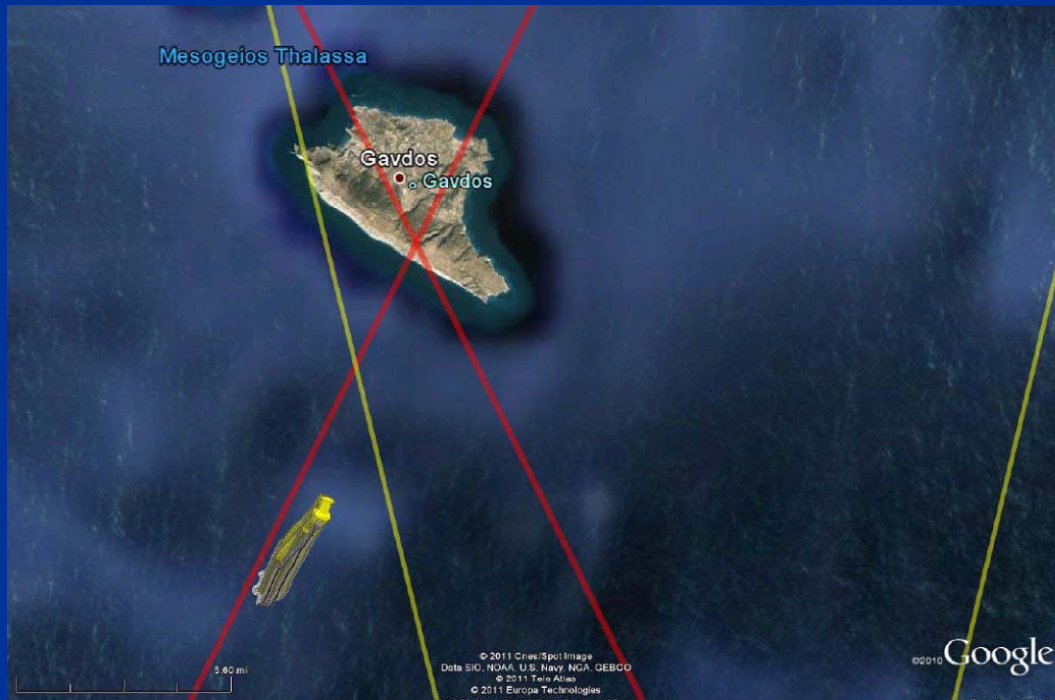


Wet Tropo wrt GPS for Pass No. 109





Kinematic boat campaign on 27-Aug-2010, Along Pass No. 109

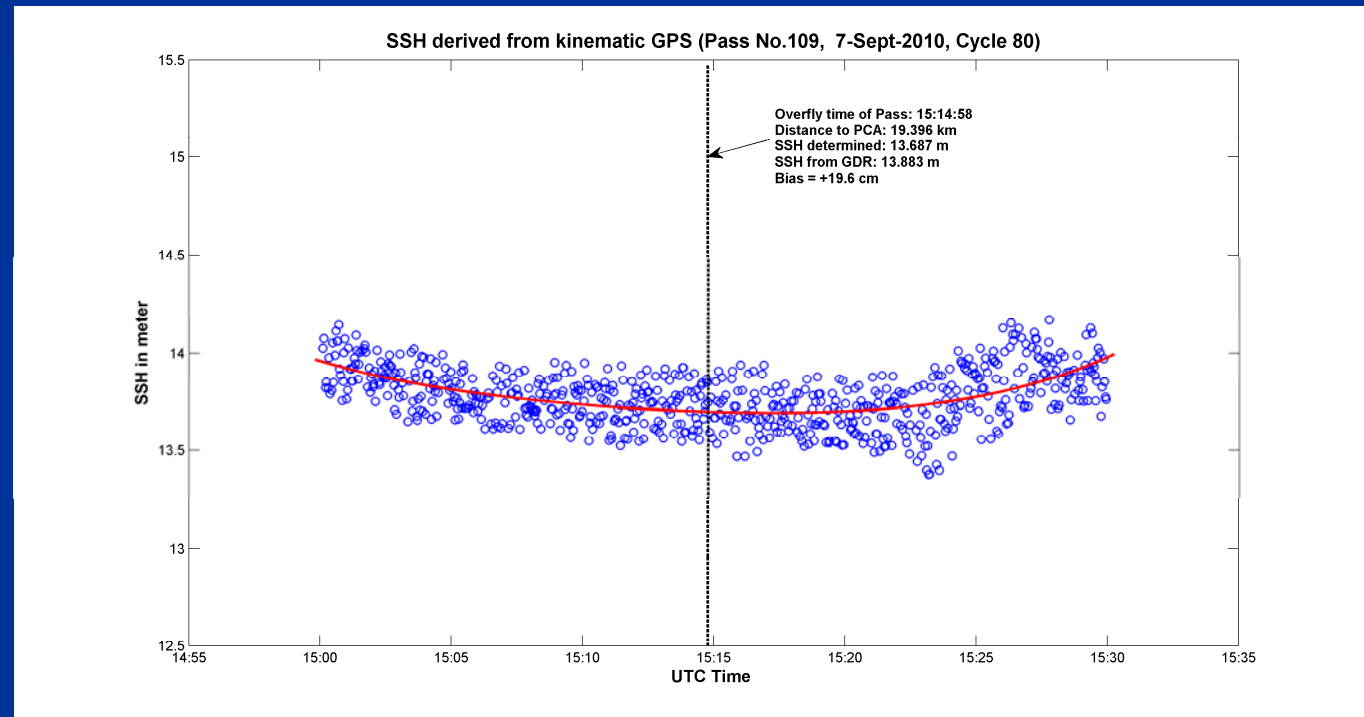




Altimeter calibration with boat



27-Sept-2010, Cycle 80, Time=15:14:58 UTC





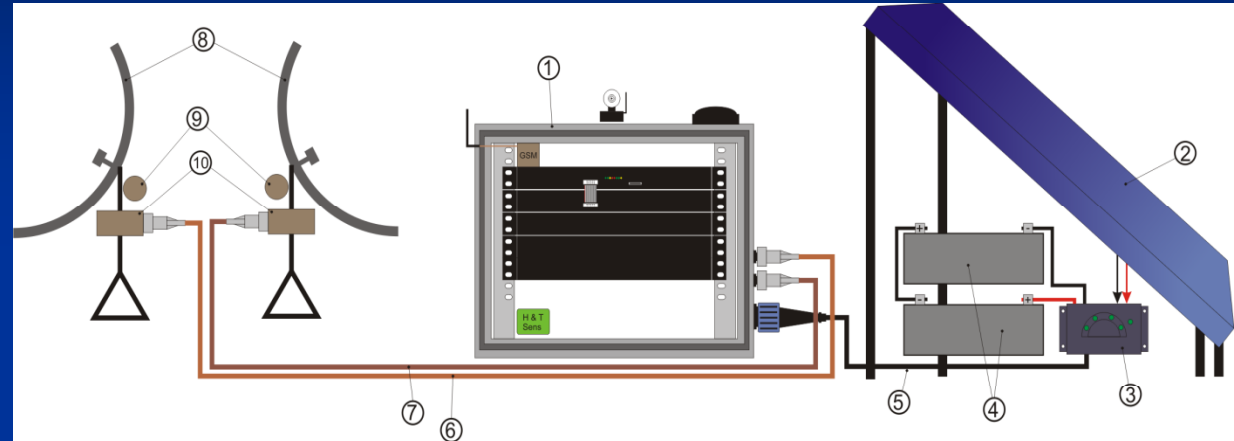
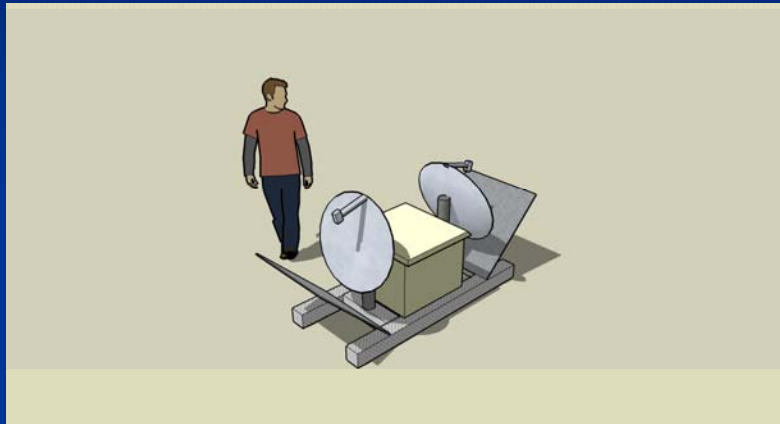
Altimeter calibration with kinematic GPS boat campaign

- Satellite passing on 15:14:38 UTC, 7-Sept-2010,
- Simultaneous measurement of sea surface height with boat (GPS & tide gauge),
- 900 samples of GPS data, 2-sec sampling rate,
- Distance from PCA = 19.3 km from PCA,
- Bias = $SSH(k) - SSH(k_0) = +19.6$ cm, Pass No. 109.





New transponder

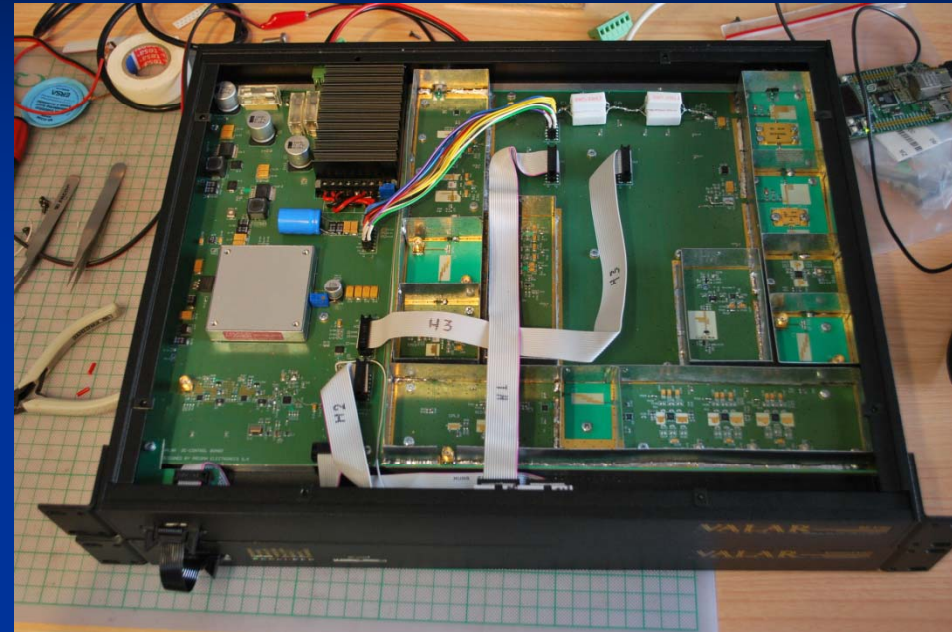


- Central frequency 13.575 GHz, bandwidth = 350 MHz;
- Polarization: Circular;
- Mobile (for new locations) and modular (for other frequencies).
- Capable for record incoming & outgoing signal at the transponder;
- Controlled remotely through control computer using communication links.
- Capable for monitoring internal delays (± 1 mm);





New transponder

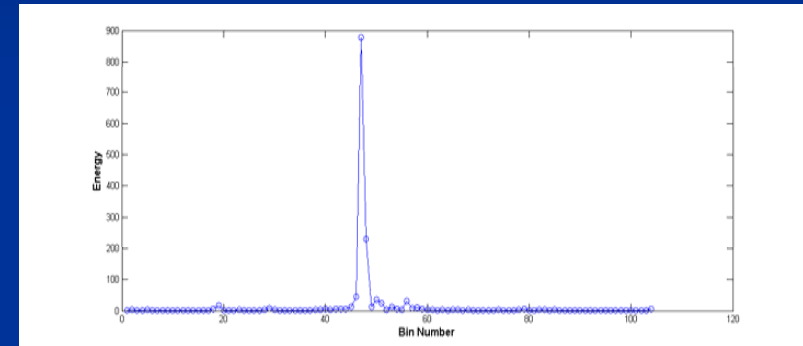
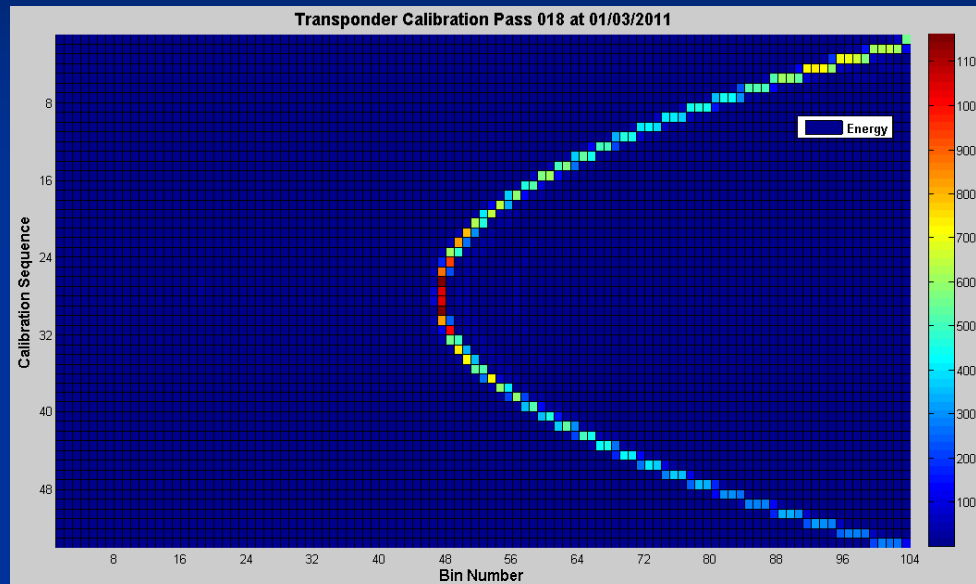


- Constructed under the ESA specs and supervision;
- Easily transferred to new locations in Crete;
- Will be sent to ESA for calibration in Nov 2011;
- Add modules for new satellites (AltiKa: 35.75 GHz, 500 MHz)





Present transponder signal response



- Jason-2 satellite response in Gavdos in the DEM-mode,
- Measurements over Pass No. 18, on 1-Mar-2011,
- 104 bins (DEM-mode & 128 in CAL2-mode) in each calibration No, and
- Max power return around the bin No. =42.



Summary



- The absolute bias for the Jason-2 altimeter has been determined using sea surface measurements:
 - $B = +191 \pm 4$ mm (Ascending Pass No.109, Cycle 2-105)
 - $B = +171 \pm 5$ mm (Descending Pass No. 18, Cycle 2-79);
 - $B = +196 \pm 5$ mm (GPS-Boat campaign, Pass No. 109, Cycle 80)
 - Many cycles are missing because of simultaneous transponder calibration
- Atmospheric parameter calibration
 - Wet tropo against GPS -8.56 mm (No.18) & -5.43 mm (No. 109).
 - Ionosphere against GPS $+6.78$ mm (No. 18) & $+6.21$ mm (No. 109)
- Field sea-surface campaigns have been performed along satellite ground tracks to validate the used geoid models.
- Transponder data for Jason-2 collected as of July 2009. Results are excellent and consistent.
- A new transponder has been developed to:
 - Calibrate satellite altimeters & determine bias (Sentinel-3, Cryosat-2, Jason)
 - Determine the orientation of the satellite interferometer baseline.

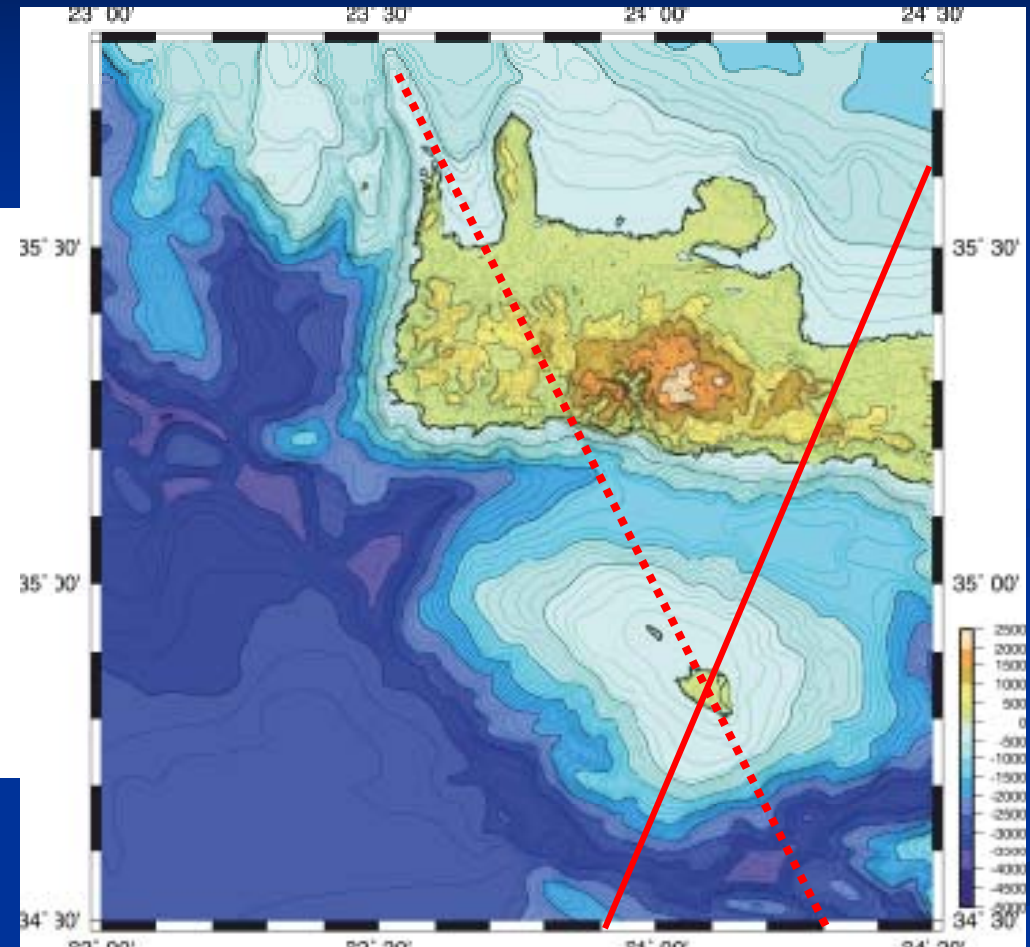
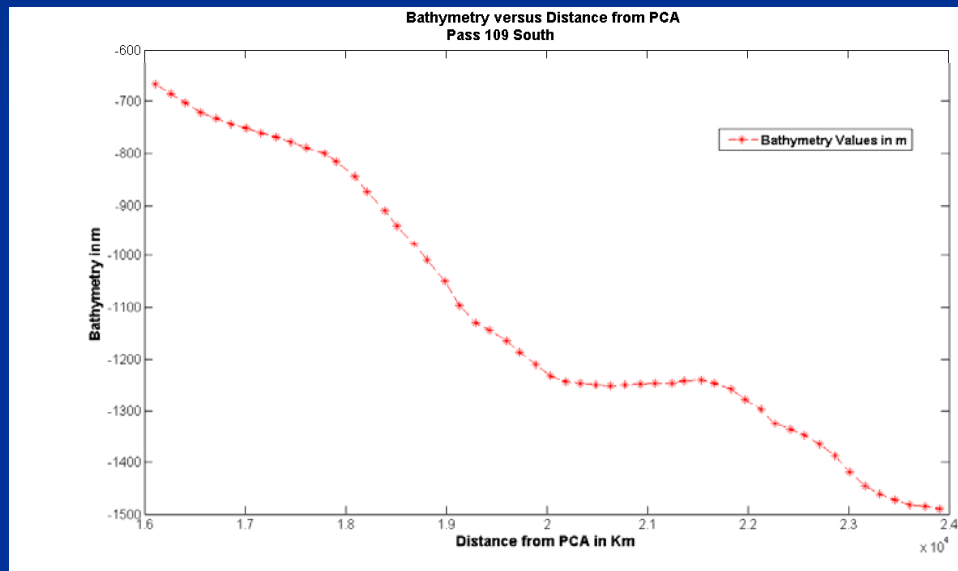




Back up Slides



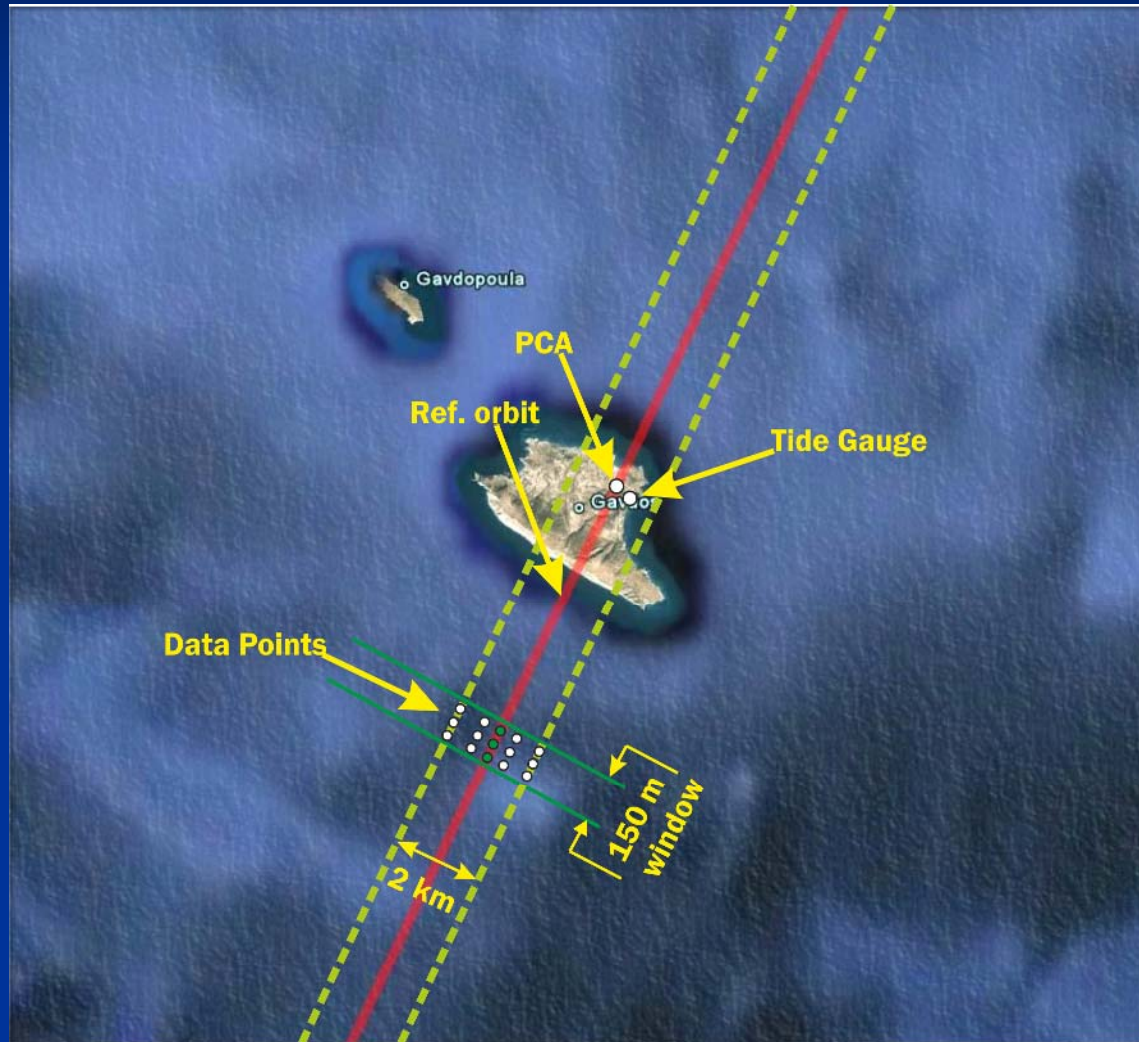
Steep Bathymetry in calibration regions



16-24 km calibration region, along No. 109

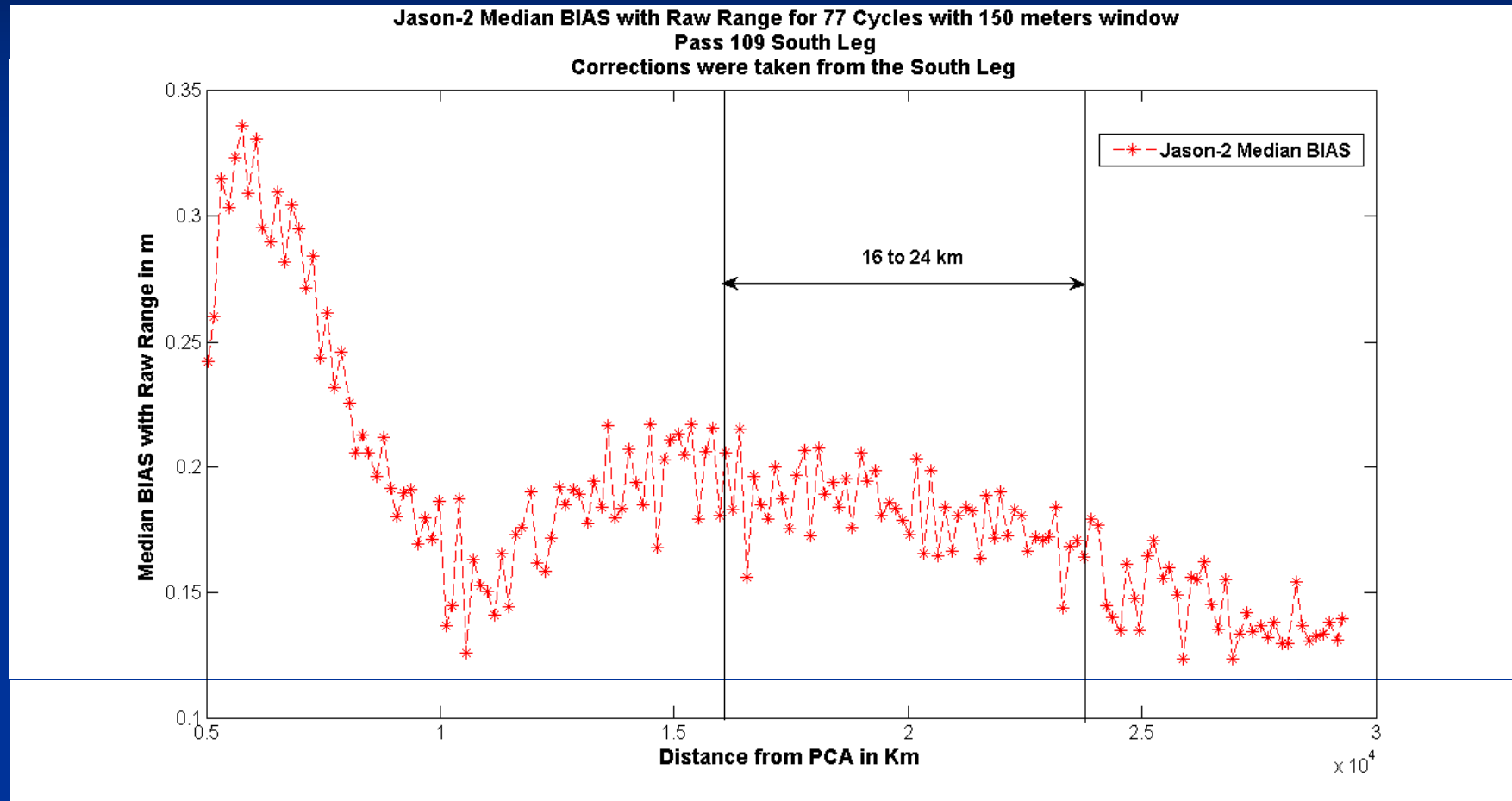


Calculation of bias trend along track





Bias within 150-m window along J2 Pass



Pass No. 109