



An ESA absolute and permanent site with a transponder for the altimeter calibration of Sentinel-3, CryoSat-2, and Jason-3 in West Crete, Greece

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Abstract

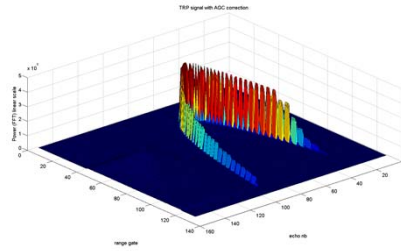
A new calibration site at a cross-over point of the tracks of multiple missions (Sentinel-3A, Sentinel-3B, Jason series, SARAL/AltiKa, etc.) has been established in West Crete, Greece. This research infrastructure has been already established and is operational with a microwave transponder. It aims at monitoring and controlling, in an absolute sense, satellite altimetry measurements and results by (1) continuously keeping track of their quality, biases, errors and drifts and (2) by establishing an absolute reference of altimetry on a common and reliable standard for settling relations among different, as well as on ascending and descending orbits, at the same location and settings. This external calibration site, called CDN1, will act as a monitoring service, mainly, for the Sentinel-3 satellite missions. In this work, successful responses of the transponder for the Jason-2 and CryoSat-2 missions are presented.

1. Transponder Calibration for S3A&3B, CryoSat-2 and Jason-2&3



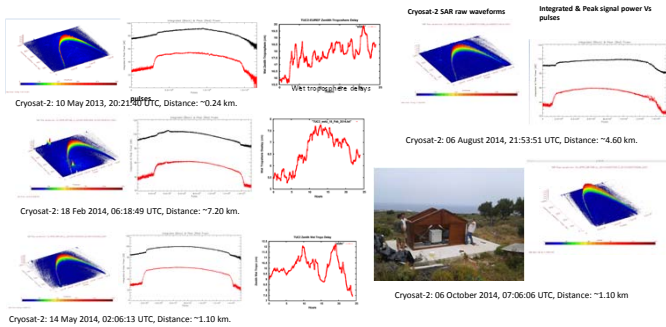
CDN1: A permanent altimeter calibration site with a transponder in West Crete, Greece.

4. Jason-2 Transponder Calibration @ CDN1



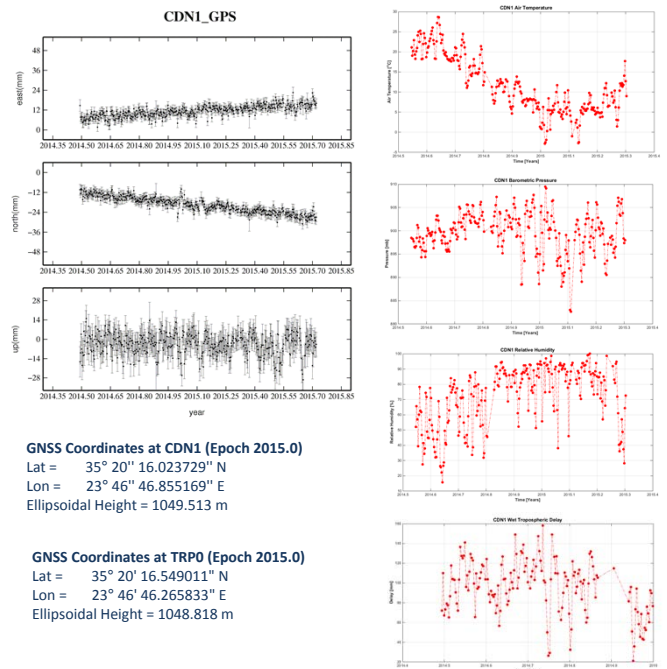
- The transponder has been effectively used for Jason-2 calibration on 2 October, 2015.
- 10 more calibration campaigns have been scheduled for 2015 and 2016 (Jason-2, cycles 269-278)

2. Preparatory tests before deployment: SLR2 site on TUC Campus

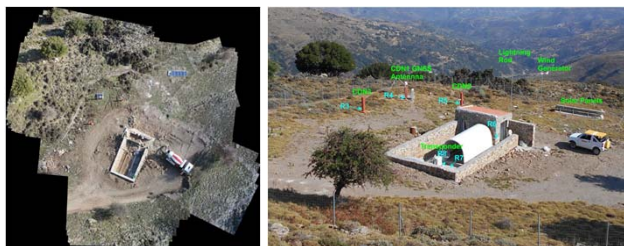


Five successful CryoSat-2 transponder calibrations in 2013 & 2014.

5. GNSS & Meteo stations operational @ CDN1



3. Construction stages for CDN1 deployment site



CDN1: Aerial view taken with a UAV flight in Sept 2014 and a panoramic photo of the Cal/Val site.



Transponder deployment at CDN1 site is complete. All instruments and devices are controlled remotely via satellite and 3G communication links.



6. Conclusions & Future Plans

- The CDN1 site in West Crete, Greece has been established;
- It will be used to support the Sentinel-3 Commissioning Phase;
- In early 2016, the ESA FRM4ALT will upgrade CDN1 site to fiducial reference measurement status;
- The transponder is already deployed at its final position at CDN1 site;
- CDN1 Cal/Val site is available for calibration of Jason-2 & Jason-3, as well as CryoSat-2;
- Transponder has been effectively used for five CryoSat-2 calibrations at the SLR2 site, on the Technical University of Crete campus, in 2013 and 2014;
- Transponder has been effectively used for Jason-2 calibration at the CDN1 site, October 2015;
- Wet troposphere and ionosphere delays have been determined by in situ GNSS arrays for each CryoSat-2 calibration;
- The S-3 transponder measurements shall be processed within the S-3 PDGS;
- Preliminary CryoSat-2 calibration values have been determined as: B = 0.638m (FBR data), and B = 0.745m (stack data) for the May-2013 transponder campaign.



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