



OSTM/JASON-2 Cal/Val Results From the Eastern Mediterranean Altimeter

Calibration Network - eMACnet



Abstract

The eastern Mediterranean Altimeter Calibration network (eMACnet) is the result of the expansion of ongoing collaborative efforts in the Aegean area. By 2003 we had established the Gavdos permanent absolute calibration facility through a joint EU, NASA, and the Swiss Federal Government effort. This was further expanded with NASA funding over the past three years to include a second site at Kasteli, Crete, Greece, both of these sites were established and operated in collaboration with the local team from the Tech. Univ. of Crete. The two sites at Karave, Gavdos, and Kasteli, Crete are located under the OSTM/JASON-2 ground-tracks (pass 018 and passes 018 and 109 respectively). The Gavdos "Karave" facility is now being relocated to its final and originally intended location, on a new pier, a move that will improve vastly the protection of the facility from heavy winter storms and minimize the need for maintenance. Over the past year our team expanded to include the Nation. Tech. Univ. of Athens (NTUA), the Hellenic Center for Marine Research (HCMR) and the Hellenic Navy Hydrographic Service (HNHS), in an attempt to obtain at a minimal cost data from existing facilities operated by these groups and future sites, most of which are now deployed and operating. The primary purpose of the extended network is the calibration and validation of altimeter data from current and future altimetric missions. The location of some of our sites though is such that they are also of interest to tsunami warning network operators and we thus intend to provide our observations in real-time from these sites to the European Tsunami Warning System (TWS). Some of the new sites are HCMR open sea buoys that we will collaboratively instrument with additional equipment to allow their data to contribute to the calibration/validation process. As of this date, we have five more tide gauges in operation at four new sites: KASTELI, Western Crete (co-located with our existing radar gauge for calibration and back-up), PALEKASTRO, Eastern Crete (with CGRS), MANI-KARAVOSTASI, South Peloponnese, EMPORIO, Chios, THASOS, Northern Aegean. A sixth system along with a CGRS receiver will be deployed at KYMI, north of Athens on the EVIA island within a month. This Aegean-wide network will sample the following OSTM tracks, some of them in more than one location: 18, 33, 94, 109, and 185. We will present an overview of the project and initial results from the expanded network based on IGDRs and the latest release of JASON-2 GDR-C whenever possible.

Mertikas, S. P., E. C. Pavlis and P. Drakopoulos. 2003. GAVDOS: A satellite radar altimeter calibration and sea-level monitoring site on the island of Gavdos, Crete, H. Dahlin, N.C. Flemming, K. Nittis, S.E. Petersson eds. *Building the European Capacity in Operational Oceanography*, Proceedings of the 3rd EuroGOOS Conference, 3-6 December 2002, Athens, Greece, pp. 258-264, Elsevier Oceanography Series 69.

Pavlis, E. C. 1999. Tectonics, Sea-level Monitoring and Altimeter Calibration With a Regional GPS Array, G. Maul ed. *Proc. of the International Symposium on Marine Positioning, INSMAP 98*, Nov. 30 - Dec. 4, 1998, Melbourne, Florida.

Pavlis, E. C., S. P. Mertikas and the GAVDOS Team. 2004. The GAVDOS Mean Sea Level and Altimeter Calibration Facility: Results for Jason-1, 3rd Jason special issue, *Mar. Geod.*, (27), 3-4, DOI:10.1080/01490410490902106, pp. 631-655.

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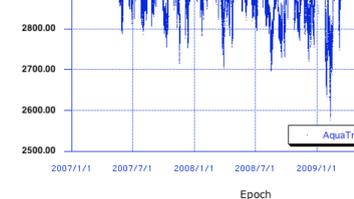
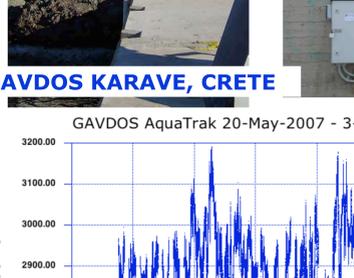
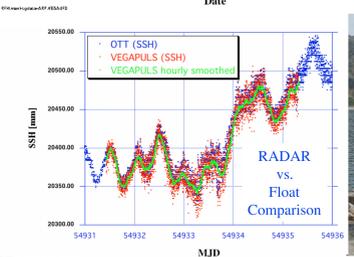
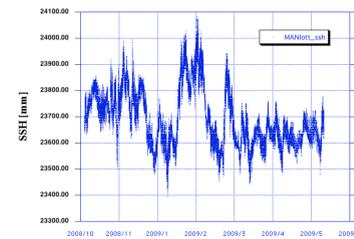
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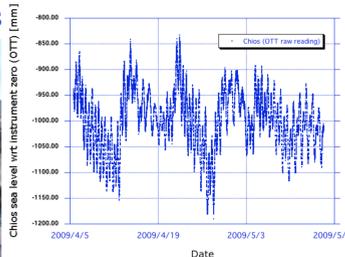
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MANI-KARAVOSTASI



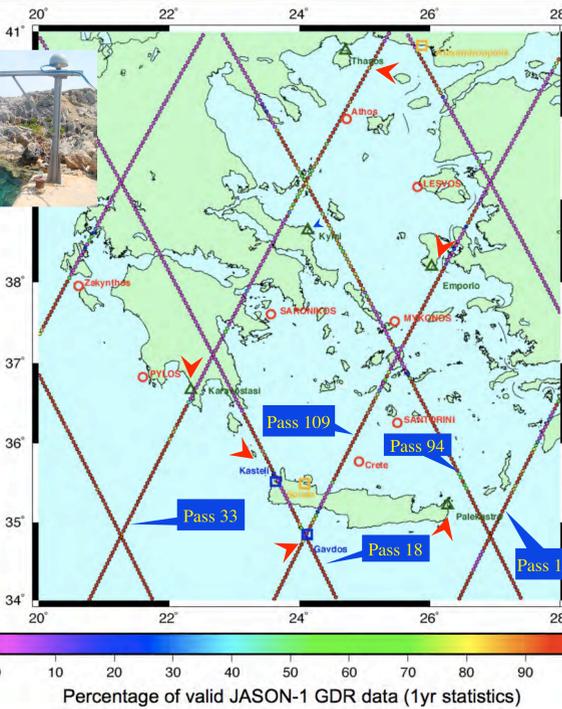
EMPORIO, CHIOS



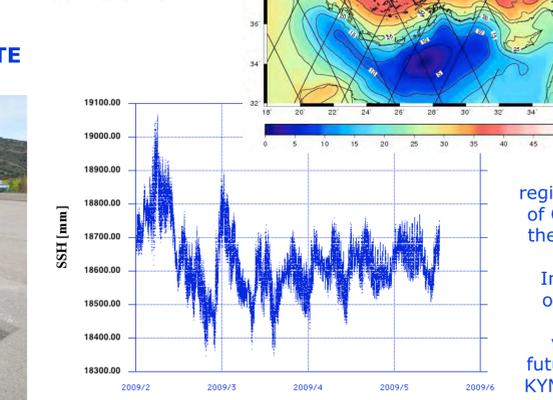
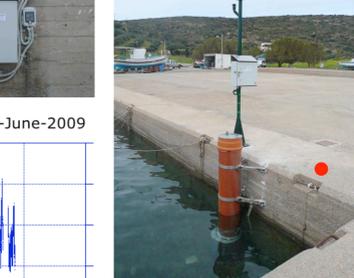
ONLY ONE SITE LEFT TO BE INSTALLED: KYMI, ON EVIA, TIDE GAUGE PLUS GPS (EXPECTED : July '09)

- JCET - Joint Center for Earth Systems Technology
- TUC - Technical University of Crete
- NTUA - National Technical University of Athens
- HNHS - Hellenic Navy Hydrographic Service
- HCMR - Hellenic Center for Marine Research

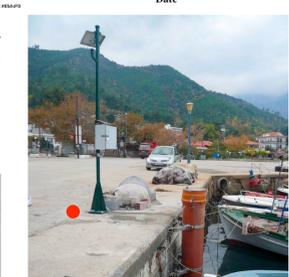
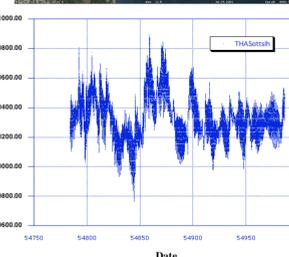
- Existing sites (JCET/TUC)
- Existing sites (HNHS)
- Fu New sites UA/JCET
- Present Buoy sites (HCMR)



Tide gauge PALEKASTRO, CRETE GPS

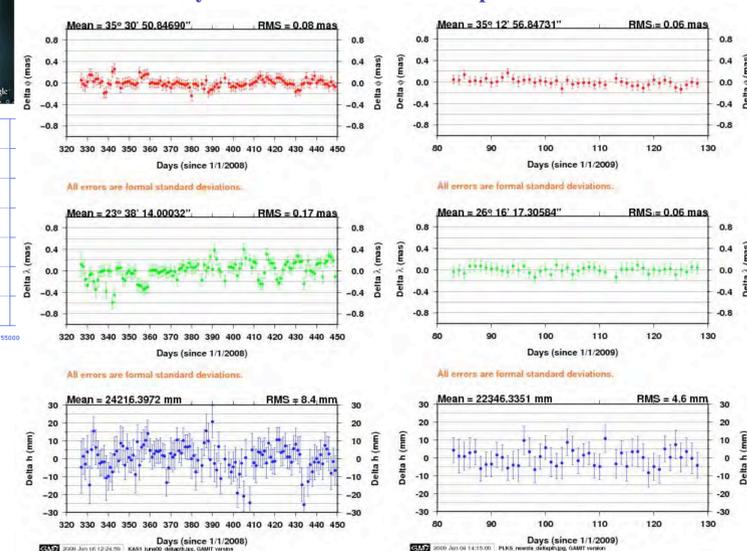


Aegean region tracks of OSTM and the eMACnet network. In cyan the operational sites, in yellow the future site of KYMI (EVIA).



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Summary

The Aegean network eMACnet is the outgrowth of the Gavdos facility that was established during 2001-2003. The current network encompasses the KARAVE site on Gavdos, the KASTELI site that was established during 2004-2008, and five new sites that are now instrumented under the new network. One of these is co-located at KASTELI, to calibrate the new float-type tide gauges (Thalimedes™ of OTT) with the RADAR-type system (VEGAPULS 61™) which we installed in 2007. The data are collected locally as well as via DCP upload to METEOSAT and then downloaded from EUMETSAT's internet facility. A new site with identical system and a CORS GPS is now operating at PALEKASTRO, at the easternmost tip of Crete. Three other tide gauges were installed and now operate at MANI, THASOS, and EMPORIO, Chios. The last site is slated to go to KYMI, Evia and it will be equipped with a CORS GPS also. The sites without GPS are monitored with periodic surveys that connect them to nearby CORS sites that belong to the Hellenic GPS positioning network HEPOS.

Data collected by the network have been used with the JASON-2 IGDR records from cycles 14 to 32 and the latest corrections released by the project, to estimate the absolute bias of the Poseidon altimeter. A total of 45 comparisons resulted in the following estimates:

- Editing at 3-σ: 227 ± 23 mm scatter about mean: 153 mm
- Editing at 2-σ: 212 ± 19 mm scatter about mean: 121 mm

The second estimate is based on 40 comparisons out of 45. The collected data will be used next with the 20 Hz data from the GDR-C release as they become available, to obtain refined bias estimates, eliminating possible land-contamination errors.

During this summer the KARAVE facility will be relocated to a permanent housing provided by the Hellenic Navy Hydrographic Service.

