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Altimeter Calibration and Tectonics Inference Oceanographic Network (ACTION) for OSTM, SWOT, and the Tsunami Warning System in Eastern Mediterranean

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We propose the contribution of an existing network of GNSS-equipped tide gauges in the Aegean Sea to the Mediterranean Tsunami Warning System. The Gavdos permanent absolute calibration facility, initially established with joint EU, NASA, and Swiss Federal Government funding in 2002 expanded to a regional absolute sea level monitoring and altimeter calibration facility applicable to many missions, in the Eastern Mediterranean region. The eastern Mediterranean Altimeter Calibration network—eMACnet, was the result of international collaborative efforts in the Aegean since the early 2000s. Initially we established a permanent absolute calibration facility south of Crete, Greece on the isle of Gavdos, followed by a second site at Kasteli, in collaboration with the Tech. Univ. of Crete, and equipped with GNSS Continuously Operating Reference Stations (CORS). Since 2008 the Nat. Tech. Univ. of Athens (NTUA) joined us expanding the network with an immediate addition of four tide gauge sites which we proceeded to equip with CORS GNSS: at PALEKASTRO, MANI-KARAVOSTASI, EMPORIO-CHIOS, and THASOS. Additional tide gauges and GNSS receivers will be deployed soon, likely at KYMI-EVIA and NEA SKIONI, before the end of 2012, while more sites are planned for next year. The primary purpose of the extended network is the absolute calibration and validation of altimetry missions through the continuous monitoring of sea level and tectonics at locations near the Ocean Surface Topography Mission (OSTM) mean groundtrack. The CORS positioning ties our network to the ITRF, so that our sea level observations contribute in addition to absolute calibration of altimeters, to global change observations that are of importance to global international initiatives, as well as absolute sea level studies of the region. This Aegean-wide network samples at the moment the OSTM/Jason-2 tracks 18, 33, 94, 109, and 185, some of them in more than one location. It will support current and future altimeter missions JASON-2/3, Cryosat-2, HY-2A, JASON-CS and SWOT, especially the latter, requiring calibration over an area rather than a single track. By 2020, the ACTION network will provide a well-understood environment for a successful Cal/Val phase of a complex mission such as SWOT. We will expand our consortium with additional local groups and agencies operating sea level monitoring networks in the area: the Hellenic Navy Hydrographic Service (HNHS) and the Hellenic Center for Marine Research (HCMR). In discussions with HCMR we have reached agreement for the future use of their open-sea buoys once we outfit them with CORS GNSS receivers. HNHS submitted a proposal to obtain new, state-of-the-art tide gauges with GNSS receivers to replace old equipment throughout the Aegean and seeks funds for additional buoys and equipment for open-sea environmental monitoring. NTUA will also provide absolute gravimeters to complement the geometric measurement of height changes, and Ocean Bottom Pressure gauges installed at the HCMR buoys for amongst other uses, support for mass redistribution studies (in connection with GRACE and GRACE FO). ACTION builds upon the existing equipment, facilities and access-to-data of the previously NASA/EU-funded GAVDOS, DynMSLAC, and eMACnet projects, and relies heavily on collaborations with other European and OSTM Cal/Val groups. Our facilities contribute the collected data to many other projects (CLIVAR, WMO initiatives, IOC, GCOS, GOOS, GGOS, etc.).