



Hellenic subduction earthquake locations including OBS, ocean bottom seismometers and hints at shallow slab structure from teleseismic conversions: A pilot experiment.

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In the frame of the European Union “THALES WAS RIGHT” project on seismogenic zones in European subductions and of the European Union “SALVADOR” programme of IfM-GEOMAR for the access to OBS, ocean bottom seismometers, we have deployed in early June 2006 and for 5 months an onshore-offshore array in the SW part of the Hellenic subduction, the area between the south west tip of Peloponissos and Crete. The array consisted of 5, three component OBS and of up to 15 land seismometers. This provided for the first time a constraint on the hypocentral locations of local earthquakes offshore, that up to then were poorly located because of an insufficient azimuthal coverage, since all the permanent stations are on land on one side.

Comparison of the routinely located hypocenters by the permanent array with those located by the special local onshore/offshore local array shows that some background seismicity may be mislocated by several tens of kilometers with for instance small earthquakes of the upper part of the plate boundary SW of Crete-Peloponissos having been located as deep earthquakes in the SW Aegean because of lack of constraint to the SW.

This survey was organized early in the THALES WAS RIGHT project, in order to provide a reference observation period for the project. This proved a valuable effort since it provided this basis just a year before the major earthquake for decades in the region. This allows to reveal temporal patterns of seismicity, thus constrained by the addition of offshore observations. Indeed a very strong earthquake for the region occurred on February 14, 2008, SW offshore Methoni. Differential location of its hypocenter can be made by land stations, with respect to hypocenters of the pre-seismic period phase that had been accurately located with OBS nearby. This allows to constrain in retrospect the future hypocenter of the M=6.9 earthquake as a geographical gap in smaller earthquake occurrence in the months before.

Preliminary results from the distribution of hypocenters and teleseismic Receiver Function at stations deployed at the SW land extremities of Peloponissos, can be used to discuss along arc variations of the subduction geometry. Since this pilot study, both the land and offshore coverages have been enriched by much larger OBS-land station surveys in the frame of the project, that will last few months more.