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Seismotectonic study of the Hellenic subduction zone combining local microseismicity and relocation of ISC data

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We have thoroughly investigated the seismogenic zone structure along the broader area of the Hellenic Arc, with emphasis on the region around the island of Crete, analyzing mainly the recordings from the Seismic Network of Crete (SNC) from the beginning of 2004 till August of 2006. These data are combined to the recordings of the permanent seismological network in Greece maintained by the National Observatory of Athens, the Department of Geophysics of the University of Thessaloniki and some stations operated by the Geofon network. The analysis of the local microseismicity and the regional higher magnitude earthquakes (e.g. the M6.9 Kythira slab-pull event of 8 January 2006), nucleated during the time period of the study, can define the geometry and volume of active seismogenic zones that could be a potential threat for the broader area. Actually, in the area of Crete, a number of seismically active zones were imaged by microseismicity. Based on the travel time curves of reliably located earthquakes we firstly determined 15 velocity models for the southern part of the Hellenic Arc. For each of these models time delays at all stations from events at different regions were calculated and applied as time corrections to improve the reliability of earthquake location in the area. Our final models are consistent with previous results concerning the crustal structure in the south Aegean. Based on these models and the calculated time delays we have compiled a new complete catalogue of seismic events with well-

constrained hypocentral parameters and improved depth estimates.

Additionally to these data, we have worked on improving the accuracy of the focal parameters of the earthquakes that occurred in the broader area of South Aegean since 1964 by relocating all the available data from ISC applying modern methodologies. These accurately determined data are used for the definition of the geometry of the Wadati-Benioff zone. Finally, the combination of the fault plane solutions of both the strong regional earthquakes of the last decades and local earthquakes of lower magnitude provide a further insight into the evolution of the stress field in the area. Our results contribute to the seismotectonic modeling of the study area and to the construction of a most complete image of the geometry of the subducted plate.