



Seismicity at the convergent Plate Boundary offshore Crete observed by an OBS Network

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The convergent margin between the oceanic African lithosphere and the Eurasian plate with its high seismic activity offers a unique opportunity to study the rheology and the geodynamic processes at a retreating subduction zone. The active continental margin is located south of Crete in the Lybian Sea and approaches the passive continental margin of Africa due to roll back of the Hellenic subduction zone and the convergence between Africa and Eurasia. South of eastern Crete a transtensional regime manifested in deep sea depressions like the Ptolemy, Pliny and Strabo trenches is assumed to be due to oblique subduction. Despite the abundant seismic activity many features in this region, including the southern extend of the seismogenic zone, the seismic activity of the continental crust south of Crete and the deep sea trenches, remain sketchy due to the lack of observation stations. In 2003/4 five deployments of Ocean Bottom Seismometers (OBS) each with a 2-month recording period were conducted on top of the plate boundary SE of Crete in the Lybian Sea (Libyan Sea seismic offshore network -LIBNET). The transition from continental crust in the north with a relatively modest cover of sediments to oceanic crust in the south with > 10 kilometers of sediment results in highly varying signal to noise ratios (SNR). First results indicate that the southernmost deep-sea depression (Strabo) marks the southern termination in the seismic activity while the thick sediment cover further south lacks significant activity. The simultaneous deployment of LIBNET and a local network onshore southern central Crete will allow to significantly improve hypocenter determinations for this region. The majority of seismic events during the registration period occurred within the continental crust. A prominent feature is a nearly vertically dipping, seismically active fault zone that lies along the strike direction of the northern Ptolemy depression which already showed significant activity in earlier microseismic studies of the

region. Furthermore, microearthquakes occur at the plate interface between the continental Eurasian and the subducting oceanic African plate. These events allow to address questions concerning the seismic coupling of the two plates along this part of the plate boundary.