



Deep imaging of collision zone between African and Anatolian plates in southwest part of Cyprus arc based on wide-angle seismic and gravity data

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All previous deep seismic sounding studies of Cyprus arc show the complex and controversial nature of the tectonic regime. While the collision zone along its south boundary between the Cyprus and Eratosthenes seamount is thoroughly studied, its southwest boundary is still not properly identified and located on seismic evidences only and its deformation mechanisms and fault type is not well understood. During the integrated onshore and offshore wide-angle seismic survey of Cyprus and its vicinity, carried out by Russian Academy of Science in 1989-90, were collected detailed wide-angle seismic and gravity data of the region. The compiled Bouguer gravity anomaly map is based on collected data supplemented with pre-existing onshore and offshore gravity data sets. The velocity model of crust was developed with strip layer inversion technique for wide-angle refraction reflection arrivals. We identify the deep structure of sub-oceanic crust of Mediterranean Sea and continental crust of Cyprus, location and geometry of the main fault of collision zone between African and Anatolian plates in southwest sector of Cyprus Arc. The deep structure of collision zone shows essentially strike-slip motion along the southwest side of Cyprus arc. This conclusion has a good agreement with earthquakes location and its focal mechanism. We found new evidences supporting the hypothesis on development of Cyprus ophiolite complex as ongoing obduction of the mafic and ultramafic rocks from the low part of crust and upper mantle. Detected “keyboard“ structure of sub-oceanic crust of Mediterranean sea reflects complex history of horizontal and vertical movements. The huge (60 km diameter) positive gravity anomaly located to the south-west direction from the Cyprus could be explained as combination of mafic intrusion in the middle and low crust with uplift of Moho in south-west direction.