

O16-4**ANAXIMANDER MOUNTAINS FOR THE UNDERSTANDING OF HELLENIC AND CYPRUS ARCS IN THE EASTERN MEDITERRANEAN****MUSTAFA ERGUN**¹ and **ERSEL ZAFER ORAL**²¹ D.E. U. Geophysics Department, Izmir, Turkey. E-mail: mergun@izmir.eng.deu.edu.tr² DLHI Izmir Bolge Mudurlugu, Izmir, Turkey.

The Anaximander Mountains lie at the junction between the Hellenic arc and the Cyprus arc where the Mediterranean ridge meets the Florence rise. There is a considerable scientific interest in this region whether they are founded part of Turkey, a northward collided part of the African lithospheric plate, or an upthrust block of neo-Tethyan seafloor. Although complex, the current tectonics of the whole region cannot be understood without an understanding of the nature of Anaximander Mountains. This would further shed light on the region as the continuation of the ODP drilling in the Florence rise and the Erastosthenes. In this connection, several marine geological / geophysical expeditions have been carried out in the region within the framework UNESCO/TREDMAR "TTR" program and ANAXIPROBE projects during 1991, 1995, 1996, 1997 and 1998. The excessive data of marine gravity, magnetics, high resolution seismic (25 Kjoule an as well as 200 cubic-inch sleeve gun with 500 m streamer), the seismo-acoustic surveys with the wide angle side-scan-sonar system, multi-beam swath mapping with the SIMRAD EM-12 system and the deep tow combined system of side-scan-sonar and subbottom profiler were collected during these marine expeditions. also several bottom samplings (dredging, grab sampling and gravity coring) were carried as well as deep diving with the French submersible Nautila on board of the R/V I'Atalante (IFREMER) during 1998.

Neotectonics of the eastern Mediterranean is controlled by the reciprocal affects of the Avrasia, Africa and Arab plates and the other small plates and blocks. The eastern Mediterranean region is at the convergence zone of the Africa and Avrasia plates. The boundary between these plates is indicated by the seismic activity and it is delineated by the Hellenic Arc and the Pliny-Strabo Trench in the west and the Cyprus Arc in the east. The Anaximander Mountains are under the compressional stress that is located on the junction between the Hellenic and Cyprus Arcs. The Anaximander Mountains are made of three principal highs that are separated from each other with faults and they are undergoing independent deformations. There are variations and unconformities on the strikes and dips of the faults and folds in the region which mean that those structures have been formed by the forces from different directions, and accordingly it could be said that the area have been affected by several deformations at the different times. Recent structural deformations indicate that the region is still tectonically active.

The three principal mountains in the complex rise from depths around 2000 to 2500 m to peaks at about 700 m (the southern mountain), 900 m (the eastern mountain), and 1200 m (the western mountain); but surrounding depths can reach more than 4000 m to the west (Rhodos basin) and 3000 m to the north (Finike basin). Each mountains in the group has a different from the others: the southern mountains is curved ridge of steeply dipping (about 250) sedimentary strata, the western mountain is a north tilted (at about 40) tabular block, and the eastern mountain comprises a broken NW-SE ridge on a broader plateau of rough relief. Seismic data do not indicate the apparent absence a typical M-reflector (representing either the top of the Messinian evaporates or its correlative erosion unconformity) implies that the basin formed since the Miocene.

Multibeam bathymetric data indicated five different geological provinces in the Anaximander Mountains area as : (i) the steep margin of southern Turkey with canyons, slums, and cross-slope faulting; (ii) the consistent Western mountain with a relative flat but northward dipping northern slope and steep southern escarpment, (iii) the relatively flat areas of the Finike basin and the region between the western and southern mountains; (iv) the rough and irregular eastern mountain; and (v) the irregular low relief of the region southwest of the mountains. A large tongue of sediment seems to

extend over the basin from between the western and southern mountains. Gravity results indicate that there is a major crustal discontinuity running directly through the middle of the mountains and that the western peaks are under compensated crustal loads.

There is a great anomaly variation between the eastern and western parts of the region in the gravity anomalies and this transition is very sharp. Besides the local irregularities caused by sedimentary layers, these anomaly variations were found to be due to the crustal structure of the region and the mantle boundary were determined to deepen from 20-25 km in the West to 30-35 km in the east. The deep Rhodos Basin (more than 4 km) is placed at the eastern part of the Hellenic Arc as the unconsumed semi-oceanic crust and the effect of this is indicated by the gravity anomaly in the western Anaximander region.

The Western and Southern Mountains, and probably the Beydağlar are, although they are spatially widely separated, the continuations of each other morphologically, geologically and geophysically. The Rhodos and Finike Basins indicate the rifting in the region. The Western and Southern Mountains with Beydağlar region were probably formed by rifting due to horizontal and vertical movements occurred during the Miocene. However the Eastern Mountain which is separated from the Southern Mountain with gentle relief of fold belt, is quite different from the other two mountains tectonically and morphologically and it has been affected by the different tectonism and geological evolution.

The Finike Basin that was formed by rifting due to the tensional tectonics of the Beydağlar block in the north is filled by thick sedimentary sequence over which the sediments have been pushed basin wise over the southern side derived from the area between the Southern and Western Mountains. Differential vertical movements are thought to be responsible both the elevation of the Anaximander Mountains and for the subsidence of the Finike and Antalya basins the north and northeast of the Anaximander Mountains respectively effects which seem to be connected with the development of the Hellenic arc in the case of Finike basin and with the development of the Cyprus arc in the case of the Antalya basin.

The existence of mud volcanoes was determined during 1995 within the Anaximander project studies in the eastern Anaximander Mountains under the compressional tectonics. Mud volcanoes are distributed randomly in the region. Also the cobblestone structures that were observed at the boundary region of the eastern Anaximander Mountains and the Antalya Basin, are the results of compressional tectonics. The Messinian evaporates which show great coverage over the Mediterranean and the Antalya Basin, were not observed all over the Anaximander Mountains. This situation indicates that the Anaximander Mountains region was over the water standing as the land during the Messinian period.