STRUCTURE OF IZMIT BAY (THE EASTERN MARMARA SEA)

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As a result of the collision of the Arabian and Anatolian land masses during the middle Miocene, westerly escape of the Anatolian block introduced E-W compression in the western Turkey, which began to be relieved by N-S extension. The Izmit Bay lies along the line of North Anatolian Fault (NAF) which loses its dextral strike-slip displacement from East to West, and it splits into several fault strands definining a broad tectonic zone with associated high swarmlike seismic activity. As the Anatolian block moves west, its leading edge comes under the influence of the Aegean North-South extension and breaks up into discrete graben structures. The westward motion of the Anatolian block is not responsible for the extensional tectonic processes in the Aegean region which was existed before the iniation of NAF. There is major internal deformation within Anatolia, possibly involving counter clockwise rotational movements. Estimates of the average amount of North-South extension over the past 12-13 Ma are in between 30 to 50 percent in the region. The Marmara basin is the extension of the Thrace basin in the North and Northwest. During the middle Eocene, the subsidence of basement was occured creating the Thrace basin and the NAF uses the older tectonic structures in this region. According to the gravity interpretation there is a relative crustal thinning under the sea of Marmara. Zero contour of the Bouguer gravity anomaly follows the trend of the NAF zone but this trend bends to the NE-SW direction just before the Izmit Bay. The north of the NAF zone and its splay areas have positive Bouguer gravity values reaching up to 50-55 Mgals levels towards the Black sea coast. Moho gets shallower towards the Black sea from 25-30 km to 20 km. The Izmit Bay area has a localized gravity minimum due to sedimentary fill of about 3-4 km. The grabens around the sea of Marmara (Izmit, Iznik and Gemlik Bays, Yeniflehir-Bursa-Manyas) lie along the course of N and S strands of the NAF, have very strong strike-slip components. The Izmit Bay area is just located the at the eastern edge of the Marmara basin and it is stil under the strong influence of the dextral strike-slip fault with the tensional regime of the sea of Marmara and the western Turkey. In the Izmit Bay area the NAF has a pull-apart structure. From the geometry of the basin about 8 km right-lateral displacement can be deduced. The NAF must have used the weakness pooints in the sea of Marmara (i.e. the Thrace extensional Basin) which should have active before the Middle Eocene, with additional effects of counter clockwise rotations of blocks in the western Turkey and the Aegean sea. Active tectonics of both strike-slip and normal faults effect the recent sedimentary facies in the Izmit Bay. These will be documented from the high resolution seismic investigations in the region within the context of of the general tectonic regime of the region where the even the very recent sedimentary sequences are affected by the transform and growth faulss which are still active.

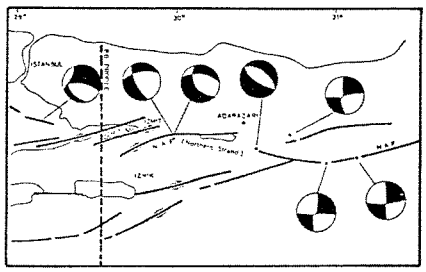

Fig. 1. Structural framework of the Izmit Bay area.

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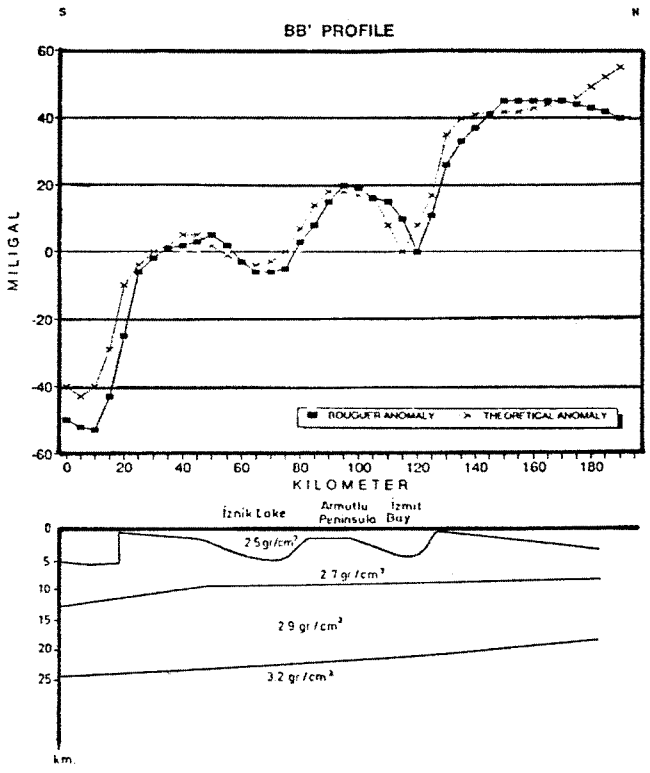

Fig. 2. Interpretation of the N-S Bouguergravity profile.

THE MUD BRECCIA CLASTS FROM THE MEDITERRANEAN RIDGE : THE RESULTS OF THE STUDY OF SUBSTANTIAL COMPOSITION

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In 1993, during the TTR-3 Cruise of R/V Gelendzhik, some new mud volcanoes were discovered, located on the crest of the Mediterranean Ridge. The mud breccia from the newly discovered volcanoes is composed of subrounded clasts of different lithologies supported by a silty-mud matrix.

The breccia clasts are represented by a large variety of different rocks: limestones, sandstones, siltstones, and mudstones.

Precise description of the main types of the rocks obtained as clasts from the mud breccia was made. The types of rocks were determined on the basis of macrodescription, microdescription (more than three hundreds of thin sections), and the X-ray data. They provide an important information of the composition and genesis of the Lower-Middle Miocene deposits. The obtained lithologic data show that the Lower-Middle Miocene rocks of the Mediterranean Ridge were formed in deep-sea environments, far away from the continental slope. There show a prevalence of biogenic and hemipelagic sedimentations of marls and muds. A terrigenious matter was supplied periodically by gravity flows. Distant sources were the reason why coarse terrigenious material did not reach the depocentres, and only fine sediments were supplied in the study area thanks to deep-sea fans action. Coarser material was supplied rarely and formed accumulative bodies of suprafans consisted of silty and sandy sediments.

Thus, the genetic features of the defined rock types from the clasts from the mud volcanoes indicate deep-sea environments during their accumulation and the presence of distal turbidites in sedimentary sequence of the Mediterranean Ridge. This suggests that the turbidity currents from the African margin were capable to reach the Mediterranean Ridge crest in the Early-Middle Miocene time, and the Mediterranean Ridge was rather deeply submerged.

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