Tectonic evolution of basins in Northeastern Mediterranean Sea

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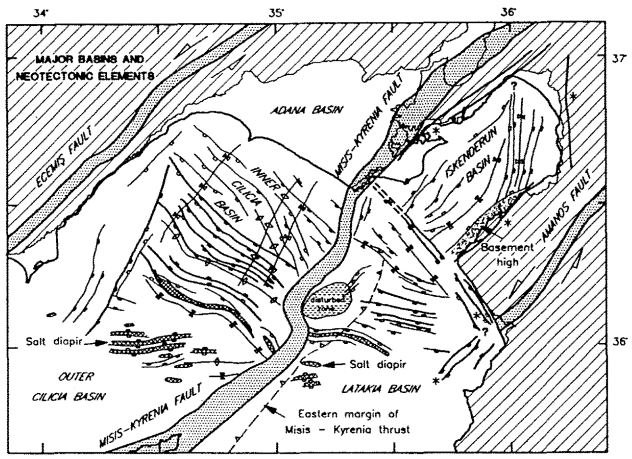
The present-day tectonic framework of the Eastern Mediterranean is controlled by the last phase of collision between the African and Eurasian plates, in particular the displacements of the smaller Arabian, Syrian, Anatolian and Aegean plates. The Aegean/Anatolian plate is pushed westwards along strike-slip faults, due to collision between the Arabian/Syrian and Eurasian plates along the Bitlis-Zagros Suture (SENGÖR and YILMAZ, 1981). The North Anatolian Transform Fault moves dextrally, while the East Anatolian Transform Fault shows a complementary sinistral motion. There are a number of subsidiary faults to the East Anatolian Transform Fault, such as the Ecemis and Sungurlu Faults. To the west, the Anatolian plate merges with the Aegean plate with an intervening diffuse plate boundary, characterized by E-W trending grabens. At its northeastern edge, the African plate is presently moving NNE relative to the Eurasian plate. The boundary between the African and the Anatolian plates is delineated by the Hellenic Arc and Pliny-Strabo Trench in the west and the Cyprus Arc and a diffuse fault system probably associated with the Amanos Fault in the east. The two arcs are near perpendicular to the relative motion of the African and Anatolian plates, delineating the subduction zones, whereas the Pliny-Strabo Trench and East Anatolian fault zones (including the Amanos and Ecemis Faults) are subparallel to the slip vector, with predominantly transform motion. The boundary between the African and Arabian plates is characterised by sinistral strike slip motion along the Dead Sea Transform Fault.

The study area is located at the edge of the Anatolian platform, immediately southwest of the Africa/Arabia/Anatolia triple function (DEWEY *et al.*, 1986), and includes four genetically related basins: Adana, Cilicia, Iskenderun and Latakia Basins. These four bssins collectively form a moderately large semi-enclosed depocentre in the northeastern Mediterranean Sea and provide an excellent opportunity to study the tectonic and sedimentary evolution of depocentres near the edge of active orogenic regions with complicated microplate configurations. They offer a modern analogue for ancient sedimentary troughs, which evolved in continental collisional settings.

Detailed interpretation of ~5000 km of seismic reflection profiles from the northeastern Mediterranean Sea showed the followings (AKSU *et al.*, submitted): (1) During the Pliocene-Quaternary, extension took place in the NE corner of the Mediterranean Sea by listric faulting on a decollement surface at the base of the Messinian evaporites. The extensional basin in bounded by two sinistral strike-slip splays : Ecemis and Amanos Fault, and subparallel listric fault that sole much deeper than the Messinian evaporites. The former Misis-Kyrenia thrust belt may also have acted as a strike-slip fault, although its surface expression is as a horst block. The decoupling at the base of the evaporites has resulted in listric fault fans and roll-over anticlines almost orthogonal to the bounding faults. (2) The evolution of Pliocene-Pleistocene depocentres was largely controlled by the Misis-Kyrenia horst and the listric fans and associated roll-over anticlines, which shifted position through time, creating a shifting pattern of depocentres. (3) The extensional collapse of the Adana-Cilicia-Iskenderun-Latakia basin complex resulted in overall retreat of the coastline in Cilicia and Latakia basins during the mid- to late Quaternary. The continental shelf subsided sufficiently rapidly to trap most sediment on the shelf. Delta plain gradients were low, so that coarse sediment was trapped far inland. In the mid-late Quaternary, deep-water turbidites occurred only at extreme lowstands of sea level. This late-orogenic extensional basin resembles neither classical "flysch" or "molasse" type basins : the fill is principally deltaic shales. (4) Four types of depocentre are distinguished : (A) depocentres landward of the maximum paleoshorelines in which accommodation space between two transgressive surfaces that was created almost exclusively by tectonic subsidence; (B) thick sediment accumulations near paleoshorelines, particularly where a depositional sequence prograded further seaward than the underlying depositional sequence; (C) isolated depocentres in deep water controlled by halokinesis and (D) small deep water turbidite basins fed by fault-controlled channels.



Tectonic map of the area, showing the Ecemis, Amanos and Misis-Kyrenia Fault zones, major faults, salt diapirs/ridges and anticline and basin axes.

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Marine Geological Geographic Information System (G.I.S.) of Aegean Sea of Greece

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The digital organization of Marine Geological Data of Aegean Sea of Greece and the development of a Computer based Marine Information System from the available Marine Data Sets, helps for better understanding of the natural environments at all scales from local to global.

The reason for the creation of the Marine Information System of the Aegean Sea was:

- The urgent need for the better distribution of available data sets, coupled with improved data management facilities to enable more efficient access to the increasing volume of marine data.
- A requirement for data integration and compatibility, in an increasingly multidisciplinary environment.
- The correlation evaluation and interpretation of the existing data.
- The extraction of data in various combinations.

To create a Data Bank with high credibility, a "systematic validation" has been undertaken for the data collection according to generally accepted specifications.

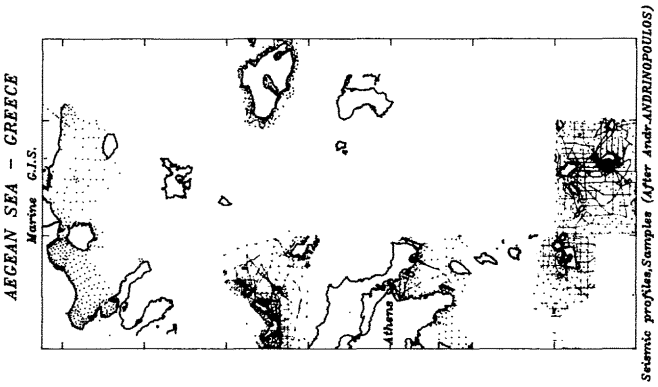
The collected data consist of the first Data Bank levels, which are created during the field-trip work on the ship. The second Data Bank levels are added to the first one and contains various data classified into groups.

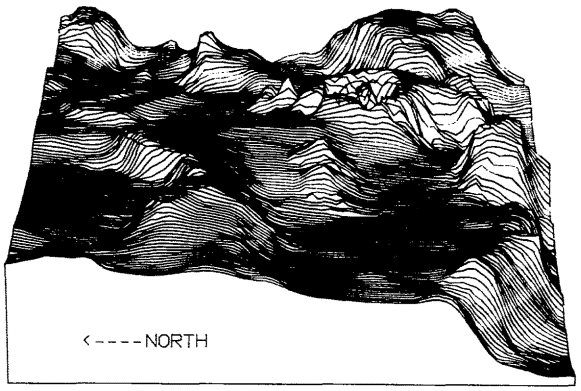
The addition of Data Bank levels vertically and horizontally is one of the advantages. Vertical addition means entering new data which belong to the same group of the existing data or consists of new groups of data. At all the vertical levels there is a compatibility. Horizontal addition means the joining of the adjacent areas in which there are similar data available.

Maps can be produced showing all the available data and any correlations between them.

Other big advantages of the Marine Geological G.I.S. of the Aegean Sea are the possibility of evaluation and presentation of the different data for various windows at any scale, the creation of detailed bathymetric maps, accurate geostatistical evaluations and the construction of 3-D models.

It is also possibile to development an expert system which will allow access to fully developed numerical models and the refinement of existing 3-D models to help investigation.





Bathymetry of Santorini sheet, developed from the Marine Geology G.I.S. for the Aegean Sea of Greece (after A. Andrinopoulos, 1992)