Petrography and geochemistry of uppermost Pleistocene sediments in the outer Thermaikos Shelf : Project EURECOMARGE

G. ANASTASAKIS and A. SIOULAS*

* National Center for Marine Research, Aghios Kosmas, Hellinikon, 16604 Athens (Greece)

Smear slide petrography and geochemical analysis were carried out on a series of seven gravity cores recovered from the outer continental shelf of the Thermaikos Gulf in the northwest Aegean Sea (fig. 1). On the basis of the lithofacies associations observed in the cores they are divided into two broad categories: a)cores recovered from water depths of less than 175m are composed mostly of a uniform mud with in tercalations of silt and sand (cores 26, 36, 35,4 in fig.1). b) Cores recovered from water depths of more than 180m (cores 31,39,2) contain a cyclothematic lithofacies development centered around sapropelic horizons already reported by Anastasakis (1985) and well established from other deeper regions of the Eastern Mediterranean Sea.

Smear slide petrography has revealed important downcore variations in the compositional attributes of these predominantly fine-grained sediments. From the studied cores (fig.1) the only which apparently recovered the entire Holocene transgression is core 36. This core is getting coarser downwards and smear slides show a significant increase in the terrigenous minerals, most notably in the quartz, feldspar, muscovite, heavy and opaque minerals. From the biogenic components cal careous nannoplankton and foraminifera shells are the most abundant. Towards the base of this core there is a substantial increase in the shell fragment contents, including shells of nearshore environments. Core 26 is also getting coarser downwards, however this trend is not well defined .Generally speaking the fine grained layers (silts and muds) displaying some faint lamination contain increased amounts of terrigenous minerals composed mostly of quartz, feldspars and mica.However adjacent mud layers can contain variable amounts of terrigenous components.The dominating biogenic elements are calcareous nannoplankton and a few foraminifera shells which are getting more abundant downwards joined by an increased proportion of ostracods and gasteropods. Core 35 is composed entirely from current reworked and emplaced thin clastic sand, silt and laminated mud layers.The coarser sandy layers generally display enhanced proportions of quartz and most notably heavy mineral contents. Core 4 is entirely composed of homogeno us mud and only the middle portion of the core is displaying some lamination. This laminated portion is displaying an enhanced proportion of terrigenous minerals, most notably increased mica contents. The biogenic components display no significant variations along this core. Cores recovered from the east Thermaikos shelf(cores 31,39 and 2) con sistently display an increased proportion of terrigenous minerals dow nwards. This increase is getting more pronounced below the sapropelic layers joined by a concomitant decrease of the biogenic attributes. Core 39 contains also an enhanced proportion of stable heavy mineral grains.

The geochemical analysis were performed by means of X-ray fluorescence and the results recalculated carbonate free. In the cores recovered from the outer periphery of the Thermaikos shelf(cores 39 and 2) major element contents, most notably SiO_2 and K_2O, display a clear increase downwards. However this trend is not so obvious on the west shelf region where river derived sediment input during the lower Holocene had a more irregular pattern. Down-core minor element data show some variation between samples. In general, the sapropelic lithofacies is enriched in Ba,Ni and depleted in Mn, when compared to the other lithofacies. Cores containing heavy minerals display a substantial increase in Zr.

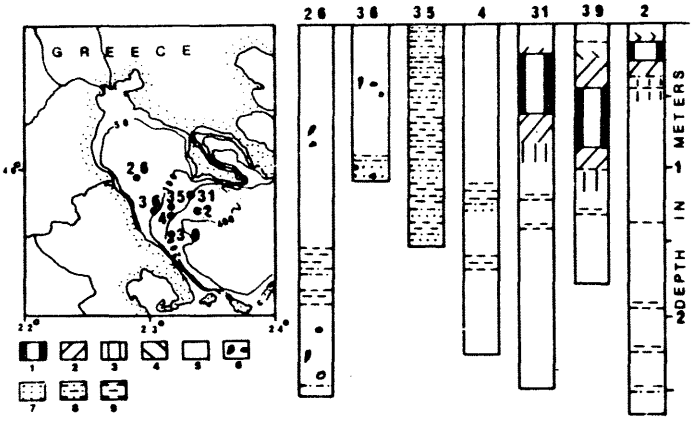

Fig.1:Coring stations and core logs studied in the Thermaikos outer continental shelf region.The basic lithofacies are:1 for sapropelic mud; 7,8,9 for turbiditic sand, silt and mud respectively.

The above cited results indicate that Upper Pleistocene sedimentation in the outer Thermaikos shelf has been influenced strongly by the latest marine regression-transgression. As a result, generally there is observed an enhanced proportion of terrigenous minerals downwards in the cores resulting mainly from the increased input of terrigenous material in the outer Thermaikos shelf region during the uppermost Pleistocene-low Holocene. This was the consequence of the direct fluvial sediment supply in the outer shelf region during the latest major low sea level stand. It is well established, through the study of high resolution seismic reflection records, that deltaic sequences are the main Holocene sedi ments in the Thermaikos plateau(Lykousis et al.,1986).

REFERENCES

ANASTASAKIS, G.C., 1986.A new uppermost limit of sapropelic sequence deposition in the Aegean Sea.Rapp. Comm. Int. Mer. Mediter., vol.30,p.72

LYKOUSIS, V., CHRONIS,G., SIOULAS, A., BARBETSEA, H. and STAVRAKAKIS, S.,1987. The Holocene sediment sequence and dispersion in the Thermaikos plateau, N.W. Aegean Sea, Greece.Boll. di Ocean. Teor. Appl., Vol. 2,75-83.

Gravity and tectonics of the Southern Aegean Sea

P. PAVLAKIS*, J. MAKRIS** and R. EGLOFF**

* EKTHE, Athens (Greece)

** Institute of Geophysics, Hamburg University, Hamburg (Federal Republic of Germany)

The southern Aegean and particularly the Cretan Sea were resurveyed recently by gravity, magnetic and seismic methods. The new data confirmed to a great extend the existing modelles and provided new information that can be used to refine the geological concepts for the development of the Cretan Sea.

In the past, the Back Arc spreading modell was used to explaine the evolution of this area. Another possibility for interpreting the observations could be provided by considering the deformation as a consequence of large scale shearing associated with the East Anatolian Fault System and the way that continental crust and lithosphere react under shearing forces. The Cretan Sea, seem under this aspect, can be understood as a'pull apart basin'. Geophysical evidence and gravity modelles will be presented and discussed under this aspect.