G-II6

CONTRIBUTION TO THE STUDY OF QUATERNARY DEPOSITS OF GERAS GULF IN LESVOS ISLAND (E. AEGEAN, GREECE) (PRELIMINARY NOTE)

M. DERMITZAKIS°, C. IOAKIM°° and D. PAVLAKELLI°

° Subfaculty of Earth Sciences, University of Athens (Greece)
°° Institute of Geology and Mineral Exploration, Mesogion 70, Athens (Greece)

The principal object of this study is the analysis of stratigraphical and paleontological characteristics of a section of Pleistocene sediments on the island of Lesvos, at Geras gulf near the thermal springs. The combined application of mollusks association and the ostracods and pollen assemblages allow us to consider the chronostratigraphic interval of deposition of Geras section. More over the received paleoecological data make possible the understanding of processes, which dominated the accumulation of the sediments.

The fieldwork was carried out in the frame of a research study on stratigraphy of Lesvos island by the Lab. of Hist. Geology and Paleontology of Athens University.

The Geras Gulf is the second of the two natural gulfs of Lesvos island, in eastern Aegean Sea. In general view the island of Lesvos consists of two geologic parts, both different in origin and composition. (Prager, 1966, Pe, 1978). The southwestern and northwestern parts are occupied by volcanic rocks mainly Tertiary in age, while in the southeastern part older (Paleozoic?) metamorphic rocks occur which surrounded Geras gulf is shallow (about ten meters average depth), with a normal bottom surface which becomes deeper and irregular towards the entrance of the gulf. Tassos & Hopkins (1972) referred that the gulf is undergoing deposition from the surroundings, with the narrow entrance being kept open by currents.

The Late Cenozoic of Lesvos has been subject of several studies of Geology as well as of paleontology dealing with the petrified forest (Velitzelos, Petrescu, Symeonidis, 1982).

Simeakis & Someritis (1982) examined the northern coasts of Geras Gulf and concluded Pliocene age for the marls, calcitic sandstones and conglomerates surrounding the Geras coasts. While Houtzeos (1979) based on molluscs and ostracode species attributed to Geras sediments a Pontian age.

The exposure of Geras gulf with in this paper, is situated in the northern coast of the bay and, according to our investigations, the sediments were deposited during the Lower-Middle Pleistocene timespan (Fig. 1). This area was exposed to fluviatile supply from the west and northwest and to marine influence from a southern direction.

The Ostracode fauna contains several genera of freshwater nature like *Aurila, Candona, Cypria, Cyprideis, Darwinula, Ilyocypris, Leptocythere, Pcionocypris, Propontocypris, Tyrrhenocythere* etc. Also, attention should be paid to the common occurrence of the fresh-water Thecamoebian *Centropyxis marsupiformis* and the Charophytes: *Chara* cf. *hispida, Nitella* sp., *Tectochara* sp., *Lymnothamnus* sp. The biostratigraphical and ecological information supplied by the Molluscan assemblages, like *Dreissensia, Neritina, Unio, Cardium, Mytilus, Hydrobia, Valvata* etc. allow the conclusion that these sediments were deposited during the Lower-Middle Pleistocene.

Thus we infer the presence of a lake to lagoonal environment with waters of relatively low and variable salinity. The data on the distribution of pollen confirmed the above mentioned conclusion on the condition of the sedimentation.

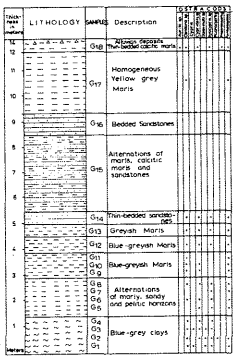

Fig. 1. Lithostratigraphic column of Geras section with distribution of ostracod fauna.

Five samples from the lower part of the section have yielded pollen-spores grains (fig. 2); 43 taxa were identified. The pollen grains from the samples G2 and G3 are not well preserved, most of them are carbonized. Pteridophytae spores occur through the section and are numerous at any level. The pollen diagram indicates three pollen spectra.

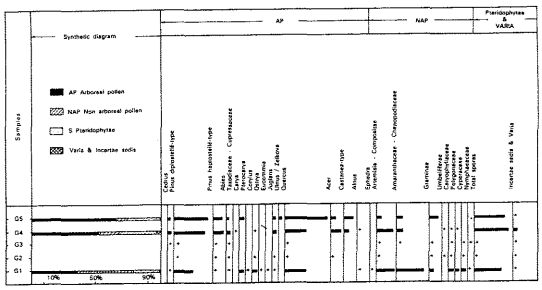

Fig. 2. Frequency distribution and Pollen diagram of Geras section.

Pinaceae pollen grains are dominant, *Pinus* as much as 32%, with *Quercus, Acer* and *Castanea*-type; those of *Cedrus, Abies, Carya, Julans, Ulmus/Zelkova* are less numerous. The non arboreal pollen grains are abundant by *Artemisia*, Compositae, Amaranthaceae, Chenopodiaceae, Graminae and Caryophyllaceae, Polygonaceae, Nymphaeaceae, Cyperaceae.

The interpretation of this pollen diagram is difficult, due to differences in pollen spectra documented in the different regions at Greece and in the other provinces of Europe. In these samples, pollen spectra are characterized by a very low frequency of arboreal pollen grains, except *Pinus* and *Quercus* and high percentages of herbaceous pollen grains, including more than 20% steppe elements, such as Amaranthaceae, Chenopodiaceae, *Artemisia* and some other Compositae. Therefore, these assemblages clearly illustrate a poor presentation of forest cover and the elargement of «steppic» vegetational associations.

Moreover the absence of Taxodiaceae with the other «tertiary» elements is caracteristic. From a climatic point of view it indicates a reduction of humidity and probably also of temperature; the extinction of taxodiaceae must be related to the first Pleistocene cold phases (Michaux M. et al. 1979; Zagwijn W.H. 1960, 1974; Suc J.P. et al. 1983).

On the basis of these palynological assemblages an Early Pleistocene age can be attributed to these lacustrine deposits of G1, G2, G3, G4, G5 horizons from the basal part of the section Geras. Further, these elements appear similar to those of Zeli and Yialtra section, (Ioakim C. et al 1985, Sauvage J. et al. 1973) and Thassos island (Lyberis N. et al. 1985), to the «steppic» phases of Adriatic sea (Cravatte et al. unpublished) to Lelle lacustrine deposits of Italy Lona N. 1950; Lona N. et al. 1973) and of southeastern region of France (Cravatte J. et al. 1981; Suc J.P. 1985). The study of the pollen diagram of these sections drives us to the conclusion that this part of Geras section was deposited during the Lower Pleistocene time span.

The Pleistocene sediments of Geras section were deposited in a coastal topography comparable to that of today. The depositional framework which became partially submerged during the Late Pliocene by faulting and fluviatile erosion. The variation of the depositional and paleontological properties of the section was caused by longshore currents from a southern direction. These currents and waves and the subsidence of the coastal area produced modifications of the depositional pattern. The presence of rocky headland, immediately to the north of the Geras hot springs, is rather well established.

The barrier system was attacked by marine currents oriented to western directions not so often, but possible only seasonally. These currents were of a wind origin. During storms, sands deriving from the outer barrier-face were transported westward.

The evolution of the area of Geras gulf described above, gives a condensed picture of a part of the Pleistocene history of the present-day island of Lesvos. The fluvial-lacustrine sediments exposed in the northern part of Geras gulf derived from a mainland, which was situated to the west and nortwest of modern Lesvos. The gradual waning of fluviatile supply from the west and northwest is expressed in an upward increase in grain-size of the Geras sediments. The consequences of these change on a regional scale, for the sedimentation in a shallow realm are well documented by the vertical arrangement of sediment types and faunal assemblages in the Geras section.

G-II7

HOLOCENE SEDIMENT SEQUENCE AND DISPERSION IN THE THERMAIKOS PLATEAU, N.W. AEGEAN SEA

V. LYKOUSIS, G. CHRONIS, A. SIOULAS, H. BARBETSEA and S. STAVRAKAKIS
National Centre for Marine Research, Aghios Kosmas, Hellinikon (Greece)

RESUME

S'analyse lithoseismique (3.5 KHz) et l'analyse des sédiments superficielles donnent la dynamique sédimentaire pendant la période de l'holocène jusqu'aujourd'hui. Cette répartition se conduite par les paramètres, hydrologiques (regime des riviers Axios, Aliakmon, Penios), hydrodynamiques (courants, vents, etc.) et tectoniques (marge passif pendant l'holocene). L'apparition superficielle des salbes Würmiennes et la deminution d'epaisseur de l'holocène allont de l'Ouest a l'Est sont les phenomènes principaux qui sont observés.

ABSTRACT

The Thermaikos plateau, a passive continental margine in the N.W. Aegean Sea (Fig. 1), covers an area of about 3,500 km^2. The river Axios with mean annual discharge 5.031 X 10^6 m^3 of water and river Aliakmon with mean annual discharge 0.292 X 10^6 m^3 of water drains the inner part (<50m), while the river Pinios with mean annual discharge 2.529 X 10^6 m^3 of water drains the outer part (>50m) of the plateau. There is a well defined anti-clock wise of water masses circulation in the area.

Detailed 3.5 KHz seismic-reflection profiling have shown that during the Holocene the Thermaikos plateau received fine grained sediments that discharged mainly by the rivers Axios, Aliakmon and Pinios. A well developed obligue-sigmoid progradation pattern have been observed in the seismic profiles crossing the deltaic sequences of these rivers. Three seismic facies have been identified within the oblique-sigmoid pattern. 1) Dark homogeneous facies that represent sand deposits along the delta front, 2) Stratified facies (Refl. A) that represent alternating muddier or sandier horizons, and 3) transparent facies (Refl. B) in which the muddy sediments predominates. The reflector C (base of Holocene) have been found under the obligue-sigmoid pattern, covered by 30ms of sediments near the rivers mouth thining rapidly to a few ms of sediments 20-30 km away. This implies high sedimentation rates (~3 m/1000 yrs) near the rivers mouth during the Holocene that becomes rapidly lower (~1m/1000yrs) a few kilometers and generally low (~0.5-0.2 m/1000 yrs) in 20-30 km away.

Bottom samples from the outer Thermaikos plateau have shown that this is floored from relict terrigenous sand in depths from 80-110 m. The sand grains of these deposits are very well sorted, well rounded and consists of Quartz and heavy minerals (Epidote, Hornblend, Zircon, Garnet etc). Since these sands are pre-Holocene there has been little or no sedimentation during this period. Smectite and Illite are the dominant (~80%) clay minerals in the Thermaikos plateau. The ratio SM/I in the outer plateau is decreasing in the eastward direction away from the Pinios river mouths, while in the inner plateau the ration is decreasing in the southwestern direction away from Axios and Aliakmon rivers. The same trent is generally observed in the ratio Silt/Clay due to differential settling velocities of flocs with various relative percentages of silt and clay (snectite + illite).

The rivers Axios, Aliakmon and Pinios are the main contributors to terrigenous fine-grained sediments in the Thermaikos plateau during the Holocene period developing the characteristic obligue-sigmoid deltaic sequences. Water masses circulation contributed to the trasportation and dispersion of the fine-grained sediments to the Thermaikos plateau. The deposition of sand is located near-shore from land erosion and long-shore movement, and in the delta front of the rivers. It seems that the present depositional regime, in the Thermaikos plateau, could be prevailed during the Holocene period.

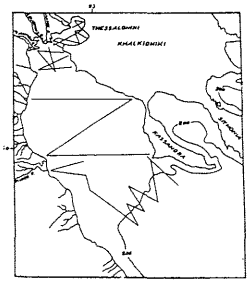

Fig.1. Map of Thermaikos plateau with subottom profiling tracks.