CONTRIBUTION TO THE KNOWLEDGE OF THE PLIOCENE TRANSGRESSION IN THE SERRES BASIN (NORTHERN GREECE)

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The Serres basin is developed in the north part of the Aegean sea (NE Mediterranean). Marine deposits are extending in many parts of the basin. Because of the geographical site of this basin, the age of the marine sediments, depending on the use of the Mediterranean or Paratethys stages, has been determined either as Upper Miocene or as Pliocene. The age of the marine transgression as well as the sedimentological paleonvironmental conditions in the area will be discussed.

PRE-TRANSGRESSION ENVIRONMENT

The initial opening of the basin occured at the end of the Mid - Miocene. In a limnofluviatil environment polymictic conglomerates and coarse sands were deposited. They were followed by a thick sequence of firer sediments. Red beds and breccias close this sedimentary group.One of these breccias a monomictic granitic one is of special interest. Anywhere it appears is in contact with the overlying marine deposits. Its thickness varies and the slicken sides of the silicified surfaces of many boulders show a tectonic origin. Sedimentologically this breccia is a typical debris flow deposit.No macro- or microfossils have been recovered. The existing traces could suggest that the deposition of this debris flow affected greatly-if not destroyed- the preexisting mammal fauna. It is difficult to say whether the granitic breccia is the first bed of the marine transgression or the last one of the pre-transgression environment.

MARINE TRANSGRESSION

Dark grey coloured coarse sands turning fast to grey green muds are deposited over the granitic breccia. The Corals *(Siderastrea crenulata* (GOLDF.), *Tarbelastrea* sp.and others),found in some outcrops intercalated with the muds show a sea depth of about 20-50m,a water temperature of 25-30°C and normal salinity conditions.

Some meters higher calcareous sandstones with marine fossils not well preserved, are cemented. The abundant presence of *Pecten benedictus* and the whole composition of the Molluscs fauna assemblage found in the calcareous sandstones *(Anadara pectinata* (BR.),*Anadara* sp.,*Anodontia(Loripimus) fragilis* (PH.),*Anomia ephippium* (L.), *Cardium* sp.,*Cerithium* sp.,*Corbula* sp.,*Dosinia exoleta* (L.), *Hinnites* sp.,*Loripes dentatus* (DEFR.),*Lucina* sp.,*Lutraria lutraria* (L.),*Modiola* sp.,*Nucula nucleus* (L.),*Nucula sulcata* (BRN.),*Pecten benedictus* (LK.),*Pinna* cf.*tetragona*(BR.),*Pirenella disjnucta* (SOW.),*Pirenella* sp.,*Telina planata* (L.),*Telina* sp.,*Venus* sp. correlated with other Molluscs localities in the hellenic area, suggest a pliocene age for the sediments of the marine transgression. The whole thickness of the pure marine deposits in the peripheral outcrops, seldom exceeds the 20m. They are much thicker in the central part of the basin.This happens because the marine environment did not remain long in the peripheral places. Large scale cross beds indicate a fresh water influence,resulting in a deltaic environment and a gradual marine regression.Over these deltaic depositions these is a thick cemented bed consisting almost entirely from banks with *Ostrea lamellosa*.Such *Ostrea* beds normally are formed in low salinity environments (10-30 °/oo),due to fresh water inflow.

From here on, there are continuous alternations of brackish environments,to lagoonal and limnish and again to brackish,as indicated by the determined fauna *(Dreissensia simplex auricularis* (F.),*Dreissensia serbica* (BRS.),*Dreissensia* sp.,*Limnocardium* sp.,*Mactra eichwaldi* (LAS.),*Mactra* sp.,*Melanopsis impressa bonelli* (MAN.),*Melanopsis impresse* (KR.).This fauna assemblage indicates also a Pliocene age.

Finally,the marine influence disappears,the sediments are becoming gradually coarser and a final conglomerate ends this transgression-regression cycle.

CONCLUSIONS

The better knoweledge of the Mediterranean-Paratethys stages correlation (Rögl et al.1983) as well as the found Mollusc fauna assemblages leave no doubt that the described transgression is of a Pliocene age.

The similar marine transgression found in the neighbouring basins of Drama and Prinos seem to be parts of the world wide Pliocene transgression (Vail et al.1977).

The transgression in the Serres basin must be characterised as a sudden event.The sea occupied the basin in a very short time. The transgression was "announced" by tectonic events and an important climatic change as indicated by the amount of water required for the deposition of the granitic breccia.

The regression phase that followed was of much longer dueation.

UPPER CENOZOIC CONNECTIONS OF THE AEGEAN TO THE EASTERN MEDITERRANEAN : MARINE GEOLOGICAL EVIDENCE AS COMPARED TO THE FOSSIL MAMMALS OF THE REGION

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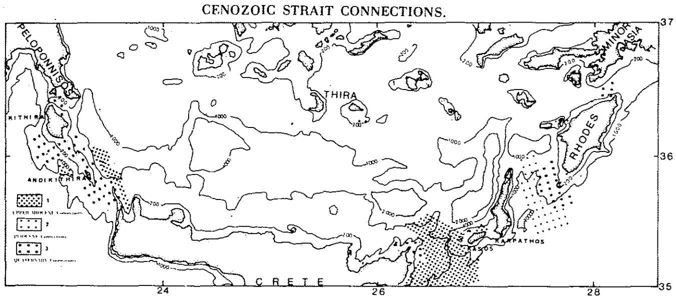
Today the Aegean Sea is connected to the Eastern Mediterranean via several passages (Fig. 1): between Minor Asia and Rhodes (width 17km), between Rhodes and Karpathos (width 43km), the Kaso strait (67km to the E. Crete) and the W. Crete - Andikithira - Kithira - SE Peloponnisos straits (32km, 33km, 11km respectively). Marine geological work, aidded by land geology of the adjacent islands, revealed a complicated paleogeographic history in the vicinity of the straits during the Upper Cenozoic.

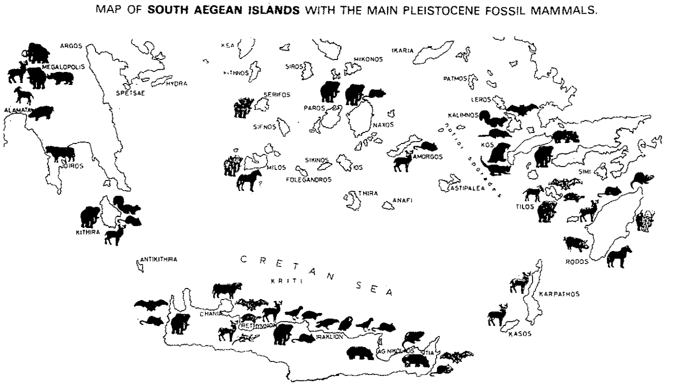
The earliest major connection to the Eastern Mediterranean is located in the vicinity of E. Crete - Kasos strait. This was formed in the Middle-Late Tortonian and connected the E-W oriented basinal areas of the north to the south. A similar, although much smaller in scale subsidence, with a terrestrial-marine transition ocurred in the Kithira - Antikithira islands which, however, has not been observed on marine sesmic reflection records from that region. During the Messinian the E. Crete - Kasos region experienced a renewed period of subsidence (which possibly suceeded an initial period of uplift) and as a result the Aegean Sea acquired, through Crete - Kasos - Karpathos several connections to the south. In the Kithira - Andikithira straits region this tectonic phase resulted in titling, uplift and erosion with concomitant deposition of clastics in the SE Aegean and west Andikithiran margin. Sometime in the Middle Pliocene the Karpathos - Rhodes passage started subsiding and the Aegean acquired a further connection to the east. During the Quaternary this Karpathos - Rhodes corridor became wider. However the most significant event was the subsidence of the Kithiran - Andikithiran straits around the Middle Quaternary.

On the basis of fossil mammals (Fig. 2) it has been suggested that the sea invaded the Aegean area through a seaway between Karpathos and Crete, from Karpathos a mainland fauna of the Early Pliocene is known, indicating that the island was still connected to the mainland during that period. In Rhodes the sediments in which the fossil mammals are found are covered by marine sediments indicating a submergence of the island after the Late Pliocene - Erly Pleistocene. On Crete the Miocene mammalian fauna is poorly known and no Pliocene mammals are known indicating a complicated submergence of the area which started in the Middle Miocene continuing into the Pliocene. The endemic Pleistocene unbalanced island faunas from Crete, Kasos, Karpathos and Rhodes (Fig. 2) without Miocene-Pliocene relicts of mammals suggest that the mammals dissappeared after a period of submergence. Kythera was an island in the Middle Pleistocene probably not so far from the coast and the mammals came by pendel route to the island.

GENERAL PHYSIOGRAPHY OF THE SOUTH AEGEAN REGION AND OUTLINE OF THE CENOZOIC STRAIT CONNECTIONS.



MAP OF SOUTH AEGEAN ISLANDS WITH THE MAIN PLEISTOCENE FOSSIL MAMMALS.



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