Texture and composition of the bottom sediments of Pagasitikos Gulf and Trikeri Strait, Thessaly (Greece)

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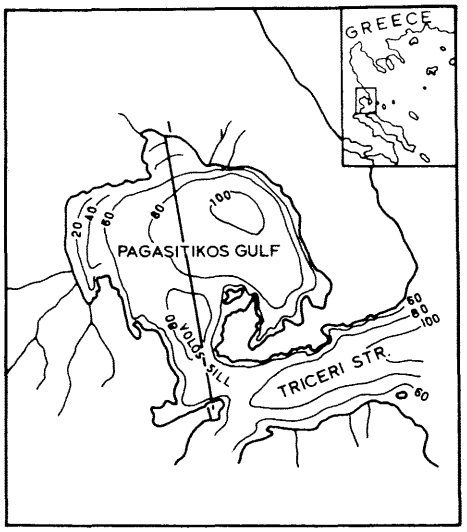
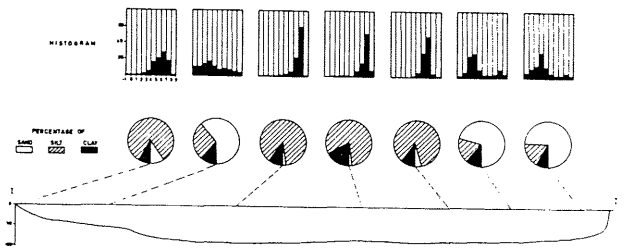
At an earlier note (1) the general setting and preliminary results of a marine geological research at Pagasitikos gulf and eastern Oreon strait (Trikeri strait) were given. In this paper a detailed study of the composition and texture of the sea floor sediments is presented.

The greatest part of the 100m. deep gulf is covered by silt (terms according to Sheppard) with a mean size from 6,0 to 7,30, the presence of which was noted even in the near shore areas. The units of sand, silty sand and sandy silt occur only locally, mainly at the northern and southern parts. Silt predominates also in the greater area of Trikeri strait (depth from 80 to over 100m.), with a coarser character (mean size 5,8 to 6,30), while sand occurs in narrow strips along the northern and southern coasts. The shallower Volos sill (depth around 75 to 80 cm.) which connects the gulf and the strait on the contrary is covered by medium and fine sand and only at its eastern sides fine grained sediments are present.





The coarse fraction of the sediments consists of terrigenous, biogenic and authigenic components, the most important of which show the following distribution: From the terrigenous components, quartz is abudant (up to 60%) at the nearshore areas of the gulf and the strait, but diminishes rappidly at the central parts. Rock fragments shows similar distribution with quartz, with higher percentages at the northern coasts, while mica is concentrated in significant amounts (over 20%) only at the eastern deeper parts of the gulf and the northern part of the strait respectively. From biogenic constituents, the benthonic forams show high percentage (over 20%) at the central sectors while the shell fragments exhibit an uneven concentration with high percentages at nearshore sandy areas with low sediment input (Volos sill, northern coasts of Trikeri Strait), as well as at the central parts. Finally glauconite (authigenic), is present mainly at the sill and the northwestern parts of the gulf, associated usually with high sand percentage.

From the above it is evident that both Pagasitikos Gulf and Trikeri strait are today sites of fine grained sedimentation. The sediments are redistributed by current action as shown by the benthonic foram and mica concentration. Little, however, sediment transport occurs between the gulf and the strait, mainly along the eastern part of Volos sill. Preliminary work on cores combined with data from seismic profiles indicates that the above sedimentation pattern has prevailed in the gulf throughout the holocene period, with sedimentation rates not exceeding 0,5m per kyr. At the Volos sill however, as well as the northwestern parts of the gulf the sediments reflect a different environment of deposition, related apparently to earlier periods.

Following the classification by Mc. Manus, the sediments of Pagasitikos gulf and Trikeri strait can be characterized as neoteric, amphoteric and occasionally palimsest, while the ones at the Volos sill are mainly relict and palimsest.

1 . Perissoratis, C., 1986.:Sedimentology of Pagasitikos Gulf and Oreon Strait, Thessaly, Greece, Rap. Proc.-Ver.Reun., v.30,Fas.2, p.68.

Seismic stratigraphy and structure of Pagasitikos and Maliakos Gulf and the surrounding areas, Aegean Sea, Greece

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In this paper, preliminary results from the study of the seismic stratigraphy and structure of the following areas is presented :Pagasitikos gulf (max.depth 100m), Trikeri strait (m.d. 90m), Oreon strait (m.d.70m), Maliakos gulf (m.d. 25m.),Knimida strait (m.d.95m), western end of North Aegean Trough and western part of the Sporadhes Basin (fig.1).

For this research shallow (3,5 KHz, Uniboom) and medium (1 kj sparker)penetration seismic systems were used.

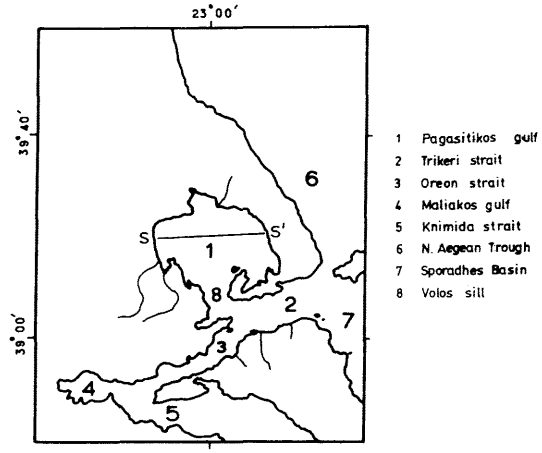

Fig. 1

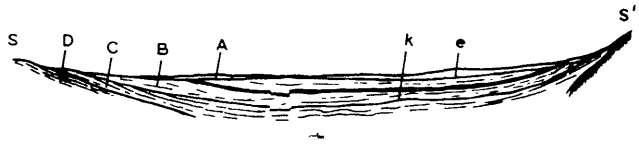

Fig. 2

In the greater Pagasitikos gulf, three seismic units were recognised, separated by two uncomformities (fig. II) while in some places (northern part of the gulf) a forth unit and a third deeper uncomformity appeared, which is not always clearly distinguished. Starting from top to bottom, unit A is a transparent sequence with greatest thickness in the central and the east part of the gulf (up to 16m.). Unit B is also transparent with many thin, undisturbed, parallel reflectors (max.thickness 50m.). In this sequence a thin layer with strong reflectivity was observed, which extends in the whole area. Unit C is less transparent than B, while the internal reflectors are thicker, continuous, parallel to each other and slightly folded. The bottom of this unit was not always possible to be determined due to limited penetration of the seismic systems used. Unit D, as mentioned before, appears only at the northern part of the gulf and has different characteristics from the others, such as strong reflectivity with obscured prolonged reflectors.

In the shallow sectors of the other areas, the uppermost unconformity was also observed separating unit A from the underlying sequences, which are not always recognised.

In the deeper sector (sea depth above 120m) such as the N. Aegean Trough and the Sporadhes Basin the seismic stratigraphy is different. There, a uniform sedimentary sequence is observed which was apparently deposited in normal marine environment. The total thickness of this cover was not possible to be estimated at the North Aegean Trough. At Sporadhes Basin its thickness is up to 150m., and is in angular unconformity with the underlying sequence which consists of harder formations. In some parts of the basin, where the sea floor is steep, mass movement processes were noted, transporting sediments to deeper areas.

Based on land observations, the above horizons are tentatively correlated to Holocene marine sediments (Unit A), Plio-Pleistocene sediments (Units B & C) and undivided Neogene formations or pre-neogene beds (Unit D).

In the research area, two systems of normal faults were observed. An older one, which strikes NNW-SSE, and which is responsible for the shapping of the steep Pelion coasts, Pagasitikos basin, Volos sill and Sporadhes Basin and a younger one, which strikes ENE-WSW, and which is responsible for the formation of Trikeri, Oreon and Knimida straits and for todays Pagasitikos-Maliakos shape. It is suggested that the second fault system was active during Middle-Upper Pleistocene. Apart from the above tectonic lines, the sediments are affected by many synsedimentary faults.