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ACTIVE FAULTS IN THE SOUTH-EASTERN PART OF THE MOESIAN PLATE AND THE LOWER-KAMCHIA DROP

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INTRODUCTION

The research works presented in the article are part of a performance of a project (agreement N NZ-1314/03).

Neo-tectonic research works, based on seismic stratigraphy have been presented in this article. The geological structures studied are located in the South – Eastern area of the Moesian plate and the Lower-Kamchia drop. The area studied includes the eastern marginal part of the shelf and the up most part of the adjacent continental slope. The Quaternary sediments have been the subject of study. The main purpose is to define the active faults that have been of essential importance for the seismic-tectonic research.

MATERIALS AND METHODS

The materials, used here, are the seismic acoustic profiles gained during the PP-98 expedition. The method of sustainable seismic profiling was applied during the expedition. The seismic waves were of applied electric spark source. The penetration depth of the useful signal reached 50-60 meters. Some literature data has also been used. The territory studied, which is a transitional zone between the shelf and the continental slope, is crossed by the trajectories of eighteen seismic acoustic profiles (Fig. 1).

The method of seismic stratigraphic approach, established in the Russian Academy of Science, has been applied [1, 2]. Some methodological approaches developed in competent institutes in the USA and West Europe have been also used [3, 4].

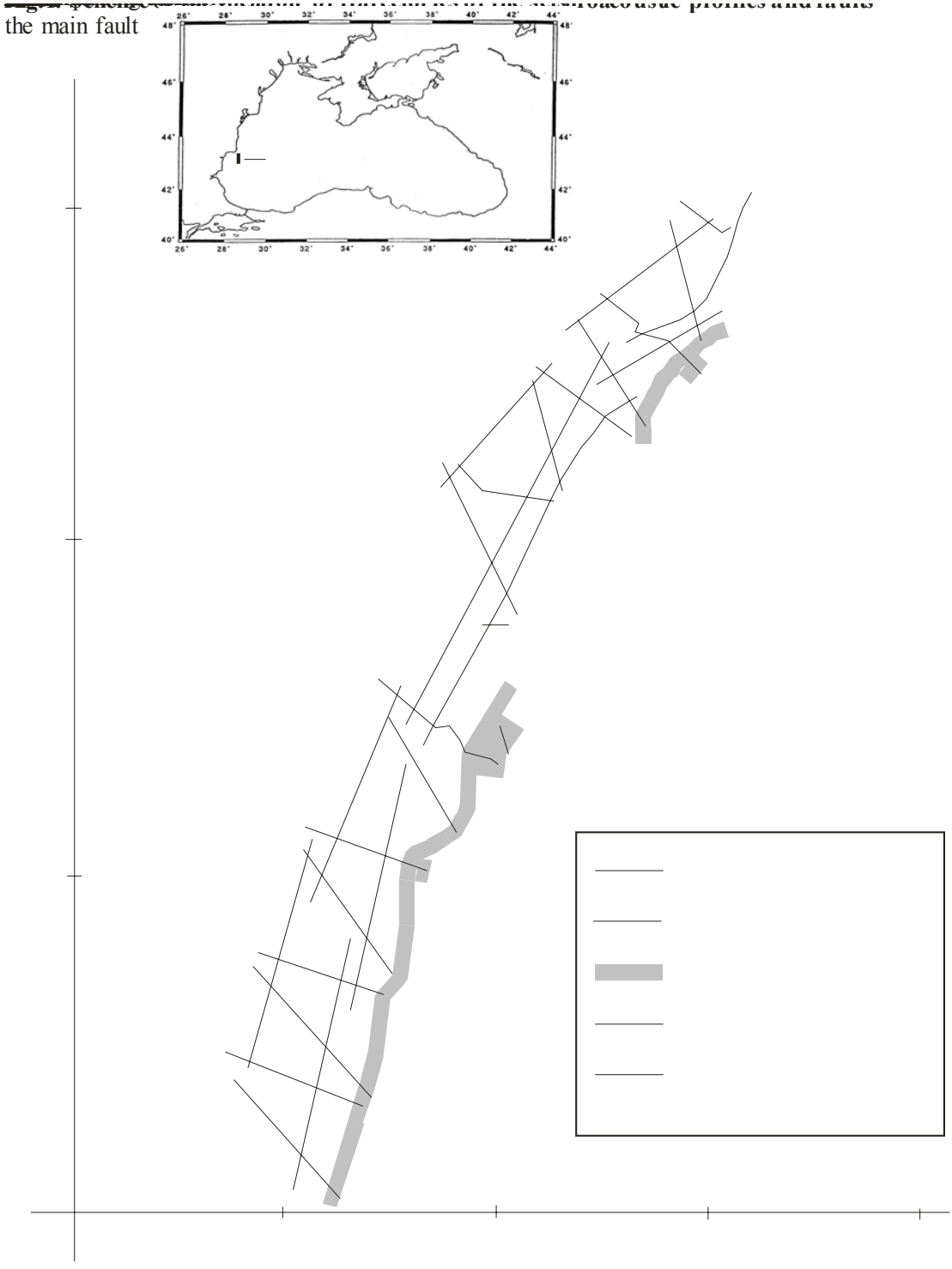
RESULTS

During the research process initially the seismic groups formed during the Quaternary were defined. Nine significant in the sea level occurred during that age – five increases and four decreases [5,6].

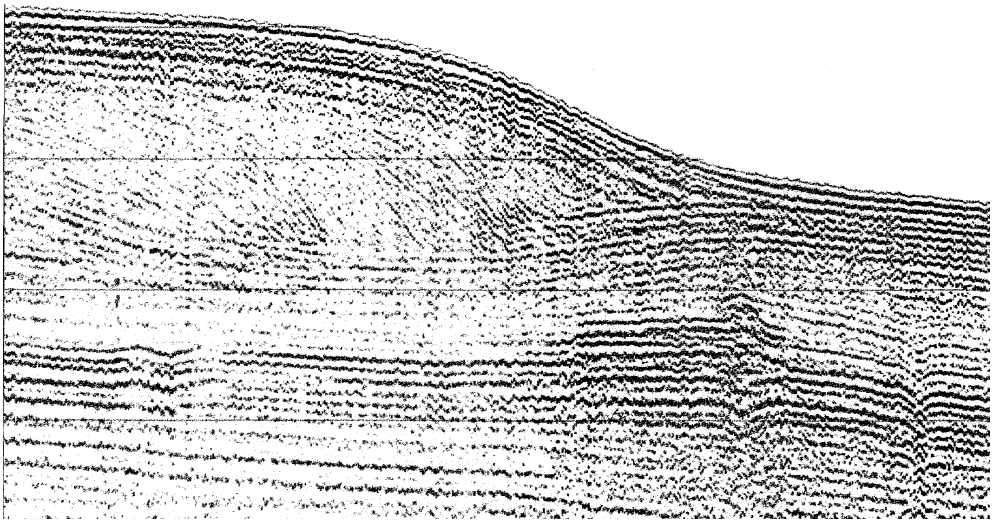
It has been established that during the mentioned above changes a depositional accumulation occurred and continuous interruptions of the process have not been registered. Dilutions (wash aways) have been registered in the shelf area.

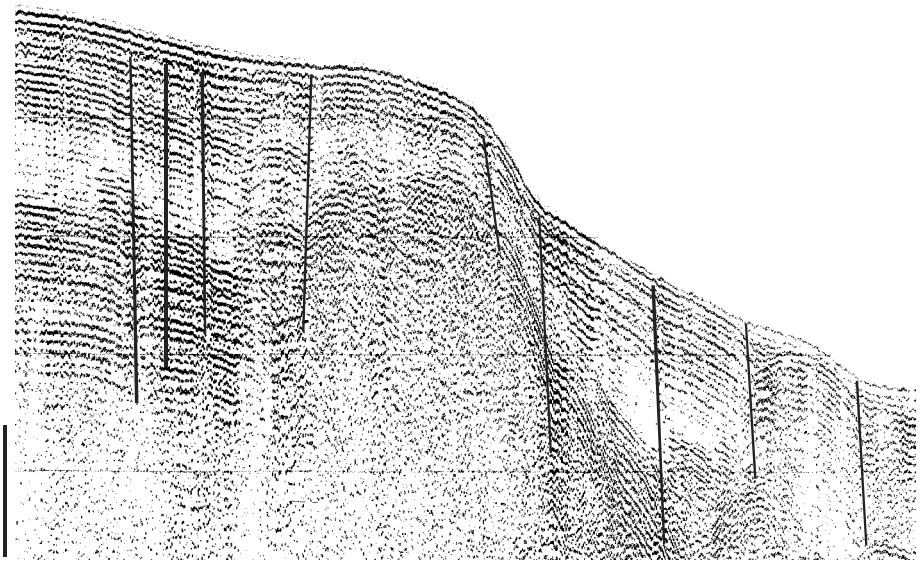
As a result of the geotectonic researches a lot of tectonic disorders have been defined (Fig. 1). It has been found out that the trajectories of a series of faults pass through around the trajectory of the 100 m isobaths, marked on fig.1 with A^{I}, A^{II}, A^{III}, A^{IV}. It can be accepted that these faults represent separate segments of a large fault. Looking at the sector around the trajectories of profiles IX – XIII we can notice that segments A^{III}, A^{IV}

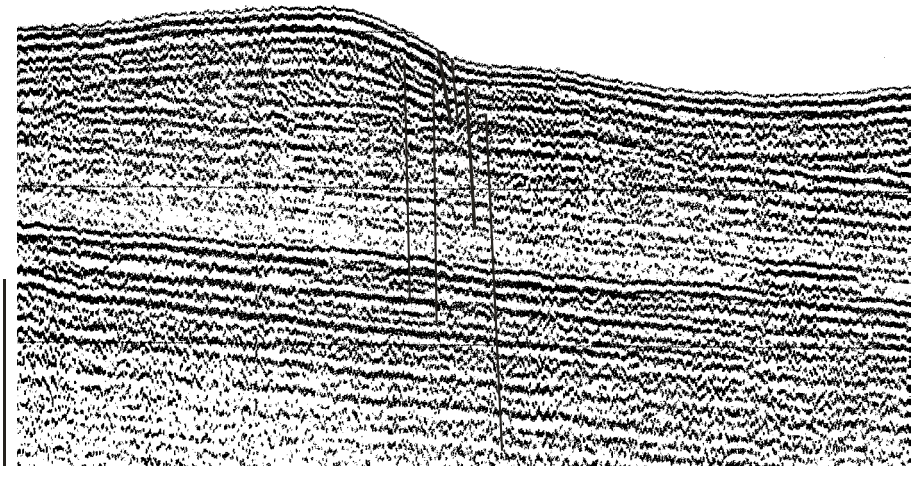
are bended and another fault is fixed between them. The geographic latitude of these curves coincides with the geographic latitude of the up-most eastern segment of the sub-parallel fault starting from “Saedinenie” reserviour, passing through the Valley of Provadiiska River, through the middle of Varna Lake and continuing into the sea [7]. The necessity of additional research works to establish the possible link between the sub-parallel fault and the mentioned above bended fault segments is obvious.



the main fault







A typical feature of the fault segments A^{I} - A^{IV} (Fig. 1) is that in neither of the profiles do they reach the sea bottom surface (Fig. 2). On the East of them a fault zone is fixed, consisting of plenty of faults (Fig. 3) directed North-East - South-West. Their number on separate profiles varies from two-three to over ten. All these faults get close to the sea bottom, and part of them appears on its surface. Probably the fault zone in question continues eastwards. At the west side of the great fault several smaller faults are fixed whose trajectories are sub-parallel to those of the segments comprising it (Fig. 1). On many spots these faults reach on the sea bottom surface (Fig. 4).

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CONCLUSIONS

The analysis of the facts presented here lays the conclusion that during the Quaternary age there was an active breaking process in the area studied.

The epicenters of earthquakes registered close to the studied area and their possible link to the faults whose surfaces reach the sea bottom are indicative of the present activity of these faults.

The sub-meridian faults defined here are probably a result of stretching tension in the trajectory studied here [8]. The tendency in the development of the continental terrace of the Bulgarian part of the Black Sea is the stepped submergence in direction to the deep-water kettle over a system of new and renewed sub-meridian breaks [9,10]. According to Muislivetz and others [11], during the neo-tectonic stage (from the Oligocene until now) the

shelf has been submerging relatively less than the continental slope, and the continental slope has been submerging relatively less than the continental base. This determines the presence of stretching forces in the area of the shelf edge and the continental slope. Therefore we could suggest that the fixed faults are gravitation dippers with steep break planes, typical for the areas subjected to stretching. A confirmation for existing then conditions for stretching appears to be the presence of ridges, limited by sub-meridian faults on the west of the area studied.

The transverse driftage – F, cutting through the main sub-meridian fault at the shelf's edge (fig. 1) is probably a result of the changing tension in the Earth Crust of the Moesian plate, caused by changes in its location to the neighboring tectonic structures. Such changes in the tension fields during the Neogene in the region of the north-west Bulgarian Black Sea coast have been mentioned by Shanov [12]. At some spots along the Black Sea coast North from Varna a change in the location of horizontal projections of the axis of maximum pressure has been established – from transverse, compared to sub-meridian faults in Miocene deposits, to steep in Pliocene deposits, in other words from earlier to later geological ages.

All tectonic disorders presented here probably reflect the development of a great fault located deeper.

The data presented is important for the geo-tectonic, marine geology and geomorphology research works.

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