GEOLOGY, SEDIMENTOLOGY, AND NEOTECTONIC FEATURES OF THE BUTRINTI REGION

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Abstract. Butrinti region it is part of Çika anticline belt, limited by regional thrust fault between external Albanides and Sazan - Karaborun zone (Apulian Platform). The most widespread formations there are Permo-Triassic evaporites, Mesozoic carbonates, Paleogene flysch, Neogen - Pliocene molasses and Quaternary sediments. Butrinti region belongs to the external zones of compression regimen named "folding and overthrusting zone".

Key words: Albanides Butrinti geology, anticline, marine environment.

Introduction

Butrinti region represents special interest in neotectonical and sedimentological studies. It is placed in the most southern part of Albania, south of Vurgu - Delvina field and includes Butrinti lake, Xara-Mursi field, Pavllo river mouth, Çiflig and Konispol up to the confine with Greece. Butrinti has outstanding historical values as archaeological centre. In this paper we are dealing with geological construction of Butrinti region , about neotectonic features and with some Quaternary sedimentological data of this region.

Geology. Butrinti region is of complicated geological construction with development of diapiric processes. The oldest formations are presented by Permo-Triassic evaporites, Jurassic and Cretaceous, carbonates, Paleogene flysch, Neogen - Pliocene molasses and Quaternary sediments.

Permo-Triassic formations there are presented by evaporite rocks, mainly anhydrites, some times with dolomite and limestone remains. Jurassic formations are presented by carbonate rocks. Upper Jurassic-Lower Cretaceous it is constructed by biomicrite bedded limestones (porcelaneous) of white colour, intercalated with thin siliceous beds. In general, these rocks are placed normally on the upper siliceous pack of Upper Jurassic. Lower Cretaceous formations there are presented by clay limestones with cherts. In upper part of the section there are going to be predominant clay schists. Upper Cretaceous formations there are placed normally on the Lower Cretaceous ones. Lower levels there are presented by micritic limestones thin bedded and by thin bedded clay limestones with chert lenses and thick turbiditic limestone beds.

Palaeocene-Eocene. These deposits in lover part there are presented by thick bedded organogeno-breeciate limestones with chert concretions. In upper part there are placed thin bedded pelitomorfic

limestones. Oligocene flysch and Tortonian-Pliocene molasses there are widespread as well. All over territory of this region there are widespread Quaternary sediments, especially northern Butrinti Lake. They form Monastery, Konispoli, Xara, Vurgu fields. They represent continental formations of slopes (deluvial, coluvial, proluvial deposits) and fluvial ones. Concerning the period of formation, referring to the neotectonical development of the region and in analogy with other zones we are of the opinion that main deposits are linked with after glacial period, during Holocene. As the oldest formations (wurm) we have considered breccias of slopes, deluvial, colluvial and proluvial formations and reddish gravel in Xare-Mursi defined as Pleistocen-Hollocene (Qp^1h^1).

Holocene (Q.h). Fluvial deposits of Qh_1 there are presented by sandy deposits of Pavlla river south of region and Bistrica, Kalasa rivers north.

Quaternary deposits (Qh_2-k) there are formed north of Butrinti Lake and are presented by clays aleurites and turfs. Marsh formations of 7-8 m thick there are formed around of Bufi Lake and in Çiflig village. In seaside, where Pavlla river flows to the sea and around Viron channel there are formed delta and lagoon sediments.

Tectonic. Butrinti region belongs to the southern continuation of Çika anticline belt placed at the most western past of Ionian zone. At the western side it is limited by regional thrust fault, through which it is realised thrust of external Albanides to the west on Sazan-Karaborun zone (Apulian - Platform -Adria Microplate). Neotectonically this region it is divided in two large parts different from nowadays tectonical trends (Aliaj, 1988):a) Continental part of common uplifting trends.

b) Marine part of common depresional plunging trends.

In continental post there are defined inner areas of horizontal extension regimen and external areas of compression horizontal regimen. Butrinti region belongs to the external zones of horizontal compression regimen named as “folding and upliping thrusts”. In general structure of region has strike NNW, and it is included in Ionian tectonic zone. The folding and upsliping thrusting zone during neotectonic stage have had uplifting trend and it is noted for intensive differentiated movements, while Butrinti basin has depression trend and it is formed during Pliocene-Quaternary. It is important to remember that in structural modelling of this region have influenced and are influencing up to day evaporite diapiric processes.

Butrinti Lake and its genesis of formation are of special importance in this region. Concerning the origin of this lake there are grouped two man hypothesis:

Firstly, Butrinti lake was an simple sea bay.

Secondly, the formation of Butrinti lake was as result of tectonical phenomena.

Tectonical movements caused depression of this area where today it is placed Butrinti Lake. In favour of this opinion testify light depression of beds of the near seaside anticline, which can be watched during last days. Another fact it is Korphy sea channel, which is parallel to this lake

formed as consequences of tectonic depressions. At the same time it is known that one part of remains of Ancient Butrinti Town it is below the sea level. As conclusion, Butrinti lake concerning its genesis is of tectonical origin, while concerning water regimen represents typically seaside logoon.

Sedimentology. For sedimentological study of Quaternary sediments were used geological - geophysical data realised up to now for different purposes.

Due to geophysical study of all profiles and realised sondages with SEV method (Vertically electrical sondages of resistance was done lithological - facial deschifering (electrosedimentalogical) of Quaternary sediment sections. On the basis of data attained from sedimentogical and electrosedimentological deschifering of factic data was defined " perfect " sequence with relative facial terms; clay, aleurolite, sand.

Identification and geometrisation of genetically forms of sedimentary bodies is of special importance, because places sedimetary bodies in real conditions of their formation and gives geometry of position in time and space. Sedimentological association and geometrisation of genetical forms gives the imagine to the realty of development and identification of environments of sedimentation. That has importance for applicative purposes such as: hydrogeological, geological - engineering, geological- environmental, archaeological., urban studies.

Conclusions. - Butrinti region represents complicated geological-tectonical example due to the result of development of evaporite diapirs and thrust tectonics.

- The diapiric development of Permo-Triassic evaporites has conditioned the formation of depression structure, stimulating features of widening tectonic in external zones.
- The character of widening tectonics it is expressed with normal faults, where diapiric phenomena formed depression structures during Pliocene-Quaternary, was the strongest during Quaternary-Lover Pleistocene and continued up to day.
- Quaternary sediments there are divided in two cycles:

First cycle, coincides with development of alluvium fan environment in marine conditions of thickness 30 - 40m. during Lower Pleistocene and during sea transgression after Pliocene.

Second cycle of sedimentation coincides with sea regression and with beginning of river environment and its relations of delta front with more advanced littoral westward of region. In this cycle, amongst river environment happened two local transgressions which coincide with Holocene and with beginning and development of Ancient Butrinti civilisation.

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Fig. 1
1 - Marsh Sediments: clay, aleurites, turfs (Qh_2 - K_1)
2 - Alluvium sediments: gravel, sands, aleurites, clay (Qh-a)
3 - Deluvium, coluvium, proluvium sediments (Qp - 4 - dep).
4 - Slope breccia (Qph_1 -b)
5 - Clays, aleurolites, sands and conglomerates with coal beds (N2p)
6 - Carbonate clays, limestone and sands with lithotogne and corals. Marls with rare limestone beds (N_1^1b)
7 - Flyschiodal formations: sandstone, aleurolites, sandstone - clays with limestone horizons and massive sandestones. (N_1^1a).
8 - Flych aleurolite - clay - sandstone with marly and limestone interclations (Pg_3^3).
9 - Aleurolite - clay - sandstone deposits with limestones (Pg^1_3 -2).
10 - Marly deposits intercalated with limestones and clays (Pg_2^3).
11- Interclations of organogeno-detritic limestones, micrograin limestones with chert intercolations (Pg_1 - Pg_2^{1-2}).
12 - Plate micrograin limestones, organogeno-detritic and clastic, thick bedded with rare chert concretions.
13 - Plate limestones pelitomorphic ones, some times clay limestones with cherts, clay schists and clastic organogene limestones (Cr_1).
14 - White limestones with intercalations of cherts (J_3 - Cr_1).
15 - Limestones intercalated with siliceous and clay schists (J_3).
16 - Interealations of limestones with cherts and clay schists (J_2 - J_3).
17 - Interealations of tripoli, marls, limestone and thin bedded clay limestones (J_2)
18 - Dolomite, dolomite limestone, dolomite with cherts and clay bituminous schists (J1).
19 - Evaporite formation (P -T).
20 - Conys of flowing
21 -Aluvium and coluvium - prolivium.
22 - Strike elements
23 - Geological confines
24 - tectonic faults.

Fig, 2 - Schematic geological section in Butrinti region (Sopik - Ksamil).
1 - Flyschoidal deposites: Aleurolite, sandstone, sandy clays, carbonate clays, clays with lithotogne and corals (N). (All other signs as in Fig. 1.)

Fig.3 - Structural map of the bottom of Quaternary marsh deposits, Butrinti region (Vrina zone). After V. Kavaja, in sc. 1:25000. 1. First river stage (second cycle). 2 - SEV places.

Fig.4 - Geological model after mognetometric profile in Butrinti region. After V. Kavaja, etc.

1 - Cretaceous limestones, 2 - Quaternary deposits, 3 - Neogene, 4 - Evaporite diapir, 5 - Jurassic formations

Fig.5 . 2a. Average rising up to strong and continuating during Pliocen - Quaternary, 2b. Lightly rising since Pliocene, 2d. Lightly plunging during Pliocene and mainly during Quaternary,
K - carbonates, F - Flysch, Pl - tk - Middle Pliocene deposits, Hol - Hollocene alluvium deposits
Hkt - Hollocene marsh deposits.

Fig. 1

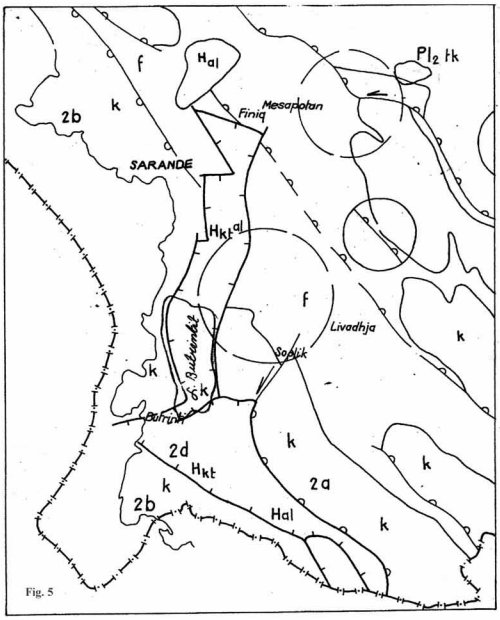

Fig. 5

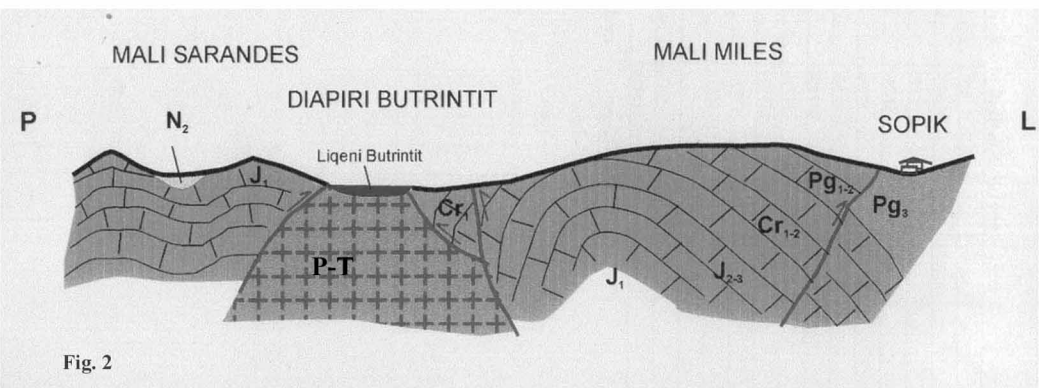

Fig. 2

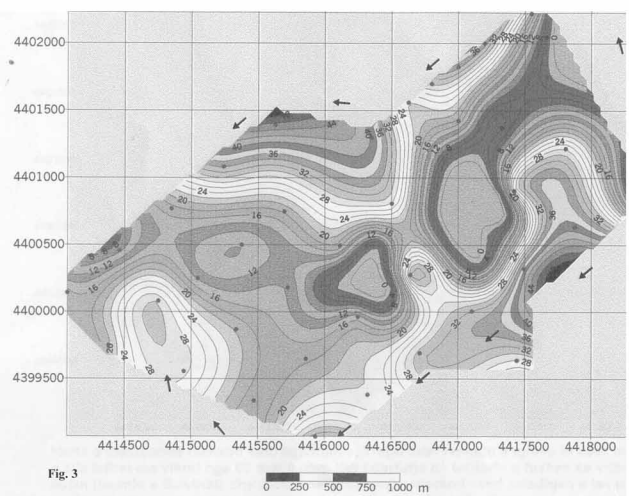

Fig. 3

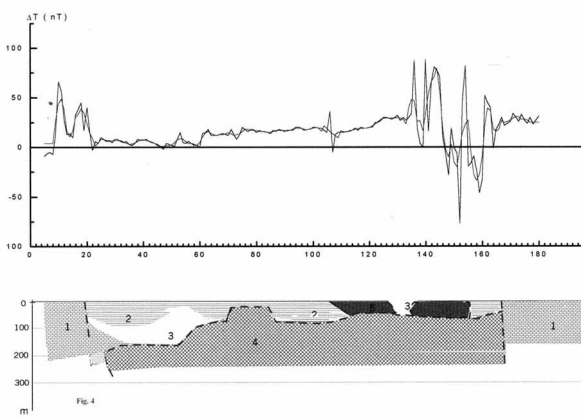

Fig. 4