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NEW GEOLOGICAL AND BIOSTRATIGRAPHICAL DATA ON SAZANI ZONE

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ABSTRACT

The stratigraphy of the Sazan zone deposits has been continuously discussed by a number of geologists. This zone extends in northern part of Paksos (Greece) and east to Apulian zone (Italy) and it should reflect the same developing geodynamic of the two above mentioned ones.

For all three zones and respectively for Sazani one, there is a basic question that arises: What periode of time does the carbonate cycle closing and the beginning of the terigenous one belong to?

The new geological data obtained by the seismic works and wells drilled in Albanian offshore especially several detailed observations. As a result, many geological facts were put in evidence and explained by numerous faunal analyses. The accurate knowing of all the phenomena and their correlation in time and space with adjacent zones, put into sight organic relationships between them and at the same time clarified their geodynamical evolution according to the tectonic phases.

KEY WORDS: Detailed observations, faunal analyses, geodynamical evolution, Sazani Zone, Apulia platform, Ionian Zone, transversal fault, monocline, structures, narrow graben, geologicalobservations, stratigraphical data, conglo-breccia, dolomitic-limestones.

1. BRIEFLY ON THE GEOTECTONIC SETTING OF SAZANI ZONE

In the external Albanides framework, the Sazani zone outcrops restrictevely (in South-West of them) represented by Sazani island and Karaburuni peninsula. It is represented by two monoclines, concerning the structural feature, separated from each other by a longitudinal fault (Fig.1).

The principal extension of this zone is in Albanian (Ionian and Adriatic) offshore, but in this case it is completely covered by the molassic deposits of the Miocene-Pliocene age. This zone is an eastern continuation of the Apulia platform (part of the Adriatic plate).

Its eastern border in surface, serves the overthrusting tectonic contact of the Ionian zone, which is very evident in Dukati, "Qafa e Llogarase" region up to Palasa (Fig.1).

More eastward, it is covered by the Ionian sea waters up to the north of Corfu, Oton islands, where it is deviated nearly 25-30km more westward. This deviation should have been caused since the rifting time phase through a transversal fault, putting in front of each other entirely different facies.

The two monocline structures which are well distinguished on land, consist chiefly of Lower-Upper, Cretaceous carbonate deposits and seldom of Paleogene ones.

In Orikumi region, the Karaburuni monocline deposits display tendences for a periclinal closing. Likewise, in its N-W extreme (at Gjuheza cape) parallelly with all the deposits of eastern dipping trend, there are also deposits of western dipping, especially those of the western margin of it, which belong to the Upper Cretaceous age (Fig.1). The passing of these deposits from the eastern dipping to the western one is realized through a narrow graben, clearly distinguished between the South and North quay lithologically represented by Paleogene deposits.

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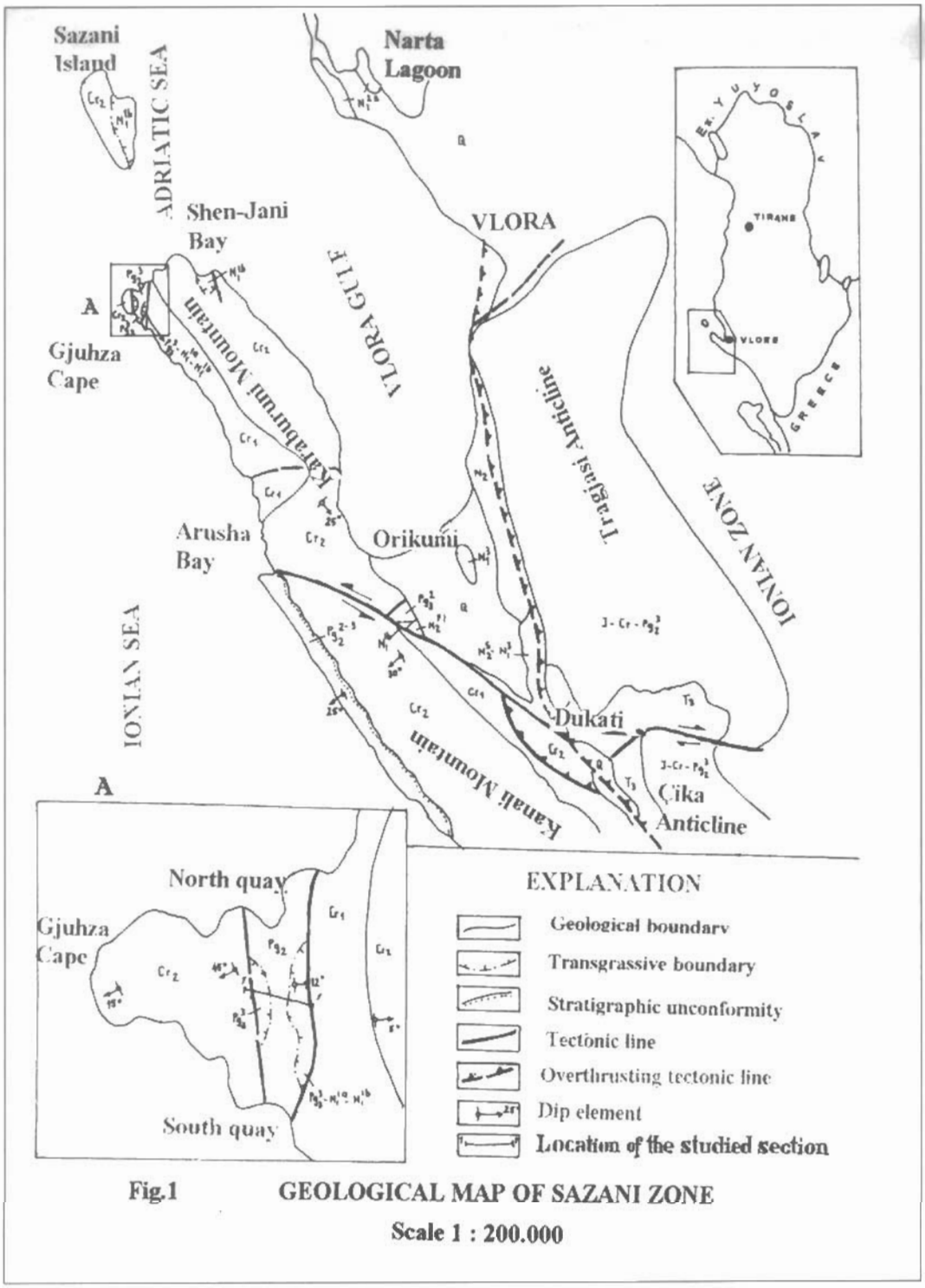


Fig.1 GEOLOGICAL MAP OF SAZANI ZONE

Scale 1 : 200.000

All these facts give strong support to the opinion that the two monoclines should have been an unique structure.

2. STRATIGRAPHY

The stratigraphy of this zone has been treated at length in different studies and papers [Dalipi, H. et al. 1964; Dalipi, H. et al. 1966; Kornjejev, V. J. et al. 1959; Sota, T. 1979; et al. ; Shushkov, G. S. 1950]. The principal purpose of this paper is to present new data on the Paleogene and especially Oligocene deposits stratigraphy. The geological observations and microfaunal determinations are more concentrated in the regions, where these deposits crop-out clearly (Fig. 1).

Basing on the map data of this zone, it is noticed that the extension of the paleogene deposits is along the western slope of Kanali Mountain up to Arusha bay, at Gjuhza cape and Rreza e Kanalit (Fig.1). It is important to be underlined that there is not a full section of the Paleogene deposits in all mentioned-above regions and to give a generalized lithological column, we have mounted individual sections (Fig.1,4).

According to the stratigraphical data [Dalipi, H. et al. , 1964;, Kornjejev, V. J. et al. 1959;. Sota T. 1979; et al.] the oldest Paleogene deposits crop-out, belong to Middle Eocene which go on successively with the Upper Ologocene deposits.

2.1. MIDDLE-UPPER EOCENE

These deposists lie unconformably on Maestrihtian ones (Fig.1). At their base a conglo-breccia layer of about 2-3cm thick, is noticed. It constituents as the pebbles and clasts are not rounded and have different sizes, reaching 5-6cm up to 0.5m. They are mainly represented by mudstones, dolomitic-limestones and rarelly by clastic limestones, rich in *rudista* fragments.

Generally, the section consists of thick-bedded wackestones and mudstones. The rocky fragments within the layers, seldom are of 1mm in size and in only case there are bigger blocks, reflecting in this way a great irregularity in the clastic material spreading during its deposition time. Within the cementing mass of rocky fragments and pebbles, large *foraminifera* as *Nummulites sp, Discocyclina sp, Alveolina sp,* are encountered. In some layers they become rockforming. Besides them, coralline polyps are encountered as well. The more frequent faune present in these deposits is represented by *Nummulites sp, Discocyclina nummulitica, Chapmanina gassinensis, Melobesioidea, Alveolina sp. , Alveolina fusiformis.*

The apparent thickness of these deposits reaches up to 130-170m.

2.2. OLIGOCENE

These deposits are represented by Middle-Upper Oligocene age and crop-out in Rreza e Kanalit, Gjuhza cape region, in a restricted area (Fig.1).

2.3 MIDDLE OLIGOCENE

The deposits of this subdivision have been determined in the most southern extreme of Karaburuni monocline only (Rreza e Kanalit) and are exposed in a tectonic block form contacting with the Upper Cretaceous deposits (Fig.1). They are cavernous rocks without any stratification, represented by wackestones of beige colour. The limestone fragments are of different composition and their size is up to 2-3cm.

The faunal assemblage is represented by *Lepidocyclina (Nephrolepidina sp, Lepidocyclina (Eulepidina) sp. , Spiroclypeus sp. , Amphistegina sp. , Operculina sp. , Austrotrillina sp. , Microcodium elegans* and *Subterraniphyllum thomasi,* etc, testifying to Middle Oligocene age.

2.4. UPPER OLIGOCENE

These deposits crop-out restrictevely in surface (at Kepi i Gjuhzes only) and lie unconformably on the Middle-Upper Eocene deposits where an evident angular unconformity is also visible (Fig.1,3).

They are present the terrigenous cycle beginning and are constituted by a clay -marly sequence (fig. 6).

Their base is characterized by a conglo-breccious layer of 0.5-1.0m thick. The consistuent clasts are semi-rounded and cemented by fine marly carbonatic mass of grey-yellow colour. Going to the top, the

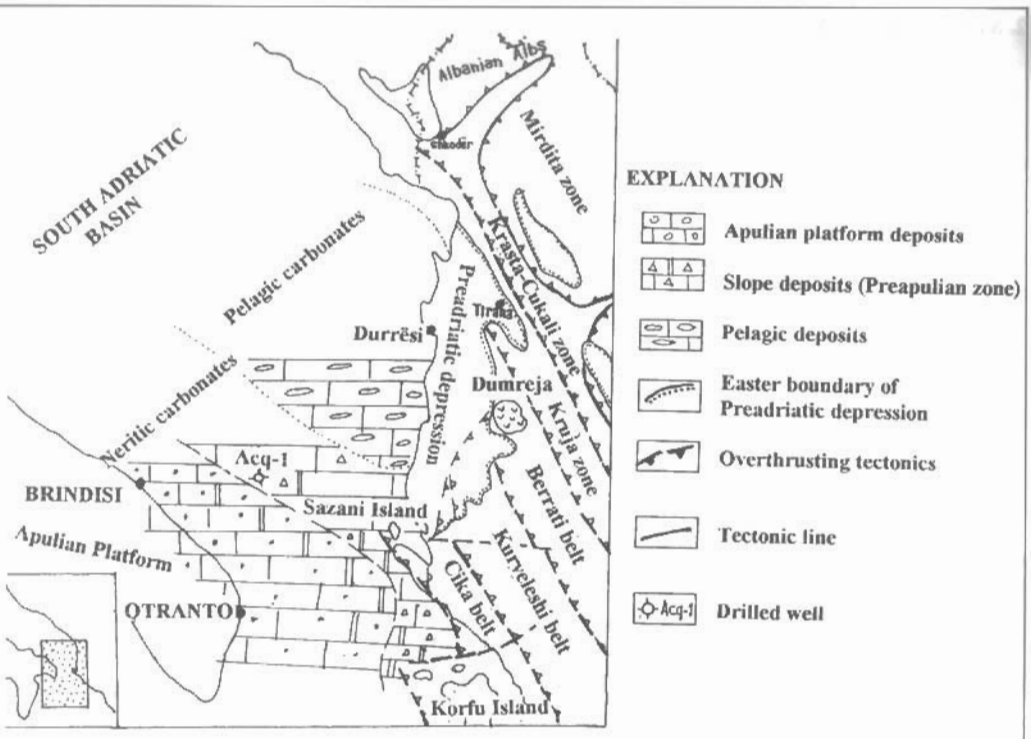
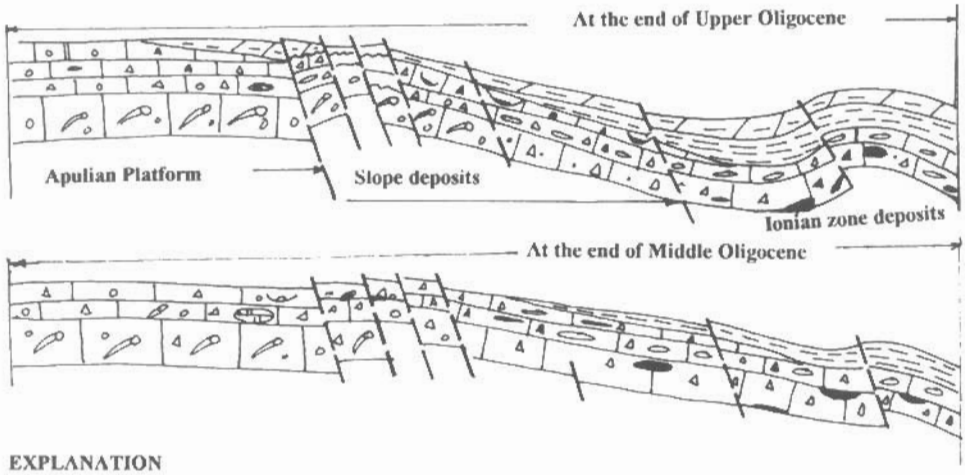


Fig. 2 THE TECTONIC SKETCH OF EXTERNAL ALBANIDES



1. Limestone with Rudista; 2. Clastic limestone; 3. Conglobreccius limestone; 4. Wackstone; 5. Limestone with Lepidocyclina passing in clays laterally; 6. Clays; 7. Marly clays; 8. Transgressive boundary

fIG. 5 THE SKETCH OF PALEOGEOGRAPHICAL DEVELOPMENT DURING THE MIDDLE-UPPER OLIGOCENE (SAZANI ZONE)

section becomes more clayey and is alternated with some breccious limestone layers, whose thickness increases gradually upward (Fig.3).

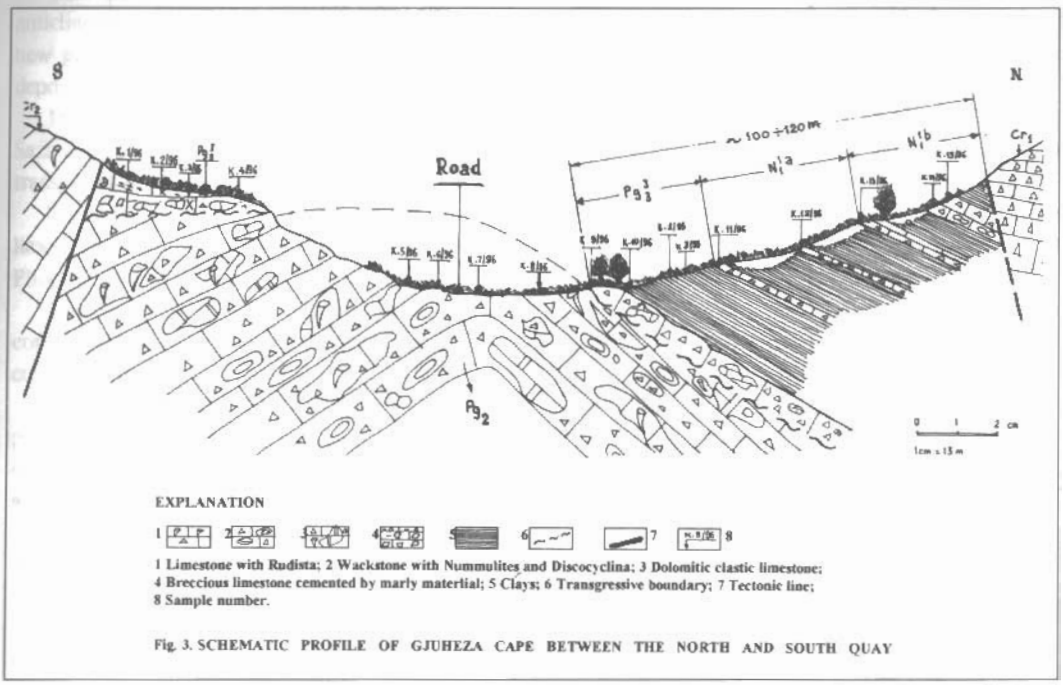


Fig. 3. SCHEMATIC PROFILE OF GJUHEZA CAPE BETWEEN THE NORTH AND SOUTH QUAY

In all the previous works these deposits have been considered to be of Aquitanian or Chattian-Aquitanian age (Aliaj Sh., 1967; IFP, 1966).

The paleontological examinations (microfaunal and especially *calcerous nannofossils* ones) performed recently on the terrigenous section samples and cementing material of the lower most bed, put in evidence the presence of *Globorotalia kugleri, Globorotalia pseudokugleri, G. opima nana, G. venezueliana, G. trilobus, Globigerinoides trilocularis, Globigerina gr. ciperoensis, Globigerinoides sp. , Miogypsinoides sp., Sphenolithus ciperoensis, S. conicus, S. moriformis, C. eopelagicus, H. euphratis, T. carinatus, P. hermosus, P. ovata, E. fenestrata*, etc, which date the Upper Oligocene age (Fig.3,4).

The other part of the following terrigenous section consists of mudstone and conglo-breccias layers alternation which belong to the Chattian-Aquitanian up to Burdigalian age (*Globigerinoides trilobus* subzone).

So, it is fully confirmed, based on the geological and paleontological data, that the terrigenous cycle in the Sazani zone has begun with the Upper Oligocene subsection. The same situation has been also evidenced even in a long distance from Sazani zone in north-west to it, at well Acq-1 (Fig.2,4).

These results show that the Sazani zone should be included in a transitory zone in comparison with the Apulia platform or Paksos zone where the carbonate deposits cycle for them is thought to be of Aquitanian or Burdigalian age beginning (Deas E., 1993).

3. BRIEFLY ON THE BASIN GEODYNAMIC AND HYDROCARBONS EXPLORATION

The Sazani zone was underthrusted during the compressional phases occured especially in Upper Cretaceous - Early Paleogene (when in the internal zones the orogenese was being performed).

This zone situated between the Apulia platform (represented by deposits of nearly horizontal dipping) and orogene of the eastern zones, underwent a fracturing of the deposits in horsts and grabens shape (Fig.5).

So this zone gradually took the aspect of a slope. A series of vertical faults which presented the passing

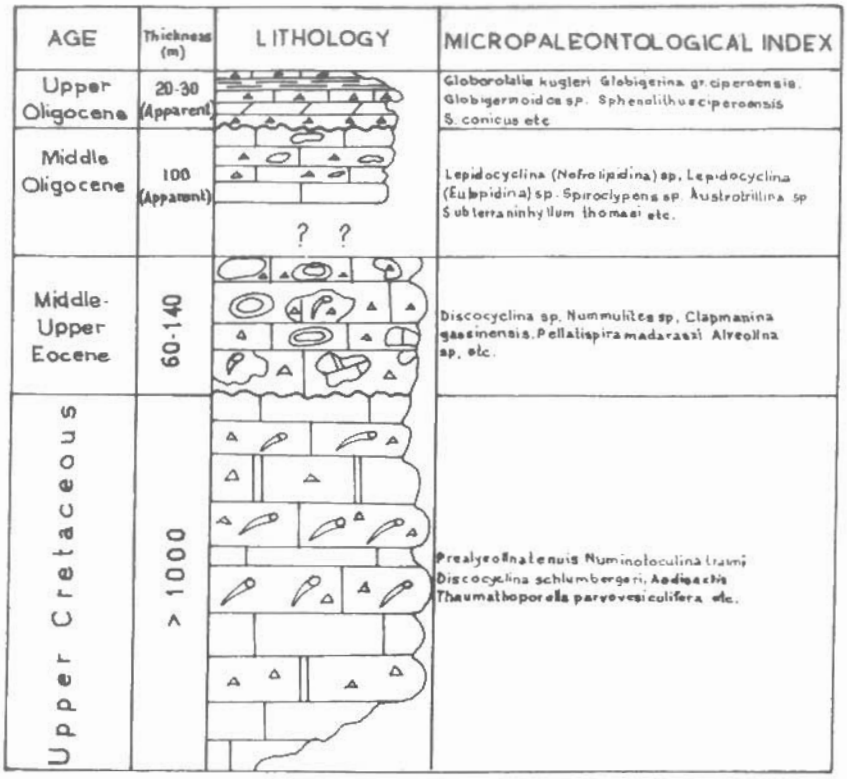
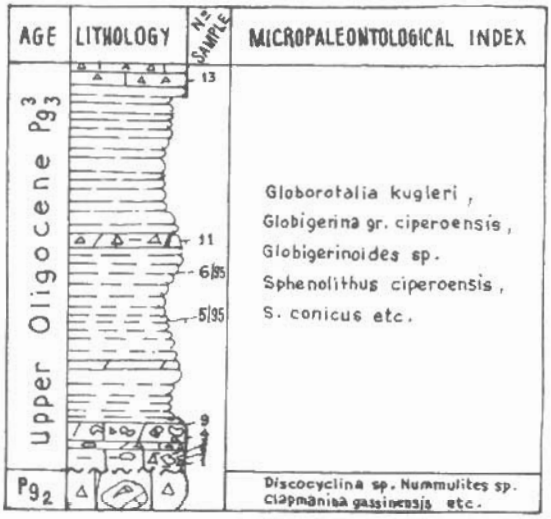


FIG. 4. STRATIGRAPHIC SECTION OF THE CARBONATE AND TERRRIGENOUS FORMATION IN SAZANI ZONE



(SEE. Fig.3)

Fig.6 LITHOLOGY AND MICROPALEONTOLOGICAL DATA OF THE GJUHZA SECTION

to the basin, arose there. During the time of the most powerfull orogenic stages, some blocks emerged and later on being eroded in different levels of the carbonate deposits.

This situation remained the same up to the post Middle Ologocene time. During this time some anticline belts sectors in Ionian and especially in Kruja zone, should have been emerged and eroded. The new geological background of the above-mentioned zones brought to a new tectonic regime of the deposition process in the Sazani zone (Fig. 5).

During the successive geological periods, especially before the Middle Miocene and Pliocene age, Sazani zone continued to be also object of the erosion and dipping processes. The last ones caused a transgressive setting of the relevant deposits on those of Paleogene and Cretaceous ones.

The seismic works have evidenced some erosional uplifts of different dimensions and types at the limestone level. They are as of "sandy dunes" aspect, covered by molassic deposits of Miocene and Pliocene age.

The reservoir qualities of these rocks are adequate for the hydrocarbons production. The problem consists in finding the stratigraphical type of the traps in these deposits, sealed by a certain sedimentary cover presence.

On the other hand, the finding of the economical oil accumulations within the erosional uplifts is also possible. The well Zv.3 has encountered oil shows whose geochemical characteristics are identical to those of the well Vl-11 drilled in Ionian zone and highly different to those of the well Vl-10 (situated 500 m of the well Vl-11).

This unconformity, related to the oil composition of the two last wells, is explained by the blocky feature of the Vlora structure that belongs to the çika anticline belt of the Ionian zone, which overthrusts the Sazani zone.

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