

TECTONIC RELATIONSHIP BETWEEN THE KRUJA (GAVROVO) AND THE IONIAN ZONES OF THE ALBANIA THRUST BELT

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ABSTRACT

The Kruja zone and the Ionian one are integral parts of the Albanian Thrust Belt, which lie directly in the northern continuation of the Western Hellenic Nappes up to their interruption against the thrust front.

Flysch of the Oligocene and rarely carbonate deposits of Cretaceous-Eocene age consist the area along the boundary between the two zones in question.

Deposits of both tectonic zones are similar. But, despite the lithological similarities, presence of conglomerates in the Oligocene flysch and dolomites in the Cretaceous carbonates are the main characteristics of the Kruja zone. Whereas, pelagic carbonates in the Cretaceous section, as well as presence of detritic foraminifer limestone in the Oligocene flysch typify the Ionian zone.

1. INTRODUCTION

Numerous detailed geological surveys, seismic surveys and exploratory wells, carried out along the area between the Kruja and the Ionian zones have provided an invaluable information on their facial, structural and tectonic features. Nevertheless, there are still principal discussions on the tectonic relationship between them. The main question is whether there is a big thrust between these two tectonic zones or a real gradual transition exists. It is a big question, because of its influence on depicting the spatial position and estimation of the oilbearing perspective of the oil prospects in both tectonic zones in question.

2. LITHOLOGICAL CORRELATION OF THE CARBONATE AND FLYSCH DEPOSITS BETWEEN THE KRUJA AND THE IONIAN ZONES.

Both sides' areas, along the contact between the Kruja zone and the Ionian one, in southern part of the Albanides Thrust Belt consist of flysch deposits of the Oligocene age. Farther north the molasses deposits of Miocene cover transgressively the flysch and flyschoid deposits. Nevertheless, existing seismic data and dry exploratory wells ones offer the possibility of interpreting the tectonic relationships between these two tectonic zones under the molasses cover (Fig.1, 3).

Lithological features of the Lower Oligocene flysch deposits of the Kruja and the Ionian zones are similar to each other. So, flysch deposits of this age in both zones consist of intercalations of sandstone, siltstone, clays, as well as puddings and limestone olistholiths of the Cretaceous and the Eocene age (Fig.2). Whereas the Middle and Upper Oligocene flyschoid deposits of the Kruja zone consist of massive sandstone, conglomerates and puddings. Meanwhile a more fine material as foraminifers limestone, marly clays and clays characterize the flysch of these ages in the Ionian zone (H. BAKIA, et al., 1987)

Regarding the facial nature, in carbonate deposits of the Cretaceous are observed some interesting phenomena. So, these deposits consist chiefly of dolomite limestone, bituminous dolomite and bituminous shale in the eroded carbonate anticlines of the Kruja zone, as Tomorri, etc. (E. PRENJASI, et al., 1981). Whereas in their counterparts in the Ionian zone is not found any dolomite layer. Meanwhile, carbonate deposits of the Cretaceous section in Melesini anticline located in the same structural chain with the Tomorri anticline, along the western edge of the Kruja zone are quite similar to their counterparts in the Ionian zone (Fig. 2). In other words the anticline of Melesini represents an example of gradual lithological changes of the carbonate deposits between the Kruja and the Ionian zones (E. PRENJASI, et al., 1997).

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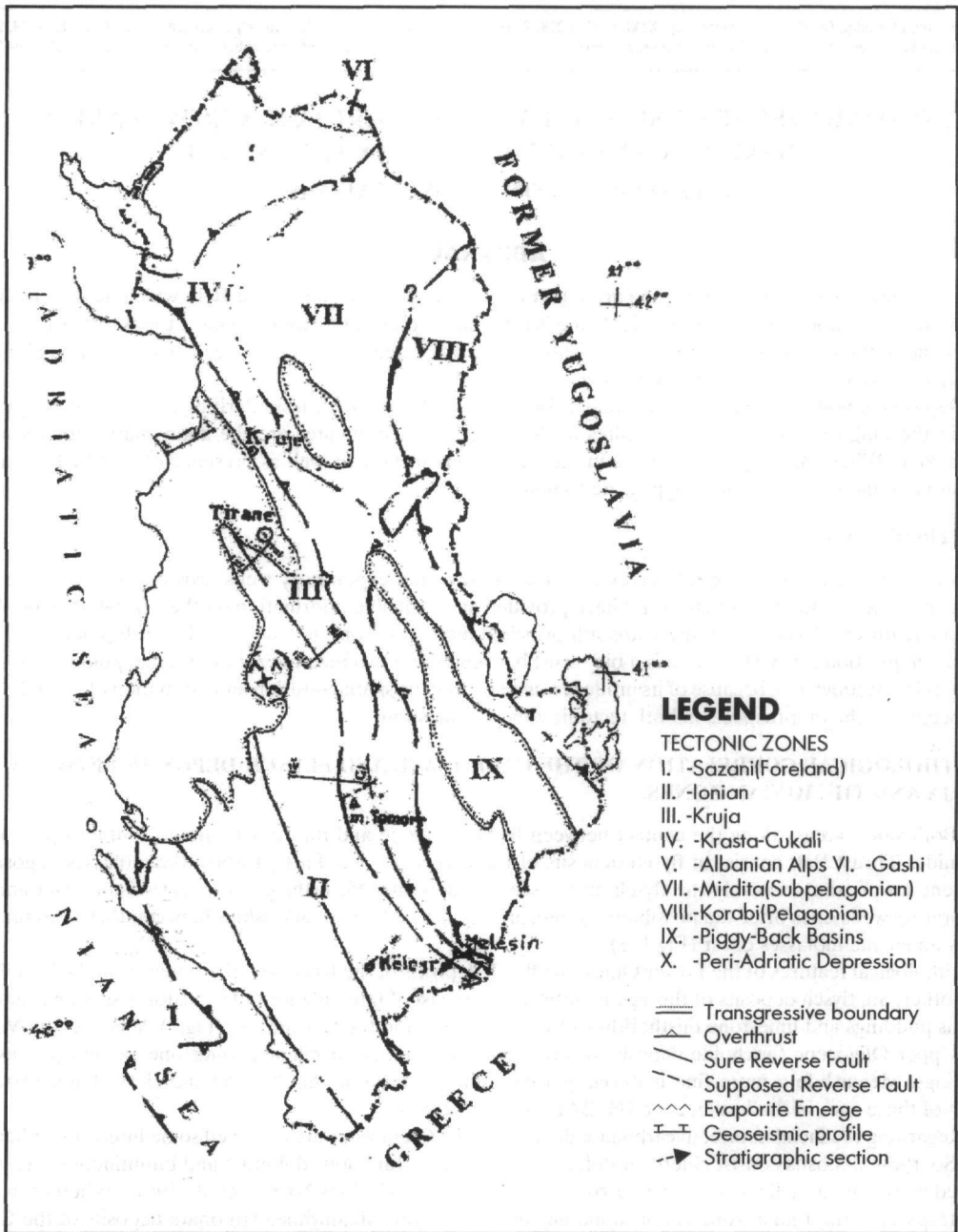
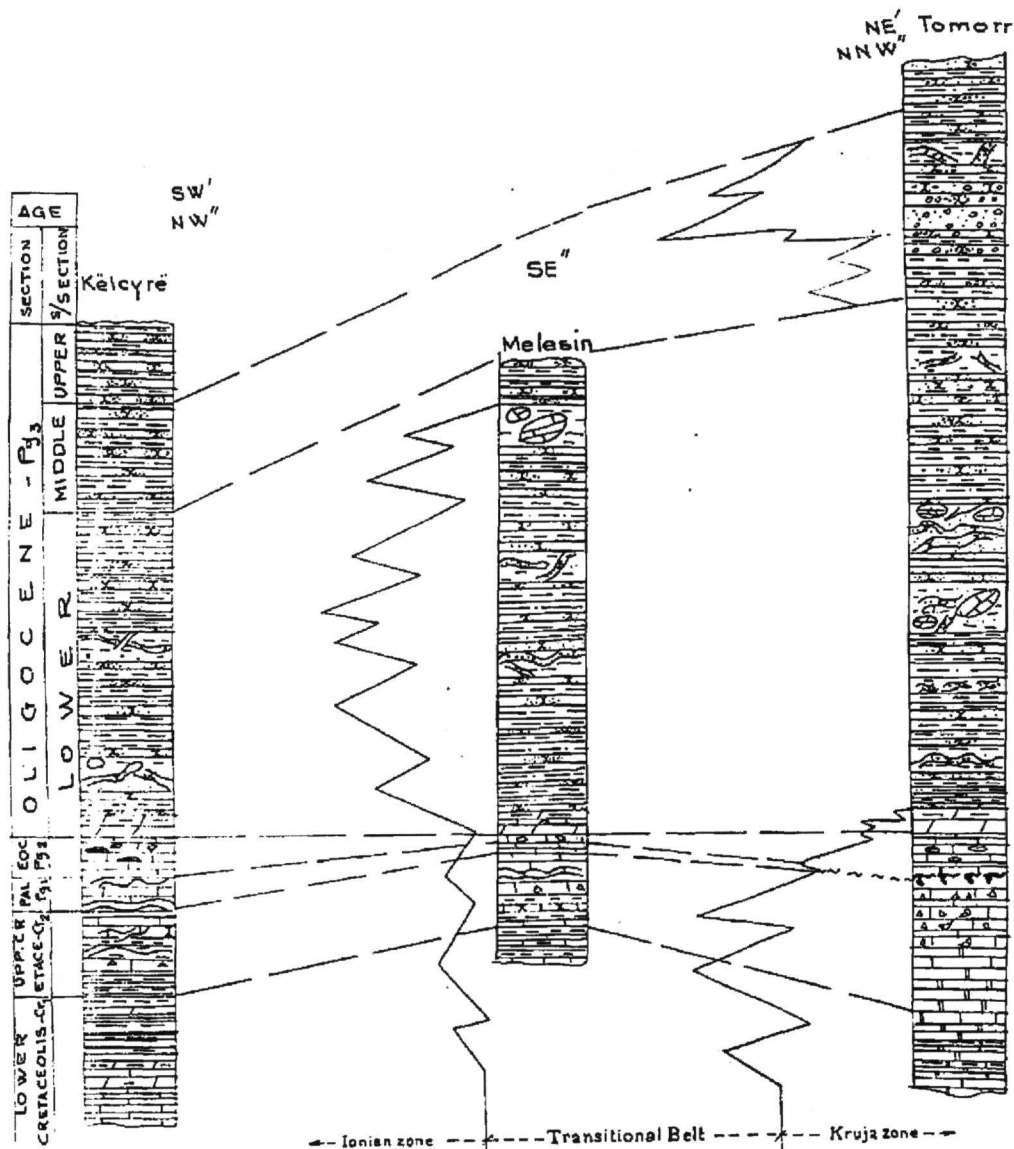


Fig.1 Schematic Tectonic Map of Albania
(From H. Bakia 1987, E. Prenjasi 1991)

3. STRUCTURAL FEATURES AND TECTONIC RELATIONSHIPS BETWEEN THE KRUJA AND THE IONIAN ZONES.

The structural and tectonic features of the anticline structures of the Kruja and the Ionian zones are very similar to each other. So, in both zones in question prevail folds of the western asymmetry, associated frequently with longitudinal reverse folds along the western flanks of the eroded structures (Fig. 3,6). Whereas faults of back-thrust type are depicted rarely (Fig. 3). (E.PRENJASI, 1991) Additionally there is not a solely remarkable



Legend

SW' - NE' Cross trending

NW''-SW''-NNW'' longitudinal trending

Supposed lithological changes

Hiatus filled up with bauxites

Fig.2 Correlation scheme: Comparison of the carbonate and flysch deposits of the Kruja zone with their equivalences in the Ionian one. Gradual lithological changes have taken place across both zones and extensionally, within the same zone. They are more emphasized and obvious in the Cretaceous carbonate deposits than in the Oligocene flysch ones.

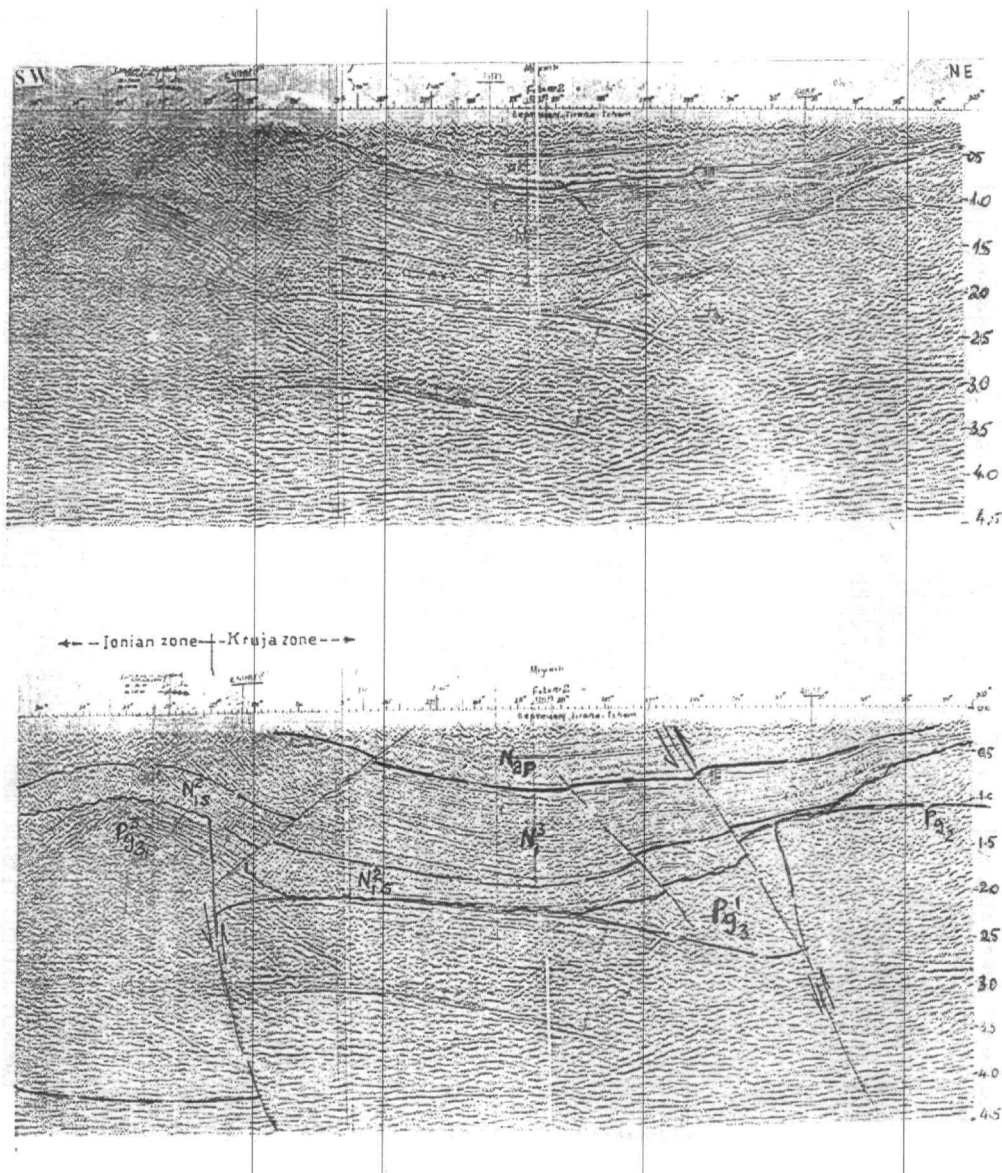


Fig.3 Geoseismic cross section I-I: Westward thrust of a buried anticline of the western edge of the Kruja zone onto the Ionian one. N_{2p} -Pliocene, N_1^3 -Messinian, N_1^2 -Serravallian, Pg_3^3 -Upper Oligocene, Pg_3^1 -Lower Oligocene, Pg_2 -Eocene

continuous tectonic contact between the Kruja and the Ionian zones. So, there are two almost parallel reverse faults, which die and replace each other along their extension through Oligocene flysch at surface. What is more important, a normal tectonic transition from the eastern flank of the Maraku anticline (Ionian zone) to a big syncline of the Kruja zone is detected following the top Eocene limestone horizon, towards the depth in a cross seismic section (Fig.5).

Normal is also the transition from the western flank of the Melesini (Leskoviku) anticline (Kruja zone) to its neighboring syncline in the Ionian zone (E. PRENJASI, 1997).

Other examples of essential normal structural transition are depicted in the west of the anticline structures of Rova and Papri located along the western edge of the Kruja zone. In these cases, both anticlines consist of

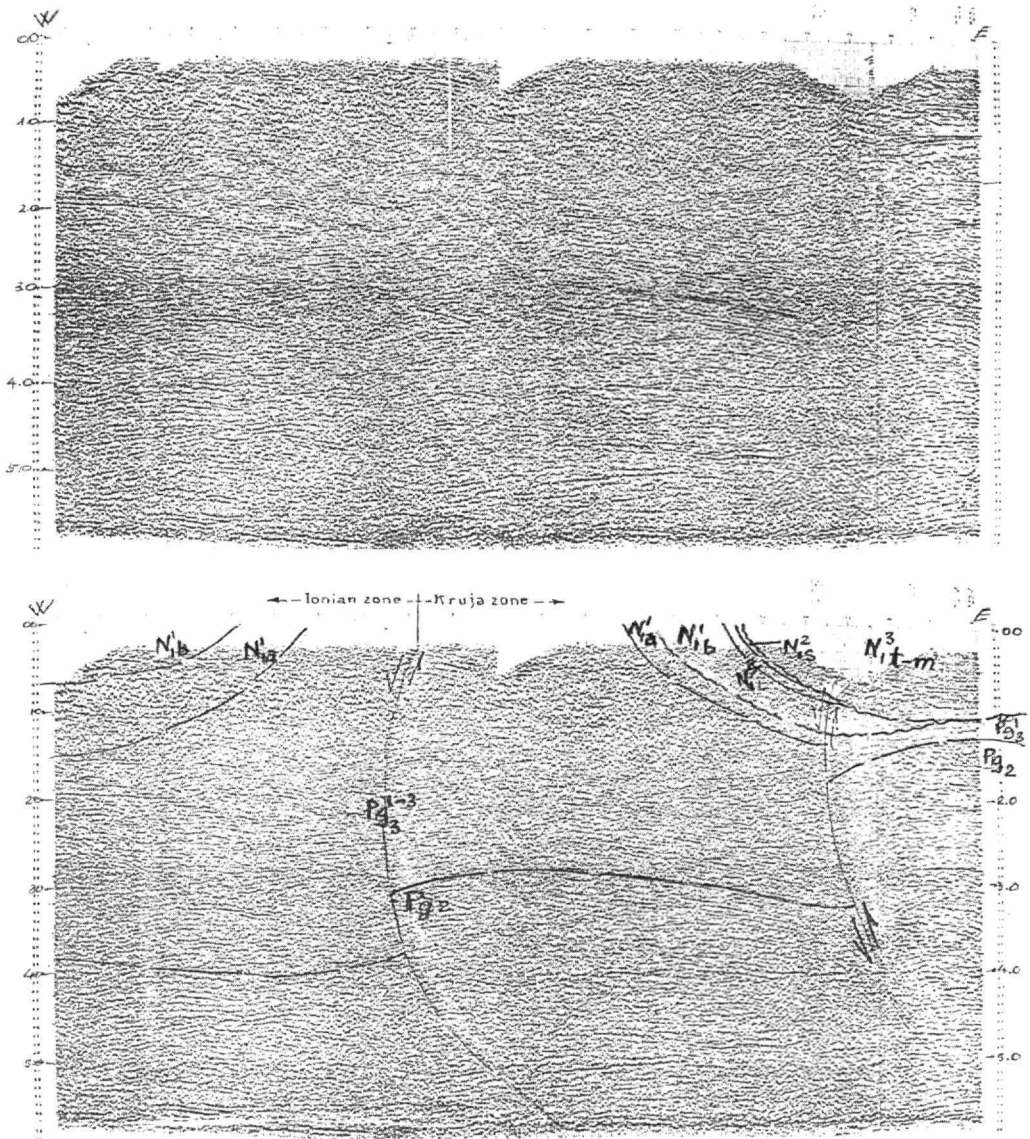


Fig.4 Geoseismic cross section II-II: Reverse fault between an anticline structure overlain by the Oligocene flysch deposits of the Kruja zone and a syncline structure of the Ionian one. N_1^3 -Tortonian-Messinian, N_1^2 - Serravallian, N_1^1 -Langhian, N_{1b}^1 -Burdigalian, N_{1a}^1 -Aquitanian, Pg_3^{1-3} -Lower - Upper Oligocene, Pg_2 - Eocene

deposits of the Middle Oligocene age at surface (Fig.4). While longitudinal reverse faults complicate the flysch deposits along their western flanks, but these faults may remain suspended in the flysch deposits of the Lower Oligocene age, in depth.

Additionally, gradual transition between the Kruja and the Ionian zones is presented in a study on the Aegean region (V. JACOBSHAGEN, et al., 1987).

4. CONCLUSIONS

1. Considering the following facts:

- Facial similarities and gradual transitions of flysch and carbonate deposits between the Kruja zone and the Ionian one.

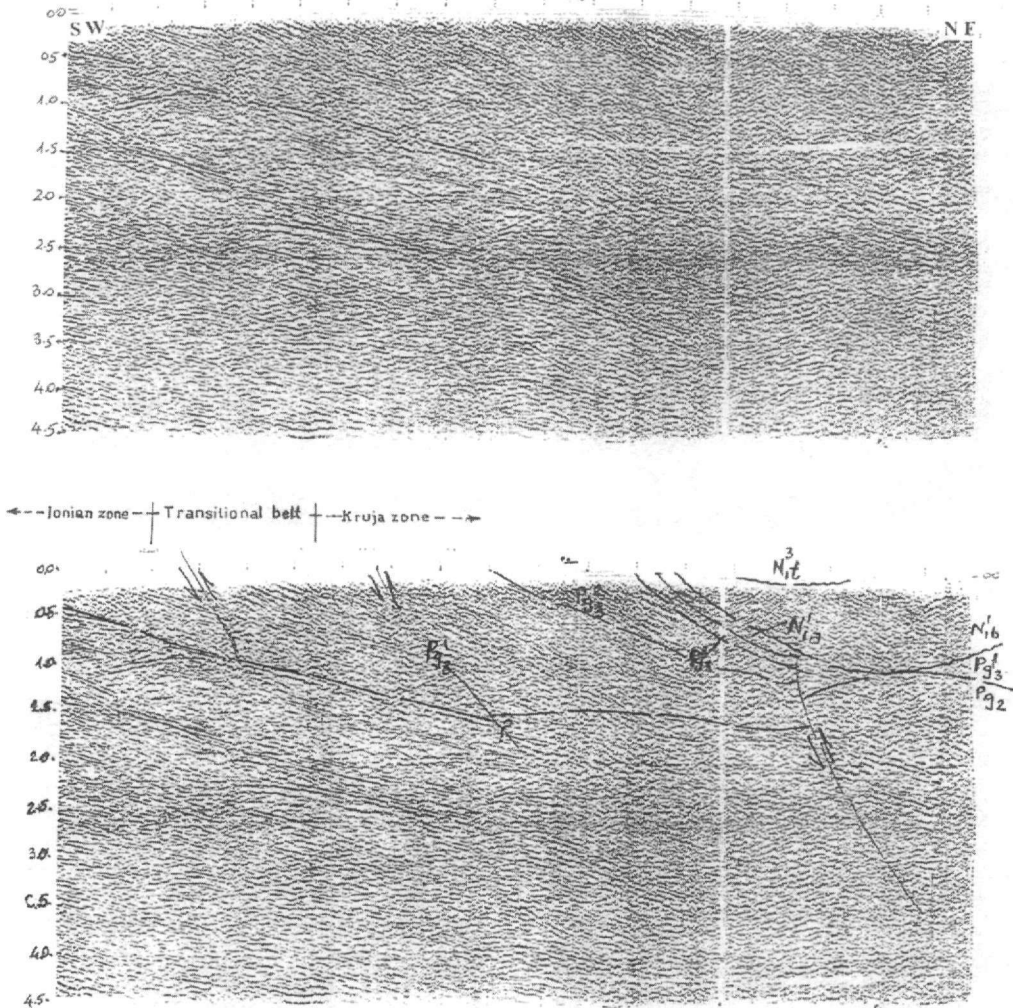


Fig.5 Geoseismic cross section III-III: Gradual structural transition from an anticline structure of the Eastern part of the Ionian zone to a syncline structure of the central part of the Kruja one. N_{1t}^3 -Tortonian, N_{1a}^1 - Burdigalian ("Levani" suite), N_{1a}^1 -Aquitanian, Pg_3^3 -Upper Oligocene, Pg_3^2 -Middle Oligocene, Pg_3^1 -Lower Oligocene, Pg_2 -Eocene

- Structural and tectonic similarities between the anticline structures of both tectonic zones in question.
- Existence of sectors with normal tectonic transition, from the Kruja zone to the Ionian one, as well as of the sectors with tectonic contact between them.

It is clear that the transition between the Kruja (Gavrovo) zone and the Ionian one is essentially gradual.

2. The anticlines covered successively with a considerable flysch thickness, as Papri, Rova, etc. deserve further attention as potential oil prospects.

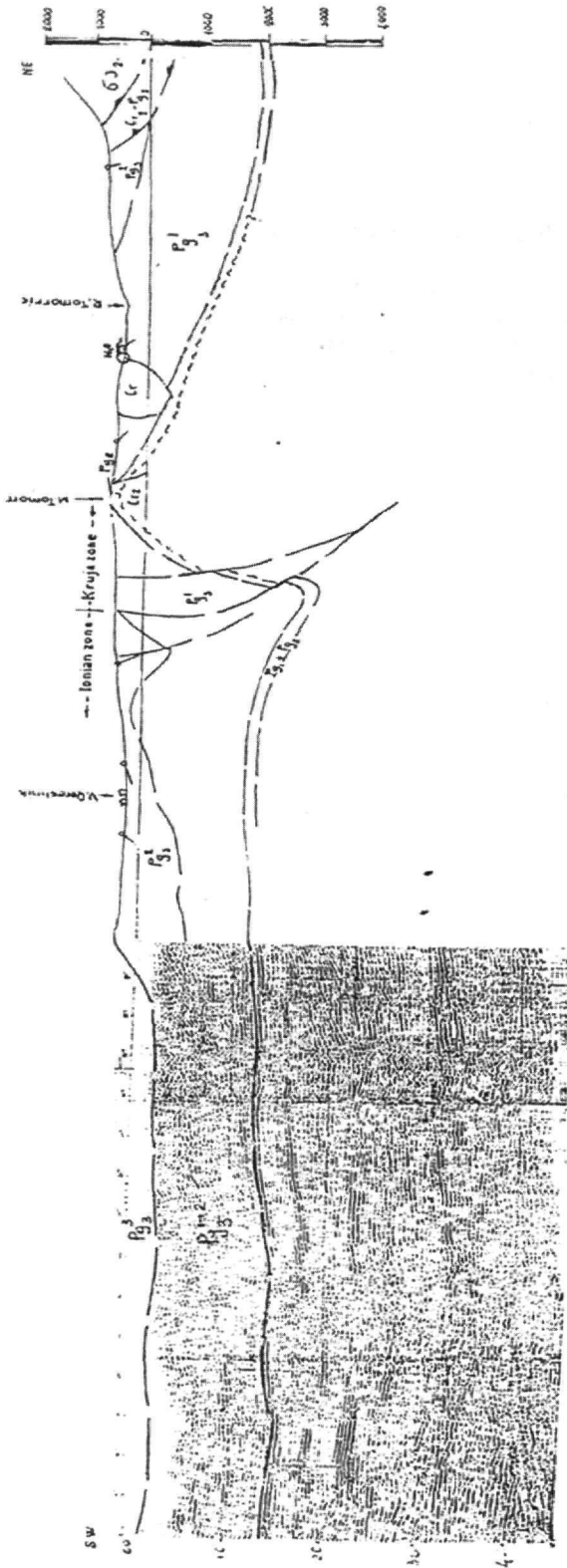


Fig.6 Geoseismic cross section IV-IV: Westward thrust of an eroded anticline of the Kriuja zone onto the Ionian one. P_3^3 -Upper Oligocene, P_3^{1+2} -Lower and Upper Oligocene, P_3^1 -Lower Oligocene, P_3^2 -Paleocene and Eocene, Cr_2 -Upper Cretaceous, S_3 - Ultrabasite rocks

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