



## 9. MEDZINÁRODNÁ BANÍCKA KONFERENCIA 9th INTERNATIONAL MINING CONFERENCE

### NEW PETROLEUM GEOLOGICAL RESULTS FROM THE CENTRAL PART OF THE NEOGENE IN THE EAST SLOVAKIAN LOWLAND

### NOVÉ NAFTOVO - GEOLOGICKÉ VÝSLEDKY CENTRÁLNEJ ĽASTI NEOGÉNU VÝCHODOSLOVENSKEJ NÍŽINY

Július Magyar<sup>1</sup>, Milan Možkovský<sup>2</sup> a Rudolf Rudinec<sup>1</sup>

**Abstrakt:** Nové seizmické a vrtné údaje z východného okraja centrálnej časti neogénu Východoslovenskej nížiny zistili výrazný podpovrchový štruktúrny element. Zlomami porušená antiklinála je prešmyknutá od SZ k JV na horniny pozdišovsko – iňačovskej jednotky. Silne deformované horniny boli zistené vo vrte - 3 (Pozdišovce - 1). Definovanie štruktúrneho štýlu je dôležité pre určenie typov uhľovodíkových pascí, ktoré boli objavené čerpacími skúškami.

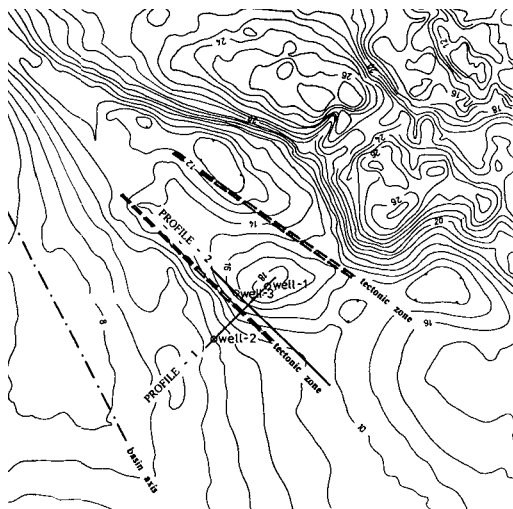


Fig. 1. Gravity survey for studied area and location of profiles 1, 2 and tectonic zones.

developed along it. The fault creates westerly marginal delimitation to the Pozdišovce elevation in Pre-Neogene

#### 1. Introduction

New geological and geophysical data (Fig. 1), mainly seismic results from eastern margin of the central parts of the East Slovakian Neogene in the region of Michalovce show deformations in Neogene filling and its basement, or between two smaller blocks and their movements, illustrated by seismic profiles (Profile 1,2). Deformations are multi-phase and complicated ones including both compressional and extensional events.

#### 2. Structural interpretation

The most pronounced structural feature in the north (Profile 1) are the Močarany faults (including the Michalovce faults) deduced from detailed stratigraphy and seismics. This is a ramifying high angle fault with pronounced horizontal component of movements. A „flower structure “

<sup>1</sup> RNDr. Július Magyar, CSc., Doc. Rudolf Rudinec, DrSc., Nafta, a.s., Gbely, Prieskumno - ťažobný závod, 071 01 Michalovce, Priemyslná 6. Tel.: 0946 / 41 5311. Fax: 0946 / 41 5250

<sup>2</sup> RNDr. Milan Možkovský, CSc., Geofyzika, a.s., 612 43 Brno, Ječná 29 a, P. O. BOX 62, Česká republika. Tel.: 05 / 7264111. Fax: 05 / 4122508

basement.

The elevation is assumed to represent an upthrust structure originated by shortening due to pressure from NW to SE in the Pannonian (well - 1).

Investigations into the origin of elevation, the upthrust nature of what is assumed proven, disclosed several stage movements. If assuming sequence thickness and vergency deformations of fold axis, it appears that last movements along the thrust plane were backwards. After the cease of compression, backslipping movements occurred. Deformations completely ceased in Upper Sarmatian and Pontian sediments (5,4 - 7,5 My) along the SE slope cover the elevation.

**Profile - 1**

WSW

2T

**NEOGENE EAST SLOVAKIAN LOWLAND**

ENE

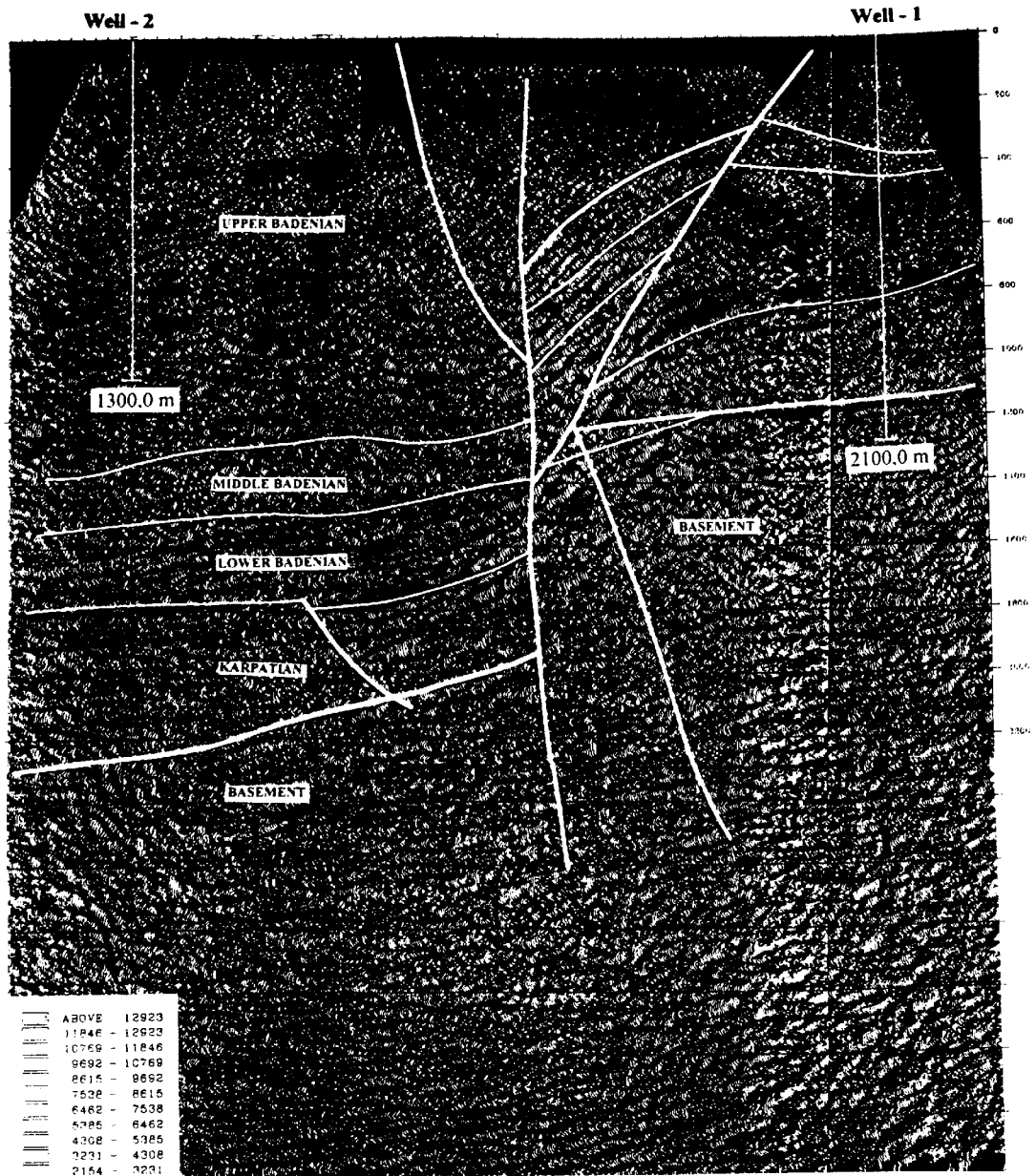


Fig.2. Hilbert transformation of a time section (Profile 1, 2) showing interpreted structural styles of the central parts of the Neogene in the region of Michalovce.

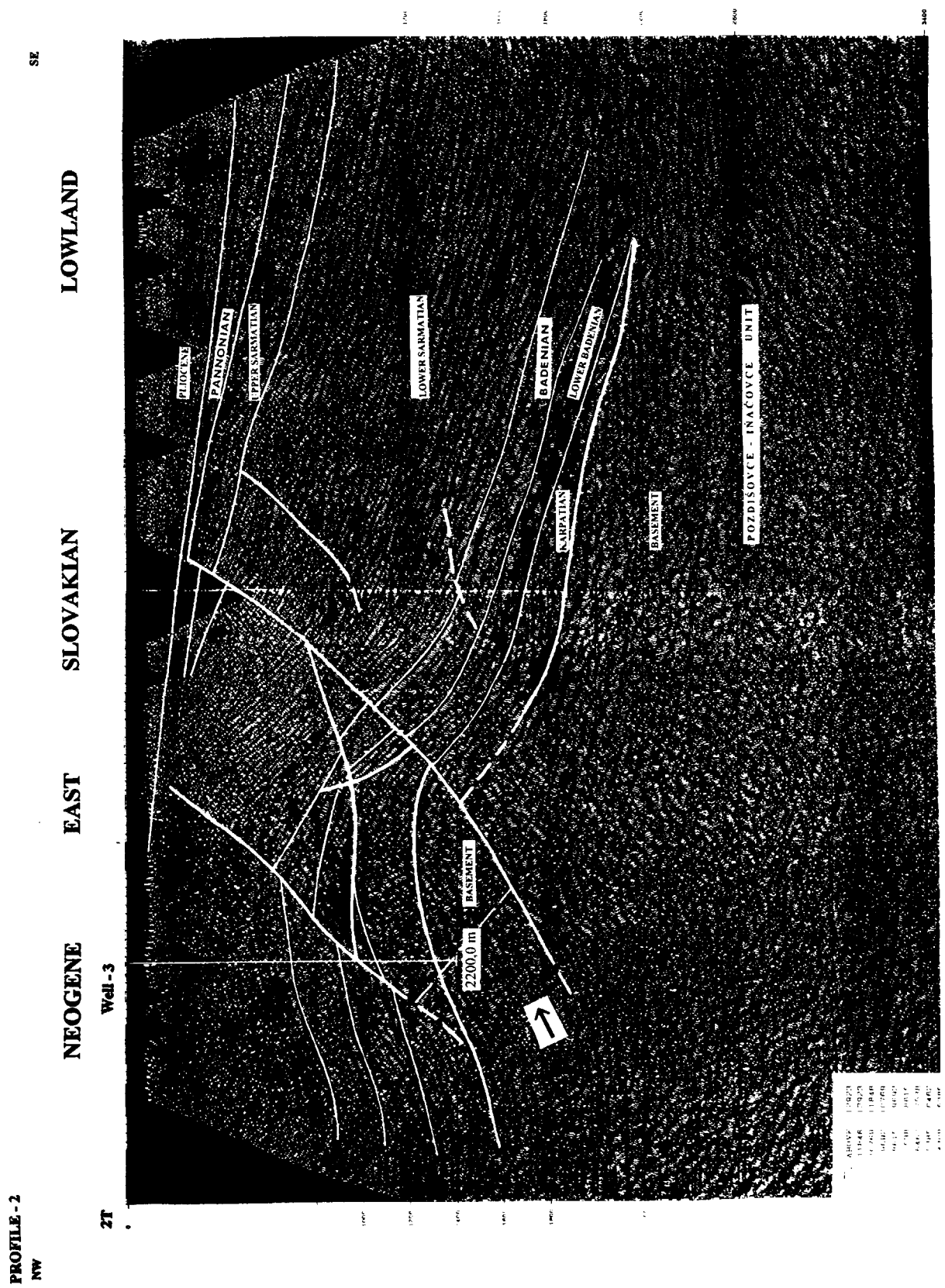


Fig.3. Hilbert transformation of a time section (Profile 1, 2) showing interpreted structural styles of the central parts of the Neogene in the region of Michalovce.

High angle reflexes along elevation slopes are, most probably, true. Beside repeated tests, this was found in well - 3 drilling where values in drill cores show 450 and more.

The Moèarany fault belt (together with the Michalovce faults) continues from the Pozdišovce elevation area to SSE. Its importance is pronounced by the generation of antithetical Trhovište faults segmenting the area into numerous blocks.

The structure of southern part (Profile 2) is influenced by the function of main décollement listric plane separating Neogene filling from Pre-Neogene basement.

Možkovský and Lukášová (1986) stated consistency of Pre-Neogene basement with thrust planes in its upper parts and Soták et al. (1993) indicated superposition of Mesozoic over Neogene due to thrusting. This surface is pronounced in seismic profiles due to physical difference between Neogene and basement, represented by the Pozdišovce - Iôaèovce unit. It appears that it is a multi-stage listric fault structure from which the uppermost is represented by décollement along the Neogene and basement boundary. The main listric surface is striking in seismic profiles oriented to NE, i.e. perpendicular to the most pronounced younger structural elements of the basin. The general dip is to SW and the gradual merge may be reliably followed up to the contact between Trhovište faults with Moèarany ones. The Moèarany faults are dipping towards the basin, i.e. to SW and towards the main listric surface.

### **3. Conclusion**

All these tectonic features occur over a large area in which economic hydrocarbon accumulations were discovered. Exploration that has been carried out had proven new pool types in Lower Sarmatian and Upper Badenian beds in the 400 - 1,600 m depth interval. This supplied data for a better understanding of geology and of the development of the area.

### **Literature**

- Možkovský, M. a Lukášová.: Zpráva o reflexní - seizmickém meøení ve východoslovenském neogénu v r. 1986. *Manuskript - archiv Nafta - P Z Michalovce.*
- Soták, J., Rudinec and R. Spišiak, J.: The Penninic „pull-apart" dome in the pre-Neogene basement of the Transcarpathian Depression (Eastern Slovakia). *Geol. Carpathica 1993, 44, 1. 11-16.*