

CORRELATION OF THE PALEOGENE AND NEOGENE DEPOSITS FROM NORTHERN TRANSYLVANIA

NICOLAE MÉSZÁROS*

ABSTRACT. The study was concentrated on the Paleogene and Neogene deposits from the border of the Gilău Mountains, east Meseș Mountains, south of Țicău and Preluca Massifs, the Transcarpathian flysh, as well as those from of south Rodna Mountains. The formations are made up of continental (including fluvial and lacustrine) and normal marine deposits. Based on the nannoplankton data, these were compared to those of the Transcarpathian flysch. In the case of the marine deposits, 5 sedimentation cycles were separated. The last cycle belongs to the Badenian, marked by a general transgression, represented by conglomerates and marls in the base allowed by Dej Tuff and salt deposits. Starting with the Badenian, the Transylvanian Depression evolved as a unitary basin.

KEY WORDS: Transylvanian Depression, lithostratigraphy.

Introduction

As a collaborator of the Shell Romania Exploration B.V., I prospected a large territory between 1992-1996, starting with the eastern part of the Gilău Mountains (Iara area), the northern part of the Gilău Mountains and the eastern part of the Vlădeasa Mountains (Huedin), the eastern part of the Meseș Mountains, the southern side of from the Țicău and Preluca Massifs, as well as Transcarpathian flysh area (Sălăuța Valley), the Bârgăului Mountains and the southern slope of the Rodnei Mountains. 120 long profiles and several hundreds of sections and outcrops were studied. In the same time, a part of showing the lithologic characters of several stratigraphic units, the lithologic variations were followed laterally and vertically, and the thickness and the age of the deposits was determined based on nannoplankton assemblages.

Depending on the paleoenvironment, these units belong either to the epicontinental domain, or to the Transcarpathian flysch. We managed to separate fluvio-lacustrine deposits and marsh deposits. Lagunar deposits of gypsum and alabaster can be distinguished, as well as normal salinity deposits. The Transcarpathian flysch deposits have on the whole a marine character.

Correlations

Five lithostratigraphic units were separated (sedimentation cycles):

* Department of Geology-Paleontology, Babeș-Bolyai University, 1 Kogălniceanu str. RO-3400, Cluj-Napoca, Romania

The *Jibou Formation* (ex - lower variegated clays - Koch, 1894; Hofmann, 1879; lower variegated complex – Răileanu & Saulea, 1956). This is a 1500 thick fluvio-lacustrine unit, having a main lacustrine interbedding of the Rona Member (ex - lower freshwater level - Koch, 1894) at Jibou, separating the formation into three parts. The *Rona Member* is made up of limestone, marls, clays with characeans (Baciu, 1997), mollusks (Mészáros, 1991) and vertebrate (Gheerbrant et al., 1999) remains.

The corresponding unit in the Transcarpathian flysch is the *Sălăuța Formation*, made up especially of sandstones and conglomerates. The two nannoplankton levels (NP 8 and NP 14), indicate the Paleocene, Early Eocene and Early Lutetian age of these deposits.

Early marine transgression of the Late Lutetian determined the deposition of the *Călata Group* (Rusu, 1995; Filipescu, 1997) (ex - Lower marine series - Răileanu & Saulea, 1956; the Rakoczi Group - Mészáros, 1991).

This group includes the *Foidaș Formation* (Mészáros & Moiescu, 1991; Pion, 1968) in the base, a lagunar unit with gypsum (ex - lower gypsum of the *Anomia* limestone - Koch, 1894). This is followed by the *Căpuș Formation* (ex - *Ostrea* level, Marly-limestones with *Ostrea*, lower marls with mollusks, lower level with "*striata*", "*perforatus*" level, upper "*striatus*" level, medium marls with molluscs, upper *Ostrea* level, marls and limestone with nummulites and mollusks - Koch, 1894). All these banks and levels were included into the *Inucu* and *Văleni members*. NP 15-16 and 17 nannozones are characteristic to these deposits.

The following *Mortănușa Formation* (ex - grey marly-clay horizon - Koch, 1894) is made up of clays and marls and presents a regressive character in the upper third, where it becomes extremely sandy. There we can trace the boundary between NP 17 and 18 zones, that is between Lutetian and Bartonian (Mészáros, 1989; Bombiță, 1963).

The equivalent of the Foidaș, Căpușu and Mortănușa formations in the Transcarpathian Basin is the *Prislop Formation* (Mészáros, 1993).

The Călata Group ends with the *Viștea Limestone* (Rusu, 1995) (ex - Lower coarse limestone - Koch, 1894) and the Rakoczi Sandstone.

Due to the pre-Pirenean movements (Dudich & Mészáros, 1963), the continental environment established again and thus the *Valea Nadășului Formation* was deposited (ex - upper variegated clay series Koch, 1894).

The equivalent of these deposits in the Transcarpathian flysch, is the lower part of the *Vaser Formation* (Mészáros, 1993).

Another marine transgression was responsible for the formation of the following unit, the *Turea Group* (Rusu, 1995) (ex - upper marine series - Răileanu & Saulea, 1956). This group starts with the lagunar *Jebucu Formations* (Moiescu, 1989) (ex - upper gypsum - Koch, 1894) The following formation is the *Cluj Limestone* (ex- upper coarse limestone - Koch, 1894). The deepening of the sea permitted the deposition of the *Brebi Formation* (ex - "*intermedia*" and bryozoan beds – Koch, 1894), made up of marls containing *Nummulites fabianii*. In this unit, the *Gigantostrea gigantea* level marks the Eocene-Oligocene boundary (Mészáros, et al., 1989) or the boundary between the nannoplankton zones NP 21-22. In the Transcarpathian area corresponding to Jebucu, Cluj and Brebi formations, was

formed the upper part of the *Vaser Formation*.

The *Mera Formation* (Mészáros, et al., 1989) lays on the top of the *Brebi Formation*, having as base the *Hoiia Limestone*, corresponding east of Jibou to the *Ciocmani Formation* (Hofmann, 1879). In NW of Transylvania we can distinguish a stratigraphic unit containing coal, freshwater mollusks and characeans known as the *Curtuiuş Formation* (Petrescu & Mészáros, 1989). All these formations are equivalent to the upper part of the *Vaser Formation* in the Transcarpathian flysh.

Due to Pirennian movements, a rise produced in NW of Transylvania (Mészáros & Dudich, 1968), and thus continental deposits belonging to the *Moigrad Formation* (ex - Ticu beds - Koch, 1894) were deposited. These continental deposits change into marine deposits in the East; there are made up of marly-limestones of the *Bizuşa Formation*, belonging to zone NP 24. Corresponding to these, the *Valea Carelor Formation* occurs in the Transcarpathian area.

Over the continental deposits of the *Moigrad Formation* lay the brackish deposits belonging to the *Gruia* and *Dâncu formations* (ex - Cetate beds - Koch, 1894), which change in the East into disodilic shales of *Ileanda Formation*. In the Transcarpathian area these correspond to bituminous shales with interbedded sandstone of the *Birţu Sandstone* (Mészáros, 1993).

In the NW of Transylvania the *Cuzăplac Formation* represents a continental formation, changing in the East into the marine (zone NP 25) *Cubleşu Formation*, which changes further East into *Var Sandstone*. On their top occur the continental deposits of the *Sâncraiu Almaşului Formation* which is Early Miocene in age.

Another transgression produced the deposition of the *Coruş Formation*. South of Preluca, the *Var Formation*, *Sânmihaiu Almaşului* and *Coruş Formations* change into the *Buzaş Sandstone* (Rusu, 1989) south of Preluca.

The *Coruş Formation* is covered by the *Chechiş Formation*, having in base a glauconitic level (NN 3). The *Buzaş Formation*, together with the *Chechiş Formation* change into the marls belonging to the *Vima Formation* (Mészáros, 1993). Inside this we can trace the Oligocene-Miocene boundary (NP 25 - NN 1). Towards the Transcarpathian region, the *Vima Formation* changes into very thick turbidite deposit belonging to the *Borşa Sandstone*.

A more than 500 m thick formation developed over the *Chechiş Formation*, in Northern Transylvania. It consists of conglomerate and sandstones alternating with clays, marls, sandy marls belonging to the Ottnangian *Hida Formation* (NN 4).

The Lower Badenian (Moravian) contains at its base the conglomerates of the *Ciceu-Giurgeşti Formation* (NN 5), which support the *Dej Tuff* (Popescu, 1975; Mészáros & Filipescu, 1991), then salt deposits (Wielician).

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