REASSESSMENT OF THE PLIOCENE/PLEISTOCENE (NEOGENE / QUATERNARY) BOUNDARY IN THE DACIAN BASIN (EASTERN PARATETHYS), ROMANIA

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This paper is dedicated to **EMIL LITEANU**
the founder of Quaternary research in Romania

Abstract. The aim of the present contribution is three folded: the emphasizing of the recent achievements concerning the redefinition and/or outlining of several Upper Pliocene-Pleistocene litho-bio and chronostratigraphic units (ANDREESCU et al., in print); the separation of some new Pleistocene lithostratigraphic units and, finally, the relocation of the Neogene/Quaternary boundary in the Dacian Basin. Accordingly, the presentation of the Upper Pliocene formations Cândeşti, Trajkovo, Izvoarele and Tuluceşti is resumed, as the Pleistocene Frăteşti, Vlădeni, Vânători, Coconi/Copăceni, and Mostiştea ones as well. Two other formations, Tetoiu (Lower Pleistocene) and Călmăţui (Mid Pleistocene) have been depicted in this paper. Biochronologically, the Romanian molluscan zones NSM11 and NSM12 have been redefined and 6 new Early-Mid Pleistocene zones (QM4-QM9) were also outlined. Since the lower boundary of the Quaternary System/Period, by decision of the ICS (June, 2009), has been accepted at 2.6 Ma, the Romanian Stage and its subdivisions (Pelendavian and Valahian) had to be again biochronologically redefined and, ipso facto, temporally constricted, so that the Romanian is now spanning between 3.7-2.6 Ma. Another item consisted in the summary description of the new Pleistocene chronostratigraphic units: Argedavian Age/Stage (Early/Lower Pleistocene), with Milcovian and Uzunian substages; Dinogetian Age/Stage (Middle Pleistocene), with Netindavian and Musaisian substages and Ilfovian Age/Stage (Late/Upper Pleistocene). Finally, the Pliocene/Pleistocene (Neogene/Quaternary) boundary has been relocated, so that in the Dacian Basin it lies at the base of both Frăteşti (in the Moesian Platform) and Tetoiu (in the Carpathian Foredeep) formations, roughly coincident with the C2r/C2An1n boundary (~2.6 Ma).

Keywords: Dacian Basin, Neogene, Pliocene, Pleistocene, Litho-Bio-Chronostratigraphy, Neogene/Quaternary Boundary.

Rezumat. Reevaluarea limitei Pliocen-Pleistocen (Neogen-Cuaternar) în Bazinul Dacic (Paratethysul Oriental), România. Această lucrare îşi propune tratarea a trei obiective principale: a) reliefarea unor unităţi lito-bio-cronostratigrafice pliocen superioare-pleistocene recent propuse (ANDREESCU et al., in print); b) separarea unor noi unităţi litostratigrafice pleistocene si c) relocarea limitei Neogen/Cuaternar, respectiv Pliocen/Pleistocen, în Bazinul Dacic. În cadrul primului obiectiv amintim: individualizarea formaţiunilor de Trajkovo (Romanian), de Vlădeni, de Vânători (Pleistocen); redefinirea formaţiunilor de Izvoarele şi de Tuluceşti (Romanian); redefinirea biozonelor de moluşte NSM11 şi NSM12 romaniene; individualizarea a 6 noi zone de moluşte cuaternare (QM4-QM9); redefinirea Romanianului şi a subetajelor sale (Pelendavianul şi Valahianul) separarea etajelor (Argedavian, Dinogetian, Ilfovian) şi subetajelor pleistocene (Milcovian, Uzunian etc.) din Bazinul Dacic. În cel de al doilea obiectiv se înscrie definirea formaţiunilor de Tetoiu (Argedavian) şi de Călmăţui (Dinogetian) şi redefinirea formaţiunilor de Coconi (Argedavian-Dinogetian) şi de Mostiştea (Dinogetian superior). Faunele de moluşte (zonele QM1-QM4) şi de mamifere (zonele MN16b, MN17), detectate în partea inferioară a formaţiunilor de Frăteşti şi de Tetoiu sugerează că aceste două unităţi sunt coevale. Cel de al treilea obiectiv al lucrării prezintă argumentele pe baza cărora, în Bazinul Dacic, noua poziţie a limitei Pliocen-Pleistocen poate fi acceptată la baza formaţiunilor de Frăteşti (în arealul Platformei Moesice) şi de Tetoiu (în arealul Avanfosei Carpatice), care coincide cu limita dintre cronele C2r (Matuyama inferior) şi C2An1n (Gauss superior), având o vârstă absolută de cca. 2,6 Ma.

Cuvinte cheie: Bazinul Dacic, Neogen, Pliocen, Pleistocen, lito-bio-cronostratigrafie, limita Neogen-Cuaternar.

1. INTRODUCTION

Framed northward by the Carpathian and southward by the Balkan orogenic structures, the Dacian Basin represented, in the Sarmatian-Pleistocene time span, one of the most spectacular and interesting sedimentation area of the Paratethys.

The uniqueness of the Dacian Basin consisted, first of all, in its superposition on several major structural units, respectively: southwestern area of the East-European Platform; the Eastern Carpathians Outer Flysch Zone (the intramountaineous Comăneşti Basin); northwestern area of the Scythian Platform; northwestern dippiest part of the North Dobrogea Orogene; the Carpathian Foredeep (including both Wallachian and Getic depressions); Pre-Balkan Foredeep and Moesian Platform. The fingerprint of this structural diversity can be observed also on the actual physiography, as a result of tectonic and sedimentary evolution already started in Sarmatian.

Another peculiarity of the Dacian Basin was its function as an "intermittent passage way" between the Euxinian and Pannonian basins, with major consequences on paleogeography of the Paratethys basins, including the distribution of terrestrial and aquatic biota.

In Pliocene the Dacian Basin was the occidental realm of the Eastern Paratethys, whereas the Pannonian Basin was still remaining as the Central Paratethys (Fig. 1). This realm linking the Central and Eastern Paratethys acted as a distinct sedimentary basin.

According to the present Miocene-Pliocene boundary position, it has been stated that, in the Dacian Basin, the Early Pliocene corresponds to the Dacian Age (~5.3-3.7 Ma) (ANDREESCU, 1981, 1983). In this case, the Late Pliocene is to be represented by the Romanian Age.

The aim of the present contribution is three folded: the emphasizing of the recent achievements concerning the redefinition and/or outlining of several Upper Pliocene-Pleistocene litho-bio and chronostratigraphic units (ANDREESCU et al., 2010; ANDREESCU et al., in print); the separation of some new Pleistocene lithostratigraphic units and, finally, the relocation of the Neogene/Quaternary boundary in the Dacian Basin.

2. UPPER PLIOCENE (ROMANIAN) LITHOSTRATIGRAPHIC UNITS

The Pliocene-Pleistocene deposits of the Dacian Basin, developed in a wide range of sedimentary environments, provide a valuable record reflected in a variety of facies and faunal content.

The main Pliocene lithostratigraphic units of the Dacian Basin are the following: Berbeşti, Jiu-Motru and Cândeşti formations, in the western area; Merişani, Călineşti, Cândeşti and Izvoarele formations in the central area; Luncile, Gura Dimienii, Râmna, Cândeşti and Tuluceşti formations in the northeastern and eastern areas; Oltina in the east-southeastern area; Trajkovo Fm in the southernmost area of the sedimentary basin.

Most of the mentioned units have already been outlined and/or extensively described in a series of previous papers: Luncile, Gura Dimienii, Râmna, Cândeşti in the northeastern Dacian Basin (ANDREESCU, 1967, 2008, 2009); Berbeşti, Jiu-Motru and Cândeşti formations in Oltenia (PAULIUC et al., 1981; PANĂ et al., 1981; ANDREESCU et al., 1984, 1985, 1992); Merişani, Călineşti, Izvoarele (LUBENESCU et al., 1987; ANDREESCU et al., 2010, ANDREESCU et al., in print); Oltina (ANDREESCU, in POP et al., 1991; ANDREESCU & PANĂ, 1996; ANDREESCU et al., 2010, in print) and Tuluceşti (GHENEA, 1968; MUNTEANU, 2006; ANDREESCU et al., in print), in the easternmost basinal area, and Trajkovo (ANDREESCU et al., in print), in the southern Dacian Basin.

The Dacian formations: Berbeşti, Jiu-Motru, Merişani, Călineşti, Luncile, Gura Dimienii, Râmna (lower part) and Oltina are not taken into account in this paper. Besides those Dacian units, both the Jiu-Motru Fm upper part, and Râmna Fm as well, representing Parscovian-Pelendavian typical sequences of fluvial environments, developed in large progradational - aggradational alluvial plains, are not rendered out in figure 1.

The Romanian formations: Cândeşti, Trajkovo and Tuluceşti are characterized by consistent, sometimes prevalent presence of the rudito-arenitic sequences, reflecting typical, diagnostic alluvial environments. Consequently, those formations represent the proximal and proximal to medial Carpathian alluvial fans (Cândeşti Fm.) to the north, Balkano-Moesian, to the south (Trajkovo Fm) and those coming from the East-European and Scythian platforms (Tuluceşti Fm.), while the Izvoarele Fm, accumulated in prevalent fluvial environments extended on the junction, most subsiding, area between the Carpathian Foredeep and Moesian Platform (Figs. 1; 2).

All Romanian lithostratigraphic units have been described elsewhere (ANDREESCU et al., in print) so that, in this contribution, our attention is to be focused on the main Pleistocene formations in the Dacian Basin.

2.1. Cândeşti Formation (=**Cândeşti Beds**, MRAZEC & TEISSEYRE, 1901) is developed as a quasi-continuous alluvial train in the northern realm of the Dacian Basin (Fig. 1).

Typical development of the Cândeşti Fm is to be found in the oriental basinal domain between the Olt River, to the west, and the Siret River, to the east, where its thickness can exceed 2,500 m in the Bend Zone of the Eastern Carpathians (ANDREESCU, 1969; ANDREESCU & ŢICLEANU, 1977).

The type section of the Cândeşti Fm is localized in the Buzău valley near Cândeşti village (LITEANU et al., 1971; ANDREESCU, 2008) (Fig. 1).

The Cândeşti Fm is made up by thick polycyclic sequences of pebbles, sometimes indurated, sands, silts and clays. Main sedimentological feature of this unit consists in the prevalence of coarse clasts (gravel, pebble, cobble) over to medium-sized (sand) and/or fine ones (silt, clay).

In the western Dacian Basin, west to the Olt River, the Cândeşti Fm, in spite of its somewhat atypical development (smaller thickness with prevailing sandy and/or small pebbly sequences), has frequently been proven to be rich fossiliferous both in molluscs fauna and mammals as well. Consequently, the faunal record of the Cândeşti Fm from Oltenia allowed the elaboration of a reliable biochronologic scale valid for the Latest Pelendavian (NSM11c Subzone) – Valahian (NSM12 Zone) from the entire Dacian Basin (PANĂ et al., 1981; ALEXEVA et al., 1983; ANDREESCU, 1981, 1982, 1983; ANDREESCU et al., 1981, 1985; LUBENESCU et al., 1987; ENCIU & ANDREESCU, 1990; MUNTEANU, 2006; ENCIU, 2007; ANDREESCU, 2008; ANDREESCU et al., 2010; ANDREESCU et al., in print) (Fig. 3).

On the other hand, among the most significant contributions on the various mammal taxa and the biochronologic scale refinement of the investigated mammal sites from Oltenia, one can mention: FERU et al. (1978, 1979), TERZEA & BORONEANŢ (1979), TERZEA (1981, 1997, 2004, 2005), RADULESCU & SAMSON (1986, 1990, 2001), RĂDULESCU et al. (1993, 1995, 1998, 1999), ŞTIUCĂ et al. (2003, 2004). According to these palaeontologists, both large and small mammal remains as well, yielded by the Cândeşti Fm in Oltenia, confidently can be referred to the MN16a Subzone (Fig. 4), pointing out the Late Romanian, *i.e.* the Valahian Substage.

In addition, it is worthy to be mentioned that a lot of Romanian sections have been bio-magneto-stratigraphically investigated also (ANDREESCU et al., 1981; ALEXEEVA et al., 1982; SNEL et al., 2006; ENCIU, 2007; ANDREESCU, 2008, 2009).

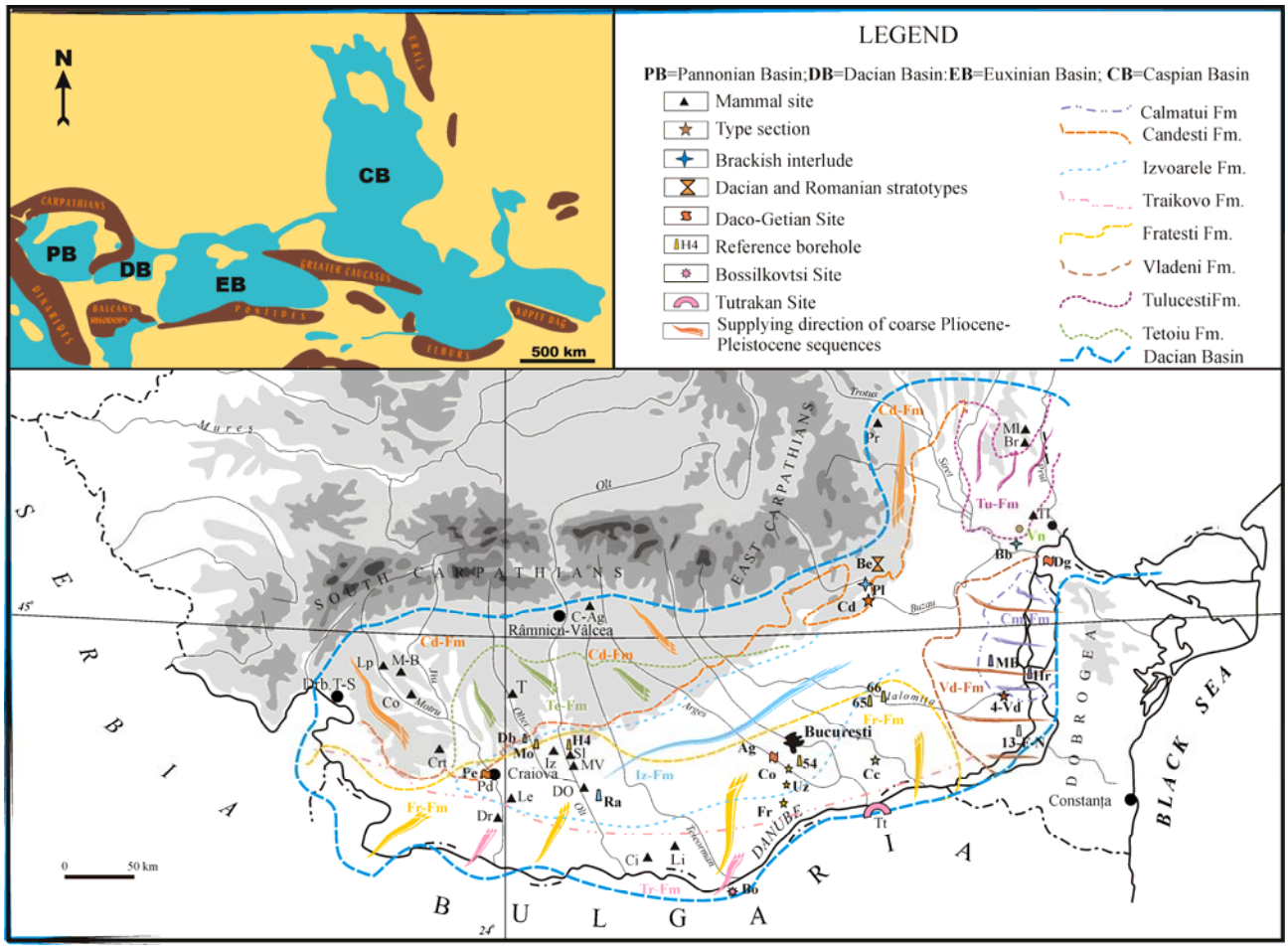

Figure 1. The Dacian Basin in the frame of the Paratethys realm during the Romanian-Pleistocene (modified after ANDREESCU et al., in print). Explanations: PB=Pannonian Basin (Romanian Age); DB=Dacian Basin (Romanian-Pleistocene); EB=Euxinian Basin; (Kujalnikian Age); CB=Caspian Basin (Akchagylian Age). / Figura 1. Bazinul Dacic în cadrul Paratethysului în Romanian-Pleistocen (modificată, după ANDREESCU et al., sub tipar). Explicaţii: PB=Bazinul Pannonic (Romanian); DB=Bazinul Dacic (Romanian-Pleistocen); EB=Bazinul Euxinic (Kujalnikian); CB=Bazinul Caspic (Akchagylian).

Abbreviated Mammal sites in the Dacian Basin: Br=Bereşti; Bo=Bossilkovtsi; C-Ag=Curtea de Argeş; Ci=Ciuperceni; Co=Covrigi**;** Crt=Cernăteşti**;** DO=Drăgăneşti-Olt; Dr=Drănic; Iz=Izvoru**;** Le=Leu**;** Li=Lisa; Lp=Lupoaia; M-B=Mătăsari - Brădetu; Ml=Măluşteni; MV=Milcovu din Vale; Pd=Podari; Pr=Pralea; Sl=Slatina; T=Tetoiu; Tl =Tulucești;
Type sections: Bb=Barbosi-Babele Fm; Be=Beceni (Dacian and Romanian stages); Cd=Cândeşti; Cd-Fm=Cândeşti Fm; Cm-Fm=Călmăţui Fm; Cc=Coconi Fm; Co= Copaceni Site; Fr=Frăteşti Site; Fr-Fm=Frăteşti Fm; Iz-Fm = Izvoarele Fm; Pl=Pleşcoi (Pelendavian-Valahian boundary); Te-Fm=Tetoiu Fm; Tr-Fm=Trajkovo Fm; Tt=Tutrakan Site; Tu=Tulucești Fm; Uz=Uzunian Site; Vd-Fm=Vlădeni Fm; Vd=Vlădeni Site (F4-Vlădeni Borehole); Vn=Vânători Site;
Drill sites: Ra=Radomireşti; Db=63104/1H-Dobreţu; 13-F-N=13-Feteşti-North; H4=H4-Slatina; 54=68901/54-Berceni; 65=H65-Fierbinţi; 66=H66-Urziceni; Hr=8521-Hârşova; MB=3505-Mihai Bravu; Mo=60160-Morunglav.
Ancient Daco-Getian sites:Ag=Argedava Fortress and Capital; Dg=Dinogetia Fortress; Pe=Pelendava Fortress.

Situri mamaliene abreviate în Bazinul Dacic: Br=Bereşti; Bo=Bossilkovtsi; C-Ag=Curtea de Argeş; Ci=Ciuperceni; Co=Covrigi; Crt=Cernăteşti; DO=Drăgăneşti-Olt; Dr=Drănic; Iz=Izvoru; Le=Leu; Li=Lisa; Lp=Lupoaia; M-B=Mătăsari-Brădetu; Ml=Măluşteni; MV=Milcovu din Vale; Pd=Podari; Pr=Pralea; Sl=Slatina; T=Tetoiu; Tl=Tulucești;
Secţiuni tip: Bb=Barboşi-Babele Fm; Be=Beceni (etajele Dacian şi Romanian); Cd=Cândeşti; Cd-Fm=Cândeşti Fm; Cm-Fm=Călmăţui Fm; Cc=Coconi Fm; Co=Situl Copăceni; Fr=Situl Frăteşti; Fr-Fm=Frăteşti Fm; Iz-Fm=Izvoarele Fm; Pl=Pleşcoi (limita Pelendavian-Valahian); Te-Fm=Tetoiu Fm; Tr-Fm=Trajkovo Fm; Tt=Situl Tutrakan; Tu=Tulucești Fm; Uz=Situl Uzunianului; Vd-Fm=Vlădeni Fm; Vd=Situl Vlădeni (Foraj F4-Vlădeni); Vn=Situl Vânători;
Foraje: Ra=Radomireşti; Db=63104/1H-Dobreţu; 13-F-N=13-Feteşti-Nord; H4=H4-Slatina; 54=68901/54-Berceni; 65=H65-Fierbinţi; 66=H66-Urziceni; Hr=8521-Hârşova; MB=3505-Mihai Bravu; Mo=60160-Morunglav.
Situri antice geto-dacice: Ag=Cetatea şi capitala Argedava; Dg=Cetatea Dinogetia; Pe=Cetatea Pelendava.

Among the most significant bio-magnetostratigraphic results, those concerning the stratotypical Romanian sections at Beceni and Pleşcoi (Fig. 1) are to be noted (ALEXEEVA et al., 1983; GHENEA et al., 1983; ANDREESCU, 1983, 2008, 2009). In these type sections the Pelendavian-Valahian biochronologic boundary, represented by the so-called "Pleşcoi Fauna" (ANDREESCU, 1969, 2008) signifying, *inter alia*, the Akchagylian transgression, has been proved to be coincident with the subchron C2An2n (=3.2 Ma) of the C2An Chron (=Gauss Epoch). Another important event, bearing

an basinal sedimentogenetic significance, was the emphasizing of the Cândeşti Fm outset[1], just coincident with the C2An1r (=Kaena) - C2An1n boundary (=3.0 Ma in ATNTS-2004).

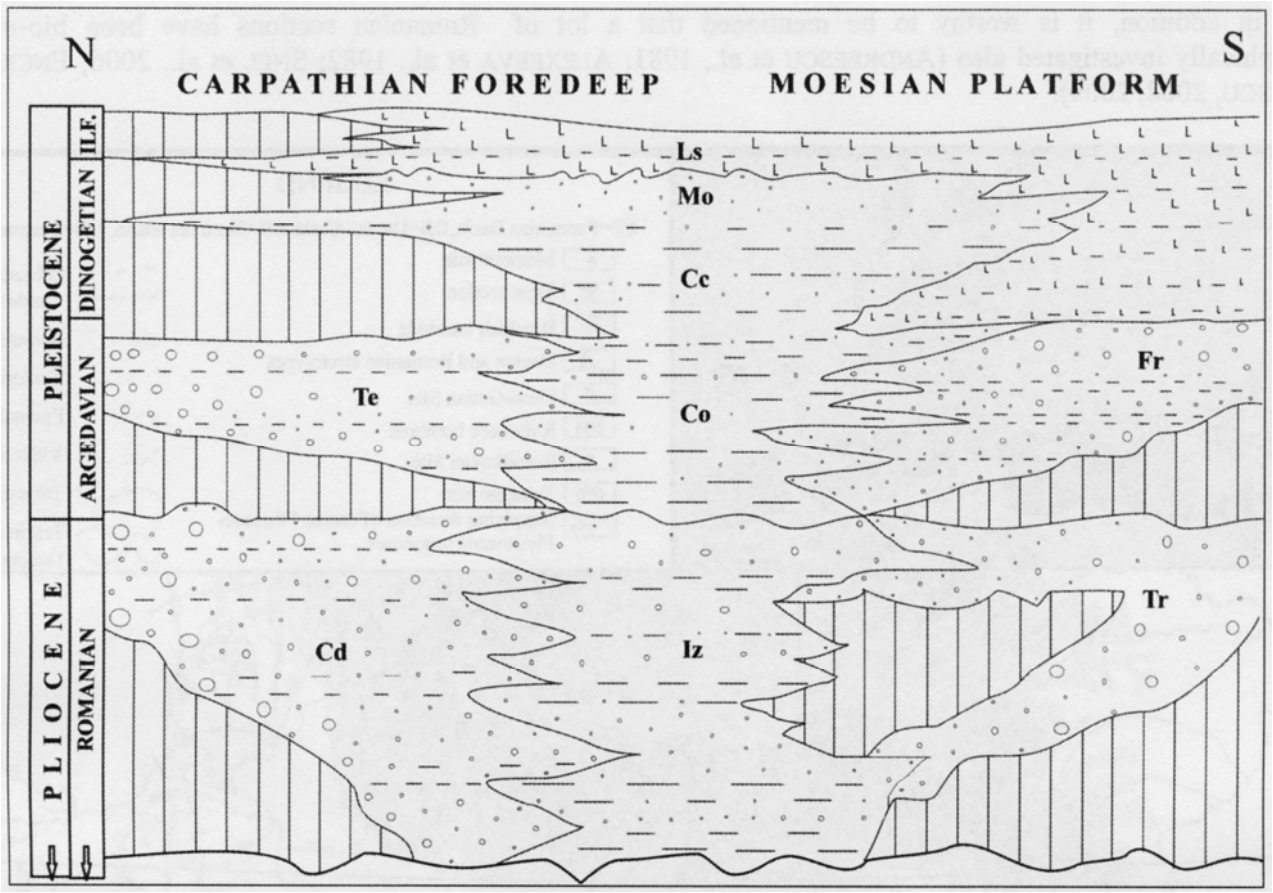

Figure 2. Suggested relationships among the Romanian-Pleistocene deposits in the central area of the Dacian Basin (Olt-Arges sector) (after ANDREESCU et al., in print). / Figura 2. Relațiile sugerate dintre depozitele romanian-pleistocene din zona centrală a Bazinului Dacic (sectorul Olt-Argeş) (după ANDREESCU et al., sub tipar).

Abbreviations: Cc=Coconi Fm; Cd=Cândeşti Fm; Co=Copăceni Beds; Fr=Frăteşti Fm; Iz=Izvoarele Fm; Ls=Loess and Loessoid deposits; Mo=Mostiştea Fm; Te=Tetoiu Fm; Tr=Trajkovo Fm; ILF=Ilfovian Stage.

Abrevieri: Cc=Formațiunea de Coconi; Cd=Formațiunea de Cândeşti; Co=Stratele de Copăceni; Fr=Formațiunea de Frăteşti; Iz=Formațiunea de Izvoarele; Ls=Loess şi depozite loessoide; Mo=Formațiunea de Mostiştea; Te=Formațiunea de Tetoiu; Tr=Formațiunea de Trajkovo; ILF=Etajul Ilfovian.

2.2. Trajkovo Formation (ANDREESCU et al., in print).

This lithostratigraphic entity, developed in the southernmost Dacian Basin, laying on the southern Moesian Platform, represents the counterpart of the Candesti Fm from the northern basinal area. These deposits are usually made up of sands, sandy-gravels and gravels, habitually forming elongated belts trended south-northward, as remains of the former alluvial fans originated in the Pre-Balkan Plateau. The fossil record is extremely scarce. The only mentioned mollusc site is located in Tutrakan area (Fig.1), where MANOLESCU (1915, apud ANDREESCU & PANĂ, 1996) reported an assemblage delivered by sands and silty sands overlying gravels and boulders sequences. This assemblage with *Pristinunio pristinus* (BIELZ), *Cyclopotomida munieri* (SABBA), *Psilunio craiovensis* (TOUR.), *Wenziella* sp., *Viviparus turgidus* (BIELZ), *Melanopsis* div. sp. etc., is indicative for the Romanian stage, but is not diagnostic either for Pelendavian, or Valahian substages.

In various localities, situated both on northern and southern Danube areas of Trajkovo Fm., there are reported numerous sites bearing large mammals fossils. The assemblages with *Mammuth borsoni* (CROIZET & JOBERT) and *Anancus arvernensis* (HAYS), sometimes have been recorded together with *Mammuthus rumanus* (STEFĂNESCU) too, as found in the sites Oprişoru-Vest, Cujmir, Calopăr, Belcin etc. (BANDRABUR, 1971; GHENEA, 1977) from southwestern Oltenia, but also in Trajkovo, Bossilkovtsi etc. (EVLOGHIEV et al., 1995; LISTER & VAN ESSEN, 2003; MARKOV & SPASSOV, 2003) from northern Bulgaria. Several of the mentioned sites, with *M. rumanus-M. borsoni-A.arvernensis* association, remind Pralea (ATHANASIU & PREDA, 1928; MOTAŞ, 1956) and Curtea de Arges in northern basinal area (MIHĂILĂ, 1971), Cernăteşti (SCHOVERTH et al., 1963; FERU et al., 1983), in the western Dacian Basin or Tulucești (eastern Dacian Basin) (RĂDULESCU & SAMSON, 1995, 2001) sites (Fig. 1).

[1]See Addendum at the end of the paper.

Figure 3. Pliocene-Pleistocene Mollusc Zonation of the Dacian Basin. The most significant revisions concerning the Late Pliocene-Pleistocene zonation are the following: 1. The former NSM11d -*Valahunio iconomianus Subzone*, became the second, NSM12b Subzone; 2. The former NSM12c-*Unio kujalnicensis* and 12d-*Bogatschevia tamanensis* subzones, as a result of the Pliocene/Pleistocene boundary relocation, became QM1 and QM2 zones respectively; 3. Pleistocene QM5-QM9 have been outlined as new zones. / Figura 3. Zonarea revizuită a moluştelor pliocen-pleistocene din Bazinul Dacic. Revizuirile cele mai semnificative, privitoare la zonarea Pliocenului superior-Pleistocenului, sunt următoarele: 1. Fosta subzonă NSM11d-*Valahunio iconomianus* devine subzona NSM12b; 2. Fostele subzone NSM12c-*Unio kujalnicensis* şi NSM12d-*Bogatschevia tamanenesis*, devin zonele QM1, respectiv QM2, ca urmare a relocării limitei Pliocen/Pleistocen; 3. Zonele QM5-QM9 sunt nou create.

2.3. Tuluceşti Formation (=**Tuluceşti Beds**, GHENEA, 1968) is located in the easternmost area of the Dacian Basin. In Romania, only restricted outcrops are to be found in the southern Prut-Siret interfluve (Fig. 1). The sequences of the Tuluceşti Fm are represented mainly by small sized gravels, sands, sandy clays, in piles reaching-up 5-7 m at type locality). But, the Tuluceşti site is among the most notorious in Paratethys due to the Upper Pliocene mammal assemblage (ATHANASIU, 1915; GHENEA & RĂDULESCU, 1964; GHENEA, 1968; SAMSON & RĂDULESCU, 1973; SAMSON, 1976; RĂDULESCU & SAMSON, 1995), in which the archaic mammoth "*Elephas antiquus rumanus*" has been coined by ŞTEFĂNESCU (1924).

According to RĂDULESCU et al. (2003) mammalian remains from Tuluceşti, are attributable to the following taxa: *Mammuth borsoni, Anancus arvernensis, Mammuthus rumanus* (ŞTEFĂNESCU), *Paracamelus* cf. *kujalnensis* (KHOM.), *Cervus* cf. *perrieri* CROIZET & JOBERT, *Allohippus euxinicus* (ŞTEFĂNESCU*)*.

The above named authors and ŞTIUCĂ et al. (2003) as well, consider the level with *M. rumanus* as an equivalent to the Cernăteşti in Western Oltenia and to the Skortselskian Complex (NIKIFOROVA et al., 1976, 1986), in Moldova Republic.

Paleomagnetically, the Podari mammal site from Oltenia has been calibrated to the C2An2n and C2An-1r subchrons of the C2An Chron (=middle Gauss epoch) by GHENEA et al. (1982), ALEXEEVA et al. (1983) and ANDREESCU (1982, 1983, 2008, 2009). By correlation, based on the mammal remains content, Tuluceşti is considered an equivalent of the Cernăteşti from the western Oltenia which, in turn, has the same geochronologic significance as Podari, corresponding in the ATNTS-2004 to 3.2-3.0 Ma (Fig. 4).

As a result it is worthy to emphasize the three mammal sites are to be placed in the Earliest Valahian Substage.

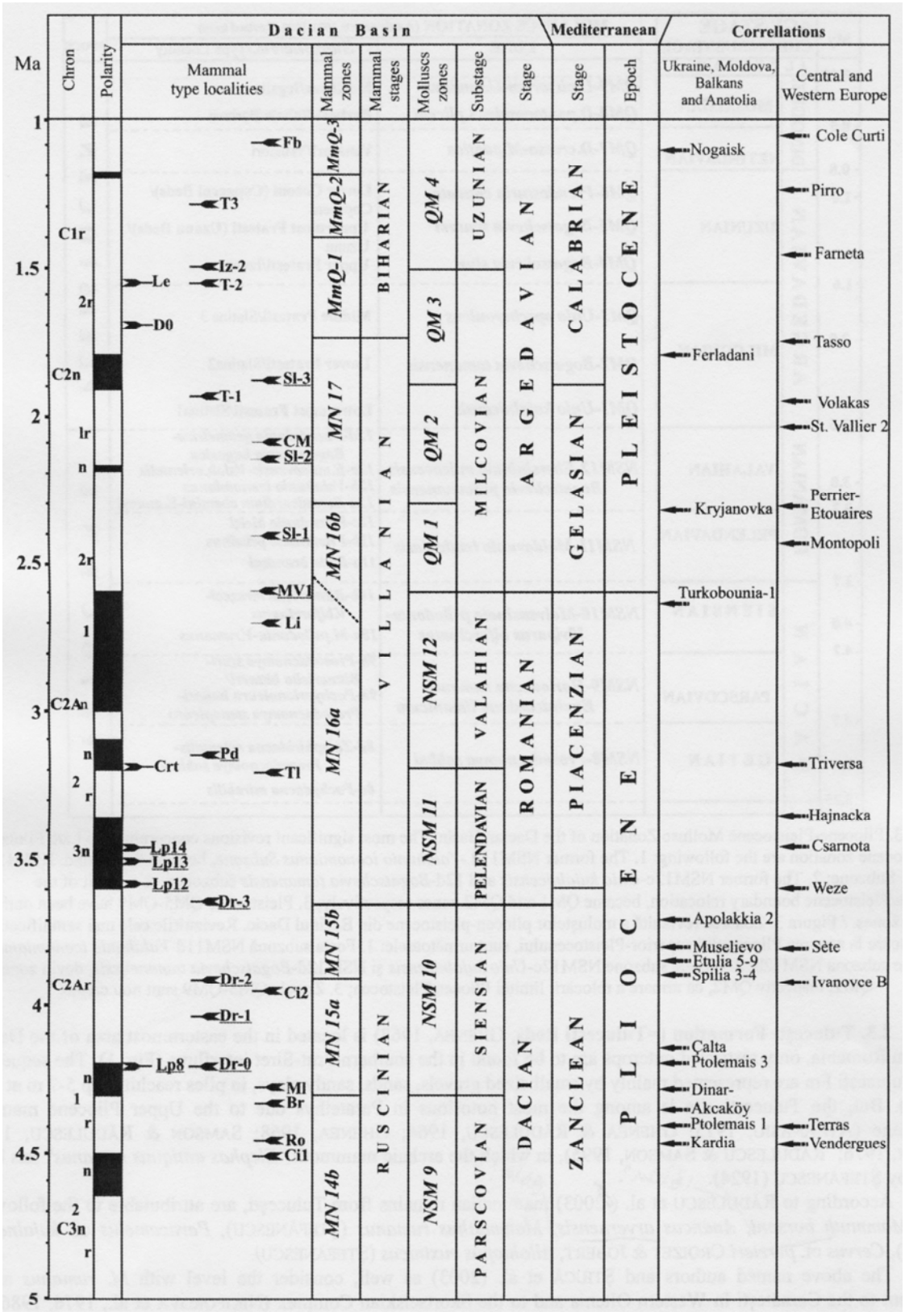

Figure 4. Dacian Basin. Pliocene-Pleistocene Mammal sites, Zonation, Age Assignment and Correlations with the Mollusc zones (after ANDREESCU et al., in print). / Figura 4. Bazinul Dacic. Siturile mamaliene pliocen-pleistocene, zonarea, vârsta şi corelarea cu zonele de moluşte (după ANDREESCU et al., sub tipar).

Abbreviations: Br=Bereşti, CM=Cherleştii Mosteni, Ci=Ciuperceni, Crt= Cernăteşti, DO=Drăgăneşti Olt, Dr=Drănic, Fb= Fierbinţi, Iz=Izvoru, Le=Leu, Li=Lisa, Lp= Lupoaia, Ml= Măluşteni, MV= Milcovu din Vale, Pd=Podari, Ro=Roşiori, Sl=Slatina, T=Tetoiu;Underlined sites have been paleomagnetically investigated.

Abrevieri: Br=Bereşti; CM=Cherleştii Moşteni; Ci=Ciuperceni; Crt=Cernăteşti; DO=Drăgăneşti Olt; Dr=Drănic; Fb=Fierbinţi; Iz=Izvoru; Le=Leu; Li=Lisa; Lp=Lupoaia; Ml=Măluşteni; MV=Milcovu din Vale; Pd=Podari; Ro=Roşiori; Sl=Slatina; T=Tetoiu. Siturile subliniate au fost investigate paleomagnetic).

2.4. Izvoarele Formation (LUBENESCU et al., 1987, emend. ANDREESCU et al., in print).

The sequences of this formation accumulated mainly in fluvial environments, as illustrated by the geophysical logs. In some restricted areas (the sector Olteț-Teleorman), these deposits could represent medial to distal Carpathian alluvial channels, as well as Balkan-Moesian ones, at the junction between the Getic Depression and Moesian Platform (Figs: 1; 2; 5). Izvoarele Fm has been named by LUBENESCU et al. (1987) based on borehole data, without specifying its lower and upper limits and lateral repartition as well.

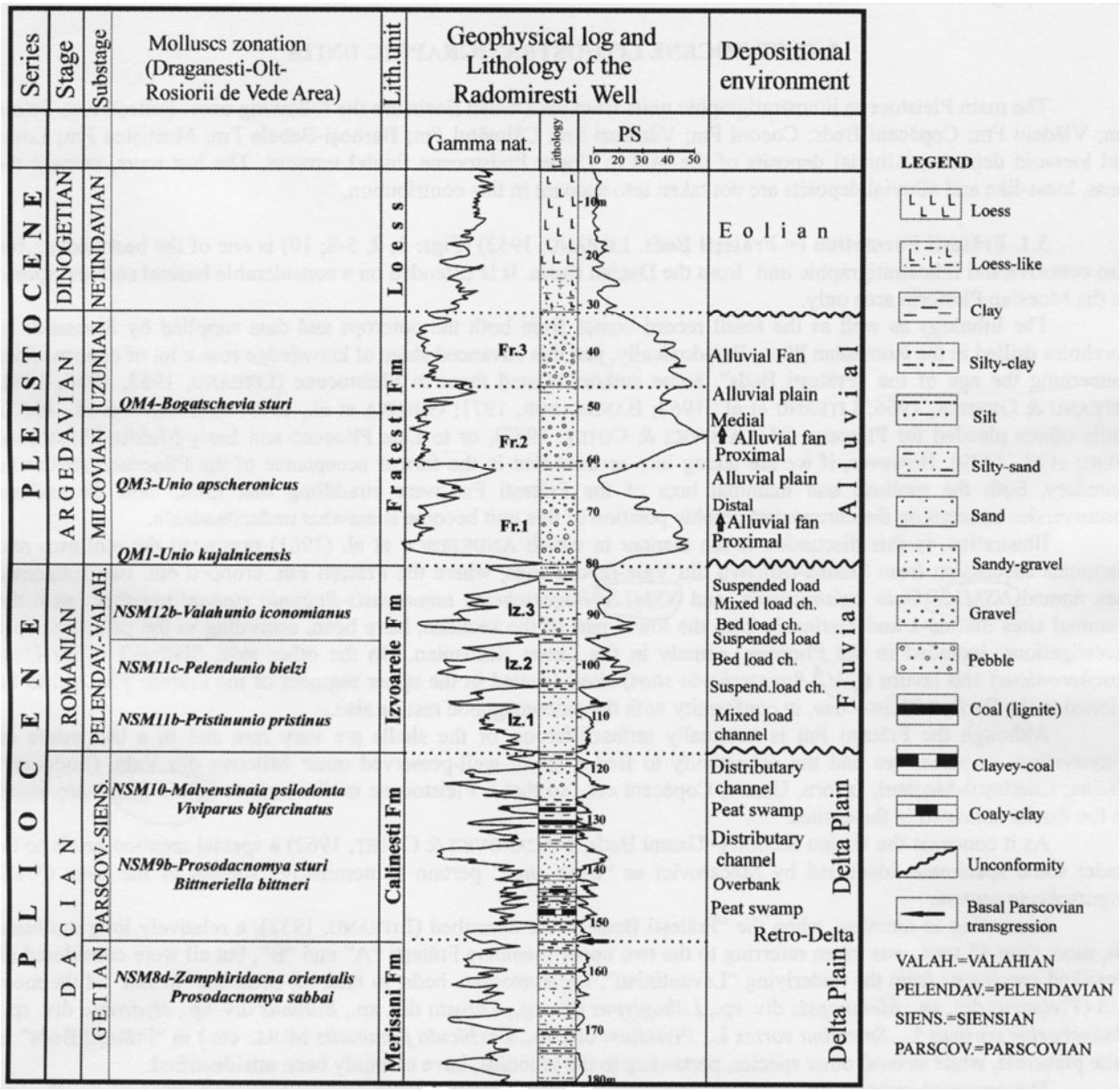

Figure 5. The stratotype section (in Radomireşti Well), located in the Central Area (Olt-Argeş Interfluve) of the Moesian Platform, of the redefined Izvoarele Fm (Romanian) (after ANDREESCU et al., in print). (Iz1, Iz2, Iz3 can be considered as three successive members of the Izvoarele Formation, revealed by the three fluvial cycles; the black arrow is pointing to the basalmost Parscovian transgression). / Figura 5. Secțiunea stratotipică (în forajul Radomireşti) a Formațiunii de Izvoarele, situată în zona centrală (interfluviul Olt-Argeş) a Platformei Moesice (după ANDREESCU et al., sub tipar). (Iz1, Iz2, Iz3 constituie membri ai Formațiunii de Izvoarele, evidențiați de cele trei cicluri fluviale; săgeata neagră indică transgresiunea din baza Parscovianului).

The mollusc fauna, as it was reported: *Pristinunio pristinus* (BIELZ), *P. davilai* (PORUMB.), *Pelendunio bielzi* (CZEK.), *Psilunio biplicatus* (BIELZ), *P. craiovensis* (TOURN.), *Rugunio condai* (PORUMB.), *R. turbureensis* (FONT.), *R.* aff. *mojswari* (PEN.), *Cuneopsidea doljensis* (SABBA), *Pseudohyriopsis problematica* (COB.), *Anodonta* sp., *Dreissena polymorpha* PALLAS, *Viviparus bifarcinatus* (BIELZ), *V. stricturatus* (NEUM.), *V. rudis* (NEUM.), *V. strossmayerianus* (BRUS.), *V. turgidus* (BIELZ), *V. craiovensis* (TOURN.), *Melanopsis bergeroni* SABBA, *M. pterochilla* BRUS., *M. rumanus* TOURN., *M. onusta* SABBA, *M. soubeirani* PORUMB., *M. amaradicus* FONT., *Valvata piscinalis* MULL., *V. crusitensis* FONT., *Bulimus vukotinovici* (BRUS.), *B. melanthopsis* (BRUS.), *B. oncophorus* (BRUS.), *Planorbis* sp. does

not allows any chronologic subdivision of these deposits, including "clays, sands with coal interbeddings, gravels and sands, apparently unconformable overlaying the Călineşti Fm" (LUBENESCU et al.,1987, p. 120).

However, based on the above mentioned taxa one can estimate that this formation could be assigned to both the Pelendavian and Valahian substages.

In Radomireşti borehole, the geophysical log (Fig. 5) shows the Izvoarele Fm is a succession of fluvial, transitional cycles, overlying the upper Călineşti Fm representing sequences developed in upper delta environments, and underlying the alluvial Frăteşti Fm.

3. PLEISTOCENE LITHOSTRATIGRAPHIC UNITS

The main Pleistocene lithostratigraphic units from the Dacian Basin are the following ones: Frăteşti Fm; Tetoiu Fm; Vlădeni Fm; Copăceni Beds; Coconi Fm; Vânători Fm; Călmăţui Fm; Barboşi-Babele Fm; Mostiştea Fm; Loess and loessoid deposits; Alluvial deposits of the Mid to Upper Pleistocene fluvial terraces. The last units, namely the loess, loess-like and alluvial deposits are not taken into account in this contribution.

3.1. Frăteşti Formation (= **Frăteşti Beds**, LITEANU, 1952) (Figs: 1; 2, 5-8; 10) is one of the best known, but also controversial lithostratigraphic unit from the Dacian Basin. It is extended on a considerable basinal surface, spread on the Moesian Platform area only.

The lithology as well as the fossil record comes from both the outcrops and data supplied by thousands of boreholes drilled in the Romanian Plain. Paradoxically, just this advanced stage of knowledge rose a lot of controversies concerning the age of the "Frăteşti Beds": some authors related them to Pleistocene (LITEANU, 1952, 1956, 1961; LITEANU & GHENEA, 1966; LITEANU et al., 1967; BANDRABUR, 1971; GHENEA et al., 1979; ALEXEEVA et al., 1983), while others pleaded for Pliocene (MACAROVICI & COTEŢ, 1962), or to Late Pliocene and Early-Middle Pleistocene (FERU et al., 1979). However, if we are taking into account that in the former acceptance of the Pliocene/Pleistocene boundary, both the mollusc and mammal taxa of the Frăteşti Fm were straddling that limit, then the endless controversies concerning the chronostratigraphic position of this unit become somewhat understandable.

Illustrative, in this discussion is the manner in which ANDREESCU et al. (1981) presented the molluscs and mammals succession from Slatina-Milcovu din Vale-Izvoru sites, where the Frăteşti Fm. cropped out: two subzones, then named NSM12c-*Unio kujalnicensis* and NSM12d-*Bogatschevia tamanensis-Rugunio riphaei* together with the mammal sites Slatina-1 and Slatina-2, from the lower part of the sections, have been, according to the paleomagnetic investigations, included in the Pliocene, namely in the Latest Romanian. On the other side, Slatina-3 (QM1-*Unio apscheronicus*) and Izvoru (QM2-*Bogatschevia sturi*) sites, located in the upper segment of the Frăteşti Fm, had to be allotted to the Earliest Pleistocene, in conformity with the paleomagnetic results also.

Although the Frăteşti Fm is habitually unfossiliferous, or the shells are very rare and in a bad estate of conservation, in places we had the opportunity to find a lot of well-preserved ones: Milcovu din Vale, Clocociov, Slatina, Cherleştii-Moşteni, Izvoru, Uzunu, Copăceni etc., so that 6 Pleistocene mollusc zones (QM1-QM6) are based on the fossils collected in those sites.

As it concerns the Uzunu section (=Uzunu Beds, MACAROVICI & COTEŢ, 1962) a special mention needs to be made: some specimens identified by Macarovici as "*Unio sturi*" pertain to nominative species of the zone QM5-*Bogatschevia scutum*.

Interesting to mention, when the "Frăteşti Beds" were described (LITEANU, 1952), a relatively long molluscs list, more than 45 taxa, was given referring to the two upper members Frăteşti "A" and "B", but all were considered as reworked specimens from the underlying "Levantinian", i.e. Romanian beds. In fact, the presence "*in situ*" of the most taxa (*Viviparus* div. sp., *Melanopsis* div. sp., *Lithoglypus* div. sp., *Valvata* div. sp., *Bulimus* div. sp., *Hydrobia* div. sp., *Planorbarius corneus* L., *Spiralina vortex* L., *Pissidium* div. sp., *Corbicula fluminalis* MULL. etc.) in "Frăteşti Beds" is quite plausible, while several other species, pertaining to the unionids, have certainly been misidentified.

The mammal remains are relatively abundant, especially in the south and southwestern areas of the Dacian Basin. Besides the well-known sites, mentioned by various authors (LITEANU & GHENEA, 1966; BANDRABUR, 1971; FERU et al., 1979) or those located in Slatina area (FERU et al., 1978, 1979; ANDREESCU et al., 1981), an interesting rich (Large) mammal site, Leu, with *Mammuthus meridionalis* (NESTI), *Plesippus athanasiui* SAMSON, *Stephanorhinus* ex gr. *etruscus* (FALCONER), *Alces gallicus* (AZZAROLI), *Leptobos* cf. *furtivus* DUVERNOI, *Pliotragus ardeus* (DEPERET), *Castor plicidens* MAJOR, *Ursus etruscus* CUVIER, *Cervus* sp. etc., has been described (POPESCU, 2004, 2010) south of Craiova (Figs. 1; 4).

Other characteristic features of the Frăteşti Fm, refer to its major deposional style (stacked alluvial fans), thickness of its lithological subdivisions, faunal content (molluscs zonation), subtle relations with the adjoining, underlying and overlying formations and chronostratigraphic assignment, features which are suggestively depicted in figures 1; 2; 5-8.

In conclusion, having in view the above mentions, one can safely state the Frăteşti Fm could be seen as the most interesting Lower Pleistocene (Argedavian) lithostratigraphic units in the Dacian Basin. Moreover, laying onto the Moesian Platform, it could be viewed as a counterpart of the Tetoiu Formation developed in the Carpathian Foredeep domain (Figs. 1; 2; 8).

3.2. Tetoiu Formation (herein established). It is an equivalent, in the south-central area of the Getic Depression, of the Frăteşti Fm (Figs. 1; 2; 8). The sediments, predominantly exhibiting sandy-pebbly facies, are sometimes rich fossiliferous, yielding both molluscs (ANDREESCU et al., 1984, 1985; LUBENESCU et al., 1987) and mammals (LITEANU et al., 1967b; MIHĂILĂ, 1971; SAMSON & RĂDULESCU, 1973; RĂDULESCU & SAMSON, 1990) (Fig. 4).

The area in which this formation is typically developed is situated in the Olt-Olteţ interfluve. However similar facies are to be found both westwardly, to the Jiu valley, and eastwardly to the Argeş river, areas in which these sequences have previously been considered as "Upper Cândeşti Fm". The Tetoiu Fm thickness is slowly but gradually growing basin ward, from ca 50-60 m to ca 150 m, when, presumably, the silty-clayey sequences of the Copăceni Beds/Coconi Fm become prevalent (Fig. 2).

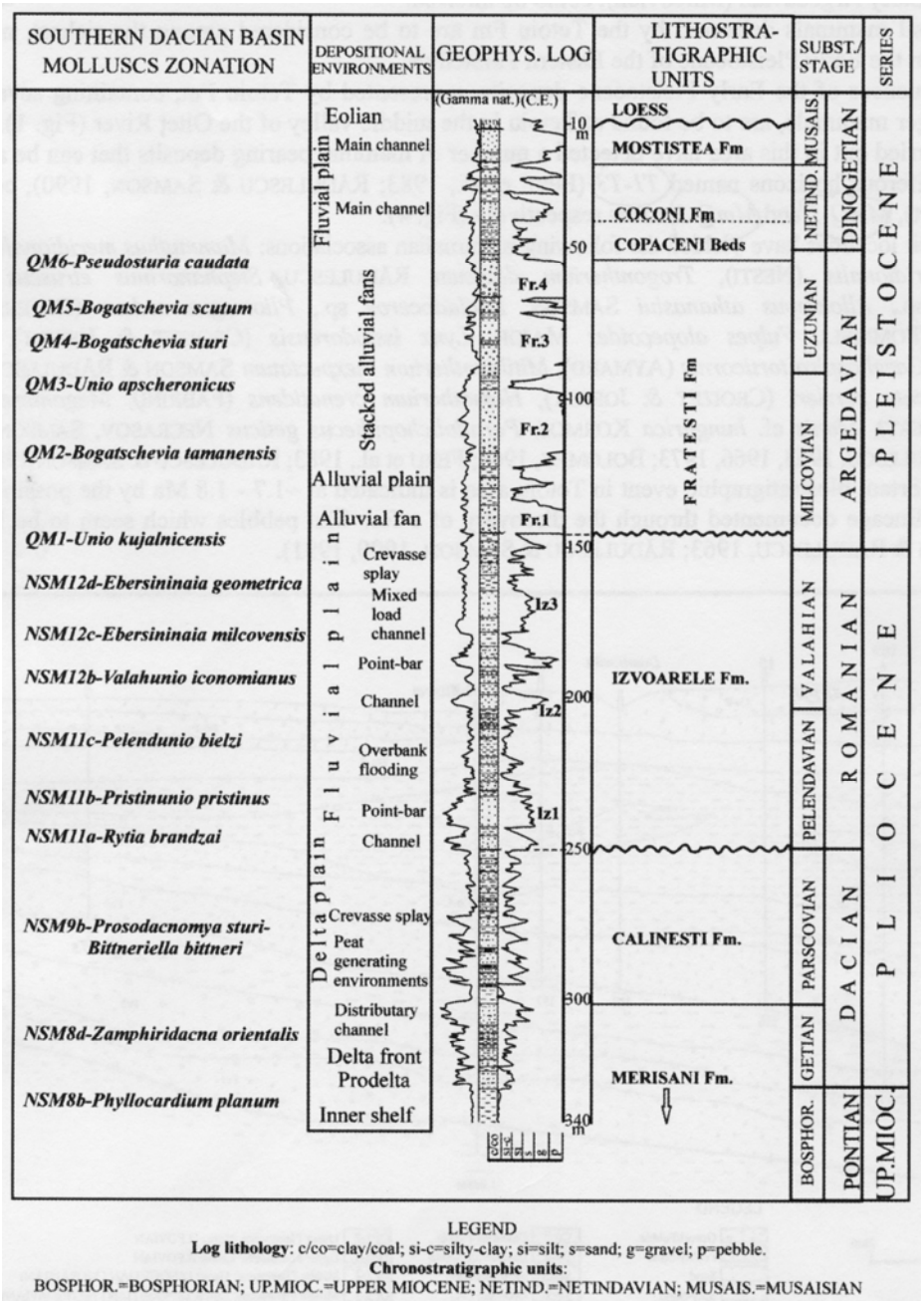

Figure 6. The Pliocene-Pleistocene formations, their zonation and depositional environments in the borehole 68901/54-Berceni (after ANDREESCU et al., in print). (The site has been established as the Stratotypical Section of the Frăteşti Formation (=Frăteşti Beds, LITEANU, 1952); FRT1 to FRT4=Frăteşti members; The underlying Izvoarele Fm is well developed in fluvial environments, while the Frăteşti Fm represents a succession of stacked alluvial fans; some Romanian and Argedavian molluscs zones have been imported either from neighbouring areas or Slatina-Milcov sites in the Olt valley region). / Figura 6. Formaţiunile pliocen-pleistocene, zonarea lor şi ambianţele depoziţionale în forajul 68901/54-Berceni (după ANDREESCU et al., sub tipar). Acest foraj constituie Secţiunea stratotipică a Formaţiunii de Frăteşti (=Stratele de Frăteşti, LITEANU, 1952); Fr1…Fr4 = membri ai Formaţiunii de Frăteşti; Formaţiunea de Izvoarele, subiacentă, este clar dezvoltată în ambianţe fluviale, in timp ce Formaţiunea de Frăteşti reprezintă o succesiune suprapusă a unor evantaie aluviale; unele zone de moluşte romaniene şi argedaviene au fost importate fie din ariile adiacente, fie din sectorul Slatina-Milcov (valea Oltului).

The borehole 63104/1H-Dobreţu (Figs. 1, 8) has been selected as the type reference section of the Tetoiu Fm.

Unlike the Frăteşti Fm, the molluscan fauna of the Tetoiu Fm, relatively rich but seemingly less diversified by comparison to the Cândeşti Fm, has not yet been as intensively studied**.** Among the most significant taxa, recorded in the Gilort-Olteț-Cerna area (ANDREESCU et al., 1981, 1984, 1985; LUBENESCU et al., 1986), could be mentioned: *Unio apscheronicus* ALZ., *U. haeckeli* PEN., *U. kujalnicensis* MANG., *Sinanodonta krejcii* (WENZ), *Cristaria problematica* (COB.), *Cuneopsidea smiciclasi* (BRUS.), *Wenziella wilhelmi* (PEN.), *Bogatschevia* sp., *Viviparus tiraspolitanus* BOG., *V. sinzovi* BOG., *V. diluvianus* KUNTH., *V. gracilis* KUNTH., *V. craiovensis* (TOURN.), *V. contiquus* (SABBA), *Melanopsis amaradicus* (FONT.), *M. hastatus* NEUM., *Fagotia esperi* (FER.), *F. acicularis* (FER.), *Valvata* div. sp., *Theodoxus semiplicatus* NEUM., *Gyraulus* sp. etc. Based mainly on the *unionacean* taxa, the presence of the QM1-QM3 zones, representing the Early Argedavian (Milcovian), could be inferred.

The fossil mammals delivered by the Tetoiu Fm are to be considered among the richest, most various and interesting ones in the Early Pleistocene of the Eastern Paratethys.

The sequences of the Early Pleistocene deposits, represented by Tetoiu Fm, containing several fossiliferous levels rich in larger mammals, are to be found at Tetoiu in the middle valley of the Olteț River (Fig. 1). Paleontological investigations carried out in this area have detected a number of mammal bearing deposits that can be assigned to three successive fossiliferous horizons named T1-T3 (FERU et al., 1983; RĂDULESCU & SAMSON, 1990), corresponding to: MN17 (upper part), MmQ-1 and MmQ-2 zones respectively (Fig. 4).

The fossil localities have yielded the following mammalian associations: *Mammuthus meridionalis* (archaic form), *Mammuthus meridionalis* (NESTI), *Trogontherium dacicum* RĂDULESCU, *Stephanorinus etruscus* (FALCONER), *Stephanorhinus* sp.**,** *Allohippus athanasiui* SAMSON, *Eucladoceros* sp., *Pliotragus ardeus* (DEPERET), *Nyctereutes megamastoides* (POMMEL), *Vulpes alopecoides* MAJOR, *Lynx issiodorensis* (CROIZET & JOBERT)*, Cervus* ex gr. *rhenanus/philisi, Gazellospira torticornis* (AYMARD)**,** *Mitilanotherium inexpectatum* SAMSON & RĂDULESCU*, Ursus etruscus* CUVIER**,** *Pliocrocuta perrieri* (CROIZET & JOBERT), *Homotherium crenatidens* (FABRINI*), Megantereon megantereon* (CROIZET & JOBERT*), Manis* cf. *hungarica* KORMOS*, Paradolichopithecus geticus* NECRASOV, SAMSON & RĂDULESCU (SAMSON & RĂDULESCU, 1963, 1966, 1973; BOLOMEY, 1965; FERU et al., 1983; RĂDULESCU & SAMSON, 1990, 2001).

An important biostratigraphic event in Tetoiu area is indicated at ~1.7 - 1.8 Ma by the possible appearance of a *Homo erectus* lineage documented through the discovery of a few flint pebbles which seem to be linked to human activity (SAMSON & RĂDULESCU, 1963; RĂDULESCU & SAMSON, 1990, 1991).

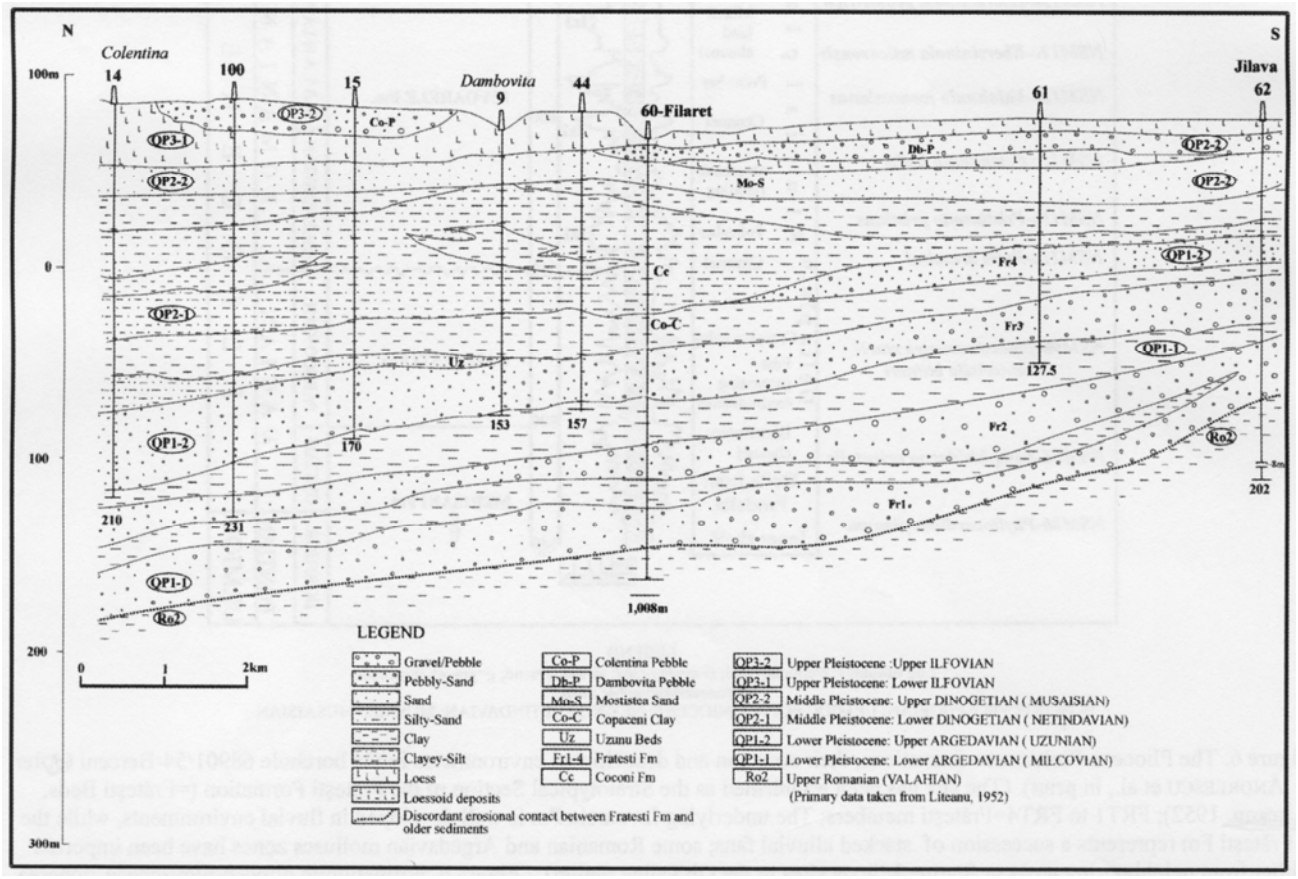

Figure 7. Litho-facial cross-section showing detailed lithology and relationships among Pleistocene deposits in the Bucharest Area (according to ANDREESCU et al., in print). / Figura 7. Secțiune litofacială, ilustrând alcătuirea litologică detaliată şi relațiile dintre depozitele pleistocene în zona Bucureşti (după ANDREESCU et al., sub tipar).

3.3. Vlădeni Formation (ANDREESCU et al., in print). The basinal extension of this unit can be only estimated, in the eastern area of the Moesian Platform, since it has nowhere been found in outcrops. The deposits of this formation, represented mostly by pebbles, gravels and sands, grading vertically to sandy silts or even silts and silty clays, drilled in the south-eastern area of the Dacian Basin, represent alluvial fans, coming from the South Dobrogea (Fig. 1). Their usual thickness, in the type area, rather lower than 30-50 m, is consistently increasing basinward, to the west and northeast, where the finer clasts (sands, sandy silts, silts) become prevalent, suggesting a gradual passage to the Lower Copăceni/Coconi typical sequences (Fig. 2).

These sequences, habitually devoid of fossils, are laying unconformably over a pile of Romanian finer terrigenous deposits which, in places, proved to be rich fossiliferous: *Wenziella subclivosa* (TEISS.), *Cuneopsidea beyrichi* (NEUM.), *Rugunio mojsvari* (PEN.), *Moldavunio circula* (ANDR.), *Pelendunio* cf. *bielzi* (CZEK.), *Psilunio* ex gr. *acutus* (NEUM.), *Viviparus* div. sp., *Melanopsis* div. sp., documenting the Pelendavian Substage (PAPAIANOPOL et al., 1987; PAPAIANOPOL, 1993).

Since the Vlădeni Fm is unconformable underlain by sandy-silty-clayey Pelendavian sequences, and is unconformale overlain by the Lower Dinogetian (Netindavian) Reddish-Clay (Fig. 9), a Lower Argedavian (Milcovian) age of this unit could be inferred.

3.4. Copăceni Beds (ANDREESCU et al., in print) (Figs. 2; 7) can eventually be viewed either as an "independent" formation, or as the lower member of the Coconi Fm. The sequences of Copăceni Beds are mainly represented by fine facies. In our thought this unit, well developed in the most subsiding area of the basin, has to be considered as an equivalent of both the Tetoiu Fm, to the north, and Frăteşti Fm, to the south (Fig. 2).

The small mammals (*Mymomys savini* HINTON, *Allophaiomys pliocaenicus* KORM., *Lagurodon arankae* KRET. found in the Copăceni Site (Fig. 1) together with a very rich molluscan fauna (*Pseudosturia caudata* TSCHEP., *Bogatschevia* cf. *scutum* (BOG.), *B. sturi* (HOERN.), *B*. cf. *tamanica* (JATZ.), *Wenziella* ex gr. *wilhelmi* (PEN.), *Potomida ovata* TSCHEP., *Margaritifera* cf. *arca* TSCHEP., *Crassiana pseudodavilai* RUD., *Unio* cf. *chasaricus* BOG., *U. kujalnicensis* JATZ., and an extremely abundant small gastropod assemblage, whose taxa were not yet minutely identified, let us suppose the correlation of this site with the T_8 terrace of the Nistru and the Prut rivers (ANDREESCU et al., in print).

3.5. Coconi Formation (**"Marly Complex"**, LITEANU, 1952; **"Coconi Beds"**, ALEXEEVA et al., 1983). If the Copăceni Beds are to be considered as a formation, *per se*, then the "Marly Complex" has to be seen as the continuously upward developing, during the Mid Pleistocene, of the prevailingly clayey-silty sequences in the same area dominated by fluvial plain environments, located in the transition zone between the Carpathian Foredeep, to the north, and the Moesian Platform, to the south (Fig. 2).

The thickness ranging between 50-100 m, in the southern area (LITEANU, 1952), is relatively uniform on the whole southern Romanian Plain, illustrating pronounced diminishing rate of subsidence during the Middle Pleistocene (Early Dinogetian = Netindavian) of the southeastern area of the Moesian Platform. To the north and northeast the thickness of the Coconi Fm is growing consistently, so that in the Ialomiţa-Buzău interfluve it reaches 350-400 m, as revealed by some boreholes: 65/H-Fierbinţi-Târg (RĂDULESCU et al., 1997) , 66/H-Urziceni (ENCIU, 2007) etc.

The molluscan fauna of the Coconi Fm, rather scarce, is considered biochronologically insignificant. Since its outlining (LITEANU, 1952) till now, no reliable marker had been signalized, either in the outcropping area of Mostiştea valley, or in hundreds of boreholes drilled in the eastern region of the Romanian Plain. Among the most frequent taxa reported from the "Marly Complex", the following are to be cited: *Pisidium priscum* EICHW., *P. amnicum* MULL., *P. clessini* NEUM., *Sphaerium rivicola* LEACH, *S. corneum* L., *Corbicula fluminalis* MULL., *Unio* cf. *pictorum* L., *Valvata piscinalis* MULL., *V. sibinensis* NEUM., *V. sulekiana* BRUS., *Viviparus diluvianus* KUNTH, *V. megarensis* (FUCHS), *V. altus* (NEUM.), *V. romaloi* (COB.), *V. geticus* PAVLOV, *V. crassus* KUNTH, *V. craiovensis* TOURN., *V. istriensis* PAVLOV, *V. maldarescui* (COB.), *Lithoglyphus naticoides* PFEIFF., *L. fuscus* (ZIEG.), *Bithynia tentaculata* L., *B. leachi* SHAPP., *Theodoxus danubialis* PFEIFF., *T. fluviatilis* L., *Spiralina vortex* L., *Planorbis planorbis* L., *Planorbarius corneus* (L.) etc. (MACAROVICI & COTET, 1962; MACAROVICI & COSTETCHI, 1973; LITEANU & GHENEA, 1966; LITEANU et al., 1967a; ALEXEEVA et al., 1983).

On the basis of rodent taxa *Prolagurus pannonicus* (KORMOS) and *Allophaiomys pliocaenicus* KORMOS found in the borehole 65/H-Fierbinţi (Fig. 1), RĂDULESCU et al. (1997) assigned the middle-upper part of the "Coconi Beds" to the Late Early Pleistocene (~1.1-1.0 Ma), an age which is in wholly agreement with our view concerning the spatial relationships of the Copăceni/Coconi Beds with both the Frăteşti and Tetoiu formations (Fig. 2).

3.6. Călmăţui Formation (herein established). Based on boreholes data, from the easternmost area of the Dacian Basin (Fig. 1) a pile of ca 50-70 m of deposits dominated by sands, pebbly sands, gravels and cobbles had been outlined and named "psamo-psephitic complex" by FERU et al., 1977. These deposits representing typical facies of some alluvial fans originating in the northern and central Dobrogea, are quickly merging westward into the Coconi Fm. No molluscan fauna was ever reported in those sequences that we name Călmăţui Formation.

In two boreholes, 8521-Hârşova and 76-119-Albina, in the basal, prevalent sandy member of "psamo-psephitic complex", FERU et al. (1977) found a few mammal remains assigned to *Praemegaceros verticornis* (DAWK.) and *Equus* cf. *mosbachensis* V. REICH. Although the fossil record is rather poor, the authors considered the named taxa could be invoked in assigning the "psamo-psephitic complex" to the Middle Pleistocene as an equivalent of the *Tiraspolian*

mammal complex (NIKIFOROVA et al., 1976, 1986), corresponding in our chronostratigraphic scale to the Early Dinogetian (Netindavian Substage).

As a type section for the Călmățui Fm could be selected the borehole 3505-Mihai Bravu, in which the "psamo-psephitic complex" reaches a thickness of about 68 m (FERU et al., 1977).

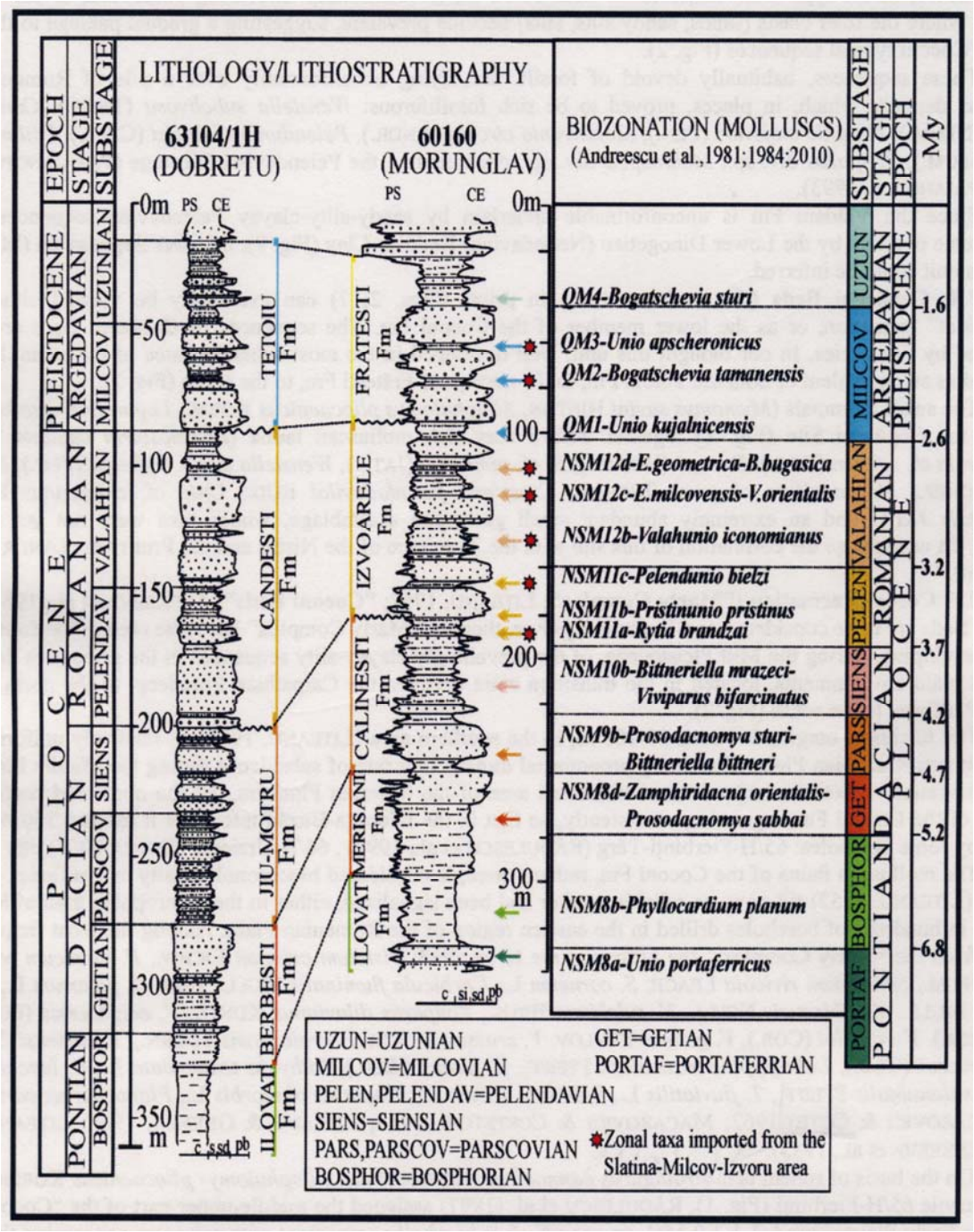

Figure 8. Litho-biostratigraphic similarities and dissimilarities among the Pliocene-Pleistocene sequences recorded in the transition area between Carpathian Foredeep (borehole 63104/1H-Dobrețu) and Moesian Platform (borehole 60160-Morunglav). / Figura 8. Similitudini şi deosebiri lito-biostratigrafice între depozitele pliocen-pleistocene din aria de tranziție dintre Avanfosa Carpatică (forajul 63104/1H-Dobrețu) şi Platforma Moesică (forajul 60160-Morunglav).

3.7. Vânători Formation (ANDREESCU et al., in print). According to the following mollusc taxa: *Unio apscheronicus* (ALIZ.), *U. pictorum* L., *U. tumidus* RETZ., *Didacna crassa* (EICH.), *D. pseudocrassa* PAV., *Monodacna pontica* (EICHW.), *Dreissena polymorpha* PALLAS, *Corbicula fluminalis* (MULL.), *Viviparus sadleri* (NEUM.), *V. altus* (PAVL.), *V. diluvianus* (KUNTH.), *V. aethiops* (PARR.), *V. istriensis* (PAV.), *V. romaloi* (COB.), *V. geticus* (PAVL.), *Fagotia acicularis* (FER.), *F. esperi* (FER.), *Theodoxus danubialis* PFEIF., *Gibbula deversa* MILASCH. etc. the QM7-*Didacna crassa-Monodacna pontica* Zone has been inferred and consequently the Vânători Fm has been assigned to the Lowermost Mid-Pleistocene (Early Dinogetian=Netindavian Substage) (Fig. 3).

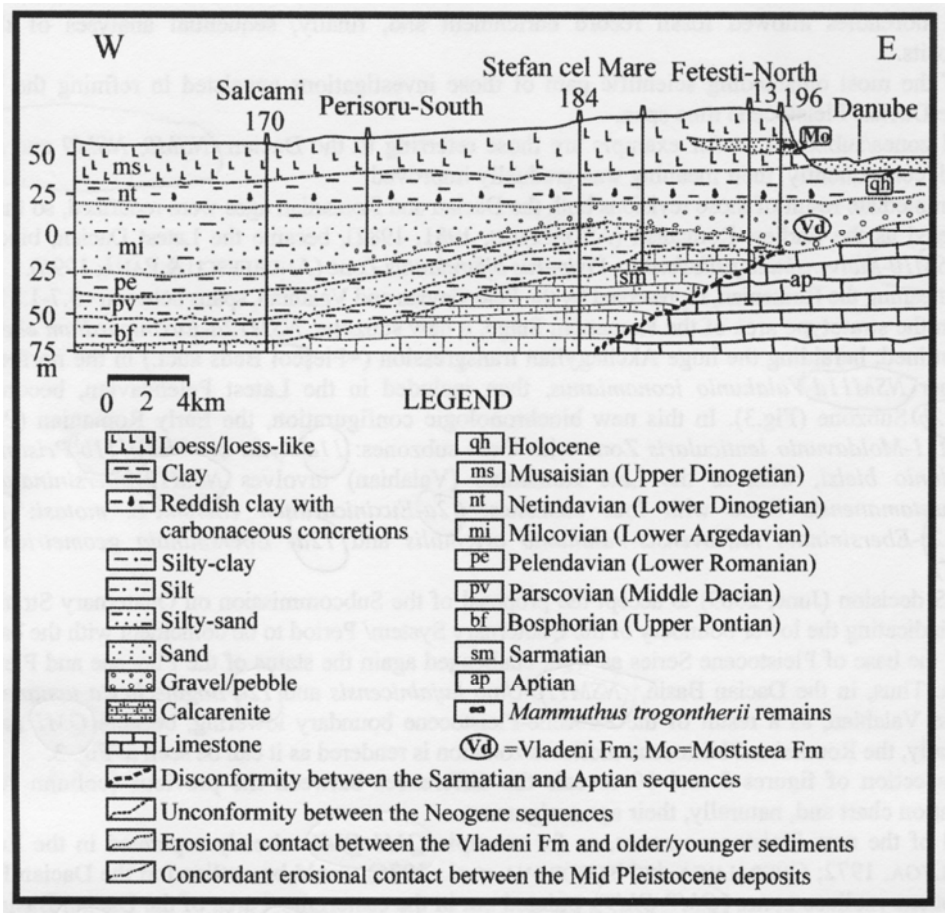

Figure 9. Litho-facial cross-section showing the relationships among the Neogene-Quaternary deposits in the southeastern Dacian Basin (after ANDREESCU et al., in print). (Primary data taken from PAPAIANOPOL et al., 1987; PAPAIANOPOL, 1993; ENCIU, 2007).
Figura 9. Secţiune litofacială ilustrând relaţiile dintre depozitele neogen-cuaternare în sud-estul Bazinului Dacic (după ANDREESCU et al., sub tipar). (Datele primare luate din PAPAIANOPOL et al., 1987; PAPAIANOPOL, 1993; ENCIU, 2007).

3.8. Barboşi-Babele Formation (=**Barboşi-Babele Beds**, MACAROVICI, 1960) is referring to a pile of sandy-clayay deposits, reaching a thickness up to 80-90m, developed in the easternmost area of the Dacian Basin where, habitually, are underlain by sequences of the Tuluceşti Fm and/or Vânători Fm. The faunal content is represented, as in the Vânători Fm case, by a mixed freshwater, lacustrine taxa: *U. pictorum, U. tumidus, D. polymorha*, *Sphaerium* div. sp., *Corbicula* div. sp., *Pisidium* div. sp., *Viviparus* div. sp., *Melanopsis* div. sp., *Lithoglyphus* div. sp., *Valvata* div. sp., *Theodoxus* div. sp. and brackish estuarine molluscs: *Didacna pontocaspia* PAVL., *D. pseudocrassa* PAVL, *Adacna plicata* (EICHW) (MACAROVICI & COTEŢ, 1962; MACAROVICI & COSTEŢCHI, 1973). This fauna, outlining the QM8-*D. pontocaspia-A. plicata Zone* (Table 1), correlates with the molluscan fauna yielded by 'Babele Beds' (MACAROVICI & COSTEŢCHI, 1973), mentioned in terraces T_5-Kolkotova (Nistru), T_5-Pietricica (Prut) and T_5-Nagornoe (Danube), Middle Pleistocene in age (~0.5 Ma), representing the Lowermost Musaisian Substage in the Dacian Basin.

3.9. Mostiştea Formation (ANDREESCU et al., in press) (**"Thick Sands Bank"**, LITEANU, 1952; = **Mostiştea Beds**, ALEXEEVA et al., 1983).

Till now Mostiştea Beds proved to be, habitually, devoid of any significant molluscan fauna. However, in places MACAROVICI & COTEŢ (1962) and MUNTEANU (2006) mentioned: *U. pictorum*, *U.* aff. *pictorum, Anodonta* sp., *Corbicula fluminalis* MULL., *Sphaerium corneum* L., *S. subnobilis* COB., *Musculum lacustre* MULL., *Viviparus* div. sp., *Lithoglyphus naticoides* PFEIFF., *Theodoxus danubialis* PFEIFF., *Radix ovata* DRAP., *Planorbis corneus* L. etc., reminding the molluscan fauna from the "Upper Babele Beds", equivalent to T_4-T_3 terraces of the Prut and the Danube rivers.

The finding of the *Mammuthus trogontherii* (POHLIG) remains (APOSTOL, 1971, 1974) yielded by "Mostiştea Beds" from the Oriental Romanian Plain, has definitely been argued the assignment of these sands to the Upper Dinogetian (Musaisian).

4. UPPER PLIOCENE AND PLEISTOCENE BIOCHRONOLOGIC AND CHRONOSTRATIGRAPHIC UNITS

In the Dacian Basin for the Sarmatian-Pliocene time interval, 12 Middle-Late Miocene-Pliocene mollusc zones (NSM_1 – NSM_{12}), and 4 Early Pleistocene ones (QM_1 – QM_4) have been proposed (ANDREESCU, 1981, 1983). A lot of new data subsequently acquired (ANDREESCU et al., 1984, 1985, 1992; PAPAIANOPOL et al., 1987; LUBENESCU et al., 1987; ENCIU & ANDREESCU, 1990) by detailed mapping and processing information coming from coal or

hydrogeological boreholes allowed fossil record enrichment and, finally, sequential analyses of the Pliocene - Pleistocene deposits.

One of the most outstanding scientific gain of those investigations consisted in refining the biochronology (molluscs) of the Dacian-Pleistocene time span.

Several zones/subzones, as for example are those referring to the Dacian (NSM8, NSM9 and NSM10), have been revised and, consequently, their meaning was gradually improved.

As an immediate result of those revisions both the Dacian and Romanian ages were redefined, so that the Siensian, formerly considered as the Earliest Romanian (ANDREESCU, 1981, 1982), became the Latest Dacian, biochronologically marked by the NSM10-*Malvensinaia psilodonta – Viviparus bifarciantus* Zone (ANDREESCU & PANĂ, 1996).

In this meaning the Romanian, represented by the Pelendavian and Valahian, spans between ~3.7-1.8 Ma (Fig. 10).

Since in the stratotype area of the Romanian Stage, a new subzone, NSM12a-*Euxinicardium ebersini-E. motasi* Subzone was outlined, heralding the huge Akchagylian transgression (=Pleşcoi Beds auct.) in the northeastern Dacian Basin, the former NSM11d-*Valahunio iconomianus,* then included in the Latest Pelendavian, become the second Valahian NSM12b Subzone (Fig. 3). In this new biochronologic configuration, the Early Romanian (Pelendavian) is defined by NSM11-*Moldavunio lenticularis* Zone with three subzones: 11a-*Rytia brandzai;* 11b-*Pristinunio pristinus* and 11c-*Pelendunio bielzi*, whereas the Late Romanian (Valahian) involves NSM12-*Ebersininaia milcovensis-Bogatschevia pretamanensis* Zone with four subzones: 12a-*Euxinicardium ebersini-E. motasi*; 12b-*Valahunio iconomianus*; 12c-*Ebersininaia milcovensis-Valahunio orientalis* and 12d-*Ebersininaia geometrica-Bogatschevia bugasica* (Fig. 3).

The ICS decision (June, 2009) to accept the proposal of the Subcommission on Quaternary Stratigraphy (SQS) (August, 2008), indicating the lower boundary of the Quaternary System/ Period to be coincident with the base of Gelasian (2.588 Ma), and the base of Pleistocene Series as well, challenged again the status of the Pliocene and Pleistocene in the Paratethys realm. Thus, in the Dacian Basin, NSM12c-*Unio kujalnicensis* and 12d-*Bogatschevia tamanensis* subzones, defining the Late Valahian, as a result of the Pliocene-Pleistocene boundary lowering, became QM1 and QM2 zones respectively. Finally, the Romanian-Pleistocene molluscs zonation is rendered as it can be seen in Fig. 3.

The inspection of figures 3 and 10 reveals the differences between the previous (column A) and present (column B) zonation chart and, naturally, their age assignment.

Several of the new Pleistocene zones, as for example QM1-QM6, already separated in the Euxino-Caspian domain (CHEPALYGA, 1972; CHEPALYGA, in NIKIFOROVA et al., 1976), could be outlined in the Dacian Basin too. The last three Pleistocene mollusc zones (QM7-QM9), pointed out in the easternmost area of the Dacian Basin, characterize the Dinogetian Stage (Mid-Pleistocene deposits). QM1-*U.kujalnicensis;* QM2-*B.tamanensis;* QM3-*U. apscheronicus* and QM4-*B. sturi* zones have been outlined (ANDREESCU et al., 1981) in the Milcov-Slatina area and, since then, their taxa content did not change. The QM5-*Bogatschevia scutum* assemblage comes from Uzunu Beds, described by MACAROVICI & COTEŢ (1962); QM6-*Pseudosturia caudata* assemblage has been outlined in section 3.4. Copăceni Beds; QM7-*D. crassa-M. pontica* assemblage characterizes the Vânători Fm (see also section 3.7); QM8-*D. pontocaspia-A. plicata* assemblage comes from the Barboşi-Babele Beds (MACAROVICI, 1960) and QM9-*Unio pictorum-U. tumidus* Zone is mainly conceived on the mollusc assemblages (*Unio pictorum, U. tumidus, Corbicula consobrina, C. crassula, C. fluminalis, Viviparus megarensis, V. altus, V. istriens, V. tiraspolitanus, Fagotia esperi, Bithynia* div. sp., *Bulimus* div. sp., *Valvata* div. sp. etc.) reported by MACAROVICI & COTEŢ (1962), MACAROVICI & COSTEŢCHI (1973), MUNTEANU (2006) in the southeastern and easternmost areas of the Dacian Basin.

Based on detailed biochronologic separations, expressed in the Romanian-Pleistocene zonal revisions, and in outlining of a series of new molluscan zones (Fig. 3) on the one hand, and on magnetobiostratigraphic investigations, on the other hand, we finally were able to redefine not only the Romanian Age and its subdivisions, but also to separate a series of new Pleistocene chronostratigraphic units: the **Argedavian** Age (with **Milcovian** and **Uzunian** subdivisions), the **Dinogetian** Age (with **Netindavian** and **Musaisian** subdivisions), and the **Ilfovian** Age (Figs. 3; 10) (ANDREESCU et al., 2010).

Argedavian Age represents the Early Pleistocene. Its name comes from **Argedava**, the ancient Geto-Dacian Fortress and Burebista's Kingdom Capital (Fig. 1). The Argedavian Stage is characterized by Frăteşti Fm, in the western and central areas of the Moesian Platform, Tetoiu Fm, in the southern sector of the Carpathian Foredeep, Vlădeni Fm, in the eastern sector of the Moesian Platform, and Copăceni Beds laying in the junction zone between the above named units (Fig. 2). Biochronologically 6 molluscan zones (QM1-QM6) (Figs. 3; 10), one subzone (MN16b) and four mammalian zones (MN17, MmQ-1, MmQ-2, MmQ-3) (Figs. 4, 10) define the Argedavian Age, which spans a relatively long interval of ca 1.8 Ma.

The zones QM1-QM3, MN16b, MN17 and the greatest part of MmQ-1 zone (?possibly the entire zone) characterize the Early Argedavian (Milcovian), while the Late Argedavian (Uzunian) is defined by QM4-QM6 and MmQ-2, MmQ-3 zones (Figs. 4; 10).

Since no magnetostratigraphic investigation on the passage among molluscan zones QM3/QM4 to QM8/QM9 is available in the Dacian Basin, their absolute age, and consequently the stage/substage boundaries as well, had to be only estimated, first of all by analogy with the reliable data coming from studies carried out on the Pleistocene deposits in the Euxino-Caspian region (NIKIFOROVA et al., 1976, 1986; YAKHIMOVICI et al., 2000; TESAKOV et al., 2007; DANUKALOVA et al., 2008) (Figs. 3; 10).

The Dinogetian Age whose name is derived from **Dinogetia**, an ancient Geto-Dacian Fortress (Fig. 1), corresponds to the former Middle Pleistocene and keeps the same meaning in the present paper, spanning ca 0.65 Ma (Fig. 10).

Lithostratigraphically the Dinogetian Stage is represented by the upper part of the Coconi Fm ("Marly complex", LITEANU, 1952), Călmăţui Fm ("Psamo-psephitic complex", FERU et al., 1977), Vânători Fm (ANDREESCU et al., in press), Barboşi-Babele Fm ("Barboşi-Babele Beds", MACAROVICI, 1960), Mostiştea Fm ("Thick sand bank", LITEANU, 1952), "lower loess" and loess-like deposits and alluvial accumulations of the T_7-T_3 terraces.

Owing to its relative scarcity, Dinogetian monotonous molluscan fauna, yielded in places by the above mentioned lithological units, could hardly be considered, at basinal scale, as reliable chronologic markers (*datum planes*) for the Netindavian or Musaisian. Not too much different is to be noted as concerns the availability of the Mid-Pleistocene large and/or small mammal fauna in the Dacian Basin. In other words, despite the two Dinogetian chrons were clearly outlined by the "assemblage zones" QM7-QM9, we are still unable to point out an accurate absolute age of the Netindavian/Musaisian boundary. However, by correlation of the QM7 Zone with the Early Ceaudian (=T_6-T_5 terrace of the Nistru, the Prut and the Danube rivers) (~0.75-0.7 Ma) and QM8 with the Late Ceaudian (=T_5-T_4 terrace Kolcotova-the Nistru and Pietricica-the Prut) (~0.55-0.5 Ma) (FEDOROV, 1978; SHOPOV, 1996; SHOPOV et al., 1994; WINGUTH et al., 2000) an absolute age of ca 0.5 Ma could be accepted for that boundary and, this case, the Netindavian is lasting ca 0.30 Ma, and the Musaisian ca 0.35 Ma.

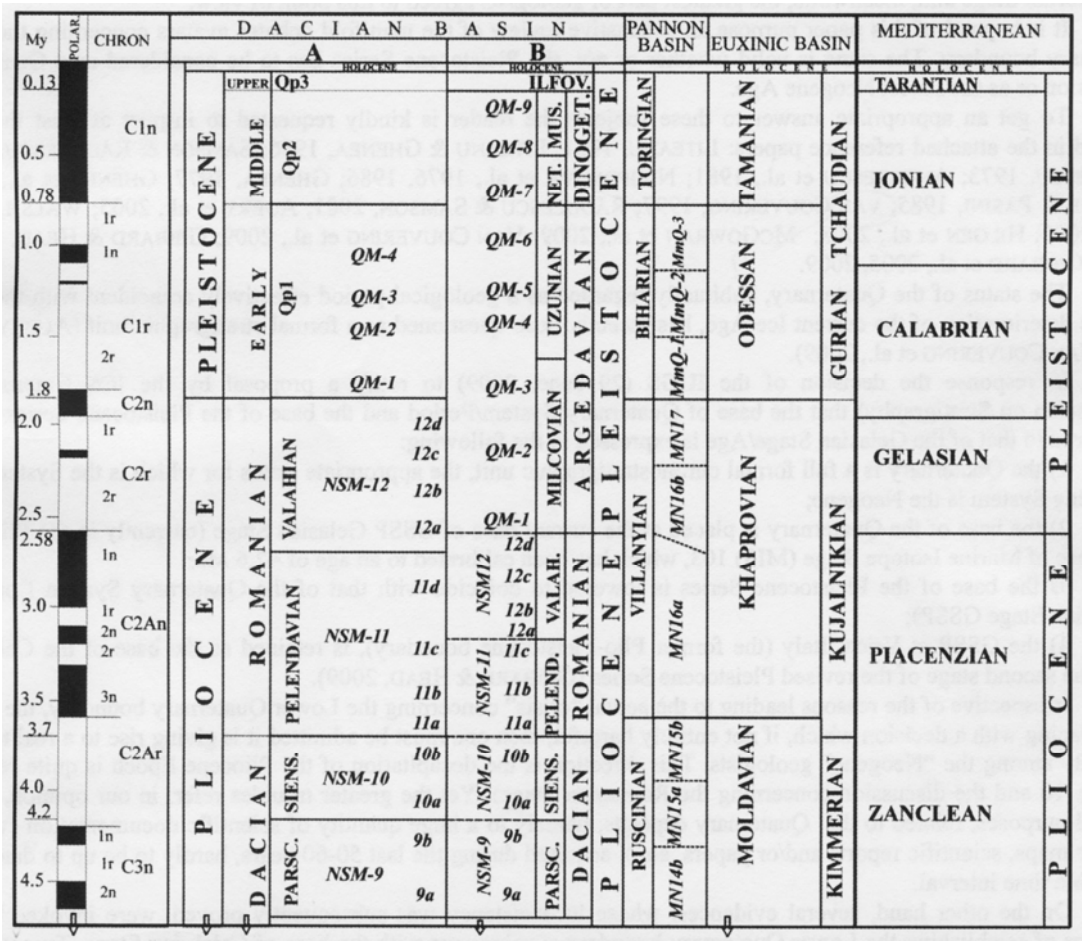

Figure10. Former (column A) and actual (column B) state of the Pliocene-Pleistocene Biochronologic (Molluscs, Mammals) and Chronostratigraphic units in the Dacian Basin and correlations with the Pannonian, Euxinic and Mediterranean realms (according to ANDREESCU et al., in print). / Figura 10. Unităţile biocronologice (moluşte, mamifere) pliocen-pleistocene şi unităţile cronostratigrafice foste (coloana A) şi actuale (coloana B) din Bazinul Dacic; corelarea acestora cu Bazinul Pannonic, Bazinul Euxinic şi domeniul mediteranean (după ANDREESCU et al., sub tipar).

Abbreviations: NSM-9 – QM-9=Mollusc zones; MN14b-MnQ3=Mammal zones; PARSC.=Parscovian; SIENS.=Siensian; PELEND.=Pelendavian; VALAH.=Valahian; DINOGET.=Dinogetian NET.=Netindavian; MUS.=Musaisian; ILFOV.=Ilfovian).

Abrevieri*:* NSM-9 – QM9=Zone de moluşte; MN14b – MnQ3=Zone mamaliene; PARSC.=Parscovian; SIENS.=Siensian; PELEND.=Pelendavian; VALAH.=Valahian; DINOGET.=Dinogetian; NET.=Netindavian; MUS.=Musaisian; ILFOV.=Ilfovian).

The Late Pleistocene, named Ilfovian Age in the Dacian Basin (ANDREESCU et al., 2010), is spanning ca 0.118 Ma (0.130-0.0115 Ma), versus 0.108 Ma as accepted by various authors (GIBBARD, 2003; GIBBARD & HEAD, 2009; GIBBARD et al., 2005, 2009) in other sedimentary realms. Its name comes from the Ilfov district where LITEANU (1952)

described in detail the Colentina Pebbles and the loess-like deposits assigned to the Upper Pleistocene. Beside those rocks the Ilfovian Stage is represented by 1-3 loess "levels" and the alluvial accumulations of terraces T_3-T_1.

No biochronologically significant freshwater/terrestrial mollusc fauna was ever reported in the uppermost Pleistocene deposits either in the Dacian Basin or other Paratethyan basin. In exchange the Ilfovian mammal fauna, reflecting a lot of environments, is pretty rich and diversified: *Mammuthus primigenius* (BLUMB.), *Palaeoloxodon antiquus* (FALCONER), *Coelodonta antiquitatis* (BLUMB.), *Bison priscus* BOJAN, *Bos primigenius* (BOJAN), *Megaceros giganteus* (BLUMB.), *Ursus arctos* L., *Canis lupus* L., *Crocuta spelaea* (GOLDF.) etc.

5. REASSESSING THE PLIOCENE/PLEISTOCENE BOUNDARY IN THE DACIAN BASIN

The decision adopted at the 18-th International Geological Congress (London, 1948) to establish the Neogene/Quaternary boundary synchronous with the base of the Calabrian Stage has been met in two main ways: some geologists, less directly involved, accepted without restraint this proposal, while other 'Quaternarists' from eastern European countries, especially from the former USSR, refuted it "ab initio". As habitually, in such a case, available reasons to be invoked in a certain sense or another were more than abundant on each side.

More than half of century elapsed since the 18th IGC decided to establish Quaternary boundary at the base of the Calabrian Stage and, meanwhile, the greatest part of geologists agreed to this point of view.

It is beyond of this paper purpose an exhaustive review of the manifold debates avatars concerning the Early Quaternary boundary. The same is valid whether or not, the Pleistocene Series has to be considered as a Quaternary subdivision or as the Latest Neogene Age.

To get an appropriate answer to these subjects the reader is kindly requested to inspect at least the titles included in the attached reference papers: LITEANU, 1961; LITEANU & GHENEA, 1966; SAMSON & RĂDULESCU, 1973; ANDREESCU, 1973; ANDREESCU et al., 1981; NIKIFOROVA et al., 1976, 1986; GHENEA, 1977; GHENEA et al., 1982; AGUIRRE & PASINI, 1985; VAN COUVERING, 1997; RĂDULESCU & SAMSON, 2001; AUBRY et al., 2005; WALSH, 2006; PRAT, 2007; HILGEN et al., 2008; MCGOWRAN et al., 2009; VAN COUVERING et al., 2009; GIBBARD & HEAD, 2009a, 2009b; GIBBARD et al., 2005, 2009.

The status of the Quaternary, habitually regarded as a geological period effectively coincident with the main climatic deterioration of the current Ice Age, has recently been questioned as a formal stratigraphic unit (AUBRY et al., 2005; VAN COUVERING et al., 2009).

In response the decision of the IUGS (29 June, 2009) to ratify a proposal by the ICS (International Commission on Stratigraphy) that the base of Quaternary System/Period and the base of the Pleistocene Series/Epoch be lowered to that of the Gelasian Stage/Age is expressed in the following:

1) the Quaternary is a full formal chronostratigraphic unit, the appropriate status for which is the System. The underlying System is the Neogene;

2) the base of the Quaternary is placed at the current base of GSSP Gelasian Stage (currently in the Pliocene) at the base of Marine Isotope Stage (MIS) 103, which has been calibrated to an age of ~2.6 Ma*;*

3) the base of the Pleistocene Series is lowered to coincide with that of the Quaternary System Boundary (=Gelasian Stage GSSP);

4) the GSSP at Vrica, Italy (the former Plio-Pleistocene boundary), is retained as the base of the Calabrian Stage, the second stage of the revised Pleistocene Series (GIBBARD & HEAD, 2009).

Irrespective of the reasons leading to the actual "crisis" concerning the Lower Quaternary boundary, the fact is we are facing with a decision which, if not entirely harmful, then one must be admitted it is giving rise to a real turmoil especially among the "Neogene" geologists. This direction is the decapitation of the Pliocene Epoch is quite relevant (see Fig. 10 and the discussion concerning the Romanian Stage). Yet the greater troubles refer, in our opinion, to the practical purposes, related to the Quaternary deposits, namely to a huge quantity of scientific documentation (various geologic maps, scientific reports and/or papers, etc.), acquired during the last 50-60 years, hardly to be up to dated in a reasonable time interval.

On the other hand, several evidences, whose inconsistency was subsequently proved, were invoked by the advocates of establishing the Lower Quaternary boundary synchronous with the base of Calabrian Stage. Two of them are worthy to be mentioned:

1) the presence of the so-called "northern guests" (molluscs, forams) in Early Calabrian. In fact, the first occurrence of those disparate taxa (i.e. *Hyalinea baltica, Globorotalia truncatulinoides*) is recorded in older sediments, former included in the Picenzian Stage. RIO et al. (1984) pointed out that the Mediterranean nannofloral and foraminiferal assemblages underwent marked changes in the Late Pliocene in the proximity of Gauss/Matuyama paleomagnetic epochs (n.n.~2.6 Ma). These events, according to various authors (SHACKLETON & OPDYKE, 1977; THUNELL & WILLIAMS, 1983; SUC et al., 1997; VAN DAM et al., 2006) seemingly occurred worldwide being related to a severe cooling, the onset of the Northern Hemisphere glaciation;

2) the pseudo-correlation between the "marine stage" Calabrian and the "continental stage" Villafranchian (SUC et al., 1997) and, moreover, the inexistence in the type section of Villafranca d'Asti of several mammal taxa (*Elephas, Leptobos, Equus*) (AZZAROLI, 1970) considered typical for this stage.

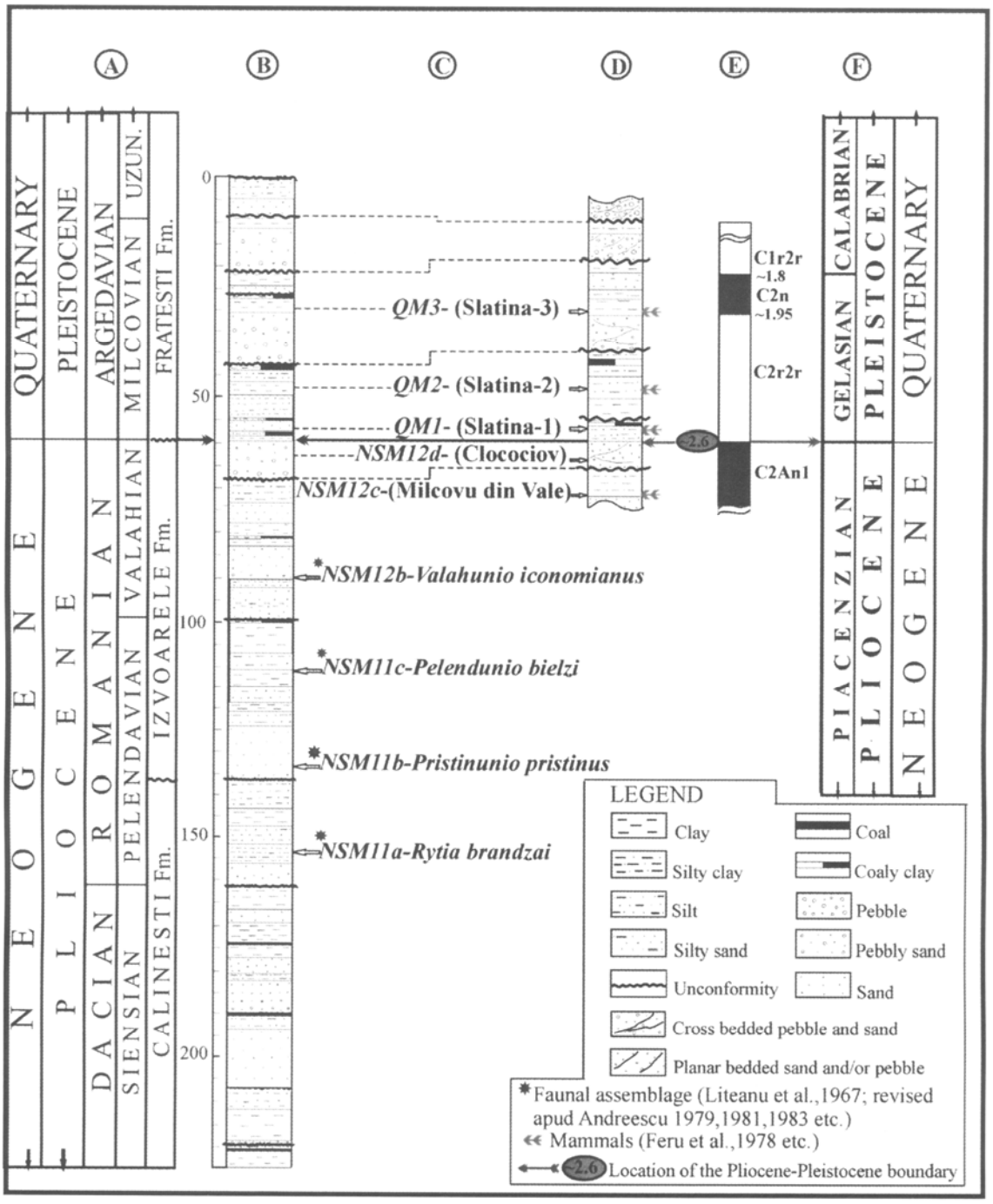

Figure 11. Reassesed the Pliocene/Pleistocene boundary in the Dacian Basin (Stratotypical Slatina Area, Olt District) (according to ANDREESCU et al., 2010). / Figura 11. Repoziționarea limitei Pliocen/Pleistocen în Bazinul Dacic (Aria stratotipică Slatina, județul Olt) (după ANDREESCU et al., 2010).

Legend: A=Upper Pliocene-Pleistocene lithostratigraphic and chronostratigraphic units in the Central Dacian Basin, applied to the Slatina Area; B=Lithology of the upper part of the H4-Slatina Drill-Site, in which the Upper Călineşti Fm. (=Siensian), Izvoarele Fm and Frăteşti Fm. (lower and middle parts) are represented; C=Molluscs zonation: NSM11a to NSM12b, inferred, taking into account the faunal assemblages described by LITEANU et al., 1967; NSM12c to QM3 are coming from the former Milcovu din Vale and Slatina outcrops (ANDREESCU et al.,1981); D=Former Pliocene-Pleistocene stratotypical sections of Slatina and Milcovu din Vale (ANDREESCU et al., 1981); E=Slatina-Milcovu din Vale magnetostratigrafic column (ANDREESCU et al., 1981); F=Upper Pliocene-Lower Pleistocene (Neogene/Quaternary) boundary in the Mediterranean realm.

Legendă: A=Unităţile litostratigrafice şi cronostratigrafice din sectorul central al Bazinului Dacic aplicate zonei Slatina; B=Litologia din partea superioară a coloanei relevate de forajul H4-Slatina, în care sunt reprezentate partea superioară a Formaţiunii de Călineşti (Siensian), Formaţiunea de Izvoarele şi segmentele inferior şi mediu ale Formaţiunii de Frăteşti; C=Zonarea moluştelor: NSM11a…NSM12b deduse prin considerarea asociaţiilor prezentate de LITEANU et al., 1967: NSM12c…QM3 provin din fostele aflorimente Milcovu din Vale şi Slatina (ANDREESCU et al., 1981); D=Fostele secţiuni stratotipice Slatina şi Milcovu din Vale (ANDREESCU et al., 1981); E=Coloana magnetostratigrafică Slatina-Milcovu din Vale (ANDREESCU et al., 1981); F=Limita Pliocen superior-Pleistocen inferior (Neogen/Cuaternar) în domeniul mediteranean.

However, irrespective of the adopted or rejected point of view, expressed by "Quaternarists" versus "Neogenists", regarding the position of this boundary, we found that, in the Dacian Basin, the lowering Quaternary base to ca 2.6 Ma (ANDREESCU et al., 2010) seems to be much more plausible than its still present position at 1.8 Ma (ANDREESCU et al., 1981).

Consequently, taking into account the area Slatina-Milcovu din Vale, where the Pliocene-Pleistocene boundary (~1.8 Ma) has been pointed out by ANDREESCU et al. (1981) (Fig. 11), and the data provided by a lot of boreholes, drilled in the southern Dacian Basin, we were able to argue the new, reassessed, Pliocene-Pleistocene boundary can be considered coincident with the lowermost sequences of the Frăteşti Fm in the Moesian Platform area and Tetoiu Fm in the Carpathian Foredeep (Figs. 2-8; 10; 11).

Important to mention, in the eastern Dacian Basin (Fig. 1) the Pliocene/Pleistocene boundary can be magnetostratigraphically pointed out in Berca-Pleşcoi (ANDREESCU, 2008) and Râmnicu Sărat sections (VASILIEV et al., 2004; ANDREESCU, 2009) as well.

6. CONCLUSIONS

In our attempt to get more confident stratigraphic results, in this contribution we defined and/or redefined some of the main Upper Pliocene-Pleistocene lithostratigrafic, biochronologic and chronostratigraphic units in the Dacian Basin. This direction, the first step consisted in resuming the already known formations (Trajkovo Fm, Izvoarele Fm, Frăteşti Fm, Vlădeni Fm, Vânători Fm, Bărboşi-Babele Fm etc.) and in outlining the new Pleistocene ones (Tetoiu Fm, Călmăţui Fm).

In the same time, the faunal record (molluscs, mammals) has been pointed out. The results of these investigations are rendered out in the graphic figures accompanying the paper (Figs. 2-11).

The next step consisted in emphasizing of the Romanian/Pleistocene biochronological units based on molluscs and/or mammals. Accordingly the Romanian zones NSM11-*Moldavunio lenticularis,* characterizing the Early Romanian (Pelendavian), and NSM12-*Ebersininaia milcovensis-Bogatschevia pretamanensis* of the Late Romanian (Valahian) have been redefined (Figs. 3; 10). A distinct significance, in the base of the NSM12 Zone, has 12a-*Euxinicardium ebersini-E. motasi* Subzone which could be seen as a "palaeobiological echo" of the Akchagylian transgression in the Caspian Basin. A number of 9 Pleistocene zones, QM1- QM9*,* presented in previous papers (ANDREESCU et al., 2010, in press), have been redefined or outlined (Fig. 3).

The mammal faunas, previously recorded in various sites (Milcovu din Vale, Slatina, Tetoiu etc.) had been revised, and new assemblages, have been revealed so that many sites with upper Pliocene and/or Pleistocene mammal associations (Figs. 1; 4) added new taxa in faunal lists, with implications in an accurate establishing of host deposit ages (Coconi Fm, Călmăţui Fm etc.).

Further the Romanian - Pleistocene chronostratigraphic units were outlined and biochronologically documented. The Romanian Age had to be again redefined, since its former upper boundary, according to the new acceptance of the Pliocene/Pleistocene boundary at ~2.6 Ma, is now situated in the Early Pleistocene (Fig. 10). Acting in this manner, we succeeded to maintain, although redefined, the two chrons/substages, Pelendavian (~0.5 Ma) and Valahian (0.6 Ma), of the Romanian Age/Stage.

The Pleistocene age names Argedavian and Dinogetian, assessed in a previous paper (ANDREESCU et al., 2010), come from Argedava (Fortress and Capital of the ancient Daco-Getian tribes) and Dinogetia (Daco-Getian, then Roman Fortress) respectively, whereas the Ilfovian represents a derivation of the Ilfov district (see section 4).

Milcovu din Vale Site, Uzunu Site, Netindava (Daco-Getian Fortress), Dinogetia (Geto-Dacian, then Roman Fortress), and Musaisos (Ancient Daco-Getian name of the Buzău River) appellatives stand at the origin of Milcovian, Uzunian, Netindavian, Dinogetian and Musaisian names respectively (Fig. 1).

In Slatina-Milcovu din Vale area, where the former Neogene/Quaternary boundary (~1.8 Ma) was pointed out in the Dacian Basin (ANDREESCU et al., 1981), we succeeded to reassess the new Pliocene/Pleistocene boundary (2.6 Ma), coincident with the lowermost sequences of the Frăteşti Fm in the Moesian Platform area (Figs. 6; 11), whereas Tetoiu Fm has the same significance in the Carpathian Foredeep (Fig. 8).

Important to mention, in the eastern Dacian Basin (Fig. 1) the Pliocene/Pleistocene boundary can now be magnetostratigraphically pointed out in Berca-Pleşcoi (ANDREESCU, 2008, 2009) and Râmnicu Sărat sections (VASILIEV et al., 2004; ANDREESCU, 2009) as well.

Lowering the Pleistocene base, that is ageing it from 1.8 to 2.6 Ma, actually the Neogene-Quaternary boundary *rejuvenated* and, in this new posture, became more suitable to a longer life expectancy than the preceding younger boundary.

ADDENDUM

If the architecture of Romanian (Izvoarele Fm, Trajkovo Fm) and Milcovian (Tetoiu Fm, Frăteşti Fm and Vlădeni Fm) siliciclastic rudito-arenitic deposits, their source areas and supply directions are to be taken into account, then the supposition that those lithostratigraphic units were generated in the Danube's River environments, draining west-eastwardly the Dacian Basin (ENCIU, 2007), seems quite unlikely. In this context the "Danube Formation" import in the Dacian Basin (ENCIU, 2007), becomes the more inadequately so as, in agreement with recent investigations

(ENACHE, 2006; ANDREESCU, 2009), at that time, i.e. during Valahian-Milcovian, the Paleo-Danube was still trapped somewhere in the northern Pannonian Basin.

Moreover "Danube Series", in various authors acceptance (SZADECZKY-KARDOSS, 1938; RONAI, 1960: apud RONAI, 1985), refer to the Danube's terraces alluvial accumulations from the central-southern Pannonian Basin, a region which the Danube seemingly reached not sooner than the second part of the Early Pleistocene, in Uzunian respectively.

Alluvial deposits of the oldest Danubian terraces (T_8-T_6), known in that region as „Lower Danube Series', revealed the presence of *Bogatschevia sturi,* the nominative species of QM4 Zone which, as a datum plane at the Paratethys scale, spans the time interval ~1.6-1.3 Ma (NIKIFOROVA et al., 1976, 1986; ALEXEEVA et al., 1983).

In antithesis the facies of all the Romanian "rudito-arenitic" formations are plainly dissimilar both of genesis (see sections 2; 2.1-2.4**)** and age point of view, those units representing the northern, southern and northeastern alluvial environments results, whose onset is placed at ~3.2-3.0 Ma ago. The same observations, about the "Danube Fm" are valid as it concerns the Lower Pleistocene Frăteşti (southern, Balkan-Moesian, source area), Tetoiu (northern, Carpathian source area), Vlădeni (eastern, South-Central Dobrogea source area) formations and the Middle Pleistocene, Călmăţui Fm (eastern, Central-Northern Dobrogea source area) (Fig. 1): none of those units (see sections 3.1 - 3.3 and 3.6) could be related to the Danube River.

On the other hand, the figure 1 suggests the Izvoarele Fm could be considered as the Pelendavian and Valahian coarse to finer facies developed in the frame of a more or less longitudinal, coalescent drainage system, a drainage (fluvial) system having nothing in common with the Danube River, indeed.

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