

PALEOGEOGRAPHY OF THE CHERSONIAN TO MEOTIAN IN THE NORTH OF FĂLCIU HILLS (MOLDAVIAN PLATFORM) BASED ON SEDIMENTOLOGICAL DATA

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Abstract: The geological drills conducted in the Pădureni area from the north of Fălciu Hills (Moldavian Plateau) have crossed through the Chersonian-Meotian sedimentary sequence. In this way we have obtained a series of supplementary lithological, mineralogical and grano-facial data which have allowed the analysis of the paleogeographical evolution on the principles of sequential stratigraphy. The investigated sequence is made up of an alternation of lutitic, siltitic and sandy deposits, with intercalations of small gravels. At the upper part there are intercalated cineritic siltites. At the base of this sequence, the drills have intercepted supergene lutitic deposits, diagnosed on the basis of mineralogical and RX data and their macroscopic aspect. In these conditions, in the studied sedimentary sequence we separated two sets of parasequences – a retrograde and a prograde one, which enter a Transgressive Systems Tract and a High-stand Systems Tract. Genetically, the sets of parasequences have been interpreted as a result of the eustatic oscillations that have affected the Paratethys, especially the Euxinic and Dacic basins. The surface draped by the supergene deposits was considered to represent the pre-Chersonian relief, described in literature as the "*moldovalah surface II*". In what regards the geomorphology we witnessed a conditioning of the general aspect of the relief by lithology, and at least in the case of Pădureni area the inheritance of some depressionary paleo-alignments by the hydrographic network.

Keywords: lithostratigraphy, paleogeography, sequence stratigraphy, Chersonian-Meotian, geomorphology, Moldavian Platform.

1. INTRODUCTION

The studied area geographically belongs to the northern part of Fălciu Hills, subunit of the Moldavian Platform (Fig. 1). Structurally, the deposits belong to the sedimentary cover of the Moldavian Platform, more precisely to "*the last marine sedimentation mega-cycle*" that took place during late Badenian to Meotian (Ionesi, 1994; Ionesi et al., 2005; Săndulescu 1984). The area was a part of the peripheral "*new Carpathian foreland basin*" configured after the Miocene tectogenesis (Grasu et al., 1999, 2002). The research has been oriented on the Chersonian-Meotian sedimentary sequence, so as to interpret the lithofacial particularities in relation to the eustatic variations registered during Sarmatian - Meotian in the Euxinic basin. At the same time we made several

observations on the relation between the geological deposits and the post-Meotian geomorphology, in order to highlight an eventual paleogeographical reflex in the present landscape.

2. MATERIALS AND METHODS

The research focused on the paleogeographical conditions during the Chersonian to Meotian by using the sequence stratigraphy (Anastasiu et al., 2007; Cătuneanu, 2002, 2006; Dinu et al., 2007; Einsele, 1991; Miall, 2000; Nichols, 2011; Posamentier et al., 1998).

For this purpose we mapped the lithological columns from 11 technical-geological drills from the Pădureni area, which have crossed through the Chersonian-Meotian sedimentary sequence on depths between 43 and 51 m. On the basis of granofacies

analyses 20 sedimentary bodies were separated. For the genetic diagnosis of the deposits, we conducted mineralogical, polarizing microscopy and RX determinations. Later, by applying the principles of the sequential analysis, the sedimentary bodies have been grouped in retrograde and prograde para-sequences, which in their turn enter system tracts (Anastasiu et al., 2007; Cătuneanu, 2002, 2006; Nichols, 2011). The particle size determinations for the granofacies analyses were done in the Geotechnical Research Laboratory of the Faculty of Constructions, "Gheorghe Asachi" Technical University of Iași. The RX determinations were conducted in the Physics Laboratory of the Al. I. Cuza University, Iași (AMON Interdisciplinary Research Platform).

For the study of the relations between the geology and landforms have been used *The hypsometric map of Pădureni region* (Fig. 3) and *The lithofacial map of Pădureni region*, drawn in conformity with the data obtained from the investigated drills (Fig. 7). All the maps were achieved using the TNTmips 7.3 software packages (Microimages Inc., 2008). The *Digital Elevation Model* (DEM, 5x5m spatial resolution) and some geomorphometrical parameters derived from DEM (hypsometry, slope angle, slope aspect) were obtained on the basis of 1:25,000 topographic maps (MTD, 1974).

3. GEOLOGICAL BACKGROUND

3.1. General geological data

The evolution of the Euxinic basin during the Miocene was strongly conditioned by the Moldavidean structogenesis (Săndulescu, 1984) of the Eastern Carpathians area and the eustatic variations induced by the paleoclimatic changes during the Miocene (Artyushkov et al., 1996; Cendóna et al., 2004; Jipa, 2006; Kováč et al., 2007). The moldavidean structogenetic movements that affected during the Neogene the oriental part of the Eastern Carpathians determined peculiar evolution of the South-Western and Western segments of the Eastern-European and Scythian platforms, respectively the Moldavian and Bârlad platforms, reflected in the litho- and biostratigraphic content of the Badenian to Romanian cover (Ionesi, 1994; Ionesi & Barbu, 1996; Ionesi & Ionesi, 1976, 1994; Ionesi et al., 1994, 2005; Grasu et al., 1999, 2002; Jeanrenaud, 1966, 1969, 1971; Jipa, 2006; Săndulescu, 1984).

The depozones of the peripheral "new foreland basin" were individualized in this geotectonic context, configured by the moldavidean Miocene movements. The styric tectogenetic movements (Săndulescu, 1984) have configured the general morphological lines of the future basins from the Eastern Paratethys and activated a series of terrigenous source areas for the platform foreland. At the same time the geomorphologic and paleoclimatic conditions generated critical values of the basin's salinity. The Badenian sea level rise completely flooded Moldavian and Bârlad platforms, including the eastern border of the Eastern Carpathians.

The sedimentary sequence that begins in the late Badenian ended in Meotian in the Southern area of the Moldavian Platform and during the Romanian on the Bârlad platform. From a sedimentological

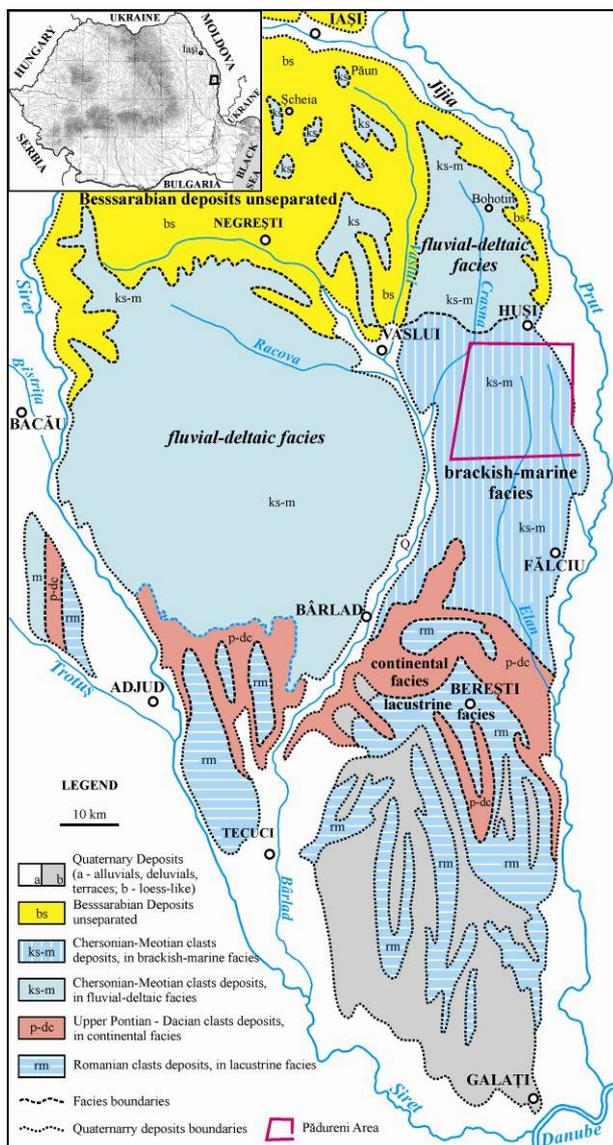


Figure 1. The distribution of the sedimentary facies from the Bessarabian – Romanian cover of the Eastern European and Scythian domains from the south of the Moldavian Platform (after Jeanrenaud, 1971).

viewpoint two depositional stages of different polarity were described. They were determined by the stiffening of the Western contact between the Carpathian area and the Moldavian Platform, which occurred earlier than on the southern alignment on which the contact between the orogen and the Scythian and Moesic platforms was made (DeCelles & Giles, 1996; Grasu et al., 1999, 2002; Jipa, 2006; Săndulescu, 1984). The time-different cratonization going from north to south led to the modification of foreland basin's subsidence direction. This changed the relations between the source-areas and sedimentary basin, causing the accumulation of a sedimentary cover in different facies.

During the deposition of this sequence at least two sedimentation breaks existed (generating higher order sequences), one between Badenian and Sarmatian ("the moldovalah surface I") and another during the late Bessarabian – early Chersonian ("moldovalah surface II"), biostratigraphically documented by Ionesi & Barbu (1996); Ionesi & Ionesi (1976, 1994); Ionesi et al., (1991, 1994). In the aforementioned basinal and climatic context, a succession of epiclastic rocks, accumulated during in the late Badenian, in which at the middle part is intercalated an evaporitic episode.

Moldavic tectonogenesis manifested in the Eastern Carpathians area during the Volhynian affecting the the morphology of the extra-Carpathian basins, and thus forming "the new Carpathian foreland basin" (Grasu et al., 1999, 2002). According to the same authors, the basinal subsidence during Volhynian to Bessarabian has been controlled by the moldavidic overthrust from the western area and later, during late Bessarabian to Romanian, by the geodynamic evolution of the Vrancea region. In this context the sedimentation evolved in two stages: the first with a west-east polarity, and the second with a north-south one. The deposits accumulated during the first stage, Volhynian - Bessarabian, outcrop in the northern part of the Moldavian Platform, with a lithofacial position in accordance to the depozones of the foreland basins' system: dominantly arenito-ruditic in the wedge-top depozone, sandy in the foredeep depozone, clayey-sandy and sandstone-limestone in the forebulge and dominantly silto-lutitic in the backbulge depozone.

The Chersonian to Romanian sedimentary cover deposited in the second stage outcrop in the central-southern part of the Moldavian Platform. A sedimentation gap occurred after the accumulation of the *Șcheia Sands*, with the formation of the "moldovalah II" paleorelief, over which were accumulated the Chersonian to Romanian deposits

in different facieses (Ionesi, 1994; Ionesi & Barbu, 1996; Ionesi & Ionesi, 1976, 1994, Ionesi et al., 1994, 2005; Jeanrenaud, 1966, 1969, 1971) (Fig. 1): *in marine-brackish facies Chersonian – middle Pontian deposits*, which outcropping south of Huși-Vaslui, between Bârlad and Prut rivers and west of Siret; *in deltaic-litoral facies of a Chersonian – middle Pontian age*, which outcrop south of Iași up to the Huși-Vaslui line, and to south between Siret and Bârlad rivers; *in continental facies deposits accumulated during upper Pontian - Dacian*, which outcrop south of Pădureni, on Bârlad Platform; *in continental-lacustrine facies deposits of Romanian age*, which outcrop in the southern part of Bârlad Platform.

The reality of the sedimentation discontinuity in the late Bessarabian and the formation of the "moldovalah surface II" has been biostratigraphically proven for the entire platform area of Romania (Ionesi et al., 1994) (Fig. 2).

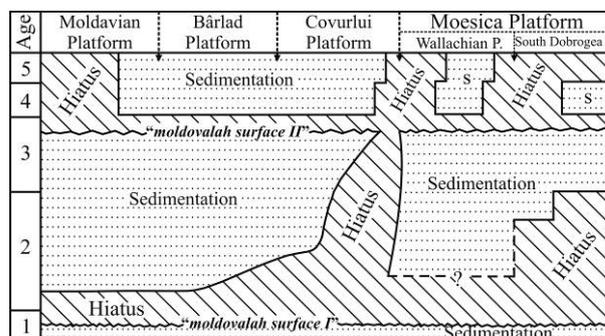


Figure 2. The I and II moldovalah surfaces (after Ionesi & Ionesi, 1994): S - Sedimentation, 1 - Kossovian, 2 - Volhynian, 3 - Bessarabian, 4 - Chersonian, 5 - Meotian.

The same authors affirm that the *pre-Chersonian paleorelief* has been of an epiplatformic type, with incipient or more advanced (hilly) fragmentation. Bringing into discussion the Chersonian-Meotian sedimentary sequence from the Moldavian Platform, Jeanrenaud (1971) separates a *brackish sea facies* on the basis of faunal associations with small Mactra (*M. caspica*, *M. bulgarica*, *M. orbiculata*, *M. mingirensis*), ostracods and rare foraminifera (*Ammonia becarii*, *Prosonion subgranosus*, *Elphidium macellum*). This facies is neighbored north and west by a *fluvio-deltaic one*, with samples of *Unio*, *Planorbis*, *Helix*, rests of terrestrial mammals (*Hiparrion*, *Aceratherium*, *Ictiterium*) and plants (*Carpinus*, *Ulmus*, *Tilia*, *Betula*, *Populus*, *Platanus*, etc). Having in mind the succession of the facieses over the *moldovalah paleorelief II* from the Moldavian and Bârlad Plateau (*sensu* Ionesi, 1994), we have to admit that it represents a portion of an *SBI depositional sequence*

limit (senso Anastasiu et al., 2007; Cătuneanu, 2002, 2006; Nichols, 2011).

3.2. The depositional architecture in the Pădureni Area

The sedimentation in the Pădureni area happened during the second stage. The basin's morphology and eustatism were controlled by the subsidence in the Vrancea region.

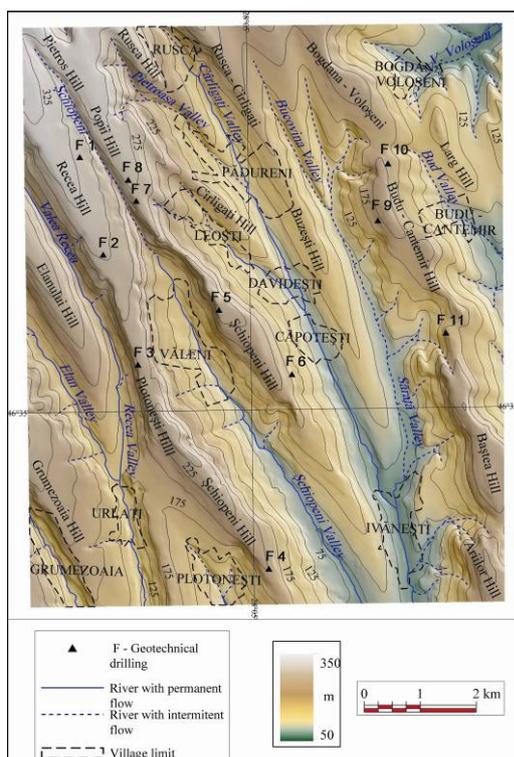


Figure 3. The hypsometric map of Pădureni area, with the locations of the geotechnical drills.

The geological structure and the paleogeographical significance were interpreted using two essential sets of data. The first was represented by the lithological and grain size data coming from the drills. The second was the fact that a sedimentation break happened in the late Bessarabian in the southern part of the Moldavian Platform, a fact which is confirmed by biogeographical studies. In these conditions the Chersonian to Meotian sedimentary cover is made up of sets of parasequences formed due to Miocene eustatic loop of a lower order. The lithostratigraphy of the area has been described on the basis of data obtained from 11 drillings covering a surface of 8935 ha (Table 1 and Fig. 3). Grain size distribution and geotechnical determinations and analyses, as well as a series of microscopic and RX analyses were conducted on the intercepted sedimentary deposits.

The analysis of the lithological columns reveals one important aspect: in all cases the drill base reached a lutitic body, over which sands with fine gravels in base are deposited (Figs. 6, 7 and 8). The basal lutitic body has a variable depth between 4.7 - 17 m. It is made of purple-grey clays and calcareous clays of a hard consistency, and at the upper part, under the fine gravel, of a lutite structured horizon (O-Bt), of a red-brick red color, with depths of 3.70 – 15.00 m. This macroscopic aspect indicates that what we are dealing with is a clay-illuviation affected soil horizon (Bt). The grain size distribution and geotechnical analyses classify the deposits as clays with hard consistency (lutite = 60.20 – 67.57%; silt = 29.64 – 36.82%; sand = 1.02 – 7.85 %; $I_c = 0.92 - 1.15$) (Table 2 and Fig. 4). The deposits of the O-Bt horizon have been compared with the continental silty-sandy Dacian ones which outcrop in the south of Fălciu Hills. In both deposits the substantial presence of iron oxides is obvious, which gives them a pronounced brick-reddish color. Moreover, the silty-lutites of the O-Bt horizon from Pădureni have a structure characteristic to the pedogenetic Bt horizon (Fig. 5A). Under the stereomicroscope, the material from the O-Bt horizon forms prismatic or blocky aggregates, in comparison to the Dacian silty-sands made up of rounded or almost rounded litoclasts, mainly of quartz (Fig. 5B).

The analysis on thin sections of the lutites from the O-Bt reveals the presence of quartz silty clasts, of chalcedonic or calcitic pseudomorphs on the bioclastic fragments, angular isotropic grains (heavy minerals) and vegetal fragments caught in a lutitic ferruginous matrix. A chalcedonic or micritic cement is rarely present (Fig. 5C). The RX analyses conducted on the clays of the O-Bt horizon indicate a mineralogical association with: *quartz*; secondary mineral: *kaolinite* $[Al_2Si_2O_5(OH)_4]$, *nontronite* $[Na_0.3Fe^{3+}(Si,Al)_4(OH)_2 \cdot nH_2O]$, allophane minerals [*neotocite*, $(Mn,Fe^{2+})(SiO_3) \cdot (H_2O)$], *akhtenskite* $[MnO_2]$; heavy minerals: *kleberite* $[FeTi_6O_{13.4}(H_2)]$, *lindsleyite* $[(Ba,Sr)(Ti,Cr,Fe,Mg)_{21}O_{38}]$.

The Chersonian to Meotian clastic succession is disposed over the described clays, which ends the sedimentation in marine brackish facies on the Moldavian Platform. Regarding the age of the deposits, it should be remarked that the Chersonian / Meotian boundary between Siret and Bârlad rivers was drawn by Jeanrenaud (1966, 1969, 1971) under the first level of "andesitic cinerites of Nușasca-Ruseni".

The typical development with high depths (70-80 m) of the *Nușasca-Ruseni cinerites* occurred west of Bârlad valley. Towards east, between Bârlad and

Prut rivers, the depths of the cineritic levels decrease up to 10-20 m.

Table 1. The coordinates of the drills (X - latitude; Y - longitude; Z - altitude; T – drill base depth; A – drill depth).

Coordinates	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11
X (°lat. N)	46° 37' 30"	46° 36' 32"	46° 35' 28"	46° 33' 27"	46° 35' 59"	46° 35' 21"	46° 37' 04"	46° 37' 16"	46° 36' 50"	46° 37' 24"	46° 35' 44"
Y (°long. E)	28° 02' 39"	28° 02' 57"	28° 03' 25"	28° 05' 13"	28° 04' 34"	28° 05' 34"	28° 03' 26"	28° 03' 19"	28° 06' 48"	28° 06' 57"	28° 07' 44"
Z (m)	292.30	277.23	232.07	200.31	233.62	169.28	267.31	279.26	193.82	192.95	176.15
T (m)	237.30	223.23	177.07	144.31	179.31	121.28	215.31	224.26	143.2	141.5	124.5
A (m)	55.00	54.00	55.00	56.00	54.31	48.00	52.00	55.0	50.0	51.0	52.0

Table 2. The lithologic, granulometric and physic-mechanical properties of the deposits from the area of Pădureni. Dr - Drill; Sb - Sedimentary body; Bd - Body depth (m); Sn - Sample number; Sd - Sample depth (m); Ic - Consistency; Pf - Petrographic field.

Dr	Sb	Bd	Sn	Sd	Clay%	Silt%	Sand%	Ic	Pf	Petrographic description
F1	C20	6,5	1	2.0	32.97	26.79	40.24	1.22	SaM	Mud-sandy body, with transitions towards sandy silto-lutites, Ic-II, III.
			2	3.0	23.36	41.23	35.41	1.05	SiM	
			3	4.0	29.67	26.62	43.71	0.84	SaM	
			4	5.0	10.48	42.37	47.15	1.07		
			5	6.0	29.68	26.62	43.70	0.92		
	C18	8,0	6	7.0	46.94	48.42	4.64	0.85	CM	Clayey body, at the upper part with clayey silties and mud-clayey intercalations, Ic-II, III.
			7	8.0	81.01	18.12	0.87	0.93	C	
			8	9.0	68.39	30.74	0.87	0.93	SiC	
			9	10.0	75.03	13.73	11.24	0.99	C	
			10	11.0	86.39	12.74	0.87	0.99		
			11	12.0	34.74	56.76	8.50	1.06	CSi	
			12	13.0	46.66	48.70	4.64	0.97	SiM	
			13	14.0	3.59	77.16	19.26	0.73	Si	
	C17	1,9	14	15.0	9.59	14.48	75.93	-	Sa	Sandy body with transitions towards mud-sandy.
			15	16.0	26.78	29.52	43.71	-	SaM	
	C16	13,6	16	17.0	39.57	24.68	35.75	0.96	CM	Mixed body made up of sandy mud, with transitions towards silty mud. In base is found intercalated green silty cineritic material and friable sandstones. Ic-I, II.
			17	18.0	26.38	39.74	33.88		SiM	
	C14	12,0	-	-	-	-	-	-	-	Sandy body with fine gravels in base.
-			-	-	-	-	-	-		
O-Bt	9,0	19	48.0	63.92	35.05	1.02	1.15	SiC	Silty clay, structured, brick-reddish, with macroscopic aspect of Bt horizon.	
C-Bs	4,0	20	55.0	63.04	34.02	0.95	1.15	SiC	Silty clay, grayish, Ic-III.	
F2	C18	4,5	21	2.0	37.38	26.87	35.75	1.30	CM	Body made up of a clayey mud with hard consistency, with thin intercalations of sandstones with calcareous cement.
			22	4.0	49.51	30.56	19.94	1.54		
	C17	4,0	23	5.0	3.20	34.11	62.69	-	SiSa	Sandy body.
			24	7.0	0.00	0.00	100.0	-	Sa	
	C16	6,0	25	9.0	12.95	82.61	4.44	0.89	Si	Mixed body, made up of sandy mud with transitions towards silty mud, Ic-II. In base is found intercalated brownish silty cineritic material.
			26	10.0	27.51	64.64	7.85	0.83	CSi	
			27	12.0	16.51	35.46	48.03	0.92	SaM	
			28	13.0	64.45	33.08	2.47	1.05	SiC	
	C15	4,9	29	15.0	0.00	0.00	100.0	-	Sa	Sandy body.
			30	17.0	0.00	0.00	100.0	-		
			31	18.0	6.67	19.08	74.24	0.90		
	C13	12,6	32	20.0	41.00	46.89	12.11	0.98	SiM	Mud silty cineritic body, with a greenish-brownish color.
	C11	6,0	-	-	-	-	-	-	-	Sandy body with fine gravels in base.
	O-Bt	15,0	33	49.0	65.04	33.77	1.19	1.19	SiC	Silty clay, structured, brick-reddish.
	C-Bs	2,0	34	54.0	64.60	31.15	4.25	1.17	SiC	Silty clay, Ic-III.
F3	C13	19,5	35	1.00	29.30	40.87	29.83	1.24	SiM	Mixed silty clay, with transitions towards sandy silt, sandy mud and clayey silt, with Ic-III
			36	3.0	27.41	40.83	31.76	1.19		
			37	5.0	3.49	63.19	33.32	1.27		
			38	6.0	3.59	66.58	29.83	1.31	SaSi	
			39	9.0	10.26	52.95	36.80	1.26		
			40	11.0	3.49	56.25	40.25	1.13		
			41	12.0	9.65	55.96	34.39	1.17		
42	13.0	18.46	37.84	43.71	1.48	SaM				

			43	14.0	7.24	44.74	48.02	121		
			44	15.0	6.88	60.78	32.34	1.02	CSi	
			45	17.0	18.46	51.71	29.83	0.98	SaSi	
			46	19.0	11.77	47.97	40.25	0.86	SiM	
	C12	2,80	47	20.0	13.02	16.48	70.50	-	CSa	Sandy body, with transitions towards sandy silt and sandy clay, Ic-II.
			48	21.0	38.58	52.92	8.50	0.91	CSi	
			49	22.0	9.95	14.15	75.91	-	Sa	
	C10	13,7	50	23.0	43.22	41.08	15.70	0.99	CM	Mixed clay, with a mud clayey fund, and transitions towards silt and clayey silt, Ic-II.
			51	24.0	12.79	75.11	12.11	0.99	Si	
			52	25.0	28.97	56.40	14.63	0.99	CSi	
			53	26.0	32.21	56.55	11.24	0.92		
			54	27.0	21.05	69.41	9.55	0.98		
			55	28.0	43.22	33.98	22.80		CM	
	C8	8,0	-	-	-	-	-	-	-	Sandy body with fine gravels in base.
	O-Bt	9,0	56	49.0	62.83	35.98	1.19	1.18		Siltic clay, structured, brick-reddish.
	C-Bs	2,0	57	55.0	55.00	64.60	29.21	1.16		Grayish siltic clay, Ic-III.
F4	C9	17,3	58	1.0	13.23	18.86	67.91	-	CSa	Sandy body, with transitions towards siltic sands and reduced intercalations of sandy mud.
			59	4.0	0.00	0.00	100.0	-	Sa	
			60	6.0	3.37	20.64	75.99	-	SaSi	
			61	7.0	3.49	68.41	28.10	-	SaM	
			62	8.0	16.76	40.43	42.80	-	Sa	
			63	9.0	0.00	0.00	100.0	-	Sa	
			64	11.0	7.07	35.53	57.40	-	SiSa	
			65	14.0	3.49	24.14	72.37	-	Sa	
	C7	3,0	66	15.0	0.00	0.00	100.0	-	Sa	Clayey-silt body, Ic-II.
			67	17.0	6.66	33.41	59.92	-	SiSa	
	C6	4,7	68	18.0	71.92	23.83	4.25	0.94	SiC	Siltic body with transitions towards clayey silts, Ic-II.
			69	20.0	52.17	46.96	0.87	0.81	Si	
	C5	12,0	70	21.0	3.87	91.69	4.44	0.99	CSi	Clayey body with reduced intercalations of siltic clays and clayey silts, Ic-II, III.
			71	22.0	37.34	54.16	8.50	0.99	C	
			72	24.0	31.04	55.88	13.08	0.97		
			73	26.0	86.37	12.76	0.87	1.01	CSi	
			74	28.0	88.10	9.43	2.47	0.96	C	
75			30.0	75.97	21.43	2.60	1.06			
76			32.0	44.26	54.55	1.19	0.91	CSi		
C3	7,0	77	33.0	76.93	22.20	0.87	1.03	SiC	Sandy body with fine gravels in base.	
		78	35.0	57.34	41.78	0.87	0.97	C		
O-Bt	6,0	80	46.0	61.58	36.82	1.60	1.17		Siltic clay, structured, brick-reddish.	
C-Bs	6,0	81	56.0	64.60	30.62	4.78	1.19		Grayish siltic clay, Ic-III.	
F5	C13	10,4	82	2.0	89.91	9.21	0.87	1.09	C	Mixed siltic body, with transitions towards siltic mud and clayey silts, and reduced intercalations of sands, Ic-III, II.
			83	3.0	10.26	48.25	41.49	-	SiM	
			84	5.0	0.00	0.00	100.0	-	Sa	
			85	7.0	56.16	24.59	19.26	1.14	SiC	
			86	9.0	38.14	57.43	4.44	0.80	CSi	
			87	10.0	27.57	63.58	8.86	1.50		
	C12	8,1	88	11.0	0.00	0.00	100.0	-	Sa	Sandy body.
			89	13.0	0.00	0.00	100.0	-		
			90	15.0	0.00	0.00	100.0	-		
			91	18.0	0.00	0.00	100.0	-		
	C10	18,0	92	19.0	50.71	34.67	14.63	1.08	SiC	Mixed mud siltic body, with transitions towards clayey mud, siltic mud and siltic clay, with reduced intercalations of siltic sands, Ic-III, II.
			93	20.0	66.87	25.28	7.85	0.96	CSi	
			94	22.0	40.19	51.96	7.85	1.08	SiM	
			95	24.0	36.27	49.11	14.63	1.11	SiSa	
			96	26.0	23.44	46.73	29.83	1.16	CSi	
			97	29.0	16.51	21.09	62.39	1.49	SiM	
			98	31.0	28.88	54.84	16.28	1.12	CSi	
99			33.0	31.32	33.67	35.01	1.13	SiM		
100			35.0	26.38	40.30	33.32	1.11	CM		
C9	6,9	101	36.0	44.54	22.39	33.07	0.97		Siltic sandy body.	
		102	38.0	17.88	31.76	50.37	-	SiSa		
		103	40.0	7.24	29.57	63.19	-			
C8	5,4	-	-	-	-	-	-		Sandy body with fine gravels in base.	
O-Bt	5,0	105	51.0	63.92	31.83	4.25	1.04		Siltic clay, structured, brick-reddish.	

	C-Bs	0,2	106	54.0	83.56	23.84	2.60	1.06		Grayish siltic clay, Ic-III.
F6	C5	8,3	107	2.0	29.68	28.48	40.84	1.02	SaM	Mixed mud body, with transitions towards siltic and sandy mud, and reduced intercalations of sandy silt, Ic-III, II.
			108	3.0	10.81	50.14	39.04	1.25	SaSi	
			109	6.0	22.17	47.06	30.77	0.95	SiM	
			110	8.0	29.71	45.73	24.56	1.05	CM	
	C4	3,9	111	11.0	16.26	20.94	62.80	-	SiSa	Siltic sandy body.
			112	12.0	3.59	25.76	70.65	-		
	C2	18,8	113	13.0	24.83	47.11	28.06	1.11	SiM	Mixed clayey mud body, with transitions towards siltic varieties and reduced intercalations of siltic sand, Ic-II.
			114	15.0	66.94	32.11	0.95	0.75	SiC	
			115	18.0	1.11	85.29	2.60	0.75	Si	
			116	20.0	68.60	23.55	7.85	0.76	SiC	
			117	21.0	9.78	39.26	50.96	0.96	SiSa	
			118	23.0	45.53	46.30	8.17	1.12	CM	
			119	25.0	47.19	48.37	4.44	0.87	SiM	
120			26.0	74.71	17.74	7.55	0.90	SiC		
121			28.0	79.24	19.89	0.87	0.92	Si		
122	29.0	57.54	41.51	0.95	0.99	SiC				
123	31.0	23.78	71.78	4.44	0.69	CSi				
C1	8,5	-	-	-	-	-	-	-	Sandy body with fine gravels in base.	
O-Bt	7,7	124	46.0	60.20	31.95	7.85	1.07		Siltic clay, structured, brick-reddish.	
C-Bs	0,8	125	48.0	68.60	30.46	0.95	1.10		Grayish siltic clay, Ic-III.	
F7	C17	6,3	126	1.0	19.50	12.93	67.57	-	CSa	Sandy body with transitions at the upper part towards clayey sand.
			127	3.0	0.00	0.00	100.0	-	Sa	
			128	5.0	0.00	0.00	100.0	-		
	C13	10,0	129	7.0	32.97	47.78	19.26	1.12	SiM	Mixed argilo-siltic body with transitions towards siltic mud and reduced intercalations of sandy silts, Ic- I, II.
			130	8.0	20.39	56.57	23.04	0.91	SaSi	
			131	10.0	61.58	32.28	6.14	0.89	SiC	
			132	11.0	58.81	26.56	14.63	1.07		
			133	13.0	52.01	33.37	14.63	1.15	CSi	
			134	14.0	23.09	64.80	12.11	1.18		
			135	16.0	13.23	48.01	38.76	1.41		
	C12	16,7	136	17.0	13.02	12.74	74.24	-	SiSa	Sandy body with reduced intercalations of siltic sands and clayey sands.
			137	18.0	16.26	12.95	70.80	-	CSa	
			138	21.0	0.00	0.00	100.0	-	Sa	
			139	23.0	0.00	0.00	100.0	-		
			140	26.0	11.40	21.50	67.10	-	CSa	
			141	27.0	0.00	0.00	100.0	-	Sa	
			142	29.0	0.00	0.00	100.0	-		
143	30.0	0.00	0.00	100.0	-					
144	32.0	16.51	21.09	62.39	1.49	SiSa				
C10	8,2	145	35.0	28.88	54.84	16.28	1.12	CSi	Mixed mud body with transitions towards siltic mud and clayey mud, Ic-III.	
		146	37.0	31.32	33.67	35.01	1.13	SaM		
		147	39.0	26.38	40.30	33.32	1.11	SiM		
C8	6,1	-	-	-	-	-	-	-	Sandy body with fine gravels in base.	
O-Bt	3,7	148	49.0	65.07	32.33	2.60	1.09		Siltic clay, structured, brick-reddish.	
C-Bs	1,0	149	52.0	72.13	25.27	2.60	1.11		Grayish siltic clay, Ic-III.	
F8	C19	6,0	150	2.0	0.00	0.00	100.0	-	Sa	Sandy body with intercalations of siltic sands.
			151	3.0	15.99	30.56	53.45	-	SiSa	
			152	5.0	0.00	0.00	100.0	-	Sa	
	C18	2,0	153	7.0	41.88	31.80	26.32	1.12	SiM	Clayey mud body, Ic-III.
	C17	3,5	154	9.0	19.19	18.01	62.81	-	CSa	Sandy body, with transitions towards clayey sands.
			155	11.0	0.00	0.00	100.0	-	Sa	
	C13	21,0	156	12.0	16.51	62.08	21.41	0.63	SaSi	Mixed clayey-siltic body, with transitions towards clayey silts and siltic mud, Ic-III.
			157	13.0	38.58	60.40	1.02	0.91	CSi	
			158	14.0	33.98	51.39	14.63	0.89		
			159	16.0	52.93	33.67	13.41	1.05		
			160	17.0	42.83	48.67	8.50	0.98	SiM	
			160	19.0	50.31	38.84	10.84	1.12	SiC	
			162	21.0	61.16	32.70	6.14	1.14		
			163	23.0	58.09	40.88	1.02	1.07		
	164	32.0	27.18	57.12	15.70	1.15	CSi			
C12	7,7	165	33.0	0.00	0.00	100.0	-	Sa	Sandy body.	
		166	36.0	0.00	0.00	100.0	-			
C11	5,0	-	-	-	-	-	-	-	Sandy body with fine gravels in base.	
O-Bt	9,3	167	46.0	61.58	35.85	2.60	1.08		Siltic clay, structured, brick-reddish.	
C-Bs	0,5	168	55.0	68.60	30.38	1.02	1.09		Grayish siltic clay, Ic-III.	

F9	C9	10,1	169	1.0	11.40	16.03	72.57	-	SiSa	Sandy body with reduced intercalations of silty sands and silty clays.
			170	2.0	0.00	0.00	100.0	-	Sa	
			171	3.0	65.10	33.95	0.95	-	SiC	
			172	5.0	13.23	25.97	60.80	-	SiSa	
			173	7.0	0.00	0.00	100.0	-	Sa	
	C7	3,1	174	10.0	3.20	20.87	75.93	-		Clayey mud body, Ic-II.
			175	11.0	44.54	22.39	33.07	0.95	CM	
	C6	6,8	176	12.0	89.71	9.41	0.88	0.94	C	Clayey silt body, with transitions towards silty clays, Ic-II.
			177	14.0	22.74	55.85	21.41	0.77	CSi	
			178	15.0	23.05	61.25	15.70	0.77	CSi	
	C5	19,0	179	17.0	70.79	24.36	4.85	0.96	SiC	Mixed silt clayey body, with transitions from clayey silts to silty clays and silty mud, Ic-II.
			180	19.0	32.97	61.71	5.33	0.94	CSi	
			181	21.0	59.45	39.52	1.03	1.00	SiC	
			182	22.0	41.01	44.36	14.63	0.87	SiM	
183			24.0	52.88	46.10	1.02	0.87	SiC		
184			26.0	56.55	38.60	4.85	0.84	SiC		
185			28.0	31.51	67.30	1.19	0.93	CSi		
C3	4,0	-	-	-	-	-	-	-	Sandy body with fine gravels in base.	
O-Bt	5,0	189	45.0	62.51	29.64	7.85	1.07		Silty clay, structured, brick-reddish.	
C-Bs	2,0	190	50.0	69.61	29.14	0.95	1.07		Grayish silty clay, Ic-III.	
F10	C9	8,40	191	1.0	26.78	52.57	20.65	-	CSi	Sandy body with reduced intercalations of silty sands and silty clays.
			192	3.0	19.50	42.81	37.70	-	SiM	
			193	4.0	6.87	23.88	69.34	-	SiSa	
			194	5.0	9.78	12.57	77.65	-	Sa	
			195	7.0	16.51	36.33	47.15	-	SaM	
			196	8.0	13.35	23.11	63.54	-	SiSa	
	C7	4,1	197	10.0	33.27	56.01	10.72	1.04	CSi	Silty-clayey body with transitions at the upper part to clayey silts, Ic-II, III.
			198	11.0	71.20	27.78	1.02	1.02	SiC	
			199	12.0	57.58	34.57	7.85	0.92	SiC	
	C6	8,5	200	14.0	36.83	46.86	16.31	0.99	SiM	Mixed clayey silty body, with transitions from clayey silts to silty clays and silty mud, Ic-II, III.
			201	16.0	16.83	68.55	14.63	0.91	CSi	
			202	18.0	52.01	38.75	9.24	1.08	SiC	
			203	20.0	35.69	52.20	12.11	1.12	CSi	
	C5	14,0	204	22.0	39.11	49.65	11.24	0.70	SiM	Mixed silty mud with transitions to silty clays and clayey mud, Ic-I, II.
205			24.0	44.26	32.94	22.80	0.91	CM		
206			26.0	70.36	21.47	8.17	0.90	SiC		
207			28.0	37.40	39.80	22.80	0.78	SiM		
208			30.0	28.45	42.63	28.92	0.62			
C3	7,2	-	-	-	-	-	-	-	Sandy body with fine gravels in base	
O-Bt	7,9	209	43.0	62.83	36.07	1.10	0.92		Silty clay, structured, brick-reddish	
C-Bs	0,9	210	51.0	74.35	24.63	1.02	1.09		Grayish silty clay, Ic-III.	
F11	C6	2,5	211	1.0	35.15	60.19	4.66	0.90	CSi	Clayey silt body, Ic-II.
			212	2.0	13.44	52.65	33.91	0.98		
	C4	13,5	213	4.0	3.44	25.84	70.72	-	SiSa	Sandy body with transitions to silty sands.
			214	6.0	3.20	15.83	80.97	-	Sa	
			215	8.0	9.59	16.11	74.30	-	SiSa	
			216	10.0	6.66	19.31	74.02	-	Sa	
			217	12.0	9.59	12.76	77.65	-	SiSa	
			218	13.0	13.23	25.97	60.80	-	SiSa	
			219	15.0	0.00	0.00	100.0	-	Sa	
	C2	20,0	220	17.0	36.15	59.21	4.64	0.95	CSi	Clayey silty body with transitions towards varieties of silty clays and silty mud, Ic-II.
			221	21.0	33.98	64.99	1.03	0.92	CSi	
			222	23.0	41.01	44.36	14.63	0.87	SiM	
			223	27.0	56.55	38.60	4.85	0.84	SiC	
			224	31.0	44.97	54.16	0.87	0.97	CSi	
225			33.0	47.51	51.62	0.87	0.95	CSi		
C1	5,5	-	-	-	-	-	-	-	Sandy body with fine gravels in base.	
O-Bt	6,5	226	44.0	67.57	29.83	2.60	1.09		Silty clay, structured, brick-reddish.	
C-Bs	4,0		52.0	75.05	22.36	2.60	1.08		Grayish silty clay, Ic-III.	

(Grain size distribution% - STAS 1913-5-85; Ic - STAS 1243-83: *Consistent* - I; *Vigorous* - II; *Hard* - III; Pf - according to Boggs, 2009, Fig. 4)

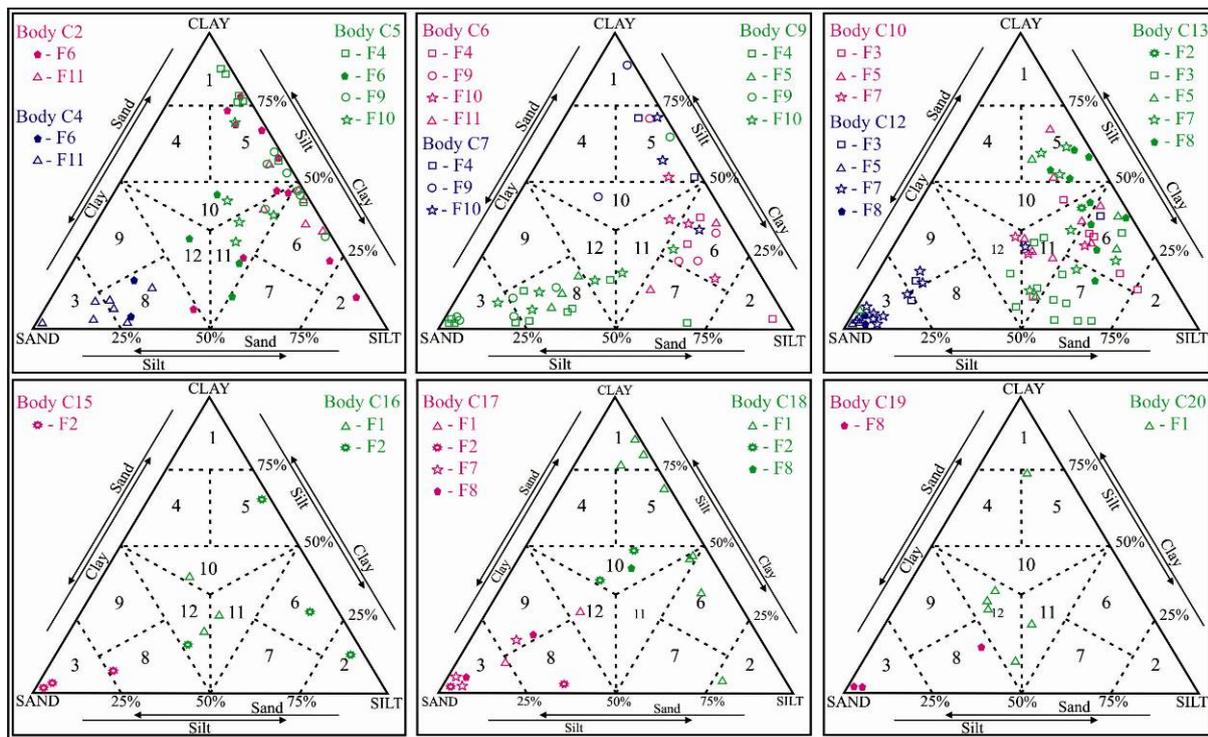


Figure 4. The granulometric projection of the separate sedimentary bodies (from Boggs jr., 2009): 1 - Clay (claystone) (C); 2 - Silt (siltstone) (Si); 3 - Sand (sandstone) (Sa); 4 - Sandy clay (sandy claystone) (SaC); 5 - Silty clay (silty claystone) (SiC); 6 - Clayey silt (clayey siltstone) (CSi); 7 - Sandy silt (sandy siltstone) (SaSi); 8 - Silty sand (silty sandstone) (SiSa); 9 - Clayey sand (clayey sandstone) (CSa); 10 - Clayey mud (clayey mudstone) (CM); 11 - Silty mud (silty mudstone) (SiM); 12 - Sandy mud (sandy mudstone) (SaM).

At the same time, towards east, the levels of cineritic tufts loose their individuality, being replaced by cineritic sands (Ionesi et al., 2005). Ghenea & Ghenea (1968; fide Ionesi, 1994) remark west of Siret the presence of cineritic sands even from Chersonian west of Siret, and challenge the chronostratigraphic value of the *Nuțasca-Ruseni cinerites*. Having in view this opinion and those that support the re-sedimentation of the Meotian volcanic ashes, at least east of Bârlad (Bulgariu, 2005), the Chersonian-Meotian sedimentary cover from the Pădureni area will be presented undifferentiated.

Invariably, in the drills conducted in the Pădureni area, the O-Bt horizon supports a clastic sedimentary cover with depths of 37.0 – 48.8 m. These deposits begin in all situations with coarse sands that have fine gravels in base. The grain size distribution data allowed the separation in the Chersonian-Meotian lithological column of 20 clastic sedimentary bodies, classified according to the ternary diagram for the classification of lutito-silto-sandy rocks (Picard, 1971; fide Boggs jr., 2009) (Table 2 and Fig. 4). By analyzing the geometric relations of the sedimentary bodies, these can be grouped into 7 parasequences (Figs. 6, 8a and 9). The spatial ranking of the sedimentary bodies was done by projecting them on a vertical projection, oriented west-east. Later, departing from the vertical

projection and the geological sections conducted through geotechnical drills, was drawn the lithofacial map of the Pădureni region, by intersecting the separate bodies with the topographic surface.

The tectonics of the region was interpreted departing from the situations registered on the alignments marked by the drills F7-F5, F7-F3, F2-F3 and F2-F5. The altitude difference of the landmark horizon O-Bt from the drills F2, F7, F8 and F3, F5, F4 cannot be interpreted but as a normal post-depositional fault. The interpretation is plausible if we take into account the post-Meotian accentuation of the subsidence in the southern part of the basin, under the geodynamic control from the Vrancea region (Figs. 6 and 7).

4. SIGNIFICANCE OF THE DEPOSITIONAL ARCHITECTURE

Analyzing on the cartographic materials the way in which the deposits of the last cycle of marine sedimentation outcrop on the Romanian territory and mainly on the Moldavian and Scythian platforms (*Bârlad and Danube Delta platforms*; sensu Ionesi, 1994), it can be seen that the oldest, upper Badenian to Volhynian deposits, occur in the Northern part of the Moldavian Platform, the Bessarabian ones in the central part of the unit, and the newer Chersonian to

Romanian only in the southern part (Jeanrenaud, 1971; Ionesi et al., 2005). This disposition is explained by the evolution of the basin during the Miocene, influenced by the geotectonic dynamics from the Carpathian area and the paleo-climatic changes, that finally lead to the general regression and reconfiguration during successive stages of the eastern Parathethys.

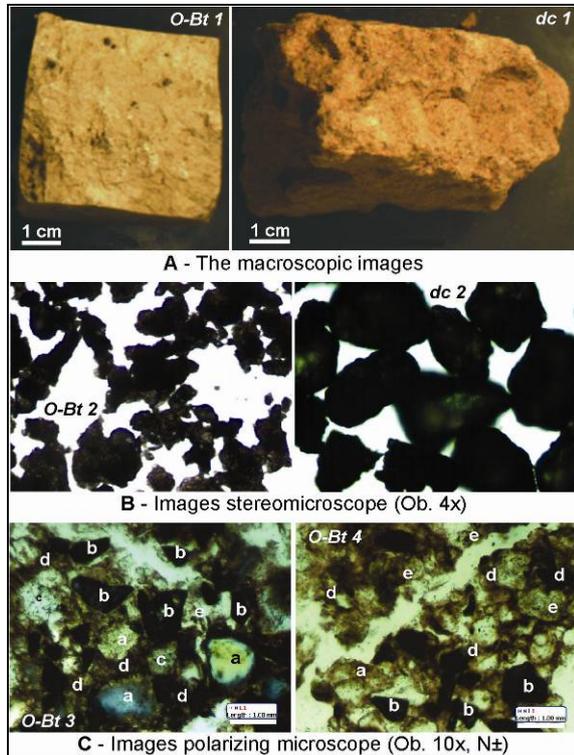


Figure 5. The macroscopic and appearance aspect of the lutitic continental deposits from Pădureni area and of the silty-sandy continentals Dacian ones from the south of Fălciu Hills (Moldavian Platform): **A:** *O-Bt 1* - samples from the O-Bt horizon, with iron oxides and coaly material; *dc 1* - samples from the Dacian continental silty sands; **B:** *O-Bt 2* - structural aggregates from the O-Bt horizon; *dc 2* - quartzitic litoclastic grains from the Dacian silty sands; **C:** *O-Bt 3* - images from the polarizing microscope, N+; *O-Bt 4* - images from polarizing microscope, N- (a – quartzitic litoclast, b – heavy metals, c – potassium feldspar, d – ferruginous matrix, e – coaly substance).

In these conditions, the lithological and grain size distribution data, as well as those regarding the depositional architecture of the Chersonian to Meotian cover investigated with drills in the Pădureni area, allow a series of affirmations and conclusions regarding the Bessarabian to Meotian paleogeographical evolution of the region, in the framework of the general model of the Euxinic and Dacic basins.

Thus:

- the lutitic O-Bt horizon, structured, brick-reddish, intercepted in all the drills, represents a continental

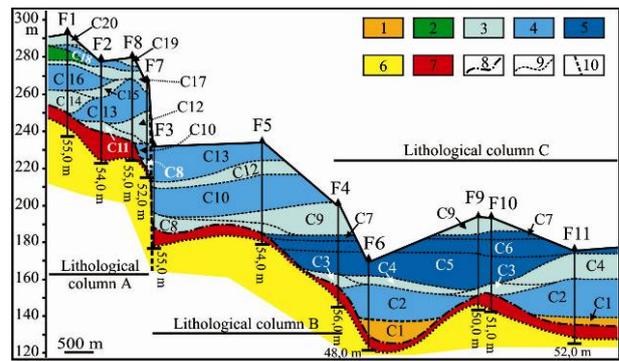


Figure 6. The projection of the clastic sedimentary bodies on a west-east oriented projection: 1 - channel fill; 2 - backshore/foreshore environment; 3 - foreshore/shoreface environment; 4 - shoreface / inner shelf environment; 5 - inner shelf environment; 6 – Bessarabian silty clays intercepted by drills; 7 – deposits with aspect of Bt illuvial soil horizon ; 8 - moldovalah II surface; 9 – lithologic limit of the sedimentary bodies; 10 – fault line; C1-C20 – sedimentary bodies; F1-F11 - drills.

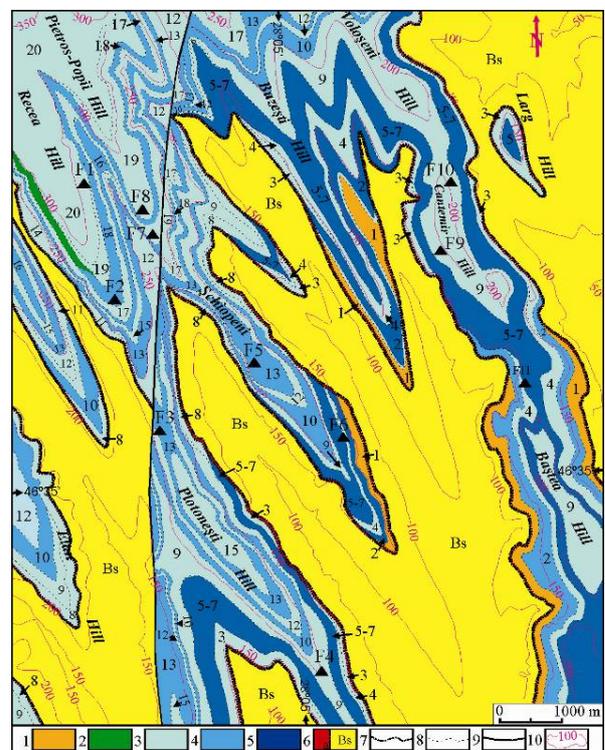


Figure 7. Lithofacial map of the Pădureni Area: 1 - channel fill; 2 - backshore / foreshore environment; 3 - foreshore / shoreface environment; 4 - shoreface / inner shelf environment; 5 - inner shelf environment; 6: a - silty-lutitic deposits with aspect of Bt illuvial soil horizon; Bs – Bessarabian deposits intercepted by drills; 7 - moldovalah II surface; 8 - lithologic limit of the sedimentary bodies; 9 - fault line; 10 - contour curves; 1-20 - sedimentary bodies; F1-F11 - drills.

deposit (possibly the clay-illuvial horizon of a paleosol), which marks a paleorelief formed on Bessarabian deposits. The RX analyses conducted on these deposits have showed a supergene

mineralogical association with *quartz*, secondary minerals (*kaolinite*, *nontronite*), allophane minerals (*neotocite*, *akhtenskite*); heavy minerals (*kleberite*, *lindsleyite*). Under the microscope we identified quartzitic silty clasts, chalcedony or calcite pseudomorphoses on bioclastic fragments, angular isotropic granules (heavy minerals) and vegetal residues caught in a lutitic ferruginous matrix. The mineralogical and RX data confirm the supergene character of the deposit, probably a soil horizon of the Bt type. As a consequence the evidenced unconformity corresponds to a *SB (SBI?) sequence limit* (Figs. 6, 7 and 9);

- in the Chersonian-Meotian sedimentary sequence accumulated over the *SBI unconformity*, in a neritico-litoral facies, we separated according to sequential stratigraphy two sets of parasequences: a retrograde and a prograde one. The first set belongs to the upper part of a transgressive systems tract (TST), and the second to the high systems tract (HST). Most probable this is a Ist type depositional sequence (Anastasiu et al., 2007) (Fig. 8).

Analyzing the sedimentary sequence from the Pădureni region and the arrangement of the parasequences over the *SBI surface*, the following conclusions are drawn:

- the sedimentation of the deposits took place in the following depositional environments: *backshore/foreshore* (partially body C18) *foreshore/shoreface* (bodies C3, C8, C9, C11, C12, C14, C15, C17, C19 and C20), *shoreface/inner shelf* (bodies C10, C13, C16 and partially C18) and *inner shelf* (C5, C6, C7). The depositional environments and the granofacial characteristics of the deposits accumulated have been considered in conformity with the models presented by Anastasiu et al. (2007), Cătuneanu (2002, 2006) and Nichols (2011) (Figs. 6 and 8a);

- the granofacial analysis of the sedimentary sequence allowed the separation of a retrograde set made up of four parasequences (R1-R4), followed by a prograde one made up of 3 parasequences (P1, A1, P2). The parasequences sets separated reflect the IVth order oscillations of the sea level (paracycle) (Fig. 8);

- the retrograde parasequences set corresponds to the upper part of a TST tract, while the prograde set of parasequences represents a HST tract. This situation reflects a IIIrd order eustatic oscillation. The separated paracycle is located over the upper part of the sinusoid which describes the IIIrd order oscillation (Figs. 8 and 9).

The parasequences separated in the Pădureni sedimentary sequence denotes an oscillating eustatic variation, reflected in the change in the ratio between the accommodation space and the sedimentation rate.

The flooding surfaces correspond to the upper limit of the parasequences (*FS*), and the limit between the prograde and retrograde parasequences corresponds to the maximum flooding surface (*MFS*) (senso Cătuneanu, 2006). The scenario of the eustatic variation in the studied region could have been the following:

- a first stage of marine transgression, demonstrated by the retrograde character of the R1-R4 parasequences. The contact of these in relation to the *SBI unconformity* is of the onlap type. During the increase in the marine level the value of the SA/RS ratio is > 1 . The moment of stagnation or even decrease in the marine level is marked by the flooding surfaces corresponding to the upper limit of the parasequences. In this case the SA/RS ratio becomes ≤ 1 . A moment of accelerated increase of the marine level occurs during the deposition of the R2 parasequence. This one is made of sediments characteristic to the *inner shelf - foreshore/shoreface* depositional environments, the *shoreface / inner shelf* transition missing. These absences in the architecture of the parasequences have been interpreted by Nichols (2011) as a result of the rapid oscillations of the sea level (Figs. 8c and 9);

- the upper limit of the R4 parasequence coincides with the maximum flooding surface, the parasequences set which follows having a prograde character. The sea level, after a slow increase, enters the negative segment of the eustatic curve. The contact of the prograde parasequences set is of the downlap type in relation to the *MFS*. In these conditions is formed the lower part of the HSt sequence, made up of the P1/A1/P2 parasequences. The SA/RS ratio becomes < 1 (Fig. 8c).

The model presented for the area of Pădureni is compatible with the paleogeographic models presented by a series of authors for the Eastern European and Scythian platforms. In this sense, Ionesi & Ionesi (1976, 1994) and Ionesi et al. (1991, 1994, 2005) argument with biostratigraphic proofs that the sedimentation on the Moldavian Platform during the last sedimentation cycle (late Badenian – Meotian) has suffered two discontinuities with significant morpho-genetical consequences. The first took place during the Late Kossovian – early Volhinian and the second from the end of the Bessarabian up to the beginning of the Chersonian. These interruptions have affected the entire eastern Carpathian foreland, including the Moesian domain (Fig. 2). In both situations paleo-lands with paleo-reliefs were formed.

Regarding the paleo-relief from the end of the Bessarabian – beginning of Chersonian ("*moldovalah surface IP*"), it is speculated that it was of an epiplatformic type, with incipient hilly fragmentation.

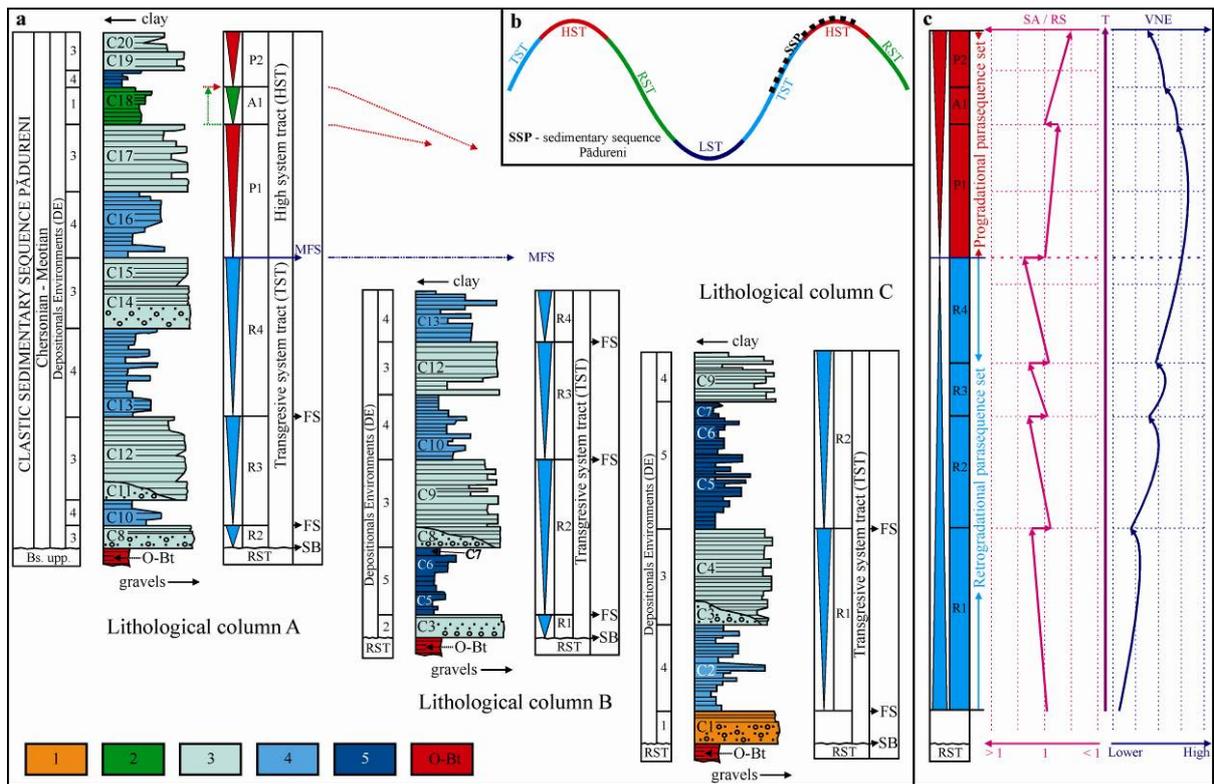


Figure 8. Lithological columns of Pădureni Area: a. *Lithological column*: 1- channel fill; 2 - backshore/foreshore environment; 3 - foreshore/shoreface environment; 4 - shoreface/inner shelf environment; 5 - inner shelf environment; C1-C20 – sedimentary bodies; O-Bt – silto-lutitic deposits with aspect of Bt illuvial soil horizon; c – channel deposits (?); SB – limit of depositional sequence; FS – flooding surface; MFS – maximum flooding surface; R1-R4 - retrogradation parasequences set; P1-P2 - progradation parasequences set; A1 - aggradation parasequence; b. Position of the sedimentary sequence Pădureni on the Miocene eustatic curve of the Euxinic basin; c. *Variation of the sedimentation rate and of the accommodation space according to the oscillations of the marine level in the Pădureni area*: SA – accommodation space; RS – sedimentation rate; T - time; VNE – variation of the marine level.

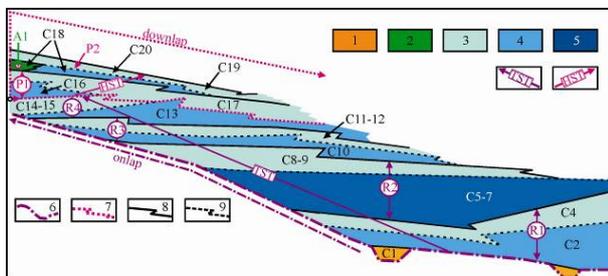


Figure 9. The architecture of the parasequences from the Pădureni region: 1- channel fill; 2 - backshore/foreshore environment; 3 - foreshore/shoreface environment; 4 - shoreface/inner shelf environment; 5 - inner shelf environment; 6 – limit of depositional sequence (SB1); 7 – limit of parasequences set TST/HST (MFS); 8 - limit of parasequences; 9 - boundaries sedimentary bodies; C1-C20 – sedimentary bodies; R1-R4 - retrogradation parasequences set; P1-A1-P2 - progradation parasequences set; TST - parasequences set of transgresiv system tract; HST - parasequences set of high system tract.

Regarding the sedimentation continuity from the Bessarabian / Chersonian boundary, some authors affirm that there is no gap in sedimentation in the Southern part, in the sedimentary cover of the Scythian Platform east of Prut. In accordance with these data,

the eustatic and depositional evolution in the area of Pădureni can be interpreted as such (Fig. 10):

- *The SB surface*, marked by the O-Bt continental deposits, corresponds to the II moldovalah surface. This is correlated with the surfaces formed in the areas of Păun, Șcheia, Bohotin, on the „oolitic Repedea limestone”, or on the „Șcheia sands” which stand over the oolitic level of late Bessarabian age;

- Having in view the situation evidenced by geological map of the former USSR, scale 1:1000000 (from Ionesi et al., 2005) that east of Prut the Chersonian follows in continuity over the Bessarabian, it may be concluded that on the negative eustatic variation segment of the sea level during the late Bessarabian a level of forced regression was not reached.

In this situation it could be the case of a depositional segment made up of HST/NR sequences in the upper Bessarabian, over which are deposited TST/HST Chersonian-Meotian sequences. In the areas situated to the south, on the Bârlad Platform, it is possible that the depositional succession be of a TST/HST/NR type.

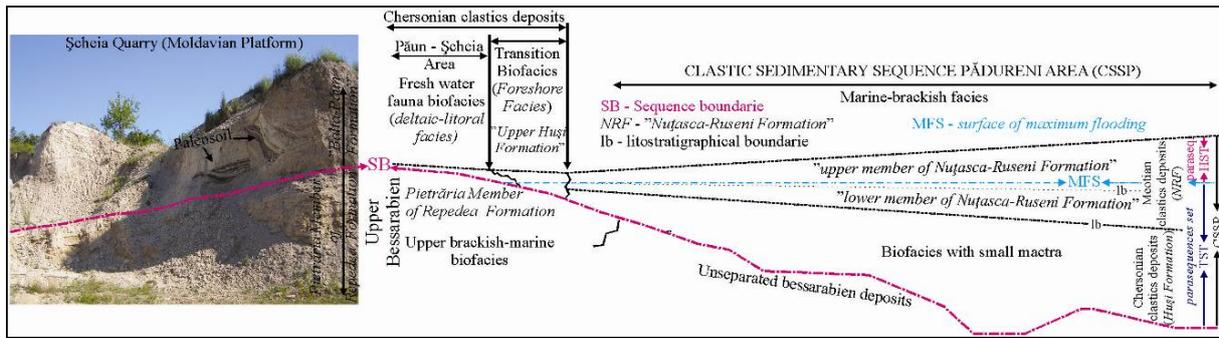


Figure 10. The TST-HST parasequences at Pădureni Area.

5. GEOMORPHOLOGIC SIGNIFICANCE

The landforms enter the general morphographic and morphometric style of the Central-Eastern part of the Moldavian Tableland, with large interflues, more or less rounded, sculptural or structural, with accentuated slopes (in the case of structural plateaus) or terraced slopes and valleys characterized by the presence of accumulative landforms (floodplains, floodplain terraces and colluviums at the contact with the slopes) (Condorachi, 2006). The characteristic landforms are the sculptural ones, with a hilly fragmentation in the west, north-west and north of the region – area corresponding to Fălcu Hills, and a rounded hilly fragmentation in the east, south and south-east – typically hilly plain area. Among the landforms there are a series of elongated interflues, affected by weak and moderate erosion processes spread across 760 ha (8.5% of the area). About 85% of the surface is dominated by slopes with geomorphic processes from moderate to excessive (weakly degraded slopes – 13.1%; moderately degraded slopes – 21.7%; excessively degraded slopes – 49.1%). The accumulative floodplains of aluvio-coluvio-proluvial type occupy about 7.3% of the region's surface, at the lowest altitudes (Fig. 3).

Analyzing the distribution of the landforms formed on Chersonian-Meotian deposits, it can be noticed that the coarser deposits (sands and gravels) favor the conservation of the interflues with geomorphic processes of reduced intensity. As the frequency of the silto-lutitic deposits increases, so is that of the slopes affected by higher intensity geomorphic processes (Fig. 11).

Taking into consideration the horizontal variation of the deposits' thickness, it may be concluded that the flooding of the pre-Chersonian paleo-relief in the area of Pădureni was done from SSE (relating to the present geographical coordinates). From a paleogeomorphologic point of view, the situation presented on the cartographic materials, correlated with the depositional

architecture, suggests the existence of a river paleo-valley, possibly inherited by Elan river (*Paleo-Elan?*) (Figs. 6, 7 and 9).

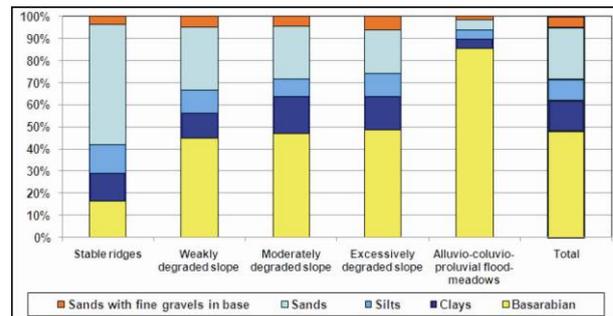


Figure 11. The relation between landforms and the Chersonian - Meotian clastic cover.

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