Quaternary International xxx (2014) 1–12

Contents lists available at ScienceDirect

Quaternary International

journal homepage: www.elsevier.com/locate/quaint

Contributions to the knowledge of Quaternary formations in the southwest Romanian Plain

Petru Enciu*, Dan Balteanu, Cristina Dumitrica

Institute of Geography, Romanian Academy of Sciences, Romania

ARTICLE INFO

Article history:
Available online xxx

Keywords:
Romanian plain
Quaternary stratigraphy
Aeolian Formation
Danube Formation
Pliocene

ABSTRACT

The processing of geological information obtained from some 1055 wells drilled in the southwestern Romanian Plain over an area of about 5200 km^2 has led to a better understanding of the structure and stratigraphy of Quaternary formations. The bending of the Danube River southwestwards and then westwards, between the Iron Gate Gorge and Brza Palanka, as well as the unbraiding at Ostrovul Corbului (Batoti) and 20 km farther downstream, at Ostrovu Mare (Gogosu), are the result of major trans-extensional movements of compartments buried west of the Timok fault, broken mainly from south to north due to the compression of the Southwestern Carpathians at the contact with the Moesian Platform.

The morphostratigraphy of the Lower Member of the Danube Formation alluvia (Lower Pleistocene) deposited by the Danube and its tributaries on the High Fields of the Romanian Plain (250–110 m altitude) and of the Upper Member of the Danube Formation alluvia, of Middle Pleistocene–Holocene age (170–20 m elevation, with 5–8 layers of terrace alluvia and a present-day floodplain) is partially elucidated. This is due to the existence of active earthquake-affected faults, involving unequal movements of alluvial layers. The 5–8 stepped fluvial terraces and floodplain relief is blanketed by the Aeolian Formation (up to 35 m thick in the High Plains and between 20 and 25 m-thick over the old terraces).

Zoning the alluvial thickness of the Upper Member of the Danube Formation, omnipresent in the Lower Danube Valley, reveals the dominance (69.3%) of the 5–10 m and 10–15 m ranges. Terrace and floodplain alluvia are 15–20 m, 20–25 m and 25–30 m-thick on about 20.5% of the studied area: (i) near Miroć Tableland, on the subsiding sectors divided by faults (ii) stacked alluvial sequences) and (iii) at the confluence of the Blahnita and the Drincea rivers with the Danube Valley (3 stacked alluvial sequences).

1. Introduction

Knowledge of the geological structure underlying the stratigraphy of Quaternary formations within the first 50 m depth of the Romanian Plain is of major importance for a better understanding of natural resources and environmental hazards. The investigated area covers southwest Romania, well-known for agriculture (Fig. 1). Geographically, this region corresponds to the western part of Lower Danube Valley subunit, namely the Danube terraces and floodplain (170–20 m elevation), about 300 km long between Batoti Commune in the west (14 km south of Drobeta Turnu Severin) and Turnu Magurele in the east (at the confluence of the Danube with the Olt). This study targeted also portions of the surrounding Balacita, Salcuta and Leu-Rotunda High Plains (250–110 m elevation) with outcrops in the Upper Miocene-Pliocene formations covered by coarse and sorted alluvia (~25 m-thick) deposited by the Danube and its tributaries in the first part of the Lower Pleistocene (the Lower Member of the Danube Formation, 2.6–0.8 Ma).

The current conceptual model of the Lower Danube Valley Quaternary Stratigraphy, illustrated on the Geological Map of Romania scale 1:200,000, dates from the 1970s. As far as geographical research is concerned, the first reference papers on the Iron Gate Gorge (Cvijić, 1908; Dimitrescu-Aldem, 1911) and on the Oltenia Plain (Vâlsan, 1915; Popescu-Voiteşti, 1925) were published at the beginning of the 20th century.

After World War II, new and significant investigations focused on the geomorphology of the surrounding Getic Piedmont (Mihăilescu, 1947; Stroe, 2003) and the western part of the Lower Danube Valley (Coteţ, 1957; Oancea et al., 1967; Badea and Coteţ, 1969; Badea et al., 1969; Posea et al., 2005). Geological research after World War II, more precisely the boreholes drilled in the

* Corresponding author.
E-mail addresses: geoinst@rnc.ro, petru_enciu@yahoo.com (P. Enciu).

http://dx.doi.org/10.1016/j.quaint.2014.09.048
1040-6182/

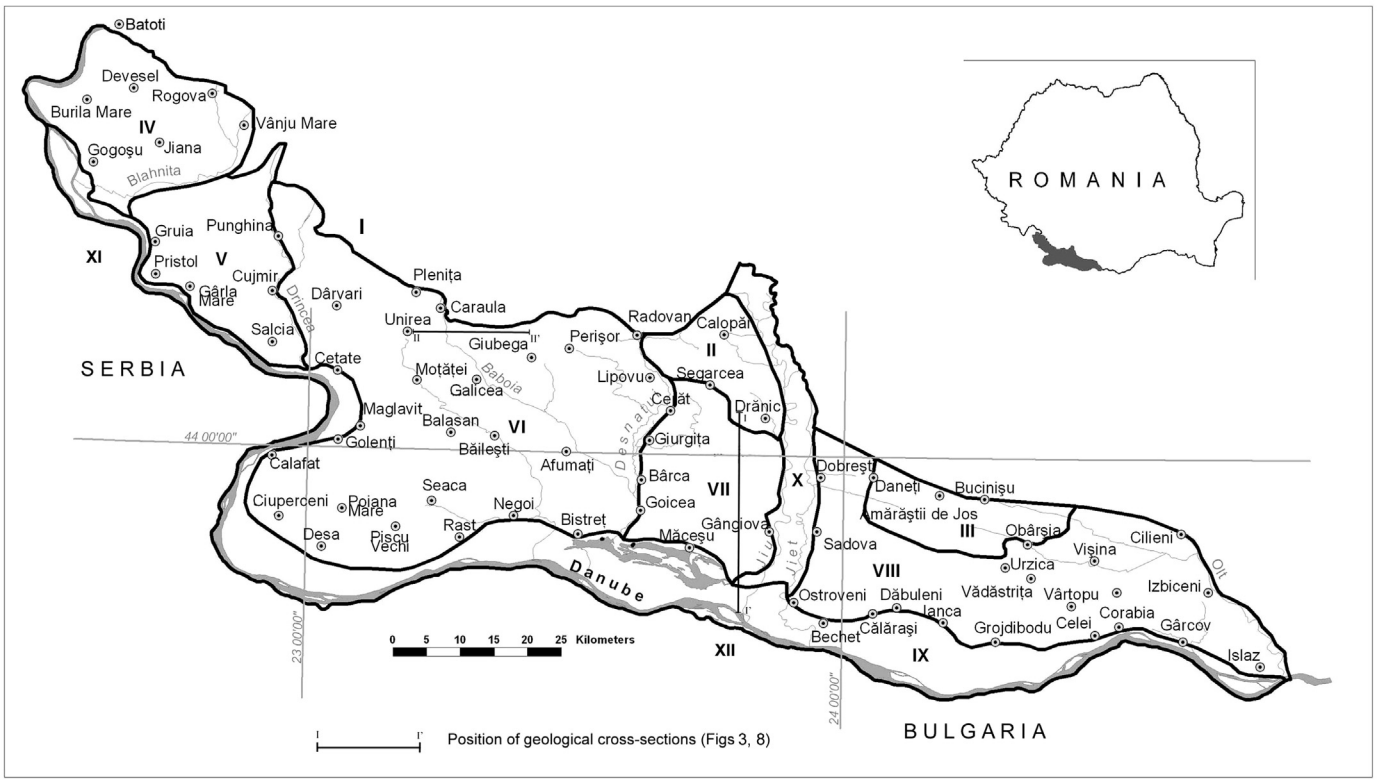

Fig. 1. Main geomorphological subunits and the location of the study area. a) on the High Plain: I. Balacita Plain; II. Salcuta Plain; III. Leu-Rotunda Plain; b) in the Lower Danube Valley: IV. Jiana Plain; V. Punghina Plain; VI. Bailesti Plain; VII. Segarcea Plain; VIII. Dabuleni Plain; IX. Danube Floodplain; X. Jiu Floodplain; b) on the righthandside of the Danube River: XI. Miroc Tableland; XII. Prebalkan Tableland.

south-western Romanian Plain, were aimed at investigating the terrain's Pliocene-Quaternary paleontology and stratigraphy (e.g. Liteanu, 1955; Liteanu and Bandrabur, 1957; Stoian, 1959; Bandrabur et al., 1963; Ghenea et al., 1963; Schoverth et al., 1963). The results were published by the Geological Institute of Romania in the Geological Map scale 1: 200,000, sheets "Turnu Severin" (Savu et al., 1966), "Calafat-Bechet" (Mihaila and Patrulius, 1966), "Turnu Magurele" (Bandrabur et al., 1966) and "Craiova" (Mihaila et al., 1968).

Information on the surrounding Miroć and Prebalkan Tablelands were published in the Donji Milanovać, Turnu Severin and Negotin sheets of the Geological Map of Serbia, scale 1:100,000 (Dolić and Rakić, 1974; Bogdanović et al., 1978a, 1978b) and later on, in the Bregovo, Vidin and Lom sheets of the Geological Map of Bulgaria, scale 1:100,000 (Filipov et al., 1988, 1990, 1992). Subsequently, one collection of papers dedicated to the geology of the Iron Gate area was published (Knezević, 1997; Marović et al., 1997; Rakić and Simonović, 1997).

ERA	PERIOD	EPOCH	AGE	AGE (Ma)	LITHOSTRATIGRAPHIC UNITS	Thick-ness (m)
CENOZOIC	QUATERNARY	HOLOCENE		0.012	Aeolian Formation	0 - 35
		PLEISTOCENE	Upper	0.126	Danube Formation	
			Middle	0.781		0 - 30
			Lower	2.588		
	NEOGENE	PLIOCENE	Romanian	4.1	Jiu-Motru Formation	0 - 190
			Dacian	4.9	Berbesti Formation	0 - 140
		MIOCENE	Pontian	6.0	Cartojani Formation	10 - 250
			Meotian	8.6 / 8.2	hiatus	
			Sarmatian	13	Krivodol Formation	10 - 125

Fig. 2. Stratigraphic chart of the study area.

Please cite this article in press as: Enciu, P., et al., Contributions to the knowledge of Quaternary formations in the southwest Romanian Plain, Quaternary International (2014), http://dx.doi.org/10.1016/j.quaint.2014.09.048