

Trans-border (east Serbia/west Bulgaria) correlation of the morpho-tectonic structures

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Abstract. In the Bulgarian and Serbian geological literatures, many maps, both geological and tectonic, exist showing the structures, but limiting them nationally. There are very few publications correlating the structures from both sides of the border and they preserve the local Bulgarian or Serbian names. Our aim is to create a base for the unification of the names defining the major morpho-tectonic structures: the Moesian Platform, the Miroč – Fore-Balkan Unit, the Poreč–Stara Planina Unit, the Krayna Unit, the Getic – Srednogorie Unit, the Supra Getic – Kraishtide Zone, the Serbo-Macedonian – Thracian Massif and the Vardar Zone, showing their synonyms from the Bulgarian and Serbian sides.

Key words: east Serbia, west Bulgaria, morpho-tectonic structures, correlation, synonyms.

Апстракт. У геолошкој литератури Србије и Бугарске постоје многе геолошке и тектонске карте које приказују различите структуре које су ограничене само на националне територије. Ретке су публикације које се баве корелацијом ових структура, а и у њима су структуре садржале, како српске, тако и бугарске називе. Циљ овог рада је да створи базу за унификацију назива, прикаже синониме са обе стране границе и дефинише главне морфо-тектонске структуре: Мезијска платформа, Мироч – Предбалкан, Поречко-Старопланинска јединица, Крајина јединица, Гетик – Средњогорје, Супрагетик – Крајиштиди, Српско-македонска маса – Тракијски масив, Вардарска зона.

Кључне речи: источна Србија, западна Бугарска, морфо-тектонске структуре, корелација, синоними.

Introduction

A collective of Serbian and Bulgarian geologists started a trans-border correlation of the Jurassic sediments in 2005 as an unofficial collaboration, which later extended into an official project. The first steps were made by correlating the Jurassic sediments from southeast Serbia and southwest Bulgaria (TCHOUMATCHENCO *et al.*, 2006a, b, 2008). The main Jurassic palaeogeographic units were correlated in TCHOUMATCHENCO *et al.* (2006a). The lithostratigraphic units from both sides of the state border were compared in TCHOUMATCHENCO *et al.* (2006b, 2008) with the aim

of demonstrating their positions in the sections and the possibilities of their correlation. Later this correlation became the subject of a bilateral project between the Bulgarian Academy of Sciences (Project leader for Bulgaria Dr. ISKRA LAKOVA) and the Serbian Academy of Sciences (Project leader for Serbia Dr. DRAGOMAN RABRENOVIĆ). As results of this collaboration, the palaeogeographic correlations during the Hettangian–Early Callovian (TCHOUMATCHENCO *et al.* 2010a) and the Middle Callovian–Tithonian (TCHOUMATCHENCO *et al.* 2010b) were elaborated. The purpose of the present paper is to correlate the major morpho-tectonic units established in Serbia and in Bulgaria across the com-

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mon state border and to show the synonyms used by the Bulgarian and the Serbian geologists as a first step for their unification. This idea came from recommendations of the International Stratigraphic Guide (SALVADOR 1994) that “Stratigraphic units are not limited by international boundaries and should not differ across them”. If this suggestion is difficult to be followed for single lithostratigraphic units, which are quite numerous, in our opinion, it is much easier to be applied to tectonic units as they are much larger and can be followed easier.

From the two sides of the Bulgarian/Serbian state border, several morpho-tectonic units, having their local name in the two countries, are distinguished.

In the regional geology and the regional tectonics, two general ways to make trans-border correlations are accepted: (1) to prolong the geological/tectonic units established in a bordering neighbouring region to the local region subjected to investigation; (2) to study the geology in one local region and to try to extend the established units into the neighbouring regions. Some, mainly Serbian, geologists (ANDJELKOVIĆ 1996; SIKOŠEK 1955; ANDJELKOVIĆ & SIKOŠEK 1967; GRUBIĆ 1980; BOGDANOVIĆ 1974; DIMITRIJEVIĆ 1995; KRÄUTNER & KRSTIĆ 2003; *etc.*) proceeded in the first manner, which prolonged the classical units established in the Carpathians across the Danube into northeastern Serbia. The second way was applied by some Bulgarian geologists (S. BONČEV 1910, 1927; E. BONČEV 1936, 1978, 1986; *etc.*), who made efforts to draw out the units established in Bulgaria over the Bulgarian state border into Serbia. The two ways of study have their advantages and their weak points. However, the majority of authors limit their interpretations to the national territory (Bulgarian or Serbian) – IOVČEV (1971, ed.), KARAMATA *et al.* (1997), HAYDUTOV *et al.* (1997), ANDJELKOVIĆ (1996), SIKOŠEK (1955), ANDJELKOVIĆ & SIKOŠEK (1967), GRUBIĆ (1980), BOGDANOVIĆ (1974), DIMITRIJEVIĆ (1995), DABOVSKI *et al.* (2002), DABOVSKI & ZAGORCHEV (2009), *etc.*

The problem of the trans-border correlation (according to BONČEV 1986) started in 1885 when E. Suess, launched the idea for the existence of a general bending (torsion?) of the directions in the Carpatho-Balkan arc. In 1904, CVIJIĆ (reference in: ANDJELKOVIĆ 1996) found in the valley of the Timok near the town of Zaječar a graben, a low structural zone, in which the axes of both South Carpathian and the Balkan structures are deepening. This was the starting point of the delimitation between the Carpathian and Balkanide structures. Later on, this view was also supported by S. BONČEV (1910, 1927). In the last paper, S. Bončev used for the first time the term Balkanides. In the opinion of E. BONČEV (1936), the Berkovitsa anticline is cut diagonally and its prolongation must occur to the west of Zaječar. Later, SIKOŠEK (1955) proved that along the Timok Valley passes a strike-slip fault, along which the Berkovitsa and the Belogradchik

anticlines are displaced by up to 40–50 km. To the west, the Carpatho–Balkanides are represented by the Srednogorie (which according to S. BONČEV 1910, 1927, is a prolongation of the Getic). Many Serbian authors, such: ANDJELKOVIĆ & SIKOŠEK (1967), GRUBIĆ (1980), BOGDANOVIĆ (1974), DIMITRIJEVIĆ (1995), KARAMATA *et al.* (1997), KRÄUTNER & KRSTIĆ (2003), *etc.* published their views concerning the structure of East Serbia. In general, they all considered the area as consisting of a series of longitudinal structural zones, which differed from one another only by the explanation of their genesis (based on different positions: the geosynclinal theory, the plate-tectonic theory, the principles of the naps tectonic, the conception of the terranes, *etc.*), and in some details. Some Bulgarian geologists, such E. BONČEV (1936, 1986), *etc.*, also proposed their explanations about the correlation of the west Bulgarian/east Serbian structures. To explain our ideas for the trans-border correlation (Fig. 1), the Tectonic model for the Carpatho-Balkan arch of BONČEV (1986; fig. 38) was taken. In addition, the Tectonic Framework of the Carpatho-Balkanides of eastern Serbia of ANDJELKOVIĆ (1996; fig. 2) was employed. Despite the fact that his sketch map covers only eastern Serbia, we went beyond its regional value and furthermore it has already been used as a basis for palaeogeographic maps (TCHOUMATCHENCO *et al.* 2010a, 2010b).

Correlation of the morpho-tectonic units

We refer to eight morpho-tectonic units (Fig. 1) and we mention only some of their synonyms existing in the Bulgarian and Serbian literature. The reason for not making a full list of synonyms is that the literature treating the problems of the tectonic division of the region is too numerous, which makes it impossible to reference all the authors; nevertheless, their contributions are important.

(1) **Moesian Platform** (Fig. 1, 1) represents a platform with a Precambrian consolidated basement and a Palaeozoic–Mesozoic–Neozoic cover, part (“spur”) of Eurasia. It is described as the Moesian Platform or the Moesian Plate by many authors: BONČEV (1978), IVANOV (1988), DABOVSKI *et al.* (2002), NACHEV & NACHEV (2008), TZANKOV (1995), IOVČEV (1971), DABOVSKI & ZAGORCHEV (2009), ANDJELKOVIĆ (1996), DIMITRIJEVIĆ (1995), KARAMATA *et al.* (1997), KRÄUTNER & KRSTIĆ (2003), *etc.*

(2) **Miroč – Fore-Balkan Unit** (Fig. 1, 2) represents an area, consisting of autochthonous fold structures, which is separated from the Moesian Platform by the Fore-Balkan Fault or Balkanide Frontal Line, BONČEV (1978) (Fig. 1, A). Its western part is built-up by series of longitudinal folds, as the Miroč (ANDJELKOVIĆ 1996; DIMITRIJEVIĆ 1995), Belogradchik and Mihailovgrad anticlines (or anticlinorium) (BONČEV

1971, 1978; TZANKOV 1995), *etc.*, and the Milanovac–Novo Korito–Salash syncline (ANDJELKOVIĆ 1996; BONČEV 1910, 1927; BONČEV 1971, *etc.*). For this unit KRÄUTNER & KRSTIĆ (2003) used the name of Lower Danubian (Cosustea Unit, Lainici (Cerna-Miroč), Dragsan Unit) and BONČEV *et al.* (1973) – Mesosalpine (Illyrian–Pyrenean) Unit: FB – Proper Fore-Balkan and TR – Transitional Zone (Northern Strip of the Fore-Balkan), ND – Danubicum.

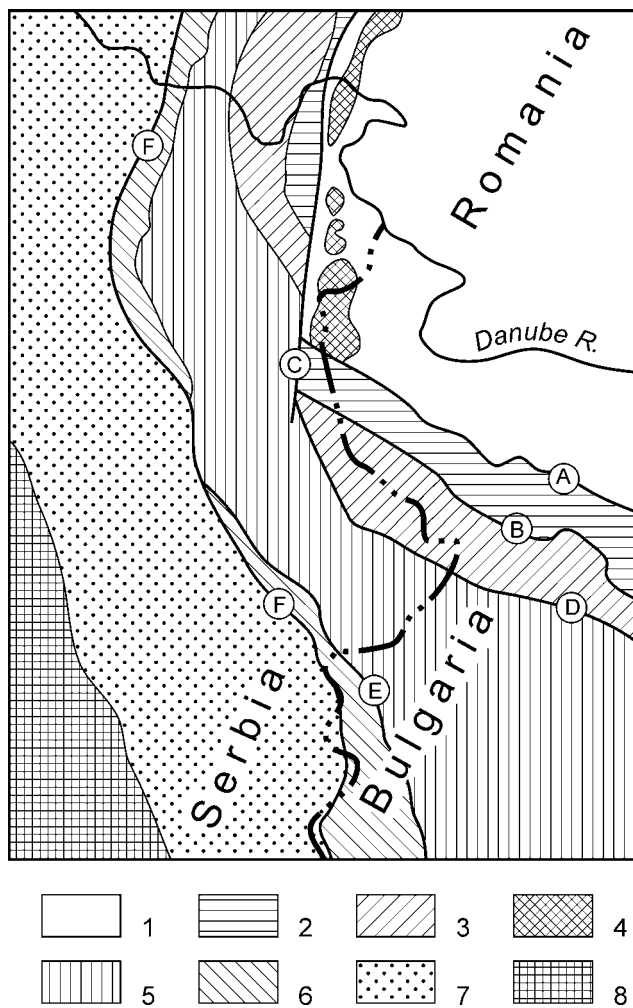


Fig. 1. Trans-border (east Serbia/west Bulgaria) correlations of the morpho-tectonic units. 1, Moesian Platform; 2, Miroč – Fore-Balkan Unit; 3, Poreč–Stara Planina Unit; 4, Krayna Unit; 5, Getic – Srednogorie Unit; 6, Supra Getic – Kraishide Unit; 7, Serbo-Macedonian–Rhodope Massif; 8, Vardar Zone. A, Fore-Balkan Fault (Balkanide Frontal Line); B, Stara Planina Frontal Line; C, Timok Strike-Slip Fault; D, Vidlič Dislocation (Behind the Balkanide Fault); E, Tran–Ozren Fault; F, Morava Fault.

Synonyms: Fore-Balkan Tectonic Zone – YOVČEV (1971); Fore-Balkan Zone (representing the northern part of the Balkanides) – E. BONČEV (1986); Proper Fore-balkan (with Miroč Anticlinorium, Belogradchik Anticlinorium, *etc.*) – BONČEV (1978); Koula–Obzor

Unit of the Balkanide Alpine Folded System – Centralbalkan–Fore-Balkan – IVANOV (1988); Belogradchik Superunit – TZANKOV (1995); West Balkan Unit (*p.p.*) of the Balkan Zone of the Balkan Orogenic System – DABOVSKI *et al.* (2002); Stara Planina Tectonic Zone – Illirian structures – post-Lutetian – NACHEV & NACHEV (2008); Lower Danubian Units (Vraca Scale, Kutlovska Unit, Kula Unit) – KRÄUTNER & KRSTIĆ (2003); Mesosalpine (Illyrian–Pyrenean) Unit: FB – Proper Fore-Balkan and TR – Transitional Zone (Northern Strip of Fore-Balkan), ND – Danubicum – BONČEV *et al.* (1973); Fore-Balkan Unit – DABOVSKI & ZAGORCHEV (2009); Danubikum, Miroč Unit – DIMITRIJEVIĆ (1995); Milanovac–Novokorito Unit and Miroč Unit of the Balkanikum – ANDJELKOVIĆ (1996); Vrška Čuka–Miroč Terrane, part of the Composite terrane of the Carpatho-Balkanides – KARAMATA *et al.* (1997); Lower Danubian (Cosustea Unit, Lainici (Cerna-Miroč), Dragsan Unit) – KRÄUTNER & KRSTIĆ (2003).

(3) **Poreč–Stara Planina Unit** (Fig. 1, 3) occupies the space covering the structures of Stara Planina – both in Bulgaria and East Serbia and the massifs of Deli Jovan, Miroč and Greben and continues to the massif Almash, north of the Danube, in Romania (BONČEV 1910). Its northern and eastern boundary with the Miroč – Fore-Balkan unit is the Stara Planina Frontal Line (an overthrust) (Fig. 1, B). The Poreč–Stara Planina Unit is severed and displaced by the Timok–Pirot Transcurrent (strike-slip) Fault (BONČEV 1986; known also as the Štubik–Timok Dislocation – ANDJELKOVIĆ 1996, *etc.*). The south-western slope of this unit builds-up a syncline, known in western Bulgaria as the Izdremets Syncline and in eastern Serbia, as the Dobri Dol–Grište Zone (ANDJELKOVIĆ 1996). During the Jurassic, the relatively deeper marine sediments of the Infra-Getic Palaeogeographic Zone were deposited in this area. The western boundary of the Poreč–Stara Planina was placed by BONČEV (1986) between the Svoge and the Berkovitsa anticline (anticlinorium), while NACHEV & NACHEV (2008) in this unit included the Svoge Antiforme (anticline, anticlinorium) into the Stara Planina Tectonic Zone.

Synonyms: West-Balkan Tectonic Zone – YOVČEV (1971); Balkan Structural Zone (with anticlinal structure of Deli Jovan, Berkovitsa Anticlinorium, Šipka Anticlinorium, *etc.*) – BONČEV (1986); Stara Planina Zone – BONČEV (1986; fig. 38); West Balkan Unit (*p.p.*) of the Balkan Zone of the Balkan Orogenic System – DABOVSKI *et al.* (2002); Western Balkan Zone – IVANOV (1988); Berkovitsa Superunit – TZANKOV (1995); Stara Planina Tectonic Zone – Illirian structures – post-Lutetian – NACHEV & NACHEV (2008); Upper Danubian Units (Melianska Scale) – KRÄUTNER & KRSTIĆ (2003); Mesosalpine (Illyrian–Pyrenean) Unit: SP – Stara Planina Zone – BONČEV *et al.* (1973); Western Balkan Unit – DABOVSKI & ZAGORCHEV (2009); Stara Planina–Poreč Unit (B1) of the

Balkanikum or Balkan Autochthon – ANDJELKOVIĆ (1996); Poreč Unit – DIMITRIJEVIĆ (1995); Stara Planina–Poreč Terrane of the Composite Terrane of the Carpatho-Balkanides – KARAMATA *et al.* (1997); Upper Danubian Units (Arjana and Căleanu–Cuntu Units, Visoč Scale, Presacina–Comereva/Komska Unit, Poiana Mraconia–Gabrovnica Unit, Neamtu–Stakevci Unit) – KRÄUTNER & KRSTIĆ (2003).

(4) Krayna Unit (Fig. 1, 4), in its native land, was affected during the Tithonian by intensive geodynamic processes which caused significant fracturing and submarine volcanic activity that resulted in the formation of volcanogenic-sedimentary products (Vratarica Series – ANDJELKOVIĆ 1996) and Upper Jurassic–Lower Cretaceous flysch sediments (NACHEV & NACHEV 2008). In the present day, they represent extensions of the Severin Nappes (DABOVSKI & ZAGORCHEV 2009; fig. 5, 1-1) from the South Carpathian and crop out along the state border between NE Serbia and NW Bulgaria.

Synonyms: Krayna Unit of the Moesian Microcraton – TZANKOV (1995); Kraina Unit of the South Carpathian Orogenic System – extension of the Severin Nappe in Serbia and Romania – DABOVSKI *et al.* (2003); Koula Tectonic Zone – YOVCHEV (1971); Severin Zone – BONČEV (1986); Kula Zone – IVANOV (1988); South Carpathians – early Autrichian structures – Aptian – NACHEV & NACHEV (2008); KR – Kraina Unit – BONČEV *et al.* (1973); Severin Nappes, Krayna Unit of the South Carpathian Orogen System – DABOVSKI & ZAGORCHEV (2009); Kraina Thrust Nappe (Krainicum) – Severin Nappe – ANDJELKOVIĆ (1996); Getian Klippe – GRUBIĆ (1980); Krajina Nappes – DIMITRIJEVIĆ (1995).

(5) Getic – Srednogorie Unit (Fig. 1, 5) is a typical riftogenic system with magmatism of an island-arc type. It is manifested by the outcrops of Upper Cretaceous sedimentary and volcano-sedimentary rocks and a typical Ca-alkaline (to the east K-alkaline as well) magmatism in volcanic, subvolcanic and intrusive facies (BONČEV 1986). In its easternmost part occur big fold structures such as the Svoge–Vidlič anticlinorium, practically without Upper Cretaceous sediments. Its east boundary, with the Poreč–Stara Planina Unit, is the Vidlič dislocation or the Sub-Balkanide fault (Fig. 1, D) (in many localities with transition to an overthrust sheet).

Synonyms: Srednogorie – a zone of impermanent riftogenesis during the Late Alpine tectonic cycle and up to the present (developed on the Thracian Massif) – BONČEV (1978); Srednagora – Getic Strip – BONČEV (1986); Srednagora Zone – IVANOV (1988); Srednagora Tectonic Zone – YOVCHEV (1971); Svogue Superunit – TZANKOV (1995); Burela Unit of Troyan Superunit – TZANKOV (1995); West Srednogorie Unit of the Srednogorie Zone – DABOVSKI *et al.* (2002); Srednagora Tectonic Zone – Late Subhercynian structures – Antemastrichtian – NACHEV & NACHEV (2008); SR – Sred-

nogorie; TU – Tupižnica Zone; SUP – Suva Planina Zone; K – Kučaj Zone – BONČEV *et al.* (1973); Srednogorie Zone with – Lyubash–Golo Bardo Unit, Western Srednogorie Unit, Svogue Unit – DABOVSKI & ZAGORCHEV (2009); Getikum – DIMITRIJEVIĆ (1995); Carpathicum or Carpathian Thrust Nappe – ANDJELKOVIĆ (1996); the composite terrane of the Carpatho-Balkanides – KARAMATA *et al.* (1997); Getic Units (Suva Planina–Samanjac Unit (included Dušnik Scale), Getic Unit (Kučaj, Ljubaš, Sredna Gora), Kučaj–Svoge Unit, Semenik–Osanica Unit, Luchita–Jidostita Unit, Iskâr Scale, Vidlič Scale, etc. – KRÄUTNER & KRSTIĆ (2003). The Getic in Romanian South Carpathian, as the Srednogorie in Bulgaria must be regarded as the most outer fragment of the median Pannonian–Thracian Massif – BONČEV (1986; p. 212).

(6) Supra Getic – Kraistide Zone (Fig. 1, 6) possesses relatively thick Precambrian high-grade metamorphic rocks covered by Palaeozoic, Mesozoic and Neozoic sequences. A very characteristic feature for it is the presence of a synsedimentary graben (Palaeozoic, Mesozoic and Neozoic) in which a specific sedimentation is expressed. Its eastern boundary with the Getic – Srednogorie unit is the Tran–Ozren Fault (Fig. 1, E).

Synonyms: Supra-Getic (Krepolin Strip), Kraistide Zone – BONČEV (1986; fig. 2); Kraistide Tectonic Zone – YOVCHEV (1971); Thracian Massif (Kraistides, Dardanian Massif, Rhodope Massif) – BONČEV (1978); Kraistide Zone – IVANOV (1988); West Kraistide (Elovitsa Exotic Terrane) (continues into the Ranovac–Vlassina–Osogovo Terrane) – HAYDUTOV *et al.* (1997); Strouma Unit of the Morava–Rhodope Zone – DABOVSKI *et al.* (2002); Srednagora Tectonic Zone – Late Cimmerian structures – Tithonian–Berriasian – NACHEV & NACHEV (2008); KE – Kraistides, LU – Lužnica Zone – BONČEV *et al.* (1973); Struma Unit of the Morava–Rhodope Zone – DABOVSKI & ZAGORCHEV (2009); Supra-Getikum (Golubac–Lužnica Zone) – DIMITRIJEVIĆ (1995); Lužnica Tectonic Unit – DIMITRIJEVIĆ (1995); Carpathicum or Carpathian Thrust Nappe – ANDJELKOVIĆ (1996); Kraistide Units – Zemen Unit, Lužnica Unit (Vlahina, Osogovo–Cmook, Ograzden–Verila), Koritnik Scale – KRÄUTNER & KRSTIĆ (2003).

(7) Serbo-Macedonian – Thracian Massif (Fig. 1, 7) is the area between the Vardar Zone and the Carpatho-Balkanides. Its principal feature is the presence of metamorphic rocks, which served as the source area for the Palaeozoic–Mesozoic seas. Its eastern boundary is the large Morava Fault (Fig. 1, F).

Synonyms: Thracian Massif (Kraistides, Dardanian Massif, Rhodope Massif) – BONČEV (1978); Dardanian (Serbo-Macedonian) – Thracian massif – BONČEV (1986); Rhodope Composite Terrane (composed of a few metamorphic blocs: Serbo-Macedonian Massif, Rhodope Massif, Sredna Gora Block and Sakar–Istranca Zone – HAYDUTOV *et al.*) (1997); Rhodope

Massif – IVANOV (1988); Morava Unit of the Morava–Rhodope Zone (Morava, Ograzhden, Strouma, Pirin–Pangaion, Rila–Rhodope, East-Rhodope, Mandritsa–Makri Units) – DABOVSKI *et al.* (2002); R – Rhodope Massif, GP – Golubac–Penkovo Nappe, SM – Serbo-Macedonian Massif – BONČEV *et al.* (1973); Morava Unit and Struma Unit of the Morava–Rhodope Zone – DABOVSKI & ZAGORCHEV (2009); Morava Nappes – DIMITRIJEVIĆ (1995); Serbian-Macedonian Mass, Morava Tectonic Unit – DIMITRIJEVIĆ (1995); Serbian-Macedonian composite Terrane – KARAMATA *et al.* (1997); Moravides, Morava Zone – ANDJELKOVIĆ (1996); Morava Structural Unit – DIMITRIJEVIĆ (1995); Serbo-Macedonian Units, not differentiated; Supragetic Units (included the Morava, Ranovac–Vlasina and Elešnica Units) – KRÄUTNER & KRSTIĆ (2003).

(8) Vardar Zone (Fig. 1, 8) is situated between the Serbo-Macedonian Massif (to the east) and the Dinarides (to the west).

Synonyms: Vardar Zone Composite Terrane – KARAMATA *et al.* (1997); Vardar Units – KRÄUTNER & KRSTIĆ (2003); Vardar Zone – BONČEV *et al.* (1973). This Zone is mentioned with the aim of completing the western boundary of the Serbian-Macedonian–Rhodope Massif. It does not cross the Serbian/Bulgarian border area.

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Резиме

Међугранична (источна Србија/западна Бугарска) корелација морфо–тектонских структура

Циљ овог рада је да се прикаже корелација главних морфо–тектонских структура Србије и Бугарске дуж државних граница и дају њихови синоними коришћених од стране бугарских и српских геолога. Дефинисане су следеће морфо–тектонске структуре: Мезијска платформа, Мироч – Предбалкан, Поречко–Старопланинска јединица, Крајина јединица, Гетик – Средњогорје, Супрагетик – Кра-

јиштиди, Српско–македонска маса – Тракијски масив, Вардарска зона.

(1) **Мезијска платформа** (сл. 1.1) представља платформу са прекамбријском подином и палеозојско–мезозојско–неозојским покривачем повластом кји је део Еуразијског копна. Она је описана као Мезијска платформа или Мезијска плоча од стране многих аутора: БОНЧЕВ (1978), ИВАНОВ (1988), ДАВОВСКИ *et al.* (2002), НАЧЕВ и НАЧЕВ (2008), ЦАНКОВ (1996), ЈОВЧЕВ (1971), ДАВОВСКИ и ЗАГОРЧЕВ (2009), АНЂЕЛКОВИЋ (1996), ДИМТРИЈЕВИЋ (1995), КАРАМАТА *и др.* (1997), КРАЌУТNER & KRSTIĆ (2003) и др.

(2) **Мироч – Предбалкан** (сл. 1.2) представља област која се састоји од аутохтоних наборних структура, а која је раздвојена од Мезијске платформе предбалканским раседом или балканском фронталном линијом (БОНЧЕВ 1978) (сл. 1.A): Његов западни део је изграђен од серије лонгитудиналних набора, као што је Мироч (АНЂЕЛКОВИЋ 1996; ДИМТРИЈЕВИЋ 1995), Белоградчикским и михајловградским антиклиналама (или антиклиноријумима) (БОНЧЕВ 1971, 1978; САНКОВ 1995) итд., и Милановачко–новокоритска (Салашка) синклинала (АНЂЕЛКОВИЋ 1996; Ст. БОНЧЕВ 1910, 1927; БОНЧЕВ 1971). За ову јединицу КРАЌУТNER & KRSTIĆ (2003) употребљавају називе: Доњи данубиан (Косустеа јединица, Лаинци (Церна–Мироч), Драгсан јединица), а БОНЧЕВ *и др.* (1973) Мезоалписка (Илирско–пиринејска) јединица: FB – Предбалкан, TR – прелазна зона (северни део Предбалкана), и ND – Данубикум.

(3) **Пореч – Стара планина** (сл. 1.3). Заузима простор који покривају структуре Старе планине, како у Бугарској тако и у источној Србији, масиви Дели Јован, Мироч и Гребен и наставља ка масиву Алмаш, северно од Дунава, у Румунији. Његову северну и источну граница са јединицом Мироч – Предбалкан јединицом је Поречко–старопланинска фронтална линија. Ова јединица је пресечена и померена Тимочко–пиротским транскурентним раседом (БОНЧЕВ 1986), који је, такође, познат као Штубичко–тимочка дислокација – АНЂЕЛКОВИЋ (1996).

Југозападне падине ове зоне изграђују синклиналу, познату у Бугарској као Издреметска синклинала, а у источној Србији као Добродолско–грлишка зона (АНЂЕЛКОВИЋ 1996).

За време јуре у овој области се депонују релативно дубоководни морски седименти инфрагетске палеогеографске зоне. Западна граница ове јединице, према БОНЧЕВУ (1986), је између Свођске и Берковичке антиклинале, док НАЧЕВ и НАЧЕВ (2008) укључују и Свођску антиформу (антиклиналу, антиклиноријум) у Старопланинску тектонску зону.

(4) **Крајина** (сл. 1.4) је аутохтоно копно које је захваћено за време титона интезивним геодина-

мичким процесима који су изазвали значајне фрактуре и подморску вулканску активност, што је довело до формирања вулканогено–седиментних творевина (Вратарничка серија – Анђелковић 1996) и горњојурско–доњокредно флишних седимената (НАЧЕВ и НАЧЕВ 2008). Данас су то продужетци Северинске навлаке (ДАБОВСКИ и ЗАГОРЧЕВ 2009, сл. 5, 1–1) од Јужних Карпата који прелазе границу СИ Србије и СЗ Бугарске.

(5) Гетик – Средњогорје (сл. 1.5) је типичан рифтогени систем са магматизмом острвско-лучног типа. Карактерише се изданцима горњокредне старости, вулканогено-седиментним стенама и Са–алкалним (према истоку и К–алкалним) магматизмом у вулканским, субвулканским и интрузивним фацијама (ВОНЉЕВ 1986). У најисточнијим деловима појављују се велике наборне структуре, као што је Свође–Видлички антиклиноријум, углавном без горњокредних седимената. Источна граница ове јединице, са Поречко–старопланинском јединицом, је Видличка дислокација или суббалкански расед (сл. 1.D) (код многих локалитета са прелазом ка навлакама).

(6) Супра-гетик – Крајиште (сл. 1.6) поседује карактерише се релативно дебелим прекамбриј-

ским високо метаморфисаним стенама прекривених палеозојским, мезозојским и неозојским секвенцама. Његова веома карактеристична особина је присуство синседиментационих рова (палеозојског, мезозојског и неозојског) у којем се одвијала специфична седиментација. Његова источна граница са Гетик – Средњогорском јединицом је Тран–озренски расед (сл. 1.E).

(7) Српско македонски масив (сл. 1.7) је област која се налази између Вардареске зоне и Карпато-балканида. Његова главна особина је присуство метаморфних стена, које представљају изворну област палеозојских–мезозојских мора. Његова источна граница је велики Моравски расед (сл. 1.F).

(8) Вардарска зона (сл. 1. 8) налази се између Српско-македонског масива на истоку и Динарида на западу.

У енглеском тексту приказани су неки од синонима који се помињу у српској и бугарској литератури. Разлог што није приказана целокупна листа синонима је тај што у литератури о тектонским поделама поменуте области постоји велики број синонима који не допуштају да поменемо све ауторе.