

paper) that the rocks of the Luda Kamčija Group have been, after their formation, displaced at a considerable distance northward to their present position (Гочев, 1979, and others), a thrusting related to the Austrian phase (Паскалев, 1988). It is also a very important problem whether these blocks represent only olistostromes or some of them are formed as a result of tectonic movements (tectonic melange) or represent partially old or new landslides (Енчева, Кънчев, 1962). Tectonic melange has been mentioned for that area by Hsu et al. (1977), Гочев (1979), Вълчев (1980). The authors only briefly have mentioned that a part of the blocks with Upper Jurassic and Cenomanian age have been formed respectively through tectonic movements, and in landslides (Бончев, 1986; Енчева, Кънчев, 1962) but on all illustrations only olistostromes are shown. Olistostromes are typical not only for the Kotel Formation as the authors claim: small olistostromes may be observed also in the Sinivir Formation, e. g. north of Kotel and immediately south of the river Glogova Reka.

6. Another interesting fact not known to the authors is of particular importance for the Jurassic stratigraphy of the area. South of the village Veselinovo (in the locality Bakalaka), grayish-brown medium- to coarse-grained sandstones contain interlayers of grayish-black to brownish-black quartz conglomerates. According to their field relations with the sediments of the flyschoid formation (Norian), these sandstones and conglomerates probably belong to the basal packets of the Lower Jurassic unconformably covering the flyschoid formation. Similar geologic relations may be observed also along the stream Koru Dol (east of the river Stara reka) in the locality Borinata.

7. The paper is unnecessarily long, with more than 17 pages of tables proving the flysch character of flysch sediments.

In conclusion I would like to emphasize that the contributions of the paper discussed to the stratigraphy and lithology of the Luda Kamčija Group are of considerable value. The tectonic problems, however, need a far better study with the specific methods of the structural geology.

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Answer to the Critical notes

The author of the critical notes obviously did not understand the character of our papers and the stratigraphic contributions when writing that "the most outstanding contribution is the confirmation of the Jurassic age. . . on the basis of new paleontologic evidence". In fact, the contributions consist in the first proving of: 1) Pliensbachian and Toarcian age for the sediments of the Sinivir and Balaban Formations; the first proving of an Aalenian part of the Kotel Formation; the confirmation and the

first findings for a number of new localities of a Bajocian age for the Kotel Formation which was first proven by Чернявска (1965); for the first time has been proven also an Early- and Middle Bathonian age in the Kotel Formation (Dodekova, Tchoumatchenko, 1988). The previous proofs with macrofauna for the Jurassic in East Stara Planina Mts concerned only the Jurassic age of separate olistolites, and many authors (including Паскалев, 1988) ascribed a "Lias — Dogger" or "Bajocian — Bathonian" age to the sediments of the Luda Kamčija Group without any proofs. Thus, in our case there is not a confirmation but proving of Early- and Middle Jurassic age for the rocks of this group.

According to Paskalev, figs 1 and 4 contain a number of errors which reflect in the tectonic interpretations "which do not correspond to the real situation". These "errors" are not technical errors but a concept. The opinion of Paskalev about their incorrectness is not sufficient, he should prove this opinion with his structural data. If he cannot understand how given rocks may cover progressively the older ones in one locality, and cover them with a tectonic (thrust) contact in another locality, it is his problem!

The Mator Planina anticline is refuted by Paskalev on the basis of the almost missing northern dips of the sediments' bedding. What is the meaning of this "almost"? — may be there is "almost not a northern limb"?

On the problems enumerated by Paskalev, the following may be emphasized:

1. According to Paskalev, nowhere west of Kotel north-dipping bedding may be observed. This is shown on the maps except for the northern slopes of Zelenič Poljana and in the valley of Boazdere (fig. 1, F) where the crest and the northern limb of the Mator-Planina anticline crop out; the northern limb is proven not only with the northern dips but also with the occurrence of the Kotel Formation. This fact was demonstrated also during a field trip (October 1989) with the participation of Paskalev. Our critic failed to observe the northern dips of the bedding also in the valley of the river Elešnica (south of the village Bjala Reka) in the sediments of the Sinivir Formation as well within the Kotel Formation in the valley of the river Gerila west of the Varbica pass. All these data have been already published, and Dr Paskalev had the possibility to check them in the field instead of denying them groundlessly. It is true that the southern dips prevail in the Jurassic sediments simply because the northern limb is preserved in a comparatively limited sectors shown on our map (fig. 1).

2. Paskalev is contesting also the "seven Austrian tectonic dislocations" because of the "lack of structural data... in the Triassic — Jurassic sediments of the Kotel zone". First of all, we have not described "Triassic — Jurassic sediments" because the Triassic is known only as olistolites. "The Austrian tectonic dislocations" are shown conditionally (with a broken line), a sign used by most geologists to express their concept about the structure in the case when no sufficient exposures are present.

3. The sandstones of the Sinivir Formation and Balaban Formation really crop out around the town of Kotel but they dip in different directions and build up olistolites often with overturned sequence of the beds. They are mixed with Triassic and Jurassic carbonatic olistolites, all included into the matrix of the Kotel Formation. This fact is very clear in the escarpment of the new asphalt road towards the summit Kuminčeto.

5. The aim of the criticized papers has not been the production of a detailed geological or/and tectonic map neither to show the position of all extraneous to the Luda Kamčija Group bodies. Tchoumatchenko (1988, 1989, 1990) considered only the type of the carbonatic Jurassic olistolites, and of their brachiopod fauna. Other authors (e. g. Berndt, 1934; Ганев, 1961; Енчева, Кънчев, 1962) have to a great extent already fulfilled the wish of Paskalev. As far as olistolites "may be observed also in the Sinivir Formation, e. g. north of Kotel and immediately south of the river Glogova Reka", olistolites of carbonatic Triassic and Jurassic rocks are really present in this area but together with olistolites from the Sinivir and Balaban Formations they are included within the shales of the Kotel Formation. It is a pity that Paskalev has not observed and understood that obvious facts.

6. Preserved transgressive relations of Jurassic sediments over different parts of the Triassic section have been recorded in several localities near the village Bilka, in Ayvadžikdere etc. (Tchoumatchenko, 1988). Thus the fact observed by Paskalev near the village Veselinovo is not a discovery for this area.

7. The tables on 17 pages are not aiming to prove "the flysch character of the flysch sediments" but to record and to follow the changes related to the paleogeography of the basin in which the turbidites have developed: formation of a fan-delta, with a proximal character of the turbidites, and their distal part. These tables are proving for the first time after more than 100 years of geological studies, the presence of Lower Jurassic turbidite sediments. Although these turbidites have a comparatively broad occurrence they have not been known to the geological community.

I wish to thank Dr Paskalev for his evaluation of the stratigraphic and paleontologic value of the papers discussed, and to express the hope that the "far better study with the specific methods of the structural geology" needed will be performed by himself.

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The Matorides in the East Stara-Planina Mountains— structure, origin and reality

The paper by Tchoumatchenco and Cernjavska published in two parts in *Geologica Balcanica* (19.4 and 20.3) provoked a fully justified interest. Without doubt, it is a detailed and competent study on the lithostratigraphy, biostratigraphy and paleobotany of the Jurassic in this part of the East Stara-Planina (Balkan) Mountains, with a considerable regional contribution. Such a study had to be performed by the best specialists on the Jurassic System because many of them had denied for a long time the presence of normal sequences of Jurassic rocks in the Kotel Stara-Planina Mountains although they were regionally biostratigraphically proven by Бакалов (1942) and Чернявска (1965). Nevertheless, these proofs were subjected (Начев et al., 1967; Чумаченко, Сапунюв, 1988 etc.) to doubts and became subject of different speculations.

In the conclusive parts of the paper, Tchoumatchenco proposed structural, paleogeographic and geodynamic considerations and hypotheses about the palinspastics of the region (at the northern margin of the Tethys and the Eurasian plate), as well as isolated tectonic data and suggestions for the structure, symmetry and evolution of an Early Alpine orogenic system called "Matorides" and built up of a single Mator-Planina anticline formed at the place of a back-arc ensialic trough at the end of the Early Jurassic over the southern margin of Eurasia (Рейбернес et al., 1989). This provokes the resumption of an old discussion in the Bulgarian geotectonics (e. g. on the pages of the *Review of the Bulgarian Geological Society* — Гочев, 1988, pp. 113-116, and in *Geologica Balcanica* — Вончев, 1983).

It should be emphasized that the newly introduced Jurassic Luda Kamcija Group is built up of three formation, with a total thickness of more than 1500 m, and covers the geochron Pliensbachian — Middle Bathonian. The first two formations (Sinivir and Balaban) have a well expressed flysch character, and the third, Kotel Formation is an argillaceous formation with olistostroms (Чумаченко, Чернявска, 1989, pp. 37-43). The reality of the Luda Kamcija Group in the Eastern Stara-Planina Mountains confirms an already existing opinion (Йорданов, 1957,