

• Discussion

Critical remarks to the article of Soták et al. (1996)

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Soták, Bebej and Biroň (1996) describe the deep-sea fan sediments of the Levočské vrchy Mts., as indicators of a „collision-orogene regime”. For recognizing such deposits they used as criteria the occurrence of some sandstone beds enriched in ophiolitic (serpentinic) detritus, located at the „perisutural” Šambron-Kamenica zone. The petrographic composition of these beds the authors interpret as arenites related to a magmatic- or oceanic-arc. Their age was designated as Late Oligocene.

In cited article the authors fail to acknowledge the principal previous works by many authors, although they use those results. For example, the authors use some formation names that are new (Kluknava-, Kežmarok-, Tomášovce Member) or those with different meaning by different authors (Šambron Beds), neither referring to the original papers (Filo and Siráňová 1996, Filo et al. 1994, 1995, Gross et al. 1994-1996), nor to the source of the drill hole information (Nemčok et al. 1977, Rudinec 1979, 1986, Kullmanová and Rudinec 1988, Píchová and Kudělásková 1989). They also seem unaware several sedimentological analyses (e.g. Marschalko 1962, 1978, Krysiak 1976, Radomski 1958-9), and paleontological researches (Nemčok and Vaňová 1977, Nemčok et al. 1990, Oszczytko 1996).

Through this lack of familiarity, some of the paleogeographical interpretations became quite questionable, methodically deficient and terminology used is inadequate at places. These shortcomings are pointed out below.

Soták and Bebej (1996) published already some basic definition of the Šambron Beds with their serpentinic sandstones, but in actual paper is missing more detailed description of the facies character and analysis on which their succeeding reconstructions were based. Thus, the inferred paleotectonic setting remains speculative. Using inappropriate terms the authors lead to a false conclusion. For example, one on their page 346 they state that „... the top sandstone lithosomes... representing the final stage... referred to as suprafan”, and further „...progressive progradation of (the) cone in the stage of suprafan development...”, which is misleading. The *suprafan* is a morphological term related to facies definition and as such it cannot be used to designate the stage of development.

Authors mention the conglomerates, whose position within the Šambron Beds in the paper is left uncertain. This position is even more obscure since in their previous publication (Soták & Bebej 1996) the conglomerates are completely omitted in the scheme (l.c. Fig. 1 and 4). The location of the serpentinic sandstones on the Nemčok's map (1990) is all within the Šambron beds, but outside of the conglomerate suite.

Another obscure term is the so-called *Šambron zone* (their p. 346). Does this term refer to a sedimentary basin or to a tectonic zone? If it designate tectonic zone then the position of the conglomerates may be interpreted also outside of their „Šambron Beds”. Several different usages of „Šambron Beds” occur (Chmelík 1959, Chmelík in Buday et al. 1968, Koráb et al. 1962, Marschalko 1975, Nemčok et al. 1977, 1990, Leško et al. 1979, Koráb 1986, Mastella et al. 1988), so it is unclear which significance is used.

The correlation of the Šambron Beds with the Szaflary Beds of the Podhale region is also disputable. The Szaflary Beds besides the flysch framework, contain numerous conglomerate beds (Mastella 1975, Mastella et al. 1977). Paradoxically, if Soták et al. (1996) consider the Šambron Beds to be Late Oligocene, then these can not be correlated with the Szaflary Beds, which, according to paleontological determinations, are older (Priabonian) (Bieda 1959, Mastella et al. 1977).

The age of the Šambron beds given by Soták et al. (1996) provides another problem, that affects their paleogeographic interpretation. At first it is necessary to analyse the original determination of the Šambron Beds age. Their „Late Oligocene” was designed on the basis of Nagymarosy's determination of three nannoplankton species, as reported in Soták and Bebej (1997). Two of these fossils are *Cyclicargolithus abisectus* and *Reticulofenestra lockeri*, which are not restricted to the Late Oligocene exclusively. The *C. abisectus* was also found in the older sediments, the Inner Carpathian Paleogene inclusive (Dudziak 1983, 1990, Birkenmajer & Dudziak 1988, Bystrická 1979, Bubík 1996, Oszczytko 1996, Potfaj and Raková 1989). Furthermore *R. lockeri* may be a synonym to *Cribrocentrum reticulatum*, which is a Middle Eocene taxon (Bubík 1996, Oszczytko 1996). The third cited fossil, *Zygrhablithus bijugatus*, is common Early Eocene to Late Oligocene species (Perch-Nielsen 1986). Thus, referring to faunal data the proposed Late Oligocene age of the Šambron Beds is not sufficiently proved. It is more likely that the Šambron Beds are Late Priabonian – Early Oligocene as was determined on the basis of numerous foraminiferal and nannoplankton associations by Bieda (1959), Vaňová (1962, 1964), Snopková (1989), Nemčok et al. (1990), or Dudziak (1983, 1993).

To make a paleogeographic reconstruction more reliable, one should also include observations on marine paleocurrent directions. Even when the authors do not possess their own data, they should use that of previous studies (Marschalko 1975, Radomski 1958, 1959, Krysiak 1976, Koráb et al. 1962). This added data indicate a transport of detritus longitudinal to the basin axis. Therefore, it can neither be interpreted as coming from the „slopes of the active Central Carpathian plate”, nor from the „northern collisional edge”.

When Soták et al. (1996) suggest a single ocean in the realm of the Magura basin, joined to the Inner Carpathian Paleogene basin, how can they explain the presence of „ophiolitic detritus” on the side of the Inner Carpathians in the Šambron Beds (according to the authors – Late Oligocene), without leaving a trace of it in the Malcov Formation of Magura basin? The source of the ophiolite detritus in the zone of the plate boundaries is unrealistic.

Also unexplained remains the „convergent extensional model” with „perisutural basin” introduced in their Fig. 2. Terms „convergent” and „extensional” used in this way seem to be contradictory.

A palinspastic reconstruction of segmented blocks of the ocean crust derived from a subduction scar, their subsequent uplift to erosion level (Soták and Bebej 1995), and then the de-

tritus transport to a single local sand-lobe deep on the same ocean floor seems speculative, if not unrealistic. What kind of morphological and structural body could such a source be? An intra-oceanic perisubductional cordillera is not known today. Where is there an analog?

In this context the interpretation of different sources for some clasts in the conglomerates of the Šambron Beds, designed as Iňačovce-Kričovo unit (their p. 346), is practically impossible. Following the author's definition given elsewhere (Soták et al. 1993) in the stratigraphic pile of the Iňačovce-Kričovo unit also occur Middle Eocene sediments, and these are metamorphosed. Now, if the metamorphism took place sometimes during the Savic (but certainly not earlier than Pyreneic) phase then the succession of geological processes implies that Iňačovce-Kričovo unit could neither have been exposed at the time of sedimentation of the Šambron Beds, nor served as a source for the Šambron conglomerates.

A valid paleogeographic reconstruction could not work without incorporating the Klippen Belt into the scheme. The principal structures of the Klippen zone were already formed in the Middle Eocene and Oligocene. These structures served as a local source for the material of the Szaflary Beds (Mastella 1975). On the Laramian structures of the Klippen zone, there transgressed the clastics of the „Klippen Paleogene” (Scheibner in Buday et al. 1968, Birkenmajer 1956, 1965, 1970, Potfaj in Žec et al. 1997, Potfaj et al. 1991, 1993, Potfaj 1997).

Taking into account the paleogeographic configuration of the land-masses and ocean-basins, their geological arrangement and marine paleocurrent system, we should rather search for the source of serpentinite detritus in the sandstones of the Huty Formation somewhere on the southern continent. The small ultrabasic body near Sedlice is out of question, because its age is, according to Marschalko (1962), much younger. Larger southern land-mass source is indicated also by the pollen spectra identified from the Šambron Beds (Snopková 1989). In addition, organic carbon analyses of the Inner Carpathian Paleogene sediments testify that the organic matter was derived from dry-land higher plants (Masaryk et al. 1995).

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Comments on the article „Neogene tectono-sedimentary megacycles in the Western Carpathians basins, their biostratigraphy and paleoclimatology“ by the authors N. Hudáčková, M. Kováč, V. Sitár, R. Pipík, K. Zagoršek & A. Zlinská

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In the Slovak Geological Magazine No 3-4/96 among the articles summarizing the results of investigations carried out under the Project of Geodynamic Development of the Western Carpathians is a paper by Hudáčková et al. As leader of the Problem No 5. „Geodynamic Development of the Carpathian arc in the Neogene“ of the above mentioned Project I had the possibility to study the manuscript of the article, before publishing. I called attention of the authors to some shortages and provided references of papers to help them made correct or at least confront their views with opinion of other authors. It has not happened so, therefore I use the possibility for critical remarks to the concerned article.

The authors rather avoid to use the lithostratigraphical names, manifesting rigidity, proper to many Slovak geologists,

to the Anglo-Saxon system of geological terminology, which however, was codified by Hedberg et al., on the one hand and in the Code of Czechoslovak Stratigraphical Terminology on the other hand (Chlupáč et al., 1968), which is till now obligatory for the Slovak geological community. Unfortunately, it is not so, what does not contribute to the good name of Slovak geology. Therefore in the article the formations are characterized and/or designated by long descriptive names, as for instance their „Ottangian deposits of terrestrial or lake sediments without foraminifera“, corresponding to the Bukovinka Formation in present lithostratigraphical terminology. This formation is assigned by the authors to the Ottangian, based on older studies by Čechovič (1952), Vass et al., (1979). More recent studies show that this formation is Eggenburgian in age as