



New data on the age of the Polaten Formation in Central Balkan Mountains

Нови данни за възрастта на Полатенската свита в Средна Стара планина

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Introduction

The review of the regional stratigraphy of the Middle Jurassic rocks in West and Central Bulgaria by Sapunov and Tchoumatchenco (1989) provided a scheme whereby the total chronostratigraphic extent of the Polaten Formation in the exposures between the town of Etropole (Yamna Ridge) and the Cherni Osam River valley (Trojan Mt) (Central Balkan Mts) ranges from the upper part of the Lower Bajocian to unspecified part of the Upper Bathonian. Based on scattered ammonite findings and the distinctive development of the upper limit of the Polaten Formation in this area, these authors motivated a rapid eastwards reduction of its age from the top due to a submarine washout. Thus the age of the Polaten Formation to the east of the Cherna Reka River valley (Teteven Region) was assumed to be merely Bajocian. This view was later adopted in drawing up of the geological map in scale 1: 100 000 (i.e. Cheshitev et al., 1994; Sapunov, Tchoumatchenco in: Cheshitev et al., 1995). During the last mapping in the area outlined above, we confirmed the opinion of Sapunov and Tchoumatchenco (1989), at least with regard to the upper boundary of the Polaten Formation to the west of the Cherna Reka River. This was achieved by the discovery of an Upper Bathonian ammonite field associated with the very top of the formation near the Chertigrad Summit (Yamna Ridge) (Fig. 1a, b). Eastwards, in the Trojan Mountain, we found, however, another new locality with the same stratigraphic position and almost the same age (Fig. 1c, d). The ammonites from this locality, called Chaushov Dol, clearly revealed wider extent of the Polaten Formation in this area than assumed earlier. The aim of this study is to give the newly obtained evidence, as it alters the older stratigraphic point of view, and moreover that it includes ammonite species unknown from the Upper Bathonian in Bulgaria so far.

Results and discussion

The studied ammonite localities refer to the last few centimetres to a few decimetres of the Polaten Formation, which are overlaid by thinly developed pelagic micritic limestones of the Yavorets Formation (Fig. 1b, d). These deposits correspond to locally preserved and disrupted beds of dark grey, sandy-bioclastic (crinoidal) limestones, comprising commonly well-rounded quartz pebbles and angular phosphate grains, common belemnite rostra, and scattered brachiopods and ammonites. Another noteworthy feature of these sediments are the varied allochems (mostly crinoids, but also fragmentary bivalves, bryozoans, echinoderms and foraminifers, micritic peloids and intraclasts, as well as fine-grained and subrounded quartz, feldspars and lithoclasts of less value). The ammonites from both fields occur as sufficiently well-preserved internal moulds of wholly-septates of various sizes and morphologies, as well as clustered, crushed and phosphatized smaller shells. No signs of bioerosion and encrustation were observed. The contents of the ammonite associations imply significant taphonomic condensation due to prolonged fossil concentration. But since there is no textural or compositional difference between the ammonite moulds and the surrounding sediments, the ammonites can be defined as coeval with the host rocks. Therefore, they are reliable source for the dating of the topmost parts of the Polaten Formation.

The locality near the Chertigrad Summit yielded common small planulates of the subgenus *Homoeoplanulites* (*Homoeoplanulites*) from which we recognized *H. (H.)* aff. *ybbsensis* (Jussen) and *H. (H.)* gr. *acuticostatus* (Roemer), and a few oxycones referred to *Prohecticoceras* aff. *blanzense* (Elmi). The Chaushov Dol locality delivered more varied fauna, including a distinct *Procerites* pavement by *Procerites (P.) mirabilis* (Arkell), attaining big sizes,

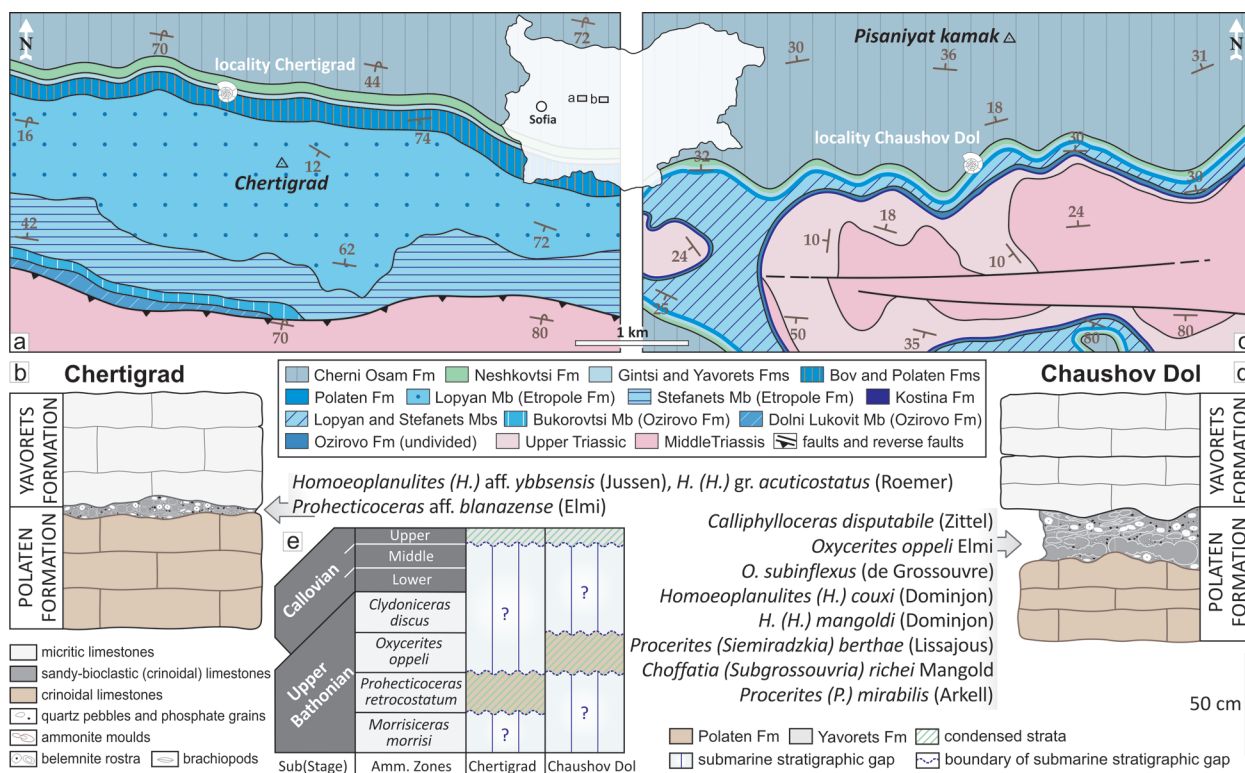


Fig. 1. Upper Bathonian ammonite-bearing beds from Central Balkan Mts (Bulgaria) *a*, location map of locality Chertigrad; *b*, simplified column of the same locality; *c*, location map of locality Chaushov Dol (courtesy of A. Radulov); *d*, simplified column of the same locality; *e*, summarized correlation scheme of the studied Upper Bathonian ammonite localities. Identified species are arranged according to the original positions of the specimens into the beds.

common medium-sized *Procerites* (*Siemiradzka*) *berthae* (Lissajous) and *Procerites* (*Siemiradzka*) spp., large oxycones of *Oxycerites oppeli* Elmi and *O. subinflexus* (de Grossouvre), several complete adults of *Choffatia* (*Subgrossouvria*) *richei* Mangold, small planulates of *Homoeoplanulites* (*H.*) *couxi* (Dominjon) and *H. (H.) mangoldi* (Dominjon), and a single *Calliphylloceras disputabile* (Zittel). As seen from the listed identified species, both associations contain valuable Upper Bathonian species, which allowed the locality near the Chertigrad Summit to be considered as an indication of the *Prohecticoceras retrocostatum* Zone, whereas the Chaushov Dol locality definitely refers to the *Oxycerites oppeli* Zone. Hence the conclusion that despite being generally coeval, the two fields analyzed differ in age, as the former precedes in time the latter. On the other hand, the lack of ammonite record older than *P. retrocostatum* and younger than *O. oppeli* Zones suggests the absence of the base and the top of the Upper Bathonian (Fig. 1e). Since we do not have ammonites from levels lower than the ammonite-bearing beds of the fields studied, we are not able to evaluate whether the gap of the lowermost Upper Bathonian is bracketed in this level or extends from below. From above, it is clear that there is no record from the topmost Bathonian approximately up to the base of the Upper Callovian (Sapunov, Tchoumatchenco in: Cheshitev et al., 1995). This ma-

ior discontinuity is well-documented in the literature, and an overall shallowing up trend on a regional scale was adopted (Sapunov, Tchoumatchenco, 1989), but we believe that it is rather a contrary eustatic signal. The above considered cases of condensation revealed an appearance through mechanical concentration, limited by periods of low or no sedimentary influx. The condensations were produced by combined winnowing/sieving processes, during an episode of sea-level rise, as stated by Fels and Seyfried (1993) on similar examples from the Jurassic in Subbetic Plateau (SE Spain).

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