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Tithonian–early Berriasian perisphinctoid ammonites from the Štramberk Limestone at Kotouč Quarry near Štramberk, Outer Western Carpathians (Czech Republic)

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ABSTRACT

The present contribution deals with the taxonomy of 11 species of perisphinctoid ammonite recovered recently from the Štramberk Limestone as exposed at the Kotouč Quarry (Štramberk, Moravia). The majority of these are described from this unit for the first time. In the stratigraphic evaluation, finds of ammonites from other localities within the quarry, which were published by us in 2013 and 2014, are included. Ammonites recorded from beyond the continuous section document a stratigraphic range from upper lower Tithonian to lower Berriasian inclusive. In addition to taxonomy and new ontogenetic data of some species, we also present information on the distribution of species recognised and on their palaeogeographic distribution, as well as data on the structural composition of the Homole Block at Kotouč Quarry.

1. Introduction

Since the beginning of historical collecting, the Štramberk Limestone has been famous for the abundance of fossils, amongst which ammonites represent a significant portion. Fossils are deposited in many museums, above all in the Moravian-Silesian region (Czech Republic), at Vienna (Austria) and at Munich (Germany). The Štramberk Limestone has always been assumed to be of Tithonian age. Old collections often lack details of provenance, and museum labels merely state 'Štramberk' or 'Štramberk Limestone'.

Recently, we, together with local collectors, have focused on the collection of ammonites from the active Kotouč Quarry (Fig. 1), in the part designated as the Homole Block (Fig. 2). Our new finds from quarry faces at different exploitation levels have been marked by GPS data. At the quarry, ammonites are comparatively sporadic and found more or less by chance. Exceptions are finds from the so-called soft layers on Level 8 and from the lower Berriasian limestones, from which ammonite associations are known. The larger part of our collection of early Berriasian ammonites and a smaller number of Tithonian ones have been published recently (Vašíček et al., 2013; Vašíček & Skupien, 2013, 2014).

The present paper deals with the taxonomy of the newly collected material that is assigned to eleven species, originating from 11 exactly localised points on six quarry levels, none of them in the stratified section. Tithonian finds stem from unstratified limestones; where early Berriasian limestones are concerned, stratification can usually be found.

For identification of our ammonite collection we have visited accessible museum holdings in the Nový Jičín Regional Museum, the Museum of Ostrava in the town Ostrava, the Museum Fojtství in Kopřivnice, the Remeš Collection at the Faculty of Science of Charles University in Prague and the partially accessible Silesian Museum in Opava. To facilitate our comparative study, we have been allowed to borrow part of these lots. Moreover, one of us (ZV) visited the Bayerische Staatssammlung für Paläontologie und historische Geologie (Ludwig-Maximilian University, Munich) in 2014 and 2015, in order to assess the originals of ammonite records from Štramberk by von Zittel (1868), as well as the Natural History Museum at Vienna in 2015, where the Blaschke (1911) collection of fossils is held, and the depository of fossils at the Geological Survey of Austria, Vienna.

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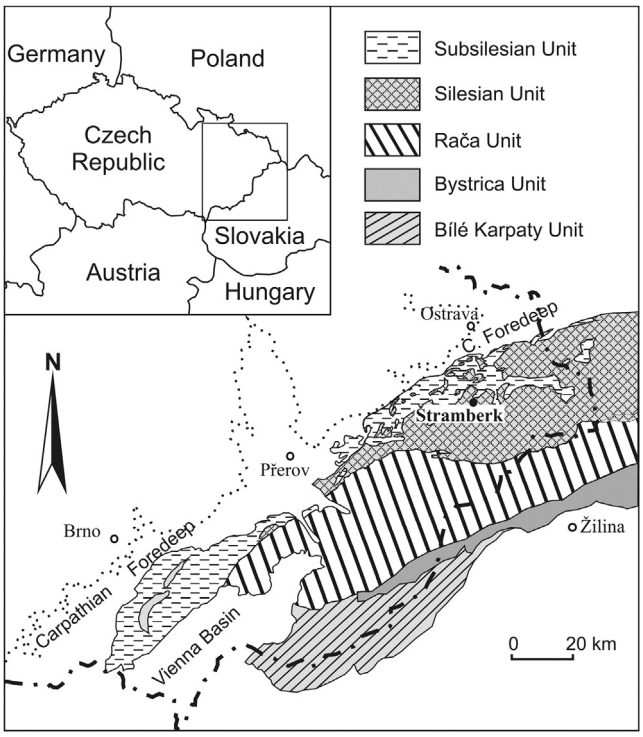

Fig. 1. Tectonic map of the Outer Western Carpathian area of the Czech Republic (after Skupien & Smaržová, 2011).

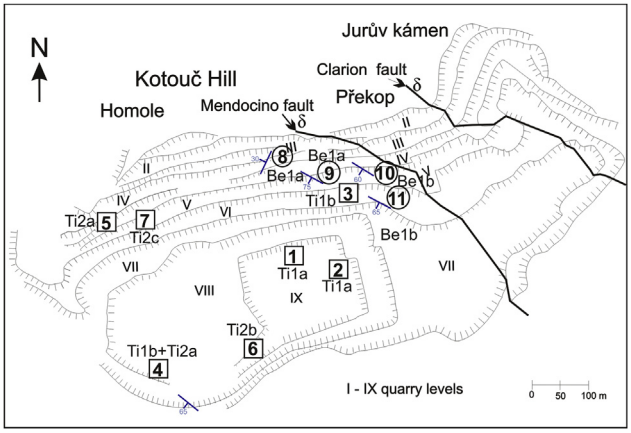

Fig. 2. Location and age of finds of Tithonian (squares) and Berriasian (circles) ammonites at Kotouč Quarry. Ti1a – lower part of early Tithonian, Ti1b – higher early Tithonian, Ti2a – basal part of late Tithonian, Ti2b – higher part of late Tithonian, Ti2c – uppermost part of late Tithonian, Be1a – basal part of the early Berriasian, Be1b – upper part of the early Berriasian.

2. Geological setting

The Štramberk Limestone is exposed at several quarries (Kotouč, Municipal, Horní Skalka and Castle Hill) in the immediate vicinity of the town of Štramberk (Figs. 1 and 2), in the form of carbonate megablocks (in a wide range of sizes), breccias and conglomerates. The Štramberk Limestone represents sediments that formed on a carbonate platform during the latest Jurassic and earliest Cretaceous, along the northern Tethyan margin in the area of the Outer Western Carpathians. The block accumulations of the Štramberk Limestone form part of the continental-rise sediments of the Baška Facies in the Silesian Unit, deposited in the flysch trough of the Baška Subunit (for more details, see Picha et al., 2006).

The geology of the Štramberk area and the nature of the megablocks have been the subject of a long-standing controversy. Houša (1990) interpreted the carbonate blocks as tectonic klippen which separated from the carbonate platform during the Silesian Nappe overthrust movements. According to Eliáš and Stráník (1963), Eliáš (1970) and Eliáš and Eliášová (1986), the limestones are embedded in base-of-slope conglomerates and slump bodies within the Cretaceous part of the Hradiště Formation, constituting an extreme development of the Chlebovice Conglomerate. More likely is that this accumulation was repeated several times between the Tithonian and Turonian (see Svobodová et al., 2004, 2011; Vašíček & Skupien, 2014).

According to Picha et al. (2006), the Štramberk carbonate platform, rimmed by coral reefs, was the source of the clastics and of large fragments of the carbonate body, later created by a combination of mass movement and tectonic activity. Gravitational slides and turbidity currents transported both small and large blocks and fragments of limestones from the edge of the platform to the bottom of the adjacent basin. However, during the course of later (Neogene) tectonic thrusting of the nappe, large tectonic pieces of the carbonate platform were separated from the softer, less resistant rocks situated on the slopes of the platform. The result is a melange, in which larger blocks from the carbonate platform are reminiscent of the characteristics of klippen. The smaller blocks and debris correspond to clastic sediments at the foot of the platform. These developed in the Early Cretaceous and the earliest part of the Late Cretaceous, in particular.

Traditionally, the Štramberk Limestone was assumed to be of Tithonian age, which may be the correct date for the main stage of reef development. Houša, without detailed justification, was of the opinion that the Štramberk Limestone had already originated during the latest Kimmeridgian (e.g., Houša, 1990; Houša *in*; Houša & Vašíček, 2004). Calpionellid zonation (Houša *in* Houša & Vašíček, 2004) and ammonites (Vašíček et al., 2013; Vašíček & Skupien, 2013, 2014) from the limestone bodies are indicative of the higher part of lower Tithonian, the entire upper Tithonian and the lowermost Berriasian.

3. List of fossiliferous localities at Kotouč Quarry

The list of localities (Fig. 2; Table 1) is arranged from oldest to youngest:

1. The first site is situated in the middle part of the northern slope of Level 9 (GPS 49°34′56.9″N, 18°6′58.1″E). Specimens were collected from debris after blasting in June 2013 (locality 1 in Fig. 2). Macroscopically, sediments consist of greyish, massive and finely detrital limestones. In one block of limestone, two ammonites were found. The accompanying fauna comprises fine coral and bivalve debris.
2. The second site is situated in the northernmost part of the eastern slope of Level 9 (GPS 49°34′57.5″N, 18°7′1.2″E), near a cleft filled with dark claystones of the Plaňava Formation (locality 2 in Fig. 2). Specimens were collected from debris after blasting in June 2012. Macroscopically, sediments consist of greyish, massive and finely detrital limestones. In one block of limestone two ammonites were encountered. The accompanying fauna consists of fine debris of corals and bivalves.
3. The third locality is situated on Level 6 (GPS 49°35′0.5″N, 18°6′57.1″E). Two ammonites were found in debris after blasting in November 2013 (locality 3 in Fig. 2). Macroscopically, the limestones are white, finely to coarsely detrital and disintegrated. This locality is rich in associated fauna, mainly corals, bivalves, gastropods and crabs. Signs of reworking and