

***Gyronautilus*, a new genus of Triassic Nautilida from South Primorye, Russia**

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Received 25 April 2000; Revised manuscript accepted 10 August 2000

Abstract. A new genus of Triassic Nautilida, *Gyronautilus*, is proposed for material from the Lower Triassic of South Primorye, Russia. The new genus differs from previous known genera of the family Grypoceratidae by its gyroconic shell with subrectangular whorl sections and a near-marginal siphuncle. A new subfamily, *Gyronautilinae*, within the Grypoceratidae is also proposed.

Key words: Early Triassic, *Gyronautilus*, Nautilida, Olenekian, South Primorye

Introduction

The Triassic deposits in South Primorye, Far East of Russia, yield well-preserved nautilids, some of which species have been described by previous authors (Diener, 1895; Kiparisova, 1954, 1961; Zakharov, 1978). *Syringoceras praevolutum* was proposed by Kiparisova (1961) on the basis of a single small specimen collected by N.K. Trifonov in 1948 from the Lower Triassic of the Abrek Bay area, about 45 km southeast of Vladivostok. The exact locality and horizon of the specimen were not described, but recently we found a large and complete specimen identified as *S. praevolutum* from the type locality (Figure 1). In this paper we describe the early to adult features of the species, and propose a new subfamily and genus based on the specimen.

The specimen utilized herein is deposited in the National Science Museum, Tokyo (NSM).

Note on Stratigraphy

The Lower Triassic strata exposed along the eastern coast of Abrek Bay are lithostratigraphically divided into two formations, the Lazurnaya Bay and Zhitkov Formations in upward sequence, as defined by Zakharov (1996, 1997) along the shore of Lazurnaya (= Shamara) Bay and the east coast of Russian Island near Vladivostok.

The Lazurnaya Bay Formation unconformably overlies the Permian Abrek Formation and consists of basal conglomerate and gray, fine-grained, bedded sandstone with lenses of coquinooid calcareous sandstone. Its thickness is 57.9 m in the section surveyed. It contains the ammonoids *Gyronites*

subdharmaus Kiparisova and *Koninckites?* sp., the brachiopod *Lingula* sp., the bivalves *Promyalina vetusta* Bencke and *Eumorphotis multiformis* (Bittner) in the middle part, and the cephalopods *Hedenstroemia* sp., *Meekoceras boreale* Diener, *M. subcristatum* Kiparisova, *Ambites* sp. indet., and *Gyronautilus praevolutum* (Kiparisova), as well as the brachiopods *Abrekia sulcata* Dagens and *Lingula borealis* Bitner in the upper part (Zakharov and Popov, 1999). These fossils suggest the Upper Induan in the middle part and the Lower Olenekian (lower part of the *Hedenstroemia bosphorensis* Zone) in the upper part of the formation. The Induan/Olenekian boundary is located at 55 m above the base of the formation.

The overlying Zhitkov Formation consists mainly of dark grey siltstone with calcareous nodules and intercalations of fine-grained sandstone. The formation is more than 87.3 m thick in the section studied. The ammonoids *Inyoites spicini* Zakharov, *Parahedenstroemia conspicienda* Zakharov, *Prosphingitoides magnumbilicatus* (Kiparisova), *Dieneroceras* sp., *Meekoceras boreale* Diener, *M. subcristatum* Kiparisova, *Koninckites* aff. *timorense* Wanner, *K. varaha* (Diener), *Arctoceras septentrionale* (Diener), and *Flemingites* sp., as well as the bivalves *Phaedrysmocheilus* sp. and *Promyalina putiatinensis* (Kiparisova) were found in the lower part of the formation, suggesting an early Olenekian age (upper part of the *Hedenstroemia bosphorensis* Zone).

Paleontological description

Order Nautilida Agassiz, 1847
Superfamily Trigonocerataceae Hyatt, 1884
Family Grypoceratidae Hyatt in Zittel, 1900

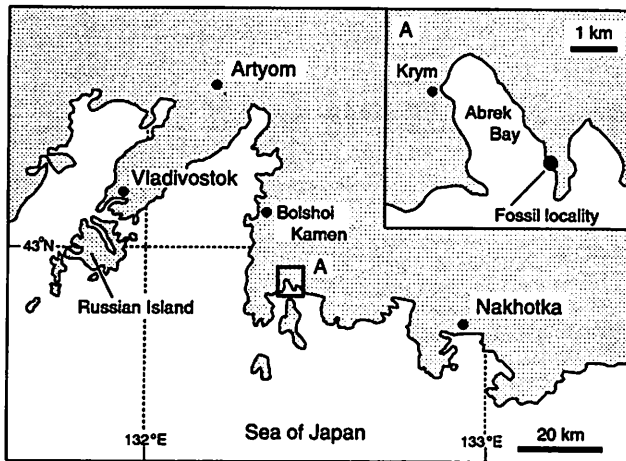


Figure 1. Map showing the fossil locality in South Primorye, Far East Russia.

Subfamily Gyronautiliinae, subf. nov.

Diagnosis.—Gyroconic shell with flattened venter. Suture with distinct ventral and lateral lobes.

Composition.—One genus: *Gyronautilus* Zakharov and Shigeta.

Remarks.—Kiparisova (1961) described "*Syringoceras*" *praevolutum* in 1961 from the Lower Triassic of South Primorye and included it in the family Syringonautiliidae. Shimansky (1962) recognized four subfamilies in the family Grypoceratidae: Domatoceratinae, Grypoceratinae, Syringonautiliinae and Clymenonautiliinae. During our investigation of Kiparisova's species we experienced problems with determination of its subfamily assignment, and concluded that it seems to be a representative of a new, previously unknown subfamily of the family Grypoceratidae. However, the nomenclatural and taxonomic history around the type genus of Grypoceratidae, *Grypoceras* Hyatt, 1883 is very complicated (T. Engeser, 2000, personal communication) and was not completely correctly investigated by Engeser and Reitner (1992).

Distribution.—Lower Triassic in South Primorye, Russia.

Genus *Gyronautilus*, gen. nov.

Type species.—*Gyronautilus praevolutum* (Kiparisova).

Diagnosis.—Gyroconic shell with subrectangular whorl-sections and a near-marginal siphuncle. Suture with shallow ventral lobe, broad lateral lobe, and deep dorsal lobe.

Discussion.—The new genus is discussed with *Gyronautilus praevolutum*.

Geological distribution.—Lower Olenekian.

Gyronautilus praevolutum (Kiparisova, 1961)

Figures 2–4

Syringoceras praevolutum Kiparisova, 1961, p.25, pl.4, fig. 2.

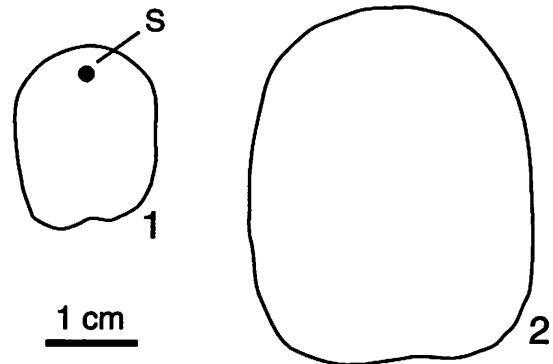


Figure 2. Whorl cross sections of *Gyronautilus praevolutum* (Kiparisova), NSM PM16132, at whorl height of 18.0 mm (1) and 39.3 mm (2). S: siphuncle.



Figure 3. Suture line of *Gyronautilus praevolutum* (Kiparisova), NSM PM16132, at whorl height of 25 mm.

Holotype.—CGM 12/5504 figured by Kiparisova (1961, pl.4, fig.2) from the Lower Triassic (Olenekian?) of Abrek Bay in South Primorye, Russia.

Material.—One specimen, NSM PM16132.

Description.—Shell moderately large, reaching 92.6 mm in diameter, rapidly expanding gyroconic conch, consisting of 1.7 whorls. Embryonic shell 18.2 mm long, exogastrically curved, consisting of 0.4 whorl, attaining 7.4 mm height and 7.0 mm width at nepionic constriction. First whorl subquadrate in cross section, with near-marginal siphuncle, attaining 18.1 mm height and 14.7 mm width; umbilical opening 8.2–13.4 mm across. Adult whorl subrectangular in cross-section with rounded-inflated venter, well-rounded shoulder and concave dorsal side, with near-marginal siphuncle, attaining 39.7 mm height and 36.1 mm width at last septum. Body chamber partly preserved, attaining 45.2 mm height and 36.6 mm width at adoral end. Shell surface not preserved. Suture consisting of shallow ventral lobe, broad lateral lobe, and deep dorsal lobe.

Discussion.—Kiparisova described the only previously known middle stage of *Gyronautilus praevolutum* on the basis of a fragment of the phragmocone reaching 17.0 mm height and 15.0 mm width at the last septum. The specimen described herein is a large and nearly complete one from the embryonic shell to a part of the adult body chamber. Characteristic features described by Kiparisova (1961) are also observed in the middle stage of specimen NSM PM16132.

Gyronautilus praevolutum is placed within the family Grypoceratidae because of its flattened venter and suture with ventral and lateral lobes. Among the previously de-

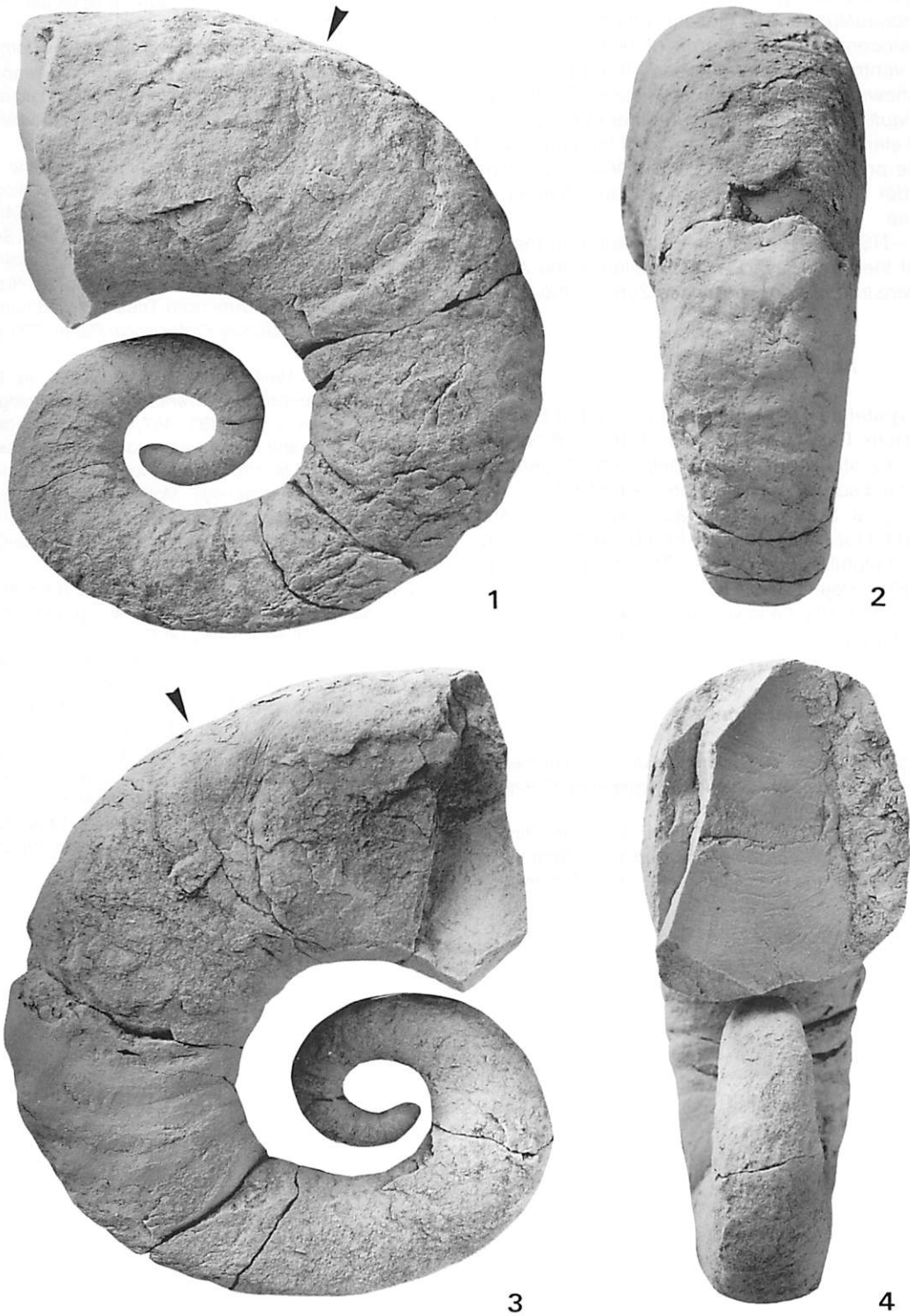


Figure 4. *Gyronautilus praevolutum* (Kiparisova), NSM PM16132. Right lateral (1), back (2), left lateral (3) and frontal (4) views, x1.0. Arrow marks indicate the position of the preserved last septum.

scribed genera of the family, the shape of the conch and the suture of *Gyronautilus* show closest affinities with the Permian *Domatoceras*. The sutures of both are similar, with rounded ventral and lateral lobes (Kummel, 1964). *Gyronautilus* shows some affinities to Triassic *Grypoceras* and *Menuthionautilus*, but the latter two differ in the proportions of sutural elements, in general forms of the conch, and in the siphuncle position (Kummel, 1953, 1964). It seems best to consider that *Gyronautilinae* is an offshoot of *Domatoceratinae*.

Occurrence.—NSM PM16132 was collected from the uppermost part of the Lazurnaya Bay Formation in the Abrek Bay area, *Hedenstroemia bosphorenses* Zone of the Lower Olenekian.

Acknowledgments

We are very grateful to A. M. Popov (Federal Far Eastern Geological Institute, Far Eastern Branch, Russian Academy of Science, Vladivostok) for his kind help and cooperation throughout the field survey. Thanks are extended to J. W. Haggart (Geological Survey of Canada, Vancouver) and T. Engeser (Institut für Paläontologie, Frei Universität Berlin, Berlin) for their helpful suggestions. This study was supported by RFBR Project (no. 97-05-65832) to Y. D. Zakharov and the JSPS Fellowships for research in NIS countries and Grant-In-Aid for Scientific Research from JSPS (No. 12440141 for 2000) to Y. Shigeta.

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