The Fauna of the Abrek Bay (Far East Russia): A New Window to the Aftermath of the End-Permian Mass Extinction Event

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Book review

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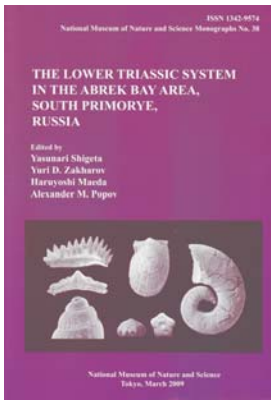

Shigeta, Y., Zakaharov, Y. D., Maeda, H., and Popov, A. M. (eds.) 2009. *The Lower Triassic System in the Abrek Bay area, South Primorye, Russia*. 218+vii pp. National Museum of Nature and Science Monographs 38, Tokyo. ISSN 1342-9574.

An important Early Triassic fauna from Far East Russia (South Primorye) has recently been reported. Faunas from the aftermath of the end-Permian mass extinction event are most important for our understanding of the extinction and the recovery process. Early Triassic marine faunas are commonly of low diversity and the material is poorly preserved. The fauna from the Abrek Bay area reported by a team of palaeontologists is very diverse for Early Triassic standards and it consists of relatively well-preserved material. The fossil material has been recovered by a Japanese/Russian team during a research program which initiated in 1998. Thirteen contributors from Japan, Russia, and Poland studied the fauna, facies, and stratigraphy of this important occurrence.

The first 43 pages of the study treat the geological setting including stratigraphy, palaeogeography, and depositional environment; moreover some important aspects of the fauna are highlighted. The exposed sections comprise the Lazurnaya Bay and the Zhitkov Formations which range from the Griesbachian to the Smithian. Detailed well-documented sections are given including sedimentological data and well-documented fossil occurrence data. South Primorye was situated at the eastern margin of the Khanka Block which was probably situated in middle northern latitudes during the Early Triassic. The Lower Triassic sediments of South Primorye are predominantly clastic (sand- and mudstones) and represent various depositional environments. The fossils, especially the ammonites, were commonly transported into deeper, anoxic settings by mass flows, e.g., by turbidity currents. The background sediments are not very fossiliferous. The stratigraphy of the fossiliferous units is well-established based on rich conodont and ammonite faunas. Moreover, the age of detrital monazites have been determined.

The largest part of the study treats the systematic paleontology (pp. 44–202). The fauna is strongly dominated by molluscs, especially by cephalopods (ammonites and nautiloids), bivalves, and gastropods. Moreover, brachiopods, a crinoid, conodonts, teeth and scales of fish and sharks, and a possible marine reptile bone are treated. About 100 taxa are reported, many of them in open nomenclature. All new taxa belong to Cephalopoda and Gastropoda (7 new ammonite genera and 1 new gastropod genus). 16 new species are described (3 nautiloid, 9 ammonoid, and 4 gastropod species).

The nautiloid fauna consists of one straight and 5 coiled species, mostly from the Griesbachian to early Dienerian (some with nicely preserved embryonic shells); these occurrences contribute significantly to our understanding of the recovery of this group. The ammonite fauna is very rich. Ammonites are present throughout the section; most species are restricted to a single sampling interval. The bivalve fauna comprises 17 species with typical Early Triassic genera such as *Unionites*, *Promyalina*, and *Claraia*. 9 gastropod species are present, most are from the Griesbachian and Dienerian. They are very well preserved including protoconchs which is very rare in the Early Triassic. Two bellerophontoids are especially abundant and underline the significance of the Dead Clade Walking phenomenon. A single scaphopod taxon is reported from the Dienerian. 8 brachiopod species are present: 2 inarticulates and 6 articulates (Rhynchonellida). Some of them are new but were preliminarily treated in open nomenclature. They are rather small as is usual for the Early Triassic brachiopods. Most brachiopod species occur in the Griesbachian (all co-occur in sampling level 1004). Several columnalia of the crinoid genus *Holocrinus* were reported from the early Smithian. This is the oldest occurrence of a post-Palaeozoic articulate crinoid and represents important new information for the timing of the recovery of this group. 15 conodont taxa are listed. The conodont material is well-preserved so that the stratigraphy rests on firm ground. Finally, several vertebrate remains are reported.

All taxa are well illustrated and described. Detailed stratigraphic information is provided for their occurrence. Therefore, the Abrek fauna is one best documented Early Triassic faunas in the world. This is most important for the timing of recovery. Another remarkable feature of the Abrek fauna is the very high diversity of this fauna when compared with other Early Triassic faunas. For instance, in the Griesbachian sample level 1010, 15 gastropod and bivalve species co-occur—probably the richest benthic community ever reported from the Griesbachian. In addition, 6 cephalopod species are present in this horizon. Another remarkable feature is the strong mollusc dominance. However, the presence of articulate brachiopods and crinoids, both severely hit by the extinction, are also most interesting. Some more work on the palaeoecology and diversity, e.g., sample standardized comparisons with other faunas would have been nice.

The present monograph will be a standard reference for future studies on the consequences of the end-Permian extinction and the subsequent recovery.

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