Conodonts and other microfossils from the Omi Limestone of the Akiyoahi Belt, Niigata Prefecture

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Although pelagic seas occupy the widest biosphere on earth, we have limited information concerning the Paleozoic ecosystem in the pelagic sea environment. We are now conducting a study to clarify the late Paleozoic ecosystem in pelagic sea environments using microfossils, including conodonts, foraminifers, ostracods, and others. Here we present our preliminary results on the microfossils obtained from the Omi Limestone of the Akiyoshi belt, Niigata Prefecture. The Akiyoshi belt is an accretionary complex that formed in the Permian period. It has a sporadic distribution from northern Kyushu (Fukuoka Prefecture) to the northern part of central Honshu (Niigata Prefecture) (Kanmera et al., 1990). The Akiyoshi belt is characterized by the presence of huge limestone blocks associated with basaltic rocks, which are inferred to have accumulated on a seamount. These limestone blocks are generally massive with no clear stratification and a complete lack of coarse quartz grains (Sano and Kanmera, 1991), which means that deposition occurred at a great distance from the continents. Seamounts are gradually sinking because of cooling of oceanic plates, and associated biota are growing upward to maintain their optimal environmental conditions. Therefore, seamount limestones are presumed to have a record of environmental and biotic changes over the last 100 ma, from the Early Carboniferous to the Middle Permian period. Based on their lithological and biostratigraphical characteristics, these limestones were generally constructed by reef builders, such as corals, bryozoans, algae, brachiopods, ammonites, and others. The organic reef has topographically diversified environments, such as the outer and inner reef, and various species are associated with each environment (Kitsukawa, 1994).

The Omi Limestone is located around the Omi Town, Niigata Prefecture, which is the most northeastern extension of the Akiyoshi belt. It is distributed along the Omi River with a length of approximately 8 km and a width of approximately 2 km (Nagamori et al., 2010). Many previous paleontological investigations have been conducted on the microfossils of the Omni Limestone, including foraminifers (Igo, 1960; Watanabe, 1973; Kobayashi, 1988; Ueno and Nakazawa, 1993), conodonts (Igo and Koike, 1964; Watanabe, 1975), corals (Rowett and Minato, 1968; Yoshida et al., 1987; Yoshida and Okimura, 1992; Niko and Hasegawa, 2000; Niikawa, 2001), brachiopods (Hayasaka, 1918; Tazawa et al., 1983; Tazawa et al., 2004), bryozoans (Sakagami, 1962, 1963), conuralia (Makiguchi, 1993), and others. This aim of this study was to re-examine the conodont biostratigraphy and investigate the Late Paleozoic microfossil fauna recovered from the limestone using the acetic acid method. Limestone samples were systematically collected from the Tomi (Myojyou Cement Co., Ltd.) and Omni mines (Denkikagaku Kogyo Co., Ltd.).

We recovered conodonts, fish teeth, ostracods, smaller foraminifers, bryozoans, sea urchin spines, holothurian sclerites, calcareous algae, and other unidentified fossils. The following conodont genera, indicative of the late Carboniferous Bashkirian–Moscovian time scale, were identified: *Declinognathodus*, *Idiognathoids*, *Idiognathodus*, *Streptognathodus*, *Neognathodus*, *Mesogondolella*, and others. With respect to the limestone lithology, limemudstone and grainstone predominated based on the thin section analysis. Lime mudstone consists of very fine calcareous mud and often contains fossil fragments. Grain stone is characterized by a concentration of fragments and ooids within a sparitic matrix. As these lithological microfacies are continuously observed laterally and stratigraphically, these limestones seem to have been deposited in a back reef environment during the late Carboniferous period. This indicates that the microbiota were diversified in pelagic back

reef environments during this time.

Keywords: microfossil, Paleozoic Era, Akiyoshi Belt, Omi Limestone, conodont

