BASHKIRIAN TO ARTINSKIAN FUSULINIDS OF A LOST CARBONATE PLATFORM IN THE JURASSIC ACCRETIONARY COMPLEX OF JAPAN

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There are two types of Paleozoic limestone in Japan: continental margin shallow water limestone and pelagic shallow water limestone in Panthalassa. The former is distributed throughout the Kuma Formation (within the Kurosegawa tectonic belt), the Maizuru belt, the Hida marginal belt and the South Kitakami belt. On the other hand, the latter, accumulated at the top of a seamount of Panthalassa, is distributed as block among the Permian accretionary complex (Akiyoshi) belt, and Jurassic accretionary complex (Mino-Tamba-Ashio belt).

Many limestone blocks of the Permian accretionary complex, e.g. the Akiyoshi limestone Group (Late Tournaisian – Capitanian) [Ozawa, Kobayashi, 1990; Toriyama, 1967], are large and span a long stratigraphic range from the Carboniferous to the Permian. In contrast, there is a clear difference between the occurrence of the Carboniferous limestone mass and that of the Permian limestone mass within the Jurassic accretionary complex [Sano, Kojima, 2000]. The limestone blocks in the Jurassic accretionary complex are distributed unevenly, and do not continuously span a long time range from the Carboniferous to the Permian.

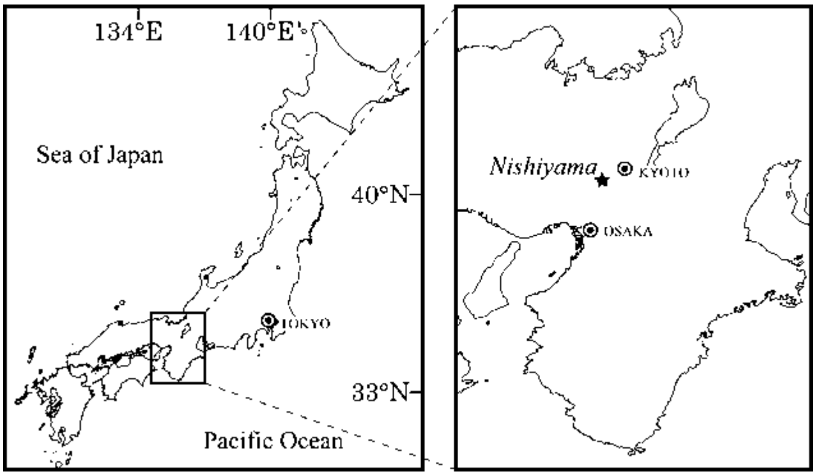
Limestone blocks of the Jurassic accretionary complex have been divided into Permian and Carboniferous. The Permian limestone blocks consist of large scale slabs accompanied by greenstone of probably sea-plateau basalt origin [Koizumi et al., 2006] and are obviously larger than the Carboniferous ones. Their deposition started at the Sakmarian or the Late Artinskian [Sano, Kojima, 2000]. On the other hand, the Carboniferous limestone blocks are distinctly smaller than the Permian and are not accompanied by greenstone. Their fossils show a short and/or discontinuous time range.

The Jurassic accretionary complex often contains limestone breccias which are classified into three types: 1. those formed by large-scale collapse of the seamount at the accretionary point [Sano, Kanmera, 1991]; 2. large-scale collapse of an unstable seamount split caused by cooling joints or faults before accretion [Yamagata, 2000]; and 3. gravity flow on the seamount slope [Sano, 1988]. Previous work on limestone breccias has focused on those for which "hinterlands of gravels of limestone breccias" are located nearby. However, there are many localities of limestone breccias for which no "hinterland" can be assigned. These "unknown limestone breccias" occur in many places within the Tamba belt belonging the Jurassic accretionary complex in Japan. We studied several of these "unknown limestone breccias" in the Tamba belt and found that these might be a gravity flow deposit in the outer apron of fairly large "carbonate platform".

Limestone breccias of the present study crop out in the Tano complex, Jurassic accretionary complex, of the Western hills of Kyoto, at a place called Nishiyama (Fig. 1). In the Southern Konzo-ji, Iwakuragawa and Nakahata regions of Nishiyama, olistoliths containing the limestone breccia crop out. Description of the lithology at these three sections is as follows in ascending order. The Iwakuragawa section is composed of dolostone, chert, clast to matrix-supported limestone breccia, chert, pebbly dolostone and chert, the Nakahata section of clast-supported limestone breccia, chert and pebbly dolostone, the Southern Konzo-ji outcrop of limestone breccia and chert. The limestone breccias are composed of limestone gravels without terrigenous matter, basaltic gravels and clay matrices. Limestone gravels are thus considered to have originally derived from pelagic shallow water limestone.

The limestone breccias yielded fusulinids of 52 species in 20 genera. Similarities of lithofacies and fusulinids contained in three outcrops within a short distance indicate that these olistoliths might have been derived from the same source material. These fusulinids are contemporaneous or younger than *Profusulinella*

Fig. 1. Index map of study area



in age and, as a whole, cover the whole time range from the Late Bashkirian to the Middle to Late Artinskian (Figs. 2, 3). A Permian radiolarian, *Pseudoalbaillella* sp. and a conodont, *Diplognathodus*? sp., also occurred in the chert of the Nakahata outcrop.

The limestone breccias in the Nishiyama area might have been deposited by gravity flows in an outer apron of probably one and the same isolated carbonate platform. Furthermore the fairly long time ranges of the accompanying fusulinids indicate that the carbonate platform was probably sufficiently large to sustain shallow water limestone deposition for a long period of time from at least the Late Bashkirian to the Middle to Late Artinskian. The inferred platform of the present study, however, is not found in the Mino-Tamba-Ashio belt, Jurassic accretionary complex in Japan, and is thus termed here a "lost carbonate platform" (Fig. 4).

In spite of being the same age, the limestone within the Jurassic accretionary complex might have taken more time from formation to accretion than the same one within the Permian accretionary complex. Thus the present "lost carbonate platform" might have been in a more pelagic position than the limestones within the Permian accretionary complex in Panthalassa. The rich, diverse fauna of fusulinids from the "lost carbonate platform" of more pelagic location reported in the present study strongly suggest that further detailed study of similar limestone breccias within the Jurassic accretionary complex will enrich our knowledge of the fauna of fusulinids lived on the "lost carbonate platform" of more pelagic location in Panthalassa, and elucidate the global pattern of fusulinid distribution in Panthalassa.

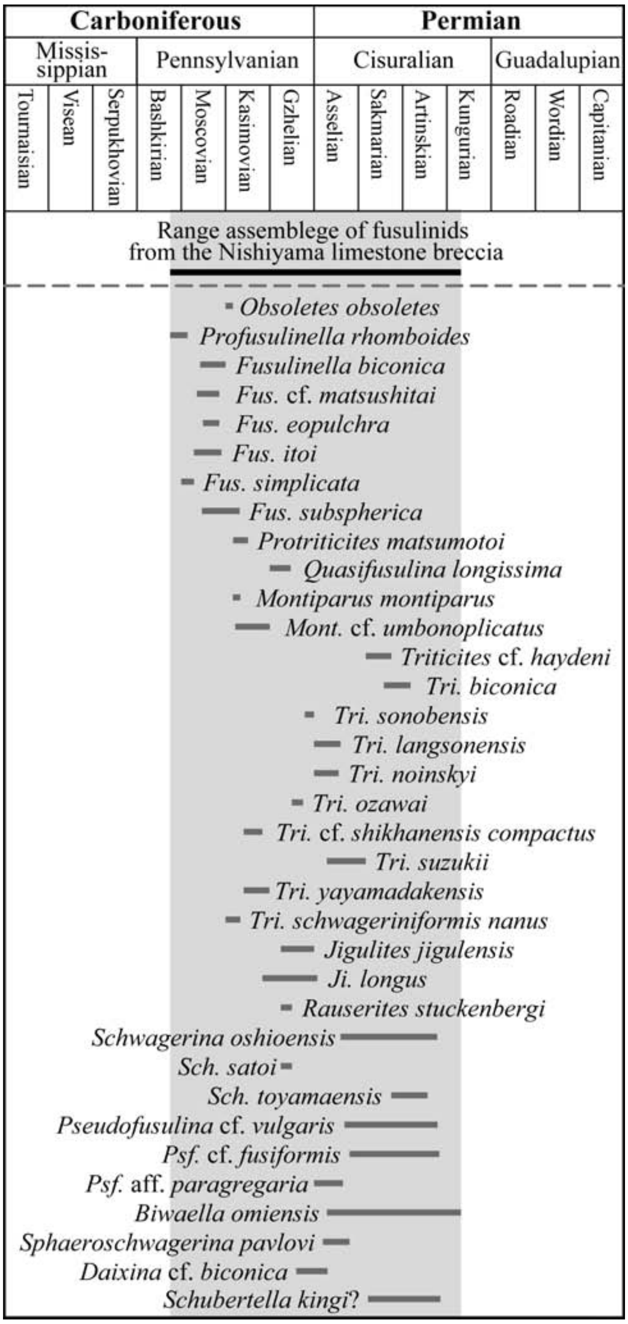


Fig. 2. Representative fusulinids from the Nishiyama limestone breccia, their known biostratigraphic range, and sedimentation time of "hinterland"

Gray lines denote biostratigraphic ranges of each fusulinid from the Nishiyama limestone breccia. Black line denotes range assemblage of fusulinids from the Nishiyama limestone breccias and sedimentation time of "hinterland" of the Nishiyama limestone breccias

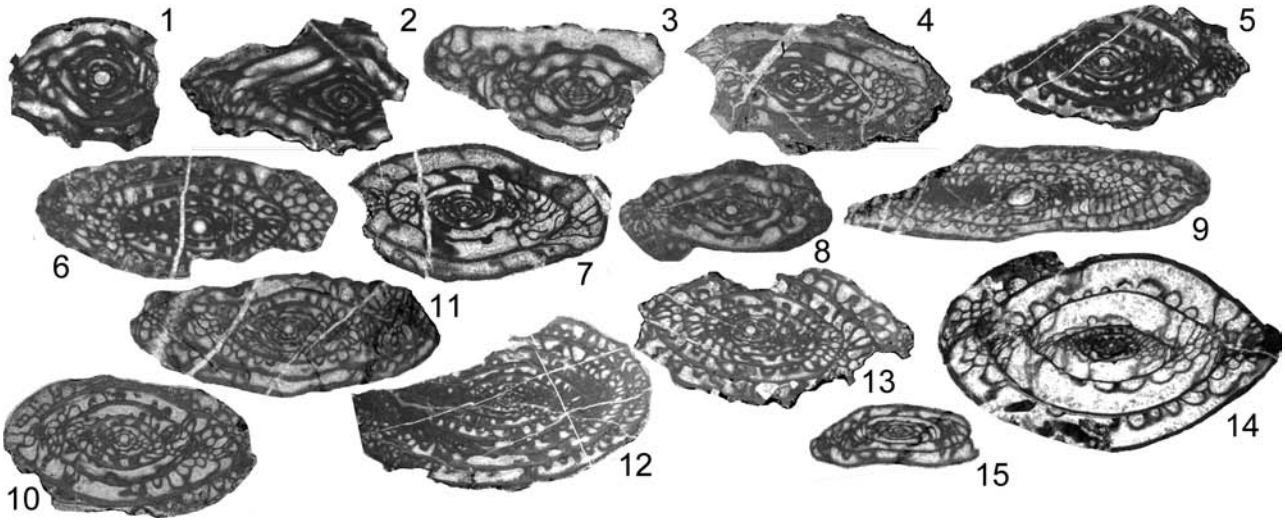


Fig. 3. Fusulinids from the Nishiyama limestone breccia

1 — *Profusulinella rhomboides* (Lee et al., 1930); 2 — *Fusulinella itoi* Ozawa, 1925; 3 — *Obsoletes obsoletes* (Schellwien, 1908); 4 — *Montiparus montiparus* ((Ehrenberg) sensu von Möller, 1878); 5 — *Rauserites stuckenbergi* (Rauser-Chernousova, 1938); 6 — *Jigulites jigulensis* (Rauser-Chernousova, 1938); 7 — *Protriticites motsumotoi* (Kanmera, 1955); 8 — *Triticites suzukii* (Ozawa, 1925); 9 — *Quasifusulina longissima* (von Möller, 1878); 10 — *Schwagerina satoi* (Ozawa, 1925); 11 — *Daixina* cf. *biconica* Rauser-Chernousova and Shcherbovich, 1958; 12 — *Schwagerina toyamaensis* Suyari, 1962; 13 — *Pseudofusulina* cf. *vulgaris* (Schellwien and Dyhrenfurth, 1909); 14 — *Sphaeroschwagerina pavlovi* Rauser-Chernousova, 1960; 15 — *Biwaella omiensis* Morikawa and Isomi, 1960. 1–3, 8, 15 — ×15; 4–7, 9–11, 13 — ×8; 12, 14 — ×5

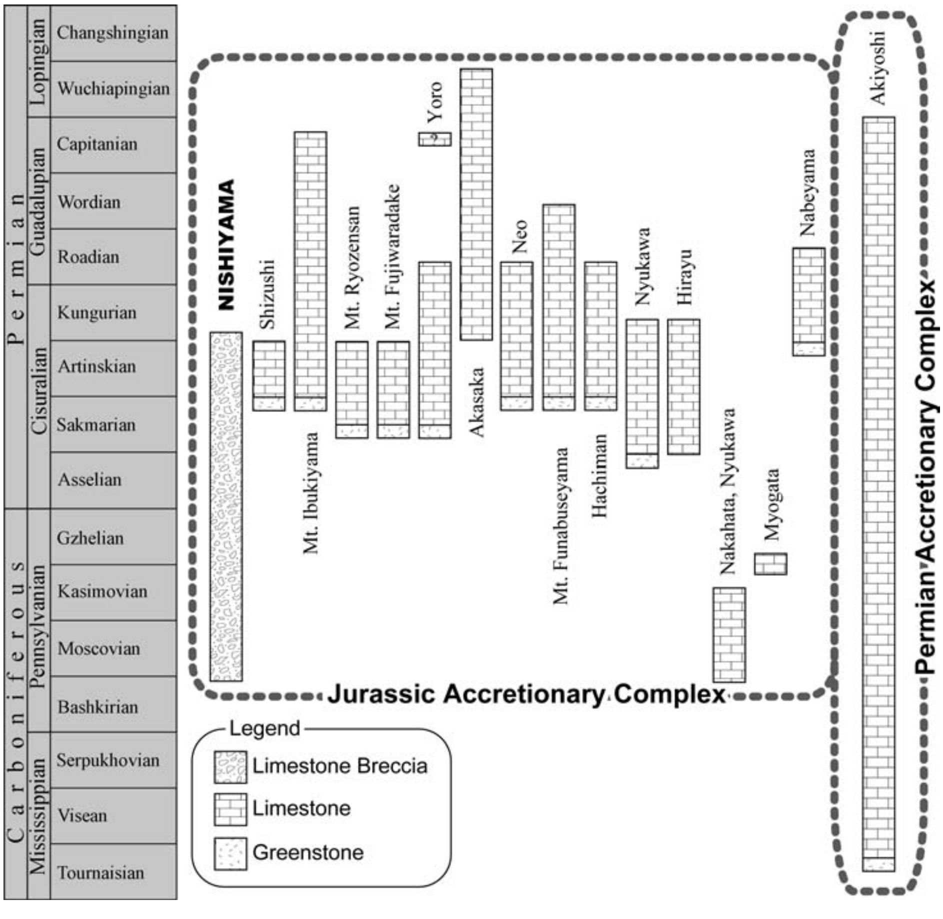


Fig. 4. Stratigraphic summary of representative Carboniferous-Permian pelagic shallow-marine carbonates and underlying basaltic rocks of the Mino-Tamba-Ashio belt and the Akiyoshi limestone Group of the Akiyoshi belt. After [Sano, Kojima, 2000], [Toriyama, 1967], Ozawa and Kobayashi [1990]

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