

Recognition of the Olenekian-Anisian Boundary Sequence from Ogama, Ashio Belt

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Pre-Jurassic pelagic sedimentary sequences are known to have accumulated in the pelagic Panthalassa over millions of years (Matsuda and Isozaki, 1991; Ando et al., 2001). These pelagic sequences are considered to preserve environmental record of the pelagic Panthalassa. However, spatial variations of pelagic sequences are not fully understood, due to the scarcity of well-preserved sequences. In order to face this problem, this study reconstructed the stratigraphic sequence ranging from Lower to Middle Triassic with high resolution at the Ogama section of the Ashio Belt, which is located in Tochigi, Japan (Kamata, 1996; Kamata 1997).

The section consists of three parts, which occur in separate outcrops; Og-A section, Og-B section and Og-C section. The boundaries of these outcrops were not directly observed, but the major difference in lithology suggests that these outcrops are in contact with faults. The Og-A section consists of approximately 2.5 m thick black claystone overlain by bedded chert. The Og-B section consists of alternating claystone and chert. Claystone in the Og-B section has two types: black claystone and grey siliceous claystone. The Og-C section consists entirely of bedded chert. Components of bedded chert are 1 to 10 cm thick chert beds and 2 to 25 mm thick intercalated claystone beds.

Age diagnostic conodonts were recovered from the Og-B section. Spathian conodonts indicating the *Triassospathodus homeri* zone (*Neospathodus homeri* zone; Koike, 1981), early Anisian conodonts indicating the *Chiosella timorensis* zone (*Neogondolella timorensis* zone; Koike, 1981), Middle Anisian conodonts indicating the *Neogondolella bulgarica* zone (Koike, 1981) were recovered. Radiolarian fossils were recovered from the Og-C section. Early-middle Anisian radiolarian *Triassocampe eruca* (Sugiyama, 1997) and late Anisian radiolarian *Triassocampe coronata* (Bragin) group were recovered.

The reconstructed stratigraphic sequence spans from upper Spathian of Lower Triassic to upper Anisian of Middle Triassic. The Spathian-Anisian boundary determined by the first occurrence of conodont *Ch. timorensis* is placed at the lower part of the Og-B section. The Lower to Middle Triassic pelagic sequence of the Ogama section has two important characteristics. One is the lithofacies change from claystone dominant facies of upper Spathian to bedded chert facies of middle Anisian. The other is the 4 m thick interval of black claystone and black chert, which spans from uppermost Spathian to lower Anisian.

Lower to Middle Triassic pelagic sequences are also exposed in other Jurassic accretionary complexes. A particularly well-studied sequence belongs to the Mino Belt, and is situated in the Inuyama area, Gifu, Japan. This area has been the target of intensive biostratigraphical examinations (Sugiyama, 1997; Yao and Kuwahara, 1997) and cyclostratigraphical researches (Ikeda et al., 2010). The comparison of the two pelagic sequences from the Ashio Belt and the Mino Belt revealed the common general trend of increasing chert content within the lower to middle Anisian interval. However, it is also noteworthy that the interval consisting of black claystone and black chert is remarkably thicker in the Ogama section than in the Inuyama area. Takahashi et al. (2009) indicated the uppermost Spathian interval consisting of black claystone and black chert in the Inuyama area is the result of an oceanic anoxia. The thicker interval at Ogama section may represent longer duration of this event, or a greater sedimentation rate during the event, at the depositional setting than that of Inuyama area. Further correlations by biostratigraphy and carbon isotope stratigraphy are required to compare the onset and offset timing of this event in both depositional settings. The comparison of timing between the two sections may reveal the cause of this regional difference in pelagic sequences.

Keywords: Ogama section, Ashio Belt, Olenekian-Anisian Boundary, Conodont, Radiolarian, Equatorial Panthalassa