

Constraint on the depositional environment of the Triassic-Jurassic stratiform manganese deposits in the Chichibu Belt, Southwest Japan

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Introduction

Stratiform manganese deposits have been known to occur in the Triassic to Jurassic cherts or chert-greenstone complex in the Chichibu Belt, Southwest Japan, which are considered to have accumulated in a mid-oceanic basin of the Panthalassa Ocean[1, 2]. To constrain the depositional environment of these manganese deposits, we describe the field occurrence, stratigraphy, and radiolarian age of chert-hosted manganese deposits from the Triassic to Jurassic bedded cherts succession of the Chichibu Belt, defined as a Jurassic subduction-generated accretionary complex in Japan.

Results and Discussion

The stratiform manganese deposits range in thickness from 80 to 150 cm, and occur intercalated in ribbon-bedded chert. The age of the manganese deposits is constrained by the presence of radiolarian fossils in the associated bedded chert. Our biostratigraphic analysis reveals that the stratiform manganese deposits occur intercalated within the Upper Triassic and Lower Jurassic bedded cherts. The red bedded chert above the manganese deposit can be correlated with the upper Carnian based on the radiolarian fossils, including *Trialatus longicornutus* and *Trialatus megacornutus*. Lower Jurassic manganese deposit occurs intercalated within the gray to dark gray bedded cherts. Detailed biostratigraphic analysis of radiolarians indicates that the manganese deposit is embedded in the upper Pliensbachian to Toarcian (*Mesosaturnalis hexagous* Zone - *Parashuum(?) grande* Zone). Chemical compositions of the Upper Triassic manganese deposits are characterized by the enrichment in Mn content and the depletions of Co, Ni and Zn and are similar to those of modern submarine hydrothermal manganese deposits. In contrast, the enrichments in Cr, Ni and Zn are recognized below the Lower Jurassic manganese deposits, suggesting an anoxic depositional environment. It is likely that the Lower Jurassic deposits are considered to have formed by an oceanic anoxic event, at the end of the middle Early Jurassic.

[1] Sato & Kase (1996) *Isl. Arc* **5**, 216-228. [2] Usui et al. (2015) *Univ. Tokyo Press*, 264.