

Magneto-biostratigraphy of the Upper Triassic to Lower Jurassic bedded chert succession from Inuyama area, central Japan: an improved method for measurement of red chert

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A number of radiolarian biostratigraphic studies of bedded chert successions from the Jurassic accretionary complex in Japan have been conducted since the late-1970s. Especially, Sugiyama (1997) reported a detailed radiolarian biostratigraphy from Triassic to Jurassic bedded chert sequence in the Inuyama area, central Japan. Several magnetostratigraphic studies have been also carried out on the same area. The bedded chert sequence is suitable material for establishment of bio-magnetostratigraphy because it covers a long time range and yields radiolarians and conodont. However it is usually difficult to identify the primary component of magnetization of the red chert due to secondary magnetization. Here, we present the improved method for measurement of red chert and the magneto-biostratigraphy established in exactly the same sections that Sugiyama in 1997 used as the type sections for his radiolarian biozones. The stratigraphic intervals from the Carnian to the Hettangian in his sections H, N, Q and R in the Inuyama area, central Japan were examined.

In total, 477 oriented hand samples (red cherts) were collected through the bedded chert succession at average sampling interval of ~30 cm: 42 horizons from the R section, 244 horizons from the Q section and 191 horizons from the H section. Each hand sample was cored and cut into cylindrical specimens (25 mm in diameter, 22 mm in length). To remove magnetic particles attached the surface of specimens, all specimens were polished with sandpaper and washed in a dilute hydrochloric acid. During demagnetization and measurement, we used a magnetic shielding box, a conductive glove and slipper to avoid the problem of VRM acquisition.

Magnetostratigraphic results delineate 20 substantive normal and reverse magnetozones, defined by measurement of 357 samples. Thermal demagnetization of a three-component IRM shows that the low-coercivity magnetization is unblocked at 580 °C and that the high-coercivity magnetization is demagnetized by 690 °C. Although the magnetostratigraphic data in the vicinity of the early-late Carnian boundary is the first record from the marine section, the magnetostratigraphy of samples in Carnian-Rhaetian interval was well correlatable with that of Tethyan marine sections. This correlation implies that the bedded chert of Inuyama area was deposited in the Northern Hemisphere, assuming that the rocks in the Tethyan marine sections were deposited in the Northern Hemisphere. The mean inclination of the last demagnetized component (primary remanent magnetization) suggests the bedded chert originated in an equatorial area through the Late Triassic. The intercalibrated conodont–radiolarian biostratigraphy and magnetostratigraphy from the studied sections accurately calibrates the radiolarian zones in Japan with standard chronostratigraphic stages and substages.

Keywords: magnetostratigraphy, Triassic, Mino Belt, chert, conodont, radiolarian