

# Carbon isotope stratigraphy and radiometric ages of the Upper Jurassic to Lower Cretaceous (Shishiori and Oshima groups) in Kesennuma-Oshima, Miyagi, Japan

\*Takumi Otsubo<sup>1</sup>, Reishi Takashima<sup>2</sup>, Azumi Kuroyanagi<sup>2</sup>, Toshiro Yamanaka<sup>3</sup>, Yuji Orihashi<sup>4</sup>, Yoshihiro Asahara<sup>5</sup>

1. Tohoku University, 2. The Tohoku University Museum, 3. Tokyo University of Marine Science and Technology, 4. Hirosaki University, 5. Nagoya University

Most of the GSSPs (Global Boundary Stratotype Section and Point) of the Uppermost Jurassic and Lower Cretaceous have not been defined because there are few fossils useful for international stratigraphic correlation on account of strong provincialism of fauna and flora during this period, and significant hiatus have been identified at the candidate sequences of GSSPs. In addition, numerical ages of the Lower Cretaceous stage boundaries are highly uncertain because of few radiometric ages derived from lack of volcanoclastic layers in the Lower Cretaceous sequence in European sections (e.g., Geologic Time Scale 2020). Consequently, integrated study of chemo- and biostratigraphy and radiometric dating of the Lower Cretaceous is important for improve Early Cretaceous Time Scale.

The Valanginian Stage is characterized by a prominent positive excursion of carbon isotope, named Weissert Event which have been identified various sections in the Tethyan and Boreal sections. The Weissert event is associated with the emplacement of the Paraná Etendeka Large Igneous Province, global cooling, and the drowning of shallow-marine carbonate platforms, and then could have caused a major impact on the ecosystem (Weissert et al., 1998; Erba and Tremolada, 2004; Möller et al., 2020). Therefore, the Weissert Event is important not only international stratigraphic correlation but also paleoenvironmental change during LIPs emplacement. Regardless the importance of the Weissert Event, it has not been found from the North Pacific region, including Japan.

The Nagasaki, Kogoshio and Kanaegaura formations, exposed in Kesennuma-Oshima, Northeastern Japan, are correlated with uppermost Jurassic to Lower Cretaceous based on radiolarian and ammonite stratigraphies. The former two sequences mainly consist of hemipelagic mudstone with intercalations of felsic to intermediate tuff, and the latter is composed of andesitic volcanic breccia. In order to identify the Weissert Event and obtain radiometric ages of the event, we analyzed  $\delta^{13}\text{C}$  values of bulk rocks and U-Pb zircon ages of tuffs and lava in the Nagasaki, Kogoshio and Kanaegaura formations. Our  $\delta^{13}\text{C}$  values of the studied sequences varied between -27.5‰ and -24.5‰, and a significant positive excursion of 2‰, correlative with the Weissert Event, was found in the middle part of the Nagasaki and Kogoshio formations, respectively. The age of  $136.1 \pm 1.0$  Ma was obtained 7-8 m below the Weissert Event while volcanic breccia from the basal Kanaegaura Formation exhibits  $126.2 \pm 1.5$  Ma. Our result was accord with the previous biostratigraphic correlation (Nara et al., 1994; Taketani, 2013), and the latest age model of Weissert Event proposed by Martinez et al. (2015).

## References

Erba and Tremolada, 2004, *Paleoceanogr.*, 19, PA1008. Gale et al., 2020, In Geologic time scale 2020, vol. 2 1023-1086. Martinez et al., 2015, *Glob. Planet. Chang.*, 131, 158-173. Möller et al., 2020, *Mar. Micropaleontol.*, 157, 101875. Nara et al 1994, *Bull. Fuku. Mus.*, 8, 29-63. Taketani, 2013, *Bull. Fuku. Mus.*, 27, 1-24. Weissert et al., 1998, *Palaeogeogr., Palaeoclimatol., Palaeoecol.*, 137, 189-203.

Keywords: carbon isotope ratio, U-Pb ages, Weissert Event

