

Bio- and chemo-stratigraphy and U-Pb ages of the Cretaceous sequence in Japan

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Most of GSSPs (Global Boundary Stratotype Section and Points) and their candidate sites of the Cretaceous stages are located in Europe where the stage boundaries are defined by the detailed biostratigraphy (e.g., Gale et al., 1996). Recent studies of integrated stratigraphy of microfossil, megafossil and carbon isotope of those sequences have greatly improved resolution of international stratigraphic correlation. However, few radiometric ages are determined from those sequences because of rare intercalations of volcanoclastic sediments. In order to understand detailed Cretaceous paleo-climatic changes, it is necessary to improve resolution of Cretaceous chronostratigraphic framework based on the radiometric dating.

The Yezo Group, accumulated at approximately 30-40 degree North along the Asian active continental margin in the north-western Pacific Ocean, ranges from Aptian to Paleocene in age and consists mainly of hemipelagic mudstone and turbidite sandstone. Total thickness of this sequence attains 10,000m. This sequence is suitable for establishment of Cretaceous chronostratigraphic framework because it yields abundant felsic tuffs and well preserved age-diagnostic marine macro and micro fossils.

In this study, we established integrated stratigraphies of planktic foraminifera and carbon isotope of wood fragments of the Yezo Group exposed in Tomamae, Yubari and Urakawa sections. Detailed correlation of integrated stratigraphy of planktic foraminifera and carbon isotope between the Yezo Group and European sequences enabled the determination of Cretaceous stage boundaries and oceanic anoxic events (OAEs) in the Yezo Group. The felsic tuffs of the Yezo Group are intercalated at or near stratigraphic datum levels and environmental events, such as Aptian/Albian, Albian/Cenomanian, Cenomanian/Turonian, Turonian/Coniacian, Coniacian/Santonian, Santonian/Campanian boundaries and OAE 1b, OAE1c, OAE1d. The U-Pb ages of these tuff beds are consistent with the inferred age-model of Geologic Time Scale 2012 (GST2012) within the margin of error concerning Aptian/Albian, Albian/Cenomanian, Cenomanian/Turonian, Turonian/Coniacian, Coniacian/Santonian boundaries. On the other hand, Santonian/Campanian boundary, OAE1c and OAE1d show discrepancy about 1 m.y. These discrepancies between this study and GST2012 may attribute to the scarcity of radiometric age of European sections. Therefore, determination of a large quantity of U-Pb age in the Yezo Group will greatly improve the resolution of Cretaceous chronostratigraphy.

References

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