A reassessment of the stratigraphy of the Cretaceous-Paleogene (K-Pg) transition interval at the Lord Howe Rise, southern Pacific

*Junichiro Kuroda[1,2], Saneatsu Saito[2], Yoichi Usui[2], Kyoko Hagino[3], KanHsi Hsiung[2], Masafumi MURAYAMA[3], Takuto Ando[4], Naohiko Ohkouchi[2]

1. Department of Ocean Floor Geoscience, Atmosphere and Ocean Research Institute, the University of Tokyo, 2. Japan Agency for Marine-Earth Science and Technology, 3. Center for Advanced Marine Core Research, Kochi University, 4. Arctic Research Center, Hokkaido University

The Lord Howe Rise is an elongate ribbon of submerged and extended continental crust that was separated from Australia during the Late Cretaceous. Deep Sea Drilling Project (DSDP) Leg 21 drilled on the Lord Howe Rise, and recovered Cenozoic and latest Cretaceous pelagic sediments at Sites 207 and 208. In this study we provide new geochemical, biostratigraphic and magnetostratigraphic data for the latest Cretaceous and the Paleocene sediments of the DSDP Site 208 (cores from 21-208-30R to 21-208-34R), to reassess the stratigraphy around the boundary between Cretaceous and Paleogene (K-Pg). The sediments are mainly composed of calcareous nannofossil chalk with an interval of siliceous mudstone and marlstone in the top 83 cm of the Core 21-208-33R, which was previously identified as the K-Pg transition zone. Both paleomagnetic data and calcareous nannofossil assemblages show that the sediment deposited nearly continuously from 550 to 590 meter below seafloor (mbsf), corresponding to ca. 62 through 68 Ma, respectively, with an average sedimentation rate of ~7 m/m.y. However, the sedimentation rate significantly dropped in the K-Pg transition zone, which was attributed to several hiatuses. Because radiogenic isotopic composition of osmium ($^{187}Os/^{188}Os$) of ocean water draws a unique and globally synchronous variation across the K-Pg boundary, it can be used as a stratigraphic correlation tool. Simply, the K-Pg boundary marks a very low $^{187}Os/^{188}Os$ value of <0.2 compared to the Maastrichtian (~0.5-0.6) and Danian (~0.4). Our $^{187}Os/^{188}Os$ data of sediment show a similar variation with the typical pattern of ocean water $^{187}Os/^{188}Os$ values from the Maastrichtian through Danian. More importantly, we found a siliceous mudstone sample with a low $^{187}Os/^{188}Os$ value of ~0.16. We propose that this sample represents the K-Pg boundary. However, paleomagnetic data suggest that this sample belongs to the chron C29N, substantially younger than the K-Pg boundary. In the presentation we will discuss the controversy, and further assess the stratigraphy around the K-Pg boundary.

Keywords: Cretaceous-Paleogene boundary, Os isotope, Lord Howe Rise

