Neogene Kuroshio variability and evolution of the North Pacific subtropical gyre

*Yusuke Okazaki[1]

1. Department of Earth and Planetary Sciences, Graduate School of Science, Kyushu University

The Kuroshio Current is a western boundary current located on the western edge of the North Pacific subtropical circulation. It transports numerous amounts of heat and materials from the equatorial Pacific to the mid-latitudes of the North Pacific. Changes in the Kuroshio Current flow path and strength under different climate must had a pronounced impact on the climate and environments in the North Pacific and surrounding regions. The Mid-Miocene Climatic Optimum (MMCO) is the one of the most remarkable Neogene warming event prolonged from 16 to 14 Ma. During MMCO, The Kuroshio Current flowed much more northward, which leaded marked expansion of subtropical circulation in the North Pacific, evidenced by terrestrial geologic records from the NW Pacific margin. Unfortunately, complete sedimentary sequence of MMCO in the western North Pacific has not yet obtained due to hiatuses distributed widely in the western North Pacific. We have re-established DSDP 296 biostratigraphy (calcareous nannofossils, planktic foraminifera, and radiolaria) and chemostratigraphy (strontium isotope ratios, and stable carbon and oxygen isotope ratrios) from the northern Kyushu-Palau Ridge near the Kuroshio Current flow path to reveal almost continuous sedimentation for the past 20 Myrs although the several drilling gaps. Re-drilling at site DSDP 296 will provide us a chance to recover complete sedimentary sequence including MMCO. Since late Miocene, earth’s climate has cooled down, intensification of the glaciation in the Northern Hemisphere during Pliocene, and leaded to an initiation of glacial-interglacial cycles. However, long-term Kuroshio Current variability responding to the above major climatic events are still poorly understood mainly due to lack of appropriate marine sediment samples. We would like to fill the gap by drilling new sediment cores along the western North Pacific margin such as the Benham Rise, Okinawa Trough besides the DSDP 296 site.

Keywords: Kuroshio, North Pacific subtropical gyre, Neogene

