

Numerical simulation about meandering Kuroshio in LGM

*Yoshimi Sugiyama¹, Minoru Ikehara², Hirohiko Nakamura³

1. Kochi University, Graduate School of Integrated Arts and Sciences, 2. Center for Advanced Marine Core Research, Kochi University, 3. Kagoshima University, Faculty of Fisheries, group of marine environment

The Kuroshio Current(KC) is the western boundary current of the North Pacific subtropical gyre. The KC has a role for transportation of heat energy to the subarctic zone from the tropical zone. The KC transports not only heat energy but also plankton, marine resources, and chemical substance, so the KC variation has a major influence on marine environment and climate change in the north Pacific region. At present, the variation of past KC is mainly reconstructed by proxy analysis from marine core on paleoceanography (e.g., Ujiie and Ujiie [1999], Ujiie et al. [2003], and Kawahata et al. [2003]), but each study (proxy analysis) showed different interpretations about the main route of the KC during the Last Glacial Maximum (LGM) in the Okinawa Trough, and the physical oceanographic approach for the past KC variability is significantly limited.

The main purpose of this study is to reconstruct the main pass of KC in the last glacial using a 3-D ocean model with global sea level change. The numerical simulation with realistic topography was performed using the 2003 version of the Princeton Ocean Model [Blumberg and Mellor, 1987] configured for the western North Pacific Ocean, domain in 5°N-55°N and 120°E-170°E, and horizontal resolution of 1.3/10° - 3.9/10°.

When the sea level drops at -120m for LGM, the KC passes through the Okinawa Trough, which is almost same route of modern KC. In addition, when the sea level is down, warm- and cold-core eddies tend to form frequency and become large scale in the Sikoku Basin, and the main route of the KC shows a large meander path. These results suggest that the KC became easily large meandering during the LGM because strengthen topographic closed around the Sikoku Basin by sea level drop.

Keywords: Kuroshio, Paleoceanography , Paleoclimatology