

Planktonic foraminiferal analysis of the Plio-Pleistocene sequence at IODP Site U1499: Response of the northern South China Sea environment to the intensity of the East Asian monsoon after Pliocene

*Mizuki Kitamura¹, Akira Furusawa¹, Hiroki Hayashi¹

1. SHIMANE University

The South China Sea (SCS) is a marginal sea located in the tropical zone of the western Pacific. The East Asian monsoon affects the climate system in this area by the prevailing seasonal winds. Such influence of the East Asian monsoon is expected to be stronger during the glacial period and weaker during the interglacial period. During the IODP Exp. 367, drilling of Site U1499 was conducted near the outer shelf of the northern SCS in 2017. As an onboard result of this site, sediments from Oligocene to Present were recovered and the upper sequence especially contains abundant foraminiferal fossils. Kitamura et al. (2018, JpGU) examined the planktonic foraminiferal assemblage of the stratigraphic interval from approximately 4 to 1 Ma at this site and reconstructed the water mass changes. As a result, they reported a remarkable increase of cold-water species at approximately 1.4 Ma. However, several previous studies on SCS indicated that a big change of planktonic foraminiferal assemblage occurred in the Mid-Pleistocene Transition (MPT). Recently, the age-depth model of the present site has been refined by an astronomical tuning study. Then, it needs further reevaluations of the significance of the planktonic foraminiferal change in the upper part of Site U1499. The purpose of the present study is to clarify temporal changes of the planktonic foraminiferal assemblage from approximately 5 Ma to present and evaluate the coastal upwelling in the northern SCS associated with the intensity of the East Asian winter monsoon associated with the glacial-interglacial changes. As a preliminary result, 85 species belonging to 19 genera of planktonic foraminifera were detected from 30X-7W to 12H-1W (ca. 4.55 to 1.17 Ma). According to multivariate analyses of the foraminiferal assemblage, we determined the temporal change into four stages: Stage A (ca. 4.5 to 4.0 Ma), Stage B (ca. 3.3 to 2.5 Ma), Stage C (ca. 2.0 to 1.5 Ma) and Stage D (ca. 1.5 to 1.2 Ma). The species composition of Stage A implies that the oceanographic condition of that time was characterized by highly stratified ocean. At the next Stage B, the thermocline was deepened and SCS was occupied by a subtropical oligotrophic water. In turn, relatively cold components of planktonic foraminifera were increased during the Stage C. This change might correspond to the global cooling of the Pliocene and Pleistocene boundary. After that, the Stage D is characterized by alternative changes between subtropical surface components and cold-temperate components caused by the glacial-interglacial changes.

Keywords: South China Sea, East Asian monsoon, Planktonic foraminifera, International Ocean Discovery Program