

An insight into the area characteristic of seasonal change in nitrogen isotope ratio based on a marine nitrogen isotope model

*吉川 知里¹、重光 雅仁¹、山本 彬友¹、岡 顕²、大河内 直彦¹

*Chisato Yoshikawa¹, Masahito Shigemitsu¹, Akitomo Yamamoto¹, Akira Oka², Naohiko Ohkouchi¹

1. 海洋研究開発機構、2. 東大大気海洋研

1. JAMSTEC, 2. AORI

The condition of nitrogenous nutrient in the surface water is an important factor that determines the primary production and the carbon cycle in the ocean. Nitrogen isotope ratios ($\delta^{15}\text{N}$) of nitrate, sinking particles, sediments have been widely used as a proxy for the condition of nitrogenous nutrient in the surface water. However, the interpretation of $\delta^{15}\text{N}$ values are not simple. The $\delta^{15}\text{N}$ value of surface primary producer records $\delta^{15}\text{N}$ value of nitrate supplied to the euphotic layer, nitrate utilization efficiency and rate of N_2 fixation. As there are multiple possibilities for the interpretation, $\delta^{15}\text{N}$ values should be interpreted with ample consideration of the characteristics of surface nitrogen cycle by region. In this study we show the area characteristic of seasonal change in $\delta^{15}\text{N}$ value by using a global ocean nitrogen isotope model in order to improve the interpretation of observed $\delta^{15}\text{N}$ values. We installed a marine nitrogen isotope model (Yoshikawa et al., 2005) with denitrification (Shigemitsu et al., 2016) and N_2 fixation (Coles et al., 2007) schemes into an off-line biogeochemical model that is driven by climatological monthly mean physical fields obtained from the outputs of a preindustrial control simulation performed with MIROC 3.2 (K-1 Model Developers, 2004). The simulated $\delta^{15}\text{N}$ of sinking particles had a global distribution similar to the observed $\delta^{15}\text{N}$ of surface sediments (Tesdal et al., 2013). The simulated sinking particles were enriched in ^{15}N in the eastern and western tropical North Pacific and the Indian Ocean where water column denitrification occurs and were depleted in ^{15}N in the Sargasso Sea, the Kuroshio extension region, and the Indian Ocean where N_2 fixation occurs. The seasonal variations in $\delta^{15}\text{N}$ of sinking particles vary considerably from one region to another. In this talk, we will report the seasonal $\delta^{15}\text{N}$ patterns categorized by region and the factors in the determination of those seasonal patterns.

キーワード：海洋窒素循環、窒素同位体比、海洋生態系モデル

Keywords: Marine nitrogen cycle, Nitrogen isotope ratio, Marine ecosystem model