

Determination of nitrogen isotopic baseline in western north Pacific Ocean using compound specific isotope analysis of amino acid

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Nitrogen stable isotope value ($\delta^{15}\text{N}$) has been widely used in food web studies in marine ecosystem, but also it provides information of source of inorganic nitrogen and N cycle. In particular, the $\delta^{15}\text{N}$ of individual amino acid of consumer is used as proxy of inorganic nitrogen source due to negligible differences in the $\delta^{15}\text{N}$ of source between consumer and diet. In this study, zooplankton was sampled in 16 stations including the western North Pacific, Bering Sea and Chukchi Sea in summer season, in order to determine nitrogen isotopic baseline using $\delta^{15}\text{N}$ value of source amino acid.

Even though the significantly increased $\delta^{15}\text{N}$ values of bulk tissue in zooplankton (*Calanus sp.*) compare to those of source amino acid (phenylalanine) were due to the trophic information in bulk tissue, similar spatial distributions of both $\delta^{15}\text{N}$ values were indicating that $\delta^{15}\text{N}$ baseline of bulk tissue is related to that of phenylalanine. The $\delta^{15}\text{N}$ value of phenylalanine was intensively depleted in western North Pacific than the Bering Sea and Chukchi Sea and close to the $\delta^{15}\text{N}$ value of the N_2 fixation. These low $\delta^{15}\text{N}$ values were well correlated with size dependant chlorophyll result, which is dominant size were pico (smaller than $2\mu\text{m}$) plankton.

Consequently, we found the enhanced N_2 fixation in the in western North Pacific in summer season, and suggest that $\delta^{15}\text{N}$ value of phenylalanine in zooplankton (*Calanus sp.*) should be a possible tracer for nitrogen isotopic baseline.