

Nitrogen source and trophic dynamics of calanoid copepod *Calanus* spp. in the northwest Pacific and subarctic Ocean

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Zooplankton plays a key role in transferring from the photosynthetic energy to higher trophic level organisms through the marine food web. However, zooplankton community structures and trophic position would be strongly affected by varying ocean environments under changing climate. Compound-specific isotope analysis of AAs (amino acids) has been used as a powerful tool to calculate TPs (trophic positions) by comparing trophic enrichment and nitrogen baselines as trophic and source AAs in a single consumer tissue, providing improved precision of the TPs. In this study, carbon and nitrogen isotopes of amino acids in calanoid copepod *Calanus* spp. as a cosmopolitan zooplankton were measured to investigate their trophic variability and nitrogen sources in the region marine plankton ecosystem from the western North Pacific to the Pacific Arctic Ocean. Stable isotope fingerprinting was applied to understand the latitudinal distribution of basal sources recorded in $\delta^{13}\text{C}$ of essential AAs. As a result, *Calanus* spp. in tropical and subtropical Pacific showed a relatively larger proportion of N_2 fixer and heterotrophic bacteria accounting for average 52.3%. In contrast, the dietary contribution of eukaryotic phytoplankton reached over 70% of the total in the Bering Strait and southern Chukchi Sea, regardless of their trophic variability (around 2 to 3) along the latitude. In addition, $\delta^{15}\text{N}$ of DIN in the study sites were calculated by the combination of carbon and nitrogen isotope of AAs. The estimated nitrogen isotope values of DIN suggest the significant contributions of biologically fixed nitrogen to the plankton ecosystem.