Combining isoscapes and segmental isotope analysis of vertebrae to study the movement of fishes

I.TAYASU[1*], Y. KATO[1], H. KAMAUCHI[1], C. YOSHIMIZU[1], J. MATSUBAYASHI[2], Y. OSADA[3], Y. SAITOH[4], K. SHIN[1], T. NAKANO[1,4], H. TOGASHI[5], Y. KURITA[5]

[1]Research Institute for Humanity and Nature, Kyoto, 603-8047 Japan (*correspondence: ichirotayasu@chikyu.ac.jp)
[2]Japan Agency for Marine-Earth Science and Technology, Kanagawa 237-0061 Japan
[3]Tohoku University, Miyagi 980-8577 Japan
[4]Waseda University, Tokyo 169-8050 Japan
[5]Tohoku National Fisheries Research Institute, Miyagi 985-0001 Japan

Stable isotope ratios of elements, together with the concentrations, can trace the matter flow through the environment. Spatiotemporal distribution of isotope ratios, which is called an isoscape, can be used for studying earth systems, ranging from local to global scales [1]. Each isotope indicates each environmental condition, allowing the multiple isotope ratios to form more reliable indecies of the local condition.

Recently, segmental isotope analysis of vertebrae in teleost fishes has been established to reconstruct the "retrospective" isotope values of the fish [2, 3]. The method is valuable in estimating the change in the diet along the ontogenic growth. To date, carbon, nitrogen and sulfur isotope ratios have been analyzed to demonstrate the utility of the method, however, it is potentially applicable to various analyses, including the nitrogen isotope ratios of individual amino acids in separating the trophic position and the source value [4, 5].

At this presentation, we discuss the applicability of the method in natural populations.

[1] Bowen (2010) *Annu. Rev. Earth Planet. Sci.* **38**, 161–187. [2] Matsubayashi *et al.* (2017) *Methods Ecol. Evol.* **8**, 1755–1763. [3] Matsubayashi *et al.* (2019) *Limnol. Oceanogr.: Methods* **17**, 87–96. [4] Ohkouchi *et al.* (2017) *Org. Geochem.* **113**, 150–174. [5] Ishikawa *et al.* (2018) *Limnol. Oceanogr.: Methods* **16**, 607–620.