

## The seasonal isotopic record of Antarctic bivalve shell

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Stable carbon and oxygen isotopic analysis of bivalve *Laternula elliptica* (King and Broderip, 1831), collected from the shallow waters around the Langhovde, Northern part of the Sôya Coast, East Antarctica, shows oscillatory variations, that record seasonality in the polar shallow marine environment. Oxygen isotopic compositions of the carbonate skeletons are mainly controlled by seawater temperature and marine salinity. In Antarctica, seasonal variation of seawater temperature is minimum (-2 to 2 °C; at Langhovde), on the other hand, salinity can change considerably by the inflow melt water, having extremely low oxygen isotopic composition (-30 to -45‰). We estimated the amount of the melt water inflow by isotopic analysis and compared with Recent and fossil *Laternula elliptica* shells. The oxygen isotopic results indicate a significant impact of melt water in fossil shell than the Recent one, and substantiates the potential application of oxygen isotopic records in *Laternula elliptica* as a proxy of paleo-inflow meter of melt water.

We present here a high resolution micro sampling technique for isotopic analysis in order to reconstruct the paleo-seasonality in Antarctica. Samples were cut from the prismatic layer of shell at intervals of 300 µm (5 times resolution than previous study).

The  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  values of Recent shell show an ordered oscillatory variations, which correspond Antarctic seasonality. The wavelength of oscillation decreases with shell growth, a trend consistent with growth rate. The amplitude of oxygen isotope oscillation remains approximately constant, however, that of carbon isotope become narrow similar to the variation observed in wavelength. This suggests that carbon isotopic compositions of shell are more controlled by the physiological parameters "so called vital effects" rather than environmental factors.

Whereas,  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  values of fossil shell indicate no oscillatory variation, they show distinct negative correlation. The causes for such opposite trends are discussed, and the possibility of using *Laternula elliptica* shell as a proxy of antarctic seasonality is examined.

## Concentration levels of rhenium in Japanese river waters

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### Trace-level Re determination by Q-ICP-MS

Rhenium is one of the least abundant metals in the earth's surface and its concentration in environmental samples is not well known. We have developed a simple separation method using an extraction chromatographic resin (TEVA resin, Eichrom Industry Inc.) for Re determination in terrestrial water by quadrupole inductively coupled plasma mass spectrometry (Q-ICP-MS). Using the method, Re concentration in water samples collected at 56 points of 6 rivers in Japan were measured. The average chemical recovery for Re was  $97.4 \pm 3.4\%$ , and the detection limit by the method was 0.02 ng/L when 100 mL of river water was applied.

### Results and discussion

The Re values ranged from 0.71 to 17.8 ng/L with the average of 2.8 ng/L and were within the reported values. High values, >10 ng/L, were observed for the samples that had high salinity, apparently affected by seawater. Figure 1 shows the result for Naka River plotted against the distance from the mouth of the river. The concentrations of Mn ( $\mu\text{g/L}$ ) and  $\text{SO}_4^{2-}$  (mg/L) are also plotted.

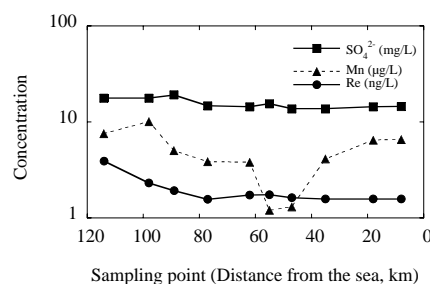


Figure 1: Re, Mn and  $\text{SO}_4^{2-}$  in Naka River, Japan.

Although Re is a member of Group VIIb, there was no correlation with Mn, possibly because the sources and the dissolution forms in river waters are different from each other. Besides, the Re values showed no correlation with the river characteristics, such as pH, EC, major ions and 40 elements concentrations except  $\text{SO}_4^{2-}$  ( $r=0.71$ ). The high correlation with  $\text{SO}_4^{2-}$  would be influenced by dissolution conditions of the elements or chemicals.

### References

Uchida, S., Tagami, K. and Saito, M., (2003), *J. Radioanal. Nucl. Chem.* **255**, 329-333.