

泥盆紀腕足動物化石殼體穩定碳氧同位素之環境意義初探

Devonian paleoenvironment inferred from the $\delta^{13}\text{C}$ and $\delta^{18}\text{O}$ isotope
compositions of brachiopod shells—a pilot study

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Global climate change, either warming or cooling, is one of the main focuses in earth science researches. From Devonian to Carboniferous, the atmospheric CO_2 concentration has been estimated to reduce from roughly 15 times of present concentration to present level. The possible change in the atmospheric CO_2 concentration could influence the seawater temperature and the $\delta^{13}\text{C}$ of dissolved inorganic carbon of seawater. These kinds of environmental records can be recorded in the stable oxygen and carbon isotope compositions of marine carbonate formed in the contemporaneous ocean.

Theoretically carbon isotope in carbonates can record contemporaneous water mass information, such as global carbon budget and oxygen isotope of carbonates may respond to the seawater temperature, the salinity of water mass, and the continental ice volume change. However, original stable isotope compositions and chemical contents of carbonates are prone to alteration by diagenesis. Therefore, before we utilize the stable isotope and chemical contents of ancient carbonates for the paleoenvironmental interpretation, we need to examine the preservation status of the samples carefully.

The purpose of this summer project is to preliminarily examine the preservation status of some Devonian brachiopod shells and see if they can be further studied for reconstruction of the Paleozoic environments. Student participates in this project will get a chance to make thin sections of samples, examine fossil thin sections using a petrographic and cathodoluminescence microscope, and performed isotope analyses.