Goldschmidt 2026 Abstract
https://doi.org/10.46427/gold2026.35761

Reconstructing stable strontium isotope records of the Middle Ordovician carbonate rocks.

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Improved analytical methods have enabled high-precision measurements of stable Sr isotopes ($^{88/86}$Sr), providing new insights into global geochemical cycles. Compared to radiogenic Sr isotopes, stable Sr isotope ratios are a useful proxy for understanding marine carbonate precipitation and its role in the global Sr and C cycles [1, 2].

The goal of this study is to provide a high-resolution stable Sr isotope record of the Middle Ordovician carbonate rocks of the Sino-Korean Block. Carbonate samples were collected from the Taebaek Group in the central-eastern Korean Peninsula, which preserves the Middle Darriwilian Isotopic Carbon Excursion (MDICE) [3]. To identify the leaching method that best reflects the primary carbonate signal, we applied a sequential leaching procedure to carbonate reference materials (JLs-1, JDo-1, and NIST SRM 1d). Notably, as $^{88/86}$Sr values for NIST SRM 1d have rarely been reported, we provide new stable Sr isotope data for this standard to assess analytical accuracy and reproducibility.

Sr isotope ratios were measured by MC-ICP-MS (Thermo Fisher Scientific Neptune Plus) at the Korea Institute of Geoscience and Mineral Resources (KIGAM). Our results for the carbonate standards are consistent with previously reported ^{87}Sr/^{86}Sr and $^{88/86}$Sr values. Preliminary data from the Darriwilian sample yield a $^{88/86}$Sr value of 0.068±0.035‰, which overlaps with the reported $^{88/86}$Sr range of Darriwilian brachiopods (0.093-0.160‰) within analytical uncertainty [4]. Ongoing high-resolution analysis will further clarify variations in stable Sr isotopes during the Middle Ordovician.

[1] Paytan et al. (2021) *Science*, 371, 1346-1350.

[2] Wang et al. (2023) *Nature*, 615, 265-269.

[3] Bang and Lee (2020) *Palaeogeography, Palaeoclimatology, Palaeoecology*, 541, 109534.

[4] Vollstaedt et al. (2014), *Geochimica et Cosmochimica Acta*, 128, 249–265.