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# Lithium isotope evidence for enhanced weathering during MDICE

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Silicate weathering is critical in regulating long-term climate change by removing atmospheric $CO_2$ [1]. Lithium isotopes are used as a proxy for silicate weathering, because lithium is concentrated in silicate rather than carbonate minerals and is not biologically fractionated [2]. Therefore, the lithium isotopic composition of past seawater can help reconstruct paleoclimate and paleo-environment [3,4]. In this study, we extracted $\delta^7Li_{SW}$ data from Middle Ordovician sedimentary rocks of the Sino-Korean block in the equatorial peri-Gondwana region [5]. The samples are shallow platform carbonate rocks, for which the middle Darriwilian carbon isotope excursion (MDICE) has been documented [6]. Care was taken to selectively dissolve the carbonate minerals in the samples, as silicate minerals possess a distinctly different isotopic composition than carbonates. The major element concentrations and lithium isotopic compositions were analyzed by Agilent 8900 ICP-QQQ at Seoul National University and Nu Plasma 3 MC-ICPMS at University College London. We applied geochemical filters (Al/Ca, Li/Ca, Mn/Ca, Mg/Ca) to identify silicate mineral leaching [7,8], and three of the 14 samples were excluded. For lithium separation, a single-column method was used as default, and a two-column method was used for samples with a high Na/Li ratio. Lithium isotopic ratios of standard reference materials after the column procedure (NASS-7 = 31.0 ± 0.4 ‰, L-SVEC = 0.3 ± 0.5 ‰) agree well with the published values. The data show a slight decrease in $\delta^7Li_{SW}$ during MDICE and a negative excursion of -9.7 ‰ at the end of MDICE. Sr isotopes of total sedimentary rocks are being analyzed and additional interpretations will investigate the paleo-environmental causes and consequences of the changes during the middle Ordovician.

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